

Feeding behavior of the Amazonian Water Snake *Helicops hagmanni* Roux, 1910
(Reptilia: Squamata: Colubridae: Hydropsini)
Comportamento alimentar da cobra d'água amazônica *Helicops hagmanni* Roux, 1910
(Reptilia: Squamata: Colubridae: Hydropsini)

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Abstract: The genus *Helicops* currently comprises 15 species, of which eleven occur in the Amazon Forest. *H. hagmanni* feeds on fishes and has nocturnal habits, but detailed data about its diet and behavioral ecology are scarce. Here, we report a *H. hagmanni* adult female specimen (snout-vent length: 516 mm; weight: 162 g) preying on an adult fish, *Rhamdia muelleri* (Actinopterygii: Heptapteridae, 215 mm in total length; weight: 70 g), in the creek Caquajó, a tributary of the Anapu River, municipality of Portel, Pará State, Brazil. We found the snake submersed at 20 cm, convoluted around the fish, and shortly after that, started ingesting the fish headfirst. The snake attacked the cat-fish biting the region between the anal and post-anal fins. This information increases the knowledge about the feeding behavior in snakes, especially of the genus *Helicops*.

Keywords: Water snakes. *Helicops*. Predation. Cat-fish. *Rhamdia muelleri*.

Resumo: O gênero *Helicops* inclui, atualmente, 15 espécies, das quais onze ocorrem na floresta amazônica. *Helicops hagmanni* se alimenta de peixes e apresenta hábitos noturnos, mas dados detalhados sobre seu comportamento alimentar e ecologia são escassos. Neste trabalho, registramos *H. hagmanni* (fêmea adulta; comprimento rostro-cloacal: 516 mm; massa: 162 g) predando um peixe adulto, *Rhamdia muelleri* (Actinopterygii, Heptapteridae; comprimento total: 215 mm; massa: 70 g), no igarapé Caquajó, rio Anapu, município de Portel, estado do Pará, Brasil. Encontramos a serpente submersa a 20 cm, enrolada sobre a presa, em seguida, começou a ingeri-lo no sentido ântero-posterior. A serpente atacou o peixe-gato mordendo a região entre o ânus e as nadadeiras anais. Essas informações ampliam o conhecimento sobre o comportamento alimentar das serpentes, especialmente do gênero *Helicops*.

Palavras-chave: Serpente aquática. *Helicops*. Predação. Peixe-gato. *Rhamdia muelleri*.

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The genus *Helicops* (Colubridae) comprises 15 species of water snakes distributed throughout cis-Andean South America, from Colombia to Argentina. Eleven of those species occur in the Amazonian rain forest (Rossman, 1970, 1973; Frota, 2005). Little is known about the ecology and natural history of *Helicops* species and the studies available are concentrated in few localities in Amazonia (Cunha & Nascimento, 1978; Duellman, 1978; Cunha & Nascimento, 1993; Silva Jr., 1993; Martins & Oliveira, 1998), caatinga (Vanzolini *et al.*, 1980), pantanal wetland (Ávila *et al.*, 2006), Atlantic rain forest (Sazima & Strüssmann, 1990; Marques *et al.*, 2004; Marques & Sazima, 2004), and southern Brazil (Araujo & Ely, 1980; Sazima & Martins, 1990; Aguiar & Di-Bernardo, 2004; Franz *et al.*, 2007).

Most *Helicops* species exhibit nocturnal habits, feed upon fishes, anuran tadpoles, and lizards (Cunha & Nascimento, 1978; Duellman, 1978; Vanzolini *et al.*, 1980; Sazima & Martins, 1990; Sazima & Strüssmann, 1990; Cunha & Nascimento, 1993; Silva Jr., 1993; Martins & Oliveira, 1998; Marques *et al.*, 2004; Marques & Sazima, 2004; Ávila *et al.*, 2006), but generally no details are provided about the predatory behaviour in relation to prey type (for example a fish with spines in its fins or not). Sazima & Strüssmann (1990) reported scavenging of *H. modestus* Günther, 1861 of *Geophagus brasiliensis* (Quoy & Gaimard, 1824) (Cichlidae) and *Astyanax scabripinnis* (Jenyns, 1842) (Characidae) in the field in southeastern Brazil. Lema *et al.* (1983) reported an event of cannibalism among newborn captive *H. infrataeniatus* Jan, 1865.

Information on food and feeding behavior of *Helicops hagmanni* is scarce. This species feeds upon fishes and some authors suggested that it is primarily nocturnal (Cunha & Nascimento, 1978, 1993; Silva Jr., 1993; Martins & Oliveira, 1998). In this work, we present an observation of *Helicops hagmanni* preying on a cat-fish, *Rhamdia muelleri* (Günther, 1864), in the field.

On September 9, 2007 at 2300h in the creek Caquaió (1° 57' 36" S, 51° 36' 55" W; 20 m a.s.l.) of the plot of Programa de Pesquisa em Biodiversidade (PPBio), Anapu River, Floresta Nacional de Caxiuanã, municipality of Portel, state of Pará,

Brazil, we found an adult female *Helicops hagmanni* (516 mm snout-vent length and 162 g weight) submersed in water at a depth of 20 cm, which was preying on an adult cat-fish, *Rhamdia muelleri* (215 mm total length and 70 g weight).

The snake seized the fish biting the prey's posterior body between the anal and post-anal fins (mark of bite on the *R. muelleri* was observed after the capture), maybe avoiding the fish's pectoral spines. After this, the snake held the prey with anterior, horizontal coils, similar to what has been observed in other colubrid snakes according to Willard (1977) (Figure 1A). Subsequently, the snake extended constriction until the opercula area of the cat-fish (Figure 1B). Thereafter, the snake examined the prey's body and swallowed it (Figure 1C), starting ingestion headfirst (Figure 1D). Aguiar & Di-Bernardo (2004) reported, based on fieldwork, that 92% of the proportionally large preys ingested by *H. infrataeniatus* (mainly adults) were oriented and swallowed headfirst.

Greene (1997) pointed out that large preys or preys with a defensive apparatus (spines) require some maneuvering prior to swallowing. We concluded that *H. hagmanni* assessed the better way to swallow its prey, likely, due to ontogenetic learning, taking into account the presence of pectoral spines and the proportionally large size of the fish (Murphy & Campbell, 1987; Sazima & Martins, 1990). The pectoral spines could obstruct the ingestion if the prey was oriented tailfirst, which would result in damage of the digestive tract, causing lesion, and even leading to death (Aguiar & Di-Bernardo, 2004).

More field observations on the feeding behavior of *Helicops* and other water snakes are needed to increase our knowledge about how these snakes capture and feed upon their preys.

Both specimens have been deposited in the herpetological (MPEG 22403) and ichthyological (MPEG 13408) collections of the Museu Paraense Emílio Goeldi, Belém, Pará, Brazil.

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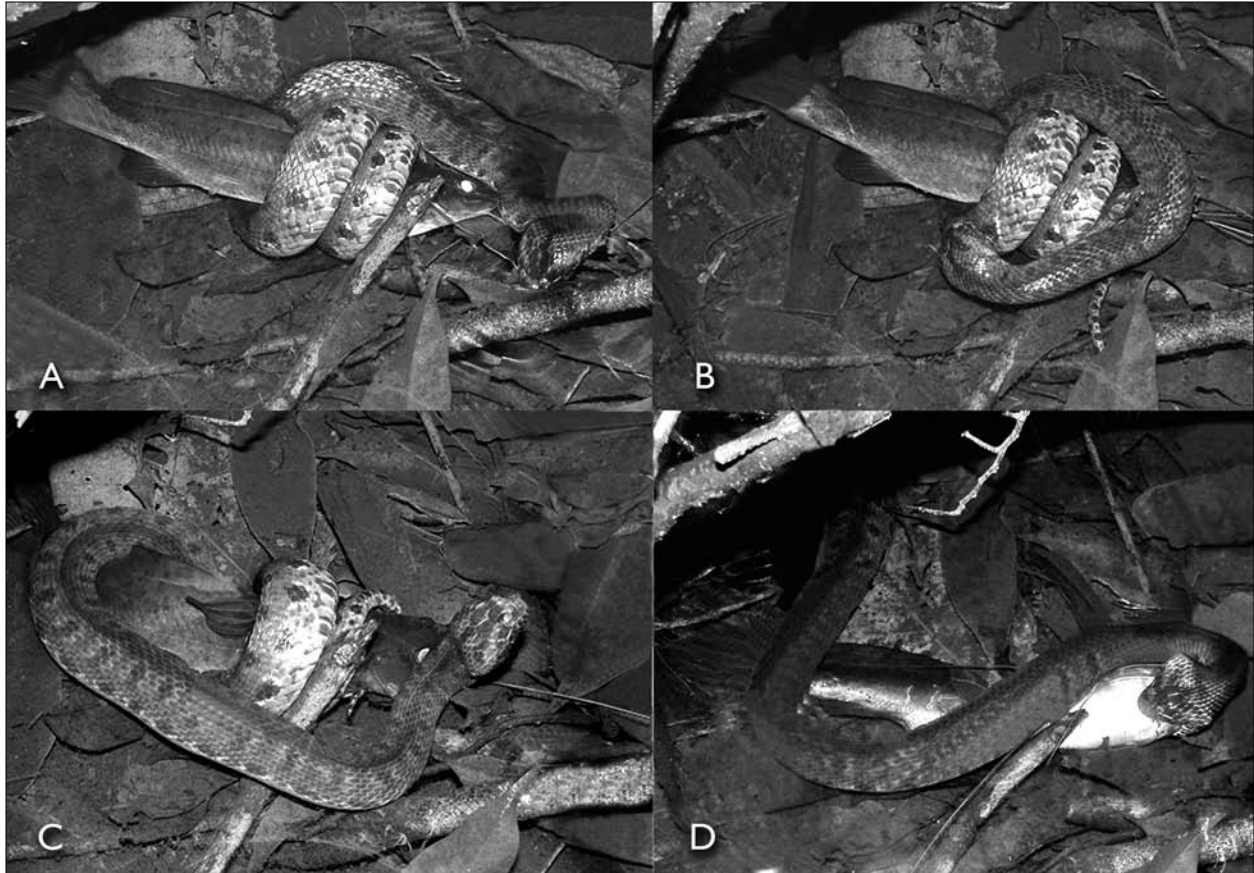


Figure 1. *Helicops hagmanni* feeding on a *Rhamdia muelleri* in a tributary of the Anapu River, municipality of Portel, Pará State, Brazil. (A) The snake holding the cat-fish with anterior, horizontal coils. (B) The snake extending constriction until the opercula area of the cat-fish. (C) The snake examining the prey's body. (D) The snake starting the ingestion headfirst.

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