Field observations of predation events in Malagasy amphibians and reptiles

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Abstract. The relationship between prey and predator is a common interaction within animal communities, but it is often poorly documented. The records for a species diet are often obtained by fecal sample examination and from collected regurgitated samples, rather than direct observation. Here we report three cases of predation events by Malagasy amphibians and reptiles observed in the wild and try to explore and interpret the predation strategies used in these observations.

Keywords. Mimophis occultus, Zonosaurus laticaudatus, Trachylepis elegans, Mantidactylus guttulatus, dietary observation, Madagascar

Records of predation events in the wild are often the result of opportunistic observations during fieldwork studies. The relationship between prey and predator within an animal community is usually poorly documented, and mechanisms of prey capture and ingestion are often unknown. The almost unparalleled diversity of the Malagasy herpetofauna is recognized worldwide (Myers et al., 2000; Glaw & Vences, 2007), but there is a large knowledge gap on the availability of information on the ecology of Malagasy herpetofauna (including foraging, diet, and predation strategies). Several records have been derived from stomach content analysis, or from post-mortem dissection of preserved specimens (e.g. Raxworthy and Nussbaum, 1994; Vences et al., 1999; Woodhead et al., 2007; Knoll et al., 2009) and in the recent years we observe an increase in the publications of predation notes based on field observation (e.g. Mercurio et al., 2006; Jovanovic et al., 2009; Knoll et al., 2009; Crottini et al., 2010; Rosa et al., 2010; Gardner and Jasper, 2015; Rosa et al., 2016; Cove, 2017); although these records remains quite scarce (e.g. Heying, 2001).

Here we report three cases of predation events observed in a newly described snake species Mimophis occultus Ruane, Myers, Lo, Yuen, Welt, Juman, Futterman, Nussbaum, Schneider, Burbrink & Raxworthy (2017), in the girdled lizard Zonosaurus laticaudatus (Grandidier, 1869), and in the frog Mantidactylus guttulatus (Boulenger, 1881).

On June 11th 2015 at 15:56 h, at the bottom of a deep canyon in Anjiamangirana forest (15°09'24.3"S, 47°44'05.9"E, 102 m a.s.l.), in north-western Madagascar.
Madagascar, we observed an adult *Mimophis occultus* in the process of ingesting a plated lizard, *Zonosaurus laticaudatus* (Fig. 1). This prey item is very large in relation to the snake, which struggled to ingest it. Snakes are renowned for their capacity to hunt and swallow large preys because of the flexibility of their jaws, joined by ligaments at the front part. As already reported in the majority of other snake species, (e.g. *Mimophis mahfalensis* Rosa et al., (2016); *Parastenophis betsileanus* Kaloloha et al. (2011)), the lizard was swallowed head first. In nature, *Mimophis occultus* is known to commonly preys upon frogs (e.g. *Ptychadena mascareniensis*) and small reptiles (e.g. skinks, Cove, (2017)), but the feeding on a large-sized species which is known to be extremely strong and fast-running, was thus far not reported and we consider it to be a rare event. The apparent capacity of this snake species to successfully attack such a large and fast running lizard might be facilitated by its cryptic coloration that could allow it to surprise a basking lizard.

The second predation event reports on a plated lizard, *Zonosaurus laticaudatus* catching and eating upon the skink, *Trachylepis elegans* Peters, 1854. This record was observed on December 5th 2017 at 15:22 h in a dry deciduous forest of Kirindy (20°04′02.3″S, 44°39′26.5″E, 55 m a.s.l.), in the west of Madagascar. In the area where we witness this predation the soil is covered by thick leaf litter and dried leaves and both species are abundant and forage among these dead leaves in this dry deciduous forest. An adult *Zonosaurus laticaudatus* caught an adult *Trachylepis elegans* from its tail base, and while the predator had difficulties to grip it correctly, the prey autotomized its tail (Figure 2A). To enable the ingestion of the prey the predator turned the prey and started to ingest it, head first (Figures 2B-C). After getting the head of the prey into its mouth, it took

![Figure 2. A) Zonosaurus laticaudatus caught awkwardly the prey Trachylepis elegans from the tail which was autotomized, probably an escape strategy to the predator. B-C) Zonosaurus laticaudatus effectuated different movements with his head to turn the position of the prey 180° to grip it from the head, good position for swallowing process. 2D) Swallowing process almost done two minutes after the head of prey getting into the mouth.](image-url)
about two minutes to swallow the skin entirely (Figure 2D). The skin was alive during the entire swallowing process, and tried to escape without success. It is interesting to note that the predator did not consume the autotomized tail, which rapidly became a point of attraction for ants.

The third observation occurred in October 26th 2013 at around 18:30 h along a slow moving stream in a closed canopy humid forest of Bemanevika (14°22’57.6”S, 48°35’15.2”E, 1517 m a.s.l.), in northern Madagascar. A large-bodied frog, *Mantidactylus guttulatus* (about 90 mm snout vent length), preyed upon a crab (Figure 3). Both predator and prey are water dwelling species, living in calm flowing water habitat associated with rocks and stones. Both are nocturnal and quite commonly seen in this region, sympatric with other aquatic vertebrates, including other frog species and aquatic invertebrates.

During a nocturnal search for amphibians and reptiles in a riparian habitat we observed a *Mantidactylus guttulatus* individual on an emerged rock consuming a large crab. According to the position and orientation of the claws of the crab, the frog started swallowing his prey from the abdomen. This seems to be an effective strategy to avoid the contact with the chelipeds of the crab and facilitate its ingestion. Interestingly, the freshwater crab (*Hydrothelphusa sp.*) has already been reported as a predator of the treefrog *Boophis rufioculis* in Betampona, eastern Madagascar (Rosa et al., 2014) and, is known to act as a predator of tadpoles and eggs of amphibians globally (Pyke et al., 2013).

**Figure 3: Mantidactylus guttulatus** in ingestion process of a freshwater crab, predator and prey live along a stream with aquatic invertebrates and other frogs.

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**References**


