

Micrurus ibiboboca (Serpentes, Elapidae) is not a Guiana Shield Species

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Coral snakes (*Micrurus*) are a diverse group of Neotropical squamates. Similarities in morphology and coloration can make identification difficult, especially in areas of species sympatry. Species with triad-type coloration, approximately 30% of all *Micrurus* species, are among the most difficult to identify. *Micrurus ibiboboca* Merrem, 1820 is an east Brazilian species with triad-type coloration. There are also reports of *M. ibiboboca* from the Guiana region, in Guyana, French Guiana and Surinam.

In a recent revision of the genus *Micrurus*, Roze (1996) stated that "isolated populations [of *M. ibiboboca*] are probably also found in Suriname and French Guiana", although the accompanying map of the species' distribution shows no records from north of the Amazon. Roze's distribution list by countries includes *M. ibiboboca* in the Surinam list, but not in the French Guiana list. In publications prior to 1996, Roze did not mention *M. ibiboboca* as occurring in French Guiana or Surinam (Roze 1967, 1983). Furthermore Roze (1996) suggested that the Guianan specimens of *M. ibiboboca* may really be *M. isozonus*.

Other authors have reported the occurrence of *M. ibiboboca* in the Guiana region. Abuys

(2003) stated that it occurs "in Suriname and also very probably in the other Guianas" based on two specimens "from the vicinity of Zanderij." Kok *et al.* (2003) stated that it had been "reported from northern Suriname", and "probably erroneously from northern French Guiana". Golay *et al.* (1993) stated the range of *M. ibiboboca* as "Surinam and Brazil." David and Ieich (1999) stated that the species occurs in French Guiana and Surinam, based on literature citations. Campbell and Lamar (1989) included records for *M. ibiboboca* from Surinam and French Guiana on the species' distribution map, but indicated that these were questionable. Campbell and Lamar (2004) suggested that the Guiana region specimens of *M. ibiboboca* are really *M. lemniscatus diutius*.

The sources of the reports of *M. ibiboboca* were traced and the specimens that they are based upon were examined. Identification was based on accepted criteria such as scale counts and banding pattern (Peters and Orejas-Miranda 1970, Chippaux 1986, Roze 1996, Starace 1998, Campbell and Lamar 2004). Below we examine each of the Guiana reports in detail.

Guyana – The record from Guyana was based on a specimen from southwestern Guyana at the Royal Ontario Museum (ROM 11702). This individual was determined to be a specimen of *Micrurus lemniscatus*; it has complete triads, discrete head bands, and 31 subcaudals; this last number is outside the

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range of *Micrurus ibiboboca*, but within the range of *M. lemniscatus* (Table 1).

The ROM specimen cannot be *M. isozonus*, which occurs in the same region (Kok *et al.* 2003), because of differences in the color pattern on the head. ROM 11702 has the pattern of sequential black-white-black-red head bands which is characteristic of *M. lemniscatus*; in *M. isozonus* the snout tip is never uniformly black (Roze 1996). The ROM specimen also exceeds the largest reported size for *M. isozonus* (981 mm vs 885 mm).

According to the distribution maps in Roze (1996) and Campbell and Lamar (2004), ROM 11702 originated from within the range of *M. lemniscatus diutius*. The ROM specimen resembles *M. l. diutius* from French Guiana as described and illustrated in Starace (1998) more closely than it resembles the description of this subspecies in Roze (1966, 1996).

French Guiana – Roze (1996) and Campbell and Lamar (2004) cite Chippaux (1986) as listing *M. ibiboboca* from French Guiana. However, Chippaux (1986) says only that *M. ibiboboca* "...could possibly be collected there because it is present in neighbouring territory." Starace (1998) also treats the species as "possible presence" in French Guiana (along with four other species of *Micrurus* known from Surinam or Brazil). Other lists of snakes from French Guiana do not mention *M. ibiboboca* (Gasc and Rodrigues 1980, Rogé and Sauvenet 1987). We are therefore confident that the reports of *M. ibiboboca* from French Guiana are not based on specimen records, but only on speculation that the species could possibly occur there because it occurs in Brazil.

Surinam – The source of the reports of *M. ibiboboca* in Surinam is Abuys (1982) (cited in Roze 1996, David and Ineich 1999, Abuys 2003 and Campbell and Lamar 2004). Abuys (1982) based the claim on two specimens from north-central Surinam. These two specimens, identified as *M. ibiboboca*, are in the collection of the Naturalis Museum in Leiden (RMNH 13780, RMNH 17277). Examination of these

two specimens indicates that they are actually *M. lemniscatus*; they have sequential black-white-black-red head bands and the numbers of subcaudals fall outside the range of *M. ibiboboca*, but within the range of *M. lemniscatus* (Table 1).

Moonen *et al.* (1979) show a photograph of a snake purported to be *M. ibiboboca*. They state that the species "...was never found by the authors. The specimen in the picture was caught by others..." and "the provenance of the only specimen that we got to see is unknown, unfortunately." Abuys (1982) provides some corrections and additions to Moonen *et al.* (1979), and stated that the abovementioned quote in Moonen *et al.* (1979) should be replaced by "two specimens [of *M. ibiboboca*], one male and one female, [were] collected from the vicinity of Bosbivak Zanderij" (approximately 40 km S of Paramaribo). It is not explicitly stated whether the snake in the photograph is one of the two collected specimens.

Other text in Moonen *et al.* (1979) reads: "At first glance this species is easily confused with *Micrurus lemniscatus*. However, the yellow transverse bands are much wider here." It appears that color pattern, rather than scale counts, was used to identify the snake as *M. ibiboboca*. The photograph in Moonen *et al.* (1979) strongly resembles the ROM specimen, the RMNH specimens, and the photographs of *M. l. diutius* in Starace (1998). The white bands are broader in *M. l. diutius* from eastern and central Guiana than they are in individuals from the northwestern part of its range. In specimens from Trinidad and Venezuela the black bands are much broader than the white bands, whereas in specimens from Guyana, Surinam and French Guiana the white bands are approximately equal to the outer black bands. Specimens from French Guiana also have a greater number of ventrals and subcaudals than do Venezuelan specimens. This is evident in comparing the scale counts in Starace (1998) with those in Roze (1996) (summarised in Table 1). These

Table 1 - Scale counts of *Micrurus ibiboboca* and *M. lemniscatus diutius*. Sample sizes are shown in parentheses.

SPECIES	VENTRALS	SUBCAUDALS	WIDTH OF CENTRAL BLACK BANDS	WIDTH OF OUTER BLACK BANDS	WIDTH OF WHITE BANDS	WIDTH OF RED BANDS
<i>M. ibiboboca</i> (Roze 1996)	♂ 206–247 (35) ♀ 216–254 (25)	♂ 20–28 (35) ♀ 19–27 (25)	4–8 dorsals	3–5 dorsals	2–4 dorsals	8–13 dorsals
<i>M. l. diutius</i> (Roze 1996)	♂ 212–225 (28) ♀ 225–242 (21)	♂ 31–38 (28) ♀ 31–37 (21)	7–12 dorsals	half of central or more	2+ dorsals	2–10 dorsals
<i>M. l. diutius</i> (Starace 1998)	♂ 224–255 (2) ♀ 229–268 (2)	♂ 34–42 (2) ♀ 33–41 (2)	6–8 dorsals	5–6 dorsals	4–5 dorsals	7–13 dorsals
ROM 11702 ♀	228	31	6–8 dorsals	4–5 dorsals	3–4 dorsals	6–9 dorsals
RMNH 13780 ♀	236	32	5–7 dorsals	4–5 dorsals	3–4 dorsals	7–13 dorsals
RMNH 17277 ♂	226	30	5–7 dorsals	5–6 dorsals	3–4 dorsals	7–12 dorsals

differences are illustrated in the photographs of *M. l. diutius* from Venezuela (Roze 1966), Trinidad (Campbell and Lamar 2004) and French Guiana (Starace 1998).

Starace (1998) remarks on the considerable differences between *M. l. lemniscatus* and *M. l. diutius* in French Guiana. There is considerable variation both within and among the subspecies of *M. lemniscatus*, as evidenced by both meristics and photographs (Roze 1996, Campbell and Lamar 2004). Jorge da Silva and Sites (2001) found *M. lemniscatus* to be polyphyletic. Obviously, variation in *M. lemniscatus* requires further examination.

Micrurus ibiboboca and *M. lemniscatus*, especially *M. l. diutius*, resemble each other strongly, and confusion is understandable. The photographs of *M. ibiboboca* from Brazil in Campbell and Lamar (2004) strongly resemble those of *M. l. diutius* in Starace (1998). This confusion is reflected in the taxonomic history of the two species; they have been synonymised and separated twice (Amaral 1925, Schmidt 1936, Hoge 1952, Hoge and Romano 1973). *Micrurus lemniscatus* has also been confused with *M. frontalis* in northern Argentina (Jorge da

Silva and Silva 1996).

The inclusion of *Micrurus ibiboboca* in the Guiana region fauna was based on mistaken identification of specimens. The specimens from the Guiana region previously identified as *Micrurus ibiboboca* are in fact *Micrurus lemniscatus diutius*. There are no valid records of *M. ibiboboca* from the Guiana region. The range of *M. ibiboboca* is restricted to eastern Brazil, south of the Amazon.

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Specimens Examined: *Micrurus lemniscatus diutius* – GUYANA: *Rupununi*: Ruawau River (ROM 11702). SURINAM: *Paramaribo*: Zanderij vicinity (RMNH 13780, 17277).

References

- Abuys, A. 1982. Enige korrekties en aanvullende gegevens t.a.v. het boekje "Surinaamse slangen in kleur" van Joep Moonen e.a., 1979. *Litteratura Serpentinum* 2: 34–42.
- Abuys, A. 2003. *De slangen van Suriname en de andere Guyanas*. Groningen. A. Abuys/Gopher Publishers. 592 pp.
- Amaral, A. 1925. Da invalidez da espécie de colubrídeo elapíneo *Micrurus ibiboboca* (Merrem) e redescrção de *M. lemniscatus* (L.). *Revista do Museu Paulista* 15: 29–40.
- Campbell, J. A. and W. W. Lamar. 1989. *The Venomous Reptiles of Latin America*. Ithaca. Cornell University Press. 425 pp.
- Campbell, J. A. and W. W. Lamar. 2004. *The Venomous Reptiles of the Western Hemisphere*. Volumes 1 and 2. Ithaca. Cornell University Press. 774 pp.
- Chippaux, J.-P. 1986. *Les Serpents de la Guyane Française*. Cayenne. ORSTOM Faune Tropical 27. 165 pp.
- David, P. and I. Ineich. 1999. Les serpents venimeux du monde: systématique et répartition. *Dumerilia* 3: 1–499.
- Gasc, J.-P. and M. T. Rodrigues. 1980. Liste préliminaire des serpents de la Guyane française. *Bulletin du Muséum National d'Histoire Naturelle, Paris* 2: 559–598.
- Golay, P., H. M. Smith, D. G. Broadley, J. R. Dixon, C. McCarthy, J.-C. Rage, B. Schätti and M. Toriba. 1993. *Endoglyphs and Other Major Venomous Snakes of the World – a checklist*. Geneva. Azemiops S.A. 478 pp.
- Hoge, A. R. 1952. Notas Erpetológicas. 1ª contribuição ao conhecimento dos ofídios do Brasil central. *Memórias do Instituto Butantan* 24: 179–214.
- Hoge, A.R. and W.D.L. Romano. 1973. Sinopse das serpentes peçonhentas do Brasil. Serpentes, Elapidae, Viperidae. *Memórias do Instituto Butantan* 36: 109–207.
- Jorge da Silva, N. and D. J. Silva. 1996. Geographic distribution: *Micrurus lemniscatus*. *Herpetological Review* 27: 34.
- Jorge da Silva, N. and J. W. Sites. 2001. Phylogeny of South American triad coral snakes (Elapidae: *Micrurus*) based on molecular characters. *Herpetologica* 57: 1–22.
- Kok, P. J. R., J. A. Roze, G. L. Lenglet, H. Sambhu, and D. Arjoon. 2003. *Micrurus isozonus* (Cope, 1860) (Serpentes, Elapidae): an addition to the herpetofauna of Guyana, with comments on other species of coral snakes from Guyana. *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique* 73: 73–79.
- Moonen, J., W. Eriks and K. van Deursen. 1979. *Surinaamse Slangen in Kleur*. Paramaribo. C. Kersten and Co. 119 pp.
- Peters, J. W. and B. Orejas-Miranda. 1970. Catalogue of the Neotropical Squamata: Part 1. Snakes. *United States National Museum Bulletin* 297: 1–347.
- Rogé, J.-P. and J. Sauvenet. 1987. *Les Serpents*. Cayenne. Saga Éditions. 32 pp.
- Roze, J. A. 1966. *La Taxonomia y Zoogeografia de los Ofidios de Venezuela*. Caracas. Universidad Central de Venezuela. 362 pp.
- Roze, J. A. 1967. A checklist of the New World venomous coral snakes (Elapidae) with descriptions of new forms. *American Museum Novitates* 2287: 1–60.
- Roze, J. A. 1983. New World coral snakes (Elapidae): a taxonomic and biological summary. *Memórias do Instituto Butantan* 46: 305–338.
- Roze, J. A. 1996. *Coral Snakes of the Americas – biology, identification, and venoms*. Malabar. Krieger Publishing. 328 pp.
- Schmidt, K. P. 1936. Preliminary account of coral snakes of South America. *Zoological Series, Field Museum of Natural History* 20: 189–203.
- Starace, F. 1998. *Guide des Serpents et Amphisbènes de Guyane*. Paris. Ibis Rouge Éditions. 449 pp.