

First record of male-male combat in the Malagasy giant hognose snake *Leioheterodon madagascariensis*

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Male ritualistic combat has been widely documented in snakes and is considered to be an ancestral characteristic of the group (Senter et al., 2014). Rival males engage in combat in order to gain mating dominance or access to fertile females. Combat is generally non-lethal and combatants attempt to force the head of their competitor to the ground, often by entwining their bodies to exert a downward pressing force, known as topping. Herein we present the first known recorded observation of male combat in *Leioheterodon madagascariensis*, a Malagasy endemic now also found on the Comoros Islands (Meirte, 1993). It is a large and common lamprophiid species that may reach lengths of 1800 mm and is frequently encountered close to human habitation where it eats rats and eggs (Glaw & Vences, 2007). The species has an upturned rostral scale, which is referred to in the common name, that is used for foraging under leaf litter and sand (Glaw & Vences, 2007). Previously, the only reproductive behaviour described for *L. madagascariensis* has been courtship and mating between a captive male and female (Campbell & Murphy, 1977).

On 24 July 2019 at 11:28 h during a herpetofaunal survey in the north-west dry forests of the Mahamavo region of Madagascar (15° 28'30.7" S, 46° 41'43.4" E), two large adult male *L. madagascariensis* were observed engaged in combat (BHS video, 2022). The two males were found mid combat on a frequently used village path, with both snakes seemingly undisturbed by the presence of the two authors despite being only metres away. Their body and tail regions were entwined, and heads elevated (Fig. 1A). Both snakes attempted to pin the head of the other, whilst continuously coiling around each other without much forward travel. An individual would attempt to pin the head of the other to the ground with the underside of its own head, whilst the other would jerk its head to one side in an effort to not be pinned and to try to regain dominance. Combat was observed for approximately 8 minutes and the position of dominance switched repeatedly. Whilst combat in other species sometimes involves multiple phases (Guedes et al., 2019; Senter et al., 2014), combat in *L. madagascariensis* only seemed to have a 'topping' phase, but it must be noted that combat was not observed from the start. No biting was observed.

When combat was completed, the victor flared and raised its neck in a manner often exhibited in *L. madagascariensis*'

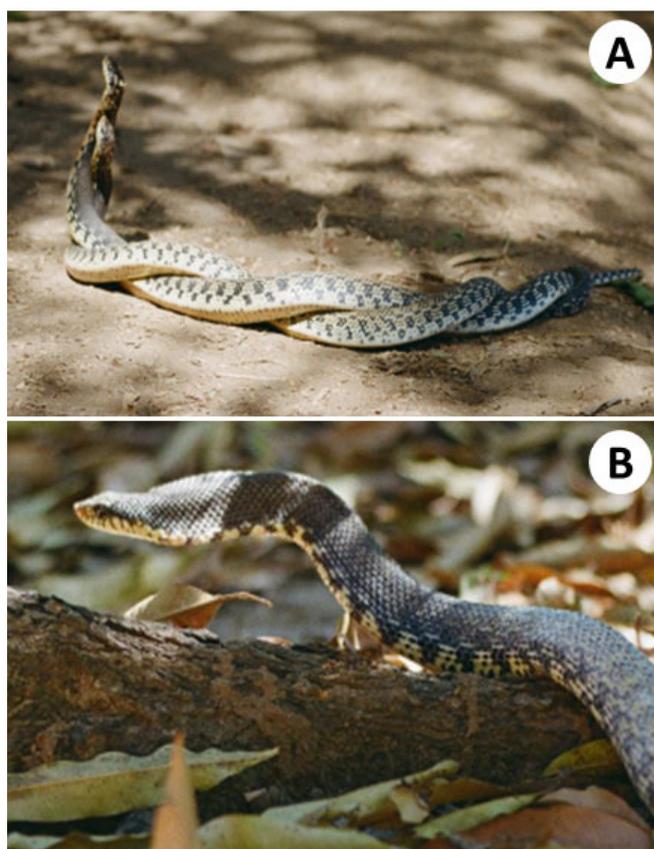


Figure 1. Male combat in *Leioheterodon madagascariensis* - **A.** Two males engaged in ritualistic combat, **B.** Threat behaviour exhibited by the victorious male

defensive behaviour (Fig. 1B) and appeared to chase off the loser, which moved off the path into the undergrowth, shortly followed by the victor. We did not observe a female, however, a passing villager claimed to have seen another snake, which we assumed to be the female. The victor was later caught and biometric data recorded. The snake was the largest *L. madagascariensis* caught during the survey season (1500 mm long and weighing 1200 g); its large size may have played a role in victory (Glaudias et al., 2020; Schuett, 1997). Whilst handled, the snake convulsed its cloacal region, seemingly in response or sensitivity to touch, perhaps indicating sexual stimulation during combat. Despite obvious fatigue displayed whilst catching the snake,

it was still capable of producing large amounts of force and at one point freeing itself from the grip of the handler.

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