

- Defense and Life history*, vol. 16, pp. 1–152. Gans, C. & Huey, R.B. (Eds.). New York: Alan R. Liss, Inc.
- Greene, H.W. (1997). *Snakes: the Evolution of Mystery in Nature*. California. University of California Press. 352 pp.
- Lillywhite, H.B. & Henderson, R.W. (1993). Behavioral and functional ecology of arboreal snakes. In: *Snakes: Ecology and Behavior*. pp. 1–48 Seigel, R.A. & Collins, J.T. (Eds.). New York: McGraw-Hill.
- Marques, O.A.V. (1999). Defensive behavior of the green snake *Philodryas viridissimus* (Linnaeus) (Colubridae, Reptilia) from the Atlantic forest in the northeastern Brazil. *Rev. Bras. Zool.* **16**, 265–266.
- Marques, O.A.V., Eterovic, A. & Sazima, I. (2004). *Snakes of the Brazilian Atlantic Forest: An Illustrated Field Guide for the Serra do Mar Range*. Ribeirão Preto, Holos Editora, 205 pp.
- Marques, O.A.V. & Sazima, I. (2004). História natural dos répteis da Estação Ecológica Juréia-Itatins. In *Estação Ecológica Juréia-Itatins: Ambiente Físico, Flora e Fauna*, pp. 257–277. Marques, O.A.V. & Duleba, W. (Eds.). Ribeirão Preto: Holos Editora.
- Vidal, N., Kindl, S.G., Wong, A. & Hedges, B. (2000). Phylogenetic relationships of Xenodontine snakes inferred from 12S and 16S ribosomal RNA sequences. *Molec. Phylog. Evol.* **14**, 389–402.

Notes on the distribution and natural history of the Bluntheaded vine snake, *Imantodes cenchoa*, in Ecuador

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THE Bluntheaded vine snake, *Imantodes cenchoa*, is a widespread species distributed on the Atlantic and Pacific versants of America from southern Tamaulipas and Oaxaca, México, south to central western Ecuador (Pacific versant) and Bolivia, Paraguay and northeastern Argentina (Atlantic versant); from sea level up to 1500 m elevation (Pérez-Santos & Moreno, 1991; Savage, 2002; Köhler, 2003). *Imantodes cenchoa* has been reported in Ecuador from the provinces of Guayas, Los Ríos, Pichincha, Tungurahua, Napo, Sucumbíos, Orellana, Pastaza, and Morona-Santiago (Rendahl & Vestergren, 1941; Fugler & Walls, 1978; Duellman, 1978; Zug *et al.* 1979; Pérez-Santos & Moreno, 1991; Cisneros-Heredia, 2003; Ken Miyata, in litt.). More recently, it was recorded at the provinces of Esmeraldas and El Oro by Yáñez-Muñoz *et al.* (2004) and at Manabí (Fundación Jatun Sacha [Reserva Lalo Loor] in litt.).

A specimen of *Imantodes cenchoa* (FHGO 2801) collected at Bombuscaro, province of Zamora-Chinchiipe (Appendix 1), provides the first record from this province, extending the distributional

range of the species in Ecuador ca. 200 km SSW from the nearest locality (Sucua) in the province of Morona-Santiago (Fugler & Walls, 1978), representing the westernmost locality in the distribution of the species on the eastern versant of the Andes, and filling the gap between localities from northeastern Peru and central eastern Ecuador. Yáñez-Muñoz *et al.* (2004) reported *Imantodes cenchoa* from one locality in the province of Esmeraldas. Five specimens (FHGO 89, 120, 570, 543, 2535) of *Imantodes cenchoa* collected at various localities in the province of Esmeraldas (Appendix 1) provide additional records from this province, and fill the gap between localities from southwestern Colombia and central western Ecuador.

A sample of 23 specimens from various localities in western and eastern Ecuador includes five hatchlings (<450 mm, *sensu* Zug *et al.*, 1979; Martins & Oliveira 1998) collected in western Ecuador in May and in eastern Ecuador in August and November; eight juveniles (<800 mm SVL, *sensu* Zug *et al.*, 1979; Martins & Oliveira, 1998)

collected in July and August in western Ecuador and in January, March, June, and November in eastern Ecuador; and, ten mature adults. Measurement data for these specimens are presented in Table 1. The scalation and color patterns of these specimens fall within the range of variation reported for *Imantodes cenchoa* elsewhere (Duellman, 1978; Myers, 1982; Martins & Oliveira, 1999; Savage 2002).

Two specimens (DFCH-USFQ 087, 088) were collected at night while active (foraging) in palms ca. 40–60 cm above floor at the night, in primary terra firme forest (a hatchling) and in secondary seasonal flooded forest (an adult), at the Tiputini Biodiversity Station, province of Orellana. One adult specimen (FHGO 2943) was collected between bamboos in a secondary forest at the Maquipucuna Reserve, province of Pichincha. An adult individual was observed (not collected) active (foraging) in the branches of a tree ca. 170 cm above floor at night in secondary forest at the lodge near Cascada de San Rafael, province of Napo, Ecuador.

Based on records presented herein and those from other references (Rendahl & Vestergren, 1941; Fugler & Walls, 1978; Duellman, 1978; Zug *et al.*, 1979; Pérez-Santos & Moreno, 1991; Cisneros-Heredia, 2003; Yáñez-Muñoz *et al.*, 2004, Ken Miyata in litt., Fundación Jatun Sacha [Reserva Lalo Loor] in litt.); *Imantodes cenchoa* is known from six provinces on the Pacific versant of Ecuador (Esmeraldas, Manabí, Guayas, Los Ríos, El Oro, and Pichincha), and all provinces on the Atlantic versant of Ecuador (Sucumbíos, Napo, Orellana, Pastaza, Tungurahua, Morona-Santiago and Zamora-Chinchipe) (Figure 1). *Imantodes cenchoa* inhabits the Northwestern Tropical and Western and Eastern Subtropical zoogeographic floors of Ecuador (*sensu* Albuja *et al.*, 1980), and occurs in the following vegetation formations (*sensu* Sierra, 1999): (a) in western Ecuador: Lowland Evergreen Forest, Foothill Evergreen Forest, Lowland Semideciduous Forest, Low Montane Evergreen



Figure 1. Distribution of *Imantodes cenchoa* in Ecuador. Circle = examined material; square = data from literature. A symbol can represent more than one locality. Pérez-Santos & Moreno (1991) did not report a precise locality for Guayas (question mark). Numbers correspond to the mainland Ecuadorian provinces: Esmeraldas (1), Manabí (2), Guayas (3), Los Ríos (4), El Oro (5), Pichincha (6), Tungurahua (7), Sucumbíos (8), Napo (9), Orellana (10), Pastaza (11), Morona-Santiago (12), Zamora-Chinchipe (13). Continuous thick line: international border; thin dotted line: provincial borders.

Forest; (b) in eastern Ecuador: Low Montane Evergreen Forest, Foothill Evergreen Forest, Lowland Non-flooded Evergreen Forest, Lowland Evergreen Forest flooded by white-waters, Lowland Evergreen Forest flooded by black-waters, Palm Flooded Evergreen Forest.

Table 1. Measurements of 23 specimens of *Imantodes cenchoa* from various localities in Ecuador. Mean \pm 95% confidence interval in boldface followed by range.

	<i>n</i>	TTL	TaL	SVL	TaL as % of TTL
Hatchlings	5	363.0 \pm 65.6 (315 – 450)	110.0 \pm 19.1 (95 – 135)	253.0 \pm 47.42 (215 – 315)	8.8 – 31.7 %
Juveniles	8	666.8 \pm 74.7 (545 – 805)	190.6 \pm 24.6 (150 – 230)	476.3 \pm 51.1 (395 – 575)	27.2 – 30.8 %
Adults	10	1020.8 \pm 62.7 (895 – 1180)	286.5 \pm 37.5 (195 – 355)	734.3 \pm 51.3 (620 – 825)	19.9 – 31.6 %

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REFERENCES

- Albuja, L., Ibarra, M., Urgilés, J., & Barriga, R. (1980). *Estudio preliminar de los vertebrados ecuatorianos*. Quito: Departamento de Ciencias Biológicas, Escuela Politécnica Nacional. 143 pp.
- Cisneros-Heredia, D. F. (2003). Herpetofauna de la Estación de Biodiversidad Tiputini, Amazonía Ecuatoriana: Ecología de una comunidad taxonómicamente diversa con comentarios sobre metodologías de inventario. In: *Ecología y Ambiente en el Ecuador, Memorias I Congreso Ecología y Ambiente, Ecuador país megadiverso*. CD. De la Torre, S. & Reck, G. (Eds.). Quito: Universidad San Francisco de Quito.
- Duellman, W. E. (1978). *The Biology of an Equatorial Herpetofauna in Amazonian Ecuador*. Lawrence: *Misc. Publ. Univ. Kansas* No. 65. 352 pp.
- Fugler, C. M. & Walls, A. B. 1978. Snakes of the Upano valley of Amazonian Ecuador. *J. Tennessee Acad. Sci.* 53(3), 81–87.
- Köhler, G. (2003). *Reptiles of Central America*. Offenbach: Herpeton Verlag. 367 p.
- Martins, M. & Oliveira, M. E. (1999). Natural history of the snakes in forests of the Manaus region, Central Amazonia, Brazil. *Herpetol. Nat. Hist.* 6(2), 78–150.
- Myers, C. W. 1982. Blunt-headed vine snakes (*Imantodes*) in Panama, including a new species and other revisionary notes. *Am. Mus. Novit.* 2738, 1–50.
- Pérez-Santos, C. & Moreno, A. G. (1991). *Serpientes de Ecuador*. Torino: Mus. Reg. Sci. Nat. Monogr. 11. 538 pp.
- Rendahl, H. & Vestergren, G. (1941). On a small collection of snakes from Ecuador. *Ark. Zool.* 33A(5), 1–16.
- Savage, J. M. (2002). *The Amphibians and Reptiles of Costa Rica, a Herpetofauna between Two Continents, between Two Seas*. Chicago: The University of Chicago Press. 934 p.
- Sierra, R. (ed.). (1999). *Propuesta Preliminar de un Sistema de Clasificación de vegetación para el Ecuador Continental*. Quito: Proyecto INEFAN/GEF-BIRF and EcoCiencia. 175 p.
- Yáñez-Muñoz, M, Reyes, M. & Meza-R., P. (2004). *Caracterización y Composición de la Herpetofauna en las reservas de la Fundación Jocotoco*. Informe Técnico 20, División de Herpetología, Sección de Vertebrados, Museo Ecuatoriano de Ciencias Naturales. 49 pp.
- Zug, G. R., Hedges, S. B. & Sunkel, S. (1979). Variation in Reproductive Parameters of Three Neotropical Snakes, *Coniophanes fissidens*, *Dipsas catesbyi*, and *Imantodes cenchoa*. *Smithson. Contr. Zool.* 300, 1–20.

APPENDIX 1 – Examined material of *Imantodes cenchoa* from Ecuador. Institutional abbreviations: FHGO, Fundación Herpetológica G. Orcés, Quito, Ecuador; DFCH-USFQ, D. F. Cisneros-Heredia collection, housed at the Universidad San Francisco de Quito, Quito, Ecuador.

ESMERALDAS: FHGO 089, Km 17 vía Lita-Alto Tambo (00°51'N, 78°31', 830 m), 17 February 1991; FHGO 120, Km 18 vía Lita-Alto Tambo (00°51'N, 78°31'W, 830 m), 11 August 1990; FHGO 543, Zapallo Grande - Río Cayapas (00°54'N, 78°57'W, 90 m), 13 July 1992; FHGO 570, Tabiazo - Finca Esperanza (00°49'N, 79°42'W, 20 m), November 1992; FHGO 2535, Canton Río Verde, Parroquia Juan Montalvo, La Mayronga (150 m), 01 November 1998. PICHINCHA: FHGO 1317-19, Mindo (00°02'54"S, 78°46'21"W, 1200 m), 13 May 1996; FHGO 2943, Reserva Maquipucuna (1400 m). NAPO: FHGO 456, Runa Huasi - Río Arajuno - confluencia río Napo (01°03'S, 77°32'W, 340 m). SUCUMBÍOS: FHGO 826, San Pablo de Kantesiaya (00°15'00"S, 76°25'30", 240 m), 21 November 1993. ORELLANA: DFCH-USFQ 087, 088, 452, Tiputini Biodiversity Station (00°37'05"S, 76°10'19"W; 215 m.s.n.m.), 10 August 1999; FHGO 216, Cononaco (01°01'05"S, 76°53'31", 230 m), July 1989; FHGO 1069, Km 77 vía Hollín - Loreto - Río Huataraco (00°43'S, 77°22'W, 480 m), 15 January 1995; FHGO 1140-1, Km 77 vía Hollín - Loreto - Río Huataraco (00°43'S, 77°22'W, 480 m), 27 March 1995. PASTAZA: FHGO 119, Pozo Garza - Oryx (00°26'S, 77°03'W, 300 m), 06 July 1989; FHGO 520, Shell (01°29'S, 78°02'W, 600 m), 05 August 1992; FHGO 1656-7, Comuna Curaray (01°22'22"S, 76°56'52"W), 02 November 1997; FHGO 3593, Shell-Te Zulay (1000 m), 04 March 1999. MORONA-SANTIAGO: FHGO 1096, Makuma (02°08'75"S, 77°42'98"W, 600 m), 14 September 1994; FHGO 1192, Makuma (02°08'75"S, 77°42'98"W, 600 m), 19 June 1995. ZAMORA-CHINCHIPE: FHGO 2801, Bombuscaro (07°09'06"S, 78°58'10"W, 1270 m), 16 December 1999.