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ON A NEW SPECIES OF *LEPTOTYPHLOPS* FROM SURINAM, WITH NOTES ON THE OTHER SURINAM SPECIES OF THE GENUS (LEPTOTYPHLOPIDAE, SERPENTES). - NOTES ON THE HERPETOFAUNA OF SURINAM V

by

M. S. HOOGMOED

Rijksmuseum van Natuurlijke Historie, Leiden

With 10 text-figures, 2 plates and 4 tables

Abstract

In the present paper *Leptotyphlops collaris* nov. spec. from Surinam and French Guiana is described, whereas *L. cupinensis* Bailey & Carvalho, *L. dimidiatus* (Jan) and *L. septemstriatus* (Schneider) are reported from Surinam for the first time. A total of six species (the four mentioned above plus *L. macrolepis* (Peters) and *L. tenella* Klauber) is now known to occur in Surinam. Of each species a diagnosis and the ranges of variation of a number of characters are provided. At the end of the paper a key facilitating the identification of the Surinam species is given.

Introduction

The first to report *Leptotyphlops* from Surinam was Van Lidth de Jeude (1904), who, in a paper dealing with the material collected by several primarily topographical expeditions into the interior of Surinam, mentioned *Glauconia albifrons* and *G. macrolepis*. The specimens attributed by him to *G. albifrons* turned out to belong to *Leptotyphlops tenella* Klauber, whereas the specimen identified by him as *G. macrolepis* served as a holotype for the description of *L. ihlei* Brongersma (1933). However, in 1966 Orejas-Miranda synonymised *ihlei* with *macrolepis* and expressed as his opinion that the character used by Brongersma to differentiate his new species (the fusing of the basal parts of second supralabial and ocular) is merely an aberration.

The most recent paper dealing with the *Leptotyphlops* species of South-America is the Catalogue of Neotropical Squamata by Peters & Orejas-Miranda (1970), in which paper 34 species are listed. The following six are recorded as occurring in the Guiana region:

L. amazonicus Orejas-Miranda, from southern Venezuela.
L. cupinensis Bailey & Carvalho, from Mato Grosso and Serra do Navio, Amapá, Brazil.
L. dimidiatus (Jan), from Guianas, northern Brazil and south-eastern Venezuela.
L. macrolepis (Peters), from Panama to Colombia, Venezuela, Guianas and northern Brazil.
L. septemstriatus (Schneider), from northern Brazil, Guiana and south-eastern Venezuela.
L. tenella Klauber, from Guianas, Trinidad, south-eastern Venezuela and Amazonian Brazil.

In two earlier papers Orejas-Miranda (1967, 1969) provides distributional maps for the species mentioned above and from them it is clear that he only considers *L. macrolepis* and *L. tenella* as occurring in Surinam. Investigation of the material of this group present in several museums and recently collected in Surinam and French Guiana showed the presence in Surinam of five of the above mentioned species (*amazonicus* not being present) and of one new species, which is described below.

The Surinam species of Leptotyphlops

Leptotyphlops collaris nov. spec.

Holotype. — 1 ex., RMNH 13468 b, Base Camp Nassau Mountains, distr. Marowijne, Surinam, 12-II-1949, leg. Surinam Expedition 1948-49.

Paratypes. — Surinam. Nassau Mountains, distr. Marowijne: 3 ex., RMNH 13468 a, c, d, same data as holotype. Brown's Mountain, distr. Brokopondo: 1 ex., RMNH 17833, 27-II-1972, 1 ex., RMNH 17834, February 1972, both leg. G. F. Mees; 1 ex., MCZ R 149550, February 1976, leg. R. A. Mittermeier.

French Guiana. Between Cayenne and Dégrad des Cannes: 1 ex., RMNH 17748, 7-III-1976, leg. N. Degallier. Montagne du Mahury: 1 ex., MNHNP unnumbered, end of June 1976, leg. N. Degallier.

Diagnosis. — A small *Leptotyphlops* of the *albifrons*-group, not exceeding a total length of 104 mm in the type-series. Supraoculars present, separated from the first supralabial. Two supralabials, four scales along the edge of the upper lip from rostral to corner of mouth. Three infralabials. Total number of dorsals 155-166, ventrals 141-151, subcaudals 14+1 — 17+1, tip of tail sharply pointed. Number of scales around the middle of the tail 10. Brown, dorsally slightly darker than ventrally. A pair of white spots in the neck, white spots on the snout, on the tip of the tail and near the vent.

Description. — A small species, reaching a maximum length in the type-series of 104 mm (holotype 102 mm), tail very short (7 mm in holotype).

Ratio total length/tail length 11.4-14.9 ($\bar{x}$ = 13.5, N = 9), ratio total length/diameter body 31.7-41.6 ($\bar{x}$ = 35.0, N = 9). Body cylindrical, head slightly flattened dorso-ventrally. Snout rounded, well projecting over the mouth. Head as wide as the body.

Rostral visible from above, just reaching to the line connecting the anterior margins of the eyes. Supraoculars present, separated by the frontal, not forming a suture with the first supralabial. Nasal horizontally divided by a suture traversing the nostril, slanting obliquely, highest anteriorly, lowest posteriorly. Infranasal much smaller than the supranasal, bordering the upper lip. Two supralabials, first between nasal and ocular, second posterior of ocular. Labial border of first supralabial wider than labial border of ocular. First supralabial reaching to the level of the lower margin of the eye, second supralabial just reaching to the level of the centre of the eye. Upper lip bordered by four scales (infranasal, first supralabial, ocular and second supralabial) between the rostral and the corner of the mouth. Parietals,

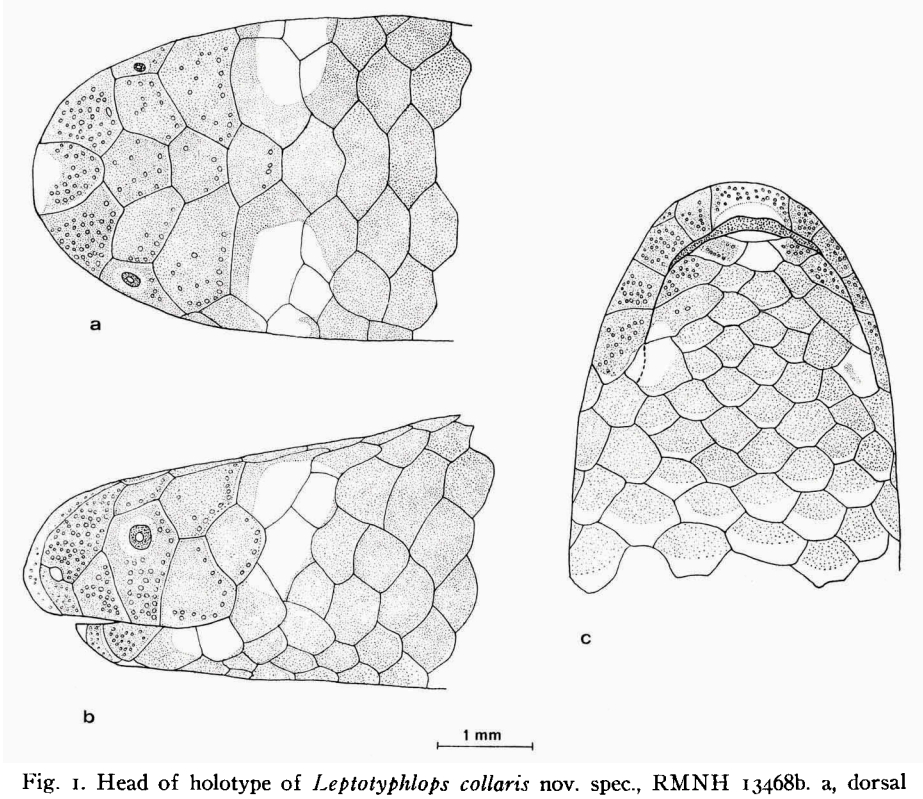

Fig. 1. Head of holotype of *Leptotyphlops collaris* nov. spec., RMNH 13468b. a, dorsal view; b, lateral view; c, ventral view.

followed posteriorly by equally large occipitals, largest scales on the head. Eye well visible, moderately large, situated in the upper part of the ocular, equidistant from the sutures with supranasal and supraocular, distance to suture with the parietal slightly larger.

Four median scales on the head posteriorly of the rostral (prefrontal, frontal, interparietal, interoccipital) of approximately the same size and shape, as long as wide, distinctly differing in shape from the anterior median dorsals, which are wider than long.

Anterior dorsal and lateral headscales pitted, number of pits per scale diminishing posteriorly; rostral, nasal and first supralabial pitted all over, pits on the other scales restricted to the posterior margin.

Mental small, much wider than long. Three infralabials, the last one largest, completely hidden by the second supralabial when the mouth is closed, only visible when the lower jaw is completely depressed.

Scales on neck cyclo-hexagonal, wider than long, on back cycloid, ventrals like the dorsals. Fourteen longitudinal rows of scales around the body. Number of dorsal scales between the rostral and the scale covering the tip of the tail 155-166 ($\bar{x}$ = 161.4, N = 9), number of ventrals between mental and preanal scale 141-151 ($\bar{x}$ = 146.8, N = 9), a large, undivided preanal scale, 14-17 ($\bar{x}$ = 15.1, N = 9) subcaudals. Tip of tail covered by a sharply pointed, slightly asymmetrical, conical scale, the point closer to the ventral part of the tail. Subcaudal scales differing in shape from the surrounding scales, being slightly wider and shorter. Ten rows of scales around the middle of the tail. Dorsal part of the tail covered with scales identical to the dorsals. In all animals studied tail with a slight downward curvature.

Colour in preservative brown, dorsally slightly darker than ventrally. All scales with a dark-brown area at the base and a light-brown posterior edge. The light-brown edge wider on the ventrals, thus causing the ventral parts to appear slightly lighter. Headscales with narrow white edges. Greater part of the rostral covered by a white spot, only the dorsal tip brown. A white spot on the anterior tip of the lower jaw. A pair of white spots on the posterior part of the head/neck region, covering the greater part of the occipital and several neckscales. The spots are separated dorsally by approximately twice to once the interoccipital width. Ventrally they are more or less continuous with a small white spot on the lower jaw near the corner of the mouth. Tip of tail white, the white area comprising the pointed scale and two or three rows of scales (dorsals and ventrals) anterior of it. A white spot on the postanal scales.

Colour in life black with blue-green shine, the spots which in preservative are white were a vivid yellow in life (from slides of RMNH 17748 while

alive, provided by Mr. N. Degallier). The specimens comprising RMNH 13468 were 'blackish-blue with yellow spots on tail and head' according to the field-notes made by P. H. Creutzberg.

Habitat. — All specimens were found in primary rainforest or close to it. The Nassau Mountains specimens actually were caught on the bank of the river Marowijne, near the foot of the mountains. They were found on the ground. The same is true for the Brown's Mountain specimens, which were also found on the ground, but at a much higher elevation (475 m). More data are available for the French Guiana specimens: RMNH 17835 was found in a roadside quarry, digging in the earth between the roots of a fallen tree. The other specimen (MNHNP unnumbered) was found at an altitude of 130 m while crossing the road. The majority of the specimens was collected in February and March, which is during the small rainy season. One specimen from French Guiana was collected in June, during the great rainy season. As all specimens were found out in the open the activity of this species seems to increase during the rainy season.

Range and distribution. — Hitherto the species is only known from a few localities in the northern part of Surinam and French Guiana. The situation of the localities, and their altitudes, make it probable that the species occurs in the intermediate areas as well. However, the range is probably restricted to the area south of the coastal savanna's. The species is known to occur

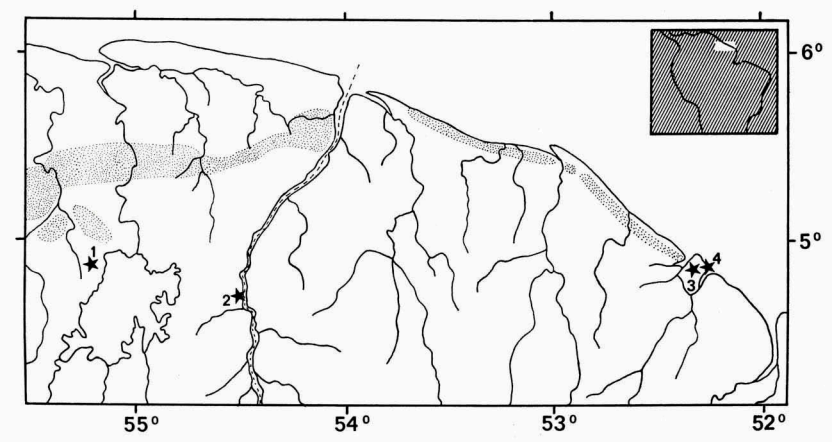

Fig. 2. Known distribution of *Leptotyphlops collaris* nov. spec. 1, Brown's Mountain; 2, Nassau Mountains; 3, Between Cayenne and Dégrad des Cannes; 4, Montagne du Mahury. The stippled area represents savanna.

from about sea-level (RMNH 17835) to an altitude of at least 475 m (top of Brown's Mountain).

Remarks. — The two specimens from French Guiana were kept in captivity for some time by Mr. N. Degallier of Cayenne. The following observations were made by him. RMNH 17748, collected on March 7, 1976, lived till July 28, 1976 and in this period shed its skin twice (on March 9, 1976 and 'a few days after May 9, 1976'). The second specimen lived only for a month in captivity. The specimens lived in tunnels, were fed with termites and emerged from the tunnels in the evening. Several times the specimens were observed to drink water.

Etymology. — From the Latin *collare* = collar, with reference to the conspicuous pattern of the neck.

Relationships. — *L. collaris* is quite easily identified as a member of the *albirostris* group as defined by Orejas-Miranda (1969), by virtue of having only two supralabials, the first of which is not in contact with the supraocular, ten scales around the middle of the tail, 'normally' sized (that is neither extremely large, nor extremely small) supraoculars, and by having white spots on the snout and the tip of the tail. As our knowledge of this family is still poor, the *albirostris*-group may very well be (and very likely is) an artificial assemblage and further speculations as to relationships with other species at the moment still seem premature and even undesirable.

Leptotyphlops cupinensis Bailey & Carvalho

Leptotyphlops cupinensis Bailey & Carvalho, 1946: 1.

Material. — SURINAM. Distr. Marowijne. Lely Mountains: 1 ex., MCZ R 149551, 19/II-4/III-1976, leg. R. A. Mittermeier.

BRAZIL. Estado Mato Grosso. Porto Velho, Rio Tapirapé: 2 ex., MZUSP 3754-55, February-June 1964, leg. R. T. Lima. Barra do Tapirapé: 1 ex., MZUSP 4405, July 1963, leg. B. Malkin; 1 ex., MNRJ 387 (holotype), January 1940, leg. A. Leitão de Carvalho.

Diagnosis. — A small *Leptotyphlops* of the *septemstriatus*-group, known to reach a total length of 128 mm. Supraoculars absent. Two supralabials, anterior one very small, four scales along the edge of the upper lip from rostral to corner of mouth. Four infralabials, mental absent. Total number of dorsals (MCZ R 149551) 265, ventrals 248, subcaudals 14+1, tip of tail with a blunt conical scale. Number of scales around the middle of the tail 14. Body pale yellowish brown without apparent pattern.

Measurements and scale counts of the Surinam specimen. — Total length 105 mm, tail length 5 mm, diameter of body 1.8 mm, ratio total length/tail length 21, ratio total length/diameter of body 58, scale counts see diagnosis.

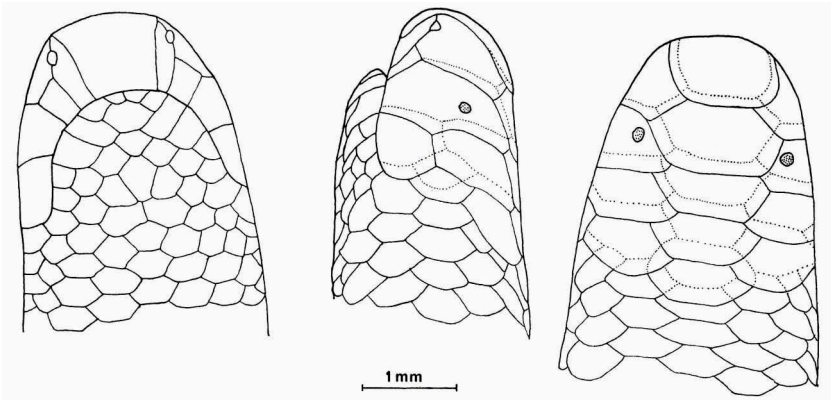

Fig. 3. Ventral, lateral and dorsal view (from left to right) of the head of *Leptotyphlos cupinensis* Bailey & Carvalho, MCZ R 149551.

The data on the Brazilian specimens were obtained too recently to be able to present them in the form of a table and thus they are presented here, respectively of MZUSP 3754, 3755 and 4405. The sequence is as for the Surinam specimen: total length 208, 198, 232 mm; tail length 8, 8, 8 mm; diameter of body: 2.6, 2.8, 3.2 mm; ratio total length/tail length: 26, 24.8, 29; ratio total length/diameter of body: 80, 70.7, 72.5; total number of dorsals 281, 281, 282; ventrals 267, 262, 268; subcaudals 19+1, 15+1, 14+1.

From these data it is clear that the Surinam specimen shows differences with the ones from Mato Grosso, it has less dorsals and ventrals, also its ratio total length/diameter of body is lower. Though this might be indicative for the existence of a different subspecies in Surinam, I think that the material available is still too scanty to make definite statements on this subject.

Habitat. — The single Surinam specimen of this species was collected on top of the Lely Mountains plateau, where it was found 'on top of ground after bulldozer cleared trail through rainforest'. The altitude probably was somewhere between 600 and 700 m. The holotype was collected in a termite hill in open savanna, together with a number of other vertebrates and invertebrates. From these rather contrasting data it is difficult to draw any sound conclusions concerning the habitat of this species, whether it is a forest-inhabitant, a savanna-inhabitant or an ubiquist.

Range and distribution. — Known only from four widely separated localities in South America: Lely Mountains, Surinam; Serra do Navio, Amapá and Tapirapé River, Mato Grosso, both in Brazil (see fig. 4). The species occurs to at least 600 m above sea level.

In 1970 Orejas-Miranda mentioned the species from the type-locality and from the Serra do Navio, Territorio do Amapá, Brazil, thus indicating that between 1967 and 1970 material from Amapá became known to him. However, I am not aware of the existence of another publication dealing with the specimen(s) from that area, so unfortunately I cannot include data concerning it (them) in this paper. During a recent trip to Brazil I studied the *Leptotyphlops* material in the collections of the MNRJ, MZUSP, IB and MPEG, but in none of these collections I could find a specimen from Serra do Navio.

Remarks. — This species was described in 1946, synonymised with *L. septemstriatus* (Schneider) by Amaral (1954) and resurrected as a valid species by Orejas-Miranda (1966). Amaral's decision was solely based on his comparison of the original description with drawings of *L. septemstriatus*. Orejas-Miranda examined the holotype and reached the conclusion that *L. cupinensis* was a valid species. I agree with him.

The description by Bailey & Carvalho (1946) was excellent and needs not to be repeated here. Only some additional data will be mentioned. Alive, the Surinam specimen was reported to be orange, without any pattern. In preservative, under high magnification, there is an indistinct pattern visible of 14 lighter, longitudinal lines, all around the body.

Bailey & Carvalho (1946) give the number of infralabials as being seven pairs and they report the absence of a mental. I agree with their observation that there is no mental touching the edge of the lower lip, but I am not quite sure whether it is correct to say that the mental is absent. I think that the scale lying immediately behind the first pair of small infralabials might be the mental. Orejas-Miranda (1967) considers the first pair of infralabials as a divided mental. The number of seven pairs of infralabials mentioned in the original description, is not correct, because the number was obviously obtained by counting with the mouth closed. When the mouth is opened it turns out that the number of infralabials is significantly lower and amounts only to four, the last one being completely hidden from sight when the mouth is closed, by the second supralabial. In reality Bailey & Carvalho (1946) counted the scales that were apparently bordering the lower lip, but actually were chinscales being in contact with the edge of the upper lip, which overhangs the lower jaw for quite some distance.

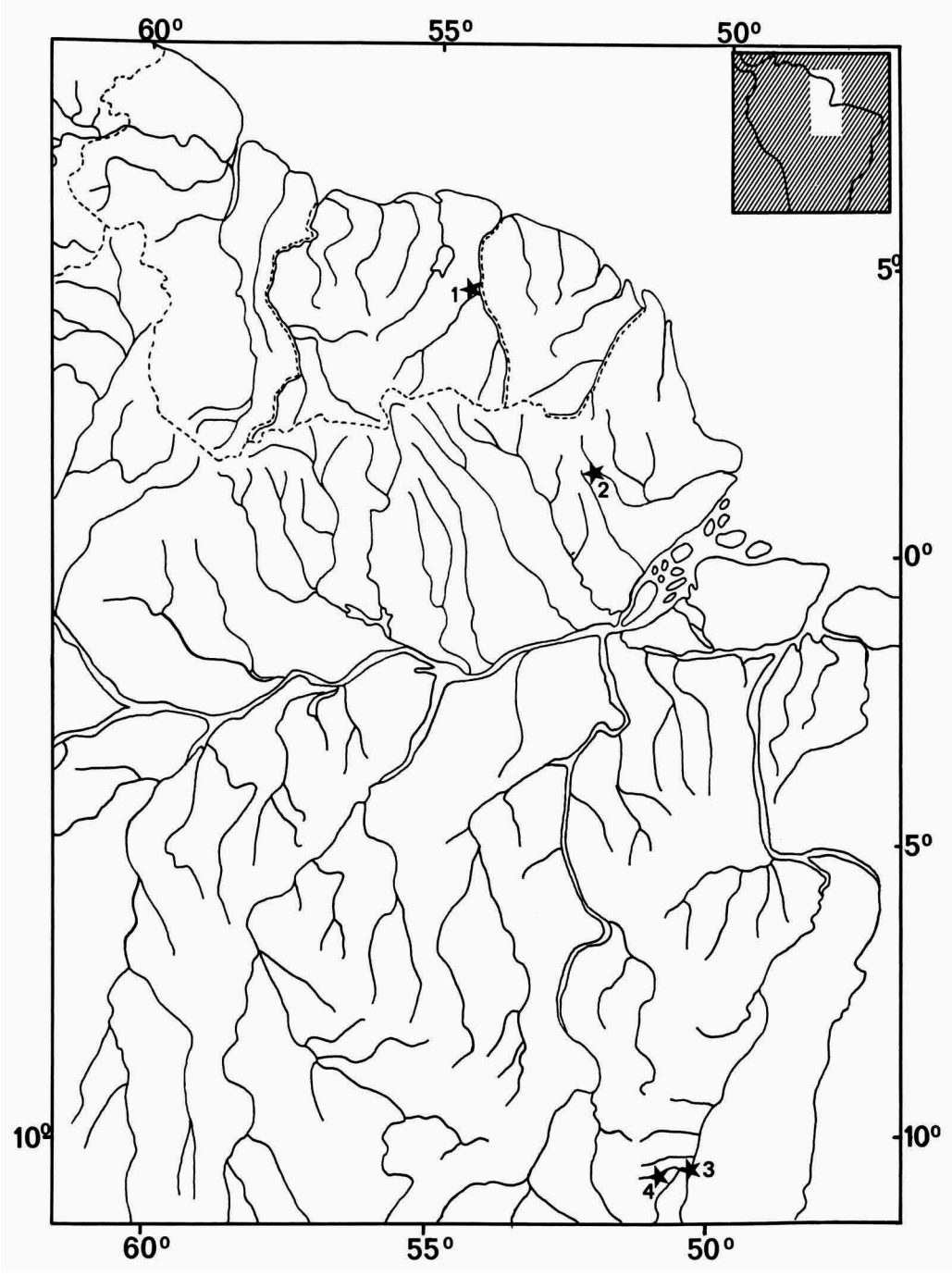

Fig. 4. Known distribution of *Leptotyphlops cupinensis* Bailey & Carvalho in north-eastern South America. 1, Lely Mountains; 2, Serra do Navio; 3, Mouth of Tapirapé River; 4, Porto Velho.

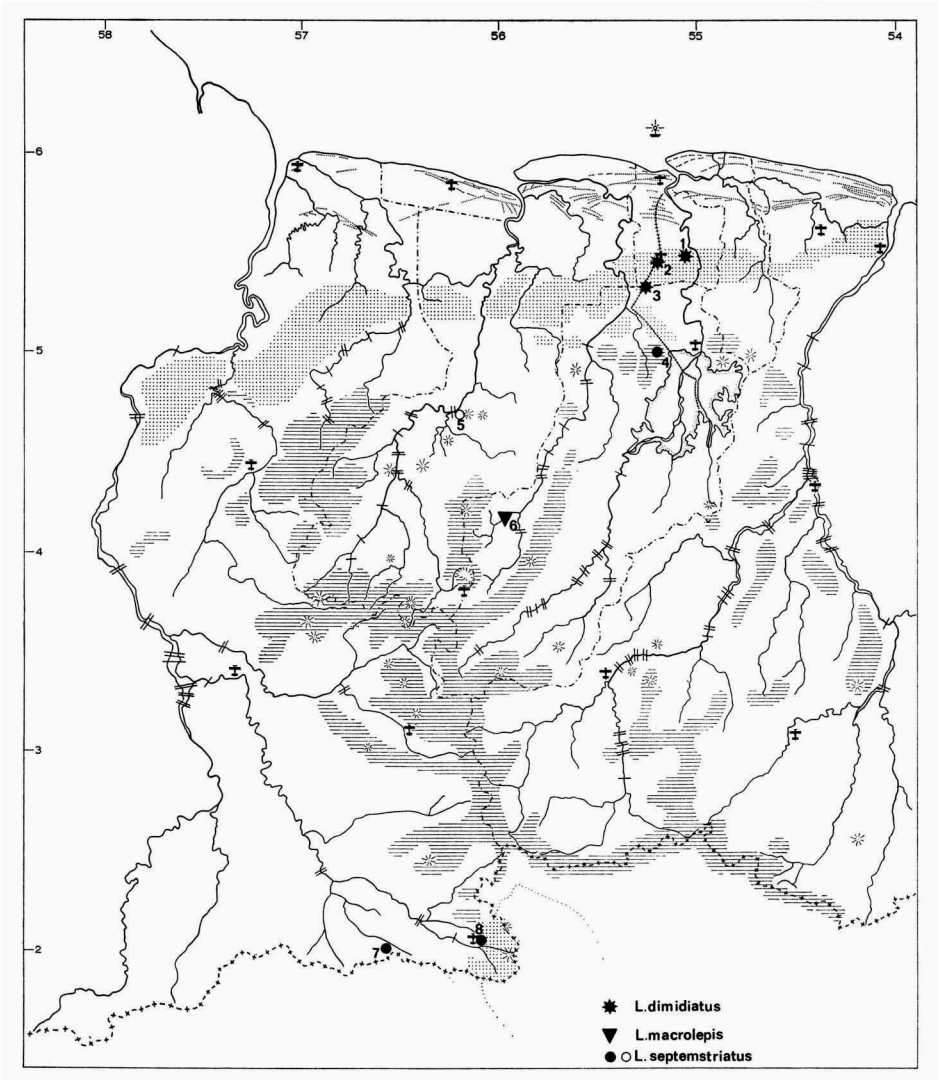

Fig. 5. Recorded distribution of *Leptotyphlops dimidiatus* (Jan) (3 asterisks), *L. macrolepis* (Peters) (1 triangle) and *L. septemstriatus* (Schneider) (4 dots; open dot: no material preserved) in Surinam. 1, Powakka; 2, Zanderij; 3, Railway km 62; 4, Brown's Mountain; 5, Raleigh Cataracts; 6, Toekoemoetoe Creek; 7, New River, 750 feet; 8, 2 km E. airstrip Sipaliwini.

Leptotyphlops dimidiatus (Jan)

Stenostoma dimidiatum Jan, 1861: 188.

Material. — SURINAM. Distr. Para. Powakka: 1 ex., CM 44284, 22-IX-1966, leg. M. H. de la Fuente. Zanderij: 1 ex., ZMA 12974, 15-VII-1956, leg. J. v. d. Kamp; 1 ex., RMNH 17835, 20-XII-1974, leg. M. S. Hoogmoed; 1 ex., RMNH 17836, May 1975, leg. A. Abuys. Distr. Brokopondo. Railway km 62: 2 ex., RMNH 13479-80, 26 April — 16 May 1949, leg. A. Brouwer.

Diagnosis. — A large *Leptotyphlops* of the *dulcis*-group, reaching a recorded maximum total length of 227 mm. Supraoculars present but small, either separate or fused with the oculars. Two supralabials, the anterior one not in contact with the supraocular, four scales along the edge of the upper lip between rostral and corner of mouth. Four infralabials. Total number of dorsals 190-197, ventrals 174-186, subcaudals 14+1 — 15+1. Number of scales around the middle of the tail 10. Tip of tail with a sharply pointed scale. Back uniformly dark-brown, belly uniformly white, with a fairly sharp demarcation between the dorsal and ventral colouration.

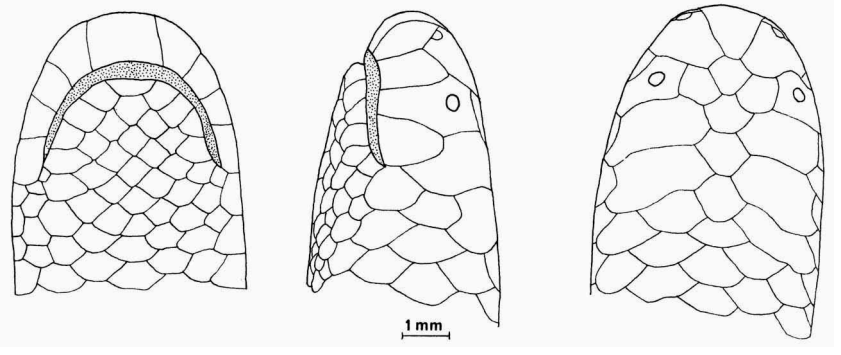

Fig. 6. Ventral, lateral and dorsal view (from left to right) of the head of *Leptotyphlops dimidiatus* (Jan), RMNH 13480.

Measurements and scale counts. — Total length 154-227 mm, tail length 10-13 mm, diameter of body 4.3-4.8 mm, ratio total length/tail length 14-17.4 ($\bar{x}$ = 15.7, N = 5), ratio total length/diameter of body 35-51.6 ($\bar{x}$ = 40.9, N = 5), dorsals 190-197 ($\bar{x}$ = 194.8, N = 5), ventrals 174-186 ($\bar{x}$ = 180, N = 5), subcaudals 14-15 ($\bar{x}$ = 14.8, N = 5), scales around the middle of the tail 10, supralabials 2, infralabials 4.

Range, distribution and habitat. — According to Orejas-Miranda (1967) the species only occurs in a restricted zone in the border area of Brazil, Guyana and Venezuela, coinciding with the Rupununi savanna and its exten-

sions into Brazil and Venezuela. In 1970 the area is given as being slightly more extensive by the same author. Here the species is reported from Surinam for the first time. Hitherto in Surinam it has only been recorded from a restricted area in the coastal savanna area, only slightly elevated above sea level, where the substratum consists of white sand. The vegetation in that area consists of alternating patches of savanna and a low type of forest. The area at Zanderij where the specimens were caught is wet, well grown with shrubs and herbs and with a few patches of bare white sand, situated between a wet type of forest along a creek and a sandy savanna. RMNH 17835 was found drowned in a concrete basin let into the ground. These data, scarce though they are, seem to implicate that this species is restricted to wet savanna areas. Thus, it might be a member of the Roraima-centre fauna (Müller, 1973), with a distribution restricted to savanna areas in the Guiana region.

Leptotyphlops macrolepis (Peters)

Stenostoma macrolepis Peters, 1857: 402.
Glauconia macrolepis: Van Lidth de Jeude, 1904: 84.
Leptotyphlops ihlei Brongersma, 1933: 175.
Leptotyphlops macrolepis: Orejas-Miranda, 1966: 2; 1967: 430.

Material. — SURINAM. Distr. Saramacca. Toekoemoetoe Creek: 1 ex., RMNH 4466, 19-II-1903, leg. Saramacca Expedition (holotype of *L. ihlei* Brongersma).

BRAZIL. Estado Amazonas. São Manoel, Rio Cururú, Alto Tapajoz: 1 ex., MNRJ 386. Estado Para. Canindé, Rio Gurupi: 1 ex., MZUSP 4286, 6/15-IV-1963, leg. B. Malkin. Aldeia Coarací, Rio Gurupi: 1 ex., MZUSP 4308, 2/4-XII-1964, leg. B. Malkin.

PERU. Loreto. Igarapé Champuia, Alto Curanja, Alto Purus: 1 ex., MZUSP 5522, leg. H. Schultz.

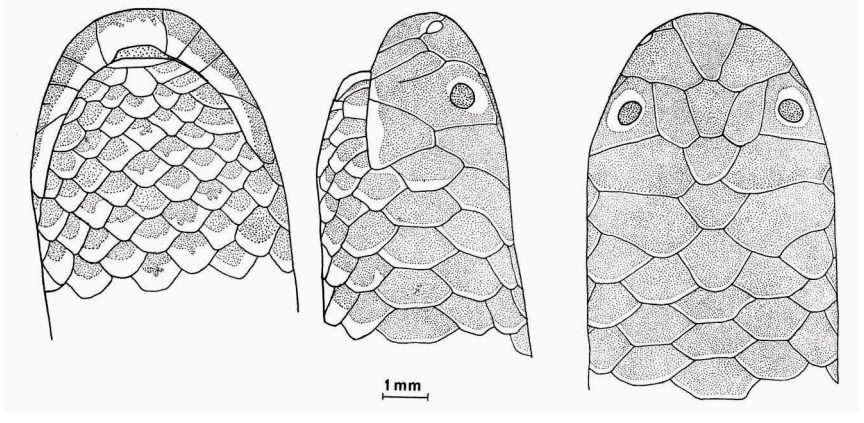

Fig. 7. Ventral, lateral and dorsal view (from left to right) of the head of *Leptotyphlops macrolepis* (Peters), RMNH 4466.

Diagnosis. — A large *Leptotyphlops* of the *dulcis*-group, reaching a total length of 274 mm. Supraoculars present, small, not in contact with the first supralabial. Three supralabials, two between nasal and ocular, one behind the ocular, five scales along the edge of the upper lip between rostral and corner of mouth. Four infralabials. Total number of dorsals 235, ventrals 212, subcaudals 23+1. Number of scales around the middle of the tail 10. Tip of tail with a very sharply pointed scale. Dorsals brown with narrow white edges, causing the back to be brown with a white reticulation. Ventrals brown with wide white edges, causing the belly to be white with longitudinal series of brown spots.

Measurements and scale counts (Brazilian and Peruvian specimens not included). — Total length 274 mm, tail length 24 mm, diameter of body 5.6 mm, ratio total length/tail length 11.4, ratio total length/diameter of body 48.9, scale counts see diagnosis.

Habitat. — This species seems to be an inhabitant of rainforest, as this is the only type of habitat found in the area around Toekoemoetoe Creek.

Range and distribution. — The range of the species is extensive and covers the greater part of northern South America, extending from Panama and Colombia eastwards (Orejas-Miranda, 1967, 1970). No additional specimens of this species have become available from Surinam since 1903. In Surinam it is most probably restricted to the area south of the coastal savanna's. Roze (1966) reports this species from altitudes between sea level and 1800 m.

Leptotyphlops septemstriatus (Schneider)

Anguis septemstriatus Schneider, 1801: 341.

Material. — SURINAM. Distr. Brokopondo. Brown's Mountain: 1 ex., RMNH 17837, 13-VII-1968, leg. M. S. Hoogmoed. Distr. Nickerie. Sipaliwini: 1 ex., RMNH 17838, 2 km. E. of airstrip, 5-IX-1968, leg. M. S. Hoogmoed. New River, 750 feet: 1 ex., BM 1939.1.183, leg. C. A. Hudson.

FRENCH GUIANA. Cayenne: 1 ex., MNHNP 03-230.

VENEZUELA. Estado Bolivar. Road between Caicara and San Juan de Manapiare, km 180: 1 ex., SCNLS 6176, 10-IV-1974, leg. R. Guerrero. Territorio Amazonas. Simarawochi, Rio Metacuni: 1 ex., MBUCV no number, 30-III-1973, leg. W. Perez.

BRAZIL. Estado Para. Nova Olinda: 1 ex., IB 25496, 1962. Estado Amazonas. Uaupes, Rio Negro: 1 ex., IB 22153, Tapurucuara, July 1962, leg. F. M. Oliveira. Oriximiná: 1 ex., MZUSP 5072, 18-XI-1968, leg. Exp. Perm. Am.

No known locality: 1 ex., ZMB 3876 (holotype); 1 ex., RMNH 3710.

Diagnosis. — A large *Leptotyphlops* of the *septemstriatus* group, reaching a recorded maximum length of 300 mm. Supraoculars absent. Two supra-

labials, the anterior one small, four scales along the edge of the upper lip between rostral and corner of mouth. Total number of dorsals 213-227, ventrals 206-222, subcaudals 8+1 — 10+1. Number of scales around the middle of the tail 12. Tip of tail with a blunt, conical scale. Back whitish with seven brown, longitudinal stripes, belly immaculate, white.

Measurements and scale counts (Venezuelan and Brazilian specimens not included). — Total length 189-300 mm, tail length 4-10 mm, diameter of body 4.4-7.8 mm, ratio total length/tail length 30.0-47.3 ($\bar{x}$ = 36.3, N = 4), ratio total length/diameter of body 38.5-47.9 ($\bar{x}$ = 43.0, N = 4), dorsals 213-227 ($\bar{x}$ = 220, N = 2), ventrals 206-222 ($\bar{x}$ = 214, N = 2), subcaudals 8-10 ($\bar{x}$ = 9.2, N = 5), scales around the middle of the tail 12, supralabials 2, infralabials 3-4.

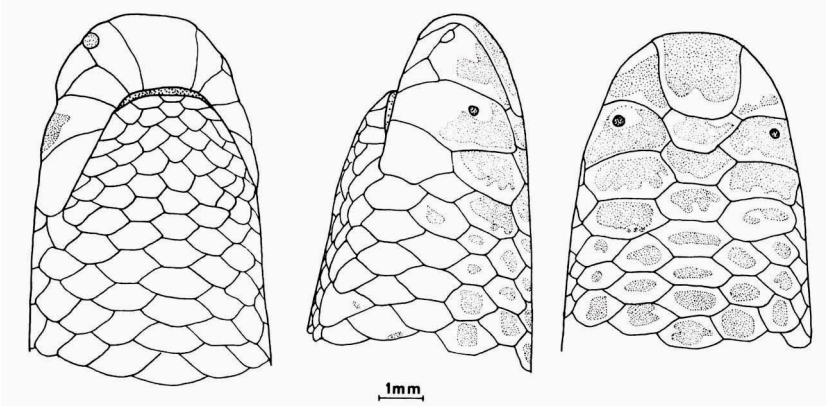

Fig. 8. Ventral, lateral and dorsal view (from left to right) of the head of *Leptotyphlops septemstriatus* (Schneider), RMNH 17837.

Colour in life. — From my fieldnotes concerning RMNH 17837 and from slides of this specimen I take the following description. Dorsum anteriorly pinkish, posteriorly grey, with seven longitudinal brown stripes. Dorsal and lateral head scales with brown spots. Belly transparent, immaculate, pinkish anteriorly, bluish posteriorly and white under the tail. The colour description of RMNH 17838, based solely on field notes, reads as follows. Snout cream-coloured, back of head and neck orange-brown, dorsum yellow-brown with dark-brown longitudinal stripes. Chin cream-coloured, belly anteriorly orange-brown, posteriorly changing into yellow-brown, which further posteriorly turns into grey. Ventral surface of tail orange-brown.

Notes on living specimen. — When captured RMNH 17837 threw its body in a number of coils and formed an irregular ball, under which the head

was hidden. Due to the lack of osteoderms this species is very soft to the touch and much more agile than the other Surinam representatives of this genus which I observed alive.

Habitat. — Apart from the three Surinam specimens mentioned above, a fourth specimen was collected at Raleigh Cataracts, Coppename River, distr. Saramacca, Surinam, but this specimen escaped from the collecting bag before it could be preserved. Three specimens were collected in rainforest, the Brown's Mountain specimen on the ground, just after a tractor had cleared a road in the forest. Both the Raleigh Cataracts and Sipaliwini specimens were found inside rotten logs on the forest-floor. The last specimen shared its hide-out with a specimen of *Amphisbaena vanzolinii* Gans and another of *Lithodytes lineatus* (Schneider). No data are available on the period of activity of this species.

Range and distribution. — The species is only known from the Guianan parts of Venezuela and Brazil, from Guyana, Surinam and French Guiana. In Surinam only known from the interior, south of the coastal savanna's. The Surinam specimens were collected at altitudes between 100 and 250 m. Specimens reported by Roze (1966) from Rio Uraricapará, Venezuela, near the Brazilian-Venezuelan border and from Simarawochi (850 m) suggest that this species also occurs in higher elevations.

Remarks. — In 1925 Mertens described the first specimen of this species with a known locality from Uypiranga, Rio Negro. However, in 1967 Orejas-Miranda stated: "Terra typica: Rio Negro, Amazonia, Brasil (Mertens, 1925)". This conclusion yet is not justified. In the first place Mertens nowhere indicates the Rio Negro as a restricted type locality and, secondly, the holotype (ZMB 3876) of the species is still in existence, a fact apparently unknown to Orejas-Miranda. There is no locality attached to the holotype, but there are some indications which may help us to restrict the type-locality correctly. According to the labels this specimen is from the "Breslauer Museum ex coll. Lampiana", which in part was also stated by Schneider in his original description. Lampe was a medical doctor in Hannover who possessed an important cabinet with objects of natural history. Several of the reptiles and amphibians in this cabinet were described by Schneider. In 1804 Lampe's collection came in the possession of Gravenhorst, who, in 1814, presented it to the natural history museum of Breslau (Gravenhorst, 1851). At least part of this material is now in the Berlin Museum. So far, I could not obtain more information on this collection. It is difficult to say whence

the material forming Lampe's collection was obtained. As apparently it was obtained well before 1800, it seems unlikely that the type of *Leptotyphlops septemstriatus* came from the Rio Negro, a region hardly explored in those days. Therefore, the restriction of the type-locality presumed by Orejas-Miranda seems unjustified. It appears, however, that the Lampe collection contained several items from Dutch possessions and probably a substantial part of his material reached him via the Netherlands, where at that time natural history cabinets were very popular. Therefore, it does not seems too far-fetched to suppose that the holotype of *L. septemstriatus* (Schneider) came from Surinam and I here correct the type-locality and restrict it to Surinam.

Leptotyphlops tenella Klauber

Typhlops reticulatus: Müller, 1878: 588.
Glauconia albifrons: Van Lidth de Jeude, 1904: 84, 1917: 536.
Leptotyphlops tenella Klauber, 1939: 59; Orejas-Miranda, 1967: 435.

Material. — SURINAM. No locality: 2 ex., SM no numbers, 1 ex., MBS 363. Distr. Para. Powakka: 1 ex., RMNH 13478, 10-IX-1963, leg. M. H. de la Fuente. Zanderij: 1 ex., RMNH 17842, 1975, leg. A. Abuys. Distr. Brokopondo. Phedra: 1 ex., RMNH 13475, 25-XI-1946, leg. F. H. Schols. Brokopondo: 1 ex., RMNH 13472, 15-VIII-1965, 1 ex., RMNH 13477, 6-VI-1965, both leg. G. F. Mees; 1 ex., RMNH 13473, 6-IX-1964, leg. M. Boeseman. Afobaka: 1 ex., RMNH 13471, 26-III-1964, leg. P. Leentvaar. Brown's Mountain: 1 ex., RMNH 17839, 11-XI-1968, leg. R. Hoogmoed-Verschoor. Marowijne Creek: 1 ex., ZMA 12661, 35 km S. of Afobaka, 26-V-1966, leg. H. Nijssen. Mamadam, Suriname River: 1 ex., RMNH 13482, 28-VII-1910, leg. J. F. Hulk (Corantijn Expedition). Toekoemoetoe Creek: 1 ex., RMNH 13476, 12-VII-1944, probably leg. L. Schmidt. Distr. Saramacca. Raleigh Cataracts: 1 ex., RMNH 17841, Lolopasi, 13-VII-1975, leg. P. A. Teunissen; 1 ex., RMNH 17843, March 1972, leg. G. F. Mees. Distr. Nickerie. Upper Nickerie River: 2 ex., RMNH 13474, leg. H. van Capelle. Rechter Kabalebo River: 1 ex., RMNH 17840, 24-V-1975, leg. M. S. Hoogmoed & S. B. Kroonenberg. Distr. Marowijne. Soeakisi Creek, left bank of Tapanahony River: 1 ex., ZMA 13216, 22-IV-1967, leg. H. Nijssen.

VENEZUELA. Estado Bolivar. 20 km S. of El Manteco: 1 ex., RMNH 17924, 31-X-1976, leg. M. S. Hoogmoed. Right bank Caroni River, Guri Barrage: 1 ex., SCNLS 3520, 12-VIII-1968, leg. A. J. Perez. San Salvador de Paul: 1 ex., MBUCV no number, 3-X-1969, leg. R. Jimenez.

BRAZIL. Territorio do Amapá. Serra do Navio: 1 ex., MNRJ R 3290, September 1963, leg. H. F. Berla; 2 ex., IB 24760, 24774, 2/24-II-1965, 3 ex., IB 25426-28, 4/VIII-19/VIII-1965, all leg. A. R. Hoge. Rio Anicoly: 1 ex., IB 19129, 30-XII-1958, leg. D. S. Gomes. Oiapoc: 1 ex., IB 24861, 2/24-II-1965, leg. A. R. Hoge. Estado Para. Rio Cuminá: 1 ex., MNRJ 389. Estado Amazonas. Itapiranga: 2 ex., MZUSP 5520, 9/12-IX-1968, leg. Exp. Perm. Am. Alto Rio Catrimany: 1 ♂, MNRJ 390. Borba: 2 ex., MNRJ 1561-62. Manacapuru: 1 ex., IB 30689, 12/I-12/II-1970, leg. J. C. de Freitas. Estado Mato Grosso. Aldeia do Tapirapé: 1 ex., MNRJ 388. Utiarití, Rio Papagaio: 1 ex., MZUSP 5589, August 1961, leg. K. Lenko; 1 ex., MZUSP 4627, 6-XII-1966, leg. K. Lenko & F. S. Pereira. Territorio de Rondonia. Forte Principe da Beira: 2 ex., MZUSP 3786-87, 10-XII-1967, leg. G. R. Kloss.

Diagnosis. — A large *Leptotyphlops* of the *tessellatus*-group, reaching a recorded maximum length of 215 mm. Supraoculars present, forming a narrow suture with the first supralabial or just touching it. Two supralabials, the anterior one reaching to the level of the centre of the eye. Eye large, bulging. Four scales along the edge of the upper lip between rostral and corner of mouth. Total number of dorsals 215-233, ventrals 200-217, subcaudals 16+1 — 20+1. Number of scales around the middle of the tail 10. Tip of tail with a sharply pointed scale. Back blackish brown with narrow white

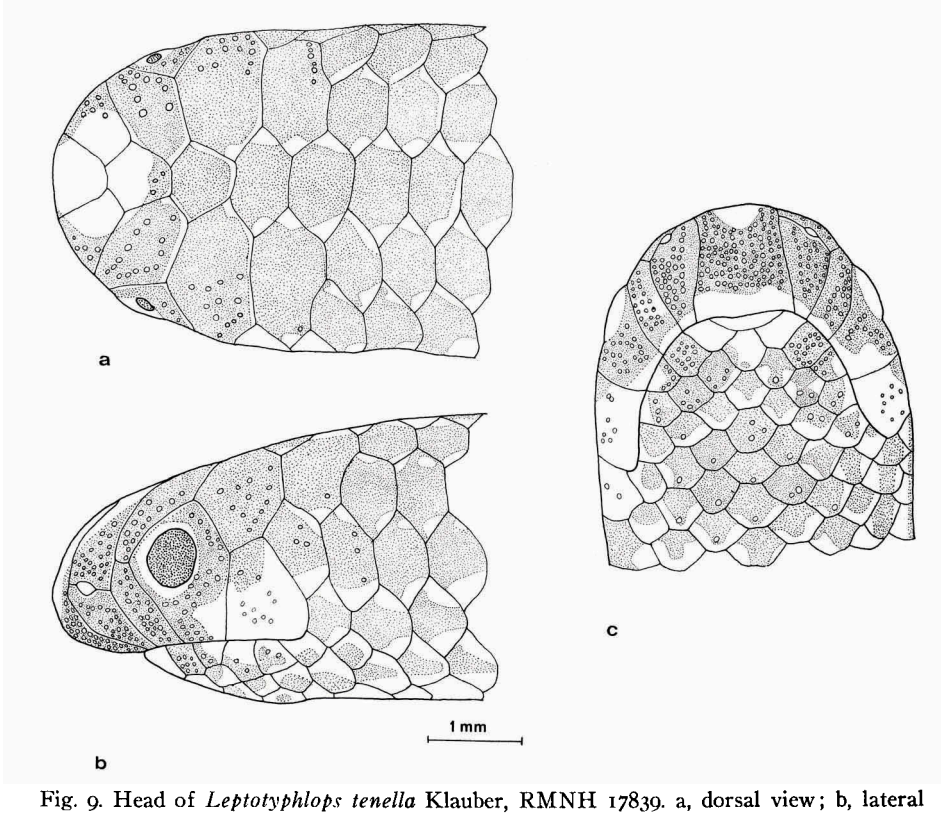

Fig. 9. Head of *Leptotyphlops tenella* Klauber, RMNH 17839. a, dorsal view; b, lateral view; c, ventral view.

zigzag stripes, caused by the sides of the dorsals and laterals showing a narrow white zone. Belly anteriorly white with longitudinal rows of brown spots, posteriorly dark greyish brown with indistinct lighter zigzag stripes. Posterior part of belly lighter than back. On top of head and on tip of tail a white spot, the last one reaching further anteriorly on the ventral than on the dorsal surface of the tail.

Measurements and scale counts (Venezuelan and Brazilian specimens not included). — Total length 71-215 mm, tail length 5-12 mm, diameter of body 1.9-4.6 mm, ratio total length/tail length 14.0-19.5 ($\bar{x}$ = 15.6, N = 20), ratio total length/diameter of body 37.4-59.6 ($\bar{x}$ = 49.5, N = 20), dorsals 215-233 ($\bar{x}$ = 223.5, N = 20), ventrals 200-217 ($\bar{x}$ = 207.8, N = 19), subcaudals 16-20 ($\bar{x}$ = 17.6, N = 19), scales around the middle of the tail 10, supralabials 2, infralabials 4.

Colour in life. — Black with a yellow spot on the frontal region, covering the upper part of the rostral, the anterior part of the frontal, the mediad part of the supranasals and sometimes the medio-anterior corner of the supraoculars; a narrow, yellow, median stripe may extend down the rostral, originating from the frontal spot. Another yellow spot on the tip of the tail, extending further forward ventrally than dorsally.

Habitat. — Only for a few specimens habitat data are available. Most specimens come from the rainforest region south of the coastal savanna belt. They were found crawling on the forest floor in daytime (RMNH 17839, 17840, 13482), several times close to a river or a creek (RMNH 17840, 17841, 13482), once a specimen was found inside a rotten log (RMNH 13477). Bailey & Carvalho (1946) report a specimen that was found "within a much perforated, moss-covered rock in humid forest". Vanzolini (1970) reported several cases of climbing in this (and other *Leptotyphlops*-) species, concluding that it was mainly induced by the habit of following ant- and termite-trails, though he does not completely exclude the possibility that flooding plays a role in the Amazonian region. Most of the cases he reports on concern specimens climbing the outer surface of objects (tree-trunks, bamboo, walls of houses). During a recent visit to El Manteco, Estado Bolivar, Venezuela, I collected a specimen of this species (RMNH 17924) in daytime from under the bark of a standing, vertical tree, at a height of approximately 2.20 m above the ground. The bark was only loosely attached to the tree-trunk and underneath there were several termite-paths. Unfortunately, neither the exact position of the specimen in relation to the termite paths, nor whether it was active or not, could be established. However, I think that the circumstantial evidence (no flooding in the region (dry season), termites present underneath the bark) strongly indicates that this specimen was actively following the termites on their way up the tree. Thus, I think that this observation favours Vanzolini's opinion that the climbing arose as a consequence of trail-following. Regarding Vanzolini's remarks concerning the partly diurnal habits of this species and the relation to eye-size, I think it

relevant to mention here that *L. tenella* Klauber is the species with the largest eyes, both absolutely and relatively, in the Amazonian region.

A few Surinam specimens (RMNH 13475, 13478, 17841) come from within the white sand coastal savanna belt, where they are known from the same localities as *Leptotyphlops dimidiatus* (Zanderij, Powakka). However,

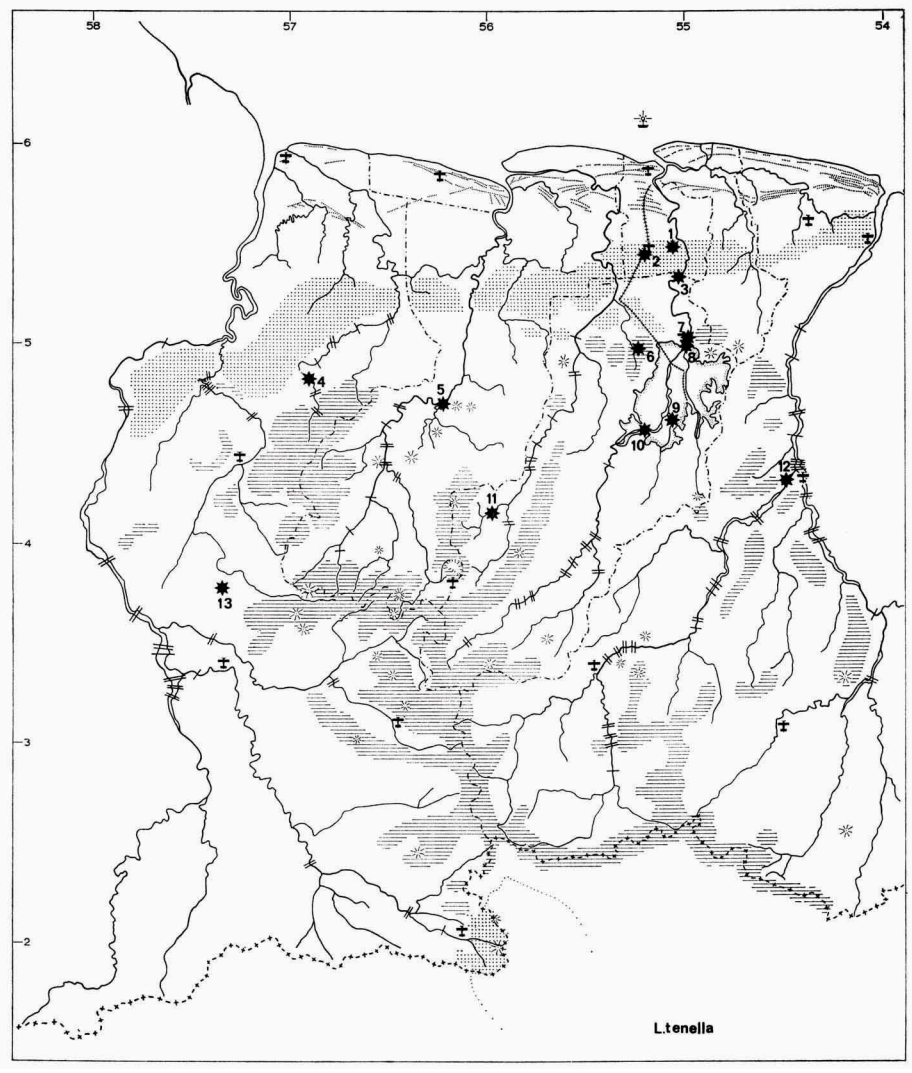

Fig. 10. Distribution of *Leptotyphlops tenella* Klauber in Surinam. 1, Powakka; 2, Zanderij; 3, Phedra; 4, Upper Nickerie River; 5, Raleigh Cataracts; 6, Brown's Mountain; 7, Brokopondo; 8, Afobaka; 9, Marowijne Creek; 10, Mamadam; 11, Toekoemoetoe Creek; 12, Soeakisi Creek; 13, Rechter Kabalebo River.

as this seems to be a forest-species, it probably is not really sympatric with *L. dimidiatus,* but only living in the same general area in a different microhabitat, possibly gallery forest along creeks.

Range and distribution. — In Surinam the species occurs from the northern edge of the coastal savanna belt southward into the forested interior. Apart from the case of 'sympatry' mentioned above, this species is sympatric with other species of the genus as well, namely in the following places: Brown's Mountain with *L. collaris* and *L. septemstriatus,* Toekoemoetoe Creek with *L. macrolepis.* To what extent different microhabitats are involved is not known. *L. tenella* is known to occur from sea level to at least 496 m above it. This species is known from Trinidad, Venezuela, Guyana, Surinam, French Guiana, Amazonian Brazil south to Mato Grosso and north-eastern Peru (see maps in Orejas-Miranda, 1967 and in Orejas-Miranda & Zug, 1974).

The data obtained on the Surinam representatives of this genus have been compiled in the following key. In the light of the recent discovery of *L. cupinensis* in Surinam and the discovery of a new species, *L. collaris,* in Surinam and French Guiana, it seems likely that other species of the genus (e.g. *L. amazonicus*) still await discovery in this region.

KEY TO THE SPECIES OF *LEPTOTYPHLOPS* PRESENTLY KNOWN TO OCCUR IN SURINAM

1. Supraoculars absent, tip of tail bluntly pointed, number of scales around the middle of the tail 12 or 14 2

Supraoculars present (sometimes fused with the ocular), tip of tail sharply pointed, number of scales around the middle of the tail 10 3

2. Back with seven longitudinal brown stripes, number of scales around the middle of the tail 12, number of dorsals 213-227 . . . . . *Leptotyphlops septemstriatus* (Schneider)

Back (without magnification) apparently without longitudinal stripes, number of scales around the middle of the tail 14, number of dorsals 265 . . . . . *Leptotyphlops cupinensis* Bailey & Carvalho

3. Two scales bordering the upper lip between the nasal and the ocular, number of subcaudals more than 20 . . *Leptotyphlops macrolepis* (Peters)

One scale bordering the upper lip between the nasal and the ocular, number of subcaudals less than 20 4

4. First supralabial and supraocular in contact, 200 or more dorsals, white spots on frontal region and tip of tail only, eyes very large, bulging . . . . . *Leptotyphlops tenella* Klauber

First supralabial and supraocular separated, less than 200 dorsals, white spots absent or present, but in the last case also a pair of white spots on the neck, eyes small, not bulging 5

5. Dorsals 190-197, no white spots . . *Leptotyphlops dimidiatus* (Jan)

Dorsals 155-166, white spots on the tip of the snout, the tip of the tail and in the neck . . . . . *Leptotyphlops collaris* nov. spec.

Zoogeography. — The species of *Leptotyphlops* presently known from the Guianan region can be divided into two groups:

1. A group containing four species whose distribution does not extend beyond the limits of Guiana (region bordered by Orinoco, Cassiquiare, Rio Negro, Amazon and Atlantic Ocean). These species are: *L. amazonicus*, *L. collaris*, *L. dimidiatus* and *L. septemstriatus*.

2. A group containing three species whose distribution extends far beyond the limits of Guiana: *L. cupinensis*, *L. macrolepis* and *L. tenella*.

Of the first four species *L. dimidiatus* may be regarded as a member of the Roraima-centre fauna, the members of which are adapted to savanna conditions. The other three species of this group are to be looked upon as members of the Guiana-centre fauna, consisting of forest-inhabitants.

L. tenella probably is a member of the Amazonian-centre fauna. It is difficult to assign *L. cupinensis* to a certain centre. In fact, its known distribution is very unusual for species occurring in the Guianas and probably is indicative for a much larger range, which might turn out to cover the greater part of the Amazon Basin and the Guianas. *L. macrolepis* is a wide-spread species which cannot be assigned to any faunal centre.

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Table 1: *Leptotyphlops collaris* nov. spec.

A		B	C	D	E	F	G	H	I	J	K
RMNH 13468	a	96	7	3.0	13.7	32.0	14	15+1	10	141	155
	b*	102	7	3.1	14.6	32.9	14	14+1	10	142	156
	c	101	7	2.8	14.4	36.1	14	16+1	10	146	161
	d	103	8	3.0	12.9	34.3	14	16+1	10	150	166
17748		104	7	2.5	14.9	41.6	14	14+1	10	146	160
17833		71	5	2.1	14.2	33.8	14	15+1	10	151	166
17834		103	8	2.7	12.9	38.1	14	15+1	10	148	163
MCZ R 149550		101	8	2.9	12.6	34.8	14	17+1	10	151	166
MP -		57	5	1.8	11.4	31.7	14	14+1	10	146	160

Table 2: *Leptotyphlops dimidiatus* Jan

A	B	C	D	E	F	G	H	I	J	K
RMNH 13479	154	10	4.4	15.4	35.0	14	15+1	10	174	190
13480	190	12	4.8	15.8	40.0	14	15+1	10	186	197
17835	-	-	-	-	-	14	-	-	-	-
17836	227	13	4.4	17.4	51.6	14	15+1	10	184	195
ZMA 12974	154	11	4.3	14.0	38.1	14	15+1	10	180	197
CM 44284	190	12	4.8	15.8	39.6	14	14+1	10	176	195

Table 3: *Leptotyphlops septemstriatus* (Schneider)

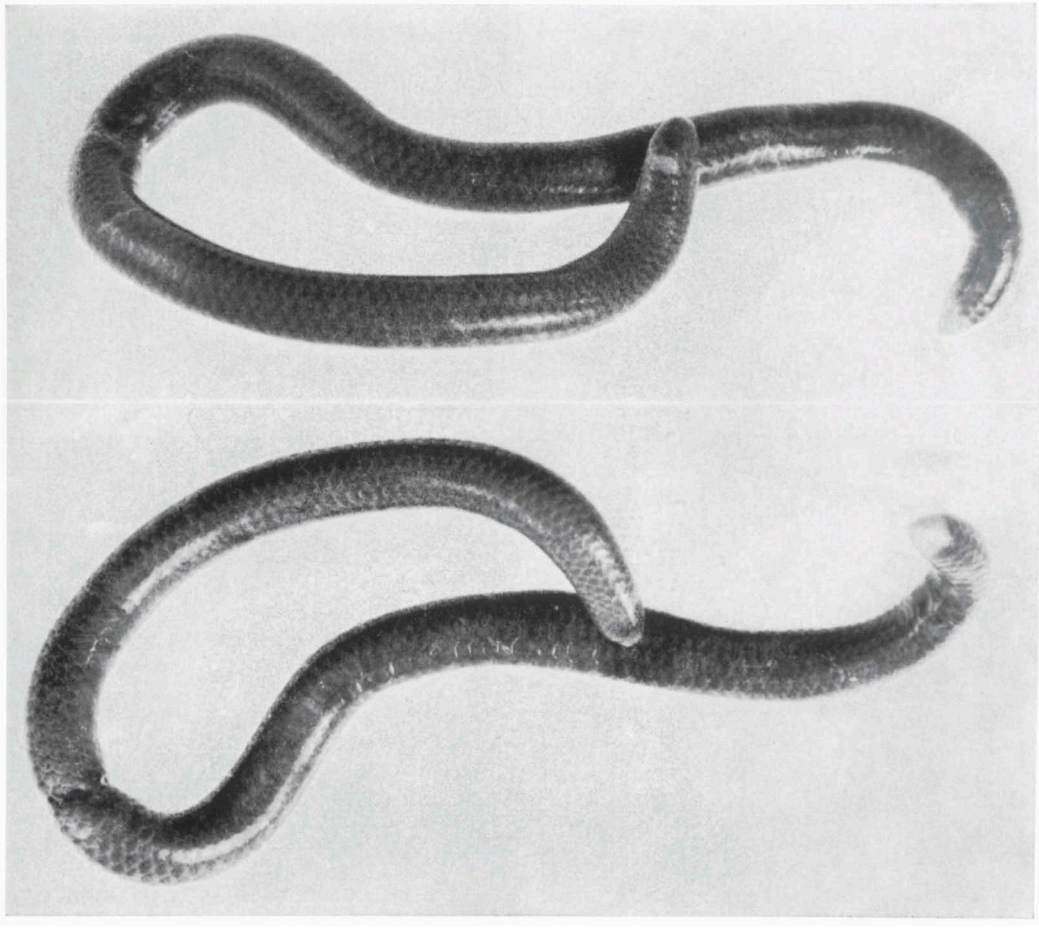
A	B	C	D	E	F	G	H	I	J	K
RMNH 17837	212	7	5.0	30.3	42.4	14	8+1	12	206	213
17838	189	4	4.4	47.3	43.0	14	10+1	12	222	227
BM 1939.1.1.83	± 225	4	5.8	-	-	14	9+1	-	-	-
MP 03 - 230	300	10	7.8	30.0	38.5	14	9+1	-	-	-
ZMB 3876*	225	6	4.7	37.5	47.9	14	10+1	-	-	-

Table 4: *Leptotyphlops tenella* Klauber

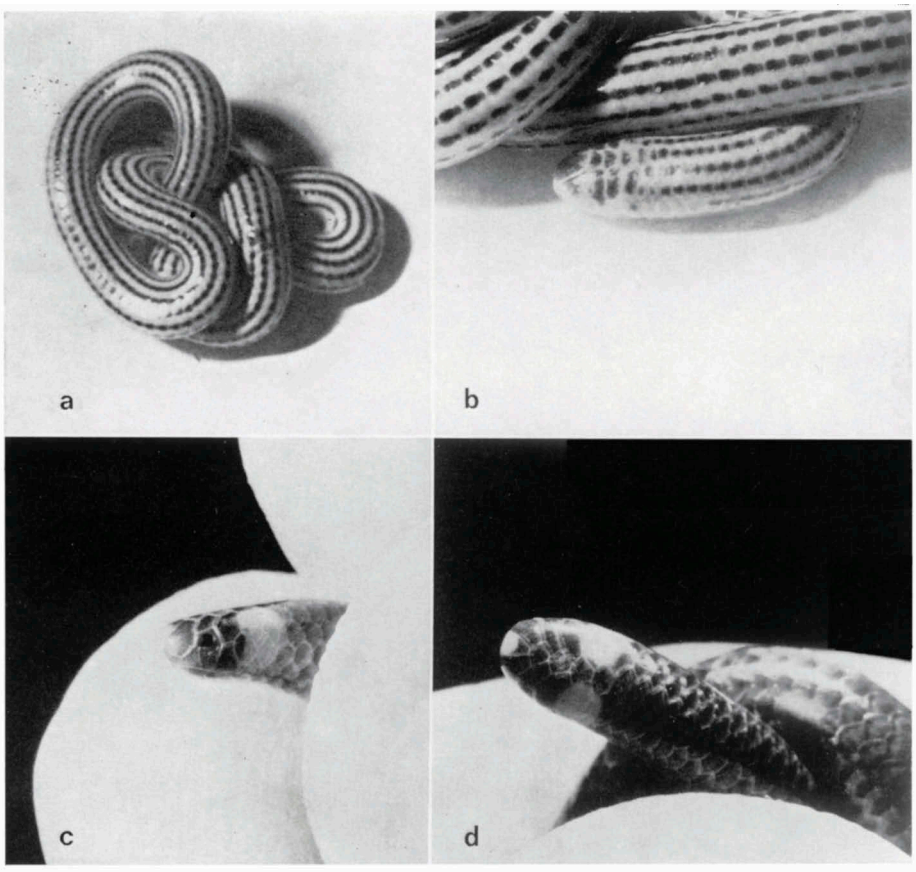
A		B	C	D	E	F	G	H	I	J	K
RMNH	13471	119	7	2.3	17.0	51.7	14	18+1	10	206	223
	13472	215	11	4.0	19.5	53.0	14	16+1	10	217	233
	13473	116	7	2.1	16.6	55.2	14	20+1	10	215	231
	13474 a	159	11	3.3	14.5	48.2	14	17+1	10	207	222
	b	174	12	3.5	14.5	49.7	14	18+1	10	204	219
	13475	132	9	3.0	14.7	44.0	14	17+1	10	202	217
	13476	173	12	3.1	14.4	55.8	14	16+1	10	202	219
	13477	71	5	1.9	14.2	37.4	14	17+1	10	206	219
	13478	168	11	3.8	15.3	44.2	14	18+1	10	203	218
	13481	130	8	3.3	16.3	39.4	14	17+1	10	207	224
	13482	149	8	2.5	18.6	59.6	14	-	-	-	229
	17839	150	10.5	3.2	14.3	46.9	14	18+1	10	209	225
	17840	215	14	4.6	15.4	46.7	14	17+1	10	200	215
	17841	152	10	2.7	15.2	56.3	14	16+1	10	209	224
	17842	154	11	3.4	14.0	45.3	14	17+1	10	201	215
	17843	153	10	2.6	15.3	58.8	14	18+1	10	208	222
ZMA	12661	194	12.3	4.0	15.8	48.5	14	19+1	10	217	233
	13216	192	13	3.7	15.5	51.9	14	19+1	10	212	227
SM	-	142	10	2.8	14.2	50.7	14	19+1	10	215	231
	-	88	5	1.9	17.6	46.3	14	18+1	10	208	223

Explanation of tables 1-4

A = museum and reg. no. B = total length, C = tail length, D = diameter of body, E = ratio total length/tail length, F = ratio total length/diameter of body, G = number of scales around midbody, H = number of subcaudals, I = number of scales around middle of tail, J = number of ventrals, K = number of dorsals. An asterisk indicates a holotype.



Dorsal (above) and ventral (below) view of the holotype of *Leptotyphlops collaris* nov. spec., RMNH 13468b.



a, Coiled living specimen of *Leptotyphlops septemstriatus* (Schneider), RMNH 17837. b, Detail of head of the same specimen as in a. c, Lateral view of head of living specimen of *Leptotyphlops collaris* nov. spec., RMNH 17748. d, Dorsal view of head of same specimen as in c. (a and b after slides by the author, c and d after slides by Mr. N. Degallier).