

Diversification of *Rhododendron*: The Healthy Flourishing Flowers

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Rhododendron is also referred as Burans or lali guras flowers and famous for its diversity and various health benefits. The flowers of *Rhododendron* are known as national flower of Nepal and state flower of Nagaland, Himanchal Pradesh and Uttarakhand. Plants heights of *Rhododendron* are in the range of 6-22 meters and grown at higher altitude (1800 to 4000 m) of different country including India, Bhutan, Nepal, China, and Pakistan, Myanmar, Sichuan, etc. However, the south region of India, North America, Europe, North-east Asia have very less diversity of *Rhododendron* species. Its flowers are available in may colors as shown in figure 1.



Figure 1 Rhododendron flowers

The Rhododendron is the largest genus in the Ericaceae family, with 960 species worldwide, 542 of which are geographically prevalent to China in the south and southwest regions. The endemic species of China are R. micranthum Turcz., R. dauricum L., R. capitatum Maxim., and R. schlippenbachii Maxim. However, species Rhododendron arboreum are mostly found in India.

A study conducted by Shrestha et al. (2018) on the pattern of diversification of *Rhododendron*, they have found that north-east Asia as the origin of *Rhododendron*. Throughout the late Eocene and Oligocene, dispersal of *Rhododendron* took place from north-east Asia to North America. Its species populated and diversified in the subtropical and tropical mountains relatively late in their evolution. Tropical and subtropical species,

particularly those found in Southeast Asia and the Malay Archipelago, where the species diversity is high, have seemed to be much younger than those found at higher latitudes.

Why are rates of diversification higher in the tropics?

Previous research indicates that tropical regions experience higher rates of speciation, which are a result of higher rates of reproductive isolation, higher rates of molecular evolution, higher levels of biotic interaction, or higher levels of climatic changes. This process may have been accentuated by the development of heterogeneous topography, which produced a variety of climatic niches and increased opportunities for geographic isolation. The strongest factor influencing the diversity of rhododendrons among all other factors is habitat heterogeneity (Liu et al., 2021).

The flowers of *Rhododendron* have antioxidant activity, antibacterial activity, antitumor activity, analgesic activity, insecticidal and other pharmacological activity (Liu et al., 2021; Hu et al., 2022). It has been found that *Rhododendron arboreum* species have tree density of 370 (Tehri, Chamoli) to 830 trees/ha (Pauri Garhwal and Rudraprayag) (Chauhan et al., 2021). They investigated eight sites of Uttarakhand i.e. Phadkhal, Khirsu, Jadipani, Ranichauri, Nandasain, Nauti, Ghimtoli, and Khadapatiya to assess the flower yield from per hectare of *Rhododendron* growing land. The maximum yield of Burans flower was found from the Khirsu sites (83.34 ± 3.78 kg/ha). These flowers are becoming the good source of employment especially in the region of high altitude by producing number of value added products. Some of the *Rhododendron* (Burans) based products are shown in figure 2. Burans flowers has been utilised in the preparation of jam, jelly, chutney, juice, wine and many other local beverages.



Figure 2 Value added products prepared from Rhododendron

References

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