

Feeding behavior and first record of *Rhinatrema bivittatum* (Guérin-Méneville, 1829) as part of the diet of the ribbon coral snake, *Micrurus lemniscatus* (Linnaeus, 1758) in the Central Amazon region (Serpentes: Elapidae)

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The snakes of the genus *Micrurus* belong a monophyletic group of coral snakes (Pyron, Burbrink and Wiens, 2013), which are widely distributed mainly throughout the Neotropics, where they occur in a variety of different environments (Roze, 1996; Campbell and Lamar, 2004). The majority of these snakes have terrestrial habits and are mostly fossorial and/or cryptic, but there are exceptions, such as *M. surinamensis* and *M. lemniscatus* that preferentially occur in swampy environments and have semi-aquatic habits (Schmidt 1957; Roze 1996; Campbell and Lamar 2004).

Coral snakes of the *Micrurus* genus include a wide variety of prey in the composition of their diet, consuming invertebrates, lizards, amphibians, fish, and even other snakes (Cunha and Nascimento 1978; Sazima and Abe, 1991; Roze 1996; Solórzano, 2005; Ávila et al., 2010, Souza et al., 2011). However, the most frequently consumed prey appear to be blind snakes and amphisbaenians (Campbell and Lamar 2004; Cisneros-Heredia 2005, Arévalo-Páez et al., 2015).

The Ribbon Coral Snake (*Micrurus lemniscatus*) is known to be a predator of caecilians, amphisbaenians, and blind snakes (Amaral 1927, Sazima and Abe 1991, Roze 1996, Martins and Oliveira 1998), but other

vertebrate prey, such as lizards and even fish, have also been documented for this species (Schmidt 1957, Roze 1996, Silva et al., 2010).

However, observations of predation attempts of *M. lemniscatus* are scarce, as these are rarely observed in the field (Souza et al., 2011, Cavalcanti et al., 2012). Here we report and document the first recorded predation of a *M. lemniscatus* on a two-lined caecilian, *Rhinatrema bivittatum*, in central Amazon. The observation was made on May 2, 2015, at 00:36h, located at km 23 of the road AM-010 (02°55'51.59"N, 59°59'38.21W) in the Adolpho Ducke Forest Reserve in city of Manaus, Amazonas, Brazil.

Initially, *M. lemniscatus* bit and grabbed the *R. bivittatum* by the side at midbody. In an attempt to break loose and escape, the caecilian curled up around the body of the snake, but the snake did not release its prey. The snake maintained a firm grip on the *R. bivittatum* with its jaws for a period of five minutes. During that time envenomation presumably occurred.

After this, *M. lemniscatus* released the *R. bivittatum* and moved away from the prey and hid completely beneath a trunk about 30 cm away. After exactly five minutes, the snake returned to its prey and made some repeated, rapid strikes along the body of caecilian. Realizing that its prey was greatly weakened, the snake grabbed the caecilian and dragged it beneath the trunk that it had been hiding under before and began the process of ingesting its prey by the head. The snake began ingestion exactly 24 minutes after the first bite. The whole ingestion process lasted about twelve minutes and initially commenced under the trunk, the trunk was subsequently removed to carry out the photographic record. During the process of swallowing, the snake rubbed its head on the ground repeatedly laterally and at

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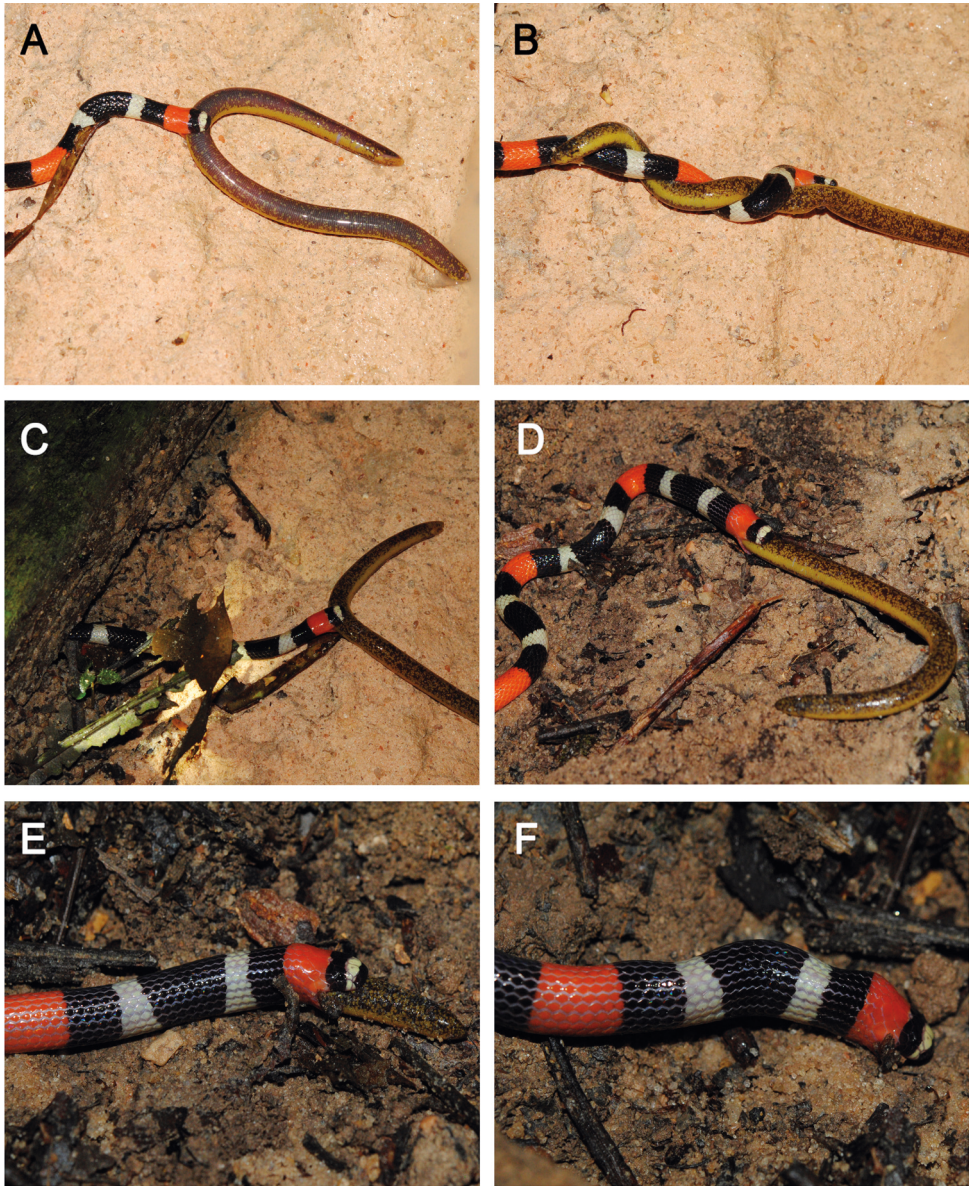


Figure 1. *Micrurus lemniscatus* preying on *Rhinatremas bivittatus* in a bog. Moment of initial attack, with the snake dragging its prey out of the bog (A). *R. bivittatus* wrapping itself around the body of the snake and trying to gain traction on the ground (B). *M. lemniscatus* dragging its prey beneath a trunk (C). *M. lemniscatus* starting the process of ingestion of its prey (D). *M. lemniscatus* finalizing the swallowing process and rubbing its head on the ground (E,F). Photos by DMM Mendes.

the end of the ingestion slightly tilted its head to aid in swallowing its prey.

Data on prey consumed by *M. lemniscatus* from the Central Amazon region reported mainly snakes and

lizards (Martins and Oliveira 1998; Campbell and Lamar 2004), which occupy a similar habitat as *M. lemniscatus*. Although *M. lemniscatus* preferentially consumes prey with a cylindrical body shape to ease

ingestion, other prey with a more flattened or depressed body shape, like armored catfishes (*Callichthyidae*) (Roze 1966), have been documented for the diet of *M. lemniscatus*, suggesting that the diet of this snake is not as specialized and can be considered somewhat generalized.

The fact that *M. lemniscatus* consume non terrestrial vertebrates, such as swamp eels of the species *Synbranchus marmoratus* and electric fishes like *Gymnotus carapo* (Roze 1996; Silva et al., 2010), shows its semi-aquatic habits. The predation of *M. lemniscatus* on *R. bivittatum* reported here, in addition to previous reports of aquatic prey, indicates that these animals may actively forage in or at least near water bodies, as *R. bivittatum* is often found in swamps and bogs. The fact that *M. lemniscatus* dragged its prey down beneath a trunk is evidence of its cryptic habits, although this behavior might also be a defense strategy, as it reduces exposure to visual predators.

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