

PREDATION OF *ENYALIOIDES PRAESTABILIS* (HOPLOCERCIDAE) BY *IMANTODES CENCHOA* (COLUBRIDAE) IN SAN MIGUEL DE CONCHAY, MORONA SANTIAGO PROVINCE, ECUADOR.

DEPREDAÇÃO DE *ENYALIOIDES PRAESTABILIS* (HOPLOCERCIDAE) POR *IMANTODES CENCHOA* (COLUBRIDAE) EN SAN MIGUEL DE CONCHAY, PROVINCIA DE MORONA SANTIAGO, ECUADOR.

KEYKO CRUZ-GARCÍA^{1,2*}, NADIA CHAUCA^{1,3} & NATALIA ZAPATA¹

¹Facultad de Ciencias Naturales, Universidad de Guayaquil, Av. Raúl Gómez Lince s/n Av. Juan Tanca Marengo, Guayaquil, Ecuador.

²Universidad San Francisco de Quito USFQ, Instituto de Biodiversidad Tropical IBIOTROP, Laboratorio de Zoología Terrestre, Museo de Zoología, Quito, Ecuador.

³Fundación para la Conservación e Investigación JaPu, Garzota, Av. Agustín Freire y Av. Hermano Miguel, Guayaquil, Ecuador.

* Correspondence: fherkey@hotmail.com

Received: 2022-11-11. Accepted: 2023-05-26. Published: 2023-06-13.

Editor: Pier Cacciali, Paraguay.

Abstract. – Here we report an unusual record of predation on *Enyalioides praestabilis* by *Imantodes cenchoa*. Other genera of small lizards have been recorded as prey for these snakes, but this is the first report for the genus *Enyalioides*. This report is unusual due to the size and thickness of the prey, which exceeds the thickness of the predator (*Imantodes cenchoa*). The data were obtained in a forest near San Miguel de Conchay, Morona Santiago province, Ecuador.

Key words. – Predation, Hoplocercidae, Colubridae, ecological interaction, behavioral ecology.

Resumen. - Reportamos un inusual registro de depredación de *Enyalioides praestabilis* por parte de *Imantodes cenchoa*. Se han registrado otros géneros de lagartijas pequeñas que son presas de estas serpientes, pero no del género *Enyalioides*. Esto es poco común por el tamaño y el grosor que presentan este género que supera al depredador (*Imantodes cenchoa*). Los datos se obtuvieron en un bosque aldeaño San Miguel de Conchay, Morona Santiago, Ecuador.

Palabras claves. – Depredación, Hoplocercidae, Colubridae, interacción ecológica, ecología del comportamiento.

Predation is part of the ecological dynamics of living organisms, and it is based on the effort that an animal uses to find prey and feed on it (Curio, 1976). Feeding habits of snakes are of great interest because the mechanism varies considerably between and within the different taxa due to differences in ontogeny and evolutionary history (Rojas-Morales et al., 2021), and also because snakes are among the less known reptiles regarding their biology.

Imantodes cenchoa is an arboreal species that can be found foraging and feeding at night (Henderson & Nickerson, 1976; Bartlett & Bartlett, 2003). Records of its diet include four frogs species, of the genera *Eleutherodactylus* and *Craugastor*, and 12 lizards species, predominantly *Anolis*, *Gonatodes*, *Baliscus*, and their eggs (Myers, 1982; Martins & Olivera, 1998; Campbell, 1999;

Savage, 2002; Gutiérrez-Cárdenas & Arredondo, 2005; de Sousa et al., 2014; Clause & Clause, 2016; González-Acosta et al., 2023).

Rojas-Morales et al. (2021) performed a small experiment on the feeding behavior of *I. cenchoa* where authors offered an *Anolis antonii* to the snake and compared with a natural observation of predation on an individual of *Craugastor metriosistus*. In both cases the prey was considerably wider than the snake, however, once the event began, both snakes did not give up until they swallowed their preys completely (Rojas-Morales et al., 2021).

In this contribution we present an event in which an *I. cenchoa* preyed on an *Enyalioides praestabilis*. This lizard is a terrestrial to semi-arboreal diurnal species with a snout-vent length (SVL) measurement ranging from 117 mm to 128 mm. Found in primary and secondary evergreen forests on Amazonian slopes

of Colombia and Ecuador, may sleep within tree cavities or perch on leaves, stems, branches, and tree trunks less than 1.7 m above the ground, usually near ponds and streams (Torres-Carvajal et al., 2011; Cisneros-Heredia et al., 2016; Pazmiño-Otamendi, 2018; Arteaga & Aguiar, 2023).

This depredation case was recorded near San Miguel de Conchay (3.123022° S; 78.433633° W, WGS84, 1,175 m a.s.l.), in the Limón Indanza canton, Morona Santiago province, Ecuador. The environment was a wooded area with tropical humid forest vegetation with a closed canopy. We observed an individual of

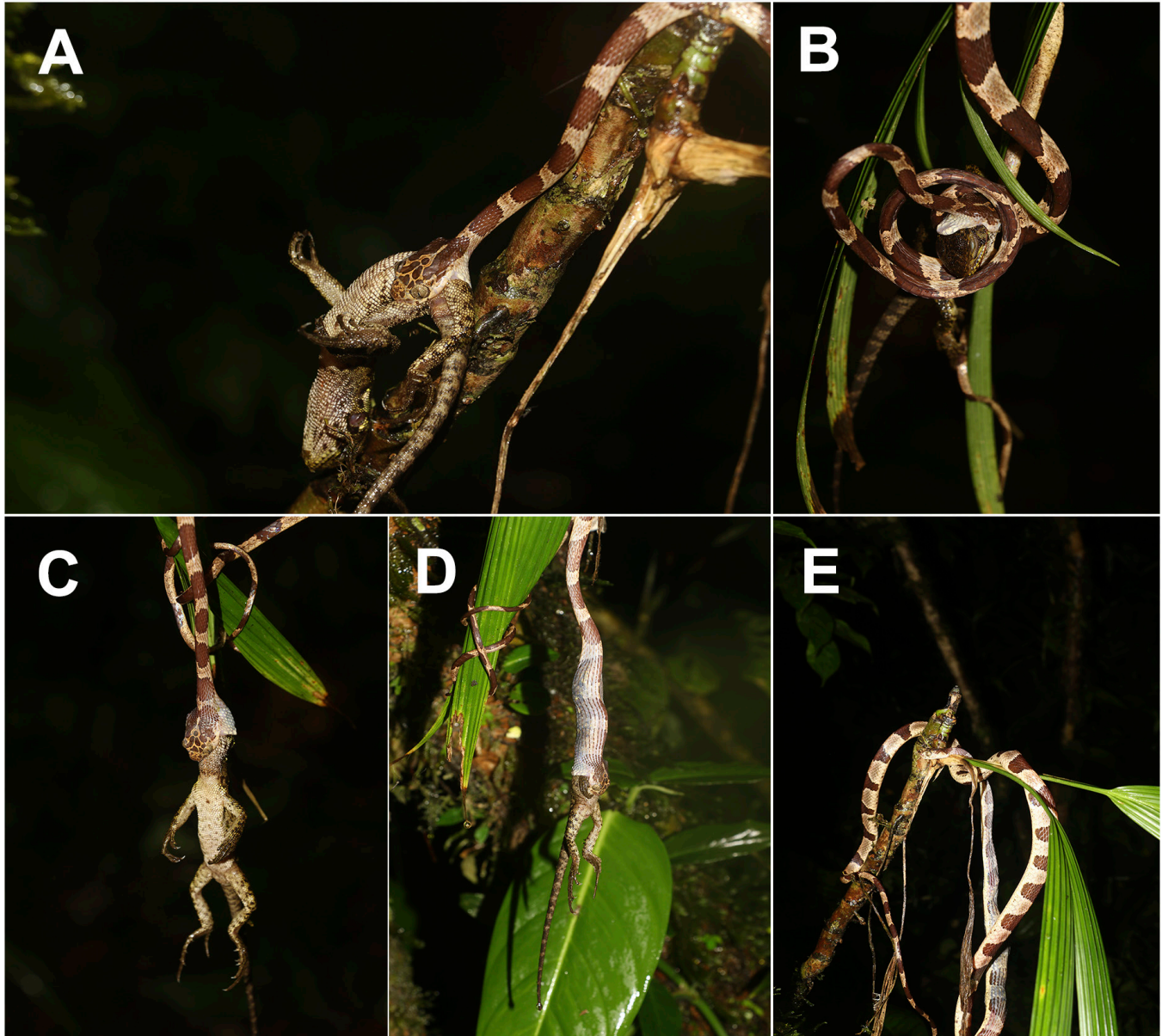


Figura 1. Interacción del evento de depredación de *Imantodes cenchoa* a un juvenil de *Enyalioides praestabilis* en San Miguel de Conchay, cantón Limón Indaza, Morona Santiago. A) *Imantodes cenchoa* mordiendo a *Enyalioides praestabilis* por la cintura. B) *I. cenchoa* acomoda la presa para ingerirla por el extremo anteroposterior. C) La presa inmóvil empieza a ser tragada desde la cabeza. D) Después de 59 minutos de que el evento empezara, medio cuerpo de la presa ha sido ingerido. E) Finalmente, después de 83 minutos, *I. cenchoa* ha devorado completamente su presa.

Figure 1. Interaction of the predation event of *Imantodes cenchoa* on a juvenile of *Enyalioides praestabilis* in San Miguel de Conchay, Limón Indaza canton, Morona Santiago. A) *Imantodes cenchoa* biting *Enyalioides praestabilis* by the waist. B) *I. cenchoa* accommodates the prey to ingest it anteroposteriorly. C) The immobile prey begins to be swallowed from the head. D) After 59 minutes of the event starting, half of the prey's body has been ingested. E) Finally, after 83 minutes, *I. cenchoa* has completely devoured its prey.

I. cenchoa (SVL: ~700 mm) preying a juvenile of *E. praestabilis* (SVL: ~90 mm) on September 29, 2021 at 23:41 h. The interaction occurred near a bush (125 cm tall) while it was drizzling.

We found a specimen of *I. cenchoa* biting the lizard by the waist, which was already motionless when we found it. Then slowly with its jaw and body it began to accommodate the prey to be able to ingest it by the head (Figure 1A,B). Anteroposterior (head first) ingestion is the most common way to swallow prey by snakes according to de Sousa et al. (2014), in which 77% of the individuals of *I. cenchoa* analyzed showed this feeding behavior. This also seems to be related to a decrease in the probability of injuries during feeding (Palmuti et al., 2009). The prey did not move while being swallowed, so it was presumably dead because *I. cenchoa* saliva has been reported to be cytotoxic (Pazmiño-Otamendi & Rodríguez-Guerra, 2022). After 22 minutes *I. cenchoa* had positioned its prey and began to swallow it vertically while hanging in the bush (Figure 1C); At 59 minutes, half of the prey's body had been ingested (Figure 1D). After 83 minutes, *I. cenchoa* had completely consumed its prey (Figure 1E), then climbed up some branches to a tree at a height of 3 m and the event was no longer observed.

This type of information helps to better understand the ecological interactions of this species with potential prey, and the effort involved during ingestion. Additionally, diet observations for snakes in nature are valuable because predation events are rare to observe (Dias-Silva et al., 2021), for which there are few records. Such as in the works of Myers (1982) and González-Acosta et al. (2023), in which they report individuals of *I. cenchoa* preying on an *Anolis frenatus* and a juvenile *Basiliscus galeritus* respectively. Our observation represents the first documented record of interaction between *I. cenchoa* and *E. praestabilis*, adding this snake species to the list of predators of this lizard. This helps to better understand the ecological interactions of this genus of lizards that does not have much ecological information even though it is in the category of Least Concern according to the IUCN (2023).

CITED LITERATURE

- Arteaga, A. & G. Aguiar. 2023. Blue-spotted Dwarf-Iguana (*Enyalioides praestabilis*). Retrieved from https://www.reptilesofecuador.com/enyalioides_praestabilis.html. [Accessed on 28 October 2022]
- Bartlett, R.D. & P.P. Bartlett. 2003. Reptiles and Amphibians of the Amazon: an Ecotourist's Guide. University of Florida Press. Gainesville.
- Campbell, J.A. 1999. Amphibians and Reptiles of Northern Guatemala, the Yucatán, and Belize. Vol. 4. University of Oklahoma Press.
- Cisneros-Heredia, D.F., G. Gagliardi, J. Moravec, J. Aparicio & J. Perez. 2016. *Enyalioides praestabilis*. The IUCN Red List of Threatened Species 2016: e.T44578980A44578997. <https://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T44578980A44578997.en>. [Accessed on 28 October 2022].
- Clause, J.K. & A.G. Clause. 2016. *Imantodes cenchoa* (Blunt-headed Tree Snake) Diet. Herpetological Review 47:312-313.
- Curio, E. 1976. The Ethology of Predation. New York: Springer Science & Business Media.
- de Sousa, K.R., A.L.C. Prudente & G.F. Maschio. 2014. Reproduction and diet of *Imantodes cenchoa* (Dipsadidae: Dipsadinae) from the Brazilian Amazon. Zoologia (Curitiba) 31:8-19.
- Dias-Silva, F., C. Mattedi, R.C. Pontes & E.A. Pereira. 2021. Predation on the treefrog *Trachycephalus typhonius* (Linnaeus, 1758) by a vine snake (genus *Chironius*) in the Amazon rainforest of northern Brazil. Herpetology Notes 14:379-382.
- González-Acosta, C., E. Erb, & J. Culebras. 2023. First report of predation of *Imantodes cenchoa* (Colubridae) on *Basiliscus galeritus* (Corytophanidae) in a tropical humid forest in Colombia. Revista Latinoamericana de Herpetología 6:127-130.
- Gutierrez Cárdenas, P.D. & J.C. Arredondo. 2005. *Imantodes cenchoa* (Chunk-headed snake, Bejuquilla). Diet. Herpetological Review 36:324.
- Henderson, R.W. & M.A. Nickerson. 1976. Observations on the behavioral ecology of three species of *Imantodes* (Reptilia, Serpentes, Colubridae). Journal of Herpetology 10:205-210.
- IUCN. 2023. The IUCN Red List of Threatened Species. Version 2022-2. <https://www.iucnredlist.org> [Accessed on 28 March 2023]
- Martins, M. & M.E. Olivera. 1998. Natural history of snakes in forests of the Manaus region, Central Amazonia. Herpetological Natural History, 6 (2): 78-150.
- Myers, C.W. 1982. Blunt-headed vine snakes (*Imantodes*) in Panama, including a new species and other revisionary notes. American Museum Novitates 2738:1-50.

- Palmuti, C.F.S., J. Cassimiro & J. Bertoluci. 2009. Food habits of snakes from the RPPN Feliciano Miguel Abdala, an Atlantic Forest fragment of Southeastern Brazil. *Biota Neotropica* 9:263–270.
- Pazmiño-Otamendi, G. 2018. *Enyalioides praestabilis*. In O. Torres-Carvajal, G. Pazmiño-Otamendi, F. Ayala-Varela & D. Salazar-Valenzuela (Eds.). 2021. *Reptiles del Ecuador*. Version 2022.0. Museo de Zoología, Pontificia Universidad Católica del Ecuador. <https://bioweb.bio/faunaweb/reptiliaweb/FichaEspecie/Enyalioides%20praestabilis>, [Accessed on 26 March 2022]
- Pazmiño-Otamendi, G. & A. Rodríguez-Guerra. 2022. *Imantodes cenchoa*. In O. Torres-Carvajal, G. Pazmiño-Otamendi, F. Ayala-Varela & D. Salazar-Valenzuela (Eds.). *Reptiles del Ecuador*. Version 2021.0. Museo de Zoología, Pontificia Universidad Católica del Ecuador. <https://bioweb.bio/faunaweb/reptiliaweb/FichaEspecie/Imantodes%20cenchoa>, [Accessed on 28 October 2022].
- Rojas-Morales, J., J. González, J. Cepeda-Duque, M. Marín-Martínez, R. Díaz-Ayala & T. Guedes. 2021. On delicate night hunters: observations of the feeding behaviour of *Imantodes cenchoa* (Linnaeus, 1758) and *Sibon nebulatus* (Linnaeus, 1758) through staged and natural encounters (Serpentes: Dipsadidae: Dipsadinae). *Herpetology Notes* 14:717-723.
- Savage, J.M. 2002. *The amphibians and reptiles of Costa Rica: a herpetofauna between two continents, between two seas*. University of Chicago press.
- Torres-Carvajal, O., R. Etheridge & K. de Queiroz. 2011. A systematic revision of neotropical lizards in the clade Hoplocercinae (Squamata: Iguania). *Zootaxa* 2752:1-44.

