 https://doi.org/10.22201/fc.25942158e.2022.3.489

NEW PREY ITEM FOR THE COLOMBIAN RAINBOW BOA, *EPICRATES MAURUS* (GRAY, 1849) (SQUAMATA, SERPENTES, BOIDAE): THE SHORT-TAILED CANE MOUSE *ZYGODONTOMYS BREVICAUDA* (J. A. ALLEN & F. M. CHAPMAN, 1893)

NUEVA PRESA PARA LA BOA ARCOÍRIS COLOMBIANA, *EPICRATES MAURUS* (GRAY, 1849) (SQUAMATA, SERPENTES, BOIDAE): EL RATÓN DE CAÑA DE COLA CORTA *ZYGODONTOMYS BREVICAUDA* (J. A. ALLEN & F. M. CHAPMAN, 1893)

Alejandra María Salazar-Guzmán[1*], Catalina Cárdenas-González[1], Alejandra Niño-Reyes[1], Julián Lozano-Flórez[1] & Julián A. Rojas-Morales[1]

[1]*Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, Colecciones Biológicas, Carrera 8 # 15 - 08, Villa de Leyva, Boyacá, Colombia*

**Correspondence: msalazar@humboldt.org.co, almasagu89@gmail.com*

Received: 2022-06-06. **Accepted**:2022-08-18. **Published:** 2022-09-22.

Editor: Marcio Martins , Brazil.

Resumen.– Durante muestreos de campo realizados en el año 2021 en el Valle Medio del Río Magdalena, Colombia, registramos un nuevo ítem dietario para la serpiente *Epicrates maurus*, consistente en la especie de roedor *Zygodontomys brevicauda*. Al momento de fotografiar la serpiente, ésta regurgitó el ratón parcialmente digerido el cual fue identificado a partir de sus caracteres dentarios y craneales. El presente registro contribuye al conocimiento acerca del espectro dietario de *E. maurus* en el norte de Sur América.

Palabras claves.– Valle Medio del Río Magdalena, Rodentia, reptiles, relación trófica, Colombia.

Abstract.– During field surveys conducted in 2021 in the Middle Magdalena River Valley, Colombia, we recorded a new dietary item for the snake *Epicrates maurus*, consisting of the rodent species *Zygodontomys brevicauda*. When photographed, the snake regurgitated the partially digested mouse, which was identified from its dental and cranial characters. The present record contributes to the knowledge about the dietary spectrum of *E. maurus* in northern South America.

Key words.– Middle Magdalena River Valley, Rodentia, reptiles, trophic relationship, Colombia.

The Brown Rainbow Boa, *Epicrates maurus* Gray, 1849 is a medium-sized species (up to 1.5 m Snout Vent length, Lourdais et al., 2006) with terrestrial or semi-arboreal habits and nocturnal activity, and is widely distributed in Central America and northern South America (Passos & Fernandes, 2008; Wallach et al., 2014; Uetz et al., 2021). Its diet comprises mainly vertebrates such as reptiles, birds and small mammals -including bats- (Natera-Numaw et al., 2015; Aya-Cuero et al., 2019; Salcedo-Rivera et al., 2021). In addition, it has been observed that females of *E. maurus* may consume part of their brood (i.e., dead hatchlings, undeveloped eggs) as a maternal cannibalism strategy, to recover part of the energy invested during pregnancy and parturition (Lourdais et al., 2005). The analysis of specimens from biological collections and fortuitous observations of predation events in the wild, has contributed to an increase of the information regarding the dietary preferences of some large snakes such as Neotropical boids (Cherubini et al., 2003; Pizzatto et al., 2009; Palmuti et al., 2009; Cassimiro et al., 2010; Henderson & Pauers, 2012; Aya-Cuero et al., 2019). However, reports of the predatory behavior in nature of *E. maurus* and other Neotropical snakes still remain scarce within the literature.

Here, we report a new dietary item for *E. maurus*, based on an individual observed at the tropical humid forest from the Middle Magdalena River Basin, Colombia, which concentrates the largest human population and productive activities in this country.

On July 13, 2021 at 22:14 h, we captured an individual of *E. maurus* that was crossing a main road bordered by palm crops

Figura 1. Individuo de *Epicrates maurus* proveniente de Puerto Wilches, departamento de Santander, Colombia. La fotografía fue tomada justo antes de regurgitar la presa parcialmente digerida. Foto: Santiago Ruiz-Guzmán.

Figure 1. Individual of *Epicrates maurus* from Puerto Wilches, Department of Santander, Colombia. Photograph was taken just before regurgitating a partially digested prey. Photo: Santiago Ruiz-Guzmán.

between "Km 8" and "Puente Sogamoso" villages, municipality of Puerto Wilches, department of Santander, Colombia (7.286279° N, -73.812989° O; WGS84; 95 m a.s.l). The next day (July 14), the snake regurgitated a mouse while we took measurements and photographs of the individual (Snout-vent length 1114 mm, Tail length 130 mm, and weighted 780 g before regurgitating the prey). Despite the fact that the mouse was partially digested, it could still be identified preserved in 70% ethanol and housed in the Mammalian Collection of the Instituto Alexander von Humboldt (IAvH-M-10890). Contrary, the snake was not collected. We identified the snake following the key and description provided by Abaunza-López & Valderrama-Aranda (2021). *Epicrates maurus* is differentiated from its congeners by a more homogeneous coloration throughout its body. Dorsally, this species has spots, stripes or ocelli on its head and along the body with a darker coloration than the base tone and the paraventral region is often brown; ventrally it has a cream or yellow tone. Furthermore, this species has a clear iridescent effect blue along the body (Fig. 1).

The prey was identified as *Zygodontomys brevicauda* (J. A. Allen & F. M. Chapman, 1893) based on the following cranial characters: 1) the incisive foramen (in ventral view) is long and extend between the first molar alveoli, 2) a broad and smooth palatal bridge, without conspicuous ridges, deep furrows, or a spine-like median posterior process, 3) the upper molars are bunodont with labial and lingual cusps arranged in opposite pairs, the

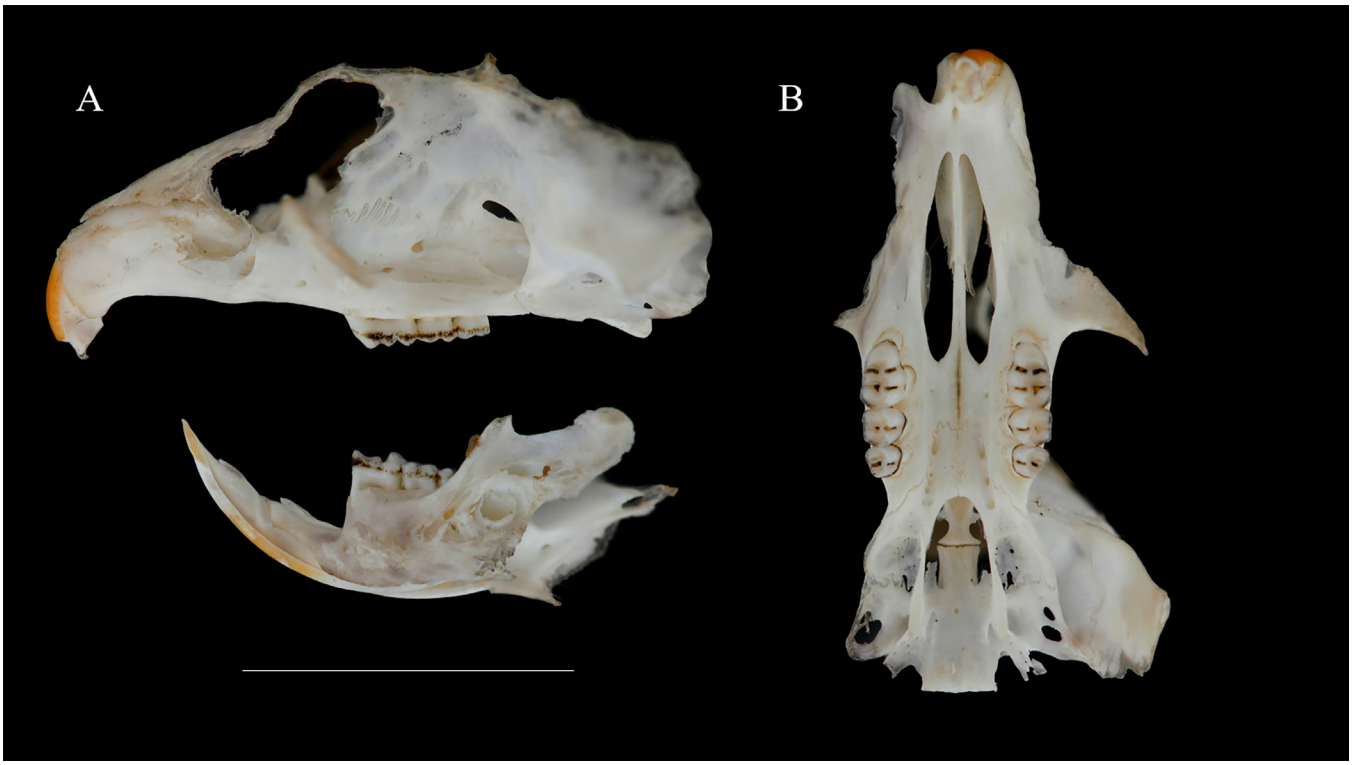

Figura 2. Espécimen de *Zygodontomys brevicauda* depositado en la colección de mamíferos del Instituto Alexander von Humboldt (IAvH-M) bajo el número de catálogo IAvH-M-10890. A. Vista lateral del cráneo y la mandíbula. B. Vista ventral del cráneo. Escala: 10 mm.

Figure 2. Specimen of *Zygodontomys brevicauda* deposited in the Mammal Collection of the Alexander von Humboldt Institute (IAvH-M) under catalog number IAvH-M-10890. A. Lateral view of the skull and the mandible. B. Ventral view of the skull. Scale: 10 mm.

anterocone of first upper molar is undivided, mesolophs are absent from all of the upper teeth and, upper molar tooth row 4.15 mm (see Voss, 2015).

Feeding behavior and dietary habits are fundamental aspects of the biology of organisms (Begon et al., 2006). For large ectothermic predators such as snakes, endothermic vertebrates are the most energetically valuable food resource, being consumed by a wide variety of snakes within the Macrostomata clade (Cundall & Greene, 2000; Martins et al., 2002; Moon et al., 2019). *Z. brevicauda* is a type III prey, according to Cundall & Greene (2000), as it has a fusiform shape. Some species of boids (Serpentes, Boidae) are among the largest and heaviest terrestrial predators in the Neotropics (e.g., *Eunectes murinus* Linnaeus, 1758; *Boa constrictor* Linnaeus, 1758) (Murphy & Henderson, 1997). As far as is known, supported by field observations, sit-and-wait as well as wide-searching are used to locate prey by henophidians (see Greene, 1983). The boids hunt with a faster attack followed by a process of constriction until killing the prey (Cundall & Greene, 2000). For *E. maurus*, although information about feeding behavior and prey preferences is limited (Pizzatto et al., 2009; Aya-Cuero et al., 2019), records on dietary items allow to identify this snake as a generalist species, which is concordant with its diurnal and nocturnal habits. One interesting ecogeographical aspect to be evaluated, is how the diet varies between populations of this widely geographic and ecological distributed species (Passos & Fernandes, 2008, Natera-Numaw et al., 2015, Duarte et al., 2000).

Similarly, *Z. brevicauda* is an abundant rodent in unforested lowland habitats and modified landscapes as pastures, open rangelands denuded of natural forest cover (Voss, 1991; Voss, 2015). At the site of study, we observed high local abundance of this species in the oil palm plantations (Obs. pers.). It is also a reservoir of viruses that cause diseases in humans, such as the Arenavirus reported in Venezuela (Fulhorts et al., 1999; Utrera & Duno, 2007; Milazzo et al., 2011) and the Hantavirus reported in Panama (Armien et al., 2004) and Colombia (Alemán et al., 2006; Londoño et al., 2011; Blanco et al., 2012). According to Voss (1991), *Z. brevicauda* is an important item for birds as *Tyto alba* (Scopoli, 1769), *Asio clamator* (Vieillot, 1807), *Elanus leucurus* (Vieillot, 1818) and mammals as *Cerdocyon thous* (Linnaeus 1766) and *Herpailurus*

yagouaroundi (Geoffroy, 1803). As far as we know, no reptile predators have been recorded for this rodent.

Finally, the present record contributes to the knowledge about the dietary spectrum of *E. maurus*, which was expected considering that *E. maurus* and *Z. brevicauda* share the same geographic and ecological distribution (unforested habitats) in northern South America (Voss, 2015; Abaunza-López & Valderrama-Aranda, 2021; Cherubini, 2007).

Acknowledgements.– This note is a product of the interadministrative agreement 21-095 of 2021 between the Agencia Nacional de Hidrocarburos -ANH- and the Instituto Alexander von Humboldt -Instituto Humboldt-. To Santiago Ruiz for sharing the picture of figure 1. Also, we thank all the researchers involved in the aforementioned project for their help during fieldwork. Finally, we are deeply indebted to Daniela García-Cobos and anonymous referees for their helpful comments on previous drafts of the manuscript.

CITED LITERATURE

Abaunza-López, N. A. & N. Valderrama-Aranda (Eds.). 2021. Guía Boas de Colombia. Universidad Incca de Colombia – Serpentario Nacional. Bogotá, D.C., Colombia.

Alemán, A., H. Iguarán, H. Puerta, C. Cantillo, J. Mills, W. Ariz & S. Mattar. 2006. Primera evidencia serológica de infección por Hantavirus en roedores, en Colombia. Revista Salud Pública 8:1-12.

Armien, B., J.M. Pascale, V. Bayard, C. Muñoz, I. Mosca, G. Guerrero, A. Armien, E. Quiroz, Z. Castillo, Y. Zaldivar, F. Gracia, B. Hjelle & F. Koster. 2004. High seroprevalence of hantavirus infection on the Azuero peninsula of Panama. The American Journal of Tropical Medicine and Hygiene 70:682-687

Aya-Cuero, C.A., C.H. Cáceres-Martínez & D.A. Esquivel. 2019. First record of predation on Greater sac-winged bat, *Saccopteryx bilineata* (Chiroptera: Emballonuridae), by the Colombian rainbow boa, *Epicrates maurus* (Serpentes: Boidae). Herpetology Notes 12:815-817.

Begon, M., C.R. Townsend & J.L. Harper. 2006. Ecology: From individuals to ecosystems. Fourth Edition. Blackwell Publishing.

Blanco, P., S. Arroyo, H. Corrales, J. Perez, L. Álvarez & A. Castellar. 2012. Evidencia serológica de infección por hantavirus (Bunyaviridae: Hantavirus) en roedores del departamento de Sucre, Colombia. Revista Salud Pública 14:755-764.

Cassimiro, J., C.F.S. Palmuti & J. Bertoluci. 2010. *Epicrates cenchria:* Diet. Herpetological Review 41:501.

Cherubini, A.L., T.H., Barella & R.J. Silva. 2003. Death of *Boa constrictor amarali* (Serpentes, Boidae) after ingestion of a tree porcupine (Rodentia). Journal of Venom Animals and Toxins 9:117-124.

Cundall, D. & H.W. Greene. 2000. Feeding in snakes. Pp. 293-333. In K. Schwenk (Ed.), Feeding: form, function, and evolution in tetrapod vertebrates. Academic Press. San Diego, California, USA.

Duarte, M.R., S.M. Almeida-Santos & J.L. Cardoso. 2000. An attack on a human by a green anaconda (*Eunectes murinus*). Bulletin of the Chicago Herpetological Society 35:164.

Fulhorst, C.F., T.G. Ksiazek, C.J. Peters & R.B. Tesh. 1999. Experimental infection of the cane mouse *Zygodontomys brevicauda* (family Muridae) with guanarito virus (Arenaviridae), the etiologic agent of Venezuelan hemorrhagic fever. The Journal of infectious diseases 180:966-969.

Greene, H.W. 1983. Dietary Correlates of the Origin and Radiation of Snakes. American Zoologist 23:431-441.

Henderson, R.W. & M.J. Pauers. 2012. On the diets of Neotropical treeboas (Squamata: Boidae: *Corallus*). South American Journal of Herpetology 7:71-180.

Londoño, A.F., F.J. Díaz, P. Agudelo-Flórez, S. Levis & J.D. Rodas. 2011. Genetic evidence of hantavirus infections in wild rodents from northwestern Colombia. Vector-Borne and Zoonotic Diseases 11:701-708.

Lourdais, O., F. Brischoux, R. Shine & X. Bonnet. 2005. Adaptive maternal cannibalism in snakes (*Epicrates cenchria maurus*, Boidae). Biological Journal of the Linnean Society 84: 767-774.

Lourdais, O., R. Shine, X. Bonnet & F. Brischoux. 2006. Sex differences in body composition, performance and behaviour in the Colombian rainbow boa (*Epicrates cenchria maurus*, Boidae). Journal of Zoology 269:175-182.

Martins, M., O.A. Marques & I. Sazima. 2002. Ecological and phylogenetic correlates of feeding habits in Neotropical pitvipers

of the genus *Bothrops*. Pp: 307-328. In Schuett G.W., Höggren M., Douglas M.E., Greene H.W. (Eds.), Biology of the Vipers. Eagle Mountain Publishing, Eagle Mountain.

Milazzo, M.L., M.N.B. Cajimat, G. Duno, F. Duno, A. Utrera & C.F. Fulhorst. 2011. Transmission of Guanarito and Pirital Viruses among Wild Rodents, Venezuela. Emerging Infectious Diseases 17:2209-2215.

Moon, B.R., D.A. Penning., M. Segall & A. Herrell. 2019. Feeding in Snakes: Form, Function, and Evolution of the Feeding System. Pp: 527-574. In Bels, V. & I. Whishaw. (eds), Feeding in Vertebrates. Evolution, Morphology, Behavior, Biomechanics. Springer Nature Switzerland AG.

Murphy, J.C. & R.W. Henderson. 1997. Tales of giant snakes: a historical natural history of Anacondas and Pythons. Krieger Publishing Company, Malabar, Florida.

Natera-Numaw, M., L.F. Esqueda & M. Castelaín. 2015. Atlas serpientes de Venezuela. Una visión actual de su diversidad. Editorial independiente, Santiago de Chile, Chile.

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: 263-269.

Passos, P., & R. Fernandes. 2008. Revision of the *Epicrates cenchria* complex (Serpentes: Boidae). Herpetological Monographs 22:1-30.

Pizzatto, L., O.A.V. Marques & K. Facure. 2009. Food habits of Brazilian boid snakes: overview and new data, with special reference to *Corallus hortulanus*. Amphibia-Reptilia 30:533-544.

Salcedo-Rivera, G.A., J. Vanegas-Arroyo, C.J. Castillo, J.A. Díaz-Pérez & D. Montes-Vergara. 2021. On the human-snake conflict: Predation attempt of *Oryctolagus cuniculus* (Linnaeus, 1758) by *Epicrates maurus* Gray, 1849 on a farm in the Caribbean Region of Colombia. Herpetology Notes 14:941-943.

Uetz, P., P. Freed, R. Aguilar & J. Hošek (Eds.). 2021. The Reptile Database, http://www.reptile-database.org, [Last accessed 20 October 2021].

Utrera, A. & G. Duno. 2007. Preferencias de hábitat de *Sigmodon alstoni* y *Zygodontomys brevicauda* (Rodentia, Cricetidae) en agroecosistemas de los llanos de Venezuela. Interciencia 32: 471-476.

Voss, R. 1991. An introduction to the Neotropical muroid rodent genus *Zygodontomys*. Bulletin of the American Natural History Museum, 210.

Voss, R. 2015. Genus *Zygodontomys*. Pp. 460-465. In J. L. Patton, U. F. J. Pardiñas & G. D´elia G. (Eds.), Mammals of South America. The University of Chicago Press, USA.

Wallach, V., K.L. Williams & J. Boundy. 2014. Snakes of the world: A catalogue of living and extinct species. Taylor and Francis, CRC Press, Boca Ratón, Florida, USA.