

Polyandry in the northern Western Ghats vine snake *Ahaetulla borealis*

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The Indian tree snake *Ahaetulla borealis* Mallik et al. 2020 occurs in the northern and central parts of the Western Ghats mountain range. Its geographic range extends from the Matheran plateau (18° 59'58.92" N, 73° 16'20.64" E) in the north to Devimane ghat (14° 31'9.84" N, 74° 34'20.28" E) in the south. The species is commonly found in low-to-mid altitude, moist deciduous and semi-evergreen forests (Mallik et al., 2020). Despite its common occurrence, the ecology of *A. borealis* is scarcely documented, and available notes are unlikely to be attributed to its current nomen. Kinnear (1912; as *Dryophis mycterizans*) revealed the ovoviviparous nature of this species and reported 15 and 18 young ones in two individuals obtained from the Thane and Bhandup regions of the Bombay state (in present-day Maharashtra). Most other members of the genus *Ahaetulla* have also been observed to be ovoviviparous (Mohapatra et al., 2017; Fischer, 1915; Feldman et al., 2015). The mating season and reproductive strategies of *Ahaetulla* spp. are not established, and we did not find any report describing their mating behaviours.

Herein, we report the breeding behaviour of *A. borealis* from The Niche-Malnad Farmstay, Sonda, Karnataka (14° 44'2.76" N, 74° 45'29.88" E). On 26 September 2023, around 06:30 h, we observed a pair of *A. borealis* on the branches of an Indian laurel (*Terminalia elliptica*). The pair rested on a branch 4 m above the ground. The observation site featured mixed vegetation with areca palms and banana plantations on one side and rural homes on the other. Forest fragments were present a few metres away. Later in the afternoon (~16:30 h), we inspected the tree and found roughly seven individuals of various sizes dispersed over different branches. Two individuals were seen moving quickly between branches as if chasing one another, but we observed no pushing or biting behaviour. On the following morning (27 September 2023, at 08:00 h), we witnessed copulation. The female was notably larger than the other individuals, presumably all males, which were scattered on the tree. The snakes had not changed their positions on the same afternoon (~16:00 h), and copulation was still underway. By the following day, 28 September 2023, the snakes had coiled up together, forming a breeding ball around the female, and copulation was taking place (Fig. 1; [BHS video, 2024](#)). This breeding ball had at least five individuals, including the female. Several tails were firmly entwined around the female's abdomen and tail. Copulation did not occur at night since all individuals,



Figure 1. Several *Ahaetulla borealis* were seen on a branch of Indian Laurel four metres from the ground

except for the female, had scattered to distant branches on the same tree. We observed this breeding ball over the next two days. For the next 12 days, the snakes remained on the same tree, with no change in behaviour where the female stayed on the lower branch throughout and males moved to adjacent branches late evening and remained there until morning. On 13 October 2023, four individuals abandoned the site, leaving two males and one female. On 14 October 2023, all snakes had abandoned the site.

This is the first report of a polyandrous breeding ball in the tree snake genus *Ahaetulla*. The male combat depicted here differed from prior descriptions of other species (Senter et al., 2014). The several males dangling on various tree branches moved using the body bridges other snakes built. However, their activity did not resemble 'body bridging' (as described in Greene & Mason, 2000), in the sense that neither pinning down nor chin rubbing took place. However, the behaviour of satellite males engaging in rapid chases on the tree was consistently observed across multiple days and appeared purposeful.

The formation of a mating ball seemed surprising for tree-dwelling species of snakes, given the constraints arboreality puts on free movement. A breeding ball has also been recorded among the oviparous tree snake *Dendrelaphis tristis* (Visvanathan et al., 2022), a close relative of the genus *Ahaetulla*. More observational studies are needed to disentangle the variety of ways in which tree-dwelling snake species reproduce. The high diversity in snake

breeding behaviours implies the presence of a strong sexual selection in this lineage. Senter et al. (2014) found that the majority of courting and male-male combat behaviours are species-specific and phylogenetically unpredictable. This diversity in snake breeding behaviours should be examined in conjunction with the microhabitat preferences, activity times, and other ecological correlates that may be driving variations in breeding behaviours.

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