

A Revision of the Neotropical  
Aquatic Beetle Genus *Stenhelmoides*  
(Coleoptera: Elmidae)

PAUL J. SPANGLER  
and  
PHILIP D. PERKINS

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ABSTRACT

Spangler, Paul J., and Philip D. Perkins. A Revision of the Neotropical Aquatic Beetle Genus *Stenelmoides* (Coleoptera: Elmidae). *Smithsonian Contributions to Zoology*, number 479, 63 pages, 262 figures, 1989.—Five previously described species and nine new species are recognized for the genus. The 14 taxa now known are: *S. antennarius*, new species; *S. beebei*, new species; *S. grandis*, new species; *S. grouvellei* (Pic); *S. guyanensis* Grouvelle; *S. inconscriptus*, new species; *S. mimicus*, new species; *S. platysternum*, new species; *S. pubipes*, new species; *S. rufulus* (Hinton); *S. stegastus*, new species; *S. strictifrons* Grouvelle; *S. submaculatus* (Hinton); and *S. variabilis*, new species. The species are assigned to three species groups; keys to those groups and species are included. The species are redescribed or described and illustrated by line drawings and scanning electron micrographs. A map of the known distribution of each species is included. Some typical biotopes are illustrated by photographs and briefly described.

RESUMEN

Cinco especies previamente descritas y nueve especies nuevas son reconocidas para este genero. Los 14 taxa conocidos ahora son: *Stenelmoides antennarius*, sp. nov.; *S. beebei*, sp. nov.; *S. grandis*, sp. nov.; *S. grouvellei* (Pic); *S. guyanensis* Grouvelle; *S. inconscriptus*, sp. nov.; *S. mimicus*, sp. nov.; *S. platysternum*, sp. nov.; *S. pubipes*, sp. nov.; *S. rufulus* (Hinton); *S. stegastus*, sp. nov.; *S. strictifrons* Grouvelle; *S. submaculatus* (Hinton); y *S. variabilis*, sp. nov. Se designan 3 grupos de especies; se incluyen claves para los grupos y para las especies. Se describen o redescriben las especies y se ilustran por medio de dibujos a linea y microfotografias de microscopio electronico de barrido. Se incluye para cada especie un mapa con la distribucion conocida. Algunos biotopos tipicos se describen brevemente y se ilustran por medio de fotografias.

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# Contents

	<i>Page</i>
Introduction . . . . .	1
Acknowledgments . . . . .	1
Biology . . . . .	2
Distribution . . . . .	2
Distinguishing Characters . . . . .	2
Plastron . . . . .	2
Surface Sculpture . . . . .	3
Head . . . . .	3
Thorax . . . . .	3
Elytra . . . . .	3
Abdomen . . . . .	4
Legs . . . . .	4
Genitalia . . . . .	4
Secondary Sexual Characters . . . . .	4
Genus <i>Stenhelmoidea</i> Grouvelle, 1908 . . . . .	4
Species Groups . . . . .	5
Key to Species Groups of <i>Stenhelmoidea</i> . . . . .	6
Clave para los Grupos de Especies de <i>Stenhelmoidea</i> . . . . .	6
The <i>rufulus</i> Group . . . . .	7
Key to Species of <i>rufulus</i> Group . . . . .	7
Clave para las Especies del Grupo <i>rufulus</i> . . . . .	7
1. <i>Stenhelmoidea inconscriptus</i> , new species . . . . .	8
2. <i>Stenhelmoidea rufulus</i> (Hinton) . . . . .	11
3. <i>Stenhelmoidea pubipes</i> , new species . . . . .	17
4. <i>Stenhelmoidea antennarius</i> , new species . . . . .	20
The <i>guyanensis</i> Group . . . . .	24
Key to Species of <i>guyanensis</i> Group . . . . .	25
Clave para las Especies del Grupo <i>guyanensis</i> . . . . .	25
5. <i>Stenhelmoidea guyanensis</i> Grouvelle . . . . .	27
6. <i>Stenhelmoidea beebii</i> , new species . . . . .	29
7. <i>Stenhelmoidea submaculatus</i> (Hinton) . . . . .	31
8. <i>Stenhelmoidea grandis</i> , new species . . . . .	34
9. <i>Stenhelmoidea platysternum</i> , new species . . . . .	39
10. <i>Stenhelmoidea grouvellei</i> (Pic) . . . . .	42
11. <i>Stenhelmoidea variabilis</i> , new species . . . . .	45
The <i>strictifrons</i> Group . . . . .	48
Key to Species of <i>strictifrons</i> Group . . . . .	48
Clave para las Especies del Grupo <i>strictifrons</i> . . . . .	49
12. <i>Stenhelmoidea stegastus</i> , new species . . . . .	49
13. <i>Stenhelmoidea mimicus</i> , new species . . . . .	53
14. <i>Stenhelmoidea strictifrons</i> Grouvelle . . . . .	57
Literature Cited . . . . .	63



# A Revision of the Neotropical Aquatic Beetle Genus *Stenelmoides* (Coleoptera: Elmidae)

*Paul J. Spangler  
and Philip D. Perkins*

## Introduction

The neotropical genus *Stenelmoides* and two included species from Guyana, *S. guyanensis* and *S. strictifrons*, were described by Grouvelle (1908). A third species, *Stenelmoides* [sic] *grouvellei* [an erroneous emendation of the generic name], was described by Pic (1923), and a fourth species, *Stenelsianus rufulus* Hinton (1934), was later transferred by Hinton (1937a) to the genus *Stenelmoides* under the erroneous name *Stenelmoides*. Soon thereafter Hinton (1937b) described the fifth species *Stenelmoides submaculatus* from Brazil and compared it with *S. guyanensis*.

The genus (as *Stenelmoides*) was next mentioned when Blackwelder (1944) listed it and the five included species in his checklist. No further information on the genus was published until Delève (1970) examined and published on a number of South American elmids from the Grouvelle and Pic collections in the National Museum of Natural History in Paris. In his treatment of the types of *Stenelmoides*, Delève illustrated the pronotal patterns of Grouvelle's *S. guyanensis* and *S. strictifrons* and Pic's *S. grouvellei*; in addition, he illustrated the genitalia of Pic's male type of *S. grouvellei*.

The members of the genus are moderate to large riffle beetles that lack pronotal carinae and sulci and usually have distinctive reddish or reddish black pronotal and elytral median areas surrounded by grayish plastron. Only one known species, *S. submaculatus*, has the lateral pronotal margins rimmed; all others have, at most, a vague indication of a partial rim apicolaterally.

In this first revision of the genus we discuss and illustrate

the plastron of *Stenelmoides*; characterize the *rufulus*, *platysternum*, and *strictifrons* Groups; provide synonymies for the 5 previously described species; discuss variations; describe and illustrate 9 new species from South America; provide the first information available on the habitats of several species; and provide a key to the 14 species presently assigned to the genus.

We were able to examine the type specimens of the five previously described species. The data associated with those specimens are detailed following our redescription of each species.

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The specimens of *S. grandis*, *S. mimicus*, and *S. strictifrons* from Cerro de la Neblina, Venezuela, were collected when Spangler et al. participated in a biological survey of that area. The expedition to Cerro de la Neblina Park was organized and directed by the Foundation for the Development of Physics, Mathematics, and Natural Sciences of Venezuela, with the patronage of the following Venezuelan organizations: The Ministry of Education, The Ministry of the Environment, The National Council of Scientific and Technological Research, the Venezuelan Air Force, and the National Institute of Parks. The project was coordinated by Dr. Charles Brewer-Carias and was conducted in collaboration with the National Science Foundation of the United States, the American Museum of Natural History, the Field Museum of Natural History, the Missouri Botanical Garden, and the Smithsonian Institution; biologists from several universities and other institutions also participated. We thank all of the organizations mentioned above and their administrators for their contributions to the survey and, in turn, to this study.

### Biology

Little is known about the biology of the members of this genus; most of the specimens included in this study were obtained at black lights operated along river banks. However,

within the past 5 years, Spangler et al., using aquatic nets and seines, collected adult specimens of several species of *Stenhelmoidea* from streams. The specimens were collected from whitewater and blackwater streams that varied from 1.5 to 35 m in width, and 2 cm to 1 m in depth and had substrates of gravel, cobbles, and boulders or, in one instance, a very sandy substrate without rocks. The specimens from the stream (the Río Paria Chico, T.F.A., Venezuela) with the sandy substrate were found in leaf packs lodged against woody debris partially buried in the sand. The colorimetric water chemistry analyses of the streams indicated a range of: pH, 4–5.5; oxygen, 9–12 ppm; hardness, 0. The streams were subjected to flash-flooding and the velocity of the streams at the times the collections were made ranged from 0.5–1.5 m/sec.

Unfortunately, the immature stages of *Stenhelmoidea* have not been identified.

The food of members of this genus has not been verified by examination of their gut contents but their presence in leaf packs in the Río Paria Chico near Puerto Ayacucho, T.F.A., Venezuela, suggests that they are herbivores that feed on dead leaves or other vegetable detritus in their habitats.

### Distribution

Members of the genus *Stenhelmoidea* have been collected from as far north as Michoacan, Mexico; in Central America they have been recorded from Belize, Costa Rica, Guatemala, Honduras, and Panama; in South America they have been collected from Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, and Venezuela.

The most widely dispersed species of *Stenhelmoidea*, *S. rufulus* (Hinton), is known to occur from southern Mexico through Central America and south to Peru at elevations ranging from 100 to 2900 m. Other members of the genus are known only from the Amazon Basin at elevations ranging from 100 to 300 m. The species *S. strictifrons* is known to occur from Brazil, the Guianas, Peru, and Venezuela but the other South American species are known only from one or two countries. Undoubtedly, when the South American stream fauna is explored, many new species of *Stenhelmoidea* will be found and the ranges of the species presently described will be widely expanded.

### Distinguishing Characters

The majority of the morphological terms used in the systematic section of this revision are known to students of Coleoptera. However, many elmid beetles have additional characters not present widely on other families of beetles. A brief discussion of the characters and associated terminology follows.

PLASTRON.—A plastron as originally defined by Harpster (1941, 1944) is a thin film of air that functions as a gill and is held in place by hydrofuge setae and other cuticular structures of diverse forms on various surfaces of some aquatic



organisms. As we have done in this revision, for convenience, some subsequent workers have referred to these areas of hydrofuge cuticular structures as the plastron. Plastrons are usually distributed in various patterns over the genae; prosternum; hypomera; epipleura; sides of the mesosternum, metasternum, and abdominal sterna; and, sometimes, on the femora. In two described elmid genera, *Stenhelmoides* and *Pagelmis*, from South America, the plastron also occurs on a variable but usually wide area of the dorsal surface of the head, thorax, and elytra. Because the types and structure of the plastron are too minute to distinguish without the use of a scanning electron microscope, we have not used the differences among them to differentiate species. However, the plastron-covered areas may be distinguished by the silvery glazed appearance on the surface, and those areas are described for the different species.

The plastron of members of *Stenhelmoides* consists of two very different structural types: scale-like setae and microtrichial mesh. Scale-like setae vary in width and development of lateral projections. The scale-like setae on the pronotum (Figures 179, 180), prosternum, and medial areas of the metasternum and abdomen are short, broad, fringed with proportionally short lateral projections and overlap one another only slightly; scale-like setae on the lateral areas of the elytra are longer, thinner, have longer lateral projections in relation to the width of the setal shaft, and overlap one another extensively; scale-like setae on the gena (Figures 135, 136, 210, 211), hypomeron (Figures 17, 18), epipleura (Figures 19, 20, 81), and lateral areas of the metasternum and abdomen (Figures 217–220) are thinner and longer still, overlap extensively, and have proportionally longer lateral projections. These three types of scale-like setae are quite similar to those found on members of many other elmid genera.

In addition to the scale-like plastron, members of *Stenhelmoides* have another type that we refer to as microtrichial plastron. Individual units of the mesh are pentagonal when closely grouped (Figures 61, 62), but lack angular margins when occurring singly (Figure 79). The microtrichial mesh plastron—found on parts of the pronotum, prosternum, and elytra—is not noticeably affected by treatment with sodium hydroxide, xylene, or dilute acetic acid. Among described elmid genera, this mesh plastron is similar only to that of *Pagelmis* (Spangler, 1981).

The degree of development of the mesh plastron varies among species and in *S. rufulus* it varies among and within populations. Differences in development of mesh and scale-like plastron result in different shapes of the reddish or reddish black areas without plastron on the pronotum and elytra that are frequently diagnostic for the species (Figures 1–4).

In known species of *Stenhelmoides*, the extent of the mesh plastron on the elytra varies from moderately wide in *S. pubipes*, new species, and *S. antennarius*, new species, (Figures 45, 73) to completely covering the elytra in *S. stegastus*, new species, (Figures 196, 199). In members of *S. rufulus* (Hinton)

the mesh plastron may be absent between the rows of granules on the elytral disc, partially developed, or completely cover the area. Regardless of degree of development of the mesh, it is always accompanied by an equal development of the random granules within the mesh, suggesting gene linkage of these two very different cuticular elements. Variation in development of the elytral microtrichial mesh plastron of *S. rufulus* is discussed further in the variation section of that species.

With light microscopy it is sometimes difficult to differentiate boundaries of scale-like and mesh plastron areas. Therefore, in species descriptions that follow, these areas are not differentiated, both being referred to as “gray plastron” areas in contrast to the reddish or reddish black cuticular areas without plastron.

**SURFACE SCULPTURE.**—In addition to the areas covered by plastrons, granules are usually present on various other parts of the cuticle. The granules (Figures 58–61; 133, 134) are large enough to be seen with the aid of a stereoscopic microscope at about  $\times 20$  magnification; usually they are round and flat, but some are somewhat elongate (Figure 12) and others are pointed (Figure 111). Each round granule on the pronotum and elytra usually has a short seta arising from its base (Figures 59–61). The granules on the elytra may be present in bands or scattered at random, and we have used those differences to help distinguish various species.

Most species of *Stenhelmoides* do not have distinct rows of punctures on the elytra but a few species have such rows and they are helpful diagnostic characters.

**HEAD.**—The head is largely retracted into the pronotum and little of its surface is exposed for examination unless the specimen is in a liquid preservative or can be relaxed in hot water. The exposed area, except the granules, from the top of the head to the clypeus, is covered with the plastron and rarely provides useful distinguishing characters. The antennae are 11 segmented. The width between the antennal acetabula is almost confluent in the species of the *rufulus* Group (Figures 8, 48, 75) and wider in members of the *guyanensis* and *strictifrons* Groups (Figures 110, 132, 208, 232) but is of limited taxonomic use. The maxillary palpi are usually obscured or hidden by the retraction of the head into the pronotum and although the maxillary palpi vary in the relative lengths of the palpal segments, this character state is of limited use.

**THORAX.**—The pronotum offers good characters for distinguishing species. The most useful character is the usually distinctively shaped, shiny area without plastron on the middle and base (Figures 1–4). The pronotal granules are usually randomly scattered over most of the surface; however, they are absent from the discal area of *Stenhelmoides guyanensis* Grouvelle and that immediately distinguishes that species from all the other described species of the genus.

The shape of the prosternal process; the distribution of the plastron on it; and the shape, abundance, and density of granules on it also are useful diagnostic characters.

**ELYTRA.**—The elytra offer a number of useful characters for

distinguishing various taxa. The distribution of the plastron over definite areas is generally diagnostic. Also, the type and arrangement of the granules, at random or in bands, is distinctive for some taxa. In *Stenelmoides stegastus*, new species, the surface sculpture appears shagreened (Figure 215), and, therefore, distinctive. The presence or absence of rows of coarse punctures is useful but, when present, they may be partly obscured by the plastron on some areas.

**ABDOMEN.**—The abdominal sterna afford little help in distinguishing the various species of *Stenelmoides*. Only males of *Stenelmoides antennarius* have an apical arcuate arrangement of setae on the sides of a moderately broad, shallow depression on the last sternum (Figure 80) that distinguishes males of this species from all others in the genus. Both sexes of *S. inconscriptus*, new species, have a short, shallow, but distinctive longitudinal groove on the posterior midline of the last sternum.

**LEGS.**—Although the legs offer some useful diagnostic characters for both sexes, the legs of some males exhibit numerous, often very elaborate, secondary sexual characteristics; these modifications are described below under that topic. The position and size of tibial cleaning and smoothing fringes and their associated setae are useful taxonomic characters. Both sexes of the taxa included in the *rufulus* and *guyanensis* Groups may be recognized by a distinctive row of dense, long, slender, golden setae on the middle of the posterior face of the mesofemur (Figures 14, 33).

The species in the *rufulus* Group may be distinguished from those in the *guyanensis* Group by the presence of a similar row of dense, long, slender, golden setae on the middle of the anterior face of the profemur; in members of the *guyanensis* Group, the profemoral setae are absent (or abraded) or apparently reduced to two setae as on *S. beebei*, new species, *S. grandis*, new species, (Figure 141) and *S. variabilis*, new species.

Members of the *strictifrons* Group are without the rows of setae on the posterior face of the mesofemora and the anterior face of the profemora as discussed above.

Plastron setae cover the metafemur of the species of the *rufulus* Group but are absent from the metafemur of the species of the *guyanensis* and *strictifrons* Groups.

**GENTILIA.**—The male genitalia (Figure 21), as in most elmids, are the primitive trilobed type consisting of the tegmen and median lobe. The tegmen consists of an unpaired sclerite called the basal piece and apical paired sclerites called parameres. The median lobe bears a gonopore (i.e., an opening for the ejaculatory duct) near its apex and two basal apodemes. The male genitalia provide useful and, usually, very stable characters for distinguishing species. However, these genitalic characters may exhibit some minor individual variations and allowances must be made for those variations. Also, hot caustic potash used to clear male genitalia occasionally may cause some minor variations and care must be taken in the clearing process.

The female genitalia (Figure 23) of most elmids are similar and consist of two apical styli; each stylus arises from a coxite. An elongate rod-like baculus for muscular attachment is attached to each coxite. The elmid female genitalia have not been compared nor well studied in the past; however, the differences noticed in those that have been examined suggest that, in some cases, they may show relationships at the generic or species group levels.

**SECONDARY SEXUAL CHARACTERS.**—Males of most species in this genus may be distinguished most easily by the concave area of the first abdominal sternum between the metacoxae and, often, there is a similarly concave posterior part of the metasternum. Additional secondary sexual characters that distinguish males of some species are: antennal acetabula confluent; mesotibia arcuate; the presence of tufts of long, golden, hair-like setae on the lower surfaces of the mesofemora (Figures 15, 54) and mesotibiae (Figures 54, 55); long but sparse golden setae on the lower surfaces of the protarsal and/or mesotarsal segments; a distinctive tubercle with apical setae present on the metasternum immediately in front of each metacoxa (Figures 50–52, 54); a small tubercle on apicomedial margin of prosternum; a distinctive swirled arrangement of setae bordering a concave area on the posterior half of the last abdominal sternum (Figure 80); antennal segments thickened and bearing dense tufts of setae on lower surfaces; broadening of protarsal and mesotarsal claws.

#### Genus *Stenelmoides* Grouvelle, 1908

*Stenelmoides* Grouvelle, 1908:182 [type species: *Stenelmoides* [sic] *guyanensis* Grouvelle by subsequent designation, Hinton, 1937a:138].—Delève, 1970:65.

*Stenelmoides* Pic, 1923:4 [erroneous emendation of *Stenelmoides*].—Hinton, 1934:197; 1937a:138; 1937b:109.—Blackwelder, 1944:271 [checklist].

*Stenelsianus* Hinton, 1934:196 [type species: *Stenelsianus rufulus* Hinton, by original designation]; 1937a:138 [synonym of *Stenelmoides* [sic]].—Blackwelder, 1944:271 [checklist].

**Diagnosis.**—Elongate, subparallel. Head partly retractile. Antenna, 11 segmented. Maxillary palpus (Figure 30), 4 segmented; first segment half as long as or about equal to second; second segment slightly longer than third; fourth segment more than twice as long as third. Labial palpus, 3 segmented; apical segment broad, rounded, and compressed dorsoventrally.

Pronotum without carinae or sulci; with lateral gray plastron areas and a reddish brown medial area without plastron; sides rimmed or not.

Elytron without carinae but may have elevated lines of small granules from base to apex; with narrow or wide areas of gray plastron laterally; sutural margins without plastron (except *S. stegastus*, new species); surface mostly granulate and sparsely clothed with short setae; rows of punctures present or not. Scutellum moderately large; rounded basally, acuminate apically.

Prosternal process large and broad; partially covering inner

TABLE 1.—Comparison of *rufulus*, *guyanensis*, and *strictifrons* Groups.

Character	<i>rufulus</i> Group	<i>guyanensis</i> Group	<i>strictifrons</i> Group
Body form	more convex dorsally; less elongate (Figures 27, 47)	flat discal areas; more elongate (Figures 172, 173)	more convex, less elongate (Figures 200, 201) (as <i>rufulus</i> Group)
Maxillary palpus	first palpal segment as long as or longer than second (Figure 30)	first palpal segment half length of second (Figure 110)	first palpal segment half length of second (Figure 248)
Lacinia	armed with well-developed rows of spines; without tooth-like projection of lateral extreme (Figure 31)	spines very reduced, not in distinct rows; lateral extreme with tooth-like projection (Figures 156, 157)	same as <i>guyanensis</i> Group
Frons	protrudes distinctly over base of clypeus between antennae	does not protrude over base of clypeus	does not protrude over base of clypeus
Prosternal process	foveate, very weakly granulate, (Figure 78); in profile, forming angle at base with disc in front of procoxae	non-foveate (except <i>submaculatus</i> ), markedly granulate (Figure 176), angulation midway between base of process and anterior margin	same as <i>rufulus</i> Group
Metasternal disc	depressed	flat	moderately to strongly depressed
Abdominal intercoxal process	depressed	flat	shallowly to strongly depressed
Protibial cleaning fringe	long, occupying distal $\frac{3}{4}$ or more	very short, occupying middle $\frac{1}{3}$ of length	very short, occupying middle $\frac{1}{3}$ of length
Mesotibial and metatibial smoothing setae	well-developed row bordering cleaning fringe for nearly its entire length (Figure 89)	reduced to short row of stout setae at distal end of cleaning fringe, (Figure 223)	same as <i>guyanensis</i> Group
Profemur	with row of dense, long, golden, hair-like setae at midlength of anterior face (Figures 13, 82)	with only 2 long, golden, hair-like setae or without long setae (Figure 141)	without row of long, golden, hair-like setae
Mesofemur	with row of dense, long, golden, hair-like setae at midlength of posterior face (Figure 14)	with row of dense, long, golden, hair-like setae (Figure 158)	without row of dense, long, golden, hair-like setae
Metafemur	surface covered with plastron setae	surface without plastron setae	surface without plastron setae
Elytron	with 1 or 2 rows of granules (Figures 28, 63, 76)	granules grouped into bands (Figures 137, 174, 184)	granules at random or in 3-5 indistinct rows (Figures 215, 251)
Female genitalia	coxite and styli long, slender; apical segment of styli 3 to 4 times longer than wide (Figures 41, 71, 93)	coxite and styli short, broader; apical segment of styli small, about as long as wide (Figures 102, 121, 125)	coxite and styli long, slender apical segment of styli 3 to 4 times longer than wide (Figures 227, 243, 260)

sides of procoxae, narrowed and rounded apically. Metasternum with longitudinal groove on midline. Legs moderately short and stout; tibiae with cleaning fringe.

### Species Groups

Three very distinct species groups are apparent in the specimens of *Stenhelmoides* currently available for study. These groups are referred to as the *guyanensis*, *rufulus*, and *strictifrons* Groups. Species comprising the *guyanensis* Group are *S. guyanensis* Grouvelle; *S. beebei*, new species; *S. grandis*, new species; *S. grouvellei* (Pic); *S. platysternum*, new species; *S. submaculatus* (Hinton); and *S. variabilis*, new species. The *rufulus* Group includes *S. rufulus* (Hinton); *S. antennarius*, new species; *S. inconscriptus*, new species; and *S. pubipes*, new species. The *strictifrons* Group is comprised of *S. strictifrons* Grouvelle; *S. mimicus*, new species; and *S. stegastus*, new species.

Selected characters of the *guyanensis*, *rufulus*, and *strictifrons* Groups are compared in Table 1. Further discussion of

most of these characters is unnecessary; tibial setae, however, warrant further explanation. In common with members of many elmid genera, members of *Stenhelmoides* have a brush-like variety of setae arranged lengthwise on the anterior face of the protibia (Figure 84) and the posterior face of the mesotibia and metatibia (Figures 86, 89). We believe that all of these setae are involved in the "plastron replacement activities" as reported by Harpster (1941, 1944) and Thorpe and Crisp (1949). Those activities presumably include smoothing the plastron setae, spreading the air bubble over and among the plastron setae, and, perhaps, spreading an oily secretion over the plastron setae that imparts a hydrofuge property to them. In members of *Stenhelmoides*, the long golden setae of the cleaning fringe are simple (non-bifid), parallel to the tibia, and characteristically have thin, pointed, slightly curved apices. Members of the *rufulus* Group have the mesotibiae and metatibiae with a row of stout setae on each side of the cleaning fringe. Setae of the medial row are perpendicular to the tibia, widely spaced, spike-like (Figures

35, 36, 89), and probably function to dislodge debris from the plastron; those spines are termed scraping setae in the species descriptions that follow.

Lateral to the cleaning fringe is a comb-like row of closely spaced, flat setae set at an angle oblique to the tibia (Figures 86, 87, 89). The probable function of the comb-like row of flat setae is to serve a dual role of cleaning and smoothing the long plastron setae on the elytral epipleura and lateral areas of the metasternum and abdomen. During a forward stroke of the tibia, the comb-like row of setae, being flat and oblique to the tibia, probably forces air bubbles into the plastron (the so-called "plastron replacement activity" referred to by Harpster, 1941); during this stroke the comb-like setae would brush in a direction opposite the angle of repose of the plastron setae. During a backward stroke the comb-like row probably functions to scrape clean the external surface of the plastron setae and comb them in preparation for deeper penetration by the slender setae of the cleaning fringe and by extending the film of air more widely over the plastron setae. The flat setae of the comb-like row are termed smoothing setae in the species descriptions that follow.

Contrastingly, the smoothing setae of members of the *guyanensis* and *strictifrons* Groups are restricted to the apical area of the mesotibiae and metatibiae, and the scraping setae

are subsinuate and form a close-set row (Figures 189, 223, 224). Apparently the smoothing or spreading function in the *guyanensis* Group and the *strictifrons* Group is accomplished by the flattened inner surface of the tibia; the tibiae of members of the *rufulus* Group are oval in cross section.

Protibiae of all presently known members of *Stenhelmoides* have a cleaning fringe (very small in *S. platysternum* and *S. grouvellei*) and a medial row of scraping setae, but lack a lateral row of setae.

Cleaning and smoothing of the hypomera and elytral epipleura may be aided by patches of long setae on the anterior face of the profemur and posterior face of the mesofemur, respectively (Figures 13, 14). Members of all species of the *rufulus* Group have these patches on the profemora and mesofemora; members of the *guyanensis* Group, except *S. grandis* and *S. guyanensis*, lack the profemoral patch; and members of the *strictifrons* Group lack both the profemoral and mesofemoral patches.

Sexual dimorphism may alter the tibial setal formula, as in males of *S. pubipes*, new species, which have the scraping row replaced by a distinctive patch of long hair-like setae (Figures 54, 55). Other secondary sexual characteristics of males of the *rufulus* Group are compared in Table 2.

#### Key to Species Groups of *Stenhelmoides*

1. Cleaning fringe of protibia occupying distal  $\frac{3}{4}$  or more of length [Figure 84].  
   Metafemoral surface covered with plastron. Frons, between bases of antennae, protrudes over clypeus . . . . . *rufulus* Group  
   Cleaning fringe of protibia occupying middle third of length [Figure 187].  
   Metafemoral surface without plastron. Frons, between bases of antennae, on same plane as clypeus . . . . . 2
2. Mesofemur with row of long, golden, hair-like setae on posterior surface at midlength [Figure 14]. Length, 2.70–4.43 mm . . . . . *guyanensis* Group  
   Mesofemur without row of long golden setae. Length, 2.04–2.52 mm . . . . .  
   . . . . . *strictifrons* Group

#### Clave para los Grupos de Especies de *Stenhelmoides*

1. Protibia con flequillo limpiador ocupando las tres cuartas partes distales o mas de su longitud [Figura 84]. Superficie del metafémur cubierta con plastron. Area frontal, entre las bases de las antenas, proyectandose sobre el clipeo . . . . .  
   . . . . . Grupo *rufulus*  
   Protibia con flequillo limpiador ocupando el tercio medio de su longitud [Figura 187]. Superficie del metafémur sin plastron. Area frontal, entre las bases de las antenas, en el mismo plano que el clipeo . . . . . 2
2. Mesofémur con una hilera de sedas largas y doradas sobre la superficie posterior a la mitad de su longitud [Figura 14]. Longitud, 2.70–4.43 mm . . . . .  
   . . . . . Grupo *guyanensis*  
   Mesofémur sin hilera de sedas largas y doradas. Longitud, 2.04–2.52 mm . . . . .  
   . . . . . Grupo *strictifrons*

TABLE 2.—Male secondary sexual characteristics of species of *rufulus* Group (+ = present, - = absent).

Character	<i>rufulus</i>	<i>inconscriptus</i>	<i>antennarius</i>	<i>pubipes</i>
Mesofemur pubescent ventrally	+	+	-	+
Mesotibia and mesotarsus pubescent	-	-	-	+
Protibiae arcuate	-	-	-	+
Antennal acetabula confluent; antennal segments enlarged	-	-	+	-
Prosternum with apicomedial tubercle	-	-	-	+
Metasternum with basal tubercles	-	-	-	+
Last sternum with broad depression	-	-	+	-
Last sternum with short, narrow, longitudinal groove on midline	-	+	-	-
Metasternal disc depressed	+	+	+	+

**The *rufulus* Group**

DIAGNOSIS.—Members of the *rufulus* Group may be recognized by the following combination of characters: Body elongate and moderately convex dorsally. Frons protrudes distinctly over base of clypeus between bases of antennae; basal segment of maxillary palpus as long as second segment (Figure 30); lacinia apically armed with distinct rows of spines (Figure 31), without tooth-like lateral projection. Prosternal process foveate, weakly granulate; at base forming angle with disc in front of procoxae. Metasternal disc depressed.

Abdominal intercoxal process depressed. Protibial cleaning fringe well developed, occupying distal 3/4 or more. Mesotibia and metatibia each with a distinct row of robust smoothing setae bordering cleaning fringe for almost its entire length. Profemur with row of dense, long, golden, hair-like setae at midlength on anterior surface; mesofemur with row of dense, long, golden, hair-like setae at midlength on posterior surface. Metafemur with surface covered with plastron setae. Elytron with 1 or 2 rows of granules. Female genitalia with coxites and styli long, slender; apical segment of styli 3 to 4 times longer than wide.

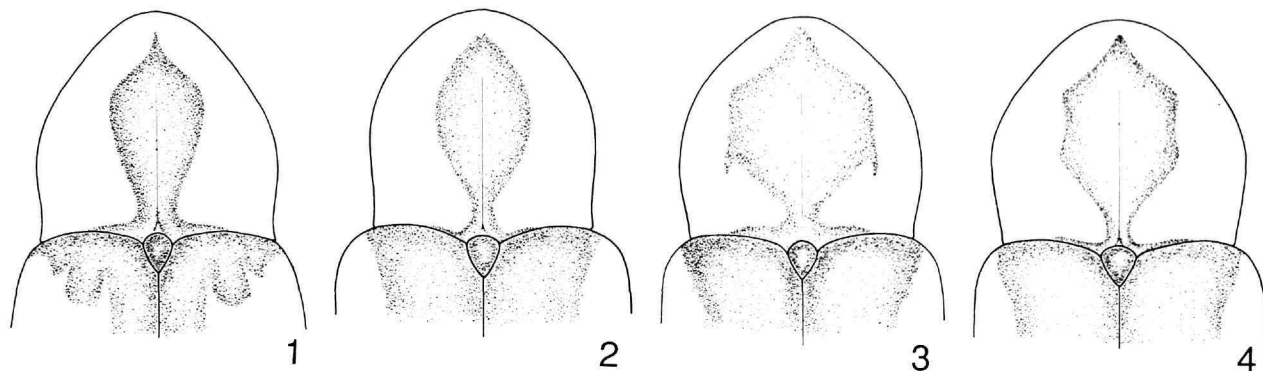
**Key to Species of *rufulus* Group**

1. Area without plastron on pronotal disc ovoid [Figures 1, 2] . . . . . 2  
    Area without plastron on pronotal disc hexagonal [Figures 3, 4] . . . . . 3
2. Elytron with 1 complete submedian row and 1 very short basomedian row of granules [Figure 9]; plastron area on elytron wide, covering lateral 2/3 of dorsal surface [Figure 1] . . . . . 1. *S. inconscriptus*, new species  
    Elytron with 2 complete rows of granules on each elytron [Figures 25, 28]; plastron area on elytron narrow, covering lateral third [Figure 2; rarely wider, Figure 29] . . . . . 2. *S. rufulus*
3. Hexagonal area without plastron on pronotal disc with acute lateral extensions [Figure 3]. Males with long, dense, golden hair-like setae on ventral surface of mesofemur, mesotibia, and mesotarsus [Figure 54]. Antecoxal sclerites of male metasternum each with a strong tubercle [Figures 50–52, 54]. Antennae typically filiform . . . . . 3. *S. pubipes*, new species  
    Hexagonal area without plastron on pronotal disc without acute lateral extensions [Figure 4]. Males without golden hair-like setae on mesofemur and mesotarsus; mesotibia with typical cleaning fringe bordered by short setae [Figures 86, 87]. Antecoxal sclerites of male metasternum without tubercles. Antennal segments enlarged, about as wide as long . . . . . 4. *S. antennarius*, new species

**Clave para las Especies del Grupo *rufulus***

1. Area discal del pronoto sin plastron, ovoide [Figuras 1, 2] . . . . . 2  
    Area discal del pronoto sin plastron, hexagonal [Figuras 3, 4] . . . . . 3

2. Elitro con 1 hilera de gránulos submedial completa y 1 hilera de gránulos basomedial muy corta [Figura 9]; élitro con área de plastron amplia, cubriendo los dos tercios laterales de la superficie dorsal [Figura 1] . . . . . 1. *S. inconscriptus*, sp. nov.  
Cada élitro con 2 hileras completas de gránulos [Figuras 25, 28]; élitro con área de plastron angosta, cubriendo aproximadamente el tercio lateral de la superficie dorsal [Figura 2; raramente mas amplia, Figura 29] . . . . . 2. *S. rufulus*
3. Area hexagonal sin plastron en el disco del pronoto con extensiones laterales agudas [Figura 3]. Machos con sedas largas, densas y doradas sobre la superficie ventral del mesofémur, mesotibia y mesotarso [Figura 54]. Escleritos antecoxales del metasterno del macho cada uno con un fuerte tubérculo [Figuras 50–52, 54]. Antena típicamente filiforme . . . . . 3. *S. pubipes*, sp. nov.  
Area hexagonal sin plastron en el disco del pronoto sin extensiones laterales agudas [Figura 4]. Machos sin sedas sobre el mesofémur y mesotarso; mesotibia con flequillo limpiador típico bordeado de sedas cortas [Figuras 86, 87]. Escleritos antecoxales del metasterno del macho sin tubérculos. Segmentos antenales ansanchados casi tan anchos como largos . . . . . 4. *S. antennarius* sp. nov.



FIGURES 1–4.—Pattern of area without plastron (stippled) on pronotum and base of elytra: 1, *Stenelmoides inconscriptus*, new species; 2, *Stenelmoides rufulus* (Hinton); 3, *Stenelmoides pubipes*, new species; 4, *Stenelmoides antennarius*, new species.

### 1. *Stenelmoides inconscriptus*, new species

FIGURES 1, 5–24

**DIAGNOSIS.**—This species may be distinguished from all described species except *S. rufulus* by the shape of the pronotal area without plastron (Figure 1). See the diagnosis of *S. rufulus* (Hinton) for the characters that separate *S. inconscriptus* from *S. rufulus*.

**HOLOTYPE MALE.**—*Body Form and Size:* Elongate, subparallel (Figures 5, 6), moderately convex dorsally (Figure 7). Length, 3.68 mm; width, 1.52 mm.

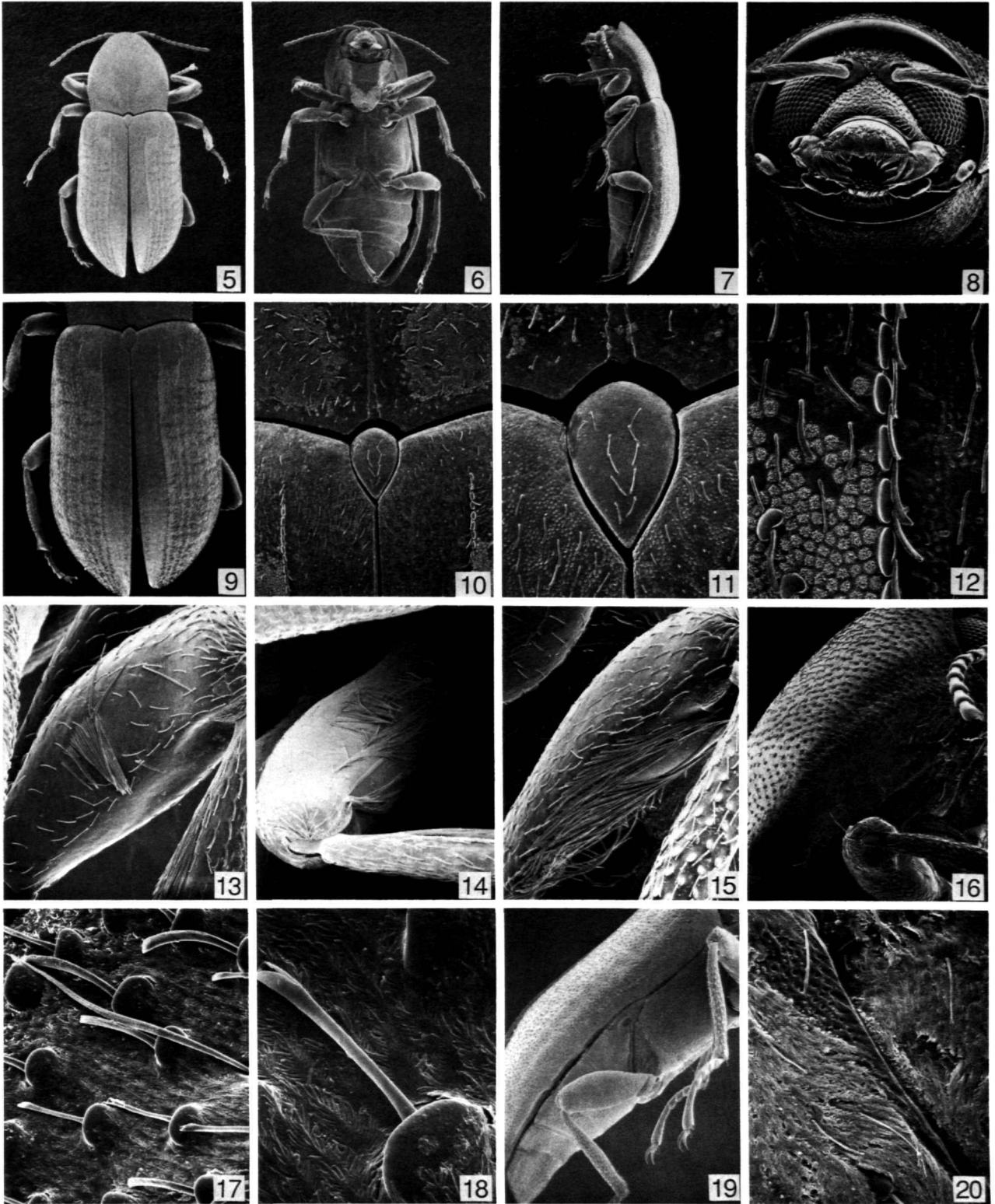
*Color:* Pronotum with gray pronotum and reddish pattern as in *S. rufulus* (Figure 1). Legs reddish except coxa, trochanter, and femur of hind leg with gray plastron. Palpi and antennae reddish.

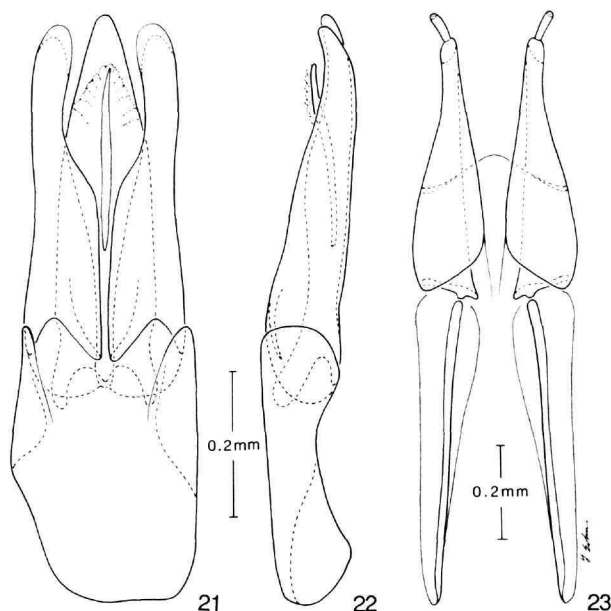
*Head:* Width between antennal acetabula, 0.06 mm (Figure 8). Frons gray. Granules pointed, smaller than facets

of eyes. Clypeus reddish, granulate, sparsely pubescent. Labrum with transverse row of hair-like setae near apical third. First antennal segment subequal to combined lengths of segments 2–4.

*Thorax:* Pronotum, 1.24 mm long, 1.24 mm wide; reddish black area dull, very finely densely microreticulate between granules; with extremely shallow median longitudinal line extending from base to apical third. Pronotal granules rounded,

FIGURES 5–20.—*Stenelmoides inconscriptus*, new species: 5, habitus, dorsal view,  $\times 25$ ; 6, ventral view,  $\times 25$ ; 7, lateral view,  $\times 25$ ; 8, head, adoral view,  $\times 100$ ; 9, elytra, enlarged,  $\times 40$ ; 10, base of pronotum and elytra,  $\times 130$ ; 11, scutellum,  $\times 300$ ; 12, plastron and granules on elytral base,  $\times 700$ ; 13, profemur, anterior face with row of long setae,  $\times 220$ ; 14, mesofemur, posterior face,  $\times 186$ ; 15, mesofemur, ventral surface with long setae (male),  $\times 250$ ; 16, hypomerion,  $\times 100$ ; 17, plastron setae and granules on hypomerion,  $\times 1000$ ; 18, granule and plastron setae on hypomerion enlarged,  $\times 3000$ ; 19, epipleuron,  $\times 50$ ; 20, plastron setae on epipleuron, enlarged,  $\times 800$ . (Reduced to 56% of original.)





FIGURES 21–23.—*Stenhelmoides inconscriptus*, new species: 21, male genitalia, dorsal view, 22, lateral view, 23, Female genitalia, dorsal view.

about size of eye facets, separated by about their diameter; becoming sparser and smaller medially and posteriorly; each granule with short basal seta; setae of all granules directed toward median basal fifth of pronotum. Elytra, 2.56 mm long, 1.52 mm wide (slightly past midlength). Each elytron (Figures 9, 10, 12) with a longitudinal row of low granules at medial fourth that delimits lateral gray plastron and medial reddish black areas; a second, short row of granules in basal tenth of midline of elytron, granules becoming random but very slightly suggesting serial row; reddish black area of each elytron slightly wider at declivity than on disc; each elytron with 2 rows of punctures between row of granules and suture; cuticle in reddish black area very finely microreticulate with tiny smooth circular areas each of which has a tiny central puncture; lateral areas of gray plastron with large dense granules that are slightly smaller than largest pronotal granules and separated by about 1 to 4 times granule diameter, each granule with small basal seta extended medially. Scutellum ovoid (Figure 11). Prosternum, 1.44 mm long; prosternum in front of process reddish black, shiny, sparsely pubescent; sides of prosternum and hypomera with gray plastron, granulate similar to pronotum. Prosternal process 0.76 mm long, 0.92 mm wide; elevated to form angle with anterior part of prosternum; small median oval depression at apical third; with gray plastron and very sparsely granulate except reddish black, basal, median area. Mesosternum with deep fovea for reception of apex of prosternal process. Metasternum with disc depressed; with gray plastron except reddish black intercoxal process and shiny median reddish black area extending posteriorly from meso-

coxae and gradually widening to occupy area between hind coxae; lateral area with gray plastron with granules finer and sparser than those on pronotum, granules separated by 2 to 4 times granule diameter; midline with deeply impressed median longitudinal line; lateral angles of intercoxal process elevated on different plane than disc. Legs reddish except hind coxa, trochanter and femur with gray plastron. Profemur with short patch of long setae on anterior surface at midlength. Protibia straight; cleaning fringe occupying distal  $\frac{3}{4}$  of anterior surface, bordered medially by row of short scraping setae. Protarsal segments 1–4 with short, stout setae ventrally; segment 5 with short hair-like setae ventrally. Mesofemur with long golden pubescence ventrally; posterior surface with short patch of long setae at midlength. Mesotibial and metatibial cleaning fringes similar, occupying distal  $\frac{4}{5}$  of posterior surface, bordered laterally by row of short, closely spaced, smoothing setae, bordered medially by row of more widely spaced, short, scraping setae. Mesotarsal and metatarsal segments 1–4 with sparse, short, stout setae ventrally.

**Abdomen:** With gray plastron and granulate like metasternum except intercoxal process reddish black. Sternum 5 with stout golden setae at rounded apex and a shallow median longitudinal depression in apical half.

**Male Genitalia:** As illustrated (Figures 21, 22).

**FEMALE GENITALIA.**—As illustrated (Figure 23).

**SEXUAL DIMORPHISM.**—The allotype has the following features differing from those of the holotype. Antennal acetabula slightly more widely separated. Metasternal disc not as depressed and having the reddish black median area restricted to narrow border of median longitudinal sulcus. Mesofemur without long golden pubescence.

**VARIATIONS.**—The median longitudinal depression on the last abdominal sternum is wider on several specimens.

**TYPE DATA.**—*Holotype* (male): ECUADOR: NAPO PROVINCE: 5 km N Lago Agrio, 26 Sep 1975, at blacklight, Andrea Langley; deposited in the National Museum of Natural History, Smithsonian Institution.

*Allotype:* Same data as holotype.

*Paratypes:* Same data as holotype, 4 ♂, 2 ♀ (USNM); same data as holotype except 19 Sep 1975, 1 ♀ (USNM).

**DISTRIBUTION.**—Currently known only from the Lago Agrio area, Napo Province, Ecuador (Figure 24).

**ETYMOLOGY.**—From the Latin, *inconscriptus* (unarranged). Members of this species lack a discrete median row of granules on each elytron.

**HABITAT.**—Unknown.





FIGURE 24.—*Stenelmoides inconscriptus*, new species, distribution map.

## 2. *Stenelmoides rufulus* (Hinton)

FIGURES 2, 25–44

*Stenelsianus rufulus* Hinton, 1934:197.

*Stenelmoides rufulus*.—Hinton, 1937a:138.—Blackwelder, 1944:27 [check-list].

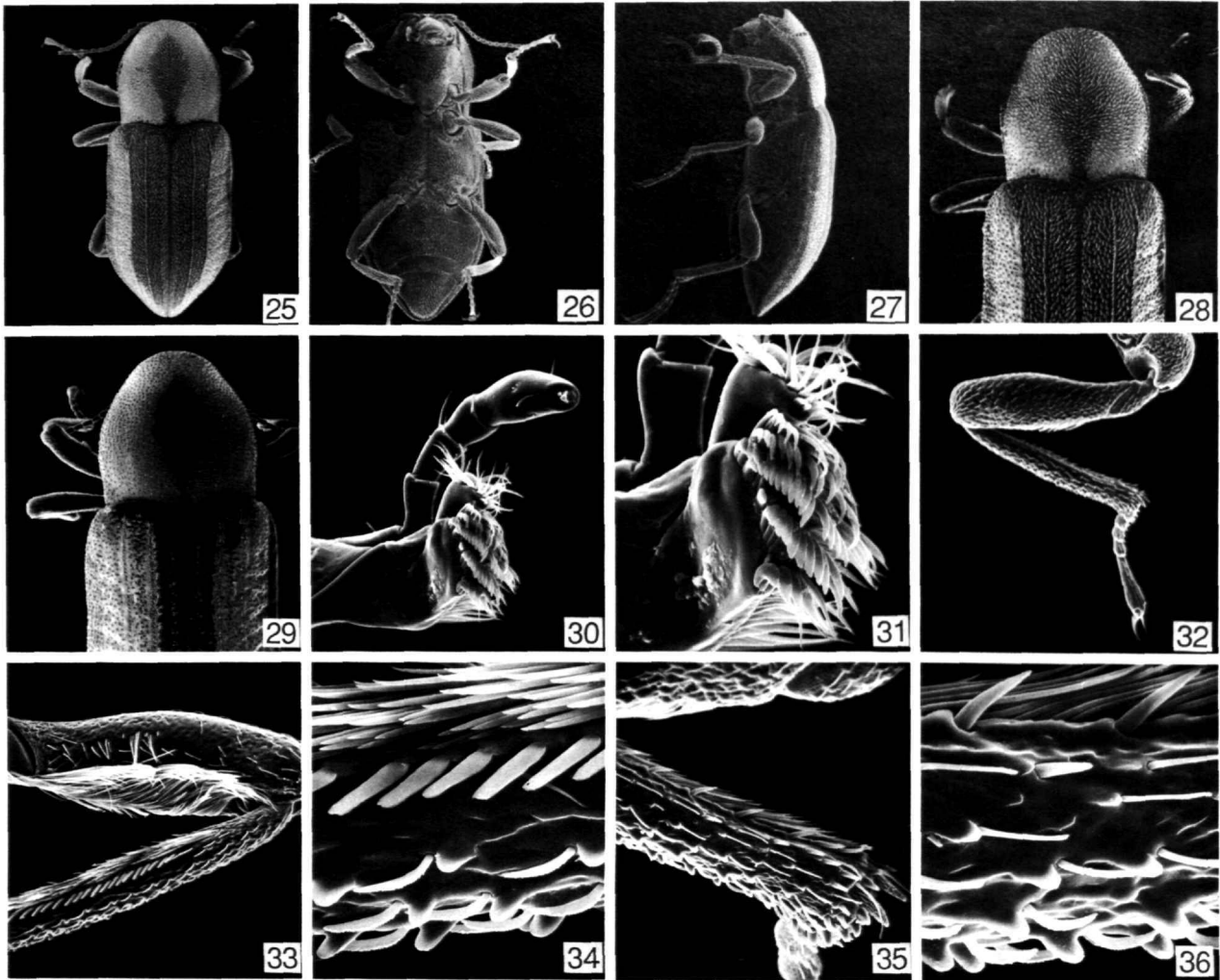
**DIAGNOSIS.**—Distinguished from all species except *S. inconscriptus*, new species, by the ovoid shape of the reddish pronotal area without plastron (Figures 1–4). *Stenelmoides rufulus* may be distinguished from *S. inconscriptus*, new species, by the narrower elytral plastron area that covers only the lateral third (Figure 2) (in *S. inconscriptus*, new species, covers lateral  $\frac{2}{3}$ ); by 2 complete rows of granules (Figures 25, 28) on each elytron (1 complete and 1 very short row of granules in *S. inconscriptus*, new species); and by differences

in the male genitalia (Figures 37–40, 21, 22).

**REDESCRIPTION, HOLOTYPE FEMALE.**—*Body Form and Size:* Elongate, subparallel (Figures 25, 26), moderately convex dorsally (Figure 27). Length, 3.40 mm; width, 1.44 mm.

*Color:* Dorsal surface with gray plastron and reddish pattern (Figure 2, 25). Legs reddish except hind leg with coxa, trochanter, and femur with gray plastron. Palpi and antennae reddish. (Note: due to soiled condition, some reddish areas were originally described as gray.)

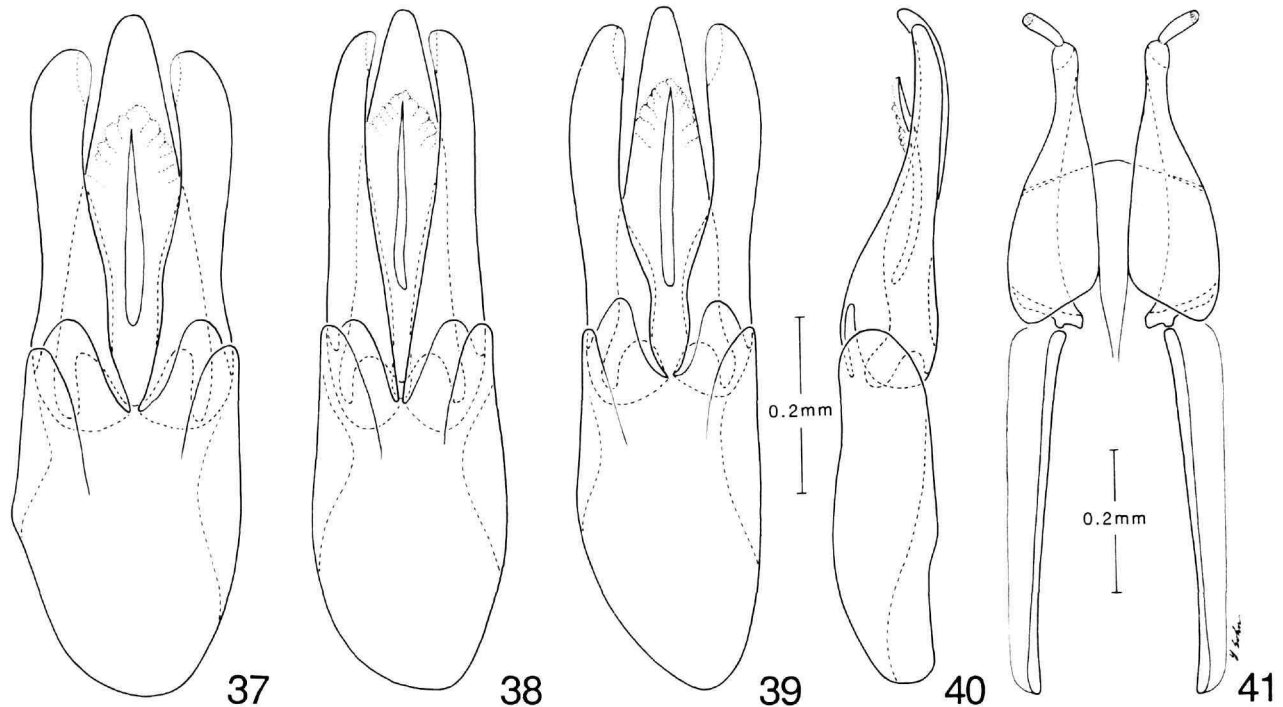
*Head:* Width between antennal acetabula, 0.06 mm. Frons gray. Granules pointed, less coarse than facets of eyes. Clypeus reddish, granulate, sparsely pubescent. Labrum with transverse row of hair-like setae near midlength. First antennal segment subequal to combined lengths of antennal segments 2–4.



FIGURES 25-36.—*Stenhelmoides rufulus* (Hinton): 25, habitus, dorsal view,  $\times 30$ ; 26, ventral view,  $\times 30$ ; 27, lateral view,  $\times 30$ ; 28, Pronotum and elytral base with typical extent of plastron,  $\times 40$ ; 29, plastron, more extensive on elytron,  $\times 40$ ; 30, maxilla,  $\times 340$ ; 31, maxilla, galea and lacinia enlarged,  $\times 700$ ; 32, middle leg, anterior face,  $\times 75$ ; 33, mesofemur and tibia, posteroventral surface,  $\times 140$ ; 34, mesotibia, cleaning fringe and smoothing setae,  $\times 750$ ; 35, mesotibia, lateral surface,  $\times 240$ ; 36, lateral surface, enlarged,  $\times 750$ . (Reduced to 54% of original.)

**Thorax:** Pronotum, 1.16 mm long, 1.16 mm wide (slightly past midlength); reddish area dull, very finely densely microreticulate between granules; extremely shallow median longitudinal line extending from base to midlength. Pronotal granules rounded, about size of eye facets; separated antero-laterally by about their diameter, becoming sparser and smaller medially and posteriorly; each granule with short basal seta; setae of all granules directed toward median basal fifth of pronotum. Elytra, 2.40 mm long, 1.44 mm wide (at midlength). Each elytron with a median and submedian longitudinal row of low granules (Figure 28); median row delimits lateral area of gray plastron and medial reddish area; reddish area with 2

rows of shallow, widely spaced punctures between rows of granules, and 2 similar rows between sutural margin and submedian row of granules; cuticle in reddish area very finely densely microreticulate, with tiny smooth circular areas each of which has a tiny central seta; lateral areas of gray plastron with large dense granules slightly smaller in size than largest pronotal granules, granules separated by about 1 to 4 times granule diameter; each granule with a small basal seta extending medially. Prosternum, 0.76 mm long; sides and hypomeron with gray plastron, granulate like pronotum; prosternum in front of process reddish, finely granulate. Prosternal process 0.34 mm long, 0.44 mm wide; elevated to



FIGURES 37-41.—*Stenelmoides rufulus* (Hinton) (37, 38, Costa Rican male; 39, 40, Colombian male): 37-39, variations in form of male genitalia, dorsal views; 40, lateral view. 41, Female genitalia, dorsal view.

form angle with anterior part of prosternum; small median oval depression at apical third, area of gray plastron of sides nearly attaining midline, granulate. Mesosternum with deep fovea for reception of apex of prosternal process. Metasternum with disc shallowly depressed; with gray plastron except reddish mid-longitudinal sulcus; lateral area with gray plastron and finer sparser granules than those on pronotum, granules separated by 2 to 4 times granule diameter; lateral angles of intercoxal process elevated, on different plane than disc. Legs reddish except hind coxa, trochanter, and femur with gray plastron. Profemur with small group of long setae at midlength of anterior surface; mesofemur with small group of long setae at midlength of posterior surface. Cleaning fringes occupying distal four-fifths of all tibiae; protibial fringe on anterior surface; mesotibial (Figures 33, 34) and metatibial fringes on posterior surface. Protibial cleaning fringe bordered medially by row of stout spines. Mesotibial and metatibial cleaning fringes bordered laterally by row of approximate, stout, smoothing setae (Figures 35, 36); cleaning fringes bordered medially by row of more widely spaced, stout, scraping setae. Tarsus with short stout setae ventrally.

**Abdomen:** With gray plastron and granulate like metasternum except intercoxal process reddish. Sternum 5 with shallow median longitudinal depression in apical half.

**Female Genitalia:** As illustrated (Figure 41).

**MALE GENITALIA.**—As illustrated (Figures 37-40).

**SEXUAL DIMORPHISM.**—Females have the antennal acetabula slightly more widely separated than males; metasternal disc not as depressed and the reddish median area restricted to narrow border of median longitudinal sulcus. Males have a patch of long hair-like setae on the lower surface of the mesofemur (Figure 33); females lack these setae.

**VARIATION.**—Minor variation in the form of the male genitalia is illustrated from a Colombian and two Costa Rican specimens (Figures 37-39); male genitalia lengths vary proportionally with body lengths in these three individuals. Body length of members of *S. rufulus* varies from 2.92 mm (small males) to 3.48 mm (large females); length of most specimens is about 3.20 mm. There is considerable variation in development of mesh plastron between the two rows of granules on the elytral disc. A small series of six specimens from Colombia, Department of Valle del Cauca, consisted of one female without any mesh plastron between the elytral discal rows of granules, two males and one female with partial development of mesh plastron, and one specimen of each sex with complete development of the mesh plastron on the elytral disc (Figure 29). One male from Ecuador not only had full development of mesh plastron between the granular rows, but slight development medial to the submedian row of granules. Some males have the apical half of the last sternum with a

TABLE 3.—Variation of *S. rufulus* (Hinton) (+ = present, - = absent).

Locality	Male mesotrochanter pubescent ventrally	Last male sternum depressed	Mesh plastron between row of granules on elytral disc		
			Absent	Partial	Complete
Mexico	-	-	+	-	-
Belize	-	-	+	-	-
Guatemala*	?	?	+	-	-
Honduras	-	-	+	-	-
Costa Rica	+	+	+	-	-
Panama	+	+	+	-	-
Colombia	+	+	+	+	+
Venezuela†	-	+	+	-	-
Ecuador	+	+	+	+	+
Peru*	?	?	+	-	-

\*Males unknown.

†Only 1 male.

median longitudinal depression and/or have the long hair-like setae of the middle legs present on the mesocoxa as well as the mesofemur. Geographical distributions of variation of these male secondary sexual characteristics and variation of development of the mesh plastron are presented in Table 3. Finally, the generally inconspicuous setae on the reddish pronotal and elytral areas without plastron are distinct in a series from Chiapas, Mexico.

TYPE DATA.—The holotype female has the following label data: "Paraiso, Panama, 29 January 1911, E.A. Schwarz" and is deposited in the National Museum of Natural History, Smithsonian Institution.

DISTRIBUTION.—Ranges from the Mexican states of Michoacan, Oaxaca, and Chiapas in southern Mexico south through Colombia to Peru (Figure 42).

SPECIMENS EXAMINED.—BELIZE: CAYO: M. Pine Ridge Rd., mile 10, at MV light, J.J. McCae, 1 ♂ (USNM); same data, 2 ♂ (BDA); East of Roaring Creek, at airstrip landing site, 28 Apr 1984, H.L. Dozier, 14 ♂, 15 ♀ (USNM). STANN CREEK: Kendal (12 km S), Cockscomb Basin Wildlife Sanctuary, in South Stann Creek, 26 Apr 1987, P.J. Spangler and R.A. Faitoute, 1 ♂ (USNM).

COLOMBIA: ANTIOQUIA: Río Anori, blacklight trap, 23 Sep 1970, S.W. Zaragoza, D.G. Young, 1 ♂ (FSCA). CESAR: Becerril, at light, 21–22 Jul 1968, B. Malkin, 2 ♀ (FMNH). PUTAMAYO: Sta. Rosa (Kofan Indian Village), hdwrs of Río San Miguel, Int. Putomayo, at light, 2–24 Oct 1970, B. Malkin and P. Burchard, 6 ♂, 3 ♀ (FMNH). VALLE DE CAUCA: Cisneros (4 km W), blacklight trap, 28 Feb 1969, R.E. Woodruff, 3 ♂, 3 ♀ (FSCA).

COSTA RICA: GUANACASTE: La Pacifica, (4 km NW) Canas, 17 Nov 73, at light, P. Opler, 1 ♀ (UCB); Liberia (10 mi NW), blacklight at Río Ahogado, 25 Jul 1965, P.J. Spangler, 1 ♀ (USNM). HEREDIA: Heredia, OTS La Selva Field Sta., Puerto Viejo de Sarapiquí, Río Puerto Viejo, 10°26'N, 83°59'W, 5–11 Mar 1973, at light, J. Wagner and J. Kethley, 4 ♂, 3 ♀ (FMNH). LIMON: La Lola nr. Matina, 11 Mar 1965,

S.S. and W.D. Duckworth, 1 ♂ (USNM); Limón, Reventazon, Hamburg Farm, 1 Feb 1934, at light, F. Nevermann, 2 ♀ (FMNH). PUNTARENAS: Golfito (2.8 mi E) 18–19 Jul 1967, O.S. Flint, Jr., 1 ♂ (USNM).

ECUADOR: MANABI: Sto. Domingo (29 km W), Rancho Ronaldo, 20 Jul 1978, J. Anderson, 1 ♂, 4 ♀ (USNM); Santo Domingo (47 km S), blacklight, 29 Jul 1976, J. Cohen, 2 ♀ (USNM). NAPO: Lago Agrio (2 km N), 26 Sep 1975, A. Langley, 1 ♂ (USNM); Lago Agrio (5 km N), 26 Sep 1975, at blacklight, A. Langley, 1 ♂ (USNM). PASTAZA: Puyo (27 km N), Est. Fluv. Metrica, 4 Feb 1976, Spangler et al., 1 ♂ (USNM). PICHINCHA: via Puerto Quito (at km 113), at blacklight, 24 Jun 1976, J. Cohen, 1 ♂ (USNM). ZAMORACHINCHIPE: Yanzatza, at light, 13 Jun 1976, Langley et al., 1 ♀ (USNM).

GUATEMALA: RETALHULEU: Finca San Rafael Olimpo, Cuyotenango Such., 1700', 20 Dec 1965, J.M. Campbell, 3 ♀ (BMNH).

HONDURAS: ATLANTIDA: La Ceiba, 27 Jun 1949, E.C. Becker, in light trap, 2 ♂ (INHS); Lancetilla, M. Bates, 3 ♂, 9 ♀ (MCZ). FRANCISCO MORAZON: Guaimaca (4 km W), 2800', 28 Aug 1968, H-29, A.R. Hardy, L. Espinosa, J.P. Abrayaya, 3 ♂, 2 ♀ (CDFA). YORO: Olanchito, 25 May 1949, E.C. Becker, 2 ♀ (INHS); Olanchito, 7 Oct 1948, in lamp globe, 1 ♀ (INHS).

MEXICO: CHIAPAS: Ocosingo (22 km N), Río Lacanjá, 1 May 1981, P.J. Spangler, 1 ♂ (USNM); Río Usumicinta and Arroyo Budsijo confluence, 22 Feb 1980, at blacklight, J. Cohen, 3 ♂, 6 ♀ (USNM); Frontera de Echevaria (Agua Azul), Usumicinta River, 1200' 15 Feb 1980, J. Cohen, 8 ♂, 1 ♀ (USNM); Palenque, 7–9 May 1969, Bright and Campbell, 2 ♂ (BMNH). MICHOACAN: Apatzingam, 12,000', 15 Aug. 1941, H. Hoogstraal, 1 ♂ (USNM). OAXACA: Valle Nacional (near), 18 May 1971, H. Howden, 1 ♂ (BMNH).

PANAMA: CHIRIQUI: Boquete (1 km N), Río Caldera, 30 May 1983, 1225 m, P.J. Spangler, R.A. Faitoute, W.E. Steiner, 1 ♂ (USNM); Caldera, 1 Jun 1983, P.J. Spangler, R.A.

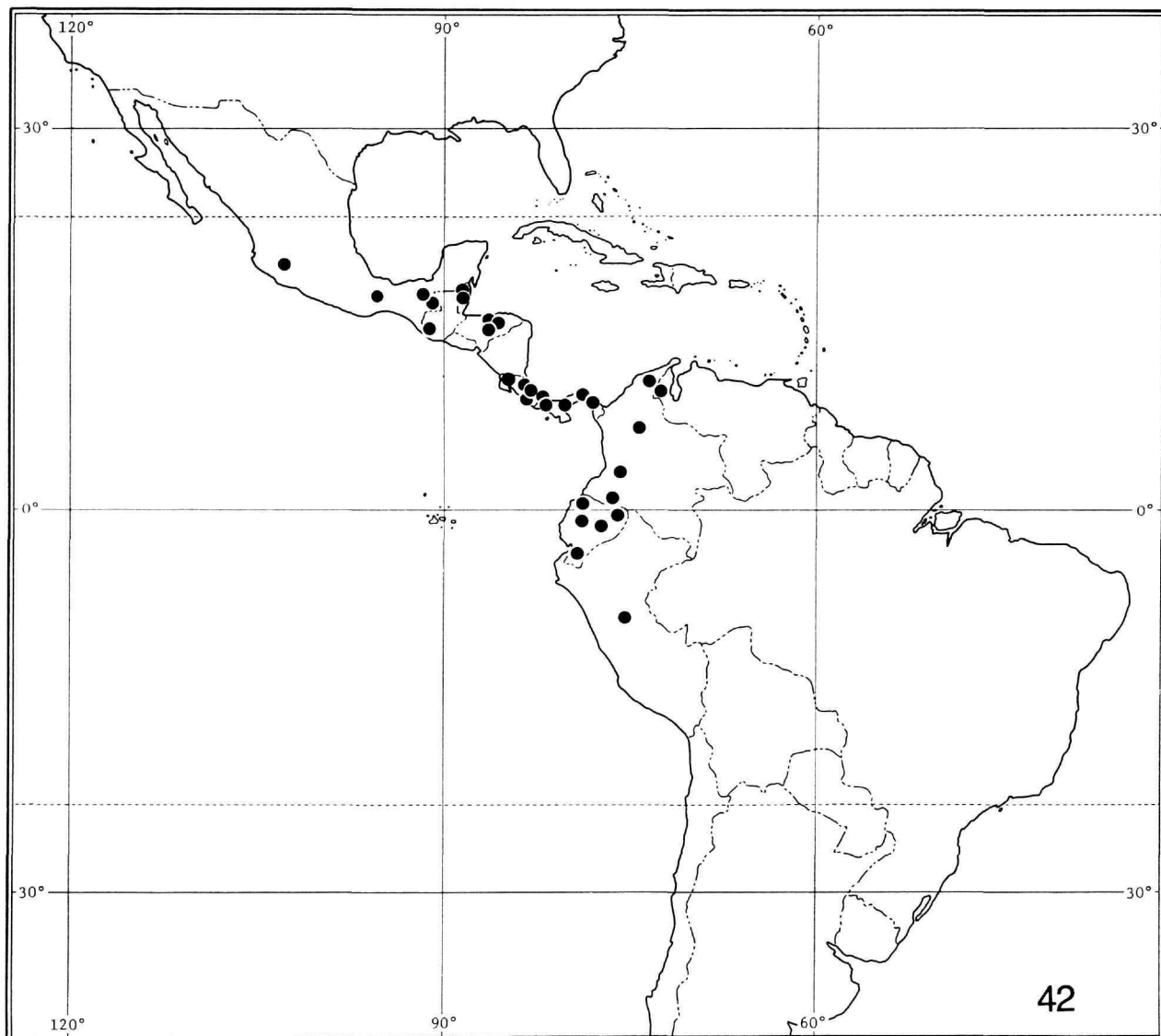


FIGURE 42.—*Stenhelmoides rufulus* (Hinton), distribution map.

Faitoute, W.E. Steiner, 1 ♂ (USNM). COCLE: El Valle, 829 m, 27 May 1983, P.J. Spangler, R.A. Faitoute, W.E. Steiner, 1 ♂ (USNM). DARIEN: Darien, 16–17 Feb 1985, J. Louton, 1 ♂ (USNM).

PERU: HUANUCO: Tingo Maria, 19–24 Apr 1969, P. and P. Spangler, 2 ♀ (USNM).

VENEZUELA: ZULIA: Tucuco, 15 Nov 1982, R.F. Denno, 1 ♂ (USNM).

HABITAT.—Although the majority of specimens of *S. rufulus* were collected by operating blacklights on or near the banks of rivers or streams, some specimens were collected, in recent years, by using seines or aquatic dipnets; those collections confirmed the presence of *S. rufulus* in four different streams.

Habitats varied from larger streams such as the Río Caldera (15 m wide) at Boquete, Panama, and the Río Lacanjá (13 m wide) (Figure 43) near Ocosingo, Mexico, to small brooks such as an unnamed one at Caldera, Panama, and another at El Valle, Panama (1–2 m wide) (Figure 44).

The streams varied from 5.0 cm to 0.80 m deep and the substrates were very similar, consisting of sand, cobbles, and boulders. The water velocity varied from 0.30 to 0.44 m/sec and the water temperature varied from 23.5°C to 26.5°C. Colorimetric water analyses varied as follows: pH of 5.5 to 6.0; hardness from 0 to 10 grains/gallon; oxygen, 9 ppm. The four collecting sites were at altitudes ranging from 820 to 2900 m, and all sites were in open unshaded areas but the streams



FIGURES 43, 44.—*Stenhelmoides rufulus* (Hinton), biotopes: 43, Río Lacanjá, Ocosingo (22 km N), Mexico; 44, El Valle, Panama.

passed through forested areas and the beetles probably will also be found in shaded areas.

At the biotope at El Valle, Panama, *S. rufulus* was collected in association with the following elmid genera: *Austrolimnius*, *Cylloepus*, *Disersus*, *Heterelmis*, *Hexacylloepus*, *Hexanchorus*, *Macrelmis*, *Phanocerus*, and *Xenelmis*.

### 3. *Stenhelmoides pubipes*, new species

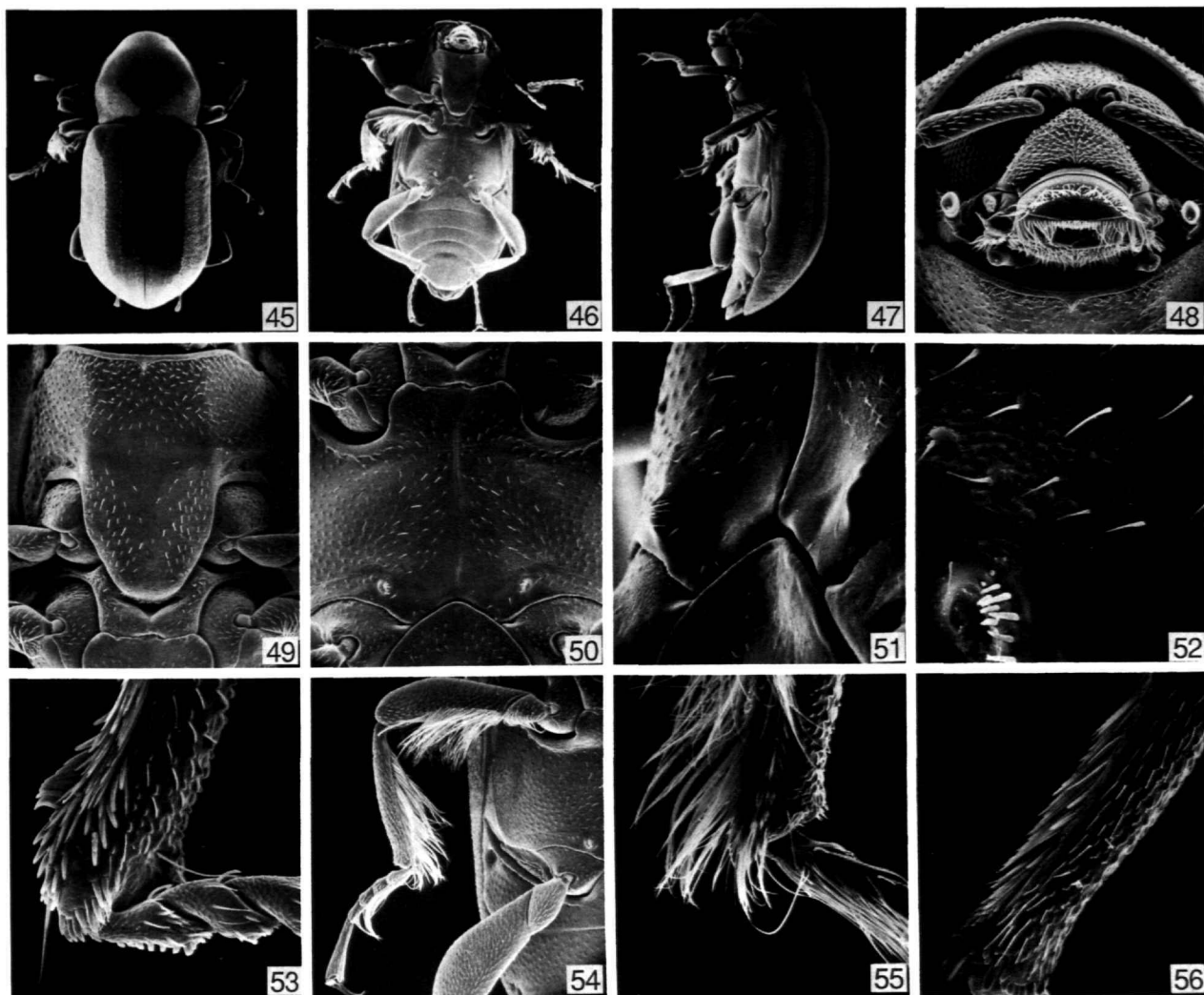
FIGURES 3, 45-72

DIAGNOSIS.—Similar to *S. antennarius* in size and extent of elytral plastron. Differs from all known species of the genus

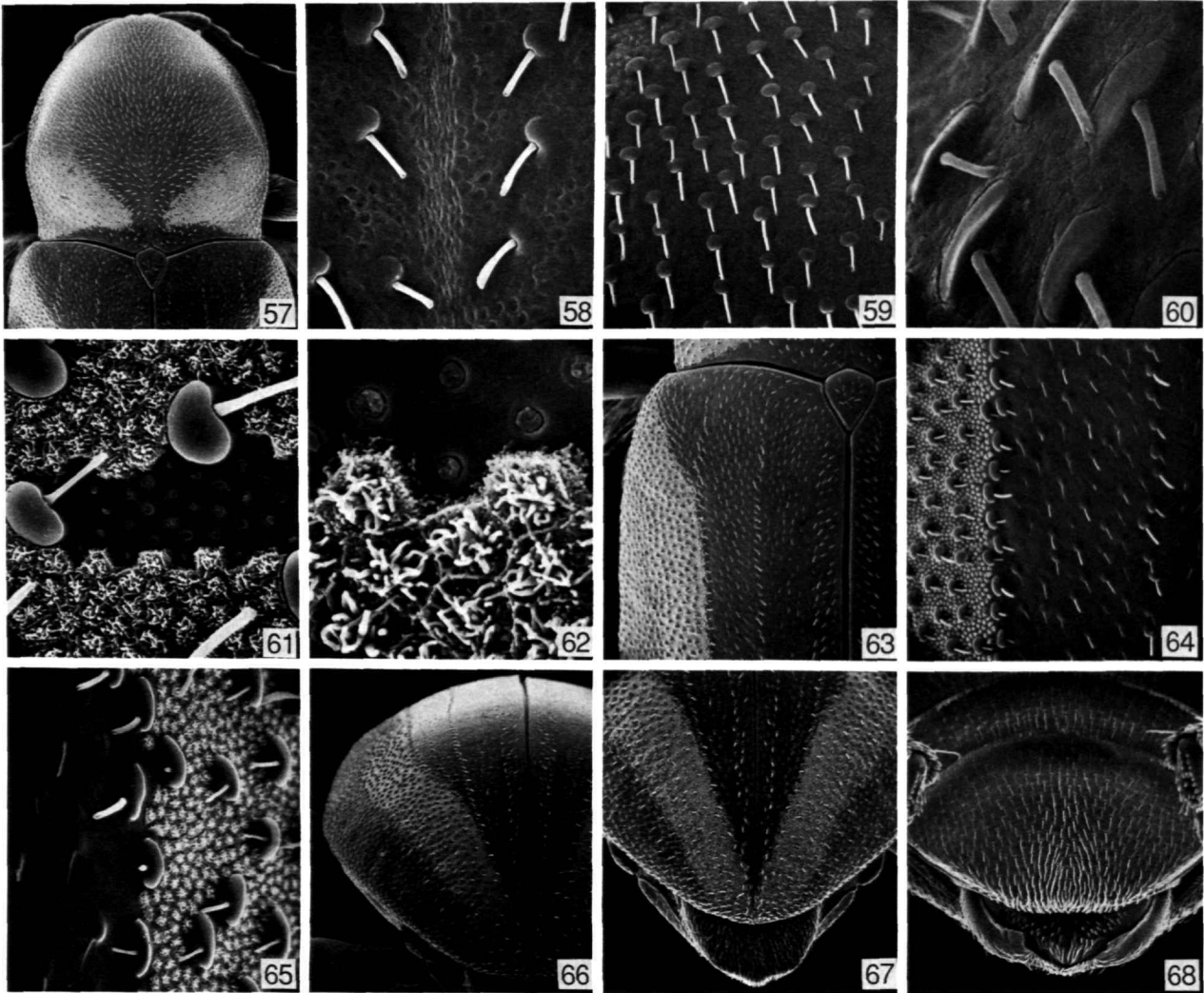
in pattern of the pronotal plastron (Figure 3), in having tuberculate cuticle in area of elytra without plastron (Figures 3, 45), in form of male genitalia (Figures 69, 70), and several male secondary sexual characteristics (see Table 2).

HOLOTYPE MALE.—*Body Form and Size*: Elongate, subparallel (Figures 45, 46), moderately convex dorsally (Figure 47). Length, 3.78 mm; width, 1.7 mm.

*Color*: Dorsal surface reddish brown with reddish black to black markings as follows. Pronotum reddish black except anterior and posterior margins reddish brown and gray plastron on sides as illustrated (Figures 3, 45, 57). Elytron with plastron area gray; shiny discal area without plastron reddish brown.



FIGURES 45-56.—*Stenhelmoides pubipes*, new species: 45, habitus, dorsal view,  $\times 25$ ; 46, ventral view,  $\times 25$ ; 47, lateral view,  $\times 27$ ; 48, Head, adoral view,  $\times 125$ ; 49, prosternum,  $\times 95$ ; 50, metasternum, tubercles on antecoxal sclerites,  $\times 95$ ; 51, tubercle in profile,  $\times 225$ ; 52, tubercle enlarged,  $\times 600$ ; 53, protibial apex,  $\times 300$ ; 54, middle leg, male,  $\times 60$ ; 55, mesotibial apex, male,  $\times 225$ ; 56, metatibia, cleaning fringe,  $\times 200$ . (Reduced to 50% of original.)



FIGURES 57-68.—*Stenelmoides pubipes*, new species: 57, pronotum and elytral bases, enlarged,  $\times 55$ ; 58, middle of pronotum, sculpture,  $\times 1000$ ; 59, pronotal granules on shiny discal area,  $\times 400$ ; 60, granules, lateral area of pronotum,  $\times 2000$ ; 61, plastron setae and granules on pronotum,  $\times 1525$ ; 62, plastron setae, enlarged, some abraded,  $\times 4500$ ; 63, elytral base,  $\times 90$ ; 64, elytral disc, granules and plastron,  $\times 250$ ; 65, elytral disc, granules and plastron, enlarged,  $\times 750$ ; 66, elytral apex, posterior view,  $\times 80$ ; 67, dorsal view,  $\times 85$ ; 68, last abdominal sternum,  $\times 130$ . (Reduced to 50% of original.)

Ventral surface and appendages reddish brown except areas with gray plastron.

**Head:** Width between antennal acetabula, 0.04 mm (Figure 48). Frons with gray plastron. Granules pointed, less coarse than facets of eyes. Clypeus granulate, reddish, sparsely pubescent. Labrum with a transverse row of hair-like setae near apical third. First antennal segment subequal to combined lengths of antennal segments 2-4.

**Thorax:** Pronotum, 1.20 mm long, 1.32 mm wide; with gray plastron except large median reddish black area (Figure 3) surface of which is dull between granules; extremely

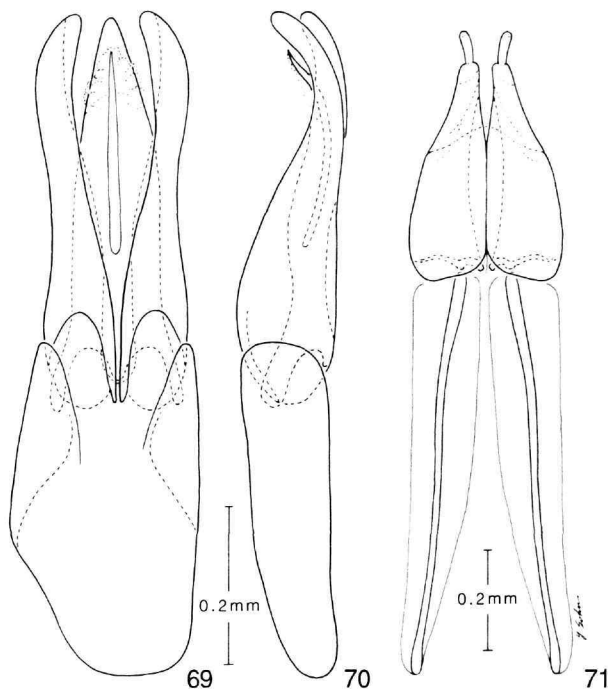
shallow, median longitudinal line extending from base to slightly past midlength. Pronotal granules rounded (Figures 58-61), about size of eye facets; separated by about their diameter, becoming sparser medially and posteriorly; each granule with short basal seta; setae of all granules directed toward median basal fifth of pronotum. Elytra, 2.72 mm long, 1.68 mm wide (near midlength). Each elytron with a median longitudinal row of low granules which delimits lateral area of gray plastron and medial reddish black area; row of granules becoming obsolete where junction of gray and reddish black areas angle laterally to humeral angle; row of granules



terminates at elytral declivity where junction of gray and reddish black areas angle medially to elytral apices; reddish black median area with second longitudinal row of small granules (smaller than those of median row), row slightly closer to median row than to suture, extending nearly to base (Figures 57, 63), terminating half way between declivity and elytral apex; reddish black area also with extremely fine, sparse, random granules separated by about 5 times their diameter; random granules about  $\frac{1}{4}$  size of granules in rows; reddish black area lacking rows of punctures; lateral areas of gray plastron with large, dense granules (Figures 64, 65) similar in size to largest granules on pronotum, granules separated by about 1 to 2 times granule diameter; each granule with small basal seta; setae of lateral granules directed medially (Figures 66, 67); setae of tiny granules in reddish black area directed posteriorly. Prosternum (Figure 49), 0.82 mm long; with small apicomedial tubercle. Prosternal process 0.42 mm long, 0.44 mm wide; elevated slightly to form angle with anterior part of prosternum; small oval median depression at apical third; surface with very minute, sparse granules, much smaller than granules on lateral surface of prosternum and hypomeron, which are similar in size to largest pronotal granules; narrowly margined laterally with gray plastron. Mesosternum with deep fovea for reception of apex of prosternal process. Metasternum (Figure 50) with disc depressed; with gray plastron except reddish black intercoxal process and median reddish black area extending from mesocoxae and gradually widening to occupy area between metacoxae; prominent tubercle (Figures 50–52) on each side of reddish black area in front of metacoxae; lateral area of gray plastron with granules slightly smaller than largest granules of pronotum and separated by 2 to 3 times granule diameter; midline with moderately deeply impressed line; lateral angles of intercoxal process elevated, on different plane than disc. Legs reddish except hind coxa, trochanter, and femur with gray plastron; granulate as metasternum. Foreleg with short patch of long setae at midlength of anterior surface of femur; tibia arcuate; cleaning fringe occupying distal  $\frac{3}{4}$  of anterior surface, bordered medially by row of short scraping setae. Protarsal segments 1–4 with short stout setae ventrally. Midlegs (Figures 54, 55) with long golden pubescence on all segments ventrally except coxa and last tarsal segment; posterior surface of femur with short patch of long setae at midlength; mesotibial cleaning fringe occupying distal  $\frac{3}{4}$  of posterior surface, bordered laterally by row of short stout setae. Hind legs with tibial cleaning fringe (Figure 56) occupying distal  $\frac{4}{5}$  of posterior surface and bordered laterally by row of short, closely spaced smoothing setae and bordered medially by row of more widely spaced, short, scraping setae; tarsal segments 1–4 with short setae ventrally.

**Abdomen:** With gray plastron and granulate like lateral areas of metasternum, except intercoxal process shiny reddish black. Sternum 5 (Figure 68) with short, apical, hair-like setae; without median depression.

**Male Genitalia:** As illustrated (Figures 69, 70).



FIGURES 69–71.—*Stenhelmoides pubipes*, new species: 69, male genitalia, dorsal view; 70, lateral view. 71, Female genitalia, dorsal view.

**FEMALE GENITALIA.**—As illustrated (Figure 71).

**SEXUAL DIMORPHISM.**—Females average slightly larger in body size than males and lack the pubescence of the midlegs and the apicomedial tubercle of the prosternum. The large metasternal tubercles of males are reduced to low humps with very short golden setae in females. Females have the metasternal disc less depressed and have the reddish black median area restricted to the median longitudinal sulcus. Male protibiae are markedly arcuate and have enlarged apicomedial setae; female protibiae have the lateral surface very slightly arcuate and lack distinctively enlarged setae. Antennae of females are slightly more distant from one another than those of males.

**VARIATION.**—A few specimens have the gray pronotal plastron encroaching slightly on the sides of the reddish black hexagonal area. Males vary in body length from 3.68 to 3.96 mm; females from 3.95 to 4.16 mm.

**TYPE DATA.**—*Holotype* (male): PERU: MADRE DE DIOS: Puerto Maldonado (30 km SW), Río Tambopata Res., 11–15 Nov 1979, 290 m, subtropical moist rainforest, J.B. Heppner; deposited in the National Museum of Natural History, Smithsonian Institution.

*Allotype*: ECUADOR: PASTAZA PROVINCE: confluence of Río Macuma, with Río Morona, 300 meters, at light, river sand bank, 13 Jul 1971, B. Malkin; deposited in the Field Museum of Natural History, Chicago.

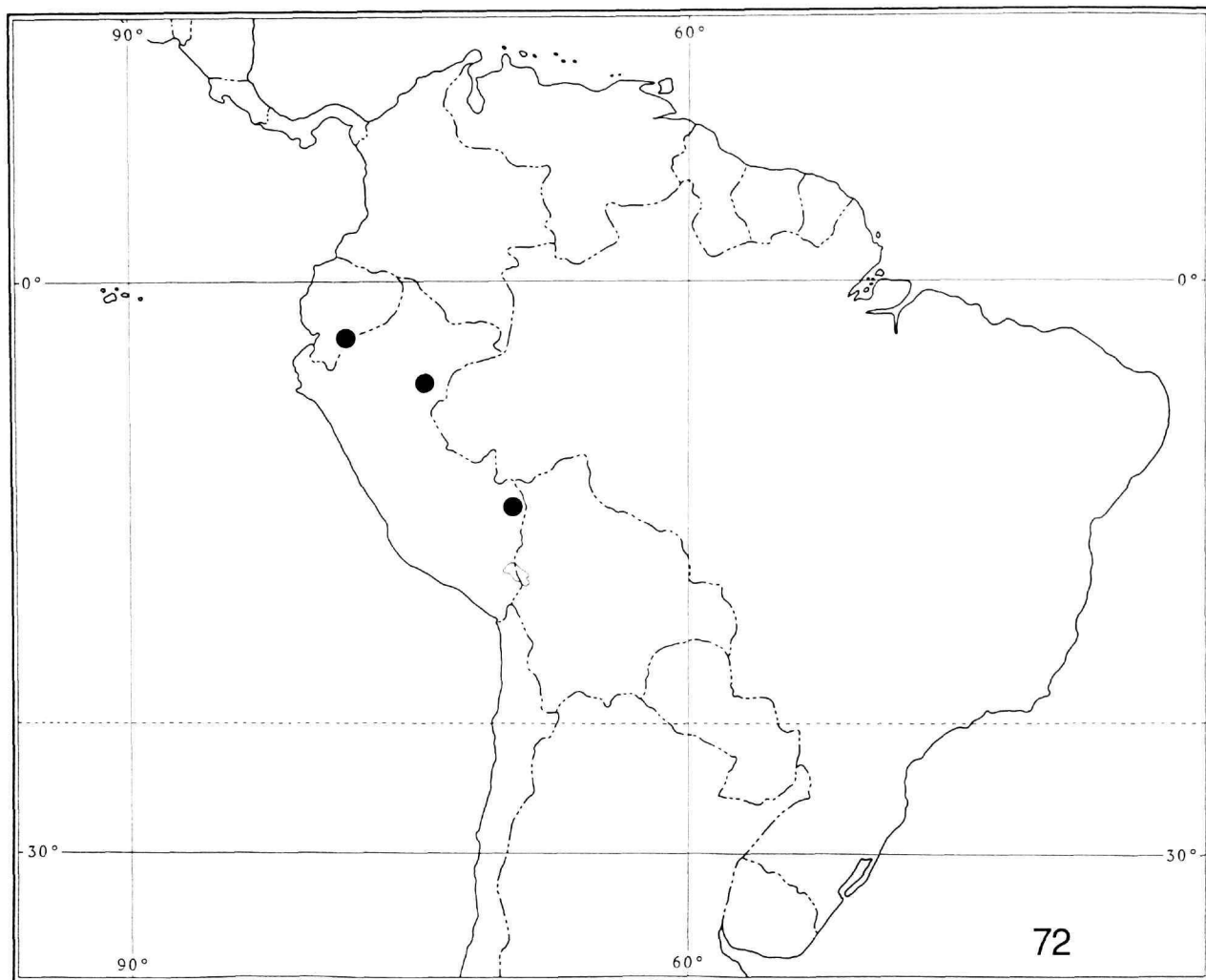


FIGURE 72.—*Stenhelmoides pubipes*, new species, distribution map.

*Paratypes*: Same data as allotype, 136; deposited in FMNH, USNM, and PDP. PERU: LORETO: Colonia Calleria, 15 km E of Ucayali, Río Calleria, at light, 24 Nov–12 Dec 1961, B. Malkin, 3 ♀ (FMNH).

*DISTRIBUTION*.—Currently known from Pastaza Province, Ecuador, to Puerto Maldonado in southeastern Peru (Figure 72).

*ETYMOLOGY*.—From the Latin *pubipes* (hair), plus *pes* (foot), in reference to the long, golden, hair-like setae on the middle legs of the males of this species.

*HABITAT*.—Unknown.

#### 4. *Stenhelmoides antennarius*, new species

FIGURES 4, 73–94

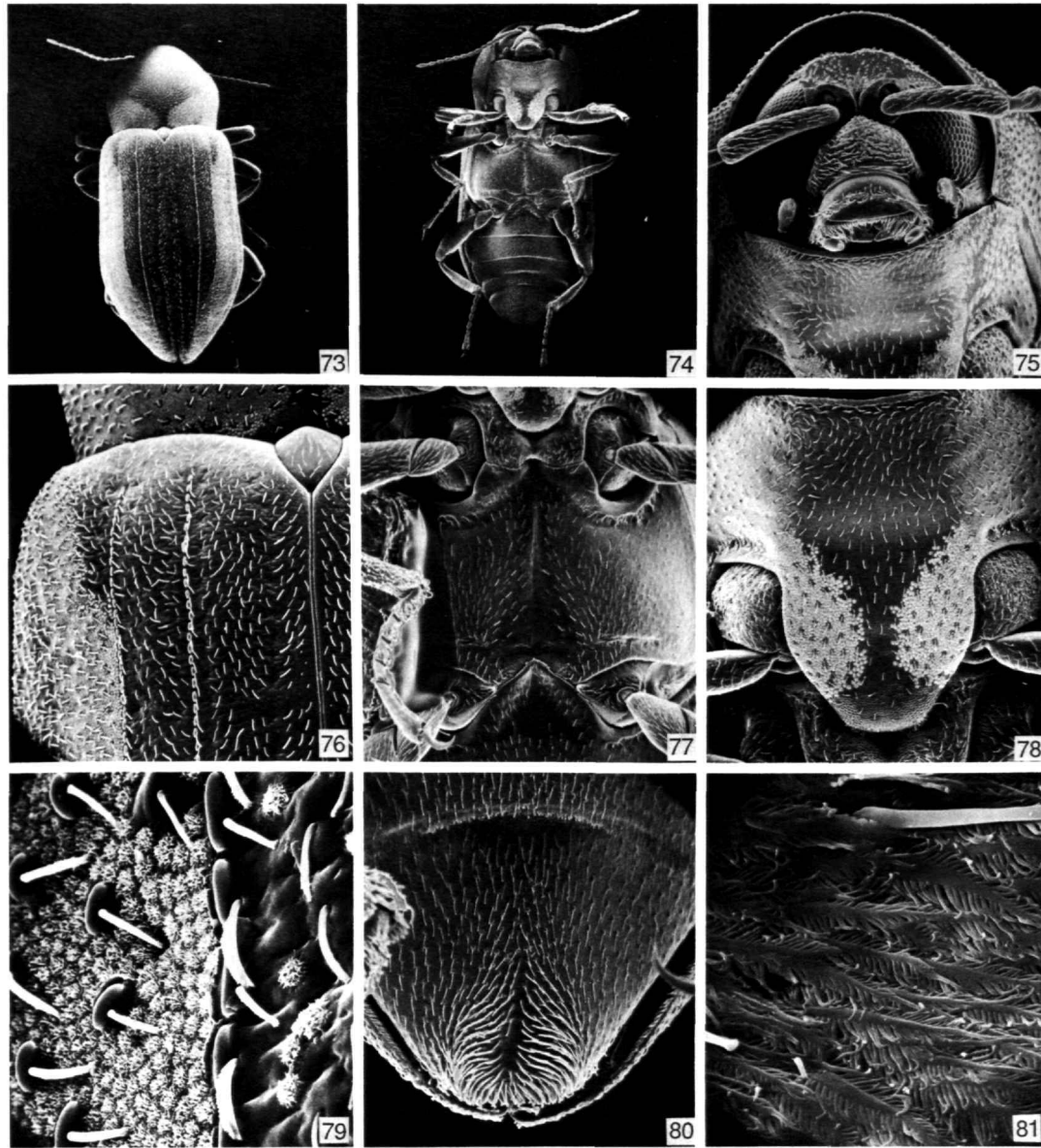
*DIAGNOSIS*.—Similar to *S. pubipes*, new species, in size and extent of elytral plastron. Differs from all other known species

of *Stenhelmoides* in shape of reddish black area without plastron on pronotum (Figure 4), shape of male genitalia (Figures 69, 91), and secondary sexual characteristics of the male—almost confluent antennal acetabula and enlarged antennal segments (see Table 2).

*HOLOTYPE MALE*.—*Body Form and Size*: Elongate, subparallel (Figures 73, 74), moderately convex dorsally. Length, 4.00 mm; width, 1.64 mm.

*Color*: Dorsal surface with gray plastron except large, reddish black area without plastron (Figures 4, 73). Palpi, clypeus, and antennae reddish. Legs reddish except faintly gray coxa, trochanter, and femur of hind leg.

*Head*: Width between antennal acetabula, 0.06 mm (Figure 75). Frons gray; granules pointed, less coarse than facets of eyes. Clypeus granulate, sparsely pubescent. Labrum with transverse row of hairs near apical third. First antennal segment subequal to combined lengths of segments 2–4;

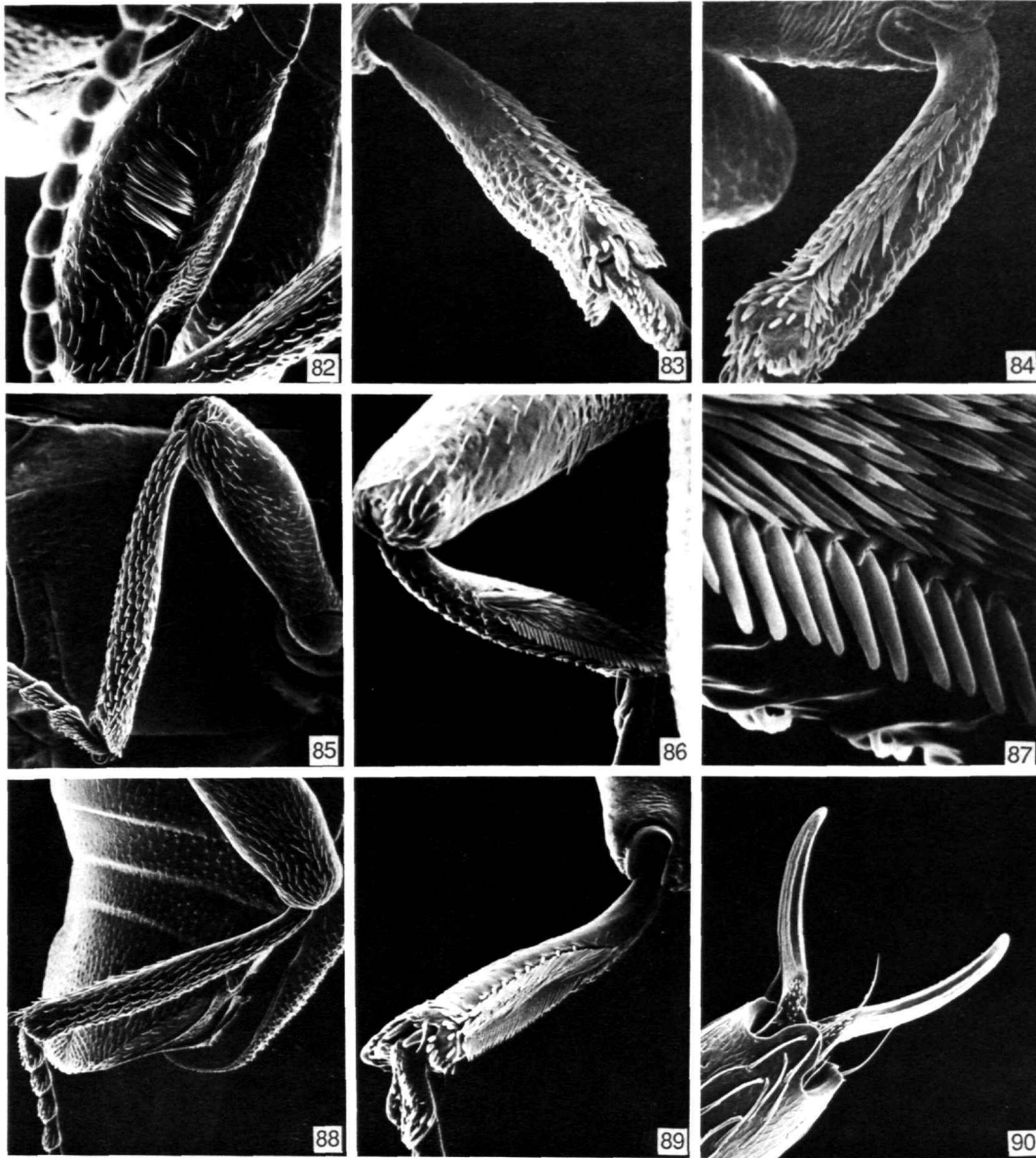


FIGURES 73–81.—*Stenhelmoides antennarius*, new species: 73, habitus, dorsal view,  $\times 21$ ; 74, ventral view,  $\times 21$ . 75, Head, dorsal view,  $\times 82$ ; 76, elytral base, extent of plastron,  $\times 90$ ; 77, metasternum,  $\times 60$ ; 78, prosternum,  $\times 105$ ; 79, plastron setae on elytral base,  $\times 750$ ; 80, last abdominal sternum, male,  $\times 115$ ; 81, plastron setae on epipleuron,  $\times 2800$ . (Reduced to 72% of original.)

antennal segments 3–10 thickened, width of each segment nearly equal to length; segments 3–11 usually with tufts of long setae on lower surface.

**Thorax:** Pronotum, 1.24 mm long, 1.32 mm wide; with gray plastron except large reddish black median area (Figure 4); cuticle of reddish black area dull between granules; extremely shallow median longitudinal line extending from base to apical third. Pronotal granules rounded, about size of eye facets; separated anterolaterally by about their diameter;

becoming sparser and smaller medially and posteriorly; each granule with short basal seta; setae of all granules directed toward median basal fifth of pronotum. Elytra, 2.88 mm long, 1.64 mm wide (near midlength). Each elytron with a median longitudinal row of granules that delimits lateral area of gray plastron and medial reddish black area (Figures 73, 76); row of granules nearly attaining elytral base, becoming less discrete as a row beyond elytral declivity; junction of gray plastron and reddish black area diverging obliquely from row of granules



FIGURES 82-90.—*Stenhelmoides antennarius*, new species: 82, profemur, anterior face,  $\times 150$ ; 83, protibial scraping setae,  $\times 185$ ; 84, protibial cleaning fringe,  $\times 200$ ; 85, middle leg, lateral surface,  $\times 100$ ; 86, mesotibial cleaning fringe and smoothing setae,  $\times 150$ ; 87, mesotibial cleaning fringe and smoothing setae, enlarged,  $\times 1050$ ; 88, hind leg, lateral surface,  $\times 75$ ; 89, metatibial cleaning fringe (middle), scraping setae (upper row) and smoothing setae (lower row),  $\times 150$ ; 90, protarsal claws,  $\times 400$ . (Reduced to 72% of original.)

to humeral angle (Figures 76, 79); area of gray plastron widens medially at apical declivity, almost attaining suture at elytral apex. Reddish black median area of elytron with second longitudinal row of granules similar in size to those of median row; row closer to median row than to suture, extended nearly to base, terminating slightly before apex; also with 4 rows of lightly impressed punctures, 2 rows between rows of granules

and 2 rows between suture and submedian row of granules; punctures of a row separated by about 5 times their diameter; surface of cuticle with irregular, very lightly impressed, short, transverse lines and extremely small, sparse, random punctures; most punctures have a short fine seta. Epipleuron with dense, frondose plastron setae (Figure 81). Elytron with lateral area of gray plastron with large dense granules; granules

slightly smaller than largest pronotal granules, separated by about 1 to 2 times their diameter; each granule with small basal seta directed medially. Prosternum (Figure 78), 0.88 mm long; reddish black, shiny medially; finely and sparsely pubescent in front of process; sides and hypomera with gray plastron and granulate like pronotum. Prosternal process 0.44 mm long, 0.44 mm wide; elevated to form angle with anterior part of prosternum; small median oval depression at apical third; median third of reddish black area shiny, sparsely finely pubescent; lateral areas gray, sparsely granulate. Mesosternum with deep fovea for reception of apex of prosternal process. Metasternum (Figure 77) with disc depressed; with gray plastron except intercoxal process reddish black; median reddish black area extending from hind margins of metacoxae, gradually widening to occupy area between hind coxae, and very finely microreticulate; lateral area of gray plastron with granules finer and sparser than those on pronotum, granules separated by 2 to 4 times their diameter; midline with deeply impressed longitudinal line; lateral angles of intercoxal process elevated, on different plane than disc. Legs reddish except hind coxa, trochanter, and femur faintly gray. Profemur with small patch of long setae at midlength on anterior surface (Figure 82). Protibia straight; cleaning fringe occupying distal  $\frac{3}{4}$  of anterior surface (Figure 84); cleaning fringe bordered medially by row of short, stout, scraping setae (Figure 83). Protarsus with short stout spines ventrally. Mesofemur with small patch of long setae at midlength on posterior surface. Mesotibial and metatibial cleaning fringes similar (Figures 86, 87, 89); fringes occupying distal  $\frac{3}{4}$  of posterior surface, bordered mediolaterally by row of short, closely spaced, smoothing setae, bordered medially by row of more widely spaced, stout, scraping setae; lateral surfaces unmodified (Figures 85, 88). Metacoxa with small tubercle at medial angle. Mesotarsus and metatarsus with short, dense setae ventrally. Tarsal claws stout (Figure 90).

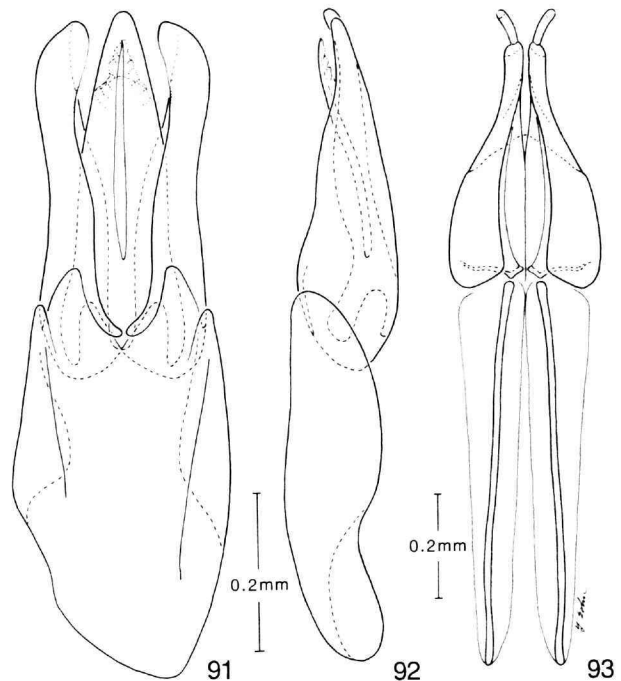
**Abdomen:** With gray plastron and granulate like metasternum except intercoxal process and small anteromedian areas of sterna 2-4 reddish black. Sternum 5 with apicomedian half broadly depressed; depression bordered with golden setae (Figure 80).

**Male Genitalia:** As illustrated (Figures 91, 92).

**FEMALE GENITALIA.**—As illustrated (Figure 93).

**SEXUAL DIMORPHISM.**—Females have the following features differing from those of males. Antennal acetabula separated narrowly. Antennal segments much narrower; setae at apices on antennal segments 3-11 less developed. Tarsal setae less developed. Metasternal disc not as depressed and having the reddish black median area restricted to median longitudinal sulcus. Last sternum with median longitudinal line lightly impressed in apical half, not broadly and deeply depressed.

**VARIATION.**—On several specimens the gray plastron on the hind femur appears to cover the proximal  $\frac{2}{3}$  or is absent; however, the plastron probably is complete but soiled and obscured.



FIGURES 91-93.—*Stenhelmoides antennarius*, new species: 91, male genitalia, dorsal view; 92, lateral view. 93, Female genitalia, dorsal view.

**TYPE DATA.**—*Holotype* (male): ECUADOR: NAPO: 5 km N Lago Agrio, at blacklight, 26 Sep 1975, Andrea Langley; deposited in the National Museum of Natural History, Smithsonian Institution.

*Allotype:* Same data as holotype.

*Paratypes:* Same data as holotype, 6 ♂, 9 ♀; same data as holotype except: 2 km N Lago Agrio, 26 Sep 1975, A. Langley, 8 ♂, 10 ♀; 18 km NW Lago Agrio, 30 Aug 1975, Langley and Cohen, 2 ♂, 2 ♀; Lago Agrio, 19 Sep 1975, A. Langley, 1 ♂, 1 ♀. All specimens collected at blacklight.

**DISTRIBUTION.**—Currently known only from the vicinity of Lago Agrio, Napo Province, Ecuador (Figure 94).

**ETYMOLOGY.**—From the Latin *antennarius*, in reference to the sexually dimorphic antennae.

**HABITAT.**—Unknown.

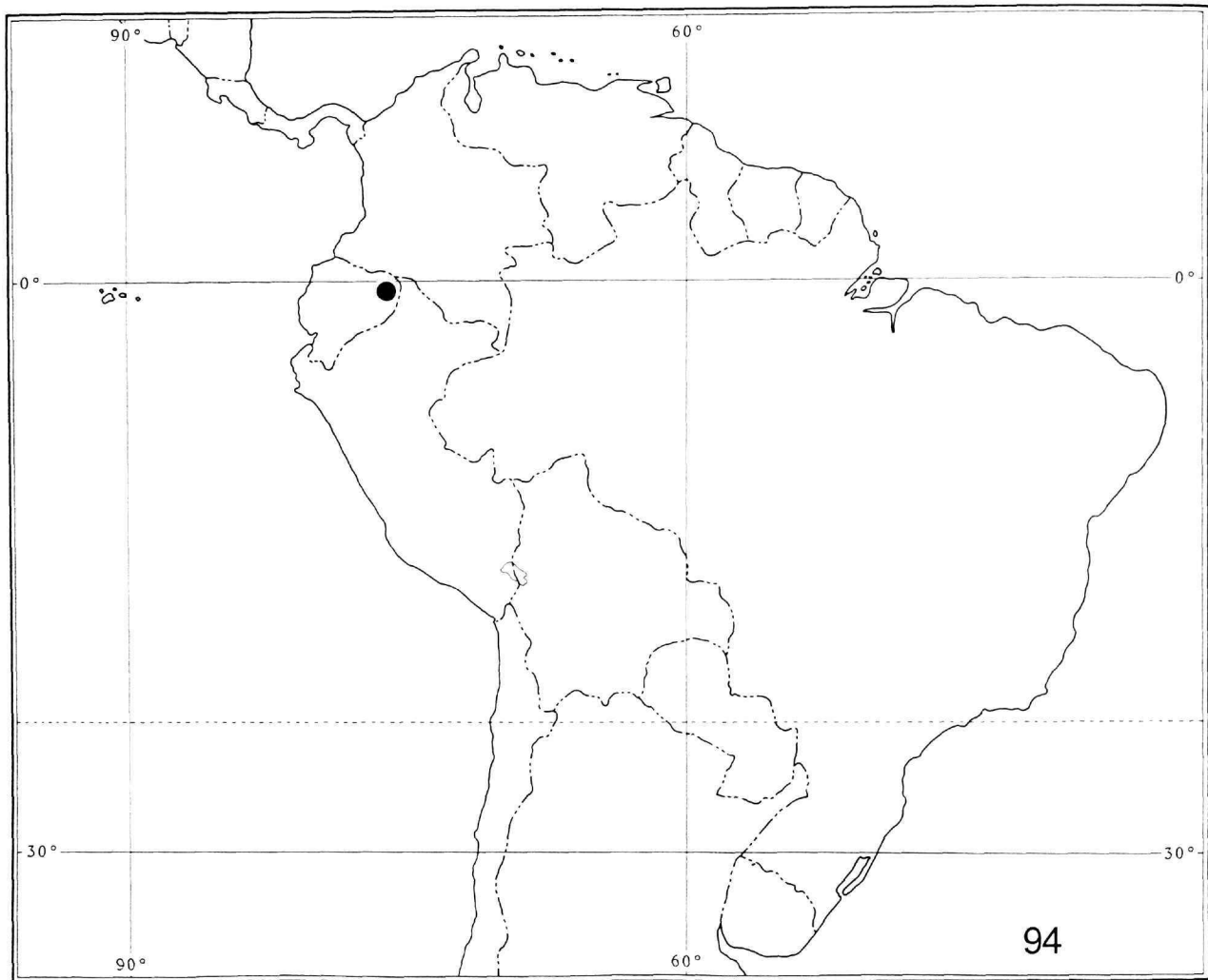


FIGURE 94.—*Stenelmoides antennarius*, new species, distribution map.

#### The *guyanensis* Group

DIAGNOSIS.—Members of the *guyanensis* Group are recognized by the following combination of characters. Body elongate and rather flattened on dorsal discal areas. Frons merging with clypeus on same plane between bases of antennae. Length of basal segment of maxillary palpus about half as long as second segment (Figures 156, 178). Lacinia with apical spines reduced, not in distinct rows; with tooth-like lateral projection (Figures 156, 157). Prosternal process not foveate (except *S. submaculatus*); densely, coarsely granulate; forming angle midway between base of process and anterior

margin of prosternum. Metasternal disc flat. Abdominal intercoxal process flat. Protibial cleaning fringe short, occupying middle third of tibial length. Mesotibia and metatibia with only a short row of smoothing setae at distal end of cleaning fringe. Profemur without or with 2 long, slender, golden, hair-like setae at midlength on anterior surface. Mesofemur with row of dense, long, golden, hair-like setae at midlength on posterior surface. Metafemur without plastron setae on surface. Elytron with granules grouped into bands. Female genitalia with coxites and styli short, broad; apical segment of styli small, about as long as wide.

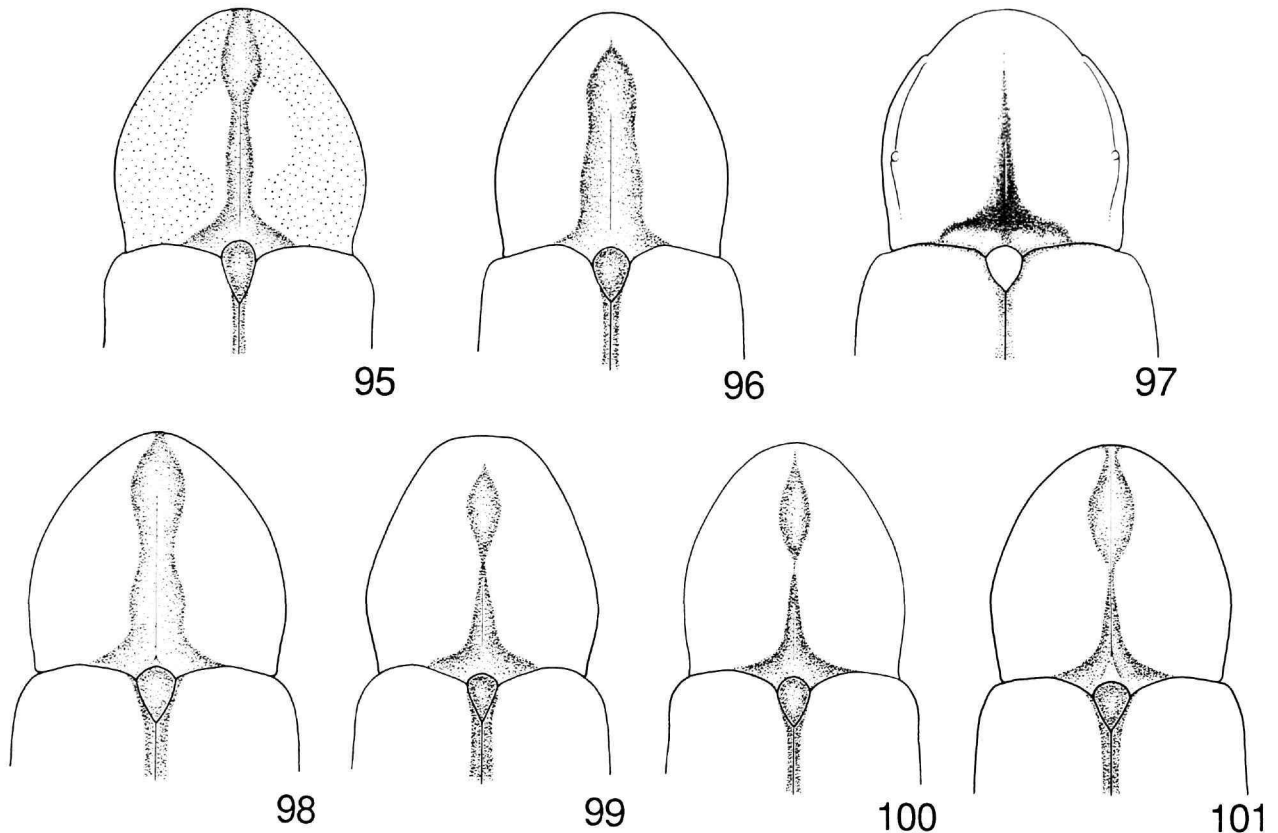
**Key to Species of *guyanensis* Group**

1. Granules of pronotum absent from a circular discal area and shiny longitudinal area that is without plastron [Figure 95]. Length, 4.40 mm . . . . . 5. *S. guyanensis*  
 Granules of pronotum extending onto disc and shiny longitudinal area that is without plastron. Length, 2.70–4.43 mm . . . . . 2
2. Pronotum and elytra with surface shagreened. Elytra with fine granules in narrow, rather indistinct, longitudinal bands, especially beyond basal fourth. Length, 2.70 mm . . . . . 6. *S. beebei*, new species  
 Pronotum and elytra with surface not shagreened. Elytra with coarse granules in distinct or indistinct longitudinal rows. Length, 2.80–4.43 mm . . . . . 3
3. Pronotum with strong lateral rim with a small tubercle in groove beside rim slightly behind midlength [Figure 97]; disc strongly swollen and abruptly declivous in front of scutellar emargination. Length, 2.80 mm . . . . . 7. *S. submaculatus*  
 Pronotum without lateral rim; disc not strongly swollen in front of scutellar emargination. Length, 3.50–4.43 mm . . . . . 4
4. Pronotal area without plastron only slightly narrowed at midlength [Figure 98]. Elytra with 3 distinct rows of coarse punctures and 3 to 5 indistinct discal bands of granules. Length, 4.43 mm . . . . . 8. *S. grandis*, new species  
 Pronotal area without plastron very narrow about at midlength then widening both apically and basally [Figures 99–101]. Elytra not as above. Length, 3.50–3.80 mm . . . . . 5
5. Pronotal area without plastron not extending to anterior edge of pronotum [Figure 99]. Elytra without rows of coarse punctures; granules in 3 distinct bands. Length, 3.80 mm. . . . . 9. *S. platysternum*, new species  
 Pronotal area without plastron extending to anterior edge of pronotum [Figures 100, 101]. Elytra with rows of coarse punctures and granules in 4 or 5 distinct bands at midlength. Length, 3.50 mm . . . . . 6
6. Elytra with 6 or 7 distinct rows of coarse punctures; 4 discal bands of granules alternately broad (3 to 5 granules) and narrow (1 or 2 granules). Length, 3.50 mm . . . . . 10. *S. grouvellei*  
 Elytra with 3 distinct rows of coarse punctures; 5 discal bands of granules alternately broad (3 to 5 granules) and narrow (1 or 2 granules). Length, 3.50 mm . . . . . 11. *S. variabilis*, new species

**Clave para las Especies del Grupo *guyanensis***

1. Gránulos del pronoto ausentes del area discal circular y del área brillante longitudinal que carece de plastron [Figura 95]. Longitud, 4.40 mm . . . . . 5. *S. guyanensis*  
 Gránulos del pronoto extendiéndose sobre el área discal y el área brillante longitudinal que carece de plastron. Longitud, 2.70–4.43 mm . . . . . 2
2. Pronoto y élitros con superficie áspera. Elitros con gránulos finos dispuestos en bandas longitudinales angostas, poco evidentes especialmente mas allá de la cuarta porción basal. Longitud, 2.70 mm . . . . . 6. *S. beebei* sp. nov.  
 Pronoto y élitros sin superficie áspera. Elitros con gránulos gruesos dispuestos en bandas longitudinales claras o difusas. Longitud, 2.80–4.43 mm . . . . . 3
3. Pronoto con un borde lateral claramente desarrollado con un pequeño tubérculo en una depresión a un lado del borde ligeramente después de la parte media [Figura 97]; disco fuertemente abultado y abruptamente en declive frente a la emarginación escutelar. Longitud, 2.80 mm . . . . . 7. *S. submaculatus*  
 Pronoto sin borde lateral; disco no abultado frente a la emarginación escutelar. Longitud, 3.50–4.43 mm . . . . . 4

4. Area pronotal sin plastron solo un poco angosta hasta la parte media [Figura 98].  
Elitros con 3 hileras definidas de puntuaciones gruesas y 3 a 5 bandas discales no definidas de gránulos. Longitud, 4.43 mm . . . . . 8. *S. grandis*, sp. nov.  
Area pronotal sin plastron muy angosta hasta la parte media, ampliándose en seguida [Figuras 99–101]. Elitros no como arriba. Longitud, 3.50–3.80 mm . . . . . 5
5. Area pronotal sin plastron no extendiéndose hasta el extremo anterior del pronoto [Figura 99]. Elitros sin hileras de puntuaciones gruesas; gránulos en 3 bandas bien definidas. Longitud, 3.80 mm . . . . . 9. *S. platysternum*, sp. nov.  
Area pronotal sin plastron extendiéndose al extremo anterior del pronoto [Figuras 100, 101]. Elitros con 3 a 7 hileras de puntuaciones gruesas; gránulos en 4 o 5 bandas discales. Longitud, 3.50 mm . . . . . 6
6. Elitros con 6 o 7 hileras bien definidas de puntuaciones gruesas; 4 bandas discal de gránulos alternativamente amplias (3 a 5 gránulos) y angostas (1 a 2 gránulos). Longitud, 3.50 mm . . . . . 10. *S. growellei*  
Elitros con 3 hileras bien definidas de puntuaciones gruesas; 5 bandas discal de gránulos alternativamente amplias (3 a 5 gránulos) y angostas (1 a 2 gránulos) a la parte media. Longitud, 3.50 mm . . . . . 11. *S. variabilis*, sp. nov.



FIGURES 95–101.—Pattern of area without plastron (stippled) on pronotum and base of elytra: 95, *Stenelmoides guyanensis* Grouvelle (also showing absence of granules on discal area); 96, *Stenelmoides beebei*, new species; 97, *Stenelmoides submaculatus* (Hinton); 98, *Stenelmoides grandis*, new species; 99, *Stenelmoides platysternum*, new species; 100, *Stenelmoides growellei* (Pic); 101, *Stenelmoides variabilis*, new species.



### 5. *Stenelmoides guyanensis* Grouvelle

FIGURES 95, 102, 103

*Stenelmoides guyanensis* Grouvelle, 1908:182.—Delève, 1970:65.

*Stenelmoides guyanensis*.—Hinton, 1937a:138; 1937b:111.—Blackwelder, 1944:271 [checklist].

**DIAGNOSIS.**—Differs from all known species of *Stenelmoides* by the absence of granules on the pronotal disc and the pattern of the pronotal plastron (Figure 95).

**REDESCRIPTION OF HOLOTYPE FEMALE.**—*Body Form and Size:* Elongate, parallel sided, moderately depressed. Length, 4.40 mm; width, 1.62 mm.

*Color:* Dorsal surface reddish brown overlaid by a gray plastron except an elongate, sinuous area on midline of pronotum and scutellum and a narrow area along sutural margins of elytra without plastron (Figure 95); in addition, infusate, slightly rounded maculae present sublaterally at about midlength of pronotum. Each elytron with the following nearly vittate, ill-defined markings: 1 at base of each band of granules 3, 4, and 5; 1 indistinctly rectangular behind midlength, confluent between bands of granules 1, 2, and 3; 1 indistinctly uniting bands 1, 2, and 3 subapically. Clypeus, labrum, antennae, palpi, and legs reddish except femora infusate at midlength. Venter dark reddish brown but overlaid by gray plastron. Abdominal sterna with wide area of light gray plastron laterally that contrasts with middle area of darker gray plastron.

*Head:* Width between antennal acetabula, 0.11 mm. Frons gray. Granules pointed, less coarse than facets of eyes. Clypeus finely, densely granulate. Labrum with a transverse row of golden yellow hair-like setae near midlength. First antennal segment subequal to combined length of segments 2–4.

*Thorax:* Pronotum, 1.43 mm long, 1.43 mm wide at basal third; reddish overlaid by gray plastron except median reddish area (Figure 95); extremely shallow median longitudinal line on basal  $\frac{2}{3}$ ; posterior half of pronotum punctate instead of granulate. Pronotal granules flat or slightly rounded, slightly smaller than facets of eyes, separated by about diameter of a granule; slightly more widely spaced apically and basally; absent in circular area of disc (Figure 95); denser on apical half of reddish area; each granule with short basal seta; setae of all granules directed toward median basal fifth of pronotum. Elytra, 2.97 mm long, 1.77 mm wide (slightly past midlength). Each elytron with 8 longitudinal bands of granules, 7 distinct discal bands and 1 indistinct lateral band; granules similar to those on pronotum; reddish sutural margin intermittently finely, sparsely punctate; each granule with a basal seta directed obliquely toward midline. Prosternum 0.93 mm long; with gray plastron and large round granules; granules separated by  $\frac{1}{2}$  to 1 times granule diameter, sparser and smaller laterally; disc slightly angulate at border of reddish area. Prosternal process 0.39 mm long, 0.31 mm wide; apical half indistinctly deflexed; apex V-shaped; apicomedia area reddish and granulate. Mesosternum with deep fovea for reception of apex of prosternal process. Metasternum with disc with gray

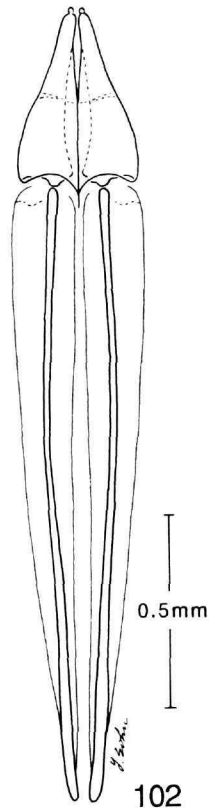


FIGURE 102.—*Stenelmoides guyanensis* Grouvelle: female genitalia, ventral view.

plastron, rather broadly but very shallowly depressed, with granules similar in size but sparser than those of prosternal disc; midline with deep reddish sulcus; lateral angles of intercoxal process not strongly elevated; metasternal disc and intercoxal process of abdomen on same plane. All tibiae with a prominent row of subsinuate, stout, scraping setae on inner margin. Tibial cleaning fringes as follows: protibiae—short, very narrow band occupying middle third of anterior surface; mesotibiae and metatibiae—distal  $\frac{4}{5}$  of posterior surface. Mesotibial cleaning fringe bordered laterally by 4 stout smoothing setae. Metatibial cleaning fringe bordered laterally at apex by 6 stout smoothing setae. Anterior surface of profemur with very narrow band of long golden setae at midlength. Posterior surface of mesofemur with short band of long golden setae at midlength. Protarsal, mesotarsal, and metatarsal segments with sparse setae ventrally.

*Abdomen:* With gray plastron. Granules on intercoxal process slightly smaller and about as dense as granules on metasternal disc, becoming sparser and smaller laterally and apically. Last sternum with minute granules. Sternum 5 evenly rounded; without depression or distinctive apical setae.

*Female Genitalia:* As illustrated (Figure 102).

**TYPE DATA.**—The "type specimens" of *S. guyanensis* in the

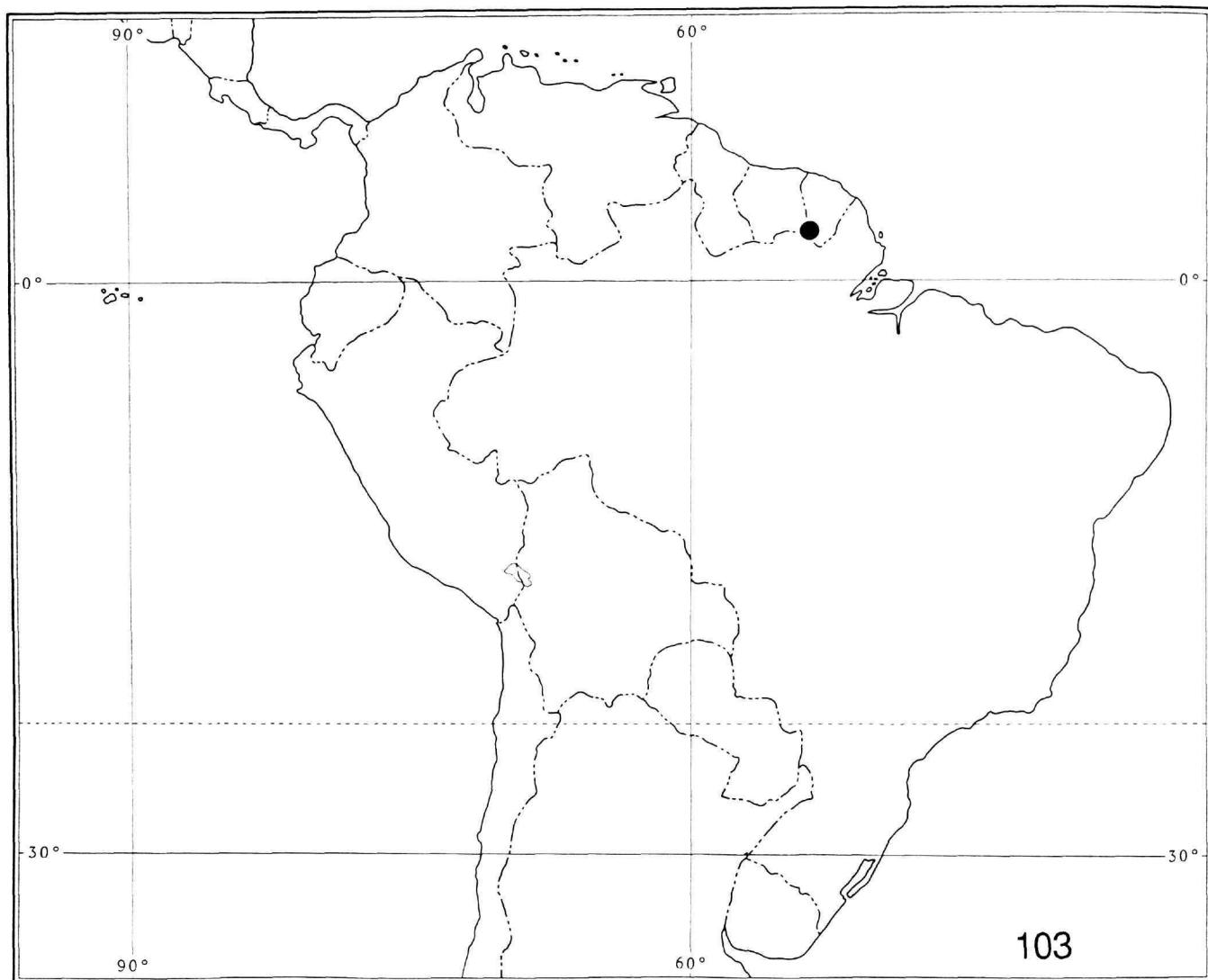


FIGURE 103.—*Stenelmoides guyanensis* Grouvelle, distribution map.

Paris Museum were confusing because Delève first received and studied a female specimen labeled as "*Stenelmoides guyanensis* Grouv. Type." Delève accepted this as the authentic type and, in 1966, he labeled it *Stenelsianus guyanensis* Gr. In 1967, he apparently received another female specimen labeled *Stenelmoides guyanensis* Grouv. For whatever reason, Delève apparently attached one of his pink with black border lectotype labels to that specimen. However, Delève (1970) did not designate that specimen as a lectotype as he did for the other South American taxa he included in that publication. That is fortunate because the two specimens he received as *S. guyanensis* are not conspecific and we accept the female (dissected and remounted on a point) bearing the label "*S. guyanensis* Grouv. Type" as the authentic type. The specimen

bearing Delève's lectotype label (label turned upside down to indicate its invalidity) is previously undesignated and is one of six specimens described in this study as *S. grandis*, new species. There is no doubt that the female specimen Delève saw and labeled as *S. guyanensis* in 1966 is typical of one of the specimens Grouvelle reported as "5 exemplaires.—Rivière Lunier et Bas-Carsevenne." Furthermore, the pronotum without granules on the disc is unique among the specimens we have studied and is as Grouvelle clearly described it: "Prothorax...couvert, sauf sur le disque, de fines granulations serrées semblables a celles de la tête...." That specimen also bears "Type" on two labels attached to the pin. We have not seen the other four specimens to which Grouvelle referred in his description; however, we accept that female as a typical

syntypic example and designate it as the lectotype. The female lectotype is glued to a point bearing the female sex symbol and the following: mounting card with female genitalia glued to it / a female sex symbol /Museum Paris, Guyane, Rivière Lunier, F. Geay 1899 / *Stenelmoides guyanensis* type Grouv. / J. Delève det. 1966, *Stenelsianus guyanensis* Gr. / Lectotype, *Stenelmoides guyanensis* Grouv., 1984, P.J. Spangler & P.D. Perkins.

DISTRIBUTION.—Currently known only from the type

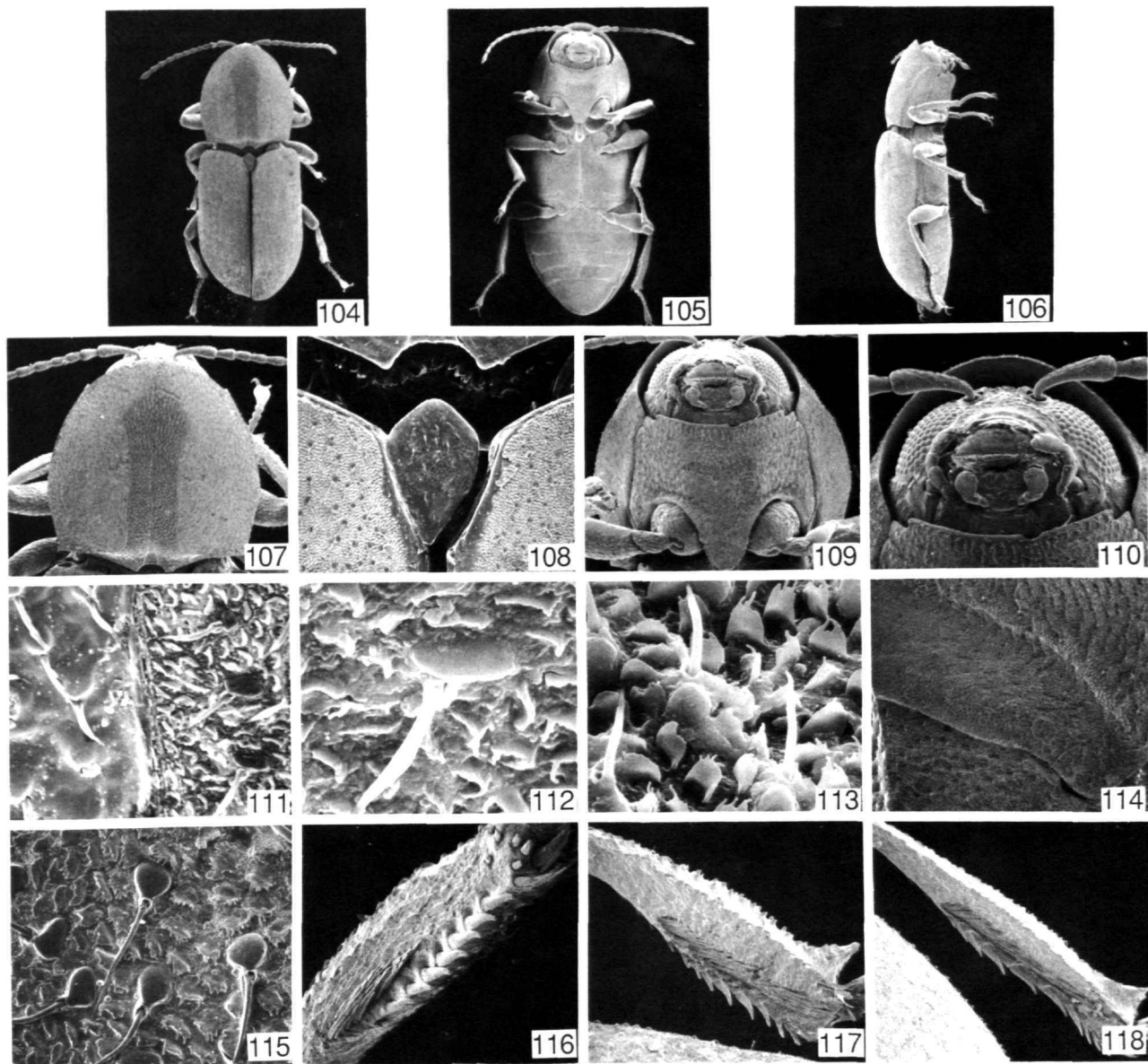
locality at Rivière Lunier and Bas-Carsevenne, Guyane (French Guiana) (Figure 103).

HABITAT.—Unknown.

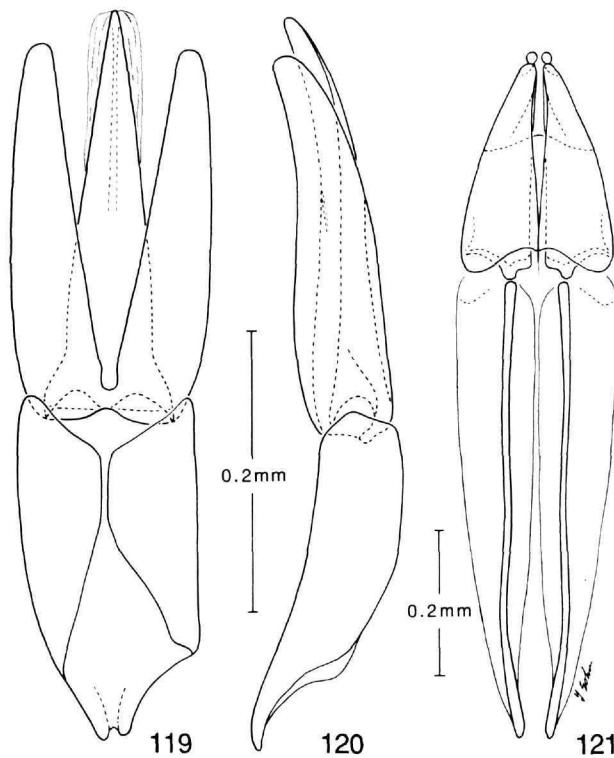
#### 6. *Stenelmoides beebei*, new species

FIGURES 96, 104–122

DIAGNOSIS.—The smaller size of *S. beebei* ( $2.70 \times 0.96$  mm vs  $3.50 \times 1.31$  mm) will distinguish this small species from



FIGURES 104–118.—*Stenelmoides beebei*, new species: 104, habitus, dorsal view,  $\times 32$ ; 105, ventral view,  $\times 32$ ; 106, lateral view,  $\times 30$ . 107, Pronotum,  $\times 70$ ; 108, scutellum and base of elytra,  $\times 207$ ; 109, prosternum,  $\times 85$ ; 110, head, ventral view,  $\times 140$ ; 111, pronotum, edge of plastron area,  $\times 1210$ ; 112, plastron setae on pronotum,  $\times 3390$ ; 113, plastron setae on frons,  $\times 2240$ ; 114, hypomeron,  $\times 200$ ; 115, plastron on hypomeron,  $\times 1500$ ; 116, protibia,  $\times 400$ ; 117, mesotibia,  $\times 300$ ; 118, metatibia,  $\times 190$ . (Reduced to 52% of original.)



FIGURES 119–121.—*Stenhelmoides beebei*, new species: 119, male genitalia, dorsal view; 120, lateral view. 121, Female genitalia, ventral view.

others assigned to the *platysternum* Group.

**HOLOTYPE MALE.**—*Body Form and Size:* Elongate, parallel sided (Figures 104, 105), moderately depressed (Figure 106). Length, 2.70 mm; width, 0.96 mm.

*Color:* Dorsal surface mostly dark gray overlaid with gray plastron; following areas without plastron (Figure 104): a black, elongate, moderately wide, sinuous area on midline of pronotum; scutellum; a narrow, reddish brown area along sutural margins of elytra. Head and appendages light reddish brown. Eyes black. Pronotum dark gray with the following light reddish brown maculae: one across apical margin; narrow one at each posterolateral angle; a narrow one basally on each side of medial area without plastron. Elytra very dark gray except anterolateral angle, basal margin and vitta on basal fourth of second band of granules light reddish brown. Venter darker reddish brown than legs and overlaid with gray plastron; sides of thorax and abdomen darker reddish brown than discal areas. Legs light reddish brown.

*Head:* Width between antennal acetabula, 0.06 mm (Figure 110). Frons with gray plastron (Figure 113). Granules pointed, less coarse than facets of eye. Clypeus finely granulate, reddish, sparsely pubescent. Labrum with a transverse row of golden hair-like setae near apical third. First antennal segment subequal to combined lengths of segments 2–4.

*Thorax:* Pronotum, 0.87 mm long, 0.85 mm wide at basal

third; granulate and reddish brown with gray plastron except large median shiny black area (Figure 107); extremely shallow, median, longitudinal line on basal  $\frac{2}{3}$ . Pronotal granules (Figures 111, 112) adjacent to black sinuous area on midline small, separated by 3 to 5 times granule diameter; granules on sides of pronotum larger; each granule with short basal seta; setae of all granules directed toward median basal fifth of pronotum. Hypomeron with dense plastron setae (Figures 114, 115). Elytra 1.90 mm long, 1.00 mm wide (slightly past midlength). Each elytron with 4 indistinct bands of coarse punctures on basal half near elytral suture, punctures becoming disarrayed laterally; granules slightly smaller than largest ones on pronotum; 5 vague rows of coarse punctures, 1 on sutural interval, 1 between each of next 4 bands of granules; each granule with a basal seta directed obliquely toward midline. Scutellum (Figure 108) flat, obovate; without plastron; shiny; moderately coarsely punctate; granules separated by 1 to 3 times granule diameter. Prosternum (Figure 109) 0.50 mm long; apical half indistinctly deflexed; apicomedial area reddish and granulate; remainder with gray plastron; with large round granules. Prosternal granules separated by 1 to 2 times granule diameter on midline, sparser and smaller laterally and on anterior third. Prosternal disc slightly angulate at border of reddish area, about halfway between anterior prosternal margin and anterior margin of procoxal cavities. Prosternal process 0.23 mm long, 0.15 mm wide; apex flat; granules large, round, separated by 2 to 4 times granule diameter. Mesosternum with deep fovea for reception of apex of prosternal process and coarsely, sparsely punctate between mesocoxae. Metasternal disc rather broadly, shallowly depressed; granules slightly smaller and slightly more widely separated than those on prosternal process; midline with deep reddish sulcus; lateral angles of intercoxal process not strongly elevated. All tibiae with a prominent row of stout scraping setae on inner margin. Tibial cleaning fringes as follows: protibia (Figure 116)—short, very narrow band occupying middle third of anterior surface; mesotibia (Figure 117) and metatibia—on distal  $\frac{4}{5}$  of posterior surface. Mesotibial cleaning fringes bordered laterally at apex with 8 stout smoothing setae. Metatibial cleaning fringes bordered laterally at apex with 6 stout smoothing setae. Anterior surface of profemur without row of long, golden setae. Posterior surface of mesofemur with short row of long, golden, hair-like setae at midlength. Protarsal, mesotarsal, and metatarsal segments with sparse setae ventrally.

*Abdomen:* Granules on intercoxal process about same size and slightly sparser than granules on metasternal disc, becoming sparser and smaller laterally and apically; minute on last sternum. Sternum 5 evenly rounded; without depression or distinctive apical setae.

*Male Genitalia:* As illustrated (Figures 119, 120).

*FEMALE GENITALIA.*—As illustrated (Figure 121).

*SEXUAL DIMORPHISM.*—No noticeable dimorphism found.

*VARIATIONS.*—One specimen of the available seven differs by having the dark markings on the pronotum and elytra much

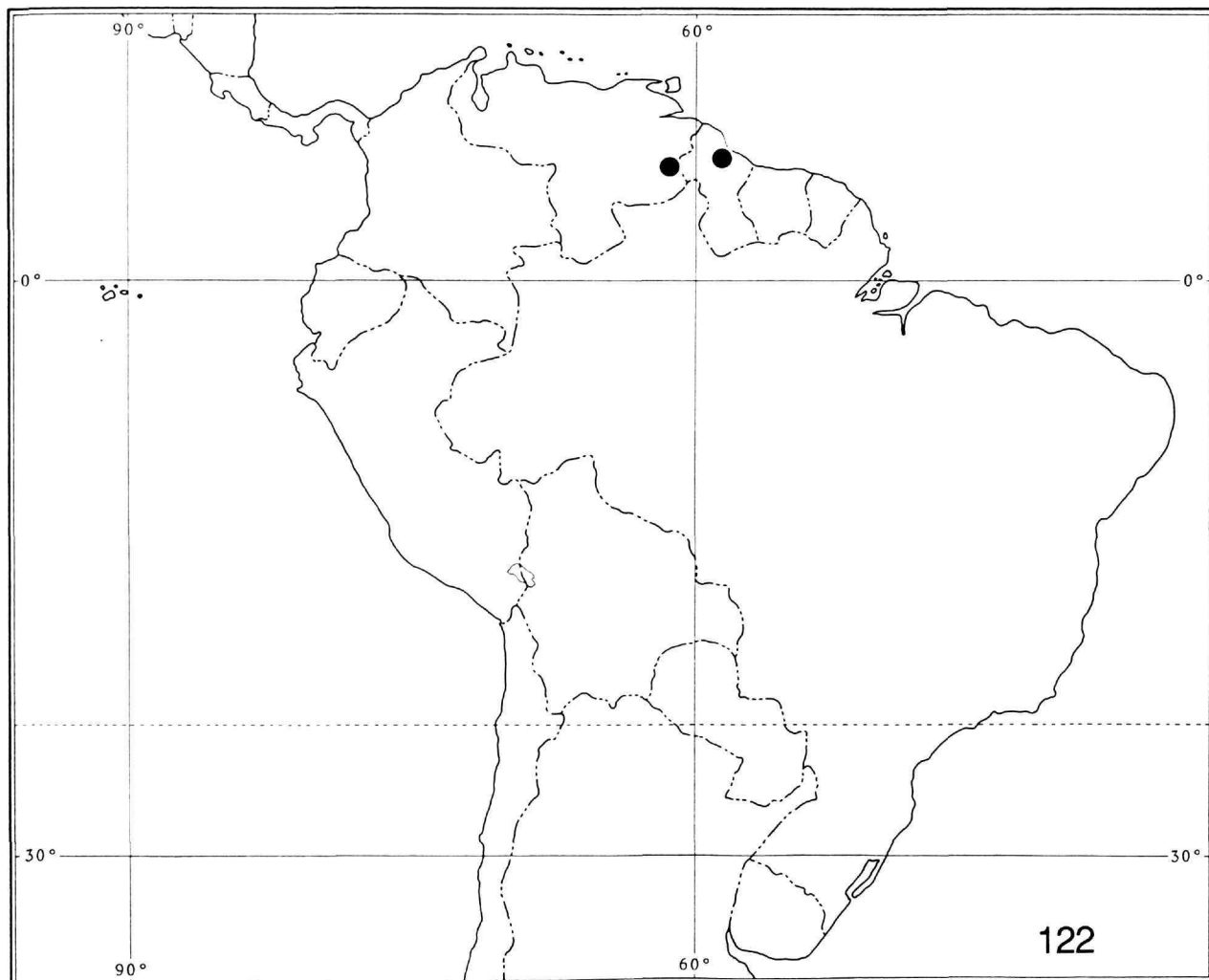


FIGURE 122.—*Stenelmoides beebei*, new species, distribution map.

darker so that the pronotum has a more distinct reddish brown spot apically and another on the basal half interrupted by the black area on the midline without plastron setae. Also the elytra of that specimen are black except for two short reddish brown lines on the basal fourth near the elytral suture and narrowly along the basal margins. The specimens range in length from 2.62 to 2.74 mm and in width from 0.96 to 1.08 mm.

**TYPE DATA.**—*Holotype* (male): GUYANA: MAZARUNIPOTARO: Kartabo, 1 Jan 1982, W.E. Steiner, collected at ultraviolet light; deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.

*Allotype*: Same data as holotype.

*Paratypes*: Same data as holotype except: 23 Dec 1982, 1 ♂. VENEZUELA: BOLIVAR: Las Cocuizas (5 km N), 2 Nov 1982, John L. Hellman, collected in blacklight trap, 4 ♀ (1

coated for SEM) (USNM).

**DISTRIBUTION.**—Presently known only from Guyana and Venezuela (Figure 122).

**ETYMOLOGY.**—Named *beebei* for the zoologist, explorer, and writer William Beebe whose books on his experiences in the jungles of South and Central America were exciting and inspirational to us during our youth and who had his own station at Kartabo where the holotype was collected.

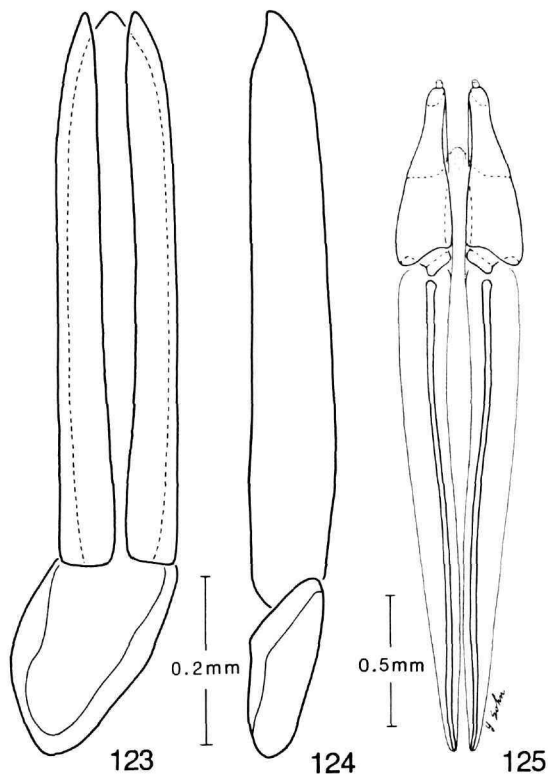
**HABITAT.**—Unknown.

#### 7. *Stenelmoides submaculatus* (Hinton)

FIGURES 97, 123–126

*Stenelmoides* [sic] *submaculatus* Hinton, 1937b:109.

*Stenelmoides submaculata*.—Blackwelder, 1944:271. [checklist]



FIGURES 123-125.—*Stenhelmoides submaculatus* (Hinton): 123, male genitalia (redrawn from Hinton, 1939), dorsal view; 124, lateral view. 125, Female genitalia, dorsal view.

**DIAGNOSIS.**—This species may be distinguished immediately from all others described in the genus by presence of distinct lateral pronotal rim and adjacent tubercle in groove beside rim and slightly behind pronotal midlength.

**REDESCRIPTION OF HOLOTYPE MALE.**—*Body Form and Size:* Elongate, subparallel, moderately convex dorsally. Length, 2.8 mm; greatest width, 1.24 mm.

*Color:* Dorsal surface reddish brown with reddish black to black markings as follows. Pronotum black except anterior sixth reddish brown; basal margin reddish black; gray plastron extensive, as illustrated (Figure 97). Elytron with basal fifth black except laterally; 2 and a partial third reddish black vittae underlying first 3 broad bands of granules; a black lateral macula at about midlength; an indistinct macula medially and slightly behind midlength; another macula subapically and confluent with those on opposite elytron. Ventral surface and appendages reddish brown with metasternum slightly darker.

*Head:* Width between antennal acetabula, 0.09 mm. Frons with gray plastron; granules pointed, smaller than facets of

eyes. Clypeus finely punctate, sparsely pubescent. Labrum with a transverse row of hair-like setae near apical third. First antennal segment subequal to combined length of segments 2-4.

*Thorax:* Pronotum, 0.95 mm long, 0.92 mm wide; with gray plastron except median reddish black area (Figure 97), which is shiny between granules; with slight indication of longitudinal depression on basal third; disc strongly swollen and abruptly declivous in front of scutellar emarginations; lateral margins strongly rimmed and bearing a tubercle slightly behind midlength in groove beside rim. Pronotal granules flat, rounded, about same size as facets of eyes; separated anterolaterally by  $\frac{1}{2}$  to 2 times diameter of a granule; becoming denser medially and posteriorly; each granule with short basal seta; setae of all granules directed toward median basal fifth of pronotum. Elytra 2.00 mm long, 1.20 mm wide (near midlength); surface not carinate nor striate. Each elytron with disc with 3 rows of nearly contiguous granules separating wider rows (3 or 4 granules abreast); surface between granules with gray plastron except reddish, shiny, narrow, sutural margins (about equal to  $\frac{1}{4}$  width of scutellum); granules becoming finer and sparser near apex; each granule with small basal seta; setae of lateral granules directed posteromedially. Prosternum, 0.60 mm long; with gray plastron except apicomedial  $\frac{2}{5}$  reddish and shiny; elevated slightly to form angle with anterior part of prosternal process; surface with granules larger than those on lateral surface of hypomeron but becoming finer on apex of prosternal process. Prosternal process, 0.27 mm long; with small oval median depression subapically. Mesosternum with deep fovea for reception of apex of prosternal process. Metasternum with disc moderately depressed; with gray plastron except reddish brown intercoxal process; discal area with granules as large as those on middle of prosternum; lateral area with granules about same size as granules of epimeron, granules separated by 3 to 4 times granule diameter; midline with moderately deeply impressed line; lateral angles of intercoxal process elevated, on different plane than disc. Legs reddish, shiny. Foreleg with cleaning fringe of long golden setae on middle third of anterior (medial) surface of tibia. Protarsal and mesotarsal segments 1-4 with sparse, short, stout setae ventrally. Mesotibial cleaning fringe occupying distal  $\frac{4}{5}$  of posterior (medial) surface, bordered laterally by row of short stout setae. Hind legs with tibial cleaning fringe occupying distal  $\frac{4}{5}$  of posterior surface; tarsal segments 1-4 with very short setae ventrally. Scutellum reddish, shiny, subovate, very feebly convex; about as long as broad; finely indistinctly punctate.

*Abdomen:* With gray plastron and granulate like lateral areas of metasternum. Sternum 5 moderately convex.

*Male Genitalia:* (Figures 123, 124), redrawn from Hinton (1939).

**FEMALE GENITALIA.**—As illustrated (Figure 125); from

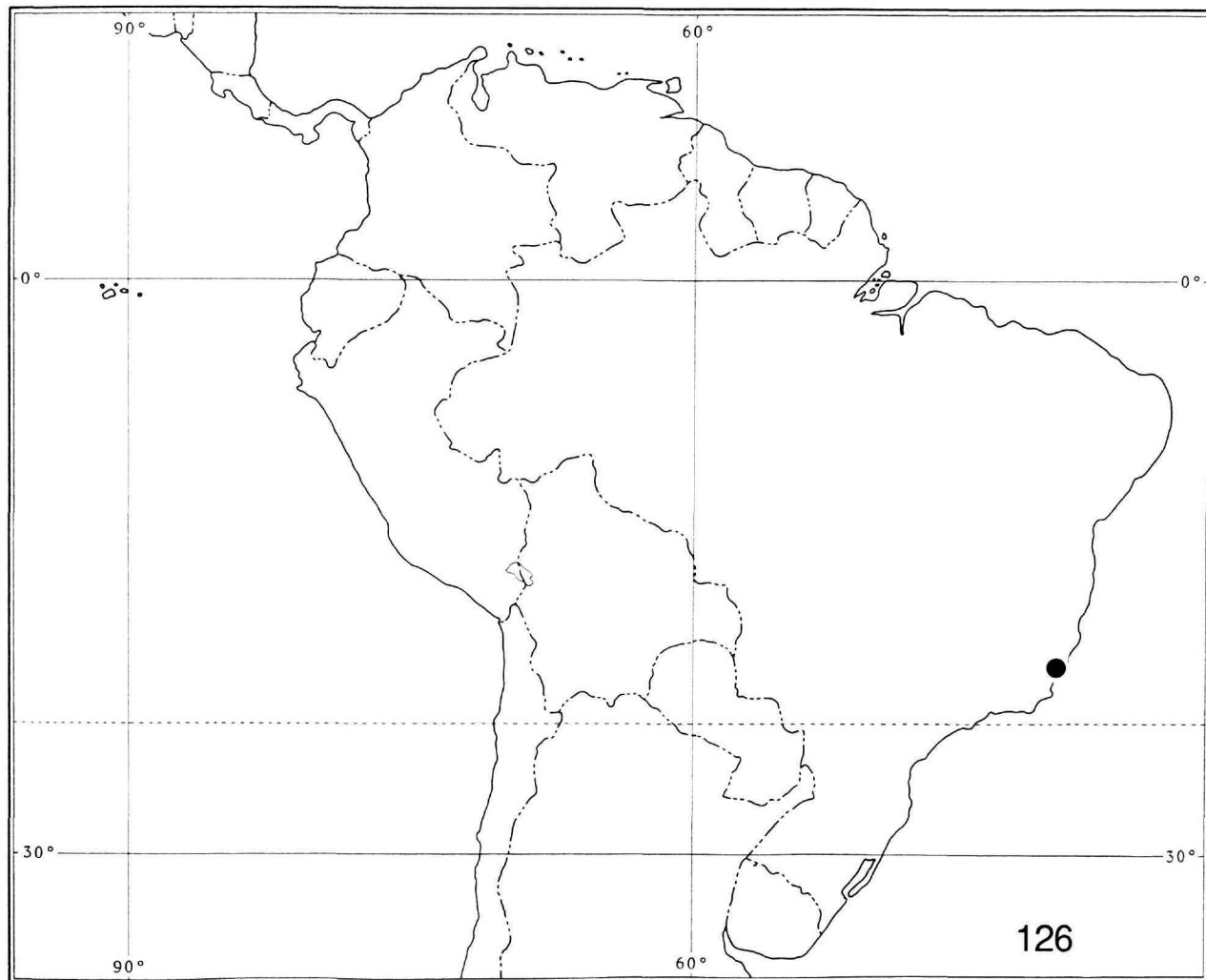


FIGURE 126.—*Stenhelmoides submaculatus* (Hinton), distribution map.

female paratype in the Deutsches Entomologisches Institut der Akademie der Landwirtschaftswissenschaften zu Berlin.

**SEXUAL DIMORPHISM.**—The female is similar to the male except the antennal acetabula are slightly more widely separated (0.12 mm).

**VARIATIONS.**—The specimens ranged from 2.78 to 2.82 mm in length and 1.24 to 1.47 mm in width.

**TYPE DATA.**—After he described the species, Hinton returned the holotype and one female paratype to the "Deutsches Entomologisches Institut, Berlin-Dahlem," now the Deutsches Entomologische Institut der Landwirtschaftswissenschaften zu Berlin. We have examined those specimens and they are dirty and poorly prepared; their abdomens were

removed (apparently by Hinton) and glued, ventral side up, beside the specimens. Hinton kept two female paratypes in his personal collection that was given to the British Museum (Natural History) following his death in 1977. We have examined one of the two female paratypes presently in the British Museum.

The male genitalia of the holotype was dissected and illustrated by Hinton for his description; however, the dissection (dyed red) glued on the point beside the male is so badly fragmented that only the median lobe is recognizable and we, consequently, left the mount exactly as it was. Furthermore, Hinton's illustration is so small and the illustration of the genitalia unlike any others known to us in

the genus that we doubt the accuracy of the illustration. Fortunately, the distinctively rimmed sides of the pronotum and the tubercle in the groove beside the rim are known only for this species in this genus and the species should be easily recognized when found again. In the unlikely event that Hinton's illustration of the male genitalia is sufficiently accurate, we have enlarged his illustration and included it with this redescription (Figures 123, 124).

The abdomen of the female paratype from the Deutsche Entomologische Institut had been dissected from the beetle and is glued to the point beside the specimen. Beneath the abdomen was a small mass of tissue with a part of the female genitalia visible within it. We placed the entire specimen in hot water and removed it from the point; the beetle was cleaned as far as its condition would permit, and the female genitalia was cleared in KOH and illustrated (Figure 125). The structure of the female genitalia validates the placing of *S. submaculatus* in the *guyanensis* Group.

The holotype bears the following labels below the specimen that is mounted on a point. [1] ♂ / [2] Espir. Santo x.1920-11.1921 / [3] F. Hoffmann coll. Arp. dedic. 1921 / [4] Holotypus / [5] Type *Stenelmoides submaculatus* Hinton / [6] [a white disc with red border] Type [printed across white center].

The female paratype bears the same labels except as follows: [1] ♀ / [4] Paratypus / and there is no label 6. The female paratype borrowed from the British Museum (Natural History) bears the following labels [1] ♀ / [2] F. Hoffmann coll. Arp.dedic. 1921 / [3] [same as two] / [4] paratype, *Stenelmoides submaculatus* Hinton. / H.E. Hinton collection. BM. 1977-566 / [6] L9.34.

DISTRIBUTION.—Known only from the type locality; Espir[ito] Santo, Brazil (Figure 126).

HABITAT.—Unknown.

### 8. *Stenelmoides grandis*, new species

FIGURES 98, 127-155

DIAGNOSIS.—Differs from all known species of *Stenelmoides* in pattern of the pronotal plastron (Figure 98) and male genitalia (Figures 151, 152). Although the dark medial pronotal area without plastron is similar in shape to that of *S. guyanensis*, the discal area of *S. grandis* is densely granulate (Figure 98) and that of *S. guyanensis* is without granules (Figure 95).

HOLOTYPE MALE.—*Body Form and Size*: Elongate, parallel sided (Figures 127, 129), moderately convex dorsally (Figure 128). Length, 4.40 mm; width, 1.70 mm.

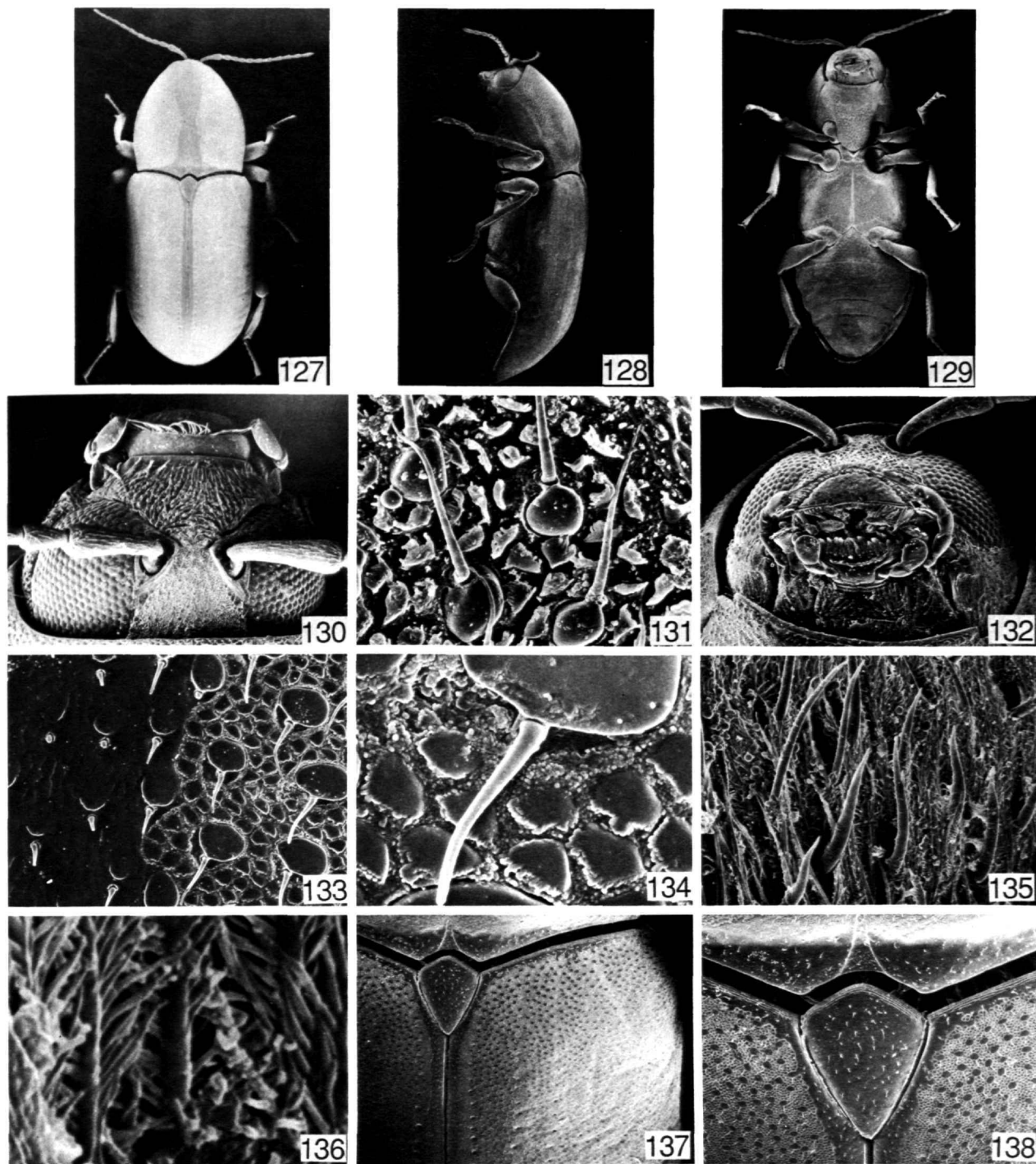
*Color*: Dorsal surface dark reddish brown overlaid with gray plastron except an elongate, sinuous area on midline of pronotum, the scutellum, and a narrow area along sutural margins of elytra without plastron. In addition, dark gray-

brown rounded macula present on each side at about midlength of pronotum. Each elytron with the following elongate maculae: one on base at midwidth, about 3 times length of scutellum; one laterally and one subsuturally at midlength; and one laterally and one subsuturally just before apex. Clypeus, labrum, antennae, and palpi reddish. Gena with gray plastron setae (Figures 135, 136). Legs reddish except profemur and mesofemur each with black to dark gray-brown macula at midlength; macula more obvious on side normally lying against sterna. Venter dark reddish brown to black but overlaid with gray plastron. Abdominal sterna with wide area of light gray plastron laterally that contrasts abruptly with darker gray middle area.

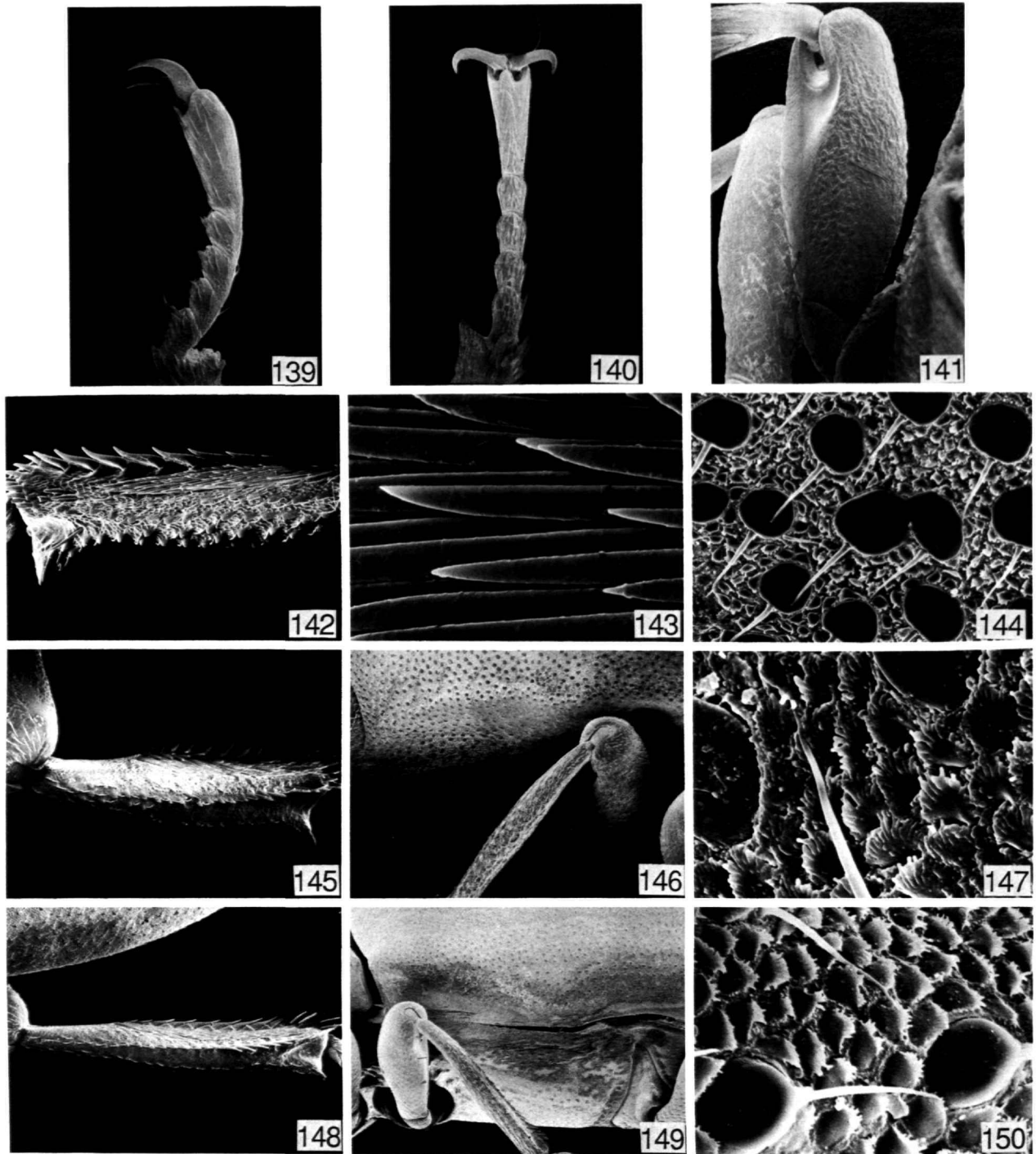
*Head*: Width between antennal acetabula, 0.10 mm (Figures 130, 132). Frons gray. Granules pointed (Figure 131), less coarse than facets of eyes. Clypeus finely granulate. Labrum with a transverse row of hair-like setae near midlength. First antennal segment subequal to combined lengths of segments 2-4.

*Thorax*: Pronotum, 1.40 mm long, 1.47 mm wide at basal third; with gray plastron except median microreticulate area (Figure 133); extremely shallow median longitudinal line extending from near base to midlength. Pronotal granules flat (Figures 133, 134), slightly smaller than facets of eyes, separated by 1 to 2 times the diameter of a granule; slightly more widely spaced apically and basally; smaller and denser in median reddish area; each granule with short basal seta; setae of all granules directed toward median basal fifth of pronotum. Hypomerion with scale-like plastron setae (Figures 146, 147). Elytra, 3.01 mm long, 1.43 mm wide (slightly past midlength). Each elytron with 6 distinct longitudinal bands of granules, 5 discal bands more evident than lateral band; granules (Figure 137) similar to those on pronotum; each granule with a basal seta directed obliquely toward midline; reddish sutural margin finely punctate and indistinctly microreticulate. Epipleuron with scale-like plastron setae and granulate (Figures 149, 150). Scutellum subtriangular, without plastron (Figures 137, 138). Prosternum 0.85 mm long; apicomedial area reddish and not granulate, remainder with gray plastron; with large, flat, round granules; granules (Figure 144) separated by 1/2 to 1 times granule diameter in midline, only slightly sparser laterally; prosternal disc slightly angulate at border of reddish area. Prosternal process 0.35 mm long and 0.39 mm wide; apical half deflexed slightly; apex broadly V-shaped. Mesosternum with deep fovea for reception of apex of prosternal process. Metasternum with gray plastron on disc; disc very shallowly depressed and granules similar in size but denser than those of prosternal disc; midline with deep sulcus; lateral angles of intercoxal process not strongly elevated; metasternal disc and intercoxal process of abdomen on same plane. Granules on intercoxal process between metacoxae coarse and dense. All tibiae with a prominent row of dense, subsinuate, stout, scraping setae on inner margin. Tibial cleaning fringes as





FIGURES 127-138.—*Stenhelmoides grandis*, new species: 127, habitus, dorsal view,  $\times 23$ ; 128, lateral view,  $\times 23$ ; 129, ventral view,  $\times 23$ . 130, Head, dorsal view,  $\times 119$ ; 131, plastron setae, on frons,  $\times 2000$ ; 132, head, adoral view,  $\times 115$ ; 133, plastron on pronotal disc,  $\times 862$ ; 134, pronotal granules and plastron, enlarged,  $\times 3048$ ; 135, genal plastron and stout setae,  $\times 1013$ ; 136, genal plastron setae, enlarged,  $\times 9025$ ; 137, elytral base,  $\times 82$ ; 138, scutellum,  $\times 168$ . (Reduced to 60% of original.)



FIGURES 139-150.—*Stenhelmoides grandis*, new species: 139, protarsus, lateral view,  $\times 170$ ; 140, protarsus, ventral view,  $\times 146$ ; 141, profemur, anterior surface, with 2 long setae,  $\times 146$ ; 142, protibia and scraping setae, medial surface,  $\times 214$ ; 143, cleaning fringe, enlarged,  $\times 3490$ ; 144, prosternal plastron and granules,  $\times 863$ ; 145, mesotibia and scraping setae, medial surface,  $\times 201$ ; 146, hypomeron,  $\times 90$ ; 147, hypomeral plastron setae,  $\times 3340$ ; 148, metatibia and scraping setae, medial surface,  $\times 124$ ; 149, epipleuron,  $\times 66$ ; 150, epipleural plastron and granules,  $\times 1870$ . (Reduced to 60% of original.)

follows: protibia (Figures 142, 143)—short, very narrow band occupying middle third of anterior surface; mesotibia and metatibia—distal  $\frac{4}{5}$  of posterior surface. Mesotibial cleaning fringe (Figure 145) bordered apicolaterally by 10 stout, smoothing setae; metatibial cleaning fringe (Figure 148) bordered apicolaterally by 8 stout smoothing setae. Anterior surface of profemur with only 2 long, slender, golden, hair-like setae at midlength (Figure 141). Posterior surface of mesofemur with distinct row of long, hair-like setae at midlength. Protarsal, mesotarsal, and metatarsal segments with short sparse setae ventrally; tarsal segments 1–4 of protarsus (Figures 139, 140) and mesotarsus with moderately dense hair-like setae, setae almost as long as width of second tarsal segment.

**Abdomen:** Granules on intercoxal process slightly larger and slightly more dense than granules on metasternal disc, becoming sparser and smaller laterally and apically; last sternum with minute granules. Sternum 5 evenly rounded; without depression or distinctive apical setae.

**Male Genitalia:** As illustrated (Figures 151, 152).

**FEMALE GENITALIA.**—As illustrated (Figure 153).

**VARIATIONS.**—This species varies primarily in its color. On several specimens the maculae on the dorsum are plainly evident and on others they are indistinct. The black macula described for the profemora and mesofemora of the holotype is indistinct on several specimens on the ventral surface but is distinct on the upper surface, which lies against the sterna.

Females are without the moderately dense hair-like setae on segments 1–4 of the protarsus and mesotarsus.

**TYPE DATA.**—*Holotype* (male) and *Allotype*: VENEZUELA: TERRITORIO FEDERAL AMAZONAS: Cerro de la Neblina, Basecamp, 140 m, 0°50'N, 66°10'W, 20 Feb 1985, P.J. and P.M. Spangler, R.A. Faitoute, W.E. Steiner; deposited in National Museum of Natural History, Smithsonian Institution.

**Paratypes:** BRAZIL: AMAZONAS: Manaus, 11 Sep 1937, 1 ♂, 1 ♀ (BMNH). FRENCH GUIANA: Rivière Lunier, F. Geay, 1899, 1 ♀ (MNHN). VENEZUELA: BOLIVAR: El Dorado (65 km S), 5 Nov 1982, R.F. Denno, 1 ♀ (coated for scanning electron microscopy) (USNM); Las Cocuizas (5 km N), 2 Nov 1982, John L. Hellman, 1 ♀ (USNM). TERRITORIO FEDERAL AMAZONAS: Same data as holotype, 2 ♂, one deposited in Universidad Central de Venezuela at Maracay.

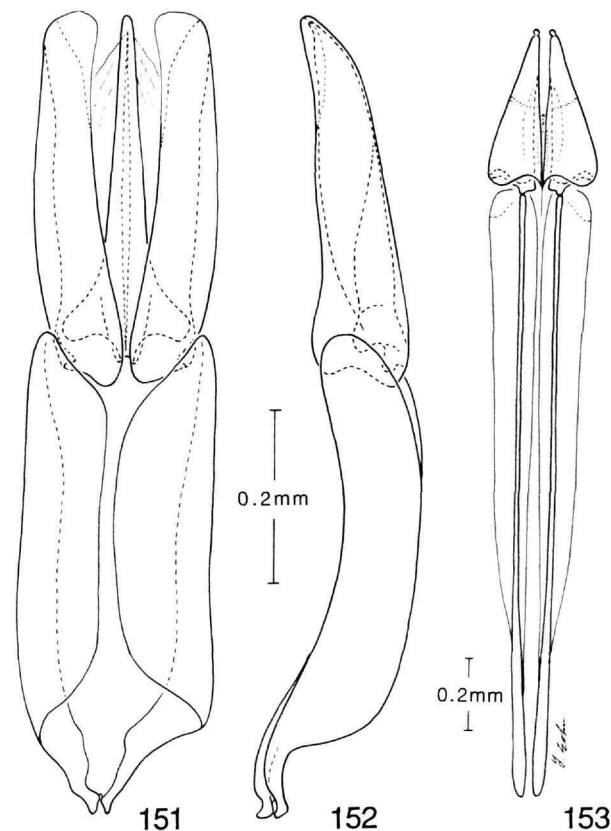
**DISTRIBUTION.**—Presently known only from Brazil, French Guiana, and Venezuela (Figure 154).

**ETYMOLOGY.**—From the Latin *grandis* (large), in reference to its large size.

**HABITAT.**—The holotype and 3 additional specimens were collected from the rocky shallows (Figure 155) of the Río Baria at Cerro de la Neblina, Venezuela; altitude, 140 m. At the collection site, the Río Baria was an unshaded blackwater stream about 25 to 35 meters wide and about 0.5 to 1.0 meter

deep (during a period of low water). The stream had a sand, gravel, and rocky substrate and was subjected to flash flooding; the elmid fauna was diverse and abundant at the site. Colorimetric water chemistry analyses at the base camp, where the holotype et al. were collected, was as follows: pH, 4; hardness, 0; oxygen, 12 ppm. The water temperature was 27°C at the time the analyses were made.

Other aquatic beetle genera collected with *Stenelmoides* from the same riffle area in the Río Baria are: Dytiscidae: *Bidessodes*, *Hydrodessus*, *Hypodessus*, *Laccodytes*, *Microdessus*. Elmidae: *Cyloepus*, *Gyrelmis*, *Heterelmis*, *Hexacycloepus*, *Hintonelmis*, *Macrelmis*, *Microcyloepus*, *Neelmis*, *Pagelmis*, *Stegoelmis*, *Tyletelmis*, *Xenelmis*. Gyrimidae: *Gyretes*.



FIGURES 151–153.—*Stenelmoides grandis*, new species: 151, male genitalia, dorsal view; 152, lateral view. 153, Female genitalia, dorsal view.

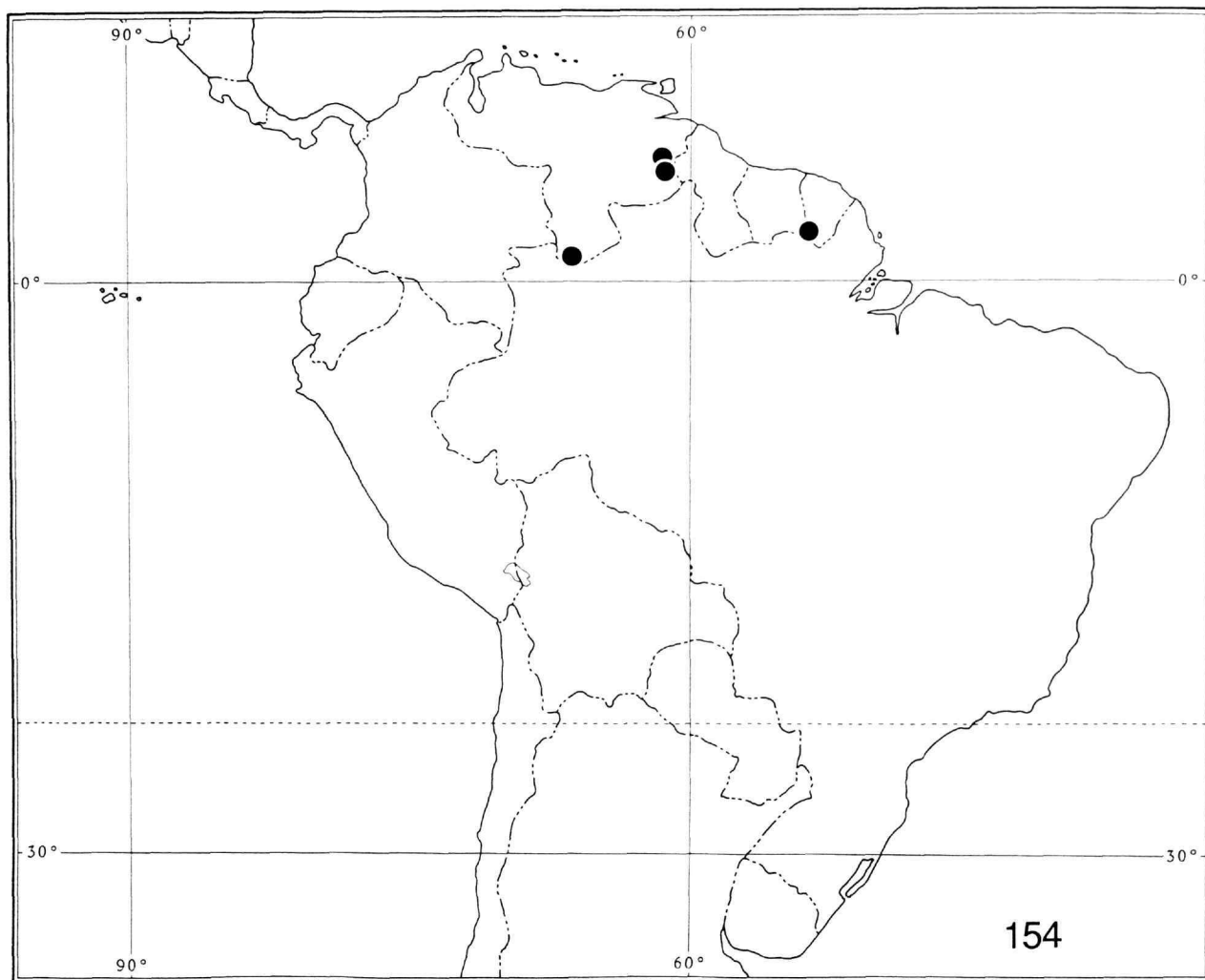


FIGURE 154.—*Stenhelmoides grandis*, new species, distribution map.



FIGURE 155.—*Stenhelmoides grandis*, new species, biotope: Río Baria, Territorio Federal Amazonas, Venezuela.

### 9. *Stenhelmoides platysternum*, new species

FIGURES 99, 156–167

**DIAGNOSIS.**—Differs from all known species of *Stenhelmoides* in pattern of pronotal plastron (Figure 99) and male genitalia (Figures 165, 166). Refer to Table 1 for comparison with species of the *rufulus* Group.

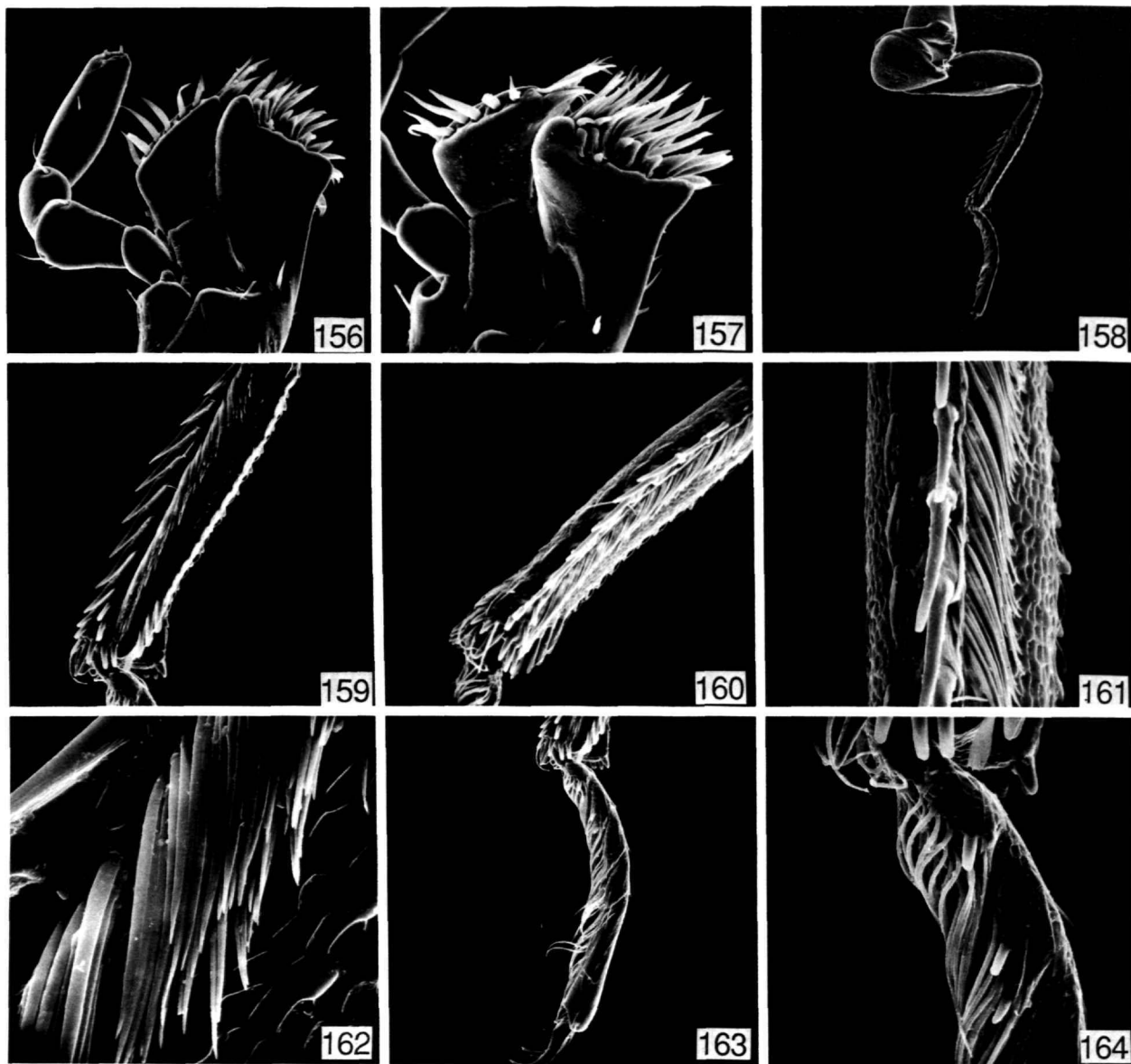
**HOLOTYPE MALE.**—*Body Form and Size:* Elongate, parallel sided, moderately depressed. Length, 3.80 mm; width, 1.44 mm.

*Color:* Dorsal surface with gray plastron except reddish pattern on pronotum and narrow sutural band on each elytron (Figure 99). Antennae, clypeus, and legs reddish.

*Head:* Width between antennal acetabula, 0.09 mm. Frons gray. Granules pointed, less coarse than facets of eyes. Clypeus finely granulate. Labrum with a transverse row of hair-like setae near midlength. First antennal segment subequal to combined lengths of antennal segments 2–4.

*Thorax:* Pronotum 1.16 mm long, 1.16 mm wide at basal third; with gray plastron except median reddish area (Figure 99); extremely shallow median longitudinal line extending

from base to midlength. Pronotal granules flat or slightly rounded, slightly smaller than facets of eyes; separated by about diameter of a granule; granules slightly more widely spaced apically and basally; granules in median reddish area smaller and denser; each granule with short basal seta; setae of all granules directed toward median basal fifth of pronotum. Elytra, 2.68 mm long, 1.44 mm wide (slightly past midlength). Each elytron with 6 longitudinal bands of granules, 4 discal bands more evident than 2 lateral bands; granules similar to those on pronotum; each granule with a basal seta directed obliquely toward midline; reddish sutural margin finely, intermittently microreticulate, with irregular transverse depressions. Prosternum 0.68 mm long; apicomедial area reddish and granulate, remainder with gray plastron; with large round granules, separated on midline by  $\frac{1}{2}$  to 1 times granule diameter, sparser laterally; disc slightly angulate at border of reddish area. Prosternal process 0.32 mm long, 0.22 mm wide; apical half deflexed slightly; apex V-shaped. Mesosternum with deep fovea for reception of apex of prosternal process. Metasternum with disc with gray plastron, very shallowly depressed; granules similar in size but sparser than those of



FIGURES 156-164.—*Stenhelmoides platysternum*, new species: 156, maxilla,  $\times 400$ ; 157, maxilla, with galea and lacinia enlarged,  $\times 550$ ; 158, middle leg, posterior view, male,  $\times 55$ ; 159, mesotibia, with cleaning fringe,  $\times 200$ ; 160, mesotibia, showing scraping setae,  $\times 210$ ; 161, mesotibial scraping setae, enlarged,  $\times 560$ ; 162, mesotibia, cleaning fringe setae, enlarged,  $\times 1300$ ; 163, mesotarsus of male, with long ventral setae,  $\times 140$ ; 164, mesotarsal segments 1 and 2, enlarged,  $\times 500$ . (Reduced to 60% of original.)

prosternal disc; midline with reddish sulcus; lateral angles of intercoxal process not strongly elevated; metasternal disc and intercoxal process of abdomen on same plane. Legs reddish; all tibiae with a prominent row of subsinuate, stout, scraping setae on inner margin (Figures 158–162). Tibial cleaning fringes as follows: protibia—short, very narrow band occupying middle third of anterior surface; mesotibia (Figures 158–162) and metatibia—distal  $\frac{4}{5}$  of posterior surface. Mesotibial cleaning fringe bordered laterally at apex by 4 stout smoothing setae; metatibial cleaning fringe bordered laterally at apex by 6 stout smoothing setae. Posterior surface of mesofemur with short band of setae at midlength. Protarsal and mesotarsal segments (Figures 163, 164) with dense hair-like setae ventrally; metatarsal segments with sparse setae ventrally.

**Abdomen:** With gray plastron. Granules on intercoxal process slightly smaller and about as dense as granules on metasternal disc, becoming sparser and smaller laterally and apically. Granules minute on last sternum. Sternum 5 evenly rounded; without depression or distinctive apical setae.

**Male Genitalia:** As illustrated (Figures 165, 166).

**FEMALE.**—Unknown.

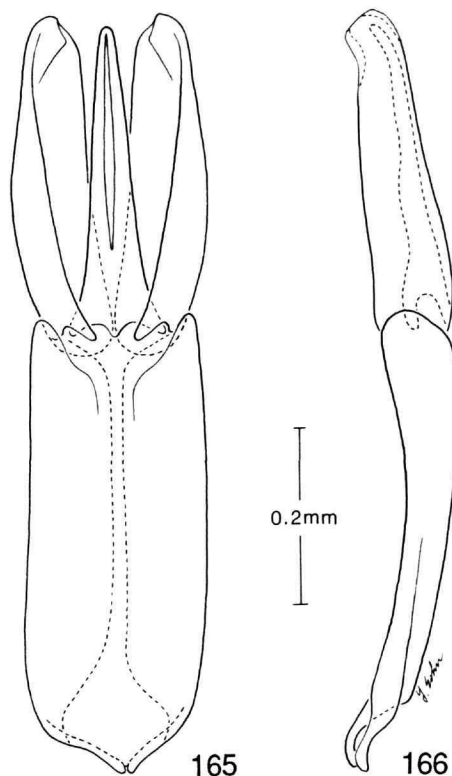
**VARIATIONS.**—Only the type specimen is known.

**TYPE DATA.**—*Holotype* (male): ECUADOR: PASTAZA PROVINCE: 70 mi SE Limoncocha, on Río Cononaco, at Anglo air-strip, 1°19'S, 76°6'W, blacklight, 30 May 1976, Jeffrey Cohen; deposited in the National Museum of Natural History, Smithsonian Institution.

**DISTRIBUTION.**—Currently known only from the type locality in eastern Ecuador (Figure 167).

**ETYMOLOGY.**—From the Latin *platysternum*, a noun in apposition; in reference to the flat sternal discal areas.

**HABITAT.**—Unknown.



FIGURES 165, 166.—*Stenhelmoides platysternum*, new species: 165, male genitalia, dorsal view; 166, lateral view.



FIGURES 167.—*Stenhelmoides platysternum*, new species, distribution map.

### 10. *Stenhelmoides grouvellei* (Pic)

FIGURES 100, 168–170

*Stenelmoides* [sic] *grouvellei* Pic, 1923:4.—Hinton, 1937b:111.—Blackwelder, 1944:271 [checklist].

*Stenhelmoides grouvellei*.—Delève, 1970:61.

**DIAGNOSIS.**—Differs from all known species of *Stenhelmoides* in pattern of the pronotal plastron (Figure 100) except for that of *S. platysternum*, which it resembles. However, *S. grouvellei* may be distinguished by the presence of distinct rows of elytral punctures, the indistinct mixture of granules at the level of the apex of the scutellum instead of the distinct, wide bands of granules, and the different male genitalia (Figure 168).

**REDESCRIPTION OF HOLOTYPE MALE.**—*Body Form and Size:* Elongate, parallel sided, moderately depressed. Length, 3.50 mm; width, 1.50 mm.

*Color:* Head with palpi, clypeus, antennae, and frons reddish; vertex covered with gray plastron. Dorsal surface of pronotum reddish except moderately large, sublateral macula on each side at about midlength and one sublaterally at each posterolateral angle dark gray-brown; overlaid with gray plastron except a narrow, shiny area on midline without plastron. Scutellum reddish and shiny, without plastron. Elytron reddish except the following dark gray-brown maculae: a moderately large, sublateral, basal macula; a lateral macula; a medial macula at midlength; and a subapical macula. Elytral maculae joined by narrow, vague, dark gray-brown vittae. Elytra overlaid with gray plastron except narrow, smooth, shiny sutural margin without plastron. Venter, including legs, reddish; lateral areas with gray plastron.

*Head:* Width between antennal acetabula, 0.09 mm. Granules pointed, much smaller than facets of eyes. Clypeus finely granulate. Labrum with a transverse row of golden



yellow hair-like setae near midlength. First antennal segment subequal to combined length of segments 2–4.

**Thorax:** Pronotum 1.10 mm long, 1.12 mm wide at basal third; reddish overlaid by gray plastron except median reddish area (Figure 100); extremely shallow, median, interrupted, longitudinal line extending from base to midlength. Pronotal granules flat and slightly rounded; slightly smaller than facets of eyes; separated by 1 to 2 times granule diameter; granules slightly more widely spaced apically and basally; granules in median reddish area smaller and denser; each granule with short basal seta; setae of all granules directed toward median basal fifth of pronotum. Elytra 2.40 mm long, 1.40 mm wide (slightly past midlength). Each elytron with a distinct discal row and 1 indistinct lateral row of coarse punctures and 6 longitudinal bands of granules, 4 discal bands more evident than 2 lateral bands; granules similar to those on pronotum, each granule with a basal seta directed obliquely toward midline; reddish sutural margin finely punctate. Prosternum 0.60 mm long; with gray plastron and large round granules; granules separated by  $\frac{1}{2}$  to 1 times granule diameter on midline, sparser laterally; prosternal disc slightly angulate at border of reddish area. Prosternal process 0.28 mm long, 0.20 mm wide; apical half deflexed slightly; apex V-shaped; apicomedial area reddish and granulate. Mesosternum with deep fovea for reception of apex of prosternal process. Metasternum with disc with gray plastron, very shallowly depressed, and granules similar in size but sparser than those of prosternal disc; midline with deep reddish sulcus; lateral angles of intercoxal process not strongly elevated; metasternal disc and intercoxal process of abdomen on same plane. Legs reddish; all tibiae with a prominent row of subsinuate, stout, scraping setae on inner margin. Tibial cleaning fringes as follows: protibia—short, very narrow band occupying middle third of anterior surface; mesotibia and metatibia—distal  $\frac{4}{5}$  of posterior surface. Mesotibial cleaning fringe bordered laterally at apex by 4 smoothing setae. Metatibial cleaning fringe bordered laterally at apex by 6 stout smoothing setae. Posterior surface of mesofemur at midlength with small patch of long setae. Protarsal and mesotarsal segments with dense hair-like setae ventrally; metatarsal segments with sparse setae ventrally.

**Abdomen:** With gray plastron. Granules on intercoxal process slightly smaller and about as dense as granules on metasternal disc, becoming sparser and smaller laterally and apically. Granules minute on last sternum. Sternum 5 evenly rounded; without depression or distinctive apical setae.

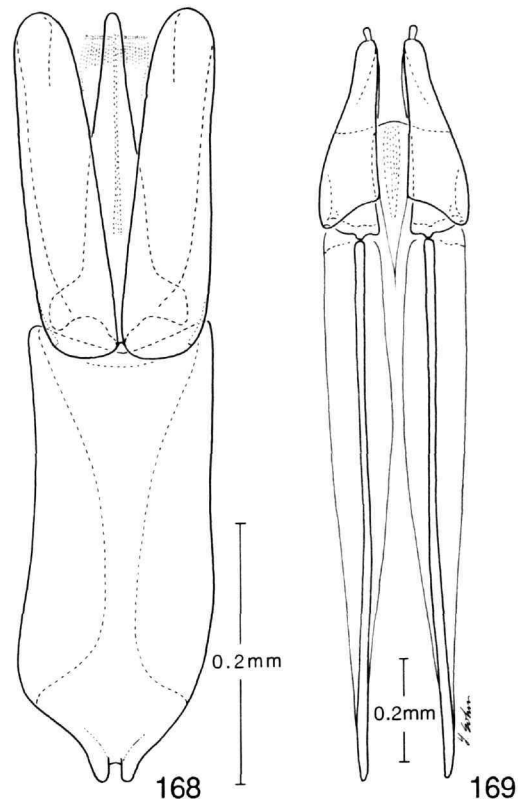
**Male Genitalia:** As illustrated (Figure 168).

**FEMALE GENITALIA.**—As illustrated (Figure 169).

**SEXUAL DIMORPHISM.**—No differences were noted.

**VARIATIONS.**—The four specimens seen vary from 3.28 to 3.50 mm in length and 1.20 to 1.50 mm in width.

**TYPE DATA.**—We have examined the unique male “type” deposited in the MNHN, Paris. That specimen is glued to a card. The abdomen has been removed and is glued on another card beneath the card with the specimen (apparently by Delève,



FIGURES 168, 169.—*Stenelmoides grouvellei* (Pic): 168, male genitalia, dorsal view. 169, Female genitalia, dorsal view.

who prepared a slide with the genitalia mounted on it). Next is a card bearing the male sex symbol and then the following series of labels: Type [printed on red paper] / Type [handwritten] / Guyane Francse, St. Laurent du Maroni, Collection Le Mout / Dicembre / *Stenelmoides* [sic] guyanensis Grouv. [illegible word] / [illegible handwritten note, in French] / [illegible handwritten note, in French] / Prepar. genit. No. 27867.6 [Delève's label with number of slide containing his dissection of the male genitalia] / Museum Paris Coll Pic / *grouvellei* Type / J. Delève d., 1967, *Stenelmoides grouvellei* Pic.

In addition to the type specimen, there are three conspecific specimens in the Paris museum mounted as follows. [1] specimen on a card / female sex symbol / Guyane Francse, Nouveau Chantier, collection LeMout / Septembre / Prepar. genit. No. 3766 / Delève d., 1966, *Stenelmoides strictifrons* Gr. [This is not *S. strictifrons*.] / Museum Paris, collection Leuirole [?] / *Stenelsianus grouvellei* Pic, not *strictifrons* as labeled, P.J. Spangler, 1983. [2] specimen on card / male sex symbol / Guyane Francse, Nouveau Chantier, collection LeMout / Septembre / Museum Paris, collection Leuirole / Prepar. genit. No. 3766.6 / *Stenelmoides strictifrons* Grouv. Type / Delève d. 1966, *Stenelsianus strictifrons* Gr.



FIGURE 170.—*Stenelmoides grouvellei* (Pic), distribution map.

*Stenelmoides grouvellei* Pic, not *strictifrons* as labeled, P.J. Spangler, 1983. [3] Specimen now on a point with a female sex symbol [specimen dissected and remounted by P.J. Spangler] / card on which abdomen and female genitalia are glued/ mai / Guyane Française, St. Laurent du Maroni, collection LeMoult / Museum Paris, collection A. Grouvelle 1917 /Grouv. 332. / *Stenelmoides grouvellei* Pic, det. P.J. Spangler, 1983.

**DISTRIBUTION.**—Currently known only from the type locality at St. Laurent Maroni, French Guiana, and Nouveau Chantier, French Guiana (Figure 170).

Delève, in 1966, apparently requested the types of *Stenelmoides guyanensis* and *S. strictifrons* from the Paris Museum. Judging from Delève's labels, he received three specimens, one labeled "*Stenelmoides guyanensis* Gr., type," which is different than those considered herein and is of no further concern for this account. He also received two conspecific specimens, only one of which bears an obviously

old handwritten label "*Stenelmoides strictifrons*, type." To both of those specimens Delève attached his label, dated 1966, and identifying them as "*Stenelsianus strictifrons*." He apparently did that because he thought the old handwritten label indicated the true identity of the specimens. However, in 1967, Delève may have realized that something was amiss because he received three more specimens labeled, respectively: [1] "*Stenelmoides strictifrons* Grouv.," [2] "*S. grouvellei* type"; and [3] "*Stenelmoides guyanensis* ty Grouv." To those three specimens he added his identification labels showing that he accepted each of them as labeled and as the true types. The male "type" specimen of *S. grouvellei* bears an apparently new bright red label with "TYPE" typed on it and two handwritten "Type" labels on aged paper on the same pin. That type specimen is conspecific with the two specimens Delève labeled "*Stenelsianus strictifrons* Grouv." in 1966. If Delève had seen those two specimens again in 1967

he presumably would have corrected his labels to read *S. grouvellei*; however, it is obvious that the specimen Delève examined and labeled *grouvellei* in 1967 fits Pic's description and we concur that that specimen is Pic's actual type specimen.

HABITAT.—Unknown.

### 11. *Stenhelmoïdes variabilis*, new species

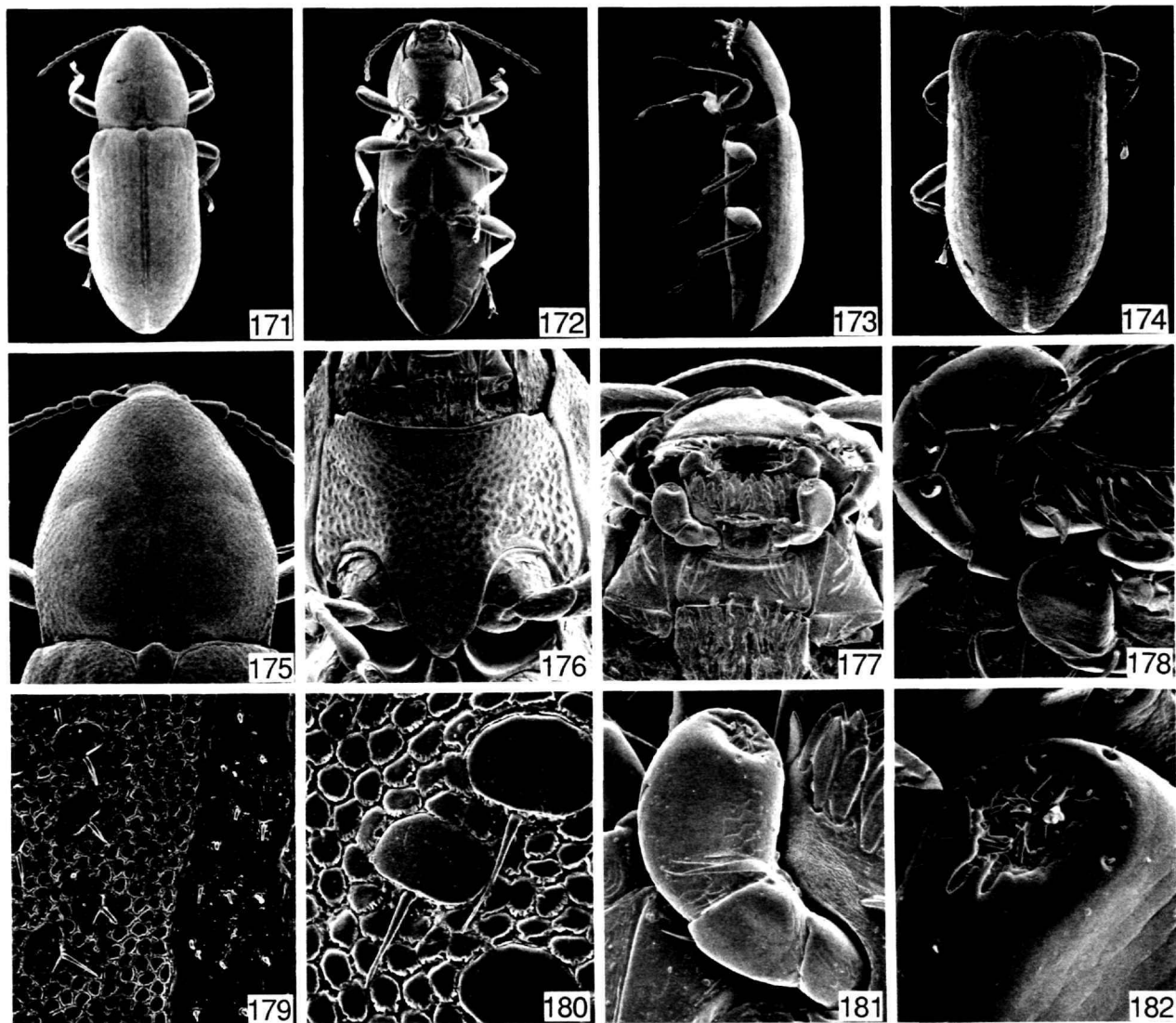
FIGURES 101, 171–195

DIAGNOSIS.—Differs from all known species of *Stenhelmoïdes* in pattern of pronotal plastron (Figure 101), male genitalia

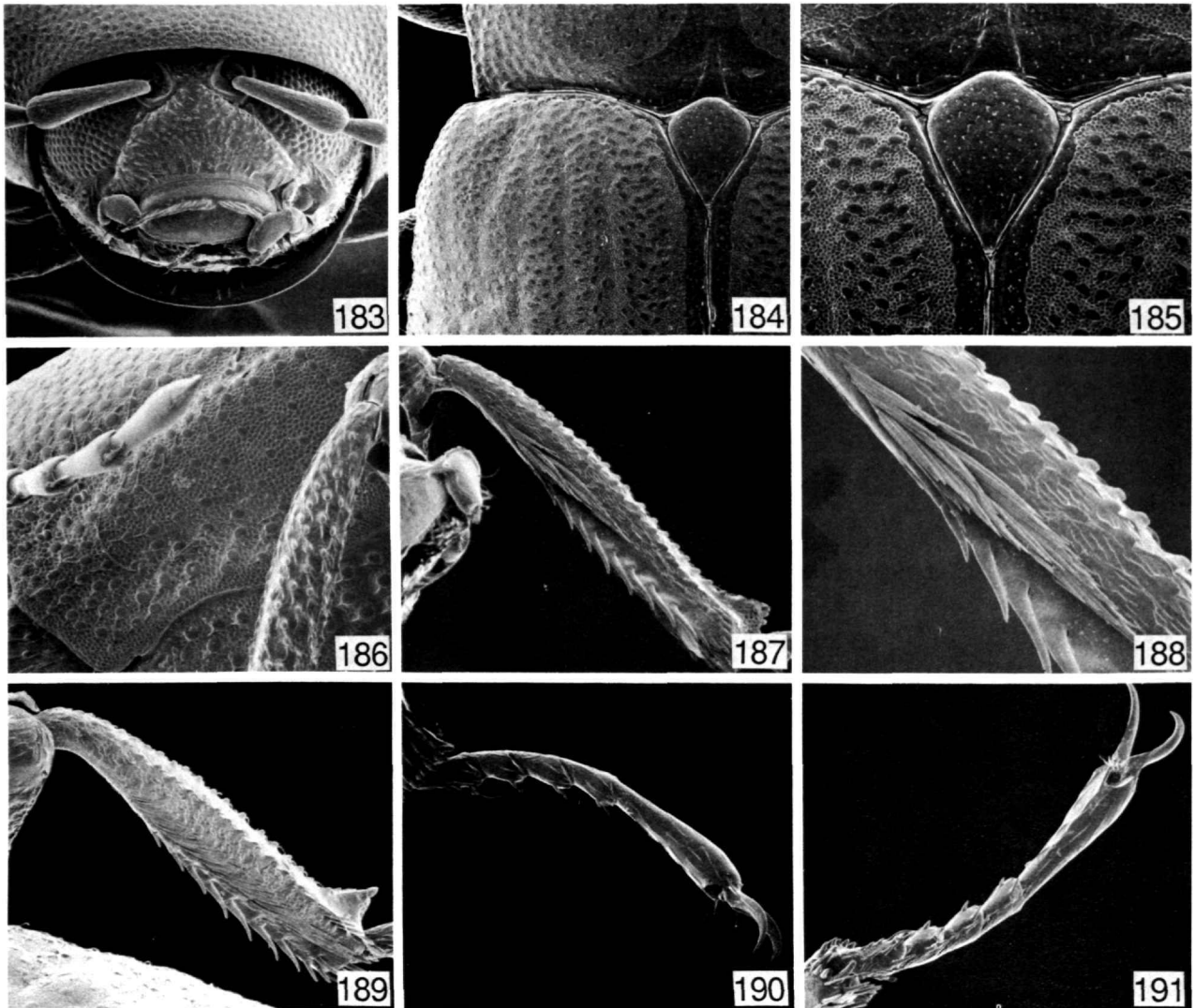
(Figures 192, 193), and the presence of 3 distinct discal rows plus about 3 indistinct lateral rows of punctures on each elytron. *Stenhelmoïdes variabilis* is most similar to *S. grouvellei* but the rows of elytral punctures will readily distinguish *S. variabilis* from *S. grouvellei*.

HOLOTYPE MALE.—*Body Form and Size*: Elongate, parallel sided (Figures 171, 172), moderately depressed (Figure 173). Length, 3.50 mm; width, 1.31 mm.

*Color*: Clypeus, labrum, antennae, palpi reddish. Frons gray. Dorsal surface reddish brown overlaid by gray plastron



FIGURES 171–182.—*Stenhelmoïdes variabilis*, new species: 171, habitus, dorsal view,  $\times 27$ ; 172, ventral view,  $\times 27$ ; 173, lateral view,  $\times 27$ . 174, Elytra,  $\times 40$ ; 175, pronotum,  $\times 70$ ; 176, prosternum,  $\times 100$ ; 177, head, ventral view,  $\times 200$ ; 178, maxillary and labial palpi,  $\times 500$ ; 179, pronotal plastron setae,  $\times 800$ ; 180, pronotal plastron setae,  $\times 2000$ ; 181, labial palpus,  $\times 750$ ; 182, labial palpus, last segment, sensilla on apex,  $\times 2000$ . (Reduced to 55% of original.)



FIGURES 183-191.—*Stenhelmoides variabilis*, new species: 183, head, dorsal view,  $\times 130$ ; 184, elytral base,  $\times 120$ ; 185, scutellum,  $\times 200$ ; 186, hypomeron,  $\times 200$ ; 187, protibia, scraping and smoothing setae,  $\times 170$ ; 188, protibial cleaning fringe,  $\times 400$ ; 189, mesotibia, scraping and smoothing setae,  $\times 200$ ; 190, metatarsus, lateral view,  $\times 170$ ; 191, metatarsus, ventral view,  $\times 170$ . (Reduced to 60% of original.)

except an elongate, sinuous area on midline of pronotum, scutellum, and a narrow area along sutural margins of elytra without plastron (Figures 101, 171). Five dark gray-brown maculae present on the pronotum as follows: 1 medially in widest part of area without plastron; a mediolateral and a basolateral macula on each side of pronotum. Each elytron with the following maculae joined by 5 indistinct dark gray-brown vittae: 1 at midwidth at base; 1 on disc; 1 laterally at midlength; and 1 subsuturally, just before apex. Venter dark reddish brown to black, especially medially, but overlaid by gray plastron. Abdominal sterna widely margined laterally with light gray plastron that contrasts abruptly with darker gray

middle area. Legs reddish except femora with black to dark gray-brown macula at midlength; macula more obvious on side normally lying against sterna.

**Head:** Width between antennal acetabula, 0.09 mm (Figure 183). Granules pointed, smaller than facets of eyes. Clypeus finely granulate. Labrum with a transverse row of hair-like setae near midlength (Figure 177). Labium with ligula covered with dense, flattened, elongate setae (Figures 177, 181). Labial palpus with last segment expanded and bearing sensilla on apex (Figures 181, 182). Antenna with segment 1 subequal to combined lengths of segments 2-4.

**Thorax:** Pronotum 1.08 mm long, 1.08 mm wide at basal

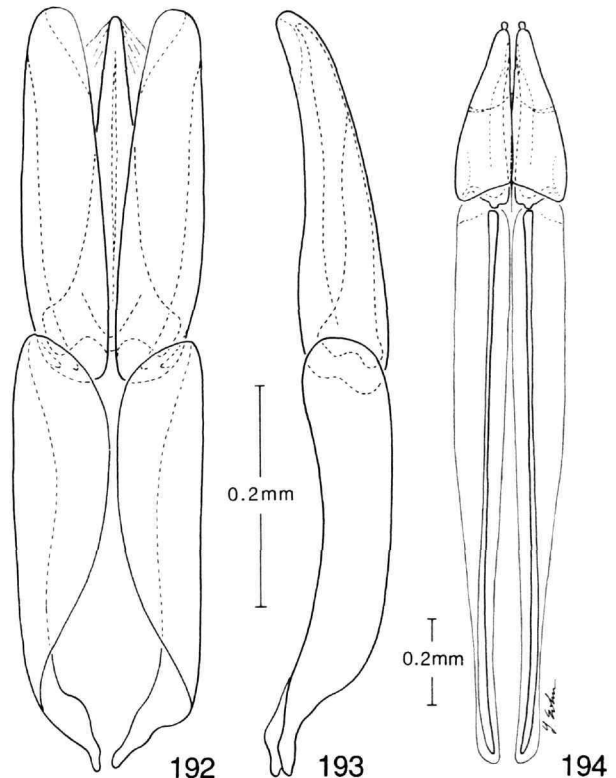
third; with gray plastron except median reddish area (Figures 101, 175); extremely shallow median longitudinal line extending from base to midlength. Pronotal granules (Figures 179, 180) flat, rounded, about same size as facets of eyes; separated at middle of side by about granule diameter; slightly more widely spaced apically and basally; granules in median reddish area larger and denser; each granule with short basal seta; setae of all granules directed toward median basal fifth of pronotum. Hypomeron with plastron and coarse granules, denser posteriorly (Figure 186). Elytra, 2.43 mm long, 1.31 mm wide (slightly past midlength). Each elytron with 6 longitudinal bands of granules, 5 discal bands more evident than the 1 lateral band (Figure 184); granules slightly smaller than those on pronotum; reddish sutural margin finely, intermittently microreticulate; with 4 rows of punctures on disc, 1 sutural and others on intervals between first 3 bands of granules; lateral rows of punctures indicated but obscured; each granule with a basal seta directed obliquely toward midline. Scutellum (Figure 185) elliptical, without plastron setae. Prosternum (Figure 176), 0.69 mm long; apicomedial area reddish and granulate, remainder of prosternum with gray plastron; with large round granules, separated by  $\frac{1}{2}$  to 1 times granule diameter in midline, sparser laterally; prosternal disc slightly angulate at border of reddish area. Prosternal process 0.27 mm long, 0.27 mm wide; apical half deflexed slightly; apex V-shaped. Mesosternum with deep fovea for reception of apex of prosternal process. Metasternum with disc with gray plastron and very shallowly depressed; granules slightly larger but sparser than those of prosternal disc; midline with reddish sulcus; lateral angles of intercoxal process not strongly elevated; metasternal disc and intercoxal process of abdomen on same plane. Tibiae each with a prominent row of subsinuate, stout, scraping setae on inner margin (Figures 187–189). Tibial cleaning fringes as follows: protibia—short, very narrow band occupying middle third of anterior surface; mesotibia and metatibia—distal  $\frac{4}{5}$  of posterior surface. Mesotibial cleaning fringe bordered laterally at apex by 4 stout smoothing setae. Metatibial cleaning fringes bordered laterally at apex by 6 stout smoothing setae. Posterior surface of mesofemur with short band of setae at midlength. Protarsal and mesotarsal segments with moderately dense hair-like setae ventrally; metatarsal segments with sparse setae ventrally (Figures 190, 191).

**Abdomen:** Granules on intercoxal process as large as or slightly larger than and about as dense as granules on metasternal disc, becoming sparser and smaller laterally and apically. Granules minute on last sternum. Sternum 5 evenly rounded; without depression or distinctive apical setae.

**Male Genitalia:** As illustrated (Figures 192, 193).

**FEMALE GENITALIA.**—As illustrated (Figure 194).

**VARIATIONS.**—This species varies considerably in color; 3 specimens out of a series of 12 from the same locality are uniformly dark reddish brown to black overlaid by gray plastron. The other nine specimens in that series have maculae joined by vittae and closely resemble the holotype as described above; however, two of those are very dark. The single



FIGURES 192–194.—*Stenhelmoides variabilis*, new species: 192, male genitalia, dorsal view; 193, lateral view. 194, Female genitalia, dorsal view.

specimen from the Territorio Federal Amazonas is uniformly dark, thus somewhat intermediate in color. All specimens have the rows of elytral punctures present as described.

**TYPE DATA.**—*Holotype* (male): VENEZUELA: BOLIVAR: Las Cocuizas (5 km N), 2 Nov 1982, John L. Hellman; deposited in the National Museum of Natural History, Smithsonian Institution.

*Allotype:* Same data as holotype.

*Paratypes:* Same data as holotype, 6 ♂, 6 ♀, (2 coated for SEM work). VENEZUELA: BOLIVAR: El Dorado (65 km S), 5 Nov 1982, R.F. Denno, 1 ♀ (USNM). TERRITORIO FEDERAL AMAZONAS: Isla de la Hormigas, 22 Aug 1951, Exp. Fco Ven Alto Orinoco, 1 ♀ (USNM).

**DISTRIBUTION.**—Currently known only from southeastern and southern Venezuela (Figure 195).

**ETYMOLOGY.**—From the Latin *variabilis* (changeable), in reference to the differences in color that may vary from uniformly very dark reddish brown or almost black dorsum to a moderately lighter reddish brown with dark gray-brown maculae on pronotum and maculae connected by vittae on elytra.

**HABITAT.**—Unknown.



FIGURE 195.—*Stenhelmoides variabilis*, new species, distribution map.

### The *strictifrons* Group

DIAGNOSIS.—Members of the *strictifrons* Group may be recognized by the following combination of characters. Body short and moderately convex dorsally. Frons merges with clypeus on same plane between bases of antennae. Basal segment of maxillary palpus about half as long as length of second segment. Lacinia apically armed with distinct rows of spines; without tooth-like lateral projection. Elytron with granules at random or in 3 to 5 indistinct rows (Figures 199, 215). Prosternal process foveate, weakly granulate; at base,

forming angle with disc in front of procoxae. Metasternal disc moderately to strongly depressed. Abdominal intercoxal process shallowly to strongly depressed. Protibial cleaning fringe short, occupying middle third of tibial length. Mesotibia and metatibia each with only a short row of robust smoothing setae at distal end of cleaning fringe. Profemur and mesofemur without row of dense, long, slender, golden, hair-like setae. Metafemur without plastron over surface. Female genitalia with coxites and styli long and slender; styli 3 to 4 times longer than wide (Figure 227).

### Key to Species of *strictifrons* Group

1. Elytra completely covered with plastron [Figure 196] . . . . . 12. *S. stegastus*, new species
- Elytra without plastron along sutural margin [Figures 197, 198] . . . . . 2

- 2. Metasternum and intercoxal area of first abdominal sternum of both sexes obviously and distinctly depressed. Protibia of male arcuate. Last segment of male mesotarsus with very long, golden, hair-like setae on ventral surface . . . . . 13. *S. mimicus*, new species
- Metasternum and intercoxal area of first abdominal sternum of both sexes indistinctly depressed. Protibia of male straight. Last segment of male mesotarsus without long, golden, hair-like setae . . . . . 14. *S. strictifrons*

**Clave para las Especies del Grupo *strictifrons***

- 1. Elitros cubiertos completamente con plastron [Figura 196] . . . . . 12. *S. stegastus*, sp. nov.
- Elitros sin plastron a lo largo del margen sutural [Figuras 197, 198] . . . . . 2
- 2. Metasterno y área intercoxal del primer esterno abdominal formando una conspicua y clara depresión en ambos sexos. Protibia del macho arqueada. Ultimo segmento del mesotarsos del macho con sedas muy largas y doradas en la superficie ventral . . . . . 13. *S. mimicus*, sp. nov.
- Metasterno y area intercoxal del primer esterno abdominal en inconspicuamente deprimidos en ambos sexos. Protibia del macho recta. Ultimo segmento del mesotarsos del macho sin sedas largas y doradas . . . . . 14. *S. strictifrons*

**12. *Stenhelmoides stegastus*, new species**

FIGURES 196, 199–228

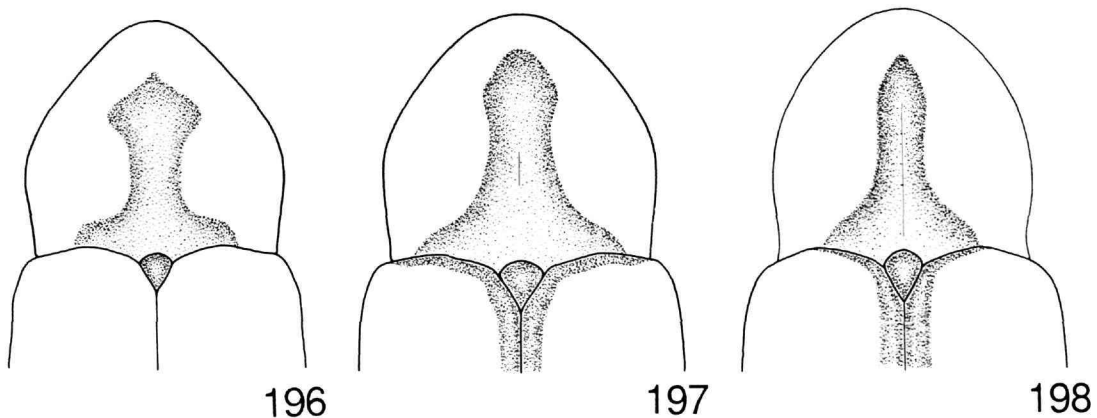
DIAGNOSIS.—Differs from all known species of *Stenhelmoides* by plastron covering the entire elytral surface (Figure 196); all other species have the elytral sutural margins either narrowly or broadly devoid of plastron.

HOLOTYPE MALE.—*Body form and size*: Moderately elongate, moderately broad; elytra parallel sided to posterior third then converging to apices (Figures 199, 200); convex

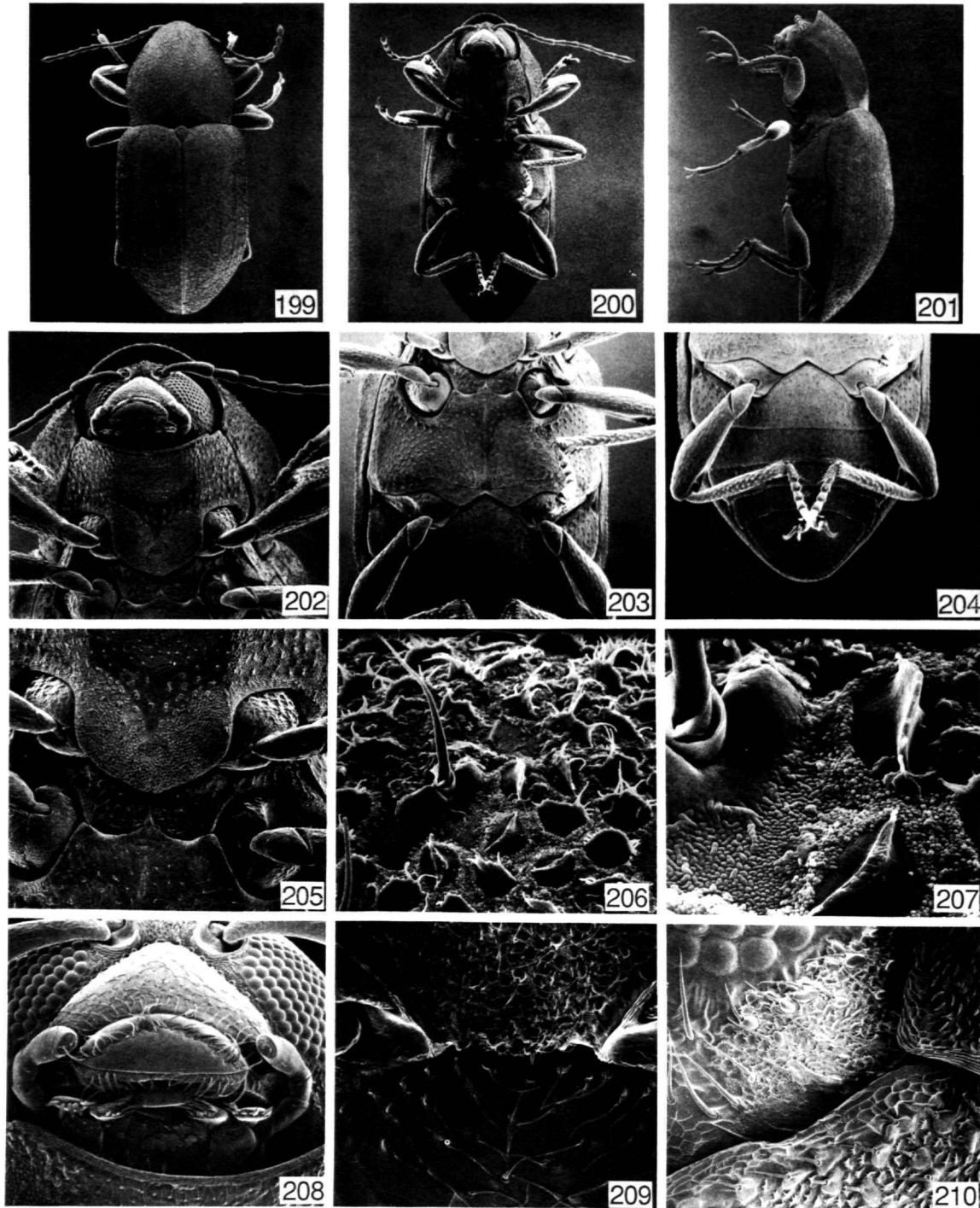
dorsally (Figure 201). Length, 2.16 mm; width, 1.00 mm.

*Color*: Eyes black; otherwise entire surface reddish overlaid by gray plastron except granules, clypeus, labrum, palpi, antennae, elongate sinuous area on midline of pronotum, scutellum, anterior half of prosternal disc, mesosternum between mesocoxae, anterior projection of metasternum between mesocoxae, and legs reddish.

*Head*: Width between antennal acetabula, 0.05 mm (Figures 200, 202, 208). Frons gray. Granules pointed, smaller than facets of eyes. Clypeus (Figures 208, 209) finely punctate.

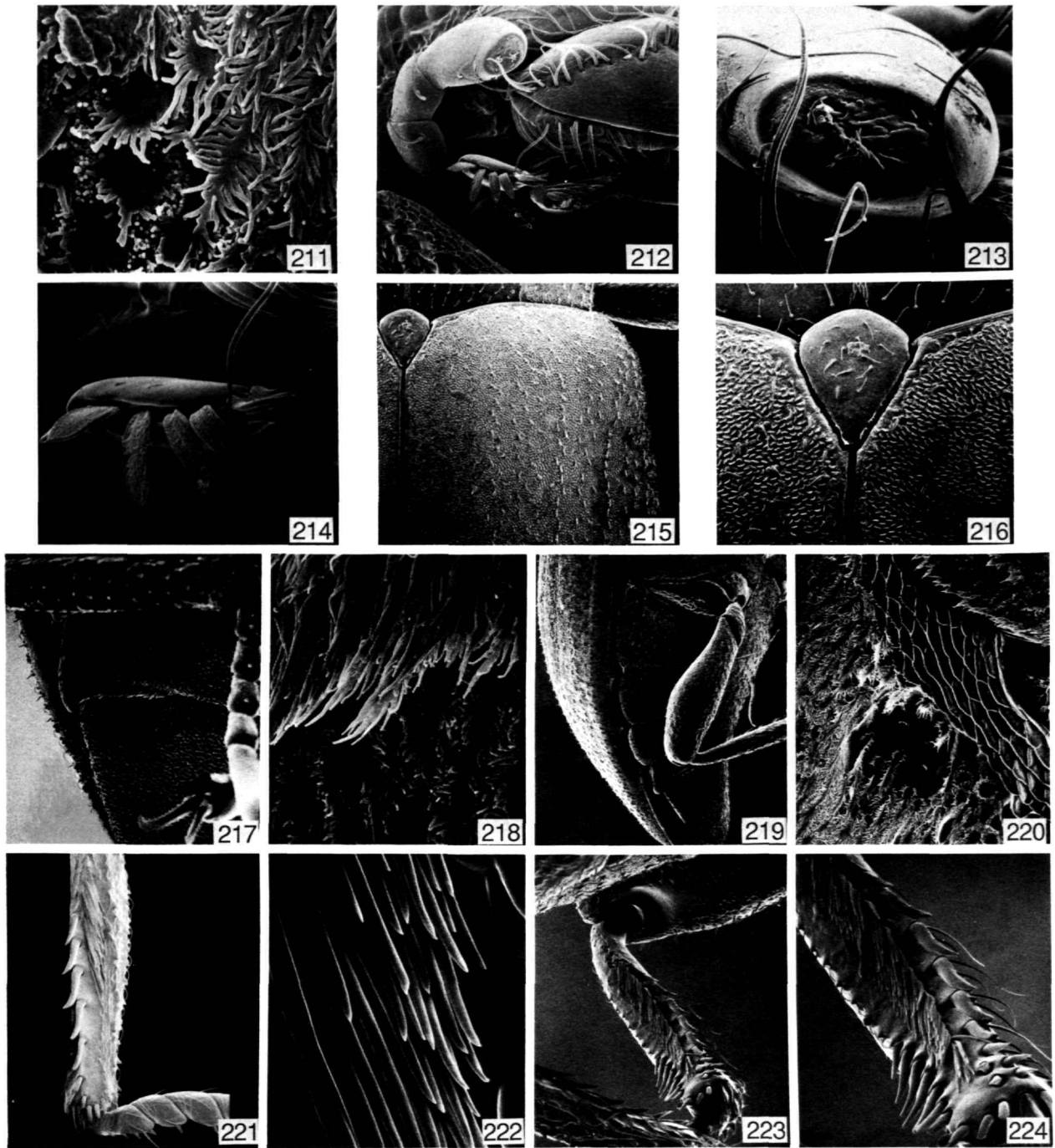


FIGURES 196–198.—Pattern of area without plastron (stippled) on pronotum and base of elytra: 196, *Stenhelmoides stegastus*, new species; 197, *Stenhelmoides mimicus*, new species; 198, *Stenhelmoides strictifrons* Grouvelle.

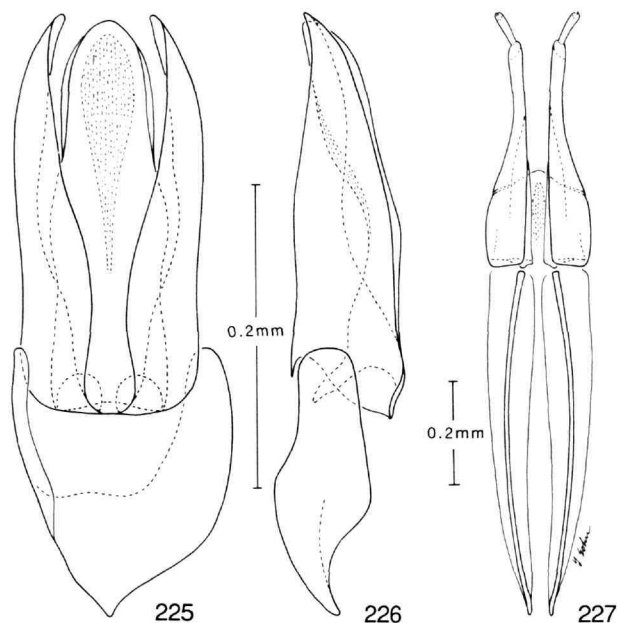


FIGURES 199-210.—*Stenhelmoides stegastus*, new species: 199, habitus, dorsal view,  $\times 45$ ; 200, ventral view,  $\times 45$ ; 201, lateral view,  $\times 45$ . 202, Prosternum,  $\times 100$ ; 203, metasternum,  $\times 80$ ; 204, abdomen,  $\times 80$ ; 205, prosternal process,  $\times 170$ ; 206, prosternal plastron,  $\times 2500$ ; 207, prosternal plastron setae,  $\times 7000$ ; 208, head, adoral view,  $\times 280$ ; 209, sculpture on frons and clypeus,  $\times 800$ ; 210, genal plastron,  $\times 700$ . (Reduced to 59% of original.)





FIGURES 211-224.—*Stenhelmoides stegastus*, new species: 211, plastron setae on gena,  $\times 7000$ ; 212, maxilla and clypeus,  $\times 600$ ; 213, maxilla, last segment, apex,  $\times 2500$ ; 214, galea,  $\times 1700$ ; 215, elytral base with complete plastron,  $\times 170$ ; 216, scutellum,  $\times 400$ ; 217, plastron, abdominal sterna 1 and 2, lateral margins,  $\times 280$ ; 218, abdominal plastron setae, enlarged,  $\times 4500$ ; 219, abdominal sterna, lateral view,  $\times 110$ ; 220, plastron setae, sternum 1, anterolateral corner,  $\times 1000$ ; 221, protibia and cleaning fringe,  $\times 300$ ; 222, cleaning fringe enlarged,  $\times 3500$ ; 223, metatibia and cleaning fringe,  $\times 300$ ; 224, cleaning fringe, scraping setae, and smoothing setae, enlarged,  $\times 600$ . (Reduced to 50% of original.)



FIGURES 225–227.—*Stenhelmoides stegastus*, new species: 225, male genitalia, dorsal view; 226, lateral view. 227, Female genitalia, dorsal view.

Labrum (Figures 208, 212) with a transverse row of golden hair-like setae near midlength and finely punctate. Maxillary palpus with last segment broad (Figure 212), with sensilla apically (Figure 213). Galea with flattened, elliptical setae apically (Figure 214). Gena with plastron and granules (Figures 210, 211). Antenna with segment 1 subequal to combined lengths of segments 2–4.

**Thorax:** Pronotum 0.73 mm long, 0.81 mm wide at basal third; with gray plastron except median reddish area (Figure 196); without shallow median longitudinal line. Pronotal granules narrow, elongate, slightly raised and about as long as diameter of facets of eyes; separated at middle of side by about  $1/2$  to 1 times granule diameter; smaller and more widely spaced apically; larger and sparser basally; granules in median reddish area smaller and denser; each granule with short basal seta; setae of all granules directed toward median basal fifth of pronotum. Elytra 1.54 mm long, 1.00 mm wide (slightly past midlength). Each elytron, at midlength, with indistinct rows, not bands, of granules; granules similar to but slightly smaller than those on pronotum; each granule with a basal seta directed obliquely toward midline; plastron complete to sutural margin (Figures 196, 215). Scutellum (Figure 216) elliptical; without plastron setae. Prosternum (Figure 202), 0.43 mm long; apicomedial discal area reddish and granulate, remainder of prosternum with gray plastron; with small round granules; in

front of procoxae, granules large and separated by  $1/2$  to 1 times granule diameter, sparser anteriorly; prosternal disc slightly angulate on a line between anterior margins of procoxal cavities. Prosternal process (Figures 205–207) 0.19 mm long, 0.27 mm wide; apical half deflexed slightly; apex broadly V-shaped. Mesosternum with deep fovea for reception of apex of prosternal process. Metasternum (Figure 203) with disc with gray plastron except area between mesocoxae, very shallowly depressed; discal granules smaller and sparser than those in front of procoxae on prosternum; midline with narrow reddish sulcus; intercoxal process moderately depressed, lateral angles slightly elevated; metasternal disc and intercoxal process of abdomen about on same plane. Legs without plastron; all tibiae with a prominent row of subsinuate, stout, scraping setae on inner margins (Figures 221–224). Tibial cleaning fringes as follows: protibia—short, very narrow band occupying middle third of anterior surface; mesotibia and metatibia—distal  $4/5$  of posterior surface. Mesotibial cleaning fringe bordered laterally at apex by 8 stout smoothing setae; metatibial cleaning fringes bordered laterally at apex by 6 stout smoothing setae. Anterior surface of profemur and posterior surface of mesofemur without row of long, golden setae at midlength. All tarsal segments without dense hair-like setae ventrally.

**Abdomen:** With gray plastron (Figures 204, 217–220) except on granules. Granules on intercoxal process slightly smaller and about as dense as granules on metasternal disc; becoming sparser and smaller laterally and apically. Sternum 5 evenly rounded; without depression or distinctive apical setae.

**Male Genitalia:** As illustrated (Figures 225, 226).

**FEMALE GENITALIA.**—As illustrated (Figure 227).

**SEXUAL DIMORPHISM.**—None observed.

**VARIATION.**—The only variation noticed in the 18 specimens available is a small difference in size. The specimens varied from 2.16 to 2.47 mm in length and from 1.0 to 1.08 mm in width.

**TYPE DATA.**—*Holotype* (male): VENEZUELA: BOLIVAR: Las Cocuizas (5 km N), 2 Nov 1982, John L. Hellman, in blacklight trap; deposited in the National Museum of Natural History, Smithsonian Institution.

*Allotype:* Same data as holotype.

*Paratypes:* Same data as holotype, 9 ♂, 6 ♀. Same data as holotype, 1 ♂, 1 ♀; deposited in IBMV.

**DISTRIBUTION.**—Presently known only from eastern Venezuela (Figure 228).

**ETYMOLOGY.**—The trivial name *stegastus* is from the Greek *stegastos* (covered), in reference to the extensive plastron that covers the entire dorsal surface of the elytra (except the top of the granules).

**HABITAT.**—Unknown; all specimens were collected in a blacklight trap.

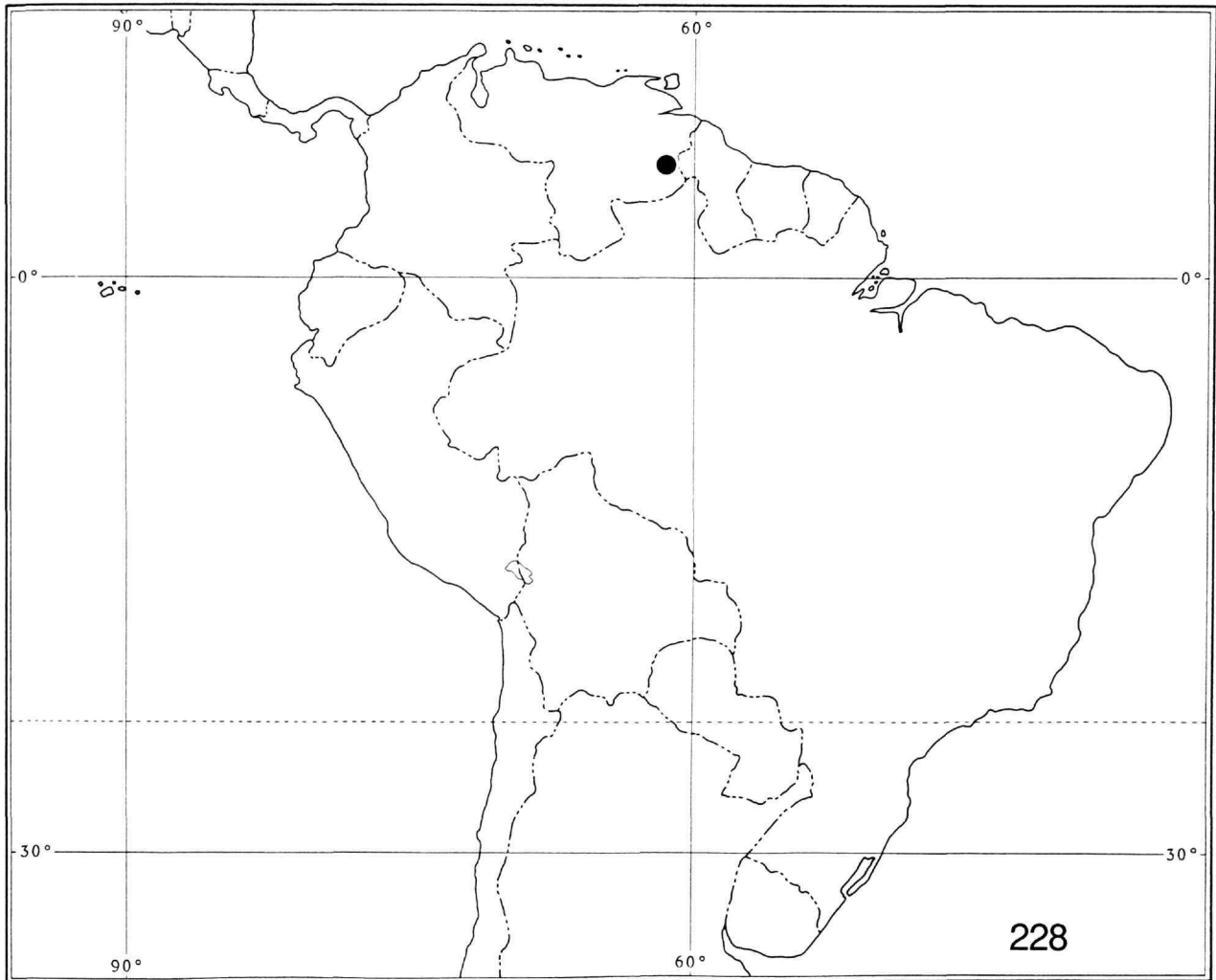


FIGURE 228.—*Stenelmoides stegastus*, new species, distribution map.

### 13. *Stenelmoides mimicus*, new species

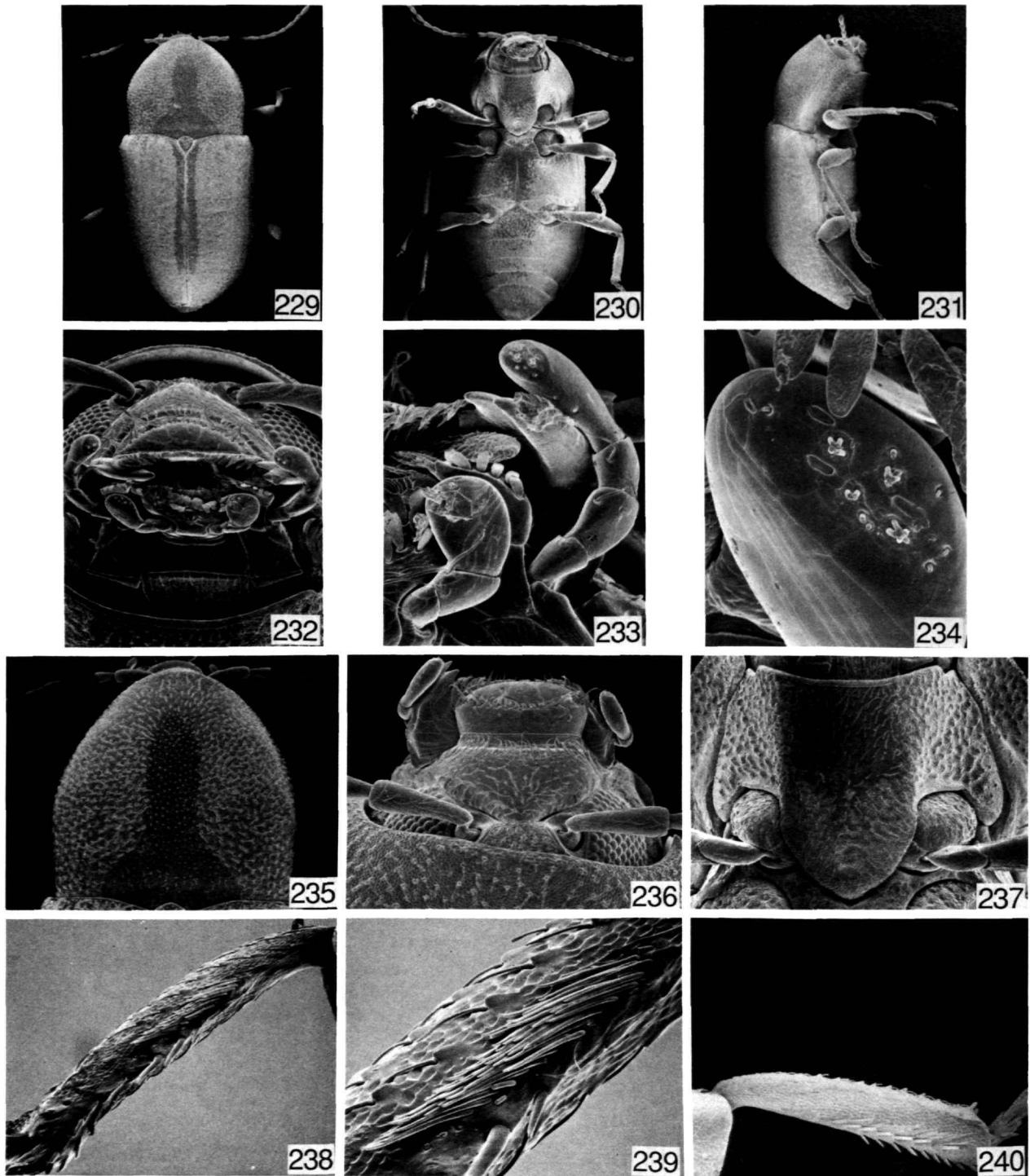
FIGURES 197, 229-245

**DIAGNOSIS.**—Differs from all known species of *Stenelmoides* except *S. strictifrons* and *S. stegastus*, new species, in its small size, 2.35 mm, and male genitalia (Figure 241, 242). However, *S. mimicus* may be distinguished immediately from *S. stegastus* by the absence of the plastron adjacent to the elytral sutural margin (Figures 197, 229). From *S. strictifrons*, which *S. mimicus* resembles very closely, both sexes of *S. mimicus* may be distinguished by the very deeply and widely depressed metasternum and intercoxal process of the first abdominal sternum; *S. strictifrons* has the metasternum feebly

depressed and on the same flat plane as the intercoxal process of the first abdominal sternum. In addition, *S. mimicus* has the elytral granules randomly mixed whereas *S. strictifrons* has 2 distinct rows of granules plus randomly mixed ones. The male of *S. mimicus* has a tuft of sparse, very long, golden, hair-like setae on the ventral surface of the last segment of the mesotarsus; *S. strictifrons* lacks this tuft.

**HOLOTYPE MALE.**—*Body Form and Size:* Moderately elongate, moderately broad; elytra diverging to posterior third then converging to apices (Figures 229, 230); convex dorsally (Figure 231). Length, 2.35 mm; width, 1.00 mm.

*Color:* Dorsal surface reddish black overlaid by gray plastron except elongate, sinuous area on midline of pronotum,



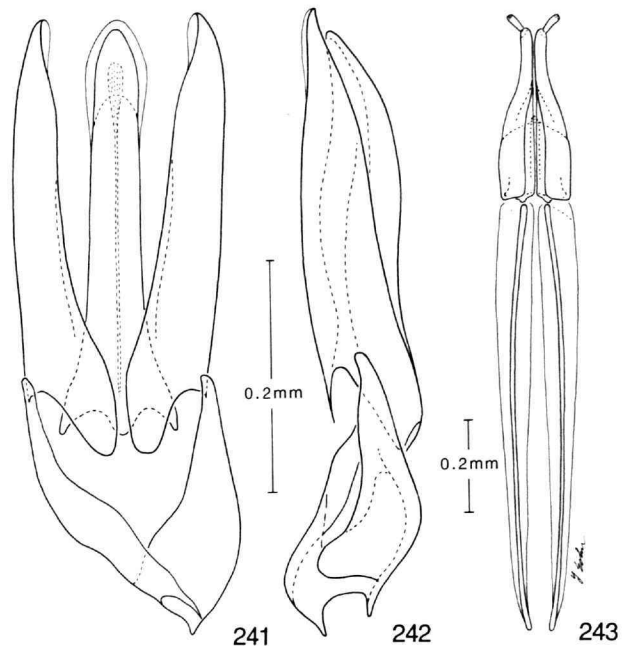
FIGURES 229-240.—*Stenhelmoides mimicus*, new species: 229, habitus, dorsal view,  $\times 32$ ; 230, ventral view,  $\times 32$ ; 231, lateral view,  $\times 32$ . 232, Head, adoral view,  $\times 161$ ; 233, maxillary palpi, labial palpi, and lacinia,  $\times 405$ ; 234, labial palpus, last segment, sensilla on apex,  $\times 1900$ ; 235, pronotum,  $\times 71$ ; 236, head, dorsal view,  $\times 153$ ; 237, prothorax,  $\times 120$ ; 238, protibia,  $\times 228$ ; 239, protibial cleaning fringe,  $\times 619$ ; 240, metatibial cleaning fringe,  $\times 166$ . (Reduced to 60% of original.)

scutellum, and narrow elytral sutural band without plastron. Venter reddish black except antennae, clypeus, palpi, legs, and last abdominal sternum reddish.

**Head:** Width between antennal acetabula, 0.07 mm (Figures 232, 236). Frons gray. Granules pointed, smaller than facets of eyes. Clypeus finely punctate. Labrum with a transverse row of golden hair-like setae near midlength and finely punctate. Maxillary palpus with apical segment swollen (Figure 233). Labial palpus with last segment broad and bearing apical sensilla (Figures 233, 234). Antenna with segment 1 subequal to combined lengths of segments 2–4.

**Thorax:** Pronotum 0.73 mm long, 0.81 mm wide at basal third; with gray plastron except median reddish area (Figures 197, 235). Pronotal granules narrow, elongate, and slightly raised; about as long as diameter of facets of eyes; separated at middle of side by about half length or length of a granule; smaller and more widely spaced apically and basally; granules in median reddish area smaller and denser; each granule with short basal seta; setae of all granules directed toward median basal fifth of pronotum; with fine, short, shallow, median, longitudinal line. Elytra 1.58 mm long, 1.00 mm wide (slightly past midlength). Each elytron, at midlength, with indistinct rows, not in bands, of granules; granules similar to but slightly shorter than those on pronotum; each granule with a basal seta directed obliquely toward midline; reddish sutural margin finely microreticulate. Prosternum (Figure 237) 0.50 mm long; apicomedial discal area reddish black and granulate, remainder of prosternum with gray plastron; with small round granules; in front of procoxae, granules large and separated by  $\frac{1}{2}$  to 1 times granule diameter; prosternal disc, in profile, slightly angulate on a line between anterior margins of procoxal cavities. Prosternal process 0.25 mm long, 0.30 mm wide; apical half deflexed slightly; apex broadly V-shaped and shallowly foveate. Mesosternum with deep fovea for reception of apex of prosternal process. Metasternum with disc with gray plastron except area between mesocoxae and in medial depression; granules smaller and sparser than those in front of procoxae on prosternum; midline with narrow reddish black sulcus; intercoxal process strongly depressed, lateral angles distinctly elevated; metasternal disc and intercoxal process of abdomen widely and strongly depressed, not on flat plane. Legs reddish; all tibiae (Figures 238–240) with a prominent row of subsinuate, stout, scraping setae on inner margins. Tibial cleaning fringes as follows: protibia—short, very narrow band occupying middle third of anterior surface; mesotibia and metatibia—distal  $\frac{4}{5}$  of posterior surface. Mesotibial cleaning fringe bordered laterally at apex by 8 stout smoothing setae. Metatibial cleaning fringe bordered laterally at apex by 6 stout smoothing setae. Anterior surface of profemur and posterior surface of mesofemur without row of long, golden setae at midlength. Protarsal and metatarsal segments with few short setae ventrally; last mesotarsal segment with a tuft of sparse, very long, hair-like setae ventrally. Tarsal claws broad.

**Abdomen:** With gray plastron except on granules. Gran-



FIGURES 241–243.—*Stenhelmoides mimicus*, new species: 241, male genitalia, dorsal view; 242, lateral view. 243, Female genitalia, dorsal view.

ules on intercoxal process slightly smaller and about as dense as granules on metasternal disc; becoming sparser and smaller laterally and apically. Sternum 5 evenly rounded; without depression or distinctive apical setae.

**Male Genitalia:** As illustrated (Figures 241, 242).

**FEMALE GENITALIA.**—As illustrated (Figure 243).

**SEXUAL DIMORPHISM.**—The females differ from the males as follows: metasternal disc and intercoxal area of first abdominal segment less deeply depressed; protarsal claws narrower; no tuft of sparse, long, golden, hair-like setae on ventral surface of last segment of the mesotarsus.

**VARIATION.**—Three of the 16 specimens in the type series are reddish overlaid by the plastron instead of reddish black and 5 specimens have an indistinct transversely wrinkled cuticular surface. The specimens vary from 2.35 to 2.51 mm in length and from 0.98 to 1.04 mm in width.

**TYPE DATA.**—*Holotype* (male): VENEZUELA: TERRITORIO FEDERAL AMAZONAS: Puerto Ayacucho (40 km S), at Tobogán, 27 Feb 1986, P.J. Spangler, colln # 20; deposited in the National Museum of Natural History, Smithsonian Institution.

*Allotype:* Same data as holotype.

*Paratypes:* Same data as holotype except: 28 Feb 1986, P.J. Spangler, in stream between cascades, colln #21, 1 ♂; same data except: 18 Nov 1987, P.J. Spangler and R.A. Faitoute, colln #12, 6 ♀; same data except: among roots on edge of cascade, colln #13, 1 ♂ (USNM). VENEZUELA: TERRITORIO FEDERAL AMAZONAS: Cerro de la Neblina, base-



FIGURE 244.—*Stenhelmoides mimicus*, new species, distribution map.

camp, 0°50'N 66°10'W, 140 m, seined from rocks in rapids of Río Baria, 27 Jan 1985, P.J. and P.M. Spangler, R.A. Faitoute, W.E. Steiner, 1 ♂, 4 ♀ (USNM); same data except: netted along margins of Río Baria, 20 Feb 1985, P.J. and P.M. Spangler, R.A. Faitoute, W.E. Steiner, 2 ♂, 1 ♀ (USNM); same data except seined from rocks and leaf packs in whitewater stream, 22 Feb 1985, P.J. and P.M. Spangler, R.A. Faitoute, W.E. Steiner, 1 ♀ (USNM).

**DISTRIBUTION.**—Presently known only from southern Venezuela (Figure 244).

**ETYMOLOGY.**—The trivial name *mimicus* is from the Greek *mimos* (imitator), in reference to the close resemblance of this species to *S. strictifrons*.

**HABITAT.**—The type material available for this species was collected from two different biotopes. The holotype was

described from a small series of specimens from the Tobogán area, 40 km south of Puerto Ayacucho, T.F.A., Venezuela, because this locality is readily accessible for anyone wishing to visit it. Because it is very difficult to visit, the other site at Cerro de la Neblina in the southernmost part of Venezuela was not chosen as the type locality.

The Tobogán area consists of two broad, shallow cascades over a large granitic outcrop. The cascades are separated by a pool at the base of the upper cascade and a short, narrow stretch of stream (Figure 245) that quickly tumbles over the steeper, lower cascade. Specimens of this previously undescribed species of *Stenhelmoides* were collected from among rocks, gravel, sand, and roots washed by the current in the short stretch of shaded stream. The stream was about 3 m wide, 1/3 m deep, and was flowing at about 1–1.5 m/sec when the



FIGURE 245.—*Stenhelmoides mimicus*, new species, biotope: Tobogán, 40 km south of Puerto Ayacucho, T.F.A., Venezuela.

specimens were collected. The polished rocks and driftwood along the cascades indicated that the area is periodically scoured by high water. Colorimetric water analysis provided the following data: pH, 5; oxygen, 12 ppm; hardness, 0. The water temperature was 28°C when the specimens were collected.

Other aquatic insects collected with the holotype at the type locality are: Coleoptera: Dytiscidae: *Laccodytes*; Elmidae: *Cylloepus*, *Gyrelmis*, *Heterelmis*, *Macrelmis*, *Microcylloepus*, *Neoelmis*, *Pagelmis*, *Phanocerus*, *Stegoelmis*, *Tyletelmis*, and *Xenelmis*; Torridincolidae; Hydroscaphidae: *Scaphydra*; Hydraenidae: *Hydraena*; Hydrophilidae: *Helochares*, *Oocylus*, and *Phaenonotum*. Hemiptera: Helotrephidae; Veliidae: *Microvelia* and *Rhagovelia*.

The whitewater biotope at Cerro de la Neblina was a lowland, unnamed stream at an altitude of about 150 m and about 1 km from the basecamp. The stream was about 8 m wide, 1/3 m deep, had a substratum of rocks and gravel, and was shaded most of the day. Colorimetric water chemistry analyses indicated the following: pH, 5; oxygen, 9 ppm; hardness, 0. This stream was the only one we found in the area in which snails were living; this suggests that sufficient calcium was present for the snails to secrete their shells.

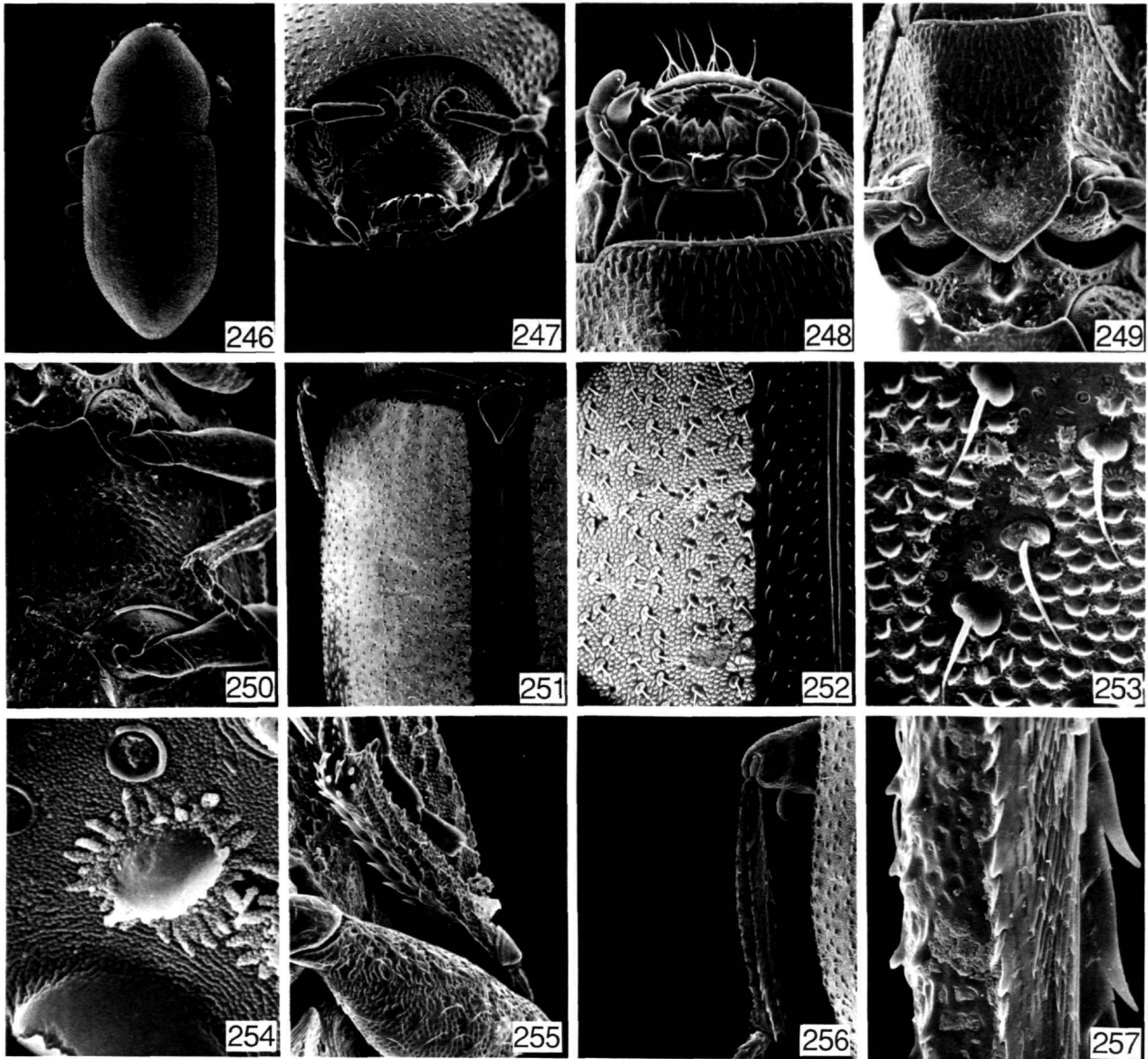
Other aquatic and semiaquatic beetle genera collected from the Río Baria site with these *Stenhelmoides* are: Dytiscidae: *Bidessodes*, *Hydrodessus*, *Hypodessus*, *Laccodytes*, *Laccophilus*, and *Microdessus*; Elmidae: *Austrolimnius*, *Cylloepus*, *Gyrelmis*, *Heterelmis*, *Hexacylloepus*, *Hintonelmis*, *Macrelmis*, *Microcylloepus*, *Neoelmis*, *Neolimnius*, *Pilielmis*, *Stegoelmis*, *Tyletelmis*, and *Xenelmis*; Limnichidae: *Limnichoderus*; Psephenidae: *Pheneps*.

#### 14. *Stenhelmoides strictifrons* Grouvelle

FIGURES 198, 246–262

*Stenhelmoides strictifrons* Grouvelle, 1908:182.—Delève, 1970:65.  
*Stenelmoides strictifrons*.—Blackwelder, 1944:271 [checklist].

DIAGNOSIS.—Differs from all known species of *Stenhelmoides* except *S. mimicus*, new species, in its small size, 2.04–2.52 mm, combined with its plastron pattern (Figure 198) and male genitalia (Figures 258, 259). From *S. mimicus*, *S. strictifrons* may be distinguished by its slightly depressed metasternum on the same flat plane as the intercoxal process of the first abdominal sternum (metasternum and intercoxal process of first abdominal sternum of *S. mimicus* deeply and widely depressed); by the elytral granules in rows (randomly placed



FIGURES 246–257.—*Stenhelmoides strictifrons* Grouvelle: 246, habitus, dorsal view,  $\times 20$ ; 247, adoral view,  $\times 125$ ; 248, Mouthparts, ventral view,  $\times 20$ ; 249, prosternum,  $\times 130$ ; 250, metasternum,  $\times 110$ ; 251, elytral base and scutellum,  $\times 90$ ; 252, elytral plastron,  $\times 240$ ; 253, elytral plastron and granules, enlarged (some abraded),  $\times 1200$ ; 254, elytral plastron microseta, enlarged,  $\times 6000$ ; 255, front leg, with cleaning fringe,  $\times 220$ ; 256, metatibia, with cleaning fringe,  $\times 150$ ; 257, metatibia with cleaning fringe, enlarged,  $\times 850$ . (Reduced to 56% of original.)

in *S. mimicus*); ventral surface of last segment of mesotarsus of males of *S. strictifrons* without tuft of long, golden, hair-like setae as found on mesotarsus of males of *S. mimicus*.

**REDESCRIPTION OF HOLOTYPE FEMALE.**—*Body Form and Size:* Moderately elongate, moderately broad; elytra diverging to posterior third then converging to apices (Figure 246); moderately convex dorsally. Length, 2.12 mm; width, 1.00 mm.

*Color:* Dorsal surface reddish overlaid by gray plastron except elongate, sinuous area on midline of pronotum, scutellum, and narrow sutural band on elytron without plastron. Clypeus, palpi, antennae and legs reddish.

*Head:* Width between antennal acetabula, 0.06 mm (Figures 247, 248). Frons gray. Granules pointed, smaller than facets of eyes. Clypeus finely punctate. Labrum with a transverse row of golden hair-like setae near midlength (Figure



248). Antenna with segment 1 subequal to combined lengths of segments 2-4.

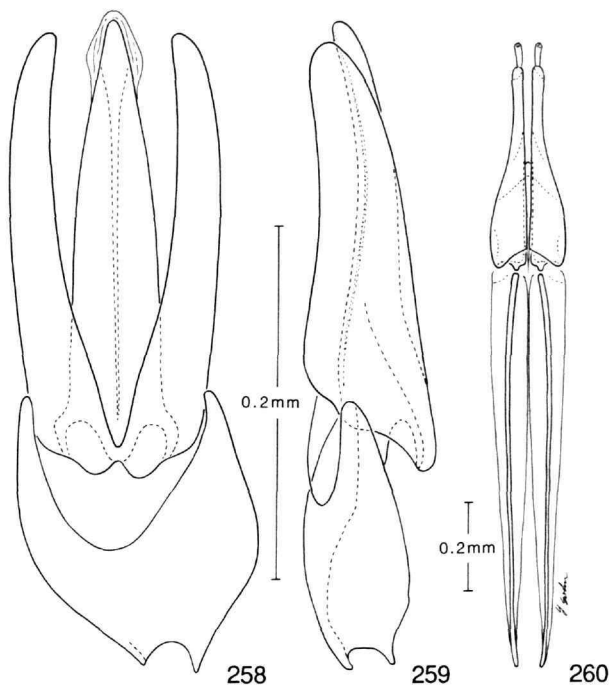
**Thorax:** Pronotum 0.70 mm long, 0.73 mm wide at basal third; with gray plastron except median reddish area (Figure 198); without shallow median longitudinal line. Pronotal granules narrow, elongate, and slightly raised; about as long as diameter of facets of eyes; separated at middle of side by about half length or length of a granule; smaller and more widely spaced apically and basally; granules in median reddish area smaller and denser; each granule with short basal seta; setae of all granules directed toward median basal fifth of pronotum. Elytra 1.4 mm long, 1.00 mm wide (slightly past midlength). Each elytron (Figures 251, 252), at midlength, with indistinct rows (but not in bands) of granules; granules similar to but slightly smaller than those on pronotum; reddish sutural margin finely microreticulate; each granule with a basal seta directed obliquely toward midline; plastron setae (Figures 252-254) radiallyspiculate. Scutellum elliptical, shiny (Figure 251). Prosternum (Figure 249) 0.42 mm long; apicomedial area reddish and granulate, remainder of prosternum with gray plastron; with small round granules; in front of procoxae, granules separated by  $\frac{1}{2}$  to 1 times granule diameter and sparser anteriorly; prosternal disc slightly angulate at border of reddish area at about midlength. Prosternal process 0.23 mm long, 0.27 mm wide; apical half deflexed slightly; apex broadly V-shaped (Figure 249). Mesosternum with deep fovea for reception of apex of prosternal process. Metasternum (Figure 250) with disc with gray plastron, very shallowly depressed; discal granules smaller and sparser than those in front of procoxae; midline with reddish sulcus; intercoxal process slightly depressed, lateral angles only slightly elevated; metasternal disc and intercoxal process of abdomen on same plane. Legs reddish; all tibiae with a prominent row of subsinuate, stout, scraping setae on inner margins (Figures 255-257). Tibial cleaning fringes as follows: protibia—short, very narrow band occupying middle third of anterior surface; mesotibia and metatibia—distal  $\frac{4}{5}$  of posterior surface. Mesotibial cleaning fringe bordered laterally at apex by 8 stout smoothing setae. Metatibial cleaning fringes bordered laterally at apex by 6 stout smoothing setae. Anterior surface of profemur and posterior surface of mesofemur without row of long, golden setae at midlength. All tarsal segments without dense hair-like setae ventrally.

**Abdomen:** With gray plastron. Granules on intercoxal process slightly smaller and about as dense as granules on metasternal disc, becoming sparser and smaller laterally and apically. Sternum 5 evenly rounded; without depression or distinctive apical setae.

**Female Genitalia:** As illustrated (Figure 260).

**MALE GENITALIA.**—As illustrated (Figures 258, 259).

**SEXUAL DIMORPHISM.**—No distinct external differences have been observed between males and females of this species. The male protarsal claws appear slightly broader than those of the females but the difference is not great enough to separate



FIGURES 258-260.—*Stenhelmoides strictifrons* Grouvelle: 258, male genitalia, dorsal view; 259, lateral view. 260, Female genitalia, dorsal view.

the sexes easily.

**VARIATIONS.**—Specimens vary in length from 2.04 to 2.52 mm. The only other difference noticed in the specimens examined is in the color of the dorsal surface; the majority are reddish overlaid by the gray plastron, whereas, some are almost black.

**TYPE DATA.**—In his description of *Stenhelmoides strictifrons*, Grouvelle (1908) gave no indication of the number of specimens he had seen. He did state that the species originated from "Rivière Lunier, Tumuc Humac." When we examined the type material deposited in the Paris Museum we found the following. One specimen labeled as "*S. strictifrons* Grouv. Type"; also examined by Delève and accepted as *S. strictifrons* as his label dated 1966 attests. However, that specimen is conspecific with *S. grouvellei* Pic. In 1967, Delève received and studied another specimen bearing an old label "*Stenhelmoides strictifrons* Grouv."; this is a much smaller and different specimen than the specimen he had examined in 1966. Delève apparently noted the discrepancy between that specimen and the one he received the year before and accepted the small specimen as the authentic type of *S. strictifrons* and illustrated its pronotum (1970, fig. 21). He or someone else added a fresh pink "Holotype" label to the pin bearing that female specimen. Because that is the only specimen of *S. strictifrons* we have seen that is labeled "Guyane, Rivière Lunier, Tumuc Humac" as Grouvelle cited in his description,

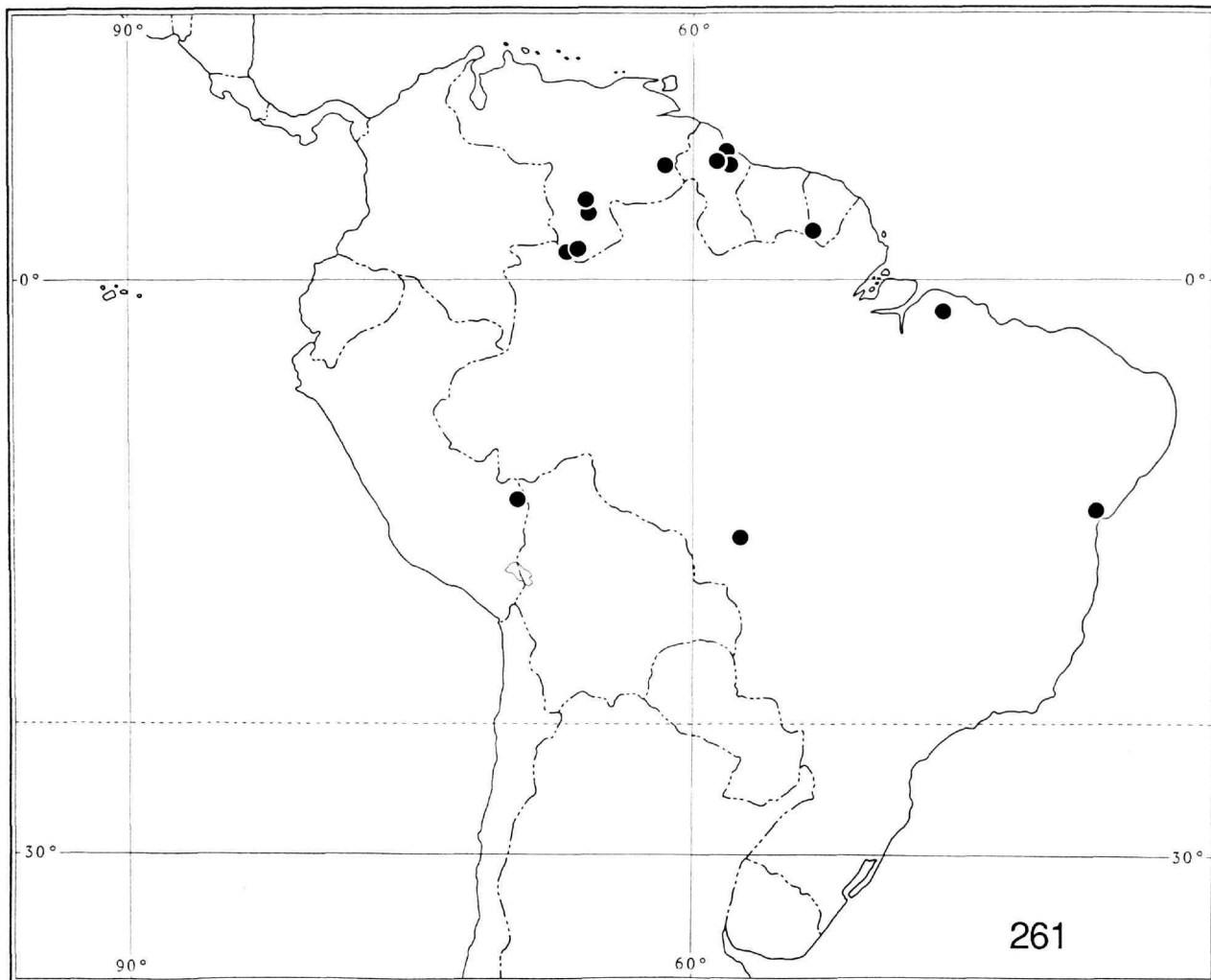


FIGURE 261.—*Stenelmoides strictifrons* Grouvelle, distribution map.

we agree with Delève that that female is the holotype. We have examined one additional male specimen of *S. strictifrons* that bore a manuscript name "Helmis discreta Grouv. Type" from "Guyane, Rivière Lunier" but did not include "Tumuc Humac" on it. That male was removed from the card, dissected, and placed on a point; the genitalia was placed in glycerine in a microvial and the vial was attached to the pin below the labels. We have also added our identification label to the pin.

**DISTRIBUTION.**—Presently known from Brazil, French Guiana, Guyana, Peru, and Venezuela (Figure 261).

**SPECIMENS EXAMINED** (in addition to type).—**BRAZIL:** MATO GROSSO: Oct 1974, M. Alvarenga, 10 ♂, 26 ♀ (CNC). PARA: Caninde, Río Gurupi, at light, 8 Jun 1963, B. Malkin, 1 ♀ (FMNH). SAO PAULO: Piracicaba, 12 Feb 1966, C.A. Triplehorn, 1 ♀ (USNM).

**FRENCH GUIANA:** Rivière Lunier, F. Geay 1899, 1 ♂ (also labeled "Type, Helmis discreta Grouv.") (MNHN).

**GUYANA:** Kartabo Point, at blacklight in secondary forest near river shore, 22 Dec 1982, W.E. Steiner, 1 ♂ (USNM); Kartabo Point, 1 Jan 1983, W.E. Steiner, 1 ♂ (USNM); Skull Point, 24 Dec 1982, W.E. Steiner, 5 ♀, 12 ♂ (USNM); Takutu Lumber Camp, Takutu Mts., 6°25'N, 59°0'W, 30 Dec 1982, Steiner, Lowry, Williams, 1 ♀ (USNM); Takutu Mountains, collected at blacklight in forest clearing near stream, 6°15'N, 59°5'W, 12 Dec 1982, P.J. Spangler, W.E. Steiner, Earthwatch Research Expedition, 2 ♂, 2 ♀ (USNM); Takutu Mountains, 6°15'N, 59°5'W, collected at blacklight in forest clearing near stream, 17 Dec 1982, P.J. Spangler, W.E. Steiner, Earthwatch Research Expedition, 3 ♂ (USNM); Takutu Mountains, 6°15'N, 59°5'W, collected at blacklight in forest, 18 Dec 1982, P.J.

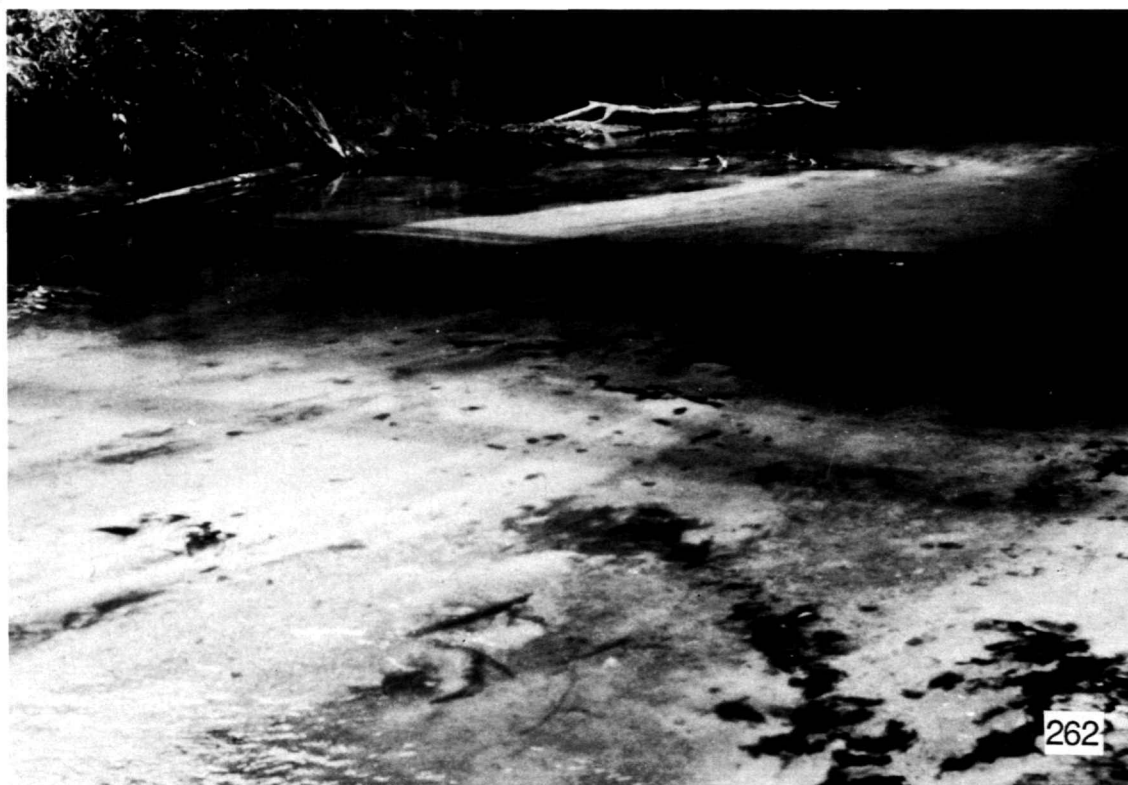


FIGURE 262.—*Stenelmoides strictifrons* Grouvelle, biotope: Río Paria Chico, 29 km south of Puerto Ayacucho, T.F.A., Venezuela.

Spangler, W.E. Steiner, Earthwatch Research Expedition, 2 ♂ (USNM); Takutu Mountains, 6°15'N, 59°5'W, collected at blacklight in forest clearing near stream, 19 Dec 1982, P.J. Spangler, W.E. Steiner, Earthwatch Research Expedition, 1 ♀ (USNM).

PERU: MADRE DE DIOS: Puerto Maldonado (30 km SW), Río Tambopata Reserve, 290 m, subtropical moist forest, 2–5 Sep 1979, J.B. Heppner, 2 ♀ (USNM).

VENEZUELA: BOLIVAR: Las Cocuizas (5 km N), 2 Nov 1982, collected in blacklight trap, J.L. Hellman, 2 ♂, 4 ♀ (USNM). TERRITORIO FEDERAL AMAZONAS: Cerro de la Neblina, basecamp, 0°50'N, 66°10'W, 140 m, blacklight on bank of Río Baria, 6 Feb 1985, W.E. Steiner, 1 ♂ (USNM); Cerro de la Neblina, basecamp, 0°50'N, 66°10'W, 140 m, netted along margin of Río Baria, 20 Feb 1985, P.J. and P.M. Spangler, R.A. Faitoute, W.E. Steiner, 1 ♂ (USNM); Cerro de la Neblina, basecamp, 0°50'N, 66°10'W, 140 m, along small whitewater stream, pools with dead leaves and sticks, 17 Feb 1985, P.J. and P.M. Spangler, R.A. Faitoute, W.E. Steiner, 1 ♀ (USNM); Culebra N. Duida, 7–16 Apr 1950, J. Maldonado Capriles, 1 ♂ (USNM); Culebra N. Duida, 1–4 Jul 1950, J. Maldonado Capriles, 1 ♀ (USNM); Julian, Upper Cunucunuma, 27 May 1950, J. Maldonado Capriles, 5 ♂, 4 ♀ (USNM); Upper

Cunucunuma, 27 May 1950, Maldonado C., Venezuela Expedition, 1 ♂ (USNM); Puerto Ayacucho (29 km S), Río Paria Chico, 20 Feb 1986, P.J. Spangler and W. Sanchez, 2 ♂, 3 ♀ (USNM); same data except: 17 Nov 1987, P.J. Spangler and R.A. Faitoute, 1 ♀ (USNM); Puerto Ayacucho (37 km SE), Río Gavilán, 20 Feb 1986, P.J. Spangler and W. Sanchez, 4 ♂, 2 ♀ (USNM).

HABITAT.—Although most specimens of *S. strictifrons* were collected at blacklights operated along stream banks, some were seined or netted from streams.

At Cerro de la Neblina, Venezuela, specimens were collected from two streams, the blackwater stream Río Baria and an unnamed small whitewater tributary feeding the Río Baria.

In both streams the substrate was sandy, gravelly, and rocky and the Río Baria site is described under *S. grandis*. The whitewater stream was about 8 meters wide and averaged about 0.3 meter deep. It was shaded most of the day by the adjacent forest but some stretches were exposed to sunlight for a short time when the sun was directly overhead. The water chemistry of this whitewater stream and the aquatic insects collected and associated with this species are given under the habitat data for *Stenelmoides mimicus*.

In contrast to the Río Baria, snails were fairly abundant in the whitewater stream suggesting that: (1) calcium was more abundant in this water; (2) the water was perhaps much less subject to flash flooding with less scouring effect on the fauna; (3) possibly, fewer mollusk-eating predators were present in

the smaller stream.

A few specimens were collected in the Río Paria Chico (Figure 262), 29 km south of Puerto Ayacucho, in leaf packs lodged against woody debris partially imbedded in the sandy substrate.

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