

Arboreal mating by rough-necked monitors *Varanus rudicollis* in Sabah, Malaysia

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The roughneck monitor *Varanus rudicollis* (Gray, 1845), is a large (TL 146 cm), arboreal species, although there are some reports of it being ground-dwelling. It is diurnal and native to primary and secondary rainforests in Myanmar, Thailand, Malaysia, and the islands of Penang, Sumatra, Riau, Bangka and Borneo (Bennett, 1995; 1998; Pianka et al., 2004; Uetz, 2025). Despite this wide range it is one of the most poorly studied varanid species as direct observations in the wild are very rare, especially as its prefers to shelter in tree hollows in dense jungle (Bayless, 1997; Bennett, 1998; Pianka et al., 2004).

First record: On 21 February 2025 at 16:35 h, a mating pair of roughneck monitors were observed (Fig. 1A) in Danum Valley Conservation Area in Lahad Datu, Sabah, Borneo, Malaysia (196 m a.s.l.). The pair was located at a height of about 10–15 m on the trunk of a *Shorea* sp. (Dipterocarpaceae). The tree was in the primary rainforest, about 50 m from the road, but in a dense and thick area,

with no trail immediately in the vicinity. The temperature at the time of observation was 26–27 °C, after some rain in the morning, windless and partially cloudy. The surrounding area was near the road, with low traffic, approx. 30 cars a day, plus some cars and golf carts at night, and people walking. The animals were at a sufficient distance so that they were not disturbed. The observation continued for only 10 minutes. On return to the site after 25 minutes, the lizards had changed positions slightly (the male clearly remained along the female's back without any mating movements), staying still, for another 10 minutes before we left the area. An interesting addition is that some 24 hours later, in the same location, during the rain, one of the observed individuals was in the same tree, a little lower.

Second record: On 9 March 2025 at 14:15 h, while monitoring local birds, a mating pair of roughneck monitors were observed (Fig. 1B) in Rainforest Discovery Centre Sepilok in Sabah, Borneo, Malaysia (32 m a.s.l.). The pair was located at a height of about 20 m on the trunk of a *Shorea parvifolia* (Dipterocarpaceae). The temperature at the time of observation was 29–30 °C, humidity 80–90%, windless, with overcast skies. The surrounding area was a dense tropical forest with single tall trees overhanging the canopy. The reptiles were perched on one of the trees at the edge of a larger density on the screened, unshaded side. To avoid disturbing the animals, the observation continued for only a few minutes during time which several photos were taken from a suitable distance. On return to the site after 20 minutes, the lizards were absent.

To the best of our knowledge, this is the first documented, direct observation of mating in this species from northern Borneo. The only details about the reproduction of this species come from captivity, clutches consist of 8–16 eggs (up to 3 clutches per year), proximately 4 weeks after mating, the incubation period of 152–190 days at 28–30 °C, hatchlings measure 200–260 mm, and weigh 14–21.6 g (Horn & Petters, 1982; Bayless, 1992; Bennet, 1993; 1998; Auliya & Koch, 2020). Observations such as these, even as single events, broaden our understanding of the natural history and the mating period and behaviour of this difficult-to-observe monitor lizard species.



Figure 1. Two instances of arboreal mating by *Varanus rudicollis* in Sabah (Borneo) - **A.** Lahad Datu and **B.** Rainforest Discovery Centre Sepilok. In both cases the smaller male (on top) embraces the female with his front limbs near the nape of the neck, introducing the hemipenis on the right side, and the male is noticeably less massive but with a longer tail than the female.

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