



# Validating the Two Records of Mocquard's Swampsnake, *Tretanorhinus mocquardi* Bocourt 1891 (Dipsadidae), in Colombia, with Comments on the Taxonomy of Mainland Swampsnakes

Juan D. Vásquez-Restrepo

Grupo Herpetológico de Antioquia, Instituto de Biología, Facultad de Ciencias Exactas y Naturales, Universidad de Antioquia, Calle 67 #53-108, Laboratorio 7-121, Medellín, Colombia (juanda037@outlook.com)

Photographs by the author.

Swampsnakes in the genus *Tretanorhinus* are nocturnally active aquatic to semi-aquatic snakes that inhabit freshwater streams and swamps and brackish water in man-

grove forests (Dunn 1939; Lee 1996; Savage 2002; Heimes 2016). Four currently recognized species (Uetz et al. 2020) range from Mexico to Ecuador and some Caribbean islands



**Fig. 1.** Mocquard's Swampsnake (*Tretanorhinus mocquardi*) (MHUA-R 14528) collected in 2007 in Nuquí Municipality, Chocó Department, Colombia.

(Savage 2002; Wallach et al. 2014). Colombian records include Striped Swampsnakes (*T. taeniatus*) from along the Pacific Coast (Dunn 1939; Peters and Orejas-Miranda 1970; Wallach et al. 2014) and Mocquard's Swampsnakes (*T. mocquardi*) that correspond to two specimens deposited in the Museo de Herpetología Universidad de Antioquia (MHUA), Medellín, Colombia, and which are listed by the Global Biodiversity Information Facility (GBIF) (Daza 2018). Although *T. mocquardi* is a species expected to occur in Colombia since its known distribution includes Panama and Ecuador (Cisneros-Heredia 2005), its presence has not been recorded in the literature and information regarding the two presumptive records might contain uncertainties (Maldonado et al. 2015; Marshall and Strine 2019; Chapman et al. 2020). Data from online databases must be curated both taxonomically and geographically to guarantee reliability (Marshall and Strine 2019).

Because *Tretanorhinus mocquardi* and *T. taeniatus*, are morphologically similar, I examined the MHUA specimens to corroborate their identity and clarify the status of *T. mocquardi* in Colombia. The two specimens tentatively identified as *T. mocquardi* (MHUA-R 14528–9) were collected in 2007 at Nuquí Municipality in Chocó Department (5.60°N, 77.35°W; WGS84; ca. 15 m asl). Identification was based on

the original description by Bocourt (1891) and that of Dunn (1939). However, given that this is a rare species and little published information exists, comparisons with other mainland species of *Tretanorhinus* must include information in Boulenger (1903), Peters and Orejas-Miranda (1970), Pérez-Santos and Moreno (1988), Lee (1996), Savage (2002), and Heimes (2016).

In preservative (70% ethanol), both specimens (Figs. 1 & 2) have a grayish dorsum with a dark (blackish) but diffuse and sometimes interrupted longitudinal stripe that extends from the parietals along the midline of the body. The dorsum is bordered laterally by dark (blackish) lateral lines extending from the nares to the eyes and from the eyes onto the fourth scale rows and onto the tail. The flanks from the first to the third scale rows are cream colored and are separated from the venter by narrow black zig-zag lines that follow the edges of the ventral scales. The venter is mostly dark, except the edges, which are yellowish-cream in color. For scale counts and comparisons see Table 1.

The morphological data provided herein support the presence of *Tretanorhinus mocquardi* (as currently defined) in Colombia and also provide qualitative and quantitative information useful for future comparisons. However, the problem with poorly sampled rare and elusive species, such as *T. moc-*



**Fig. 2.** Mocquard's Swampsnake (*Tretanorhinus mocquardi*) (MHUA-R 14529) collected in 2007 in Nuquí Municipality, Chocó Department, Colombia.

**Table 1.** Comparisons of mainland Swampsnakes in the genus *Tretanorhinus*. When not equal for bilateral characters, counts are presented as left/right. Data for types are from Cope (1861), Bocourt (1891), and Boulenger (1903), and accounts of variation are from Dunn (1939) and Heimes (2016). Dashes (—) denote no data. \* = incomplete tail; \*\* = first temporal fused with parietal on the left side.

	<i>Tretanorhinus nigroluteus</i>		<i>Tretanorhinus taeniatus</i>		<i>Tretanorhinus mocquardi</i>		MHUA	MHUA
	Type	Variation	Type	Variation	Type	Variation	R-14528	R-14529
<b>Dorsals</b>	21	19 or 21 (21–17 per Dunn)	21	21–19	19	19–17	19–19–17	19–19–17
<b>Ventrals</b>	136	127–151	168	168–175	—	166–177	168	164
<b>Subcaudals</b>	—	56–82	81	74–81	—	69–85	37 (divided)*	74 (divided)
<b>Supralabials</b>	8	8	8	8–9	—	—	9/8	9/8
<b>Infralabials</b>	10	10–11	4 or 5 (in contact with anterior chin shields)	—	—	—	9/10	10
<b>Temporals</b>	—	1+2	1+2 or 2+3	—	—	—	2+2	2+2/2+3**
<b>Postocular</b>	2	2	2	—	—	—	2	2
<b>Preoculars</b>	2	2–3	2	2–3	2	—	2	2
<b>Dorsal keels</b>	Present	Present	Present	—	—	—	Present (weaker laterally)	Present (weaker laterally)
<b>Cloacal</b>	—	Divided	Divided	—	—	—	Divided	Divided
<b>Prefrontal</b>	>1	—	3	—	1	1 or 2	1	2

*quardi* and even *T. taeniatus*, is that published data on variation is limited to a few small samples (Dunn 1939).

Both *Tretanorhinus mocquardi* and *T. taeniatus* have a grayish dorsum with a middorsal black line and lateral black lines on the fourth or fifth scale rows, below which the flanks are cream. Ventral coloration for *T. taeniatus* has been described as cream or yellowish with traces of three longitudinal black lines, but a lack of details in those descriptions and an absence of illustrations or photographs leaves ample room for interpretation. For example, Dunn's (1939) description of ventral coloration in some individuals of the Orange-bellied Swampsnake (*T. nigroluteus*) does not differ from that shown in Figs. 1 and 2 (ventral views), consisting of three lines, the midventral and two additional lines along the edges. Also, although *T. mocquardi* was once considered a synonym of *T. nigroluteus* (Barbour and Amaral 1924; Amaral 1929), the differences in the patterns of the two species (longitudinal lines in *T. mocquardi* vs. alternating dark dots in *T. nigroluteus*) are clearly evident (Dunn 1939; Lee 1996; Heimes 2016). Additionally, for *T. taeniatus*, Boulenger (1903) mentioned

the presence of a middorsal line in the nape that reappears on the tail, which resembles to some degree the discontinuous middorsal lines in MHUA-R 14528 and 14529. However, before evaluating the usefulness of this character as a diagnostic trait, one must consider that coloration can be affected by preservative or post-mortem scale loss.

*Tretanorhinus mocquardi* was described by Bocourt (1891) within a dichotomous key that mentioned only the presence of 19 dorsal scale rows and a single prefrontal. When Boulenger (1903) subsequently described *T. taeniatus*, he included more information but, when comparing it with *T. mocquardi*, neither color, pattern, nor scale counts differ dramatically (see Table 1), leaving only the tendency of *T. mocquardi* to have fewer prefrontals and dorsal scale rows as notable distinctions. Furthermore, Dunn (1939) mentioned that *T. taeniatus* may exhibit a reduction in the number of dorsal scale rows, thus the presence of 19 dorsal scale rows cannot in itself adequately diagnose *T. mocquardi*. Another element that can lead to confusion when comparing these species is Boulenger's (1903) incomplete description of the infralabial

scales in *T. taeniatus*, mentioning only that “4 or 5 lower labials [are] in contact with the anterior chin-shields” without stating how many lower labials were present (other species of *Tretanorhinus* have about 10 infralabials). Anyone unfamiliar with these snakes might interpret Boulenger’s statement as representing the total number of infralabials.

Our understanding of the taxonomy of northern South American species of *Tretanorhinus* is complicated not only by the low number of samples available for examination but also by the laxity of the original descriptions and the reliance on incomplete morphological data. The resultant paucity of accurate data has consequences in the taxonomic resolution of the currently recognized species. A redescription of the type series of *T. mocquardi*, a reexamination of the holotype of *T. taeniatus*, and molecular evidence are necessary to resolve the taxonomic status of these snakes. Worthy of note is that if the two names were considered synonyms, *T. mocquardi* would have priority over *T. taeniatus*.

### Acknowledgements

I thank the Museo de Herpetología Universidad de Antioquia for allowing me to examine their specimens. I also thank A. Uribe for her help with English and Sven Vogler for his help accessing some of the literature.

### Literature Cited

- Amaral, A. 1929. Estudos sobre ophidios neotropicos. XVII. Valor systematico de varias formas de ophidios neotropicos. *Memórias do Instituto Butantan* 4: 1–68.
- Barbour, T. and A. Amaral. 1924. Notes on some Central American snakes. *Occasional Papers of the Boston Society of Natural History* 5: 129–132.
- Bocourt, M.F. 1891. Sur quelques ophidiens de l’Amerique intertropicale. *Le Naturaliste* (2) 5: 121–122.
- Boulenger, G.A. 1903. Descriptions of new snakes in the collection of the British Museum. *Annals and Magazine of Natural History* (7) 12: 350–354.
- Chapman, A.D., L. Belbin, P.F. Zermoglio, J. Wiczorek, P.J. Morris, M. Nicholls, E.R. Rees, A.K. Veiga, A. Thompson, A.M. Saraiva, S.A. James, C. Gendreau, A. Benson, and D. Schigel. 2020. Developing standards for improved data quality and for selecting fit for use biodiversity data. *Biodiversity Information Science and Standards* 4: e50889.
- Cisneros-Heredia, D.F. 2005. *Tretanorhinus mocquardi* (Swamp Snake). *Herpetological Review* 36: 340.
- Cope, E.D. 1861. Contributions to the ophiology of Lower California, Mexico and Central America. *Proceedings of the Academy of Natural Sciences of Philadelphia* 13: 292–306.
- Daza, J.M. 2018. Colección de Reptiles - Museo de Herpetología Universidad de Antioquia. Version 3.0. Universidad de Antioquia. Occurrence dataset <<https://doi.org/10.15472/z6yhzr>> accessed via GBIF.org.
- Dunn, E.R. 1939. Mainland forms of the snake genus *Tretanorhinus*. *Copeia* 1939: 212–217.
- Heimes, P. 2016. *Snakes of Mexico*. Edition Chimaira, Frankfurt am Main, Germany.
- Lee, J.C. 1996. *The Amphibians and Reptiles of the Yucatan Peninsula*. Cornell University Press, Ithaca, New York.
- Maldonado, C., C.I. Molina, A. Zizka, C. Persson, C.M. Taylor, J. Albán, E. Chilquillo, N. Rønsted, and A. Antonelli. 2015. Estimating species diversity and distribution in the era of Big Data: to what extent can we trust public databases? *Global Ecology and Biogeography* 24: 973–984.
- Marshall, B.M. and C.T. Strine. 2019. Exploring snake occurrence records: Spatial biases and marginal gains from accessible social media. *PeerJ* 7: e8059.
- Peters, J. and B. Orejas-Miranda, B. 1970. *Catalogue of the Neotropical Squamata. Part I. Snakes*. Smithsonian Institution Press, Washington, DC.
- Pérez-Santos, C. and A.G. Moreno. 1988. *Ofidios de Colombia*. Museo Regionale di Scienze Naturali, Torino, Italy.
- Savage, J.M. 2002. *The Amphibians and Reptiles of Costa Rica: A Herpetofauna Between Two Continents, Between Two Seas*. University of Chicago Press, Chicago, Illinois.
- Uetz, P., P. Freed, and J. Hošek. 2020. The Reptile Database. <<http://www.reptile-database.org>>.
- Wallach, V., K.L. Williams, and J. Boundy. 2014. *Snakes of the World: A Catalogue of Living and Extinct Species*. CRC Press, Boca Raton, Florida.