

Micrurus isozonus (COPE, 1860) (Serpentes, Elapidae): an addition to the herpetofauna of Guyana, with comments on other species of coral snakes from Guyana

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Abstract

Micrurus isozonus is reported for the first time from Guyana : South Rupununi Savannahs, Region 9. The two collected specimens are described and compared to the data from museum specimens from northern South America. Comparison of the Guyana specimens to other populations did not show any significant geographical variation. New data on the diet of the species are given. A brief overview of the nine species and subspecies of coral snakes reported from Guyana is offered, with a key for their identification.

Key-words : *Micrurus isozonus*, South Rupununi Savannahs, Guyana.

Résumé

Micrurus isozonus est découvert pour la première fois au Guyana : dans les Savanes Sud Rupununi, Région 9. Les deux spécimens récoltés sont décrits et comparés à d'autres spécimens en collection provenant du nord de l'Amérique du Sud. La comparaison des spécimens guyanais avec d'autres populations n'a pas mis en évidence de variation géographique significative. De nouvelles données concernant l'alimentation de l'espèce sont apportées. Une brève revue des neuf espèces et sous-espèces de serpents corail du Guyana est donnée ainsi qu'une clé pour leur identification.

Mots-clés : *Micrurus isozonus*, Savanes Sud Rupununi, Guyana.

Introduction

Micrurus isozonus is a triad type coral snake distributed in northern South America from Colombia and Venezuela to northern Brazil. During a recent field trip (April 2002) in the South Rupununi Savannahs, Region 9, Guyana, two of us (PK and HS) collected two adult specimens that proved to be the first record of *Micrurus isozonus* (COPE, 1860) in Guyana.

We provide below the description of the two specimens collected and comparison with data from additional 59 museum specimens from Colombia, Venezuela and Brazil. Information on the distribution and on the natural history of the species is also provided.

Material and Methods

The two specimens, IRSNB 16573 (field number PK471) and IRSNB 16575 (field number PK473) are adult males collected on April 24th, 2002 in Dadanawa Ranch (N 02°49'30" W 59°31'34"), South Rupununi Savannahs, Region 9, Guyana (see Fig. 1). Members of the Dadanawa Ranch staff collected the two specimens on the same night and kindly brought the specimens to our attention. The Dadanawa Ranch pastures where the specimens were found are in tropical savannah, at an elevation of around 118 m.

JR took all the data from the museum specimens given in Table 2 for comparison during his extensive study of the genus *Micrurus* (see ROZE, 1955, 1996). We used only the data of specimens with more or less precise localities, e.g. at least the country, avoiding imprecise localities given for earlier specimens, such as «South America» or doubtful localities such as «Cayenne». Ventrals are counted according to DOWLING (1951). Museum abbreviations follow standardised usage (LEVITON et al., 1985).

Description and variation of *Micrurus isozonus*

Micrurus isozonus (COPE, 1860) (Fig. 2)

E. [laps] isozonus COPE, 1860, Proc. Acad. Nat. Sci. Philadelphia, 12: 73. (Type locality: Venezuela, restricted to Caracas, Venezuela by Roze, 1955).
Micrurus isozonus : SCHMIDT, 1936, Zool. Ser. Field Mus. Nat. Hist., 2(19): 198.

In their colour pattern and morphology the two Guyanese specimens are similar, conforming to the characteristics of *Micrurus isozonus* (see Table 1 for measurements). Both have 10+1 black triads on body and tail (10 triads on the body and one on the tail). The 10th body «triad» of IRSNB 16573 is composed of 4 black bands. The first triad is complete and the pale yellow bands (white in preservative) are equal to or a little longer than the black bands. The black bands are 3-4



Fig. 1. Distribution of *Micrurus isozonus*. Star shows new locality.

(generally 3) dorsal scales long; the yellow bands are 3-4 (generally 4) dorsals long, and the red bands are 2-6 (generally 5 or 6) dorsals. Red and yellow bands have black apical tips. The snout is predominantly black, spotted with white, followed by an irregular white band and an interorbital black band. The latter is followed by a red frontal band and a red parietal band.

Rostral is wider than high, visible from above; internasals wider than long, shorter than prefrontals. Frontal longer than wide, approximately as long as its distance from snout. Supraoculars a little shorter than frontal, and parietals a little shorter than their distance from the posterior suture of internasals. Nasal divided, prenasals larger than postnasals, in contact with the first three supralabials. Preoculars longer than high; two postoculars, the upper about twice the size of the lower; 1+1 temporals in IRSNB 16573, 1+1/2 temporals in IRSNB 16575; 7(3-4) supralabials and 7 infralabials, first four in contact with anterior pair of genials; fourth infralabial is the largest, in contact with both pairs of genials. Posterior pair of genials longer than anterior pair.

Table 1. Measurements of the Guyanese specimens

Measurements (mm)	IRSNB 16573	IRSNB 16575
Snout-vent length	484	652
Tail length	37	64
Total length	521	716
Head length	141	185
Eye horizontal diameter	13	16
Dorsal scale rows	15, smooth, without reduction	15, smooth, without reduction
Ventrals	206	201
Subcaudals	29 (4 first and 6 last subcaudals undivided)	28 (all of them divided)
Anal	Undivided	Divided



Fig. 2. *Micrurus isozonus*. Left, IRSNB 16573; right, IRSNB 16575.

Table 2. Comparison with museum specimens from throughout the range

Characters	Colombia n=2	Venezuela n=55	Brazil n=2	Guyana n=2
Total length (mm)	910-1274 (n=2)	190-850 (n=40)	885 (n=1)	484-652 (n=2)
Tail length (mm)	52-63 (n=2)	12-72 (n=40)	63 (n=1)	37-64 (n=2)
Dorsal scale rows	–	15-15-15 (n=55)	15-15-15 (n=2)	15-15-15 (n=2)
Ventrals in males	–	199-219 (n=36)	210 (n=1)	201-206 (n=2)
Ventrals in females	–	213-227 (n=19)	219 (n=1)	–
Subcaudals in males	–	26-33 (n=35)	31 (n=1)	28-29 (n=2)
Subcaudals in females	–	19-29 (n=19)	29 (n=1)	–
Supralabials	–	7 (n=54)	7 (n=2)	7 (n=2)
Infralabials	–	7 (n=54)	7 (n=2)	7 (n=2)
Preoculars	–	1 (n=54)	1 (n=2)	1 (n=2)
Postoculars	–	2 (n=54)	2 (n=2)	2 (n=2)
Anterior temporals	–	1-2 (n=54)	1 (n=2)	1 (n=2)
Posterior temporals	–	1-2 (n=54)	1 (n=2)	1-2 (n=2)
N° of black triads	9+1-10+1 (n=2)	8+1-14+1 $\frac{1}{2}$ (n=55)	11+1 $\frac{1}{2}$ (n=2)	10+1 (n=2)

According to ROZE (1996: 184-185), the diagnostic characters used to define *M. isozonus* are 199-225 ventrals, 25-33 subcaudals (usually several of them undivided), a triad-type coloration with a complete first triad, 10-14 black triads on the body, a spotted snout of black and white followed by an interorbital black band and by red parietal band, the white and yellow bands usually longer than the black bands, red and white (or yellow) bands with conspicuously black-tipped scales.

Our specimens agree very well with this diagnosis and with other descriptions of *Micrurus isozonus* found in the literature with the exception of the undivided anal plate of IRSNB 16573. The only *Micrurus* species known to have an undivided anal plate is *Micrurus hemprichii* (Jan, 1858) (CAMPBELL & LAMAR, 1989: 118; ROZE, 1996: 180). At first sight, we thought that the undivided anal plate of our specimen was a congenital abnormality. But LANCINI (1962: 170) described a specimen of *Micrurus isozonus* from Venezuela with an undivided anal plate. This character should be therefore considered as variable, even if an undivided anal plate seems to be extremely rare in *M. isozonus*.

The number of dorsal rows is strictly invariable (15 without reduction). There is a significant sexual dimorphism in number of ventrals and subcaudals as is the case in most spe-

cies of coral snakes: 199-219 in males and 213-227 in females. The longer tail in males can accommodate the hemipenes, while the longer body in females accommodates the reproductive system.

Comments on coral snakes of Guyana

Nine species and subspecies of coral snakes are known to occur in Guyana belonging to the genera *Leptomicrurus* and *Micrurus* (CAMPBELL & LAMAR, 1989: 61; ROZE, 1996: 228): *Leptomicrurus collaris* (SCHLEGEL, 1837), with two subspecies: *L. collaris collaris* (SCHLEGEL, 1837) and *L. collaris breviventris* ROZE & BERNAL-CARLO, 1988 [Whereas SLOWINSKI (1995) thought it was preferable to return *Leptomicrurus* to the synonymy of *Micrurus*, we think that there is equally ample and complex evidence for the recognition of both genera as valid taxa], *Micrurus averyi* SCHMIDT, 1939, *Micrurus hemprichii hemprichii* (Jan, 1858), *Micrurus lemniscatus* (LINNAEUS, 1758), with two subspecies: *M. lemniscatus lemniscatus* (LINNAEUS, 1758) and *M. lemniscatus diutius* (BURGER, 1955), *Micrurus psyches* (DAUDIN, 1803) and *Micrurus surinamensis surinamensis* (CUVIER, 1817).

Key to the species and subspecies of coral snakes from Guyana

- 1. Black above, without complete red or white bands, except on head and behind it and on tail; genials in contact with the mental (*Leptomicrurus*) 2
- 1a. Body with black and light bands; genials separated from the mental (*Micrurus*) 3
- 2. Ventrals 227 to 237 in males; about 247 in females *Leptomicrurus collaris collaris*
- 2a. Ventrals 212 to 219 in males, probably less than 247 in females *Leptomicrurus collaris breviventris*
- 3. Anal plate undivided; body usually with orange yellowish light bands *Micrurus hemprichii hemprichii*
- 3a. Anal plate divided; body with red and yellow or white bands 4
- 4. Black body bands in triads (in sets of 3) separated by red bands 5
- 4a. Black body bands not in triads 8
- 5. Only fourth supralabial in contact with the eye; the central black band of the triad usually with slightly roundish borders dorsally; head shields red with black borders *Micrurus surinamensis surinamensis*
- 5a. Third and fourth supralabial in contact with eye; central black band with more or less straight borders 6
- 6. Yellow or white body bands are as long as or longer than the black bands; snout spotted with black and white *Micrurus isozonus*
- 6a. White bands are shorter than the black bands; snout black 7
- 7. 212 to 225 ventrals in males and more than 242 in females *Micrurus lemniscatus diutius*
- 7a. Usually more than 228 ventrals in males and more than 242 in females *Micrurus lemniscatus lemniscatus*
- 8. 8 to 13 black body bands; red bands about 7 times longer than the black bands *Micrurus averyi*
- 8a. 22 to 41 black body bands; red or dark purple bands are slightly longer than the black body bands *Micrurus psyches*

Both subspecies of *Leptomicrurus collaris* are immediately distinguishable from *M. isozonus* and the other species of *Micrurus* by their uniformly black body dorsally with yellow or reddish spots on the belly and whitish or reddish nuchal band, and by a higher number of subcaudals in males (45-48 versus 26-33 in *M. isozonus*). *M. averyi* is easily distinguishable from *M. isozonus* by having single red and black bands; *M. hemprichii* is easily distinguishable from *M. isozonus* by the presence of orange rather than red on the body, its very long black bands and very short white bands and by a lower number of triads on the body (7-10 versus 10-14 in *M. isozonus*); *M. lemniscatus* is similar to *M. isozonus* but can be distinguished by its cephalic pattern: a long red cephalic band covers the parietal tips and the anterior four rows of dorsals, the tip of the snout is black followed by a well-defined white or yellow ring, moreover, the yellow bands are shorter than the black bands (longer or equal in *M. isozonus*); *M. psyches* is readily distinguishable from *M. isozonus* by a pattern not forming triads, a black head and a higher number of subcaudals; *M. surinamensis* is easily distinguishable from *M. isozonus* by its red cephalic scales with black borders, a single supralabial in contact with the eye and a lower number of black triads on the body (5-8 versus 10-14 in *M. isozonus*).

Micrurus filiformis (GÜNTHER, 1859) and *Micrurus spixii* WAGLER, 1824 are not reported from Guyana but are present in the area (notably in northern Brazil). As pointed out by CAMPBELL & LAMAR (1989: 60, 113, 144), these species may occur in Guyana. *M. filiformis* can be readily distinguished from *M. isozonus* by its black snout, red parietal scales and higher number of ventrals (270-333 versus 194-227 in *M. isozonus*). *M. spixii obscurus* is similar to *M. isozonus* but can easily be distinguished by a lower number of subcaudals in males (17-22 versus 26-33 in *M. isozonus*). Specimens that seem to represent *Micrurus ibiboboca* (MERREM, 1820), a species occurring in eastern Brazil, are reported from northern Suriname (ABUYS, 1982, 1987) and probably erroneously from northern French Guiana. A specimen from Suriname is available (RMNH 13780) which according to Hoogmoed (pers. comm.) is clearly different from *M. isozonus*. The name *M. ibiboboca* was used by CHIPPAUX (1987: 116) in a key of the *Micrurus* species from French Guiana, but no specimen was collected. The intention of Chippaux was clearly only to serve purposes of comparison. STARACE (1998: 351) did the same but never asserted that *M. ibiboboca* was collected in French Guiana, he only noted that its presence is possible.

As noted by ROZE (1996: 184) and CAMPBELL & LAMAR (1989: 121), the status of this Surinamese population needs to be clarified. It could be an extension of *M. isozonus* in northeastern South America (ROZE, 1996: 184) or it could be a distinct population (CAMPBELL & LAMAR, 1989: 121). *M. isozonus* differs notably from *M. ibiboboca* by a lower number of ventrals in males (206-247 in *M. ibiboboca* versus 199-219 in *M. isozonus*), by a higher number of subcaudals in males (20-28 in *M. ibiboboca* versus 26-33 in *M. isozonus*) and therefore by a ratio of ventrals/subcaudals in males generally higher to 8.5 in *M. ibiboboca* and lower to 8.5 in *M. isozonus*. The head coloration is also different: in *M. ibiboboca* the head has well marked white internasal and red

parietal bands, on the contrary, there is no well marked white internasal band in *M. isozonus* but a spotted snout of black and white.

Distribution

Before this paper, *Micrurus isozonus* was only known from semi-arid and seasonally dry regions in Colombia from east of the Andes throughout the Llanos Orientales eastward, the Llanos of central and southeastern Venezuela, humid forests of the Cordillera de la Costa in northern and central Venezuela, Isla Margarita and the Rio Cotinga region in Roraima, Brazil (see Fig. 1, data compiled after CAMPBELL & LAMAR, 1989 and ROZE, 1996). The Brazilian records are based on 2 museum specimens (AMNH 36064 and AMNH 36066) identified by JR.

It is not really surprising to find *M. isozonus* in Guyana. CAMPBELL & LAMAR (1989: 60) already pointed out that the species could enter western Guyana because suitable habitat exists notably in the South Rupununi Savannahs. It is highly probable that the species is also present in the North Rupununi Savannahs. Our two Guyanese specimens extend the known distribution ca 160 km airline southeast from the southernmost and easternmost locality (Limão, Brazil).

Natural History

This species is considered as common throughout most of its range (LANCINI, 1986: 186) but stays rather poorly known. Few ecological data are available in the literature. In Valle de Caracas as well as in several other localities of the Cordillera de la Costa (Venezuela), *M. isozonus* has penetrated into more humid areas where the human influence has modified (aridified) the environment, reaching altitudes over 1000 m. In suburban and even urban areas of Caracas, this coral snake is the most abundant venomous snake, found in abandoned lots and gardens not fully cared for. In Isla Margarita, Venezuela, *M. isozonus* occupies xerophytic arid areas that are considerably drier than its habitat on the mainland. While in the llanos and the area around Caracas the species is active morning, evening and at night, the population observed in Isla Margarita is strictly nocturnal; avoiding the intense sun during the day.

Diet: Very little is known about the diet of *Micrurus isozonus*. ROZE (1996: 185) reported litter-dwelling lizards (genus *Bachia*) and colubrid snakes as part of the diet of *M. isozonus*. He based part of these data on IRSNB 694B-2 (unfortunately a specimen without locality) which contained a *Bachia* tail. In Yopal, Casanare, Colombia, Juan Manuel Renjifo observed and photographed a *M. isozonus* feeding on a *Erythrolamprus bizonus* (Jan, 1863), a non-venomous coral snake mimic (ROZE, 1996, fig. on p. 255).

One of our specimens (IRSNB 16573) contained a *Leptotyphlops* in the stomach. Unfortunately, the head of the specimen is missing, making the determination difficult, but we tentatively identified it as *Leptotyphlops dimidiatus* (JAN, 1861) [registered under IRSNB 16574]. This is the first record of *M. isozonus* eating a *Leptotyphlops*.

Reproduction: ROZE (1955, p. 458, and 1996, p. 69) reported on a clutch of 6 eggs laid on April 27, 1953 by a 680 mm long female, collected in Cúa, Miranda, Venezuela. The size of eggs was 27.5x11 mm, 26.5x12 mm, 27x10 mm, 26.5x10 mm, 25x11 mm and 24x10 mm, averaging 26.1x10.7 mm. The egg quotient for this clutch was 2.44 and a size index of 279.3.

The size and egg laying time falls in a reproductive cycle #1, as proposed by ROZE (1996, p. 63), and observed in coral snakes in the tropics with dry and rainy season, characteristic of the llanos of northern South America, including the Guyanan savannah. Mating takes place some time in dry season and the eggs are laid some time shortly before the beginning of the rains, usually around May.

Defensive display: As pointed out by GORZULA & SEÑARIS (1998: 183), a frequently observed defensive display by *M. isozonus* consists, like in most species of coral snakes, of raising and waving the tail above the body while seeking to escape or to protect the head beneath a body loop of the anterior part of the body.

List of specimens of *Micrurus isozonus* examined

Brazil: No other locality (ZMB 7076a, 7076b); *Rio Branco:* Limão, Rio Cotinga (AMNH 36064, 36066). **Colombia:** *Meta:* Piñalito (ICNMNH 1878); Base Aérea Apiay, Villavicencio (ICNMNH 7040; San Juan de Arana (FMNH 83045). **Guyana:** *Region 9:* Dadanawa Ranch (N 02° 49' 30" W 59° 31' 34"), South Rupununi Savannahs (IRSNB 16573; IRSNB 16575). **Venezuela:** No other locality (ANSP 6836, BMNH 1946.1.17.15 holotype of *Elaps omissus*, CM 9978, MBUCV 8224, MNHN 4636f, UMMZ 124218). «Orenoque» (MNHN 4635c), «Forests of Caratal» (probably near Caracas) (NMBA 2308); *Amazonas:* Sabanas de Cacuri, Alto Ventuari (MCN 1518); *Apure:* confluencia ríos Apure-Orinoco (SCN no/no); *Aragua:* Maracay (MBUCV 8226, ZSM no/no – 8 specimens), Las Tejerías (MCN 1967), Rancho Grande (FAUCV no/no); *Bolívar:* Ciudad Bolívar (SMF 9427b); *Carabobo:* Valencia (MCN 1633); *Distrito Federal:* Caracas (SCN no/no, NMBA 11368, 11972, SMF 9427c, ZSM no/no – 3 specimens), Carayaca, Dto. Vargas (MCN 1720), Cerro Avila (SCN 11), El Valle (AMNH 59390, 59391), Jardín Botánico de UCV, Caracas (MBUCV 8342), La Montañita, El Avila (UIMNH 22628), Los Venados, El Avila (SCN no/no), probably Cordillera de la Costa (UIMNH ex MCN 91); *Guarico:* Espino (MBUCV 8345); *Miranda:* Cúa (MBUCV 8344), Curupao (MCN 433, 1245, 1247) Dos Caminos (SCN no/no), Los Chorros (MCN 671), Santa Lucía (CM 7458), Turgua (SCN no/no); *Monagas:* 60 km SE Maturín (USC [BBB77]) Uraoa, Dto. Sotillo (CM 17386); *Nueva Esparta:* Cueva del Piache, Isla Margarita (SCN no/no), La Soledad, Macanao, Isla Margarita (MBUCV 8341), San Francisco de Macanao, Isla Margarita (SCN no/no) *Sucre:* Cumanacoa (CM 7955), San Rafael, near Cumanacoa (CM 7846), 7961), Puerto de Hierro (MBUCV 8215) near Yaguaraparo (UIMNH [MCN 316]);

Zulia: Rio Guasare (MBUCV 8202).

Other or questionable localities: Perou (MNHN 4610b), «South America» (ANSP 6841, NMBA 2307), «Côte Ferme» (probably state of Sucre, Venezuela) (MNHN 4635d); «Cayenne» (MNHN 4632)

No locality: BMNH no/no, IRSNB 694B (1-2), 627; ANSP 6804, 6805 (syntypes of *Elaps isozonus*).

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Literature Cited

ABUYS, A., 1982. Enige korrekties en aanvullende gegevens t.a.v. het boekje «Surinaamse slangen in kleur» van Joep Moonen e. a., 1979. *Litteratura Serpentina*, 2: 34-42.

ABUYS, A., 1987. De slangen van Suriname, deel XVIII: familie Elapidae, subfamilie Micrurinae. *Litteratura Serpentina*, 7: 240-262.

CAMPBELL, J. A. & LAMAR, W. W., 1989. *The Venomous Reptiles of Latin America*. Ithaca, Comstock Publishing Associates, Cornell University Press: 425 pp.

CHIPPAUX, J-P., 1987. *Les Serpents de la Guyane française*. Coll. Faune Tropicale no. 27. Paris, Editions de l'ORSTOM: 165 pp.

DOWLING, H. G., 1951. A proposed standard system of counting ventrals in snakes. *British Journal of Herpetology*, 1 (5): 97-99.

GORZULA, S. & SEÑARIS, J. C., 1998. Contribution to the herpetofauna of the Venezuelan Guayana I. A data base. *Scientia Guianae*, 8: xviii, 1-269.

LANCINI, V. A. R., 1962. Contribución al conocimiento de los ofidios del cordón litoral. Los ofidios de Curupao, Estado Miranda (Venezuela). *Acta Biologica Venezuéllica*, 3: 161-172.

LANCINI, V. A. R., 1986. *Serpientes de Venezuela*. Ernesto Armitano Editor, Caracas : 261 pp.

LEVITON, A. E., GIBBS JR, R. H., HEAL, E. & DAWSON, C. E., 1985. Standards in herpetology and ichthyology: Part I. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. *Copeia*, 1985: 802-832.

ROZE, J. A., 1955. Revisión de las Corales (Serpentes: Elapidae) de Venezuela. *Acta Biologica Venezuéllica*, 1 (17): 453-500.

ROZE, J. A., 1996. *Coral Snakes of the Americas. Biology, Identification, and Venoms*. Krieger Publishing Company, Malabar, Florida: 328 pp.

SLOWINSKI, J. B., 1995. A phylogenetic analysis of the New World Coral Snakes (Elapidae: *Leptomicrurus*, *Micruroides*, and *Micrurus*) based on allozymic and morphological characters. *Journal of Herpetology*, 29 (3): 325-338.

STARACE, F., 1998. *Guide des Serpents et Amphibènes de Guyane*. Ibis Rouge Editions, Guadeloupe-Guyane: 449 pp.

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