

NOTES

Canopy chameleon (*Furcifer willsii*) consumption by common big-eyed snake (*Mimophis mahfalensis*) in Fivahona Forest, eastern Madagascar

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Madagascar is known for its incredible biodiversity, with over 440 described species of reptiles of which about 100 species are colubrid snakes (Cadle, 2003; Glaw & Vences, 2007; Burbrink *et al.*, 2019; Uetz *et al.*, 2020). Despite increased intensity of herpetological field research over the last three decades, resulting in an impressive cumulated knowledge (especially from protected areas; Goodman *et al.*, 2018), data on behavior and inter-species' interactions are still largely lacking.

As mesopredators, snakes are prey items to some vertebrates (e.g. birds and carnivorans), while obligatory preying on other vertebrate species. While a large proportion are frog-eating snakes (for example in comparison to mainland Africa; Andreone & Luiselli, 2000), some species have specialized in consuming other reptiles (Brown *et al.*, 2014; Cove *et al.*, 2017). For Madagascar there are mostly scattered publications on prey-predator interactions (Mercurio *et al.*, 2006; Crottini *et al.*, 2010; Rosa *et al.*, 2010,

2012, 2016a; Cove *et al.*, 2017; Raselimanana, 2018), and general patterns are still difficult to unveil.

The Malagasy common big-eyed snake, *Mimophis mahfalensis*, is a widespread species and perhaps the most common diurnal snake encountered in the southwestern portion of the island. This lamprophiid snake is widely distributed along the central and southern regions of the country (Nagy *et al.*, 2003; Glaw & Vences, 2007; Ruane *et al.*, 2018). Frogs, skinks, plated lizards, and chameleons are common items in its diet (Jenkins *et al.*, 2009; Rosa *et al.*, 2016b; Raselimanana, 2018). Here we report on a new prey item to *Mimophis mahfalensis*, based on the inspection of stomach contents.

During a herpetological survey in the areas surrounding the Andringitra Massif (Haute Matsiatra Region), we investigated Velotsoa Forest, a remote fragment of humid forest close to the village of Fivahona. This patch of remaining forest is located ca. 5 km northeast from the Andringitra Massif (22°4'13.48"S, 46°52'33.13"E). An adult individual of *M. mahfalensis* was found moving on the forest leaf litter in the morning (at around 10:00 am) of 17 December 2018. The snake had a conspicuous widen bump in the anterior region of the body and was captured and photographed with a digital camera to document its coloration in life (Figure 1a). Given the uncertainty regarding the unequivocal identification of the species, the individual was euthanized (overdose of MS222) and collected as voucher specimen. The specimen was deposited in the herpetological collection of the Zoologische Staatssammlung München, Germany (ZSM).

We dissected the specimen to analyze the stomach contents, revealing the occurrence of a chameleon of the genus *Furcifer* Fitzinger, 1843 (Figure 1b). Morphological identification was difficult due to the life stage of the chameleon and, to some extent also by the degree of deterioration caused by the cytotoxic bite of the snake (Rosa *et al.*, 2014) and the initial digestive process. A tissue sample of the chameleon was collected and stored in 99% ethanol. We amplified a fragment of ca. 650 bp of the cytochrome oxidase I (COI) for both the snake and

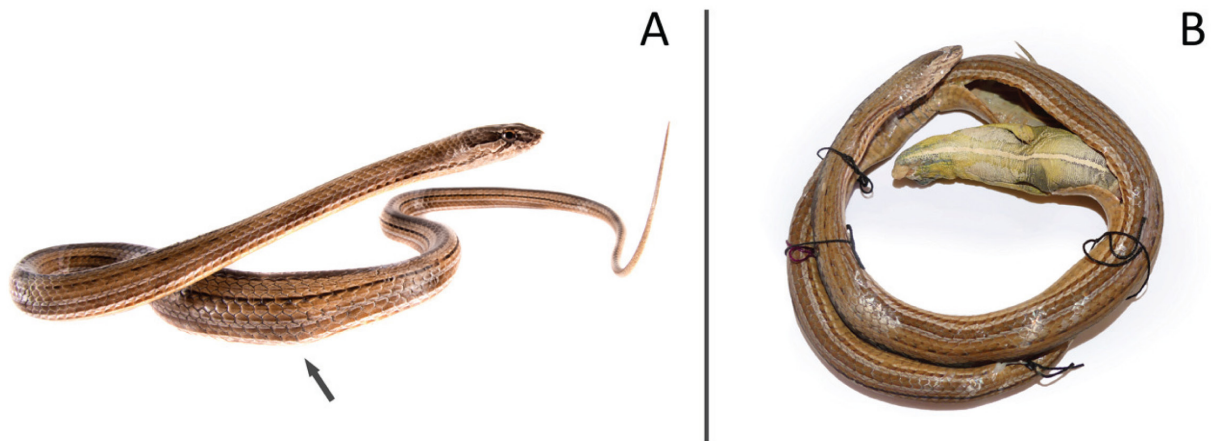


Figure 1. A) Living specimen (ACZCV_0905, ZSM 303/2018) of *Mimophis mahfalensis* collected at Fivahona Forest. B) The individual of *Furcifer willsii* (ACZCV_0436, ZSM 304/2018) found in the stomach of ZSM 303/2018.

the chameleon. We used the primers published in Nagy *et al.* (2012) following the laboratory procedures described in Cocca *et al.* (2018). Chromatograms were checked and sequences were manually edited using the sequence alignment editor BIOEDIT (v.7.2.0; Hall, 1999). Edited sequences were compared with GenBank sequences using the BLAST algorithm and confirmed the identification of the snake as *M. mahfalensis* and revealed the preyed chameleon as a sub-adult (possibly a female) of *Furcifer willsii* (Günther, 1890). Sequences have been deposited in GenBank under the accession numbers MT895499 *M. mahfalensis*, and MT895498 *F. willsii*.

Furcifer willsii is a medium-sized rainforest dwelling chameleon (Glaw *et al.*, 2009) endemic to Madagascar (Glaw & Vences, 2007). The species is widely distributed in the eastern rainforests. The closest reported site to the Velotsoa Forest for this species is Ikongo, a locality ca. 50 km north, therefore our record represents the southernmost range extension for the species. *Furcifer willsii* has been reported as being predated upon by *Parastenophis betsileanus* (Raxworthy, 1988). That author hypothesized that small to medium size chameleons could be potential preyed of *Parastenophis* snakes when they are sleeping on branches at night. Given the state of degradation of the chameleon it is possible that this predation event took place only some hours before our arrival and therefore during the early hours of the day, while the *F. willsii* was walking on the ground, as reported by Rosa *et al.* (2016b) that documented a predation event upon another chameleon species (*F. major*). As reported by other authors, *M. mahfalensis* has a great preference for saurian preys (Domergue, 1989; Rosa *et al.*, 2016b; Cove *et al.*, 2017; Raselimanana, 2018). Here we

report on a novel prey-predator interaction between *F. willsii* and *M. mahfalensis*.

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