

Papéis Avulsos de Zoologia

MUSEU DE ZOOLOGIA DA UNIVERSIDADE DE SÃO PAULO

ISSN 031-1049

PAPÉIS AVULS. ZOOL., S. PAULO 36(8): 77-85

15.III.1985

MICRURUS AVERYI SCHMIDT, 1939, IN CENTRAL AMAZONIA (SERPENTES, ELAPIDAE)

P. E. VANZOLINI

RESUMO

M. averyi, originalmente descrito da fronteira Brasil-Guyana, é redescrito com base em 8 exemplares da região de terra firme ao norte de Manaus.

INTRODUCTION

Micrurus averyi was based on a single female from southernmost Guyana, close to the Brazilian border. The species is distinctive and the original description and illustration are good, but the fact that the only specimen was a female prevented a full characterization. There exists marked sexual dimorphism in *Micrurus* and, furthermore, some characters peculiar to males, such as supra-anal tubercles, are thought to be important in defining relationships.

I have found ten citations of the species in the literature. Marx (1958: 485) cited the holotype in his list of Field Museum type materials. Brongersma (1967: 73) cited *averyi* in a synoptic paper on the poisonous snakes of Surinam; from context it seemed to me that he had had no specimens, but relied rather on geographical plausibility. However, dr. M. S. Hoogmoed (*in litt.*) has kindly informed me that the type locality is in an area then claimed by Holland, although occupied by Guyana (whose sovereignty Brasil has long recognized: Aguiar, 1942).

Roze, in his 1967 checklist of *Micrurus* cited *averyi* as "known only from the type locality", i. e., from the type only. In "The poisonous snakes of the world" edited by Moore (1970: 60), with the help of a committee from the American Society of Ichthyologists and Herpetologists, the species was attributed to Surinam, not to Guyana. Since the snake is relatively rare and secretive, one hopes the mistake will not inconvenience the intended users of the book, the U. S. amphibious forces.

In his indispensable key to Neotropical *Micrurus*, Roze (in Peters & Orejas-Miranda, 1970) used in part the head color pattern and the number

of black cross bands to characterize *averyi*; as he had only the original description to go by, the key makes the identification at times difficult, leading initially to *M. psyches*. Hoge & Romano (1971: 216), in a synopsis of Neotropical poisonous snakes, cited the species as known only from the type locality. In a later synopsis (Hoge and Romano, 1973: 122, pl. 1, fig. 3) they extended the distribution to the region of Manaus; they did not cite actual specimens, but presented a diagrammatic illustration of the color pattern, which indicates they had seen the form. (The head region is not very clearly depicted, but the ensemble is perfectly recognizable). In a second edition of the synopsis (Hoge & Romano-Hoge, 1981: 392, fig.) exactly the same information and illustration were presented. Hoogmoed (1979), in his chapter on the herpetofauna of the Guianan region, in the book on the South American herpetofauna edited by Duellman, characterized the distribution of *M. averyi* as "rainforest lowland endemic".

Finally, Roze (1983), in an annotated list of New World elapids, cited three Butantan specimens, obviously the basis for Hoge and Romano's extension of range, from Reserva "Duke" (actually Ducke), near Manaus, remarking on the absence in males of supra-anal tubercles and on the presence of a black cap, both features tending to indicate relationship with *Micrurus psyches*. These Butantan specimens are included in this note.

MATERIALS

We have now at hand eight additional specimens that make it possible to complement Schmidt's original description. Five of them, in our collection, were collected for Barbara Zimmerman at different times in 1983 and 1984 in the "INPA-WWF Reserves" near Manaus, areas where the Instituto Nacional de Pesquisas da Amazônia and the World Wildlife Fund are conducting research on the carrying capacity of isolated forest plots. The approximate geographical coordinates are 02°25'S, 59°43'W. The other three were collected at the Reserva Ducke (02°50'S, 59°50'W), and donated by INPA to Instituto Butantan.

DESCRIPTION

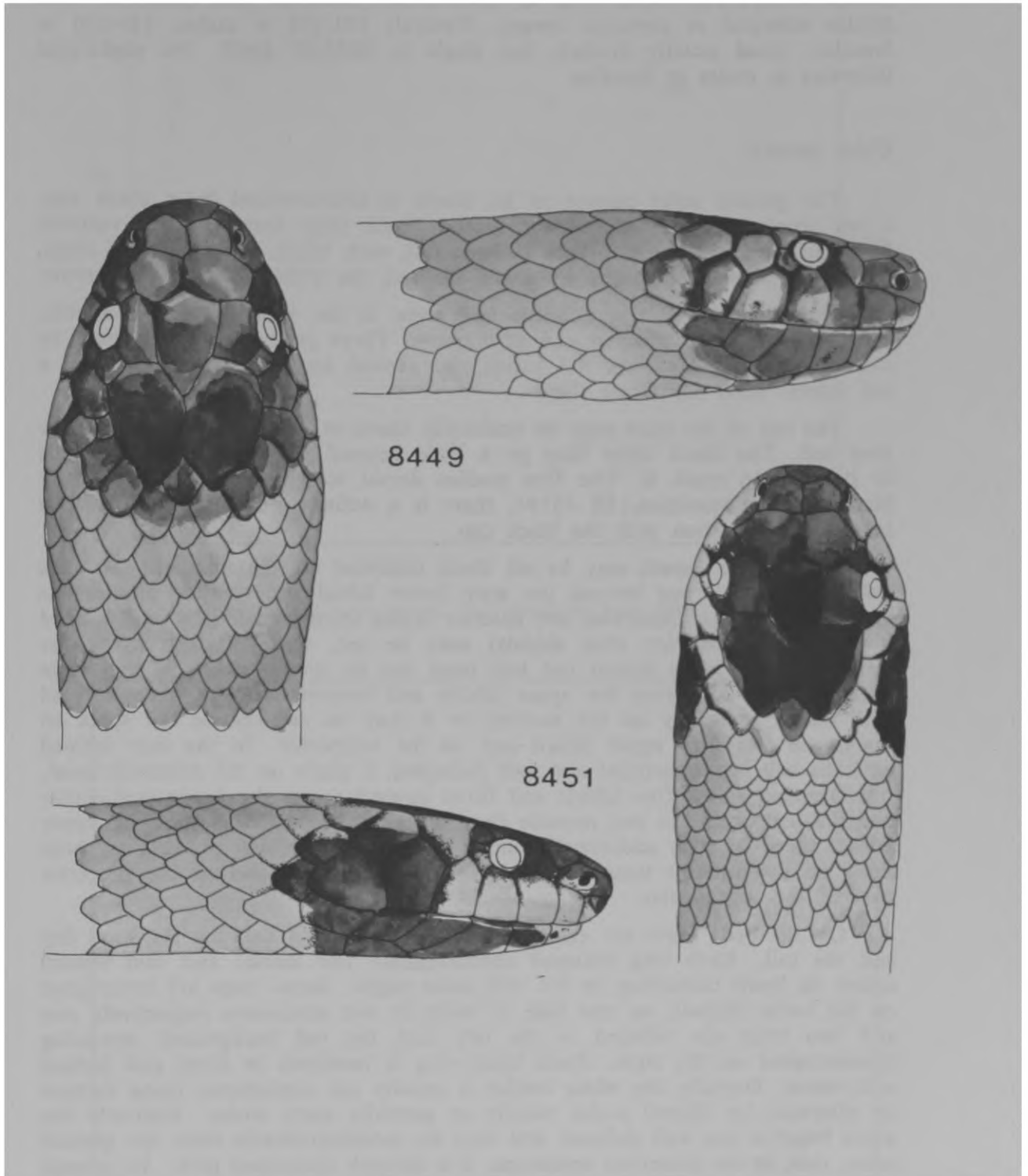
The following is an adaptation of K. P. Schmidt's description (which is standard for *Micrurus*) including the new information. Measurements and meristic data of the available specimens are shown in Table 1 and Figure 1.

Micrurus averyi Schmidt, 1939

Micrurus averyi Schmidt, 1939: 45, fig. Holotype: FMNH 30956, adult female. Type locality: Courantyne District near the Brazilian border, at Latitude 1°40'W and Longitude 58°W. Collector Emmet R. Blake, head of the Sewell Avery Expedition to British Guiana, September 22, 1938.

Pholidosis

Head shields normal in arrangement. Supralabials seven. Lower labials seven, the fourth very large, reaching the anterior chin shield or, on one side or both, split in two, a narrow labial proper and a large inner scale. Preocular one. Postoculars, one (on the type) or two (all the other specimens). Tem-



Two extreme types of head color pattern in *Micrurus averyi*, MZUSP 8449 and 8451.

porals 1+1/1+1, 1+2/1+2, or 1+1/1+2. Anterior and posterior chin shields subequal or posterior longer. Ventrals 191-196 in males, 210-220 in females. Anal usually divided, but single in MZUSP 8449. No supra-anal tubercles in males or females.

Color pattern

The general color pattern of *M. averyi* is characterized by a black cap, a red trunk with narrow, widely spaced black rings narrowly and variably bordered with white, and a very melanic tail, with black, white and red rings, frequently obsolete, both the white and the red, the white always very narrow.

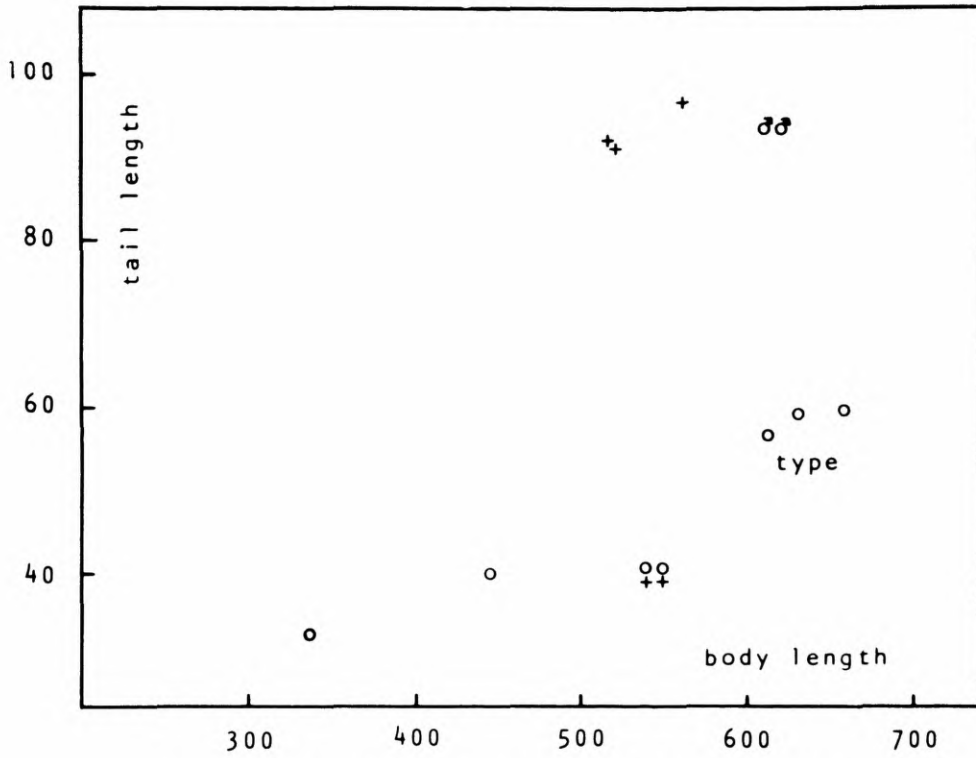
The black cap is not uniform and, even in the small sample available, shows considerable variation and asymmetry. Three pattern elements must be considered: black areas on the dorsal and ventral aspects of the head and a red lateral band separating them.

The top of the head may be uniformly black or the snout marbled, sooty over red. The black color may go a little beyond the edge of the parietals or just fail to reach it. The first median dorsal scale is entirely or partially black. In one specimen, IB 43194, there is a definite nuchal spot, 3 dorsals long, in continuation with the black cap.

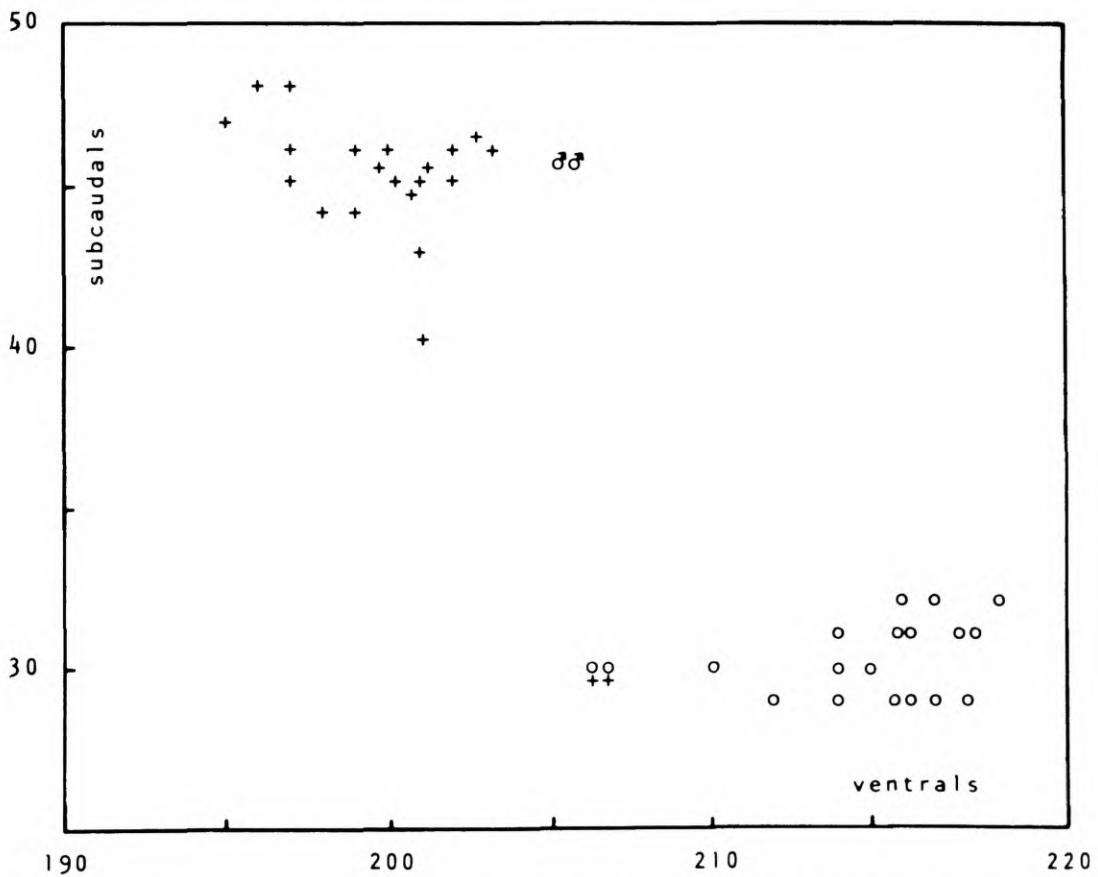
The ventral aspect may be all black (marbled on the middle), the dark color reaching or not beyond the sixth lower labial and meeting or not the dorsal black cap. Otherwise the anterior scales (symphysial, first and second lower labials, anterior chin shields) may be red, marbled with black, or generally sooty. The lateral red belt need not be symmetrical. It may have diffuse edges, occupying the upper labials and temporals, all of them spotted with black, especially on the sutures; or it may be reduced to red spots on the fourth and fifth upper labials and on the temporals. In the best defined case the belt is symmetrical and well delimited; it starts on the posterior nasal, runs along the first five labials and turns upward across the lower post-ocular and the temporals. In one juvenile the lateral red is limited to spots on upper labials three to five; additionally, small faint red spots are present, on both sides, on the anterior temporal, on the upper postocular and on the posterior part of the supraocular.

On the body there are eight to thirteen black rings between the head cap and the tail. Each ring occupies approximately two dorsal and two ventral scales, its limits coinciding or not with scale edges. Some rings are interrupted on the lower dorsals, on one side or both; in two specimens respectively one and two rings are reduced to the left half, the red background extending uninterrupted on the right. Each black ring is bordered in front and behind with white. Dorsally the white border is usually not continuous, being formed by alternate (or fewer) scales wholly or partially stark white. Ventrally the white band is less well defined, and may be indistinguishable from the ground color, that, in the preserved specimens, is a dirtyish undecided pink. In general the white borders of the anterior rings are better defined than those of the posterior ones; in one case (MZUSP 8450) the white is practically absent. In the Butantan specimens the white is not discernible, but this may be due to bleaching. In two specimens there are irregularly placed black ventral spots.

Between the rings the dorsum is light red; the dorsal scales have light condensations of melanophores along the free edges, not sufficient, however,



Graph 1. *Micrurus averyi*. Tail length on body (SVL) length



Graph 2. *Micrurus corallinus*, Coast of São Paulo. Number of subcaudals on number of ventrals.

to build a reticulate pattern. In two specimens there are definite short thin lines along the dorsal scales. In one specimen there are dark spots on the tips of the dorsals, more evident on the posterior third of the body.

The number of black annuli does not seem correlated, within sexes, with the number of ventrals. Females, however, having more ventrals, tend to have more rings. The number of ventrals between annuli varies from five to thirteen per cent of the total number of ventrals; the distance is usually largest between the head cap and the first ring and between the last ring and the tail.

The transition between body and tail pattern is abrupt; it occurs dorsally above the front edge of the anal; ventrally, the anal may show a few black markings or not; the first caudals are black. The tail can be described as black or blackish with lighter markings. At its lightest there are five to eight black rings, bordered with white, as on the trunk; the intervening red spaces are heavily loaded with melanin on the dorsal aspect, but show light spots ventrally. On the opposite extreme the red spaces become black, and one sees a series of up to sixteen black rings, three to five scales wide, separated by narrow, at times obsolete, white lines. In all cases the first two anterior light rings are closest to each other and more regular than the remainder.

COMMENTS

Sexual dimorphism

Table 1 and Graph 1 show the usual sexual dimorphism in tail length and scale counts. They also indicate that adding ventrals and subcaudals tends to offset the dimorphism. The size of the *averyi* sample not permitting an adequate statistical treatment, I examined three reasonable geographical samples of the related *Micrurus corallinus*; the impression was confirmed. I present here (Table 2) only the data for a sample from the coast of the state of São Paulo (a narrow strip some 230 km long), but agreement is perfect with the other two samples, from the state of Rio de Janeiro and from the interior of São Paulo. The sex differences in number of ventrals and subcaudals are so pronounced that it is unnecessary to test them for significance. Contrariwise, there is no significant difference between the means of the sums for either sex.

There is another way of looking at the data. Taking the scale counts individually, the coefficients of variation (V) for the single sex samples are suitably low (Klauber, 1941), and those for combined sexes much higher. Taking instead the distributions of the sum, the coefficient of variation of the combined sample is within the range of those of the single sex samples.

A cursory examination of other data at hand indicates that this relative constancy of the sum of ventrals and subcaudals may be a property of some groups of subterranean snakes, such as *Micrurus* and probably *Atractus*. It might represent a compromise between the need for housing the hemipenes and some mechanical demand of subterranean life.

Plotting the number of subcaudals against the number of ventrals (Graph 2) one sees that the two scale counts are not correlated within single sex samples. (This also occurs in the other two geographical samples tested). This absence of correlation leads to the idea that selection acts on the sum itself (equalling approximately the total number of vertebrae), a somewhat curious conclusion.

TABLE 1. *Micrurus averyi*, measurements and meristic data

		Length		Ventals	Sub-caudals	Sum	Body Rings
		Body	Tail				
MZUSP 8451	♂	505	75+	198	40+	238+	8
MZUSP 8450		515	93	190	47	237	10
IB 43195		520	92	193	45	238	9
MZUSP 8449		560	98	194	48	242	10
MZUSP 8448	♀	335	31	216	34	250	11
IB 43194		450	40	207	28	235	13
IB 32492		630	60	220	31	251	12
MZUSP 8485		655	60	207	33	240	10
Holotype*	♀	612	58	210	34	244	11

+ tail broken at the tip

* from the original description

TABLE 2. *Micrurus corallinus*, Coast of São Paulo. Statistics of the distributions of scale counts.

		N	R	M	s(M)	V
Ventals	♂	20	195-203	199.7	0.52	1.16
	♀	17	210-219	215.6	0.55	1.05
	♂ ♀	37	195-219	207.0	1.38	4.04
Subcaudals	♂	20	40-48	45.3	0.39	3.85
	♀	18	29-32	30.3	0.27	3.72
	♂ ♀	38	29-48	38.2	1.25	20.22
Ventals +	♂	19	242-254	248.0	0.89	1.57
Subcaudals	♀	18	243-255	249.2	0.94	1.60
	♂ ♀	37	242-255	248.6	0.65	1.58

R range of variable

M mean

s(M) standard deviation of mean

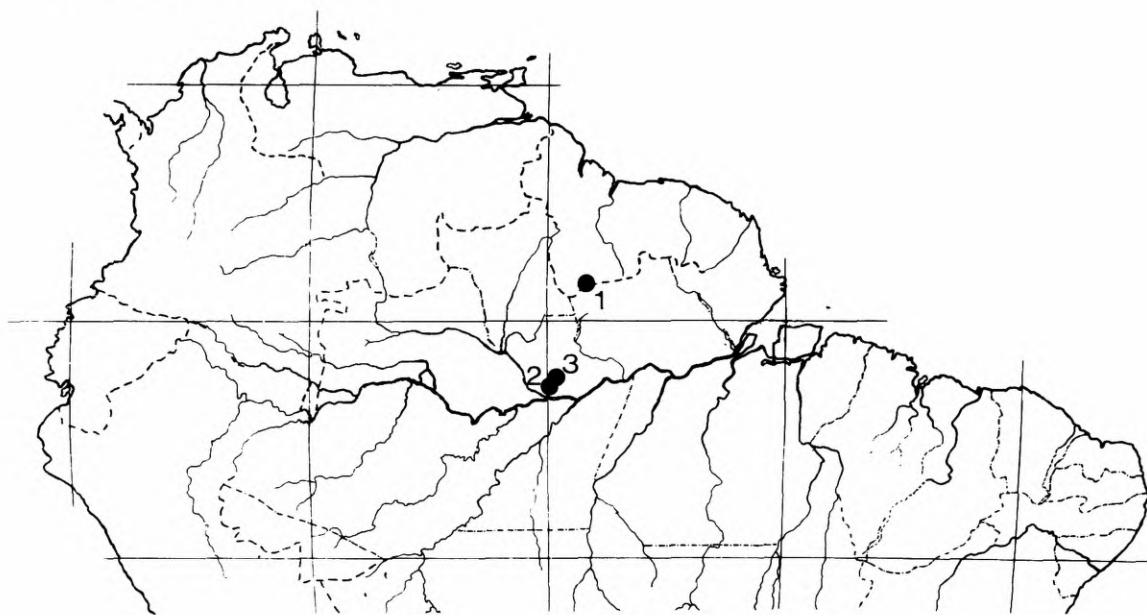
V coefficient of variation

It is obvious that number of subcaudals is correlated with tail length, and the expected sexual dimorphism is seen, as said, in Graph 1. This graph additionally shows that also in this character the Amazonas samples agree well with the holotype.

Distribution

Schmidt further defined the type locality as the Boundary Commission's "Boundary Camp", at the head of Itabu Creek, that enters the New River, an affluent of the Courantyne, at New River Depot. The report of the Boundary Commission (Aguiar, 1942), permits placing the camp at 01°34'N, 58°17'W; the altitude is 600 m. This shows the very good accuracy of Blake's field reference, both as to coordinates (01°40'N, 58°W) and altitude (2,000 ft). The INPA-WWF reserves and Reserva Ducke are on the low plateau (altitude 120m) of the Upper Tertiary Barreiras Formation (Moreira, 1977) that extends north of Manaus.

The three localities from which *M. averyi* is known, and where it is frequent (Barbara Zimmerman, *in litt.*), are on terra firme (never flooded) forest. This type of environment has been much less explored than the more easily accessible juxta-fluvial varzea (seasonally flooded) forests; this probably explains the rarity of the species in collections and indicates a habitat preference. We may expect more finds of *averyi* as roads are opened in the terra firme. Such finds of subterranean snakes will be made more probable by the activity of resident collectors, instead of travelling expeditions. There is, then, little profit at present in trying to define precisely the geographical distribution of the species.



Localities of *Micrurus averyi*. 1, Type locality. 2, Reserva Ducke. 3, INPA-WWF Reserves.

ACKNOWLEDGMENTS

Barbara Zimmerman, in the course of her research on the ecology of reptiles and amphibians in Amazonas, has steadfastly provided extremely interesting materials. Dr. Carmen Lúcia Cordeiro generously loaned the Butantan specimens, that are part of her own research on *Micrurus*. Ernest E. Williams, Charles W. Myers and W. Ronald Heyer have criticized the manuscript.

REFERENCES

- Aguilar, B. D., 1942. Trabalhos da Comissão Brasileira Demarcadora de Limites — Primeira Divisão — nas fronteiras da Venezuela e Guianas Britânica e Neerlandesa, de 1930 a 1940. Anais do IX Congresso Brasileiro de Geografia 2: 202-375.
- Brongersma, L. D., 1967. Poisonous snakes of Surinam. Mem. Inst. Butantan 33 (1) (1966): 73-79.
- Hoge, A. R. & S. A. R. W. D. L. Romano, 1971. Neotropical pit-vipers, sea snakes and coral snakes, Chapter 30, p. 211-293 in W. Bücherl & E. E. Buckley (eds.) Venomous animals and their venoms, vol. 2, Venomous Vertebrates. New York, London: Academic Press. 3 vols.
- Hoge, A. R. & S. A. Romano, 1973. Sinopse das serpentes peçonhentas do Brasil. Mem. Inst. Butantan 36 (1972): 109-208.
- Hoge, A. R. & S. A. R. W. L. Romano-Hoge, 1981. Sinopse das serpentes peçonhentas do Brasil (2.^a ed.). Mem. Inst. Butantan 42/43 (1978/79): 373-496.
- Hoogmoed, M. S., 1979. The herpetofauna of the Guianan Region, Chapter 10, p. 241-279, in W. E. Duellman (ed.), The South American herpetofauna: its origins, evolution and dispersal. Lawrence: Monograph of the Museum of Natural History, The University of Kansas, 7.
- Klauber, L. M., 1941. Four papers on the applications of statistical methods to herpetological problems. I. The frequency distributions of certain herpetological variables. Bull. Zool. Soc. San Diego 17: 1-31.
- Marx, H., 1958. Catalogue of type specimens of reptiles and amphibians in Chicago Natural History Museum. Fieldiana (Zool.) 36 (4): 409-496.
- Moore, G. M. (ed.), 1970. Poisonous snakes of the world. A manual for use by U. S. amphibious forces. Washington: Department of the Navy, Bureau of Medicine and Surgery (Navmed P-5099).
- Moreira, A. A. N., 1977. Relevô, p. 1-38 in Geografia do Brasil, vol. 1, Região Norte. Rio de Janeiro: Fundação Instituto Brasileiro de Geografia e Estatística.
- Roze, J. A., 1967. A check list of the New World venomous coral snakes (Elapidae), with descriptions of new forms. Amer. Mus. Novit. 2287: 60 p.
- Roze, J. A., 197. *Micrurus* Wagler, p. 196-220 in J. A. Peters & B. Orejas-Miranda, Catalogue of the Neotropical Squamata Part I, Snakes. U. S. Nat. Mus. Bull. 297.
- Roze, J. A., 1983. New World coral snakes (Elapidae): a taxonomic and biological summary. Mem. Inst. Butantan 46 (1982): 305-338.
- Schmidt, K. P., 1939. A new coral snake from British Guiana. Zool. Ser. Field Mus. Nat. Hist. 24 (6): 45-47.

