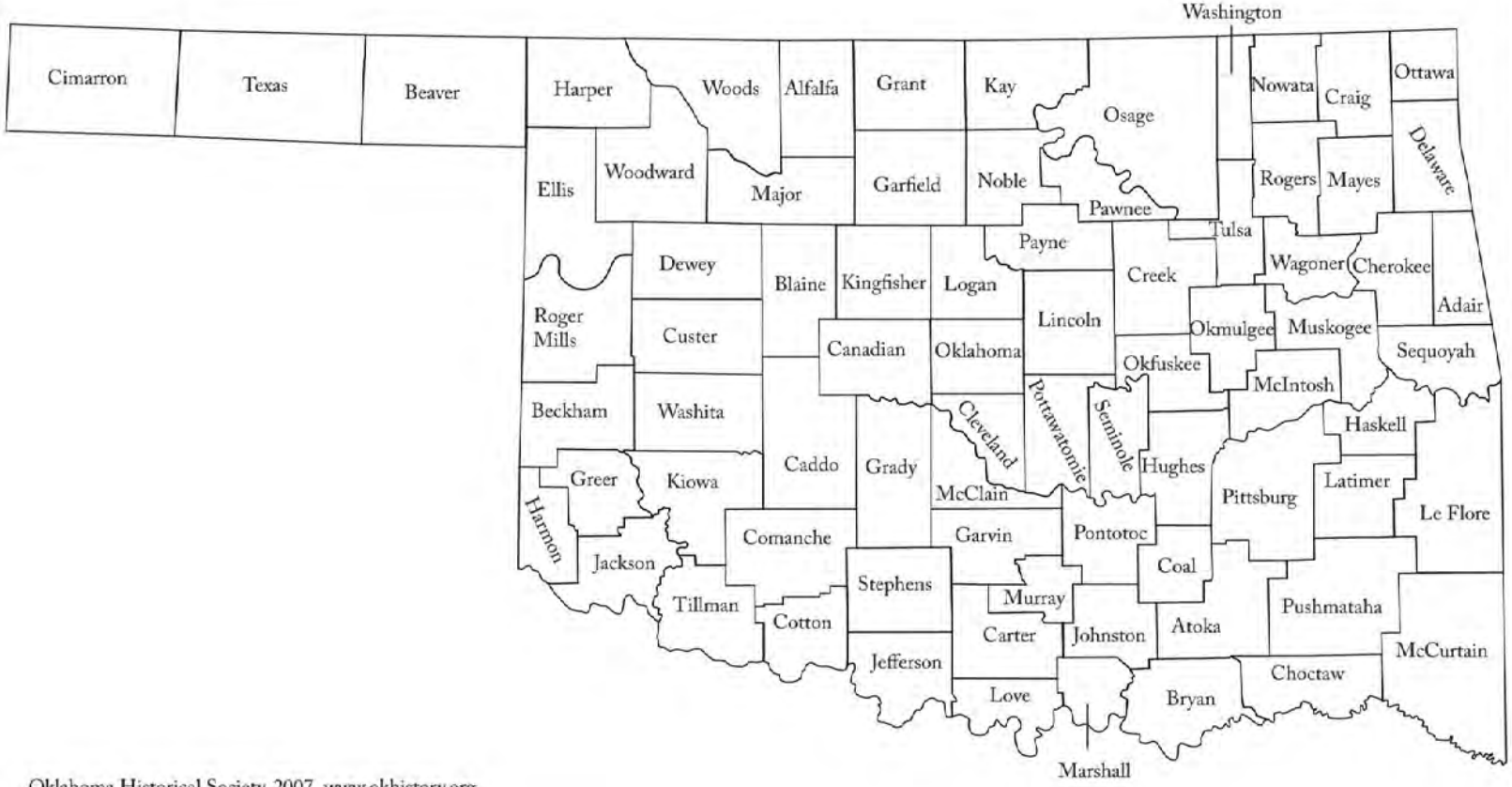
FLORA OF OKLAHOMA

KEYS AND DESCRIPTIONS

2nd Edition



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FLORA OF OKLAHOMA

KEYS AND DESCRIPTIONS

2nd Edition

by

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Cover illustration of Oklahoma Penstemon (*Penstemon oklahomensis*) by Katy Levings

Oklahoma City, Oklahoma

PREFACE

The flora and vegetation of Oklahoma are strongly influenced by the state's location in the southern plains of the United States. The geology of this region is dominated by extensive beds of Paleozoic sedimentary rocks, mostly overlain by deep alluvial and aeolian deposits and tilted along an east-west axis. The interior location creates a strongly seasonal temperate climate influenced by the Gulf of Mexico to the southeast and the rain shadow of the Rockies to the west. Together these factors create diverse vegetation that includes temperate deciduous forests, grasslands, and semi-arid woodlands and shrublands.

Climate—Oklahoma is located at the southern edge of the temperate, continental climate zone, bordering on the sub-tropical zone. Seasonal and daily temperature fluctuations are great, with long, hot summers and short mild winters over most of the state, with occasional, brief periods of extreme cold. The annual mean temperature across the state is 15.5˚C (60˚F). The average growing season ranges from only 171 days in the far northwest to 215 days in the southeast. Because of the combined effects of latitude and elevation (the state is tilted with the highest elevations at the western end of the Panhandle and the lowest in valleys along the eastern border), there is a temperature gradient with highest mean temperatures in the southeast and lowest in the northwest. The most conspicuous and dramatic aspect of the climate is the strong precipitation gradient along the state's long east-west axis, with the greatest precipitation found in the southeast. The gradient is driven by the combined effects of the proximity of the southeastern corner of the state to the Gulf of Mexico, the source of Gulf Stream moisture, and the gradually diminishing effect of the rain shadow of the Rocky Mountains from west to east. Mean annual rainfall ranges from 43 cm (17 in) in the western panhandle to 142 cm (56 in) in the southeast. However, annual variation in precipitation is dramatic, characterized by multi-year cycles of extreme drought and extreme rainfall. Snowfall is rare across most of the state, except for the Panhandle.

Geology—Much of Oklahoma consists of rolling plains with relatively few mountainous areas. The state is situated largely in the southern Great Plains, but includes the western edge of the Ozark Plateau, the northwestern edge of the Gulf Coastal Plain, and an extreme eastern outpost of the foothills of the Rocky Mountains. There are numerous rivers, but few with large and continuous flows. The sources of the Arkansas, Cimarron, and Canadian Rivers are in the Rocky Mountains or their foothills, whereas the Washita and Red Rivers originate on the high plains. The largest of these is the Arkansas River, which enters the eastern part of the state from Kansas and exits into Arkansas between the Ozark and Ouachita Mountains. There are no large, natural lakes, but numerous reservoirs. Elevation ranges from a low of 88 m (289 ft), where the state line crosses the Little River in the southeast, to 1516 m (4974 ft) atop Black Mesa near the state line, at the western end of the Panhandle. The major mountain ranges are the Ozarks and Ouachitas, which extend into the eastern part of the state from Arkansas and Missouri, and the Arbuckles and Wichitas, which were uplifted as major fault blocks and are contained entirely in the south-central and southwestern parts of the state, respectively.

By far the most common rock type in Oklahoma is sedimentary, with relatively limited occurrences of volcanic and metamorphic rocks. The rolling plains that make up most of the western two-thirds of the state are underlain by Permian sedimentary rocks, most commonly red shales and sandstones. Gypsum beds are common, capping hills and mesas where the bedrock is exposed. Limestone is less common. Much of this area is overlain by Neogene and Quaternary sedimentary and aeolian deposits along rivers. Sedimentary rocks are also the primary constituent of the uplifted Ozark and Ouachita Mountains of the eastern one-fourth of the state. However, these are older, Carboniferous-aged limestones, sandstones, and shales. Together, the Permian and Carboniferous sedimentary rocks and their overlying sediments cover the great majority of the land. A sliver of the Gulf Coastal Plain is present in southeastern Oklahoma north of the Red River, covered by Cretaceous sediments. Two isolated mountain ranges contain older formations. The Arbuckle Mountains consist largely of Silurian and Devonian limestones and the Wichita Mountains are composed of even older Cambrian granite, the largest outcropping of ancient igneous rocks in the state. Extrusive igneous rocks are uncommon, with the only large exposure forming the Neogene-aged Black Mesa, which just enters the Oklahoma Panhandle from New Mexico.

Vegetation—Precipitation, geology, and fire are the strongest influences on the vegetation of Oklahoma. This is reflected in the classification systems of Oklahoma's ecoregions and vegetation types. The US EPA recognizes 15 major ecoregions in North America, and two of these are present in Oklahoma. The northwestern three-fourths of the state are included in the Great Plains ecoregion and the southeastern one-fourth in the Eastern Temperate Forest.

Similarly, the most common natural vegetation types in the state are grasslands, followed by forests and woodlands. Much of the Great Plains ecoregion is covered by mixed-grass prairies, with smaller areas of short-grass prairie in the Panhandle and tall-grass prairie in northeastern portion of the region. However, the Great Plains ecoregion also includes the broad irregular transition to forest across much of the central portion of the state. This transition zone consists of a patchwork of mixed-grass and tall-grass prairie vegetation with a short-statured, species-poor oak-hickory woodland widely known as the Cross Timbers. The Great Plains also consists of conifer woodlands on the slopes of Black Mesa and on surrounding hills that are outposts of the pinyon-juniper woodlands of the foothills of the Rocky Mountains. Other restricted vegetation types in the Great Plains ecoregion include sage-dominated and oak-dominated shrublands on sandy soils, mesquite-dominated woodlands, and halophytic vegetation in the Salt Plains and on playas.

The Cross Timbers gradually grade into the Eastern Temperate Forest ecoregion along an amorphous line running roughly from Durant to Miami. Continuous extents of diverse forest occur primarily in the Ozark and Ouachita Mountains. These are largely oak-pine-hickory forests with short-leaf pine the only naturally occurring pine throughout much of the region. However, loblolly pine occurs naturally in southern slopes of the Ouachita Mountains, has been extensively planted by the forest industry, and now occurs across the entire region. Another common conifer species in these forests is eastern red-cedar. Eastern red-cedar becomes increasingly conspicuous in the Cross Timbers, where its abundance has dramatically increased in response to fire suppression. The increase in red-cedar highlights the important role of fire in controlling the ecotone between forests and grasslands, especially in the Cross Timbers transition that runs through a broad swath of Oklahoma. In the absence of fire, grasslands become invaded by woody species (mostly natives in our state) and over time will become forests, pushing the ecotone to the west and filling in the prairie openings of the Cross Timbers.

Flora—The documented flora of Oklahoma consists of 3,737 native and naturalized taxa, including subspecies and varieties. The most species-rich families in the flora are the same as those of most other floras from the temperate region of the Northern Hemisphere. These are Asteraceae, Poaceae, Fabaceae, Cyperaceae, Rosaceae, Brassicaceae, and Lamiaceae. The largest genera include *Carex*, *Cyperus*, and *Eleocharis* (Cyperaceae), *Oenothera* (Onagraceae), *Eragrostis* (Poaceae), *Solidago* and *Symphyotrichum* (Asteraceae), *Quercus* (Fagaceae), *Juncus* (Juncaceae), *Euphorbia* (Euphorbiaceae), and *Asclepias* (Apocynaceae). The only federally listed Threatened or Endangered plant species in Oklahoma are Great Plains white fringed orchid (*Platanthera praeclara*) and piedmont mock bishopweed (*Harperella nodosa*, or *Ptilimnium nodosum* by some authors). There are only a few species, subspecies, or varieties that have been considered endemic to the state, and these have been questioned taxonomically. Knowledge of the flora is uneven across the state. Several counties and numerous state parks, conservation areas, and wildlife management areas have been surveyed for plant occurrences. The areas of the state that have received the least attention from plant collectors are the eastern Panhandle and adjacent counties, and other counties of western Oklahoma, particularly the southwestern counties. Knowledge of the flora of Oklahoma improves daily with new state records of native and, more commonly, non-native species occurring several times a year.

Studies of Oklahoma's Flora—As might be expected, this diverse flora has long been of interest to taxonomists and our knowledge of it is the result of contributions by numerous explorers, surveyors, botanists, taxonomists, and academicians for more than 450 years (see Tyrl and Shryock 2013). Some individuals merely recorded their observations of the flora as they passed through, whereas, others collected plants, made systematic surveys of distinctive ecogeographic areas, or prepared treatments of different plant groups such as grasses and ferns. We traditionally cite the doctoral dissertation submitted to Harvard University by G.W. Stevens in 1916 as the first formal floristic study of the state's plants. Never formally published, his treatment included keys and generic descriptions, but lacked descriptions for the more than 1,600 listed species. In 1929, T.R. Stemen and W.S. Myers published a ***Spring Flora of Oklahoma with Keys*** which was followed by their more comprehensive ***Oklahoma Flora*** in 1937. In the latter book, they treated 147 families, 640 genera, and 1,626 species; however, they did not include the graminoid families Poaceae, Cyperaceae, and Juncaceae. Illustrations accompanied abbreviated descriptions of families, genera, and species. Taxonomic treatments of portions of Oklahoma's flora were prepared by G.J. Goodman and D.A. McCoy. In 1958, Goodman published ***The Spring Flora Of Central Oklahoma***. As the title indicates, the treatment was restricted both for area and season. ***A Study of Flowering Plants*** was published by McCoy in 1968. It is a treatment providing descriptions of the major families. In 1952, U.T. Waterfall undertook the writing of a comprehensive treatment for the flora of Oklahoma. Recognizing that there was an immediate need for a means of identification, he first prepared keys to all of the state's plant species and personally published four editions of ***Keys to the Flora of Oklahoma*** (later editions are only reprintings of the fourth edition). Simultaneously with publication

of the keys, he began to write diagnostic descriptions of each taxon. Sadly, this manuscript was not completed because of his death in 1971.

Flora of Oklahoma Project—The last edition of Waterfall's ***Keys*** (1969) was the primary taxonomic reference for studies of the state's flora for more than two decades. During this time, numerous taxonomic revisions of families and genera were published, and many nomenclatural changes were made. In addition, additional native taxa were discovered, and numerous introduced taxa have become naturalized. In the fall of 1983, botanists from throughout the state initiated an effort to write and publish a modern floristic treatment for Oklahoma's vascular plants. Initial steps included the establishment of an editorial board, formation of a non-profit corporation, development of an editorial format, production of a computerized data base for families, solicitation of contributors, and initiation of research and writing. In order to provide students and other individuals keys and descriptions as quickly as possible, the editorial board decided to sequentially produce a key to families, descriptions of families, keys to the genera of each family, keys to their species, and finally genus and species descriptions. The key to families, titled ***Keys to the Vascular Plants of Oklahoma***, appeared in 1994. Completion of the family descriptions resulted in 1997's ***Keys and Descriptions for the Vascular Plant Families of Oklahoma***. Concurrent with the publication of this second book, work was begun on keys to the genera and species of all families. As updates were completed and added to the book, iterations were published, the last appearing in 2010.

Flora of Oklahoma Keys & Descriptions*—**In the 21 years since the publication of our first iteration of the ***Keys, additional changes in the classification of families, genera, and species. These changes reflect the accumulation of additional taxonomic data and new interpretations of characters in terms of phylogenetics. We have adopted, the classifications of the Angiosperm Phylogeny Group (APGIII; www.mobot.org/MOBOT/research/APweb) (Stevens 2001 onwards) and Integrated Taxonomic Information System (ITIS; http://www.itis.gov). Our specific taxonomic decisions as to family, genus, and species concepts are based on our field work, examination of Oklahoma herbarium specimens, and review of the literature. Author citations appearing in the index are taken from ITIS, Brummitt and Powell (1992), and the International Plant Names Index (IPIN).

USE OF *KEYS AND DESCRIPTIONS*

Use—As noted above, the editorial board envisions that an individual will use this book in conjunction with other taxonomic works to identify unknown plant species in the state. The following steps are recommended.

1. Examine the vegetative and floral characters of the plant at-hand.

2. Key the unknown plant using the "Key to Groups."

3. Compare the characters of the plant with the brief diagnosis of the identified group.

4. Key the plant to family using the key to families of that group.

5. Compare the characters of the plant with the family descriptions that follow the “Key to Groups.”

6. Use the generic key that follows the family description to identify the genus of the unknown plant.

7. Compare the characters of the plant with the genus descriptions appearing in available taxonomic treatments such as ***Shinners & Mahler’s Illustrated Flora of North Central Texas, Manual of the Vascular Plants of Texas, Flora of the Great Plains, or Gray's Manual of Botany.***

8. Use the key appearing under the genus name to identify the species of the unknown plant.

9. Compare the characters of the plant with the species descriptions appearing in the available taxonomic treatments.

10. Use the glossary that appears at the end of this book to determine the meanings of unfamiliar terms.

Punctuation—To facilitate use of the keys and descriptions, characters are separated from one another by periods and their first letter capitalized. Their different states are separated by semicolons. Commas are used as appropriate for clarity. In addition, major characters are bold-faced in the descriptions for emphasis and ease of comparison.

The authors welcome any comments regarding the utility and accuracy of these keys, glossary, and index. Please inform us if you encounter problems in keying taxa, troublesome or poorly worded couplets and leads, omitted taxa, and characters that are inappropriate or inaccurate. Please send all comments and suggestions to Adam K. Ryburn, Coordinating Editor, Department of Biology, Oklahoma City University, Oklahoma City, Oklahoma 73106 (aryburn@okcu.edu). Information about this project is available at www.biosurvey.ou.edu/floraok.

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KEY TO GROUPS

(page)

1. Plants trees or shrubs or woody vines or arboreal subshrubs.
  2. Plants woody vines or arboreal subshrubs. ..... **GROUP A** (2)
  2. Plants trees or shrubs.
    3. Stems succulent; bearing spines in clusters. ..... **CACTACEAE** (114)
    3. Stems not succulent; not bearing spines in clusters.
      4. Flowers or cones appearing before leaves. ..... **GROUP B** (3)
      4. Flowers or cones appearing with or after leaves.
        5. Leaves opposite or whorled or fascicled or in rosettes. ..... **GROUP C** (4)
        5. Leaves alternate.
          6. Leaves compound. ..... **GROUP D** (6)
          6. Leaves simple.
            7. Leaf margins entire. ..... **GROUP E** (7)
            7. Leaf margins lobed or toothed. ..... **GROUP F** (10)
1. Plants herbs, some woody at the base.
  8. Plants aquatic floating on or submerged in or emergent from water. ..... **GROUP G** (12)
  8. Plants terrestrial or epiphytic.
    9. Plants herbaceous epiphytes or herbaceous vines. ..... **GROUP H** (18)
    9. Plants not herbaceous epiphytes nor herbaceous vines.
      10. Chlorophyll absent. Plants parasitic or saprophytic or mycotrophic. ..... **GROUP I** (19)
      10. Chlorophyll present. Plants autophytic.
        11. Plants not producing flowers and seeds. Spores produced in strobili or sori or sporocarps or in aggregations of sporangia at ends of elongated stalks. ..... **GROUP J** (19)
        11. Plants producing flowers and seeds. Spores produced in anthers or ovaries.
          12. Stems bearing spines and/or glochids in areoles; succulent. Foliage leaves absent. Ovaries inferior. Perianth parts 25 or more. Stamens 25 or more. ..... **CACTACEAE** (114)
          12. Stems not bearing spines or glochids in areoles; succulent or not succulent. Foliage leaves present or absent. Ovaries superior or inferior. Perianth parts of various numbers. Stamens of various numbers.
            13. Plants acaulescent, aerial stems not apparent and leaves not cauline. ..... **GROUP K** (22)
            13. Plants caulescent, aerial stems apparent and leaves cauline.
              14. Perianth parts absent. ..... **GROUP L** (25)
              14. Perianth parts present.
                15. Perianth parts in 1-series or parts all similar.
                16. Perianth parts 3 or multiples of 3. ..... **GROUP M** (26)
                16. Perianth parts 1 or 2 or 4 or 5 or multiples of 4 or 5 or many. ..... **GROUP N** (28)
                15. Perianth parts in 2-series. ..... **couplet 17**

17. Petals 3 or multiples of 3. ..... **GROUP O** (31)
17. Petals 1 or 2 or 4 or 5 or multiples of 4 or 5 or many.
  18. Corollas bilaterally symmetrical.
    19. Petals free. ..... **GROUP P** (32)
    19. Petals fused at least at base or apex.
      20. Ovaries inferior, wholly or partially. ..... **GROUP Q** (33)
      20. Ovaries superior. ..... **GROUP R** (33)
  18. Corollas radially symmetrical or asymmetrical.
    21. Petals free.
      22. Ovaries inferior, wholly or partially. ..... **GROUP S** (35)
      22. Ovaries superior.
        23. Pistils or fruits 1 per flower. ..... **GROUP T** (35)
        23. Pistils or fruits 2 or more per flower. ..... **GROUP U** (38)
    21. Petals fused at least at base or apex.
      24. Ovaries inferior, wholly or partially. ..... **GROUP V** (38)
      24. Ovaries superior. ..... **GROUP W** (39)

GROUP A: Plants woody vines or arboreal evergreen subshrubs.

1. Plants arboreal evergreen subshrubs. ..... **SANTALACEAE**
1. Plants woody vines.
  2. Leaves opposite or whorled.
    3. Plants climbing by tendrils or aerial rootlets, or prehensile petioles or petiolules.
      4. Plants climbing by prehensile petioles or petiolules. Perianth in 1-series. Fruits achenes. ..... **RANUNCULACEAE**
      4. Plants climbing by aerial rootlets or tendrils from leaf rachises (may be absent on scrambling-bushy forms). Perianth in 2-series. Fruits capsules.
        5. Leaves compound. Petals fused; red-orange; 40–90 mm long. Capsules elongate. ..... **BIGNONIACEAE**
        5. Leaves simple. Petals free; green to cream; 2–5 mm long. Capsules globose. ..... **CELASTRACEAE**
    3. Plants climbing by twining or scrambling stems.
      6. Leaf margins crenate or serrate.
        7. Leaves compound. Fruits capsules. ..... **BIGNONIACEAE**
        7. Leaves simple. Fruits berries. ..... **CAPRIFOLIACEAE**
      6. Leaf margins entire.
        8. Flowers radially symmetrical. Fruits follicles. Seeds comose. Shoot exudate viscous; white. Axillary buds solitary. ..... **APOCYNACEAE**
        8. Flowers strongly to weakly bilaterally symmetrical. Fruits berries. Seeds without hairs. Shoot exudate watery; clear. Axillary buds multiple. ..... **CAPRIFOLIACEAE**
  2. Leaves alternate.
    9. Plants climbing by tendrils or aerial rootlets.
      10. Venation parallel-convergent. Tendrils paired. Inflorescences umbels. Pith absent. ..... **SMILACACEAE**
      10. Venation palmate or pinnate or pinnipalmate. Tendrils solitary or absent. Inflorescences panicles or cymes. Pith present.
        11. Leaves compound.
          12. Leaves 1-pinnately compound. ..... **(poison ivy) ANACARDIACEAE**
          12. Leaves palmately compound or 2- or 3-pinnately compound.
            13. Leaves 2- or 3-pinnately compound; leaflets numerous. ..... **VITACEAE**
            13. Leaves palmately compound.
              14. Leaflets always 3 per leaf. [Leaves 1-pinnately compound, but rachises occasionally short or almost absent; hence leaves falsely appearing palmately compound]. Inflorescences panicles. Pistillates 3-carpellate. Fruits drupes; white. ..... **(poison ivy) ANACARDIACEAE**
              14. Leaflets typically 5 or rarely 3 due to abscission of 2 leaflets. Inflorescences cymes. Pistils 2-carpellate. Fruits berries; dark blue to black. ..... **VITACEAE**
        11. Leaves simple.
          15. Leaves ovate or oblong-ovate; margins entire. Inflorescences racemose panicles. Flowers perfect. Calyces deeply 5-parted. Corollas absent. Fruits achenes; subtended by persistent sepals. ..... **POLYGONACEAE**
          15. Leaves cordate or rotund to broadly ovate; margins toothed. Inflorescences cymes. Flowers functionally imperfect. Calyces slightly to shallowly 4-lobed. Corollas present, may be caducous. Fruits berries. ..... **VITACEAE**
    9. Plants climbing by twining stems.
      16. Leaves compound.
        17. Stems bearing prickles. Pistils numerous. Fruits aggregates of drupelets or achenes. ..... **ROSACEAE**
        17. Stems not bearing prickles. Pistils 1. Fruits berries or legumes.
          18. Leaflets 3–7 cm long. Flowers radially symmetrical. Corollas greenish; 1–3 mm long. Berries bluish purple or green. ..... **VITACEAE**
          18. Leaflets 10–30 cm long. Flowers bilaterally symmetrical. Corollas purplish or lilac or blue; 15–20 mm long. Legumes reddish brown. ..... **FABACEAE**
      16. Leaves simple.

19. Stipules absent. Axillary buds 3 (2 may be obscured by petiole bases or leaf scars).
20. Stems and leaves glabrous or puberulent. Leaf scars U-shaped. Flowers imperfect. Plants dioecious. Perianths radially symmetrical. Fruits drupes. ..... **MENISPERMACEAE**
20. Stems and leaves tomentose. Leaf scars elliptic. Flowers perfect. Perianths bilaterally symmetrical. Fruits capsules. ..... **ARISTOLOCHIACEAE**
19. Stipules or stipular scars present. Axillary buds 1.
21. Tendrils present. Fruits berries. Vascular bundle scars 12. ..... **VITACEAE**
21. Tendrils absent. Fruits drupes or capsules. Vascular bundle scars 1.
22. Fruits capsules; orange. Arils present; bright red. Stamens alternate with petals. Axillary buds subglobose. ..... **CELASTRACEAE**
22. Fruits drupes; bluish black. Arils absent. Stamens opposite petals. Axillary buds triangular and elongate. ..... **RHAMNACEAE**

GROUP B: Plants trees or shrubs. Flowers or cones appearing before leaves.

1. Plants producing cones. Buttresses typically present. Knees typically present. ..... **CUPRESSACEAE**
1. Plants producing flowers. Buttresses absent. Knees absent.
2. Leaf scars opposite.
3. Bracts 20–50 mm long; white to pinkish or greenish white. Ovaries inferior. ..... **CORNACEAE**
3. Bracts 4–5 mm long or absent; purple or green or yellow. Ovaries superior.
4. Stamens of staminate or perfect flowers 2 or 4. Styles of pistillate or perfect flowers 1. Immature ovaries not winged. Vascular bundle scars 1 or numerous. ..... **OLEACEAE**
4. Stamens of staminate flowers 5–12. Styles of pistillate or perfect flowers 2. Immature ovaries 2-winged. Vascular bundle scars 3. ..... **SAPINDACEAE**
2. Leaf scars alternate.
5. Catkins present.
6. Plants dioecious. Ovaries of pistillate flowers superior.
7. Bark of trunks smooth or deeply furrowed. Sepals absent or modified into cup-like glands. Fruits capsules. ..... **SALICACEAE**
7. Bark of trunks shallowly fissured into narrow scaly plates. Sepals present; 4. Fruits syncarps of achenes. ..... **MORACEAE**
6. Plants monoecious. Ovaries of pistillate flowers inferior.
8. Terminal buds present. Pith a 5-pointed star in cross-section. Pistillate inflorescences solitary flowers or clusters of 2–4. ..... **FAGACEAE**
8. Terminal buds absent. Pith a 3-sided to round in cross-section. Pistillate inflorescences catkins. ..... **BETULACEAE**
5. Catkins absent.
9. Perianth parts absent. ..... **ANACARDIACEAE**
9. Perianth parts present.
10. Perianth parts in 1-series.
11. Inflorescences solitary flowers or clusters of 2–3. Pistils enclosed by spiny or muricate husks, or subtended by involucral cupules (caps). Ovaries inferior. Terminal buds present. ..... **FAGACEAE**
11. Inflorescences umbels or fascicles or dense clusters of flowers. Pistils not enclosed or subtended by spiny or muricate husks or involucral cupules. Ovaries superior. Terminal buds absent.
12. Branchlets armed with pairs of curved prickles. Pistils 2–5. ..... **RUTACEAE**
12. Branchlets not armed with pairs of curved prickles. Pistil 1.
13. Inflorescences umbel-like clusters. Stamen number greater than number of perianth parts. Branchlets aromatic when fresh. ..... **LAURACEAE**
13. Inflorescences spherical clusters or fascicles or cymes or racemes. Stamen number equal to number of perianth parts. Branchlets not aromatic.
14. Shoot exudate viscous; white. Flowers imperfect. Fruits syncarps of achenes. ..... **MORACEAE**

14. Shoot exudate thin; colorless. Flowers perfect or both perfect and imperfect intermixed. Fruits samaras or drupes.
15. Plants bearing perfect flowers. Flowers all borne in axillary fascicles or short racemes. Winter buds divergent. Sepals fused more than 1/3 their length. Fruits samaras. ..... **ULMACEAE**
15. Plants monoecious or polygamo-monoecious. Perfect or pistillate flowers solitary or paired in distal axils; staminate flowers in fascicles in proximal axils. Winter buds appressed. Sepals free or fused only at bases. Fruits drupes. ..... **CELTIDACEAE**

10. Perianth parts in 2-series.
16. Corollas bilaterally symmetrical. ..... **FABACEAE**
16. Corollas radially symmetrical.
17. Flowers 3- or 4-merous.
18. Flowers 3-merous. Petals purple. Fruits berries. ..... **ANNONACEAE**
18. Flowers 4-merous. Petals yellow or reddish yellow or white to pale green or pink. Fruits capsules or drupes.
19. Flowers imperfect. Corollas white to pale green. Fruits drupes. ..... **RHAMNACEAE**
19. Flowers perfect. Corollas yellow to reddish yellow or pink. Fruits capsules. ..... **HAMAMELIDACEAE**
17. Flowers 5-merous.
20. Stamens 2 or more times length of petals. Fruits legumes. ..... **FABACEAE**
20. Stamens equal to or less than length of petals. Fruits berries or pomes or drupes or capsules.
21. Petals fused more than 1/2 their length. Anthers dehiscing poricidally. Fruits berries. ..... **ERICACEAE**
21. Petals free or fused only at base. Anthers dehiscing longitudinally. Fruits pomes or drupes or capsules.
22. Petals yellow or greenish white. Plants polygamo-dioecious. ..... **ANACARDIACEAE**
22. Petals pink or white. Plants bearing perfect flowers.
23. Flowers hypogynous. Petals 1–3 mm long. Fruits capsules. Branchlets deciduous. ..... **TAMARICACEAE**
23. Flowers perigynous or epigynous. Petals 3–25 mm long. Fruits pomes or drupes. Branchlets not deciduous. ..... **ROSACEAE**

GROUP C: Plants trees or shrubs. Leaves opposite or whorled or fascicled or in rosettes. Flowers or cones appearing with or after leaves.

1. Leaves borne in fascicles or rosettes.
2. Plants trees. Leaves needle-like. Cones present. Flowers absent. ..... **PINACEAE**
2. Plants shrubs or subshrubs. Leaves not needle-like, blades expanded. Cones absent. Flowers present.
3. Leaves flabellate; 100–150 cm wide. Fruits drupes. ..... **ARECACEAE**
3. Leaves lanceolate or ensiform or spathulate or ovate or cordate-orbicular; 0.5–11 cm wide. Fruits capsules or berries.
4. Venation parallel. Leaves lanceolate to ensiform. ..... **ASPARAGACEAE**
4. Venation pinnate or palmate. Leaves spathulate or ovate or cordate-orbicular.
5. Leaves spathulate to ovate; margins entire; venation pinnate. Petals fused. Ovaries superior; locules 2. Berries subtended by persisent calyces. ..... **SOLANACEAE**
5. Leaves cordate-orbicular; margins serrate or crenate; venation palmate. Petals free. Ovaries inferior; locules 1. Berries crowned by shriveled hypanthia. ..... **GROSSULARIACEAE**

1. Leaves opposite or whorled.

6. Leaves scale-like or subulate or reduced to membranous sheaths fused at bases and surrounding stems. Flowers absent. Cones present.
  7. Trees or shrubs more than 3 m tall. Leaves imbricate; scale-like or subulate. Ovulate cones globose; fleshy or woody; purple or blue or red-brown. ..... **CUPRESSACEAE**
  7. Shrubs less than 1 m tall. Leaves not imbricate; reduced to membranous sheaths fused at bases and surrounding stems. Ovulate cones elliptic; chaffy at maturity; stramineous. ..... **EPHEDRACEAE**
6. Leaves elongate; terete or flattened; not scale-like nor subulate nor reduced to sheaths. Flowers present. Cones absent.
  8. Leaves terete; fleshy; 0.1–0.2 cm wide; 1–2 cm long. Plants 20–40 cm tall. ..... ***(Pseudoclappia)*** **ASTERACEAE**
  8. Leaves flat; not fleshy; more than 1 cm wide; more than 2 cm long. Plants more than 40 cm tall.
    9. Leaves compound.
      10. Leaflets 3.
        11. Shrubs to 5 m tall. Twigs with longitudinal stripes. Pistils 3-carpellate. Fruits capsules; inflated. ..... **STAPHYLEACEAE**
        11. Trees to 20 m tall. Twigs without stripes. Pistils 2-carpellate. Fruits schizocarps of samaras. ..... **SAPINDACEAE**
      10. Leaflets 5–11.
        12. Leaves pinnately compound.
          13. Plants shrubs. Pith 1/2–3/4 diameter of twigs in cross-section. Ovaries inferior. Fruits drupes. [Stones 3–5; hence fruits falsely resembling berries]. ..... **ADOXACEAE**
          13. Plants trees. Pith less than 1/4 diameter of twigs in cross-section. Ovaries superior. Fruits samaras.
            14. Axillary buds solitary. Leaflet margins coarsely toothed. Stamens 3–12. Samaras 2; fused. ..... **SAPINDACEAE**
            14. Axillary buds superposed, lower small. Leaflet margins entire or shallowly toothed. Stamens 2. Samaras 1. ..... **OLEACEAE**
        12. Leaves palmately compound.
          15. Leaflets pungently aromatic; lanceolate to elliptic. Petals fused. Fruits drupes; 3 mm in diameter. ..... **LAMIACEAE**
          15. Leaflets without odor; oblanceolate to obovate. Petals free. Fruits capsules; 30–50 mm in diameter. ..... **SAPINDACEAE**
    9. Leaves simple, blades may be dissected.
      16. Leaf margins palmatifid; lobes 3–5 parted 1/2–2/3 to midribs. Fruits samaras. ..... **SAPINDACEAE**
      16. Leaf margins dentate or serrate or entire. Fruits capsules or berries or drupes or schizocarps or multiple syncarps of achenes covered by fleshy calyces. ..... **couplet 17**

17. Petals absent.
  18. Shoot exudate viscous; white. Flowers borne in pendulous catkins 6–8 cm long or in globose heads 1.5–2.5 cm in diameter. Fruits multiple syncarps of achenes covered by fleshy calyces. ..... **MORACEAE**
  18. Shoot exudate thin; colorless. Flowers borne in lateral fascicles or axillary glomerules; inconspicuous. Fruits drupes. Calyces absent or minute; not fleshy. ..... **OLEACEAE**
17. Petals present.
  19. Petals free.
    20. Leaves with minute translucent dots obvious when leaves back-lighted. Flowers bright to pale yellow. Stamens in 3 fascicles. ..... **HYPERICACEAE**
    20. Leaves without translucent dots. Flowers of various colors, may be pale yellowish white. Stamens in whorls.
      21. Leaf margins evenly, finely serrate. Ovaries superior. Seeds with bright red arils. ..... **CELASTRACEAE**
      21. Leaf margins irregularly serrate or entire. Ovaries inferior. Seeds without arils.
        22. Axillary buds with scales. Leaf margins toothed. Fruits capsules. ..... **HYDRANGEACEAE**
        22. Axillary buds without scales. Leaf margins entire. Fruits drupes. ..... **CORNACEAE**
  19. Petals fused.
    23. Corollas radially symmetrical.

24. Stipules or stipular scars present. Inflorescences heads.
Fruits dry; schizocarps, separating into 2 1-seeded segments. ..... **RUBIACEAE**
24. Stipules absent. Inflorescences cymes or panicles. Fruits
fleshy; drupes or berries, not separating into 2 1-seeded segments.
25. Stamens 5. Ovaries inferior.
26. Inflorescences compound cymes. Styles absent. Fruits 1-seeded. ..... **ADOXACEAE**
26. Inflorescences simple cymes or few-flowered clusters.
Styles present. Fruits 2- to several seeded. ..... **CAPRIFOLIACEAE**
25. Stamens 2 or 4. Ovaries superior.
27. Inflorescences hemispheric heads. ..... **VERBENACEAE**
27. Inflorescences cymes or panicles.
28. Branchlets and leaves stellate-scurfy. Inflorescences
cymes; axillary, forming verticels. Stamens 4. ..... **LAMIACEAE**
28. Branchlets and leaves glabrous or variously indumented,
but not stellate-scurfy. Inflorescences panicles;
terminal, not forming verticels. Stamens 2. ..... **OLEACEAE**
23. Corollas bilaterally symmetrical.
29. Ovaries inferior. ..... **CAPRIFOLIACEAE**
29. Ovaries superior.
30. Branchlets and abaxial surfaces of leaves densely stellate-scurfy.
Inflorescences spikes or cymes; axillary. Flowers small; 4–7 mm long.
Fruits drupes. ..... **LAMIACEAE**
30. Branchlets and abaxial surfaces of leaves not stellate-scurfy.
Inflorescences panicles; terminal. Flowers large; 20–70 mm long
Fruits capsules.
31. Pedicels glabrous to sparsely pilose; hairs white.
Capsules terete; 10–45 cm long. ..... **BIGNONIACEAE**
31. Pedicels tomentose; hairs rusty brown.
Capsules ovoid; 3–5 cm long. ..... **PAULOWNIACEAE**

GROUP D: Plants trees or shrubs. Leaves alternate; compound. Flowers or cones appearing with or after leaves.

1. Leaves simple; linear; borne on deciduous branchlets [falsely appearing pinnately
compound]. Flowers absent. Seeds borne in fleshy cones. Plants typically producing
buttresses and erect columnar knees when in standing water. ..... **CUPRESSACEAE**
1. Leaves compound; of various shapes; deciduous at petioles, not borne on
deciduous branchlets. Flowers present. Seeds borne in fruits. Plants not producing
buttresses nor knees.
2. Leaves both 1- and 2-compound. ..... **FABACEAE**
2. Leaves variously compound, but not both 1- and 2-compound.
3. Leaves 2- or 3-compound.
4. Plants shrubs.
5. Tendrils present. Leaflet margins serrate or coarsely toothed. Stamens 4 or 5. ..... **VITACEAE**
5. Tendrils absent. Leaflet margins entire. Stamens 6. ..... **BERBERIDACEAE**
4. Plants trees.
6. Stipules present. Inflorescences spikes or racemes or head. Fruits legumes. ..... **FABACEAE**
6. Stipules absent. Inflorescences umbels or panicles. Fruits drupes; stones 1 or 5.
7. Stems and leaves armed with stout prickles. Petals 1.5–2 mm long.
Ovaries inferior. Fruits 5-seeded; black; 4–6 mm in diameter. ..... **ARALIACEAE**
7. Stems and leaves not armed. Petals 9–11 mm long. Ovaries superior.
Fruits 1-seeded; yellow; 12–15 mm in diameter. ..... **MELIACEAE**
3. Leaves 1-compound.
8. Fruits nuts; enclosed in involucral husks. Staminate inflorescences elongate catkins.
Pistillate inflorescences of flowers solitary or borne in clusters of 2–5. ..... **JUGLANDACEAE**
8. Fruits of various types but not nuts enclosed in involucral husks.
Inflorescences of various types, but not catkins.

9. Inflorescences racemes or globose spikes. Corollas bilaterally symmetrical. Fruits legumes. ..... **FABACEAE**
9. Inflorescences corymbs or panicles or solitary flowers. Corollas radially symmetrical. Fruits aggregates of achenes or drupes or drupelets, or follicles or drupes or berries or samara-like schizocarps.
  10. Leaflets 3.
    11. Pistils 10–many. Fruits aggregates of achenes or drupes. ..... **ROSACEAE**
    11. Pistils 1. Fruits drupes or samaras or hesperidia.
      12. Leaflets gland-dotted. Ovaries 2–5 locular. Fruits samaras or hesperidia; tan or green to brownish orange; 20–50 mm in diameter. ..... **RUTACEAE**
      12. Leaflets not gland-dotted. Ovaries 1-locular. Fruits drupes; red or reddish brown or white (poison ivy); 5–8 mm in diameter. ..... **ANACARDIACEAE**
  10. Leaflets 4–41.
    13. Stamens numerous. Pistils 10–many per flower. Fruits aggregates of achenes or drupes. ..... **ROSACEAE**
    13. Stamens 4 or 5 or 8 or 10. Pistils 1–5 per flower. Fruits follicles or drupes or berries or samara-like schizocarps or samaras.
      14. Leaflets gland-dotted or bearing 1–5 dark green glands near bases on abaxial surfaces. Fruits follicles or samara-like schizocarps or samaras.
        15. Branchlets armed with stout prickles. Fruits follicles; 5–6 mm long. Pith white; less than 1/2 diameter of stem in cross-section. Vascular bundle scars 3. ..... **RUTACEAE**
        15. Branchlets not armed. Fruits schizocarps, splitting into samaras; 30–50 mm long. Pith brown; about 3/4 diameter of stem in cross-section. Vascular bundle scars 9. ..... **SIMAROUBACEAE**
      14. Leaflets not gland-dotted nor bearing 1–5 dark green glands near bases on abaxial surfaces. Fruits drupes or berries.
        16. Petals yellow or greenish white. Stamens 5. Fruits drupes; red or reddish brown or magenta; opaque at maturity; 5–8 mm in diameter. ..... **ANACARDIACEAE**
        16. Petals white or cream-white or white with yellowish apices. Stamens 8 or 10. Fruits 1-seeded berries; amber or yellow; translucent at maturity; 10–13 mm in diameter. ..... **SAPINDACEAE**

GROUP E: Plants trees or shrubs. Leaves alternate; simple. Margins entire. Flowers or cones appearing with or after leaves.

1. Venation parallel.
  2. Stems jointed. Branches fascicled at nodes. Internodes hollow Leaves with sheaths. Flowers borne in spikelets. ..... (***Arundinaria***) **POACEAE**
  2. Stems not jointed. Branches absent. Internodes solid. Leaves without sheaths. Flowers borne in panicles.
    3. Leaves flabellate; 100–150 cm wide. Perianth parts 3–10 mm long. Fruits drupes; spherical; 8–13 mm in diameter. [leaves actually palmately incised, lobes entire] ..... **ARECACEAE**
    3. Leaves lanceolate or ensiform; 0.5–2.5 cm wide. Perianth parts 30–50 mm long. Fruits capsules; oblong; 25–40 mm in diameter. ..... **ASPARAGACEAE**
1. Venation pinnate or pinnipalmate or palmate or not apparent.
  4. Plants subshrubs or shrubs; less than 2 m tall.
    5. Flowers imperfect. Plants monoecious or dioecious.
      6. Inflorescences heads or catkins.
        7. Inflorescences heads. Pappus present, capillary bristles. Fruits achenes. ..... (***Baccharis***) **ASTERACEAE**
        7. Inflorescences catkins. Pappus absent. Fruits drupes or capsules.
          8. Plants evergreen. Leaves fragrant; resin-dots present. Fruits drupes; white; waxy. Seeds not comose. ..... **MYRICACEAE**

8. Plants deciduous. Leave not fragrant; resin-dots absent.
Fruits capsules. Seeds comose. ..... **SALICACEAE**

6. Inflorescences racemes or cymes or solitary flowers in leaf axils.

9. Stipules present; 1–2 mm long. Pistils 3-lobed; 3-locular;
ovules 6. Fruits capsular schizocarps. ..... **EUPHORBIACEAE**

9. Stipules absent. Pistils not lobed; 1-locular;
ovules 1. Fruits utricles or drupes.

10. Leaf surfaces scurfy or farinaceous. Fruits utricles. Bark not
spicy aromatic. Plants of saline or alkaline sites. ..... **AMARANTHACEAE**

10. Leaf surfaces not scurfy nor farinaceous. Fruits drupes.
Bark spicy aromatic. Plants of non-saline or non-alkaline sites. ..... **LAURACEAE**

5. Flowers perfect.

11. Leaves less than 3 mm long; imbricate. Branchlets deciduous. ..... **TAMARICACEAE**

11. Leaves more than 5 mm long; not imbricate. Branchlets not deciduous.

12. Inflorescences heads. Anthers fused in ring around style. ..... **ASTERACEAE**

12. Inflorescences of various types, but not heads. Anthers not
fused in ring around style.

13. Leaves broadly obovate or broadly elliptic. Leaf scars annular,
nearly encircling bud. Fruits drupes; red. ..... **THYMELIACEAE**

13. Leaves of various shapes, but not broadly obovate nor elliptic.
Leaf scars not annular. Fruits berries or capsules or achenes
or follicles; of various colors.

14. Petals fused. Fruits berries or capsules.

15. Branches armed. Axillary buds multiple. Anthers dehiscing
longitudinally. Pistils 2-carpellate. ..... **SOLANACEAE**

15. Branches not armed. Axillary buds solitary. Anthers
dehiscing poricidally. Pistils 5-carpellate. ..... **ERICACEAE**

14. Petals free or absent. Fruits achenes or follicles.

16. Stipules present as ocrea. Perianth parts in 1-series.
Fruits achenes. ..... **POLYGONACEAE**

16. Stipules absent. Perianth parts in 2-series.
Fruits follicles. ..... **CROSSOSOMATACEAE**

4. Plants large shrubs or trees, more than 2 m tall.

17. Trunks typically with buttresses and producing erect columnar
knees when in standing water. Branchlets deciduous and bearing
linear leaves. Flowers absent. Seeds borne in fleshy cones. ..... **CUPRESSACEAE**

17. Trunks without buttresses; knees not produced. Branchlets not deciduous
and bearing linear leaves. Flowers present. Seeds borne in fruits.

18. Plants armed and/or with spur branches.

19. Shoot exudate viscous; white. Flowers imperfect. Plants dioecious.
Fruits multiple syncarps of achenes covered by fleshy calyces;
10–15 cm in diameter; globose; yellow-green. ..... **MORACEAE**

19. Shoot exudate thin; colorless. Flowers perfect. Fruits berries or achenes
or drupe-like; less than 5 cm in diameter; of various colors.

20. Perianth parts in 2-series. Stamens 5. Fruits berries;
black; drupe-like; 1-seeded. ..... **SAPOTACEAE**

20. Perianth parts in 1-series. Stamens 4 or 12 or more. Fruits
achenes; plumose or enclosed by fleshy perianths.

21. Stems and leaves with silvery peltate scales. Thorns present.
Spur branches absent. Stamens 4. Achenes enclosed by fleshy
perianths. Styles in fruit not elongate; not plumose. ..... **ELAEAGNACEAE**

21. Stems and leaves without silvery peltate scales. Thorns absent.
Spur branches present. Stamens 12 or more. Achenes not enclosed
by fleshy perianths. Styles of fruit elongate; plumose. ..... **ROSACEAE**

18. Plants not armed. Spur branches absent.

22. Leaves scale-like; imbricate. Branchlets deciduous. ..... **TAMARICACEAE**

22. Leaves not scale-like; not imbricate. Branchlets not deciduous.

23. Inflorescences solitary flowers.

24. Terminal buds multiple. Pith of twigs a 5-pointed star in cross-section.
Fruits nuts, subtended by involucral cupules (=acorn). ..... **FAGACEAE**
24. Terminal buds solitary or absent. Pith of twigs terete in
cross-section. Fruits drupe or berries or aggregates of berries
or follicles, not subtended by involucral cupules.
25. Flowers 0.2–1 cm in diameter. Stamens 0 or 4–12; whorled.
Pistils 0 or 1 per flower. Fruits drupes or berries.
26. Ovaries inferior. Flowers perfect. ..... **NYSSACEAE**
26. Ovaries superior. Flowers imperfect.
27. Venation pinnipalmate. Bark becoming warty.
Fruits drupes. ..... **CELTIDACEAE**
27. Venation pinnate. Bark not becoming warty.
Fruits berries. ..... **EBENACEAE**
25. Flowers 3–25 cm in diameter. Stamens 13 or more;
spiraled. Pistils 3 or more per flower. Fruits aggregates
of berries or follicles.
28. Flowers yellow or white; 10–25 cm in diameter.
Leaves coriaceous. Stipules present, but caducous.
Fruits aggregates of follicles. ..... **MAGNOLIACEAE**
28. Flowers dull purple; 3–4 cm in diameter. Leaves
not coriaceous. Stipules absent. Fruits berries. ..... **ANNONACEAE**
23. Inflorescences of various types, but not solitary flowers.
29. Stems and leaves with silvery peltate scales. ..... **ELAEAGNACEAE**
29. Stems and leaves without silvery peltate scales. ..... **couplet 30**

30. Leaves evergreen.
31. Terminal buds absent. Leaves with resin-dots; fragrant. Pistillate flowers
in catkins. Fruits drupes; white. ..... **MYRICACEAE**
31. Terminal buds multiple. Leaves without resin-dots; not fragrant. Pistillate flowers solitary
or in clusters of 2–3. Fruits nuts subtended by involucral cupule (acorn); brown or green. ..... **FAGACEAE**
30. Leaves deciduous.
32. Flowers imperfect. Plants monoecious or dioecious.
33. Inflorescences catkins.
34. Terminal buds multiple. Pith a 5-pointed star in cross-section. Plants monoecious.
Fruits nuts; subtended by involucral cupule (=acorn); in clusters of 2 or 3. ..... **FAGACEAE**
34. Terminal buds absent. Pith terete in cross-section. Plants dioecious.
Fruits capsules or multiple syncarps of achenes covered by fleshy calyces.
35. Leaves ovate or lanceolate. Shoot exudate viscous; white. Fruits multiple
syncarps of achenes covered by fleshy calyces. Seeds not comose. ..... **MORACEAE**
35. Leaves obovate or oblanceolate. Shoot exudate thin; colorless. Fruits
capsules. Seeds comose. ..... **SALICACEAE**
33. Inflorescences of various types, but not catkins.
36. Terminal buds multiple. Pith a 5-pointed star in cross-section. Plants monoecious.
Fruits nuts; subtended by involucral cupule (=acorn); in clusters of 2 or 3. ..... **FAGACEAE**
36. Terminal buds solitary or absent. Pith terete in cross-section.
Plants dioecious or polygamo-monoecious. Fruits berries or drupes.
37. Venation pinnipalmate. Leaves 2-ranked. Bark becoming warty.
Branchlets zig-zagged. ..... **CELTIDACEAE**
37. Venation pinnate. Leaves not 2-ranked. Bark not becoming warty.
Branchlets not zig-zagged.
38. Leaf scars with 1 vascular bundle scar. Petals fused.
Fruits berries; 2–5 cm in diameter; yellowish orange. ..... **EBENACEAE**
38. Leaf scars with 3 vascular bundle scars. Petals absent
or free. Fruits drupes; 0.5–1 cm in diameter; red or blue-black
39. Accessory buds present. Young twigs aromatic.
Perianth parts yellow or yellow-white. Ovaries superior. ..... **LAURACEAE**
39. Accessory buds absent. Young twigs not aromatic.
Perianth parts greenish. Ovaries inferior. ..... **NYSSACEAE**

32. Flowers perfect.
40. Flowers bilaterally symmetrical.
41. Corollas papilionaceous. Petals free. Stamens 10.
Pistils 1-carpellate. Fruits legumes; flattened. Seeds not winged. ..... **FABACEAE**
41. Corollas campanulate or funnelform. Petals fused. Stamens 2 or 4 or 5.
Pistils 2-carpellate. Fruits capsules; terete or ovoid. Seeds winged.
42. Pedicels glabrous to sparsely pilose; hairs white.
Capsules terete; 10–45 cm long. ..... **BIGNONIACEAE**
42. Pedicels tomentose; hairs rusty brown.
Capsules ovoid; 3–5 cm long. ..... **PAULOWNIACEAE**
40. Flowers radially symmetrical.
43. Venation pinnipalmate. Leaves 2-ranked. Bark becoming warty.
Branchlets zig-zagged. ..... **CELTIDACEAE**
43. Venation pinnate. Leaves not 2-ranked. Bark not becoming warty.
Branchlets not zig-zagged.
44. Leaf scars with 1 vascular bundle scar. Flowers borne in dense,
sessile clusters along sides of branches. Petals fused. ..... **SYMPLOCACEAE**
44. Leaf scars with 3 vascular bundle scars. Flowers borne in
pedunculate cymes or panicles. Petals free or absent.
45. Branchlets aromatic. Wood yellow. Inflorescences
panicles; terminal. Petals persisent. Ovaries superior. ..... **ANACARDIACEAE**
45. Branchlets not aromatic. Wood white. Inflorescences
cymes; axillary. Petals caducous. Ovaries inferior. ..... **NYSSACEAE**

GROUP F: Plants trees or shrubs. Leaves alternate; simple; margins lobed or toothed. Flowers appearing with or after leaves.

1. Venation palmate.
2. Leaves 100–150 cm wide; pleated. ..... **ARECACEAE**
2. Leaves 0.5–50 cm wide; not pleated.
3. Flowers perfect. Petals present. Fruits berries or capsules or
follicles or nut-like or drupe-like.
4. Stipules absent. Stamens 5. Ovaries inferior. ..... **GROSSULARIACEAE**
4. Stipules present. Stamens 10–50. Ovaries superior.
5. Plants trees. Peduncles arising from midribs of strap-shaped bracts.
Pistils 1. Fruits nut-like or drupe-like capsules. ..... **MALVACEAE**
5. Plants shrubs. Peduncles arising from leaf axils or stem apices.
Pistils 2 or 3. Fruits follicles. ..... **ROSACEAE**
3. Flowers imperfect. Petals absent in pistillate flowers. Fruits
drupes or syncarps of achenes or capsules.
6. Shoot exudate viscous; white. Plants dioecious. Staminate inflorescences
pendulous. Fruits covered by fleshy calyces. ..... **MORACEAE**
6. Shoot exudate thin; colorless. Plants monoecious. Staminate inflorescences
erect or ascending. Fruits not covered by fleshy calyces.
7. Bark light; gray-green; exfoliating to expose whitish-green under bark.
Axillary buds enclosed by petioles. Emerging leaves densely stellate.
Styles 1. Sepals of staminate flowers present, fimbriate. Older branches
not winged. Fruits syncarps of achenes; not spiny. ..... **PLATANACEAE**
7. Bark dark; brown; not exfoliating. Axillary buds not enclosed by petioles.
Emerging leaves glabrous or glabrate. Styles 2. Sepals of staminate flowers
absent. Older branches winged. Fruits syncarps of capsules; spiny. ..... **ALTINGIACEAE**
1. Venation pinnate or pinnipalmate.
8. Inflorescences heads.
9. Plants trees. Leaves 4–12 cm wide. ..... **MORACEAE**
9. Plants shrubs. Leaves 0.2–3 cm wide. ..... **ASTERACEAE**
8. Inflorescences of various types, but not heads.
10. Flowers imperfect.

11. Plants dioecious or polygamo-dioecious.
12 Inflorescences catkins.
13. Perianth parts in 1-series. Fruits multiple syncarps of achenes. ..... **MORACEAE**
13. Perianth parts absent or vestigial. Fruits capsules or drupes.
14. Leaves with resin-dots; aromatic.
Fruits drupes. Seeds not comose. ..... **MYRICACEAE**
14. Leaves without resin-dots; not aromatic.
Fruits capsules. Seeds comose. ..... **SALICACEAE**
12 Inflorescences of various types, but not catkins.
15. Perianth parts in 1-series ..... **MORACEAE**
15. Perianth parts in 2-series.
16. Bark spicy-aromatic. Inflorescences racemes or umbels. ..... **LAURACEAE**
16. Bark not spicy-aromatic. Inflorescences cymes or fascicles
or solitary flowers.
17. Stipules absent. Ovaries inferior. Locules 1. Fruits 1-seeded. ..... **NYSSACEAE**
17. Stipules or stipular scars present. Ovaries superior.
Locules 2–8. Fruits 2- to 5-seeded.
18. Petals clawed; cucullate. Stamens opposite the petals.
Drupes black. ..... **RHAMNACEAE**
18. Petals not clawed; not cucullate. Stamens alternate with
the petals. Drupes red to orange. ..... **AQUIFOLIACEAE**
11. Plants monoecious or polygamo-monoecious.
19. Leaf bases oblique.
20. Leaves 2-ranked. Terminal buds absent. Staminate flowers borne in
fascicles at bases of branchlets. Perfect flowers present; borne in
axils of leaves. Ovaries superior. Fruits drupes or nut-like drupes.
21. Venation pinnate. Ovaries and fruits stipitate in calyces;
pericarps roughened. Fruits nut-like drupes. ..... **ULMACEAE**
21. Venation pinnipalmate. Ovaries and fruits sessile in calyces;
pericarps smooth. Fruits drupes. ..... **CELTIDACEAE**
20. Leaves not 2-ranked. Terminal buds present. Staminate flowers borne in
pendulous catkins. Perfect flowers absent. Ovaries inferior. Fruits nuts. ..... **FAGACEAE**
19. Leaf bases not oblique.
22. Pistillate flowers in catkins. Nuts individually subtended
by woody or foliaceous bracts, but not by cupule.
Pith 3-sided to round in cross-section. ..... **BETULACEAE**
22. Pistillate flowers solitary or in clusters of 2–3, but not in catkins.
Nuts subtended individually or in clusters of 3 by spiny or muricate
or cap-like involucral cupule; bracts not woody nor foliaceous.
Pith a 5-pointed star in cross-section. ..... **FAGACEAE**
10. Flowers perfect.
23. Ovaries inferior.
24. Petals fused.
25. Leaf blades 0.1–3.5 cm wide. Inflorescences heads. Fruits achenes. ..... **ASTERACEAE**
25. Leaf blades 4–8 cm wide. Inflorescences clusters of flowers.
Fruits capsules. ..... **STYRACACEAE**
24. Petals free or absent.
26. Plants shrubs. Sepals 4. Petals 4; yellow. ..... **HAMAMELIDACEAE**
26. Plants trees. Sepals 5. Petals 5 or 0; white or greenish white.
27. Leaf margins entire or with 1 or 2 coarse teeth. Stipules absent.
Stamens 5–12. Fruits drupes with thin mesocarp and ridged or
winged endocarp. ..... **NYSSACEAE**
27. Leaf margins serrate or irregularly lobed. Stipules or stipular
scars present. Stamens 15 or more. Fruits pomes or drupes with
thick fleshy mesocarp and smooth non-winged endocarp. ..... **ROSACEAE**
23. Ovaries superior.
28. Perianth parts in 1-series; in 1 or 2 whorls.

29. Leaf margins pinnately toothed or entire. Leaf bases oblique. Bark not spicy-aromatic. Nectaries absent.
30. Leaf margins twice serrate. Fruits samaras. ..... **ULMACEAE**
30. Leaf margins entire or once serrate. Fruits drupes or nut-like drupes.
31. Venation pinnipalmate. Bark corky verrucose or with corky vertical ridges. Ovaries and fruits sessile in calyces. Fruits drupes. ..... **CELTIDACEAE**
31. Venation pinnate. Bark not corky verrucose or with corky vertical ridges. Ovaries and fruits stipitate in calyces. Fruits drupe-like nuts. ..... **ULMACEAE**
29. Leaf margins palmately lobed. Leaf bases cuneate. Bark spicy-aromatic. Nectaries present [sometimes resembling stamens; hence flowers falsely appearing perfect]. ..... **LAURACEAE**
28. Perianth parts in 2-series.
32. Petals fused.
33. Petals fused more than half their length. Anthers dehiscing poricidally. Styles present; long. Stigmas not subsessile. ..... **ERICACEAE**
33. Petals fused only at base. Anthers dehiscing longitudinally. Styles absent or short. Stigmas subsessile. ..... **AQUIFOLIACEAE**
32. Petals free.
34. Stamens 15 or more. ..... **ROSACEAE**
34. Stamens 4–6.
35. Petals clawed; cucullate. Stamens opposite petals. Nectary disks present. ..... **RHAMNACEAE**
35. Petals not clawed; not cucullate. Stamens alternate with petals. Nectary disks absent.
36. Inflorescences racemes; terminal. Fruits capsules. ..... **ITEACEAE**
36. Inflorescences solitary flowers or cymose clusters; axillary. Fruits drupes, stones 4 or 5 [hence falsely resembling berries]. ..... **AQUIFOLIACEAE**

GROUP G: Plants aquatic herbs. Plants floating on or submerged in or emergent from water.

1. Plants free-floating in water column or on surface of water [receding water may strand plants on substrate].
2. Plants floating on surface.
3. Leaves 4–10 cm long.
4. Petioles or stems not inflated. Abaxial surfaces of blades spongy. Flowers imperfect. Ovaries inferior. Fruits berries. ..... **HYDROCHARITACEAE**
4. Petioles or stems inflated. Abaxial surfaces of blades not spongy. Flowers perfect. Ovaries superior. Fruits capsules.
5. Leaves simple; blades suborbicular to broadly elliptic. Flowers 4–6 cm long. Stamens 3. ..... **PONTEDERIACEAE**
5. Leaves pinnately compound; blades of leaflets filiform. Flowers 0.4–0.5 cm long. Stamens 5. ..... **PRIMULACEAE**
3. Leaves less than 1.5 cm long or absent.
6. Stems 3–7 cm long; inflated; radiating and forming conspicuous floating whorls at surfaces; bearing finely dissected branches with numerous sac-like bladders. Flowers conspicuous; borne on scapes 10–15 cm long above water surface. Corollas yellow; bilaterally symmetrical. ..... **LENTIBULARIACEAE**
6. Stems less than 0.5 cm long or absent. Dissected branches absent. Bladders absent. Flowers inconspicuous or not produced. Scapes absent. Corollas absent.
7. Plants thalloid; producing flowers and fruits. Spores produced in anthers and ovaries. ..... **ARACEAE**
7. Plants differentiated into stems and fronds (leaves); not producing flowers and fruits. Spores produced in soft, thin-walled sporocarps.
8. Fronds less than 1 mm long; imbricate; dull reddish green; adaxial surfaces glabrous. ..... **AZOLLACEAE**

8. Fronds 5–15 mm long; not imbricate; bright green;
adaxial surfaces with short, branched, multicellular hairs. ..... **SALVINIACEAE**

2. Plants floating submerged in water column.
9. Plants without leafy stems.
10. Branches whorled; not dissected; without sac-like bladders; consisting of 1–5 macroscopic cells. Joints of stem consisting of single macroscopic cells. Flowers and fruits absent. Oogonia and antheridia present [macroscopic non-vascular family occasionally collected in ponds and lakes]. ..... **CHARACEAE**
10. Branches alternate; finely dissected with numerous sac-like bladders; consisting of many microscopic cells. Joints of stem consisting of many microscopic cells. Flowers and fruits present. Oogonia and antheridia absent. Flowers borne on scapes 10–15 cm above water surface. Petals yellow; bilaterally symmetrical. ..... **LENTIBULARIACEAE**
9. Plants with leafy stems.
11. Leaves alternate. ..... **POTAMOGETONACEAE**
11. Leaves whorled or opposite.
12. Leaf blades dichotomously or pinnately dissected.
13. Leaves dichotomously dissected. Flowers submerged. ..... **CERATOPHYLLACEAE**
13. Leaves pinnately dissected. Flowers borne at water surface or above. ..... **HALORAGACEAE**
12. Leaf blades entire or serrulate or denticulate.
14. Leaves elliptic to linear-lanceolate. Flowers borne at water surface or just above. Petals 3; white. ..... **HYDROCHARITACEAE**
14. Leaves filiform to narrowly linear. Flowers submerged. Petals 0.
15. Leaf bases sheathing stems. Stipules absent. Pistils 1. Stigmas linear. Fruits terete; not beaked; not curved. ..... **HYDROCHARITACEAE**
15. Leaf bases not sheathing stems. Stipules present; hyaline to scarious. Pistils 2–8. Stigmas funnelform. Fruits flattened; beaked; curved. ..... **POTAMOGETONACEAE**.

1. Plants rooted in substrate; stems and leaves submerged in or floating on or emergent from water.
18. Stems bearing finely dissected branches [falsely resembling leaves]. Sac-like bladders. .....**LENTIBULARIACEAE**
18. Stems not bearing finely dissected branches. Sac-like bladders.
19. Leaves compound or dissected into filiform or linear segments.
20. Plants attached to rocks by fleshy disks; forming mats or crusts. ..... **PODOSTEMACEAE**
20. Plants attached to substrate by roots; not forming mats or crusts.
21. Leaves pinnately compound or pinnately dissected.
22. Leaflets ovate or oval. Terminal leaflets larger than lateral ones; somewhat fleshy. ..... **BRASSICACEAE**
22. Leaflets or leaf segments oblong or linear or filiform. Terminal leaflets if present not larger than laterals; not fleshy.
23. Inflorescences compound umbels. Petioles of lower cauline leaves sheathing. ..... **(*Berula*) APIACEAE**
23. Inflorescences racemes or spikes or solitary flowers. Petioles of lower cauline leaves not sheathing.
24. Stems and peduncles inflated. Stamens 5. Fruits capsules. ..... **PRIMULACEAE**
24. Stems and peduncles not inflated. Stamens 4 or 6 or 8. Fruits siliques or silicles or nuts or schizocarps.
25. Leaves all alike; emergent ones dissected. ..... **HALORAGACEAE**
25. Leaves of 2 forms; emergent ones not dissected.
26. Inflorescences racemes; terminal. Petals 4. Stamens 6. Pistils 2-carpellate. Fruits siliques or silicles. ..... **BRASSICACEAE**
26. Inflorescences solitary flowers; axillary. Petals 0. Stamens 3. Pistils 3-carpellate. Fruits nut-like. ..... **HALORAGACEAE**

21. Leaves palmately compound or palmately dissected or dichotomously compound.
    27. Leaflets 4; obdeltoid or flabellate; venation dichotomous. Flowers absent. Spores produced in sori borne in hard sporocarps in axils of leaves. ..... **MARSILEACEAE**
    27. Leaflets of various numbers; filiform or linear; venation comprising a single vein. Flowers present. Spores produced in anthers and ovaries.
        28. Leaves alternate.
            29. Leaves dichotomously compound. Plants attached to rocks by fleshy disks; forming mats or crusts. ..... **PODOSTEMACEAE**
            29. Leaves palmately compound or dissected. Plants attached to substrate by roots; not forming mats or crusts. ..... **RANUNCULACEAE**
        28. Leaves opposite or whorled.
            30. Leaves dichotomously 1–4 compound. Flowers submerged; inconspicuous. Plants may be embedded in substrate, but not rooted. ..... **CERATOPHYLLACEAE**
            30. Leaves palmately 1-compound. Flowers borne at water surface; showy. Plants rooted in substrate. ..... **CABOMBACEAE**

19. Leaves simple; not dissected into filiform or linear segments.
    31. Leaves submerged or floating [receding water level may cause plants and leaves to appear emergent].
        32. Leaf blades floating on surface.
            33. Leaves peltate or cordate.
                34. Leaves peltate.
                35. Perianth parts 5. Pistils 1; compound; styles 2; ovaries inferior. ..... **ARALIACEAE**
                35. Perianth parts 6 or 8 or 22–30. Pistils 2–40; simple; styles 1 or 0; ovaries superior.
                36. Blades 2–14 cm wide. Perianth parts 6–8; reddish purple or white to cream with basal yellow auricles. Styles present. Fruit achene-like or follicle-like; not enclosed in cavities of enlarged receptacle. ..... **CABOMBACEAE**
                36. Blades 30–70 cm wide. Perianth parts 22–30; yellow to greenish yellow. Styles absent. Fruits nuts; each loose in cavitgies of enlarged receptacle. ..... **NELUMBONACEAE**
                34. Leaves cordate.
                37. Flowers 0.2–0.5 cm in diameter. Ovaries inferior. Styles 2; stylopodia present. Fruits schizocarps. ..... **ARALIACEAE**
                37. Flowers 2–25 cm in diameter. Ovaries superior. Styles 0 or 1 or 12 or more; stylopodia absent. Fruits capsules or berries.
                38. Leaf margins crenate. Stamens 5. Petals 5; fused; margins fringed; valvate in bud. Fruits capsules; beaked. ..... **MENYANTHACEAE**
                38. Leaf margins entire. Stamens numerous. Petals 12 or more; free; margins entire; imbricate in bud. Fruits berries; not beaked. ..... **NYMPHAEACEAE**
            33. Leaves of various shapes, but not peltate or cordate.
                39. Plants acaulescent. Petals 3. Stamens 12 or more. Pistils 12 or more. ..... **ALISMATACEAE**
                39. Plants caulescent. Petals 4 or 5 or 0. Stamens 1 or 4 or 8 or 10. Pistils 1.
                40. Stipules present. Venation parallel or parallel convergent or a single vein. Fruits drupe-like. ..... **POTAMOGETONACEAE**
                40. Stipules absent. Venation pinnate or palmate. Fruits capsules or nutlets.
                41. Leaves less than 15 mm long. Flowers imperfect. Plants monecious. Fruits 2 or 4 nutlets. ..... **PLANTAGINACEAE**

41. Leaves more than 15 mm long. Flowers perfect. Fruits capsules.
42. Venation pinnate. Corollas radially symmetrical or absent. Petals free or absent. Ovaries inferior. ..... **ONAGRACEAE**
42. Venation palmate. Corollas bilaterally symmetrical. Petals fused. Ovaries superior. ..... **PLANTAGINACEAE**

32. Leaf blades submerged.
43. Leaf blades dichotomously or trichotomously dissected into linear-filiform segments; orbicular or suborbicular in outline. ..... **CABOMBACEAE**
43. Leaf blades not dissected into linear-filiform segments; not orbicular in outline.
44. Leaves obovate or oblanceolate or elliptic or linear-lanceolate.
45. Leaves whorled; elliptic or linear-lanceolate. ..... **HYDROCHARITACEAE**
45. Leaves opposite; obovate or oblanceolate.
46. Stipules present. Flowers perfect. Fruits capsules. ..... **ELATINACEAE**
46. Stipules absent. Flowers imperfect. Plants monoecious. Fruits 4 nutlets; winged. ..... **PLANTAGINACEAE**
44. Leaves linear or filiform.
47. Plants cespitose; attached to rocks by fleshy disks and forming mats or crusts on them. ..... **PODOSTEMACEAE**
47. Plants rhizomatous or with stems rooting at nodes; not attached to rocks by fleshy disks.
48. Leaves alternate or basal.
49. Leaves basal. Stipular sheaths absent. Flowers absent. Spores produced in sori borne in hard sporocarps in axils of leaves. ..... **MARSILEACEAE**
49. Leaves alternate. Stipular sheaths present. Flowers present. Spores produced in anthers and ovaries.
50. Flowers borne in 2–5 whorls on peduncles elongated above water surface. Perianth parts present. Stamens 4. ..... **POTAMOGETONACEAE**
50. Flowers borne in 1 whorl on peduncle below water surface. Perianth parts absent. Stamens 2. ..... **RUPPIACEAE**
48. Leaves opposite or appearing whorled.
51. Leaf bases not sheathing stems. Apices of leaf blades obtuse; notched.
52. Fruits capsules. Perianth parts present. ..... **LYTHRACEAE**
52. Fruits nutlets. Perianth parts absent. [2, whitish bracteoles present; hence flowers falsely appearing to have perianth]. ..... **PLANTAGINACEAE**
51. Leaf bases sheathing stems. Apices of leaf blades acute; not notched.
53. Leaf sheaths conspicuously inflated and elongated; 6–10 mm long. Flowers borne on elongated peduncles. ..... **RUPPIACEAE**
53. Leaf sheaths not conspicuously inflated nor elongated; 0.2–4 mm long. Flowers borne in axils of leaves.
54. Leaf bases sheathing stems. Stipules absent. Pistils 1. Stigmas linear. Fruits terete; not beaked; not curved. ..... **HYDROCHARITACEAE**
54. Leaf bases not sheathing stems. Stipules present; hyaline to scarious. Pistils 2–8. Stigmas funnelform. Fruits flattened; beaked; curved. ..... **POTAMOGETONACEAE**

31. Leaves emergent.
55. Venation pinnate or palmate or pinnipalmate.
56. Plants acaulescent. Leaves basal.
57. Leaves peltate. Blades 30–70 cm wide. Perianth parts 22–30; yellow or greenish yellow. Fruits nuts; each loose in cavities of enlarged receptacle. ..... **NELUMBONACEAE**
57. Leaves of various shapes but not peltate. Blades 1–25 cm wide. Perianth parts 10 or 12; white or purple or yellow-brown or green. Fruits schizocarps or capsules or berries or achenes; receptacles not enlarged with cavities.
58. Flowers 5-merous. Fruits schizocarps. ..... **ARALIACEAE**
58. Flowers 3-merous. Fruits capsules or berries or achenes.
59. Corollas bilaterally symmetrical; purple. Ovaries inferior. Fruits capsules. ..... **MARANTACEAE**
59. Corollas radially symmetrical or absent; white. Ovaries superior. Fruits berries or achenes.
60. Inflorescences spadices. Spathes present. Fruits berries. ..... **ARACEAE**
60. Inflorescences racemes; flowers borne in whorls of 3. Spathes absent. Fruits achenes. ..... **ALISMATACEAE**
56. Plants caulescent. Leaves cauline.
61. Corollas bilaterally symmetrical.
62. Seeds 2–4. Anther apices recurved. Anthers borne at 45 degree angle to filaments. ..... **ACANTHACEAE**
62. Seeds 12 or more. Anther apices not recurved. Anthers borne vertically or at less than 45 degree angle to filaments.
63. Fertile stamens 2.
64. Calyces 4-lobed. Corollas 4-lobed; rotate. Capsules obcordate. ..... **PLANTAGINACEAE**
64. Capsules 5-lobed. Corollas 5-lobed; bilabiate. Capsules ovoid or ellipsoidal.
65. Staminodia present; 2. Calyces not subtended by bracteoles. ..... **LINDERNIACEAE**
65. Staminodia absent. Calyces subtended by 2 bracteoles. ..... **PLANTAGINACEAE**
63. Fertile stamens 4.
66. Upper leaves petiolate. ..... **PHRYMACEAE**
66. Upper leaves sessile.
67. Flowers subtended by 2 bracteoles. ..... **PLANTAGINACEAE**
67. Flowers subtended by 1 bracteole or bracteole absent.
68. Corollas tubular-campanulate to inconspicuously bilabiate. ..... **PLANTAGINACEAE**
68. Corollas bilabiate. ..... **PHRYMACEAE**
61. Corollas radially symmetrical or absent.
69. Ovaries inferior. ..... **ONAGRACEAE**
69. Ovaries superior.
70. Leaves opposite.
71. Fruits nutlets. Perianth parts absent [2, whitish bracteoles present; hence flowers falsely appearing to have perianths]. ..... **PLANTAGINACEAE**
71. Fruits capsules. Perianth parts present.
72. Stems 4-sided. Petals 4 or 6. Styles 1 or 0. Hypanthia present. ..... **LYTHRACEAE**
72. Stems terete. Petals 3 or 5. Styles 3 or 5. Hypanthia absent. ..... **ELATINACEAE**
70. Leaves alternate.

73. Leaves of 2 forms; submerged ones pinnately compound or pinnately dissected; emergent ones simple. Inflorescences racemes or solitary flowers.
74. Inflorescences racemes; terminal. Petals 4. Pistils 2-carpellate. Fruits siliques or silicles. ..... **BRASSICACEAE**
74. Inflorescences solitary flowers; axillary. Petals 0. Pistils 3-carpellate. Fruits nut-like. ..... **HALORAGACEAE**
73. Leaves all alike. Inflorescences spikes or spicate racemes or paniculate cymes or cymose clusters.
75. Perianth parts absent. Pistils 3 or 4 per flower; fused at base. Fruits capsules. ..... **SAURURACEAE**
75. Perianth parts present. Pistils 1 per flower. Fruits achenes or siliques or capsules.
76. Stipules present as ocrea. Fruits achenes. Seeds 1. ..... **POLYGONACEAE**
76. Stipules absent. Fruits siliques or capsules. Seeds numerous to many.
77. Plants armed with thorns at nodes. Styles 2. Fruits capsules. ..... **HYDROLEACEAE**
77. Plants not armed. Styles 1. Fruits siliques. ..... **BRASSICACEAE**
55. Venation parallel or parallel-convergent or a single vein.
78. Leaf blades sagittate or cordate or ovate or elliptic; venation parallel-convergent or a single vein.
79. Leaves opposite. ..... **PLANTAGINACEAE**
79. Leaves alternate or basal. Perianth parts present.
80. Pistils 12 or more per flower. Perianth parts in 2-series; parts free. Fruits achenes. ..... **ALISMATACEAE**
80. Pistils 1 per flower. Perianth parts in 1-series; parts fused. Fruits capsules or utricles. ..... **PONTEDERIACEAE**
78. Leaf blades linear or narrowly linear-lanceolate; venation parallel. ..... **couplet 81**

81. Plants caulescent. Leaves cauline.
82. Perianth parts petaloid or sepaloid.
83. Inflorescences spadices. Spathes present. Peduncles 3-angled. ..... **ACORACEAE**
83. Inflorescences panicles or glomerules or head-like clusters. Spathes absent. Peduncles terete or flattened. ..... **JUNCACEAE**
82. Perianth parts absent or bristles or scales.
84. Stems jointed, nodes and internodes distinct. Each flower subtended by 2 or more bracts. Stigmas feathery. ..... **POACEAE**
84. Stems not jointed, nodes and internodes not distinct. Each flower subtended by 1 bract or bracts absent. Stigmas barbellate or smooth.
85. Leaves 3-ranked. Margins of leaf sheaths fused to form tubes. ..... **CYPERACEAE**
85. Leaves 2-ranked. Margins of leaf sheaths overlapping, not fused. ..... **TYPHACEAE**
81. Plants acaulescent. Leaves basal.
86. Flowers absent. Spores produced in sporangia at bases of leaves or in subterranean sporocarps.
87. Plants cespitose; corms 2-5 lobed. Leaves 5-60 cm long; divided into 4 longitudinal cavities; bases enlarged. Sporangia embedded in leaf bases. ..... **ISOETACEAE**
87. Plants rhizomatous. Leaves 2-5 cm long; not divided into 4 longitudinal cavities; bases not enlarged. Sporangia borne in subterranean sporocarps. ..... **MARSILEACEAE**
86. Flowers present. Spores produced in anthers or ovaries.
88. Perianth parts absent or 6 inconspicuous bristles or 6 scales.
89. Leaves inconspicuous, reduced to scales or bladeless sheaths at stem bases. Plants appearing to consist only of green leafless stems. ..... **CYPERACEAE**
89. Leaves conspicuous, with well-developed blades and petioles or sheaths. Plants not appearing to consist only of green leafless stems.

90. Leaves 2-ranked. Margins of leaf sheaths overlapping, not fused
Inflorescences heads, globose; 6 or more per peduncle; multiple
staminate heads above multiple pistillate heads. ..... **TYPHACEAE**
90. Leaves 3-ranked. Margins of leaf sheaths fused. Inflorescences of
various types, 1-4 per peduncle; multiple staminate heads not borne
above multiple pistillate heads. ..... **CYPERACEAE**
88. Perianth parts present; petaloid or sepaloid.
91. Flowers imperfect. Plants monoecious. Pistils 12 or more per flower. Stamens 12
or more. Inflorescences racemes or multiple heads. Fruits achenes.
92. Inflorescences racemes; flowers borne in whorls of 3. Perianth
parts in 2-series. Petals white. Achenes beakless. ..... **ALISMATACEAE**
92. Inflorescences heads; flowers numerous. Perianth parts
in 1-series. Petals absent. Achenes beaked. ..... **TYPHACEAE**
91. Flowers perfect. Pistils 1 per flower. Stamens 3 or 4 or 6.
Inflorescences solitary spikes or solitary heads. Fruits capsules.
93. Perianth parts yellow; glabrous. Stamens 3; anthers yellow. ..... **XYRIDACEAE**
93. Perianth parts gray-black; bearing fleshy appendages at apices.
Stamens 4 or 6; anthers black. ..... **ERIOCAULACEAE**

GROUP H: Plants herbaceous epiphytes or herbaceous vines.

1. Chlorophyll absent. Stems filamentous, typically forming tangled masses on host plants,
or embedded entirely in tissues of host plants. Leaves absent or reduced to scales. ..... **CONVOLVULACEAE**
1. Chlorophyll present. Stems not filamentous nor imbedded in host tissues. Leaves present.
2. Plants epiphytes.
3. Leaf margins entire. Flowers present; imperfect. Spores produced in
anthers or ovaries. Fruits berries; white. [Plants woody, but distal portion of
stems herbaceous. Plants semiparasitic]. ..... **SANTALACEAE**
3. Leaf (frond) margins pinnately lobed. Flowers absent. Spores produced
in sori on abaxial surfaces of fronds. Fruits absent. ..... **POLYPODIACEAE**
2. Plants vines.
4. Stems climbing by tendrils.
5. Leaves simple.
6. Leaf margins entire or finely denticulate. Venation pinnate or
parallel-convergent.
7. Venation pinnate. Inflorescences racemes; elongate; terminal.
Perianth parts 5. Fruits achenes. ..... **POLYGONACEAE**
7. Venation parallel-convergent. Inflorescences umbels; axillary.
Perianth parts 6. Fruits berries. ..... **SMILACACEAE**
6. Leaf margins lobed or serrate. Venation palmate.
8. Flowers with a conspicuous fringed corona attached to hypanthial
cup; perfect. Petals free. Styles 3. Ovaries superior. ..... **PASSIFLORACEAE**
8. Flowers without a fringed corona; imperfect. Petals fused.
Styles 1. Ovaries inferior. ..... **CUCURBITACEAE**
5. Leaves compound.
9. Leaves opposite. Perianth parts in 1-series. Fruits achenes.
Styles plumose; elongate. ..... **RANUNCULACEAE**
9. Leaves alternate. Perianth parts in 2-series. Fruits legumes
or capsules. Styles not plumose; not elongate.
10. Leaves 1-compound. Tendrils borne on leaves, formed from
ultimate leaflets. Flowers papilionaceous. Fruits legumes. ..... **FABACEAE**
10. Leaves 2- or 3-compound. Tendrils borne on peduncles of
inflorescences. Flowers funnelform. Fruits capsules;
inflated; 3-loculed; with 3 round black seeds. ..... **SAPINDACEAE**
4. Stems trailing or climbing by twining; tendrils absent.
11. Plants not producing flowers and seeds. Spores produced in sporangia borne
in 2-rowed aggregations at ends of oblong marginal lobes of pinnules. ..... **LYGODIACEAE**

11. Plants producing flowers and seeds. Spores produced in sporangia borne in anthers or ovaries.
    12. Leaves alternate.
        13. Upper cauline leaves compound. Fruits legumes. ..... **FABACEAE**
        13. Upper cauline leaves simple. Fruits capsules or achenes or drupes.
            14. Perianth parts in 2-series.
                15. Petals 3 or 6, free. Fruits drupes; red at maturity; stone curved into a closed spiral. [Plants woody, but distal portions of stems herbaceous]. ..... **MENISPERMACEAE**
                15. Petals 5, fused. Fruits capsules or achenes.
                16. Venation not apparent. Corollas bilaterally symmetrical. Fruits spiny achenes. ..... **KRAMERIACEAE**
                16. Venation pinnate or palmate. Corollas radially symmetrical. Fruits capsules. ..... **CONVOLVULACEAE**
            14. Perianth parts in 1-series or absent.
                17. Stipules present as ocrea, sheathing stems. Perianth parts 3. Fruits achenes; trigonous; not winged; black at maturity. ..... **POLYGONACEAE**
                17. Stipules absent. Perianth parts 6. Fruits capsules. Seeds 1 or 2; flat; winged; golden-brown at maturity. ..... **DIOSCOREACEAE**
    12. Leaves opposite or whorled.
        18. Leaves whorled; becoming opposite or alternate above. ..... **DIOSCOREACEAE**
        18. Leaves opposite at all nodes.
            19. Petals absent.
                20. Leaves simple. Perianth parts sepaloid. Inflorescences of 2 types: pistillate flowers in drooping clustered spikes; staminate flowers in drooping panicles. ..... **CANNABACEAE**
                20. Leaves compound. Perianth parts petaloid. Inflorescences all alike; panicles or solitary flowers. ..... **RANUNCULACEAE**
            19. Petals present.
                21. Inflorescences heads with 4 florets; arrangement cymose-paniculate. Ovaries inferior. Pappus present; numerous capillary bristles. Fruits achenes. ..... **ASTERACEAE**
                21. Inflorescences umbels or cymes or racemes; flowers 5–many. Ovaries superior. Pappus absent. Fruits follicles; seeds 12 or more. ..... **APOCYNACEAE**

GROUP I: Plants parasitic or saprophytic or mycotrophic herbs. Chlorophyll absent.

1. Stems filamentous, typically forming tangled masses on host plants. Leaves absent or reduced to scales. ..... **CONVOLVULACEAE**
1. Stems not filamentous nor imbedded in host tissues. Leaves present.
    2. Ovaries inferior. Stamens 1. ..... **ORCHIDACEAE**
    2. Ovaries superior. Stamens 4 or 8 or 10.
        3. Corollas radially symmetrical. Leaves cauline. Fertile stamens 8 or 10. Sepals deciduous. ..... **ERICACEAE**
        3. Corollas bilaterally symmetrical. Leaves basal. Fertile stamens 4. Sepals persistent. ..... **OROBANCHACEAE**

GROUP J: Plants acaulescent or caulescent herbs. Spores produced in strobili or sori or sporocarps or in aggregations of sporangia at ends of elongate stalks.

1. Leaves (microphylls) scale-like; less than 1 cm long; veins 1, unbranched. Aerial stems present. Strobili present; terminal.
    2. Stems jointed, fluted; internodes hollow. Leaves whorled and forming sheaths around stems. ..... **EQUISETACEAE**
    2. Stems not jointed, not fluted; internodes solid. Leaves spiraled and imbricate.
        3. Leaves 1–3 mm long. Strobili 4-angled. Spores of 2 sizes. ..... **SELAGINELLACEAE**

3. Leaves 6–7 mm long. Strobili cylindrical. Spores of 1 size. ..... **LYCOPODIACEAE**

1. Leaves (megaphylls) not scale-like; more than 1 cm long; veins 2 or more, branched. Aerial stems absent. Strobili absent.
    4. Leaves linear or filiform.
        5. Plants bearing both simple and dichotomously compound leaves. Pinnae present; margins bearing 1–3 teeth. Sporangia produced in sori on abaxial surfaces of pinnae. ..... **ASPLENIACEAE**
        5. Plants bearing only simple leaves. Pinnae absent. Sporangia produced in cavities at bases of leaves or in subterranean sporocarps.
            6. Plants cespitose; corms 2–5 lobed. Leaves 5–60 cm long; divided into 4 longitudinal cavities; bases enlarged. Sporangia embedded in leaf bases. ..... **ISOETACEAE**
            6. Plants rhizomatous. Leaves 2–5 cm long; not divided into 4 longitudinal cavities; bases not enlarged. Sporangia borne in subterranean sporocarps. ..... **MARSILEACEAE**
    4. Leaves of various shapes, but not linear nor filiform.
        7. Plants climbing. Leaves twining. Sporangia clustered in 2-rowed aggregations at ends of oblong marginal lobes of pinnules. ..... **LYGODIACEAE**
        7. Plants not climbing. Leaves not twining. Sporangia clustered in sori or in aggregations at ends of elongate stalks.
            8. Leaves palmately compound. Leaflets 4, obdeltoid or flabellate. Spores produced in sori borne in hard sporocarps in axils of leaves (fronds). ..... **MARSILEACEAE**
            8. Leaves simple or pinnately compound. Leaflets when present not obdeltoid nor flabellate. Spores produced in sori on abaxial surfaces of leaves (fronds) or in aggregations of sporangia at ends of stalks. Sporocarps absent.
                9. Sori absent.
                10. Fronds (leaves) simple. ..... **OPHIOGLOSSACEAE**
                10. Fronds (leaves) compound.
                11. Fronds of 2 types. Sterile fronds foliaceous. Fertile fronds stalk-like and bearing aggregations of sporangia at ends.
                12. Pairs of pinnae 15–25. Bases of pinnae with tufts of reddish brown hairs. ..... **OSMUNDACEAE**
                12. Pairs of pinnae 1–12. Bases of pinnae without tufts of reddish brown hairs. [Fronds of 1 type, but divided near base; hence falsely appearing as 2 types of fronds]. ..... **OPHIOGLOSSACEAE**
                11. Fronds of 1 type, differentiated into basal sterile and apical fertile segments. Sterile segments foliaceous. Fertile segments bearing paniculate aggregations of sporangia.
                13. Blades of sterile segments of fronds 3–15 cm long. Rhizomes absent. Roots fleshy. Reproductive segment of frond arising from base of vegetative segment. Sporangia fused to form 2 rows. ..... **OPHIOGLOSSACEAE**
                13. Blades of sterile segments of fronds 20–50 cm long. Rhizomes present. Roots not fleshy. Reproductive segment of frond arising at apex of vegetative segment. Sporangia free. ..... **OSMUNDACEAE**
                9. Sori present.
                14. Abaxial surfaces of blades with fringed or stellate scales. ..... **PTERIDACEAE**
                14. Abaxial surfaces of blades glabrous or pubescent.
                15. Fronds of 2 types, sterile and fertile.
                16. Sterile and fertile fronds conspicuously different. Sterile fronds separate from fertile fronds. Blade bases not auriculate.
                17. Margins of sterile blades entire or lobed. Ultimate segments of sterile blades and pinnae opposite to subopposite. Fertile fronds 2-pinnately compound; ultimate segments globose. Sori not visible, enclosed within ultimate segments. Indusia not conspicuous. ..... **ONOCLEACEAE**

17. Margins of sterile blades serrate. Ultimate segments of sterile blades and pinnae alternate. Fertile fronds 1-pinnately compound; ultimate segments linear. Sori visible, not enclosed within ultimate segments. Indusia conspicuous. ..... **BLECHNACEAE**

16. Sterile and fertile fronds not conspicuously different. Sterile fronds clustered with fertile fronds. Blade bases auriculate.

18. Fertile fronds 2-pinnately compound at bases. Sori covered partially or completely by revolute margins of blades. ..... **PTERIDACEAE**

18. Fertile fronds 1-pinnately compound at bases. Sori not covered by revolute margins of blades.

19. Distal fertile pinnae abruptly reduced in size. Sori borne only on distal pinnae of fertile fronds; orbicular; becoming contiguous. Rachises and stipes scaly. ..... **DRYOPTERIDACEAE**

19. Distal fertile pinnae gradually reduced in size. Sori borne on distal, medial and proximal pinnae of fertile fronds; linear-oblong. Rachises and stipes not scaly. ..... **ASPLENIACEAE**

15. Fronds all alike, not differentiated into sterile and fertile.

20. Fronds simple.

21. Plants with needle-like hairs. Blades triangular; twice pinnatifid. ..... **THELYPTERIDACEAE**

21. Plants without needle-like hairs. Blades not triangular nor twice pinnatifid.

22. Blade apices not attenuate; margins pinnatifid or pinnatisect; bases not cordate; abaxial surfaces covered with reddish brown scales with transparent margins. Stipes scaly. Sori embedded. Indusia absent. ..... **POLYPODIACEAE**

22. Blade apices attenuate; margins entire or lobed; bases cordate; abaxial surfaces without scales. Stipes not scaly. Sori not embedded. Indusia present. ..... **ASPLENIACEAE**

20. Fronds 1- to 5-compound.

23. Sori located at the margins of blades.

24. Sori not covered by revolute or reflexed margins of pinnae or pinnules or ultimate segments.

25. Blades linear to linear-oblong; adaxial scales present. Sori contiguous, inconspicuous; indusia absent. ..... **PTERIDACEAE**

25. Blades ovate to lanceolate; adaxial scales absent. Sori separate, conspicuous; indusia present. ..... **DRYOPTERIDACEAE**

24. Sori covered partially or completely by revolute or reflexed margins of pinnae or pinnules or ultimate segments.

26. Abaxial surfaces of blades cream or white. ..... **PTERIDACEAE**

26. Abaxial surfaces of blades green.

27. Blades broadly triangular. Sori partially covered by both hyaline indusium and revolute margin of blades. Croziers silver; claw-like. Rhizome scales absent. ..... **DENNSTAEDTIACEAE**

27. Blades flabellate or narrowly triangular or lanceolate or elliptic or reniform or rhomboidal. Sori covered only by margin of blades. Croziers not silver nor claw-like. Rhizome scales present. ..... **PTERIDACEAE**

23. Sori not located at the margins of blades.

28. Plants with transparent needle-like hairs. ..... **THELYPTERIDACEAE**

28. Plants without transparent needle-like hairs.
29. Indusia attached at centers of sori. ..... **DRYOPTERIDACEAE**
29. Indusia attached at bases or along margins of sori.
30. Indusia attached at bases of sori. ..... **WOODSIACEAE**
30. Indusia attached along margins of sori.
31. Stipes black or brown or green or reddish brown; terete. Rhizome scales clathrate. Fronds evergreen. Indusia not crossing veins. ..... **ASPLENIACEAE**
31. Stipes stramineous; angular or flattened. Rhizome scales not clathrate. Fronds deciduous. Indusia crossing veins. ..... **WOODSIACEAE**

GROUP K: Plants acaulescent herbs. Plants producing flowers and seeds.

1. Leaves inconspicuous, reduced to scales or bladeless sheaths at stem bases. Plants appearing to consist only of green leafless stems. ..... **CYPERACEAE**
1. Leaves conspicuous, with well-developed blades. Plants consisting of leaves and scapes.
2. Emerging leaves not forming conspicuous rosettes or tufts. Flowers borne on scapes that emerge from ground separately from leaves.
3. Leaves compound.
4. Inflorescences spadices. Spathes present. Flowers imperfect; borne in same inflorescence, staminate above the pistillate. Fruits berries. ..... **ARACEAE**
4. Inflorescences racemes or cymes or solitary flowers. Spathes absent. Flowers perfect. Fruits capsules or achenes.
5. Leaves 2-compound. Inflorescences racemes. Corollas bilaterally symmetrical. ..... **PAPAVERACEAE**
5. Leaves 1-compound. Inflorescences cymes or solitary flowers. Corollas radially symmetrical.
6. Pistils 1. Leaflets obcordate. ..... **OXALIDACEAE**
6. Pistils 12 or more. Leaflets of various shapes, but not obcordate. ..... **RANUNCULACEAE**
3. Leaves simple.
7. Leaf margins entire or weakly undulate.
8. Inflorescences spadices or heads.
9. Leaves with sheaths. Inflorescences spadices. Spathes present. Perianth parts 6 or 0.
10. Venation parallel. Spathes not enclosing spadices. Spadices borne laterally on 3-angled peduncles. Flowers perfect. Perianth parts 6. ..... **ACORACEAE**
10. Venation pinnate or palmate. Spathes enclosing spadices. Spadices borne erect and sessile. Flowers imperfect. Perianth parts 0. ..... **ARACEAE**
9. Leaves without sheaths. Inflorescences heads. Spathes absent. Perianth parts 5. ..... **ASTERACEAE**
8. Inflorescences racemes or spikes or panicles or umbels or solitary flowers.
11. Perianths bilaterally symmetrical. Stamens 1 or 2; united with style to form a column. ..... **ORCHIDACEAE**
11. Perianths radially symmetrical. Stamens 6 or 12; free, not united with a style.
12. Perianth parts 3. Stamens 12. Leaves cordate-reniform. ..... **ARISTOLOCHIACEAE**
12. Perianth parts 6. Stamens 6. Leaves linear or lanceolate or ovate.
13. Perianths 7–16 cm long; salverform. Ovaries inferior. ..... **AMARYLLIDACEAE**
13. Perianths 1.5–3 cm long; rotate. Ovaries superior. ..... **ASPARAGACEAE**
7. Leaf margins crenate or lobed or cleft or toothed.
14. Leaf blades orbicular; peltate or nearly so.
15. Styles 2. Ovaries inferior. ..... **ARALIACEAE**
15. Styles 5. Ovaries superior. ..... **GERANIACEAE**
14. Leaf blades flabellate or reniform or cordate; not peltate.
16. Stamens 5 or 10. Sepals 5; persistent.

17. Flowers radially symmetrical. Petals not spurred. Fruits schizocarps; dehiscing into 5, 1-seeded beaked mericarps. ..... **GERANIACEAE**
17. Flowers bilaterally symmetrical. Petals spurred. Fruits capsules. ..... **VIOLACEAE**
16. Stamens 20 or more. Sepals 0 or 2; caducous.
18. Pistils 1. Fruits capsules. Sap of rhizomes red-orange. ..... **PAPAVERACEAE**
18. Pistils 20 or more. Fruits achenes. Sap of tubers colorless. ..... **RANUNCULACEAE**

2. Emerging leaves forming conspicuous rosettes or tufts. Flowers borne on scapes that emerge from centers of rosettes or tufts.
19. Leaves compound.
20. Leaves 2- or 3-compound. Ovaries inferior. ..... **APIACEAE**
20. Leaves 1-compound. Ovaries superior.
21. Inflorescences umbels. Stamens 5. Fruits schizocarps; dehiscing into 5, 1-seeded, beaked mericarps. ..... **GERANIACEAE**
21. Inflorescences of various types, but not umbels. Stamens 6 or more. Fruits achenes or drupes or berries or legumes or aggregates of achenes.
22. Corollas papilionaceous. Fruits legumes. ..... **FABACEAE**
22. Corollas of various shapes, but not papilionaceous. Fruits achenes or berries or aggregates of achenes.
23. Leaflets 30–45 cm long; arrangement conspicuously flabellate. Stamens 6. ..... **ARECACEAE**
23. Leaflets 0.5–10 cm long; arrangement pinnate or palmate. Stamens 10 or more.
24. Stipules present. Perianth parts in 2-series. ..... **ROSACEAE**
24. Stipules absent. Perianth parts in 1-series. ..... **RANUNCULACEAE**
19. Leaves simple.
25. Leaves spathulate or clavate; covered with long glandular hairs that exude a clear glistening sticky secretion. Plants insectivorous. ..... **DROSERACEAE**
25. Leaves of various shapes; with various types of pubescence, but not covered with long glandular hairs. Plants not insectivorous.
26. Perianth parts absent.
27. Leaves ovate to triangular; bases sagittate to hastate. Inflorescences spadices. ..... **ARACEAE**
27. Leaves linear or linear-lanceolate. Inflorescences spikelets.....**CYPERACEAE**
26. Perianth parts present. ..... **couplet 28**

28. Perianth parts in 2-series.
29. Perianth parts in 3s.
30. Petals yellow. ..... **XYRIDACEAE**
30. Petals white or pink.
31. Flowers borne in fascicles at ends of inflorescence branches. Pistils 1. ..... **POLYGONACEAE**
31. Flowers borne in whorls of 3 along a rachis. Pistils 25 or more. ..... **ALISMATACEAE**
29. Perianth parts in 4s or 5s.
32. Perianth parts in 4s.
33. Ovaries inferior. Stamens 8. ..... **ONAGRACEAE**
33. Ovaries superior. Stamens 2 or 4 or 6.
34. Inflorescences racemes. Petals free; yellow or white; membranous. Fruits siliques or silicles. ..... **BRASSICACEAE**
34. Inflorescences spikes. Petals fused; chartaceous; hyaline. Fruits capsules; circumscissile. ..... **PLANTAGINACEAE**
32. Perianth parts in 5s.
35. Inflorescences heads; 1–10 per plant; arrangement solitary or racemose or spicate. Pappus of bristles or scales. ..... **ASTERACEAE**
35. Inflorescences panicles or umbels or cymes or solitary flowers, heads not present. Pappus not present.
36. Inflorescences panicles; large; dichotomously branched; with numerous flowers. Sepal apices white. Fruits utricles. ..... **PLUMBAGINACEAE**
36. Inflorescences umbels or cymes or solitary flowers.

Sepal apices green. Fruits capsules or achenes.
37. Pistils 12 or more. Sepals spurred at base. Fruits achenes. ..... **RANUNCULACEAE**
37. Pistils 1 [or appearing to be 2 or 3 when mature due to carpel separation]. Sepals not spurred at base. Fruits capsules.
38. Corollas bilaterally symmetrical; petals spurred or gibbous.
39. Sepals fused. Petals fused. Leaves soft-fleshy; greasy to the touch. ..... **LENTIBULARIACEAE**
39. Sepals free. Petals free. Leaves not soft-fleshy; not greasy to the touch. ..... **VIOLACEAE**
38. Corollas radially symmetrical; petals not spurred nor gibbous.
40. Stamens alternate with petals.
41. Inflorescences solitary flowers. Staminodia present, in 3s opposite petals. Stigmas 4. ..... **CELASTRACEAE**
41. Inflorescences panicles of racemes. Staminodia absent. Stigmas 2. ..... **SAXIFRAGACEAE**
40. Stamens opposite petals.
42. Petals free. Sepals 2 [Perianth in 1-series, but 2 subtending bracts are sepaloid; hence perianths falsely appearing in 2-series]. ..... **MONTIACEAE**
42. Petals fused. Sepals 5. ..... **PRIMULACEAE**
28. Perianth parts in 1-series or parts all similar.
43. Pistils 12 or more. ..... **RANUNCULACEAE**
43. Pistils 1.
44. Inflorescences spadices. ..... **ACORACEAE**
44. Inflorescences of various types, but not spadices.
45. Leaves conspicuously 3-ranked. ..... **CYPERACEAE**
45. Leaves not conspicuously 3-ranked.
46. Perianth parts 3-5.
47. Ovaries inferior. Fruits achenes. ..... **ASTERACEAE**
47. Ovaries superior. Fruits capsules.
48. Perianth parts 4; gray or yellow-white. Pedicels absent. ..... **ERIOCAULACEAE**
48. Perianth parts 5; pink or magenta or purple or white with pink markings. Pedicels present. ..... **MONTIACEAE**
46. Perianth parts 6. ..... **couplet 49**

49. Ovaries inferior.
50. Corollas bilaterally symmetrical. Stamens 1 or 2; united with style to form a column. ..... **ORCHIDACEAE**
50. Corollas radially symmetrical. Stamens 3 or 6; free, not united with style.
51. Inflorescences spikes; elongate; 25–45 cm long. Leaves conspicuously stiff; succulent; margins spinulose. ..... **ASPARAGACEAE**
51. Inflorescences solitary or paired flowers or racemes or umbels; not elongate, racemes 1–3.5 cm long. Leaves flexible; non-succulent; margins entire.
52. Leaves equitant. Stamens 3. ..... **IRIDACEAE**
52. Leaves not equitant. Stamens 6.
53. Styles 3. ..... **MELANTHIACEAE**
53. Styles 1.
54. Perianth parts free; pilose. Plants from corms. ..... **HYPOXIDACEAE**
54. Perianth parts fused; glabrous. Plants from bulbs or rhizomes or crowns.
55. Inflorescences spicate racemes. Ovaries wholly inferior. Plants from rhizomes or crowns. ..... **NARTHECIACEAE**
55. Inflorescences solitary or paired flowers or umbels. Ovaries partially inferior. Plants from bulbs. ..... **AMARYLLIDACEAE**
49. Ovaries superior.
56. Abaxial surfaces of leaves tomentose to floccose. Stamens 9. ..... **POLYGONACEAE**
56. Abaxial surfaces of leaves glabrous or sparsely pubescent. Stamens 3 or 6.

57. Plants from woody caudices. Leaf apices spine-tipped or with ragged fibers. ..... **ASPARAGACEAE**
57. Plants from bulbs or corms or rhizomes or crowns or fibrous roots.
Leaf apices of various shapes, but not spine-tipped nor lacerate.
58. Inflorescences solitary cone-like spikes. ..... **XYRIDACEAE**
58. Inflorescences of various types, but not solitary cone-like spikes.
59. Perianth parts green or brown or stramineous or black; scarious. ..... **JUNCACEAE**
59. Perianth parts of various bright colors; petaloid.
60. Involucral bracts sheathing.
61. Leaves with onion odor when crushed ..... **AMARYLLIDACEAE**
61. Leaves without onion odor when crushed.
62. Perianth parts 3–12 mm long ..... **AMARYLLIDACEAE**
62. Perianth parts 14–35 mm long ..... **ASPARAGACEAE**
60. Involucral bracts absent or not sheathing.
63. Inflorescences solitary flowers..... **LILIACEAE**
63. Inflorescences with multiple flowers.
64. Perianth parts yellow to orange; 8–15 cm long.
Plants from rhizomes and fibrous roots ..... **XANTHORRHOEACEAE**
64. Perianth parts light blue to purple or whitish;
0.2–1.5 cm long. Plants from bulbs.
65. Styles 3. Capsules deeply 3-lobed ..... **MELANTHIACEAE**
65. Styles 1. Capsules globose ..... **ASPARAGACEAE**

GROUP L: Plants caulescent herbs. Perianth parts absent.

1. Venation parallel or a single vein.
2. Flowers borne in cyathia. Fruits capsular schizocarps; 3-seeded. ..... **EUPHORBIACEAE**
2. Flowers borne in spikelets or spikes or heads or solitary. Fruits achenes or caryopses or nutlets.
3. Flowers subtended by 1–5 chaffy bracts.
4. Leaves 2-ranked. Stems jointed, nodes and internodes apparent.
Each flower subtended by 2 or more bracts. Stigmas feathery. ..... **POACEAE**
4. Leaves 3-ranked. Stems not jointed, nodes and internodes not apparent.
Each flower subtended by 1 bract. Stigmas barbellate or smooth. ..... **CYPERACEAE**
3. Flowers not subtended by bracts.
5. Flowers 1–3; axillary. Fruits 4 nutlets. Stamens 1. ..... **PLANTAGINACEAE**
5. Flowers many; terminal. Fruits achene-like follicles or dry-spongy drupes;
1 per flower. Stamens 3. ..... **TYPHACEAE**
1. Venation pinnate or palmate.
6. Leaves opposite.
7. Leaves spathulate or obovate or oblanceolate. Stems flaccid. Inflorescences
solitary flowers or clusters of 2–3. Fruits nutlets; 4 per flower. ..... **PLANTAGINACEAE**
7. Leaves ovate or lanceolate or linear. Stems rigid or flexible, but
not flaccid. Inflorescences heads or cyathia. Fruits achenes or
capsular schizocarps; 1 per flower.
8. Flowers borne in small heads. Heads borne in elongate
terminal racemes or in axils of leaves. Fruits achenes;
enclosed in involucre to form a bur. ..... **(*Ambrosia*) ASTERACEAE**
8. Flowers borne in cyathia. Fruits capsular schizocarps; 3-lobed. ..... **EUPHORBIACEAE**
6. Leaves alternate.
9. Inflorescences spadices or heads or spiny burs or cyathia.
10. Root systems fibrous. Leaves with sheaths. Inflorescences
spadices. Spathes present. Fruits berries. ..... **ARACEAE**
10. Root systems taproots. Leaves without sheaths. Inflorescences
heads or spiny burs or cyathia. Spathes absent. Fruits achenes
or capsular schizocarps.
11. Inflorescences heads or spiny burs. Ovaries not lobed.
Fruits achenes. ..... **ASTERACEAE**
11. Inflorescences cyathia. Ovaries 3-lobed. Fruits capsular schizocarps. ..... **EUPHORBIACEAE**

9. Inflorescences solitary flowers or panicles or spikes or racemes
or glomerules.
12. Plants dioecious. Flowers subtended by 2 or 3 spine-tipped bracts. ..... **AMARANTHACEAE**
12. Plants monoecious or bearing only perfect flowers or polygamous.
Flowers not subtended by 2 or 3 spine-tipped bracts.
13. Plants rhizomatous or stoloniferous. Stipules
present; fused to petioles. Stamens 6–8. Seeds 2 or more. ..... **SAURURACEAE**
13. Plants from taproots, not rhizomatous nor stoloniferous.
Stipules absent. Stamens 1–5. Seeds 1. ..... **AMARANTHACEAE**

GROUP M: Plants caulescent herbs. Perianth parts in 1-series or parts all similar. Perianth parts 3 or multiples of 3.

1. Venation pinnate or palmate or a single vein.
2. Leaves [branches] fascicled; needle-like or filiform. [Leaves reduced to
inconspicuous, dry scales and stems cladophylls; hence foliage falsely
appearing to comprise fascicled leaves]. ..... **ASPARAGACEAE**
2. Leaves alternate or opposite or whorled; of various shapes, but not
needle-like nor filiform.
3. Leaves opposite or whorled
4. Leaves whorled. ..... **RUBIACEAE**
4. Leaves opposite.
5. Leaves peltate; margins palmately lobed. Flowers solitary in leaf axils.
[Sepals 6 but caducous; hence perianth parts falsely appearing in 1-series]. ..... **BERBERIDACEAE**
5. Leaves not peltate; margins serrate. Flowers 3–12 in axils of leaves. ..... **URTICACEAE**
3. Leaves alternate.
6. Inflorescences umbels. Fruits berries; purple-black. Tendrils present. ..... **SMILACACEAE**
6. Inflorescences spikes or flowers solitary or in clusters of 1–5. Fruits
capsules or capsular schizocarps or achenes or utricles; of various colors.
Tendrils absent.
7. Perianths tubular; conspicuously curved or S-shaped; parts fused. ..... **ARISTOLOCHIACEAE**
7. Perianths bowl-shaped, not curved nor S-shaped; parts free.
8. Flowers imperfect.
9. Ocrea present. Plants dioecious. ..... **POLYGONACEAE**
9. Ocrea absent. Plants monoecious.
10. Pistils 3-lobed; styles 3 (may be divided). Fruits capsular
schizocarps; 3-seeded. ..... **EUPHORBIACEAE**
10. Pistils not lobed; styles 2. Fruits utricles; 1-seeded. ..... **AMARANTHACEAE**
8. Flowers perfect.
11. Ovaries inferior. Seeds 3. ..... **HALORAGACEAE**
11. Ovaries superior. Seeds 1 or numerous.
12. Stamens 12 or more. Fruits capsules. Shoot
exudate viscous; yellow or white. ..... **PAPAVERACEAE**
12. Stamens 3 or 5–9. Fruits achenes or utricles.
Shoot exudate thin; colorless.
13. Perianth parts 6. Stamens 6–9. Fruits achenes;
trigonous or lenticular; not winged. ..... **POLYGONACEAE**
13. Perianth parts 3. Stamens 3 or 5. Fruits utricles;
elliptic to orbicular; winged. ..... **AMARANTHACEAE**
1. Venation parallel or parallel-convergent.
14. Ovaries inferior.
15. Perianth parts bilaterally symmetrical. Stamens 1 or 2; fused with style to
form a column. ..... **ORCHIDACEAE**
15. Perianth parts radially symmetrical. Stamens 3 or 6; free or fused to
perianth parts.
16. Stamens 3.
17. Leaves more than 2 cm long; equitant. Inflorescences racemes or panicles. ..... **IRIDACEAE**

17. Leaves less than 0.5 cm long; not equitant. Inflorescences heads; solitary. ..... **BURMANNIACEAE**
16. Stamens 6.
19. Inflorescences spikes. Perianth parts yellow to red.
Leaves conspicuously stiff; succulent; margins spinulose. ..... **ASPARAGACEAE**
19. Inflorescences panicles. Perianth parts greenish yellow to purplish
maroon or brown. Leaves flexible; not succulent; margins entire. ..... **MELANTHIACEAE**
14. Ovaries superior.
20. Flowers subtended by 1–5 membranous or chartaceous bracts.
21. Fruits capsules. Seeds 3–many. ..... **JUNCACEAE**
21. Fruits caryopses or achenes. Seeds 1.
22. Leaves 2-ranked. Margins of leaf sheaths overlapping, rarely
fused to form tubes. Stems jointed, nodes and internodes apparent.
Inflorescences spikelets. Each flower subtended by 2 or more bracts.
Stigmas feathery. ..... **POACEAE**
22. Leaves 3-ranked. Margins of leaf sheaths fused to form tubes.
Stems not jointed, nodes and internodes not apparent.
Inflorescences spikes. Each flower subtended by 1 bract.
Stigmas barbellate or smooth. ..... **CYPERACEAE**
20. Flowers not subtended by membranous or chartaceous bracts.
23. Flowers imperfect. Plants monoecious or dioecious or polygamo-monoecious.
24. Tendrils present. Inflorescences umbels; axillary. Fruits berries.
Plants dioecious. ..... **SMILACACEAE**
24. Tendrils absent. Inflorescences heads or panicles; terminal. Fruits achenes
or capsules. Plants monoecious or polygamo-monoecious.
25. Inflorescences heads. Fruits achenes. Plants monoecious.
staminate heads above pistillate heads. ..... **TYPHACEAE**
25. Inflorescences panicles. Fruits capsules. Plants polygamo-monoecious;
staminate flowers above or below perfect flowers in panicles. ..... **MELANTHIACEAE**
23. Flowers perfect.
25. Perianths bilaterally symmetrical. ..... **PONTEDERIACEAE**
25. Perianths radially symmetrical.
26. Inflorescences spadices. ..... **ACORACEAE**
26. Inflorescences of various types, but not spadices.
27. Perianth parts green or brown or stramineous or black. ..... **JUNCACEAE**
27. Perianth parts white or greenish white or other colors,
but not green nor brown nor stramineous nor black.
28. Leaves spathulate; basal sheaths present.
Spathes present. Stamens 3. ..... **PONTEDERIACEAE**
28. Leaves of various shapes, but not spathulate;
basal sheaths absent. Spathes absent. Stamens 6.
29. Leaves conspicuously stiff; succulent;
apices spine-tipped; margins minutely
spinose or filiferous. ..... **ASPARAGACEAE**
29. Leaves flexible; not succulent; apices not
spine-tipped; margins entire. ..... **couplet 30**

30. Inflorescences axillary.
31. Leaves scale-like; 0.2–1 mm wide. Cladophylls present; filiform; 8–15 mm long. ..... **ASPARAGACEAE**
31. Leaves lanceolate to ovate; 10–90 mm wide. Cladophylls absent.
32. Perianth parts fused. Fruits dark blue or black. ..... **ASPARAGACEAE**
32. Perianth parts free. Fruits red or green or yellow-green.
33. Perianths greenish white. Fruits berries; red; globose. ..... **LILIACEAE**
33. Perianths yellow or yellowish white. Fruits capsules; green or
yellow-green; 3-angled. ..... **COLCHICACEAE**
30. Inflorescences terminal.
34. Inflorescences panicles.
35. Panicles 6–10 cm long. Stems arched. Fruits berries. ..... **ASPARAGACEAE**
35. Panicles 20–60 cm long. Stems erect. Fruits capsules. .....**MELANTHIACEAE**

34. Inflorescences racemes or solitary flowers.
36. Basal leaves whorled. Perianths orange to reddish orange. Plants from bulbs. ..... **LILIACEAE**
36. Basal leaves alternate. Perianths yellow or white to green. Plants from rhizomes.
37. Perianth parts yellow; 12–50 mm long. Fruits capsules. ..... **COLCHICACEAE**
37. Perianth parts white to green; 3–7 mm long. Fruits berries. ..... **ASPARAGACEAE**

GROUP N: Plants caulescent herbs. Perianth parts in 1-series or parts all similar. Perianth parts 1 or 2 or 4 or 5 or multiples of 4 or 5 or many.

1. Inflorescences spikelets or heads with flowers subtended by bracts.
2. Inflorescences spikelets. Leaves with basal sheaths.
Stamens 3 or 6 or 1 or 2. Perianth parts 2. ..... **POACEAE**
2. Inflorescences heads. Leaves without basal sheaths. Stamens 4 or 5.
Perianth parts 4 or 5.
3. Stems and leaves prickly. Heads subtended by stiff prickly bracts. Perianth parts 4. Stamens 4; free. [Sepals modified into prickles; hence perianths falsely appearing to be in 1-series]. ..... **CAPRIFOLIACEAE**
3. Stems and leaves not prickly. Heads not subtended by stiff prickly bracts. Perianth parts 5. Stamens 5; fused by anthers into ring around style. ..... **ASTERACEAE**
1. Inflorescences of various types, but not spikelets or heads with flowers subtended by bracts.
4. Perianths bilaterally symmetrical.
5. Perianths spurred or saccate.
6. Stamens 12 or more. Pistils 3 or 5; free or fused slightly at base. Fruits follicles. ..... **RANUNCULACEAE**
6. Stamens 3 or 6. Pistils 1. Fruits capsules.
7. Leaves alternate; pinnately dissected. Perianth parts 4. Stamens 6. Ovaries superior. [Sepals 2 but caducous; hence perianth parts falsely appearing to be in 1-series]. ..... **PAPAVERACEAE**
7. Leaves opposite; not pinnately dissected. Perianth parts 5. Stamens 2 or 3. Ovaries inferior. ..... **CAPRIFOLIACEAE**
5. Perianths not spurred nor saccate.
8. Perianths bilabiate. [Calyces 2-parted and bract-like; hence perianths falsely appearing to be in 1-series]. ..... **OROBANCHACEAE**
8. Perianths of various shapes, but not bilabiate.
9. Ovaries inferior. Perianth parts petaloid.
10. Leaves and peduncles viscid-villous to glandular-puberulent [calyces tightly constricted above ovaries which falsely appear inferior]. ..... **NYCTAGINACEAE**
10. Leaves and peduncles glabrous or pubescence of various types but not viscid-villous to glandular-puberulent.

11. Leaves alternate; compound. Perianth parts free. Inflorescences umbels. Fruits schizocarps. ..... **APIACEAE**
11. Leaves opposite; simple. Perianth parts fused. Inflorescences cymes. Fruits achenes. ..... **CAPRIFOLIACEAE**
9. Ovaries superior. Perianth parts sepaloid.
12. Plants annual. Perianth parts 1. Fruits utricles. ..... **AMARANTHACEAE**
12. Plants perennial. Perianth parts 4 or 5. Fruits capsules or achenes.
13. Leaves ovate; margins serrate. Flowers perfect. Fruits capsules. ..... **CISTACEAE**
13. Leaves linear or lanceolate; margins entire. Flowers imperfect. Fruits achenes. ..... **URTICACEAE**
4. Perianths radially symmetrical or asymmetrical.
14. Lower leaves opposite or whorled.
15. Leaves whorled.
16. Pistils 4 or more. Stamens 12 or more. Fruits achenes. ..... **RANUNCULACEAE**
16. Pistils 1. Stamens 3-10. Fruits capsules or schizocarps.
17. Ovaries superior. Pistils 3- or 5- carpellate. Fruits capsules. ..... **MOLLUGINACEAE**
17. Ovaries inferior. Pistils 2-carpellate. Fruits schizocarps.

18. Perianth parts 3 or 4; fused. Inflorescences cymes.
Leaves and foliaceous stipules in numerous whorls. ..... **RUBIACEAE**
18. Perianth parts 5; free. Inflorescences umbels.
Leaves in 1 whorl; stipules absent. ..... **(*Panax*) APIACEAE**
15. Leaves opposite.
19. Perianth parts bearing woolly or silky hairs and hidden by them. ..... **AMARANTHACEAE**
19. Perianth parts glabrous or variously indumented, but not bearing woolly or silky hairs and hidden by them.
20. Perianth parts fused.
21. Ovaries inferior, wholly or partially.
22. Leaves and peduncles viscid-villous to glandular-puberulent. [Calyces tightly constricted above ovaries which falsely appear inferior]. ..... **NYCTAGINACEAE**
22. Leaves and peduncles glabrous or pubescence of various types but not viscid-villous to glandular-puberulent.
23. Inflorescences solitary flowers; axillary. Stamens 12 or more. Fruits capsules; circumscissile. ..... **AIZOACEAE**
23. Inflorescences cymes, terminal; in dense clusters. Stamens 2 or 3. Fruits achenes. ..... **CAPRIFOLIACEAE**
21. Ovaries superior.
24. Ovaries 3-lobed. Flowers borne in cyathia. Shoot exudate viscous; white. ..... **EUPHORBIACEAE**
24. Ovaries not 3-lobed. Flowers borne in various inflorescences, but not cyathia. Shoot exudate thin; colorless.
25. Stipules present; conspicuous; scarious. Fruits utricles. ..... **CARYOPHYLLACEAE**
25. Stipules absent. Fruits achenes or capsules.
26. Flowers subtended by bracts. Bracts 5; fused. Hypanthia absent. Anthocarps present; 5–10 angled or ribbed. Fruit achenes. ..... **NYCTAGINACEAE**
26. Flowers not subtended by bracts. Hypanthia present. Anthocarps absent. Fruits capsules.
27. Perianth parts 5. Capsules circumscissile. ..... **AIZOACEAE**
27. Perianth parts 4. Capsules not circumscissile. ..... **LYTHRACEAE**
20. Perianth parts free.
28. Ovaries inferior. ..... **ONAGRACEAE**
29. Sepals 4. ..... **ONAGRACEAE**
29. Sepals 5. [hypanthium hardens with fruit; hence ovaries falsely appearing inferior] ..... (*Scherlanthus*) **CARYOPHYLLACEAE**
28. Ovaries superior.
30. Leaves compound. Pistils 4–many. ..... **RANUNCULACEAE**
30. Leaves simple. Pistils 1.
31. Leaves palmately lobed. Fruits berries. [Sepals 6 but caducous; hence perianth parts falsely appearing to be in 1-series]. ..... **BERBERIDACEAE**
31. Leaves not palmately lobed. Fruits utricles or capsules or achenes.
32. Perianth parts entirely scarious. ..... **AMARANTHACEAE**
32. Perianth parts petaloid or sepaloid, sometimes with scarious margins.
33. Flowers imperfect. Plants monoecious or dioecious. Perianth parts 2 or 4. Pistils 1-carpellate. Fruits achenes. ..... **URTICACEAE**
33. Flowers perfect. Perianth parts 5. Pistils 2–5 carpellate. Fruits capsules.
34. Leaves whorled. ..... **MOLLUGINACEAE**
34. Leaves opposite.

35. Styles 1. Leaves fleshy to succulent.
Perianth parts petaloid, pink or white. ..... **MONTIACEAE**
35. Styles 2–5. Leaves herbaceous to scarious.
Perianth parts sepaloid, entirely green or
with a green midrib and a white,
scarious margin. ..... **CARYOPHYLLACEAE**

14. Lower leaves alternate.
36. Ovaries inferior, wholly or partially.
37. Leaves compound or both compound and simple leaves present. Styles 2. ..... **APIACEAE**
37. Leaves simple. Styles 1 or 3–9.
38. Leaves peltate. Fruits schizocarps. ..... **APIACEAE**
38. Leaves not peltate. Fruits capsules or dry drupes.
39. Stamens 5. Fruits dry drupes. Seeds 1. ..... **SANTALACEAE**
39. Stamens 4 or 8–many. Fruits capsules. Seeds 12 or more.
40. Stamens 8–many. Capsules circumscissile. Plants succulent.
Placentation free-central. ..... **PORTULACACEAE**
40. Stamens 4. Capsules loculicidal or septicidal or poricidal.
Plants not succulent. Placentation axile or parietal.
41. Capsules 4-loculed; dehiscent longitudinally or by
terminal pore. ..... **ONAGRACEAE**
41. Capsules 1–3 loculed; dehiscent by lateral pore. ..... **CAMPANULACEAE**
36. Ovaries superior or absent.
42. Plants bearing only imperfect flowers.
43. Leaves palmately compound. ..... **CANNABACEAE**
43. Leaves simple.
44. Ocrea present. ..... **POLYGONACEAE**
44. Ocrea absent.
45. Plants with branched or stellate hairs. ..... **EUPHORBIACEAE**
45. Plants glabrous or with unbranched hairs.
46. Pistils 3-loculed. Fruits capsular schizocarps.
Seeds 3 or more.
47. Ovules or seeds 2 per locule. Schizocarps 6-seeded. ..... **PHYLLANTHACEAE**
47. Ovules or seeds 1 per locule. Schizocarps 3-seeded. ..... **EUPHORBIACEAE**
46. Pistils 1-loculed. Fruits achenes or utricles. Seeds 1.
48. Leaf margins serrate or crenate.
49. Plants with stinging hairs. Inflorescences panicles. . ..... **URTICACEAE**
49. Plants without stinging hairs. Inflorescences
glomerules. ..... **MORACEAE**
48. Leaf margins entire or sinuate or irregularly
toothed or lobed.
50. Flowers subtended by 2 or 3 spine-tipped
bracts. Stamen filaments fused and forming
a short tube. ..... **AMARANTHACEAE**
50. Flowers not subtended by 2 or 3 spine-tipped
bracts. Stamen filaments free, not forming a tube.
51. Perianth parts 5. ..... **AMARANTHACEAE**
51. Perianth parts 2 or 4.
52. Styles 2 or 3. Fruits utricles. ..... **AMARANTHACEAE**
52. Styles 1. Fruits achenes. ..... **URTICACEAE**
42. Plants bearing only perfect flowers or plants bearing both perfect and
imperfect flowers.
53. Leaves compound.
54. Stamens 4 or 5. Hypanthia present. ..... **ROSACEAE**
54. Stamens 12 or more. Hypanthia absent. ..... **RANUNCULACEAE**
53. Leaves simple.
55. Stamens 12 or more.
56. Pistils 4-7. Fruits follicles. ..... **RANUNCULACEAE**
56. Pistils 1. Fruits capsules.

57. Inflorescences solitary flowers. Shoot exudate viscous; yellow or white. [Sepals 2 or 3 but caducous; hence perianth parts falsely appearing to be in 1-series]. ..... **PAPAVERACEAE**
57. Inflorescences cymes. Shoot exudate thin; colorless. ..... **MONTIACEAE**
55. Stamens 1-10. ..... **couplet 58**

58. Perianth parts 4.
59. Leaf margins palmately lobed. Stipules present. Hypanthia present. ..... **ROSACEAE**
59. Leaf margins pinnately lobed or entire. Stipules absent. Hypanthia absent.
60. Inflorescences cymes. Fruits achenes. ..... **URTICACEAE**
60. Inflorescences racemes. Fruits berries or siliques or silicles.
61. Fruits berries. Bracteoles present. Carpels 10 or 1. ..... **PHYTOLACCACEAE**
61. Fruits siliques or silicles. Bracteoles absent. Carpels 2. ..... **BRASSICACEAE**
58. Perianth parts 5 or more.
62. Plants less than 3 cm in diameter or height. [Petals minute and easily overlooked; hence perianth parts falsely appearing to be in 1-series]. ..... **CELASTRACEAE**
62. Plants greater than 3 cm in diameter or height.
63. Stipules present as ocrea. Fruits achenes. ..... **POLYGONACEAE**
63. Stipules absent. Fruits berries or utricles or capsules or follicles.
64. Inflorescences racemes or helicoid cymes.
65. Pistils terete; not horned or beaked. Fruits berries. . ..... **PHYTOLACCACEAE**
65. Pistils 5- or 7-angular; horned or beaked. Fruits capsules [carpel fusion at bases may be so slight that may falsely appear to be separate pistils]. ..... **PENTHORACEAE**
64. Inflorescences solitary flowers or cymes or spikes or glomerules.
66. Perianth parts sepaloid. Fruits utricles. ..... **AMARANTHACEAE**
66. Perianth parts petaloid. Fruits capsules; circumscissle. Ovaries partially inferior, but falsely appearing to be superior. ..... **PORTULACACEAE**

GROUP O: Plants caulescent herbs. Perianth parts in 2-series. Petals 3 or multiples of 3.

1. Venation pinnate or palmate or a single vein.
2. Petals 6 or 9.
3. Leaves 1 or 2 per stem. Fruits berries. ..... **BERBERIDACEAE**
3. Leaves 4 or more per stem. Fruits capsules.
4. Stems and leaves with prickly bristles. Stamens 150 or more. Sap viscous; yellow or orange-red. Hypanthium absent. Sepals 2 or 3; caducous. ..... **PAPAVERACEAE**
4. Stems and leaves without prickly bristles. Stamens 4–12. Sap thin; colorless. Hypanthium present. Sepals 4–6; persistent. ..... **LYTHRACEAE**
2. Petals 3.
5. Ovaries inferior.
6. Inflorescences spikes. Flowers not subtended by an involucre. ..... **ONAGRACEAE**
6. Inflorescences heads. Flowers subtended by an involucre. [Petals 5, but fused and conspicuously 3-lobed; hence flowers falsely appearing to have 3 petals]. ..... **ASTERACEAE**
5. Ovaries superior.
7. Sepals 3.
8. Pistils 3. Fruits follicles. ..... **CRASSULACEAE**
8. Pistils 1. Fruits capsules or achenes.
9. Spurs present; 1. Fruits capsules. [Petals 5, but 4 fused into lateral 2; hence flowers falsely appearing to have 3 petals]. ..... **BALSAMINACEAE**
9. Spurs absent. Fruits achenes. [Sepals of 2 sizes, the inner larger; hence may be falsely mistaken for petals]. ..... **POLYGONACEAE**
7. Sepals 5.
10. Corollas radially symmetrical. Pistils 3-carpellate. Styles 0. Stigmas 3. ..... **CISTACEAE**

10. Corollas bilaterally symmetrical. Pistils 2-carpellate.
Styles 1. Stigmas 1; 2-lobed. ..... **POLYGALACEAE**
1. Venation parallel or parallel-convergent.
11. Corollas bilaterally symmetrical or asymmetrical.
12. Ovaries superior. Leaves and stems mucilaginous when crushed. ..... **COMMELINACEAE**
12. Ovaries inferior. Leaves and stems not mucilaginous when crushed.
13. Plants terrestrial; less than 1 m tall. Stamens united with style to form a column. Seeds 12 or more. ..... **ORCHIDACEAE**
13. Plants emergent aquatics; more than 1 m tall. Stamens not united with style to form a column. Seeds 1–3. ..... **MARANTACEAE**
11. Corollas radially symmetrical.
14. Pistils 12 or more. Fruits achenes. [Plants acaulescent, but can appear caulescent]. ..... **ALISMATACEAE**
14. Pistils 1. Fruits capsules.
15. Inflorescences solitary spikes or solitary heads.
16. Perianth parts gray-black; bearing fleshy appendages at apices. Stamens 4 or 6. Anthers black. ..... **ERIOCAULACEAE**
16. Perianth parts yellow; not bearing fleshy appendages at apices. Stamens 3. Anthers yellow. [Plants acaulescent, but can appear caulescent]. ..... **XYRIDACEAE**
15. Inflorescences racemes or cymes or solitary flowers.
17. Leaves equitant. Inflorescences racemes. Stamens 3. ..... **IRIDACEAE**
17. Leaves alternate or whorled, not equitant. Inflorescences cymes or solitary flowers. Stamens 6.
18. Leaves alternate. Inflorescences cymes. Stamen filaments pilose. ..... **COMMELINACEAE**
18. Leaves whorled. Inflorescences solitary flowers. Stamen filaments glabrous. ..... **MELANTHIACEAE**

GROUP P: Plants caulescent herbs. Perianth parts in 2-series. Petals 1 or 2 or 4 or 5. Corollas bilaterally symmetrical. Petals free.

1. Perianth parts (some or all) spurred or gibbous.
2. Stamens 12 or more. Pistils simple; free or fused slightly at base. Fruits follicles. ..... **RANUNCULACEAE**
2. Stamens 5–10. Pistils compound. Fruits capsules or schizocarps.
3. Sepals 3. ..... **BALSAMINACEAE**
3. Sepals 2 or 5.
4. Petals 5. Sepals 5. ..... **VIOLACEAE**
4. Petals 4. Sepals 2. ..... **PAPAVERACEAE**
1. Perianth parts not spurred nor gibbous.
5. Sepals 4.
6. Hypanthia present. Ovaries inferior. ..... **ONAGRACEAE**
6. Hypanthia absent. Ovaries superior.
7. Leaves simple. ..... **BRASSICACEAE**
7. Leaves palmately compound.
8. Stipules absent or minute. Petals 4. Stamens exserted beyond perianths. Fruits capsules. ..... **CLEOMACEAE**
8. Stipules present; large. Petals 5. Stamens included within perianths. Fruits legumes. ..... **FABACEAE**
5. Sepals 5.
9. Ovaries inferior. ..... **APIACEAE**
9. Ovaries superior.
10. Leaves compound. ..... **FABACEAE**
10. Leaves simple.
11. Stipules present. Fruits legumes or schizocarps.
12. Corollas papilionaceous. Stamens 10. Fruits legumes; inflated. ..... **FABACEAE**
12. Corollas rotate to funnelform. Stamens 5. Fruits schizocarps. ..... **GERANIACEAE**
11. Stipules absent. Fruits achenes or capsules.

13. Stems trailing or prostrate. Inflorescences solitary flowers.
Stamens 4 or 5. Fruits achenes; lanate-tomentose; spiny.
[Petals appearing free, but slightly fused at base]. ..... **KRAMERIACEAE**
13. Stems erect or ascending. Inflorescences racemes or spikes.
Stamens 6 or 8. Fruits capsules; glabrous; not spiny.
[Inner sepals petaloid; hence may be mistaken for petals]. ..... **POLYGALACEAE**

GROUP Q: Plants caulescent herbs. Perianth parts in 2-series. Petals 4 or 5. Corollas bilaterally symmetrical. Petals fused at least at base or apex. Ovaries wholly or partially inferior.

1. Inflorescences heads.
2. Stamens 4. Anthers free. Styles not branched. ..... **CAPRIFOLIACEAE**
2. Stamens 5. Anthers fused into a ring around style. Styles 2-branched. ..... **ASTERACEAE**
1. Inflorescences solitary flowers or cymes or thyrses or racemes.
3. Leaves alternate. ..... **CAMPANULACEAE**
3. Leaves opposite or whorled or appearing whorled due to the presence of stipules.
4. Corolla lobes 4. Fruits capsules or schizocarps or berries. ..... **RUBIACEAE**
4. Corolla lobes 5. Fruits achenes or dry drupes with 3 stones. ..... **CAPRIFOLIACEAE**

GROUP R: Plants caulescent herbs. Perianth parts in 2-series. Petals 2 or 4 or 5. Corollas bilaterally symmetrical. Petals fused at least at base or apex. Ovaries superior.

1. Plants with slender leafless stems bearing finely dissected branches with numerous sac-like bladders. Plants free-floating aquatics, but often stranded in wet areas. ..... **LENTIBULARIACEAE**
1. Plants with stems and foliage leaves; sac-like bladders absent. Plants terrestrial.
2. Lower cauline leaves alternate.
3. Leaves compound.
4. Petals 5. Spurs absent. Fruits legumes or loments or achene-like.
[Keel petals distally fused and basally free]. ..... **FABACEAE**
4. Petals 2 or 4. Spurs present. Fruits capsules or follicles.
5. Stamens 6. Fruits capsules. [Inner petals distally fused and basally free]. ..... **PAPAVERACEAE**
5. Stamens 10–15. Fruits follicles. ..... **RANUNCULACEAE**
3. Leaves simple.
6. Sepals of 2 forms
7. Spurs present. Stamens 5. ..... **BALSIMINACEAE**
7. Spurs absent. Stamens 6 or 8. ..... **POLYGALACEAE**
6. Sepals all alike.
8. Petals clawed. Fruits achenes; lanate-tomentose. ..... **KRAMERIACEAE**
8. Petals not clawed. Fruits capsules or berries; glabrous or variously indumented, but not lanate-tomentose.
9. Plants armed with prickles. Inflorescences cymes. Fruits berries.
Anthers dehiscing poricidally. ..... **SOLANACEAE**
9. Plants not armed with prickles. Inflorescences spikes or racemes.
Fruits capsules. Anthers dehiscing longitudinally.
10. Fertile stamens 5 ..... **SCROPHULARIACEAE**
10. Fertile stamens 2 or 4.
11. Fertile stamens 2. ..... **PLANTAGINACEAE**
11. Fertile stamens 4.
12. Corollas spurred. ..... **PLANTAGINACEAE**
12. Corollas not spurred.
13. Bracts 1–2 mm long or absent. Stamens of equal length. ..... **PHRYMACEAE**
13. Bracts 5–30 mm long. Stamens didynamous. ..... **OROBANCHACEAE**
2. Lower cauline leaves opposite or whorled.
14. Fruits nutlets or achenes or drupes.
15. Fruits achenes. Flowers at anthesis paired and oriented at right angles to rachises.
Pedicels conspicuously reflexed and fruits appressed against rachises. ..... **PHRYMACEAE**

15. Fruits nutlets or drupes. Flowers at anthesis solitary or paired or whorled, but not oriented at right angles to rachises. Pedicels not reflexed and fruits not appressed against rachises.
16. Corollas bilabiate or unilabiate. Stigmas distinctly bifid. Styles gynobasic. ..... **LAMIACEAE**
16. Corollas salverform. Stigmas not bifid. Styles apical. ..... **VERBENACEAE**
14. Fruits capsules.
17. Plants with fetid odor. Surfaces clammy with glandular hairs. Fruits with incurved beak that splits at maturity to form 2 horns. ..... **MARTYNIACEAE**
17. Plants without fetid odor. Surfaces not clammy, with or without hairs. Fruits not developing 2 horns.
18. Stamens 2.
19. Lowest cauline leaves whorled. ..... **PLANTAGINACEAE**
19. Lowest cauline leaves opposite.
20. Calyx and corolla 4-lobed; stamens exserted. ..... **PLANTAGINACEAE**
20. Calyx and corolla 5-lobed; stamens included.
21. Calyces not subtended by bracts or bracteoles. ..... **LINDERNIACEAE**
21. Calyces subtended by bracts or bracteoles.
22. Seeds 2–4; leaves petiolate. ..... **ACANTHACEAE**
22. Seeds numerous, >10; leaves sessile. ..... ***(Gratiola)*** **PLANTAGINACEAE**
18. Stamens 4 or 5.
23. Petals scarious or chartaceous. Capsules circumscissile. ..... **PLANTAGINACEAE**
23. Petals not scarious nor chartaceous. Capsules septicidal or loculicidal.
24. Seeds 2-4.
25. Corollas 10–15 mm long; campanulate. Calyces 3.5–10 mm long. ..... ***(Collinsia)*** **PLANTAGINACEAE**
25. Corollas 27–70 mm long; tubular or salverform. Calyces 15–30 mm long. ..... **ACANTHACEAE**
24. Seeds 6 to numerous. ..... **couplet 26**

26. Upper cauline leaves petiolate.
27. Inflorescences panicles. Corollas greenish yellow or greenish purple or reddish brown. ..... **SCROPHULARIACEAE**
27. Inflorescences racemes or solitary or paired flowers. Corollas yellow or pink or white to blue-purple.
28. Inflorescences terminal racemes. Upper cauline leaves alternate. Calyx lobes longer than calyx tubes. ..... **MAZACEAE**
28. Inflorescences solitary or paired flowers in leaf axils. Upper cauline leaves opposite. Calyx lobes shorter than calyx tubes. ..... **PHRYMACEAE**
26. Upper cauline leaves sessile or absent.
29. Corollas yellow. ..... **OROBANCHACEAE**
29. Corollas pink to magenta or blue to lavender or white.
30. Flowers subtended by 2 bracteoles.
31. Inflorescences spikes or spicate racemes; terminal. Corollas 16–23 mm long. ..... **OROBANCHACEAE**
31. Inflorescences solitary flowers; axillary. Corollas 7–10 mm long. ..... **PLANTAGINACEAE**
30. Flowers subtended by 1 bracteole or bracteole absent.
32. Filaments 5. Staminodia present; 1. ..... **PLANTAGINACEAE**
32. Filaments 4. Staminodia absent.
33. Corollas tubular-campanulate to weakly bilabiate.
34. Leaves obovate to orbicular; venation palmate. Calyx lobes more than 4 times longer than tubes. Calyx tubes rudimentary. Stigmas 2-lobed. ..... **PLANTAGINACEAE**
34. Leaves linear to lanceolate or pinnately-parted; venation pinnate or with a single vein. Calyx lobes shorter than to 1.5 times longer than tubes. Calyx tubes well-developed. Stigmas not lobed. ..... **OROBANCHACEAE**
33. Corollas strongly bilabiate.
35. Stems 4-sided. Corollas 20–30 mm long. ..... **PHRYMACEAE**
35. Stems terete. Corollas 3–15 mm long.

36. Leaf margins pinnatifid or 2-pinnatifid. Corollas 3–5 mm long. ..... **PLANTAGINACEAE**
36. Leaf margins entire to dentate. Corollas 7–14 mm long.
37. Corollas spurred. Basal leaves oblanceolate to elliptic or cordate-sagittate. Upper cauline leaves present. ..... **PLANTAGINACEAE**
37. Corollas gibbous. Basal leaves obovate to spathulate. Upper cauline leaves absent. ..... **MAZACEAE**

GROUP S: Plants caulescent herbs. Perianth parts in 2-series. Petals 4 or 5 or multiples of 4 or 5 or many. Corollas radially symmetrical or asymmetrical. Petals free. Ovaries wholly or partially inferior.

1. Stamens 4. ..... **ONAGRACEAE**
1. Stamens 5 or 8 or 10.
2. Stamens 5.
3. Plants less than 3 cm in diameter or height. Inflorescences solitary flowers. Seeds 12 or more per fruit. ..... **CELASTRACEAE**
3. Plants greater than 3 cm in diameter or height. Inflorescences heads or umbels or cymes. Seeds 1 or 2 per fruit.
4. Inflorescences heads.
5. Leaves armed with stinging hairs. Heads not subtended by involucre. Fruits capsules. ..... **LOASACEAE**
5. Leaves not armed with stinging hairs. Heads subtended by involucre. Fruits schizocarps. ..... **APIACEAE**
4. Inflorescences umbels or cymes.
6. Inflorescences cymes [lobes of disk petaloid; hence perianth falsely appearing to be in 2-series]. ..... **SANTALACEAE**
6. Inflorescences umbels.
7. Leaves whorled; palmately compound. Fruits berry-like drupes. ..... **ARALIACEAE**
7. Leaves alternate; pinnately compound or simple. Fruits schizocarps. ..... **APIACEAE**
2. Stamens 8 or more.
8. Sepals 2. Styles 3-9. Capsules circumscissile; placentation free-central. Ovaries partially inferior, the distal 1/2 free from sepals and petals. .....**PORTULACACEAE**
8. Sepals 3 or 4 or 5. Styles 1. Capsules loculicidal or poricidal; placentation axile or parietal. Ovaries wholly inferior, the distal portion not free from sepals and petals.
9. Petals 5 or apparently more with outer stamens sometimes petaloid. Stamens 10 or more.
10. Stamens 15–60. Capsules 1-locular; poricidal. Herbage with glochidate, variously ornamented hairs, rough to the touch. ..... **LOASACEAE**
10. Stamens 10. Capsules 5-locular; loculicidal. Herbage indumented or glabrous, but not rough to the touch. ..... **ONAGRACEAE**
9. Petals 4. Stamens 8.
11. Leaves with 3 primary veins. Hypanthia urceolate. Anthers opening by terminal pores. Inflorescences cymes or solitary flowers. ..... **MELASTOMATACEAE**
11. Leaves with 1 primary vein. Hypanthia tubular. Anthers opening by longitudinal slits. Inflorescences panicles or spikes or flowers borne in leaf axils. ..... **ONAGRACEAE**

GROUP T: Plants caulescent herbs. Perianth parts in 2-series. Petals 2 or 4 or 5 or more. Corollas radially symmetrical or asymmetrical. Petals free. Ovaries superior. Pistils 1.

1. Petals 2; gray-black; bearing fleshy appendages at apices. ..... **ERIOCAULACEAE**
1. Petals 4 or 5 or more; of various colors, but not gray-black; not bearing fleshy appendages at apices.
2. Flowers imperfect. Plants monoecious. ..... **EUPHORBIACEAE**
2. Flowers perfect.
3. Sepals 2.
4. Leaves fleshy. Placentation basal or free-central. [Perianths in 1-series but 2 subtending bracts are sepaloid; hence perianths falsely appearing in 2-series]. ..... **MONTIACEAE**
4. Leaves not fleshy. Placentation parietal or axile.
5. Leaves alternate; not glandular punctate; variously toothed or incised. ..... **PAPAVERACEAE**
5. Leaves opposite; glandular punctate; entire. ..... **HYPERICACEAE**

3. Sepals 3 or more.
  6. Petals 4.
    7. Sepals and petals inserted on a hypanthium.
      8. Anthers basifixed; curved. Venation parallel-convergent; veins 3, conspicuous [ovaries falsely appearing superior because of their separation from hypanthia at maturity]. ..... **MELASTOMATACEAE**
      8. Anthers dorsifixed; straight. Venation pinnate or a single vein. ..... **LYTHRACEAE**
    7. Sepals and petals inserted on receptacle.
      9. Leaves simple; entire or toothed or lobed or pinnatifid, but not compound.
        10. Open flowers 7–10 cm in diameter. Sepals with prickles. Fruits with prickles. ..... **PAPAVERACEAE**
        10. Open flowers 0.3–5 cm in diameter. Sepals without prickles. Fruits without prickles.
          11. Stamens 12 or more. ..... **HYPERICACEAE**
          11. Stamens 2–10.
            12. Stamens didynamous or tetradynamous. ..... **BRASSICACEAE**
            12. Stamens equal in length.
              13. Pistils 4-carpellate. Fruits capsules. Placentation free-central. ..... **CARYOPHYLLACEAE**
              13. Pistils 2-carpellate. Fruits siliques or silicles. Placentation parietal. ..... **BRASSICACEAE**
      9. Leaves compound.
        14. Leaves palmately compound.
          15. Stamens tetradynamous. Ovaries 2-locular. Fruits siliques. ..... **BRASSICACEAE**
          15. Stamens equal in length. Ovaries 1-locular. Fruits capsules. ..... **CLEOMACEAE**
        14. Leaves pinnately compound.
          16. Stamens 2 or 4 or 6. Fruits siliques or silicles. ..... **BRASSICACEAE**
          16. Stamens 5 or 10. Fruits berries or legumes.
            17. Leaflets ovate or lanceolate. Inflorescences racemes. Fruits berries. ..... **RANUNCULACEAE**
            17. Leaflets linear or oblong. Inflorescences heads. Fruits legumes. ..... **FABACEAE**
  6. Petals 5 or more.
    18. Stamens 12 or more.
      19. Filaments fused, forming a tube surrounding styles. Stigmas peltate. ..... **MALVACEAE**
      19. Filaments free or fused only at base, not forming a tube surrounding styles. Stigmas not peltate.
        20. Leaves 2- or 3-pinnately compound. Fruits legumes or berries.
          21. Leaflets ovate or lanceolate. Inflorescences racemes. Fruits berries. ..... **RANUNCULACEAE**
          21. Leaflets linear or oblong. Inflorescences heads. Fruits legumes. ..... **FABACEAE**
        20. Leaves simple. Fruits capsules.
          22. Leaf margins conspicuously spinose. Shoot exudate viscous; yellow or orange-red. Sepals 3. Capsules spiny. ..... **PAPAVERACEAE**
          22. Leaf margins not spinose. Shoot exudate thin; colorless. Sepals 5. Capsules not spiny.
            23. Sepals in 2 whorls, outer whorl of 2 smaller than inner whorl of 3. Styles 1. ..... **CISTACEAE**
            23. Sepals in 1 whorl, equal or subequal. Styles 2–5. ..... **HYPERICACEAE**
    18. Stamens 1–11.
      24. Stamens 1–5.
        25. Leaves compound.
          26. Inflorescences cymes. Styles 5. Fruits schizocarps. ..... **GERANIACEAE**
          26. Inflorescences spikes or heads. Styles 1. Fruits legumes or achene-like [Petals similar; hence corollas falsely appearing radially symmetrical]. ..... **FABACEAE**
        25. Leaves simple.

27. Leaves palmately lobed or crenate.
28. Pistils 2-carpellate. ..... **SAXIFRAGACEAE**
28. Pistils 5-carpellate. ..... **GERANIACEAE**
27. Leaves entire or toothed or pinnately lobed, not crenate. Pistils 3- or 4- or 5-carpellate.
29. Styles or style branches 3–5.
30. Upper cauline leaves opposite. Petals pink or white. ..... **CARYOPHYLLACEAE**
30. Upper cauline leaves alternate. Petals blue or yellow or yellow-orange. ..... **LINACEAE**
29. Styles 1 or 0.
31. Leaves lobed. Inflorescences cymes. Fruits schizocarps. ..... **GERANIACEAE**
31. Leaves entire or toothed. Inflorescences solitary flowers. Fruits capsules. ..... **CELASTRACEAE**
24. Stamens 6-11.
32. Leaves compound.
33. Leaves opposite.
34. Petals yellow. ..... **ZYGOPHYLLACEAE**
34. Petals pink or purple or white. ..... **GERANIACEAE**
33. Leaves alternate.
35. Leaves palmately compound. Styles 5. Fruits capsules. ..... **OXALIDACEAE**
35. Leaves pinnately compound. Styles 1. Fruits legumes or achene-like or schizocarps.
36. Leaves 2-pinnately compound. ..... **FABACEAE**
36. Leaves 1-pinnately compound.
37. Fruits legumes. Seeds 5–numerous [Petals similar; hence corollas falsely appearing radially symmetrical]. ..... **FABACEAE**
37. Fruits schizocarps. Seeds 2, 1 per mericarp [Leaves opposite, but one of each pair smaller or abortive; hence falsely appearing alternate]. ..... **ZYGOPHYLLACEAE**
32. Leaves simple.
38. Leaves alternate.
39. Stamens fused; forming a tube surrounding styles. ..... **MALVACEAE**
39. Stamens free.
40. Stipules absent. Fruits capsules; 5- or 7-beaked. Seeds many. ..... **PENTHORACEAE**
40. Stipules present. Fruits schizocarps. Seeds 5. ..... **GERANIACEAE**
38. Leaves opposite or whorled.
41. Leaf margins palmately lobed or palmately parted. Fruits schizocarps. ..... **GERANIACEAE**
41. Leaf margins entire or toothed. Fruits capsules.
42. Styles 1. Sepals in 2 whorls; outer whorl of 2 smaller than inner whorl of 3. ..... **CISTACEAE**
42. Styles 2–5. Sepals in 1 whorl.
43. Stamens 6 or 9; in 3 fascicles. ..... **HYPERICACEAE**
43. Stamens 5-10; separate, not in fascicles.
44. Plants characteristic of wet mud flats or shallow standing water. Locules 5. Placentation axile. ..... **ELATINACEAE**
44. Plants characteristic of dry terrestrial habitats. Locules 1. Placentation free-central. ..... **CARYOPHYLLACEAE**

GROUP U: Plants caulescent herbs. Perianth parts in 2-series. Petals 4 or 5 or multiples of 4 or 5 or many. Corollas radially symmetrical or asymmetrical. Petals free. Ovaries superior. Pistils 2 or more.

1. Leaves opposite or whorled. ..... **CRASSULACEAE**
1. Leaves alternate or basal.
  2. Hypanthia present as a disk or cup or tube. Perianth and stamens inserted on hypanthium.
    3. Leaves compound. ..... **ROSACEAE**
    3. Leaves simple.
      4. Stipules present. Leaves lobed. Fruits aggregates of achenes. ..... **ROSACEAE**
      4. Stipules absent. Leaves not lobed. Fruits 5- to 7-beaked capsules. [Carpel fusion at bases may be so slight that multiple pistils may falsely appear to be present]. ..... **PENTHORACEAE**
  2. Hypanthia absent. Perianth and stamens inserted on receptacle.
    5. Leaves succulent; terete. ..... **CRASSULACEAE**
    5. Leaves not succulent; not terete.
      6. Filaments fused, forming a tube around styles. [Carpels of ovaries fused until the fruits mature, then separating; hence falsely appearing polycarpous]. ..... **MALVACEAE**
      6. Filaments free, not forming a tube around styles.
        7. Stamens 10; whorled. Fruits 5- to 7-beaked capsules. [Carpel fusion at bases may be so slight that multiple pistils may falsely appear to be present]. Seeds numerous. ..... **PENTHORACEAE**
        7. Stamens 12–many; spiraled. Fruits achenes. Seeds 1 ..... **RANUNCULACEAE**

GROUP V: Plants caulescent herbs. Perianth parts in 2-series. Petals 2 or 4 or 5. Corollas radially symmetrical or asymmetrical. Petals fused at least at base or apex. Ovaries wholly or partially inferior.

1. Stems trailing or prostrate.
  2. Tendrils present. Leaves alternate. Flowers imperfect. Fruits pepos. ..... **CUCURBITACEAE**
  2. Tendrils absent. Leaves opposite or whorled. Flowers perfect. Fruits berries or schizocarps or capsules.
    3. Leaves whorled. ..... **RUBIACEAE**
    3. Leaves opposite.
      4. Stipules present. Fruits berries or schizocarps. ..... **RUBIACEAE**
      4. Stipules absent. Fruits capsules. ..... **TETRACHONDRACEAE**
1. Stems erect or ascending.
  5. Flowers with hypanthium-tube elongated beyond ovary [thus falsely giving the appearance of fused petals]. ..... **ONAGRACEAE**
  5. Flowers without an elongated hypanthium-tube.
    6. Anthers connivent or fused.
      7. Inflorescences racemes or cymes or mixed. Fruits capsules. Sepals present, not modified into a pappus. ..... **CAMPANULACEAE**
      7. Inflorescences heads. Fruits achenes. Sepals modified into a pappus. ..... **ASTERACEAE**
    6. Anthers free.
      8. Ovaries partially inferior, the distal 1/3–1/2 free from sepals and petals.
        9. Petals 5. Ovaries 5-carpellate; 1-locular. Placentation free-central. ..... **PRIMULACEAE**
        9. Petals 4. Ovaries 2-carpellate; 2-locular. Placentation axile or basal.
          10. Leaves whorled. ..... **RUBIACEAE**
          10. Leaves opposite.
            11. Stipules present. ..... **RUBIACEAE**
            11. Stipules absent. ..... **TETRACHONDRACEAE**
      8. Ovaries wholly inferior, the distal portion not free from sepals and petals.
        12. Leaves alternate.
          13. Corollas 2.3–2.7 mm long. Rachises of inflorescences not visible. Stamens attached at middle of corolla tubes. Capsules circumscissle. ..... **SPHENOCLEACEAE**
          13. Corollas 5–10 mm long. Rachises of inflorescences visible. Stamens attached at bases of corolla tubes. Capsules poricidal or loculicidal. ..... **CAMPANULACEAE**
        12. Leaves opposite or whorled.

14. Flowers numerous, borne in dense flat-topped inflorescences.
Branches conspicuously dichotomous. Fruits achenes. ..... **CAPRIFOLIACEAE**
14. Flowers solitary or borne in few-flowered inflorescences that
are not flat-topped. Branches not conspicuously dichotomous.
Fruits capsules or berries or schizocarps or dry drupes.
15. Sepals 0.5–5 mm long. Corollas not gibbous. Stipules present. ..... **RUBIACEAE**
15. Sepals 8–18 mm long. Corollas gibbous. Stipules absent. ..... **CAPRIFOLIACEAE**

GROUP W: Plants caulescent herbs. Perianth parts in 2-series. Petals 2 or 4 or 5. Corollas radially symmetrical or asymmetrical. Petals fused at least at base or apex. Ovaries superior.

1. Pistils or fruits 2 or 4 or 5 per flower.
2. Fruits nutlets; each 1- or 2-seeded.
3. Stamens 5. Upper cauline leaves alternate.
4. Styles terminal. Stigmas conical or truncate-conical.
Ovaries shallowly 2- or 4-lobed. ..... **HELIOTROPIACEAE**
4. Styles gynobasic. Stigmas linear to capitate or discoid or bilobed.
Ovaries deeply 4-lobed. ..... **BORAGINACEAE**
3. Stamens 2 or 4. Upper cauline leaves opposite or whorled.
5. Styles gynobasic to subapical. Stigmas 2. Nutlet scars basal. ..... **LAMIACEAE**
5. Styles apical. Stigmas 1. Nutlet scars covering the entire inner surface. ..... **VERBENACEAE**
2. Fruits follicles or capsules; multi-seeded.
6. Plants succulent. Petals fused only at base and not forming a tube and limb.
Fruits 5 per flower. ..... **CRASSULACEAE**
6. Plants not succulent. Petals fused forming a tube and limb. Fruits 2 or 4 per flower.
7. Shoot exudate white. ..... **APOCYNACEAE**
7. Shoot exudate colorless.
8. Stigmas massive. Fruits follicles. Seeds 12 or more. ..... **APOCYNACEAE**
8. Stigmas not massive. Fruits capsules. Seeds 2–4. [Two ovary lobes
united only at base by gynobasic style; hence falsely appearing separate.] ..... **CONVOLVULACEAE**
1. Pistils or fruits 1 per flower.
9. Pistils with 2 separate ovaries, 1 or 2 styles, but only 1 stigma due to fusion.
Stigmas massive. Fruits follicles. ..... **APOCYNACEAE**
9. Pistils with only 1 ovary, 1 or more styles, and 1 or more stigmas. Stigmas not
massive. Fruits capsules or nutlets or legumes or schizocarps or berries or achenes.
10. Fruits nutlets or achenes.
11. Perianths 40–60 mm long. [Petals absent, sepals petaloid, and involucre
resembling calyx; hence perianths falsely appearing to be in 2-series]. ..... **NYCTAGINACEAE**
11. Perianths 1.2–35 mm long.
12. Stamens 5. Upper cauline leaves alternate.
13. Styles terminal. Stigmas conical or truncate-conical.
Ovaries shallowly 2- or 4-lobed. ..... **HELIOTROPIACEAE**
13. Styles gynobasic. Stigmas linear to capitate or discoid or bilobed.
Ovaries deeply 4-lobed. ..... **BORAGINACEAE**
12. Stamens 2 or 4. Upper cauline leaves opposite or whorled.
14. Styles gynobasic. Stigmas 2. Nutlet scars basal. ..... **LAMIACEAE**
14. Styles apical. Stigmas 1. Nutlet scars covering the entire inner surface. ..... **VERBENACEAE**
10. Fruits capsules or berries or schizocarps or legumes or utricles.
15. Upper cauline leaves opposite or whorled.
16. Stamens opposite the corolla lobes. Pistils 5-carpellate;
placentation free-central. ..... **PRIMULACEAE**
16. Stamens alternate with the corolla lobes. Pistils 2- or 3-carpellate;
placentation parietal or axile.
17. Pistils 3-carpellate. Stigmas 3. Locules 3. ..... **POLEMONIACEAE**
17. Pistils 2-carpellate. Stigmas 1 or 2. Locules 1 or 2.
18. Inflorescences helicoid cymes. ..... **HYDROPHYLLACEAE**
18. Inflorescences of various types, but not helicoid cymes.

19. Stamen number less than corolla lobe number.
20. Seeds 2–4. Anther apices recurved. Anthers borne at 45 degree angle to filaments. ..... **ACANTHACEAE**
20. Seeds 12 or more. Anther apices not recurved. Anthers borne vertically or at less than 45 degree angle to filaments.
21. Stamens 4. Corollas salverform; 15–18 mm long [Corolla lobes nearly the same; hence corolla symmetry falsely appearing radial]. ..... **OROBANCHACEAE**
21. Stamens 2. Corollas rotate or tubular-funnelform; 5–12 mm long (Corolla lobes nearly the same; hence corolla symmetry falsely appearing radial]. ..... **PLANTAGINACEAE**
19. Stamen number same as corolla lobe number.
22. Corollas white to light blue.
23. Leaf margins pinnatifid. ..... **HYDROPHYLLACEAE**
23. Leaf margins entire or serrate.
24. Corolla throats glabrous. Locules 1. Placentation parietal. ..... **GENTIANACEAE**
24. Corolla throats pubescent. Locules 2. Placentation axile or basal.
25. Flowers 4-merous. Inflorescences of solitary flowers or simple cymes; axillary. Corolla lobes 1 mm long [Sepal fusion with ovary wall inconspicuous; hence ovary falsely appearing superior]. ..... **TETRACHONDRACEAE**
25. Flower 5-merous. Inflorescences spike-like or branched cymes; terminal. Corolla lobes 1.5–50 mm long. ..... **LOGANIACEAE**
22. Corollas of various colors, but not white to light blue.
26. Corollas red and yellow. Placentation axile. ..... **LOGANIACEAE**
26. Corollas green or blue-purple or pink. Placentation parietal. ..... **GENTIANACEAE**
15. Upper cauline leaves alternate and/or leaves basal.
27. Corolla lobes 2; gray-black; bearing fleshy appendages at apices. Anthers black. ..... **ERIOCAULACEAE**
27. Corolla lobes 4 or 5; of various colors, but not gray-black; not bearing fleshy appendages. Anthers of various colors, but not black.
28. Inflorescences helicoid cymes.
29. Stigmas 2. Fruits capsules. ..... **HYDROPHYLLACEAE**
29. Stigmas 1. Fruits 2 or 4 nutlets [tardily separating; hence falsely appearing to be capsules when young]. ..... **BORAGINACEAE**
30. Styles terminal. Stigmas conical or truncate-conical. Ovaries shallowly 2- or 4-lobed. ..... **HELIOTROPIACEAE**
30. Styles gynobasic. Stigmas linear to capitate or discoid or bilobed. Ovaries deeply 4-lobed. ..... **BORAGINACEAE**
28. Inflorescences of various types, but not helicoid cymes.
31. Pistils 5–many carpellate.
32. Stamen filaments fused, forming a tube around styles.
33. Stamens 5–10 [petals coherent; hence falsely appearing fused]. ..... **OXALIDACEAE**
33. Stamens 12–many [petals fused basally to staminal column; hence falsely appearing fused]. ..... **MALVACEAE**
32. Stamen filaments free.
34. Seeds 1. Styles 5. Petals free [coherent distally; hence falsely appearing fused]. [Plants acaulescent, but can appear caulescent]. ..... **PLUMBAGINACEAE**
34. Seeds 5 or more. Styles 1. Petals fused more than half their length. ..... **PRIMULACEAE**

31. Pistils 1–3 carpellate.
35. Petals 4.
36. Inflorescences panicles or racemes; terminal.
Capsules septicidal. ..... **GENTIANACEAE**
36. Inflorescences terminal spikes or solitary flowers
borne in axils of leaves. Capsules circumscissle.
37. Inflorescences spikes; terminal.
Petals scarious; colorless or tan. ..... **PLANTAGINACEAE**
37. Inflorescences solitary flowers; axillary.
Petals not scarious; pink. [5-carpellate,
but falsely appearing 1-carpellate]. ..... **PRIMULACEAE**
35. Petals 5. ..... **couplet 38**

38. Filaments 3 or more times length of perianths. Inflorescences heads.
Leaves 2-compound. Fruits legumes. ..... **FABACEAE**
38. Filaments 2 or less times length of perianths. Inflorescences of various types, but
not heads. Leaves simple. Fruits capsules or berries.
39. Ovaries 3-locular. Stigmas 3. ..... **POLEMONIACEAE**
39. Ovaries 1- or 2- or 4-locular. Stigmas 1 or 2 or 4.
40. Stamens opposite the corolla lobes. Placentation free-central. ..... **PRIMULACEAE**
40. Stamens alternate with the corolla lobes. Placentation parietal or axile.
41. Leaves pinnatifid.
42. Anthers dehiscing poricidally, terminal. Fruits berries.
Seeds 12 or more. Placentation axile. ..... **SOLANACEAE**
42. Anthers dehiscing longitudinally. Fruits capsules.
Seeds 1–4. Placentation parietal. ..... **HYDROPHYLLACEAE**
41. Leaves entire or variously lobed, but not pinnatifid.
43. Sepals fused more than half their length.
44. Styles 2. Seeds 1–4. ..... **CONVOLVULACEAE**
44. Styles 1. Seeds 12 or more. ..... **SOLANACEAE**
43. Sepals fused less than half their length or free.
45. Anthers dehiscing poricidally, terminal. Fruits berries. ..... **SOLANACEAE**
45. Anthers dehiscing longitudinally. Fruits capsules.
46. Inflorescences racemes or spikes or panicles.
Capsules septicidal [corolla lobes nearly the same;
hence corolla symmetry falsely appearing radial]. ..... **PLANTAGINACEAE**
46. Inflorescences cymes or solitary flowers. Capsules loculicidal.
47. Seeds 1–4. ..... **CONVOLVULACEAE**
47. Seeds numerous
48. Plants armed with thorns at nodes. Styles 2.
Filaments basally dilated. Placentation axile. ..... **HYDROLEACEAE**
48. Plants not armed. Styles 1. Filaments not
basally dilated. Placentation parietal. ..... **HYDROPHYLLACEAE**

ACANTHACEAE A.L. de Jussieu Acanthus Family

Plants herbs; perennials or annuals; perennating organs caudices or crowns or rhizomes. **Leaves** cauline; simple; opposite; venation pinnate; stipules absent. **Inflorescences** solitary flowers or simple cymes or spikes; terminal or axillary; bracts present; bracteoles present or absent. **Flowers** perfect; chasmogamous or cleistogamous; perianths in 2-series. **Sepals** 5; fused. **Corollas** bilaterally or nearly radially symmetrical; bilabiate or salverform to funnelform. **Petals** 5; fused; white or pink or purple. **Stamens** 4 or 2 (but appearing to be 4 due to separation of thecae); of equal length or didynamous; epipetalous**;** staminodia 2 or 1 or 0. **Pistils** 1; compound, carpels 2; stigmas 2; styles 1; ovaries superior; locules 2; placentation axile. **Fruits** capsules; loculicidal. **Seeds** 2 to 10.

The family is represented in Oklahoma by 4 genera and 7 species, all native.

1. Stamens 4. Corolla lobes convolute.
   2. Corollas weakly bilabiate. Bases of anther sacs mucronate. Stigma lobes appearing to be 1, posterior lobe rudimentary. ..... ***Dyschoriste***
   2. Corollas salverform to funnelform. Bases of anther sacs rounded. Stigma lobes 2, unequal in length. ..... ***Ruellia***
1. Stamens 2. Upper corolla lips erect.
   3. Plants annuals. Corolla lobes imbricate. ..... ***Dicliptera***
   3. Plants perennials. Upper corolla lips reflexed. ..... ***Justicia***

Dicliptera A.L. de Jussieu

One species. ..... ***D. brachiata***

Dyschoriste C.G.D. Nees

One species. ..... ***D. linearis***

Justicia C. Linnaeus Waterwillow

1. Spikes dense; head-like. Stamen filaments 6 mm long; attached at tip of corolla tubes. ..... ***J. americana***
1. Spikes loose; elongate. Stamen filaments 3–4 mm long; attached at middle of corolla tubes. ..... ***J. ovata***

Ruellia C. Linnaeus Wild Petunia[1]

1. Peduncles below pair of foliaceous bracts and flowers 2–5 cm long. Ovaries pubescent. ..... ***R. pedunculata***
1. Peduncles below pair of foliaceous bracts and flowers absent or 0.5–1.5 cm long. Ovaries glabrous.
   2. Calyx lobes 0.5–1 mm wide; setaceous to linear; hairs longer than width of lobes, extending beyond margins. ..... ***R. humilis***
   2. Calyx lobes 2–4 mm wide; lanceolate; hairs shorter than width of lobes, not extending beyond margins. ..... ***R. strepens***

[1] Treatment contributed by Lisa Costantino

ACORACEAE I.I. Martinov Sweet Flag Family

Plants herbs; perennials; perennating organs stout rhizomes; emergent aquatics; acaulescent; strongly aromatic. **Root Systems** fibrous. **Leaves** simple; alternate; equitant; linear to ensiform; venation parallel; margins entire; stipules absent. **Inflorescences** spadices; borne laterally; peduncles 3-angled, fused proximally with spathes; spathes present, leaf-like, not enclosing spadices. **Flowers** perfect; perianths in 1-series. **Perianth Parts** 6; free; light brown. **Stamens** 6; dehiscing transversely. **Pistils** 1; compound, carpels 2 or 3; stigmas 1; styles absent; ovaries superior; locules 1 to 3; placentation apical. **Fruits** syncarps of berries. **Seeds** 2 or 3; embedded in mucilage.

The family is represented in Oklahoma by 1 genus and 1 species. *Acorus* was formerly positioned in the Araceae or arum family. Phylogenetic studies, however, support its recognition as a distinct monogeneric family. Our species is a sterile triploid introduced in North America by early European settlers. It does not produce fruit; descriptions appearing in earlier floras are apparently of the withered ovary.

Acorus C. Linnaeus Sweet Flag

One species. ..... ***A. calamus***

ADOXACEAE E.H.F. Meyer Elderberry or Moschatel Family

Plants small trees or shrubs; deciduous; perennials. **Leaves** simple or 1-pinnately compound; opposite; venation pinnate; margins serrate; stipules absent. **Inflorescences** compound cymes; terminal; flat-topped or hemispheric. **Flowers** perfect; perianths in 2-series. **Sepals** 5; fused. **Corollas** radially symmetrical; rotate. **Petals** 5; fused. **Stamens** 5; epipetalous. **Pistils** 1; compound, carpels 3; stigmas 3- to 5-lobed, styles absent or obsolete; ovaries partially inferior. **Nectaries** present or absent.**Fruits** fleshy drupes with 1 or 3 to 5 stones.

The family is represented in Oklahoma by 2 genera and 4 species. *Sambucus and Viburnum* were long classified in the Caprifoliaceae or honeysuckle family. Phylogenetic studies, however, indicated a closer phylogenetic relationship to the genera of the Adoxaceae, thus their repositioning.

1. Leaves 1-pinnately compound. Drupes with 3–5 stones. Nectaries absent. ..... ***Sambucus***
1. Leaves simple. Drupes with 1 stone. Nectaries present; 1; borne on top of ovaries. ..... ***Viburnum***

Sambucus C. Linnaeus Elderberry

One species. ..... ***S. nigra***
(= *S. canadensis*)

Viburnum C. Linnaeus Blackhaw

1. Leaf margins coarsely toothed; 1–3 teeth per cm. Lateral veins not branching and anastomosing; each extending to a marginal tooth. ..... ***V. molle***
(= *V. ozarkense*)
1. Leaf margins finely toothed; 6–12 teeth per cm. Lateral veins branching and anastomosing; not reaching margins.
   2. Petioles typically rusty-brown tomentose. Terminal buds densely pubescent; lanceolate-ovate..... ***V. rufidulum***
   2. Petioles glabrous or with scattered branched hairs. Terminal buds glabrous; linear-lanceolate. ..... ***V. prunifolium***

AIZOACEAE K.A. Rudolphi Fig-Marigold Family

Plants herbs; annuals or perennials. **Root Systems** taproots. **Stems** prostrate or decumbent or ascending. **Leaves** simple; opposite; clasping; venation pinnate; margins entire; petioles scarious; winged at base; stipules present or absent. **Inflorescences** solitary flowers or simple cymes; axillary. **Flowers** perfect; perianths in 1-series; radially symmetrical. **Sepals** 5; fused; with abaxial surfaces green and adaxial surfaces white or pink to purple. **Petals** absent. **Stamens** 5 to 10 or numerous. **Pistils** 1; compound, carpels 2 to 5; stigmas 1 to 5; styles 1 to 5; ovaries superior or half inferior; locules 1–5; placentation axile or basal. **Fruits** capsules; circumscissile. **Seeds** 1 to numerous.

The family is represented in Oklahoma by 2 genera and 2 species. It is sometimes combined with the Molluginaceae.

1. Plants perennials. Stipules absent. Locules 3–5. Fruits conical; apically rounded. Seeds numerous. ..... ***Sesuvium***
1. Plants annuals. Stipules present. Locules 1–2. Fruits cylindrical; apically winged. Seeds 1–5. ..... ***Trianthema***

Sesuvium C. Linnaeus Sea Purslane

One species. ..... ***S. verucosum***

Trianthema C. Linnaeus Horse Purslane

One species. ..... ***T. portulacastrum***

ALISMATACEAE E.P. Ventenat Water-Plantain Family[1]

Plants herbs; perennials or annuals; perennating organs rhizomes; emergent or submerged aquatics; acaulescent; bearing perfect flowers or monoecious or dioecious. **Leaves** basal; simple; petiolate; venation parallel or parallel-convergent; petioles sheathing; stipules absent. **Scapes** 1 or few. **Inflorescences** racemes or panicles; bracts present. **Flowers** perfect or imperfect, similar; chasmogamous or cleistogamous; perianths in 2-series. **Sepals** 3; persistent; free; green. **Corollas** radially symmetrical. **Petals** 3; free; caducous; white. **Stamens** 6 or numerous; whorled or spiraled. **Pistils** 6 to numerous; free; simple, carpels 1; stigmas 1; styles 1; ovaries superior; locules 1; placentation basal. **Nectaries** present; receptacular. **Fruits** achenes. **Seeds** 1.

The family is represented in Oklahoma by 3 genera and 13 species. All species are native, emergent aquatics inhabiting shallow water, mudflats, and sandbars.

1. Stamens 6. Receptacles flat; pistils and achenes in marginal ring. ..... ***Alisma***
1. Stamens 7–30. Receptacles convex; pistils and achenes in globose spiral.
  2. Flowers perfect. Achenes plump. Roots not septate. ..... ***Echinodorus***
  2. Flowers imperfect, pistillate rarely with staminal rudiments. Achenes flattened. Roots septate. ..... ***Sagittaria***

Alisma C. Linnaeus Water Plantain

1. Flowers 7–13 mm in diameter. Petals 3.5–6 mm long. Infructescences 4–7 mm in diameter. ..... ***A. triviale***
1. Flowers 3–3.5 mm in diameter. Petals 1–3 mm long. Infructescences 2–4 mm in diameter. ..... ***A. subcordatum***

Echinodorus L.C.M. Richard & G. Engelmann ex A. Gray Burhead

1. Flowering stems erect. Flowers 6-11 mm in diameter. Stamens 9-15. ..... ***E. berteroi***
1. Flowering stems arching. Flowers 12-25 mm in diameter. Stamens 20-22. ..... ***E. cordifolius***

Sagittaria C. Linnaeus Arrowhead

1. Fruiting pedicels recurved.
  2. Emergent leaf blades hastate to sagittate. Infructescences 1.2–2.1 cm in diameter. ..... ***S. montevidensis* subsp. *calycina***
  2. Emergent leaf blades linear-ovate to ovate. Infructescences 0.7–1.2 cm in diameter. ..... ***S. platyphylla***
1. Fruiting pedicels spreading or ascending.
  3. Filaments pubescent to tomentose. ..... ***S. graminea***
  3. Filaments glabrous.
    4. Emergent leaf blades elliptic or lanceolate or ovate.
      5. Bracts 4–8 mm long; papillose; fused 1/4 of length. Achenes obovate. ..... ***S. papillosa***
      5. Bracts 10–30 mm long; not papillose; free or fused only at bases. Achenes falcate. ..... ***S. ambigua***
    4. Emergent leaf blades cordate or sagittate or hastate.
      6. Bracts free or fused less than 1/4 of length. ..... ***S. brevirostra***
      6. Bracts fused 1/4 or more of length.
        7. Achene beaks horizontal; 1–2 mm long. ..... ***S. latifolia***
        7. Achene beaks erect; 0.1–0.4 mm long.
          8. Basal lobes of emergent leaves 18–35 mm long; shorter than blade bodies. Emergent leaf petioles recurved. Submerged leaves and sagittate or cordate floating leaves often present. ..... ***S. cuneata***
          8. Basal lobes of emergent leaves 4–6 mm long; longer than blade bodies. Submerged and floating leaves absent. ..... ***S. longiloba***

[1] Treatment contributed by C. Barre Hellquist

ALTINGIACEAE P.F. Horaninow Sweet Gum Family

Plants trees; deciduous; monoecious; aromatic. **Branches** with wings present or absent. **Leaves** simple; alternate; venation palmate; deeply 5- to 7-lobed, star-shaped; stipules present, caducous. **Inflorescences** globose heads; terminal; of 2 types; staminate in dense or open racemes; pistillate solitary on elongate peduncles; bracts present, scale-like, intermingled with flowers. **Flowers** produced simultaneously with leaves; imperfect; perianths absent. **Staminate Flowers:** Stamens 4 to 10; filaments short. **Pistillate Flowers:** Androecial Rudiments 4. Pistils 1; compound, carpels 2; stigmas 2, decurrent; styles 2, recurved, persistent;

ovaries partially inferior; locules 2; placentation axile. **Nectaries** absent. **Fruits** syncarps of capsules, globose, spiny; capsules 2-beaked, styles persistent and indurate; septicidal; ligneous and brown at maturity. **Seeds** 1 to 2; wings present.

The family is represented in Oklahoma by 1 genus and 1 species. *Liquidambar* and *Altingia* were long classified as a subfamily in the Hamamelidaceae or witch hazel family. Phylogenetic studies, however, support their recognition as a distinct family. Native to the eastern 1/4 of the state, *Liquidambar styraciflua* has been widely planted throughout the state as an ornamental for its shade and autumn foliage.

Liquidambar C. Linnaeus Sweetgum

One species. ..... ***L. styraciflua***

AMARANTHACEAE A.L. de Jussieu Amaranth Family[1]

Plants herbs or shrubs or subshrubs; annuals or perennials; strongly aromatic or not aromatic; armed or not armed with spines; bearing perfect flowers or dioecious or monoecious or gynomonoecious. **Stems** erect or prostrate to decumbent or ascending; succulent or not succulent. **Leaves** simple; opposite or alternate; petiolate or sessile; blades flat or cylindrical if succulent; venation pinnate or pinnipalmate or not apparent; surfaces glabrous or mealy or pubescent; margins entire or sinuate or dentate or incised; stipules absent. **Inflorescences** cymes or glomerules or spikes or panicles or heads or solitary flowers sunken in stems; terminal or axillary; bracts present or absent, membranous or scarious; bracteoles present or absent. **Flowers** perfect or imperfect, all similar; perianths in 1-series or absent. **Calyces** radially or rarely bilaterally symmetrical. **Sepals** 1 to 5 or 0; in 1 whorl or rarely 2 whorls; free or fused; green or reddish green to white; herbaceous or scarious or membranous. **Petals** absent. **Stamens** 1 to 5; opposite the sepals; free or fused by filaments. **Pistils** 1; compound, carpels 2 to 5; stigmas 1 to 3, linear or capitate; styles 1 to 5 or 0; ovaries superior; locules 1; placentation basal. **Fruits** utricles or achenes; usually enclosed within persistent sepals and/or bracteoles; indehiscent or dehiscent; circumscissile. **Seeds** 1.

The family is represented in Oklahoma by 18 genera and 46 species. As presently circumscribed on the basis of phylogenetic analyses, it includes the Chenopodiaceae or goosefoot family. Its species occupy a variety of habitats and biomes. Many are weedy, some extremely troublesome, and thrive in disturbed soils. Species of *Amaranthus* are cultivated as a grain crop. The fruits of some genera are important wildlife food.

1. Plants shrubs or subshrubs.
    2. Herbage white to brownish tomentose; stellate hairs present. Bracts of pistillate flowers hirsute; 4–7.5 mm long; slightly keeled, but not winged. ..... ***Krascheninnikovia***
    2. Herbage mealy; stellate hairs absent. Bracts of pistillate flowers mealy; 8–25 mm long; conspicuously 4-winged longitudinally. ..... ***Atriplex***
1. Plants herbs.
    3. Upper leaves opposite.
        4. Stems erect. Inflorescences terminal.
            5. Plants annuals; from taproots. Inflorescences spikes. Flowers perfect. Sepals fused; villous-lanate. ..... ***Froelichia***
            5. Plants perennials; from rhizomes. Inflorescences panicles. Flowers imperfect. Plants dioecious. Sepals free; glabrous. ..... ***Iresine***
        4. Stems prostrate to ascending. Inflorescences axillary.
            6. Indumentum stellate. ..... ***Tidestromia***
            6. Indumentum absent or of various types, but not stellate.
                7. Plants from elongate roots. Sepals glabrous or sparsely pilose or pubescent with barbed hairs. ..... ***Alternanthera***
                7. Plants from branching caudices. Sepals lanate, hairs not barbed.
                8. Sepals fused. Stamens fused; episepalous. Basal leaves 0.5–10 mm long, equal in length to cauline leaves. ..... ***Guilleminea***
                8. Sepals free. Stamens free; not episepalous. Basal leaves 20–50 mm long, longer than cauline leaves. ..... ***Gossypianthus***
    3. Upper leaves alternate.
        9. Plants armed with 2 spines at some nodes. ..... ***Amaranthus***
        9. Plants not armed with spines at nodes.
            10. Leaf apices spinescent or cuspidate.

11. Leaf apices spinescent. Flowers subtended by 2 bracteoles.
Persistent sepals winged. Utricles not winged. ..... ***Salsola***
11. Leaf apices cuspidate. Flowers not subtended by 2 bracteoles.
Persistent sepals not winged. Utricles winged. ..... ***Corispermum***
10. Leaf apices various but neither spinescent nor cuspidate.
12. Plants monoecious or dioecious. Pistillate flowers subtended by 2 or 3 bracts or bracteoles.
13. Each flower subtended 1 bract and 2 bracteoles. Bracts and bracteoles crowded; membranous or scarious. Calyces membranous or scarious. Sepals of pistillate flowers 1–3 or 5. Styles 1 or 0. ..... ***Amaranthus***
13. Each flower subtended by 1 or 0 bracts and 0 bracteoles. Bracts not crowded; herbaceous. Sepals of pistillate flowers 0. Styles 2.
14. Stems erect or spreading. Leaves linear-spathulate or triangular or lanceolate-hastate. Sepals of staminate flowers 5. Bracts of pistillate flowers not conduplicate; winged; not keeled; bases not subhastate. ..... ***Atriplex***
14. Stems prostrate to ascending. Leaves rhombic-ovate to orbicular. Sepals of staminate flowers 3 or 4. Bracts of pistillate flowers conduplicate; not winged; keeled; bases subhastate. ..... ***Suckleya***
12. Plants bearing perfect flowers or gynomonoecious. Pistillate flowers, when present, not subtended by 2 bracts.
15. Sepals 1. ..... ***Monolepis***
15. Sepals 3–5.
16. Leaf surfaces pilose-villous. Bract surfaces pilose; hairs silver-white or reddish brown. ..... ***Kochia***
16. Leaf surfaces mealy or glabrous or pubescence of various types, but not pilose-villous. Bract surfaces glabrous or mealy.
17. Sepals horizontally winged, with wings forming a continuous ring. Utricles and seeds lanulate. ..... ***Cycloloma***
17. Sepals not horizontally winged. Utricles and seeds glabrous.
18. Leaves succulent. Blades terete or subterete. Bracteoles present; 2. ..... ***Suaeda***
18. Leaves not succulent. Blades flat. Bracteoles absent.
19. Leaves and flowers with yellow to orange, sessile glands. ..... ***Dysphania***
19. Leaves and flowers without glands. ..... ***Chenopodium***

Alternanthera P. Forsskal Chaff Flower

1. Heads pedunculate, peduncles 2–5 cm long; 12–14 mm in diameter. Sepals 5–6 mm long. ..... ***A. philoxeroides***
1. Head sessile; 8–12 mm in diameter. Sepals 3–5 mm long.
2. Sepals 1-nerved; densely pubescent with barbed hairs; apices spinescent. ..... ***A. caracasana*** (= *A. repens*)
2. Sepals 3-nerved; glabrous or sparsely pilose; apices not spinescent. ..... ***A. paronichyoides***

Amaranthus C. Linnaeus Pigweed

1. Plants armed with spines at some nodes. ..... ***A. spinosus***
1. Plants not armed with spines.
2. Plants monoecious.
3. Inflorescences only axillary.
4. Plants erect or ascending. Sepals 3. Bracts 2 or 3 times length of sepals. ..... ***A. albus***
4. Plants prostrate. Sepals 4 or 5. Bracts equal in length to sepals. ..... ***A. blitoides***
3. Inflorescences both terminal and axillary.
5. Sepals 3. Utricles indehiscent. ..... ***A. viridis*** (= *A. gracilis*)
5. Sepals 5. Utricles dehiscent; circumscissile.
6. Leaves villous on veins. Sepal apices round; mucronate. ..... ***A. retroflexus***
6. Leaves glabrous. Sepal apices acute; not mucronate. ..... ***A. hybridus***
2. Plants dioecious.
7. Plants staminate.
8. Bract apices not mucronate. ..... ***A. arenicola***
8. Bract apices mucronate.

9. Outer bracts 1.5–3 mm long. Leaf apices acute or acuminate. ..... ***A. tuberculatus***
(= *A. rudis, A. tamariscina*)
9. Outer bracts 4–6 mm long. Leaf apices rounded or obtuse. ..... ***A. palmeri***
7. Plants pistillate.
10. Sepals 1 or 2; 1 lanceolate, 1 rudimentary or absent. ..... ***A. tuberculatus***
(= *A. rudis, A. tamariscina*)
10. Sepals 5; spathulate.
11. Sepals recurved; outer 2–2.5 mm long; apices emarginate or apiculate, excurrent midvein when present 0.1–0.3 mm long. Bracts 1.5–2.5 mm long. ..... ***A. arenicola***
11. Sepals appressed; outer 3–4 mm long; apices acute, excurrent midvein when present 0.5–1 mm long. Bracts 3–6 mm long. ..... ***A. palmeri***

Atriplex C. Linnaeus Saltbush

1. Plants shrubs. Bracts subtending pistillate flowers longitudinally 4-winged. ..... ***A. canescens***
1. Plants herbs. Bracts subtending pistillate flowers not 4-winged.
2. Bracts of pistillate flowers triangular to ovate-triangular; fused only at bases; margins entire or denticulate. ..... ***A. patula***
2. Bracts of pistillate flowers obovate to suborbicular; fused to middle or above; margins laciniate. ..... ***A. argentea***

Chenopodium C. Linnaeus Goosefoot

1. Lower leaves deeply sinuate-dentate, with 2–4 large triangular teeth separated by rounded sinuses; bases truncate to subcordate. Utricles 2–2.6 mm in diameter. ..... ***C. simplex***
(= *C. gigantospermum*)
1. Lower leaves entire or toothed, with small irregularly shaped teeth not separated by rounded sinuses; bases cuneate or rounded. Utricles 0.5–1.6 mm in diameter.
2. Leaves linear.
3. Veins 1 at blade bases. Pericarp fused to seed, not readily separated. ..... ***C. pallescens***
3. Veins 3 at blade bases. Pericarp free from seed, readily separated. ..... ***C. pratericola***
2. Leaves of various shapes, but not linear.
4. Sepals 3 or 4; glabrous. ..... ***C. glaucum***
4. Sepals 5; mealy.
5. Blades 3–4 times longer than wide. ..... ***C. pratericola***
5. Blades 1.5–2.5 times longer than wide.
6. Pericarps conspicuously roughened; alveolate. Fresh plants malodorous. ..... ***C. berlandieri***
6. Pericarps smooth or inconspicuously roughened; not alveolate. Fresh plants not malodorous.
7. Upper stems and branches glabrous. Adaxial surfaces of leaves glabrous to sparsely mealy. ..... ***C. standleyanum***
7. Upper stems and branches mealy. Adaxial surfaces of leaves densely mealy.
8. Sepals not keeled. Pericarp free from seed, readily separated. ..... ***C. incanum***
8. Sepals keeled. Pericarp fused to seed, not readily separated. ..... ***C. album***
(= *C. missouriensis*)

Corispermum C. Linnaeus Tickseed

1. Spikes axillary. Stamens 5. Mature utricles narrower than or only as wide as bracts; hidden by bracts. ..... ***C. hyssopifolim***
1. Spikes terminal. Stamens 3. Mature utricles wider than bracts; exposed, not hidden by bracts. ..... ***C. nitidum***

Cycloloma C.H.B. Moquin-Tandon Winged Pigweed

One species. ..... ***C. atriplicifolium***

Dysphania R. Brown Snakecotton

1. Stems prostrate or decumbent. Stamens 1. ..... ***D. pumilio***
(= *Chenopodium pumilio*)

1. Stems erect or ascending. Stamens 5.
   2. Inflorescences glomerules or spikes. Flowers sessile; all fertile. ..... ***D. ambrosioides***
   (= *Chenopodium ambrosioides*)
   2. Inflorescences few-flowered cymes. Flowers sessile in forks of branches and pedicellate at ends of branches; sessile fertile; pedicellate aborted. ..... ***D. graveolens***
   (= *Chenopodium graveolens, C. incisum*)

Froelichia C. Moench Snakecotton

1. Calyces with sharp lateral spines; lateral crests absent. Stems branched at plant base. ..... ***F. gracilis***
1. Calyces without sharp lateral spines; lateral crests 2; dentate. Stems not branched or branched only above plant base. ..... ***F. floridana***

Gossypianthus W.J. Hooker Cotton Flower

One species. ..... ***G. lanuginosus***

Guilleminea K.S. Kunth Dense Cotton Flower

One species. ..... ***G. densa***

Iresine P. Browne Bloodleaf

One species. ..... ***I. rhizomatosa***

Kochia A.W. Roth

One species. ..... ***K. scoparia***

Krascheninnikovia A.J. von Gueldenstaedt Winter-Fat

One species. ..... ***K. lanata***
(= *Ceratoides lanata*)

Monolepis H.A. Schrader Povertyweed

One species. ..... ***M. nuttalliana***

Salsola C. Linnaeus Russian Thistle

1. Spikes 15–40 cm long. Bracts appressed or only tips slightly recurved. ..... ***S. collina***
1. Spikes 3–14 cm long. Bracts spreading. ..... ***S. tragus***
(= *S. iberica, S. kali*)

Suaeda P. Forsskal ex J.F. Gmelin Seepweed

1. Plants herbaceous; annuals. Stems and leaves glabrous. Leaves 17–24 mm long. ..... ***S. calceoliformis***
(= *S. depressa*)
1. Plants suffrutescent; perennials. Stems and leave tomentose. Leaves 4–12 mm long. ..... ***S. nigra***
(= *S. suffrutescens*)

Suckleya A. Gray

One species. ..... ***S. suckleyana***

Tidestromia P.C. Standley

One species. ..... ***T. lanuginosa***

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[1] Treatment based on those of Fathi B. Erteeb and Rhonda R. Hampton

AMARYLLIDACEAE J.H.J. Saint-Hilarie Amaryllis or Daffodil Family

Plants scapose herbs; perennials; perennating organs bulbs; acaulescent. **Root Systems** fibrous. **Leaves** basal; simple; alternate; blades linear or narrowly lanceolate; venation parallel; stipules absent. **Inflorescences** solitary or paired flowers, or umbels; spathes present; scapes terete or flattened, solid or hollow. **Flowers** showy; perfect; perianths in 1-series; radially symmetrical. **Perianth Parts** 6; petaloid; free or fused; coronas present or absent. **Stamens** 6; arising from perianths. **Pistils** 1; compound, carpels 3; stigmas 1, capitate or 3-lobed; styles 1, stout or filiform; ovaries superior or inferior; locules 3; placentation axile. **Hypanthia** present or absent; **Nectaries** absent**. Fruits** capsules; loculicidal; pericarps membranous or coriaceous. **Seeds** numerous; black or green.

The family is represented in Oklahoma by 5 genera and 13 species. These genera were formerly positioned in the Liliaceae or lily family. Phylogenetic studies, however, support their placement in this family. *Allium* and *Tristagma* are classified in the Alliaceae or onion family by some taxonomists.

1. Ovaries inferior.
    2. Inflorescences solitary or paired flowers. Coronas absent. Perianth lobes 1–3 cm long.
        Leaves 1–5 mm wide. ..... ***Zephyranthes***
    2. Inflorescences umbels. Coronas present. Perianth lobes 6–10 cm long.
        Leaves 18–42 mm wide. ..... ***Hymenocallis***
1. Ovaries superior.
    3. Leaves without onion odor when crushed. Perianth parts greenish white to yellowish white. ..... ***Nothoscordum***
    3. Leaves with onion odor when crushed. Perianth parts blue or blue with pale blue tinge or white to pink or purple-red.
        4. Perianth parts 14–32 mm long; blue or blue with pale blue tinge. ..... ***Tristagma***
        4. Perianth parts 3–11 mm long; white to pink or purple-red. ..... ***Allium***

Allium C. Linnaeus Onion

1. Inflorescences producing only bulblets rather than flowers. ..... ***A. canadense***
1. Inflorescences producing only flowers.
    2. Spathes not divided; bracts 1, caducous. Leaf-sheaths elongate, extending to middle of scapes.
        3. Leaves 6–12; blades solid below middles; flat; keeled. ..... ***A. sativum***
        3. Leaves 2–4; blades hollow below middles; terete or filiform; not keeled. ..... ***A. vineale***
    2. Spathes divided; bracts 2–5, persistent. Leaf-sheaths short, at or below ground.
        4. Bracts 3–5.
            5. Stamens equal to or longer than perianths. ..... ***A. ampeloprasum***
            5. Stamens shorter than perianths.
                6. Spathe bracts 1-veined. Perianths campanulate. ..... ***A. drummondii***
                6. Spathe bracts 3- to 7-veined. Perianths urceolate. ..... ***A. canadense***
        4. Bracts 2.
            7. Plants flowering in fall. Scapes nodding, becoming erect at anthesis. Ovaries crested, with 6 points. Perianths rotate. Bulb coats not reticulate-fibrous. ..... ***A. stellatum***
            7. Plants flowering in spring and early summer. Scapes always erect. Ovaries not crested. Perianths urceolate to campanulate. Bulb coats reticulate-fibrous.
                8. Stamens as long as perianths. Pollen white. Leaves absent at anthesis. Plants flowering in June and July; known only from Rich Mt. in LeFlore County. ..... ***A. tricoccum***
                8. Stamens shorter than perianths. Pollen yellow. Leaves present at anthesis. Plants flowering March to June; widespread in western 3/4 of state.
                9. Spathe bracts 1-veined. Perianths campanulate. ..... ***A. drummondii***
                9. Spathe bracts 3- to 7-veined. Perianths urceolate.
                10. Perianths rose to purple. Aveoli of seed coats not papillate. ..... ***A. perdulce***
                10. Perianths white to pink or lavender. Alveoli of seed coats papillate. ..... ***A. canadense***

Hymenocallis R.A. Salisbury Spider Lily

1. Coronas 33–40 mm long. Free portion of filaments above corona 23–25 mm long. Plants of drained soils. ..... ***H. occidentalis***
(= *H. caroliniana*)
1. Coronas 25–35 mm long. Free portion of filaments above corona less than 20 mm long.

Plants of water saturated soils or standing water. ..... ***H. liriosme***

Nothoscordum K.S. Kunth Crow Poison

One species. ..... ***N. bivalve***

Tristagma E.F. Poeppig Spring Star

One species. ..... ***T. uniflorum***
(= *Ipheion uniflorum*)

Zephyranthes W. Herbert Rain Lily

One species. ..... ***Z. chlorosolen***
(= *Cooperia drummondii*)

ANACARDIACEAE J. Lindley Sumac Family

Plants trees or shrubs or woody vines; deciduous; solitary or colonial; polygamo-dioecious or dioecious; shoot exudate viscous. **Leaves** simple or compound; alternate; venation pinnate; resin canals present; stipules absent. **Inflorescences** panicles or compound cymes; terminal or axillary. **Flowers** perfect or imperfect, similar; perianths in 2-series. **Sepals** 5; fused or free. **Corollas** radially symmetrical; imbricate. **Petals** 5; free; yellow or greenish white. **Stamens** 5; alternate with petals; staminodia 0 or 5 to 10 in pistillate flowers. **Pistils** 1; compound, carpels typically 3; stigmas 1 or 3; styles 3 or 1; free or fused; ovaries superior; locules 1; placentation basal. **Fruits** drupes; often resinous or waxy. **Seeds** 1.

The family is represented in Oklahoma by 4 genera and 9 species. It is pantropical with several cultivated taxa including cashew, mango, pistachio, smoke-tree, and sumac. *Toxicodendron*, poison ivy, may cause contact dermatitis in susceptible individuals. *Rhus* and *Toxicodendron* are sometimes combined.

1. Plants producing flowers before leaves.
  2. Plants trees. Perianths absent. ..... ***Pistacia***
  2. Plants shrubs. Perianths present. ..... ***Rhus***
1. Plants producing flowers simultaneously with leaves or after leaves are formed.
  3. Leaves simple. Styles lateral. ..... ***Cotinus***
  3. Leaves compound. Styles terminal.
    4. Leaflets 5–31.
      5. Plants trees. Inflorescences open panicles. ..... ***Pistacia***
      5. Plants thicket forming shrubs. Inflorescences dense panicles. ..... ***Rhus***
    4. Leaflets 3.
      6. Terminal leaflets petiolulate; petiolules 10–34 mm long. Inflorescences axillary; spreading or drooping panicles. Drupes white; glabrous. ..... ***Toxicodendron***
      6. Terminal leaflets sessile or subsessile; petiolules 0–5 mm long. Inflorescences terminal; short spike-like panicles. Drupes red; pubescent. ..... ***Rhus***

Cotinus P. Miller Smoke Tree

One species. ..... ***C. obovatus***

Pistacia C. Linnaeus Pistache

One species. ..... ***P. chinensis***

Rhus C. Linnaeus Sumac

1. Plants producing flowers before leaves.
  2. Plants armed with thorns. ..... ***R. microphylla***
  2. Plants not armed with thorns. ..... ***R. aromatica***
1. Plants producing flowers simultaneously with leaves or after leaves are formed.
  3. Leaflets 3. ..... ***R. aromatica***
  3. Leaflets 5–31.

4. Leaf rachises not winged. Twigs and small branches glabrous; glaucous. ..... ***R. glabra***
4. Leaf rachised winged. Twigs and small branches pubescent; not glaucous.
5. Leaflets 3–10 mm long. Plants armed with thorns. ..... ***R. microphylla***
5. Leaflets 30–70 mm long. Plants not armed with thorns. ..... ***R. copallinum***

Toxicodendron P. Miller Poison Ivy

1. Plants rhizomatous herbs or climbing woody vines. ..... ***T. radicans***
1. Plants shrubs or subshrubs.
2. Drupes pubescent. Leaflet margins undulate or multiple-lobed; lobe apices round. ..... ***T. pubescens***
2. Drupes glabrous or glabrate. Leaflet margins coarsely toothed or 1-lobed or entire; lobe apices acute or acuminate.
3. Leaflets suborbicular to broadly ovate or broadly rhomboidal. Petioles 15–25 cm long. Leaves clustered near stem apices. Drupes 5–7 mm in diameter. ..... ***T. rydbergii***
3. Leaflets lanceolate to elliptic or narrowly rhomboidal. Petioles 2–16 cm long. Leaves borne along stems, not clustered near apices. Drupes 2.5–5.5 mm in diameter. ..... ***T. radicans***

ANNONACEAE A.L. de Jussieu Custard-Apple Family

Plants small trees or shrubs; deciduous. **Stems** with terminal buds present. **Leaves** aromatic when crushed; simple; alternate; venation pinnate; margins entire; bases obtuse or cuneate; stipules absent. **Inflorescences** solitary flowers; axillary. **Flowers** produced before or with leaves; nodding; perfect; perianths in 2-series. **Sepals** 3; caducous; free or fused at bases. **Petals** 6; in 2 whorls; free; green at first, gradually turning brown, lurid purple at maturity. **Stamens** numerous; spiraled; connective enlarged. **Pistils** 3 to numerous, but only 1-3 maturing; free; simple, carpels 1; stigmas 1; styles 1; ovaries superior; locules 1; placentation parietal. **Fruits** berries; sometimes aggregated. **Seeds** numerous.

The family is represented in Oklahoma by 1 genus and 1 species. Mostly a tropical family, our species is infrequently encountered in mesic shaded sites in the eastern 1/3 of the state. It has large simple leaves and an edible fruit.

Asimina M. Adanson Pawpaw

One species. ..... ***A. triloba***

APIACEAE J. Lindley Carrot Family

Plants herbs; annuals or biennials or perennials; terrestrial or emergent aquatics; aromatic or not aromatic. **Stems** usually hollow or with soft pith. **Leaves** variable, but usually deeply lobed or dissected, one species with phyllodes; herbaceous or cartilaginous; cauline or forming a basal rosette; 1-pinnately or 2-pinnately or palmately compound or simple; alternate; petioles sheathing or not sheathing; surfaces rugose or smooth or punctate; terminal leaflets of compound leaves present; venation pinnate or a single vein; stipules absent. **Inflorescences** umbels or heads; umbels compound or simple; terminal or axillary or extra-axillary or verticillate; bracts absent or present, subtending umbels and forming involucres; bracteoles absent or present, subtending umbellets and forming involucels. **Flowers** perfect or imperfect (staminate); perianths in 2-series or 1-series. **Sepals** 5 or 0; free. **Corollas** radially symmetrical or occasionally outermost flowers of umbels or umbellets bilaterally symmetrical. **Petals** 5; small; caducous; free; white or yellow or green or red or purple or blue; spreading; apices usually inflexed. **Stamens** 5. **Pistils** 1; compound, carpels 2; stigmas 2; styles 2; stylopodia present; ovaries inferior, lobed in cross-section, lobes 2; locules 2; placentation apical. **Nectaries** present; forming disks at bases of styles. **Fruits** schizocarps; mericarps with at least 5 primary ribs. **Seeds** 1 per mericarp.

The family is represented in Oklahoma by 35 genera and 54 species. The alternative family name Umbelliferae alludes to the characteristic umbel inflorescences. *Hydrocotyle*, long positioned in this family, is now placed in the Araliaceae, or ginseng family, on the basis of phylogenetic studies. Most abundant in the northern temperate regions of the world, it includes food plants such as carrots, parsnips, and celery, and spices such as dill, anise, and caraway. Some species are poisonous such as water hemlock and poison hemlock, the latter used in the execution of Socrates.

1. Phyllodes present; linear; terete; hollow; septate; leaflets or pinnae absent or reduced to hydathodes. ..... ***Harperella***
1. Phyllodes absent; blades and petioles developed; leaflets or pinnae present, well-developed.
2. Inflorescences heads or verticillate clusters.
3. Leaves simple.

4. Inflorescences heads; flowers 20–numerous. Bracts of flowers present; apices spiny. Schizocarps with white scales. ..... ***Eryngium***
4. Inflorescences verticillate clusters; flowers 2–8. Bracts absent. Schizocarps without white scales.
5. Leaves opposite; pubescence stellate. ..... ***Bowlesia***
5. Leaves alternate; glabrous. ..... ***Sanicula***
3. Leaves compound.
6. Flowers or fruits 1–3 per cluster. Leaves palmately compound. ..... ***Sanicula***
6. Flowers or fruits 10–40 per cluster. Leaves pinnately compound.
7. Schizocarps with tubercles or prickles. Petal apices inflexed. ..... ***Torilis***
7. Schizocarps smooth. Petal apices spreading. ..... ***Ammoselinum***
2. Inflorescences umbels.
8. Schizocarps with prickles or tubercles.
9. Rays 20–numerous. Prickles or tubercles in rows. ..... ***Daucus***
9. Rays 3–14. Prickles or tubercles scattered.
10. Plants glabrous. Leaflets of upper cauline leaves filiform. ..... ***Spermolepis***
10. Plants hispid to sparsely hispidulous. Leaflets of upper cauline leaves linear-lanceolate to ovate.
11. Leaflets linear to lanceolate. Rays 6–12. Flowers 8–16 per umbellet. Schizocarps 3–4 mm long; with glochidiate bristles. ..... ***Torilis***
11. Leaflets ovate to ovate-lanceolate. Rays 3–5. Flowers 3–7 per umbellet. Schizocarps 2–2.5 mm long; with uncinate bristles. ..... ***Anthriscus***
8. Schizocarps without prickles or tubercles.
12. Plants acaulescent.
13. Schizocarps not winged. Plants from globose tubers. ..... ***Erigenia***
13. Schizocarps winged. Plants from woody taproots.
14. Bracteoles pubescent. Schizocarps 2-winged. Mature wings 1–1.2 mm wide. ..... ***Lomatium***
14. Bracteoles glabrous. Schizocarps 4-winged. Mature wings 2–3 mm wide. ..... ***Cymopterus***
12. Plants caulescent.
15. Stems with 1 leaf. ..... ***Erigenia***
15. Stems with 2 or more leaves.
16. Flowers yellow or creamy yellow or purplish yellow.
17. Stylopodia present. Plants biennial. ..... ***Pastinaca***
17. Stylopodia absent. Plants perennial.
18. Leaflet margins entire or undulate; abaxial surfaces glaucous. Sepals absent or obsolete. ..... ***Taenidia***
18. Leaflet margins conspicuously toothed or lobed or incised; abaxial surfaces not glaucous. Sepals present.
19. Leaflet margins only serrate.
20. Central flower or schizocarp of each umbellet sessile or subsessile. Schizocarps not winged. ..... ***Zizia***
20. Central flower or schizocarp of each umbellet pedicellate. Schizocarps winged. ..... ***Thaspium***
19. Leaflet margins both irregularly toothed and pinnatifid or lobed or incised.
21. Plants from multiple, thickened, fibrous roots. Leaflets ovate to elliptic. Schizocarps terete; wings in 2 or more planes. ..... ***Thaspium***
21. Plants from a single, stout taproot. Leaflets obovate. Schizocarps flattened; wings in 1 plane. ..... ***Polytaenia***
16. Flowers white or greenish white or pink.
22. Plants aquatic; stoloniferous. Leaves of 2 forms; submerged and aerial different. ..... ***Berula***
22. Plants terrestrial; not stoloniferous. Leaves all alike; all aerial. ..... **couplet 23**
23. Schizocarps 3–10 times longer than wide.
24. Ultimate leaf segments rhomboid to ovate to oblong.
25. Bracteoles 4–6. Schizocarp ribs hispid. Carpophores bifid or cleft above middle. ..... ***Osmorhiza***
25. Bracteoles 0–1. Schizocarp ribs glabrous. Carpophores divided to bases. ..... ***Cryptotaenia***
24. Ultimate leaf segments narrowly lanceolate or linear.

26. Ultimate leaf segments of mid-cauline and/or basal leaves 0.5–2 mm wide.
Involucres absent. Bracteoles ovate. Sepals absent or obsolete. ..... ***Chaerophyllum***
26. Ultimate leaf segments of mid-cauline and/or basal leaves 2–7 mm wide.
Involucres present. Bracteoles linear. Sepals present; conspicuous.
27. Plants perennials. Sepals triangular. ..... ***Falcaria***
27. Plants annuals. Sepals linear. ..... ***Trepocarpus***
23. Schizocarps 1.2–2.5 times longer than wide, or shorter than wide.
28. Schizocarps shorter than wide. Mericarps subglobose. ..... ***Bifora***
28. Schizocarps longer than wide. Mericarps of various shapes, but not subglobose.
29. Narrowest leaflets or ultimate leaflet lobes 4–8 mm wide.
30. Schizocarps winged.
31. Leaflets 1-pinnately compound; margins irregularly serrate.
Rays glabrous. Schizocarps glabrous. ..... ***Oxypolis***
31. Leaflets 2- or 3-pinnately compound; margins uniformly serrate.
Rays hirsute. Schizocarps hirsute. ..... ***Angelica***
30. Schizocarps not winged.
32. Leaflet margins irregularly dissected or lobed. Sepals absent. ..... ***Conium***
32. Leaflet margins uniformly serrate or dentate. Sepals present. ..... ***Cicuta***
29. Narrowest leaflets or ultimate leaflet lobes 0.1–2 mm wide.
33. Plants perennials; from fusiform or tuberous roots.
34. Lower leaves 1-pinnately compound; 6–14 cm long.
Rays 15–45. Schizocarps winged. ..... ***Oxypolis***
34. Lower leaves 2- or 3-pinnately compound; 1–3 cm long.
Rays 6–12. Schizocarps not winged. ..... ***Perideridia***
33. Plants annuals or biennials; from fibrous or taproots.
35. Plants from fibrous roots.
36. Leaflets filiform. Carpophores cleft to middles. ..... ***Ptilimnium***
36. Leaflets linear to linear-lanceolate. Carpophores bifid at apices.
37. Middle cauline leaves palmately compound. Petal apices
inflexed. Schizocarps beaked. ..... ***Cyanosciadium***
37. Middle cauline leaves pinnately compound. Petal apices
spreading or reflexed. Schizocarps not beaked. ..... ***Limnosciadium***
35. Plants from taproots.
38. Schizocarps winged. ..... ***Eurytaenia***
38. Schizocarps not winged.
39. Sepals present. Flowers bilaterally symmetrical.
Carpophores divided to bases. ..... ***Coriandrum***
39. Sepals absent. Flowers radially symmetrical.
Carpophores entire or bifid at apices.
40. Umbels opposite the leaves; peduncles fascicled.
Involucels absent. ..... ***Cyclaspermum***
40. Umbels in axils of leaves or terminal; peduncles
not fascicled. Involucels present.
41. Leaflets filiform. ..... ***Spermolepis***
41. Leaflets linear to broadly lanceolate.
42. Plants annuals; 1–35 cm tall. Rays 1–8.
Bracts 1–2 or 0; linear. ..... ***Ammoselinum***
42. Plants biennials; 50–300 cm tall.
Rays 12–15. Bracts 5–7; lanceolate to ovate. ..... ***Conium***

Ammoselinum J. Torrey & A. Gray Sand Parsley

1. Plants 4–5 cm tall. Umbels sessile. Lateral ribs of schizocarps without corky appendages. ..... ***A. butleri***
1. Plants 10–35 cm tall. Umbels pedunculate. Lateral ribs of schizocarps with corky appendages. ..... ***A. popei***

Angelica C. Linnaeus

One species. ..... ***A. venenosa***

Anthriscus C.H. Persoon — Beakchervil

One species. ..... ***A. caucalis***
(= *A. scandicina*)

Berula W.S.J.G. Besser & W.D.G. Koch — Water-Parsnip

One species. ..... ***B. erecta***

Bifora G.F. Hoffmann — Prairie Bishop

One species. ..... ***B. americana***

Bowlesia H. Ruiz Lopéz & J.A. Pavón — Hoary Bowlesia

One species. ..... ***B. incana***

Chaerophyllum C. Linnaeus — Wild Chervil

1. Pedicels filiform. Leaves glabrous. Stems spreading to decumbent. ..... ***C. procumbens***
1. Pedicels clavate. Leaves pubescent. Stems erect. ..... ***C. tainturieri***

Cicuta C. Linnaeus — Water Hemlock

One species. ..... ***C. maculata***

Conium C. Linnaeus — Poison Hemlock

One species. ..... ***C. maculatum***

Coriandrum C. Linnaeus — Coriander

One species. ..... ***C. sativum***

Cryptotaenia A.P. de Candolle — Honewort

One species. ..... ***C. canadensis***

Cyclospermum M. Lagasca y Segura — Marsh Parsley

One species. ..... ***C. leptophyllum***
(= *Apium leptophyllum*)

Cymopterus C.S. Rafinesque — Wavewing, Spring Parsley

1. Bracts foliaceous. ..... ***C. glomeratus***
(= *C. acaulis*)
1. Bracts scale-like.
    2. Mature peduncles shorter than or equal to subtending leaves; 3–7 cm long. ..... ***C. montanus***
    2. Mature peduncles longer than subtending leaves; 9–17 cm long. ..... ***C. macrorhizus***

Cynosciadium A.P. de Candolle — Finger Dogshade

One species. ..... ***C. digitatum***

Daucus C. Linnaeus — Carrot

1. Involucral bracts shorter than umbels at anthesis. Barbs of schizocarp prickles not conspicuous at 10X magnification. Plants biennials. ..... ***D. carota***
1. Involucral bracts equal to or longer than umbels at anthesis. Barbs of schizocarp prickles conspicuous at 10X magnification. Plants annuals. ..... ***D. pusillus***

Erigenia T. Nuttall — Harbinger of Spring

One species. ..... ***E. bulbosa***

Eryngium C. Linnaeus Eryngo

1. Leaves linear; venation parallel. ..... ***E. yuccifolium***
1. Leaves lanceolate to ovate; venation pinnate or palmate.
    2. Leaves not rigid; margins not prickly.
        3. Stems prostate. Leaf blades 1–3 cm long; margins entire or lobed. Heads 2–4 mm wide. ..... ***E. prostratum***
        3. Stems erect. Leaf blades 4–7 cm long; margins toothed or incised. Heads 5–20 mm wide. ..... ***E. integrifolium***
    2. Leaves rigid; margins prickly.
        4. Fruiting heads 2–4 cm long. Bracts at tops of spikes present; 3–5 mm wide. ..... ***E. leavenworthii***
        4. Fruiting heads 0.6–2 cm long. Bracts at tops of spikes absent or if present 1 mm wide.
            5. Internodes short with heads overlapping. Heads 6–8 mm in diameter.
            Basal leaves palmately parted; sessile or subsessile. ..... ***E. diffusum***
            5. Internodes long with heads conspicuously separated. Heads 8–15 mm
            in diameter. Basal leaves serrate or dentate; petiolate. ..... ***E. hookeri***

Eurytaenia J. Torrey & A. Gray Texas Spreadwing

One species. ..... ***E. texana***

Falcaria P.C. Fabricius Sickleweed

One species. ..... ***F. vulgaris***

Harperella J.N. Rose Piedmont Mock Bishopweed

One species. ..... ***H. nodosa***
(= *Ptilimnium nodosum*)

Limnosciadium M.E. Mathias & L. Constance Arkansas Dogshade

One species. ..... ***L. pinnatum***

Lomatium C.S. Rafinesque

1. Petals yellow. Bracteoles fused; at least to middle. ..... ***L. foeniculaceum***
1. Petals white or purplish. Bracteoles free. ..... ***L. orientale***

Osmorhiza C.S. Rafinesque Sweet Cicely

One species. ..... ***O. longistylis***

Oxypolis C.S. Rafinesque Cowbane

One species. ..... ***O. rigidior***

Pastinaca C. Linnaeus Wild Parsley

One species. ..... ***P. sativa***

Perideridia H.G.L. Reichenbach

One species. ..... ***P. americana***

Polytaenia A.P. de Candolle Prairie Parsnip

One species. ..... ***P. nuttallii***

Ptilimnium C.S. Rafinesque Mockbishopweed

1. Bracts 5- to 7-parted. ..... ***P. capillaceum***
1. Bracts entire or 1- to 3-parted.
    2. Styles, excluding stylopodium, 1–1.3 mm long, longer than stylopodia.
    Leaf divisions crowded, appearing whorled. Bracts 3–5 mm long. ..... ***P. costatum***
    2. Styles, excluding stylopodium, 0.3–0.5 mm long; equal or subequal to stylopodia.
    Leaf divisions not crowded, definitely alternate or opposite. Bracts 6–40 mm long. ..... ***P. nuttallii***

Sanicula C. Linnaeus Black Snakeroot

1. Plants biennials. Petals white; shorter than calyx lobes. Staminate flowers 2–7 per umbellet. Styles shorter than schizocarp bristles; hidden. ..... ***S. canadensis***
1. Plants perennials. Petals yellow-green; longer than calyx lobes. Staminate flowers 12–25 per umbellet. Styles longer than schizocarp bristles; visible. ..... ***S. odorata*** (= *S. gregaria*)

Spermolepis C.S. Rafinesque Scale-seed

1. Schizocarps prickly with uncinate hairs. Leaves ovate. ..... ***S. echinata***
1. Schizocarps smooth or tuberculate. Leaves oblong to oblong-ovate.
   2. Fruiting pedicels of umbellets spreading; equal or subequal; 10–20 mm long. Ultimate leaf divisions linear. ..... ***S. divaricata***
   2. Fruiting pedicels of umbellets erect; conspicuously unequal; 0.5–5 mm long. Ultimate leaf divisions filiform. ..... ***S. inermis***

Taenidia (J. Torrey & A. Gray) C.G.O. Drude Pimpernel

One species. ..... ***T. integerrima***

Thaspium T. Nuttall Meadow Parsnip

1. Basal leaves 2- or 3-compound. Blades irregularly serrate or incised. Upper nodes bearded. ..... ***T. barbinode***
1. Basal leaves simple or 1-compound. Blades regularly crenate-dentate. Upper nodes glabrous or scabrous. ..... ***T. trifoliatum***

Torilis M. Adanson Hedge Parsley

1. Plants erect. Umbels pedunculate; terminal. ..... ***T. arvensis***
1. Plants decumbent to ascending. Umbels sessile or subsessile, axillary. ..... ***T. nodosa***

Trepocarpus T. Nuttall ex A.P. de Candolle

One species. ..... ***T. aethusae***

Zizia W.D.J. Koch Golden Alexanders

1. Basal leaves simple. Margins crenate-dentate. ..... ***Z. aptera***
1. Basal leaves 1- or 2-compound. Margins serrate or dentate. ..... ***Z. aurea***

APOCYNACEAE A.L. de Jussieu Milkweed or Dogbane Family

Plants herbs or subshrubs or vines; perennials, perennating organs tubers or caudices or rhizomes; deciduous or evergreen; shoot exudate latex, white or rarely colorless. **Stems** prostrate to erect, twining or not twining. **Leaves** herbaceous or chartaceous or coriaceous; simple; opposite or subopposite or alternate; petiolate or sessile; margins entire; venation pinnate or pinnipalmate or a single vein; colleters present or absent on adaxial surfaces at blade bases; interpetiolar colleters present or absent; stipules absent. **Inflorescences** racemes or cymes or umbels or solitary flowers; extra-axillary or axillary, but may appear terminal. **Flowers** perfect; perianths in 2-series; **Sepals** 5; fused. **Corollas** radially symmetrical; rotate or campanulate or urceolate or tubular-funnelform or salverform; valvate or contorted-imbricate. **Petals** 5; fused; of various colors; ascending or spreading or reflexed. **Coronas** absent or present; in 1 or more series; segments 5 per series; fused or free; segments cucullate or not cucullate; each cucullate segment with or without a horn. **Stamens** 5; epipetalous; filaments free or fused; anthers free or fused or fused to styles forming gynostegia; thecae 2, 1- or 2-sporangiate, apical scale-like appendages present or absent; pollen shed singly or in tetrads or in pollinia. **Pistils** 1; compound; carpels 2; stigmas 1, subapical, ring-shaped; styles 1 or 2, free or fused; ovaries 2, free, superior or partially inferior; locules 2; placentation parietal. **Nectaries** absent or present; scale-like at ovary bases. **Fruits** follicles; 1 or 2 per flower. **Seeds** few to numerous; comose or not comose**.**

The family is represented in Oklahoma by 9 genera and 42 species. Nearly worldwide in distribution, it is most abundant in the tropics. Inclusion of the formerly segregated Asclepiadaceae is widely accepted. The Apocynaceae possess diverse secondary compounds some of which are potent toxins or are pharmacologically active. The indole alkaloids vincristine and vinblastine present in *Catharanthus roseus* are the only effective drug treatment for Hodgkin's disease. Toxic cardiac glycosides in *Asclepias*

are sequestered by several species of milkweed-feeding insects for use in their own defense, most famously by the monarch butterfly. Species of *Vinca* have long been horticulturally important as evergreen ground covers with showy flowers; species of *Amsonia* and *Asclepias* are increasingly used in horticulture, especially because the nectar-rich flowers are attractive to butterflies and other insects. The tropical *Asclepias curassavica* is cultivated in Oklahoma, but is not naturalized although it will persist through mild winters.

1. Stems not twining.
    2. Leaves alternate.
        3. Coronas present. Seeds comose. Follicles erect on straight or upcurved peduncles. ..... ***Asclepias***
        3. Coronas absent. Seeds not comose. Follicles pendulous on spreading peduncles. ..... ***Amsonia***
    2. Leaves opposite or subopposite.
        4. Inflorescences solitary flowers. Corollas salverform. Plants evergreen. Stems rooting at nodes. ..... ***Vinca***
        4. Inflorescences umbels or racemes or cymes or fascicles of 2 or more flowers. Corollas urceolate or rotate or campanulate or rotate with reflexed lobes. Plants deciduous. Stems not rooting at nodes.
            5. Corollas urceolate; tubes longer than lobes. Stamens and coronas included within corolla tubes. Anthers adherent and appressed to styles; filaments free. Pollen granular. ..... ***Apocynum***
            5. Corollas rotate or campanulate; tubes shorter than lobes; stamens and corona exserted beyond corolla tubes. Anthers fused to style apices; filaments fused into a column. Pollen borne in pollinia.
                6. Stems and leaves glabrous or variously pubescent, but without glandular hairs. Corona segments cup-shaped or tubular or spathulate or thin scales with incurved margins. Follicles with slender, soft protuberances or protuberances absent. ..... ***Asclepias***
                6. Stems and leaves with minute glandular hairs intermixed with longer non-glandular hairs. Corona segments thick scales with plane margins. Follicles with stout, firm protuberances. ..... ***Matelea***
1. Stems twining.
    7. Leaf bases acute to obtuse. Coronas absent. Follicles linear; more than 20 times longer than wide. ..... ***Thyrsanthella***
    7. Leaf bases cordate or hastate. Coronas present. Follicles ovate to linear; less than 10 times longer than wide.
        8. Corollas cream colored, suffused or not suffused with green or purple. Stems and leaves variously pubescent, but without glandular hairs. Follicles without wings or protuberances.
            9. Latex colorless. Inflorescences racemes. Corollas urceolate; lobes reflexed. Coronas with 5 bifid, linear scales arising from staminal column, slightly exserted beyond corollas. Follicles ovoid; 2–4 cm wide; apices acute; surfaces longitudinally wrinkled. ..... ***Cynanchum***
            9. Latex white. Inflorescences umbels. Corollas rotate to broadly campanulate; lobes spreading to ascending. Coronas with a raised white ring at base of corolla plus 5 inflated white segments arising from staminal column. Follicles lanceolate-ovoid; 0.7–1.5 cm wide; apices attenuate or acuminate; surfaces smooth. ..... ***Funastrum***
        8. Corollas green, or deep reddish to purplish brown, or green and brown, or white. Stems and leaves with minute glandular hairs intermixed with longer non-glandular hairs. Follicles with 5 longitudinal wings or many stout, blunt protuberances.
            10. Corollas rotate; partly or wholly green. Anthers with scoop-shaped dorsal appendages. Follicles 5-winged; surfaces smooth. ..... ***Gonolobus***
            10. Corollas campanulate; white or reddish brown. Anthers without scoop-shaped dorsal appendages. Follicles not winged; surfaces with stout, blunt protuberances. ..... ***Matelea***

Amsonia T. Walter Bluestar

1. Outer surfaces of corollas pilose or villous, at least near sinuses.
    2. Adaxial surfaces of leaf blades shiny; narrowly lanceolate to elliptic. Calyces pilose to tomentulose. Pericarps chartaceous; somewhat constricted between seeds. ..... ***A. illustris***
    2. Adaxial surfaces of leaf blades dull; elliptic to lanceolate or ovate. Calyces glabrous. Pericarps coriaceous; not constricted between seeds. ..... ***A. tabernaemontana***
1. Outer surfaces of corollas glabrous throughout.
    3. Leaves elliptic; less than 10 times longer than wide. ..... ***A. ciliata***
    3. Leaf blades linear; more than 15 times longer than wide.
        4. Inflorescences borne above vegetative branches. Length of corolla lobes equal or subequal to length of corolla tubes. ..... ***A. ciliata***

4. Inflorescences surrounded by some vegetative branches. Length of corolla lobes 1/2 to 3/4 length of corolla tubes. ..... ***A. hubrichtii***

Apocynum C. Linnaeus Dogbane

1. Leaves drooping to spreading. Inflorescences borne above vegetative branches. Corollas 5.2–8.8 mm long; lobes reflexed to spreading; white with pink stripes. …….....…… ***A. ×floribundum***
1. Leaves ascending to spreading. Inflorescences surrounded by some vegetative branches. Corollas 2.5–4.7 mm long; erect to ascending; greenish to yellowish cream. ..... ***A. cannabinum***

Asclepias C. Linnaeus Milkweed

1. Mid-cauline leaves linear to linear-lanceolate; more than 3 times longer than wide.
    2. Plants subshrubs; intricately and densely branched. Apices of corona segments filiform; incurved. ..... ***A. macrotis***
    2. Plants herbs; branches absent or few. Apices of corona segments truncate to acute.
        3. Plants less than 15 cm tall.
            4. Stems erect. Leaves alternate; tightly spiraled; more than 20 per branch; narrowly linear; more than 20 times longer than wide. Fruiting pedicels straight; erect. ..... ***A. pumila***
            4. Stems decumbent. Leaves opposite or subopposite; fewer than 12 per branch; linear-lanceolate to lanceolate; less than 10 times longer than wide. Fruiting pedicels sharply upcurved.
                5. Flowers per umbel fewer than 10. Petals reddish violet. Corona segments shorter than gynostegia. Mature follicles 1–2.5 cm wide; pericarps thin, dense. ..... ***A. uncialis***
                5. Flowers per umbel more than 15. Petals pale green. Corona segments longer than gynostegia. Mature follicles 4–6 cm wide; pericarps thick, spongy. ..... ***A. involucrata***
        3. Plants 15–200 cm tall.
            6. Corona segments cucullate; stipitate. Horns present; arching over gynostegia.
                7. Leaves alternate.
                8. Flowers white or pinkish. Leaves narrowly linear; more than 20 times longer than wide. Stems and leaves puberulent. Latex white. ..... ***A. pumila***
                8. Flowers yellow or orange or orange-red. Leaves narrowly lanceolate; less than 10 times longer than wide. Stems and leaves conspicuously hirsute. Latex colorless. ..... ***A. tuberosa***
                7. Leaves opposite or whorled.
                9. Leaves whorled.
                10. Leaves lanceolate or ovate-lanceolate; mostly opposite, but 2 pairs forming a pseudowhorl. Fewer than 10 nodes per stem. ..... ***A. quadrifolia***
                10. Leaves filiform to linear; all whorled. More than 15 nodes per stem. ..... ***A. verticillata***
                9. Leaves opposite.
                11. Stems prostrate or decumbent. Leaf margins conspicuously ciliate, appearing white. Umbels terminal; subtended by linear, bract-like leaves. Pericarps spongy. ..... ***A. involucrata***
                11. Stems erect. Leaf margins inconspicuously ciliate or glabrous. Umbels extra-axillary or terminal, if terminal, not subtended by linear, bract-like leaves. Pericarps papery.
                12. Long horizontal rhizomes present. Stems and pedicels densely puberulent to tomentose. Umbels sessile or subsessile; exceeded in length by leaves. Fruiting pedicels sharply upcurved. Plants of sandy soils. ..... ***A. arenaria***
                12. Short vertical rhizomes present or rhizomes absent. Stems and pedicels glabrous or with hairs in lines on stems. Umbels pedunculate; exceeding leaves in length. Fruiting pedicels straight; erect. Plants of rocky or wet soils.
                13. Leaves all opposite. Umbels extra-axillary; 2 per node. Flowering stems 65–125 cm tall. Plants of pond margins or stream banks or ditches. ..... ***A. incarnata***

13. Leaves opposite, but with 2 pairs commonly forming a pseudowhorl. Umbels terminal or both terminal and extra-axillary, but not paired. Flowering stems 30–65 cm tall. Plants of dry rocky hillsides. ..... ***A. quadrifolia***

6. Corona segments dorsally flattened or corona segments hollow and clavate and curved; sessile. Horns absent or rudimentary.

14. Leaves opposite.

15. Plants decumbent; flowering stems typically 5 or more; 10–40 cm tall. Corollas campanulate; lobes ascending. Coronas showy; segments hollow and clavate; dark purple and white. ..... ***A. asperula***

15. Plants erect; stems 1–3; 30–80 cm tall. Corollas rotate with lobes reflexed. Coronas inconspicuous; segments dorsally flattened; cream or yellowish green, sometimes tinged reddish purple.

16. Leaves narrowly linear-lanceolate; more than 15 pairs per stem. Corona segments 1–2 mm long. ..... ***A. hirtella***

16. Leaves lanceolate or ovate or oval or linear-lanceolate; fewer than 15 pairs per stem. Corona segments 3–5 mm long. ..... ***A. viridiflora***

14. Leaves alternate.

17. Plants decumbent; flowering stems typically 5 or more; 10–40 cm tall. Corollas campanulate; lobes ascending. Coronas showy; segments hollow and clavate; dark purple and white. ..... ***A. asperula***

17. Plants erect; stems 1–3; 30–80 cm tall. Corolla lobes reflexed. Coronas inconspicuous; segments dorsally flattened; white or yellowish cream or green, sometimes tinged reddish purple.

18. Leaves narrowly linear lanceolate. Peduncles and pedicels hirtellous; pedicels 15–20 mm long. Corona segments 1.5–2.5 mm long. ..... ***A. hirtella***

18. Leaves linear. Peduncles and pedicels puberulent; pedicels 5–10 mm long. Corona segments 3–4 mm long.

19. Leaves drooping. Apices of corona segments shorter than gynostegia; truncate or emarginate. ..... ***A. engelmanniana***

19. Leaves spreading to ascending. Apices of corona segments equal to or longer than gynostegia; deeply lobed. ..... ***A. stenophylla***

1. Mid-cauline leaves oblanceolate or lanceolate to ovate; less than 3 times longer than wide.

20. Leaves alternate to subopposite. Corollas campanulate; lobes ascending. ..... ***A. viridis***

20. Leaves opposite or appearing whorled. Corollas rotate; lobes reflexed.

21. Inflorescences 1 or 2 terminal umbels. Extra-axillary umbels present or absent.

22. Leaf pairs 2–5 per stem; 2 pairs commonly forming a pseudowhorl of 4 leaves. Corollas 4.5–6 mm long. Fruiting pedicels straight; erect. ..... ***A. quadrifolia***

22. Leaf pairs 3 or more per stem; pseudowhorls absent. Corollas more than 7 mm long. Fruiting pedicels sharply upcurved.

23. Leaves sessile or subsessile; bases clasping; glaucous.

24. Leaf margins crisped. Umbels solitary; borne above leaves. Peduncles 6–30 cm long; terminal. ..... ***A. amplexicaulis***

24. Leaf margins planar. Umbels 2 or more; exceeded in length by leaves. Peduncles 1–6.5 cm long; arising at upper nodes. ..... ***A. sullivantii***

23. Leaves petiolate; bases not clasping; petiolate; not glaucous.

25. Leaves glabrous. Flowers white with a red to purple ring at corona bases. Corona segments slightly longer than gynostegia; apices truncate. ..... ***A. variegata***

25. Leaves inconspicously to densely puberulent to tomentose. Flowers pink or red or reddish purple, colored ring at corona bases absent. Corona segments conspicuously longer than gynostegia; apices acute to acuminate.

26. Leaves inconspicuously puberulent to glabrate. Flowers uniformly colored, deep pinkish purple to reddish purple. Corona segments erect; apices acute. Follicles unornamented; sparsely puberulent. ..... ***A. purpurascens***

26. Leaves densely and conspicuously puberulent to tomentose. Flowers with dark pink corollas and pale pink coronas. Corona segments spreading ; apices long attenuate. Follicles with soft protuberances; densely puberulent to tomentose. ..... ***A. speciosa***

21. Inflorescences of 2 or more extra-axillary umbels, sometimes clustered distally, but not terminal.

27. Stems and leaves and peduncles and pedicels glabrous or inconspicuously puberulent; hairs borne in lines on stems and peduncles and leaf veins.

28. Leaves petiolate; spreading; not obscuring stems. Apices of corona segments acute. ..... ***A. purpurascens***

28. Leaves sessile; ascending; typically obscuring stem. Apices of corona segments truncate.

29. Stems and leaves glabrous; glaucous. Umbels pedunculate. Corollas pink. Coronas pink. ..... ***A. sullivantii***

29. Stems and leaves tomentose to glabrate; not glaucous. Umbels sessile or subsessile. Corollas green. Coronas white or yellow. ..... ***A. latifolia***

27. Stems and leaves and peduncles and pedicels uniformly tomentose or villous or pilose or hirsute; hairs not borne in lines.

30. Corollas pink. Follicles ornamented with soft, protuberances.

31. Leaf apices tapering, narrowly rounded to acute. Corolla lobes 10–15 mm long. Corona segments 9–15 mm long; apices attenuate. ..... ***A. speciosa***

31. Leaf apices blunt, broadly rounded. Corolla lobes 7–10 mm long. Corona segments 4–7 mm long; apices acute. ..... ***A. syriaca***

30. Corollas green. Fruits not ornamented.

32. Corona segments dorsally flattened; 1/2 to 2/3 as long as gynostegia. Horns or internal crests absent. ..... ***A. viridiflora***

32. Corona segments tubular or cucullate; equal to or longer than gynostegia. Horns or internal crests present; exserted.

33. Stems and leaves and inflorescences hirsutulous. ..... ***A. obovata***

33. Stems and leaves and inflorescences sparsely puberulent to tomentose; stems and leaves may become glabrate.

34. Herbage tomentose to glabrate. Corona segments less than 2 times longer than wide; equal to or slightly longer than gynostegia. ..... ***A. arenaria***

34. Herbage puberulent. Corona segments more than 3 times longer than wide; conspicuously longer than gynostegia. ..... ***A. oenotheroides***

Cynanchum C. Linnaeus Sandvine, Honeyvine

One species. ..... ***C. laeve***

Funastrum E. Fournier Twinevine

1. Leaf margins crisped. ..... ***F. crispum***
(= *Sarcostemma crispum*)

1. Leaf margins planar.

2. Leaves ovate; bases cordate. Corollas cream, often suffused with purple. Inflated corona segments sessile or subsessile, gynostegial columns absent. Follicles 6.5–7.5 cm long. ..... ***F. cynanchoides***
(= *Sarcostemma cynanchoides*)

2. Leaves lanceolate; bases sagittate to hastate. Corollas green, often suffused with brown or purple. Inflated corona segments elevated on gynostegial columns. Follicles 8.5–12.5 cm long. ..... ***F. crispum***
(= *Sarcostemma crispum*)

Gonolobus A. Michaux Anglepod

One species. ..... ***G. suberosus***
(= *Matelea gonocarpos*)

Matelea J. Aublet Milkweed Vine[1]

1. Plants non-twining herbs. Stems prostrate to ascending; 10–50 cm long. Leaf blades 1–6 cm long; conspicuously pubescent. Corollas rotate-campanulate; lobes lanceolate to deltoid, not twisted.
   2. Adaxial surfaces of calyces and corollas densely pubescent. Stems prostrate. Corolla lobes spreading; margins reflexed at maturity; narrowly deltoid to lanceolate. ..... ***M. biflora***
   2. Adaxial surfaces of calyces and corollas glabrous. Stems decumbent or ascending to nearly erect. Corolla lobes ascending; margins planar at maturity; deltoid. ..... ***M. cynanchoides***
1. Plants vines. Stems twining; 100–300 cm long. Leaf blades 6–18 cm long; inconspicuously puberulent with hairs mostly limited to veins. Corollas campanulate; lobes narrowly lanceolate to linear, twisted.
   3. Corollas white or cream. ..... ***M. baldwyniana***
   3. Corollas maroon or brown-purple. ..... ***M. decipiens***

[1]Treatment contributed by Angela McDonnell

Thyrsanthella M. Pichon Climbing Dogbane

One species. ..... ***T. difformis***
(= *Trachelospermum difforme*)

Vinca C. Linnaeus Periwinkle

1. Leaf blades ovate; 2–6 cm wide; margins ciliate; bases truncate to shallowly cordate. Calyx lobes 7–17 mm long; margins ciliate. Corolla tubes 12–15 mm long; lobes 30–50 mm wide. ..... ***V. major***
1. Leaf blades elliptic to ovate; 0.5–2 cm wide; margins glabrous; bases cuneate to rounded. Calyx lobes 3–5 mm long; margins glabrous. Corolla tubes 9–11 mm long; lobes 25–30 mm wide. ..... ***V. minor***

AQUIFOLIACEAE F.G. Bartling Holly Family

Plants trees or shrubs; deciduous or evergreen; dioecious or rarely polygamo-dioecious. **Stems** with terminal buds absent. **Leaves** cartilaginous or coriaceous or herbaceous; simple; alternate; venation pinnate; apices acute or obtuse or spinescent; margins crenate or spinose; stipules present, caducous. **Inflorescences** of 2 types, staminate and pistillate different; axillary; staminate inflorescences compound cymes; pistillate inflorescences solitary flowers or simple cymes. **Flowers** imperfect or perfect, staminate and pistillate similar; perianths in 2-series. **Sepals** 4 or 5 or rarely 6; fused. **Corollas** radially symmetrical; rotate. **Petals** 4 or 5 or rarely 6; free or fused; greenish white to yellow. **Stamens** 4 or 5 or 6; androecial rudiments present in pistillate flowers. **Pistils** 1; compound, carpels 4 or 5 or rarely 6; stigmas 4 or 5 or rarely 6, capitate; styles absent; ovaries superior; locules 4 or 5 or rarely 6; placentation axile; gynoecial rudiments present in staminate flowers. **Fruits** drupes; falsely resembling berries because of multiple stones; red to orange. **Seeds** 1 to 6.

The family is represented in Oklahoma by 1 genus and 4 species. All are native. Holly is a popular ornamental and three of the state's species are widely planted. The drupes provide an important food resource for songbirds in winter. In addition, *Ilex. opaca*, American holly, is noted for its white wood which is used in decorative inlays and veneer.

Ilex C. Linnaeus Holly

1. Leaves thin; herbaceous; deciduous. Inflorescences sessile. Pedicels without basal bracts.
   2. Leaves oval; abaxial surfaces glabrous; apices acute or attenuate. ..... ***I. ambigua***
   2. Leaves spathulate to narrowly obovate; abaxial surfaces pubescent to glabrate; apices obtuse. ..... ***I. decidua***
1. Leaves thick; coriaceous; evergreen. Inflorescences pedunculate. Pedicels with minute basal bracts.
   3. Leaves 3–6 cm wide; margins spinose-dentate or entire; apices acute, spinescent. Sepal apices acute. ..... ***I. opaca***
   3. Leaves 1–2.8 cm wide; margins crenulate or crenulate-serrulate; apices rounded, not spinescent. Sepal apices rounded. ..... ***I. vomitoria***

ARACEAE A.L. de Jussieu Arum Family

Plants herbs or thalloid; perennials; perennating organs rhizomes or corms; terrestrial, or emergent or free-floating aquatics; acaulescent; monoecious. **Root Systems** fibrous or absent or composed of 1 to 10 unbranched rootlets. **Leaves** absent or simple or palmately or pedately compound; alternate; sheathing; venation pinnate or palmate; margins entire; terminal leaflets of

compound leaves present; stipules absent. **Inflorescences** spadices, staminate flowers borne above pistillate, or clusters of 2 to 4 flowers borne in pouches and falsely appearing to be 1 perfect flower; spathes present, enlarged and showy or scale-like. **Flowers** imperfect, similar; perianths absent. **Sepals** absent. **Petals** absent. **Stamens** 1 or 4 to 6; anthers dehiscing poricidally or longitudinally**;** staminodia present or absent. **Pistils** 1; compound, carpels 3; stigmas 1; styles 1 or 0; ovaries superior; locules 1 to 3; placentation basal or axile. **Fruits** utricles or syncarps of berries. **Seeds** 1 to 6.

The family is represented in Oklahoma by 7 genera and 16 species. As presently circumscribed on the basis of phylogenetic studies, it includes the Lemnaceae or duckweed family. *Acorus,* at one time positioned within the Araceae, is now treated as a distinct family. The state's terrestrial species occur in moist, shaded habitats or wetlands, primarily in the eastern half of Oklahoma. The thalloid, free-floating aquatic taxa are found throughout the state and are the smallest known flowering plants. Their reproduction is primarily asexual by budding.

1. Plants differentiated into stems, leaves, and roots; greater than 150 mm in diameter or height; terrestrial or emergent aquatics.
  2. Leaves compound. Plants from corms. Berries red or orange. ..... ***Arisaema***
  2. Leaves simple. Plants from rhizomes. Berries green or brown. ..... ***Peltandra***
1. Plants thalloid; 0.5–10 mm long or in diameter or long; free-floating aquatics at surface [receding water may strand plants on substrate].
  3. Plants without rootlets. Reproductive pouches 1; basal. Stamens 1 per pouch.
    4. Plants ovoid or globose; 0.5–1.7 mm long or in diameter; not coherent in star-like masses. ..... ***Wolffia***
    4. Plants flat, strap-like; 5–10 mm long; coherent in star-like masses. ..... ***Wolffiella***
  3. Plants with 1 or more rootlets. Reproductive pouches 2; lateral. Stamens 2 per pouch.
    5. Rootlets 1 per thallus segment. ..... ***Lemna***
    5. Rootlets 2–20 per thallus segment.
      6. Thallus segments broadly obovate to circular; as wide as long; nerves conspicuous, 7–21. ..... ***Spirodela***
      6. Thallus segments elliptic-oblong to narrowly obovate; longer than wide; nerves inconspicuous or faint, 3–7. ..... ***Landoltia***

Arisaema C.F.P. von Martius Jack-in-the-Pulpit

1. Leaves pedately compound; leaflets unequal. Spadices exserted; attenuate; conical in fruit. ..... ***A. dracontium***
1. Leaves palmately compound; leaflets equal. Spadices inserted; tapering to clavate; ovoid or subglobose in fruit. ..... ***A. triphyllum***

Landoltia D.H. Les & D.J. Crawford Dotted Duckmeat

One species. ..... ***L. punctata***
(= *Spirodela punctata*)

Lemna C. Linnaeus Duckweed

1. Dorsal veins of thallus segments 1 or 0.
  2. Bases of thallus segments oblique. Dorsal veins conspicuous; extending 3/4 of distance between points of rootlet attachment and segment apices. ..... ***L. valdiviana***
  2. Bases of thallus segments symmetrical. Dorsal veins absent or inconspicuous; if present, extending 2/3 of distance from points of rootlet attachment to segment apices. ..... ***L. minuta***
(= *L. minuscula*)
1. Dorsal veins of thallus segments 3–5.
  3. Transparent wing present on basal sheath of rootlets. Apices of rootlets acute.
    4. Papillae of dorsal surfaces of thallus segments 2 or 3. ..... ***L. perpusilla***
    4. Papillae of dorsal surfaces of thallus segments 1. ..... ***L. aequinoctialis***
  3. Transparent wing absent on basal sheath of rootlets. Apices of rootlets rounded.
    5. Ventral surfaces of thallus segments green. ..... ***L. minor***
    5. Ventral surfaces of thallus segments red or reddish green.
      6. Turions present. ..... ***L. turionifera***
      6. Turions absent.
        7. Apical papilla not conspicuously larger than those near middle of thallus segments. Thallus segments often gibbous. ..... ***L. obscura***
        7. Apical papilla conspicuously larger than those near middle of thallus segments. Thallus segments flat. ..... ***L. turionifera***

Peltandra C.S. Rafinesque — Arrow Arum

One species. ..... ***P. virginica***

Spirodela M.J. Schleiden — Duckmeat

One species. ..... ***S. polyrrhiza***

Wolffia J. Horkel ex M.J. Schleiden — Watermeal

1. Plants globose to ovoid. Pigment cells present; brown. ..... ***W. columbiana***
1. Plants cup-shaped. Pigment cells absent.
   2. Vegetative plants rounded at apices; central papilla present. ..... ***W. brasiliensis***
   2. Vegetative plants acute to obtuse at apices; central papilla absent. ..... ***W. borealis***

Wolffiella C. F. Hegelmaier — Mud-Midget

One species. ..... ***W. gladiata***

ARALIACEAE A.L. de Jussieu — Ginseng Family

Plants small deciduous trees or herbs; perennials; perennating organs tubers or not apparent; deciduous; armed or not armed with prickles; bearing perfect flowers or polygamous. **Leaves** simple or palmately or 2-pinnately or 3-pinnately compound; alternate or whorled; venation palmate or pinnate; stipules present or absent. **Inflorescences** umbels; terminal or axillary. **Flowers** perfect or imperfect, similar; perianths in 1-series or 2-series. **Sepals** 5 or 0; small, fused at bases. **Corollas** radially symmetrical; valvate. **Petals** 5; caducous; free; white or greenish white. **Stamens** 5. **Pistils** 1; compound, carpels 2 to 5; stigmas 2 to 5; styles 2 to 5, free, stylopodia present; ovaries inferior; locules 2 to 5; placentation axile; ovules 1 per locule. **Nectaries** present, forming disk at bases of styles or absent. **Fruits** schizocarps or drupes falsely resembling berries because of multiple stones; black or red. **Seeds** 2 to 5.

The family is represented in Oklahoma by 3 genera and 5 species. Both *Aralia* and *Panax* are infrequently encountered in the eastern forests of the state. *Panax* is especially rare, and excessive collecting by herbalists is threatening the state's populations. *Hydrocotyle* occurs primarily throughout the southeastern quarter of the state. *Hedera helix*, the cultivated English ivy, also a member of the family, may persist at abandoned home sites. Some taxonomists have included the Araliaceae in the Apiaceae.

1. Leaves simple. Stems prostrate; rooting at nodes. Fruits schizocarps. ..... ***Hydrocotyle***
1. Leaves compound. Stems erect; not rooting at nodes. Fruits drupes.
   2. Plants small trees. Leaves alternate; pinnately compound. Styles 5. Drupes black. ..... ***Aralia***
   2. Plants herbs. Leaves whorled; palmately compound. Styles 2 or 3. Drupes red. ..... ***Panax***

Aralia C. Linnaeus — Hercule's Club

One species. ..... ***A. spinosa***

Hydrocotyle C. Linnaeus — Water Pennywort

1. Leaf blades orbicular-reniform, cleft to petioles. ..... ***H. ranunculoides***
1. Leaf blades peltate.
   2. Inflorescences solitary umbels. Peduncles not branched. ..... ***H. umbellata***
   2. Inflorescences 2–4 verticils. Peduncles typically branched. ..... ***H. verticillata***

Panax C. Linnaeus — Ginseng

One species. ..... ***P. quinquefolius***

ARECACEAE B.W. von Berchtold & J. Presl — Palm Family

Plants shrubs; from caudices or woody crowns; evergreen. **Leaves** coriaceous; forming a rosette or cauline; simple; alternate, blades flabellate; venation palmate; margins entire in bud but palmately incised when mature. **Inflorescences** spadices; spathes present. **Flowers** perfect; perianths in 2-series. **Sepals** 3; free. **Corollas** radially symmetrical. **Petals** 3; free; white. **Stamens** 6; in

2 whorls; epipetalous. **Pistils** 1; compound, carpels 3; stigmas 1; styles 1, 3-lobed in cross-section; ovaries superior, triangular in cross-section; locules 3; placentation basal-axile. **Fruits** drupes; purplish black. **Seeds** 1.
The family is represented in Oklahoma by 1 genus and 1 species. It is found only in the extreme southeastern portion of McCurtain County, primarily on flood plains. Populations are declining because of habitat alteration and extensive collecting for decorative purposes. The small fruits are eaten by birds and mammals. Palms are the sources of dates, coconuts and sago. An alternate family name is Palmae.

Sabal M. Adanson Palmetto

One species. ..... ***S. minor***

ARISTOLOCHIACEAE A.L. de Jussieu Birthwort Family

Plants herbs or woody vines; perennials; perennating organs rhizomes; caulescent or acaulescent. **Stems** erect or prostrate or twining. **Leaves** herbaceous or fleshy; cauline or basal; simple; alternate; venation palmate or pinnipalmate; margins entire; bases cordate to sagittate; stipules absent. **Inflorescences** solitary or paired flowers or racemose clusters; axillary; borne both above or below ground or litter; bracts absent or present, odor often spicy or fetid. **Flowers** perfect; perianths in 1-series. **Calyces** radially or bilaterally symmetrical; tubular or saxophone-shaped. **Sepals** 3; fused; greenish yellow and/or maroon or with maroon spots; petaloid. **Petals** absent. **Stamens** 6 or 12; fused to styles or free; filaments present or absent. **Pistils** 1; compound, carpels 6; stigmas 1, 6-lobed, discoid; styles 1; ovaries inferior; locules 6; placentation axile. **Fruits** capsules; dry or fleshy; septicidal or opening irregularly. **Seeds** numerous.

The family is represented in Oklahoma by 2 genera and 4 species. A pantropical family, our species are native and typically encountered in the mesic forests of the eastern half of the state. Some have dark flowers and mimic carrion to attract their fly and gnat pollinators.

1. Plants erect herbs or twining vines. Calyces bilaterally symmetrical.
   Stamens 6; anthers fused to styles. Capsules dry. ..... ***Aristolochia***
1. Plants creeping herbs. Calyces radially symmetrical. Stamens 12;
   anthers not fused to styles. Capsules fleshy. ..... ***Asarum***

Aristolochia C. Linnaeus Dutchman's Pipe

1. Plants woody twining vines. Perianths yellow to yellow-green with red-purple orifices.
   Flowers borne in upper leaf axils. ..... ***A. tomentosa***
1. Plants erect herbs. Perianths purple-brown to dark brown. Leaf apices acute or acuminate.
   Flowers borne in lower leaf axils.
   2. Leaves subsessile; bases clasping; blades thick and firm;
      veins of abaxial surfaces conspicuously raised, pale. ..... ***A. reticulata***
   2. Leaves petiolate; bases not clasping; blades thin; veins of
      adaxial surfaces not raised, same color as remainder of blades. ..... ***A. serpentaria***

Asarum C. Linnaeus Wild Ginger

One species. ..... ***A. canadense***

ASPARAGACEAE A.L. de Jussieu Asparagus Family

Plants herbs or subshrubs; perennating organs bulbs or corms or rhizomes or woody caudices; caulescent or acaulescent. **Root Systems** fibrous. **Cladophylls** absent or present. **Leaves** fibrous or semisucculent or succulent; basal or cauline; simple; alternate; blades linear to lanceolate or elliptic-ovate; venation parallel or parallel-convergent; stipules absent. **Inflorescences** solitary flowers or racemes or spikes or panicles or corymbs; terminal or axillary; spathes present or absent; scapes present or absent. **Flowers** showy; perfect; perianths in 1-series; radially symmetrical. **Perianth Parts** 6; petaloid; free or fused; coronas present or absent. **Stamens** 6; arising from perianths. **Pistils** 1; compound, carpels 3; stigmas 1, capitate or 3-lobed; styles 1, stout or filiform; ovaries superior or inferior; locules 3; placentation axile. **Hypanthia** present or absent; **Nectaries** present or absent**. Fruits** berries or loculicidal capsules. **Seeds** 1 to numerous.
The family is represented in Oklahoma by 10 genera and 14 species. These genera were formerly positioned in the Liliaceae, Amaryllidaceae, and Agavaceae. *Nolina* has also been placed in the Ruscaceae and in the Nolinaceae. Phylogenetic studies, however, support their placement in this family.

1. Plants from woody caudices or short woody stems; conspicuously cespitose.
  2. Leaf apices spine-tipped. Perianth parts 33–65 mm long. Capsules 30–70 mm long. Seeds numerous per locule; flattened. ..... ***Yucca***
  2. Leaf apices lacerate. Perianth parts 3–4 mm long. Capsules 3–5 mm long. Seeds 1 per locule; globose. ..... ***Nolina***
1. Plants from bulbs or corms or rhizomes; not cespitose.
  3. Ovaries inferior. Perianth parts red or yellow to orange. ..... ***Manfreda***
  3. Ovaries superior. Perianth parts white or green or blue or purple.
    4. Plants caulescent; from rhizomes. Fruits berries.
      5. Leaves scale-like; 0.2–1 mm wide. Cladophylls present; filiform; 8–15 mm long. ..... ***Asparagus***
      5. Leaves lanceolate to elliptic-ovate; 10–90 mm wide. Cladophylls absent.
        6. Inflorescences terminal. Perianth parts free. Mature berries red. ..... ***Maianthemum***
        6. Inflorescences axillary. Perianth parts fused. Mature berries dark blue or black. ..... ***Polygonatum***
    4. Plants acaulescent; from bulbs or corms. Fruits capsules.
      7. Inflorescences umbels or corymbs.
        8. Perianth parts of 1 color, light blue to violet-purple; fused. Coronas present. Plants from corms. ..... ***Androstephium***
        8. Perianth parts of 2 colors, white and green; free. Coronas absent. Plants from bulbs. ..... ***Ornithogalum***
      7. Inflorescences racemes.
        9. Racemes 3–10 cm long. Flowers urceolate. Perianth parts fused. ..... ***Muscari***
        9. Racemes 19–87 cm long. Flowers rotate. Perianth parts free. ..... ***Camassia***

Androstephium J. Torrey — Funnel Lily

One species. ..... ***A. coeruleum***

Asparagus C. Linnaeus — Asparagus

One species. ..... ***A. officinalis***

Camassia J. Lindley — Camas

1. Capsules subglobose. Sterile bracts of racemes 0–5. Styles 4.5–8 mm long. ..... ***C. scilloides***
1. Capsules ovoid-ellipsoid. Sterile bracts of racemes 3–28. Styles 2.5–5.5 mm long. ..... ***C. angusta***

Maianthemum F.H. Wiggers — False Solomon's Seal, May Flower

1. Inflorescences panicles. Leaves petiolate; petioles 2–15 mm long. Perianth parts 1.5–4 mm long. Stamens exserted beyond perianths. Berries 4–6 mm in diameter. ..... ***M. racemosum***
(= *Smilacina racemosa*)

1. Inflorescences racemes. Leaves clasping. Perianth parts 5–7 mm long. Stamens included within perianths. Berries 7–9 mm in diameter. ..... ***M. stellatum***
(= *Smilacina stellata*)

Manfreda R.A. Salisbury — Agave

One species. ..... ***M. virginica***
(= *Agave virginica*)

Muscari P. Miller — Grape-Hyacinth

One species. ..... ***M. botryoides***

Nolina A. Michaux — Beargrass

One species. ..... ***N. greenei***
(= *N.texana*)

Ornithogalum C. Linnaeus — Star-of-Bethlehem

One species. ..... ***O. umbellatum***

Polygonatum P. Miller Solomon's Seal

One species. ..... ***P. biflorum***

Yucca C. Linnaeus

1. Leaves stiff. Inflorescences 70–100 cm long. ..... ***Y. glauca***
1. Leaves flexible. Inflorescences 10–60 cm long.
    2. Styles oblong-cylindric; bases narrower than apices of ovaries. Plants of Cimarron County. ..... ***Y. neomexicana*** (= *Y. harrimania*)
    2. Styles ovoid; bases equal to or wider than apices of ovaries. Plants of eastern 2/3 of state. ..... ***Y. arkansana***

ASPLENIACEAE F.W. Newman Spleenwort Family

Plants herbs; perennials; perennating organs rhizomes; evergreen; producing sporangia in sori on abaxial surfaces of fronds. **Rhizomes** branching or not branching; erect to horizontal; glabrous; scales present, clathrate. **Fronds** all alike or of 2 types, fertile and sterile; vernation circinate; simple or 1- or 2-pinnately compound; stipitate; blades linear to lanceolate; apices rooting or not rooting; pinnae sessile, alternate or opposite; auricles present or absent; stipes grooved adaxially. **Sori** separate; borne on veins; scattered or in uniform rows; indusia attached at one side of sori. **Sporangia** all alike; annuli present, vertical. **Spores** all alike. **Gametophytes** all alike; green; cordate.

The family is represented in Oklahoma by 1 genus and 7 species. It has been included in a broadly circumscribed Polypodiaceae by some taxonomists. Our species are more common in the eastern part of the state, but occur statewide.

Asplenium C. Linnaeus Spleenwort

1. Fronds filiform to narrowly linear; 1–3 mm wide; apices forked. ..... ***A. septentrionale***
1. Fronds of various shapes, but not filiform or narrowly linear; 10–30 mm wide; apices not forked.
    2. Fronds of 2 types, fertile and sterile. Fertile fronds larger, erect or ascending. Sterile fronds smaller; spreading. ..... ***A. platyneuron***
    2. Fronds of 1 type, all fertile.
        3. Fronds simple; apices attenuate.
            4. Frond apices rooting; margins entire; veins anastomosing. ..... ***A. rhizophyllum*** (= *Camptosorus rhizophyllus*)
            4. Frond apices not rooting; margins lobed; veins free. ..... ***A. pinnatifidum***
        3. Fronds 1- to 2-compound; apices acute to obtuse.
            5. Bases of pinnae overlapping rachises. ..... ***A. platyneuron***
            5. Bases of pinnae not overlapping rachises.
                6. Rachises and stipes black. ..... ***A. resiliens***
                6. Rachises and stipes green to reddish or purplish brown.
                7. Pinnae rhomboidal or oval. Basal pinnae not deeply lobed or compound; usually smaller than medial pinnae. Rachises uniformly brown. ..... ***A. trichomanes***
                7. Pinnae deltoid to oblong-lanceolate. Basal pinnae deeply lobed or compound; usually larger than medial pinnae. Rachises green in the upper 1/4–1/2 and brown in the lower 1/2–3/4. ..... ***A. bradleyi***

ASTERACEAE I.I. Martinov Aster Family

Plants herbs, or rarely deciduous shrubs or subshrubs, or herbaceous vines; perennials or annuals or biennials; perennating organs rhizomes or tubers or caudices or crowns or fleshy roots; terrestrial or emergent aquatics; caulescent or acaulescent; strongly aromatic or not aromatic; not armed or armed with spines or thorns or prickles. **Leaves** cauline or basal or both basal and cauline or forming basal rosettes; simple or 1-pinnately or 2-pinnately or 3-pinnately compound; alternate or opposite or whorled or alternate above and opposite below; venation pinnate or palmate or a single vein; stipules absent. **Inflorescences** heads (capitula); solitary or in pairs or racemes spikes or corymbs or panicles or cymes or clusters; terminal or axillary. **Heads** consisting of 5–300 sessile flowers (florets) tightly clustered on a common receptacle and enclosed by an involucre of bracts (phyllaries); of 4 forms, radiate or discoid or disciform or ligulate. **Phyllaries** 4 to many; borne in 1- to many-series; free or fused into a hardened structure surrounding florets. **Receptacles** flat or convex or conical; pitted. **Receptacular Bracts** (pales) present or absent, 1 subtending each floret if present. **Receptacular Bristles** absent or present. **Florets** perfect or functionally staminate or pistillate or neutral; of 3 forms, ray or disk or ligulate. **Ray Florets** 1 to many per head or absent; borne at periphery of receptacles, pistillate or neutral;

corollas bilaterally symmetrical, limbs strap-shaped or rarely reduced to short tube or absent, apices 2- or 3- or 4-lobed or not lobed. **Disk Florets** 1 to many per head or absent; borne in center of receptacles; perfect or functionally staminate or pistillate; corollas radially or rarely bilaterally symmetrical, tubular, limbs 5 or 4. **Ligulate Florets** 3 to many per head or absent, borne both in center and at periphery of receptacles; perfect; corollas bilaterally symmetrical, limbs strap-shaped, apices 5-toothed. **Perianths** in 2-series or 1-series or absent. **Corollas** radially or bilaterally symmetrical; tubular or strap-shaped; lobes 0 or 2 to 5. **Petals** 5 or rarely 4 or 0; fused; of various colors, most commonly yellow or white or blue or reddish purple. **Stamens** 5 or 4 or 3; epipetalous; anthers fused forming a tube around style or free, bases obtuse or rounded or caudate; filaments free or fused. **Pistils** 1; compound, carpels 2; stigmas 2, borne on inner surfaces of style branches, of various shapes; styles 1, divided, exserted beyond perianths; ovaries inferior; locules 1; placentation basal. **Nectaries** present or absent; at bases of styles. **Fruits** achenes (cypselae of some authors); beaks absent or present; wings absent or present. **Seeds** 1. **Pappus** present or rarely absent; when present, consisting of bristles or scales or awns or teeth or a crown.

The family is represented in Oklahoma by 125 genera and 370 species. On the basis of extensive phylogenetic studies, several large genera that were recognized by earlier taxonomists have been subdivided into numerous smaller genera, and some species repositioned in different genera. An alternate family name is Compositae.

In number of species, Asteraceae is the state's largest family, and it is both frequent and abundant throughout Oklahoma. Members of the family are important constituents of grasslands. *Gaillardia pulchella,* Indian blanket, is the official State Wildflower. Many species are ornamentals, such as asters, daisies, dusty millers, eupatoriums, gay feathers, mums, yarrows, and zinnias. There also are numerous weeds in the family, e.g., dandelions, broomweeds, thistles, ragweeds, and groundsels. *Helianthus annuus*, annual sunflower, is an important crop plant for food, cooking oil, and birdseed. Species of *Ambrosia*, ragweeds, and *Artemisia*, sagebrushes, produce the bulk of allergenic pollen of the fall hayfever season. Some species are toxic to humans and livestock, whereas others have significant medicinal value.

Key to Groups of Genera

1. Plants shrubs or subshrubs. ..... **GROUP A**
1. Plants herbs, some slightly woody at bases.
    2. Heads forming hardened and/or spiny burs. ..... **GROUP B**
    2. Heads of various forms, but not forming hardened or spiny burs.
        3. Phyllary apices conspicuously spinose or toothed or lacerate or pinnatisect-pectinate. ..... **GROUP C**
        3. Phyllary apices of various shapes, but not spinose nor toothed nor bearing appendages.
            4. Corollas of florets absent or inconspicuous. ..... **GROUP D**
            4. Corollas of florets conspicuous.
                5. Heads ligulate. ..... **GROUP E**
                5. Heads radiate or discoid or disciform.
                6. Heads radiate.
                7. Receptacular bristles or pales present. ..... **GROUP F**
                7. Receptacular bristles or pales absent.
                8. Corollas of ray florets white or pink or lavender or blue or purple.
                9. Pappus of disk florets of awns or scales or coroniform or absent. ..... **GROUP G**
                9. Pappus of disk florets of numerous bristles. ..... **GROUP H**
                8. Corollas of ray florets yellow or red or orange or maroon or brown.
                10. Pappus of disk florets of awns or scales or coroniform or absent. ..... **GROUP I**
                10. Pappus of disk florets of numerous bristles. ..... **GROUP J**
                6. Heads discoid or disciform.
                11. Receptacular bristles or pales present. ..... **GROUP K**
                11. Receptacular bristles or pales absent.
                12. Pappus of scales or coroniform or absent. ..... **GROUP L**
                12. Pappus of bristles.
                13. Corollas of disk florets pink or lavender or blue or purple. ..... **GROUP M**
                13. Corollas of disk florets white or or cream or green or yellow. ..... **GROUP N**

GROUP A: Plants shrubs or subshrubs.

1. Plants appearing to comprise only green, leafless stems. Leaves if present scale-like, inconspicuous. ..... ***Chloracantha***
1. Plants comprising both stems and leaves. Leaves developed, conspicuous.
    2. Heads radiate.
        3. Heads 40–many per plant.
            4. Leaves opposite; bases connate, sheathing. ..... ***Haploësthes***
            4. Leaf alternate; bases sessile, but not connate nor sheathing. ..... ***Euthamia***
        3. Heads 1–20 per plant.
            5. Heads borne singly at ends of elongate peduncles.
                6. Ray florets 2–4. Receptacular bristles present. Pappus bristles 4–6 mm long. ..... ***Pseudoclappia***
                6. Ray florets 12–26. Receptacular bristles absent. Pappus scales 1.5–2.5 mm long. ..... ***Tetraneuris***
            5. Heads borne in corymbs or cymes.
                7. Limbs of ray florets 8–10 mm long. Involucres 7–10 mm in diameter. Pappus of bristles. Stems glabrous. Distal leaves persistent. ..... ***Senecio***
                7. Limbs of ray florets 3–5.5 mm long. Involucres 1.5–3 mm in diameter. Pappus coroniform. Stems hispidulous. Distal leaves deciduous prior to anthesis. ..... ***Gutierrezia***
    2. Heads discoid or disciform.
        8. Involucres 1–2.5 mm in diameter. Ray florets present; corolla limbs shorter than phyllaries. Pappus absent. Ovaries of disk florets abortive. ..... ***Artemisia***
        8. Involucres 3–16 mm in diameter. Ray florets absent. Pappus of bristles or scales; persistent or caducous. Ovaries of disk florets well developed.
            9. Leaves 30–50 mm wide.
                10. Leaves deltoid to deltoid-ovate; adaxial surfaces scabrous; petiolate, petioles 5–60 mm long. ..... ***Brickellia***
                10. Leaves elliptic to rhombic; adaxial surfaces glabrous; sessile or sub-sessile; petioles absent or short. ..... ***Baccharis***
            9. Leaves 1–20 mm wide.
                11. Disk floret corollas white to brownish white. ..... ***Baccharis***
                11. Disk floret corollas yellow.
                12. Phyllaries in 1-series; apices acute. ..... ***Pericome***
                12. Phyllaries in 5-series; apices awned.
                13. Leaves glabrous. Corollas of disk florets10–14 mm long. Apices of pappus bristles attenuate. ..... ***Lorandersonia***
                13. Leaves tomentose. Corollas of disk florets 6–9 mm long. Apices of pappus bristle clavate. ..... ***Ericameria***

GROUP B: Plants herbs. Heads forming hardened and/or spiny burs.

1. Stems 2–4 cm tall. Burs subtended by sheathing leaf bases. Phyllary apices acute. Achenes lenticular; winged, wings 2-lobed. Styles indurate, forming a stout spine. ..... ***Soliva***
1. Stems 20–350 cm tall. Burs not subtended by sheathing leaf bases. Phyllary apices spiny or tuberculate. Achenes columnar to ellipsoidal or fusiform; not winged. Styles not indurate, not forming a spine.
    2. Phyllary apices tuberculate. ..... ***Ambrosia***
    2. Phyllary apices spinose.
        3. Phyllary spines uncinate.
            4. Burs hemispheric to globose. Florets numerous; visible, not completely enclosed by phyllaries; corollas present; purple or pink or white. Pappus of bristles. ..... ***Arctium***
            4. Burs ellipsoidal. Florets 2; hidden, completely enclosed by fused phyllaries; corollas absent. Pappus absent. ..... ***Xanthium***
        3. Phyllary spines straight.
            5. Phyllary spines 10–25 mm long. Burs solitary at branch ends. Plants bearing heads with perfect florets. ..... ***Centaurea***
            5. Phyllary spines 0.5–5 mm long. Burs clustered in upper leaf axils. Plants monoecious; staminate heads borne in terminal racemes and pistillate heads borne in upper leaf axils. ..... ***Ambrosia***

GROUP C: Plants herbs. Phyllary apices conspicuously spinose or toothed or lacerate or pinnatisect-pectinate.

1. Phyllary apices toothed or lacerate or pinnatisect-pectinate.
    2. Heads 3–6 cm in diameter. Corollas of outermost florets 20–25 mm long. Phyllary apices with pinnatisect-pectinate appendages. ..... ***Plectocephalus***
    2. Heads 1.5–2.5 cm in diameter. Corollas of outermost florets 12–20 mm long. Phyllary apices toothed or lacerate. ..... ***Centaurea***
1. Phyllary apices conspicuously spinose.
    3. Cauline leaves without spines. Central achenes oblique at bases. ..... ***Centaurea***
    3. Cauline leaves with spines. Central achenes truncate at bases.
        4. Corollas golden yellow. Pappus of scales; in 2- to 5-series. ..... ***Carthamus***
        4. Corollas lavender or pink to white or yellowish brown. Pappus of bristles; in 1-series.
            5. Pappus bristles plumose. ..... ***Cirsium***
            5. Pappus bristles barbellate.
                6. Leaves and stems canescent. Receptacles alveolate; bristles absent. ..... ***Onopordum***
                6. Leaves and stems glabrous to tomentose. Receptacles not alveolate; bristles present.
                7. Stems winged. Cauline leaves not variegated. Phyllaries bearing both terminal spines. Filaments free at bases. ..... ***Carduus***
                7. Stems not winged. Cauline leaves adaxially variegated. Phyllaries bearing only terminal spines. Filaments fused at bases. ..... ***Silybum***

GROUP D: Plants herbs. Phyllary apices of various shapes. Corollas of florets absent or inconspicuous, limbs less than 2 mm long.

1. Lower cauline leaves opposite.
    2. Heads borne in racemes or spikes or panicles. Perfect florets absent. Anthers free.
        3. Heads borne in racemes. Phyllaries fused. Pistillate and functionally staminate florets borne in separate heads. Phyllaries of pistillate heads tuberculate. ..... ***Ambrosia***
        3. Heads borne in panicles or spikes. Phyllaries free. Pistillate and staminate florets borne in the same head. Phyllaries of heads not tuberculate.
            4. Heads borne in spikes; borne in axils of herbaceous bracts. ..... ***Iva***
            4. Heads borne in panicles; not borne in axils of bracts. ..... ***Cyclachaena***
    2. Heads borne singly or in 2s or 3s or corymbs. Perfect florets present. Anthers fused.
        5. Corollas of florets white or gray. Pappus of capillary bristles. Style branches terete; elongate, exserted well beyond corollas; clavate. ..... ***Eupatorium***
        5. Corollas of florets yellow or yellow-orange. Pappus of awned scales or awns or absent. Style branches flattened; not elongate; linear-oblong
            6. Leaf margins serrate or spinulose-serrate. Phyllaries 3 or 4. Disk florets 5–8. Pappus absent. ..... ***Flaveria***
            6. Leaf margins 1- to 3-pinnatisect or pinnately lobed. Phyllaries 5–12. Disk florets 12–60. Pappus of 1–4 awns or 15–20 scales each ending in 5–10 bristles.
                7. Phyllaries bearing 1–7 glands. Pappus of 15–20 scales each ending in 5–10 bristles. ..... ***Dyssodia***
                7. Phyllaries not bearing glands. Pappus of 1–4 awns. .....***Bidens***
1. Lower cauline leaves alternate.
    8. Heads borne in panicles or racemes or spikes.
        9. Heads discoid; of 2 types, staminate and pistillate different. Staminate heads borne in terminal racemes. Pistillate heads forming burs in upper leaf axils. Pales present. Anthers free. ..... ***Ambrosia***
        9. Heads disciform; all alike. Heads borne in terminal panicles. Pales absent. Anthers fused. ..... ***Artemisia***
    8. Heads borne singly or in 2s or 3s or corymbs or clusters.
        10. Phyllaries not imbricate; equal in length; small outer ones at bases of heads present or absent.
            11. Venation palmate or parallel-convergent. Phyllaries 5. Disk Florets 5. Plants perennials; from rhizomes or crowns. ..... ***Arnoglossum***
            11. Venation pinnate. Phyllaries 20 or more. Disk florets 10–50 or more. Plants annuals; from taproots.
                12. Lower cauline leaves oblanceolate. Apices of outer phyllaries black. ..... ***Senecio***
                12. Lower cauline leaves ovate-lanceolate to lanceolate. Apices of outer phyllaries green. ..... ***Erechtites***
        10. Phyllaries imbricate; of various lengths.
            13. Abaxial surfaces of leaves white woolly.
                14. Florets hidden by woolly pubescence. Pales present. Pappus absent. ..... ***Diaperia***

14. Florets not hidden by woolly pubescence. Pales absent. Pappus of bristles.
    15. Pappus of plumose bristles. ..... ***Facelis***
    15. Pappus of capillary bristles.
        16. Plants from rhizomes or stolons. Plants dioecious. ..... ***Antennaria***
        16. Plants from taproots. Plants polygamo-dioecious.
            17. Heads borne in narrowly thrysoid inflorescences. Pappus bristles fused at bases; deciduous as a unit; smooth. Receptacles concave at end of fruiting. Achene hairs 2-celled. ..... ***Gamochaeta***
            17. Heads borne in corymbose inflorescences. Pappus bristles free; deciduous separately; scaberulous. Receptacles flat or subconic at end of fruiting. Achene hairs 3-celled. ..... ***Pseudognaphalium***
13. Abaxial surfaces of leaves glabrous or with pubescence of various types, but not white woolly.
    18. Leaf margins 2- or 3-pinnately lobed or dissected.
        19. Floret corollas white or cream or gray.
            20. Pappus of capillary bristles. Style branches terete; clavate. ..... ***Eupatorium***
            20. Pappus absent or of scales. Style branches flattened; linear-oblong.
                21. Basal rosettes present. Phyllaries petaloid. Pales absent. ..... ***Hymenopappus***
                21. Basal rosettes absent. Phyllaries herbaceous or scarious. or membranous. Pales present. ..... ***Parthenium***
        19. Floret corollas yellow.
            22. Pappus of 12–22 scales. Achenes 3–7 mm long; villous or hirsutellous. ..... ***Hymenopappus***
            22. Pappus absent or coroniform. Achenes 1–2 mm long; glabrous or gland-dotted.
                23. Lower cauline leaves 10–20 cm long. Phyllary margins white. Receptacles flat. Lateral ribs of achenes dark brown. Plants perennials with chamomile-like odor when crushed. ..... ***Tanacetum***
                23. Lower cauline leaves 1–6 cm long. Phyllary margins greenish. Receptacles conical. Lateral ribs of achenes bright orange. Plants annuals; with pineapple-like odor when crushed. ..... ***Matricaria***
    18. Leaf margins entire or toothed or lobed
        24. Phyllaries not imbricate; equal in length; small outer ones at bases of heads present or absent.
            25. Venation palmate or parallel-convergent. Phyllaries 5; small outer ones absent. Disk florets 5. Plants perennials; from rhizomes or crowns. ..... ***Arnoglossum***
            25. Venation pinnate. Phyllaries 20 or more; 1–6 small outer ones present. Disk florets 10–50 or more. Plants annuals; from taproots.
                26. Lower cauline leaves oblanceolate. Apices of outer phyllaries black. ..... ***Senecio***
                26. Lower cauline leaves ovate-lanceolate to lanceolate. Apices of outer phyllaries green. ..... ***Erechtites***
        24. Phyllaries imbricate; of various lengths.
            27. Phyllaries 20–many; in 3- to 6-series. Pappus of capillary bristles. Pales absent.
                28. Pappus bristles longer than disk florets at anthesis; 4–6 mm long. ..... ***Symphyotrichum***
                28. Pappus bristles equal to or shorter than disk florets at anthesis; 2–3 mm long. ..... ***Conyza***
            27. Phyllaries 6–16; in 1- or 2-series. Pappus absent or of small scales. Pales present.
                29. Heads borne in terminal clusters. Involucres saucer-shaped. Pistillate and functionally staminate florets borne in separate heads. Anthers free. ..... ***Xanthium***
                29. Heads borne in open corymbs. Involucres hemispheric. Pistillate and functionally staminate florets borne in same head. Anthers fused. ..... ***Parthenium***

GROUP E: Plants herbs. Phyllary apices of various shapes, but not spinose nor toothed nor bearing appendages. Corollas of florets present, limbs more than 2 mm long. Heads ligulate.

1. Corollas blue or pink or lavender or white or cream.
    2. Pappus of minute scales. ..... ***Cichorium***
    2. Pappus of bristles.
        3. Mature achenes beaked or apices attenuate.
            4. Heads 1–6 per plant; 10–30 mm wide at anthesis. Phyllaries 25–40 mm long. ..... ***Tragopogon***
            4. Heads 50–100 or more per plant; 5–12 mm wide at anthesis. Phyllaries 6–17 mm long. ..... ***Lactuca***
        3. Mature achenes not beaked, but may be somewhat tapered.
            5. Pappus bristles plumose.
                6. Phyllaries 5–12; in 1-series. Florets 4–16. ..... ***Stephanomeria***
                6. Phyllaries 18–30; in 3- to 5-series. Florets 30–100. ..... ***Scorzonera***
            5. Pappus bristles capillary; glabrous or barbellate.
                7. Leaves of various shapes, but not linear nor reduced to bracts.
                Inflorescences of paniculate or thyrsoid heads; nodding. ..... ***Prenanthes***
                7. Leaves linear or reduced to bracts. Inflorescences of solitary heads; erect.
                8. Lower leaves opposite. Corollas 5–7 mm long; 1 mm wide; erect.
                Style branches white; 0.3 mm long. Achenes 8- to 10-sulcate. ..... ***Shinnersoseris***
                8. Lower leaves alternate. Corollas 10–25 mm long; 4–12 mm wide;
                reflexed. Style branches pink to lavender; 0.6–4 mm long. Achenes not sulcate. ..... ***Lygodesmia***
1. Corollas yellow to yellow-orange or salmon.
    9. Pappus of both bristles and scales or scales only or minute crowns or absent. ..... ***Krigia***
    9. Pappus of bristles only.
        10. Pappus of 2 forms; inner series plumose, longer than outer series.
        Achenes of 2 types; inner series beaked; outer series not beaked. ..... ***Hypochaeris***
        10. Pappus bristles all alike. Achenes all alike.
            11. Pappus bristles plumose.
                12. Phyllaries in 1-series. Pappus bristles in 1-series. Achene
                beaks present; ribs muricate or prickly or scaly. ..... ***Tragopogon***
                12. Phyllaries in 3- to 5-series. Pappus bristles in 2- or 3-series.
                Achene beaks absent; ribs smooth or absent. ..... ***Scorzonera***
            11. Pappus bristles capillary; glabrous or barbellate.
                13. Mature achenes beaked.
                14. Achenes flattened. ..... ***Lactuca***
                14. Achenes terete or angled.
                15. Basal leaves runcinate. Florets golden yellow. ..... ***Taraxacum***
                15. Basal leaves dentate or undulate or pinnatifid or
                subentire. Florets lemon yellow. ..... ***Pyrrhopappus***
                13. Mature achenes not beaked.
                16. Plants acaulescent. ..... ***Nothocalais***
                16. Plants caulescent, upper leaves may be greatly reduced.
                17. Leaf margins spinulose. Achenes flattened. ..... ***Sonchus***
                17. Leaf margins entire or toothed or pinnatifid. Achenes terete or angled.
                18. Leaf margins entire to subentire. Lower stems and
                leaves with spreading tawny hairs. Plants perennials. ..... ***Hieracium***
                18. Leaf margins toothed. Lower stems and leaves
                glabrous or with white hairs. Plants annuals. ..... ***Crepis***

GROUP F: Plants herbs. Phyllary apices of various shapes. Corollas of florets present, limbs more than 2 mm long. Heads radiate. Receptacular bristles or pales present.

1. Leaf margins 2- or 3-pinnatisect.
    2. Limbs of ray florets 2–3 mm long. Corolla lobes of disk florets white. Heads borne in
    dense flat-topped corymbs. Ultimate segments divergent above and below plane of blades. ..... ***Achillea***
    2. Limbs of ray florets 5–30 mm long. Corolla lobes of disk florets yellow. Heads borne
    singly at ends peduncles. Ultimate segments not divergent above and below plane of blades. ..... ***Anthemis***
1. Leaf margins entire or variously lobed or dissected, but not 2- or 3-pinnatisect.
    3. Limbs of ray florets reflexed or drooping.

4. Limbs of ray florets white or pink or lavender. ..... ***Echinacea***
4. Limbs of ray florets yellow or reddish purple or orange or yellow with maroon or deep red or rusty brown at bases.
5. Pales flexible; not spine-tipped; shorter than or equal to disk florets. ..... ***Rudbeckia***
5. Pales stiff; spine-tipped; longer than disk florets..... ***Echinacea***
3. Limbs of ray florets spreading, distally reflexed or spreading.
6. Perfect florets absent. Anthers free.
7. Staminate and pistillate florets in the same heads. Phyllaries of heads not spinose nor or tuberculate. ..... ***Iva***
7. Staminate and pistillate florets in separate heads. Phyllaries of pistillate heads spinose or tuberculate.
8. Staminate heads borne in racemes or spikes. Phyllaries of pistillate heads tuberculate. ..... ***Ambrosia***
8. Staminate heads borne in clusters. Phyllaries of pistillate heads spinose. ..... ***Xanthium***
6. Perfect florets present. Anthers fused.
9. Disk florets not producing achenes. Style branches not separated at maturity.
10. Ray achenes terete or angular; if compressed, oriented parallel to the radius of the head.
11. Inner phyllaries clasping achenes. ..... ***Melampodium***
11. Inner phyllaries subtending but not clasping achenes. ..... ***Polymnia***
12. Corollas of ray florets white to cream. Lower cauline leaves pinnately lobed. Venation pinnate. Achenes smooth; 3–4 mm long. ..... ***Polymnia***
12. Corollas of ray florets yellow. Lower cauline leaves palmately lobed. Venation palmate or pinnipalmate. Achenes striate; 4.5–6 mm long. ..... ***Smallanthus***
10. Ray achenes flattened; if compresss, oriented perpendicular to the radius of the head.
13. Achenes winged.
14. Ray florets 4 or 5; in 1-series. Plants annuals; from taproots. ..... ***Lindheimera***
14. Ray florets 15–34; in 2- or 3-series. Plants perennials; from rhizomes. ..... ***Silphium***
13. Achenes not winged.
15. Ray florets white; limbs 0.1–2 mm long. ..... ***Parthenium***
15. Ray florets yellow; limbs 6–20 mm long.
16. Abaxial surfaces of limbs with contrasting colored veins. Pappus absent or if present, coroniform. Leaves puberulent or tomentose or scabrous. ..... ***Berlandiera***
16. Abaxial surfaces of limbs without contrasting colored veins. Pappus present, of scales. Leaves hispid. ..... ***Engelmannia***
9. Disk florets producing achenes. Style branches separated at maturity.
17. Corollas of ray florets white or pink or lavender.
18. Stems winged. Leaves alternate. Limbs of ray florets 10–90 mm long. ..... ***Verbesina***
18. Stems not winged. Leaves opposite. Limbs of ray florets 1–2.5 mm long.
19. Achenes verrucose. Pales bristle-like. Receptacles flat to convex. ..... ***Eclipta***
19. Achenes smooth. Pales membranous. Receptacles conical. ..... ***Galinsoga***
17. Corollas of ray florets yellow or reddish purple or orange or yellow with maroon or deep red or rusty brown at bases.
20. Receptacles columnar or conical.
21. Achenes of disk florets 4-sided or terete. ..... ***Rudbeckia***
21. Achenes of disk florets trigonous or flattened.
22. All upper cauline leaves opposite. ..... ***Acmella***
22. One or more upper cauline leaves alternate, not all opposite.
23. Stems winged. Mid-cauline leaves serrate to subentire. ..... ***Verbesina***
23. Stems not winged. Mid-cauline leaves pinnate to pinnatifid. ..... ***Ratibida***
20. Receptacles flat or convex.
24. Achenes of disk florets winged.
25. Achenes flattened parallel to the radius of the head. ..... ***Verbesina***
25. Achenes flattened perpendicular to the radius of the head. ..... ***Coreopsis***
24. Achenes of disk florets not winged.
26. Achenes of disk florets 3-sided or 4-sided.
27. Pappus of 5–10 awned scales. Receptacular bristles present. Pales absent. ..... ***Gaillardia***

27. Pappus of 1–4 awns or 1–4 minute scales or
Receptacular bristles absent. Pales present.
28. Corollas of ray florets deciduous, absent on mature achenes. ..... ***Bidens***
28. Corollas of ray florets persistent, present on mature achenes.
29. Plants 100–150 cm tall; from fibrous
roots. Leaves lanceolate to ovate; petiolate. ..... ***Heliopsis***
29. Plants 8–22 cm tall; from taproots.
Leaves linear; sessile. ..... ***Zinnia***
26. Achenes of disk florets flattened or absent.
30. Achenes of disk florets beaked. ..... ***Cosmos***
30. Achenes of disk florets not beaked.
31. Achenes of disk florets flattened parallel
to the radius of the head. ..... ***Helianthus***
31. Achenes of disk florets flattened perpendicular
to the radius of the head.
32. Inner phyllaries fused 1/3–2/3 length. ..... ***Thelesperma***
32. Inner phyllaries free.
33. Margins of leaves or their lobes toothed.
34. Plants mat-forming. Stems prostrate to
decumbent. Heads borne in axils of leaves. ..... ***Calyptocarpus***
34. Plants not mat-forming. Stems erect.
Heads borne in terminal corymbs. ..... ***Bidens***
33. Margins of leaves or their lobes entire.
35. Limbs of ray floret corollas
suborbicular to orbicular; about
as long as wide. Phyllaries ciliate. ..... ***Zinnia***

35. Limbs of ray floret corollas lanceolate
to elliptic; at least 1.5 times longer
than wide. Phyllaries not ciliate. ..... ***Coreopsis***

GROUP G: Plants herbs. Phyllary apices of various shapes. Corollas of florets conspicuous, limbs more than 2 mm long. Heads radiate. Receptacular bristles or pales absent. Corollas of ray florets white or pink or lavender or blue. Pappus of disk florets of awns or scales or coroniform or absent.

1. Pappus of disk florets of awns or scales.
2. Disk florets violet to purple or pinkish. Pappus of disk florets
of scales only; scales 7–9 mm long. ..... ***Palafoxia***
2. Disk florets yellow. Pappus of disk florets a combination of scales
and awns; scales 0.1–2 mm long
3. Plants 3–20 cm tall. Corollas of ray florets 2–4 mm long. Pappus of disk
florets a combination of 4–6 scales and 4–6 slender awns. Achenes not winged. ..... ***Chaetopappa***
3. Plants 35–150 cm tall. Corollas of ray florets 5–15 mm long. Pappus of disk florets
a combination of minute scales and 2–4 longer awns. Achenes winged. ..... ***Boltonia***
1. Pappus of disk florets coroniform or absent.
4. Pappus of disk florets a short white crown of fringed scales. Achenes sparsely
pubescent; hairs white. ..... ***Aphanostephus***
4. Pappus of disk florets absent. Achenes glabrous or densely pubescent; hairs brown.
5. Leaf margins entire. Achenes densely pubescent. Apices of style branches
of disk florets acute. ..... ***Astranthium***
5. Leaf margins pinnately toothed or lobed or pinnatisect. Achenes glabrous.
Apices of style branches of disk florets truncate. ..... ***Leucanthemum***

GROUP H: Plants herbs. Phyllary apices of various shapes. Corollas of florets conspicuous, limbs more than 2 mm long. Heads radiate. Receptacular bristles or pales absent. Corollas of ray florets white or pink or lavender or purple or blue. Pappus of disk florets of numerous bristles.

1. Plants appearing to comprise only green, leafless stems. Leaves if present scale-like, inconspicuous.
Thorns at lower nodes of stems usually present or absent. ..... ***Chloracantha***

1. Plants comprising both stems and leaves. Leaves developed, conspicuous. Thorns absent.
  2. Corollas of ray florets equal or less than phyllaries in length. ..... ***Conyza***
  2. Corollas of ray florets 2 or more times length of phyllaries.
    3. Corollas of disk florets white. ..... ***Solidago***
    3. Corollas of disk florets yellow or pink or lavender or purple or blue.
      4. Leaves 1- or 2-pinnatifid. ..... ***Machaeranthera***
      4. Leaves entire or toothed or lobed or pinnately cleft, but not pinnatifid.
        5. Plants acaulescent. ..... ***Townsendia***
        5. Plants caulescent.
          6. All mid-cauline leaves 0.5–2 mm wide.
            7. Ray florets 50–150. Phyllaries in 1-series or inconspicuously imbricate. ..... ***Erigeron***
            7. Ray florets 12–30. Phyllaries in 2- or 3-series.
              8. Leaf margins ciliate or scabrous.
                9. Plants 4–15 cm tall. Leaves 8–10 mm long.
                Involucres 3–6 mm long. Phyllaries not keeled. ..... ***Chaetopappa***
                9. Plants 50–75 cm tall. Leaves 12–40 mm long.
                Involucres 7–10 mm long. Phyllaries keeled. ..... ***Ionactis***
              8. Leaf margins not ciliate or scabrous.
                10. Pappus double, an inner whorl of capillary bristles
                3.5–6 mm long and an outer of stiff bristles 0.2–0.8 mm
                long. Phyllary midnerves orange resinous. ..... ***Doellingeria***
                10. Pappus single, not differentiated. Phyllary midnerves
                not orange resinous. ..... ***Symphyotrichum***
          6. One or more mid-cauline leaves greater than 2 mm wide.
            11. Phyllaries in 1-series or inconspicuously imbricate.
            Plants flowering chiefly in spring and early summer. ..... ***Erigeron***
            11. Phyllaries in 2- or more-series; conspicuously imbricate.
            Plants flowering chiefly in late summer and autumn.
              12. Plants from rhizomes or caudices or fibrous roots.
                13. Pappus bristles uniformly capillary, none clavate
                distally. Phyllaries herbacous; equal in length;
                conspicuously imbricated. ..... ***Symphyotrichum***
                13. Pappus bristles coarse; rigid; some clavate distally.
                Phyllaries indurate proximally and coriaceous or
                membranous distally; unequal in length, outer longer
                than inner; not imbricated. ..... ***Eurybia***
              12. Plants from single taproot.
                14. Stems densely white pubescent. Phyllaries densely white fimbriate. ..... ***Townsendia***
                14. Stems glabrate or green-gray puberulent. Phyllaries glabrate. ..... ***Dieteria***

GROUP I: Plants herbs. Phyllary apices of various shapes. Corollas of florets conspicuous, limbs more than 2 mm long. Heads radiate. Receptacular bristles or pales absent. Corollas of ray florets yellow or red or orange of maroon or brown. Pappus of disk florets of awns or scales or coroniform or absent.

1. Phyllaries conspicuously glandular.
  2. Pappus coroniform. Phyllaries in 1-series. Achenes cylindrical. ..... ***Pectis***
  2. Pappus of scales. Phyllaries in 2- or 3-series. Achenes obconical or obpyramidal.
    3. Upper cauline leaves opposite. Phyllary glands orange. ..... ***Picradeniopsis***
    3. Upper cauline leaves alternate. Phyllary glands yellowish-brown or dark brown
      4. Leaf margins 1- to 3-pinnatisect. Ray florets 5–8; corollas yellow-orange.
      Phyllaries fused only at bases. Pappus scales ending in 5–10 bristles. Achenes strigose. ..... ***Dyssodia***
      4. Leaf margins toothed. Ray florets 7–12; yellow to greenish yellow. Phyllaries
      fused 1/2 or more of length. Pappus scales ending in 1 bristle. Achenes glabrous. ..... ***Dysodiopsis***
1. Phyllaries not conspicuously glandular; may be punctate.
  5. Leaves opposite.
    6. Ray florets 5–9. Phyllaries 7–10. Pappus of scales. ..... ***Picradeniopsis***
    6. Ray florets 1. Phyllaries 3–4. Pappus absent. ..... ***Flaveria***
  5. Leaves alternate.

7. Phyllaries reflexed or curled outward at anthesis.
  8. Leaves decurrent. Stems winged. ..... ***Helenium***
  8. Leaves not decurrent. Stems not winged.
    9. Phyllaries glutinous.
      10. Leaf margins crenate, teeth gland-tipped. Involucres 8–25 mm in diameter. Pappus of disk florets of 2 awns. ..... ***Grindelia***
      10. Leaf margins entire. Involucres 2–4 mm in diameter. Pappus of disk florets of 5–8 scales. ..... ***Amphiachyris***
    9. Phyllaries not glutinous.
      11. Corollas of ray florets 3-lobed. Phyllaries in 1- to 3-series; valvate or overlapping.
        12. Leaves elliptic to obovate. Heads hemispheric to rotate. ..... ***Gaillardia***
        12. Leaves filiform to linear. Heads globose. ..... ***Helenium***
      11. Corollas of ray florets not lobed. Phyllaries in 4- or more series; imbricate.
        13. Leaf margins crenate, teeth gland-tipped. Involucres 8–25 mm in diameter. Pappus of disk florets of 2 awns. ..... ***Grindelia***
        13. Leaf margins entire. Involucres 2–4.5 mm in diameter. Pappus of disk florets of 5–8 scales.
          14. Ray florets 10–15. Ovaries of disk florets present; producing achenes. Pappus scales of disk florets linear to elliptic; shorter than corollas; bases free. ..... ***Gutierrezia***
          14. Ray florets 6–10. Ovaries of disk florets obsolete; not producing achenes. Pappus scales of disk florets spathulate; equal to or longer than corollas; bases united. ..... ***Amphiachyris***
7. Phyllaries ascending to erect at anthesis.
  15. Plants acaulescent. Heads solitary at ends of elongate, naked scapes. ..... ***Tetraneuris***
  15. Plants caulescent. Heads borne at ends of branches or short peduncles.
    16. Leaves elliptic to lanceolate; margins coarsely dentate to serrate. Involucres 15–25 mm in diameter. Phyllaries linear; flexuous; loose. Pappus of disk florets of 2 awns. ..... ***Grindelia***
    16. Leaves linear to narrowly oblancolate; margins entire or 1- or 2-pinnatifid. Involucres 2–12.5 mm in diameter. Phyllaries lanceolate or ovate or triangular; stiff; appressed. Pappus of disk florets coroniform or of scales.
      17. Leaf margins 1- or 2-pinnatifid. ..... ***Hymenoxys***
      17. Leaf margins entire or 1- to 5-lobed.
        18. Peduncles and phyllaries densely arachnoid-woolly. Cauline leaves oblanceolate to spathulate. Heads clustered in compact corymbs. Ray florets 3 or 4. ..... ***Psilostrophe***
        18. Peduncles and phyllaries glabrous or sericeous. Cauline leaves linear to narrowly oblanceolate. Heads borne singly or in open corymbs. Ray florets 5–23.
          19. Limbs of ray floret corollas 8–17 mm long. Phyllaries sericeous; not resinous or shiny. Involucres 7–12 mm in diameter. ..... ***Tetraneuris***
          19. Limbs of ray floret corollas 3–6 mm long. Phyllaries glabrous; resinous shiny. Involucres 2–5 mm in diameter.
            20. Ray florets 10–15. Ovaries of disk florets present; producing achenes. Pappus scales of disk florets linear to elliptic; shorter than corollas; bases free. ..... ***Gutierrezia***
            20. Ray florets 6–10. Ovaries of disk florets obsolete; not producing achenes. Pappus scales of disk florets spathulate; equal to or longer than than corollas; bases united. ..... ***Amphiachyris***

GROUP J: Plants herbs. Phyllary apices of various shapes. Corollas of florets conspicuous, limbs more than 2 mm long. Heads radiate. Receptacular bristles or pales absent. Corollas of ray florets yellow or red or orange of maroon or brown. Pappus of numerous bristles.

1. Leaves opposite; filiform to linear. Phyllaries 4 or 5. ..... ***Haploësthes***
1. Leaves alternate; of various shapes but not filiform to linear. Phyllaries 6–numerous.

2. Pappus of disk florets in 2 whorls; the inner of capillary bristles, the outer of short scales or bristles.
  3. Upper cauline leaves clasping stems. Pappus of ray florets absent. ..... ***Heterotheca***
  3. Upper cauline leaves not clasping stems. Pappus of ray florets present.
    4. Phyllaries ovate; apices mucronate to spinose; abaxial surfaces glabrous. Achenes of ray florets trigonous. ..... ***Xanthisma***
    4. Phyllaries linear to lanceolate; apices acute; abaxial surfaces pubescent. Achenes of ray florets flattened or cylindrical to fusiform.
      5. Basal and lower cauline leaves 7–30 cm long. Venation parallel; primary veins 3 or 5 or 7. ..... ***Pityopsis***
      5. Basal and lower cauline leaves 1–6 cm long. Venation pinnate; primary veins 1.
        6. Plants annuals; from taproots; pilose-puberulent. Leaves soft; flexible. Achenes 10-ribbed. ..... ***Bradburia***
        6. Plants perennials; from woody caudices or rhizomes; sericeous or canescent or strigose-hispid. Leaves firm; rigid. Achenes 3- or 5-ribbed. ..... ***Heterotheca***
2. Pappus of disk florets in 1 whorl; of capillary bristles.
  7. Phyllaries not imbricate; equal in length, minute outer ones at bases of heads present or absent.
    8. Cauline leaf margins pinnately lobed or pinnatifid or pinnatisect. ..... ***Packera***
    8. Cauline leaf margins dentate or serrate to subentire.
      9. Cauline leaves only slightly reduced in size upward. ..... ***Senecio***
      9. Cauline leaves conspicuously reduced in size upward. ..... ***Packera***
  7. Phyllaries imbricate; of various lengths.
    10. Leaf margins entire or variously toothed, but not mucronate to spinulose. Plants from rhizomes or fibrous roots.
      11. Inflorescences paniculate or axillary clusters. ..... ***Solidago***
      11. Inflorescences corymbose.
        12. Leaves glandular punctate. ..... ***Euthamia***
        12. Leaves not glandular punctate. ..... ***Solidago***
    10. Leaf margins with mucronate to spinose teeth. Plants from taproots or woody caudices.
      13. Involucres of mature heads 20–35 mm wide. Upper stems and leaves glabrous; typically glaucous. Longest pappus bristles 7–10 mm long. Achenes glabrous. ..... ***Grindelia***
      13. Involucres of mature heads 5–20 mm wide. Upper stems and leaves tomentose or hispid or with glandular hairs; not glaucous. Longest pappus bristles 4–7 mm long. Achenes sericeous or sericeous-canescent.
        14. Involucres of mature heads 4–10 mm wide. Heads borne in open panicles; peduncles slender; 0.3–0.5 mm in diameter. ..... ***Croptilon***
        14. Involucres of mature heads 12–20 mm wide. Heads borne in dense corymbs or solitary at stem apices; peduncles stout; 0.9–1.1 mm in diameter.
          15. Leaf margins coarsely and irregularly toothed. Plants annuals; from taproots. ..... ***Rayjacksonia***
          15. Leaf margins pinnatifid or uniformly toothed. Plants perennials; from woody branching caudices. ..... ***Xanthisma***

GROUP K: Plants herbs. Phyllary apices of various shapes. Corollas of florets conspicuous, limbs more than 2 mm long. Heads discoid or disciform. Receptacular bristles or pales present.

1. Plants acaulescent. Heads borne singly at ends of elongate scapes.
  2. Corollas reddish purple to brown. Receptacular bristles present. Pales absent. ..... ***Gaillardia***
  2. Corollas white or pink or lavender. Receptacular bristles absent. Pales present. ..... ***Marshallia***
1. Plants caulescent. Heads borne in various inflorescences, but not at ends of scapes.
  3. Florets hidden by white-woolly pubescence. Anther bases caudate. ..... ***Diaperia***
  3. Florets not hidden by white-woolly pubescence. Anther bases obtuse to rounded.
    4. Corolla lobes linear or filiform. Styles with thickened, minutely pubescent ring below junction of branches. Pales absent. Receptacular bristles present. ..... ***Rhaponticum***
    4. Corolla lobes triangular; long or short. Styles without thickened ring below junction of branches. Pales present; membranous or scarious. Receptacular bristles absent.
      5. Disk florets not producing achenes. Style branches not separated at anthesis. ..... ***Polymnia***
      5. Disk florets producing achenes. Style branches separated at anthesis.
        6. Plants monoecious; staminate heads borne in clusters; pistillate heads

forming burs in upper leaf axils. Anthers of staminate florets free. ..... ***Xanthium***
6. Plants bearing heads with perfect florets. Anthers of all florets fused.
7. Pappus of scales or absent. ..... ***Galinsoga***
7. Pappus of barbed awns.
8. Inner phyllaries free or fused only at bases. ..... ***Bidens***
8. Inner phyllaries fused 1/4–2/3 length. ..... ***Thelesperma***

GROUP L: Plants herbs. Phyllary apices of various shapes. Corollas of florets conspicuous, limbs more than 2 mm long. Heads discoid or disciform. Receptacular bristles or pales absent. Pappus of scales or coroniform or absent.

1. Corollas of disk florets violet to purple or pinkish. ..... ***Palafoxia***
1. Corollas of disk florets white or yellow or greenish yellow.
2. Mid and lower leaves opposite.
3. Leaves petiolate; blades deltoid; bases hastate. Corolla lobes of disk florets 4. Pappus coroniform with 0–2 bristles. Plants of rocky slopes, Cimarron County. ..... ***Pericome***
3. Leaves sessile; blades linear-lanceolate to lanceolate; bases cuneate. Corolla lobes of disk florets 5. Pappus absent. Plants of alkaline and saline areas, body of state..... ***Flaveria***
2. Mid and lower leaves alternate.
4. Pappus of 12–22 scales. Achenes 3–7 mm long; villous or hirsutellous. ..... ***Hymenopappus***
4. Pappus absent or coroniform. Achenes 1–2 mm long; glabrous or gland-dotted.
5. Lower cauline leaves 10–20 cm long. Phyllary margins white. Receptacles flat. Lateral ribs of achenes dark brown. Plants perennials; with chamomile-like odor when crushed. ..... ***Tanacetum***
5. Lower cauline leaves 1–6 cm long. Phyllary margins greenish. Receptacles conical. Lateral ribs of achenes bright orange. Plants annuals; with pineapple-like odor when crushed. ..... ***Matricaria***

GROUP M: Plants herbs. Phyllary apices of various shapes. Corollas of florets conspicuous, limbs more than 2 mm long. Heads discoid or disciform. Receptacular bristles or pales absent. Pappus of bristles. Corollas of disk florets pink or lavender or blue or purple.

1. Plants twining vines. Phyllaries 4. Florets 4. ..... ***Mikania***
1. Plants not vines; stems not twining. Phyllaries 5–many. Florets 5–many.
2. Plants acaulescent. Heads borne singly at ends of elongate scapes. Corollas reddish to brownish purple. ..... ***Gaillardia***
2. Plants caulescent. Heads borne in various inflorescences, but not at ends of scapes. Corollas pink or lavender or blue or purple.
3. Abaxial surfaces of leaves white woolly. ..... ***Antennaria***
3. Abaxial surfaces of leaves glabrous or with pubescence of various types, but not white woolly.
4. Lower leaves alternate.
5. Plants aromatic; fetid odor. Anther bases caudate. ..... ***Pluchea***
5. Plants not aromatic. Anther bases not caudate.
6. Pappus bristles longer than disk florets at anthesis. Style branches flattened; elliptic to lanceolate; conspicuously pubescent; apices acute. ..... ***Symphyotrichum***
6. Pappus bristles equal to or shorter than disk florets at anthesis. Style branches terete or semiterete; filiform or clavate; glabrous or irregularly hispidulous; apices rounded.
7. Heads borne in spike or racemes. Plants from fibrous-woody corms. Style branches clavate; glabrous. ..... ***Liatris***
7. Heads borne in corymbs or glomerules. Plants from rhizomes or caudices. Style branches filiform; irregularly hispidulous.
8. Bracts subtending heads present; foliaceous; 3. Florets 3–4 per head. Pappus of 5–10 bristles; bases dilated. ..... ***Elephantopus***
8. Bracts subtending heads absent. Florets 10–many per head. Pappus of 25–many bristles; bases not dilated. ..... ***Vernonia***
4. Lower leaves whorled or opposite.
9. Leaves whorled. ..... ***Eutrochium***
9. Leaves opposite.

10. Leaf margins pinnately dissected into linear or filiform lobes. ..... ***Eupatorium***
10. Leaf margins entire or toothed.
11. Leaves sessile or subsessile. ..... ***Eupatorium***
11. Leaves conspicuously petiolate.
12. Florets 35–70 or more. Phyllaries equal or subequal. Receptacles conical. Heads borne in dense corymbs. ..... ***Conoclinium***
12. Florets 12–24. Phyllaries unequal, outer 1/3 to 1/2 length of inner. Receptacles flat or slightly convex. Heads borne in loose corymbs. ..... ***Fleischmannia***

GROUP N: Plants herbs. Phyllary apices of various shapes. Corollas of disk florets conspicuous, limbs more than 2 mm long. Heads discoid or disciform. Receptacular bristles or pales absent. Pappus of bristles. Corollas of disk florets white or cream or green or yellow.

1. Lower cauline leaves whorled or opposite.
2. Leaves whorled. ..... ***Eutrochium***
2. Leaves opposite.
3. Plants twining vines. Phyllaries 4. Florets 4. ..... ***Mikania***
3. Plants not vines; stems not twining. Phyllaries 5–many. Florets 5–many.
4. Leaf margins pinnately dissected into linear or filiform lobes. ..... ***Eupatorium***
4. Leaf margins entire or toothed.
5. Leaves sessile or subsessile. ..... ***Eupatorium***
5. Leaves conspicuously petiolate.
6. Stems erect. Involucres 3–5 mm long. Phyllaries equal or subequal. Glands on adaxial surfaces of leaves absent. ..... ***Ageratina***
6. Stems sprawling or weakly ascending. Involucres 5–6 mm long. Phyllaries unequal, outer 1/3 to 1/2 length of inner. Glands on adaxial surfaces of leaves present, visible at 15X magnification. ..... ***Fleischmannia***
1. Lower cauline leaves alternate.
7. Leaf margins pinnately dissected into linear or filiform lobes. ..... ***Eupatorium***
7. Leaf margins entire or toothed or lobed.
8. Phyllaries not imbricate; equal in length; small outer ones at bases of heads present or absent.
9. Venation palmate or parallel-convergent. Phyllaries 5. Disk Florets 5. Plants perennials; from rhizomes or crowns. ..... ***Arnoglossum***
9. Venation pinnate. Phyllaries 20 or more. Disk florets 10–50 or more. Plants annuals; from taproots.
10. Lower cauline leaves oblanceolate. Apices of outer phyllaries black. ..... ***Senecio***
10. Lower cauline leaves ovate-lanceolate to lanceolate. Apices of outer phyllaries green. ..... ***Erechtites***
8. Phyllaries imbricate; of various lengths.
11. Abaxial surfaces of leaves white woolly.
12. Pappus of plumose bristles. ..... ***Facelis***
12. Pappus of capillary bristles.
13. Plants from rhizomes or stolons. Plants dioecious. ..... ***Antennaria***
13. Plants from taproots. Plants polygamo-dioecious.
14. Heads borne in spicate or narrowly thrysoid inflorescences. Pappus bristles fused at bases; deciduous as a unit; smooth. Receptacles concave at end of fruiting. Achene hairs 2-celled. ..... ***Gamochaeta***
14. Heads borne in corymbose inflorescences. Pappus bristles free; deciduous separately; scaberulous. Receptacles flat or subconic at end of fruiting. Achene hairs 3-celled. ..... ***Pseudognaphalium***
11. Abaxial surfaces of leaves glabrous or with pubescence of various types, but not white woolly.
15. Bracts subtending heads present; foliaceous; 3. Florets 3–4 per head. Pappus of 5–10 bristles; bases dilated. ..... ***Elephantopus***
15. Bracts subtending heads absent. Florets 3–30 per head. Pappus of 15–50 bristles; bases not dilated.

16. Leaves 10–40 mm wide; bases clasping. Plants aromatic; fetid odor. Style branches of central florets not separating at anthesis; oblong-linear; apices rounded. Anther bases caudate. ..... ***Pluchea***
16. Leaves 0.5–10 mm wide; bases not clasping. Plants not aromatic. Style branches of central florets separating at maturity; elliptic to lanceolate; apices acute. Anther bases obtuse to rounded, not caudate.
    17. Pappus bristles longer than disk florets at anthesis; 4–6 mm long. ..... ***Symphyotrichum***
    17. Pappus bristles equal to or shorter than disk florets at anthesis; 2–3 mm long. ..... ***Conyza***

Achillea C. Linnaeus Yarrow

One species. ..... ***A. millefolium***
(= *A. lanulosa*)

Acmella L.C.M. Richard ex C.H. Persoon Spotflower

One species. ..... ***A. repens***
(= *Spilanthes americana*)

Ageratina E. Spach Snakeroot

One species. ..... ***A. altissima***
(= *Eupatorium rugosum*)

Ambrosia C. Linnaeus Ragweed

1. Leaves palmately lobed or entire or with 2 basal lobes.
    2. Upper cauline leaves opposite; palmately 3- or 5-lobed; petiolate. Staminate heads pedicellate; involucres radially symmetrical. ..... ***A. trifida***
    2. Upper cauline leaves alternate; entire or with 2 basal lobes; sessile. Staminate heads sessile; involucres bilaterally symmetrical. ..... ***A. bidentata***
1. Leaves 1- or 2-pinnatifid or dissected.
    3. Involucral burs of pistillate heads with 4–7 tubercules in 1 whorl.
        4. Lower and mid-cauline leaves petiolate; ovate; 2-pinnatifid; lobes lanceolate. Plants annuals; from taproots; not colonial. ..... ***A. artemisiifolia***
        4. Lower and mid-cauline leaves sessile or subsessile; lanceolate; 1-pinnatifid, lobes linear. Plants perennials; from spreading woody rootstocks; colonial. ..... ***A. psilostachya***
    3. Involucral burs of pistillate head with 0–30 spines in several series.
        5. Lower cauline leaves opposite. Mature pistillate heads 6–14 mm in diameter. Plants annuals; from taproots; not colonial. ..... ***A. acanthicarpa***
        (= *Franseria acanthicarpa*)
        5. Lower cauline leaves alternate. Mature pistillate heads 2–6 mm in diameter. Plants perennials; from spreading woody rootstocks; colonial.
            6. Herbage canescent; silvery gray. Staminate heads 4–6 mm in diameter. Pistillate heads with apical beaks 2; florets 2 locules 2. ..... ***A. grayi***
            (= *Franseria tomentosa*)
            6. Herbage pubescent; gray-green to whitish. Staminate heads 1–3 mm in diameter. Pistillate heads with apical beaks 1; florets 1; locules 1. ..... ***A. confertiflora***
            (= *Franseria confertifolia*)

Amphiachyris (A. de Candolle) T. Nuttall Broomweed

One species. ..... ***A. dracunculoides***
(= *Gutierrezia dracunculoides, Xanthocephalum dracunculoides*)

Antennaria J. Gaertner Pussytoes

1. Basal leaves conspicuously 3-nerved. Largest leaves 15–40 mm wide.
    2. Abaxial surfaces of basal leaves conspicuously tomentose. Involucres of pistillate heads 5–7 mm tall. Corollas of staminate florets 2–3.5 mm long. Pappus bristles of staminate florets 2.5–4 mm long. ..... ***A. plantaginifolia***
    2. Abaxial surfaces of basal leaves gray-pubescent to floccose-glabrate. Involucres of pistillate heads 7–13 mm tall. Corollas of staminate florets 3.5–5 mm long. Pappus bristles of staminate 4–5 mm long. ..... ***A. parlinii***
1. Basal leaves 1-nerved, 2 faint lateral nerves present or absent. Largest leaves 3–13 mm wide.
    3. Plants mat-forming. Both adaxial and abaxial leaf surfaces tomentose. Plants of western end of Panhandle. ..... ***A. parvifolia***
    3. Plants not mat-forming. Adaxial leaf surfaces glabrate and abaxial surfaces tomentose. Plants of body of state. ..... ***A. neglecta***

Anthemis C. Linnaeus Dog Fennel

One species. ..... ***A. cotula***

Aphanostephus A. P. de Candolle Lazy Daisy

1. Pappus of short unequal hairs or cilia. ..... ***A. ramosissimus***
1. Pappus of 5 scales.
    2. Peduncles 15–100 mm long. Involucres 6–8 mm long. Ray florets 20–44. ..... ***A. skirrhobasis***
    2. Peduncles 3–12 mm long. Involucres 4.5–5.5 mm long. Ray florets 12–18. ..... ***A. pilosus***

Arctium C. Linnaeus Burdock

One species. ..... ***A. minus***

Arnoglossum C.S. Rafinesque Indian Plantain

1. Venation of basal and lower cauline leaves parallel-convergent. Basal and lower cauline leaves elliptic to lanceolate; margins entire or toothed, teeth minute, sparse. Phyllaries keeled, keels winged. ..... ***A. plantagineum***
(= *Cacalia plantaginea*)
1. Venation of basal and lower cauline leaves palmate. Basal and lower cauline leaves reniform to deltoid; margins palmately lobed or coarsely and irregularly toothed. Phyllaries not keeled.
    2. Basal and lower cauline leaves reniform; margins coarsely and irregularly toothed. Stems 6- to 8-angled; sulcate. Abaxial surfaces of leaves green; not glaucous; sparsely pubescent. ..... ***A. reniforme***
(= *A. muehlenbergii*, *Cacalia muehlenbergii*)
    2. Basal and lower cauline leaves deltoid; margins palmately lobed. Stems terete; not sulcate. Abaxial surfaces of leaves whitish; glaucous; glabrous. ..... ***A. atriplicifolium***
(= *Cacalia atriplicifolia*)

Artemisia C. Linnaeus Sagebrush, Wormwood

1. Plants shrubs. Leaf margins strongly revolute, abaxial surfaces obscured. Plants of deep sandy soils, western half of state. ..... ***A. filifolia***
1. Plants herbs or subshrubs. Leaf margins slightly revolute to plane; abaxial surfaces clearly visible.
    2. Abaxial leaf surfaces glabrate-glandular.
        3. Leaves entire or few lobed; lobes entire. Involucres brownish. ..... ***A. dracunculus***
        3. Leaves pinnatifid, lobes toothed. Involucres green to grayish-green.
            4. Heads globose; 1–2.2 mm in diameter. Disk florets perfect, styles cleft, ovaries fertile. Plants annuals, leaves cauline. Panicles 10–20 cm wide. ..... ***A. annua***
            4. Heads turbinate; 2.5–3 mm in diameter. Disk florets staminate, styles entire, ovaries abortive. Plants biennials, leaves mostly basal. Panicles 1–8 cm wide. ..... ***A. campestris***
    2. Abaxial leaf surfaces tomentose.

5. Lower cauline leaves entire to few toothed. ..... ***A. ludoviciana***
5. Lower cauline leaves lobed.
6. Lower leaf lobes 4–10 mm wide; some lobes toothed.
Adaxial leaf surfaces floccose-tomentose. ..... ***A. mexicana***
6. Lower leaf lobes 0.5–3 mm wide; not toothed.
Adaxial surfaces persistent tomentose.
7. Adaxial leaf surfaces yellowish green. Leaf lobes divergent.
Leaves 1–3.5 cm long. ..... ***A. carruthii***
7. Adaxial leaf surfaces green. Leaf lobes curved toward apex.
Leaves 4–7.1 mm long. ..... ***A. neomexicana***

Astranthium T. Nuttall Western Daisy

One species. ..... ***A. integrifolium***

Baccharis C. Linnaeus Groundsel-Tree

1. Plants shrubs 1–3 m tall. Mid-cauline leaves ovate to narrowly lanceolate or oblanceolate; 5–20 mm wide. Pappus bristles of pistillate florets in 1- or 2-series. Achenes glabrous.
2. Largest leaves ovate to ovate-lanceolate; 10–30 mm wide; appearing 1-nerved, the 2 lateral nerves inconspicuous. ..... ***B. halimifolia***
2. Largest leaves narrowly lanceolate or oblanceolate; 5–10 mm wide; appearing 3-nerved, the 2 lateral nerves conspicuous. ..... ***B. salicina***
1. Plants shrubs or subshrubs 0.2–0.6 m tall. Mid-cauline leaves linear; 2–3 mm wide. Pappus bristles of pistillate florets in 3 or more series. Achenes glandular-pubescent.
3. Longest leaves typically 20–50 mm long; margins minutely undulate.
Plants of southwest corner of state. ..... ***B. texana***
3. Longest leaves typically 7–20 mm long; margins entire or serrate.
Plants of Panhandle. ..... ***B. wrightii***

Berlandiera A.P. de Candolle Green Eyes

1. Leaves oblanceolate; margins pinnatifid to irregularly dentate; bases narrowly cuneate. Veins of abaxial surfaces of corollas of ray florets maroon or red. Plants of western Panhandle. ..... ***B. lyrata***
1. Leaves ovate to lanceolate-deltoid; margins regularly serrate to crenate; bases cordate or truncate. Veins of abaxial surfaces of corollas of ray florets green. Plants of body of state.
2. Leaf blades ovate; velutinous. Peduncles white tomentose; hairs less than 1 mm long. ..... ***B. pumila***
2. Leaf blades deltoid-lanceolate to ovate; hirsute or scabrous. Peduncles pilose-villous; hairs 1–2 mm long. ..... ***B. texana***

Bidens C. Linnaeus Beggar Ticks[1]

1. Leaves simple.
2. Ray florets present.
3. Ray florets 8–17 mm long. Apices of pales yellow. Nerves of achenes pale; raised. ..... ***B. cernua***
3. Ray florets 20–30 mm long. Apices of pales red to reddish brown. Nerves of achenes, dark; not raised. ..... ***B. laevis***
2. Ray florets absent or caducous.
4. Leaves petiolate. Lower leaves all or at least some 3- to 5-lobed or cleft. ..... ***B. connata***
4. Leaves sessile. Lower leaves not lobed or cleft.
5. Corolla lobes of disk florets primarily 4. Achenes flattened, scarcely angled. ..... ***B. tripartita*** (= *B. comosa*)
5. Corolla lobes of disk florets primarily 5. Achenes 4-sided, angled. ..... ***B. cernua***
1. Leaves 1- to 3-pinnately compound.
6. Corollas of ray florets 6–30 mm long.
7. Outer phyllaries 8–12; 4–7 mm long; margins entire or ciliolate; apices rounded to acute. Achenes 2.5–5 mm long. ..... ***B. aristosa***
7. Outer phyllaries 12–25; 7–20 mm long; margins coarsely serrate-ciliate, apices attenuate. Achenes 5–7 mm long. ..... ***B. polylepis***
6. Corollas of ray florets 2–5 mm long or absent.

8. Leaves 2- or 3-pinnately compound. Achenes of disk florets 4-sided; awns 3 or 4.
    9. Outer phyllaries 5–25 mm long. Achenes of disk and ray florets of 2 forms; ray achenes flattened; disk achenes 4-sided. Plants of Black Mesa area, Cimarron County. ..... ***B. bigelovii***
    9. Outer phyllaries 3–5 mm long. Achenes of ray and disk florets all alike; 4-sided. Plants of body of state. ..... ***B. bipinnata***
8. Leaves 1-pinnately compound. Achenes of disk florets flattened; awns 2.
    10. Disk florets pale yellow. Outer phyllaries 10–16; margins hispid-ciliate. Inner phyllaries 8–18. Achenes olivaceous to brown. ..... ***B. vulgata***
    10. Disk florets orange. Outer phyllaries 2–10, margins ciliate or entire. Inner phyllaries 5–12. Achenes dark to black.
        11. Outer phyllaries 5–10; margins ciliate. Achenes glabrous or glabrate; awns retrorsely barbellate. ..... ***B. frondosa***
        11. Outer phyllaries 2–5; margins entire. Achenes antrorsely strigose-hirsute; awns antrorsely barbellate. ..... ***B. discoidea***

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[1] Treatment contributed by Ronald R. Weedon

Boltonia C.L. L'Heritier

1. Corollas of ray florets 8–15 mm long. Heads 6–15 mm wide. Uppermost leaves 10–20 mm long. Rhizomes present. ..... ***B. asteroides***
1. Corollas of ray florets 5–8 mm long. Receptacles 3–6 mm wide. Uppermost leaves 5–10 mm long. Rhizomes absent. ..... ***B. diffusa***

Bradburia J. Torrey & A. Gray — Soft Golden Aster

One species. ..... ***Bradburia pilosa***
(= *Chrysopsis pilosa*)

Brickellia W. Elliot — Brickellbush

1. Plants shrubs. Leaves broadly ovate to deltoid. Pappus bristles scabrous. ..... ***B. californica***
1. Plants herbs or subshrubs. Leaves lanceolate to linear. Pappus bristles plumose.
    2. Plants from woody, taprooted caudices. Pappus bristles tan. ..... ***B. eupatorioides***
    (= *Kuhnia eupatorioides*)
    2. Plants from fibrous or tuberous roots. Pappus bristles white. ..... ***B. brachyphylla***

Calyptocarpus C.F. Lessing — Straggler Daisy

One species. ..... ***C. vialis***

Carduus C. Linnaeus — Plumeless Thistle, Nodding Thistle

One species. ..... ***C. nutans***

Carthamus C. Linnaeus — Distaff Thistle

One species. ..... ***C. lanatus***

Centaurea C. Linnaeus — Star-Thistle, Knapweed

1. Corollas yellow. Apices of phyllaries conspicuously spine tipped; longest spines 11–22 mm long. Leaves decurrent. ..... ***C. solstitialis***
1. Corollas blue or purple or lavender or pink or white. Apices of phyllaries entire or toothed or lacerate or pectinate. Leaves not decurrent. ..... ***C. cyanus***

Chaetopappa A.P. de Candolle — Least Daisy, White Aster

1. Plants annuals; not colonial; not rhizomatous. Leaves not densely overlapping; herbaceous; flat. ..... ***C. asteroides***
1. Plants perennials; colonial, tufts connected by rhizomes. Leaves densely overlapping; coriaceous; ridged (midnerve) and 2-furrowed. ..... ***C. ericoides***
(= *Leucelene ericoides*)

Chloracantha G.L. Nesom — Devilweed Aster

One species. ..... ***C. spinosa***
(= *Aster spinosus*)

Cichorium C. Linnaeus — Chicory

One species. ..... ***C. intybus***

Cirsium P. Miller — Thistle

1. Heads subtended by conspicuous whorl of appressed, spinose leaves, spines 8–15 mm long. ..... ***C. horridulum***
1. Heads not subtended by whorl of spinose leaves, subtending leaves if present not whorled nor appressed, spines 3–10 mm long.
  2. Adaxial surfaces of leaves prickly, prickles numerous, yellowish, appressed. ..... ***C. vulgare***
  2. Adaxial surfaces of leaves not prickly.
    3. Apices of outer phyllaries acuminate, not spinose. ..... ***C. muticum***
    3. Apices of outer phyllaries spinose.
      4. Involucres 15–20 mm long. Flowering heads nearly as wide as long. Fruiting heads conspicuously wider than long.
        5. Uppermost reduced leaves of peduncles entire. Cauline leaves toothed; 2–15 mm long. ..... ***C. carolinianum***
        5. Uppermost reduced leaves of peduncles spinose-lobed. Cauline leaves pinnatifid; 40–90 mm long. ..... ***C. texanum***
      4. Involucres 20–50 mm long. Flowering heads conspicuously longer than wide. Fruiting heads nearly as wide as long.
        6. Middle and upper cauline leaves conspicuously decurrent; spines golden yellow, 7–10 mm long. ..... ***C. ochrocentrum***
        6. Middle and upper cauline leaves sessile or clasping or inconspicuously decurrent; spines stramineous to whitish, 3–8 mm long.
          7. Stems densely white-tomentose. Adaxial surfaces of leaves grayish green-tomentose. ..... ***C. undulatum***
          7. Stems green-glabrate or sparsely hirsute or pilose or floccose. Adaxial surfaces of leaves dark green glabrous or glabrate or sparsely hirsute.
            8. Cauline leaves toothed or shallowly pinnately lobed. Spines of leaf margins flexible. Heads borne on leafy branches, or short peduncles and subtended by leaves. ..... ***C. altissimum***
            8. Cauline leaves pinnatifid. Spines of leaf margins stiff. Heads borne on elongate, naked peduncles, leaves if present conspicuously reduced, bract-like. ..... ***C. engelmannii***
(= *C. terrae-nigrae*)

Conoclinium A.P. de Candolle — Blue Mistflower

One species. ..... ***C. coelestinum***
(= *Eupatorium coelestinum*)

Conyza C.F. Lessing — Horseweed, Mare's Tail

1. Plants 30–400 cm tall. Stems not branched near bases; erect; hirsute or glabrous, hairs spreading. ..... ***C. canadensis***
1. Plants 15–25 cm tall. Stems branched profusely near bases; spreading to ascending; strigose, hairs antrorse. ..... ***C. ramosissima***

Coreopsis C. Linnaeus — Tickseed

1. Ray florets distally yellow and basally red or reddish brown. Outer phyllaries ovate.
  2. Disk florets 4-lobed; lobes deltoid. Ray florets 3-lobed, middle lobe sometimes emarginate or erose. Achenes silver-gray to black; flat; surfaces smooth. ..... ***C. tinctoria***
(= *C. cardaminefolia*)

2. Disk florets 5-lobed; lobes linear. Ray florets 4- or 5-lobed. Achenes dark brown; involute with margins overlapping; surfaces tuberculate. ..... ***C. basalis***
(= *C. wrightii*)

1. Ray florets all yellow. Outer phyllaries linear-lanceolate.
   3. Leaves crowded at stem bases and lower nodes; nodes 2–5. Peduncles 20–40 cm long. ..... ***C. lanceolata***
   3. Leaves not crowded at stem bases and lower nodes, distributed along stems; nodes 5–12. Peduncles 1–20 cm long.
      4. Mid-cauline leaves palmately lobed or parted, or palmately compound. Pales linear or clavate; apices round to acute. Plants from rhizomes.
         5. Mid-cauline leaves simple; sessile or subsessile. Corolla lobes of disk florets yellow at anthesis. ..... ***C. palmata***
         5. Mid-cauline leaves palmately compound; conspicuously petiolate. Corolla lobes of disk florets purplish red at anthesis. ..... ***C. tripteris***
      4. Mid-cauline leaves pinnatifid or entire or pinnately 3-lobed. Pales narrowly lanceolate; apices attenuate. Plants from short caudices.
         6. Leaves glabrous; pinnatifid, lobes linear to filiform. ..... ***C. grandiflora***
         6. Leaves glandular-hispid to puberulent; entire or pinnately 3-lobed, lobes when present elliptic to ovate. ..... ***C. pubescens***

Cosmos A.J. Cavanilles

One species. ..... ***C. sulphureus***

Crepis C. Linnaeus Hawksbeard

One species. ..... ***C. pulchra***

Croptilon C.S. Rafinesque Scratch Daisy

1. Ray florets 5–7; 4–6 mm long. Mature heads 4–5 mm wide. ..... ***C. divaricatum***
(= *Haplopappus divaricatus*)

1. Ray florets 10–18; 6–12 mm long. Mature heads 5–10 mm wide. ..... ***C. hookerianum***
(= *Haplopappus divaricatus* var. *hookerianus*)

Cyclachaena J.B.G. Fresenius Giant Sumpweed

One species. ..... ***C. xanthiifolia***
(= *Iva xanthifolia*)

Diaperia T. Nuttall Rabbit's Tobacco

1. Heads clustered in leaf axils along stems. ..... ***D. candida***
(= *Evax candida*, *Filago candida*)

1. Heads clustered in terminal glomerules at ends of stems.
   2. Leaves among heads in center of glomerules exserted beyond heads. Heads cylindrical to oblong-fusiform. Apices of pales sparsely villous to glabrate. Ovaries of central florets vestigial at 20X magnification. Corollas of outer florets minute; tubular at 20X magnification. ..... ***D. prolifera***
(= *Evax prolifera*, *Filago prolifera*)
   2. Leaves among heads in center of glomerules not exserted beyond heads. Heads globose to ovoid. Apices of pales lanate. Ovaries of central florets absent. Corollas of outer florets absent. ..... ***D. verna***
(= *Evax multicaulis*, *Filago multicaulis*)

Dieteria T. Nuttall Hoary Aster

One species. ..... ***D. canescens***
(=*Machaeranthera canescens*)

Doellingeria C.G.D. Nees von Esenbeck — Parasol Whitetop

One species. ..... ***D. umbellata***
(= *Aster umbellatus*)

Dysodiopsis (A. Gray) P.A. Rydberg — Dogfennel

One species. ..... ***D. tagetoides***
(= *Dyssodia tagetoides*)

Dyssodia A.J. Cavanilles — Dogweed

One species. ..... ***D. papposa***

Echinacea C. Moench — Coneflower[1]

1. Basal leaves ovate to ovate-lanceolate; margins serrate; bases rounded.
   Phyllaries linear-lanceolate. Apices of pales flexible. ..... ***E. purpurea***
1. Basal leaves lanceolate to linear-lanceolate or oblong-lanceolate; margins entire;
   bases attenuate. Phyllaries lanceolate or oblong. Apices of pales rigid.
   2. Stems hispid or hirsute. Leaves hispid or hirsute.
      3. Stem and leaf hairs tuberculate. Ray florets 2–4 cm long. ..... ***E. angustifolia***
      3. Stem and leaf hairs not tuberculate. Ray florets 4–7 cm long.
         4. Mature heads conical. Ray florets drooping.
            Pollen of disk florets white. Mature achenes 3.5–5 mm long. ..... ***E. pallida***
         4. Mature heads hemispheric. Ray florets spreading.
            Pollen of disk florets yellow. Mature achenes 3 mm long. ..... ***E. sanguinea***
   2. Stems glabrous or strigose to strigose-hirsute. Leaves strigose to strigose-hirsute.
      5. Lower stems strigose or strigose-hirsute. Ray florets 3–7 cm long. ..... ***E. paradoxa***
      5. Lower stems glabrous. Ray florets 2–3 cm long.
         6. Leaf hairs tuberculate. Phyllaries hirsute. Corollas of ray florets light purple or pink or
            white; spreading to drooping, but apices not touching peduncles. Pappus teeth equal. ..... ***E. angustifolia***
         6. Leaf hairs not tuberculate. Phyllaries strigose. Corollas of ray florets dark purple;
            conspicuously reflexed, with apices touching peduncles. Pappus teeth unequal. ..... ***E. atrorubens***

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[1] Treatment contributed by Wayland L. Ezell

Eclipta C. Linnaeus — Yerba de Tajo

One species. ..... ***E. prostrata***
(= *E. alba*)

Elephantopus C. Linnaeus — Elephant's Foot

1. Lower cauline leaves well developed. Basal leaves absent or if present, not forming rosettes. ..... ***E. carolinianus***
1. Lower cauline leaves absent or conspicuously reduced. Basal leaves present, forming distinct rosettes.
   2. Basal leaves oblanceolate; 4–7 cm wide; midveins of abaxial surfaces
      sparsely strigose-hispid. Pappus bristles 4–5 mm long. ..... ***E. nudatus***
   2. Basal leaves spathulate to obovate; 7–9 cm wide; midveins of abaxial
      surfaces densely villous. Pappus bristles 6–8 mm long. ..... ***E. tomentosus***

Engelmannia A. Gray ex T. Nuttall — Engelmann's Daisy

One species. ..... ***E. peristenia***
(= *E. pinnatifida*)

Erechtites C.S. Rafinesque — Burnweed

One species. ..... ***E. hieraciifolius***

Ericameria T. Nuttall Goldenbush

One species. ..... ***E. nauseosus***
(= *Chrysothamnus nauseosus*)

Erigeron C. Linnaeus Fleabane

1. Pappus of ray florets of only minute scales.
    2. Lower cauline leaves ovate to lanceolate; 15–80 mm wide; margins coarsely toothed. Lower stems pilose-hirsute. ..... ***E. annuus***
    2. Lower cauline leaves lanceolate to linear; 5–15 mm wide; margins entire to inconspicuously toothed. Lower stems strigose. ..... ***E. strigosus***
    (= *E. traversii*)
1. Pappus of ray florets of only bristles, or both bristles and minute scales.
    3. Lower cauline leaves 10–50 mm wide; ovate to lanceolate or spathulate.
        4. Heads, excluding limbs of ray florets, 15–20 mm in diameter. Corollas of ray florets 1–1.7 mm wide. Corollas of disk florets 4.5–6 mm long. Bases of leaves clasping to inconspicuously auriculate. ..... ***E. pulchellus***
        4. Heads, excluding limbs of ray florets, 10–14 mm in diameter. Corollas of ray florets 0.2–0.6 mm wide. Corollas of disk florets 2.1–3.2 mm long. Bases of cauline leaves conspicuously auriculate. ..... ***E. philadelphicus***
    3. Lower cauline leaves 2–10 mm wide; linear to narrowly lanceolate or narrowly spathulate.
        5. Pappus of ray and disk florets in 1-whorl [outer bristles reduced to a cartilaginous crown, hence pappus falsely appearing to have bristles in 1-whorl]. ..... ***E. bellidiastrum***
        5. Pappus of ray and disk florets in 2-whorls, inner whorl of slender bristles, outer whorl of scales or stout bristles.
            6. Outer whorl of pappus of ray and disk florets of scales.
                7. Corollas of disk florets 1.8–2.3 mm long. Achenes 0.9–1.2 mm long. Ray florets 75–150. Plants perennials; from fibrous roots. ..... ***E. divergens***
                7. Corollas of disk florets 1.2–1.6 mm long. Achenes 0.7–0.9 mm long. Ray florets 44–70. Plants annuals; from taproots. ..... ***E. geiseri***
            6. Outer whorl of pappus of ray and disk florets of stout bristles.
                8. Middle cauline leaves 3–5 mm wide. ..... ***E. tenuis***
                8. Middle cauline leaves 1–2 or rarely 3 mm wide.
                9. Achenes glabrous; nerves 8–14. ..... ***E. canus***
                9. Achenes pubescent; nerves 2.
                10. Margins of cauline leaves pinnately lobed or dissected. ..... ***E. divergens***
                10. Margins of cauline leaves entire or dentate or with 1 or 2 pairs of coarse lobes. [The following four species are difficult to distinguish due to integration and polyploidy. Many authors have suggested that this is one species complex.]
                11. Plants first erect, later developing stolons and forming mats.
                12. Stems densely hirsutulous. Plantlets at ends of stolons typically absent. ..... ***E. tracyi***
                12. Stems strigose. Plantlets at ends of stolons typically present. ..... ***E. flagellaris***
                11. Plants erect to ascending, not forming mats.
                13. Ray florets usually 24–65. Stem hairs spreading. Phyllaries in 2 or 3 series. ..... ***E. modestus***
                13. Ray florets 75–150. Stem hairs appressed or appressed-ascending. Phyllaries in 3 or 4 series. ..... ***E. divergens***

Eupatorium C. Linnaeus

1. Leaf margins pinnately dissected.
    2. Leaf lobes capillary; 0.3–0.5 mm wide. Lower cauline leaves alternate. ..... ***E. capillifolium***
    2. Leaf lobes linear; 1–3 mm wide. Lower cauline leaves opposite or subopposite. ..... ***E. compositifolium***
1. Leaf margins entire or toothed.
    3. Leaves petiolate; petioles 8–25 mm long. ..... ***E. serotinum***
    3. Leaves perfoliate or sessile or subsessile; petioles absent or less than 2 mm long.
        4. Leaves perfoliate. Disk florets 10–20. Longest mid-cauline leaves 9–15 cm long. ..... ***E. perfoliatum***
        4. Leaves sessile or subsessile. Disk florets 4–7. Longest mid-cauline leaves 2–9 cm long.

5. Leaves deltoid-ovate to orbicular; bases truncate or broadly acute. ..... ***E. rotundifolium***
5. Leaves lanceolate or elliptic or oblong or oblanceolate; bases acuminate or narrowly cuneate.
6. Leaves oblong to oblanceolate; apices rounded to obtuse. Involucres 2–3 mm long. ..... ***E. semiserratum***
6. Leaves lanceolate to elliptic; apices acute. Involucres 4–6 mm long. ..... ***E. altissimum***

Eurybia (A.H.G de Cassini) A.H.G. de Cassini — Southern Prairie Aster

One species. ..... ***E. hemispherica***
(= *Aster hemisphericus, A. paludosus*)

Euthamia (T. Nuttall) A.H.G. de Cassini — Goldentop, Flat-Topped Goldenrod

1. Leaves conspicuously 5-nerved; not resinous gland-dotted. Heads sessile or subsessile in small clusters. Plants of seeps and bogs. ..... ***E. graminifolia***
1. Leaves conspicuously 1- or 3-nerved; resinous gland-dotted at 15X magnification. Heads pedunculate. Plants of mesic prairies and floodplains.
2. Resinous glands borne on surfaces; glistening; punctate. Phyllaries strongly glutinous; shiny. ..... ***E. gymnospermoides***
2. Resinous glands borne below surfaces; not glistening; not punctate. Phyllaries sparsely glutinous; dull. ..... ***E. leptocephala***

Eutrochium C.S. Rafinesque — Joe Pye Weed

1. Corollas of disk florets 3.5–4.5 mm long. Internodes purplish green; hollow. ..... ***E. fistulosum***
(= *Eupatorium fistulosum, Eupatoriadelphus fistulosus*)
1. Corollas of disk florets 5.5–7.5 mm long. Internodes green; solid. ..... ***E. purpureum***
(= *Eupatorium purpureum, Eupatoriadelphus purpureus*)

Facelis A.H.G. de Cassini — Trampweed

One species. ..... ***F. retusa***

Flaveria A.L. de Jussieu — Yellowtops

One species. ..... ***F. campestris***

Fleischmannia C.H. Schultz-Bipontinus — Thoroughwort

One species. ..... ***F. incarnata***
(= *Eupatorium incarnatum*)

Gaillardia A.D. Fougeroux de Bondaroy — Indian Blanket, Blanket Flower

1. Ray florets absent or shorter than phyllaries and inconspicuous. Leaves basal. ..... ***G. suavis***
1. Ray florets present; longer than phyllaries. Leaves cauline.
2. Leaves all pinnatifid. Awns of pappus scales 1/4–1/2 length of bodies of scales. ..... ***G. pinnatifida***
2. Leaves all entire to toothed, or only the lowest incised or pinnatifid. Awns of pappus scales as long as or longer than bodies of scales.
3. Ray florets distally yellow or orangish yellow and basally red or orange-red or purplish red. Receptacles bearing stiff seta equal to or longer than mature achenes. ..... ***G. pulchella***
3. Ray florets all yellow or rarely yellow with small reddish spot at base. Receptacles naked or bearing soft, tooth-like seta much shorter than mature achenes. ..... ***G. aestivalis***
(= *G. lanceolata*, *G. fastigiata*, *G. serotina*)

Galinsoga H. Ruiz Lopez & J.A. Pavon — Quickweed

1. Phyllaries deciduous; margins herbaceous. Corolla lobes of ray florets equal. Apices of inner pales entire or toothed. ..... ***G. quadriradiata***

1. Phyllaries persistent: margins scarious. Corolla lobes of ray florets unequal, central lobe longer than 2 lateral lobes. apices of inner pales deeply divided. ..... ***G. parviflora***

Gamochaeta H.A. Weddell Everlasting[1]

1. Leaf surfaces conspicuously different; adaxial surfaces green, glabrous or glabrate or arachnoid; abaxial surfaces white or greenish white, densely lanate or densely tomentose.
  2. Involucres turbinate-cylindrical. Inner phyllaries triangular-lanceolate; apices acute. Perfect florets 3–4. ..... ***G. purpurea***
  (= *Gnaphalium purpureum)*
  2. Involucres campanulate. Inner phyllaries elliptic-oblong to oblong; apices truncate-rounded and apiculate. Perfect florets 4–6. ..... ***G. argyrinea***
1. Leaf surfaces similar, both green or gray-green, sparsely tomentose or arachnoid.
  3. Upper cauline leaves spathulate to obovate; apices 4–16 mm wide; rounded with minute mucro. Bracts subtending lower heads spathulate to oblanceolate.. ..... ***G. pensylvanica***
  (= *Gnaphalium pensylvanicum*)
  3. Upper cauline leaves linear to linear-oblanceolate; apices 2–5 mm wide; acute. Bracts subtending lower heads linear to oblanceolate or oblanceolate-oblong.
    4. Involucres 2.5–3 mm long; bases glabrous or glabrate. Phyllaries in 3–5 series; outer 1/2–-2/3 length of inner. ..... ***G. antillana***
    (= *Gnaphalium falcatum*)
    4. Involucres 2.4–3.5 mm long; bases arachnoid. Phyllaries in 5–7 series; outer 1/3–1/2 length of inner. ..... ***G. calviceps***
    (= *Gnaphalium falcatum*)

[1] Adapted from key by Guy Nesom

Grindelia C.L. von Willdenow Gumweed

1. Pappus of capillary bristles. ..... ***G. ciliata***
(= *Prionopsis ciliata, Haplopappus ciliatus, G. papposa*)
1. Pappus of scales or awns.
  2. Ray florets absent. ..... ***G. squarrosa***
  2. Ray florets present.
    3. Phyllaries ascending or spreading. Pappus awns of disk florets as long as or longer than corollas of disk florets. Teeth of leaf margins spinose or narrowly acute. ..... ***G. lanceolata***
    3. Phyllaries conspicuously recurved. Pappus awns of disk florets shorter than corollas of disk florets. Teeth of leaf margins crenate or broadly acute. ..... ***G. squarrosa***

Gutierrezia M. Lagasca y Segura Broomweed, Snakeweed

1. Plants perennial subshrubs; from woody rootstocks. Stems branching in basal half. Heads cylindrical. Disk florets 2–6. ..... ***G. sarothrae***
(= *Xanthocephalum sarothrae*)
1. Plants annual herbs; from taproots. Stems not branching in basal half. Heads hemispheric to turbinate or campanulate. Disk florets 10–25. .....***G. texana***
(= *Xanthocephalum texanum*)

Haploësthes A. Gray False Broomweed

One species. ..... ***H. greggii***

Helenium C. Linnaeus Sneezeweed

1. Ray florets absent. ..... ***H. flexuosum***
1. Ray florets present.
  2. Leaves not decurrent; filiform to linear. ..... ***H. amarum***
  (= *H. badium*)
  2. Leaves decurrent; elliptic, or linear to lanceolate.
    3. Corolla lobes of disk florets yellow. ..... ***H. autumnale***
    3. Corolla lobes of disk florets reddish or purplish brown.

4. Mature heads, excluding rays, 10–12 mm wide. Plants perennials; from branching crowns and fibrous roots. Pappus scales awned. Ray florets neutral. ..... ***H. flexuosum***
4. Mature heads, excluding rays, 5–7 mm wide. Plants annuals; from taproots. Pappus scales not awned. Ray florets pistillate.
5. Margins of upper leaves serrate or serrate-undulate. Corollas of ray florets 2.5–5 mm long. Pappus scales 0.3–0.5 mm long; 0.2–0.3 mm wide. ..... ***H. microcephalum***
5. Margins of upper leaves entire. Corollas of ray florets 5.5–15 mm long. Pappus scales absent or 0.1–0.3 mm long; 0.1–0.2 mm wide.
6. Corollas of disk florets 4-lobed. ..... ***H. quadridendatum***
6. Corollas of disk florets 5-lobed. ..... ***H. elegans***

Helianthus C. Linnaeus Sunflower

1. Lobes of disk florets reddish brown or reddish purple.
2. Leaves linear to linear-lanceolate.
3. Stems and leaves blue-green; glaucous. Leaves 3-veined from near base. Plants of Panhandle and western 1/4 of body of state. ..... ***H. ciliaris***
3. Stems and leaves green; not glaucous. Leaves 1-veined from near base. Plants of eastern 1/3 of body of state.
4. Stems glabrous. Leaves conduplicate; adaxial surfaces of leaves glabrous. ..... ***H. salicifolius***
4. Stems hispid or scaberulous. Leaves revolute; adaxial surfaces pubescent.
5. Leaves usually 2-12 mm wide (rarely to 10 mm); rhizomes absent or few. ..... ***H. angustifolius***
5. Leaves 10-40 mm wide; rhizomes well developed..... ***H. simulans***
2. Leaves ovate or ovate-oblong to lanceolate.
6. Plant annuals; from taproots. Receptacles flat or flattened.
7. Phyllaries broadly ovate; apices attenuate; margins ciliate. Pales purplish brown. Largest cauline leaves 5–15 cm wide; ovate; bases cordate. ..... ***H. annuus***
7. Phyllaries lanceolate; apices acute; margins not ciliate. Pales white or yellow. Largest cauline leaves 2–4 cm wide; lanceolate; bases cuneate to truncate. ..... ***H. petiolaris***
6. Plants perennials; from rhizomes or short creeping rootstocks or erect branching crowns. Receptacles convex or low conical.
8. Stems and leaves blue-green; glaucous. Leaf margins conspicuously ciliate. Plants from long slender rhizomes; colonial. ..... ***H. ciliaris***
8. Stems and leaves green or gray-green; not glaucous. Leaf margins not ciliate. Plants from short rootstocks or branching crowns; not colonial.
9. Pappus of 2 awns and 2 scales. Phyllaries narrowly ovate to lanceolate; apices acute. Leaves lanceolate. ..... ***H. pauciflorus*** (= *H. laetiflorus, H. rigidus*)
9. Pappus of 2 awns. Phyllaries broadly oval or oval-oblong; apices rounded. Leaves rounded-ovate to suborbicular. ..... ***H. silphioides***
1. Lobes of disk florets yellow.
10. Leaves linear-lanceolate to narrowly lanceolate.
11. Leaf blades conduplicate; gray-green. Arrangement of heads racemose or spicate. ..... ***H. maximiliani***
11. Leaf blades plane (margins may be revolute); green. Arrangement of heads paniculate or corymbiform.
12. Petioles 10–30 mm. Leaf margins plane. Involucres 15-25 mm in diameter.
13. Leaves mostly alternate. Apices of phyllaries attenuate-subulate. ..... ***H. grosseserratus***
13. Leaves mostly opposite. Apices of phyllaries narrowly acute to short attenuate. ..... ***H. nuttallii***
12. Petioles 0-3 mm. Leaf margins revolute. Involucres 10-18 mm in diameter..... ***H. simulans***
10. Leaves ovate to subdeltoid or broadly lanceolate.
14. Leaves sessile.
15. Stems and leaves whitish; densely villous. Abaxial surfaces of leaves with translucent to pale dots. Phyllaries densely villous; appearing white; apices acute. ..... ***H. mollis***
15. Stems and leaves greenish; scabrous or hirsute or scaberulous. Abaxial surfaces of leaves with golden dots. Phyllaries scabrous or hirsute; green; apices attenuate. ..... ***H. divaricatus***

14. Leaves petiolate.
17. Upper stems glabrous or glabrate.
18. Leaves thick and firm; margins entire to sparsely serrate;
adaxial surfaces pustulate hairs . ..... ***H. strumosus***
18. Leaves thin and flexible; margins coarsely serrate;
adaxial surfaces scabrous to glabrate. ..... ***H. decapetalus***
17. Upper stems scabrous, strigose to strigulose or hirsute.
19. Phyllaries ovate to ovate-lanceolate to elliptic;
apices acute or short acuminate. ..... ***H. pauciflorus***
(= *H. laetiflorus, H. rigidus*)
19. Phyllaries linear to narrowly lanceolate;
apices long acuminate to attenuate.
20. Longest petioles 2–4 cm long; winged. Tubers present. ..... ***H. tuberosus***
20. Longest petioles 1–2 cm long; not winged. Tubers absent.
21. Pales 5–8 mm long.
Achenes 3–3.6 mm long. Disk corollas 4.3–5.5 mm long. ..... ***H. divaricatus***
21. Pales 7–10 mm
long. Achenes 4–4.5 mm long. Disk corollas 5.5–6.5 mm long. ..... ***H. hirsutus***

Heliopsis C.H. Persoon Ox-Eye

One species. ..... ***H. helianthoides***

Heterotheca A.H.G. de Cassini Golden Aster, Gold Aster

1. Upper cauline leaves lanceolate to ovate; bases cordate to clasping.
Ray florets 3–5 mm long. Pappus of ray florets absent. ..... ***H. subaxillaris***
(= *H. latifolia*)
1. Upper cauline leaves linear to oblanceolate; bases cuneate to attenuate.
Ray florets 8–14 mm long. Pappus of ray florets present.
2. Leaves and stems green; strigose-hispid; glands present, abundant, stipitate or sessile.
Largest leaves linear to narrowly spathulate; 2–5 mm wide. .....***H. stenophylla***
(= *Chrysopsis stenophylla*, *C. villosa* var. *stenophylla*)
2. Leaves and stems gray-green; densely sericeous or canescent; glands absent or inconspicuous,
sparse, sessile. Largest leaves oblanceolate to broadly spathulate; 5–9 mm wide.
3. Leaves and stems canescent. Ray florets 12–20; 6–8 mm long.
Involucres 5–7 mm long. Plants from rhizomes. ..... ***H. canescens***
(= *Chrysopsis canescens*, *C. villosa* var. *canescens*)
3. Leaves and stems sericeous. Ray florets 20–35; 8–12 mm long.
Involucres 8–12 mm long. Plants from woody caudices. ..... ***H. villosa***
(= *Chrysopsis villosa*, *C. villosa* var. *villosa*)

Hieracium C. Linnaeus Hawkweed

1. Hairs of lower stems 10–20 mm long. Plants of prairies. Florets 30–60. Phyllaries 20–35. ..... ***H. longipilum***
1. Hairs of lower stems 3–8 mm long or absent. Plants of woods. Florets 12–20. Phyllaries 8–15. .....***H. gronovii***

Hymenopappus C.L. L'Heritier

1. Florets yellow. Plants of sandy soils. ..... ***H. flavescens***
1. Florets white. Plants of clay and loam soils.
2. Basal rosettes typically 2 or more per plant. Taproots woody.
Plants perennials from branching crowns. ..... ***H. filifolius***
2. Basal rosettes 1 per plant. Taproots not woody. Plants annuals,
not from branching crowns.
3. Basal leaves entire or 1-pinnately lobed or dissected with linear lobes 3–5 mm wide.
Phyllaries white in distal 1/2–1/3. ..... ***H. scabiosaeus***
3. Basal leaves 2-pinnately dissected with filiform lobes 0.5–1.5 mm wide.
Phyllaries white only at apices. ..... ***H. tenuifolius***

Hymenoxys A.H.G. de Cassini Bitterweed

1. Annuals. Leaves glabrous or glabrate. Florets equaling phyllaries at anthesis.
   Achenes dimorphic; outer truncate, inner beaked. ..... ***H. glabra***
1. Perennials. Leaves hirsute. Florets surpassing phyllaries at anthesis.
   Achenes monomorphic; all beaked. ..... ***H. radicata***

Hypochaeris C. Linnaeus Cat's Ear

One species. ..... ***H. glabra***

Ionactis E.L. Greene Flaxleaf Whitetop Aster

One species. ..... ***I. linariifolia***
(= *Aster linariifolius*)

Iva C. Linnaeus Marsh-Elder, False Ragweed

1. Leaves broadly ovate to lanceolate; 30–100 mm wide. Phyllaries free; involucres not cup-like. ..... ***I. annua***
   (= *I. ciliata*)
1. Leaves linear to oblong or narrowly lanceolate or elliptic or spathulate; 1–12 mm wide.
   Phyllaries fused; involucres cup-like.
   2. Plants annuals; from taproots. Bracts subtending heads linear; 1 mm wide.
      Pistillate florets 1 or 2 per head. Leaves linear to oblong or narrowly lanceolate. ..... ***I. angustifolia***
   2. Plants perennials; from creeping rootstocks. Bracts subtending heads oblong to
      oblong-lanceolate; 2–4 mm wide. Pistillate florets 5–8 per head. Leaves narrowly
      lanceolate to elliptic or spathulate. ..... ***I. axillaris***

Krigia J.C.D. von Schreber Dwarf Dandelion

1. Pappus absent or minute crowns.
   2. Achenes columnar. Phyllary midnerves conspicuous; keeled. ..... ***K. wrightii***
   2. Achenes fusiform. Phyllary midnerves inconspicuous; not keeled. ..... ***K. caespitosa***
      (= *K. oppositifolia*)
1. Pappus of scales and capillary bristles.
   3. Plants caulescent, cauline leaves sessile, clasping. Heads multiple at ends of branches. ..... ***K. biflora***
   3. Plants acaulescent. Heads solitary at ends of scapes.
      4. Tubers present. Phyllaries 12–16; 7–15 mm long. Pappus bristles 25–40. Pappus scales 10. ..... ***K. dandelion***
      4. Tubers absent. Phyllaries 4–13; 4–6.5 mm long. Pappus bristles 5. Pappus scales 5.
         5. Phyllaries 4–8; ovate; keeled in fruit; ribbed in fruit; erect after achenes have
            fallen. Corollas 3.5–3.8 mm long. Pappus scales 0.4–0.6 mm long; flabellate. ..... ***K. occidentalis***
         5. Phyllaries 10; narrowly lanceolate to ovate-lanceolate; not keeled in fruit;
            not ribbed in fruit; reflexed after achenes have fallen. Corollas 4–7 mm long.
            Pappus scales 0.6–1 mm long; rounded-truncate. ..... ***K. virginica***

Lactuca C. Linnaeus Lettuce

1. Corollas blue or violet or white.
   2. Beaks of mature achenes 2–4 mm long. Achenes conspicuously 1-nerved
      on each face, 2 faint lateral nerves sometimes present. Sap salmon to brown. ..... ***L. ludoviciana***
   2. Beaks of mature achenes absent, or if present less than 1 mm long. Achenes
      conspicuously 3- to 6-nerved on each face. Sap white. ..... ***L. floridana***
1. Corollas yellow.
   3. Achenes conspicuously 3- to 7-nerved on each face. Sap white.
      4. Mid and upper cauline leaves linear; margins not spinose; abaxial
         midribs glabrous or hirsute. Achenes glabrous at beak bases. ..... ***L. saligna***
      4. Mid and upper cauline leaves lanceolate-ovate to oblong; margins spinose;
         abaxial midribs hispid-spinose. Achenes hispid-spinulose at beak bases. ..... ***L. serriola***
         (= *L. scariola*)
   3. Achenes conspicuously 1-nerved on each face, 2 faint lateral
      nerves sometimes present. Sap salmon to brown.

5. Abaxial midribs of leaves glabrous. Phyllaries 6–12 mm long. Achenes including beaks 4.5–6 mm long. Pappus bristles 5–6 mm long. Abaxial surfaces of corollas gradually turing brick red. ..... ***L. canadensis***
5. Abaxial midribs of leaves spinose. Phyllaries 10–20 mm long. Achenes including beaks 7–10 mm long. Pappus bristles 8–9 mm long. Abaxial surfaces of corollas remaining yellow. ..... ***L. ludoviciana***

Leucanthemum P. Miller — Ox-Eye Daisy

One species. ..... ***L. vulgare***
(= *Chrysanthemum leucanthemum*)

Liatris J. Gaertner ex J.C.D. von Schreber — Blazing Star

1. Pappus bristles barbellate.
  2. Basal leaves linear; 4–5 mm wide. Florets 5–12 per head. Phyllaries not cucullate; apices recurved. Inner surfaces of corolla tubes glabrous. ..... ***L. pycnostachya***
  2. Basal leaves oblanceolate or rhombic-lanceolate; 10–25 mm wide. Florets 20–40 per head. Phyllaries cucullate; apices straight. Inner surfaces of corolla tubes pilose.
    3. Stems with retrorse hairs. Corollas 10–15 mm long. Pappus bristles 8–10 mm long. ..... ***L. squarrulosa***
    (= *L. scabra*)
    3. Stems without retrorse hairs. Corollas 8–10 mm long. Pappus bristles 7–8 mm long. ..... ***L. aspera***
1. Pappus bristles plumose.
  4. Florets 20–60 per head. Heads not crowded; not overlapping or overlapping less than 1/2 length. ..... ***L. squarrosa***
  4. Florets 3–8 per head. Heads crowded; overlapping more than 1/2 length.
    5. Inner phyllaries petaloid. Inner surfaces of corolla tubes glabrous. ..... ***L. elegans***
    5. Inner phyllaries herbaceous. Inner surfaces of corolla tubes pilose.
      6. Pappus bristles 9–11 mm long. Rootstocks elongate; branched. ..... ***L. punctata***
      6. Pappus bristles 6–7 mm long. Rootstocks globose; not branched.
        7. Inner phyllaries mucronate to cuspidate. Leaves inconspicuously punctate; flexible. ..... ***L. angustifolia***
        7. Inner phyllaries acute to acuminate. Leaves conspicuously punctate; stiff.
          8. Lower and middle cauline leaves similar in length and width. Phyllaries 11–18; in 4- to 6-series; outermost 1/5–1/3 length of inner. Inner phyllaries 7–9 mm long. ..... ***L. punctata***
          (= *L. mucronata*)
          8. Lower cauline leaves 2–3.5 times longer than middle cauline leaves; 1.5–2 times wider. Phyllaries 6–11; in 2- or 3-series; outermost 1/2–2/3 length of inner. Inner phyllaries 11–12 mm long. ..... ***L. aestivalis***

Lindheimera A. Gray & G. Engelmann — Lindheimer Daisy

One species. ..... ***L. texana***

Lorandersonia L.E. Urbatsch, R.P. Roberts & K.M. Neubig — Rabbitbush

One species. ..... ***L. baileyi***
(= *Chrysothamnus pulchellus*)

Lygodesmia G. Don — Skeletonweed

1. Lowest leaves 10–20 cm long. Basal rosette present; fugacious. Phyllaries 15–20 mm long. Florets 8–12. Achenes 12–15 mm long. Pappus bristles 10–15 mm long. ..... ***L. texana***
(= *L. aphylla* var. *texana*)
1. Lowest leaves 1–4 cm long. Basal rosette absent. Phyllaries 12–15 mm long. Florets 5. Achenes 6–10 mm long. Pappus bristles 6–9 mm long. ..... ***L. juncea***

Machaeranthera C.G.D. Nees von Esenbeck — Tansy Aster

One species. ..... ***M. tanacetifolia***
(= *Aster tanacetifolius*)

Marshallia J.C.D. von Schreber — Barbara's Buttons[1]

One species. ..... ***M. caespitosa***

Matricaria C. Linnaeus — Chamomille

One species. ..... ***M. discoidea***
(= *M. matricarioides*)

Melampodium C. Linnaeus — Plains Blackfoot

One species. ..... ***M. leucanthum***

Mikania C.L. von Willdenow — Hempvine

One species. ..... ***M. scandens***

Nothocalais (A. Gray) Greene — Prairie Dandelion

One species. ..... ***N. cuspidata***
(= *Agoseris cuspidata*)

Onopordum C. Linnaeus — Scotch Thistle

One species. ..... ***O. acanthium***

Packera Á. Löve & D. Löve — Groundsel[1]

1. Blades of basal leaves cordate or reniform. ..... ***P. aurea***
(= *Senecio aureus*)

1. Blades of basal leaves orbicular or oblong to obovate or spathulate.
  2. Cauline leaves pinnatisect or pinnatifid.
    3. Lower stems and basal leaves floccose-tomentose. Plants perennials. ..... ***P. plattensis***
(= *Senecio plattensis*)
    3. Lower stems and basal leaves glabrous. Plants annuals.
      4. Stems from a tuft of thin fibrous roots. Terminal lobes of lower cauline leaves entire; 10–30 mm wide. Plants of open woodlands. ..... ***P. glabella***
(= *Senecio glabellus*)
      4. Stems from a distinct taproot [well-developed lateral roots may be present]. Terminal lobes of lower cauline leaves dissected or lobed; ultimate segments 2–10 mm wide. Plants of open fields and roadsides. ..... ***P. tampicana***
(= *Senecio imparipinnatus*)
  2. Cauline leaves entire to deeply and irregularly dentate.
    5. Blades of basal leaves obovate to orbicular. Stolons present. ..... ***P. obovata***
(= *Senecio obovatus*)
    5. Blades of basal leaves of various shapes, but not obovate to orbicular. Stolons absent.
      6. Basal leaves narrowly spathulate; apices 3-toothed; 3–5 mm wide; thickened; succulent. Plants of Panhandle. ..... ***P. tridenticulata***
(= *Senecio tridenticulatus*)
      6. Basal leaves ovate to oblong; apices not 3-toothed; 10–20 mm wide; thin; not succulent. Plants of body of state. ..... ***P. tomentosa***
(= *Senecio tomentosus*)

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[1]Adapted from a key contributed by T.M. Barkley

Palafoxia M. Lagasca y Segura

1. Ray florets present. ..... ***P. sphacelata***
1. Ray florets absent. [Corollas of outer disk florets may be enlarged, hence heads falsely appearing to have ray florets].
  2. Pappus scales obovate; 0.3–2 mm long. Plants of calcareous soils. ..... ***P. callosa***
  2. Pappus scales lanceolate; 1–7 mm long. Plants of sandy soils. ..... ***P. rosea***
(= *P. texana*)

Parthenium C. Linnaeus Feverfew

1. Lower and mid-cauline leaves pinnatifid. Mature heads 3–4 mm wide.
   Pappus of scales; 2. Plants annuals from slender taproot. ..... ***P. hysterophorus***
1. Lower and mid-cauline leaves crenate to serrate. Mature heads 6–10 mm wide.
   Pappus of awns; 2 or 3. Plants perennials from tuberous, woody root. ..... ***P. integrifolium***

Pectis C. Linnaeus

One species. ..... ***P. angustifolia***

Pericome A. Gray

One species. ..... ***P. caudata***

Picradeniopsis P.A. Rydberg

1. Pappus scales ovate; midnerves inconspicuous at apices, not
   protruding as bristles. Achenes glandular. ..... ***P. oppositifolia***
   (= *Bahia oppositifolium*)
1. Pappus scales lanceolate; midnerves conspicuous at apices,
   protruding as bristles. Achenes hispidulous. ..... ***P. woodhousei***
   (= *Bahia woodhousii*)

Pityopsis T. Nuttall Grass-Leaved Golden Aster

One species. ..... ***P. graminifolia***
(= *Chrysopsis graminifolia, C. nervosa*, *C. microcephala*)

Plectocephalus D. Don Basketflower

One species. ..... ***P. americanus***
(= *Centaurea americana*)

Pluchea A.H.G. de Cassini Camphorweed

1. Corollas of disk florets white. Upper cauline leaves sessile; bases clasping. ..... ***P. foetida***
1. Corollas of disk florets pink to purple. Upper cauline leaves petiolate; bases cuneate.
   2. Apices of inner phyllaries glabrous or glabrate. Largest leaves 4–7 cm wide; 10–15 cm long. ..... ***P. camphorata***
   2. Apices of inner phyllaries pubescent. Largest leaves 2.5–4 cm wide; 6–10 cm long. ..... ***P. odorata***
   (= *P. pupurascens*)

Polymnia C. Linnaeus Leafcup, Bear's Foot

One species. ..... ***P. canadensis***

Prenanthes C. Linnaeus Rattlesnakeroot, White Lettuce

1. Upper cauline leaves petiolate; ovate; bases cordate to hastate. Peduncles reflexed,
   heads nodding. Phyllaries glabrous. Florets 5 or 6. Plants of southeastern 1/4 of state. ..... ***P. altissima***
   (= *Nabalus altissimus*)
1. Upper cauline leaves sessile; lanceolate; bases truncate to broadly acute. Peduncles straight
   heads ascending to erect. Phyllaries pubescent. Florets 8–19. Plants of northeastern 1/4 of state. ..... ***P. aspera***
   (= *Nabalus asperus*)

Pseudoclappia P.A. Rydberg False Clap Daisy

One species. ..... ***P. arenaria***

Pseudognaphalium M.E. Kirpicznikov Cudweed, Everlasting

1. Adaxial surfaces of mature leaves green; sparsely puberulent-glandular.
   2. Upper stems tomentose-lanate. ..... ***P. obtusifolium***
   (= *Gnaphalium obtusifolium*)

2. Upper stems with glandular hairs, but not tomentose-lanate. ..... ***P. helleri***
(= *Gnaphalium helleri*)

1. Adaxial surfaces of mature leaves white- or gray-green; tomentose-lanate.
3. Pistillate florets 160–200. Perfect florets 8–28. Phyllaries broadly elliptic. ..... ***P. stramineum***
(= *Gnaphalium chilense*)
3. Pistillate florets 16–44. Perfect florets 1–6. Phyllaries narrowly elliptic. ..... ***P. canescens***
(= *Gnaphalium wrightii*)

Psilostrophe A.P. de Candolle Paperflower

One species. ..... ***P. villosa***

Pyrrhopappus A.P. de Candolle Morning Star

1. Plants acaulescent, rarely with 1 or 2 bracts on scapes; perennials from a vertical subterranean stem. Root tuber present 3–10 cm below surface. Leaves in basal rosettes. ..... ***P. grandiflorus***
(= *P. scaposus*)

1. Plants caulescent; annuals from slender roots. Root tubers absent. Leaves primarily cauline, basal leaves ephemeral.
2. Leaves toothed to entire, pair of basal lobes present or absent. Stems glabrous. ..... ***P. carolinianus***
2. Leaves pinnatifid. Stems pubescent. ..... ***P. pauciflorus***
(= *P. geiseri, P. multicaulis*)

Ratibida C.S. Rafinesque Prairie Coneflower, Mexican Hat[1]

1. Heads cylindrical. Pappus of 1 or 2 teeth. ..... ***R. columnifera***
1. Heads globose. Pappus absent or coroniform.
2. Corollas of ray florets; yellow with red-brown bases or red-brown; 2–9 mm long. Pappus coroniform. Plants from taproots. ..... ***R. tagetes***
2. Corollas of ray florets yellow; 20–60 mm long. Pappus absent. Plants from fibrous roots. ..... ***R. pinnata***

[1] Treatment contributed by Wayland L. Ezell

Rayjacksonia R.L. Hartman & M.A. Lane Viscid Tansy Aster

One species. ..... ***R. annua***
(= *Haplopappus phyllocephalus var. annua*)

Rhaponticum S. Valliant Russian Knapweed

One species. ..... ***R. repens***
(= *Acroptilon repens, Centaurea repens*)

Rudbeckia C. Linnaeus Black-Eyed Susan, Coneflower[1]

1. Leaf bases auriculate-clasping.
2. Plants annuals; from taproots; 0.3–0.7 m tall at anthesis. Ray florets subtended by pales. Pappus absent or minutely coroniform. Achenes terete. ..... ***R. amplexicaulis***
(= *Dracopis amplexicaulis*)
2. Plants perennials; from short rhizomes; 1.5–2.5 m tall at anthesis. Ray florets not subtended by pales. Pappus of 4–6 scales. Achenes 4-angled. ..... ***R. maxima***
1. Leaf bases acute to cuneate.
3. Leaves 3- to 7-lobed or parted, or pinnatifid.
4. Upper stems glabrous or glabrate. Lower cauline leaves 3- to 7-parted or pinnatifid; adaxial surfaces glabrous. Disk florets yellow or greenish-yellow. Apices of pales rounded or truncate. ..... ***R. laciniata***
4. Upper stems hirsute or strigose or tomentose. Lower cauline leaves 3-lobed; adaxial surfaces hirsute or strigose or tomentose. Disk florets dark purple to brown. Apices of pales acute or obtuse.
5. Lower stems hirsute or strigose. Leaf surfaces hirsute or strigose. Apices of pales glabrous; spinescent. ..... ***R. triloba***

5. Lower stems tomentose. Leaf surfaces short tomentose.
Apices of pales viscid-canescent; not spinescent. ..... ***R. subtomentosa***

3. Leaves entire or toothed.
6. Stems hispid or hirsute or villous. Basal leaves lanceolate or oblanceolate or linear or oblong.
7. Stems hispid or hirsute. Basal leaves lanceolate or oblanceolate; hispid or hirsute. Apices of pales viscid-canescent. Pappus absent. Style branches elongate; subulate. ..... ***R. hirta***
7. Stems villous. Basal leaves linear or oblong; villous. Apices of pales glabrous. Pappus coroniform. Style branches short; blunt. ..... ***R. missouriensis***
6. Stems glabrous or glabrate. Basal leaves ovate or elliptic or orbicular.
8. Flowering plants 1.5–2.5 m tall. Stems glaucous. Leaves glabrous; glaucous. Mature heads columnar; 4–8 cm long. Phyllaries glabrous. ..... ***R. maxima***
8. Flowering plants 0.3–1 m tall. Stems not glaucous. Leaves strigose or hirsute; not glaucous. Mature heads ovoid or conical; 1.5–2.5 cm long. Phyllaries pubescent.
9. Leaves strigose. Ray florets 1–2 cm long; spreading. Apices of pales glabrous or sparsely strigose; margins ciliate. ..... ***R. fulgida***
9. Leaves hirsute. Ray florets 3–6 cm long; drooping. Apices of pales viscid-canescent; margins not ciliate. ..... ***R. grandiflora***

[1] Treatment contributed by Wayland L. Ezell

Scorzonera C. Linnaeus Viper's Grass

One species. ..... ***S. laciniata***

Senecio C. Linnaeus Groundsel[1]

1. Ray florets absent. Leaves obovate to oblanceolate.
Minute outer phyllaries present; apices conspicuously black. ..... ***S. vulgaris***
1. Ray florets present. Leaves filiform to linear or oblong or lanceolate.
Minute outer phyllaries absent, or if present, apices green to grayish.
2. Plants annual herbs; from taproot surrounded by fibrous roots. Leaves lanceolate; margins dentate to subentire. Minute outer phyllaries present, apices green to grayish. ..... ***S. ampullaceus***
2. Plants subshrubs or shrubs; from woody rootstocks. Leaves filiform to linear or oblong; margins entire or divided into linear lobes. Minute outer phyllaries absent, or if present, apices green.
3. Leaves white-tomentose; filiform to linear; margins entire or with a few linear lobes. ..... ***S. flaccidus***
(= *S. douglasii*, *S. longilobus*)
3. Leaves green; glabrous or glabrate; oblong; margins divided into numerous linear lobes. ..... ***S. riddellii***

[1] Treatment contributed by T.M. Barkley

Shinnersoseris S. Tomb Beaked Skeltonweed

One species. ..... ***S. rostrata***
(= *Lygodesmia rostrata*)

Silphium C. Linnaeus Rosinweed

1. Leaves connate-perfoliate. Stems 4-sided. ..... ***S. perfoliatum***
1. Leaves free, not connate-perfoliate. Stems terete or angular.
2. Leaves pinnatifid or laciniate. Basal leaves 25–50 cm long. ..... ***S. laciniatum***
2. Leaves entire or toothed. Basal leaves 6–15 cm long.
3. Peduncles and upper stems glabrous to velutinous or scabrous.
Heads excluding ray corollas 15–25 mm wide. ..... ***S. integrifolium***
(= *S. speciosum*)

3. Peduncles and upper stems coarsely hispid.
Heads excluding ray corollas 10–15 mm wide. ..... ***S. asteriscus***
(= *S. asperrimum*, *S. gatesii*, *S. radula*)

Silybum M. Adanson Milkthistle

One species. ..... ***S. marianum***
(= *Carduus marianus*)

Smallanthus K.K. Mackenzie ex J.K. Small Hairy Leafcup

One species. ..... ***S. uvedalia***
(= *Polymnia uvedalia*)

Solidago C. Linnaeus Goldenrod

1. Inflorescences corymbose.
  2. Leaves ovate; scabrous. ..... ***S. rigida***
  2. Leaves linear to linear-lanceolate; glabrous or glabrate.
    3. Ray florets 1–4; yellow; limbs 3–5 mm long. Disk florets 7–13; yellow. ..... ***S. nitida***
    3. Ray florets 10–20; white; limbs 7–7.5 mm long. Disk florets 30–36; white. ..... ***S. ptarmicoides***
    (= *Unamia alba, Oligoneuron album, Aster ptarmicoides*)
1. Inflorescences racemose to paniculate; cylindrical to broadly pyramidal.
  4. Inflorescences axillary. Leaves subtending inflorescences well developed; conspicuously longer than inflorescences.
    5. Ray florets 1 or rarely 2. Internodes 5–7 cm long. Widest leaves 4–6 cm wide.
      Plants of upper slopes, north side of Rich Mountain, LeFlore County; rare. ..... ***S. ouachitensis***
    5. Ray florets 3 or 4. Internodes 1.5–2.5 cm long. Widest leaves 1.5–2.5 wide.
      Plants of eastern 1/4 of state; abundant. ..... ***S. caesia***
  4. Inflorescences terminal. Leaves subtending inflorescences small; shorter than inflorescences.
    6. Primary stems glabrous or glabrate. Leaves glabrous or glabrate.
      7. Branches and bracts of inflorescences glabrous or glabrate.
        8. Leaves oblanceolate; margins toothed only in distal 1/2. Fascicles of leaves in leaf axils usually present. Plants of grasslands. ..... ***S. missouriensis***
        8. Leaves broadly ovate; margins toothed from apices to bases. Fascicles of leaves in axils absent. Plants of woods.
          9. Basal rosettes present. Lowest cauline leaves petiolate. ..... ***S. arguta***
          9. Basal rosettes absent. Lowest cauline leaves sessile or absent.
            10. Abaxial midribs and primary veins glabrous. Panicle branches glabrous. ..... ***S. delicatula***
            10. Abaxial midribs and primary veins sparsely hirsute. Panicle branches pubescent. ..... ***S. ulmifolia***
      7. Branches and bracts of inflorescences densely pubescent.
        11. Inflorescences racemose to narrowly paniculate; cylindrical to narrowly conical. Branch ends straight. Heads not secund. ..... ***S. speciosa***
        11. Inflorescences broadly paniculate; broadly pyramidal. Branch ends recurved. Heads secund.
          12. Leaves lanceolate. Plants of wetlands; 1.5–2.3 m tall. ..... ***S. gigantea***
          12. Leaves ovate. Plants of upland forest and prairies of Cross Timbers; 1–1.5 m tall. ..... ***S. ulmifolia***
    6. Primary stems pubescent. Leaves typically pubescent.
      13. Leaves linear.
        14. Leaves glandular-punctate; glabrous. Stems with narrow lines of pubescence, but glabrous below points of leaf attachment. Plants of eastern 1/2 of state. ..... ***S. odora***
        14. Leaves not glandular-punctate; pubescent. Stems uniformly pubescent. Plants of western 1/2 of state. ..... ***S. altiplanities***
      13. Leaves lanceolate or ovate or elliptic.
        15. Cauline leaves clasping-auriculate. Plants of floodplain of Little River, McCurtain County; rare. ..... ***S. auriculata***
        15. Cauline leaves not clasping-auriculate. Plants of entire state; infrequent to abundant.

16. Inflorescences racemose to narrowly paniculate; cylindrical to narrowly conical. Branch ends straight. Heads not secund.
  17. Leaves densely pubescent; majority ovate to elliptic.
    18. Basal and lower cauline leaves absent or withered at anthesis. Plants of Cimarron County. ..... ***S. wrightii***
    18. Basal and lower cauline leaves present at anthesis. Plants of eastern edge of state. ..... ***S. hispida***
  17. Leaves glabrate; lanceolate.
    19. Heads 2.5–5 mm wide; 4.5–7 mm long. Corollas of ray florets erect. ..... ***S. speciosa***
    19. Heads 6–10 mm wide; 6–11 mm long. Corollas of ray florets spreading. ..... ***S. petiolaris***
16. Inflorescences broadly paniculate; broadly pyramidal. Branch ends recurved. Heads secund.
  20. Leaf margins uniformly serrate from apices to bases.
    21. Leaves ovate; abaxial cross-veins conpicuous, raised, hirsute-villous. ..... ***S. rugosa***
    21. Leaves lanceolate; abaxial cross-veins inconspicuous, not raised, glabrous or glabrate. ..... ***S. canadensis***
  20. Leaf margins entire or serrate only in distal half.
    22. Leaves ovate to elliptic; 2–4 times longer than wide.
      23. Leaves of primary stems more or less uniform in size from plant bases to inflorescences. ..... ***S. mollis***
      23. Leaves of primary stems conspicuously decreasing in size from plant bases to inflorescences.
        24. Leaves of inflorescence branches ovate. Plants of Black Mesa area, Cimarron County. ..... ***S. velutina***
        24. Leaves of inflorescence branches elliptic. Plants of eastern 2/3 of body of state. ..... ***S. radula***
    22. Leaves linear to narrowly lanceolate or spathulate; more than 5 times longer than wide.
      25. Largest cauline leaves of primary stems 1-nerved.
        26. Leaves of primary stems uniform in size from bases to inflorescences; 1–1.5 times longer than wide. Inflorescences as wide as long. Basal rosettes absent. ..... ***S. mollis***
        26. Leaves of primary stems decreasing in size from plant bases to inflorescences. Inflorescences not as wide as long. Basal rosettes present. ..... ***S. nemoralis***
      25. Largest cauline leaves of primary stems 3-nerved.
        27. Leaves of primary stems unifrom in size from plant bases to inflorescences. Basal rosettes absent. Heads 4–5 mm long. Plants of body of state. ..... ***S. canadensis***
        27. Leaves of primary stems conspicuously decreasing in size from plant bases to inflorescences. Basal rosettes present. Heads 5.5–6.5 mm long. Plants of Black Mesa area, Cimarron County. ..... ***S. velutina***

Soliva H. Ruiz Lopez & J.A. Pavon Burweed

One species. ..... ***S. sessilis***

Sonchus C. Linnaeus Sowthistle

1. Auricles of upper and mid-cauline leaves rounded. Achenes smooth; broadest at middle; 2–2.5 times longer than wide. Leaves stiff; painfully prickly when grasped. ..... ***S. asper***
1. Auricles of upper and mid-cauline leaves acute. Achenes striate or wrinkled; broadest above middle; 3.5–4 times longer than wide. Leaves flexible; not painfully prickly when grasped. ..... ***S. oleraceus***

Stephanomeria T. Nuttall Wire Lettuce

One species. ..... ***S. pauciflora***
(= *Lygodesmia pauciflora*)

Symphyotrichum C.G.D. Nees von Esenbeck Aster

1. Ray florets absent. ..... ***S. ciliatum***
(= *Brachyactis ciliata*)

1. Ray florets present.
  2. Bases of cauline leaves conspicuously auriculate-clasping.
    3. Ray florets 40–100. Inflorescences corymbose; heads crowded. Majority of peduncles 0.3–4 cm long; bearing 1–4 small leaves. ..... ***S. novae-angliae***
(= *Aster novae-angliae*)

    3. Ray florets 12–35. Inflorescences paniculate or racemose; heads separated, not crowded. Majority of peduncles 4–15 cm long; bearing numerous phyllary-like leaves.
      4. Basal and lower cauline leaves long petiolate; petioles winged. Mid-cauline leaves 8–15 cm long. ..... ***S. laeve***
(= *Aster laeve*)

      4. Basal and lower cauline leaves sessile or subsessile. Mid-cauline leaves 1.5–6 cm long. ..... ***S. patens***
(= *Aster patens*)

  2. Bases of cauline leaves of various types, but not auriculate-clasping.
    5. Basal and lowest cauline leaves petiolate, blades conspicuously differentiated from petioles.
      6. Apices of phyllaries reflexed; long attenuate. Ray florets 22–35. ..... ***S. anomalum***
(= *Aster anomalus*)

      6. Apices of phyllaries appressed or slightly spreading; obtuse to narrowly acute. Ray florets 2–20.
        7. Margins of largest mid-cauline leaves serrate or crenate-serrate. Bases of largest mid-cauline leaves cordate or rounded to truncate. ..... ***S. drummondii***
(= *Aster sagittifolius, A. texanus, A. drummondii*)

        7. Margins of largest mid-cauline leaves entire. Bases of largest mid-cauline leaves acute to cuneate. ..... ***S. oolentangiense***
(= *A. azureus, Aster oolentangiensis*)

    5. Basal and lowest cauline leaves sessile or subsessile, blades gradually narrowed towards bases. ..... **couplet 8**

8. Both surfaces of leaves conspicuously silvery-sericeous. ..... ***S. sericeum***
(= *Aster sericeus*)

8. Both surfaces of leaves glabrous or variously pubescent, but not silvery-sericeous.
  9. Phyllaries glandular.
    10. Plants suffrutescent; from branched woody caudices. Largest cauline leaves linear; surfaces glabrous; margins coarsely ciliate. ..... ***S. fendleri***
(= *Aster fendleri*)

    10. Plants herbaceous; from creeping or tangled rhizomes. Largest cauline leaves oblong-ovate; surfaces scabrous to hispidulous or hirsute; margins scabrous-ciliolate. ..... ***S. oblongifolium***
(= *Aster oblongifolius*)

  9. Phyllaries not glandular.
    11. Plants annuals; from taproots. ..... ***S. subulatum***
(= *Aster subulatus*)

    11. Plants perennials; from rhizomes or caudices.
      12. Abaxial surfaces of phyllaries pubescent.
        13. Ray florets violet-purple to dark purple; limbs of corollas 8–13 mm long, 1–2 mm wide. Heads 1–25 per plant. Involucres 6–11 mm long. ..... ***S. pratense***
(= *Aster pratensis*)

        13. Ray florets white or white and pink tinged; limbs of corollas 4–10 mm long, 0.8–1.2 mm wide. Heads 50–many per plant. Involucres 3–7 mm long.
          14. Involucres 4.5–7 mm long. Ray florets 8–18. Heads typically secund. ..... ***S. ericoides***
(= *Aster ericoides*)

14. Involucres 3–4 mm long. Ray florets 18–35. Heads not secund. ..... ***S. falcatum***
(= *Aster falcatus*)

12. Abaxial surfaces of phyllaries glabrous.
15. Heads solitary at ends of elongate peduncles. Involucres 7–12 mm long. . ..... ***S. turbinellum***
(= *Aster turbinellus*)

15. Heads several to many per panicle branch, sessile or on short peduncles. Involucres 2–7 mm long. ..... **couplet 16**

16. Apices of phyllaries spinescent.
17. Disk florets 8–12. Corollas of ray florets 4–6 mm long; 0.5–0.8 mm wide. ..... ***S. parviceps***
(= *Aster parviceps*)

17. Disk florets 30–70. Corollas of ray florets 7–10 mm long; 0.8–1.5 mm wide. ..... ***S. pilosum***
(= *Aster pilosus*)

16. Apices of phyllaries not spinescent.
18. Areoles of abaxial surfaces of largest leaves isodiametric. ..... ***S. praealtum***
(= *Aster praealtus*)

18. Areoles of abaxial surfaces of largest leaves oblong or irregular in shape or inconspicuous.
19. Leaves subtending heads 7–20 mm long; not scale-like. ..... ***S. lanceolatum***
(= *Aster lanceolatus, A. simplex*)

19. Leaves subtending heads 1–4 mm long; scale-like.
20. Corollas of ray florets 8–12 mm long. Achenes glabrous or glabrate. Involucres 5–7 mm long. ..... ***S. oolentangiense***
(= *Aster azureus, A. oolentangiensis*)

20. Corollas of ray florets 3–8 mm long. Achenes strigillose or puberulent. Involucres 2.5–5.5 mm long.
21. Abaxial surfaces of cauline leaves glabrous. Corolla lobes of disk florets constituting 1/4–1/3 length of limbs. ..... ***S. dumosum***
(= *Aster dumosus*)

21. Abaxial surfaces of cauline leaves uniformly puberulent or villous to minutely hirsute only along midribs. Corolla lobes of disk florets constituting 1/2–3/4 length of limbs.
22. Heads secund. Abaxial surfaces of cauline leaves villous to minutely hirsute only along midribs. Plants from caudices or short tangled rhizomes; cespitose; typically in drier soils of uplands. ..... ***S. lateriflorum***
(= *Aster lateriflorus, A. vimineus*)

22. Heads not secund. Abaxial surfaces of cauline leaves uniformly puberulent. Plants from elongate rhizomes; colonial; typically in moist soils of bottomlands. ..... ***S. ontarionis***
(= *Aster ontarionis*)

Tanacetum C. Linnaeus Tansy

One species. ..... ***T. vulgare***

Taraxacum F.H. Wiggers Dandelion

1. Achenes stramineous or olive-green or brownish. Outer phyllaries conspicuously recurved. Terminal leaf lobes conspicuously longer than lateral lobes. ..... ***T. officinale***
1. Achenes reddish brown to reddish purple. Outer phyllaries spreading to ascending. Terminal leaf lobes equal to shorter than lateral lobes. ..... ***T. erythrospermum***
(= *T. laevigatum*)

Tetraneuris E.L. Greene Four-Nerved Daisy

1. Leaves conspicuously cauline. Phyllaries 2.5–4.5 mm long. Plants annuals from herbaceous taproots. ..... ***T. linearifolia***
(= *Hymenoxys linearifolia*)

1. Leaves basal or nearly so. Phyllaries 4.5–6.5 mm long. Plants perennials from branched woody caudices or woody taproots.

2. Leaves densely sericeous; all basal. Plants conspicuously acaulescent. ..... ***T. acaulis***
(= *Hymenoxys acaulis*)

2. Leaves pilose-villous or glabrate; both basal and clustered at stem bases.
Plants inconspicously caulescent with short stems. ..... ***T. scaposa***
(= *Hymenoxys scaposa*)

Thelesperma C.F. Lessing Greenthread

1. Corollas of disk florets yellow.
   2. Ray florets present. ..... ***T. filifolium***
   2. Ray florets absent or conspicuously reduced. ..... ***T. megapotamicum***
1. Corollas of disk florets reddish brown.
   3. Outer phyllaries 4–6; 1–2 mm long; less than 1/4 length of inner phyllaries. ..... ***T. ambiguum***
   3. Outer phyllaries 7–12; 3–12 mm long; 1/2 or more length of inner phyllaries. ..... ***T. filifolium***

Townsendia W.J. Hooker Easter Daisy

1. Plants acaulescent. Heads sessile in rosettes of leaves. Pappus bristles of ray and disk florets equal in length. ..... ***T. exscapa***
1. Plants caulescent. Heads pedunculate on leafy stems. Pappus bristles of ray florets conspicuously shorter than those of disk florets. ..... ***T. texensis***

Tragopogon C. Linnaeus Goat's Beard, Salsify

1. Florets purplish. ..... ***T. porrifolius***
1. Florets yellow.
   2. Phyllaries of mature heads 4–5 cm long; longer than corollas. Flowering peduncles conspicuously enlarged immediately below heads; 4–10 mm in diameter. ..... ***T. dubius***
   2. Phyllaries of mature heads 2–3 cm long; shorter than or equal to corollas. Flowering peduncles not enlarged immediately below heads; 3–4 mm in diameter. ..... ***T. pratensis***

Verbesina C. Linnaeus Crownbeard

1. Ray florets white. ..... ***V. virginica***
1. Ray florets yellow.
   2. Stems not winged. Plants annuals; from taproots. Corollas of ray florets conspicuously 3-lobed or 3-toothed. Abaxial surfaces of leaves gray-canescent. ..... ***V. encelioides***
   2. Stems winged. Plants perennials; from fibrous roots. Corollas of ray florets inconspicuously 3-toothed. Abaxial surfaces of leaves green.
      3. Heads 10–100 per plant. Phyllaries reflexed in fruiting heads; glabrous or glabrate. Ray florets 2–10. Fruiting heads globose; with achenes diverging in all directions. ..... ***V. alternifolia***
      (= *Actinomeris alternifolia*)
      3. Heads 1–10 per plant. Phyllaries ascending or spreading in fruiting heads; densely pubescent. Ray florets 8–15. Fruiting heads hemispheric; with achenes erect or slightly spreading. ..... ***V. helianthoides***

Vernonia J.C.D. von Schreber Ironweed

1. Mid-cauline leaves elliptic or ovate to lanceolate.
   2. Apices of phyllaries attenuate-filiform; 3–4 mm long. Heads 9–10 mm wide. ..... ***V. arkansana × V. baldwinii***
   2. Apices of phyllaries rounded-obtuse to acute-acuminate; 0.5–1.5 mm long. Heads 3–9 mm wide.
      3. Mid-cauline leaves pitted, pits appearing as black dots with 10X magnification. ..... ***V. texana***
      3. Mid-cauline leaves not pitted.
         4. Florets 30–65 per head. ..... ***V. missurica***
         (= *V. aborigina*)
         4. Florets 12–34 per head.
            5. Phyllaries with shiny resinous glands present; midribs conspicuous. ..... ***V. baldwinii***
            5. Phyllaries with shiny resinous glands absent; midribs not conspicuous. ..... ***V. gigantea***
            (= *V. altissima*)

1. Mid-cauline leaves linear to linear-lanceolate.
    6. Apices of phyllaries attenuate-filiform; 3–10 mm long. Heads 8–16 mm wide.
        7. Heads 10–15 mm wide. Longest apices of inner phyllaries 5–10 mm long. ..... ***V. arkansana*** (= *V. crinita*)
        7. Heads 9–10 mm wide. Longest apices of inner phyllaries 3–4 mm long. ..... ***V. arkansana* × *V. baldwinii***
    6. Apices of phyllaries rounded-obtuse to acute-acuminate; 0.5–1.5 mm long. Heads 3–9 mm wide.
        8. Upper cauline leaves 1–5 mm wide.
            9. Upper cauline leaves 2–5 mm wide; scabrous. Plants of Panhandle and southwestern 1/4 of state. ..... ***V. marginata***
            9. Upper cauline leaves 1–1.5 mm wide; smooth. Plants of southeastern 1/4 of state. ..... ***V. lettermannii***
        8. Upper cauline leaves 6–10 mm wide.
            10. Abaxial surfaces of leaves glabrous. Achenes 3–3.5 mm long. ..... ***V. fasciculata***
            10. Abaxial surfaces of leaves scabrous-pubescent. Achenes 1–3 mm long. ..... ***V. texana***

Xanthisma A.P. de Candolle — Sleepy Daisy

1. Plants perennial herbs or subshrubs from woody caudices. Leaf margins pinnatifid to pinnatisect. ..... ***X. spinulosum*** (= *Machaeranthera pinnatifida, Haplopappus spinulosus*)
1. Plants annuals from taproots. Leaf margins entire to serrate. ..... ***X. texanum***

Xanthium C. Linnaeus — Cocklebur

1. Stems bearing yellow spines in one or more leaf axils. Leaves linear to lanceolate; venation pinnate; bases acute to cuneate; petioles 0.3-0.6 cm long. Burs with 1 beak. ..... ***X. spinosum***
1. Stems not bearing spines. Leaves deltoid to rhomboidal to lanceolate; venation palmate; bases cordate; petioles 2-3 cm long. Burs with 2 beaks. ..... ***X. strumarium***

Zinnia C. Linnaeus

One species. ..... ***Z. grandiflora***

AZOLLACEAE R. Wettstein — Azolla Family

Plants small; annuals or rarely perennials; herbs; free-floating aquatics (often stranded on mud flats); reddish green or green; producing sporangia in pairs or quartets of sporocarps borne on submerged leaf lobes. **Roots** present; colorless, not branched. **Stems** prostrate to suberect; pinnately branched; concealed by imbricate leaves; internodes glabrous. **Leaves** small; alternate; sessile; 2-ranked; with 2 oval to suborbicular lobes, the upper lobe floating and the lower lobe submerged; adaxial surfaces papillate. **Sporocarps** of 2 types; not equal in size; borne in pairs or quartets on first leaf of lateral branches. **Sori** absent or rarely present. **Sporangia** of 2 types. **Spores** of 2 types; microspores 32 or 64; megaspores 1. **Gametophytes** of 2 types.

The family is represented in Oklahoma by 1 genus and 2 species. Plants are often mistaken for leafy liverworts. The dense cover formed by these plants over the surface of ponds, lagoons, and inlets provides shade and habitat for fish. The plants also serve as a food source for ducks and other water fowl.

Azolla J.B.A.P. de Lamarck — Mosquito Fern

1. Plants 1-1.5 cm in diameter. Upper leaf lobes 0.7-0.9 mm long. Megaspores with pits. ..... ***A.cristata*** (= *A. mexicana*)
1. Plants 0.5-1 cm in diameter. Upper leaf lobes 0.5-0.6 mm long. Megaspores without pits. ..... ***A. filiculoides*** (= *A. caroliniana*)

BALSAMINACEAE A. Richard — Touch-Me-Not Family

Plants herbs; annuals; sap mucilaginous. **Stems** glabrous; often succulent; nodes swollen; internodes hollow. **Leaves** herbaceous; simple; alternate or rarely opposite; venation pinnate; stipules absent. **Inflorescences** cymes; flowers 1 to 4; axillary; pedunculate. **Flowers** perfect; chasmogamous or cleistogamous; perianths in 2-series. **Calyces** bilaterally symmetrical. **Sepals** 3; of 2 forms;

lateral 2 small; middle or lower large, recurved; free; spurs 1, 1/2 to 1/3 length of sepals; yellow or orange or white, often with red or reddish brown markings; petaloid. **Corollas** bilaterally symmetrical. **Petals** 5, appearing to be 3 because of fusion; of 2 forms; 1 free and 4 fused in 2 pairs, each pair resembling a single bilobed petal; yellow or yellow-orange or white, often with red or reddish brown spots. **Stamens** 5; monadelphous; filaments flattened, enclosing pistil. **Pistils** 1; compound, carpels 5; stigmas 1 to 5; styles absent; ovaries superior; locules 5; placentation axile. **Nectaries** present; 1; sepaliferous. **Fruits** capsules; explosive, elastically dehiscent into 5 spirally coiled valves. **Seeds** numerous.

The family is represented in Oklahoma by 1 genus and 2 species. They are encountered in moist soils of shaded habitats, often adjacent to water. The crushed leaves and stems of both species are reputed to help prevent a reaction to poison ivy and promote healing of minor burns.

Impatiens C. Linnaeus Touch-Me-Not

1. Perianths orange to reddish or whitish. Spurs 6–9 mm long; reflexed and oriented parallel to corollas. ..... ***I. capensis***
1. Perianths yellow. Spurs 4–6 mm long; oriented at right angle to corollas. ..... ***I. pallida***

BERBERIDACEAE A.L. de Jussieu Barberry Family

Plants deciduous shrubs or herbs; perennials; perennating organs rhizomes. **Leaves** simple or 2-pinnately or 3-pinnately compound; opposite or alternate; spreading; blades peltate or not peltate; venation palmate or pinnipalmate or pinnate; glabrous; margins pinnately lobed or entire; stipules absent. **Inflorescences** solitary flowers or racemes or panicles; axillary or terminal. **Flowers** perfect; perianths in 2-series. **Sepals** 6; caducous or persistent; in 2 whorls. **Corollas** radially symmetrical; bowl- or saucer-shaped. **Petals** 6 or 9; in 2 or 3 whorls; free; white or pink or greenish yellow to bronze. **Stamens** 6 or 12 or 18. **Pistils** 1; simple, carpels 1; stigmas 1; styles 1 or 0; ovaries superior, ovoid in longitudinal-section; locules 1; placentation parietal or basal. **Fruits** berries, may rupture and release drupe-like seeds. **Seeds** numerous or 1 or 2.

The family is represented in Oklahoma by 3 genera and 3 species. They are encountered in shaded, moist soils of the deciduous forests in the eastern 1/3 to 1/2 of the state. The mature fruit of *Podophyllum* is edible while the rest of the plant is poisonous.

1. Plants shrubs. Berries red to purple-red. ..... ***Nandina***
1. Plants herbs. Berries yellow to yellowish green.
   2. Leaves pinnately compound. Inflorescences racemes or panicles. Petals greenish yellow to bronze; smaller than sepals. Berries greenish yellow; rupturing to expose seeds. Seeds blue. ..... ***Caulophyllum***
   2. Leaves simple. Inflorescences solitary flowers. Petals white or pink; larger than sepals. Berries yellow; not rupturing to expose seeds. Seeds tan or cream. ..... ***Podophyllum***

Caulophyllum A. Michaux Blue Cohosh

One species. ..... ***C. thalictroides***

Nandina C.P. Thunberg Heavenly Bamboo

One species. ..... ***N. domestica***

Podophyllum C. Linnaeus Mayapple

One species. ..... ***P. peltatum***

BETULACEAE S.F. Gray Birch Family

Plants trees or small trees or shrubs; deciduous; monoecious. **Stems** slender and zig-zag. **Leaves** simple; alternate; venation pinnate; margins serrate or undulate; stipules present, caducous. **Inflorescences** catkins; staminate and pistillate different; axillary or terminal; staminate catkins pendulous, elongate; bracts scaly; pistillate catkins pendulous or erect, elongate to globose, cone-like in some genera, flowers grouped in 2's or 3's , bracts herbaceous or indurate or papery and inflated. **Flowers** produced before or simultaneously with leaves; imperfect, staminate and pistillate different; perianths in 1-series or absent. **Staminate Flowers:** Sepals 2 or 4 or 0; minute. Petals absent. Stamens 1 to 4. Gynoecial Rudiments present or absent. **Pistillate Flowers:** Sepals 1 to

6 or 0. Petals absent. Androecial Rudiments absent. Pistils 1; compound, carpels 2; stigmas 2; styles 2; ovaries inferior; locules 1 or 2; placentation axile or parietal; ovules 1 or 2 per locule. **Fruits** nuts or samaras. **Seeds** 1; wings present or absent.

The family is represented in Oklahoma by 5 genera and 6 species. Most abundant in cool temperate regions, its Oklahoma taxa occur as understory or stream edge species primarily in the eastern 1/3 of the state. Eaten whole or ground into flour, the nuts of *Corylus americana*, hazelnut, were an important food source of Native Americans.

1. Leaf margins undulate to 1-serrate. Pistillate catkins cone-like; scales thick; indurate. ..... ***Alnus***
1. Leaf margins 2-serrate. Pistillate catkins of various shapes, but not cone-like; scales thin; flexible.
    2. Bark reddish brown; peeling in papery strips. Leaves grayish white abaxially. Seeds winged. ..... ***Betula***
    2. Bark light brown to brown or blue-gray; smooth or scaly, not peeling.
       Leaves green or pale green abaxially. Seeds not winged.
        3. Leaves with 5–8 pairs of veins; abaxially uniformly tomentose.
           Fruits 9.5–16 mm long; closely enveloped by involucre. ..... ***Corylus***
        3. Leaves with 9–15 pairs of veins; abaxially glabrous or tomentose only in vein
           axils. Fruits 6–8.5 mm long; loosely enveloped or subtended by involucre.
            4. None of lateral veins of abaxial surfaces of leaves forked. Fruits subtended by leafy bract.
               Bark blue-gray; smooth. Trunk and branches fluted, appearing like twisted muscle. ..... ***Carpinus***
            4. Some of lateral veins of abaxial surfaces of leaves forked. Fruits in bladdery
               involucre. Bark light brown to brown; scaly. Trunk and branches terete. ..... ***Ostrya***

Alnus P. Miller Alder

1. Plants flowering in late summer and fall. Mature pistillate catkins on previous season's growth; 15–20 mm in diameter; pedicellate. ..... ***A. maritima***
1. Plants flowering in spring. Mature pistillate catkins on current season's growth; 5–15 mm in diameter; sessile or subsessile. ..... ***A. serrulata***

Betula C. Linnaeus Birch

One species. ..... ***B. nigra***

Carpinus C. Linnaeus Hornbeam

One species. ..... ***C. caroliniana***

Corylus C. Linnaeus Hazelnut

One species. ..... ***C. americana***

Ostrya J.A. Scopoli Hop Hornbeam

One species. ..... ***O. virginiana***

BIGNONIACEAE A.L. de Jussieu Trumpet-Creeper Family

Plants trees or shrubs or woody vines; perennials; deciduous or evergreen; with or without tendrils. **Stems** with terminal buds present or absent. **Leaves** simple or 1-pinnately compound; opposite or whorled or alternate; stipules absent. Simple Leaves: blades cordate or linear; venation pinnate or pinnipalmate; margins entire. Compound Leaves: terminal leaflets or tendrils present; ovate to oblong; venation pinnate; margins entire or serrate. **Inflorescences** panicles or simple cymes or racemes; terminal or axillary. **Flowers** fragrant or not fragrant; perfect; perianths in 2-series; large; showy. **Calyces** bilaterally symmetrical; campanulate or tubular or bilabiate. **Sepals** 5; fused. **Corollas** bilaterally symmetrical; tubular to bilabiate. **Petals** 5; fused; red or red-orange or yellow or white or violet. **Stamens** 4 or 2; included within perianths; epipetalous**;** staminodia present or absent; 1 to 3. **Pistils** 1; compound, carpels 2; stigmas 1, 2-lobed; styles 1; ovaries superior; locules 2; placentation axile. **Nectaries** present; receptacular. **Fruits** capsules; elongate; ligneous; septicidal or loculicidal. **Seeds** numerous; flat; wings present, broad.

The family is represented in Oklahoma by 4 genera and 5 species. Two species are native; the others are ornamentals that have escaped and become naturalized. *Chilopsis* is commonly encountered in older wind breaks in the western part of the state. *Catalpa* with its showy flowers is cultivated, and once was used for railroad ties.

1. Plants climbing or scrambling vines. Tendrils or aerial rootlets present.
   Leaves compound. Corollas orange-yellow or orange to scarlet.
   2. Plants deciduous; climbing by aerial rootlets. Leaflets 5–13; coarsely serrate.
      Inflorescences terminal. Pedicels 0.5–1.5 cm long. Corolla throats orange-red
      to red. Capsules terete; loculicidal. ..... ***Campsis***
   2. Plants evergreen; climbing by tendrils. Leaflets 2; entire. Inflorescences axillary.
      Pedicels 2–4 cm long. Corolla throats orange-yellow tinged with dull red.
      Capsules flattened; septicidal. ..... ***Bignonia***
1. Plants erect shrubs or trees. Tendrils or aerial rootlets absent. Leaves simple.
   Corollas white to purple.
   3. Leaf blades linear to linear-lanceolate. Petioles 0–1 cm long. ..... ***Chilopsis***
   3. Leaf blades cordate to ovate. Petioles 8–20 cm long. ..... ***Catalpa***

Bignonia **C. Linnaeus** **Crossvine**

One species. ..... ***B. capreolata***

Campsis **J. de Loureiro** **Trumpet Creeper**

One species. ..... ***C. radicans***

Catalpa **J.A. Scopoli**

1. Corollas 2–3 cm wide; lower lobes entire. Capsules 5–10 mm in diameter. ..... ***C. bignonioides***
1. Corollas 4–6 cm wide; lower lobes emarginate. Capsules 10–15 mm in diameter. ..... ***C. speciosa***

Chilopsis **D. Don** **Desert-Willow**

One species. ..... ***C. linearis***

BLECHNACEAE C.B. Presl Chain Fern Family

Plants herbs; perennials from rhizomes; deciduous; needle-like hairs absent; producing sporangia in sori on abaxial surfaces of fertile fronds. **Rhizomes** branching or not branching; scales present. **Fronds** of 2 types, sterile and fertile different; vernation circinate; auricles absent; stipitate. **Sterile Fronds** simple or rarely 1-pinnately compound at bases; blades lanceolate, distally pinnatifid; lobes alternate, elliptic to oblong, margins serrate; green; rachises olive green, curved, with wings at distal and proximal ends; venation dichotomous, anastomosing, aeroles with veinlets absent; stipes with scales present. **Fertile Fronds** with stipe bases not persistent; green turning brown; rachises yellow-green or reddish brown, straight to curved; 1-pinnately compound, pinnae separated, distal, alternate, linear. **Sori** separate; positioned end-to-end in chain-like rows; linear to oblong; indusia persistent, attached at one side of sori; dehiscing toward midribs. **Sporangia** all alike; annuli present; vertical. **Spores** all alike; green; reniform. **Gametophytes** all alike; green; cordate.

The family is represented in Oklahoma by 1 genus and 1 species. *Woodwardia* and 8 other genera that do not occur in Oklahoma were formerly positioned in the Dryopteridaceae or wood fern family. Phylogenetic studies, however, support their recognition as a distinct family.

Woodwardia **J.E. Smith** **Netted Chain Fern**

One species. ..... ***W. areolata***

BORAGINACEAE A.L. de Jussieu Borage Family

Plants herbs; annuals or biennials or perennials; indumentum usually scabrous or hispid. **Leaves** simple; alternate or occasionally alternate above and opposite below; venation pinnate or a single vein; stipules absent. **Inflorescences** solitary flowers or simple cymes or helicoid cymes; terminal or axillary. **Flowers** perfect; perianths in 2-series. **Sepals** 5; fused. **Corollas** radially symmetrical; tubular or salverform or funnelform. **Petals** 5; fused; white or blue or purple or yellow or yellow-orange or cream. **Stamens** 5; exserted beyond or included within perianths; epipetalous. **Pistils** 1; compound, carpels 2; stigmas 1, not lobed or 2-lobed; styles 1, gynobasic; ovaries superior, deeply 4-lobed; placentation axile. **Fruits** nutlets; 4, rarely 1 to 3. **Seeds** 1 per nutlet.

The family is represented in Oklahoma by 9 genera and 17 species. *Heliotropium*, long classified in this family, is now positioned on the basis of phylogenetic studies in the Heliotropiaceae with 4 other genera that do not occur in the state. The inflorescences of the family have long been called scorpioid cymes, but are actually helicoid cymes because the pedicels arise on both sides of the rachises. Several species were used as medicines by Native Americans. Species of *Lithospermum,* gromwell, are used as sources of dyes.

1. Ovary and nutlet surfaces with hooked or barbed prickles.
    2. Nutlets attached to receptacles near apices; strongly divergent at maturity; not angled. Dorsal nutlet surfaces uniformly covered with prickles. ..... ***Cynoglossum***
    2. Nutlets attached to receptacles near their bases or middles; erect or incurved at maturity; angled. Dorsal nutlet surfaces with prickles restricted to edges.
        3. Pedicels erect or spreading in fruit. Gynobases equalling nutlets in length. Styles exceeding nutlets in length. ..... ***Lappula***
        3. Pedicels recurved or deflexed in fruit. Gynobases 1/2 length of nutlets. Styles shorter than nutlets in length. ..... ***Hackelia***
1. Ovary and nutlet surfaces smooth or punctate or angled or wrinkled, but without prickles.
    4. Stigmas 2-lobed or styles bifid. Nutlets not laterally flattened, without ridges; attached by bases to flat or depressed gynobases.
        5. Corolla lobes acute or acuminate. Anthers sagittate. Styles exserted beyond corollas. ..... ***Onosmodium***
        5. Corolla lobes obtuse or rounded. Anthers oblong. Styles included within corollas.
            6. Corollas white; 4–6 mm long; tubes shorter than or equal to calyces. Nutlets dull; surfaces tuberculate or wrinkled or rugose. Plants annuals or biennials; from slender taproots. ..... ***Buglossoides***
            6. Corollas yellow to yellow-orange; 8–50 mm long; tubes longer than calyces. Nutlets shiny; surfaces smooth or lightly punctate. Plants perennials; from stout woody caudices. ..... ***Lithospermum***
    4. Stigmas not lobed, styles simple. Nutlets laterally flattened, with ridges; attached above bases to narrowly pyramidal gynobases.
        7. Corollas uniformly deep yellow to yellow-orange. Nutlets obliquely attached to gynobases. ..... ***Amsinckia***
        7. Corollas white to bluish white or white with yellow centers. Nutlets basally or laterally attached to gynobases.
            8. Fruiting calyx lobes unequal in length. Corollas convolute in bud. Styles disciform. ..... ***Myosotis***
            8. Fruiting calyx lobes equal in length. Corollas imbricate in bud. Styles capitate. ..... ***Cryptantha***

Amsinckia J.G.C. Lehmann — Fiddle Neck

One species. ..... ***A. lycopsoides***

Buglossoides C. Moench — Corn Gromwell

One species. ..... ***B. arvensis***
(= *Lithospermum arvense*)

Cryptantha J.G.C. Lehmann ex G. Don

1. Plants annuals. Corollas 1–2 mm wide; yellow centers inconspicuous.
    2. Bracts absent or inconspicuous at base of inflorescences. Nutlets 4, of 2 sizes. ..... ***C. crassisepala***
    2. Bracts present and conspicuous throughout inflorescences. Nutlets 3, of equal size. ..... ***C. minima***
1. Plants biennials or perennials from woody taproots or caudices. Corollas 4–9 mm wide; yellow centers conspicuous.
    3. Nutlets widely separated, not in contact at maturity; dorsal surfaces smooth and shiny; scars closed. ..... ***C. cinerea***
    (= *C. jamesii*)
    3. Nutlets touching or only slightly apart at maturity; dorsal surfaces rugose and dull; scars open at base. ..... ***C. thyrsiflora***

Cynoglossum C. Linnaeus — Hound's Tongue

1. Basal leaves elliptic-oblong; 5–10 cm wide; blades decurrent. Cauline leaves clasping. Corollas 8–10 mm long. ..... ***C. virginianum***

1. Basal leaves lanceolate; 1–4 cm wide; blades not decurrent. Cauline leaves sessile.
   Corollas 4–7 mm long. ..... ***C. amabile***

Hackelia P.M Opiz Stickseed

One species. ..... ***H. virginiana***

Lappula C. Moench Stickseed

One species. ..... ***L. occidentalis***
(= *L. redowskii, L. texana*)

Lithospermum C. Linnaeus Puccoon, Gromwell

1. Leaves linear; 3–5 mm wide; apices acute. Corollas 15–50 mm long;
   margins undulate, erose-dentate. ..... ***L. incisum***
1. Leaves linear-lanceolate to oblong; 7–15 mm wide; apices obtuse.
   Corollas 8–16 mm long; margins entire.
   2. Corollas 8–9 mm in diameter; lobes 1–2.5 mm wide. ..... ***L. multiflorum***
   2. Corollas 10–25 mm in diameter; lobes 3–5 mm wide.
      3. Leaves rough-hispid; hairs emerging from rings of white epidermal cells.
         Calyx lobes 10–15 mm long. Corollas 15–25 mm wide. ..... ***L. caroliniense***
      3. Leaves softly canescent; hairs not emerging from rings of white epidermal
         cells. Calyx lobes 6–8 mm long. Corollas 10–15 mm wide. ..... ***L. canescens***

Myosotis C. Linnaeus Forget-Me-Not

1. Lower pedicels on central axes 20–50 mm apart. Fruiting pedicels reflexed or spreading.
   Fruiting calyces 5–7 mm long. ..... ***M. macrosperma***
1. Lower pedicels on central axes 5–20 mm apart. Fruiting pedicels appressed or ascending.
   Fruiting calyces 2–4.5 mm long. ..... ***M. verna***

Onosmodium A. Michaux Marbleseed

One species. ..... ***O. bejariense***
(= *O. molle*)

BRASSICACEAE G.T. Burnett Mustard Family

Plants herbs; annuals or biennials or perennials; perennating organs rhizomes or caudices; terrestrial or emergent or floating aquatics; caulescent or acaulescent; strongly aromatic or not aromatic. **Leaves** basal or forming a basal rosette or cauline; simple or 1- or 2-pinnately compound or rarely palmately compound; alternate or rarely opposite; petiolate or sessile; clasping or not clasping; perfoliate or not perfoliate; venation pinnate; margins entire or dentate or incised or pinnately lobed or pinnatifid; terminal leaflets of compound leaves present; stipules absent. **Inflorescences** racemes; terminal or axillary. **Flowers** perfect; perianths in 2-series or 1-series. **Sepals** 4; free. **Corollas** radially or rarely bilaterally symmetrical. **Petals** 4 or 0 or rarely 1; persistent or caducous; free; clawed or not clawed; yellow or white or lavender or purple. **Stamens** 6 or 4 or 2; tetradynamous or didynamous or of equal length. **Pistils** 1; compound, carpels 2; stigmas 1, not lobed or 2-lobed; styles 1 or 0; ovaries superior; locules 2; placentation parietal. **Nectaries** present or absent; receptacular. **Fruits** siliques (more than 2 times longer than wide) or silicles (less than 2 times longer than wide); dehiscent or indehiscent. **Seeds** 2 to numerous.

The family is represented in Oklahoma by 31 genera and 68 species. Most abundant in the temperate and cold regions of the northern hemisphere, it is noted for important foods including cabbage, broccoli, kale, rape, turnip, and mustard. The family also includes ornamentals and weeds. An alternate family name is Cruciferae. It is closely related to the Cleomaceae because of the similar gynoecia.

1. Petals absent.
   2. Fruits silicles; flat. ..... ***Lepidium***
   2. Fruits siliques; terete.
      3. Plants glabrous. Pedicels 0.1–1 mm long. ..... ***Rorippa***
      3. Plants pubescent. Pedicels 2–25 mm long.

4. Leaves entire or dentate. ..... ***Draba***
4. Leaves pinnatifid or pinnately dissected. ..... ***Descurainia***

1. Petals present.
5. Petals yellow or yellowish green or pale yellow or orange or reddish orange.
6. Fruits silicles.
7. Petals 1–1.5 mm long. Silicles flat. ..... ***Lepidium***
7. Petals 3–15 mm long. Silicles subterete to terete.
8. Lower stems glabrous; glaucous. Silicles spathulate to clavate. ..... ***Myagrum***
8. Lower stems pubescent; not glaucous. Silicles pyriform to spherical or obovate to oblanceolate.
9. Silicles transversely divided into 2 segments; lower segment cylindrical to obovoid; upper segment globose and 5-ribbed. ..... ***Rapistrum***
9. Silicles not transversely divided into 2 segments; not 5-ribbed.
10. Cauline leaves attenuate. ..... ***Physaria***
10. Cauline leaves sagittate-auriculate.
11. Racemes bearing mature silicles 10–45 cm long. Stamens borne in 3 pairs of unequal length. Silicles pyriform to obovoid; margins narrowly winged; valves 1-nerved. ..... ***Camelina***
11. Racemes bearing mature silicles 3–8 cm long. Stamens tetradynamous. Silicles subglobose to globose; margins not winged; valves not nerved. ..... ***Paysonia***
6. Fruits siliques.
12. Siliques compressed to flat.
13. Terminal leaf lobes suborbicular to orbicular. Bracts absent. Styles 2–3.5 mm long. ..... ***Leavenworthia***
13. Terminal leaf lobes linear to lanceolate. Bracts present; foliaceous. Styles 5–10 mm long. ..... ***Selenia***
12. Siliques subterete to terete or 4-sided.
14. Siliques beaked.
15. Styles conspicuously demarcated from ovaries. ..... ***Barbarea***
15. Styles not conspicuously demarcated from ovaries.
16. Sepals spreading to reflexed. Silique valves 3- to 7-nerved. ..... ***Sinapis***
16. Sepals ascending to erect. Silique valves 1-nerved. ..... ***Brassica***
14. Siliques not beaked.
17. Margins of lower leaves 1- to 3-pinnatifid.
18. Margins of lower leaves 2- or 3-pinnatifid. Hairs stellate or branched; sometimes intermixed with unbranched hairs. ..... ***Descurainia***
18. Margins of lower leaves 1-pinnatifid. Hairs absent or unbranched. ..... ***Sisymbrium***
17. Margins of lower leaves entire or toothed or lobed.
19. Hairs appressed; malpighiaceous. ..... ***Erysimum***
19. Hairs absent or divergent; of various types, but not malpighiaceous.
20. Siliques 8–13 cm long; 4-sided. ..... ***Conringia***
20. Siliques 0.5–2.5 cm long; subterete to terete.
21. Fruits divergent from rachises. Nerves of silique valves 0 or 1; inconspicuous. ..... ***Rorippa***
21. Fruits appressed against rachises. Nerves of silique valves 3; conspicuous. ..... ***Sisymbrium***
5. Petals white or greenish white or pink or lavender or purple or maroon or magenta.
22. Fruits deeply constricted at middle; wider than long; resembling eyeglasses. ..... ***Dimorphocarpa***
22. Fruits not constricted at middle; longer than wide or as long as wide; of various shapes, but not resembling eyeglasses.
23. Cauline leaves auriculate or sagittate.
24. Fruits obtriangular-obcordate. ..... ***Capsella***
24. Fruits of various shapes, but not obtriangular-obcordate.
25. Basal leaves pinnatifid or pinnately dissected. ..... ***Barbarea***
25. Basal leaves entire or sinuate or dentate to shallowly lobed.
26. Fruits flattened.
27. Fruits silicles; orbicular to broadly elliptic.

28. Leaves 8–20 per stem. Mature silicles 8 mm or more long. Fruiting pedicels 8–18 mm long. Silicle wings 2.5–4 mm wide. ..... ***Thlaspi***
28. Leaves 3–5 per stem. Mature silicles 6 mm or less long. Fruiting pedicels 5–8 mm long. Silicle wings 1 mm or less wide. ..... ***Microthlaspi***
27. Fruits siliques; linear to oblong.
29. Siliques flattened at right angles to septum. ..... ***Arabidopsis***
29. Siliques flattened parallel to septum. ..... ***Boechera***
26. Fruits terete or subterete.
30. Fruits silicles.
31. Silicles with vesicular trichomes. ..... ***Lepidium***
31. Silicles without vesicular trichomes.
32. Racemes corymbose. Rhizomes present. Silicles obcordate to reniform. ..... ***Lepidium***
32. Racemes elongate. Rhizomes absent. Silicles obovoid or pyriform. ..... ***Camelina***
30. Fruits siliques.
33. Siliques 6–12 cm long. ..... ***Streptanthus***
33. Siliques 1–4 cm long.
34. Leaves 1–4 cm long. Petals 2–4 mm long. Beaks absent. Plants annuals. ..... ***Arabidopsis***
34. Leaves 5–15 cm long. Petals 10–13 mm long. Beaks present. Plants perennials. ..... ***Iodanthus***
23. Cauline leaves not auriculate nor sagittate, or cauline leaves absent.
35. Fruits silicles.
36. Silicles flattened at right angles to septum. ..... ***Lepidium***
36. Silicles subterete to terete or flattened parallel to septum.
37. Fruits with stellate hairs.
38. Petal apices deeply 2-lobed. Silicles 2-4 times length of styles. ..... ***Berteroa***
38. Petal apices rounded or emarginate. Silicles 8–12 times length of styles. ..... ***Draba***
37. Fruits glabrous or with non-stellate hairs.
39. Plants aquatic. Leaves pinnately dissected. ..... ***Rorippa***
39. Plants terrestrial. Leaves entire or dentate.
40. Plants from woody rootstocks. Petals 7–15 mm long. Silicles globose. ..... ***Physaria***
40. Plants from herbaceous rootstocks. Petals 2–5 mm long. Silicles elongate. ..... ***Draba***
35. Fruits siliques.
41. Leaves palmately compound or palmately lobed. Rhizomes constricted. ..... ***Cardamine***
41. Leaves simple or pinnately compound. Rhizomes not constricted or absent.
42. Petals pink or purple or lavender or maroon.
43. Stamens exserted beyond perianths. ..... ***Thelypodium***
43. Stamens included within perianths.
44. Petals maroon or dark purple or dark pink; margins crisped. Calyces urceolate. Siliques 6–12 cm long; beaks absent. ..... ***Streptanthus***
44. Petals blue-violet to pale violet or pale pink; margins entire. Calyces cylindrical to campanulate. Siliques 2–4 cm long; beaks present.
45. Plants annual. Pedicels bearing stipitate glands. Silique beaks 10–15 mm long. ..... ***Chorispora***
45. Plants perennial. Pedicels glabrous. Silique beaks 1–3 mm long. ..... ***Iodanthus***
42. Petals white or greenish white. ..... **couplet 46**

46. Plants aquatic. ..... ***Nasturtium***
46. Plants terrestrial.
47. Stamens exserted beyond perianths. ..... ***Thelypodium***

47. Stamens included within or equal to perianths.
48. Leaves reniform to deltoid. Siliques 4-angled. Fresh leaves with garlic odor when crushed. ..... ***Alliaria***
48. Leaves lanceolate to elliptic or oblanceolate. Siliques flattened to subterete.
Fresh leaves without garlic odor when crushed.
49. Cauline leaves pinnatifid or 1-pinnately compound.
50. Seeds winged. Silique valves stiff; not coiling upon fruit dehiscence. ..... ***Planodes***
50. Seeds not winged. Silique valves elastic; coiling upon fruit dehiscence. ..... ***Cardamine***
49. Cauline leaves entire or toothed.
51. Petals 6–13 mm long. Lower stems glabrous or with only unbranched hairs.
52. Rhizomes present; bulbous. Siliques dehiscent; valves 0-nerved,
elastic, coiling upon fruit dehiscence. ..... ***Cardamine***
52. Rhizomes absent. Siliques indehiscent; valves 1-nerved,
not elastic, not coiling. ..... ***Iodanthus***
51. Petals 2–5 mm long. Lower stems with at least some branched hairs.
53. Siliques flattened at right angles to septum. ..... ***Arabidopsis***
53. Siliques flattened parallel to septum.
54. Siliques 3–10 times longer than wide. Seeds not winged;
borne in 2 rows in each locule. ..... ***Draba***
54. Siliques more than 15 times longer than wide. Seeds winged;
borne in 1 row in each locule. ..... ***Boechera***

Alliaria L. Heister ex P.C. Fabricius — Garlic Mustard

One species. ..... ***A. petiolata***

Arabidopsis G. Heynhold — Mouse-Ear-Cress

One species. ..... ***A. thaliana***

Barbarea R. Brown

One species. ..... ***B. vulgaris***

Berteroa A.P. de Candolle — Hoary False Alyssum

One species. ..... ***B. incana***

Boechera Á. Löve & D. Löve — Rockcress

1. Basal leaves with forked hairs. Plants of Black Mesa area, Cimarron County; perennials. ..... ***B. fendleri***
(= *Arabis fendleri*)
1. Basal leaves with simple hairs. Plants of body of state; annuals or biennials.
2. Bases of cauline leaves acute to cuneate. Flowering peduncles
spreading to reflexed. Fruiting peduncles pendulous. ..... ***B. canadensis***
(= *Arabis canadensis*)
2. Bases of cauline leaves auriculate-clasping. Flowering peduncles
ascending to erect. Fruiting peduncles ascending to erect.
3. Stems and leaves pubescent. Seeds not winged. ..... ***B. dentata***
(= *Arabis shortii*)
3. Stems and leaves glabrous. Seeds winged.
4. Plants glaucous. Petals 3–5 mm long. Siliques 0.5–2 mm wide. ..... ***B. laevigata***
(= *Arabis laevigata*)
4. Plants not glaucous. Petals 6–8 mm long. Siliques 2–3 mm wide. ..... ***B. missouriensis***
(= *Arabis missouriensis*)

Brassica C. Linnaeus — Mustard

1. Upper cauline leaves auriculate-clasping.
2. Petals 10–18 mm long; tan-yellow. Apices of mature inflorescences convex. ..... ***B. napus***
2. Petals 6–10 mm long; bright yellow. Apices of mature inflorescences concave. ..... ***B. rapa***
1. Upper cauline leaves petiolate or sessile.

3. Pedicels 8–10 mm long; spreading to ascending. Siliques 3–6 cm long; terete or subterete; beaks 6–12 mm long, conical. ..... ***B. juncea***
3. Pedicels 2–4 mm long; appressed. Siliques 1–2 cm long; 4-sided; beaks 1.5–4 mm long, cylindrical. ..... ***B. nigra***

Camelina H.J.N. von Crantz — False Flax

1. Lower stems glabrate to sparsely pubescent. ..... ***C. sativa***
1. Lower stems densely pubescent.
   2. Petals 2–6 mm long. Lower stems with both simple and branched hairs. ..... ***C. microcarpa***
   2. Petals 6–9 mm long. Lower stems with simple hairs only or branched hairs rare. ..... ***C. rumelica***

Capsella F.K. Medicus — Shepherd's Purse

One species. ..... ***C. bursa-pastoris***

Cardamine C. Linnaeus — Bittercress

1. Petals 7–20 mm long.
   2. Cauline leaves broadly oblong to cordate-ovate or reniform. ..... ***C. bulbosa***
   2. Cauline leaves palmately dissected or palmately compound.
      3. Rachises glabrous. Lobes or leaflets of cauline leaves 1–3 cm long; lanceolate to narrowly ovate. ..... ***C. angustata***
      3. Rachises sparsely hirsute. Lobes or leaflets of cauline leaves 3.5–7 cm long; linear to oblong. ..... ***C. concatenata***
      (= *Dentaria laciniata*)
1. Petals 1.5–4 mm long.
   4. Stamens 4. Basal leaves more numerous and conspicuous than cauline leaves. Plants scapiform. ..... ***C. hirsuta***
   4. Stamens 6. Basal leaves fewer or equal to and as conspicuous as cauline leaves. Plants not scapiform.
      5. Terminal leaflets of cauline leaves approximately as wide as lateral leaflets. Lateral leaflets narrowly linear. Seeds 0.7–1 mm wide. ..... ***C. parviflora***
      5. Terminal leaflets of cauline leaves conspicuously wider than lateral leaflets. Lateral leaflets orbicular to oblong. Seeds 1–1.5 mm wide. ..... ***C. pensylvanica***

Chorispora R. Brown ex A.P. de Candolle — Blue Mustard

One species. ..... ***C. tenella***

Conringia L. Heister ex P.C. Fabricus — Hare's Ear Mustard

One species. ..... ***C. orientalis***

Descurainia P.B. Webb & S. Berthelot — Tansy Mustard

1. Siliques clavate. Seeds 2-ranked in each locule. ..... ***D. pinnata***
1. Siliques linear. Seeds 1-ranked in each locule. ..... ***D. sophia***

Dimorphocarpa R.C. Rollins — Spectacle Pod

One species. ..... ***D. candicans***
(= *Dithyrea wislizenii*)

Draba C. Linnaeus

1. Fruits glabrous.
   2. Pedicels strigose. Lower leaves with cruciform hairs; apices acute. Fruits 2–6 mm long; linear-lanceolate to oblanceolate. Stem bases with sessile stellate hairs. ..... ***D. brachycarpa***
   2. Pedicels glabrous. Lower leaves strigose or with forked hairs; apices rounded. Fruits 10–17 mm long; linear. Stem bases with stalked cruciform hairs. ..... ***D. reptans***
1. Fruits strigose, or with forked or stellate hairs.
   3. Bracts present at raceme bases. Pedicels with stellate hairs. Fruits with stellate hairs. Racemes corymbose. ..... ***D. aprica***

3. Bracts absent at raceme bases. Pedicels glabrous or strigose or with forked hairs. Fruits strigose. Racemes elongate.
   4. Pedicels glabrous. ..... ***D. platycarpa***
   4. Pedicels strigose, hairs forked. ..... ***D. cuneifolia***

Erysimum C. Linnaeus Wallflower

1. Petals greenish yellow; 5–10 mm long. Pedicels 2–4 mm long. ..... ***E. repandum***
1. Petals yellow to orange-red; 12–25 mm long. Pedicels 5–10 mm long.
   2. Mature siliques spreading; 8–12 cm long. ..... ***E. asperum***
   2. Mature siliques erect; 5–8 cm long. ..... ***E. capitatum***

Iodanthus (J. Torrey & A. Gray) E.G. Steudel Purple Rocket

One species. ..... ***I. pinnatifidus***

Leavenworthia J. Torrey

One species. ..... ***L. aurea***

Lepidium C. Linnaeus Pepperweed

1. Upper cauline leaves perfoliate or sagittate-clasping.
   2. Plants rhizomatous perennials. Petals 2.5–4.5 mm long. Siliques obcordate to reniform; inflated; apical notch absent; indehiscent; vescicular trichomes absent. .....***L. draba***
   (= *Cardaria draba*)
   2. Plants taprooted annuals or biennials. Petals 1.5–3 mm long. Siliques oblong to ovate; not inflated; dehiscent; vescicular trichomes present.
      3. Petals yellow. Basal leaves bipinnatisect. Upper cauline leaves perfoliate; ovate to orbicular. Fruiting pedicels glabrous. Silicles glabrate to glabrous. Seeds winged. ..... ***L. perfoliatum***
      3. Petals white. Basal leaves dentate to shallowly lobed. Upper cauline leaves sagittate-clasping; oblong to linear or lanceolate. Fruiting pedicels densely pubescent. Silicles with vesicular trichomes. Seeds not winged. ..... ***L. campestre***
1. Upper cauline leaves petiolate or sessile.
   4. Silicles pubescent at least on margins. ..... ***L. austrinum***
   4. Silicles glabrous.
      5. Petals conspicuous; equal to or longer than sepals. ..... ***L. virginicum***
      5. Petals inconspicuous, rudimentary or absent; shorter than sepals when present.
         6. Upper cauline leaves pinnatifid. Plants prostrate to ascending. ..... ***L. oblongum***
         6. Upper cauline leaves entire or serrate or dentate. Plants erect..... ***L. densiflorum***

Microthlaspi F.K. Meyer Pennycress

One species. ..... ***M. perfoliatum***
(= *Thlaspi perfoliatum*)

Myagrum C. Linnaeus

One species. ..... ***M. perfoliatum***

Nasturtium R. Brown Water Cress

One species. ..... ***N. officinale***

Paysonia S.L. O'Kane Jr. & I.A. Shehbaz Ear-leaf Bladderpod

One species. ..... ***P. auriculata***
(= *Lesquerella auriculata*)

Physaria (T. Nuttall ex J. Torrey & A. Gray) A. Gray Bladderpod, Twinpod

1. Plants perennials from woody caudices and taproots. ..... ***P. ovalifolia***
(= *Lesquerella ovalifolia*)

1. Plants annuals or biennials from taproots only.
   2. Ovules 2–4 per locule. Stipes of mature silicles inconspicuous. ..... ***P. angustifolia***
   (= *Lesquerella angustifolia*)
   2. Ovules 4–20 per locule. Stipes of mature silicles conspicuous.
      3. Fruiting pedicels sigmoid. ..... ***P. gordonii***
      (= *Lesquerella gordonii*)
      3. Fruiting pedicels straight or bent. ..... ***P. gracilis***
      (= *Lesquerella gracilis*)

Planodes E.L. Greene Rock Cress

One species. ..... ***P. virginica***
(= *Sibara virginica*)

Rapistrum H.J.N. von Crantz Bastard Cabbage

One species. ..... ***R. rugosum***

Rorippa J.A. Scopoli Yellow-Cress

1. Plants submerged aquatics. Petals white. ..... ***R. aquatica***
(= *Armoracia aquatica*)
1. Plants terrestrial or emergent aquatics. Petals yellow.
   2. Petals 3.5–8 mm long. Plants from rhizomes; perennials. ..... ***R. sinuata***
   2. Petals 1–2 mm long or absent. Plants from taproots; annuals or biennials.
      3. Petals 0 or rarely 1. Siliques sessile or subsessile, lower pedicels if present 0.5–1.5 mm long.
      Basal and lower cauline leaves sinuate-dentate to entire. ..... ***R. sessiliflora***
      3. Petals 4. Siliques pedicellate, pedicels 2–5 mm long. Basal and lower cauline leaves coarsely
      crenate to deeply lobed or pinnatifid.
         4. Basal and lower cauline leaves deeply cleft. Pedicels equal
         to or longer than mature siliques. ..... ***R. palustris***
         4. Basal and lower cauline leaves 1- or 2-pinnatifid.
         Pedicels 1/4–1/2 length of mature siliques. ..... ***R. teres***

Selenia T. Nuttall Golden Selenia

One species. ..... ***S. aurea***

Sinapis C. Linnaeus Mustard

One species. ..... ***S. arvensis***

Sisymbrium C. Linnaeus Hedge Mustard

1. Siliques terete, 3–10 cm long; widely divergent or loosely ascending. Limbs of
petals 5 mm or more long. ..... ***S. altissimum***
1. Siliques subulate, 1–2 cm long; appressed to rachis. Limbs of petals 3 mm or less long. ..... ***S. officinale***

Streptanthus T. Nuttall Twistflower

1. Upper leaves linear to linear-lanceolate; bases petiolate or cuneate. Filaments
of 2 longest stamens fused. Plants of western half of state only on sandy soils. ..... ***S. hyacinthoides***
1. Upper leaves ovate or oblong or lanceolate; bases auriculate-clasping.
Filaments of 2 longest stamens free. Plants of Ouachita Mountains area.
   2. Sepals glabrous; subapical horns absent. ..... ***S. maculatus***
   2. Sepals pubescent; hairs squamiform, transparent; subapical horns present. ..... ***S. squamiformis***

Thelypodium S.F.L. Endlicher

One species. ..... ***T. wrightii***

Thlaspi C. Linnaeus Meadow Parsnip

One species. ..... ***T. arvense***

BURMANNIACEAE C.L. von Blume Burmannia Family

Plants herbs; annuals. **Stems** filiform. **Leaves** filiform or scale-like; basal or cauline; simple; alternate; blades linear; stipules absent. **Inflorescences** heads; solitary; terminal. **Flowers** perfect; perianths in 1-series; radially symmetrical; tubular; 3-angled. **Perianth Parts** 6 or 3; in 1 or 2 whorls; fused; white or whitish green or whitish blue; petaloid. **Stamens** 3; included within perianths; fused to perianth parts; filaments absent. **Pistils** 1; compound, carpels 3; stigmas 1, 3-lobed; styles 1; ovaries inferior; locules 3; placentation axile. **Fruits** capsules; opening irregularly. **Seeds** numerous.

The family is represented in Oklahoma by 1 genus and 1 species. The mode of nutrition is not clearly defined in our species; specimens are green, but some members of the family are known to be saprophytic or mycotrophic. Plants are typically found in bogs in the southeastern part of the state and are rarely encountered.

Burmannia C. Linnaeus Blue Thread

One species. ..... ***B. capitata***

CABOMBACEAE A. Richard Water-Shield Family

Plants herbs; perennials; perennating organs rhizomes; floating-leaved aquatics. **Leaves** of 2 forms or all alike; abaxial surfaces and petioles often mucilaginous; simple; alternate or opposite or whorled; submerged blades palmately dissected into linear-filiform segments; floating blades peltate, orbicular or oval to elliptic, venation palmate; stipules absent. **Inflorescences** solitary flowers; axillary. **Flowers** perfect; perianths in 2-series. **Sepals** 3 or rarely 4; free; green or same color as petals. **Corollas** radially symmetrical. **Petals** 3 or rarely 4; free; clawed or not clawed; white with yellow auricles or reddish purple. **Stamens** 3 or 6 or 12 to 36. **Pistils** 2 to 18; simple, carpels 1; stigmas 1, decurrent or capitate; styles 1; ovaries superior; locules 1; placentation parietal. **Fruits** achene-like or follicle-like; indehiscent. **Seeds** 1 to 4.

The family is represented in Oklahoma by 2 genera and 2 species. Both are found in quiet waters of lakes, ponds and streams.

1. Submerged leaves absent. Leaves alternate. Petals reddish purple. Stamens 12–36. ..... ***Brasenia***
1. Submerged leaves present; palmately dissected. Leaves opposite or whorled.
   Petals white with yellow auricles. Stamens 3 or 6. ..... ***Cabomba***

Brasenia J.C.D. von Schreber Water Shield

One species. ..... ***B. schreberi***

Cabomba J.B.C.F. Aublet

One species. ..... ***C. caroliniana***

CACTACEAE A.L. de Jussieu Cactus Family

Plants herbs or shrubs; perennials; succulent; caulescent; armed with spines and/or glochids; spines and glochids arising from areoles. **Root Systems** fibrous. **Stems** cylindrical or flattened to form pads; ribbed or mammillate or smooth; branched or unbranched; jointed or not jointed. **Leaves** absent or occasionally present; all alike or of 2 forms; modified into spines or foliaceous; foliage leaves when present small, succulent, simple, alternate, caducous. **Inflorescences** solitary flowers arising from areoles; bracts present, spirally arranged, grading into perianth parts. **Flowers** perfect; perianths in 1-series; radially symmetrical**. Perianth Parts** numerous; spiraled; free; yellow or yellow with reddish base or magenta or green; outer sepaloid grading into inner petaloid. **Stamens** numerous; spiraled. **Pistils** 1; compound, carpels numerous; stigmas numerous; styles numerous, fused; ovaries inferior; locules 1; placentation parietal. **Hypanthia** present; tubular; extending beyond ovaries. **Fruits** berries. **Seeds** numerous.

The family is represented in Oklahoma by 6 genera and 16 species. It is distributed primarily in the arid regions of North and South America with its center of diversity in the warm deserts of the United States. In Oklahoma, species are encountered primarily in the western counties, but *Opuntia* and *Coryphantha* can be found throughout the state.

1. Stems of jointed segments, cylindrical or flattened. Areoles bearing both spines and glochids.
  2. Joints of stems cylindrical. Spine sheaths present; membranous. Glochids not barbed; capillary. ..... ***Cylindropuntia***
  2. Joints of stems (pads) flattened. Spine sheaths absent. Glochids barbed; well-developed. ..... ***Opuntia***
1. Stems not of jointed segments. Areoles bearing spines only.
  3. Stems ribbed. Berries with spines or scales.
    4. Petals with central red line. Fruits red; scaly. ..... ***Echinocactus***
    4. Petals without central red line. Fruits green; spiny. ..... ***Echinocereus***
  3. Stems not ribbed. Berries without spines or scales.
    5. Tubercles with adaxial grooves. Flowers borne on current year's growth. ..... ***Escobaria***
    5. Tubercles without adaxial grooves. Flowers borne on previous year's growth. ..... ***Mammillaria***

Cylindropuntia (G. Englemann) F.M. Knuth Cholla

1. Terminal joints 1.5–5.5 cm in diameter. Berries yellow. Spines 10–30 per areole. Perianths magenta. ..... ***C. imbricata***
(= *Opuntia imbricata*)

1. Terminal joints 0.3–1.2 cm in diameter. Berries red or green. Spines 1–10 per areole. Perianths yellow or yellow-green, sometimes reddish tinged.
  2. Spines obscuring stems; 6–10 per areole; reddish brown; sheaths white-tan. Plant appearing golden. Terminal joints 0.9–1.2 cm in diameter; whorled or subwhorled; tubercules conspicuous. Berries green; tuberculate. ..... ***C. davisii***
(= *Opuntia davisii*)
  2. Spines not obscuring stems; 1–3 per areole; grayish tan; sheaths tan. Plants green. Terminal joints 0.3–0.4 cm in diameter, alternate; tubercules inconspicuous, stems almost smooth. Berries red; smooth. ..... ***C. leptocaulis***
(= *Opuntia leptocaulis*)

Echinocactus J.H.F. Link & C.F. Otte

One species. ..... ***E. texensis***

Echinocereus G. Englemann

1. Flowers 5–7.5 cm in diameter. Radial spines 12–32 per areole. ..... ***E. reichenbachii***
1. Flowers 2–2.5 cm in diameter. Radial spines 8–10 per areole. ..... ***E. viridiflorus***

Escobaria N.L. Britton & J.N. Rose Pin Cushion Cactus

1. Flowers greenish to yellowish. Berries red, subglobose. ..... ***E. missouriensis***
(= *Coryphantha missouriensis*)
1. Flowers pink to purplish. Berries green; oblong to clavate. ..... ***E. vivipara***
(= *Coryphantha vivipara*)

Mammillaria A.H. Haworth Nipple Cactus

One species. ..... ***M. heyderi***

Opuntia P. Miller Prickly Pear

1. Pad spines absent. ..... ***O. humifusa***
(= *O. compressa*)

1. Pad spines present.
  2. Pad spines barbed. Mature berries tan; dry; apical rim of spreading spines present. Ovaries green or reddish green.
    3. Largest pads 5–12.5 cm long; 4–10 cm wide; less than 1/2 as thick as wide; not readily disarticulating. Spines inconspicuously barbed; shorter than pad widths. ..... ***O. polyacantha***
(= *O. trichophora*)
    3. Largest pads 2.5–4 cm long; 2.5–4 cm wide; 1/2 or more as thick as wide; readily disarticulating, but clinging by spines. Spines conspicuously barbed; equal to or longer than pad widths. ..... ***O. fragilis***

2. Pad spines not barbed. Mature berries red or reddish purple; fleshy; apical rim of spines absent. Ovaries red or reddish purple.
  4. Spines subulate, flattened at bases. Stems erect.
    5. Spines dark brown; 5–8 in most areoles. Pads bluish green. ..... ***O. phaeacantha***
    5. Spines white or cream or yellow or ashy gray; 1–4 in most areoles. Pads green. ..... ***O. engelmannii***
  4. Spines acicular. Stems prostrate or spreading.
    6. Pads blue-green; glaucous; dull. Perianth parts yellow with red bases. Stigma lobes cream or yellow. Spines white or pale gray; 3.8–5.6 cm long. Roots tuberculate. ..... ***O. macrorhiza*** (= *O. mackensenii*)
    6. Pads green; not glaucous; shiny. Perinath parts uniformly yellow. Stigma lobes white. Spines gray or light brown; 1.9–3 cm long. Roots not tuberculate.
      7. Spines 1 in most areoles. ..... ***O. humifusa*** (= *O. compressa*)
      7. Spines 2–8 in most areoles. ..... ***O. tortispina***

CAMPANULACEAE A.L. de Jussieu Bellflower Family

Plants herbs; annuals or biennials or perennials; perennating organs not apparent or rhizomes; terrestrial or emergent aquatics; sap white or colorless. **Leaves** simple; alternate; venation pinnate; stipules absent. **Inflorescences** spikes or racemes or panicles or solitary flowers; terminal or axillary. **Flowers** perfect; chasmogamous or cleistogamous; perianths in 2-series or 1-series; radially or bilaterally symmetrical. **Calyces** radially symmetrical; campanulate or tubular or bowl-shaped. **Sepals** 5 or 3 or 4; fused. **Corollas** radially or bilaterally symmetrical; bowl-shaped or bilabiate, with 2 petals above and 3 below. **Petals** 5 or 0; all alike or of 2 forms; fused; blue or red or white or purple. **Androecia** radially or bilaterally symmetrical. **Stamens** 5; of equal length or of 2 lengths; free or fused by filaments or by anthers. **Pistils** 1; compound, carpels 2 to 5; stigmas 2 to 5, capitate; styles 1; ovaries inferior; locules 2 to 5; placentation axile or parietal. **Nectaries** present; staminal or borne on pistils at bases of styles. **Fruits** capsules; poricidal or loculicidal. **Seeds** numerous.

The family is represented in Oklahoma by 3 genera and 11 species, all native. *Lobelia* is sometimes segregated into a separate family, the Lobeliaceae. Sphenocleaceae, on the other hand, is sometimes included in the Campanulaceae. The showy nature of *Lobelia* and *Campanula* makes them valuable horticulturally. Some members have been used in the treatment of respiratory problems.

1. Corollas bilaterally symmetrical; bilabiate. Stamens fused, forming a tube. Capsules apically valvate. ..... ***Lobelia***
1. Corollas radially symmetrical or absent. Stamens free. Capsules laterally poricidal.
  2. Leaves 0.5–3 cm long. Inflorescences axillary. Flowers sessile; of 2 types, upper chasmogamous and lower cleistogamous. ..... ***Triodanis***
  2. Leaves 6–17 cm long. Inflorescences terminal. Flowers pedicellate; all alike, chasmogamous. ..... ***Campanula***

Campanula C. Linnaeus Bluebell

One species. ..... ***C. americana*** (= *Campanulastrum americana*)

Lobelia C. Linnaeus

1. Corollas red; 35–50 mm long. Filament tubes 15–33 mm long. ..... ***L. cardinalis***
1. Corollas blue or bluish or purplish or white; 3–25 mm long. Filament tubes 2–15 mm long.
  2. Corollas 12–25 mm long. Filament tubes 6–15 mm long.
    3. Largest corollas 20–25 mm long; tubes 5–10 mm wide. Filament tubes 12–15 mm long. Pedicels 5–10 mm long; bracteoles glandular, medial. ..... ***L. siphilitica***
    3. Largest corollas 12–20 mm long; tubes 3–4 mm wide. Filament tubes 6–7 mm long. Pedicels 3–5 mm long; bracteoles not glandular, basal. ..... ***L. puberula***
  2. Corollas 3–6 mm long. Filament tubes 2–6 mm long.
    4. Capsules 6–10 mm long. Lower stems pilose to hirsute. ..... ***L. inflata***
    4. Capsules 3–5 mm long. Lower stems glabrous to puberulent.

5. Lower stems glabrous or glabrate. Bases of middle cauline leaves clasping to auriculate. Most calyx lobes ciliate. ..... ***L. appendiculata***
5. Lower stems puberulent. Bases of middle cauline leaves acute. Most calyx lobes glabrous or ciliate only at apices. ..... ***L. spicata***

Triodanis C.S. Rafinesque ex E.L. Greene — Venus' Looking-Glass

1. Leaves lanceolate to linear; 6–10 times as long as wide. Pores of capsules 1; distal. Lowest capsule 8–20 mm long. ..... ***T. leptocarpa***
1. Leaves ovate to suborbicular; 0.5–3 times as long as wide. Pores of capsules 2 or 3; medial to submedial to distal. Lowest capsule 5–8 mm long.
   2. Pores linear; 0.2–0.4 mm wide. Cartilage of pores with narrow scarious margins. ..... ***T. holzingeri***
   2. Pores elliptic to oval or circular; 0.5–1.5 mm wide. Cartilage of pores with broad scarious margins.
      3. Pores medial or sub-medial. Seeds muricate; dull. ..... ***T. perfoliata***
      3. Pores sub-medial to distal. Seeds smooth; shiny.
         4. Upper leaves 5–18 mm wide; most wider than long; margins conspicuously toothed. Seeds 0.8–1 mm long. ..... ***T. lamprosperma***
         4. Upper leaves 2–5 mm wide; most longer than wide; margins entire to conspicuously toothed. Seeds 0.4–0.7 mm long. ..... ***T. perfoliata*** (= *T. biflora*)

CANNABACEAE S.F.L. Endlicher — Hemp Family

Plants herbaceous vines or herbs; annuals; strongly aromatic; dioecious. **Leaves** simple or palmately compound; alternate above and opposite below; venation pinnate; stipules present. Simple Leaves: blades cordate; margins palmately 3-lobed and serrate. Compound Leaves: leaflets linear to lanceolate to elliptic; margins serrate. **Inflorescences** of 2 types; staminate and pistillate different; axillary; staminate inflorescences panicles; pistillate inflorescences spikes or clusters; bracts foliaceous, small, or large and enclosing flowers and fruits. **Flowers** imperfect, staminate and pistillate different; perianths in 1-series. **Staminate Flowers:** Calyces radially symmetrical. Sepals 5; free. Petals absent. Stamens 5. **Pistillate Flowers:** Calyces radially symmetrical. Sepals 5; fused; appressed; hyaline. Petals absent. Pistils 1; compound, carpels 2; stigmas 2, linear; styles 1, short; ovaries superior; locules 1; placentation apical. **Fruits** achenes, enclosed by subtending bracts. **Seeds** 1.

The family is represented in Oklahoma by 2 genera and 2 species. It is closely related to the Urticaceae and Moraceae and is sometimes included in the former. Both species are introduced in Oklahoma. *Humulus* is used in brewing beer and occasionally escapes. *Cannabis* is encountered in illegal, clandestine cultivation or in disturbed areas. *Celtis*, formerly positioned in the Ulmaceae or Elm family, is included here by some taxonomists. We, however, classify the genus in the Celtidaceae.

1. Plants erect herbs. Leaves palmately compound. Pistillate inflorescences 5–15 mm wide. Bracts of pistillate flowers 2 mm wide. ..... ***Cannabis***
1. Plants twining vines. Leaves simple. Pistillate inflorescences 20–30 mm wide. Bracts of pistillate flowers 8–10 mm wide. ..... ***Humulus***

Cannabis C. Linnaeus — Hemp

One species. ..... ***C. sativa***

Humulus C. Linnaeus — Hops

One species. ..... ***H. lupulus***

CAPRIFOLIACEAE A.L. de Jussieu — Honeysuckle Family

Plants shrubs or woody vines or herbs; annuals or biennials or perennials; deciduous or evergreen. **Stems** terete or striate-angled. **Leaves** cauline or both basal and cauline; simple; opposite; petiolate or sessile; connate or not connate; venation pinnate; stipules absent. **Inflorescences** simple or compound cymes or heads or few-flowered clusters or solitary flowers; terminal or axillary; bracts present or absent; bracteoles present or absent. **Flowers** perfect or neuter; perianths in 1-series or 2-series. **Sepals** 0 or 5; fused; well developed or minute or highly modified into a bowl-shaped mass of prickles. **Corollas** radially or bilaterally symmetrical; tubular to funnelform or salverform or bilabiate. **Petals** 4 or 5; fused; gibbous or not gibbous; white to purplish or

pinkish white or yellow or red. **Stamens** 2 to 5; epipetalous; exserted beyond or included within perianths. **Pistils** 1; compound, carpels 2 to 5; stigmas 1, capitate, entire or lobed; styles 1; ovaries inferior; locules 1 to 5; placentation axile or apical. **Nectaries** present; petaliferous. **Fruits** berries or drupes or achenes. **Seeds** 1 to numerous.

The family is represented in Oklahoma by 6 genera and 20 species. On the basis of phylogenetic studies, its circumscription has been widened, with inclusion of the Dipsacaceae or teasel family and the Valerianaceae or valerian family. *Sambucus* and *Viburnum,* long classified in this family, are now positioned in the Adoxaceae or elderberry family.

1. Plants woody; shrubs or vines. Fruits berries or berry-like drupes with 2 stones.
    2. Corollas 10–56 mm long; bilaterally symmetrical. Locules 2 or 3. Fruits berries. Seeds numerous. ..... ***Lonicera***
    2. Corollas 4–7 mm long; radially symmetrical. Locules 4. Fruits berry-like drupes. Seeds 2. ..... ***Symphoricarpos***
1. Plants herbs. Fruits achenes or dry drupes with 3 stones.
    3. Inflorescences conical heads surrounded by an involucre.
        4. Coarse prickles present on abaxial midveins of blades and on involucral bracts. Petals 4. Stamens 4. ..... ***Dipsacus***
        4. Prickles on midveins and involucre absent. Petals 5. Stamens 5. ..... ***Scabiosa***
    3. Inflorescences flat-topped compound cymes or clusters or solitary flowers, not involucrate.
        5. Branches of stems conspicuously dichotomous. Inflorescences dense, flat-topped cymes. Sepals 0.2–0.5 mm long or absent. Fruits achenes. ..... ***Valerianella***
        5. Branches of stems not dichotomous. Inflorescences solitary flowers or few-flowered clusters. Sepals 8–18 mm long. Fruits dry drupes with 3 stones. ..... ***Triosteum***

Dipsacus C. Linnaeus Teasel

One species. ..... ***D. fullonum***
(= *D. sylvestris*)

Lonicera C. Linnaeus Honeysuckle

1. Uppermost pairs of leaves not perfoliate. Inflorescences axillary.
    2. Plants shrubs. Corollas 1–2.3 cm long. Berries red or red-orange before frost. ..... ***L. maackii***
    2. Plants vines. Corollas 2.5–6 cm long. Berries black before frost. ..... ***L. japonica***
1. Uppermost pairs of leaves perfoliate. Inflorescences terminal.
    3. Corollas 3.5–5 cm long; deep red or red-yellow; weakly bilaterally symmetrical. ..... ***L. sempervirens***
    3. Corollas 1.5–3 cm long; white to yellow or pink; strongly bilaterally symmetrical, bilabiate.
        4. Pair of perfoliate leaves 2.5–5 cm long from apex to apex. ..... ***L. albiflora***
        4. Pair of perfoliate leaves 5–9 cm long from apex to apex.
            5. Corollas 2–3 cm long; bright yellow to orange tinged. Abaxial surfaces of leaves not glaucous. Outer surface of corolla tubes sparsely villous. ..... ***L. flava***
            5. Corollas 1.5–1.7 cm long; pale yellow to pink. Abaxial surfaces glaucous. Outer surface of corolla tubes glabrous or glabrate. ..... ***L. dioica***

Scabiosa C. Linnaeus Pincusions

One species. ..... ***S. atropurpurea***

Symphoricarpos H.L. Duhamel du Monceau Coral Berry

1. Corollas 2–4 mm long. Drupes coral to magenta. Plants of eastern 3/4 of state. ..... ***S. orbiculatus***
1. Corollas 6–12 mm long. Drupes white, sometimes drying black to bluish. Plant of western Cimarron County.
    2. Plants erect. Corollas campanulate; lobe lengths equal to tube lengths. Stamens exserted beyond perianths. Styles 4–8 mm long. ..... ***S. occidentalis***
    2. Plants trailing. Corollas salverform; lobe lengths shorter than tube lengths. Stamens included with perianths. Styles 3–4 mm long. ..... ***S. palmeri***

Triosteum C. Linnaeus Horse-Gentian

1. Corollas yellow. Flowers subtended by 2 bracts. Bracts as long as or longer than corollas. Styles included within corollas. Abaxial surfaces of sepals glabrous or glabrate. ..... ***T. angustifolium***
1. Corollas orange to dark red. Flowers or cymes subtended by 1 bract. Bracts one-half as long as corollas. Styles exserted beyond corollas. Abaxial surfaces of sepals pubescent.

2. Leaves pandurate; bases perfoliate. ..... ***T. perfoliatum***
2. Leaves oblanceolate to elliptical; bases cuneate to attenuate. ..... ***T. aurantiacum***

Valerianella P. Miller Corn-Salad, Lamb's Lettuce

1. Ovaries and achenes uncinate-hirsute. ..... ***V. amarella***
1. Ovaries and achenes glabrous to variously pubescent, but not uncinate-hirsute.
    2. Corollas 1–3 mm long. Bract margins with minute, white, non-glandular hairs.
        3. Corollas 2.5–3 mm long. Two sterile carpels of achenes inconspicuous at 20X magnification. ..... ***V. palmeri***
        3. Corollas 1.5–2 mm long. Two sterile carpels of achenes conspicuous at 20X magnification. ..... ***V. radiata***
    2. Corollas 4–10 mm long. Bract margins with purple, glandular teeth.
        4. Corolla tubes white; 4–6 mm long; minutely gibbous at or above middle. ..... ***V. nuttallii***
        4. Corolla tubes pink to purplish-red; 7–10 mm long; minutely gibbous below middle.
            5. Achenes all alike, glabrate to minutely puberulent; 1.8–22 mm long; 1–1.5 times longer than wide; fertile carpel narrower than 2 sterile carpels together. ..... ***V. longiflora***
            5. Achenes of 2 forms, glabrous to puberulent or ciliate in three lines; 2.5–3.3 mm long; 2-3 times longer than wide; fertile carpel wider than 2 sterile carpels together. ..... ***V. ozarkana***

CARYOPHYLLACEAE A.L. de Jussieu Pink Family

Plants herbs; annuals or perennials; nodes often swollen. **Leaves** herbaceous or indurate or scarious; cauline or basal or forming a basal rosette; simple; opposite or whorled or fascicled; sessile or petiolate; connate or not connate or connected by a transverse line; blades linear to lanceolate or ovate or elliptic; venation pinnate or appearing parallel-veined or a single vein; margins entire; stipules absent or present. **Inflorescences** solitary flowers or simple or compound cymes or umbellate clusters; terminal or axillary; bracts present or absent. **Flowers** perfect; perianths in 2-series or 1-series. **Sepals** 4 or 5; free or fused. **Corollas** radially symmetrical. **Petals** 5 or 0; free; clawed or not clawed; green or white or pink to red. **Stamens** 1 to 10. **Pistils** 1; compound, carpels 2 to 5; stigmas 2 to 5; styles 2 to 5; ovaries superior; locules 1; placentation free-central or basal. **Hypanthia** absent or present; cup-shaped. **Nectaries** absent or present; receptacular. **Fruits** capsules or utricles; dehiscent or indehiscent; valvate. **Seeds** numerous or 1.

The family is represented in Oklahoma by 17 genera and 34 species. Thirteen are introduced. *Paronychia* is placed in the Paronychiaceae or Illecebraceae by some taxonomists. Likewise, five genera have been recognized as members of the Alsinaceae. The family occurs throughout Oklahoma.

1. Sepals fused, or if free, hypanthia present.
    2. Petals absent.
        3. Styles 3–5. ..... ***Silene***
        3. Styles 2.
            4. Hypanthia present. Flowers sessile. ..... ***Scleranthus***
            4. Hypanthia absent. Flowers pedicellate. ..... ***Paronychia***
    2. Petals present.
        5. Bracts present.
            6. Calyx nerves 20–40. Petals 2–2.5 cm long. ..... ***Dianthus***
            6. Calyx nerves 15 or fewer. Petals 1–1.4 cm long. ..... ***Petrorhagia***
        5. Bracts absent.
            7. Calyces united less than 1/2 their length. Petals shorter than sepals. ..... ***Agrostemma***
            7. Calyces united more than 1/2 their length. Petals longer than sepals.
                8. Styles 3–5. ..... ***Silene***
                8. Styles 2.
                9. Calyces cylindrical; 20-nerved; not winged. Petals with appendages at bases. ..... ***Saponaria***
                9. Calyces ovoid; 5-nerved; winged. Petals without appendages. ..... ***Vaccaria***
1. Sepals free; hypanthia absent.
    10. Stipules present; white; hyaline.
        11. Fruits utricles. Seeds 1. Sepal apices cupped or folded. Plants glabrous or if indumented, not glandular-pubescent. ..... ***Paronychia***
        11. Fruits capsules. Seeds numerous. Sepal apices flat. Plants glandular-pubescent.

12. Sepal apices awned; margins with two lateral bristles. Petals green or absent. Inflorescences axillary; solitary or in clusters. ..... ***Loeflingia***
12. Sepal apices acute; margins entire. Petals white or pink. Inflorescences terminal; cymes. ..... ***Spergularia***

10. Stipules absent.
13. Inflorescences umbels. Petals erose-fimbriate. ..... ***Holosteum***
13. Inflorescences of various types, but not umbels. Petals entire or notched or bifid.
14. Mature capsules dehiscent by 6–10 teeth; typically bent apically. ..... ***Cerastium***
14. Mature capsules dehiscent by 3–6 valves; erect apically.
15. Petals absent.
16. Leaves linear to linear subulate; less than 1 mm wide. Sepals 1.4–2.5 mm long. ..... ***Sagina***
16. Leaves ovate; 5–20 mm wide. Sepals 3.5–7 mm long. ..... ***Stellaria***
15. Petals present.
17. Petals deeply bifid, [hence falsely appearing to have 10 petals]. ..... S***tellaria***
17. Petals entire to shallowly notched.
18. Styles 5 or 4. Capsule valves 5 or 4. ..... ***Sagina***
18. Styles 3. Capsule valves 3 or 6.
19. Ovary sutures 3. Capsules opening apically by 3 valves.
20. Leaves needle-like. Plants perennials. .....***Sabulina***
20. Leaves ovate to linear. Plants annuals.....***Monoeuria***
19. Ovary sutures 6. Capsules opening apically by 6 valves.
21. Leaves needle-like. Plants of Cimarron County. ..... ***Eremogone***
21. Leaves ovate to linear. Plants of body of state. .....***Arenaria***

Agrostemma C. Linnaeus Corn Cockle

One species. ..... ***A. githago***

Arenaria C. Linnaeus Sandwort

1. Leaves ovate. Sepals scaberulous-puberulent; 3- or 5-nerved; nerves conspicuous. ..... ***A. serpyllifolia***
1. Leaves oblong-lanceolate or oblanceolate. Sepals glabrous; 1-nerved; nerves faint or obscure. ..... ***A. benthami***

Cerastium C. Linnaeus Mouse-Ear Chickweed

1. Stamens 4 or 5. ..... ***C. pumilum***
1. Stamens 10.
2. Margins of bracts scarious. Plants perennials. ..... ***C. fontanum*** (= *C. vulgatum*)
2. Margins of bracts herbaceous. Plants annuals.
3. Pedicels 3–5 mm long, shorter than sepals; cymes dense. Leaves elliptic to ovate or obovate. ..... ***C. glomeratum*** (= *C. viscosum*)
3. Pedicels 5–40 mm long; equal to twice length of sepals; cymes open, leaves oblong to lanceolate.
4. Pedicels equal to or shorter than capsules; deflexed proximally. Petals ovate-elliptic. ..... ***C. brachypodium***
4. Pedicels longer than capsules; deflexed distally. Petals oblanceolate. ..... ***C. nutans***

Dianthus C. Linnaeus Pink

One species. ..... ***D. armeria***

Eremogone J. Frenzl Sandwort

One species. ..... ***E. hookeri*** (= *Arenaria hookeri*)

Holosteum C. Linnaeus

One species. ..... ***H. umbellatum***

Loeflingia C. Linnaeus

One species. ..... ***L. squarrosa***

Mononeuria H.G.L. Reichenbach Sandwort

1. Sepals elliptic-lanceolate; less than 2 mm wide; acute; 3- or 5-nerved, nerves conspicuous. ..... ***M. patula***
(= *Arenaria patula*, *Minuartia patula*)
1. Sepals ovate; more than 2 mm wide; obtuse; 1-nerved; nerves faint or obscure. ..... ***M. nuttallii***
(= *Arenaria drummondii*, *Minuartia drummondii*)

Paronychia P. Miller Nailwort

1. Leaves flattened; oblanceolate to elliptic. Plants annuals; from taproots.
    2. Sepals 2–3 mm long; margins herbaceous; mucronate. ..... ***P. fastigiata***
    2. Sepals 1–1.5 mm long; margins white; awned.
        3. Calyces and stems glabrous. ..... ***P. canadensis***
        3. Calyces subtended by a ring of uncinate hairs. ..... ***P. drummondii***
1. Leaves not flattened; linear to needle-like. Plants perennials; from woody rootstocks.
    4. Plants cushion-shaped. Stems spreading; 1–4 cm long. Calyces shorter than bracts or leaves. ..... ***P. sessiliflora***
    4. Plants not cushion-shaped. Stems erect; 10–35 cm long. Calyces longer than bracts or leaves.
        5. Sepals triangular lanceolate; prominently 3-ribbed. ..... ***P. virginica***
        5. Sepals oblong to oblong-elliptic; not ribbed. ..... ***P. jamesii***

Petrorhagia (N.C. Seringe) J.H.F. Link

1. Apices of petals notched or 2-lobed. Veins of petals with 1–3 darkened areas.
Leaf sheaths 3–6 mm long. Bracts herbaceous. ..... ***P. dubia***
(= *P. velutina*)
1. Apices of petals truncate or emarginate. Veins of petals without darkened areas.
Leaf sheaths 1–3 mm long. Bracts scarious. ..... ***P. prolifera***

Sagina C. Linnaeus Pearlwort

One species. ..... ***S. decumbens***

Saponaria C. Linnaeus

One species. ..... ***S. officinalis***

Scleranthus C. Linnaeus

One species. ..... ***S. annuus***

Silene C. Linnaeus Catchfly

1. Petals absent. ..... ***S. antirrhina***
1. Petals present.
    2. Petals red.
        3. Cauline leaves 2–4 pairs; lanceolate to oblanceolate; tapering at bases.
        Apices of petals notched. ..... ***S. virginica***
        3. Cauline leaves 12–30 pairs; ovate to ovate-lanceolate; rounded at bases.
        Apices of petals rounded, not notched. ..... ***S. regia***
    2. Petals white or pink.
        4. Sepals in fruit 20–25 mm long. Flowering opening at night. ..... ***S. noctiflora***
        4. Sepals in fruit 5–10 mm long. Plants opening during the day.
            5. Mid-cauline leaves whorled, 4 per node. Internodes not glandular-sticky.
            Apices of petals 8- to 12-lobed. ..... ***S. stellata***
            5. Mid-cauline leaves opposite, 2 per node. Internodes glandular-sticky.
            Apices of petals 2-lobed. ..... ***S. antirrhina***

Spergularia (C.H. Persoon) J. Presl & C. Presl Sand Spurry

One species. ..... ***S. salina***

Stellaria C. Linnaeus Chickweed

One species. ..... ***S. media***

Sabulina H.G.L. Reichenbach Sandwort

One species. ..... ***S. michauxii***
(= *Arenaria stricta, Minuartia michauxii*)

Vaccaria N.M. von Wolf Cow Cockle

One species. ..... ***V. hispanica***
(= *V. pyramidata*)

CELASTRACEAE R. Brown Bittersweet Family

Plants herbs or shrubs or small trees or woody vines; annuals or perennials; deciduous or evergreen; bearing perfect flowers or dioecious or polygamo-dioecious. **Stems** erect or trailing or scandent. **Leaves** herbaceous or coriaceous; simple; opposite or alternate; venation pinnate; stipules absent or present, minute, caducous. **Inflorescences** solitary flowers or compound cymes or racemes or panicles; terminal or axillary. **Flowers** perfect, but functionally staminate or pistillate in 2 genera; perianths in 2-series. **Sepals** 4 or 5; free or fused. **Corollas** radially symmetrical. **Petals** 4 or 5; free; claws present or absent; spreading or reflexed; white to greenish white or greenish purple to dark purple. **Stamens** 4 or 5; staminodia 0 or 15 fused in 5 clusters. **Pistils** 1; compound, carpels 2 to 5; stigmas 1 or 4, not lobed or 2- to 5-lobed, capitate; styles 1 or 0; ovaries superior or partially inferior; locules 1 to 5; placentation axile or parietal; ovules 2 to 6 per locule. **Hypanthia** absent or present; saucer-shaped. **Nectaries** absent or present; 1; staminal; disks large, occupying entire flower centers, rounded or shallowly lobed. **Fruits** capsules; septicidal or loculcidal. **Seeds** 2 to numerous; showy arils present or absent.

The family is represented in Oklahoma by 4 genera and 9 species. *Lepuropetalon* and *Parnassia* were formerly positioned in the Saxifragaceae. Phylogenetic studies, however, support their placement in this family. Cultivated as ornamentals *Celastrus and Euonymus* occasionally escape. Their bright, showy seeds and arils are prized horticulturally and eaten by birds.

1. Plants herbs.
    2. Plants annuals; less than 3 cm in height and diameter. Flowers 1.5–2 mm in diameter. ..... ***Lepuropetalon***
    2. Plants perennials; more than 3 cm in height and diameter. Flowers 25–30 mm in diameter. ..... ***Parnassia***
1. Plants shrubs or small trees or woody vines
    3. Leaves alternate. Inflorescences terminal; panicles or racemes.
        Capsules not lobed; orange or orangish yellow. ..... ***Celastrus***
    3. Leaves opposite. Inflorescences axillary; cymes.
        Capsules lobed; purple or crimson or green. ..... ***Euonymus***

Celastrus C. Linnaeus Bittersweet

1. Leaves suborbicular to broadly oblong-obovate; apices acute. Flowers 2 or 3 in axillary cymes. ..... ***C. orbiculatus***
1. Leaves ovate to ovate-lanceolate; apices acuminate. Flowers numerous in terminal panicles. ..... ***C. scandens***

Euonymus C. Linnaeus

1. Branches corky winged. ..... ***E. alatus***
1. Branches not corky winged.
    2. Flowers 5-merous. Capsules tuberculate. ..... ***E. americanus***
    2. Flowers 4-merous. Capsules smooth.
        3. Petioles 3–5 mm long. Capsules not lobed. ..... ***E. kiautschovicus***
        3. Petioles 5–20 mm long. Capsules deeply 4-lobed.
            4. Abaxial surfaces of leaves puberulent. Petals brownish-purplish. Arils red or scarlet ..... ***E. atropurpureus***
            4. Abaxial surfaces of leaves glabrous. Petals greenish or yellowish white. Arils orange. .....***E. europaeus***

Lepuropetalon S. Elliott Petite Plant

One species. ..... ***L. spathulatum***

Parnassia C. Linnaeus Grass of Parnassus

One species. ..... ***P. grandifolia***

CELTIDACEAE J.H.F. LINK Hackberry Family

Plants trees or shrubs; perennials; polygamo-monoecious. **Older Bark** light gray; smooth but irregularly verrucose, and/or with narrow, vertical corky ridges. **Leaves** simple; alternate; venation pinnipalmate or pinnate; blades lanceolate to ovate; margins entire or serrate; bases oblique or cordate. **Inflorescences** of 2 types; staminate and pistillate different; axillary; staminate inflorescences fascicles or short racemes, flowers typically in 3s; pistillate inflorescences solitary or paired flowers. **Flowers** imperfect or perfect, staminate and pistillate similar; perianths in 1-series. **Calyces** radially symmetrical. **Sepals** 4–6; free or fused. **Petals** absent. **Stamens** 4–6. **Pistils** 1; compound, carpels 2; stigmas 2, linear, divergent to recurved; styles 1, short; ovaries superior; locules 1; placentation apical. **Fruits** drupes. **Seeds** 1.

The family is represented in Oklahoma by 1 genus and 4 species. Classification of *Celtis* has long been problematic. It has been treated as the subfamily Celtidoideae in the Ulmaceae or elm family; treated as a distinct family; and placed in the Cannabaceae or hemp family. Phylogenetic studies demonstrate that it definitely does not belong in the Ulmaceae, and indicate its possible placement in the Cannabaceae or alternatively in its own family, a position we follow here, until further data are available. *Celtis* is an important genus for wildlife, providing food for birds and mammals and serving as a larval host for several species of butterflies.

Celtis C. Linnaeus Hackberry

1. Leaves uniformly serrate from apices to near bases. Drupes wrinked when dry. ..... ***C. occidentalis***
1. Leaves entire or irregularly serrate to entire. Drupes smooth when dry.
    2. Adaxial surfaces of leaf blades smooth. Apices of most leaves falcate. ..... ***C. laevigata***
    2. Adaxial surfaces of leaf blades scabrous. Apices of most leaves symmetrical.
        3. Leaf blades thick; coriaceous to subcoriaceous; ovate to broadly lanceolate; tertiary veins conspicuously raised on abaxial surfaces. Mature drupes beaked; reddish or reddish black. Plants of Arbuckle Mountains and western 1/2 of state. ..... ***C. reticulata***
        3. Leaf blades thin; membranous; lanceolate; tertiary veins not raised on abaxial surfaces. Mature drupes not beaked; orange to brown or cherry red. Plants of eastern 1/4 of state ..... ***C. tenuifolia***

CERATOPHYLLACEAE S.F. Gray Hornwort Family

Plants herbs; perennials; perennating organs absent; submerged aquatics to 2 m long, forming large masses; reproducing by flowers and stem fragmentation; monoecious. **Root Systems** absent, even in embryos. **Leaves** brittle; cauline, crowded at stem apices; simple; whorled; sessile; 3-12 per node; blades 1- to 4-times dichotomously branched into filiform to linear divisions; venation not apparent; margins entire to dentate or serrate; stipules absent. **Inflorescences** solitary flowers; axillary; bracts present. **Flowers** imperfect, staminate and pistillate similar; perianths in 1-series. **Sepals** 8-15; fused; often dentate or lacerate. **Petals** absent. **Stamens** 12 to 20; spiraled; anthers terminating in 2 or 3 sharp points; filaments short or absent. **Pistils** 1; simple, carpels 1; stigmas 1, decurrent; styles 1, persistent, becoming indurate; ovaries superior; locules 1; placentation apical. **Fruits** achenes; with or without lateral spines. **Seeds** 1.

The family is represented in Oklahoma by 1 genus and 2 species. Plants float free in the water column of quiet areas of lakes, ponds, and streams. They often become a nuisance because of their dense growth, but do provide shelter for small fish and other animals.

Ceratophyllum C. Linnaeus Hornwort

1. Leaf divisions 2-4; dentate to serrate; teeth visible without magnification. ..... ***C. demersum***
1. Leaf divisions 3-8; entire or denticulate or serrulate; teeth visible only with magnification. ..... ***C. echinatum***

CISTACEAE A.L. de Jussieu Rockrose Family

Plants herbs; annuals or perennials. **Leaves** cauline and/or forming a basal rosette; simple; alternate; blades lanceolate or linear to filiform; venation parallel-convergent or a single vein; indumentum villous or hirsute or appearing stellate; margins entire; stipules absent. **Inflorescences** simple or scorpioid cymes or rarely solitary flowers. **Flowers** perfect; chasmogamous and cleistogamous;

perianths in 1-series or 2-series. **Sepals** 5; of 2 forms; in 2 whorls; free or fused. **Corollas** radially symmetrical. **Petals** 3 or 5 or 0; free; yellow or reddish green or reddish purple. **Stamens** 3 to numerous; free or fascicled. **Pistils** 1; compound, carpels 3; stigmas 1 or 3, not lobed or 3-lobed; capitate or plumose; styles 1 or 0; ovaries superior; locules 1 or 3; placentation parietal. **Nectaries** present; 1; annular. **Fruits** capsules; loculicidal. **Seeds** 2 to numerous.

The family is represented in Oklahoma by 2 genera and 4 species. Plants are present throughout the state except in the Panhandle.

1. Stem surfaces villous or strigose. Petals 3; reddish green or reddish purple; persistent; flattened in bud. Locules 3. ..... ***Lechea***
1. Stem surfaces stellate. Petals 5 or 0; yellow; caducous; convolute or crumpled in bud. Locules 1. ..... ***Helianthemum***

Helianthemum P. Miller Sunrose

1. Sepals of chasmogamous flowers 3.6–6.6 mm long. Capsules of chasmogamous flowers 4–6 mm long; seeds 20–35. ..... ***H. georgianum***
1. Sepals of chasmogamous flowers 1–4 mm long. Capsules of chasmogamous flowers 1.3–4 mm long; seeds 1–6. ..... ***H. rosmarinifolium***

Lechea C. Linnaeus Pinweed

1. Mid-cauline leaves 3–9 mm wide. Erect stems pilose or villous. ..... ***L. mucronata***
1. Mid-cauline leaves 0.5–1.5 mm wide. Erect stems sericeous. ..... ***L. tenuifolia***

CLEOMACEAE B.W. von Berchtold & J.Presl Spiderflower Family[1]

Plants herbs; annuals; usually viscid-pubescent and aromatic. **Leaves** palmately compound; alternate; leaflets 3 or 5; ovate to oblong or lanceolate or linear; venation pinnate; margins entire; stipules absent or present, minute. **Inflorescences** racemes; bracts present. **Flowers** perfect; perianths in 2-series. **Sepals** 4; free or fused. **Corollas** bilaterally symmetrical. **Petals** 4; all alike or of 2 forms; free; clawed; white or pink or yellow or lavender. **Stamens** 6 to 20; exserted beyond perianths. **Pistils** 1; compound, carpels 2; stipitate or sessile; stigmas 1, capitate; styles 1 or 0; ovaries superior; locules 1; placentation parietal. **Nectaries** present; 1; receptacular, sometimes long and lobed. **Fruits** capsules. **Seeds** numerous.

The family is represented in Oklahoma by 5 genera and 7 species. Phylogenetically closely related to the Brassicaceae and Capparaceae, the Cleomaceae has traditionally been treated as a subfamily of the Capparaceae or caper family. Studies, however, indicate that it can be recognized as a distinct family. The popular garden ornamental cleome, commonly known as bee-plant or spider-flower, is a member of the family. Its circumscription has been narrowed and Oklahoma taxa formerly included within it are now positioned in other genera.

1. Capsules rhomboidal, as long as broad. Seeds 4–8. Petals yellow. ..... ***Cleomella***
1. Capsules elongate, 5–10 times as long as broad. Seeds 12–70. Petals white or pink or lavender.
    2. Petals of 2 forms; apices emarginate to lobed. Capsules sessile to short stipitate; stipes 0–7 mm long. ..... ***Polanisia***
    2. Petals all alike; apices obtuse to rounded. Capsules long-stipitate; stipes 10–70 mm long.
        3. Staminal filaments green; fused to stipes of pistils. Stipules absent. ..... ***Gynandropsis***
        3. Staminal filaments purple; free from stipes of pistils. Stipules present; spinose or bristle-like.
            4. Leaflets 3; not glandular. Stipules bristles; 0.5–0.8 mm long; deciduous. Petioles not bearing prickles. ..... ***Peritoma***
            4. Leaflets 5 or 7; glandular. Stipules spines; 1–3 mm long; persistent. Petioles bearing prickles. ..... ***Tarenaya***

Cleomella A.P. de Candolle

One species. ..... ***C. angustifolia***

Gynandropsis A.P. de Candolle Spider Wisp

One species. ..... ***G. gynandra***
(= *Cleome gynandra*)

Peritoma A.P. de Candolle Bee Plant

One species. ..... ***P. serrulata***
(= *Cleome serrulata*)

Polanisia C.S. Rafinesq Clammy Weed

1. Leaflets obovate to oblanceolate; 5–20 mm wide. Styles 5–17 mm long; deciduous from fruit. ..... ***P. dodecandra***
1. Leaflets linear to elliptic; 0.8–2.5 mm wide. Styles 0.5–4.5 mm long; persistent on fruit.
   2. Longest petals 3.2–5 mm long. Stigmas red. Anthers yellow. Nectary glands 2–3 mm long. Stipes 1–4 mm long. ..... ***P. jamesii***
   2. Longest petals 7–10 mm long. Stigmas green. Anthers purple. Nectary glands 3.5–4 mm long. Stipes 7–14 mm long. ..... ***P. erosa***

Tarenaya C.S. Rafinesque Spider Flower

One species. ..... ***T. hassleriana***
(= *Cleome hassleriana*)

[1] Treatment contributed by Staria S. Vanderpool

COLCHICACEAE A.P. de Candolle Colchicum Family

Plants herbs; perennials; perennating organs rhizomes; caulescent. **Root Systems** fibrous. **Stems** not branched or forked above middle; bearing 4 to 6 bladeless papery sheaths below. **Leaves** cauline; simple; alternate; sessile or perfoliate; venation parallel-convergent; stipules absent. **Inflorescences** solitary flowers or racemose; pendulous; terminal, but appearing axillary due to elongation of branches or paired flowers, or racemes; bracts present or absent. **Flowers** showy; perfect; perianths in 1-series, narrowly campanulate; radially symmetrical. **Perianth Parts** 6; petaloid; free. **Stamens** 6; arising from receptacles. **Pistils** 1; compound, carpels 3; stigmas 3; styles 1 or 3; ovaries superior; locules 3; placentation axile. **Hypanthia** absent; **Nectaries** present; at bases of perianth parts. **Fruits** loculicidal capsules. **Seeds** numerous.

The family is represented in Oklahoma by 1 genus and 3 species. *Uvularia* was formerly positioned in the Liliaceae or lily family. Phylogenetic studies, however, support its placement in the Colchicaceae.

Uvularia C. Linnaeus Bellwort

1. Leaves sessile; margins papillose-denticulate. Stems angled distally. Bracts absent. Capsules 3-winged; ellipsoidal; not beaked. ..... ***U. sessilifolia***
1. Leaves perfoliate; margins entire. Stems terete distally. Bracts present; 2. Capsules not winged; obovoid to obpyramidal; beaked, beaks 6.
   2. Perianth parts golden yellow; adaxial surfaces smooth. Beaks of capsules truncate. Stems not glaucous. ..... ***U. grandiflora***
   2. Perianth parts straw yellow; adaxial surfaces papillose, papillae orange. Beaks of capsules attenuate. Stems glaucous. ..... ***U. perfoliata***

COMMELINACEAE R. Brown Spiderwort Family

Plants herbs; annuals or perennials; succulent; sap mucilaginous. **Root Systems** fibrous; fleshy or not fleshy. **Stems** jointed; nodes swollen. **Leaves** cauline or basal and cauline; simple; alternate; with basal sheaths, margins fused, membranous; blades linear to ovate; venation parallel or parallel-convergent; margins entire; stipules absent. **Inflorescences** simple or compound cymes; terminal or axillary; spathes absent or present, consisting of 2 foliaceous bracts or 1 expanded cymbiform bract. **Flowers** perfect; perianths in 2-series. **Sepals** 3; free. **Corollas** ephemeral; deliquescent; radially or bilaterally symmetrical; imbricate. **Petals** 3; all alike or of 2 forms; free; clawed or not clawed; pink to magenta or blue or purple or white. **Stamens** 3 or 5 or 6; of equal length or didynamous; anthers all alike or of 2 forms, 2 or 3 sterile and 3 fertile, basifixed; staminodia absent or present, 3. **Pistils** 1; compound, carpels 3; stipitate or sessile; stigmas 1, capitate or 3-lobed; styles 1; ovaries superior; locules 3 or 2; placentation axile. **Fruits** capsules; loculicidal. **Seeds** 3 to 18.

The family is represented in Oklahoma by 3 genera and 13 species. It is primarily tropical or subtropical, and some species are cultivated as ornamentals.

1. Inflorescence subtended by 1 expanded cymbiform bract. Corollas bilaterally symmetrical. Filaments glabrous. ..... ***Commelina***
1. Inflorescence subtended by 2 foliaceous bracts or bracts absent. Corollas radially symmetrical. Filaments villous.
  2. Plants perennials. Stems erect, not trailing. Bracts 2; foliaceous. Fertile stamens 6. Staminodia 0. ..... ***Tradescantia***
  2. Plants annuals. Stems decumbent, trailing. Bracts 0. Fertile stamens 3. Staminodia 3. ..... ***Murdannia***

Commelina C. Linnaeus Dayflower

1. Margins of cymbiform bracts partially fused. Seeds smooth. Roots fleshy.
  2. Stems spreading or decumbent. Leaves auriculate; sheath margins glabrous or with inconspicuous pale white hairs. Petals of 2 forms, 2 blue and large, 1 white and small. ..... ***C. erecta***
  2. Stems erect. Leaves not auriculate; sheath margins with conspicuous reddish cilia. Petals all alike, blue, equal or subequal in size. ..... ***C. virginica***
1. Margins of cymbiform bracts not fused. Seeds rugose or reticulate. Roots not fleshy.
  3. Leaf sheaths 10–20 mm long. Petals of 2 forms, 2 blue and large, 1 white and small. Petals ovate. Capsules 2-locular. Seeds rugose; 3.5–4 mm long. ..... ***C. communis***
  3. Leaf sheaths 5–10 mm long. Petals all alike, blue, equal or subequal in size. Petals reniform. Capsules 3-locular. Seeds reticulate; 2–2.5 mm long. ..... ***C. diffusa***

Murdannia J.F. Royle Asian Spiderwort, Wart-Removing Herb

One species. ..... ***M. keisak***

Tradescantia C. Linnaeus Spiderwort

1. Abaxial surfaces of sepals glabrous or with apical tuft of hairs. ..... ***T. ohiensis***
1. Abaxial surfaces of sepals uniformly pubescent.
  2. Leaf blades wider than circumference of sheaths.
    3. Leaf blades of different sizes, upper larger than lower. Bracts larger than leaf blades; anastomosing cross-veins not numerous, inconspicuous. ..... ***T. ernestiana***
    3. Leaf blades uniform in size, upper not larger than lower. Bracts not larger than upper leaf blades; anastomosing cross-veins numerous, conspicuous. ..... ***T. ozarkana***
  2. Leaf blades narrower than circumference of sheaths.
    4. Abaxial surfaces of sepals glandular-puberulent.
      5. Upper internodes glabrous. ..... ***T. occidentalis***
      5. Upper internodes glandular pilose. ..... ***T. humilis***
    4. Abaxial surfaces of sepals without glandular hairs or if present obscured by long, non-glandular hairs.
      6. Leaves 7–8 mm wide. ..... ***T. hirsuticaulis***
      6. Leaves 10–15 mm wide.
        7. Pedicels 4–6 mm long. Internodes 1 or 2. Stems 2–7 cm tall at anthesis. ..... ***T. tharpii***
        7. Pedicels 2–3 mm long. Internodes 2–5. Stems 12–49 cm tall at anthesis. ..... ***T. hirsutiflora***

CONVOLVULACEAE A.L. de Jussieu Morning-Glory Family

Plants herbaceous vines climbing by twining or herbs; annuals or perennials; autophytic or parasitic; chlorophyll present or absent. **Root Systems** fibrous or taproots or absent. **Stems of Autophytes** prostrate or decumbent or trailing or ascending to erect. **Stems of Parasites** filamentous, typically forming white or yellow or orange tangles on host plants; attached to host plants by haustoria; not connected to ground after hosts are parasitized. **Leaves** present or absent or scale-like; simple or palmately compound; alternate; petiolate or sessile; blade shape variable, but typically cordate; venation pinnate or palmate; margins entire or sinuate or pinnately cleft or palmately lobed; leaflets of compound leaves 3 to 7; stipules absent (*Ipomoea quamoclit* with a pair of stipule-like appendages at base of petiole). **Inflorescences** solitary flowers or simple cymes or compound cymes or glomerules; axillary or arising from stems as they twine about hosts; bracts present or absent. **Flowers** perfect; perianths in 2-series. **Sepals** 5 or 4 or 5; in 1-whorl or in 2-whorls; free or fused. **Corollas** radially symmetrical; funnelform or campanulate or salverform or tubular or rotate; convolute. **Petals** 5 or 4 or 3; fused; greenish white or white to shades of blue or purple or pink or red, colors often darker at bases or apices. **Stamens** 5 or 4 or 3; exserted beyond or included within perianths; epipetalous. **Pistils** 1; compound, carpels 2;

stigmas 1 or 2 or 4, not lobed or 2-lobed, capitate or linear; styles 1 or 2, gynobasic or apical; ovaries superior; locules 2; placentation axile or basal. **Fruits** capsules; dehiscent or indehiscent; valvate or circumscissile or opening irirregularly. **Seeds** 1 to 4.

The family is represented in Oklahoma by 9 genera and 28 species. As presently circumscribed, it once again includes the monogeneric Cuscutaceae which has been segregated on the basis of *Cuscuta*'s parasitic habit, reduced chlorophyll content, scale-like leaves, haustoria, and reduced embryo. The Convolvulaceae also includes several cultivated species including sweet potato. Our native species are known to hybridize with garden varieties creating great variability in populations.

1. Chlorophyll absent. Stems filamentous; white or yellow or orange. Stigmas linear or oblong. Leaves absent or reduced to scales. ..... ***Cuscuta***
1. Chlorophyll present. Stems well developed, not filamentous; of various colors but not white or yellow or orange. Leaves present and well developed.
    2. Stigmas linear or oblong.
        3. Corollas 0.5–1.2 cm in diameter. Styles 2. ..... ***Evolvulus***
        3. Corollas 1.6–8 cm in diameter. Styles 1.
            4. Flowers 3.5–7 cm long. Bracts present; 2; foliaceous; subtending and enclosing calyces; 12–25 mm long. Ovaries 1-locular. ..... ***Calystegia***
            4. Flowers 1–3 cm long. Bracts absent. Ovaries 2-locular. ..... ***Convolvulus***
    2. Stigmas globose to reniform or capitate.
        5. Corollas up to twice as long as calyces; lobes 1/3–3/4 total length.
            6. Leaves petiolate; blades suborbicular to reniform. ..... ***Dichondra***
            6. Leaves sessile; blades elliptic to lanceolate. ..... ***Cressa***
        5. Corollas more than twice as long as the calyces; lobes less than 1/3 total length or absent.
            7. Corollas 2–9 cm long. ..... ***Ipomoea***
            7. Corollas 1–1.9 cm long.
                8. Leaves linear. Stigmas slightly larger than diameter of style. ..... ***Stylisma***
                8. Leaves of various shapes, but not linear. Stigmas more than twice diameter of style.
                9. Flowers clustered in head-like compound cymes. Stigma lobes reniform to elliptic. ..... ***Jacquemontia***
                9. Flowers solitary or in simple cymes. Stigmas globose and undivided or with subglobose lobes. ..... ***Ipomoea***

Calystegia **R. Brown** **False Bindweed**

One species. ..... ***C. sepium***
(= *Convolvulus sepium*)

Convolvulus **C. Linnaeus** **Bindweed**

1. Calyces 3–5 mm long; sparsely pubescent to glabrate. Corolla lobes acute to obtuse. ..... ***C. arvensis***
1. Calyces 6–12 mm long, densely pubescent. Corolla lobes acuminate. ..... ***C. equitans***

Cressa **C. Linnaeus** **Alkaliweed**

One species. ..... ***C. truxillensis***
(= *C. depressa*)

Cuscuta **C. Linnaeus** **Dodder**

1. Bracts immediately below flowers 2–4; well developed; sepaloid.
    2. Flowers pedicellate. Cymes loose. ..... ***C. cuspidata***
    2. Flowers subsessile. Cymes dense.
        3. Corolla lobes ascending at anthesis. Bract apices recurved. Aggregations of cymes rope-like. Stems withering early in season, breaking and dropping. ..... ***C. glomerata***
        3. Corolla lobes reflexed at anthesis. Bract apices erect or ascending. Aggregations of cymes globose. Stems not withering, persistent. ..... ***C. compacta***
1. Bracts immediately below flowers 0 or 1; scale-like; not sepaloid.
    4. Cymes with flowers mostly 4-merous.
        5. Corollas urceolate. Withered corollas caducous or persistent at apices of capsules. Styles 1–1.2 mm long. ..... ***C. coryli***

5. Corollas rotate. Withered corollas persistent at bases of capsules.
Styles 0.7–0.8 mm long. ..... ***C. polygonorum***
4. Cymes with flowers mostly 5-merous.
6. Sepal lobes triangular; at least as long as wide.
7. Corolla tubes equal or subequal to calyx tubes. ..... ***C. umbellata***
7. Corolla tubes longer than calyx tubes. ..... ***C. indecora***
(= *C. attenuata*)
6. Sepal lobes ovate; shorter than wide.
8. Corolla lobes obtuse. ..... ***C. gronovii***
8. Corolla lobes acute.
9. Pedicels longer than length of flowers; cylindrical. ..... ***C. pentagona***
(= *C. glabrior*)
9. Pedicels shorter than length of flowers; conspicuously tapered. ..... ***C. obtusiflora***

Dichondra J.R. Forster & G. Forster Pony's Foot

One species. ..... ***D. micrantha***
(= *D. repens*)

Evolvulus C. Linnaeus Dwarf Morning Glory

One species. ..... ***E. nuttallianus***

Ipomoea C. Linnaeus Morning Glory

1. Corolla limbs scarlet. Apices of outer 2 sepals caudate.
2. Leaves entire or toothed. ..... ***I. coccinea***
2. Leaves pinnatisect, lobes filiform to linear, 0.2–1.5 mm wide. ..... ***I. quamoclit***
1. Corolla limbs of various colors, but not scarlet. Apices of outer 2 sepals acute or obtuse or mucronate.
3. Leaves palmately compound. ..... ***I. wrightii***
(= *I. heptaphylla*)
3. Leaves simple.
4. Hairs of pedicels and peduncles reflexed.
5. Fruiting sepals oblong to ovate; 0.8–1.7 cm long. Stamens exserted beyond corollas. Corolla limbs dark blue or purplish or rose. Seeds 6. ..... ***I. purpurea***
5. Fruiting sepals linear-lanceolate; 1.5–2.5 cm long. Stamens included within corollas. Corolla limbs light blue, sometimes drying pink. Seeds 4. ..... ***I. hederacea***
4. Hairs of pedicels and peduncles absent, or if present, straight.
6. Corollas 1.5–2.5 cm long; limbs white tinged with pale pink; throats white. Sepals lanceolate; ciliate to sparsely ciliate at anthesis. Plants annuals. ..... ***I. lacunosa***
6. Corollas 4–9 cm long; limbs purplish red or lavender or white tinged with purple; throats reddish purple. Sepals ovate; glabrous at anthesis. Plants perennials.
7. Plants herbs; erect to recumbent but not twining. Corolla limbs purple to lavender. Seeds pubescent. ..... ***I. leptophylla***
7. Plants vines; twining. Corolla limbs white or pink. Seeds tomentose.
8. Largest leaves 3.5–9 cm wide; ovate-cordate to pandurate; bases cordate. ..... ***I. pandurata***
8. Largest leaves 1–3 cm wide; lanceoate to ovate; bases acute to obtuse. ..... ***I. shumardiana***

Jacquemontia J.D. Choisy Clustervine

One species. ..... ***J. tamnifolia***

Stylisma C.S. Rafinesque Dawnflower

One species. ..... ***S. pickeringii***

CORNACEAE B.C.J. Dumortier Dogwood Family

Plants small trees or thicket-forming shrubs; deciduous. **Leaves** simple; opposite; petiolate; blades ovate or lanceolate or elliptic; venation pinnate; apices acute to acuminate; margins entire or obscurely crenulate; stipules absent. **Inflorescences** compound

cymes or glomerules; bracts present or absent. **Flowers** perfect or imperfect, similar; perianths in 2-series. **Sepals** 4 or rarely 5; fused. **Corollas** radially symmetrical. **Petals** 4 or rarely 5; free; white or yellow or greenish yellow; spreading. **Stamens** 4 or rarely 5. **Pistils** 1; compound, carpels 2; stigmas 1, capitate; styles 1, slender; ovaries inferior; locules 2; placentation axile. **Fruits** drupes; red or white or blue. **Seeds** 2 or 1.

The family is represented in Oklahoma by 1 genus and 4 species. The horticulturally popular *Cornus florida*, flowering dogwood, is native to the southeastern one-third of Oklahoma.

Cornus C. Linnaeus Dogwood

1. Inflorescences glomerules. Bracts 4; large; white to pinkish or greenish white; petaloid.
   Petals greenish yellow. Drupes red. ..... ***C. florida***
1. Inflorescences open cymes. Bracts absent. Petals white to creamy white. Drupes white or blue.
   2. Youngest twigs pubescent. Styles abruptly dilated about 1 mm below apices. Drupes dark blue. ..... ***C. amomum***
   2. Youngest twigs scabrous-strigose or glabrate to glabrous. Styles uniform in diameter.
      Drupes white or pale blue.
      3. Youngest twigs scabrous-strigose. Adaxial surfaces of leaves scabrous.
         Abaxial surfaces of leaves pilose or tomentose. Secondary veins mostly arising
         from lower half of midribs. Cymes flat or slightly convex. Drupes white. ..... ***C. drummondii***
      3. Youngest twigs glabrate to glabrous. Adaxial surfaces of leaves smooth.
         Abaxial surfaces of leaves glabrate to glabrous. Secondary veins arising
         from both upper and lower half of midribs. Cymes pyramidal or
         conspicuously convex. Drupes pale blue. ..... ***C. foemina***

CRASSULACEAE A.P. de Candolle Stonecrop Family[1]

Plants herbs; annuals or biennials or perennials; succulent or not succulent; glabrous. **Leaves** simple; alternate or opposite or whorled; sessile; blades linear; venation not apparent; stipules absent. **Inflorescences** simple cymes or solitary flowers; terminal or axillary. **Flowers** perfect; perianths in 2-series. **Sepals** 4 or 5; fused slightly at base. **Corollas** radially symmetrical. **Petals** 4 or 5; free or fused; white or green or pink or purple or yellow. **Stamens** 4 or 5 or 8 or 10; in 1 whorl or 2 whorls. **Pistils** 4 or 5, equal in number to number of petals; simple, carpels 1; stigmas 1; styles 1, slender or short, subulate; ovaries superior; locules 1; placentation parietal. **Nectaries** present; 4 or 5; small; scale-like; subtending each pistil. **Fruits** aggregates of follicles. **Seeds** 1 to numerous.

The family is represented in Oklahoma by 2 genera and 4 species. A cosmopolitan family, its center of distribution is South Africa. Many genera are grown as ornamentals. Our native species are characteristically encountered in thin soils of rocky outcrops.

1. Plants aquatic. Stems not succulent; filiform; branched; forming mats.
   Leaves opposite. Inflorescences solitary flowers. Stamens 4 or 5. ..... ***Crassula***
1. Plants terrestrial. Stems succulent; not filiform; not branched; not forming mats.
   Leaves alternate or whorled. Inflorescences 1-sided cymes. Stamens 8 or 10. ..... ***Sedum***

Crassula C. Linnaeus Pigmy-Weed

One species. ..... ***C. aquatica***
(= *Tillaea aquatica*)

Sedum C. Linnaeus Stonecrop

1. Leaves whorled. Plants perennials; creeping. Stems prostrate; rooting at nodes. ..... ***S. sarmentosum***
1. Leaves alternate. Plants annuals; not creeping. Stems erect or ascending; not rooting at nodes.
   2. Petals yellow. Sepals yellow. Mature follicles widely divergent. ..... ***S. nuttallii***
      (= *S. nuttallianum*)
   2. Petals white or pink. Sepals green. Mature follicles ascending or spreading. ..... ***S. pulchellum***

[1] Treatment contributed by Fathi B. Erteeb

CROSSOSOMATACEAE A. Engler Crossosoma Family

Plants shrubs; deciduous; armed with spines. **Stems** highly branched and interlocking; internodes with decurrent lines. **Leaves** coriaceous; simple; alternate; blades elliptic to oblanceolate; glaucous; venation pinnipalmate; surfaces scaberulous; apices acute; margins entire; stipules present, persistent, subulate. **Inflorescences** solitary flowers; axillary; bracts present at bases of pedicels, reduced, scarious. **Flowers** perfect; perianths in 2-series. **Sepals** 5; ovate; margins hyaline; fused at bases. **Corollas** radially symmetrical; imbricate. **Petals** 5; free; clawed; oblanceolate; white. **Stamens** 8; unequal in length. **Pistils** 1; simple, carpels 1; stigmas 1, capitate; styles 1; ovaries superior; locules 1; placentation parietal. **Hypanthia** present. **Nectaries** present; hypanthial. **Fruits** follicles; asymmetrical, striated. **Seeds** 1 or 2; with arils.

The family is represented in Oklahoma by 1 genus and 1 species. It has been placed in *Forsellesia* in the Celastraceae by some taxonomists. Plants are restricted to the Black Mesa region of northwestern Cimarron County.

Glossopetalon A. Gray Greasebush

One species. ..... ***G. spinescens***
(= *G. planitierum*)

CUCURBITACEAE A.L. de Jussieu Gourd Family

Plants herbaceous vines; perennials or annuals; perennating organs fleshy roots; caulescent; strongly aromatic or not aromatic; monoecious or dioecious. **Root Systems** taproots. **Stems** bearing coiling, often branched tendrils at nodes. **Leaves** simple or palmately compound; alternate; blades cordate or oval; venation palmate; surfaces glabrous or indumentum pubescent or hispid; apices acuminate or obtuse; margins dentate or palmately lobed or palmately cleft; bases usually cordate; stipules absent. **Inflorescences** of 1 or 2 types; staminate and pistillate different; solitary flowers or racemes or corymbs or clusters; axillary; bracts absent or rarely present. **Flowers** imperfect, staminate and pistillate similar; perianths in 2-series. **Calyces** tubular. **Sepals** 5 or 6; fused. **Corollas** radially symmetrical; campanulate or funnelform or rotate. **Petals** 5 or 6; fused; white or greenish white to greenish yellow or dark yellow. **Stamens** 5 or 3; included within perianths; fused by filaments or anthers or free. **Pistils** 1; compound, carpels 3; stigmas 1 to 3, not lobed or 2-lobed or 3-lobed, capitate or linear; styles 1 to 3, included within perianths; ovaries inferior, terete or flattened in cross-section, lobes 5 or 6; locules 1; placentation parietal. **Hypanthia** absent or present. **Nectaries** present; receptacular or borne at apices of ovaries. **Fruits** pepos; pericarps dry or fleshy; smooth or armed with prickles or warts. **Seeds** 1 or 3 or numerous; typically flattened; oval; smooth to granular.

The family is represented in Oklahoma by 8 genera and 8 species. It includes many economically important plants such as squashes, cucumbers, melons, and gourds. Native Americans used root extracts medicinally.

1. Leaves compound. ..... ***Cyclanthera***
1. Leaves simple.
    2. Plants dioecious or falsely appearing dioecious due to sequential maturation of flowers.
        3. Petals 5–15 cm long. Anthers fused. Pepos 5–7.5 cm in diameter; green to greenish orange. ..... ***Cucurbita***
        3. Petals 0.6–0.8 cm long. Anthers free. Pepos 2.5–3.5 cm in diameter; red or reddish orange. ..... ***Ibervillea***
    2. Plants monoecious.
        4. Ovaries and pepos prickly or warty.
            5. Plants viscid-pubescent. Seeds 1. ..... ***Sicyos***
            5. Plants glabrous. Seeds 4 or more.
                6. Corollas 6-lobed. Pepos inflated; green; prickly. ..... ***Echinocystis***
                6. Corollas 5-lobed. Pepos firm; orange; warty. ..... ***Momordica***
        4. Ovaries and pepos smooth.
            7. Petals 5–15 cm long. Pepos 5–6 cm in diameter. ..... ***Cucurbita***
            7. Petals 0.3–1.2 cm long. Pepos 0.5–2 cm in diameter.
                8. Petals white to greenish white. Pepos subsessile; reddish green. Seeds 3–6. ..... ***Cayaponia***
                8. Petals yellow or greenish yellow. Pepos pedunculate; green to black. Seeds 12 or more. ..... ***Melothria***

Cayaponia A.L.P. da Silva Manso Melon-Leaf

One species. ..... ***C. quinqueloba***
(= *C. grandifolia*)

Cucurbita C. Linnaeus Gourd

One species. ..... ***C. foetidissima***

Cyclanthera H.A. Schrader

One species. ..... ***C. dissecta***

Echinocystis J. Torrey & A. Gray Mock Cucumber

One species. ..... ***E. lobata***

Ibervillea E.L. Greene Globe Berry

One species. ..... ***I. lindheimeri***

Melothria C. Linnaeus Melonette

One species. ..... ***M. pendula***

Momordica C. Linnaeus Balsam Pear

One species. ..... ***M. balsamina***

Sicyos C. Linnaeus Bur Cucumber

One species. ..... ***S. angulatus***

CUPRESSACEAE H.H. Bartlett Cypress Family

Plants trees or shrubs; evergreen or deciduous; strongly aromatic or not aromatic; producing pollen cones and seed cones; monoecious or dioecious; columnar knees absent or present. **Leaves** persistent for 1 or 2 to 12 years; simple; opposite or alternate; petiolate or sessile; 2-ranked or 4-ranked; linear or scale-like or subulate; blades all alike or of 2 forms, juvenile and adult; stipules absent; **Pollen Cones** terminal; maturing in 1 season; microsporophylls overlapping; microsporangia 2 to 10 per microsporophyll; pollen spherical; not winged. **Seed Cones** solitary or in clusters of 2 or 3; terminal; globose; woody or fleshy; maturing in 1 to 2 years; ovuliferous scales overlapping or abutting; megasporangia 2 to 9 per scale. **Seeds** 1 to 3 per scale; 1 to 8 per cone; wings present or absent.

The family is represented in Oklahoma by 3 genera and 7 species. *Platycladus,* arbor-vitae, appears to be naturalized. *Taxodium distichum*, bald cypress, is a deciduous gymnosperm. Although it is planted throughout the state as an ornamental, its natural distribution is in extreme southeastern McCurtain County. Our species of *Juniperus* occur throughout the state and several are cultivated as ornamentals. *Juniperus* pollen is a common allergen responsible for winter hay fever. Due to habitat modification, *Juniperus virginiana*, Eastern red cedar, has become an invasive species.

1. Leaves linear on deciduous branchlets. Pollen cones in drooping terminal panicles.
   Seed cones 2–4 cm in diameter. ..... ***Taxodium***
1. Leaves scale-like or subulate on persistent branchlets. Pollen cones solitary or in clusters.
   Seed cones 0.5–1.5 cm in diameter.
   2. Seed cones fleshy; bluish to reddish; not opening at maturity. Branchlets terete;
      orientation not flabellate. ..... ***Juniperus***
   2. Seed cones woody; brown; opening at maturity. Branchlets flattened; orientation flabellate. ..... ***Platycladus***

Juniperus C. Linnaeus Juniper

1. Leaf margins entire.
   2. Plants of Black Mesa area. Leaves overlapping 1/4 or less of their length.
      Seed cones maturing in 2 years. ..... ***J. scopulorum***
   2. Plants of body of state. Leaves overlapping 1/2 or more of their length.
      Seed cones maturing in 1 year. ..... ***J. virginiana***
1. Leaf margins minutely serrate, teeth may be visible only with magnification.
   3. Seed cones red to reddish brown; not glaucous; pulp resinous, soft. ..... ***J. pinchotii***
   3. Seed cones blue to blue-black; glaucous; pulp dry, solid.

4. Branchlets 4-sided. Microsporangia 12–18 per pollen cone. Seed apices acute.
Plants of Arbuckle Mountains and Ozark Plateau. ..... ***J. ashei***
4. Branchlets terete. Microsporangia 8–10 per pollen cone. Seed apices obtuse.
Plants of Black Mesa area. ..... ***J. monosperma***

Platycladus E. Spach Arborvitae

One species. ..... ***P. orientalis***
(= *Thuja orientalis*)

Taxodium L.C.M. Richard Bald Cypress

One species. ..... ***T. distichum***

CYPERACEAE A.L. de Jussieu Sedge Family

Plants herbs; perennials or annuals; perennating organs rhizomes or tubers; caulescent or acaulescent; bearing perfect flowers or monoecious. **Root Systems** fibrous. **Stems** (culms) branched; jointed or not jointed; internodes solid; 3-angled or terete or rarely 4-angled. **Leaves** basal or cauline; simple; alternate; with basal sheaths, margins fused; typically 3-ranked; blades linear to ensiform or absent; venation parallel; ligules absent or rarely present; venters present; margins entire. **Inflorescences** spikelets or spikes borne in panicles or spikes or heads or solitary; terminal or axillary; involucral bracts present or absent. **Spikelets or Spikes** consisting of flowers and subtending bracts (scales) borne on short axes; some scales without flowers; perigynia present or absent. **Flowers** reduced; hidden by scale except at anthesis; perfect or imperfect, similar; perianths absent or in 1-series; radially symmetrical. **Perianth Parts** 0 or 1 to 3 or 5 or 6; free; bristles or scale-like; colorless or stramineous or dark brown. **Stamens** 1 to 3; anthers usually deciduous; filaments usually persistent. **Pistils** 1; compound, carpels 2 or 3; stigmas 2 or 3; styles 1; ovaries superior; locules 1; placentation basal. **Fruits** achenes. **Seeds** 1.

The family is represented in Oklahoma by 16 genera and 189 species. Its members are most often encountered in mesic or wet habitats, but some species occur in dry, sandy or rocky soils. Young plants may be grazed by livestock, especially in the absence of other forage. The achenes are also eaten by birds and other animals. Most Oklahoma species are native and their most important economic value is in soil binding, the prevention of floodplain erosion and bioremediation. The family is sometimes confused with the Poaceace and Juncaceae. *Carex* is the largest genus of vascular plants in Oklahoma.

1. Pistils and achenes enclosed in perigynia. ..... ***Carex***
1. Pistils and achenes not enclosed in perigynia.
  2. Spikelets of 2 types, pistillate reduced to single flower, staminate with numerous flowers. Achenes conspicuously white or gray. ..... ***Scleria***
  2. Spikelets all alike, containing only perfect flowers or containing both perfect and imperfect flowers. Achenes of various colors, but not white or gray.
    3. Scales of spikelets 2-ranked; keeled. Spikelets flat or lenticular or trigonous in cross-section.
      4. Inflorescences axillary. Perianth bristles present. ..... ***Dulichium***
      4. Inflorescences terminal. Perianth bristles absent.
        5. Flowers or achenes 1 per spikelet. Scales 4; of 2 sizes, basal 2 minute and brownish. ..... ***Kyllinga***
        5. Flowers or achenes 3–many per spikelet. Scales 4–many; all alike. ..... ***Cyperus***
    3. Scales of spikelets spirally imbricated; rounded or flat. Spikelets terete in cross-section.
      6. Tubercles present; different in color or texture from bodies of achenes.
        7. Spikelets 1 per culm. Leaves inconspicuous, reduced to scales or bladeless sheaths at culm bases. Plants appearing to consist only of green leafless culms. ..... ***Eleocharis***
        7. Spikelets 2–many per culm. Leaves conspicuous, with well developed blades and sheaths. Plants consisting of culms and leaves.
          8. Perfect florets 1–4 per spikelet. ..... ***Rhynchospora***
          8. Perfect florets 7–25 per spikelet.
            9. Leaf blades 0.8–4 mm wide. Styles deciduous. ..... ***Fimbristylis***
            9. Leaf blades 0.1–0.6 mm wide. Styles persistent. ..... ***Bulbostylis***
      6. Tubercles absent.
        10. Styles fimbriate or ciliate. ..... ***Fimbristylis***
        10. Styles glabrous.
          11. Spikelets appearing to be borne laterally. Involucral bracts 1; culm-like.

12. Achenes minutely papillose. ..... ***Isolepis***
12. Achenes conspicuously transversely ridged.
13. Culms trigonous immediately below inflorescences. ..... ***Schoenoplectus***
13. Culms terete to oval immediately below inflorescences.
14. Spikelets 1–10; borne in sessile, capitate clusters. Apices of spikelet scales acute to acuminate or mucronate. ..... ***Schoenoplectiella***
14. Spikelets numerous; borne in 3–many, stalked, elongate clusters. Apices of spikelet scales conspicuously emarginate to bifid; awned. ..... ***Schoenoplectus***
11. Spikelets borne terminally. Involucral bracts 2–9; foliaceous.
15. Perianth parts absent.
16. Leaves 0.5–4 mm wide. Involucral bracts 2 or more. ..... ***Fimbristylis***
16. Leaves 5–10 mm wide. Involucral bracts 1. ..... ***Scirpus***
15. Perianth parts present
17. Perianth bristles absent. ..... ***Lipocarpha***
17. Perianth bristles present.
18. Perianth parts of 2 types, 3 stalked scales and 3 bristles. ..... ***Fuirena***
18. Perianth parts all alike.
19. Spikelets 2–7 mm long; 2–4 mm wide. Achenes 0.5–1.5 mm long. Culms terete or inconspicuously 3-angled. ..... ***Scirpus***
19. Spikelets 10–30 mm long; 6–12 mm wide. Achenes 3–4 mm long. Culms conspicuously 3-angled. ..... ***Bolboschoenus***

Bolboschoenus (P.F.A. Ascherson) E. Palla Bulrush

1. Stigmas 3. Achenes trigonous. Veins at apices of leaf sheaths abruptly bent. ..... ***B. fluviatilis*** (= *Scirpus fluviatilis*)
1. Stigmas 2. Achenes terete. Veins at apices of leaf sheaths gradually arched. ..... ***B. maritimus*** (= *Scirpus maritimus*)

Bulbostylis K.S. Kunth Hair Sedge

1. Apices of spikelet scales notched. Achenes transversely ridged at 10X magnification. ..... ***B. capillaris***
1. Apices of spikelet scales obtuse to mucronate. Achenes smooth or granular at 10X magnification. ..... ***B. ciliatifolia***

Carex C. Linnaeus Sedge

Plants herbs; perennials; cespitose to solitary rhizomes present or absent; monoecious or rarely dioecious. **Culms** 1–many per plant; erect to arching or spreading; trigonous to terete. **Leaves** basal and/or cauline; ligulate; linear to linear-lanceolate; flat or folded or pleated. **Inflorescences** of 1–many spikes; terminal or both terminal and axillary; sessile or pedunculate. **Involucral Bracts** foliaceous or setaceous; awns present or absent; sheaths present or absent. **Spikes** borne on central axis or branches; staminate or pistillate, or bearing both staminate and pistillate flowers (androgynous or gynaecandrous). **Flowers** imperfect; subtended by 1 scale; perianths absent. **Staminate Flowers** with stamens 1–3. **Pistillate Flowers** with pistils enclosed in perigynia; stigmas 2 or 3; styles deciduous or persistent. **Achenes** lenticular or trigonous to terete; perigynia persistent.

The genus is represented in Oklahoma by 93 species in 25 sections.

Key to Sections

1. Culms bearing 1 spike [dense clusters of multiple spikes sometimes falsely resembling 1 spike].
2. Spikes bearing only staminate or pistillate flowers. ..... ***Acrocystis***
2. Spikes bearing both staminate and pistillate flowers.
3. Staminate flowers below pistillate flowers. ..... ***Squarrosae***
3. Staminate flowers above pistillate flowers.
4. Scales of lowest pistillate flowers 15–50 mm long; foliaceous. ..... ***Phyllostachyae***
4. Scales of lowest pistillate flowers 2.5–5 mm long; setaceous. ..... ***Leptocarpae***
1. Culms bearing 2 or more spikes. Spikes separated or densely clustered.
5. Stigmas 2. Achenes lenticular.
6. Spikes of 2 forms, different in size and appearance.

7. Inflorescences 1–2 times longer than wide; condensed; spikes overlapping, difficult to distinguish. ..... ***Divisae***
7. Inflorescences 3–20 times longer than wide; open to loosely condensed; spikes separated.
8. Pistillate spikes 30–110 mm long. ..... ***Phacocystis***
8. Pistillate spikes 3–13 mm long. ..... ***Stellulatae***
6. Spikes all alike, similar in size and appearance.
9. Plants with culms solitary or in small tufts. Rhizomes well-developed.
10. Inflorescences open; proximal spikes distinctly separated. ..... ***Phaestoglochin***
10. Inflorescences condensed; individual spikes difficult to distinguish. ..... ***Divisae***
9. Plants cespitose; tufts large. Rhizomes absent or weakly developed.
11. Staminate flowers or empty scales borne at bases of some or all spikes. Bases of spikes tapered. ..... ***Ovales***
11. Staminate flowers or empty scales borne at apices of some or all spikes. Bases of spikes rounded or truncate.
12. Bases of mature perigynia conspicuously spongy when probed with dissecting needle.
13. Spikes 10–40. Lowest nodes of inflorescences bearing more than 1 spike. ..... ***Vulpinae***
13. Spikes 2–9. Lowest nodes of inflorescences bearing 1 spike. ..... ***Phaestoglochin***
12. Bases of mature perigynia not spongy when probed with dissecting needle.
14. Lower branches of inflorescences conspicuous; 1–4 cm long. Mature perigynia nearly black or dark brown to olive green. ..... ***Heleoglochin***
14. Lower branches of inflorescences absent or 0.1–0.3 cm long. Mature perigynia green or straminous or yellow or tan or brown.
15. Spikes 2 or more at lowest nodes. ..... ***Multiflorae***
15. Spikes 1 at lowest nodes. ..... ***Phaestoglochin***)
5. Stigmas 3. Achenes trigonous or terete.
16. Leaf sheaths, leaf blades, bracts, and/or culms entirely or partly pubescent.
17. Bodies of perigynia pilose or hispidulous.
18. Perigynia pilose. ..... ***Porocystis***
18. Perigynia hispidulous. ..... ***Hallerianae***
17. Bodies of perigynia glabrous.
19. Terminal spikes bearing only staminate flowers [a few pistillate rarely present at apices or bases].
20. Perigynia 9–25 per spike. Basal leaf sheaths magenta tinged. ..... ***Hymenochlaenae***
20. Perigynia 2–8 per spike. Basal leaf sheaths not magenta tinged. ..... ***Griseae***
19. Terminal spikes bearing pistillate flowers at apices and ..... staminate flowers at bases.
21. Lateral spikes 6–8 times longer than wide; 18–45 mm long. ..... ***Hymenochlaenae***
21. Lateral spikes 1–4 times longer than wide; 5–20 mm long. ..... ***Porocystis***
16. Leaf sheaths, leaf blades, bracts, and culms glabrous [margins of leaves or culms sometimes scaberulous].
22. Bodies of perigynia pubescent or puberulent with magnification.
23. Pistillate spikes 20–40 mm wide. Perigynia 10–20 mm long. ..... ***Lupulinae***
23. Pistillate spikes 4–15 mm wide. Perigynia 2–10 mm long.
24. Flowering culms 20–120 cm tall.
25. Terminal spikes bearing pistillate flowers at apices and staminate flowers at bases. ..... ***Porocystis***
25. Terminal spikes bearing only staminate flowers.
26. Staminate spikes sessile. ..... ***Acrosystis***
26. Staminate spikes long pedunculate. ..... ***Paludosae***
24. Flowering culms 1–20 cm tall.
27. Flowering culms shorter than and concealed by leaf blades.
28. Achenes terete to inconspicuously trigonous; sides convex. Leaf and culm bases magenta tinged. ..... ***Acrocystis***
28. Achenes conspicuously trigonous; sides flat to concave. Leaf and culm bases not magenta tinged. ..... ***Hallerianae***

27. Flowering culms longer than and not concealed by leaf blades.
29. Terminal spikes bearing pistillate flowers at apices and staminate flowers at bases. ..... ***Porocystis***
29. Terminal spikes bearing only staminate flowers.
30. Staminate spikes sessile. ..... ***Acrocystis***
30. Staminate spikes long pedunculate. ..... ***Paludosae***

22. Bodies of perigynia glabrous.
31. Terminal spikes bearing pistillate flowers at apices and staminate flowers at bases; never overtopped by longer or stalked, lateral, pistillate spikes.
32. Mature spikes 10–22 mm wide. Perigynia 3.5–8.5 mm long. ..... ***Squarrosae***
32. Mature spikes 2–8 mm wide. Perigynia 2–4 mm long.
33. Beaks of perigynia present, well developed. Lowest spikes spreading to drooping. Distal sheaths longer than culms are wide. ..... ***Hymenochlaenae***
33. Beaks of perigynia absent or minute. Lowest spikes erect or ascending. Distal sheaths absent or not longer than culms are wide.
34. Mature perigynia ascending; conspicuously longer than wide; nerves 3–8. ..... ***Porocystis***
34. Mature perigynia spreading; as wide as long; nerves 0. ..... ***Shortianae***

31. Terminal spikes bearing only staminate flowers [a few pistillate rarely present at bases]; may be overtopped by longer or stalked, lateral, pistillate spikes.
35. Mature perigynia 10–20 mm long. ..... ***Lupulinae***
35. Mature perigynia 2–9 mm long.
36. Bracts of lowest (or only) spikes absent or reduced to tubular sheath; blades absent or short triangular [do not confuse bract of spike with scale of lowest pistillate flower that subtends perigynium and may be leaf-like].
37. Scales of lowest pistillate flowers of spikes 15–50 mm long; leaf-like. All spikes bearing staminate flowers at apices and 2–4 pistillate flowers at bases. Bracts of lowest (or only) spikes absent. ..... ***Phyllostachyae***
37. Scales of lowest pistillate flowers of spikes 1.2–4 mm long; not leaf-like. Spikes bearing only staminate or pistillate flowers, terminal spikes staminate, basal spikes pistillate. Bracts of lowest spikes reduced to tubular sheaths; blades absent or short triangular. ..... ***Acrocystis***
36. Bracts of lowest spikes well-developed; blades leaf-like. ..... **couplet 38**

38. Pistillate spikes with 1–9 perigynia.
39. Perigynia pale green; typically glaucous. Pistillate scales conspicuously purplish brown with pale green midribs. Plants with culms solitary or in small tufts. Rhizomes well-developed; long. ..... ***Paniceae***
39. Perigynia olive to dark green or brown; not glaucous. Pistillate scales stramineous to light brown or green. Plants with culms multiple; cespitose. Rhizomes poorly developed; short.
40. Nerves of perigynia 18–30 [visible in dry specimens]. ..... ***Laxiflorae***
40. Nerves of perigynia 40–65.
41. Apices of proximal pistillate scales acute to rounded, not awned. Perigynia sharply trigonous; sides nearly flat; nerves raised. ..... ***Careyanae***
41. Apices of proximal pistillate scales awned, awns scabrous. Perigynia bluntly trigonous to terete; sides convex; nerves impressed. ..... ***Griseae***

38. Pistillate spikes with 10–numerous perigynia.
42. Styles not withering; persistent; continuous with ovaries. Beaks of perigynia ending in 2, stiff teeth.
43. Staminate spikes 1 per inflorescence.

44. Perigynia obovate to obtriangular; abruptly beaked. ..... ***Squarrosae***
44. Perigynia ovate; gradually beaked. ..... ***Vescicariae***
43. Staminate spikes 2–6 per inflorescence.
45. Plants cespitose; tufts dense. Rhizomes absent or weakly developed. Perigynia thin-walled; papery. ..... ***Vescicariae***
45. Plants forming spreading colonies. Rhizomes well-developed; long creeping. Perigynia thick-walled; firm or coriaceous. ..... ***Paludosae***
42. Styles withering; deciduous; articulated with ovaries. Beaks of perigynia lacking teeth or ending in 1 or 2 soft, papery teeth or absent.
46. Sheaths of bracts of lowest pistillate spikes obsolete [ignore solitary spikes in leaf axils]. ..... ***Glaucescentes***
46. Sheaths of bracts of lowest pistillate spikes present; well developed; tubular [do not confuse sheaths with scales of lowest perigynia].
47. Pistillate spikes or only lowest spreading or nodding or drooping at maturity.
48. Pistillate spikes 20–60 mm long. ..... ***Hymenochlaenae***
48. Pistillate spikes 6–20 mm long.
49. Stalks of all pistillate spikes spreading or nodding or drooping at maturity. Beaks of perigynia present; about as long as bodies. ..... ***Hymenochlaenae***
49. Stalks of only lowest spike spreading or nodding or drooping at maturity, others erect to ascending. Beaks of perigynia absent or if present, much shorter than bodies. ..... ***Laxiflorae***
47. Pistillate spikes erect or ascending at maturity.
50. Plants with culms solitary or in small tufts. Rhizomes well-developed, long creeping.
51. Perigynia green to brown; not glaucous; ovate; loosely enclosing achenes. Abaxial surfaces of blades smooth. ..... ***Granulares***
51. Perigynia pale green to pale brown or nearly white; typically glaucous; obovate; tightly enclosing achenes. Abaxial surfaces of blades papillose. ..... ***Paniceae***
50. Plants cespitose; tufts dense. Rhizomes absent or weakly developed.
52. Nerves of perigynia of 2 forms; 40–65 fine, impressed; 2 stout, raised [visible in dry specimens]. ..... ***Griseae***
52. Nerves of perigynia all alike; 18–30; all raised [visible in dry specimens].
53. Culms inconspicuously trigonous, bluntly angled; firm, not easily compressed. Perigynia weakly trigonous to terete; bases rounded. Well developed spikes bearing 25 or more perigynia. ..... ***Granulares***
53. Culms conspicuously trigonous; sharply angled; soft, easily compressed. Perigynia conspicuously trigonous; sides convex at least below middles; bases tapered. Well developed spikes bearing less than 25 perigynia. ..... ***Laxiflorae***

Section *Acrocystis* B.C.J. Dumortier

Plants cespitose. **Culms** erect to ascending; sharply trigonous, 0.4–0.7 mm in diameter below inflorescences. **Leaves** primarily basal; usually exceeding inflorescences; sheath bases magenta-tinged; venters thin, white-hyaline, minutely granular, deeply notched. **Involucral Bracts** setaceous; sheaths absent. **Spikes** 1–5 per culm. **Staminate Spikes** 1 or absent, when present sessile; borne above pistillate spikes. **Pistillate Spikes** 1–4; sessile. **Perigynia** 3–14 per spike; elliptic to terete in cross-section; not inflated; broadest at middle; hispid; straminous; beaks present, short, teeth 2, minute; nerves 2, conspicuous; bases tapered, not spongy-thickened. **Stigmas** 3. **Styles** deciduous. **Achenes** trigonous to subterete; beaks present or absent, straight, bases not bulbous.

1. Culms 0.5–4 cm tall. ..... ***C. umbellata***
(= *C. microrhyncha, C. abdita*)

1. Culms 4–35 cm tall.

2. Bodies of perigynia globose or subglobose. Shorter culms bearing only staminate spikes. ..... ***C. umbellata***
(= *C. microrhyncha, C. abdita*)
2. Bodies of perigynia lanceolate. All culms bearing pistillate and staminate spikes. ..... ***C. albicans***
(= *C. varia, C. physorrhyncha, C. artitecta)*

Section *Careyanae* E. Tuckerman

Plants cespitose. **Culms** spreading or seldom erect; sharply trigonous; 0.2–0.6 mm in diameter below inflorescences. **Leaves** basal and cauline; shorter than to exceeding inflorescences; sheath bases white to light brown; venters hyaline, fragile, usually split or torn. **Involucral Bracts** foliaceous; longer than spikes; sheaths longer than diameters of culms. **Spikes** 2–5 per culm; long-pedunculate to sessile. **Staminate Spikes** 1; borne above pistillate spikes; sessile or subsessile; hidden by upper pistillate bracts. **Pistillate Spikes** 2–4; proximal long pedunculate, distal sessile; ascending to spreading; partially hidden by involucral bracts and leaves; 1 staminate or neuter floret at spike base in one species. **Perigynia** 3–9 per spike; sharply trigonous; not inflated; broadest at middle; glabrous; dull green or stramineous; beaks present, short, straight or slightly bent, truncate, teeth 0; nerves 40–60, raised; bases tapered, not spongy-thickened. **Stigmas** 3. **Styles** deciduous. **Achenes** sharply trigonous; beaks present, minute, straight, bases not bulbous

1. Lowest florets of pistillate spikes staminate or neuter. Pistillate scales 2.5–3.2 mm long. ..... ***C. laxiculmis***
1. Lowest florets of pistillate spikes pistillate. Pistillate scales 1.2–2.7 mm long.
2. Basal and cauline leaves not exceeding inflorescences. Staminate scales keeled. ..... ***C. digitalis***
2. Basal and cauline leaves conspicuously exceeding inflorescences. Staminate scales not keeled. ..... ***C. abscondita***

Section *Divisae* H. Christ ex G. Kükenthal

Plants with culms solitary; colonial; rhizomes long, unbranched. **Culms** erect; sharply trigonous; 0.7–1.3 mm in diameter below inflorescences. **Leaves** basal and cauline; not exceeding inflorescences; sheath bases dark brown; venters loose, firm, convex. **Involucral Bracts** setaceous; sheaths absent. **Spikes** 5–7 per culm; sessile; pistillate androgynous; lanceolate to ovoid. **Perigynia** 10 per spike; lenticular, biconvex; slightly inflated; broadest at middle; glabrous; brownish black; beaks present, hyaline, teeth 2, minute; nerves numerous; inconspicuous, incomplete; margins winged; bases rounded, not spongy-thickened. **Stigmas** 2. Styles deciduous. **Achenes** lenticular; beaks absent or present, minute, straight, bases not bulbous.

One species. ..... ***C. praegracilis***

Section *Glaucescentes* A.A. Reznicek

Plants cespitose; colonial; rhizomes conspicuous, short. **Culms** erect to arching; sharply trigonous, 1.2–1.8 mm in diameter below inflorescences. **Leaves** basal and cauline; exceeding inflorescences; sheath bases reddish to brown; venters hyaline, apices thin, brown-tinged, often red-dotted. **Involucral Bracts** foliaceous; blades longer than inflorescences; sheaths absent. **Spikes** 5–8 per culm; androgynous or pistillate or staminate; peduncles to 6 cm long. **Staminate Spikes** 1 or 2; distal. **Pistillate and/or Androgynous Spikes** 4–6; widely spaced; upper ones sessile. **Perigynia** 20–60 per spike; terete; slightly inflated; broadest at middle; glabrous; dark purple-brown; beaks present, short, truncate, teeth 0; nerves 0–8, conspicuous or inconspicuous, surfaces slightly glaucous; bases tapered, not spongy-thickened. **Stigmas** 3. **Styles** deciduous. **Achenes** sharply trigonous; beaks present, short, straight, bases not bulbous.

1. Margins and adaxial surfaces of leaves glabrous. Nerves of perigyna 6–8. ..... ***C. joori***
1. Margins and adaxial surfaces of leaves conspicuously scabrous. Nerves of perigynia absent or inconspicuous. ..... ***C. glaucescens***

Section *Granulares* (O. Lang) G. Kükenthal

Plants with solitary culms or cespitose; rhizomes long or short. **Culms** erect or ascending; bluntly trigonous; 0.5–1.3 mm in diameter below inflorescences. **Leaves** primarily basal; not exceeding inflorescences; sheath bases pale brown; venters membranous, usually red-dotted. **Involucral Bracts** foliaceous; sheaths longer than diameters of culms. **Spikes** 2–6 per culm; staminate or pistillate or androgynous. **Staminate Spikes** 1–5; distal; larger than pistillate spikes; scales oblong-ovate, translucent, reddish brown-tinged. **Pistillate and Androgynous Spikes** 1–5; widely spaced; ascending to spreading; scales hyaline, midribs green, often streaked with short red or brownish lines. **Perigynia** 10–numerous per spike; inconspicuously trigonous to terete; slightly inflated; broadest at or below middle; glabrous; green-stramineous to light brown; beaks absent or if present short-tubular, truncate or toothed, teeth 2, short, soft; nerves numerous, raised; surfaces granular at 30X magnification; bases rounded, not spongy-thickened. **Stigmas** 3. **Styles** deciduous. **Achenes** trigonous; beaks present, short, bent, bases not bulbous.

1. Staminate spikes 2–5. ..... ***C. microdonta***

1. Staminate spikes 1.
  2. Rhizomes well-developed. Plants with culms solitary, forming spreading colonies. Staminate spikes long pedunculate; exceeding pistillate spikes. ..... ***C. microdonta***
  2. Rhizomes poorly developed or absent. Plants cespitose, tufts dense. Staminate spikes sessile or short pedunculate; usually overtopped by distal pistillate spikes. ..... ***C. granularis*** (= *C. haleana*)

Section *Griseae* L.H. Bailey

Plants cespitose to short rhizomatous. **Culms** erect to spreading; bluntly trigonous, 0.4–1.6 mm in diameter below inflorescences. **Leaves** cauline and basal; exceeding inflorescences; sheath bases brown to magenta-tinged; venters thin, white. **Involucral Bracts** foliaceous; exceeding inflorescences; sheaths longer than diameters of culms. **Spikes** 2–6 per culm; staminate or pistillate or androgynous. **Staminate Spikes** 1; distal; sessile or pedunculate; linear to narrowly oblanceolate; a few pistillate flowers occasionally at bases. **Pistillate and Androgynous Spikes** 1–5; loosely spaced on upper 1/2 to 1/3 of culms; uppermost sessile, lower pedunculate; lanceolate. **Perigynia** 1–25 per spike; bluntly trigonous to terete; not inflated; broadest at middle; glabrous; yellowish to dark brown; beaks absent or if present short, smooth, truncate, teeth 0; nerves of 2 forms, 2 stout, raised and 40–65 fine, impressed [visible in dry specimens]; bases rounded or tapered, not spongy-thickened. **Stigmas** 3. **Styles** deciduous. **Achenes** sharply trigonous to subterete; beaks present, short, straight or bent, bases bulbous or not bulbous.

1. Leaf sheaths hispid. ..... ***C. hitchcockiana***
1. Leaf sheaths glabrous.
  2. Spikes terete; rachillas terete. Perigynia spiralled.
    3. Perigynia more than 2 times longer than bodies of achenes. ..... ***C. flaccosperma***
    3. Perigynia less than 2 times longer than bodies of achenes.
      4. Perigynia terete; green to stramineous. ..... ***C. grisea***
      4. Perigynia trigonous; green with streaks of bronze. ..... ***C. amphibola***
  2. Spikes flattened; rachillas flattened. Perigynia 2-ranked.
    5. Perigynia beaked; apices not inflated, closely enclosing achenes.
      6. Beaks of perigynia straight to slightly curved. Plants cespitose. ..... ***C. oligocarpa***
      6. Beaks of perigynia conspicuously bent, 30–60 degrees. Plants short rhizomatous. ..... ***C. ouachitana***
    5. Perigynia not beaked; apices inflated, not closely enclosing achenes.
      7. Perigynia 1.2–2 times longer than wide. Style bases swollen. ..... ***C. bulbostylis***
      7. Perigynia 2.5–3 times longer than wide. Style bases not swollen. ..... ***C. planispicata***

Section *Hallerianae* (P.R. Ascherson & K.O. Graebner) G.C. Rouy

Plants cespitose. **Culms** erect to ascending; bluntly trigonous, 0.1–0.4 mm in diameter below inflorescences. **Leaves** mostly basal; exceeding culms; sheath bases light brown. venters hispid, v-notched, brownish. **Involucral Bracts** setaceous; sheaths shorter than diameters of culms. **Spikes** 2–4 per culm; staminate or pistillate or androgynous or gynaecandrous; upper ones sessile; lower ones pedunculate; overlapping. **Staminate Spikes** 1; distal. **Pistillate Spikes** 1–3. **Perigynia** 3–12 per spike; bluntly trigonous; not inflated; broadest at or above middle; hispidulous; greenish; beaks present, short, oblique, teeth 0; nerves numerous, fine; bases tapered, not spongy-thickened. **Stigmas** 3. **Styles** deciduous. **Achenes** sharply trigonous; beaks absent or minute; straight, bases not bulbous.

One species. ..... ***C. planostachys***

Section *Heleoglochin* B.C.J. Dumortier

Plants cespitose. **Culms** erect or ascending; bluntly trigonous, 0.7–1 mm in diameter below inflorescences. **Leaves** basal and cauline; exceeding inflorescences; sheath bases dark brown to black; venters thin, usually splitting, smooth, minutely red-dotted. **Involucral Bracts** setaceous; sheaths absent. **Spikes** 5–many per culm; androgynous; borne in branched inflorescences. **Perigynia** 9–numerous; lenticular; not inflated; broadest below middle; glabrous; dark olive-green to black or brown; beaks present, short, abruptly constricted, teeth 2, small; nerves inconspicuous, incomplete; bases tapered, not spongy-thickened. **Stigmas** 2. **Styles** deciduous. **Achenes** lenticular; beaks present, cap-like, short, dark, triangular, bases bulbous.

One species. ..... ***C. decomposita***

Section *Hymenochlaenae* (S.T.N. Drejer) L.H. Bailey

Plants cespitose. **Culms** erect to spreading; bluntly to sharply trigonous; conspicuously ribbed; 0.6–1.1 mm in diameter below inflorescences. **Leaves** basal and cauline; usually exceeding inflorescences; sheath bases magenta-tinged or dark brown; venters

hyaline, often red-dotted, apices concave or truncate. **Involucral Bracts** foliaceous; sheaths longer than diameters of culms. **Spikes** 3–7 per culm. **Staminate Spikes** 1–3; distal; narrowly lanceolate; occasionally with a few pistillate flowers at bases. **Pistillate Spikes** 3–5; upper sessile; lowest long pedunculate; drooping; occasionally a few staminate flowers at apices or bases. **Perigynia** 6–50 per spike; trigonous to terete; not inflated; broadest at or above middle; glabrous; stramineous; beaks present, hyaline, truncate, teeth 0; nerves 5–7, inconspicuous or inconspicuous; bases tapered, not spongy-thickened. **Stigmas** 3. **Styles** deciduous. **Achenes** sharply trigonous; beaks absent or short, straight or bent, bases not bulbous.

1. Leaf sheaths uniformly pubescent. Abaxial surfaces of blades pubescent, at least near bases.
    2. Awns of distal pistillate scales 1–3 mm long, more than half as long as bodies of scales. Perigynia 2 times longer than wide; broadest below middle. ..... ***C. davisii***
    2. Awns of distal pistillate scales absent or 0.1–0.2 mm long, less than half as long as bodies of scales. Perigynia 3 times longer than wide; broadest at middle. ..... ***C. oxylepis***
1. Leaf sheaths glabrous or with pubescence only on dorsal surface.
    3. Bases of culms and sheaths brown to black, not magenta tinged. Beaks of perigynia white; hyaline-membranous. ..... ***C. cherokeensis***
    3. Bases of culms and sheaths green, conspicuously magenta tinged. Beaks of perigynia green; not hyaline-membranous.
        4. Pistillate scales awned. Perigynia dull olive-green, becoming brown or reddish copper at maturity. ..... ***C. davisii***
        4. Pistillate scales not awned. Perigynia pale green, not changing color at maturity. ..... ***C. debilis***

Section *Laxiflorae* (K.S. Kunth) G. Kükenthal

Plants cespitose. **Culms** erect to spreading; 0.9–1.6 in diameter below inflorescences; sharply trigonous to narrowly winged. **Leaves** basal and cauline; exceeding or equal to inflorescences; those of vegetative culms 2–3 times wider than those of fertile culms; sheath bases almost white to brown-tinged [magenta-tinged in one species]; venters hyaline, thin, convex. **Involucral Bracts** foliaceous; exceeding inflorescences; sheaths longer than diameters of culms. **Spikes** 3–6 per culm. **Staminate Spikes** 1; distal; sessile or short pedunculate. **Pistillate Spikes** 2–5; borne in axils of bracts; upper ones sessile, lower ones pedunculate. **Perigynia** 6–30 per spike; trigonous; not inflated; broadest at middle; glabrous; stramineous to greenish brown; beaks present, tapered to truncate, straight to sharply bent, teeth 0; nerves of 2 forms, 2 stout and 40–65 fine [visible in dry specimens]; bases tapered, not spongy-thickened. **Stigmas** 3. **Styles** deciduous. **Achenes** trigonous; beaks present, shorter than bodies of achenes, straight or bent, bases not bulbous.

1. Bases of culms and sheaths green, magenta tinged. ..... ***C. gracilescens***
1. Bases of culms and sheaths white to brown, not magenta tinged.
    2. Widest leaves 15–40 mm wide. ..... ***C. albursina***
    2. Widest leaves 10–12 mm wide.
        3. Beaks of perigynia straight or slightly curved. Staminate spikes linear. ..... ***C. laxiflora***
        3. Beaks of perigynia conspicuously bent outward. Staminate spikes lanceolate. ..... ***C. blanda***

Section *Leptocarpae* L.H. Bailey

Plants cespitose; colonial, forming mats. **Culms** erect; sharply trigonous; 0.2–0.3 mm in diameter below inflorescences. **Leaves** primarily basal; exceeding inflorescences; sheath bases brown; venters hyaline, fragile, splitting to v-shape. **Involucral Bracts** absent or setaceous; sheaths absent. **Spikes** 1 per culm; androgynous; staminate flowers 2–7; pistillate flowers 2–6. **Perigynia** 3–6 per spike; terete to subterete; not inflated; broadest below middle; glabrous; greenish brown; beaks present, truncate, teeth 0; nerves 32, conspicuous; bases tapered, not spongy-thickened. **Stigmas** 3. **Styles** deciduous. **Achenes** sharply trigonous; beaks present, minute, bases not bulbous.

One species. ..... ***C. leptalea***

Section *Lupulinae* E. Tuckerman

Plants cespitose; tufts solitary or colonial, rhizomes short or long. **Culms** erect or spreading; stiff; stout; sharply trigonous. 0.8–2.8 mm in diameter below inflorescences. **Leaves** basal and cauline; usually exceeding inflorescences; basal sheaths absent or short, light greenish to reddish brown; venters hyaline, elongate, easily splitting, usually entire length. **Involucral Bracts** foliaceous; exceeding inflorescences; sheaths shorter than diameters of culms. **Spikes** 2–6 per culm. **Staminate Spikes** 1 or rarely 2; sessile to long pedunculate; linear. **Pistillate Spikes** 2–4; sessile or short pedunculate; cylindrical to globose. **Perigynia** 6–78 per spike; trigonous; inflated; broadest below to above middle; glabrous or hispidulous; stramineous; beaks present, conical, teeth

2, stiff; nerves 18–24, conspicuous; bases tapered, not spongy-thickened. **Stigmas** 3. **Styles** persistent. **Achenes** sharply trigonous; beaks present, longer than bodies of achenes, straight to sinuous, bases not bulbous.

1. Perigynia hispidulous to puberulent. ..... ***C. grayi***
1. Perigynia glabrous or edges scabrous.
    2. Perigynia empty, achenes absent. ..... Sterile hybrid between *C. louisianica* and *C. lupulina*
    2 . Perigynia filled, achenes present.
        3. Pistillate spikes globose or subglobose. Achenes sessile. Styles straight or slightly bent or curved. ..... ***C. intumescens***
        3. Pistillate spikes cylindrical. Achenes stipitate. Styles abruptly bent.
            4. Bodies of achenes 1.5–2 times longer than wide; sides shallowly concave; not conspicuously 3-knobbed.
                5. Plants with culms solitary or in small tufts. Blades 3–5 mm wide. Peduncles of staminate spikes 6–18 cm long. Perigynia lustrous gray-green. Bodies of achenes 2.5–3 mm long. ..... ***C. louisianica***
                5. Plants cespitose; tufts large. Blades 5–16 mm wide. Peduncles of staminate spikes 1–3.5 cm long. Perigynia stramineous. Bodies of achenes 3.5–4 mm long. ..... ***C. lupulina***
            4. Bodies of achenes as long as wide or shorter than wide; sides deeply concave; conspicuously 3-knobbed.
                6. Mature perigynia ascending; beaks about as long as bodies. Bodies of achenes 2–2.2 mm wide. ..... ***C. lupuliformis***
                6. Mature perigynia spreading; beaks 2–3 times longer than bodies. Bodies of achenes 2.5–3.5 mm wide. ..... ***C. gigantea***

Section *Multiflorae* K.S. Kunth

Plants cespitose. **Culms** erect to spreading; sharply trigonous; 0.9–2.5 mm in diameter below inflorescences. **Leaves** basal and cauline; exceeding or not exceeding inflorescences; sheath bases light to dark brown; venters thin, white, usually transversely wrinkled. **Involucral Bracts** setaceous; sheaths absent. **Spikes** 8–many per culm; androgynous, staminate flowers inconspicuous; sessile or short pedunculate; tightly packed. **Perigynia** 8–many; lenticular; not inflated; broadest at or above middle; glabrous; stramineous to tan or brown; beaks present, teeth 2, small, margins scaberulous; nerves inconspicuous; wings absent or present; bases tapered to rounded, not spongy-thickened. **Stigmas** 2. **Styles** deciduous. **Achenes** lenticular, biconvex; beaks persistent or caducous, cap-like, bases bulbous.

1. Perigynia red-dotted on adaxial surfaces. Largest perigynia widest below middle. ..... ***C. triangularis***
1. Perigynia not red-dotted on adaxial surfaces. Largest perigynia widest at middle.
    2. Perigynia gradually beaked. Beaks 1/2 to as long as bodies; margins entire or nearly so. Leaf apices reaching or exceeding inflorescences. ..... ***C. vulpinoidea***
    2. Perigynia abruptly beaked. Beak 1/4–1/2 length of bodies; margins serrate. Leaf apices seldom reaching inflorescences.
        3. Culms stout, 4–7 mm wide at bases. Inflorescences compact; 2–4 times longer than wide. ..... ***C. fissa***
        3. Culms slender, 2–4 mm wide at bases. Inflorescences elongate; 4–8 times longer than wide. ..... ***C. annectens***

Section *Ovales* K.S. Kunth

Plants cespitose. **Culms** erect to arching; sharply to bluntly trigonous; 0.3–1.8 mm in diameter below inflorescences. **Leaves** basal and cauline; not exceeding to exceeding inflorescences; sheath bases light brown to magenta-tinged; venters translucent, whitish to yellowish-white; firm, not prolonged above collars. I**nvolucral Bracts** setaceous; shorter than inflorescences; sheaths absent. **Spikes** 2–15 per culm; gynaecandrous or sometimes the lower ones pistillate; tightly clustered to widely spaced; clavate; apices rounded; bases tapered, formed by empty staminate scales clasping axis. **Perigynia** 15–numerous per spike; lenticular, planoconvex or concave-convex in cross-section; broadest at or above middle; glabrous; stramineous; beaks present, flattened, teeth 2, narrow, margins ciliate-serrate; nerves inconspicuous; margins winged; bases rounded or tapered, not spongy-thickened. **Stigmas** 2. **Styles** deciduous. **Achenes** lenticular; beaks present, straight or bent, bases not bulbous.

1. Lower pistillate scales of spikes subulate or awned.
    2. Largest perigynia 4–7 mm wide; suborbicular to orbicular; beak lobes appressed. ..... ***C. tetrastachya***
    2. Largest perigynia 0.9–3.8 mm wide; narrowly to broadly ovate; beak lobes spreading.
        3. Perigynia width less than half length; 0.9–2 mm wide; lanceolate. ..... ***C. scoparia***
        3. Perigynia width more than half length; 2–3.8 mm wide; lance-ovate to obovate.

4. Bodies of perigynia obovate; bases acute. ..... ***C. alata***
4. Bodies of perigynia elliptical to orbicular; bases rounded.
5. Largest perigynia 2.6–3.6 mm wide. Achenes 1.3–1.5 mm wide; 1.8–2.2 mm long. ..... ***C. shinnersii***
5. Largest perigynia 2–2.5 mm wide. Achenes 0.8–1.4 mm wide; 1.2–1.8 mm long. ..... ***C. festucacea***

1. Lower pistillate scales of spikes obtuse or acute or short acuminate.
6. Perigynia 1–2 mm wide.
7. Perigynia translucent; wings not extending to bases. Pistillate scales short acuminate. Vegetative culms conspicuous. Leaves many; borne on upper half of culms. ..... ***C. tribuloides***
7. Perigynia more or less opaque; wings extending to bases. Pistillate scales obtuse. Vegetative culms inconspicuous. Leaves few; strictly basal. ..... ***C. scoparia***
6. Perigynia 2–6 mm wide.
8. Spikes fusiform. ..... ***C. muskingumensis***
8. Spikes ovoid.
9. Nerves of venters present; conspicuous; green; extending nearly to summit.
10. Beaks of perigynia diverging; slender; abruptly contracted. Style bases conspicuously sinuous. ..... ***C. albolutescens***
10. Beaks of perigynia appressed; triangular; gradually tapered. Style bases straight.
11. Pistillate scales white-hyaline; apices obtuse. ..... ***C. longii***
11. Pistillate scales reddish brown; apices acute. ..... ***C. ozarkana***
9. Nerves of venters absent.
12. Bodies of perigynia reniform; finely granular-papillose at 30–40X magnification. Lower pistillate scales obtuse-rounded. ..... ***C. reniformis***
12. Bodies of perigynia broadly ovate or elliptic or orbicular; smooth at 30–40X magnification. Lower pistillate scales rounded or acuminate to aristate.
13. Perigynia thin and nearly flat; bulge over achene prominent on both surfaces.
14. Adaxial surfaces of perigynia not nerved. Largest perigynia 4–7 mm wide. Awns of lowest staminate scales of terminal spike scabrous. ..... ***C. tetrastachya***
14. Adaxial surfaces of perigynia 1–8 nerved. Largest perigynia 2.5–4.8 mm wide. Awns of lowest staminate scales of terminal spike absent or if present not scabrous.
15. Largest perigynia 1.5–2.5 mm longer than subtending scales. Staminate and lower pistillate scales obtuse to acute. ..... ***C. opaca***
15. Largest perigynia 0.6–1.4 mm longer than subtending scales. Staminate and lower pistillate scales acuminate. ..... ***C. shinnersii***
13. Perigynia bowl-shaped; bulge over achene prominent only on adaxial surface.
16. Spikes on larger culms 5–7. Bases of uppermost spikes acute. Basal staminate scales of spikes conspicuous.
17. Lower spikes 6–7 mm long. ..... ***C. festucacea***
17. Lower spikes 9–13 mm long.
18. Largest perigynia 3.2–4.8 mm long. Pistillate scales acute. ..... ***C. brevior***
18. Largest perigynia 5–5.5 mm long. Pistillate scales acuminate. ..... ***C. shinnersii***
16. Spikes on larger culms 2–4. Bases of uppermost spikes rounded. Basal staminate scales of spikes inconspicuous.
19. Perigynia not nerved or faintly and irregularly 1–5 nerved on adaxial surfaces. ..... ***C. brevior***
19. Perigynia strongly 3–7 nerved on adaxial surfaces.
20. Vegetative culms numerous; conspicuous; bearing 15–35 leaves only on distal half. Plants rhizomatous, colonial. Plants of Red River floodplains. ..... ***C. hyalina***
20. Vegetative culms few; inconspicuous; bearing 3–5 leaves widely spaced. Plants cespitose. Plants of Ozark Plateau. ..... ***C. molestiformis***

Section *Paludosae* G. Don

Plants with culms solitary; colonial; rhizomes conspicuous. **Culms** erect to ascending; sharply trigonous; 0.8–4.5 mm in diameter below inflorescences. **Leaves** basal and cauline; not exceeding to exceeding inflorescences; sheath bases brown to magenta-tinged; venters deeply concave, of various colors. **Involucral Bracts** foliaceous; sheaths absent or shorter than diameters of culms. **Spikes** 3–8; staminate and pistillate. **Staminate Spikes** 1–4; distal; pedunculate or sessile or subsessile; narrowly cylindrical. **Pistillate**

Spikes 2–4; narrowly oblong; widely spaced along culms; sessile or short pedunculate; distal 1 occasionally with staminate flowers at apices. **Perigynia** 26–numerous per spike; terete; not inflated; broadest at middle; glabrous or hispid; stramineous; beaks present, short, teeth 2, conspicuous; nerves 10–15, inconspicuous, slightly impressed; bases rounded, not spongy-thickened. **Stigmas** 3. **Styles** tardily deciduous or persistent. **Achenes** sharply trigonous; beaks present, short, straight or bent, bases not bulbous.

1. Perigynia including beaks 5–8 mm long. Widest leaves 5–8 mm wide. ..... ***C. hyalinolepis***
1. Perigynia including beaks 3–4.5 mm long. Widest leaves 2–3 mm wide.
    2. Perigynia glabrous. ..... ***C. melanostachya***
    2. Perigynia hispid. ..... ***C. pellita***
    (= *C. lanuginosa* auct. non Michx.)

Section *Paniceae* G. Don

Plants cespitose; colonial. **Culms** erect to arching; sharply trigonous; 0.6–1.6 mm in diameter below inflorescences. **Leaves** basal and cauline; not exceeding inflorescences; sheath bases brown to magenta-tinged; venters concave, firm. **Involucral Bracts** foliaceous; sheaths longer than diameters of culms. **Spikes** 2–4 per culm. **Staminate Spikes** 1; pedunculate; lanceolate. **Pistillate Spikes** 1–3; ovoid. **Perigynia** 10–18 per spike; bluntly trigonous; slightly inflated; broadest above middle; glabrous; stramineous to greenish brown; beaks present, short, truncate, bent, teeth 0; nerves 20–30, inconspicuous; bases tapered, not spongy-thickened. **Stigmas** 3. **Styles** deciduous. **Achenes** trigonous; beaks present, short, bent, bases not bulbous.

One species. ..... ***C. meadii***

Section *Phacocystis* B.C.J. Dumortier

Plants cespitose; colonial. **Culms** erect to spreading; sharply trigonous; 1–2.6 mm in diameter below inflorescences. **Leaves** basal and cauline; not exceeding inflorescences; sheath bases brownish or magenta-tinged; venters hyaline to slightly thickened, often red-dotted. **Involucral Bracts** foliaceous, equal to or exceeding inflorescences; sheaths absent or shorter than diameters of culms. **Spikes** 3–9 per culm; drooping; sessile or borne on peduncles shorter than spikes. **Staminate Spikes** 1–3; distal, sometimes with a few pistillate flowers at apices or bases; cylindrical. **Pistillate Spikes** 3–8; drooping. **Perigynia** numerous per spike; biconvex to terete in cross-section; slightly inflated; broadest below middle; glabrous; stramineous; beaks present, truncate or short-tubular, teeth 0; nerves inconspicuous; bases rounded, not spongy-thickened. **Stigmas** 2. **Styles** deciduous or persistent. **Achenes** lenticular; beaks absent or present, minute, straight or bent, bases not bulbous.

1. Margins of pistillate scales green to straminous. Lowest spike of inflorescences drooping.
    2. Lower spikes sessile. Leaves 3–5 mm wide. Pistillate scales not awned. ..... ***C. torta***
    2. Lower spikes pedunculate. Leaves 6–10 mm wide. Pistillate scales awned. ..... ***C. crinita***
1. Margins of pistillate scales dark reddish brown. Lowest spike of inflorescences erect or ascending.
    3. Pistillate scales mucronate or awned; midribs greenish white, extending to apices; margins green. Teeth of perigynia beaks 2. Plants of Black Mesa area. ..... ***C. nebrascensis***
    3. Pistillate scales not mucronate nor awned. midribs green, not extending to apices; margins white. Teeth of perigynia beaks 0. Plants of central 2/3 of body of state. ..... ***C. emoryi***

Section *Phaestoglochin* B.C.J. Dumortier

Plants cespitose or with solitary culms; rhizomes long or short. **Culms** erect to spreading; sharply to bluntly trigonous; 0.3–1.5 mm in diameter below inflorescences. **Leaves** basal and cauline; usually exceeding inflorescences; sheath bases light to dark brown or a few with reddish stains; venters thin, colorless or white, concave. **Involucral Bracts** setaceous; sheaths absent. **Spikes** 3–15; androgynous; sessile; tightly clustered to scattered along upper culms, staminate flowers inconspicuous. **Perigynia** 3–numerous per spike; lenticular, plano-convex; not inflated; broadest below or at middle; glabrous; stramineous or greenish or tan; beaks present, teeth 2, tapered; nerves of various numbers and appearance; wings present or absent; bases rounded, spongy-thickened. **Stigmas** 2. **Styles** deciduous. **Achenes** lenticular; beaks absent or present, minute, some cap-like, bases bulbous.

1. Lower sheaths white with conspicuous green ribs; cross-veins conspicuous; loosely enclosing culms. Widest blades 3–10 mm wide.
    2. Venters white-hyaline; thin; often torn. Backs of sheaths not white spotted. Mature perigynia stramineous. Pistillate scales acute to short awned. ..... ***C. gravida***
    2. Venters yellow or brown; thick, typically intact. Backs of sheaths typically white spotted. Mature perigynia green. Pistillate scales long awned. ..... ***C. aggregata***
1. Lower sheaths green without conspicuous ribs; cross-veins not conspicuous; tightly enclosing culms. Widest blades 0.5–4 mm wide.

3. Perigynia beaks smooth at 20–30X magnification.
    4. Adaxial bases of perigynia spongy thickened, when probed with dissecting needle, but not swollen. Inflorescences dense; internodes not visible between lower spikes. ..... ***C. leavenworthii***
    4. Adaxial bases of perigynia spongy thickened and swollen. Inflorescences open; internodes visible between lower spikes.
        5. Swollen adaxial bases of perigynia bearing vertical stripes or veins. Perigynia 1.3–2.3 mm wide; 1.5–2.3 times longer than wide. Widest blades 1.5–3 mm wide. ..... ***C. retroflexa***
        5. Swollen adaxial bases of perigynia not bearing vertical stripes or veins. Perigynia 1–1.3 mm wide; 2.7–3 times longer than wide. Widest blades 0.9–1.8 mm wide. ..... ***C. texensis***
3. Perigynia beaks scabrous at 20–30X magnification.
    6. Involucral bracts 6–25 cm long; 2 or more times longer than inflorescences. ..... ***C. arkansana***
    6. Involucral bracts 0.7–5 cm long; less than 2 times longer than inflorescences.
        7. Inflorescences open. Lower internodes more than 2 times longer than lower spikes.
            8. Stigmas flexuous or slightly recurved. Spongy bases of perigynia 1–1.5 mm long, 1/4 to 1/2 length of the perigynia. ..... ***C. socialis***
            8. Stigmas tightly coiled. Spongy bases of perigynia 0.5–0.8 mm long, equal to or less than 1/5 length of perigynia. ..... ***C. rosea***
        7. Inflorescences dense. Lower internodes less than 2 times longer than lower spikes.
            9. Perigynia hidden by pistillate scales. Pistillate scales 3-nerved; long awned. Awns of lowest scales 1–4 mm long; longer than bodies. Lower bracts leaf-like at bases; several-veined. Leaf apices reaching or exceeding mature inflorescences. ..... ***C. austrina***
            9. Perigynia visible, not hidden by pistillate scales. Pistillate scales 1-nerved; not awned or mucronate or short awned. Awns of lowest scales 0.5–1.7 mm long; shorter than bodies. Lower bracts setaceous at bases, 1-veined. Leaf apices not reaching mature inflorescences.
                10. Largest perigynia 2 mm wide or more.
                11. Abaxial nerves of perigynia 0 or 3–5; inconspicuous. ..... ***C. perdentata***
                11. Abaxial nerves of perigynia 9–15; conspicuous. ..... ***C. muehlenbergii***
                10. Largest perigynia 2 mm wide or less.
                12. Culms stiff; stout; 0.9 mm in diameter. Bodies of perigynia ovoid. Beaks 0.3–0.8 mm long with teeth 0.1–0.3 mm long. Pistillate scales mucronate. ..... ***C. leavenworthii***
                12. Culms flexuous; delicate, 0.5–0.7 mm in diameter. Bodies of perigynia ellipsoid to globose. Beaks 0.7–1.1 mm long with teeth 0.3–0.5 mm long. Pistillate scales awned, awns 0.5–1.5 mm long.
                13. Inflorescences conical; 1–2 times longer than wide. ..... ***C. cephalophora***
                13. Inflorescences cylindrical; 3–6 times longer than wide. ..... ***C. muehlenbergii***

Section *Phyllostachyae* (E. Tuckerman) L.H. Bailey

Plants cespitose. **Culms** dilated below inflorescences; erect to arching; sharply trigonous to winged; 0.3–3 mm in diameter below inflorescences. **Leaves** basal or cauline; exceeding inflorescences; sheath bases light brown to pale chestnut; venters thin, fragile, splitting to v-shape. **Involucral Bracts** absent [Lowest pistillate scales foliaceous, hence involucral bracts falsely appearing to be present]. **Spikes** 1–5 per culm; androgynous; few-flowered; proximal pistillate scales foliaceous, large; staminate scales with margins fused at bases and clasping rachises. **Perigynia** 1–9 per spike; globose or ellipsoid; not inflated; widest at middle; glabrous; pale green to stramineous; beaks long, truncate, teeth 0; nerves numerous, inconspicuous; bases tapered, long. **Stigmas** 3. **Styles** deciduous. **Achenes** terete to slightly trigonous; beaks absent or present, minute, bases not bulbous.

1. Lower bracts leaf-like; 4–10 mm wide at bases; concealing perigynia; apices acute. ..... ***C. latebracteata***
1. Lower bracts setaceous; 1–3 mm wide at bases; not concealing perigynia; apices acuminate.
    2. Perigynia subglobose; abruptly beaked; beak margins smooth. ..... ***C. jamesii***
    2. Perigynia ellipsoid; gradually beaked; beak margins serrate. ..... ***C. basiantha***

Section *Porocystis* B.C.J. Dumortier

Plants cespitose. **Culms** erect to arching; sharply trigonous; 0.3–1.2 mm in diameter below inflorescences. **Leaves** basal and cauline; not exceeding or rarely exceeding inflorescences; sheath bases magenta-tinged; venters white to yellowish-brown, opaque, densely to slightly pubescent, concave. **Involucral Bracts** setaceous; sheaths absent or shorter than diameters of culms. **Spikes** 2–5 per culm, usually 3; short pedunculate or sessile; distal one gynaecandrous; proximal ones pistillate; clustered near culm apices. **Perigynia** 10–40 per spike; terete or trigonous or plano-convex; inflated or not inflated; broadest below middle; pilose to glabrous; greenish brown to reddish brown; beaks absent; nerves numerous, conspicuously pale; surfaces granular or not granular; bases tapered, not spongy-thickened. **Stigmas** 3. **Styles** deciduous. **Achenes** trigonous; beaks absent or present, short, bent or straight, bases not bulbous.

1. Perigynia densely pilose. ..... ***C. swanii***
1. Perigynia glabrous or minutely papillose or sparsely scabrous.
    2. Pistillate scales in middle of spikes attenuate; equal to or longer than perigynia; awns present, some or all longer than 5 mm. ..... ***C. bushii***
    2. Pistillate scales in middle of spikes rounded to obtuse; shorter than perigynia; awns absent or if present, shorter than 5 mm.
        3. Mature perigynia inflated; terete; spreading. ..... ***C. caroliniana***
        3. Mature perigynia not inflated; trigonous or plano-convex; ascending.
            4. Abaxial surfaces of blades pilose. Venters retrorsely pubescent. ..... ***C. hirsutella***
            4. Abaxial surface of blades glabrous. Venters glabrous. ..... ***C. complanata***

Section *Shortianae* (L.H. Bailey) G. Kukenthal

Plants cespitose. **Culms** erect to arching; sharply trigonous; 0.8–3.2 mm in diameter below inflorescences. **Leaves** basal and cauline; exceeding inflorescences; sheath bases light magenta to light brown; venters hyaline, sometimes transversely wrinkled. **Involucral Bracts** foliaceous; sheaths absent. **Spikes** 4–6 per culm; gynaecandrous; short pedicellate to subsessile; overlapping less than half their length; cylindrical. **Perigynia** 30–numerous per spike; terete; not inflated; broadest at middle; glabrous; olive green to dark brown; beaks present, short, teeth 0 or 2, minute; nerves 2, conspicuous; bases tapered, not spongy-thickened. **Stigmas** 3. **Styles** deciduous. **Achenes** bluntly trigonous; beaks present, short, bent, bases not bulbous.

One species. ..... ***C. shortiana***

Section *Squarrosae* J. Carey

Plants cespitose; colonial. **Culms** erect; sharply trigonous; 0.8–3 mm in diameter below inflorescences. **Leaves** basal and cauline; exceeding inflorescences; sheath bases white to brownish or magenta; venters hyaline, slightly concave. **Involucral Bracts** foliaceous, sheaths absent to longer than diameters of culms. **Spikes** 1–8 per culm; distal one gynaecandrous or staminate; proximal ones pistillate or rarely gynaecandrous; cylindrical, narrower at apices. **Perigynia** 35–numerous per spike; terete; slightly inflated; broadest above middle; glabrous; olive green or stramineous; beaks present, long, narrow, teeth 2, stiff; nerves 8–12, conspicuous; bases tapered. **Stigmas** 3. **Styles** persistent. **Achenes** bluntly trigonous; beaks present, short or long, straight or sinous, bases not bulbous.

1. Mature perigynia straminous. Pistillate scales not awned. ..... ***C. squarrosa***
1. Mature perigynia dull olive-green. Pistillate scales awned or awn-like
    2. Bases of pistillate scales not hyaline. ..... ***C. frankii***
    2. Bases of pistillate scales hyaline winged. ..... ***C. aureolensis***

Section *Stellulatae* (K.S. Kunth) H. Christ

Plants cespitose. **Culms** erect; sharply trigonous; 0.8–1.7 mm in diameter below inflorescences. **Leaves** basal and cauline; not exceeding inflorescences; margins narrowly white-hyaline; sheath bases light brown and stramineous; venters straight or concave, often with narrow thickened lip. **Involucral Bracts** setaceous; shorter than spikes; sheaths absent. **Spikes** 3–8 per culm; distal one 1 gynaecandrous, bearing 4–40 pistillate and 2–20 staminate flowers; proximal 2–7 usually pistillate, about as wide as long, bearing 3–12 flowers. **Perigynia** 3–40 per spike; lenticular; not inflated; broadest below middle; glabrous; olive green to tan; beaks present, teeth 2; nerves 1–12, conspicuous; margins thin but not winged; bases rounded, spongy-thickened. **Stigmas** 2. **Styles** deciduous. **Achenes** lenticular, biconvex; beaks present, short, straight, bases not bulbous.

One species. ..... ***C. atlantica***

Section *Vescicariae* (E. Tuckerman) J. Carey

Plants cespitose. **Culms** erect to arching; sharply to bluntly trigonous; 0.9–2 mm in diameter below inflorescences. **Leaves** basal and cauline; exceeding inflorescences; sheath bases magenta-tinged or brown; venters thin, white to yellowish-white; concave. **Involucral Bracts** foliaceous; sheaths shorter than diameters of culms or absent. **Spikes** 2–8 per culm. **Staminate Spikes** 1; sessile to short pedunculate; linear. **Pistillate Spikes** 1–7; upper one short pedunculate; lower ones long pedunculate, drooping; cylindrical, ends rounded. **Perigynia** 100–numerous per spike; lenticular, biconvex; not inflated; broadest at or below middle; glabrous; light green; beaks present, teeth 2, spreading or recurved; nerves 7–20; bases abruptly tapered, not spongy-thickened. **Stigmas** 3. **Styles** persistent. **Achenes** sharply trigonous; beaks present, equal to or longer than bodies of achenes, straight or bent, bases not bulbous.

1. Perigynia 7–9 mm long; veins 8–10; beaks 3–4 mm long. ..... ***C. lurida***
1. Perigynia 5–7 mm long; veins 15–20; beaks 2 mm long.
    2. Spikes 2–3.4 cm long. Beak teeth straight, spreading; 0.3–0.9 mm long. ..... ***C. hystericina***
    2. Spikes 3.5–4.5 cm long. Beak teeth recurved; 1.3–2 mm long. ..... ***C. comosa***

Section *Vulpinae* (J. Carey) H. Christ

Plants cespitose. **Culms** erect to spreading or arching; bluntly to sharply trigonous; 0.8–2.7 mm in diameter below inflorescences. **Leaves** basal and cauline; usually exceeding inflorescences; sheath bases brown; venters hyaline, loose, sometimes transversely wrinkled. **Involucral Bracts** setaceous; sheaths shorter than diameters of culms. **Spikes** 10–40 per culm; androgynous, the staminate flowers inconspicuous; more than one at lowest nodes. **Perigynia** numerous per spike; lenticular; not inflated; broadest below middle; glabrous; stramineous or greenish tan; beaks present, short or long, abruptly or gradually constricted; nerves 10–22, conspicuous; bases truncate or rounded, spongy-thickened. **Stigmas** 2. **Styles** deciduous. **Achenes** lenticular, biconvex; beaks present, minute, straight, bases not bulbous.

1. Perigynia 5.5–7.5 mm long; adaxial ribs absent; bases conspicuously distended.
   Beaks more than 2 times length of bodies. Venters minutely red-dotted. ..... ***C. crus-corvi***
1. Perigynia 4–5 mm long; adaxial ribs present; bases not distended; beaks 0.8–2 times
   length of bodies. Venters not red-dotted.
    2. Venters of upper sheaths smooth or longitudinally wrinkled. Blades of lower sheaths 3 cm long. ..... ***C. oklahomensis***
    2. Venters of upper sheaths transversely wrinkled. Blades of lower sheaths more than 4 cm. ..... ***C. stipata***

Cyperus C. Linnaeus Flatsedge

1. Stigmas 2. Achenes lenticular.
    2. Spikelets 1–1.7 mm wide. Scale apices acute; straight to slightly recurved; mucronulate.
       Mature achenes narrowly obovate; apices abruptly tapered. ..... ***C. polystachyos***
    2. Spikelets 1.8–3.5 mm wide. Scale apices rounded to obtuse; slightly incurved. Mature
       achenes ovate or elliptic; apices gradually tapered.
        3. Mature achenes stramineous to dark brown, rarely gray; surfaces smooth, appearing
           slightly grainy, patterned with 4- or 5-angled, isodiametric cells at 35X magnification. ..... ***C. bipartitus***
           (= *C. rivularis*)
        3. Mature achenes dark reddish brown to black at maturity; surfaces rugulose,
           appearing satiny, patterned with vertically elongate cells at 35X magnification. ..... ***C. flavescens***
1. Stigmas 3. Achenes trigonous, sometimes unequally so.
    4. Plants cespitose. Rhizomes absent or short and inconspicuous.
        5. Scale apices recurved.
            6. Scales inconspicuously 3-nerved; apices not awned. ..... ***C. acuminatus***
            6. Scales conspicuously 5- or 7- or 9-nerved; apices awned, awns recurved. ..... ***C. squarrosus***
               (= *C. aristatus*)
        5. Scale apices straight to slightly incurved.
            7. Spikelets borne in globose to subglobose heads; radiating palmately,
               arrangement not conspicuously alternate.
                8. Culms smooth to touch. Spikelets 4–10 times longer than wide. ..... ***C. compressus***
                8. Culms scabrous to touch. Spikelets 2–3 times longer than wide. ..... ***C. surinamensis***
            7. Spikelets borne in cylindrical spikes; radiating pinnately;
               arrangement conspicuously alternate.
                9. Scales 3–6.5 mm long. Spikelets flattened; disarticulating only
                   at bases, shed intact in fruit leaving lowest scale on rachillas. ..... ***C. strigosus***

9. Scales 1.1–3.2 mm long. Spikelets terete; disarticulating into segments in fruit, or scales and achenes shed separately leaving naked rachillas.
10. Scales 2–2.8 mm long; not overlapping. Spikelets 10–20 mm long; disarticulating in fruit into segments comprising achene, winged rachis joint, and scale. ..... ***C. odoratus***
(= *C. ferax, C. engelmannii, C. acicularis*)
10. Scales 1–1.7 mm long; overlapping. Spikelets 3–12 mm long; scales and achenes disarticulating separately leaving naked rachillas.
11. Scales ovate to elliptic; sides russet or magenta striped; apices obtuse; mucronate. Mature achenes 0.7–1 mm long. ..... ***C. erythrorhizos***
11. Scales broadly obovate; sides golden brown; apices rounded; not mucronate. Mature achenes 1–1.5 mm long. ..... ***C. iria***
4. Plants rhizomatous. Rhizomes slender and creeping, or short and knotty, or bearing tubers.
12. Culms and/or inflorescence branches weakly to strongly scabrous to touch or hispidulous.
13. Spikelets terete to somewhat 4-sided; typically strongly reflexed. ..... ***C. plukenetii***
13. Spikelets flattened; ascending.
14. Scales reddish brown. Involucral bracts horizontal to reflexed. ..... ***C. cephalanthus***
14. Scales stramineous to white or transparent, sometimes red spotted. Involucral bracts spreading to nearly erect.
15. Mature achenes 1.9–2.4 mm long. Scales 5–10 per spikelet. Culm bases abruptly bulbous. ..... ***C. schweinitzii***
15. Mature achenes 0.5–1 mm long. Scales 10–50 per spikelet. Culm bases not bulbous. ..... ***C. surinamensis***
12. Culms and inflorescence branches smooth to touch.
16. Spikelets flattened. Edges of mature spikelets with toothed appearance; scale apices divergent.
17. Spikelets borne in globose or ovoid or pyramidal heads; radiating palmately; arrangement not conspicuously alternate.
18. Spikelets ovoid; 1–2 times longer than wide. Longest involucral bract stiffly erect, appearing to be continuation of culm. ..... ***C. reflexus***
18. Spikelets linear; 3–5 times longer than wide. All involucral bracts spreading to ascending.
19. Lowest spikelets of head reflexed. Widest leaf blades flat. Heads globose. ..... ***C. lupulinus***
19. Lowest spikelets of heads ascending. Widest leaf blades folded. Heads ovoid or pyramidal. ..... ***C. schweinitzii***
17. Spikelets borne in cylindrical spikes; radiating pinnately; arrangement conspicuously alternate.
20. Mature scales bicolored, bodies magenta or reddish brown, midribs green; margins colorless, translucent.
21. Spikelet scales 2.5–3.1 mm long. Culms 10–60 cm tall. Tubers present. Mature achenes black; concave-convex. ..... ***C. rotundus***
21. Spikelet scales 3.1–5 mm long. Culms 50–120 cm tall. Tubers absent. Mature achenes dark grey-dark brown; bluntly trigonus. ..... ***C. setigerus***
20. Mature scales uniformly yellow to brown; margins yellowish brown, opaque.
22. Spikelet scales 2.6–3.1 mm long, rounded at midribs. Scales and fruits shed as units, leaving naked rachillas. Tubers typically present. ..... ***C. esculentus***
22. Spikelet scales 3.5–6.4 mm long, sharply creased at midribs. Scales and fruits retained and entire spikelet shed at maturity. Tubers absent. ..... ***C. strigosus***
16. Spikelets terete to 4-sided. Edges of mature spikelets with more or less entire appearance; scale apices strongly appressed.
23. Spikelets borne in dense to loose spikes; loosely spaced. Rachises visible between spikelet bases.
24. Scales 2–3.1 mm long.

25. Scales reddish brown; midribs green; nerves inconspicuous. Spikelets disarticulating completely into segments; achenes shed with winged rachilla joints and scales. ..... ***C. odoratus***
25. Scales whitish with red dots; midribs whitish; nerves conspicous, 2–4. Spikelets persistent, not disarticulating completely; only achenes shed, rachillas and scales persistent. ..... ***C. croceus***
24. Scales 3.3–5.3 mm long.
26. Spikelets 50–120 per spike; lower ones typically strongly reflexed. Scales golden brown to stramineous. ..... ***C. lancastriensis***
26. Spikelets 10–40 per spike; lower ones ascending to spreading, or rarely the lowest somewhat reflexed. Scales light reddish brown to stramineous. ..... ***C. retroflexus***
23. Spikelets borne in globose heads; crowded. Rachises not visible between spikelet bases.
27. Fertile florets 1–3 per spikelet.
28. Spikes ovoid-oblong. Scales stramineous to greenish white. Rachilla wings 0.2–0.3 mm wide. ..... ***C. retrorsus***
28. Spikes globose to ovoid-globose. Scales reddish brown. Rachilla wings 0.5–1 mm wide. ..... ***C. echinatus*** (= *C. ovularis*)
27. Fertile florets 3–22 per spikelet.
29. Heads obovoid. Scales 4–5 mm long. ..... ***C. lancastriensis***
29. Heads globose to hemispheric. Scales 2–3.5 mm long. ..... ***C. lupulinus***

Dulichium C.H. Persoon — Three-Way Sedge

One species. ..... ***D. arundinaceum***

Eleocharis R. Brown — Spike-Rush[1]

1. Culms stout; 2–4 mm in diameter as measured 1–2 cm below spikes.
2. Culms 4-sided; solid, pith soft; septa absent or incomplete. ..... ***E. quadrangulata***
2. Culms terete; hollow, pith absent; septa present, conspicuous in lower half. ..... ***E. interstincta***
1. Culms filiform, 0.3–1.8 mm in diameter as measured 1–2 cm below spikes.
3. Culms arching and rooting at apices. ..... ***E. rostellata***
3. Culms not arching and rooting at apices.
4. Achenes lenticular; stigmas 2.
5. Mature achenes black; bodies 0.3–0.7 mm long.
6. Tubercles sessile, confluent with achene apices. Achene bodies 0.5–0.7 mm long. ..... ***E. geniculata***
6. Tubercles short stipitate, articulated with achene apices. Achenes bodies 0.3–0.5 mm long. ..... ***E. atropurpurea***
5. Mature achenes yellow to brown; bodies 0.8–1.4 mm long.
7. Tubercles about as wide as achene apices.
8. Spikes cylindrical to ovoid-cylindrical. Tubercles 1/4 as long as achenes or shorter. ..... ***E. engelmannii***
8. Spikes ovate to lance-acuminate. Tubercles 1/3–1/2 as long as achenes.
9. Spikes ovate; apices rounded to acute; distal scales obtuse. ..... ***E. obtusa***
9. Spikes lanceolate; apices acuminate; distal scales acute. ..... ***E. lanceolata***
7. Tubercles 1/3–1/2 as wide as achene apices.
10. Basal scales of spikes clasping entire culm. Culms terete; 0.5–0.7 mm in diameter as measured 1–2 cm below spikes. Sterile basal scales 1. ..... ***E. erythropoda***
10. Basal scales of spikes clasping 1/2–3/4 of culm. Culms flattened; 1–1.6 mm in diameter as measured 1–2 cm below spikes. Sterile basal scales 2 or 3.
11. Leaf sheaths loosely enclosing culms, somewhat inflated; apices usually toothed. Apices of spikes acute to attenuate. Achenes dull yellow to dull brown. ..... ***E. macrostachya***
11. Leaf sheaths tightly enclosing culms, not inflated; apices often splitting, but never toothed. Apices of spikes rounded to obtuse. Achenes shiny brown. ..... ***E. palustris***
4. Achenes trigonous to terete; stigmas 3.

12. Tubercles sessile, confluent with achene apices.
    13. Culms rooting at tips. Rhizomes not forming tubers. ..... ***E. rostellata***
    13. Culms not rooting at tips. Rhizomes forming tubers about 1 mm in diameter.
        14. Culms 0.5–0.8 mm in diameter as measured 1–2 cm below spikes. ..... ***E. obtusa***
        14. Culms 0.2–0.4 mm in diameter as measured 1–2 cm below spikes.
            15. Perianth bristles equal to or longer than achenes. ..... ***E. parvula***
            15. Perianth bristles absent or obsolete. ..... ***E. coloradoensis***
12. Tubercles short stipitate, articulated with achene apices.
    16. Mature achenes whitish.
        17. Perianth bristles longer than achenes. Apices of leaf sheaths flexible; fugacious; translucent. ..... ***E. radicans***
        17. Perianth bristles shorter than achenes or obsolete. Apices of leaf sheaths rigid; not fugacious; opaque.
            18. Apices of leaf sheaths obtuse. ..... ***E. acicularis***
            18. Apices of leaf sheaths acute to short-acuminate. ..... ***E. wolffii***
    16. Mature achenes green or golden or brown.
        19. Culms flattened or ellipsoid.
            20. Apices of all scales bifid. ..... ***E. occulta***
            20. Apices of all scales acuminate or only upper scales bifid and lowest 1–3 scales bifid. ..... ***E. compressa***
        19. Culms terete or 4- to 8-ribbed.
            21. Apices of scales acuminate. ..... ***E. compressa*** (= *E. acutisquamata*)
            21. Apices of scales obtuse to acute.
                22. Perianth bristles obsolete. Achenes minutely warty. ..... ***E. tenuis***
                22. Perianth bristles about as long as achenes. Achenes finely rugose to nearly smooth.
                23. Scales uniformly stramineous; margins opaque. Apices of leaf sheaths oblique; teeth absent. Achenes greenish tan; smooth. ..... ***E. albida***
                23. Scales multicolored; bodies dark magenta, midribs stramineous or green; margins white, translucent. Apices of leaf sheaths truncate; teeth 1, narrowly triangular, acute. Achenes yellow to gold or dark brown; minutely pitted. ..... ***E. montevidensis***

[1] Adapted from key by George M. Diggs, Jr. and Barney L. Lipscomb

Fimbristylis M. Vahl

1. Styles 3-branched. Achenes trigonous. ..... ***F. autumnalis***
1. Styles 2-branched. Achenes lenticular or obovoid.
    2. Spikelets all sessile. Leaves filiform. Achenes 0.5–0.7 mm long. ..... ***F. vahlii***
    2. Spikelets both sessile and pedunculate (at least one). Leaves linear. Achenes 0.9–1.2 mm long.
        3. Plants annuals. Culms conspicuously cespitose. Rhizomes absent. ..... ***F. dichotoma*** (= *F. annua*)
        3. Plants perennials. Culms solitary or few per node. Rhizomes present. ..... ***F. puberula***

Fuirena C.F. Rottboell Umbrellagrass

1. Perianth blades with subapical awns. ..... ***F. simplex***
1. Perianth blades with apical awns.
    2. Perianth blades flattened; apices acuminate, incurved. ..... ***F. squarrosa***
    2. Perianth blades terete; apices conical to apiculate, not incurved. ..... ***F. bushii***

Isolepis R. Brown Dwarf Bulrush

1. Flowers or achenes 7–14 per spikelet. Scales in middle of spikelet 1.8–2 mm long; awns 0.2–0.5 mm long. Achenes 1–1.5 mm long. ..... ***I. carinata*** (= *Scirpus koilolepis*)

1. Flowers or achenes 20–30 per spikelet. Scales in middle of spikelets 1–1.2 mm long; mucros to 0.1 mm long. Achenes 0.7–0.9 mm long. ..... ***I. pseudosetacea***
(= *Scirpus molestus*)

Kyllinga C.F. Rottboell Spike Sedge, Green-Head Sedge[1]

1. Inflorescences bluntly triangular. Plants annuals; from fibrous roots. ..... ***K. pumila***
(= *Cyperus tenuifolius*)

1. Inflorescences oval, longer than wide. Plants perennials; from rhizomes.
  2. Two involucral bracts spreading and one erect. Rhizomes 1–12 cm long. Mature achenes uniformly light to medium brown. ..... ***K. brevifolia***
  (= *Cyperus brevifolius*)
  2. All three involucral bracts spreading. Rhizomes 0.1–0.3 cm long. Mature achenes reddish brown to blackish brown with contrasting light apices and bases. ..... ***K. odorata***
  (= *Cyperus sesquiflorus*)

[1] Treatment contributed by George M. Diggs, Jr. and Barney L. Lipscomb

Lipocarpha R. Brown Halfchaff Sedge

1. Perianth scales absent or shorter than achenes. ..... ***L. micrantha***
1. Perianth scales as long as achenes.
  2. Apices of spikelet scales long acuminate; spreading to recurved; length equal to or longer than length of scale body. ..... ***L. aristulata***
  2. Apices of spikelet scales acute; appressed; length conspicuously shorter than length of scale body. ..... ***L. drummondii***

Rhynchospora M. Vahl Beakrush

1. Tubercles more than two times longer than bodies of achenes.
  2. Perianth parts scale-like; flattened; shorter than mature achenes. ..... ***R. corniculata***
  2. Perianth parts bristles; terete; longer than mature achenes. ..... ***R. macrostachya***
1. Tubercles shorter than or equal to bodies of achenes.
  3. Scales white. Perianth bristles absent. ..... ***R. nivea***
  (= *Dichromena nivea*)
  3. Scales stramineous to reddish brown. Perianth bristles present.
    4. Perianth bristles retrorsely barbed.
      5. Leaves filiform; 0.2–1 mm wide. ..... ***R. capillacea***
      5. Leaves flat; 2–5 mm wide.
        6. Achenes including tubercles; 3–4 mm long. ..... ***R. glomerata***
        6. Achenes including tubercles; 1.5–2 mm long. ..... ***R. capitellata***
    4. Perianth bristles antrorsely barbed.
      7. Leaves filiform; 0.2–1 mm wide.
        8. Bodies of achenes with wavy transverse ridges and indentations at 30–40X magnification. ..... ***R. rariflora***
        8. Bodies of achenes smooth or with inconspicuous transverse lines of indentations at 30–40X magnification.
          9. Bodies of achenes dark brown with small pale centers on each surface. ..... ***R. gracilenta***
          9. Bodies of achenes uniformly light reddish brown. ..... ***R. harveyi***
      7. Leaves flat; 1–6 mm wide.
        10. Bodies of achenes smooth with inconspicuous rows of indentations. ..... ***R. harveyi***
        10. Bodies of achenes with conspicuous wavy transverse ridges and indentations.
          11. Margins of tubercles papillose. Perianth bristles shorter than bodies of achenes. ..... ***R. recognita***
          11. Margins of tubercles minutely bristly. Perianth bristles longer than bodies of achenes.
            12. Achenes 1.4–1.7 mm long; bodies less than twice as long as wide; obovate. ..... ***R. caduca***
            12. Achenes 2–2.2 mm long; bodies ltwice as long as wide; elliptic-obovate. ..... ***R. inexpansa***

Schoenoplectiella K.A. Lye Bulrush

1. Stigmas of upper spikelets 3. Achenes of upper spikelets trigonous. ..... ***S. saximontanus***
(= *Schoenoplectus saximontanus, Scirpus saximontanus*)

1. Stigmas of upper spikelets 2. Achenes of upper spikelets lenticular. ..... ***S. hallii***
(= *Schoenoplectus hallii, Scirpus hallii*)

A named hybrid of these two species, *S.* ×*magrathii* has been reported to occur in the Wichita Mountains.

Schoenoplectus (H.G.L. Reichenbach) E. Palla Bulrush

1. Culms trigonous immediately below the inflorescences.
    2. Spikelets borne at ends of multiple long branches. Culms bluntly triangular only below the inflorescences; stout, 10–20 mm wide at midpoint. ..... ***S. californicus***
    (= *Scirpus californicus*)
    2. Spikelets borne in 1, capitate cluster on culms. Culms sharply triangular entire length; flexible; 2–7 mm wide at midpoint.
        3. Apices of spikelet scales rounded to short acute; notches 0.1–0.4 mm deep. Culm-like involucral bract subtending inflorescence 1–6 cm long. Achene bodies 1.8–2.8 mm long. ..... ***S. americanus***
        (= *Scirpus americanus*)
        3. Apices of spikelet scales acute to acuminate; notches 0.5–1 mm deep. Culm-like involucral bract subtending inflorescence 3–20 cm long. Achene bodies 2.5–3.5 mm long. ..... ***S. pungens***
        (= *Scirpus pungens*)
1. Culms terete to oval immediately below inflorescences.
    4. Spikelet scales 2–3 mm long; orange-brown to dark brown, reddish marks if present, not conspicuous; awns straight or nearly so. ..... ***S. tabernaemontani***
    (= *Scirpus tabernaemontani*)
    4. Spikelet scales 3–5 mm long; pale grayish brown with prominent reddish-purple dots or streaks with magnification; awns bent or contorted.
        5. Stigmas 3. Achenes trigonous. ..... ***S. heterochaetus***
        (= *Scirpus heterochaetus*)
        5. Stigmas 2. Achenes lenticular. ..... ***S. acutus***
        (= *Scirpus acutus*)

Scirpus C. Linnaeus Bulrush

1. Perianth bristles 0–3. ..... ***S. georgianus***
1. Perianth bristles 5 or 6.
    2. Perianth bristles straight or slightly arched; retrorsely barbed.
        3. Spikelet scales mucronulate; awns 0.1–0.2 mm long. ..... ***S. atrovirens***
        3. Spikelet scales attenuate; awns 0.4–0.5 mm long. ..... ***S. pallidus***
    2. Perianth bristles curled or contorted; smooth or sparsely antrorsely barbed.
        4. Midribs of spikelet scales conspicuous; raised. Perianth bristles mostly hidden by spikelet scales at maturity. Achenes 1–1.3 mm long. ..... ***S. pendulus***
        (= *S. lineatus*)
        4. Midribs of spikelet scales inconspicuous; not raised. Perianth bristles exserted beyond spikelet scales at maturity. Achenes 0.7–1 mm long. ..... ***S. cyperinus***

Scleria P.J. Bergius Nut Rush

1. Hypogynia obsolete. ..... ***S. verticillata***
1. Hypogynia present.
    2. Hypogynia covered with continuous or interrupted rough white crust. ..... ***S. triglomerata***
    2. Hypogynia not covered with white crust.
        3. Achenes smooth. Hypogynia bearing 8 or 9 tubercules. Contra-ligules ovate; pubescent-ciliate. ..... ***S. oligantha***
        3. Achenes papillose or tuberculate or reticulate. Hypogynia bearing 3 or 6 tubercules. Contra-ligules rotund or obsolete; glabrous.
            4. Hypogynia conspicuously lobed; tubercules absent. Inflorescences paniculate. ..... ***S. reticularis***
            4. Hypogynia not or inconspicuously lobed; tubercules present. Inflorescences fascicled.
                5. Hypogynia bearing 3 tubercules. Achenes 2–3 mm long. ..... ***S. ciliata***
                5. Hypogynia bearing 6 tubercules. Achenes 1–2 mm long. ..... ***S. pauciflora***

DENNSTAEDTIACEAE R.C. Ching Bracken Fern Family

Plants herbs; perennials; perennating organs rhizomes; colonial; producing sporangia in sori on abaxial surfaces of fronds. **Roots** dark brown or black; branching; thick. **Rhizomes** black; woody; branching; scales absent. **Fronds** all alike; vernation circinate, croziers silver, claw-like; 1-pinnately to 4-pinnately compound; stipitate; erect to spreading; blades deltoid; veins not anastomosing; pinnae stalked, opposite or subopposite, proximally 2-pinnately compound and distally 1-pinnately compound; rachises yellow-brown, curved; stipes jointed, grooved adaxially. **Sori** present, rare; contiguous; borne on revolute margins; linear; indusia hyaline, partially concealing sporangia; false indusia formed by revolute margins, partially concealing sporangia. **Sporangia** all alike. **Spores** all alike; tetrahedral to globose. **Gametophytes** all alike; green; cordate.

The family is represented in Oklahoma by 1 genus and 1 species. It has been included in a broadly circumscribed Polypodiaceae by some taxonomists.

Pteridium G.G. Gleditsch ex J.A. Scopoli Bracken Fern

One species. ..... ***P. aquilinum***

DIOSCOREACEAE R. Brown Yam Family

Plants vines; herbaceous or woody at bases; perennials; perennating organs rhizomes or aerial, axillary tubers; dioecious or rarely polygamo-dioecious. **Stems** climbing by twining. **Leaves** simple; whorled and/or alternate, whorls of 3 to 7; blades cordate; venation parallel-convergent; apices acuminate; margins entire; bases cordate; stipules absent or with a stipule-like flange on petioles. **Inflorescences** panicles or racemes or glomerules or solitary flowers; axillary; staminate inflorescences panicles; pistillate inflorescences racemes or panicles or glomerules or solitary flowers. **Flowers** imperfect or rarely perfect, staminate and pistillate similar, pistillate larger; perianths in 1-series; radially symmetrical. **Perianth Parts** 6; in 2 whorls; free; pale greenish yellow; petaloid. **Stamens** 6 or rarely 3; in 2 whorls; androecial rudiments present in pistillate flowers. **Pistils** 1; compound, carpels 3; stigmas 3; styles 3; ovaries inferior; locules 3; placentation axile; gynoecial rudiments present in staminate flowers. **Fruits** capsules; wings present. **Seeds** usually 6; wings present.

The family is represented in Oklahoma by 1 genus and 2 species. The genus is distributed in moist, shaded sites in the deciduous forests of the eastern 1/2 of the state. The roots were used medicinally by Native Americans and early settlers. They contain steroids that serve as a basis for some modern hormone drugs. Fresh material may be poisonous.

Dioscorea C. Linnaeus Yam

1. Bulblets present; axillary. Plants tuberous. Tubers elongate; vertical. Leaves 3-lobed. ..... ***D. polystachya*** (= *D. batatas*)

1. Bulblets absent. Plants rhizomatous. Rhizomes horizontal. Leaves entire to sinuate or undulate. ..... ***D. villosa*** (= *D. quaternata*)

DROSERACEAE R.A. Salisbury Sundew Family

Plants herbs; annuals; autophytic and insectivorous; acaulescent; glandular; in wet areas. **Leaves** modified to trap and digest animals; circinate in bud; forming a basal rosette; simple; alternate; blades covered with long glandular hairs exuding a clear viscid secretion; spathulate; venation pinnate; petioles glandular, 3 times length of blades; stipules absent. **Inflorescences** racemose cymes; circinate. **Flowers** perfect; perianths in 2-series. **Sepals** 5; fused. **Corollas** radially symmetrical; convolute; persistent. **Petals** 5 or rarely 6; free or fused at bases; white or pink or roseate. **Stamens** 5; persistent; anthers versatile. **Pistils** 1; compound, carpels 3 or 5; stigmas 3 or 5, 2-lobed; styles 3 or 5; ovaries superior; locules 1; placentation parietal. **Fruits** capsules; loculicidal. **Seeds** numerous.

The family is represented in Oklahoma by 1 genus and 1 species. An insectivorous taxon, it captures invertebrates via glandular hairs on the leaf blades.

Drosera C. Linnaeus Sundew

One species. ..... ***D. brevifolia***

DRYOPTERIDACEAE W.G.F. Herter Wood Fern Family

Plants herbs; perennials from rhizomes; deciduous or evergreen; needle-like hairs absent; producing sporangia in sori on abaxial surfaces of fronds. **Rhizomes** branching or not branching; scales present. **Fronds** all alike or of 2 types, sterile and fertile different; vernation circinate; 1-pinnately or 2-pinnately compound; stipitate; ascending to erect; blades linear-lanceolate to lanceolate-ovate; venation dichotomous, veins anastomosing or not anastomosing, areoles with veinlets absent; auricles absent; stipes with scales present. **Sori** separate or contiguous; borne on veins; orbicular or linear or oblong or lunate or U-shaped; indusia attached beneath sori and enclosing sporangia or beneath sori at one side. **Sporangia** all alike; annuli present, vertical. **Spores** all alike; green; reniform or oblong. **Gametophytes** all alike; green; cordate.

The family is represented in Oklahoma by 2 genera and 3 species. On the basis of phylogenetic analyses, its circumscription has been narrowed, with *Athyrium*, *Cystopteris*, and *Woodsia* now positioned in the Woodsiaceae; and *Onoclea* positioned in the Onocleaceae.

1. Distal fertile pinnae abruptly reduced in size. Pinnae margins with upward curving bristles; bases auriculate. Sori borne only on distal pinnae; contiguous when mature. ..... ***Polystichum***
1. Distal fertile pinnae gradually reduced in size. Pinnae margins without upward curving bristles; bases not auriculate. Sori borne on both distal and proximal pinnae; separate when mature. ..... ***Dryopteris***

Dryopteris M. Adanson Wood Fern

1. Sori borne on margins. Fronds evergreen. Lowest pinnae not reduced. ..... ***D. marginalis***
1. Sori borne between midvein and margins. Fronds deciduous. Lowest pinnae reduced. ..... ***D. filix-mas***

Polystichum A.W. Roth Christmas Fern

One species. ..... ***P. acrostichoides***

EBENACEAE R.L.A. Gurke Ebony Family

Plants trees; solitary or colonial; deciduous; dioecious or rarely polygamo-dioecious. **Stems** pubescent or glabrous; terminal buds absent; older bark deeply divided into square blocks or plates. **Leaves** simple; alternate; petiolate; blades thick or thin, coriaceous, adaxial surfaces with dark glands or necrotic spots, elliptic or ovate; venation pinnate; surfaces glabrous or sparsely pubescent; apices acuminate; margins entire; bases cuneate or rounded; stipules absent. **Inflorescences** of 2 types, staminate and pistillate different; axillary. **Staminate Inflorescences** simple cymes; 2 or 3 flowered; bracts present, caducous; bracteoles present, caducous. **Pistillate Inflorescences** solitary flowers; on short recurved pedicels; bracts present. **Flowers** imperfect or rarely perfect, staminate and pistillate similar, pistillate larger; perianths in 2-series. **Calyces** radially symmetrical. **Sepals** 4, fused, deeply lobed. **Corollas** radially symmetrical; urceolate; convolute. **Petals** 4; fused; yellowish green to creamy-white or orange. **Stamens** 16; in 2 whorls; equaling perianths; epipetalous; androecial rudiments present in pistillate flowers, 8 to 16. **Pistils** 1; compound, carpels 4; stigmas 4; styles 4, fused 1/2 length; ovaries superior; locules 8; ovules 1 per locule; placentation apical-axile; gynoecial rudiments present in staminate flowers. **Fruits** berries; subglobose; yellow or pale orange; glaucous. **Seeds** 8; oblong; thick; flat; hard; brown; rugose.

The family is represented in Oklahoma by 1 genus and 1 species. The family is distributed widely in tropical and warm-temperate regions. The fruits are astringent when green, but sweet and edible when ripe, often after killing frosts. They were used by Native Americans and early settlers for food and medicine, and are important as food for mammals and birds.

Diospyros C. Linnaeus Persimmon

One species. ..... ***D. virginiana***

ELAEAGNACEAE A.L. de Jussieu Oleaster Family

Plants trees or shrubs; deciduous or evergreen; armed with thorns or not armed; silvery-brown peltate scales on stems and leaves. **Stems** with terminal buds absent; lateral buds conspicuous. **Leaves** simple; alternate; blades dark green above, brown and/or silvery-white scales below; elliptic to oblanceolate; venation pinnate; margins entire; stipules absent. **Inflorescences** solitary flowers or clusters; axillary on twigs of current year. **Flowers** produced simultaneously with or after leaves; fragrant; perfect; perianths in 1-series. **Calyces** radially symmetrical; salverform. **Sepals** 4; deciduous; fused; silvery-gray on outer surfaces;

spreading yellow on inner surfaces; petaloid above and sepaloid below. **Petals** absent. **Stamens** 4; inserted on upper throats of hypanthia. **Pistils** 1; simple, carpels 1; stigmas 1, styles 1; linear, 1-sided; ovaries superior, may appear inferior due to constricted, persistent hypanthia; locules 1; placentation basal. **Hypanthia** present; tubular or urn-shaped, constricted above and extending beyond ovaries. **Nectaries** present; hypanthial. **Fruits** drupe-like achenes, enclosed by fleshy bases of hypanthia. **Seeds** 1.

The family is represented in Oklahoma by 1 genus and 2 species, both native to Eurasia. *Elaeagnus angustifolia*, Russian olive, has been widely planted in shelterbelts to provide cover and food for wildlife. Both species are popular ornamentals that appear to be naturalizing.

Elaeagnus C. Linnaeus Oleaster

1. Twigs and abaxial surfaces of leaves with only silvery-white scales. Fruits yellow. ..... ***E. angustifolia***
1. Twigs and abaxial surfaces of leaves with both brown and silvery-white scales. Fruits red. ..... ***E. umbellata***

ELATINACEAE B.C.J. Dumortier Waterwort Family

Plants herbs; annuals; terrestrial or emergent aquatics, often stranded on mud flats. **Stems** often reddish; ascending or prostrate, floating. **Leaves** simple; opposite; blades linear to oblong to spathulate; venation pinnate; margins entire to serrulate; stipules present, persistent, membranous. **Inflorescences** cymes or solitary flowers; axillary. **Flowers** perfect; perianths in 2-series. **Calyces** radially symmetrical. **Sepals** 3 or 5; imbricate in bud; persistent; free. **Corollas** radially symmetrical; imbricate. **Petals** 3 or 5; minute; free; white or pink. **Stamens** 3 or 5 or 10; equal to or 2 times petal number. **Pistils** 1; compound, carpels 3 or 5; stigmas 3 or 5, capitate; styles 3 or 5; free; ovaries superior; locules 3 or 5; placentation axile. **Fruits** capsules; septicidal. **Seeds** numerous.

The family is represented in Oklahoma by 2 genera and 2 species. Both are encountered in wetlands, either in shallow water or mudbanks.

1. Stems glandular hispidulous; not rooting at the nodes; not forming mats. Petals 5.
   Sepals 5; cuspidate; margins scarious; midribs conspicuous, thickened. Locules 5. ..... ***Bergia***
1. Stems glabrous; rooting at the nodes; forming mats. Petals 3. Sepals 3; obtuse;
   margins not scarious; midribs not conspicuous, not thickened. Locules 3. ..... ***Elatine***

Bergia C. Linnaeus

One species. ..... ***B. texana***

Elatine C. Linnaeus Waterwort

One species. ..... ***E. triandra***

EPHEDRACEAE B.C.J. Dumortier Ephedra Family

Plants shrubs; producing pollen cones and seed cones; dioecious. **Stems** jointed; branches whorled or fascicled or opposite; internodes green or pale yellow-green, photosynthetic, terete. **Leaves** scale-like; typically caducous; opposite; with basal sheaths. **Pollen Cones** nodal; elliptic; microsporophylls opposite, 5 to 8 pairs; microsporangia 4 to 6 per microsporophyll, dehiscing by apical pores. **Seed Cones** similar to pollen cones; nodal; elliptic; maturing in 1 year; ovuliferous scales opposite, 4 to 6 pairs; megasporangia 1 per scale; 1 or 2 seeds per cone exserted from upper scale. **Seeds** 1 or 2 per cone, conspicuously exserted; 3 or 4 angled; dark brown; smooth, wings absent; seed coats not differentiated.

The family is represented in Oklahoma by 1 genus and 1 species. It has been found in the southwestern corner of the state, and its dried stems were used medicinally by Native Americans and settlers.

Ephedra C. Linnaeus

One species. ..... ***E. antisyphilitica***

EQUISETACEAE A. Michaux. ex A.P. DeCandolle Horsetail Family

Plants herbs; perennials; perennating organs creeping and branching rhizomes; terrestrial to emergent aquatics; producing sporangia on whorled, peltate sporophylls borne in terminal strobili. **Stems** all alike or of 2 types, fertile and sterile; persisting for 1 or more growing seasons; jointed; longitudinally ribbed; branched or not branched; internodes hollow. **Leaves** small; scale-like; chlorophyll absent; whorled; fused to form toothed sheaths at nodes; sheaths with 1 or 2 dark bands. **Strobili** terminal; sessile or pedunculate; erect; elliptic to cylindrical; apices rounded or acute or apiculate. **Sporophylls** all alike; peltate; polygonal; with 5 to 10 sporangia. **Sporangia** borne on inner surfaces; pendulous. **Spores** all alike; greenish or white; with 4 elaters. **Gametophytes** all alike; green.

The family is represented in Oklahoma by 1 genus and 4 species. Typically forming dense stands in wet areas that are often shaded, *Equisetum* is sometimes described as a living fossil, little changed since the Devonian. Early settlers used stems as abrasive materials, hence the common name, scouring rush.

Equisetum C. Linnaeus Horsetail

1. Stems of 2 types, sterile and fertile. Sterile stems branched at each node; green. Fertile stems not branched; brown. ..... ***E. arvense***
1. Stems of 1 type, not differentiated into sterile and fertile. Stems not branched at each node; all green.
   2. Spores white; misshapen; abortive. ..... ***E. × ferrissii***
   2. Spores green; spherical; fertile.
      3. Leaf sheaths with 2 dark bands; cylindrical. Aerial stems persisting more than 1 year. ..... ***E. hyemale***
      3. Leaf sheaths with 1 dark band; funnelform. Aerial stems persisting less than 1 year. ..... ***E. laevigatum***

ERICACEAE A.L. de Jussieu Heath Family

Plants shrubs or small trees or herbs; perennials; deciduous or evergreen; autophytic or mycotrophic; chlorophyll present or absent. **Root Systems** taproots or fibrous. **Stems** branched or not branched. **Leaves** herbaceous to coriaceous or scale-like; simple; alternate; venation pinnate or not apparent; margins entire to serrate; stipules absent. **Inflorescences** panicles or racemes or umbellate clusters or corymbs or solitary flowers; terminal or axillary; bracts present; bracteoles present or absent. **Flowers** perfect; perianths in 2-series. **Sepals** 2 to 5; persistent or deciduous; free or fused. **Corollas** radially or slightly bilaterally symmetrical; funnelform or urceolate. **Petals** 4 to 6; free or fused; white to pink or green or yellowish. **Stamens** 8 to 10; anthers appendaged or with terminal awn or tubules; dorsifixed; dehiscing poricidally or longitudinally; pollen aggregated; filaments may be basally dilated. **Pistils** 1; compound, carpels 4 or 5; stigmas 1, 4- or 5-lobed; capitate or peltate; styles 1; ovaries superior or inferior; locules 4 or 5 or 8 or 10 (doubling by false partitions); placentation axile. **Nectaries** present; borne on intra-staminal disks or receptacular. **Fruits** berries or capsules; capsules septicidal or loculicidal. **Seeds** numerous, small.

The family is represented in Oklahoma by 5 genera and 11 species. *Monotropa* and other achlorophyllus mycotrophic genera were formerly classified in the Monotropaceae or Indian Pipe family. Phylogenetic studies, however, support their placement in the Ericaceae. Widely distributed, it is presently treated as one large family comprising 8 subfamilies. The fruits of several species of *Vaccinium*, blueberry, are used as food, while other taxa are used as ornamentals.

1. Plants herbs. Chlorophyll absent, stems and leaves white to yellowish or pinkish white, turning black when dried or injured.
   2. Stems glabrous. Inflorescences solitary flowers. ..... ***Monotropa***
   2. Stems pubescent. Inflorescences racemes. ..... ***Hypopitys***
1. Plants shrubs or small trees. Chlorophyll present, stems and leaves of various colors, but not white to yellowish or pinkish white nor turning black.
   3. Ovaries inferior. Fruits berries. ..... ***Vaccinium***
   3. Ovaries superior. Fruits capsules.
      4. Leaves clustered toward ends of twigs. Corollas funnelform; 15–30 mm long; 40–50 mm wide. Capsulests 15–20 mm long; septicidal. ..... ***Rhododendron***
      4. Leaves scattered along twigs. Corollas urceolate; 4–13 mm long; 3–7 mm wide. Capsules 3–10 mm long; loculicidal. ..... ***Lyonia***

Hypopitys H.J.N. von Crantz Pine Sap

One species. ..... ***H. monotropa***
(= *Monotropa hypopitys*)

Lyonia T. Nuttall

1. Leaf margins serrulate. Inflorescences panicles of racemes. Corollas globose-urceolate; 3–5 mm long. ..... ***L. ligustrina***
1. Leaf margins entire. Inflorescences umbellate or racemose clusters. Corollas cylindrical; 7–13 mm long. ..... ***L. mariana***

Monotropa C. Linnaeus Indian Pipe

One species. ..... ***M. uniflora***

Rhododendron C. Linnaeus

1. Pedicels and calyces and capsules densely covered with glandular hairs.
   Stamen filaments as long as or barely longer than corollas. ..... ***R. canescens***
1. Pedicels and calyces and capsules canescent-strigose. Stamen filaments
   conspicuously longer than corollas. ..... ***R. viscosum***
   (= *R. oblongifolium*)

Vaccinium C. Linnaeus Blueberry

1. Twigs smooth or variously roughened, but not verrucose. Anthers dorsally 2-awned.
   2. Corollas urceolate; lobes reflexed. Anthers included within corollas. Pedicels articulated
      below hypanthia. Leaves coriaceous; thick; adaxial surfaces dark green; adaxial surfaces dark green. ..... ***V. arboreum***
   2. Corollas campanulate; lobes spreading. Anthers exserted beyond corollas. Pedicels not
      articulated below hypanthia. Leaves membranous; thin; adaxial surfaces pale green or glaucous. ..... ***V. stamineum***
1. Twigs verrucose. Anthers not dorsally 2-awned.
   3. Abaxial leaf surfaces with glandular stipitate hairs. ..... ***V. corymbosum***
   3. Abaxial leaf surfaces without glandular stipitate hairs.
      4. Abaxial leaf surfaces pale green or glaucous. Flowers borne in terminal racemes or
         solitary in upper leaf axils. Young hypanthia not resin-dotted. Filaments glabrous. ..... ***V. pallidum***
         (= *V. vacillans*)
      4. Abaxial leaf surfaces dark green. Flowers borne in fascicles. Young hypanthia
         resin-dotted. Filaments ciliate. ..... ***V. corymbosum***
         (= *V. virgatum, V. fuscatum*)

ERIOCAULACEAE N. A. Desvaux Pipewort Family

Plants herbs; perennials; monoecious. **Leaves** herbaceous or fleshy; basal; simple; alternate; venation parallel; surfaces glabrous; margins entire; stipules absent. **Scapes** 1 to 12; ribbed, sheathed at bases. **Inflorescences** solitary heads; hemispheric to globose; bracts present, extending beyond the flowers, gray, bearing white, fleshy appendages at apices. **Flowers** imperfect, staminate and pistillate similar, except for fusion of petals; perianths in 2-series; membranous. **Sepals** 2; free or fused; gray; bearing white, fleshy appendages at apices; membranous. **Corollas** radially symmetrical. **Petals** 2; fused in staminate flowers and free in pistillate; gray; bearing white, fleshy appendages at apices; membranous. **Stamens** 4; exserted beyond perianths; anthers black. **Pistils** 1; compound, carpels 2; stipitate; stigmas 2; styles 1, branched; ovaries superior; locules 2; placentation axile, ovules apical. **Nectaries** present; 2; petaliferous. **Fruits** capsules; loculicidal. **Seeds** 2.

The family is represented in Oklahoma by 1 genus and 2 species. Plants are found in wet sites, but rarely encountered.

Eriocaulon C. Linnaeus Pipewort

1. Heads 10-20 mm wide. Leaves 10 mm wide at blade middles. Receptacles villous. ..... ***E. decangulare***
1. Heads 3–5 mm wide. Leaves 1 mm wide at blade middles. Receptacles glabrous or glabrate. ..... ***E. koernickianum***

EUPHORBIACEAE A.L. de Jussieu Spurge Family

Plants herbs or deciduous shrubs; annuals or perennials or biennials; perennating organs rhizomes or tubers or caudices or crowns; armed with stinging hairs or not armed; monoecious or dioecious; sap colorless or white. **Stems** erect or prostrate or decumbent or trailing. **Leaves** simple; alternate or opposite or opposite above and alternate below; petiolate or sessile; venation pinnate or palmate or a single vein; margins entire or serrate or palmately lobed; stipules present or absent, sometimes glandular. **Inflorescences** of 1 or 2 types, staminate and pistillate conspicuously different; simple cymes or compound cymes (spicate, racemose, paniculate or clustered) or cyathia; terminal or axillary, bracts present or absent, herbaceous or petaloid. **Flowers** imperfect, staminate and pistillate similar or different; perianths absent or in 1-series or 2-series. **Sepals** typically 5 or 0 or 3 to 8; free or fused; herbaceous or petaloid. **Corollas** radially symmetrical. **Petals** 0 or 5 or rarely 6; free; white. **Stamens** 1 to 10; free or fused by filaments. **Pistils** 1; compound, carpels 3 or 2; stigmas 3, 2- or 3-lobed or not lobed; styles 3 or 2 or 0; ovaries superior, lobes 3 or 2 or 0; locules 3 or 1 or 2; placentation axile; ovules 1 or 2 per locule. **Nectaries** absent or present; 1 to 5; sepaliferous or receptacular or glands on cyathia, with or without petaloid appendages. **Fruits** capsular schizocarps or achenes; dehiscent or indehiscent. **Seeds** typically 3 or 1 to 6.

The family is represented in Oklahoma by 8 genera and 46 species. One of the larger families, it exhibits a wide range of morphology. Some taxonomists divide *Euphorbia* into 4 or 5 genera; however, phylogenetic studies support recognition of a single broadly circumscribed genus. Also on the basis of phylogenetic studies, *Phyllanthus* and *Reverchonia*, formerly positioned in this family, are now placed in the family Phyllanthaceae. Many of our species are noxious weeds.

1. Plants with stinging hairs.
    2. Leaves palmately lobed; 10–15 cm long; venation palmate.
       Sepals petaloid; white; 10–20 mm long. ..... ***Cnidoscolus***
    2. Leaves serrate or dentate or entire; 1–6 cm long; venation pinnate.
       Sepals not petaloid; green; 1.8–4 mm long. ..... ***Tragia***
1. Plants without stinging hairs.
    3. Perianth parts absent. Flowers borne in cyathia. ..... ***Euphorbia***
    3. Perianth parts present. Flowers borne in spikes or racemes or clusters or solitary.
        4. Plants with branched or stellate hairs, or scales. ..... ***Croton***
        4. Plants glabrous or with unbranched hairs.
            5. Ovules or seeds 2 per locule. Schizocarps 6-seeded. ..... ***Andrachne***
            5. Ovules or seeds 1 per locule. Schizocarps 1 to 3-seeded.
                6. Inflorescences terminal.
                7. Teeth of leaf margins glandular. Sap viscous; white. Staminate flowers subtended by saucer-shaped glands. Pistillate flowers not subtended by folded, foliaceous bract. Styles not branched. ..... ***Stillingia***
                7. Teeth of leaf margins not glandular. Sap thin; colorless. Staminate flowers not subtended by saucer-shaped glands. Pistillate flowers subtended by folded, foliaceous bract. Styles irregularly branched. ..... ***Acalypha***
                6. Inflorescences axillary.
                8. Pistillate flowers with 5 petals; not subtended by a folded, foliaceous bract. Malpighian hairs present. ..... ***Ditaxis***
                8. Pistillate flowers with 0 petals; subtended by folded, foliaceous bract. Malpighian hairs absent. ..... ***Acalypha***

Acalypha C. Linnaeus Copperleaf

1. Leaves oblong to linear.
    2. Schizocarps 1-seeded. Seeds 1.8–2.5 mm long. ..... ***A. monococca***
    2. Schizocarps 3-seeded. Seeds 1–1.8 mm long. ..... ***A. gracilens***
1. Leaves ovate-rhombic to ovate-lanceolate.
    3. Pistillate inflorescences spikes; terminal. Mature schizocarps papillate-echinate. ..... ***A. ostryifolia***
       (= *A. ostryaefolia*)
    3. Pistillate inflorescences clusters of flowers; axillary. Mature schizocarps smooth and glabrous to pubescent.
        4. Lobes of bracts of pistillate flowers 5–7. Blades 1–1.5 times longer than petioles. ..... ***A. rhomboidea***
        4. Lobes of bracts of pistillate flowers 9–15. Blades 2–5 times longer than petioles. ..... ***A. virginica***

Andrachne C. Linnaeus Maidenbush

One species. ..... ***A. phyllanthoides***

Cnidoscolus J.B.E. Pohl Bull Nettle

One species. ..... ***C. texanus***

Croton C. Linnaeus

1. Inflorescences axillary; spikes. Ovaries 1-locular. Fruits indehiscent. ..... ***C. michauxii***
(= *Crotonopsis elliptica*, *Crotonopsis linearis*)

1. Inflorescences terminal; spicate racemes. Ovaries 2- or 3-locular. Fruits dehiscent.
  2. Plants dioecious. Petals of both staminate and pistillate flowers absent. ..... ***C. texensis***
  2. Plants monoecious. Petals of staminate flowers present. Petals of pistillate flowers absent.
    3. Leaves serrate. ..... ***C. glandulosus***
    3. Leaves entire.
      4. Style branches 12 or 24. Sepals longer than schizocarps. ..... ***C. capitatus***
      4. Style branches 4 or 6. Sepals shorter than schizocarps.
        5. Styles 3; branches 6. Seeds 3. ..... ***C. lindheimerianus***
        5. Styles 2; branches 4. Seeds 1. ..... ***C. monanthogynus***

Ditaxis M. Vahl ex A.L. de Jussieu Silverbush

1. Stems conspicuously branched above. Inflorescences shorter than subtending leaves.
Schizocarps 5–7 mm wide. Seeds 2–3 mm long. ..... ***D. humilis***
(= *Argythamnia humilis*, *A. laevis*)

1. Stems not branched above. Inflorescences equal to or longer than subtending leaves.
Schizocarps about 10 mm wide. Seeds about 5 mm long. ..... ***D. mercurialina***
(= *Argythamnia mercurialina*)

Euphorbia C. Linnaeus Spurge

Plants herbs; annuals or perennials; monoecious; sap white, viscid. **Stems** erect or prostrate. **Leaves** simple; alternate or opposite or both alternate and opposite; venation pinnate; margins entire or dentate; bases symmetrical or oblique. **Inflorescences** cyathia; borne in terminal or axillary cymes; bracts and bracteoles present or absent, opposite or whorled, herbaceous or petaloid. **Cyathia:** Involucres cup-shaped or urceolate; lobes 4 or 5, entire or laciniate. Nectar glands 1–5, of various shapes and colors. Petaloid appendages present or absent. **Flowers** with perianths absent; staminate flowers 2–35 per cyathium, borne on inner surface of involucre, stamens 1; pistillate flowers 1 per cyathium, pedicellate, pedicel elongate in fruit. **Sepals** absent. **Petals** absent. **Fruits** capsular schizocarps; 3-lobed; glabrous or pubescent. **Seeds** 3.

The genus is represented in Oklahoma by 26 species in 5 subgenera. Some taxonomists circumscribe it more narrowly than others and treat some of the subgenera listed below as distinct genera. The generic names *Chamaesyce*, *Poinsettia*, and *Agaloma* thus appear in some taxonomic treatments. The traditional, broad circumscription of *Euphorbia* is used in this book because the cyathium is such an unifying feature, the boundaries among these smaller genera so tenuous, and the lack of consensus among taxonomists.

Key to Subgenera

1. Glands of cyathia 1–3. ..... ***Poinsettia***
1. Glands of cyathia 4 or 5.
  2. Margins of bracts and uppermost leaves white. ..... ***Agaloma***
  2. Margins of bracts and uppermost leaves green.
    3. Glands of cyathia 5; vestigial glands absent.
      4. Stems prostrate. Cyathia borne in leaf axils. Leaf bases oblique.
        Stipules well-developed. ..... ***Chamaesyce***
      4. Stems erect or ascending. Cyathia borne in terminal cymes.
        Leaf bases symmetrical. Stipules minute and gland-like or absent. ..... ***Agaloma***
    3. Glands of cyathia 4; vestigial glands, if present, 1.
      5. Stipules well-developed. ..... ***Chamaesyce***
      5. Stipules minute and gland-like or absent.

6. Petaloid appendages of glands of cyathia absent. Stipules absent. ..... ***Esula***
6. Petaloid appendages of glands of cyathia present. Stipules minute and gland-like. ..... ***Euphorbia***

Subgenus *Agaloma* (C.S. Rafinesque) H.D. House

Plants annuals or perennials. **Stems** erect. **Leaves** alternate or both alternate and opposite; bases symmetrical. **Stipules** minute and gland-like or absent. **Bracts** present; petaloid or herbaceous. **Glands of Cyathia** 5; petaloid appendages present.

1. Margins of bracts and uppermost leaves white. Schizocarps villous.
    2. Bracts and uppermost leaves glabrous; ovate to lanceolate. ..... ***E. marginata***
    2. Bracts and uppermost leaves densely pilose; linear oblong to linear. ..... ***E. bicolor***
1. Margins of bracts and uppermost leaves green. Schizocarps glabrous or sericeous.
    3. Petaloid appendages green or greenish yellow; 0.5–1.5 mm long. Leaves all opposite. Plants annuals; from taproots. ..... ***E. hexagona***
    3. Petaloid appendages white; 2–4 mm long. Lower leaves alternate; upper leaves opposite. Plants perennials; from small crowns. ..... ***E. corollata***

Subgenus *Chamaesyce* C.S. Rafinesque

Plants annuals or perennials. **Stems** typically prostrate or decumbent to ascending or rarely erect. **Leaves** opposite; bases oblique or symmetrical (in one species). **Stipules** present; well-developed. **Bracts** absent. **Glands of Cyathia** 4 or 5; petaloid appendages present or absent.

1. Schizocarps pubescent. Abaxial surfaces of upper leaves pubescent.
    2. Plants perennials; from branching caudices. Leaves narrowly triangular to ovate; apices attenuate. ..... ***E. lata***
    (= *Chamaesyce lata*)
    2. Plants annuals; from taproots. Leaves oblong to ovate, not triangular; apices rounded.
        3. Glands of cyathia 5, vestigial glands absent.
            4. Stems prostrate; villous. Styles entire. Schizocarps 1.4–2.3 mm long. ..... ***E. stictospora***
            (= *Chamaesyce stictospora*)
            4. Stems erect; glabrous. Styles bifid. Schizocarps 1.3 mm long. ..... ***E. hypericifolia***
            (= *Chamaesyce hypericifolia*)
        3. Glands of cyathia 4; vestigial glands, if present, 1.
            5. Hairs of schizocarps spreading; primarily on edges. Pubescence of terminal internodes spreading or retrorse. ..... ***E. prostrata***
            (= *Chamaesyce prostrata*)
            5. Hairs of schizocarps appressed; scattered over surfaces. Pubescence of terminal internodes antrorse.
                6. Styles 0.5–0.7 mm long; terete. Surface of mature seeds granular; transverse ridges absent. ..... ***E. humistrata***
                (= *Chamaesyce humistrata*)
                6. Styles 0.3–0.4 mm long; clavate. Surfaces of mature seeds not granular; transverse ridges present. ..... ***E. maculata***
                (= *Chamaesyce maculata*, *E. supina*)
1. Schizocarps glabrous. Abaxial surfaces of upper leaves glabrous.
    7. Leaves linear to narrowly oblong; 4.5–10 times longer than wide; bases symmetrical. ..... ***E. missurica***
    (= *Chamaesyce missurica*)
    7. Leaves oblong to elliptic; less than 4.5 times longer than wide; bases oblique.
        8. Largest leaves 15–40 mm long. Stems pubescent. Leaf margins uniformly toothed from apices to bases. ..... ***E. nutans***
        (= *Chamaesyce nutans*)
        8. Largest leaves 7–15 mm long. Stems glabrous. Leaf margins entire or toothed only at apices.
            9. Schizocarps 4–5 mm wide; 5–7 mm long. Seeds 4–4.5 mm long; bases attenuate; not angled. ..... ***E. carunculata***
            (= *Chamaesyce carunculata*)
            9. Schizocarps 1–3 mm wide; 1–2 mm long. Seeds 0.9–1.6 mm long;

bases not attenuate; angled.

10. Leaf margins toothed at apices.
    11. Seeds minutely pitted; transverse ridges short, not extending across each face. ..... ***E. serpyllifolia*** (= *Chamaesyce serpyllifolia*)
    11. Seeds not minutely pitted; transverse ridges long, extending entirely across each face. ..... ***E. glyptosperma*** (= *Chamaesyce glyptosperma*)
10. Leaf margins entire.
    12. Stipules fused, forming whitish membranous scale.
        13. Schizocarps 1.5–2 mm long. Staminate flowers 15–20 per cyathium. Seeds 1.2–1.7 mm long. Plants perennials; taproots becoming woody. ..... ***E. albomarginata*** (= *Chamaesyce albomarginata*)
        13. Schizocarps 1–1.2 mm long. Staminate flowers 3–12 per cyathium. Seeds 0.9–1 mm long. Plants annuals; taproots not becoming woody. ..... ***E. serpens*** (= *Chamaesyce serpens*)
    12. Stipules free, not forming whitish scale.
        14. Stipules entire. ..... ***E. fendleri*** (= *Chamaesyce fendleri*)
        14. Stipules dissected.
            15. Plants perennials; taproots becoming woody. Stipule lobes lanceolate to linear. Leaf apices acute. ..... ***E. fendleri*** (= *Chamaesyce fendleri*)
            15. Plants annuals; taproots not becoming woody. Stipule lobes filiform. Leaf apices obtuse.
                16. Leaf blades oblong to ovate-oblong. Cyathia turbinate to narrowly campanulate. Glands oval to orbicular; 0.2–0.6 mm long. Styles 0.2–0.6 mm long; bifid 1/3 to 1/2 length. Staminate flowers 5–25 per cyathium. ..... ***E. geyeri*** (= *Chamaesyce geyeri*)
                16. Leaf blades orbicular to oblong. Cyathia broadly campanulate. Glands elliptic to oblong; 0.5–0.9 mm long. Styles 0.6–0.9 mm long; bifid to base. Staminate flowers 29–44 per cyathia. ..... ***E. cordifolia*** (= *Chamaesyce cordifolia*)

Subgenus *Esula* C.H. Persoon

Plants annuals. **Stems** erect. **Leaves** alternate or both alternate and opposite; bases symmetrical. **Stipules** absent. **Bracts** present; herbaceous. **Glands of Cyathia** 4; petaloid appendages absent.

1. Leaf margins serrate. Schizocarps tuberculate. Glands of cyathia elliptic or oval; horn-like projections absent. ..... ***E. spathulata*** (= *E. obtusata*)
1. Leaf margins entire. Schizocarps smooth. Glands of cyathia lunate; horn-like projections present; 2.
    2. Seeds with 4–8 pits in 2 rows on inner surfaces only. Plants of sandy soils. ..... ***E. tetrapora***
    2. Seeds with numerous pits scattered on inner and outer surfaces. Plants of calcareous soils.
        3. Uppermost leaves and bracts fused to middle [hence falsely appearing perfoliate]; bases symmetrical. Seeds with pits only. Plants of southeastern 1/4 of state. ..... ***E. commutata***
        3. Uppermost leaves and bracts not fused; bases asymmetrical. Seeds with pits and ridges. Plants of western 1/2 of state. ..... ***E. longicruris***

Subgenus *Euphorbia*

Plants annuals. **Stems** erect. **Leaves** opposite; bases symmetrical. **Stipules** minute and gland-like. **Bracts** absent. **Glands of Cyathia** 4; petaloid appendages present.

One species. ..... ***E. exstipulata***

Subgenus *Poinsettia* (R.C. Graham) H.D. House

Plants annuals. **Stems** erect. **Leaves** opposite or both opposite and alternate; bases symmetrical. **Stipules** absent. **Bracts** absent or leaves subtending cyathia with reddish splotches near bases. **Glands of Cyathia** 1-3; petaloid appendages absent.

1. Schizocarps 4–5 mm in diamteter. Mid-cauline leaves primarily opposite; adaxial surfaces pubescent. Glands of cyathia longer than wide. Styles bifid nearly to bases. ..... ***E. dentata***
1. Schizocarps 6–8 mm in diameter. Mid-cauline leaves primarily alternate; adaxial surfaces glabrous. Glands of cyathia shorter than wide. Styles bifid to middles or less. ..... ***E. cyathophora*** (= *E. heterophylla*)

Stillingia A. Garden ex C. Linnaeus

1. Leaves oblong to ovate or lanceolate-elliptic; 9–30 mm wide. Schizocarps 11–15 mm in diameter. Caruncles subreniform; 4–5 mm wide. ..... ***S. sylvatica***
1. Leaves linear; 2–5 mm wide. Schizocarps 5–7 mm in diameter. Caruncles bulbous; about 1 mm wide. ..... ***S. texana***

Tragia C. Linnaeus Nose Burn

1. Largest leaves ovate to narrowly lanceolate; 19–26 mm wide; bases cordate. Petioles 5–25 mm long. Calyx lobes of pistillate flowers at anthesis equal to or longer than pistils; 3–5 mm long in fruit. ..... ***T. betonicifolia***
1. Largest leaves narrowly oblong to linear; 6–10 mm wide; bases truncate or obtuse. Petioles 1–5 mm long. Calyx lobes of pistillate flowers at anthesis shorter than pistils; 1.5–3 mm long in fruit. ..... ***T. ramosa***

FABACEAE J. Lindley Pea Family

Plants herbs or trees or shrubs or vines; deciduous; annuals or perennials; caulescent or acaulescent; bearing perfect flowers or andromonoecious or polygamo-dioecious; armed or not armed with spines or prickles; with or without tendrils. **Stems** erect or decumbent or trailing or twining. **Leaves** simple or palmately or 1- pinnately or 2-pinnately compound; alternate; venation pinnate or palmate; leaflets 2 to numerous, terminal one absent or present; pulvini conspicuous or inconspicuous; stipules present, fused to petioles or free. **Inflorescences** spikes or racemes or panicles or heads or umbels or solitary flowers; terminal or axillary; bracts present or absent; bracteoles present or absent. **Flowers** perfect or imperfect; chasmogamous or cleistogamous; perianths in 2-series. **Calyces** radially or bilaterally symmetrical. **Sepals** 5 or 4; free or fused. **Corollas** bilaterally or radially symmetrical. **Petals** 5 or 1; all alike or of 3 forms; free or coherent or fused; clawed or not clawed; of various colors. **Androecia** radially or bilaterally symmetrical. **Stamens** 10 or 5 or rarely 3 to 10; free or filaments fused; included within or exserted beyond perianths. Anthers all alike or of 2 forms. **Pistils** 1; simple, carpels 1; sessile or stipitate; stigmas 1, capitate or linear; styles 1; ovaries superior; locules 1 or 2; placentation parietal. **Hypanthia** present; small; cup-shaped. **Nectaries** absent or present**,** staminal or receptacular or extrafloral. **Fruits** legumes or loments or achene-like; dehiscent or indehiscent. **Seeds** 1 to numerous.

The family is represented in Oklahoma by 58 genera and 177 species. One of the largest families, the Fabaceae, is monophyletic as indicated by phylogenetic studies, and its genera are traditionally grouped in 3 subfamilies—Mimosoideae, Caesalpinioideae, and Faboideae (Papilionoideae). Some taxonomists have treated these 3 subfamilies as separate families. An alternate family name is Leguminosae. The family is economically important for food, forage, timber, and as ornamentals. A major component of the forb flora of Oklahoma's grasslands, it is ecologically important because most species bear nodules containing nitrogen-fixing bacteria. The fruits and seeds are eaten by wildlife. The nectaries of some species are an important food source for ants.

Key to Subfamilies

1. Stamens two or more times length of petals. ..... **Mimosoideae**
1. Stamens equal to or less than length of petals.
    2. Petals 1. ..... **(*Amorpha*) Faboideae**
    2. Petals 5.
        3. Corollas conspicuously bilaterally symmetrical; papilionaceous.

4. Upper (adaxial) petal (banner) enclosed by lateral petals (wings) in bud. ..... **(*Cercis*) Caesalpinioideae**
4. Upper (adaxial) petal (banner) enclosing other petals (wings and keel) in bud. ..... **Faboideae**
3. Corollas radially to slightly bilaterally symmetrical; not papilionaceous.
5. Plants trees or shrubs. Leaves 2-pinnately compound or both 1- and 2-pinnately compound. ..... **Caesalpinioideae**
5. Plants herbs. Leaves 1-pinnately compound.
6. Inflorescences terminal spikes. Legumes 1- or 2-seeded; obovoid; 2–3 mm long. ..... **(*Dalea*) Faboideae**
6. Inflorescences axillary racemes. Legumes numerous-seeded; linear to oblong; 25–200 mm long. ..... **Caesalpinioideae**

Mimosoideae A.P. DeCandolle Mimosa Subfamily

Plants perennials; armed or not armed with prickles; without tendrils. **Stems** erect or trailing. **Leaves** 2-pinnately compound; leaflets numerous, terminal one absent, linear or oblong, bases oblique; rachises with 1 or more glands present; petioles with 1 or more glands present; pulvini present. **Inflorescences** heads or racemes or spikes. **Flowers** perfect. **Sepals** 5; fused. **Corollas** radially symmetrical; funnelform or tubular or campanulate. **Petals** 5; all alike; free or fused; white or cream or pink or yellow. **Stamens** 5 or 10 or numerous; filaments white or pink or yellow, giving flowers and inflorescences characteristic color; exserted beyond perianths; free or fused by filaments at base; filaments 2 or more times length of petals. **Pistils** with locules 1. **Nectaries** present; extrafloral or receptacular. **Fruits** legumes. **Seeds** 1 to numerous.

The subfamily is represented in Oklahoma by 6 genera and 9 species. It has been treated by some taxonomists as a separate family, Mimosaceae. All species are native except *Albizia julibrissin*, silk tree, generally called mimosa in Oklahoma.

1. Plants woody.
2. Plants shrubs. Legumes armed with apically recurved prickles. ..... ***Mimosa***
2. Plants trees. Legumes not armed with apically recurved prickles.
3. Branches not armed with spines. Pinnae pairs 5–12; leaflets 1–1.5 cm long. Flower clusters pale to dark pink. ..... ***Albizia***
3. Branches armed with spines. Pinnae pairs 1 or rarely 2; leaflets 2–6 cm long. Flower clusters yellow to creamy-white. ..... ***Prosopis***
1. Plants herbaceous.
4. Stems armed with prickles. Inflorescences pale to dark pink. ..... ***Mimosa***
4. Stems not armed with prickles. Inflorescences yellow to cream to white.
5. Inflorescences yellow. Legumes 10–15 mm wide. ..... ***Neptunia***
5. Inflorescences white to cream. Legumes 2–8 mm wide.
6. Glands present on rachises between lowest pairs of pinnae. Stamens 5 or 10. ..... ***Desmanthus***
6. Glands absent on rachises between lowest pairs of pinnae. Stamens 20–100. ..... ***Acacia***

Caesalpinioideae A.P. DeCandolle Caesalpinia Subfamily

Plants annuals or perennials; armed or not armed with thorns; bearing perfect flowers or andromonoecious or polygamo-dioecious; without tendrils. **Leaves** simple or 1-pinnately or 2-pinnately compound; venation palmate to pinnate; leaflets numerous, terminal one present or absent; petioles frequently bearing solitary glands; stipules present. **Inflorescences** racemes or solitary flowers or panicles or umbels. **Flowers** perfect or imperfect, similar. **Sepals** 5; free or fused. **Corollas** radially to bilaterally symmetrical; bowl-shaped or papilionaceous or salverform. **Petals** 5; free; upper enclosed by lateral 2 in bud; of various colors. **Stamens** 10 or 5 or rarely 3 to 10. **Pistils** with locules 1. **Nectaries** present or absent; extrafloral. **Fruits** legumes. **Seeds** 2 to numerous.

The family is represented in Oklahoma by 8 genera and 13 species. It has been treated by some taxonomists as a separate family, Caesalpiniaceae. Twelve species are native and widespread. *Erythrostemon gilliesii* is native to South America, but has escaped and naturalized in the southwest corner of the state. *Cercis canadensis*, redbud, is Oklahoma's State Tree.

1. Plants herbs, some woody at base.
2. Leaves 2-pinnately compound.
3. Abaxial leaflet surfaces glandular-punctate; glands orange or black. ..... ***Pomaria***
3. Abaxial leaflet surfaces not glandular-punctate. ..... ***Hoffmannseggia***
2. Leaves 1-pinnately compound.
4. Stamens equal to subequal. Leaflets 7–20 mm long. Fruits elastically dehiscent. ..... ***Chamaecrista***
4. Stamens unequal, 3 short, 4 intermediate, and 3 long. Leaflets 25–60 mm long. Fruits not elastically dehiscent. ..... ***Senna***

1. Plants trees or shrubs.
  5. Leaves simple. Corollas strongly bilaterally symmetrical; papilionaceous; pale to dark pink or pink-purple or white. ..... ***Cercis***
  5. Leaves 1- or 2-pinnately compound. Corollas radially to weakly bilaterally symmetrical; not papilionaceous; yellowish green or greenish white or yellow.
    6. Flowers bright yellow. Stamen filaments 7–9 cm long; bright red. ..... ***Erythrostemon***
    6. Flowers yellowish or greenish white. Stamen filaments 0.2–0.4 cm long; greenish.
      7. Inflorescences axillary. Corollas yellowish green. Stamens 5–8. Legumes curved or twisted. Pith white to tan. ..... ***Gleditsia***
      7. Inflorescences terminal. Corollas greenish white. Stamens 10. Legumes straight. Pith pinkish orange. ..... ***Gymnocladus***

Faboideae Pea or Bean Subfamily

Plants annuals or perennials; armed or not armed with spines or prickles; with or without tendrils. **Stems** erect or decumbent or trailing or twining. **Leaves** simple or palmately or 1- pinnately compound; leaflets 3 to numerous, terminal one absent or present. **Inflorescences** spikes or racemes or heads or umbels or solitary flowers. **Flowers** perfect. **Sepals** 5 or appearing 4 due to fusion of lobes. **Corollas** bilaterally symmetrical; papilionaceous or tubular. **Petals** 5 or 1; all alike or of 3 forms—upper (adaxial), termed the standard or banner, large, enclosing other petals in bud; two lateral, termed the wings, free or coherent or fused to keel; two lower, termed the keel, fused distally and enclosing stamens and pistil. **Stamens** 10 or 5 or rarely 5 to 10; usually included within keels; fused by filaments or free; diadelphous or monadelphous. Anthers all alike or of 2 forms. **Pistils** with locules 1 or 2. **Nectaries** absent or present; staminal or receptacular. **Fruits** legumes or loments or achene-like. **Seeds** 1 to numerous.

The subfamily is represented in Oklahoma by 44 genera and 153 species. It has been treated by some taxonomists as a separate family, Fabaceae. An alternative name widely used for the subfamily is Papilionoideae.

1. Plants trees or shrubs or woody vines.
  2. Plants trees.
    3. Stipular spines present; paired; conspicuous on young branches. ..... ***Robinia***
    3. Stipular spines absent.
      4. Stamens diadelphous. ..... ***Robinia***
      4. Stamens free or monadelphous.
        5. Leaflets 7–11; 5–10 cm long. Fruits legumes; flat; green to tan. ..... ***Cladrastis***
        5. Leaflets 13–19; 1.5–4 cm long. Fruits loments; terete; black. ..... ***Styphnolobium***
  2. Plants shrubs or woody vines.
    6. Branches densely hispid-setose. Stipular spines present; paired; conspicous on young branches. ..... ***Robinia***
    6. Branches glabrous or various indumented, but not hispid-setose. Stipular spines absent.
      7. Plants woody vines. Fruits dehiscent.
        8. Leaflets 3. Banners reddish purple. Stamens monadelphous. Legumes 4–5 cm long. ..... ***Pueraria***
        8. Leaflets 5–15. Banners lavender-purple. Stamens diadelphous. Legumes 7–20 cm long. ..... ***Wisteria***
      7. Plants shrubs. Fruits indehiscent.
        9. Petals yellow, marked with red; 1.8–2.2 cm long. Fruits 6–8 cm long. ..... ***Colutea***
        9. Petals purple or rose-purple, banners sometimes yellow; 0.5–1.6 cm long. Fruits 0.3–1 cm long.
          10. Inflorescences racemes. Petals 1. ..... ***Amorpha***
          10. Inflorescences spikes or heads. Petals 5. ..... ***Dalea***
1. Plants herbs, some woody at bases.
  11. Tendrils present.
    12. Leaflets 2. Stems winged. ..... ***Lathyrus***
    12. Leaflets 4-numerous. Stems not winged.
      13. Leaflets 4–6. Stipules equal to or longer than leaflets. ..... ***Pisum***
      13. Leaflets 6–many. Stipules shorter than leaflets.
        14. Wing petals coherent to keels. Styles filiform; hairs only at apices, tufted or forming a ring. ..... ***Vicia***
        14. Wing petals free from keels. Styles dilated distally; hairs on upper 1/2, forming a line. ..... ***Lathyrus***
  11. Tendrils absent.
    15. Leaves simple or falsely appearing so because leaflets caducous.

16. Stems winged. Petals yellow. ..... ***Crotalaria***
16. Stems not winged. Petals blue or white or tan-pink or dull purple.
17. Petals blue. Racemes with at least some nodes bearing 2–4 flowers. Sepals glandular-punctate. ..... ***Pediomelum***
17. Petals white or tan-pink or dull purple. Racemes with all nodes bearing 1 flower. Sepals not glandular-punctate. ..... ***Astragalus***
15. Leaves compound.
18. Leaflets 2 or 3.
19. Plants prostrate to erect herbs.
20. Leaflet margins toothed, at least apically.
21. Inflorescences loose racemes; pedicels visible, not obscured by flowers. ..... ***Melilotus***
21. Inflorescences heads or spikes or compact racemes; pedicels obscured by flowers.
22. Fruits exserted beyond calyces. Corollas deciduous. ..... ***Medicago***
22. Fruits included within calyces. Corollas persistent, but withering. ..... ***Trifolium***
20. Leaflet margins entire.
23. Leaflets and sepals glandular punctate.
24. Petals yellow. ..... ***Dalea***
24. Petals of various colors, but not yellow.
25. Fertile stamens 5; monadelphous. Calyces campanulate. ..... ***Dalea***
25. Fertile stamens 10; diadelphous. Calyces bilabiate.
26. Legumes conspicuously rugose. ..... ***Orbexilum***
26. Legumes smooth.
27. Calyces inflated and elongated in fruit. Legumes enclosed in calyces except for beak; beak long; pericarps thin, papery. ..... ***Pediomelum***
27. Calyces not inflated nor elongated in fruit. Legumes exserted well beyond calyx remnants; beak short; pericarps thick, coriaceous. ..... ***Psoralidium***
23. Leaflets and sepals not glandular punctate.
28. Flowers 11–30 mm long.
29. Stems 30–200 cm tall. Inflorescences terminal; racemes. Flowers pedicellate. Leaves cauline; leaflets glabrous, green to greenish yellow. Keels of corollas white or blue or yellow. ..... ***Baptisia***
29. Stems 1–3 cm tall. Inflorescences axillary; solitary flowers or capitate clusters. Flowers sessile. Leaves basal; leaflets canescent, silvery white. Keels of corollas purplish. ..... ***Astragalus***
28. Flowers 1–10 mm long.
30. Ovaries and fruits bearing hooked hairs. ..... ***Desmodium***
30. Ovaries and fruits glabrous or variously pubescent, but not bearing hooked hairs.
31. Fruits legumes; 20–45 mm long. Seeds 3-numerous.
32. Legumes uniformly dark brown; not inflated. Leaflets lanceolate-elliptic to obovate. Stipules gland-like. Plants annuals. ..... ***Acmispon***
32. Legumes mottled reddish purple and yellow-white; inflated. Leaflets linear-filiform or absent. Stipules herbaceous. Plants perennials. ..... ***Astragalus***
31. Fruits achene-like or 2-chambered loments; 2.5–7 mm long. Seeds 1.
33. Petals orange-yellow. Stamens monadelphous; anthers of 2 forms, spherical alternating with oblong. Stipules fused to petioles. ..... ***Stylosanthes***
33. Petals of various colors, but not orange-yellow. Stamens diadelphous; anthers all alike, spherical. Stipules free.

34. Stipules lanceolate to ovate; scarious; striate; persistent. Plants annuals. Calyx lobes acute to obtuse. ..... ***Kummerowia***
34. Stipules subulate or setaceous; not scarious; not striate; caducous or eventually deciduous. Plants perennials. Calyx lobes acuminate. ..... ***Lespedeza***

19. Plants twining or trailing vines.
35. Flowers 2–6 cm long; resupinate. Banners 2 times length of other petals.
36. Flowers 4–6 cm long. Calyx tubes 10–20 mm long. Legumes 3–6 cm long. ..... ***Clitoria***
36. Flowers 2–3 cm long. Calyx tubes 3–5 mm long. Legumes 7–14 cm long. ..... ***Centrosema***
35. Flowers 0.6–1.8 cm long; not resupinate. Banners same length as other petals.
37. Petals bright yellow to yellow-orange. Leaflets with resinous glands. ..... ***Rhynchosia***
37. Petals purple or pink or blue or pale yellow. Leaflets without glands.
38. Styles pubescent. Keels laterally curved or coiled.
39. Keels coiled. Inflorescences racemes. Calyces 5-lobed. ..... ***Phaseolus***
39. Keels incurved. Inflorescences heads or solitary flowers. Calyces 4-lobed. ..... ***Strophostyles***
38. Styles not pubescent. Keels vertically arching, but not laterally curved or coiled.
40. Flowers of 2 kinds; chasmogamous and cleistogamous; chasmogamous 9–16 mm long. Petals white to lavender. Cleistogamous fruits subterranean; spherical; 6–12 mm in diameter. Aerial fruits elliptic; falcate; 5–10 mm wide. ..... ***Amphicarpaea***
40. Flowers all alike; chasmogamous; 6–8 mm long. Petals pink or rose or violet or reddish purple. Fruits oblong; straight; 4–5 mm wide. ..... ***Galactia***

18. Leaflets 4-numerous.
41. Plants vines. ..... ***Apios***
41. Plants erect or prostrate or decumbent.
42. Leaves palmately compound.
43. Leaves punctate. Fruits indehiscent or rupturing irregularly.
44. Calyces campanulate. Stamens monadelphous. Anthers all alike, spherical. ..... ***Dalea***
44. Calyces bilabiate. Stamens diadelphous. Anthers of 2 forms, spherical alternating with oblong.
45. Calyces inflated and elongated in fruit. Legumes enclosed in calyces except for beak; beak long; pericarps thin, papery. ..... ***Pediomelum***
45. Calyces not inflated nor elongated in fruit. Legumes exserted well beyond calyx remnants; beak short; pericarps thick, coriaceous. ..... ***Psoralidium***
43. Leaves not punctate. Fruits dehiscent.
46. Inflorescences axillary; solitary or in clusters. Petals yellow to orange-red or white with pink veins or pinkish with darker veins. Stamens diadelphous; filaments dilated below anthers. ..... ***Lotus***
46. Inflorescences terminal; racemes. Petals white or blue or bluish white to purple. Stamens monadelphous; filaments not dilated below anthers. ..... ***Lupinus***
42. Leaves pinnately compound.
47. Stamens free. ..... ***Sophora***
47. Stamens fused.
48. Leaves even pinnate. ..... ***Sesbania***
48. Leaves odd pinnate.
49. Leaves punctate.

50. Fruits 12–15 mm long; prickles present. ..... ***Glycyrrhiza***
50. Fruits 2–5 mm long; prickles absent. ..... ***Dalea***
49. Leaves not punctate. ..... **couplet 51**

51. Stamens monadelphous.
52. Petals 1; violet to purple. Corollas not papilionaceous. Fruits 0.3–0.5 cm long. ..... ***Amorpha***
52. Petals 5; pink and yellow. Corollas papilionaceous. Fruits 3–5 cm long. ..... ***Tephrosia***
51. Stamens diadelphous.
53. Inflorescences umbellate clusters or 1- or 2-flowered.
54. Petals orange to orange-red. Fruits legumes; subcylindrical. ..... ***Lotus***
54. Petals pinkish to white. Fruits loments; 4-sided. ..... ***Securigera***
53. Inflorescences racemes.
55. Petals yellow or maroon, streaked with orange-red. Pubescence on new growth pustulate. Stamens fused in 2 sets, 5 & 5. ..... ***Aeschynomene***
55. Petals of various colors, but not yellow or maroon nor streaked with orange-red. Pubescence not pustulate. Stamens fused in 2 sets, 9 & 1.
56. Fruits loments. ..... ***Hedysarum***
56. Fruits legumes.
57. Petals brick red to salmon. Legumes 4-sided. Leaflets alternate on rachises. ..... ***Indigofera***
57. Petals of various colors, but not brick red to salmon. Legumes terete. Leaflets opposite on rachises.
58. Keels acute; beaks present. ..... ***Oxytropis***
58. Keels rounded; beaks absent. ..... ***Astragalus***

Acacia P. Miller — Prairie Acacia

One species. ..... ***A. angustissima***

Acmispon C.S. Rafinesque — American Bird's-foot Trefoil

One species. ..... ***A. americanus***
(= *Lotus americanus, L. purshianus, L. unifoliolatus*)

Aeschynomene C. Linnaeus — Jointvetch

One species. ..... ***A. indica***

Albizia A. Durazzini — Silk Tree

One species. ..... ***A. julibrissin***

Amorpha C. Linnaeus

1. Plants herbs, some woody at base. ..... ***A. canescens***
1. Plants shrubs.
2. Leaflets 6–10 mm long. ..... ***A. nana***
2. Leaflets 15–50 mm long.
3. Calyces white canescent; apices acuminate to aristate. ..... ***A. paniculata***
3. Calyces glabrous or sparsely pilose or ciliolate; apices rounded to broadly acute.
4. Largest leaflets 7–15 mm wide.
5. Calyces conspicuously glandular. Petiolules conspicuously glandular warty. Stipules glandular; persistent. ..... ***A. laevigata***
5. Calyces not glandular or inconspicuously so. Petiolules not glandular or inconspicuously so. Stipules pubescent; caducous. ..... ***A. fruticosa***
4. Largest leaflets 15–35 mm wide.
6. Calyces conspicuously glandular. Lowest calyx lobes acuminate; 0.8–1 mm long. Leaves and pedicels green when dried. ..... ***A. ouachitensis***
6. Calyces not glandular or inconspicuously so. Lowest calyx lobes acute or rounded. Leaves and pedicels typically black or darkened when dried. ..... ***A. nitens***

Amphicarpaea W. Elliott ex T. Nuttall

One species. ..... ***A. bracteata***

Apios P. C. Frabricius Groundnut

One species. ..... ***A. americana***

Astragalus C. Linnaeus Milkvetch

1. Leaflets 3 or 2 or absent.
    2. Leaves palmately compound. Leaflets obovate-rhombic to oblanceolate. Banners purplish; 16–28 mm long. Legumes 6–10 mm long; erect; leathery; not inflated. Inflorescences axillary. ..... ***A. gilviflorus***
    2. Leaves pinnately compound. Leaflets filiform-linear or absent. Banners whitish; 6–9 mm long. Legumes 30–50 mm long; pendulous; papery; inflated. Inflorescences racemes. ..... ***A. ceramicus***
1. Leaflets 5–35.
    3. Leaflets filiform-linear. Upper leaves typically reduced to naked rachises. ..... ***A. ceramicus***
    3. Leaflets of various shapes, but not filiform-linear. Upper leaves not reduced to naked rachises.
        4. Pubescence of stems and leaves malpighian.
            5. Flowers 30–150 per raceme. Stipules of lowest leaves fused into sheath. Legumes 2-locular. ..... ***A. canadensis***
            5. Flowers 3–17 per raceme. Stipules of lowest leaves free. Legumes 1-locular.
                6. Wings 7.8–11.8 mm long. Calyx tubes 3–4 mm long. Legumes dorsally compressed. ..... ***A. lotiflorus***
                6. Wings 13–19 mm long. Calyx tubes 6–9 mm long. Legumes laterally compressed. ..... ***A. missouriensis***
        4. Pubescence of stems and leaves basifixed.
            7. Stipules of lowest 1–3 cauline leaves fused into bidentate sheaths.
                8. Wings 5–8 mm long. Keels 3.5–6 mm long. Legumes 7–9 mm long. ..... ***A. gracilis***
                8. Wings 8–19 mm long. Keels 5.5–16 mm long. Legumes 10–38 mm long.
                9. Stems erect or ascending. Legumes stipitate; pendulous; dorsally compressed or trigonous.
                10. Legumes 7–20 mm long; dorsally compressed; upper (ventral) surfaces with 2 deep longitudinal grooves. Plants of Cimarron County. ..... ***A. bisulcatus***
                10. Legumes 11–30 mm long; trigonous; faces flat or slightly concave, not grooved. Plants of western 1/4 of body of state. ..... ***A. racemosus***
                9. Stems prostrate or spreading. Legumes sessile; ascending or horizontal or deflexed; terete or laterally compressed.
                11. Leaflet apices obtuse to acute or mucronate. Legumes 4.5–8 mm in diameter; 2-locular. Seeds purplish black; smooth. ..... ***A. plattensis***
                11. Leaflet apices emarginate. Legumes 11–13 mm in diameter; 1-locular. Seeds brown; pitted. ..... ***A. puniceus***
            7. Stipules of lowest 1–3 cauline leaves free.
                12. Plants annuals.
                13. Flowers 13–15 mm long. Keels 9.5–12.9 mm long. Legumes 3.5–4 mm wide; coriaceous. Styles pubescent. ..... ***A. lindheimeri***
                13. Flowers 5–12 mm long. Keels 3.7–9.3 mm long. Legumes 2–3.5 mm wide; chartaceous. Styles glabrous.
                14. Calyx lobes triangular; shorter than tubes. Legumes straight; oblong. Ovules 20–26. ..... ***A. leptocarpus***
                14. Calyx lobes linear-subulate, equal to or longer than tubes. Legumes slightly curved to lunate. Ovules 10–18. ..... ***A. nuttallianus***
                12. Plants perennials.
                15. Banners 6–9 mm long. Wings 6–8 mm long. ..... ***A. crassicarpus***
                15. Banners 11–25 mm long. Wings 9–21 mm long.
                16. Keels 6–9 mm long. Stems and leaves strigulose to glabrate. Legumes 1-locular. ..... ***A. distortus***
                16. Keels 11.5–18 mm long. Stems and leaves pilose or villous-tomentose. Legumes 2-locular.
                17. Stems and leaves pilose. Flowers 3–5 per raceme. Legumes inflated; indehiscent; fleshy. ..... ***A. plattensis***

17. Stems and leaves villous-tomentose. Flowers 10–40 per raceme. Legumes not inflated; dehiscent or tardily so; coriaceous or chartaceous. ..... ***A. mollissimus***

Baptisia E. P. Ventenat Wild Indigo

1. Corollas yellow.
    2. Flowers 1–4 per raceme. Bracts persistent. ..... ***B. nuttalliana***
    2. Flowers 5 or more per raceme. Bracts deciduous.
        3. Corollas bright yellow. Stipules 2–6 mm long or absent. ..... ***B. sphaerocarpa***
        3. Corollas pale to dull yellow. Stipules 7–34 mm long.
            4. Pedicels 2–4 mm long. Mature plants glabrous. Ovaries glabrous; glaucous. ..... ***B.* × *sulphurea***
            4. Pedicels 7–15 mm long. Mature plants pubescent. Ovaries villose; not glaucous. ..... ***B.* × *bushii***
1. Corollas blue or white or cream or multicolored.
    5. Racemes held horizontal or curving downward. Corollas cream. ..... ***B. bracteata***
    5. Racemes ascending to erect. Corollas blue or white or multicolored.
        6. Corollas multicolored; brick red and yellow to orangish to blue-violet and yellow. ..... ***B.* × *variicolor***
        6. Corollas blue or white.
            7. Corollas white. Stipules deciduous. ..... ***B. alba***
            7. Corollas blue. Stipules persistent.
                8. Racemes erect. Leaves glabrous; glaucous. ..... ***B. australis***
                8. Racemes ascending, angle about 45°. Leaves glabrate; not glaucous. ..... ***B.* × *bicolor***

Centrosema (A.P. de Candolle) G. Bentham

One species. ..... ***C. virginianum***

Cercis C. Linnaeus Redbud

One species. ..... ***C. canadensis***

Chamaecrista C. Moench Partridge Pea

1. Petals 10–20 mm long; subequal. Stamens 10. Pedicels 10–25 mm long. ..... ***C. fasciculata***
(= *Cassia fasciculata*)
1. Petals 3–8 mm long; unequal. Stamens 5. Pedicels 1–4 mm long. ..... ***C. nictitans***
(= *Cassia nictitans*)

Cladrastis C.S. Rafinesque Yellowwood

One species. ..... ***C. kentuckea***

Clitoria C. Linnaeus Butterfly Pea

One species. ..... ***C. mariana***

Colutea C. Linnaeus

One species; plants of Black Mesa area. ..... ***C. arborescens***

Crotalaria C. Linnaeus Rattlebox

One species. ..... ***C. sagittalis***

Dalea C. Linnaeus

1. Plants shrubs.
    2. Calyx lobes plumose; filiform; longer than or equal to tubes. ..... ***D. formosa***
    2. Calyx lobes glabrous or minutely ciliate; deltoid; shorter than tubes. ..... ***D. frutescens***
1. Plants herbs, some woody at base.
    3. Corollas purple to pink or violet.
        4. Stamens 8–10.

5. Leaflets 3 or 5. Calyx lobes 5–10 mm long; longer than tubes.
Banners 5–6.5 mm long. Legumes 3.4–4 mm long. ..... ***D. jamesii***
5. Leaflets 9–15. Calyx lobes 1.5–2.3 mm long; shorter than tubes.
Banners 3–4.3 mm long. Legumes 2.5–3 mm long. ..... ***D. lanata***
4. Stamens 5.
6. Spikes 12–15 mm wide. Stems decumbent. Legumes minutely strigose. ..... ***D. compacta***
(= *Petalostemon decumbens*)
6. Spikes 8–12 mm wide. Stems ascending to erect. Legumes glabrous or pubescent to villous.
7. Leaflets 9–17. Stems and leaves densely villous. ..... ***D. villosa***
(= *Petalostemon villosum*)
7. Leaflets 3 or 5. Stems and leaves glabrous to sparsely villous.
8. Bracts oblanceolate; apices shorter than bodies. Plants of the body of the state. ..... ***D. purpurea***
(= *Petalostemon purpureum*)
8. Bracts obovate to orbicular; apices longer than or equal to bodies.
Plants of the Panhandle. ..... ***D. tenuifolia***
(= *Petalostemon tenuifolium*)
3. Corollas white to yellow.
9. Stamens 9 or 10.
10. Stems and leaves glabrous. Corollas white. Spike rachises visible; flowers separated or overlapping less than 1/2 length. Bracts broadly obovate; folded around flowers; conspicuously glandular-punctate. ..... ***D. enneandra***
10. Stems and leaves silky-pilose or villous-tomentose. Corollas yellow. Spike rachises hidden by flowers; flowers overlapping completely. Bracts lanceolate to ovate; not folded around flowers; inconspicuously glandular.
11. Spikes 8–13 mm wide. ..... ***D. nana***
11. Spikes 15–25 mm wide.
12. Stems erect. Corollas remaining yellow with age. Calyx lobes 3.5–5 mm long. Banners 6.5–8.6 mm long. ..... ***D. aurea***
12. Stems decumbent to ascending. Corollas becoming rose-purple or brown with age. Calyx lobes 5–10 mm long. Banners 5–6.5 mm long. ..... ***D. jamesii***
9. Stamens 5.
13. Mature spikes globose or subglobose; 1 cm in diameter.
Mature legumes 3.5–5 mm long. ..... ***D. multiflora***
(= *Petalostemon multiflorum*)
13. Mature spikes cylindrical or oblong; 1–23 cm long.
Mature legumes 2–3 mm long.
14. Leaflets 15–41. Largest cauline leaflets 3–10 mm long; pubescent. ..... ***D. phleoides***
(= *D. microphylla*)
14. Leaflets 5–11. Largest cauline leaflets 10–30 mm long; glabrous.
15. Calyces densely pilose; hairs 1.6–2.4 mm long. Rachises of spikes densely pilose. ..... ***D. cylindriceps***
15. Calyces glabrous to pubescent; hairs 0.2–0.4 mm long. Rachises of spikes glabrous to puberulent. ..... ***D. candida***
(= *Petalostemon candidum*)

Desmanthus C.L. Willdenow Bundleflower

1. Legumes falcate; 1.5–2.5 cm long; 5–6 mm wide. ..... ***D. illinoensis***
1. Legumes straight or slightly curved; 4–10 cm long; 2–3 mm wide.
2. Leaflets 3–5 mm long; 1.5 mm wide. Stamens 10. Seeds rhomboidal. ..... ***D. cooleyi***
2. Leaflets 1.5–2 mm long; less than 1 mm wide. Stamens 5. Seeds narrowly obovate. ..... ***D. leptolobus***

Desmodium N.A. Desvaux Ticktrefoil

1. Calyces not bilabiate or inconspicuously so. Stamens monadelphous. Loment stipes at least 2.5 times longer than calyces.
2. Inflorescences borne on leafless stems. ..... ***D. nudiflorum***
2. Inflorescences borne on leafy stems.

3. Internodes inconspicuous, leaves appearing whorled. Corollas pink to purple.
Loment stipes glabrous. ..... ***D. glutinosum***
3. Internodes conspicuous, leaves clearly alternate. Corollas white.
Loment stipes puberulent. ..... ***D. pauciflorum***
1. Calyces conspicuously bilabiate. Stamens diadelphous. Loment stipes shorter or slightly longer than calyces.
4. Stems prostrate or trailing often forming mats. Terminal leaflets suborbicular or obovate. ..... ***D. rotundifolium***
4. Stems ascending to erect. Terminal leaflets of various shapes but not suborbicular or obovate.
5. Terminal leaflets linear to lanceolate.
6. Petioles 1–4 mm long. Stems densely uncinate-pubescent. Loment segments rounded to subangular. ..... ***D. sessilifolium***
6. Petioles 15–30 mm long. Stems glabrous to sparsely pilose. Loment segments triangular to subrhomboidal. ..... ***D. paniculatum***
5. Terminal leaflets broadly elliptic to ovate or rhomboidal.
7. Abaxial surfaces of leaflets uncinate-puberulent.
8. Inflorescences branched. Corollas 9–13 mm long.
Loment segments 6.5–10 mm long. ..... ***D. canescens***
8. Inflorescences not branched. Corollas 6–8 mm long.
Loment segments 4–5.5 mm long. ..... ***D. illinoense***
7. Abaxial surfaces of leaflets glabrous or pilose or villous or velvety-tomentose.
9. Corollas 3–7 mm long.
10. Terminal leaflets 5–10 cm long.
11. Abaxial surfaces of leaflets velvety-tomentose. Pedicels 2.5–6.5 mm long.
Loment stipes 2.5–4mm long. ..... ***D. nuttallii***
11. Abaxial surfaces of leaflets pilose to glabrate. Pedicels 6–17 mm long.
Loment stipes 1.5–2 mm long. ..... ***D. obtusum***
(= *D. rigidum*)
10. Terminal leaflets 1–3 cm long.
12. Abaxial surfaces of leaflets glabrous or glabrate.
Pedicels 8–20 mm long. Corollas 5–7 mm long. ..... ***D. marilandicum***
12. Abaxial surfaces of leaflets pubescent. Pedicels 3–8 mm long.
Corollas 3–5 mm long. ..... ***D. ciliare***
9. Corollas 7–12 mm long.
13. Abaxial surfaces of leaflets glaucous. Dorsal suture of loment segments without uncinate hairs. ..... ***D. laevigatum***
13. Abaxial surfaces of leaflets not glaucous. Dorsal suture of loment segments with uncinate hairs.
14. Bracts and stipules if present 2–5 mm long. Upper calyx lobes 2–3 mm long. Abaxial surfaces of leaflets velvety-tomentose. ..... ***D. viridiflorum***
14. Bracts and stipules if present 7–15 mm long. Upper calyx lobes 4–5 mm long. Abaxial surfaces of leaflets pilose or glabrous.
15. Petioles 0.8–2.5 cm long. Abaxial surfaces of leaflets pilose. Stipules persistent. Bracts pilose. Loment segments 4–7 mm long. ..... ***D. canadense***
15. Petioles 4–10 cm long. Abaxial surfaces of leaflets glabrous. Stipules caducous. Bracts glabrous. Loment segments 9–11 mm long. ..... ***D. cuspidatum***

Erythrostemon J.F. Klotzsch

One species. ..... ***E. gilliesii***
(= *Caesalpinia gilliesii*)

Galactia P. Browne Milkpea

One species. ..... ***G. regularis***

Gleditsia C. Linnaeus Honey Locust

One species. ..... ***G. triacanthos***

Glycyrrhiza C. Linnaeus — Wild Licorice

One species. ..... ***G. lepidota***

Gymnocladus J.B.A.P. de Lamarck — Kentucky Coffee Tree

One species. ..... ***G. dioicus***
(= *G. dioica*)

Hedysarum C. Linnaeus — Sweet Vetch

One species. ..... ***H. boreale***

Hoffmannseggia A.J. Cavanilles — Rush Pea

1. Upper stems and inflorescences with stipitate glands. Calyx lobes 6–7 mm long.
   Petals 10–13 mm long. ..... ***H. glauca***
1. Upper stems and inflorescences without stipitate glands. Calyx lobes 3–5 mm long.
   Petals 5–6 mm long. ..... ***H. drepanocarpa***

Indigofera C. Linnaeus — Scarlet Pea

One species. ..... ***I. miniata***

Kummerowia A.K. Schindler — Japanese Clover

1. Petioles of mid-cauline leaves 4–10 mm long. Stem hairs antrorse-strigose.
   Leaflet margins bristly-ciliate. Petals 6–7 mm long. ..... ***K. stipulacea***
   (= *Lespedeza stipulacea*)
1. Petioles of mid-cauline leaves 1–3 mm long. Stem hairs retrorse-strigose.
   Leaflet margins glabrous or inconspicuously ciliate. Petals 4.5–6 mm long. ..... ***K. striata***
   (= *Lespedeza striata*)

Lathyrus C. Linnaeus — Peavine

1. Leaflets 6–14. Stems not winged.
   2. Flowers 10–15 mm long. ..... ***L. venosus***
   2. Flowers 20–30 mm long.
      3. Leaflets linear; tendrils not branched, bristle-like, not prehensile. ..... ***L. polymorphus***
      3. Leaflets lanceolate to elliptic; tendrils branched, flexuous, prehensile. ..... ***L. eucosmus***
1. Leaflets 2. Stems winged.
   4. Petioles winged.
      5. Flowers 5–15 per raceme; 15–25 mm long. Legumes 6–11 cm long. Plants perennials. ..... ***L. latifolius***
      5. Flowers 1–4 per raceme; 5–12 mm long. Legumes 2–6 cm long. Plants annuals. ..... ***L. hirsutus***
   4. Petioles not winged.
      6. Flowers 5–15 per raceme; 15–25 mm long. Legumes 6–11 cm long. Plants perennials. ..... ***L. latifolius***
      6. Flowers 1–4 per raceme; 5–12 mm long. Legumes 2–6 cm long. Plants annuals.
         7. Legumes pustulate-hirsute; 5–8 mm wide. Stipules linear-lanceolate;
            1/5 to 1/4 length of leaflets. ..... ***L. hirsutus***
         7. Legumes glabrous; 3–5 mm wide. Stipules lanceolate to lanceolate-ovate;
            1/3 to 3/4 length of leaflets. ..... ***L. pusillus***

Lespedeza A. Michaux — Bush Clover

1. Stems prostrate or trailing.
   2. Pubescence of stems and petioles spreading. ..... ***L. procumbens***
   2. Pubescence of stems and petioles appressed or absent. ..... ***L. repens***
1. Stems ascending to erect.
   3. Corollas white or cream; veins or throats may be purple. Calyx lobes of chasmogamous
      flowers longer than or equal to length of legumes.
      4. Flowers 1–4 per raceme. Leaflets oblanceolate. Wings and keels equal in length. ..... ***L. cuneata***
      4. Flowers 10–24 per raceme. Leaflets of various shapes, but not oblanceolate.
         Wings longer than keels.

5. Inflorescences capitate to globose. Petioles 1–5 mm long. Peduncles shorter than length of subtending leaves. ..... ***L. capitata***
5. Inflorescences cylindrical to oblong. Petioles 5–20 mm long. Peduncles longer than subtending leaves. ..... ***L. hirta***

3. Corollas pink to purple. Calyx lobes of chasmogamous flowers shorter than length of legumes.
6. Wings shorter than length of keels. Racemes exserted beyond adjacent leaves. ..... ***L. violacea***
6. Wings longer than or equal to length of keels. Racemes partially or completely exceeded by adjacent leaves.
7. Adaxial surfaces of leaflets glabrous or glabrate along midrib. ..... ***L. frutescens*** (= *L. intermedia*)
7. Adaxial surfaces of leaflets appressed pubescent.
8. Leaflets linear to narrowly oblong; 3–8 times longer than wide. ..... ***L. virginica***
8. Leaflets elliptic to ovate or oblong or obovate; 1–3 times longer than wide. ..... ***L. stuevei***

Lotus C. Linnaeus Trefoil

One species. ..... ***L. corniculatus***

Lupinus C. Linnaeus Lupine

1. Calyces 6–8 mm long. Plants of southern Oklahoma roadsides; planted. ..... ***L. texensis***
1. Calyces 7–12 mm long. Plants of Texas and Cimarron counties.
2. Plants annuals; from taproots. Seeds 1 or 2. Stem hairs only ascending; 3–5 mm long. ..... ***L. pusillus***
2. Plants perennials; from rhizomes. Seeds 3–8. Stem hairs both appressed and ascending; 1–2 mm long. ..... ***L. plattensis***

Medicago C. Linnaeus Alfalfa

1. Corollas purple or blue-violet. Flowers 6–12 mm long. Stems erect. Plants perennials; root systems woody. ..... ***M. sativa***
1. Corollas yellow. Flowers 1–5 mm long. Stems prostrate to ascending. Plants annuals; root systems herbaceous.
2. Leaves and calyces pubescent. Stipules entire to toothed.
3. Legumes with hooked prickles; forming 3–5 coils, 5–12 mm in diameter; greenish to stramineous when mature. ..... ***M. minima***
3. Legumes without prickles; curved or forming 1 coil, 2–3 mm in diameter; black when mature. ..... ***M. lupulina***
2. Leaves and calyces glabrous. Stipules lacerate or incised or parted.
4. Legumes without hooked prickles; 10–15 mm in diameter. Pedicels 2–3 mm long. ..... ***M. orbicularis***
4. Legumes with hooked prickles; 4–6 mm in diameter. Pedicels 0.5–2 mm long.
5. Leaflets longer than wide. Adaxial surfaces of leaflets uniformly green. Basal portion of peduncles glabrous or glabrate. Pedicels 0.5–1 mm long. ..... ***M. polymorpha***
5. Leaflets as long as wide or shorter. Adaxial surfaces of leaflets typically with a reddish purple spot. Basal portion of peduncles sparsely pubescent, hairs long, crooked. Pedicels 0.2–0.5 mm long. ..... ***M. arabica***

Melilotus P. Miller Sweet Clover

1. Corollas white. Legumes reticulate veined; dark brown or black at maturity. ..... ***M. albus***
1. Corollas yellow. Legumes transversely ribbed; gray or light brown at maturity.
2. Flowers 4–7 mm long. Pedicels recurved. Legumes 2.5–4 mm long; ovoid. ..... ***M. officinalis***
2. Flowers 2–3 mm long. Pedicels ascending. Legumes 1.5–2.5 mm long; flattened-orbicular. ..... ***M. indicus***

Mimosa C. Linnaeus

1. Stems ascending to erect. Peduncles 1.5–2 cm long. ..... ***M. borealis***
1. Stems prostrate to decumbent, often trailing. Peduncles 2–9 cm long. ..... ***M. quadrivalvis*** (= *M. microphylla*, *Schrankia nuttallii*, *S. uncinata*)

Neptunia J. de Loureiro — Yellow Neptune

One species. ..... ***N. lutea***

Orbexilum C.S. Rafinesque — Snakeroot

1. Corollas dark purple; 7–10 mm long. Calyx tubes 3.2–4 mm long. ..... ***O. simplex***
(= *Psoralea simplex*)

1. Corollas lavender or light blue or whitish; 4–7 mm long. Calyx tubes 2–3 mm long. ..... ***O. pedunculatum***
(= *Psoralea psoralioides*)

Oxytropis A.P. de Candolle

1. Pubescence both basifixed and malpighian. Corollas purplish rose to pinkish blue, fading to violet. ..... ***O. lambertii***
1. Pubescence all basifixed. Corollas white, fading to yellow, with purple tipped keels. ..... ***O. sericea***

Pediomelum P.A. Rydberg — Scurf-pea

1. Leaves pinnately compound; leaflets 3. Rachises 10–15 mm long.
Corollas brick red to pink. Legumes not glandular..... ***P. rhombifolium***
(= *Psoralea rhombifolia*)

1. Leaves palmately compound; leaflets 3–7. Rachises absent. Corollas blue to
lavender to purple. Legumes glandular.
  2. Leaves not glandular punctate. Calyx lobes equal or subequal.
    3. Plants caulescent. Pubescence of stems and petioles spreading.
    Mature legumes totally enclosed within calyces; beaks 2–3 mm long. ..... ***P. esculentum***
    (= *Psoralea esculenta*)

    3. Plants acaulescent. Pubescence of stems and petioles appressed.
    Mature legumes partially exserted beyond calyces; beaks 7–15 mm long. ..... ***P. hypogaeum***
    (= *Psoralea hypogaea, Psoralea scaposa*)

  2. Leaves glandular punctate. Calyx lobes unequal, lower longer than upper.
    4. Bracts broadly ovate; totally enclosing calyces. Racemes 3–7 flowered. ..... ***P. reverchonii***
    (= *Psoralea reverchonii*)

    4. Bracts lanceolate to elliptic or narrowly ovate; not enclosing calyces.
    Racemes 12–many flowered.
      5. Racemes 25–30 mm in diameter. Fruiting calyces 12–20 mm long. ..... ***P. cuspidatum***
      (= *Psoralea cuspidata*)

      5. Racemes 7–20 mm in diameter. Fruiting calyces 2–7 mm long.
        6. Abaxial leaf surfaces green or gray-green. Stems glabrous or strigose.
        Bodies of mature legumes not enclosed by calyces. ..... ***P. linearifolium***
        (= *Psoralea linearifolia*)

        6. Abaxial leaf surfaces silvery white. Stems sericeous to lanate.
        Bodies of mature legumes enclosed by calyces.
          7. Leaflets oblong to oblong-lanceolate or obovate. Beaks of
          mature legumes exserted beyond calyces. Seeds reniform;
          olive-colored. ..... ***P. argophyllum***
          (= *Psoralea argophylla*)

          7. Leaflets linear or linear-lanceolate. Beaks of mature legumes
          enclosed within calyces. Seeds ellipsoid; brown. ..... ***P. digitatum***
          (= *Psoralea digitata*)

Phaseolus C. Linnaeus — Wild Bean

One species. ..... ***P. polystachios***

Pisum C. Linnaeus — Garden Pea

One species. ..... ***P. sativum***

Pomaria A.J. Cavanilles Holdback

One species. ..... ***P. jamesii***
(= *Hoffmannseggia jamesii*)

Prosopis C. Linnaeus Mesquite

One species. ..... ***P. glandulosa***

Psoralidium P.A. Rydberg Scurf-Pea

1. Leaflets 5–10 mm wide; 3–5 times longer than wide. Calyx lobes 1–7 mm long.
   Banners and wings blue to purple. Legumes ellipsoid to ovoid. ..... ***P. tenuiflorum***
   (= *Psoralea tenuiflora*)
1. Leaflets 2–4 mm wide; 10–15 times longer than wide. Calyx lobes 0.5–1 mm long.
   Banners and wings white. Legumes globose or subglobose. ..... ***P. lanceolatum***
   (= *Psoralea lanceolata*)

Pueraria A.P. de Candolle Kudzu

One species. ..... ***P. montana***
(= *P. lobata*)

Rhynchosia J. de Loureiro Snoutbean

One species. ..... ***R. latifolia***

Robinia C. Linnaeus Black-Locust

1. Flowers white. Stems and leaves glabrous or glabrate. Legumes glabrous. ..... ***R. pseudoacacia***
1. Flowers reddish-purple to pink. Stems and leaves densely hispid. Legumes densely glandular-hispid. ..... ***R. hispida***

Securigera A.P. de Candolle Crown Vetch

One species. ..... ***S. varia***
(= *Coronilla varia*)

Senna P. Miller

1. Largest leaflets 20–30 mm wide. Plants annuals.
   2. Gland at base of petiole. Leaflets ovate to elliptic. Pairs of leaflets 3–6.
      Legumes flattened. ..... ***S. occidentalis***
      (= *Cassia occidentalis*)
   2. Gland between or above 2 lowest leaflets. Leaflets obovate.
      Pairs of leaflets 2 or 3. Legumes tetragonal. ..... ***S. obtusifolia***
      (= *Cassia obtusifolia*)
1. Largest leaflets 5–15 mm wide. Plants perennials.
   3. Pairs of leaflets 1. Legumes 2–3 cm long. ..... ***S. roemeriana***
      (= *Cassia roemeriana*)
   3. Pairs of leaflets 4–10. Legumes 5–8 cm long. ..... ***S. marilandica***
      (= *Cassia marilandica*)

Sesbania J.A. Scopoli Riverhemp or Bagpod

1. Petals 6–10 mm long. Legumes oblong to ellipsoidal; 15–25 mm wide; 2.5–8 cm long;
   pericarps differentiated into exocarp and papery endocarp. Seeds 1 or 2. ..... ***S. vesicaria***
   (= *Glottidium vesicarium*)
1. Petals 10–20 mm long. Legumes cylindrical; 3–5 mm wide; 10–20 cm long; pericarps not
   differentiated into exocarp and endocarp. Seeds 30–40. ..... ***S. herbacea***
   (= *S. exaltata*)

Sophora C. Linnaeus Necklacepod

One species. ..... ***S. nuttalliana***

Strophostyles W. Elliott — Wild Bean

1. Mature legumes 2–3.5 cm long; hairs spreading. Calyx tubes 1–1.5 mm long; densely pubescent. Flowers 5–8 mm long. ..... ***S. leiosperma***
1. Mature legumes 3.5–10 cm long; hairs appressed. Calyx tubes 1.5–2.5 mm long; glabrous to glabrate. Flowers 8–15 mm long.
    2. Bracteoles 0.5–1 mm long; half as long as calyx tubes. Seeds 3–6 mm long. Plants perennials. ..... ***S. umbellata***
    2. Bracteoles 2–4.5 mm long; as long as calyx tubes. Seeds 6–10 mm long. Plants annuals. ..... ***S. helvola***

Stylosanthes O. Swartz — Pencilflower

One species. ..... ***S. biflora***
(= *S. riparia*)

Styphnolobium H.W. Schott — Eve's Necklacepod, Texas Sophora

One species. ..... ***S. affine***
(= *Sophora affinis*)

Tephrosia C.H. Persoon — Hoarypea, Goat's Rue

1. Racemes 3–10 cm long. Leaflets 3–8 mm wide; acute. Hairs of stems and legumes white. ..... ***T. virginiana***
1. Racemes 10–14 cm long. Leaflets 8–14 mm wide; rounded to truncate or emarginate. Hairs of stems and legumes tan. ..... ***T. onobrychoides***

Trifolium C. Linnaeus — Clover

1. Corollas yellow, becoming tan. Leaves pinnately compound; rachises 1–4 mm long.
    2. Largest inflorescences 12–15 mm long. Flowers 20–40 per inflorescence; 3.5–5 mm long. Banners conspicuously striate. ..... ***T. campestre***
    2. Largest inflorescences 5–10 mm long. Flowers 5–19 per inflorescence; 2.5–3.5 mm long. Banners not striate or inconspicuously so. ..... ***T. dubium***
1. Corollas white or cream or pink to red or purple. Leaves palmately compound; rachises absent.
    3. Flowers sessile or subsessile.
        4. Calyces longer than corollas. Petals white or pinkish white. ..... ***T. arvense***
        4. Calyces shorter than corollas. Petals red to rose-lavender or reddish purple.
            5. Heads oblong; 2 times longer than wide. Corollas scarlet to deep red. ..... ***T. incarnatum***
            5. Heads globose to ovoid; as long as wide or shorter than wide. Corollas rose to rose-lavender or reddish purple.
                6. Corollas 4–6 mm long. Calyces inflated in fruit. ..... ***T. resupinatum***
                6. Corollas 10–20 mm long. Calyces not inflated in fruit. ..... ***T. pratense***
    3. Flowers pedicellate; pedicels 1–5 mm long.
        7. Calyx lobes 2 to 4 times longer than length of the tubes. Calyx tubes 0.7–1.7 mm long.
            8. Flowers 5–6 mm long. Banners cream. Wings acute. Inflorescences 8–15 mm in diameter. ..... ***T. carolinianum***
            8. Flowers 7–12 mm long. Banners red or pinkish. Wings obtuse. Inflorescences 18–35 mm in diameter. ..... ***T. reflexum***
        7. Calyx lobes less than 2 times longer than length of tubes. Calyx tubes 1.5–3 mm long.
            9. Leaflets bristle-tipped; bristles 0.8–2 mm long. Mature inflorescences 4–10 cm long. Calyces inflated in fruit. Corollas 15–20 mm long. Plants annuals. ..... ***T. vesiculosum***
            9. Leaflets not bristle-tipped. Mature inflorescences 1–3 cm long. Calyces not inflated in fruit. Corollas 6–12 mm long. Plants perennials.
                10. Stems prostrate; rooting at nodes. Calyx tubes 10-nerved. Stipules sheathing. ..... ***T. repens***
                10. Stems ascending; not rooting at nodes. Calyx tubes 5-nerved. Stipules clasping. ..... ***T. hybridum***

Vicia C. Linnaeus Vetch

1. Inflorescences sessile or subsessile. ..... ***V. sativa***
1. Inflorescences pedunculate.
   2. Stems and leaves villous. ..... ***V. villosa***
   2. Stems and leaves glabrous or sparsely pubescent.
      3. Flowers at anthesis 12–28 mm long. ..... ***V. americana***
      3. Flowers at anthesis 5–12 mm long.
         4. Flowers 8–12 mm long. Banners and wings white. Keels bicolor, apices blue, bases white. ..... ***V. caroliniana***
         4. Flowers 5–8 mm long. Banners and wings blue to lavender or purplish white. Keels uniformly blue to lavender or purplish white.
            5. Calyces 2.8–3.5 mm long; lobes unequal, lower subulate. Flowers 2–15 or rarely 1 per peduncle. ..... ***V. ludoviciana***
            5. Calyces 2.2–2.8 mm long; lobes equal, all triangular. Flowers 1 or rarely 2 per peduncle. ..... ***V. minutiflora***

Wisteria T. Nuttall

One species. ..... ***W. frutescens*** (= *W. macrostachya*)

FAGACEAE B.C.J. Dumortier Beech Family

Plants trees or shrubs; deciduous or evergreen; monoecious. **Leaves** simple; alternate; blades entire to variously toothed or lobed; awns present or absent; venation pinnate; stipules present, caducous. **Inflorescences** of 2 types, staminate and pistillate different; axillary. **Staminate Inflorescences** catkins; pendulous; elongate or globose; bracts present or absent, caducous. **Pistillate Inflorescences** solitary flowers or clusters of 2 to 4; bracts present, fused forming involucral cupules (caps) or husks that completely or partially enclose flowers. **Flowers** produced before leaves or simultaneously with or after leaves, imperfect, staminate and pistillate similar; perianths in 1-series. **Calyces** radially symmetrical. **Sepals** 4 to 8; fused. **Petals** absent. **Stamens** 4 to 20. **Pistils** 1; compound, carpels 3 to 7; stigmas 3; styles 3; ovaries inferior; locules 3 to 7; placentation axile; ovules 2 per locule. Gynoecial rudiments occasionally present. **Fruits** nuts; subtended by involucral cupules (caps) in *Quercus* (=acorn) or enclosed in spiny or prickly husks that are dehiscent at maturity in *Castanea* and *Fagus*. **Seeds** 1.

The family is represented in Oklahoma by 3 genera and 31 species. *Quercus,* oak, is the largest genus of woody plants in the state and is found in virtually all wooded habitats. *Fagus*, beech, and *Castanea,* chestnut, are uncommon and encountered in the extreme eastern portion of the state. The nuts are an important food for wildlife.

1. Buds at twig apices multiple. Nuts subtended by cap-like involucral cupules (=acorn). ..... ***Quercus***
1. Buds at twig apices solitary or absent. Nuts enclosed in spiny or muricate husks.
   2. Bark of mature trees smooth. Buds 4 times longer than wide; apices acute, shiny. Staminate catkins globose. Involucres muricate. Nuts trigonous. ..... ***Fagus***
   2. Bark of mature trees furrowed. Buds 1.5–2 times longer than wide; apices obtuse or rounded; dull. Staminate catkins elongate. Involucres spiny. Nuts rounded or slightly flattened on 1 side. ..... ***Castanea***

Castanea P. Miller Chestnut

1. Abaxial surfaces of leaves glabrous at or after anthesis. Spines of involucres glabrous. Nuts 2 or 3 per involucre; flattened. ..... ***C. dentata***
1. Abaxial surfaces of leaves arachnoid or with stellate hairs at 10X magnification. Spines of involucres pubescent. Nuts 1 per involucre; terete.
   2. Branchlets glabrous. Spines of fruiting involucres 10–13 mm long. Bark of trunks and primary branches light gray. ..... ***C. ozarkensis***
   2. Branchlets puberulent to glabrate. Spines of fruiting involucres 3–10 mm long. Bark of trunks and primary branches reddish brown. ..... ***C. pumila***

Fagus C. Linnaeus Beech

One species. ..... ***F. grandifolia***

Quercus C. Linnaeus Oak[1]

Plants trees or shrubs; deciduous or evergreen. **Terminal Buds** 3–9; clustered. **Bark** whitish gray or brown or black; smooth or furrowed or scaly or flaky. **Leaves** pinnately lobed or serrate-crenate or entire or revolute; lobe apices acute or acuminate or rounded, awns present or absent. **Staminate Flowers** borne in elongate, pendulous catkins. **Pistillate Flowers** 1 per involucral cupule (cap). **Mature Acorns** borne on previous or current year's wood; involucral scales of cupules flattened or keeled or with bases thickened; bases of cupules with or without darkened or pubescent callus; inner surfaces of cupules tomentose or glabrous or glabrate.

The genus is represented in Oklahoma by 23 species and numerous hybrids, some of which were initially given species names.

Key to Sections

1. Principal veins of leaves excurrent as awns or mucros.
   2. Leaf margins conspicuously revolute. ..... ***Quercus***
   2. Leaf margins of various types, but not revolute. ..... ***Lobatae***
1. Principal veins of leaves not excurrent as awns nor mucros.
   3. Mature acorns borne on previous year's wood. Inner surfaces of cupules tomentose. Involucral scales of cupules flattened. Bases of cupules without darkened or pubescent callus. ..... ***Lobatae***
   3. Mature acorns borne on current year's wood. Inner surfaces of cupules glabrous or glabrate. Involucral scales of cupules thickened. Bases of cupules with darkened or pubescent callus. ..... ***Quercus***

Section *Lobatae* J.C. Loudon Black Oaks, Red Oaks

Plants trees; deciduous, sometimes tardily so. **Terminal Buds** with apices acute. **Bark** smooth or deeply furrowed, not scaly or flaky. **Leaves** pinnately lobed to entire; lobe apices acute or acuminate, awns typically present, but sometimes absent on mature leaves. **Pistillate Flowers** with calyces free from ovaries, forming flanges; styles linear-spathulate. **Mature Acorns** borne on previous year's wood; involucral scales of cupules flattened; bases of cupules without darkened or pubescent callus; inner surfaces of cupules tomentose.

1. Leaf margins entire, denticulate or apically undulate to sinuate and basally entire. Lobes, if present, rounded or obtuse to broadly acute.
   2. Leaves linear-lanceolate to lanceolate or elliptic or oblong; lobes absent.
      3. Leaf margins denticulate. Awns 2–5; both apical and marginal. ..... ***Q. incana***
      3. Leaf margins entire. Awns 1; only apical.
         4. Petioles of mature leaves 2–4 mm long. Leaves 4–6 times longer than wide. Adaxial surfaces of blades yellow-green. Abaxial surfaces of blades glabrous. Terminal bud scales glabrous. ..... ***Q. phellos***
         4. Petioles of mature leaves 10–20 mm long. Leaves 2–3.5 times longer than wide. Adaxial surfaces of blades blue-green. Abaxial surfaces of blades pubescent or tomentose. Terminal bud scales pubescent. ..... ***Q. incana***
   2. Leaves spathulate or oblanceolate to obovate; lobes present.
      5. Blades of mature leaves 2.5–6 cm wide. Abaxial surfaces of blades glabrous, except for conspicuous tomentum in vein axils. Lateral veins impressed on adaxial blade surfaces. Cupules covering 1/4 of mature nuts. Branchlets glabrous. Bark with irregular fissures. ..... ***Q. nigra***
      5. Blades of mature leaves 6–18 cm wide. Abaxial surfaces scurfy or pubescent. Lateral veins raised on adaxial blade surfaces. Cupules covering 1/2 of mature nuts. Branchlets pubescent or tomentose. Bark with irregular or rectangular blocks. ..... ***Q. marilandica***
1. Leaf margins pinnately lobed to pinnately cleft or pinnately parted. Lobe apices narrowly acute to acuminate.
   6. Abaxial surfaces of blades stellate. Branchlets pubescent.
      7. Leaf bases truncate or cuneate. Apices of involucral scales of cupules spreading. Abaxial leaf surfaces appearing whitish to gray. Acorns 13–18 mm long; ovoid. Terminal lobes typically equal in length and width to lateral lobes. ..... ***Q. velutina***
      7. Leaf bases of at least some leaves oblique or u-shaped. Apices of involucral scales of cupules tightly appressed. Abaxial leaf surfaces dull yellowish-brown or tawny. Acorns 3–13 mm long; subglobose to round-ellipsoid. Terminal lobes typically narrower and longer than adjacent lateral lobes or leaves pagodiform. ..... ***Q. falcata***
   6. Abaxial surfaces of blades glabrous, or only with red tomentum in vein axils. Branchlets glabrous.

9. Blade sinuses not extending more than halfway to midribs.
    10. Terminal buds uniformly pubescent; hairs tan to silvery-white. Apices of involucral scales of cupules spreading. Adaxial surfaces of leaves dark green; glossy. Cupules covering 1/2 of mature nuts. ..... ***Q. velutina***
    10. Terminal buds not uniformly pubescent, single tuft of red hairs at apices. Apices of involucral scales of cupules tightly appressed. Adaxial surfaces of leaves pale green; dull. Cupules covering 1/4–1/3 of mature nuts. ..... ***Q. rubra*** (= *Q. borealis*)
9. Blade sinuses extending more than halfway to midribs.
    11. Terminal buds uniformly pubescent; 8–12 mm long. Apices of involucral scales of cupules spreading. ..... ***Q. velutina***
    11. Terminal buds glabrous or only pubescent on distal 1/2; 4–8 mm long. Apices of involucral scales of cupules tightly appressed.
        12. Cupules covering 1/5–1/4 of mature nuts; 3–6 mm deep. Leaves oblong to narrowly elliptic. ..... ***Q. palustris***
        12. Cupules covering 1/4–1/2 of mature nuts; 7–16 mm deep. Leaves broadly elliptic to obovate.
            13. Margins of terminal bud scales ciliate. Petioles and twigs sparsely stellate or villous. Leaves 5–10 cm long. ..... ***Q. buckleyii***
            13. Margins of terminal bud scales glabrous. Petioles and twigs glabrous. Leaves 10–20 cm long. ..... ***Q. shumardii***

Section *Quercus* **White Oaks**

Plants trees or shrubs; deciduous or evergreen. **Terminal Buds** with apices obtuse or rounded. **Bark** smooth or scaly or flaky. **Leaves** pinnately lobed or serrate-crenate or entire or revolute; lobe apices rounded, awns absent. **Pistillate Flowers** with calyces fused to ovaries, not forming flanges; styles usually abruptly spathulate. **Mature Acorns** borne on current year's wood;

involucral scales of cupules keeled or with bases thickened; bases of cupules with darkened or pubescent callus; inner surfaces of cupules glabrous or glabrate.

1. Leaf margins conspicuously revolute. ..... ***Q. fusiformis*** (= *Q. virginiana*)
1. Leaf margins not revolute.
    2. Blades deeply lobed with at least some of sinuses extending half way to midribs.
        3. Plants all shrubs or sometimes small trees and shrubs intermixed. Plants of Black Mesa area, Cimarron County. ..... ***Q. gambelii***
        3. Plants all trees. Plants of body of state.
            4. Abaxial surfaces of leaves glabrate to glabrous. Blade lobes finger-like. Mature nuts oblong. ..... ***Q. alba***
            4. Abaxial surfaces of leaves densely to sparsely stellate. Blade lobes of various shapes, but not finger-like. Mature nuts globose to ovoid.
                5. Primary lateral lobes of leaves 1 or 2 per side. Cupules covering 1/4–1/3 of mature nuts. Involucral scales not tuberculate. Catkins 5–8 cm long. ..... ***Q. stellata***
                5. Primary lateral lobes of leaves 2–4 per side. Cupules covering 1/2 to all of mature nuts. Involucral scales tuberculate. Catkins 1–4 cm long.
                    6. Leaf bases acute to acuminate. Leaf lobes acute to obtuse. Cupules covering 3/4 to all of mature nuts; margins not fringed. Distal portion of twigs glabrous to glabrate. Catkins 1–2 cm long. ..... ***Q. lyrata***
                    6. Leaf bases cuneate to rounded. Leaf lobes rounded. Cupules enclosing 1/2–3/4 of mature nuts; margins long fringed. Distal portion of twigs finely pubescent. Catkins 3–4 cm long. ..... ***Q. macrocarpa***
    2.Blades entire or toothed, none of sinuses extending at least half way to midribs.
        7. Leaf margins uniformly serrate, teeth 9–14 per side.
            8. Petioles densely stellate. Abaxial surfaces of blades lanate-velutinous. Cupules covering 1/2 or more of mature nuts; involucral scales loosely appressed. Secondary veins 16–20 per side. ..... ***Q. michauxii***

8. Petioles glabrous. Abaxial surfaces of blades glabrous or sparsely stellate.
Leaf margins glabrous. Cupules covering 1/4–1/2 of mature nuts; involucral scales tightly appressed. Secondary veins 10–15 per side. ..... ***Q. muehlenbergii***

7. Leaf margins entire to dentate; teeth, if present, 2–8 per side.
9. Plants of Black Mesa area, Cimarron County.
10. Leaf margins moderately to deeply dentate, at least some sinuses extending about 1/3 of way to midribs. ..... ***Q. gambelii***
10. Leaf margins entire to shallowly dentate or denticulate, none of sinuses extending 1/3 of way to midribs.
11. Leaf blades 1–1.5 cm wide; 2.5–4 cm long. ..... ***Q. mohriana***
11. Leaf blades 2–3 cm wide; 4–6 cm long. ..... ***Q. gambelii***
9. Plants of body of state.
12. Plants solitary trees.
13. Adaxial leaf surfaces glossy; glabrous. Leaf lobes 5–7 per side. Peduncles 40–70 mm long. Plants of northeastern part of state. ..... ***Q. bicolor***
13. Adaxial leaf surfaces dull; glabrate to pubescent. Leaf lobes 2–5 per side. Peduncles 3–8 mm long. Plants of south-central part of state. ..... ***Q. durandii***
12. Plants colonial shrubs, or sometimes small trees and shrubs intermixed.
14. Leaf margins uniformly toothed; teeth 5–8 per side. Petioles 7–25 mm long. ..... ***Q. prinoides***
14. Leaf margins entire to irregularly toothed; teeth 1–3 per side. Petioles 2–7 mm long.
15. Plants of Arbuckle Mountains and surrounding plains. Cupules covering 1/8–1/4 of mature nuts. Involucral scales blackish gray; both margins and apices reddish. ..... ***Q. durandii*** (= *Q. sinuata*)
15. Plants of western 1/3 of state. Cupules covering 1/4–1/2 of mature nuts. Involucral scales whitish gray; margins whitish gray; only apices reddish.
16. Cupules 20–25 mm in diameter. Nuts obovoid; truncate. Involucral scales at cupule rims linear; 2–2.5 times longer than scales at cupule bases. ..... ***Q. havardii***
16. Cupules 6–18 mm in diameter. Nuts ovoid to ellipsoid or fusiform. Involucral scales at cupule rims triangular to ovate; shorter than scales at cupule bases.
17. Mature acorns 7–15 mm long; solitary or paired. Cupules 5–10 mm deep; enclosing 1/3–1/2 of nuts. Nuts ovoid to ellipsoid; light brown. Stellate hairs of abaxial leaf surfaces 4- to 6-rayed. ..... ***Q. mohriana***
17. Mature acorns 18–32 mm long; paired or in 3s. Cupules 10–13 mm deep; enclosing 1/4–1/3 of nuts. Nuts fusiform to ellipsoid; dark brown with darker stripes. Stellate hairs of abaxial leaf surfaces 8- to 16-rayed. ..... ***Q. fusiformis***

[1] Treatment contributed by Will F. Lowry

GENTIANACEAE A.L. Jusseau The Gentian Family

Plants herbs; annuals or perennials; perennating organs fleshy roots or rhizomes; glabrous. **Leaves** simple; alternate or opposite or whorled; sessile; connate or not connate, or clasping; blades spathulate or ovate or deltoid or linear or reduced to pointed scales; venation pinnate or palmate or a single vein; margins entire; stipules absent. **Inflorescences** simple or compound cymes or racemes or solitary flowers. **Flowers** perfect; chasmogamous or rarely cleistogamous; perianths in 2-series. **Calyces** tubular or campanulate. **Sepals** 5 or 4; fused. **Corollas** radially symmetrical; rotate or salverform or campanulate or tubular to funnelform; imbricate or convolute. **Petals** 5 or 4; fused; of various colors. **Stamens** 5 or 4; alternate the petals; epipetalous; anthers coiled or recurved or straight. **Pistils** 1; compound, carpels 2; stigmas 2 or 1, not lobed or 2-lobed, linear or rounded or capitate; styles 1 or 0; ovaries superior; locules 1 or seldom 2; placentation parietal. **Nectaries** absent or present; petaliferous, a disk or discrete glands. **Fruits** capsules; septicidal. **Seeds** numerous.

The family is represented in Oklahoma by 7 genera and 12 species, all native. Several are valued as ornamentals, in particular *Eustoma grandiflora*, lisianthus. A few are poisonous.

1. Leaves scale-like; alternate. Petals 2–5 mm long. Corolla lobes imbricate in bud. ..... ***Bartonia***
1. Leaves of various shapes, but not scale-like; opposite or whorled. Petals 15–50 mm long.
   Corolla lobes convolute in bud.
   2. Leaves whorled. Plants 1–2.5 m tall. Corollas greenish white with purple dots. ..... ***Frasera***
   2. Leaves opposite. Plants 0.1–0.9 m tall. Corollas rose or pink or white or blue or purple.
      3. Leaves linear to oblanceolate. Corollas salverform. Anthers spirally coiled.
         4. Corolla lobes 1–6 mm long; shorter than tubes. Mature anthers 0.6–1.1.1 mm long. ..... ***Centaurium***
         4. Corolla lobes 7–10 mm long; equal in length to tubes. Mature anthers 1.5–2.5 mm long. ..... ***Zeltnera***
      3. Leaves lanceolate to ovate. Corollas rotate or campanulate or tubular to funnelform.
         Anthers straight or recurved or circinately coiled.
         5. Corollas rotate. ..... ***Sabatia***
         5. Corollas campanulate or tubular to funnelform.
            6. Corollas campanulate; without plicate folds between the lobes. ..... ***Eustoma***
            6. Corollas tubular to funnelform; with plicate folds between the lobes. ..... ***Gentiana***

Bartonia G.H.E. Muhlenberg ex C.L. von Willdenow Screw-stem

One species. ..... ***B. paniculata***

Centaurium J. Hill Centaury

1. Inflorescences flat-topped corymbs; flower sessile. Leaves lanceolate-ovate.
   Plants of disturbed areas and roadsides. ..... ***C. tenuiflorum***
1. Inflorecences panicles; flowers pedicellate, pedicels 2–12 mm long. Leaves
   linear to linear-lanceolate. Plants of dry limestone outcrops. ..... ***C. texense***

Eustoma R.A. Salisbury Prairie Gentian

One species. ..... ***E. exaltatum***
(= *E. grandiflorum*)

Frasera T. Walter Green Gentian

One species. ..... ***F. caroliniensis***
(= *Swertia caroliniensis*)

Gentiana C. Linnaeus Gentian

1. Stems pubescent. Calyx lobes 1–1.5 mm wide. ..... ***G. puberulenta***
1. Stems glabrous. Calyx lobes 2–5 mm wide.
   2. Leaves entire. Corollas yellow-white; funnelform. ..... ***G. alba***
   2. Leaves minutely ciliate. Corollas blue-violet to bluish white; barrel-shaped. ..... ***G. saponaria***

Sabatia M. Adanson Rose Gentian

1. Inflorescences paniculate cymes. Branches opposite at upper nodes.
   Calyx tubes 2 mm long; wings absent or if present 0.2 mm wide. ..... ***S. angularis***
1. Inflorescences of solitary flowers. Branches alternate at upper nodes.
   Calyx tubes 4–8 mm long; wings 0.5–0.6 mm wide. ..... ***S. campestris***

Zeltnera G. Mansion Centaury

1. Leaves linear. Seeds dark brown. ..... ***Z. beyrichii***
(= *Centaurium beyrichii*)
1. Leaves narrowly oblanceolate. Seeds light brown. ..... ***Z. calycosa***
(= *Centaurium calycosum*)

GERANIACEAE A.L. de Jussieu Geranium Family

Plants herbs; annuals or biennials or perennials;perennating organs rhizomes. **Root Systems** taproots or fibrous from rhizomes. **Leaves** cauline or basal or forming a winter rosette; simple or 1-pinnately compound; alternate or opposite; venation pinnate or palmate; margins palmately lobed to palmatifid or pinnately lobed to pinnatifid; terminal leaflets of compound leaves present; stipules present. **Inflorescences** simple cymes, often umbelliform; terminal or axillary. **Flowers** perfect; perianths in 2-series. **Sepals** 5; free. **Corollas** radially or slightly bilaterally symmetrical. **Petals** 5; free; red-violet or rose-purple or pale pink to white. **Stamens** 5 or 10; staminodia 5 or 0. **Pistils** 1; compound, carpels 5; stigmas 5; styles 5, fused forming a stylar column, but separating at maturity; ovaries superior, lobes 5; locules 5; placentation axile. **Fruits** schizocarps; abruptly dehiscent from a persistent central column. **Seeds** 1 per segment; smooth or reticulate.

The family is represented in Oklahoma by 2 genera and 8 species. Ours are typically encountered as weeds of lawns and disturbed sites, but are not economically important. Several species were used medicinally by Native Americans.

1. Leaves 1-pinnately compound. ..... ***Erodium***
1. Leaves simple.
   2. Leaves pinnately lobed or pinnatifid. Stamens 5.
      Styles twisting after separation. Mericarps fusiform. Seeds smooth. ..... ***Erodium***
   2. Leaves palmatifid. Stamens 10. Styles curving upward after separation,
      but not twisting. Mericarps obovate to oblong. Seeds reticulate. ..... ***Geranium***

Erodium C.L. L'Heritier ex W. Aiton Stork's Bill

1. Leaves 1-pinnately compound. Blade hairs conspicuously flattened; translucent;
   usually articulate. Petal apices rounded. ..... ***E. cicutarium***
1. Leaves simple; palmately lobed. Blade hairs terete or slightly flattened;
   not translucent; not articulate. Petal apices bifid. ..... ***E. texanum***

Geranium C. Linnaeus Cranesbill

1. Plants perennials. Rhizomes present. Pedicels erect; glandular hairs absent.
   Petals 12–20 mm long. ..... ***G. maculatum***
1. Plants annuals or biennials. Rhizomes absent. Pedicels reflexed; glandular hairs
   present. Petals 3–6 mm long.
   2. Lower cauline leaves opposite. Petal apices deeply bifid. Mericarps glabrous;
      transversely rugose. ..... ***G. molle***
   2. Lower cauline leaves alternate. Petal apices emarginate bifid. Mericarps indumented;
      not transversely rugose.
      3. Sepals not awned nor mucronate. Petals 3–3.8 mm long. Seeds 1.5–1.8 mm long. ..... ***G. pusillum***
      3. Sepals awned. Petals 4–6 mm long. Seeds 2 mm long.
         4. Sepals 4–5 mm long. Stem pubescence retrorse or both retrorse and spreading. ..... ***G. texanum***
         4. Sepals 6–8 mm long. Stem pubescence only spreading.
            5. Style branches yellow. Apices of leaf lobes obtuse.
               Petals white to pale pink or purple tinged. ..... ***G. carolinianum***
            5. Style branches purple. Apices of leaf lobes acute.
               Petals reddish pink. ..... ***G. dissectum***

GROSSULARIACEAE A. P. de Candolle Currant Family

Plants shrubs; deciduous; perennials; armed or not armed with spines or prickles. **Leaves** simple; alternate or fascicled; blades orbicular to reniform or cordate; venation palmate; margins serrate or palmately lobed; stipules present. **Inflorescences** racemes or clusters of 2 to 4 flowers; terminal or axillary. **Flowers** perfect; fragrant or not fragrant; perianths in 2-series; coronas present or absent. **Sepals** 5; free; herbaceous or petaloid; longer than petals. **Corollas** radially symmetrical. **Petals** 5; free; yellow to orange-red or white. **Stamens** 5; arising from hypanthia. **Pistils** 1; compound, carpels 2; stigmas 2, capitate; styles 2, fused proximally; ovaries inferior; locules 1; placentation parietal. **Hypanthia** present; tubular or cup-shaped; persistent in fruit. **Nectaries** absent or present; lobed; on staminal disks. **Fruits** berries. **Seeds** 10 to 60.

The family is represented in Oklahoma by 1 genus and 5 species. *Itea* formerly classified in this family is now classified in its own family on the basis of phylogenetic studies.

Ribes C. Linnaeus Currant

1. Stems not armed with spines. Pedicels articulated below ovaries.
   2. Corollas white. Berries orange-red. ..... ***R. cereum***
   2. Corollas yellow to orange-red. Berries black. ..... ***R. aureum*** (= *R. odoratum*)
1. Stems armed with spines. Pedicels not articulated below ovaries.
   3. Stamens and styles included within perianths. Ovaries and berries armed with prickles. ..... ***R. cynosbati***
   3. Stamens and styles conspicuously exserted beyond perianths. Ovaries and berries not armed with prickles.
      4. Adaxial surfaces of leaves glandular-punctate. Filaments pubescent. Ovaries with short stipitate glandular hairs. ..... ***R. curvatum***
      4. Adaxial surfaces of leaves not glandular-punctate. Filaments glabrous. Ovaries glabrous. ..... ***R. missouriense***

HALORAGACEAE R. Brown Water-Milfoil Family

Plants herbs; perennials; perennating organs rhizomes; submerged or emergent aquatics; bearing perfect flowers or polygamo-monoecious or dioecious. **Leaves** all alike or of 2 forms; simple, may be deeply dissected and appearing pinnately compound; alternate or whorled; venation pinnate; margins pinnatifid or dentate when emergent; stipules absent. **Inflorescences** solitary flowers or verticillate spikes; axillary or terminal; bracts present. **Flowers** perfect or imperfect, similar; perianths in 1-series or 2-series; radially symmetrical; small to minute. **Sepals** 3 or 4; persistent; free or fused. **Petals** 4 or 0; free. **Stamens** 3 to 8; anthers longer than the filaments. **Pistils** 1; compound, carpels 4 or 3; stigmas 4 or 3, recurved; styles 4 or 3; ovaries inferior; locules 4 or 3; placentation apical; ovules 1 per locule. **Fruits** schizocarps or nuts. **Seeds** 4 or 3.

The family is represented in Oklahoma by 2 genera and 6 species. Its name is sometimes misspelled Haloragidaceae. Our species are submerged aquatics or emergents in wetlands and roadside ditches. The foliage and fruits are eaten by waterfowl and muskrats.

1. Leaves whorled; blades 1–2 mm wide. Flowers 4-merous. Fruits schizocarps; 4-sided; splitting into 4 mericarps. ..... ***Myriophyllum***
1. Leaves alternate; blades 5–10 mm wide. Flowers 3-merous. Fruits nuts; trigonous; not splitting. ..... ***Proserpinaca***

Myriophyllum C. Linnaeus Water Milfoil

1. Leaves alternate, or both alternate and whorled on same stem. ..... ***M. pinnatum***
1. Leaves all whorled.
   2. Segments of submerged leaves stiff; 3–6 mm long; narrowly linear. Flowers borne in clusters in axils of emergent leaves similar in appearance to submerged leaves. ..... ***M. aquaticum*** (= *M. brasiliense*)
   2. Segments of submerged leaves flexible; 6–35 mm long; filiform. Flowers borne in terminal spikes or in axils of emergent bracts or leaves different in appearance from submerged leaves.
      3. Nodes of mature stems typically 0.3–1 cm apart. Emergent leaves entire or serrate. Flowers borne in axils of bracts or leaves. Bracts more than 2 times length of flowers. ..... ***M. heterophyllum***
      3. Nodes of mature stems typically 1–3 cm apart. Emergent leaves pinnately dissected. Flowers borne in terminal spikes. Bracts equal to or shorter than length of flowers.
         4. Leaf segments 5–11 per side. Mature peduncles straight; diameters same as vegetative stems. Turions present; lanceolate. ..... ***M. sibiricum*** (= *M. exalbescens*)
         4. Leaf segments 12–20 per side. Mature peduncle typically curved; diameters 2 times greater than vegetative stems. Turions absent. ..... ***M. spicatum***

Proserpinaca C. Linnaeus Mermaid Weed

One species. ..... ***P. palustris***

HAMAMELIDACEAE R. Brown Witchhazel Family

Plants shrubs; deciduous; bearing perfect flowers; aromatic. **Leaves** simple; alternate; venation pinnate; stipules present, caducous. **Inflorescences** solitary flowers or borne in clusters; axillary; bracts present, scale-like. **Flowers** produced before or after leaves; perfect; perianth parts in 2-series. **Sepals** 4; fused. **Corollas** radially symmetrical; spirally involute. **Petals** 4; free; yellow or red; ligulate. **Stamens** 4; staminodia 4, scale-like. **Pistils** 1; compound, carpels 2; stigmas 2, decurrent; styles 2, spreading; ovaries superior or inconspicuously inferior; carpels 2; locules 2; placentation axile. **Nectaries** present; staminodial. **Fruits** capsules; solitary or in clusters of 2 or 3; ligneous; loculicidal. **Seeds** 1 to 4; wings present or absent.

The family is represented in Oklahoma by 1 genus and 2 species. *Liquidambar* and *Altingia* were formerly grouped to form a subfamily within the family. Phylogenetic studies, however, support their recognition as a distinct family, the Altingiaceae or sweet gum family. Both species of *Hamamelis* are native to the eastern 1/4 of the state but are often planted as ornamentals. As its common name indicates, the genus is the source of an important astringent.

Hamamelis C. Linnaeus Witch Hazel

1. Plants spring flowering. Petals 10–15 mm long. Adaxial surfaces of calyx lobes reddish. Twigs densely pubescent. Plants of the Ozark Plateau. ..... ***H. vernalis***
1. Plants fall flowering. Petals 15–22 mm long. Adaxial surfaces of calyx lobes yellow or greenish. Twigs glabrate to glabrous. Plants of the Ouachita Mountains. ..... ***H. virginiana***

HELIOTROPIACEAE H.A. Schrader Heliotrope Family

Plants herbs; annuals or perennials. **Leaves** simple; alternate or occasionally alternate above and opposite below; venation pinnate or a single vein; stipules absent. **Inflorescences** solitary flowers or simple cymes or helicoid cymes; terminal or axillary. **Flowers** perfect; perianths in 2-series. **Sepals** 5; fused. **Corollas** radially symmetrical; tubular or funnelform. **Petals** 5; fused; white or white with a yellow throat. **Stamens** 5; epipetalous; **Pistils** 1; compound, carpels 2; stigmas 1, conical or truncate-conical; styles 1 or 0, terminal; ovaries superior, shallowly 2- or 4-lobed; locules 4; placentation axile. **Fruits** schizocarps, separating into 2 or 4 mericarps. **Seeds** 1 or 2 per mericarp.

The family is represented in Oklahoma by 2 genera and 5 species. *Heliotropium* and 4 other genera that do not occur in the state were formerly positioned in the Boraginaceae. Phylogenetic studies, however, support their recognition as a distinct family. Although the inflorescence of the genus has long been called a scorpioid cyme, it is actually a helicoid cyme because the pedicels arise on both sides of the rachises.

1. Inflorescences solitary flowers or cymose clusters. Corollas 12–22 mm wide; 18–30 mm long; lobes broadly triangular. ..... ***Euploca***
1. Inflorescences helicoid cymes. Corollas 2–5 mm wide; 1.2–3 mm long; lobes linear.
   2. Anther apices fused. Schizocarps separating into 2 mericarps ..... ***Euploca***
   2. Anther apices free. Schizocarps separating into 4 mericarps. ..... ***Heliotropium***

Euploca T. Nuttall

1. Inflorescences solitary flowers or cymose clusters. Corollas 12–22 mm wide; 18–30 mm long; lobes broadly triangular. Herbage whitish. ..... ***E. convolvulacea***
   (= *Heliotropium convolvulaceum*)
1. Inflorescences helicoidal cymes. Corollas 2–5 mm wide; 1.5–3 mm long; lobes linear. Herbage greenish. ..... ***E. procumbens***
   (= *Heliotropium procumbens*)

Heliotropium C. Linnaeus Heliotrope

1. Plants succulent; glabrous. ..... ***H. curassavicum***
1. Plants not succulent; pubescent.
   2. Leaves linear; sessile. Bracts present. ..... ***H. tenellum***
   2. Leaves oblong to ovate-deltoid; petiolate, petioles 0.1–10 cm long. Bracts absent. ..... ***H. indicum***

HYDRANGEACEAE B.C.J. Dumortier Hydrangea Family

Plants shrubs; deciduous. **Leaves** simple; opposite; blades ovate to elliptic; venation pinnate; apices acute; margins serrate; stipules absent. **Inflorescences** corymbose or racemose compound cymes; terminal. **Flowers** perfect or neutral; perfect and neutral different; perianths in 2-series or in 1-series. **Neutral Flowers** present or absent. Calyces radially or slightly bilaterally symmetrical. Sepals 3 to 5; persistent; free or slightly fused; petaloid; large; white or greenish white; petals absent. Stamens 8 to 10, sterile. Pistils abortive. **Perfect Flowers**. Sepals 4 or 5; fused. Corollas radially symmetrical. Petals 4 or 5; free; white or pink or greenish white. Stamens 8 to numerous; in 2 or more whorls; free or fused by filaments. Pistils 1; compound, carpels 2 to 5; stigmas 2 to 5; styles 2 to 5, free or fused at bases; ovaries wholly or partially inferior; locules 2 to 5; placentation parietal or axile. **Nectaries** present; 1; borne on pistil apices. **Fruits** capsules; poricidal or loculicidal. **Seeds** numerous.

The family is represented in Oklahoma by 2 genera and 2 species. The family has been included in the Saxifragaceae by some. Commonly planted as ornamentals, both genera are found only in mesic habitats of the Ozark Plateau and Ouachita Mountains. The roots of *Hydrangea* were used medicinally by Native Americans, but are considered toxic.

1. Neutral flowers present; large; marginal; white. Petals 5. Stamens 8 or 10.
   Capsules ribbed; apically poricidal. ..... ***Hydrangea***
1. Neutral flowers absent. Petals 4. Stamens 20–40.
   Capsules not ribbed; loculicidal. ..... ***Philadelphus***

Hydrangea C. Linnaeus

One species. ..... ***H. arborescens***

Philadelphus C. Linnaeus

One species. ..... ***P. pubescens***

HYDROCHARITACEAE A.L. de Jussieu Frog's-Bit Family[1]

Plants herbs; annuals or perennials; perennating organs stolons or rhizomes; submerged or emergent or free-floating aquatics; caulescent or acaulescent; monoecious or dioecious. **Root Systems** fibrous. **Stems** branched or unbranched. **Leaves** basal or cauline; simple; alternate or opposite or whorled; sessile or petiolate; blades of various shapes; venation parallel-convergent or a single vein or not apparent; surfaces glabrous; margins entire or denticulate or serrulate to serrate; stipules present or absent. **Inflorescences** solitary flowers or compact, few-flowered simple cymes; spathes present, 1 or 2 [sometimes absent in pistillate flowers of *Najas*], leaf-like or tubular, 2-cleft, often elongate and carrying flowers to surface; pedicels present or absent; inflorescences solitary flowers or simple cymes. **Flowers** imperfect, staminate and pistillate similar; perianths in 2-series or 1-series or absent. **Sepals** 3 or 0; free. **Corollas** radially symmetrical; imbricate. **Petals** 3 or absent; free; white to pink. **Stamens** 1 or 3 to numerous; filaments present or absent, fused or free; staminodia 0 or 3 to 6 in pistillate flowers. **Pistils** 1; simple or compound, carpels 1 or 3 or 6 to 9, often slightly fused; stigmas 2 to 4 or 6 to 9, linear or 2-lobed; styles 1 or 6 to 9, bifid, free; ovaries superior or inferior; locules 1; placentation basal or parietal; gynoecial rudiments present in staminate flowers, vestigial ovaries usually present. **Hypanthia** absent or present; tubular; elongate at anthesis, pedicel-like, carrying flowers to surface. **Nectaries** absent or present; central; 3-lobed. **Fruits** capsules or berries or nutlets; irregularly dehiscent or indehiscent. **Seeds** 1 to 5 or numerous.

The family is represented in Oklahoma by 5 genera and 7 species. As presently circumscribed, it includes the Najadaceae or water nymph family. It is a cosmopolitan family of free-floating or substrate-attached, submerged aquatics that provide food for waterfowl and cover for fish. Capable of vigorous vegetative growth, plants of *Najas, Hydrilla, Elodea, and Egeria* may become so dense as to impede water flow and boat movement. An aggressive invasive species, *Hydrilla* is designated a noxious weed by various federal and state agencies.

1. Plants free-floating or emergent aquatics; acaulescent. Leaves basal; petiolate; blades suborbicular or cordate or reniform. Styles 6–9. Fruits berries. ..... ***Limnobium***
1. Plants submerged aquatics; caulescent. Leaves whorled or opposite; sessile; blades elliptic or oblong or linear-lanceolate or oblanceolate. Styles 1. Fruits capsules or nutlets.
   2. Leaf margins serrate or dentate; teeth visible without magnification.
      3. Leaf bases sheathing stems. Venation not apparent. Flowers sessile in leaf axils. Sepals 0. Petals 0. Stamens 1; filaments absent. Ovaries superior. Fruits nutlets. ..... ***Najas***

3. Leaf bases not sheathing stems. Venation a single vein. Flowers borne at ends of long pedicels. Sepals 3. Petals 3. Stamens 3; filaments present. Ovaries inferior. Fruits capsules. ..... ***Hydrilla***

2. Leaf margins entire or serrulate or denticulate; teeth if present visible only with magnification.

4. Leaf bases sheathing stems. Venation not apparent. Flowers sessile in leaf axils. Sepals 0. Petals 0. Stamens 1; filaments absent. Ovaries superior. Fruits nutlets. ..... ***Najas***

4. Leaf bases not sheathing stems. Venation a single vein. Flowers borne at ends of pedicels. Sepals 3. Petals 3. Stamens 9; filaments present. Ovaries inferior. Fruits capsules.

5. Leaves opposite or in whorls of 3; 6–15 mm long. Staminate flowers 1 per spathe. ..... ***Elodea***

5. Leaves in whorls of 4–6; 25–40 mm long. Staminate flowers 2–4 per spathe. ..... ***Egeria***

Egeria J.M. Planchon Water-Weed

One species. ..... ***E. densa***

Elodea A. Michaux Water-Weed

One species. ..... ***E. nuttallii***

Hydrilla L.C.M. Richard

One species. ..... ***H. verticillata***

Limnobium L.C.M. Richard American Frog-Bit

One species. ..... ***L. spongia***

Najas C. Linnaeus Water-Nymph

1. Leaves entire or serrulate or denticulate; teeth visible only with magnification. ..... ***N. guadalupensis***

1. Leaves serrate or dentate; teeth visible without magnification.

2. Abaxial surfaces of leaves bearing prickles. Internodes usually bearing prickles. Plants dioecious. Seeds reddish brown; ovoid; 1.2–2.2 mm wide. ..... ***N. marina***

2. Abaxial surfaces of leaves without prickles. Internodes never bearing prickles. Plants monoecious. Seeds purplish; fusiform; 0.5–0.7 mm wide..... ***N. minor***

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[1] Treatment contributed by C. Barre Hellquist and Robert R. Haynes

HYDROLEACEAE T.S. Edwards False Fiddleleaf Family

Plants herbs; perennials; perennating organs rhizomes or fleshy roots; armed with thorns. **Leaves** simple; alternate; venation pinnate; margins entire; stipules absent. **Inflorescences** paniculate cymes or cymose cluster; terminal or axillary. **Flowers** perfect; perianths in 2-series. **Sepals** 5; free. **Corollas** radially symmetrical; rotate-campanulate. **Petals** 5; fused; blue or rarely white. **Stamens** 5; epipetalous filaments basally dilated. **Pistils** 1; compound, carpels 2; stigmas 2, capitate or funnelform; styles 2; ovaries superior; locules 2; placentation axile. **Fruits** capsules. **Seeds** numerous.

The family is represented in Oklahoma by 1 genus and 2 species. *Hydrolea* was long positioned in the Hydrophyllaceae or waterleaf family. Phylogenetic studies, however, support its recognition as a distinct, monogeneric family. Plants are characteristically encountered at the edges or in shallow water of ponds and streams.

Hydrolea C. Linnaeus

1. Upper stems pubescent. Leaves ovate. Inflorescences terminal. Corollas 12–15 mm long. Stamens exserted beyond corollas. Style bases and upper portion of ovaries glandular-pubescent. Styles about 10 mm long. ..... ***H. ovata***

1. Upper stems glabrous. Leaves elliptic to linear-elliptic. Inflorescences axillary. Corollas 8–10 mm long. Stamens included within corollas. Style bases and upper portion of ovaries glabrous. Styles about 5 mm long. ..... ***H. uniflora***

HYDROPHYLLACEAE R. Brown Waterleaf Family

Plants herbs; annuals or biennials or perennials; perennating organs rhizomes or fleshy roots or not apparent. **Leaves** simple; alternate or opposite; venation pinnate; margins entire to sinuate or pinnatifid or pinnately parted; stipules absent. **Inflorescences** helicoidal cymes or simple cymes or solitary flowers. **Flowers** perfect; perianths in 2-series. **Sepals** 5; fused. **Corollas** radially symmetrical; campanulate or rotate or tubular or funnelform; convolute or imbricate. **Petals** 5; fused; blue or purple or lavender or white. **Stamens** 5; epipetalous. **Pistils** 1; compound, carpels 2; stigmas 2, capitate or linear; styles 1; ovaries superior; locules 1 or 2; placentation parietal. **Fruits** capsules. **Seeds** 1 to numerous.

The family is represented in Oklahoma by 5 genera and 11 species. *Hydrolea* was long classified in this family; phylogenetic studies, however, support its recognition as a distinct family, the Hydroleaceae. The Hydrophyllaceae contains a number of popular ornamentals.

1. Leaf margins entire to sinuate. ..... ***Nama***
1. Leaf margins pinnately lobed to pinnatifid.
    2. Lower cauline leaves opposite. Corollas equal to or shorter than calyces. ..... ***Ellisia***
    2. Lower cauline leaves alternate. Corollas longer than calyces.
        3. Calyces with auriculate appendages between lobes. Styles cleft to about 1/2 their length. Seeds with eliasomes. ..... ***Nemophila***
        3. Calyces without auriculate appendages between lobes. Styles bifid to cleft less than 1/2 their length. Seeds without eliasomes.
            4. Inflorescences helicoid cymes. Plants annuals or biennials; from taproots. ..... ***Phacelia***
            4. Inflorescences simple cymes, not helicoid. Plants perennials; from rhizomes and fibrous roots. ..... ***Hydrophyllum***

Ellisia C. Linnaeus Aunt Lucy

One species. ..... ***E. nyctelea***

Hydrophyllum C. Linnaeus Waterleaf

One species. ..... ***H. virginianum***

Nama C. Linnaeus

1. Stems and leaves hirsute to hispid. Plants of sandy soils. ..... ***N. hispida***
1. Stems and leaves strigose. Plants of gypsum soils. ..... ***N. stevensii***

Nemophila T. Nuttall Baby Blue Eyes

One species. ..... ***N. phacelioides***

Phacelia A.L. de Jussieu Blue Curls, Scorpion Weed

1. Upper leaves petiolate. ..... ***P. congesta***
1. Upper leaves sessile.
    2. Leaves crenate; glandular hairs present. Plants of gypsum soils. ..... ***P. integrifolia***
    2. Leaves lobed or incised or pinnatifid; glandular hairs absent. Plants of various soils, but not gypsum.
        3. Pedicels glabrous. ..... ***P. glabra***
        3. Pedicels pubescent.
            4. Corollas purplish-lavender. Fruiting pedicels erect or suberect. ..... ***P. strictiflora***
            4. Corollas light bluish-lavender. Fruiting pedicels spreading or spreading-ascending.
                5. Stems pilose-hirsute. Plants of sandy soils. ..... ***P. hirsuta***
                5. Stems strigose-canescent. Plants of loam or clay calcareous soils. ..... ***P. gilioides***

HYPERICACEAE A.L. de Jussieu St. John's Wort Family

Plants herbs or evergreen shrubs; perennials or annuals; shoot exudate viscous, brightly colored or colorless. **Leaves** glandular punctate or not glandular punctate; simple; opposite; sessile or petiolate; venation pinnate; margins entire; stipules absent. **Inflorescences** simple or compound cymes or solitary or paired flowers; terminal or axillary; bracteoles present. **Flowers** perfect; perianths in 2-series. **Calyces** radially symmetrical. **Sepals** 2 or 4 or 5; 5 in 1 whorl and all equal, or 2 or 4 in 2 whorls and of 2 sizes; free. **Corollas** radially symmetrical. **Petals** 4 or 5; free; yellow or pink or salmon or light green. **Stamens** 9 to numerous; not fascicled or fascicled in 3 to 5 groups; free or fused by filaments. **Pistils** 1; compound, carpels 2 to 5; stigmas 2 to 5; styles 2 to 5, fused or free; ovaries superior; locules 1 to 5; placentation axile or parietal. **Fruits** capsules. **Seeds** numerous.

The family is represented in Oklahoma by 2 genera and 17 species. Some taxonomists position the family in the Clusiaceae. Several native species were used medicinally by Native Americans.

1. Petals yellow; convolute in bud. Receptacles not glandular. ..... ***Hypericum***
1. Petals pink or salmon or light green; imbricate in bud. Receptacles glandular; glands 3, orange. ..... ***Triadenum***

Hypericum C. Linnaeus St. John's Wort

1. Petals 4. Sepals 4 or 2.
    2. Sepals 2. ..... ***H. hypericoides***
    2. Sepals 4 in 2-whorls; outer sepals larger, leaf-like; inner sepals smaller.
        3. Styles 2. Inner sepals vestigal. Petals 4–7 mm wide. Leaves 2–9 mm wide. ..... ***H. hypericoides***
        3. Styles 3 or 4. Inner sepals well-developed. Petals 7–15 mm wide. Leaves 9–20 mm wide. ..... ***H. crux-andreae***
1. Petals 5. Sepals 5.
    4. Sepals densely glandular punctate; glands black.
        5. Sepals 2.5–4 mm long. Petals 4–7.5 mm long. Styles 2–4 mm long; persistent. Stems not branched or branched distally. ..... ***H. punctatum***
        5. Sepals 4–7 mm long. Petals 8–14 mm long. Styles 6–10 mm long; fugacious. Stems branched along entire length; branches small. ..... ***H. pseudomaculatum***
    4. Sepals not glandular punctate or sparsely glandular punctate, glands pale.
        6. Leaves 0.2–1.5 mm wide; nerves 1; ascending or appressed. Inflorescences solitary flowers; axillary. Plants annuals.
            7. Leaves 6–20 mm long; linear. Sepals 3–5 mm long. Capsules equal to or slightly longer than calyces. ..... ***H. drummondii***
            7. Leaves 1–4 mm long; subulate. Sepals 2 mm long. Capsules conspicuously longer than calyces. ..... ***H. gentianoides***
        6. Leaves 2–17 mm wide; nerves 3–5; spreading. Inflorescences cymes; terminal. Plants perennials.
            8. Plants shrubs.
                9. Sepals 5–8 mm long. Stamens 7–8 mm long. ..... ***H. prolificum*** (= *H. spathulatum*)
                9. Sepals 2–5 mm long. Stamens 5 mm long.
                10. Styles 4 or 5. ..... ***H. lobocarpum***
                10. Styles 3. ..... ***H. densiflorum***
            8. Plants herbs.
                11. Styles fused. ..... ***H. sphaerocarpum***
                11. Styles free.
                12. Petals 1.5–2 times longer than sepals. Stamens 20–many; fused in 3-fascicles. Ovaries 3-locular. Petal margins sparsely black glandular punctate. ..... ***H. perforatum***
                12. Petals equal to or shorter than sepals. Stamens 6 or 9 or 12 or 20; free. Ovaries 1-locular. Petals margins not glandular punctate.
                13. Leaves cordate; bases always clasping. Sepal apices attenuate. ..... ***H. gymnanthum***
                13. Leaves lanceolate to ovate; bases clasping or not clasping. Sepal apices slender, rounded to acuminate, but not attenuate.
                14. Leaves ovate; about 2 times longer than wide. Flowers 1.2–5 mm in diameter. Stamens 6 or 9 or 12. Cymes many flowered. ..... ***H. mutilum***

14. Leaves lanceolate; 2–3.5 times longer than wide. Flowers 7–12 mm in diameter. Stamens 20. Cymes few flowered. ..... ***H. majus***

Triadenum C.S. Rafinesque — Marsh St. John's Wort

1. Upper cauline leaves petiolate; bases acute to acuminate. ..... ***T. walteri***
1. Upper cauline leaves sessile; bases cordate.
   2. Abaxial leaf surfaces not gland-dotted. Styles 0.6–1.3 mm long. ..... ***T. tubulosum***
   2. Abaxial leaf surfaces gland-dotted. Styles 2–3 mm long. ..... ***T. virginicum*** (= *T. fraseri*)

HYPOXIDACEAE R. Brown — Yellow Stargrass Family

Plants scapose herbs; perennials; perennating organs corms; acaulescent; **Root Systems** fibrous. **Leaves** basal; simple; alternate; venation parallel; blades linear; stipules absent. **Inflorescences** solitary flowers or racemes or umbels; bracts present; scapes typically shorter than leaves. **Flowers** showy; perfect; perianths in 1-series; radially symmetrical. **Perianth Parts** 6; petaloid; free; adaxial surfaces yellow or white; abaxial surfaces green, pilose. **Stamens** 6; filaments fused at bases; arising from receptacles. **Pistils** 1; compound, carpels 3; stigmas 3; styles 1; ovaries inferior; locules 3; placentation axile. **Hypanthia** present. **Nectaries** absent. **Fruits** capsules; indehiscent or loculicidally dehiscent. **Seeds** 10 to numerous.

The family is represented in Oklahoma by 1 genus and 2 species. *Hypoxis* and 6 related genera were formerly classified in the Liliaceae or lily family. Phylogenetic studies, however, support their recognition as a distinct family.

Hypoxis C. Linnaeus — Yellow Stargrass

1. Perianth parts 5–15 mm long; adaxial surfaces yellow. Scapes bearing 2–14 flowers. Capsules indehiscent. Seeds muricate. ..... ***H. hirsuta***
1. Perianth parts 1–3 mm long; adaxial surfaces white. Scapes bearing 1 or 2 flowers. Capsules dehiscent. Seeds reticulate. ..... ***H. sessilis*** (= *H. longii*)

IRIDACEAE A.L. de Jussieu — Iris Family

Plants herbs; perennials or annuals; perennating organs rhizomes or bulbs; caulescent or acaulescent. **Root Systems** fibrous. **Leaves** simple; alternate; sessile; often equitant; with open basal sheaths; linear to lanceolate to ensiform; venation parallel or parallel-convergent; margins entire; stipules absent. **Inflorescences** solitary flowers or simple cymes or compound cymes (often racemose or paniculate); spathes present, consisting of 2 foliaceous bracts. **Flowers** perfect; perianths in 2-series or 1-series; radially symmetrical. **Perianth Parts** 6; petaloid; free or fused; clawed or not clawed; spreading or reflexed; blue or purple or yellow or orange-red or white. **Stamens** 3; free or fused. **Pistils** 1; compound, carpels 3; stigmas 3; styles 1, branched, sometimes petaloid; ovaries inferior; locules 3; placentation axile. **Hypanthia** present or absent. **Nectaries** absent or present; sepaliferous or petaliferous or staminal. **Fruits** capsules; loculicidal. **Seeds** numerous.

The family is represented in Oklahoma by 4 genera and 13 species. Species of several genera are prized as ornamentals.

1. Outer and inner perianth parts not similar.
   2. Leaves plicate. Plants from bulbs. Styles 2-parted. ..... ***Alophia***
   2. Leaves conduplicate. Plants from rhizomes. Styles 3-parted, petaloid. ..... ***Iris***
1. Outer and inner perianth parts similar.
   3. Plants from orange rhizomes. Perianth parts orange-red with purple spots. Capsules exposing fleshy mass of black seeds at maturity. ..... ***Iris***
   3. Plants from brown to tan bulbs or fibrous roots. Perianth parts blue to blue-purple or white. Capsules not exposing fleshy mass of black seeds at maturity.
      4. Plants from bulbs. Stems terete. Perianth tubes present. ..... ***Nemastylis***
      4. Plants from fibrous roots. Stems flattened. Perianth tubes absent. ..... ***Sisyrinchium***

Alophia W. Herbert — Pleat-Leaf

One species. ..... ***A. drummondii***

Iris C. Linnaeus

1. Outer and inner perianth parts similar. Style branches not petaloid; not expanded.
   Anthers not appressed against style branches and hidden by them. ..... ***I. domestica***
   (= *Belamcanda chinensis*)
1. Outer and inner perianth parts not similar. Style branches petaloid; expanded.
   Anthers appressed against style branches and hidden by them.
   2. Perianth parts yellow or cream. ..... ***I. pseudacorus***
   2. Perianth parts lavender to purple or white.
      3. Plants stemless or nearly so. ..... ***I. cristata***
      3. Plants with well-developed stems.
         3. Stems straight. Ovaries and capsules 3-angled. ..... ***I. virginica***
         3. Stems conspicuously zig-zag. Ovaries and capsules 6-angled. ..... ***I. brevicaulis***

Nemastylis T. Nuttall Celestial Lily

1. Leaves 5–11 mm wide. Perianth parts 8–15 mm wide. Filaments free. Style branches
   about 6 mm long. Capsules 2 times longer than wide. ..... ***N. geminiflora***
1. Leaves 1–4 mm wide. Perianth parts 3–5 mm wide. Filaments fused. Style branches
   about 2 mm long. Capsules 3 to 4 times longer than wide. ..... ***N. nuttallii***

Sisyrinchium C. Linnaeus Blue-Eyed Grass

1. Flowering stems not branched; bearing 1 spathe. Outer bracts of spathes 1.7–2.5 times
   longer than inner bracts of spathes. ..... ***S. campestre***
1. Flowering stems branched; bearing 2 or more spathes. Outer bracts of spathes equal to
   or 1.5 times longer than inner bracts of spathes. ..... ***S. angustifolium***
   (including *S. ensigerum, S. graminoides, S. langloisii, S. pruniosum*)

ISOETACEAE C. L. von Reichenbach Quillwort Family

Plants herbs; perennials; perennating organs corms; terrestrial or emergent aquatics; producing sporangia in basal cavities of leaves (sporophylls). **Corms** brown; lobed. **Leaves** quill-like; simple; spirally arranged; blades linear; venation a single vein; apices acute; margins entire; bases dilated, sheathing; ligules present, attached above sporangia. **Sporangia** of 2 types, microsporangia and megasporangia; subtended by velums; microsporangia borne in bases of innermost leaves; megasporangia borne in bases of outermost leaves. **Spores** of 2 types; microspores minute; megaspores large. **Gametophytes** of 2 types, microgametophytes and megagametophytes.

The family is represented in Oklahoma by 1 genus and 2 species. Plants are typically encountered in vernal pools or wet areas, in the Wichita and Arbuckle Mountains, and in eastern Oklahoma.

Isoetes C. Linnaeus Quillwort

1. Plants of limestone soils. Sporangia brown lined. Microspores light brown.
   Megaspores tuberculate at 30–40X magnification. ..... ***I. butleri***
1. Plants of non-limestone soils. Sporangia brown spotted. Microspores gray.
   Megaspores rugose at 30–40X magnification. ..... ***I. melanopoda***

ITEACEAE J.G. Agardh Sweetspire Family

Plants shrubs; deciduous; perennials; not armed with spines or prickles. **Leaves** simple; alternate; blades elliptic to oblong; venation pinnate; margins glandular-serrulate or glandular-denticulate; stipules present, minute, caducous. **Inflorescences** racemes; terminal. **Flowers** perfect; fragrant; perianths in 2-series. **Sepals** 5; free; herbaceous. **Corollas** radially symmetrical. **Petals** 5; free; white. **Stamens** 5; filaments pubescent. **Pistils** 1; compound, carpels 2; stigmas 1, capitate, 2-lobed; styles 1, longitudinally 2-grooved; ovaries superior, pilose to hirsute; locules 2; placentation axile. **Hypanthia** present; cup-shaped; persistent in fruit. **Nectaries** absent or present; lobed; on staminal disks. **Fruits** capsules; septicidal; longitudinally 2-grooved; styles persistent forming beaks; pilose to hirsute. **Seeds** 20 to 30.

The family is represented in Oklahoma by 1 genus and 1 species. *Itea* was formerly classified in the Grossulariaceae or currant family. Phylogenetic studies, however, support its recognition as a distinct monogeneric family.

Itea C. Linnaeus Sweetspire

One species. ..... ***I. virginica***

JUGLANDACEAE A. Richard ex K.S. Kunth Walnut Family

Plants trees; deciduous; monoecious. **Leaves** aromatic; 1-pinnately compound; alternate; leaflets abaxially gland-dotted, terminal ones present; venation pinnate; stipules absent. **Inflorescences** of 2 types, staminate and pistillate different. **Staminate Inflorescences** catkins; borne on previous year's twigs. **Pistillate Inflorescences** solitary flowers or clusters; borne on current year's twigs; bracts present; bracteoles 2–4. **Flowers** imperfect, staminate and pistillate different. **Staminate Flowers:** Perianths in 1-series; radially symmetrical. Perianth Parts 2 to 6; fused; yellowish green to yellowish brown. Stamens 3 to 50. Gynoecial Rudiments present. **Pistillate Flowers:** Perianths in 1-series; bilaterally symmetrical. Perianth Parts 0 or 1 or 4; fused. Androecial Rudiments absent. Pistils 1; compound, carpels 2 or 3; stigmas 2; styles 2; ovaries inferior; locules 1; placentation apical. **Fruits** nuts; surrounded by dehiscent or indehiscent, fibrous-fleshy husks derived from involucre and perianth parts. **Seeds** 1.

The family is represented in Oklahoma by 2 genera and 12 species, all native. *Juglans*, walnut, and *Carya*, hickory, are the only genera of this small but economically important family in North America. They are used for landscaping and lumber, and their fruits are vital to the survival of wildlife. *Carya illinoinensis*, pecan, is an important crop in the state.

1. Pith solid. Staminate catkins fascicled; in 3s. Bracteoles 4. Perianth parts of pistillate flowers 0 or 1. Involucral husks of fruits sutured; dehiscent. Nuts smooth or reticulate. ..... ***Carya***
1. Pith chambered. Staminate catkins solitary. Bracteoles 2 or 3. Perianth parts of pistillate flowers 4. Involucral husks of fruits not sutured; indehiscent. Nuts furrowed. ..... ***Juglans***

Carya T. Nuttall Hickory

1. Bud scales valvate; 4–6; scars separate, not forming ring. Sutures of involucral husks winged or keeled.
  2. Bud scales sulphur yellow to brownish yellow. Involucral husks not winged at bases. ..... ***C. cordiformis***
  2. Bud scales brown to reddish brown, but may bear caducous yellow scurf. Involucral husks winged to bases.
    3. Lateral leaflets ovate or obovate to elliptic. ..... ***C. myristiciformis***
    3. Lateral leaflets conspicuously falcate.
      4. Involucral husks terete. Nuts terete; surfaces smooth; kernals sweet. ..... ***C. illinoinensis***
      4. Involucral husks flattened. Nuts flattened; surfaces wrinkled; kernals bitter. ..... ***C. aquatica***
1. Bud scales imbricate; 6–12; scars fused, forming ring. Sutures of involucral husks not winged nor keeled.
  5. Terminal buds 6–12 mm long; scales 6–10. Nuts 1.5–4 cm long. Involucral husks 1.5–4 mm thick.
    6. Terminal leaflets sessile. Winter buds and branchlets and young leaves with reddish or reddish brown pubescence. Nuts conspicuously reticulate. ..... ***C. texana***
    6. Terminal leaflets petiolulate. Winter buds and branchlets and leaves glabrous or with pale pubescence. Nuts smooth. ..... ***C. glabra***
  5. Terminal buds 12–30 mm long; scales 10–12. Nuts 3.5–7 cm long. Involucral husks 4–12 mm thick.
    7. Basal teeth of leaflets with tufts of hairs. Involucral husks splitting to bases. Pericarps 1–2 mm thick. ..... ***C. ovata***
    7. Basal teeth of leaflets without tufts of hairs. Involucral husks not splitting to bases. Pericarps 3–6 mm thick.
      8. Petioles and rachises and abaxial surfaces of leaflets tomentose, hairs curly. Involucral husks reddish brown. Bark furrowed. ..... ***C. tomentosa***
      8. Petioles and rachises and abaxial surfaces of leaflets glabrous or scurfy or pilose, hairs straight or wavy. Involucral husks yellowish to brown. Bark forming loose plates. ..... ***C. laciniosa***

Juglans C. Linnaeus Walnut

1. Mature leaves 30–60 cm long. Fruits including husk 4–6 cm in diameter. Nut surfaces irregularly grooved and ridged. ..... ***J. nigra***

1. Mature leaves 20–30 cm long. Fruits including husk 1–3 cm in diameter. Nut surfaces uniformly grooved and ridged.
  2. Leaflets 9–13; ovate-lanceolate; 4.5–10 cm long. Nuts 2.5–3 cm in diameter. ..... ***J. major***
  2. Leaflets 13–23; narrowly lanceolate; 9–24 cm long. Nuts 1–2 cm in diameter. ..... ***J. microcarpa*** (= *J. rupestris*)

JUNCACEAE A.L. de Jussieu Rush Family

Plants herbs; perennials or annuals; perennating organs rhizomes or rarely stolons or not apparent; emergent aquatics or terrestrial. **Root Systems** fibrous. **Stems** unbranched; erect or decumbent. **Leaves** simple; alternate; with basal sheaths; blades linear; flat to cylindrical; frequently septate; venation parallel; margins entire; bases sagittate or rounded; stipules absent. **Inflorescences** cymose or capitate or spicate clusters; terminal or pseudolateral; bracts present; bracteoles present or absent. **Flowers** perfect; perianths in 2-series, but all parts similar, radially symmetrical. **Perianth Parts** 6; sepaloid; free; green or reddish brown or black or brown or stramineous; membranous or scarious. **Stamens** 6 or 3; included within perianths. **Pistils** 1; compound, carpels 3; stigmas 3; styles 3; ovaries superior; locules 1 or 3; placentation parietal or axile or basal. **Fruits** capsules; loculicidal. **Seeds** 3 or numerous.

The family is represented in Oklahoma by 2 genera and 23 species. It is sometimes mistaken for the Poaceae because of similarities in their leaves. Plants are characteristic of wetlands and more commonly encountered in the eastern 1/2 of the state.

1. Leaf margins glabrous. Sheath margins overlapping. Locules 3. Seeds numerous. ..... ***Juncus***
1. Leaf margins pilose. Sheath margins fused. Locules 1. Seeds 3. ..... ***Luzula***

Juncus C. Linnaeus Rush

1. Inflorescences appearing to be lateral (pseudolateral).
  2. Leaves with both blades and sheaths. Capsules 3–4 mm in diameter. Perianth parts widely spreading. ..... ***J. coriaceus***
  2. Blades absent. Capsules 1–1.5 mm in diameter. Perianth parts appressed.
    3. Stamens 6. Stems smooth. Perianth parts 3.5–5 mm long. Plants of Black Mesa area. ..... ***J. arcticus*** (= *J. balticus*)
    3. Stamens 3. Stems ribbed. Perianth parts 2.5–3 mm long. Plants of southeastern 1/4 of state. ..... ***J. effusus***
1. Inflorescences terminal or both terminal and pseudolateral.
  4. Plants annual. Auricles absent at sheath apices.
    5. Inflorescences per stem 3 or more solitary flowers or clusters of flowers. Bractioles 2 or 3 below each flower. ..... ***J. bufonius***
    5. Inflorescences of 1 or 2 solitary flowers or clusters of flowers per stem. Bractioles 1 below each flower. ..... ***J. capitatus***
  4. Plants perennials. Auricles present at sheath apices.
    6. Leaf blades flat; not septate. Bracteoles present.
      7. Stems stoloniferous, rooting at nodes. ..... ***J. repens***
      7. Stems erect, not rooting at nodes.
        8. Auricles 2–6 mm long.
          9. Capsules 2–3.2 mm long. Flowers occurring singly along inflorescence branches; internodes more than 6 mm long. ..... ***J. anthelatus***
          9. Capsules 3.3–4.7 mm long. Flowers occurring in clusters of 2–6 along inflorescence branches; internodes 3.3–4.4 mm long. ..... ***J. tenuis***
        8. Auricles 0.2–1.2 mm long.
          10. Stamens 3. Seeds fusiform.
            11. Perianth parts lanceolate; 3.5–5 mm long; inner and outer nearly equal; stramineous. ..... ***J. filipendulus***
            11. Perianth parts ovate-lanceolate; 1.8–3.5 mm long; inner slightly longer than outer; dark brown. ..... ***J. marginatus***
          10. Stamens 6. Seeds oblong to ovoid to ellipsoid to lunate.
            12. Flowers borne mostly along adaxial sides of inflorescence branches. Branches curving inward near tips. ..... ***J. secundus***
            12. Flowers mostly crowded near tips of inflorescence branches or not along the adaxial sides of branches. Branches straight or arching outward.

13. Auricles yellow; cartilaginous. ..... ***J. dudleyi***
13. Auricles white to tan or gray brown or purple tinged; scarious or membranous.
14. Capsules 3-locular. ..... ***J. brachyphyllus***
14. Capsules 1-locular or falsely 3-locular, cross-walls extending about halfway to middle of capsule. ..... ***J. interior***

6. Leaf blades terete or compressed; septate. Bracteoles absent.
15. Seeds caudate; not apiculate or mucronate; 0.6–1.2 mm long including tail; whitish. ..... ***J. brachycephalus***
15. Seeds not caudate; apiculate or mucronate, 0.3–0.6 mm long; yellow-brown.
16. Heads obconic to hemispheric.
17. Capsules linear lanceolate; more than 2 times length of perianth parts. ..... ***J. diffusissimus***
17. Capsules obconic or ovoid or ellipsoid; equal to or slightly longer than perianth parts.
18. Leaves somewhat compressed; not conspicuously nodose-septate. Perianth parts 3–4 mm long. Capsules 2.8–4 mm long. ..... ***J. acuminatus***
18. Leaves terete; conspicuously nodose-septate. Perianth parts 2–2.5 mm long. Capsules 1.9–2.5 mm long. ..... ***J. nodatus*** (= *J. robustus*)
16. Heads spheric or nearly spheric.
19. Stamens 6.
20. Plants rhizomatous. Capsules 4.3–5.7 mm long. ..... ***J. torreyi***
20. Plants cespitose. Capsules 2.8–4 mm long. ..... ***J. acuminatus***
19. Stamens 3.
21. Capsules 1.8–2.7 mm long, shorter than perianths. ..... ***J. brachycarpus***
21. Capsules 2.8–5.7 mm long, longer than or equal to perianths.
22. Perianth parts lanceolate. Capsules ellipsoid to narrowly ovoid. ..... ***J. acuminatus***
22. Perianth parts lanceolate-subulate. Capsules lanceolate-subulate to subulate.
23. Leaves laterally compressed. Perianth parts 4–5 mm long. Capsules 4–5.5 mm long; valves separating at apices after dehiscence. Seeds ellipsoid; 0.5–0.6 mm long. ..... ***J. validus***
23. Leaves terete. Perianth parts 2–3.5 mm long. Capsules 3–4 mm long; valves not separating after dehiscence. Seeds oblong; 0.3–0.5 mm long. ..... ***J. scirpoides***

Luzula A.P. de Candolle Wood Rush

1. Inflorescence branches ascending to erect. Inflorescences cylindrical. Mature capsules obovoid; equal to or longer than perianth parts. Style branches 1–1.5 mm long. Seeds ellipsoidal. ..... ***L. bulbosa***
1. Inflorescence branches horizontal or drooping. Inflorescences broadly conical or globose. Mature capsules subglobose; shorter than perianth parts. Style branches 2–2.5 mm long. Seeds globose. ..... ***L. echinata***

KRAMERIACEAE B.C.J. Dumortier Krameria Family

Plants herbs or herbaceous vines; perennials; perennating organs caudices or crowns; sericeous. **Root Systems** fibrous. **Stems** branched; trailing or prostrate. **Leaves** simple; alternate; sessile; ascending; blades linear or elliptic to oblong; venation not apparent; apices mucronate; margins entire; stipules absent. **Inflorescences** solitary flowers; axillary; bracts present, paired, leaf-like, immediately below flowers on peduncles. **Flowers** perfect; perianths in 2-series. **Calyces** bilaterally symmetrical; rotate. **Sepals** 4 or 5; showy; more conspicuous and larger than petals; of different sizes; abaxial surfaces sericeous; adaxial surfaces glabrous; shiny; fused; bright magenta. **Corollas** bilaterally symmetrical. **Petals** 5; of 2 forms; upper 3 long clawed, free or fused, separating as flower matures, spathulate; magenta to green; lower 2 short, thick, gland-like; free, obovate, green. **Androecia** bilaterally symmetrical. **Stamens** 4, fused by filaments; diadelphous separating as flower matures; anthers dehiscing poricidally; staminodia 0 or 1, free from stamens. **Pistils** 1; compound, carpels 2, 1 well-developed and 1 reduced; stigmas 1, linear or rounded; styles 1, apical; ovaries superior, locules 2, 1 reduced and devoid of ovules; placentation apical; ovules 2 in developed locules. **Nectaries** absent. **Fruits** achenes; globose; lanate-tomentose; with short, straight, retrorsely scabrous, flattened prickles. **Seeds** 1.

The family is represented in Oklahoma by 1 genus and 1 species. Historically, it was placed in the Caesalpiniaceae or Fabaceae by some taxonomists.

Krameria P. Loefling

One species. ..... ***K. lanceolata***

LAMIACEAE J. Lindley Mint Family

Plants herbs or deciduous shrubs; annuals or perennials; perennating organs rhizomes or fleshy roots or tubers or stolons or not apparent; strongly aromatic or not aromatic. **Stems** 4-sided in herbs and subterete in shrubs. **Leaves** cauline or forming a basal rosette; simple or palmately compound; opposite; venation pinnate or palmate; margins usually serrate; stipules absent. **Inflorescences** solitary flowers or simple cymes or spikes or racemes or glomerules or verticillate clusters; terminal or axillary; bracts present. **Flowers** perfect; perianths in 2-series. **Calyces** bilaterally or radially symmetrical. **Sepals** 5 or 4; fused. **Corollas** bilaterally or rarely radially symmetrical; typically bilabiate with 2-lobed upper lips and 3-lobed lower lips or funnelform. **Petals** 5 or rarely 4; fused; of various colors. **Stamens** 2 or 4; didynamous or of equal lengths; exserted beyond or included within perianths; epipetalous. **Pistils** compound, carpels 2, each divided in half; stigmas 2; styles 1; gynobasic or rarely apical; ovaries superior; locules 4; placentation axile, often appearing basal. **Nectaries** present; receptacular; annular. **Fruits** nutlets or drupes; stones 4, hence drupes falsely resembling berries. **Seeds** 1 or 4.

The family is represented in Oklahoma by 26 genera and 66 species. An alternate family name is Labiatae. Some taxonomists submerge the family into the Verbenaceae. *Vitex* and *Callicarpa* are positioned in the Verbenaceae by other taxonomists. Many members of the family are used as seasonings, medicinal herbs, and ornamentals.

1. Leaves palmately compound ..... ***Vitex***
1. Leaves simple.
    2. Plants shrubs. Corollas radially symmetrical; funnelform. Fruits drupes; red-purple or rose-pink. ..... ***Callicarpa***
    2. Plants herbaceous. Corollas bilaterally symmetrical, strongly to weakly bilabiate. Fruits nutlets; dark brown to black
        3. Calyx tubes with conspicuous adaxial projection; lip margins entire. ..... ***Scutellaria***
        3. Calyx tubes without adaxial projection; lip margins toothed or lips absent.
            4. Fertile stamens 2.
                5. Calyces radially or weakly bilaterally symmetrical.
                6. Corollas 10–40 mm long; bilabiate. ..... ***Monarda***
                6. Corollas 1–7 mm long; funnelform or campanulate.
                7. Flowers pedicellate. Calyces conspicuously 10-nerved. ..... ***Cunila***
                7. Flowers sessile. Calyces inconspicuously 4- or 5-nerved. ..... ***Lycopus***
                5. Calyces strongly bilaterally symmetrical.
                8. Filaments branched; thecae separate. ..... ***Salvia***
                8. Filaments not branched; thecae joined.
                9. Leaves 1–2.5 cm long; blades 1–9 mm wide. Flowers pedicellate. ..... ***Hedeoma***
                9. Leaves 3–8 cm long; blades 10–50 mm wide. Flowers sessile. ..... ***Blephilia***
            4. Fertile stamens 4.
                10. Plant pubescence woolly-villous. Calyces radially symmetrical with 10 teeth; teeth apically recurved. ..... ***Marrubium***
                10. Plant pubescence of various types, but not woolly-villous. Calyces bilaterally symmetrical, or radially symmetrical with 5 teeth; teeth not apically recurved.
                11. Staminal connectives apically branched. Thecae separate; 1 per branch [stamens 2, but connective apically divided with each branch bearing 1 theca; hence flowers falsely appearing to have 4 stamens]. ..... ***Salvia***
                11. Staminal connectives not apically branched. Thecae joined.
                12. Nutlets united more than 3/4 length of ovaries; attached obliquely. Styles apical to subapical.
                13. Corollas blue. Leaf margins entire to sparsely toothed. ..... ***Trichostema***
                13. Corollas white to light pink or purple. Leaf margins uniformly toothed or lobed. ..... ***Teucrium***
                12. Nutlets free or united only at bases; attached basally. Styles basal.

14. Inflorescences only axillary.
    15. Leaves linear to linear-oblanceolate; margins entire or serrulate. ..... ***Clinopodium***
    15. Leaves ovate-deltoid to reniform; margins serrate or crenate or dentate or incised.
        16. Lower leaves lobed 1/2 way or more to midribs. Calyx lobes spine-tipped. ..... ***Leonurus***
        16. Lower leaves not lobed or lobed less than 1/2 way to midribs. Calyx lobes not spine-tipped.
            17. Leaf blades widest at bases.
                18. Stems prostrate. Flowers pedicellate. Plants perennials. ..... ***Glechoma***
                18. Stems decumbent to erect. Flowers sessile. Plants annuals. ..... ***Lamium***
            17. Leaf blades widest at middles.
                19. Corollas 3–5 mm long. Styles exserted beyond corollas. Calyces weakly bilaterally symmetrical; tubular or campanulate. ..... ***Mentha***
                19. Corollas 8–15 mm long. Styles included within corollas. Calyces strongly bilaterally symmetrical; bilabiate. ..... ***Melissa***
14. Inflorescences only terminal or both terminal and axillary.
    20. Inflorescences spicate.
        21. Upper leaves sessile; linear to linear-lanceolate. ..... ***Physostegia***
        21. Upper leaves petiolate; ovate to lanceolate or elliptic.
            22. Bracts subulate to narrowly linear; 0.3–1 mm wide. ..... ***Nepeta***
            22. Bracts ovate to reniform; 2–16 mm wide.
                23. Upper pair of staminal filaments longer than lower pair. Bracts 2–3 mm wide. ..... ***Agastache***
                23. Upper pair of staminal filaments shorter than lower pair. Bracts 7–16 mm wide. ..... ***Prunella***
    20. Inflorescences verticillate clusters or racemes or cymes or glomerules.
        24. Inflorescences racemes or cymes; elongate.
            25. Leaves sessile; linear to linear-lanceolate. ..... ***Warnockia***
            25. Leaves petiolate; ovate to ovate-lanceolate.
                26. Inflorescences cymes. Bracts subtending clusters of flowers. Calyx hairs short, white, not twisted. ..... ***Nepeta***
                26. Inflorescences racemes. Bracts subtending each flower. Calyx hairs long, brownish, twisted. ..... ***Perilla***
        24. Inflorescences verticillate clusters or glomerules; not elongate.
            27. Inflorescences glomerules borne in flat-topped aggregations. ..... ***Pycnanthemum***
            27. Inflorescences verticillate clusters borne on elongate axes.
                28. Corollas weakly bilaterally symmetrical; tubular; lobes 4. Styles exserted beyond corollas. Calyces punctate. ..... ***Mentha***
                28. Corollas strongly bilaterally symmetrical; bilabiate; lobes 5. Styles included within corollas. Calyces not punctate.
                29. Leaves ovate-deltoid to reniform. Plants annuals. Rhizomes absent. Calyces 5-nerved. ..... ***Lamium***
                29. Leaves lanceolate to elliptic. Plants perennials. Rhizomes present. Calyces 10-nerved. ..... ***Stachys***

Agastache J. Clayton ex J.F. Gronovius Giant Hyssop

One species. ..... ***A. nepetoides***

Blephilia C.S. Rafinesque — Wood Mint

One species. ..... ***B. ciliata***

Callicarpa C. Linnaeus — American Beautyberry

One species. ..... ***C. americana***

Clinopodium C. Linnaeus — Savory

One species. ..... ***C. glabrum***
(= *Satureja arkansana*)

Cunila D. van Royen ex C. Linnaeus — Stone Mint

One species. ..... ***C. origanoides***

Glechoma C. Linnaeus — Ground Ivy

One species. ..... ***G. hederacea***

Hedeoma C.H. Persoon — Pennyroyal

1. Leaves ovate to elliptic. Nutlets subglobose.
    2. Calyces 5–8 mm long; lobes all alike, linear-subulate. Corollas pink.
       Plants of Arbuckle Mountains. ..... ***H. acinoides***
    2. Calyces 4–5 mm long; lobes of 2 forms, upper lanceolate, lower linear-subulate.
       Corollas blue. Plants of northeast 1/4 of state. ..... ***H. pulegioides***
1. Leaves linear to linear-oblong or obovate or spathulate. Nutlets ovoid.
    3. Leaves obovate or spathulate. Calyces 6–7 mm long. ..... ***H. reverchonii***
    3. Leaves linear to linear-oblong. Calyces 5–6 mm long.
        4. Plants perennials; suffrutescent; from woody taproots or caudices. Bracteoles 1–2 mm long. ..... ***H. drummondii***
        4. Plants annuals; herbaceous; from slender taproots. Bracteoles 1.5–6.5 mm long. ..... ***H. hispida***

Lamium C. Linnaeus — Deadnettle

1. Upper cauline leaves sessile or clasping; reniform. Flowers 6–10 per verticillate cluster.
   Calyces densely villous. ..... ***L. amplexicaule***
1. Upper cauline leaves petiolate; cordate or deltoid or ovate to suborbicular. Flowers 3–6
   per verticillate cluster. Calyces sparsely hirsute. ..... ***L. purpureum***
   (= *L. hybridum*)

Leonurus C. Linnaeus — Motherwort

1. Primary leaf lobes ovate to lanceolate; 7–15 mm wide at middles. Calyces 5-angled.
   Outer surfaces of upper lip of corollas villous. ..... ***L. cardiaca***
1. Primary leaf lobes linear to narrowly lanceolate; 2–5 mm wide at middles. Calyces 10-ribbed.
   Outer surfaces of upper lip of corollas puberulent. ..... ***L. sibiricus***

Lycopus C. Linnaeus — Water Horehound

1. Calyces equal to or shorter than nutlets; lobes 0.5–1 mm long, deltoid
   to lanceolate, obtuse; midveins absent.
    2. Calyces campanulate. Corolla lobes 5; spreading. Stamens and styles exserted beyond corollas. ..... ***L. uniflorus***
    2. Calyces cylindrical. Corolla lobes 4; erect. Stamens and styles included within corollas. ..... ***L. virginicus***
1. Calyces longer than nutlets; lobes 1–4 mm long., subulate, narrowly
   acute or attenuate; midveins present.
    3. Mid-cauline leaves lanceolate; teeth 1–10 mm long. Corolla lobes 4. Summits of
       nutlets smooth. ..... ***L. americanus***
    3. Mid-cauline leaves ovate to ovate-lanceolate; teeth 0.5–1 mm long. Corolla lobes 5.
       Summits of nutlets verrucose to tuberculate. ..... ***L. rubellus***

Marrubium C. Linnaeus Horehound

One species. ..... ***M. vulgare***

Melissa C. Linnaeus Beebalm

One species. ..... ***M. officinalis***

Mentha C. Linnaeus Peppermint

1. Verticils of flowers only axillary. Bracts longer than verticils. ..... ***M. arvensis***
1. Verticils of flowers only terminal or both terminal and axillary. Bracts equal to or shorter than verticils.
   2. Pedicels 0.5–0.8 mm long. Calyx teeth pubescent. ..... ***M. spicata***
   2. Pedicels 1.2–2 mm long. Calyx teeth glabrous. ..... ***M. citrata***
   (= *M. piperita*)

Monarda C. Linneaus Horsemint

1. Leaf bases abruptly narrowed or truncate or subcordate. Stamens and styles exserted beyond upper lips of corollas. Verticils 1 or rarely 2.
   2. Petioles 10–15 mm long. Lower lips of corollas not spotted with purple-red dots.
      3. Calyx teeth stipitate-glandular. Bract margins pilose. ..... ***M. stipitatoglandulosa***
      3. Calyx teeth not stipitate-glandular. Bract margins puberulent. ..... ***M. fistulosa***
   2. Petioles 0.1–5 mm long. Lower lips of corollas with purple-red dots.
      4. Upper lips bearded at apices; equal or subequal to corolla tubes. Calyx teeth 2 mm long. Corollas tubes shorter than or equal to calyces. Leaves lanceolate to linear-lanceolate. ..... ***M. bradburiana***
      4. Upper lips not bearded at apices; less than half as long as corolla tubes. Calyx teeth 3–4 mm long. Corolla tubes longer than calyces. Leaves ovate to ovate-lanceolate. ..... ***M. russeliana***
1. Leaf bases gradually tapered. Stamens and styles included within corollas. Verticils 2–8.
   5. Calyx teeth deltoid to narrowly triangular-lanceolate; 1 mm long. Bracts acute to acuminate. ..... ***M. punctata***
   5. Calyx teeth aristate; 2–7 mm long. Bracts aristate.
      6. Adaxial surfaces of largest bracts canescent; purple or white. Bracts similar in shape; oblong; conspicuously reflexed. ..... ***M. citriodora***
      6. Adaxial surfaces of largest bracts glabrous; pale green or with purple-tinged apices. Bracts dissimilar; inner bracts narrow becoming progressively broader distally; straight or recurved.
         7. Calyx teeth 3–6 mm long; stout; rigid. Bracts elliptical; prominent veins of abaxial surfaces 3 or 5. Plants of eastern 3/4 of state. ..... ***M. clinopodioides***
         7. Calyx teeth 1–3 mm long; slender; flexible. Bracts ovate; prominent veins of abaxial surfaces 1. Plants of Cimarron County. ..... ***M. pectinata***

Nepeta C. Linnaeus Catnip

One species. ..... ***N. cataria***

Perilla C. Linnaeus Common Perilla

One species. ..... ***P. frutescens***

Physostegia G. Bentham Lionsheart

1. Margins of leaves entire to inconspicuously dentate; teeth blunt, 3–11 per side. Flowers separated, not overlapping each other. ..... ***P. intermedia***
1. Margins of leaves conspicuously serrate; teeth sharp, 10–30 per side. Flowers overlapping.
   2. Leaves linear to narrowly lanceolate; thick. Plants flowering in late summer and autumn. ..... ***P. angustifolia***
   2. Leaves broadly lanceolate to elliptic or oblanceolate. Plants flowering in spring and early summer. ..... ***P. virginiana***

Prunella C. Linnaeus Self-Heal

One species. ..... ***P. vulgaris***

Pycnanthemum A. Michaux Mountain Mint

1. Abaxial surfaces of leaves white. Inflorescences open; branches and pedicels visible. Calyces bilaterally symmetrical; bilabiate; lobes conspicuously unequal. ..... ***P. albescens***
1. Abaxial surfaces of leaves green. Inflorescences head-like; branches and pedicels not visible. Calyces almost radially symmetrical; tubular; lobes equal.
    2. Stems glabrous or glabrate. ..... ***P. tenuifolium***
    2. Stems pilose-villous.
        3. Stems uniformly pubescent. ..... ***P. pilosum***
        3. Stems pubescent only on edges, faces glabrous. ..... ***P. virginianum***

Salvia C. Linnaeus Sage

1. Leaves primarily basal, cauline leaves absent or only 1 or 2 pairs. Both anther lobes developed and producing pollen. ..... ***S. lyrata***
1. Leaves cauline; numerous. One anther lobe absent or rudimentary.
    2. Calyces white-tomentose; not bilabiate. ..... ***S. farinacea***
    2. Calyces not white-tomentose, hairs short, appressed; bilabiate.
        3. Plants annuals; from taproots. Corollas 6–11 mm long; tubes equal to or slightly exserted beyond calyces. ..... ***S. reflexa***
        3. Plants perennials; from rhizomes. Corollas 15–25 mm long; tubes long exserted beyond calyces. ..... ***S. azurea***

Scutellaria C. Linnaeus Skullcap

1. Inflorescences solitary or paired flowers.
    2. Leaf margins crenate. Nutlets yellowish to buff; glandular. Plants of seeps and marshes. ..... ***S. galericulata***
    2. Leaf margins entire or irregularly toothed. Nutlets black or brown; not glandular. Plants of drier upland sites.
        3. Corollas 15–23 mm long; lower lips 7–10 mm wide.
            4. Stem hairs conspicuous; spreading; of 2 types, glandular and not glandular. Plants of Panhandle. ..... ***S. resinosa***
            4. Stem hairs inconspicuous; retrorsely curved; all alike, not glandular. Plants of southwest and south-central portion of state. ..... ***S. wrightii***
        3. Corollas 10–12 mm long; lower lips 3–7 mm wide.
            5. Bases of mid-cauline leaves subcordate or truncate. Plants perennials; from moniliform rhizomes and whitish tubers. Nutlet papillae cylindrical. ..... ***S. parvula***
            5. Bases of mid-cauline leaves rounded or acute or attenuate. Plants annuals; from taproots. Nutlet papillae conical. ..... ***S. drummondii***
1. Inflorescences racemes.
    6. Corollas 5–7 mm long. Fruiting calyces 2–3 mm long. Racemes 1-sided; typically axillary. Nutlets yellowish. ..... ***S. lateriflora***
    6. Corollas 13–25 mm long. Fruiting calyces 4–7 mm long. Racemes 2-sided; terminal. Nutlets black or brown.
        7. Adaxial surfaces of leaves glabrous. Bracts and upper cauline leaves intergrading in size; bracts not conspicuously smaller than leaves. Stem hairs appressed with apices recurved. ..... ***S. cardiophylla***
        7. Adaxial surfaces of leaves pubescent. Bracts and upper leaves not intergrading in size; bracts conspicuously smaller than leaves. Stem hairs of various types but not appressed with apices recurved.
            8. Mid-cauline leaves oblong to linear-lanceolate; margins entire; bases attenuate. ..... ***S. integrifolia***
            8. Mid-cauline leaves deltoid-ovate to ovate-oblong; margins dentate; bases rounded or cordate.
                9. Calyx glands sessile or absent. ..... ***S. incana***
                9. Calyx glands stipitate.
                10. Hairs of rachises spreading; straight; of 2 forms, glandular and not glandular. ..... ***S. ovata***
                10. Hairs of rachises appressed; curled; all alike, not glandular. ..... ***S. elliptica***

Stachys C. Linnaeus Hedge Nettle

1. Upper cauline leaves petiolate. ..... ***S. tenuifolia***
1. Upper cauline leaves sessile or subsessile.
   2. Leaves 2–4 cm wide. Sepals linear to narrowly lanceolate. ..... ***S. pilosa***
   2. Leaves 6–12 cm wide. Sepal lobes triangular. ..... ***S. iltisii***
   (= *S. eplingii* and *S. nuttallii* of other authors)

Teucrium C. Linnaeus American Germander

1. Leaf margins serrate or crenate or dentate. Calyces strongly bilaterally symmetrical. ..... ***T. canadense***
1. Leaf margins pinnatifid or incised or lobed. Calyces weakly bilaterally symmetrical. ..... ***T. laciniatum***

Trichostema C. Linnaeus False Pennyroyal

1. Calyces strongly bilaterally symmetrical. Stamens 6–16 mm long. ..... ***T. dichotomum***
1. Calyces weakly bilaterally symmetrical. Stamens 2.3–4.2 mm long. ..... ***T. brachiatum***

Vitex C. Linnaeus Chaste-Tree

One species. ..... ***V. agnus-castus***

Warnockia M.W. Turner Prairie Brazoria

One species. ..... ***W. scutellarioides***
(= *Brazoria scutellarioides*)

LAURACEAE A.L. de Jussieu Laurel Family

Plants small trees or shrubs; deciduous; strongly aromatic; dioecious or polygamo-dioecious. **Leaves** simple; alternate; blades ovate to obovate or elliptic; venation pinnate or pinnipalmate; margins entire or palmately lobed or pinnately lobed; stipules absent. **Inflorescences** racemose or umbel-like clusters; produced before or simultaneously with leaves; terminal or axillary. **Flowers** imperfect or rarely perfect, staminate and pistillate similar; perianths in 1-series; radially symmetrical. **Sepals** 6; free; yellow or greenish yellow; petaloid. **Petals** absent. **Stamens** 9; in 3 whorls; anthers dehisicing by valves from bases upward; staminal rudiments present in pistillate flowers. **Pistils** 1; simple, carpels 1; stigmas 1; styles 1; ovaries superior; placentation apical. **Hypanthia** present; bowl-shaped. **Nectaries** present; sessile or stalked glands often resembling stamens. **Fruits** drupes; red or blue-black. **Seeds** 1.

The family is represented in Oklahoma by 2 genera and 2 species. Both species are restricted to the eastern 1/3 of the state, and each has a history of medicinal use by Native Americans and settlers.

1. Leaves often palmately lobed. Inflorescences axillary; umbellate. Pistillate flowers with 12–18 staminal rudiments. Terminal buds absent. Axillary buds multiple. Venation pinnate. Mature drupes red; pedicels green, apices not enlarged. ..... ***Lindera***
1. Leaves not lobed. Inflorescences terminal; racemose. Pistillate flowers with 6 staminal rudiments. Terminal buds present. Axillary buds solitary. Venation pinnipalmate. Mature drupes blue-black; pedicels red, apices enlarged. ..... ***Sassafras***

Lindera C.P. Thunberg Spicebush

One species. ..... ***L. benzoin***

Sassafras C.D.G. Nees von Esenbeck & J.E.C. Ebermaier

One species. ..... ***S. albidum***

LENTIBULARIACEAE L. C. Richard Bladderwort Family

Plants herbs; perennials or annuals; autophytic and insectivorous; floating aquatics, semi-terrestrial, or terrestrial; caulescent or acaulescent. **Root Systems** fibrous or absent; rhizoids may be present. **Leaves** of one or of two forms; all foliaceous or of submergent highly dissected capillary segments and emergent basal rosettes of flatten leaves that serve as floats; simple; alternate;

venation a single vein or pinnate or not apparent; stipules absent. **Carnivorous traps** vegetative bladders or sticky glands on leaves. **Inflorescences** solitary flowers or racemes; bracts present, scalelike; bracteoles present or absent. **Flowers** perfect; perianths in 2-series. **Calyces** bilaterally symmetrical; 2- or 5-lobed. **Sepals** 4 or 5; fused. **Corollas** bilaterally symmetrical; bilabiate or personate; imbricate. **Petals** 5; fused; gibbous or spurred; yellow or white or pale violet. **Stamens** 2; epipetalous; thecae 1 or 2. **Pistils** 1; compound, carpels 2; stigmas 1, unequally 2-lobed or not lobed; papillate; styles 1 or 0; ovaries superior; locules 1; placentation free-central. **Nectaries** present; petaliferous. **Fruits** capsules; circumscissile or bivalvate or ventral slit. **Seeds** numerous; minute.

The family is represented in Oklahoma by 2 genera and 7 species, all native. The vegetative body plan in the Lentibulariaceae has challenged taxonomists, as it does not fit the classical root—shoot architecture. *Pinguicula* displays less divergence from the formula with its acaulescent rosette of leaves. But some *Pinguicula* species possess roots without root caps. *Utricularia* on the other hand is a central "stolon" with appendages. These appendages are a combination of rhizoids, smaller stolons, "leaves", floats, and bladder traps. As there is a loss of root genes in both genera. Pinguicula thought to have loss of the root system while Utricularia is thought to have the root transition to a "stolon" with green appendages. Our species are a minor food source for waterfowl and provide shelter for small fish and other small animals.

1. Plants terrestrial; trapping organs leaves with sticky glands.
   Flowers white or pale violet. Calyces 5-lobed. ..... ***Pinguicula***
1. Plants free-floating aquatics or semi-terrestrial; trapping organs sac-like bladders.
   Flowers yellow. Calyces 2-lobed. ..... ***Utricularia***

Pinguicula C. Linnaeus Butterwort

One species. ..... ***P. pumila***

Utricularia C. Linnaeus Bladderwort

1. Inflorescence subtended by 1 whorl of flattened emergent leaves (floats).
   2. Spur apex distinctly notched at tip. Flowers 4–18 per inflorescence. Turions absent. ..... ***U. inflata***
   2. Spur apex entire or barely notched at tip. Flowers 1–5 per inflorescence. Turions present. ..... ***U. radiata***
1. Inflorescence naked; flattened emergent leaves (floats) absent.
   3. Bracteoles 2, paired. Capsule dehiscence by ventral longitudinal slit.
      4. Corollas 15–25(–30) mm, spurs 7–14 mm. ..... ***U. cornuta***
      4. Corollas 9–15 mm, spurs 4–7 mm long. ..... ***U. juncea***
   3. Bracteoles absent. Capsule dehiscence by ventral ovate pore, circumscissile, or bivalvate.
      5. Stolons, leaves and bladders growing in substrate. Bracts clasping. ..... ***U. subulata***
      5. Stolons, leaves and bladders growing in water column or stranded on substrate. Bracts basifixed.
         6. Corolla upper lips truncate or slightly notched at apex; spurs straight. ..... ***U. vulgaris*** (= *U. macrorhiza*)
         6. Corolla upper lips 3-lobed; spurs curved upwards. ..... ***U. gibba*** (= *U. biflora*)

LILIACEAE A. L. de Jussieu Lily Family

Plants herbs; perennials; perennating organs rhizomes or bulbs. caulescent or acaulescent; **Root Systems** fibrous. **Leaves** basal or cauline; simple; alternate or whorled; venation parallel-convergent; stipules absent. **Inflorescences** solitary or paired flowers, or racemes; bracts present or absent. **Flowers** showy; perfect; perianths in 1-series; radially symmetrical. **Perianth Parts** 6; petaloid; free. **Stamens** 6; arising from receptacles. **Pistils** 1; compound, carpels 3; stigmas 1, 3-lobed or not lobed; styles 1; ovaries superior; locules 3; placentation axile. **Hypanthia** absent; **Nectaries** present; at bases of perianth parts. **Fruits** berries or loculicidal capsules. **Seeds** numerous.

The family is represented in Oklahoma by 3 genera and 5 species. On the basis of phylogenetic studies, its earlier circumscription has been narrowed considerably with the segregation of genera into numerous small families. Oklahoma taxa are now positioned in 8 other families.

1. Plants acaulescent. Leaves 1 or 2; basal. ..... ***Erythronium***

1. Plants caulescent. Leaves numerous; cauline.
  2. Leaves alternate. Flowers solitary or paired in upper leaf axils. Fruits berries; yellowish orange to red; globose. Plants from rhizomes. ..... ***Streptopus***
  2. Leaves whorled. Inflorescences terminal; racemose. Flowers 2–11; borne in terminal racemes. Fruits capsules; green to brown; obovoid to oblong. Plants from bulbs. ..... ***Lilium***

Erythronium C. Linnaeus Trout Lily

1. Abaxial surfaces of perianth parts red-purple tinged. Inner perianth parts auriculate, enclosing filaments. Stigmas erect. Capsule apices long beaked. ..... ***E. rostratum***
1. Abaxial surfaces of perianth parts pink to blue tinged. Inner perianth parts not auriculate, not enclosing filaments. Stigmas curved outward. Capsule apices rounded to apiculate.
  2. Perianth parts reflexed. Leaves not conduplicate; typically mottled. Mature capsules held above ground. Bulbs with 1-3 stolons. ..... ***E. albidum***
  2. Perianth parts spreading. Leaves conduplicate; not mottled. Mature capsules laying on ground. Bulbs without stolons. ..... ***E. mesochoreum***

Lilium C. Linnaeus Lily

One species. ..... ***L. michiganense***

Streptopus A. Michaux Twisted Stalk

One species. ..... ***S. amplexifolius***

LINACEAE S. F. Gray Flax Family

Plants herbs; annuals or biennials or perennials; perennating organs caudices. **Root Systems** taproots. **Leaves** simple; alternate or alternate above and opposite below; sessile; venation a single vein; margins entire or ciliate; stipules absent or present, glandular. **Inflorescences** solitary flowers or simple cymes or compound cymes; terminal and axillary. **Flowers** perfect; perianths in 2-series. **Sepals** 5; free. **Corollas** radially symmetrical; saucer-shaped. **Petals** 5; caducous; free or fused; yellow or yellow with an orange to red center or blue. **Stamens** 5; fused by filaments**;** staminodia absent or present, minute. **Pistils** 1; compound, carpels 5; stigmas 5, linear or capitate; styles 5, free or fused; ovaries superior; locules 10 or 5; placentation axile. **Nectaries** present; staminal. **Fruits** capsules; septicidal into 5 or 10 segments. **Seeds** 10.

The family is represented in Oklahoma by 1 genus and 10 species. Three species are introduced, including *Linum usitatissimum*, cultivated flax, which escapes from cultivation.

Linum C. Linnaeus Flax

1. Petals blue or white.
  2. Margins of inner sepals ciliate. Stigmas not capitate. Fruiting pedicels erect or ascending. ..... ***L. usitatissimum***
  2. Margins of inner sepals entire. Stigmas capitate. Fruiting pedicels spreading or recurved.
    3. Plants perennials from caudices. Petals 10–15 mm long. Styles 4–9 mm long. ..... ***L. lewisii***
    3. Plants annuals from taproots. Petals 5–10 mm long. Styles 1–3 mm long. ..... ***L. pratense***
1. Petals yellow or yellow with reddish bases.
  4. Styles free or fused only at bases. Plants perennials.
    5. Lower cauline leaves 2–4 mm wide. Outer sepals 2.–2.5 mm long. Capsules 2–2.5 mm long. ..... ***L. medium***
    5. Lower cauline leaves 6–8 mm wide. Outer sepals 1.5–2 mm long. Capsules 1–1.7 mm long. ..... ***L. striatum***
  4. Styles fused 1/2 or more of length. Plants annuals.
    6. Petals 12–17 mm long. Capsules 4–6 mm long.
      7. Sepals 8–10 mm long. Capsules triangular-ovoid; 5–6 mm long. ..... ***L. berlandieri***
      7. Sepals 5–8 mm long. Capsules ellipsoid; 3.5–4.5 mm long. ..... ***L. rigidum***
    6. Petals 6.5–12 mm long. Capsules 2.5–3.5 mm long.
      8. Sepal margins with glandular hairs. Stipular glands present. Capsules dehiscing into ten 1-seeded segments. ..... ***L. sulcatum***

8. Sepal margins without glandular hairs. Stipular glands absent.
Capsules dehiscing into five 2-seeding segments.
9. Margins of upper leaves ciliate. Petals 6.5–8 mm long.
Margins of sepals coarsely ciliate or toothed. ..... ***L. imbricatum***
9. Margins of upper leaves entire. Petals 8–12 mm long.
Margins of sepals entire. ..... ***L. hudsonioides***

LINDERNIACEAE T. Borsch, K. Müller & Eb. Fischer False Pimpernel Family

Plants herbs; annuals. **Stems** 4-sided. **Leaves** simple; opposite; cauline; sessile or short-petiolate; venation pinnipalmate; margins entire; stipules absent. **Inflorescences** racemes or solitary flowers; terminal or axillary; bracts absent. **Flowers** perfect; perianths in 2-series. **Calyces** radially symmetrical. **Sepals** 5; fused. **Corollas** bilaterally symmetrical; bilabiate. **Petals** 5; fused. **Stamens** 2; epipetalous; staminodia 2. **Pistils** 1; compound; carpels 2; styles 1; stigmas 1, 2-lobed; ovaries superior; locules 2; placentation axile. **Nectaries** present. **Fruits** capsules. **Seeds** numerous.

The family is represented in Oklahoma by 1 genus and 1 species. *Lindernia* was previously placed in the Scrophulariaceae. Molecular phylogenetic analyses indicate that the Linderniaceae, comprising 13 genera worldwide, represents a distinct lineage within the Lamiales.

Lindernia C. Allioni False Pimpernel

One species. ..... ***L. dubia***

LOASACEAE B.C.J. Dumortier Stick-Leaf Family

Plants herbs or subshrubs; perennials; armed or not armed with stinging hairs, or hairs bristly, barbed or hooked. **Stems** viscid. **Leaves** simple; alternate or occasionally opposite; petiolate or sessile; clasping or not clasping; venation pinnate or not apparent; margins entire or sinuate to pinnately lobed; stipules absent. **Inflorescences** solitary flowers or simple cymes or heads; terminal or axillary; bracts present or absent. **Flowers** perfect; perianths in 2-series. **Calyces** imbricate or convolute. **Sepals** 5; free, herbaceous or petaloid. **Corollas** radially symmetrical; valvate. **Petals** 5 or 10; free; white to yellow or orange. **Stamens** 5 or 10 to numerous; staminodia absent or present; petaloid. **Pistils** 1; compound, carpels 3 to 5; stigmas 1, 3-lobed; styles 1; ovaries inferior; locules 1, with 1 to 5 intruding placentae; placentation parietal; ovules numerous. **Hypanthia** present; coroniform. **Nectaries** absent or present; staminodal. **Fruits** capsules; with persistent calyx; dehiscent or indehiscent. **Seeds** 1 to numerous.

The family is represented in Oklahoma by 2 genera and 5 species. Primarily a tropical family of the western hemisphere, it is of little economic value. The family is characterized by multicellular hairs, which are pagodiform with a retrorse apex or simple harpoonlike barbs or hooks and/or glandular, bulbous-based stinging hairs.

1. Plants subshrubs; armed with stinging hairs. Perianth parts densely villous.
Sepals petaloid. Stamens 5. Capsules indehiscent. Seeds 1. ..... ***Cevallia***
1. Plants herbs; not armed with stinging hairs. Perianth parts glabrous.
Sepals herbaceous. Stamens 10 or more. Capsules dehiscent. Seeds 2-numerous. ..... ***Mentzelia***

Cevallia M. Lagasca y Segura

One species; southwest corner of state; on gypsum. ..... ***C. sinuata***

Mentzelia C. Linnaeus Stick-leaf

1. Petals 5; orange. Capsules 2–3 mm in diameter; 8–14 mm long. Seeds 2–3; not winged. ..... ***M. oligosperma***
1. Petals 10–13; white to pale yellow. Capsules 7–16 mm in diameter; 15–30 mm long.
Seeds 12-numerous; winged.
2. Stamens equal in length. Petals 44–77 mm long. ..... ***M. decapetala***
2. Stamens unequal in length. Petals 7–40 mm long.
3. Petals 7–9 mm long; pale yellow. Capsules 7–8 mm in diameter. ..... ***M. albescens***
3. Petals 15–40 mm long; white to cream. Capsules 9–13 mm in diameter. ..... ***M. nuda***

LOGANIACEAE R. Brown ex C.F.P. von Martius Logania Family

Plants herbs; perennials or annuals. **Leaves** simple; opposite; blades linear or lanceolate or ovate; venation pinnate or a single vein; surfaces glabrous; margins entire; stipules present, membranous or reduced to an inconspicuous ridge between leaves. **Inflorescences** cymes or solitary flowers; terminal or axillary; bracts present or absent. **Flowers** perfect; perianths in 2-series. **Sepals** 4 or 5; fused. **Corollas** radially symmetrical; funnelform or salverform or tubular. **Petals** 4 or 5; fused; white or pinkish white or red and yellow. **Stamens** 4 or 5; included within or somewhat exserted beyond perianths; epipetalous. **Pistils** 1; compound, carpels 2; stigmas 1 or 2, capitate; styles 1 or 2; ovaries superior; lobed or flattened; locules 2; placentation axile. **Nectaries** absent or present; receptacular. **Fruits** capsules; septicidal or loculicidal. **Seeds** numerous.

The family is represented in Oklahoma by 2 genera and 3 species. *Spigelia,* Indian pink, is grown as an ornamental.

1. Corollas white to pinkish white; globose-funnelform; 1.5–3 mm long.
   Inflorescences branched cymes. ..... ***Mitreola***
1. Corollas with red exterior and yellow interior; elongate-tubular; 30–50 mm long.
   Inflorescences spike-like cymes. ..... ***Spigelia***

Mitreola C. Linnaeus Mitrewort

1. Leaves petiolate. Capsules 3–4 mm long; smooth. ..... ***M. petiolata***
   (= *Cynoctonum mitreola*)
1. Leaves sessile. Capsules 2–3 mm long; mealy-papillose. ..... ***M. sessifolia***
   (= *Cynoctonum sessilifolium*)

Spigelia C. Linnaeus Indian Pink

One species. ..... ***S. marilandica***

LYCOPODIACEAE C.F.B. de Mirbel Clubmoss Family

Plants herbs; perennials; creeping; deciduous; producing sporangia on non-photosynthetic sporophylls borne in cylindrical, pedunculate strobili. **Roots** emerging from lower sides of stems. **Stems** branched; erect or prostrate to arching. **Leaves** spirally arranged; appressed; linear to lanceolate; venation a single vein; margins entire or slightly toothed at bases; ligules present. **Strobili** conspicuous; solitary; pedunculate; erect; cylindrical; peduncle leaves appressed, incurved, not imbricate, linear to lanceolate. **Sporophylls** all alike; resembling vegetative leaves in shape; generally longer than peduncle leaves; marginal teeth absent. **Sporangia** all alike; globose. **Spores** all alike. **Gametophytes** all alike; green; cordate.

The family in Oklahoma is represented by 1 genus and 1 species.

Lycopodiella J.L. Holub Bog Club-Moss

One species. ..... ***L. appressa***

LYGODIACEAE C.B. Presl Climbing Fern Family

Plants herbs; twining vines; perennials; perennating organs rhizomes; producing sporangia in 2-rowed aggregations at ends of pinnules. **Rhizomes** branching. **Fronds** all alike; with sterile and fertile portions; 2-pinnately to 4-pinnately compound; stipitate; pinnae stalked, alternate, proximally compound and distally simple; blades deltoid, ultimate segments of fertile portions fringed with radiating oblong lobes; rachises light brown; twining. **Sori** absent; indusia persistent, hood-like; dehiscing away from midribs. **Sporangia** all alike; obovate; annuli absent. **Spores** all alike; tetrahedral to globose. **Gametophytes** all alike; green; cordate.

The family is represented in Oklahoma by 1 genus and 1 species. Introduced from the southeastern U.S., it is known only from McCurtain County.

Lygodium O. Swartz Climbing Fern

One species. ..... ***L. japonicum***

LYTHRACEAE J. St. Hilaire Loosestrife Family

Plants herbs; perennials or annuals; perennating organs fleshy or woody roots; emergent aquatics or terrestrial. **Stems** 4-sided; erect or ascending or decumbent. **Leaves** simple; opposite, or alternate above and opposite below, or whorled; venation a single vein or pinnate; margins entire; stipules absent or present, minute. **Inflorescences** solitary flowers or simple few-flowered cymes or spikes or racemes; axillary or terminal; bracts present. **Flowers** perfect; often heterogonous; perianths in 2-series or rarely 1-series. **Sepals** 4 to 6, often with accessory teeth between them; free, but appearing to be lobes of the hypanthium. **Corollas** radially symmetrical. **Petals** 4 to 6 or rarely 0; attached to the top of the hypanthium, alternate with the lobes of the calyx; caducous; free; not clawed or clawed; pink or rose or purple or lavender or white. **Stamens** 4 to numerous, often twice the number of petals; in 1 to 3 whorls; lengths often varying among flowers of one plant. **Pistils** 1; compound, carpels 2 or 4; sessile or stipitate; stigmas 1, not lobed or 2-lobed, capitate; styles 1 or 0, lengths often varying among flowers of one plant; ovaries superior; locules 1 to 4; placentation axile or free-central. **Nectaries** present; receptacular; annular. **Hypanthia** present; tubular to campanulate. **Fruits** capsules. **Seeds** 4 to numerous.

The family is represented in Oklahoma by 5 genera and 8 species. Our taxa are usually found in wetland habitats. *Lythrum salicaria*, purple loosestrife, is often cultivated for its showy flowers but escapes to become a pest of waterways.

1. Plants aquatic. Calyces without appendages between lobes. Corollas absent. ..... ***Didiplis***
1. Plants terrestrial. Calyces with appendages between lobes. Corollas present; may be caducous.
   2. Calyx lobes unequal in length. Petals clawed. Stamens 11. ..... ***Cuphea***
   2. Calyx lobes equal in length. Petals not clawed. Stamens 4 or 6 or 8 or 12.
      3. Plants perennials. Calyx appendages longer than lobes. ..... ***Lythrum***
      3. Plants annuals. Calyx appendages equal to or shorter than lobes.
         4. Styles 1.5–3 mm long. Capsules smooth; dehiscing irregularly. ..... ***Ammannia***
         4. Styles 0.5 mm long or less. Capsules striate; dehiscing septicidally. ..... ***Rotala***

Ammannia C. Linnaeus Toothcup

1. Cymes pedunculate. Peduncles 3–9 mm long; longer than pedicels.
   Mature capsules 1.5–3 mm in diameter. ..... ***A. auriculata***
1. Cymes sessile or subsessile. Peduncles if present less than 0.9 mm long;
   equal to or shorter than pedicels. Mature capsules 3.5–5 mm in diameter. ..... ***A. coccinea***

Cuphea P. Browne

One species. ..... ***C. viscossissima***

Didiplis C.S. Rafinesque Water Purslane

One species. ..... ***D. diandra***

Lythrum C. Linnaeus Loosestrife

1. Upper leaves opposite or rarely whorled. Petals 8–12 mm long. Flowers 4–6 clustered in
   leaf axils, forming conspicuous terminal spicate inflorescences. Stamens 12. ..... ***L. salicaria***
1. Upper leaves alternate. Petals 3–6 mm long. Flowers solitary or paired in leaf axils,
   forming inconspicuous inflorescences. Stamens 6–8.
   2. Cauline leaves subsessile to short petiolate; bases cuneate or abruptly constricted. ..... ***L. alatum***
   2. Cauline leaves sessile or clasping; bases rounded to auriculate. ..... ***L. californicum***

Rotala C. Linnaeus

One species. ..... ***R. ramosior***

MAGNOLIACEAE A. L. de Jussieu Magnolia Family

Plants trees; deciduous. **Leaves** simple; alternate; blades elliptic or ovate or obovate; venation pinnate; margins entire; stipules present; caducous; enclosing young buds; scars linear. **Inflorescences** solitary flowers. **Flowers** perfect; 6 to 25 cm in diameter; perianths in 2-series. **Sepals** 3; free; petaloid. **Corollas** radially symmetrical; bowl-shaped; imbricate. **Petals** 6 or 9; free; white or greenish yellow. **Stamens** numerous; laminar; spiraled; anthers long, introrse. **Pistils** numerous; spiraled; free; simple, carpels 1,

conduplicate; stigmas 1, linear or decurrent; styles 1; ovaries superior; locules 1; placentation parietal. **Fruits** aggregates of follicles. **Seeds** 1 or 2; suspended from follicles by elongated funiculi.

The family is represented in Oklahoma by 1 genus and 2 species. Widespread in the eastern deciduous forests, both species reach the western edge of their ranges in the Ouachita Mountains of LeFlore County. *Magnolia grandiflora*, southern magnolia, is a common ornamental tree.

Magnolia C. Linnaeus

1. Leaves of flowering branches scattered; elliptical to ovate. Corollas dull green or yellow tinged.
   Styles deciduous from follicles. ..... ***M. acuminata***
1. Leaves of flowering branches clustered; ovobate. Corollas white. Styles persistent on follicles. ..... ***M. tripetala***

MALVACEAE A. L. de Jussieu Mallow Family

Plants herbs or trees; perennials or annuals; perennating organs woody or fleshy roots; shoot exudate viscous, mucilaginous. **Leaves** simple; alternate; venation palmate; margins entire or crenulate or serrate or serrulate, or palmately lobed or parted; stipules present; persistent or caducous. **Inflorescences** solitary flowers or simple cymes; axillary or terminal; peduncles naked or partially fused to midribs of strap-shaped bracts; bracts subtending individual flowers absent or present, when present forming epicalyces (=involucels of some authors); bracts of epicalyces free or fused. **Flowers** perfect; perianths in 2-series. **Sepals** 5; persistent or deciduous; free or fused. **Corollas** radially symmetrical; convolute or imbricate. **Petals** 5; free, entirely so or basally fused to the staminal tube; obovate or spathulate or oblong; spreading to ascending; of various colors. **Stamens** numerous; filaments fused, forming fascicles or tube around gynoecium; anthers free; petaloid staminodia absent or present. **Pistils** 1; compound, carpels 5 to numerous; stigmas 1 or 5 to numerous, capitate or peltate or truncate or decurrent; styles 1 or 5 to numerous; fused or free; ovaries superior, lobed or terete, lobes 5 to numerous; locules 5 to numerous; placentation axile; ovules 1 to 12 or more per locule. **Nectaries** present; sepaliferous or petaliferous. **Fruits** schizocarps or capsules; dehiscent or indehiscent. **Seeds** 1 or 2 or 5 to numerous.

The family is represented in Oklahoma by 11 genera and 21 species. As presently circumscribed, it includes the Tiliaceae or linden family. Its members occupy a variety of habitats and are distributed throughout the state. Cotton, okra, **hibiscus, hollyhock,** and **linden tree** are members of the family, as are several noxious weeds. The original confectionary marshmallow was spun from the mucilage of the European marsh mallow (*Althaea officinalis*). Several native species are prized for their beauty.

1. Plants trees. Peduncles arising from midribs of strap-shaped bracts. Stamens forming fascicles. ..... ***Tilia***
1. Plants herbs. Peduncles naked. Stamens forming tube around gynoecium.
   2. Petals 50–100 mm long. ..... ***Hibiscus***
   2. Petals 1–25 mm long.
      3. Stigmas decurrent along inner side of branches.
         4. Petals 15–35 mm long; apices truncate or rounded. Leaf margins cleft or parted.
            Stamen columns with anthers on sides and at summit. Carpels beaked. ..... ***Callirhoë***
         4. Petals 4–12 mm long; apices bifid. Leaf margins crenate or inconspicuously lobed.
            Stamen columns with anthers only at summit. Carpels not beaked. ..... ***Malva***
      3. Stigmas apical; capitate or peltate or truncate.
         5. Corollas white or pinkish or lavender or purple or red.
            6. Bracts of epicalyces 10–15. ..... ***Hibiscus***
            6. Bracts of epicalyces 1–5.
               7. Leaves linear-oblong or lanceolate. Carpel surfaces
                  differentiated, apices smooth and bases reticulate. ..... ***Sphaeralcea***
               7. Leaves deltoid to orbicular. Carpel surfaces uniformly smooth or roughened.
                  8. Petals 10–16 mm long. Leaf bases asymmetrical. Bracts of
                     epicalyces 1–3. Stellate hairs on abaxial surfaces of leaves
                     with more than 10 rays. Ovules 1 per carpel. ..... ***Malvella***
                  8. Petals 4–6 mm long. Leaf bases symmetrical. Bracts of
                     epicalyces 3–5. Stellate hairs on abaxial surfaces of leaves,
                     when present, with less than 10 rays. Ovules 2–9 per carpel . ..... ***Modiola***
         5. Corollas pale yellow to bright orange.
            9. Epicalyces present.

10. Leaves ovate to orbicular; margins palmately 3- to 7- cleft or parted. Bracts of epicalyces 10–15. Fruits loculicidal capsules, carpels fused at maturity. ..... ***Hibiscus***
10. Leaves linear to narrowly oblong or lanceolate; margins serrate or entire. Bracts of epicalyces 3. Fruits schizocarps, carpels separating from one another and central axis at maturity. ..... ***Malvastrum***

9. Epicalyces absent.
11. Inflorescences terminal; racemose. Leaves lobed or dissected. ..... ***Sphaeralcea***
11. Inflorescences axillary; flowers solitary or fasciculate. Leaves crenate-dentate.
12. Leaves cordate. Mature carpels 7–18 mm long. Ovules 2–9 per carpel. ..... ***Abutilon***
12. Leaves linear to suborbicular. Mature carpels 4–7 mm long. Ovules 1-per carpel.
13. Leaves suborbicular to oblong. Tubercules at leaf bases present. Calyces conspicuously accrescent; 10–12 mm long; 5-winged or 5-angled. ..... ***Rhynchosida***
13. Leaves linear to ovate-elliptic. Tubercules at leaf bases absent. Calyces not accrescent; 5–7 mm long; not 5-winged or 5-angled. ..... ***Sida***

Abutilon P. Miller Indian Mallow

1. Leaves 5–9.5 cm wide. Carpels 4–9 per pistil; 7–8 mm long; beaks absent. ..... ***A. incanum***
1. Leaves 16–21 cm wide. Carpels 10–15 per pistil; 10–18 mm long; beaks if present divergent. ..... ***A. theophrasti***

Callirhoë T. Nuttall Poppy Mallow

1. Epicalyces present, of 3 bracts.
2. Plants erect or ascending. At least one epicalyx bract separated from the calyx by 1-3 mm ..... ***C. papaver***
2. Plants trailing. Epicalyx bracts not conspicuously separated from the calyces ..... ***C. involucrata***

1. Epicalyces absent.
3. Carpels strigose. Pedicels and calyces strigose. ..... ***C. alcaeoides***
3. Carpels glabrous. Pedicels and calyces glabrous to glabrate.
4. Plants perennials. Carpels 12–15. Beaks of mature mericarps continuous with bodies. ..... ***C. digitata***
4. Plants annuals. Carpels 10–12. Beaks of mature mericarps articulated with bodies. ..... ***C. leiocarpa***

Hibiscus C. Linnaeus Rose Mallow

1. Plants annuals; 0.3–0.6 m tall. Leaves parted. Petals 1.5–2.5 cm long. Fruiting calyces inflated, loosely enclosing capsules. ..... ***H. trionum***

1. Plants perennials; 1–2.5 m tall. Leaves entire or lobed. Petals 5–10 cm long. Fruiting calyces not inflated, tightly enclosing capsules.
2. Stems glabrous. Abaxial surfaces of leaves glabrous or scabrous. Calyces glabrate to glabrous. ..... ***H. laevis*** (= *H. militaris*)
2. Stems pubescent. Abaxial surfaces of leaves stellate or velutinous. Calyces stellate-pubescent. ..... ***H. moscheutos*** (= *H. lasiocarpus*)

Malva C. Linnaeus Mallow

One species. ..... ***M. neglecta*** (= *M. rotundifolia*)

Malvastrum A. Gray False Mallow

One species. ..... ***M. hispidum***

Malvella H.F. Jaubert & E. Spach Small Mallow

One species. ..... ***M. leprosa***

Modiola C. Moench

One species. ..... ***M. caroliniana***

Rhynchosida P.A. Fryxell

One species. ..... ***R. physocalyx***

Sida C. Linnaeus

1. Carpels 10. ..... ***S. rhombifolia***
1. Carpels 5.
   2. Stems erect. Leaf blades with 12–22 teeth per side. Axillary flowers fasciculate.
      Pedicels shorter than petioles. Corollas inconspicuously longer than calyces.
      Plants annuals. ..... ***S. spinosa***
   2. Stems prostrate. Leaf blades with 4–9 teeth per side. Axillary flowers solitary.
      Pedicels longer than petioles. Corollas conspicuously longer than calyces.
      Plants perennials. ..... ***S. abutifolia***
      (= *S. procumbens*)

Sphaeralcea A.F.C. de Saint-Hilaire Globe Mallow

1. Leaves oblong-lanceolate to linear-lanceolate; irregularly dentate; green.
   Inflorescences paniculate. Petals pinkish red, drying violet. ..... ***S. angustifolia***
1. Leaves broadly deltoid or suborbicular to ovate; deeply 3- to 5-lobed or
   dissected; silvery gray. Inflorescences racemose. Petals salmon to orange. ..... ***S. coccinea***

Tilia C. Linnaeus Basswood, Linden

One species. ..... ***T. americana***

MARANTACEAE O.G. Petersen Arrowroot Family

Plants herbs; perennials; perennating organs rhizomes; emergent aquatics or terrestrial at edges of ponds; acaulescent. **Leaves** basal; simple; sheathing; blades ovate or elliptic or lanceolate; margins entire; petioles swollen at summit; stipules absent. **Scapes** 1 to 2 m tall. **Inflorescences** panicles of spikes; more or less white powdery; bracts present, obovate, coriaceous. **Flowers** perfect; perianths in 2-series. **Sepals** 3; free. **Corollas** asymmetrical. **Petals** 3; fused, forming short basal tube; purple to blue. **Stamens** 1; petaloid; bearing a single pollen sac along 1 edge; staminodia 3 or 4, petaloid, unequal, fused at bases, one forming hood over style and stigma before anthesis, one forming lip. **Pistils** 1; compound, carpels 3; stigmas 1; styles 1; ovaries inferior; locules 1; placentation axile, appearing basal. **Nectaries** present; sepaliferous. **Fruits** capsules. **Seeds** 1.

The family is represented in Oklahoma by 1 genus and 1 species. It is found along lake edges primarily in eastern Oklahoma.

Thalia C. Linnaeus

One species. ..... ***T. dealbata***

MARSILEACEAE C.F.B. de Mirbel Water Clover Family

Plants perennials; herbs; perennating organs rhizomes; emergent aquatics or floating-leaved aquatics (often partly submerged); producing sporangia in hardened sporocarps borne on short axillary branches at bases of petioles. **Roots** arising from nodes. **Stems** slender; creeping; growing on or below soil surface; branched. **Leaves** aerial or floating or submerged; simple or palmately compound; alternate; long or short petiolate; vernation circinate; blades absent or present; venation conspicuous, anastomosing, vein tips not free at margins; leaflets of compound leaves 4, obdeltoid or flabellate, margins entire or toothed, bases cuneate. **Sporocarps** all alike; borne on short axillary stalks, borne above or below soil surface; attached laterally at apices, perpendicular or slightly nodding; brownish yellow; elliptic to nearly orbicular or reniform; with matted or coarse reddish hairs or glabrous; dehiscing into 2 or 4 parts. **Sori** 4 to 22 per sporocarp. **Sporangia** of 2 types, microsporangia and megasporangia. **Spores** of 2 types; microspores 32–64; megaspores 1. **Gametophytes** of 2 types, microgametophytes and megagametophyes; developing within spores.

The family is represented in Oklahoma by 2 genera and 2 species.

1. Leaves palmately compound; leaflets 4; obdeltoid or flabellate. ..... ***Marsilea***
1. Leaves simple; setaceous. ..... ***Pilularia***

Marsilea C. Linnaeus Water Clover

One species. ..... ***M. vestita***

Pilularia C. Linnaeus Pillwort

One species. ..... ***P. americana***

MARTYNIACEAE O. Stapf Unicorn Family

Plants herbs; annuals; strongly aromatic; viscid pubescent. **Root Systems** taproots. **Stems** diffusely branched. **Leaves** simple; opposite to alternate; blades oval or reniform to broadly ovate; venation palmate; margins entire or sinuate; bases cordate; stipules absent. **Inflorescences** racemes; bracteoles present, 1 or 2 subtending calyces. **Flowers** perfect; perianths in 2-series. **Calyces** somewhat inflated; bilaterally symmetrical. **Sepals** 5; fused. **Corollas** gibbous at bases; bilaterally symmetrical; tubular to bilabiate; imbricate. **Petals** 5; fused; dull white to purple or dull white to pink, usually yellow or reddish purple spotted and/or striped. **Stamens** 4; didynamous; epipetalous; anthers gland tipped; staminodia present, 1. **Pistils** 1; compound, carpels 2; stigmas 1, capitate; styles 1; ovaries superior; locules 1; placentation parietal. **Nectaries** present; annular. **Fruits** capsules; 2 valved, with incurved beaks splitting to form 2 long horns; exocarps deciduous; endocarps reticulate, hard at maturity. **Seeds** numerous.

The family is represented in Oklahoma by 1 genus and 1 species. *Proboscidea* is placed by some taxonomists in the Pedaliaceae. One common name, devil's claw, is attributed to the distal ends of the mature fruit which bear two curved, prong-like appendages which may become entangled in the feet or mouths of grazing animals, causing injury.

Proboscidea C.C. Schmidel Unicorn Plant

One species. ..... ***P. louisianica***

MAZACEAE J. L. Reveal Mazus Family

Plants herbs; annuals. **Leaves** simple; basal or both basal and cauline; lower opposite, upper when present alternate; blades obovate to spathulate; margins toothed, venation pinnate; stipules absent. **Inflorescences** racemes, subsecund; terminal; bracteoles present or absent. **Flowers** perfect; perianths in 2-series. **Calyces** campanulate. **Sepals** 5; fused; lobes ovate-lanceolate. **Corollas** bilaterally symmetrical; bilabiate with 2-lobed upper lips, and 3-lobed lower lips. **Petals** 5; fused; 2 of lower lips gibbous; blue, palates yellow or whitish bordered by reddish brown. **Stamens** 4; included within perianths; epipetalous; thecae divergent. **Pistils** 1; compound; carpels 2; stigmas 2-lobed, lobes ovate to orbicular; styles 1; ovaries superior; locules 2; placentation axile. **Fruits** capsules; loculicidal. **Seeds** numerous.

The family is represented in Oklahoma by 1 genus and 1 introduced species. *Mazus* and 2 related genera have long been positioned in the Scrophulariaceae or figwort family and more recently in the Phrymaceae or lopseed family. Phylogenetic studies, however, support their recognition as a distinct family.

Mazus J. de Loureiro

One species. ..... ***M. pumilus***
(= *M. japonicus*)

MELANTHIACEAE A.J.G. Batsch ex M.B. Borkhausen Death Camas Family

Plants herbs; perennials; perennating organs rhizomes or bulbs; caulescent or acaulescent; bearing perfect flowers or polygamo-monoecious or polygamo-dioecious. **Root Systems** fibrous. **Leaves** basal or cauline; simple; alternate or whorled; blades linear or elliptic to broadly ovate or obovate; venation parallel or parallel-convergent or palmate-reticulate; stipules absent. **Inflorescences** solitary flowers or panicles or racemes or corymbs; bracts present or absent; scapes present or absent. **Flowers** showy; perfect or imperfect, perfect and staminate and pistillate flowers similar; perianths in 1-series or 2-series; radially symmetrical. **Perianth Parts** 6; all alike and petaloid or 3 sepaloid and 3 petaloid; free or fused at bases. **Stamens** 6; in 1 whorl or 2 whorls; arising from receptacles or hypanthia. **Pistils** 1; compound, carpels 3; stigmas 3; styles 3; ovaries superior or partially inferior; locules 3; placentation axile. **Hypanthia** present or absent; **Nectaries** present; at bases of perianth parts. **Fruits** capsules or berries; capsules loculicidal or septicidal at first and then loculicidal. **Seeds** numerous.

The family is represented in Oklahoma by 5 genera and 9 species. These genera were formerly positioned in the Liliaceae, or lily family. Phylogenetic studies, however, support their placement in this family.

1. Flowers solitary. Leaves 3; whorled; venation palmate-reticulate. Perianth parts in 2-series. Fruits berries. ..... ***Trillium***
1. Flowers borne in panicles or racemes. Leaves numerous; alternate; venation parallel or parallel-convergent. Perianth parts in 1-series. Fruits capsules.
   2. Plants acaulescent. Inflorescences racemes or corymbs.
      3. Perianth parts 6–8 mm long; basal glands present. Filament bases dilated. Ovaries and capsules distally 3-lobed. ..... ***Toxicoscordion***
      3. Perianth parts 2–4 mm long; basal glands absent. Filament bases not dilated. Ovaries and capsules 3-parted nearly to bases. ..... ***Amianthium***
   2. Plants caulescent. Inflorescences panicles.
      4. Leaves elliptic to broadly oblanceolate; 6–12 cm wide. Flowers perfect. ..... ***Veratrum***
      4. Leaves linear; 1–3 cm wide. Flowers both perfect and imperfect.
         5. Stems pubescent. Perianth parts clawed; glands present. Plants from rhizomes. ..... ***Veratrum***
         5. Stems glabrous. Perianth parts not clawed; glands absent. Plants from bulbs. ..... ***Stenanthium***

Amianthium A. Gray Fly Poison

One species. ..... ***A. muscitoxicum***
(= *A. muscaetoxicum*)

Stenanthium (A. Gray) K.S. Kunth Feather Bells

One species. ..... ***S. gramineum***

Toxicoscordion P.A. Rydberg Death Camas

One species. ..... ***T. nuttallii***
(= *Zigadenus nuttallii*)

Trillium C. Linnaeus Wake Robin

1. Flowers pedicellate. Corollas white to pink to rose. Berries white to pale green. ..... ***T. pusillum***
1. Flowers sessile. Corollas green to purple to maroon. Berries green to purple.
   2. Bracts and leaves petiolate. Sepals reflexed. ..... ***T. recurvatum***
   2. Bracts and leaves sessile or subsessile. Sepals spreading to ascending.
      3. Calyces 9–30 mm long; apices rounded-acuminate. Anther dehiscence introrse. Connectives extending 2–3.5 mm beyond sacs; tips triangular-lanceolate. Mature berries conspicuously 6-angled. ..... ***T. sessile***
      3. Calyces 35–60 mm long; apices acute. Anther dehiscence latrorse. Connectives extending 0.5–1.5 mm beyond sacs. Mature berries inconspicuously angled. ..... ***T. viridescens***

Veratrum C. Linnaeus False Hellebore

1. Leaves elliptic to broadly oblanceolate; 6–12 cm wide. Perianths at anthesis greenish yellow. Perianth parts not clawed; apices obtuse. Stamens 4.5–6.5 mm long. ..... ***V. woodii***
(= *Melanthium woodii*)
1. Leaves linear; 1–3 cm wide. Perianths at anthesis maroon to brown. Perianth parts clawed; apices acute. Stamens 6.6–8.5 mm long. ..... ***V. virginicum***
(= *Melanthium virginicum*)

MELASTOMATACEAE A. L. de Jussieu Melastome Family

Plants herbs; perennials; perennating organs rhizomes or tubers; few stemmed or single stemmed. **Stems** becoming woody with age; branched or unbranched; erect; internodes 4-sided; hirsute and with glandular hairs. **Leaves** simple; opposite; sessile or short petiolate; blades lanceolate or linear or ovate or elliptic; venation parallel-convergent, 3 veins conspicuous; surfaces hirsute and with glandular hairs; margins serrate. **Inflorescences** solitary flowers or simple cymes; terminal; bracts present. **Flowers** perfect; perianths in 2-series. **Sepals** 4; free, borne on outer layer of hypanthium; ascending or spreading. **Corollas** radially symmetrical; showy; saucer-shaped; convolute. **Petals** 4; free, borne on inner layer of hypanthium; clawed; ovate to obovate; spreading; magenta

to rose-purple. **Androecia** bilaterally symmetrical. **Stamens** 8; both alternate with and opposite the petals; in 2 whorls; exserted beyond perianths; attached to inner hypanthium; anthers oriented horizontally, yellow, basifixed, with basal spur, dehiscing poricidally, curved or J-shaped, thecae 1; filaments curved or bent. **Pistils** 1; compound, carpels 4; stigmas 1, capitate; styles 1; ovaries inferior, separating from hypanthia at maturity; locules 4; placentation axile. **Hypanthia** present; urceolate, glandular hairy, becoming slightly woody with age. **Fruits** capsules; loculicidal. **Seeds** numerous.

The family is represented in Oklahoma by 1 genus and 2 species. They are wetland plants on sandy soils in the southeastern portion of the state.

Rhexia C. Linnaeus Meadow Beauty

1. Stem sides conspicuously unequal in width, one pair of opposing sides wider.
   Wide sides convex; narrow sides concave. ..... ***R. mariana***
1. Stem sides equal in width. All sides flat or nearly so.
   2. Mid-stem angles conspicuously winged. Petals with glandular hairs. Tubers present. ..... ***R. virginica***
   2. Mid-stem angles not winged or inconspicuously winged. Petals glabrous. Tubers absent. ..... ***R. mariana***

MELIACEAE A.L. de Jussieu Mahogany Family

Plants trees; deciduous; bearing perfect flowers or rarely polygamous. **Leaves** 2-pinnately compound; alternate; leaflets 50 or more; ovate to elliptic-lanceolate; venation pinnate; apices acuminate; margins crenate to serrate; stipules absent. **Inflorescences** panicles; axillary or cauliflorous. **Flowers** perfect or rarely imperfect; perianths in 2-series. **Sepals** 5 or 6; fused. **Corollas** radially symmetrical; valvate. **Petals** 5 or 6; free; pinkish lavender. **Stamens** 10 to 12; anthers yellow; filaments fused to form tube with slender teeth; purple. **Pistils** 1; compound, carpels 3 to 6; stigmas 3- to 6-lobed; styles absent; ovaries superior; locules 3 to 6; placentation axile. **Nectaries** present; on staminal disk; annular. **Fruits** drupes; pericarps smooth, thin, fleshy, yellow, or black upon drying. **Seeds** 1–6 per stone.

The family is represented in Oklahoma by 1 genus and 1 species. A native of Asia, it is cultivated as an ornamental but has escaped and become naturalized.

Melia C. Linnaeus China Berry

One species. ..... ***M. azedarach***

MENISPERMACEAE A.L. de Jussieu Moonseed Family

Plants woody vines; without tendrils; deciduous; dioecious. **Leaves** simple; alternate; venation palmate; stipules absent. **Inflorescences** simple or compound cymes (may appear racemose or paniculate); axillary or terminal or cauliflorous. **Flowers** imperfect, staminate and pistillate similar; perianths in 1-series or 2-series. **Sepals** 3 or 6; in 1 or 2 whorls; free; green or white or greenish white. **Corollas** radially symmetrical. **Petals** 3 or 6 or 0; in 1 or 2 whorls; free; white or greenish white. **Stamens** 6 or 12 or 24; androecial rudiments present in pistillate flowers. **Pistils** 2 to 6; free; simple, carpels 1; stigmas 1; styles 1; ovaries superior; locules 1; placentation parietal. **Fruits** drupes; black or red; stones flattened on one or both sides, margins thickened and roughened. **Seeds** 1; cup-shaped or compressed.

The family is represented in Oklahoma by 3 genera and 3 species. All are widely distributed in the deciduous forests of eastern and central Oklahoma. Members of the family have both medicinal and toxic properties.

1. Petals absent. Anthers 2-locular. Drupes elliptical, flattened on one side; stone cup-shaped. ..... ***Calycocarpum***
1. Petals present. Anthers 4-locular. Drupes subglobose to globose, not flattened; stone compressed.
   2. Drupes red. Stamens 6. Leaves not peltate. ..... ***Cocculus***
   2. Drupes black. Stamens 12-24. Leaves peltate. ..... ***Menispermum***

Calycocarpum T. Nuttall ex E. Spach Cupseed

One species. ..... ***C. lyonii***

Cocculus A.P. de Candolle Carolina Snailseed

One species. ..... ***C. carolinus***

Menispermum C. Linnaeus Moonseed

One species. ..... ***M. canadense***

MENYANTHACEAE (B.C.J. Dumortier) B.C.J. Dumortier Bogbean Family

Plants herbs; perennials; perennating organs fleshy roots; floating-leaved aquatics. **Stems** long, stout, creeping or buried in mud and ascending to the surface of the water; branched. **Leaves** simple; opposite; blades deeply cordate; venation palmate; margins crenate; petiole bases enlarged and sheathing stems; stipules absent. **Inflorescences** umbels; axillary. **Flowers** perfect; perianths in 2-series. **Sepals** 5; fused. **Corollas** radially symmetrical; nearly rotate. **Petals** 5; fused; fimbriate, bright yellow. **Stamens** 5; opposite the petals. **Pistils** 1; compound, carpels 2; stigmas 2, linear; styles 1, short; ovaries superior; locules 1; placentation parietal. **Nectaries** present; receptacular. **Fruits** capsules; opening irregularly. **Seeds** numerous; flat; margins fimbriate.

The family is represented in Oklahoma by 1 genus and 1 species. It is included in the Gentianaceae by some taxonomists. Limited to the extreme southeastern counties, plants occasionally proliferate to become a hazard to small boats.

Nymphoides J.F. Sèguier Floating Heart

One species. ..... ***N. peltata***

MOLLUGINACEAE F.G. Bartling Carpetweed Family

Plants herbs; annuals; glabrous or indumentum stellate. **Stems** mat-forming or low-growing; repeatedly forked. **Leaves** simple; opposite or whorled; sessile; blades lanceolate or obovate or spathulate; venation pinnate; stipules absent. **Inflorescences** glomerules; axillary. **Flowers** perfect; perianths in 1-series. **Calyces** radially symmetrical. **Sepals** 4 or 5; free or fused; green to white. **Petals** absent. **Stamens** 3 to 10. **Pistils** 1; compound, carpels 3; stigmas 1 to 3; styles 1 or 3; ovaries superior; locules 3; placentation axile. **Fruits** capsules. **Seeds** numerous.

The family is represented in Oklahoma by 2 genera and 3 species. It has been placed in the Aizoaceae by some taxonomists. Our species are weedy introductions.

1. Stems and leaves tomentose or stellate-tomentose. Flowers sessile or subsessile. ..... ***Glinus***
1. Stems and leaves glabrous. Flowers pedicellate. ..... ***Mollugo***

Glinus C. Linnaeus

1. Sepal apices rounded to acute or mucronate. Capsules 3.6–4.5 mm long.
   Seeds papillate to tuberculate; blackish-brown. ..... ***G. lotoides***
1. Sepal apices long acuminate to attenuate. Capsules 3–3.5 mm long.
   Seeds smooth; reddish or light brown. ..... ***G. radiatus***

Mollugo C. Linnaeus Carpetweed

One species. ..... ***M. verticillata***

MONTIACEAE C.S. Rafinesque Miner's Lettuce Family

Plants herbs; perennials; perennating organs fleshy-woody or tuberous roots; glabrous. **Leaves** fleshy to succulent; cauline or basal or forming a basal rosette; simple; alternate or opposite; sessile; linear; flat or terete; venation not apparent; stipules absent. **Inflorescences** racemose or paniculate cymes; terminal; peduncles short or long and scape-like; bracts 2, sepaloid, subtending each flower. **Flowers** perfect; perianths in 1-series; radially symmetrical; imbricate. **Perianth Parts** 5; petaloid; caducous or persistent; free; of various colors, showy. **Stamens** 4 to 45; opposite the perianth parts; free or filaments fused basally. **Pistils** 1; compound, carpels 3; stigmas 1 or 3; linear or subcapitate or triangular; styles 1; ovaries superior; locules 1 or 3; placentation free-central or basal. **Fruits** capsules; loculicidal; valves 3, persistent or deciduous. **Seeds** 2 to numerous.

The family is represented in Oklahoma by 2 genera and 5 species. These two genera were formerly classified in the Portulacaceae or purslane family. Phylogenetic studies, however, support their placement in the Montiaceae. The perianth is considered by anatomists and morphologists to be in 1-series, the petals absent, the sepals petaloid, and the bracts resembling sepals. Some taxonomists, however, describe the perianth as in 2-series.

1. Basal rosettes present. Peduncles scape-like; 7–10 cm long. Perianth parts uniformly colored.
   Perennating organs fleshy-woody roots. Capsule valves deciduous. ..... ***Phemeranthus***
1. Basal rosettes absent. Peduncles not scape-like; 1–5 cm long. Perianth parts bicolored, veins darker.
   Perennating organs globose tuberous roots. Capsule valves persistent. ..... ***Claytonia***

Claytonia C. Linnaeus Spring Beauty

1. Cauline leaves conspicuously differentiated into blades and petioles; blades 6–10 mm wide,
   oblanceolate or elliptic or ovate. Bracts of inflorescences 2 or more; scale-like; 1–2 mm long. ..... ***C. ozarkensis***
1. Cauline leaves sessile, not well differentiated into blades and petioles; blades 2–7 mm wide,
   linear to linear-oblanceolate. Bracts of inflorescences 1; herbaceous; 1–10 mm long. ..... ***C. virginica***

Phemeranthus C.S. Rafinesque Fameflower

1. Stamens 4–8. Sepals 2.7–4 mm long. ..... ***P. parviflorus***
   (= *Talinum parviflorum*)
1. Stamens 10–45. Sepals 4–8 mm long.
   2. Perianth parts 6.5–8 mm long. Capsules 4–5 mm long. Seeds corrugate-rugose. Stigmas 3; linear. ..... ***P. rugospermus***
      (= *Talinum rugospermum*)
   2. Perianth parts 10–16 mm long. Capsules 6–8 mm long. Seeds smooth. Stigmas 1; subcapitate. ..... ***P. calycinus***
      (= *Talinum calycinum*)

MORACEAE J.H.F. Link Mulberry Family

Plants trees or shrubs or herbs; deciduous; perennials or annuals; armed or not armed with thorns; dioecious or monoecious; shoot exudate viscous or thin; white or colorless. **Leaves** simple; alternate or rarely opposite; petiolate; blades ovate to obovate or cordate or lanceolate; venation palmate or pinnate or pinnipalmate; apices acuminate or acute; margins entire or serrate or palmately lobed or pinnately lobed; stipules present. **Inflorescences** of 1 or 2 types; staminate, pistillate and mixed different; axillary; staminate inflorescences catkins or clusters; pistillate inflorescences catkins or heads or clusters; mixed inflorescences compound cymes. **Flowers** imperfect, staminate and pistillate similar or different; perianths in 1-series. **Calyces** radially symmetrical. **Sepals** 4; fused; appressed or spreading. **Petals** absent. **Stamens** 4; opposite the sepals; androecial rudiments present or absent in pistillate flowers. **Pistils** 1; compound, carpels 2; stigmas 1 or 2, linear, sometimes most of style length; styles 1 or 2, exserted beyond perianths; ovaries superior; locules 1 or 2; placentation apical. **Fruits** achenes or syncarps with fleshy calyces partially or entirely enclosing achenes on frequently fleshy rachises. **Seeds** 1.

The family is represented in Oklahoma by 4 genera and 6 species. Two species are native, and all are woody except the herbaceous, weedy *Fatoua villosa*, hairy crabweed. The family is considered to be part of the Urticaceae by some taxonomists. The fruits of *Morus*, mulberry, and *Maclura*, Osage orange, are important for wildlife.

1. Plants herbs. ..... ***Fatoua***
1. Plants shrubs or trees.
   2. Leaves entire; venation pinnate. Fruits 7–15 cm in diameter. ..... ***Maclura***
   2. Leaves serrate, often lobed; venation palmate or pinnipalmate. Fruits 0.5–2 cm in diameter.
      3. Styles not parted. Fruit globose. Bark smooth. ..... ***Broussonetia***
      3. Styles 2-parted. Fruit short-cylindrical.
         Bark shallowly fissured; plates narrow, scaly. ..... ***Morus***

Broussonetia C.L. L'Hèritier ex E.P. Ventenat Paper Mulberry

One species. ..... ***B. papyrifera***

Fatoua C. Gaudichaud-Beaupré Crabweed

One species. ..... ***F. villosa***

Maclura T. Nuttall Osage Orange

One species. ..... ***M. pomifera***

Morus C. Linnaeus Mulberry

1. Trees with mature leaves.
    2. Leaves 2.5–6 cm long; areas between veins of adaxial surfaces scabrous. ..... ***M. microphylla***
    2. Leaves 6–18 cm long; areas between veins of abaxial surfaces pubescent or glabrous, not scabrous.
        3. Abaxial surfaces of leaves uniformly pubescent; adaxial surfaces scabrous, dark green. Bud scales margins ciliate. Stipules linear. Syncarps 2.5–6 cm long. ..... ***M. rubra***
        3. Abaxial surfaces of leaves glabrous or with tufts of hairs in axils of veins; adaxial surfaces smooth, light green. Bud scales margins smooth. Stipules ovate to ovate-lanceolate. Syncarps 1–2 cm long. ..... ***M. alba***
1. Trees with immature leaves and catkins or with catkins only.
    4. Plants monoecious. ..... ***M. alba***
    4. Plants dioecious.
        5. Trees staminate.
            6. Staminate catkins 1–2 cm long. ..... ***M. microphylla***
            6. Staminate catkins 2.5–5 cm long.
                7. Sepals distinct, 1.5 mm long. Filaments 2–3 mm long. ..... ***M. alba***
                7. Sepals united at base, 2–2.5 mm long. Filaments 3–3.5 mm long. ..... ***M. rubra***
        5. Trees pistillate.
            8. Pistillate catkins 5–8 mm long. Style branches reddish brown. ..... ***M. alba***
            8. Pistillate catkins 8–12 mm long. Style branches whitish.
                9. Ovary ellipsoid or obovoid. Plants found on limestone soils. ..... ***M. microphylla***
                9. Ovary ovoid. Plants of soils other than limestone. ..... ***M. rubra***

MYRICACEAE C. L. von Blume Bayberry Family

Plants shrubs or small trees; evergreen or tardily deciduous; strongly aromatic; dioecious. **Leaves** simple; alternate; blades resinous-punctate, aromatic when crushed, adaxial surfaces shiny, with minute dark glands; abaxial surfaces with bright orange glands, oblanceolate to elliptic; venation pinnate; apices acute to rounded; margins entire or coarsely serrate above middle; bases cuneate to attenuate; stipules absent. **Inflorescences** catkins, staminate and pistillate similar; axillary; bracts present, 1 per staminate flower, 2 to 6 per pistillate flower. **Flowers** imperfect, staminate and pistillate similar; perianths absent. **Sepals** absent. **Petals** absent. **Stamens** 2 to 8; fused by filaments at base or free; anthers yellow to reddish yellow. **Pistils** 1; compound, carpels 2; stigmas 2, linear, spreading; styles 1, short or not apparent; ovaries superior; locules 1; placentation basal. **Fruits** drupes; globose; verrucose; covered with white waxy coating. **Seeds** 1.

The family is represented in Oklahoma by 1 genus and 1 species. Occurring only in the southeastern corner of McCurtain County, it is found along streams and in wet woodlands. The fruit's waxy covering has been used to make fragrant candles.

Morella J. de Loureiro Wax Myrtle

One species. ..... ***M. cerifera***
(= *Myrica cerifera*)

NARTHECIACEAE E.P. Fries ex J. Bjurzon Colic-Root Family

Plants scapose herbs; perennials; perennating organs short rhizomes or crowns; acaulescent; **Root Systems** fibrous. **Leaves** forming dense basal rosettes; simple; alternate; venation parallel; blades linear to linear-elliptic or lanceolate; stipules absent. **Inflorescences** spicate racemes; bracts 2 per flower, subulate; scapes 2 to 10 cm long; **Flowers** showy; perfect; perianths in 1-series; tubular or campanulate; radially symmetrical. **Perianth Parts** 6; petaloid; fused; persistent. **Stamens** 6; included within perianths; filaments fused to perianth parts near top of tubes. **Pistils** 1; compound, carpels 3; stigmas 3, minute; styles 1, distally 3-lobed; ovaries partially inferior; locules 3; placentation axile. **Hypanthia** present. **Nectaries** absent**. Fruits** capsules; loculicidal; beaked; enclosed by withered perianths. **Seeds** numerous; minute; fusiform.

The family is represented in Oklahoma by 1 genus and 2 species. *Aletris* was formerly classified in the Liliaceae or lily family. Phylogenetic studies, however, support its placement in the Nartheciaceae.

Aletris C. Linnaeus Colic-Root[1]

1. Perianths yellow; campanulate; 5–7 mm long; lobes triangular, erect. ..... ***A. aurea***
1. Perianths white; tubular; 7–9 mm long; lobes ovate, recurved. ..... ***A. farinosa***

[1] Treatment contributed by Patricia Weigant

NELUMBONACEAE B.C.J. Dumortier Lotus Family

Plants herbs; perennials; perennating organs rhizomes; floating-leaved or emergent aquatics; sap white. **Leaves** arising directly from rhizomes; simple; alternate; blades orbicular; peltate; venation palmate, primary veins dichotomous; margins entire; petioles elongate; stout; bearing blades at or above water surface; stipules present, 1, sheathing. **Inflorescences** solitary flowers; axillary; peduncles stout; bearing flowers above water surface. **Flowers** perfect; 10 to 30 cm in diameter; perianths in 1-series; radially symmetrical**. Perianth Parts** 22 to 30; spiraled; free; greenish yellow to pale yellow; outer sepaloid and inner petaloid. **Stamens** 200 to 400; spiraled; connectives extending beyond anther sacs as projections. **Pistils** 12 to 40; free; simple, carpels 1; borne in cavities of the enlarged obconic, spongy receptacle with only the stigmas protruding; stigmas 1; styles absent; ovaries superior; locules 1; placentation apical. **Fruits** nuts; each loose in cavities of enlarged receptacle. **Seeds** 1.

The family is represented in Oklahoma by 1 genus and 1 species. It has been placed in the Nymphaeaceae by some taxonomists. Lotus typically establishes large populations in ponds, lakes, and slow-moving streams. The rootstocks and fruits are eaten by both wildlife and humans.

Nelumbo M. Adanson Lotus Lily

One species. ..... ***N. lutea***

NYCTAGINACEAE A.L. de Jussieu Four-O-Clock Family

Plants herbs; perennials or annuals; perennating organs fleshy or woody roots; nodes typically swollen. **Leaves** simple; opposite; petiolate or sessile; venation pinnate; stipules absent. **Inflorescences** simple cymes; usually bracteate or variously involucrate; terminal or axillary or both; bracts present, free or fused, often calyx-like and enclosing flowers, may be persistent or accrescent in age, green or brilliantly colored. **Flowers** perfect; chasmogamous or cleistogamous; perianths in 1-series. **Calyces** radially symmetrical or nearly so; salverform or funnelform or campanulate; persistent on fruits. **Sepals** 5; fused; greenish yellow or white or pink or red to purple; petaloid. **Petals** absent. **Stamens** 1 to 7, usually 5; of unequal lengths; free or fused by filaments. **Pistils** 1; simple, carpels 1; stigmas 1, capitate; styles 1, short, filiform; ovaries superior; locules 1; placentation basal. **Nectaries** present; on staminal disk. **Anthocarps** present. **Fruits** achenes. **Seeds** 1.

The family is represented in Oklahoma by 5 genera and 11 species. It is primarily a tropical family with greatest abundance in the New World. A casual examination of the flowers may give the impression of a perianth in 2-series. However, the petals are absent, the tubular calyx is usually petaloid, and the involucre of bracts subtending the inflorescence may mimic a calyx.

1. Involucral bracts subtending individual flowers.
    2. Calyces 1–1.5 mm long. ..... ***Boerhavia***
    2. Calyces 7–60 mm long.
        3. Anthocarps winged; 6–7 mm long. Calyces greenish yellow. ..... ***Acleisanthes***
        3. Anthocarps ribbed; 5 mm long. Calyces white or pink or red to purple. ..... ***Mirabilis***
1. Involucral bracts subtending flower clusters.
    5. Involucral bracts fused. Anthocarps not winged; ribbed or smooth. ..... ***Mirabilis***
    5. Involucral bracts free. Anthocarps 2–5 winged.
        6. Inflorescences paniculate clusters; flowers 3. Calyces 5–8 mm long.
            Anthocarps 3–4.5 mm long; 2-winged. Involucral bracts 1. ..... ***Allionia***
        6. Inflorescences capitate clusters; flowers numerous. Calyces 10–30 mm long.
            Anthocarps 5–10 mm long; 5-winged. Involucral bracts 5. ..... ***Abronia***

Abronia A.L. de Jussieu

One species. ..... ***A. fragrans***

Acleisanthes A. Gray Moonpod

One species. ..... ***A. diffusa***
(= *Selinocarpus diffusus*)

Allionia C. Linnaeus

One species. ..... ***A. incarnata***

Boerhavia C. Linnaeus

One species. ..... ***B. erecta***

Mirabilis C. Linnaeus Four O-Clock

1. Anthocarps terete or weakly 5-ribbed in cross-section; ovoid or ellipsoid.
    2. Perianths 2–6 cm long. Flowers or anthocarps 1 per involucre. ..... ***M. jalapa***
    2. Perianths 0.5–1.8 cm long. Flowers or anthocarps 3 per involucre. ..... ***M. oxybaphoides***
1. Anthocarps strongly 5-ribbed in cross section; obovoid or fusiform.
    3. Anthocarps glabrous or sparsely puberulent, hairs 0.1 mm long. ..... ***M. glabra***
    3. Anthocarps puberulent to densely pubescent, hairs 0.3–0.6 mm long.
        4. Largest leaf blades linear to linear-lanceolate; 1–10 mm wide. Involucral hairs with purple or black cross walls. Tubercules of anthocarp ribs absent or present only near apices. Longitudinal furrows of anthocarps conspicuously cross-rugose. ..... ***M. linearis***
        4. Largest leaf blades linear-lanceolate to ovate; 10–80 mm wide. Involucral hairs with colorless cross walls. Tubercules of anthocarp ribs present from bases to apices. Longitudinal furrows of anthocarps not cross-rugose.
            5. Stems not or slightly branched. ..... ***M. gigantea***
            5. Stems profusely branched.
                6. Leaf bases acute to attenuate. Leaves sessile or subsessile; petioles 1–2 mm long. Cymes both terminal and axillary. Stems whitish. ..... ***M. albida***
                6. Leaf bases truncate or obtuse or cordate. Leaves subsessile to petiolate; petioles 2–20 mm long. Cymes only terminal. Stems purplish or greenish-red. ..... ***M. nyctaginea***

NYMPHAEACEAE R.A. Salisbury Water-Lily Family

Plants herbs; perennials; perennating organs rhizomes; floating-leaved aquatics. **Leaves** simple; alternate; blades orbicular to ovate or sagittate; venation palmate or pinnate, primary veins dichotomous; margins entire; bases cordate or cleft; petioles elongate; bearing blades at water surface; stipules present. **Inflorescences** solitary flowers; axillary; peduncles bearing flowers at or above water surface. **Flowers** perfect; perianths in 2-series. **Sepals** 4 to 6; free; appressed or spreading; green or yellow. **Corollas** radially symmetrical. **Petals** numerous; showy or inconspicuous and stamen-like; free; yellow or reddish brown or white or pink or blue. **Stamens** numerous; spiraled; laminar to petaloid to filamentous. **Pistils** 1; compound, carpels 10 to 25; stigmas 1; 7 or more lobed or not lobed and with only radiating stigmatic lines, discoid; styles absent; ovaries superior; locules 10 to 25; placentation parietal. **Nectaries** present or absent; petaliferous or borne on pistils. **Fruits** berries; spongy; indehiscent or dehiscent; opening irregularly. **Seeds** numerous; with or without arils.

The family is represented in Oklahoma by 2 genera and 2 species, *Nuphar lutea*, spatterdock, and *Nymphaea odorata*, white water-lily. The family is combined with the Nelumbonaceae by some taxonomists. Both genera are encountered in shallow ponds, lakes, and slow streams. They provide food and cover for wildlife and were eaten and used medicinally by Native Americans.

1. Leaves ovate to suborbicular or subsagittate. Venation pinnate. Sepals 5 or 6. Petals yellow or reddish brown. Berries ovoid or urceolate. Seeds without arils. ..... ***Nuphar***
1. Leaves orbicular. Venation palmate. Sepals 4. Petals white or rarely pink or blue. Berries globose or depressed globose. Seeds with arils. ..... ***Nymphaea***

Nuphar J.E. Smith Yellow Water-Lily

One species. ..... ***N. lutea***

Nymphaea C. Linnaeus Water-Lily

One species. ..... ***N. odorata***

NYSSACEAE B.C.J. Dumortier Sour Gum Family

Plants trees; deciduous; polygamo-dioecious. **Leaves** simple; alternate; blades ovate or obovate or elliptic or oblong; venation pinnate; apices broadly rounded to acute or acuminate; margins entire or rarely dentate; bases cuneate or rounded; stipules absent. **Inflorescences** of 2 types, staminate and pistillate different. **Staminate Inflorescences** capitate clusters; axillary; bracts absent; peduncles long. **Pistillate Inflorescences** solitary flowers or 2- to several-flowered clusters; axillary; bracts present, conspicuous, often foliaceous; peduncles long. **Flowers** imperfect or perfect, staminate and pistillate similar, pistillate larger; perianths in 2-series. **Sepals** 5; fused; lobes minute. **Corollas** radially symmetrical. **Petals** 5 to 10; caducous; free; green or greenish white. **Stamens** 5 to 15; androecial rudiments present in pistillate flowers, 5 to 10. **Pistils** 1; compound, carpels 2; stigmas 1 or rarely 2; styles 1 or rarely 2; ovaries inferior; locules 1 or rarely 2; placentation apical; gynoecial rudiments absent in staminate flowers. **Fruits** drupes. **Seeds** 1 or rarely 2.

The family is represented in Oklahoma by 1 genus and 1 species. It has been placed in the Cornaceae by some taxonomists. Plants are encountered along the edges of swamps and in wet, poorly drained soils primarily in the southeastern 1/4 of the state.

Nyssa J.F. Gronovius ex C. Linnaeus Black Gum

One species. ..... ***N. sylvatica***

OLEACEAE J.C. von Hoffmannsegg and J.H.F. Link Olive Family

Plants trees or small trees or shrubs; deciduous; dioecious or polygamo-dioecious or bearing perfect flowers. **Leaves** simple or 1-pinnately compound; opposite or occasionally subopposite; venation pinnate; stipules absent. **Inflorescences** panicles or glomerules; terminal or axillary. **Flowers** perfect or imperfect, staminate and pistillate similar; perianths absent or in 1-series or 2-series. **Calyces** radially symmetrical. **Sepals** 4 or 6 to 12 or absent; persistent or caducous; fused. **Corollas** radially symmetrical. **Petals** 4 or 6 to 12 or absent; fused or free; white. **Stamens** 2 to numerous. **Pistils** 1 to 6; compound, carpels 2; stipitate or sessile; stigmas 1, 2-lobed; styles 1; ovaries superior; locules 1 or 2; placentation axile; ovules 1 or 2 per locule. **Nectaries** absent or present; receptacular or borne on ovary. **Fruits** drupes or samaras or berries. **Seeds** 1 to 4.

The family is represented in Oklahoma by 4 genera and 7 species. Only *Ligustrum sinense,* privet, is introduced. Widely used as a hedge, it is naturalized in bottomland forests.

1. Flowers appearing before leaves. Perianths in 1-series or absent. Corollas absent.
   2. Inflorescences panicles. Fruits samaras. Leaves 1-pinnately compound. ..... ***Fraxinus***
   2. Inflorescences glomerules. Fruits drupes. Leaves simple. ..... ***Forestiera***
1. Flowers appearing with or after leaves. Perianths in 2-series. Corollas present.
   3. Petioles 1–3 mm long. Panicles erect; terminal. Corollas 3–6 mm long; lobes triangular, entire. ..... ***Ligustrum***
   3. Petioles 10–20 mm long. Panicles drooping; axillary. Corollas 15–30 mm long; lobes linear, cleft. ..... ***Chionanthus***

Chionanthus C. Linnaeus Fringetree

One species. ..... ***C. virginicus***

Forestiera J.L.M. Poiret

1. Leaves 4–10 cm long; apices acuminate; petioles 5–11 mm long. Twigs glabrous. Pistillate flowers 18–30 per glomerule. Drupes 9–18 mm long. Plants of wet habitats. ..... ***F. acuminata***
1. Leaves 1–3.8 cm long; apices rounded to acute; petioles 2–5 mm long. Twigs pubescent. Pistillate flowers 3–12 per glomerule. Drupes 5–7 mm long. Plants of rocky dry habitats. ..... ***F. pubescens***

Fraxinus C. Linnaeus Ash

1. Twigs 4-sided. Samaras deciduous in autumn; 4.5–8 mm wide; wings extending to base. ..... ***F. quadrangulata***
1. Twigs terete. Samaras persisting to midwinter or spring; 0.8–3.3 mm wide; wings not extending to base.
   2. Terminal buds rounded; wider than long. Leaf scars openly U-shaped. Petiolules 5–15 mm long. Samara wings terminal or decurrent less than 1/3 length of body. ..... ***F. americana***
   2. Terminal buds acute to acuminate; longer than wide. Leaf scars suborbicular, upper margin shallowly notched. Petiolules 0.5–5 mm long. Samara wings decurrent 1/2–3/4 length of body. ..... ***F. pennsylvanica***

Ligustrum C. Linnaeus Privet

One species. ..... ***L. sinense***

ONAGRACEAE A.L. de Jussieu Evening Primrose Family

Plants herbs; perennials or annuals or biennials; perennating organs caudices or crowns; terrestrial, or emergent or floating or floating-leaved aquatics. **Leaves** cauline or forming a basal rosette; simple; alternate or opposite; petiolate or sessile; blades linear or lanceolate or ovate; venation pinnate; margins entire or dentate or pinnatifid; stipules absent or present; persistent. **Inflorescences** solitary flowers or spikes or racemes; axillary or terminal; bracts present or absent. **Flowers** fragrant or not fragrant; perfect; perianths in 2-series or 1-series. **Calyces** radially symmetrical. **Sepals** 2 to 6, usually 4; persistent or caducous; free. **Corollas** radially or bilaterally symmetrical due to petal orientation. **Petals** 0 to 6, usually 4; persistent or caducous; free; yellow or pink or white or purple. **Stamens** 2 or 4 or 6 or 8 or 10; exserted beyond perianths; free; anthers versatile or basifixed; pollen held or not held by viscin threads. **Pistils** 1; compound, carpels 2 to 5, usually 4; stigmas 1, usually 4-lobed; capitate or linear or discoid; styles 1, exserted beyond perianths; ovaries inferior, lobed or terete, lobes 4 or 3; locules 1 to 5, usually 4; placentation axile; ovules numerous or 1 to 4. **Hypanthia** absent or present; tubular or cup-shaped. **Nectaries** present; hypanthial or borne at bases of styles. **Fruits** capsules or nutlets; septicidal or loculicidal or poricidal. **Seeds** numerous or 1 to 4.

The family is represented in Oklahoma by 4 genera and 43 species. Cosmopolitan, its center of distribution is the western U.S. and Mexico. Its members occupy both prairies and wetlands. Taxonomic differences of opinion are primarily at the genus level.

1. Sepals 2. Fruits with bristles. ..... ***Circaea***
1. Sepals 3-5, usually 4. Fruits glabrous or pubescent, but not with bristles.
   2. Hypanthia tubular. Plants of dry to mesic forests and grasslands. ..... ***Oenothera***
   2. Hypanthia cup-shaped. Plants of wetlands or aquatic habitats.
      3. Petals white or pink. ..... ***Epilobium***
      3. Petals yellow or absent. ..... ***Ludwigia***

Circaea C. Linnaeus Enchanter's Nightshade

One species. ..... ***C. lutetiana***

Epilobium C. Linnaeus Willow Herb

1. Leaf margins entire; revolute. Stolons present; filiform. ..... ***E. leptophyllum***
1. Leaf margins serrate; not revolute. Stolons absent.
   2. Sepals of mature flower buds appressed. Teeth of leaf margins 2–5 per cm. Seeds beaked. ..... ***E. ciliatum***
   2. Sepals of mature flower buds spreading. Teeth of leaf margins 4–8 per cm. Seeds not beaked. ..... ***E. coloratum***

Ludwigia C. Linnaeus Primrose Willow

1. Stamens 8 or 10. Capsules 4 times longer than wide.
   2. Stamens 8. Petals 4. Sepals 4. Stems conspicuously 4-winged. Leaves decurrent. Capsules conspicuously 4-winged; obpyramidal. ..... ***L. decurrens***
      (= *Jussiaea decurrens*)
   2. Stamens 10. Petals 5. Sepals 5. Stems not 4-winged. Leaves not decurrent. Capsules not 4-winged; cylindrical to subcylindrical.

3. Fruiting pedicels 2–15 mm long. ..... ***L. leptocarpa***
(= *Jussiaea leptocarpa*)

3. Fruiting pedicels 20–60 mm long.
4. Upper stems glabrate or sparsely pubescent. Bracteoles deltoid. Sepals 4–12 mm long. Petals 7–14 mm long. ..... ***L. peploides***
(= *Jussiaea peploides*, *J. repens*)

4. Upper stems densely pubescent, hairs long, spreading. Bracteoles lanceolate. Sepals 15–30 mm long. Petals 12–23 mm long. ..... ***L. grandiflora***
(= *L. uruguayensis*, *Jussiaea grandiflora*)

1. Stamens 4. Capsules 1–2 times longer than wide.
5. Leaves opposite. Stems creeping; rooting at nodes.
6. Capsules with longitudinal green bands. Flowers sessile. Petals absent. ..... ***L. palustris***
6. Capsules without longitudinal green bands. Flowers subsessile or pedicellate, pedicels 0.5–1.5 mm long. Petals present; caducous. ..... ***L. repens***
5. Leaves alternate. Stems erect; not rooting at nodes.
7. Petals absent. Flowers sessile or subsessile. Capsules 1.5–2.5 mm in diameter. ..... ***L. glandulosa***
7. Petals present. Flowers pedicellate. Capsules 4–8 mm in diameter.
8. Plants glabrous or stigulose; hairs incurved, less than 1 mm long. Leaf bases cuneate. Sepals of mature capsules ovate to ovate-lanceolate; as long as fruits. ..... ***L. alternifolia***
8. Plants hirsute; hairs spreading, 1–2 mm long. Leaf bases rounded. Sepals of mature capsules lanceolate-deltoid; longer than fruits. ..... ***L. hirtella***

Oenothera C. Linnaeus Evening Primrose[1]

1. Corollas at anthesis yellow.
2. Stigmas discoid or clavate.
3. Plants annuals; from taproots. Leaves filiform. ..... ***O. linifolia***
3. Plants perennials; from caudices. Leaves narrowly linear to ovate.
4. Sepal midribs keeled. Stamens of 2 lengths. Flower buds sharply 4-angled. Hypanthia 4-angled; 1–2 cm long. Petal margins crenulate. Flowers opening at sunrise.
5. Stigmas longer than or equal to apices of outer anthers. ..... ***O. berlandieri***
(= *Calylophus berlandieri*)

5. Stigmas shorter than or equal to bases of outer anthers. ..... ***O. serrulata***
(= *Calylophus serrulatus*)

4. Sepal midribs not keeled. Stamens subequal. Flower buds terete. Hypanthia terete; 2–5 cm long. Petal margins toothed or entire, but not crenulate. Flowers opening in late afternoon or at sunset.
6. Ovaries with long, spreading hairs. Leaf bases abruptly narrowed or truncate or clasping. ..... ***O. hartwegii***
(= *Calylophus hartwegii*, *Oenothera greggii*)

6. Ovaries strigose or glabrous. Leaf bases gradually tapering.
7. Leaves linear. Ovaries gray-strigose. Sepal apices 0.3–2 mm long. ..... ***O. lavandulifolia***
(= *Calylophus lavandulifolius*)

7. Leaves narrowly ovate to lanceolate-linear. Ovaries glabrous. Sepal apices 2–6 mm long. ..... ***O. hartwegii***
(= *Calylophus hartwegii*)

2. Stigmas 4-lobed, lobes linear.
8. Ovaries and capsules winged.
9. Plants acaulescent. Flowers basal. Sepals 1–1.8 cm long. Petals 1–2 cm long. Corollas pale yellow. Capsules winged distally. ..... ***O. triloba***
9. Plants caulescent; stems trailing, up to 50 cm long. Flowers cauline; axillary. Sepals 2–4 cm long. Petals 2–5 cm long. Corollas dark yellow. Capsules winged from apices to bases. ..... ***O. macrocarpa***
(= *O. missouriensis*)

8. Ovaries and capsules not winged.
10. Ovaries and capsules clavate. Seeds clustered, not in rows. ..... ***O. spachiana***
10. Ovaries and capsules ovoid to cylindrical. Seeds in 1 or 2 rows.

11. Hypanthia 6–9 cm long. ..... ***O. jamesii***
11. Hypanthia 0.1–5 cm long.
12. Ovaries and capsules 1–2 times longer than wide. ..... ***O. fruticosa***
12. Ovaries and capsules 4–10 times longer than wide.
13. Capsules 4–6 mm wide.
14. Petals 2–4 cm long. ..... ***O. elata***
(= *O. biennis* var. *hirsutissima*)
14. Petals 1–2 cm long.
15. Plants green. Flowers and capsules sparsely hirsute.
Glandular hairs absent. Inflorescences densely flowered. ..... ***O. biennis***
15. Plants grayish. Flowers and capsules densely villous.
Glandular hairs present. Inflorescences few flowered. ..... ***O. villosa***
(= *O. biennis* var. *canescens*)
13. Capsules 2–3 mm wide.
16. Inflorescences elongate spikes; terminal.
Petals rhombic-obovate. ..... ***O. rhombipetala***
(= *O. heterophylla* var. *rhombipetala*)
16. Inflorescences solitary flowers; axillary. Petals obovate.
17. Petals 0.5–1.8 cm long. Sepals 0.5–1.2 cm long. ..... ***O. laciniata***
17. Petals 2.5–4 cm long. Sepals 2–3 cm long. ..... ***O. grandis***
1. Corollas at anthesis white or pink, or white or pink with dark pink to reddish spots or splotches.
18. Petals 2.5–4 cm long. Seeds numerous.
19. Corollas with dark pink to reddish spots or splotches on a white or pink or pink. background. Capsules beaked; 7–8 mm long; indehiscent. Plants of playas of Panhandle. ..... ***O. canescens***
19. Corollas not spotted nor splotched, either uniform in color or veins of a different color. Capsules not beaked; 10–45 mm long; dehiscent. Plants of various sites throughout state, but not playas.
20. Anthers 10–12 mm long. Capsules clavate; bases stipe-like. Seeds clustered, not in distinct rows. ..... ***O. speciosa***
20. Anthers 4–10 mm long. Capsules cylindric to narrowly lanceolate; bases not stipe-like. Seeds in 1 or 2 rows.
21. Petal apices obtuse. Capsules not ribbed nor 4-angled. Seeds dark brown to blackish with purplish dots. Plants perennials. ..... ***O. pallida***
(= *O. latifolia*)
21. Petal apices emarginate. Capsules ribbed or 4-angled. Seeds yellowish or reddish brown. Plants annuals.
22. Stems strigulose or sparsely villous. Sepals with broad pale reddish purple stripe. Seeds in 2 rows in each locule; yellowish-brown. Capsules erect; ribbed; pubescent. ..... ***O. albicaulis***
22. Stems densely villous. Sepals uniformly green. Seeds in 1 row in each locule; reddish brown. Capsules spreading; weakly 4-angled; hirsute. ..... ***O. engelmannii***
18. Petals 0.5–1.5 cm long. Seeds 1–4.
23. Corollas white, never pink; radially symmetrical. Hypanthia 2 times length of ovary. ..... ***O. glaucifolia***
(= *Stenosiphon linifolius, S. virgatus*)
23. Corollas pink or white turning pink in age; bilaterally symmetrical, petals all oriented on upper part of flower. Hypanthia about as long as the ovary.
24. Stipes of mature capsules present, 1.5–8.5 mm long [may be pedicel-like]. Plants perennials; from woody caudices or rhizomes.
25. Hypanthia 5.5–9 mm long; cylindrical. Mature capsules including stipes 4.5–7.5 mm long. ..... ***O. suffrutescens***
(= *Gaura coccinea*)
25. Hypanthia 2–4.5 mm long; funnelform. Mature capsules including stipes 7.5–23 mm long.
26. Stems villous to lanate. Bases of mature capsules abruptly tapered. ..... ***O. cinerea***
(= *Gaura villosa*)

26. Stems glabrous or strigulose; sometimes villous near bases.
Bases of mature capsules gradually tapered. ..... ***O. sinuosa***
(= *Gaura sinuata*)

24. Stipes of mature capsules absent or if present less than 1 mm long.
Plants annuals; from taproots.
27. Mature capsules fusiform; weakly angled; not furrowed.
Anthers oval; 0.5–1 mm long. Petals 2–4 mm long. ..... ***O. curtiflora***
(= *Gaura parviflora*)

27. Mature capsules ellipsoid or pyramidal; distinctly angled;
conspicuously furrowed. Anthers linear; 2–5 mm long.
Petals 3.5–17 mm long.
28. Edges of mature capsules not winged. Stems strigulose,
sometimes glandular and/or long spreading hairs present.
Plants flowering July-November. Plants 58-285 cm tall.
29. Petals 6-11.5 mm long. Flowers opening near sunset and
usually withering by next morning. ..... ***O. filiformis***
(= *Gaura longiflora*)

29. Petals 12–17 mm long. Flowers opening near sunrise and
withering the same afternoon. ..... ***O. demareei***
(= *Gaura demareei*)

28. Edges of mature capsules winged. Stems villous.
Plants flowering March-June. Plants 14-62 cm tall.
30. Flowers of 1 plant 3-merous, rarely 4-merous.
Capsules of 1 plant 3-angled, rarely 4-angled. ..... ***O. triangulata***
(= *Gaura triangulata*)

30. Flowers of 1 plant 4-merous, rarely 3-merous.
Capsules of 1 plant 4-angled, rarely 3-angled.
31. Sepals glabrous. Bracts 4–9 mm long. Capsules ellipsoid. ..... ***O. suffulta***
(= *Gaura suffulta*)

31. Sepals strigulose. Bracts 2–4 mm long. Capsules pyramidal. ..... ***O. patriciae***
(= *Gaura brachycarpa*)

[1] Couplets to taxa formally recognized as species of *Gaura* based on a treatment contributed by Gloria D. Hoggard

ONOCLEACEAE R.E.G. Pichi Sermolli Sensitive Fern Family

Plants herbs; perennials from rhizomes; needle-like hairs absent; producing sporangia enclosed in ultimate segments of fertile fronds. **Rhizomes** branching or not branching; scales present. **Fronds** of 2 types, sterile and fertile different; vernation circinate; stipitate. **Sterile Fronds** deciduous; simple, pinnatifid to 1-pinnately pinnatifid at bases; ascending; blades deltoid, lobes and pinnae opposite or subopposite; margins entire to sinuate; venation dichotomous, veins dichotomous, anastomosing; areoles with veinlets absent; auricles absent; stipes with scales present. **Fertile Fronds** with stipe bases persistent; green turning dark brown; 2-pinnately compound; blades linear to oblong; pinnae clustered distally, opposite, resembling ascending branches, pinnules opposite. **Sori** borne on veins; tightly enclosed by revolute margins of hardened pinnules; orbicular; indusia vestigial, attached beneath sori; enclosing sporangia or beneath sori at one side. **Sporangia** all alike; annuli present, vertical. **Spores** all alike; green; reniform or oblong. **Gametophytes** all alike; green; cordate.

The family is represented in Oklahoma by 1 genus and 1 species. *Onoclea* and 3 other genera were formerly classified as a tribe within the Dryopteridaceae or wood fern family. Phylogenetic studies, however, support its recognition as a distinct family.

Onoclea C. Linnaeus Sensitive Fern

One species. ..... ***O. sensibilis***

OPHIOGLOSSACEAE C.A. Agardh Adder's-Tongue Family

Plants herbs; perennials; perennating organs fleshy erect subterranean stems; producing sporangia in aggregations at ends of elongated stalks. **Roots** fleshy. **Fronds** all alike; divided into sterile and fertile segments; vernation erect; blades of sterile segments simple or 1-pinnately to 3-pinnately compound; fertile segments simple or 1-pinnately to 2-pinnately compound; stipes with stipules at base, terete, stout, succulent, sheaths open or closed. **Sori** absent. **Sporangia** all alike; annuli absent. **Spores** all alike. **Gametophytes** all alike; not green; mycotrophic; growing below the soil surface; orbicular to ovate or linear.

The family is represented in Oklahoma by 2 genera and 9 species, all native.

1. Blades of sterile segment of fronds 1- to 3-pinnately compound. Fertile segments of fronds 1- or 2-pinnately compound. Veins not anastomosing. Sporangia stalked or sessile, not embedded. ..... ***Botrychium***
1. Blades of sterile segment of fronds simple. Fertile segments of fronds simple. Veins anastomosing. Sporangia embedded. ..... ***Ophioglossum***

Botrychium O. Swartz Grape Fern

1. Sheath margins overlapping. Blades of sterile segments of fronds sessile. ..... ***B. virginianum***
1. Sheath margins fused. Blades of sterile segments of fronds stipitate.
    2. Blades of sterile segments of fronds prostrate; ultimate segments flabellate or reniform; midveins absent. ..... ***B. lunarioides***
    2. Blades of sterile segments of fronds erect to ascending; ultimate segments oblong; midveins present.
        3. Proximal pinnae of blades of sterile segments pinnatisect to 1-pinnately compound; bases of ultimate segments cuneate. ..... ***B. biternatum***
        3. Proximal pinnae of blades of sterile segments 1-pinnate-pinnatisect to 1-pinnately compound; bases of ultimate segments truncate or obtuse. ..... ***B. dissectum***

Ophioglossum C. Linnaeus Adder's Tongue

1. Rootstocks corm-like; globose; bearing terminal cavity. ..... ***O. crotalophoroides***
1. Rootstocks not corm-like; cylindrical; not bearing terminal cavity.
    2. Apices of sterile segment of fronds mucronate.
        3. Blades of sterile segments of fronds spreading parallel to ground. Fertile segment of fronds 3–7 mm long. ..... ***O. nudicaule***
        3. Blades of sterile segments of fronds erect or ascending. Fertile segment of fronds 15–30 mm long. ..... ***O. engelmannii***
    2. Apices of sterile segment of fronds rounded to acute.
        4. Fronds 1 per rootstock. Apices of sterile segment of blades rounded. ..... ***O. vulgatum***
        4. Fronds 2 or 3 per rootstalk. Apices of sterile segment of blades acute.
            5. Sporangial aggregations 3–7 mm long. Rootstocks subglobose. Roots yellowish to pale brown. ..... ***O. nudicaule***
            5. Sporangial aggregations 10–12 mm long. Rootstocks cylindrical. Roots dark brown. ..... ***O. petiolatum***

ORCHIDACEAE A.L. de Jussieu Orchid Family

Plants herbs; perennials; perennating organs rhizomes or tubers or corms or fleshy roots or pseudobulbs; autophytic or saprophytic or mycotrophic; caulescent or acaulescent. **Root Systems** absent or present; fibrous. **Leaves** basal or forming a basal rosette or cauline or tubular sheaths; simple; alternate or opposite or whorled; with basal sheaths; venation parallel or parallel-convergent; margins entire; stipules absent. **Inflorescences** solitary flowers or spikes or racemes; terminal or axillary; bracts present. **Flowers** perfect; chasmogamous or cleistogamous; perianths in 2-series; resupinate or not resupinate. **Calyces** bilaterally symmetrical. **Sepals** 3 (may appear to be two); free or fused; petaloid; green or white or brightly colored. **Corollas** bilaterally symmetrical or asymmetrical; imbricate. **Petals** 3; of 2 forms; 1 larger, modified into lip (labellum); 2 smaller, resembling the sepals; free or fused; of various colors. **Stamens** 1 or 2; fused to style and stigma forming column (gynostemium); pollen in pollinia. **Pistils** 1; compound, carpels 3; stigmas 3, 3-lobed (all fertile, or 2 fertile and 1 sterile and enlarged (rostellum); styles 1; ovaries inferior; locules 1; placentation parietal. **Nectaries** present; 1; petaliferous; often modified into elongate spurs. **Fruits** capsules; usually dehiscent by 3 longitudinal slits but remaining closed at top and bottom. **Seeds** usually several thousand; minute.

The family is represented in Oklahoma by 19 genera and 33 species. One of the two largest families of flowering plants, it is cosmopolitan in distribution but most abundant in the tropics. Our taxa occupy a variety of habitats including open prairies, shaded forest floors, and sphagnum bogs.

1. Leaves absent at flowering time or reduced to sheaths.
    2. Plants without chlorophyll.
        3. Rhizomes with annular scale scars. Lips 16–18 mm long. ..... ***Hexalectris***
        3. Rhizomes without annular scale scars. Lips 4–7 mm long. ..... ***Corallorhiza***
    2. Plants with chlorophyll.
        4. Inflorescences racemes. Perianths with combinations of brown or maroon or green or greenish yellow.
            5. Lips 4–8 mm long; spurs present. Capsules 0.8–1.4 mm long; 0.4–0.5 mm in diameter. ..... ***Tipularia***
            5. Lips 10–15 mm long; spurs absent. Capsules 1.7–2.2 mm long; 0.8–0.9 mm in diameter. ..... ***Aplectrum***
        4. Inflorescences spikes. Perianths white to creamy white. ..... ***Spiranthes***
1. Leaves present at flowering time.
    6. Leaves one.
        7. Leaves basal; linear to linear-lanceolate. Flowers not resupinate. ..... ***Calopogon***
        7. Leaves cauline; lanceolate to ovate or elliptic. Flowers resupinate.
            8. Perianths pink to rose or white. ..... ***Pogonia***
            8. Perianths green. ..... ***Malaxis***
    6. Leaves two or more.
        9. Leaves basal.
            10. Leaves 2. Inflorescences racemes. Perianths maroon or green. ..... ***Liparis***
            10. Leaves 3 or more. Inflorescences spikes. Perianths white or creamy white.
                11. Leaves with white veins or markings. Lips saccate. ..... ***Goodyera***
                11. Leaves without white veins or markings. Lips not saccate. ..... ***Spiranthes***
        9. Leaves cauline.
            12. Leaves opposite or whorled.
                13. Leaves 5–6; whorled. Sepals 35–60 mm long. ..... ***Isotria***
                13. Leaves 2; opposite. Sepals 1.5–2 mm long. ..... ***Neottia***
            12. Leaves alternate.
                14. Lips saccate. Anthers 2. ..... ***Cypripedium***
                14. Lips not saccate. Anthers 1.
                15. Lips without spurs.
                16. Perianths greenish maroon. Leaves plicate. ..... ***Epipactis***
                16. Perianths white or pink. Leaves not plicate.
                17. Flowers 1–3; pedicellate. ..... ***Triphora***
                17. Flowers 6–numerous; sessile. ..... ***Spiranthes***
                15. Lips with spurs.
                18. Lips entire.
                19. Flowers lavender and white. ..... ***Galearis***
                19. Flowers greenish white to white. ..... ***Gymnadeniopsis***
                18. Lips 3 parted or fringed or both.
                20. Lips or lip parts fringed. ..... ***Platanthera***
                20. Lips or lip parts not fringed. ..... ***Habenaria***

Aplectrum T. Nuttall Adam & Eve

One species. ..... ***A. hyemale***

Calopogon R. Brown Grass-Pink

1. Flowering stems and leaves subequal in length. Flowers opening simultaneously. Hairs at tips of lips pink. Hairs at bases of lips yellow. ..... ***C. oklahomensis***
1. Flowering stems much longer than leaves. Flowers opening sequentially. Hairs at tips of lips golden yellow. Hairs at bases of lips magenta to rose-pink. ..... ***C. tuberosus***

Corallorhiza A. Gagnebin Coral-Root

1. Plants fall flowering. Lips 2.2–3.5 mm long. Columns 1.4–2.4 mm long.

Sepals 3–4.5 mm long. ..... ***C. odontorhiza***
1. Plants spring flowering. Lips 4–7.5 mm long. Columns 2.4–5 mm long.
Sepals 4.5–10 mm long. ..... ***C. wisteriana***

Cypripedium C. Linnaeus Lady's-Slipper

1. Lips 5–6.3 cm long; pale yellow to cream. Dorsal (uppermost) sepals 7–9.3 cm long.
Capsules 3.5–5.5 cm long. ..... ***C. kentuckiense***
1. Lips 2–3 cm long; bright yellow or white. Dorsal (uppermost) sepals 3.5–4.7 cm long.
Capsules 2.5–3.3 cm long. ..... ***C. parviflorum***

Epipactis J.G.Zinn

One species. ..... ***E. gigantea***

Galearis S.C. Rafinesque Showy Orchid

One species. ..... ***G. spectabilis***

Goodyera R. Brown Rattlesnake Orchid

One species. ..... ***G. pubescens***

Gymnadeniopsis P.A. Rydberg Green Fringed Orchid

One species. ..... ***G. clavellata***
(= *Platanthera clavellata*)

Habenaria C.L. von Willdenow Rein Orchid

One species. ..... ***H. repens***

Hexalectris C.S. Rafinesque

One species. ..... ***H. spicata***

Isotria C.S. Rafinesque Whorled Pogonia

One species. ..... ***I. verticillata***

Liparis L.C. Richard Twayblade

One species. ..... ***L. liliifolia***

Malaxis D.C. Solander ex O. Swartz Adder's Mouth

One species. ..... ***M. unifolia***

Neottia J.E. Guettard Twayblade

One species. ..... ***N. bifolia***
(= *Listera australis*)

Platanthera L.C. Richard Fringed Orchid

1. Lips entire or lobed. ..... ***P. flava***
1. Lips fringed or lacerate.
  2. Lips simple. Flowers golden-yellow to apricot orange. ..... ***P. ciliaris***
  2. Lips 3 parted; flowers white to cream or light green to greenish white or yellowish green.
    3. Flowers light green to greenish white or yellowish green. Spurs 1–1.5 cm long. ..... ***P. lacera***
    3. Flowers white to cream. Spurs 2–4 cm long.
      4. Rostellum lobes spreading. Viscidia of pollinia 6–7.5 mm apart; angular in lateral view. ..... ***P. praeclara***
      4. Rostellum lobes parallel. Viscidia of pollinia 1–3.5 mm apart; rounded in lateral view. ..... ***P. leucophaea***

Pogonia A.L. de Jussieu Rose Pogonia

One species. ..... ***P. ophioglossoides***

Spiranthes L.C. Richard Ladies-Tresses

1. Lips with green spots or veins.
    2. Lips with central green spot. Plants fall flowering. ..... ***S. lacera* var. *gracilis***
    2. Lips with green veins. Plants spring flowering. ..... ***S. praecox***
1. Lips without green spots or veins.
    3. Flowers uniformly white; glabrous. Sepals 2.5–3 mm long. ..... ***S. tuberosa***
    3. Flowers uniformly cream or white with cream to pale yellow areas on lips; pubescent. Sepals 3.5–14 mm long.
        4. Hairs needle-like. Plants flowering late spring to early summer. ..... ***S. vernalis***
        4. Hairs capitate to slightly clavate. Plants flowering late summer to late fall.
            5. Sepals 3.5–5 mm long. ..... ***S. ovalis* var. *erostellata***
            5. Sepals 6.5–14 mm long.
                6. Basal leaves present at anthesis.
                7. Lips ovate-oblong; slightly constricted near middles. ..... ***S. cernua***
                7. Lips broadly rhombic-ovate; not constricted near middles. ..... ***S. odorata***
                6. Basal leaves absent or withered at anthesis.
                8. Lips slightly constricted near middles; basal calluses longer than wide. Lateral sepals appressed; not arching over dorsal sepal and petals. ..... ***S. cernua***
                8. Lips not constricted near middles; basal calluses as long as wide. Lateral sepals spreading; arching over dorsal sepal and petals. ..... ***S. magnicamporum***

Tipularia T. Nuttall Crane-Fly Orchid

One species. ..... ***T. discolor***

Triphora T. Nuttall Three-Birds' Orchid

One species. ..... ***T. trianthophoros***

OROBANCHACEAE E.P. Ventenat Broomrape Family

Plants herbs; annuals or perennials; semiparasitic or wholly parasitic on roots; chlorophyll present or absent. **Root Systems** taproots or fibrous or haustorial. **Leaves** well-developed or reduced to scales; simple; alternate or opposite, or alternate above and opposite below; basal rosettes present or absent; venation pinnate or not apparent; stipules absent. **Inflorescences** of various types; terminal or axillary; bracts present or absent; bracteoles present or absent. **Flowers** perfect; chasmogamous or cleistogamous; perianths in 2-series. **Calyces** radially or bilaterally symmetrical; lobes 2 or 4 or 5. **Sepals** 5; fused. **Corollas** strongly or weakly bilaterally symmetrical; bilabiate or tubular-campanulate or salverform. **Petals** 5; fused; of various colors. **Stamens** 4; didynamous; epipetalous; anthers caudate or not caudate. **Pistils** 1; compound, carpels 2; stigmas 1, not lobed or 2-lobed, styles 1, ovaries superior; locules 1 or 2; placentation axile or parietal. **Fruits** capsules. **Seeds** numerous.

The family is represented in Oklahoma by 9 genera and 24 species. All species are root parasites and the family, as presently circumscribed on the basis of phylogenetic analyses, includes genera long placed in the Scrophulariaceae.

1. Chlorophyll absent; stems and leaves not green. Anthers caudate. Placentation parietal.
    2. Plants glabrous; parasitic on roots of *Fagus grandifolia*. Flowers dimorphic. Corollas 5–10 mm long; 4-lobed. ..... ***Epifagus***
    2. Plants with glandular hairs; parasitic on roots of various species, but not *Fagus grandifolia*. Flowers similar. Corollas 15–25 mm long; 5-lobed. ..... ***Orobanche***
1. Chlorophyll present; stems and leaves green. Anthers not caudate. Placentation axile.
    3. Bracts petaloid, hiding flowers. Anther sacs unequal and separated. ..... ***Castilleja***
    3. Bracts herbaceous, not hiding flowers. Anther sacs equal and parallel.
        4. Corollas pink to magenta or lavender-blue or white.
            5. Corollas salverform; blue to lavender. ..... ***Buchnera***
            5. Corollas tubular-campanulate or inconspicuously bilabiate; pink to magenta or white. ..... ***Agalinis***
        4. Corollas yellow.

6. Calyces 2- or 4-lobed. Upper corolla lobes 1; hooded.
7. Cauline leaves sessile, clasping. Basal rosettes of leaves absent. Plants annuals. ..... ***Parentucellia***
7. Cauline leaves petiolate, not clasping. Basal rosettes of dissected leaves present. Plants perennials. ..... ***Pedicularis***
6. Calyces 5-lobed. Upper corolla lobes 2; straight-divergent.
8. Corollas 30–50 mm long. Anthers villous. Capsules 12–20 mm long. ..... ***Aureolaria***
8. Corollas 14–16 mm long. Anthers glabrous. Capsules 6–11 mm long. ..... ***Dasistoma***

Agalinis C.S. Rafinesque — False Foxglove, Gerardia

1. Flowering pedicels 0.5–4 mm long.
2. Stems hispid to hirsute. Calyx lobes 6–10 mm long.
3. Leaf margins entire. Bases of upper cauline leaves auriculate. Capsules broadly ovoid; 10–14 mm long. ..... ***A. auriculata*** (= *Tomanthera auriculata*)
3. Leaf margins pinnately parted. Bases of upper cauline leaves attenuate. Capsules obovoid; 8–10 mm long. ..... ***A. densiflora*** (= *Tomanthera densiflora*)
2. Stems minutely roughened to scabrous. Calyx lobes 1–6 mm long.
4. Calyx lobes 3–6 mm long; longer than calyx tubes. Leaves lanceolate; 2–8 mm wide. ..... ***A. heterophylla*** (= *Gerardia heterophylla*)
4. Calyx lobes 1–2.5 mm long; shorter than or equal to calyx tubes. Leaves linear; 1–2 mm wide. ..... ***A. fasciculata*** (= *Gerardia fasciculata*)
1. Flowering pedicels 5–20 mm long.
6. Veins of outer surfaces of calyx tubes conspicuous. Seeds yellow. Fresh plants light green; drying green to brown.
7. Capsules obovoid; 5–7 mm long. Flowering pedicels shorter than bracts. Calyx lobes 1.5–2 mm long. ..... ***A. viridis*** (= *Gerardia viridis*)
7. Capsules globose to ovoid; 3.5–5 mm long. Flowering pedicels equal to or longer than bracts. Calyx lobes 0.5–1.5 mm long. ..... ***A. gattingeri*** (= *Gerardia gattingeri*)
6. Veins of outer surfaces of calyx tubes inconspicuous. Seeds dark brown to black. Fresh plants dark green; drying black.
8. Pedicels scaberulous. Anthers 3.5–4 mm long. ..... ***A. homalantha*** (= *Gerardia homalantha*)
8. Pedicels glabrate. Anthers 1.5–2.5 mm long.
9. Capsules 3–6 mm long. Calyx tubes 2.5–4 mm long. Calyx lobes apiculate. ..... ***A. tenuifolia*** (= *Gerardia tenuifolia*)
9. Capsules 7–11 mm long. Calyx tubes 4–6 mm long. Calyx lobes acute to acuminate. ..... ***A. aspera*** (= *Gerardia aspera*)

Aureolaria C.S. Rafinesque — False Foxglove

1. Leaves serrate or irregularly lobed. Stems pubescent, but not glandular. Plants perennials. Calyx lobes entire to dentate. Seeds winged; 1.3–2.7 mm long. ..... ***A. grandiflora***
1. Leaves 1- or 2-pinnatifid. Stems glandular-pubescent. Plants annuals. Calyx lobes pinnatifid to pectinate. Seeds not winged; 0.8–1 mm long. ..... ***A. pectinata***

Buchnera C. Linnaeus — Bluehearts

One species. ..... ***B. americana***

Castilleja J.C.B. Mutis ex C. Linnaeus — Indian Paintbrush[1]

1. Corollas conspicuously longer than calyces; tubes 30–45 mm long. Bract apices mostly greenish or occasionally pink. ..... ***C. sessiliflora***
1. Corollas less than to slightly longer than calyces; tubes 15–28 mm long. Bract apices yellow or orange or red or purple or greenish yellow.

2. Calyces divided laterally for at least 1/3 of their length, forming 4 broadly lanceolate segments.
   3. Apices of bracts and calyces greenish yellow to yellow. Lower lip of corollas 3–7 mm long. ..... ***C. citrina*** (= *C. purpurea* var. *citrina*)
   3. Apices of bracts and calyces purple or red or orange or yellow-orange. Lower lip of corollas 1.5–3 mm long. ..... ***C. purpurea***
2. Calyces united laterally forming 2 rounded or emarginate segments.
   4. Bract margins entire. Cauline leaves entire or rarely lobed. Lower lip of corollas 0.2–2 mm long. Basal rosettes of leaves absent. ..... ***C. indivisa***
   4. Bract margins lobed. Cauline leaves conspicuously lobed. Lower lip of corollas 2–3.5 mm long. Basal rosettes of leaves present. ..... ***C. coccinea***

[1] Treatment contributed by Allan Nelson

Dasistoma C.S. Rafinesque — Mullein Foxglove

One species. ..... ***D. macrophylla***

Epifagus T. Nuttall — Beechdrops

One species. ..... ***E. virginiana***

Orobanche C. Linnaeus — Broomrape

1. Inflorescences spicate racemes. Bracts present; subtending calyces. ..... ***O. ludoviciana*** (= *O. multiflora*)
1. Inflorescences solitary flowers or clusters at ends of scapes. Bracts absent.
   2. Scapes 8–15 cm long. Caudices herbaceous; branches not or barely prolonged above surface of ground. Calyx lobes longer than tubes. ..... ***O. uniflora***
   2. Scapes 3–6 cm long. Caudices subligneous; branches prolonged above ground. Calyx lobes equal to or shorter than tubes. ..... ***O. fasciculata***

Parentucellia D. Viviani — Glandweed

One species. ..... ***P. viscosa***

Pedicularis C. Linnaeus — Lousewort, Redfern

One species. ..... ***P. canadensis***

OSMUNDACEAE B.W. von Berchtold & C.B. Presl — Royal Fern Family

Plants herbs; perennials; perennating organs rhizomes; producing sporangia in aggregations on non-expanded pinnae. **Roots** black; wiry. **Rhizomes** woody; bearing persistent stipe bases and wiry roots to form conspicuous crowns. **Fronds** of 2 types, sterile and fertile different, or all alike and divided into sterile and fertile segments; vernation circinate; sterile fronds green, 1-pinnately compound, stipitate; fertile fronds green becoming brown, 2-pinnately compound; sterile segments proximal, green, subtending fertile segment; fertile segments distal, brown; stipes yellow-green or green, grooved adaxially. **Sori** absent. **Sporangia** all alike; annuli absent, poorly developed. **Spores** all alike; greenish. **Gametophytes** all alike; green; obcordate.

The family is represented in Oklahoma by 2 genera and 2 species. Plants are found in wet sites in the eastern 1/3 of the state.

1. Fronds of 2 types, sterile and fertile. Sterile pinnae simple; pinnatisect. ..... ***Osmundastrum***
1. Fronds of 1 type, but differentiated into basal sterile and apical fertile segments. Sterile pinnae 1-pinnately compound. ..... ***Osmunda***

Osmunda C. Linnaeus — Royal Fern

One species. ..... ***O. regalis***

Osmundastrum C. Presl Cinnamon Fern

One species. ..... ***O. cinnamomea***
(= *Osmunda cinnamomea*)

OXALIDACEAE R. Brown Wood Sorrel Family

Plants herbs; annuals or perennials; perennating organs rhizomes or bulbs or stolons; caulescent or acaulescent; sap thin, sour. **Stems** erect or decumbent. **Leaves** cauline or basal; palmately compound; alternate; leaflets 3; obcordate; venation pinnate; stipules present or absent. **Inflorescences** solitary flowers or simple cymes or umbels; axillary. **Flowers** perfect; chasmogamous or cleistogamous; perianths in 2-series. **Calyces** funnelform. **Sepals** 5; free. **Corollas** radially symmetrical; campanulate. **Petals** 5; free or coherent; yellow to yellowish orange or purplish pink or white. **Stamens** 10; of 2 lengths; fused by filaments at bases; anthers dorsifixed. **Pistils** 1; compound, carpels 5; stigmas 5, capitate; styles 5, free; ovaries superior; locules 5; placentation axile. **Fruits** capsules; explosively dehiscent; loculicidal. **Seeds** numerous.

The family is represented in Oklahoma by 1 genus and 5 species. Its distribution is primarily tropical and subtropical with some species occurring in temperate regions. Four of ours are native; the other is an Old World introduction. Most are somewhat weedy, and none are of economic importance. Several species are of horticultural interest, including *Oxalis acetosella*, shamrock.

Oxalis C. Linnaeus Woodsorrel

1. Plants acaulescent. Flowers pink to violet or pinkish purple or white.
    2. Abaxial surfaces of leaflets villous. Stems from woody caudices. ..... ***O. rubra***
    2. Abaxial surfaces of leaflets glabrous or puberulent. Stems from bulbs. ..... ***O. violacea***
1. Plants caulescent. Flowers yellow.
    3. Hairs of stems and petioles spreading. Septate hairs of stems and petioles always present, sometimes intermixed with non-septate hairs; septa brown to amber. ..... ***O. stricta***
    3. Hairs of stems and petioles mostly appressed, sometimes intermixed with a few spreading hairs. Septate hairs of stems and petioles absent.
        4. Stems creeping; rooting at nodes. Fruiting pedicels erect or ascending. Capsule apices gradually tapered. Seeds and transverse ridges uniformly brown. ..... ***O. corniculata***
        4. Stems decumbent; not rooting at nodes. Fruiting pedicels deflexed. Capsule apices abruptly tapered. Seeds brown with gray-white transverse ridges or gray-white spotted ridges. ..... ***O. dillenii***

PAPAVERACEAE A.L. de Jussieu Poppy Family

Plants herbs; annuals or biennials or perennials; perennating organs rhizomes or bulblets from rootstocks or not apparent; caulescent or acaulescent; strongly aromatic or not aromatic; armed or not armed with prickles; shoot exudate viscous or watery, yellow or orange or red or colorless. **Root Systems** taproots or fibrous. **Leaves** cauline or basal; simple or 1-pinnately to 4-pinnately compound; alternate; venation pinnate or palmate; surfaces glabrous or indumented, crystalline vesicles present or absent; margins pinnately lobed or cleft or parted or serrate or crenate or spinose; stipules absent. **Inflorescences** solitary flowers or racemes or simple cymes; terminal. **Flowers** perfect; perianths in 2-series. **Sepals** 2; caducous; free. **Corollas** radially or bilaterally symmetrical. **Petals** 4 to 16; all alike or of 2 forms; caducous or persistent; in 2 or 3 whorls; free or fused at apices; white or red or yellow or purple. **Stamens** 6 or numerous; in 1 or 3 or more whorls; fascicled or not fascicled; free or fused by filaments; anthers all alike or of 2 forms, bilocular or unilocular, filaments spurred or not spurred. **Pistils** 1; compound, carpels 2 or 4 to numerous; stigmas 1 to numerous, 2-lobed or 3-lobed or not lobed, horned or not horned; styles 1 or 0; ovaries superior; locules 1; placentation parietal. **Fruits** capsules; poricidal or valvate. **Seeds** 3 to numerous.

The family is represented in Oklahoma by 7 genera and 14 species. As presently circumscribed on the basis of phylogenetic studies, it now includes the Fumariaceae or fumitory family.

1. Stems, leaves and capsules prickly. Bracts 2; herbaceous. ..... ***Argemone***
1. Stems, leaves and capsules glabrous or pubescent but not prickly. Bracts absent.
    2. Plants acaulescent.
        3. Leaves simple; orbicular-reniform to cordate; 5- to 7-lobed; venation palmate. Corollas radially symmetrical. Petals 8–16; all alike; not spurred or saccate at bases. Rhizomes elongate; thick; exudate red to dark orange. ..... ***Sanguinaria***

3. Leaves 3-pinnately or 4-pinnately compound; broadly deltoid; many-lobed; venation pinnate. Corollas bilaterally symmetrical. Petals 4; of 2 forms; outer 2 petals spurred or saccate at bases. Rhizomes short; bearing white to pink ovoid bulblets; exudate colorless. ..... ***Dicentra***

2. Plants caulescent.

4. Leaves 2-pinnately compound. Corollas bilaterally symmetrical; 1 petal spurred or saccate. Stamens 6; in 2 fascicles of 3 each; filaments fused.

5. Petals uniformly yellow. Capsules linear to oblong; dehiscent. Seeds numerous. ..... ***Corydalis***

5. Petals white to cream; apices crimson or purple. Capsules globose; indehiscent. Seeds 1. ..... ***Fumaria***

4. Leaves simple. Corollas radially symmetrical; petals not spurred nor saccate. Stamens numerous; not in fascicles; filaments free.

6. Carpels 2. Stigma lobes 2. ..... ***Glaucium***

6. Carpels 4-numerous. Stigma lobes 4-numerous. ..... ***Papaver***

Argemone C. Linnaeus Prickly Poppy

1. Stems and leaves prickly, but not hispid. Plants from taproots. Flower buds elliptic-oblong. ..... ***A. polyanthemos***

1. Stems and leaves both prickly and hispid. Plants from stout caudices. Flower buds subglobose. ..... ***A. squarrosa***

Corydalis A.P. de Candolle Scrambled Eggs

1. Ovaries and capsules white mealy with transparent vesicles. ..... ***C. crystallina***

1. Ovaries and capsules glabrous.

2. Spurred petals 7–9 mm long; pale yellow. Spurs 1.3–3 mm long. ..... ***C. flavula***

2. Spurred petals 9–24 mm long; bright yellow. Spurs 4–9 mm long.

3. Mature seeds 1.2–1.6 mm in diameter; smooth. Spurred petals 9–15 mm long. ..... ***C. micrantha***

3. Mature seeds 1.8–2.2 mm in diameter; minutely pitted. Spurred petals 14–24 mm long.

4. Bracts ovate; 10–17 mm long. Capsules 20–25 mm long. ..... ***C. curvisiliqua***

4. Bracts elliptic to linear; 4–9.5 mm long. Capsules 16–18 mm long. ..... ***C. aurea***

Dicentra J.J. Bernhardi Dutchman's Breeches

One species. ..... ***D. cucullaria***

Fumaria C. Linnaeus Fine-Leaved Fumitory

One species. ..... ***F. parviflora***

Glaucium P. Miller Horned Poppy

1. Ovaries and capsules hispid. Petals orange to reddish orange, often with a blackish basal spot. Flowers 2.5–5 cm in diameter. ..... ***G. corniculatum***

1. Ovaries and capsules glabrous or scabrous. Petals yellow; or golden-yellow; often with a faint violet basal spot. Flowers 6–9 cm in diameter. ..... ***G. flavum***

Papaver C. Linnaeus Poppy

1. Plants glabrous; glaucous. Leaves sessile; clasping. Capsules subglobose; 1.5–9 cm long; 20–60 mm in diameter. ..... ***P. somniferum***

1. Plants hispidulous; not glaucous. Leaves petiolate; not clasping. Capsules obovoid; 1–1.5 cm long; 4–6 mm in diameter. ..... ***P. dubium***

Sanguinaria C. Linnaeus Bloodroot

One species. ..... ***S. canadensis***

PASSIFLORACEAE A.L. de Jussieu ex K.S. Kunth Passion-Flower Family

Plants herbaceous vines; perennials; with tendrils. **Leaves** simple; alternate; venation palmate; margins palmately lobed; stipules present. **Inflorescences** solitary flowers or occasionally in pairs; axillary. **Flowers** perfect; perianths in 2-series; coronas present; conspicuously fringed. **Sepals** 5; fused. **Corollas** radially symmetrical. **Petals** 5; free; pink to purple or greenish yellow to greenish white. **Stamens** 5; arising from central stalk (androgynophore); anthers versatile. **Pistils** 1; compound, carpels 3; arising at apex of central stalk; stigmas 3, capitate or discoid; styles 3, free; ovaries superior; locules 1; placentation parietal. **Nectaries** present; on staminal disks and stems. **Fruits** berries. **Seeds** numerous.

The family is represented in Oklahoma by 1 genus and 2 species. Its greatest diversity is in tropical America and Africa. The fruits are edible, and the plants are the favored food of gulf fritillary larvae.

Passiflora C. Linnaeus

1. Leaf margins serrulate. Petals oblanceolate or elliptic. Outer corona filaments 15–20 mm long. Berries 3–7 cm long. ..... ***P. incarnata***
1. Leaf margins entire. Petals linear. Outer corona filaments 5–10 mm long. Berries 0.4–0.6 cm long. ..... ***P. lutea***

PAULOWNIACEAE T. Nakai Princess-Tree Family

Plants trees; deciduous; perennials. **Stems** woody. **Leaves** simple; opposite; petiolate; margins entire; stipules absent. **Inflorescences** thyrses of 3- or 4-flowered cymes; terminal; bracts present. **Flowers** perfect; perianths in 2-series. **Calyces** bilaterally symmetrical; campanulate; densely tomentose. **Sepals** 5; fused; upper enlarged. **Corollas** bilaterally symmetrical; bilabiate. **Petals** 5; fused. **Stamens** 4; didynamous; epipetalous; included within corollas; staminodia 0. **Pistils** 1; compound; carpels 2; styles 1; stigmas 1, capitate; ovaries superior; locules 2; placentation axile. **Fruits** capsules. **Seeds** numerous; winged.

This family is represented in Oklahoma by 1 genus and 1 species. *Paulownia* was previously placed in the Scrophulariaceae or the Bignoniaceae. Molecular analyses indicate that the Paulowniaceae is a distinct lineage in the Lamiales.

Paulownia P.F. von Siebold & J.G. Zuccarini Princess-Tree

One species. ..... ***P. tomentosa***

PENTHORACEAE N.L. Britton Ditch Stonecrop Family

Plants herbs; perennials; stoloniferous. **Stems** decumbent to erect; branched or unbranched. **Leaves** cauline; simple; alternate; petiolate or sessile; lanceolate to elliptic; apices acuminate; margins serrate; bases narrowly cuneate; stipules absent. **Inflorescences** helicoid cymes; terminal or axillary. **Flowers** perfect; perianths in 1-series or 2-series. **Calyces** radially symmetrical. **Sepals** 5 or 7; fused; greenish or yellowish. **Corollas** when present radially symmetrical. **Petals** 0 or 5 or 7; free, white. **Stamens** 10. **Pistils** 1; compound; carpels 5 or 7, fused slightly at bases; stigmas 5 or 7, terminal, capitate; styles 5 or 7; ovaries superior; locules 5 or 7; placentation parietal. **Hypanthia** present; discoid to saucer-shaped. **Nectaries** absent. **Fruits** capsules; 5- or 7-angled; 5- or 7-beaked; circumscissile at beak bases; reddish at maturity. **Seeds** many; minute.

The family is represented in Oklahoma by 1 genus and 1 species. *Penthorum* has been included in the Saxifragaceae or saxifraga family and the Crassulaceae or stonecrop family. Phylogenetic studies, however, support its recognition as a distinct monogeneric family. Fusion of the carpels may be so slight that they falsely appear to be separate pistils.

Penthorum C. Linnaeus Ditch Stonecrop

One species. ..... ***P. sedoides***

PHRYMACEAE J.C. Schauer Lopseed Family

Plants herbs; perennials; terrestrial or emergent aquatics. **Stems** 4-sided or terete. **Leaves** simple; alternate or opposite; venation pinnate; stipules absent. **Inflorescences** solitary flowers in leaf axils or terminal spicate racemes; bracts present or absent. **Flowers** perfect; perianths in 2-series. **Calyces** tubular. **Sepals** 5; fused; lobes acute; midribs conspicuous. **Corollas** bilaterally symmetrical; bilabiate with 2-lobed upper lips and 3-lobed lower lips. **Petals** 5; fused; of various colors. **Stamens** 4; didynamous; included

within or slightly exserted beyond perianths; epipetalous; thecae divergent or side-by-side. **Pistils** 1; compound; carpels 2; stigmas 2-lobed; styles 1; ovaries superior; locules 1 or 2; placentation axile or basal. **Fruits** loculicidal capsules or achenes. **Seeds** 1 or numerous.

The family is represented in Oklahoma by 2 genera and 4 species. *Mimulus* has long been positioned in the Scrophulariaceae or figwort family, and *Phryma* in the Verbenaceae or vervain family. Phylogenetic studies, however, indicate that the 2 genera should be classified in the same family.

1. Flowers at anthesis oriented at right angles to rachises. Fruiting pedicels conspicuously reflexed and flowers appressed against rachises. Fruits achenes. ..... ***Phryma***
1. Flowers at anthesis oriented at ascending angles to rachises. Fruiting pedicels straight or curved, but not reflexed and flowers not appressed against rachises. Fruits capsules. .....***Mimulus***

Mimulus C. Linnaeus Monkey Flower

1. Corollas yellow. Stems terete. ..... ***M. glabratus***
1. Corollas blue to violet or white. Stems 4-angled.
   2. Leaves petiolate. Pedicels 2–14 mm long; shorter than calyces. ..... ***M. alatus***
   2. Leaves sessile. Pedicels 20–45 mm long; longer than calyces. ..... ***M. ringens***

Phryma C. Linnaeus Lopseed

One species. ..... ***P. leptostachya***

PHYLLANTHACEAE I.I. Martinov Leaf-Flower Family

Plants herbs; annuals or perennials; perennating organs woody caudices; not armed with stinging hairs; monoecious or dioecious; sap white or colorless, viscid or thin. **Stems** herbaceous or suffrutescent. **Leaves** simple; alternate; 2-ranked or loosely spiraled; petiolate or sessile; margins entire; stipules present, persistent or deciduous. **Inflorescences** flowers solitary or paired or borne in cymose clusters; axillary; clusters comprising only staminate flowers or both staminate and pistillate flowers; bracteoles present or absent. **Flowers** imperfect, staminate and pistillate different; perianths in 1-series. **Sepals** of staminate flowers 4 to 6, fused; sepals of pistillate flowers 5 or 6, fused, ovate or elliptic or obovate. **Petals** absent. **Stamens** 2 or 3; filaments free or fused; anthers connivent or divergent. **Pistils** 1; compound; carpels 3; stigmas subcapitate or rounded or dilated; styles 1 or 3, bifid. **Fruits** capsular schizocarps; subglobose to globose. **Seeds** 6; longitudinally ribbed or smooth or minutely verrucose.

The family is represented in Oklahoma by 1 genus and 4 species. *Phyllanthus* and related genera were long classified as a subfamily within the Euphorbiaceae or spurge family. Phylogenetic studies, however, support their recognition as a separate family.

Phyllanthus C. Linnaeus Leaf-flower

1. Plants perennials; from woody caudices; stems multiple. Leaves loosely spiraled, not 2-ranked. ..... ***P. polygonoides***
1. Plants annuals; from taproots; stems solitary. Leaves 2-ranked.
   2. Flowers 5–7 per cluster. Schizocarps 6–10 mm in diameter. ..... ***P. warnockii***
      (= *Reverchonia arenaria*)
   2. Flowers 1–3 per cluster. Schizocarps 1–3 mm in diameter
      3. Leaves 1-4 mm wide. Filaments fused. Calyx lobes of pistillate flowers ovate to obovate. Schizocarps 2.3–2.7 mm in diameter. ..... ***P. abnormis***

      3. Leaves 4–12 mm wide. Filaments free. Calyx lobes of pistillate flowers linear-lanceolate or narrowly spathulate. Schizocarps 1.5–2 mm in diameter. ..... ***P. caroliniensis***

PHYTOLACCACEAE R. Brown Pokeweed Family

Plants herbs; perennials; perennating organs fleshy roots. **Leaves** simple; alternate; blades ovate to lanceolate; venation pinnate; margins entire to undulate; stipules absent. **Inflorescences** racemes; axillary or arising opposite the leaves; bracteoles present. **Flowers** perfect; perianths in 1-series; radially symmetrical. **Sepals** 5 or 4; free; greenish white or cream or pinkish white; petaloid. **Petals** absent. **Stamens** 10 or 4. **Pistils** 1; compound or simple, carpels 10 or 1; stigmas 10 or 1; styles 10 or 1; ovaries superior; locules 10 or 1; placentation axile or basal. **Nectaries** present; receptacular; annular. **Fruits** berries; purplish black or red or orange. **Seeds** 10 or 1.

The family is represented in Oklahoma by 2 genera and 2 species. It is primarily a New World family of the tropics and subtropics. Pokeweed is poisonous, but when properly prepared, the young leaves are edible and rich in Vitamin C. It may be found on market shelves as 'poke salet.'

1. Pedicels 5–10 mm long. Stamens 10. Pistils compound. Berries purplish black; 8–10 mm in diameter. ..... ***Phytolacca***
1. Pedicels 2–4 mm long. Stamens 4. Pistils simple. Berries red or orange; 2–4 mm in diameter. ..... ***Rivina***

Phytolacca C. Linnaeus Pokeweed

One species. ..... ***P. americana***

Rivina C. Linnaeus Pigeon-Berry

One species. ..... ***R. humulis***

PINACEAE J. Lindley Pine Family

Plants trees; evergreen; resinous; strongly aromatic; producing pollen cones and seed cones. **Leaves** needle-like; persistent for 2 to 12 years; simple; fascicled, in bundles of 2 or 3 with surrounding basal sheaths; sessile; venation not apparent; stipules absent. **Pollen Cones** axillary; small; soft; tan to yellow; clustered at bases of current year's growth; microsporophylls spirally arranged; microsporangia 2 per microsporophyll; pollen winged. **Seed Cones** subterminal or axillary; conical; woody; maturing in 2 to 3 years; ovuliferous scales overlapping; megasporangia 2 per scale. **Seeds** 2 per scale; wings present or absent.

The family is represented in Oklahoma by 1 genus and 4 species. It is widely distributed over the northern hemisphere. Our species are geographically separated with *P. echinata*, shortleaf, and *P. taeda*, loblolly, restricted to the eastern counties and *P. ponderosa*, ponderosa, and *P. edulis*, piñon, occurring only in the northwestern corner of Cimarron County. *Pinus* is important for lumber and paper. Its seeds are eaten by both wildlife and humans.

Pinus C. Linnaeus Pine

1. Plants of Black Mesa area.
   2. Crowns compact; globose. Needles 2–7 cm long; fascicle sheaths 5–7 mm long.
      Mature seed cones 2–5 cm long; maturing in 1 season. Seeds not winged. ..... ***P. edulis***
   2. Crowns open; pyramidal. Needles 8–25 cm long; fascicle sheaths 15–20 mm long.
      Mature seed cones 6–12 cm long; maturing in 2 seasons. Seeds winged. ..... ***P. ponderosa***
1. Plants of eastern 1/3 of state.
   3. Needles 7–10 cm long; 2 or rarely 3 per fascicle; fascicle sheaths 4–7 mm long.
      Mature seed cones 4–7 cm long. ..... ***P. echinata***
   3. Needles 10–23 cm long; 3 per fascicle; fascicle sheaths 10–20 mm long.
      Mature seed cones 7–12 cm long. ..... ***P. taeda***

PLANTAGINACEAE A.L. de Jussieu Plantain Family[1]

Plants herbs; annuals or perennials; caulescent or acaulescent; terrestrial or submerged or floating-leaved aquatics; bearing perfect flowers or monoecious. **Leaves** all alike or of 2 forms; simple; alternate or opposite; cauline or in a basal rosette; venation pinnate or pinnipalmate or parallel-convergent or a single vein; stipules absent. **Inflorescences** of various types; bracts present or absent; bracteoles present or absent. **Flowers** perfect or imperfect; chasmogamous or cleistogamous; perianths in 2-series or absent. **Sepals** 4 or 5 or 0; free or fused when present. **Corollas** radially or bilaterally symmetrical or absent. **Petals** 4 or 5 or 0; fused when present; petaloid or chartaceous or scarious. **Stamens** 4 or 2 or 1; epipetalous or receptacular when perianth absent. **Pistils** 1; compound, carpels 2; stigmas 1 or 2, not lobed or 2-lobed; styles 1 or 2; ovaries superior; locules 2 or 4; placentation axile. **Fruits** capsules or schizocarps splitting into 4 nutlets. **Seeds** 2 to numerous; mucilaginous or not mucilaginous.

The family is represented in Oklahoma by 14 genera and 52 species. As previously circumscribed, it was a relatively small family of 3 genera, the majority of which were classified in *Plantago*. On the basis of molecular phylogenetic analyses, its circumscription has been expanded to include genera formerly positioned in the Scrophulariaceae *sensu lato* and Callitrichaceae.

1. Plants submerged or floating-leaves or emergent aquatic herbs.
   2. Perianths absent [2, whitish bracteoles present, hence flowers falsely appearing

to have perianth]. Flowers imperfect; plants monoecious. Fruits schizocarps of 4 nutlets. ..... ***Callitriche***
2. Perianths in 2-series. Flowers perfect. Fruits capsules.
3. Stamens 4.
4. Leaf margins entire. Corollas tubular-campanulate to inconspicuously bilabiate. ..... ***Bacopa***
4. Leaf margins serrate. Corollas bilabiate. ..... ***Mecardonia***
3. Stamens 2.
5. Leaves whorled. ..... ***Veronicastrum***
5. Leaves opposite or alternate.
6. Calyces 4-lobed. Corollas 4-lobed; rotate. Capsules obcordate. ..... ***Veronica***
6. Calyces 5-lobed. Corollas 5-lobed; bilabiate. Capsules ovoid or ellipsoidal. ..... ***Gratiola***
1. Plants terrestrial herbs.
7. Petals chartaceous or scarious; colorless or tan. Capsules circumscissle. ..... ***Plantago***
7. Petals not chartaceous or scarious; of various colors but not tan. Capsules septicidal or loculicidal.
8. Fertile stamens 2.
9. Leaves whorled. ..... ***Veronicastrum***
9. Leaves opposite or alternate.
10. Calyces 4-lobed. Corollas 4-lobed; rotate. Capsules obcordate. ..... ***Veronica***
10. Calyces 5-lobed. Corollas 5-lobed; bilabiate. Capsules ovoid or ellipsoidal. ..... ***Gratiola***
8. Fertile stamens 4.
11. Upper leaves alternate. Corollas spurred.
12. Lower stems glabrous to glabrate. Flowers in terminal racemes.
13. Corollas bluish; palates whitish; lower lips greatly exceeding upper lips. Capsules 2.5–4 mm long. Plants annuals. ..... ***Nuttallanthus***
13. Corollas yellow; palates orange-yellow; lower lips shorter than upper lips. Capsules 5–11 mm long. Plants perennials. ..... ***Linaria***
12. Lower stems pubescent. Flowers solitary in leaf axils.
14. Stems erect; glandular-pubescent. Leaves linear to narrowly oblanceolate; bases attenuate. Capsules pubescent. ..... ***Chaenorhinum***
14. Stems prostrate; villous. Leaves ovate; bases hastate or toothed. Capsules glabrous. ..... ***Kickxia***
11. Upper leaves opposite. Corollas not spurred.
15. Flowers subtended by 2 bracteoles.
16. Leaf margins entire. Corollas tubular-campanulate to inconspicuosly bilabiate. ..... ***Bacopa***
16. Leaf margins serrate. Corollas bilabiate. ..... ***Mecardonia***
15. Flowers subtended by 1 bracteole or bracteole absent.
17. Filaments 5. Staminodia present; 1; elongate. ..... ***Penstemon***
17. Filaments 4. Staminodia absent or if present, gland-like.
18. Leaf margins pinnatifid or 2-pinnatifid. ..... ***Leucospora***
18. Leaf margins entire or serrate.
19. Corollas tubular-campanulate to inconspicuously bilabiate. ..... ***Bacopa***
19. Corollas bilabiate. ..... ***Collinsia***

Bacopa J.B.C. Aublet Waterhyssop

1. Leaves oblanceolate to spathulate; 3–7 mm wide; bases narrowly cuneate. Flowers 1 per node. Bracts 2; linear. ..... ***B. monnieri***
1. Leaves suborbicular; 7–25 mm wide; bases clasping. Flowers 2–4 per node. Bracts 0. ..... ***B. rotundifolia***

Callitriche C. Linnaeus Water Starwort

1. Plants aquatic [receding water may expose plants on substrate]. Leaves of 2 forms, submerged linear, floating spathulate. Styles 1–10 mm long. Bracteoles 2; whitish; inflated. ..... ***C. heterophylla***
1. Plants terrestrial. Leaves all alike. Styles 0.7–0.9 mm long. Bracteoles absent.
2. Fruits pedicellate. Styles 0.7–0.9 mm long. Stamen filaments 0.2–0.5 mm long. ..... ***C. pedunculosa*** (= *C. nuttallii*)
2. Fruits sessile or subsessile. Styles 0.2–0.4 mm long. Stamen filaments 0.1–0.2 mm long. ..... ***C. terrestris***

Chaenorhinum (A.P. de Candolle) H.G.L. Reichenbach — Dwarf Snapdragon

One species. ..... ***C. minus***

Collinsia T. Nuttall

1. Stems puberulent in longitudinal lines. Principal leaves widest just above bases.
   Corollas shallowly emarginate, notches less than 1 mm deep. Seeds 2–4. ..... ***C. verna***
1. Stems uniformly puberulent. Principal leaves widest at middles or well above bases.
   Corollas deeply emarginate, notches more than 1 mm deep. Seeds 6–12. ..... ***C. violacea***

Gratiola C. Linnaeus — Hedgehyssop

1. Stems villous-hirsute. Flowers and fruits subsessile; pedicels less than 1 mm long.
   Calyx lobes conspicuously unequal. ..... ***G. pilosa***
1. Stems glabrate or minutely glandular-puberulent. Flowers and fruits pedicillate;
   pedicels 1–20 mm long. Calyx lobes equal or subequal.
   2. Leaves broadest at bases. Mature capsules 1–3 mm long; shorter than calyx lobes. ..... ***G. brevifolia***
   2. Leaves broadest at or above middles. Mature capsules 3–7 mm long; equal
      or subequal to calyx lobes.
      3. Pedicels filiform; 6–20 mm long at anthesis; 9–20 mm long in fruit.
         Stems minutely glandular-puberulent; not fleshy at bases. ..... ***G. neglecta***
      3. Pedicels stout; 1–3 mm long at anthesis; 2–6 mm long in fruit.
         Stems glabrate; fleshy at bases. ..... ***G. virginiana***

Kickxia B.C.J. Dumortier — Fluelli

One species. ..... ***K. elatine***

Leucospora T. Nuttall

One species. ..... ***L. multifida***

Linaria P. Miller — Toadflax

1. Leaves linear; 2–4 mm wide. Corollas 20–30 mm long. Seeds discoid; wings present. ..... ***L. vulgaris***
1. Leaves ovate-lanceolate; 6–28 mm wide. Corollas 30–40 mm long. Seeds polygonal;
   ridged, wings absent. ..... ***L. dalmatica***

Mecardonia H. Ruiz Lopez & J.A. Pavon — Waterhyssop

One species. ..... ***M. acuminata***

Nuttallanthus D.A. Sutton — Toadflax

1. Corollas, excluding spurs, 14–22 mm long. Spurs 6–11 mm long. Seeds conspicuously
   tuberculate; longitudinal ridges inconspicuous. ..... ***N. texanus***
   (= *Linaria canadensis* var. *texana*)
1. Corollas, excluding spurs, 8–12 mm long. Spurs 3–7 mm long. Seeds not tuberculate
   or if tubercules present, inconspicuous; longitudinal ridges conspicuous. ..... ***N. canadensis***
   (= *Linaria canadensis* var. *canadensis*)

Penstemon C.C. Schmidel — Beardtongue

1. Outer surfaces of corollas glandular pubescent.
   2. Throats of corolla tubes open; longitudinal folds absent; floors concave to flat.
      3. Corollas 35–55 mm long. Calyces 10–16 mm long. ..... ***P. cobaea***
      3. Corollas 12–30 mm long. Calyces 3–8 mm long.
         4. Corolla tubes gradually expanding distally. Throats without colored lines. ..... ***P. tubiflorus***
         4. Corollas tubes abruptly expanding distally. Throats with reddish-purple lines.
            5. Lower stems glabrous to glabrate. Anther sacs pubescent. ..... ***P. digitalis***
            5. Lower stems pubescent. Anther sacs glabrous. ..... ***P. albidus***
   2. Throats of corolla tubes partially closed; longitudinal folds present, 2; floors convex.

6. Staminodium pubescent for distal 3–6 mm. Corollas 13–18 mm long. ..... ***P. arkansanus***
6. Staminodium pubescent for distal 8–16 mm. Corollas 19–32 mm long.
7. Palates of corollas with reddish-purple lines and markings.
Corollas white, suffused with pink or violet. ..... ***P. laxiflorus***
7. Palates of corollas without colored lines or markings.
Corollas white to yellowish-white. ..... ***P. oklahomensis***
1. Outer surfaces of corollas glabrous to glabrate.
8. Leaves 0.5–2 mm wide. Plants suffrutescent. ..... ***P. ambiguus***
8. Leaves 4–50 mm wide. Plants herbaceous.
9. Upper leaves connate-perfoliate. Corollas scarlet. Staminodium glabrous. ..... ***P. murrayanus***
9. Upper leaves sessile or clasping. Corollas pink to violet or blue. Staminodium pubescent distally.
10. Corollas 35–50 mm long. Calyces 8–10 mm long. ..... ***P. grandiflorus***
10. Corollas 12–28 mm long. Calyces 4–7 mm long.
11. Distal bracts shorter than pedicels at anthesis. ..... ***P. fendleri***
11. Distal bracts longer than pedicels at anthesis.
12. Cauline leaves linear to lanceolate. Corollas blue.
Bracts equal to or longer than internodes. ..... ***P. angustifolius***
12. Cauline leaves ovate-lanceolate to ovate. Corollas pale pink to pale blue. Bracts shorter than internodes. ..... ***P. buckleyi***

Plantago C. Linnaeus Plantain[1]

1. Bract apices scarious; long-acuminate. Two sepals on abaxial side fused. ..... ***P. lanceolata***
1. Bract apices herbaceous; acute or short-acuminate. Two sepals on abaxial side free.
2. Bracts and sepals glabrous.
3. Leaves linear to filiform. Stamens 2. Plants spring annuals.
4. Seeds 4. ..... ***P. elongata***
(= *P. pusilla*)
4. Seeds 10–30. ..... ***P. heterophylla***
(= *P. hybrida*)
3. Leaves broadly elliptic to ovate or ovate-cordate. Stamens 4. Plants perennials.
5. Mature capsules ellipsoid to oblong; dehiscent below middles. Sepals acute. Seeds 4–9. ..... ***P. rugelii***
5. Mature capsules subglobose; dehiscent near middles. Sepals rounded. Seeds 8–22. ..... ***P. major***
2. Bracts and sepals pubescent.
6. Middle of peduncles with spreading pubescence. Plants acaulescent.
7. Midveins of abaxial sepals extending beyond scarious margins.
Seeds reddish; margins hyaline. ..... ***P. rhodosperma***
7. Midveins of abaxial sepals not extending beyond scarious margins.
Seeds yellowish-brown; margins not hyaline. ..... ***P. virginica***
6. Middle of peduncles with appressed pubescence. Plants caulescent; stems short, rarely longer than 5 cm, obscured by leaf sheaths.
8. Bracts conspicuously longer than sepals.
9. Adaxial surfaces of mature leaves glabrous or glabrate. Lower bracts 7.5–40 mm long. Plant turning dark when dry. ..... ***P. aristata***
9. Adaxial surfaces of mature leaves densely pubescent or rarely glabrate. Lower bracts 1.9–6.9 mm long. Plant yellow-green or gray-green when dry, rarely turning dark. ..... ***P. patagonica***
(= *P. purshii*)
8. Bracts shorter to slightly longer than sepals.
10. Adaxial surfaces of mature leaves glabrous or glabrate.
Corolla lobes 2.2–3.4 mm long. Plants turning dark when dry. ..... ***P. wrightiana***
10. Adaxial surfaces of mature leaves densely pubescent or rarely glabrate.
Corolla lobes 0.7–2 mm long. Plants yellow-green or gray-green when dry, rarely turning dark. ..... ***P. patagonica***

[1] Treatment contributed by Ronald Hoggard

Veronica C. Linnaeus Speedwell

1. Flowers in axillary racemes.
    2. Cauline leaves petiolate; bases attenuate. Racemes with 10–25 flowers. ..... ***V. americana***
    2. Cauline leaves sessile; bases clasping. Racemes with 30–60 flowers. ..... ***V. anagallis-aquatica***
1. Flowers solitary in leaf axils or in terminal racemes.
    3. Pedicels 0.5–2 mm long. Seeds flat; 0.5–1 mm long.
        4. Leaves oblong to oblanceolate. Corollas white, edges often blue-tinged. Sepals of equal length. ..... ***V. peregrina***
        4. Leaves ovate to suborbicular. Corollas blue to violet. Sepals unequal in length, one pair longer. ..... ***V. arvensis***
    3. Pedicels 4–40 mm long. Seeds concave; 1–3 mm long.
        5. Longest fruiting pedicels 15–40 mm long. Corollas 8–12 mm wide. ..... ***V. persica***
        5. Longest fruiting pedicels 4–15 mm long. Corollas 3–8 mm wide.
            6. Capsules glabrous; apical notches 0.2–0.3 mm deep. Calyx lobes deltoid. Seeds 1 or 2 per locule. ..... ***V. hederifolia***
            6. Capsules pubescent; apical notches 0.8–1.6 mm deep. Calyx lobes lanceolate to ovate. Seeds 6–12 per locule.
                7. Margins of cauline leaves 3- to 7-lobed. Capsules flattened. ..... ***V. triphyllos***
                7. Margins of cauline leaves serrate to crenate. Capsules inflated.
                8. Calyx lobes linear-lanceolate. Corollas white, often blue-tinged. Capsules 2.5–4 mm long. ..... ***V. agrestis***
                8. Calyx lobes broadly ovate. Corollas blue. Capsules 4–6 mm long. ..... ***V. polita***

Veronicastrum L. Heister ex P.C. Fabricus Culver's Root

One species. ..... ***V. virginicum***

PLATANACEAE T.G. Lestiboudois ex B.C.J. Dumortier Plane-Tree Family

Plants trees; deciduous; monoecious. **Stems** with brownish-gray bark exfoliating to reveal smooth, greenish white surfaces; mature trunks shallowly fissured; terminal buds absent; lateral buds hidden by petiole bases. **Leaves** simple; alternate; blades ovate to broadly reniform; venation palmate; margins 3- to 5-palmately lobed, serrate; stipules present, caducous, forming toothed membranous cylinders surrounding stems. **Inflorescences** heads; globose; axillary; pistillate larger than staminate; bracteoles present. **Flowers** produced simultaneously with or after leaves; imperfect, staminate and pistillate different; perianths in 1-series or 2-series, minute. **Staminate Flowers:** Sepals 3 to 7; free or fused at bases; fimbriate. Petals 3 to 7; free; fleshy. Stamens 3 to 7; filaments short or absent. Gynoecial Rudiments absent or present; 3 or 4. **Pistillate Flowers:** Sepals 3 to 7; free or fused at bases. Petals absent. Androecial Rudiments present; 3 or 4. Pistils 5 to 9; simple, carpels 1; sessile or short-stipitate; stigmas 1, decurrent; styles 1, recurved; ovaries superior; locules 1; placentation parietal; ovules 1 or 2. **Fruits** syncarps of achenes. **Seeds** 1.

The family is represented in Oklahoma by 1 genus and 1 species. It is a monogeneric family of the northern hemisphere.

Platanus C. Linnaeus Sycamore

One species. ..... ***P. occidentalis***

PLUMBAGINACEAE A.L. de Jussieu Leadwort Family

Plants herbs; perennials; perennating organs caudices or crowns; acaulescent. **Leaves** simple; alternate; coriaceous; venation pinnate; stipules absent. **Inflorescences** panicles. **Flowers** perfect; perianths in 2-series. **Calyces** funnelform. **Sepals** 5; fused; membranous; persistent; apices white. **Corollas** radially symmetrical. **Petals** 5; clawed; apices coherent; bright blue. **Stamens** 5; opposite petals; epipetalous. **Pistils** 1; compound, carpels 5; stigmas 5; styles 5; ovaries superior; locules 1; placentation basal. **Fruits** utricles. **Seeds** 1.

The family is represented in Oklahoma by 1 genus and 1 species. It is a small family with plants most often encountered in saline, alkaline, and semi-arid habitats.

Limonium P. Miller

One species. ..... ***L. limbatum***

POACEAE J.H. Barnhart Grass Family

Plants herbs or woody canes; annuals or perennials; perennating organs rhizomes or stolons or caudices or crowns; terrestrial or emergent aquatics. **Root Systems** fibrous. **Stems** (culms) branched or unbranched; jointed; internodes solid or hollow, terete or slightly to strongly flattened. **Leaves** basal or cauline; simple; alternate; with basal sheaths, margins overlapping or rarely fused; 2-ranked; blades linear to ensiform to ovate; venation parallel or parallel-convergent; ligules present or rarely absent; margins entire or scabrous. **Inflorescences** spikelets borne in panicles or racemes or spikes or rames or enclosed in burs; terminal or axillary. **Spikelets** consisting of glumes and florets borne in 2 ranks on a short axis (rachilla); lowest bracts (glumes) 2 or rarely 1 or absent, subopposite, without flowers; florets 1 to many, borne above glumes, consisting of paired bracts (lemmas and paleas), flowers typically present or rarely absent; lemmas enclosing paleas and flowers; paleas typically present or rarely absent. **Flowers** reduced; hidden by lemmas and paleas or glumes except at anthesis; perfect or imperfect; chasmogamous or cleistogamous; perianths in 1-series. **Sepals** (lodicules) 1 to 3; reduced to small appendages at bases of ovaries; free or fused. **Petals** absent. **Stamens** 3, or rarely 6 or 1. **Pistils** 1; compound, carpels 2 or 3; stigmas 2 or rarely 3, plumose; styles 2 or 1; ovaries superior; locules 1; placentation parietal. **Fruits** caryopses. **Seeds** 1.

The family is represented in Oklahoma by 102 genera and 335 species classified in 20 tribes. In this treatment, the Cynodonteae and Eragrostideae are maintained as separate tribes as are the Poeae and Aveneae. An alternate family name is Gramineae.

The Poaceae is one of the largest families, cosmopolitan, and the most important because it includes the cereal grains, sugar cane, bamboo, and numerous forage species. The dominant species of the prairie and plains ecosystems are members of the family.

Key to Tribes

1. Culms woody; persisting 2 or more years. Leaves pseudopetiolate; persisting 2 or more years. ..... **Arundinarieae**
1. Culms herbaceous; persisting 1 year. Leaves not pseudopetiolate, blades continuous with sheaths; persisting 1 year.
  2. Spikelets enclosed in burs or partially embedded in rachises or borne on axillary, thickened rachises (cobs).
    3. Spikelets enclosed in burs.
      4. Burs with hard spines; borne on elongate peduncles above leaves. Plants annuals; cespitose. Spikelets perfect. ..... **Paniceae**
      4. Burs with soft spines; borne subsessile in axils of inflated sheaths and overtopped by leaves. Plants perennials; spreading by stolons. Spikelets imperfect. ..... **Cynodonteae**
    3. Spikelets partially embedded in rachises or borne on axillary, thickened rachises (cobs).
      5. Spikelets with all florets imperfect. Plants monoecious. Pistillate spikelets borne on axillary thickened rachises subtended by leafy bracts (ears). Staminate spikelets borne in terminal panicles of rames (tassels). ..... **(*Zea*) Andropogoneae**
      5. Spikelets with at least 1 floret perfect. Spikelets not borne in ears nor tassels.
        6. Inflorescences rames. Spikelets 2 per node, 1 sessile and 1 pedicellate. ..... **Andropogoneae**
        6. Inflorescences spikes. Spikelets 1 per node.
          7. Spikes 2-sided. Spikelets awned. Plants annuals. Stolons absent. ..... **Triticeae**
          7. Spikes 1-sided. Spikelets not awned. Plants perennials. Stolons present. ..... **Paniceae**
  2. Spikelets not enclosed in burs nor partially embedded in rachises nor borne on thickened rachises (cobs).
    8. Inflorescences rames [pedicellate spikelets may be vestigial or absent]. ..... **Andropogoneae**
    8. Inflorescences spikes or racemes or panicles or clusters.
      9. Spikelets sessile or subsessile. Pedicels absent or obscured by spikelets.
        10. Inflorescences capitate clusters of spikelets. ..... **Cynodonteae**
        10. Inflorescences spikes or panicles or racemes.
          11. Inflorescences spikes.
            12. Spikes 2-sided, spikelets borne on both sides of rachises.
              13. Spikes terete. ..... **Triticeae**
              13. Spikes flattened.
                14. Lemma midnerves against rachises. Lower glumes absent, except in terminal spikelets. Ligules membranous. ..... **Poeae**
                14. Lemma margins against rachises. Lower glumes present. Ligules ciliate-membranous. ..... **Centotheceae**

12. Spikes 1-sided, spikelets borne in 2 rows on 1 side of rachises.
15. Fertile florets 2–40 per spikelet. ..... **Eragrostideae**
15. Fertile florets 1 per spikelet.
16. Spikelets dorsally compressed. Both glumes longer than florets, completely enclosing them; indurate. ..... **Andropogoneae**
16. Spikelets laterally compressed. One or both glumes shorter than florets, not completely enclosing them; membranous. ..... **Cynodonteae**
11. Inflorescences racemes or spicate panicles.
17. Florets 1 per spikelet.
18. Spikelets laterally compressed. Mature lemmas membranous.
19. Glumes longer than florets, concealing them. Lemma awns dorsal when present. ..... **Aveneae**
19. Glumes shorter than florets, not concealing them. Lemma awns apical when present. ..... **Eragrostideae**
18. Spikelets terete or dorsally compressed. Mature lemmas indurate or coriaceous.
20. Spikelets terete. Disarticulation above the glumes. Lemma awns 3. ..... **Aristideae**
20. Spikelets dorsally compressed. Disarticulation below the glumes. Lemma awns 0. [Lower glumes absent or vestigial and lowest lemma resembling upper glume, hence spikelets falsely appearing to have 1 floret]. ..... **Paniceae**
17. Florets 2–60 per spikelet.
21. Spikelets dorsally compressed. ..... **Paniceae**
21. Spikelets laterally compressed.
22. Ligules ciliate or ciliate-membranous.
23. Lemma awns 9; plumose. ..... **Pappophoreae**
23. Lemma awns 0 or 1; not plumose.
24. Lemma nerves 5–15. Florets imperfect. ..... **Aeluropodeae**
24. Lemma nerves 1 or 3. Florets perfect. ..... **Eragrostideae**
22. Ligules membranous or lacerate-membranous or erose-membranous.
25. Upper glumes obovate to oblanceolate. ..... **Aveneae**
25. Upper glumes ovate to lanceolate.
26. Glumes longer than florets, concealing them. Lemma awns dorsal when present. ..... **Aveneae**
26. Glumes shorter than florets, not concealing them. Lemma awns apical when present.
27. Sheath margins overlapping. Lemmas not awned or awned from acute apices. Ovary apices not pubescent. Styles apical. ..... **Poeae**
27. Sheath margins fused. Lemmas awned from bifid apices. Ovary apices pubescent. Styles subapical. ..... **Bromeae**
9. Spikelets pedicellate. Pedicels conspicuous.
28. Florets 1 per spikelet.
29. Glumes 0. Spikelets consisting of only lemmas and paleas. ..... **Oryzeae**
29. Glumes 1 or 2. Spikelets consisting of glume(s) and lemmas and paleas.
30. Lower glumes absent.
31. Ligules ciliate. Spikelets laterally compressed. ..... **Eragrostideae**
31. Ligules membranous or ciliate-membranous. Spikelets terete or dorsally compressed.
32. Spikelets terete; 8–11 mm long. Lemmas awned. Disarticulation above the glumes. ..... **Brachyelytreae**
32. Spikelets dorsally compressed; 1–5 mm long. Lemmas not awned. Disarticulation below the glumes. ..... **Paniceae**
30. Lower glumes present.
33. Lower glumes 0.1–0.5 mm long.
34. Ligules ciliate. Spikelets laterally compressed. ..... **Eragrostideae**
34. Ligules membranous or ciliate-membranous. Spikelets terete or dorsally compressed.

35. Spikelets terete; 8–11 mm long. Lemmas awned. Disarticulation above the glumes. ..... **Brachyelytreae**
35. Spikelets dorsally compressed; 1–5 mm long. Lemmas not awned. Disarticulation below the glumes. ..... **Paniceae**

33. Lower glumes 1–25 mm long.
36. Spikelets laterally compressed. Mature lemmas membranous or hyaline.
37. Glumes longer than lemmas, concealing them.
38. Rhizomes present; 1–2 mm in diameter; scale leaves present. ..... **Eragrostideae**
38. Rhizomes absent, or if present, less than 1 mm in diameter; scale leaves absent. ..... **Aveneae**
37. Glumes shorter than lemmas, not concealing them.
39. Spikelets 1–6 mm long. Stamens 3. ..... **Eragrostideae**
39. Spikelets 7–10 mm long. Stamens 6. [Glumes absent but 2 sterile lemmas below 1 fertile floret reduced and glume-like, hence spikelets falsely appearing to have 1 floret and 2 glumes]. ..... **Oryzeae**
36. Spikelets terete or dorsally compressed. Mature lemmas indurate.
40. Spikelets terete. Disarticulation above the glumes. Lemma bases pointed; sharp-edged.
41. Lemma awns 1. Ligules membranous. ..... **Stipeae**
41. Lemma awns 3. Ligules ciliate-membranous. ..... **Aristideae**
40. Spikelets dorsally compressed. Disarticulation below the glumes. Lemma bases blunt; not sharp-edged.
42. Glumes indurate. Upper lemmas hyaline. ..... **Andropogoneae**
42. Glumes membranous. Upper lemmas indurate or coriaceous [Lower glumes absent or obsolete and lowest lemma resembling upper glume, hence spikelets falsely appearing to have 1 floret]. ..... **Paniceae**

28. Florets 2–60 per spikelet.
43. Spikelets dorsally compressed.
44. Glumes membranous. Upper lemmas indurate or coriaceous. ..... **Paniceae**
44. Glumes indurate. Upper lemmas hyaline. ..... **Andropogoneae**
43. Spikelets laterally compressed or terete.
45. Culms 2.5–6 m tall. Florets hidden by long villous hairs. ..... **Arundineae**
45. Culms 0.1–2 m tall. Florets not hidden by long villous hairs.
46. Glumes longer than florets.
47. Lemma awns 9; plumose. ..... **Pappophoreae**
47. Lemma awns 0 or 1; not plumose.
48. Ligules membranous or lacerate-membranous. Lemma awns dorsal when present. ..... **Aveneae**
48. Ligules ciliate or ciliate-membranous. Lemma awns apical from bifid apices when present.
49. Lemma apices bifid. Lemma awns present; geniculate. Lemma nerves 5; inconspicuous. ..... **Danthonieae**
49. Lemma apices acute to acuminate. Lemma awns absent or straight when present. Lemma nerves 3; conspicuous. ..... **Eragrostideae**
46. Glumes shorter than florets.
50. Upper glumes obovate to oblanceolate. ..... **Aveneae**
50. Upper glumes ovate to lanceolate. ..... **couplet 51**

51. Lemma nerves 5–15.
52. Lemmas oblong to obovate; nerves parallel. ..... **Meliceae**
52. Lemmas ovate to lanceolate or elliptic; nerves parallel-convergent.
53. Ligules membranous or lacerate-membranous or erose-membranous.

54. Sheath margins overlapping. Lemmas not awned or awned from acute apices. Styles apical. ..... **Poeae**
54. Sheath margins fused. Lemmas awned from bifid apices. Styles subapical. ..... **Bromeae**
53. Ligules ciliate or ciliate-membranous.
55. Plants of shady woods; bearing perfect flowers. Blades flat; 4–20 mm wide. ..... **Centotheceae**
55. Plants of sunny saline sites; dioecious. Blades involute; 1–4 mm wide. ..... **Aeluropodeae**
51. Lemma nerves 1 or 3.
56. Ligules ciliate or ciliate-membranous. ..... **Eragrostideae**
56. Ligules membranous or lacerate-membranous or erose-membranous.
57. Caryopses 4–7 mm long; beaked; shiny; protruding from florets at maturity. ..... **Diarrheneae**
57. Caryopses 1–3.7 mm long; not beaked; dull; not protruding from florets at maturity.
58. Inflorescences panicles of spicate, 1-sided racemes. ..... **Eragrostideae**
58. Inflorescences panicles or racemes.
59. Spikelets borne on pedicels 0.5–2 mm long; clustered. Panicles or racemes narrow to broadly pyramidal. ..... **Poeae**
59. Spikelets borne on pedicels 3–18 mm long; not clustered. Panicles globose to flabellate. ..... **Eragrostideae**

Descriptions of Tribes & Keys to Their Genera

Aeluropodeae N.L. Bor Saltgrass Tribe

Plants perennials; halophytes; from rhizomes or stolons; dioecious. **Leaves** conspicuously distichous. **Ligules** fimbriate-membranous. **Inflorescences** spicate racemes; short; appressed against central axes. **Spikelets** of 2 kinds, staminate and pistillate similar; conspicuously laterally compressed. **Florets** 5–25. **Lemmas** with nerves 9 or 11; conspicuously keeled. **Disarticulation** above the glumes and between the florets.

The tribe is represented in Oklahoma by 1 genus, *Distichlis*, and 1 species, *D. spicata*.

Andropogoneae B.C.J. Dumortier Bluestem Tribe

Plants annuals or perennials; cespitose or from rhizomes. **Ligules** membranous or ciliate-membranous. **Inflorescences** rames; solitary or digitate or paniculate. **Spikelets** all alike or of 2 types, staminate and pistillate different with perfect and imperfect florets or florets all imperfect; dorsally compressed. **Florets** 1 or 2, lower florets staminate or neuter, upper florets perfect. **Glumes** indurate or coriaceous; enclosing florets. **Lemmas** hyaline or membranous; awns present or absent. **Paleas** hyaline or absent. **Disarticulation** below the glumes, pairs of spikelets and rachis joints dropping as units.

The tribe is represented in Oklahoma by 12 genera and 25 species.

1. Spikelets with all florets imperfect. Plants monoecious. Staminate spikelets borne above pistillate spikelets in one inflorescence or staminate spikelets borne in separate inflorescence above pistillate inflorescence.
2. Staminate and pistillate spikelets borne in separate inflorescences. Staminate spikelets borne in paniculate rames (tassels). Pistillate spikelets borne on axillary thickened rachises subtended by leafy bracts (ears). Mature caryopses protruding well beyond glumes. Plants annuals; from fibrous roots. ..... ***Zea***
2. Staminate and pistillate spikelets borne in 1 inflorescence. Staminate spikelets borne in 2–4 digitate rames immediately above pistillate spikelets which are embedded in hardened rachis. Mature caryopses enclosed within glumes. Plants perennials; from massive, knotty rhizomes. ..... ***Tripsacum***
1. Spikelets with at least 1 floret perfect. Plants bearing perfect flowers or both perfect and imperfect flowers.
3. Inflorescences cylindrical. Sessile spikelets sunken in hollows of concave rachis joints. Pedicels of pedicillate spikelets thickened; appressed against rachis joints. ..... ***Mnesithea***
3. Inflorescences not cylindrical. Sessile spikelets not sunken in hollows of concave rachis joints. Pedicels of pedicillate spikelets, if present, not thickened; not appressed against rachis joints.

4. Spikelets not paired.
  5. Blades broadly ovate; clasping. Plants annuals; cespitose. Culms decumbent or creeping. Rachis joints glabrous. ..... ***Arthraxon***
  5. Blades narrowly lanceolate; not clasping. Plants perennials; spreading by rhizomes. Culms erect. Rachis joints hispid. ..... ***Sorghastrum***
4. Spikelets paired, one sessile and one pedicellate; pedicellate spikelets well developed or vestigial.
  6. Rames 1 per peduncle. ..... ***Schizachyrium***
  6. Rames 2–many per peduncle.
    7. Sessile and pedicellate spikelets similar. Pedicellate spikelets as large as sessile; perfect; awned.
      8. Plant annuals. Culms decumbent; rooting at nodes; 0.3–0.7 m tall. Rames digitate. ..... ***Microstegium***
      8. Plants perennials from knotty bases. Culms erect; not rooting at nodes; 1–4 m tall. Rames paniculate.
        9. Lemma awns 12–15 mm long. Spikelets 6–7 mm long. ..... ***Saccharum***
        9. Lemma awns 2–3 mm long. Spikelets 4-5 mm long. ..... ***Tripidium***
    7. Sessile and pedicellate spikelets dissimilar. Pedicellate spikelets smaller than sessile; staminate or neuter; not awned.
      10. Inflorescences 15–45 cm long. Spikelet pairs 2 or 3 per ultimate branchlet. ..... ***Sorghum***
      10. Inflorescences 1–9 cm long. Spikelet pairs 7–20 per ultimate branchlet
        11. Upper pedicels and rachis joints with a longitudinal translucent furrow. ..... ***Bothriochloa***
        11. Upper pedicels and rachis joints without a longitudinal translucent furrow. ..... ***Andropogon***

Aristideae C.E. Hubbard Three-Awn Tribe

Plants annuals or perennials; cespitose. **Blades** rolled or involute or flat. **Ligules** ciliate. **Sheaths** with margins free, non-overlapping. **Inflorescences** panicles. **Spikelets** terete. **Florets** 1, perfect. **Lemmas** coriaceous or indurate; nerves 1 or 3; awns 3, apical, divergent; margins overlapping and enclosing paleas and flowers; calluses sharp pointed, pubescent. **Disarticulation** above the glumes.

The tribe is represented in Oklahoma by 1 genus, *Aristida*, and 13 species.

Arundinarieae P.F.A. Ascherson & K O. Graebner Cane Tribe

Plants perennials; from rhizomes. **Culms** 1–5 m tall; woody; branching above; branches fascicled. **Leaves** cauline; pseudopetiolate. **Ligules** membranous. **Sheaths** with auricles. **Inflorescences** panicles; branches fascicled. **Spikelets** laterally compressed. **Florets** 6–15. **Glumes** with nerves many. **Lemmas** with nerves 7 or 9 or 11; transverse nerves often conspicuous. **Paleas** with nerves many. **Disarticulation** above the glumes and between the florets.

The tribe is represented in Oklahoma by 1 genus, *Arundinaria,* and 1 species, *A. gigantea.*

Arundineae B.C.J. Dumortier Reed Tribe

Plants perennials; cespitose or from rhizomes; with perfect flowers or dioecious. **Culms** 2.5–6 m tall. **Ligules** ciliate or ciliate-membranous. **Inflorescences** panicles; oblong-pyramidal; plumose. **Spikelets** all alike or of 2 kinds, staminate and pistillate similar; laterally compressed. **Florets** 2–5; upper progressively smaller. **Glumes** with nerves 1 or 3. **Lemmas** with nerves 3. **Disarticulation** above the glumes and between the florets.

The tribe is represented in Oklahoma by 2 genera and 2 species.

1. Lemmas villous; awned, from bifid apices. Rachillas glabrous. ..... ***Arundo***
1. Lemmas glabrous; not awned. Rachillas villous. ..... ***Phragmites***

Aveneae B.C.J. Dumortier Oat Tribe

Plants annuals or perennials; cespitose. **Ligules** membranous. **Inflorescences** panicles; spicate or open. **Spikelets** laterally compressed. **Florets** 1–3; all alike or of 2 forms. **Glumes** equal or subequal in length; equal to or longer than florets and enclosing them. **Lemmas** with nerves 3 or 5 or 7 or 9; awns absent or present from back. **Paleas** present or absent. **Disarticulation** above or below the glumes.

The tribe is represented in Oklahoma by 15 genera and 29 species. As circumscribed here, it includes taxa placed in the Phalarideae and Agrostideae by some taxonomists.

1. Florets 1 per spikelet.
    2. Panicles not spicate; broadly pyramidal. Pedicels and branches conspicuous. ..... ***Agrostis***
    2. Panicles spicate; cylindrical. Pedicels and branches hidden by spikelets.
        3. Glumes awned.
            4. Panicles 0.6–0.8 cm wide. Keels of glumes hispid-ciliate. ..... ***Phleum***
            4. Panicles 1–2.5 cm wide. Keels of glumes scabrous. ..... ***Polypogon***
        3. Glumes not awned.
            5. Spikelets with 2 scales below floret [scales are lemmas of vestigial florets]. ..... ***Phalaris***
            5. Spikelets without scales below floret.
                6. Lemmas 3–5 mm long.
                7. Lemma awns 0.2–0.5 mm long. Rachillas not prolonged above florets. ..... ***Cinna***
                7. Lemma awns 7–12 mm long. Rachillas prolonged above florets as slender bristles. ..... ***Limnodea***
                6. Lemmas 1–2 mm long.
                8. Lemmas awned. Plants annuals. ..... ***Alopecurus***
                8. Lemmas not awned. Plants perennials. ..... ***Agrostis***
1. Florets 2 or 3 per spikelet.
    9. Glumes dissimilar in shape; lower linear to lanceolate; upper oblanceolate to broadly obovate.
        10. Upper glumes oblanceolate. Disarticulation above the glumes. ..... ***Koeleria***
        10. Upper glumes broadly obovate. Disarticulation below the glumes. ..... ***Sphenopholis***
    9. Glumes similar in shape; both lanceolate.
        11. Panicles open; not spicate. Pedicels and branches not appressed against rachises; conspicuous.
            12. Spikelets 20–25 mm long. ..... ***Avena***
            12. Spikelets 1–5 mm long.
                13. Spikelets 1–3 mm long. Upper lemmas awned from middle. Awns 2–4 mm long. Plants annuals. ..... ***Aira***
                13. Spikelets 4–5 mm long. Upper lemmas awned from below the middle. Awns 5–7 mm long. Plants perennials. ..... ***Avenella***
        11. Panicles dense; spicate. Pedicels and branches appressed against rachises; hidden by spikelets.
            14. Florets 3 per spikelet; lower 2 sterile, pilose-hirsute or sericeous. Disarticulation above the glumes.
                15. Glumes equal in length. Lower lemmas scale-like; not awned; sericeous. ..... ***Phalaris***
                15. Glumes unequal in length. Lower lemmas awned; pilose-hirsute. ..... ***Anthoxanthum***
            14. Florets 2 or 3 per spikelet; all fertile, glabrous or scaberulous. Disarticulation below the glumes.
                16. Lower lemmas awned; nerves 3. Plants annuals. ..... ***Sphenopholis***
                16. Lower lemmas not awned; nerves 1. Plants perennials. ..... ***Holcus***

Brachyelytreae J. Ohwi Brachyeleytrum Tribe

Plants perennials; from short, knotty rhizomes. **Ligules** membranous. **Inflorescences** panicles; narrow; branches and pedicels appressed against rachises. **Spikelets** terete. **Florets** 1. **Glumes** 1 or 2; lower glumes absent or minute; upper glumes subulate. **Lemmas** with nerves 5; awns 1, apical; margins involute; calluses oblique. **Paleas** with keels hispid-ciliate. **Disarticulation** above the glumes.

The tribe is represented in Oklahoma by 1 genus *Brachyelytrum,* and 1 species, *B. erectum*.

Bromeae B.C.J. Dumortier Bromegrass Tribe

Plants annuals or perennials; cespitose or from rhizomes. **Ligules** membranous. **Sheaths** with margins fused. **Inflorescences** panicles or racemes. **Spikelets** laterally compressed or subterete. **Florets** 4–13. **Glumes** shorter than florets. **Lemmas** convex or keeled in 1 species; nerves 5 or 7 or 9 or 11 or 13; awns absent or present from bifid apices. **Paleas** with keels ciliate. **Ovaries** with subterminal stigmas. **Disarticulation** above the glumes.

The tribe is represented in Oklahoma by 1 genus, *Bromus,* and 14 species.

Centotheceae H.N. Ridley Centothecum Tribe

Plants perennials; from rhizomes. **Ligules** ciliate-membranous. **Inflorescences** panicles; open or spicate. **Spikelets** laterally compressed. **Florets** 3–16; lowest 1 or 2 neuter, resembling glumes. **Glumes** shorter than florets. **Lemmas** lanceolate to ovate-falcate; nerves 5–many; keels present. **Paleas** conspicuously shorter than lemmas; keels ciliolate. **Disarticulation** above the glumes.

The tribe is represented in Oklahoma by 1 genus, *Chasmanthium*, and 2 species.

Cynodonteae B.C.J. Dumortier Gramagrass Tribe

Plants annuals or perennials; cespitose or from rhizomes and/or stolons. **Ligules** ciliate or ciliate-membranous. **Inflorescences** 1-sided spikes; arrangement solitary or alternate or digitate or verticillate or racemose or capitate or clustered. **Spikelets** all alike or of 2 forms; laterally compressed. **Florets** 1–3; perfect or imperfect; fertile florets 1 per spikelet. **Lemmas** with nerves 3; awns absent or present from apices. **Disarticulation** above or below the glumes.

The tribe is represented in Oklahoma by 8 genera and 20 species.

1. Spikelets imperfect. Plants dioecious. Pistillate spikelets enclosed in indurate burs. ..... ***Bouteloua***
1. Spikelets perfect.
    2. Spikelets borne in capitate clusters or in clusters of 3 per node.
        3. Plants annuals; stoloniferous. Leaves fascicled; 1–3 cm long.
            All spikelets of clusters fertile. Clusters not falling as units. ..... ***Munroa***
        3. Plants perennials; rhizomatous. Leaves not fascicled; 4–15 cm long.
            Lateral spikelets of clusters sterile. Clusters falling as units. ..... ***Hilaria***
    2. Spikelets borne in 1-sided spikes.
        4. Spikes 2–9 per node; arrangement digitate or verticillate.
            5. Sterile florets absent or inconspicuous, reduced to scales. Rachillas prolonged as bristles
                beyond the fertile floret. Spikelets not awned. ..... ***Cynodon***
            5. Sterile florets conspicuous above fertile floret. Rachillas not prolonged as bristles
                beyond the fertile floret. Spikelets awned. ..... ***Chloris***
        4. Spikes 1 per node; arrangement alternate.
            6. Lemmas not awned. Florets 1 per spikelet; fertile. ..... ***Spartina***
            6. Lemmas awned. Florets 2 or 3 per spikelet; lower 1 fertile and upper 1 or 2 sterile.
                7. Spikes 0.5–6 cm long. Spikelets overlapping on rachises. Ligules ciliate. ..... ***Bouteloua***
                7. Spikes 8–9 cm long. Spikelets widely spaced on rachises.
                    Ligules ciliate-membranous. ..... ***Gymnopogon***

Danthonieae V.D. Zotov Oatgrass Tribe

Plants perennials; cespitose. **Leaves** basal. **Ligules** ciliate. **Inflorescences** panicles; narrow; branches and pedicels appressed against rachises. **Spikelets** laterally compressed. **Florets** 5–8. **Glumes** equal; longer than florets. **Lemmas** with nerves 5; villous; awns 1, from bifid apices, geniculate, basal segment flat, twisted, and golden brown. **Paleas** oblanceolate; keels ciliolate. **Disarticulation** above the glumes.

The tribe is represented in Oklahoma by 1 genus, *Danthonia,* and 1 species, *D. spicata.*

Diarrheneae C.S. Campbell Beakgrain Tribe

Plants perennials; from rhizomes. **Culms** solitary or in small tufts. **Ligules** membranous. **Inflorescences** panicles; narrow; nodding; short branches and pedicels appressed against rachises or ascending. **Spikelets** laterally compressed. **Florets** 2–5. **Glumes** shorter than florets; apices mucronate to attenuate. **Lemmas** broadly elliptic; backs rounded; nerves 3. **Paleas** shorter than lemmas; keels scaberulous. **Caryopses** protruding from florets; beaked; shiny. **Disarticulation** above the glumes.

The tribe is represented in Oklahoma by 1 genus, *Diarrhena,* and 2 species.

Eragrostideae O. Stapf Lovegrass Tribe

Plants annuals or perennials; cespitose or from rhizomes or stolons. **Ligules** ciliate or ciliate-membranous or membranous. **Inflorescences** panicles or spikes or 1-sided racemes. **Spikelets** all alike or of 2 forms; laterally compressed. **Florets** 1–60; perfect

or imperfect. **Glumes** shorter or longer than florets. **Lemmas** convex or keeled; nerves 3 or 1; awns absent or present from acute apices. **Disarticulation** above or below the glumes.

The tribe is represented in Oklahoma by 10 genera and 69 species.

1. Ligules membranous or lacerate-membranous.
    2. Florets 1 or 2 per spikelet. ..... ***Muhlenbergia***
    2. Florets 6–10 per spikelet.
        3. Inflorescences panicles of 1-sided spikes. Ligules 1–5 mm long. Spikelets 5–14 mm long. ..... ***Leptochloa***
        3. Inflorescences panicles. Ligules 0.3–0.5 mm long. Spikelets 1.5–3.2 mm long. ..... ***Eragrostis***
1. Ligules ciliate or ciliate-membranous.
    4. Florets 1 per spikelet.
        5. Glumes 0.1–0.2 mm long. Lower glumes typically absent; nerves 0. ..... ***Muhlenbergia***
        5. Glumes 0.5–10 mm long. Lower glumes always present; nerves 1.
            6. Lemma callus hairs present; 2–6 mm long. Rhizomes present. ..... ***Calamovilfa***
            6. Lemma callus hairs absent. Rhizomes absent. ..... ***Sporobolus***
    4. Florets 2–60 per spikelet.
        7. Spikelets pedicellate. Pedicels conspicuous.
            8. Lemmas glabrous. ..... ***Eragrostis***
            8. Lemmas pubescent.
                9. Plants stoloniferous. Spikelets imperfect, staminate and pistillate different; plants dioecious or monoecious. ..... ***Scleropogon***
                9. Plants cespitose. Spikelets perfect.
                10. Panicles 3–10 cm long, partially or fully enclosed in subtending sheaths. Palea nerves long silky-pubescent at apices. Plants annuals. ..... ***Triplasis***
                10. Panicles 12–40 cm long, not enclosed in subtending sheaths. Palea nerves glabrous or puberulent at apices. Plants perennials. ..... ***Tridens***
        7. Spikelets sessile or subsessile. Pedicels absent or hidden by spikelets.
            11. Inflorescences spikes or spicate racemes or panicles of 1-sided spikes.
                12. Spikes or spicate racemes borne in digitate or subdigitate inflorescences. Rachises winged. ..... ***Eleusine***
                12. Spikes or spicate racemes borne in elongate inflorescences. Rachises not winged.
                13. Culms branched at bases. Collars densely pilose. Panicle rachises spiraled. Disarticulation at bases of panicles. ..... ***Eragrostis***
                13. Culms not branched at bases. Collars glabrous to sparsely pilose. Panicle rachises straight or arching. Disarticulation between the florets. ..... ***Leptochloa***
            11. Inflorescences spicate panicles.
                14. Panicles capitate; 1.5–3 cm long.
                15. Plants cespitose; perennials. Leaf blade margins cartilaginous; white. Lemma margins distally ciliate-pilose. Lemmas awned from bifid apices. ..... ***Erioneuron***
                15. Plants stoloniferous; annuals. Leaf blade margins not cartilaginous; not white. Lemma margins distally glabrous. Lemmas not awned. ..... ***Eragrostis***
                14. Panicles elongate; 5–15 cm long.
                16. Plants stoloniferous. Spikelets imperfect. Plants only in Black Mesa area. ..... ***Scleropogon***
                16. Plants cespitose. Spikelets perfect. Plants widespread, but not in Black Mesa area.
                17. Lemma apices obtuse. Glumes longer than the lowest lemma. ..... ***Tridens***
                17. Lemma apices acute. Glumes shorter than or equal to the lowest lemma. ..... ***Eragrostis***

Meliceae L. Reichenbach Melicgrass Tribe

Plants perennials; cespitose or from short rhizomes. **Culms** solitary or in small tufts. **Ligules** membranous. **Inflorescences** panicles. **Spikelets** laterally compressed. **Florets** 4–13. **Glumes** shorter than florets; margins scarious or hyaline. **Lemmas** oblong to oblanceolate; nerves 7, parallel, not reaching apices. **Disarticulation** above or below the glumes.

The tribe is represented in Oklahoma by 2 genera and 5 species.

1. Glumes 5–10 mm long; nerves 3 or 5 or 7. Fertile florets 2 or 3 per spikelet Upper florets sterile; forming club-like rudiments. ..... ***Melica***

1. Glumes 0.5–3 mm long; nerves 1. Fertile florets 4–13 per spikelet.
   Upper florets fertile, not forming club-like rudiments. ..... ***Glyceria***

Oryzeae B.C.J. Dumortier Rice Tribe

Plants annuals or perennials; cespitose or from rhizomes; monoecious or bearing perfect florets. **Ligules** membranous. **Inflorescences** panicles. **Spikelets** laterally compressed or terete. **Florets** 1–3; lowest 2 glume-like when 3 present; perfect or imperfect. **Glumes** absent**. Lemmas** with nerves 5 or 7. **Paleas** with nerves 3. **Disarticulation** below spikelets.

The tribe is represented in Oklahoma by 3 genera and 5 species.

1. Spikelets terete; imperfect, staminate borne below pistillate on branches. Panicle branches whorled. ..... ***Zizaniopsis***
1. Spikelets laterally compressed; perfect. Panicle branches alternate or fascicled.
   2. Spikelets 2–5 mm long. Sterile lemmas below perfect floret absent. Plants perennials; rhizomes present. ..... ***Leersia***
   2. Spikelets 7–10 mm long. Sterile lemmas below perfect floret present; 2; glume-like. Plants annuals; rhizomes absent. ..... ***Oryza***

Paniceae R. Brown Panicgrass Tribe

Plants annuals or perennials; cespitose or from rhizomes or stolons. **Ligules** membranous or ciliate-membranous or ciliate or absent. **Inflorescences** panicles or 1-sided racemes or spikelets borne in spiny burs. **Spikelets** dorsally compressed. **Florets** 2; lower florets staminate or neuter; upper florets perfect. **Glumes** 1 or 2; membranous; lower glumes present or absent; upper glumes typically resembling lemmas of lower florets. **Lemmas of Lower Florets** membranous; nerves 5 or 7 or 9. **Paleas of Lower Florets** hyaline or absent. **Lemmas of Upper Florets** indurate or coriaceous; tightly enclosing paleas. **Paleas of Upper Florets** indurate or coriaceious. **Disarticulation** below the glumes.

The tribe is represented in Oklahoma by 16 genera and 88 species.

1. Spikelets subtended by bristles or enclosed in spiny burs.
   2. Spikelets enclosed in spiny burs of broad, sharp, flattened, fused spines. ..... ***Cenchrus***
   2. Spikelets subtended by narrow, blunt, terete, free bristles.
      3. Spikelets dropping from inflorescences at maturity; bristles remaining attached to rachises. ..... ***Setaria***
      3. Spikelets and bristles dropping together from inflorescences at maturity, bristles not remaining attached to rachises. ..... ***Pennisetum***
1. Spikelets not subtended by bristles nor enclosed in spiny burs.
   4. Spikelets partially embedded in one side of thickened, flattened rachises. ..... ***Stenotaphrum***
   4. Spikelets not embedded in one side of thickened flattened rachises.
      5. Terminal spikelets of each branch subtended by a single, scabrous bristle 1–7 mm long. ..... ***Setaria***
      5. Terminal spikelets of each branch not subtended by a single, scabrous bristle.
         6. Inflorescences paniculate.
            7. Spikelets silky-pubescent; hairs 3–4.5 mm long. ..... ***Digitaria***
            7. Spikelets glabrous or pubescent, but not silky; hairs less than 3 mm long if present.
               8. Bases of upper glumes saccate. Upper florets stipitate; much shorter than upper glumes and lemmas of lower florets. ..... ***Sacciolepis***
               8. Bases of upper glumes not saccate. Upper florets sessile; equal or subequal to upper glumes and lemmas of lower florets.
                9. Lemmas of upper florets dark brown at maturity; thin and flexible; margins hyaline and infolded over paleas. Lower glumes absent or minute; less than 1/4 length of upper glumes. ..... ***Digitaria***
                9. Lemmas of upper florets light green or stramineous at maturity; indurate; margins-light brown and inrolled over paleas. Lower glumes always present; at least 1/4 as long as upper glumes.
                10. Paleas of lower florets obovate; longer than lemmas at spikelet maturity. ..... ***Steinchisma***
                10. Paleas of lower florets ovate to lanceolate; shorter than lemmas at spikelet maturity.
                11. Lemmas of upper florets transversely rugose. ..... ***Urochloa***
                11. Lemmas of upper florets smooth or papillose.
                12. Spikelets pilose or villous. ..... ***Dichanthelium***
                12. Spikelets glabrous or hispid-tuberculate or tuberculate.

13. Plants producing basal rosettes. Blades of rosette and cauline leaves dissimilar in shape. Panicles of 2 forms; produced in early spring or late summer. Spring panicles; terminal; exserted beyond leaves. Late summer panicles axillary; subtended by fascicles of short branches and leaves. ..... ***Dichanthelium***
13. Plants not producing basal rosettes. Blades of all leaves similar in shape. Panicles of 1 form; produced in summer and autumn; exserted beyond leaves; branches and leaves not in fascicles.
14. Spikelets falcate; attached obliquely to pedicels; apices weakly twisted. ..... ***Coleataenia***
14. Spikelets straight; erect, not attached obliquely to pedicels; apices not twisted.
15. Spikelets pedicellate; not borne on 1 side of panicle branches. Pedicels capillary; spreading; 3–25 mm long. ..... ***Panicum***
15. Spikelets sessile or subsessile; borne on 1 side of panicle branches. Pedicels stout; appressed against branches; 0–1 mm long. ..... ***Coleataenia***

6. Inflorescences racemose; arrangement digitate or along elongate axes.
16. Stolons present. Lower and upper glumes equal or subequal in length.
17. Racemes appressed against rachises. Spikelets 3.2–4 mm long; obovate to oblong. .....***Hopia***
17. Racemes spreading. Spikelets 6–6.5 mm long; lanceolate–elliptic. ..... ***Phanopyrum***
16. Stolons absent. Lower and upper glumes conspicuously not equal in length.
18. Glumes and/or lemmas of lower florets awned.
19. Ligules ciliate-membranous. Lower glumes awned; awns 5–10 mm long. ..... ***Oplismenus***
19. Ligules absent. Lower glumes not awned nor mucronate nor apiculate. ..... ***Echinochloa***
18. Glumes and lemmas of lower florets not awned.
20. Lower glumes well developed; 1/4–3/4 length of upper glumes.
21. Spikelets 1.7–2.7 mm long.
22. Ligules absent. Inflorescences 2–11 cm long. Spikelets hirsute to hispid; borne in 4 rows on rachises. Plants annuals. ..... ***Echinochloa***
22. Ligules ciliate- or fimbriate-membranous or erose. Inflorescences 14–27 cm long. Spikelets glabrous; borne in 1 or 2 rows on rachises. Plants perennials.
23. Spikelets ovate or broadly elliptic; 2–2.4 mm long. Lower glumes 1/4–1/3 length of spikelets. Lemmas of upper florets transversely rugose; 2–2.4 mm long. ..... ***Paspalidium***
23. Spikelets lanceolate-elliptic; 1.9–2.1 mm long. Lower glumes 1/2–2/3 length of spikelets. Lemmas of upper florets smooth; 1.1–1.2 mm long. ..... ***Coleataenia***
21. Spikelets 3–5 mm long.
24. Ligules membranous. Lemmas of upper florets smooth. ..... ***Panicum***
24. Ligules ciliate or ciliate-membranous. Lemmas of upper florets rugose. ..... ***Urochloa***
20. Lower glumes absent or less than 1/4 length of upper glumes.
25. Backs of upper glumes and lemmas of upper florets turned away from rachises.
26. Racemes 4–30 per peduncle; arrangement racemose. Spikelets with a cup-like ring at bases. Lemmas of upper florets short awned or mucronate. ..... ***Eriochloa***
26. Racemes 2 or 3 per peduncle; arrangement subdigitate. Spikelets without a cup-like ring at bases. Lemmas of upper florets not awned nor mucronate. ..... ***Axonopus***
25. Backs of upper glumes and lemmas of upper florets against rachises.
27. Spikelets lanceolate to elliptic-oblong. Lemmas of upper florets brown at maturity; thin and flexible; margins infolded over paleas. ..... ***Digitaria***
27. Spikelets ovate to suborbicular. Lemmas of upper florets light green or stramineous at maturity; indurate; margins tightly inrolled over paleas. ..... ***Paspalum***

Pappophoreae K.S. Kunth Pappusgrass Tribe

Plants perennials; cespitose. **Blades** filiform; folded or involute. **Ligules** ciliate. **Sheaths** inflated. **Inflorescences** panicles; spicate. **Spikelets** laterally compressed. **Florets** 3; lowest floret perfect; upper 2 florets neuter. **Glumes** longer than florets; nerves 5–6. **Lemmas** with nerves 9; each nerve extended as plumose awn. **Disarticulation** above the glumes, the florets falling together.

The tribe is represented in Oklahoma by 1 genus, *Enneapogon,* and 1 species, *E. desvauxii*.

Poeae R. Brown Bluegrass Tribe

Plants annuals or perennials; cespitose or from rhizomes. **Ligules** membranous. **Sheaths** with margins overlapping or fused. **Inflorescences** panicles or racemes or 2-sided spikes in 1 genus. **Spikelets** all alike or of 2 forms; laterally compressed. **Florets** 2–11; perfect or imperfect. **Glumes** shorter than florets. **Lemmas** convex or keeled; nerves 3 or 5 or 7 or 9 or 11 or 13; awns absent or present from acute apices. **Paleas** with keels scabrous or ciliolate-fimbriate. **Disarticulation** above or below the glumes.

The tribe is represented in Oklahoma by 10 genera and 29 species.

1. Inflorescences 2-sided spikes or spicate panicles. Spikelets sessile or subsessile.
   Branches and pedicels absent or hidden by spikelets.
   2. Inflorescences 2-sided spikes. ..... ***Lolium***
   2. Inflorescences spicate panicles.
      3. Lemma awns 4–16 mm long. Spikelets of 2 forms; fertile hidden by sterile. ..... ***Cynosurus***
      3. Lemmas awns absent or 0.4–0.8 mm long. Spikelets all alike; fertile.
         4. Flowering culms prostrate to ascending; 5–10 cm tall.
            Glumes and lemmas glabrous. Plants annuals. ..... ***Sclerochloa***
         4. Flowering culms erect; 45–100 cm tall. Glumes and
            lemmas hispid-ciliate. Plants perennials. ..... ***Dactylis***
1. Inflorescences panicles or racemes; open or condensed, but not spicate. Spikelets pedicellate. Branches
   and pedicels conspicuous.
   5. Lemmas not mucronate nor awned.
      6. Glume apices rounded. Spikelets triangular to broadly ovate. Ligules 5–10 mm long. ..... ***Briza***
      6. Glume apices acute. Spikelets elliptic-lanceolate. Ligules 0.2–4 mm long.
         7. Lemma nerves sericeous to villous. Leaf apices boat-shaped. ..... ***Poa***
         7. Lemma nerves glabrous. Leaf apices not boat-shaped. ..... ***Festuca***
   5. Lemmas mucronate or awned.
      8. Auricles present; falcate; clasping. Ligule margins entire. ..... ***Schedonorus***
      8. Auricles absent. Ligule margins lacerate or erose or ciliolate.
         9. Blades involute. Ligule margins ciliolate. Stamens 1 per floret. ..... ***Vulpia***
         9. Blades flat. Ligule margins erose or lacerate. Stamens 3 per floret.
            10. Lemmas coriaceous. Ovary apices glabrous. Leaf blades 1–3 mm wide.
                Plants annuals; remnants of previous year's growth absent. ..... ***Catapodium***
            10. Lemmas chartaceous-membranous. Leaf blades 2.5–8 mm wide.
                Plants perennials; remnants of previous year's growth usually present. ..... ***Festuca***

Stipeae B.C.J. Dumortier Needlegrass Tribe

Plants perennials; cespitose. **Ligules** membranous. **Inflorescences** panicles. **Spikelets** terete or laterally compressed. **Florets** 1. **Glumes** longer than florets; membranous or hyaline. **Lemmas** terete or subterete; indurate or coriaceous; nerves obscurely 5 or 7 or 9; awns 1, persistent or deciduous, straight or twice geniculate; margins overlapping and enclosing paleas and flowers; calluses sharp pointed, pubescent. **Disarticulation** above the glumes.

The tribe is represented in Oklahoma by 5 genera and 9 species.

1. Lemma awns straight; deciduous. Lemmas subterete; 2–4.5 mm long; calluses short, oblique.
   2. Pedicels flexuous; capillary; 10–25 mm long. Spikelets 7–8 mm long. Lemmas densely pilose. ..... ***Achnatherum***
   2. Pedicels stiff; stout; 4–7 mm long. Spikelets 2.5–3.5 mm long. Lemmas glabrous or sparsely pilose. ..... ***Piptatherum***
1. Lemma awns geniculate and twisted; persistent. Lemmas terete; 5–14 mm long; calluses long, acute.
   3. Glumes 6–10 mm long. Paleas sulcate; apices exserted beyond lemmas. ..... ***Piptochaetium***
   3. Glumes 11–50 mm long. Paleas convex or flat; apices included within lemmas.

4. Lemmas villous; apices with brush-like tuft of spreading hairs 3–3.5 mm long; awns 1–1.3 cm long. ..... ***Achnatherum***
4. Lemmas sericeous or canescent, or distally glabrous and proximally sericeous; apices without brush-like tuft of long spreading hairs; awns 2–30 cm long.
  5. Lemma margins conspicuously overlapping entire length at spikelet maturity. Paleas 1/4–1/2 length of lemmas; glabrous; veins absent. ..... ***Nassella***
  5. Lemma margins slightly overlapping at spikelet maturity. Paleas as long as lemmas; pubescent; veins 2. ..... ***Hesperostipa***

Triticeae B. C. J. Dumortier Wheat Tribe

Plants annuals or perennials; cespitose or from rhizomes. **Ligules** membranous. **Inflorescences** 2-sided spikes; terminal. **Spikelets** laterally compressed; 1–4 per rachis node. **Florets** 1–11. **Glumes** shorter or longer than florets; lanceolate or bristle-like; awns present or absent. **Lemmas** with nerves 5 or 7; awns absent or present from acute apices. **Disarticulation** above or below the glumes.

The tribe is represented in Oklahoma by 8 genera and 21 species.

1. Spikelets 2–4 per rachis node.
  2. Spikelets 3 per node. Florets 1 per spikelet. ..... ***Hordeum***
  2. Spikelets 2 or 4 per node. Florets 2–4 per spikelet. ..... ***Elymus***
1. Spikelets 1 per rachis node.
  3. Plants perennials. Glume shape symmetrical.
    4. Plants cespitose. Spikes 15–40 cm long. Internodes of lower rachises 15–30 mm long. ..... ***Thinopyrum***
    4. Plants rhizomatous. Spikes 8–16 cm long. Internodes of lower rachises 5–10 mm long.
      5. Leaf blades 1–4.5 mm wide. Glumes narrowly lanceolate; apices acuminate. ..... ***Pascopyron***
      5. Leaf blades 6–10 mm wide. Glumes oblong; apices acute. ..... ***Elymus***
  3. Plants annuals. Glume shape asymmetrical.
    5. Spikes 2–5 mm wide. Spikelets subterete; embedded in thickened rachis joints. ..... ***Aegilops***
    5. Spikes 9–25 mm wide. Spikelets laterally compressed; not embedded in rachis joints.
      6. Peduncles glabrous or puberulent immediately below spikes. Lemmas not keeled. Lemma nerves not converging at apices. ..... ***Triticum***
      6. Peduncles villous immediately below spikes. Lemmas keeled; keels conspicuously ciliate or scabrous. Lemma nerves converging at apices.
        7. Glumes subulate; nerves 1; margins not dentate. ..... ***Secale***
        7. Glumes lanceolate; nerves 3 or 5; margins dentate. ..... × ***Triticosecale***

Grass Genera & Keys to Their Species

Achnatherum A.M.F. Palisot de Beauvois Needlegrass, Ricegrass

1. Panicles open; branches spreading; pedicels flexuous, 10–25 mm long. Spikelets 7–8 mm long. Lemmas subterete; 2–4.5 mm long; awns straight, not twisted, deciduous. ..... ***A. hymenoides***
(= *Oryzopsis hymenoides*)
1. Panicles dense; branches appressed or stiffly ascending; pedicels straight, 5–8 mm long. Spikelets 11–14 mm long. Lemmas terete; 6–8 mm long; awns geniculate; twisted, persistent. ..... ***A. scribneri***
(= *Stipa scribneri*)

Aegilops C. Linneaus Goatgrass

One species. ..... ***A. cylindrica***

Agrostis C. Linnaeus Bentgrass

1. Panicles dense; elliptic to oblong; branches and pedicels hidden by spikelets. ..... ***A. exarata***
1. Panicles open; pyramidal; branches and pedicels conspicuous.
  2. Lemma awns 5–11 mm long; flexuous; hair-like. Plants annuals; remnants of previous year's shoots absent. ..... ***A. elliottiana***

2. Lemma awns absent or if present minute to 3.5 mm long; stiff; stout. Plants perennials; remnants of previous year's shoots typically present.
  3. Paleas present; 2/5 to equal length of lemmas.
    4. Plants stoloniferous. Longest lower panicle branches 1–5 cm long. ..... ***A. stolonifera***
    4. Plants rhizomatous. Longest lower panicle branches 4–9 cm long. ..... ***A. gigantea***
  3. Paleas absent or rudimentary, less than 2/5 length of lemmas.
    5. Primary panicle branches 1–5 cm long. ..... ***A. perennans***
    5. Primary panicle branches 8–15 cm long.
      6. Glumes 1–2 mm long. Lemmas 1–1.3 mm long. Adaxial surfaces of leaves 7-ribbed. Anthers 0.1–0.3 mm long. ..... ***A. hyemalis***
      6. Glumes 2–3 mm long. Lemmas 1.5–2 mm long. Adaxial surfaces of leaves 10-ribbed. Anthers 0.5–0.7 mm long. ..... ***A. scabra***

Aira C. Linnaeus Hairgrass

1. Lower lemmas awned; awns 2–3 mm long. Spikelets clustered at ends of branches on short pedicels. Pedicels 1–2 times longer than spikelets. Glumes 2–3 mm long. ..... ***A. caryophyllea***
1. Lower lemmas not awned. Spikelets solitary, scattered at ends of flexuous, capillary pedicels. Pedicels 2–5 times longer than spikelets. Glumes 1–2 mm long. ..... ***A. elegantissima*** (= *A. elegans*)

Alopecurus C. Linnaeus Foxtail

One species. ..... ***A. carolinianus***

Andropogon C. Linnaeus Bluestem

1. Pedicellate spikelets staminate; well developed and similar to sessile. Sessile spikelets 6–12 mm long. Rames 5–9 cm long.
  2. Awns of sessile spikelets 8–15 mm long. Rhizomes short or absent. Plants of clay and loam soils. ..... ***A. gerardii***
  2. Awns of sessile spikelet absent or less than 5 mm long. Rhizomes long; well developed. Plants of loose deep sands. ..... ***A. gerardii*** (= *A. hallii*)
1. Pedicellate spikelets neuter; greatly reduced or absent. Sessile spikelets 3–6 mm long. Rames 1–4.5 cm long.
  3. Peduncles elongate; exserted beyond sheaths. Upper sheaths not inflated; not partially enclosing inflorescences. Sessile spikelets 4.5–7 mm long. ..... ***A. ternarius***
  3. Peduncles short, enclosed within sheaths. Upper sheaths inflated; partially enclosing inflorescences comprising clusters of branches, peduncles, and rames. Sessile spikelets 3–4.7 mm long.
    4. Sheaths subtending rames 6–10 mm wide; 7–15 cm long; blades well-developed. ..... ***A. gyrans*** (= *A. elliottii*)
    4. Sheaths subtending rames 1.8–5 mm wide; 3–6 cm long; blades vestigal or absent.
      5. Inflorescences dense flabellate to oblong clusters at culm apices. Ligules 0.7–1 mm long. ..... ***A. glomeratus***
      5. Inflorescences slender linear-elliptic clusters from inflated sheaths along upper half of culms. Ligules 0.5–0.7 mm long. ..... ***A. virginicus***

Anthoxanthum C. Linnaeus Vernalgrass

1. Plants annuals; rhizomes absent. Ligules 1–3 mm long. Upper glumes 5–7 mm long. ..... ***A. aristatum***
1. Plants cespitose perennials; rhizomes present. Ligules 2–7 mm long. Upper glumes 8–10 mm long. ..... ***A. odoratum***

Aristida C. Linnaeus Threeawn[1]

1. Lateral awns absent or less than 2/3 length of central awns.
  2. Sheaths lanate or lanate-floccose. Plants perennials, remnants of previous year's culms typically present. Culms not branched. ..... ***A. lanosa***
  2. Sheaths glabrous or sparsely pilose at throats. Plants annuals, remnants of previous year's culms absent. Culms usually branched at lower nodes.

3. Bases of central awns straight, not coiled or twisted. ..... ***A. longespica***
(= *A. necopina*)

3. Bases of central awns spirally coiled or with conspicuous semicircular bend or twist.
4. Upper glumes 18–23 mm long. Lemmas, excluding awns, 16–20 mm long.
Central awns 18–28 mm long. ..... ***A. ramosissima***

4. Upper glumes 3–12 mm long. Lemmas, excluding awns, 4–10 mm long.
Central awns 5–15 mm long.
5. Lateral awns erect; 0.5–3 mm long. ..... ***A. dichotoma***
(= *A. curtisii*)

5. Lateral awns spreading; 4–18 mm long. ..... ***A. basiramea***

1. Lateral awns equal or subequal in length to central awns.
6. Culms branched at lower nodes. Plants annuals; remnants of previous year's culms absent.
7. Lemmas, excluding awns, 13–20 mm long. Nerves of lower glumes 3 or 5 or 7. ..... ***A. oligantha***

7. Lemmas, excluding awns, 2.5–10 mm long. Nerves of lower glumes 1 or 2.
8. Glumes equal or subequal in length. Lower glumes 10–15 mm long.
Lemmas beaked, beaks 2–7 mm long, articulated at apices. ..... ***A. desmantha***

8. Glumes conspicuously unequal in length. Lower glumes 5–7 mm long.
Lemmas not beaked. ..... ***A. adscensionis***

6. Culms not branched at lower nodes. Plants perennials; remnants of previous year's culms usually present.
9. Lemma apices narrowed, tapering into slender twisted column 2–6 mm long; twists 1–4.
10. Panicles condensed; lower branches appressed. Lemmas, excluding awns, 8–13 mm long; column twists 3 or 4. Central awns 7–22 mm long. ..... ***A. arizonica***

10. Panicles open; lower branches spreading. Lemmas, excluding awns, 12–18 mm long; column twists 1 or 2. Central awns 20–35 mm long.
11. Spikelets spreading. Pulvini present in axils of branches and pedicels.
Panicles deciduous; primary branches 2–6 cm long, spikelets absent in basal 1/3–1/2. Lemma apices straight or with 1 or 2 twists. ..... ***A. havardii***

11. Spikelets appressed. Pulvini absent in axils of branches and pedicels.
Panicles persistent; primary branches 5–13 cm long, spikelets present in basal 1/3–1/2. Lemma apices with 4 or more twists. ..... ***A. divaricata***

9. Lemma apices not narrowed, not tapering into twisted column.
12. Awns 40–85 mm long. Lower glumes about 1/2 length of upper glumes. ..... ***A. purpurea***
(= *A. longiseta*)

12. Awns 15–35 mm long. Lower glumes 3/4 length of upper glumes or subequal to equal.
13. Lower glumes 3/4 length of upper glumes.
Lemmas 8–14 mm long. ..... ***A. purpurea***
(= *A. glauca, A. fendleriana, A. nealleyi, A. wrightii*)

13. Lower glumes subequal to equal length of upper glumes.
Lemmas 4–8 mm long. ..... ***A. purpurascens***

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[1] Treatment contributed by Wilma Pireh

Arthraxon A.M. Palisot de Beauvois — Small Carpetgrass

One species. ..... ***A. hispidus***

Arundinaria A. Michaux — Cane

One species ..... ***A. gigantea***

Arundo C. Linnaeus — Giant Reed

One species. ..... ***A. donax***

Avena C. Linnaeus — Oats

1. Lemmas glabrous; awns absent, or if present, straight. Calluses glabrous. Florets not disarticulating at spikelet maturity. ..... ***A. sativa***

1. Lemmas sericeous, hairs reddish brown or white; awns present, geniculate. Calluses bearded. Florets disarticulating at spikelet maturity. ..... ***A. fatua***

Avenella (M.J. Bluff & C.A. Fingerhuth) S.T.N. Drejer — Hairgrass

One species in southeastern corner of state. ..... ***A. flexuosa***
(= *Deschampsia flexuosa*)

Axonopus A.M.F. Palisot de Beauvois — Carpetgrass

1. Spikelets 2–2.5 mm long. Upper glumes sparsely villous; nerves 2. ..... ***A. fissifolius***
(= *A. affinis*)
1. Spikelets 4.5–5 mm long. Upper glumes glabrous; nerves 5. ..... ***A. furcatus***

Bothriochloa C.E.O. Kuntze

1. Rames 2–12 per inflorescence. Lowest rames longer than central axes. Central axes 0.5–4 cm long. ..... ***B. ischaemum***
1. Rames 10–60 per inflorescence. Lowest rames equal to or shorter than length of central axes. Central axes 3–14 cm long.
  2. Hairs of rachises and pedicels dense; 5–8 mm long. Panicles silky-silvery or whitish. Glumes coriaceous.
    3. Panicles elliptic to oblong. Sessile spikelets 3–5 mm long. Hairs of nodes 0.5–1.2 mm long. ..... ***B. laguroides***
    (= *B. saccharoides*)
    3. Panicles flabellate. Sessile spikelets 4–7 mm long. Hairs of nodes 1.5–2 mm long. ..... ***B. barbinodis***
  2. Hairs of rachises and pedicels sparse; 1–2 mm long. Panicles stramineous or purple-brown. Glumes membranous to cartilaginous.
    4. Rames bearing 15–30 spikelet pairs. Length of lower lemmas equal to or slightly shorter than length of lower glumes. Apices of lower lemmas acute. Lower glumes pitted; pits 1, deep, circular. ..... ***B. bladhii***
    4. Rames bearing 5–15 spikelet pairs. Lower lemmas 1/2–2/3 length of lower glumes. Apices of lower lemmas rounded. Lower glumes not pitted, surface plane or with a circular or elongate depression. ..... ***B. caucasica***

Bouteloua M. Lagasca y Segura — Gramagrass

1. Spikelets imperfect. Plants dioecious. Pistillate spikelets enclosed in indurate burs. ..... ***B. dactyloides***
(= *Buchloë dactyloides*)
1. Spikelets perfect.
  2. Spikes 5–50 per culm; not pectinate; deciduous. Spikelets 2–9 per spike; disarticulation below the glumes. Culms erect.
    3. Blades 1–2 mm wide. Spikes 5–10 per culm; conical. Florets of 2 types, fertile and sterile. Lemma awns 3; divergent; long exserted. Culms 0.5–1 mm in diameter. ..... ***B. rigidiseta***
    3. Blades 2–6 mm wide. Spikes 20–50 per culm; cuneiform. Florets all alike, fertile. Lemmas awns 0, apices merely trifid. Culms 1–5 mm in diameter. ..... ***B. curtipendula***
  2. Spikes 1–5 per culm; pectinate; persistent. Spikelets 8–150 per spike; disarticulation above the glumes. Culms prostrate or geniculate or ascending.
    4. Culms white-lanate; rooting at nodes. ..... ***B. eriopoda***
    4. Culms glabrous or variously pubescent, but not lanate; not rooting at nodes.
      5. Upper glumes not tuberculate.
        6. Spikes spreading; 2–5 cm long. Culms slightly geniculate to erect. Plants perennials. ..... ***B. gracilis***
        6. Spikes ascending; 1–2 cm long. Culms decumbent. Plants annuals. ..... ***B. barbata***
      5. Upper glumes tuberculate.
        7. Rachises not prolonged as bristles beyond spikelets. Tubercules inconspicuous, visible only at 10X magnification. ..... ***B. gracilis***
        7. Rachises prolonged as bristles beyond spikelets. Tubercules conspicuous, visible without magnification.

8. Tufts of hair present at bases of sterile florets. Spikes 3–5 per culm. Rachis bristles scale-like. Terminal rudimentary spikelet present. Culms 40–70 cm tall. ..... ***B. pectinata***

8. Tufts of hair absent at bases of sterile florets. Spikes 1 or 2 per culm. Rachis bristles setaceous. Terminal rudimentary spikelet absent. Culms 15–40 cm tall. ..... ***B. hirsuta***

Brachyelytrum A.M.F.J. Palisot de Beauvois

One species. ..... ***B. erectrum***

Briza C. Linnaeus Quaking Grass

One species in southeastern corner of state. ..... ***B. minor***

Bromus C. Linnaeus Brome, Chess, Cheatgrass

1. Spikelets conspicuously laterally compressed; bicolored with green and straminenous bands. Lemmas and glumes conspicuously keeled. Nerves of lower glumes 5 or 7 or 9. ..... ***B. catharticus*** (= *B. unioloides*)

1. Spikelets terete to slightly laterally compressed; uniformly green. Lemmas and glumes rounded. Nerves of lower glumes 1 or 3 or 5.
   2. Lemmas glabrous or scabrous.
      3. Lemmas not awned.
         4. Lemmas 10–11 mm long. Nerves of lower glumes 1. Nerves of upper glumes 3. Paleas conspicuously shorter than lemmas. Anthers 3.5–6 mm long. Plants perennials; rhizomatous. ..... ***B. inermis***
         4. Lemmas 6–8 mm long. Nerves of lower glumes 3. Nerves of upper glumes 5 or 7. Paleas equal to lemmas. Anthers 1–2 mm long. Plants annuals; cespitose. ..... ***B. secalinus***
      3. Lemmas awned.
         5. Lemma awns 15–65 mm long. Apical teeth of lemmas 2–5 mm long; acute. Lemmas, excluding awns, 14–35 mm long.
            6. Bodies of lemmas 14–20 mm long; awns 15–25 mm long. Lower glumes 7–10 mm long. Panicle branches flexuous; ascending or spreading or drooping. ..... ***B. sterilis***
            6. Bodies of lemmas 25–35 mm long; awns 30–65 mm long. Lower glumes 15–20 mm long. Panicle branches stiff; erect. ..... ***B. diandrus*** (= *B. rigidus*)
         5. Lemma awns 1–10 mm long. Apical teeth of lemmas 0.5–1 mm long; obtuse or rounded. Lemmas, excluding awns, 6–13 mm long.
            7. Lower sheaths glabrous to puberulent. ..... ***B. secalinus***
            7. Lower sheaths conspicuously pilose to tomentose.
               8. Lemma awns bent; conspicuously divergent from florets; arising more than 1.5 mm below lemma apices; bases flattened. ..... ***B. japonicus***
               8. Lemma awns straight or slightly curved; appressed or slightly spreading, but not conspicuously divergent from florets; arising 1.5 mm or less below lemma apices; bases terete.
                  9. Nerves of upper glumes 5. Lowest sheaths sericeous. Anthers 2.5–5 mm long. ..... ***B. arvensis***
                  9. Nerves of upper glumes 7 or 9. Lowest sheaths pilose or retrorsely pilose. Anthers 0.7–3 mm long.
                     10. Lemmas, excluding awns, 8–11.5 mm long; margins angular. Rachilla joints 1.5–2 mm long. ..... ***B. commutatus***
                     10. Lemmas, excluding awns, 6.5–8 mm long; margins rounded. Rachilla joints 1–1.5 mm long. ..... ***B. racemosus***
   2. Lemmas pilose.
      11. Lemma awns 9–16 mm long. Apical teeth of lemmas 2 mm long; acute. Paleas conspicuously shorter than lemmas. ..... ***B. tectorum***
      11. Lemma awns 1.5–7 mm long. Apical teeth of lemmas 0.5–1 mm long; obtuse or rounded. Paleas equal or subequal to lemmas.

12. Panicles condensed; branches and pedicels completely or partially hidden by overlapping spikelets. Nerves of upper glumes 7. Plants annuals, remnants of previous year's culms absent. ..... ***B. hordeaceus***
(= *B. mollis*)

12. Panicles open; branches and pedicels visible, spikelets not or occasionally overlapping. Nerves of upper glumes 3 or 5. Plants perennials, remnants of previous year's culms usually present.
  13. Glumes glabrous except for a few hairs on keels. Plants of Black Mesa area, Cimarron County. ..... ***B. lanatipes***
  13. Glumes uniformly pilose. Plants of body of state.
    14. Collars glabrous or pubescent, but not with a distinct line of hairs. Ligules glabrous. Majority of upper glumes in panicle 3-nerved, sometimes with 2 additional, faint lateral nerves. ..... ***B. pubescens***
    (= *B. purgans* of some authors)
    14. Collars with dense line of sericeous hairs. Ligules pubescent. All of upper glumes in panicle 5-nerved. ..... ***B. nottowayanus***

Calamovilfa (A. Gray) E. Hackel ex F.L. Scribner & E. A. Southworth

1. Plants with culms solitary from long rhizomes. Blades 9–10 mm wide. Lemmas 7–9.5 mm long; straight; callus hairs 5–6 mm long. Plants of sandy soils; western 1/2 of state. ..... ***C. gigantea***
1. Plants cespitose. Blades 2–4 mm wide. Lemmas 5.5–7 mm long; curved; callus hair 2–2.5 mm long. Plants of rocky stream beds; southeastern corner of state. ..... ***C. arcuata***

Catapodium J.H.F. Link Ferngrass

One species. ..... ***C. rigidum***
(= *Desmazeria rigida*)

Cenchrus C. Linnaeus Sandbur

1. Burs with whorls of flattened spines 1. ..... ***C. echinatus***
1. Burs with whorls of flattened spines 2–4.
  2. Spines 50–75 per bur. Bases of inner flattened spines 0.5–0.9 mm wide. Culms 0.5–1.5 mm in diameter. Basal spines strongly reflexed. ..... ***C. longispinus***
  2. Spines 8–40 per bur. Bases of inner flattened spines 1–3 mm wide. Culms 1.7–3 mm in diameter. Basal spines weakly reflexed. ..... ***C. incertus***
  (= *C. pauciflorus, C. spinifex* of other authors)

Chasmanthium J.H.F. Link

1. Spikelets 20–40 mm long; florets 4–16. Panicle branches long, arching or drooping; pedicels spreading, 3–40 mm long, flexuous. ..... ***C. latifolium***
(= *Uniola latifolia*)

1. Spikelets 3–7 mm long; florets 2–5. Panicle branches short, erect, appressed against rachises; pedicels appressed against branches, 0.5–1 mm long, stiff. .....***C. laxum***
(= *Uniola laxa, Uniola sessiliflora, Chasmanthium sessiliflorum*)

Chloris O. Swartz Windmill Grass

1. Inflorescences verticillate. Spikes in 2–5 whorls; rachises spreading at maturity. ..... ***C. verticillata***
1. Inflorescences digitate or subdigitate. Spikes in 1-whorl; rachises ascending at maturity.
  2. Plants stoloniferous. Flowering culms 3 mm in diameter; 100–125 cm tall. ..... ***C. gayana***
  2. Plants cespitose. Flowering culms 0.5–1 mm in diameter; 15–75 cm tall.
    3. Awns of fertile florets 5–12 mm long. Hairs of lateral nerves of fertile lemmas 3–3.5 mm long. Sterile lemmas not inflated. Plants annuals. ..... ***C. virgata***
    3. Awns of fertile florets 0.1–1.5 mm long. Hairs of lateral nerves of fertile lemmas 0.3–1 mm long. Sterile lemmas inflated, forming conspicuous hoods. Plants perennials. ..... ***C. cucullata***

Cinna C. Linnaeus Woodreed

One species. ..... ***C. arundinacea***

Coleataenia A.H.R. Grisebach Woodreed

1. Rhizomes present; short; knotty; scaly. Spikelets 2.4–3.5 mm long; attached obliquely to pedicels; apices weakly twisted. ..... ***C. anceps***
(= *Panicum anceps*)

1. Rhizomes absent. Spikelets 1.9–2.1 mm long; not attached obliquely to pedicels; apices not twisted. ..... ***C. longifolia***
(= *Panicum rigidulum, P. agrostoides*)

Cynodon L.C.M. Richard Bermudagrass

One species. ..... ***C. dactylon***

Cynosurus C. Linnaeus Dogstail Grass

One species. ..... ***C. echinatus***

Dactylis C. Linnaeus Orchardgrass

One species. ..... ***D. glomerata***

Danthonia A.P. de Candolle Oatgrass

One species. ..... ***D. spicata***

Diarrhena A.M.F. Palisot de Beauvois Beakgrain

1. Lemmas of lowest florets 7–11 mm long; widest below middle; apices gradually tapered into stout rigid point. Calluses of upper florets sparsely pilose or tufted-pilose at 20 X magnification. Mature caryopses gradually tapered into a broad, blunt beak; 1.3–1.8 mm wide. ..... ***D. americana***
1. Lemmas of lowest florets 4.5–7.5 mm long; widest above middle; apices abruptly contracted into stout, rigid point. Calluses of upper florets glabrous. Mature caryopses abruptly contracted into a bottle-shaped beak; 1.8–2.5 mm wide. ..... ***D. obovata***

Dichanthelium (A.S. Hitchcock & A. Chase) F.W. Gould

1. Basal rosettes of leaves absent; blades of all leaves similar in shape. Autumnal branches produced only at plant bases or lowest nodes of vernal culms.
  2. Spikelets beaked; upper florets 0.8–1 mm shorter than upper glumes and lemmas of lower florets. ..... ***D. depauperatum***
  (= *Panicum depauperatum*)
  2. Spikelets not beaked; upper florets as long as upper glumes and lemmas of lower florets.
    3. Spikelets 1.8–2.1 mm long. Blades of vernal culm leaves 4–11 mm wide. Ligules 0.3–0.5 mm long. ..... ***D. laxiflorum***
    (= *Panicum laxiflorum*, *P. xalapense*)
    3. Spikelets 2–3.4 mm long. Blades of vernal culm leaves 1–5 mm wide. Ligules 0.5 mm long. ..... ***D. linearifolium***
    (= *Panicum linearifolium*, *P. perlongum, P. werneri*)
1. Basal rosettes of leaves present; blades of rosette and cauline leaves dissimilar in shape. Autumnal branches produced only at upper nodes of vernal culms.
  4. Spikelets 2.9–4.5 mm long.
    5. Spikelets 3.5–4.5 mm long.
      6. Ligules ciliate; 3–4 mm long. Blades of rosette leaves 10–12 mm wide; 5–7 cm long. Upper florets 3.5–3.7 mm long. Lower florets neuter. ..... ***D. ravenelii***
      (= *Panicum ravenelii*)
      6. Ligules ciliate-membranous; 0.4–1 mm long. Blades of rosette leaves 5–9 mm wide; 1.5–3 cm long. Upper florets 2.3–3.4 mm long. Lower florets staminate.

7. Nodes densely pilose; bearded; hairs retrorse. Spikelets 4–4.2 mm long. ..... ***D. boscii***
(= *Panicum boscii*)

7. Nodes glabrous or sparsely pilose, not bearded; hairs spreading when present. Spikelets 3.5–3.9 mm long. ..... ***D. latifolium***
(= *Panicum latifolium*)

5. Spikelets 2.9–3.5 mm long.

8. Adaxial surfaces of blades of vernal culm leaves velutinous-pilose. Nodes conspicuously densely pilose; bearded; hairs retrorse. Lower glumes 1/2 length of spikelets. Paleas of lower florets 1/2 length of lemmas of lower florets. ..... ***D. malacophyllum***
(= *Panicum malacophyllum*)

8. Adaxial surfaces of blades of vernal culm leaves glabrous. Nodes glabrous to sparsely pilose, not bearded; hairs spreading when present. Lower glumes 1/4–1/3 length of spikelets. Paleas of lower florets 2/3–3/4 length of lemmas of lower florets.

9. Blades of vernal culm leaves 7–11 mm wide; bases cuneate. Ligules ciliate; 1–4 mm long. ..... ***D. oligosanthes***
(= *Panicum oligosanthes*, *P. scribnerianum, P. helleri*)

9. Blades of vernal culm leaves 11–40 mm wide; bases cordate. Ligules ciliolate-membranous or ciliate-membranous; 0.2–1 mm long.

10. Sheath backs of cauline leaves pustulate-hispid. Panicle rachises sparsely pilose. ..... ***D. clandestinum***
(= *Panicum clandestinum*)

10. Sheath backs of cauline leaves glabrous or villous or scabrous. Panicle rachises glabrous or glabrate. ..... ***D. latifolium***
(= *Panicum latifolium*)

4. Spikelets 1.6–2.6 mm long.

11. Culm internodes velutinous or tomentose or pilose or villous.

12. Lower glumes attached about 0.2 mm below upper glumes; clasping pedicels. Apices of lemmas of upper florets minutely puberulent at 20X magnification. Lower and upper glumes different in texture and prominence of veins. ..... ***D. ovale***
(= *D. consanguineum, Panicum consanguineum*)

12. Lower glumes attached immediately below upper glumes; not clasping pedicels. Apices of lemmas of upper florets smooth. Lower and upper glumes similar in texture and prominence of veins.

13. Culms and cauline leaves velutinous or tomentose. Culms 50–180 cm tall; with glabrous or glutinous band below each node. Blades of vernal culm leaves 10–18 mm wide. Ligules 1.2–1.5 mm long. ..... ***D. scoparium***
(= *Panicum scoparium*)

13. Culms and cauline leaves pustulate-villous. Culms 12–40 cm tall; without glabrous or glutinous band below each node. Blades of vernal culm leaves 3–10 mm wide. Ligules 2–4 mm long.

14. Sheaths and blades glabrous. ..... ***D. acuminatum***
(= *Panicum acuminatum*, *P. lanuginosum, P. lindheimeri, P. villosissimum*)

14. Sheaths and blades pilose or villous.

15. Sheaths and blades densely pilose or villous; hairs 3–5 mm long. Hairs of ligules in 2-series, short hairs in front of long hairs. Upper florets 1.6–2.5 mm long. ..... ***D. ovale***
(=*Panicum ovale*, *P. praecocius*)

15. Sheaths and blades sparsely pilose; hairs 1–2 mm long. Hairs of ligules in 1-series; hairs all same length. Upper florets 1–1.7 mm long. ..... ***D. acuminatum***
(= *Panicum acuminatum*, *P. lanuginosum, P. lindheimeri*)

11. Culm internodes glabrous or puberulent.

16. Ligules 2–4 mm long. ..... ***D. acuminatum***
(= *Panicum acuminatum*, *P. lanuginosum, P. lindheimeri*)

16. Ligules 0.2–1 mm long or absent.

17. Ligules absent. Lower glumes 0.5–0.7 mm long.
Apices of upper florets smooth.
18. Nodes pilose or pubescent; hairs somewhat appressed.
Blades of mid-cauline vernal leaves 6–14 mm wide.
Blades of rosette leaves 5–10 mm wide; 1.5–2.5 cm long.
Blades of uppermost culm leaf 3–9 cm long. ..... ***D. sphaerocarpon***
(= *Panicum sphaerocarpon*)

18. Nodes glabrous or glabrate. Blades of mid-cauline vernal leaves 15–21 mm wide. Blades of rosette leaves 11–15 mm wide; 2.5–6 cm long. Blades of uppermost culm leaf 10–15 cm long. ..... ***D. polyanthes***
(= *Panicum polyanthes*)

17. Ligules present; 0.2–1 mm long. Lower glumes 0.7–1.1 mm long.
Apices of upper florets minutely puberulent or roughened.
19. Spikelets 2.4–6.2 mm long. Lemmas of upper florets 2.5 mm long. Ligules ciliolate-membranous. Blades of vernal culm leaves 11–25 mm wide. Blades of autumnal culm leaves 7–18 mm wide. ..... ***D. commutatum***
(= *Panicum commutatum*)

19. Spikelets 1.8–2.2 mm long. Lemmas of upper florets 1.7–2 mm long. Ligules ciliate. Blades of vernal culm leaves 1.5–10 mm wide. Blades of autumnal culm leaves 1.5–7 mm wide.
20. Spikelets densely villous. Backs of sheaths pustulate-villous; hairs retrorse. Panicle rachises and branches sparsely villous. Blades of autumnal leaves 5–7 mm wide. ..... ***D. laxiflorum***
(= *Panicum laxiflorum, P. xalapense*)

20. Spikelets glabrous or minutely puberulent. Backs of sheaths glabrous or pilose or pustulate-pilose; hairs spreading. Panicle rachises and branches glabrous or scabrous. Blades of autumnal leaves 1.5–2.5 mm wide.
21. Paleas of lower florets absent. Blades of vernal culm leaves 6–12 cm long; stiff; ascending; typically involute. Blades of autumnal leaves 5–10 cm long. Apices of lemmas of upper florets rounded. ..... ***D. aciculare***
(= *Panicum aciculare, P. angustifolium*)

21. Paleas of lower florets present. Blades of vernal culm leaves 3–7 cm long; thin; spreading; flat. Blades of autumnal leaves 1.5–3 cm long. Apices of lemmas of upper florets acute or apiculate. ..... ***D. dichotomum***
(= *Panicum dichotomum, P. microcarpon*)

Digitaria V.A. von Haller Crabgrass

1. Inflorescences open panicles. Peduncles disarticulating; entire panicles separating from plants.
2. Nerves of lower lemmas 7; not spaced equidistantly. Lemmas of lower florets glabrous or with narrow row of hairs between veins. ..... ***D. cognata***
(= *Leptoloma cognatum*)

2. Nerves of lower lemmas 5; spaced equidistantly. Lemmas of lower florets densely pubescent between veins. ..... ***D. pubiflora***

1. Inflorescences 1-sided racemes. Peduncles not disarticulating; entire panicles not separating from plants.
3. Spikelets silky-pubescent; hairs 3–4.5 mm long. Raceme arrangement alternate. Plants perennials. Culm bases swollen; knotty; lanate. ..... ***D. californica***
(= *Trichachne californica*)

3. Spikelets glabrous or scaberulous or pilose; hairs if present 0.2–1 mm long. Raceme arrangement digitate or subdigitate. Plants annuals. Culm bases not swollen; not knotty; not lanate.
4. Lower glumes present; 0.1–0.3 mm long. Upper florets pale brown or pale yellow.

5. Distal portions of lateral nerves of lemmas of lower florets scaberulous at 15–20X magnification. Upper glumes 1/3–1/2 length of spikelets. ..... ***D. sanguinalis***
5. Distal portions of lateral nerves of lemmas of lower florets glabrous at 15–20X magnification. Upper glumes 1/2–4/5 length of spikelets. ..... ***D. ciliaris***
4. Lower glumes absent. Upper florets dark brown or black.
6. Rachises not winged. Sheaths of lower leaves pustulate-hirsute. ..... ***D. filiformis***
6. Rachises winged. Sheaths of lower leaves glabrous.
7. Spikelets 1.8–2 mm long; 0.8–1 mm wide; borne in pairs; both fully developed. ..... ***D. ischaemum***
7. Spikelets 1.2–1.7 mm long; 0.5–0.8 mm wide; borne in threes; one vestigal or absent with only pedicel present. ..... ***D. violascens***

Distichlis C.S. Rafinesque Saltgrass

One species. ..... ***D. spicata***

Echinochloa A.M.F. Palisot de Beauvois

1. Racemes widely spaced on central axes, not or barely overlapping each other.
2. Spikelets ovoid; borne in 4 conspicuous rows on rachises. Paleas of lower florets present. ..... ***E. colona*** (= *E. colonum*)
2. Spikelets elliptic; borne irregularly on rachises. Paleas of lower florets absent or vestigial. ..... ***E. crus-pavonis***
1. Racemes clustered on central axes, overlapping each other.
3. Sheaths papillose-hirsute or papillose-hispid or just papillose. ..... ***E. walteri***
3. Sheaths glabrous; smooth.
4. Apices of lemmas of upper florets rounded to broadly acute; tips conspicuously articulated with bases, withering, membranous, with a row of minute hairs at base visible at 25X magnification. ..... ***E. crus-galli***
4. Apices of lemmas of upper florets acuminate to narrowly acute; tips continuous with bases, not withering, not membranous, minute hairs absent. ..... ***E. muricata***

Eleusine J. Gaertner Goosegrass

One species. ..... ***E. indica***

Elymus C. Linneaus Wildrye

1. Spikelets 1 per node.
2. Plants conspicuously rhizomatous. Adaxial surfaces of leaf blades glabrous or sparsely pilose. Sheaths distally pilose and proximally glabrous. Glume awns 0–3 mm long. ..... ***E. repens*** (= *Agropyron repens*)
2. Plants cespitose, short inconspicuous rhizomes sometimes present. Adaxial surfaces of leaf blades densely short pilose with scattered longer hairs. Sheaths uniformly puberulent. Glume awns 3–8 mm long. ..... ***E. glaucus***
1. Spikelets 2 or 3 per node.
3. Glumes conspicuously divergent; 40–70 mm long. Mature rachises disarticulating. ..... ***E. elymoides*** (= *Sitanion hystrix*)
3. Glumes erect or ascending; 3–40 mm long. Mature rachises not disarticulating.
4. Inflorescences with glumes of 2 types, short teeth 0.3 mm long and bristles 1–8 mm long. ..... ***E. hystrix*** (= *Hystrix patula*)
4. Inflorescences with glumes all alike, 10–45 mm long including awns.
5. Glumes setaceous to subulate; 0.1–0.3 mm wide; nerves 0 or 1. Mid-rachis internodes 5–18 mm long. ..... ***E. churchii***
5. Glumes linear to lanceolate; 0.3–2.3 mm wide; nerves 2–8. Mid-rachis internodes 1.5–8 mm long.
6. Glumes hirsute; nerves 2. Rachis margins hirsute. ..... ***E. villosus***

6. Glumes glabrous or scabrous or hirsutulous; nerves 3–5.
Rachis margins glabrous or scabrous.
7. Basal portion of glumes straight; flat or inconspicuously thickened;
not indurate; nerves extending to bases; 0.3–0.7 mm wide.
8. Glume awns straight or nearly so; 3–8 mm long.
Mid-glume margins hyaline or scarious; entire. ..... ***E. glaucus***
8. Glume awns curved or flexuous; 8–27 mm long.
Mid-glume margins indurate; scabrous. ..... ***E. canadensis***
7. Basal portion of glumes curved; terete or conspicuously thickened;
indurate; nerves not extending to bases; 0.5–1.5 mm wide.
9. Spikelets conspicuously diverging from rachises.
10. Auricles 2–3 mm long. Nodes of spikes 6–20.
Mature spikelets pale yellowish brown. ..... ***E. macgregorii***
10. Auricles 0–2 mm long. Nodes of spikes 18–30.
Mature spikelets reddish brown. ..... ***E. glabriflorus***
9. Spikelets appressed against rachises or only slightly spreading
11. Glume awns 0–5 mm long. Spikes including awns 0.5–1.5
cm wide; partially enclosed within sheaths.
12. Lemma awns 0.5–4 mm long. Leaf blades involute; ascending. ..... ***E. curvatus***
12. Lemma awns 5–20 mm long. Leaf blades flat; apreading. ..... ***E. virginicus***
11. Glume awns 10–25 mm long. Spikes including awns 1.7–5.5
cm wide; exserted beyond sheaths.
13. Glume awns 3–10 mm long. Spikes including awns 1–2.5 cm
wide. Leaf blades flat. ..... ***E. virginicus***
13. Glume awns 10–30 mm long. Spikes including awns 2.5–5.5 cm
wide. Leaf blades involute. ..... ***E. glabriflorus***

Enneapogon N.A. Desvaux ex A.M.F. Palisot de Beauvois

One species. ..... ***E. desvauxii***

Eragrostis N.M. von Wolf Lovegrass[1]

1. Plants stoloniferous; mat-forming. Erect culms 2–10 cm tall.
2. Panicles globose or subglobose. Lemmas sparsely villous. Plants dioecious.
Stamens 3; anthers 1.5–2.2 mm long. ..... ***E. reptans***
(= *Neeragrostis reptans*)
2. Panicles ellipsoidal to fusiform or cylindrical. Lemmas glabrous. Plants bearing
perfect flowers. Stamens 2; anthers 0.2–0.3 mm long. ..... ***E. hypnoides***
1. Plants cespitose; not mat-forming. Erect culms 10–150 cm tall.
3. Ligules membranous. ..... ***E. japonica***
(= *E. glomerata*)
3. Ligules ciliate or ciliate-membranous.
4. Crateriform glands present, on pedicels and/or sheaths and/or blade margins
and/or lemma midnerves.
5. Lemmas 1.4–1.8 mm long. Stamens 2; anthers at anthesis reddish brown.
Spikelets 1.1–2.2 mm wide. Pedicels typically with glandular band above middle. ..... ***E. minor***
(= *E. poaeoides*)
5. Lemmas 2–2.8 mm long. Stamens 3; anthers at anthesis yellow.
Spikelets 2.5–4 mm wide. Pedicels without glandular band. ..... ***E. cilianensis***
4. Crateriform glands absent.
6. Plants annuals; remnants of previous year's culms absent.
7. Majority of spikelets with 2–6 florets. Caryopses ovoid to
rectangular-prismatic; adaxial surfaces with 1 longitudinal groove.
8. Sheath margins glabrous. Pedicels 1.5–5 mm long. Panicles narrowly
elliptic; less than 1/2 height of plants. Anthers at anthesis purplish.
Internodes typically with glandular pits below nodes. ..... ***E. frankii***

8. Sheath margins pilose. Pedicels 5–25 mm long. Panicles ovate to broadly elliptic; 1/2–3/4 height of plants. Anthers at anthesis reddish brown. Internodes without glandular pits below nodes. ..... ***E. capillaris***

7. Majority of spikelets with 6–35 florets. Caryopses ellipsoid or pyriform, or obovate to prismatic; adaxial surfaces smooth, not longitudinally grooved.

9. Lower glumes as long as upper glumes.

10. Spikelets 2.5–4 mm wide. ..... ***E. cilianensis***

10. Spikelets 1–2.2 mm wide. ..... ***E. barrelieri***

9. Lower glumes 1/2–3/4 length of upper glumes.

11. Panicle branches whorled at lowest 2 nodes of rachises. Lower glumes 1/4–1/3 length of lowest lemma. Paleas dropping from rachillas with lemmas or shortly after. ..... ***E. pilosa***

11. Panicle branches alternate or opposite at lowest 2 nodes of rachises. Lower glumes 1/2–3/4 length of lowest lemma. Paleas persistent on rachillas after lemmas have dropped.

12. Pedicels typically with glandular band above middle. Stamens 2; anthers reddish brown at anthesis. ..... ***E. minor*** (= *E. poaeoides*)

12. Pedicels without glandular band. Stamens 3; anthers purplish at anthesis. ..... ***E. pectinacea***

6. Plants perennials; remnants of previous year's culms present. ..... **couplet 13**

13. Lemma backs rounded; nerves inconspicuous, light.

14. Sheaths pustulate-pilose or pustulate-hirsute. ..... ***E. hirsuta***

14. Sheaths glabrous or glabrate or pilose in tufts at apices, hairs not pustulate based.

15. Blades 3–11 mm wide. Sheaths longer than internodes. ..... ***E. hirsuta***

15. Blades 1–3.5 mm wide. Sheaths shorter than internodes.

16. Spikelets 1–1.8 mm wide. Lower glumes 1–1.7 mm long. Sheath margins sparsely pilose. Longitudinal groove of adaxial surfaces of caryopses conspicuous. ..... ***E. intermedia***

16. Spikelets 0.5–1 mm wide. Lower glumes 0.5–1 mm long. Sheath margins glabrous. Longitudinal groove of adaxial surfaces of caryopses absent or inconspicuous. ..... ***E. lugens***

13. Lemma backs keeled; nerves conspicuous, dark.

17. Plants rhizomatous; rhizomes short, knotty.

18. Culms and sheaths and rachises and panicle branches viscid. Pedicels 0.2–1.2 mm long; appressed against branches. Peduncles not disarticulating; entire panicles not separating from plants. Caryopses terete; adaxial surfaces not longitudinally grooved. ..... ***E. curtipedicellata***

18. Culms and sheaths and rachises and panicle branches not viscid. Pedicels 1.5–17 mm long; spreading. Peduncles disarticulating; entire panicles separating from plants. Caryopses flattened; adaxial surfaces longitudinally 1-grooved. ..... ***E. spectabilis***

17. Plants not rhizomatous.

19. Spikelets diverging from branches. Pedicels present; flexuous; capillary; longest 5–50 mm long.

20. Panicles oblong; conspicuously longer than wide. Mature spikelets ovate to lanceolate; greenish yellow with purplish tinge. Stamens 3. Caryopses 0.8–1.3 mm long. rectangular-prismatic; adaxial surfaces longitudinally 1-grooved. ..... ***E. trichodes***

20. Panicles broadly ovate to obovate; as wide as long. Mature spikelets linear-lanceolate; grayish green or stramineous. Stamens 2. Caryopses 0.6–0.8 mm long; ovoid to ellipsoidal; adaxial surfaces striate, but not longitudinally 1-grooved. ..... ***E. elliotii***

19. Spikelets appressed against branches. Pedicels absent, or if present, straight; not capillary; longest no more than 5 mm long.

21. Spikelets widely spaced, not overlapping.

22. Primary branches stout; typically not bearing secondary branches. Ligules 0.4–0.5 mm long. Lower glumes 2.5–6 mm long. Lemmas 3–5 mm long. ..... ***E. sessilispica***

22. Primary branches slender; bearing secondary branches. Ligules 0.1–0.4 mm long. Lower glumes 0.8–2.4 mm long. Lemmas 1.4–2.8 mm long. ..... ***E. refracta***

21. Spikelets closely spaced, overlapping.

23. Plants forming large tufts with leaves primarily basal. Blades conspicuously arching; linear-filiform; 20–45 cm long. Ligules 0.5–0.8 mm long. ..... ***E. curvula***

23. Plants forming small tufts with leaves both basal and cauline. Blades straight or slightly curved, but not arching; linear-lanceolate; 5–15 cm long. Ligules 0.2–0.5 mm long.

24. Spikelets ovate to linear-elliptic; 2.4–5 mm wide; reddish purple, or stramineous with reddish purple margins. Florets 10–45. Lemmas 2–6 mm long. Leaf blades flat. ..... ***E. secundiflora***
(= *E. oxylepis*, *E. beyrichii*)

24. Spikelets linear-lanceolate; 0.8–1.2 mm wide; lead green, or stramineous without reddish purple margins. Florets 4–12. Lemmas 1.5–1.7 mm long. Leaf blades involute. ..... ***E. lehmanniana***

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[1] Treatment contributed by Mary E. Gard

Eriochloa K.S. Kunth Cupgrass

1. Spikelets at middle of rachises borne in pairs or triplets. ..... ***E. acuminata***
(= *E. gracilis*)

1. Spikelets at middle of rachises borne singlely.

2. Pedicels pilose; hairs 0.5–1 mm long. Lemmas of upper florets awned. Plants annuals; culms geniculate. ..... ***E. contracta***

2. Pedicels pilose-hirsute; hairs 1–3 mm long. Lemmas of upper florets awnless or mucronate. Plants perennials; culms erect. ..... ***E. sericea***

Erioneuron G.V. Nash Woollygrass

One species. ..... ***E. pilosum***

Festuca C. Linnaeus Fescue, Perennial Fescue

1. Spikelets 9–13 mm long. Lemmas 6–7 mm long. Florets 4–5 per spikelet. ..... ***F. versuta***

1. Spikelets 5–7 mm long. Lemmas 3–5 mm long. Florets 2–4 per spikelet.

2. Panicles condensed; longest of lower primary branches ascending, 1–5 cm long. Spikelets 7–15 per branch; overlapping each other. ..... ***F. paradoxa***

2. Panicles open; longest of lower primary branches spreading or drooping, 6–10 cm long. Spikelets 2–4 per branch; not or barely overlapping each other. ..... ***F. subverticillata***
(= *F. obtusa*)

Glyceria R. Brown Mannagrass

1. Spikelets 2.5–4 mm long; conspicuously laterally compressed; florets 4–6. ..... ***G. striata***

1. Spikelets 15–17 mm long; terete; florets 11–13. ..... ***G. septentrionalis***
(= *G. arkansana*)

Gymnopogon A.M. Palisot de Beauvois Skeletongrass

1. Lemmas 3.5–4 mm long; awns 4.5–8.5 mm long. Ligules 0.2 mm long. ..... ***G. ambiguus***

1. Lemmas 2.5–2.6 mm long; awns 1.2–2 mm long. Ligules 0.5 mm long. ..... ***G. brevifolius***

Hesperostipa (M.K. Elias) M.E. Barkworth Needle & Thread

1. Terminal segment of lemma awns plumose, hairs 1–3 mm long. ..... ***H. neomexicana***
(= *Stipa neomexicana*)

1. Terminal segment of lemma awns scaberulous.

2. Lemmas uniformly sericeous; hairs short, white. Basal segment of lemma awns flexuous or loosely coiled. ..... ***H. comata***

(= *Stipa comata*)

2. Lemmas distally glabrous and proximally sericeous; hairs brown or tan. Basal segment of lemma awns straight or nearly so.
   3. Bodies of lemmas 15–25 mm long; awns 9–19 cm long. ..... ***H. spartea*** (= *Stipa spartea*)
   3. Bodies of lemmas 8.5–14 mm long; awns 5–10.5 cm long. ..... ***H. curtiseta*** (= *Stipa curtiseta*)

Hilaria K.S. Kunth — Galleta, Tobosagrass

1. Glumes of lateral spikelets flabellate. Plants of Harmon and Jackson counties. ..... ***H. mutica*** (= *Pleuraphis mutica*)
1. Glumes of lateral spikelets lanceolate-oblong. Plants of Cimarron County. ..... ***H. jamesii*** (= *Pleuraphis jamesii*)

Holcus C. Linnaeus — Velvetgrass

One species. ..... ***H. lanatus***

Hopia F.O. Zuloaga & O. Morrone — Vine Mesquite

One species. ..... ***H. obtusa*** (= *Panicum obtusum)*

Hordeum C. Linneaus — Barley

1. Auricles present; 1.5–3.5 mm long. Central and lateral spikelets equal or subequal in size. Lemmas of lateral spikelets, excluding awns, 6–15 mm long.
   2. Lateral spikelets sessile. Leaf blades 8–9 mm wide. Auricles 2.5–3.5 mm long. Mature rachises not disarticulating. ..... ***H. vulgare***
   2. Lateral spikelets pedicellate. Leaf blades 1–2 mm wide. Auricles 1.5 mm long. Mature rachises disarticulating. ..... ***H. murinum*** (= *H. stebbinsii, H. leporinum*)
1. Auricles absent. Central and lateral spikelets different in size, lateral conspicuously smaller. Lemmas of lateral spikelets, excluding awns, 2.5–6.5 mm long.
   3. Glumes of central spikelets setaceous to subulate; 20–60 mm long; arching or bent and conspicuously spreading at spike maturity. Spikes, including awns, 20–65 mm wide. ..... ***H. jubatum***
   3. Glumes of central spikelets elliptic to lanceolate; 7–15 mm long; straight or nearly so at spike maturity. Spikes, including awns, 10–15 mm wide. ..... ***H. pusillum***

Koeleria C.H. Persoon — Junegrass

One species. ..... ***K. macrantha***

Leersia O. Swartz — Cutgrass

1. Spikelets suborbicular to broadly ovate; 3–4 mm wide. ..... ***L. lenticularis***
1. Spikelets oblong-elliptic; 1–2 mm wide.
   2. Spikelets 0.5–1.2 mm wide; 2.5–3.8 mm long. Lower panicle branches solitary. Culms branched at lower nodes. Anthers 2. ..... ***L. virginica***
   2. Spikelets 1.5–2 mm wide; 4–5 mm long. Lower panicle branches both fascicled and solitary. Culms not branched. Anthers 3. ..... ***L. oryzoides***

Leptochloa A.M.F.J. Palisot de Beauvois — Sprangletop

1. Sheaths pustulate-pilose. Spikelets 1.3–3 mm long. Florets 2–4 per spikelet. Lowest lemmas 0.7–1.5 mm long. ..... ***L. panicea*** (= *L. filiformis*, *L. mucronata*)
1. Sheaths glabrous or scabrous. Spikelets 4–14 mm long. Florets 4–11 per spikelet. Lowest lemmas 1–6.5 mm long.

2. Ligules ciliate; 0.5–1.5 mm long. Lemma apices emarginate. Plants perennials, sheaths of previous years' culms persistent. ..... ***L. dubia***
2. Ligules membranous; 1.5–8 mm long. Lemma apices acute to rounded or bifid. Plants annuals.
3. Lemmas awned from bifid apices; awns 0.5–3.5 mm long. ..... ***L. fusca*** (= *L. fascicularis*)
3. Lemmas mucronate or not awned from acute or obtuse or truncate apices; mucros, if present, 0.1–0.5 mm long.
4. Ligules erose-membranous; apices truncate. Lemmas apices acute. ..... ***L. panicoides***
4. Ligules lacerate-membranous; apices attenuate. Lemmas apices obtuse or truncate. ..... ***L. fusca*** (= *L. uninervia*)

Limnodea L.H. Dewey Ozarkgrass

One species. ..... ***L. arkansana***

Lolium C. Linnaeus Ryegrass

1. Upper glumes, excluding awns, equal to or longer than florets; 12–15 mm long. Lemma awns 9–11 mm long. ..... ***L. temulentum***
1. Upper glumes, excluding awns, shorter than florets; awns 5–9 mm long. Lemma awns 0–6 mm long.
2. Lemma awns present; 1–6 mm long. Auricles present; 0.8–3 mm long. ..... ***L. multiflorum***
2. Lemma awns absent. Auricles absent or minute. ..... ***L. perenne***

Melica C. Linnaeus Melicgrass

1. Floret rudiments broadly obconic; divergent at ends of rachillas. Ligules 0.5–1 mm long. Spikelets 2–5 per panicle branch. ..... ***M. mutica***
1. Floret rudiments oblong; erect at ends of rachillas. Ligules 1.5–6 mm long. Spikelets 5–20 per panicle branch.
2. Panicles open; branches spreading or drooping; pedicels conspicuous; spikelets barely overlapping. Glumes unequal; of 2 shapes, lower glumes broadly ovate, upper glumes oblanceolate. Lemma apices rounded. ..... ***M. nitens***
2. Panicles dense; branches appressed or stiffly ascending; pedicels hidden by overlapping spikelets. Glumes subequal; all alike in shape, ovate-elliptic. Lemma apices acute. ..... ***M. altissima***

Microstegium C.G.D. Nees von Esenbeck Browntop

One species. ..... ***M. vimineum***

Mnesithea K.S. Kunth Rattail Grass

One species. ..... ***M. cylindrica*** (= *Coelorachis cylindrica, Manisuris cylindrica*)

Muhlenbergia J.C.D. von Schreber Muhly

1. Inflorescences racemes of 1-sided spikes, 1/2–2/3 of total length of plants. Central axes of inflorescences twisted, forming elongate and trailing spirals. ..... ***M. paniculata*** (= *Schedonnardus paniculatus*)
1. Inflorescences narrow or open panicles or spicate racemes. Rachises of inflorescences straight.
2. Awns of the lower glume 2 or 3. Spikelets borne in pairs; the lower sterile. Disarticulation below the glumes, the paired spikelets falling together. ..... ***M. alopecuroides*** (= *Lycurus setosus*)
2. Awns of the lower glume 1 or 0. Spikelets borne singly; fertile. Disarticulation above the glumes, the florets dropping and the glumes persisting.
3. Glumes 0.1–0.2 mm long. Lower glumes typically absent. Ligules ciliate. ..... ***M. schreberi***

3. Glumes 0.8–5 mm long. Lower glumes always present. Ligules membranous or ciliate-membranous.
  4. Ligules 2–6 mm long.
    5. Lemma awns 5–20 mm long. Glumes awned; awns 0.5–1 mm long. ..... ***M. capillaris***
    5. Lemma awns 1–4 mm long. Glumes not awned.
      6. Lemmas 4–6 mm long. Plants of Arbuckle Mountains and surrounding grasslands. ..... ***M. reverchonii***
      6. Lemmas 1.5–3 mm long. Plants of Panhandle and southwestern corner of state.
        7. Leaf blades 1–5 cm long; 1/5–1/4 height of plants. Panicles 6–10 cm long. ..... ***M. torreyi***
        7. Leaf blades 5–12 cm long; 1/3–1/2 height of plants. Panicles 11–25 cm long. ..... ***M. arenicola***
  4. Ligules 0.1–1.5 mm long.
    8. Panicles diffuse; 4–25 cm wide; branches and pedicels spreading to ascending. Longest pedicels 10–18 mm long. Spikelets borne at branch ends.
      9. Lemma callus hairs present. Spikelets 5–9 mm long. ..... ***M. multiflora*** (= *Redfieldia flexuosa*)
      9. Lemma callus hairs absent. Spikelets 1.2–4.5 mm long.
        10. Lemmas 2–4.5 mm long; awns present, 2–8 mm long. ..... ***M. porteri***
        10. Lemmas 0.8–1.5 mm long; awns absent. ..... ***M. asperifolia***
    8. Panicles dense; 0.1–2 cm wide; branches and pedicels appressed. Longest pedicels 1–7 mm long. Spikelets borne along branches.
      11. Rhizomes absent. Lemma calluses glabrous. ..... ***M. cuspidata***
      11. Rhizomes present; scaly. Lemma calluses pubescent or pilose, hairs 0.5–1 mm long.
        12. Lemma awns 3–18 mm long.
          13. Spikelets 2–3 mm long. Blades 2–4 mm wide. Glumes narrowly lanceolate to linear-attenuate; equal or subequal to lemmas. ..... ***M. sylvatica***
          13. Spikelets 3–4 mm long. Blades 3–7 mm wide. Glumes ovate to ovate-lanceolate; conspicuously shorter than lemmas. ..... ***M. tenuiflora***
        12. Lemma awns absent or less than 1.6 mm long.
          14. Glume awns 1–3 mm long. Panicles 5–15 mm in diameter; only terminal. ..... ***M. racemosa***
          14. Glume awns absent or, if present, less than 1 mm long. Panicles 1–3 mm in diameter; both terminal and axillary.
            15. Culms scabrous or pubescent immediately below nodes. ..... ***M. mexicana***
            15. Culms glabrous.
              16. Peduncles 4–11 cm long. Glumes acuminate; 1–2 mm long. ..... ***M. sobolifera***
              16. Peduncles 1–2 cm long. Glumes acute; 2–3.5 mm long.
                17. Pedicels 3–7 mm long. Glumes 1–2.5 mm long. Ligules 0.2–0.5 mm long. ..... ***M. bushii*** (= *M. brachyphylla*)
                17. Pedicels 1–2 mm long. Glumes 2.5–4 mm long. Ligules 0.5–1 mm long. ..... ***M. frondosa***

Munroa J. Torrey — False Buffalograss

One species. ..... ***M. squarrosa***

Nassella (C.B. von Trinius) E. Desvaux — Needlegrass

One species. ..... ***N. leucotricha*** (= *Stipa leucotricha*)

Oplismenus A.M.F. Palisot de Beauvois — Basketgrass

One species. ..... ***O. hirtellus*** (= *O. setarius*)

Oryza C. Linnaeus — Rice

One species. ..... ***O. sativa***

Panicum C. Linnaeus

1. Upper glumes and lemmas of lower florets tuberculate or hispid-tuberculate.
    2. Spikelets 1.8–2.1 mm long. Upper glumes and lemmas of lower florets tuberculate. Upper florets 1.5–2 mm long. ..... ***P. verrucosum***
    2. Spikelets 3.5–4 mm long. Upper glumes and lemmas of lower florets hispid-tuberculate. Upper florets 2.7–3.2 mm long. ..... ***P. brachyanthum***
1. Upper glumes and lemmas of lower florets glabrous.
    3. Spikelets 4–6.5 mm long.
        4. Plants perennials; rhizomes present. Upper florets 2.3–3 mm; 0.8–1.1 mm wide. Paleas of lower florets 3–3.5 mm long. Lower florets staminate. ..... ***P. virgatum***
        4. Plants annuals; rhizomes absent. Upper florets 3–3.8 mm long; 2–2.5 mm wide. Paleas of lower florets 1.2–1.6 mm long. Lower florets neuter. ..... ***P. miliaceum***
    3. Spikelets 1.5–4 mm long.
        5. Spikelets 1.5–2.4 mm long.
            6. Lower glumes 0.9–1.3 mm long. Upper glumes and lemmas of lower florets 2–2.9 mm long. Upper florets 1.5–2 mm long. Panicles flabellate; 25–40 cm long; typically wider than long; peduncles disarticulating and entire panicles separating from plants. ..... ***P. capillare***
            6. Lower glumes 0.5–0.9 mm long. Upper glumes and lemmas of lower florets 1.5–1.9 mm long. Upper florets 1–1.5 mm long. Panicles elliptic to rhomboidal; typically 2–3 times longer than wide; peduncles not disarticulating and entire panicles not separating from plants. ..... ***P. philadelphicum***
        5. Spikelets 2.4–3.5 mm long.
            7. Rhizomes present; short; knotty; scaly. Primary panicle branches fascicled or opposite or both opposite and alternate.
                8. Lower glumes 2 mm long; 1/2–2/3 length of spikelets; nerves 3 or 5. Panicle branches bearing spikelets to bases. Culms becoming hard and woody with age; branched above. ..... ***P. antidotale***
                8. Lower glumes 0.7–1.5 mm long; 1/4–1/3 length of spikelets; nerves 1 or 3. Panicle branches bearing spikelets near ends. Culms not becoming hard and woody with age; not branched above. ..... ***P. coloratum***
            7. Rhizomes absent. Primary panicle branches all alternate.
                9. Sheaths glabrous.
                10. Panicles typically included partially in sheaths. Apices of lower glumes obtuse to truncate. Lower florets neuter. Plants annuals; remnants of previous year's shoots absent. ..... ***P. dichotomiflorum***
                10. Panicles borne well above foliage. Apices of lower glumes acute. Lower florets staminate. Plants perennials; remnants of previous year's shoots typically present. ..... ***P. coloratum***
                9. Sheaths pustulate-pilose or pustulate-villous or pustulate-hispid. ..... **couplet 11**

11. Culm nodes glabrous or puberulent or sericeous. Collars glabrous or villous. Bases of primary branches of panicles not swollen. Plants perennials; remnants of previous year's shoots typically present.
    12. Culm nodes sericeous. Lower glumes 1.5–2.4 mm long; 1/2–3/4 length of spikelets; nerves 3 or 5. Lower florets neuter. Paleas of lower florets 1/2–2/3 length of lemmas or lower florets. ..... ***P. hallii***
    12. Culm nodes glabrous or puberulent. Lower glumes 0.7–1.5 mm long; 1/4–1/3 length of spikelets; nerves 1 or 3. Lower florets staminate. Paleas of lower florets equal or subequal to length of lemmas of lower florets. ..... ***P. coloratum***
11. Culm nodes hirsute or pilose. Collars pustulate-hirsute or pustulate-hispid. Bases of primary branches of panicle swollen. Plants annuals; remnants of previous year's shoots absent.
    13. Panicles oblong to elliptic; 2–3 times longer than wide. Ligules 0.5–1 mm long. Spikelets 3–3.7 mm long. ..... ***P. flexile***
    13. Panicles flabellate to broadly rhomboidal; as wide as long or to 1.5 times longer than wide. Ligules 1.3–2 mm long. Spikelets 2.4–3 mm long.

14. Pedicels and secondary branches appressed to or slightly divergent from primary branches. Paleas of lower florets present. Mature upper florets blackish or dark brown. Lunate mark present at bases of upper florets on adaxial sides. ..... ***P. hillmanii***
(= *P. capillare* var. *hillmanii*)

14. Pedicels and secondary branches conspicuously divergent from primary branches. Paleas of lower florets absent. Mature upper florets stramineous. Lunate mark absent at bases of upper florets on adaxial sides. ..... ***P. capillare***

Pascopyrum Á. Löve Wheatgrass

One species. ..... ***P. smithii***
(= *Elymus smithii*, *Agropyron smithii*)

Paspalidium O. Stapf

One species. ..... ***P. geminatum***
(= *Panicum geminatum*)

Paspalum C. Linnaeus

1. Spikelets 1 per node; vestigial spikelets and naked pedicels absent.
  2. Racemes alternate on elongate axes; rachises more than 1 cm apart. Rachises foliaceous; partially enclosing spikelets; typically conduplicate.
    3. Racemes 2–6 per peduncle. Leaf blades 1–5 mm wide. Spikelets glabrous; 1–1.4 mm wide. Nerves of upper glumes 5. Nerves of lemmas of lower florets 5. ..... ***P. dissectum***
    3. Racemes 15–38 per peduncle. Leaf blades 8–22 mm wide. Spikelets pubescent; 0.5–0.8 mm wide. Nerves of upper glumes 0. Nerves of lemmas of lower florets 0. ..... ***P. repens***
    (= *P. fluitans*)
  2. Racemes paired or nearly so; rachises digitate or less than 1 cm apart. Rachises not foliaceous; not enclosing spikelets; not conduplicate.
    4. Spikelets elliptic; 1–1.6 mm wide. Nerves of lemmas of lower florets 3. Culms decumbent; usually rooting at lower nodes. ..... ***P. distichum***
    4. Spikelets ovate to obovate; 2–2.8 mm wide. Nerves of lower florets 5. Culms erect or ascending; not rooting at nodes.
      5. Spikelets shiny green. Nerves of upper glumes 5. Ligules ciliate; 0.2–0.5 mm long. ..... ***P. notatum***
      5. Spikelets dull green. Nerves of upper glumes 3. Ligules membranous; 1–2.2 mm long. ..... ***P. laeve***
1. Spikelets 2 per node; both spikelets well developed or 1 vestigial or represented by naked pedicel.
  6. Rachises of racemes slender; 0.5 mm wide; not winged. Spikelets widely spaced on rachises or barely overlapping. ..... ***P. bifidum***
  6. Rachises of racemes stout; 0.7–2.1 mm wide; narrowly winged. Spikelets conspicuously overlapping on rachises.
    7. Peduncles both terminal and axillary. Leaf sheaths often hiding axillary inflorescences. Spikelets elliptic. Rachises 0.7–1 mm wide. ..... ***P. setaceum***
    7. Peduncles only terminal; axillary inflorescences absent. Spikelets oval or ovate or obovate. Rachises 0.8–2.1 mm wide.
      8. Margins of spikelets conspicuously pilose-villous; hairs long, silky.
        9. Racemes 8–30 per peduncle. Spikelets 1–1.5 mm wide. Nerves of upper glumes 3. Nerves of lemmas of lower florets 3. ..... ***P. urvillei***
        9. Racemes 3–7 per peduncle. Spikelets 1.7–2.5 mm wide. Nerves of upper glumes 5 or 7. Nerves of lemmas of lower florets 5 or 7. ..... ***P. dilatatum***
      8. Margins of spikelets glabrous or puberulent to pubescent; hairs not long, not silky.
        10. Spikelets broadly oval to orbicular; 3.5–4.2 mm long. Nerves of upper glumes 5. ..... ***P. floridanum***
        10. Spikelets elliptic to ovate; 2.5–3.1 mm long. Nerves of upper glumes 3. ..... ***P. pubiflorum***

Pennisetum L.C.M. Richard — Pearl Millet

One species. ..... ***P. glaucum***
(= *P. americanum* of some authors)

Phalaris C. Linnaeus — Canarygrass

1. Plants rhizomatous; perennials. Panicles 9–15 cm long; lower branches 2–3 cm long, visible, not hidden by spikelets, typically spreading. Spikelets lanceolate. ..... ***P. arundinacea***
1. Plants cespitose; annuals. Panicles 2–9 cm long; lower branches 0.5–1 cm long, hidden by spikelets, appressed against rachises. Spikelets oblanceolate to obovate.
   2. Fertile lemmas 3–4 mm long. Sterile lemmas 1–2 mm long; linear-acicular; densely sericeous. ..... ***P. caroliniana***
   2. Fertile lemmas 5–6 mm long. Sterile lemmas 2–3 mm long; lanceolate; glabrous to sparsely pubescent. ..... ***P. canariensis***

Phanopyrum (C.S. Rafinesque) G.V. Nash — Savannah Panicum

One species. ..... ***P. gymnocarpon***
(= *Panicum gymnocarpon*)

Phleum C. Linnaeus — Timothy

One species. ..... ***P. pratense***

Phragmites M. Adanson — Common Reed

One species. ..... ***P. australis***

Piptatherum A.M.F. Palisot de Beauvois — Ricegrass

One species in Cimarron County. ..... ***P. micranthum***
(= *Oryzopsis micrantha*)

Piptochaetium J.S. Presl — Speargrass

One species in southeastern 1/4 of state. ..... ***P. avenaceum***
(= *Stipa avenacea*)

Poa C. Linnaeus — Bluegrass

1. Spikelets producing only leafy bulblets rather than florets. Bases of culms bulbous. ..... ***P. bulbosa***
1. Spikelets producing only florets. Bases of culms not bulbous.
   2. Plants annuals; remnants of previous year's shoots absent. Flowering culms 5–20 cm tall.
      3. Lemma nerves 5; calluses glabrous. ..... ***P. annua***
      3. Lemma nerves 3; calluses arachnoid.
         4. Spikelets 4–7 mm long. Sheath keels scabrous. ..... ***P. bigelovii***
         4. Spikelets 3–4 mm long. Sheath keels glabrous. ..... ***P. chapmaniana***
   2. Plants perennials; remnants of previous year's shoots usually present. Flowering culms 20–100 cm tall.
      5. Culms conspicuously compressed. ..... ***P. compressa***
      5. Culms terete or slightly compressed.
         6. Lemma calluses arachnoid.
            7. Callus hairs longer than lemmas; exserted beyond spikelets. ..... ***P. arachnifera***
            7. Callus hairs not longer than lemmas; not exserted beyond spikelets.
               8. Plants cespitose; rhizomes absent. Sheath margins fused 1/2–9/10 of length. ..... ***P. sylvestris***
               8. Plants rhizomatous; rhizomes spreading. Sheath margins fused 1/8–1/2 of length.
                  9. Spikelets 5–8 mm long. Pedicels densely scabrous. Plants dioecious. Florets pistillate. ..... ***P. arachnifera***
                  9. Spikelets 3–5 mm long. Pedicels glabrous to sparsely scabrous. Plants bearing perfect flowers. Florets perfect. ..... ***P. pratensis***
         6. Lemma calluses glabrous.

10. Panicles broad, open; primary branches spreading or drooping.
Spikelets not or barely overlapping each other. ..... ***P. autumnalis***
10. Panicles narrow; condensed; primary branches ascending.
Spikelets overlapping each other.
11. Plants rhizomatous; rhizomes spreading.
12. Florets perfect. Lemmas 2.5–4.5 mm long. ..... ***P. arida***
12. Florets staminate. Lemmas 3.5–5 mm long. ..... ***P. arachnifera***
11. Plants cespitose; rhizomes absent.
13. Spikelets conspicuously laterally compressed. Lemma backs conspicuously keeled. Ligules 0.2–1.5 mm long. Sheath margins fused 1/3 of length. ..... ***P. fendleriana***
13. Spikelets subterete to barely laterally compressed. Lemma backs rounded. Ligules 2–6 mm long. Sheath margins fused 1/10–1/4 of length. ..... ***P. secunda***
(= *P. canbyi*)

Polypogon R.L. Desfontaines Rabbitsfoot Grass, Beardgrass

1. Culms decumbent; rooting at nodes; appearing stoloniferous. Glumes not awned. ..... ***P. viridis***
(= *Agrostis semiverticillata*)
1. Culms erect or ascending; not rooting at nodes; not appearing stoloniferous. Glumes awned.
2. Awns of glumes 1.5–3.5 mm long. Paleas 3/4 length of lemmas. Plants perennials; remnants of previous year's shoots typically present. ..... ***P. interruptus***
2. Awns of glumes 4–10 mm long. Paleas subequal to lemmas. Plants annuals; remnants of previous year's shoots absent. ..... ***P. monspeliensis***

Saccharum C.Linnaeus Plumegrass

1. Tufts of hairs at spikelet bases absent or sparse. Panicle rachises and pedicels scaberulous. ..... ***S. baldwinii***
(= *Erianthus strictus*)
1. Tufts of hairs at spikelet bases present; conspicuous; dense. Panicle rachises and pedicels villous.
2. Lemma awns terete; not twisted near bases. ..... ***S. giganteum***
(= *Erianthus giganteus*)
2. Lemma awns flat; loosely twisted near bases.
4. Peduncles sparsely to densely villous. Lemma awns twisted from bases to apices. ..... ***S. alopecuroides***
(= *Erianthus alopecuroides*)
4. Peduncles glabrous. Lemma awns twisted below middle, straight above middle. ..... ***S. brevibarbe***
(= *Erianthus contortus*)

Sacciolepis G.V. Nash Cupscale

One species. ..... ***S. striata***

Schedonorus A.M.F. Palisot de Beauvois

1. Upper glumes 3–4 mm long. Lower glumes 2.8–4 mm long. Florets 5–8 per spikelet. Auricle margins entire. Ligules 0.2–0.5 mm long. Lemmas distally glabrous or scaberulous. Panicle branches 1 or 2 per node, if 2 branches, then spikelets 1 or 2 on shorter branch. ..... ***S. pratensis***
(= *Festuca pratensis*)
1. Upper glumes 5–6 mm long. Lower glumes 4–5 mm long. Florets 4–5 per spikelet. Auricle margins ciliate, occasionally as few as 1 or 2 hairs. Ligules 1–2 mm long. Lemmas distally scabrous or hispidulous. Panicle branches 2 or 3 per node, if 2 branches, then spikelets 3 or more on shorter branch. ..... ***S. arundinaceus***
(= *Festuca arundinacea*)

Schizachyrium C.G.D. Nees von Esenbeck Little Bluestem

One species. ..... ***S. scoparium***
(= *Andropogon scoparius*)

Sclerochloa A.M.F. Palisot de Beauvois Hardgrass

One species. ..... ***S. dura***

Scleropogon R.A. Philippi Burrograss

One species in Cimarron County. ..... ***S. brevifolius***

Secale C. Linneaus Rye

One species. ..... ***S. cereale***

Setaria A.M.F. Palisot de Beauvois Bristlegrass

1. Bristles present only at base of terminal spikelet of each branch of panicles. ..... ***S. reverchonii*** (= *S. firmula*)
1. Bristles present below all spikelets of panicles.
    2. Bristles 4–12 below each spikelet.
        3. Plants perennials; from short knotty rhizomes. ..... ***S. parviflora*** (= *S. gracilis, S. geniculata*)
        3. Plants annuals; from fibrous roots.
            4. Margins of upper sheaths ciliate. Spikelets 2 or 3 per fascicle. Rachises villous. Lemmas of upper florets inconspicuously transversely rugose. ..... ***S. faberi***
            4. Margins of upper sheaths glabrous. Spikelets 1 per fascicle. Rachises hispid. Lemmas of upper florets conspicuously transversely rugose. ..... ***S. pumila*** (= *S. lutescens*)
    2. Bristles 1–3 below each spikelet.
        5. Bristles retrorsely scabrous. ..... ***S. verticillata***
        5. Bristles antrorsely scabrous.
            6. Panicles, including bristles, 2–3 cm in diameter. Spikelets 3.5–4 mm long. Disarticulation between lower and upper florets. ..... ***S. italica***
            6. Panicles, including bristles, 0.7–2 cm in diameter. Spikelets 1.5–3 mm long. Disarticulation below the glumes.
                7. Rachises hidden by spikelets and bristles. Panicles uniformly dense. Apices of lemmas of upper florets rounded to obtuse.
                8. Adaxial surfaces of blades glabrous. Spikelets 1.8–2.5 mm long. Lemmas of upper florets minutely papillose, but not transversely rugose; often dark brown spotted. Upper glumes equal to or 9/10 length of lemmas of upper florets. ..... ***S. viridis***
                8. Adaxial surfaces of blades pustulate-pilose or pilose. Spikelets 2.5–3 mm long. Lemmas of upper florets inconspicuously transversely rugose; not brown spotted. Upper glumes 6/10–8/10 length of lemmas of upper florets. ..... ***S. faberi***
                7. Rachises visible, not completely hidden by spikelets and bristles. Panicles not uniformly dense, interrupted. Apices of lemmas of upper florets acute-apiculate.
                9. Ligules 0.5–1 mm long. Spikelets 1.5–2.2 mm long. Lower glumes 1/3 length of spikelets. Paleas of lower florets 1/3 length of paleas of upper florets. Plants annuals. ..... ***S. grisebachii***
                9. Ligules 1–2.5 mm long. Spikelets 2–2.5 mm long. Lower glumes 1/3–1/2 length of spikelets. Paleas of lower florets 1/2 to equal length of paleas of upper florets. Plants perennials.
                10. Mature lemmas of upper florets inflated. Paleas of upper florets convex. Paleas of lower florets equal or subequal to length of paleas of upper florets. ..... ***S. macrostachya***
                10. Mature lemmas of upper florets not inflated. Paleas of upper florets flat or concave. Paleas of lower florets 1/2–3/4 length of paleas of upper florets. ..... ***S. leucopila***

Sorghastrum G.V. Nash Indiangrass

1. Awns 9–20 mm long; once geniculate. Rhizomes present. Mature spikelets golden-brown. ..... ***S. nutans***
1. Awns 25–30 mm long; twice geniculate. Rhizomes absent. Mature spikelets dark brown. ..... ***S. elliottii***

Sorghum C. Moench

1. Plants perennials; rhizomatous. Mature caryopses enclosed within glumes. Blades 12–25 mm wide. ..... ***S. halepense***
1. Plants annuals; not rhizomatous. Mature caryopses protruding from glumes. Blades 15–120 mm wide. ..... ***S. bicolor***

Spartina J.C.D. von Schreber Cordgrass

One species. ..... ***S. pectinata***

Sphenopholis F. Lamson-Scribner Wedgescale, Wedgegrass

1. Glumes similar in shape; both lanceolate. Lemmas dorsally awned; awns 3–5 mm long, twisted, geniculate. ..... ***S. interrupta***
(= *Trisetum interruptum*)
1. Glumes dissimilar in shape; lower linear to lanceolate; upper oblanceolate to broadly obovate. Lemmas not awned.
  2. Panicles dense; spicate; straight. Upper glumes obovate; subcucullate. Lower lemmas 2–2.3 mm long; apices rounded. ..... ***S. obtusata***
  2. Panicles open; not spicate; usually nodding or arching. Upper glumes oblanceolate; not subcucullate. Lower lemmas 2.3–3 mm long; apices broadly acute. ..... ***S. intermedia***

Sporobolus R. Brown Dropseed

1. Mature panicles condensed or spicate; cylindrical to narrowly ellipsoidal; both terminal and axillary; branches appressed or slightly diverging.
  2. Panicles 1–4 cm long. Plants annuals; remnants of previous year's shoots absent.
    3. Lemmas glabrous; 1.5–3 mm long. Mature caryopses 1.2–1.8 mm long. ..... ***S. neglectus***
    3. Lemmas strigose; 3–4.5 mm long. Mature caryopses 1.8–2.7 mm long. ..... ***S. vaginiflorus***
    (= *S. ozarkanus*)
  2. Panicles 5–50 cm long. Plants perennials; remnants of prevous year's shoots typically present.
    4. Lemmas strigose. Paleas longer than or equal to lemmas. ..... ***S. clandestinus***
    4. Lemmas glabrous. Paleas shorter than or equal to lemmas.
      5. Collars densely pilose, hairs silky white.
        6. Spikelets 1.5–2.5 mm long. Ligules 0.2–0.5 mm long. Upper glumes 1–2.5 mm long. Culms 1–1.8 mm in diameter. ..... ***S. cryptandrus***
        6. Spikelets 2.5–4 mm long. Ligules 0.5–0.7 mm long. Upper glumes 2.5–3.5 mm long. Culms 2–3 mm in diameter. ..... ***S. giganteus***
      5. Collars glabrous, a few hairs sometimes present at apices of sheath margins, hence collars falsely appearing pubescent.
        7. Blades 35–70 cm long; adaxial surfaces pilose in proximal half. Spikelets 2.5–6 mm long. Keels of upper glumes scaberulous. Mature paleas split longitudinally. ..... ***S. compositus***
        (= *S. asper*)
        7. Blades 10–25 cm long; adaxial surfaces glabrous. Spikelets 1.7–2 mm long. Keels of upper glumes smooth. Mature paleas not split longitudinally. ..... ***S. indicus***
        (= *S. poiretii*)
1. Mature panicles open; pyramidal to ovoid or broadly ellipsoidal; only terminal; branches spreading to slightly ascending.
  8. Spikelets 3–7 mm long.
    9. Lemmas 3.9–6.5 mm long. Primary panicle branches 5–16 cm long. Blade margins scaberulous. ..... ***S. silveanus***
    9. Lemmas 2.8–4 mm long. Primary panicle branches 0.5–5 cm long. Blade margins scabrous.
      10. Panicle branches in conspicuous whorls; spreading. Mature caryopses ellipsoid, somewhat flattened; minutely rugose; reddish brown. ..... ***S. junceus***
      10. Panicle branches not in whorls; ascending. Mature caryopses pyriform to globose; smooth; shining light brown. ..... ***S. heterolepis***
  8. Spikelets 0.5–2.8 mm long.
    11. Longest pedicels 5–25 mm long; capillary. Spikelets solitary; not overlapping. ..... ***S. texanus***
    11. Longest pedicels 1–3 mm long; not capillary. Spikelets clustered; overlapping.
      12. Collars pilose. ..... ***S. cryptandrus***
      12. Collars not pilose.

13. Panicles 3–9 cm wide; 3–18 cm long; branches whorled at lowest nodes. ..... ***S. pyramidatus***
13. Panicles 10–30 cm wide; 15–47 cm long; branches alternate or fascicled at lowest nodes.
14. Plants 130–200 cm tall. Culms 2–4 mm in diameter. Ligules 0.5–1 mm long. Pedicels appressed; 0.2–0.5 mm long. Panicle branches bearing spikelets to bases. ..... ***S. wrightii***
14. Plants 35–80 cm tall. Culms 1–2.5 mm in diameter. Ligules 0.1 mm long. Pedicels spreading; 0.5–2 mm long. Panicle branches bearing spikelets only in the distal 1/2–2/3. ..... ***S. airoides***

Steinchisma C.S. Rafinesque — Gaping Panicgrass

One species. ..... ***S. hians***
(= *Panicum hians*)

Stenotaphrum C.B. von Trinius — St. Augustine Grass

One species. ..... ***S. secundatum***

Thinopyrum Á. Löve — Tall Wheatgrass

One species. ..... ***T. ponticum***

Tridens J.J. Roemer & J.A. Schultes

1. Panicles diffuse; branches ascending or spreading or drooping; pedicels conspicuous. Paleas equal or subequal to lemmas.
2. Panicle branches stiffly ascending at spikelet maturity. Axils of primary branches glabrous. ..... ***T.* × *oklahomensis***
2. Panicle branches spreading or drooping at spikelet maturity. Axils of primary branches sparsely to densely pilose. ..... ***T. flavus***
1. Panicles spicate; branches appressed; pedicels hidden by spikelets or inconspicuous. Paleas 1/2–3/4 as long as lemmas.
3. Lemma nerves glabrous or pubescent only at bases. ..... ***T. albescens***
3. Lemma nerves pilose 1/2–3/4 of their length.
4. Spikelets 3–6 mm long. Glumes longer than lowest florets, typically longer than all florets of spikelets. Panicles 10–20 mm in diameter. ..... ***T. strictus***
4. Spikelets 6–10 mm long. Glumes shorter than or equal to lowest florets. Panicles 5–8 mm in diameter. ..... ***T. muticus***
(= *T. elongatus*)

Tripidium J.E.H. Scholz — Ravenna Grass

One species. ..... ***T. ravennae***
(= *Erianthus ravennae*)

Triplasis A.M.F.J. Palisot de Beauvois — Sandgrass

One species. ..... ***T. purpurea***

Tripsacum C. Linnaeus — Eastern Gamagrass

One species. ..... ***T. dactyloides***

×*Triticosecale* L. Wittmack ex A.A. Camus — Triticale

One taxon. ..... **a hybrid of *Triticum* and *Secale***
(= *T. rimpaui*)

Triticum C. Linneaus — Wheat

One species. ..... ***T. aestivum***

Urochloa A.M.F. Palisot de Beauvois — Signalgrass

1. Margins of upper glumes and lemmas of lower florets densely villous, appearing fringed. Lower glumes 3/4 length of spikelets; lanceolate. Plants perennials; stoloniferous or rhizomatous. ..... ***U. ciliatissima***
(= *Brachiaria ciliatissima*)

1. Margins of upper glumes and lemmas of lower florets glabrous or sparsely pillose, not appearing fringed. Lower glumes 1/4–2/3 length of spikelets; broadly ovate. Plants annuals; cespitose.
   2. Spikelets sparsely pillose; 5–6 mm long. Lower glumes 3.1–4 mm long; 2/3 length of spikelets. Ligules 1.5–3 mm long. Distal 1/4 of upper glumes and lemmas of lower florets without transverse nerves. ..... ***U. texana***
   (= *Brachiaria texana, Panicum texanum*)

   2. Spikelets glabrous; 3–5 mm long. Lower glumes 0.8–2.5 mm long; 1/4–1/3 length of spikelets. Ligules 0.7–1 mm long. Distal 1/4 of upper glumes and lemmas of lower florets with conspicuous transverse nerves.
      3. Rachises winged. Spikelets 4–5 mm long; ovate to lanceolate. Lower glumes 1.5–2.5 mm long. Upper glumes and lemmas of lower florets 4–4.8 mm long; nerves 5. ..... ***U. platyphylla***
      (= *Brachiaria platyphylla*)

      3. Rachises not winged. Spikelets 3–3.1 mm long; obovate. Lower glumes 0.8–1.1 mm long. Upper glumes and lemmas of lower florets 3 mm long; nerves 7. ..... ***U. fusca***
      (= *Brachiaria fasciculata, Panicum fasciculatum*)

Vulpia C.C. Gmelin — Annual Fescue

1. Lower glumes 0.2–1.5 mm long; 1/8–1/3 length of upper glumes. Inflorescences partially exserted from upper sheaths at maturity. Lemmas scabrous. ..... ***V. myuros***
(= *Festuca myuros*)

1. Lower glumes 1.5–5 mm long; 1/2–3/4 length of upper glumes. Inflorescences fully exserted from upper sheaths at maturity. Lemmas glabrous or pubescent.
   2. Lemma awns shorter than to 1.5 times the length of lemmas or absent. Florets 5–17 per spikelet. Lemma margins not scarious. ..... ***V. octoflora***
   (= *Festuca octoflora*)

   2. Lemma awns 2–3 times length of lemmas. Florets 3–7 per spikelet. Lemma margins scarious.
      3. Lemmas of lowest florets 2.5–3.5 mm long. Spikelets, excluding awns, 3.5–5 mm long. Lower glumes 1.3–3.5 mm long. Caryopses 1.5–2 mm long. ..... ***V. elliotea***
      (= *Festuca sciurea*)

      3. Lemmas of lowest florets 3.5–7.5 mm long. Spikelets, excluding awns, 5–10 mm long. Lower glumes 3.5–5 mm long. Caryopses 3.5–5.5 mm long. ..... ***V. bromoides***
      (= *Festuca bromoides*)

Zea C. Linnaeus — Maize, Corn

One species. ..... ***Z. mays***

Zizaniopsis J.C. Döll & P.F.A. Ascherson — Southern Wildrice, Giant Cutgrass

One species in southeastern 1/4 of state. ..... ***Z. miliacea***

PODOSTEMACEAE L.C. Richard ex C.A. Agardh — Riverweed Family

Plants herbs; annuals or perennials; submerged aquatics attached to rocks by disks. **Leaves** simple; alternate; with basal sheaths; 2-ranked; venation not apparent; margins linearly dissected; stipules absent. **Inflorescences** solitary flowers; axillary; spathes present, caducous. **Flowers** perfect; perianths absent. **Sepals** absent. **Petals** absent. **Stamens** 2; fused by filaments for more than 1/2 their length; staminodia present, 2. **Pistils** 1; compound, carpels 2; stigmas 2, capitate; styles 2; ovaries superior; locules 2; placentation axile. **Fruits** capsules; septicidal; 6-to 10-ribbed. **Seeds** numerous, minute.

The family is represented in Oklahoma by 1 genus and 1 species. It is mostly tropical in distribution and occurs in the eastern 1/3 of the state. Found in fast-running streams with rocky beds and waterfalls, it is probably undercollected because it resembles algae.

Podostemon A. Michaux

One species. ..... ***P. ceratophyllum***

POLEMONIACEAE A.L. de Jussieu Phlox Family

Plants herbs; perennials or annuals or biennials; glandular-pubescent or glabrous. **Leaves** simple or 1-pinnately compound; alternate, or alternate above and opposite below, or opposite; venation pinnate; margins entire to pinnatisect; terminal leaflets of compound leaves present, oval, margins entire; stipules absent. **Inflorescences** simple or compound cymes or glomerules or solitary flowers. **Flowers** perfect; perianths in 2-series. **Calyces** tubular. **Sepals** 5; fused; scarious to herbaceous. **Corollas** radially or rarely slightly bilaterally symmetrical; salverform or funnelform or campanulate. **Petals** 5; fused; of various colors, often with differently colored centers. **Stamens** 5; of unequal lengths; epipetalous. **Pistils** 1; compound, carpels 3; stigmas 3, linear; styles 1; ovaries superior; locules 3; placentation axile. **Nectaries** present; 1; receptacular; annular. **Fruits** capsules; loculicidal. **Seeds** 1 to numerous.

The family is represented in Oklahoma by 4 genera and 14 species. Chiefly North American in distribution, it includes many showy species, some of which attract hummingbirds as pollinators. Species are most commonly encountered in dry, sandy, or rocky soils.

1. Leaves simple.
    2. Leaves all alternate. ..... ***Ipomopsis***
    2. Leaves opposite or opposite below and alternate above. ..... ***Phlox***
1. Leaves pinnately compound.
    3. Calyx tubes wholly herbaceous. Leaf segments ovate to lanceolate. ..... ***Polemonium***
    3. Calyx tubes scarious between lobes. Leaf segments filiform.
        4. Corollas rotate; violet-blue. ..... ***Giliastrum***
        4. Corollas salverform; red or white. ..... ***Ipomopsis***

Giliastrum (A. Brand) P.A. Rydberg

One species. ..... ***G. rigidulum***
(= *Gilia rigidula*)

Ipomopsis A. Michaux

1. Inflorescences open panicles. Flowers solitary or paired. Corollas white to light blue or violet.
    2. Corolla tubes 9–20 mm long. Plants of Cimarron County. ..... ***I. laxiflora***
    2. Corolla tubes 30–40 mm long. Plants of the western 1/3 of body of state. ..... ***I. longiflora***
1. Inflorescences spicate panicles. Flowers in clusters. Corollas scarlet to pale pink or yellow.
    3. Lobes of leaves linear. Apices of corolla lobes acute or acuminate. ..... ***I. aggregata***
    3. Lobes of leaves filiform. Apices of corolla lobes obtuse. ..... ***I. rubra***

Phlox C. Linnaeus

1. Styles 10–18 mm long; fused almost entire length.
    2. Leaves entire to serrulate. Pedicels glabrous. ..... ***P. glaberrima***
    2. Leaves minutely ciliate. Pedicels pubescent. ..... ***P. paniculata***
1. Styles 1–3 mm long; fused half of length or less.
    3. Leaves alternate above and opposite below.
        4. Plants perennials. Longest hairs of sepals 2–4 mm long. ..... ***P. longipilosa***
        4. Plants annuals. Longest hairs of sepals 1–2 mm long.
            5. Upper leaves 3–6 mm wide. Corolla lobes 7–15 mm wide;
                throats and bases of lobes striate. ..... ***P. drummondii***
            5. Upper leaves 7–10 mm wide. Corolla lobes 2.5–7 mm wide;
                throats and bases of lobes not striate. ..... ***P. cuspidata***
    3. Leaves all opposite or subopposite.
        6. Flowering stems 8–10 cm tall. Leaves of flowering stems 1.6–3 mm wide. ..... ***P. oklahomensis***

6. Flowering stems 15–70 cm tall. Leaves of flowering stems 3–25 mm wide.
    7. Leaf apices broadly acute to rounded; not cartilaginous.
        Plants with sterile prostrate shoots at bases. ..... ***P. divaricata***
    7. Leaf apices narrowly acute to attenuate; cartilaginous.
        Plants without sterile prostrate shoots at bases. ..... ***P. pilosa***

Polemonium C. Linnaeus Jacob's Ladder

One species. ..... ***P. reptans***

POLYGALACEAE R. Brown Milkwort Family

Plants herbs; perennials or annuals or biennials; perennating organs rhizomes or caudices or crowns. **Stems** unbranched or sparingly branched; erect or ascending. **Leaves** simple; alternate or whorled, or alternate above and opposite or whorled below; lower often smaller than upper; venation a single vein or pinnate; margins entire; stipules absent. **Inflorescences** racemes or spikes; terminal or axillary; bracts present; bracteoles present, 2 per pedicel. **Flowers** perfect; chasmogamous or cleistogamous; perianths in 2-series. **Sepals** 5; in 2 whorls; deciduous or persistent; the outer 3 smaller, herbaceous or partially petaloid; lower 2 free or fused; the inner 2 larger, petaloid, wing-like, free. **Corollas** bilaterally symmetrical or asymmetrical. **Petals** 3, or rarely 5, but if so 2 minute; fused at bases; white or whitish green or pale to deep pink or rose or magenta or bicolored; of 2 forms; the lower keeled or bowl-shaped, usually fringed or lobed at the apices; the upper 2 ligulate, not fringed or lobed at apices. **Stamens** 8 or 6; fused by filaments and fused to corollas in 2 rows of 4 or 3. **Pistils** 1; compound, carpels 2; stigmas 1, 2-lobed, capitate, 1 lobe fertile, the other functioning in pollination; styles 1; ovaries superior; locules 2; placentation axile, ovules apical. **Fruits** capsules. **Seeds** 2; with 2 or 3 aril-like micropylar outgrowths.

The family is represented in Oklahoma by 1 genus and 8 species. It is almost cosmopolitan in distribution. The flowers superficially resemble the papilionaceous flowers of the Fabaceae, but upon close examination it is evident that the structures are not the same.

Polygala C. Linnaeus Milkwort

1. Stems densely pubescent. Corolla keels beaked; not crested. ..... ***P. lindheimeri***
1. Stems glabrous. Corolla keels not beaked; crested.
    2. Lower cauline leaves whorled or subwhorled.
        3. Inflorescences 10–17 mm wide; apices blunt or rounded. Flowers rose-purple to greenish purple. ..... ***P. cruciata***
        3. Inflorescences 2.2–4.5 mm wide; apices acute. Flowers white to greenish white, rarely purple-tinged.
            4. Upper cauline leaves whorled or subwhorled. Racemes conical;
                flowers and fruits crowded. ..... ***P. verticillata***
            4. Upper cauline leaves alternate. Racemes narrowly ellipsoidal;
                flowers and fruits not crowded, lower ones widely spaced. ..... ***P. ambigua***
    2. Lower cauline leaves alternate.
        5. Stems multiple at bases. Plants perennials or biennials.
            6. Flowers white with green centers, and crests white or purple. Inflorescences 4–8 mm
                in diameter at anthesis. Cleistogamous flowers absent. Taproots woody. ..... ***P. alba***
            6. Flowers uniformily pink rose-purple. Inflorescences 9–14 mm in
                diameter at anthesis. Cleistogamous flowers present; underground; whitish tan.
                Taproots herbaceous. ..... ***P. polygama***
        5. Stems solitary at bases. Plants annuals.
            7. Stems and leaves glaucous. Petals and staminal tubes fused
                into conspicuous narrow trough, 5 mm long. ..... ***P. incarnata***
            7. Stems and leaves not glaucous. Petals and staminal tubes
                not fused into conspicuous trough. ..... ***P. sanguinea***

POLYGONACEAE A.L. de Jussieu Buckwheat Family

Plants herbs or herbaceous vines or tardily deciduous subshrubs; perennials or biennials or annuals; perennating organs fleshy roots or rhizomes or caudices or crowns; terrestrial or emergent or floating-leaved aquatics; bearing perfect flowers or dioecious. **Stems** jointed; nodes swollen. **Leaves** simple; alternate; petiolate or sessile; venation pinnate or a single vein or not apparent; stipules present, fused, sheathing stems (ocrea), or absent. **Inflorescences** simple or compound cymes or spikes or racemes or clusters or glomerules or solitary flowers; bracts absent or present. **Flowers** perfect or imperfect, similar; perianths in 1-series;

radially symmetrical. **Sepals** 2 to 6; in 1 or 2 whorls; fused or free; sepaloid or petaloid; of various colors except blue. **Petals** absent. **Stamens** 2 to 9. **Pistils** 1; compound, carpels 3 or 2; stigmas 3 or 2; styles 1 to 3, fused; ovaries superior; triangular or lenticular; locules 1; placentation basal. **Fruits** achenes. **Seeds** 1.

The family is represented in Oklahoma by 7 genera and 42 species. Cosmopolitan in distribution but most abundant in the temperate regions of the northern hemisphere, it is an important food source for wildlife. Our taxa are characteristically encountered in wetlands or wet soils.

1. Plants vines. Stems climbing or twining or trailing.
    2. Tendrils present. Fruiting calyces 12–30 mm long. ..... ***Brunnichia***
    2. Tendrils absent. Fruiting calyces 3–8 mm long. ..... ***Fallopia***
1. Plants subshrubs or herbs. Stems erect or ascending or decumbent.
    3. Flowers subtended by cup-like involucre. Stamens 9. Ocreas absent. ..... ***Eriogonum***
    3. Flowers not subtended by cup-like involucre. Stamens 4–8. Ocreas present.
        4. Sepals similar in size; equal or subequal.
            5. Flowers fascicled in leaf axils. Stamens didynamous; filaments inflated. Upper ocrea 2-lobed; typically shredding into fibers or disappearing completely. ..... ***Polygonum***
            5. Flowers in spikes or racemes or panicles. Stamens of equal length; filaments not inflated. Upper ocrea not 2-lobed; remaining intact or simply tearing with age. ..... ***Persicaria***
        4. Sepals of 2 sizes; outer smaller than inner.
            6. Plants subshrubs. Leaves linear; 0.5–1.2 mm wide. ..... ***Polygonella***
            6. Plants herbs. Leaves lanceolate to ovate; 10–100 mm wide. ..... ***Rumex***

Brunnichia J. Banks & J. Gaertner — Eardrop Vine

One species. ..... ***B. ovata***

Eriogonum A. Michaux — Wild Buckwheat

1. Abaxial surfaces of leaves strigose to glabrous. Achenes winged; yellow to yellowish green. ..... ***E. alatum***
1. Abaxial surfaces of leaves tomentose to floccose. Achenes not winged; light brown to dark brown.
    2. Inner surfaces of sepals yellow at anthesis.
        3. Basal leaves 1–3 cm long. Inflorescences compact; 1–3 cm in diameter. ..... ***E. lachnogynum***
        3. Basal leaves 9–14 cm long. Inflorescences diffuse; 6–20 cm in diameter. ..... ***E. longifolium***
    2. Inner surfaces of sepals white or cream or rose or greenish or reddish brown.
        4. Flowering stems glabrous. Blades of basal leaves 6–10 mm long. ..... ***E. tenellum***
        4. Flowering stems tomentose to floccose. Blades of basal leaves 12–41 mm long.
            5. Cauline leaves and bracts whorled or opposite. Plants perennials; from woody caudices. Abaxial surfaces of sepals pubescent. ..... ***E. jamesii***
            5. Cauline leaves and bracts alternate. Plants annuals; from taproots. Abaxial surfaces of sepals glabrous.
                6. Plants reddish. Involucres sparsely pubescent. Outer sepals oblong-cordate to cordate. ..... ***E. multiflorum***
                6. Plants grayish. Involucres densely pubescent. Outer sepals obovate. ..... ***E. annuum***

Fallopia M. Adanson — False Buckwheat

1. Stigmas fimbriate. ..... ***Fallopia japonica***
(= *Polygonum cuspidatum*)
1. Stigmas capitate or peltate.
    2. Outer sepals minutely keeled in fruit. Achenes minutely pitted. ..... ***Fallopia convolvulus***
(= *Polygonum convolvulus*)
    2. Outer sepals winged in fruit. Achenes smooth.
        3. Plants perennials. Fruiting perianths obovate. Sepal wings undulate or crinkled; gradually decurrent near sepal bases. Sepal margins wavy-crenate to incised or lacerate or rarely entire. ..... ***Fallopia scandens***
(= *Polygonum scandens, P. cristatum*)
        3. Plants annuals. Fruiting perianths orbicular. Sepal wings typically flat or rarely undulate or crinkled; truncate or abruptly attenuate near sepal bases. Sepal margins typically entire or rarely undulate-crenate. ..... ***Fallopia dumetorum***
(= *Polygonum dumetorum*)

Persicaria (C. Linnaeus) P. Miller Smartweed

1. Pedicels recurved in fruit. Ends of achene styles hooked. ..... ***P. virginiana***
(= *Tovara virginiana*, *Polygonum virginianum*)

1. Pedicels ascending in fruit. Ends of achene styles not hooked.
  2. Stems armed with prickles. Inflorescences capitate. ..... ***P. sagittata***
  (= *Polygonum sagittatum*)

  2. Stems not armed with prickles. Inflorescences of various types, but not capitate.
    3. Ocrea margins entire, may have strigose hairs that originate below margin.
      4. Peduncles densely pubescent. Racemes 1 or 2 per stem.
      Plants perennials; from rhizomes. ..... ***P. amphibia***
      (= *Polygonum coccineum*, *Polygonum amphibium*)

      4. Peduncles glabrous to sparsely pubescent. Racemes 3-numerous per stem. Plants annuals; from taproots.
        5. Peduncles glabrous or with sessile glands. Inflorescences arching
        Veins at apices of sepals bifurcated, recurved. ..... ***P. lapathifolia***
        (=*Polygonum lapathifolium*)

        5. Peduncles with stipitate glands. Inflorescences erect or ascending.
        Veins at apices of sepals not bifurcated; not recurved.
          6. Achenes with 1 surface concave and 1 surface convex with.
          rounded protuberance. Flowers heterostylous. ..... ***P. bicornis***
          (= *Polygonum bicorne*)

          6. Achenes with both surfaces flat or convex. Flowers homostylous. ..... ***P. pensylvanica***
          (= *Polygonum pensylvanicum*)

    3. Ocrea margins ciliate.
      7. Sepals glandular-punctate.
        8. Inner sepals glandular-punctate, glands inconspicuous.
          9. Outer ocrea surfaces glabrous. ..... ***P. hydropiperoides***
          (= *Polygonum hydropiperoides*)

          9. Outer ocrea surfaces hirsute or strigose.
            10. Ocrea surfaces uniformly strigose. ..... ***P. hydropiperoides***
            (= *Polygonum hydropiperoides*)

            10. Ocrea surfaces both strigose distally and hirsute
            proximally. ..... ***P. setacea***
            (= *Polygonum setaceum*)

        8. Both inner and outer sepals glandular-punctate, glands conspicuous.
          11. Achenes dull; minutely pitted. Flowers overlapping on rachises. ..... ***P. hydropiper***
          (= *Polygonum hydropiper*)

          11. Achenes shiny; smooth. Flowers widely spaced on rachises. ..... ***P. punctata***
          (= *Polygonum punctatum*)

      7. Sepals not glandular-punctate.
        12. Peduncles hirsute. Lower leaves long petiolate; petioles 10–140 mm long; blades ovate. Plants of upland habitats. ..... ***P. orientalis***
        (= *Polygonum orientale*)

        12. Peduncles glabrous. Lower leaves sessile to short petiolate; petioles 2–20 mm long; blades lanceolate to linear-lanceolate. Plants of wetland habitats.
          13. Ocrea cilia 4–10 mm long. Plants perennials; from rhizomes. ..... ***P. hydropiperoides***
          (= *Polygonum hydropiperoides*)

          13. Ocrea cilia 0.5–3 mm long. Plants annuals; from taproots. ..... ***P. maculosa***
          (= *Polygonum persicaria*)

Polygonella A. Michaux Jointweed

One species. ..... ***P. americana***

Polygonum C. Linnaeus Knotweed, Smartweed

1. Outer and inner sepals equal in length. ..... ***P. aviculare***
1. Outer sepals longer than inner sepals.

2. Leaves plicate. Achenes striate. ..... ***P. tenue***
2. Leaves flat. Achenes smooth.
3. Leaves linear to lanceolate; largest cauline leaves at least 4 times longer than wide. Achenes black. Sepals 6. ..... ***P. ramosissimum***
3. Leaves elliptic; largest cauline leaves 2–3 times longer than wide. Achenes brown. Sepals 5. ..... ***P. erectum***

Rumex C. Linnaeus Dock, Sorrel

1. Leaf bases all or at least some hastate or sagittate.
2. Inner sepals 2.3–3.5 mm wide. Pedicels jointed below middles. Outer sepals reflexed in fruit. ..... ***R. hastatulus***
2. Inner sepals 1.2–2 mm wide. Pedicels jointed at apices, immediately below flowers. Outer sepals not reflexed in fruit. ..... ***R. acetosella***
1. Leaf bases of various types, but never hastate or sagittate.
3. Inner sepals 20–45 mm wide in fruit. ..... ***R. venosus***
3. Inner sepals 1–12 mm wide in fruit.
4. Margins of inner sepals dentate or denticulate or spinose.
5. Teeth or spines of margins of inner sepals 1.5–2 times longer than width of bodies of inner sepals. Plants annuals. ..... ***R. maritimus***
5. Teeth or spines of margins of inner sepals shorter than or equal to width of bodies of inner sepals. Plants perennials.
6. Tubercles of inner sepals verrucose. Middle whorls of flowers on primary branches widely separated; internodes 3–10 times longer than pedicels. Leaves 4–15 cm long. ..... ***R. pulcher***
6. Tubercles of inner sepals pitted or reticulate. Middle whorls of flowers on primary branches densely clustered, internodes 1–3 times longer than pedicels. Leaves 15–40 cm long.
7. Tubercles of inner sepals minutely pitted. Bases of largest leaves cuneate to truncate. ..... ***R. stenophyllus***
7. Tubercles of inner sepals reticulate. Bases of largest leaves cordate. ..... ***R. obtusifolius***
4. Margins of inner sepals entire to erose.
8. Inner fruiting sepals with tubercles absent.
9. Inner sepals 11–12 mm wide; turning pink. Roots conspicuously tuberous. ..... ***R. hymenosepalus***
9. Inner sepals 3.5–9 mm wide; remaining green. Roots not conspicuously tuberous.
10. Outer sepals in fruit reflexed. Inner sepals 5–9 mm wide. ..... ***R. patientia***
10. Outer sepals in fruit not reflexed. Inner sepals 3.5–6 mm wide. ..... ***R. altissimus***
8. Inner fruiting sepals with tubercles present.
11. Leaf margins conspicuously undulate-crisped. ..... ***R. crispus***
11. Leaf margins of various types, but not undulate-crisped.
12. Inner sepals 1–1.6 mm wide in fruit. ..... ***R. conglomeratus***
12. Inner sepals 3.5–9 mm wide in fruit.
13. Fruiting pedicels 2–4 times longer than length of inner sepals. Tubercles of all 3 inner sepals fully developed. ..... ***R. verticillatus***
13. Fruiting pedicels as long as length of inner sepals. Tubercles of only 1 or 2 inner sepals fully developed.
14. Outer sepals in fruit reflexed. Inner sepals 5–9 mm wide. Largest tubercles less than 1/3 length of inner sepals in fruit. ..... ***R. patientia***
14. Outer sepals in fruit not reflexed. Inner sepals 3.5–6 mm wide. Largest tubercles more than 1/2 length of inner sepals in fruit. ..... ***R. altissimus***

POLYPODIACEAE B.W. von Berchtold and C.B. Presl Polypody Family

Plants epiphytic herbs; perennials; evergreen; perennating organs stolons; producing sporangia in sori on abaxial surfaces of fronds. **Roots** dark brown. **Stolons** branching; scales present. **Fronds** all alike; vernation circinate; simple; stipitate; arching; blades ovate to oblong; venation free or anastomosing; abaxial surfaces light gray-green, glabrous, scales with reddish brown centers and transparent margins, margins pinnatifid to pinnatisect. **Sori** separate; borne at ends of veins; embedded; indusia absent. **Sporangia** all alike; annuli present, vertical. **Spores** all alike; spherical. **Gametophytes** all alike; green; cordate or elliptic.

The family is represented in Oklahoma by 1 genus and 1 species. It is a common epiphyte on mosses growing on trees and rocks in the forests of the eastern part of the state.

Pleopeltis F.W.H.A. von Humboldt & A.J.A. Bonpland ex C.L. von Willdenow Shielded-Sorus Fern

One species. ..... ***P. polypodioides***
(= *Polypodium polypodioides*)

PONTEDERIACEAE K.S. Kunth Water-Hyacinth Family

Plants herbs; perennials or annuals; perennating organs rhizomes or stolons; emergent or floating or submerged aquatics; glabrous. **Leaves** simple; alternate; petiolate or sessile; with basal sheaths; blades lanceolate to ovate or linear; venation parallel-convergent; bases cordate or truncate or attenuate; stipules absent. **Inflorescences** spikes or panicles or solitary flowers or racemes; bracts present, sheathing, bladeless or with short blades. **Flowers** perfect; chasmogamous or cleistogamous; perianths in 1-series; bilaterally or nearly radially symmetrical; salverform or funnelform. **Perianth Parts** 6; in 2 whorls; fused; blue or violet or white or yellow; petaloid. **Stamens** 3 or 6; of 3 or equal lengths; fused to perianth parts. **Pistils** 1; compound, carpels 3; stigmas 1 or 3, capitate or linear; styles 1 or 3; ovaries superior; locules 3; placentation axile or parietal. **Nectaries** absent or present; on perianth parts. **Fruits** utricles or capsules. **Seeds** 1 or numerous.

The family is represented in Oklahoma by 2 genera and 6 species. A small family of fresh-water aquatics, it is pantropical in distribution but with a few species found in north temperate zones. The cultivated *Eichhornia crassipes,* water hyacinth, may escape from cultivation and persist for several years.

1. Perianths salverform. Inflorescences 1- to 6-flowered. Stamens 3; anthers basifixed.
   Fruits capsules. Rhizomes absent. ..... ***Heteranthera***
1. Perianths funnelform. Inflorescences many-flowered. Stamens 6; anthers versatile.
   Fruits utricles. Rhizomes present. ..... ***Pontederia***

Heteranthera H. Ruiz Lopez & J.A. Pavón Mud Plantain

1. Corollas yellow; radially symmetrical. Stamens equal; anthers coiling after anthesis;
   filaments glabrous. Leaves all alike, all sessile. Stipules absent. ..... ***H. dubia***
1. Corollas white to mauve to blue or purple; weakly to strongly bilaterally symmetrical.
   Stamens unequal; anthers not coiling after anthesis; filaments glandular-pubescent or
   pilose. Leaves of 2 forms, sessile and petiolate. Stipules present on petiolate leaves.
   2. Inflorescences 1-flowered. Filaments glandular-pubescent.
      3. Distal central perianth limb lobes with lateral flanges. ..... ***H. rotundifolia***
      3. Distal central perianth limb lobes without lateral flanges. ..... ***H. limosa***
   2. Inflorescences 2- to 16- flowered. Filaments pilose.
      4. Spikes shorter than spathes. Filament hairs white. ..... ***H. reniformis***
      4. Spikes longer than spathes. Filament hairs purple. ..... ***H. multiflora***

Pontederia C. Linnaeus Pickerel-Weed

One species. ..... ***P. cordata***

PORTULACACEAE A.L. de Jussieu Purslane Family

Plants herbs; annuals; glabrous or pubescent only at nodes and in inflorescences. **Root Systems** taproot or fibrous. **Stems** prostrate to ascending; succulent. **Leaves** fleshy to succulent; cauline; simple; alternate or opposite; venation not apparent; stipules present or absent, scarious or setose. **Inflorescences** solitary or borne in clusters; terminal or axillary; bracts 2, sepaloid, subtending each

flower. **Flowers** perfect; perianths in 1-series; radially symmetrical; imbricate. **Perianth Parts** 5 or rarely 4 to 6; petaloid; ephemeral; free; of various colors, showy. **Stamens** 4 to 40; opposite the perianth parts; free or fascicled. **Pistils** 1; compound, carpels 3 to 9; stigmas 3 to 9; linear; styles 1; ovaries partly inferior; locules 1; placentation free-central; **Fruits** capsules; circumscissile. **Seeds** many.

The family is represented in Oklahoma by 1 genus and 5 species. *Claytonia* and *Phemeranthus,* long classified in this family, are now positioned in the Montiaceae on the basis of phylogenetic studies. The perianth is considered by anatomists and morphologists to be in 1-series, the petals absent, the sepals petaloid, and the bracts resembling sepals. Some taxonomists, however, describe the perianth as in 2-series.

Portulaca C. Linnaeus Purslane

1. Capsule rims winged. ..... ***P. umbracticola***
1. Capsule rims not winged.
    2. Perianth parts 15–30 mm long. Seeds silver–gray. ..... ***P. grandiflora***
    2. Perianth parts 2–10 mm long. Seeds reddish to brownish black or black.
        3. Leaves flattened. Inflorescences and leaf axils glabrous or short pilose. ..... ***P. oleracea*** (= *P. retusa*)
        3. Leaves terete or subterete. Inflorescences and leaf axils villous.
            4. Perianth parts 3–7.5 mm long; rose or reddish or purple. Capsules 2.5–3.5 mm wide at bases. ..... ***P. pilosa*** (= *P. mundula*)
            4. Perianth parts 2–3 mm long; yellow or copper or bronze. Capsules 1.5–2 mm wide at bases. ..... ***P. halimoides*** (= *P. parvula*)

POTAMOGETONACEAE B.C.J. Dumortier Pondweed Family[1]

Plants herbs; perennials; perennating organs rhizomes or turions; floating-leaved or submerged aquatics rooted in the substrate; bearing perfect flowers or monoecious. **Stems** erect or ascending through water column; jointed. **Leaves** all alike or of 2 forms; submerged leaves hyaline, flaccid, sessile; floating leaves coriaceous or adaxially waxy, petiolate; simple; alternate or opposite; sheathing; venation parallel or a single vein; surfaces glabrous; stipules present, free or fused along one or both margins to form open or closed sheaths around stems. **Inflorescences** solitary flowers or borne in pairs or spikes with flowers whorled; submerged or emergent at anthesis; axillary or terminal; bracts present or absent. **Flowers** perfect or imperfect; perianths absent or in 1-series; radially symmetrical. **Perianth Parts** 0 or 4; free; green; sepaloid; rounded; short clawed. **Stamens** 1 or 4; fused to perianth parts; anthers sessile on claws or borne on elongate slender filaments. **Pistils** 2 to 8; simple, carpels 1; stigmas 1, discoid or funnelform; styles 1 or 0; ovaries superior; locules 1; placentation apical or parietal to basal. **Fruits** achenes or drupe-like; globose or flattened; strongly or slightly beaked. **Seeds** 1.

The family is represented in Oklahoma by 3 genera and 11 species. As presently circumscribed, it includes the Zannichelliaceae or horned pondweed family. A small, cosmopolitan family, the Potamogetonaceae is characteristically encountered in ponds, lakes, or slow moving water of creeks and springs. Its genera are an important food for waterfowl and provide cover for fish.

1. Inflorescences solitary or paired flowers sessile in leaf axils; submerged at anthesis. Perianth parts absent. Stamens 1; filaments elongate, slender. Stigmas funnelform. ..... ***Zannichellia***
1. Inflorescence terminal spikes borne on peduncles; emergent at anthesis. Perianth parts 4; green; sepaloid. Stamens 4; filaments absent. Stigmas discoid.
    2. Stipular sheaths of submerged leaves not fused to leaf margins at leaf bases. ..... ***Potamogeton***
    2. Stipular sheaths of submerged leaves fused to leaf margins at leaf bases.
        3. Stipular sheaths of submerged leaves fused 2/3 or more of their length. Peduncles flexible. ..... ***Stuckenia***
        3. Stipular sheaths of submerged leaves fused less than 1/2 of their length. Peduncles stiff. ..... ***Potamogeton***

Potamogeton C. Linnaeus Pondweed

1. Plants producing floating leaves.
    2. Floating leaves 0.8–1.6 cm long. Submerged leaves narrowly-linear; 0.1–1.5 mm wide; stipular sheaths fused to leaf bases, apices projected as ligules. ..... ***P. diversifolius***
    2. Floating leaves 2.5–20 cm long. Submerged leaves ovate or oblanceolate or linear-lanceolate or elliptic; 3–70 mm wide; stipular sheaths free from leaf bases, apices not projected as ligules.
        3. Submerged leaves sessile. ..... ***P. illinoensis***
        3. Submerged leaves petiolate.

4. Apices of largest submerged leaves subulate to acuminate. ..... ***P. illinoensis***
4. Apices of largest submerged leaves acute.
5. Stems and peduncles conspicuously black spotted. ..... ***P. pulcher***
5. Stems and peduncles not black spotted.
6. Veins of floating leaves 27–49. Veins of submerged leaves 19–49. Fruits 5–6.7 mm long. ..... ***P. amplifolius***
6. Veins of floating leaves 9–21. Veins of submerged leaves 7–15. Fruits 2.7–4.3 mm long. ..... ***P. nodosus***

1. Plants not producing floating leaves.
7. Margins of submerged leaves serrulate-crisped to serrate-undulate. ..... ***P. crispus***
7. Margins of submerged leaves entire or denticulate.
8. Submerged leaves linear.
9. Stipular sheaths fused to leaf bases, apices projected as ligules. Wings of fruits bearing sharp points. ..... ***P. diversifolius***
9. Stipular sheaths free from leaf bases, apices not projected as ligules. Wings of fruits lacking sharp points or wings absent.
10. Fruits keeled. Nodal glands absent. Peduncles recurved; only axillary. ..... ***P. foliosus***
10. Fruits not keeled. Nodal glands present. Peduncles straight; both terminal and axillary.
11. Widest leaves 1–3 mm wide. Stipules fused. Turions produced only in leaf axils. ..... ***P. pusillus***
11. Widest leaves 0.3–1 mm wide. Stipules free. Turions produced at both apices of main shoots and in leaf axils. ..... ***P. berchtoldii***
8. Submerged leaves of various shapes, but never linear.
12. Leaves sessile. ..... ***P. illinoensis***
12. Leaves petiolate.
13. Apices of largest submerged leaves subulate to acuminate. ..... ***P. illinoensis***
13. Apices of largest submerged leaves acute.
14. Stems and peduncles conspicuously black spotted. ..... ***P. pulcher***
14. Stems and peduncles not black spotted.
15. Leaf veins 19–49. Fruits 5–6.7 mm long. ..... ***P. amplifolius***
15. Leaf veins 7–15. Fruits 2.7–4.3 mm long. ..... ***P. nodosus***

Stuckenia C.J.B. Börner — Sago Pondweed

One species. ..... ***S. pectinata***
(= *Potamogeton pectinatus*)

Zannichellia C. Linnaeus — Horned Pondweed

One species. ..... ***Z. palustris***

[1] Treatment contributed by C. Barre Hellquist

PRIMULACEAE E.P. Ventenat — Primrose Family

Plants herbs; annuals or perennials; perennating organs rhizomes or not apparent; terrestrial or emergent aquatics; caulescent or acaulescent. **Leaves** all alike or of 2 forms; forming a basal rosette or cauline; simple; alternate or opposite; venation pinnate; margins entire or dentate or pinnately dissected; stipules absent. **Inflorescences** solitary flowers or racemes or umbels or verticillate clusters. **Flowers** perfect; perianths in 2-series. **Sepals** 5, or rarely 4 or 6; fused. **Corollas** radially symmetrical. **Petals** 5, or rarely 4 or 6; fused; yellow or white or blue to red. **Stamens** 5, or rarely 4 or 6; opposite the petals; epipetalous; staminodia absent or present, 5. **Pistils** 1; compound, carpels 5; stigmas 1, capitate; styles 1; ovaries superior or inferior; locules 1; placentation free-central. **Fruits** capsules; valvate or circumscissile. **Seeds** numerous.

The family is represented in Oklahoma by 6 genera and 11 species. Although cosmopolitan in distribution, it is most abundant in north temperate regions, especially Asia. Several of our taxa are used in the horticulture trade.

1. Leaves pinnately dissected. Peduncles inflated. Plants free-floating aquatics. ..... ***Hottonia***
1. Leaves entire or toothed. Peduncles not inflated. Plants terrestrial.
  2. Plants acaulescent; scapose. Inflorescences umbels.
    3. Petals 10–30 mm long. Leaves 6–30 cm long. Corolla lobes reflexed. ..... ***Primula***
    3. Petals 1 mm long. Leaves 1–2 cm long. Corolla lobes erect or spreading. ..... ***Androsace***
  2. Plants caulescent. Inflorescences solitary flowers or racemes.
    4. Inflorescences racemes. Ovaries 1/2 inferior. ..... ***Samolus***
    4. Inflorescences solitary flowers. Ovaries superior.
      6. Corollas blue or white to red. Capsule dehiscence circumscissile. Plants annuals. ..... ***Anagallis***
      6. Corollas yellow. Capsule dehiscence valvate. Plants perennials. ..... ***Lysimachia***

Anagallis C. Linnaeus Pimpernel

1. Leaves opposite. Flowers pedicellate. Corollas longer than calyces. ..... ***A. arvensis***
1. Leaves alternate. Flowers sessile. Corollas shorter than calyces. ..... ***A. minima***
(= *Centunculus minimus*)

Androsace C. Linnaeus Rock Jasmine

One species. ..... ***A. occidentalis***

Hottonia C. Linnaeus Feather Foil

One species. ..... ***H. inflata***

Lysimachia C. Linnaeus Yellow Loosestrife

1. Stems prostrate or trailing or decumbent; sometimes rooting at nodes.
  2. Rhizomes absent. Leaves orbicular. ..... ***L. nummularia***
  2. Rhizomes present; slender. Leaves lanceolate to ovate-lanceolate. ..... ***L. radicans***
1. Stems erect or ascending; not rooting at nodes.
  3. Mid-cauline leaves elliptic to ovate or ovate-lanceolate. Petioles 0.5-6 cm long. ..... ***L. ciliata***
  3. Mid-cauline leaves linear-lanceolate. Petioles sessile or 0.1-0.5 cm long.
    4. Filaments free. Leaves pinnate. ..... ***L. lanceolata***
    4. Filaments weakly connate. Leaves appearing as 1-veined. ..... ***L. quadriflora***

Primula C. Linnaeus Shooting Star

One species. ..... ***P. meadia***
(= *Dodecatheon meadia*)

Samolus C. Linnaeus Brookweed, Water Pimpernel

1. Corollas 2–3 mm in diameter; lobes longer than tubes. Staminodia present.
Racemes sessile to short subsessile. Pedicel bracts present, minute. ..... ***S. valerandi***
(= *S. parviflorus*)
1. Corollas 4–9 mm in diameter; lobes shorter than tubes. Staminodia absent
Racemes long pedunculate. Pedicel bracts absent. ..... ***S. ebracteatus***
(= *S. cuneatus*)

PTERIDACEAE C.L. von Reichenbach Maidenhair Fern Family

Plants herbs; perennials; deciduous or evergreen; perennating organs rhizomes; producing sporangia in sori on abaxial surfaces of fronds. **Rhizomes** branching or not branching; scales present. **Fronds** all alike or of 2 types, sterile and fertile; vernation circinate or erect; 1-pinnately to 5-pinnately compound; stipitate; veins not anastomosing; abaxial surfaces green or white or cream, mealy or not mealy. **Sori** contiguous or separate; borne on revolute margins; true indusia absent; false indusia formed by revolute or reflexed margins or absent. **Sporangia** all alike; annuli present, vertical. **Spores** all alike; tetrahedral to globose. **Gametophytes** all alike; green; obcordate to reniform.

The family is represented in Oklahoma by 6 genera and 16 species. Many taxa exhibit adaptations for xeric habitats.

1. Abaxial surfaces of blades with fringed or stellate scales. False indusia absent. ..... ***Astrolepis***
1. Abaxial surfaces of blades glabrous or pubescent. False indusia present, sori covered partially or completely by revolute or reflexed margins.
  2. Frond blades pentagonal or broadly deltoid; abaxial surfaces white or cream.
    3. Fronds 1-pinnately compound; blades pentagonal; abaxial surfaces cream. ..... ***Notholaena***
    3. Fronds 3- to 5-pinnately compound; blades broadly deltoid; abaxial surfaces white. ..... ***Argyrochosma***
  2. Frond blades of various shapes, but not pentagonal or broadly deltoid; abaxial surfaces green.
    4. Fronds of 2 types, sterile and fertile. ..... ***Pellaea***
    4. Fronds all alike, not differentiated into sterile and fertile.
      5. Ultimate segments flabellate or oblong or irregularly rhomboidal; bases cuneate and oblique; veins dichotomous; sori borne only on apical margins. ..... ***Adiantum***
      5. Ultimate segments of various shapes, but not flabellate or oblong or irregularly rhomboidal; bases of various shapes, but not oblique and cuneate; veins not dichotomous; sori borne on both apical and lateral margins.
        6. Adaxial surfaces of costae green. ..... ***Myriopteris***
        6. Adaxial surfaces of costae brown in proximal half.
          7. Rachises glabrous. Abaxial surfaces of pinnules glabrous. ..... ***Pellaea***
          7. Rachises pubescent. Abaxial surfaces of pinnules pubescent.
            8. Pinnules 1–5 mm long. ..... ***Myriopteris***
            8. Pinnules 9–22 mm long. ..... ***Pellaea***

Adiantum C. Linnaeus Maidenhair Fern

1. Fronds lanceolate. Ultimate segments flabellate or irregularly rhomboidal; about as long as broad. Stipes not forked. ..... ***A. capillus-veneris***
1. Fronds flabellate. Ultimate segments irregularly oblong; about 3 times longer than broad. Stipes forked. ..... ***A. pedatum***

Argyrochosma (J. Smith) M.D. Windham Powdery Cloak Fern

One species. ..... ***A. dealbata***
(= *Notholaena dealbata*)

Astrolepis D.M. Benham & M.D. Windham Star-Scaled Cloak Fern

One species. ..... ***A. integerrima***
(= *Notholaena sinuata*)

Myriopteris Fée emend. Grusz & Windham Lip Ferns

1. Rachises and abaxial surfaces of costae without scales; segmented hairs conspicuous or inconspicuous, septa dark brown.
  2. Blades 3-or 4-pinnately compound at the base; abaxial surfaces hidden by indumentum; pinnulets and ultimate segments beadlike. ..... ***M. gracilis***
  (=*Cheilanthes feei*)
  2. Blades 2-pinnately compound at the base; abaxial surfaces not hidden by indumentum; pinnules not beadlike.
    3. Stipes and rachises black; segmented hairs inconspicuous. Auricles mostly present on distal portions of lower pinnules. Adaxial surfaces of costae green. ..... ***M. alabamensis***
    (=*Cheilanthes alabamensis*)
    3. Stipes and rachises dark brown: segmented hairs conspicuous. Auricles not present on lower pinnules. Adaxial surfaces of costae brown. ..... ***M. lanosa***
    (*Cheilanthes lanosa*)
1. Rachises and abaxial surfaces of costae with scales; segmented hairs not present.
  4. Blades scabrous, with white pustulose hairs; 1-or 2- pinnately compound at the base. ..... ***M. scabra***
  (=*Cheilanthes horridula*)

4. Blades not scabrous, without white pustulose hairs; 3-or 4- pinnately compound at the base.
  5. Stipes separate. Rhizomes short to long creeping. Scales on abaxial surfaces partially hiding or hiding the pinnulets and ultimate segments; margins ciliate..
    6. Adaxial surfaces of blades glabrous, but appearing to be densely villous (the origin of these hairs are from the abaxial surface, spreading to the adaxial surface). Revolute margins inconspicuous, partially hidden by abaxial scales. ..... ***M. lindheimeri*** (=*Cheilanthes lindheimeri*)
    6. Adaxial surfaces of blades glabrous. Revolute margins conspicuous, not hidden by abaxial scales. ..... ***M. wootonii*** (=*Cheilanthes wootonii*)
  5. Stipes in tufts. Rhizomes compact, not short to long creeping. Scales on abaxial surfaces not partially hiding or hiding the pinnulets; margins erose-dentate or entire.
    7. Costal and rachis scales conspicuous; margins erose-dentate; hairs and scales easily distinguishable. ..... ***M. rufa*** (=*Cheilanthes eatonii*)
    7. Costal and rachis scales inconspicuous; margins entire; hairs and scales not easily distinguishable. ..... ***M. tomentosa*** (= *Cheilanthes tomentosa*)

Notholaena R. Brown Cloak Fern

One species. ..... ***N. standleyi***

Pellaea J.J.F. Link Cliff Brake Fern

1. Fronds of 2 types, sterile and fertile. ..... ***P. atropurpurea***
1. Fronds all alike, not differentiated into sterile and fertile.
  2. Apices of pinnules conspicuously mucronate. Scales of rhizomes black with brown margins. ..... ***P. wrightiana***
  2. Apices of pinnules obtuse to mucronulate. Scales of rhizomes reddish brown.
    3. Adaxial surfaces of rachises densely pubescent. Abaxial surfaces of pinnules sparsely pubescent. ..... ***P. atropurpurea***
    3. Adaxial surfaces of rachises glabrous or glabrate. Abaxial surface of pinnules glabrous. ..... ***P. glabella***

RANUNCULACEAE A.L. de Jussieu Buttercup Family

Plants herbs, or woody or herbaceous vines; annuals or perennials; perennating organs caudices or rhizomes or tuberous roots; terrestrial or emergent aquatics; caulescent or acaulescent; bearing perfect flowers or dioecious or polygamo-dioecious. **Leaves** simple or 1- to 3-pinnately compound; alternate, or rarely opposite or whorled; venation pinnate or palmate; petioles often swollen and stipular-like; stipules absent. **Inflorescences** solitary flowers or simple cymes or compound cymes or racemes or panicles or umbels; terminal or axillary; bracts present or absent. **Flowers** perfect or rarely imperfect, similar; perianths in 1-series or 2-series; of various colors. **Perianths in 1-Series:** Sepals radially symmetrical; 4 to 30; spiraled or whorled; free; sepaloid or petaloid or coriaceous. **Perianths in 2-Series:** Sepals 5 or 3 or 4; free; not spurred or spurred; sepaloid or petaloid. Corollas radially or bilaterally symmetrical. Petals 2 to 5 or 10; free or rarely fused; not spurred or spurred. **Stamens** 5 to numerous**;** staminodia present or absent. **Pistils** numerous or 3 to 7 or 1; spiraled or whorled; free; simple, carpels 1; stigmas 1; styles 1; ovaries superior; locules 1; placentation parietal. **Nectaries** absent or present; petaliferous or sepaliferous. **Fruits** achenes or follicles or berries. **Seeds** 1 to numerous.

The family is represented in Oklahoma by 10 genera and 38 species. Widespread in northern temperate regions, it is most abundant in forested areas. It is thought to be among the most primitive families of flowering plants. An important use has been as ornamentals; however, some members have been used medicinally, and some are toxic to grazing animals.

1. Sepals or petals spurred.
  2. Perianths bilaterally symmetrical. Spurs 1.
    3. Plants perennials. Upper leaves petiolate. Pistils or follicles 3 or 4. Petals 4; free. ..... ***Delphinium***
    3. Plants annuals. Upper leaves sessile. Pistils or follicles 1. Petals 2; fused. ..... ***Consolida***
  2. Perianths radially symmetrical. Spurs 5.

4. Sepals spurred. Petals absent, or if present, not spurred; greenish white or absent. Cauline leaves absent. Leaves simple. ..... ***Myosurus***
4. Sepals not spurred. Petals present, spurred; reddish white. Cauline leaves present. Leaves 2- or 3-pinnately compound. ..... ***Aquilegia***

1. Sepals or petals not spurred.
5. Perianth parts in 2-series.
6. Pistils 1. Fruits berries; white. ..... ***Actaea***
6. Pistils numerous. Fruits achenes; green or brown.
7. Achenes sericeous; concealed by long cottony hairs. Sepals petaloid [inner and outer sepals different, hence perianth parts falsely appearing to be in 2-series]. Petals absent. ..... ***Anemone***
7. Achenes glabrous or papillose; visible. Sepals not petaloid. Petals present. ..... ***Ranunculus***
5. Perianth parts in 1-series or parts all similar.
8. Pistils 1. Fruits berries; white [Sepals and petals cauduous, hence perianths falsely appearing in 1-series]. ..... ***Actaea***
8. Pistils numerous. Fruits achenes; green or brown.
9. Sepals 4. ..... ***Clematis***
9. Sepals 5-numerous.
10. Leaves alternate. Sepals 3–5 mm long; cauducous.
11. Flowers imperfect. Fruits achenes; numerous. ..... ***Thalictrum***
11. Flowers perfect. Fruits follicles; 4. ..... ***Enemion***
10. Leaves opposite or whorled or all basal. Sepals 10–22 mm long; persistent.
12. Pistils 50 or more. Involucral bracts simple. ..... ***Anemone***
12. Pistils 8–12. Involucral bracts compound. ..... ***Thalictrum***

Actaea C. Linnaeus Baneberry

One species. ..... ***A. pachypoda***

Anemone C. Linnaeus Windflower

1. Bracts petiolate. Sepals 5. Leaves 5–14 cm long. Plants from woody caudices. ..... ***A. virginiana***
1. Bracts sessile or subsessile. Sepals 10–33. Leaves 1–6 cm long. Plants from rhizomes or tuberous roots.
2. Styles straight. Plants from rhizomes. Infructescences ellipsoidal. ..... ***A. caroliniana***
2. Styles recurved. Plants from tuberous roots. Infructescences cylindrical. ..... ***A. berlandieri***

Aquilegia C. Linnaeus Columbine

One species. ..... ***A. canadensis***

Clematis C. Linnaeus Virgin's Bower, Leather Flower

1. Sepals thin; not coriaceous; not connivent. Calyces broadly campanulate to rotate; white or nearly white. Inflorescences cymes.
2. Leaflets entire or undulate-crenate. Plants bearing perfect flowers. ..... ***C. terniflora*** (= *C. dioscoreifolia*)
2. Leaflets toothed or lobed. Plants polygamous-dioecious.
3. Plants of extreme southwestern part of state. Leaflets 1–4.5 cm long; 3-parted. Plants grayish-pubescent. ..... ***C. drummondii***
3. Plants of northeastern 1/4 of state. Leaflets 4–8 cm long; 3-lobed. Plants glabrous or pubescent, but not grayish-pubescent.
4. Leaflets 3. Pistils 40–60. ..... ***C. virginiana***
4. Leaflets 5 or 9. Pistils 18–35. ..... ***C. catesbyana***

1. Sepals thick; coriaceous; connivent at least at bases. Calyces campanulate to urceolate; blue or violet or reddish purple or green. Inflorescences solitary flowers.
5. Plants not vines. Stems erect or sprawling; 0.1–0.7 m tall or long. Plants of Cimarron County. ..... ***C. hirsutissima***
5. Plants vines. Stems climbing via twining or tendrils; 1–5 m long. Plants of eastern 2/3 of state.
6. Styles and achene beaks glabrous to canescent or puberulent.
7. Inflorescences axillary. Sepal margins not winged. ..... ***C. pitcheri***

7. Inflorescences terminal. Sepal margins winged distally; wings crisped, 2–6 mm wide. ..... ***C. crispa***
6. Styles and achene beaks plumose.
8. Leaflets not coriaceous; adaxial surfaces not conspicuously reticulate. ..... ***C. glaucophylla***
8. Leaflets coriaceous; adaxial surfaces conspicuously reticulate.
9. Abaxial surfaces of leaves glaucous. ..... ***C. versicolor***
9. Abaxial surfaces of leaves not glaucous. ..... ***C. reticulata***

Consolida (A.P. de Candolle) A. Gray

One species. ..... ***C. ajacis***
(= *Delphinium ajacis*)

Delphinium C. Linnaeus Larkspur

1. Lower stems tomentose to lanate or sericeous. Mature follicles erect. Seeds with scales. ..... ***D. carolinianum***
(= *D. virescens*)
1. Lower stems glabrous or sparsely pilose. Mature follicles conspicuously spreading.
Seeds without scales. ..... ***D. tricorne***

Enemion C.S. Rafinesque False Rue Anemone

One species. ..... ***E. biternatum***
(= *Isopyrum biternatum*)

Myosurus C. Linnaeus Mousetail

One species. ..... ***M. minimus***

Ranunculus C. Linnaeus Buttercup, Crowfoot

1. Leaves all simple; margins entire or denticulate or crenate.
2. Cauline leaves absent. Leaf apices broadly rounded to truncate; margins crenate.
Achenes longitudinally nerved; walls thin, papery. ..... ***R. cymbalaria***
2. Cauline leaves present. Leaf apices acuminate to rounded-obtuse; margins entire
or denticulate. Achenes not longitudinally nerved; walls thick, not papery.
3. Petals 1–3 or rarely 5; 1.5–3 mm long; shorter than or equal to sepals.
Stamens 3–10. ..... ***R. pusillus***
3. Petals 4–6; 2–6 mm long; longer than or equal to sepals. Stamens 10–30. ..... ***R. laxicaulis***
1. Leaves all compound or both compound and simple; margins of at least
some leaves lobed or parted or dissected.
4. Plants submerged or floating in water.
5. Petals white. Achenes conspicuously transversely wrinkled. ..... ***R. aquatilis* var. *diffusus***
(= *R. longirostris*)
5. Petals yellow. Achenes smooth or inconspicuously wrinkled.
6. Petals 2–5 mm long. Stems erect or ascending. Styles absent. ..... ***R. sceleratus***
6. Petals 6–10 mm long. Stems prostrate or floating. Styles present. ..... ***R. flabellaris***
4. Plants terrestrial or emergent aquatics.
7. Leaves all basal. Sepals persistent in fruit. Achenes tomentose;
beaks 3–5 mm long. ..... ***R. testiculatus***
7. Leaves both cauline and basal. Sepals deciduous after flowering.
Achenes glabrous; beaks 0.2–2.5 mm long.
8. Stems glabrous.
9. Petals 5–8 mm long; about two times longer than sepals. ..... ***R. harveyi***
9. Petals 2–5 mm long; shorter than or equal to sepals.
10. Majority of basal leaves parted. Achenes 40–300. Sepal margins herbaceous. ..... ***R. sceleratus***
10. Majority of basal leaves not parted. Achenes 10–40. Sepal margins membranous. ..... ***R. abortivus***
8. Stems villous or hirsute or hispid, sometimes sparsely so.
11. Petals 1–5 mm long; equal to or shorter than sepals.
12. Achene surfaces muricate or prickly papillose with apices hooked. ..... ***R. parviflorus***
12. Achene surfaces smooth or minutely pitted.

13. Blades of basal leaves 3–9 cm long. Achene beaks lanceolate; recurved; 1–1.4 mm long. ..... ***R. recurvatus***
13. Blades of basal leaves 1–3 cm long. Achene beaks subulate; curved; 0.1–0.3 mm long. ..... ***R. micranthus***

11. Petals 5–15 mm long; longer than sepals.
14. Sepals pilose. Beaks of mature achenes triangular; curved; 0.2–0.8 mm long. ..... ***R. sardous***
14. Sepals hispid or glabrous. Beaks of mature achenes filiform or lance-subulate; straight to slightly bent; 0.8–2.8 mm long.
15. Tuberous roots present. Achene beaks filiform. ..... ***R. fascicularis***
15. Tuberous roots absent. Achene beaks lance-subulate. ..... ***R. hispidus*** (= *R. carolinianus*)

Thalictrum C. Linnaeus Meadow Rue

1. Leaves all basal. Inflorescences umbels or solitary flowers. Sepals 5–18 mm long; persistent. ..... ***T. thalictroides*** (= *Anemonella thalictroides*)

1. Leaves cauline or both basal and cauline. Inflorescences panicles or racemes or corymbs. Sepals 1–5 mm long; caducous.
2. Plants decumbent; 15–40 cm tall. Ultimate leaflets 0.5–1.5 cm long. Sepals 1–3 mm long. Filaments pink. ..... ***T. arkansanum***
2. Plants erect; 50–200 cm tall. Ultimate leaflets 2–3.5 cm long. Sepals 3–5 mm long. Filaments white.
3. Abaxial surfaces or only veins of leaflets gland-dotted, or with short glandular hairs. Achenes gland-dotted, or with short glandular hairs. ..... ***T. revolutum***
3. Abaxial surfaces and veins of leaflets not gland-dotted, glabrous or pubescent, but hairs not glandular. Achenes not gland-dotted, glabrous or pubescent, but hairs not glandular.
4. Abaxial surfaces of leaflets sparsely pubescent. ..... ***T. dasycarpum***
4. Abaxial surfaces of leaflets glabrous.
5. Blade margins revolute. Veins of abaxial surfaces prominent, forming conspicuous network. ..... ***T. revolutum***
5. Blade margins flat. Veins of abaxial surfaces not prominent, forming inconspicuous network. ..... ***T. dasycarpum***

RHAMNACEAE A.L. de Jussieu Buckthorn Family

Plants small trees or shrubs or woody vines; deciduous; armed or not armed with thorns; bearing perfect flowers or polygamo-dioecious. **Leaves** simple; alternate; venation pinnate or pinnipalmate; stipules present, caducous, minute. **Inflorescences** simple cymes or panicles or corymbs or umbels or solitary flowers; terminal or axillary. **Flowers** perfect or imperfect, similar; perianths in 2-series. **Sepals** 5 or 4; free. **Corollas** radially symmetrical. **Petals** 5 or 4; free; clawed or not clawed; spathulate or cucullate; yellowish or greenish white to greenish pink. **Stamens** 5 or 4; opposite the petals; anthers often partially enclosed by petal hoods. **Pistils** 1; compound, carpels 2 to 4; stigmas 1, 2- to 4-lobed; styles 1; ovaries superior or inferior; locules 2 to 4; placentation axile; ovules 1 per locule. **Hypanthia** absent or present; tubular or cup-shaped or annular. **Nectaries** present; receptacular. **Fruits** septicidal capsules or drupes; stones 1, or 2 or 3 hence fruits falsely resembling berries. **Seeds** 1 per stone.

The family is represented in Oklahoma by 5 genera and 6 species. Cosmopolitan in distribution, it is of little economic importance although it members were used as purgatives, dyes, and basketry materials. The flowers are good sources of nectar, and the fruits are an important winter food for thrushes and small mammals.

1. Plants climbing vines. Fruits 2 or more times longer than wide. ..... ***Berchemia***
1. Plants shrubs or trees. Fruits as long as broad or less.
2. Inflorescences both terminal and axillary. Petals white. Venation pinnipalmate. Fruits dry. ..... ***Ceanothus***
2. Inflorescences only axillary. Petals yellowish white to greenish white to greenish pink. Venation pinnate. Fruits fleshy.
3. Branches armed with thorns. Stones 1 per drupe. ..... ***Ziziphus***
3. Branches unarmed. Stones 2 or 3 per drupe.
4. Axillary bud scales absent. Plants bearing perfect flowers. Calyces 5-lobed. Petals 5. Seeds 3; not furrowed. ..... ***Frangula***

4. Axillary bud scales present. Plants polygamo-dioecious.
Calyces 4-lobed. Petals 4. Seeds 2; furrowed. ..... ***Rhamnus***

Berchemia N.M.J. de Necker ex A.P. de Candolle Supple-Jack

One species. ..... ***B. scandens***

Ceanothus C. Linnaeus New Jersey Tea

1. Largest leaves ovate; 2.5–4 cm wide. Inflorescences borne on long, naked axillary peduncles. ..... ***C. americanus***
1. Largest leaves elliptic to elliptic-lanceolate; 1–2 cm wide. Inflorescences borne at ends of leafy branches. ..... ***C. herbaceus***

Frangula P. Miller Buckthorn

One species. ..... ***F. caroliniana***
(= *Rhamnus caroliniana*)

Rhamnus C. Linnaeus Buckthorn

One species. ..... ***R. lanceolata***

Ziziphus P. Miller Lotebush

One species. ..... ***Z. obtusifolia***
(= *Condalia obtusifolia*)

ROSACEAE A.L. de Jussieu Rose Family

Plants small trees or shrubs or herbs; deciduous; annuals or perennials; armed or not armed with thorns or prickles. **Stems** erect or arching. **Leaves** basal to cauline; simple or 1- to 3-pinnately compound or palmately compound; alternate; venation pinnate or palmate; leaflets 3 to 15; terminal leaflet of compound leaves present; stipules present. **Inflorescences** solitary flowers or simple cymes or racemes or spikes or panicles or corymbs or clusters; terminal or axillary. **Flowers** produced before or simultaneously with or after leaves; fragrant or not fragrant; perfect or rarely imperfect; perianths in 2-series or 1-series. **Sepals** 5 or 4; free or fused; herbaceous or rarely petaloid. **Corollas** radially symmetrical. **Petals** 5 or 0; free; white or pink or yellow. **Stamens** 1 to numerous; in 1 or more whorls; arising from receptacles or hypanthia. **Pistils** numerous or 1; simple or compound, carpels 1 to 5; stigmas 1 to 5; styles 1 to 5; free; ovaries superior or inferior; locules 1 to 5; placentation axile or basal. **Hypanthia** present or absent; cup-shaped or saucer-shaped or tubular. **Nectaries** absent or present; hypanthial. **Fruits** achenes or drupes or follicles or pomes or hips or aggregates of drupelets or aggregates of achenes. **Seeds** 1 to numerous.

The family is represented in Oklahoma by 21 genera and 61 species. Nearly cosmpolitan, it is most abundant in the northern temperate regions. One of the larger families, its members have conspicuously similar flowers. Floral structure varies primarily in the position and number of ovaries and types of fruits. The family is economically important for ornamentals and food plants, including strawberries, plums, peaches, apples, and pears.

1. Plants woody.
    2. Ovaries 2-many.
        3. Leaves compound. Plants with prickles.
            4. Hypanthia present. Fruits achenes; enclosed in red to orange urn-shaped hips. ..... ***Rosa***
            4. Hypanthia absent. Fruits drupelets; exposed; black. ..... ***Rubus***
        3. Leaves simple. Plants without prickles.
            5. Ovaries 2–5. Sepal and fruit pubescence stellate. ..... ***Physocarpus***
            5. Ovaries 12 or more. Sepal and fruit pubescence of various types, but not stellate.
                6. Fruits achenes. Styles in fruit 20–30 mm long; plumose. Abaxial surfaces of leaves white-tomentose. ..... ***Fallugia***
                6. Fruits drupelets. Styles in fruit less than 1 mm long; not plumose. Abaxial surfaces of leaves not white-tomentose. ..... ***Rubus***
    2. Ovaries 1.
        7. Ovaries superior. Styles 1. Fruits drupes or achenes.

8. Petals present. Fruits drupes. Styles in fruit not plumose. ..... ***Prunus***
8. Petals absent. Fruits achenes. Styles in fruit plumose. ..... ***Cercocarpus***
7. Ovaries inferior. Styles 2 – 5. Fruits pomes.
9. Petals 2.5 – 5 times longer than wide. Pomes reddish purple, appearing 10-locular from partitions dividing carpels. ..... ***Amelanchier***
9. Petals 1–2 times longer than wide. Pomes green to yellow or red or blue-black; 2 – 5 locular.
10. Pedicels and adaxial midribs of leaves glandular. Hypanthia 1 – 2 mm in diameter. ..... ***Aronia***
10. Pedicels and adaxial midribs of leaves not glandular. Hypanthia 2 – 5 mm in diameter.
11. Styles fused or connate at base. Flower 3 – 5 cm in diameter. Pomes 2 – 5 cm long. ..... ***Malus***
11. Styles free at base. Flower 1 – 3.5 cm in diameter. Pomes 0.5 – 16 cm long.
12. Bracteoles present, maybe caducous. Pomes red at maturity, endocarp stony. ..... ***Crataegus***
12. Bracteoles absent. Pomes yellow-green at maturity, endocarp cartilagenous. ..... ***Pyrus***

1. Plants herbaceous.
18. Stems with prickles. ..... ***Rubus***
18. Stems without prickles.
19. Leaves palmately compound or simple and palmately lobed.
20. Petals absent. Sepals 4. Leaves 0.2–1 cm long. Stamens 1–4. ..... ***Alchemilla***
20. Petals present. Sepals 5. Leaves 1.5–20 cm long. Stamens 5–30.
21. Styles articulated near tips; persistent. ..... ***Geum***
21. Styles not articulated near tips; deciduous. ..... ***Potentilla***
19. Leaves pinnately compound.
22. Leaves 2- or 3-compound; 15–50 cm long. Flowers imperfect. Plants dioecious. Petals 1 mm or less long. ..... ***Aruncus***
22. Leaves 1-compound; 1–10 cm long. Flowers perfect. Petals 1.5–15 mm long or absent.
23. Petals absent. Sepals 4. Hypanthia cup-shaped; enclosing ovaries. ..... ***Poteridium***
23. Petals present. Sepals 5. Hypanthia saucer-shaped or absent; ovaries exposed.
24. Hypanthia with hooked prickles. Pistils 2. ..... ***Agrimonia***
24. Hypanthia absent, or if present, without hooked prickles. Pistils 5–numerous.
25. Styles jointed near tips. ..... ***Geum***
25. Styles not jointed near tips.
26. Petals white or pink.
27. Petals linear to narrowly oblanceolate. Ovaries 5. Fruits follicles. ..... ***Gillenia***
27. Petals obovate to suborbicular. Ovaries numerous. Fruits achenes.
28. Leaflets 3. Plants stoloniferous. Receptacles swollen in fruit; red; edible. ..... ***Fragaria***
28. Leaflets 5 or 7–11. Plants rhizomatous or arising from branched caudices. Receptacles not swollen in fruit; green or brown; not edible. ..... ***Drymocaulis***
26. Petals yellow.
29. Flowers 4–7 mm in diameter. ..... ***Potentilla***
29. Flowers 14–18 mm in diameter.
30. Leaflets 3. Bracteoles foliaceous; longer than sepals; 3-lobed. Receptacles swollen in fruit; red. ..... ***Duchesnea***
30. Leaflets 5 or 7–11. Bracteoles not foliaceous; shorter than sepals; lanceolate, not lobed. Receptacles not swollen in fruit; green or brown. ..... ***Drymocaulis***

Agrimonia C. Linnaeus Harvest-Lice

1. Lower stems densely hirsute to villous. Leaflets 11–25. ..... ***A. parviflora***
1. Lower stems glabrate or sparsely villous. Leaflets 3–9.
2. Abaxial surfaces of leaves and inflorescence axes not gland-dotted. Hypanthia turbinate; furrowed. ..... ***A. pubescens***
2. Abaxial surfaces of leaves and inflorescence axes gland-dotted. Hypanthia hemispherical; not furrowed. ..... ***A. rostellata***

Alchemilla C. Linnaeus — Ladysmantle

One species. ..... ***A. microcarpa***

Amelanchier F.K. Medicus — Serviceberry

One species. ..... ***A. arborea***

Aronia F.K. Medicus — Red Chokeberry

One species. ..... ***A. arbutifolia***

Aruncus C. Linnaeus — Goat's Beard

One species. ..... ***A. dioicus***

Cercocarpus K.S. Kunth — Mountain Mahogany

One species. ..... ***C. montanus***

Crataegus C. Linnaeus — Hawthorn, Haw

1. Inflorescences solitary or paired flowers. Stamens 20–25. Dorsal faces of stones grooved. ..... ***C. uniflora***
1. Inflorescences corymbs; flowers 5–25. Stamens 5–20. Dorsal faces of stones smooth or pitted or ridged, but not grooved.
  2. Leaf margins entire or crenate.
    3. Pomes maturing in October and November; red; 4–6 mm in diameter; shiny; not glaucous. Flowers 6–8 mm in diameter. ..... ***C. spathulata***
    3. Pomes maturing in August and September; blue or blue-black; 10–13 mm in diameter; dull; glaucous. Flowers 8–15 mm in diameter. ..... ***C. brachyacantha***
  2. Leaf margins serrate or doubly serrate.
    4. Leaf margins both deeply dissected or incised and serrate, one or more sinuses extending at least halfway to midribs. Secondary leaf veins extending to both sinuses and apices of divisions. ..... ***C. marshallii***
    4. Leaf margins only serrate, not dissected or incised, sinuses if present shallow and not extending halfway to midribs. Secondary leaf veins extending only to apices of largest teeth.
      5. Majority of leaves ovate to deltoid; majority of bases truncate. ..... ***C. mollis***
      5. Majority of leaves obovate or oblanceolate or spathulate or elliptic or rhomboidal; majority of bases attenuate or acute or cuneate.
        6. New twigs tomentose or villous. Stones pitted on inner surface. ..... ***C. calpodendron***
        6. New twigs glabrous or puberulent. Stones smooth on inner surface.
          7. Bracteoles linear-filiform. Pomes 5–8 mm in diameter. ..... ***C. viridis***
          7. Bracteoles narrowly elliptic to linear. Pomes 8–15 mm in diameter.
            8. Petioles 10 mm long. Leaf blades chartaceous; adaxial surfaces dull. ..... ***C. collina***
            8. Petioles 0–5 mm long. Leaf blades coriaceous; adaxial surfaces glossy.
              9. Leaf blades orbicular to broadly oblong-elliptic. Styles 3–5 or rarely 1. Stones 3–5 or rarely 1. ..... ***C. reverchonii***
              9. Leaf blades broadly spathulate to oblanceolate. Styles 1 or 2 or rarely 3. Stones 1 or 2 or rarely 3. ..... ***C. crus-galli***

Drymocallis J.P. Fourreau ex P.A. Rydberg — Tall Cinquefoil

One species. ..... ***D. arguta***
(= Potentilla arguta)

Duchesnea J.E. Smith — Mock Strawberry

One species. ..... ***D. indica***

Fallugia S.F.L. Endlicher — Apache Plume

One species. ..... ***F. paradoxa***

Fragaria C. Linnaeus Wild Strawberry

One species. ..... ***F. virginiana***

Geum C. Linnaeus

1. Appendages present between sepal lobes. Petals white; 3–9 mm long. Aggregates of mature achenes sessile or borne on stipes shorter than calyces. ..... ***G. canadense***
1. Appendages absent between sepal lobes. Petals yellow to cream; 1–2 mm long. Aggregates of mature achenes borne on stipes longer than calyces. ..... ***G. vernum***

Gillenia C. Moench Indian Physic

One species. ..... ***G. stipulata***

Malus P. Miller Apple

One species. ..... ***M. ioensis***

Physocarpus (J. Cambessedes) C.J. Maximowicz Ninebark

1. Largest leaves 1–4 cm long. Follicles 1–5; densely pubescent; fused to middles. Plants of Black Mesa area. ..... ***P. monogynus***
1. Largest leaves 4–12 cm long. Follicles 5; glabrous or glabrate; fused at bases or free. Plants of Ozark Plateau area. ..... ***P. opulifolius***

Potentilla C. Linnaeus Cinquefoil

1. Abaxial surfaces of leaves densely silvery-tomentose. Leaflet margins revolute. ..... ***P. argentea***
1. Abaxial surfaces of leaves glabrous or of various pubescent types, but not densely silvery-tomentose. Leaflet margins not revolute.
  2. Inflorescences solitary flowers. Pedicels 7–13 times longer than sepals. ..... ***P. simplex***
  2. Inflorescences cymes. Pedicels shorter than or up to 4 times longer than sepals.
    3. Cauline leaves 1-pinnately compound.
      4. Leaflets of lower cauline leaves 3. Petals 1.5–2 mm long. ..... ***P. rivalis***
      4. Leaflets of lower cauline leaves 5 or 7 or 9 or 11. Petals 3–4 mm long. ..... ***P. supina*** (= *P. paradoxa*)
    3. Cauline leaves palmately compound.
      5. Leaflets 5 or 7. Petals 6–10 mm long. ..... ***P. recta***
      5. Leaflets 3. Petals 1.5–1.8 mm long.
        6. Achenes longitudinally ribbed. ..... ***P. norvegica***
        6. Achenes smooth. ..... ***P. rivalis***

Poteridium E. Spach Burnet

One species. ..... ***P. annuum*** (= *Sanguisorba annua*)

Prunus C. Linnaeus Plum, Cherry[1]

1. Inflorescences solitary flowers. Flowers 25–35 mm in diameter. Petals pink to red. Drupes velutinous or puberulent. ..... ***P. persica***
1. Inflorescences racemes or umbels or clusters. Flowers 8–20 mm in diameter. Petals white. Drupes glabrous or glaucous.
  2. Inflorescences racemes.
    3. Calyces persistent in fruit. Racemes 8–15 cm long. Teeth of leaf margins appressed. ..... ***P. serotina***
    3. Calyces deciduous in fruit. Racemes 4–8 cm long. Teeth of leaf margins divergent-ascending. ..... ***P. virginiana***
  2. Inflorescences umbels or clusters.
    4. Plants producing flowers simultaneously with or after leaves.
      5. Teeth of leaf margins not glandular.
        6. Leaves 2–5 cm long; margins once serrate. Pedicels densely pubescent. ..... ***P. gracilis***
        6. Leaves 5–12 cm long; margins doubly serrate. Pedicels glabrous to glabrate.

7. Plants small trees; solitary. Branchlets finely pubescent.
Stipules lanceolate; 3–6 mm long. ..... ***P. mexicana***
7. Plants shrubs; forming thickets. Branchlets glabrous.
Stipules linear-aristate; 5–12 mm long. ..... ***P. americana***
5. Teeth of leaf margins glandular.
8. Leaves 2–5 cm long. Sepal margins not glandular. ..... ***P. angustifolia***
8. Leaves 5–12 cm long. Sepal margins glandular.
9. Leaves lanceolate to elliptic; blades conduplicate. Sepal margins entire. ..... ***P. rivularis***
(= *P. reverchonii*)
9. Leaves oval; blades flat or rolled, but not conduplicate. Sepal margins serrate or ciliate.
10. Plants trees; solitary. Petals clawed. Teeth of leaf margins divergent-ascending; glands terminal. ..... ***P. hortulana***
10. Plants shrubs; forming thickets. Petals not clawed. Teeth of leaf margins appressed; glands in sinuses. ..... ***P. rivularis***
(= *P. munsoniana*)
4. Plants producing flowers before leaves.
11. Plants trees; solitary.
12. Petals clawed. Outer surfaces of hypanthia glabrous. ..... ***P. hortulana***
12. Petals not clawed. Outer surfaces of hypanthia pubescent. ..... ***P. mexicana***
11. Plants shrubs; forming thickets.
13. Outer surfaces of hypanthia pubescent. ..... ***P. gracilis***
13. Outer surfaces of hypanthia glabrous.
14. Sepal margins glandular. ..... ***P. rivularis***
(= *P. reverchonii, P. munsoniana*)
14. Sepal margins not glandular.
15. Petals 8–12 mm long. Abaxial surfaces of sepals uniformly pubescent; 3–4 mm long. ..... ***P. americana***
15. Petals 4–6 mm long. Abaxial surfaces of sepals glabrous; 1–1.5 mm long. ..... ***P. angustifolia***

[1] Treatment contributed by Kyong-Sook Chung

Pyrus C. Linnaeus Pear

One species. ..... ***P. calleryana***

Rosa C. Linnaeus Rose

1. Styles fused; longer than stamens; exserted beyond hypanthia openings.
2. Leaflets 3 or 5. Stipule margins entire or denticulate. Petals rose to pink, fading white. ..... ***R. setigera***
2. Leaflets 7 or 9 per leaf. Stipule margins fimbriate to pectinate. Petals white. ..... ***R. multiflora***
1. Styles free; shorter than stamens; included within hypanthia.
3. Sepals spreading after anthesis; fugacious; absent in fruit. Achenes inserted at bottom of receptacles.
4. Sepals 12–16 mm long. Petals 15–20 mm long; white to light pink. ..... ***R. foliolosa***
4. Sepals 16–22 mm long. Petals 20–32 mm long; rosy pink. ..... ***R. carolina***
3. Sepals ascending after anthesis; persistent; present in fruit. Achenes inserted on hypanthial walls and at bottom of receptacles.
5. Outer surfaces of hypanthia glabrous. Plants of northeast 1/4 of state. ..... ***R. arkansana***
(= *R. suffulta*)
5. Outer surfaces of hypanthia with stipitate glands. Plants of Panhandle. ..... ***R. woodsii***

Rubus C. Linnaeus Blackberry, Dewberry, Raspberry

1. Leaves simple. Older stems smooth; glabrous; bark exfoliating. ..... ***R. deliciosus***
1. Leaves compound. Older stems with prickles or stiff bristles; bark persistent.
2. Abaxial surfaces of leaflets white or whitish.
3. Inflorescences axillary. Mature druplets red or reddish. ..... ***R. idaeus***
3. Inflorescences terminal. Mature druplets black to blackish purple.

4. Inflorescences corymbs. Mature druplets disarticulating from receptacles.
Pedicels with slender prickles; bases 0.2–0.5 mm wide. Stems erect or ascending. ..... ***R. occidentalis***
4. Inflorescences panicles. Mature druplets and receptacles disarticulating as a
unit. Pedicels with stout prickles; bases 0.5–1.2 mm wide. Stems low arching. ..... ***R. bifrons***
2. Abaxial surfaces of leaflets green or grayish green.
5. Non-flowering stems (primocanes) prostrate or low-arching; rooting at apices.
6. Stems hispid and glandular-hispid distally. ..... ***R. trivialis***
6. Stems tomentose to lanate or glabrous distally. ..... ***R. flagellaris***
(= *R. aboriginum*)
5. Non-flowering stems (primocanes) erect or ascending, arching or not arching;
not rooting at apices.
7. Pedicels stipitate-glandular. ..... ***R. allegheniensis***
7. Pedicels not glandular.
8. Primocane leaflets 2–3 times longer than wide. ..... ***R. argutus***
8. Primocane leaflets as long as wide or shorter than wide. ..... ***R. pensilvanicus***
(= *R. frondosus*, *R. oklahomus, R. ozarkensis*)

RUBIACEAE A.L. de Jussieu Madder Family

Plants herbs or deciduous shrubs; annuals or perennials; perennating organs rhizomes or caudices or crowns. **Stems** prostrate to erect or trailing. **Leaves** simple; opposite or whorled; sessile or petiolate; blades lanceolate or ovate or linear; venation pinnate or a single vein; surfaces glabrous or scabrous; stipules present, leaf-like or triangular, or sheathing and bristly, free or fused to petioles. **Inflorescences** solitary flowers or simple cymes or compound cymes or heads or glomerules or paired flowers; axillary or terminal. **Flowers** perfect; perianths in 2-series or 1-series. **Sepals** 4 or 6 or 0; free. **Corollas** salverform or funnelform or tubular or rotate; radially or rarely bilaterally symmetrical. **Petals** 4 or rarely 3; fused; white or green or blue or pink or lavender or maroon or pale yellow. **Stamens** 4 or rarely 3; epipetalous. **Pistils** 1; compound, carpels 2; stigmas 1 to 4; linear or capitate; styles 1; ovaries inferior; locules 2; placentation axile. **Nectaries** present; receptacular. **Fruits** capsules or schizocarps or berries. **Seeds** 2 to numerous.

The family is represented in Oklahoma by 11 genera and 28 species. One of the larger families, it is primarily tropical and subtropical in distribution. Most species are woody, while ours are herbaceous with one exception. The family has many taxa of economic significance including coffee, quinine, ipecac, and ornamentals.

1. Plants shrubs. Inflorescences globose heads. ..... ***Cephalanthus***
1. Plants herbs. Inflorescences of various types, but not globose heads.
2. Leaves whorled.
3. Involucres present. Corollas funnelform; lavender to pink. ..... ***Sherardia***
3. Involucres absent. Corollas rotate; green or white or maroon or pale yellow.
4. Corollas yellow. Flowers borne in dense axillary whorls of cymes. ..... ***Cruciata***
4. Corollas green or white or maroon. Flowers borne in terminal cymes. ..... ***Galium***
2. Leaves opposite.
5. Plants evergreen. Flowers paired. Fruits berries; bright red. ..... ***Mitchella***
5. Plants deciduous. Flowers in glomerules or corymbose cymes or solitary.
Fruits capsules or schizocarps; green to pinkish brown.
6. Stipular membranes with 2–6 or 0 bristles. Fruits capsules. Ovules 2 or more per locule.
7. Inflorescences terminal leafy cymes.
8. Cauline leaves ovate; 10–32 mm wide. ..... ***Houstonia***
8. Cauline leaves linear; 1–3 mm wide.
9. Inflorescences compact. Flowers both sessile and pedicillate. Longest
pedicels 3–5 mm long. Corolla tubes 1–3.5 times longer than calyx lobes.
Basal rosettes absent. ..... ***Stenaria***
9. Inflorescences diffuse. Flowers all pedicillate. Longest pedicels 15–20 mm long.
Corolla tubes 4–6 times longer than calyx lobes. Basal rosettes present. ..... ***Houstonia***
7. Inflorescences solitary flowers; terminal or axillary.
10. Corollas 3–8 mm long. Mature fruits 1/2–3/4 inferior. Seeds 5–20; bowl-shaped
or concave-convex. ..... ***Houstonia***
10. Corollas 1–2 mm long. Mature fruits wholly inferior. Seeds 50–250; angular. ..... ***Oldenlandia***

6. Stipular membranes with 8–16 bristles. Fruits schizocarps. Ovules 1 per locule.
11. Leaves glabrous. Inflorescences glomerules. ..... ***Spermacoce***
11. Leaves pubescent. Inflorescences solitary flowers.
12. Corollas funnelform; 4–6 mm long. Sepals 4. Stipular bristles longer than nutlets. Stigmas 1; capitate. Nutlets 2.54 mm long. ..... ***Diodella***
12. Corollas salverform; 7–10 mm long. Sepals 2. Stipular bristles shorter than nutlets. Stigmas 2; linear. Nutlets 5–8 mm long. ..... ***Diodia***

Cephalanthus C. Linnaeus Buttonbush

One species. ..... ***C. occidentalis***

Cruciata P. Miller Crosswort

One species. ..... ***C. pedemontana***
(= *Galium pedemontanum*)

Diodella J.K. Small Poor Joe

One species. ..... ***D. teres***
(= *Diodia teres*)

Diodia C. Linnaeus Buttonweed

One species. ..... ***D. virginiana***

Galium C. Linnaeus Bedstraw[1]

1. Leaves in whorls of 5 to 9 or in whorls of both 5 and 4 or both 6 and 4.
2. Schizocarps tuberculate. Fruiting pedicels recurved. ..... ***G. tricornutum***
2. Schizocarps smooth or uncinate-hispid. Fruiting pedicels straight.
3. Apices of leaves acute or obtuse.
4. Angles of stems glabrous. Corollas of 1 plant 4-lobed; lobes 0.8–1.5 mm long. ..... ***G. obtusum***
4. Angles of stems retrorsely scaberulous; hairs 0.1 mm or less long. Corollas of 1 plant 3-lobed or rarely 4-lobed, lobes 0.3–0.9 mm long. ..... ***G. tinctorium***
3. Apices of leaves cuspidate or apiculate or mucronate.
5. Leaf margins retrorsely scabrous. Leaves linear to linear-oblanceolate. ..... ***G. aparine***
5. Leaf margins glabrous or antrorsely hispid or scabrous. Leaves narrowly lanceolate to ovate.
6. Largest leaves 4–11 mm wide. Schizocarps 1.4–1.8 mm long; with uncinate hairs. ..... ***G. triflorum***
6. Largest leaves 1.5–3.3 mm wide. Schizocarps 0.4–1.0 mm long; glabrous.
7. Longest leaves 13–20 mm long. Mericarps botuliform. ..... ***G. concinnum***
7. Longest leaves 4–10 mm long. Mericarps reniform. ..... ***G. parisiense***
1. Leaves in whorls of 4.
8. Schizocarps glabrous to papillose-pustulate.
9. Corollas reddish or purplish; 3–4 mm wide. Leaves 22–45 mm long, 4–10 mm wide. ..... ***G. arkansanum***
9. Corollas white or greenish white; 0.8–2 mm wide. leaves 6–23 mm long; 1–4 mm wide.
10. Angles of upper stems glabrous. Corolla lobes 0.8–1.5 mm long. ..... ***G. obtusum***
10. Angles of upper stems retrorsely scaberulous or scabrous, or both villous and hispid. Corolla lobes 0.3–0.9 mm long. ..... ***G. tinctorium***
8. Schizocarps with uncinate hairs.
11. Leaves with 3 conspicuous veins. ..... ***G. circaezans***
11. Leaves with 1 conspicuous vein, lateral veins if present inconspicuous.
12. Apices of leaves mucronate. Longest leaves 11–28 mm long. Corollas lobes abruptly acuminate, adaxial surfaces purplish. ..... ***G. pilosum***
12. Apices of leaves acute or obtuse. Longest leaves 2–8 mm long. Corolla lobes acute, adaxial surfaces greenish to whitish.
13. Flowers solitary or paired; sessile or subsessile. Leaves of 1 whorl equal in length; 1–1.8 mm wide. Margins of corolla lobes glabrous. Peduncles reflexed in fruit. ..... ***G. virgatum***

13. Flowers in cymes; pedicellate. Leaves of 2 lengths in 1 whorl;
1.7–4 mm wide. Margins of corolla lobes with long straight hairs.
Peduncles straight in fruit. ..... ***G. texense***

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[1] Adapted from a key by Cheryl A. Lawson

Houstonia C. Linnaeus Bluet

1. Inflorescences terminal leafy cymes.
   2. Cauline leaves ovate; 10–32 mm wide. Basal rosettes absent. ..... ***H. purpurea***
   (= *Hedyotis purpurea*)
2. Cauline leaves linear; 1–3 mm wide. Basal rosettes present. ..... ***H. ouachitana***
   (= *Hedyotis ouachitana*)
1. Inflorescences solitary flowers; terminal or axillary.
   3. Fruiting pedicels recurved. Flowers axillary; heterostylous. Apices of calyx lobes subulate. ..... ***H. humifusa***
   (= *Hedyotis humifusa*)
   3. Fruiting pedicels erect. Flowers terminal; homostylous. Apices of calyx lobes obtuse or acute.
      4. Corollas pink or pinkish or rarely white; throats puberulent; tubes 5–6 mm long.
      Basal leaves 1–2 mm wide; narrowly spathulate. ..... ***H. rosea***
      (= *Hedyotis rosea*)
      4. Corollas purple or blue or white; throats glabrous or sparsely puberulent;
      tubes 0.8–5 mm long. Basal leaves 2–5 mm wide; ovate to broadly spatulate.
         5. Corolla tubes 2.5–5 mm long. Corollas purple or blue or rarely white. ..... ***H. pusilla***
         (= *Hedyotis crassifolia*)
         5. Corolla tubes 0.8–2 mm long. Corollas white. ..... ***H. micrantha***
         (= *Hedyotis australis*)

Mitchella C. Linnaeus Partridgeberry

One species. ..... ***M. repens***

Oldenlandia C. Linnaeus

1. Leaves 1–2.5 mm wide. Ovaries papillate to verrucose. Calyx teeth shorter
than capsules. Plants perennials; glabrous to glabrate. ..... ***O. boscii***
(= *Hedyotis boscii*)
1. Leaves 5–10 mm wide. Ovaries smooth. Calyx teeth longer than capsules.
Plants annuals; pubescent. ..... ***O. uniflora***
(= *Hedyotis uniflora*)

Sherardia C. Linnaeus Field Madder

One species. ..... ***S. arvensis***

Spermacoce C. Linnaeus Butter Plant

One species. ..... ***S. glabra***

Stenaria C.S. Rafinesque ex E.G. von Steudel Diamond Flowers

One species. ..... ***S. nigricans***
(= *Houstonia nigricans, Hedyotis nigricans*)

RUPPIACEAE J. Hutchinson Ditchgrass Family

Plants herbs; perennials; submerged aquatics. **Stems** slender to filiform; branched or unbranched. **Leaves** flaccid; simple; alternate or opposite; sheathing; blades linear to filiform; venation parallel or a single vein; stipules present, membranous, sheathing. **Inflorescences** spikes; axillary; peduncles elongating to lift flowers to surface at anthesis and after pollination contracting into loose, spiral coils. **Flowers** perfect; perianths absent. **Sepals** absent. **Petals** absent. **Stamens** 2; appearing 4 due to broad connective between sacs; filaments short and broad or absent. **Pistils** 3 to 7, usually 4; free; simple, carpels 1; subsessile or stipitate; stigmas 1, peltate; styles 1; ovaries superior; locules 1; placentation apical. **Fruits** nutlets; black; becoming long stipitate at maturity. **Seeds** 1.

The family is represented in Oklahoma by 1 genus and 1 species. Cosmopolitan in distribution, it is monogeneric and has been combined with the Zosteraceae or the Potamogetonaceae by some taxonomists. Its reduced flowers and extremely variable populations result in difficulty determining if there are 1 or 2 or 7 species. *Ruppia maritima* is found in saline pools, rivers, and marshes of central and western Oklahoma. It is one of the most valuable aquatic plants for wildlife, providing food and/or shelter for fish and birds.

Ruppia C. Linnaeus Ditchgrass

One species. ..... ***R. maritima***

RUTACEAE A.L. de Jussieu Citrus Family

Plants shrubs or trees; deciduous or evergreen; strongly aromatic; armed or not armed with spines or thorns or prickles; bearing perfect flowers or polygamous or dioecious or polygamo-dioecious. **Leaves** glandular punctate; 1-pinnately compound; alternate; terminal leaflets present; stipules absent. **Inflorescences** solitary flowers or simple cymes or clusters or panicles; terminal or axillary. **Flowers** perfect or imperfect, similar, perianths in 2-series. **Sepals** 5 or 4; free or fused at bases. **Corollas** radially symmetrical; imbricate. **Petals** 5 or 4; free; white to pale yellow to pale green. **Stamens** 4 or 5 or 8 or numerous; filaments free or fused at bases; androecial rudiments present or absent in pistillate flowers. **Pistils** 1 to 5; compound or simple, carpels 1 to 5; stigmas 1, styles 1; 2-lobed or not lobed; ovaries superior; locules 1 to 5; placentation axile; gynoecial rudiments present or absent in staminate flowers. **Nectaries** present; on staminal disks. **Fruits** follicles or samaras or hesperidia. **Seeds** 1 to numerous.

The family is represented in Oklahoma by 3 genera and 5 species. Nearly cosmopolitan in distribution, it occurs mostly in tropical and subtropical regions with greatest abundance in South Africa and Australia. One introduced species has escaped and become naturalized. Ours are of little economic value, but other members of the family are the important citrus fruits.

1. Leaflets 5–19. Flowers yellow-green. Fruits fleshy follicles. ..... ***Zanthoxylum***
1. Leaflets 3. Flowers white. Fruits hesperidia or samaras.
   2. Thorns present. Petioles winged. Stamens 8–numerous.
      Fruits hesperidia; pubescent; globose. ..... ***Poncirus***
   2. Thorns absent. Petioles not winged. Stamens 4 or 5.
      Fruits samaras; glabrous; orbicular. ..... ***Ptelea***

Poncirus C.S. Rafinesque Trifoliate Orange

One species. ..... ***P. trifoliata***
(= *Citrus trifoliata*)

Ptelea C. Linnaeus Hop Tree

One species. ..... ***P. trifoliata***

Zanthoxylum C. Linnaeus Prickly Ash

1. Flowers appearing before leaves. Inflorescences axillary clusters. Sepals absent. ..... ***Z. americanum***
1. Flowers appearing after leaves. Inflorescences terminal clusters or panicles. Sepals present.
   2. Leaves 10–30 cm long. Leaflets 35–90 mm long; apices acute or acuminate. ..... ***Z. clava-herculis***
   2. Leaves 2.5–9 cm long. Leaflets 8–35 mm long; apices obtuse to rounded. ..... ***Z. hirsutum***

SALICACEAE C.F.B. de Mirbel Willow Family

Plants trees or shrubs; deciduous; dioecious. **Leaves** simple; alternate; venation pinnate; stipules present, persistent or caducous. **Inflorescences** catkins; axillary; bracts present, small or scale-like, often deciduous. **Flowers** produced before or simultaneously with leaves; imperfect, staminate and pistillate similar; perianths absent or in 1-series. **Sepals** absent or modified into cup-like disk or 1 or 2 glands. **Petals** absent. **Androecia** bilaterally symmetrical. **Stamens** 1 or 2 to numerous; free or fused by filaments. **Pistils** 1; compound, carpels 2 or 4; sessile or short stipitate; stigmas 2 or 4, 2-lobed or not lobed; styles short or absent; ovaries superior; locules 1; placentation parietal or rarely basal. **Nectaries** absent or present. **Fruits** capsules. **Seeds** numerous; comose.

The family is represented in Oklahoma by 2 genera and 8 species. Its distribution is almost cosmopolitan with greatest diversity in north temperate and arctic regions. Ours are typically found in wet or moist habitats. The inner bark of both genera contains the precursor of aspirin and acetametaphin which has been used medicinally for headaches, fevers, and as an anti-inflammatory for thousands of years.

1. Terminal buds present. Axillary bud scales 3–7. Leaves deltoid or ovate. Bract margins fimbriate or laciniate. ..... ***Populus***
1. Terminal buds absent. Axillary bud scales 1. Leaves lanceolate or falcate or elliptic or linear or oblanceolate. Bract margins entire. ..... ***Salix***

Populus C. Linnaeus Cottonwood

1. Leaves ovate; abaxial surfaces white tomentose. Petioles terete. Catkin rachises tomentose. Capsules 3–5 mm long. ..... ***P. alba***
1. Leaves deltoid; abaxial surfaces glabrous. Petioles flattened. Catkin rachises glabrous. Capsules 15–20 mm long. ..... ***P. deltoides***

Salix C. Linnaeus. Willow

1. Plants producing catkins before leaves. Stems decumbent. Staminate and pistillate catkins borne on main stems. Leaves obovate or oblanceolate. ..... ***S. humilis***
1. Plants producing catkins simultaneously with leaves or after leaves are formed. Stems erect. Staminate and pistillate catkins borne on leafy lateral twigs. Leaves linear or lanceolate or ovate.
   2. Leaf surfaces different; adaxial surfaces green or yellowish green; abaxial surfaces white or whitish green, glaucous.
      3. Adaxial leaf surfaces dark green. Margins of catkin bracts erose. Plants of eastern 3/4 of state. ..... ***S. caroliniana***
      3. Adaxial leaf surfaces yellow green. Margins of catkin bracts entire. Plants of western Panhandle. ..... ***S. amygdaloides***
   2. Leaf surfaces similar, both green; abaxial surfaces not glaucous.
      4. Plants trees; not rhizomatous. Leaves lanceolate to linear-lanceolate. Margins of mature leaves with 7–13 teeth per cm. Stamens 4–6. ..... ***S. nigra***
      4. Plants shrubs; rhizomatous. Leaves linear. Margins of mature leaves with 2–6 teeth per cm. Stamens 2.
         5. Abaxial surfaces of mature leaf blades densely silky-villous or pilose. Capsules 3–6 mm long; sessile or subsessile. ..... ***S. exigua***
         5. Abaxial surfaces of mature leaf blades glabrous or glabrate; yellow-green. Capsules 5–8 mm long; conspicuously stipitate. ..... ***S. interior***

SALVINIACEAE C.L. von Reichenbach Floating Fern Family

Plants small; annuals; herbs; free-floating aquatics (occasionally stranded on mud flats); producing sporangia in sporocarps borne at tips of submerged root-like leaves. **Roots** absent. **Stems** branched; with many dark multicellular hairs. **Leaves** whorled; 2 leaves green, sessile or short-petiolate, flat, entire, floating and 1 leaf petiolate, dissected, root-like, submerged; blades orbicular to elliptic; venation anastomosing; vein tips free at margins; adaxial surfaces with short multicellular stiff hairs separated into 4 segments at apex; abaxial surfaces glabrous; apices obtuse or emarginate. **Sporocarps** borne at tips of submerged, root-like leaves; solitary. **Sporangia** of 2 types, microsporangia and megasporangia. **Spores** of 2 types; microspores 64; megaspores 1. **Gametophytes** of 2 types, microgametophytes and megagametophytes.

The family is represented in Oklahoma by 1 genus and 1 species.

Salvinia J.F. Sèguier Floating Fern

One species. ..... ***S. minima***

SANTALACEAE R. Brown Sandalwood or Mistletoe Family

Plants suffrutescent terrestrial herbs or arboreal evergreen subshrubs attached to branches of host trees and shrubs; perennials; obligate hemiparasitic; bearing perfect flowers or dioecious. **Root Systems** haustorial; penetrating roots or branches of hosts. **Leaves** coriaceous or slightly succulent; simple; alternate or opposite; blades linear to ovate or obovate; venation a single vein or palmate; margins entire; stipules absent. **Inflorescences** spicate or racemose cymes; terminal or axillary; bracts present or absent. **Flowers** perfect or imperfect; perianths in 1-series, radially symmetrical. **Perianth Parts** 2 to 5; fused; greenish white to pinkish white or yellowish green; petaloid or scale-like. **Stamens** 2 to 5; borne opposite perianth parts or borne on perianth parts; filaments present or absent. **Pistils** 1; compound, carpels 2 to 5; stigmas 1, capitate; styles 1; ovaries inferior; locules 1; placentation free-central to basal; ovules 1 to 4, not differentiated from placentae. **Hypanthia** present; tubular. **Nectaries** present; 1; receptacular; lobes alternate with stamens. **Fruits** dry drupes or berries. **Seeds** 1; seed-coat absent.

The family is represented in Oklahoma by 2 genera and 2 species. As presently circumscribed, it now includes the Viscaceae or mistletoe family. A widespread temperate and tropical family, its members are the source of sandalwood and sandalwood oil. Mistletoe is the official Floral Emblem of the state as designated by the Assembly of the Territory of Oklahoma on 11 February 1893.

1. Plants suffrutescent terrestrial herbs. Flowers perfect. Perianth parts petaloid;
   greenish white to pinkish white. Fruits dry drupes; green to yellowish. ..... ***Comandra***
1. Plants arboreal evergreen subshrubs. Flowers imperfect. Perianth parts scale-like; yellowish green.
   Fruits berries; white. ..... ***Phoradendron***

Comandra T. Nuttall Bastard Toadflax

One species. ..... ***C. umbellata***
(= *C. pallida*)

Phoradendron T. Nuttall Mistletoe

One species. ..... ***P. serotinum***
(= *P. leucarpum, P. tomentosum*)

SAPINDACEAE A.L. de Jussieu Soapberry Family

Plants trees or shrubs or herbaceous vines; deciduous; solitary or colonial; perennials or annuals; with or without tendrils; polygamo-dioecious or andromonoecious or dioecious. **Stems** with terminal buds present or absent in woody species. **Leaves** simple or palmately compound, or 1-pinnately or 2-pinnately compound; alternate or opposite; stipules present or absent. **Inflorescences** compound cymes or corymbs or panicles or racemes; terminal or axillary. **Flowers** appearing before or with or after leaves; perfect or imperfect, similar; perianths in 1-series or 2-series. **Calyces** radially or bilaterally symmetrical. **Sepals** 4 to 6; all alike or of 2 forms; free or fused. **Corollas** radially or bilaterally symmetrical. **Petals** 4 to 6 or 0; free; clawed or not clawed. **Stamens** 3 to 12; in 1-whorl or 2-whorls; free. **Pistils** 1; compound, carpels 2 or 3; stigmas 1 to 3; styles 1 or 2 or 0; ovaries superior; locules 2 or 3; placentation axile; ovules 1 or 2 per locule. **Nectaries** present. **Fruits** 1-seeded berries or capsules or schizocarps of samaras. **Seeds** 1 to 3.

The family is represented in Oklahoma by 4 genera and 8 species. Primarily pantropical in distribution, its members are mostly woody. Phylogenetic studies support inclusion of the long recognized Aceraceae or maple family and Hippocastanaceae or horse chestnut family within the Sapindaceae.

1. Plants herbaceous vines. Tendrils present. Leaves 2-pinnately compound. ..... ***Cardiospermum***
1. Plants trees or shrubs. Tendrils absent. Leaves simple or 1-pinnately compound or palmately compound.
   2. Leaves alternate. Fruits 1-seeded berries. ..... ***Sapindus***
   2. Leaves opposite. Fruits capsules or schizocarps of samaras.
      3. Leaves palmately compound. Calyces and corollas bilaterally symmetrical. Fruits capsules. ..... ***Aesculus***
      3. Leaves simple or 1-pinnately compound. Calyces and corollas radially symmetrical
         Fruits schizocarps of samaras. ..... ***Acer***

Acer C. Linnaeus Maple[1]

1. Branchlets green. Leaves pinnately compound, leaflets 3–7. Outer bud scales strigulose; margins not ciliate . ..... ***A. negundo***
1. Branchlets brown or tan. Leaves simple. Outer bud scales glabrous or sparsely puberulent; margins usually ciliate.
   2. Flowers appearing just before or with leaves. Fruits appearing with leaves. Leaf lobes entire or with 1–4 large teeth per side; abaxial surfaces green; sinuses U-shaped. Apices of axillary buds acute; pairs of scales 3–6. ..... ***A. saccharum***
   2. Flowers and fruits both appearing well before leaves. Leaf lobes serrate or with 4-numerous small teeth per side; abaxial surfaces white or greenish white; sinuses V-shaped. Apices of axillary buds rounded; pairs of scales 1–3.
      3. Leaves 5-lobed; terminal lobes more than half length of blades; margins coarsely toothed. Petals absent. Young samaras green to stramineous. Bark of mature trees typically flaking; light gray. ..... ***A. saccharinum***
      3. Leaves 3- to 5-lobed; terminal lobes less than half length of blades; margins serrate to coarsely toothed. Petals present. Young samaras red to pale pink. Bark of mature trees not flaking; dark gray. ..... ***A. rubrum***

[1] Treatment contributed by William Hess

Aesculus C. Linnaeus Buckeye

1. Corollas cream to yellowish green. Petals equal or subequal in length; 9–12 mm long. Calyces 3–8 mm long; margins without glands. Stamens long exserted, approximately twice length of corollas. Capsules echinate. ..... ***A. glabra***
1. Corollas red. Petals unequal in length; upper 25–40 mm long, lower 20–31 mm long. Calyces 8–18 mm long; margins with stipitate glands. Stamens included within corollas or barely exserted. Capsules smooth. ..... ***A. pavia***

Cardiospermum C. Linnaeus Balloonvine

One species. ..... ***C. halicacabum***

Sapindus C. Linnaeus Soapberry

One species. ..... ***S. saponaria***
(= *S. drummondii*)

SAPOTACEAE A.L. de Jussieu Sapodilla Family

Plants small trees; deciduous; solitary or colonial; armed or not armed with thorns. **Leaves** simple; alternate or fascicled on short spur branches; oblanceolate to elliptic; venation pinnate; surfaces villous to lanate; margins entire; bases cuneate; stipules absent. **Inflorescences** cymose clusters; axillary. **Flowers** perfect; perianths in 2-series. **Sepals** 5; persistent in fruit; free. **Corollas** radially symmetrical; imbricate. **Petals** 5; fused; with pairs of lobe-like appendages in sinuses, each appendage 3-parted; white or whitish pink or whitish green or whitish yellow. **Stamens** 5; opposite the petals; epipetalous; staminodia present; 5, petaloid, alternate with corolla lobes. **Pistils** 1; compound, carpels 5; stigmas 1, capitate; styles 1; ovaries superior, pilose; locules 5; placentation axile; ovules 5, 1 per locule. **Fruits** berries; purplish black at maturity. **Seeds** 1; large.

The family is represented in Oklahoma by 1 genus and 1 species. Widespread in tropical and subtropical regions, it occurs in both the Old and New World. Our species is one of the few taxa found in temperate regions. It is a good bee-tree and produces fruits eaten by a variety of birds and small mammals.

Sideroxylon L. Chittamwood

One species. ..... ***S. lanuginosum***
(= *Bumelia lanuginosa*)

SAURURACEAE E. Meyer Lizard's-Tail Family

Plants herbs; perennials; perennating organs rhizomes or stolons; aromatic or not aromatic. **Leaves** cauline or basal; simple; alternate; venation pinnipalmate or pinnate; stipules present. **Inflorescences** spikes or racemes; bracts absent or present. **Flowers** perfect; perianths absent. **Sepals** absent. **Petals** absent. **Stamens** 3 to 8; arising from receptacle or fused to ovaries. **Pistils** 1; compound, carpels 3 to 5; stigmas 1 or 3 to 5; styles 1 or 3 to 5; ovaries superior; locules 1 or 3 to 5; placentation parietal. **Fruits** capsules or schizocarps. **Seeds** 1 to 10.

The family is represented in Oklahoma by 2 genera and 2 species. Occurring in eastern Asia and North America, it is a small family and thought by some taxonomists to be closely related to the Piperaceae.

1. Leaf apices rounded. Inflorescences 1.5–4 cm long. Involucral bracts present; white.
   Ovaries embedded in rachises. Fruits capsules. ..... ***Anemopsis***
1. Leaf apices acuminate. Inflorescences 6–15 cm long. Involucral bracts absent.
   Ovaries not embedded in rachises. Fruits schizocarps. ..... ***Saururus***

Anemopsis W.J. Hooker & G.A.W. Arnott Yerba Mansa

One species. ..... ***A. californica***

Saururus C. Linnaeus Lizard's-Tail

One species. ..... ***S. cernuus***

SAXIFRAGACEAE A.L. de Jussieu Saxifrage Family

Plants scapose herbs; perennials; perennating organs caudices or crowns; acaulescent. **Leaves** basal; basal rosettes present; simple; alternate; petiolate; venation pinnate or palmate; margins entire or toothed or undulate or palmately lobed; stipules absent. **Inflorescences** or racemes or panicles, or paniculate to capitate compound cymes; terminal; scapes present; bracts present or absent. **Flowers** perfect; perianths in 2-series. **Sepals** 5; free or fused; green or pinkish. **Corollas** radially symmetrical. **Petals** 5; free; white to greenish or pinkish or purplish. **Stamens** 5 or 10. **Pistils** 1; compound, 2-beaked; carpels 2; stigmas 2; styles 2; ovaries superior or partially inferior; locules 2; placentation axile or parietal. **Hypanthia** present; campanulate. **Nectaries** present. **Fruits** capsules; 2-beaked; dehiscent along inner sutures of beaks. **Seeds** numerous.

The family is represented in Oklahoma by 2 genera and 4 species. On the basis of phylogenetic studies, its earlier circumscription has been narrowed considerably with the segregation of several genera. *Penthorum, Ribes,* and *Itea* are now classified in their own monogeneric families, while *Parnassia* and *Lepuropetalon* are positioned in the Celastraceae and *Hydrangea* and *Philadelphus* in the Hydrangeaceae. Molecular phylogenetic studies also support the recognition of *Micranthes* as distinct from *Saxifraga,* hence the repositioning of our species.

1. Venation pinnate. Inflorescences capitate or paniculate compound cymes. Stamens 10. Placentation axile. ..... ***Micranthes***
1. Venation palmate. Inflorescences racemes or panicles. Stamens 5. Placentation parietal. ..... ***Heuchera***

Heuchera C. Linnaeus Alumroot

One species. ..... ***H. americana***

Micranthes A.H. Haworth

1. Leaves undulate. Margins of calyx lobes pink. Corollas equal to or slightly longer than calyces. ..... ***M. texana***
   (= *Saxifraga texana*)
1. Leaves entire or crenate-dentate or slightly toothed. Margins of calyx lobes green. Corollas 2 or 3 times longer than calyces.
   2. Leaves crenate-dentate. Pedicels glandular-pubescent. ..... ***M. virginiensis***
      (= *Saxifraga virginiensis*)
   2. Leaves entire to slightly toothed. Pedicels glabrous. ..... ***M. palmeri***
      (= *Saxifraga palmeri*)

SCROPHULARIACEAE A.L. de Jussieu Figwort Family

Plants herbs; annuals or perennials or biennials. **Leaves** cauline; basal rosettes present of absent; simple; alternate or opposite; venation pinnate; stipules absent. **Inflorescences** spikes or spicate racemes or panicles; bracts present or absent. **Flowers** perfect; perianths in 2-series. **Calyces** radially symmetrical. **Sepals** 5; fused. **Corollas** strongly or weakly bilaterally symmetrical; bilabiate or nearly rotate. **Petals** 5; fused. **Stamens** 4 or 5; of equal lengths or didynamous; epipetalous; staminodia 1 or 0. **Pistils** 1; compound, carpels 2; stigmas 1, not lobed or 2-lobed; styles 1; ovaries superior; locules 2; placentation axile. **Fruits** capsules. **Seeds** numerous.

The family is represented in Oklahoma by 2 genera and 4 species. As previously circumscribed, it was a large, morphologically diverse family of approximately 200 genera and 3,000–4,000 species. Molecular phylogenetic analyses, however, indicate that the family was polyphyletic with several major clades. Repositioning of many genera into other families has thus occurred. Oklahoma taxa are now placed in the Orobanchaceae, Plantaginaceae, Linderniaceae, and Phrymaceae.

1. Upper leaves alternate. Inflorescences spikes or spicate racemes. Stamens 5. Staminodia 0. ..... ***Verbascum***
1. Upper leaves opposite. Inflorescences panicles. Stamens 4. Staminodia 1. ..... ***Scrophularia***

Scrophularia C. Linnaeus Figwort

1. Leaves irregularly incised-serrate, longest teeth 4–10 mm long; bases cuneate to subtruncate. Staminodia yellow-green; flabellate. Plants of canyons in western 1/2 of state. ..... ***S. lanceolata***
1. Leaves uniformly serrate, longest teeth 2–3 mm long; bases rounded to cordate. Staminodia brown or purple; clavate. Plants of eastern 1/3 of state. ..... ***S. marilandica***

Verbascum C. Linnaeus Mullein

1. Stems not winged. Leaves glabrous to glabrate. Inflorescences racemes; pedicels 10–15 mm long. Filament hairs violet to purple. Capsules puberulent to glabrate. ..... ***V. blattaria***
1. Stems winged. Leaves white or gray tomentose. Inflorescences spikes or spicate racemes; pedicels absent or less than 1 mm long. Filament hairs yellow. Capsules densely tomentose. ..... ***V. thapsus***

SELAGINELLACEAE H.M Willkommen Spikemoss Family

Plants herbs; perennials; evergreen; typically saxicolous; producing sporangia on sporophylls borne in 4-sided or flattened strobili. **Roots** from rhizophores. **Stems** branched; prostrate to erect; nodes with wiry rhizophores borne on upper or lower sides of stems. **Leaves** all alike or of 2 forms; small; scale-like; spirally arranged; 4- or 8-ranked; imbricate; linear to lanceolate or falcate or narrowly triangular; ligules present, inconspicuous. **Strobili** solitary; terminal; sessile; erect or ascending or spreading; 4-sided or flattened; apices rounded. **Sporophylls** different from vegetative leaves; all alike or of 2 sizes; 4-ranked; microsporophylls distal; megasporophylls proximal; ligules present. **Sporangia** of 2 types, microsporangia and megasporangia. **Spores** of 2 types; microspores numerous, orange; megaspores large; yellowish white or white. **Gametophytes** of 2 types, microgametophytes and megagametophytes.

The family in Oklahoma is represented by 1 genus and 6 species. A monogeneric family, it is most commonly encountered in tropical and subtropical regions of the world.

Selaginella A.M.F.J. Palisot de Beauvois Spike Moss

1. Leaves of aerial stems not imbricate; 4-ranked with 2 spreading and 2 appressed; translucent; apices not bristle-tipped. Plants of moist habitats. ..... ***S. apoda***
1. Leaves of aerial stems imbricate; not conspicuously 4-ranked with 2 spreading and 2 appressed; opaque; apices bristle-tipped. Plants of dry habitats.
   2. Stems erect or ascending. Rhizophores arising only from rhizomes. ..... ***S. arenicola***
   2. Stems prostrate or decumbent. Rhizophores arising from both rhizomes and aerial stems.
      3. Leaves divergent; conspicuously curled upward. ..... ***S. peruviana***
      3. Leaves appressed; straight.
         4. Lower and upper leaves of any section of stem not equal in length. ..... ***S. densa***
         4. Lower and upper leaves of any section of stem equal in length.

5. Leaf margins ciliate, hairs 0.1–0.2 mm long. Leaves of largest stems borne in pseudowhorls of 6. ..... ***S. rupestris***
5. Leaf margins entire or denticulate. Leaves of largest stems borne in pseudowhorls of 4. ..... ***S. underwoodii***

SIMAROUBACEAE A.P. de Candolle Quassia Family

Plants trees; deciduous; solitary or colonial; deciduous; strongly aromatic, malodorous; dioecious or polygamo-dioecious; sap thin; **Stems** with terminal buds absent; pith brown, about 3/4 diameter of stem in cross-section. **Leaves** 1-pinnately compound; alternate; leaflets 12 to 41; terminal leaflets present or absent; lanceolate; venation pinnate; surfaces glabrous or with glandular hairs; apices acuminate or acute; margins dentate at bases, teeth gland-tipped; rachises reddish green, pilose; pulvini present; stipules absent. **Inflorescences** panicles; pseudoterminal; bracts absent. **Flowers** imperfect or perfect, imperfect and perfect similar; perianths in 2-series. **Sepals** 5; free. **Corollas** radially symmetrical; valvate. **Petals** 5; free; somewhat keeled; reflexed; greenish yellow. **Stamens** 10 in staminate flowers, or 2 or 3 in perfect flowers; androecial rudiments present or absent in pistillate flowers; exserted beyond perianths. **Pistils** 1; compound, carpels 2 to 5; stigmas 2 to 5; styles 2 to 5, fused; ovaries 2 to 5, free, superior; locules 2 to 5; placentation axile. **Hypanthia** present; annular. **Nectaries** present; on staminal disks. **Fruits** schizocarps of samaras. **Seeds** 1 per segment.

The family is represented in Oklahoma by 1 genus and 1 species. Pantropical in distribution, it is a small family with a few species found in warm temperate regions. Of Siberian origin, *Ailanthus altissima* has escaped and become naturalized.

Ailanthus R.L. Desfontaines Tree-of-Heaven

One species. ..... ***A. altissima***

SMILACACEAE E.P. Ventenat Greenbrier Family

Plants woody or herbaceous vines or weak shrubs; perennials; perennating organs rhizomes or tubers; deciduous or evergreen; armed or not armed with prickles; dioecious. **Stems** often twining; terete or slightly angled or 4-sided. **Leaves** coriaceous; simple; alternate, venation parallel-convergent; petioles sheathing; stipules present, developing tendrils. **Inflorescences** umbels; axillary. **Flowers** imperfect, staminate and pistillate similar, staminate often larger; perianths in 2-series, but all parts similar, radially symmetrical. **Perianth Parts** 6; sepaloid; free or fused; pale green or yellowish green. **Stamens** 6; androecial rudiments present in pistillate flowers, 1 to 6, filiform. **Pistils** 1; compound, carpels 3; stigmas 3 or 1; styles 3 or 1, short; ovaries superior; locules 3 or 1; placentation axile or parietal. **Nectaries** present; receptacular. **Fruits** berries. **Seeds** 1 to 6.

The family is represented in Oklahoma by 1 genus and 8 species. Primarily tropical and subtropical in distribution, it is a small family with only a few species occurring in temperate regions. It has traditionally been placed in the Liliaceae, but some taxonomists combine it with the Dioscoreaceae.

Smilax C. Linnaeus Greenbrier

1. Stem prickles absent. Plants annuals; herbaceous. Flowers malodorous.
   2. Stems erect; not climbing. Tendrils absent or if present only on upper stems. Peduncles axillary from bracts below foliage leaves. ..... ***S. ecirrhata***
   2. Stems trailing; climbing. Tendrils present, often common. Peduncles from axils of foliage leaves. ..... ***S. herbacea***
1. Stem prickles present at least on older growth. Plants perennials; woody. Flowers not malodorous.
   3. Abaxial surfaces of leaves glaucous. ..... ***S. glauca***
   3. Abaxial surfaces of leaves not glaucous.
      4. Leaf blades 2–4.5 times longer than wide. Some or all leaves persistent.
         5. Leaves oblong to oblong-lanceolate. Stigmas 1. Berries glaucous; seeds 1. ..... ***S. laurifolia***
         5. Leaves lanceolate to elliptic. Stigmas 2. Berries not glaucous; seeds 2 or 3, rarely 1. ..... ***S. smallii***
      4. Leaf blades less than 2 times longer than wide. All leaves deciduous.
         6. Prickles narrowly tapered; typically black; of 2 forms, long and short. ..... ***S. tamnoides*** (= *S. hispida*)
         6. Prickles broadly tapered; typically green; all alike.

7. Stems terete and/or angular. Rhizomes slender. Berries typically 2-seeded. ..... ***S. rotundifolia***
7. Stems 4-sided or angular. Rhizomes tuberous. Berries typically 1-seeded. ..... ***S. bona-nox***

SOLANACEAE A.L. de Jussieu Nightshade Family[1]

Plants herbs or deciduous shrubs; perennials or annuals; perennating organs caudices or crowns or rhizomes; armed or not armed with thorns and/or prickles. **Leaves** simple; alternate, or occasionally subopposite or fascicled; petiolate or sessile; venation pinnate or a single vein; stipules absent. **Inflorescences** simple or compound cymes or solitary flowers. **Flowers** perfect; perianths in 2-series. **Sepals** 5; fused. **Corollas** radially or slightly bilaterally symmetrical; plicate or rarely valvate. **Petals** 5; fused. **Stamens** 5; epipetalous; free, often connivent; anthers dehiscing poricidally or longitudinally. **Pistils** 1; compound, carpels 2; stigmas 1, not lobed or rarely 2-lobed; styles 1; ovaries superior; locules 2 or rarely 3 to 5; placentation axile. **Nectaries** absent or present; receptacular. **Fruits** berries or capsules. **Seeds** numerous.

The family is represented in Oklahoma by 8 genera and 34 species. Nearly cosmopolitan in distribution, its greatest abundance is in South America. It is of major economic importance for food plants, such as potatoes, tomatoes, eggplants, and peppers; and for toxic ones, such as tobacco, jimson weed, and nightshades.

1. Plants shrubs. Leaves in fascicles on older shoots. ..... ***Lycium***
1. Plants herbs. Leaves not in fascicles.
  2. Corollas tubular-campanulate or funnelform.
    3. Inflorescences solitary flowers. Corollas 4–22 cm long. Capsules spiny. ..... ***Datura***
    3. Inflorescences racemose-paniculate cymes. Corollas 1.5–2 cm long. Capsules not spiny. ..... ***Nicotiana***
  2. Corollas rotate or campanulate-rotate.
    4. Anthers dehiscing poricidally, terminal. ..... ***Solanum***
    4. Anthers dehiscing longitudinally.
      5. Anthers connivent around styles. Calyces 1/4–1/2 length of berries. ..... ***Solanum***
      5. Anthers not connivent around styles. Calyces 2/3 length to longer than berries.
        6. Calyces not inflated, berries visible. ..... ***Chamaesaracha***
        6. Calyces inflated, berries not visible.
          7. Petals pale yellow to cream or yellow-green. ..... ***Physalis***
          7. Petals blue or purple or white.
            8. Flowers erect at anthesis. Plants perennials. Stems prostrate to decumbent; hairs sac-like. ..... ***Quincula***
            8. Flowers pendulous at anthesis. Plants annuals. Stems erect; glabrous. ..... ***Nicandra***

Chamaesaracha (A. Gray) G. Bentham False Nightshade

1. Leaves broadly lanceolate to rhombic; 8–20 mm wide; margins pinnately lobed; surfaces densely pubescent. ..... ***C. coniodes***
1. Leaves linear to linear-lanceolate; 5–7 mm wide; margins entire or irregularly lobed; surfaces glabrous to glabrate. ..... ***C. coronopus***

Datura C. Linnaeus Thorn-Apple

1. Corollas 17.5–24 cm long. Fruiting pedicels curved, capsules nodding. Leaf margins entire to sinuate-repand. Anthers white. ..... ***D. wrightii***
1. Corollas 4–10 cm long. Fruiting pedicels straight, capsules erect. Leaf margins dentate or pinnately lobed. Anthers purple or violet to blue.
  2. Capsule spines dense; longest 4–7 mm long. Corollas 7–10.5 cm long; lobes 7–10 mm long. Leaf margins dentate, teeth large, acuminate. ..... ***D. stramonium***
  2. Capsule spines sparse; longest 14–25 mm long. Corollas 4–7 cm long; lobes 1–2 mm long. Leaf margins deeply pinnately lobed, lobes dentate with blunt teeth. ..... ***D. quercifolia***

Lycium C. Linnaeus Wolfberry

1. Corollas at anthesis greenish with purple veins. Calyces 4.5–8 mm long. Plants occurring only at west end of Panhandle. ..... ***L. pallidum***

1. Corollas at anthesis pink or pale lavender or light purple. Calyces 1–4 mm long. Plants occurring only in body of state.
  2. Leaves linear to oblanceolate or spathulate. Calyces at anthesis 1–2 mm long. Berries 4-8 mm in diameter. ..... ***L. berlandieri***
  2. Leaves elliptic to obovate. Calyces at anthesis 2-4 mm long. Berries 15–20 mm in diameter. ..... ***L. barbarum*** (= *L. halmifolium*)

Nicandra M. Adanson Apple of Peru

One species. ..... ***N. physalodes***

Nicotiana C. Linnaeus Tobacco

One species. ..... ***N. obtusifolia*** (= *N. trigonophylla*)

Physalis C. Linnaeus Ground Cherry

1. Adaxial leaf surfaces glabrous or glabrate.
  2. Flowering calyces 7–10 mm long. Corollas 10–15 mm long. Plants perennials; from rhizomes.
    3. Flowering calyces hispid, hairs both divergent and antrorse, 0.5–1 mm long. Corolla throats uniformly pale brown or ocher. ..... ***P. hispida***
    3. Flowering calyces sparsely pubescent to glabrous; hairs only antrorse 0.5 mm or less long. Corolla throats with dark brown or purple-black spots or blotches. ..... ***P. longifolia***
  2. Flowering calyces 2–6 mm long. Corollas 3–9 mm long. Plants annuals; from taproots.
    4. Corolla throats yellow. Fruiting calyces 10-angled; terete in cross-section.
      5. Leaves elliptic-ovate to orbicular. Calyces and young stems with glandular hairs. Flowering pedicels 4–7 mm long. Fruiting pedicels 5–10 mm long. ..... ***P. missouriensis***
      5. Leaves elliptic to linear-lanceolate. Calyces and young stems glabrous or sparsely pubescent with non-glandular hairs. Flowering pedicels 10–20 mm long. Fruiting pedicels 15–30 mm long. ..... ***P. angulata***
    4. Corolla throats with 5 conspicuous purple-black spots or blotches. Fruiting calyces sharply 5-angled, star-shaped in cross-section.
      6. Leaf margins entire or dentate, teeth less than 10 per side. Fruiting pedicels 3–11 mm long. ..... ***P. pubescens***
      6. Leaf margins dentate, teeth 10 or more per side. Fruiting pedicels 12–25 mm long. ..... ***P. cordata***
1. Adaxial leaf surfaces pubescent.
  7. Hairs not branched.
    8. Flowering pedicels 4–5.5 mm long. Fruiting pedicels 3–11 mm long. Fruiting calyces sharply 5-angled; star-shaped in cross-section. Plants annuals. ..... ***P. pubescens***
    8. Flowering pedicels 8–23 mm long. Fruiting pedicels 12–42 mm long. Fruiting calyces 10-angled; terete in cross-section. Plants perennials.
      9. Stems villous.
        10. Anthers 3–4.5 mm long. Stems and leaves usually with glandular hairs. ..... ***P. heterophylla***
        10. Anthers 2–3 mm long. Stems and leaves without glandular hairs. ..... ***P. virginiana***
      9. Stems hispid or hispidulous.
        11. Flowering pedicels 3–10 mm long. Fruiting pedicels 4–16 mm long. Corolla lobes reflexed when fully open. Longest erect stem hairs 0.2–0.5 mm long. ..... ***P. hederifolia***
        11. Flowering pedicels 9–23 mm long. Fruiting pedicels 17–42 mm long. Corolla lobes not reflexed when fully open. Longest erect stem hairs 1–2 mm long.
          12. Stems and pedicels without retrorse hairs. Fruiting pedicels 30–42 mm long. Corolla throats uniformly pale brown or ocher or green. ..... ***P. pumila***
          12. Stems and pedicels with some retrorse hairs. Fruiting pedicels 10–33 mm long. Corolla throats with dark brown or purple-black spots or blotches. ..... ***P. virginiana***
  7. Hairs all branched, or both branched and not branched.
    13. Pedicels 3–8 mm long. ..... ***P. hederifolia***
    13. Pedicels 10–50 mm long.
      14. Abaxial leaf surfaces and flowering calyces tomentose, occasionally with long jointed hairs. ..... ***P. mollis*** (= *P. viscosa* var. *mollis*)

14. Abaxial leaf surfaces and flowering calyces hispid or pubescent.
    15. Flowering calyces hispid; hairs stiff, longest 1.5 mm long. Corolla throats uniformly pale brown or green. ..... ***P. pumila***
    15. Flowering calyces sparsely to densely pubescent; hairs soft, longest 1 mm long. Corolla throats with dark purple-black spots. ..... ***P. cinerascens***

Quincula C.S. Rafinesque Chinese lantern

One species. ..... ***Q. lobata***
(= *Physalis lobata*)

Solanum C. Linnaeus Nightshade

1. Anthers of 2 forms. Fruiting calyces densely spiny; completely enclosing mature berries. Corollas weakly bilaterally symmetrical.
    2. Corollas purple. Stems and leaves with glandular hairs only or with both glandular hairs and scattered stellate hairs. ..... ***S. citrullifolium***
    2. Corollas yellow. Stems and leaves with stellate hairs only. ..... ***S. rostratum***
1. Anthers all alike. Fruiting calyces sparsely or not spiny; not completely enclosing mature berries. Corollas radially symmetrical.
    3. Stem and leaf pubescence of various types, but not stellate. Corollas 3–6 mm long; 4–9.5 mm wide.
        4. Leaf margins deeply pinnately lobed. ..... ***S. triflorum***
        4. Leaf margins coarsely dentate to entire.
            5. Stem and leaf pubescence glandular. Fruiting calyces enclosing at least half of berries. ..... ***S. physalifolium***
            5. Stem and leaf pubescence not glandular. Fruiting calyces not enclosing berries. ..... ***S. ptychanthum***
            (= *S. nigrum, S. americanum*)
    3. Stem and leaf pubescence stellate. Corollas 10–22 mm long; 20–40 mm wide.
        6. Stems and leaves white or silvery-white. Stellate hairs dense, surfaces hidden. Leaves oblong to oblong-lanceolate. ..... ***S. elaeagnifolium***
        6. Stems and leaves green. Stellate hairs sparse; surfaces exposed. Leaves ovate to ovate-elliptic.
            7. Stellate hairs 4- to 6-rayed; all sessile. Corollas 20–25 mm wide. Berries 1–2 cm in diameter. ..... ***S. carolinense***
            7. Stellate hairs 6- to 8-rayed; both sessile and stalked. Corollas 30–40 mm wide. Berries 2.5–3 cm in diameter. ..... ***S. dimidiatum***

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[1] Treatment contributed by Janet R. Sullivan

SPHENOCLEACEAE A.P. de Candolle Sphenoclea Family

Plants herbs; annuals. **Stems** hollow; branched. **Leaves** simple; alternate; venation pinnate; stipules absent. **Inflorescences** spikes; terminal; bracts present, spathulate; bracteoles present, 2. **Flowers** perfect; perianths in 2-series. **Sepals** 5; free. **Corollas** radially symmetrical. **Petals** 5; caducous after anthesis; fused; white. **Stamens** 5; epipetalous; anthers rounded, appearing peltate; filaments short. **Pistils** 1; compound, carpels 2; stigmas 1, slightly 2-lobed, capitate; styles 1 or 0; ovaries inferior; locules 2; placentation axile. **Fruits** capsules; circumscissle; sepals falling with lid at dehiscence. **Seeds** numerous.

The family is represented in Oklahoma by 1 genus and 1 species. A tropical monogeneric family with two species, it has been placed in the Campanulaceae by some taxonomists. Plants are generally encountered in wet habitats.

Sphenoclea J. Gaertner

One species. ..... ***S. zeylanica***

STAPHYLEACEAE (A.P. de Candolle) J. Lindley Bladdernut Family

Plants small trees or shrubs forming thickets; deciduous. **Stems** ascending; terminal buds absent. **Leaves** 1-pinnately compound; opposite; leaflets 3 or 5, terminal petiolate, lateral subsessile, elliptic or ovate or obovate; venation pinnate; margins serrulate; stipules present, caducous. **Inflorescences** panicles; pendulous; terminal or axillary. **Flowers** perfect; perianths in 2-series. **Calyces** campanulate. **Sepals** 5; fused; ascending; greenish white; petaloid. **Corollas** radially symmetrical; imbricate. **Petals** 5; free; spathulate; ascending; white. **Stamens** 5; filaments villous at bases. **Pistils** 1; compound, carpels 3 or 2; stigmas 3 or 2, capitate; styles 3 or 2, free adhering distally; equalling perianths; ovaries superior, villous; locules 3 or 2; placentation axile. **Hypanthia** present; annular. **Nectaries** present; on staminal disks. **Fruits** capsules; inflated; net veined; green to brown; septicidal. **Seeds** 1 to 4 per locule.

The family is represented in Oklahoma by 1 genus and 1 species. Distributed in north temperate regions and South America, it has a highly discontinuous distribution. Some taxonomists believe that it is related to the Sapindaceae because of the inflated capsules.

Staphylea C. Linnaeus Bladdernut

One species. ..... ***S. trifolia***

STYRACACEAE B.C.J. Dumortier Storax Family

Plants small trees or shrubs; deciduous. **Stems** with terminal buds absent. **Leaves** simple; alternate; blades ovate to elliptic or obovate; venation pinnate; surfaces glabrous or stellate; margins serrulate; stipules absent. **Inflorescences** fascicled clusters or racemes or solitary flowers. **Flowers** perfect; perianths in 2-series. **Sepals** 4 or 5; fused. **Corollas** radially symmetrical; campanulate. **Petals** 4 or 5; fused, may be divided nearly to bases; white. **Stamens** 8 to numerous; epipetalous or arising from receptacles; fused by filaments; anthers basifixed. **Pistils** 1; compound, carpels 3 to 5; stigmas 1, capitate or linear; styles 1; ovaries inferior; locules 3 to 5; placentation axile; ovules 2 to 4 per locule. **Fruits** capsules; wings present or absent. **Seeds** 1.

The family is represented in Oklahoma by 2 genera and 2 species. Distributed in both tropical and warm-temperate regions, it is a small family of minor economic value. Ours are used as garden ornamentals.

1. Petioles 15–25 mm long. Petals 4. Ovaries wholly inferior.
   Capsules 2- or 4-winged; clavate or elliptic; 25–50 mm long. ..... ***Halesia***
1. Petioles 2–10 mm long. Petals 5. Ovaries partially inferior.
   Capsules not winged; globose; 5–9 mm long. ..... ***Styrax***

Halesia J. Ellis ex C. Linnaeus Silverbell

One species. ..... ***H. carolina***

Styrax C. Linnaeus Snowbell

One species. ..... ***S. americanus***

SYMPLOCACEAE R.L. Desfontaines Sweet-Leaf Family

Plants small trees or large shrubs; tardily deciduous to evergreen; strongly aromatic. **Stems** with chambered internodes. **Leaves** coriaceous; simple; alternate; blades elliptic to obovate or oblanceolate; margins entire to sparsely serrate; stipules absent. **Inflorescences** clusters on previous year's stem; axillary; bracts present; bracteoles present. **Flowers** perfect; perianths in 2-series. **Sepals** 5; fused. **Corollas** radially symmetrical. **Petals** 5; fused; obovate; yellow. **Stamens** 30 to 50; in 5 fascicles of 6 to 10; exserted beyond perianths; epipetalous; fused by filaments; anthers minute, orange. **Pistils** 1; compound, carpels 2 to 5; stigmas 1, capitate; styles 1; ovaries inferior; locules 2 to 5; placentation axile; ovules 2 per locule. **Nectaries** present; at bases of styles. **Fruits** drupes. **Seeds** 1 to 5.

The family is represented in Oklahoma by 1 genus and 1 species. Distributed in tropical and subtropical regions except for Africa, western Asia, and Europe, it is a small family of 2 genera and about 500 species. In Oklahoma, it is found only in McCurtain County.

Symplocos N.J. von Jacquin Sweet-Leaf

One species. ..... ***S. tinctoria***

TAMARICACEAE J.H.F. Link Tamarisk Family

Plants shrubs or small trees; phreatophytes; deciduous, ultimate branchlets falling with leaves; bearing perfect flowers or rarely dioecious. **Leaves** scale-like; simple; alternate; blades scale-like; venation not apparent; stipules absent. **Inflorescences** panicles or racemes or spikes; terminal or axillary; bracts present. **Flowers** perfect; perianths in 2-series. **Sepals** 4 or 5; free or fused. **Corollas** radially symmetrical. **Petals** 4 or 5; persistent or not persistent; free or fused at bases; pink to white. **Stamens** 4 or 5 or 8 or 10. **Pistils** 1; compound, carpels 3 to 5; stigmas 3 to 5; styles 1 to 5, free or fused; ovaries superior; locules 1; placentation basal-parietal. **Nectaries** present; receptacular. **Fruits** capsules; loculicidal. **Seeds** numerous; comose.

The family is represented in Oklahoma by 1 genus and 3 species. All are introduced, but naturalized. Planted to function as wind breaks and to bind sand, our species provide limited habitat for wildlife in the western part of the state. More importantly, they are responsible for significant reduction in ground water by uptake and subsequent transpiration.

Tamarix C. Linnaeus Salt Cedar

1. Flowers 4-merous. ..... ***T. parviflora***
1. Flowers 5-merous.
   2. Sepals denticulate. Petals obovate; persistent. Filaments arising below disk margins. ..... ***T. ramosissima***
   2. Sepals entire. Petals ovate to elliptic; caducous. Filaments arising from disk lobes. ..... ***T. chinensis***

TETRACHONDRACEAE R. Wettstein Tetrachondra Family

Plants herbs; annuals or perennials. **Stems** angled, edges ribbed. **Leaves** simple; opposite; sessile or short-petiolate; linear; margins entire; stipules absent. **Inflorescences** cymes or solitary flowers; terminal or axillary. **Flowers** perfect; perianths in 2-series. **Calyces** radially symmetrical. **Sepals** 4; fused. **Corollas** radially symmetrical; rotate. **Petals** 4; fused. **Stamens** 4 of equal length; epipetalous; staminodia 0. **Pistils** 1; compound; carpels 2; styles 1; stigmas 1, capitate; ovaries partially inferior; locules 2; placentation basal. **Fruits** capsules. **Seeds** numerous.

The family is represented in Oklahoma by 1 genus and 1 species. *Polypremum* was previously placed at various times in the Buddlejaceaec or Loganiaceae or Rubiaceae. Molecular phylogenetic analyses indicate that the Tetrachondraceae, comprising 2 genera worldwide, represents a distinct lineage within the Lamiales.

Polypremum C. Linnaeus Juniperleaf

One species. ..... ***P. procumbens***

THELYPTERIDACEAE R.C. Ching ex R.E.G. Pichi Sermolli Marsh Fern Family

Plants herbs; perennials; perennating organs rhizomes; with needle-like hairs; producing sporangia in sori on abaxial surfaces of fronds. **Roots** black or dark brown. **Rhizomes** black; branching; scales present. **Fronds** all alike; vernation circinate; simple or 1-pinnately compound; stipitate; ascending to erect; blades elliptic to lanceolate or deltoid; venation dichotomous; apices acuminate; pinnae sessile, alternate or opposite, bases truncate or oblique, auricles present or absent; rachises curved; stipes with scales only at bases. **Sori** separate; borne on veins; scattered; indusia absent or present; attached at one side of sori, reniform, ciliate. **Sporangia** all alike. **Spores** all alike; globose. **Gametophytes** all alike; green; cordate.

The family is represented in Oklahoma by 2 genera and 3 species. Our taxa occur in the eastern 1/3 of Oklahoma.

1. Fronds deltoid; simple, 2-pinnatifid. Costae not grooved adaxially. Indusia absent. ..... ***Phegopteris***
1. Fronds elliptic to lanceolate; 1-pinnately compound. Costae grooved adaxially. Indusia present. ..... ***Thelypteris***

Phegopteris (C. Presl) A.L.A. Fée Beech Fern

One species. ..... ***P. hexagonoptera***

Thelypteris C.C. Schmidel — Marsh Fern, Maiden Fern

1. Blades elliptic. Proximal pinnae conspicuously shorter than medial pinnae. ..... ***T. noveboracensis***
1. Blades lanceolate. Proximal pinnae slightly shorter than medial pinnae. ..... ***T. palustris***
(= *Dryopteris thelypteris*)

THYMELAEACEAE A. L. de Jussieu — Leatherwood Family

Plants shrubs; deciduous. **Stems** with lateral buds small, enclosed by petiole bases; nodes swollen, socket-jointed by circular scars at start of annual growth. **Leaves** membranous; simple; alternate; blades elliptic or obovate or ovate; venation pinnate; margins entire; stipules absent. **Inflorescences** clusters; 2 to 4 flowers; axillary. **Flowers** perfect; perianths in 1-series; radially symmetrical; funnelform. **Sepals** 4; free; yellow; petaloid. **Petals** absent. **Stamens** 8; arising from hypanthia; unequal; exserted beyond perianths. **Pistils** 1; compound, carpels 2; stigmas 1; styles 1, exceeding the stamens; ovaries superior; locules 1, placentation apical. **Hypanthia** narrowly funnelform; yellow. **Nectaries** present; receptacular. **Fruits** drupes. **Seeds** 1.

The family is represented in Oklahoma by 1 genus and 1 species. Cosmopolitan in distribution, it is a family consisting of trees and shrubs, with greatest abundance in Australia and tropical Africa. In Oklahoma, it is found only in McCurtain County.

Dirca C. Linnaeus — Leatherwood

One species. ..... ***D. palustris***

TYPHACEAE C. Linnaeus — Cattail or Bur-Reed Family

Plants herbs; perennials; perennating organs rhizomes; colonial and forming dense stands or not colonial; emergent aquatics; monoecious. **Stems** unbranched; erect. **Leaves** cauline and basal; simple; alternate; with basal sheaths; 2-ranked; blades linear; venation parallel; margins entire; stipules absent. **Inflorescences** cylindrical spikes or globose heads borne in racemes or spikes; staminate flowers borne above pistillate flowers; terminal or axillary; bracts present or absent. **Flowers** imperfect, staminate and pistillate similar; perianths in 1-series; radially symmetrical. **Perianth Parts** 1 to 6 or numerous; free; bristles or sepaloid or scale-like. **Stamens** 1 to 8. **Pistils** 1; compound, carpels 3, usually only 1 functional; stipitate or sessile; stigmas 1 or 2, linear to spathulate; styles 1; ovaries superior; locules 1 to 3; placentation apical. **Fruits** achene-like follicles or dry-spongy drupes. **Seeds** 1.

The family is represented in Oklahoma by 2 genera and 6 species. Cosmopolitan in distribution, its members are characteristic of fresh-water habitats. Hybridization is common among the species of both genera, which frequently makes identification of some individuals difficult. *Sparganium* has been segregated in its own family (Sparganiaceae) by some taxonomists; however, phylogenetic studies support a broadly circumscribed Typhaceae.

1. Inflorescences long, cylindrical spikes. Plants colonial, forming dense stands.
   Fruits achene-like follicles; subtended by bristles. ..... ***Typha***
1. Inflorescences globose heads borne in racemes or spikes. Plants not colonial.
   Fruits dry-spongy drupes; not subtended by bristles. ..... ***Sparganium***

Sparganium C. Linnaeus — Bur-Reed

1. Stigmas 2. Pistillate heads not subtended by bracts. Drupes obpyramidal. ..... ***S. eurycarpum***
1. Stigmas 1. Pistillate heads subtended by bracts. Drupes fusiform.
   2. Stigmas linear-oblong to lanceolate; 1–2 mm long. Drupes stipitate; dark brown;
      bodies 3–5 mm long. ..... ***S. americanum***
   2. Stigmas filiform; 2–4 mm long. Drupes sessile or subsessile; pale brown;
      bodies 5–7 mm long. ..... ***S. androcladum***

Typha C. Linnaeus — Cattail

1. Staminate and pistillate parts of spikes usually contiguous. Leaves 8–20 mm wide,
   usually greater than 10 mm. Stigmas lanceolate to obovate. ..... ***T. latifolia***
1. Staminate and pistillate parts of spikes generally separated; gap 1–10 cm long.
   Leaves 3–10 mm wide, usually less than 10 mm. Stigmas filiform to linear-lanceolate.

2. Leaves overtopping tops of pistillate part of spikes. Uppermost leaf sheaths auriculate at summits. Brown mucilage glands of adaxial surfaces present only on sheaths. Spikes dark brown; 3–10 cm in diameter. ..... ***T. angustifolia***
2. Leaves equal to or not as high as tops of pistillate part of spikes. Uppermost leaf sheaths tapered at summits. Brown mucilage glands of adaxial surfaces present on both sheaths and basal 1–10 cm of blades. Spikes pale brown; 2–3 cm in diameter. ..... ***T. domingensis***

ULMACEAE C.F.B. de Mirbel Elm Family

Plants trees; deciduous; bearing perfect flowers or polygamo-monoecious. **Stems** with terminal buds absent. **Leaves** simple; alternate; 2-ranked; venation pinnate; margins twice or once serrate or crenate; bases usually oblique; stipules present, caducous. **Inflorescences** cymose or fasciculate clusters, or solitary flowers; axillary. **Flowers** perfect or imperfect, similar; perianths in 1-series; radially to slightly bilaterally symmetrical; campanulate. **Sepals** 4 to 9; fused; green or reddish brown. **Petals** absent. **Stamens** 3 to 9; arising from receptacles or fused to sepals; anthers basifixed. **Pistils** 1; compound, carpels 2; stigmas 2, linear; styles 2, spreading; ovaries superior; locules 1; placentation apical. **Fruits** samaras or drupe-like nuts. **Seeds** 1.

The family is represented in Oklahoma by 2 genera and 8 species. Cosmopolitan in distribution, it is a woody family of considerable economic importance because of its ornamental species. *Celtis*, long classified in this family, is now positioned in the Celtidaceae on the basis of phylogenetic analyses.

1. Flowers or fruits present.
   2. Plants bearing at least some unisexual flowers. Fruits nut-like drupes. ..... ***Planera***
   2. Plants bearing all perfect flowers. Fruits samaras. ..... ***Ulmus***
1. Flowers and fruits absent.
   3. Leaves twice serrate. ..... ***Ulmus***
   3. Leaves once serrate or crenate.
      4. Leaves 5–6 cm long; ovate; teeth gland-tipped. ..... ***Planera***
      4. Leaves 2–5 cm long; elliptical; teeth not gland-tipped. ..... ***Ulmus***

Planera J.F. Gmelin Water Elm

One species. ..... ***P. aquatica***

Ulmus C. Linnaeus Elm

1. Trees with only flowers and/or samaras.
   2. Flowers pedicellate; pedicels 2–20 mm long. Samara margins ciliate.
      3. Petioles 1–2 mm long. Twigs winged. Inflorescences racemose. Samaras pubescent over seeds. ..... ***U. alata***
      3. Petioles 4–10 mm long. Twigs not winged. Inflorescences fascicles. Samaras glabrous over seeds. ..... ***U. americana***
   2. Flowers sessile or subsessile; pedicels 0–2 mm long. Samara margins not ciliate.
      4. Calyces glabrous. Stamens 3–5. Stigmas white. Samaras glabrous over seeds. Axillary buds glabrous or glabrate; hairs sparse, white. ..... ***U. pumila***
      4. Calyces pubescent. Stamens 5–9. Stigmas pink. Samaras pubescent over seeds. Axillary buds pubescent; hairs dense, orange-brown to rusty brown. ..... ***U. rubra***
1. Trees with only leaves, or both leaves and flowers and/or samaras.
   5. Leaf margins crenate or once serrate.
      6. Leaves coriaceous; apices obtuse to rounded; adaxial surfaces scabrous; veins of abaxial surfaces hirsute-hispid. Calyx lobes 6–9; pubescent. Samaras ciliate. ..... ***U. crassifolia***
      6. Leaves not coriaceous; apices acute; adaxial surfaces smooth; veins of abaxial surfaces glabrous or glabrate. Calyx lobes 3–5; glabrous. Samaras glabrous.
         7. Leaf bases oblique. Bark mottled; orange to salmon or olive gray; flaky. Plants flowering in autumn. Sepals fused less than half their length. ..... ***U. parvifolia***
         7. Leaf bases equilateral. Bark not mottled; reddish brown to gray; deeply fissured with interlocking ridges. Plants flowering in spring. Sepals fused more than half their length. ..... ***U. pumila***
   5. Leaves twice serrate.
      8. Branches and twigs corky winged or ridged.
         9. Leaves coriaceous; apices obtuse to rounded; adaxial surfaces scabrous. ..... ***U. crassifolia***
         9. Leaves not coriaceous; apices acute or acuminate; adaxial surfaces smooth.

10. Petioles 5–6 mm long. Axillary buds glabrous. Leaves 6–9 cm long;
apices acuminate. Plants flowering in autumn. Samaras 10–15 mm long. ..... ***U. serotina***
10. Petioles 1-3 mm long. Axillary buds pubescent. Leaves 3–6 cm long;
apices acute. Plants flowering in spring. Samaras 8–10 mm long. ..... ***U. alata***
8. Branches and twigs not winged or corky ridged.
11. Leaves 2.5–7 cm long; 1.5–3 cm wide; Petioles 1.5–4 mm long.
12. Leaves coriaceous; apices obtuse to rounded; adaxial surfaces scabrous. ..... ***U. crassifolia***
12. Leaves not coriaceous; apices acute; adaxial surfaces smooth.
13. Bark mottled; orange to salmon or olive gray; flaky.
Plants flowering in autumn. Sepals fused less than half their length.
Samaras glabrous. ..... ***U. parvifolia***
13. Bark not mottled; light brown to gray; with shallow plates and ridges.
Plants flowering in spring. Sepals fused more than half their length.
Samaras pubescent. .....***U. alata***
11. Leaves 7–16 cm long; 3–8 cm wide. Petioles 4–10 mm long.
14. Adaxial surfaces of mature leaves conspicuously scabrous. Axillary buds obtuse;
scales red, densely pubescent, hairs orangish to red or rusty brown. Bark mucilaginous. ..... ***U. rubra***
14. Adaxial surfaces of mature leaves smooth. Axillary buds acute; scales brown,
glabrous or margins puberulent. Bark not mucilaginous.
15. Abaxial leaf surfaces glabrous or glabrate; hairs white. Tufts of white
hairs in axils of veins typically present. Margins of bud scales sparsely
pubescent. Plants flowering in spring. Sepals fused more than half their length. ..... ***U. americana***
15. Abaxial leaf surfaces villous or pilose, hairs golden yellow. Tufts of
hairs in axils of veins absent. Margins of bud scales glabrous.
Plants flowering in autumn. Sepals fused less than half their length. ..... ***U. serotina***

URTICACEAE A.L. de Jussieu Nettle Family[1]

Plants herbs; annuals or perennials; perennating organs rhizomes or caudices or crowns; single- or few-stemmed; armed or not armed with stinging hairs; monoecious or dioecious or rarely polygamo-monoecious. **Leaves** simple; alternate or opposite; blades lanceolate to ovate; venation pinnate or pinnipalmate; surfaces glabrous or pubescent; apices acuminate to obtuse; margins serrate or dentate or undulate or entire; bases cuneate or cordate or rounded; stipules present or absent. **Inflorescences** simple cymes or panicles or glomerules; axillary or rarely terminal; bracts present, minute. **Flowers** small; imperfect or rarely perfect, staminate and pistillate different; perianths in 1-series or absent. **Staminate Flowers:** Calyces radially symmetrical. Sepals 3 to 5; free or fused; green. Petals absent. Stamens 3 to 5; inflexed in bud and explosively dehiscent. Gynoecial Rudiments present or absent. **Pistillate Flowers:** Calyces radially symmetrical. Sepals 2 to 5 or 0; fused; green. Androecial Rudiments absent or present. Pistils 1; compound, carpels 2, appearing to be 1; stigmas 1, capitate or linear; styles 1 or 0; ovaries superior; locules 1; placentation basal. **Fruits** achenes; sometimes enclosed in the persistent calyces. **Seeds** 1.

The family is represented in Oklahoma by 5 genera and 6 species. Primarily tropical and subtropical in distribution, it is a family noted for taxa with stinging hairs. Some species are eaten and used medicinally.

1. Lower cauline leaves alternate
2. Leaf margins serrate. Stinging hairs present. Inflorescences 2–8 cm long. ..... ***Laportea***
2. Leaf margins entire to undulate. Stinging hairs absent.
Inflorescences 0.5–1.5 cm long. ..... ***Parietaria***
1. Lower cauline leaves opposite or subopposite.
3. Stinging hairs present. ..... ***Urtica***
3. Stinging hairs absent.
4. Inflorescences spicate cymes. Achenes enclosed by calyx. ..... ***Boehmeria***
4. Inflorescences paniculate cymes. Achenes not enclosed by calyx. ..... ***Pilea***

Boehmeria N.J. von Jacquin False Nettle

One species. ..... ***B. cylindrica***

Laportea C. Gaudichaud-Beaupre Wood Nettle

One species. ..... ***L. canadensis***

Parietaria C. Linnaeus Pellitory

One species. ..... ***P. pensylvanica***

Pilea J. Lindley Clearweed

One species. ..... ***P. pumila***

Urtica C. Linnaeus Nettle

1. Plants perennial, rhizomatous. Inflorescences with either staminate or pistillate flowers. ..... ***U. dioica***
1. Plants annuals with taproots. Inflorescences with both staminate and pistillate flowers in the same inflorescence.
   2. Leaf blades elliptic to broadly elliptic, widest at middle, bases cuneate. Achenes 1.5-1.8mm. ..... ***U. urens***
   2. Leaf blades narrowly ovate to orbiculate, usually widest below the middle or near the base; base occasionally cuneate, cuteate to truncate or rounded, sometimes distal leaves ovate-lanceolate. Achenes 1.2-1.6mm. ..... ***U.chamaedryoides***

[1] Treatment contributed by A. Joseph Pollard

VERBENACEAE J. St. Hilaire Vervain Family

Plants herbs or rarely deciduous shrubs; annuals or perennials; aromatic or not aromatic. **Stems** 4-sided or terete. **Leaves** simple; opposite or whorled; venation pinnate; stipules absent. **Inflorescences** spikes or cymes or panicles or racemes; terminal or axillary; bracts present. **Flowers** perfect; perianths in 2-series. **Sepals** 5 or 4; fused. **Corollas** bilaterally or rarely radially symmetrical; salverform or funnelform; imbricate. **Petals** 5 or 4; fused; of various colors. **Stamens** 4; didynamous or of equal lengths; epipetalous. **Pistils** 1; compound, carpels 2; stigmas 1, 2-lobed; styles 1, apical; ovaries superior; terete or lobed, locules 4 or 2; placentation axile. **Nectaries** present; receptacular; annular. **Fruits** nutlets or drupes. **Seeds** 4 or 2 or 1.

The family is represented in Oklahoma by 4 genera and 19 species. Primarily pantropical in distribution, it is morphologically similar to the Lamiaceae. Some species are popular ornamentals, and others have been used medicinally by Native Americans and settlers.

1. Plants shrubs. ..... ***Lantana***
1. Plants herbs.
   2. Nutlets 2. Corollas strongly bilaterally symmetrical. ..... ***Phyla***
   2. Nutlets 4. Corollas weakly bilaterally symmetrical.
      3. Spikes including bracts 10–20 mm wide. Calyces 2 times longer than length of nutlets. Styles 6–20 mm long. Nutlets completely enclosed within closed calyces. ..... ***Glandularia***
      3. Spikes including bracts 3–8 mm wide. Calyces equal to length of nutlets. Styles 2–3 mm long. Nutlets partially enclosed within open calyces. ..... ***Verbena***

Glandularia J.F. Gmelin Vervain

1. Corollas 8–10 mm long; limbs 2–5 mm wide. ..... ***G. pumila***
   (= *Verbena pumila*)
1. Corollas 12–20 mm long; limbs 7–20 mm wide.
   2. Calyces pubescent, but not glandular. ..... ***G. bipinnatifida***
      (= *Verbena bipinnatifida*)
   2. Calyces glandular-pubescent.
      3. Calyces 10–13 mm long. Corolla tubes 2 times longer than calyces. ..... ***G. canadensis***
         (= *Verbena canadensis*)
      3. Calyces 7–9 mm long. Corolla tubes 1.3–1.5 times longer than calyces. ..... ***G. wrightii***
         (= *Verbena wrightii*)

Lantana C. Linnaeus Lantana, Shrub Verbena

One species. ..... ***L. camara***

Phyla J. de Loureiro Frog-Fruit

1. Leaves lanceolate to ovate-lanceolate; apices acute; toothed from below middles to apices. ..... ***P. lanceolata***
1. Leaves oblanceolate to spathulate; apices rounded or obtuse; toothed only towards apices.
   2. Flowering peduncles 1.5–4 times longer than subtending leaves.
      Bracteoles 2–3 mm long. ..... ***P. nodiflora*** (= *P. incisa*)
   2. Flowering peduncles 0.7–1.5 times longer than subtending leaves.
      Bracteoles 4–5 mm long. ..... ***P. cuneifolia***

Verbena C. Linnaeus Vervain

1. Spikes borne in compact compound cymes.
   2. Leaf bases cuneate. ..... ***V. brasiliensis***
   2. Leaf bases slightly clasping and subcordate. ..... ***V. bonariensis***
1. Spikes solitary or borne in elongate simple cymes or panicles.
   3. Bracts longer than calyces.
      4. Leaves plicate; veins whitish near margins. Calyces and bracts with glandular hairs. ..... ***V. plicata***
      4. Leaves not plicate; veins green near margins. Calyces and bracts without glandular hairs. ..... ***V. bracteata***
   3. Bracts shorter than or equal to calyces.
      5. Lower cauline leaves pinnatifid or cleft or parted.
         6. Stems glabrous or with scattered hairs. ..... ***V. halei***
         6. Stems densely pubescent. ..... ***V. xutha***
      5. Lower leaves dentate or serrate or coarsely incised.
         7. Leaves plicate. Bracts divergent in fruit. ..... ***V. plicata***
         7. Leaves not plicate. Bracts appressed in fruit.
            8. Leaves sessile or subsessile; densely pubescent. Corolla limbs 7–9 mm wide. ..... ***V. stricta***
            8. Leaves petiolate; with scattered hairs. Corolla limbs 2–6 mm wide.
               9. Nutlets 2–3 mm long. Leaves linear to narrowly lanceolate, at least 3 times longer than wide. ..... ***V. simplex***
               9. Nutlets 1–2 mm long. Leaves broadly lanceolate to ovate, less than 3 times longer than wide.
                  10. Corollas white; tubes 1–2 mm long. Spikes 1–2 mm wide. ..... ***V. urticifolia***
                  10. Corollas blue-violet; tubes 2–5 mm long. Spikes 2–5 mm wide. ..... ***V. hastata***

VIOLACEAE A.J.G. Batsch Violet Family[1]

Plants herbs; perennials or annuals; acaulescent or caulescent. **Leaves** simple; alternate or occasionally opposite; venation palmate or pinnate; stipules present; foliaceous. **Inflorescences** solitary flowers or few-flowered racemes. **Flowers** perfect; chasmogamous or cleistogamous; perianths in 2-series. **Calyces** bilaterally symmetrical. **Sepals** 5; unequal in size; auricled or not auricled at bases; free. **Corollas** bilaterally symmetrical; imbricate. **Petals** 5; free; lowermost spurred or gibbous; blue or violet or purple or white or yellow or green or combinations of these. **Stamens** 5 or 2 (in some cleistogamous flowers); free (connvient) or fused. **Pistils** 1; compound, carpels 3; stigmas 1; styles 1; ovaries superior; locules 1; placentation parietal. **Staminal Nectaries** present; 2 or 1. **Fruits** capsules; loculicidal; often explosively scattering seeds. **Seeds** numerous.

The family is represented in Oklahoma by 2 genera and 13 species. Cosmopolitan in distribution, its greatest abundance is in northern temperate regions. The majority of taxa in the family are woody trees, shrubs, or vines, but ours are all herbaceous.

1. Petals green to greenish white with purple tips; 2–6 mm long. Sepals without auricles.
   Stamens fused. ..... ***Hybanthus***
1. Petals blue or violet or purple or white or yellow; 7–25 mm long. Sepals with auricles.
   Stamens free; connivent; abaxial ones spurred. ..... ***Viola***

Hybanthus N.J. von Jacquin Green Violet

1. Leaves 15–55 mm wide. Plants from fibrous roots. Leaf margins not revolute.
   Capsules oblong-ellipsoid; 15–20 mm long. ..... ***H. concolor***
1. Leaves 1–11 mm wide. Plants from woody caudices. Leaf margins revolute.
   Capsules ovoid to subglobose; 4–6 mm long. ..... ***H. verticillatus***

Viola C. Linnaeus Violet

1. Plants caulescent.
   2. Stipules palmately divided. Plants annuals. ..... ***V. bicolor*** (= *V. rafinesquii*)
   2.Stipules entire or serrate. Plants perennials.
      3. Stipules entire. ..... ***V. pubescens***
      3. Stipules serrate.
         4. Stipular teeth 0.1–0.8 mm long. Corollas bright yellow. ..... ***V. pubescens***
         4. Stipular teeth 2–3 mm long. Corollas white or cream or pale yellow. ..... ***V. striata***
1. Plants acaulescent.
   5. Corollas white.
      6. Leaves narrowly elliptic to linear at anthesis; 3.5–15 times longer than wide. ..... ***V. lanceolata***
      6. Leaves cordate to broadly elliptic at anthesis; 1.2–2 times longer than wide. ..... ***V. primulifolia***
   5. Corollas blue-violet.
      7. At least some leaves cleft or parted at anthesis.
         8. Stamens exserted. Lateral petals glabrous or puberulent. Cleistogamous flowers absent. ..... ***V. pedata***
         8. Stamens inserted. Lateral petals densely bearded. Cleistogamous flowers present.
            9. Leaves all alike at anthesis; all cleft or parted. ..... ***V. pedatifida***
            9. Leaves of 2 forms at anthesis; both cleft or parted, and not divided. ..... ***V. palmata***
      7. Leaves entire or crenate or serrate at anthesis.
         10. Spurs villous. ..... ***V. villosa***
         10. Spurs glabrous or puberulent.
            11. Leaf bases truncate or attenuate or slightly sagittate to hastate. ..... ***V. sagittata***
            11. Leaf bases broadly rounded to cordate. ..... ***V. sororia***

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[1] Treatment contributed by Landon McKinney

VITACEAE A.L. de Jussieu Grape Family

Plants woody vines or shrubs; with tendrils; polygamous or bearing perfect flowers. **Leaves** simple or palmately compound or 2-pinnately compound; alternate; venation palmate or pinnate; margins serrate or dentate or palmately lobed; terminal leaflets of compound leaves present; stipules present, caducous. **Inflorescences** compound cymes or thyrses. **Flowers** perfect or imperfect, similar; perianths in 2-series. **Calyces** bowl-shaped. **Sepals** 4 or 5 or 0; small, often reduced to lobes or teeth; fused. **Corollas** radially symmetrical. **Petals** 4 or 5; caducous; fused or free; green. **Stamens** 4 or 5; opposite the petals. **Pistils** 1; compound, carpels 2; stigmas 1, not lobed or slightly 2-lobed, capitate or rounded; styles 1 or 0; ovaries superior, lobes 2; locules 2 to 4; placentation basal; ovules 2 per locule. **Nectaries** present; 4 or 5; receptacular **Fruits** berries. **Seeds** 1 to 4.

The family is represented in Oklahoma by 4 genera and 14 species. Primarily tropical and subtropical in distribution, it is economically important because of the cultivation of species of *Vitis*, grape. Oklahoma genera are used as ornamentals for their habit and/or fall color. This family is an important source of food for wildlife.

1. Leaves simple.
   2. Petals basally free, apices adherent or fused; falling as a unit at anthesis.
      Bark loose, exfoliating. Pith brown. ..... ***Vitis***
   2. Petals completely free, apices spreading; falling individually at anthesis.
      Bark tight, not exfoliating. Pith white or greenish white.
      3. Leaves fleshy. Cymes umbelliform. Petals 4. Floral disk deeply 4 lobed. ..... ***Cissus***
      3. Leaves not fleshy. Cymes paniculate or corymbose. Petals 5. Floral disk entire or crenulate. ..... ***Ampelopsis***
1. Leaves palmately or pinnately compound.
   2. Leaves fleshy. Cymes umbellate. Petals 4. Floral disk deeply 4 lobed. ..... ***Cissus***
   2. Leaves not fleshy. Cymes paniculate or corymbose. Petals 5. Floral disk absent or entire or crenulate.

3. Leaves palmately compound. Apices of some or all tendrils bearing adhesive disks. ..... ***Parthenocissus***
3. Leaves pinnately compound. Apices of all tendrils tapered, not bearing adhesive disks. ..... ***Ampelopsis***

Ampelopsis A. Michaux Peppervine

1. Leaves 2- or 3-pinnately compound. Berries black; 10–15 mm in diameter. ..... ***A. arborea***
1. Leaves simple. Berries blue-green to turquoise; 7–10 mm in diameter. ..... ***A. cordata***

Cissus C. Linnaeus Cow-Itch

One species. ..... ***C. trifoliata***
(= *C. incisa*)

Parthenocissus J.E. Planchon Virginia Creeper

1. Tendril branches with disks at ends. Adaxial surfaces of leaves dull green.
Axes of inflorescences not dichotomously branched. Berries 5–8 mm in diameter. ..... ***P. quinquefolia***
1. Tendril branches without disks at ends. Adaxial surfaces of leaves glossy green.
Axes of inflorescences dichotomously branched. Berries 8–12 mm in diameter. ..... ***P. vitacea***

Vitis C. Linnaeus Grape

1. Abaxial surfaces of mature leaves arachnoid or tomentose; glabrous areas glaucous.
2. Pubescence of abaxial leaf surfaces pure white. ..... ***V. mustangensis***
2. Pubescence of abaxial leaf surfaces gray or yellow to rust.
3. Teeth of leaf margins coarse; uneven; acute to acuminate,
longer than wide. Pubescence of abaxial leaf surfaces light gray. ..... ***V. acerifolia***
3. Teeth of leaf margins fine; even; mucronuate to rounded,
about as long as wide. Pubescence of abaxial leaf surfaces
yellowish to rust-colored or greenish gray.
4. Margins of deepest sinuses entire. Petioles and branches of current
year glabrous or sparsely pilose; hairs 0.5 mm long or longer. ..... ***V. aestivalis***
4. Margins of all sinuses toothed to bases. Petioles and branches
of current year puberulent; hairs 0.5 mm long or shorter. ..... ***V. cinerea***
1. Abaxial surfaces of mature leaves with short hairs associated with veins, not arachnoid or
tomentose; glabrous areas not glaucous.
5. Tendrils present, simple. Lenticels conspicuous. Pith continuous
without nodal diaphragms. Berries 10–25 mm in diameter. Seeds oblong. ..... ***V. rotundifolia***
5. Tendrils absent or, if present, branched. Lenticels absent or inconspicuous.
Pith with nodal diaphragms. Berries 5–12 mm in diameter. Seeds pyriform.
6. Some leaves of vegetative shoots deeply lobed to cleft or parted.
7. Pith nodal diaphragms 0.5–2 mm thick. Berries gray to blue-black; densely glaucous. ..... ***V. riparia***
7. Pith nodal diaphragms 4–5 mm thick. Berries black; sparsely glaucous or not glaucous. ..... ***V. palmata***
6. No leaves of vegetative shoots deeply lobed or parted.
8. Leaf blades wider than long; often conduplicate. ..... ***V. rupestris***
8. Leaf blades longer than wide or as wide as long; not conduplicate. ..... ***V. vulpina***

WOODSIACEAE W.G.F. Herter Cliff Fern Family

Plants herbs; perennials from rhizomes; deciduous; needle-like hairs absent; producing sporangia in sori on abaxial surfaces of fronds. **Rhizomes** branching or not branching; scales present. **Fronds** all alike; vernation circinate; 1-pinnately or 2-pinnately compound; stipitate; ascending to erect; blades linear or lanceolate or ovate or deltoid, venation dichotomous, veins anastomosing or not anastomosing, areoles with veinlets absent, auricles absent, stipes with scales present. **Sori** separate; borne on veins; orbicular or linear or oblong or lunate or U-shaped; indusia attached at centers of sori or beneath sori and enclosing sporangia or beneath sori at one side. **Sporangia** all alike; annuli present, vertical. **Spores** all alike; green; reniform or oblong. **Gametophytes** all alike; green; cordate.

The family is represented in Oklahoma by 3 genera and 10 species. These 3 genera and approximately 12 others were formerly positioned in the Dryopteridaceae. Phylogenetic studies, however, support recognition of a distinct family.

1. Sori oblong or linear or lunate or U-shaped. Indusia attached at edges of sori; margins ciliate. ..... ***Athyrium***
1. Sori orbicular. Indusia attached at centers or bases of sori; margins not ciliate.
  2. Veins conspicuous. Stipe bases deciduous. Indusia attached beneath sori on one side; not enclosing sporangia; not lobed; segments not present after rupture. ..... ***Cystopteris***
  2. Veins inconspicuous. Stipe bases persistent, forming a clump. Indusia attached beneath sori on all sides; enclosing sporangia; multilobed; segments present after rupture, filamentous or lanceolate. ..... ***Woodsia***

Athyrium A.W. Roth Lady Fern

One species. ..... ***A. filix-femina***

Cystopteris J.J. Bernhardi Bladder Fern

1. Blade apices long attenuate. ..... ***C. bulbifera***
1. Blade apices acute to short attenuate.
  2. Blades widest at or near bases. Rachises and costae with glandular hairs. ..... ***C. tennesseensis***
  2. Blades widest at middle or just below the middle. Rachises and costae without gland-tipped hairs.
    3. Rhizomes pubescent; internodes long. Basal pinnules of basal pinnae stalked. ..... ***C. protrusa***
    3. Rhizomes glabrous; internodes short. Basal pinnules of basal pinnae sessile.
      4. Pinnae often curving toward blade apices; margins crenulate or obtuse. ..... ***C. tenuis***
      4. Pinnae not curving toward blade apices; margins acute. ..... ***C. fragilis***

Woodsia R. Brown Cliff Fern

1. Plants of body of state and eastern end of Panhandle.
  2. Indusia segments lanceolate. ..... ***W. obtusa***
  2. Indusia segments filamentous.
    3. Proximal ends of stipes light brown or stramineous at maturity. Pinnule margins translucent. ..... ***W. neomexicana***
    3. Proximal ends of stipes reddish brown or dark purple at maturity. Pinnule margins not translucent. ..... ***W. oregana***
1. Plants of Black Mesa area.
  4. Indusia segments filamentous.
    5. Proximal ends of stipes reddish brown or dark purple at maturity. Indusia segments inconspicuous, hidden by sporangia at maturity. ..... ***W. oregana***
    5. Proximal ends of stipes light brown or stramineous at maturity. Indusia segments conspicuous, not hiddden by sporangia at maturity. ..... ***W. neomexicana***
  4. Indusia segments lanceolate.
    6. Proximal ends of stipes reddish brown or dark purple at maturity. ..... ***W. plummerae***
    6. Proximal ends of stipes light brown or stramineous at maturity. ..... ***W. obtusa***

XANTHORRHOEACEAE B.C.J. Dumortier Daylily Family

Plants scapose herbs; perennials; perennating organs rhizomes; acaulescent; **Root Systems** fibrous; roots enlarged at ends. **Leaves** basal; numerous; forming dense clumps; simple; alternate; sessile; 2-ranked; venation parallel; blades elongate, linear, bases sheathing; stipules absent. **Inflorescences** helicoid cymes; terminal; bracts present; scapes taller than foliage, branched distally, 8- to 12-flowered. **Flowers** showy; fragrant, odor lemony or sweet; perfect; perianths in 1-series; funnelform; radially symmetrical. **Perianth Parts** 6; petaloid; fused basally into short tube; lobes spreading or recurved. **Stamens** 6; exserted beyond perianths; filaments unequal, curved upwards, fused to perianth parts near top of tubes. **Pistils** 1; compound, carpels 3; stigmas 1, capitate; styles 1, curved upwards, ovaries superior; locules 3; placentation axile. **Hypanthia** absent. **Nectaries** present**. Fruits** capsules; loculicidal; coriaceous. **Seeds** many; black; round or angular.

The family is represented in Oklahoma by 1 genus and 1 species. *Hemerocallis* was formerly classified in the Liliaceae or lily family and in the Hemerocallidaceae. Phylogenetic studies, however, support its placement in a broadly circumscribed Xanthorrhoeaceae.

Hemerocallis C. Linnaeus Day Lily

One species. ..... ***H. lilioasphodelus***

XYRIDACEAE C.A. Agardh Yellow-Eyed Grass Family

Plants herbs; perennials; perennating organs caudices or crowns. **Leaves** basal; simple; alternate; sessile; equitant; with basal sheaths; ascending; blades linear; venation parallel; apices acuminate; margins entire; stipules absent. **Scapes** present. **Inflorescences** spikes, cone-like; bracts present, imbricate, spirally arranged, hiding flower buds or fruits. **Flowers** perfect; perianths in 2-series. **Calyces** bilaterally symmetrical. **Sepals** 3; free; brown; of 2 forms; 2 lateral ones persistent, keeled, cartilaginous; uppermost 1 membranous, caducous. **Corollas** slightly bilaterally symmetrical. **Petals** 3; caducous; free or fused; clawed; yellow. **Stamens** 3; epipetalous; anthers basifixed, connective broad; staminodia present, 3, alternate with petals. **Pistils** 1; compound, carpels 3; stigmas 3, discoid; styles 1, 3-branched; ovaries superior, lobes 3; locules 1 or 3; placentation parietal. **Fruits** capsules; loculicidal. **Seeds** numerous; minute; striate; apiculate.

The family is represented in Oklahoma by 1 genus and 3 species. Chiefly tropical in distribution, it is a small family characteristic of wet sites in the eastern 1/3 of Oklahoma.

Xyris C. Linnaeus Yellow-Eyed Grass[1]

1. Keels of lateral sepals scabrous along entire edge; strongly curved. Plant bases bulbous. ..... ***X. torta***
1. Keels of lateral sepals scarious-lacerate above middle and entire below middle; slightly curved. Plant bases not bulbous.
   2. Plant bases pinkish or purplish. ..... ***X. difformis***
   2. Plant bases greenish or stramineous or pale to dark brown. ..... ***X. jupicai***

[1] Treatment contributed by Brandon Laxton

ZYGOPHYLLACEAE R. Brown Caltrop Family

Plants herbs; annuals. **Root Systems** taproots. **Stems** diffusely branched; prostrate. **Leaves** 1-pinnately compound; opposite, one of each pair smaller or abortive, hence sometimes falsely appearing alternate; terminal leaflets absent; elliptic to oblong to ovate; venation pinnate; margins entire; stipules present. **Inflorescences** solitary flowers; axillary. **Flowers** perfect; perianths in 2-series. **Sepals** 5; persistent or caducous; free. **Corollas** radially symmetrical; imbricate. **Petals** 5; free; yellow or orange or white. **Stamens** 10; in 2 whorls, of 2 different lengths, outer epipetalous. **Pistils** 1; compound, carpels 5; stigmas 1; styles 1; persistent; ovaries superior; lobes 5 or 10; locules 5 or 10; placentation axile; ovules 1 or 3 or 5 per locule. **Nectaries** present; receptacular. **Fruits** schizocarps; rugose to tuberculate or with prickles. **Seeds** 1 per mericarp.

The family is represented in Oklahoma by 2 genera and 2 species. Tropical to temperate in distribution, its members are typically encountered in dry, sometimes saline habitats. *Kallstroemia* is native. *Tribulus* is introduced from southern Europe and has become a widely distributed, unwelcome pest. It is commonly known as puncture vine because the spiny horns of the carpels are sharp enough to injure the feet of animals and penetrate bicycle tires.

1. Flowers 15–20 mm in diameter. Schizocarps of 10 mericarps; tuberculate. ..... ***Kallstroemia***
1. Flowers 8–10 mm in diameter. Schizocarps of 5 mericarps; with sharp, horn-like prickles. ..... ***Tribulus***

Kallstroemia J.A. Scopoli Caltrop

One species. ..... ***K. parviflora***

Tribulus C. Linnaeus Puncture Vine

One species. ..... ***T. terrestris***

ILLUSTRATED GLOSSARY

Abbreviations: *n.* - noun; *v.* - verb; *a.* - adjective; *pl.* - plural; *cf.* – compare

a- Greek prefix meaning without.
abaxial - *a.* (1) with side of lateral organ away from axis; (2) underside of leaf or outside of petal.
abortion - *n.* arrested development of an organ. (*a.* abortive)
abscission - *n.* separation of leaf or other organ from plant due to breakdown of cells at base of or just below organ.
acaulescent - *a.* stemless or apparently stemless; *cf.* caulescent. **[Plate 1]**
accessory - *a.* in addition to.
accrescent - *a.* increasing in size with age; e.g., as a calyx after flowering.
achene - *n.* small, dry, indehiscent, 1-seeded fruit with ovary wall free from the seed except at funiculus. **[Plate 23]**
achlorophyllous - *a.* without chlorophyll.
acicular - *a.* needle-like; gradually tapering from base to apex, terete in cross-section. **[Plate 6]**
acorn - *n.* fruit comprising nut and basal cupule of fused bracts (cap); characteristic of *Quercus* (oak).
acuminate - *a.* tapering to a sharp point with concave sides. **[Plate 8]**
acute - *a.* tapering to pointed apex, sides more or less straight. **[Plate 8]**
adaxial - *a.* (1) with side of lateral organ next to axis; (2) upperside of leaf or inner side of petal.
adherent - *a.* different organs, usually separate, sticking together, but not fused; e.g., anthers to the style.
adnate - *a.* with unlike parts fused.
aerial - *a.* portion of plant above ground or water surface.
aggregate - *a.* (1) collected together; (2) fruit derived from multiple, simple pistils of a single flower; e.g., drupelets of a blackberry or achenes of a strawberry. **[Plate 26]**
alternate - *a.* (1) arrangement of organs such as leaves, branches, flowers, or fruits one per node; (2) arrangement of organs in one floral whorl between organs of adjacent floral whorl; e.g., petals alternate with sepals. **[Plate 17]**
alveolate - *a.* surface with pits separated by partitions; honey-combed. (*n.* alveolus)
ament - *n.* synonym of catkin.
anastomosis - *n.* union of one vein with another to form a net. (*a.* anastomosing)
androecium - *n.* collective term for stamens of a flower. (*pl.* androecia; *a.* androecial)
androgynophore - *n.* stalk supporting androecium and gynoecium.
androgynous - *a.* (1) inflorescence bearing staminate flowers distal to the pistillate flowers; (2) in *Carex* (sedge), spike bearing staminate flowers distal to the pistillate flowers; (3) in Poaceae (grasses), inflorescence bearing staminate spikelets distal to pistillate spikelets; *cf.* gynaecandrous.
andromonoecious - *a.* having both staminate and perfect flowers on same plant.
angiosperm - *n.* plant bearing seeds enclosed in an ovary.
annual - *a.* plant completing its life cycle in one growing season.
annular - *a.* organs arranged in circle or ring.
annulus - *n.* (1) ring of elastic cells in sporangia of ferns that functions in dehiscence; (2) incompletely developed sheath below strobilus in *Equisetum* (horsetail); (3) corona or rim of corolla in *Asclepias* (milkweed). (*pl.* annuli)
anther - *n.* pollen bearing portion of stamen. **[Plate 18]**
antheridium - *n.* in lower plants, multicellular organ producing male gametes. (*pl.* antheridia)
anthesis - *n.* act of flowering; used to designate flowering period.
anthocarp - *n.* structure consisting of perianth base or receptacle fused to fruit; e.g., some multiple fruits.
antrorse - *a.* directed upward or forward or towards apex; *cf.* retrorse.
apex - *n.* morphological tip of an organ. (*pl.* apices; *a.* apical)
apiculate - *a.* ending abruptly in minute, pointed tip. **[Plate 8]**
apiculum - *n.* short, abrupt point at apex; more than 3 times longer than wide; often slightly curled or flexuous; *cf.* mucro. (*pl.* apicula) **[Plate 8]**
appendage - *n.* secondary part attached to main structure. (*a.* appendicular) **[Plate 18]**
appressed - *a.* lying flat against an organ; pressed together.
aquatic - *a.* growing naturally in water; either completely or partially submerged.
arachnoid - *a.* with very long, soft, slender, loosely tangled hairs; cobwebby. **[Plate 10]**
arboreal - *a.* (1) pertaining to a tree; (2) occurring in or growing on a tree; e.g., *Phoradendron serotinum*, mistletoe.
arborescent - *a.* with the habit or stature of a tree.
areole - *n.* (l) in Cactaceae (cacti), modified axillary bud or short branch bearing one or more spines and/or glochids; (2) area between anastomosing veins of leaf or frond.
aril - *n.* fleshy appendage of the funiculus or hilum, partially or entirely enveloping the seed.

aristate - *a.* with awn or bristle at tip. **[Plate 8]**
armed - *a.* bearing thorns or spines or prickles or sharp projections.
aromatic - *a.* having a distinctive odor; e.g., *Mentha* or *Sassafras* or *Juniperus*.
articulate - *a.* jointed or appearing so; with joints sometimes separating at maturity.
ascending - *a.* rising or extending upward at an oblique angle. **[Plate 1]**
asymmetrical - *a.* (1) not divisible into mirror-image halves in any plane; (2) irregular or unequal in shape or outline; *cf.* radial and bilateral. **[Plate 15]**
attenuate - *a.* tapering gradually to narrow tip or base. **[Plate 8]**
auricle - *n.* ear-like lobe or appendage, typically at base of organ. (*a*. auriculate) **[Plates 8, 31]**
auriculiform - *a.* with two, small, rounded, basal lobes. **[Plate 6]**
autophyte - *n.* plant capable of photosynthesis.
awn - *n.* bristle-like appendage extending beyond body of organ, usually at tip or from dorsal surface. **[Plates 29, 35]**
axil - *n.* upper angle formed between axis and any organ arising from it; e.g., between leaf and stem.
axillary - *n.* borne in axil of leaf.
axile - *a.* positioned on or pertaining to the axis.
axis - *n.* (1) principal or central line of development of plant or organ; main stem; (2) central line of any organ or structure. (*pl.* axes)
banner - *n.* in Fabaceae (legumes), uppermost (adaxial) petal in papilionaceous corolla. **[Plate 30]**
barbed - *a.* with point projecting backward, like barb of fishhook. **[Plate 11]**
barbellate - *a.* finely barbed.
bark - *n.* tissues of woody plant stem or root external to vascular cambium.
basal - *a.* attached or situated at base of plant or organ.
basifixed - *a.* attached by base; e.g., anther attached to filament at base rather than side; *cf.* dorsifixed and versatile. **[Plate 17]**
beak - *n.* (1) abruptly narrowed and prolonged tip; (2) constricted terminal portion of ovary or fruit and/or style. (*a*. beaked)
bearded - *a.* bearing long hairs in a tuft or line.
berry - *n.* fleshy, indehiscent fruit derived from 1 pistil and having a pulpy or fleshy pericarp; e.g., grape or tomato. **[Plate 25]**
bi- Latin prefix meaning two, twice, or double.
biennial - *a.* plant completing its life cycle in two seasons; generally vegetative growth the first season and reproductive growth the second.
bifid - *a.* tip deeply two-cleft or forked to form two lobes. **[Plate 8]**
bilabiate - *a.* two-lipped. **[Plate 16]**
bilateral - *a.* divisible into mirror-image halves in only one plane; *cf.* asymmetrical and radial. **[Plate 15]**
biserrate - *a.* with marginal teeth which are themselves toothed.
bladder - *n.* membranous sac filled with air or water.
blade - *n.* thin, expanded portion of leaf or petal. **[Plate 31]**
bloom - *n.* white or waxy covering of some fruits, leaves, and stems.
botuliform - *a.* sausage-shaped.
bract - *n.* modified leaf subtending flower or an inflorescence.
bracteole - *n.* (1) small bract; (2) small bract borne on pedicel and not fully subtending flower.
branch - *n.* lateral division of stem or floral axis; axis of growth.
branchlet - *n.* ultimate divisions of branch; small branch.
bristle - *n.* stiff hair. **[Plate 29]**
bud - *n.* undeveloped, terminal or axillary organ or shoot; meristem typically enclosed in bud scales.
bulb - *n.* short, thick, subterranean stem bearing fleshy leaves; e.g., onion.
bulbil - *n.* in Liliaceae (lilies), small bulbs arising at base of parent bulb.
bulblet - *n.* (1) in *Allium* (onion), small bulb formed instead of flower in inflorescence; (2) in *Dioscorea* (wild yam), small brown tuber-like structure produced in leaf axil; (3) in *Poa bulbosa* (bulbous bluegrass), short, leafy shoot formed instead of floret in spikelet.
bur - *n.* fruit or fruiting inflorescence with a rough or prickly covering derived from pericarp, persistent calyx, or involucre.
bush - *n.* low, dense shrub profusely branched at ground level.
buttress - *n.* projecting flange at base of tree trunk.
caducous - *a.* falling off early; e.g., sepals in some plants; *cf.* persistent.
callus - *n.* (1) hard protuberance; (2) in Poaceae (grasses), base of lemma or spikelet.
calyx - *n.* collective term for sepals. (*pl.* calyces)
campanulate - *a.* bell-shaped. **[Plate 16]**
cane - *n.* (l) in *Arundinaria* (bamboo), hard, jointed, hollow, aerial stem usually persisting for several growing seasons;

(2) in shrubby species of *Rubus* (blackberries), biennial stem from perennial base, unbranched and non-flowering the first season (primocane) but producing short lateral branches and flowers the second season (floricane).

canescent - *a.* gray or white due to short, fine hairs.

capillary - *a.* very slender and hair-like. **[Plate 29]**

capitate - *a.* head-like or head-shaped cluster. **[Plates 9, 20]**

capitulum - *n.* in Asteraceae (sunflowers), synonym of head. (*pl*. capitula)

capsule - *n.* dry, dehiscent fruit derived from a compound pistil and splitting along two or more lines of suture. **[Plate 21]**

carpel - *n.* in Magnoliophyta (flowering plants), megasporophyll bearing ovules on inner surface. (*a*. carpellate)

carpophore - *n.* slender extension of receptacle forming central axis to which carpels are attached; as in Apiaceae (carrots), Euphorbiaceae (spurges), and Geraniaceae (geraniums).

cartilaginous - *a.* tough and firm but elastic and flexible; like cartilage.

caruncle - *n.* protrudance or appendage near hilum of seed; e.g., *Stillingia*.

caryopsis - *n.* in Poaceae (grasses), dry, indehiscent, 1-seeded fruit with seed coat fused to pericarp; synonym is grain. **[Plate 23]**

catkin - *n.* spicate or racemose inflorescence bearing apetalous, unisexual flowers; the entire inflorescence typically dropping as unit. **[Plate 13]**

caudate - *a.* with a tail-like, basal or terminal appendage. **[Plate 18]**

caudex - *n.* persistent, often woody base of herbaceous perennial plant. (*pl.* caudices)

caulescent - *a.* producing an aerial stem with distinct nodes and internodes; *cf.* acaulescent. **[Plate 1]**

cauliflorous - *a.* bearing flowers directly from older wood of stems or trunks.

cauline - *a.* pertaining or arising from aerial stem.

cespitose - *a.* growing in dense clumps or multi-stemmed tufts.

chaff - *n.* (1) thin, dry, membranous bracts or scales; (2) in Asteraceae (sunflowers), collective term for pales. (*a*. chaffy)

chartaceous - *a.* having texture of writing paper; usually not green.

chasmogamous - *a.* pollination occurring while flower is open; *cf.* cleistogamous.

chlorophyll - *n.* green, photosynthetic pigment in chloroplasts of autophytic plants. (*a*. chlorophyllous)

ciliate - *a.* with marginal fringe of hairs. **[Plates 7, 31]**

ciliolate - *a.* minutely ciliate.

circinate - *a.* coiled from tip downward with apex in center; e.g., young fern fronds or leaflets.

circumscissile - *a.* type of dehiscence in which capsule opens along a transverse line allowing top to come off like a lid. **[Plate 21]**

cladophyll - *n.* branch or stem with form and functions of leaf.

clasping - *a.* foliacious structure partly or wholly surrounding stem. **[Plate 5]**

clathrate - *a.* pierced with openings; lattice-like in appearance.

clavate - *a.* (1) club-shaped; (2) gradually thickening toward the apex. **[Plates 9, 20]**

claw - *n.* long, narrow, petiole-like base of petals or sepals in some flowers.

cleft - *a.* indentations or incisions that extend about half-way to middle or base; *cf.* lobed, parted. **[Plate 7]**

cleistogamous - *a.* self-pollination occurring while flower is closed.

clustered - *a.* organs or structures positioned closely together, with specific arrangement not discernable. **[Plate 13]**

cob - *n.* in *Zea mays* (maize), cylindrical, thickened rachis arising in leaf axil and bearing pistillate spikelets in 8-24 rows; axis of an ear.

coherent - *a.* organs sticking together, but not fused.

collar - *n.* in Poaceae (grasses), region on abaxial surface of leaf at junction of blade and sheath. **[Plate 31]**

collateral - *a.* situated side-by-side; e.g., axillary and accessory buds.

colleter - *n.* multicellular glandular hair producing sticky, mucilaginous or resinous secretion, typically occurring on adaxial surfaces of leaf blades, stipules, petioles, and in interpetiolar regions.

colonial - *a.* plants forming colonies typically asexually via rhizomes or stolons or root sprouts.

column - *n.* (1) in Orchidaceae (orchids), fusion of stamens and styles into a single, solid, central structure; (2) in Malvaceae (mallows), tubular structure formed by fusion of staminal filaments.

coma - *n.* tuft of hairs at end of structure, especially seeds. (*a*. comose)

compound - *a.* organ divided into or composed of two or more similar parts; e.g., compound leaves or compound pistils. **[Plates 3, 19]**

compressed - *a.* (1) flattened in one plane; (2) in Poaceae (grasses), two types recognized: lateral – spikelets flattened along margins (sides) of glumes and lemmas, and dorsal – spikelets flattened along midnerves (backs) of glumes and lemmas. **[Plate 35]**

conduplicate - *a.* folded lengthwise usually into two equal, appressed halves and with adaxial surface inside.

cone - *n.* in gymnosperms, dense cluster of overlapping sporophylls on an axis; strobilus.

confluent - *a.* merger of one part with another; passing by degrees of one part into another; *cf.* contiguous.
conical - *a.* (1) cone-shaped; tapering evenly from base to apex in three dimensions; e.g., taproot of *Daucus* (carrot) **[Plate 9]**; (2) referring to shape of the cones of Pinus; e.g., fruit of pineapple or capitula of *Ratibida tagetes* or *R. pinnata*.
connate - *a.* united; applied to similar structures when fused into a single structure.
connective - *n.* portion of stamen connecting pollen sacs of anther.
connivent - *a.* coming together or converging, but not fused.
conserved - *a.* *nominia conservanda*; scientific name whose continued use has been authorized by International Code of Botanical nomenclature even though it is illegitimate according to the rules.
contiguous - *a.* separate but sharing a common edge or point; adjoining.
contra-ligule - *n.* in *Scleria* (nut rush), membranous flap arising from rim of sheath on side opposite blade.
convex - *a.* rounded or curved outward on surface.
convolute - *a.* (1) longitudinally rolled or twisted together; (2) leaf blades or sepals or petals in which edge of one overlaps that of next one; like shingles on a roof.
cordate - *a.* heart-shaped. **[Plates 6, 8]**
coriaceous - *a.* leathery or tough but pliable.
corm - *n.* short, solid, thickened underground stem with or without small, papery leaves, e.g., *Crocus* (crocus).
corolla - *n.* collective term for petals.
corona - *n.* crown or cup-like appendage or ring of appendages arising from petals or stamens, e.g. *Narcissus* (daffodil) or *Ascelpias* (milkweed); synonym is crown. (*a.* coroniform) **[Plate 16]**
corymb - *n.* short and broad, more or less flat-topped indeterminate inflorescence in which outer flowers open first and lower pedicels are longer. (*a.* corymbose) **[Plate 13]**
costa - *n.* (1) prominent midvein or midrib; (2) in ferns, midrib of pinna or pinnule. (*pl.* costae) **[Plate 37]**
costule - *n.* in ferns, midrib of pinnule when frond is 2 or more times compound. **[Plate 37]**
cotyledon - *n.* seed leaf; primary leaf or leaves in embryo.
crateriform - *a.* bowl-shaped.
creeping - *a.* running along ground and rooting at the nodes.
crenate - *a.* margin with shallow, rounded or blunt teeth. **[Plate 7]**
crenulate - *a.* finely crenate.
crest - *n.* elevation or ridge at the summit of an organ.
crisped - *a.* irregularly curled or crinkled or twisted in more than one plane, e.g., leaf margins of *Rumex crispus* (curly dock). **[Plate 7]**
crown - *n.* (1) base of tufted, herbaceous perennial where shoot and root systems merge; (2) overall appearance or form of branches of tree or shrub; (3) synonym of corona; (4) in Asteraceae (sunflowers), pappus appearing as a short ring. **[Plate 29]**
crozier - *n.* young, circinately coiled frond of most ferns (fiddlehead). **[Plate 37]**
cruciform - *a.* cross-shaped.
cucullate - *a.* hollow arched covering; hood or hooded.
culm - *n.* in Poaceae (grasses), Cyperaceae (sedges), and Juncaceae (rushes), aerial stem. **[Plate 31]**
cuneate - *a.* wedge-shaped; triangular or tapering to point. **[Plate 8]**
cupule - *n.* involucre composed of hardened bracts fused, at least at their bases; partially or completely enclosing fruit or fruits.
cuspidate - *a.* abruptly tipped with sharp, rigid point. **[Plate 8]**
cyathium - *n.* modified inflorescence consisting of a pedicelled pistillate flower arising from the center of a cup-like involucre bearing one or more glands on its rim and staminate flowers with one stamen on its inner surface; characteristic only of *Euphorbia* (spurge) and a few related genera. (*pl.* cyathia) **[Plate 14]**
cymbiform - *a.* boat-shaped. **[Plate 9]**
cyme - *n.* broad, more or less flat-topped determinate inflorescence, with central or terminal flowers opening first. (*a.* cymose) **[Plate 13]**
cypsela - *n.* used by some authors to describe a fruit similar to an achene but derived only from an inferior ovary and with accessory perianth tissue fused to the pericarp; as in Asteraceae (sunflowers). (*pl.* cypselae)
cystolith - *n.* mineral concretion, usually calcium carbonate, in cells of some plants.
deciduous - *a.* not persistent, falling; e.g., leaves falling in autumn or floral parts after anthesis; *cf.* caducous.
decumbent - *a.* lying horizontally on ground, but with terminal portion ascending. **[Plate 1]**
decurrent - *a.* (1) extending downward as wing or ridge from point of insertion; **[Plate 5]** (2) stigmatic surface extending down side of style. **[Plate 20]**
decussate - *a.* arranged in pairs with each pair at right angles to pair above and below; e.g., leaves of *Asclepias* (milkweed). **[Plate 2]**
deflexed - *a.* bent or turned abruptly downward.
dehiscent - *a.* splitting open spontaneously along suture lines when mature to release contents; e.g., anthers or fruits;

cf. indehiscent. **[Plate 18]**
deliquescent - *a.* dissolving or melting away; e.g., petals of *Tradescantia* (spiderwort).
deltoid - *a.* triangular; shaped like the Greek letter delta. **[Plate 6]**
dentate - *a.* margin with sharp teeth pointing outward, rather than forward. **[Plate 7]**
denticulate - *a.* minutely or finely dentate.
determinate - *a.* inflorescence in which terminal flower opens first and ends elongation of floral axis; flowers from apex downward; *cf.* indeterminate.
diadelphous - *a.* stamens united by filaments into two groups. **[Plate 17]**
dichotomous - *a.* branching by repeatedly forking into pairs. **[Plate 4]**
didynamous - *a.* with two pairs of stamens of unequal filament length, as in members of the Lamiaceae (mints). **[Plate 17]**
diffuse - *a.* widely or loosely spreading.
digitate - *a.* with 2 or more structures arising from a common point; resembling fingers spreading from palm of hand. **[Plate 33]**
dilated - *a.* (1) flat and widened; (2) larger in all dimensions.
dimorphic - *a.* occurring in two forms.
dioecious - *a.* pistillate and staminate flowers borne on different plants; *cf.* monoecious.
disarticulation - *n.* separation at a joint or joints at maturity.
disciform head - *n.* in Asteraceae (sunflowers), head bearing disk florets in the center and inconspicuous ray florets with reduced corollas at the periphery, hence head falsely appearing discoid; *cf.* ligulate head, radiate head, discoid head.
discoid - *a.* (1) flattened and circular; (2) disciform. **[Plate 20]**
discoid head - *n.* in Asteraceae (sunflowers), head bearing only disk florets; *cf.* ligulate head, radiate head, disciform head. **[Plate 27]**
disk - *n.* (1) more or less fleshy and/or raised outgrowth of receptacle; (2) flattened adhesive tip of tendril; (3) in Asteraceae (sunflowers), central portion of receptacle bearing disk florets. **[Plate 27]**
disk floret - *n.* in Asteraceae (sunflowers), perfect or functionally staminate or pistillate floret with radially or rarely bilaterally symmetrical corolla borne in center of head; *cf.* ray floret, liguate floret. **[Plate 27]**
dissected - *a.* (1) general term indicating cut in any way; (2) deeply and/or irregularly cut.
distal - *a.* region farthest away from point of origin or attachment or center; *cf.* proximal.
distichous - *a.* borne in 2 vertical rows on opposite sided of axis and in same plane; 2-ranked.
divergent - *a.* spreading away from center or each other. **[Plate 17]**
dorsal - *a.* (1) pertaining to or located on back; (2) abaxial surface of organ; (3) in Poaceae (grasses), one type of compression, with spikelets flattened along midnerves (backs) of glumes and lemmas; **[Plate 35]** (4) in Orchidaceae (orchids), applied to uppermost sepal in resupinate flowers.
dorsifixed - *a.* anther attached to filament along dorsal edge; *cf.* basifixed and versatile. **[Plate 17]**
drupe - *n.* fleshy, indehiscent fruit with a hard endocarp (stone or pit) enclosing 1 seed; e.g., *Prunus persica* (peach). **[Plate 25]** In some taxa, 2 or more stones are present and fruits falsely resemble berries; e.g., *Frangula caroliniana* (Carolina buckthorn).
drupelet - *n.* small drupe that is part of aggregate fruit; e.g., *Rubus* (blackberry). **[Plate 26]**
e- Latin prefix meaning part or parts missing.
ear - *n.* in *Zea mays* (maize), pistillate inflorescence borne in leaf axil and comprising rachis (cob), pistillate spikelets in 8-24 rows, and subtending leafy bracts (husk).
ebracteate - *a.* without bracts.
echinate - *a.* armed with blunt prickles or spines.
elaiosome - *n.* oily appendage attached to seed, used as food by ants.
elater - *n.* in *Equisetum* (horsetail), club-shaped, hygroscopic bands attached to spores and functioning in their dispersal.
ellipsoid - *n.* solid body elliptic in longitudinal-section and circular in cross-section. (*a.* ellipsoidal) **[Plate 9]**
elliptic - *n.* ellipse-shaped; broadest at middle and narrowed at rounded ends. **[Plate 6]**
elongate - *a.* lengthened; stretched; extended.
emarginate - *a.* apex with shallow notch. **[Plate 8]**
embryo - *n.* immature plant within seed comprising radicle, plumule, cotyledons, and possibly endosperm.
emergent - *a.* (1) outgrowth from surface; (2) raised above and out of water.
endocarp - *n.* inner layer of fruit wall or pericarp.
endogenous - *a.* growing from, or originating from, within.
ensiform - *a.* sword-shaped, as in iris or grass leaves.
entire - *a.* margin continuous and without teeth or divisions. **[Plate 7]**
ephemeral - *a.* lasting a very short time.
epi- Greek prefix meaning upon; e.g., epipetalous or borne on petals.
epicalyx - *n.* set of bracts immediately below and resembling calyx. (*pl.* epicalyces)

epigynous - *a.* with stamens, petals, and sepals arising from top of ovary or rim of hypanthium fused to ovary; ovary inferior to other organs; *cf.* hypogynous, perigynous. **[Plate 15]**
epiphyte - *n.* plant which grows entirely on other plants, but is not rooted in soil; e.g., mistletoe, some orchids, mosses, or some ferns.
equilateral - *a.* with sides of equal shape and/or length; *cf.* oblique, inequilateral.
equitant - *a.* folded leaves overlapping lengthwise in two ranks; e.g., *Iris* (iris). **[Plate 2]**
erect - *a.* upright or perpendicular to surface; vertically oriented.
erose - *a.* margin irregularly toothed as if gnawed, torn, or eroded. **[Plates 7, 31]**
evergreen - *a.* (1) plants having foliage that remains green for more than one growing season; (2) never lacking green leaves; (3) remaining green through winter.
ex- Latin prefix meaning lacking.
excrescence - *n.* small, warty outgrowth.
excurrent - *a.* extending beyond margin.
exfoliating - *a.* coming off in thin layers or shreds or plates; e.g., flaking bark of *Platanus* (sycamore).
exocarp - *n.* typically thin, outermost layer of fruit wall or pericarp that is differentiated into three layers.
exserted - *a.* extending beyond or protruding from surrounding parts.
extrafloral - *a.* outside the flower.
extrorse - *a.* facing or opening outward away from axis; e.g. dehiscence of anther; *cf.* introrse and latrorse.
exudate - *n.* substance(s) emanating or released from plant organ, especially when cut or damaged; e.g., latex and sap in *Asclepias*, milkweed.
falcate - *a.* strongly curved sideways; sickle-shaped. **[Plate 6]**
fascicle - *n.* tight cluster or bundle of organs; appearing to arise from a common point. (*a.* fascicled) **[Plates 2, 17]**
fertile - *a.* (1) capable of producing viable seeds; (2) capable of producing functional pollen except in Poaceae (grasses); (3) in Poaceae, floret or spikelet producing a caryopsis.
fetid - *a.* having an extremely unpleasant or foul odor; e.g., *Cucurbita foetidissima*.
fibrous - *a.* (1) having numerous, woody fibers; e.g., mesocarp of coconut; (2) all roots and their branches approximately the same diameter, as in Poaceae (grasses). **[Plate 1]**
filament - *n.* (1) part of stamen that supports anther; (2) thread-like structure. (*a.* filamentous)
filiferous - *a.* with filaments or filament-like appendages.
filiform - *a.* filamentous, long and very slender; thread-like.
fimbriate - *a.* margin with fringe of fine hairs or hair-like structures.
flabellate - *a.* fan-shaped; broadly wedge-shaped, sometimes pleated. **[Plates 6, 9]**
flaccid - *a.* weak and limp; flabby; lax.
fleshy - *a.* succulent; firm and juicy.
flexuous - *a.* axis with curves or bends; wavy or slightly zig-zag.
floating - *a.* resting on or at the surface of water.
floccose - *a.* bearing tufts of long, soft, tangled hairs.
floret - *n.* (1) in Poaceae (grasses), flower and two associated bracts, the lemma and palea; subunit of grass spikelet; **[Plate 35]** (2) in Cyperaceae (sedges), flower and one associated bract, the scale; subunit of sedge spikelet or spike; (3) in Asteraceae (sunflowers), one flower of a composite head with 5 fused petals, a highly modified calyx, 5 stamens fused by their anthers, and an inferior ovary; three types recognized: disk, ray, and ligulate. **[Plate 27]**
flower - *n.* determinate shoot axis bearing sepals, petals, stamens, and carpels in spiral or whorls; reproductive organ of flowering plants; site of sporogenesis, gametogenesis, and seed formation.
fluted - *a.* marked by alternating ridges and groove-like depressions.
foliaceous - *a.* leaf-like; e.g., bracts and sepals that look like leaves in texture, size, and/or color.
foliage - *n.* collective term for leaves of plant.
follicle - *n.* dry, dehiscent fruit derived from simple pistil and dehiscing along one line of suture. **[Plate 22]**
forb - *n.* (1) a broadleaf herbaceous plant (dicot); (2) any herbaceous plant other than members of the Poaceae (grasses), Cyperaceae (sedges), and Juncaceae (rushes); (3) any herbaceous plant other than a member of the Poaceae.
fragrant - *a.* having a pleasant or sweet, usually delicate, odor.
free - *a.* separate, not fused nor attached to another organ.
fringed - *a.* with marginal hairs, bristles, or hair-like structures.
frond - *n.* (1) leaf of ferns, comprising blade and stipe; **[Plates 37-41]** (2) large, compound leaf of palms.
fruit - *n.* mature ovary or ovaries plus any other structures maturing with it after fertilization.
fugacious - *a.* withering shortly after opening or appearance; becoming inconspicuous and falling away or disintegrating.
funiculus - *n.* stalk or thread-like structure connecting ovule or seed to placenta. (*pl.* funiculi)
funnelform - *a.* funnel-shaped; corolla tube widening gradually upward toward apex; e.g., many flowers of *Convolvulus* (morning glory). **[Plate 16]**

furrow - *n.* longitudinal channel or groove.
fused - *a.* parts or organs joined to one another.
fusiform - *a.* spindle-shaped; broadest near middle and tapering toward ends. **[Plate 9]**
gametophyte - *n.* haploid (ln) gamete-producing generation of plants with a sporic reproductive cycle; in flowering plants, the embryo sac and pollen grain.
geniculate - *a.* abruptly bent at an angle.
gibbous - *a.* (1) swollen on one side; (2) pouch-like enlargement of base of organ. **[Plate 16]**
glabrate - *a.* (1) nearly glabrous; (2) becoming glabrous with age.
glabrous - *a.* devoid of pubescence or hairs of any form.
gland - *n.* (1) appendage, protuberance or depression on surface of organ or at end of hair that secretes usually sticky fluid; (2) protuberance which may not be secretory; e.g., warty swelling at base of leaf blade in *Prunus* (plum). (*a.* glandular) **[Plate 11]**
glaucous - *a.* covered with fine, waxy substance that may be rubbed off and imparts a whitish or bluish cast to surface; e.g., 'bloom' of grape or plum.
globose - *a.* spherical or nearly so; globular. **[Plate 9]**
glochid - *n.* in Cactaceae (cacti), hair or bristle, usually tufted in areoles. (*pl.* glochidia; *a.* glochidiate)
glomerule - *n.* compact, cymose cluster of flowers or heads subtended by involucre.
glume - *n.* in Poaceae (grasses), one of a pair of bracts at base of spikelet; typically dry and membranous. **[Plate 35]**
glutinous - *a.* covered with sticky exudation.
gum - *n.* sticky, aqueous solution of polysaccharides exuded naturally or when plant organ is damaged.
gymnosperm - *n.* general term for plants bearing naked seeds usually borne in cones.
gynaecandrous - *a.* (1) inflorescence bearing pistillate flowers distal to the staminate flowers; (2) in *Carex* (sedge), spike bearing pistillate flowers distal to the staminate flowers; (3) in Poaceae (grasses), inflorescence bearing pistillate spikelets distal to staminate spikelets; *cf.* androgynous.
gynobase - *n.* enlargement or elongation of receptacle bearing the ovary. (*a.* gynobasic)
gynoecium - *n.* collective term for pistil or pistils of flower. (*pl.* gynoecia; *a.* gynoecial)
gynomonoecious - *a.* bearing pistillate and perfect flowers on same plant.
gynostegium - *n.* in Apocynaceae (milkweeds), structure formed by fusion of stamens and styles; specialized for mass transfer of pollen by insects. (*pl.* gynostegia)
gynostemium - *n.* in Orchidaceae (orchids), structure formed by fusion of stamens and pistils.
habit - *n.* general appearance of plant; may refer to single character or collectively to all characters.
habitat - *n.* environmental conditions or type of area normally occupied by plants of a species; e.g., borrow ditch, tallgrass prairie, or waste area.
halophyte - *n.* plant tolerant of or adapted to saline or alkaline soils.
hastate - *a.* arrowhead-shaped, with two basal lobes turned outward; *cf.* sagittate. **[Plates 6, 8]**
haustorium - *n.* specialized, root-like organ of parasitic plant that penetrates tissues of host plant and through which nutrients pass. (*pl.* haustoria; *a.* haustorial)
head - *n.* (1) dense spherical, hemispheric, or flat-topped inflorescence of sessile or subsessile flowers; (2) in Asteraceae (sunflowers), dense spherical, hemispheric, or flat-topped inflorescence of sessile flowers borne on a common receptacle and subtended by involucre. **[Plates 14, 27]**
helicoid - *a.* coiled in a spiral or helix; as in some l-sided cymes with all flowers borne on same side of rachis; characteristic of Boraginaceae (borages) and Hydrophyllaceae (waterleafs); often erroneously called a scorpioid cyme. **[Plate 13]**
herb - *n.* plant with non-woody aerial stems that die at end of growing season.
herbaceous - *a.* (l) pertaining to a herb; (2) having the texture and/or color of a foliage leaf; (3) lacking woody tissues.
herbage – *n.* (1) collective term for the stems and leaves of an herbaceous plant; (2) total plant biomass available to an herbivore.
hesperidium - *n.* modified berry, with tough rind and septate juicy flesh; e.g., orange. (*pl.* hesperidia) **[Plate 25]**
heterogonous - *a.* two or more different kinds of perfect flowers on different individuals of the same species, differing in relative length of pistils and stamens.
heterosporous - *a.* producing spores of two types; e.g., micro- and megaspores.
heterostyly - *n.* styles of different lengths in flowers of same species; *cf.* homostyly. (*a.* heterostylous)
hip - *n.* in *Rosa* (rose), berry-like, urceolate hypanthium enclosing numerous achenes. **[Plate 26]**
hirsute - *a.* with long, stiff, coarse, erect or ascending, straight hairs. **[Plate 10]**
hirsutulous - *a.* minutely hirsute.
hispid - *a.* with rigid, long, tapered, erect or ascending straight hairs; bristly. **[Plate 10]**
hispidulous - *a.* minutely hispid.
homostyly - *n.* styles of more or less uniform length in flowers of same species; *cf.* heterostyly. (*a.* homostylous)
hood - *n.* hollow, arched covering often enclosing other organs; e.g., corona of *Asclepias* (milkweed).

horn - *n.* (1) in Apocynaceae (milkweeds), arching appendage arising from within cucullate corona segment; (2) tapering projection resembling the horn of a cow.
host - *n.* plant which provides nutrients to a parasite.
husk - *n.* covering, generally derived from perianth or involucre, that encloses fruit.
hyaline - *a.* thin and translucent or transparent.
hydathode - *n.* water-secreting gland or tissue, typically on leaf margins or apices; common in aquatic plants.
hydrophyte - *n.* plant growing in water; *cf.* mesophyte and xerophyte.
hypanthium - *n.* cup-shaped to elongate tubular extension of floral axis that surrounds gynoecium; produced by fusion of basal parts of perianth and androecium or occasionally as expansion of receptacle. (*pl.* hypanthia; *a.* hypanthial) **[Plate 15]**
hypogynium - *n.* in *Scleria* (nut rush), indurate disk at base of ovary.
hypogynous - *a.* with stamens, petals, and sepals arising from receptacle below ovary; ovary superior to other organs; *cf.* perigynous, epigynous. **[Plate 15]**
imbricate - *a.* partial overlapping of organs so as to resemble shingles on a roof. **[Plates 2, 28]**
imperfect - *a.* flower lacking either stamens or pistil or both.
incised - *a.* cut sharply, deeply, and usually irregularly. **[Plate 7]**
included - *a.* not protruding beyond the surrounding organ or organs; included within; not exserted.
incurved - *a.* gradually bent or turned inward towards organ center or axis; *cf.* recurved.
indehiscent - *a.* not splitting open to release contents when mature; *cf.* dehiscent.
indeterminate - *a.* inflorescence in which flowers open progressively from base upward or from outside inward; *cf.* determinate.
indumentum - *n.* surface covering of hairs, scales, or scurf; pubescence. (*a.* indumented)
indurate - *a.* hardened.
indusium - *n.* thin epidermal outgrowth which covers or surrounds sorus on frond of many ferns. (*pl.* indusia) **[Plate 42]**
inequilateral - *a.* with sides of unequal shape and/or length; *cf.* equilateral, oblique.
inferior - *a.* (1) one organ lower than another; (2) ovary below the apparent point of attachment of the other floral organs; *cf.* superior. **[Plate 15]**
inflexed - *a.* bent or turned towards main axis or center.
inflorescence - *n.* arrangement of flowers and accessory parts on an axis. **[Plates 13, 31-33]**
infructescence - *n.* arrangement of fruits and accessory parts on an axis.
inserted - *a.* attached to or growing out of.
internode - *n.* portion of stem between successive nodes.
intrastaminal - *a.* within the androecium.
introrse - *a.* facing or opening inward towards axis; e.g., dehiscence of anther; *cf.* extrorse and latrorse.
involucel - *n.* small, secondary involucre, as in secondary umbels of Apiaceae (carrots).
involucre - *n.* (1) collective term for dense cluster of bracts subtending flower or inflorescence; (2) collective term for single, pair, or whorl of bracts subtending flower or inflorescence; (3) in Juglandaceae (walnuts), fused bracts forming a husk enclosing nut; **[Plate 24]** (4) in *Quercus* (oak), fused bracts forming a cap partially enclosing nut. **[Plate 24]**
involute - *a.* rolled inward from edges so that adaxial (upper) surface is partially concealed; *cf.* revolute. **[Plate 7]**
jointed - *a.* with distinct nodes or points of actual or apparent separation.
keel - *n.* (1) prominent longitudinal ridge, analogous to keel of boat; (2) in Fabaceae (legumes), the two, fused, abaxial (lower) petals in the papilionaceous corolla. **[Plate 30]**
knee - *n.* erect root protruding above surface of soil or water; characteristic of some emergent aquatic plants; e.g., *Taxodium distichum* (bald cypress).
labellum - *n.* lip; enlarged or morphologically distinctive petal of an orchid flower. (*pl.* labella)
labium - *n.* lower lip of a bilabiate flower. (*pl.* labia; *a.* labiate)
lacerate - *a.* appearing irregularly cut or cleft as if torn. **[Plates 7, 31]**
laciniate - *a.* deeply cut into narrow and unusually irregular lobes.
lamina - *n.* blade or flat expanded portion of leaf or petal. (*a.* laminar)
lanate - *a.* with long, soft, dense, tangled and matted hairs; woolly; *cf.* tomentose. **[Plate 10]**
lanceolate - *a.* lance-shaped; rather narrow, tapering to both ends with broadest part below middle. **[Plate 6]**
lanulate - *a.* diminutive of lanate; minutely woolly.
lateral - *a.* (1) on or at the side of axis or organ; (2) in Poaceae (grasses), one type of compression, with spikelets flattened along margins (sides) of glumes and lemmas. **[Plate 35]**
latex - *n.* thick complex emulsion exuded when a plant is damaged; becomes sticky and coagulates on exposure to air; may be white, yellow, orange, or other colors; produced in laticifers; diagnostic for Apocynaceae, Papaveraceae, Moraceae, and other taxa.
latrorse - *a.* facing or opening longitudinally at side; e.g., dehiscence of anther; *cf.* introrse and extrorse.

leaf - *n.* lateral appendage arising from stem at node and typically subtending axillary bud; comprising blade, petiole, and stipules; having primary functions of photosynthesis and transpiration. (*pl.* leaves)
leaflet - *n.* single segment of a compound leaf.
legume - *n.* in Fabaceae (legumes), Mimosaceae (mimosas), and Caesalpiniaceae (caesalpinias), dry, 1- or rarely 2-locular, 2-valved fruit derived from a simple pistil; typically dehiscent along 2 sutures. **[Plate 21]**
lemma - *n.* in Poaceae (grasses), outer and generally large bract of two subtending flower; one of two bracts of floret. **[Plates 35, 36]**
lenticel - *n.* elliptical, slightly raised, somewhat corky area or pore on surface of young bark.
lenticular - *a.* lens-shaped; elliptical with both sides convex. **[Plate 9]**
lepidote - *a.* covered with small, scurfy, peltate scales. **[Plate 12]**
-let - Latin suffix meaning small or diminutive; e.g., bulblet or leaflet.
ligneous - *a.* woody.
ligulate floret - *n.* in Asteraceae (sunflowers), perfect floret with strap-shaped, 5-toothed corolla borne both in center and at periphery of receptacle; *cf.* ray floret, disk floret. **[Plate 27]**
ligulate head - *n.* in Asteraceae (sunflowers), head bearing only ligulate florets; characteristic of only the tribe Cichorieae; *cf.* discoid head, radiate head, disciform head. **[Plate 27]**
ligule - *n.* (1) tongue- or strap-shaped organ; (2) in Asteraceae (sunflowers), strap-shaped limb of corolla of ligulate floret; **[Plates 16, 27]** (3) in Poaceae (grasses), membranous or hairy appendage on adaxial surface of leaf at junction of sheath and blade. (*a.* ligulate) **[Plate 31]**
limb - *n.* broadened or flattened part of organ extending from narrower base; e.g., the expanded portion of a fused corolla.
linear - *a.* long and narrow with margins parallel or nearly so. **[Plates 6, 20]**
lip - *n.* (l) one of the two projections or segments of a bilabiate corolla or calyx; (2) petal modified or differentiated from others; e.g., labellum of orchid flower.
lobe - *n.* segment or portion of organ separated from adjacent segment by sinuses or clefts. (*a.* lobate)
lobed - *a.* (1) general term indicating presence of lobes; (2) indentations or incisions that extend less than halfway to middle or base; *cf.* cleft, parted. **[Plates 7, 20]**
locule - *n.* cavity or chamber in ovary or anther or fruit.
loculicidal - *a.* dehiscing longitudinally and dorsally directly into locule of capsule; *cf.* septicidal. **[Plate 21]**
lodicule - *n.* in Poaceae (grasses), small, hyaline appendage of tissue at base of ovary; modified sepal.
loment - *n.* flat legume constricted between seeds and disarticulating at constrictions into 1-seeded joints when mature. **[Plate 21]**
longitudinal - *a.* extending along the long axis of an organ. **[Plate 18]**
lunate - *a.* crescent-shaped.
lyrate - *a.* pinnatifid, but with terminal lobes large and rounded and lateral lobes smaller and diminishing in size toward base.
malodorous - *a.* having a disagreeable odor.
malpighian hair - *n.* straight appressed hair attached at middle and tapering to free ends. **[Plate 11]**
mammillate - *a.* with nipple-like protuberances.
many - *a.* not easily counted, but more than 20.
marcescent - *a.* withering but persistent.
margin - *n.* edge or border of organ.
mealy - *a.* dry, powdery or granular covering; with the consistency of fine meal. **[Plate 12]**
medial - *a.* region near center.
megaphyll - *n.* generally large leaf with several to many veins and trace or traces associated with leaf gap or leaf trace gap in stem; *cf.* microphyll.
megasporangium - *n.* multicellular structure producing megaspores; in flowering plants, the nucellus within the ovule. (*pl.* megasporangia)
megaspore - *n.* larger spore of heterosporous plants, gives rise to megagametophyte or embryo sac in flowering plants.
membranous - *a.* thin, pliable, and somewhat translucent; a thin membrane. **[Plate 31]**
mericarp - *n.* 1-seeded, 1-carpellate segment of a schizocarp; characteristic of Apiaceae (carrots) and Geraniaceae (geraniums).
-merous - Greek suffix denoting number of parts in each whorl of a flower; e.g., 3-merous indicating sepals, petals, stamens, and carpels in 3's or multiples of 3.
mesic - *a.* moist habitat; intermediate between xeric and aquatic habitats.
mesocarp - *n.* middle layer of fruit wall or pericarp that is differentiated into three layers.
mesophyte - *n.* plant growing in moisture conditions intermediate between those occupied by hydrophytes and xerophytes.
microphyll - *n.* small leaf-like structure with one vein and one trace not associated with leaf gap or leaf trace gap in stem.
micropyle - *n.* opening in integuments of ovule through which pollen tube normally enters.
microsporangium - *n.* multicellular structure producing microspores; in flowering plants the tapetum of the anther. (*pl.* microsporangia)

microspore - *n.* smaller spore of heterosporous plants, gives rise to microgametophyte or pollen grain in flowering plants.
microsporophyll - *n.* modified leaf bearing microsporangia; a stamen in flowering plants.
monadelphous - *a.* stamens united by filaments or anthers into one group, usually forming tube or column. **[Plate 17]**
moniliform - *a.* regularly constricted; resembling a string of beads.
monoecious - *a.* pistillate and staminate flowers borne on same plant; *cf.* dioecious.
monotypic - *a.* (1) genus with a single species; (2) having only one component.
mucilage - *n.* thick, glutinous or gelatinous substance usually comprising protein and polysaccharides; swells but does not dissolve in water; e.g., shoot exudate of taxa of Malvaceae (mallows). (*a.* mucilaginous)
mucro - *n.* short, abrupt point at apex; less than 3 times longer than wide; straight and stiff; *cf.* apiculum. (*a.* mucronate) **[Plate 8]**
mucronulate - *a.* tipped with very small mucro.
multi- Latin prefix meaning many; as in multiseriate or multiseptate.
multiple - *a.* (1) having several, or more than one; (2) fruit produced by ripened ovaries of several to many flowers; e.g., *Morus* (mulberry); synonym is syncarp.
muricate - *a.* rough surface with short, hard points. **[Plate 12]**
mycotrophic - *a.* forming symbiotic relationship with fungus, usually mycorrhizal.
naked - *a.* (1) devoid of attached structures, hairs, or appendages; (2) without usual covering.
necrotic - *a.* having dead cells or tissues.
nectar - *n.* secretion from glands or nectaries in flowers and certain leaves. (*a.* nectariferous)
nectary - *n.* organ or tissue in which nectar is secreted.
needle - *n.* stiff, linear, evergreen leaf; characteristic of conifers; e.g., *Pinus* (pine).
nerve - *n.* prominent longitudinal vein or slender rib.
net-veined - *a.* anastomosing veins forming an irregular network; reticulate.
neuter - *a.* flower lacking stamens and pistils; *cf.* neutral.
neutral - *a.* flower lacking functional stamens and pistils; organs may be present but are sterile and do not produce spores and gametophytes; *cf.* neuter.
node - *n.* point on stem where leaf(ves), branch(es), adventitious roots, or flower(s) originate. **[Plate 31]**
numerous - *a.* 12 or more.
nut - *n.* dry indehiscent, usually 1-loculed, 1-seeded fruit derived from compound ovary with bony, woody, leathery, or papery pericarp and partially or wholly enclosed in involucre. **[Plate 24]**
nutlet - *n.* (1) in Lamiaceae (mints), Boraginaceae (borages), and Verbenaceae (vervains), dry, indehiscent, 1-seeded fruit derived from 1/2 of carpel. **[Plate 24]** (2) small nut.
ob- Latin prefix indicating inversion of shape and attached to adjectives; e.g., obcordate describes a cordate shape but with sinus at apex rather than base.
oblique - *a.* slanted with unequal sides, especially leaf bases; *cf.* equilateral. **[Plates 8, 17]**
oblong - *a.* rectangular but with rounded ends; 2-3 times longer than broad and sides nearly parallel. **[Plate 6]**
obsolete - *a.* organ or structure so reduced as to be absent or barely detectable; *cf.* rudiment and vestigial.
obtuse - *a.* blunt or rounded at end with sides forming an angle of more than 90 degrees. **[Plate 8]**
ocrea - *n.* in Polygonaceae (knotweeds), sheath around stem formed by fusion of two stipules. (*a.* ocreate)
oogonium - *n.* in lower plants, multicellular organ producing female gametes. (*pl.* oogonia)
open - *a.* expanded; spread out.
opposite - *a.* (1) arrangement of organs such as leaves, branches, flowers, or fruits two per node; **[Plate 2]** (2) arrangement of organs in one floral whorl superposed with those of adjacent floral whorl; e.g., stamens opposite the petals. **[Plate 17]**
orbicular - *a.* essentially circular in outline; applied to flat organs. **[Plate 6]**
orifice - *n.* opening; aperture.
oval - *a.* broadly elliptic, the width over one half the length. **[Plate 6]**
ovary - *n.* basal portion of pistil containing ovules and maturing into fruit after fertilization.
ovate - *a.* egg-shaped in 2 dimensions and attached at broader end; applied to plane surfaces. **[Plate 6]**
ovoid - *a.* egg-shaped in 3 dimensions; applied to solids. **[Plate 9]**
ovulate - *a.* pertaining to ovule, or possessing ovules.
ovule - *n.* multicellular structure containing megagametophyte with egg enclosed within nucellus and 1-2 integuments; becomes seed after fertilization. (*a.* ovuliferous)
pad - *n.* in *Opuntia* (prickly pear), flattened stem joint.
pagodiform - *a.* with multicellular hairs with whorls of sharp, retrorse ridges; having the appearance of miniature pagodas. **[Plate 11]**
palate - *n.* in personate corollas, the protruding portion of the lower lip that partially or completely closes the throat.
pale - *n.* in Asteraceae (sunflowers), membranous or hyaline scale or bristle arising from receptacle and subtending disk floret; synonym is receptacular bract. **[Plate 28]**

palea - *n.* in Poaceae (grasses), inner and generally smaller bract of two subtending flower ; one of two bracts of floret. **[Plate 35]**
palmate - *a.* with 2 or more lobes or segments radiating from the same basal point; resembling fingers spreading from palm of hand. **[Plates 3, 4, 7]**
palmatifid - *a.* cut in palmate fashion nearly to petiole.
palmatisect - *a.* palmately cut almost to petiole into very narrow divisions but not leaflets.
paludal - *a.* pertaining to a marsh; swampy.
pan- Greek prefix meaning whole or all, e.g., pantropical distribution.
pandurate - *a.* fiddle-shaped; rounded at both ends, constricted in middle, and one end larger than other.
panicle - *n.* indeterminate, branched inflorescence comprising rachis, 1-several series of branches, and pedicels bearing flowers. (*a*. paniculate) **[Plates 13, 32, 34]**
papilla - *n.* small, rounded projection or excrescence. (*pl*. papillae; *a*. papillate)
papillose - *a.* bearing minute papillae. **[Plate 12]**
papilionaceous - *a.* in Fabaceae (legumes), corolla shape comprising 5 petals differentiated into a standard (banner), wings, and keel; butterfly-like. **[Plates 16, 30]**
pappus - *n.* in Asteraceae (sunflowers), highly modified calyx of florets; usually in form of capillary bristles, plumose bristles, scales, awns, or short crown.
parallel - *a.* veins extending lengthwise more or less parallel to organ margin. **[Plate 4]**
parallel-convergent - *a* . parallel veins extending from base to apex of leaf in curved manner. **[Plate 4]**
parasite - *n.* plant deriving nutrients from another plant, the host, to which it is attached.
parted - *a.* indentations or incisions that extend more than halfway to middle or base; *cf.* lobed, cleft. **[Plate 7]**
patelliform - *a.* orbicular with a convex lower surface and a concave upper surface; shaped like a kneecap.
pectinate - *a.* comb-like; with close, regularly spaced divisions and long, slender, parallel segments. **[Plate 7]**
pedate - *a.* palmately compound or parted with lateral leaflets or lobes 2- to 4-cleft.
pedicel - *n.* (1) stalk bearing an individual flower; ultimate axis of compound inflorescence; (2) in Poaceae (grasses), stalk bearing a spikelet. (*a*. pedicellate)
peduncle - *n.* primary axis or stalk terminating in inflorescence; axis from node to lowest flower or branch of inflorescence. (*a*. pedunculate) **[Plate 31]**
peltate - *a.* shield-shaped; organ or structure with supporting stalk attached inside margin rather than edge; e.g., leaf blade with petiole attached in center. **[Plate 6]**
pendulous - *a.* hanging or drooping downward.
pepo - *n.* in Cucurbitaceae (gourds), modified berry derived from inferior ovary with 1 locule, many seeds, and tough rind. **[Plate 25]**
perennating organ - *n.* modified vegetative organ allowing biennial or perennial plants to persist from year to year; e.g., rhizome, bulb, corm, tuber, caudex.
perennial - *a.* (1) plant whose life cycle takes 3 to many growing seasons to complete; (2) continuing to live from year to year. (*v*. perennate)
perfect - *a.* flowers having both stamens and pistils present.
perfoliate - *a.* sessile leaf with basal portion fused around stem, so that it appears to pass through blade. **[Plates 5, 8]**
perianth - *n.* collective term for calyx and corolla; if both are present, perianth is said to be in 2-series; if calyx or corolla are absent, is said to be in 1-series.
pericarp - *n.* wall of fruit or mature ovary; may be dry or fleshy, or undifferentiated or differentiated into 2-3 layers.
perigynium - *n.* in Carex (sedge), sac-like bract surrounding pistillate flower, open only at apex. (*pl*. perigynia)
perigynous - *a.* with stamens, petals, and sepals arising from rim of hyanthium surrounding but not fused to ovary; ovary superior to other organs; *cf.* hypogynous, epigynous. **[Plate 15]**
persistent - *a.* remaining attached; not falling off; *cf.* caducous.
personate - *a.* bilabiate corolla with upper lip arched and lower closing throat by prominent projection (palate).
petal - *n.* one member of second whorl of floral organs; typically colored and showy.
petaloid - *a.* petal-like in color and/or shape and/or texture.
petaliferous - *a.* (1) bearing petals; (2) bearing nectar glands at bases of petals.
petiole - *n.* stalk of leaf connecting blade and stem node. (*a*. petiolate) **[Plate 5]**
petiolule - *n.* stalk of leaflet of compound leaf.
phreatophyte - *n.* plant with root system typically in soil saturated with water.
phyllary - *n.* in Asteraceae (sunflowers), involucral bract of head subtending florets. **[Plate 28]**
phyllode - *n.* modified petiole or rachis (rachis leaf) functioning as leaf blade; photosynthetic; linear; terete or flattened; solid or hollow; septate or non-septate; e.g., *Harperella nodosa*.
phylogeny - *n.* evolutionary history of an organism or group. (*a*. phylogenetic)
pilose - *a.* with long, soft, erect or ascending, generally straight hairs. **[Plate 10]**

pinna - *n.* (1) one of the primary divisions of a pinnately compound leaf; (2) primary division of a fern frond. (*pl.* pinnae) **[Plate 37]**
pinnate - *a.* feather-like; with closely arranged secondary veins radiating from midvein (primary) in 2 rows. **[Plate 4]**
pinnately - *a.* compound leaf with leaflets borne in 2 rows along an axis; if 1-compound, leaflets are attached to rachis; if 2- or 3-compound, leaflets attached to secondary or tertiary axes (rachillas). **[Plate 3]**
pinnatifid - *a.* pinnately cleft to parted into narrow lobes almost to midrib. **[Plate 7]**
pinnatisect - *a.* pinnately cut almost to midrib into very narrow divisions but not leaflets. **[Plate 7]**
pinnipalmate - *a.* venation intermediate between pinnate and palmate, as in leaf with first pair of veins at base of blade larger and more distinctive than others arising from midvein. **[Plate 4]**
pinnule - *n.* (1) leaflet of a 2-pinnately compound leaf; secondary pinna; (2) secondary division of fern frond. **[Plates 37, 38, 41]**
pistil - *n.* innermost floral organ; normally differentiated into ovary, style, and stigma; female organ; when simple comprising 1 carpel; when compound comprising 2 or more carpels.
pistillate - *a.* flower bearing pistil or pistils, but lacking functional stamens.
pit - *n.* hardened endocarp of drupe enclosing 1 seed; synonym is stone; e.g., *Prunus persica* (peach) and other stone-fruits of Rosaceae (roses). **[Plate 25]**
pith - *n.* centermost tissue of stem; usually soft or spongy.
placenta - *n.* ovule-bearing tissue in ovary. (*pl.* placentae)
placentation - *n.* arrangement of placentae within ovary; five types recognized: (1) apical - ovule(s) attached to apex; (2) axile - ovules attached to central axis and separated by septa; (3) free-central - ovules attached to central axis and not separated by septa; (4) basal - ovule(s) attached at base; (5) parietal - ovules attached in 1 or more sets to ovary wall. **[Plate 19]**
plano-convex - *a.* flat on one side and convex on the other side; e.g., spikelets of *Paspalum* (watergrass).
plicate - *a.* pleated or folded longitudinally, as a folding fan.
plumose - *a.* indumented in manner simulating feather or plume. **[Plate 20, 29]**
pollen - *n.* mature microspores or developing microgametophytes in seed plants.
pollinium - *n.* in Orchidaceae (orchids) and Asclepiadaceae (milkweeds), coherent mass of pollen. (*pl.* pollinia)
polygamous - *a.* bearing perfect and imperfect flowers on same plant.
polygamo-dioecious - *a.* bearing perfect and staminate flowers or perfect and pistillate flowers on separate plants.
polygamo-monoecious - *a.* bearing perfect, staminate and pistillate flowers on same plant.
pome - *n.* fleshy, indehiscent fruit derived from a compound pistil with an inferior ovary surrounded by receptacular tissue and enclosing seeds within papery or cartilaginous endocarps; e.g., *Malus* (apple). **[Plate 25]**
pore - *n.* orifice or opening, as in anthers or fruits. (*a.* poricidal) **[Plates 18, 21]**
prehensile - *a.* clasping or grasping, as tendrils.
prickle - *n.* small, spine-like outgrowth of bark or epidermis.
prostrate - *a.* laying flat on ground. **[Plate 1]**
protuberance - *n.* projection or swelling or bulge from surface of organ; may be hard or soft; apex may be rounded or acute; e.g., follicle surface of *Asclepias speciosa* (showy milkweed).
proximal - *a.* nearest to point of origin or attachment or center of organ; *cf.* distal.
pseudo- Greek prefix meaning false or closely resembling.
puberulent - *a.* minutely pubescent. **[Plate 10]**
pubescent - *a.* (1) general term for presence of any type of hairs; (2) covered with short, soft, erect or ascending hairs. **[Plate 10]**
pulverulent - *a.* appearing dusty or powdery.
pulvinus - *n.* (1) swollen base of petiole or petiolule, especially conspicuous in some legumes; (2) in Poaceae (grasses), swelling of culm or sheath just above node. (*pl.* pulvini)
punctate - *a.* (1) with pits, (2) with colored and/or translucent sunken glands. **[Plate 12]**
pungent - *a.* having a sharp, acrid odor or taste.
pustule - *n.* small blister- or pimple-like area on surface elevations. (*a.* pustulate) **[Plate 12]**
putrid - *a.* having an unpleasant or repulsive odor of decomposing matter.
pyramidal - *a.* pyramid-shaped; tetrahedral.
pyriform - *a.* pear-shaped.
raceme - *n.* indeterminate inflorescence consisting of a rachis bearing number of pedicelled flowers. (*a.* racemose) **[Plates 13, 32]**
rachilla - *n.* (1) diminutive or secondary axis of rachis; (2) in Poaceae (grasses) and Cyperaceae (sedges), axis of spikelet.
rachis - *n.* central axis of compound leaf or compound inflorescence; bearing flowers or leaflets. (*pl.* rachises) **[Plate 31]**
radial - *a.* (1) denoting radius; (2) developing uniformly on all sides; (3) divisible into mirror-image halves in 2 or more planes; *cf.* bilateral and asymmetrical. **[Plate 15]**

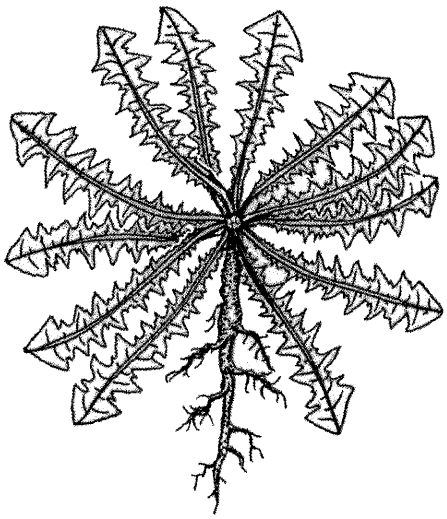
radiate head - *n*. in Asteraceae (sunflowers), head bearing disk florets in the center and conspicuous ray florets at the periphery; *cf*. ligulate head, discoid head, disciform head. **[Plate 27]**
rame - *n.* in Andropogoneae (bluestem tribe) of the Poaceae (grasses), inflorescence consisting of dorsally compressed paired spikelets, one sessile and one pedicelled, borne on a disarticulating rachis. **[Plate 34]**
rank - *n.* a vertical row along an axis.
ray - *n.* (1) one of radiating stalks arising from apex of peduncle of compound umbel; **[Plate 13]** (2) one of radiating branches of a stallate hair; (3) in Asteraceae (sunflowers), strap-shaped limb of corolla of ray floret. **[Plate 27]**
ray floret - *n*. in Asteraceae (sunflowers), pistillate or neutral floret with strap-shaped corolla borne at periphery of head (corolla absent in some taxa); *cf*. disk floret, ligulate floret. **[Plate 27]**
receptacular bract - *n.* in Asteraceae (sunflowers), membranous or hyaline scale arising from receptacle and subtending disk floret; synonym is pale.
receptacle - *n.* expanded portion of stem which bears floral organs. (*a*. receptacular)
recurved - *a.* gradually bent or turned backward.
reflexed - *a.* abruptly bent downward or backward away from organ center or axis; *cf*. recurved..
reniform - *a.* kidney-shaped. **[Plate 6]**
resin - *n.* complex oxidation products of various essential oils exuded by some plant species in a liquid or semi-liquid state; typically yellowish to dark brown or black; insoluble in water, but soluble in alcohol, ether, and other solvents; e.g., *Pinus*. (*a*. resinous)
resupinate - *a.* inverted or upside down, or apparently so, due to 180° twisting of petiole or pedicel; e.g., orchid flower.
reticulate - *a.* forming network of anastomosing veins; net-veined.
retrorse - *a.* directed downward or backward or towards base; *cf*. antrorse.
revolute - *a.* rolled downward from edges so that abaxial (lower) surface is partially concealed; *cf*. involute. **[Plate 7]**
rhizome - *n.* horizontal underground stem producing aerial stems and leaves along its length or at end; scale leaves present or absent. (*a*. rhizomatous)
rhizophore - *n.* in *Selaginella* (spikemoss), leafless stem branch from which roots arise.
rhomboidal - *a.* diamond-shaped; elliptic but with straight margins and angled at middle; *cf*. trullate. **[Plate 6]**
ribbed - *a.* with prominent ribs or veins. **[Plate 9]**
ridge - *n.* long, relatively narrow, raised strip with sloping sides.
root - *n.* descending axis of plant; growing opposite stem; without nodes and leaves, typically developing underground; having primary functions of anchorage and absorption of water and nutrients.
rootlet - *n.* small, slender root or secondary root.
rosette - *n.* cluster of leaves radiating from common center or crown; usually at or near ground level or rarely at stem apex. **[Plate 2]**
rostellum - *n.* in Orchidaceae (orchids), small, beak-like extension of tissue from upper edge of stigma.
rotate - *a.* circular corolla shape with short tube and wide limb(s) spreading at right angles to tube. **[Plate 16]**
rotund - *a.* nearly circular in outline; intermediate between orbicular and oblong.
rounded - *a*. curved in outline; arc of a circle. **[Plate 8]**
rudiment - *n.* (1) incompletely developed organ or structure; *cf*. obsolete and vestigial; (2) in *Melica* (melicgrass), club-shaped, sterile structure composed of 1-4 sterile florets at end of rachilla. (*a*. rudimentary)
rugose - *a.* irregularly and coarsely wrinkled. **[Plate 12]**
runcinate - *a.* sharply pinnatifid or cleft with retrorse segments. **[Plate 7]**
sac - *n.* bag-shaped or pouch-like. (*a*. saccate)
sagittate - *a.* arrowhead-shaped, with two basal lobes turned downward or toward axis; *cf*. hastate. **[Plates 6, 8]**
salverform - *a.* corolla with slender tube and abruptly expanded limb at right angles to tube; trumpet-shaped; e.g., *Phlox* (Phlox). **[Plate 16]**
samara - *n.* winged, dry, indehiscent, 1-seeded, achene-like fruit; e.g., *Ulmus* (elm) and *Fraxinus* (ash). **[Plate 23]**
sap - *n.* aqueous fluids transported in vessels or tracheids of xylem and in sieve elements of the phloem.
saprophyte - *n.* plant deriving all of its nutrients from dead or of decaying organic matter; usually lacking chlorophyll. (*a*. saprophytic)
saxicolous - *a.* dwelling or growing among or on rocks.
scabrous - *a.* surface rough to the touch due to epidermal projections or short stiff hairs. **[Plate 12]**
scaberulous - *a*. minutely roughened.
scale - *n.* (1) small, thin, usually scarious leaf or bract; (2) small leaf modified for protection of bud meristem; (3) small, scarious or coriaceous appendage of tissue within perianth; (4) in Cyperaceae (sedges), small bract subtending individual flower in spike; (5) thin, flat structure of epidermal origin. (*a*. scaly)
scandent - *a.* climbing.
scape - *n.* erect or ascending, leafless peduncle arising from ground and bearing 1-many flowers; may bear scales or bracts but not foliage leaves. (*a*. scapose)

scapiform - *a.* scape-like, but bearing a few leaves.
scar - *n.* (1) mark or indentation left on stem by separation of leaf or bud scale; (2) mark or indentation on seed when it detaches.
scarious - *a.* thin, dry, and membranous; not green; semi-translucent.
schizocarp - *n.* dry, dehiscent fruit derived from a compound pistil that splits into separate 1-seeded, 1-carpellate segments at maturity; e.g., Apiaceae (carrots) and Geraniaceae (geraniums). **[Plate 22]**
scorpioid - *a.* like a scorpion's tail; as in some coiled cymes with flowers borne in 2 opposite ranks.
scrambling - *v.* to climb upon or over a support such as a rock or fence, or another plant; *cf.* twining.
scurf - *n.* small bran-like scales. (*a.* scurfy)
secund - *a.* flowers or branches arranged on one side of an axis.
seed - *n.* multicellular structure developing from ovule after fertilization; typically comprising embryo, seed coat, and storage tissue such as endosperm.
semi- Latin prefix meaning partially.
semiparasite - *n.* plant photosynthetic, but obtaining some nutrients from host plant.
semiterete - *a.* (1) round on one side and flat on the other; **[Plate 9]** (2) slightly compressed.
sepal - *n.* one member of outer most whorl of floral organs; typically green; sometimes leaf-like or petaloid.
sepaliferous - *a.* (1) bearing sepals; (2) bearing nectary glands at bases of sepals.
sepaloid - *a.* sepal-like in color and/or shape and/or texture.
septicidal - *a.* capsules dehiscing through the septa between the locules; *cf.* loculicidal. **[Plate 21]**
septifragal - *a.* capsules dehiscing via separation of valves from septa leaving placentae and seeds in middle.
septum - *n.* partition or wall; e.g., walls separating adjacent locules in ovary. (*pl.* septa; *a.* septate)
sericeous - *a.* with long, soft, slender, generally appressed hairs; silky. **[Plate 10]**
series - *n.* a number of structures standing in order and related in some fashion; e.g., calyx and corolla are each a series of floral parts.
serrate - *a.* with sharp teeth pointing forward on margin of organ; if once serrate, margin of each tooth entire; if twice serrate, margin of each tooth with smaller teeth. **[Plate 7]**
serrulate - *a.* minutely serrate.
sessile - *a.* stalkless; attached directly at the base, as leaf without petiole. **[Plate 5]**
seta - *n.* bristle. (*pl.* setae)
setaceous - *a.* bristle-like; bearing bristles.
setose - *a.* covered with sharply pointed bristles.
sheath - *n.* long, more or less tubular structure partly or wholly surrounding another organ or part. **[Plate 31]**
shoot - *n.* (1) collective term for stem and leaves; (2) young stems or branches arising from roots or older stems or branches.
shrub - *n.* woody plant with multiple stems from base but lacking a single trunk.
sigmoid - *a.* curving in one direction and then the other; s-shaped.
silicle - *n.* in Brassicaceae (mustards), dry, dehiscent, 2-carpellate fruit;less than two times longer than wide; with two valves separating from persistent septum (replum) and placentae. **[Plate 22]**
silique - *n.* in Brassicaceae (mustards), dry, dehiscent, 2-carpellate fruit; more than two times longer than wide; with two valves separating from persistent septum (replum) and placentae. **[Plate 22]**
simple - *a.* organ not divided into distinct parts or segments; not compound; e.g., leaf with undivided blade or pistil with one carpel; *cf.* compound. **[Plate 3]**
sinuate - *a.* with wavy margin in horizontal plane alternatively concave and convex (in and out); *cf.* undulate. **[Plate 7]**
sinus - *n.* space or indentation between two lobes or segments of an expanded organ such as leaf or petal.
solitary - *a.* single; only one; one-flowered. **[Plate 13]**
sorus - *n.* cluster of sporangia in ferns. (*pl.* sori) **[Plates 37, 42]**
spadix - *n.* in Araceae (arums), spike bearing small flowers crowded on fleshy axis. (*pl.* spadices) **[Plate 14]**
spathe - *n.* bract or pair of bracts surrounding or subtending solitary flower, spadix, or other inflorescence. **[Plate 14]**
spathulate - *a.* spatula-shaped; obovate or oblong apically, but attenuated at base. **[Plate 6]**
spicate - *a.* spike-like; inflorescence with appearance of spike but flowers not truly sessile.
spicy - *a.* having a pleasant tart or biting odor or taste.
spike - *n.* inflorescence consisting of central rachis bearing one or more sessile flowers. **[Plates 13, 32]**
spikelet - *n.* (1) in Poaceae (grasses), highly modified inflorescence typically consisting of two glumes, one or more florets, and rachilla; **[Plates 14, 35]** (2) in Cyperaceae (sedges), highly condensed spike consisting of flowers and subtending bracts (scales) borne on short axis.
spine - *n.* (l) sharp, stiff projection from stem; a modified leaf or stipule; (2) structure with appearance of a spine. (*a.* spinose) **[Plate 7]**
spinescent - *a.* ending in a spine or spine-like sharp point.
spinulose - *a.* minutely spiny.

spiral - *a.* coiled or wound around an axis and gradually and continuously ascending or descending.
sporangium - *n.* (1) multicellular organ producing spores; (2) in ferns, borne in sori **[Plates 37, 42]** or terminal aggregations. **[Plate 39]** (*pl.* sporangia)
spore - *n.* reproductive cell capable of developing into an adult without fusion with another cell; in flowering plants giving rise to gametophytes.
sporocarp - *n.* specialized structure containing sporangia.
sporophyll - *n.* sporangium-bearing leaf, scale, or frond.
sporophyte - *n.* diploid (2n), spore-producing generation of plants with a sporic reproductive cycle; in flowering plants, the familiar green plant.
spreading - *a.* extending more or less horizontally outward.
spur - *n.* (1) short, compact branch with little or no internodal development; often bearing fascicles of leaves or flowers; (2) tubular or sac-like, basal extension of sepal or petal. (*a.* spurred) **[Plate 16]**
squamiform - *a.* scale-like.
stalk - *n.* general term for any supporting or connecting structure such as petiole, peduncle, pedicel, filament, or stipe.
stamen - *n.* floral organ producing pollen and normally consisting of filament and anther. (*a.* staminal)
staminate - *a.* flower bearing stamens but lacking functional pistil.
staminodium - *n.* sterile stamen; anther vestigial or absent, sometimes petal-like or otherwise highly modified. (*pl.* staminodia; *a.* staminodial)
standard - *n.* synonym of banner. **[Plate 30]**
stellate - *a.* (1) star-shaped, radiating like the points of a star; (2) hairs with several branches radiating from one point. **[Plate 11]**
stem - *n.* ascending axis of plant which bears and supports leaves, flowers and fruits; growing opposite root; with nodes; typically developing above ground.
sterile - *a.* (1) not producing viable seeds; (2) not producing pollen; (3) in Poaceae (grasses), floret or spikelet not producing a caryopsis; (4) in Asteraceae (sunflowers), floret not producing an achene.
stigma - *n.* portion of pistil which receives pollen; typically at end of style. (*a.* stigmatic)
stipe - *n.* (1) stalk of a pistil or other organ or gland; (2) petiole of fern frond. (*a.* stipitate) **[Plate 37]**
stipel - *n.* one of a pair of appendages borne at base of leaflet.
stipule - *n.* one of pair of appendages borne at base of leaf. (*a.* stipulate)
stolon - *n.* elongate, horizontal, aboveground stem typically rooting at nodes and giving rise to new shoots.
stoloniferous - *a.* producing stolons. **[Plate 1]**
stone - *n.* hardened endocarp of drupe enclosing 1 seed; synonym is pit; e.g., *Prunus persica* (peach) and other stone-fruits of Rosaceae (roses). **[Plate 25]**
stramineous - *a.* straw-like in color and/or texture.
striate - *a.* with narrow, usually parallel lines or grooves.
strigose - *a.* with long, stiff, sharp, straight or curved, appressed hairs. **[Plate 10]**
strigulose - *a.* minutely strigose.
strobilus - *n.* small cone, or dense cone-like cluster of sporophylls. (*pl.* strobili)
style - *n.* slender stalk connecting stigma to ovary. (*a.* stylar)
stylopodium - *n.* enlargement or disk-like expansion at base of style, as in Apiaceae (carrots) and Cyperaceae (sedges). (*pl.* stylopodia)
sub- Latin prefix meaning almost; e.g., subsessile or suboval.
submerged - *a.* plants growing entirely under water.
subshrub - *n.* (1) low growing, but wholly woody shrub; (2) plant with stems slightly woody at bases and distal herbaceous portions dying back.
subtend - *v.* to enclose or extend beyond structure in its axil; e.g., as bract below flower or leaf below bud.
subulate - *a.* narrowly wedge-shaped and tapering from base to fine, sharp point; awl-shaped.
succulent - *a.* firm, and fleshy or juicy.
suffrutescent - *a.* obscurely or somewhat shrubby; slightly woody at base; distal herbaceous portions dying back to woody bases.
suffused - *a.* spread throughout with contrasting color.
sulcate - *a.* with one or more longitudinal grooves.
superior - *a.* (1) one organ higher than another; (2) ovary attached at summit or center of receptacle and above the point of attachment of the other floral organs; *cf.* inferior. **[Plate 15]**
superposed - *a.* one above the other; e.g., vertically arranged axillary buds.
suture - *n.* junction or seam of fusion; line of opening or dehiscence of fruit or anther.
symmetry - *n.* condition whereby half of organ or structure is mirror image of other half; correspondence in size, shape, and relative position of parts of two halves.

syncarp - *n.* multiple fruit derived from fused pistils of 2 or more flowers; e.g., *Morus* (mulberry). **[Plate 26]**
taproot - *n.* persistent, well-developed primary root, generally larger than secondary roots that arise from it. **[Plate 1]**
tassel - *n.* in *Zea mays* (maize), staminate inflorescence comprising a panicle of rames and borne at end of culm.
taxon - *n.* general taxonomic term for any group of any rank. (*pl.* taxa)
tendril - *n.* rotating or twisting thread-like process or extension by which a plant grasps an object for support; morphologically it may be a modified stem, leaf, leaflet, or stipule.
terete - *a.* (1) cylindrical; (2) circular in cross section. **[Plates 9, 35]**
terminal - *a.* tip or apex of stem, summit of axis; e.g., terminal leaflet of 1-pinnately compound leaf.
ternate - *a.* in threes.
terrestrial - *a.* growing on land; not in water.
tetradynamous - *a.* having four long stamens and two short; as in Brassicaceae (mustards). **[Plate 17]**
tetrahedral - *a.* four-sided, each side triangular; pyramidal.
thallus - *n.* plant body not differentiated into roots, stems, and leaves; e.g., liverworts or members of Lemnaceae (duckweeds). (*a.* thalloid; *pl.* thalli)
theca - *n.* one-half of anther containing two pollen sacs or microsporangia. (*pl.* thecae)
thicket - *n.* thick, dense growth of shrubs or woody vines or small trees.
thorn - *n.* stiff, modified stem with sharp point; may be woody.
throat - *n.* orifice of the tube of a corolla or calyx or perianth; area between tube and limb.
thyrse - *n.* compact, cylindrical, or ovate panicle with indeterminate main axis and determinate cymose sub-axes. (*a.* thyrsoid)
tomentose - *a.* with soft, short, dense, matted or tangled, hairs; woolly; *cf.* lanate. **[Plate 10]**
tomentulose - *a.* slightly tomentose.
toothed - *a.* general term encompassing margin with serrations, dentations, or crenations.
torulose - *a.* cylindrical with swellings and constrictions at intervals; knobby.
trailing - *a.* prostrate or creeping but not rooting.
translator - *n.* in Asclepiadaceae (milkweeds), connecting structure between pollinia of adjacent anthers.
translucent - *a.* semitransparent; allowing passage of light but not permitting a clear view of any object.
transverse - *a.* perpendicular to long axis of structure.
tree - *n.* perennial woody plant of considerable stature at maturity with one main stem (trunk); generally branching well aboveground and exhibiting well developed crown.
trichome - *n.* any hair-like outgrowth of epidermis.
trifid - *a.* divided into three parts.
trigonous - *a.* with three-angles and sides. **[Plate 9]**
trullate - *a.* trowel-shaped; ovate but with straight margins and angled below middle; *cf.* rhomboidal.
truncate - *a.* ending abruptly, base or apex transversely straight or nearly so, as if cut off. **[Plate 8]**
tube - *n.* hollow, cylindrical structure, as constricted basal portion of some fused corollas.
tuber - *n.* short, thickened branch of subterranean rhizome bearing nodes and buds, serving in food storage; e.g., *Solanum tuberosum* (potato).
tubercle - *n.* (1) small swelling or projection; (2) in Cyperaceae (sedges), persistent or deciduous style or style base different in color or texture from body of achene and delimited by suture. (*a.* tuberculate)
tubular - *a.* having the form of tube or cylinder. **[Plate 16]**
tuft - *n.* dense cluster of organs or structures.
turbinate - *a.* top-shaped; inversely conical but contracted near apex.
turion - *n.* (1) small, underground, bulb-like shoot which often overwinters as in *Epilobium* (willow-herb); (2) overwintering bud produced by some aquatic plants such as *Lemna* (duckweed).
twig - *n.* small shoot or branch of woody plant.
twining - *v.* to grow around or encircle a support such as a pole or fence or another plant; *cf.* scrambling.
ultimate segment - *n.* smallest subunit of leaf or frond; e.g., one lobe of a pinnatifid or pinnatisect leaf or pinnule or pinna. **[Plate 37]**
umbel - *n.* indeterminate, flat-topped or hemispheric inflorescence consisting of flowers borne on pedicels arising from common point of attachment; in simple umbels, pedicels arise from end of peduncle; in compound umbels pedicels arise from end of rays which arise from end of peduncle. (*a.* umbellate; umbelliform) **[Plate 13]**
umbellet - *n.* one of ultimate umbellate clusters of compound umbel.
undulate - *a.* with wavy margin in vertical plane; alternatively convex and concave (up and down); *cf.* sinuate. **[Plate 7]**
uncinate - *a.* hooked at tip. **[Plate 11]**
uni- Latin prefix meaning one; as in unilabiate or unisexual.
urceolate - *a.* urn-shaped or pitcher-like corolla or involucre; globose to cylindrical, but contracted at or just below mouth. **[Plate 16]**
utricle - *n.* small, thin walled, l-seeded, bladder-like, fruit; e.g., *Atriplex* (saltbush). **[Plate 24]**

valvate - *a.* (1) edges of adjacent organs meeting but not overlapping; (2) opening by valves breaking away from septum or septa. **[Plates 18, 21, 28]**
valve - *n.* (1) one of several segments into which a dehiscent fruit naturally separates at maturity; (2) in poricidal anthers, the portion of the anther wall covering the pore.
vascular bundle scar - *n.* mark within leaf scar left by vascular bundle at leaf separation.
vein - *n.* vascular bundle visible externally; primary veins are largest of leaf, occurring either singly as midvein or as a series; secondary veins arise from primary veins.
veinlet - *n.* small vein.
velutinous - *a.* with short, soft, straight, dense hairs; uniform in length; not matted or tangled; velvety. **[Plate 10]**
velum - *n.* in *Isoetes* (quillwort), membranous indusium.
venation - *a.* arrangement of veins on surface of organ.
venter - *n.* in Cyperaceae (sedges), band or wedge of tissue connecting margins at apex of sheath; typically chartaceous.
ventral - *a.* pertaining to or located on front; (2) adaxial surface of organ; *cf.* dorsal.
verrucose - *a.* surface covered with wart-like projections; warty.
vernal - *a.* appearing or occurring in the spring.
vernation - *n.* arrangement of leaves within the bud.
versatile - *a.* attached near the middle rather than at one end, as in some anthers; *cf.* basifixed and dorsifixed.
verticil - *n.* a whorl of leaves or flowers. (*a.* verticillate) **[Plate 13]**
vesicle - *n.* small, bladder-like sac or cavity. (*a.* vesicular)
vestigial - *a.* organ much reduced and likely non-functional as a result of evolutionary reduction; *cf.* obsolete and rudiment.
villous - *a.* with long, soft, curly hairs; shaggy; not matted. **[Plate 10]**
vine - *n.* climbing or scrambling plant with elongate, flexible, non-self supporting stems.
viscid - *a.* covered with a sticky or gelatinous exudate; gummy to the touch.
viscidium - *n.* in Orchidaceae (orchids), sticky structure or region on pollinia that adheres to pollinator.
viscin threads - *n.* thread-like hairs on pollen; e.g., Onagraceae (evening-primroses).
viscous - *a.* having a sticky or glutinous consistency.
waxy - *a.* resembling wax in appearance, consistency, or adhesive qualities; e.g., surfaces of leaves and fruit in Myricaceae (bay-berries).
weed - *n.* plant species which aggressively colonizes disturbed habitats and cultivated lands.
whorl - *n.* (1) arrangement of organs such as leaves, branches, flowers, or fruits three or more per node; (2) two or more cyclic groups of sepals or petals or stamens. (*a.* whorled) **[Plate 2]**
wing - *n.* (1) thin, flat membranous expansion of pericarp in samara; (2) lateral petal of papilionaceous flower; **[Plate 30]** (3) cortical eruptions of bark forming ridges on branches of some woody plants; (4) thin, flat, membranous expansion forming ridge or flange on organ. **[Plate 9]**
xeric - *a.* dry; arid.
xerophyte - *n.* plant adapted to dry conditions of air or soil; desert plant, *cf.* hydrophyte and mesophyte.



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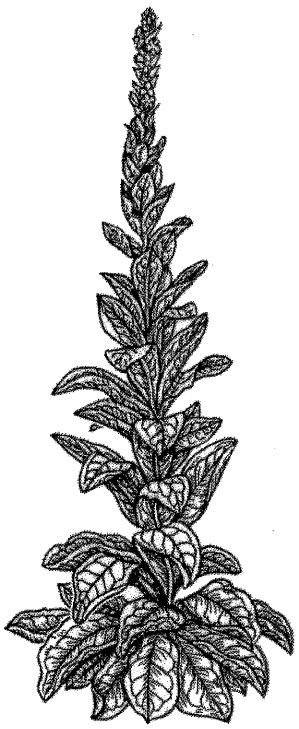

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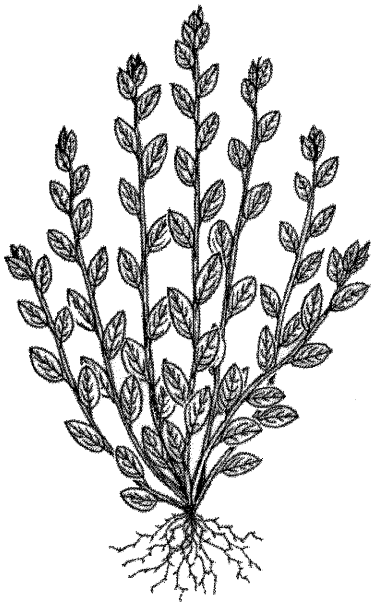
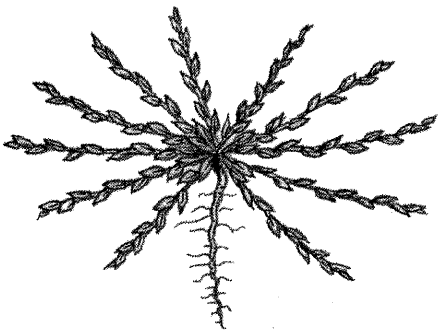
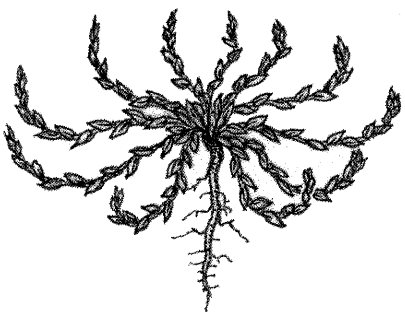


ASCENDING



PROSTRATE

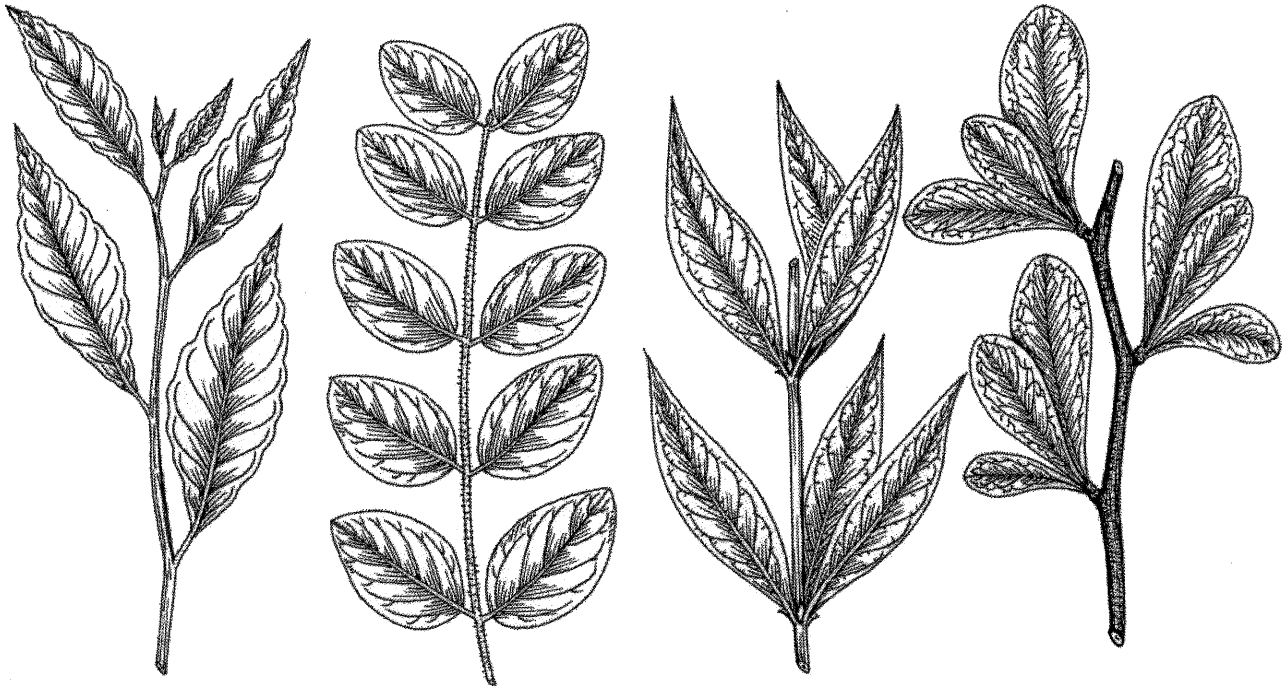


DECUMBENT

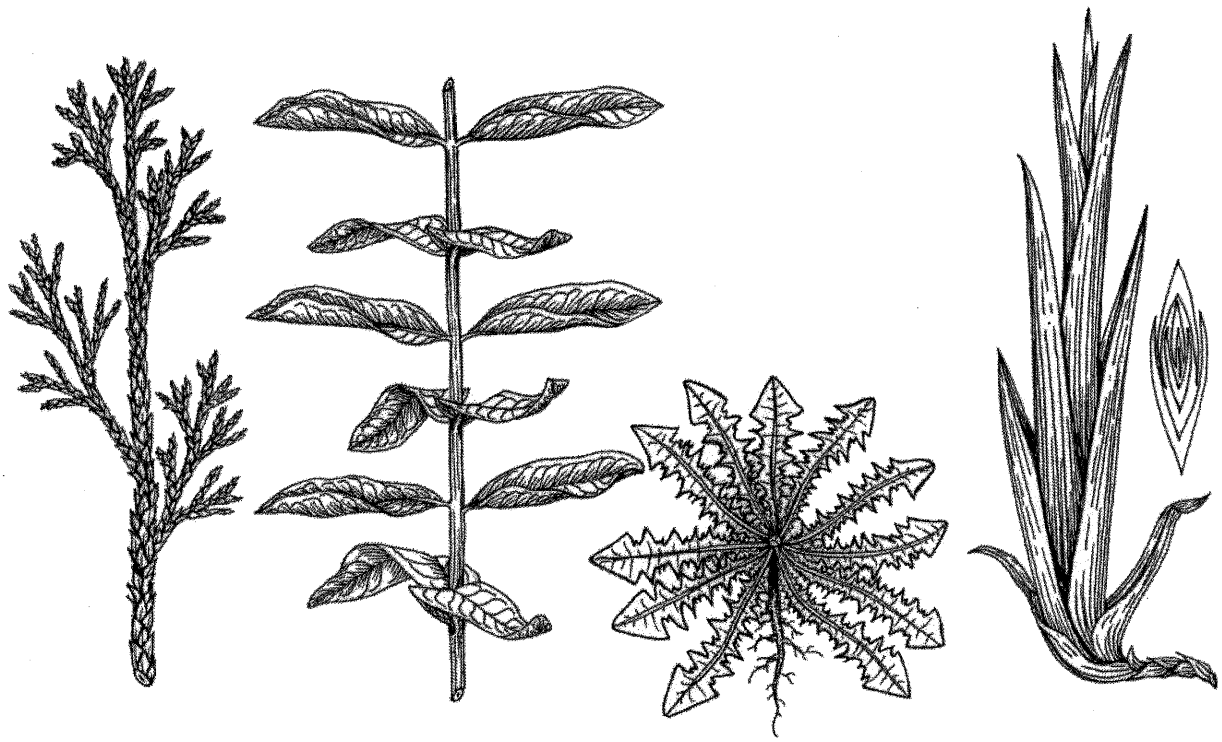
STOLONIFEROUS

Bellamy Parker Larsen ©2001

PLATE 1. STEM HABIT



ALTERNATE OPPOSITE WHORLED FASCICLED



IMBRICATE DECUSSATE BASAL ROSETTE EQUITANT

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PLATE 2. LEAF ARRANGEMENT

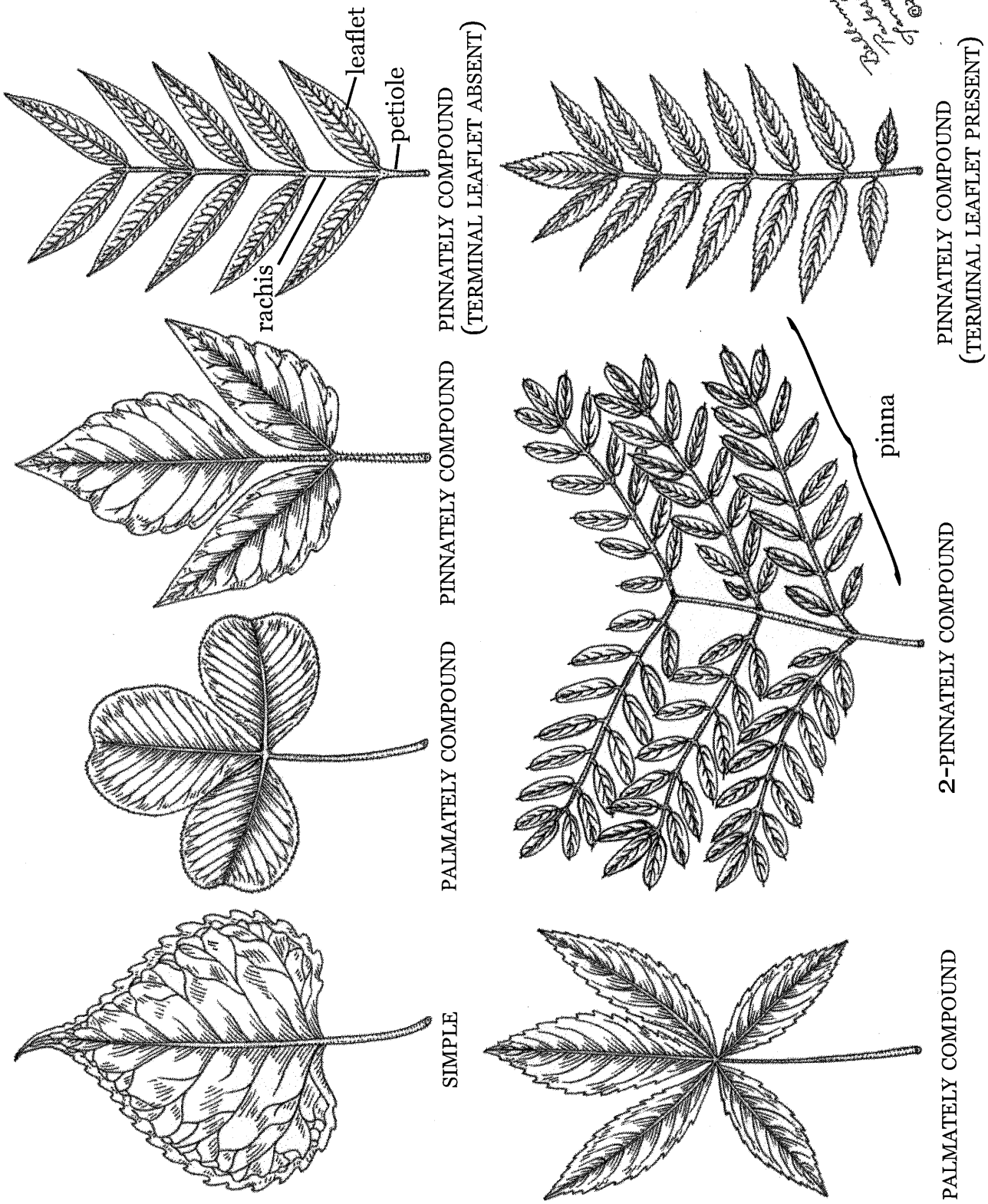
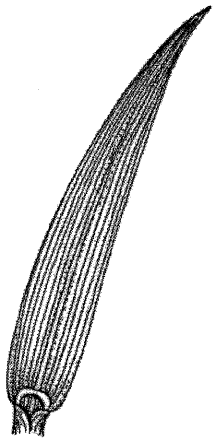
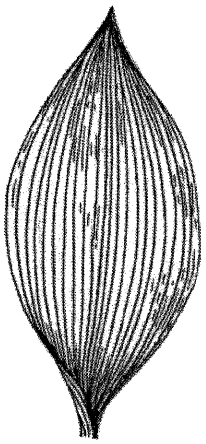


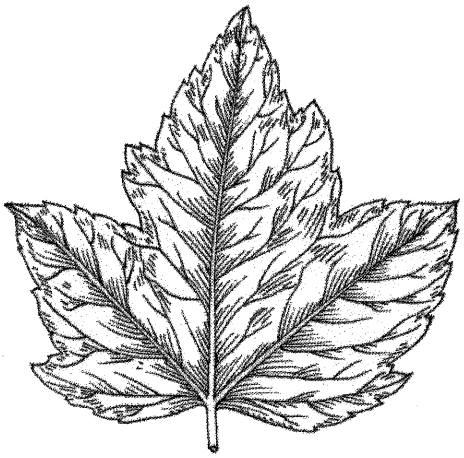
PLATE 3. BLADE DISSECTION



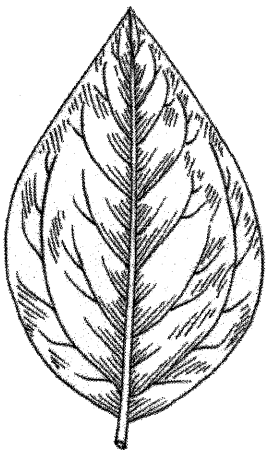
PARALLEL



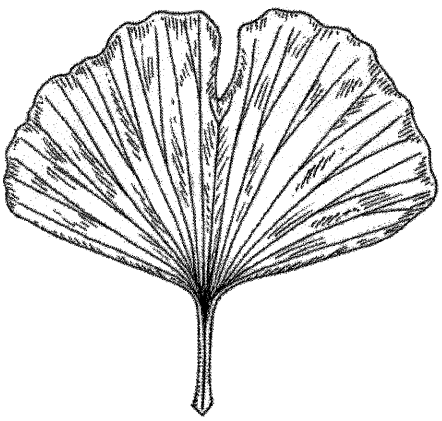
PARALLEL-CONVERGENT



PALMATE



PINNIPALMATE



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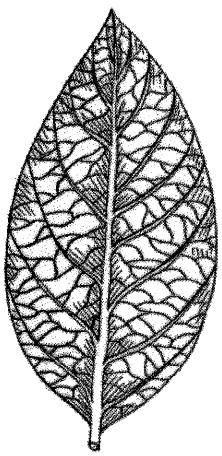

PINNATE

PLATE 4. VENATION

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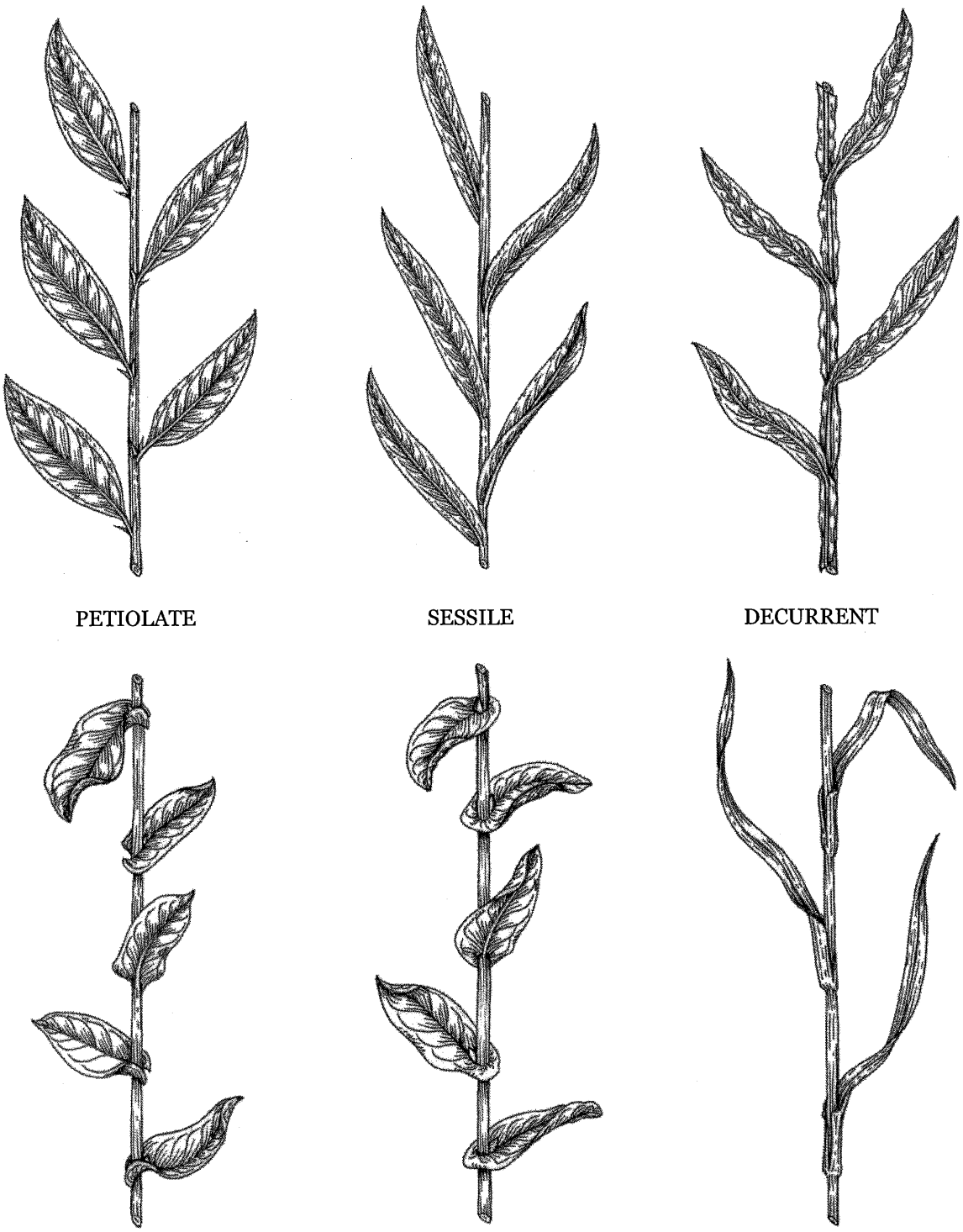


PLATE 5. LEAF ATTACHMENT

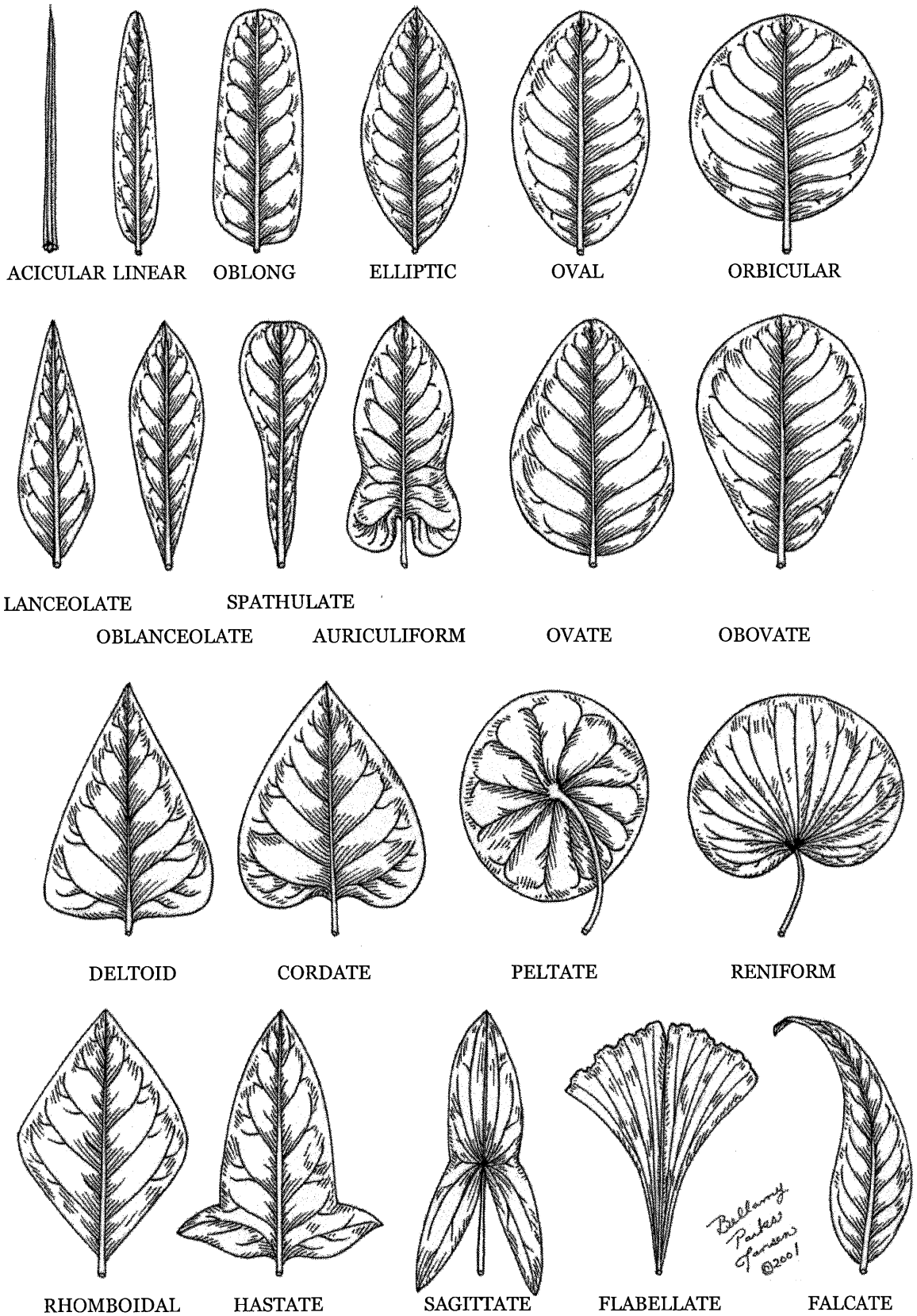


PLATE 6. SHAPES

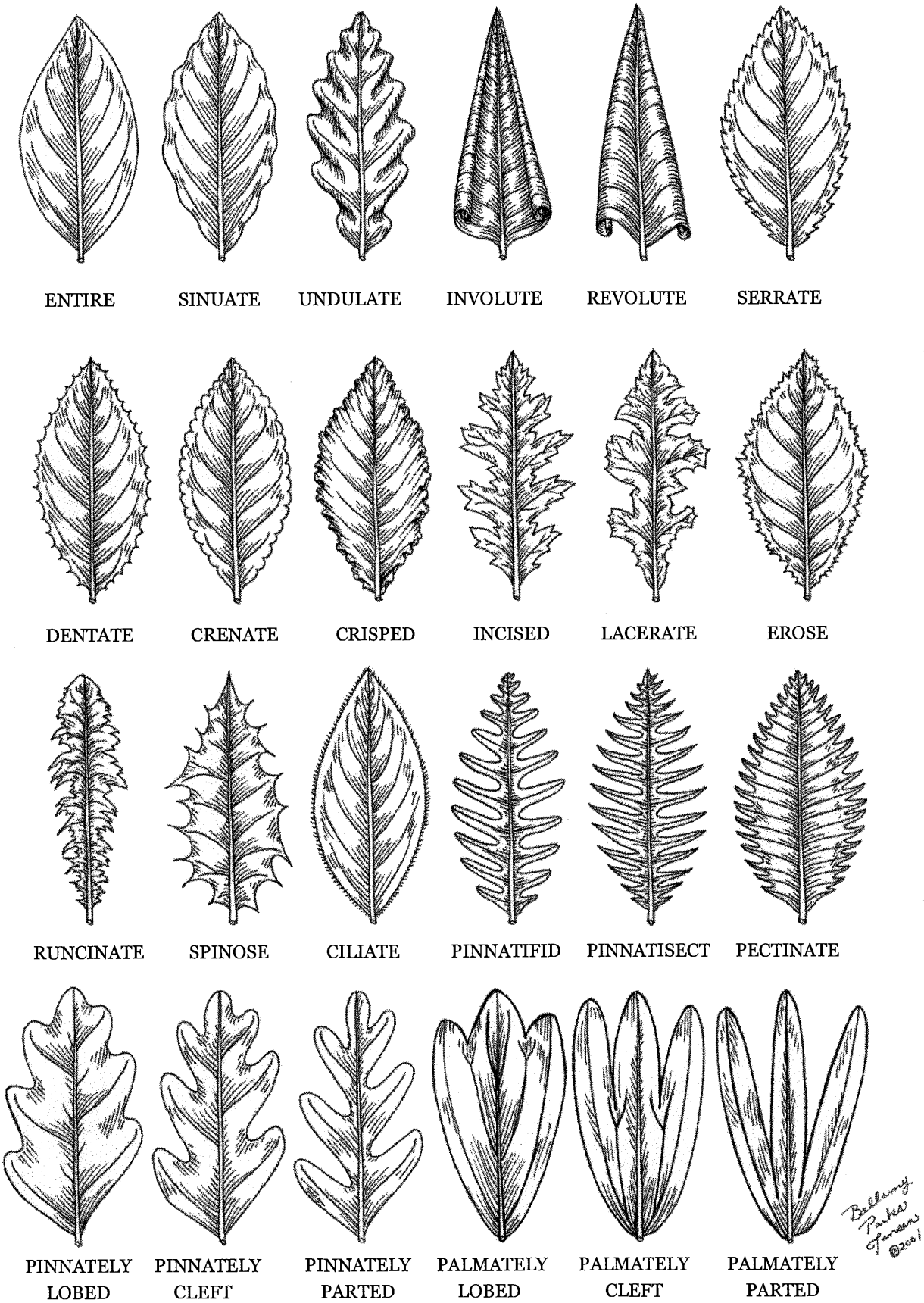
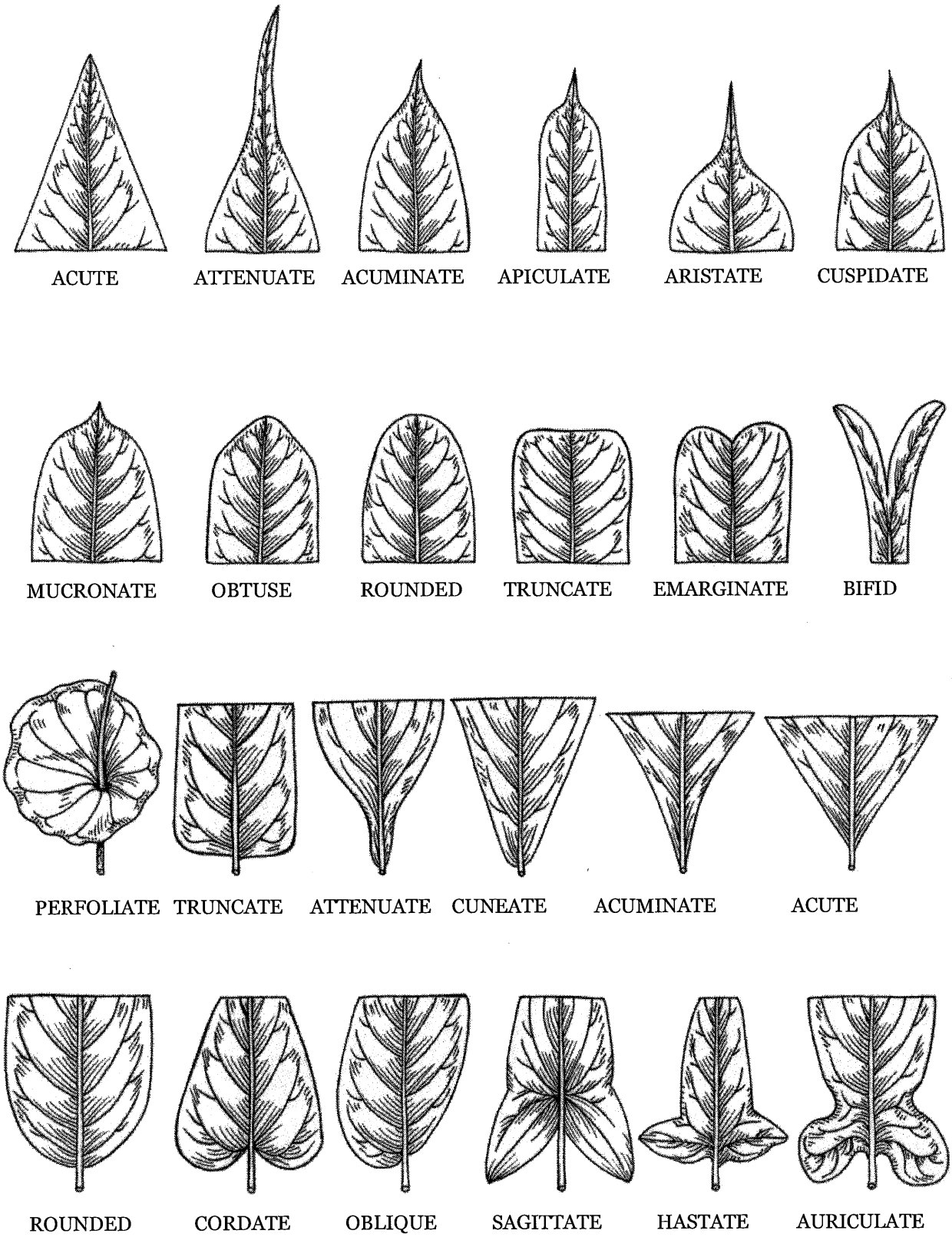


PLATE 7. MARGINS



Bellamy Parks Janssen ©2001

PLATE 8. APICES & BASES

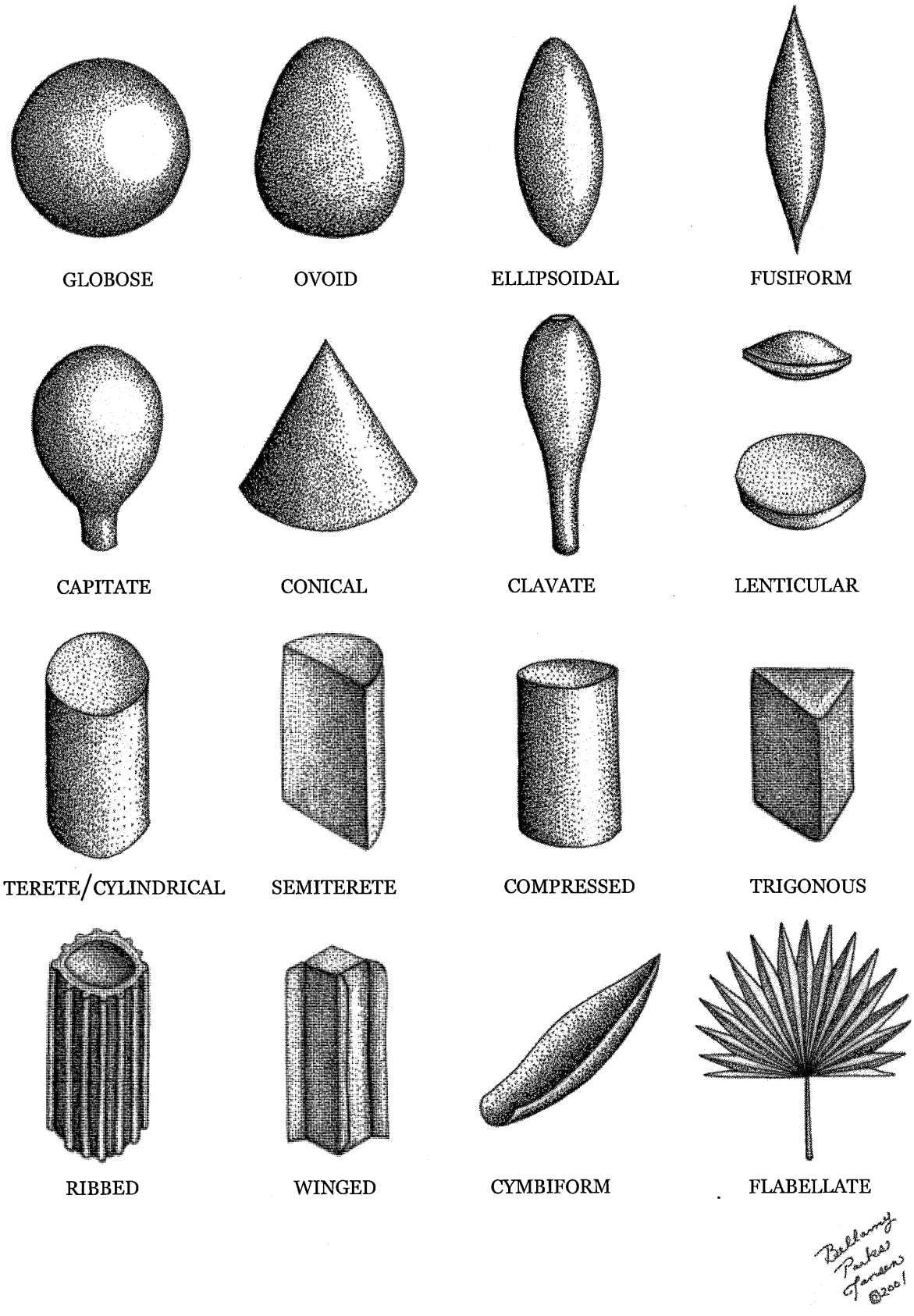


PLATE 9. THREE-DIMENSIONAL FORMS

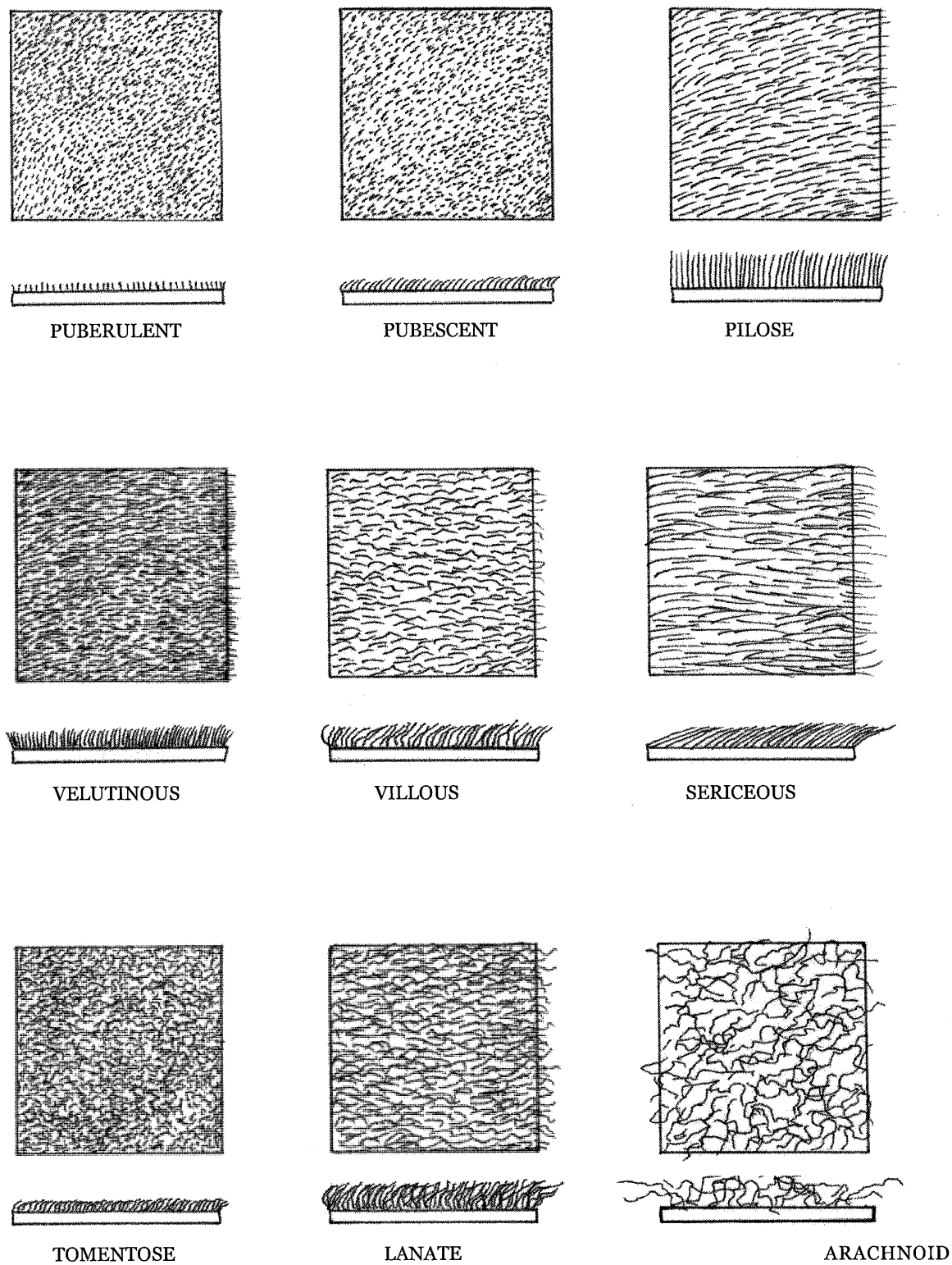


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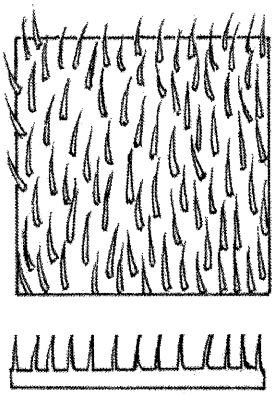
PLATE 10. PUBESCENCE TYPES



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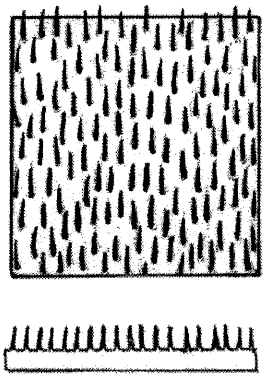

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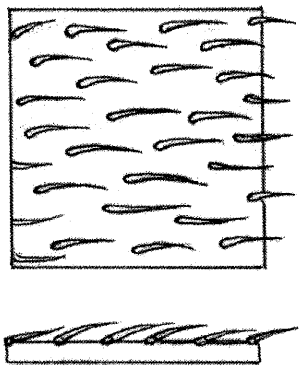
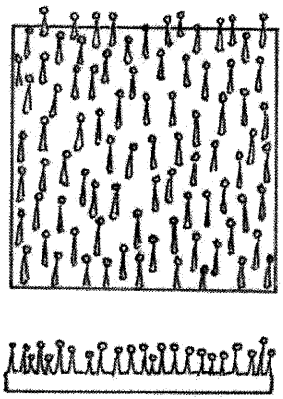
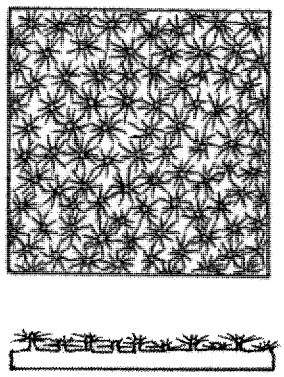


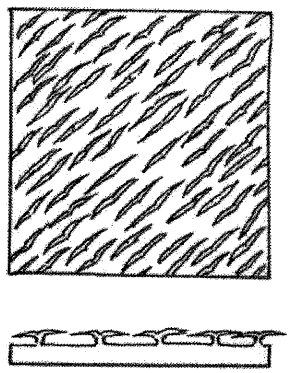
STRIGOSE



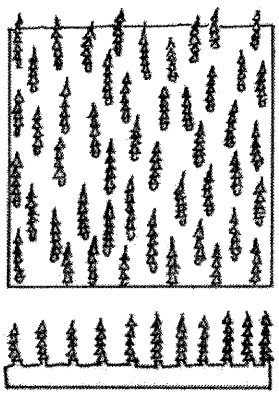
GLANDULAR



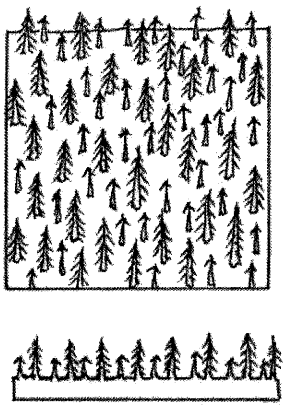
STELLATE



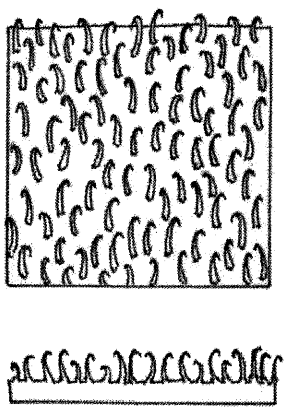
MALPIGHIAN



PAGODIFORM



BARBED



UNCINATE

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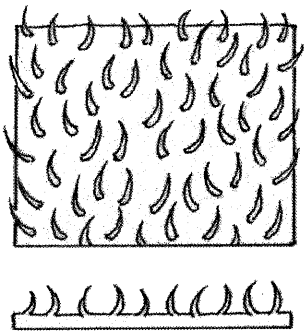
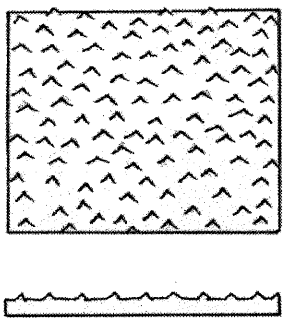
PLATE 11. PUBESCENCE TYPES (continued)



SCABROUS



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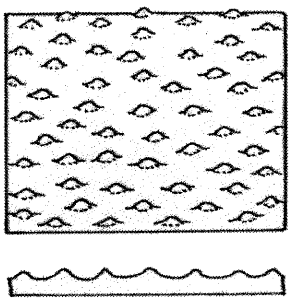
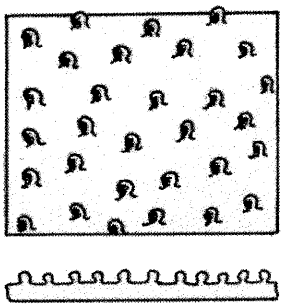
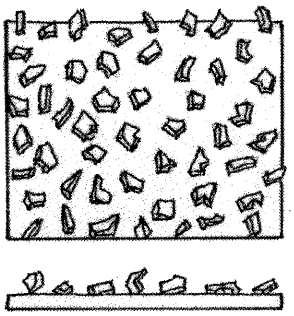


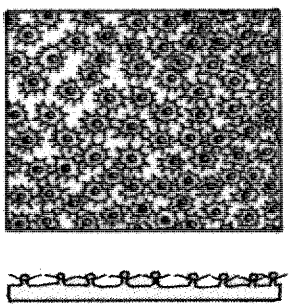
PAPILLOSE



PUSTULATE



MEALY



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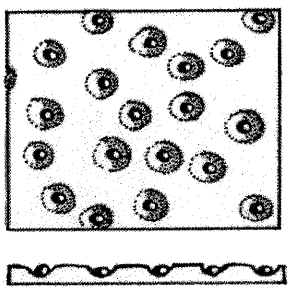

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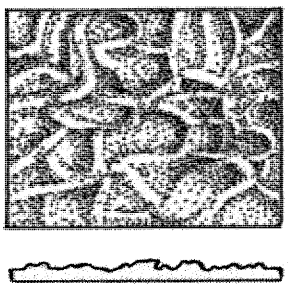

RUGOSE

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PLATE 12. SURFACE TEXTURES

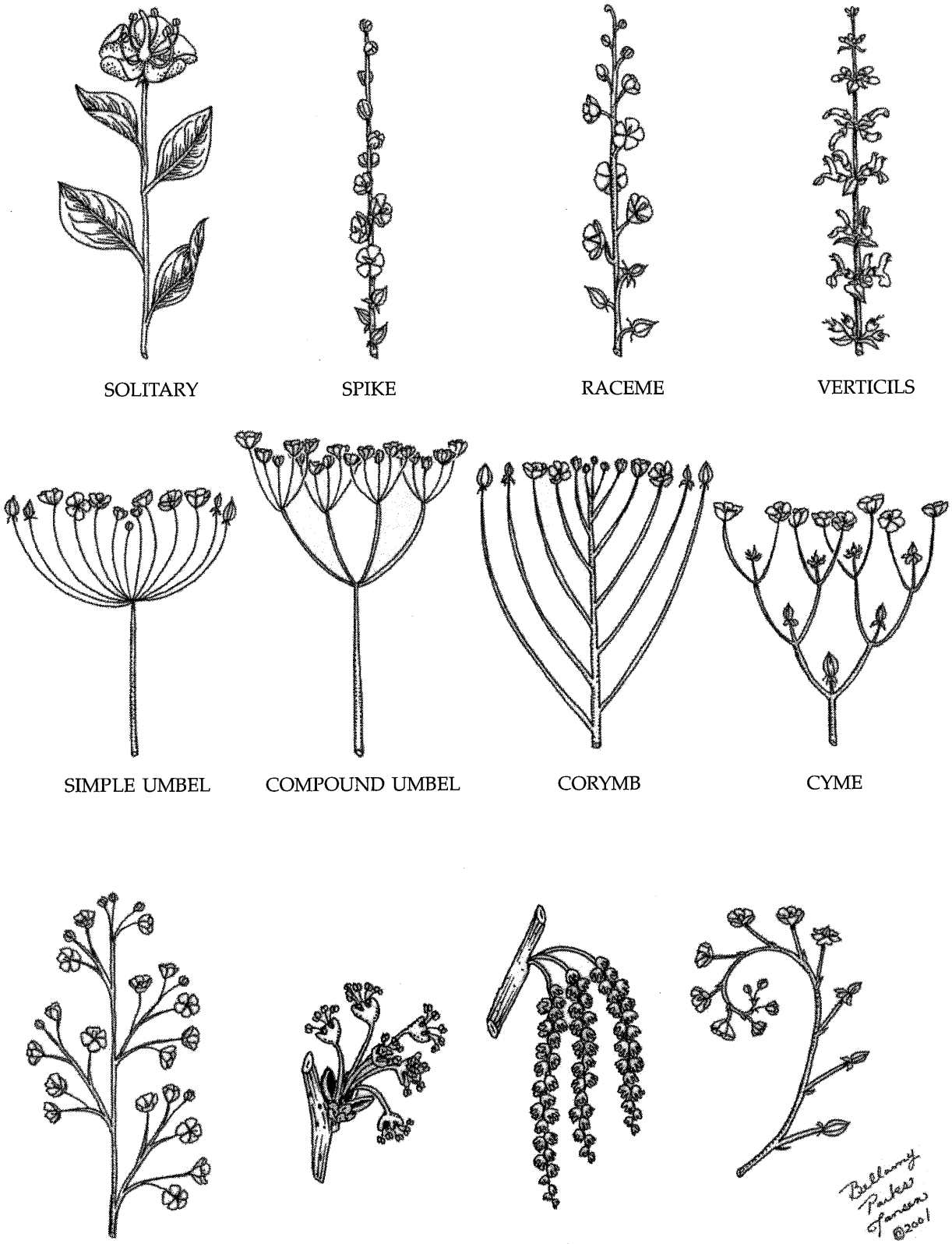
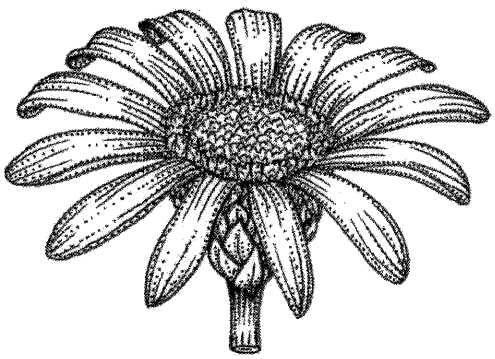
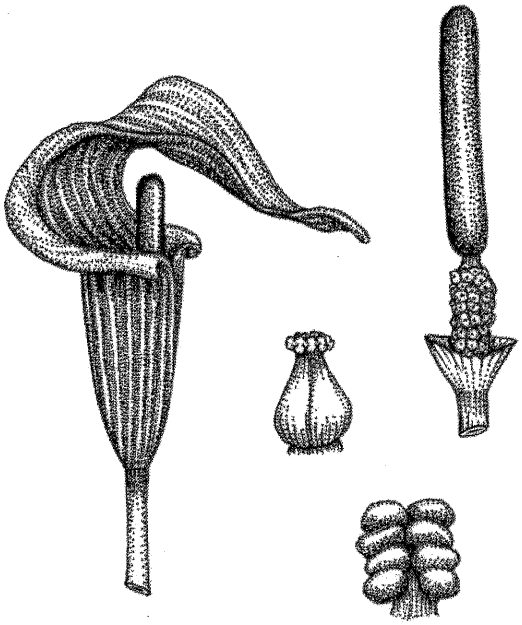


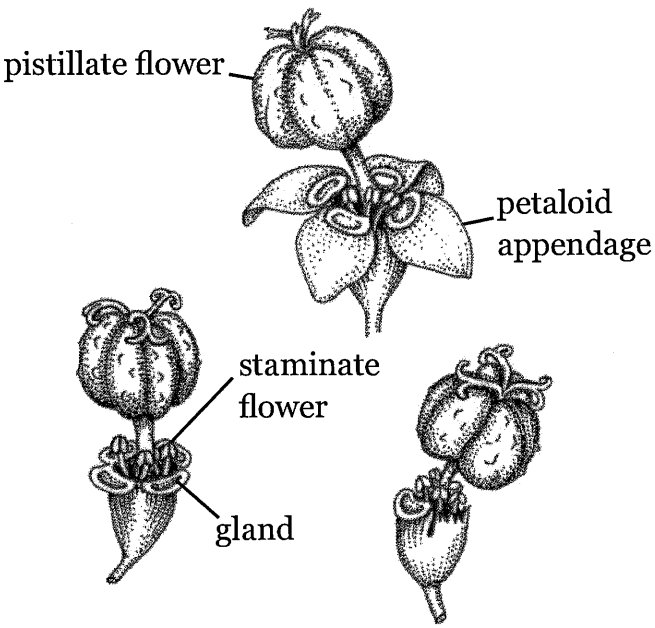
PLATE 13. INFLORESCENCE TYPES



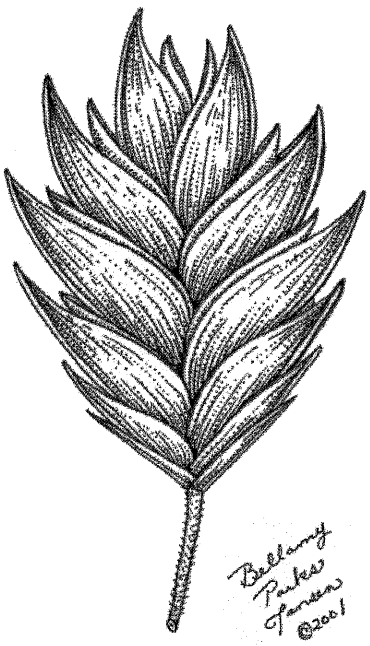
HEAD



SPADIX & SPATHE

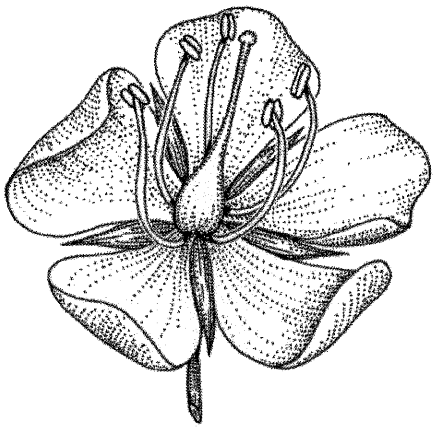


CYATHIUM

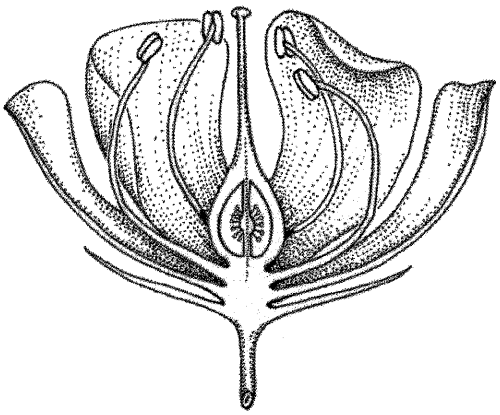


SPIKELET

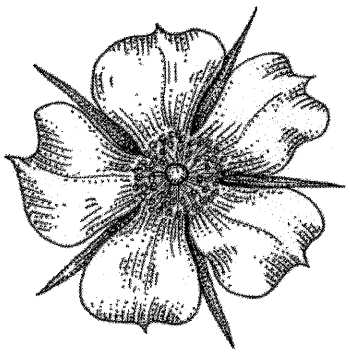
PLATE 14. INFLORESCENCE TYPES (continued)



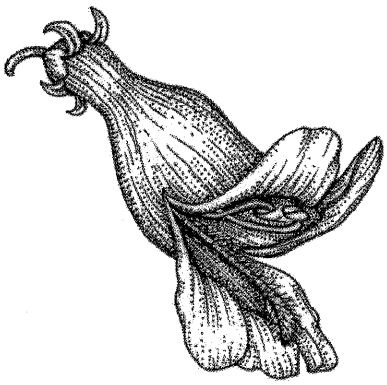
THREE-QUARTER VIEW



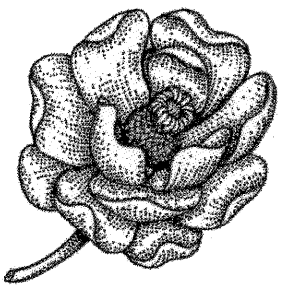
LONGITUDINAL VIEW



RADIAL

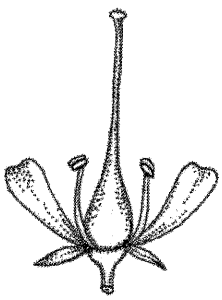


BILATERAL

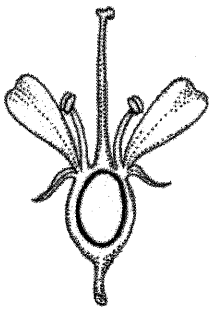


ASYMMETRICAL

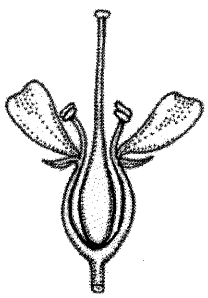
COROLLA SYMMETRY



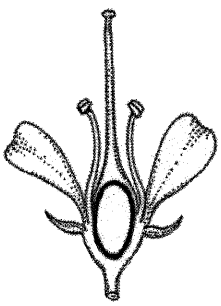
SUPERIOR



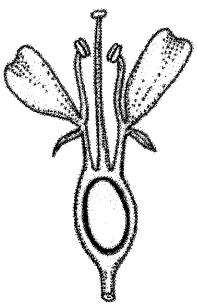
WHOLLY INFERIOR



SUPERIOR WITH HYPANTHIUM



PARTIALLY INFERIOR

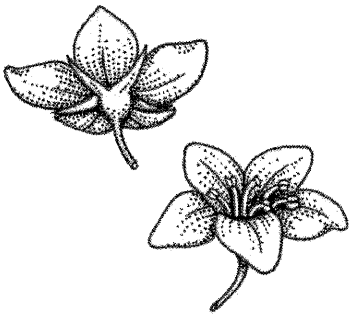


WHOLLY INFERIOR WITH HYPANTHIUM

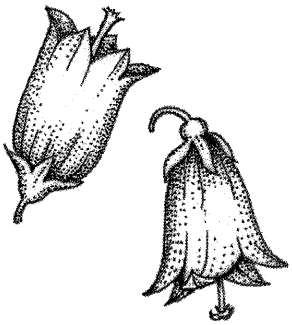
OVARY POSITION

Bellamy Parker Jensen ©2001

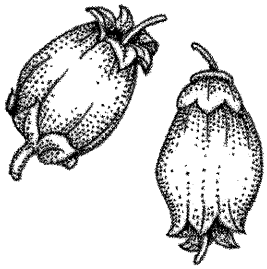
PLATE 15. FLORAL MORPHOLOGY



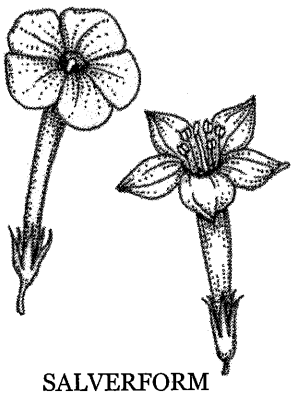
ROTATE



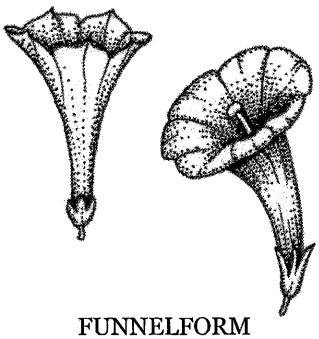
CAMPANULATE



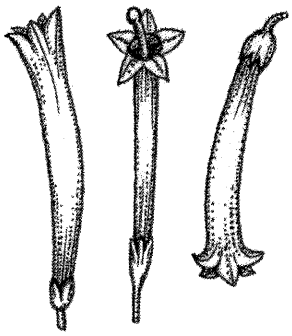
URCEOLATE



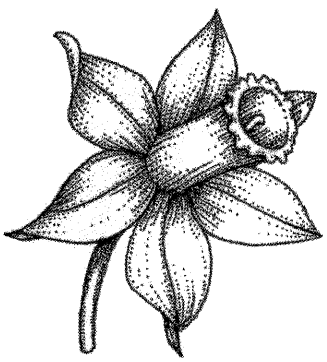
SALVERFORM



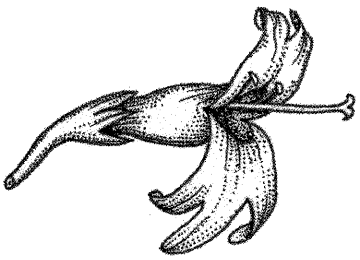
FUNNELFORM



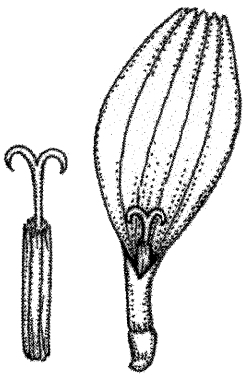
TUBULAR



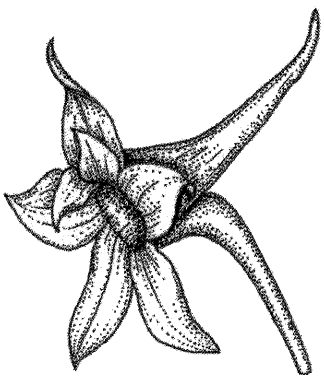
CORONIFORM



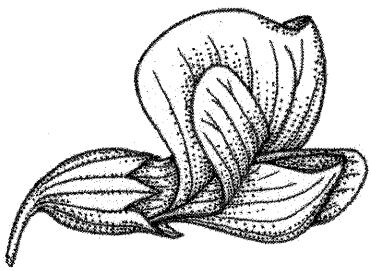
BILABIATE



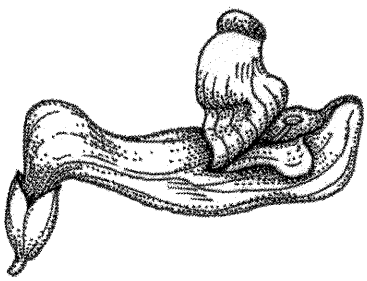
LIGULATE



SPURRED



PAPILIONACEOUS

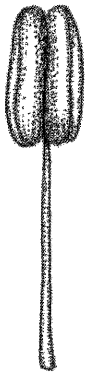


GIBBOUS

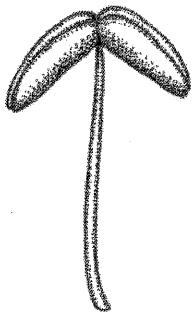
Bellamy Parks Jones ©2001

PLATE 16. COROLLA TYPES

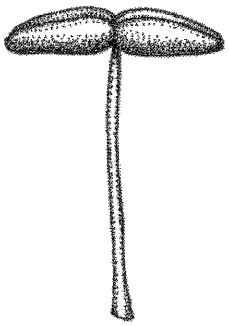
DORSIFIXED



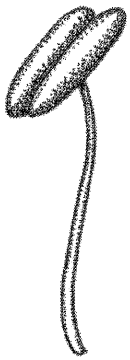
BASIFIXED



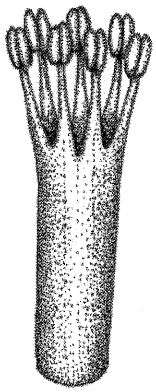
DIVERGENT LOBES



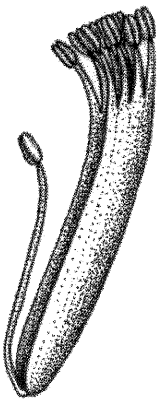
TRANSVERSE LOBES



OBLIQUE LOBES



MONADELPHOUS



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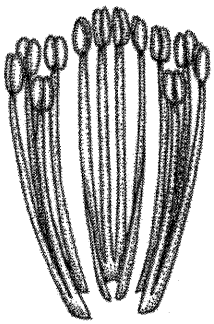
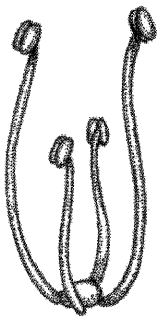


FASCICLED



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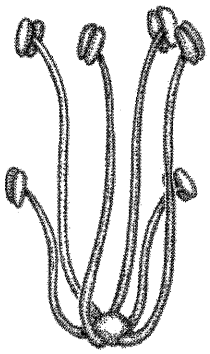

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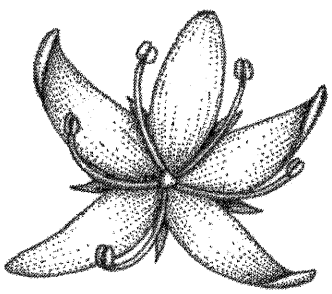
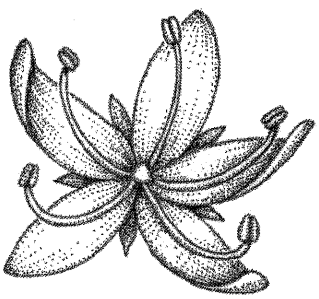
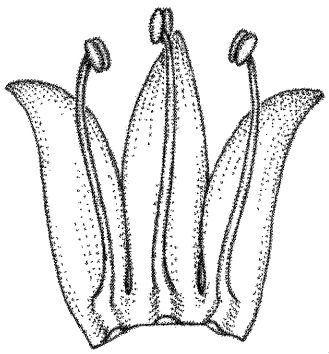


ALTERNATE WITH PETALS



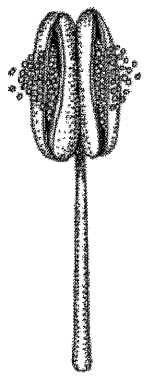
OPPOSITE THE PETALS



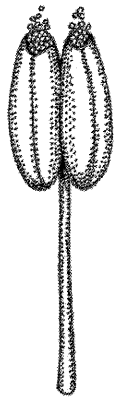
EPIPETALOUS

Bellamy Parker Jones ©2001

PLATE 17. STAMEN MORPHOLOGY & ARRANGEMENT

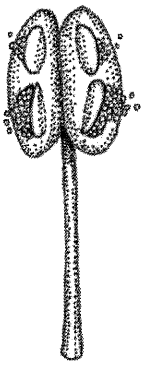


LONGITUDINAL



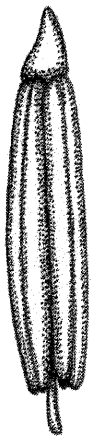
PORICIDAL

TRANSVERSE

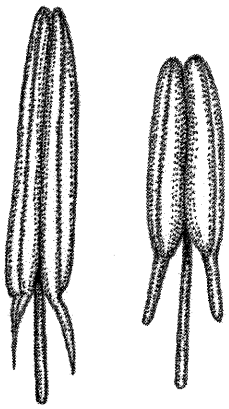


VALVATE

ANTHER DEHISCENCE



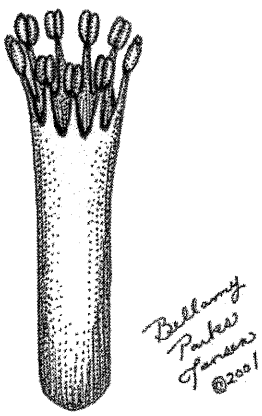
ANTHER APPENDICULAR



ANTHER CAUDATE

APPENDAGES

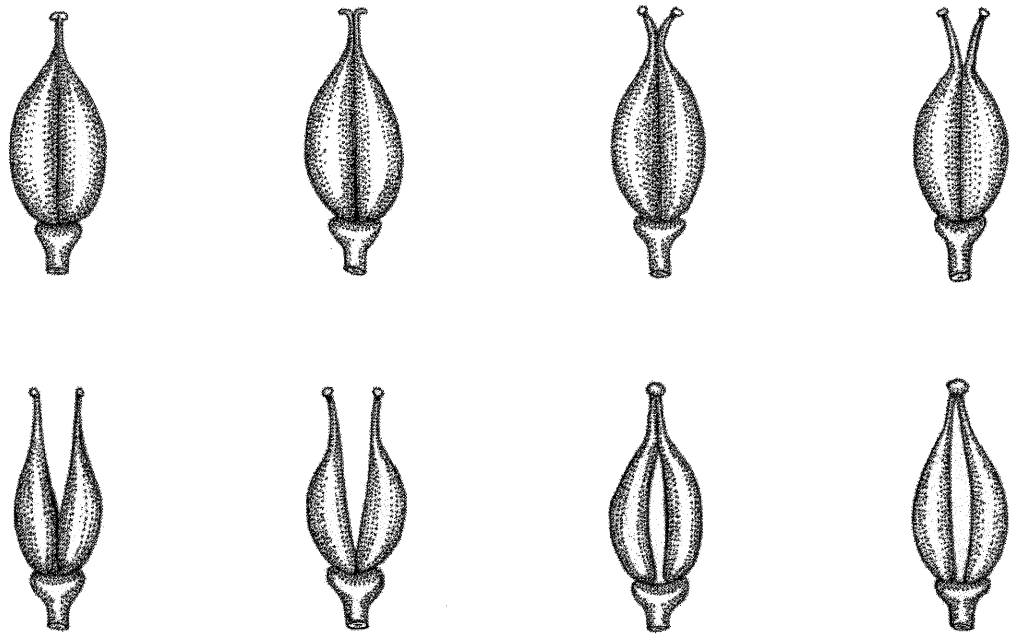
ANTHERS FUSED



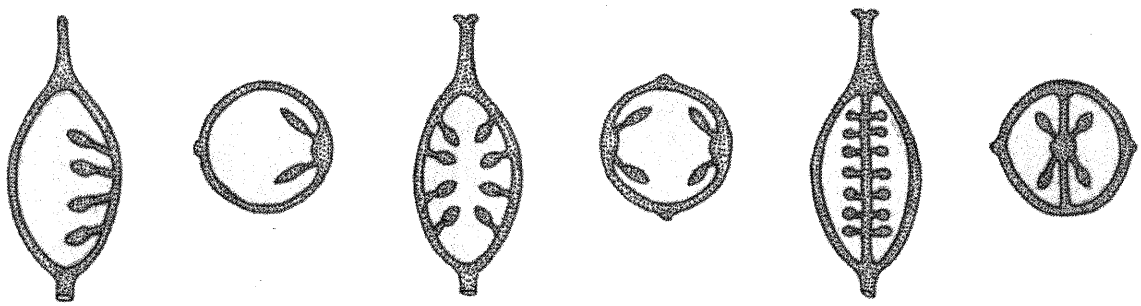
FILAMENTS FUSED

FUSION

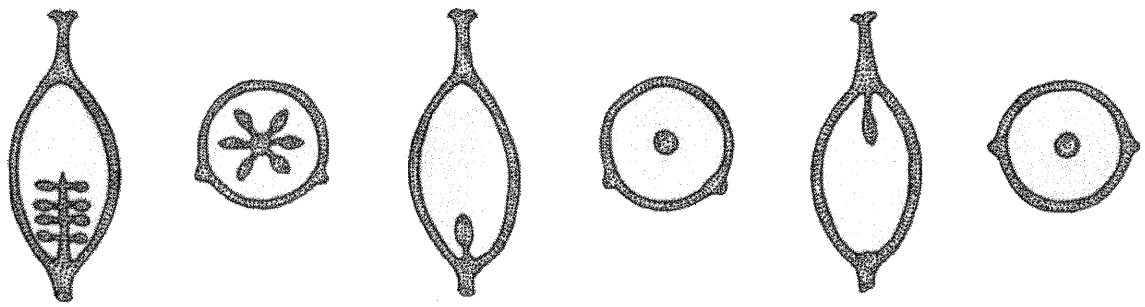
PLATE 18. STAMEN MORPHOLOGY



Degrees of Carpel Fusion



PARIETAL (SIMPLE PISTIL) PARIETAL (COMPOUND PISTIL) AXILE

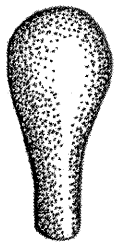


FREE-CENTRAL BASAL APICAL

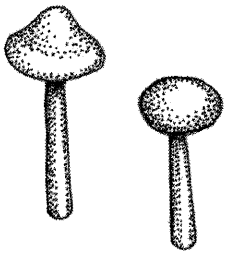
Placentation Types

Bellamy Parker Jansen ©2001

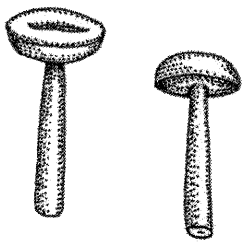
PLATE 19. CARPEL FUSION & PLACENTATION



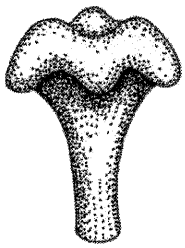
CLAVATE



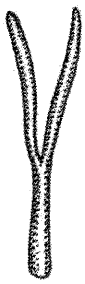
CAPITATE



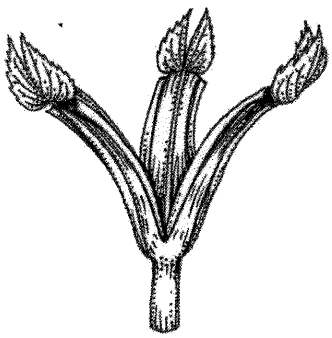
DISCOID



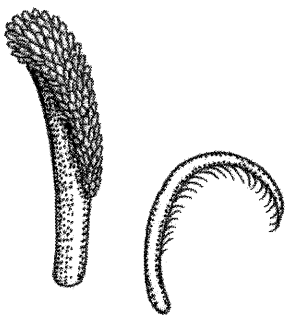
LOBED



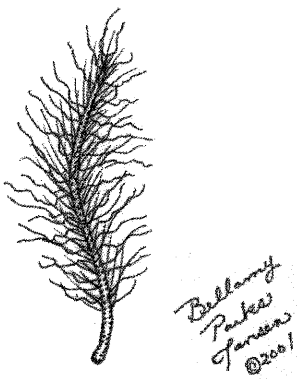
LINEAR



PETALOID

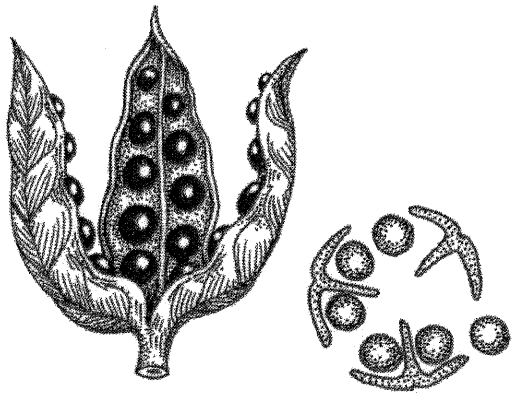


DECURRENT

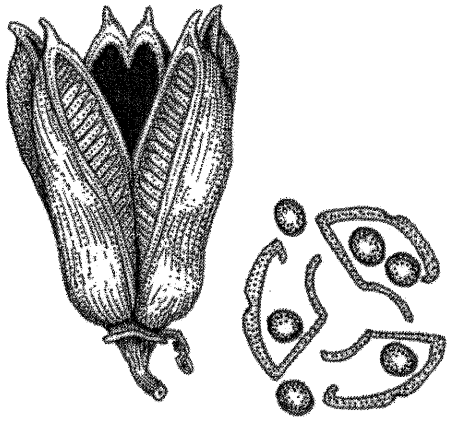


PLUMOSE

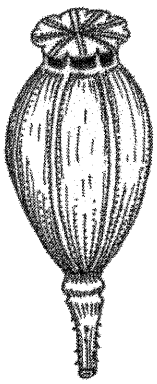
PLATE 20. STIGMA TYPES



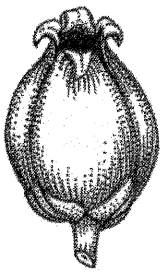
CAPSULE (LOCULICIDAL)



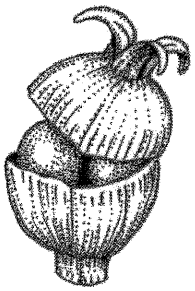
CAPSULE (SEPTICIDAL)



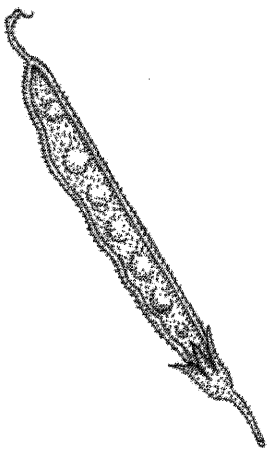
CAPSULE (PORICIDAL)



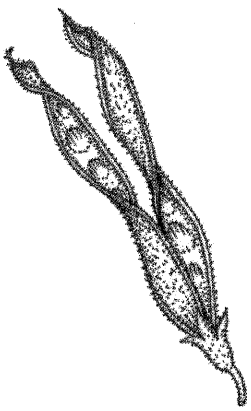
CAPSULE (VALVATE)



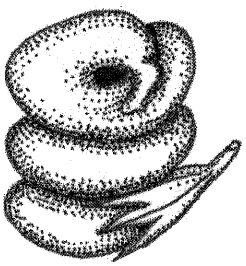
CAPSULE (CIRCUMSCISSILE)



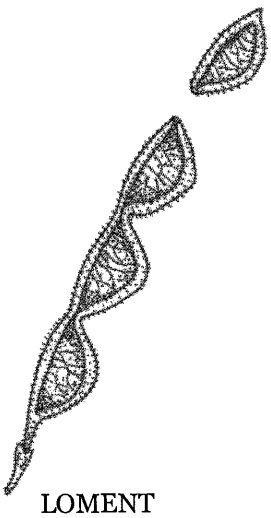
LEGUME
(UNOPENED)



LEGUME
(OPENED)



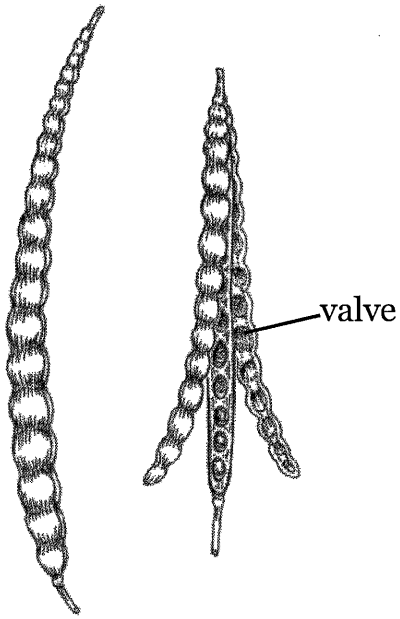
LEGUME
(COILED)



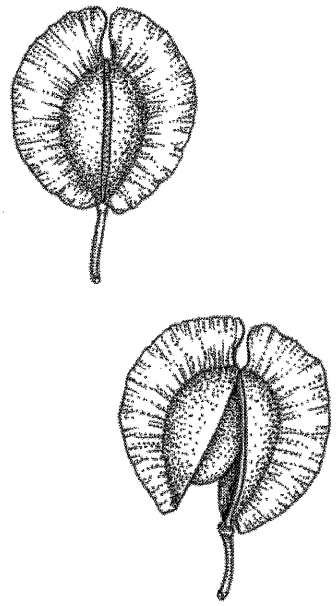
LOMENT
(DISARTICULATING)

Bellamy Parks Tanner ©2001

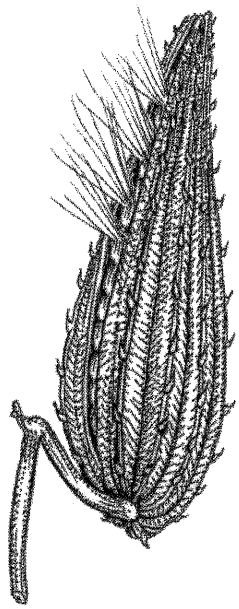
PLATE 21. FRUIT TYPES: DRY & DEHISCENT



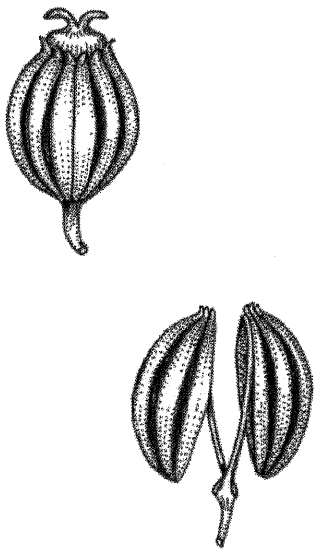
SILIQUES

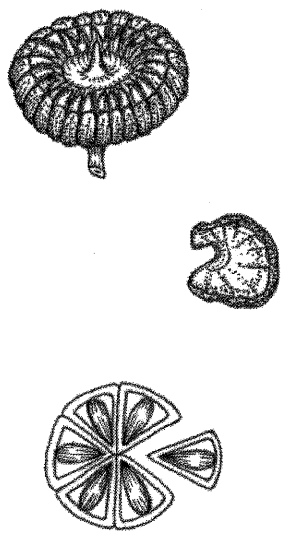


SILICLES



FOLLICLE





SCHIZOCARPS

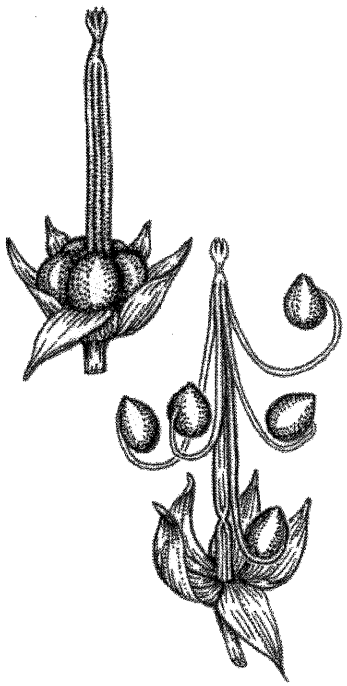


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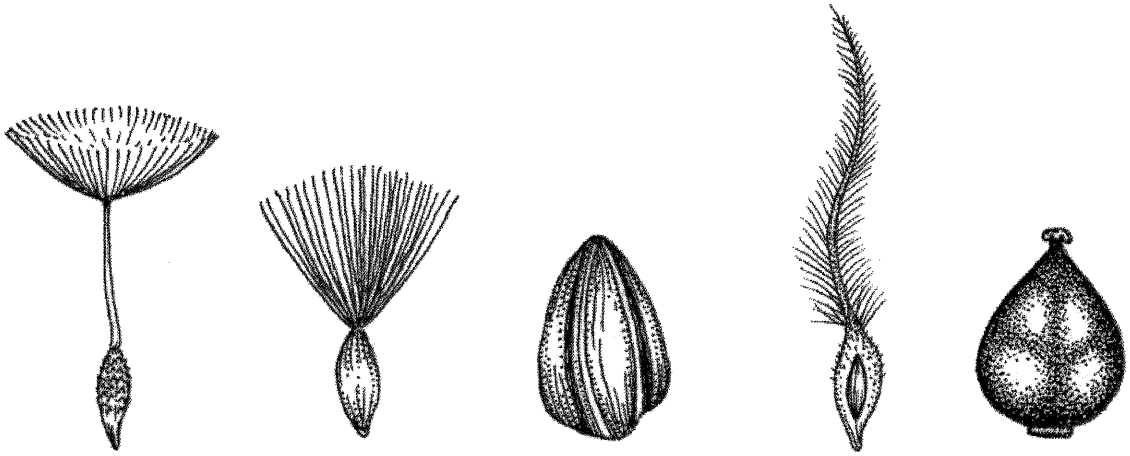
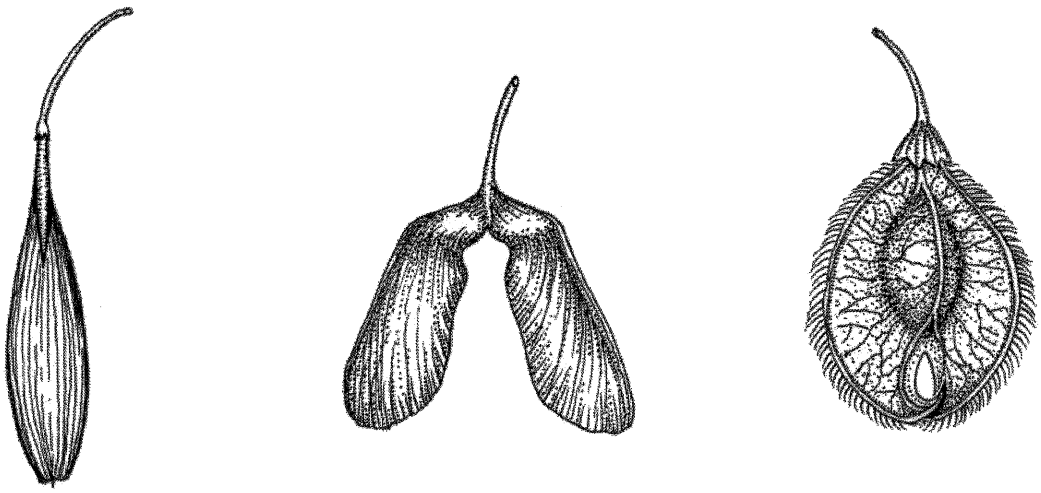
PLATE 22. FRUIT TYPES: DRY & DEHISCENT (continued)



ACHENES

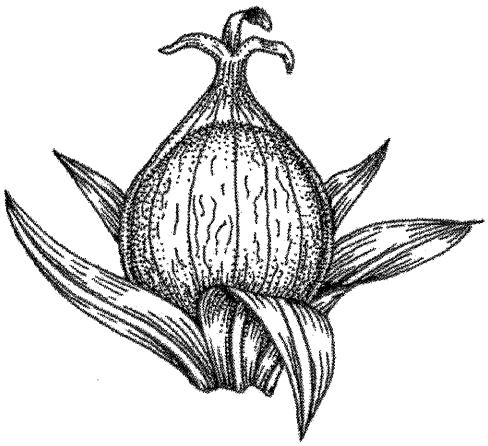


SAMARAS

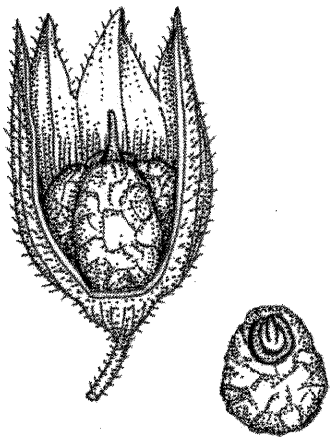
CARYOPSES

Bellamy Parks Jansons ©2001

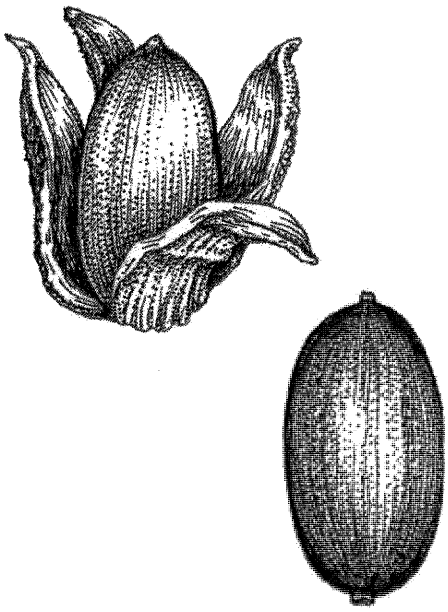
PLATE 23. FRUIT TYPES: DRY & INDEHISCENT



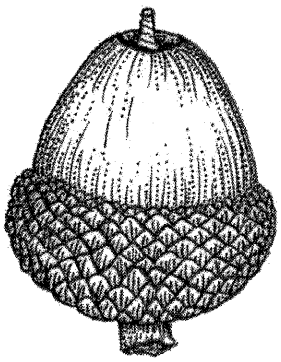
UTRICLE



NUTLETS



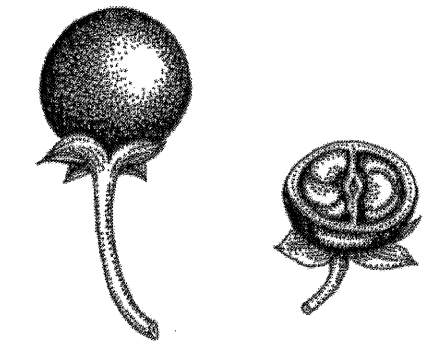
NUT WITH INVOLUCRAL HUSK



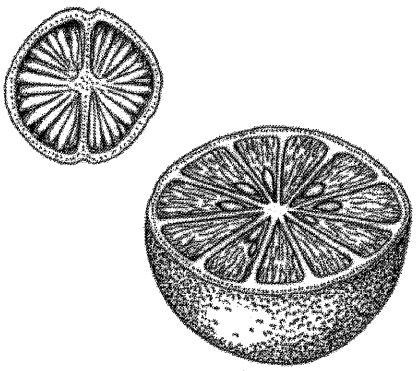
NUT WITH INVOLUCRAL CAP

Bellamy Parks Lanaeus ©2001

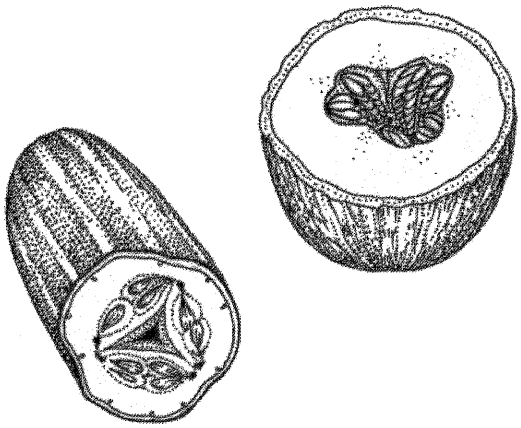
PLATE 24. FRUIT TYPES: DRY & INDEHISCENT (continued)



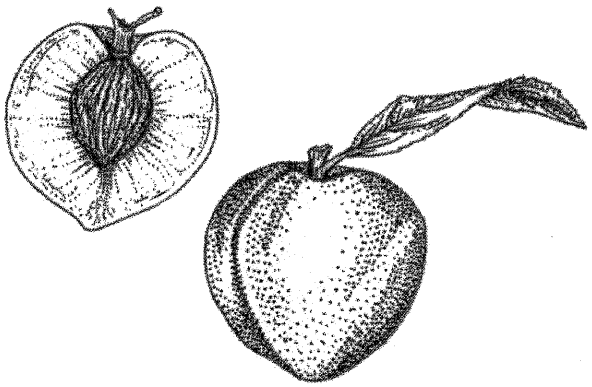
BERRY



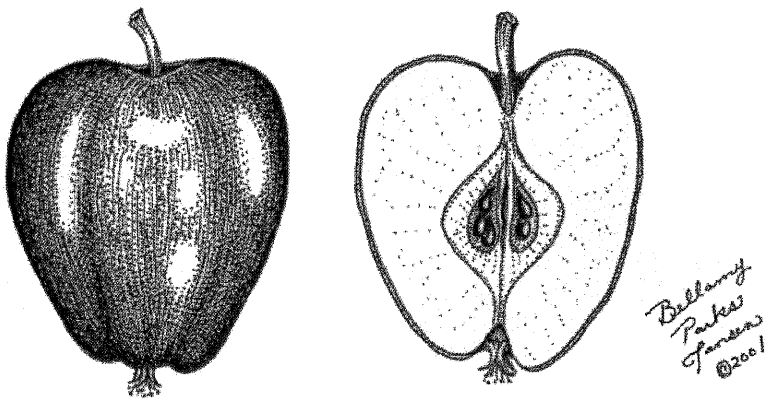
HESPERIDIUM



PEPO

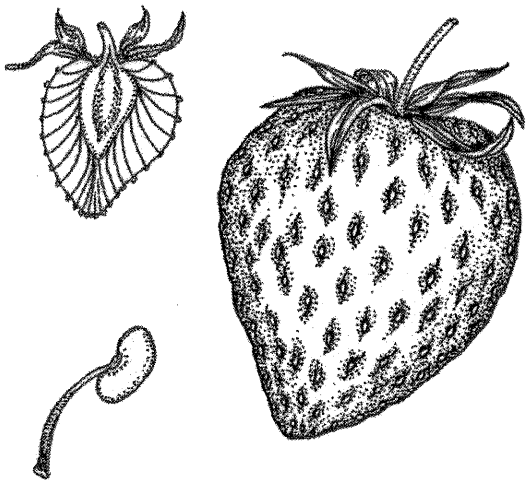


DRUPE

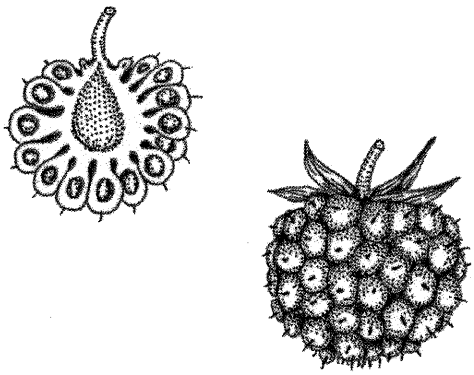


POME

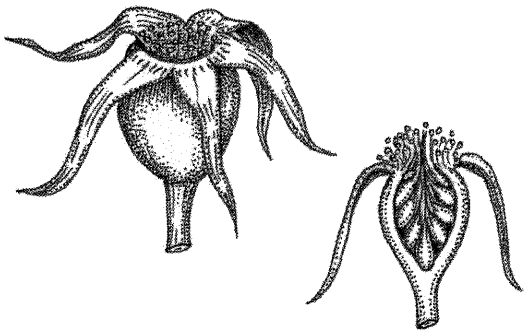
PLATE 25. FRUIT TYPES: FLESHY



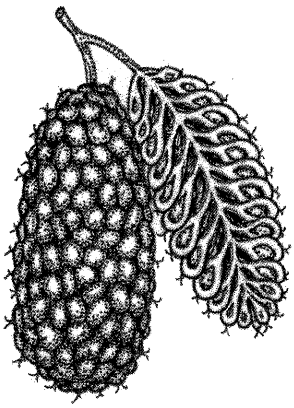
AGGREGATE OF ACHENES



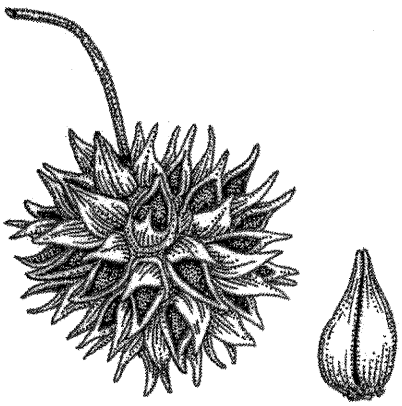
AGGREGATE OF DRUPELETS



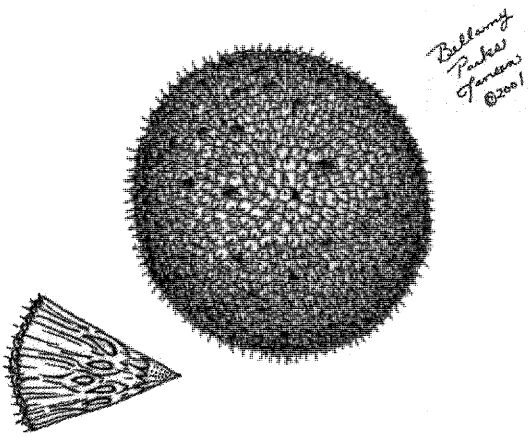
HIP



SYNCARP OF ACHENES

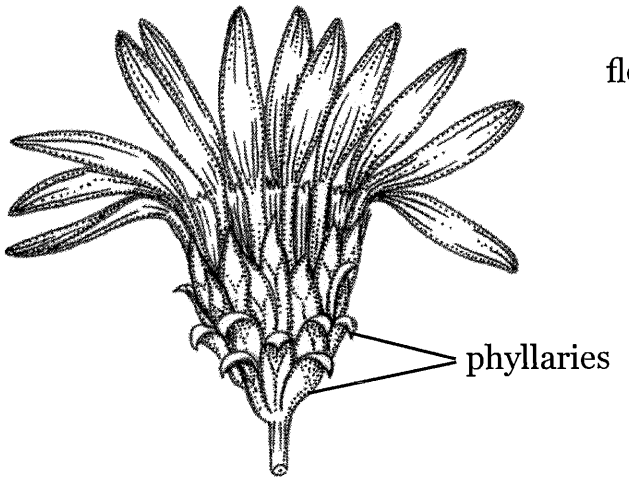


SYNCARP OF CAPSULES

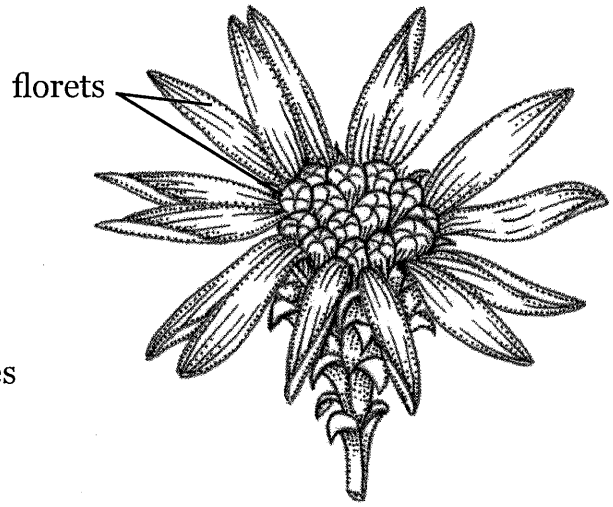


SYNCARP OF ACHENES

PLATE 26. FRUIT TYPES: AGGREGATE & MULTIPLE

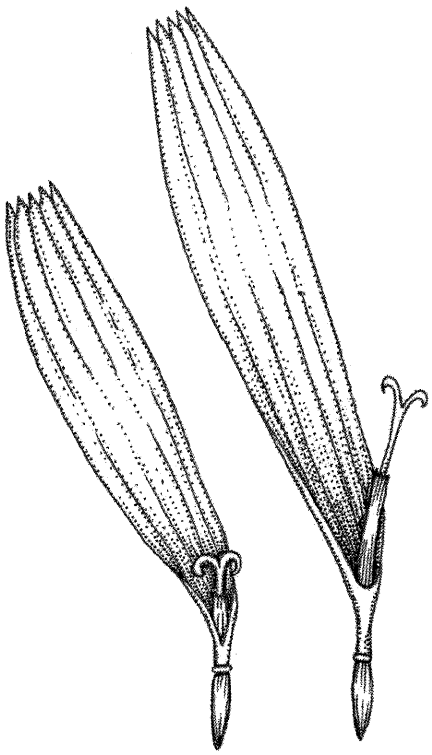


LATERAL VIEW

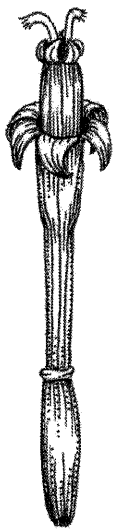


THREE-QUARTER VIEW

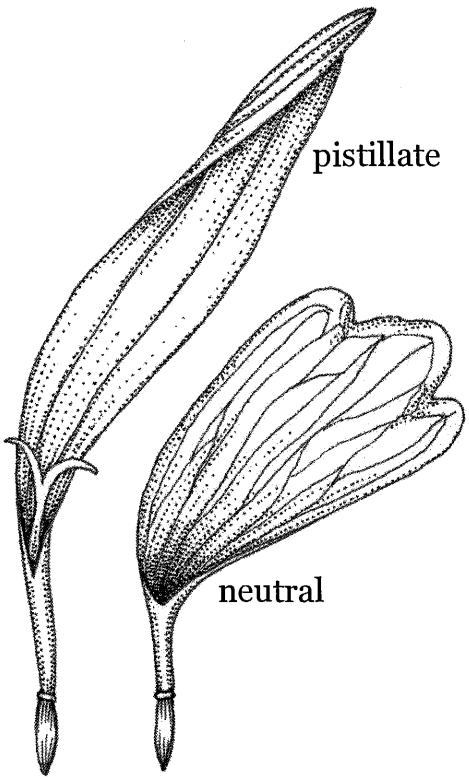
STYLIZED HEADS



LIGULATE FLORETS



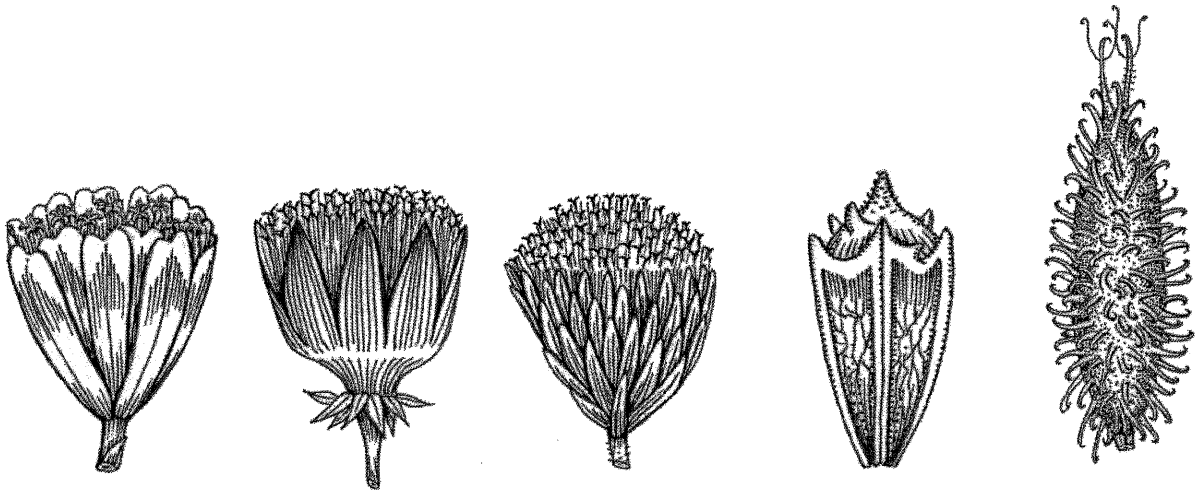
DISK FLORET



RAY FLORETS

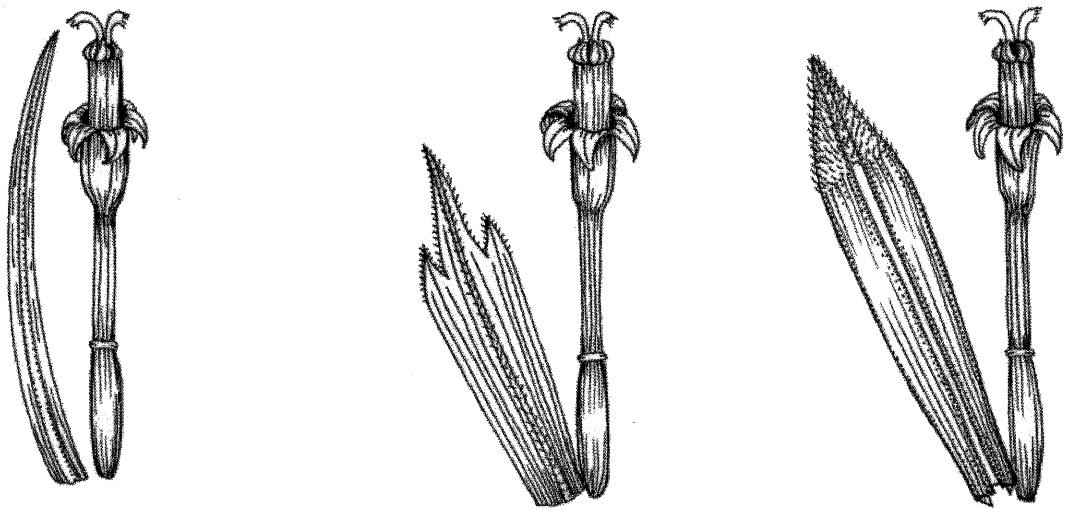
Bellamy Parks Jansen ©2001

PLATE 27. ASTERACEAE: HEAD MORPHOLOGY & FLORET TYPES



IN 1-SERIES OVERLAPPING | IN 2-SERIES INNER VALVATE OUTER OVERLAPPING | MULTISERIATE IMBRICATE | FUSED | FUSED

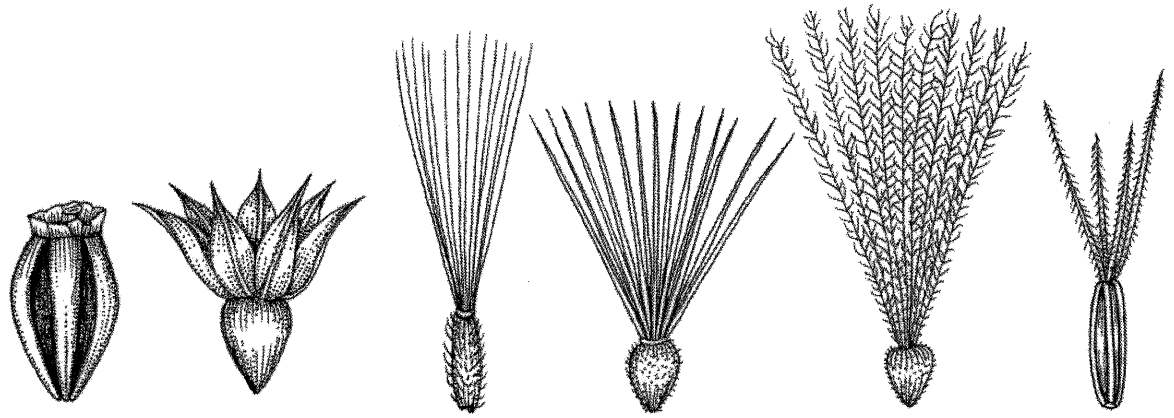
PHYLLARY ARRANGEMENT



PALES BRACTS

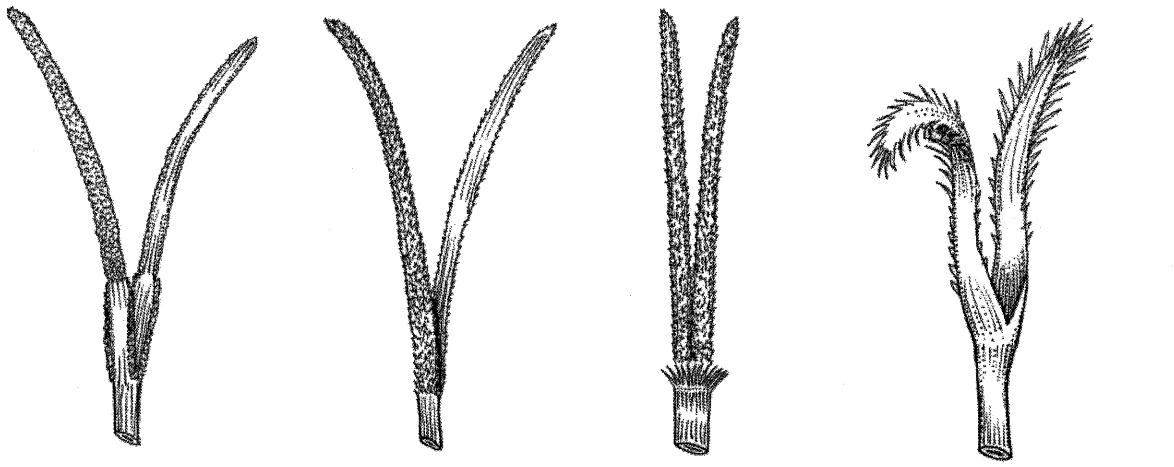
Bellamy Parks Parsons ©2001

PLATE 28. ASTERACEAE: PHYLLARY MORPHOLOGY AND ARRANGEMENT & RECEPTACULAR BRACTS

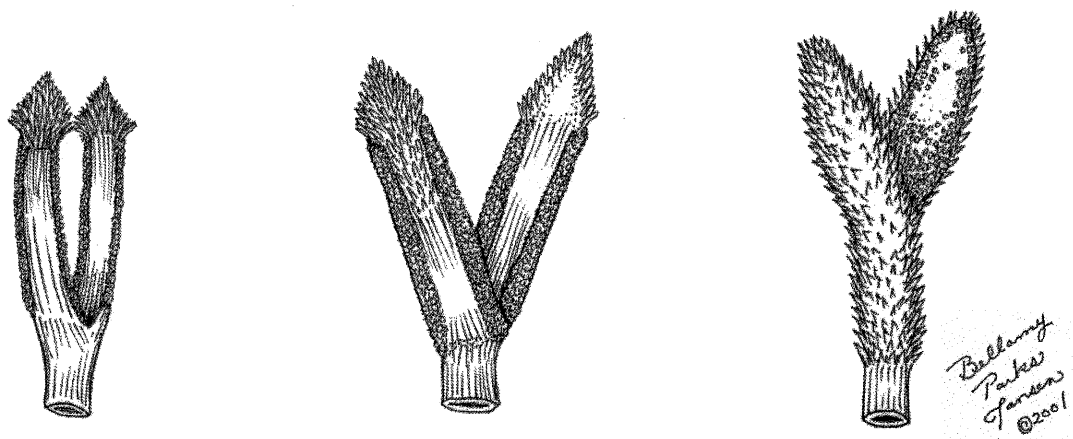


CROWN-LIKE SCALES CAPILLARY BRISTLES BRISTLES PLUMOSE BRISTLES AWNS

PAPPUS TYPES



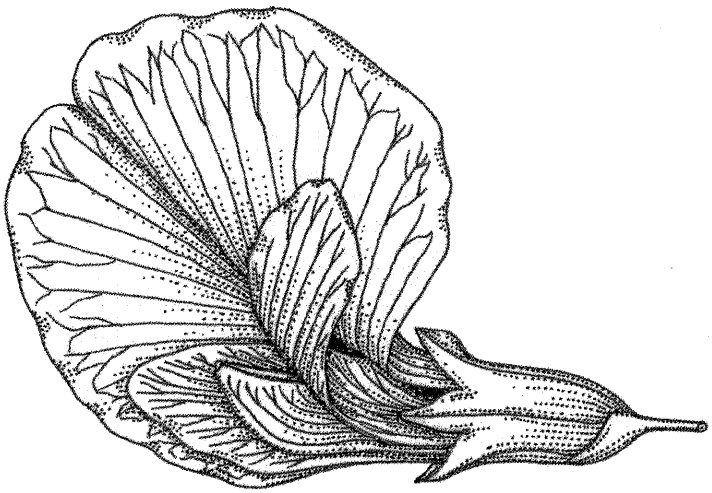
EUPATORIEAE VERNONIEAE CARDUEAE HELIANTHEAE & HELENIEAE



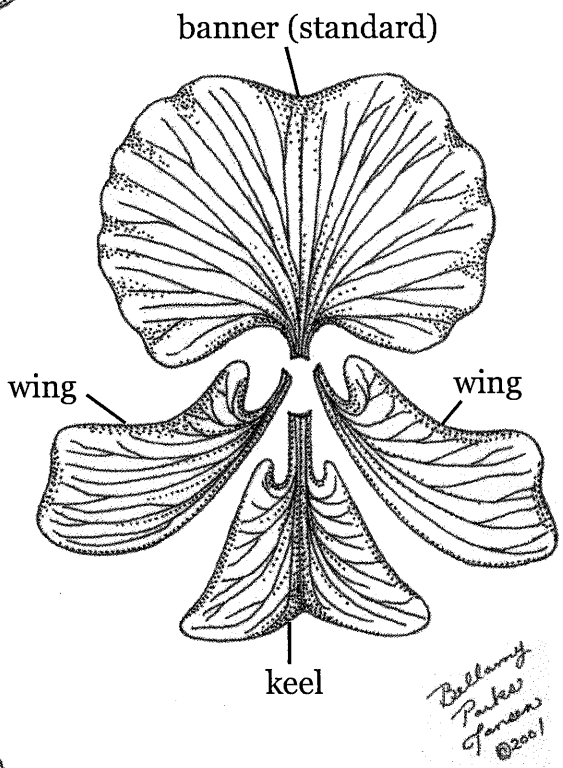
SENECIONEAE ASTEREAE ANTHEMIDEAE

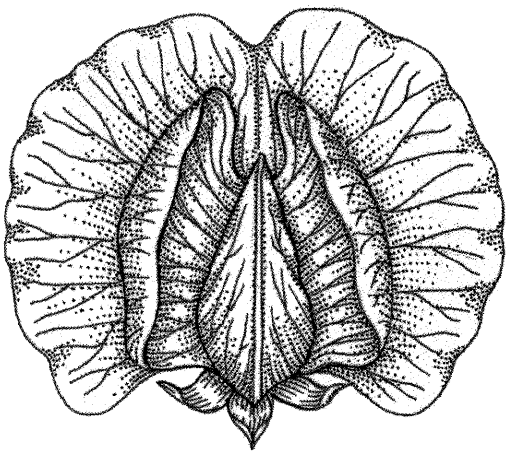
STYLE MORPHOLOGY

PLATE 29. ASTERACEAE: PAPPUS TYPES & STYLE MORPHOLOGY



SIDE VIEW





FRONT VIEW

PLATE 30. FABACEAE: PAPILIONACEOUS COROLLA

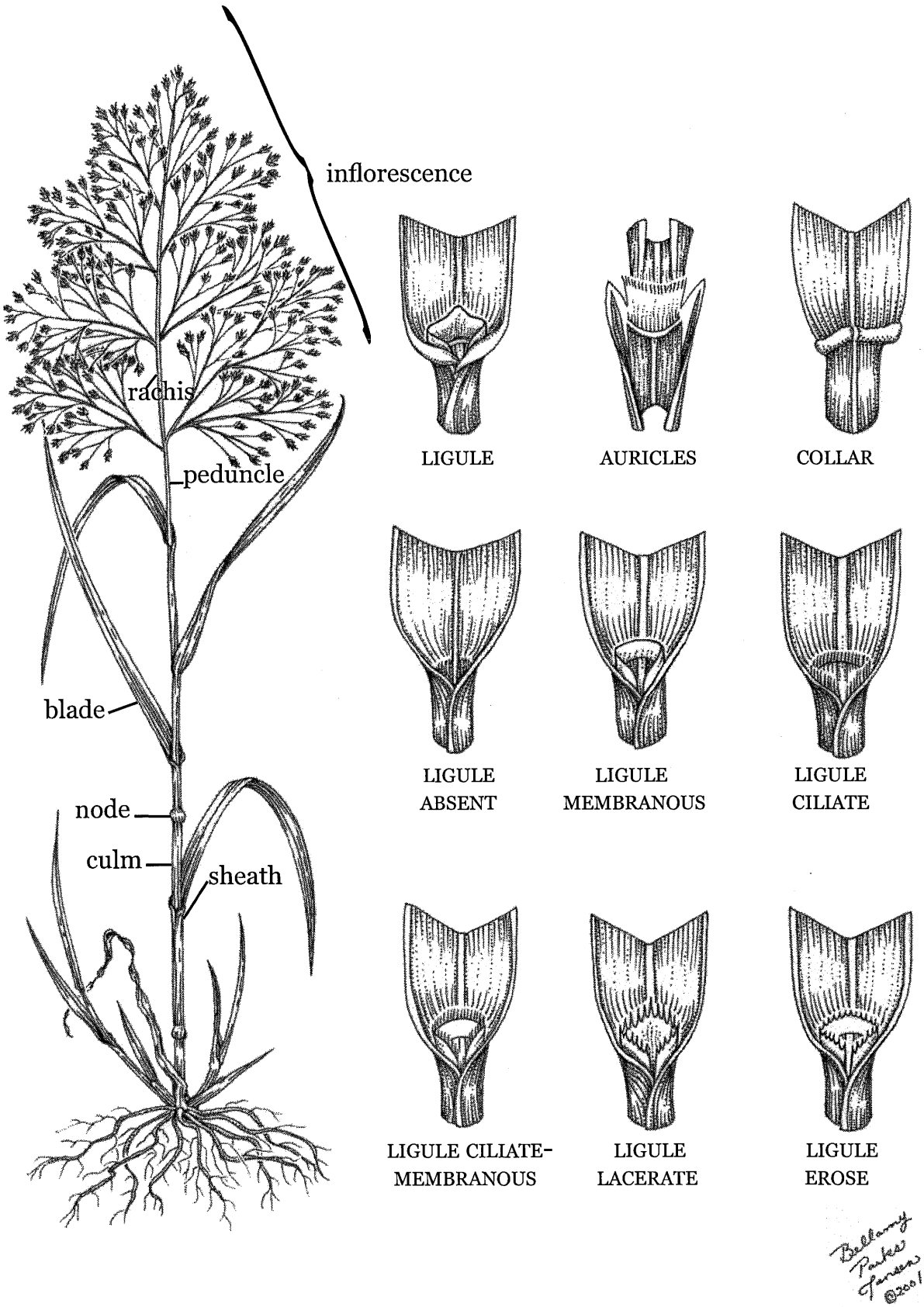
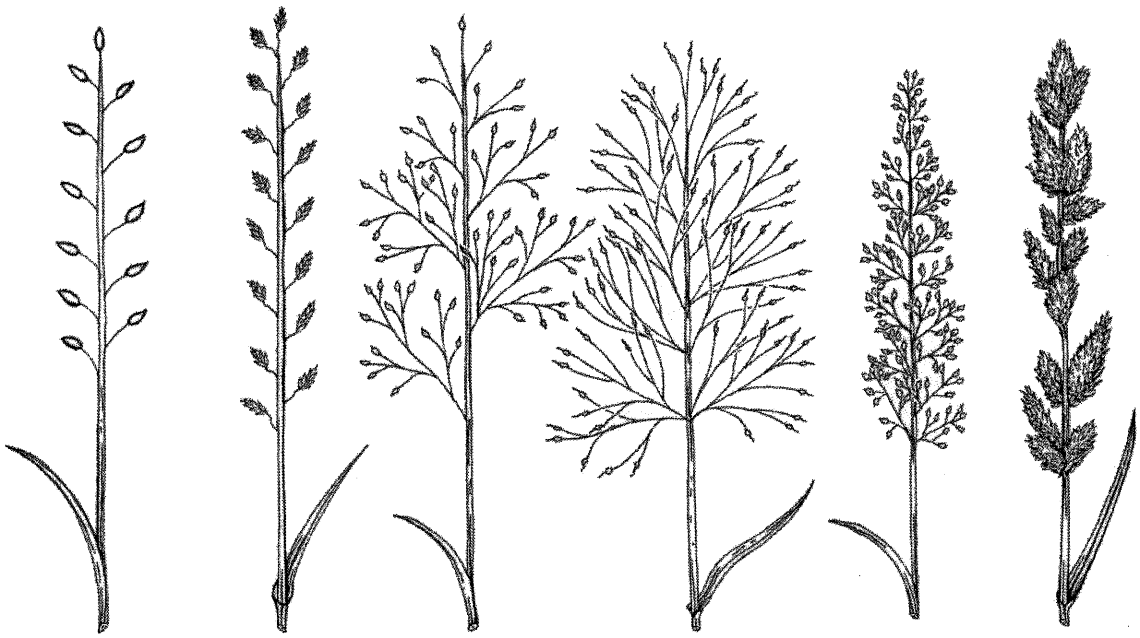


PLATE 31. POACEAE: VEGETATIVE MORPHOLOGY

SPIKE

RACEME-SPIKE COMBINATION

SPIKE
(SPIKELETS BORNE
IN RACHIS CAVITIES)



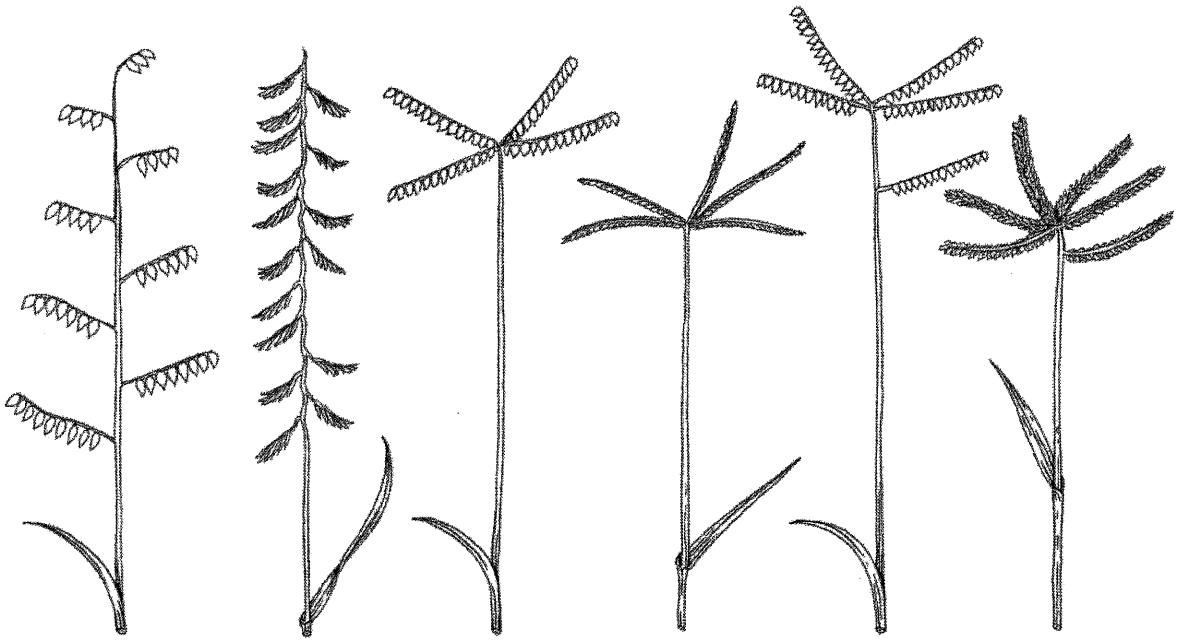
RACEME

OPEN PANICLE

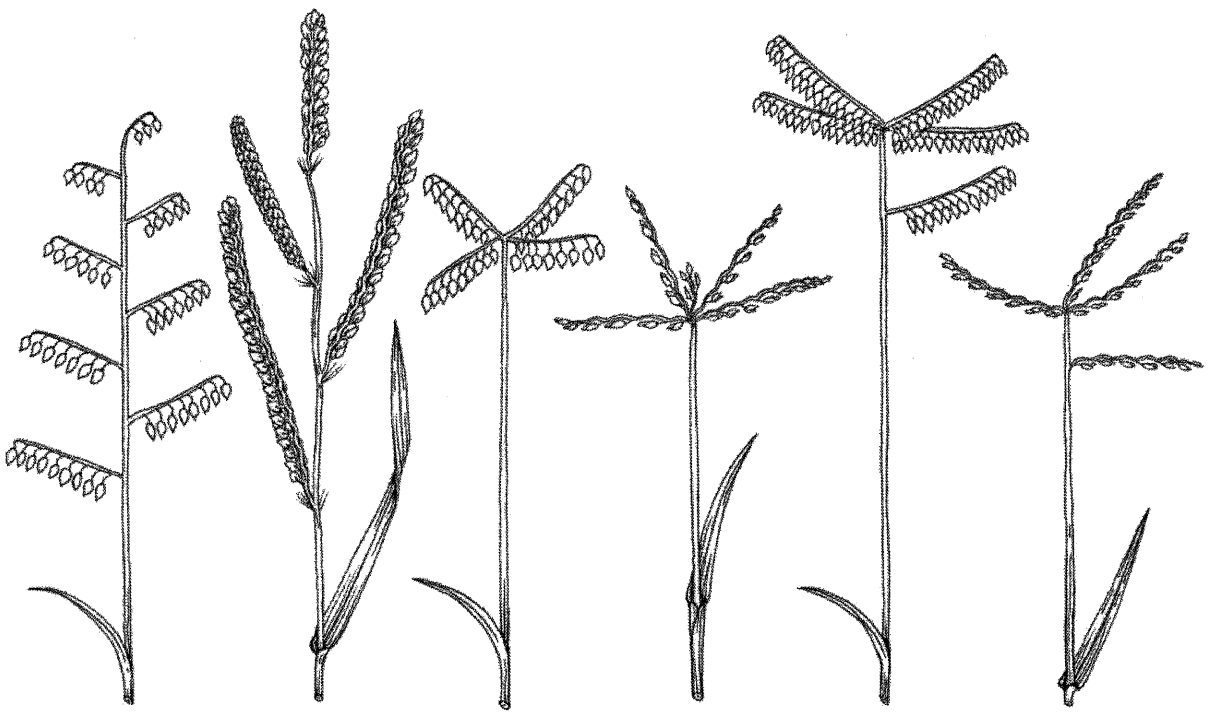
CONDENSED PANICLE

Bellamy Parker Janssen ©2001

PLATE 32. POACEAE: INFLORESCENCE TYPES



1-SIDED SPIKES (ALTERNATE ARRANGEMENT) 1-SIDED SPIKES (DIGITATE ARRANGEMENT) 1-SIDED SPIKES (SUBDIGITATE ARRANGEMENT)



1-SIDED RACEMES (ALTERNATE ARRANGEMENT) 1-SIDED RACEMES (DIGITATE ARRANGEMENT) 1-SIDED RACEMES (SUBDIGITATE ARRANGEMENT)

Bellamy Parker Jensen ©2001

PLATE 33. POACEAE: INFLORESCENCE TYPES (continued)

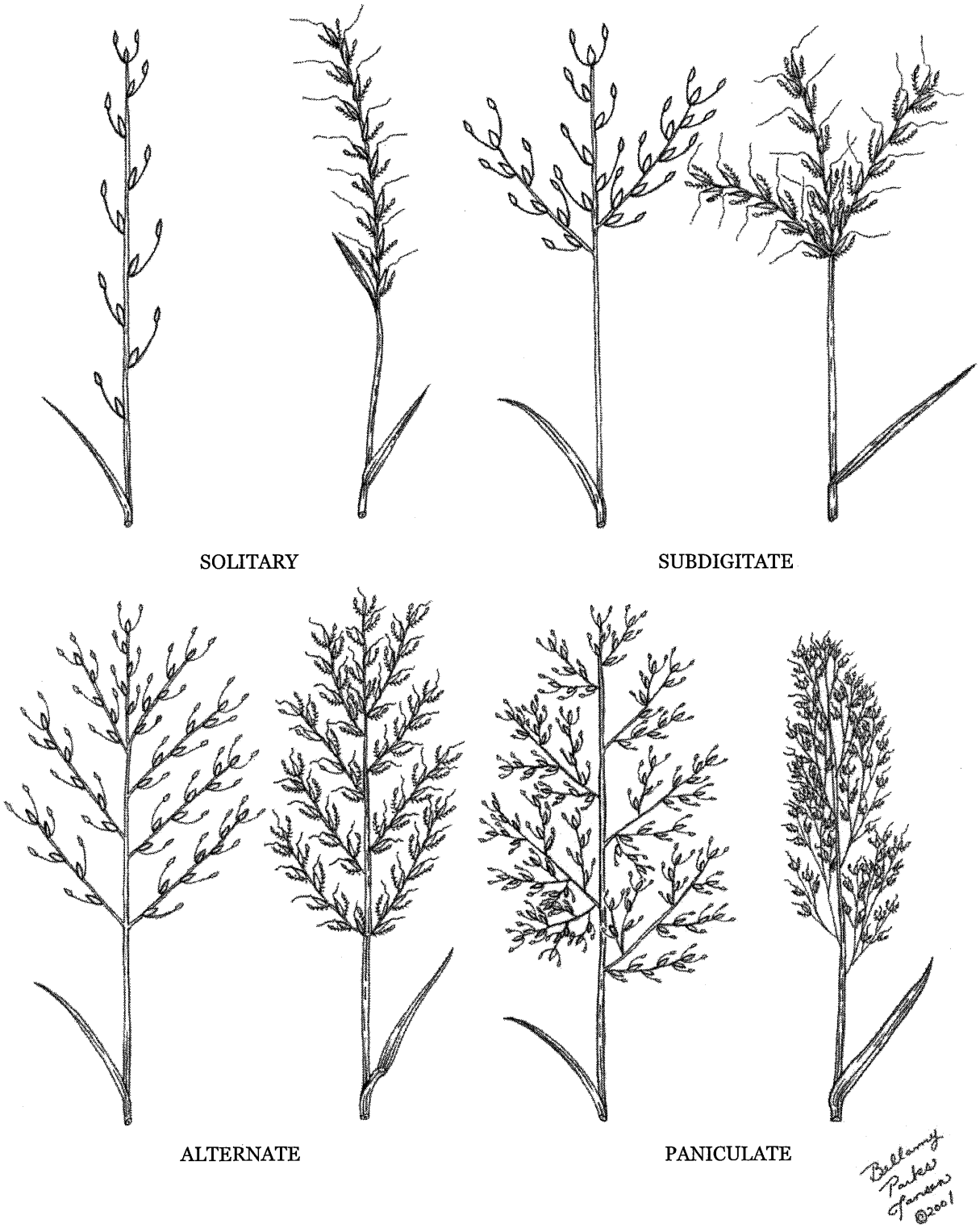
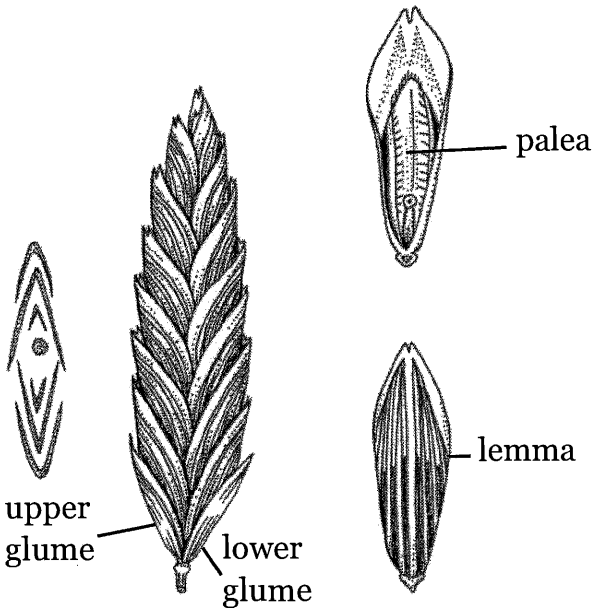
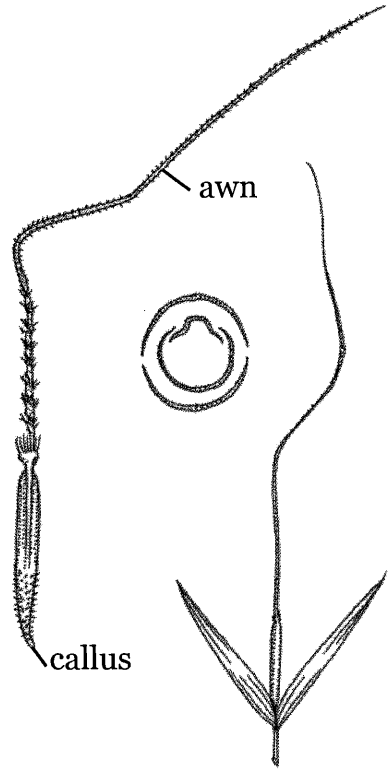


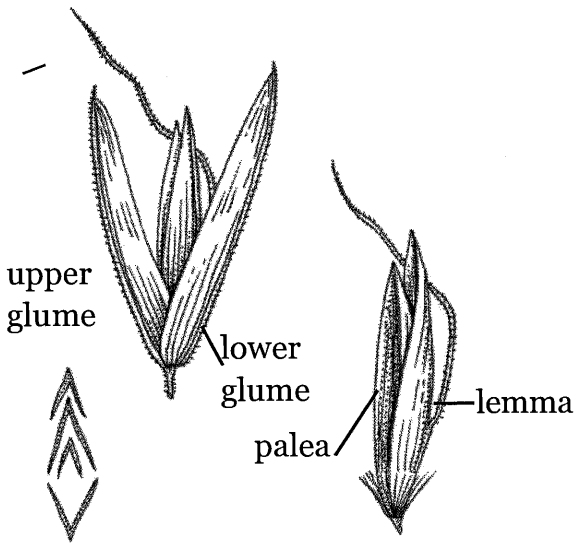
PLATE 34. POACEAE: RAME TYPES



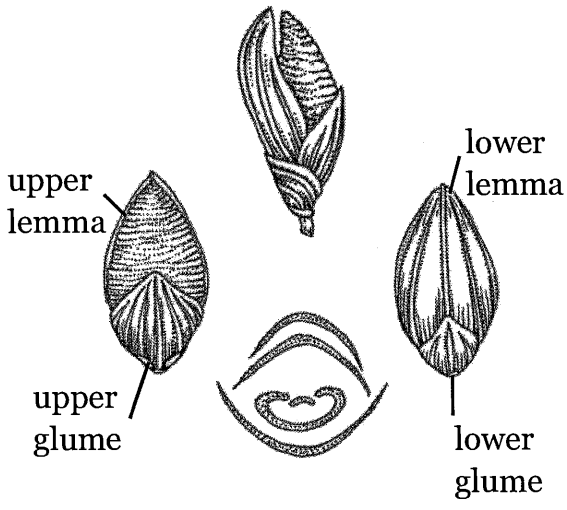
LATERALLY COMPRESSED SPIKELET
WITH 13 FLORETS



TERETE SPIKELET WITH 1 APICALLY
AWNED FLORET



LATERALLY COMPRESSED SPIKELET
WITH 1 DORSALLY AWNED FLORET

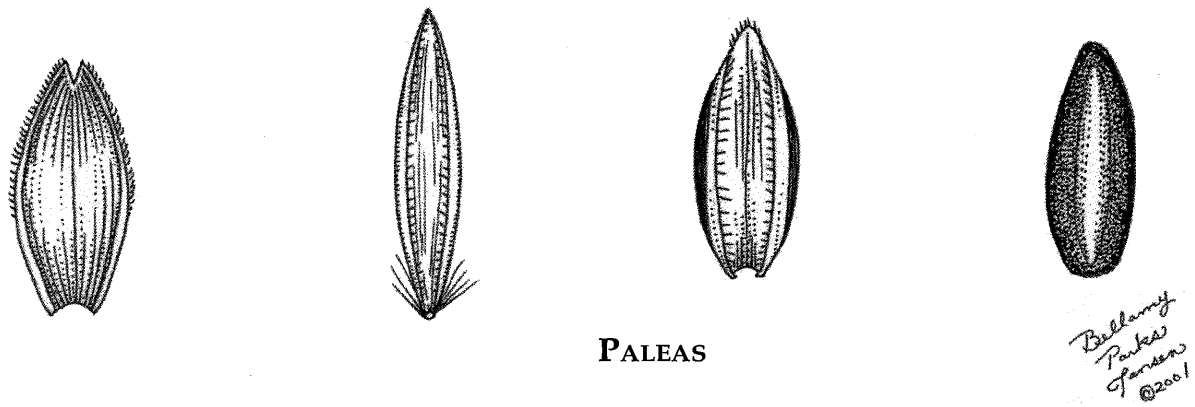


DORSALLY COMPRESSED SPIKELET
WITH 2 FLORETS

Bellamy Parker Jansen ©2001

PLATE 35. SPIKELET MORPHOLOGY

LEMMAS



PALEAS

PLATE 36. POACEAE: LEMMA & PALEA MORPHOLOGY

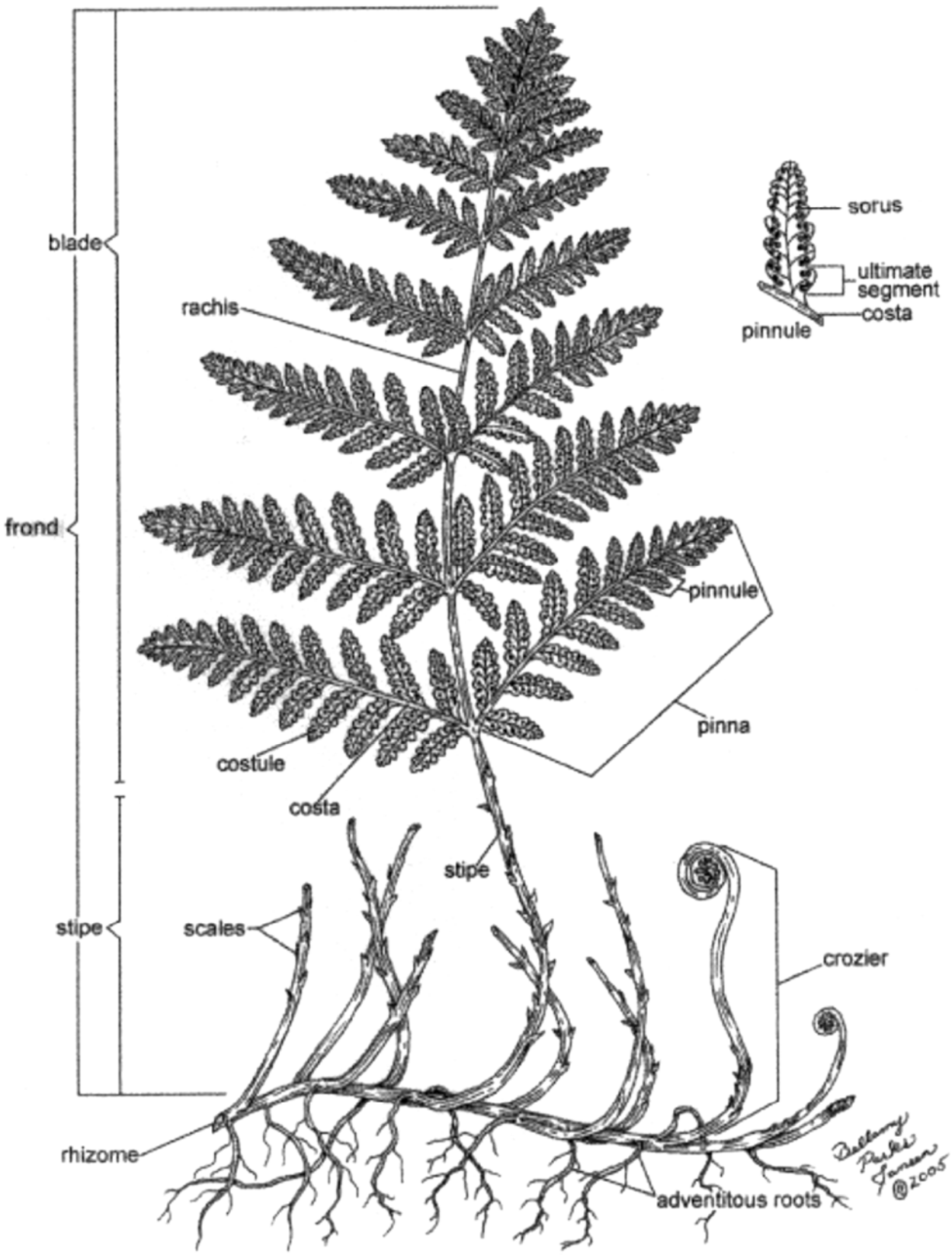


PLATE 37. GENERAL FERN MORPHOLOGY

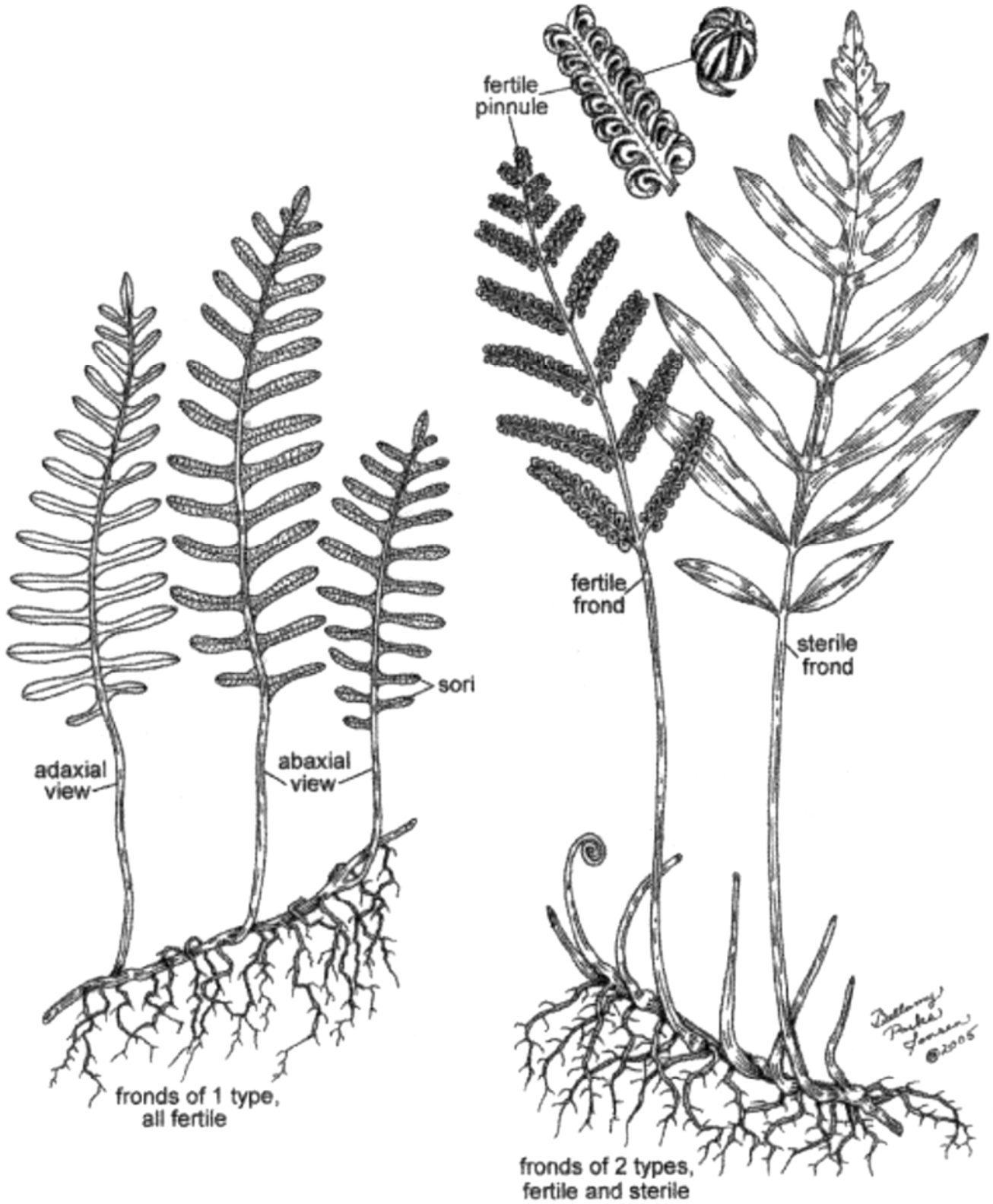


PLATE 38. GENERAL FERN MOPHOLOGY

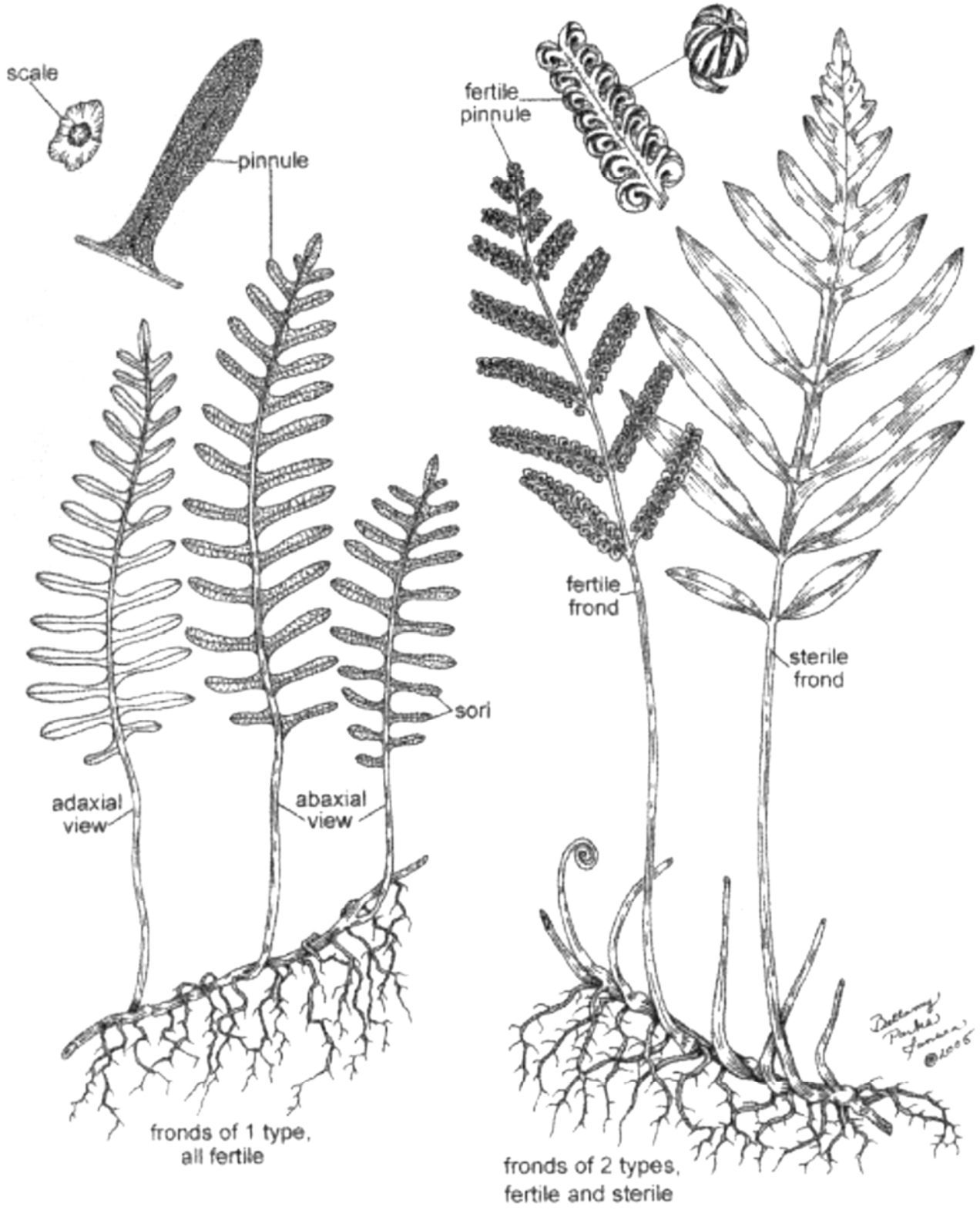


PLATE 39. FROND TYPES

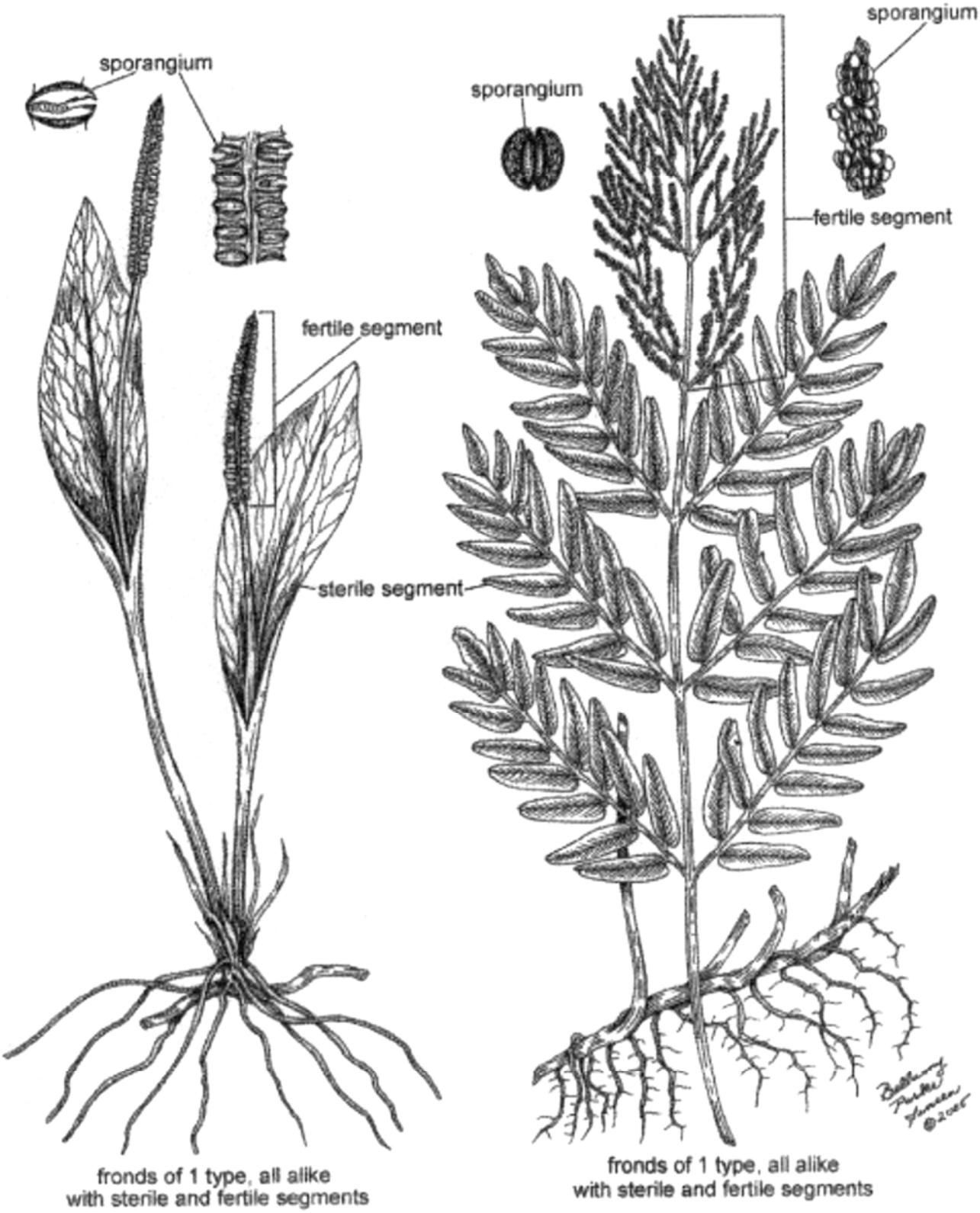
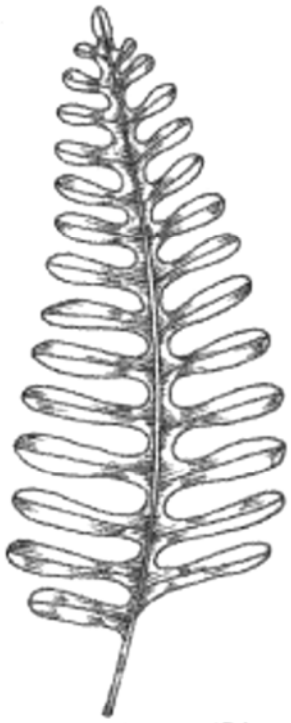


PLATE 40. FROND TYPES

simple and entire



simple and pinnatifid

1-pinnately compound

1-pinnately compound
with pinnae pinnatifid

PLATE 41. FROND TYPES

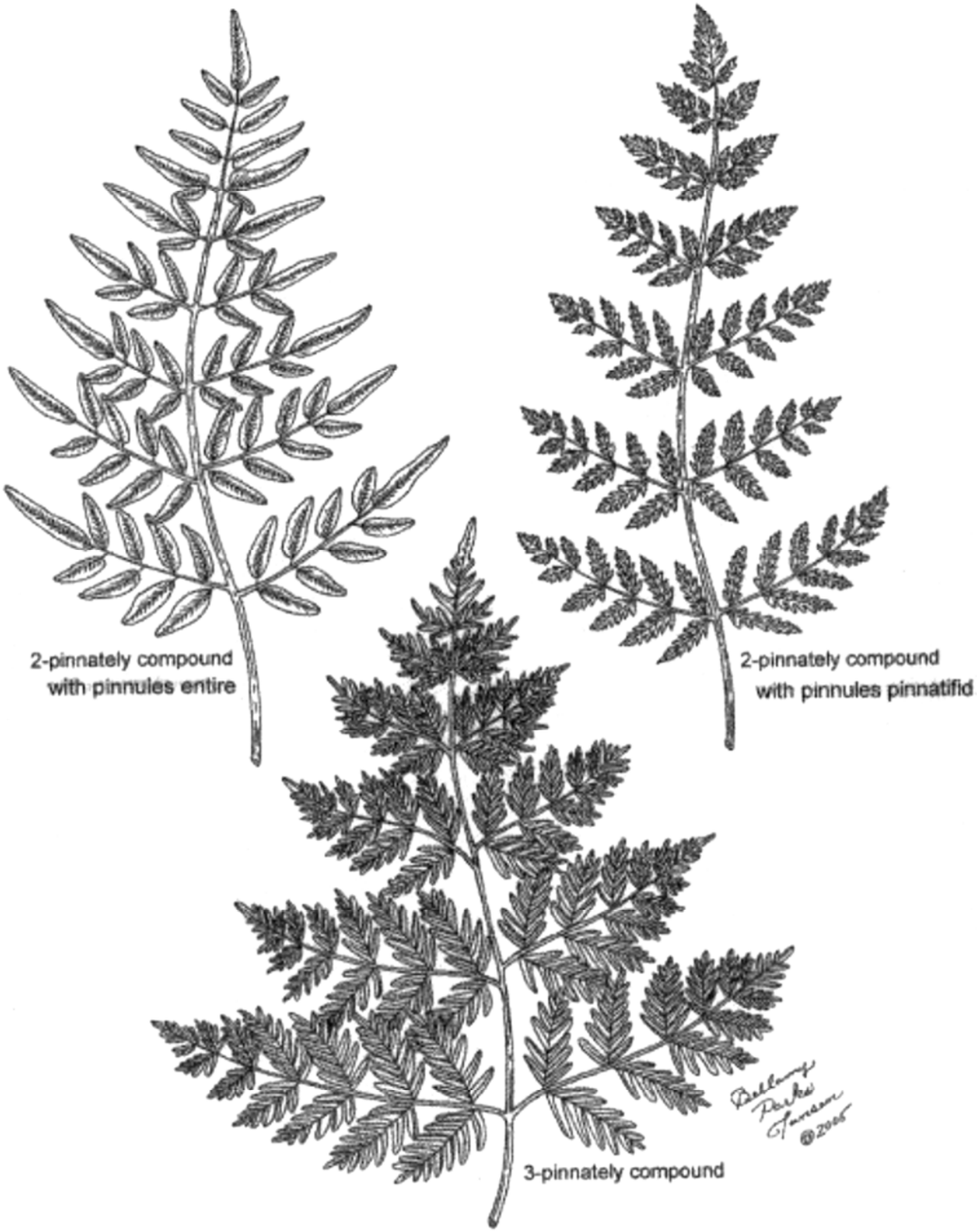


PLATE 42. FROND BLADE DISSECTION

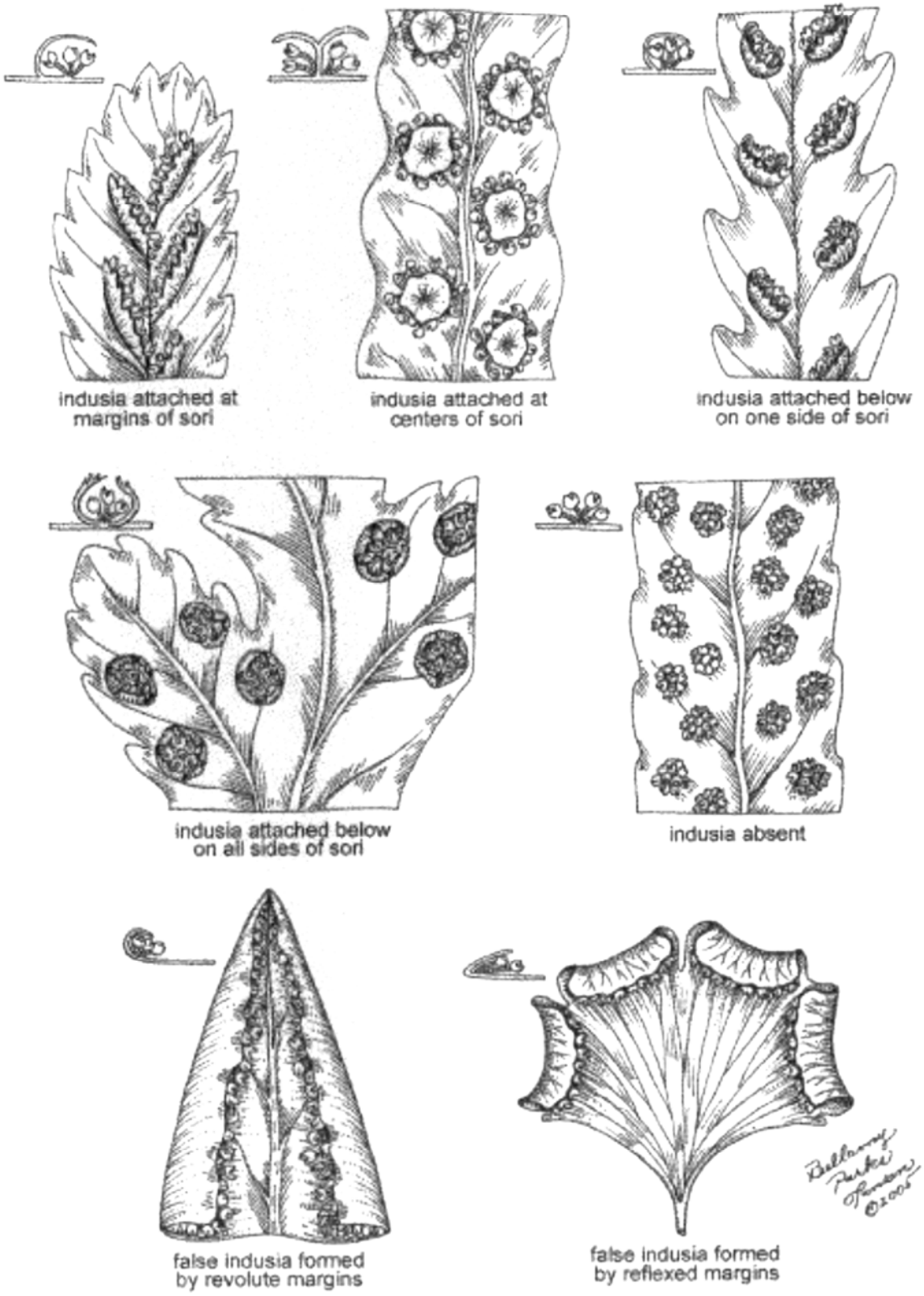


PLATE 43. INDUSIA TYPES

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accepted names in italics; synonyms in roman

PLANT FAMILIES OF OKLAHOMA