

A new species of *Ityphilus* (Chilopoda: Geophilomorpha: Ballophilidae) from the tropical rainforest of French Guiana, northern South America

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Ityphilus geoffroyi sp. nov. (Chilopoda: Geophilomorpha: Ballophilidae) is herein described and illustrated from the holotype female, paratype male and additional non type specimens collected in French Guiana. The new species is characterized by having the internal edge of the forcipular tarsungulum partially serrate; antennae apically distinctly thickened; ventral pore-fields present in an uninterrupted series along the entire body length; all pore-fields undivided; and sternite of leg-bearing segment 1 bearing a pore-field. It is compared in detail with *I. demoraisi* Pereira, Minelli & Barbieri, 1995 (from Brazil) and *I. guianensis* Chamberlin, 1921 (from Guyana) which share these five combined traits and have a roughly similar range of leg-bearing segments. *Ityphilus geoffroyi* sp. nov. is only the fourth geophilomorph centipede recorded from this vast French overseas Department in northern South America, the others being *I. betschi* Pereira, 2010 (Ballophilidae), *Schendylops tropicus* (Brölemann & Ribaut, 1911) (Schendylidae), and *Ribautia proxima* Pereira, Minelli & Barbieri, 1995 (Geophilidae).

Keywords: Geophilomorpha; Ballophilidae; *Ityphilus*; new species; Neotropical region

Introduction

The geophilomorph centipede genus *Ityphilus* Cook, 1899 is the most speciose and widespread of the 11 ballophilid genera represented in the Neotropics. Of the 19 Neotropical species currently recognized in the taxon, 11 (in addition to the new species described below) are distinguished by having the internal edge of the forcipular tarsungulum serrate: *I. betschi* Pereira, 2010 (from French Guiana); *I. crabilli* Pereira, Minelli & Barbieri, 1994 (from Brazil); *I. demoraisi* Pereira, Minelli & Barbieri, 1995 (from Brazil); *I. donatellae* Pereira, 2012 (from Brazil); *I. grandis* (Turk, 1955) (from Peru); *I. guianensis* Chamberlin, 1921 (from Guyana); *I. krausi* Pereira & Minelli, 1996 (from Peru); *I. mauriesi* Demange & Pereira, 1985 (from French Lesser Antilles: Guadeloupe); *I. perrieri* (Brölemann, 1909) (from Brazil); *I. saucius* Pereira, Foddai & Minelli, 2000 (from Brazil); and *I. sensibilis* Pereira, Foddai & Minelli, 2000 (from Brazil). In the latter the forcipular tarsungulum is entirely serrate (partially serrate in the others).

Of the eight remaining species, five have a smooth forcipular tarsungulum: *I. cavernicolus* (Matic, Negrea & Fundora Martinez, 1977) (from Cuba); *I. idanus*

Crabill, 1960 (from Antigua and Barbuda); *I. lilacinus* Cook, 1899 (from Bahamas, Cuba, USA); *I. palidus* (Matic, Negrea & Fundora Martinez, 1977) (from Cuba); and *I. polypus* (Matic, Negrea & Fundora Martinez, 1977) (from Cuba). For the other three taxa (*I. calinus* Chamberlin, 1957 (from Colombia); *I. savannus* Chamberlin, 1943 (from Mexico) and *I. ceibanus* Chamberlin, 1922 (from Honduras)) the original descriptions do not state whether the forcipular tarsungulum is serrate or smooth. The latter species was described on the basis of a single incomplete specimen (with the posterior end of the body missing); for this reason it is even doubtful whether it really belongs to the genus.

The purpose of the present contribution is to describe a new species of *Ityphilus* characterized by having the forcipular tarsungulum serrate from material collected in French Guiana. The discovery of the new taxon represents the second record of this genus and family in this vast French overseas Department of northern South America.

Recent contributions to the knowledge of the species of *Ityphilus* from the Neotropical region include Bonato et al. (2007), Demange & Pereira (1985), Foddai et al. (2000, 2002, 2004), Pereira (2010,

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2012), Pereira & Minelli (1996), Pereira et al. (1994, 1995, 2000).

Material and methods

The holotype and paratype hereby designated are deposited at the Muséum national d'Histoire naturelle, Paris (MNHN); other non type material is deposited at the same institution.

Dissections were performed with the aid of a stereomicroscope and standard dissecting tools. The specimens were examined and illustrated in detail, using a compound microscope equipped with a drawing tube attachment (the latter was used to delineate the figures, and also measured directly in mm with an objective micrometer). Temporary mounts have been prepared by direct transfer of the specimens from the preservation liquid (70% ethanol) onto microscope slides, using undiluted 2-phenoxyethanol (CAS No. 122-99-6) as a clearing agent and mounting medium. No additional steps were carried out before mounting (slides were temporarily stored in hermetic acrylic boxes to avoid evaporation of this fluid). Details of the preparation of microscope slides and dissection procedures are described in Pereira (2000), Foddai et al. (2002). All measurements are given in mm. Terminology for external anatomy follows Bonato et al. (2010). The following abbreviation is used in the text and legends of the figures: aa – antennal article/articles.

Results

Family BALLOPHILIDAE

Genus *Ityphilus* Cook, 1899

Diagnosis

This genus can be distinguished from the other genera currently recognized in the family Ballophilidae by the following particular combination of features. Antennae somewhat curved in the middle to truly geniculate, distally slightly thickened to strongly clavate. Mid-piece of labrum membranous, without teeth or with minute hair-like structures. Forcipular coxosternite with incomplete to nearly complete chitin-lines. Internal edge of forcipular tarsungulum smooth or serrate. Ventral pore-fields of anterior region of the body single (subcircular to transversely elliptical in shape), those of posterior region, single or divided into two areas. Coxopleura of the last leg-bearing segment each with two internal coxal organs of simple structure ("homogeneous coxal glands", *sensu* Brölemann & Ribaut 1912). Legs of the ultimate pair with seven articles, ultimate pretarsus setiform, basally tubercle-like and usually accompanied by a minute spine.

Type species of the genus

Ityphilus lilacinus Cook, 1899, by original designation.

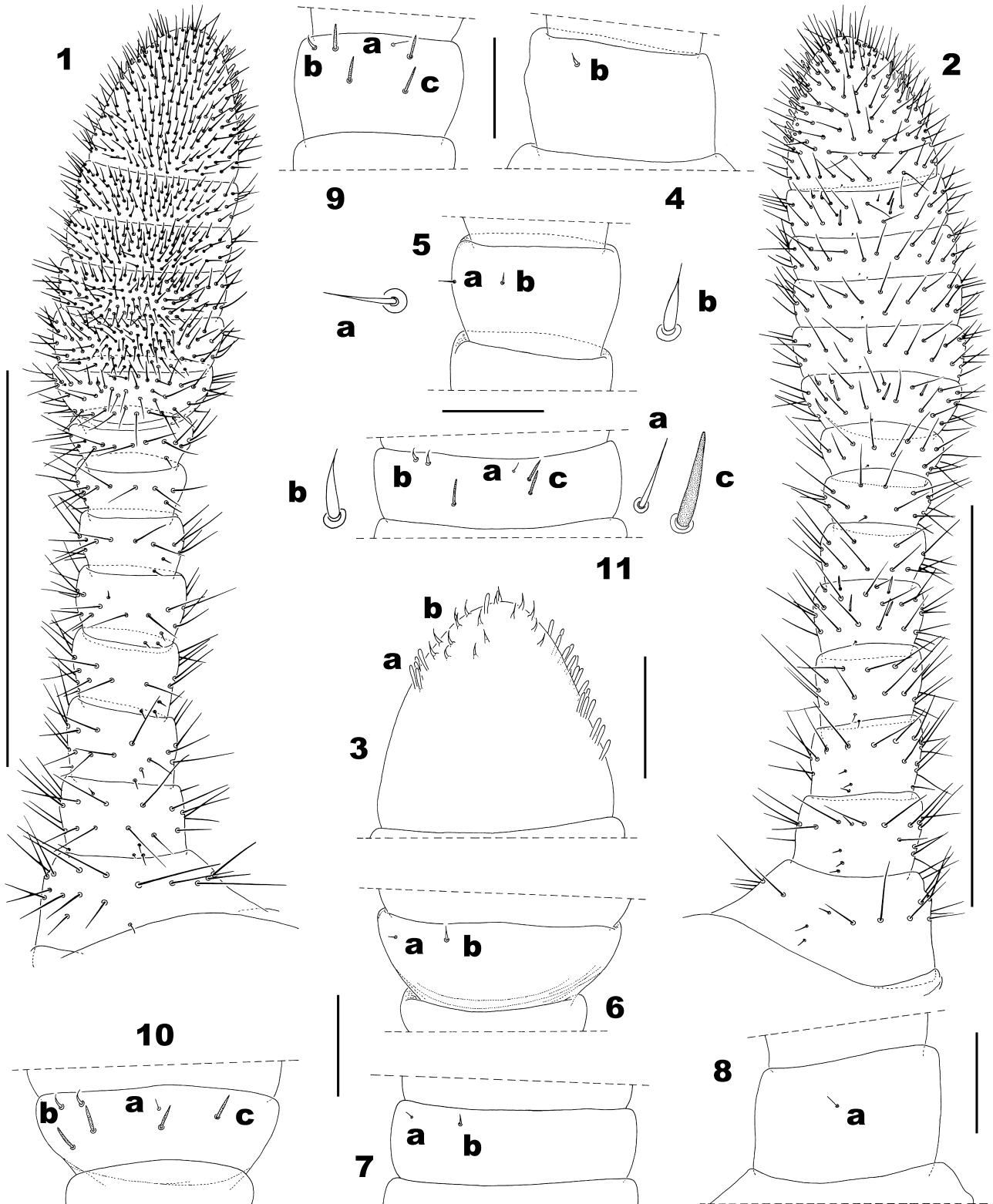
Ityphilus geoffroyi sp. nov. (Figures 1–52)

Diagnosis

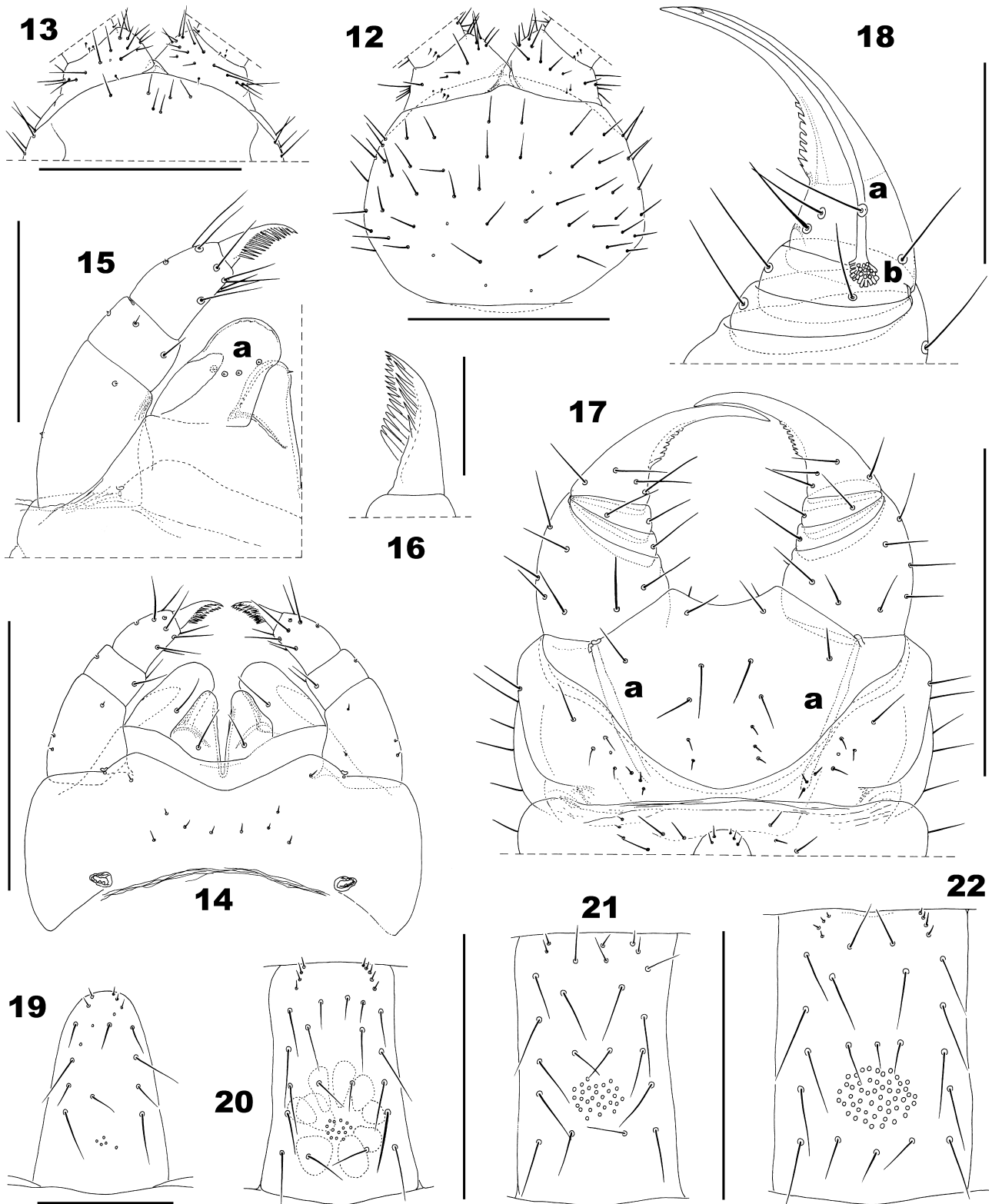
A Neotropical species of *Ityphilus* with internal edge of forcipular tarsungulum partially serrate; antennae apically distinctly thickened; ventral pore-fields present in an uninterrupted series along the entire body length; all pore-fields undivided; sternite of leg-bearing segment 1 with pore-field. The other Neotropical members of the genus sharing these five combined traits (and having a roughly similar range of leg-bearing segments) are *I. demoraisi* Pereira, Minelli & Barbieri, 1995 (Brazil) and *I. guianensis* Chamberlin, 1921 (Guyana).

Ityphilus geoffroyi can be differentiated from *I. demoraisi* by means of the following selected traits (those for the latter are given in parentheses): body length of the female 14 mm, body length of the male 13 mm (female: 32 mm, male 30 mm); male with 47, 51 and probably 49 leg-bearing segments, female with 53 and probably 49, 51 leg-bearing segments (male: 63 or 65, female: 67 or 69); antennae distally strongly clavate (Figures 1, 2) (moderately clavate); ratio of length/width of aa XIV *ca.* 1.02:1 (*ca.* 1.45:1); apical claw of telopodites of second maxillae with 13–14 teeth on dorsal edge (Figure 15), and six on ventral edge (Figure 16) (*ca.* 29 teeth on dorsal edge, *ca.* 20 on ventral edge); claw of legs of pair 1 to penultimate with two accessory spines: one anterior, one posterior (Figures 38, 39) (with three accessory spines: one anterior, two posterior); width of ultimate leg-bearing segment/width of penultimate leg-bearing segment *ca.* 1.40:1 in the male, *ca.* 1.30:1 in the female (*ca.* 1.63:1 in the male, *ca.* 1.70:1 in the female).

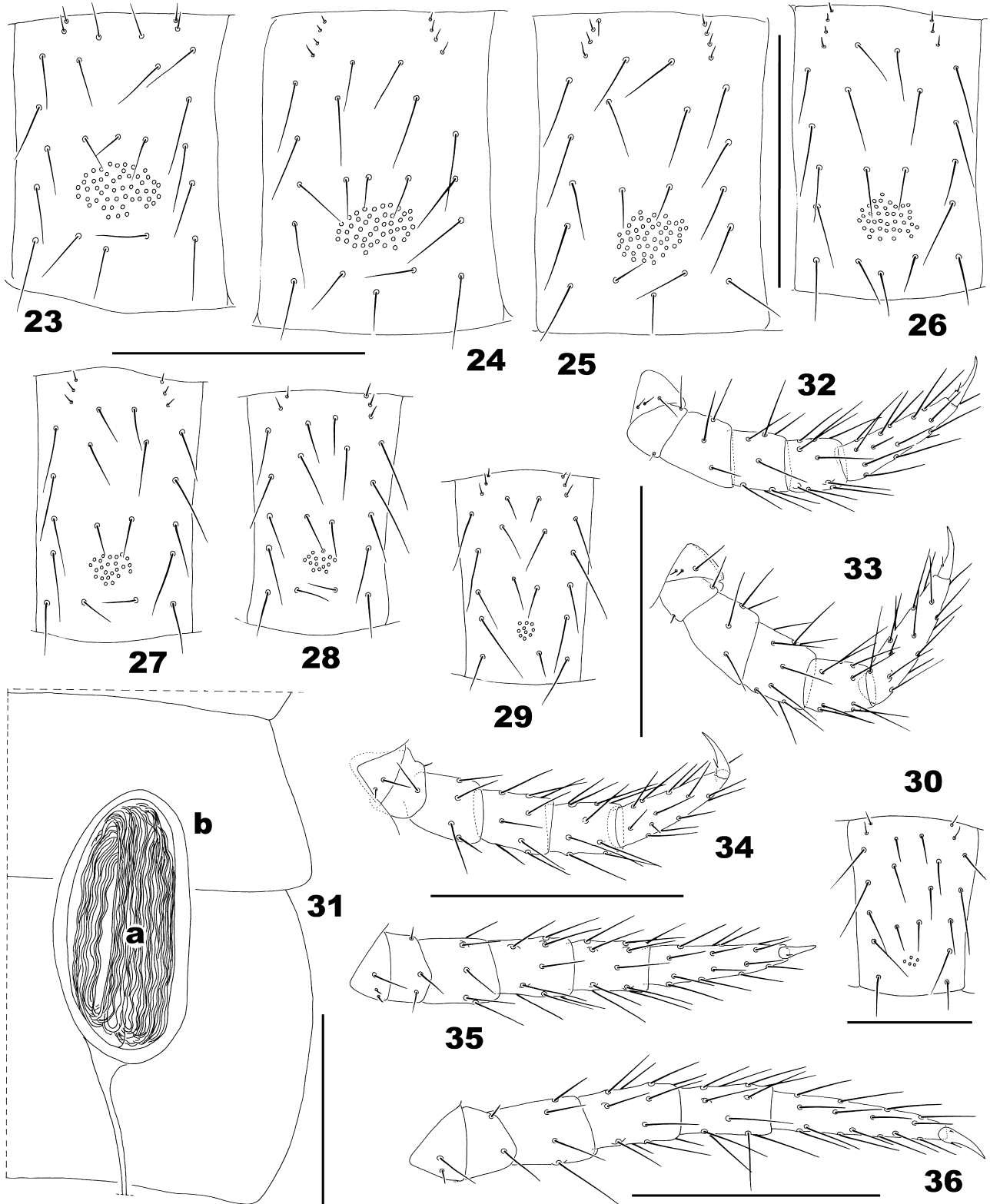
Ityphilus geoffroyi can be differentiated from *I. guianensis* by means of the following selected traits (those for the latter are given in parentheses): body length of female 14 mm, body length of male 13 mm (23 mm (male?)); male with 47, 51 and probably 49 leg-bearing segments, female with 53 and probably 49, 51 leg-bearing segments (49, 55 (male?)); antennae basally overlapping medially (Figure 12) (antennae basally not overlapping medially); anterior portion of the lateral margins of cephalic plate slightly converging anteriorly (Figure 12) (lateral margins slightly convex); ratio of width/length of cephalic plate *ca.* 1.15:1 (*ca.* 1.05:1); dentate lamellae of mandibles with all teeth of similar size (Figure 45) ("mandible with about eleven teeth of which the most ventral are



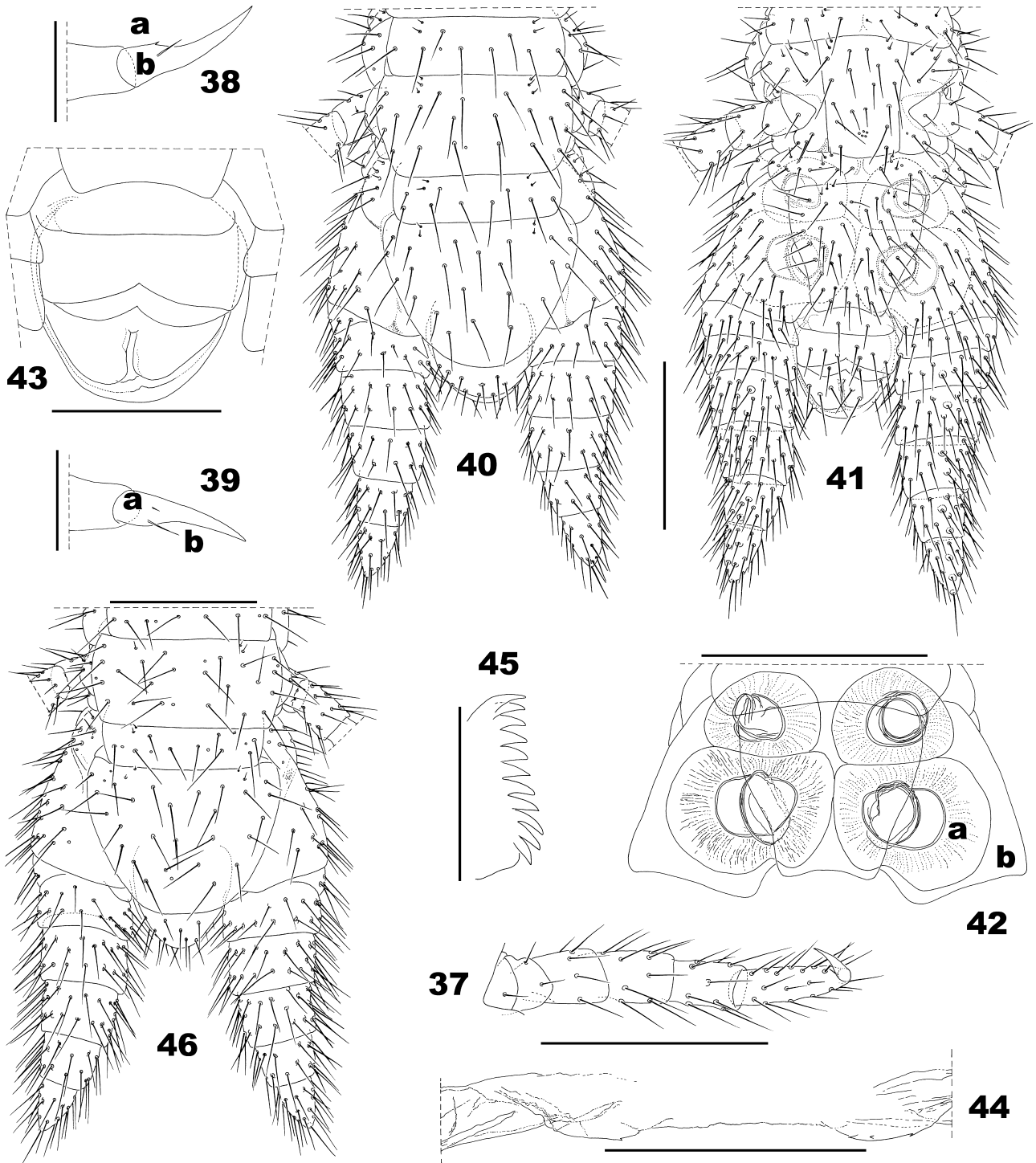
Figures 1–11. *Ityphilus geoffroyi* sp. nov. (female holotype; French Guiana: piste de St. Elie: 16 km from Sinnamary): 1, left antenna, ventral; 2, left antenna, dorsal; 3, right aa XIV, dorsal (a: claviform sensilla, b: apical specialized sensilla); 4, left aa II, ventral (b: *b* type sensilla); 5, left aa V, ventral (a, b: *a, b* type sensilla); 6, left aa IX, ventral (a, b: *a, b* type sensilla); 7, left aa XIII, ventral (a, b: *a, b* type sensilla); 8, left aa II, dorsal (a: *a* type sensilla); 9, left aa V, dorsal (a, b, c: *a, b, c* type sensilla); 10, left aa IX, dorsal (a, b, c: *a, b, c* type sensilla); 11, left aa XIII, dorsal (a, b, c: *a, b, c* type sensilla). Scale bars: 0.05 mm (3–11); 0.3 mm (1, 2).



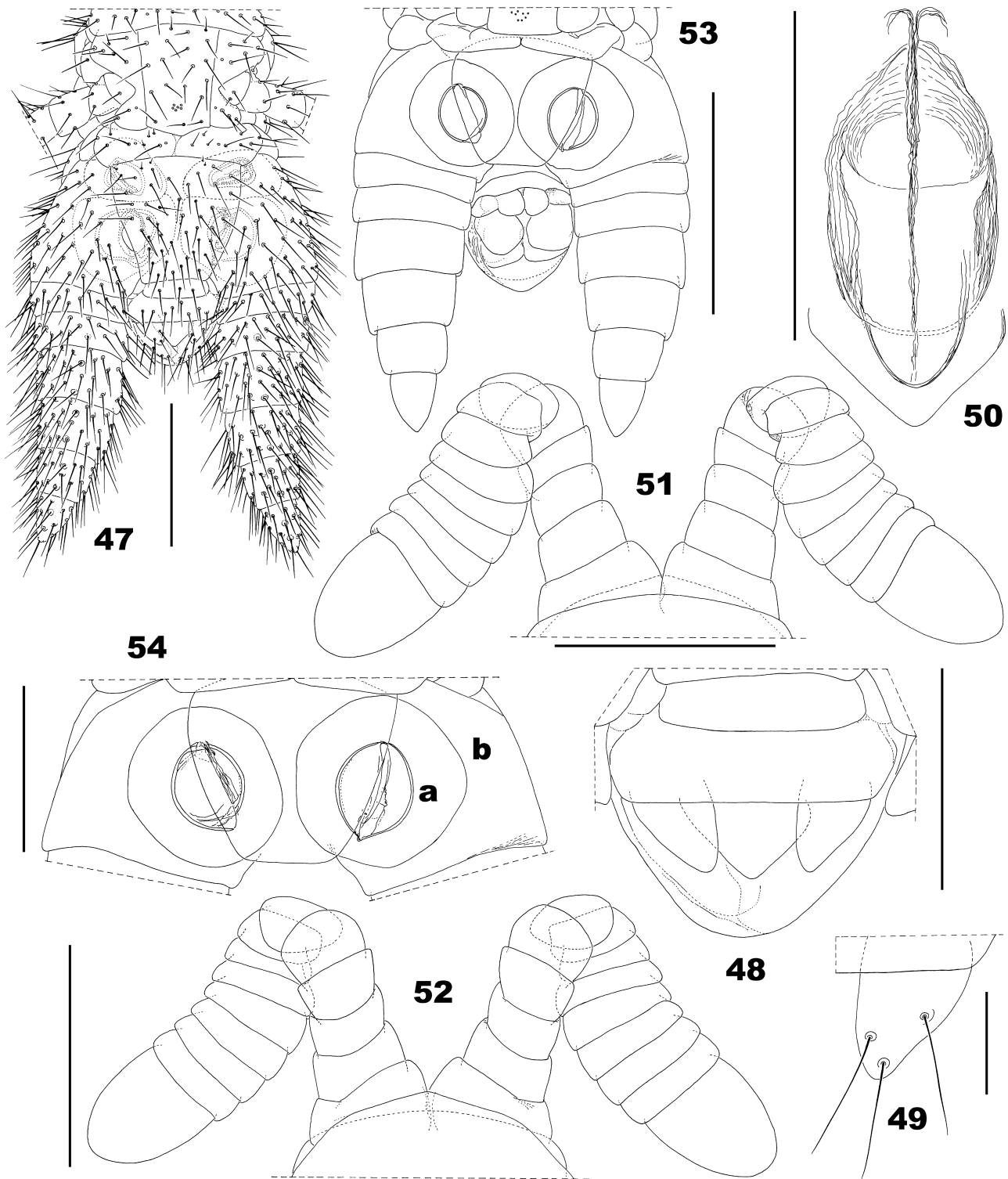
Figures 12–22. *Ityphilus geoffroyi* sp. nov. (female holotype; French Guiana: piste de St. Elie: 16 km from Sinnamary): 12, cephalic plate and bases of antennae; 13, clypeus and bases of antennae; 14, first and second maxillae, ventral; 15, left side of first maxillae and left telopodite of second maxillae, dorsal (a: sensilla); 16, claw of left telopodite of second maxillae, ventral; 17, forcipular segment, ventral (a: chitin-lines); 18, detail of duct (a) and calyx (b) of poison gland in left forcipular telopodite, ventral; 19, sternite 1; 20, sternite 2; 21, sternite 5; 22, sternite 12. Scale bars: 0.03 mm (16); 0.1 mm (15, 18, 19); 0.2 mm (12, 14, 20–22); 0.3 mm (13, 17).



Figures 23–36. *Ityphilus geoffroyi* sp. nov. (female holotype; French Guiana: piste de St. Elie; 16 km from Sinnamary): 23, sternite 20; 24, sternite 28; 25, sternite 36; 26, sternite 43; 27, sternite 47; 28, sternite 50; 29, sternite 51; 30, sternite 52; 31, posterior spermatheca at level of leg-bearing segment 49, dorsal (a: spermatozoa, b: contour of spermatheca); 32, left leg (pair 1), posteroventral view; 33, left leg (pair 2), posteroventral view; 34, left leg (pair 5), ventral; 35, left leg (pair 11), ventral; 36, left leg (pair 34), ventral. Scale bars: 0.1 mm (30, 31); 0.2 mm (23–29, 32–36).



Figures 37–46. 37–43: *Ityphilus geoffroyi* sp. nov. (female holotype; French Guiana: piste de St. Elie: 16 km from Sinnamary): 37, left leg (pair 52), ventral; 38, claw of the left leg (pair 20), posteroventral view (a: anterior spine, b: posterior spine); 39, claw of the left leg (pair 25), anteroventral view (a: anterior spine, b: posterior spine); 40, penultimate and ultimate leg-bearing segments, and postpedal segments, ventral; 41, penultimate and ultimate leg-bearing segments, and postpedal segments, dorsal; 42, coxal organs, ventral (a: mucous layer; b: contour of lobe); 43, contour of postpedal segments, ventral. 44–46: *Ityphilus geoffroyi* sp. nov. (male paratype; French Guiana: piste de St. Elie: 16 km from Sinnamary): 44, labrum; 45, dentate lamella of right mandible; 46, penultimate and ultimate leg-bearing segments, and postpedal segments, dorsal. Scale bars: 0.03 mm (38, 39); 0.05 mm (45); 0.1 mm (43, 44); 0.2 mm (37, 40–42, 46).



Figures 47–54. 47–50: *Ityphilus geoffroyi* sp. nov. (male paratype; French Guiana: piste de St. Elie: 16 km from Sinnamary): 47, penultimate and ultimate leg-bearing segments, and postpedal segments, ventral; 48, contour of postpedal segments, ventral; 49, left gonopod, ventral; 50, penis, dorsal. 51–54: *Ityphilus geoffroyi* sp. nov. (juvenile (specimen A); French Guiana: piste de St. Elie: 16 km from Sinnamary): 51, contour of antennae, ventral; 52, contour of antennae, dorsal; 53, contour of ultimate leg-bearing segment and postpedal segments showing coxal organs, ventral; 54, detail of coxal organs, ventral (a: mucous layer; b: contour of lobe). Scale bars: 0.03 mm (49); 0.1 mm (48, 50, 54); 0.2 mm (47, 51–53).

largest" (Chamberlin 1921)); chitin-lines of forcipular coxosternite complete (Figure 17) ("prosternum with chitinous lines present, these light" (Chamberlin 1921)); internal edge of forcipular tarsungulum with *ca.* 8 teeth (Figures 17, 18) (with *ca.* 4–5 teeth?); shape of pore-fields: on sternites 1 to 3–4 and last three, subcircular in form, on the remaining sternites transversely subovoidal (Figures 19–30) ("ventral pores present in a circular area on all sternites" (Chamberlin 1921)); surface of tergites and pretergites smooth ("dorsal plates conspicuously roughened with transverse ridges or series of short rugae or tubercles which bear setae" (Chamberlin 1921)); coxal organs irregular in shape (Figures 42, 47) (subcircular); sternite of the ultimate leg-bearing segment slightly wider than long in the female with length/width ratio *ca.* 0.93:1 (Figures 41, 42), about as long as wide in the male with length/width ratio *ca.* 0.97:1 (Figure 47) (much longer than wide, length/width ratio *ca.* 1.28:1 (male?)).

Remarks

The differential characters listed in the previous lines are stable enough in ballophilids for the above material to be confidently considered as belonging to a new species.

For characters differentiating *I. geoffroyi* sp. nov. from other Neotropical species of *Ityphilus*, see Discussion below.

Type material examined

French Guiana: piste de St. Elie: 16 km from Sinnamary, *ca.* 73 m asl, (Lat (DMS) 04°49'60" N, Long (DMS) 53°16'60" W), J.-M. Betsch legit, 5 May 1980: holotype female, 53 leg-bearing segments, body length 14 mm; *ibid.*, 26 March 1977: paratype male, 51 leg-bearing segments, body length 13 mm (MNHN Collection Myriapodes et Onychophores: M355).

Other material examined

All specimens are from the same locality and have the same collector as the type series; 30 March 1977: 1 juvenile male, 51 leg-bearing segments, body length 12 mm, and 1 juvenile (sex unknown) with 1 + 1 coxal organs only, 49 leg-bearing segments, body length 7 mm; 22 April 1978: 1 juvenile (sex unknown) with 1 + 1 coxal organs only, 51 leg-bearing segments, body length 8 mm (specimen "A"); 5 May 1980: 1 juvenile male, 47 leg-bearing segments, body length 9 mm (MNHN Collection Myriapodes et Onychophores: M355).

Description

Female holotype. Fifty-three leg-bearing segments, body length 14 mm. Trunk attenuate in anterior and posterior regions, except of ultimate leg-bearing segment which is about 1.3 times as wide as the penultimate (Figures 40, 41). Width of selected leg-bearing segments as follows: 1 (0.38 mm); 3 (0.30 mm); 6 (0.34 mm); 13 (0.40 mm); 19 (0.47 mm); 21 (0.52 mm); 28 (0.60 mm); 33 (0.63 mm); 40 (0.56 mm); 44 (0.47 mm); 47 (0.37 mm); 52 (0.27 mm); 53 (0.35 mm). Width of cephalic plate 0.42 mm. Width of forcipular coxosternite 0.38 mm. Ground color (of specimen preserved in alcohol) pale ocher.

Antennae. About 1.93 times as long as cephalic plate, conspicuously geniculate, distally strongly clavate (Figures 1, 2). Basal aa overlapping medially (Figure 12). Ratio of width of aa X (= widest aa of distal antennal half)/width of aa VI (= narrowest aa of basal antennal half) 1.66:1. Apical club extending over aa IX to XIV of which aa IX is transitional, being narrow basally and considerably widened distally (Figures 1, 2). Antennal article XIV apically blunt, a little longer than the three previous articles taken together (length of aa XIV/length of aa XI–XIII, 1.10:1). Length/width ratio of left aa I–XIV (in dorsoventral position) as follows: I (0.46:1); II (0.66:1); III (0.72:1); IV (0.78:1); V (0.76:1); VI (0.65:1); VII (0.62:1); VIII (0.53:1); IX (0.47:1); X (0.30:1); XI (0.31:1); XII (0.29:1); XIII (0.31:1); XIV (1.02:1). Ventral chaetotaxy: setae on aa I to VIII of various lengths, and relatively few in number, those of aa IX to XIV much shorter and very numerous (Figure 1). Dorsal chaetotaxy: setae on aa I to VIII similar to those on ventral side, setae on aa IX to XIV much longer and less numerous than those on ventral side (Figure 2). Aa XIV with 14–17 claviform sensilla on external border, 5 on internal border and 1 on apex (Figure 3a); distal end of this aa with 17 very small hyaline specialized sensilla apparently not split apically (Figure 3b). Ventral and dorsal surface of aa II, V, IX, and XIII with very small specialized sensilla. Ventrally, sensilla restricted to apical latero-internal area (Figures 4–7), and represented by two different types: *a* and *b*. Type *a* sensilla very thin and not split apically (Figure 5a); type *b* sensilla (Figure 5b) very similar to those on the apex of aa XIV. Specialized sensilla on dorsal side distributed on apical half of the specified aa (Figures 8–11), and represented by three different types: *a* and *b* similar to *a* and *b* of ventral side (Figure 11a, b), and type *c* sensilla "spine-like", larger, not divided apically, and slightly darker (pale brownish–ochreous) (Figure 11c). Number and distribution of specialized sensilla on ventral and dorsal sides of aa II, V, IX, and XIII as in Table 1.

Table 1. Number of type *a*, *b* and *c* sensilla on aa II, V, IX and XIII in the female holotype of *Ityphilus geoffroyi* sp. nov.

	Ventral		Dorsal			Figures
	<i>a</i>	<i>b</i>	<i>a</i>	<i>b</i>	<i>c</i>	
II		1	1			4,8
V	1	1	1	1	4	5,9
IX	1	1	1	2	4	6,10
XIII	1	1	1	2	3	7,11

Cephalic plate. About as wide as forcipular tergite; slightly wider than long (width/length 1.15:1); shape and chaetotaxy (as in Figure 12).

Clypeus. With 2 + 2 setae near anterior margin and 1 + 1 setae in the center (Figure 13).

Labrum. Poorly pigmented; mid-piece membranous, smooth, slightly and irregularly undulated; side-pieces with 1 + 3 diminutive sharply pointed denticles. (Compare with Figure 44, illustrating the labrum of a male paratype.)

Mandibles. Dentate lamella with all teeth of similar size, not subdivided into blocks, 11 teeth in right mandible and 8 teeth in left mandible; pectinate lamella with 23–25 hyaline teeth. (Compare with Figure 45, illustrating the mandible of a male paratype.)

First maxillae. Coxosternite without lappets, telopodites bearing lappets (Figure 15). Coxosternite devoid of setae; coxal projections subtriangular, round tipped and provided with 1 + 1 setae (Figure 14). Telopodites apparently without visible suture between presumptive basal and distal articles, ventral surface with 1 + 1 setae on central part of medial edge (Figure 14), dorsal surface with 4 + 4 sensilla (distributed as in Figure 15).

Second maxillae. Coxosternite without any trace of suture along sagittal plane and provided with 5 + 5 setae (arranged as in Figure 14). Apical claw of telopodites well developed, bipectinate, dorsal edge with 13–14 teeth (Figures 15, 16), ventral edge with 6 teeth (Figure 16).

Forcipular segment. When closed, telopodites not extending beyond anterior margin of head. Forcipular tergite wider than tergite of first leg-bearing segment (ratio 1.18:1), chaetotaxy represented by two irregular transverse rows each of 15–16 setae. Coxosternite: with complete chitin-lines (Figure 17a); maximum width/length at the middle 2.08:1; central part of anterior margin (as in Figure 17). Telopodites: all articles without teeth; trochanteroprefemur with greatest length/greatest width 1.11:1; internal edge of tarsungula serrate on proximal half, bearing 8 teeth

(Figure 17), left tarsungulum (as in Figure 18). Calyx of poison gland with shape and relative size (as in Figure 18). Shape and chaetotaxy of coxosternite and telopodites (as in Figure 17).

Sternites of leg-bearing segments 1 to penultimate. Pore-fields present in an uninterrupted series from sternite 1 to penultimate inclusive. All pore-fields undivided and located on subcircular or subovoidal raised prominences; pore-fields on sternites 1 to 3–4 and last three sternites subcircular, those on remaining sternites transversally subovoidal. Form and relative size of pore-fields changing along trunk (as in Figures 19–30). Number of pores on selected sternites as follows: sternite 1 (5); 2 (14); 5 (28); 12 (52); 20 (51); 28 (45); 36 (46); 43 (39); 47 (24); 50 (15); 51 (10); 52 (5).

Legs (pair 1 to penultimate). First pair about as long as second (relative size as in Figures 32, 33); chaetotaxy of legs similar throughout entire body. Distribution, number and relative size of setae (as in Figures 32–37). Claws with two thin and pale accessory spines ventrobasally, one anterior very small (Figures 38, 39a) and one posterior much larger (Figures 38, 39b).

Ultimate leg-bearing segment. About 1.3 times as wide as penultimate; intercalary pleurites present at both sides of ultimate pretergite; ultimate presternite divided along sagittal plane; length/width of tergite 0.75:1; length/width of sternite 0.93:1. Shape and chaetotaxy of tergite and sternite (as in Figures 40, 41). Coxopleura very slightly protruding at distal-internal ventral ends, setae distributed on almost the whole ventral and lateral surfaces, dorsal side with setae on external half only (Figures 40, 41). Two single (“homogeneous”) coxal organs in each coxopleuron, the anterior being smaller than the posterior (Figure 42), coxal pores opening on membrane between coxopleuron and sternite, partially covered by the latter (Figures 41, 42), internal cuticular structure of coxal organs as shown in Figure 42 (a: mucous layer). Ultimate legs with seven articles. Articles strongly thickened, subconically narrowing from base to distal end, width of trochanter/width of tarsus 2 2.61–2.67:1. Length of telopodites of ultimate legs/length of sternite 2.20:1. Length of telopodites of ultimate legs/length of legs of the penultimate pair 0.89:1. Shape and chaetotaxy of ultimate legs (as in Figures 40, 41).

Postpedal segments. Intermediate tergite with posterior margin convex (Figure 40); intermediate sternite with posterior margin straight to very slightly convex, posterior margin of first genital sternite notched in midline (likely an artifact) (Figures 41, 43). Gonopods uniaarticulate, contiguous in midline, each bearing a single seta (Figures 41, 43).

Male paratype. Fifty-one leg-bearing segments, body length 13 mm, maximum body width 0.55 mm. All features similar to those of female except for shape and chaetotaxy of ultimate leg-bearing segment and post-pedal segments.

Ultimate leg-bearing segment. About 1.40 times as wide as penultimate; length/width of tergite 0.75:1; length/width of sternite 0.97:1. Shape and chaetotaxy of tergite and sternite (as in Figures 46, 47). Coxopleura very slightly protruding at their distal-internal ventral ends, setae distributed on whole ventral and lateral surfaces, dorsal side with setae on external half only (Figures 46, 47). Articles of ultimate legs strongly thickened, subconically narrowing from base to distal end (width of trochanter/width of tarsus 2.2.90:1). Length of telopodites of ultimate legs/length of sternite 2.1:1. Shape and chaetotaxy of ultimate legs (as in Figures 46, 47).

Postpedal segments. Intermediate tergite with posterior margin strongly convex (Figure 46), intermediate sternite with posterior border very slightly convex, first genital sternite with posterior margin straight (Figures 47, 48). Gonopods apparently uniarticulate (suture between presumptive basal and distal articles not evident), both gonopods bearing three setae on ventral side (Figures 47, 49). Penis without setae (Figure 50).

Variation

Males with 47, 51 leg-bearing segments; females with 53; juveniles (with sex unknown) show 49 and 51. According to general pattern of variation of segment number in geophilomorph centipedes, 49 and 51 could also correspond to males and females besides males.

Post-embryonic variation of coxal organs

Two of the four juveniles examined here have 1 + 1 coxal organs only in the coxopleura of the ultimate leg-bearing segment, aspect of these organs in specimen "A" (Figures 53, 54). Mature specimens with 2 + 2 coxal organs (Figure 42).

Remarks

Anterior and posterior spermathecae of female holotype at level of leg-bearing segments 46 and 49 respectively, both full of spermatozoa (posterior spermatheca as in Figure 31).

All juveniles having antennae as strongly thickened as those of adult specimens (as in Figures 51, 52).

In the preceding description, the labrum and dentate lamella of mandible were illustrated on the basis of the male paratype, because those of the female

holotype were not positioned in such a way on the microscope slides to allow the corresponding illustrations to be made.

Etymology

The species is respectfully dedicated to my distinguished colleague Dr. Jean-Jacques Geoffroy of the Muséum national d'Histoire naturelle (Department Ecologie et Gestion de la Biodiversité, Brunoy, France).

Ecology

The specimens described above were collected in a tropical rainforest environment in equatorial Amazonia.

Type locality

French Guiana: piste de St. Elie: 16 km from Sinnamary.

Known range

Only known from the type locality.

Discussion

Ten Neotropical species of *Ityphilus* (in addition to the new taxon described above), are distinguished by having the internal edge of the forcipular tarsungulum partially serrate. *Ityphilus geoffroyi* sp. nov. is herein compared in detail with two of these taxa: *I. demoraisi* and *I. guianensis*, which, like the new species, are characterized by having a pore-field on the sternite of the first leg-bearing segment. Among the remaining eight taxa, those devoid of pore-field on the sternite of the first leg-bearing segment that have, like *I. geoffroyi*, antennae apically distinctly thickened, ventral pore-field series present along the entire body length, all pore-fields undivided, and a roughly similar range of leg-bearing segments, are: *I. donatellae*, *I. crabilli*, *I. perrieri*, and *I. saucius*. The new species can be also confidently differentiated from these latter by means of the following selected traits (the corresponding features for *I. geoffroyi* are given in parentheses):

Ityphilus donatellae: male with 41, female with 43 leg-bearing segments, body length of female 11 mm, body length of male 8.5 mm; length of aa XIV/sum of length of aa XI–XIII ca. 1.25:1; aa V without type *c* specialized sensilla; side-pieces of labrum with ca. 3–4 very small and not well-defined teeth, which have a rounded tip and are not sclerotized; sternite of leg-bearing segment 1 without pore-field; claw of legs

(pair 1 to penultimate) with three accessory spines: one anterior, two posterior. (*I. geoffroyi*: male with 47, 51 (and probably 49) leg-bearing segments, female with 53 (and probably 49, 51) leg-bearing segments; body length of female 14 mm, body length of male 13 mm; length of aa XIV/sum of length of aa XI–XIII *ca.* 1.04:1; aa V bearing type *c* specialized sensilla (Figure 9); side-pieces of labrum with 1–3 diminutive sharply pointed denticles (Figure 44); sternite of leg-bearing segment 1 with pore-field; claw of legs (pair 1 to penultimate) with two accessory spines: one anterior, one posterior (Figures 38, 39a,b)).

Ityphilus crabilli: body length 23 mm (female), 16 mm (male); antennae distally moderately clavate; length of aa XIV/sum of length of aa XI–XIII *ca.* 0.85:1; specialized sensilla on apex of aa XIV with two very small apical branches; clypeus markedly pilose with *ca.* 13 setae placed near the anterior margin of head; coxosternite of first maxillae with lappets; forcipular coxosternite with incomplete chitin-lines; sternite of leg-bearing segment 1 without pore-field; claw of legs (pair 1 to penultimate) with three accessory spines: one anterior, two posterior; anterior and posterior coxal organs of similar size (*I. geoffroyi*: antennae distally strongly clavate; specialized sensilla on apex of aa XIV not split apically; clypeus with *ca.* 4 setae placed near the anterior margin of head and 2 setae in the middle; lappets of coxosternite of first maxillae absent; forcipular coxosternite with complete chitin-lines; anterior coxal organs smaller than posterior; (other traits already mentioned above)).

Ityphilus perrieri: 61 (male), 63 (sex unknown) leg-bearing segments; antennae moderately clavate; antennae basally not overlapping medially; labrum without teeth; forcipular coxosternite with incomplete chitin-lines; sternite of leg-bearing segment 1 without pore-field; posterior limit of ventral pore-field series on the antepenultimate sternite; pre-sternite of ultimate leg-bearing segment not divided along the sagittal plane (*I. geoffroyi*: antennae basally overlapping medially (Figure 12); labrum with lateral pieces provided with *ca.* 1 + 3 diminutive sharply pointed teeth; posterior limit of ventral pore-field series on the penultimate sternite; pre-sternite of ultimate leg-bearing segment divided along the sagittal plane (Figures 40, 46); (other traits already mentioned above)).

Ityphilus saucius: female with at least 67 leg-bearing segments; body length (female) at least 22 mm; antennae distally moderately clavate; aa V without type *c* specialized sensilla; coxosternite of first maxillae with lappets; anterior edge of forcipular coxosternite deeply notched at middle; maximum length/maximum width of forcipular trochanteroprefemur *ca.* 1.32:1; sternite of leg-bearing segment 1 without pore-field; sternite of leg-bearing segment 2 without a

well-defined pore-field (only an isolated pore can be present); posterior limit of ventral pore-field series on the antepenultimate sternite (*I. geoffroyi*: anterior edge of forcipular coxosternite not deeply notched at middle; maximum length/maximum width of forcipular trochanteroprefemur *ca.* 1.11:1; sternite of leg-bearing segment 2 with a well defined pore-field; (other traits already mentioned above)).

A key to the Neotropical species of *Ityphilus* with forcipular tarsungulum serrate can be found in Pereira (2012); *I. geoffroyi* sp. nov. may be incorporated in the couplet “7” of that key, grouping it with *I. guianensis* on the basis of the number of leg-bearing segments (i.e., “47 to 55”) in contrast to *I. demoraisi* which has 63, 65, 67 or 69.

As mentioned above, the original descriptions of *I. calinus*, *I. ceibanus*, and *I. savannus* do not state whether the forcipular tarsungulum is serrate or smooth and contain only very scarce and imprecise information on other morphological features. Consequently, an adequate comparison with the new species is difficult because their similarities (and affinities) remain uncertain. Nevertheless, *I. geoffroyi* sp. nov. can also be confidently separated from these latter species by means of the following selected traits (corresponding features for *I. geoffroyi* already mentioned above).

Ityphilus calinus: male with 43 leg-bearing segments; antennae not truly geniculate, distally slightly thickened; length/width of aa XIV *ca.* 1.49:1.

Ityphilus savannus: male with 55 leg-bearing segments; ventral pore-field series present from sternite of leg-bearing segment 2 to fourth sternite from rear end of the body.

Ityphilus ceibanus: with more than 69 leg-bearing segments (sex unknown).

Up to the present only three species of Geophilomorpha have been reported from French Guiana, i.e., *I. betshi* Pereira, 2010 (Ballophilidae), *Schendylops tropicus* (Brölemann & Ribaut, 1911) (Schendylidae), and *Ribautia proxima* Pereira, Minelli & Barbieri, 1995 (Geophilidae); *I. geoffroyi* sp. nov. is the fourth geophilomorph centipede recorded from this overseas French Department. Four other species of Chilopoda are currently known to inhabit French Guiana: the scolopendromorphs *Tidops collaris* (Kraepelin, 1903) (Scolopocryptopidae); *Otostigmus* (*Parotostigmus*) *pococki* Kraepelin, 1903, *Scolopendra melionii* Lucas, 1853, and *Scolopendra subspinipes* Leach, 1915 (Scolopendridae).

The eight taxa listed above likely represent only a small portion of the chilopod biodiversity in the rich rainforest biome of this extensive geographic area in equatorial South America, which still remains almost unexplored in respect to its centipede fauna.

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