

**New and little known geophilomorph centipedes from Amazonian  
inundation forests near Manaus, Brazil  
(Chilopoda: Geophilomorpha)**

by

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**Abstract**

A new genus is proposed within the family Geophilidae: *Hyphydrophilus* n. gen., for *H. adisi* n.sp. Four additional new species are described, i.e. the ballophilids *Ityphilus crabilli* n.sp. and *Taeniolinum arborum* n.sp. and the schendylids *Pectiniunguis ascendens* n.sp. and *Schendylurus amazonicus* n.sp. The geophilid species *Ribautia centralis* (SILVESTRI, 1907) is redescribed, after material from Brazil compared with the holotype. The ballophilid *Thalthybius perrieri* BRÖLEMANN, 1909 is transferred to the genus *Ityphilus* COOK, 1889 and a lectotype is designated here for it.

**Keywords:** Amazon, Neotropics, inundation forest, Chilopoda, Geophilomorpha.

**Resumo**

É sugerido um novo gênero para *H. adisi* n.sp. na família Geophilidae: *Hyphydrophilus* n. gen. Quatro espécies adicionais são descritas: os ballophilídeos *Ityphilus crabilli* n.sp. e *Taeniolinum arborum* n.sp. e os schendylídeos *Pectiniunguis ascendens* n.sp. e *Schendylurus amazonicus* n.sp. O geophilídeo *Ribautia centralis* (SILVESTRI, 1907) é redescrito, baseado em material do Brasil comparado com o holótipo. O ballophilídeo *Thalthybius perrieri* BRÖLEMANN, 1909 é transferido para o gênero *Ityphilus* COOK, 1889, sendo designado lectótipo.

## Introduction

Several thousand specimens of geophilomorph centipedes have been collected by PD Dr. Joachim ADIS, of the Tropical Ecology Working Group at the Max-Planck-Institute for Limnology (MPI) in Plön/Germany, during his investigations on the fauna of inundation forests near Manaus/Brazil. Thanks to Dr. ADIS' courtesy, we have been able to study these specimens, which can be referred to six species, five of which, new to science, are being described. In addition, we provide a complementary description for the sixth species, *Ribautia centralis* (SILVESTRI, 1907), as well as some taxonomic information about *Ityphilus perrieri* (BRÖLEMANN, 1909), a little known Neotropical ballophilid with close affinities to one of the new species.

Ecology and life history of the species, as documented through the very careful collections of Dr. ADIS, are dealt with in a forthcoming paper by ADIS, BARBIERI & MINELLI.

All materials have been collected in a blackwater inundation forest (igapó) situated along the lower course of Tarumã Mirim River, about 20 km upstream from Manaus. Most specimens (98 %) have been sampled on trunks by means of arboreal photo-electors (BE) (FUNKE 1971; ADIS 1981); the remaining 2 % was found on the forest floor and collected by means of emergence traps (E), pitfall traps (BoF) and soil extraction (K).

A detailed description of the collecting area and a general discussion of the biology of terrestrial arthropods in this very peculiar environment are to be found in several papers by ADIS and co-workers (e.g. ADIS 1981, 1992a, b).

## Material

Holotypes, allotypes and the bulk of paratypes of new species, as well as most non-types, have been deposited in the collection of the Instituto Nacional de Pesquisas da Amazônia, Manaus (INPA), while some paratypes and duplicates have been housed in the collections of the Museum of La Plata (MLP), Dr. A. MINELLI, Padova (AM) and Dr. J. ADIS, Plön (JA), as indicated thereafter.

The following abbreviations are used throughout the text and in the figure legends: a.a. = antennal article(s); d. = dorsal; l. = left; r. = right; v. = ventral.

## Descriptions

### Family Ballophilidae

Genus *Ityphilus* COOK, 1899

Diagnosis. - Antennae conspicuously clavate. Central arc of labrum membranous, without teeth or with minute hairlike structures. Forcipular coxosternum with complete or virtually complete sclerotic lines; medial edge of tarsungulum unarmed to conspicuously serrate. Ventral pore fields transversally elliptical or subcircular. Coxopleura of the last legbearing segment each with two internal coxal organs of simple structure ("homogeneous coxal glands" sensu BRÖLEMANN & RIBAUT, 1912). Last pair of legs with seven podomeres, praetarsus in form of a setiform, proximally tubercle-like structure.

*Ityphilus crabilli* n.sp. (Figs. 1-28)

Diagnosis. - An *Ityphilus* species with pore fields present from the second to the penultimate sternum. Of the remaining species of the genus, those closest to *I. crabilli* n.sp. seem to be *I. guianensis* CHAMBERLIN, 1921 and *Ityphilus perrieri* (BRÖLEMANN, 1909). The new species can be differentiated from the first by means of the following characters (the corresponding ones in *I. guianensis* are given in parentheses): forcipular tarsungulum serrate at the basal half of the internal edge (serrate along the basal third of the internal edge); first sternum without pore fields (with pore fields); anterior and posterior coxal organs similar in size (posterior coxal organs considerably larger than the anterior ones). From *I. perrieri* it can be differentiated by means of the following characters (the corresponding ones in *I. perrieri* are given in parentheses): 53 pairs of legs, ♀ (61 pairs of legs, ♂); pore fields subcircular in form (transversally subovoidal); forcipular tarsungulum with ca. 11 short teeth, as in Fig. 17 (with ca. 6 well developed teeth, Fig. 29); coxal organs poorly developed, Fig. 26 (coxal organs very developed); labrum with 5+5 very small lateral teeth (apparently, labrum without lateral teeth).

The differential characters listed in the previous lines are reasonably stable in ballophilids, thus giving us confidence in describing the new species on the basis of a single specimen.

Type material. - Holotype ♀, with 53 pairs of legs, body length 21 mm. Brazil: Amazonas: Rio Tarumã Mirim, igapô, BE. 4.8.76, J. ADIS legit.

Depository of type. - INPA.

### Description

Female holotype. - 53 pairs of legs, body length 21 mm, maximum body width 0.7 mm. Colour of preserved specimen yellowish.

Antennae ca. 2.2 times longer than the cephalic plate, distally conspicuously clavate. The enlarged subcylindrical distal portion embraces a.a. IX to XIV of which a.a. IX is transitional being narrow at base and strongly widening distad. Articles, the last one excepted, all wider than long. Ventral chaetotaxy: setae on a.a. I-VIII of different lengths and few in number, those of remaining antennomeres much shorter and very numerous (Fig. 1); dorsal chaetotaxy: setae on a.a. I-VIII, similar to those on v. side, setae on a.a. IX-XIV bigger and much less numerous than those on v. side (Fig. 2). Terminal a.a. with ca. 10-20 claviform sensory setae on the external border and 3 on the internal border (Fig. 3). Distal end of this a.a. with ca. 6-8 very small hyaline specialized setae which have two very small apical branches at both sides of their apex (Fig. 3). Ventral surfae of a.a. II and V and d. surface of a.a. V, IX and XIII with very small specialized setae; those on the ventral side are restricted to an internal apical area and are very similar to those of the apex of the terminal article. A.a. II bears 2 setae, a.a. V 1 or 2 (Fig. 4) and each of a.a. IX and XIII bears 1 seta. Specialized setae on d. side are represented by two types: *a* and *b*. Type *a* setae are very similar to the setae at the apex of the terminal a.a. (also found on v. side); type *b* are "spine-like" (or "claviform like"), much bigger and much darker (ochraceous) in colour (Fig. 7). Type *a* setae occupy the external apical area of the specified a.a., whereas type *b* setae are more widely distributed on the surface of the antennomeres. A.a. II without any type *a* or type *b* setae; a.a. V with 1 type *a* and 10 type *b* setae; a.a. IX with 1 or 2 type *a* and 8 or 10 type *b* setae and a.a. XIII with 2 or 3 type *a* and 4 or 5 type *b* setae (Figs. 5-7).

Cephalic plate slightly wider than long (ratio 1.1:1), shape and chaetotaxy as in Fig. 8.

Clypeus with 13 setae placed near the anterior margin of head, praelabral setae absent (Figs. 9-10).

Labrum without teeth on the central arc, lateral pieces with 5+5 very small teeth (Fig. 11).

Mandible: dentate lamellae apparently not subdivided into blocks, with 11 teeth (Fig. 12); pectinate lamellae with ca. 30 hyaline teeth.

First maxillae with palps on both coxosternum and telopodite, those of coxosternum rudimentary.

Coxosternum without setae, median projections of coxosternum well developed, subtriangular and provided with 1+1 setae. Article II of telopodite with 1+1 d. sensilla (Figs. 13-14).

Second maxillae with 6+8 setae on coxosternum arranged as in Fig. 13. Apical claw of telopodite well developed, bipectinate, the d. edge with ca. 9-15 teeth (Fig. 15) and the ventral with ca. 6-9 teeth.

Forcipulae: when closed, telopodites do not extend beyond the anterior margin of the head; basal plate with ca. 30 setae dispersed on almost the whole surface. Coxosternum with subcondylic sclerotic lines. All articles of telopodites lack teeth. Ungulum with internal edge serrate along the basal half (Fig. 17). Calyx of poison gland subcircular (Fig. 17); chaetotaxy of coxosternum and telopodites as in Fig. 16.

Legs (last pair excepted) with chaetotaxy uniform throughout the body length (Fig. 18). Claws ventrobasally with three very small spines, their placement and relative size as in Fig. 19.

Sterna: pore fields present from the second to the penultimate sternum, all fields undivided and placed on a subcircular raised prominence. Form and relative size of fields changing along the trunk as in Figs. 20-25. Number of pores on selected sterna: on sternum II, 40 pores; on VII, 87; on XVII, 113; on XXXVII, 37; on L, 47; on LII, 40.

Last leg-bearing segment with pleurites at the sides of praetergum. Praesternum apparently divided along the sagittal plane; form and chaetotaxy of sternum and tergum as in Figs. 26-27. Coxopleura with numerous setae on v. side, the remaining surface with few setae. Two single ("homogeneous") coxal organs on each coxopleuron opening on the membrane between coxopleuron and sternum, with pores covered by the latter (Fig. 26). Last legs with seven podomeres, strongly thickened, subconically narrowing from the base to the distal end; form and chaetotaxy as in Figs. 26-27. Praetarsus represented by a long, straight, setiform structure (Fig. 28).

Terminal segments: intermediate tergum with posterior margin strongly convex, intermediate sternum with posterior margin slightly concave; first genital sternum with posterior margin medially concave. Gonopods uniaarticulate (Figs. 26-27).

Male. - Unknown.

Etymology. - The species is named in the memory of our deceased colleague Ralph Edwin CRABILL (1925-1992), to acknowledge his outstanding and lasting contribution to the knowledge of world Geophilomorpha.

*Ityphilus perrieri* (BRÖLEMANN, 1909) comb. nov. (Fig. 29)

*Thalthybius* (*Prionothalthybius*) *Perrieri* (sic!) BRÖLEMANN, 1909a - Arch. Zool. exp. gén., sér. 5, 3: 334 (without description!).

*Thalthybius* (*Prionothalthybius*) *Perrieri* (sic!) BRÖLEMANN, 1909b - Bull. Mus. Hist. Nat. Paris n° 7: 415.

*Thalthybius* (*Prionothalthybius*) *perrieri*, CHAMBERLIN, 1914 - Bull. Mus. Comp. Zool. Harvard Coll. 58(3): 153, 204.

*Thalthybius perrieri*, ATTEMS, 1929 - Das Tierreich 52: 105.

*Thalthybius* (*P.*) *perrieri*, BÜCHERL, 1941-1942a - Mem. Inst. Butantan, S. Paulo 15: 205.

*Thalthybius* (*P.*) *perrieri*, BÜCHERL, 1941-1942b - Mem. Inst. Butantan, S. Paulo 15: 352.

*Thalthybius perrieri*, VERHOEFF, 1941 - Beiträge zur Fauna Perus: 1: 70.

*Thalthybius* (*Prionothalthybius*) *perrieri*, KRAUS, 1957 - Senck. biol. 38(5/6): 367.

Type material examined. - Lectotype ♂ with 61 pairs of legs, body length 17 mm, maximum body width 0.6 mm. This specimen is preserved in alcohol, the head and mouth parts are dissected; the trunk is divided in two parts (6 leg-bearing segments are missing). Paralectotype (sex ?), also preserved in alcohol, with 63 pairs of legs, body length 18 mm, maximum body width 0.7 mm. Both specimens from

Brazil: Haut-Caravène, col. GEAY, 1897 (Muséum National d'Histoire Naturelle, Paris. Coll. Myriapodes M. 329).

Remarks. - Lectotype and paralectotype are designated here, due to the lack of designation of any type specimen by BROLEMANN in his original description.

The two specimens cited above are in poor state of preservation, almost all structures altered in form and nearly useless for a redescription. To complement the original description we can only give a detail of the teeth on the medial edge of the forcipular tarsungulum (Fig. 29).

#### Genus *Taeniolinum* POCOCK, 1893

Diagnosis. - Antennae not typically clavate, distal articles being slightly attenuate or progressively wider towards the distal end of the appendage. Central arc of labrum with well developed teeth. Forcipular coxosternum without or essentially without sclerotic lines; medial edge of tarsungulum not serrate. Ventral pore fields subovoidal to irregular in shape. Coxopleura of the last leg-bearing segment each with two internal coxal organs of simple structure ("homogeneous coxal glands" sensu BROLEMANN & RIBAUT, 1912). Last pair of legs with seven podomeres, praetarsus in form of a setiform, proximally tubercle-like structure.

#### *Taeniolinum arborum* n.sp. (Figs. 30-59)

Diagnosis. - A *Taeniolinum* species with antennae neither strongly (nor slightly) clavate (Figs. 30-31) and sternum I with ventral pore fields. Among the remaining species of the genus, *T. arborum* n.sp. seems to be more closely related to *T. setosum* POCOCK, 1893. The new species can be differentiated from the last one by means of the following characters (the corresponding ones in *T. setosum* are given in parentheses): labrum with 20 teeth (32 teeth); coxosternum of first maxillae with rudimentary but distinct palps ("apparently absent"); calyx of poison gland subcircular (subcordiform); ♂ with 43 pairs of legs (49); palps of telopodite of first maxillae as in Fig. 39 ("robust lappet equaling the medial lobe in length").

Type material. - Holotype ♀, with 45 pairs of legs, body length 13 mm, Brazil: Amazonas: Rio Taramã Mirim, igapó. BE, 7.7.1976. J. ADIS leg.; allotype ♂ with 43 pairs of legs, body length 10 mm, same locality, BE, 4.8.1976. J. ADIS leg.; 8 paratypes, all from the same locality, BE, and all collected by J. ADIS: 5 ♂♂, 7.7.1976; 1 ♀, 21.7.1976; 1 ♀, 4.8.1976; 1 ♂, 16.8.1976.

Depository of type. - INPA (holotype, allotype, 3 paratypes); MLP (2 paratypes); AM (2 paratypes); JA (1 paratype).

#### Description

Female holotype. - 45 pairs of legs, body length 13 mm, maximum body width 0.55 mm. Colour of preserved specimen yellowish.

Antennae ca. 1.6 times longer than the cephalic plate, distally slightly attenuate, not clavate. Ventral chaetotaxy: setae on a.a. I-V of different length and few in number; those of remaining antennomeres progressively shorter and more numerous towards the tip of the appendage (Fig. 30); dorsally the setae are less numerous and relatively bigger (Fig. 31). Terminal a.a. with ca. 5 claviform sensory setae on the external and 5 on the internal apical border (Fig. 32). Distal end of this a.a. with ca. 5 very small specialized setae ending in three small apical branches. Dorsal and v. surface of a.a. II, V, IX and XIII with very small specialized setae; those on v. side are restricted to an internal lateral area and are very similar to those of the apex of the terminal article. Each of a.a. II, V, IX and XIII have 1 seta (Fig. 33).

Specialized setae on dorsal side are restricted to an external latero-apical area and are represented by two types *a* and *b*. Type *a* setae are very similar to the setae at the apex of the terminal a.a. (also found on v. side); type *b* are much bigger, not apically divided, and are much darker (ochraceous) in colour (Fig. 34). A.a. II with 1 type *a* and 1 type *b* seta; a.a. V with 1 type *a* and 2-3 type *b* setae (Fig. 34); a.a. IX with 1 type *a* and 3 type *b* setae and a.a. XIII with 1 type *a* and 2-3 type *b* setae.

Cephalic plate approximately as long as wide, shape and chaetotaxy as in Fig. 35.

Clypeus with 1+1 postantennal setae and 2+2 median setae (Fig. 36).

Labrum with 12 teeth on the central arc, sidepieces with 3+5 teeth, each with a very sharp medial extension (Fig. 37).

Mandible: dentate lamella apparently not divided in blocks, with 5-6 teeth; pectinate lamellae with ca. 15 hyaline teeth.

First maxillae with palps on both coxosternum and telopodites (those of the coxosternum rudimentary). Coxosternum without setae, median projections of coxosternum subtriangular, well developed and provided with 1+1 setae. Article II of telopodite with 1+1 v. setae and 2+2 d. sensilla (Figs. 38-39).

Second maxillae with coxosternum apparently divided and with 4+3 setae arranged as in Fig. 38. Apical claw of telopodite well developed and bipectinate, the d. edge with ca. 10 teeth (Fig. 40) and the v. with ca. 8 teeth.

Forcipulae: when closed, the telopodites do not extend beyond the anterior margin of the head; basal plate with an irregular transverse median row of 12 large setae. All articles of the telopodites lack teeth. Calyx of poison gland subcylindrical (Fig. 41); chaetotaxy of coxosternum and telopodites as in Fig. 42.

Legs (last pair excepted) with chaetotaxy uniform throughout the body length (Fig. 43). Claws ventrobasally with two spines, one anterior one posterior; a third spine, smaller in size, occurs basally, very close to the posterior one (Fig. 44).

Sterna: pore fields present from the first to the penultimate sternum. Pores distributed in irregular areas near the posterior border of the sterna, the shape of the fields changing along the trunk as in Figs. 45-51. Number of pores on selected sterna: on sternum I, 6 pores; on II, 14; on VIII, 16; on XV, 18; on XXVI, 20; on XLIII, 9; on XLIV, 10.

Last leg-bearing segment with pleurites at the sides of praetergum. Praesternum not divided along the sagittal plane; form and chaetotaxy of sternum and tergum as in Figs. 52-53. Coxopleura slightly prominent at their distal v. ends. Two single ("homogeneous") coxal organs on each coxopleuron, opening on the membrane between coxopleuron and sternum, with pores covered by the latter. Posterior coxal organs a little bigger than the anterior ones (Fig. 55). Last legs with seven podomeres, strongly thickened, subconically narrowing from base to distal end, form and chaetotaxy as in Figs. 52-53. Praetarsus represented by a long, straight, setiform structure (Fig. 56).

Terminal segments: intermediate tergum with posterior margin convex; intermediate sternum with posterior margin slightly concave; first genital sternum with posterior margin convex. Gonopods uniaarticulate (Fig. 52).

Male allotype. - 43 pairs of legs, body length 10 mm, maximum body width 0.45 mm.

All features similar to those in the female except for the last leg-bearing segment and terminal segments.

Last leg-bearing segment: form and chaetotaxy of sternum and tergum as in Figs. 57-58. Coxopleura slightly protruding at their distal v. ends. Posterior coxal organs much bigger than the anterior ones (Fig. 59), more distinctly than in the female holotype.

Terminal segments: intermediate tergum with posterior border strongly convex; intermediate sternum with posterior border slightly convex; first genital sternum with posterior border convex (Figs. 57-58). Gonopods apparently uniaarticulate, with 3 setae; penis apparently without apico-dorsal setae.

Variation. - The small series is uniform in the number of leg-pairs, i.e. 43 in all seven males and 45 in all three females we have examined.

Etymology. - The name of this species refers to the fact, that all known specimens have been collected on trees, rather than in the soil.

## Family Geophilidae

### *Hyphydrophilus*, n.gen.

Diagnosis. - First maxillae without coxosternal palps, those of telopodites present but rudimentary; second maxillae with coxosternites separated by a non-sclerotized isthmus, antero-internal corners of coxosternum without any process, prominent statumina with concursive sutures, all telopodite articles without a distoectal process. Forcipulac: pleurocoxosternal sutures as in the enclosed Figure 71, chitinous lines nearly complete but not very evident; ventral pore fields present; each coxopleuron with two large "homogeneous" coxal organs (similar to those of *Schendylurus*). Ultimate leg with two tarsal articles; praetarsus claw-like and well developed. This genus is related to *Ribautia* BRÖLEMANN, 1909, *Schizoribautia* BRÖLEMANN, 1912, *Proschizotaenia* SILVESTRI, 1907, *Schizonampa* CHAMBERLIN, 1914, *Watophilus* CHAMBERLIN, 1912 and *Alloschizotaenia* BRÖLEMANN, 1909, but differs from all of them because of the unique combination of the above mentioned diagnostic features.

Type species. - *Hyphydrophilus adisi* n.sp.

Etymology. - This generic name (masculine) means a "Geophilus" tolerating submersion.

### *Hyphydrophilus adisi*, n.sp., (Figs. 60-91)

Type material. - Holotype ♀ with 43 pairs of legs, body length 16 mm; allotype ♂ with 41 pairs of legs, body length 14 mm; paratype A (♀) with 43 pairs of legs, body length 11 mm; paratype B (♀) with 43 pairs of legs, body length 12 mm; paratype C (♀) with 43 pairs of legs, body length 19 mm; paratype D (♀) with 43 pairs of legs, body length 13 mm; paratype E (♂) with 41 pairs of legs, body length 12 mm; paratype F (♂) with 41 pairs of legs, body length 14 mm; paratype G (♂) with 41 pairs of legs, body length 14 mm; paratype H (♂) with 41 pairs of legs, body length 13 mm and paratype I (♂) with 41 pairs of legs, body length 12 mm. All of them from Brazil: Amazonas: Rio Tarumã Mirim, igapó, BE, 11.90, J. ADIS legit.

Other material examined. - 21 ♀♀ with 43 pairs of legs, body length 7, 10, 11, 12, 12, 12, 12, 13, 13, 13, 13, 13, 13, 13, 13, 14, 14, 15, 15 and 16 mm respectively; 19 ♂♂ with 41 pairs of legs, body length 11, 11, 11, 12, 12, 13, 13, 13, 13, 13, 13, 14, 14, 14, 14, 14, 14, 14 and 15 mm: all of them with the same data as the type series. In addition, we have seen many more specimens from the same locality but collected on different dates. Most specimens have been collected by means of arboreal photo electors (BE), the exceptions being 1 ♀ collected by emergence traps (E) on 13.5.1983 and the following specimens collected by soil extraction (K): 30.9.1981, 1 juv.; 28.10.1981, 3 juv.; 30.11.1981, 3 juv.; 17.12.1981, 1 ♂, 2 ♀♀, 6 juv.; 1.2.1982, 1 ♀, 14 juv.; 3.3.1982, 2 ♀♀, 19 juv.

Overall, the material we have examined includes 676 ♀♀ with 43 pairs of legs and 3 ♀♀ with 41 pairs of legs; 1 ♂ with 39 pairs of legs, 550 ♂♂ with 41 pairs of legs and 3 ♂♂ with 43 pairs of legs. The largest male is 16 mm long, the largest female 18 mm.

Depository of type. - INPA (holotype, allotype, paratypes A, B); MLP (paratypes C, D, E), AM (paratypes F, G), JA (paratypes H, I). Non-type specimens also housed in the same collections.

## Description

Female holotype. - 43 pairs of legs, body length 16 mm, maximum body width 0.6 mm. Colour (of preserved specimen in alcohol) yellowish, with forcipular segment darker (pale ochraceous).

Antennae ca. 2.9 times longer than the cephalic plate, distally attenuate, all articles longer than wide. Setae on a.a. I-VIII of different lengths and few in number; those of remaining a.a. progressively shorter and more numerous towards the tip of the appendage (Figs. 60-61). Terminal a.a. with ca. 7 claviform sensory setae on the external and internal border. Distal end of this a.a. with ca. 4 very small specialized setae apparently not divided apically. Dorsal and v. surface of a.a. II, V, IX and XIII with very small specialized setae, which on the v. side are restricted to an internal latero-apical area. Each of a.a. II, V, IX and XIII with 1 of these setae. Similar specialized setae are also present on the d. side, where they are restricted to an external latero-apical area. Each of a.a. II, V, IX and XIII with 1 of these setae.

Cephalic plate nearly subrectangular, distinctly longer than wide (ratio 1.48: 1), shape and chaetotaxy as in Fig. 62.

Clypeus with 4 anteromedial setae placed on a subcircular clypeal area and 2+2 setae on the middle (Fig. 63). Surface of clypeal area represented by areolations much smaller than on the rest of the clypeal surface (Fig. 64).

Labrum: midpiece large, separating sidepieces and not overlapped by them, with 8 robust, dark and sharply pointed teeth. Sidepieces with 11+11 long hyaline filaments (Fig. 65).

Mandible: shape as in Figs. 66-67, pectinate lamellae with 15 hyaline teeth.

First maxillae without palps on coxosternum; telopodites with a very small palp. Coxosternum without setae, median projections of coxosternum well developed and provided with 2+2 big setae and 1+1 small ones. Article II of telopodite with 2+2 v. setae and 1+2 d. sensilla (Figs. 68-70).

Second maxillae: coxosterna medially joined by a non-areolate membranous isthmus with 6+6 setae near the anterointernal margins and 2+3 smaller setae near the lateral ones (Fig. 68). Apical claw of telopodite without teeth but very well developed, longer than the supporting article (Fig. 70).

Forcipulae: when closed, telopodites reach the level of the anterior margin of the head or slightly project beyond; basal plate with an irregular transverse median row of 8 large setae and a few additional smaller ones. Telopodites: trochanteroprefemur with two unpigmented but well distinct denticles. Femur and tibia with poorly developed unpigmented denticles. Tarsungulum basally with a conspicuous, deeply pigmented denticle. Calyx of poison gland subcircular (Fig. 72); chaetotaxy of coxosternum and telopodites as in Fig. 71.

Legs (last pair excepted) with chaetotaxy (Fig. 73) uniform throughout the body length. Claws ventrobasally with one anterior and one posterior spine (Fig. 74).

Sterna: pore fields present from the first to the penultimate sternum. On sterna I to XIV the fields are undivided; on sterna XV to XLII the fields are divided in two subsymmetrical areas. Form of fields changing along the trunk as in Figs. 75-84. Number of pores on selected sterna: on sternum I, 4 pores; on V, 30; on IX, 30; on XIV, 29; on XV, 8+10; on XXVI, 4+4; on XXXI, 4+4; on XXXVII, 4+4; on LX, 8+6; on LXII, 6+4.

Last leg-bearing segment without pleurites at the sides of praetergum. Praesternum slightly divided along the sagittal plane: form and chaetotaxy of sternum and tergum as in Figs. 85-86. Coxopleura protruding at their distal v. ends, setae small and numerous on distal internal edge, the remaining surface with few bigger setae. Two single ("homogeneous") coxal organs on each coxopleuron (similar to those of *Schendylurus*), opening on membrane between coxopleuron and sternum, with pores covered by the latter (Figs. 85, 87). Last legs with seven podomeres, form and chaetotaxy as in Figs. 85-86. Praetarsus unguiform and relatively smaller than those of the preceding leg pairs.

Terminal segments: intermediate tergum with posterior margin convex, intermediate sternum not visible (covered by sternum of last leg-bearing segment?), first genital sternum with posterior border



slightly convex. Gonopods very poorly developed and uniarticulate (Fig. 85). Anal organs present.

Male allotype. - 41 pairs of legs, body length 15 mm, maximum body width 0.6 mm.

All features similar to those in the female except for the shape and chaetotaxy of last leg-bearing segment and terminal segments.

Last leg-bearing segment: form and chaetotaxy of sternum and tergum as in Figs. 88 and 89.

Coxopleura slightly protruding at their distal v. ends, setae small and numerous on distal v. half, the remaining surface with few setae of different lengths. Podomeres of terminal legs moderately inflated with shape and chaetotaxy as in Figs. 88-89.

Terminal segments: intermediate tergum with posterior margin convex; intermediate sternum with posterior margin slightly concave; first genital sternum with posterior margin concave. Gonopods biarticulate, provided with ca. 5 setae on the basal and 5 on the distal articles (Fig. 91), penis dorsally with 4+4 apical setae. Anal pores present.

Variation. - In some cases the pore field of the penultimate leg-bearing segment is double (holotype; paratypes *A, C, E, F, G, H, I* and other additional specimens). In other cases, it is undivided (allotype, paratypes *B, D* and other additional specimens). For variation in the number of pairs of legs, see above (materials).

#### Genus *Ribautia* BRÖLEMANN, 1909

Diagnosis. - Coxosternites of the second maxillae united by a small bridge only, antero-internal corners of coxosternum with a well developed process. Forcipulae: pleurocoxosternal sutures extend obliquely beyond to the outer margin, chitinous lines present. Coxopleura of the last leg-bearing segment each with numerous coxal organs opening separately or joined in one to three clusters. Praetarsus of last legs claw-like or lacking.

Remarks. - For a commentary about the relationships between *Ribautia* and related genera, see DEMANGE (1968: 288-291). In its current circumscription, this genus is probably not monophyletic. A careful revision of all the numerous species currently included in *Ribautia* and related genera will be indispensable as a preliminary step towards a sound taxonomic understanding of this section within the family Geophilidae.

#### *Ribautia centralis* (SILVESTRI, 1907) (Figs. 92-119)

*Eurytion centralis* SILVESTRI, 1907 - Mitt. nat. Mus. Hamburg 24: 256.

*Polygonarea centralis*, ATTEMS, 1909 - Denk. Ges. Jena 14: 25.

*Ribautia centralis*, RIBAUT, 1912 - Mém. Soc. Neuchâtel. 5: 84.

*Ribautia centralis*, RIBAUT, 1923 - N. Caledonia, Zool. 3 (Lief. 1): 72.

*Ribautia centralis*, ATTEMS, 1928 - Ann. S. Afr. Mus. 26: 173.

*Ribautia centralis*, ATTEMS, 1929 - Das Tierreich 52: 293.

*Ribautia centralis*, ATTEMS, 1937 - Rev. Zool. Bot. Afr. 29(3): 323.

*Ribautia centralis*, CHAMBERLIN, 1955-1956 - Acta. Univ. Lund Avd. 2 N.S. 51(5): 17.

*Schizoribautia centralis*, CHAMBERLIN, 1957 - Proc. Biol. Soc. Wash. 70: 27.

Diagnosis. - A *Ribautia* species with coxal organs grouped in 3+3 clusters and ventral pores present on both anterior and posterior sterna. Among the Neotropical species of the genus which share these traits it can be distinguished by the large number of pairs of legs (63 to 67); the large body length (up to 64 mm) and the well developed mid part of the labrum (Fig. 98).

Type material examined. - Holotype ♀ with 65 pairs of legs; body length 46 mm. Colombia:

Inirida, 25.XI.1898, Prof. O. SCHNEIDER legit. This specimen is preserved in alcohol. The trunk is fragmented in three parts: forcipulae followed by the first 11 leg-bearing segments; 6 last leg-bearing segments, with terminal segments, and remaining 48 leg-bearing segments. The head is dissected as well as the mouth parts. First and second left maxillae are missing, a label telling the following is present: "N.B. when found, 1/2 of maxillae missing. In poor condition, det. R.E. CRABILL 29.VII.1964" (Zoologisches Institut und Zoologisches Museum, Hamburg). We agree on these comments of the late R.E. CRABILL about the poor conditions of this specimen. Therefore, we provide in the following lines a supplementary description, based on new materials from Dr. ADIS' collections.

Other material examined. - 1 ♀ with 65 pairs of legs, body length 64 mm (specimen A); 10 ♀♀ with 65 pairs of legs, body length 36, 40, 42, 45, 46, 47, 51, 52, 52 and 55 mm; 1 ♂ with 63 pairs of legs, body length 41 mm (specimen B); 1 ♂ with 63 pairs of legs, body length 42 mm (specimen C); 1 ♂ with 63 pairs of legs, body length 51 mm (specimen D); 1 ♂ with 65 pairs of legs, body length 45 mm (specimen E); 1 ♂ with 65 pairs of legs, body length 46 mm (specimen F); 4 ♂♂ with 63 pairs of legs, body length 40, 40, 45 and 49 mm; 3 ♂♂ with 65 pairs of legs, body length 41, 45 and 46 mm: all these specimens are from Brazil: Amazonas: Rio Tarumã Mirim, igapó, BE, 16.9.76, J. ADIS legit. In addition, we have examined many more specimens from the same locality, but collected on different dates. Most specimens have been collected by arboreal photo-electors, the exceptions being 1 ♀ collected on 12.5.1983 by emergence traps (E) and 1 juv. on 1.2.1982 by soil extraction. Overall, there are 26 ♀♀ with 63 pairs of legs, 335 ♀♀ with 65 pairs of legs and 67 ♀♀ with 67 pairs of legs; and 137 ♂♂ with 63 pairs of legs, 225 ♂♂ with 65 pairs of legs and 5 ♂♂ with 67 pairs of legs. Specimens A, B, C, D, E and F are housed in INPA, the remaining of this non-type material has been divided into 4 sets, respectively housed in INPA, MLP, AM, JA.

Type locality. - Colombia, Inirida.

Known range. - Colombia, Inirida; Brazil: Amazonas: Rio Tarumã Mirim.

Description, based on female specimen A cited above - 65 pairs of legs, body length 64 mm, maximum body width 2 mm. Colour (of preserved specimen in alcohol) pale orange, anterior part of the body darker.

Antennae ca. 3.5 times longer than the cephalic plate, distally attenuate, all articles longer than wide. Setae on a.a. I-V of different lengths and few in number; those of remaining antennomeres progressively shorter and more numerous towards the tip of the appendage (Figs. 92-93). Terminal a.a. with ca. 20-25 claviform sensory setae on the external border and ca. 10-15 on the internal border. Distal end of this a.a. with ca. 7 very small specialized setae apparently not divided apically. Dorsal and v. surface of a.a. II, V, IX and XIII with very small specialized setae which on the v. side are restricted to an internal latero-apical area and are represented by two different types: *a* and *b*. Type *a* setae are very thin and not divided apically, type *b* setae are thicker and very similar to those on the distal end of the terminal a.a. (*a*, *b*, Fig. 94). A.a. II with 2 type *b* setae; a.a. V with 1 type *a* seta and 1-2 type *b* setae; a.a. IX with 1 type *a* seta and 2-3 type *b* setae and a.a. XIII with 1 type *a* and 3 type *b* setae. On the dorsal side the specialized setae are restricted to an external lateroapical area and are represented by three different types: *a* and *b*, similar to type *a* and *b* of v. side, type *c* setae similar to type *b* but a little smaller and showing basally, still within the a.a., a small dark semicircular-semiovoidal structure (Fig. 95). A.a. II with 3-4 type *b* setae; a.a. V with 3 type *b* setae; a.a. IX with 1 type *a*, 6 type *b* and 2-3 type *c* setae and a.a. XIII with 1 type *a*, 7-8 type *b* and 3-5 type *c* setae (Fig. 95).

Cephalic plate nearly rectangular but sides curved, distinctly longer than wide (ratio 1.42:1), shape and chaetotaxy as in Fig. 96.

Clypeus with 4 antero-central setae placed on a subcircular clypeal area and 4 bigger setae on the posterocentral part of the anterior half (Fig. 97). Surface of clypeal area represented by minute sclerotic fragments.

Labrum: midpiece large, separating the sidepieces and slightly overlapped by them, with 17 hyaline

teeth, the more central ones shorter than the lateral ones. Sidepieces with 17+17 hyaline filaments (Fig. 98).

Mandible: pectinate lamellae with ca. 27 hyaline teeth, shape of apical part as in Fig. 99.

First maxillae without palps on coxosternum; telopodites with a small palp. Coxosternum without setae; median projections of coxosternum subtriangular, well developed and provided with 11+12 setae. Article II of telopodite with 11+10 v. setae and 7+10 d. sensilla (Figs. 100-101).

Second maxillae: the two coxites joined centrally only by a non-areolate membranous isthmus with 15+19 setae placed near the internal margins and 7+9 sensilla placed near the lateral margins (Fig. 100). Apical claw of telopodite small and without teeth.

Forcipulae: when closed, the telopodites are at the level of the anterior margin of the head or slightly beyond; basal plate with an irregular transverse row of 12 large setae near the posterior margin and a few additional smaller setae dispersed on the surface of the posterior half. Telopodites: trochanteroprefemur with two denticles, the distal one deeply pigmented and subtriangular, the proximal denticle shorter than the distal and unpigmented. Femur and tibia without denticles. Tarsungulum basally with a well developed and deeply pigmented denticle; ungular blade with dorsal and ventral edges not serrulate. Calyx of poison gland subtriangular (Fig. 103); chaetotaxy of coxosternum and telopodites as in Fig. 102.

Legs (last pair excepted) with chaetotaxy (Fig. 104) uniform throughout the body length. Claws ventrobasally with one anterior spine and two smaller posterior ones (Fig. 105).

Sterna: pore fields present from the second to the penultimate sternum. On sterna II to XXV and LV to LXIV the fields are undivided, on sterna XXVI to LIV the fields are divided in two sub-symmetrical areas. Form of fields changing along the trunk as in Figs. 106-112. Number of pores on selected sterna: on sternum II, 40 pores; on VI, 122; on XVI, 207; on XXI, 180; on XXVI, 70+69; on XXVII, 71+72; on LXIII, 175; on LXIV, 52.

Last leg-bearing segment without pleurites at the sides of praetergum. Praesternum divided along the sagittal plane; form and chaetotaxy of sternum and tergum as in Figs. 113-114. Coxopleura slightly protruding at their distal v. ends, setae small and numerous on the distal internal edge, the remaining surface with few bigger setae. Coxal organs arranged in 3+3 clusters, the anterior pore opens on the membrane between coxopleuron and praesternum, covered by the latter; middle and posterior pore open on the membrane between coxopleuron and sternum and are covered by the latter (similar to the condition in the male, Fig. 119). Last legs with seven podomeres, form and chaetotaxy as in Figs. 113-114. Praetarsus unguiform and relatively smaller than those of the other legs.

Terminal segments: intermediate tergum with posterior margin convex, intermediate sternum covered by the sternum of the last leg-bearing segment, first genital sternum with posterior margin straight to slightly concave. Gonopods uniaarticulate and very poorly developed (Fig. 114).

Male. - (description based on specimen *D* cited above) - 63 pairs of legs, body length 51 mm, maximum body width 1.8 mm.

All features similar to those in the female except for the shape and chaetotaxy of the last leg-bearing segment and the terminal segments.

Last leg-bearing segment: form and chaetotaxy of sternum and tergum as in Figs. 117 and 118. Coxopleura slightly protruding at their distal v. ends, setae small and numerous on the distal internal edge, the remaining surface with few setae of different lengths. Podomeres of terminal legs moderately inflated, with shape and chaetotaxy as in Figs. 117-118.

Terminal segments: intermediate tergum with posterior margin convex; intermediate sternum with posterior margin concave; first genital sternum with posterior margin concave. Gonopods apparently uniaarticulate (suture between presumptive basal and apical articles not evident), with ca. 10-12 setae (Fig. 117); penis dorsally with 4+4 apical setae. Anal organs present.

Variation. - In all specimens studied, the ventral pores are present along the whole trunk, beginning

with sternum II but there is variation at the level of penultimate sternum: in some specimens (holotype, specimens *A* and *B* described here, and some additional ones) a well developed pore field area is present on that sternum; in other specimens (*E*, etc.) only a small area is present, in still other specimens (*C* and others) only a very few pores are present and in many specimens (*B*, *F*, etc.) the pores are altogether absent. We have no doubt, however, about the conspecificity of all these specimens.

The number of pairs of legs varies in both sexes between 63 and 67, as already detailed (see above, materials).

## Family Schendylidae

Genus *Pectiniunguis* BOLLMAN, 1889

Diagnosis. - Pleurites of second maxillae not fused with the coxosternum; apical claw of second maxillae pectinate on both d. and v. edges. Sterna with pore fields. Last pair of legs with seven podomeres; praetarsus in form of a small pilose tubercle or replaced by a small spine or altogether absent; coxopleura of the last leg-bearing segment each with two internal coxal organs of compound structure ("heterogeneous coxal glands" sensu BRÖLEMANN & RIBAUT, 1912).

### *Pectiniunguis ascendens* n.sp. (Figs. 120-149)

Diagnosis. - A *Pectiniunguis* species with ventral pore fields on the anterior sterna only. Among the Neotropical species currently included in the genus *Pectiniunguis*, it seems more closely related to *P. gaigei* (CHAMBERLIN, 1921). *P. ascendens* can be differentiated from the last by means of the following characters (the corresponding ones in *P. gaigei* are given in parentheses): maximum body length 33 mm (45 mm); ♂ with 43 (usually) or 45 pairs of legs, ♀ with 43, 45 (usually) or 47 (♂ with 53, ♀ with 55 or 57); pore fields on the anterior half of the body only (along the whole body length).

Type material. - Holotype ♀ with 45 pairs of legs, body length 23 mm; allotype ♂ with 43 pairs of legs, body length 21 mm; paratype *A* (♀) with 45 pairs of legs, body length 33 mm; paratype *B* (♀) with 45 pairs of legs, body length 26 mm; paratype *C* (♀) with 45 pairs of legs, body length 27 mm; paratype *D* (♀) with 45 pairs of legs, body length 19 mm; paratype *E* (♀) with 45 pairs of legs, body length 22 mm; paratype *F* (♀) with 45 pairs of legs, body length 24 mm; paratype *G* (♀) with 45 pairs of legs, body length 25 mm; paratype *H* (♀) with 45 pairs of legs, body length 26 mm; paratype *I* (♂) with 43 pairs of legs, body length 23 mm; paratype *J* (♂) with 43 pairs of legs, body length 22 mm; paratype *K* (♂) with 43 pairs of legs, body length 27 mm; paratype *L* (♂) with 43 pairs of legs, body length 21 mm; paratype *M* (♂) with 43 pairs of legs, body length 22 mm; paratype *N* (♂) with 43 pairs of legs, body length 19 mm: all from Brazil: Amazonas: Rio Tarumã Mirim, igapó, BE, 16.9.76, J. ADIS legit.

Other material examined. - 28 ♀♀, all with 45 pairs of legs, body length 12, 15, 16, 16, 16, 17, 17, 18, 18, 18, 18, 18, 18, 18, 18, 19, 19, 20, 20, 20, 20, 20, 20, 21, 21, 22, 22, 22, 24 and 26 mm respectively; 28 ♂♂, all with 43 pairs of legs body length 13, 14, 14, 14, 15, 15, 15, 15, 15, 15, 15, 15, 16, 16, 16, 16, 17, 17, 17, 17, 17, 18, 18, 19, 19, 19, 20, 20 and 22 mm respectively: all of them with the same data as the type series. In addition, we have examined many more specimens from the same locality, but collected on different dates, most of them by arboreal photo-electors, the exceptions being as follows. Collected by emergence traps (E): 10.3.1977, 1 ♀; 24.3.1977, 1 ♂; 13.4.1977, 1 ♀; 13.8.1983, 1 ♀; by soil extraction (K): 30.9.1981, 1 juv.; 28.10.1981, 1 ♂; 30.11.1981, 2 juv.; 17.12.1981, 1 ♀ 2 juv.; 1.2.1982, 1 ♀ 2 juv.; 3.3.1982, 3 juv.; by pitfall traps (BoF): 2.2.1976, 1 ♀; 9.2.1976, 1 juv.

Altogether, we have seen 3 ♀♀ with 43 pairs of legs, 619 ♀♀ with 45 pairs of legs and 4 ♀♀

with 47 pairs of legs; and 553 ♂♂ with 43 pairs of legs and 5 ♂♂ with 45 pairs of legs.

Depository of type. - INPA (holotype, allotype, paratypes A, B, C, D), MLP (paratypes E, F, G, H), AM (paratypes J, K), JA (paratypes L, M, N). The same collections also house sets of non-type specimens.

### Description

Female holotype. - 45 pairs of legs, body length 23 mm, maximum body width 1 mm. Colour (of preserved specimen in alcohol) yellowish, with forcipular segment darker (pale ochraceous).

Antennae ca. 3.0 times longer than the cephalic plate, distally slightly attenuate, shape and chaetotaxy of articles as in Figs. 120-121. Terminal a.a. with ca. 20 claviform sensory setae on the external border and ca. 8 on the internal. Distal end of this a.a. with ca. 6-8 very small specialized setae ending in three very small apical branches (their size similar to that of the claviform setae). Dorsal and ventral surface of a.a. II, V, IX and XIII with very small specialized setae. On the v. side these setae are restricted to an internal latero-apical area and are similar to those of the apex of the terminal article, but a little thicker and with the two apical branches somewhat more evident. Each of a.a. II, V, IX and XIII has 1 seta (Fig. 122). Specialized setae on d. side are restricted to an external latero-apical area and are represented by two types: *a* and *b*. Type *a* setae are very similar to the specialized setae on the ventral side; type *b* setae are not divided apically and are much darker (ochraceous) in colour (Fig. 123). Each of a.a. II with 1 type *a* seta; a.a. V with 1 type *a* and 1-2 type *b* setae; a.a. IX with 1 type *a* and 3-4 type *b* setae and a.a. XIII with 1 type *a* and 4-5 type *b* setae (Fig. 123).

Cephalic plate slightly longer than wide (ratio 1.2: 1), shape and chaetotaxy as in Fig. 124.

Clypeus with 1+1 postantennal setae, 8+8 median setae and 1+1 praelabral setae (Fig. 125).

Labrum with 24 teeth, those of central arc robust, dark and round tipped, the lateral ones less sclerotized, each with a relatively long and very sharp medial extension (Fig. 126).

Mandible: dentate lamellae subdivided into three distinct blocks, with 3, 3, 2 and 4, 3, 2 teeth respectively (Fig. 127); pectinate lamellae with about 18 hyaline teeth.

First maxillae with well developed palps on both coxosternum and telopodite. Coxosternum with 3+2 setae; median projection of coxosternum subtriangular and provided with 1+1 setae. Article II of the telopodite with 3+3 v. setae and 5+6 d. sensilla (Figs. 128-129).

Second maxillae with 8+9 setae on coxosternum, arranged as in Fig. 128. Apical claw of the telopodite well developed, bipectinate, the v. edge with ca. 11 teeth, the d. with ca. 9 teeth.

Forcipulae: basal plate with an irregular transverse median row of 10 setae. All articles of the telopodites lack teeth. Calyx of poison gland cylindrical (Fig. 132). Chaetotaxy of coxosternum and telopodites as in Fig. 131.

Legs (last pair excepted) with chaetotaxy (Fig. 133) uniform throughout the body length; claws ventrobasally with one anterior spine and two posterior spines of different size (Fig. 134).

Sterna: pore fields present from the second to the XXIV sternum. All pore fields undivided. Form of fields changing along the trunk as in Figs. 135-141. Number of pores on selected sterna: on sternum II, 41 pores; on III, 51; on IV, 72; on VIII, 87; on XII, 90; on XX, 33; on XXIV, 7.

Last leg-bearing segment without pleurites at the sides of praeternum. Praesternum not divided along the sagittal plane; shape and chaetotaxy of sternum and tergum as in Figs. 142-143. Coxopleura slightly protruding at their distal v. ends, setae small and numerous on the distal internal edge, the remaining surface with few bigger setae. Two compound ("heterogeneous") coxal organs on each coxopleuron, anterior coxal organs with 5-6 external lobes, posterior with 4 external lobes (Fig. 144). Coxal organs open on the membrane between coxopleuron and sternum and are covered by the latter (Fig. 142, 144). Last legs with seven podomeres, shape and chaetotaxy as in Figs. 142-143. Praetarsus as a very small tubercle with 2 small apical spines, similar to those in the male (Fig. 147).

Terminal segments: intermediate tergum with posterior margin convex, as are those of the interme-

diate sternum and of the first genital sternum. Gonopods uniaarticulate (Fig. 142).

Male allotype. - 43 pairs of legs, body length 21 mm, maximum body width 0.9 mm.

All features similar to those in the female except for the shape and chaetotaxy of the last leg-bearing segment and terminal segments.

Last leg-bearing segment: form and chaetotaxy of sternum and tergum as in Figs. 145 and 146. Coxopleura slightly protruding at their distal v. ends, setae small and numerous on the distal internal edge, the remaining surface with few setae of different lengths. Podomeres of terminal legs moderately inflated, shape and chaetotaxy as in Figs. 145 and 146.

Terminal segments: intermediate tergum with posterior margin convex; intermediate sternum with posterior margin straight to slightly convex; first genital sternum with posterior margin medially convex, laterally concave (Fig. 148). Gonopods biarticulate, basal article with ca. 11 setae and distal article with ca. 7 setae (Fig. 149), penis dorsally with 1+1 apical setae.

Variation. - In all the specimens studied the pore field series starts on the second sternum, but the posterior limit varies between XXII and XXVI sterna.

The variation in the number of pairs of legs has already been referred to in the list of materials.

Etymology. - The name of this species refers to the habit of leaving the soil to find refuge up on the trees during the rain season.

#### Genus *Schendylurus* SILVESTRI, 1907

Diagnosis. - Pleurites of the second maxillae not fused with the coxosternum; apical claw of the second maxillae pectinate on both d. and v. edges. Sterna with pore fields. Last pair of legs with seven podomeres; praetarsus in form of a small pilose tubercle or replaced by a small spine or altogether absent; coxopleura of the last leg-bearing segment each with two internal coxal organs of simple structure ("homogeneous coxal glands" sensu BRÖLEMANN & RIBAUT, 1912).

#### *Schendylurus amazonicus* n.sp. (Figs. 150-177)

Diagnosis. - A *Schendylurus* species with pore fields present from the first to the antepenultimate sternum (undivided on anterior and posterior sterna but divided in two subsymmetrical areas on the sterna of the middle part of the trunk).

Among the Neotropical species of the genus, only the present species, *S. borellii* (SILVESTRI, 1895), *S. iguapensis* VERHOEFF, 1938, *S. longitarsis* (SILVESTRI, 1895) and *S. mesopotamicus* PEREIRA, 1981 share this trait. *Schendylurus amazonicus* is more closely related to *S. borellii* and *S. longitarsis*. It can be differentiated from *S. borellii* by means of the following characters (the corresponding ones in the latter are given in parentheses): antennae of male 5.0 to 5.2 times longer than head (3.4); male a.a. IV ca. 2.0 times longer than wide (ca. 1.3); clypeus with 6+6 setae in the middle (10+10); ♂ with 61 pairs of legs (57); last legs of the ♂ 4.7 times longer than the sternum of the corresponding segment (4.1); large setae of the podomeres of terminal legs much longer than the remaining setae (poorly differentiated in length from the remaining setae). It can be differentiated from *S. longitarsis* by means of the following characters (the corresponding ones in the latter are given in parentheses): body length 25-27 mm (39 mm); clypeus with 6+6 setae in the middle (17+17); lateral parts of labrum with 4+4 teeth (25+25).

The structure of antennae and the number of clypeal setae and labral teeth are stable enough, in this group of geophilomorphs, to allow us describing the new species on the basis of a couple of specimens only.

Type material. - Holotype ♂, with 61 pairs of legs, body length 27 mm, Brazil: Amazonas: Rio Tarumã Mirim, igapó, BE, 13.4.83, J. ADIS legit; allotype ♀, with 63 pairs of legs, body length 25 mm, same locality, BE, 29.4.83, J. ADIS leg.

Depository of type. - INPA.

### Description

Male holotype. - 61 pairs of legs, body length 27 mm, maximum body width 0.7 mm. Colour of preserved specimen yellowish.

Antennae ca. 5.2 times longer than the cephalic plate, distally slightly attenuate. Setae on a.a. I-V of different lengths and few in number, those of remaining antennomeres progressively shorter and more numerous towards the tip of the appendage (Figs. 150-151). Terminal a.a. with ca. 40 claviform sensory setae on the external border and ca. 20 on the internal border. Distal end of this a.a. with ca. 5 very small specialized setae ending in three small apical branches. Dorsal and v. surface of a.a. II, V, IX and XIII with very small specialized setae which on the v. side are restricted to an internal latero-apical area, those on a.a. IX and XIII in more apical position and represented by two different types: *a* and *b*. Type *a* setae are very thin and not apically divided, type *b* setae are thicker and very similar to those on the distal end of the terminal a.a. A.a. II with 1 type *a* and 1 type *b* seta; a.a. V and IX with 1 type *a* and 2 type *b* seta; a.a. XIII with 1 type *a* and 1 type *b* seta. Specialized setae on d. side are restricted to an external lateral area, those on a.a. IX and XIII in more apical position, and are represented by three different types: *a* and *b*, similar to *a* and *b* of v. side and type *c* setae a little bigger, ending in two apical diminute branches and much darker, ochraceous in colour (Fig. 152). A.a. II with 1 type *a* and 1 type *b* seta; a.a. V with 1 type *a*, 2 type *b* and 3 type *c* setae (Fig. 152); a.a. IX with 1 type *a*, 2 type *b* and 4 type *c* setae and a.a. XIII with 1 type *a*, 3 type *b* and 5 type *c* setae.

Cephalic plate distinctly longer than wide (ratio 1.2: 1), shape and chaetotaxy as in Fig. 153.

Clypeus with 9+5 setae on the anterior half and 1+1 praclabral setae (Fig. 154).

Labrum with 29 teeth, those of the central arc dark and round tipped, the lateral ones less sclerotized, each with a relatively long and very sharp medial extension (Fig. 155).

Mandible: dentate lamellae subdivided into three distinct blocks, with 8-3-3 teeth (Fig. 156); pectinate lamellae with ca. 23 hyaline teeth.

First maxillae with palps on both coxosternum and telopodites. Coxosternum with 3+3 setae, median projections of coxosternum subtriangular, well developed and provided with 4+5 setae. Article II of telopodite with 4+3 v. setae and 9+9 d. sensilla (Figs. 157, 158).

Second maxillae with 20+19 setae on coxosternum, arranged as in Fig. 157. Apical claw of telopodite well developed, bipectinate, the d. edge with ca. 21 teeth and the v. with ca. 15 (Fig. 159).

Forcipulae: basal plate with an irregular transverse median row of 12 setae. All articles of the telopodites lack sclerotic dark teeth, trochanteroprefemur with a small tubercle on the apical medial edge. Calyx of poison gland cylindrical (Fig. 162); chaetotaxy of coxosternum and telopodites as in Fig. 161.

Legs (last pair excepted) with chaetotaxy (Fig. 163) uniform throughout the body length. Claws ventrobasally with two spines, one anterior one posterior; a third spine, smaller in size, occurs internally, very close to the posterior one.

Sterna: pore fields present on first to antepenultimate sternum. On sternum I to XXV and LIV to LIX the fields are undivided, on sternum XXVII to LII the fields are divided in two subsymmetrical areas (on sternum XXVI and LIII the fields are incompletely divided). Shape of fields changing along the trunk as in Figs. 164-170. Number of pores on selected sternum: on sternum I, 8 pores; on II, 4+37+4; on X, 108; on XXVI, 72; on XVII, 30+38; on XXVIII, 27+34 and on LIX, 19.

Last leg-bearing segment with pleurites at the sides of praetergum. Praesternum not divided along the sagittal plane; form and chaetotaxy of sternum and tergum as in Figs. 171-172. Coxopleura slightly

protruding at their distal v. ends, setae small and numerous on distal v. half, the remaining surface with few bigger setae. Two single ("homogeneous") coxal organs on each coxopleuron (Fig. 173). Coxal organs open on the membrane between coxopleuron and sternum, covered by the latter (Fig. 173). Last legs with seven podomeres, shape and chaetotaxy as in Figs. 171-172. Praetarsus as a very small tubercle with 1 small apical spine (Fig. 174).

Terminal segments: intermediate tergum with posterior margin convex; intermediate sternum with posterior margin slightly concave; first genital sternum with posterior margin medially convex, laterally concave. Gonopods biarticulate, basal article with ca. 12 setae and distal article with ca. 9 setae (Fig. 171), penis dorsally with 3+3 apical setae.

Female allotype. - 63 pairs of legs, body length 25 mm, maximum body width 0.8 mm.

All features similar to those in the male except for the presence of special sensory setae of type c on d. side of a.a. II (absent on the male holotype on this a.a.) and for the shape and pilosity of the last leg-bearing segment and terminal segments.

Last leg-bearing segment: form and chaetotaxy of sternum and tergum as in Figs. 176-177. Coxopleura slightly protruding at their distal v. ends, setae small and numerous on v. distal medial surface, the remaining surface with few bigger setae. Podomeres of terminal legs with shape and chaetotaxy as in Figs. 176-177.

Terminal segments: intermediate tergum with posterior margin convex; intermediate sternum with posterior margin straight; first genital sternum with posterior margin medially convex, laterally slightly concave or straight. Gonopods uniarticulate (Fig. 176).

Etymology. - The name *amazonicus* refers to the region where this species has been collected.

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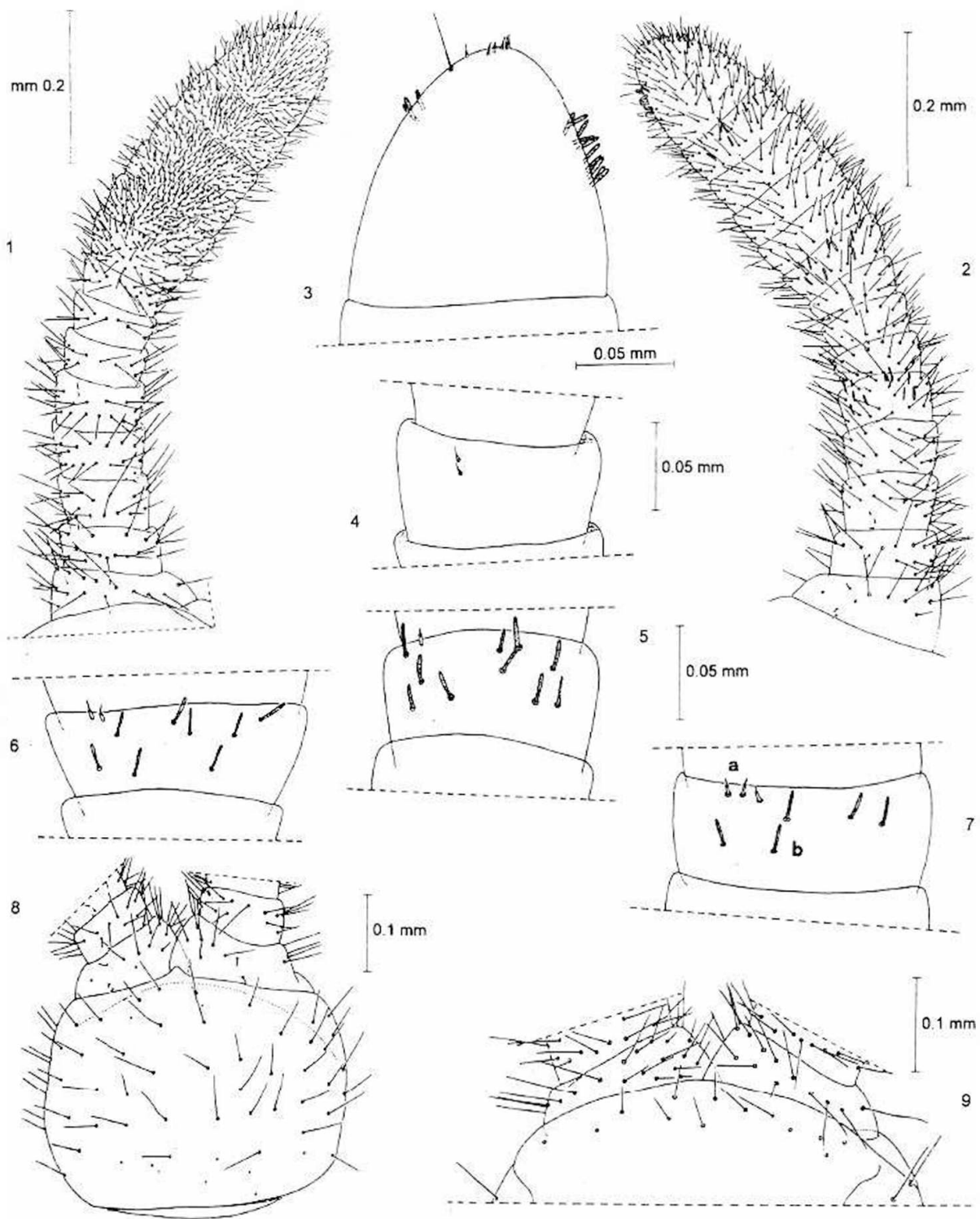
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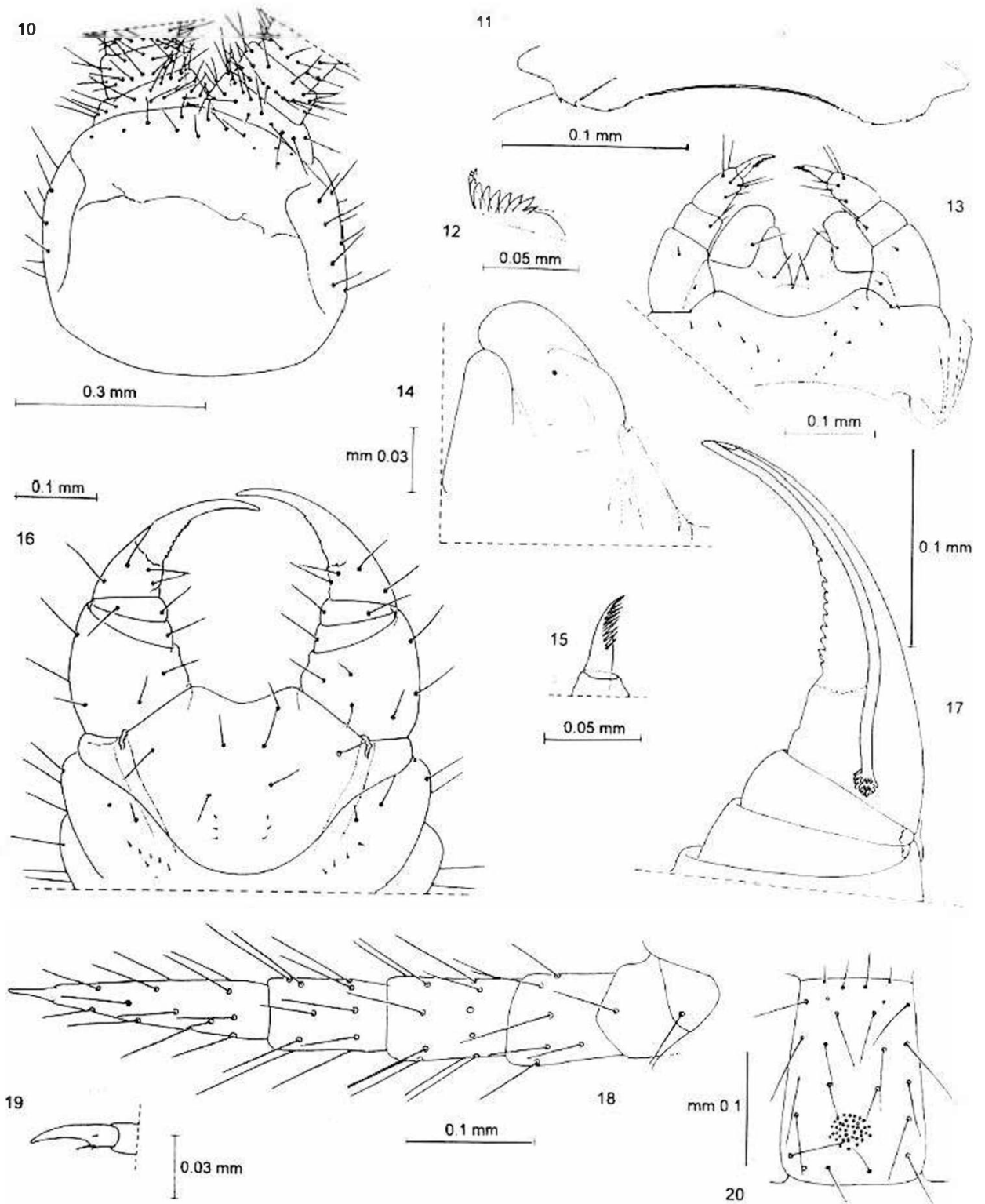
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Figs. 1-9

*Ityphilus crabilli* n.sp.: ♀ holotype (Brazil: Amazonas: Rio Tarumã Mirim).

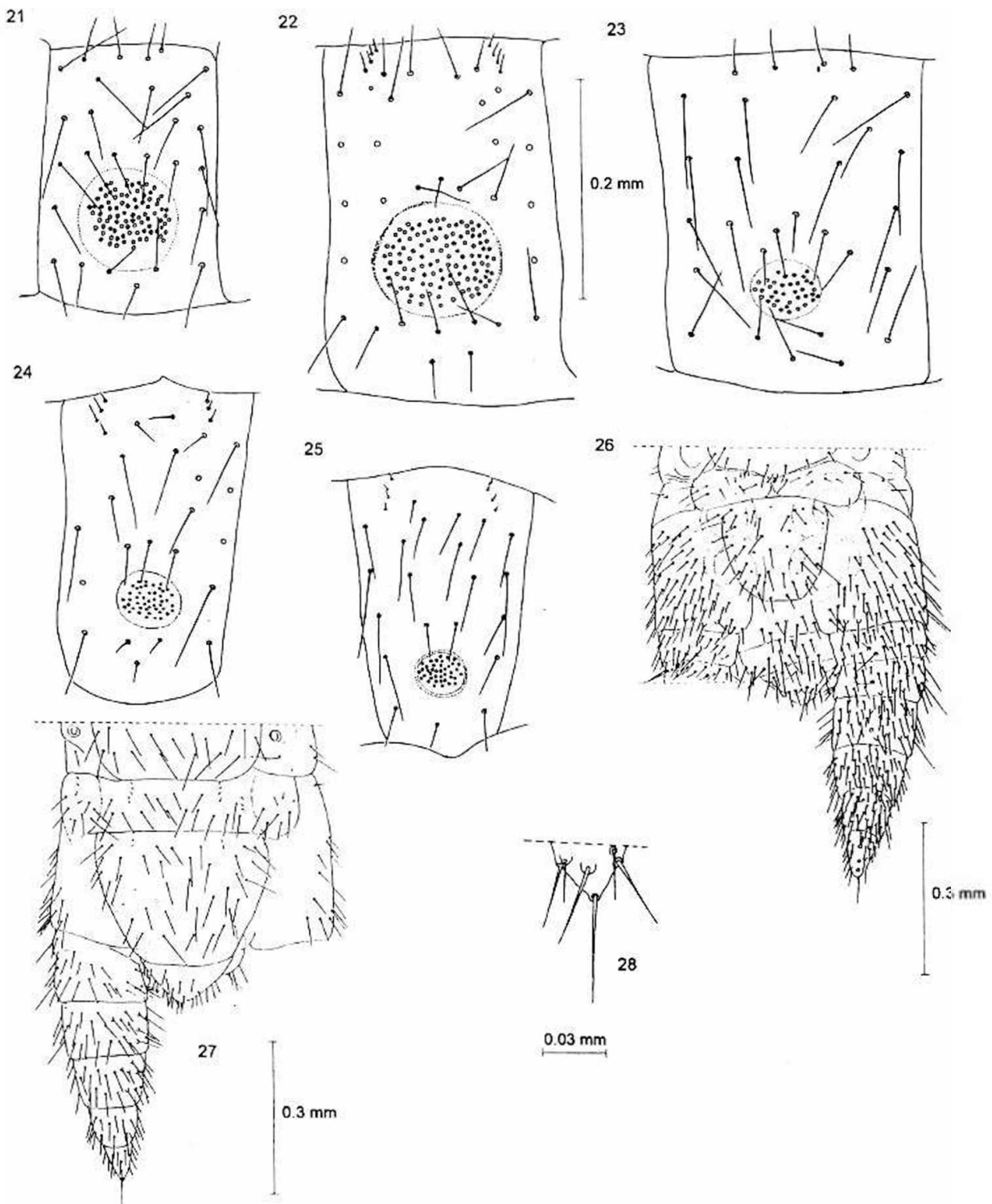
1: l. antenna, v.; 2: the same, d.; 3: l. a.a. XIV, v.; 4: l. a.a. V, v.; 5: l. a.a. V, d.; 6: l. a.a. IX, d.; 7: l. a.a. XIII, d.; 8: cephalic shield; 9: clypeus and basis of antennae.



Figs. 10-20:

*Tryphilus crabilli* n.sp.: ♀ holotype (Brazil: Amazonas: Rio Tatumã Mirim).

10: head capsule and basis of antennae; 11: labrum; v.; 12: dentate lamella of mandible; 13: first and second maxillae, v.; 14: r. first maxilla, d.; 15: claw of l. second maxilla, d.; 16: forcipular segment with poison claws, v.; 17: detail of calyx of poison gland in l. poison claw, v.; 18: r. leg II, v.; 19: claw of r. leg XIV, antero-v.; 20: sternum II.



Figs. 21-28:

*Ityphilus crabilli* n.sp.: ♀ holotype (Brazil: Amazonas: Rio Tarumã Mirim).

21-25: sterna VII, XVII, XXXVII, L. LII; 26: last leg-bearing segment and terminal segments, v.; 27: the same, d.; 28: detail of distal end of last podomere of l. last leg, v.

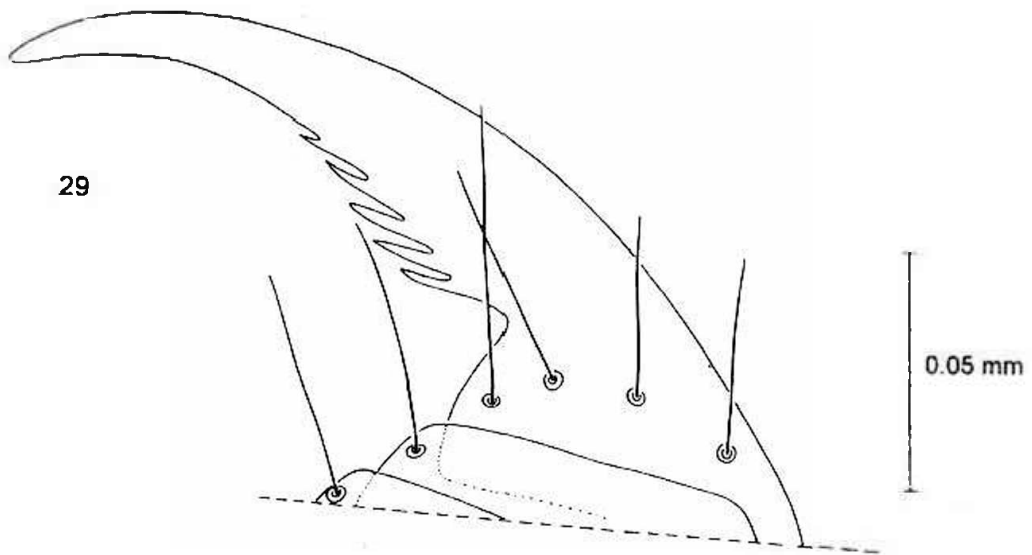
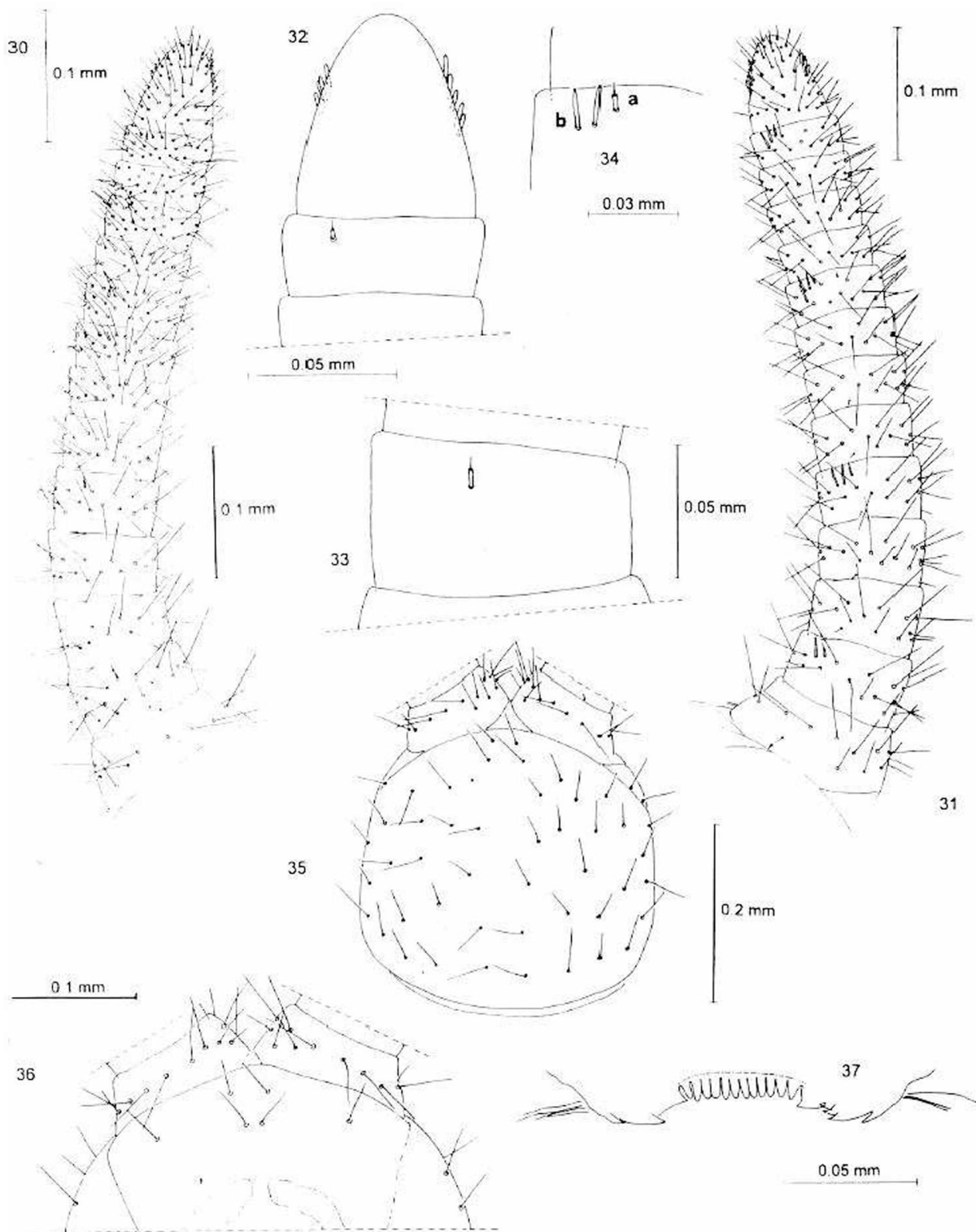


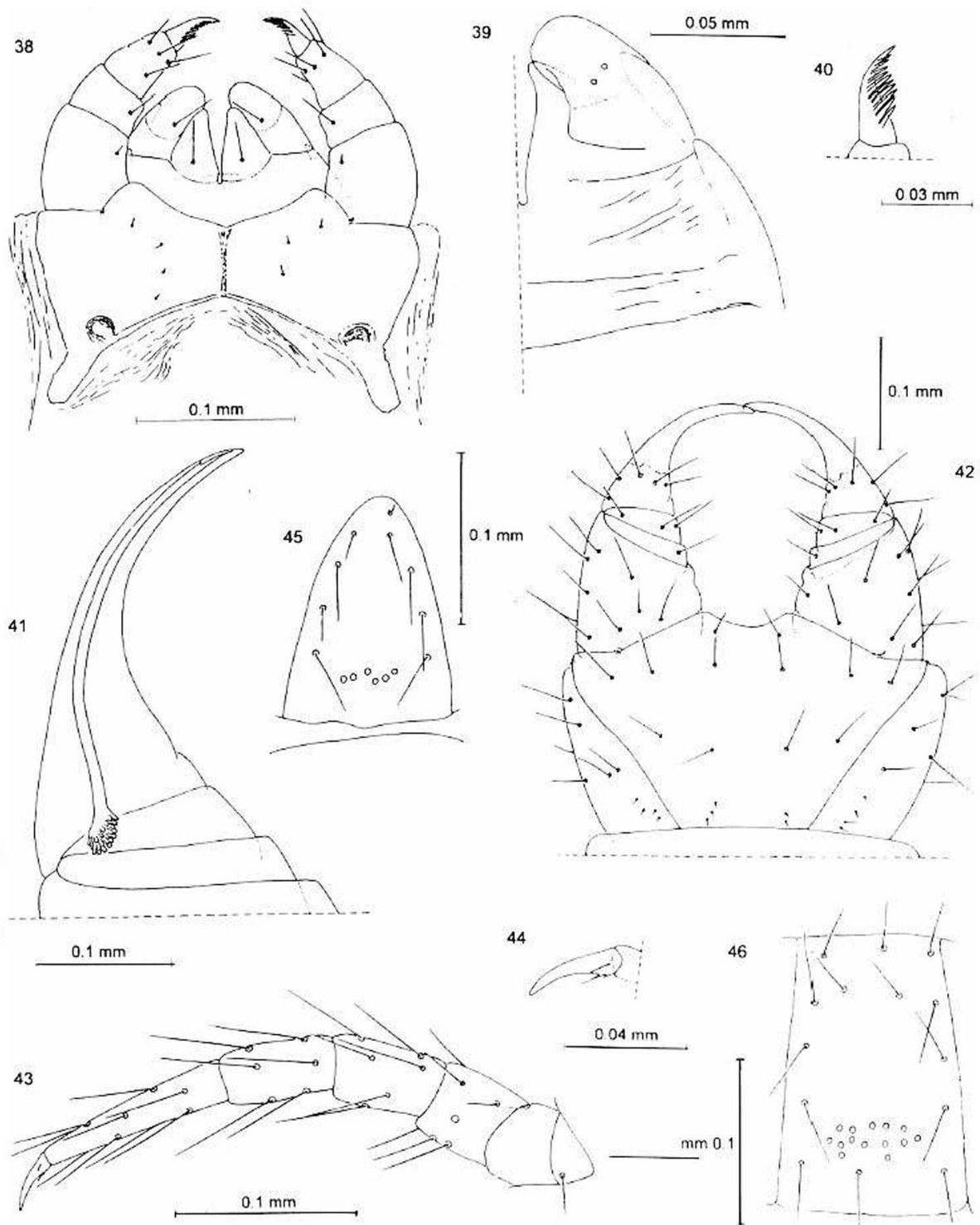
Fig. 29:  
*Ityphilus perrieri* (BROLEMANN, 1909), ♂ lectotype (Brazil: Haut-Carsevène), detail of I. forcipular tarsungulum, v.



**Figs. 30-37:**

*Taentolinum arborum* n.sp. holotype ♀ (Brazil: Amazonas: Rio Tarumã Mirim).

**30:** l. antenna, v.; **31:** the same, d.; **32:** l. a.a. XIII and XIV, v.; **33:** l. a.a. II, v.; **34:** l. a.a. V, d.; **35:** cephalic shield; **36:** clypeus and basis of antennae; **37:** labrum.

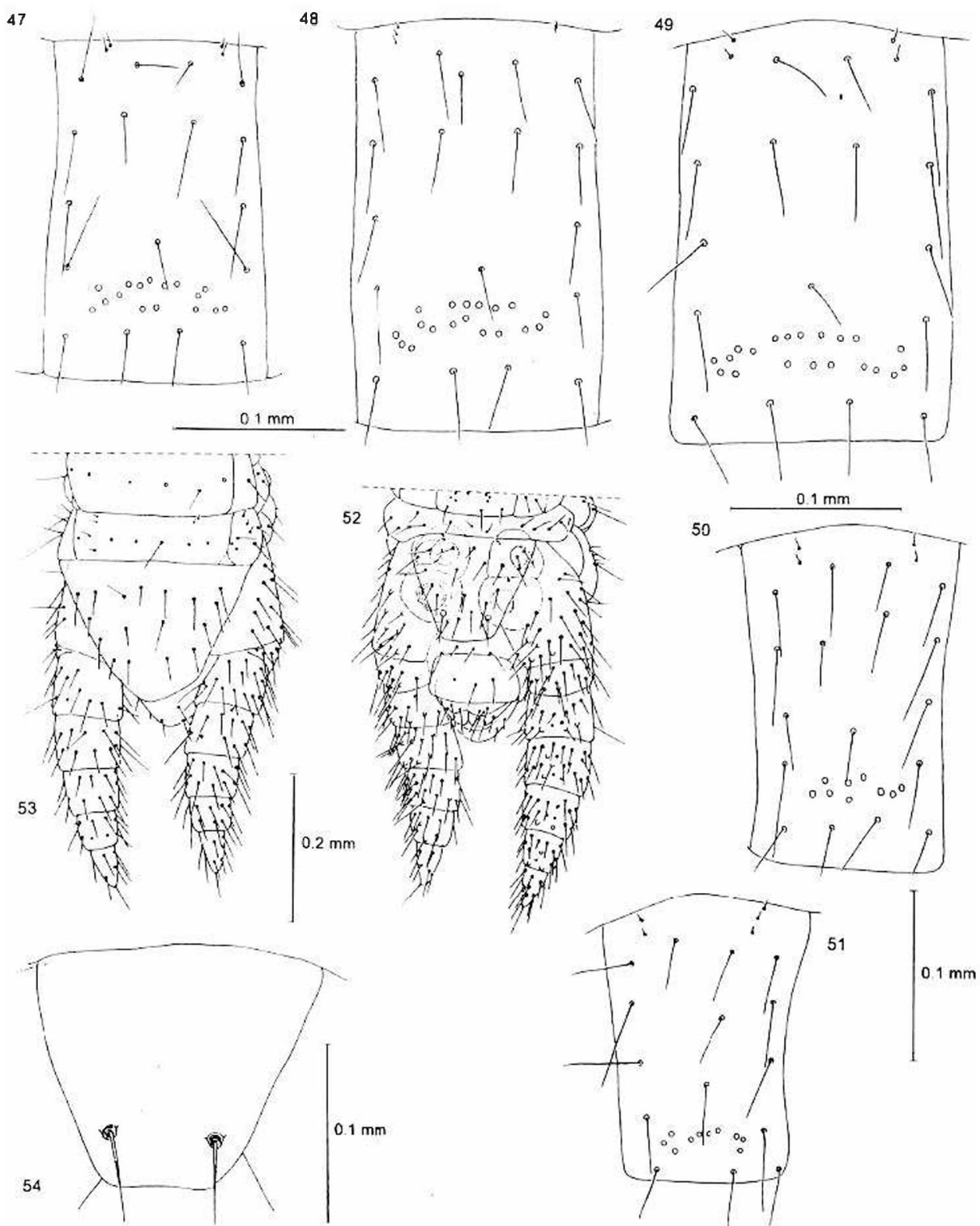


Figs. 38-46:

*Taeniolinum arborum* n.sp. holotype ♀ (Brazil: Amazonas: Rio Taramã Mirim).

38: first and second maxillae, v.; 39: r. first maxilla, d.; 40: claw of second maxilla, d.; 41: detail of calyx of poison gland in l. poison claw, d.; 42: forcipular segment with poison claws, v.; 43: r. leg IV, v.; 44: claw of r. leg XV, antero-v.; 45-46: sternite I, II.

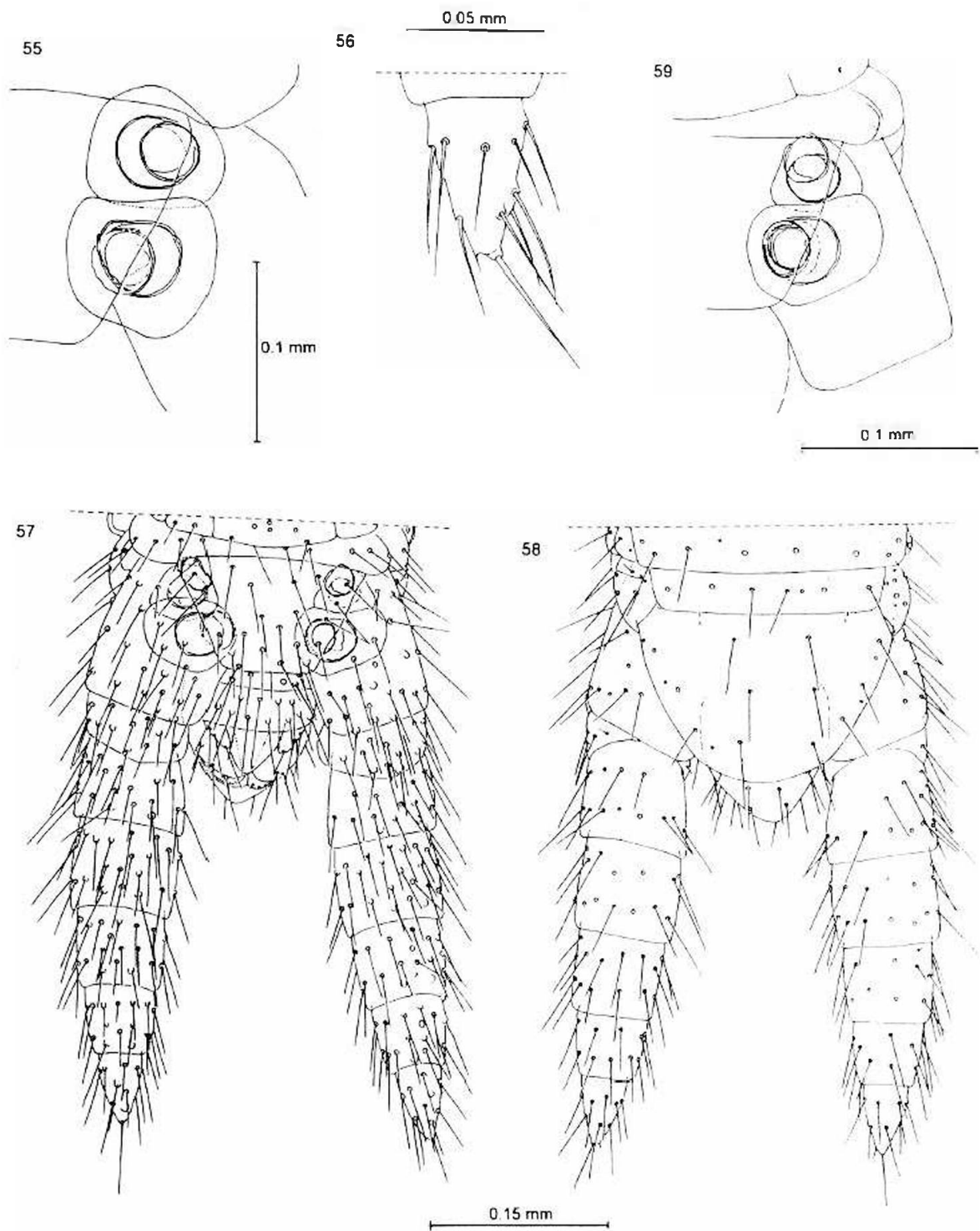




Figs. 47-54:

*Taeniolinum arborum* n.sp. holotype ♀ (Brazil: Amazonas: Rio Tarumã Mirim).

47-51: sterna VIII, XV, XXVI, XLIII, XLIV; 52: last leg-bearing segment and terminal segments, v.; 53: the same, d.; 54: sternum of last leg-bearing segment showing 1+1 "tuberculate" setae.



**Figs. 55-56:**

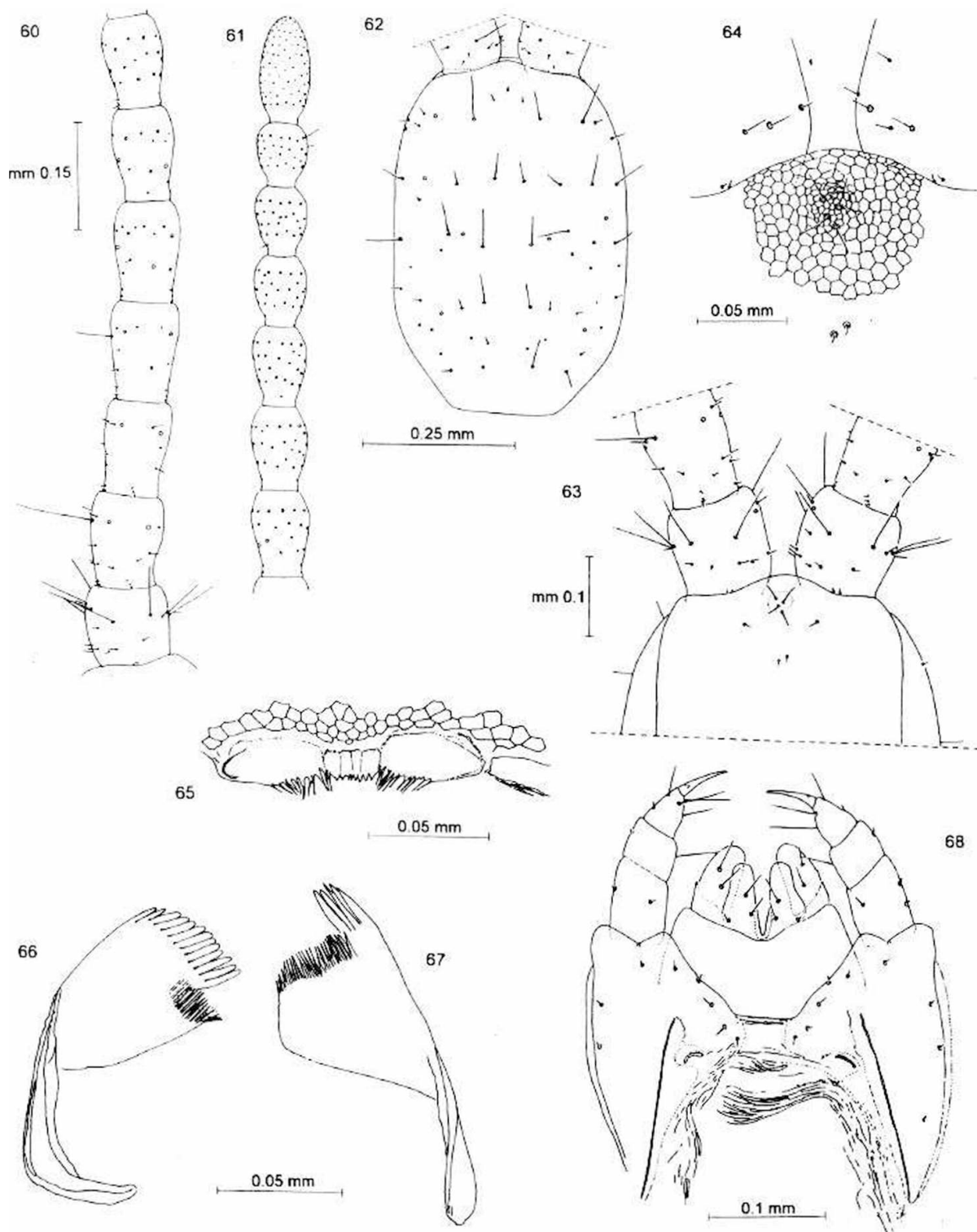
*Taeniolinum arborum* n.sp. holotype ♀ (Brazil. Amazonas: Rio Tarumã Mirim).

**55:** detail of l. coxal organs, v.; **56:** detail of distal end of last podomere of r. last leg, d.

**Figs. 57-59:**

*Taeniolinum arborum* n.sp. allotype ♂ (Brazil: Amazonas: Rio Tarumã Mirim).

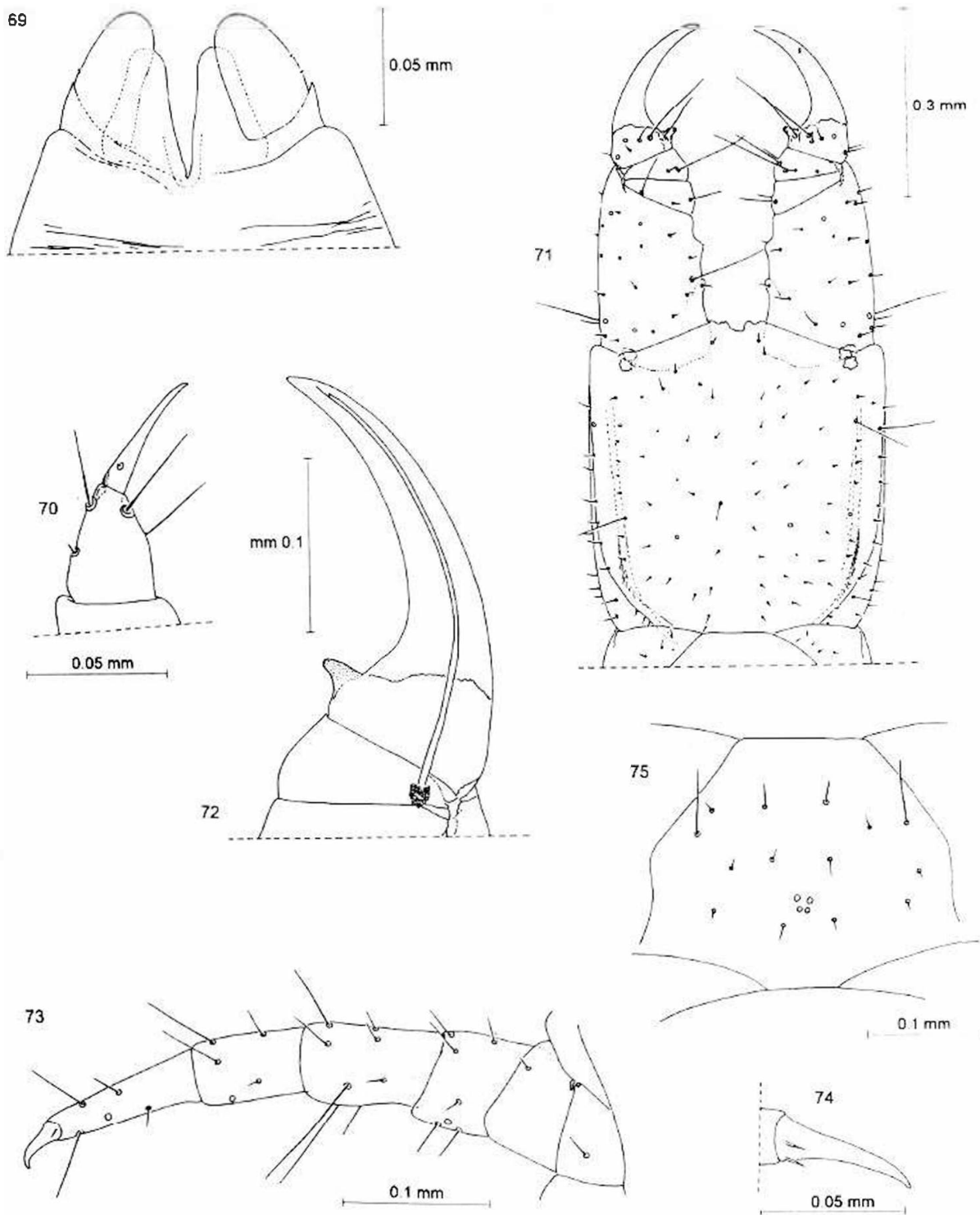
**57:** last leg-bearing segment and terminal segments, v.; **58:** the same d.; **59:** detail of l. coxal organs, v.



Figs. 60-68

*Hyphydrophilus adisi* n.sp. holotype ♀ (Brazil: Amazonas: Rio Taramã Mirim).

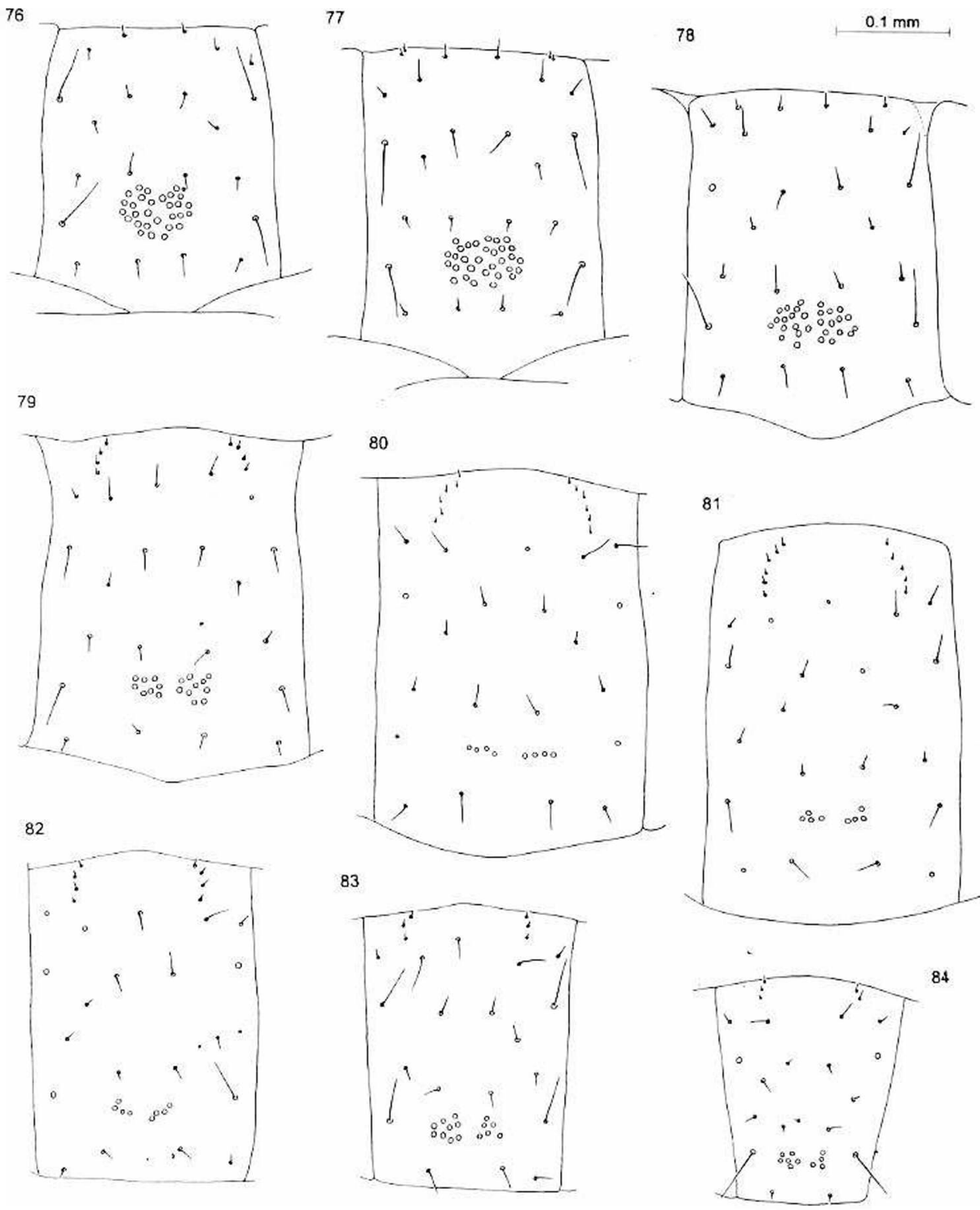
60: l. a.a. I-VII, v.; 61: l. a.a. VIII-XIV, v.; 62: cephalic shield; 63: clypeus and basis of antennae; 64: detail of clypeal area; 65: labrum; 66-67: r. and l. mandibles; 68: first and second maxillae, v.



Figs. 69-75:

*Hyphydrophilus adisi* n.sp. holotype ♀ (Brazil: Amazonas: Tarumã Mirim).

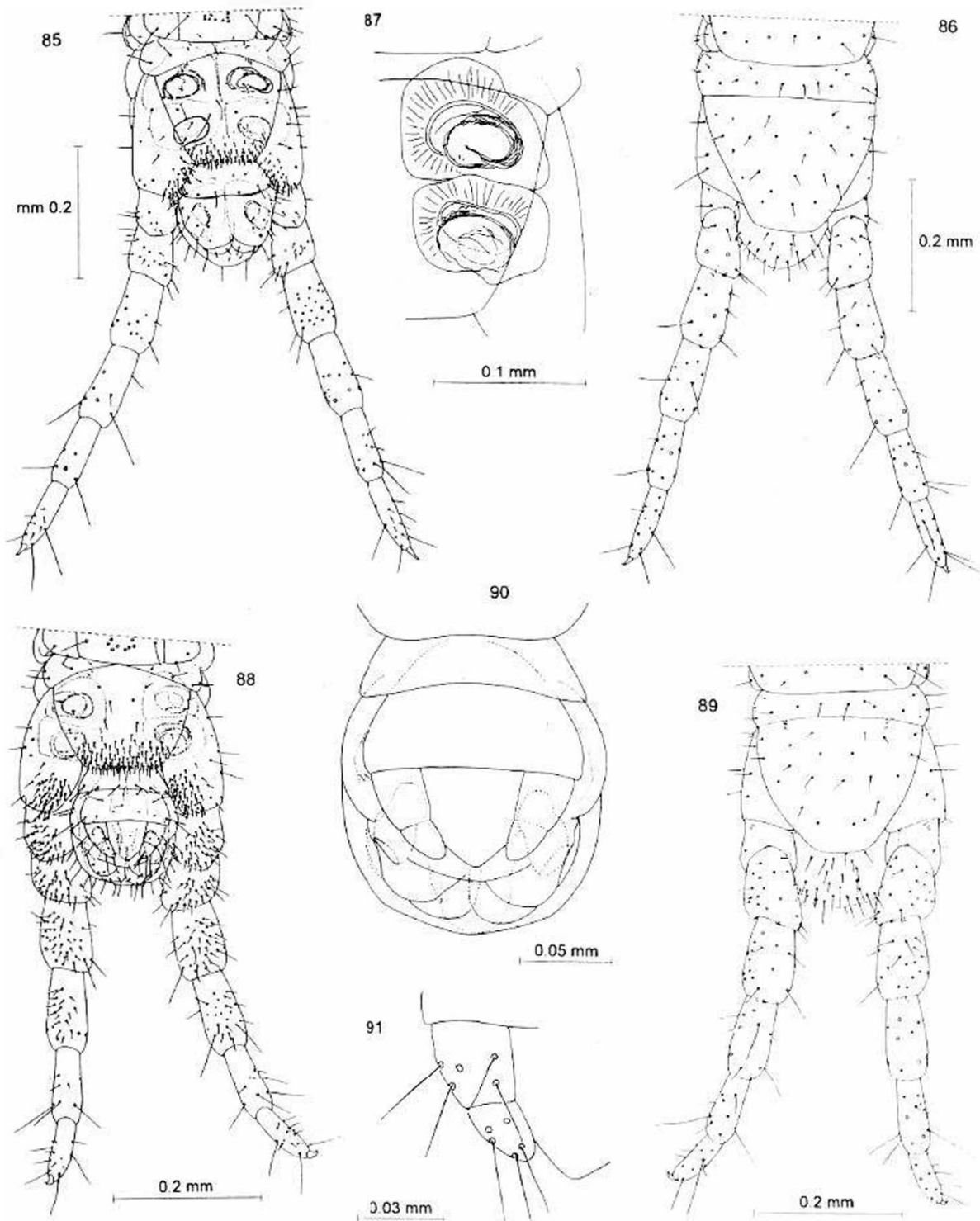
69: first maxillae, d.; 70: detail of distal end of the r. telopodite of second maxillae, v.; 71: forcipular segment with poison claws, v.; 72: detail of calyx of poison gland in l. poison claw, v.; 73: r. leg XII, antero-v.; 74: claw of l. leg IV, antero-v.; 75: sternum I.



Figs. 76-84:

*Hyphydrophilus adisi* n.sp. holotype ♀ (Brazil: Amazonas: Rio Tarumã Mirim).

Sterna V, IX, XIV, XV, XXVI, XXXI, XXXVII, XL, XLII.



Figs. 85-87:

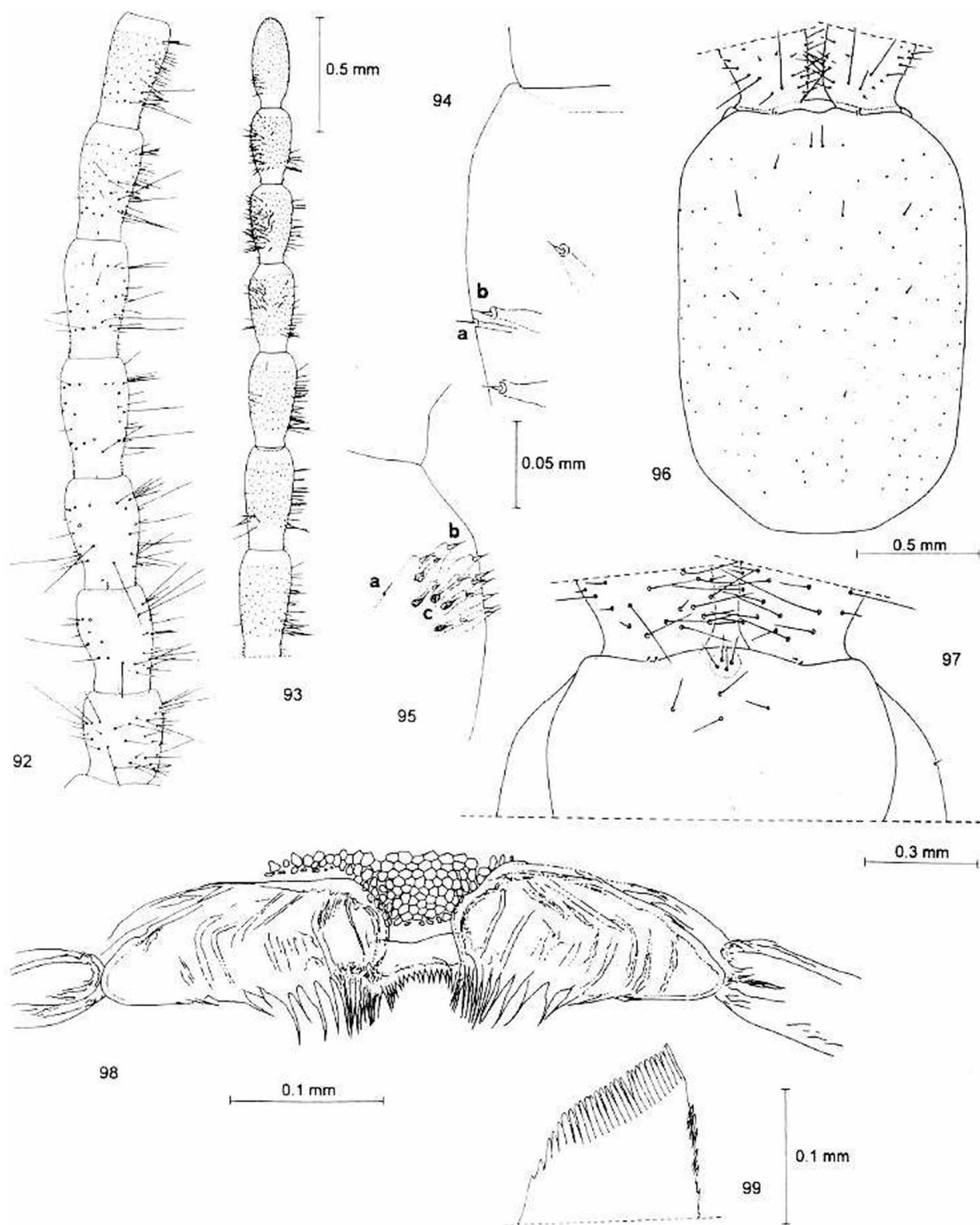
*Hyphydrophilus adisi* n.sp. holotype ♀ (Brazil: Amazonas: Rio Tarumã Mirim).

85: last leg-bearing segment and terminal segments, v.; 86: the same, d.; 87: detail of l. coxal organs, v.

Figs. 88-91:

*Hyphydrophilus adisi* n.sp. allotype ♂ (Brazil: Amazonas: Rio Tarumã Mirim)

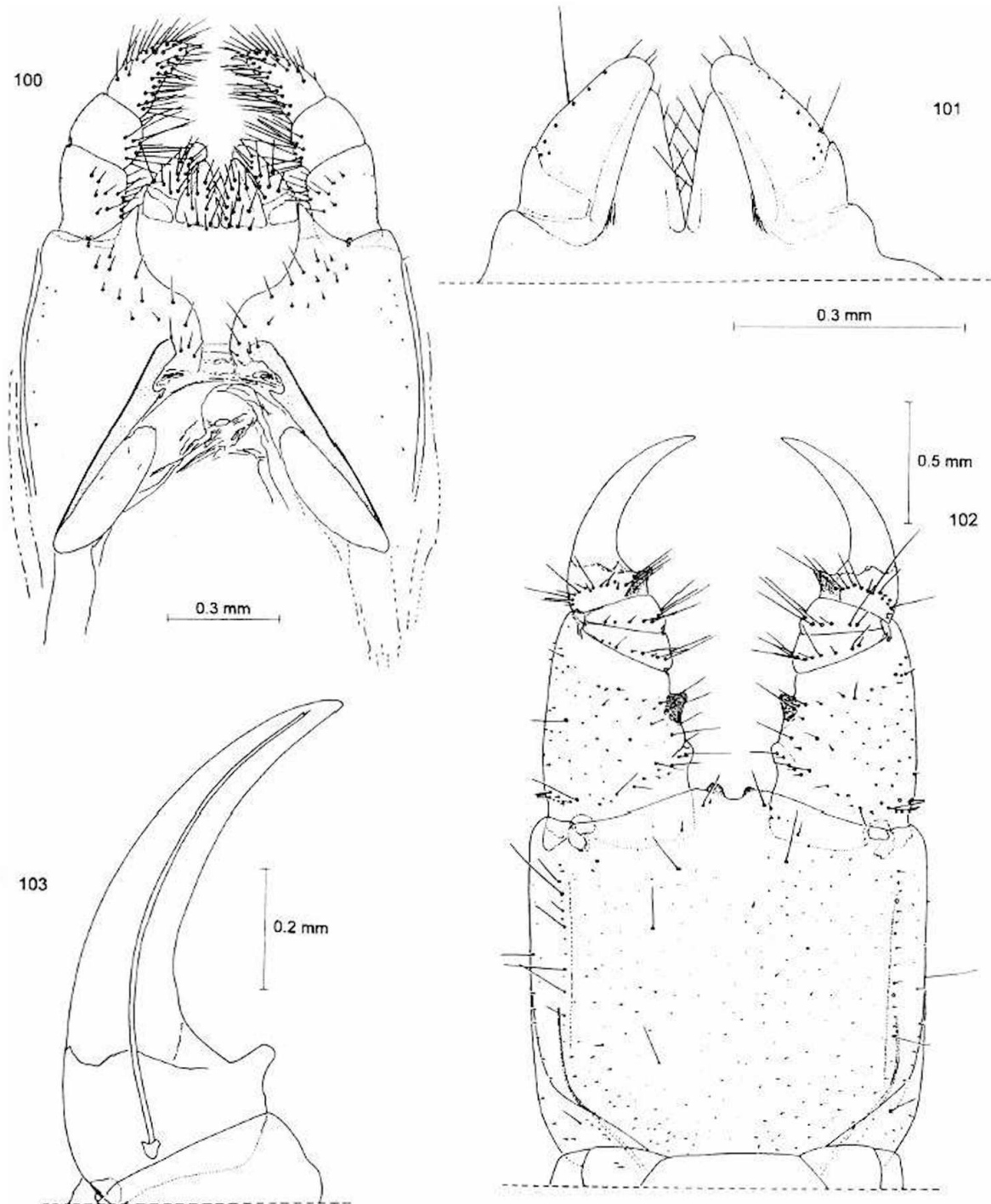
88: last leg bearing segment and terminal segments, v.; 89: the same, d.; 90: genital region, v.; 91: r. gonopod, v.



Figs. 92-99:

*Ribautia centralis* (SILVESTRI, 1909), ♀, specimen A (Brazil: Amazonas: Rio Tarumã Mirim).

92: r. a.a. I-VII, v.; 93: r. a.a. VIII-XIV, v.; 94: l. a.a. IX, v.; 95: r. a.a. XIII, d.; 96: cephalic shield; 97: clypeus and basis of antennae; 98: labrum; 99: apical part of r. mandible, d.

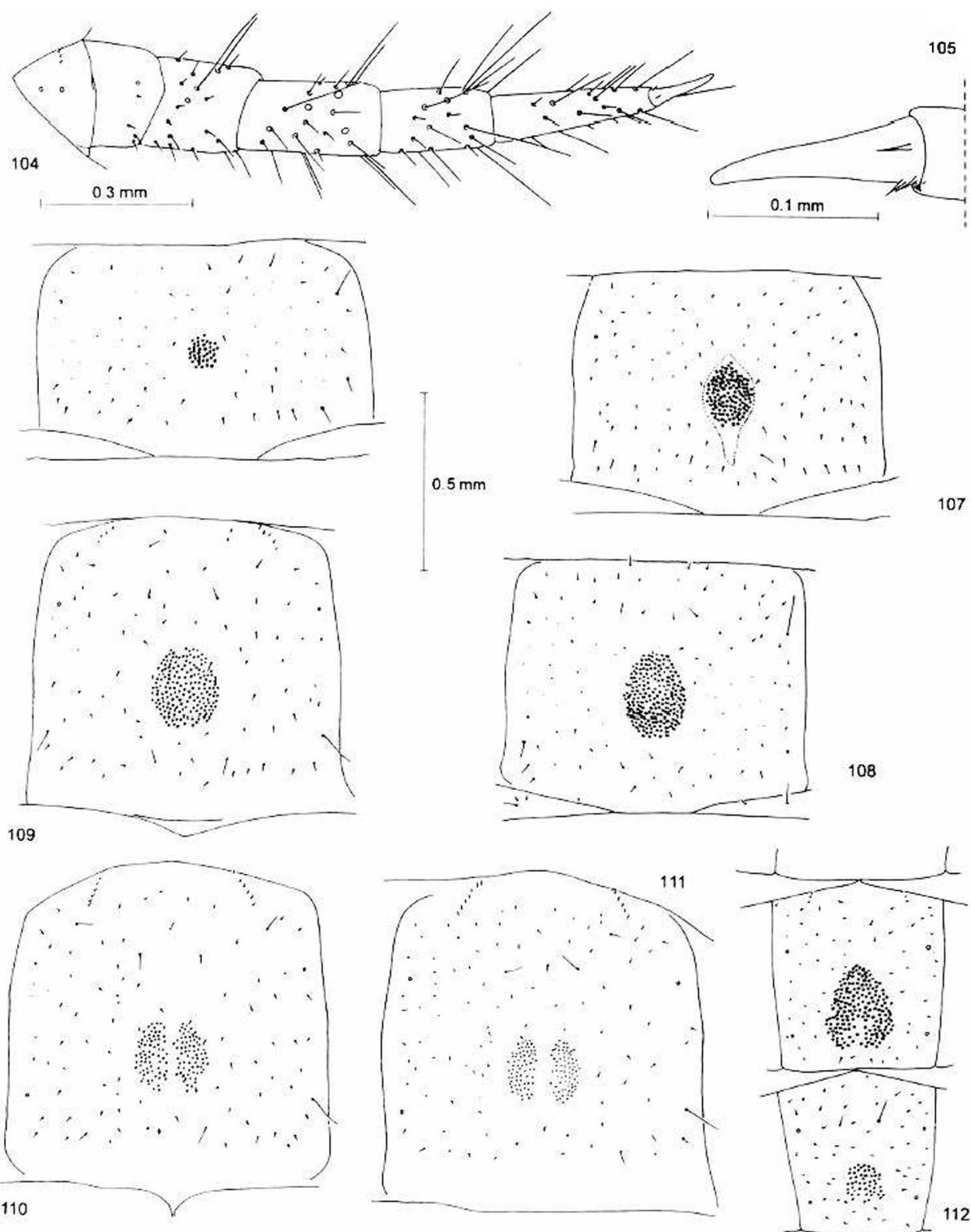


Figs. 100-103:

*Ribautia centralis* (SILVESTRI, 1909), ♀, specimen A (Brazil: Amazonas: Rio Tarumã Mirim).

**100:** first and second maxillae, v.; **101:** first maxillae, d.; **102:** forcipular segment with poison claws, v.; **103:** detail of poison gland in r. poison claw, v.

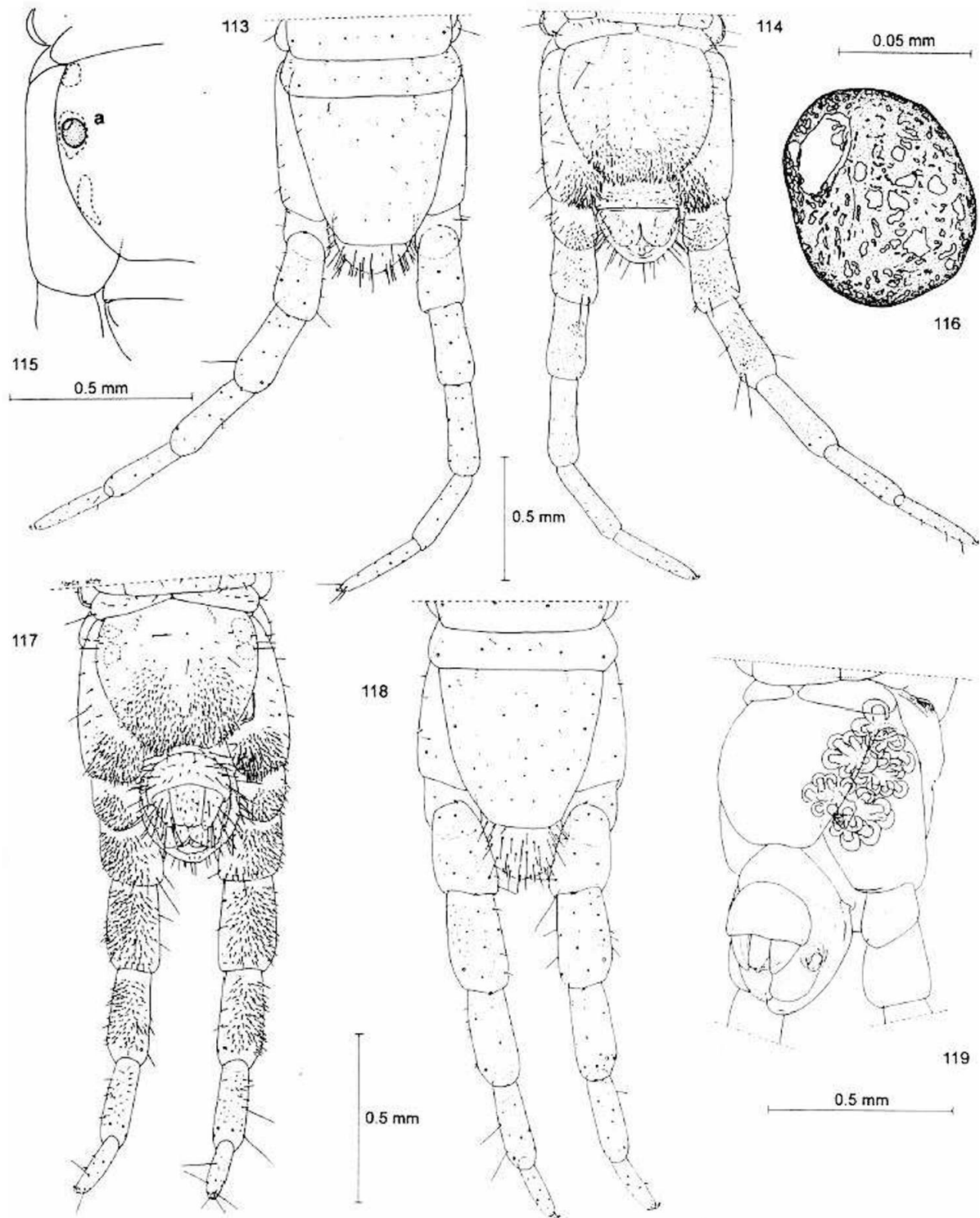




Figs. 104-112:

*Ribautia centralis* (SILVESTRI, 1909), ♀, specimen A (Brazil: Amazonas: Rio Tarumã Mirim).

104: l. leg III, v.; 105: claw of r. leg V, v.; 106-111: sterna II, VI, XVI, XXI, XXVI, XXVII; 112: sterna LXIII and LXIV.



Figs. 113-116:

*Ribautia centralis* (SILVESTRI, 1909), ♀, specimen A (Brazil: Amazonas: Rio Tarumã Mirim).

113: last leg-bearing segment and terminal segments, v.; 114: the same d.; 115: detail of r. half of last leg-bearing segment, v. (a. Tecamœba introduced by accident in the coxal pore !?); 116: detail of a in Fig. 115.

Figs. 117-118:

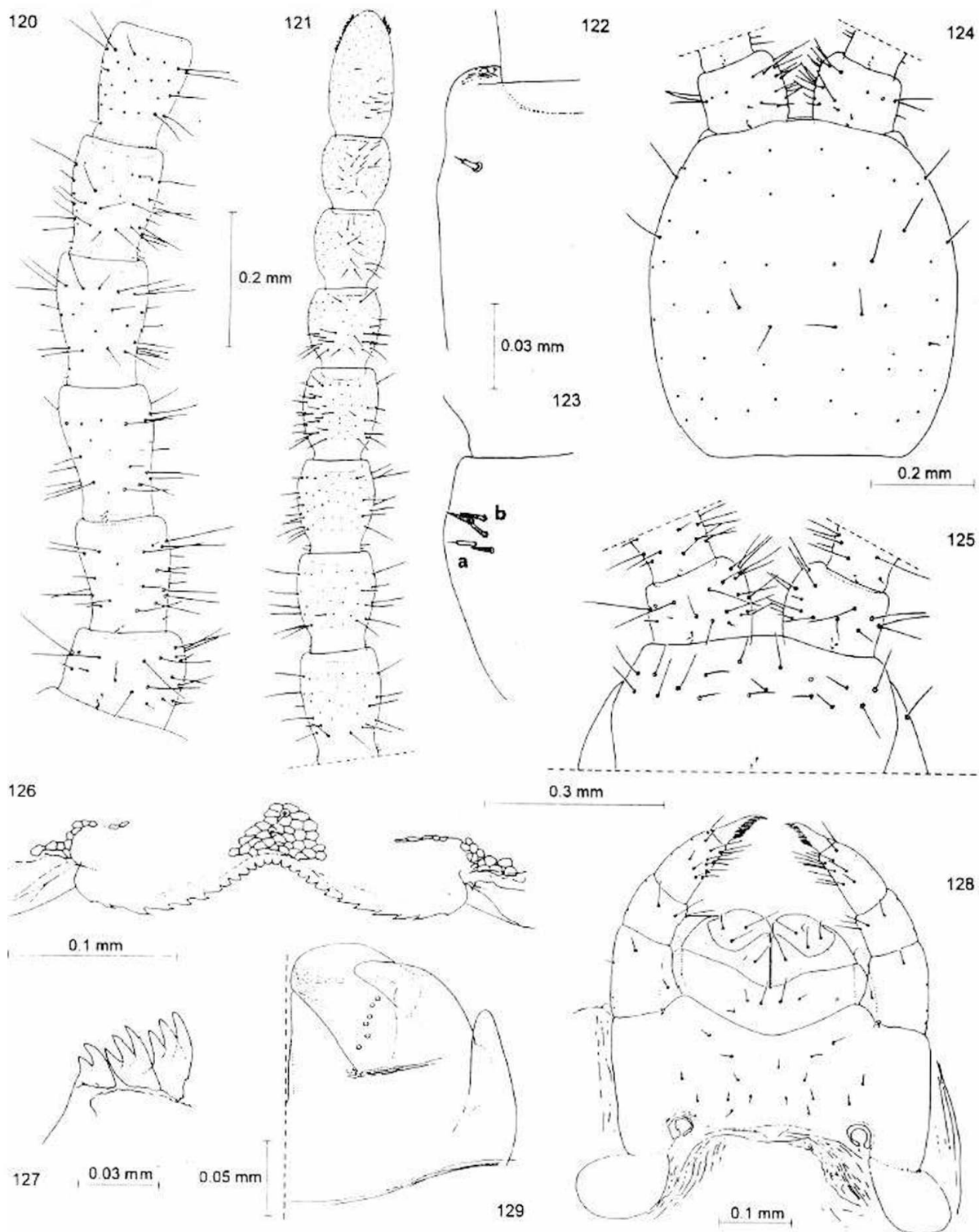
*Ribautia centralis* (SILVESTRI, 1909), ♂, specimen "D" (Brazil: Amazonas: Rio Tarumã Mirim).

117: last leg-bearing segment and terminal segments, v.; 118: the same, d.

Fig. 119:

*Ribautia centralis* (SILVESTRI, 1909), ♂, specimen E (Brazil: Amazonas: Rio Tarumã Mirim).

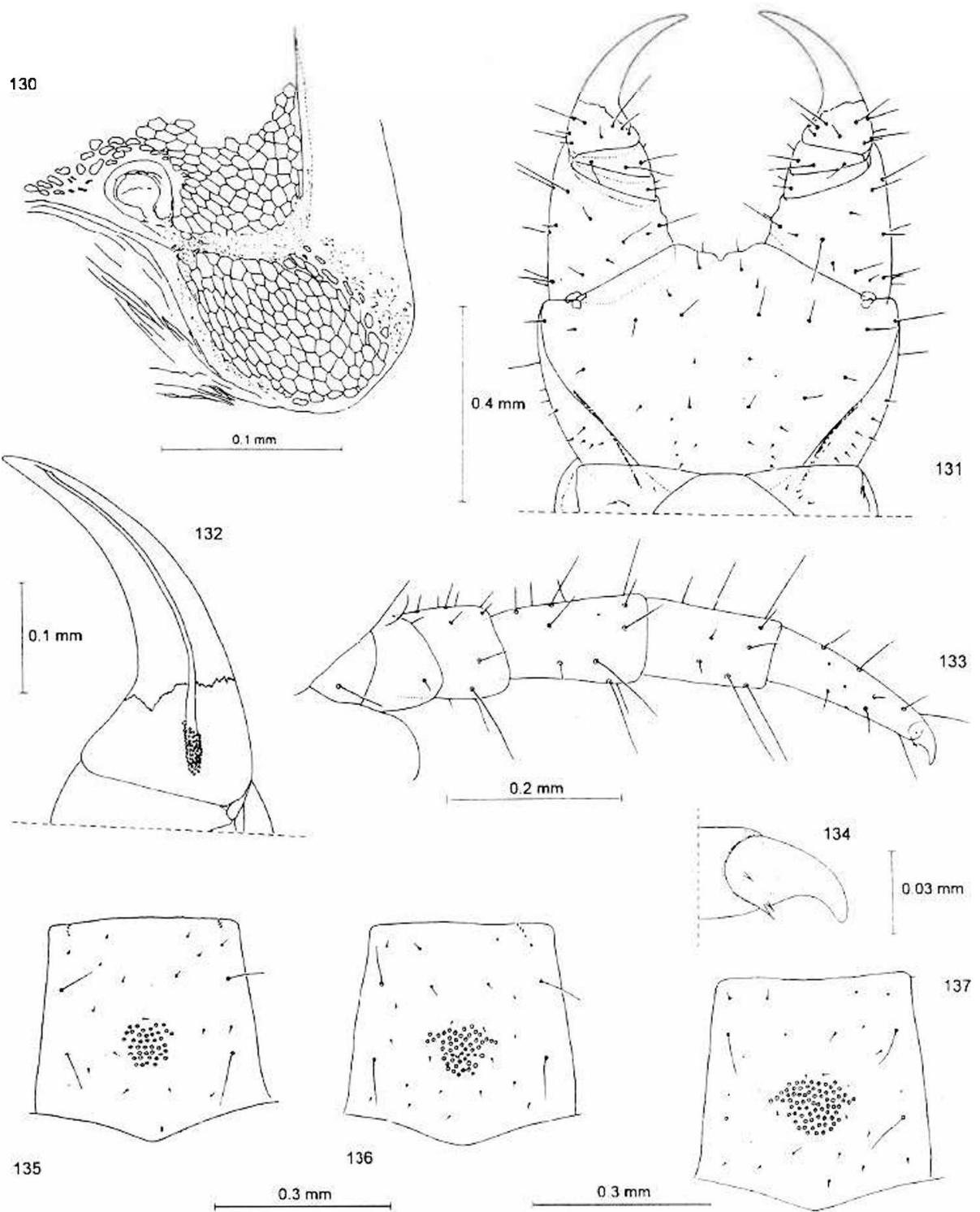
Last leg-bearing segment and terminal segments, showing coxal and anal organs, v.



Figs. 120-129:

*Pectiniunguis ascendens* n.sp., ♀ holotype (Brazil: Amazonas: Rio Tarumã Mirim).

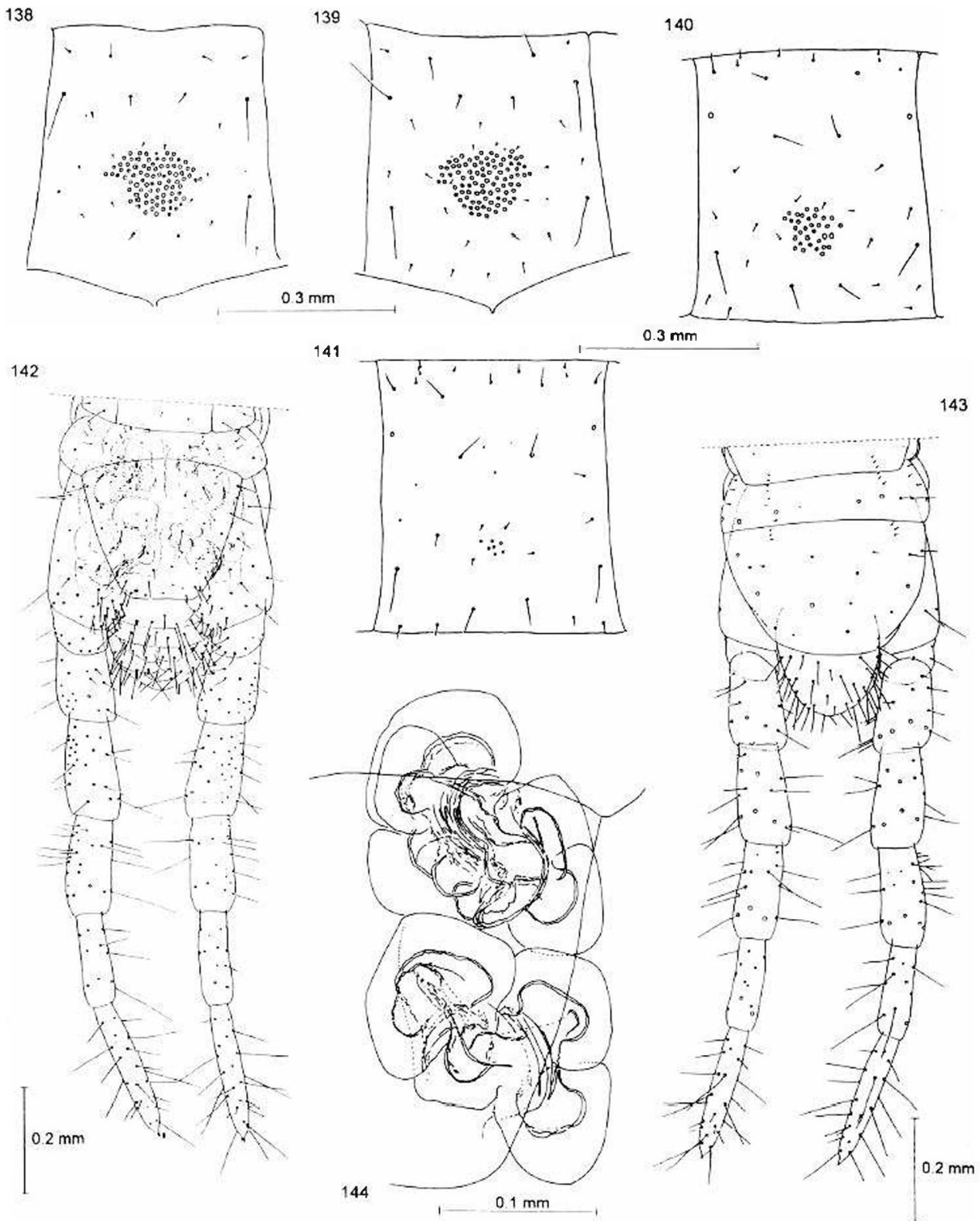
120: r. a.a. I-VI, v.; 121: r. a.a. VII-XIV, v.; 122: l. a.a. II, v.; 123: l. a.a. XIII, d.; 124: cephalic shield; 125: clypeus and basis of antennae; 126: labrum; 127: dentate lamella of mandible; 128: first and second maxillae, v.; 129: r. first maxilla, v.



Figs. 130-137:

*Pectiniunguis ascendens* n.sp., ♀ holotype (Brazil: Amazonas: Rio Taramã Mirim).

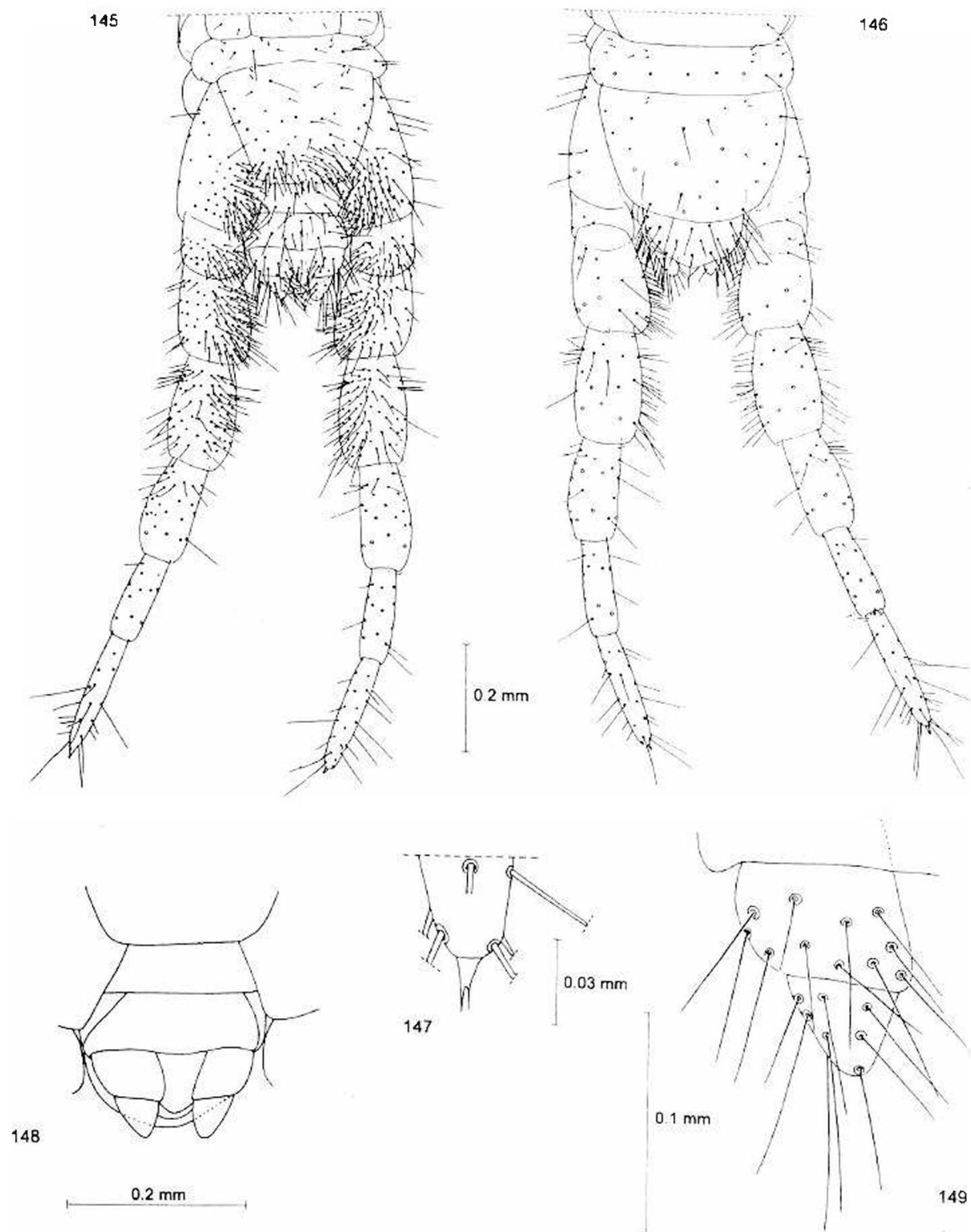
130: detail of posterior external region of the 1. second maxilla, v.; 131: forcipular segment with poison claws, v.; 132: detail of poison gland in 1. poison claw, v.; 133: 1. leg XII, v.; 134: claw of 1. leg XII, antero-v.; 135-137: sterna II, III, IV.



Figs. 138-144:

*Pectiniunguis ascendens* n.sp., ♀ holotype (Brazil: Amazonas: Rio Tarumã Mirim).

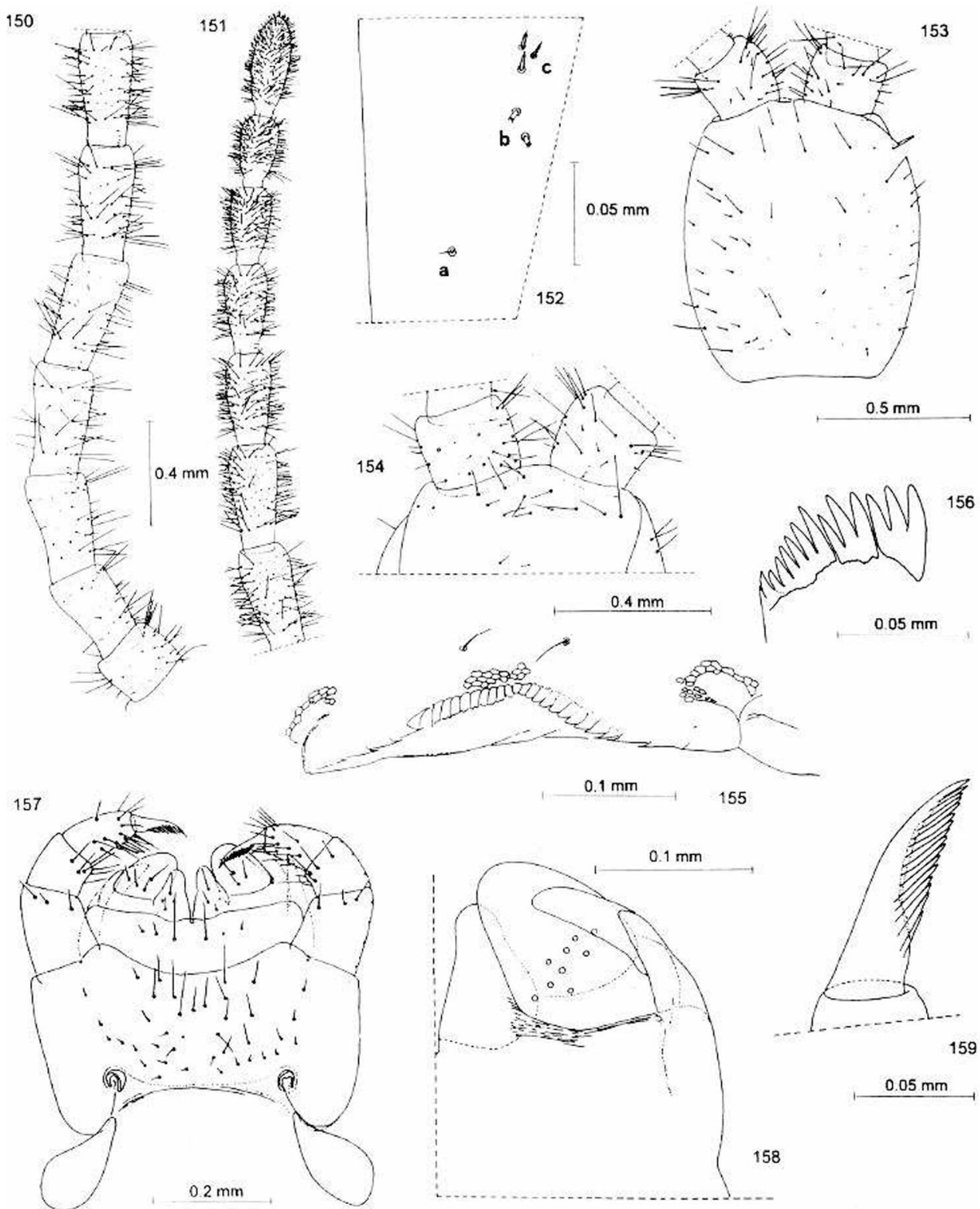
138-141: sternum VIII, XII, XX, XXIV; 142: last leg-bearing segment and terminal segments, v.; 143: the same, d.; 144: detail of I. coxal organs, v.



Figs. 145-149:

*Pectiniunguis ascendens* n.sp., ♂ allotype (Brazil: Amazonas: Rio Tarumã Mirim).

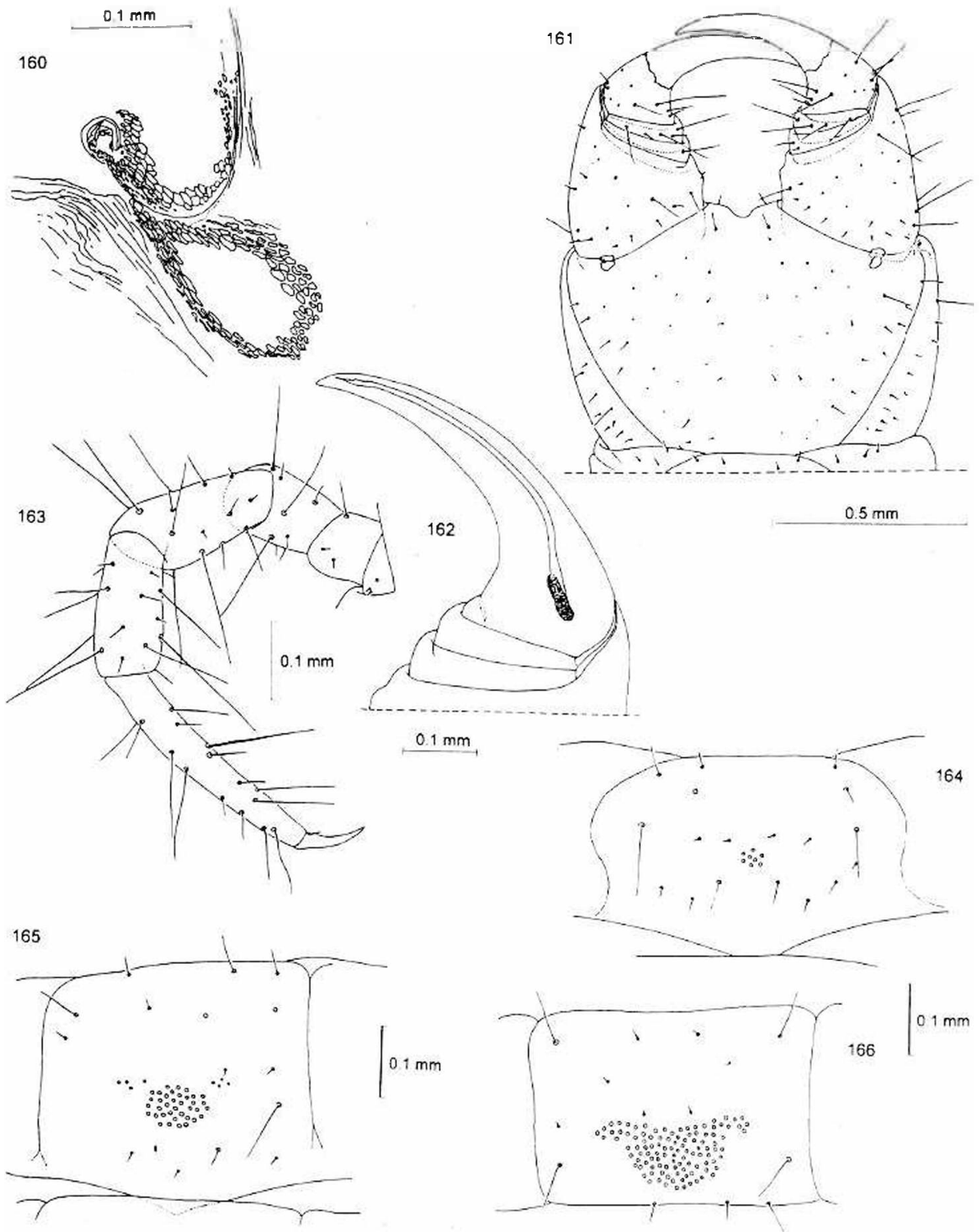
145: last leg-bearing segment and terminal segments, v.; 146: the same, d.; 147: detail of distal end of last podomere of r. last leg, d.; 148: genital region, v.; 149: r. gonopod, v.



Figs. 150-159:

*Schendylurus amazonicus* n.sp., ♂ holotype (Brazil: Amazonas: Rio Taramã Mirim).

150: r. a.a. I-VII, v.; 151: r. a.a. VIII-XIV, v.; 152: r. a.a. V, v.; 153: cephalic shield; 154: clypeus and basis of antennae; 155: labrum; 156: dentate lamella of mandible; 157: first and second maxillae, v.; 158: r. first maxilla, d.; 159: claw of r. second maxilla, v.

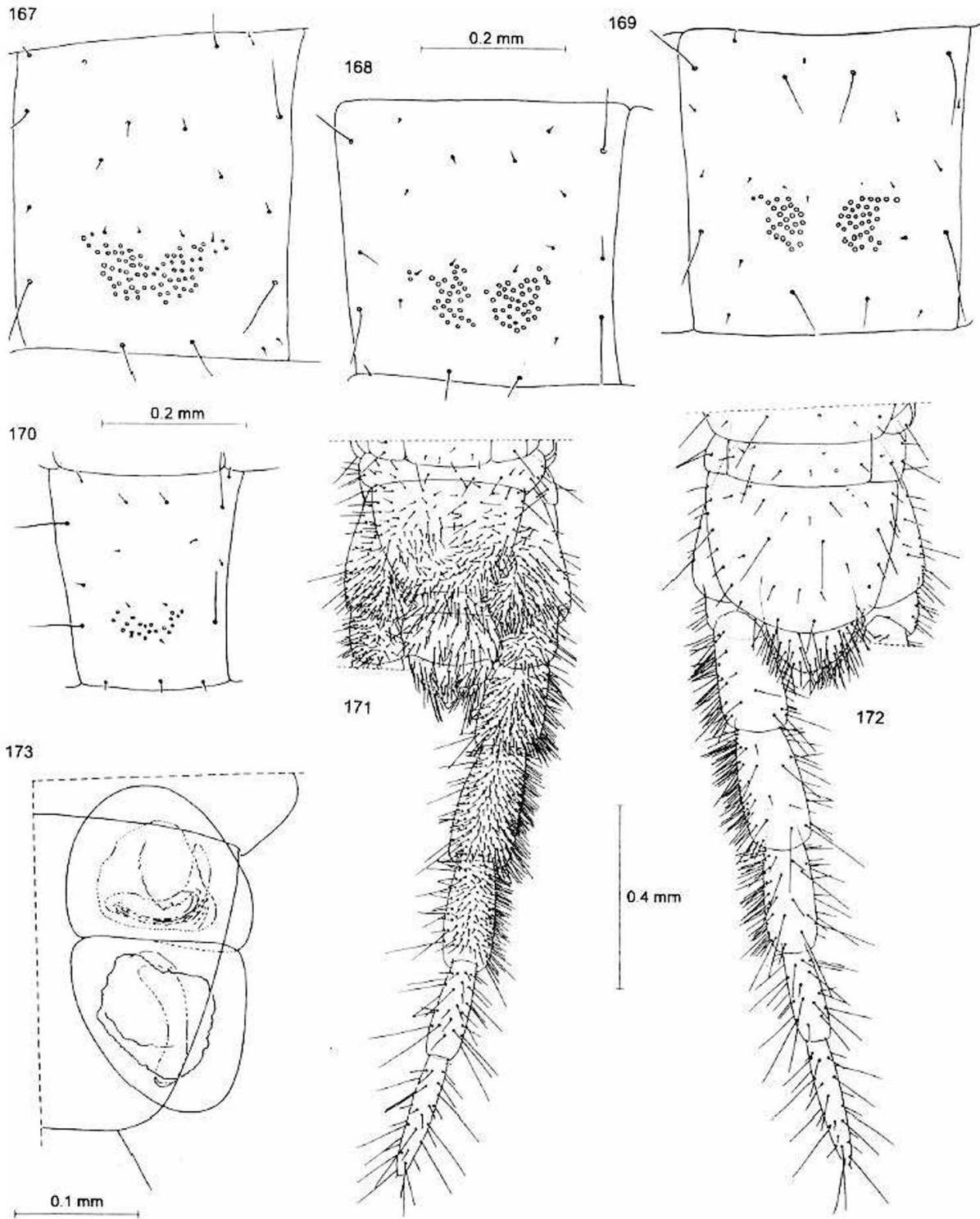


Figs. 160-166:

*Schendylurus amazonicus* n.sp., ♂ holotype (Brazil: Amazonas: Rio Tarumã Mirim).

160: detail of posterior external region of the 1. second maxillae, v.; 161: forcipular segment with poison claws, v.; 162: detail of poison gland in 1. poison claw, v.; 163: r. leg LX, antero-v.; 164-166: stema I, II, X.



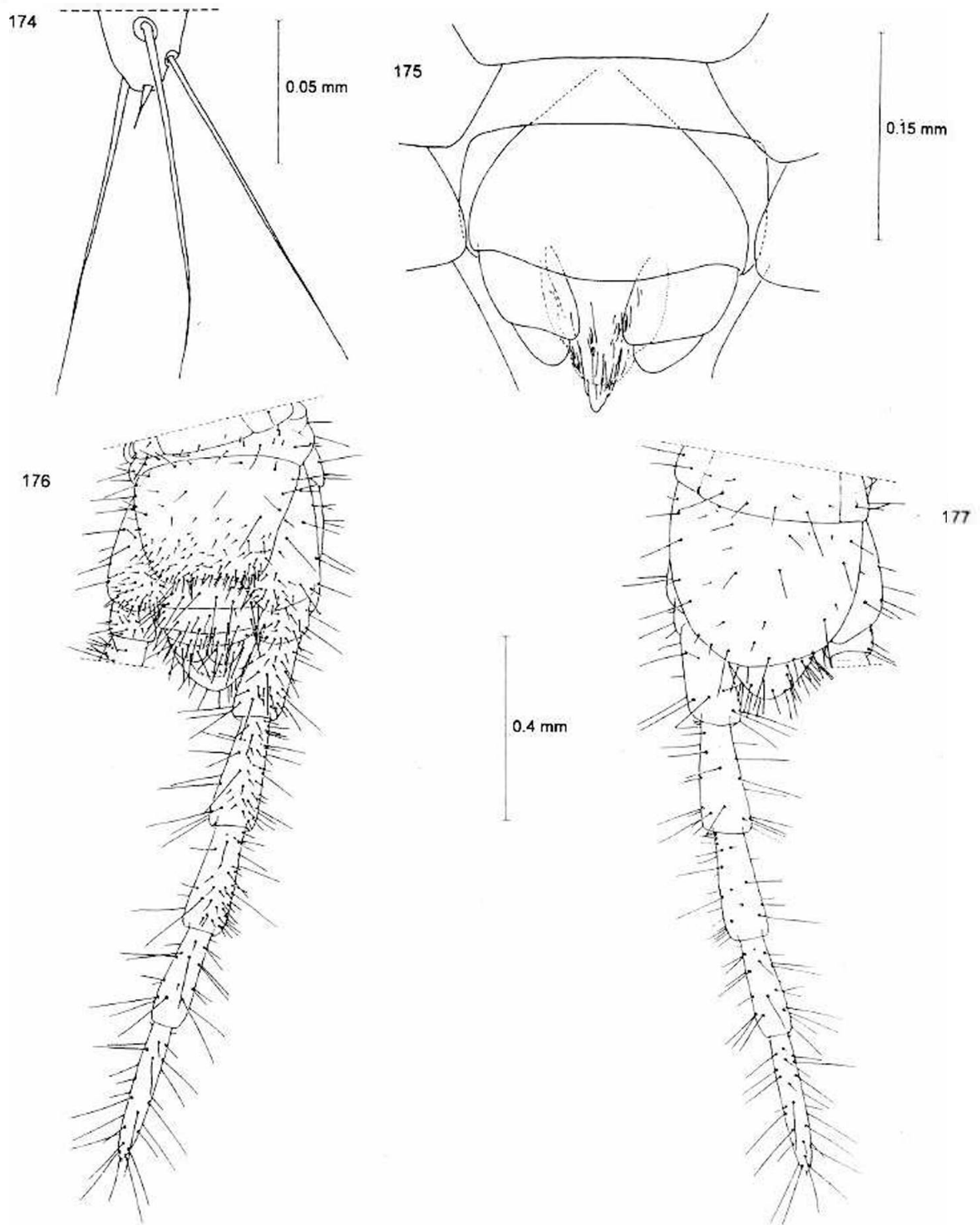


Figs. 167-173:

*Schendylurus amazonicus* n.sp., ♂ holotype (Brazil: Amazonas: Rio Tarunã Mirim).

167-170: sterna XXVI, XXVII, XXVIII, LIX; 171: last leg-bearing segment and terminal segments, v.;

172: the same, d.; 173: detail of I. coxal organs, v.



Figs. 174-175:

*Schendylurus amazonicus* n.sp., ♂ holotype (Brazil: Amazonas: Rio Tarumã Mirim).

174: detail of distal end of last podomere of r. last leg, v.; 175: genital region, v.

Figs. 176-177:

*Schendylurus amazonicus* n.sp., ♀ allotype (Brazil: Amazonas: Rio Tarumã Mirim).

176: last leg-bearing segment and terminal segments, v.; 177: the same, d.