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Snakes of the genus *Oxyrhopus* (Colubridae: Squamata) in Colombia: taxonomy and geographic variation

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ABSTRACT

Four species of Oxyrhopus *occur in Colombia, one* (O. leucomelas) *of which is Andean and the other three occur in lowlands. No geographic variation was detected in* O. occipitalis *but there is marked geographic variation in color pattern and scutellation for the widely distributed* O. petola. *Recognition of subspecies within* O. petola *is possible but appears to obscure more than it illuminates. The snake previously reported as* O. melanogenys *or* O. *aff.* melanogenys *is diagnosed as a previously unrecognized species.*

Keywords: Geographic variation; New species; *Oxyrhopus.*

INTRODUCTION

The current taxonomy of snakes of the genus *Oxyrhopus* was established largely by Bailey's accounts and keys to *Oxyrhopus* published in Peters & Orejas' (1970) catalogue. Either explicitly or implicitly, Bailey reported *O. formosus, O. leucomelas,* and *O. petola* (all three subspecies) for Colombia. There have been no subsequent studies published of specimens of Colombian *Oxyrhopus* although two reports of museum listings (without critical study of the specimens themselves) have appeared (Perez Santos & Moreno, 1988; Sánchez *et al.,* 1995). These two papers reported the same taxa as reported by Bailey but added *O. melanogenys* as well. These three publications provide only the merest of information about species distributions and nothing about individual (or populational) variation, aspects that are central to the present contribution. Color illustrations (without data other than collection locality) are available for Colombian specimens of *Oxyrhopus leucomelas* (Campbell & Lamar, 1989, 2004) and *O. petola* (Renjifo & Lundberg, 1999).

Published specimen-based studies for adjacent countries (Dixon & Soini, 1977, 1986; Duellman, 1978, 2005; Savage, 2002; and Zaher & Caramaschi, 1992) suggest that a critical review of specimens of Colombian *Oxyrhopus* is needed. There was once (Niceforo María, 1942) active study of snakes preserved in Colombian collections but such activity largely ceased around 1970 although the collections themselves grew in volume.

The four species of *Oxryhopus* known for Colombia include two (*O. leucomelas* and *O. petola*) for which taxonomic problems are minimal and two others having accumulated literature as *O. formosus* (when the Colombian specimens appear to be *O. occipitalis*) or as *O. melanogenys* (when the snake appears to be undescribed; in the text, prior to its formal description, I identify it as *O. "melanogenys"*).

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Snakes of the genus *Oxyrhopus* are mostly banded (termed coralsnake mimics by Campbell & Lamar, 1989, 2004) but at least two species (*O. melanogenys* and *O. occipitalis*) are red snakes with some head and/or nape dark bands (although some specimens of *O. melanogenys* have body bands). *Oxyrhopus petola* may be so completely melanistic that inexperienced persons confuse them with adult *Clelia clelia* (which does not exhibit preocular-frontal contact). In my survey of Colombian collections, I found *O. occipitalis* confused with juvenile *Clelia clelia* and with *Pseudoboa neuwiedii* and found melanistic *O. petola* confused with *Clelia.*

MATERIALS AND METHODS

Using material from ten Colombian institutions (Colección de Zoología, Universidad de Tolima [CZUT], Instituto Alexander von Humboldt [IAvH, formerly the collection of INDERENA], Instituto de Ciencias Naturales [ICN], J. von Neumann (JVN], Museo Herpetológico, Universidad de Antioquia [MHUA], Museo de La Salle [MLS], Museo de Historia Natural de la Universidad de Cauca [UC], Museo Universidad Javeriana [MUJ], Museo de la Universidad Industrial de Santander [UIS], and Museo de la Universidad de Valle [UVC]), I located 272 specimens of *Oxyrhopus* with at least locality data. From these specimens, scale counts, measurements, sex, maturity, location of the umbilicus (when neonates), and characters of color patterns were collected by me. Lengths of pale and dark body bands were measured in scale lengths along the vertebral scale row. Aside from males with everted hemipenes, all specimens were sexed by dissection of the base of the tail. When sample size permits, all means are reported as ± 1 standard error of the mean to facilitate simple significance tests. My simple significance tests consist of using twice the S.E. to approximate the 95% confidence intervals of the mean.

Characters pertinent to identification

Scutellation

Oxyrhopus have smooth scales with a pair of apical pits and exhibit a posterior reduction in scale row number (by two rows). The anal scute is entire. Subcaudals are paired.

Scale row formulae: Aside from the montane species, *O. leucomelas,* and unusual specimens of other species with only 18 scale rows on the neck, there are 19 scale rows on the nape as well as at midbody (curiously reported as 17 rows by Duellman, 2005, surely a victim of cut and paste) reducing to 17 (occasionally 16) rows anterior to the vent in most *Oxyrhopus* by means of the loss of scale row 4 or the fusion of 3 + 4 at about ventral scute 113 to 150. *Oxyrhopus leuucomelas* has 17-17-15 dorsal scale rows.

Number of supralabials and infralabials: Three Colombian *Oxyrhopus* have long heads whereas *O. leucomelas* has a shorter head (Fig. 1) and this affects the number of labial scales. Excepting *O. leucomelas,* supralabials are normally 8 with 4 and 5 entering the orbit (rarely 9, with 5 and 6 entering the orbit, but not bilaterally). Excepting *O. leucomelas,* there are normally 10 infralabials with 1-6 in contact with the chin shields.

Contact between preoculars and frontal scale: The preoculars may exhibit sutural contact with the frontal or be separated from the frontal (Fig. 2). This character was used by Bailey to separate species as well as to characterize one subspecies of *O. petola* as different from the other two subspecies. In order to score individuals, I generated a range of combinations (from each preocular well separated from the frontal to sutural contact with deformation [shape change] of the frontal on each side. Non contact between the preoculars and frontal is seen in combinations 1-2 as well as asymmetrically in combination 3; combinations 4-5 include various degrees of symmetrical contact). *Oxyrhopus leucomelas, O. occipitalis,* and Middle American populations of *O. petola "sebae"* are characterized partially by combinations 1 and 2.

Number of ventral and subcaudal scutes: These meristic data were collected routinely but are rarely used for species discrimination (but, see Dixon & Soini, 1977; Duellman, 2005; Zaher & Caramaschi, 1992) because of sexual dimorphism and the frequency of specimens with incomplete tails.

Coloration

Ontogenetic changes in color pattern: Oxyrhopus occipitalis exhibits the most dramatic changes. Young specimens have a yellow head and the body is banded black and nearly white whereas in adults, the snout is yellow, the rest of the head is black, and the body and tail red (all red scales with black tips). Partially grown individuals exhibit the adult pattern but with faint retention of the juvenile banded pattern concealed by the red pigment. Ontogenetic variation in *O. petola* is less marked, consisting of black and yellow-white

bands in juveniles versus black and red bands in adults. With an increase in size, the pale bands (beginning posteriorly and extending anteriorly) become orange and lastly red. The other two species do not exhibit comparable ontogenetic variation in patterns. Bailey (1970: 233) mentioned (and this is often repeatedly uncritically in more general accounts of color pattern in *O. petola*) that large individuals of *O. petola digitalis* are "often completely melanistic." That is not the case as concerns the 17 *O. petola "digitalis"* (from Colombia) here examined whereas uncommonly, *O. petola "petola"* is sufficiently melanistic to obscure completely the banding pattern (ICN 6767, 10971, and 11064) and two specimens of *O. "melanogenys"* examined in this study are so melanistic that only the orange bands are evident. The other Colombian *Oxyrhopus* normally (or always) exhibit a banded color pattern with only minor ontogenetic variation.

However, in one neonate (ICN 11007) of *O. petola* that hatched soon after the egg was found beneath a pile of African Palm fronds, the pattern consists of a single vertebral pale stripe from the nape to just anterior to the vent (1 scale wide). Another neonate (MLS 1374) has the first $4^1/_2$ dorsal body bands fused to form a pale longitudinal stripe (1 scale wide), after which, the pattern reverts to dark dorsal bands ($64^1/_2$ on body, $30^1/_2$ on tail). Such striped *Oxyrhopus*

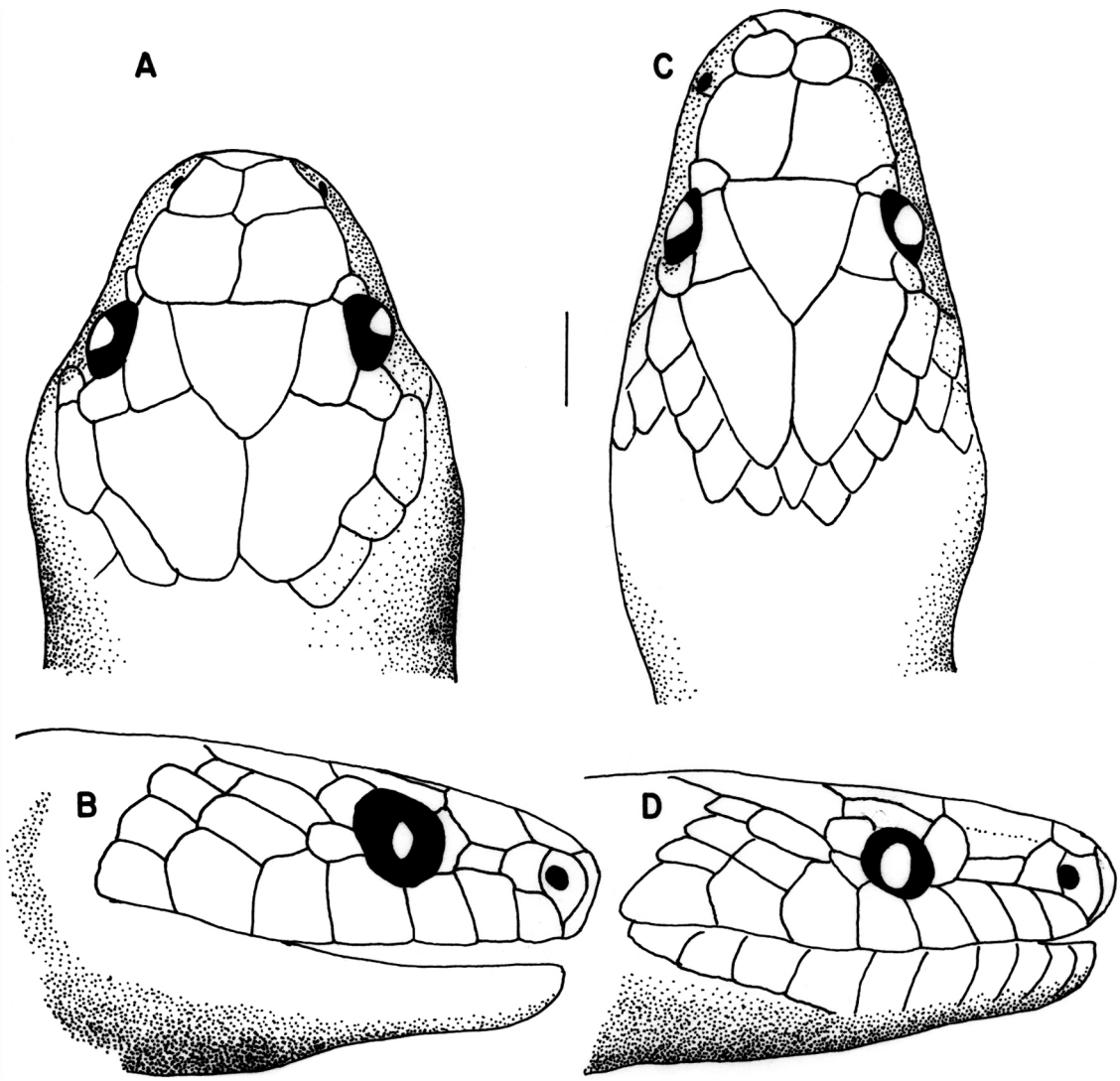

FIGURE 1: Dorsal and lateral views of heads of (A-B) *Oxyrhopus leucomelas,* ICN 10025, and (C-D) *Oxyrhopus vanidicus,* ICN 10789. Scale equals 5 mm.

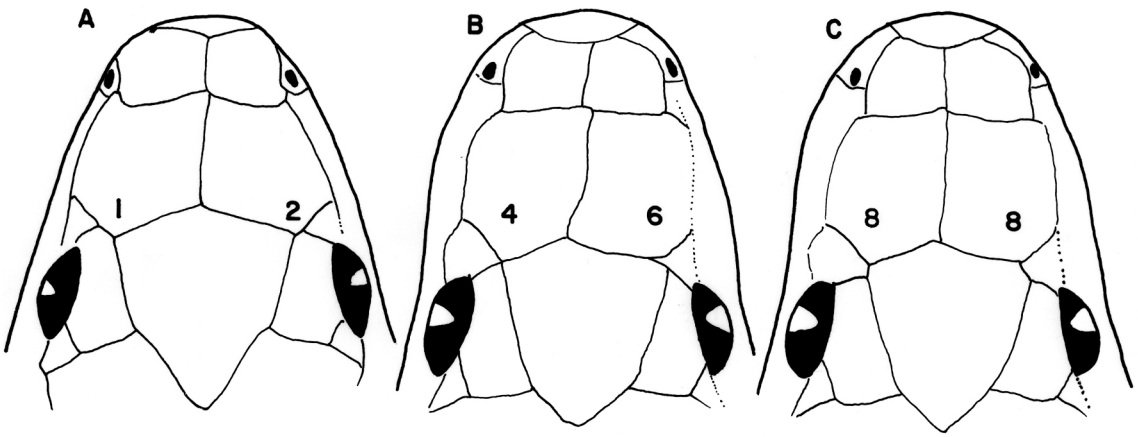

FIGURE 2: Dorsal views of heads of snakes of the genus *Oxyrhopus* illustrating combinations of contact (or lack thereof) between preocular and frontal scales. (A) Scores of 1 (left side) and 2 (right side); (B) Scores of 4 (left side) and 6 (right side); (C) Score of 8. Snakes with scores of 2 and 4 or 2 and 8 were classed as score 3. Snakes with scores of 4 and 8 were classed as score 5. Those with scores of 6 and 8 were classed as score 7.

are not found in the sample of adults, suggesting that these variants are eliminated by natural selection.

Presence of triads: Triads (a sequence of black-white-black-white-black limited by a partial or dorsally complete orange band) occur in one species of *Oxyrhopus* from Colombia. Using the orange divisions of triads as markers, the more anterior orange divisions on a snake are confined to small patches on the lowest scale rows and do not form complete dorsal bands. As one proceeds posteriorly, the orange blotches become progressively larger and eventually join the blotch on the opposite flank to form a complete band dorsally (Fig. 3). This sort of triad border is markedly different from that seen in *O. guibei* (Campbell & Lamar, 2004, plate 1212), some *O. melanogenys* (Campbell & Lamar, 2004, plate 1216), or *O. trigeminus* (Campbell & Lamar, 2004, plates 1225-26) where the red bands are complete dorsally all along the body.

Number of dark body bands and degree to which these encroach upon venter: Dark body bands vary in number ($10^1/_2$ to 72) in Colombian *Oxyrhopus.* Usually, the last dark body band overlaps the vent. In *O. leucomelas,* the dark bands completely encircle the body whereas, in the other species, the encroachment of dark bands onto the ventral scutes is limited to the lateral edges of the ventral scutes as well as the subcaudal scutes or is complete across the ventral surfaces under the tail. In the species having triads, dark blotches extend substantially onto the ventral scutes (reaching or nearly reaching the midline) but normally only on the posterior one-half of the snake.

Lengths of dark body bands: In *Oxyrhopus petola,* dark body bands exhibit different lengths along the length of the body, being longer anteriorly and shorter posteriorly. This is true as well for the snakes from the Llanos where one sees a high number of body bands (and, as a consequence, a reduction of length variation). The differences between triads in *O. "melanogenys"* and *O. guibei, O. melanogenys,* and *O. trigeminus* suggests that what constitutes a dark body band in *O. "melanogenys"* includes the orange spots (or band) forming the triad border. If one does so and then measures the length of the dark bands in terms of the number of scale lengths along the vertebral scale row (even when the orange band is complete dorsally), the dark body bands have a more complex arrangement (an alteration of long-short-long with the invasion by orange (producing a triad border) occurring in even-numbered dark body bands. Of the 172 pairs of adjacent dark body bands in *O. "melanogenys",* only seven pairs were of equal lengths (that is, were the same number of scale lengths long).

Lengths of pale interspaces (excluding the orange bands of the species with triads): Bailey (1970) used the lengths of the pale interspaces on the posterior part of the body as a character useful in detecting geographic variation in *O. petola.* My collection of these data (for all four species in Colombia, when pale bands are evident) consists of recording these lengths at three points along the length of the body (between dark bands on the neck, at midbody, and anterior to the vent) so as to evaluate differences associated with

geography and taxonomy as well as to quantify intra-body variation.

Size and proportions: I recorded snout-vent length and tail length (when the tail was complete) for all specimens examined. From these data, maximum sizes were estimated and relative tail length (as a % of total length) calculated. This proportion is of little value as it reflects the number of pairs of subcaudal scales (Fig. 4) and the two variables are very tightly correlated.

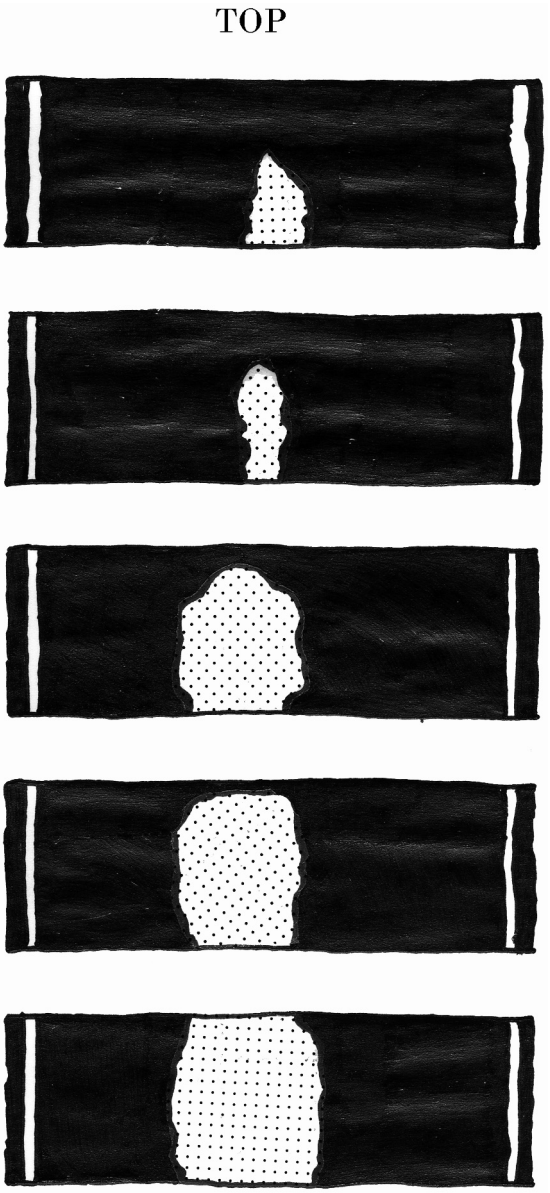

FIGURE 3: Lateral views of schematics of the color pattern in *Oxyrhopus "melanogenys"* focused upon the triad boundaries. From top to bottom, these are the first through fifth triad borders in ICN 260. Orange pigment is stippled.

Position of the umbilicus: In neonates (either because they were hatched from clutches found in the field or because the snake retains its umbilicus), the position of the umbilicus was scored in terms of ventral scute count. The umbilicus occupies two or three ventral scutes and is located at scutes 161-162 to 184-186 in the 29 neonates for which the variable was scored (*O. "melanogenys"* and *O. petola*). Sexual dimorphism (in umbilicus position) was not detected. In *O. petola,* the umbilicus is located between scutes 164-166 and 184-186, with a weak mode between scutes 169-174. In *O. "melanogenys",* it is located between scutes 161-162 and 166-168.

RESULTS

Four species of *Oxyrhopus* can be recognized among the materials housed in Colombian museums. Geographic variation is very noticeable in one of these within Colombia (*O. petola*) but not in the other three species.

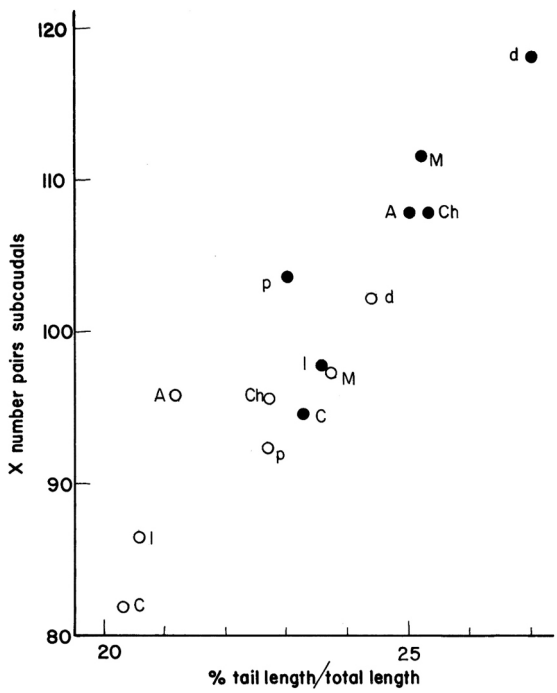

FIGURE 4: Relationship between tail length (as % of total length) and mean number of pairs of subcaudal scales in *Oxyrhopus petola.* Solid symbols (males) and open symbols (females). Populations are identified by letters: d = *O. petola digitalis,* p = *O. petola petola.* Letters in capitals refer to subdivisions of trans-Andean populations: A = Upper Río Cauca valley, C = Caribbean coast, Ch = Chocó, I = Magdalena valley, M = Maracaibo Basin.

Key to Colombian species

1a. Dorsal scale rows 17-17-15; all dark body bands encircle body..... *O. leucomelas*
1b. Dorsal scale rows 19-19-17; dark body bands not encroaching onto ventral scutes, at least on anterior third of body.....2
2a. At least some dark body bands in form of triads ..... *O. vanidicus* sp. nov.
2b. Dark body bands, when present, not forming triads.....3
3a. Snout (of adults) or head (of juveniles) yellow... ..... *O. occipitalis*
3b. Snout (of all ages) black ..... *O. petola*

Species Accounts

***Oxyrhopus leucomelas* (Werner)**

Specimens examined: COLOMBIA. (13). Antioquia, Anorí: vereda El Retiro, finca El Chaquiral, 1732 m, MHUA 14339. Boyacá, Garagoa: vereda Cienaga Valvanera, reserva El Secreto, 2250 m, 5°08'N, 73°17'W, MUJ 324, Km 45 carretera Garagoa-Miraflores, ICN 11289. Pajarito: Corinto, quebrada La Colonera, 1620 m, ICN 1371. Cauca, Inza: casco urbano, 1400 m, MHNUC 553, a 5 kms de Inzá, finca La Ceja, 1800 m, MHNUC 250. Chocó, San José del Palmar: bajando de El Boquerón, 20.5-22.5 km de El Cairo, Valle del Cauca, 2150-2200 m, UVC 12179, 10.5 km E San José del Palmar, 1700 m, UVC 12191. Huila, Belén: 2200 m, MHNUC 252. Garzón: vereda Villa Rica, finca La Esperanza, 1800 m, IAvH 4155. Putumayo ["Nariño"], Jardín de Sucumbios: territorio Kofan, alto ríos Rumiyaco-Ranchuria, "700-1000" m, 00°30'N, 77°14'W, IAvH 4930. Risaralda, Mistrató; camino Jaguados, ICN 11288. Pueblo Rico: Km 17 via Villa Claret, quebrada Santa Helena, 1540 m, ICN 10025.

This is the only species of *Oxyrhopus* in Colombia having complete body bands but also is distinctive for having fewer scale rows (17, reducing to 15). The species was described from the Cañon de Tolima (near Ibagué, Tolima) and the misplaced holotype is certainly a female (based on the tail length/total length proportion). Downs (1961) reported three other specimens (two topotypes as well as another from Moscapan, Huila) that I have not examined but these specimens are males (as reported by Downs or as inferred from the ratio of tail length to total length). I examined thirteen specimens from Colombian museums (and when combined with the four specimens reported by Downs, 1961), males have fewer ventrals and more subcaudals than do females (Table 1). This species has either 7 or 8 supralabials with both 3 and 4 or 4 and 5 entering the orbit (as reported by Downs, 1961). The source of variation is a vertical division of the third supralabial to produce two half supralabials. Infralabials are 7-7 or 8-8 (with 1-4 or 1-5 [in one case, 1-3 and 5, UVC 12179] contacting the chin shields). Temporals are 2 + 3 or 2 + 2 (by fusion of two posterior temporals, this difference is seen between individuals and within single individuals [ICN 1371 and UC 553]). Scale row reduction occurs in various ways: in most specimens by means of loss of row 4 but occasionally by loss of row 5. In some cases, the reduction appears to be accomplished by fusion of scale rows 4 and 5. Reduction occurs at ventral scute 109 to 159 based on specimens examined by me. The four specimens examined from the Cordillera Occidental have reductions occurring at ventral scutes 130-159 (mean 142.8) whereas three examined from the Cordillera Central have reductions at ventral scutes 109-147 (mean 129.5) and two from the Cordillera Oriental at ventral scutes 110-122 (mean 118.2). Downs (1961) reported the position of reduction for a specimen from Moscopan, Huila (C. Central) at scutes 124 and 126. Given these limited data, there may be geographic variation in the position of scale row reduction in this species.

Combining my data with those given by Downs (1961), *O. leucomelas* has $17^1/_2$ to $33^1/_2$ (mean 27.4 ± 1.1) dark body bands and $13^1/_2$ to $21^1/_2$ (mean 15.9 ± 0.6) dark bands on the tail. Dark bands are either of equal length at midline and low on the body or much longer at the midline than low on the body. Dark body bands are 3-$5^1/_2$ scale lengths long and pale interspaces are $1^1/_2$ to $2^1/_2$ scale lengths long. Although the sample of females is very small, there may be sexual dimorphism in the number of dark body bands (Table 1). *Oxyrhopus leucomelas* remains a rare snake in collections, however in three males from the Cordillera Occidental there are $27^1/_2$-$30^1/_2$ dark body bands whereas in six males from the Cordillera Central there are $17^1/_2$-33 bands and in three males from the Cordillera Oriental, there are $23^1/_2$-27 bands, suggesting some geographic variation in number of dark body bands, at least in males.

This is the smallest *Oxyrhopus* found in Colombia. The largest male (UVC 12179) is 722 mm in total length and the largest female (ICN 10025) is 701 mm in total length. Males have longer tails than do females: tail/total length is 25.1-29.1 (mean

TABLE 1: Variation in ventral scute and subcaudal scute counts and dark body blotches[1] in *Oxyrhopus* from Colombia. First line reports range of the variable and sample size; second line reports the mean ± 1 Standard Error of Mean.

Species	Sex	Ventrals	Subcaudals	Dark body bands
O. leucomelas	MM	183-201 (13)	81-102 (12)	17½-33 (13)
		191.9 ± 3.4	91.2 ± 3.4	26.2 ± 1.2
	FF	194-201 (4)	72-83 (4)	28½-33½ (4)
		201.8	79.2	31.5
O. occipitalis	MM	183-198 (7)	84-92 (6)	14 (2)
		188.7 ± 2.1	88.3	
	FF	189-201 (15)	71-79 (14)	19 (1)
		196.0 ± 0.8	75.2 ± 0.6	
Oxyrhopus petola				
Amazonia	MM	207-218 (8)	110-126 (8)	10½-14½ (8)
		212.1 ± 1.1	118.0 ± 2.3	12.2 ± 0.5
	FF	200-222 (9)	86-110 (9)	11½-13½ (9)
		211.7 ± 2.0	102.0 ± 2.6	13.4 ± 0.9
Chocó	MM	202-213 (8)	105-113 (7)	15½-23½ (8)
		207.6 ± 1.6	107.7 ± 2.1	18.4 ± 1.0
	FF	202-215 (7)	92-104 (6)	13½-22½ (7)
		210.1 ± 3.1	95.5	17.7 ± 1.0
Llanos	MM	193-213 (19)	96-109 (18)	25½-72 (30)
		202.3 ± 2.7	103.6 ± 1.9	48.4 ± 2.1
	FF	191-216 (19)	84-101 (18)	36½-64½ (18)
		207.6 ± 3.2	92.2 ± 2.2	50.5 ± 2.1
Caribbean coast and inter Andean valleys	MM	194-215 (48)	91-114 (43)	16½-38½ (52)
		203.7 ± 0.6	98.6 ± 0.7	25.7 ± 0.7
	FF	193-215 (40)	77-99 (35)	17½-34½ (33)
		205.9 ± 0.8	86.8 ± 1.2	25.9 ± 0.8
O. vanidicus	MM	180-197 (22)	77-92 (21)	12½-22½ (20)
		189.0 ± 1.7	85.8 ± 1.8	15.9 ± 0.6
	FF	180-204 (16)	74-91 (13)	12½-25½ (16)
		193.7 ± 3.7	80.7 ± 3.0	16.3 ± 0.8

[1] Dark body blotches in *O. occipitalis* were counted for juveniles or adults exhibiting paedomorphic bands and for *O. vanidicus* are counted including the "triad" border within the dark body band (see text and Fig. 3 for the argument in favor of doing so).

27.4 ± 0.4)% in nine males and 20.6-23.0 (mean 21.9)% in three females.

The distribution of the species in Colombia is entirely Andean (Fig. 5), in the cloud forests of all three cordilleras at elevations between 1400 and 2250 m. A record from Norte de Santander (Perez Santos & Moreno, 1988) has not been verified but appears to be the Santa Rita located between the municipalities of Arboledas and Salazar.

Oxyrhopus occipitalis (Wagler)

Specimens examined: COLOMBIA. (23). Amazonas, Leticia: Reserva Aguasclaras 4°07'S, 70°01'W, ICN 10544; corregimiento Tarapacá, via al aeropuerto, finca Las Flores, ICN 10746. Puerto Nariño: P.N.N. Amacayacu, IAvH 3075. Boyacá, Otanche: territorio Vásquez, MLS 1377, 1387. Puerto Boyacá: ICN 11067. Quípama ["Muzo"]: Humbo, MLS 1376. Caquetá, "Florencia: Yarayacu" [= Yurayaco, municipality of San José del Fagua] IAvH 3375. Solano: Puerto Abeja, río Mesay, southern edge PNN Chiribiquete, 240-350 m, ICN 11381; Tres Esquinas, MLS 1228, 1380, 1839. Córdoba, Tierralta: Cerro Murrucucú, sector El Silencio, P.N.N. Paramillo, ICN 10453. Meta, Villavicencio: Pipiral, MLS 1837. Norte de Santander, Pamplonita: [El] Diamante, MLS 1375. Putumayo, Orito: vereda El Líbano 00°43'S, 77°06'W, 1050 m, ICN 10745. Santander, Cimitarra: Río Guaytavita [= Guayabito], 750 m, ICN 81. San Vicente [de Chucuri]: MLS 1382. Vaupés, Taraira: Lago Taraira, Estación Caparú, IAvH 4088-89, 3691, ICN 8150-51.

Bailey (1970: 232) mentioned that what he identified as *O. formosus* was a "complex of forms." He specifically implied that one species occurs in Colombia and the Amazon Basin whereas another was found in eastern Brasil and western Peru. Hoge *et al.* (1973) applied the name *O. occipitalis* to the former

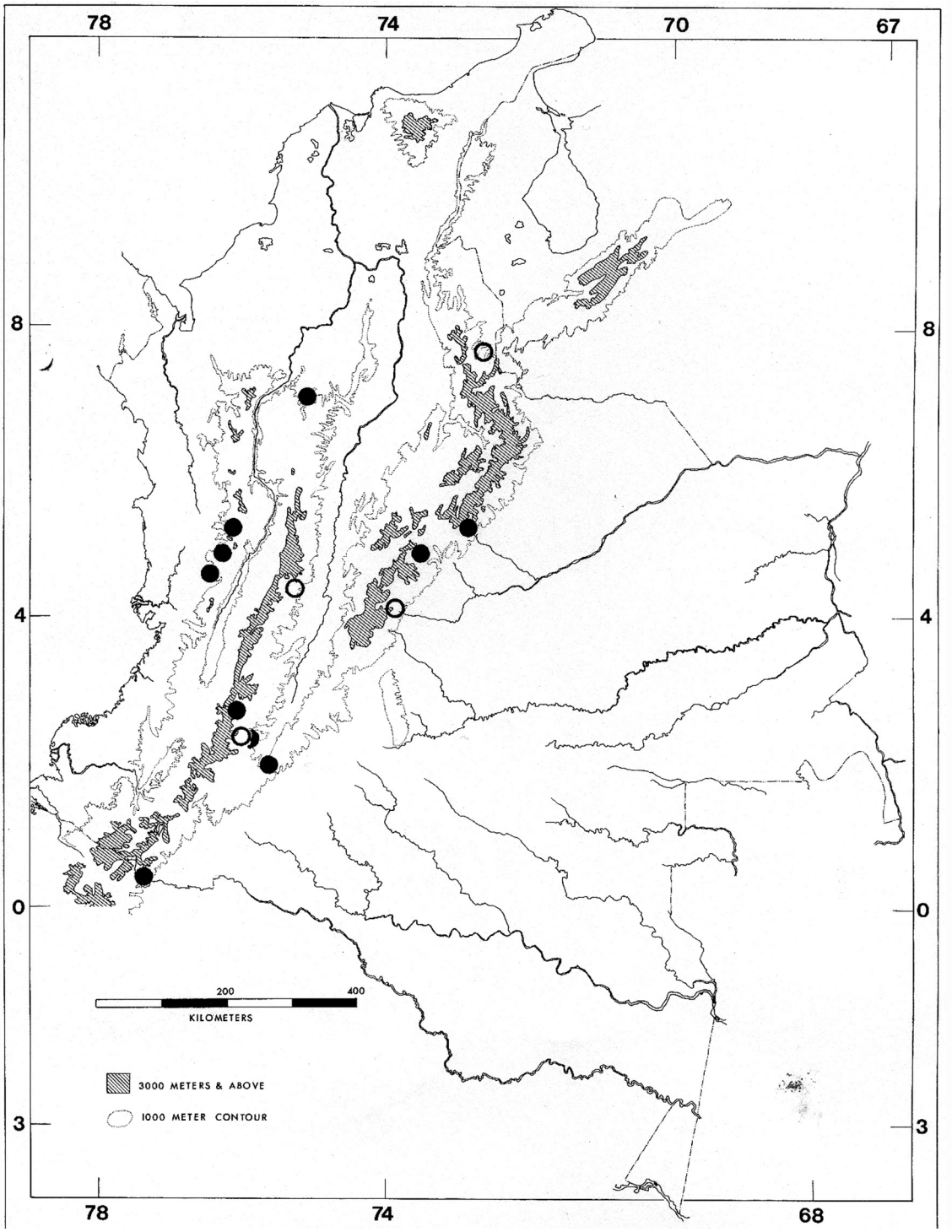

FIGURE 5: Distribution of *Oxyrhopus leucomelas* in Colombia. Open symbols represent literature records from Campbell & Lamar (1989, 2004), Downs (1961), and Perez Santos & Moreno (1988).

and restricted the name *O. formosus* to the populations in which adults are banded red and black. The species differences apparent based on Hoge *et al.* (1973) as well as Jorge da Silva (1993) are minimal and involve only color pattern where *O. formosus* appears to retain aspects of the juvenile coloration into adulthood whereas *O. occipitalis* exhibits strong ontogenetic change in color pattern. The distinction may have been premature to judge from character discordancies evident in color photographs available in Martins & Oliveira (1998). However, I use the name *O. occipitalis* for Colombian populations because they do not exhibit such discordancies and conform to the species concept of Hoge *et al.* (1973).

This is a very distinctive species within Colombia because of its ontogenetic variation in color pattern (juveniles have a yellow head with the body and tail banded black and yellow-white whereas adults have a yellow snout (extending to the suture between the prefrontals and frontal), rest of black head, and red body and tail [scale tips black]).

I have seen only three specimens exhibiting the juvenile pattern of dark body bands, two juveniles (MLS 1228 [male] and 1382 [female]) and one adult male (ICN 10453). Both males have 14 body bands and 9 tail bands; the juvenile female has 19 body bands and 9 tail bands. The most anterior dark bands are longer than those encountered at midbody or on the posterior part of the body (anterior bands 8-16 scale lengths long, others $4^1/_2$ to $8^1/_2$ scale lengths long). Pale interspaces are shorter than the dark bands but have a tendency to be longer more posteriorly (anterior pale interspaces 3-5 scale lengths long, posterior ones $4^1/_2$ to 6 scale lengths long). The banded color pattern of the adult male is a very faint banding. Even less evident banding is seen partially in other specimens (IAvH 3075, 3375, 4089, and ICN 81). In all of the adult snakes, the yellow snout is characteristic of *O. occipitalis* and none conforms to the descriptions of *O. formosus* (with more of the head yellow in adults).

The species is likewise distinctive (among lowland *Oxyrhopus*) in having a wide separation between the preocular scales and frontal (in 22 of 23 specimens examined). In terms of scutellation, males have fewer ventrals and more subcaudals than do females (Table 1). Ten specimens were examined for other scutellation features: all have 8-8 supralabials with 4 and 5 contacting the orbit, 9-9 infralabials with 1-5 contacting the chin shields) and 2 + 3 temporal scales (aside from ICN 8150 who has 2 + 2 temporals on one side and 2 + 3 on the other). Scale reduction involves the loss of scale row 4 at ventral scutes 123 to 144. For three specimens from the Middle Magdalena forests, reduction occurs at scutes 128-139 (mean 134.5) whereas for six from Amazonia, it occurs at scutes 123-144 (mean 131.9).

The largest male examined (MLS 1377) is 817 mm in total length and the largest female (ICN 10745) is 1108 mm in total length. Males have longer tails than do females: tail/total length is 22.7-25.3 (mean 24.4 ± 0.4)% in six males and 18.6-21.3 (mean 19.8 ± 0.2)% in 14 females.

In Colombia, *O. occipitalis* is distributed across the forested lowlands of Amazonia as well as in the forests termed the Middle Magdalena and within the Maracaibo Basin (Fig. 6). Given that I have seen only 23 specimens from Colombia, when these are divided among these three regions (and by sex), it is difficult to detect any geographic difference in scutellation; for the present, it appears that no geographic variation occurs among the distributional disjuncts separated by the Andean cordilleras.

Of these 23 individuals, only one (ICN 81, from Depto. Santander in the Middle Magdalena) was used explicitly in a publication (cited by both Perez Santos & Moreno, 1988, and by Sánchez *et al.* 1995). In each case, the authors incorrectly identified the specimen as *O. melanogenys,* a species not found outside of the Amazon Basin. This species was reported as well, using the combination *Pseudoboa bitorquata* by Niceforo María (1942: 96) from four localities/municipalities in Colombia. For three of these, I believe I have seen the specimens. Ayerbe González *et al.* (2007) reported *O. formosus* from two localities in western Colombia (Córdoba and Valle del Cauca). I located the specimen from Alto de Quimarí, Córdoba, 500 m (MHNUC 87) and it is a banded *Atractus* of what Passos *et al.* (MS) termed the *multicinctus* group.

What was reported as *Clelia bicolor* from northeastern Peru by Dixon & Soini (1977, 1986) is almost certainly *O. occipitalis,* accepting the scale count data in Dixon & Soini and contrasting those data with data for *C. bicolor* from Brasil (Franco *et al.,* 1997), as well as based on the color description. The specimens reported as *O. formosus* from eastern Ecuador (Duellman, 1978) are *O. occipitalis,* based on the color description provided.

Oxyrhopus petola (Linnaeus)

Specimens examined: COLOMBIA. (192 + 5). No data: ICN 2702-03, 6681, IAvH 815, UVC 6527. Amazonas, Leticia: IAvH 849, 1469, MLS 693, 1224, 2087, 2290, aeropuerto, IAvH 1463-64; La

Chorrera, Río Igará-Paraná, ICN 6448; Los Limones, Km 21 carretera Leticia-Tarapacá, 4°03'S, 69°59'W, 125 m, ICN 10560; corregimiento La Pedrera, Río Mirita-Paraná, Centro Providencia, 175 m, ICN 11290, Puerto Rastrojo, IAvH 1911. Puerto Nariño: IAvH 3684. Antioquia, Anorí: Proyecto Porce II, El

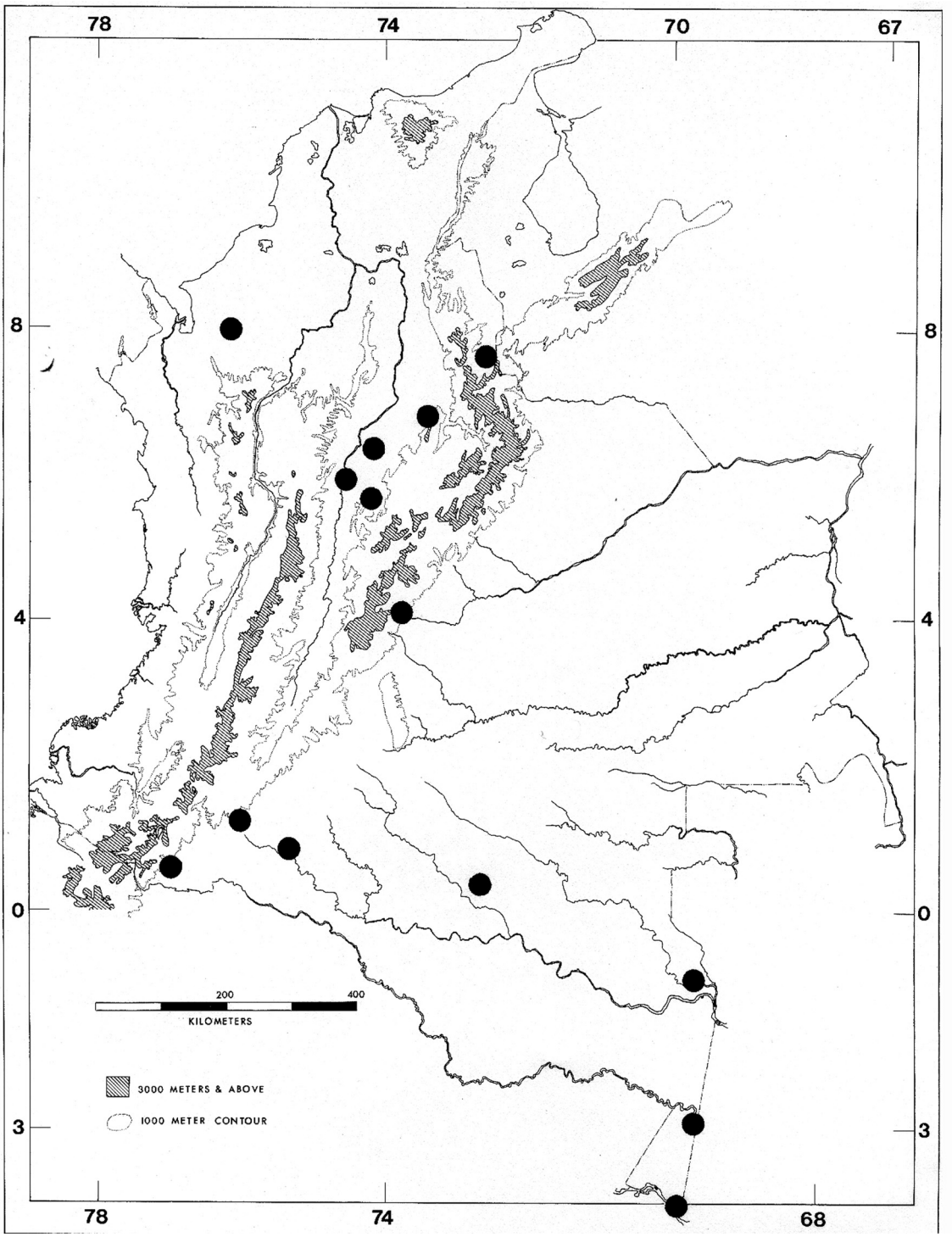

FIGURE 6: Distribution of *Oxyrhopus occipitalis* in Colombia.

Hueso, 6°48'N, 75°09'W, MHUA 14117; vereda Primavera, Porce III, quebrada Gualanday, 875 m, MHUA 14561; vereda El Roble, MHUA 14412. Campamento: MLS 2086, 2088. Cocorná: vereda La Granja, autopista Medellín-Bogotá, MHUA 14217. Dabeiba: campamento Ingeominas Río Amparradó, 805 m, ICN 1858. Sabanalarga: MLS 1370. San Roque: corregimiento San José del Nus, quebrada La Vega, 848 m, MHUA 14188. San Vicente: Las Hojas, MLS 2397. Santa Barbara: inspección de Policía La Pintada, MHUA 14004. Segovia: MLS 1371-73. Urabá: Turbo, ICN 1909, MLS 1369. Yarumal: MLS 1808-10. Yolomó: finca Normandia, 1051 m, MHUA 14467. Arauca, Arauca: casco urbano, MLS 2033. Arauquita: Caño Limón, ICN 6767, 6780-81, 6783. Tame: sabana alrededores casa Hato Matarrala, IAvH 56. Boyacá, Otanche: MLS 1384. Puerto Boyacá: Puerto Romero (Las Quinches), ICN 7890. Santa María, carretera a La Almenara, ICN 10655-56. Sutatenza: MLS 1390, 2024. Caquetá, Florencia: MLS 1360. Solano: Tres Esquinas, MLS 1361. Caldas: MLS 1364, Anserma: vereda La Alejandra, Hacienda Canoas, MHUA 14466. La Merced: MLS 1837. La Victoria: vereda La Pradera-Cacerio, 750 m, MHUA 14185. Cauca, El Tambo: Hacienda Las Torres, Río San Joaquin, 1200, MHNUC 42; Santa Rita, quebrada Pocitos, 400 m, MHNUC 325. Guapí: Bocas del Napí, 95 m, JVN 336. Cesar, Rio de Oro: vereda El Gitamo, 1300-1500 m, 8°19'N, 73°25'W, ICN 11493. San Alberto: vereda Miramar, 715 m, 7°54'N, 73°24'W, ICN 11471, 11479. Chocó, Acandí: corregimiento Ungía, IAvH 2017. Nuquí: Coquí, quebrada Bejuquillos, 0 m, MHUA 14535. Riosucio: vereda Sautatá, IAvH 2007. Córdoba, Monteria: MLS 2393, 2407; Caño Betancí, ICN 445. Lorica: Nariño, vda Ceiba Pareja, ICN 10347. Tierralta: Escuela Km 13, 346 m, MHUA 14329; Represa de Urrá, ICN 8404, 8474-75. Cundinamarca, Guayabetal: Río Negro, ICN 11284. Medina: ICN 6885. Paime: MLS 1383. San Antonio del Tequendama: Santandercito, MUJ 49. Sasaima: MLS 1365-67, 1893, 1984, 2589. Guaviare: San José de Guaviare: vereda Playa Güio, Laguna Negra, brazo de caño Negro, ICN (not catalogued, HRM 173). Huila: MLS 1363. Meta, Acacias: vereda La Esmeralda, centro Agroturistica Araguaney 3°56'N, 73°42'W, ICN 10576. La Macarena: Serranía de La Macarena, sur, caño Pava, ICN 368. Lejanías, vereda El Jardín, cerca Alto de la Mecha, 780 m 3°35'N, 74°05'W, ICN 11060-61, 11064. Puerto Gaitán: Inspección de Policía El Porvenir, UVC 5375. Restrepo: estación UniLlanos, ICN 7116. San Juan de Arama: finca Saravita, IAvH 935, 982. San Martín: vereda La Casteñada 3°35'N, 73°35'W, ICN 10954-55, 10971, 10982, 11003-13. Villavicencio: casco urbano, ICN 2715, 2997, 7065-67, 7121, 8305, 8307-08, 8320, MLS 681, 1336-50, 1374; Km 9, carretera Villavicencio-Puerto López, ICN 7122; Río Ocoa, MLS 1229; vereda El Carmen, Caño Blanco, MUJ 726. Norte de Santander, El Zulia: Astilleros, MLS 1362, 1381, 1386. Quindío, Montenegro: Isla Esmeralda, ICN 11285. Risaralda, Pereira: MLS 171, 1771-72; vereda La Virginia, finca Guaymaral, 1065 m, 4°54'N, 75°49'W, MUJ 486. Santander, Bucaramanga: casco urbano, ICN 6511-12, UIS 22, 558, 1730. Carmen de Chucuri: La Peña-Alto Cascajales, 1075 m, 6°38'N, 73°33'W, MHUA 14169. Cimitarra: entre Landázuri y Río Carare, 750 m, ICN 89. Floridablanca: casco urbano, UIS 1222, 1728. Girón: parque industrial via Chimitá, UIS 1406. Lebrija: vereda La Fuente, granja Villaluz, UIS 1732. Piedacuesta: casco urbano, UIS 1729; valle Riutoque, finca Sorento, UIS 1293. Rionegro: parque ecológico El Portal, UIS 1236. Sabana de Torres: vereda Km 36, 140 m, 7°22'N, 73°36'W, ICN 11277. San Vicente de Chucurí: MLS 1368. Sucre, Coloso: estación Primates, INDERENA, IAvH 3303. Tolú: Hacienda La Estancuela, sector El Bobo, IAvH 1902. Tolima, Ibagué: corregimiento El Totumo, finca El Cural, ca 800 m, CZUT 39. Mariquita: casco urbano, ICN 75. Valle del Cauca, Buenaventura: casco urbano, UVC 15407; corregimiento Pianguita 3°50'N, 77°12'W, UVC 14039, 15352; Estación Agroforestal "Bajo Tolima" de la Universidad de Tolima, ICN 11283, UVC 7628. Cali: campo Univalle, MLS 2321, 2350, UVC 5378, 6899-6901, casco urbano, UVC 6674, 7903, 8385. Dagua: casco urbano, UVC 6673; carretera Cali-Buenaventura, vecinidad Loboguerrero, ICN 11282; carretera vieja Cali-Buenaventura, La Elsa, UVC 7473. Darién: parcelación Los calimas, arriba de Lago Calima, 1590 m, UVC 15659. La Cumbre: Chicoral, UVC 9616; corregimiento Lomitas, ca 1700 m, UVC 7897. Palmira: vereda La Trocha, Bolo San Isidro, Km 9 carretera Palmira-Candelaria, UVC 7682, 7993. Restrepo: campamento Río Azul, ICN 10846. Tulúa: casco urbano, 1050 m, UVC 7452. Yumbo: casco urbano, UVC 5376. Vaupés, Mitú: ICN 251; Taraira: Lago Taraira, Estación Caparú, ICN 8169. Vichada, Cumaribo: P.N.N. Tuparro, centro administrativo, UVC 5377; Río Vichada, ICN 2583. Puerto Carreño: reserva Natural Bojonawi, cerca 2 km S Puerto Carreño, MUJ 784.

In Colombia, this snake is widely distributed across the lowlands and exhibits much less forest fidelity than do the other species of *Oxyrhopus* in Colombia (Fig. 7). *Oxyrhopus petola* is equally common

in areas that once were forested by dry tropical forest as well as in areas of humid lowland forest. The species, in Colombia, can be fragmented (for purposes of analysis) into (1) populations associated with the eastern Llanos, (2) those in the Amazonian forests, (3) those of the wet lowlands of the biogeographic

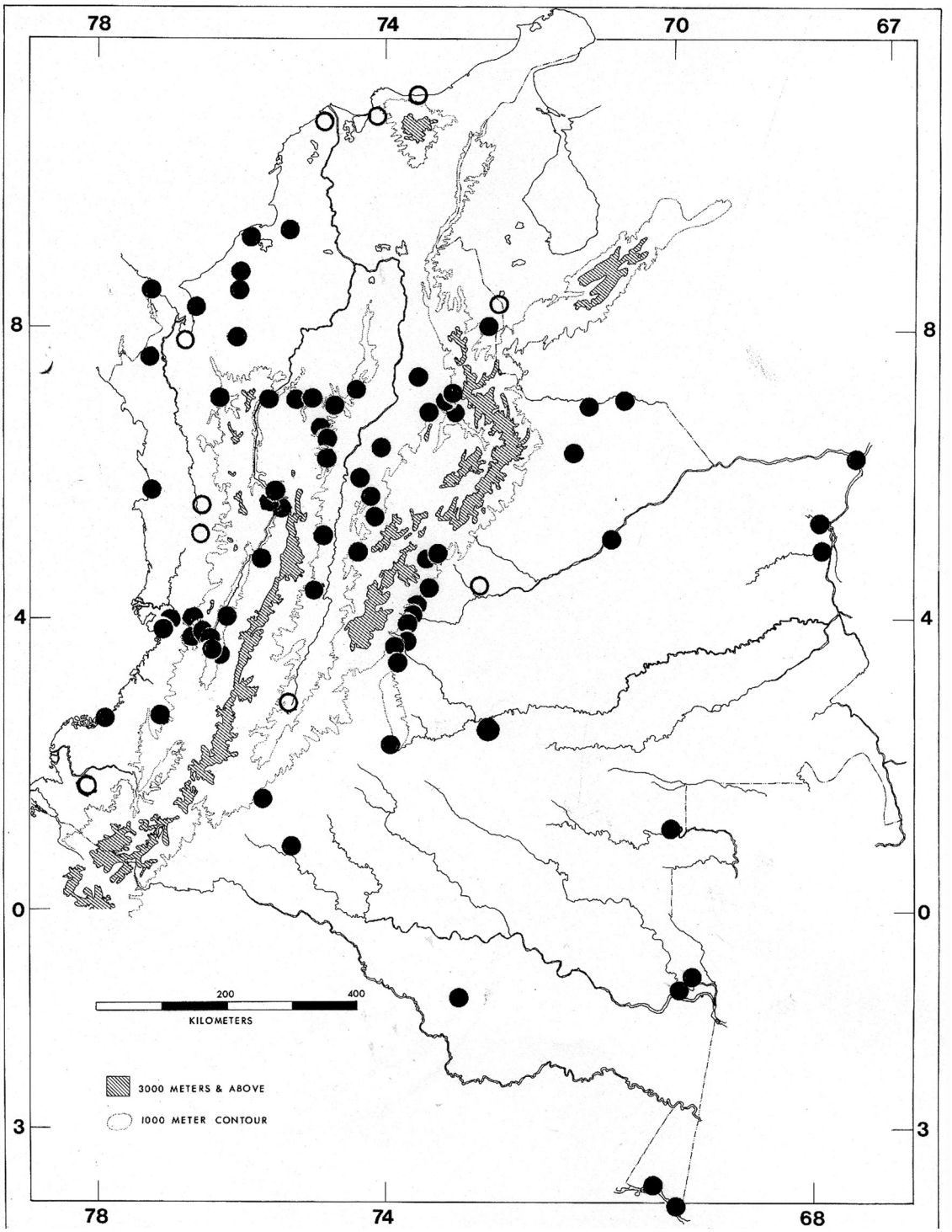

FIGURE 7: Distribution of *Oxyrhopus petola* in Colombia. Open symbols represent literature records from Niceforo María (1942) and Perez Santos & Moreno (1988).

Chocó, (4) those from the formerly dry tropical forests of the upper Río Cauca, Caribbean lowlands, and upper Magdalena Basin, (5) those from the formerly dry tropical forests of the Maracaibo Basin, and (6) those from the wet lowland forests of the Middle Magdalena valley (this unit extends westward along the Andean foothills of northern Antioquia and southern Córdoba). Niceforo María (1942: 96) cited many locality records (as *Pseudoboa petola* and, possibly *P. rhombifer*), of which I've seen MLS material of seven.

This species currently enjoys instability of names. Savage (2002) used the combination *Oxyrhopus petolarius* for the same species identified as *Oxyrhopus petola* by most authors, including Duellman (2005). The last author applied the name *O. petolarius* to what he called another sympatric species, distinguished solely by its higher subcaudal scale count.

Bailey's (1970) concept of the subspecies in Colombia was to recognize three: *O. petola petola* (unit 1, above), *O. petola digitalis* (units 2 and 3, above), and *O. petola sebae* (units 4-6, above). Bailey distinguished the subspecies using a combination of the number of dark blotches on the body and the lengths of the more posterior pale interspaces.

Bailey (1970), as well as Savage (2002), mentioned that Central American populations of *O. petola "sebae"* do not exhibit contact between the preoculars and frontal scale. However, based on my study of the Colombian snakes, otherwise assignable to *O. petola "sebae",* contact between the preoculars and frontal is normal and non contact, rare. The frequencies of preocular-frontal contact scores of 2 and 3 (no contact on at least one side) for the various ecogeographic units are: (1) 4/53 (7.5%), (2) 1/18 (5.5%), (3) 2/15 (13%), and within units 4 and 5, 1/11 (9%) from the dry Caribbean coast, 6/21 (3%), 5/51 (10%) from the wetter Magdalena valley, and 0/3 (0%) from the Maracaibo Basin. Such low frequencies are inconsistent with any taxonomic distinction among these geographic units using such a character.

However, using the number (and their lengths) of dark dorsal body bands does lend some credence to Bailey's proposal. Using only the number of dark body bands, sexual dimorphism is not evident for any population (Table 1) but four geographic units are readily discriminating using this metric (unit 1, unit 2, unit 3, and units 4-6). The greatest mean number of bands (Table 1) is seen in unit 1 (*O. petola "petola"*) and significantly fewer in units 4-6 (*O. petola "sebae"*). The wettest portions of the country (units 2 and 3) harbor snakes having significantly fewer bands (and each unit differs significantly from the other). Snakes of units 2 and 3 correspond to *O. petola "digitalis".*

Combining all the ecogeographic units that Bailey ascribed (or would have) to *O. petola" sebae"* (within Colombia) covers a range of $16^1/_2$ to $38^1/_2$ dark body bands. Colombian snakes assigned to this subspecies occupy both dry and wet lowland tropical forests as well as being fragmented into three geographic units partially divided or isolated by montane barriers (upper Río Cauca valley, Maracaibo Basin, and coastal lowlands plus Middle Magdalena). Considering the three geographic units, only six specimens are available for the southwestern Maracaibo Basin and adjacent Cesar of Colombia ($17^1/_2$-$28^1/_2$ body bands, mean 24.7). Twenty-one are available for the Alto Río Cauca ($19^1/_2$-36 body bands, mean 25.3 ± 1.0). Fifty-eight are available the Caribbean coast and Magdalena valley ($16^1/_2$-$38^1/_2$ body bands, mean 26.1 ± 0.6). However, between these three ecogeographic units, the differences are not significant.

Bailey (1970) used a combination of number of dark body bands and the lengths of the pale interspaces posteriorly in his definition of *O. petola "sebae".* These two characters are inversely related (Fig. 8) and not independent. There is no surprise that as one increases the number of dark body bands, one must decrease the lengths of the pale interspaces. *Oxyrhopus petola "petola"* is distinctive by either measurement but the distinctions among *O. petola "digitalis"* and *O. petola "sebae"* are solely the number of dark dorsal body bands.

In terms of scutellation, *O. petola* has 8-8 supralabials (4 and 5 contacting orbit) in all populations although two specimens from the Chocó (ICN 11283-84) each have 8-9 supralabials (the supralabial # 3 is divided vertically so as to increase the number

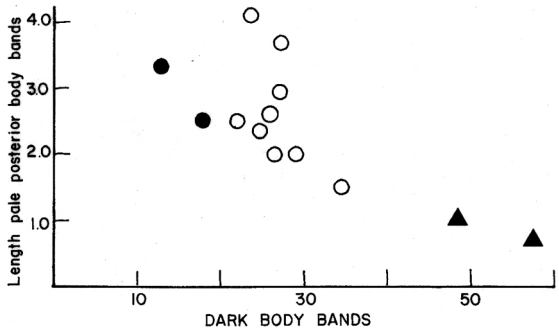

FIGURE 8: Relationship between dorsal dark body band number and length of pale posterior interspaces in *Oxyrhopus petola.* Triangles represent populations of *"O. petola petola".* Solid circles represent what Bailey (1970) called *O. petola digitalis.* Open circles correspond to populations of *"O. petola sebae".*

of supralabials to 9 on one side of the head with 5 and 6 contacting the orbit on that side of the head). Infralabials are normally 10-10 with 1-6 contacting chin shields (1-5 in 10 % of the specimens). One specimen (ICN 8474) has 9-10 infralabials, two (ICN 2997, 10560) have 10-11, and one (ICN 251) has 11-11 infralabials. When there are 11 infralabials, 1-7 contact the chin shields although ICN 251 has 1-4 and 6-7 contacting the chin shields on one side of the head. All have 2 + 3 temporal scales. Scale row reduction by means of loss [26 of 44] of row 4 (or fusion of rows 3 + 4 [17 of 44] or 4 + 5 [1 of 44]) and occurs at ventral scute 125 to 150. The position of scale row reduction may exhibit geographic variation in *O. petola:* for the Llanos at scute 128-145 (mean = 136.9 ± 1.6, N = 10), for Amazonian Colombia at 128-138 (mean = 131.1 ± 1.1, N = 5), for the coastal lowlands and Magdalena valley at 125-143 (mean = 133.9 ± 1.8, N = 19), and for the Chocó at 133-150 (mean = 141.5 ± 1.7, N = 15).

For all populations here assigned to *O. petola,* males have significantly more subcaudal scutes than do females but the number of ventral scutes does not differ significantly contrasting sexes (Table 1). Given that the color pattern differences used by Bailey (1970) to distinguish subspecies are inversely correlated, I attempted to quantify geographic variation in *O. petola* using the number of ventral and subcaudal scales.

East of the Andes, snakes from the forested Amazonas have more scutes than do those from the more open Llanos. Differences in subcaudal counts (Table 1) are significantly different for each sex contrasting the open Llanos snakes (assigned to *O. petola petola* by Bailey, 1970) with those from the forested Amazon (assigned to *O. petola digitalis* by Bailey, 1970) and this difference is accentuated in the Iquitos region (Dixon & Soini, 1977, 1986), extending the meristic cline farther south. The only discordant data point is Duellman's (2005) report of a male from central Peru having only 86 pair of subcaudals (however, given its tail length, the subcaudal count datum is suspect; Fig. 4). In addition, using only the difference (males >females or males < females), the ventral scute means for Amazonian specimens are greater in males than females whereas for the Llanos, they are greater for females than males, but the differences are not significant.

West of the Andes in Colombia, the situation is more complex although snakes from the Chocó (also assigned to *O. petola digitalis* by Bailey, 1970) also have high scute counts (Table 1). Chocoan males have significantly fewer ventral and subcaudal scutes than do those from Amazonas whereas the values for females are not statistically different.

The other populations of *O. petola* west of the Andes have been called *O. petola sebae* (following Bailey, 1970). These were cited above as (4) those from the formerly dry tropical forests of the upper Río Cauca, Caribbean lowlands, and upper Magdalena Basin, (5) those from the formerly dry tropical forests of the Maracaibo Basin, and (6) those from the wet lowland forests of the Middle Magdalena valley (this unit extends westward along the Andean foothills of northern Antioquia and southern Córdoba). When all of the snakes that could be assigned to *O. petola "sebae"* are combined, the ventral scute counts are not significantly different from those for the biogeographic Chocò or for the open Llanos (Table 1) whereas females are distinctive in terms of the low subcaudal counts (Table 1). That said, when the sample is divided among smaller geographic units, some counts appear to differ sharply from adjacent population systems. The most notable case is for the very small sample (2) of males from the Maracaibo Basin (109-114 subcaudals [one female from the same population has 97 subcaudals]) contrasted with any other population system of *O. petola "sebae".*

This is the largest of the Colombian *Oxyrhopus.* The largest males examined are ICN 6781 (Llanos, 912 mm), MLS 2397 (Caribbean lowlands, 1008 mm), MLS 693 (Amazonia, 1111 mm), and ICN 10846 (Chocó, 1021 mm). Females appear to be slightly larger (MUJ 784, 1036 mm, Llanos; MHUA 14412, 1062 mm, Caribbean lowlands; IAvH 3684, 1120 mm, Amazonia). Males have longer tails than do females: for males, tail/total length is, for the Llanos (*O. petola "petola"*), 19.2-26.9 (23.0 ± 0.5, N = 26)%, for the Caribbean lowlands and interandean valleys (*O. petola "sebae"*), 19.6-26.7 (24.0 ± 0.2, N = 49), for Amazonia (*O. petola "digitalis",* in part), 23.9-28.6 (27.0 ± 0.5, N = 9), and for the Pacific lowlands, 24.2-27.4 (25.3 ± 0.5, N = 6); and for females, Llanos, 20.6-25.2 (22.7 ± 0.3, N = 28), for the Caribbean lowlands and interandean valleys, 18.6-23.1 (20.6 ± 0.2, N = 20), for Amazonia, 22.8-26.6 (24.4 ± 0.3, N = 10), and for the Pacific lowlands, 20.7-25.5 (22.7 ± 0.6, N = 7).

Natural history: On 28 October 2006, a clutch of eight near-term eggs was found beneath a pile of fronds of African Palm in a palm plantation belonging to Palmeras de Meta. During the next hour, possibly responding to warm hands, six eggs hatched resulting in seven neonates (two were obviously within a single egg shell). The other two eggs hatched two days

later. These are now ICN 11003-11011. Our collecting at Palmeras de Meta in late October 2006 found *O. petola* to be relatively common and we secured several other neonates as well as a single, completely melanistic female (ICN 10971) containing nearly mature ova (11 ova, 9-10 mm wide and 20-21 mm long). Collecting at the same site in March 2006, did not yield in any *O. petola,* suggesting that activity and reproduction are markedly seasonal.

Subspecies: Bailey (1970) recognized three: *O. p. sebae,* from Mexico to the Caribbean coast and interandean valleys of Colombia, *O. p. digitalis,* disjunct in the Pacific lowlands of Colombia and in the Amazon Basin, and *O. petola petola* for open habitats of the Colombian-Venezuellan Llanos and east to the Atlantic. Bailey's proposal suffers from variation discordant with his proposal. The degree of preocular-frontal contact does not map well with *O. p. "sebae",* at least for Colombian populations. Significant differences in number of dorsal body blotches and in number of subcaudal scutes support separation of the Chocoan and Amazonian populations assigned by Bailey (1970) to *O. p. digitalis.* In spite of some significant differences contrasting populations, I decline to use subspecies for *O. petola* because I think use of subspecies names implies more than we know. One can investigate geographic variation using characters without obscuring that variation under subspecific names.

Contrasting the two phenetically different units east of the Andes, the Llanos population is very different from that of the forested Amazon. Nonetheless, one male specimen (ICN 368), from a geographically intermediate point, is very nicely intermediate in dorsal dark body blotch count ($25^1/_2$), with longer posterior pale interspaces (2 scales long), and a high ventral scute count (207), providing evidence of gene flow between the two units. A second geographic unit exhibits comparable intermediacy in extreme eastern Colombia (Vichada: adjacent to the Amazonian forests of southern Venezuela). Two males (ICN 2583 and UVC 5377) have $23^1/_2$ and $24^1/_2$ dark dorsal body bands separated posteriorly by pale interspaces $1^3/_4$ to $2^1/_2$ scales long. A female (MUJ 784) has only $18^1/_2$ dark dorsal body blotches separated by pale interspaces $2\text{-}2^1/_2$ scales long. The presence of such snakes in eastern Vichada implies the existence of the *digitalis* phenum in Amazonian Venezuela.

The snake reported in the literature under various names (*O. melanogenys, O. petola semifasciatus* [in part], *O. trigeminus* [in part], and *O.* aff. *melanogenys*) appears to be undescribed. Herein, it is named

***Oxyrhopus vanidicus* sp. nov.**

Oxyrhopus trigeminus: Hoge *et al.,* 1973: 228. Dixon & Soini, 1977: 65; 1986: 123-24.

Oxyrhopus melanogenys: Duellman, 1978: 236, 253-54; Perez Santos & Moreno, 1988: 257, 261-262 (in part); Sánchez *et al.* 1995: 314 (in part). Campbell & Lamar, 1989: fig. 504. Martins & Oliveira, 1998: fig. 101. Campbell & Lamar 2004: figs. 1215 and 1229.

Oxyrhopus melanogenys melanogenys: Jorge da Silva, 1993: 65.

Oxyrhopus cf *trigeminus:* Campbell & Lamar, 2004: fig. 1227.

Oxyrhopus petola semifasciatus: Campbell & Lamar, 2004: fig. 1229.

Oxyrhopus aff. *melanogenys:* Zaher & Caramaschi, 1992: 809-816, 825. Martins & Oliveira, 1998: 119.

Specimens examined: COLOMBIA. (44). Amazonas, Leticia: IAvH 821, 863, 1468, MLS 1225-27, 1357, 1395, 2003-04, 2309, 2316; carretera Leticia-Tarapacá, Km 10-11, ICN 10683; corregimiento La Pedrera, La Pedrera, IAvH 3701; Río Apoporis, campamento Gino-Gojé, ICN 95; corregimiento Tarapacá, ICN 74. Puerto Nariño: MLS 1358-59; P.N.N. Amacayacu, IAvH 3076. Caquetá, Florencia: MLS 1335, 1351-53, 2740-45. Solano: P.N.N. Chiribiqueté, Río Sararamano, IAvH 4951; Tres Esquinas, MLS 1354. Meta, Mesetas or San Juan de Arama: P.N.N. La Macarena, raudal Caño Cafre, IAvH 3011. San Martin: vereda La Casteñada 3°35'N, 73°35'W, ICN 10789. Uribe: cabaña Paujiles (junction Río Duda and Río Guayabero), ICN 1886. Villavicencio: MLS 1355. Putumayo, La Hormiga: Valle de Guamuéz, MUJ 238. Puerto Asis: MLS 1223, 1356. Vaupés, Mitú: ICN 247, 249, 260, 272, casco urbano, ICN 6135, MHNUC 516.

Holotype: ICN 10683 (original field number, JMR 4106), an adult male collected at Km 10, Leticia-Tarapacá road, municipality of Leticia, Amazonas, Colombia, by Juan Manuel Renjifo on 13 May 2003.

Paratypes: Departamento de Amazonas, Leticia, casco urbano, MLS 1225-26, 1395, collected by H. Eduardo Camilo in October 1959, MLS 1357, collected by Nicéforo María in March 1957; ICN 95, Rio Apoporis, campamento Gino-Gojé, collected 30 June 1952; ICN 74, corregimiento Tarapacá, collected by Santiago Rengifo. ICN 10789, Departamento de Meta, municipio San Martin, vereda La Casteñada, 3°35'N,

73°35'W; ICN 1886, municipio de Uribe, cabaña Paujiles (junction of Río Duda and Río Guayabero), collected by Guillermo Rocha in January 1975; MLS 1335, municipio de Villavicencio, collected by Niceforo María in February 1941. MLS 1223, 1356, Departamento de Putumayo, Puerto Asis, collected by

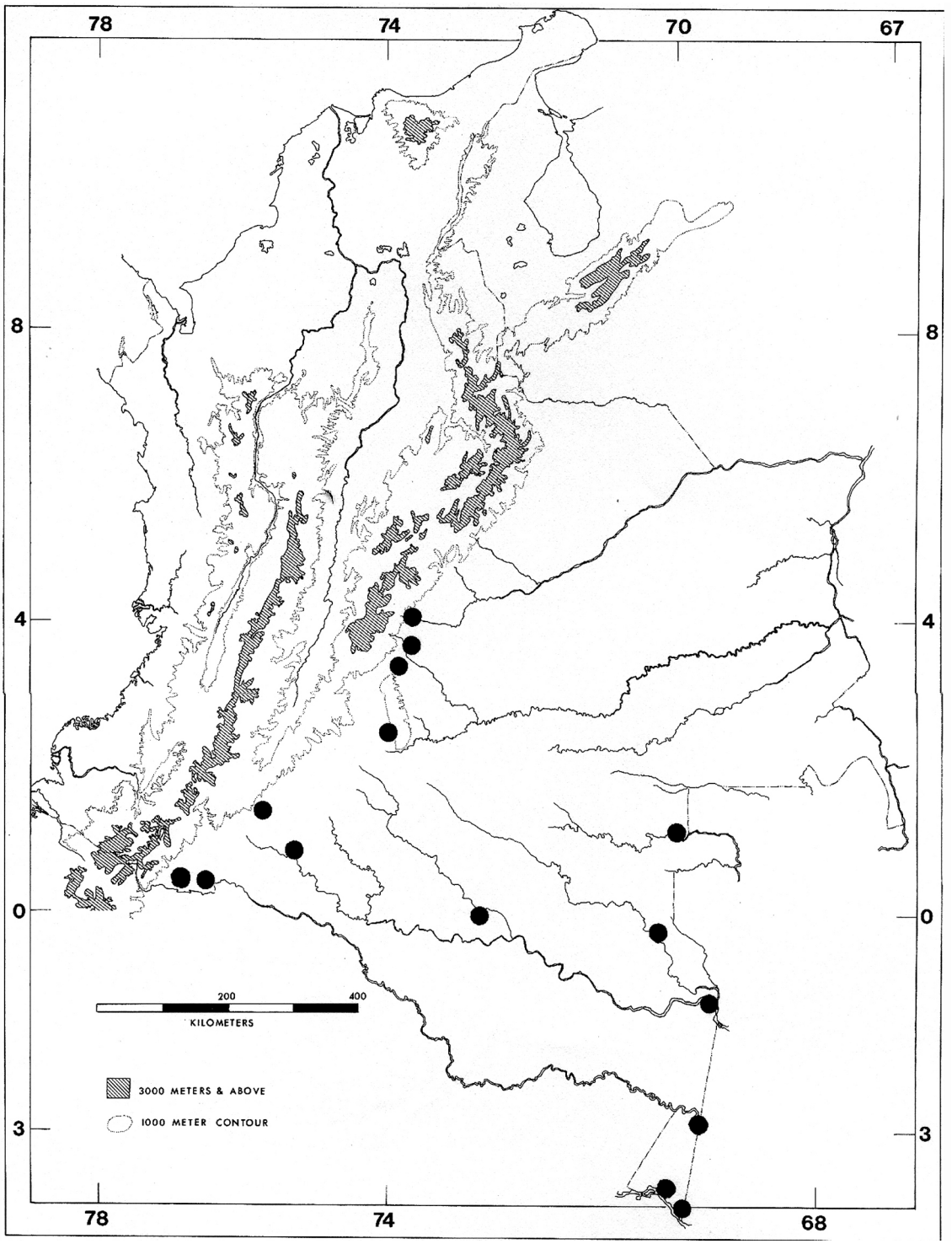

FIGURE 9: Distribution of *Oxyrhopus vanidicus* in Colombia.

Fray Miguel de Ipiales in February 1941. ICN 247, 260, Departamento de Vaupés, Mitú, collected 14 October 1958 by F. Medem & H. Arévalo, ICN 6135, casco urbano, collected in January 1989 by A. Arias.

Diagnosis: A species of *Oxyrhopus* distinguished from all others by having a color pattern of triads and by lacking a pair of short dark bands on the nape.

Etymology: Latin, meaning liar; used in allusion to the apparent mimicry of this species with the venomous coralsnake, *Micrurus hemprichii*.

Description of holotype: Head wide, distinct from neck; rostral scale nearly twice as broad as high; internasals wider than long; prefrontals about as long as wide, separated from orbits; length of frontal about equal to greatest width; median suture of parietals slightly less than length of frontal; two nasal scales with nostril in posterior part of anterior nasal and depression in anterior edge of posterior nasal; loreal scale about twice as long as high; supraoculars 1-1, forming long suture with frontal; postoculars 2-2; anterior temporals 2-2; posterior temporals 3-3; upper anterior temporal tenuously contacting sixth supralabial; supralabials 8-8, 4 and 5 enter orbit; infralabials 10-10, 1-4 contacting anterior chin shield, 5 contacting both pairs of chin shields, 6 only contacting second; first pair of infralabials in median contact; anterior pair of chin shield larger than posterior pair; eye moderately large and prominent, not visible from below; pupil vertically elliptical.

Body and tail elongate, not laterally compressed; dorsal scale rows 19-19-17, reduction occurring above ventral 113 on left and ventral 113 on right by loss of scale row 4; scales smooth, bearing paired apical pits; ventrals 183; anal entire; subcaudals in 87 pairs.

Color pattern of four dark body bands followed by $5^1/_2$ triads on body and $2^1/_2$ on tail; dark body bands separated by thin ($^1/_2$ to 1 scale lengths, measured along vertebral scale row) white bands, longest white bands (1 scale length) anteriorly, shortest posteriorly ($^1/_2$ to $^2/_3$ scale lengths); white bands wider nearer ventrals; first dark band 13 scale lengths long, measured along vertebral scale row); first triad boundary represented by orange spots reaching to scale rows 4 or 5, second and third triad boundaries have orange spots reaching nearly to midline, other triad boundaries have dorsally complete orange bands. Snout, posterior to 5th supralabial and postoculars as well as anterior $^4/_5$ of parietals dark brown (black in life). Chin and anterior venter cream; dark dorsal bands reach only to edge of ventral scutes on anterior $^1/_3$ of body; on rest of body, brown pigment occupies lateral $^1/_5$ of scute and is present as isolated spots across venter until last $^1/_3$ of body (and underside of tail) when brown pigment crosses venter (or nearly so).

The triad boundary markings and the nape band are orange in life in the few living specimens I have seen (or for which color notes are available to me). However, Dixon & Soini (1977, 1986) reported these markings as yellow, orange, or red and Martins & Oliveira (1998) as yellow. The specimens illustrated in color by Campbell & Lamar (1989, 2004) have orange bands or spots.

Variation: See Table 1 for ventral and subcaudal counts data. All have 8-8 supralabials (with 4 and 5 entering the orbit), and 2 + 3 temporal scales. Most have 10-10 infralabials, with 1-6 contacting the chin shields although ICN 260 has only 9-9 infralabials (1-5 contacting chin shields). Scale row reduction occurs through loss of scale row 4 at ventral scutes 113 to 136. The preoculars have obvious contact with the frontal in all specimens examined (N = 37).

The first dark dorsal band is long (9-18 scale lengths, N = 29, mean 13.2 ± 0.5). The narrow white bands vary in lengths from $^1/_3$ to $2^1/_2$ scale lengths along the length of the body with a modal value of $^1/_2$ scale lengths for most specimens. Some snakes have greater modes ($1^1/_2$, ICN 6135 and MLS 2004).

Oxyrhopus vanidicus is smaller than *O. occipitalis* and *O. petola* but larger than *O. leucomelas.* The largest male *O. vanidicus* examined is MLS 1353 (861 mm total length) and the largest female (ICN 1886) is 927 mm. Tail length is sexually dimorphic and males have longer tails (tail/total length 20.5-28.2, mean = 23.6 ± 0.3%) than do females (19.4-24.8, mean 22.0 ± 0.6%).

This is the only species of *Oxyrhopus* found in Colombia exhibiting a color pattern involving triads. Occasional specimens can be described as melanistic, *i.e.,* the narrow white bands defining limits of the dark bands are not visible, although the orange spots/bands are evident on an otherwise black snake (ICN 10789 and MLS 1353). In *Oxyrhopus vanidicus,* the central dark band of a triad normally (29 of 32 adults and in all 10 neonates) coincides with the vent. However, in one specimen (ICN 272), the vent corresponds to a triad border and in another (IAvH 3076), the vent occurs within a quintet of dark bands. In MLS 2745, the vent corresponds to the third dark band of a triad. The number of triads varies individually. For 32 adults, there are 1.5-7.5 (mean = 4.8 ± 0.

9) body triads and 1.5-5.5 (mean = 2.8 ± 0.2) tail triads. In 19 adult males, there are 1.5-7.5 body bands (mean 4.8 ± 0.3) and 1.5-5.5 tail triads (3.1 ± 0.3) whereas 13 females have the same number of body triads (1.5-7.5, mean 4.8 ± 0.4) but fewer tail triads (1.5-4.0, mean 2.3 ± 0.2). In 10 neonates, there are as few as one triad overlying the vent to as many as 8.5 (body) and 4.5 (tail) triads. In one neonate (MLS 2742), there is a quintet rather than a triad between the first two body triads. Quintets were found in three adults (IAvH 3076, overlying vent; ICN 247, before the first body triad; and MLS 1351, following the first three body triads). ICN 6135 has a quartet following the first body triad and MLS 1226 has a sextet anterior to the first body triad.

Comparisons: This species was previously confused with *O. trigeminus* (Dixon & Soini, 1977, 1986) and at present with *O. melanogenys,* other species presenting a color pattern of triads. It differs from each in having the first dark band on the neck long (9-18, mean 13.2 ± 0.5, scale lengths) instead of a pair of shorter dark bands followed by a dorsally complete red band (if triads are present). Zaher & Caramaschi (1992) placed greater confidence on a hemipenial character (absent in *O. trigeminus*) to group *O. formosus, O. guibei, O. melanogenys, O. petola,* and what is here named *O. vanidicus;* they viewed the presence of triads as homoplastic. However, there is no reason to prefer one of these putative incompatible synapomorphies over the other except that what is taken as a triad in *O. vanidicus* may not be homologous with the triads seen in *O. guibei, O. melanogenys,* and *O. trigeminus* (see text).

In Colombia, this species is distributed within the lowland forests of Amazonia (Fig. 9). Outside of Colombia, this species occurs as far east as Manaus, Brasil (Martins & Oliveira, 1998), in eastern Ecuador (Duellman, 1978), and in northern Peru (Dixon & Soini, 1977).

Campbell & Lamar (2004) illustrated this species under three different names (*O. melanogenys, O. petola semifasciatus,* and *O. trigeminus*). The application of Tschudi's (1845) *semifasciatus* to this species ignores the fact that the holotype had 108 pairs of subcaudals (in agreement with central Peruvian *O. petola "digitalis"*).

RESUMEN

Cuatro especies del género Oxyrhopus *se encuentran en Colombia. De las cuatro especies, una* (O. leucomelas) *es una especie andina y las otras tres son especies de las tierras bajas. Variación geográfica no fue detecta en* O. occipitalis *pero mucha variación se encuentra en* O. petola, *en términos de patrón y de conteos de escamas. Se posible de reconocer subespecies pero tal reconocimiento oscura mas que ilumina. La serpiente conocida antes como* O. melanogenys *o* O. *aff.* melanogenys *está descrita como especie nueva.*

PALABRAS-CLAVE: Especie nueva; *Oxyrhopus;* Variación geográfica.

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