

ORIGINAL ARTICLE

A new species and first record of the centipede genus *Ribautia* (Chilopoda: Geophilomorpha) from Bolivia, with redescription of two poorly known members from the Peruvian Andes

Luis Alberto Pereira

National Council for Scientific and Technological Research (CONICET) and Natural Sciences Faculty and Museum, National University of La Plata, Argentina

(Received 18 May 2007; accepted 18 May 2007)

Ribautia roigi sp. n. (Chilopoda: Geophilomorpha: Geophilidae) is here described and illustrated from a single (male) specimen collected in Bolivia (Río Vinto, 75 km from Cochabamba, on road to Villa Tunari), eastern slope of the Andes (Yungas forests), being the first record for the genus in this country. The new species is characterized by having the coxal organs grouped in clusters (two in each coxopleuron of the last leg-bearing segment), this character being shared by three other Neotropical species of the genus, i.e. *R. andecola* Kraus, 1954, *R. colcabensis* Kraus, 1957 and *R. seydi* Ribaut, 1923 (all from Peru), to which it seems to be closely related, and with which it is accordingly compared in detail. *R. andecola* and *R. colcabensis* are redescribed and figured after the type specimens, given characters not specified in the original descriptions.

Resumen

Ribautia roigi sp. n. (Chilopoda: Geophilomorpha: Geophilidae) es aquí descrita e ilustrada en base a un único espécimen (macho) colectado en Bolivia (Río Vinto, a 75 km de Cochabamba, en ruta a Villa Tunari), ladera oriental de los Andes (selva de Yungas), siendo la presente cita, la primera del género para este país. Esta nueva especie se caracteriza por tener los órganos coxales agrupados en forma de racimo (dos de éstos en cada coxopleura del último segmento pedal), carácter que es compartido por otras tres especies Neotropicales del género (*R. andecola* Kraus, 1954, *R. colcabensis* Kraus, 1957 y *R. seydi* Ribaut, 1923), todas distribuidas en Perú y con las cuales parece estar estrechamente relacionada, siendo aquí con éstas comparada en detalle. *R. andecola* y *R. colcabensis* son redescritas e ilustradas en base al estudio de los especímenes tipo, brindando caracteres no especificados en las respectivas descripciones originales.

Keywords: Andes; Bolivia; Chilopoda; Geophilomorpha; Neotropical Region; new species; Peru; redescrptions; *Ribautia*

Introduction

The geophilid genus *Ribautia* Brölemann, 1909 shows a Pantropical pattern of distribution with ca. 49 recognized species in South America, Africa, Arabian Peninsula, Madagascar, Australia, New Caledonia, the Loyalty Islands, New Zealand and New Caledonia (Pereira et al., 1997a; Minelli, 2006; Pereira, 2007). Of these, 25 (in addition to the new species described below) occur in the Neotropical Region, where the genus is known from Venezuela, Colombia, Ecuador, Peru, Guyane Française, British Guiana, Brazil and Argentina (Pereira, 2007).

A recent examination of a geophilomorph centipede collected in Bolivia (Yungas forests) resulted in its recognition as a new species of *Ribautia* which is here described and illustrated in detail, providing the first citation of the genus from this country.

Ribautia roigi sp. n. is characterized by having the coxal organs grouped in clusters (two in each coxopleuron of the last leg-bearing segment), this character being shared by three other Neotropical species of the genus, i.e. *R. andecola* Kraus, 1954, *R. colcabensis* Kraus, 1957 and *R. seydi* Ribaut, 1923 (all from Peru), to which the new species seems to be closely related, and with which it is accordingly compared in detail.

An opportunity to revise the type material of *R. andecola* and *R. colcabensis*, whose original descriptions are incomplete, has allowed the addition of further morphological data and new illustrations which facilitated the comparison of the present new species with these two taxa.

The latest taxonomic treatments of the Neotropical species of *Ribautia* can be found in

Foddai et al. (2000, 2002, 2004); Pereira (2007) and Pereira et al. (1994, 1995, 1997a, 1997b, 2000, 2006).

Materials and methods

The holotype herein designated is deposited at the Museum of La Plata (MLP); other type material revised here is currently housed at the Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt (SMF).

All specimens were studied by light microscopy and the illustrations were made using a camera lucida drawing tube attached to the microscope. The procedures employed for dissection and preparation of specimens for microscopical examination are those described in Pereira (2000), Foddai et al. (2002), Bonato & Minelli (2004) and Uliana et al. (2007). Measurements are given in mm.

The digitalized figures were prepared by arranging the original drawings in plates which were scanned at a resolution of 600 dpi, in black and white ("line art") mode, storing the files in tiff format. Later, using Photoshop, each file was edited and saved in the same format with LZW compression.

The following abbreviations are used in the text and legends of the figures: a.a., antennal article; b.l., body length; p.l., pairs of legs.

Results

Family GEOPHILIDAE

Genus *Ribautia* Brölemann, 1909

Diagnosis

Second maxillae united by a small coxosternal bridge only; antero-internal corners of coxosternum with a more or less developed process; prominent distally convergent ridges (statumina *sensu* Crabill, 1960) present. Forcípules: pleurocoxosternal sutures extending obliquely to the outer margin; chitinous lines present; medial edge of trochanteropraefemur of telopodites either with a conspicuous and deeply pigmented tooth, with two of these teeth, or with none of them. Sterna with pore fields. Each coxopleuron of the last leg-bearing segment with coxal organs, distributed in one of the following ways: (1) opening separately; (2) an anterior organ opening separately and all the remaining grouped in a cluster; (3) grouped in one to three clusters. Praetarsus of last legs either claw-like or tubercle-like.

Type of the genus

Ribautia bouvieri Brölemann, 1909, by monotypy.

Remarks

For a complete detailed list of all species currently included in the genus *Ribautia*, see Minelli (2006).

Ribautia roigi sp. n. (Figures 1–53)

Diagnosis

A species of *Ribautia* with 2+2 clusters of coxal organs in the coxopleura of the last leg-bearing segment and ventral pore field series present along the whole trunk length. Of the Neotropical species of this genus, *R. roigi* sp. n. shares these characters with *R. andecola* Kraus, 1954 and *R. colcabensis* Kraus, 1957. The new species differs from these last by the following unique traits: some antennal articles provided with type c sensilla (Figures 8, 10: c); medial edge of forcipular trochanteroprefemur with a single (distal) conspicuous and deeply pigmented tooth (Figures 23, 24, 26); sternum I having a pore field (Figure 36) and last leg praetarsus similar in size to those of precedent legs (Figures 47, 48). The comparatively lowest number of pairs of legs (43); the coxopleura of the last leg-bearing segment, conspicuously protruding at their distal ventral ends (Figures 48, 49: c, 50) and the trochanter of the last legs provided with a small protuberance on the basal external margin, as shown in Figures 47, 48, 51: a (all these last characters present at least in the male sex), also distinguish *R. roigi* sp. n. from the others.

Type material examined

Holotype: male, 43 pairs of legs, body length 17 mm, from Bolivia, Rio Vinto, 75 km from Cochabamba, on road to Villa Tunari (Yungas forests), 20 October 1983, A. Roig Alsina leg.

Remarks

Left mandible on a permanent slide, rest of the body in alcohol. The adult condition of this specimen is indicated by mature spermatozoa in the tubula seminifera.

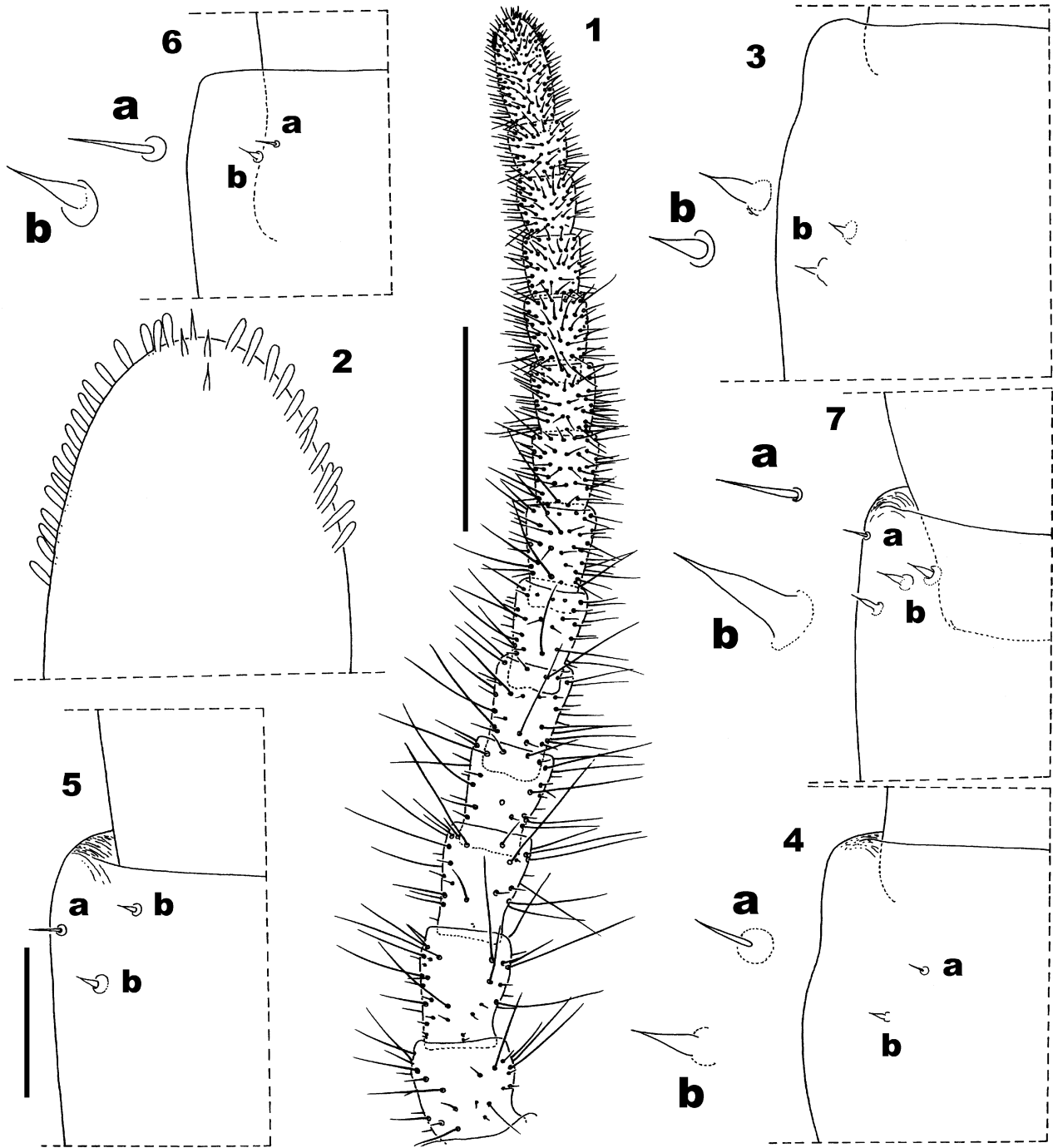
Depository of type

MLP.

Description

Male holotype

Forty-three pairs of legs, body length 17 mm, maximum body width 0.80 mm, length of cephalic shield 0.85 mm, width of forcipular coxosternum 0.75 mm. Ground color (of preserved specimen in

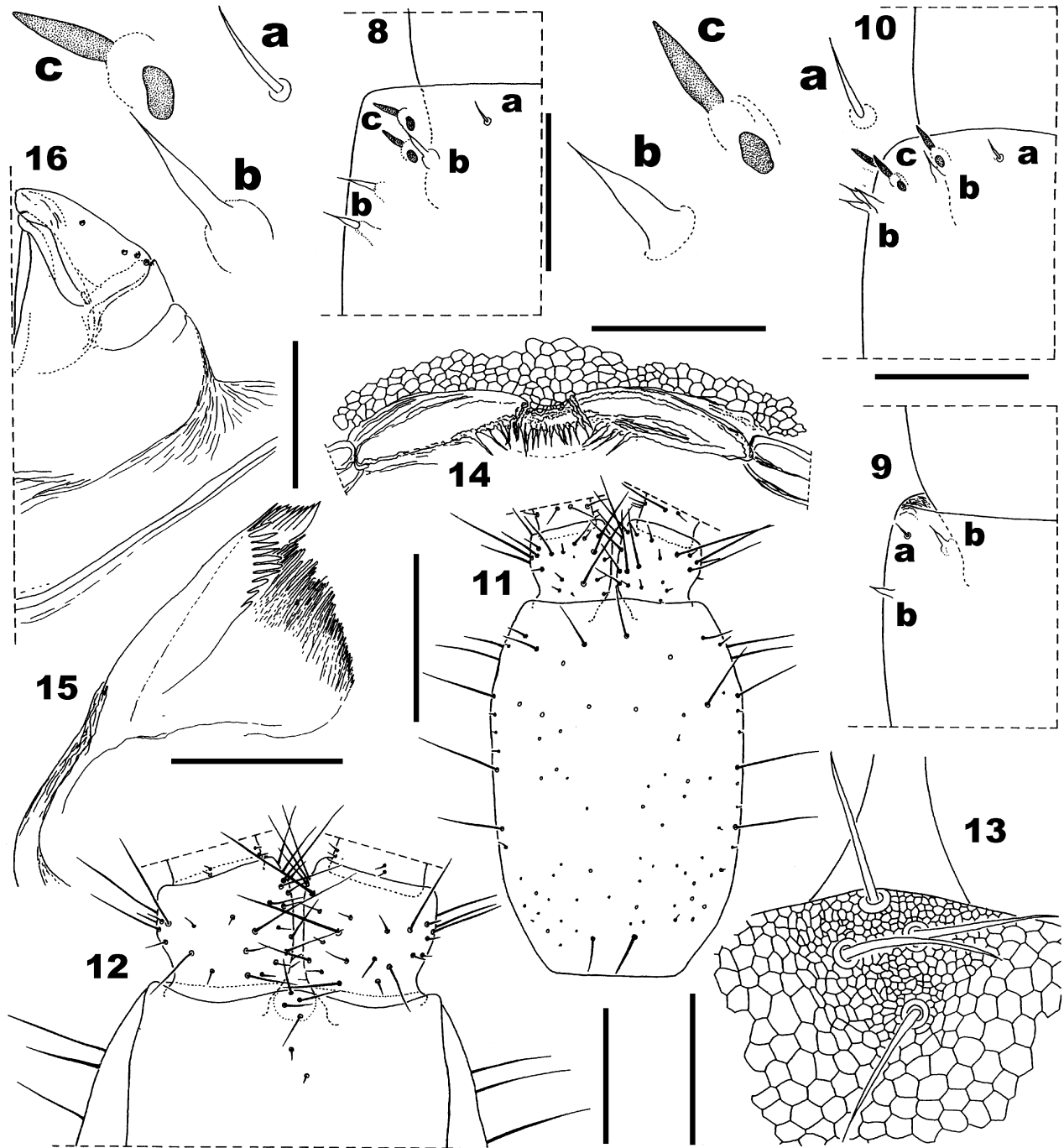


Figures 1–7. *Ribautia roigi* sp. n. (♂ holotype; Bolivia: Rio Vinto, 75 km from Cochabamba, on road to Villa Tunari). (1) Left antenna, ventral. (2) Apical region of left a.a. XIV, dorsal. (3) Left a.a. II, ventral (b: b type sensilla). (4) Left a.a. II, dorsal (a, b: a, b type sensilla). (5) Left a.a. V, ventral (a, b: a, b type sensilla). (6) Left a.a. V, dorsal (a, b: a, b type sensilla). (7) Left a.a. IX, ventral (a, b: a, b type sensilla). Scale bars: 0.4 mm (1); 0.05 mm (2–7).

alcohol) yellowish, cephalic shield and forcipular segment darker (pale ochreous).

Antennae: relatively short, ca. 2.6 times as long as the cephalic plate, distally only slightly attenuate; first article nearly as long as wide, remaining articles longer than wide. Setae on a.a. I–VI of various

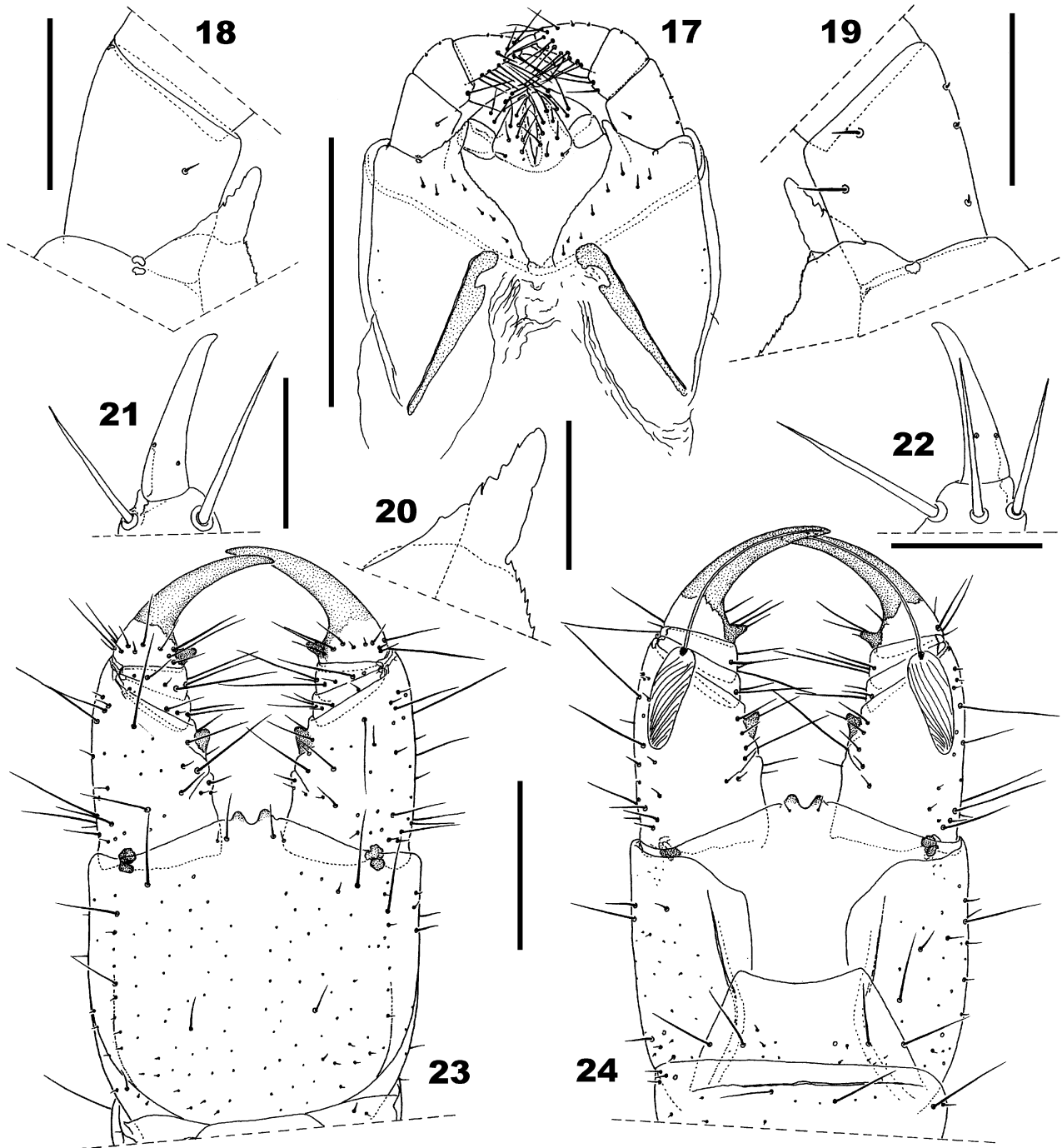
length, few in number; those of remaining articles progressively shorter and more numerous towards the tip of the appendage (Figure 1). Terminal antennal article with ca. 17 claviform sensilla on the external border and ca. 13 on the internal border (Figure 2). Distal end of this a.a. with ca. four very



Figures 8–16. *Ribautia roigi* sp. n. (♂ holotype; Bolivia: Rio Vinto, 75 km from Cochabamba, on road to Villa Tunari). (8) Left a.a. IX, dorsal (a, b, c: a, b, c type setae). (9) Left a.a. XIII, ventral (a, b: a, b type setae). (10) Left a.a. XIII, dorsal (a, b, c: a, b, c type setae). (11) Cephalic shield and base of antennae. (12) Clypeus and base of antennae. (13) Clypeal area. (14) Labrum. (15) Left mandible, dorsal. (16) Right first maxilla, dorsal. Scale bars: 0.5 mm (8–10, 13); 0.4 mm (11); 0.2 mm (12); 0.1 mm (14–16).

small sensilla, apparently not split apically (Figure 2). Ventral and dorsal surface of a.a. II, V, IX and XIII (Figures 3–10) with very small specialized sensilla. On the ventral side these sensilla are restricted to an internal latero-apical area and occur in two different

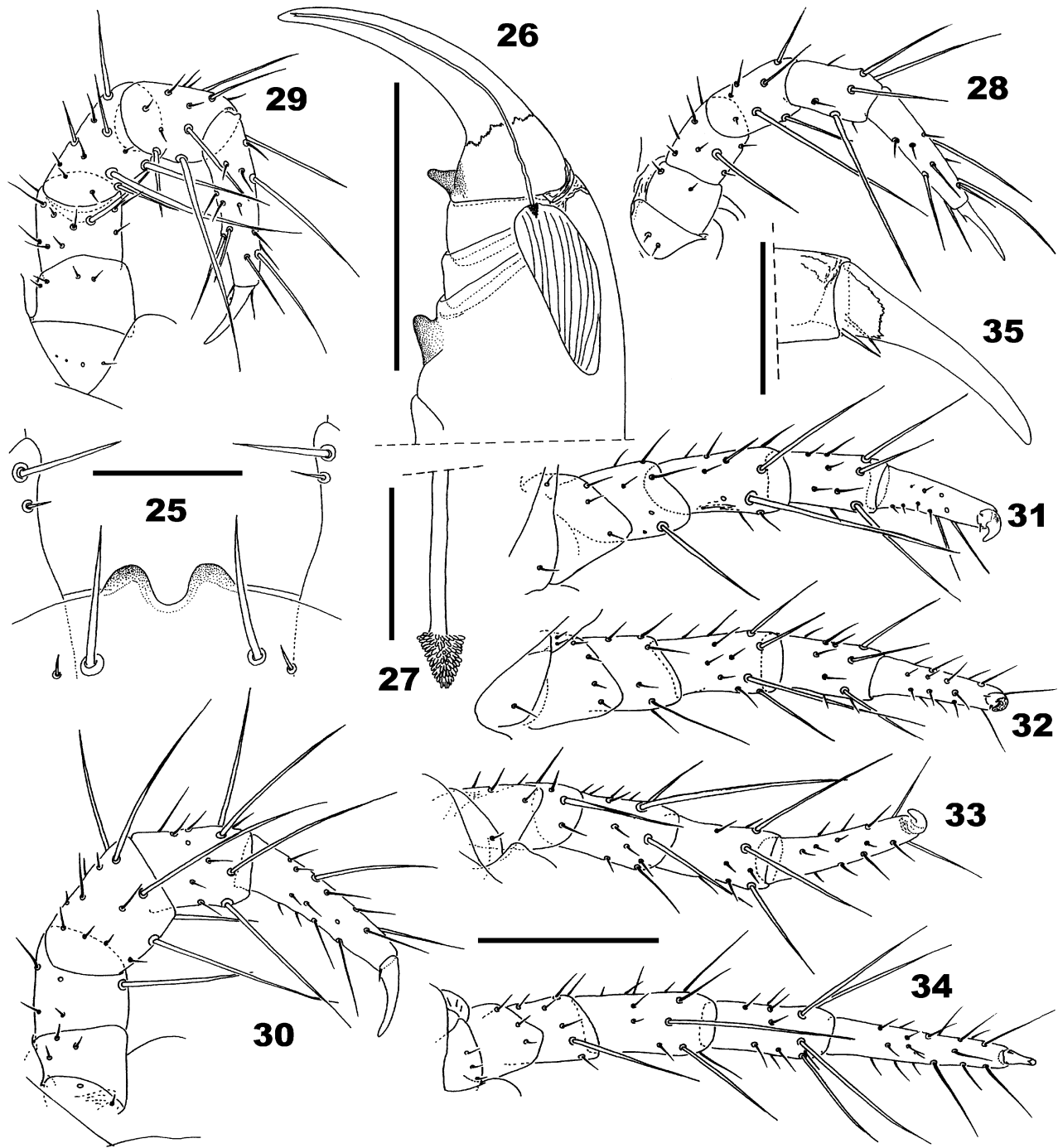
types: a and b. Type a sensilla are very thin and not split apically, type b sensilla are thicker and very similar to those on the distal end of the terminal a.a. (Figure 7: a and b). Specialized sensilla on dorsal side are restricted to an external latero-apical area and are



Figures 17–24. *Ribautia roigi* sp. n. (♂ holotype; Bolivia: Rio Vinto, 75 km from Cochabamba, on road to Villa Tunari). (17) First and second maxillae, ventral. (18) Detail of first article of telopodite and process of antero-internal corners of coxosternum of right second maxilla, ventral. (19) Detail of first article of telopodite and process of antero-internal corners of coxosternum of right second maxilla, dorsal. (20) Detail of process of antero-internal corners of coxosternum of right second maxilla, ventral. (21) Claw of telopodite of right second maxilla, ventral. (22) Claw of telopodite of left second maxilla, ventral. (23) Forcipular segment, ventral. (24) Forcipular segment, dorsal. Scale bars: 0.4 mm (17, 23, 24); 0.1 mm (18, 19); 0.05 mm (20–22).

represented by three different types: a and b, respectively similar to a and b of ventral side, and type c sensilla, similar to type b, but darker (brownish ochre) in color and with a small dark internal “root”

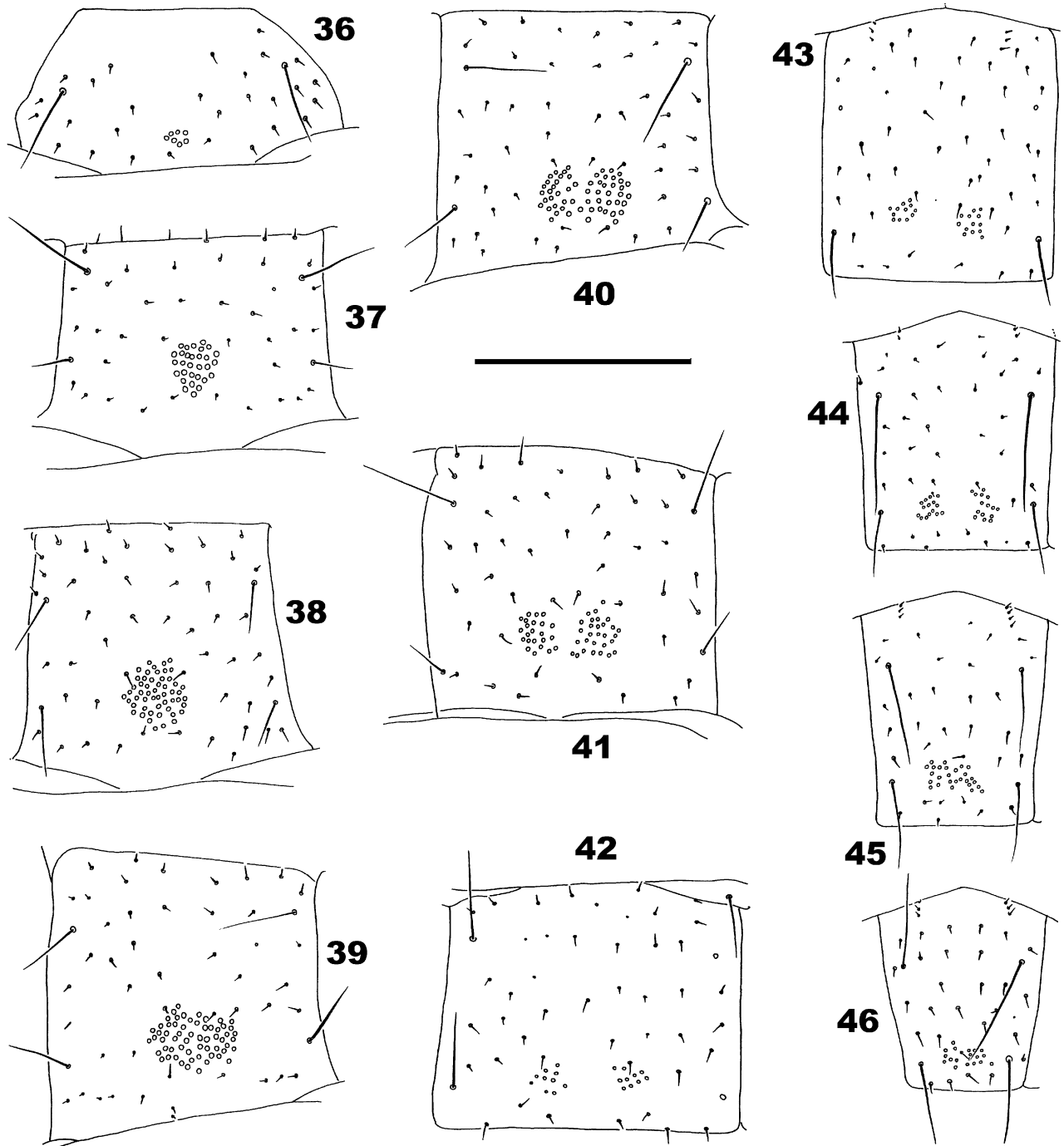
(Figures 8, 10: a, b and c). In both ventral and dorsal side, type b setae on a.a. II and V shorter than those on a.a. IX and XIII. Distribution of type a, b and c sensilla as in Table I.



Figures 25–35. *Ribautia roigi* sp. n. (♂ holotype; Bolivia: Rio Vinto, 75 km from Cochabamba, on road to Villa Tunari). (25) Middle part of anterior border of forcipular coxosternum showing denticles, ventral. (26) Detail of poison gland in left forcipular telopodite, ventral. (27) Detail of calyx of poison gland in left forcipular telopodite, ventral. (28) Left leg I, ventro-lateral view. (29) Left leg II, ventro-lateral view. (30) Left leg XIV, ventro-anterior view. (31) Left leg XXI, ventral. (32) Left leg XXXIII, ventral. (33) Left leg XXXIX, ventral. (34) Left leg XLII, ventral. (35) Claw of left leg II, ventro-anterior view. Scale bars: 0.1 mm (25); 0.4 mm (26); 0.05 mm (27, 35); 0.2 mm (28–34).

Cephalic plate: distinctly longer than wide (ratio 1.45:1), with sides curved and lateral margins convergent towards the proximal region. Shape and chaetotaxy as in Figure 11.

Clypeus: with four large setae located on the clypeal area and two smaller setae posterior to it, remaining clypeal surface without setae (Figure 12). Surface of clypeal area very densely reticulated (Figure 13).

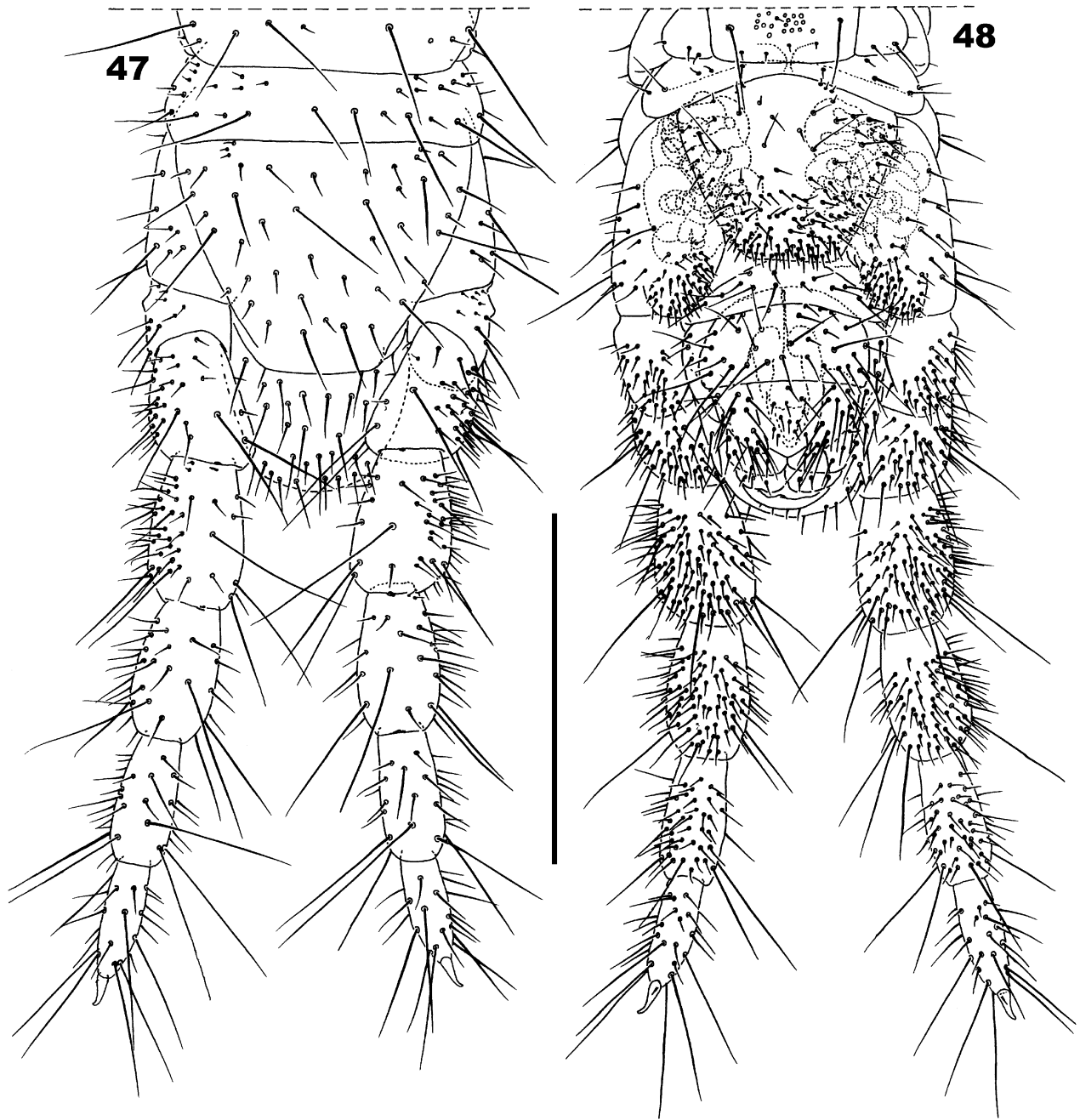


Figures 36–46. *Ribautia roigi* sp. n. (♂ holotype; Bolivia: Rio Vinto, 75 km from Cochabamba, on road to Villa Tunari). (36) Sternum I. (37) Sternum II. (38) Sternum VI. (39) Sternum XII. (40) Sternum XIII. (41) Sternum XIV. (42) Sternum XXV. (43) Sternum XXXVI. (44) Sternum XL. (45) Sternum XLI. (46) Sternum XLII. Scale bar: 0.3 mm.

Labrum: mid-piece well developed and sclerotized, with ca. 12 hyaline filaments. Side-pieces with 6+4 hyaline filaments distributed on the internal third only. Shape of labrum and relative size of filaments as in Figure 14.

Mandible: pectinate lamella with ca. 19 hyaline teeth (Figure 15).

First maxillae: with rudimentary lappets on coxosternum and telopodites (Figure 16). Coxosternum without setae; median projections of



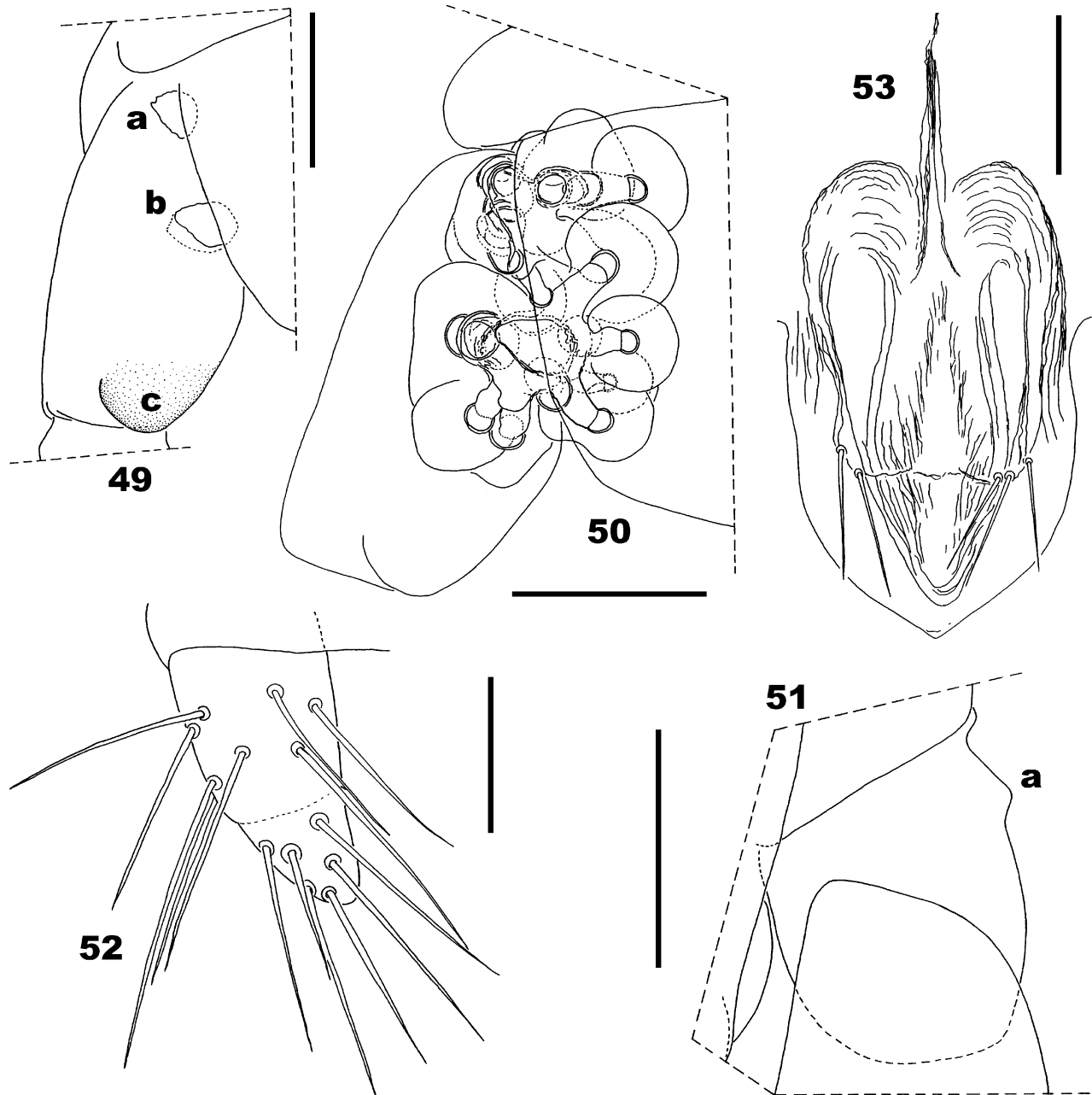
Figures 47, 48. *Ribautia roigi* sp. n. (♂ holotype; Bolivia: Rio Vinto, 75 km from Cochabamba, on road to Villa Tunari). (47) Last leg-bearing segment and terminal segments, dorsal. (48) Last leg-bearing segment and terminal segments, ventral. Scale bar: 0.4 mm.

coxosternum subtriangular, well-developed, provided with 8+8 setae. Article II of telopodite with 5+5 large setae on ventral side and 4+4 small sensilla on dorsal side (Figures 16, 17).

Second maxillae: coxites with 8+8 setae near the internal margin and 3+3 small sensilla near the external margin, medially joined through a narrow, hyaline and non-areolate membranous isthmus only (Figure 17).

Process of antero-internal corners of coxosternum well developed with form and relative size as in Figures 17–20. Telopodites with setae of uniform thickness. Apical claw of telopodite well developed, tip slightly curved inward (Figures 17, 21, 22). Chaetotaxy of coxosternum and telopodites as in Figures 17–19, 21, 22.

Forcipular segment: when closed, the telopodites reach the level of the anterior margin of the head or



Figures 49–53. *Ribautia roigi* sp. n. (♂ holotype; Bolivia: Rio Vinto, 75 km from Cochabamba, on road to Villa Tunari). (49) Right coxopleuron, ventral (a: anterior coxal pore, b: posterior coxal pore, c: ventro-apical protuberance). (50) Right coxal organs, ventral. (51) Detail of trochanter of right last leg, dorsal (a: small protuberance on basal external edge). (52) Right gonopod, ventral. (53) Penis, dorsal. Scale bars: 0.1 mm (49–51); 0.05 mm (52, 53).

project slightly beyond. Forcipular tergum trapeziform with anterior and posterior margins, respectively, covered by the cephalic plate and the tergum of the first leg-bearing segment; chaetotaxy represented by an irregular transverse row of ca. four or five large setae on the middle and a very few additional smaller setae dispersed on the remaining surface (Figure 24). Coxosternum with incomplete chitinous lines (Figure 23); middle part of anterior border with two

denticles, ochreous in color with aspect and relative size as in Figures 23–25. Telopodites: medial edge of trocanteropraefemur apically with a conspicuous, subtriangular and deeply pigmented tooth; proximally, near the vestigial suture between trochanter and praefemur with an unpigmented, round-tipped projection. Femur and tibia without denticles. Tarsungulum basally with a well-developed and deeply pigmented, subtriangular denticle; dorsal and

Table I. Number of type a, b and c sensilla on antennal articles II, V, IX and XIII in the male holotype of *Ribautia roigi* sp. n.

	Ventral		Dorsal			Figures
	a	b	a	b	c	
II		2	1	1		3, 4
V	1	2	1	1		5, 6
IX	1	2-3	1	3	2	7, 8
XIII	1	2-3	1	4	3	9, 10

ventral edges of the unguar blade not serrulate (Figures 23, 24, 26). Calyx of poison gland subtriangular (Figures 26, 27). Chaetotaxy of coxosternum and telopodites as in Figures 23, 24.

Walking legs: first pair shorter than the second (ratio ca. 0.8:1) (Figures 28, 29). Femur, tibia and tarsus of all legs with very long setae. Distribution, number and relative size of setae as in Figures 28-34. Claws ventrobasally with an anterior and a posterior parunguis (Figure 35).

Sterna: pore fields present from the first to the penultimate sternum. Fields undivided on sterna I-XIII and XLI-XLII and divided in two subsymmetrical areas on sterna XIV-XL. Form and relative size of fields changing along the trunk as in Figures 36-46. Number of pores on selected sterna: on sternum I, 7 pores; on II, 30; on VI, 52; on XII, 60; on XIII, 57; on XIV, 23+29; on XXV, 10+10; on XXXVI, 12+13; on XL, 15+15; on XLI, 27; on XLII, 19.

Last leg-bearing segment: without pleurites at the sides of praeternum. Praesternum apparently divided along the sagittal plane; form and chaetotaxy of tergum and sternum as in Figures 47, 48. Coxopleura conspicuously protruding at their distal-internal ventral area, this last having the aspect of a protuberance covered by numerous small setae (Figures 48, 49: c, 50), the remaining coxopleural surface with few larger setae. Coxal organs arranged in 2+2 clusters. Anterior clusters with ca. six or seven organs and posterior with ca. nine organs (Figures 48, 50). Pores open on the membrane between coxopleuron and sternum, covered by the latter (Figures 48, 49: a and b, 50). Last legs with seven podomeres, the trochanter bearing a small protuberance on the basal external margin (Figures 47, 48, 51: a); form and chaetotaxy of podomeres as in Figures 47, 48. Praetarsus unguiform, similar in size to those of the preceding legs (Figures 47, 48).

Terminal segments: intermediate tergum with posterior margin convex, intermediate sternum and first genital sternum with posterior margin concave

(Figures 47, 48). Gonopods with suture between basal and distal articles only slightly evident on dorsal side, basal article with ca. eight setae and apical article with ca. six setae (Figures 48, 52); penis dorsally with 2+3 apical setae (Figure 53). Anal organs absent.

Female

Unknown.

Etymology

The species is dedicated to the entomologist Dr. Arturo Roig Alsina, collector of the type specimen described above.

Remarks

Characters differentiating *R. roigi* sp. n. from the other Neotropical species of *Ribautia* with 2+2 clusters of coxal organs in the coxopleura of the last leg-bearing segment are given in Table IV.

Ribautia andecola Kraus, 1954 (Figures 54-98)

Ribautia (Schizoribautia) andecola Kraus, 1954, p. 315, 316.

Ribautia (Schizoribautia) andecola: Kraus, 1957, p. 373, 374.

Ribautia (Schizoribautia) andecola: Pereira, Minelli & Barbieri, 1995, p. 338.

Ribautia (Schizoribautia) andecola: Pereira, Minelli & Foddai, 1997a, p. 12.

Ribautia (Schizoribautia) andecola: Pereira, Foddai & Minelli, 1997b, p. 83.

Ribautia andecola: Foddai, Pereira & Minelli, 2000, p. 91.

Type locality

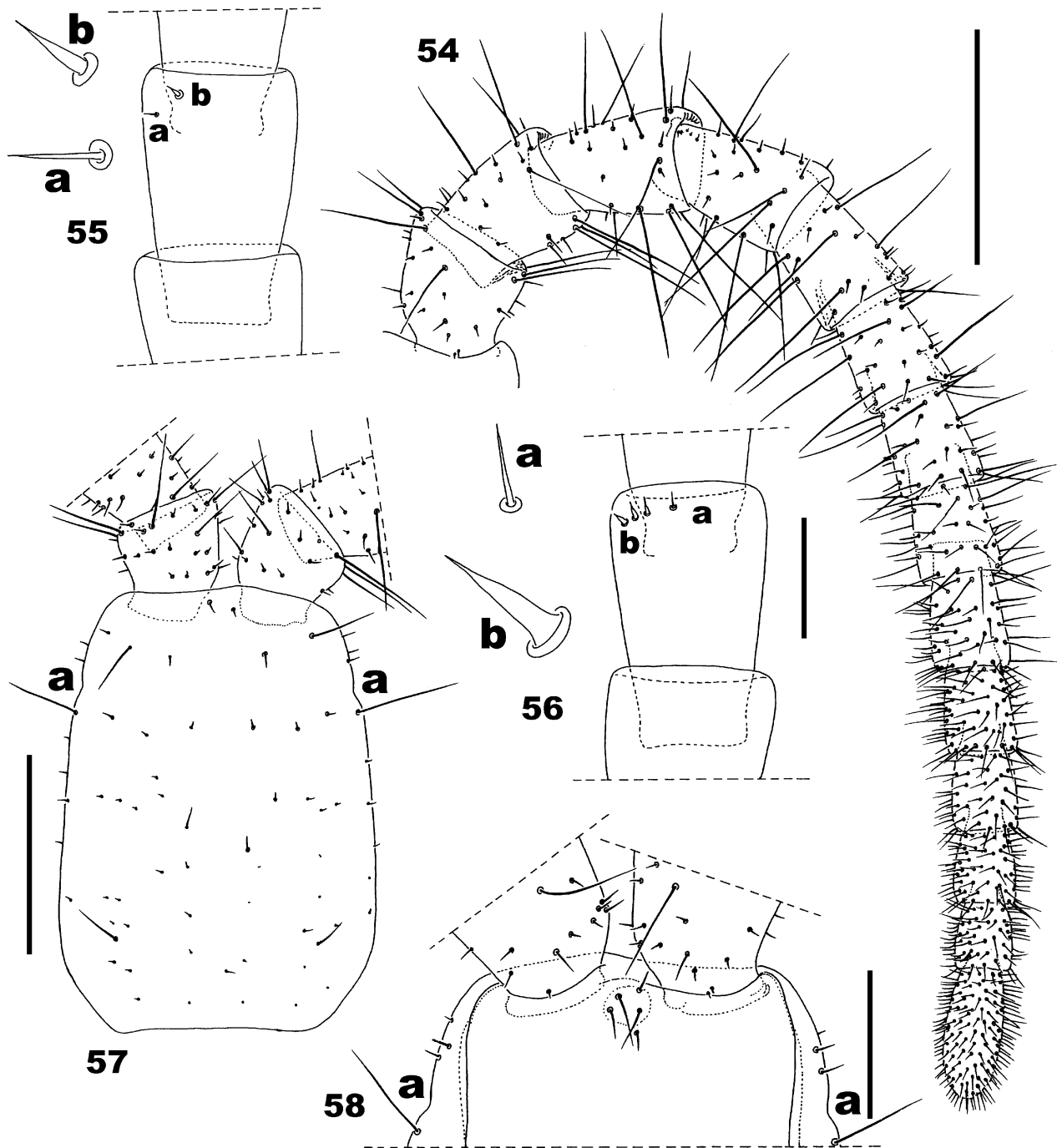
“Peru: Camjata, zwischen Moho und Conima am Titicacasee”.

Distribution

Peru: Camjata; Cerro Atojja, close to Chucuito; environs of Puno (all places around Lake Titicaca).

Diagnosis

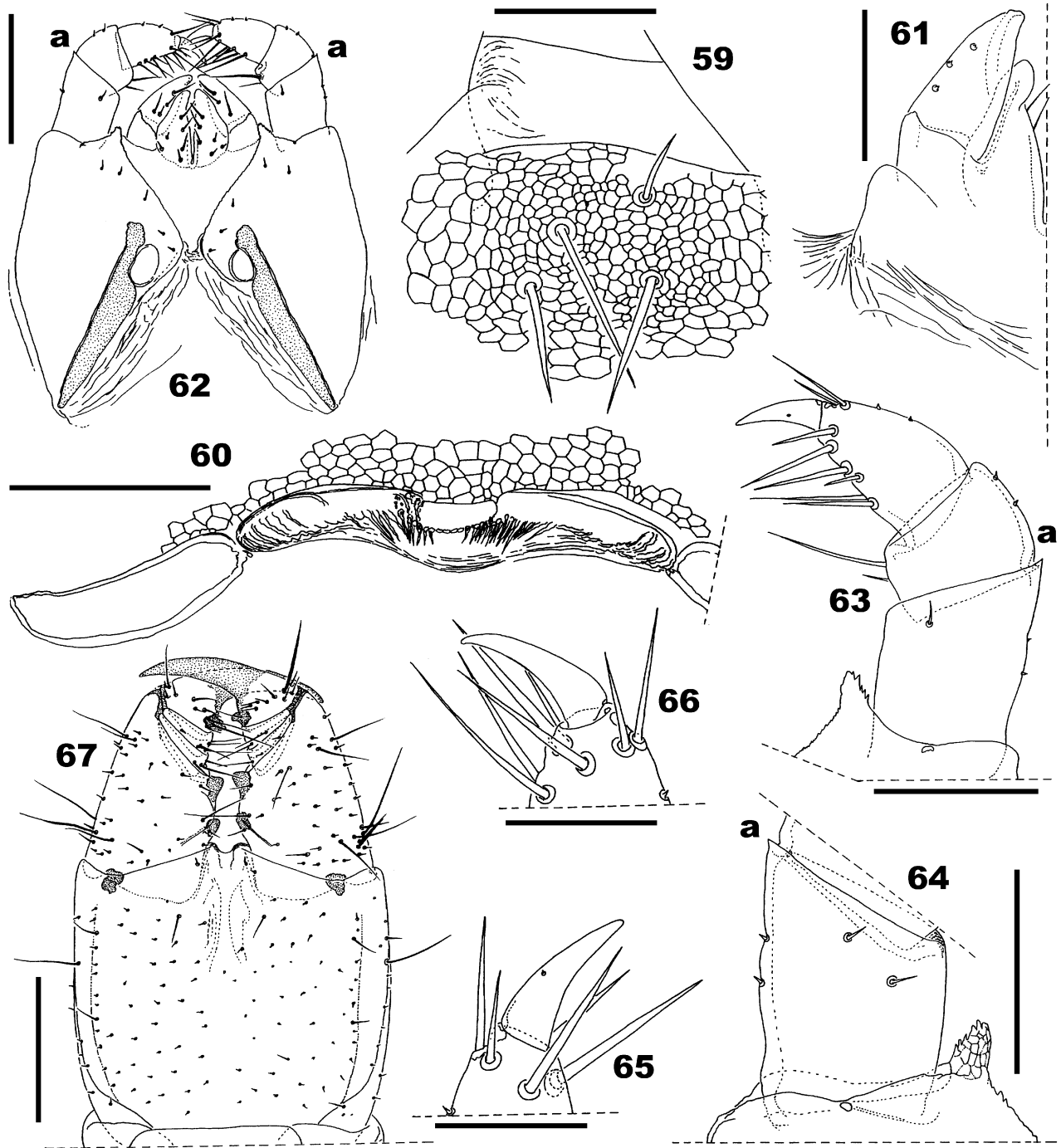
A *Ribautia* species with 2+2 clusters of coxal organs in the coxopleura of the last leg-bearing segment and ventral pore field series along the whole trunk length. Of the Neotropical species included in the same genus, *R. andecola* Kraus, 1954 only shares these characters with *R. roigi* sp. n. and *R. colcabensis* Kraus, 1957. *R. andecola* differs from these last species by having the following unique traits: first



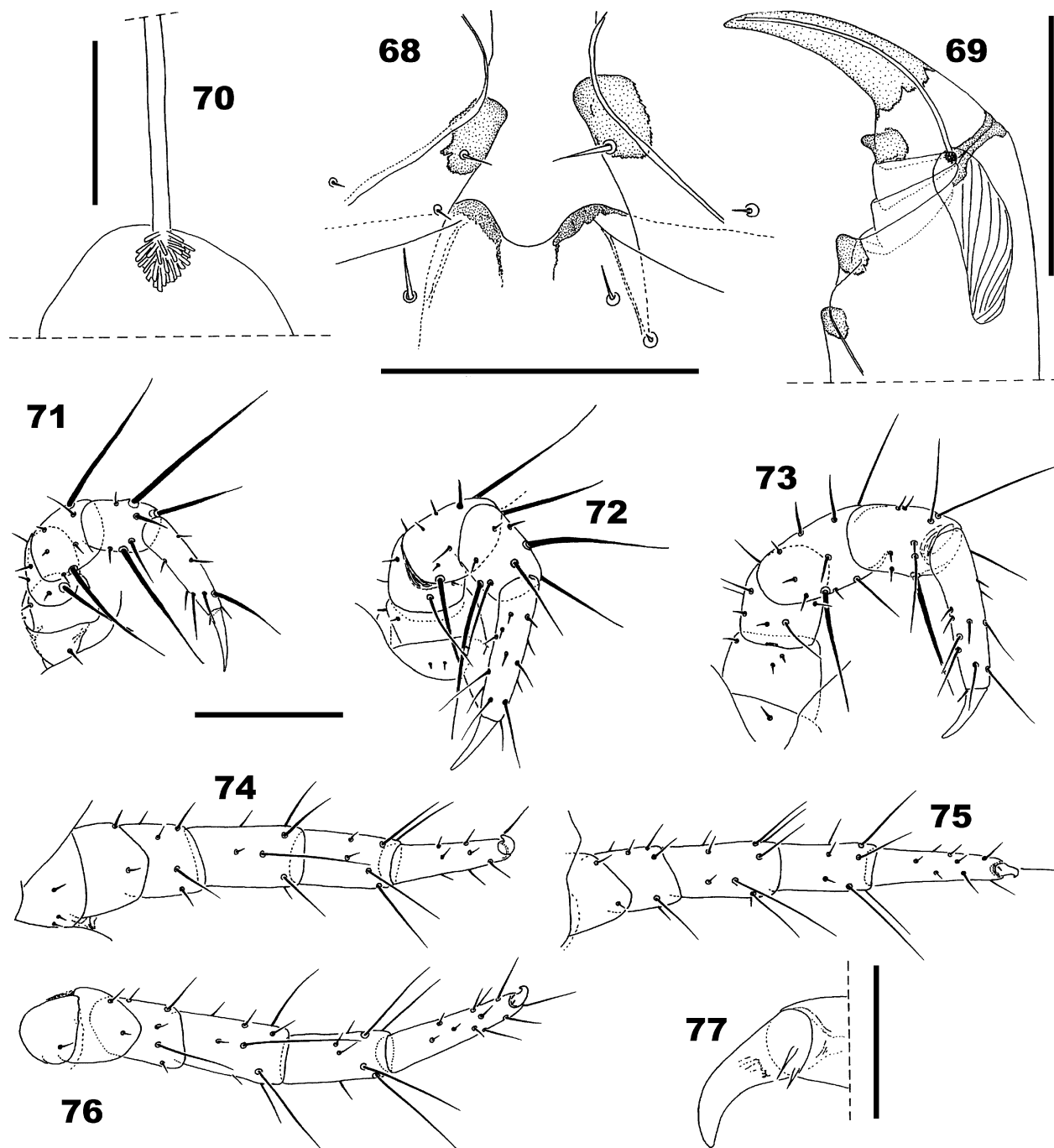
Figures 54–58. *Ribautia andecola* Kraus, 1954 (♀ “Paratypoid”, SMF 2150/1; Peru: Cerro Atojja, close to Chucuito, 3900 m a.s.l.). (54) Left antenna, ventral. (55) Left a.a. IX, ventral (a, b: a, b type sensilla). (56) Left a.a. IX, dorsal (a, b: a, b type sensilla). (57) Cephalic shield and base of antennae (a: concavity on lateral margins). (58) Clypeus and base of antennae (a: concavity on lateral margins of head). Scale bars: 0.4 mm (54, 57); 0.05 mm (55, 56); 0.2 mm (58).

article of telopodite of second maxillae with a very small distoectal process (Figures 62–64: a) and lateral margins of the head capsule convergent towards the distal region and provided on their anterior portion

with a proximal concavity (Figures 57, 58: a). The presence of 47, 49 or 51 pairs of legs in the male and 49, (51?) or 53 in the female, also distinguish *R. andecola* from the others.



Figures 59–67. *Ribautia andecola* Kraus, 1954 (♀ “Paratypoid”, SMF 2150/1; Peru: Cerro Atojja, close to Chucuito, 3900 m a.s.l.). (59) Clypeal area. (60) Labrum. (61) Left first maxilla, dorsal. (62) First and second maxillae, ventral (a: small distoectal process on first article of telopodite). (63) Telopodite of left second maxilla, ventral (a: distoectal process). (64) Detail of first article of telopodite and process of antero-internal corners of coxosternum of left second maxilla, dorsal (a: small distoectal process). (65) Claw of telopodite of left second maxilla, dorsal. (66) Claw of telopodite of right second maxilla, dorsal. (67) Forcipular segment, ventral. Scale bars: 0.05 mm (59, 65, 66); 0.1 mm (60, 61, 63, 64); 0.2 mm (62); 0.4 mm (67).

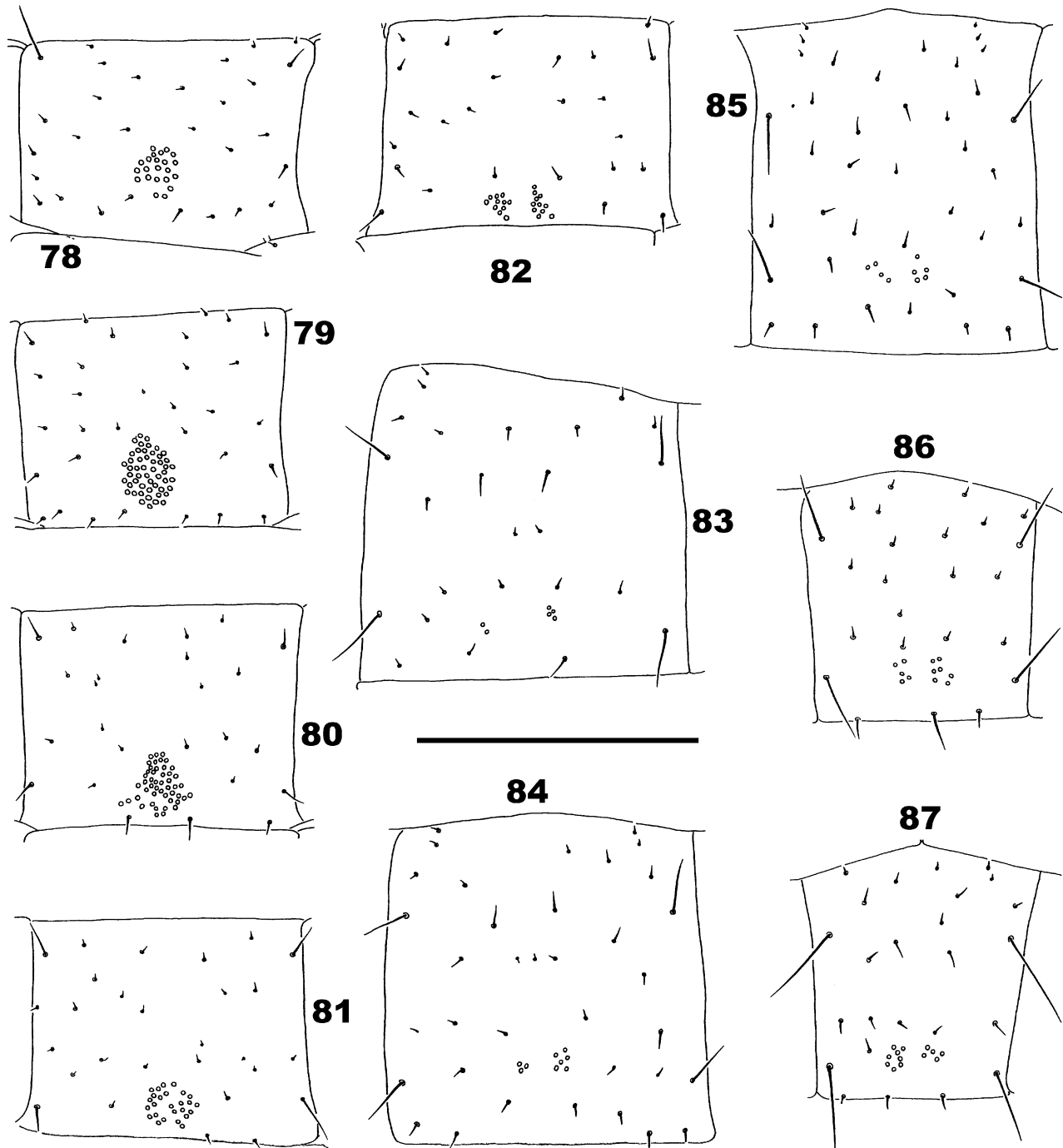


Figures 68–77. *Ribautia andecola* Kraus, 1954 (♀ “Paratypoid”, SMF 2150/1; Peru: Cerro Atojja, close to Chucuito, 3900 m a.s.l.). (68) Middle part of anterior border of forcipular coxosternum showing denticles, ventral. (69) Detail of poison gland in left forcipular telopodite, ventral. (70) Detail of calyx of poison gland in left forcipular telopodite, ventral. (71) Left leg I, ventro-anterior view. (72) Left leg II, ventro-anterior view. (73) Left leg XIV, ventro-anterior view. (74) Left leg XIX, ventral. (75) Left leg XLIV, ventral. (76) Left leg XLVI, ventral. (77) Claw of right leg XXXVI, ventro-anterior view. Scale bars: 0.2 mm (68, 71–76); 0.4 mm (69); 0.05 mm (70, 77).

Type material examined

Camjata, between Moho and Conima (around Lake Titicaca), 3950 m a.s.l., under stones, 5 March 1953, Koepcke leg.: holotype ♂, 51 p.l., b.l. 23 mm,

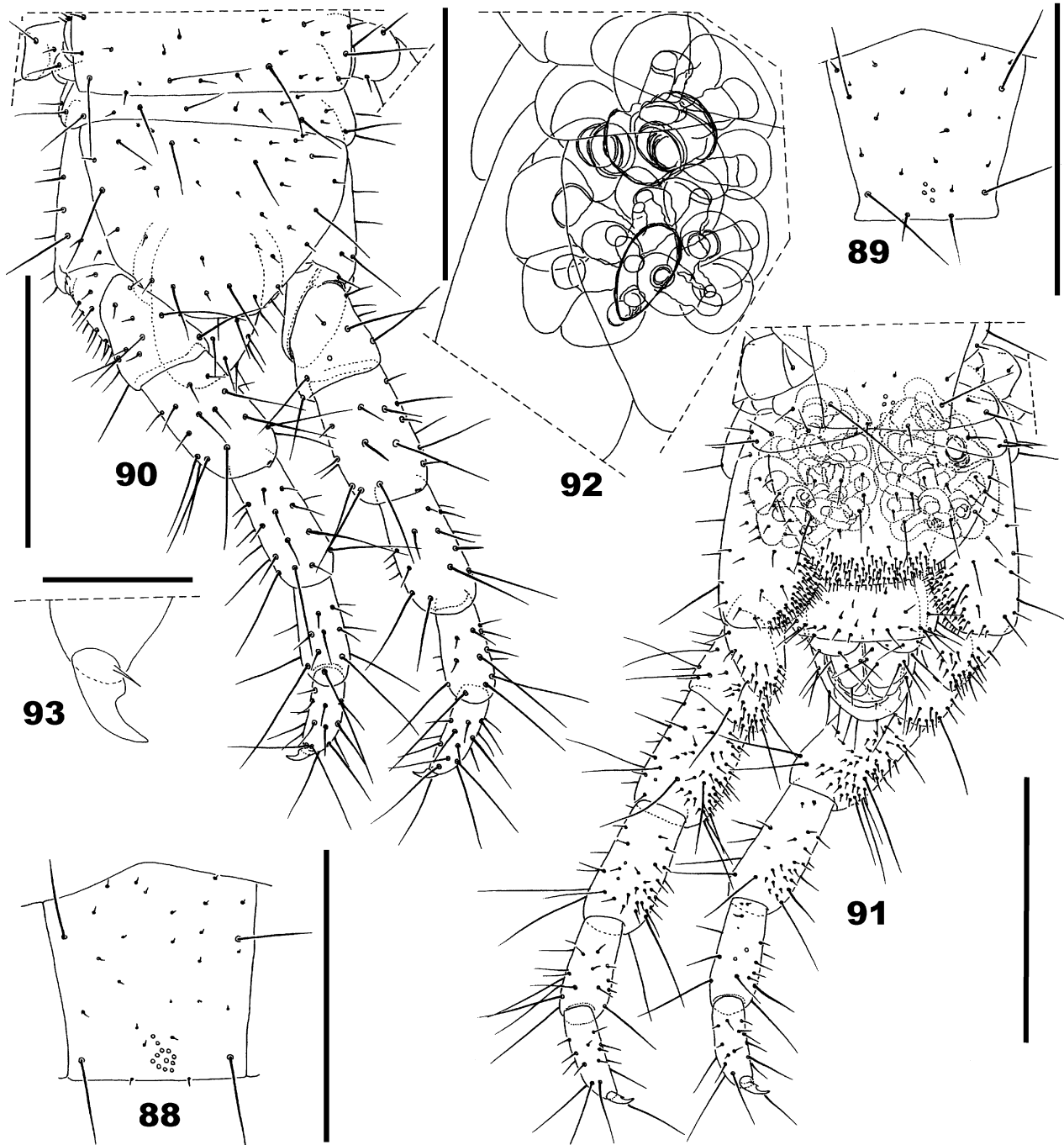
specimen on six slides: (1) anterior part of head capsule with clypeus and antennae; (2) mandibles, first maxillae and second maxillae; (3) forcipular segment followed by the first leg-bearing segment; (4)



Figures 78–87. *Ribautia andecola* Kraus, 1954 (♀ “Paratypoid”, SMF 2150/1; Peru: Cerro Atojsa, close to Chucuito, 3900 m a.s.l.). (78) Sternum II. (79) Sternum VI. (80) Sternum XII. (81) Sternum XIV. (82) Sternum XV. (83) Sternum XXX. (84) Sternum XXXII. (85) Sternum XL. (86) Sternum XLV. (87) Sternum XLVI. Scale bar: 0.4 mm.

leg-bearing segments II–XI; (5) leg-bearing segments XII–XLIX; (6) leg-bearing segment L followed by the last leg-bearing segment and terminal segments (SMF 2148). Same locality, date and collector as the holotype: “Paratypoid” (♂), adult (specimen “A”, see

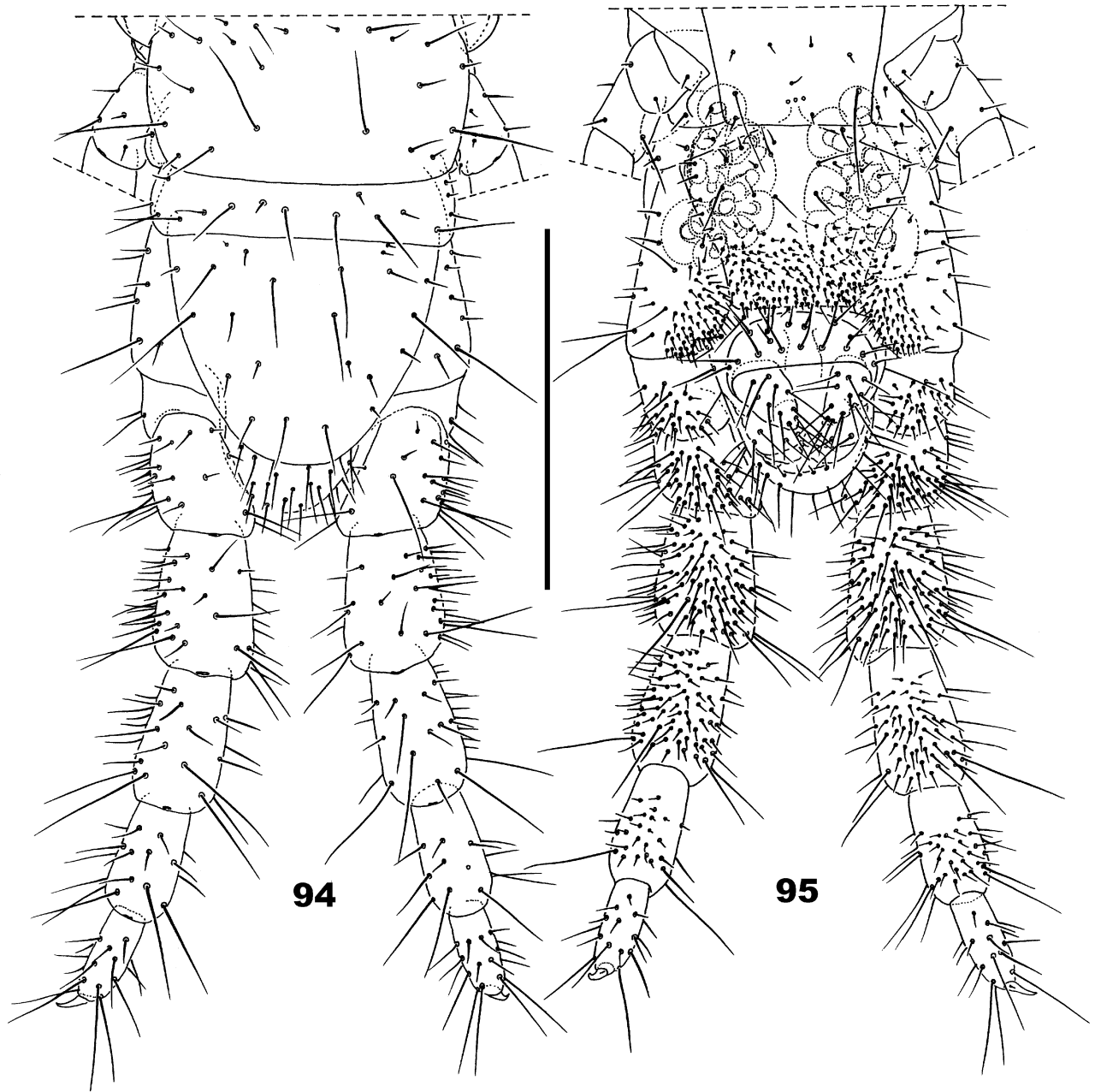
below), with tubula seminifera full of mature spermatozoa, 47 p.l., b.l. 18 mm; “Paratypoid” (sex?), (specimen “B”), incomplete: only 45 leg-bearing segments present, in a single fragment, all the remaining body parts, lacking (SMF 2149/2). Peru: Cerro Atojsa, close



Figures 88–93. *Ribautia andecola* Kraus, 1954 ♀ “Paratypoid”, SMF 2150/1; Peru: Cerro Atojiya, close to Chucuito, 3900 m a.s.l.). (88) Sternum XLVII. (89). Sternum XLVIII. (90) Last leg-bearing segment and terminal segments, dorsal. (91) Last leg-bearing segment and terminal segments, ventral. (92). Right coxal organs, ventral. (93) Detail of distal end of last podomere of left last leg, ventro-internal view. Scale bars: 0.4 mm (88–91); 0.2 mm (92); 0.05 mm (93).

to Chucuito (around Titicaca lake), 3900 m a.s.l., 8 March 1953, Koepcke leg.: “Paratypoid” (♀), adult (with spermathecae full of spermatozoa), 49 p.l., b.l. 20 mm (SMF 2150/1). Peru: close to Puno (around

Titicaca lake), 3850 m a.s.l., 13 December 1953, Koepcke leg.: “Paratypoid” (♂), subadult, 49 p.l., b.l. 13 mm; “Paratypoid” (♀), adult (with spermathecae full of spermatozoa), 53 p.l., b.l. 23 mm (SMF 2151/2).



Figures 94, 95. *Ribautia andecola* Kraus, 1954 (♂ “Paratypoid”, Specimen “A”, SMF 2149/2; Peru: Camjata, between Moho and Conima, 3950 m a.s.l.). (94) Last leg-bearing segment and terminal segments, dorsal. (95) Last leg-bearing segment and terminal segments, ventral. Scale bar: 0.4 mm.

Remarks

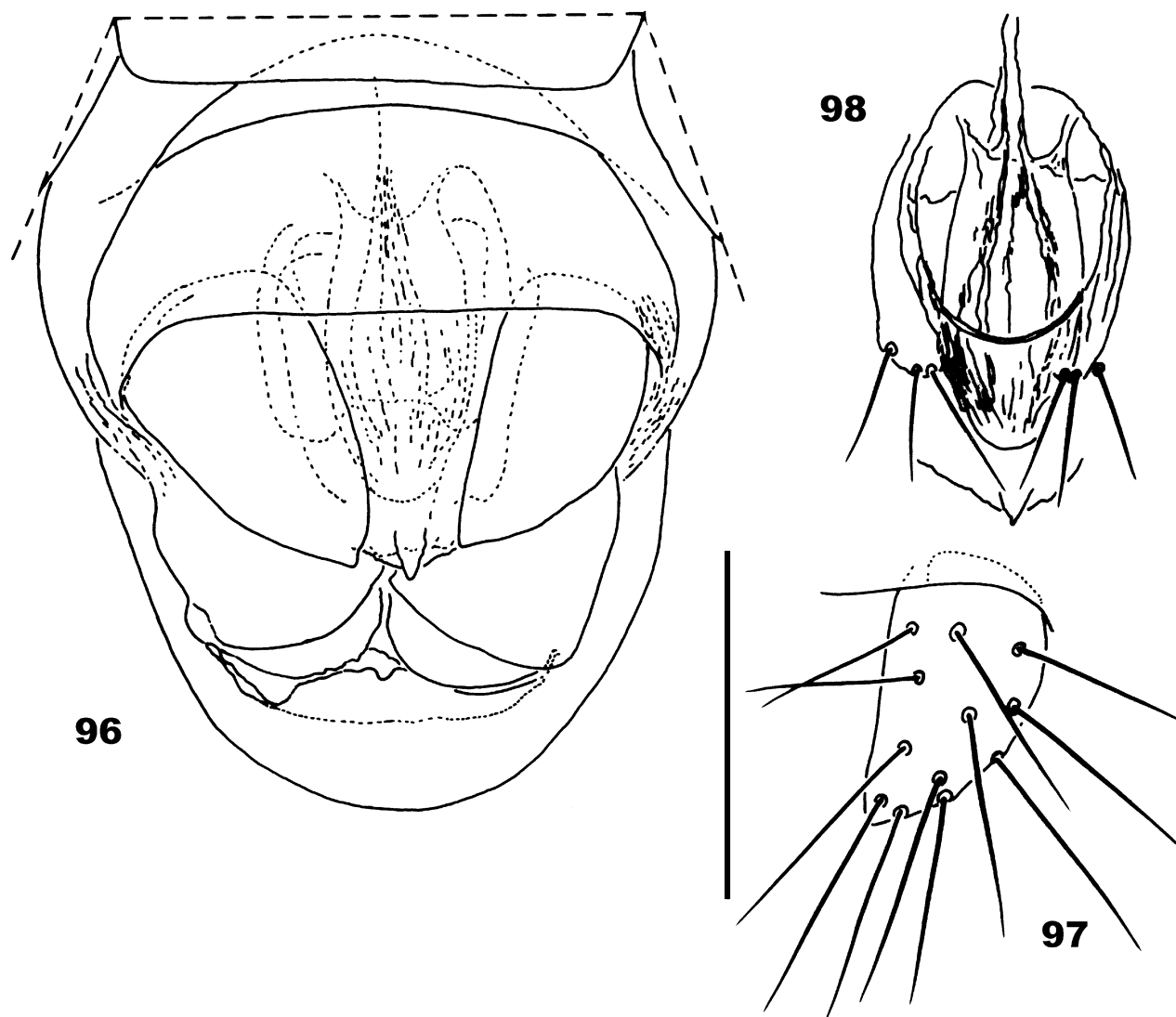
The material identified by Kraus as “SMF 2150/1” is represented by two specimens contained in the same vial: one of them (“Paratypoid” ♀) does belong to *Ribautia andecola*; in contrast, the supplementary specimen does not correspond to this species and is possibly referable to the genus *Plateurytion*. (This last specimen is an incomplete adult male, with tubula seminifera full of mature spermatozoa, represented

by the head, not detached from the trunk, and the forcipular segment followed by the leg-bearing segments I–LI; all remaining body parts, lacking.)

Redescription

Female “Paratypoid” SMF 2150/1

Forty-nine pairs of legs; body length 20 mm; maximum body width 0.85 mm; length of cephalic



Figures 96–98. *Ribautia andecola* Kraus, 1954 (♂ “Paratypoid”, Specimen “A”, SMF 2149/2; Peru: Camjata, between Moho and Conima, 3950 m a.s.l.). (96) Terminal segments, ventral. (97) Left gonopod, ventral. (98) Penis, dorsal. Scale bar: 0.1 mm.

shield 0.85 mm; width of forcipular coxosternum 0.80 mm. Ground color (of preserved specimen in alcohol) yellowish, forcipular segment darker (pale ochreous).

Antennae: ca. 3.2 times as long as the cephalic plate, distally conspicuously attenuate, first article nearly as long as wide, remaining articles longer than wide (length to width ratios of all a.a. as shown in Figure 54). Setae on a.a. I–VII of different length, relatively few in number; those of remaining articles progressively shorter and more numerous towards the tip of the appendage (Figure 54). Terminal antennal article with ca. 12 claviform sensilla on the external border and ca. 10 on the internal border. Distal end of this a.a. with ca. four or five very small sensilla, apparently not split apically.

Ventral and dorsal surface of a.a. II, V, IX and XIII (Figures 55, 56) with very small specialized sensilla. On the ventral side these sensilla are restricted to an internal latero-apical area and are represented by two different types: a and b. Type a sensilla are very thin and not divided apically, type b sensilla are thicker and very similar to those on the apex of the terminal a.a. (Figure 55: a and b). Specialized sensilla on dorsal side are restricted to an external latero-apical area and are represented by similar type a and b sensilla of ventral side (Figure 56: a and b). Distribution of type a and b sensilla as in Table II.

Cephalic plate: distinctly longer than wide (ratio 1.40:1); lateral margins convergent towards the distal region, showing anteriorly a small concavity

Table II. Number of type a and b sensilla on antennal articles II, V, IX and XIII in the female "Paratypoid" (SMF 2150/1) of *Ribautia andecola* Kraus, 1954.

	Ventral		Dorsal		Figures
	a	b	a	b	
II		1		1	
V	1	1	1	1	
IX	1	1	1	3	55, 56
XIII	1	1	1	4	

(Figures 57, 58: a). Shape and chaetotaxy as in Figure 57.

Clypeus: with four setae on the clypeal area and an additional seta very close to these, located on middle part, the remaining clypeal surface without setae (Figure 58). Clypeal area with surface very densely reticulated (Figure 59).

Labrum: mid-piece well developed and sclerotized, with four very short (round pointed?) teeth on the middle and 3+5 hyaline filaments on the sides. Side-pieces with ca. 8+11 hyaline filaments of different length, distributed on the internal third only. Shape of labrum and relative size of filaments as in Figure 60.

Mandible: pectinate lamella with ca. 12 hyaline teeth.

First maxillae: with rudimentary lappets on coxosternum and telopodites (Figure 61). Coxosternum without setae; median projections of coxosternum subtriangular, well developed and provided with 6+6 setae of different length. Article II of telopodite with 4+3 ventral setae and 3+3 dorsal sensilla (Figures 61, 62).

Second maxillae: coxites with 5+5 setae near the internal margin, medially joined through a very narrow, hyaline and non-areolate membranous isthmus only (Figure 62). Process of antero-internal corners of coxosternum well developed with form and relative size as in Figures 62–64. Telopodites with setae of different thickness on apical article, remaining articles with setae of similar thickness (Figures 63, 65, 66); first article with a very small distoectal process (Figures 62–64: a); apical claw of telopodite well developed (Figures 62, 63, 65, 66). Chaetotaxy of coxosternum and telopodites as in Figures 62–66.

Forcipular segment: when closed, the telopodites project slightly beyond the anterior margin of the head. Forcipular tergum trapeziform, chaetotaxy represented by an irregular transverse row of ca. six large setae near the posterior margin and a few smaller setae dispersed on the remaining surface. Coxosternum with incomplete chitinous lines, middle

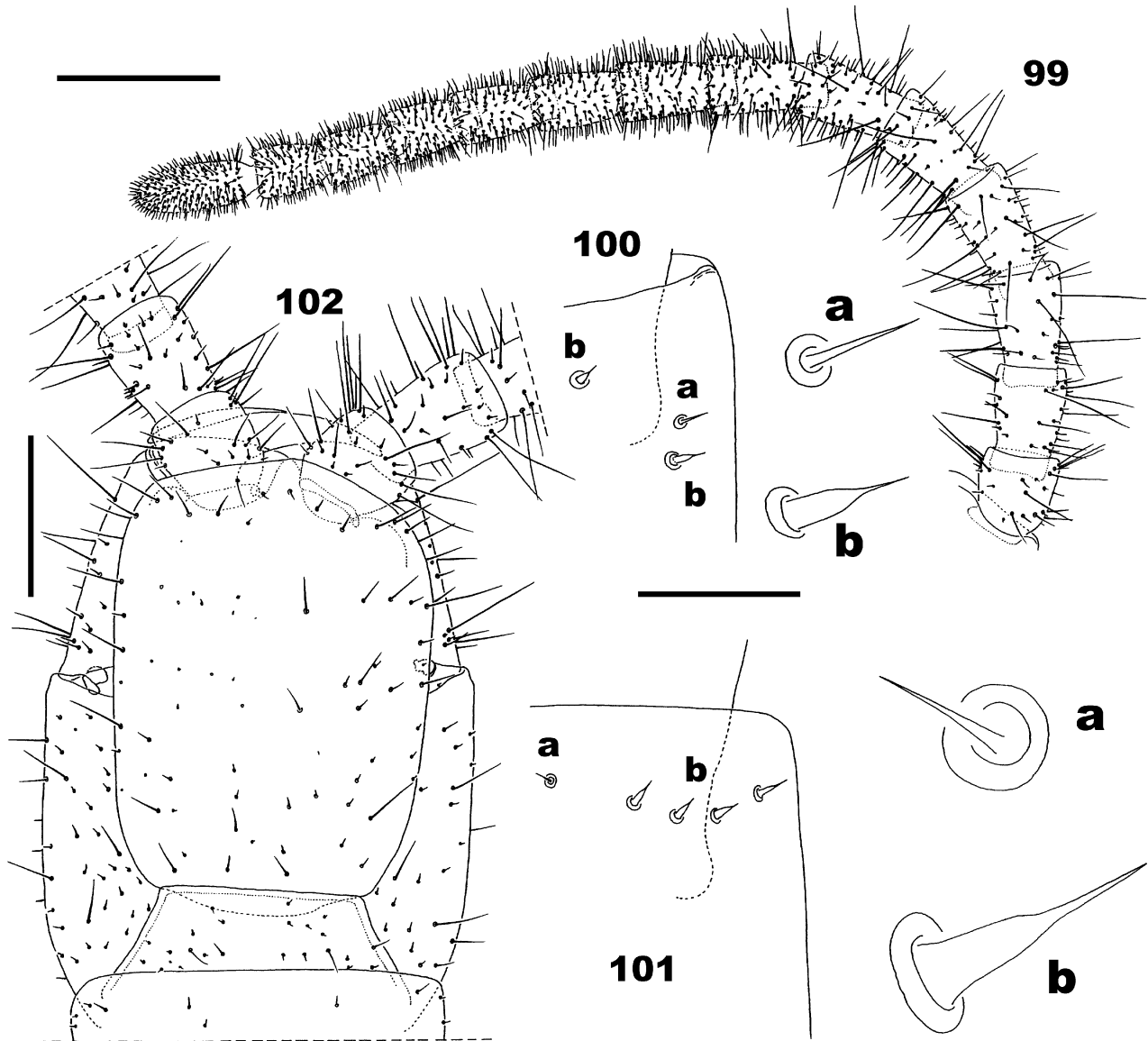
part of anterior border with two small denticles, ochreous in color with aspect and relative size as in Figures 67, 68. Telopodites: medial edge of trochanteropraefemur with two conspicuous deeply pigmented teeth, the distal one larger than the proximal (Figures 67–69). Femur and tibia without denticles. Tarsungulum basally with a well-developed and deeply pigmented subtriangular tooth (Figures 67, 69); dorsal and ventral edges of the ungular blade not serrulate (Figures 67, 69). Calyx of poison gland as in Figure 70. Chaetotaxy of coxosternum and telopodites as in Figure 67.

Walking legs: first pair (Figure 71) shorter than the second (Figure 72) with ratio ca. 0.80:1. Size of setae on femur, tibia and tarsus of legs I to XIII–XIV relatively larger than those on the remaining legs. Distribution, number and relative size of setae as in Figures 71–76. Claws ventrobasally with two basal parungues, the anterior larger than the posterior (Figure 77).

Sterna: pore fields present from the second to the penultimate sternum. Fields undivided on sterna II–XIV and XLVII–XLVIII and divided in two sub-symmetrical areas on sterna XV–XLVI. Form and relative size of fields changing along the trunk as in Figures 78–89. Number of pores on selected sterna: on sternum II, 22 pores; on VI, 51; on XII, 46; on XIV, 26; on XV, 11+11; on XXX, 2+4; on XXXII, 3+6; on XL, 4+5; on XLV, 5+7; on XLVI, 7+5; on XLVII, 12; on XLVIII, 4.

Last leg-bearing segment: without pleurites at the sides of praetergum. Praesternum divided along the sagittal plane, shape and chaetotaxy of tergum and sternum as in Figures 90, 91. Coxopleura not protruding at their distal ventral ends, setae small and numerous on the distal-internal ventral area, the remaining coxopleural surface with few setae of different length. Coxal organs grouped in 2+2 clusters opening in the membrane between coxopleuron and sternum, covered by the latter (Figures 91, 92). Anterior clusters with ca. five to seven organs and posterior clusters with ca. 11–13 organs, arranged as in Figures 91, 92. Last legs with seven podomeres, form and chaetotaxy as in Figures 90, 91. Praetarsus unguiform, relatively smaller than those of the preceding legs, in the proportion 0.50:1 and provided with a single internal parunguis basally (Figures 90, 91, 93).

Terminal segments: intermediate tergum with posterior margin strongly convex, intermediate sternum seemingly covered by the sternum of the last leg-bearing segment, posterior border of the first genital sternum slightly convex (Figures 90, 91). Gonopods uniaarticulate (Figure 91). Anal organs absent.



Figures 99–102. *Ribautia colcabensis* Kraus, 1957 (♀ “Paratypoid”, SMF 2925/1; Peru: Ancash Department: Casma Province: close to Colcabamba, 2600–2700 m a.s.l.). (99) Right antenna, ventral. (100) Right a.a. IX, ventral (a, b: a, b type setae). (101) Right a.a. IX, dorsal (a, b: a, b type setae). (102) Dorsal view of anterior region of the body, showing cephalic shield, base of antennae, forcipular segment and tergum of first leg-bearing segment. Scale bars: 0.4 mm (99, 102); 0.05 mm (100, 101).

Male

“Paratypoid”, specimen “A” (SMF 2149/2)

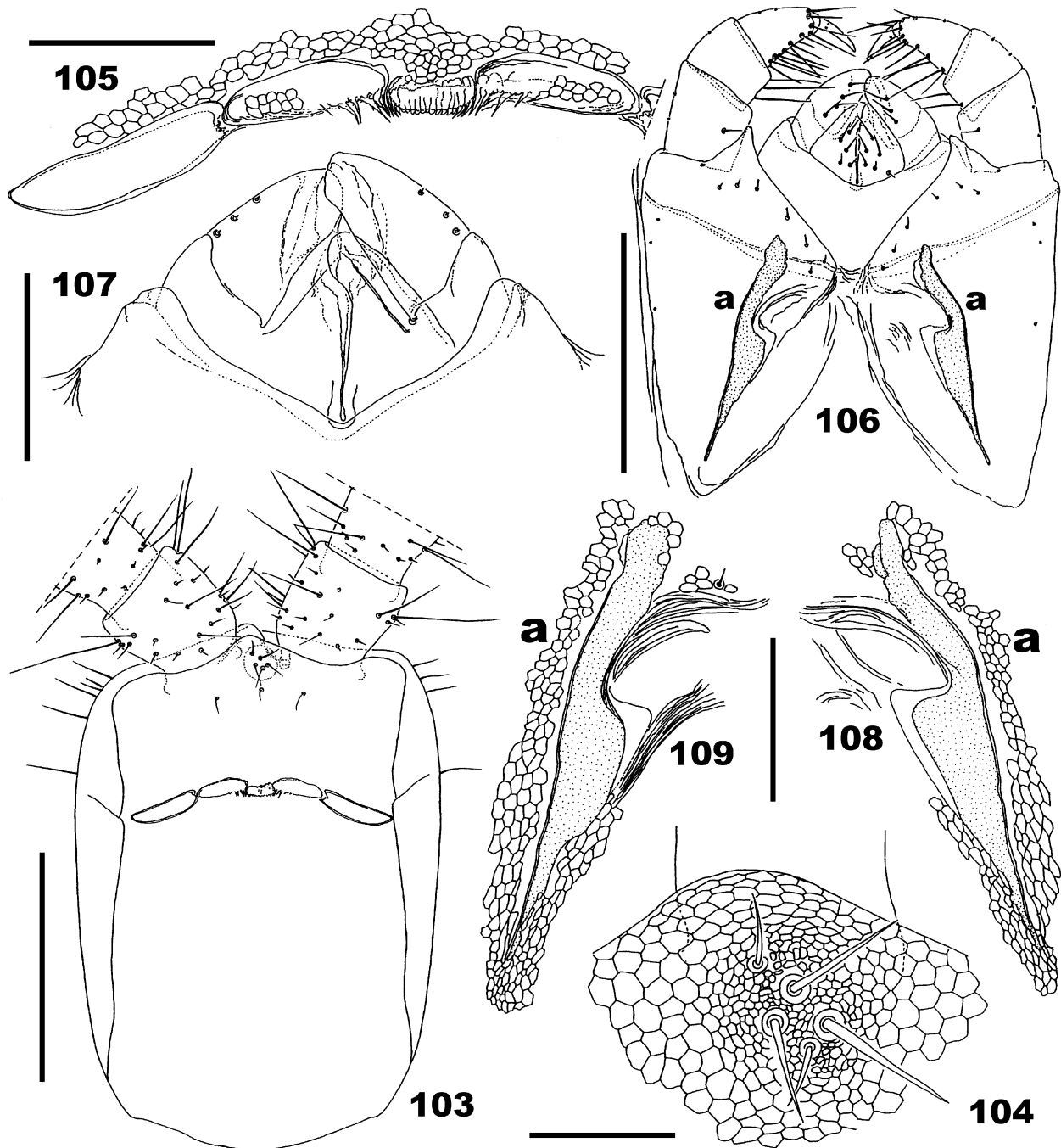
Forty-seven pairs of legs, body length 18 mm, maximum body width 0.65 mm.

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

Last leg-bearing segment: form and chaetotaxy of tergum and sternum as in Figures 94, 95. Coxopleura very slightly protruding at their distal-internal ventral ends (Figure 95), setae small and numerous on the distal-internal ventral area, the remaining coxopleural surface with few larger setae (Figures 94,

95). Anterior clusters of coxal organs with ca. four or five organs and posterior clusters with ca. five or six organs (Figure 95).

Terminal segments: intermediate tergum with posterior margin strongly convex, intermediate sternum with posterior margin concave. First genital sternum with posterior border medially straight, laterally concave (Figures 95, 96). Gonopods with presumptive suture between basal and distal articles not evident, left gonopod with 12 setae, right gonopod with 11 setae (Figures 95, 97); penis dorsally with 3+3 apical setae (Figure 98). Anal organs absent.



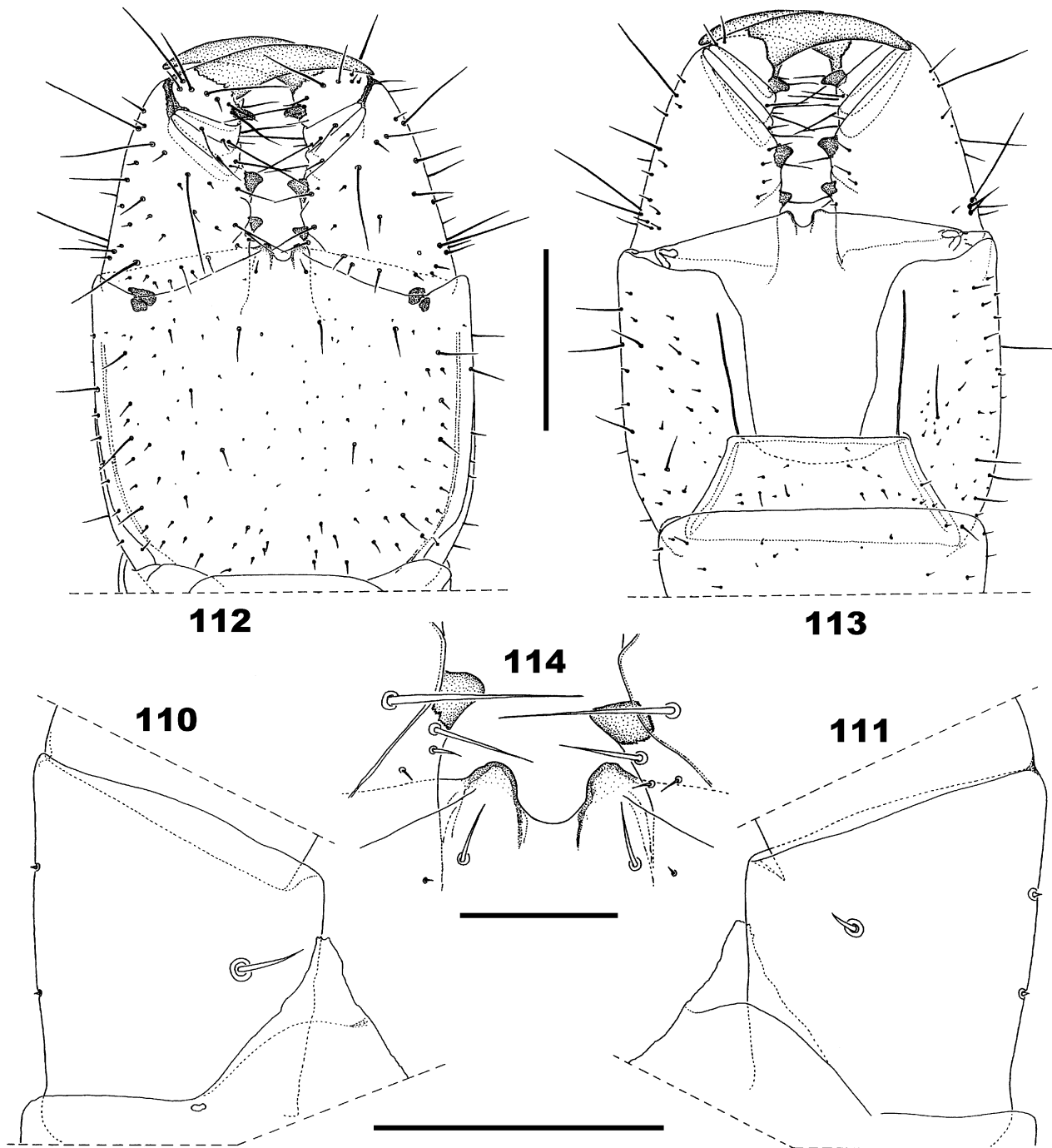
Figures 103–109. *Ribautia colcabensis* Kraus, 1957 (♀ “Paratypoid”, SMF 2925/1; Peru: Ancash Department: Casma Province: close to Colcabamba, 2600–2700 m a.s.l.). (103) Head capsule and base of antennae, ventral. (104) Clypeal area. (105) Labrum. (106) First and second maxillae, ventral (a: convexity on distal external ridge). (107) First maxillae, dorsal. (108) Statumina of left second maxilla, ventral (a: convexity on distal external ridge). (109) Statumina of right second maxilla, ventral (a: convexity on distal external ridge). Scale bars: 0.4 mm (103); 0.05 mm (104); 0.1 mm (105, 107, 108, 109); 0.3 mm (106).

Variability

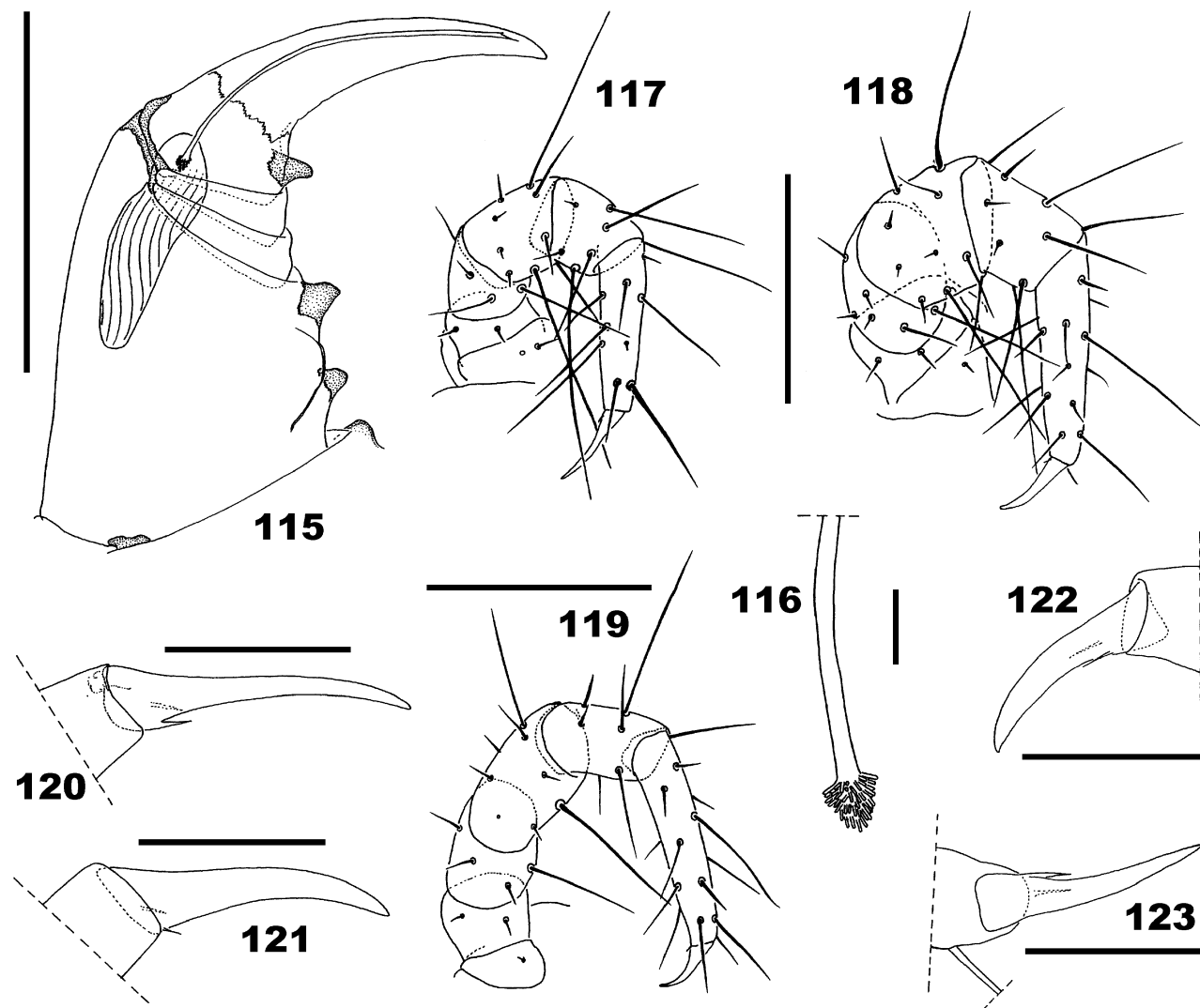
Maximum body length: 23 mm.

The number of pairs of legs in the males is 47, 49 or 51 and in the females 49 or 53 (possibly also 51).

Coxal organs in adult specimens: anterior clusters of coxal organs with ca. four or five organs and posterior clusters with ca. five or six organs, the largest individuals are those having the largest numbers.



Figures 110–114. *Ribautia colcabensis* Kraus, 1957 (♀ “Paratypoid”, SMF 2925/1; Peru: Ancash Department: Casma Province: close to Colcabamba, 2600–2700 m a.s.l.). (110) Detail of first article of telopodite and process of antero-internal corners of coxosternum of right second maxilla, ventral. (111) Detail of first article of telopodite and process of antero-internal corners of coxosternum of right second maxilla, dorsal. (112) Forcipular segment, ventral. (113) Forcipular segment, dorsal. (114) Middle part of anterior border of forcipular coxosternum showing denticles, ventral. Scale bars: 0.1 mm (110, 111, 114); 0.4 mm (112, 113).



Figures 115–123. *Ribautia colcabensis* Kraus, 1957 (♀ “Paratypoid”, SMF 2925/1; Peru: Ancash Department: Casma Province: close to Colcabamba, 2600–2700 m a.s.l.). (115) Detail of poison gland in right forcipular telopodite, ventral. (116) Detail of calyx of poison gland in right forcipular telopodite, ventral. (117) Left leg I, ventro-anterior view. (118) Left leg II, ventro-anterior view. (119) Left leg LXVII, ventro-anterior view. (120) Claw of left leg I, ventro-anterior view. (121) Claw of left leg II, ventro-anterior view. (122) Claw of right leg LXVII, ventro-anterior view. (123) Claw of right leg LXVIII, dorsal. Scale bars: 0.4 mm (115); 0.02 mm (116); 0.2 mm (117–119); 0.05 mm (120–123).

No significant variation was detected in other characters.

All specimens examined lacked anal organs.

Remarks

The original description of Kraus (1954) states: “Porenfelder auf den Sterniten 3 bis 50 (Typus)”, but a pore field is present on sternum II of the holotype as well as in the other type specimens here examined.

Characters differentiating *R. andecola* from the other Neotropical species of *Ribautia* with 2+2 clusters of coxal organs in the coxopleura of the last leg-bearing segment are given in Table IV.

Ribautia colcabensis Kraus, 1957 (Figures 99–138)

Ribautia (Schizoribautia) colcabensis Kraus, 1957, p. 373–374.

Ribautia (Schizoribautia) colcabensis: Pereira, Minelli & Foddai, 1997a, p. 12.

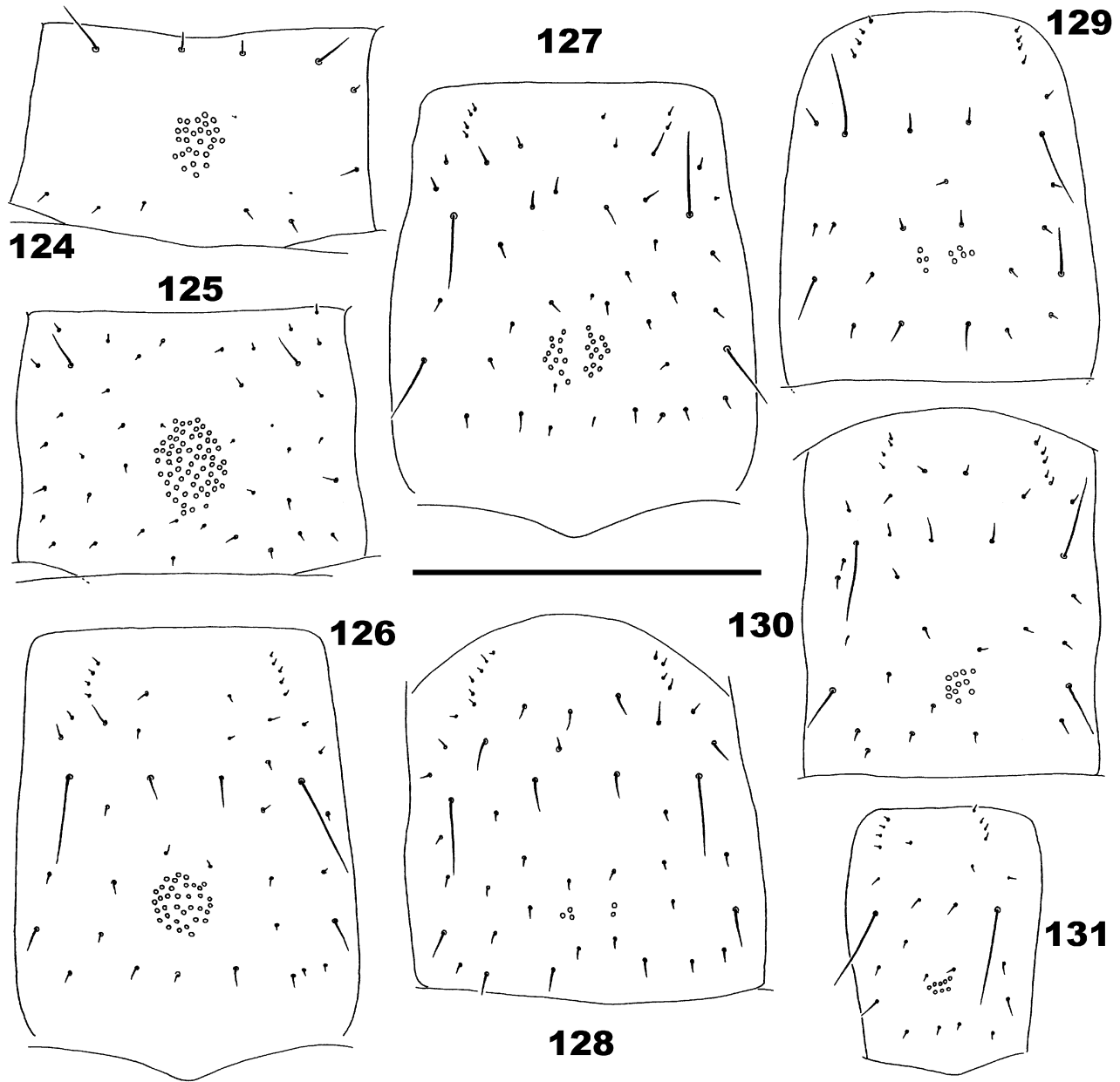
Ribautia colcabensis: Foddai, Pereira & Minelli, 2000, p. 92.

Type locality

“Bei Colcabamba (M-Peru), Bereich des oberen Casma-Tals”.

Distribution

Only known from the type locality.

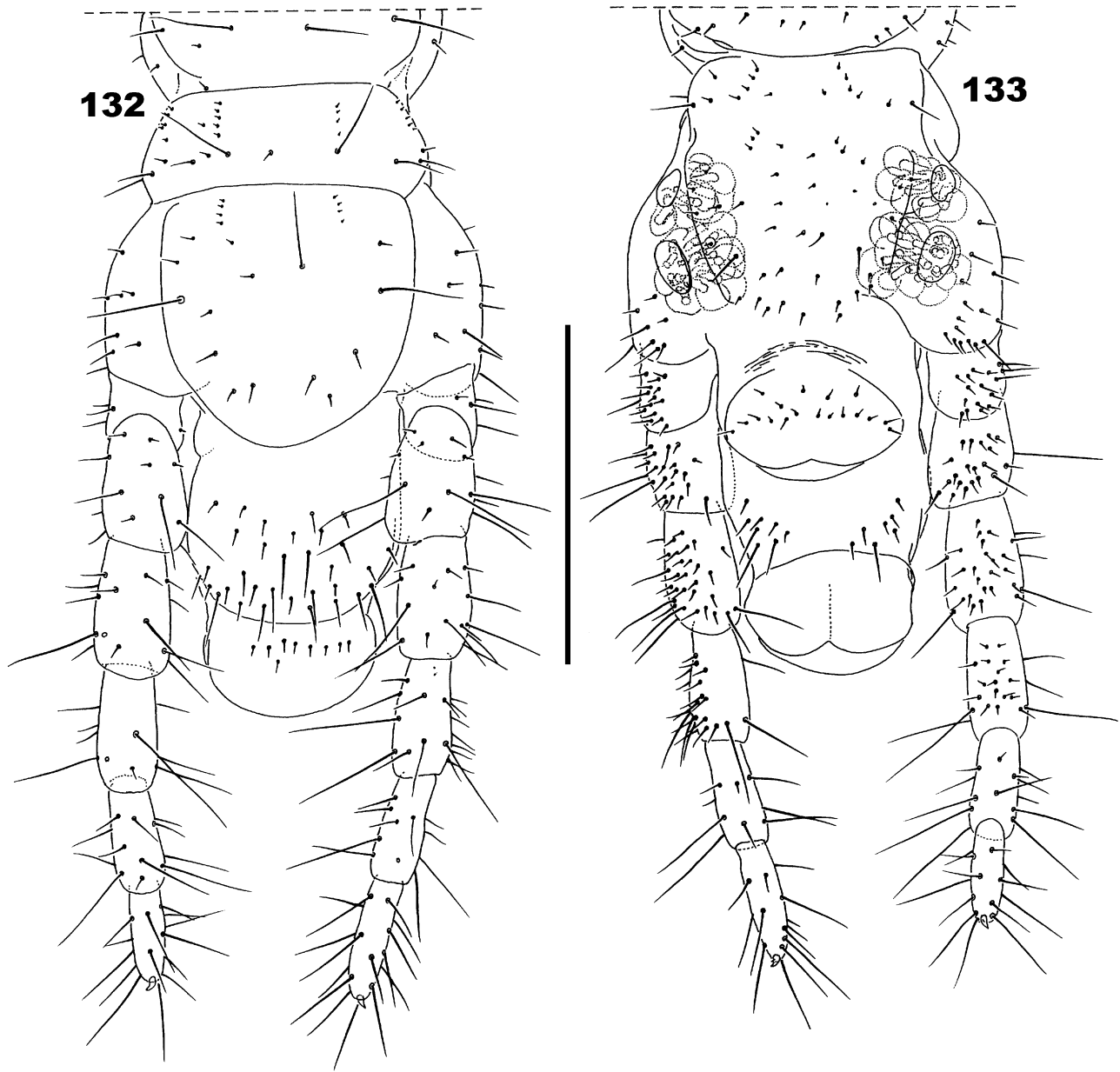


Figures 124–131. *Ribautia colcabensis* Kraus, 1957 (♀ “Paratypoid”, SMF 2925/1; Peru: Ancash Department: Casma Province: close to Colcabamba, 2600–2700 m a.s.l.). (124) Sternum II. (125) Sternum VI. (126) Sternum XX. (127) Sternum XXI. (128) Sternum XLI. (129) Sternum LVII. (130) Sternum LVIII. (131) Sternum LXVII. Scale bar: 0.4 mm.

Diagnosis

A *Ribautia* species with 2+2 clusters of coxal organs in the coxopleura of the last leg-bearing segment and ventral pore field series along all the body length. Among the Neotropical species included in the same genus, only the present species, *R. andecola* Kraus, 1954 and *R. roigi* sp. n. share these traits. *R. colcabensis* differs from these last by having the following unique traits: external border of coxosternal ridges (statumina) of second maxillae, slightly convex on distal part (Figures 106, 108, 109: a);

cephalic shield with posterior border convex and covered by the forcipular tergum (Figures 102, 103); forcipular tergum with anterior border straight (Figures 102, 113); pore field series ending on antepenultimate sternum; last five leg-bearing segments much narrower than the precedent ones and last leg praetarsus much smaller than the praetarsus of the precedent leg in the proportion 0.25–0.32:1 (Figures 132, 133, 136, 138). The comparatively largest number of pairs of legs (69 or 71 in the female); the arrangement of the coxal organs in each



Figures 132, 133. *Ribautia colcabensis* Kraus, 1957 (♀ “Paratypoid”, SMF 2925/1; Peru: Ancash Department: Casma Province: close to Colcabamba, 2600–2700 m a.s.l.). (132) Last leg-bearing segment and terminal segments, dorsal. (133) Last leg-bearing segment and terminal segments, ventral. Scale bar: 0.4 mm.

cluster (Figures 133–135); the presence of single pore fields on the last 10 sterna of the pore fields series and the relatively largest body length (38 mm) also distinguish this species from the others.

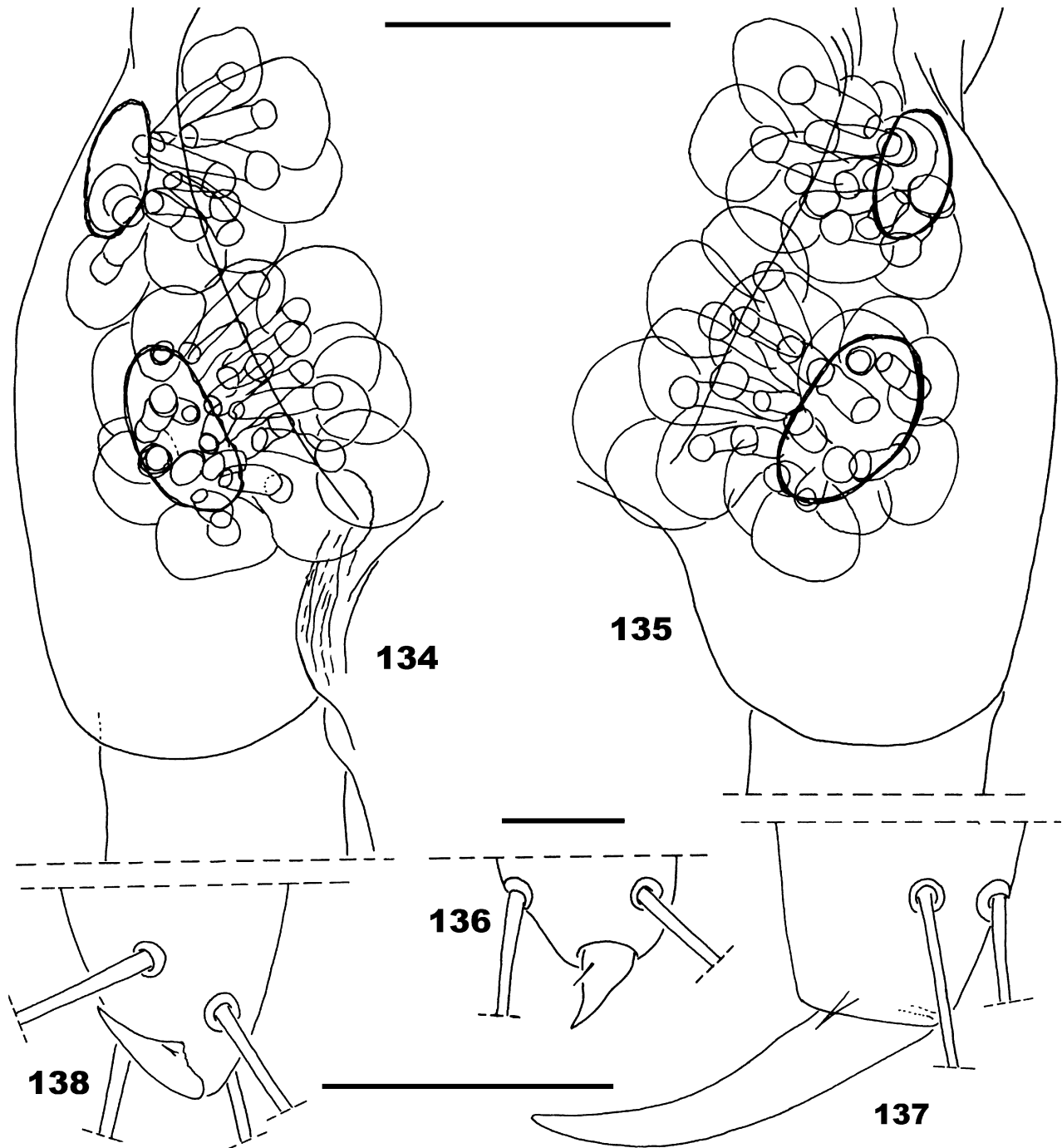
Type material examined

Peru: Ancash Department: Casma Province: close to Colcabamba: upper Casma valley, western Andean slope, light mountain forest 2600–2700 m a.s.l., August 1956, Koepcke leg.: holotype ♀, 71 p.l., b.l. 38 mm, specimen on six slides: (1) head capsule with antennae;

(2) labrum; (3) first and second maxillae; (4) forcipular segment followed by the first leg-bearing segment; (5) leg-bearing segments II–LXIX; (6) leg-bearing segment LXX followed by the last leg-bearing segment and terminal segments (SMF 2219). Same locality, date and collector as the holotype: “Paratypoid” ♀ adult, 69 p.l., b.l. 36 mm (in alcohol), SMF 2925/1.

Remarks

The mandibles of the female holotype are absent from the slides containing this specimen.



Figures 134–138. (134–136) *Ribautia colcabensis* Kraus, 1957 (♀ “Paratypoid”, SMF 2925/1; Peru: Ancash Department: Casma Province: close to Colcabamba, 2600–2700 m a.s.l.). (134) Right coxal organs, ventral. (135) Left coxal organs, ventral. (136) Detail of distal end of last podomere of right last leg, ventro-internal view. (137, 138) *Ribautia colcabensis* Kraus, 1957 (♀ holotype, SMF 2219; Peru: Ancash Department: Casma Province: close to Colcabamba, 2600–2700 m a.s.l.). (137) Claw of right leg LXX, ventro-posterior view. (138) Detail of distal end of last podomere of right last leg, ventro-internal view. Scale bars: 0.1 mm (134, 135); 0.02 mm (136); 0.05 mm (137, 138).

Redescription

Female “Paratypoid” (SMF 2925/1)

Sixty-nine pairs of legs; body length 36 mm; last five leg-bearing segments remarkably narrower than the

preceding ones, width of segments changing along the body as follows: segment I, 0.66 mm; XXI, 0.85 mm; XXX, 0.96 mm; XXXV, 0.97 mm; L, 0.85 mm; LXI, 0.66 mm; LXII, 0.63 mm; LXIII, 0.60 mm; LXIV, 0.48 mm; LXV, 0.40 mm; LXVIII, 0.37 mm. Length

Table III. Number of type a and b sensilla on antennal articles II, V, IX and XIII in the female "Paratypoid" (SMF 2925/1) of *Ribautia colcabensis* Kraus, 1957.

	Ventral		Dorsal		Figures
	a	b	a	b	
II		2		1	
V	1	2	1	2	
IX	1	2	1	3-4	100, 101
XIII	1	3	1	4-5	

of cephalic shield 0.87 mm; width of forcipular coxosternum 0.78 mm. Ground color (of preserved specimen in alcohol) yellowish white, forcipular segment darker (pale ochreous).

Antennae: ca. 3.5 times as long as the cephalic plate, distally attenuate, first article nearly as long as wide, remaining articles longer than wide (length to width ratios of all a.a. as shown in Figure 99). Setae on a.a. I-VI of different length, relatively few in number; those of remaining articles progressively shorter and more numerous towards the tip of the appendage (Figure 99). Terminal antennal article with ca. 15 claviform sensilla on the external border and ca. 13 on the internal border. Distal end of this a.a. with ca. three to four very small sensilla, apparently not split apically. Ventral and dorsal surface of a.a. II, V, IX (Figures 100, 101) and XIII with very small specialized sensilla. Type of sensilla and their position on the specified a.a. similar to those on *R. andecola*. Distribution of type a and b sensilla as in Table III.

Cephalic plate: distinctly longer than wide (ratio 1.3:1), lateral margins slightly convergent towards the posterior region, anterior and posterior margins convex (Figures 102, 103), posterior margin covered by the forcipular tergum (Figure 102). Shape and chaetotaxy as in Figure 102.

Clypeus: with five setae located on the clypeal area and three setae on the middle, the remaining clypeal surface without setae (Figure 103). Clypeal area relatively small, surface very densely reticulated (Figure 104).

Labrum: mid-piece well developed and sclerotized, with ca. 11 short teeth on the middle and 3+3 hyaline filaments on the sides. Side-pieces with 6+6 hyaline filaments of different length (Figure 105).

Mandible: pectinate lamella with ca. 17-19 hyaline teeth.

First maxillae: with very small lappets on coxosternum and telopodites (Figure 107). Coxosternum without setae; median projections of coxosternum subtriangular very well developed and provided with 5+6 setae. Article II of telopodite with

4+3 ventral setae and 3+3 dorsal sensilla (Figures 106, 107).

Second maxillae: coxites with 7+6 setae near the internal margin and 3+3 small sensilla near the external margin (Figure 106), medially joined through a very narrow, hyaline and non-areolate membranous isthmus only (Figure 106). Process of antero-internal corners of coxosternum well developed (Figures 106, 110, 111); external border of coxosternal ridges (statumina) slightly convex distally (Figures 106, 108, 109: a). Telopodites with setae of uniform thickness; apical claw of telopodite well developed, with tip very slightly curved inward (Figure 106). Chaetotaxy of coxosternum and telopodites as in Figures 106, 110, 111.

Forcipular segment: when closed, the telopodites project slightly beyond the anterior margin of the head (Figure 102). Forcipular tergum with anterior border straight and lateral borders slightly concave; chaetotaxy as in Figures 102, 113. Coxosternum with incomplete chitinous lines, middle part of anterior border with two denticles, ochreous in color (Figures 112-114). Telopodites: medial edge of trochanteropraefemur with two conspicuous deeply pigmented teeth, the distal one larger than the proximal (Figures 112-115). Femur and tibia without denticles. Tarsungulum basally with a well-developed and deeply pigmented subtriangular tooth; dorsal and ventral edges of the ungular blade not serrulate (Figures 112, 113, 115). Calyx of poison gland as in Figures 115, 116. Chaetotaxy of coxosternum and telopodites as in Figures 112, 113.

Walking legs: first pair (Figure 117) shorter than the second (Figure 118) in the ratio ca. 0.83:1. Setae on tibia and tarsus of legs I to XIII-XIV relatively larger than those on the remaining legs. Distribution, number and relative size of setae as in Figures 117-119. Claws ventrobasally with two basal parungues (Figures 120-123). Claw of leg I narrower and longer than claw of leg II in the proportions shown by Figures 117, 118, 120, 121.

Sterna: pore fields present from the second to the antepenultimate sternum. Fields undivided on sterna II-XX and LVIII-LXVII and divided in two subsymmetrical areas on sterna XXI-LVII. Form and relative size of fields changing along the trunk as in Figures 124-131. Number of pores on selected sterna: on sternum II, 27 pores; on VI, 62; on XX, 35; on XXI, 12+14; on XLI, 3+2; on LVII, 4+5; on LVIII, 11; on LXVII, 8.

Last leg-bearing segment: form of sclerites modified by the action of the preservation fluid (Figures 132, 133). Coxopleura very slightly protruding at their distal ventral ends, setae few in number

distributed as in Figures 132, 133. Coxal organs grouped in 2+2 clusters, each one opening by a large pore in the membrane between coxopleuron and sternum (Figures 133–135). Anterior clusters with ca. 10–12 organs and posterior clusters with ca. 17–18 organs, arranged as in Figures 133–135. Last legs with seven podomeres, form and chaetotaxy as in Figures 132, 133. Praetarsus unguiform, much smaller than those of the preceding legs (in the proportion 0.25–0.32:1), with a single internal parunguis basally (Figure 136).

Terminal segments: form of sclerites modified by the action of the preservation fluid, chaetotaxy as in Figures 132, 133. Anal organs absent.

Remarks

The characteristic of this species of having the posterior margin of the head covered by the forcipular tergum is very unusual in the genus (apparently this particularity is not an artifact due to action of the preservation fluid).

The last leg-bearing segment and terminal segments of the female holotype (originally mounted on a slide) are not well preserved, the form of the different structures are modified by the action of the mounting medium (“Glyc.-Gel.”); nevertheless the following observations can be added on this basis: praetergum apparently fused with its pleurites; praesternum divided along the sagittal plane; posterior border of tergum and sternum very slightly convex; praetarsus of the right last leg (Figure 138) claw-like, well evident and much smaller than the claw of the preceding leg (Figure 137) in the proportion 0.32:1. The praetarsus of the left last leg is apparently abnormal, being rudimentary with a not well-defined form.

The original description of Kraus (1957) states “Anal beine völlig ohne Praetarsus”, but (as described above), a small claw-like praetarsus is present, in the right last leg of the female holotype as well as in both last legs of the female “Paratypoid” here described.

Characters differentiating *R. colcabensis* from the other Neotropical species of *Ribautia* with 2+2 clusters of coxal organs in the coxopleura of the last leg-bearing segment are given in Table IV.

Ribautia seydi Ribaut, 1923

Ribautia seydi Ribaut, 1923, p. 68, 71.

Ribautia seydi: Attems, 1929, p. 295.

Schizoribautia seydi: Verhoeff, 1941, p. 72.

Schizoribautia seydi: Turk, 1955, p. 485–487.

Ribautia seydi: Chamberlin, 1955–56, p. 17.

Schizoribautia seydi: Kraus, 1957, p. 378–379.

Schizoribautia seydi: Chamberlin, 1957, p. 28.

Ribautia (Schizoribautia) seydi: Pereira, Minelli & Barbieri, 1995, p. 325, 336.

Ribautia (Schizoribautia) seydi: Pereira, Minelli & Foddai, 1997, p. 12.

Ribautia seydi: Foddai, Pereira & Minelli, 2000, p. 94–95.

Type locality

“Peru” (without specification of collecting site).

Distribution

Peru: without specification of locality; also E of Abancay; near Canchaque (N-Peru); El Infiernillo (C-Peru), Rio Rimac; Zárate near San Bartolomé (M-Peru); San Ramón (C-Peru), Valle de Cabanchamayo; near Cachui (C-Peru), region of Rio Cañete; Lake Junin (M-Peru), near Campañillaya (M-Peru), near Palca (M-Peru); Laguna Conococha; Atiquipa near Chala (S-Peru).

Diagnosis

A species of *Ribautia* with 2+2 (or 3+3?) clusters of coxal organs in the coxopleura of the last leg-bearing segment. Of the other Neotropical *Ribautia* species, *R. seydi* shares the presence of 2+2 clusters of coxal organs with *R. roigi* sp. n., *R. andecola* Kraus, 1954 and *R. colcabensis* Kraus, 1957, and can be differentiated from all of them by the following traits: pore fields present on the sterna of the anterior region of the body only and anal organs present.

Remarks

Ribautia seydi remains imperfectly known. Ribaut (1923) mentioned it in a key and tells that the species comes from Peru (locality unknown). From its position in the key, it is possible to deduce a small number of characteristics, among these that the ventral pore fields are present on the anterior region of the body only and the coxal organs are arranged in clusters (number in each coxopleuron not specified). Turk (1955) gives additional data on a specimen from Peru (Cajamarca), tentatively assigned by the author to this species, but no information is included on the coxal organs. Chamberlin (1955–1956) confidently assigns to this species two specimens collected in Peru (40 miles E of Abancay) and affirms that the coxal organs are arranged in 2+2 clusters. Kraus (1957) considers *R. peruana* and *R. montana* (both species having 3+3 clusters of coxal organs and ventral pore fields present along all body length) as synonyms of *R. seydi*. Pereira et al. (1995) do not recognize this synonymy, regarding these three species as valid; this

Table IV. Differential characters of *Ribautia roigi* sp. n., *R. andecola* Kraus, 1954, *R. colcabensis* Kraus, 1957 and *R. seydi* Ribaut, 1923.

	<i>roigi</i>	<i>andecola</i>	<i>colcabensis</i>	<i>seydi</i>
Pairs of legs	♂: 43 ♀: ? 17	♂: 47, 49, 51 ♀: 49, (51?), 53 23	♂: ? ♀: 69, 71 38	53, 55 (♂?) 59 (♀?) 28 ?
Body length (mm)				
Some antennal articles provided with type c sensilla	Yes, on a.a. IX and XIII (Figures 8, 10: c)	No	No	?
Lateral margins of cephalic plate provided with an anterior concavity	No (Figures 11, 12)	Yes (Figures 57, 58: a)	No (Figures 102, 103)	?
Anterior region of head capsule conspicuously narrower than the middle part	Yes (Figures 11, 12)	Yes (Figures 57, 58)	No (Figures 102, 103)	?
Middle part of lateral margins of head capsule converging towards posterior region	Yes (Figure 11)	No (Figure 57)	Yes (Figures 102, 103)	?
Posterior border of head capsule	Straight (Figure 11)	Slightly concave (Figure 57)	Convex (Figures 102, 103)	?
External border of coxosternal ridges ('statumimia') of second maxillae, slightly convex distally	No (Figure 17)	No (Figure 62)	Yes (Figures 106, 108, 109)	?
Aspect and relative size of process of antero-internal corners of coxosternum of second maxillae	As in Figures 17–20	As in Figures 62, 64	As in Figures 106, 110, 111	?
First article of telopodites of second maxillae with a very small distoecial process	No (Figures 17–19)	Yes (Figures 62–64: a)	No (Figures 106, 110, 111)	?
Aspect of denticles on middle part of anterior border of forcipular coxosternum	As in Figures 23–25	As in Figures 67, 68	As in Figures 112–114	?
Medial edge of forcipular trochanteropraefemur	With a distal conspicuous and deeply pigmented tooth and a proximal unpigmented round tipped projection (Figures 23, 24, 26)	With a distal and a proximal conspicuous tooth, both deeply pigmented (Figure 67, 69)	With a distal and a proximal conspicuous tooth, both deeply pigmented (Figures 112, 113, 115)	With a distal conspicuous and deeply pigmented tooth and a proximal unpigmented round-tipped projection
Ventral pore fields series along the whole trunk length	Yes	Yes	Yes	No
Anterior limit of ventral pore fields series	Sternum I	Sternum II	Sternum II	Sternum II
Posterior limit of ventral pore fields series	Penultimate sternum	Penultimate sternum	Antepenultimate sternum	Ca. sternum XXVII
All pore fields undivided	No, those of mid-body divided in two subsymmetrical areas ca. 2	No, those of midbody divided in two subsymmetrical areas ca. 2	No, those of midbody divided in two subsymmetrical areas ca. 10	Yes
Number of posterior sterna (at the end of the pore fields series) provided with single pore fields	No	No	Yes	?
Five last leg-bearing segments much narrower than the preceding ones	♂: Yes (Figures 48, 49: c, 50) ♀: ?	♂: No (Figure 95) ♀: No (Figures 91, 92)	♂: ? ♀: No (Figures 133, 134)	?
Coxopleura of the last leg-bearing segment conspicuously protruding at their distal ventral ends	♂: Yes (Figures 47, 48, 51: a) ♀: ? 2+2	♂: No (Figures 94, 95) ♀: No (Figures 90, 91) 2+2	♂: ? ♀: No (Figures 132, 133) 2+2	?
Trochanter of last legs with a small proximal protuberance on the external edge				
Number of clusters of coxal organs				2+2 (or 3+3?)

Table IV. Continued.

	<i>roigi</i>	<i>andecola</i>	<i>colcabensis</i>	<i>seydi</i>
Arrangement of coxal organs in anterior and posterior clusters	As in Figures 48, 50	As in Figures 91, 92, 95	As in Figures 133–135	?
Relative size of last leg praetarsus	Similar in size to those of preceding legs (Figures 47, 48)	Conspicuously smaller than those of preceding legs, ratio ca. 0.48–0.50:1 (Figures 90, 91, 93–95)	Conspicuously smaller than those of preceding legs, ratio ca. 0.25–0.32:1 (Figures 132, 133, 136, 138)	?
Anal organs	Absent	Absent	Absent	Present

decision is based principally on the fact that *R. seydi* is characterized by having pore fields present on the anterior region of the body only and (according to Chamberlin) the coxal organs are arranged in 2+2 clusters; but due to imprecisions in the bibliography also tentatively mention the possibility that in *R. seydi* the coxal organs are arranged in three clusters in each coxopleuron (instead of two), and this is expressed as “2 (or 3?)” in Table 3 of that contribution.

Characters differentiating *R. seydi* from the other Neotropical species of *Ribautia* with 2+2 clusters of coxal organs in the coxopleura of the last leg-bearing segment are given in Table IV.

Among the Neotropical species in the same genus, only *R. carpisha* (Chamberlin, 1957) and *R. junina* (Chamberlin, 1957) (both from Peru) have been described as having pore fields on the anterior region of the body only and 3+3 clusters of coxal organs in the coxopleura of the last leg-bearing segment. To define appropriately how *R. seydi* would differ from these last, and to confirm if all are valid species, will require examination of the corresponding type specimens, due to the deficiency of diagnostic characters known at present for these species.

Discussion

Up to the present, only three species of the Chilopod order Geophilomorpha have been cited from Bolivia, i.e. *Schendylops bolivianus* (Silvestri, 1897) and *Schendylops potosius* (Chamberlin, 1956) in the family Schendylidae, and *Arcophilus gracillimus* (Verhoeff, 1938) in the family Himantariidae—whose identity is uncertain and the familial assignment dubious (Foddai et al., 2000; Minelli, 2006). *Ribautia roigi* sp. n. is the fourth species of the order to be cited from this country. Considering that Bolivia represents a large region comprising a great variety of biotopes ranging from a few hundred meters above sea level to high altitudes in the Andes, it result obvious that biodiversity in this territory should be much larger than known until the present, in consequence the cited few taxa only represent a very small portion of the whole Geophilomorph fauna inhabiting the country.

A similar situation occurs in the remaining centipede orders, in which according to Minelli (2006) only ca. four species of Scolopendromorpha (in the genera *Cormocephalus*, *Rhysida* and *Scolopendra*) and two of Lithobiomorpha (in the genus *Lamyctes*) are recorded from Bolivia. (Apparently there are no published records for Scutigleromorpha for this country.) The preceding data show that Bolivia remains almost unexplored in

respect to its centipede fauna, with almost all their components still awaiting discovery.

Acknowledgments

I am indebted to Peter Jaeger and Julia Altmann (Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt) for access to relevant type specimens and to Arturo Roig Alsina (Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”, Buenos Aires) for allowing me to study the specimen collected by himself in Bolivia. I am very grateful to Richard L. Hoffman (Virginia Museum of Natural History) who kindly corrected the language and gave useful comments that helped to improve earlier versions of the paper. An anonymous referee provided additional comments on the latest version of the manuscript. Alejandro Brown (Fundación ProYungas, Tucumán) gave information on the distribution of the Bolivian Yungas. Hermán L. Pereira (La Plata) edited the digitalized figures.

References

- Attems C. 1929. Myriapoda I. Geophilomorpha. Das Tierreich 52. Berlin: de Gruyter.
- Bonato L, Minelli A. 2004. The centipede genus *Mecistocephalus* Newport, 1843 in the Indian Peninsula (Chilopoda Geophilomorpha Mecistocephalidae). *Trop Zool.* 17:15–63.
- Chamberlin RV. 1955–1956. Reports of the Lund University Chile Expedition 1948–1949. 40. The Chilopoda of the Lund University and California Academy of Science Expeditions. *Acta Univ Lunds Årsskrift, N.F. (Ser 2).* 51:1–61.
- Chamberlin RV. 1957. Geophiloid chilopods taken in the northern Andes in 1954–1955. *Proc Biol Soc Wash.* 70:21–30.
- Foddai D, Minelli A, Pereira LA. 2002. Chilopoda Geophilomorpha. In: Adis J, editor. *Amazonian Arachnida & Myriapoda*. Sofia: Pensoft Publishers. p. 459–474.
- Foddai D, Pereira LA, Minelli A. 2000. A catalogue of the geophilomorph centipedes (Chilopoda) from Central and South America including Mexico. *Amazoniana.* 16:59–185.
- Foddai D, Pereira LA, Minelli A. 2004. The geophilomorph centipedes (Chilopoda) of Brazilian Amazonia. *Anal Inst Biol Univ Nac Aut Mex Ser Zool.* 75:271–282.
- Kraus O. 1954. Myriapoden aus Peru, 1. *Senckenbergiana.* 34:311–323.
- Kraus O. 1957. Myriapoden aus Peru, VI: Chilopoden. *Senckenb Biol.* 38:359–404.
- Minelli A, editor. 2006. *CHILOBASE: a world catalogue of Centipedes (Chilopoda) for the Web* [Internet]. Available from <http://chilobase.bio.unipd.it>.
- Pereira LA. 2000. The preparation of centipedes for microscopical examination with particular reference to the Geophilomorpha. *Bull Br Myriap Group.* 16:22–25.
- Pereira LA. 2007. First record of *Ribautia* Brölemann, 1909 from Argentina, with description of *R. jakulicai* sp. n. a new Neotropical member from the Yungas with coxal organs grouped in clusters (Myriapoda: Chilopoda: Geophilomorpha). *Stud Neotrop Fauna Environ.* 42:155–168.
- Pereira LA, Foddai D, Minelli A. 1997a. Zoogeographical aspects of Neotropical Geophilomorpha. *Entomol Scand Suppl.* 51:77–86.
- Pereira LA, Foddai D, Minelli A. 2000. New taxa of Neotropical Geophilomorpha (Chilopoda). *Amazoniana.* 16:1–57.
- Pereira LA, Minelli A, Barbieri F. 1994. New and little known geophilomorph centipedes from Amazonian inundation forests near Manaus, Brazil (Chilopoda: Geophilomorpha). *Amazoniana.* 13:163–204.
- Pereira LA, Minelli A, Barbieri F. 1995. Description of nine new centipede species from Amazonia and related matters on Neotropical geophilomorphs (Chilopoda: Geophilomorpha). *Amazoniana.* 13:325–416.
- Pereira LA, Minelli A, Foddai D. 1997b. On the true identity of *Geophilus tropicus* Brölemann, 1898, a geophilid species from Venezuela (Chilopoda Geophilomorpha Geophilidae). *Boll Soc Entomol Ital.* 129:5–14.
- Pereira LA, Uliana M, Minelli A. 2006. New species and new records of the genus *Ribautia* Brölemann, 1909 (Chilopoda: Geophilomorpha: Geophilidae) from South America. *Zootaxa.* 1106:45–68.
- Ribaut H. 1923. Chilopodes de la Nouvelle Calédonie et des Îles Loyalty. In: Sarasin F, Roux J, editors. *Nova Caledonia, Forschungen in Neu-Caledonien und auf den Loyalty-Inseln.* A Zool. 3:1–79.
- Silvestri F. 1897. Viaggio del Dott. Alfredo Borelli nel Chaco Boliviano e nella Repubblica Argentina. IV. Chilopodi e Diplopodi. *Boll Mus Zool Anat Comp Torino.* 12(283):1–11.
- Turk FA. 1955. The chilopods of Peru with descriptions of new species and some zoogeographical notes on the Peruvian Chilopod fauna. *Proc Zool Soc Lond.* 125:469–504.
- Uliana M, Bonato L, Minelli A. 2007. The Mecistocephalidae of the Japanese and Taiwanese islands (Chilopoda: Geophilomorpha). *Zootaxa.* 1396:1–84.
- Verhoeff KW. 1938. Über einige Chilopoden des zoologischen Museums in München. *Zool Anz.* 123:123–130.
- Verhoeff KW. 1941. Chilopoden und Diplopoden. In: Titschack E, editor. *Beiträge zur Fauna Perus Hamburg.* 1:5–80.