NATURAL HISTORY NOTE

Prolapsed hemipenis in an adult Baja California Coachwhip (*Masticophis fuliginosus*) in the Sierra San Pedro Mártir, Baja California, México

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The Baja California Coachwhip (*Masticophis fuliginosus*) is a large (> 2 m), diurnal snake that is common throughout all of Baja California peninsula and is found in a variety of habitats ranging from desert and scrublands to riparian and agricultural areas (Stebbins 2003). The species is often observed foraging for lizards among open patches of vegetated habitat where it moves quickly along the ground and captures lizards and other prey by direct pursuit (Ortenburger 1925, Thomson et al. 2016). *Masticophis fuliginosus* is in relative decline, due to land use changes within its range (Thomson et al. 2016), and natural history investigations focused on this species are required to enable land managers and biologists the information needed to appropriately manage the species.

We regularly encounter *M. fuliginosus* and numerous other species of snakes when we enter appropriate habitat in northwestern Baja California. Herein we report an observation of a *M. fuliginosus* that exhibited a prolapsed hemipenis while otherwise completely unharmed and unmolested.

While participating in a herpetofauna natural history workshop, we observed a dark phase adult *M. fuliginosus* basking within open scrub/chaparral habitat at Rancho El Potrero, Sierra San Pedro Mártir (30.918586 N, 115.645567 W; elev. 900 m). Upon approach (RAL), the snake immediately attempted to flee but was hand-collected. At the time of capture, it was quickly noted that the right hemipenis was prolapsed (Fig 1). The snake was very carefully placed in a cotton bag, and then the bag was placed in a location where it would be undisturbed. After approximately 20 minutes the snake was removed from the bag for examination. At that time of the snake's removal from the bag, the hemipenis was still everted and extremely engorged, which can be a typical condition, but only during copulatory behavior (Kelly 2002). Podhade and Harne (2014) suggested that a prolapsed hemipenis would likely desiccate and become necrotic if not returned to its natural inverted position. One of the authors (JAA) very carefully attempted to slowly replace the hemipenis into its natural position, but it was clear that the hypertension was too high for the hemipenis to be compressed and replaced in a manner that was safe for the snake.

Prolapsed hemipenes do occur through several reptilian groups. Vyas and Mistry (2021) noted that a dead, wild Marsh Crocodile (*Crocodylus palustris*) had a prolapsed phallus/cloaca in India. Lescano and Quevedo (2016) conducted a hemipenectomy on a captive Leopard Gecko (*Eublepharis macularius*), with successful survival of the lizard. A captive Central Asian Cobra (*Naja oxiana*) had a prolapsed hemipenis, which was subsequently amputated to avoid necrosis and infection (Nasoori et al. 2018). Prolapsed hemipenes are not unique to our observation; Bennett (1996) and Hernandez-Divers (2004) both reported on suggested surgical repairs for such conditions in several reptile groups (i.e., turtles, lizards, snakes).

It appears that wild specimens are seldom reported with a prolapsed hemipenis. We found that only 3 accounts worldwide, all recent: Vyas and Mistry (2021) reported this phenomenon in a dead wild crocodile (India), Pernetta and Reading (2021) collected a live snake in this condition (Australia), and Schultz and Caven (2021) reported it in a snake killed in a fire (Nebraska, USA). This paucity of reports

Fig. 1. Prolapsed hemipene in an adult *Masticophis fuliginosus* in Baja California. Photo by Elizabeth Lopez.

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may be due to a reduced ability to remain mobile, infection and necrosis to the prolapsed area, or other factors that reduce fitness of the specimen, perhaps leading to predation or death. Prolapse of the cloacal region, in both male and female reptiles, has been reported among many reptile groups (see Hedley and Eatwell 2014). However, very few reports of wild caught reptiles have been reported with a prolapsed hemipenis. Researchers have suggested reasons how a hemipenis could become prolapsed and included: parasitic loads, traumatic injury, chronic sexual activity, forced separation during copulation, trauma involving the retractor muscle of hemipenis or cloacal sphincter, regional infection within the individual animal, and other factors (De Silva et al. 2013, Podhade and Harne 2014, Schultz and Caven 2021). In the case of our observation, we speculate that the male sex organ may have been forcibly removed during copulation and was unable to be retracted. Due to the remoteness of our observation, any surgical/veterinary intervention was not practicable and therefore we released the snake at the site of capture with its hemipenis prolapsed.

We noted that reports of a prolapsed hemipenis are very rare, and our report is the first in a live, wild snake in North America, as well as the only report of this condition in *M. fuliginosus* (Podhade and Harne 2014). It is unknown what level of frequency this may be occurring in wild populations, but this phenomenon can be a confounding effect on the population persistence of declining species in some areas.

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