

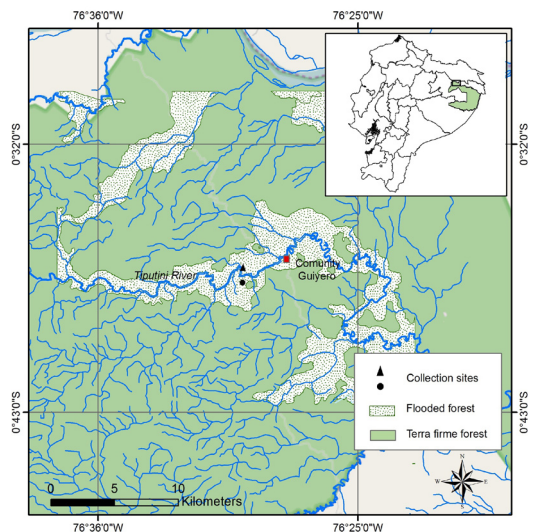
## Feeding behavior of *Helicops pastazae* Shreve 1934 (Serpentes, Colubridae, Dipsadinae) in the Ecuadorian Amazon

Ana Almendáriz C.<sup>1,\*</sup>, Ramiro Barriga<sup>1</sup> and C. Daniel Rivadeneira<sup>1</sup>

The tribe Hydropsini is monophyletic (Vidal et al., 2010; Zaher et al., 2009) and considered part of the subfamily Dipsadinae (Pyron et al., 2011, 2013). It contains three genera: *Helicops* Wagler 1828, *Hydrops* Wagler 1830 and *Pseudoeryx* Fitzinger 1826. The most specious genus is *Helicops*, with 17 extant species occurring in the lowlands from Colombia to Argentina (Uetz and Hallermann, 2016). These snakes are adapted to aquatic habitats, they have eyes and nostrils towards the top of the head and keeled scales (Ávila et al., 2006; de Aguiar and Di-Bernardo, 2004; Peters and Orejas-Miranda, 1970). Species of *Helicops* feed on fishes, anurans, lizards and snakes (Colston et al., 2010; de Aguiar and Di-Bernardo, 2004; Martins and Oliveira, 1998), and they are nocturnal except for *H. angulatus* (Martins and Oliveira, 1998) and *H. hagmanni* (de Lima Moraes and de Fraga, 2015), which have been found active during the day, and *H. infrataeniatus*, which forages during the day and night (de Aguiar and Di-Bernardo, 2004).

Four species of *Helicops* are recorded in Ecuador (Torres-Carvajal et al., 2016): *H. angulatus*, *H. leopardinus*, *H. pastazae* and *H. petersi*. *Helicops pastazae* Shreve 1934 is known from the tributaries of the Napo, Pastaza and Marañón rivers (Peters and Orejas-Miranda, 1970; Rossman, 1976), and is distinguished from other species by having 23–25 dorsal striated scale rows, the dorsum with dark spots, and the venter light with a series of dark crossbands or alternating checks (Rossman, 1976). The diet of *H. pastazae* is to our best knowledge unknown. Herein, we make comments about its feeding behaviour and identify a suckermouth armoured catfish as prey consumed *in situ*.

Between December 2006 and October 2007, three specimens of *Helicops pastazae* (all with 25 dorsal scales) were captured by catch with a driftnet (60 x 1.6 m; 2 cm mesh) in the Guiyero area of Yasuní National Park, Orellana Province, Ecuador. Two specimens (MEPN-R 10015, 10325) were collected in the Waorani lagoon (0.6270° S, 76.4969° W; 230 m.a.s.l.; Fig. 1) which is composed of black waters (pH 5.8) and the third specimen (MEPN 10870; Fig. 2) was collected in the Tiputini River at the entrance to the Waorani lagoon (0.6224° S, 76.4969° W; 230 m.a.s.l.; Fig. 1). The driftnet was placed at 18:00 h along the margins of banks with pronounced slopes due to the low water level produced by the dry season; all snake



**Figure 1.** Map of study area in the Tiputini River at Guiyero area of Yasuní National Park, Orellana Province, Ecuador. Waorani lagoon (circle) and the entrance to the Waorani lagoon (triangle).

<sup>1</sup> Instituto de Ciencias Biológicas, Escuela Politécnica Nacional, Casilla 17-01-2759, Telefax: 2236690, Quito, Ecuador

\* Corresponding author e-mail: ana.almendariz@epn.edu.ec



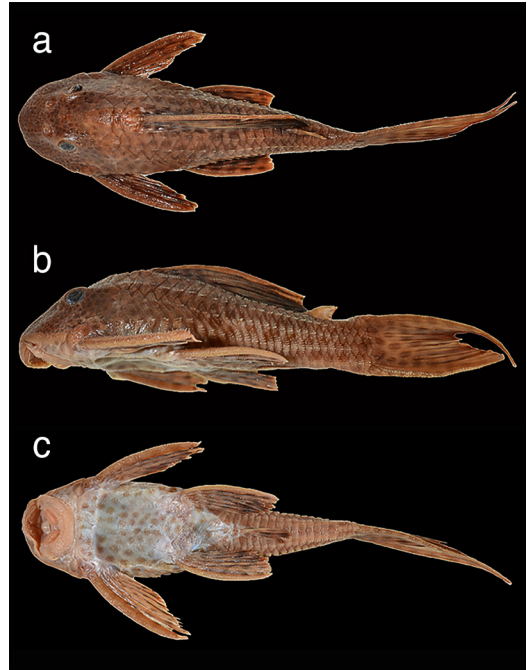
**Figure 2.** *Helicops pastazae* (MEPN-R 10870) immediately postmortem in dorsal view.

specimens were found dead in the mesh the next day in the morning between 5 and 6 AM when the mesh was withdrawal. The three water snakes were fixed in 10% formalin and then later preserved in 70% ethanol, following Simmons (2015).

Stomach contents of the three specimens of *Helicops pastazae* were analyzed in the laboratory, previously extracted by dissection when opening the stomach at the level of the third part of the body. Two specimens (MEPN-R 10015, 10325) lacked identifiable food items. The third specimen (MEPN-R 10870; Fig. 2) contained an intact specimen of *Hypostomus pyrineusi* Miranda-Ribeiro, 1920 (Siluriformes: Loricariidae; MEPN-I 18324; Fig. 3), which was head down in the stomach and covered with gastric secretions. The catfish was preserved in 10% formalin and stored in 70% ethanol. The three specimens of *H. pastazae* and the catfish are deposited at Division of Herpetology (MEPN-R 10015, 10325, 10870) and Ichthyology (MEPN-I 18324), respectively, of Museo de Historia Natural Gustavo Orcés (MEPN) of the Instituto de Ciencias Biológicas, Escuela Politécnica Nacional.

The majority of species of *Hypostomus* are nocturnal and they hide under rocks during the day (Lowe-McConnell, 1987; Nico, 2010). *Hypostomus pyrineusi* feeds on detritus by grazing rock substrates (German, 2009; German and Bittong, 2009; Lowe-McConnell, 1987; Nico, 2010).

Aquatic snakes have previously been caught in driftnets, fish traps and gillnets as by-catch during fishing activities on several occasions at night (Pers.



**Figure 3.** Food item of *Helicops pastazae*: *Hypostomus pyrineusi* (MEPN-I 18324) in dorsal (a), lateral (b) and ventral (c) views.

obs. Ramiro Barriga and Francisco Provenzano) because the aquatic snakes are entangled in net mesh, they can not get ride of the net and die trapped (e.g., Hernández-Ruz *et al.*, 2014). Therefore, we presume that *Helicops pastazae* is a possible opportunistic predator because it takes advantage of trapping methods for fishes where it can more easily capture their food. Besides, the position of the prey inside the stomach of the water snake points out that the snake started ingesting the catfish headfirst. Additionally, such known facts and our reported finding suggest that *H. pyrineusi* potentially could be a regular food item in the diet of *H. pastazae* because both are active during the night and distributed in this area.

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