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Monograph

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A revision of the genus *Sclerocoelus* Marshall (Diptera: Sphaeroceridae)

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Abstract. The widespread but mostly Andean genus *Sclerocoelus* Marshall, 1995 is revised and redescribed, and the following 48 new species are described: *S. aduncus* sp. nov. (Ecuador), *S. alpinus* sp. nov. (Ecuador, Venezuela), *S. altus* sp. nov. (Ecuador), *S. argentinensis* sp. nov. (Argentina), *S. azulensis* sp. nov. (Ecuador), *S. binus* sp. nov. (Bolivia, Costa Rica, Ecuador, Peru, Venezuela), *S. bucki* sp. nov. (Bolivia, Costa Rica, Ecuador, Peru), *S. caligarius* sp. nov. (Bolivia), *S. chilensis* sp. nov. (Chile), *S. copiosus* sp. nov. (Bolivia, Brazil, Costa Rica, Ecuador, Panama, Peru, Venezuela), *S. costaricensis* sp. nov. (Costa Rica), *S. cubus* sp. nov. (Ecuador, Peru), *S. dasysternum* sp. nov. (Costa Rica, Guatemala, Honduras, Panama, Tobago), *S. dominicensis* sp. nov. (Dominica), *S. dryadalis* sp. nov. (Venezuela), *S. elephas* sp. nov. (Bolivia, Ecuador, Venezuela), *S. espeletia* sp. nov. (Venezuela), *S. flavus* sp. nov. (Venezuela), *S. frigidifrons* sp. nov. (Ecuador), *S. grandicercus* sp. nov. (Costa Rica), *S. inornatus* sp. nov. (Ecuador), *S. irregularis* sp. nov. (Argentina, Bolivia, Brazil, Costa Rica, Ecuador, Paraguay), *S. latibarbus* sp. nov. (Guatemala, Honduras, Mexico), *S. lazulita* sp. nov. (Bolivia, Ecuador, Venezuela), *S. limbus* sp. nov. (Bolivia, Peru), *S. longibarbus* sp. nov. (Costa Rica, Guatemala, Mexico), *S. lutosus* sp. nov. (Bolivia, Peru), *S. mandibulum* sp. nov. (Bolivia, Ecuador), *S. masneri* sp. nov. (Venezuela), *S. meridensis* sp. nov. (Venezuela), *S. nebulosus* sp. nov. (Costa Rica, Ecuador, Venezuela), *S. nitidistylus* sp. nov. (Costa Rica, Panama), *S. ocellatus* sp. nov. (Costa Rica), *S. paranebulosus* sp. nov. (Venezuela), *S. pararegularis* sp. nov. (Mexico), *S. parasordipes* sp. nov. (Canada, Mexico, USA), *S. penai* sp. nov. (Bolivia), *S. punensis* sp. nov. (Bolivia, Peru), *S. puyensis* sp. nov. (Ecuador), *S. recurvatus* sp. nov. (Costa Rica), *S. riparius* sp. nov. (Ecuador), *S. rostrum* sp. nov. (Mexico), *S. synorios* sp. nov. (Mexico, USA), *S. tantus* sp. nov. (Argentina, Bolivia, Brazil, Ecuador, Peru, Paraguay, Venezuela), *S. tridens* sp. nov. (Bolivia, Ecuador), *S. turpis* sp. nov. (Brazil), *S. vulgatus* sp. nov. (Costa Rica, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru), and *S. xynos* sp. nov. (Argentina, Bolivia, Ecuador, Peru, Venezuela). A key to species is provided, along with discussions of the relationships, distribution, and biology.

Keywords. Acalyptratae, cloud forest, Neotropical, biology, taxonomy.

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Introduction

The genus *Sclerocoelus* Marshall, 1995 is known throughout the New World and from the South Atlantic islands of Tristan da Cunha. Marshall (1995) originally described the genus to include the distinctive species *Limosina sordipes* Adams, 1904, *Leptocera* (*Limosina*) *regularis* Malloch, 1914, and *Leptocera* (*Scotophilella*) *plumiseta* Duda, 1925. Later, Marshall (1997) described five new species in the *Sclerocoelus galapagensis* group, and included *Limosina subbrevipennis* Frey, 1945 in the genus. Two further species, *Leptocera* (*Limosina*) *rectangularis* Malloch, 1914 and *Limosina clarae* Papp, 1973, were included in *Sclerocoelus* by Marshall (2001) and Roháček *et al.* (2001), respectively. Most of the 58 species recognized here (including 48 new species described below) occur in the Neotropical region, where *Sclerocoelus* is one of the most abundant and distinctive genera of Sphaeroceridae (Fig. 1). Almost all species in the genus are characterized by a conspicuously enlarged and strikingly modified male genital pouch, with the ventral part of synsternite 6+7 subdivided and usually including seven separate sclerites. Other distinctive features of *Sclerocoelus* include a large and often elaborate subcercus immediately posterodorsal to the surstylus, a broad to very broad alula, an enlarged intra-alar bristle just anterior to the prescutellar dorsocentral bristle, a very broad lunule, and characteristic tibial chaetotaxy including a midventral bristle only in the female. Most species also have the inner posteroventral corner of the epandrium differentiated into a separate pseudocercus with 1–3 long setae, and many have an elaborately developed subepandrial sclerite that further contributes to the characteristic complexity of the male terminalia of *Sclerocoelu*s species.

The current study aims to revise the genus and discuss the biology and relationships of and between the 58 known species of *Sclerocoelus*. *Sclerocoelus andensis* Marshall, 1997, *S. brasilensis* Marshall, 1997, *S. caribensis* Marshall, 1997, *S. galapagensis* Marshall, 1997, *S. hemorrhoidalis* Marshall, 1997, *S. sordipes*, and *S. subbrevipennis* are not redescribed here as they are thoroughly described and illustrated in Marshall (1995, 1997), though short diagnoses are given.

Adult *Sclerocoelus* can be abundant in wet leaf litter and they are often the most common flies taken by sweep netting over wet litter on Neotropical forest trails. We have collected the genus from sea level to 4000 m a.s.l. but find it to be most abundant in cloud forests, where sweep samples are often dominated by *Sclerocoelus*. Several species abound under wet vegetation, such as prostrate *Polylepis* branches or mats of plant material along streams at higher altitudes in the Andes. Relatively few of the more than 12 000 specimens examined for this study were taken in Malaise traps, flight intercept traps, dung traps or carrion traps, but many specimens are from appropriately placed pan traps. Hand-collecting from appropriate microhabitats has routinely yielded samples including half a dozen or more sympatric *Sclerocoelus* species in the same collecting events.

Material and methods

Adult terminology

Morphological terminology follows Cumming & Wood (2017) and Yau & Marshall (2018), though terms referring to macrotrichia follow Marshall *et al.* (2014): bristles (large, named macrotrichia), setae (small to large, unnamed but distinct macrotrichia) and setulae (very small macrotrichia). Abbreviations include: CS = costal sector; S = sternite(s); T = tergite(s).

The left side and anterior margin of the male genital pouch (the ventral portion of segments 6–7) in the Limosininae incorporates a large synsternite (S6+7), that extends to the right as a characteristic narrow

arm (the ventral arm) along the generally modified posterior margin of S5, and sometimes extends anteriorly over the left side of S5 as a broad lobe referred to as the sinistral flange. In most Limosininae, the remainder of the genital pouch is membranous, although some species have a small sclerite extending to or surrounding the sixth right spiracle, some groups have a ring-shaped sclerite near the spiracle, and a few groups have small, tab-like sclerites above the posteromedial modifications of S5. Most *Sclerocoelus* differ from other Limosininae in having an unusually elaborate genital pouch in which ventral, anterior, and right areas incorporate a complex group of additional sclerites. The sclerites of the *Sclerocoelus* genital pouch, apparently derived from S6, are here given the letter designations A to G, in the approximate order of their appearance left to right (see Fig. 10). The part of S6+7 immediately posterior to the base of the ventral arm of S6, usually marked by the characteristic single pair of sensillae trichodea associated with S6, is called sclerite A; it varies widely and is not always differentiated as a separate sclerite. Sclerite B is a generally narrow, characteristically curved sclerite closely associated with sclerite A and often reaches sclerite E or F. Generally smaller sclerites between sclerite B and the ventral arm of S6 are sclerites C and D. Sclerites C and D are variable, and their homology is not always clear, but if both are present, the posterior-most is treated as sclerite C. The two main ventral sclerites on the right side of the genital pouch, usually relatively large and with narrow medial lobes, are sclerite E (smaller, anterior, more medial) and sclerite F (posterior, dextral); they are sometimes fused. To the right of the genital pouch lies the 6th right spiracle, usually surrounded by a large sclerite G, which is probably fused with sclerite F in the groundplan of the genus. A second ring-shaped sclerite posterior to (or sometimes fused with) sclerite G is presumably homologous with the ring sclerite of most limosinine genera.

The area below the anus, which in most limosinine genera is occupied by cerci that frequently fuse into a subanal plate, is unusually complex in *Sclerocoelus* and, at least in the more derived clades, includes separate pieces here referred to as the pseudocercus and subcercus. The pseudocercus is a small, setae-bearing lobe originating from the inner posteroventral corner of the epandrium, sometimes completely separated from the epandrium (as in Fig. 20B) or entirely absent. The subcercus is a larger, more complex structure ventral to the pseudocercus and posterior to the surstylus; it is sometimes divided into inner (anterior) and outer (posterior) parts and is usually linked to the surstylus by the subepandrial sclerite. The setose areas flanking the male anus, often prominent and densely setulose, are referred to as the perianal pads. The pseudocerci and subcerci are probably derived from the cerci. In species that retain recognizable cerci connected to the epandrium, the cerci are usually widely separated but they sometimes meet medially to form a narrow or broad subanal plate.

Label data

Label data are given in a standardized format, rather than verbatim, unless given in quotation marks (“”). Obvious spelling errors on labels were corrected in the data below and short-form words are given in their full forms (e.g., Natl. Pk. is given as National Park). New country records for named species are indicated by an asterisk (*) in the distributional notes.

Specimen preparation

Male and female terminalia were prepared by soaking entire abdomens in 10% potassium hydroxide (KOH) at room temperature for five minutes prior to heating the KOH to boiling point for 15–30 minutes. Cleared abdomens were subsequently neutralized in glacial acetic acid for at least 35 minutes at room temperature, then rinsed with deionized water and placed in glycerin for examination. Wings were prepared for photography by placing them flat on a microscope slide, adding a drop of ethanol and covering with a glass coverslip. Dissected parts were stored in glycerin in genitalia vials pinned below the specimens.

Photography and illustrations

Habitus photographs were taken using a Canon 70D camera mounted on a StackShot system (Cognisys Inc., Michigan USA) and stacked in HeliconFocus (Helicon Soft Ltd., Kharkiv, Ukraine). Wing photographs

Table 1 (continued on next page). Character state matrix of *Sclerocoelus* Marshall, 1995, including *Chespiritos* Marshall, 2000, *Paramosina* Marshall, 2014, and *Parasclerocoelus* Marshall & Dong, 2008 as the outgroups. The plesiomorphic state is indicated by (0) and apomorphic state(s) by (1–5); multistate characters are treated as unordered.

Taxon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Chespiritos Marshall, 2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Paramosina Marshall, 2014	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	1	0
Parasclerocoelus Marshall & Dong, 2008	0	0	1	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0
Sclerocoelus aduncus sp. nov.	0	1	0	0	0	0	0	1	0	0	0	1	0	0	?	?	?	?
S. alpinus sp. nov.	0	1	0	0	1	3	0	1	0	0	1	2	0	0	2	0	1	0
S. altus sp. nov.	0	1	1	0	1	2	0	0	1	2	0	1	0	0	?	?	?	?
S. andensis Marshall, 1997	1	1	0	0	1	4	1	1	1	4	0	1	0	0	0	0	0	0
S. argentinensis sp. nov.	0	1	0	0	0	0	0	0	1	1	0	1	0	0	?	?	?	?
S. azulensis sp. nov.	0	1	0	0	2	4	2	1	1	0	0	1	0	0	2	0	1	0
S. binus sp. nov.	1	1	0	0	2	4	2	2	1	4	0	0	0	0	2	1	2	2
S. brasilensis Marshall, 1997	1	1	0	0	2	4	2	1	1	4	0	2	0	0	0	0	0	0
S. bucki sp. nov.	0	1	0	0	2	3	0	0	0	2	0	1	0	0	2	0	1	1
S. caligarius sp. nov.	1	1	1	0	2	4	1	2	1	4	0	1	0	0	1	0	2	2
S. caribensis Marshall, 1997	1	1	0	0	2	4	2	1	1	4	0	1	0	0	0	0	0	0
S. chilensis sp. nov.	0	1	0	0	1	3	0	1	0	2	0	1	0	0	?	?	?	?
S. copiosus sp. nov.	0	1	0	1	2	4	2	1	0	4	2	0	0	0	2	1	0	0
S. costaricensis sp. nov.	0	1	1	2	2	1	1	2	1	0	0	3	0	1	1	0	1	2
S. cubus sp. nov.	0	1	0	0	1	3	0	1	1	4	0	2	0	0	?	?	?	?
S. dasysternum sp. nov.	0	1	0	1	2	1	1	2	0	0	1	3	0	0	1	0	1	2
S. dominicensis sp. nov.	0	1	0	3	1	1	1	1	1	3	0	2	1	2	1	0	0	2
S. dryadalis sp. nov.	0	1	0	0	0	0	0	0	1	3	0	2	0	0	2	0	1	1
S. elephas sp. nov.	1	1	0	2	2	4	2	1	0	4	2	0	0	0	2	1	2	2
S. espeletia sp. nov.	0	1	0	0	2	3	1	1	1	2	1	1	0	0	?	?	?	?
S. flavus sp. nov.	0	1	0	0	1	0	0	0	0	3	0	2	0	0	2	0	1	1
S. frigidifrons sp. nov.	0	1	0	0	0	0	0	0	0	0	0	2	0	0	2	0	1	0
S. galapagensis Marshall, 1997	1	1	0	0	2	4	1	1	1	4	1	3	0	0	0	0	0	0
S. grandicercus sp. nov.	0	1	1	1	2	3	1	2	1	0	1	3	0	0	1	0	1	0
S. hemorrhoidalis Marshall, 1997	1	1	0	0	2	4	2	1	1	4	0	1	0	0	0	0	0	0
S. inornatus sp. nov.	0	0	0	0	1	3	0	0	0	0	1	0	0	0	?	?	?	?
S. irregularis sp. nov.	0	1	0	3	1	1	1	1	1	3	0	2	1	2	1	0	0	2
S. latibarbus sp. nov.	0	1	1	2	2	4	2	1	1	2	0	3	0	1	1	0	1	2
S. lazulita sp. nov.	0	1	0	0	2	2	0	0	0	2	0	2	0	0	2	0	1	0
S. limbus sp. nov.	0	1	2	0	0	0	0	0	1	0	0	1	0	0	2	0	1	0
S. longibarbus sp. nov.	0	1	1	1	2	4	2	1	1	0	0	2	1	0	2	0	0	0
S. lutosus sp. nov.	0	0	0	0	1	3	0	0	1	1	0	0	0	0	1	0	1	1
S. mandibulum sp. nov.	0	1	0	0	1	2	0	1	0	5	1	2	0	0	0	1	0	2
S. masneri sp. nov.	0	1	1	1	2	3	2	1	1	4	0	4	0	0	1	0	2	2
S. meridensis sp. nov.	0	1	0	0	1	0	0	0	0	3	0	0	0	0	2	0	1	1
S. nebulosus sp. nov.	0	1	0	0	2	2	0	1	0	0	0	2	0	0	2	0	1	1
S. nitidistylus sp. nov.	0	1	0	1	2	3	1	2	1	2	1	3	0	1	0	0	1	2
S. ocellatus sp. nov.	0	1	0	1	2	3	1	2	1	3	1	4	0	0	2	0	1	2
S. paranebulosus sp. nov.	0	1	0	0	2	3	0	1	0	0	0	1	0	0	?	?	?	?
S. pararegularis sp. nov.	0	1	0	3	1	1	1	1	1	3	0	2	1	2	?	?	?	?
S. parasordipes sp. nov.	0	1	0	1	2	3	1	2	0	5	0	1	0	0	2	0	2	1
S. penai sp. nov.	0	1	2	0	2	2	0	1	0	2	0	1	0	0	?	?	?	?

Table 1 (continued). Character state matrix of *Sclerocoelus* Marshall, 1995, including *Chespiritos* Marshall, 2000, *Paramosina* Marshall, 2014, and *Parasclerocoelus* Marshall & Dong, 2008 as the outgroups. The plesiomorphic state is indicated by (0) and apomorphic state(s) by (1–5); multistate characters are treated as unordered.

Taxon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
S. plumiseta (Duda, 1925)	0	1	0	0	1	1	0	1	1	1	0	3	1	0	2	0	0	2
S. punensis sp. nov.	0	1	0	0	1	3	0	0	1	2	1	2	0	0	?	?	?	?
S. puyensis sp. nov.	0	1	1	0	1	3	0	0	0	0	2	2	0	0	2	0	1	2
S. rectangularis (Malloch, 1914)	0	1	0	0	2	4	2	2	0	1	0	3	1	0	2	0	2	2
S. recurvatus sp. nov.	0	1	0	1	2	2	2	2	1	0	1	3	0	0	0	0	3	0
S. regularis (Malloch, 1914)	0	1	0	3	1	1	1	1	1	3	0	2	1	2	1	0	2	2
S. riparius sp. nov.	0	1	0	0	1	3	1	1	1	1	0	0	0	0	1	0	1	2
S. rostrum sp. nov.	0	1	1	1	2	3	2	1	1	2	0	3	0	1	?	?	?	?
S. sordipes (Adams, 1904)	0	1	0	1	2	3	1	2	0	5	0	1	0	0	2	0	0	0
S. subbrevipennis (Frey, 1954)	1	1	0	0	2	4	1	1	1	4	0	2	0	0	0	0	0	0
S. synorios sp. nov.	0	1	1	1	2	4	2	1	1	1	1	3	0	1	2	0	0	2
S. tantus sp. nov.	1	1	0	2	2	4	2	2	0	2	2	0	0	0	2	1	0	0
S. tridens sp. nov.	0	1	0	0	2	3	0	1	1	1	0	1	0	0	2	0	1	1
S. turpis sp. nov.	0	1	0	2	1	1	1	1	1	3	1	2	1	0	?	?	?	?
S. vulgatus sp. nov.	0	1	0	1	2	3	2	2	2	2	1	2	0	1	1	0	0	2
S. xynos sp. nov.	0	1	2	0	2	2	0	1	0	2	0	1	0	0	1	0	1	0

were taken using a Nikon D70 camera mounted on a Nikon Labophot-2 compound microscope. Some genitalia illustrations for an early draft of this paper were prepared by David Montagnes, but most illustrations are free-hand drawings by the first author. Photographs of living specimens were taken using a Nikon SLR with a 105 macro lens, extension tubes and an off-camera flash.

Relationships/phylogenetic analysis

The morphological character matrix (Table 1) was created using Microsoft Excel and analyzed using TNT version 1.5 (Goloboff & Catalano 2016). The morphology-based phylogenetic tree (Fig. 2) was generated using Winclada (Nixon 2002) and visually enhanced with Adobe Photoshop.

A molecular dataset was generated by compiling CO1-5 ("barcode") sequence data from identified specimens submitted to the Biodiversity Institute of Ontario (Guelph, Ontario, Canada) and by examining BOLD (Barcode of Life Data System, Ratnasingham & Hebert 2013) records that clustered with our submitted material. A single representative of each species represented by a barcode was included in the dataset DS-SCLROCLS on the BOLD website and sequenced specimens are noted in the material examined section for each species. The dataset includes 20 higher quality sequences (> 500 base pairs) and six lower quality sequences of *Sclerocoelus*, together representing 25 of the 58 *Sclerocoelus* species; one barcoded female from the *S. regularis* group (BIOUG67112-F12/CROZA18963-21) was not identifiable to species. *Chespiritos* Marshall, 2000, *Parasclerocoelus* Marshall & Dong, 2008, *Archiceroptera* Papp, 1977 and an undescribed genus similar to *Sclerocoelus* were included as outgroups; the presumably related genus *Paramosina* Marshall, 2014 was not included as we were unable to obtain useful barcodes from the available material. CO1 data was exported into Mesquite 3.81 (Madisson & Madisson 2023), visually aligned, and trimmed to include only the barcode marker; neighbor-joining and maximum likelihood trees were generated from this dataset for comparison to the morphological phylogeny. The neighbor-joining tree (NJ) was generated using NINJA (Wheeler 2009). The maximum likelihood tree (ML) was generated using RAxML (Stamatakis 2014) with 1000 replicates.

Table 2. Available *Sclerocoelus* Marshall, 1995 species and outgroup CO1 barcode sequence data on boldsystems.org with associated barcode sequence link, barcode length, and associated BIN (if assigned).

Species	Barcode sequence	Sequence length (base pairs)	BIN/Sample ID
Archiceroptera mahunkai Papp, 1977	MYCRO290-16	658	BOLD:ADO9626
Archiceroptera venezolana (Richards, 1963)	MYCRO289-16	658	BOLD:AFH2430
Chespiritos gladiator Kuwahara & Marshall, 2020	PLXDT123-21	656	BOLD:ADF6227
Chespiritos ventrisetis Kuwahara & Marshall, 2020	DEBUA522-19	642	BOLD:ADF3995
Chespiritos hojagrande Kuwahara & Marshall, 2020	DEBUA521-19	658	BOLD:ADX3602
Chespiritos dolabratus Kuwahara & Marshall, 2020	PLNDE604-20	657	BOLD:ADB7774
Parasclerocoelus mediospinosa (Duda, 1925)	MYCRO790-20	658	BOLD:AAV0772
unplaced *Limosininae*	GMCDE545-16	591	BOLD:ADF6053
Sclerocoelus alpinus sp. nov.	MYCRO1034-22	307	
S. andensis Marshall, 1997	MYCRO1013-22	658	BOLD:AEX1573
S. azulensis sp. nov.	MYCRO916-21	658	BOLD:AEL7579
S. binus sp. nov.	MYCRO1025-22	149	
S. brasilensis Marshall, 1997	MYCRO922-21	658	BOLD:ADA8648
S. caribensis Marshall, 1997	PLLBA780-20	656	BOLD:ADA3948
S. copiosus sp. nov.	MYCRO1028-22	318	
S. dasysternum sp. nov.	PLIDC254-20	656	BOLD:ACZ6162
S. elephas sp. nov.	MYCRO918-21	435	
S. frigidifrons sp. nov.	MYCRO1019-22	637	BOLD:AFA1970
S. irregularis sp. nov.	PLFDS108-20	657	BOLD:ACV5099
S. latibarbus sp. nov.	GMHGA543-13	658	BOLD:ACJ5543
S. lazulita sp. nov.	MYCRO1032-22	307	
S. limbus sp. nov.	MYCRO901-21	658	BOLD:AEL7578
S. longibarbus sp. nov.	MYCRO779-20	577	BOLD:AEH2267
S. nebulosus sp. nov.	MYCRO1029-22	658	BOLD:AFA0290
S. nitidistylus sp. nov.	GMCDQ410-17	632	BOLD:ADF4939
S. paranebulosus sp. nov.	MYCRO1030-22	615	BOLD:AFA0971
S. parasordipes sp. nov.	SSJAE1118-13	632	BOLD:AAG7291
S. regularis (Malloch, 1914)	PLFDV252-20	667	BOLD:ACZ6776
S. sordipes (Adams, 1904)	BBDEE453-10	658	BOLD:AEA4901
S. vulgatus sp. nov.	GMCDA368-16	589	BOLD:ADF7597
S. xynos sp. nov.	MYCRO919-21	367	

Measurements

Measurements were taken from the largest and smallest specimens available of each species. Measurements are approximate because dried specimens are subject to varying degrees of shrinkage and distortion. Measurements include: body length (distance from the tip of the lunule to the posterior edge of T5), frontal height (distance from the dorsal edge of the lunule to the anterior margin of the ocellar triangle), frontal width (distance between the eyes at mid frontal height), eye height (distance between the most dorsal and ventral points of the eye when viewed laterally), and genal height (distance between the most ventral point of the eye and the ventral genal margin directly below this when viewed laterally).

Morphological character state matrix

The plesiomorphic state is indicated by (0) and the apomorphic state(s) by (1–2). Multistate characters are treated as unordered. Polarity was established using *Chespiritos* Marshall, 2000, *Paramosina* Marshall, 2014, and *Parasclerocoelus* Marshall & Dong, 2008 as outgroups.

Body

1. Membrane around prosternum: (0) bare; (1) with 1–5 small additional sclerites

Male terminalia

2. Additional genital pouch sclerites: (0) absent or only sclerites A and G developed; (1) several sclerites present, with at least one between A and G
3. S5, posteromedial margin: (0) straight or broadly emarginate; (1) distinctly protruding; (2) emarginate with a T- or Y-shaped medial lobe
4. S5, posteromedial patch of dense setulae: (0) absent; (1) present, longer than wide, reaching posterior margin of S5; (2) present, wider than long, reaching posterior margin of S5; (3) present, wider than long, well-separated from posterior margin of S5
5. Cercus/subcercus: (0) cerci continuous with epandrium and meeting in middle to form subanal plate, subcerci not differentiated; (1) subcerci separate from epandrium and cerci but still meeting medially to form a subanal plate; (2) subcerci separate from each other and from epandrium (subanal area thus open)
6. Subcercus, shape in posterior view: (0) absent; (1) shield-like; (2) rectangular; (3) triangular; (4) thin and complex, composed of inner and outer parts
7. Pseudocercus: (0) absent; (1) present and connected to epandrium; (2) present and free from epandrium
8. Subepandrial sclerite: (0) a simple bridge between the surstyli, reduced, or absent; (1) a double bridge going from surstylus to subcerci to surstylus; (2) two separate bridges and strongly arched, linking left and right surstyli to left and right subcerci, respectively
9. Surstylus: (0) long, $> 0.5 \times$ epandrial height; (1) short, $< 0.4 \times$ epandrial height
10. Surstylus, shape: (0) subquadrate or circular, about as long as tall; (1) rectangular, taller than long, apically truncate; (2) triangular, taller than long, tapered apically; (3) ovoid, taller than long, apically round; (4) boot-shaped or ventromedially emarginate, i.e., with a small anteroventral lobe and a larger posteroventral lobe; (5) T-shaped, i.e., basally constricted
11. Epiphallus: (0) absent or reduced; (1) distinct and quadrate or triangular; (2) distinct and trunk-like, J-shaped
12. Basiphallus: (0) stout, subquadrate; (1) L-shaped, stout basally but constricted and bent apically; (2) elongate, relatively parallel-sided throughout length; (3) small, reduced, V-shaped or triangular; (4) relatively small and stout, apically expanded over the distiphallus
13. Basiphallus, posterodorsal lobes: (0) absent; (1) present
14. Postgonite, apical texture: (0) smooth; (1) distinctly striate; (2) distinctly ridged

Female terminalia

15. S8: (0) present as a single large sclerite; (1) divided into two large halves; (2) divided into minute sclerotized halves, largely membranous, or entirely absent
16. Spermathecae, number: (0) three; (1) two
17. Spermathecae, invagination(s): (0) one present; (1) two present, one or both parallel to long axis; (2) two present, both perpendicular to long axis; (3) absent
18. Spermathecae, shape: (0) spherical; (1) barrel-shaped or conical; (2) bean-shaped or asymmetrical

Specimen deposition

Specimens examined in this project are deposited in the following institutions:

AMNH = American Museum of Natural History, New York City, New York, USA
ANSP = Academy of Natural Sciences of Drexel University, Philadelphia, Pennsylvania, USA
BERK = Essig Museum of Entomology, University of California, Berkeley, California, USA
BIOUG = Centre for Biodiversity Genomics, University of Guelph, Ontario, Canada

BMNH = Natural History Museum, London, United Kingdom
CAS = California Academy of Sciences, San Francisco, California, USA
CBFC = Colección Boliviana de Fauna, La Paz, Bolivia
CMNH = Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, USA
CNCI = Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, Ontario, Canada
DEBU = School of Environmental Sciences, University of Guelph, Guelph, Ontario, Canada
FMNH = Field Museum of Natural History, Chicago, Illinois, USA
LACM = Los Angeles County Museum of Natural History, Los Angeles, California, USA
MIZA = Museo del Instituto de Zoología Agrícola, Maracay, Venezuela
MNCR = Museo Nacional de Costa Rica, San José, Costa Rica
MNHN = Muséum national d'Histoire naturelle, Paris, France
MNNC = Museo Nacional de Historia Natural, Santiago, Chile
MNRJ = Museu Nacional, Universidade do Rio Janeiro, São Cristóvão, Rio de Janeiro, Brazil
MSUC = Albert J. Cook Arthropod Research Collection, Michigan State University, East Lansing, Michigan, USA
MUSM = Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru
MZLU = Lund Museum of Zoology, Lund University, Lund, Sweden
MZSP = Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil
QCAZ = Museo de Zoología, Pontifica Universidad Católica del Ecuador, Quito, Ecuador
RBINS = Royal Belgian Institute of Natural Sciences, Brussels, Belgium
ROME = Royal Ontario Museum, Toronto, Ontario, Canada
SEMC = Snow Entomological Museum Collection, University of Kansas Natural History Museum, Lawrence, Kansas, USA
USNM = United States National Museum of Natural History, Smithsonian Institution, Washington, District of Columbia, USA
UVGC = Universidad del Valle de Guatemala, Guatemala City, Guatemala

Results

Class Insecta Linnaeus, 1758
Order Diptera Linnaeus, 1758
Superfamily Sphaeroceroidea Macquart, 1835
Family Sphaeroceridae Macquart, 1835
Subfamily Limosininae Macquart, 1835

Genus ***Sclerocoelus*** Marshall, 1995

Sclerocoelus Marshall, 1995: 283 (masculine). Type species: *Limosina sordipes* Adams, 1904, original designation.

Sclerocoelus – Marshall 1997: 97 [diagnosis, phylogeny, key, illustrations]. — Roháček *et al.* 2001: 248 [world catalog].

Diagnosis

Almost all *Sclerocoelus* species exhibit the following combination of characters: (1) very broad lunule; (2) very broad alula; (3) a proximal posterodorsal seta on the mid tibia; (4) well-developed postsutural intra-alar bristle; and (5) complex male genital pouch composed of several additional sclerites. Other diagnostic characters include (6) a midventral seta on the female mid tibia (absent in males) and (7) costa terminating at the end of R_{4+5}. Some species lack the proximal posterodorsal mid tibial seta (*S. mandibulum* sp. nov. and *S. argentinensis* sp. nov.), however all other diagnostic characters are present in these species. One of the brachypterous species of *Sclerocoelus* (*S. aduncus* sp. nov.) has a

small alula but has all other diagnostic characters of the genus (the other brachypterous species have a very broad alula).

Sclerocoelus inornatus sp. nov. and *S. lutosus* sp. nov. lack the distinctively sclerotized male genital pouch that characterizes other *Sclerocoelus* species, but they do have the other defining characters of *Sclerocoelus* as listed above (with the possible exception of the dimorphic mid tibia in *S. inornatus*, as no females are known). A morphological phylogeny (Fig. 2) suggests that the relatively simple genital pouch of these species represents a character reversal rather than a plesiomorphic trait, however neither species was available for sequencing.

Redescription

Body. Colour yellow to dark brown. Length 1.8–5.3 mm.

Head. Brown, variable portion of frons orange; face, gena, and antennae orange to brown; frontal vitta, interfrontal plate and orbital plate subshining, indistinctly microtomentose. Frontal width 2.2–2.4 × frontal height. Two or three pairs of strong interfrontal bristles usually surmounting a very fine third or fourth pair; two strong lateroclinate orbital bristles, anterior orbital 0.4–0.7 × length of posterior; ocellar bristle large and diverging; postocellar bristle small; inner and outer vertical bristles large; inner and outer occipital bristles large. Vibrissa large, vibrissal angle with one subvibrissal seta; gena with an enlarged anteroventral seta and several smaller setae. Palpus yellow to brown, clavate, with two large preapical ventral setulae. Lunule usually broad, bulging and prominent, always broader in female than male; face slightly excavated and usually short, medially about 0.3–1.5 × as tall as lunule, medial keel short and usually only slightly developed. Antennae divergent; pedicel with long marginal setae; postpedicel ovoid, somewhat flattened on outer surface; arista long-pubescent. Eye variable but usually large, greatest height 1.1–5.0 × shortest genal height, posteroventral corner concave from broadened gena.

Thorax. Brown, scutum paler laterally. One or two (usually) distinct postsutural dorsocentral bristles, anterior pair sometimes reduced, 0.3–0.7 × length of posterior (prescutellar) pair, separated by 4–12 rows of acrostichal setulae. Two postpronotal bristles, outer bristle large and inner bristle small; two notopleural bristles, anterior slightly larger than posterior; two strong supra-alar bristles; postalar and intrapostalar bristles large; prescutellar acrostichal setulae usually enlarged (3.0–4.0 × length of anterior setulae). Prosternum linear, membrane around prosternum usually bare but sometimes with additional setulae-bearing sclerites. Katepisternum with a very fine anterior setula and a large posterior bristle. Scutellum subtriangular, 1.3 × as wide as long, with four long marginal bristles in usual positions.

Legs. Brown to yellow. Fore femur with 3–5 large ventral preapical setae. Dorsal surface of mid tibia with three (one small and one large anterior and one small posterior) proximal setae and three (one small and one large anterior and one large posterior) distal setae except in male *S. mandibulum* sp. nov. Ventral surface of male mid tibia with an apicoventral bristle and two rows of stout setae in apical quarter to two-thirds, mid femur with two corresponding rows of stout proximal setae; ventral surface of female mid tibia with strong midventral bristle and long apicoventral bristle. Mid basitarsus with distinctly enlarged basal ventral setula. Hind tibia with stout apicoventral seta.

Wing. Hyaline to infuscate. CS2 0.6–1.0 × CS3. R_{2+3} sinuate, basal curve almost straight and distal curve strong; R_{4+5} slightly sinuate, ending just before wing tip; costa ending at or extending just beyond end of R_{4+5} (1–3 × costal width). M_1 extending to wing tip as distinct sinuate crease. M_4 extending past dm-m 1.1–1.3 × length of dm-m. CuA+CuP sinuate, almost reaching wing margin. Alula almost always large, ovoid. Halter pale brown to brown.

Male abdomen. Dark brown, posterior edges of tergites usually slightly desclerotized. T2–5 and S2–4 long-setose with large posterolateral setae. S5 highly variable, usually rectangular; posteromedial chaetotaxy variable. Genital pouch including multiple sclerites, most of which seem to be derived from the ventral part of S6+7 (sclerites A–E, as defined in Materials and Methods). Epandrium variable, usually wedge-shaped, and uniformly long-setose; perianal pads usually weakly developed and membranous, but sometimes sclerotized and enlarged. Cercus usually weakly differentiated from epandrium, usually widely separated but sometimes entirely or partially fused medially to form subanal plate; pseudocercus usually small and separated from epandrium, sometimes fused to inner ventral corners of epandrium or entirely absent; when present, almost always with three setae. Halves of subepandrial sclerite usually strongly arched and joined medially. Subcercus usually large and complex. Hypandrium usually large; anteromedial hypandrial apodeme elongate but usually shorter than phallapodeme; lateral hypandrial arm strongly arched, separate from anteroventral corner of epandrium and usually separate from anteromedial hypandrial apodeme (fused to anteromedial apodeme in *S. punensis* sp. nov., *S. paranebulosus* sp. nov. and *S. penai* sp. nov.). Surstylus variable, usually larger than subcercus. Postgonite variable. Phallapodeme large, curved, sometimes dorsoventrally flattened apically; basiphallus variable, often stout with a neck-like distal part, epiphallus variably developed; distiphallus usually small, largely membranous, and supported by numerous sinuate sclerites.

Female abdomen. Dark brown, edges of preabdominal sclerites, especially sternites, usually desclerotized. T2–6 and S2–6 uniformly long-setose with longer posterolateral setae. T7 broad, rectangular; T8 either desclerotized dorsomedially, appearing as two large lateral sclerites, or divided into pale dorsal sclerite and two dark lateral sclerites, posteromedial corners of lateral sclerites usually expanded posteriorly. Epiproct usually large, shield-like and often desclerotized along midline, appearing as two separate sclerites, usually densely setulose, almost always with pair of large dorsal setae. Cercus variable, usually elongate, always densely setulose, usually with large apical and dorsal setae. S7 broad, often pointed posteromedially, long-setose with 4–6 distinctly enlarged, preapical, posterior setae; S8 usually highly reduced, often divided into two small, lateral sclerites each with two minute sensory setulae, though sometimes with only a single large, medial sclerite or entirely membranous/absent. Hypoproct large, broad, U-shaped, densely setulose posteriorly with 5–16 distinct setae. Three or (rarely) two spermathecae, bulb various, sometimes spherical or cylindrical but asymmetrically bean-shaped in one major clade, often with 1–2 invaginations, invaginations sometimes with a finger-like, central process pointing outwards; paired spermathecae (when present) smaller than single spermatheca; ducts short.

Similar and related genera

Marshall & Dong (2008) noted superficial similarities between the widespread southern hemisphere genus *Parasclerocoelus* and some species of *Sclerocoelus*, including a large intra-alar bristle, sinuate R_{2+3}, almost straight R_{4+5}, a double row of stout setae on the apicoventral surface of the mid tibia, large S6–8, pruinose thorax and similar female terminalia. However, *Parasclerocoelus* has a narrow alula, a small lunule and no posterior proximal seta on the mid tibia. Its male genital pouch includes an arm of S6 that extends across the anterior face of the genital pouch but lacks the multiple genital pouch sclerites that define *Sclerocoelus.*

The only species of the high Andean genus *Paramosina* is also externally similar to sympatric species of *Sclerocoelus.* Marshall & Yau (2014) noted the broad lunule and broad alula as similarities, but noted the simple male genital pouch, complete subanal plate, well-developed cerci and epiproct in the female as significant differences between the two genera. The male S6 is divided into two ventral lobes in *Paramosina*, but it does not break into separate pieces ventrally as in *Sclerocoelus*. *Paramosina* also differs from *Sclerocoelus* in lacking the posterior proximal seta on the mid tibia in both sexes and in lacking the midventral mid tibial bristle in females. Nine species of *Sclerocoelus* were collected along

with the type series of *Paramosina hirsuta* Marshall, 2014 at 3600 m a.s.l. (Quebrada Mishahuaycu, Ecuador).

Males of the small African genus *Parapoecilosomella* Papp, 2008 have a large genital pouch superficially similar to some *Sclerocoelus*, but the two species of *Parapoecilosomella* differ so widely from *Sclerocoelus* in wing venation and other features it seems unlikely that there is a close relationship.

Marshall (2000) suggested *Sclerocoelus* as a possible sister group to the mostly Neotropical genus *Chespiritos*, with which it shares a broad lunule and well-developed intra-alar bristles. Kuwahara & Marshall (2020) pointed out further similarities between the basal species of *Chespiritos* and *Sclerocoelus* species in the *S. galapagensis* species group. *Sclerocoelus* can be easily distinguished from *Chespiritos* by the broad alula, four scutellar bristles, single proximal posterodorsal seta on the mid tibia, male mid tibia without a midventral bristle, costa ending near the tip of the wing at its junction with R_{4+5}, and complex genital pouch.

Phylogeny

Phylogenetic trees were generated from the matrix using TNT with New Technology search (sectorial search and tree-fusing). Analysis of the entire character state matrix (Table 1) yielded four equally parsimonious trees (length = 196, consistency index = 0.20, retention index 0.69). The preferred tree (Fig. 2) places the very similar species *S. flavus* sp. nov. and *S. meridensis* sp. nov. as sister species. Four distinctive branches of this tree are here treated as named species groups: the *S. dasysternum* species group, the *S. galapagensis* species group, the *S. regularis* species group, and the *S. sordipes* species group. Seven relatively plesiomorphic species are treated as 'basal lineages', and 22 other species are not placed in named species groups.

The *S. dasysternum* species group (*S. costaricensis* sp. nov., *S. dasysternum* sp. nov., *S. grandicercus* sp. nov., *S. latibarbus* sp. nov., *S. masneri* sp. nov., *S. nitidistylus* sp. nov., *S. ocellatus* sp. nov., *S. recurvatus* sp. nov., *S. rostrum* sp. nov., *S. synorios* sp. nov., and *S. vulgatus* sp. nov.) is characterized by a dense, rectangular patch of posteromedial setulae on the male S5, relatively short surstyli, and usually large sclerite F. Most species in the *S. dasysternum* species group have male S5 asymmetrically developed (reduced on the left or right posterior corners, sometimes both). This group is largely Central American though *S. masneri* is known only from Venezuela, *S. synorios* ranges into the United States, and the range of *S. vulgatus* extends to Peru.

The *S. galapagensis* species group (*S. andensis* Marshall, 1997, *S. binus* sp. nov., *S. brasilensis* Marshall, 1997, *S. caligarius* sp. nov., *S. caribensis* Marshall, 1997, *S. copiosus* sp. nov., *S. elephas* sp. nov., *S. galapagensis* Marshall, 1997, *S. hemorrhoidalis* Marshall, 1997, *S. subbrevipennis* (Frey, 1954), and *S. tantus* sp. nov.) is characterized by the presence of additional sclerites in the membrane beside the prosternum. A smaller clade within the *S. galapagensis* species group is characterized by an elephant trunk-like epiphallus on the basiphallus. The *S. galapagensis* species group is the most widespread species group (Mexico to northern Argentina and throughout the Caribbean), and includes the only unequivocal *Sclerocoelus* species with a distribution outside of the New World (Tristan da Cunha).

The *S. regularis* species group (*S. dominicensis* sp. nov., *S. irregularis* sp. nov., *S. pararegularis* sp. nov., *S. regularis* (Malloch, 1914), and *S. turpis* sp. nov.) is characterized by a relatively small body size (1.8–3.1 mm), yellow legs, large, mitt-shaped surstyli (height 2.0× length), and flattened, shield-like subcerci. The *S. regularis* species group occurs from Mexico south to northern Argentina, with one species (*S. dominicensis*) known only from Dominica.

The *S. sordipes* species group is a small group made up of two of the three Nearctic species of *Sclerocoelus*, the very similar *S. sordipes* (Adams, 1904) and *S. parasordipes* sp. nov. This group is recognized by a characteristically pigmented male S5 with a large setulose medial patch.

CO1 sequence analyses (barcode trees)

Results

Figures 3 and 4 show the NJ and ML trees, respectively, for the CO1 dataset including *Sclerocoelus*, *Parasclerocoelus*, *Chespiritos*, and *Archiceropter*a. On the NJ tree, but not the ML tree, *Parasclerocoelus* comes out within *Sclerocoelus*, where it is recovered in the same branch as some of the relatively plesiomorphic *Sclerocoelus* species. Three of the four named *Sclerocoelus* species groups recognized in the morphological analysis (*S. dasysternum*, *S. sordipes*, and *S. regularis* species groups) were recovered as single branches in both trees. The *S. galapagensis* species group, however, was recovered in two places in both trees, suggesting that the species newly added to the group herein might render it a paraphyletic group: *S. andensis*, *S. caribensis* and *S. brasilensis* come out as closer to the *S. regularis* group than to the newly described species *S. elephas* sp. nov. and *S. copiosus* sp. nov. on the ML tree, but on the NJ tree *S. elephas* and *S. copiosus* are closer to the *S. regularis* group. *Sclerocoelus binus* sp. nov. is next to the latter two species on the NJ tree but next to *S. andensis*, *S. caribensis* and *S. brasilensis* on the ML tree.

Discussion

The compelling morphological synapomorphies for *Sclerocoelus* suggest that it is monophyletic, but if the NJ tree topology is correct then the two 'S*clerocoelus*' branches recognized on that tree would instead be a broadly defined *Parasclerocoelus* (including the species here treated as unplaced or plesiomorphic *Sclerocoelus*) and a more narrowly defined *Sclerocoelus* including all previously named *Sclerocoelus* species and the four named species groups of *Sclerocoelus*. Similarly, the *S. galapagensis* group is readily recognizable on the basis of morphological characters and the definition of the group remains unchanged despite the conflicting CO1 trees.

The most interesting apparent conflict between the morphological and molecular trees is the consistent division of the genus into two separate branches in the molecular trees, in contrast to the morphological tree that identifies a paraphyletic series of 'basal lineages' associated with very high elevations or temperate latitudes. Both the ML and NJ trees recover one branch with both of the putatively basal species sequenced and also including most of the sequenced species currently unplaced to species group (and, in the case of the NJ tree, also including *Parasclerocoelus*). The morphological and molecular trees thus represent two different competing hypotheses about the history of the group, one positing a south temperate/high Andean origin with successive speciation events in extreme environments prior to the origin of a single large clade now most diverse in cloud forests, the other involving an early division of the genus into a single high Andean/southern South American clade and a second clade with a more northern distribution.

The CO1 analyses may benefit from additional taxon sampling (Heath *et al*. 2008) as only 25 of the 58 species considered here are included in the molecular tree. The findings may also be a result of a poor phylogenetic signal strength in CO1 barcode region compared with other genes (Ekrem *et al*. 2010; Maddison *et al*. 2014), but the availability of CO1 data and ease in getting additional material sequenced provided us an opportunity to compare the data with the main morphological study. Some studies in acalyptrate Diptera have found CO1 contains some measure of phylogenetic signal by itself (e.g., Lindsay & Marshall 2023) but many studies have found that CO1 is best used in conjunction with other genes (e.g., Winkler *et al*. 2009; Ekrem *et al*. 2010; Kekkonen *et al*. 2015; Han & Ro 2016). This

study's development of the *Sclerocoelus* CO1 dataset will aid future multi-gene studies in examining the relationships both within *Sclerocoelus* and with other Limosininae genera.

Biology

Larval *Sclerocoelus* remain unknown, but several specimens of *S. copiosus* sp. nov. and *S. nitidistylus* sp. nov., emerged from a refuse pile under an *Eciton burchellii* Westwood, 1842 bivouac in Costa Rica, and a number of *Sclerocoelus* species have been found in or near nests of leafcutter ants and army ants. The common and very widespread species *Sclerocoelus copiosus* was the most numerous sphaerocerid in and around the aforementioned *Eciton burchellii* midden in Costa Rica, with 24 specimens collected, but nine specimens of *S. nitidistylus* and a single *S. vulgatus* sp. nov. were also collected in or around the refuse pile (along with about 20 *Leptocera hexadike* Buck, 2009, some *Pterogramma* Spuler, 1924, and a few *Boreantrops talamanca* Kits & Marshall, 2015). Other possibly ant-associated *Sclerocoelus* species include *S. costaricensis* sp. nov., which we have swept over nests of *Atta* Fabricius, 1805, swept over columns of *Eciton* Latreille, 1804 and collected in raised emergence traps over *Atta* nests; *S. vulgatus*, which we have swept over *Atta* nests and swept over *Eciton* raids; and *S. caribensis* Marshall, 1997 which we have swept over *Atta* nests.

Although most of the specimens examined are from cloud forests between 1500 and 2000 m a.s.l., collecting records for the relatively plesiomorphic species are almost all high Andean, mostly from 2900 m a.s.l. or above and in many cases only from alpine habitats at 3500 m a.s.l. or higher.

Distribution

Sclerocoelus species occur from southern Canada (49°54′ N) to central Chile (32°51′ S), and throughout the Caribbean. The only definite *Sclerocoelus* species known from outside of the New World is *S. subbrevipennis*, apparently endemic to Tristan da Cunha. *Sclerocoelus clarae* (Papp, 1973), from Mongolia, is almost certainly misplaced in *Sclerocoelus* and is excluded from the species key below (see discussion below under species incertae sedis).

Ecuador, with 25 *Sclerocoelus* species including eight apparent endemics, appears to be a center of diversity for the genus, as are Venezuela (19 species, five endemic), Costa Rica (18 species, four endemic), Bolivia (18 species, three endemic), and Peru (14 species, none known to be endemic). These numbers, however, correspond closely to directed collecting efforts in appropriate habitats in those countries. The high diversity in Ecuador undoubtedly reflects the rich fauna and habitat diversity of the country, but it also reflects the second author's extensive collecting efforts there as well as our long-term collaboration with Ecuadorian colleagues. On the other hand, the apparent low diversity of some South American countries is certainly an artefact, in part caused by the difficulty of obtaining permits and other obstacles to fieldwork in those countries. We are confident that many species of *Sclerocoelus* remain to be discovered throughout the neotropics.

Most species of *Sclerocoelus* are known from only one to three countries, but seven species are known from more than six countries (*S. caribensis* from 15, *S. rectangularis* and *S. vulgatus* sp. nov. from eight, and *S. brasilensis*, *S. copiosus* sp. nov., S. *regularis*, and *S. tantus* sp. nov. from seven). Several species are known from the same collection events. For example, Volcán Tenorio (Costa Rica) 2000, Monteverde Biological Reserve (Costa Rica) 1986 and 2000, Tapantí National Park (Costa Rica) 1999, Baeza (Ecuador) 1987, near Tandayapa (Ecuador) 1999, trout farm 'San José' (Nanegalito, Ecuador) 1999, Cock-of-the-Rock Lodge (Peru) 2006 and 2007, Laguna de Lucerdo (Venezuela) 1995, and Henri Pittier National Park (Venezuela) 1994 each yielded more than four species per collection event. Nine species are known only from the second author's collections.

The morphological phylogeny suggests that the origin of the genus was in the high Andes of southern South America with multiple speciation events in South American alpine environments before part of the genus apparently split into derived clades. One of the derived clades is characteristic of forested habitats in Mexico, the Caribbean or Central America and one is associated mostly with South American cloud forests. The latter clade also includes species from the Galapagos and Tristan da Cunha and the former includes a pair of North American species and one species found in Mexico and North America. A few species in each of the larger derived species groups have widespread Neotropical-Caribbean distributions. *Sclerocoelus vulgatus* sp. nov., for example, is a member of the mostly Central American clade but ranges from Mexico and Central America south to Peru. *Sclerocoelus copiosus* sp. nov., a commonly collected member of the South American cloud forest clade, is found from Bolivia north to Costa Rica. Most of the Mesoamerican and Central American species belong to the *S. dasysternum* group, although the more plesiomorphic *S. regularis* group also includes Mexican, Caribbean and widespread Central American species. The *S. galapagensis* group *sensu* Marshall (1997) now includes several South American cloud forest species as well as species from the Galapagos and Tristan da Cunha. The *S. sordipes* group, comprising just two Nearctic species, is weakly supported as the sister group to the *S. galapagensis* group.

Key to the species of *Sclerocoelus*

The following three letter country codes are used in the key: ARG (Argentina), BLZ (Belize), BOL (Bolivia), BRA (Brazil), CAN (Canada), CHL (Chile), CRI (Costa Rica), CUB (Cuba), DMA (Dominica), DOM (Dominican Republic), ECU (Ecuador), GRD (Grenada), GTM (Guatemala), GUF (French Guiana), GUY (Guyana), HND (Honduras), JAM (Jamaica), KNA (Saint Kitts & Nevis), LCA (Saint Lucia), MEX (Mexico), NIC (Nicaragua), PAN (Panama), PER (Peru), PRI (Puerto Rico), PRY (Paraguay), SHN (Saint Helena, Ascension & Tristan da Cunha), SLV (El Salvador), TTO (Trinidad and Tobago), USA (United States of America), VEN (Venezuela).

1. Brachypterous species (as in Fig. 11A) with wing never extending past posterior margin of T4. Cerci fused basally to form subanal plate and projecting ventrally but not divided to form separate subcercus (as in Fig. 11B). Surstylus broad, mitt-like (Figs 11C, 55C, 75C, 90C)..... 2
– Macropterous species (as in Fig. 1A) with wing fully developed, extending past apex of abdomen. Cercus and surstylus of various forms..... 5

2. Interfrontal bristles in three large pairs surmounting a fourth smaller pair. Mid tibia with five dorsal setae in distal half 3
– Interfrontal bristles in two large pairs surmounting a third smaller pair. Mid tibia with 2–3 dorsal setae in distal half 4

3. Head and legs yellow. Male S5 with dense patches of setae flanking posteromedial desclerotized area (Fig. 56B). Subcercus short, less than half length of surstylus (Fig. 55D). Postgonite curved and evenly tapered..... ***S. flavus*** sp. nov. (VEN)
– Head and legs brown. Male S5 with only scattered setae flanking dark posteromedial lobe (Fig. 91B). Subcercus elongate, at least half length of surstylus (Fig. 90B). Postgonite sinuate and almost parallel-sided..... ***S. meridensis*** sp. nov. (VEN)

4. Eye height 3.0× genal height. Male S5 with a single row of stout setae along posterior margin, interrupted by posteromedial lobe (Fig. 76B). Ventral process of cercus with a posterior bulge about midlength (Fig. 75C). Postgonite broad basally, narrow at apex.....***S. limbus*** sp. nov. (BOL, PER)
– Eye height 5.0× genal height. Male S5 with setae mostly restricted to posteromedial emargination (Fig. 12B). Ventral process of cercus smoothly concave, without a prominent posterior bulge (Fig. 11C). Postgonite almost uniform in width ..... ***S. aduncus*** sp. nov. (ECU)

5. Interfrontal bristles in two large pairs and a third smaller pair 6
– Interfrontal bristles in three large pairs with or without a fourth smaller pair 13

6. Two pairs of postsutural dorsocentral bristles, anterior pair large, distinct from surrounding acrostichal setulae 7
– Anterior postsutural dorsocentral bristle not distinct from surrounding acrostichal setulae, thus apparently only one (prescutellar) dorsocentral pair 10

7. Legs yellow to pale brown. Male S5 with a dark posteromedial patch of dense setae (Figs 43B, 97B) 8
– Legs dark brown. Male S5 uniformly setose or with a posteromedial row of slightly thickened setae, without a dense posteromedial patch (Figs 54B, 73B) 9

8. Eye height 3.5× genal height. Male S5 with a medial patch of thick setae above dark, posteromedial patch of setulae (Fig. 43B). Outer surface of surstylus densely setulose (Fig. 42C). Female hypoproct large and deeply cleft anteromedially (Fig. 44B) ..... ***S. dasysternum*** sp. nov. (CRI, GTM, HND, PAN, TTO)
– Eye height 5.0× genal height. Male S5 with only an elongate, dark, posteromedial patch of setulae (Fig. 97B). Outer surface of surstylus bare (Fig. 96C). Female hypoproct small and deeply cleft posteromedially (Fig. 98B) ..... ***S. nitidistylus*** sp. nov. (CRI, PAN)

9. Male S5 uniformly setose in posterior two-thirds. Genital pouch (Fig. 54B) sclerite A elongate, densely setulose, and partially separated from S6+7; sclerite F large, with its posterior apex sharply bent to the left. Subcercus strongly curved posteriorly, simple, blade-like (Fig. 53B–C). Surstylus short, bilobed ventrally. Postgonite evenly tapered ..... ***S. espeletia*** sp. nov. (VEN)
– Male S5 with setae restricted to a posteromedial row and the right side. Genital pouch (Fig. 73B) sclerite A small, rounded, and not separated from S6+7; sclerite F small and simple. Subcercus gently curved anteriorly, wedge-shaped with a small, preapical, posterior lobe (Fig. 72B–C). Surstylus stout, subtriangular. Postgonite apically expanded and truncate ..... ***S. lazulita*** sp. nov. (BOL, ECU, VEN)

10. Eye height 3.5× genal height; gena and face dark brown, contrasting with orange antennae. CS2 subequal to CS3. Male S5 with a narrow, T-shaped, largely bare, posteromedial lobe (Fig. 148B). Subcercus with a membranous ventral part (Fig. 149C). Female S7 pointed posteriorly; halves of S8 triangular ..... ***S. xynos*** sp. nov. (ARG, BOL, ECU, PER, VEN)
– Eye height 4.5× genal height; gena and face similar in colour to antennae. CS2 shorter than (0.7–0.9×) CS3. Male S5 with a dark posteromedial patch of dense setae (as in Fig. 38B). Subcercus various, but never with a membranous ventral part. Female S7 rounded or truncate posteriorly; halves of S8 subquadrate or rounded 11

11. Gena dark brown. Male mid tibia with double row of ventral setae in apical half. Genital pouch (Fig. 88B) sclerite A rounded and bulging, with dense setulae. Pseudocercus small and separated from epandrium (Fig. 87B). Surstylus ventrally concave. Posteroventral corner of female T8 rounded ..... ***S. masneri*** sp. nov. (VEN)
– Gena orange-brown. Male mid tibia with double row of ventral setae in apical third at most. Genital pouch (Figs 38B, 62B) sclerite A elongate and bare (without setulae). Pseudocercus large, flattened, and fused to epandrium (Figs 37B, 61B). Surstylus ventrally convex. Posteroventral corner of female T8 pointed 12

12. Large species (3.3–4.6 mm). Male S5 with an elongate (1.8–1.9× longer than wide) posteromedial patch of dense setulae, anterior margin of S5 straight (Fig. 62B). Postgonite broadly expanded and

rounded apically. Female S7 widely desclerotized posteriorly; halves of S8 well separated (Fig. 63B); spermathecae spherical (Fig. 63D) ..... ***S. grandicercus*** sp. nov. (CRI)

– Small species (1.9–2.6 mm). Male S5 with a stout (1.4 × wider than long) posteromedial patch of dense setulae, anterior margin of S5 deeply excised (Fig. 38B). Postgonite almost parallel-sided and gently tapered apically. Female S7 well-sclerotized posteriorly; halves of S8 connected by a desclerotized band (Fig. 39B); spermathecae asymmetrically bean-shaped (Fig. 39D) .. ***S. costaricensis*** sp. nov. (CRI)

13. Membrane beside prosternum with 1–5 sclerites, each bearing one or more setulae..... 14
– Membrane beside prosternum bare, without sclerites, or with a dark, semi-sclerotized, non-setulose patch (some *S. rectangularis* and *S. chilensis*, see couplet 24)..... 22

14. Anterior (postsutural) dorsocentral bristle small, not distinct from surrounding acrostichal setulae 15
– Anterior dorsocentral bristle at least 0.4 × length of posterior seta and distinct from surrounding acrostichal setulae 19

15. Eye height 5.0 × genal height..... 16
– Eye height 3.0–3.5 × genal height..... 17

16. Acrostichal setulae in 7–8 rows between anterior dorsocentral bristles. Male S5 3.0 × length of S4, largely bare except for a large, dark, densely setulose posteromedial patch flanked by desclerotized areas (Fig. 51B). Surstylus emarginate ventrally with a sinuate, tapered anterobasal inner lobe and two very thick, sinuate, ventral inner setae (Fig. 50B). Basiphallus with an elongate, curved, trunk-like epiphallus. Female epiproct setulose only medially; cercal setae elongate and sinuate ..... ***S. elephas*** sp. nov. (BOL, ECU, VEN)
– Acrostichal setulae in 9–10 rows between anterior dorsocentral bristles. Male S5 1.0 × length of S4, densely setose laterally with a pair of very long setae flanking a small posteromedial lobe (Fig. 24B). Surstylus with a constriction in apical third, dividing it into a large basal section and a small apical section (Fig. 23C); basal section densely setulose on outer surface, apical section with several large inner setae. Basiphallus simple, without epiphallus. Female epiproct entirely setulose; cercal setae stout and straight..... ***S. binus*** sp. nov. (BOL, CRI, ECU, PER, VEN)

17. Wing hyaline. Acrostichal setulae in 9–10 rows between anterior dorsocentral bristles. Head dark brown, with very little to no orange..... ***S. caligarius*** sp. nov. (BOL)
– Wing at least slightly infuscate. Acrostichal setulae in 7–8 rows between anterior dorsocentral bristles. Head paler, at least gena and face orange to orange-brown..... 18

18. Fore femur with 5–6 enlarged ventral setae; male mid tibia with double row of ventral setae in apical fifth. Male S5 posteromedially emarginate with rows of marginal setae (cf. Marshall 1997: fig. 34). Posterior third of epandrium smooth, without transverse groove (cf. Marshall 1997: fig. 37); perianal pads strongly developed. Female epiproct with only four setae; S8 with two prominent, dark, posterolateral processes ..... ***S. galapagensis*** Marshall, 1997 (ECU – Galapagos Islands)
– Fore femur with three enlarged ventral setae; male mid tibia with double row of ventral setae in apical third. Male S5 with a dark, trapezoidal, densely setulose, posteromedial patch flanked by desclerotized areas (Fig. 137B). Epandrium with a transverse groove in posterior third (Fig. 136C); perianal pads bulging slightly but weakly developed. Female epiproct entirely setulose with two larger setae; S8 reduced to a pair of minute lateral sclerites ... ***S. tantus*** sp. nov. (ARG, BOL, BRA, ECU, PER, PRY, VEN)

19. Male S6+7 broken into small, dark sclerites posterior to S5. Perianal pad with a narrowed ventral part articulating with posterior arm of outer part of subcercus (cf. Marshall 1997: fig. 14). Posteroventral epandrial seta shorter than epandrium. Female S8 strongly differentiated into almost vertical lateral

parts and concave ventral part .....
..... ***S. brasilensis*** Marshall, 1997 (BOL, BRA, CRI, ECU, GUF, PAN, PER)

– Pocket-like genital pouch well developed and S5 sometimes with two dark, posteromedial lobes, but no small, separate, dark sclerites behind posteromedial part of S5. Perianal pads broad ventrally. Posteroventral epandrial seta longer than epandrium. Female S8 relatively simple, without prominent lateral parts..... 20

20. Two prominent, bare, dark lobes arising behind posteromedial part of male S5 (cf. Marshall 1997: fig. 2). Posterior arm of surstylus with relatively small bristles .....
.....***S. andensis*** Marshall, 1997 (ARG, BOL, ECU, PER, VEN)

– Area behind posteromedial part of male S5 simple (cf. Marshall 1997: figs 24, 46). Posterior arm of surstylus with 3–6 prominent, short, stout setae..... 21

21. Acrostichal setulae in 7–8 rows between anterior dorsocentral bristles. Fore femur with 4–5 enlarged ventral setae. Male S5 short, shorter than genital pouch and 0.5 × length of S4, with posteromedial and posterolateral areas of long setae (cf. Marshall 1997: fig. 24). Genital pouch prominent, heavily sclerotized.....***S. caribensis*** Marshall, 1997 (CRI, CUB, DMA, DOM, ECU, GRD, GTM, GUY, HND, JAM, KNA, LCA, MEX, PER, PRI, SLV, VEN)

– Acrostichal setulae in 9–10 rows between anterior dorsocentral bristles. Fore femur with 7–8 enlarged ventral setae. Male S5 longer than genital pouch and 1.0 × length of S4, with two setose posteromedial lobes, setosity of posterolateral area sparse (cf. Marshall 1997: fig. 46). Genital pouch well developed, but relatively small and lightly sclerotized.... ***S. hemorrhoidalis*** Marshall, 1997 (CRI, ECU, VEN)

22. Membrane around prosternum with dark, semi-sclerotized, non-setulose patches..... 23

– Membrane around prosternum entirely white and bare..... 24

23. Distal half of mid tibia with three dorsal setae (two anterior, one posterior). CS2 0.7–0.8 × CS3. Male S5 with a very deep posteromedial cleft, lateral edges of which are flared outwards, setae largely restricted to a band about midlength and along posterior margin, anterior margin of S5 greatly expanded (Fig. 120B). Subcercus large, larger than surstylus, folded over itself (Fig. 119B–C).....
.....***S. rectangularis*** (Malloch, 1914) (CRI, DMA, DOM, GTM, HND, JAM, MEX, VEN)

– Distal half of mid tibia with two dorsal setae (one anterior, one posterior). CS2 1.0 × CS3. Male S5 very simple, posteromedially rounded slightly and uniformly setose in posterior half, anterior margin of S5 sinuate, left side moderately reduced (Fig. 33B). Subcercus smaller, subtriangular in posterior view and curved into a 90° bend in lateral view (Fig. 32B–C) .....
.....***S. chilensis*** sp. nov. (CHL)

24. Anterior pair of dorsocentral bristles small, indistinct from surrounding acrostichal setulae..... 25

– Anterior pair of dorsocentral bristles at least 0.4 × length of posterior pair, distinct from surrounding acrostichal setulae..... 29

25. Mid tibia with only two anterodorsal setae in proximal half. Male S5 with a dark, asymmetrical, posteromedial cluster of short, thick setae (Fig. 19B); S6 with similar patch of setae anterior to a brush-like tuft on sclerite A. Subcercus very large and broad, almost as tall as epandrium and 1.5 × as tall as surstylus (Fig. 18B).....***S. argentinensis*** sp. nov. (ARG)

– Mid tibia with a small posterodorsal seta in proximal half in addition to usual two anterodorsal setae. Male S5 various, but either with a large, dark, posteromedial patch of dense setulae or a dark, symmetrical, sclerotized patch with finer setulae. Subcercus various, but not more than 0.7 × as tall as epandrium or 1.2 × as tall as surstylus; if close to 1.5 × as tall as surstylus (Fig. 144C), subcercus flattened and triangular 26

26. Interfrontal bristles in three pairs, middle pair largest and cruciate. Wing hyaline. Male S5 deeply and broadly emarginate posteromedially with a distinct, rounded posteromedial lobe and a dark, inverted Y-shaped posteromedial sclerite originating underneath (dorsal to) rounded lobe (Fig. 110B). Subcercus larger than surstylus, with a large, membranous, apical part (Fig. 109C) ..... ***S. penai*** sp. nov. (BOL)
– Interfrontal bristles in four pairs, first very small and others larger but subequal. Wing slightly infuscate. Male S5 various, either with a large, dark, posteromedial patch of dense setulae (as in Fig. 35B) or with a pair of large, posteromedial setae surrounded by a setulose, desclerotized area (Fig. 14B). Subcercus smaller or equal to surstylus and entirely membranous, without a membranous apical part 27

27. Eye height 3.5 × genal height. Fore femur with four enlarged ventral setae; distal half of mid tibia with two dorsal setae (one anterodorsal, one posterodorsal). Male S5 with a pair of large posteromedial setae surrounded by a setulose, desclerotized area (Fig. 14B). Female S7 strongly produced posteromedially into an apically emarginate process as long as main part (Fig. 15B)..... ..... ***S. alpinus*** sp. nov. (ECU, VEN)
– Eye height 4.0 × genal height. Fore femur with three enlarged ventral setae; distal half of mid tibia with three dorsal setae (two anterodorsal, one posterodorsal). Male S5 with a large, dark, posteromedial patch of dense setulae (Figs 35B, 145B). Female S7 evenly rounded or produced posteromedially into a triangular process less than half as long as main part (Figs 36B, 146B) 28

28. Posteromedial patch of setulae on male S5 narrower, 1.9 × as long as wide (Fig. 35B). Surstylus shorter than long, with a triangular, anterobasal inner lobe, outer surface brown. Posteroventral corners of female T8 strongly produced to points, female S7 pointed posteromedially..... ***S. copiosus*** sp. nov. (BOL, BRA, CRI, ECU, PAN, PER, VEN)
– Posteromedial patch of setulae on male S5 wider, 1.4 × as long as wide (Fig. 145B). Surstylus taller than long, subtriangular, outer surface white. Posteroventral corners of female T8 more rounded, female S7 rounded posteromedially .***S. vulgatus*** sp. nov. (CRI, GTM, HND, MEX, NIC, PAN, PER, TTO)

29. Eye height 1.1–2.7 × genal height 30
– Eye height 3.0–5.0 × genal height 38

30. Eye greatly reduced, 1.1–1.3 × genal height ..... ***S. ocellatus*** sp. nov. (CRI)
– Eye 2.0–2.7 × genal height 31

31. Anterior (postsutural) dorsocentral bristle large, 0.7 × length of posterior (prescutellar) bristle. Wing hyaline. Male S5 with a long, dark, longitudinal, medial depression (Fig. 115B). Surstylus elongate, narrow, strongly sinuate with bifurcate apex (Fig. 114C) ..... ***S. punensis*** sp. nov. (BOL, PER)
– Anterior dorsocentral bristle distinct but smaller, 0.4–0.5 × length of posterior bristle. Wing slightly infuscate. Male S5 various, but never with a long, dark, longitudinal, medial depression. Surstylus various, usually broader, apex never bifurcate 32

32. Legs and gena yellow. Male S5 with a large, ovoid, setulose posteromedial emargination extending almost to anterior margin (Fig. 143B). Cercus indistinct from epandrium; subcercus small, shield-like (Fig. 142B). Surstylus elongate but broad, 0.7 × height of epandrium, outer surface convex and inner surface concave (Fig. 142C) ..... ***S. turpis*** sp. nov. (BRA)
– Legs and gena brown to dark brown. Male S5 various but never with a large, setulose posteromedial emargination. Cercus and subcercus various. Surstylus various but usually shorter than 0.5 × epandrial height; if surstylus large (*S. dryadalis* sp. nov.), male S5 without posteromedial emargination and cercus very large 33

33. Distal half of mid tibia with a small dorsal seta in addition to usual anterodorsal and posterodorsal setae. Male S5 wide, 3.5 × wider than long (Fig. 48B)..... ***S. dryadalis*** sp. nov. (VEN)
– Distal half of mid tibia with anterodorsal and posterodorsal setae only. Male S5 longer, 1.5–2.5 × wider than long 34

34. Distal half of mid tibia with two dorsal setae (one anterodorsal, one posterodorsal). Male S5 various but never with a dark, posteromedial patch of dense setulae 35
– Distal half of mid tibia with three dorsal setae (two anterodorsal, one posterodorsal). Male S5 with long setae largely restricted to lateral edges and a dark, posteromedial patch of dense setulae (as in Fig. 107B) 37

35. Epandrium boxy, with dorsal, lateral, and posterior surfaces at right angles to each other (Fig. 40B–C). Male S5 with very large and densely packed posteromedial patch of peg-like setae (Fig. 41B). Surstylus inverted U-shaped, with long anterior and posterior lobes (Fig. 40C) .... ***S. cubus*** sp. nov. (ECU, PER)
– Epandrium saddle-shaped, dorsal, lateral, and posterior surfaces not at right angles to each other. Male S5 with scattered elongate setae not forming a dense posteromedial cluster (Figs 59B, 65B). Surstylus small and subquadrate..... 36

36. Fore femur with 4–5 enlarged ventral setae. Eye height 2.0 × genal height. Male S5 deeply desclerotized posterolaterally, setae clustered along anterior edges of desclerotized areas, medially with a flattened V-shaped desclerotization (Fig. 59B). Additional sclerites of genital pouch very well developed. Postgonite elongate, 3.7 × as long as widest part (Fig. 59A)..... ***S. frigidifrons*** sp. nov. (ECU)
– Fore femur with three enlarged ventral setae. Eye height 2.5 × genal height. Male S5 extremely simple, rectangular, posterior margin unmodified, left side slightly extended posteriorly, uniformly setose in posterior two-thirds (Fig. 65B). Additional sclerites of genital pouch absent. Postgonite stout, 1.7 × as long as widest part (Fig. 65A) ..... ***S. inornatus*** sp. nov. (ECU)

37. Male mid tibia with a double row of ventral setae in apical half. Acrostichal setulae in 6–7 rows between anterior dorsocentral bristles. Surstylus convex anterobasally (cf Marshall 1995: fig. 2). Lateral supporting sclerite of distiphallus uniformly thin (cf. Marshall 1995: fig. 5)..... ..... ***S. sordipes*** (Adams, 1904) (CAN, USA)
– Male mid tibia with a double row of ventral setae in apical third. Acrostichal setulae in 8–9 rows between anterior dorsocentral bristles. Surstylus concave anterobasally (Fig. 106C). Lateral supporting sclerite of distiphallus abruptly expanded apically (Fig. 107A)..... .....***S. parasordipes*** sp. nov. (CAN, MEX, USA)

38. Acrostichal setulae in 11–12 rows between anterior dorsocentral bristles..... .....***S. subbrevipennis*** (Frey, 1954) (SHN – Tristan da Cunha)
– Acrostichal setulae in 4–9 rows between anterior dorsocentral bristles..... 39

39. Legs yellow. Surstylus large, mitt-like, height 2.0 × length (as in Fig. 125C) 40
– Legs brown. Surstylus various, usually not large and mitt-like, at most height 1.7 × length 43

40. Medial patch of dense setulae on male S5 almost reaching anterior margin (Fig. 126B). Outer surface of surstylus largely bare, with only short, scattered setae (Fig. 125C); inner anterior ridge of surstylus with a deep notch (Fig. 126D)..... .....***S. regularis*** (Malloch, 1914) (BLZ, CRI, HND, PAN, SLV, TTO, VEN)
– Medial patch of dense setulae on male S5 well separated from anterior margin (0.3 × length) (as in Fig. 105B). Outer surface of surstylus densely long-setose (as in Fig. 104C); inner ridge of surstylus entire 41

41. Subcercus truncate apically (Fig. 45B)..... ***S. dominicensis*** sp. nov. (DMA)
– Subcercus pointed or rounded apically (Figs 66B, 104B)..... 42

42. Postgonite sinuate (Fig. 67A). Subcercus rounded apically (Fig. 66B) .....
.....***S. irregularis*** sp. nov. (ARG, BOL, BRA, CRI, ECU, PRY)
– Postgonite straight (Fig. 105A). Subcercus produced inwards apically (Fig. 104B) .....
.....***S. pararegularis*** sp. nov. (MEX)

43. Anterior dorsocentral bristle very large, 0.8× length of posterior pair. Genital pouch sclerites reduced, only sclerite G distinguishable (Fig. 82B) ..... ***S. lutosus*** sp. nov. (BOL, PER)
– Anterior dorsocentral bristle smaller, 0.4–0.6× length of posterior pair. Genital pouch sclerites well developed, with most pouch sclerites distinguishable..... 44

44. Distal half of mid tibia with two dorsal setae (one anterodorsal, one posterodorsal) 45
– Distal half of mid tibia with three dorsal setae (two anterodorsal, one posterodorsal) 46

45. Gena bicoloured: orange anteriorly, brown posteriorly; face yellow. CS2 1.0× CS3. Posterior margin of male S5 desclerotized with short, thickened setae (Fig. 129B). Surstylus subtriangular with a triangular, inner, anterobasal lobe and dense setae apically (Fig. 128B–C).....
.....***S. riparius*** sp. nov. (ECU)
– Gena entirely orange-brown; face orange-brown; CS2 0.7–0.8× CS3. Posteromedial margin of S5 produced posteriorly with thin, elongate setae only (Fig. 17B). Surstylus ovoid with a patch of three setae apically (Fig. 16B–C) ..... ***S. altus*** sp. nov. (ECU)

46. Interfrontal bristles in three pairs, middle pair largest..... 47
– Interfrontal bristles in four pairs, first very small, other three subequal..... 48

47. Mid tibia of both sexes with three dorsal setae in proximal half (two anterodorsal, one posterodorsal). Acrostichal setulae in 8–9 rows between anterior dorsocentral bristles. CS2 0.7–0.8× CS3. Male S5 with a dark, inverted Y-shaped posteromedial sclerite flanked by a pair of converging, subtriangular, long-setose lobes (Fig. 21B). Lateral pieces of female T8 wide, subquadrate with setae well separated from ventral corner; female S8 reduced to a pair of minute lateral sclerites; spermathecae spherical with a shallow apical and a deep basal invagination (Fig. 22D) ..... ***S. azulensis*** sp. nov. (ECU)
– Male mid tibia with only a single anterodorsal seta at about midlength; female mid tibia with three dorsal setae in proximal half (two anterodorsal, one posterodorsal). Acrostichal setulae in 6–7 rows between anterior dorsocentral bristles. CS2 1.0× CS3. Male S5 with a dark, elongate, posteromedial patch of dense setulae (Fig. 85B). Lateral pieces of female T8 narrow, distinctly rectangular with setae extending to ventral corners; Female S8 well developed with four small setae and dense medial setulae; spermathecae bean-shaped with a large but not deep subbasal invagination (Fig. 86D) ..... ***S. mandibulum*** sp. nov. (BOL, ECU)

48. CS2 0.9–1.0× CS3..... 49
– CS2 0.7–0.8× CS3..... 54

49. Wing hyaline. Male mid tibia with double ventral row of setae along apical two-thirds. Female hypoproct with a sclerotized anteromedial process covered in slightly thickened setulae (Fig. 141B)..... ***S. tridens*** sp. nov. (BOL, ECU)
– Wing at least slightly infuscate. Male mid tibia with double ventral row of setae along apical third at most. Female hypoproct membranous anteromedially, without a sclerotized anteromedial process 50

50. Foreleg yellow. Male S5 with microtomentose posteromedial area (Fig. 112B). Surstylus tall, 0.9–1.0 × height of epandrium (Fig. 111C)..... ***S. plumiseta*** (Duda, 1925) (BOL, BRA, PER, PRY)
– Foreleg brown. Male S5 with a patch of dense setulae or long setae. Surstylus short, 0.4–0.5 × height of epandrium 51

51. Male S5 gently curved along posterior margin with a posteromedial patch of long setae (Figs 27B, 103B); sclerite A bifurcate and setulose posteriorly (as in Fig. 27B); sclerite E with stout setae or dense setulae posteriorly. Pseudocercus absent; subcercus large and broad, larger than surstylus. Postgonite broad, straight, and truncate apically 52
– Male S5 produced posteriorly with a posteromedial patch of dense setulae (Figs 70B, 79B); sclerite A rounded and bare; sclerite E bare. Pseudocercus free from epandrium; subcercus small and tapered, smaller than surstylus. Postgonite narrow, sharply bent in apical third, flared and pale apically ... 53

52. Eye height 4.0 × genal height. Left lobe of sclerite A subequal to right lobe and apically pointed, with only setulae (Fig. 27B); sclerite E with a posterior patch of dense setulae. Basiphallus strongly bent in lateral view ..... ***S. bucki*** sp. nov. (BOL, CRI, ECU, PER)
– Eye height 3.5 × genal height. Left lobe of sclerite A larger than right lobe and apically rounded, with two setae in addition to setulae (Fig. 103B); sclerite E with a posterior patch of stout, thickened setae. Basiphallus gently curved in lateral view..... ***S. paranebulosus*** sp. nov. (VEN)

53. Eye height 4.0 × genal height. Medial patch of setulae on male S5 1.5 × as long as wide (Fig. 70B). Surstylus subtriangular with apex elongate, curved anteriorly and blunt (Fig. 69C). Female S7 widely desclerotized along posterior margin with four large setae and 10–14 smaller setae (Fig. 71B); S8 split into two large lateral sclerites ..... ***S. latibarbus*** sp. nov. (GTM, HND, MEX)
– Eye height 3.5 × genal height. Medial patch of setulae on male S5 2.1 × longer than wide (Fig. 79B). Surstylus hatchet-shaped, anterior edge straight, posterior edge broadly rounded (Fig. 78C). Female S7 sclerotized along posterior margin with four very large setae, 18–22 small setae, and a distinct posteromedial lobe bearing 3–4 large setae (Fig. 80B); S8 reduced to two minute lateral sclerites ..... ***S. longibarbus*** sp. nov. (CRI, GTM, MEX)

54. Male S5 with a dark, posteromedial patch of dense setulae (as in Fig. 123B)..... 55
– Male S5 with short or long posteromedial setae, but not a patch of dense setulae 57

55. Surstylus subtriangular, tapered towards apex (131C). Subcercus large and pointed apically. Anal fissure short, semicircular (Fig. 131B). Postgonite dramatically expanded apically (Fig. 132A) ..... ***S. rostrum*** sp. nov. (MEX)
– Surstylus subquadrate or subrectangular, distinctly flat/truncate apically. Subcercus small and truncate apically. Anal fissure larger, subtriangular. Postgonite relatively slender throughout length..... 56

56. Male S5 with posteromedial patch of dense setulae elongate, 2.0 × as long as wide and flanked by bare, pale areas and dark, setose patches, anterior half of S5 with two large, pale areas on either side of midline (Fig. 123B). Surstylus stouter, 0.8 × as long as broad. Female S7 rectangular, posteromedially flat with sparse setae; S8 with a large, recurved ventral lobe (Fig. 124B–C); hypoproct elongate..... ***S. recurvatus*** sp. nov. (CRI)
– Male S5 with posteromedial patch of dense setulae broader, 1.4 × as long as wide and flanked by uniformly pigmented, setose patches, anterior half of S5 with two converging pale lines making a V-shape (Fig. 134B). Surstylus more elongate, 1.8 × as long as broad. Female S7 with a small posteromedial lobe and many long setae; S8 reduced to a pair of small lateral sclerites (Fig. 135B); hypoproct short ..... ***S. synorios*** sp. nov. (MEX, USA)

57. Anterior (postsutural) dorsocentral bristle 0.7× length of posterior (prescutellar) bristle. Male S5 dark, produced and bare posteromedially; sclerite A forming a rectangular, entirely densely setulose area on the posterior margin of S6+7 (Fig. 117B). Subcercus wedge-shaped with a posteriorly elongate apex. Surstylus subtriangular, apical third tapered, anterior side with a triangular notch ..... ***S. puyensis*** sp. nov. (ECU)
– Anterior (postsutural) dorsocentral bristle 0.4× length of posterior (prescutellar) bristle. Male S5 desclerotized, simple and setose posteromedially; sclerite A projecting from S6+7 as two setulose lobes (Fig. 94B). Subcercus relatively parallel-sided and rectangular, apex rounded with a small, dorsal, preapical lobe. Surstylus stout, subquadrate .....***S. nebulosus*** sp. nov. (CRI, ECU, VEN)

Species descriptions

Sclerocoelus aduncus sp. nov.
urn:lsid:zoobank.org:act:C599DCDE-8989-4D4E-927C-A00C7A4134B4
Figs 5A, 11–12

Etymology

This name refers to the apically hooked male cercus (from the Latin '*aduncus*', meaning 'hooked, bent, curved').

Material examined

Holotype

ECUADOR • ♂; Pichincha, Campamento Pichan, near Nono; 3350 m a.s.l.; 0°7′31″ S, 78°33′56″ W; 24 Oct. 1999; S.A. Marshall leg.; cloud forest, green leaf litter; QCAZ debu00115508.

Paratype

ECUADOR – **Pichincha** • 1 ♂; same data as for holotype; DEBU debu00115545.

Description

Body (Fig. 11A). Length 2.9–3.4 mm. Head dark brown, orbital plate, face, and antenna orange; gena and frontal vitta reddish. Frontal width 2.2–2.3× frontal height. Two pairs of large interfrontal bristles surmounting a fine third (holotype has a third large interfrontal bristle on one side); anterior orbital 0.4–0.5× length of posterior. Palpus pale brown. Eye very large, greatest height about 5.0× shortest genal height. Thorax dark brown, scutum shiny with slightly paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4× length of posterior pair) separated by 5–6 rows of acrostichal setulae. Membrane around prosternum bare. Legs dark brown, foreleg paler. Fore femur with four large ventral preapical setae. Dorsal surface of mid tibia with a small pair of setae at ¼, a large anterior seta just above ½, and a large pair of setae at ¾. Ventral surface of male mid tibia with two rows of stout setae along apical third. Wing (Fig. 5A) short, extending only to midpoint of T3; strongly infuscate. All veins distinguishable. CS2 0.6–0.7× CS3. Halter reduced to a small white nub.

Male abdomen (Figs 11B–C, 12). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 broad, rectangular, 0.9× length of S4, broadly desclerotized posteromedially, setae largely restricted to desclerotized area. Anterior flange of S6+7 not developed. Additional sclerites of genital pouch inconspicuously developed on anterior face of genital pouch (perpendicular to S5): sclerite A dark, fused to S6+7; sclerite B dark, arched into genital pouch; sclerite C apparently absent; sclerites D and E fused into a dark, posteriorly bilobed sclerite; sclerites F and G fused, dark with a rounded, preapical notch on left side; ring sclerite weakly sclerotized. Epandrium small, 0.7× length of S8, height 1.9× maximum length and 0.8× maximum

width, densely setose; anal fissure small, ovoid; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite broadly arched, thin, closely associated medially but not fused together. Cercus slightly sinuate in posterior view, curved with apex hooked, flattened and extended anteriorly. Hypandrium with anteromedial apodeme tapered and sinuate. Surstylus broad, subequal in length and height, subquadrate with dense ventral setae and a triangular anterobasal lobe. Postgonite with basal third boxy, apical two-thirds narrow, sinuate, apex emarginate with a slight anterior, preapical lobe. Phallapodeme narrow, slightly sinuate; basiphallus stout and connected to distiphallus by a neck-like distal part; distiphallus large with a downturned, tubular, sclerotized part and a large membranous, ventral part.

Female abdomen. Female unknown.

Distribution

Neotropical: Ecuador.

Remarks

Sclerocoelus aduncus sp. nov. is easily identified by the strongly reduced wing (Fig. 5A) with a small alula (all other brachypterous species have a large alula), apically hooked male cercus, and small, subquadrate surstylus. *Sclerocoelus aduncus* has distinct cerci fused basally into a subanal plate but lacks separate pseudocerci or subcerci. These characters suggest that *S. aduncus* and the similarly brachypterous species *S. flavus* sp. nov., *S. limbus* sp. nov., and *S. meridensis* sp. nov. are among the few species in the genus that are basal to the large, derived groups characterized by separate subcerci and pseudocerci. All four species are associated with wet, green plant material in high elevation cloud forests or elfin forests in the Andes.

Sclerocoelus alpinus sp. nov.
urn:lsid:zoobank.org:act:F98C8FAD-D3B4-4AB9-9AB0-E3ECBE0D0F02
Figs 5B, 13–15

Etymology

This name reflects the high-altitude habitats from which this species has been collected (from the Latin '*alpinus*', meaning 'alpine (of/relating to/inhabiting mountains)').

Material examined

Holotype

ECUADOR • ♂; Pichincha, 10 km NW of Quito, Valley near Hosteria San Jorge; 3050 m a.s.l.; 23 Oct. 1999; S.A. Marshall leg.; stream debris; QCAZ debu00111277.

Paratypes

ECUADOR – **Carchi** • 1 ♂; Guandera Forest Reserve, 15 km E of San Gabriel; 3400 m a.s.l.; 1 Nov. 1999; S.A. Marshall leg.; hand; QCAZ • 1 ♂; same data as for preceding; sweep forest trail; DEBU • 2 ♂♂, 3 ♀♀; Paramo El Angel, 24 km NW of El Angel; 3800 m a.s.l.; 3 Nov. 1999; S.A. Marshall leg.; dung traps in moss; QCAZ. – **Loja** • 1 ♂; Podocarpus National Park, Cajanuma, Bosque Nublado trail; 3000 m a.s.l.; 19 Feb–5 Mar. 2009; M. Pollet and A. De Braekeleer leg.; Malaise trap; debu00194781/MYRO919-21 sequenced for CO1-5'; RBINS. – **Pichincha** • 7 ♂♂, 11 ♀♀; same data as for holotype; QCAZ • 2 ♀♀; Cotopaxi National Park, Quebrada Mishahuaycu; 3600 m a.s.l.; 25 Oct. 1999; S.A. Marshall leg.; under streamside vegetation; DEBU • 1 ♂; 10 km NW of Quito, valley near Hosteria San Jorge; 3050 m a.s.l.; 22–25 Oct. 1999; S.A. Marshall leg.; creek bed, pan traps; QCAZ • 1 ♂, 2 ♀♀; same data as for preceding; 23 Oct. 1999; stream valley sweeping; DEBU.

VENEZUELA – **Mérida** • 4 ♂♂; 6 km S of Azulita, near road; 3 May 1988; S.A. Marshall leg.; DEBU • 5 ♂♂, 5 ♀♀; S Bolivar National Park, near La Aguada; 3000 m a.s.l.; 13 May 1981; L. Masner leg.; DEBU. – **Trujillo** • 2 ♂♂, 4 ♀♀; Boconó, road to Guaramacal; 2570 m a.s.l.; 2 Mar. 1996; S.A. Marshall leg.; creek bed; DEBU • 2 ♀♀; Boconó-Guaramacal Road; 3000 m a.s.l.; 3 Mar. 1995; S.A. Marshall leg.; wet debris along spring; DEBU.

Description

Body (Fig. 13A). Length 2.6–4.1 mm. Head dark brown, lower third to half of frons and antenna orange; face and gena orange-brown. Frontal width 2.4–2.5× frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.6–0.7× length of posterior. Palpus pale brown. Eye large, greatest height about 3.5× shortest genal height. Thorax dark brown, scutum with slightly paler lateral edges; postpronotum and anterior edge of anepisternum pale. Two pairs of dorsocentral bristles (anterior pair only slightly larger than surrounding acrostichal setulae) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, foreleg paler. Fore femur with four large ventral preapical setae. Dorsal surface of mid tibia with a small pair of setae at about ⅓, a large anterior seta at ½ and a large pair of setae at about ¾. Ventral surface of male mid tibia with two rows of stout setae along apical third. Wing (Fig. 5B) slightly infuscate. CS2 subequal to CS3. Halter brown.

Male abdomen (Figs 13B–C, 14). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 large, rectangular, 1.2× length of S4, uniformly long-setose with a pair of long posteromedial setae surrounded by a broad, pale, densely setulose strip. Anterior flange of S6+7 not developed. Sclerite A large, pale, densely setulose; sclerite B long, arched; sclerite C absent; sclerite D large, asymmetrically triangular; sclerites E and F fused into a large, triangular sheet wrapping around right side of sclerite A; sclerite G large, pale; ring sclerite weakly sclerotized. Epandrium small, wedge-shaped, 0.6× length of S8, height 1.4× maximum length and 0.8× maximum width, uniformly long-setose; anal fissure moderate, rounded; perianal pads weakly developed. Pseudocercus and subanal plate absent; halves of subepandrial sclerite weakly arched, medially fused. Subcercus slender, curved and blade-like distally; basally with a broad outer lobe bearing three large setae. Hypandrium with anteromedial apodeme long and straight, hypandrial arms thick and arched. Surstylus stout, subquadrate with long setae (longest on anterior and ventral edges) and a triangular, anteroapical inner lobe. Postgonite short, basal half broad, apical half strongly tapered and gently curved. Phallapodeme long, slightly curved; basiphallus elongate, slightly curved with a stout, upcurved epiphallus; distiphallus short, membranous with a strongly bent dorsal sclerite, a broad ventral sclerite, and a pair of sinuate lateral sclerites; dorsoapical membrane transversely rugose.

Female abdomen (Fig. 15). T7 broad, simple; T8 divided into a pale, almost entirely membranous dorsal sclerite and two large, dark, lateral sclerites, posterolateral corners slightly expanded but broadly emarginate. Epiproct large, subtriangular, strongly tapered in apical third, anteromedially desclerotized, and entirely setulose. Cercus elongate, apically pointed with long apical, dorsal, and apicoventral setae. S7 subtriangular/T-shaped, desclerotized along posterior margin with four large posterior setae; S8 entirely membranous. Hypoproct entirely setulose with several small dorsolateral setae. Three spermathecae, bulb stout, spherical, largely smooth with shallow invaginations basally and subapically, both with a small, finger-like, central process.

Distribution

Neotropical: Ecuador, Venezuela.

Remarks

Sclerocoelus alpinus sp. nov. can be separated by from other species of *Sclerocoelus* by the long male S5, relatively small male genitalia, strongly tapered postgonite, and Y- or T-shaped female S7. *Sclerocoelus*

alpinus is among several congeners associated with wet vegetation, especially along waterways, in the high Andes. We have collected it repeatedly in wet vegetation on the margins of alpine streams at altitudes from 2500 to 3400 m a.s.l. The elongate, ventrally narrow and curved subcercus of this species resembles that of *S. inornatus* sp. nov. but, unlike *S. inornatus*, *S. alpinus* has a complex genital pouch with multiple discrete sclerites as in the related *S. altus* sp. nov., *S. puyensis* sp. nov., and *S. punensis* sp. nov.

Sclerocoelus altus sp. nov.
urn:lsid:zoobank.org:act:DF06754A-756B-4FE5-84D7-068C009579FD
Figs 5C, 16–17

Etymology

This name was chosen because *S. altus* sp. nov. has only been found at high elevations, between 3000 and 3800 m (from the Latin '*altus*', meaning 'high, tall').

Material examined

Holotype

ECUADOR • ♂; Pichincha, 10 km NW of Quito, valley near Hosteria San Jorge; 3000 m a.s.l.; 25 Oct. 1999; S.A. Marshall leg.; trailside litter; QCAZ debu00115708.

Paratypes

ECUADOR – **Pichincha** • 1 ♂; Campamento Pichan, near Napo; 24 Oct. 1999; S.A. Marshall leg.; sweep; debu00115967/MYCRO897-21 sequenced for CO1-5'; QCAZ • 1 ♂; Cotopaxi National Park, Lago Limpiopungo; 3800 m a.s.l.; 25 Oct. 1999; R. Anderson leg.; paramo, shrub litter; DEBU • 1 ♂; Cotopaxi National Park, Quebrada Mishahuaycu; 3600 m a.s.l.; 25 Oct. 1999; S.A. Marshall leg.; under streamside vegetation; QCAZ • 1 ♂; same data as for preceding; near stream, pan traps; DEBU.

Description

Body (Fig. 16A). Length 2.8–3.9 mm. Head dark brown, lower quarter of frons and antenna orange; face and gena orange-brown. Frontal width 2.0–2.1 × frontal height. Three pairs of large interfrontal bristles surmounting a fine fourth pair; anterior orbital 0.6–0.7 × length of posterior; several setulae present at bases of interfrontal and orbital setae. Palpus orange. Eye large, greatest height about 4.0 × shortest genal height. Thorax dark brown, scutum with slightly paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.5 × length of posterior pair) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, hind leg darker. Fore femur with four large ventral preapical setae. Dorsal surface of mid tibia with a small offset pair of setae at about ⅓, a large anterior seta just above ½ and a large pair of setae at about ¾. Ventral surface of male mid tibia with two rows of stout setae along apical half. Wing (Fig. 5C) slightly infuscate. CS2 0.7–0.8 × CS3. Costa extending slightly beyond end of R_{4+5} (2–3 × costal width). Halter brown.

Male abdomen (Figs 16B–C, 17). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 broad, asymmetrical, medially 0.8 × length of S4, left side reduced, long-setose on posterior half, posteromedially acute. Anterior flange of S6+7 not developed. Sclerite A indistinct from S6+7; sclerite B dark, arched into genital pouch; sclerite C small, triangular; sclerite D dark, apically emarginate, right side fused with sclerite E; sclerite E dark, elongate, apically rounded and curved dextrally; sclerites F and G fused, large, bulging; ring sclerite indistinct. Epandrium small, 0.6 × length of S8, height 1.9 × maximum length and 0.9 × maximum width, uniformly setose; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite short, arched, medially fused by a weakly sclerotized bridge. Subcercus fused medially but separate from epandrium, slightly angled

anteriorly, sinuate, posterior surface with 3 setae, apex expanded posteriorly. Hypandrium moderate, anteromedial apodeme long but thin. Surstylus large, subtriangular with a triangular, inner, anterobasal lobe, outer surface convex and setose, inner surface concave. Postgonite slightly sinuate with a slight constriction about midlength and apex strongly tapered. Phallapodeme elongate, curved; basiphallus elongate and connected to distiphallus by a neck-like distal part; distiphallus largely membranous with a short dorsal sclerite and a pair of sinuate lateral sclerites, anterodorsal surface finely striate.

Female abdomen. Female unknown.

Remarks

Sclerocoelus altus sp. nov. is superficially very similar to *S. riparius* sp. nov., but differs by the unicolourous gena, distinct posteromedial projection of the male S5 lacking thickened setae, and bisinuate postgonite. *Sclerocoelus altus* is one of several related species, including the closely related *S. punensis* sp. nov. and *S. puyensis* sp. nov., associated with the particular microenvironment created when low branches of high Andean shrubs or herbaceous plants lie on the ground. All type specimens were taken above 3000 m a.s.l.

Sclerocoelus andensis Marshall, 1997

Sclerocoelus andensis Marshall, 1997: 99.

Sclerocoelus andensis – Roháček *et al*. 2001: 249.

Diagnosis

Body length 2.2–3.0 mm. Membrane around prosternum with 3–4 small, setulae-bearing sclerites. Male S5 with a pair of dark, posteriorly-directed, posteromedial lobes (cf. Marshall 1997: fig. 2); epandrium with a pair of very long posterior setae (cf. Marshall 1997: fig. 6); perianal pad well developed and dark; surstylus triangular with posterior apex coming to a sharp point (cf. Marshall 1997: figs 6, 8); postgonite broad basally, apical third significantly constricted and curved forwards (cf. Marshall 1997: fig. 7). Female S8 relatively small, trapezoidal, lateral edges dark (cf. Marshall 1997: fig. 10).

Material examined

The type specimens deposited in DEBU were examined, as well as the following material:

ARGENTINA – **Salta** • 9 ♂♂, 21 ♀♀; 22 km N of La Caldera, El Ucumar; 1550 m a.s.l.; 2–30 Dec. 1987; S. and J. Peck leg.; subtropical humid forest, Malaise flight-intercept trap; DEBU • 1 ♀; 30 km E of Salta, Campo Quijano; 20 Feb. 1992; S.A. Marshall leg.; forest vestige, sweep; DEBU • 14 ♂♂, 11 ♀♀; 30 km E of Salta, Campo Quijano; 20 Feb. 1992; S.A. Marshall leg.; stream debris leaf litter; DEBU • 56 ♂♂, 31 ♀♀; 30 km E of Salta, Campo Quijano; 24 Feb. 1992; S.A. Marshall leg.; forest vestige, wet debris along stream; DEBU • 4 ♂♂, 2 ♀♀; 30 km E of Salta, El Alisal, Campo Quijano, 18 Feb. 1992; S.A. Marshall leg.; forest vestige; DEBU • 17 ♂♂, 9 ♀♀; 40 km N of Camino la Carnisa; 27 Feb. 1992; S.A. Marshall leg.; roadside, forest sweep; DEBU • 3 ♂♂; Cañada de la Gotera, 15 km W of Chicoana; 16–28 Feb. 1992; S.A. Marshall leg.; forest remnant; DEBU • 13 ♂♂, 10 ♀♀; Cañada de la Gotera, 15 km W of Chicoana; 19 Feb. 1992; S.A. Marshall leg.; sweeping wet litter; DEBU • 1 ♂, 4 ♀; El Rey National Park, Pozo Verde trail, km 7; 1000 m a.s.l.; 5–15 Dec. 1987; S. and J. Peck leg.; yungas forest, Malaise flight-intercept trap; DEBU • 1 ♀, 1 ⚥; El Rey National Park, Río La Sala; 900 m a.s.l.; 5–10 Dec. 1987; S. and J. Peck leg.; open stream side in forest, Malaise flight-intercept trap; DEBU • 1 ♂, 1 ♀; La Caldera, Camino la Cornisa; 27 Feb. 1992; S.A. Marshall leg.; roadside sweep; DEBU • 16 ♂♂, 7 ♀♀; La Caldera; 1500 m a.s.l.; 27 Feb. 1992; S.A. Marshall leg.; forest, roadside sweep; DEBU.

BOLIVIA – **La Paz** • 3 ♂♂, 1 ♀; 0.5 km SE of Coroico; 16°11′ S, 67°44′ W; 15 Apr. 2001; S.A. Marshall leg.; DEBU • 1 ♀; 10 km NW of Caranavi, road to ENTEL tower; 15°46′35″ S, 67°35′48″ W; 1400 m a.s.l.; 13 Apr. 2001; S.A. Marshall leg.; DEBU • 6 ♂♂, 6 ♀♀; 23 km NE of Caranavi; 14 Apr. 2001; S.A. Marshall leg.; roadside/stream, sweep; DEBU • 2 ♀♀; Arroyo Tuhiri, W of Mapiri; 15°17′27″ S, 68°15′29″ W; 10 Apr. 2001; S.A. Marshall leg.; DEBU • 1 ♂, 2 ♀♀; Chulumani, Apa-Apa Reserve; 16°21′15″ S, 67°30′21″ W; 2000 m a.s.l.; 1 Apr. 2001; S.A. Marshall leg.; sweep; DEBU • 1 ♀; Zongo; 16°06′32″ S, 68°04′30″ W; 18 Apr. 2001; S.A. Marshall leg.; roadside, sweep cut foliage; DEBU.

ECUADOR – **Carchi** • 1 ♀; Guandera Forest Reserve, 15 km E of San Gabriel; 1 Nov. 1999; S.A. Marshall leg.; sweeping forest trail; DEBU. – **Napo** • 1 ♂, 3 ♀♀; Baeza; 1500 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; wet montane rainforest, Malaise trap; DEBU • 1 ♂; same collection data as preceding; ROME • 1 ♂; SierrAzul Lodge, 14 km W of Cosanga; 2200 m a.s.l.; 5 Nov. 1999; S.A. Marshall leg.; forest, sweep; DEBU. – **Pichincha** • 2 ♂♂, 1 ♀; 3.5 km SE of Tandayapa; 28 Oct. 1999; S.A. Marshall leg.; in green leaf litter (treefall); DEBU • 4 ♀♀; 7 km SE of Nanegalito, trout farm ‘San José’; 1500 m a.s.l.; 27–30 Oct. 1999; S.A. Marshall leg.; riverine forest, sweep treefalls; DEBU • 1 ♀; 11.7 km SE of Tandayapa, road to Nono; 28 Oct. 1999; S.A. Marshall leg.; near stream, litter/wood; DEBU • 1 ♀; 15 km NW of Nono, road to Mindo; 24 Oct. 1999; S.A. Marshall leg.; roadside sweep, cow dung; DEBU • 1 ♂, 1 ♀; Bellavista Cloud Forest Reserve; 0°1′13″ S, 78°40′30″ W; 2200 m a.s.l.; 9–13 May 2009; S.A. Marshall leg.; DEBU • same data as for preceding; 1 May 2011; tree fall; debu00339882/MYCRO1013-22 sequenced for CO1-5’; DEBU • 1 ♀; Bellavista Reserve, trail B; 30 Oct. 1999; S.A. Marshall leg.; sweeping; DEBU • 1 ♀; Tinalandia, near Santo Domingo, May 1983; M.J. Sharkey leg.; CNCI.

PERU – **Cusco** • 10 ♂♂, 9 ♀♀; Cock-of-the-Rock Lodge, NE of Paucartambo; 13°3′18″ N, 71°32′42″ W; 1120 m a.s.l.; 4–9 Nov. 2007; D. Brzoska leg.; flight-intercept trap; DEBU. – **Madre de Dios** • 1 ♀; Pantiacolla Lodge, Alto Madre de Dios River; 12°39′18″ N, 71°13′54″ W; 420 m a.s.l.; 14–19 Nov. 2007; D. Brzoska leg.; flight-intercept trap; DEBU.

VENEZUELA – **Aragua** • 2 ♀♀; Henri Pittier National Park, Rancho Grande, La Toma trail; 9 Apr. 1994; L. Masner; DEBU. – **Trujillo** • 1 ♂, 1 ♀; 10 km E of Bocono, Laguna de Lucerdo; 1760 m a.s.l.; 3 Mar. 1996; S.A. Marshall leg.; slash/compost; DEBU • 3 ♂♂, 13 ♀♀; Bocono–Guaramacal Road; 2130 m a.s.l.; 3 Mar. 1996; S.A. Marshall leg.; sweep wet litter; DEBU.

Distribution

Neotropical: Argentina, Bolivia, Ecuador*, Peru*, Venezuela.

Sclerocoelus argentinensis sp. nov.

urn:lsid:zoobank.org:act:2A847776-3A06-4E48-9EF3-3B445DA4475D

Figs 5D, 18–19

Etymology

This name reflects the apparent restriction of this species to Argentina. Four other species of *Sclerocoelus* are known from the country, but *S. argentinensis* sp. nov. is the only species known exclusively from Argentina.

Material examined

Holotype

ARGENTINA • ♂; Salta, 22 km N of La Caldera; 1550 m a.s.l.; 2–30 Dec. 1987; S. and J. Peck leg.; El Ucumar, subtropical humid forest, Malaise trap; DEBU.

Description

Body (Fig. 18A). Length 3.1 mm. Head dark brown, orbital plate, gena and antenna brown. Frontal width 2.3 × frontal height. Three pairs of strong interfrontal bristles surmounting a fine fourth pair; anterior orbital 0.4 × length of posterior. Palpus pale brown. Eye large, greatest height about 3.5 × shortest genal height. Thorax dark brown, scutum with broad paler lateral edges. Two pairs of dorsocentral bristles (anterior pair only slightly larger than surrounding acrostichal setulae) separated by 5–6 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, femora basally paler. Fore femur with three large ventral preapical setae. Dorsal surface of mid tibia lacking small posterior seta in basal half. Ventral surface of male mid tibia with two rows of stout setae along apical third. Wing (Fig. 5D) slightly infuscate. CS2 0.9 × CS3. Halter brown.

Male abdomen (Figs 18B–C, 19). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.3 × length of S4, with a short, dark, asymmetrically boot-shaped, posteromedial area margined anteriorly by long setae and posteriorly by a patch of short, stout setae. Anterior flange of S6+7 small, 1.3 × as long as wide. Sclerite A large, posteriorly deeply divided into outer (S7) and inner (S6) parts, inner part densely setulose with a posterior tuft of very dense setulae preceded by a patch of short, stout, tooth-like setae; sclerites B and C absent; sclerite D small, dark, triangular, fused to left side of a small sclerite E; sclerite F large, narrowly fused to sclerite G, setulose except for elongate extension of inner posterolateral corner; sclerite G large, bulbous; ring sclerite well sclerotized. Epandrium small, wedge-shaped, 0.7 × length of S8, height 1.4 × maximum length and 0.8 × maximum width, posteroventral corner slightly emarginate; anal fissure large, almost circular; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite reduced. Cercus much larger than surstylus, elongate-rectangular in posterior view, ventral half concave, anteroventral corner slightly flared outwards, posterior surface setulose with a small preapical process. Hypandrium with anteromedial apodeme long and sinuate. Surstylus broad, bulging, anteroventral margin flattened and blade-like, in line with inner surface of basal part with a small tooth-like lobe. Postgonite broad and almost parallel-sided, slightly tapered towards apex, indistinctly sinuate on apical half, apex truncate with a small anterolateral lobe. Phallapodeme long, slightly curved with a large, obliquely ridged dorsal 'fin'; basiphallus stout and connected to distiphallus by a neck-like distal part; distiphallus only slightly longer than basiphallus, largely membranous with a pair of larger, sinuate, dorsolateral sclerites and a small ventral sclerite.

Female abdomen. Female unknown.

Distribution

Neotropical: Argentina.

Remarks

This distinctive species shows several unusual autapomorphies, such as the prominent posterior tuft of very dense setulae on genital pouch sclerite A. Other characters that help identify *Sclerocoelus argentinensis* sp. nov. include the very large, posteriorly setulose cerci and stout, tooth-like setal patches on the male S5 and genital pouch sclerite A. *Sclerocoelus argentinensis* is one of the 'basal lineages' of *Sclerocoelus*, with plesiomorphic states including a complete but narrow subanal plate and cerci not yet differentiated into separate subcerci and pseudocerci. Related species are restricted to high alpine habitats.

Sclerocoelus azulensis sp. nov.

urn:lsid:zoobank.org:act:2EE86108-F956-4844-9DE5-8F5D906E5BFE

Figs 5E, 20–22

Etymology

This name refers to the type locality of this species, the SierrAzul Reserve in eastern Ecuador.

Material examined

Holotype

ECUADOR • ♂; Napo, SierrAzul Reserve, 14 km W of Cosanga; 0°40′55″ S, 77°56′09″ W; 2200 m a.s.l.; 10–11 May 2002; Marshall and Paiero leg.; treefall, yellow pans; QCAZ.

Paratypes

ECUADOR – **Napo** • 4 ♀♀; same data as for holotype; DEBU • 5 ♀♀; same data as for holotype; QCAZ • 1 ♂, 3 ♀♀; Napo, 27 km NW of Baeza; 2700 m a.s.l.; 2–6 Mar. 1976; S. Peck leg.; dung trap; DEBU • 1 ♂, 2 ♀♀; same data as for preceding; QCAZ • 5 ♀♀; 5 km N of El Chaco; 15 Feb. 1983; M.J. Sharkey leg.; Malaise trap and wet net; CNCI • 1 ♀; Baeza; 1500 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; wet montane rainforest, Malaise trap; DEBU. – **Pichincha** • 1 ♀; Bellavista Cloud Forest Reserve; 0°01′13″ S, 78°40′30″ W; 2200 m a.s.l.; 1 May 2011; S.A. Marshall leg.; pans near treefall; debu00371007/MYCRO916-21 sequenced for CO1-5'; DEBU.

Description

Body (Fig. 20A). Length 3.0–4.9 mm. Head dark brown; lunule and antennae orange-brown; frontal vitta, interfrontal plate and orbital plate paler and shiny. Frontal width 2.2–2.3 × frontal height. Three pairs of interfrontal bristles, middle pair largest with tips crossing; anterior orbital 0.4–0.5 × length of posterior. Palpus pale brown. Eye large, greatest height about 3.5 × shortest genal height. Thorax dark brown, scutum with reddish lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.3 × length of posterior pair) separated by 8–9 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, fore and hind femora darker. Fore femur with four or five large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical half. Wing (Fig. 5E) slightly infuscate. CS2 0.7–0.8 × CS3. Halter brown with paler stem.

Male abdomen (Figs 20B–C, 21). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 H-shaped, 2.1 × length and 1.5 × width of S4, anteromedially deeply and widely emarginate, posteromedially with two long-setose lobes flanking a central trifid process. Anterior flange of S6+7 0.6 × as long as wide, posterior margin of S7 with a distinct, dark finger-like process near cleft dividing S7 and S6. Sclerites A, B, and C fused to form a continuous arc extending from left side across posterior part of genital pouch; sclerites D and E fused, dark, and posteriorly expanded; sclerites F and G fused, extending from right side across genital pouch; ring sclerite narrow and weakly sclerotized. Epandrium large, 0.6 × length of S8, height 1.3 × maximum length and 0.5 × maximum width, uniformly setose; anal fissure subtriangular, widest at base; perianal pads weakly developed. Pseudocercus large, elongate, bearing three setae and fused with medial part of subcercus; halves of subepandrial sclerite thin, angulate and medially continuous. Subcercus with a long, dark, sinuate inner part and a pale, trilobed, outer-posterior part. Hypandrium relatively short, anteromedial apodeme narrow. Surstylus short, quadrate, ventrally setose with a narrow, setose anteroventral lobe. Postgonite very short, expanded apically with two sharp apical ridges. Phallapodeme very large, thick, with a large dorsal 'fin'; basiphallus broad and flattened with a medial constriction between main part and tubular section connecting to distiphallus; distiphallus largely membranous, very broad and dorsoventrally flattened with two sinuate lateral sclerites.

Female abdomen (Fig. 22). T7 broad, simple; T8 very broad with a broad pale dorsal area, dark lateral areas appearing quadrate. Epiproct short, medially pale and setulose between short dorsal seta. Cercus elongate, slightly tapered, with long apical, preapical, and dorsal setae. S7 broad, posteriorly rounded with four large posterior setae; S8 reduced to two minute sclerites. Hypoproct with a slight anteromedial notch. Three spermathecae, bulb spherical, smooth with a shallow apical invagination and a deep basal invagination.

Distribution

Neotropical: Ecuador.

Remarks

Sclerocoelus azulensis sp. nov. is an unplaced species probably related to the *S. dasysternum* group although it superficially resembles species in the mostly Central American *S. galapagensis* group in having an elaborate, multilobed subcercus. *Sclerocoelus azulensis* can be readily separated from the members of the *galapagensis* group by the bare prosternal membrane, deeply posteromedially notched male S5, trident-shaped genital pouch sclerite D+E, and greatly reduced surstylus. It is associated with relatively high cloud forest habitats in Ecuador.

Sclerocoelus binus sp. nov.

urn:lsid:zoobank.org:act:DD38063F-484E-408F-B8B3-D0E2896CB4D0

Figs 5F, 23–25

Etymology

This name refers to the two, very long, distinctive setae flanking the posteromedial patch of setulae on the male S5 (from the Latin '*binus*', meaning 'pair, occurring twice'), but it could equally well refer to the unusual reduction of the spermathecal number to two from the usual three.

Material examined

Holotype

BOLIVIA • ♂; La Paz, 23 km NE of Caranavi; 14 Apr. 2001; S.A. Marshall leg.; roadside/stream sweep; CBFC debu00165447.

Paratypes

BOLIVIA – **La Paz** • 42 ♂♂, 12 ♀♀; same data as for holotype; CBFC • 40 ♂♂, 11 ♀♀; same data as for holotype; debu00165453/MYCRO1025-22 sequenced for CO1-5'; DEBU • 2 ♂♂; 0.5 km SE of Coroico; 16°11′ S, 67°44′ W; 15 Apr. 2001; S.A. Marshall leg.; CBFC • 1 ♂; Apa-Apa, 8 km S of Chulumani; 16°35′36″ S, 68°51′12″ W; 1960 m a.s.l.; 9 Mar. 2001; A. Freidberg leg.; USNM.

COSTA RICA – **Cartago** • 1 ♂; Tapantí National Park, Arboles Caídos Trail; 1300 m a.s.l.; 9/11 Oct. 1999; S.A. Marshall leg.; MNCR • 3 ♂♂; Tapantí National Park, outside near west entrance; 1150 m a.s.l.; 8–9 Oct. 1999; Marshall and Buck leg.; sweep trail; DEBU • 2 ♂♂; same data as for preceding; MNCR. – **Heredia** • 1 ♂; 16 km SSE of La Virgen; 10°16′ N, 84°05′ W; 1050–1150 m a.s.l.; 9–21 Feb. 2001; transect; DEBU • 2 ♂♂; same collection data as preceding; 21 Mar. 2001; MNCR. – **Puntarenas** • 1 ♂; Monteverde Biological Reserve; 1500 m a.s.l.; 11–13 Jun. 2000; S.A. Marshall leg.; cloud forest; DEBU • 1 ♂; same data as for preceding; 11 Jun. 2000; M. Buck leg.; sweep; MNCR • 3 ♂♂; Monteverde Biological Reserve; 1500 m a.s.l.; 14 Jun. 2000; M. Buck leg.; sweeping treefall and trail; MNCR • 4 ♂♂; same data as for preceding; treefall sweep and pans; DEBU.

ECUADOR – **Napo** • 3 ♂♂; El Chaco; 2000 m a.s.l.; 15–23 Feb. 1983; L. Masner and M. Sharkey leg.; Malaise trap; CNCI. – **Pichincha** • 1 ♂; 3.5 km SE of Tandayapa; 28 Oct. 1999; S.A. Marshall leg.; in green leaf litter (treefall); QCAZ • 1 ♂; Bellavista Cloud Forest Reserve; 0°01′13″ S, 78°40′30″ W; 2200 m a.s.l.; 9–13 May 2009; S.A. Marshall leg.; DEBU.

PERU – **Cusco** • 1 ♂; Cock-of-the-Rock Lodge, NE Paucartambo; 13°03′18″ S, 71°32′42″ W; 1120 m a.s.l.; 4–9 Nov. 2007; D. Brzoska leg.; flight-intercept trap; MUSM.

VENEZUELA – **Aragua** • 1 ♂; Henri Pittier National Park, 12 km W of Maracay, on Choroni Road; 1290 m a.s.l.; 7 Mar. 1995; S.A. Marshall leg.; DEBU.

Description

Body (Fig. 23A). Length 2.9–3.5 mm. Head brown, lower third of frons and antennae orange; face and gena orange-brown. Frontal width 2.2–2.3× frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.5–0.6× length of posterior. Palpus pale brown. Eye very large, greatest height about 5.0× shortest genal height. Thorax brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair only slightly larger than surrounding acrostichal setulae) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum with a small, setula-bearing sclerite. Legs brown, trochanters pale. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical third. Wing (Fig. 5F) slightly infuscate. CS2 0.7–0.8× CS3. Halter pale brown.

Male abdomen (Figs 23B–C, 24). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae; preabdomen relatively long and typically curved downwards. S5 rectangular and short, 1.0× as long as S4, laterally long-setose, posteromedially with a patch of dense setulae and a pair of very long setae. Anterior flange of S6+7 weakly developed. Sclerite A lightly sclerotized but distinct from S6, with two long bristles in addition to sensory setulae; sclerite B small, narrow; sclerite C absent; sclerite D elongate, L-shaped; sclerites E and F large, bifurcate, the right lobes parallel, long and extending posteriorly; sclerite G well developed, elongate, and sinuate; ring sclerite large but thin. Epandrium large, 2.3× length of S8, height 1.2× maximum length and 0.8× maximum width, sparsely setose; perianal pads weakly developed but densely setulose. Pseudocercus large, elongate, separate from epandrium, with three setae; halves of subepandrial sclerite very narrow, separate and expanded medially, articulating with medially contiguous posterodorsal lobes of subcercus. Subcercus elongate, inner part forming a broad, flat, triangular anterior lobe, outer part smaller with narrow posteromedial lobes and broad lateral lobe articulating with surstylus and epandrium. Hypandrium long, anteromedial apodeme narrow. Surstylus large, divided into a broad, setose anteroventral lobe and a setulose posterior lobe, inner surface with a prominent, carinate, anteriorly projecting lobe. Postgonite broad, apically bilobed, and slightly curved; anterior lobe truncate, posterior lobe digitate. Phallapodeme long but narrow; basiphallus short, basally with a central carina and lateral expansions; distiphallus largely membranous, dorsoventrally flattened with S-shaped ventrolateral sclerites.

Female abdomen (Fig. 25). T7 broad, simple; T8 divided into a small, pale, dorsal sclerite and two broad, dark, lateral sclerites, posterolateral corners expanded posteriorly. Epiproct broad, shield-like, medially desclerotized, and entirely setulose. Cercus slightly elongate, blunt, with long, relatively stout apical and preapical setae. S7 broad, posteromedially pointed with two large medial setae and two large posterolateral setae; S8 entirely membranous, only two minute setulae indicating its presence. Two spermathecae, bulb stout, bean-shaped, finely striate with a deep invagination on one end and a shallow invagination beside insertion point of duct, both invaginations with a finger-like, central process.

Distribution

Neotropical: Bolivia, Costa Rica, Ecuador, Peru, Venezuela.

Remarks

Several features, including an elongate, curved male abdomen, large bilobed surstylus, and a setose prosternum, suggest a relationship between *S. binus* sp. nov. and *S. caribensis* and other species in the *S. galapagensis* group. *Sclerocoelus binus*, however, has only a single pair of prosternal setae and lacks the large perianal pads characteristic of *S. caribensis* and related species. *Sclerocoelus binus* has an unusually wide distribution, extending from Costa Rica to Bolivia, but the distinctive male genitalia are consistent throughout the range. The holotype and many of the paratypes were collected at the same

Bolivian locality as half a dozen congeners (*S. andensis*, *S. brasilensis*, *S. bucki* sp. nov., *S. caligarius* sp. nov., *S. copiosus* sp. nov., and *S. xynos* sp. nov.). Most of the type specimens were swept over wet leaf litter along streams, ditches or treefalls.

Sclerocoelus brasilensis Marshall, 1997

Sclerocoelus brasilensis Marshall, 1997: 100.

Sclerocoelus brasilensis – Roháček *et al*. 2001: 249.

Diagnosis

Body length 2.4–2.6 mm. Membrane around prosternum with 2–3 small, setulae-bearing sclerites. Male S5 simple and rectangular, posteromedially with a wide pale patch (cf. Marshall 1997: fig. 13); perianal pads well developed and dark; surstylus large, subrectangular with a broad, triangular, anteroventral lobe (cf. Marshall 1997: figs 14, 16–17); postgonite narrow and sinuate, apical fifth sharply bent forwards (cf. Marshall 1997: fig. 18). Female S8 relatively large, subcordate with raised lateral margins (cf. Marshall 1997: fig. 21).

Material examined

The type specimens deposited in DEBU were examined, as well as the following material:

BOLIVIA – **La Paz** • 1 ♂; 0.5 km SE of Coroico; 16°11′ S, 67°44′ W; 15 Apr. 2001; S.A. Marshall leg.; DEBU • 1 ♂, 1 ♀; 23 km NE of Caranavi; 14 Apr. 2001; S.A. Marshall leg.; roadside/stream, sweep; DEBU • 4 ♂♂, 1 ♀; Heath River Wildlife Centre, 21 km SSW of Puerto Heath; 12°40′ S, 68°42′ W; 5–9 May 2007; Paiero and Kits leg.; treefall, yellow pans; DEBU.

BRAZIL – **Santa Catarina** • 2 ♂♂, 4 ♀♀; Aparados da Serra National Park, Rio do Boi; 29°12′08″ N, 50°03′01″ W; 209 m a.s.l.; 6–8 Mar. 2015; Norrbom and Savaris leg.; river crossing, Malaise trap; MZSP.

COSTA RICA – **Alajuela** • 1 ♂; Volcán Tenorio, Bijagua Biological Station; 700 m a.s.l.; 16 Jun. 2000; M. Buck leg.; sweeping decayed vegetation; DEBU. – **Puntarenas** • 1 ♂; Monteverde Biological Reserve; 1500 m a.s.l.; 11 Jun. 2000; M. Buck leg.; cloud forest, sweep; DEBU • 1 ♂; same data as for preceding; 11 Jun. 2000; treefall sweep and pans; DEBU • 8 ♂♂, 2 ♀♀; Osa Peninsula, 2.5 km S of Rincón; 8°42′01″ N, 83°30′50″ W; 50 m a.s.l.; 11 Aug. 2001; S.A. Marshall leg.; sweep; DEBU • 1 ♂; Quepos, Manuel Antonio National Park, Punta Catedral; 80 m a.s.l.; Oct. 1991; G. Varela leg.; MNCR. – **San Jose** • 1 ♂, 1 ♀; Zurquí de Moravia; 1600 m a.s.l.; Jul. 1991; P. Hanson leg.; MNCR • 1 ♂, 1 ♀; Zurquí de Moravia; Jul. 1991; P. Hanson leg.; Malaise trap; MNCR.

ECUADOR – **Napo** • 1 ♂; SierrAzul Lodge, 14 km W of Cosanga; 0°40′55″ S, 77°56′09″ W; 2200 m a.s.l.; 10–11 May 2007; Marshall and Paiero leg.; treefall, yellow pans; DEBU.

FRENCH GUIANA • 1 ♀; Mitaraka, near MIT-A-RBF1; 1 Mar. 2015; Touroult and Poirier leg.; river, Malaise trap (6 m); (La Planète Revisitée–MNHN/PNI Guyane 2015-Apa-973-1); MNHN.

PERU – **Cusco** • 31 ♂♂, 17 ♀♀; Cock-of-the-Rock Lodge, NE Paucartambo; 13°03′18″ S, 71°32′42″ W; 1120 m a.s.l.; 4–9 Nov. 2007; D. Brzoska leg.; flight-intercept trap; DEBU. – **Madre de Dios** • 1 ♂, 1 ♀; Los Amigos Biological Station; 2–14 Jun. 2006; Paiero and Klymko leg.; debu00271536/MYCRO922-21 sequenced for CO1-5'; DEBU.

Distribution

Neotropical: Bolivia, Brazil, Costa Rica*, Ecuador, French Guiana*, Panama, Peru*.

Sclerocoelus bucki sp. nov.
urn:lsid:zoobank.org:act:58504FAC-2EF1-4C5D-B489-CBE2693CFED4
Figs 5G, 26–28

Etymology

This name is in honour of Dr Matthias Buck, an esteemed colleague with whom field trips to Ecuador and Costa Rica yielded the type of this and other *Sclerocoelus* species.

Material examined

Holotype

COSTA RICA • ♂; Cartago, Tapantí National Park; 1550 m a.s.l.; 7–12 Oct. 1999; Marshall and Buck leg.; pans in fallen tree; MNCR debu00107951.

Paratypes

BOLIVIA – **La Paz** • 3 ♂♂; 23 km NE of Caranavi; 14 Apr. 2001; S.A. Marshall leg.; roadside/stream sweep; CBFC • 1 ♂; Zongo; 16°06′32″ S, 68°04′30″ W; 18 Apr. 2001; S.A. Marshall leg.; roadside, sweep cut foliage; DEBU.

COSTA RICA – **Cartago** • 1 ♂; same data as for holotype; MNCR • 1 ♂; Tapantí National Park, La Esperanza del Guarco; 17–18 Aug. 2001; S.A. Marshall leg.; DEBU • 1 ♂; Tapantí National Park, near Catarata trail; 1450 m a.s.l.; 4 Oct. 1999; S.A. Marshall leg.; roadside, sweeping leaf litter; DEBU. – **Heredia** • 1 ♀; 6 km ENE of Vara Blanca; 10°11′ N, 84°07′ W; 2000 m a.s.l.; 11 Mar. 2002; MNCR • 3 ♂♂; Moravia, near border of Braulio Carrillo National Park; 3–4 Mar. 1996; L. Masner leg.; creek bed, yellow pans; MNCR.

ECUADOR – **Napo** • 1 ♂; SierrAzul Lodge, 14 km W of Cosanga; 5 Nov. 1999; S.A. Marshall leg.; QCAZ. – **Pichincha** • 3 ♂♂; 7 km SE of Nanegalito, trout farm ‘San Jose’; 1500 m a.s.l.; 27–30 Oct. 1999; S.A. Marshall leg.; riverine forest, sweeping treefalls; QCAZ • 2 ♂♂; Bellavista Cloud Forest Reserve; 0°01′13″ S, 78°40′30″ W; 2200 m a.s.l.; 1 May 2011; S.A. Marshall leg.; pans near treefall; DEBU • 3 ♂♂, 1 ♀; Bellavista Reserve; 0°00′54″ S, 78°40′56″ W; 2200 m a.s.l.; 1 May 2011; S.A. Marshall leg.; treefall; QCAZ • 1 ♂; Bellavista Reserve; 0°01′13″ S, 78°40′30″ W; 2200 m a.s.l.; 9–13 May 2009; S.A. Marshall leg.; DEBU.

PERU – **Cusco** • 9 ♂♂, 12 ♀♀; Cock-of-the-Rock Lodge, NE Paucartambo; 13°03′18″ S, 71°32′42″ W; 1120 m a.s.l.; 4–9 Nov. 2007; D. Brzoska leg.; flight-intercept trap; DEBU • 5 ♂♂, 7 ♀♀; same data as for preceding; MUSM • 2 ♂♂, 3 ♀♀; Wayqecha Biological Station, ~9 km NE of Challabamba; 13°10′ S, 71°35′ W; 2800 m a.s.l.; 13–15 May 2007; S.A. Marshall leg.; MUSM. – **Junín** • 1 ♂; Pampa Hermosa Lodge, 22 km N of San Ramon; 10°59′18″ S, 75°25′30″ W; 1220 m a.s.l.; 24–27 Nov. 2007; D. Brzoska leg.; flight-intercept trap; DEBU.

Description

Body (Fig. 26A). Length 2.6–3.9 mm. Head dark brown, lower third of frons, frontal vitta, and gena orange; face and antennae orange-brown. Frontal width 2.2–2.3 × frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.4–0.5 × length of posterior. Palpus yellow. Eye large, greatest height about 4.0 × shortest genal height. Thorax dark brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.5 × length of posterior pair) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, fore and hind tibiae darker. Fore femur with 3–4 large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical third. Wing (Fig. 5G) moderately infuscate. CS2 subequal to CS3. Halter brown.

Male abdomen (Figs 26B–C, 27). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.2 × length of S4, posterolaterally long-setose with a short, dark, posteromedial patch of dense setulae flanked by posterior rows of setae. Anterior flange of S6+7 small, 1.3 × as long as wide. Sclerite A large, posteriorly deeply cleft and densely setulose; sclerites B dark, arched; sclerite C absent; sclerite D small, dark, triangular, articulating with sclerite E; sclerite E large, dark, rectangular, and densely setulose posteriorly; sclerite F elongate, articulating with right posterior edge of S5; sclerite G elongate, narrow; ring sclerite small but well sclerotized. Epandrium small, 0.3 × length of S8, height 1.5 × maximum length and 0.8 × maximum width, long-setose, posteroventral corner slightly emarginate; anal fissure rounded; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite very gently curved and medially fused. Subcercus very large, subtriangular in posterior view and rectangular in lateral view, ventral half concave, posterior surface setulose with a small preapical lobe. Hypandrium with long, sinuate anteromedial apodeme. Surstylus stout, subtriangular, basal two-thirds bulging and laterally setose, apical third flattened and blade-like, in line with inner surface of basal part. Postgonite unusually long, longer than distiphallus, very broad, apex truncate with a small anterolateral lobe. Phallapodeme long, sinuate; basiphallus inverted L-shaped, bent at almost a right angle; distiphallus short, largely membranous with a flattened dorsal sclerite and a pair of sinuate ventrolateral sclerites.

Female abdomen (Fig. 28). T7 broad, simple; T8 entire but dorsally desclerotized, giving the appearance of two lateral sclerites, posterolateral corners slightly expanded posteriorly. Epiproct broad but short, posteromedially cleft, and setulose in posterior half. Cercus short, apically pointed with long apical and dorsal setae. S7 broad, posteromedially pointed with four large posterior setae; S8 entirely membranous/absent. Three spermathecae, bulb elongate, cylindrical, very finely striate with deep invaginations on both ends (basal invagination deeper than apical, ends meeting but separate).

Distribution

Neotropical: Bolivia, Costa Rica, Ecuador, Peru.

Remarks

The very large and simple subcerci, distinct from the narrow but complete subanal plate, are distinctive of *Sclerocoelus bucki* sp. nov.; other identifying characters of *S. bucki* include the densely setulose, bilobed genital pouch sclerite A, posteriorly densely setulose sclerite F, and very broad postgonite. Although *Sclerocoelus bucki* ranges from Bolivia north to Costa Rica, most records are from the South American Andes, where we have repeatedly collected it by sweeping over green leaf litter or pan trapping below the still-green foliage of fallen trees. The clade of five species (*S. altus* sp. nov., *S. bucki*, *S. lazulita* sp. nov., *S. penai* sp. nov., and *S. xynos* sp. nov.) to which *S. bucki* belongs is almost entirely Andean and is generally associated with wet plant material in cloud forest or alpine habitats.

Sclerocoelus caligarius sp. nov.

urn:lsid:zoobank.org:act:C0843A0E-3398-4A24-8087-390CA037D5B4

Figs 5H, 29–31

Etymology

This name refers to the boot-shaped male surstylus (from the Latin '*caligarius*', meaning 'of/for a soldier's boot').

Material examined

Holotype

BOLIVIA • ♂; La Paz, Caranavi, 23 km NE of Caranavi; 14 Apr. 2001; S.A. Marshall leg.; roadside/ stream sweep; CBFC debu00165694.

Paratypes

BOLIVIA – **La Paz** • 2 ♂♂, 2 ♀♀; same data as for holotype; CBFC • 3 ♂♂, 1 ♀; same data as for holotype; DEBU.

Description

Body (Fig. 29A). Length 2.9–3.9 mm. Head dark brown, almost black; lunule reddish. Frontal width 2.3 × frontal height. Three pairs of strong interfrontal bristles surmounting a fine fourth pair; anterior orbital 0.5–0.6 × length of posterior. Palpus pale brown. Eye large, greatest height about 3.0 × shortest genal height. Thorax dark brown, scutum with reddish lateral edges. Two pairs of dorsocentral bristles (anterior pair only slightly larger than surrounding acrostichal setulae) separated by 9–10 rows of acrostichal setulae. Membrane around prosternum with 2–3 small, setulae-bearing sclerites. Legs brown, foreleg paler. Fore femur with three large but unusually fine ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae along apical half. Wing (Fig. 5H) hyaline. CS2 0.9 × CS3. Halter brown.

Male abdomen (Figs 29B–C, 30). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 broad, 1.0 × length of S4, anteromedially desclerotized, long setae largely restricted to lateral margins, posteromedially with a darkened lobe bearing 4 setulae and flanked by on either side by 6–7 setae. Anterior flange of S6+7 not developed. Sclerite A pale, fused to S6+7, densely setulose; sclerites B and C apparently absent; sclerite D small, dark, triangular, situated under and to the left of sclerite E; sclerite E larger, triangular with an elongate anterolateral apodeme on right side; sclerites F and G fused, large, with a flattened apodeme extending to left side and a triangular ventral lobe articulating with apodeme of sclerite E; ring sclerite indistinct. Epandrium large, 0.8 × length of S8, height 1.4 × maximum length and 0.7 × maximum width, densely long-setose; perianal pads well developed, triangular, dark with stout spicules, apices fused. Pseudocercus small, connected to epandrium by a thin sclerotized strip, bearing 3 setae; halves of subepandrial sclerite strongly arched, medially fused. Subcercus large, main part triangular and curved inwards with a broad, desclerotized margin along ventral margin; main part with a broad, transverse part articulating with ventrolateral corner of epandrium and other subcercus laying perpendicular to main part. Hypandrium with very large, broad, apically flattened anteromedial apodeme. Surstylus large, yellow, boot-shaped, with a small anteroventral lobe resembling heel of a shoe, margins densely setose but outer surface largely bare and shiny. Postgonite elongate, sinuate with a slight constriction in basal fifth and tapered in apical half. Phallapodeme very large, dark with a large dorsal 'fin', apex flattened; basiphallus stout, slightly curved; distiphallus largely membranous with an M-shaped dorsolateral sclerite (a small dorsal sclerite connected to longer, sinuate lateral sclerites) and a broad ventral sclerite.

Female abdomen (Fig. 31). T7 broad, simple; T8 divided into a broad, pale, dorsal sclerite and two large, dark, lateral sclerites, posterolateral corners greatly expanded to a narrow point. Epiproct large, subrectangular, anteromedially desclerotized, posteromedially emarginate, and entirely setulose. Cercus elongate, apically pointed with stout apical and dorsal setae. S7 broad, subtriangular, broadly desclerotized posteriorly with four large posterior setae; S8 desclerotized, U-shaped, laterally darker. Hypoproct with thickened anteromedial setulae. Three spermathecae, bulb stout, bean-shaped, finely striate with shallow invaginations basally and subapically, both with a small, finger-like, central process.

Distribution

Neotropical: Bolivia.

Remarks

Sclerocoelus caligarius sp. nov. is externally similar to the other members of the *S. galapagensis* group, which possess small sclerites in the membrane around the prosternum. This species can be easily separated from others in the species group by the dark brown head with limited orange on the frons, the posteromedial projection of the male S5, and the long posterolateral projections on the female T8. The holotype and many of the paratypes were collected by sweeping over a roadside ditch and stream at the same locality in the Bolivian Yungas Region as half a dozen congeners (*S. andensis*, S. *binus* sp. nov., *S. brasilensis*, *S. bucki* sp. nov., *S. copiosus* sp. nov., and *S. xynos* sp. nov.). All of these species except for *S. bucki* and *S. xynos* belong to the *S. galapagensis* group.

Sclerocoelus caribensis Marshall, 1997

Sclerocoelus caribensis Marshall, 1997: 102.

Sclerocoelus caribensis – Roháček *et al*. 2001: 249.

Diagnosis

Body length 2.2–2.5 mm. Membrane around prosternum with 2–4 small, setulae-bearing sclerites. Male S5 broad and short, with long posterolateral setae and a posteromedial patch of longer setae (cf. Marshall 1997: fig. 24); perianal pads well developed and dark; surstylus boot-shaped, posteriorly coming to a broad, upcurved point, anteroventrally with a small, triangular lobe (cf. Marshall 1997: figs 25, 28–29); postgonite relatively straight and evenly tapered (cf. Marshall 1997: 27). Female S8 trapezoidal, lateral margins dark, thick, and slightly bent outwards (cf. Marshall 1997: fig. 32).

Material examined

The type specimens deposited in DEBU were examined, as well as the following material:

COSTA RICA – **Alajuela** • 5 ♂♂, 9 ♀♀; San Ramón Biological Station; 700 m a.s.l.; 24–26 Mar. 1996; L. Masner leg.; creek bed, yellow pan trap; DEBU • 1 ♂; San Ramón Biological Station, Arenal Conservation Area; 700 m a.s.l.; 5 Oct. 1995; G. Carballo leg.; yellow pans; DEBU • 145 ♂♂, 180 ♀♀; Volcán Tenorio, Bijagua Biological Station; 700 m a.s.l.; 16 Jun. 2000; M. Buck leg.; sweeping decayed vegetation; DEBU • 1 ♂, 1 ♀; same data as for preceding; 20 Jun. 2000; cut wet field, pans; DEBU • 3 ♀♀; Volcán Tenorio, N slope near Bijagua Biological Station; 700 m a.s.l.; 17 Jun. 2000; S.A. Marshall leg.; rainforest, sweep trail; DEBU • 1 ♂; same data as for preceding; 18 Jun. 2000; sweep over *Atta* mound; DEBU • 5 ♂♂, 11 ♀♀; same data as for preceding; Buck and Marshall leg.; pans in treefall; DEBU • 21 ♂♂, 12 ♀♀; Volcán Tenorio, N slope, trail to laguna; 1000 m a.s.l.; 18 Jun. 2000; S.A. Marshall leg.; sweeping; DEBU. – **Cartago** • 22 ♂♂, 17 ♀♀; Río Grande de Orosí, near Tapantí National Park, 1100–1150 m a.s.l.; 9 Oct. 1999; Marshall and Buck leg.; floodplain and forest; DEBU • 43 ♂♂, 35 ♀♀; same data as for preceding; 10–11 Oct. 1999; bromeliad leaf pile, sweeping and pans; DEBU • 7 ♂♂, 10 ♀♀; Tapantí National Park; 1550 m a.s.l.; 7–12 Oct. 1999; Marshall and Buck leg.; pans in fallen tree; DEBU. – **Guanacaste** • 20 ♂♂, 18 ♀♀; Cacao Field Station; 1100–1200 m a.s.l.; 15 Feb. 1996; S.A. Marshall leg.; MNCR • 14 ♂♂, 4 ♀♀; Cacao Field Station; 20 Feb. 1996; S.A. Marshall leg.; DEBU • 9 ♂♂; Guanacaste Conservation Area, Cacao Field Station; 1200 m a.s.l.; 12 Feb. 1995; S.A. Marshall leg.; sweep; DEBU • 10 ♂♂; Volcán Cacao, SW slope; 1150–1250 m a.s.l.; 12 Feb. 1996; S.A. Marshall leg.; MNCR. – **Heredia** • 2 ♂♂; Braulio Carrillo National Park, Barva Biological Station; 16 Feb. 2003; S.A. Marshall leg.; sweep downed bromeliads; DEBU • 25 ♂♂, 16 ♀♀; Moravia,

near border of Braulio Carrillo National Park; 3–4 Mar. 1996; L. Masner leg.; creek bed, yellow pans; DEBU • 4 ♂♂, 1♀; Santo Domingo, INBio Park; 5–6 Oct. 1999; M. Buck leg.; leaf litter; DEBU • 1 ♂, 1 ♀; same data as for preceding; 6 Oct. 1999; compost; DEBU. – **Limón** • 1 ♀; 4 km NE of Bribri; 50 m a.s.l.; Dec. 1989–Mar 1990; P. Hanson leg.; DEBU. **Puntarenas** • 1 ♂; Area de Conservacion Guanacaste, Pailas Dos; 10°45′46.8″ N, 85°20′2.4″ W; 820 m a.s.l.; 31 May 2018; D. Janzen and W. Hallwachs leg.; moist lowland forest, Malaise trap; BIOUG52325-H05/PLLBA780-20 sequenced for CO1-5'; BIOUG • 26 ♂♂, 39 ♀♀; Monteverde Biological Reserve; 1500 m a.s.l.; 11–13 Jun. 2000; S.A. Marshall leg.; cloud forest; DEBU • 37 ♂♂, 51 ♀♀; same data as for preceding; 14 Jun. 2000; M. Buck leg.; sweeping treefall and trail; DEBU • 136 ♂♂, 185 ♀♀; same data as for preceding; treefall sweep and pans; DEBU • 1 ♀; Monteverde, high pass between Pacific and Atlantic slopes; 10°18′ N, 84°48′ W; 1570 m a.s.l.; 3 Feb. 1986; A. Forsyth leg.; ROME. – **San José** • 1 ♂, 3 ♀♀; San Antonio de Escazu; 1300 m a.s.l.; 4–5 Mar. 1996; L. Masner leg.; creek bed, yellow pans; DEBU • 8 ♂♂, 1 ♀; San Gerardo de Dota, Río Savegre; 2200 m a.s.l.; 19 Mar. 1996; L. Masner leg.; riverbed, yellow pans; DEBU.

CUBA – **Santiago** • 7 ♂♂, 2 ♀♀; Gran Piedra; 25 Nov. 2005; S.A. Marshall leg.; pans near station; DEBU • 5 ♂♂, 20 ♀♀; Gran Piedra, Segundo Chorroito, km 8; 600 m a.s.l.; 7–17 Dec. 1995; S. Peck leg.; forest stream, flight-intercept trap; DEBU.

DOMINICAN REPUBLIC – **Barahona** • 9 ♂♂, 10 ♀♀; 7 km NW of Paraiso; 200 m a.s.l.; 27 Nov.–4 Dec. 1991; Masner and Peck leg.; rainforest remnant, flight-intercept trap; DEBU • 1 ♂, 11 ♀♀; La Ciénega, base of trail to Pico Duarte; 12 Jan. 1989; S.A. Marshall leg.; green leaves/some decay; DEBU • 13 ♂♂; La Ciénega, first hut; 1000 m a.s.l.; 12 Jan. 1989; S.A. Marshall leg.; decaying leaves (green); DEBU • 8 ♂♂, 7 ♀♀; La Ciénega, trail to Pico Duarte; 1200–1400 m a.s.l.; 12 Jan. 1989; S.A. Marshall leg.; sweep (wet); DEBU • 1 ♀; La Ciénega; 1000 m a.s.l.; 12 Jan. 1989; S.A. Marshall leg.; trail sweep and Malaise near hut; DEBU • 1 ♀; La Ciénega; 11–13 Jan. 1989; S.A. Marshall and J.E. Swann leg.; Malaise trap; DEBU • 1 ♂, 1 ♀; same data as for preceding; 11–22 Jan. 1989; DEBU. – **Distrito Nacional** • 1 ♀; Santo Domingo, zoo grounds; 16 Jan. 1989; S.A. Marshall leg.; DEBU. – **La Vega** • 2 ♀♀; Manabao; 22 Jan. 1989; S.A. Marshall leg.; near creek, sweep; DEBU – **Pedernales** • 2 ♂♂; 26 km N of Cabo Rojo; 565 m a.s.l.; 29 Nov.–3 Dec. 1991; Masner and Peck leg.; evergreen dry forest, flight-intercept trap; DEBU • 1 ♂; 28 km N of Cabo Rojo; 760 m a.s.l.; 29 Nov.–3 Dec. 1991; Masner and Peck leg.; evergreen dry forest, flight-intercept trap; DEBU • 5 ♂♂, 2 ♀♀; 60 km NW of Cabo Rojo, Las Abejas; 1200 m a.s.l.; 30 Nov. 1991; Masner and Peck leg.; cloud forest, sweeping; DEBU • Alcoa Road, km 25; 18 Jan. 1989; S.A. Marshall leg.; grass in dry pond; DEBU • 1 ♀; Cabo Rojo, Alcoa Road, km 23–25; 18 Jan. 1989; S.A. Marshall leg.; dry premontane forest; DEBU • 7 ♂♂, 9 ♀♀; Cabo Rojo, Alcoa Road, km 26; 17–20 Jan. 1989; S.A. Marshall and J.E. Swann leg.; flight-intercept trap; DEBU • 11 ♂♂, 24 ♀♀; same data as for preceding; pans; DEBU • 21 ♂♂, 45 ♀♀; Las Abejas cloud forest, 30 km N of Cabo Rojo; 1300 m a.s.l.; 17 Jan. 1989; J.E. Swann leg.; sweep; DEBU • 28 ♂♂, 74 ♀♀; same data as for preceding; S.A. Marshall leg.; DEBU • 9 ♂♂, 8 ♀♀; same data as for preceding; 19 Jan. 1989; J.E. Swann leg.; DEBU • 8 ♂♂, 33 ♀♀; same data as for preceding; S.A. Marshall leg.; DEBU • 1 ♂; 7 ♀♀; Las Abejas cloud forest, 30 km N of Cabo Rojo; 17 Jan. 1989; J.E. Swann leg.; sweep at sink hole; DEBU • 1 ♀; Las Abejas, near Cabo Rojo; 17 Jan. 1989; S.A. Marshall leg.; on litter; DEBU • 39 ♂♂, 61 ♀♀; Sierra de Baoruca, "Las Abejas" Valley; 1300 m a.s.l.; 17 Jan. 1989; L. Masner; cloud forest; DEBU. **Puerto Plata** • 1 ♂; Puerto Plata; 23 Jan. 1989; S.A. Marshall leg.; sweep over muddy trail; DEBU.

ECUADOR – **Pichincha** • 4 ♂♂, 2 ♀♀; 3.5 km SE of Tandayapa; 28 Oct. 1999; S.A. Marshall leg.; in green leaf litter (treefall); DEBU • 1 ♀; Bellavista Cloud Forest Reserve; 0°01′13″ S, 78°40′30″ W; 2200 m a.s.l.; 9–13 May 2009; S.A. Marshall leg.; DEBU.

GUYANA – **Potaro–Siparuni** • 1 ♀; Tukeit Creek on E side Potaro River, downstream Tukeit Falls; 91 m a.s.l.; 26–30 Sep. 1990; B. Hobley and L.D. Coote leg.; 1° rainforest, Malaise–coarse; ROME.

HONDURAS – **Cortés** • 1 ♂; Cusuco National Park; 5 Jan. 1995; R. Cordiro leg.; Malaise trap; DEBU. – **El Paraíso** • 3 ♂♂, 6 ♀♀; Cerro Montserrat; 1800 m a.s.l.; 24 May 1994; H. Howden leg.; Malaise trap; DEBU. – **Francisco Morazán** • 4 ♂♂, 1 ♀; Cerro Uyuca, 1800 m a.s.l.; 27 May 1994; H. Howden leg.; Malaise trap; DEBU • 2 ♂♂, 5 ♀♀; Uyuca, San Antonio; 23 Jan. 1995; R. Cordiro leg.; flight-intercept trap; DEBU • 2 ♂♂, 6 ♀♀; same data as for preceding; 6 Feb. 1995; DEBU • 1 ♀; same data as for preceding; 13 Feb. 1995; DEBU. – **Olancho** • 7 ♂♂, 4 ♀♀; La Muralla National Park; 15°05′49″ N, 86°44′17″ W; 1450 m a.s.l.; 4–7 Jul. 2002; Smith and Ocampo leg.; flight-intercept trap; DEBU.

MEXICO – **Chiapas** • 1 ♀; 8 km SE of Salto de Agua; 17°30′58″ N, 92°18′05″ W; 100 m a.s.l.; 14 Jun. 2008; wet forest edge, Malaise trap; UVGC • 1 ♀; 15 km E of San Cristóbal; 16°44′40″ N, 92°29′34″ W; 2460 m a.s.l.; 31 May 2008; R.S. Anderson leg.; wet oak/magnolia forest, sifted leaf litter; DEBU • 1 ♀; Sierra Morena; 16°09′36″ N, 93°36′20″ W; 1360 m a.s.l.; 13 May 2008; 2° mesophyll forest, Malaise trap; UVGC. – **San Luis Potosí** • 1 ♀; 20 km W of Xilitla; 1600 m a.s.l.; 12 Jun.–6 Aug. 1983; S. and J. Peck leg.; cloud forest, flight-intercept trap; DEBU. – **Sinaloa** • 1 ♂; 24 km W of El Palmito; 1524 m a.s.l.; 30 Jul. 1964; W.R.M. Mason leg.; CNCI.

PERU – **Cusco** • 1 ♀; Cock-of-the-Rock Lodge, NE of Paucartambo; 13°03′18″ S, 71°32′42″ W; 1120 m a.s.l.; 4–9 Nov. 2007; D. Brzoska leg.; flight-intercept trap; DEBU. – **Junín** • 1 ♀; Pampa Hermosa Lodge, 22 km N of San Ramon; 10°59′18″ S, 75°25′30″ W; 1220 m a.s.l.; 24–27 Nov. 2007; D. Brzoska leg.; flight-intercept trap; DEBU.

PUERTO RICO – **Río Grande** • 2 ♂♂; El Verde Research Station; 400–500 m a.s.l.; 31 Jan. 1989; S.A. Marshall leg.; tabanuco-palm forest; DEBU • 16 ♂♂, 31 ♀♀; El Verde; 3 Feb. 1989; S.A. Marshall leg.; sweep near biological station road; DEBU • 4 ♀♀; El Verde; 550 m a.s.l.; 1–3 Feb. 1989; S.A. Marshall leg.; bamboo, flight-intercept trap; DEBU • 1 ♂; El Yunque Recreational Area, Highway 191; 600 m a.s.l.; 1 Feb. 1989; S.A. Marshall leg.; landslide; DEBU • 3 ♂♂, 4 ♀♀; El Yunque Trail; 4 Feb. 1989; S.A. Marshall leg.; dwarf forest, sweep along road; DEBU • 2 ♀♀; near El Yunque Tabanuco, forest off Highway 191, "Big tree trail"; 5 Feb. 1989; S.A. Marshall leg.; DEBU.

SAINT KITTS & NEVIS – **Saint Kitts** • 1 ♀; Wingfield Mountain; 400 m a.s.l.; 1–30 Nov. 1985; L.D. Coote leg.; old field/forest; DEBU.

VENEZUELA – **Aragua** • 2 ♀♀; Colonia Tovar; 2300 m a.s.l.; 10 Mar. 1995; S.A. Marshall leg.; DEBU • 2 ♂♂, 1 ♀; El Limon, Pozo del Diablo; 570 m a.s.l.; 13 Apr. 1994; L. Masner leg.; DEBU • 2 ♂♂; Henri Pittier National Park, 6 km N of Rancho Grande Biological Station; 28 Feb. 1995; S.A. Marshall leg.; sweep along stream; DEBU • 1 ♀; Henri Pittier National Park, 9 km N of Maracay, Choroni Road; 1000 m a.s.l.; 7 Mar. 1995; S.A. Marshall leg.; sweep along creek; DEBU • 3 ♂♂, 13 ♀♀; Henri Pittier National Park, 12 km W of Maracay, on Choroni Road; 1290 m a.s.l.; 7 Mar. 1995; S.A. Marshall leg.; DEBU • 1 ♀; Henri Pittier National Park, La Trilla; 200 m a.s.l.; 11 Apr. 1994; L. Masner leg.; DEBU • 13 ♂♂, 20 ♀♀; Henri Pittier National Park, Maracay–Choroni Highway, km 19; 1330 m a.s.l.; 15 Apr. 1994; L. Masner leg.; creek; DEBU • 3 ♂♂, 3 ♀♀; Henri Pittier National Park, Maracay–Choroni Highway, km 32; 100 m a.s.l.; 15 Apr. 1994; L. Masner leg.; forest; DEBU • 1 ♀; Henri Pittier National Park, near Rancho Grande; 1100–1200 m a.s.l.; 19–20 Jan. 1996; J. and A. Skevington leg.; DEBU • 8 ♂♂, 28 ♀♀; Henri Pittier National Park, Rancho Grande, La Toma trail; 9 Apr. 1994; L. Masner leg.; DEBU • 2 ♀♀; Maracay, Rancho Grande Biological Station; 1250 m a.s.l.; 5 Mar. 1995; S.A. Marshall leg.; sweep trail; DEBU • 1 ♀; Rancho Grande Biological Station; 1–9 Mar. 1995; S.A. Marshall; near station; DEBU • 1 ♀; Rancho Grande; 12–30 Dec. 1987; M. Sanborne leg.; Malaise inter.; DEBU. – **Trujillo** • 6 ♀♀; 10 km E of Bocono, Laguna de Lucerdo; 1760 m a.s.l.; 3

Mar. 1995; S.A. Marshall leg.; slash/compost; DEBU • 1 ♀; Bocono, road to Guaramacal; 2130 m a.s.l.; 2 Mar. 1995; S.A. Marshall leg.; sweep mud; DEBU • 3 ♀♀; Bocono–Guaramacal Road; 2130 m a.s.l.; S.A. Marshall leg.; sweep wet litter; DEBU • 2 ♂♂, 8 ♀♀; Guaramacal National Park, 14 km NE of Bocono; 2000 m a.s.l.; 25 Aug.–1 Sep. 1992; L. Masner leg.; DEBU.

Distribution

Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador*, El Salvador, Guatemala, Guyana*, Honduras*, Jamaica, Mexico, Peru*, Puerto Rico, Saint Kitts & Nevis, Venezuela.

Sclerocoelus chilensis sp. nov.
urn:lsid:zoobank.org:act:12116740-67B2-4A52-BCB6-A6E1F4C79981
Figs 5I, 32–33

Etymology

This name reflects the apparent restriction of this species to Chile, where it is the only known species of *Sclerocoelus*.

Material examined

Holotype

CHILE • ♂; Valparaíso, Portillo, Río Juncalillo; 32°50′58″ S, 70°07′59″ W; 2500 m a.s.l.; 10 Dec. 2008; Kits and Marshall leg.; stream vegetation; MNNC debu00310625.

Paratype

CHILE – **Valparaíso** • 1 ♂; same data as for holotype; DEBU debu00310638.

Description

Body (Fig. 32A). Length 3.0–3.1 mm. Head dark brown, ventrolateral corners of frons orange; gena slightly reddish. Frontal width 2.5 × frontal height. Three pairs of strong interfrontal bristles surmounting a fine fourth pair; anterior orbital 0.4–0.5 × length of posterior. Palpus yellow. Eye reduced, greatest height about 2.0 × shortest genal height. Thorax dark brown, scutum with slightly paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.5 × length of posterior pair) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum darkened but bare. Legs brown, femora apically and tibiae basally paler. Fore femur with 3–4 large ventral preapical setae. Dorsal surface of mid tibia lacking small anterior seta in distal half. Ventral surface of male mid tibia with two rows of stout setae along apical half. Wing (Fig. 5I) slightly infuscate. CS2 subequal to CS3. Halter brown.

Male abdomen (Figs 32B–C, 33). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 broad, asymmetrical, medially 1.0 × length of S4, left side reduced anteriorly and posteriorly, setose in posterior half with a short, darkened, setulose posteromedial patch. Anterior flange of S6+7 not developed. Sclerite A large, rectangular, setulose; sclerite B very large and flat, curved to right side and laying parallel to S5; sclerite C triangular, fused to right extension of S6+7, situated over and to the left of sclerite D+E; sclerites D and E fused, triangular, posteriorly split with a slight overlap of apices; sclerite F large, setulose with a dark, sinuate apodeme on left side; sclerite G large, bulging, broadly fused to right side of sclerite F; ring sclerite well developed. Epandrium large, 0.8 × length of S8, height 1.4 × maximum length and 0.7 × maximum width, uniformly long-setose; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite broad, strongly arched, and medially fused. Subcercus large, basal half broad in posterior view and angled anteroventrally in lateral view, apical half flattened in posterior view, tapered and angled posteroventrally in lateral view. Hypandrium with thin, sinuate anteromedial apodeme.

Surstylus large, triangular, long-setose with a blade-like, inner anterobasal lobe and a curved, preapical, posterodorsal emargination. Postgonite large, strongly sinuate, and evenly tapered. Phallapodeme very large with a short dorsal 'fin'; basiphallus stout and connected to distiphallus by a neck-like distal part; distiphallus short, largely membranous with a broad, sinuate dorsal sclerite and a pair of sinuate lateral sclerites.

Female abdomen. Female unknown.

Distribution

Neotropical: Chile.

Remarks

Sclerocoelus chilensis sp. nov. is one of two species that has a darkened membrane around the prosternum, the other being *S. rectangularis*. *Sclerocoelus chilensis* can be readily separated from *S. rectangularis* by its smaller eye, smaller epandrium with an ovoid anal fissure, subtriangular subcercus, and bilobed genital pouch sclerite D. *Sclerocoelus chilensis*, the southernmost species of the genus, is known from small deposits of plant material along a stream in an otherwise dry and barren alpine landscape. An apparent restriction to the moist microhabitat created by bits of vegetation along high Andean streams or similar high elevation microhabitats is a characteristic of several related species, including *S. lutosus* sp. nov., *S. punensis* sp. nov., and *S. tridens* sp. nov.

Sclerocoelus copiosus sp. nov.
urn:lsid:zoobank.org:act:01A777A8-0CFC-46B5-90F6-D739DF37B0D2
Figs 1B, 5J, 34–36

Etymology

The species name (from the Latin '*copiosus*', meaning 'copious, abundant') reflects the abundance of this very widespread Neotropical species, especially in Malaise trap and flight-intercept trap samples from Costa Rica. Approximately 24% of the Neotropical *Sclerocoelus* specimens in the University of Guelph Insect Collection belong to this species.

Material examined

Holotype

COSTA RICA • ♂; Puntarenas, Monteverde Reserve; 1500 m a.s.l.; 15–20 Aug.1986; L. Masner leg.; MNCR.

Paratypes

COSTA RICA – **Alajuela** • 5 ♂♂, 5 ♀♀; Quesada, Albergue Pozo Verde; 1800 m a.s.l.; 10°15′15.1″ N, 84°22′18.4″ W; 21 Apr. 2023; S.A. Marshall leg.; from refuse pile under *Eciton burchellii* bivouac; DEBU • 5 ♂♂, 6 ♀♀; same data as for preceding; MNCR • 2 ♂♂, 1 ♀; same data as for preceding; W. Porras leg.; MNCR. – **Cartago** • 1 ♂; Paraiso, Tapantí National Park; 9°43′21″ N, 83°46′30″ W; 1600 m a.s.l.; 28 Jul.–4 Aug. 2013; Proyecto ZADBI leg.; Malaise trap; MNCR • 1 ♂, 1 ♀; Tapantí National Park; 1650–1750 m a.s.l.; 7 Oct.1999; S.A. Marshall leg.; trail sweep; MNCR • 2 ♀♀; Tapantí National Park, above Ranger Station; 1250 m a.s.l.; 12 Oct. 1999; S.A. Marshall leg.; trail/road sweep; DEBU • 2 ♀♀; Tapantí National Park, Arboles Caídos trail; 1300 m a.s.l.; 9–11 Oct. 1999; S.A. Marshall leg.; sweep; MNCR • 7 ♂♂; Tapantí National Park, near west entrance, trail to hydro tower/ creek, 1150 m a.s.l.; 11 Oct. 1999; Marshall and Buck leg.; sweep; DEBU • 10 ♂♂; same data as for preceding; MNCR • 28 ♂♂, 15 ♀♀; Tapantí National Park, outside near west entrance; 1150 m a.s.l.; 8–9 Oct.1999; Marshall and Buck leg.; trail, sweep, DEBU • 30 ♂♂, 18 ♀♀; same data as for preceding;

MNCR • 3 ♀♀; Tapantí National Park, Ranger Station; 1200 m a.s.l.; 7–11 Oct.1999; M. Buck leg.; pans in kitchen refuse; DEBU. – **Puntarenas** • 3 ♂♂, 4 ♀♀; same data as for holotype; MNCR • 6 ♂♂; Las Alturas Biological Station; 8°57′ N, 82°58′ W; 1500–1700 m a.s.l.; 12–14 Aug. 1995; S.A. Marshall leg.; DEBU • 6 ♂♂; same data as for preceding; MNCR • 2 ♂♂, 1 ♀; Monteverde Biological Reserve; 1500 m a.s.l.; 14 Jun. 2000; M. Buck leg.; sweeping treefall and trail; MNCR • 16 ♂♂, 10 ♀♀; Monteverde Biological Reserve; 1500 m a.s.l.; 14 Jun. 2000; M. Buck leg.; treefall, sweep and pans; DEBU • 16 ♂♂, 15 ♀♀; same data as for preceding; MNCR. – **San José** • 7 ♂♂, 5 ♀♀; Moravia, Zurquí de Moravia, Creek 2 north; 10°02′58″ N, 84°00′57″ W; 1600 m a.s.l.; 12–19 Apr. 2013; Proyecto ZADBI leg.; Malaise trap #2; MNCR • 5 ♂♂, 1 ♀; same data as for preceding; 19–26 Apr. 2013; MNCR • 1 ♂; same data as for preceding; 13–20 Sep. 2013; MNCR • 1 ♂; Moravia, Zurquí de Moravia, Tower path; 10°02′58″ N, 84°00′57″ W; 1600 m a.s.l.; 28 Feb.–8 Mar. 2013; Proyecto ZADBI leg.; Malaise trap #1, 0 m.; MNCR • 1 ♂; same data as for preceding; 26 Apr.–3 May 2013; MNCR • 2 ♂♂, 4 ♀♀; same data as for preceding; 30 Aug.–6 Sep. 2013; MNCR • 1 ♀; same data as for preceding; 11–18 Oct. 2013; MNCR.

Other material examined

BOLIVIA – **La Paz** • 20 ♂♂, 18 ♀♀; 0.5 km SE of Coroico; 16°11′ S, 67°44′ W; 15 Apr. 2001; S.A. Marshall leg.; DEBU • 1 ♂; 10 km NW of Caranavi, road to ENTEL tower; 15°46′35″ S, 67°35′48″ W; 1400 m a.s.l.; 13 Apr. 2001; S.A. Marshall leg.; DEBU • 7 ♂♂, 5 ♀♀; 23 km NE of Caranavi; 14 Apr. 2001; S.A. Marshall leg.; roadside/stream, sweep; DEBU • 12 ♂♂, 1 ♀; Chulumani, Apa-Apa Reserve; 16°21′15″ S, 67°30′21″ W; 2000 m a.s.l.; 1 Apr. 2001; S.A. Marshall leg.; sweep; DEBU.

COSTA RICA – **Alajuela** • 1 ♂; La Virgen del Socorro, near Carriblanca; 700 m a.s.l.; 16 Feb. 1989; Grimaldi and DeVries leg.; AMNH • 1 ♂, 2 ♀♀; Río Peñas Blancas; 700 m a.s.l.; 18 Jul. 1986; L. Masner leg.; CNCI • 1 ♀; Volcán Tenorio, Bijagua Biological Station; 700 m a.s.l.; 20 Jun. 2000; M. Buck leg.; cut wet field, pan traps; DEBU. – **Cartago** • 3 ♂♂, 2 ♀♀; Braulio Carrillo National Park; 500 m a.s.l.; 10 Apr. 1985; L. Masner leg.; rainforest; CNCI • 63 ♂♂, 52 ♀♀; Braulio Carrillo National Park; 1400–1500 m a.s.l.; 11 Apr. 1985; H. Goulet and L. Masner leg.; cool moist river bed, Selva Premontana; CNCI • 1 ♂, 1 ♀; Highway 2, km 67; 6 Aug. 1995; S.A. Marshall leg.; roadside; DEBU • 2 ♂♂; Río Grande de Orosí, near Tapantí National Park; 1100–1150 m a.s.l.; 9 Oct. 1999; Marshall and Buck leg.; floodplain and forest; DEBU • 1 ♂, 4 ♀♀; same data as for preceding; 10–11 Oct. 1999; bromeliad leaf pile, sweeping and pans; DEBU • 22 ♂♂, 10 ♀♀; Río Macho Forest Reserve; 2200 m a.s.l.; 10 Oct. 1999; S.A. Marshall leg.; sweeping; DEBU • 1 ♂, 3 ♀♀; Tapantí National Park; 1550 m a.s.l.; 7–12 Oct. 1999; Marshall and Buck leg.; pans in fallen tree; DEBU • 13 ♂♂, 3 ♀♀; Tapantí National Park; 1650 m a.s.l.; 7 Oct. 1999; S.A. Marshall leg.; trail sweep; DEBU • 46 ♂♂, 20 ♀♀; Tapantí National Park; 1650–1750 m a.s.l.; 7 Oct. 1999; M. Buck leg.; sweep trail; DEBU • 37 ♂♂, 21 ♀♀; same data as for preceding; S.A. Marshall leg.; sweep trail; DEBU • 33 ♂♂; Tapantí National Park, above Ranger Station; 1250 m a.s.l.; 12 Oct. 1999; S.A. Marshall leg.; sweep trail/road; DEBU • 1 ♂; Tapantí National Park, Arboles Caídos trail; 1200 m a.s.l.; 4 Oct. 1999; Marshall and Buck leg.; trail sweep; DEBU • 3 ♂♂; same data as for preceding; 1300 m a.s.l.; 9/11 Oct. 1999; S.A. Marshall leg.; sweep; DEBU • 1 ♂, 1 ♀; Tapantí National Park, near Catarata trail; 1450 m a.s.l.; 4 Oct. 1999; S.A. Marshall leg.; roadside, sweeping leaf litter; DEBU • 97 ♂♂, 34 ♀♀; Tapantí National Park, near west entrance, trail to hydro tower/creek; 1150 m a.s.l.; 11 Oct. 1999; Marshall and Buck leg.; sweeping; DEBU • 7 ♂♂, 2 ♀♀; Tapantí National Park, outside near west entrance; 1150 m a.s.l.; 8–9 Oct. 1999; Marshall and Buck leg.; sweep trail; DEBU • 2 ♂♂, 1 ♀; Tapantí National Park, Ranger Station; 1200 m a.s.l.; 9–12 Oct. 1999; Buck and Marshall leg.; human dung, hand and traps; DEBU • 4 ♂♂; same data as for preceding; 7–11 Oct. 1999; M. Buck leg.; pans in kitchen refuse; DEBU • 1 ♂, 2 ♀♀; Tapantí National Park, road near represa [dam]; 1650 m a.s.l.; 8 Oct. 1999; M. Buck leg.; fallen tree; DEBU • 1 ♀; Tapantí National Park, trail to hydro tower near west entrance; 1150 m a.s.l.; 9–12 Oct. 1999; M. Buck leg.; pan traps; DEBU. – **Heredia** • 3 ♀♀; 6 km ENE of Vara Blanca; 10°11′ N, 84°07′ W;

2000 m a.s.l.; 13 Feb. 2002; DEBU • 4 ♂♂, 3 ♀♀; same data as for preceding; 21 Feb. 2002; DEBU • 4 ♂♂, 2 ♀♀; same data as for preceding; 20 Mar. 2002; DEBU • 6 ♂♂, 1 ♀; 16 km SSE of La Virgen; 10°16′ N, 84°05′ W; 1050–1150 m a.s.l.; 11–20 Feb. 2001; transect; DEBU • 49 ♂♂, 79 ♀♀; Moravia, near border of Braulio Carrillo National Park; 3–4 Mar. 1996; L. Masner leg.; creek bed, yellow pans; DEBU • 1 ♀; Santo Domingo, INBio Park; 9°58′23″ N, 84°05′30″ W; 6–7 Mar. 1996; L. Masner leg.; urban, yellow pans; DEBU. – **Puntarenas** • 119 ♂♂, 257 ♀♀; same data as for holotype; CNCI • 9 ♂♂, 3 ♀♀; 2000 m a.s.l.; 12 Aug. 1995; S.A. Marshall leg.; DEBU • 4 ♀♀; Las Alturas Biological Station; 8°57′ N, 82°58′ W; 1500–1700 m a.s.l.; 12–14 Aug. 1995; S.A. Marshall leg.; DEBU • 8 ♂♂, 2 ♀♀; Las Alturas Biological Station; 1550 m a.s.l.; 17 Aug. 1995; T. Pape leg.; DEBU • 28 ♂♂, 13 ♀♀; Las Alturas; 1500 m a.s.l.; 12 Aug. 1995; S.A. Marshall leg.; sweep forest-pasture margin; DEBU • 8 ♂♂, 2 ♀♀; same data as for preceding; 1500–1700 m a.s.l.; 12 Aug. 1995; sweep; DEBU • 5 ♂♂, 6 ♀♀; same data as for preceding; 1600 m a.s.l.; 11–14 Aug. 1995; Malaise trap; DEBU • 7 ♂♂, 3 ♀♀; same data as for preceding; 14 Aug. 1995; DEBU • 6 ♂♂, 11 ♀♀; same data as for preceding; 15 Aug. 1995; ground *Eciton* raid; DEBU • 1 ♂; same data as for preceding; swept over dung; DEBU • 1 ♂, 1 ♀; same data as for preceding; 2000 m a.s.l.; 15 Aug. 1995; treefall; DEBU • 1 ♀; Las Alturas, trail to Cerro Chai; 1700–2100 m a.s.l.; 13–15 Aug. 1995; S.A. Marshall leg.; DEBU • 1 ♀; Las Alturas, summit of Cerro Chai; 2100 m a.s.l.; 11–17 Aug. 1995; T. Pape leg.; DEBU • 23 ♂♂, 16 ♀♀; Monteverde Biological Reserve; 1500 m a.s.l.; 13 Jun. 2000; S.A. Marshall leg.; DEBU • 91 ♂♂, 52 ♀♀; same data as for preceding; 11–13 Jun. 2000; cloud forest; DEBU • 1 ♂, 1 ♀; same data as for preceding; 12–13 Jun. 2000; M. Buck leg.; pans along stream; DEBU • 3 ♂♂, 1 ♀; same data as for preceding; 13–14 Jun. 2000; DEBU • 85 ♂♂, 59 ♀♀; same data as for preceding; 11 Jun. 2000; sweep; DEBU • 1 ♀; same data as for preceding; on log over trail; DEBU • 5 ♂♂, 1 ♀; same data as for preceding; 12 Jun. 2000, S.A. Marshall leg.; on dung; DEBU • 9 ♀♀, 5 ♂♂; same data as for preceding; 26 May 1998; sweep; DEBU • 11 ♂♂, 33 ♀♀; same data as for preceding; 14 Jun. 2000; M. Buck leg.; sweeping treefall and trail; DEBU • 56 ♂♂, 67 ♀♀; same data as for preceding; treefall, sweep and pans; DEBU • 13 ♂♂, 9 ♀♀; same data as for preceding; 18 Mar. 1996; L. Masner leg.; along creek, yellow pans; DEBU • 2 ♂♂, 5 ♀♀; same data as for preceding; 12 Jun. 2000; M. Buck leg.; white pans in kitchen compost; DEBU • 1 ♂, 6 ♀♀; same data as for preceding; 13 Jun. 2000; DEBU • 2 ♂♂, 1 ♀; Monteverde Biological Station, lower trail; 26 May 1998; S.A. Marshall leg.; DEBU • 28 ♂♂, 88 ♀♀; Monteverde Reserve; 1500 m a.s.l.; Feb. 1980; W. Mason leg.; cloud forest; CNCI • 11 ♂♂, 26 ♀♀; Monteverde Reserve; 1550 m a.s.l.; 15–20 Jul. 1986; L. Masner leg.; CNCI • 1 ♂, 1 ♀; Monteverde; 10°18′ N, 84°48′ W; 1539 m a.s.l.; 24 Feb.–2 Mar. 1988; B. Hubley leg.; 1° tropical cloud forest, pan traps; ROME • 1 ♂, 1 ♀; Monteverde; 1500 m a.s.l.; 11–18 Jul. 1983; D. Lindeman leg.; fruit pitfall; CNCI • 2 ♂♂; Monteverde, 1500 m a.s.l.; 20 Feb. 1980; D.M. Wood; CNCI • 1 ♂; Monteverde; 1500 m a.s.l.; 24 Feb. 1991; B.J. Sinclair leg.; DEBU • 2 ♂♂, 9 ♀♀; Monteverde; 1500 m a.s.l.; 29 Feb. 1980; W.R. Mason leg.; cloud forest; CNCI • 3 ♂♂, 2 ♀♀; Monteverde; 1500 m a.s.l.; 4–11 Feb. 1989; D. Grimaldi leg.; lower montane wet forest; AMNH • 1 ♂, 4 ♀♀; Monteverde; 1500 m a.s.l.; 29 Feb. 1980; Mason and Wood leg.; rainforest; CNCI • 1 ♂, 1 ♀; Monteverde; 1500–1600 m a.s.l.; 24 Feb. 1991; B.J. Sinclair leg.; sweeping trails; DEBU • 4 ♂♂, 3 ♀♀; same data as for preceding; 1500–1800 m a.s.l.; 24–27 Feb. 1991; DEBU • 2 ♀♀; Monteverde; 1520 m a.s.l.; 11–18 Jun. 1983; D. Lindeman leg.; flight-intercept trap; CNCI • 1 ♀; Monteverde; 1700–1800 m a.s.l.; 23–27 Feb. 1991; B.J. Sinclair leg.; yellow pan traps; DEBU • 1 ♂; Monteverde; 1800 m a.s.l.; 25 Feb. 1991; B.J. Sinclair leg.; guava clearing; DEBU • 11 ♂♂, 7 ♀♀; Monteverde; 25 Feb. 1991; H. and A. Howden leg.; flight-intercept trap; DEBU • 45 ♂♂, 96 ♀♀; same data as for preceding; 27 Feb. 1991; DEBU • 1 ♂; Monteverde; 26 May 1998; S.A. Marshall leg.; forest, emergence trap; DEBU • 1 ♂, 2 ♀♀; Monteverde, Finca Canada; 1500 m a.s.l.; 5 Jun. 1988; B.V. Brown leg.; primary forest; DEBU • 1 ♂, 5 ♀♀; Monteverde, high pass between Pacific and Atlantic slopes; 10°18′ N, 84°48′ W; 1570 m a.s.l.; 3 Feb. 1986; A. Forsyth leg.; ROME • 3 ♂♂, 1 ♀; Monteverde, Pension Quetzal; 10°18′ N, 84°49′ W; 24 May 1987; A. Norrbom leg.; on human dung; USNM • 9 ♂♂, 1 ♀; Monteverde, near Biological Station; 25 May 1998; S.A. Marshall leg.; sweep; DEBU • 1 ♀; Monteverde, Twin Falls Trail; 1500 m a.s.l.; 26 Feb. 1991; B.J. Sinclair leg.; DEBU • 1 ♂,

1 ♀; San Gerardo; 1200 m a.s.l.; 15 Dec. 1994; D.C. Caloren leg.; sweep in banana grove; DEBU. – **San José** • 13 ♂♂, 8 ♀♀; Highway 2, km 68; 6 Aug. 1995; D.C. Caloren leg.; around *Sphagnum* bog/ponds, sweeping; DEBU • 2 ♀♀; San Carlos, Cerro Cura, 14 km SSW of San Marcos de Tarrazú; 9°36′31″ N, 84°07′09″ W; 1800 m a.s.l.; 24 Feb. 2006; S.A. Marshall leg.; cloud forest; DEBU • 1 ♂, 1 ♀; San Gerardo de Dota; 2000 m a.s.l.; 9 Aug. 1995; S.A. Marshall leg.; stream in pasture near lodge; DEBU • 1 ♀; San Gerardo de Dota, upper trail in forest; 2400–2600 m a.s.l.; 7–9 Aug. 1995; S.A. Marshall leg.; DEBU • 1 ♂; San Gerardo de Dota; 2500 m a.s.l.; 10 Aug. 1995; S.A. Marshall leg.; sweep wet trail; DEBU • 5 ♂♂, 6 ♀♀; San Gerardo de Dota; 9°33′ N, 83°48′ W; 9 Aug. 1995; S.A. Marshall leg.; roadside, sweep; DEBU • 51 ♂♂, 23 ♀♀; San Gerardo de Dota, 9 Aug. 1995; S.A. Marshall leg.; disturbed area near river, sweep; DEBU • 9 ♂♂, 3 ♀♀; San Gerardo de Dota, near Lodge; 9°33′ N, 83°48′ W; 2000 m a.s.l.; 9 Aug. 1995; S.A. Marshall leg.; stream in pasture, sweep; DEBU • 3 ♀♀; San Gerardo de Dota, Río Savegre; 2200 m a.s.l.; 19 Mar. 1996; L. Masner leg.; river bed, yellow pans; DEBU • 3 ♀♀; San José, compost pile behind Hotel Bougainvillea; 6 Aug. 1995; S.A. Marshall leg.; DEBU • 7 ♂♂, 4 ♀♀; Zurquí de Moravia; 1600 m a.s.l.; Mar. 1981; P. Hanson leg.; DEBU • 1 ♂; same data as for preceding; Feb. 1989; MNCR • 1 ♂, 1 ♀; same data as for preceding; May 1989; Malaise trap; MNCR • 4 ♂♂, 2 ♀♀; same data as for preceding; May 1991; MNCR.

ECUADOR – **Napo** • 1 ♂, 1 ♀; 4.8 km W of El Chaco; 1750 m a.s.l.; 7 Nov. 1999; S.A. Marshall leg.; DEBU • 7 ♂♂, 2 ♀♀; 5 km N of El Chaco; 15 Feb. 1983; M.J. Sharkey leg.; Malaise trap and wet net; CNCI • 10 ♂♂, 18 ♀♀; Baeza; 1500 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; wet montane rainforest, Malaise trap; DEBU • 4 ♀♀; same data as for preceding; ROME • 4 ♂♂, 8 ♀♀; Baeza; 1550 m a.s.l.; 15–19 May 1987; L.D. Coote and B.V. Brown leg.; wet montane rainforest/pasture, Malaise trap off stone trail; ROME • 6 ♂♂, 3 ♀♀; Baeza; 1700 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; wet montane rainforest/pasture near small creek, Malaise head; ROME • 1 ♂, 3 ♀♀; Baeza, W along road; 1500 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; montane rainforest/pasture, Malaise trap; DEBU • 7 ♂♂; El Chaco; 2000 m a.s.l.; 15–23 Feb. 1983; L. Masner and M. Sharkey leg.; Malaise trap; CNCI • 1 ♀; Tena; 500 m a.s.l.; 21–27 May 1987; L.D. Coote and B.V. Brown leg.; secondary rainforest, Malaise trap; ROME. – **Pichincha** • 33 ♂♂, 31 ♀♀; 3.5 km SE of Tandayapa; 28 Oct. 1999; S.A. Marshall leg.; in green leaf litter (treefall); debu00116093/MYCRO1028-22 sequenced for CO1-5'; DEBU • 1 ♂, 1 ♀; 7 km SE of Nanegalito, trout farm 'San José'; 1500 m a.s.l.; 30–31 Oct. 1999; S.A. Marshall leg.; river edge, pan taps; DEBU • 8 ♂♂, 7 ♀♀; same data as for preceding; 27–30 Oct. 1999; riverine forest, sweep treefalls; DEBU • 1 ♀; 7 km SE of Nanegalito, trout farm 'San José'; 27 Oct. 1999; S.A. Marshall leg.; on logs/sweep; DEBU • 2 ♂♂, 2 ♀♀; Maquipucuna Biological Reserve; 1200 m a.s.l.; 29 Oct. 1999; S.A. Marshall leg.; river trail, sweep; DEBU • 5 ♂♂; Tandapi; 1300–1700 m a.s.l.; 21 Jun. 1965; L. Peña leg.; CNCI.

PANAMA – **Chiriquí** • 10 ♂♂, 7 ♀♀; Las Lagunas, 4.5 km SW of Hato del Volcan; 2550 m a.s.l.; 1–8 Jun. 1977; S. and J. Peck leg.; sweeps; DEBU • 3 ♂♂, 3 ♀♀; Hartmann's Finca; 1700 m a.s.l.; 28 Jun.–3 Jul. 1981; B. Gill leg.; DEBU.

PERU – **Cusco** • 1 ♂; Cock-of-the-Rock Lodge, NE Paucartambo; 13°03′18″ S, 71°32′42″ W; 1120 m a.s.l.; 4–9 Nov. 2007; D. Brzoska leg.; flight-intercept trap; DEBU.

VENEZUELA – **Aragua** • 1 ♂; Colonia Tovar; 2300 m a.s.l.; 10 Mar. 1995; S.A. Marshall leg.; DEBU • 1 ♀; Henri Pittier National Park, 6 km N of Rancho Grande Biological Station; 28 Feb. 1995; S.A. Marshall leg.; sweep along stream; DEBU • 15 ♂♂, 7 ♀♀; Henri Pittier National Park, 12 km N of Maracay on Choroni Road; 1290 m a.s.l.; 7 Mar. 1995; S.A. Marshall leg.; DEBU • 44 ♂♂, 26 ♀♀; Henri Pittier National Park, Maracay–Choroni Highway, km 19; 1330 m a.s.l.; 15 Apr. 1994; L. Masner leg.; creek; DEBU • 4 ♂♂; same data as for preceding; km 32, forest; DEBU • 1 ♀; Henri Pittier National Park, near Rancho Grande; 1100–1200 m a.s.l.; 19–20 Jan. 1996; J. and A. Skevington leg.;

DEBU • 4 ♂♂; Henri Pittier National Park, Rancho Grande Biological Station, above Portachuelo Pass; 1400 m a.s.l.; 27 Feb. 1995; S.A. Marshall leg.; DEBU • 1 ♂; Henri Pittier National Park, Rancho Grande Biological Station; May 1998; Ashe, Brooks and Hanley leg.; SEMC • 17 ♂♂, 13 ♀♀; Henri Pittier National Park, Rancho Grande; 1500 m a.s.l.; 3 Sep. 1992; L. Masner leg.; DEBU • 3 ♂♂, 5 ♀♀; Henri Pittier National Park, Rancho Grande, La Toma trail; 1100 m a.s.l.; 17 Apr. 1994; L. Masner leg.; DEBU • 78 ♂♂, 8 ♀♀; same data as for preceding; 9 Apr. 1994; DEBU • 1 ♀; same data as for preceding; 9–10 Apr. 1994; yellow pan traps; DEBU • 1 ♀; Henri Pittier National Park, Rancho Grande, Portachuelo Pass; 1400 m a.s.l.; 27 Feb. 1995; S.A. Marshall leg.; DEBU • 23 ♂♂, 11 ♀♀; same data as for preceding; 9 Apr. 1994; L. Masner leg.; DEBU • 3 ♀♀; same data as for preceding; 10 Apr. 1994; Malaise trap; DEBU • 2 ♂♂; Henri Pittier National Park, trail along Rancho Grande; 1225 m a.s.l.; 22–25 Jan. 1996; J. and A. Skevington leg.; Malaise trap in forest opening; CNCI • 6 ♂♂; Maracay, Rancho Grande Biological Station, Portachuelo Pass; 1400 m a.s.l.; 27 Feb. 1995; S.A. Marshall leg.; DEBU • 1 ♀; Maracay, Rancho Grande Biological Station; 8 Mar. 1995; S.A. Marshall leg.; sweep near station; DEBU • 1 ♂, 3 ♀♀; Rancho Grande Biological Station; 10°21′ N, 67°41′ W; 1200 m a.s.l.; 14 May 1998; Ashe, Brooks and Hanley leg.; flight-intercept trap; SEMC • 2 ♂♂; Rancho Grande Biological Station; 1–9 Mar. 1995; S.A. Marshall leg.; near station; DEBU • 1 ♀; Rancho Grande National Park; 1100 m a.s.l.; 18 Aug.–3 Oct. 1992; L. Masner leg.; cloud forest, maxinet; DEBU • 16 ♂♂, 6 ♀♀; Rancho Grande; 26 Feb. 1989; D.A. Grimaldi leg.; AMNH • 1 ♀; Rancho Grande, 2–30 Dec. 1987; M. Sanborne leg.; Malaise trap "Inter."; DEBU • 1 ♀; Rancho Grande, La Cumbre cloud forest; 1–10 Aug. 1987; Borden and Peck leg.; flight-intercept trap; DEBU. – **Lara** • 1 ♂; Yacambú; 1200 m a.s.l.; 7 May 1981; H. Townes leg.; cloud forest; CNCI. – **Mérida** • 1 ♀; Los Chorros; 2300 m a.s.l.; 5 May 1988; S.A. Marshall leg.; wet leaves; DEBU • 6 ♂♂; Mérida, "Fac." Forest; 1800 m a.s.l.; 11 May 1981; L. Masner leg.; old coffee plantation; CNCI. – **Trujillo** • 2 ♂♂, 2 ♀♀; 10 km E of Bocono, Laguna de Lucerdo; 1760 m a.s.l.; 3 Mar. 1995; S.A. Marshall leg.; slash/compost; DEBU • 2 ♀♀; same data as for preceding; sweep; DEBU • 2 ♀♀; Bocono, road to Guaramacal; 2130 m a.s.l.; 2 Mar. 1995; S.A. Marshall leg.; sweep mud; DEBU • 2 ♀♀; Bocono–Guaramacal Road; 2130 m a.s.l.; S.A. Marshall leg.; sweep wet litter; DEBU • 15 ♂♂, 45 ♀♀; Guaramacal National Park, 14 km NE of Bocono; 2000 m a.s.l.; 25 Aug.–1 Sep. 1992; L. Masner leg.; DEBU • 1 ♀; Guaramacal National Park; 2000–3000 m a.s.l.; 26 Aug.–1 Sep. 1992; L. Masner leg.; car net; DEBU • 16 ♂♂, 10 ♀♀; Mosquey near Bocono; 1500 m a.s.l.; 24 Aug. 1992; L. Masner leg.; coffee plantation, maxinet; DEBU.

Description

Body (Fig. 34A). Length 2.2–3.8 mm. Head brown, lower quarter of frons orange; face, gena, and antennae orange-brown. Frontal width 2.4–2.6× frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.6–0.7× length of posterior. Palpus yellow. Eye large, greatest height about 4.0× shortest genal height. Thorax dark brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair only slightly larger than surrounding acrostichal setulae) separated by 8–9 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, mid tarsomeres paler. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical quarter. Wing (Fig. 5J) slightly infuscate. CS2 0.8–0.9× CS3. Halter caramel brown.

Male abdomen (Figs 34B–D, 35). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 2.0× as long as S4, densely long-setose on posterior third, with a dark, asymmetrically triangular, posteromedial patch of very dense setulae flanked by desclerotized areas. Anterior flange of S6+7 1.5× as long as wide. Sclerite A delineated from S6+7 by a thin dark line; sclerite B reduced; sclerite C elongate and twisted, extending to base of sclerite F; sclerite D well sclerotized and somewhat triangular; sclerite E and F large and overlapping, both tapered but sclerite E bilobed mesially; sclerite G large and well sclerotized; ring sclerite small and weakly sclerotized. Epandrium large, 0.9× length of S8, height 1.5× maximum

length and 0.7× maximum width, uniformly setose with pointed inner posteromedial lobes; posterior third of epandrium separated from anterior two-thirds by a deep lateral groove extending halfway up epandrium; perianal pads weakly developed but densely setulose. Pseudocercus small and separate from epandrium with three long setae; halves of subepandrial sclerite reduced to a pair of arches fused medially forming an M-shape and articulating basally with inner part of subcercus; subcercus divided into two separate pieces, inner part large, anterodorsally projecting into arches of subepandrial sclerite and tapered posteroventrally to an elongate point; outer part of subcercus rounded and articulating with surstylus and pseudocercus. Hypandrium with anteromedial apodeme elongate with two small posterior lobes. Surstylus bilobed, anterior lobe triangular and curled inwards slightly, posterior lobe quadrate and setose. Postgonite small, curved anteriorly, and abruptly tapered apically. Phallapodeme very large with a tall dorsal 'fin'; basiphallus stout, with two large lateral plates, divergent basally and distally fused with trunk-like, anteriorly bent epiphallus; distiphallus largely membranous, reduced to a broad, distally bifurcate dorsal sclerite and a pair of small ventral sclerites.

Female abdomen (Fig. 36). T7 dark and broad with a small posteromedial notch; T8 entire but strongly desclerotized dorsally, appearing as only two lateral plates, posteroventral corners elongate and pointed. Epiproct bare and shining except for a small setulose posteromedial area. Cercus short and rounded with a long preapical seta and a smaller dorsal seta. S7 dark, semicircular with a posteromedial point and four large posterior setae; S8 reduced to two small lateral plates, usually concealed under lateroventral parts of T8. Two spermathecae, bulb spherical and finely striate with an apical invagination.

Distribution

Neotropical: Bolivia, Brazil, Costa Rica, Ecuador, Panama, Peru, Venezuela.

Remarks

Sclerocoelus copiosus sp. nov. is closely related to *S. elephas* sp. nov. and *S. tantus* sp. nov., which also have a long, trunk-like epiphallus, but differs by the bare membrane around the prosternum. Additionally, the distinctively elongated posteroventral corners of the female T8 and characteristic male surstylus allow for easy identification of even pinned specimens. *Sclerocoelus copiosus* is one of the most commonly collected species of *Sclerocoelus* in cloud forest habitats (1000–2000 m) of Central and South America, and it is among the most abundant acalyptrate species in flight intercept and Malaise trap samples in some parts of Costa Rica. It is frequently collected with other species of the *S. galapagensis* group.

Sclerocoelus costaricensis sp. nov.

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Figs 6A, 37–39

Etymology

This name reflects the apparent restriction of this species to Costa Rica, where it is widespread.

Material examined

Holotype

COSTA RICA • ♂; Alajuela, Volcán Tenorio, north slope, trail to laguna; 1000 m a.s.l.; 18 Jun. 2000; S.A. Marshall leg.; sweeping; MNCR.

Paratypes

COSTA RICA – **Alajuela** • 7 ♂♂, 1 ♀; same data as for holotype; DEBU • 7 ♂♂, 1 ♀; same data as for holotype; MNCR • 4 ♂♂, 2 ♀♀; Volcán Tenorio, north slope near Bijagua Biological Station; 700 m a.s.l.;

16–20 Jun. 2000; S.A. Marshall leg.; raised emergence trap over *Atta* mound; DEBU • 13 ♂♂, 4 ♀♀; same data as for preceding; 17 Jun. 2000; rainforest, trail sweep; DEBU • 4 ♂♂, 1 ♀; same data as for preceding; 18 Jun. 2000; sweeping trail; MNCR • 21 ♂♂, 9 ♀♀; same data as for preceding; sweep over *Atta* mound; DEBU • 22 ♂♂, 10 ♀♀; same data as for preceding; MNCR • 1 ♂, 1 ♀; same data as for preceding; 18–20 Jun. 2000; pans between cut leaves; DEBU • 7 ♂♂, 8 ♀♀; same data as for preceding; 18 Jun. 2000; Buck and Marshall leg.; pans in treefall; DEBU • 7 ♂♂, 8 ♀♀; same data as for preceding; MNCR • 5 ♂♂, 4 ♀♀; same data as for preceding; 19 Jun. 2000; MNCR • 5 ♂♂, 3 ♀♀; Volcán Tenorio, north slope, trail to laguna; 800–900 m a.s.l.; 18 Jun. 2000; M. Buck leg.; rainforest, sweep; DEBU • 6 ♂♂, 3 ♀♀; same collection data as preceding; MNCR. – **Cartago** • 1 ♂; Tapantí National Park, near west entrance, trail to hydro tower/creek; 1150 m a.s.l.; 11 Oct. 1999; Marshall and Buck leg.; sweep; DEBU • 1 ♂; Tapanti National Park, outside near west entrance; 1150 m a.s.l.; 8–9 Oct. 1999; Marshall and Buck leg.; trail sweep; MNCR. – **Guanacaste** • 1 ♂; Guanacaste National Park, Pitilla Station, 9 km S of Santa Cecilia; 700 m a.s.l.; 14 Feb. 1996; S.A. Marshall leg.; MNCR. – **Heredia** • 2 ♂♂; 6 km ENE of Vara Blanca; 10°11′ N, 84°07′ W; 2000 m a.s.l.; 21 Feb. 2002; DEBU • 1 ♂; Moravia, near border of Braulio Carrillo National Park; 3–4 Mar. 1996; L. Masner; creek bed, yellow pans; CNCI. – **Puntarenas** • 2 ♂♂; Braulio Carrillo National Park; 1400–1500 m a.s.l.; 11 Apr. 1985; H. Goulet and L. Masner leg.; cool moist riverbed, Selva Premontana; MNCR • 3 ♂♂; Las Alturas; 1500–1700 m a.s.l.; 12 Aug. 1995; S.A. Marshall leg.; sweep; MNCR • 1 ♂; Las Alturas; 1600 m a.s.l.; 15 Aug. 1995; S.A. Marshall leg.; ground *Eciton* raid; DEBU • 1 ♂; Monteverde Biological Station; 1500 m a.s.l.; 26 May 1998; S.A. Marshall leg.; sweep; DEBU • 1 ♀; Monteverde Biological Station; 1500 m a.s.l.; 13 Jun. 2000; M. Buck leg.; white pans in kitchen compost; MNCR • 1 ♂; Monteverde; 23–27 Feb. 1991; B.J. Sinclair; CNCI.

Description

Body (Fig. 37A). Length 1.9–2.6 mm. Head dark brown, lower third of frons orange; face, gena, and antennae orange-brown. Frontal width 2.2–2.3 × frontal height. Two pairs of strong interfrontal bristles surmounting a fine third pair; anterior orbital 0.5–0.6 × length of posterior. Palpus orange. Eye very large, greatest height about 4.5 × shortest genal height. Thorax dark brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair only slightly larger than surrounding acrostichal setulae) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs yellow, fore and mid tibiae slightly darker. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical quarter. Wing (Fig. 6A) slightly infuscate. CS2 0.7–0.8 × CS3. Halter brown.

Male abdomen (Figs 37B–C, 38). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.9 × length of S4, deeply emarginate anteromedially, laterally sparsely setose with dark, square patch of dense setulae flanked by pale setose areas, and a dark, triangular, posteromedial lobe. Anterior flange of S6+7 very large, 1.2 × as long as wide, longer than S5. Sclerite A long, narrow; sclerite B broad, short, continuous with pigmented area of sclerite A; sclerite C absent; sclerite D narrow, with a short base extending along left side of posteromedial lobe of S5, and a posterior lobe similar in size and shape to sclerite E; sclerite E long but broad, flat; sclerite F large, basal part subquadrate with an elongate, apicoventral process on left side; sclerite G narrow, sinuate, slightly flattened; ring sclerite thin but dark. Epandrium small, 0.5 × length of S8, height 1.3 × maximum length and 0.7 × maximum width, uniformly setose; anal fissure rounded; perianal pads weakly developed. Pseudocercus fused to subcercus and bearing 3 setae; halves of subepandrial sclerite thin, strongly arched, expanded and broadly fused medially. Subcercus small, subtriangular with a short, narrow, posteroventral process. Hypandrium with short, thin anteromedial apodeme. Surstylus simple, circular in lateral view with basal constriction, outer surface finely setulose and flat, inner surface setose with a broad, carinate, basal

lobe. Postgonite simple, flattened, slightly curved anteriorly. Phallapodeme large, apex dorsoventrally flattened; basiphallus small, with a short, dorsoventrally flattened, triangular epiphallus; distiphallus reduced, very short but very broad, with a pair of thin dorsolateral sclerites and a broad ventral sclerite.

Female abdomen (Fig. 39). T7 broad, simple, desclerotized anteromedially and posteromedially; T8 divided into a pale, dorsal sclerite and two large, dark, lateral sclerites, posterolateral corners greatly expanded, strongly pointed, and curved ventrally. Epiproct large, subtriangular, medially desclerotized, and setulose in posterior two-thirds. Cercus elongate, curved, apically rounded with long apical, dorsal, and apicoventral setae. S7 broad, subrectangular with four large posterior setae; S8 broad, rectangular, desclerotized, with darker lateral thirds. Hypoproct with thickened ventromedial setulae. Three spermathecae, bulb stout, somewhat conical, finely striate with a shallow basal and a deep subapical invagination, both with a small, finger-like, central process.

Distribution

Neotropical: Costa Rica.

Remarks

Sclerocoelus costaricensis sp. nov. is superficially very similar to the closely related *S. dasysternum* sp. nov., but differs by the darker gena, larger eye (~4.5× genal height), longer second costal sector (0.7–0.8× length of third), and single dark posteromedial patch of setulae on the male S5. *Sclerocoelus costaricensis*, a member of the mostly Central American *S. dasysternum* group, is one of four endemic Costa Rican *Sclerocoelus* species and one of 17 *Sclerocoelus* species known from Costa Rica. Six other members of the *S. dasysternum* group occur in Costa Rica. Several of the specimens listed above were collected in association with leafcutter ant nests, where they probably developed in the colony's refuse deposits.

Sclerocoelus cubus sp. nov.
urn:lsid:zoobank.org:act:E907D635-A5B2-42BD-9B40-5A9B6BBB836A
Figs 6B, 40–41

Etymology

This name (from the Latin '*cubus*', meaning 'cube') refers to the very distinctive cube-shaped male epandrium.

Material examined

Holotype

ECUADOR • ♂; Pichincha, Cotopaxi National Park, Quebrada Mishahuaycu; 3600 m a.s.l.; 26 Oct.–8 Nov. 1999; S.A. Marshall leg.; along stream, pan traps; QCAZ debu00139226.

Paratypes

ECUADOR – **Carchi** • 1 ♂; Bosque El Arrayán, 6 km E of San Gabriel; 2830 m a.s.l.; 1 Nov. 1999; S.A. Marshall leg.; sweeping; DEBU • 1 ♂; same data as for preceding; 2–4 Nov. 1999; forest, dung traps; QCAZ • 1 ♂; Páramo El Angel, 14.1 km NW of El Angel; 3450 m a.s.l.; 1 Nov. 1999; S.A. Marshall leg.; under *Polylepis* litter; QCAZ. – **Pichincha** • 2 ♂♂; same data as for holotype; DEBU • 1 ♂; Lago Limpiopungo; 3800 m a.s.l.; 25 Oct. 1999; S.A. Marshall leg.; lake edge, pans near cow dung; DEBU • 3 ♂♂; Valley near Hostería San Jorge, 10 km NW of Quito; 3000 m a.s.l.; 23 Oct. 1999; S.A. Marshall leg.; pans in grass pile; QCAZ.

PERU – **Cusco** • 1 ♂; 6.6 km S of Paucartambo; 13°22′49″ S, 71°36′17″ W; 3400 m a.s.l.; 13–16 May 2007; Marshall, Kits and Paiero leg.; along creek, yellow pans; MUSM.

Description

Body (Fig. 40A). Length 2.6–3.4 mm. Head dark brown, ventrolateral corners of frons reddish. Frontal width 2.2–2.3 × frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.5–0.6 × length of posterior. Palpus yellow. Eye large, greatest height about 3.5 × shortest genal height. Thorax dark brown, scutum with slightly paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.5 × length of posterior pair) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, hind tibia darker. Fore femur with five large ventral preapical setae. Dorsal surface of mid tibia with an offset pair of setae at about ⅓, a large anterior seta at about ½, and a pair of large setae at about ⅘. Ventral surface of male mid tibia with two rows of stout setae along apical half. Wing (Fig. 6B) slightly infuscate. CS2 0.8–0.9 × CS3. Halter brown.

Male abdomen (Figs 40B–C, 41). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 large, deeply emarginate anteromedially, laterally long-setose, huge flattened posteromedial area filled with blunt, peg-like setae and some scattered longer setae, anteromedial-most peg seta in an eye-like depression. Anterior flange of S6+7 large, triangular, 1.2 × as long as wide. Sclerite A pale, rounded, fused to S6+7; sclerite B dark, elongate, arched inwards and basally fused to sclerite A; sclerite C apparently absent; sclerite D dark, triangular, projecting dorsally; sclerites E and F fused, very large, dark, sheet-like; sclerite G reduced; ring sclerite small but well sclerotized. S8 large, flattened dorsally. Epandrium small, boxy (dorsal, lateral, and posterior surfaces almost at right angles to each other), 0.5 × length of S8, height 1.7 × maximum length and 0.7 × maximum width, long-setose; anal fissure very large, circular; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite arched, medially fused. Subcercus large, wedge-shaped, triangular in posterior view, sinuate rectangular in lateral view, apex deeply bifid (similar in appearance to a very high-heeled shoe/boot), outer-posterior lobe expanded with three inner setae, inner-anterior lobe tapered and curved with some sensory setulae. Hypandrium with slightly sinuate anteromedial apodeme. Surstylus C-shaped, anterior lobe smaller, angled inwards with several inner setulae, posterior lobe much larger and curved outwards. Postgonite elongate, gently tapered, basal third with a short, triangular, anterior lobe, apical third slightly bent forward. Phallapodeme very large, dark, curved; basiphallus large, stout basally and constricted apically with a small, node-like anterodorsal ejaculatory apodeme; distiphallus strongly sinuate, largely membranous with a pair of strong, sinuate ventrolateral sclerites, anterior surface of membrane densely spiculose.

Female abdomen. Female unknown.

Distribution

Neotropical: Ecuador, Peru.

Remarks

Sclerocoelus cubus sp. nov. is superficially similar to *S. frigidifrons* sp. nov., from which it can be separated by the slightly smaller size (2.6–3.4 mm), larger eye (~3.5 × genal height), and very characteristic male genitalia. Like other basal species of the genus, *Sclerocoelus cubus* is a high Andean species associated with wet, green litter, generally above 3000 m a.s.l.

Sclerocoelus dasysternum sp. nov.
urn:lsid:zoobank.org:act:8F711293-B3B8-4325-9CDE-8D85F2B3DFB9
Figs 6C, 42–44

Etymology

The species name (from the Greek '*dasus*', meaning 'hairy, shaggy') refers to the additional tuft of setulae anterior to the posteromedial patch of setulae found on the male S5.

Material examined

Holotype

COSTA RICA • ♂; Guanacaste, Cacao Field Station; 1000–1100 m a.s.l.; 12–15 Feb. 1996; S.A. Marshall leg.; carrion traps; MNCR.

Paratypes

COSTA RICA – **Alajuela** • 1 ♂; Volcán Tenorio, N slope near Bijagua Biological Station; 700 m a.s.l.; 18 Jun. 2000; S.A. Marshall leg.; MNCR. – **Cartago** • 1 ♂; La Suiza; P. Schild leg.; USNM. – **Guanacaste** • 1 ♂; Maritza; 15–17 Feb. 1996; S.A. Marshall leg.; dung pan; DEBU • 1 ♂, 1 ♀; SW of Faldas, Volcán Cacao; 1250–1350 m a.s.l.; 12 Feb. 1996; S.A. Marshall leg.; MNCR. – **Puntarenas** • 2 ♂♂, 2 ♀♀; 6 km ENE of Vara Blanca; 10°11′ N, 84°07′ W; 2000 m a.s.l.; 21 Feb. 2002; transect; DEBU • 2 ♂♂, 1 ♀; same data as for preceding; MNCR • 2 ♂♂; Monteverde; 1520 m a.s.l.; 18–25 Jun. 1983; D.H. Lindeman leg.; flight-intercept trap; DEBU • 2 ♂♂; Monteverde; 26 May 1998; S.A. Marshall leg.; sweep near Biological Station; MNCR. – **San José** • 1 ♀; Moravia, Zurquí de Moravia; 10°02′58″ N, 84°00′57″ W; 1600 m a.s.l.; 12–18 Sep. 2012; Proyecto ZADBI leg.; Malaise trap #2; MNCR • 1 ♀; same data as for preceding; 24 Sep. 2012; creek river 2, pan light trap; MNCR.

GUATEMALA – **Suchitepéquez** • 1 ♂; 4 km S of Volcán Atitlán; 14°32′57″ N, 91°11′26″ W; 1625 m a.s.l.; 15 Jun. 2009; cloud forest, sifted leaf litter; UVGC.

HONDURAS – **Olancho** • 1 ♂; La Muralla National Park; 15°05′49″ N, 86°44′17″ W; 1450 m a.s.l.; 4–7 Jul. 2002; Smith and Ocampo leg.; flight-intercept trap; CNCI.

PANAMA – **Chiriquí** • 1 ♂; Hartmann's Finca; 1700 m a.s.l.; 28 Jun.–3 Jul. 1981; B. Gill leg.; DEBU.

TOBAGO – **Eastern Tobago** • 1 ♂; Charlotteville, Man-o-war Bay cottages; 26–31 Jun. 1993; S. and J. Peck leg.; littoral rainforest, UV light; DEBU.

Other material examined

COSTA RICA – **Guanacaste** • 1 ♂; Area de Conservacion Guanacaste, Pailas Dos; 10°45′39.6″ N, 85°20′06.0″ W; 791 m a.s.l.; 31 May 2018; D. Janzen and W. Hallwachs leg.; moist lowland forest, Malaise trap; BIOUG58387-C07/PLIDC254-20 sequenced for CO1-5'; BIOUG.

Description

Body (Fig. 42A). Length 2.4–2.8 mm. Head brown, lower half of frons, face, gena, and antennae yellow. Frontal width 2.2–2.3 × frontal height. Two pairs of strong interfrontal bristles surmounting a fine third pair; anterior orbital 0.4–0.5 × length of posterior. Palpus yellow. Eye large, greatest height about 3.5 × shortest genal height. Thorax brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4 × length of posterior pair) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum bare. Legs yellow, hind leg slightly darker. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical quarter. Wing (Fig. 6C) slightly infuscate. CS2 0.5–0.6 × CS3. Halter pale brown.

Male abdomen (Figs 42B–C, 43). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.2× length of S4, sparsely setose, slightly emarginate anteromedially with a dark, distally tapered, slightly bulging patch of dense setulae flanked by pale setose areas. Anterior flange of S6+7 large, 0.8× as long as wide. Sclerite A small, pale; sclerite B reduced, arched and fused to sclerite A; sclerite C reduced; sclerite D club-shaped, associated with inner posterior margin of S5; sclerite E well sclerotized, elongate, curved and slightly tapered; sclerite F large, subquadrate and laterally concave, left side with an elongate apicoventral process; sclerite G dark with a prominent, ridge-like process connecting to sclerite F; ring sclerite small, dark. Epandrium small, 0.5× length of S8, height 1.3× maximum length and 0.8× maximum width, uniformly setose; anal fissure elongate; perianal pads weakly developed. Pseudocercus large, pale, bearing three setae and fused to posteroventral corners of epandrium; halves of subepandrial sclerite strongly arched, slightly flattened, and completely separate. Subcercus short but deep, subtriangular in posterior view, ventrally with a narrow, dark process, anterior part narrowed and carinate dorsally. Hypandrium with narrow anteromedial apodeme. Surstylus subquadrate, rounded, laterally setulose, ventrally setose, inner surface with anterodorsal lobe and a dark, bifurcate carina on dorsal half near middle. Postgonite short, broadened posteriorly into a broad triangle with a small, apical digitate process. Phallapodeme large, apex spoon-shaped; basiphallus small, slightly elongate with a flattened, triangular epiphallus; distiphallus reduced, largely membranous with a pair of pale Y-shaped lateral sclerites.

Female abdomen (Fig. 44). T7 broad, simple; T8 divided into a small, pale, dorsal sclerite and two dark, lateral sclerites, posterolateral corners elongate and pointed. Epiproct broad, ovoid, medially split and entirely setulose. Cercus elongate, pointed with long apical and dorsal setae. S7 large, broad, posteriorly desclerotized with four large posterior setae; S8 well developed, deeply emarginate anteromedially, almost divided. Hypoproct with thick ventromedial setulae. Three spermathecae, bulb stout, bean-shaped, moderately striate with deep invaginations at apex and insertion point of duct (perpendicular to apex), both invaginations with a finger-like, central process.

Distribution

Neotropical: Costa Rica, Guatemala, Honduras, Panama, Tobago.

Remarks

Sclerocoelus dasysternum sp. nov. is superficially very similar to the closely related *S. costaricensis* sp. nov., but differs by the yellow gena, smaller eye (~3.5× genal height), shorter second costal sector (0.5–0.6× length of third), and two dark posteromedial patches of setulae on the male S5. *Sclerocoelus dasysternum*, a member of the mostly Central American *S. dasysternum* group, is one of four endemic Costa Rican *Sclerocoelus*.

Sclerocoelus dominicensis sp. nov.

urn:lsid:zoobank.org:act:E1B2E330-F92F-4B17-80F5-067F2C3BDD39

Figs 6D, 45–46

Etymology

This name reflects the apparent restriction of this species to the island of Dominica.

Material examined

Holotype

DOMINICA • ♂; Clarke Hall Estate; 3 Jun. 1966; G. Steyskal leg.; USNM.

Paratypes

DOMINICA • 3 ♂♂; same data as for holotype; USNM • 1 ♂; Clark Hall Estate; 2 Jun. 1966; G. Steyskal leg.; USNM • 2 ♂♂; Clarke Hall Estate; 4 Jun. 1966; G. Steyskal leg.; USNM • 1 ♂; Clarke Hall Estate; 11–20 Mar. 1965; W.W. Wirth leg.; USNM • 1 ♂; Clarke Hall Estate; 13 May 1966; G. Steyskal leg.; USNM • 1 ♀; South Chiltern Estate; 20 Feb. 1965; W.W. Wirth leg.; USNM.

Description

Body (Fig. 45A). Length 1.8–2.5 mm. Head brown, lower third of frons orange; face, gena, and antennae orange-brown. Frontal width 2.4–2.5 × frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.6–0.7 × length of posterior. Palpus yellow. Eye large, greatest height about 3.5 × shortest genal height. Thorax brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4 × length of posterior pair) separated by 8–9 rows of acrostichal setulae. Membrane around prosternum bare. Legs yellow, mid and hind femora slightly darker. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical quarter. Wing (Fig. 6D) hyaline. CS2 0.7–0.8 × CS3. Halter pale brown.

Male abdomen (Figs 45B–C, 46). Dark brown, tergites reddish medially, posterior edges of tergites slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.1 × as long as S4, right side longer than left side, posterolaterally long setose with a very large desclerotized medial area (extending almost to anterior edge), a large, dark, rectangular, medial patch of dense but fine setulae, and a large, dark, anvil-shaped posteromedial sclerite. Anterior flange of S6+7 1.5 × as long as wide; S6+7 completely separated from completely from S8. Sclerite A small, lightly sclerotized; sclerite B well developed and long, normally arched into genital pouch; sclerite C absent; sclerite D well sclerotized and L-shaped; sclerite E small, fitting into a depression in distal half of large sclerite F; sclerite G small, about as large as ring sclerite; ring sclerite well sclerotized. Epandrium large, 0.4 × length of S8, height 1.4 × maximum length and 0.8 × maximum width, uniformly long-setose; perianal pads weakly developed but densely setulose. Pseudocercus very small, bearing only a single seta; halves of subepandrial sclerite short and narrow, swollen where they contact subcercus and very weakly fused medially. Subcercus large and shield-like with small lobes articulating with surstylus and epandrium, apex truncate. Hypandrium with long anteromedial apodeme. Surstylus very large and broad, twice as long as deep, concave, with dense lateral setae and a setose inner basal ridge (ridge entire). Postgonite relatively short, angulate, concave ventrally, apex swollen with prominent ridges. Phallapodeme large, gradually broadened towards apex; basiphallus expanded posterodorsally with a notched central lobe and a pair of rounded, downturned lateral lobes, basal part extending ventrally as an apically flared tube-like section which articulates with distiphallus; distiphallus largely reduced with a broad dorsal sclerite and a narrow, U-shaped ventral sclerite.

Female abdomen. T7 broad, posteromedially shortened; T8 divided into a small, pale dorsal sclerite and two dark lateral sclerites with angulate posteroventral corner. Epiproct small, pale, and posteromedially setulose. Cercus narrow and elongate with a large apical seta and a moderate preapical seta. S7 rounded posteriorly; S8 reduced to two dark, ovoid lateral sclerites. Three spermathecae, single one larger than paired ones, bulb bean-shaped and smooth with a slight basal invagination.

Distribution

Neotropical: Dominica.

Remarks

Sclerocoelus dominicensis sp. nov. is morphologically very similar to *S. irregularis* sp. nov., *S. pararegularis* sp. nov., and *S. regularis*, from which it differs in having an apically truncate subcercus;

females of these species seem to be indistinguishable. *Sclerocoelus dominicensis* is one of six species known from the Caribbean, the other five being the very widespread *S. caribensis*, *S. rectangularis* (Malloch, 1914), *S. regularis* (which occurs in Trinidad), *S. dasysternum* sp. nov., and *S. vulgatus* sp. nov. (which both occur in Tobago). All ten specimens of *S. dominicensis* were collected during the Bredin-Archbold-Smithsonian Biological Survey of Dominica. The female abdomen is not illustrated here as the abdomen of the only known female specimen is damaged.

Sclerocoelus dryadalis sp. nov.
urn:lsid:zoobank.org:act:79EE3E5A-F45D-4EE8-BFAF-6A30EBAF78FD
Figs 6E, 47–49

Etymology

This name refers to the elfin forest in the type locality (from the Latin '*dryadalis*', meaning 'elf').

Material examined

Holotype

VENEZUELA • ♂; Mérida, Sierra Nevada National Park, Laguna Negra; 4000 m a.s.l.; 28–30 Aug. 1992; L. Masner leg.; elfin forest, yellow pan traps; DEBU.

Paratypes

VENEZUELA – **Mérida** • 6 ♂♂, 8 ♀♀; same data as for holotype; DEBU • 1 ♂; Páramo de Mucuchies, Paseo de Aguila; 3740 m a.s.l.; 21 May 1998; R. Anderson leg.; dead leaves under *Espeletia schultzi*; DEBU.

Description

Body (Fig. 47A). Length 3.1–4.9 mm. Head dark brown, ventrolateral corners of frons and gena orange-brown; face brown. Frontal width 2.3–2.4× frontal height. Three pairs of strong interfrontal bristles surmounting a fine fourth pair; anterior orbital 0.5–0.6× length of posterior. Palpus pale brown. Eye reduced, greatest height about 2.2× shortest genal height. Thorax brown, scutum with slightly paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4× length of posterior pair) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, hind femur paler. Fore femur with three large ventral preapical setae. Dorsal surface of mid tibia with three setae in proximal half (one small and one large anterior and one large posterior) and four setae in distal half (one small and one large anterior, one small dorsal, and one large posterior). Ventral surface of male mid tibia with two rows of stout setae along apical third. Wing (Fig. 6E) slightly infuscate. CS2 0.8–0.9× CS3. Halter pale brown.

Male abdomen (Figs 47B–C, 48). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 broad, 0.8× length of S4, uniformly long-setose, posterior margin pale with a heart-shaped darker posteromedial patch. Anterior flange of S6+7 not developed. Sclerite A bare, bulging ventrally from S6+7; sclerite B dark, arched into genital pouch; sclerite C apparently absent; sclerites D and E fused, dark, triangular with emarginate apex; sclerite F large, rounded with an elongate posterior apodeme on left side; sclerite G large, bulging; ring sclerite well developed, partially fused to posterior surface of sclerite G. Epandrium small, 0.4× length of S8, height 2.0× maximum length and 0.7× maximum width, densely setose; perianal pads weakly developed. Pseudocercus fused between epandrium and subcercus, bearing 3 setae; halves of subepandrial sclerite dark, only slightly curved and completely separated. Subcercus large, wedge-shaped, posterior surface with 3 setae, apical half expanded in lateral view, apex with a small posterior extension. Hypandrium with very thin anteromedial apodeme. Surstylus large, as tall

as epandrium, leaf-shaped with a triangular anterobasal lobe, outer surface convex and densely setose, inner surface concave with some setae around edges. Postgonite elongate, relatively simple, gradually expanded, apical half with a shallow dorsal groove, apex truncate. Phallapodeme elongate, slightly sinuate; basiphallus elongate, slightly curved, expanded apically; distiphallus almost flower-shaped: basal half sclerotized and tubular, apical half largely membranous and flared outwards.

Female abdomen (Fig. 49). T7 broad, simple with two rows of setae, posterior setae longer; T8 divided into a pale, dorsal sclerite and two large, dark, lateral sclerites, posterolateral corners slightly expanded and rounded, posteromedially desclerotized. Epiproct large, subrectangular, medially split and posteromedially desclerotized, and posteromedially setulose. Cercus elongate, apically rounded with long apical, dorsal, and apicoventral setae. S7 broad, posteromedially expanded with 6–8 large posterior setae; S8 entirely membranous. Hypoproct entirely setulose. Three spermathecae, bulb elongate, cylindrical, finely striate with a deep basal and a shallow apical invagination, both with a small, finger-like, central process.

Distribution

Neotropical: Venezuela.

Remarks

Sclerocoelus dryadalis sp. nov. is similar to the closely related but strongly brachypterous *S. flavus* sp. nov. and *S. meridensis* sp. nov., sharing long, scoop-like surstyli, short but wide male S5s, and apically expanded distiphallus. *Sclerocoelus dryadalis* can be easily separated from these other two species by the fully developed wings and much broader gena. This species, like other basal lineages of the genus, is a high Andean species and is known only from Venezuelan elfin forests at about 4000 m a.s.l.

Sclerocoelus elephas sp. nov.

urn:lsid:zoobank.org:act:A297C0D2-4881-43C8-A4D4-1B03C751A4F4

Figs 6F, 50–52

Etymology

This name refers to the elephant trunk-like epiphallus (from the Latin '*elephas*', meaning 'elephant').

Material examined

Holotype

VENEZUELA • ♂; Mérida, Los Chorros; 23 Apr. 1988; S.A. Marshall leg.; sweeps; DEBU.

Paratypes

BOLIVIA – **La Paz** • 7 ♂♂, 6 ♀♀; Chulumani, Apa-Apa Reserve; 16°21′15″ S, 67°30′21″ W; 2000 m a.s.l.; 1 Apr. 2001; S.A. Marshall leg.; sweep; CBFC.

ECUADOR – **Napo** • 1 ♀; 4.8 km W of El Chaco; 1750 m a.s.l.; 7 Nov. 1999; S.A. Marshall leg.; QCAZ • 1 ♀; Baeza; 1500 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; wet montane rainforest, Malaise trap; DEBU • 2 ♂♂; SierrAzul Lodge, 14 km W of Cosanga; 5 Nov. 1999; S.A. Marshall leg.; QCAZ • 1 ♂; same data as for preceding; 2200 m a.s.l.; forest, sweep; QCAZ • 8 ♂♂, 5 ♀♀; SierrAzul Reserve, 14 km W of Cosanga; 0°40′55″ S, 77°56′09″ W; 2200 m a.s.l.; 9 May 2002; M. Buck leg.; trail sweep; DEBU • 2 ♂♂, 8 ♀♀; same data as for preceding; 10–11 May 2002; Marshall and Paiero leg.; treefall, yellow pans; QCAZ • 3 ♀♀; same data as for preceding; 9–11 May 2002; O. Lonsdale leg.; DEBU • 6 ♂♂; SierrAzul Reserve, 14 km W of Cosanga; 5 Nov. 1999; S.A. Marshall leg.; disturbed trail sweep; QCAZ. – **Pichincha** • 3 ♂♂, 1 ♀; 11.7 km SE of Tandayapa, road to Nono;

28 Oct. 1999; S.A. Marshall leg.; near stream, litter/wood; DEBU • 3 ♂♂; 20 km N of Nono, road to Mindo; 1900 m a.s.l.; 24 Oct. 1999; S.A. Marshall leg.; path sweep; DEBU • 1 ♀; 22.7 km E of Tandapi; 2440 m a.s.l.; 24–29 Jun. 1975; S. Peck leg.; moss forest, dung traps; DEBU • 10 ♂♂, 1 ♀; 3.5 km SE of Tandayapa; 28 Oct. 1999; S.A. Marshall leg.; in green leaf litter (treefall); QCAZ • 1 ♂; Bellavista Cloud Forest Reserve; 0°01′13″ S, 78°40′30″ W; 2200 m a.s.l.; 1 May 2011; S.A. Marshall leg.; pans near treefall; debu00339885/MYCRO918-21 sequenced for CO1-5'; DEBU. – **Zamora Chinchipe** • 3 ♂♂, 3 ♀♀; San Francisco Biological Reserve, Canal trail; 3°58′30″ S, 79°04′25″ W; 2000 m a.s.l.; 18–25 Feb. 2009; M. Pollet and A. De Braekeleer leg.; blue pan traps; RBINS.

VENEZUELA – **Mérida** • 16 ♂♂, 6 ♀♀; same data as for holotype; DEBU • 32 ♂♂, 12 ♀♀; 6 km S of Azulita; 3 May 1988; S.A. Marshall leg.; near road; DEBU • 9 ♂♂, 3 ♀♀; Jají-La Azulita; 3 May 1988; S.A. Marshall leg.; roadside sweeps; DEBU • 7 ♂♂, 3 ♀♀; Mérida, El Vallecita; 2400 m a.s.l.; 1 May 1988; S.A. Marshall leg.; second growth, sweep; DEBU • 1 ♂; Mérida, Los Chorros; 2100 m a.s.l.; 5 May 1988; S.A. Marshall leg.; sweep at trailhead; DEBU • 3 ♂♂; same data as for preceding; wet leaves; DEBU • 1 ♂, 1 ♀; same data as for preceding; 2200 m a.s.l.; 23 Apr. 1988; decaying vegetation; DEBU • 1 ♂; Mérida, Los Chorros; 1–5 May 1988; S.A. Marshall leg.; flight-intercept trap; DEBU • 1 ♂; same data as for preceding; leaf debris, flight-intercept trap; DEBU • 2 ♂♂; Mérida, Los Chorros, Santa Rosa Road; 30 Apr. 1988; S.A. Marshall leg.; sweep; DEBU • 4 ♂♂, 6 ♀♀; Mérida, Mucui, 10 km E of Tobay; 2000 m a.s.l.; 28 Apr. 1981; H. Townes leg.; CNCI • 1 ♂; Mérida, Santa Rosa Trail; 23–30 Apr. 1988; S.A. Marshall leg.; flight-intercept trap; DEBU.

Other material examined

BOLIVIA – **Chapare** • 3 ♀♀; Paracti; 2200 m a.s.l.; 1–4 Feb. 1976; L.E. Peña leg.; CNCI • 4 ♂♂, 1 ♀; Yungas; 2200 m a.s.l.; 1–3 Feb. 1976; L.E. Peña leg.; CNCI. – **La Paz** • 1 ♀; 10 km NW of Caranavi, road to ENTEL tower; 15°46′35″ S, 67°35′48″ W; 1400 m a.s.l.; 13 Apr. 2001; S.A. Marshall leg.; dung pans; DEBU • 4 ♂♂; Chulumani, Apa-Apa Reserve; 16°21′15″ S, 67°30′21″ W; 2000 m a.s.l.; 1 Apr. 2001; S.A. Marshall leg.; DEBU • 2 ♂♂; same data as for preceding; dung baits; DEBU • 1 ♀; same data as for preceding; 1–3 Apr. 2001; pan traps; DEBU.

ECUADOR – **Napo** • 2 ♀♀; 2.5 km W of Cosanga; 2150 m a.s.l.; 5–7 Nov. 1999; S.A. Marshall leg.; dung/pans; DEBU • 9 ♂♂, 8 ♀♀; 4.2 km S of Cosanga, pipeline trail; 2200 m a.s.l.; 7 Nov. 1999; S.A. Marshall leg.; DEBU • 2 ♂♂, 1 ♀; 4.8 km W of El Chaco; 1750 m a.s.l.; 7 Nov. 1999; S.A. Marshall leg.; DEBU • 1 ♂, 5 ♀♀; Baeza; 1500 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; wet montane rainforest, Malaise trap; DEBU • 2 ♂♂, 27 ♀♀; Baeza; 1550 m a.s.l.; 15–19 May 1987; L.D. Coote and B.V. Brown leg.; wet montane rainforest/pasture, Malaise trap off stone trail; ROME • 3 ♂♂, 9 ♀♀; Baeza; 1700 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; wet montane forest/pasture, near small creek, Malaise head; ROME • 1 ♂; Baeza; 2000 m a.s.l.; 1 Mar. 1979; S.A. Marshall leg.; DEBU • 1 ♂; same data as for preceding; 1–10 Mar. 1979; DEBU • 1 ♂; Jatun Sacha Reserve, 6 km W of Misahualli; 1°04′ S, 77°37′ W; 450 m a.s.l.; 7 May 2002; O. Lonsdale leg.; sweep; DEBU • 67 ♂♂, 28 ♀♀; SierrAzul Lodge, 14 km W of Cosanga; 2200 m a.s.l.; 5 Nov. 1999; S.A. Marshall leg.; forest, sweep; DEBU • 2 ♂♂, 2 ♀♀; SierrAzul Lodge, 14 km W of Cosanga; 5 Nov. 1999; S.A. Marshall leg.; DEBU • 10 ♂♂, 4 ♀♀; same data as for preceding; sweeping disturbed trail; DEBU • 2 ♂♂; SierrAzul Reserve, 14 km W of Cosanga; 0°40′55″ S, 77°56′09″ W; 2200 m a.s.l.; 9 May 2002; O. Lonsdale leg.; DEBU • 1 ♂; same data as for preceding; 10 May 2002; S.A. Marshall leg.; DEBU • 1 ♀; same data as for preceding; downed bromeliads, dung pans; DEBU • 6 ♂♂, 7 ♀♀; same data as for preceding; treefall, yellow pans, 9–10 May 2002, M. Buck leg.; DEBU. – **Pichincha** • 3 ♀♀; 3.5 km SE of Tandayapa; 28 Oct. 1999; S.A. Marshall leg.; in green leaf litter (treefall); DEBU • 1 ♂, 1 ♀; 7 km SE of Nanegalito, trout farm 'San Jose'; 1500 m a.s.l.; 27–30 Oct. 1999; S.A. Marshall leg.; riverine forest, sweep treefalls; DEBU • 8 ♂♂, 6 ♀♀; Bellavista Cloud Forest Reserve; 0°01′13″ S, 78°40′30″ W; 2200 m a.s.l.; 9–13 May 2009; S.A. Marshall leg.; DEBU • 5 ♂♂; same collection data as preceding; 1 May 2011; pans

near treefall; DEBU • 10 ♂♂, 4 ♀♀; Bellavista Reserve; 0°00′54″ S, 78°40′46″ W; 2200 m a.s.l.; 1 May 2011; S.A. Marshall leg.; treefall; DEBU • 5 ♀♀; Bellavista Reserve; 0°01′13″ S, 78°40′30″ W; 2200 m a.s.l.; 1 May 2011; S.A. Marshall leg.; pans near treefall; DEBU • 3 ♀♀; same data as for preceding; 9–13 May 2011; DEBU • 6 ♂♂, 38 ♀♀; Bellavista Reserve; 2150 m a.s.l.; 30 Oct. 1999; S.A. Marshall leg.; on sifted litter; DEBU • 16 ♂♂, 10 ♀♀; Bellavista Reserve; 2200 m a.s.l.; 30 Oct. 1999; S.A. Marshall leg.; DEBU • 1 ♂, 1 ♀; Bellavista Reserve, ridge trail; 2200 m a.s.l.; 28–30 Oct. 1999; S.A. Marshall leg.; pans near dung; DEBU • 69 ♂♂, 76 ♀♀; Bellavista Reserve, ridge trail; 28 Oct. 1999; S.A. Marshall leg.; sweeping/aspirating; DEBU • 47 ♂♂, 43 ♀♀; Bellavista Reserve, trail 'B'; 30 Oct. 1999; S.A. Marshall leg.; sweeping; DEBU • 1 ♀; Maquipucuna Biological Reserve; 0°07′34″ S, 78°37′57″ W; 1200 m a.s.l.; 27–28 Apr. 2002; M. Buck leg.; sweep; DEBU. – **Zamora Chinchipe** • 1 ♂, 1 ♀; San Francisco Biological Reserve, Canal trail; 3°58′30″ S, 79°04′25″ W; 2000 m a.s.l.; 13–18 Feb. 2009; M. Pollet and A. De Braekeleer leg.; red pan trap; RBINS • 1 ♂; same data as for preceding; yellow pan trap; DEBU • 1 ♂, 1 ♀; same data as for preceding; 17–25 Feb. 2009; RBINS • 1 ♂, 1 ♀; same data as for preceding; 18–25 Feb. 2009; DEBU.

VENEZUELA – **Aragua** • 21 ♂♂, 4 ♀♀; Colonia Tovar; 2300 m a.s.l.; 10 Mar. 1995; S.A. Marshall leg.; DEBU • 12 ♂♂, 14 ♀♀; same data as for preceding; 2400 m a.s.l.; bamboo forest, sweep; DEBU • 1 ♀; Henri Pittier National Park, Rancho Grande, La Toma trail; 9 Apr. 1994; L. Masner leg.; CNCI • 1 ♂; Maracay, Rancho Grande Biological Station; 1250 m a.s.l.; 5 Mar. 1995; S.A. Marshall leg.; sweep along trail; DEBU. – **Mérida** • 1 ♀; Jají; 27 Apr.–3 May 1988; S.A. Marshall leg.; cloud forest, flight-intercept trap; DEBU • 2 ♀♀; Jají to La Azulita; 3 May 1988; S.A. Marshall leg.; roadside sweeps; DEBU • 2 ♀♀; Mérida, Los Chorros; 23 Apr. 1988; S.A. Marshall leg.; sweeps; DEBU • 1 ♀; same data as for preceding; 2200 m a.s.l.; decaying vegetation; DEBU • 7 ♂♂, 5 ♀♀; same data as for preceding; 2300 m a.s.l.; flight-intercept trap, 23–30 Apr. 1988; DEBU • 1 ♀; Mérida, Los Chorros; 2300 m a.s.l.; 5 May 1988; S.A. Marshall leg.; wet leaves; DEBU • 1 ♀; Páramo La Culata; 3000 m a.s.l.; 25 Apr. 1988; S.A. Marshall leg.; *Espeletia*, pan traps; DEBU • 33 ♂♂, 18 ♀♀; Santa Rosa Trail; 1500 m a.s.l.; 24–30 Apr. 1988; S.A. Marshall leg.; flight-intercept trap along spring; DEBU. – **Trujillo** • 1 ♂; 10 km E of Bocono, Laguna de Lucerdo; 3 Mar. 1995; S.A. Marshall leg.; aspirated along river; DEBU • 3 ♂♂; Guaramacal National Park; 2000–3000 m a.s.l.; 26 Aug.–1 Sep. 1992; L. Masner leg.; car net; DEBU.

Description

Body (Fig. 50A). Length 2.8–3.9 mm. Head dark brown, lower fifth of frons orange; face, gena, and antennae orange-brown. Frontal width 2.3–2.4 × frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.4–0.5 × length of posterior. Palpus pale yellow. Eye very large, greatest height about 5.0 × shortest genal height. Thorax dark brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair only slightly larger than surrounding acrostichal setulae) separated by 9–10 rows of acrostichal setulae. Membrane around prosternum sometimes with a lateral sclerite bearing 1–2 inner setulae. Legs brown, hind femur darker. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical third. Wing (Fig. 6F) slightly infuscate. CS2 0.7–0.8 × CS3. Halter pale brown with white apex.

Male abdomen (Figs 50B–D, 51). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 large, subquadrate, 3.0 × length of S4, anterior third overlapped by S4; laterally sparsely setose with a dark, rectangular posteromedial patch of dense setulae flanked by large desclerotized areas, patch extending posteriorly on right side. Anterior flange of S6+7 2.0 × as long as wide. Sclerite A small, slightly separated from S6; sclerites B and C fused to form short, broad, curved band; sclerite D triangular, apparently fused with left side of posteromedial patch of S5; sclerite E large, elongate triangular and parallel to similar sclerite F; sclerite G elongate with a posterior bulge; ring sclerite thin and indistinct. Epandrium large, 0.4 × length of S8, height 1.3 × maximum length and 0.6 × maximum width, uniformly

setose, posterior setae longest; posterior quarter of epandrium separated from anterior three-quarters by a deep lateral groove extending halfway up epandrium; anal fissure short but round; perianal pads weakly developed. Pseudocercus small, separate from epandrium but with a narrow process reaching laterally to epandrium, with three setae; halves of subepandrial sclerite arched, forming an M-shape and medially fused. Subcercus with broad, elongate inner lobe, posteroventrally extended to a pointed prominent process, outer part broad and folded back outside and around inner lobe. Hypandrium with anteromedial apodeme well developed with two short posterior lobes. Surstylus short, crescent-shaped in lateral view with a dark anterobasal process and two thick, sinuate inner setae. Postgonite broad basally, apically digitate and curved anteriorly. Phallapodeme very large, thick with a very large dorsal 'fin'; basiphallus stout, with lateral ridges and an elongate, trunk-like epiphallus; distiphallus strongly reduced with two thin ventrolateral sclerites.

Female abdomen (Fig. 52). T7 broad, darker than preceding tergites; T8 divided into a small, pale, dorsal sclerite and 2 broad, dark, lateral sclerites, posteroventral corners greatly expanded posteriorly. Epiproct broad, medially desclerotized and posteriorly setulose. Cercus slightly elongate, rounded with long preapical dorsal and medial setae. S7 broad, posteromedially pointed with four large posterior setae; S8 reduced to a pair of small lateral sclerites. Two spermathecae, bulb elongate, bean-shaped, finely striate with shallow invaginations on both ends.

Distribution

Neotropical: Bolivia, Ecuador, Venezuela.

Remarks

This very abundant species of the *S. galapagensis* group belongs to a clade of three species defined by a long, trunk-like epiphallus: *S. copiosus* sp. nov., *S. elephas* sp. nov., and *S. tantus* sp. nov. *Sclerocoelus elephas* can be separated from these other two species by the very large male S6–8, characteristic shape and setation of the surstylus, and the large, subtriangular lateral sclerites of the female T8. Like other members of the species group, it can be abundant in cloud forest leaf litter.

Sclerocoelus espeletia sp. nov.

urn:lsid:zoobank.org:act:47BEB1B3-36E7-470F-A3C0-5D77BD86449C

Figs 6G, 53–54

Etymology

This name reflects the collection habitat of the holotype specimen of this species, under *Espeletia* debris.

Material examined

Holotype

VENEZUELA • ♂; Mérida, Mucuchies, 5 km S of trail to Paramo; 4000 m a.s.l.; 28 Apr. 1988; S.A. Marshall leg.; under *Espeletia* debris near lake; DEBU.

Paratypes

VENEZUELA – **Merida** • 1 ♂; same data as for holotype; 3000 m a.s.l.; 29 Apr. 1988; moss; DEBU • 2 ♂♂; La Culata, Paramo; 3000 m a.s.l.; 25 Apr.–2 May 1988; S.A. Marshall leg.; flight-intercept trap near stream; DEBU.

Description

Body (Fig. 53A). Length 3.1 mm. Head brown, lower fifth of frons orange; face, gena, and antennae orange-brown. Frontal width 2.3–2.4× frontal height. Three pairs of strong interfrontal bristles,

sometimes surmounting a very fine fourth pair; anterior orbital 0.5–0.6× length of posterior. Palpus yellow. Eye large, greatest height about 3.5× shortest genal height. Thorax brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.5× length of posterior pair) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum with dark, semi-sclerotized, non-setulose patch. Legs pale brown, mid and hind femora darker. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical half. Wing (Fig. 6G) moderately infuscate. CS2 0.7–0.8× CS3. Halter brown with paler stem.

Male abdomen (Figs 53B–C, 54). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.0× length of S4, densely long-setose in posterior two-thirds with a darkened, concave medial patch coming to a rounded posteromedial lobe. Anterior flange of S6+7 triangular, 0.6× as long as wide. Sclerite A pale, elongate, and setulose; sclerites B and C absent; sclerites D and E fused, dark, slightly sinuate and tapered on left side; sclerite F large, dark with an elongate apicoventral process on left side; sclerite G large, bulbous; ring sclerite well developed and fused to posterior surface of sclerite G. Epandrium large, 0.5× length of S8, height 1.5× maximum length and 1.0× maximum width, densely long-setose; perianal pads weakly developed. Pseudocercus almost entirely membranous, with 3–4 setae; halves of subepandrial sclerite simple, strongly arched, and fused medially. Subcercus large, blade-like, curved laterally, with an elongate anterobasal lobe articulating with halves of subepandrial sclerite. Hypandrium with thin, dorsoventrally flattened anteromedial apodeme. Surstylus elongate, with a deep apical emargination (resulting anterior lobe short and stout, posterior lobe longer and curved inwards) and a blade-like, inner anterobasal lobe. Postgonite short and simple, gently tapered and curved forwards. Phallapodeme large and dorsoventrally flattened; basiphallus stout and connected to distiphallus by a neck-like distal part with a beak-like epiphallus; distiphallus small, largely membranous and supported by a Y-shaped dorsal sclerite with a sinuate medial part and recurved dorsolateral arms, and a smaller, curved ventral sclerite.

Female abdomen. Female unknown.

Distribution

Neotropical: Venezuela.

Remarks

Sclerocoelus espeletia sp. nov. is superficially similar to *S. lazulita* sp. nov., from which it can be readily separated by the relatively simple setation of the male S5, curved subcercus, apically bifurcate surstylus, and evenly tapered postgonite. Like most basal lineages of the genus, *S. espeletia* is a high Andean species but it seems to be the sister taxon to the derived lineage made up of the *S. galapagensis* and *S. sordipes* groups, which are typically associated with lower elevation forests. As in those groups, the pseudocercus of *S. espeletia* has become differentiated from the epandrium but, in contrast to those groups, the subcercus remains simple and undifferentiated.

Sclerocoelus flavus sp. nov.
urn:lsid:zoobank.org:act:FAFDB45E-58EE-4071-9075-86647AE8E0AB
Figs 6H, 55–57

Etymology

This name refers to the bright yellow colouration of the head and legs (from the Latin '*flavus*', meaning 'yellow, golden').

Material examined

Holotype

VENEZUELA • ♂; Mérida, Sierra Nevada National Park, Laguna Negra; 4000 m a.s.l.; 28–30 Aug. 1992; L. Masner leg.; elfin forest, yellow pan traps; USNM.

Paratype

VENEZUELA – **Mérida** • 1 ♂, 1 ♀; Apartaderos, Laguna Negra; 3350 m a.s.l.; 1–29 Jul. 1989; S.B. Peck and J. Kukalova-Peck leg.; treeline moss forest, carrion traps; FMNH.

Description

Body (Fig. 54A). Length 3.2–3.4 mm. Head yellow, dark brown at level of ocelli and behind; center of frons reddish, antenna orange. Frontal width 1.8× frontal height. Three pairs of strong interfrontal bristles surmounting a fine fourth pair (holotype has a fourth large interfrontal bristle on one side); anterior orbital 0.5× length of posterior. Palpus yellow. Eye large, greatest height about 4.0× shortest genal height. Thorax yellow, scutum brown with slightly paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4× length of posterior pair) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs yellow, tibiae slightly darker. Fore femur with three large ventral preapical setae. Dorsal surface of mid tibia with an additional small anterior seta in distal half. Ventral surface of male mid tibia with two rows of stout setae along apical quarter. Wing (Fig. 6H) strongly shortened, extending to end of T2; strongly infuscate. M_1 and M_4 converging apically, eliminating dm-m; cell bm-m pointed. CS2 1.6× CS3. Halter reduced to a small brown nub.

Male abdomen (Figs 55B–D, 56). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 very broad, 1.3× length of S4, largely bare except a group of 3 posteromedial setae, two patches of long setae on either side of a deep, setulose, posteromedial emargination, and a patch of setae on left side, anterior margin with a broad anteromedial expansion. Anterior flange of S6+7 small, triangular, 1.0× as long as wide. Sclerite A a short flap fused to S6+7; sclerites B and C absent; sclerite D small, ovoid, and fused to sclerite E via a short 'neck'; sclerite E triangular, right side darker and apex curved dextrally; sclerites F and G fused, sclerite F elongate on left side to curve around sclerite E; sclerite G short, concave; ring sclerite moderately developed. Epandrium large, 0.7× length of S8, height 1.7× maximum length and 0.7× maximum width, uniformly long-setose; anal fissure ovoid; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite weakly developed. Subcerci fused anteromedially, short, triangular with apex curved posteriorly. Hypandrium with sinuate anteromedial apodeme. Surstylus large, 2.5× as long as deep, concave, long-setose on inner and outer surfaces, subrectangular with curved anteroventral corner and a long, pointed posterodorsal lobe. Postgonite short, subtriangular, gently curved with apex bent forwards abruptly. Phallapodeme very large, sinuate; basiphallus very large, dorsal part bulbous, ventral part split into two lobes: anterior lobe short, connecting to posterodorsal corner of distiphallus, posterior lobe very large, medially swollen and apically tapered, curved downwards and emarginate, posterior lobe almost as large as postgonite; distiphallus almost entirely membranous, large ventral lobes supported by a tubular basal part.

Female abdomen (Fig. 57). T7 broad, simple; T8 divided into two large, dark, lateral sclerites, posterolateral corners slightly expanded and rounded. Epiproct large, shield-like with posteromedial point, medially desclerotized, and setulose largely in the desclerotized area. Cercus stout, apically rounded with long apical, dorsal, and apicoventral setae. S7 broad, subtriangular, posteriorly with 11–12 large posterior setae; S8 entirely membranous. Hypoproct with dense setulae in apical half. Three spermathecae, bulb cylindrical, apical third slightly constricted, finely striate with an apical and basal invagination, both with a small, finger-like, central process.

Remarks

Sclerocoelus flavus sp. nov., along with the sympatric *S. meridensis* sp. nov., can be distinguished from all other species of *Sclerocoelus* by the characteristically abbreviated wing (Fig. 6H) with a non-reduced alula. *Sclerocoelus flavus* can be separated from *S. meridensis* by its yellowish head, thorax, and legs, and characters of the male and female terminalia. This species is known only from high elevation sites from at or near the treeline in Venezuela and is one of the most basal species of the genus, with the complex genital pouch sclerites that define the genus but without the apomorphic asymmetrical spermathecae or differentiated subcerci of more derived species.

Sclerocoelus frigidifrons sp. nov.

urn:lsid:zoobank.org:act:0E578D20-6A89-4DD3-A883-1E93D7063CC9

Figs 6I, 58–60

Etymology

This name reflects the collection of most of the type series from under vegetation that was in contact with the ground along cold, high elevation, streams (from the Latin words '*frigidus*', meaning 'cold', and '*frons*', meaning 'leaf, foliage').

Material examined

Holotype

ECUADOR • ♂; Pichincha, Cotopaxi National Park, Quebrada Mishahuaycu; 3600 m a.s.l.; 26 Oct.–8 Nov. 1999; S.A. Marshall leg.; pans along stream; QCAZ debu00139771.

Paratypes

ECUADOR – **Carchi** • 3 ♀♀; Guandera Forest Reserve, 15 km E of San Gabriel; 3400 m a.s.l.; 1 Nov. 1999; S.A. Marshall leg.; hand; DEBU. – **Loja** • 1 ♂, 1 ♀; Podocarpus National Park, Cajanuma, Oso de Anteojos trail; 3000 m a.s.l.; 16–20 Feb. 2009; M. Pollet and A. De Braekeleer leg.; yellow pans; QCAZ. – **Napo** • 1 ♂; Baeza, W along road; 1500 m a.s.l.; 16–19 May 1987, L.D. Coote and B.V. Brown leg.; montane rainforest/pasture, Malaise trap; DEBU • 1 ♂, 1 ♀; near Lago Papallacta; 6 Nov. 1999; S.A. Marshall leg.; under tree branches (brown leaves); QCAZ. – **Pichincha** • 18 ♂♂, 20 ♀♀; same data as for holotype; debu00339891/MYCRO1019-22 sequenced for CO1-5'; DEBU • 18 ♂♂, 20 ♀♀; same data as for holotype; QCAZ • 1 ♂; same data as for holotype; 25 Oct. 1999; near stream, pan traps; DEBU • 1 ♂, 1 ♀; same data as for preceding; under streamside vegetation; QCAZ • 1 ♀; Bellavista Reserve; 0°00′54″ S, 78°40′56″ W; 2200 m a.s.l.; 1 May 2011; S.A. Marshall leg.; treefall; QCAZ • 1 ♀; Campamento Pichan, near Nono; 24 Oct. 1999; S.A. Marshall leg.; sweeping; QCAZ • 1 ♀; Valley near Hostería San Jorge, 10 km NW of Quito; 3000 m a.s.l.; 23 Oct. 1999; S.A. Marshall leg.; pans in grass pile; DEBU.

Description

Body (Fig. 58A). Length 3.5–4.6 mm. Head dark brown, ventrolateral corners of frons slightly orange. Frontal width 2.3–2.4 × frontal height. Three pairs of strong interfrontal bristles usually surmounting a fine fourth pair; anterior orbital 0.5–0.6 × length of posterior. Palpus pale brown. Eye reduced, greatest height about 2.0 × shortest genal height; entire ventral margin of gena with row of setae. Thorax dark brown, scutum with slightly paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4 × length of posterior pair) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum bare. Legs dark brown, apices of fore and mid tibiae paler. Fore femur with 4–5 large ventral preapical setae. Dorsal surface of mid tibia with an offset pair of setae at about ⅓, a large anterior seta at about ½, and a pair of large, curved setae at about ⅘. Ventral surface of male mid tibia with two rows of stout setae along apical third. Wing (Fig. 6I) slightly infuscate. CS2 1.0–1.1 × CS3. Alula very broad. Halter brown.

Male abdomen (Figs 58B–C, 59). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.2 × length of S4, posterolaterally long-setose with a medial, T-shaped, pale area and a posteromedial, V-shaped, dark, long-setose area flanked by broad, pale, bare areas. Anterior flange of S6+7 small, 3.0 × as long as wide. Sclerite A pale, indistinct from S6+7; sclerite B dark, arched; sclerite C dark, fused to sclerite A; sclerites D and E fused, forming a large, dark, trapezoidal sclerite; sclerite F large, triangular, apical half angled inwards, wrapping around sclerite D+E; sclerite G dark, stout; ring sclerite well sclerotized and fused to sclerite G. Epandrium large, 0.5 × length of S8, height 1.8 × maximum length and 0.8 × maximum width, densely long-setose; anal fissure large and ovoid; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite very short, well separated, and curved. Cercus small, rectangular with a small, triangular, ventral lobe, cerci narrowly fused medially to form a subanal plate. Hypandrium with very long, thin anteromedial apodeme. Surstylus orange, subquadrate, bulging, ventral third densely setose, setae of inner surface thickened. Postgonite elongate, basal third with a rounded posterolateral lobe, apical two-thirds gently tapered and slightly curved. Phallapodeme large, sinuate with a large, twisted flap of sclerotized tissue on right side, connecting ventrolaterally at base to dorsolaterally at apex; basiphallus elongate, basal third tapered, resembling base of a femur; distiphallus elongate, largely membranous, without any distinct supporting sclerites.

Female abdomen (Fig. 60). T7 broad, simple; T8 divided into a small, pale, dorsal sclerite and two large, dark, lateral sclerites, posterolateral corners very slightly expanded and rounded. Epiproct large, ovoid with posteromedial point, medially desclerotized, and entirely setulose. Cercus elongate, apically pointed with long apical, dorsal, and apicoventral setae. S7 broad, posteromedially expanded into a rounded, desclerotized tab, posteriorly with 7–8 large posterior setae; S8 entirely membranous. Hypoproct with dense setulae in apical half. Three spermathecae, bulb stout, spherical, finely striate with a shallow apical and a very deep basal invagination, invaginations joined centrally.

Distribution

Neotropical: Ecuador.

Remarks

Sclerocoelus frigidifrons sp. nov. is externally most similar to *Sclerocoelus cubus* sp. nov., but differs by its larger size (3.5–4.6 mm), smaller eye (~2.0 × genal height), rounded, saddle-shaped epandrium, and the male S5 with unmodified setae. This species has distinct cerci fused basally into a subanal plate but not differentiated into separate pseudocerci or subcerci. These characters suggest that *S. frigidifrons* and its brachypterous sister species *S. aduncus* sp. nov. are among the few species in the genus that are basal to the large, derived groups characterized by separate subcerci and pseudocerci. With the exception of *S argentinensis* sp. nov., the species that have the plesiomorphic subanal plate and simple cerci are associated with wet, green plant material in high elevation cloud forests or elfin forests in the Andes.

Sclerocoelus galapagensis Marshall, 1997

Sclerocoelus galapagensis Marshall, 1997: 103.

Sclerocoelus galapagensis – Roháček *et al*. 2001: 249.

Diagnosis

Body length 2.0–2.2 mm. Membrane around prosternum with 1–2 small, setulae-bearing sclerites. Male S5 rectangular with a relatively deep posteromedial emargination surrounded by a pair of darkened lobes (cf. Marshall 1997: fig. 34); perianal pads well developed and dark; surstylus relatively short,

almost bean-shaped with an inner, anteroventral patch of thickened setae (cf. Marshall 1997: figs 35, 37); postgonite straight, almost rectangular but concave posteroapically (cf. Marshall 1997: fig. 36). Female S8 small with a dark, slightly raised, X-shaped medial ridge (cf. Marshall 1997: fig. 39).

Material examined

The type specimens deposited in DEBU were examined, as well as the following material:

ECUADOR – **Galápagos** • 1 ♀; Santa Cruz Island, Las Beseles, 31 km N of Santa Rosa; 570 m a.s.l.; 28 Jun. 1985; S. Peck leg.; *Scalesia* forest, flight-intercept trap and Malaise trap; DEBU • 1 ♂, 1 ♀; Santiago Island, 3 km NE of Aquacate Camp; 740 m a.s.l.; 5–9 Jun. 1991; S. Peck leg.; moss elfin forest, flight-intercept trap; DEBU.

Distribution

Neotropical: Ecuador (Galapagos Islands).

Sclerocoelus grandicercus sp. nov.
urn:lsid:zoobank.org:act:E1D8EB53-CCF3-4A48-AFB7-F85A3D19E4DA
Figs 6J, 61–63

Etymology

This name refers to the enlarged pseudocercus of this species, which are much broader than those of any other species of *Sclerocoelus* (from the Latin '*grandis*', meaning 'large, grand').

Material examined

Holotype

COSTA RICA • ♂; Cartago, Tapantí National Park, La Esperanza del Guarco; 9°42′00″ N, 83°51′49″ W; 2700 m a.s.l.; 17–18 Aug. 2001; S.A. Marshall leg.; oak forest, treefall pans; MNCR debu00203263.

Paratypes

COSTA RICA – **Cartago** • 1 ♂, 1 ♀; same data as for holotype; DEBU • 1 ♀; Tapantí, Macizo de la Muerte National Park, La Esperanza del Guarco; 9°42′00″ N, 83°51′49″ W; 2700 m a.s.l.; 17–18 Aug. 2001; M. Buck leg.; oak forest, yellow pan traps; DEBU • 2 ♀♀; Tapantí, Macizo de la Muerte National Park, La Esperanza del Guarco; 17–18 Aug. 2001; S.A. Marshall leg.; MNCR. – **Heredia** • 1 ♂; Braulio Carrillo National Park, Barva Biological Station; 16 Feb. 2003; S.A. Marshall leg.; sweep downed bromeliads; DEBU. – **Puntarenas** • 1 ♂; Monteverde Reserve; 1500 m a.s.l.; Feb. 1980; W. Mason leg.; cloud forest; MNCR.

Description

Body (Fig. 61A). Length 3.3–4.6 mm. Head dark brown, lower fifth of frons and gena yellow; face and antennae orange. Frontal width 2.2× frontal height. Two pairs of strong interfrontal bristles surmounting a fine third pair; anterior orbital 0.4× length of posterior. Palpus yellow. Eye very large, greatest height about 4.5× shortest genal height. Thorax brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair only slightly larger than surrounding acrostichal setulae) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, base of fore femur paler. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical third. Wing (Fig. 6J) slightly infuscate. CS2 0.8× CS3. Halter brown.

Male abdomen (Figs 61B–C, 62). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular,

1.4 × length and 1.1 × width of S4, laterally setose, posteromedially emarginate with a dark, densely setulose, Y-shaped posteromedial lobe flanked by pale areas and dark setose patches. Anterior flange of S6+7 large, 1.5 × as long as wide. Sclerite A dark, setulose, separated from S6+7; sclerite B thin, dark, elongate, and arched; sclerite C indistinct; sclerite D elongate, projecting posteriorly from left side of posteromedial lobe of S5; sclerite E short, elongate, similar to and projecting parallel to sclerite D; sclerite F large, subquadrate with an elongate apicoventral lobe on left side angulate to main part; sclerite G dark, elongate, posteriorly fused to sclerite F; ring sclerite small, dark. Epandrium moderate, 0.5 × length of S8, height 1.5 × maximum length and 0.8 × maximum width, uniformly setose; anal fissure rounded; perianal pads weakly developed. Pseudocercus large, fused to posteroventral corners of epandrium, and bearing three setae; halves of subepandrial sclerite very broad and flat apically, strongly arched, and separate. Subcercus subquadrate in lateral view with a triangular posteroventral lobe and a small, slightly curved posterodorsal lobe. Hypandrium with thin, Y-shaped anteromedial apodeme. Surstylus simple, elongate, apically rounded, slightly curved posteriorly, densely setulose laterally with a small, dark, anterodorsal lobe. Postgonite elongate, sinuate, flattened, distally expanded and striate. Phallapodeme large, thick; basiphallus small, with a small, dorsoventrally flattened, triangular epiphallus, distally expanded and extending along dorsal margin of distiphallus; distiphallus large, dorsoventrally flattened, with long, divergent, sinuate dorsolateral sclerites and shorter ventrolateral sclerites.

Female abdomen (Fig. 63). T7 broad, simple; T8 divided into a pale, dorsal sclerite and two large, dark, lateral sclerites, posterolateral corners slightly expanded and pointed. Epiproct large, subtriangular, anteromedially desclerotized, and entirely setulose. Cercus elongate, apically pointed with long apical, dorsal, and apicoventral setae. S7 broad, broadly desclerotized posteriorly with four large posterior setae; S8 divided into two dark, lateral sclerites. Hypoproct with thick anteromedial setulae. Three spermathecae, bulb stout, spherical, finely striate with deep invaginations at both ends, basal invagination with a small, finger-like, central process.

Distribution

Neotropical: Costa Rica.

Remarks

Sclerocoelus grandicercus sp. nov. is superficially similar to *S. dasysternum* sp. nov., from which it can be readily separated by larger size (3.3–4.6 mm), larger eye (~4.5 × genal height), longer second costal sector (0.8 × length of third), double patch of dark posteromedial setulae on the male S5, slightly tapered postgonite, and narrowly connected female S8. *Sclerocoelus grandicercus* and its probable sister species *S. recurvatus* sp. nov. are sympatric in the montane *Quercus* forests of Costa Rica. They are among the four endemic Costa Rican *Sclerocoelus* species and among the seven members of the *S. dasysternum* group found in Costa Rica.

Sclerocoelus hemorrhoidalis Marshall, 1997

Sclerocoelus hemorrhoidalis Marshall, 1997: 104.

Sclerocoelus hemorrhoidalis – Roháček *et al*. 2001: 249.

Diagnosis

Body length 2.1–2.3 mm. Membrane around prosternum with 3–5 small, setulae-bearing sclerites. Male S5 rectangular with a pair of short, long setose, posteromedial lobes (cf. Marshall 1997: fig. 46); epandrium with a pair of very long posterior setae (cf. Marshall 1997: fig. 43); perianal pads well developed and dark; surstylus almost claw-shaped, broadest basally and curved posteriorly to a sharp point (cf. Marshall 1997: figs 42–43); postgonite broadened medially, with the posterior margin sinuate

(cf. Marshall 1997: fig. 44). Female S8 small, trough-like and trapezoidal, with slightly darker lateral margins (cf. Marshall 1997: fig. 49).

Material examined

The type specimens deposited in DEBU were examined, as well as the following material:

ECUADOR – **Pichincha** • 1 ♂, 3 ♀♀; 7 km SE of Nanegalito, trout farm 'San Jose'; 1500 m a.s.l.; 27–30 Oct. 1999; S.A. Marshall leg.; riverine forest, sweeping treefalls; DEBU • 2 ♂♂; Bellavista Cloud Forest Reserve; 0°01′13″ S, 78°40′30″ W; 2200 m a.s.l.; 1 May 2011; S.A. Marshall leg.; pans near treefall; DEBU.

Distribution

Neotropical: Ecuador, Venezuela.

Sclerocoelus inornatus sp. nov.

urn:lsid:zoobank.org:act:94FE87A5-FC8D-485B-A408-08BEE7948661

Figs 7A, 64–65

Etymology

This name refers to the inornate male S5, which is simple and unmodified compared to most other species of *Sclerocoelus* (from the Latin '*inornatus*', meaning 'unadorned, undecorated').

Material examined

Holotype

ECUADOR • ♂; Pichincha, Maquipucuna Biological Reserve; 1200 m a.s.l.; 27–29 Oct. 1999; S.A. Marshall leg.; compost pan traps; QCAZ debu00111727.

Paratype

ECUADOR – **Pichincha** • 1 ♂; same data as for holotype; DEBU debu00111726.

Description

Body (Fig. 64A). Length 2.9–3.0 mm. Head dark brown, ventrolateral corners of frons and part of interfrontal plate orange; gena reddish-brown. Frontal width 2.2–2.3 × frontal height. Three pairs of large interfrontal bristles surmounting a fine fourth pair (holotype has a fourth large interfrontal bristle on one side); anterior orbital 0.5–0.6 × length of posterior. Palpus pale brown. Eye slightly reduced, greatest height about 2.5 × shortest genal height. Thorax dark brown, scutum with slightly paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.6 × length of posterior pair) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, femora darker. Fore femur with three large ventral preapical setae. Dorsal surface of mid tibia missing small anterior seta in distal half. Ventral surface of male mid tibia with two rows of stout setae along apical third. Wing (Fig. 7A) slightly infuscate. CS2 0.9–1.0 × CS3. Halter brown.

Male abdomen (Figs 64B–C, 65). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.2 × length of S4, simple, uniformly long-setose in posterior half. Anterior flange of S6+7 undeveloped. Sclerite A indistinct from S6+7; sclerites B–F absent; sclerite G small, weakly developed; ring sclerite weakly developed. Epandrium small, 0.5 × length of S8, height 1.8 × maximum length and 1.0 × maximum width, uniformly setose; anal fissure large, ovoid; perianal pads weakly developed. Pseudocercus entirely membranous and bearing 2 setae; halves of subepandrial sclerite poorly developed. Subcercus bulging with 3–4 posterior

setae and a flat, curved, ventral lobe. Hypandrium with long, sinuate anteromedial apodeme. Surstylus short, rectangular but concave, with several posterior and ventral setae, anteroventral corner slightly flared outwards. Postgonite short, stout, rhombic with a slight apical notch. Phallapodeme long with a subapical swelling; basiphallus stout, wedge-shaped with a short epiphallus; distiphallus moderate, largely membranous with a small dorsal sclerite and a much larger, sinuate, ventral sclerite.

Female abdomen. Female unknown.

Distribution

Neotropical: Ecuador.

Remarks

Sclerocoelus inornatus sp. nov. has an unmodified male S5 and the genital pouch is simple, with only a single free sclerite (presumably sclerite G). These are probably plesiomorphic states for the genus but the structure of the subcercus and associated sclerites is similar to the structure of more derived clades with a separate pseudocercus and subcercus and suggest that this species is closely related to the high alpine species *S. alpinus* sp. nov. and *S. puyensis* sp. nov. *Sclerocoelus inornatus* further differs from these two species by the smaller eye (~2.5× genal height), slightly shorter second costal sector (0.7–0.8× length of third), and the small, quadrate surstylus. The low elevation type locality (1200 m) contrasts with the habitats of other basal lineages of the genus.

Sclerocoelus irregularis sp. nov.

urn:lsid:zoobank.org:act:FABBDFAE-64C9-43A9-9923-4630D4602054

Figs 7B, 66–68

Etymology

This name reflects the overall similarity of this species to the very closely related *Sclerocoelus regularis* (from the Latin prefix '*ir*-', meaning 'not').

Material examined

Holotype

ECUADOR • ♂; Pichincha, Maquipucuna Biological Reserve; 0°07′23″ N, 78°37′57″ W; 1200 m a.s.l.; 27–28 Apr. 2002; M. Buck leg.; sweep; QCAZ.

Paratypes

ARGENTINA – **Misiones** • 1 ♀; 5 km E of Puerto Iguazú; 1–6 Feb. 1992; S.A. Marshall leg.; sweep Malaise; DEBU. – **Salta** • 1 ♂, 1 ♀; 30 km E of Salta, El Alisal, Campo Quijano; 18 Feb. 1992; S.A. Marshall leg.; forest vestige; DEBU • 3 ♂♂; Campo Quijano, road to San Antonia De Los Cobres, above forest level, site 2 and 3; 18 Feb. 1992; S.A. Marshall leg.; DEBU • 1 ♂; El Rey National Park, Aguas Negras Trail; 900 m a.s.l.; 11–15 Dec. 1987; S. and J. Peck leg.; forest, Malaise trap; DEBU • 5 ♂♂, 1 ♀; El Rey National Park, Rio La Sala; 900 m a.s.l.; 5–10 Dec. 1987; S. and J. Peck leg.; open stream side in forest, Malaise trap, flight-intercept trap; DEBU • 2 ♂♂; La Caldera Camino, la Cornisa; 27 Feb. 1992; S.A. Marshall leg.; roadside forest sweeps; DEBU • 5 ♂♂; Rosario De Lerma; 29 Feb. 1992; S.A. Marshall leg.; foul mud, wet vegetation; DEBU • 6 ♂♂, 9 ♀♀; Rosario De Lerma, INESALT yard; 16–28 Feb. 1992; S.A. Marshall leg.; Malaise trap; DEBU • 5 ♀♀; same data as for preceding; 17–28 Feb. 1992; pan traps; DEBU • 1 ♀; same data as for preceding; 17 Feb.–1 Mar. 1992; general collecting; DEBU • 1 ♂; Rosario De Lerma; 29 Feb. 1992; S.A. Marshall leg.; meadow, sweep; DEBU • 2 ♂♂, 3 ♀♀; same collecting data as preceding; swept in hedgerow ditch; DEBU • 2 ♂♂, 4 ♀♀; same collecting data as preceding; 19 Feb. 1992; swept in wet hedgerow ditch; DEBU • 22 ♂♂, 22 ♀♀; same

collecting data as preceding; 24 Feb. 1992; swept over bulldozed road; DEBU • 1 ♂; same collecting data as preceding; 14 Feb. 1992; swept over foul ditch; DEBU • 1 ♂; Sumalao; 19 Feb. 1992; S.A. Marshall leg.; wet muddy area along field, sweep; DEBU.

BOLIVIA – **La Paz** • 2 ♀♀; Chulumani, Apa-Apa Reserve; 16°21′15″ S, 67°30′21″ W; 2000 m a.s.l.; 1 Apr. 2001; S.A. Marshall leg.; sweep; CBFC. – **Santa Cruz** • 2 ♂♂, 4 ♀♀; Campo Guairuy, 24 km S of Camiri; 870 m a.s.l.; 18 Aug.–2 Sep. 2000; Irwin and Hauser leg.; Malaise trap; DEBU • 2 ♂♂; Quebrada Isiri, 20 km S of Camiri; 865 m a.s.l.; 18 Aug.–2 Sep. 2000; Irwin and Hauser leg.; Malaise trap; CBFC.

BRAZIL – **Minas Gerais** • 1 ♂; Prado; 21 Feb. 1990; S.A. Marshall leg.; sweep along river; MZSP. **– Paraná** • 1 ♂; Curitiba campus; 10 Feb. 1990; S.A. Marshall leg.; sweep in forest with *Araucaria*; DEBU • 2 ♂♂, 1 ♀; Curitiba; 5 Feb. 1990; S.A. Marshall leg.; underneath fallen epiphytes near National History Museum; MZSP • 5 ♀♀; Curitiba, University campus; 7 Feb. 1990; S.A. Marshall leg.; dirty water, sweep; MZSP • 2 ♂♂, 2 ♀♀; same data as for preceding; 2–5 Feb. 1990; wet areas, flight-intercept trap/pans; DEBU • 3 ♂♂, 3 ♀♀; East of Curitiba; 8 Feb. 1990; S.A. Marshall leg.; sweep near creek debris; MZSP • 1 ♀; Morretes, 5 km S of Sapidontuva; 9 Feb. 1990; S.A. Marshall leg.; MZSP • 1 ♀; Palmas, Linha Alegria, Fazenda Cerro Chato; 26°30′09″ S, 51°40′13″ W; 1224 m a.s.l.; 3–4 Mar. 2015; Savaris and Norrbom leg.; on hill in campo, Malaise trap; DEBU. **– Rio de Janeiro** • 2 ♀♀; Jacaré Paguá; 22 Jan. 1990; S.A. Marshall leg.; wet litter by stream; MZSP • 1 ♂; Muri, near Hotel Garlipp; 2 Mar. 1990; S.A. Marshall leg.; sweep over trail; MZSP • 1 ♂, 1 ♀; Nova Friburgo, Sitio Edelweiss; 26 Jan. 1990; S.A. Marshall leg.; Malaise trap; MZSP • 1 ♀; Nova Friburgo; 27 Jan. 1990; S.A. Marshall leg.; along creek; MZSP • 1 ♀; Represandos Ciganos; 22–24 Jan. 1990; S.A. Marshall leg.; Malaise head; MZSP • 2 ♂♂; Tijuca; 28 Feb. 1990; S.A. Marshall leg.; forest; DEBU **– Santa Catarina** • 1 ♂, 1 ♀; Aparados da Serra National Park, Rio do Boi; 29°12′08″ N, 50°03′01″ W; 209 m a.s.l.; 6–8 Mar. 2015; Norrbom and Savaris leg.; river crossing, Malaise trap; DEBU.

ECUADOR – **Chimborazo** • 1 ♂; Bugna; 1400 m a.s.l.; Levi-Castillo leg.; USNM • 1 ♂; Linje Chimborazo; Jul. 1955; Levi-Castillo leg.; USNM. **– Cotopaxi** • 1 ♂; 66 km E of Quevedo; 15 Jan. 1978; W.N. Mathis leg.; USNM. **– El Oro** • 1 ♀; Río Palenque; 27 Feb. 1979; S.A. Marshall leg.; dung; DEBU. – **Guayas** • 1 ♂, 1 ♀; 16 km N of Manglar Alto; 30 Jan. 1955; E.I. Schlinger and E.S. Ross leg.; CAS. – **Los Ríos** • 4 ♂♂, 4 ♀♀; Pichilingue; 40 m a.s.l.; 2 Feb. 1955; E.I. Schlinger and E.S. Ross leg.; CAS. **– Manabí** • 1 ♂, 1 ♀; Montecristi; Feb. 1983; M. Sharkey leg.; CNCI. **– Pichincha** • 7 ♂♂, 4 ♀♀; same data as for holotype; DEBU • 7 ♂♂, 5 ♀♀; same data as for holotype; QCAZ • 2 ♂♂; 7 km SE of Nanegalito, trout farm ‘San Jose’; 1500 m a.s.l.; 27–30 Oct. 1999; S.A. Marshall leg.; riverine forest, treefall sweeps; QCAZ • 1 ♂; 9.7 km E of Santo Domingo de los Colorados; 24 Feb. 1955; E.I. Schlinger and E.S. Ross leg.; CAS • 2 ♂♂, 2 ♀♀; 27 km S of Santo Domingo, Rio Palenque Station; 250 m a.s.l.; 17–25 Feb. 1979; S.A. Marshall leg.; QCAZ • 1 ♂; same data as for holotype; 1400–1700 m a.s.l.; 27 Apr. 2002; S.A. Marshall leg.; main trail; DEBU • 4 ♂♂, 2 ♀♀; Maquipucuna Biological Reserve, 1300 m a.s.l.; 27 Oct. 1999; S.A. Marshall leg.; main trail; QCAZ • 9 ♂♂, 2 ♀♀; same data as for preceding; 1200 m a.s.l.; 29 Oct. 1999; river trail, sweeping; DEBU • 10 ♂♂, 2 ♀♀; same data as for preceding; QCAZ • 2 ♂♂; same collecting data as preceding; 27 Oct. 1999; QCAZ • 1 ♂; Rio Palenque Station, 47 km S of Santo Domingo; 160–190 m a.s.l.; 1–4 May 1987; L.D. Coote leg.; primary rainforest, screen sweep; ROME • 1 ♂, 2 ♀♀; Rio Palenque Station, 47 km S of Santo Domingo; 180 m a.s.l.; 29.Apr.–5 May 1987; L.D. Coote and B.V. Brown leg.; 1° lowland rainforest, Malaise head; ROME • 1 ♀; Tinalandia; 800 m a.s.l.; 2–7 Feb. 1983; M. Sharkey and L. Masner leg.; Malaise trap; CNCI.

PARAGUAY – **Caazapá** • 1 ♀; Hermosa, San Rafael Reserve, Lopez family property; 26°19′15″ S, 55°44′55″ W; 90 m a.s.l.; 3–6 Dec. 2000; Z.H. Falin leg.; flight-intercept trap; DEBU.

Other material examined

COSTA RICA – **Guanacaste** • 1 ♂; Area de Conservacion Guanacaste, Pailas Dos; 10°45′46.8″ N, 85°00′02.4″ W; 831 m a.s.l.; 20 Sep. 2018; D. Janzen and W. Hallwachs leg.; moist lowland forest, Malaise trap; BIOUG60939-D12/PLFDS108-20 sequenced for CO1-5; BIOUG.

Description

Body (Fig. 66A). Length 2.0–3.1 mm. Head brown, lower half of frons orange; face, gena, and antennae orange-brown. Frontal width 2.3–2.4 × frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.6–0.7 × length of posterior. Palpus yellow. Eye large, greatest height about 3.5 × shortest genal height. Thorax brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.3 × length of posterior pair) separated by 8–9 rows of acrostichal setulae. Membrane around prosternum bare. Legs yellow, mid and hind femora brownish. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical quarter. Wing (Fig. 7B) hyaline. CS2 0.8–0.9 × CS3. Halter pale brown.

Male abdomen (Figs 66B–D, 67). Dark brown, tergites reddish medially, posterior edges of tergites slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.1 × as long as S4, right side longer than left side, posterolaterally long setose with a large desclerotized medial area (extending about halfway to anterior edge), a dark, ovoid, medial patch of dense but fine setulae, and a large, dark, anvil-shaped posteromedial sclerite. Anterior flange of S6+7 1.0 × as long as wide. Sclerite A small, lightly sclerotized; sclerite B well developed and long, normally arched into genital pouch; sclerite C absent; sclerite D well sclerotized and L-shaped; sclerite E small, fitting into a depression in distal half of large sclerite F; sclerite G smaller than ring sclerite; ring sclerite well sclerotized. Epandrium large, 0.9 × length of S8, height 1.3 × maximum length and 0.8 × maximum width, uniformly long-setose; perianal pads weakly developed but densely setulose. Pseudocercus very small, bearing only a single seta; halves of subepandrial sclerite short and narrow, C-shaped with a thin mesial lobe and very weakly fused medially. Subcercus large and shield-like with small lobes articulating with surstylus and epandrium, apex weakly pointed. Hypandrium with long anteromedial apodeme with pair of thin posterobasal lobes. Surstylus very large and broad, twice as long as deep, inner surface concave, with dense lateral setae and a setose inner basal ridge (ridge entire). Postgonite relatively long, almost straight, uniformly broad, apex swollen with prominent ridges. Phallapodeme large, gradually broadened towards apex; basiphallus expanded posterodorsally with a pointed central lobe and a pair of round, downturned lateral lobes, basal part extending ventrally as an apically flared tube-like section which articulates with distiphallus; distiphallus largely reduced with a broad dorsal sclerite and a narrow, U-shaped ventral sclerite.

Female abdomen (Fig. 68). T7 broad, posteromedially shortened; T8 divided into a small, pale dorsal sclerite and two dark lateral sclerites with angulate posteroventral corner. Epiproct small, pale, and posteromedially setulose. Cercus narrow and elongate with a large apical seta and a moderate preapical seta. S7 broad, rounded posteriorly with four large posterior setae; S8 reduced to two dark, ovoid lateral sclerites. Three spermathecae, single one larger than paired ones, bulb bean-shaped and smooth with a slight basal invagination.

Distribution

Neotropical: Argentina, Bolivia, Brazil, Costa Rica, Ecuador, Paraguay.

Remarks

Sclerocoelus irregularis sp. nov. resembles *S. dominicensis* sp. nov., *S. pararegularis* sp. nov., and *S. regularis*, from which it differs in having males with a straight postgonite and a much smaller

desclerotized medial area on S5; females of these species appear to be indistinguishable. *Sclerocoelus irregularis* is widespread in South America and is also known from a single specimen collected in Costa Rica; the three similar species occur in the Caribbean, Mexico, Central America and northern South America.

Sclerocoelus latibarbus sp. nov.
urn:lsid:zoobank.org:act:7E41C439-94A0-4B8F-BA06-CC89999CE431
Figs 7C, 69–71

Etymology

This name refers to the broad posteromedial patch of setulae on the male S5, especially in relation to that of the externally similar *S. longibarbus* (from the Latin words '*latus*', meaning 'broad', and '*barba*', meaning 'beard').

Material examined

Holotype

GUATEMALA • ♂; Sacatepéquez, Finca San Rafael; 2100 m a.s.l.; 30 Jun. 1948; R.D. Mitchell leg.; sweeping in oak second growth; FMNH.

Paratypes

GUATEMALA – **Baja Verapaz** • 1 ♀; Biotopo del Quetzal; 15°12′46″ N, 90°12′56″ W; 1720 m a.s.l.; 7–10 May 2009; cloud forest, Malaise trap; UVGC. – **Jutiapa** • 2 ♂♂, 1 ♀; El Progresso, Cerro Pinalón; 15°05′01″ N, 89°56′42″ W; 2575 m a.s.l.; 29 Apr.–5 May 2009; treefall gap edge in cloud forest, Malaise trap; UVGC • 1 ♂; El Progresso, Cerro Pinalón; 15°05′06″ N, 89°56′42″ W; 30 Apr.–5 May 2009; cloud forest, Malaise trap; DEBU. – **Quetzaltenango** • 13 ♂♂, 15 ♀♀; 8 km SE of Quetzaltenango, Zunil, 2450 m a.s.l.; 17–19 Jun. 1993; J.S. Ashe and R.W. Brooks leg.; flight-intercept trap; DEBU • 1 ♂, 1 ♀; same data as for preceding; 19–21 Jun. 1993; SEMC • 13 ♂♂, 9 ♀♀; same data as for preceding; 2480 m a.s.l.; 17–19 Jun. 1993; SEMC • 9 ♂♂, 12 ♀♀; same data as for preceding; 2500 m a.s.l.; SEMC • 9 ♂♂, 13 ♀♀; same data as for preceding; 19–21 Jun. 1993; SEMC • 2 ♂♂, 2 ♀♀; same data as for preceding; 19–21 Jun. 1993; DEBU • 1 ♂, 5 ♀; same data as for preceding; 2620 m a.s.l.; 17–19 Jun. 1993; SEMC • 3 ♂♂; same data as for preceding; 19–21 Jun. 1993; SEMC • 3 ♂♂, 6 ♀♀; same data as for preceding; 2630 m a.s.l.; 17–19 Jun. 1993; DEBU • 1 ♀; same data as for preceding; 19–21 Jun. 1993; SEMC • 26 ♂♂, 31 ♀♀; same data as for preceding; 2650 m a.s.l.; 17–19 Jun. 1993; DEBU • 23 ♂♂, 14 ♀♀; same data as for preceding; 19–21 Jun. 1993; SEMC • 1 ♀; 12 km SE of Quetzaltenango, Zunil, Fuentes Georginas; 2460 m a.s.l.; 21 Jun. 1993; R. Anderson leg.; cloud forest, litter; DEBU. – **Sacatepéquez** • 2 ♀♀, 5 km SE of Antigua; 14°31′43″ N, 90°41′20″ W; 2330 m a.s.l.; 10–13 Jun. 2009; oak forest, Malaise trap; DEBU • 1 ♂, 5 km SE of Antigua; 14°32′14″ N, 90°41′40″ W; 2125 m a.s.l.; 10–13 Jun. 2009; hardwood forest, Malaise trap; UVGC. – **San Marcos** • 2 ♀♀; 8 km NE of San Lorenzo; 4–18 Jul. 1986; J.M. Campbell leg.; flight-intercept trap; CNCI • 1 ♀; same data as for preceding; 7–10 Jul. 1986; CNCI • 1 ♂, 8 ♀♀; same data as for preceding; 10 Jul. 1986; CNCI • 8 ♂♂, 11 ♀♀; same data as for preceding; 12 Jul. 1986; CNCI • 4 ♀♀; same data as for preceding; 13 Jul. 1986; CNCI • 10 ♂♂, 3 ♀♀; San Antonio Sacatepéquez; 2440 m a.s.l.; 29 Sep. 1987; M.J. Sharkey leg.; CNCI • 3 ♂♂, 3 ♀♀; San Lorenzo; 19 Jul. 1986; J.M. Campbell leg.; flight-intercept trap; CNCI. – **Zacapa** • 1 ♂, 4 ♀♀; 25 km N of Santa Cruz; 18 Nov. 1986; M. Sharkey leg.; moist banks of Rio Pasabien, sweep; CNCI • 3 ♂♂, 3 ♀♀; above San Lorenzo; 1800–2000 m a.s.l.; 8 Nov. 1986; M.J. Sharkey leg.; sweep; CNCI • 1 ♂; Zacapa, 18 Nov. 1986; M.J. Sharkey leg.; sweep; CNCI.

HONDURAS – **El Paraíso** • 2 ♂♂, 4 ♀♀; Cerro Montserrat; 1800 m a.s.l.; 24 May 1994; H. Howden leg.; Malaise trap; DEBU • 1 ♀; Yuscaran, Cerro Montserrat; 24 Jan. 1995; R. Cordiro leg.; flight-

intercept trap; DEBU. – **Francisco Morazán** • 1 ♀; Cerro Uyuca; 1800 m a.s.l.; 10 May 1994; H. Howden leg.; Malaise trap; DEBU • 3 ♂♂, 1 ♀; same data as for preceding; 27 May 1994; DEBU • 2 ♂♂; same data as for preceding; 30 May 1994; DEBU • 2 ♀♀; same data as for preceding; 3 Jun. 1994; DEBU.

MEXICO – **Chiapas** • 1 ♂; 4 km SE of Custepec; 15°42′30″ N, 92°55′51″ W; 2100 m a.s.l.; 20 May 2008; cloud forest, Malaise trap; UVGC • 2 ♂♂, 4 ♀♀; 5 km NNW of Coapilla; 17°10′34″ N, 93°07′59″ W; 1910 m a.s.l.; 25 May 2008; 2° mesophyll forest, Malaise trap; DEBU • 2 ♂♂, 4 ♀♀; same data as for preceding; UVGC • 1 ♂, 2 ♀♀; 15 km E of San Cristóbal; 16°44′49″ N, 92°29′24″ W; 2500 m a.s.l.; 29 May–1 Jun. 2008; cloud forest, Malaise trap; DEBU.

Other material examined

HONDURAS – **Cortes** • 1 ♀; Cusuco National Park, base camp; 15°29′38.4″ N, 88°12′50.4″ W; 1600 m a.s.l.; 3 Jul. 2013; M. D'Souza leg.; forest, Malaise trap; BIOUG07842-G09/DMHGA543-13 sequenced for CO1-5'; BIOUG.

Description

Body (Fig. 69A). Length 2.6–3.9 mm. Head dark brown, lower fifth of frons orange; face, gena, and antennae brown. Frontal width 2.2–2.3× frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.5–0.6× length of posterior. Palpus yellow. Eye large, greatest height about 4.0× shortest genal height. Thorax dark brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4× length of posterior pair) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, fore femur darker. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical quarter. Wing (Fig. 7C) slightly infuscate. CS2 subequal to CS3. Halter pale brown.

Male abdomen (Figs 69B–C, 70). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 2.0× length of S4, anteromedially emarginate, laterally setose with a dark, rectangular patch of dense setulae flanked by dark setose patches. Anterior flange of S6+7 very large, 1.0× as long as wide, longer than S5. Sclerite A elongate, dark; sclerite B broad, pale, arched; sclerite C absent; sclerite D dark, elongate, slightly angulate and arising from left side of posteromedial process of S5; sclerite E elongate with a broad, flat basal part and a narrow distal part; sclerite F large, with a small basal part and a large, broad, posteriorly projecting left process; sclerite G slightly reduced, strongly carinate, and fused to sclerite F; ring sclerite thick. Epandrium large, 0.7× length of S8, height 1.1× maximum length and 0.7× maximum width, uniformly setose, ventrolateral corners strongly emarginate; anal fissure triangular with sinuate sides, widest at base; perianal pads bulging, dark, densely setulose dorsally, densely setose ventrally. Pseudocercus large, separate form epandrium, and with three setae; halves of subepandrial sclerite thin, strongly arched, and medially fused. Subcercus with short inner part articulating with subepandrial sclerite dorsally, forming a small, posteriorly bent process ventrally, and a larger, triangular outer part with a curved, tapered, apicoventral process. Hypandrium with slightly sinuate anteromedial apodeme. Surstylus relatively short, subtriangular with apical third long-setose and curved anteriorly, inner surface with a large carinate anterior lobe. Postgonite large, flattened, apical third bent anteriorly, expanded, pale, and striate. Phallapodeme large, apex dorsoventrally flattened; basiphallus small, constricted medially with a small, flattened, triangular epiphallus; distiphallus short, largely membranous with a pair of dark, sinuate, dorsolateral sclerites and a broad, pale, ventral sclerite.

Female abdomen (Fig. 71). T7 broad, simple, posterior margin concave; T8 divided into a large, broad, pale, dorsal sclerite and two large, dark, lateral sclerites, posterolateral corners expanded and pointed. Epiproct large, medially split into two rounded plates, posteromedially desclerotized, and entirely

setulose. Cercus elongate, apically pointed with long apical, dorsal, dorsolateral, and apicoventral setae. S7 broad, posteromedially pointed, broadly desclerotized posteriorly with four large posterior setae; S8 divided into two large, dark, subtriangular, lateral sclerites. Hypoproct very broad with thickened ventromedial setulae. Three spermathecae, bulb elongate, bean-shaped, finely striate with a shallow basal and a subapical invagination, both with a small, finger-like, central process.

Distribution

Neotropical: Guatemala, Honduras, Mexico.

Remarks

Sclerocoelus latibarbus sp. nov. is most easily distinguished from the similar *S. longibarbus* sp. nov. by the short but wide (1.5× as wide as long) posteromedial tuft on the male S5. *Sclerocoelus latibarbus* is one of several members of the *S. dasysternum* species group found in cloud forest habitats in Mexico and Central America.

Sclerocoelus lazulita sp. nov.
urn:lsid:zoobank.org:act:E33053F2-93CD-47A6-8862-E8CDFC271928
Figs 7D, 72–74

Etymology

This name reflects the type locality of this species, La Azulita, Venezuela.

Material examined

Holotype

VENEZUELA • ♂; Mérida, Jají-La Azulita; 3 May 1988; S.A. Marshall leg.; roadside sweeps; DEBU.

Paratypes

BOLIVIA – **La Paz** • 1 ♂; Chulumani Road, near La Florida; 4 Apr. 2001; S.A. Marshall leg.; on rotting vegetation; CBFC • 1 ♂; Chulumani, Apa-Apa Reserve; 16°21′15″ S, 67°30′21″ W; 2000 m a.s.l.; 1–3 Apr. 2001; S.A. Marshall leg.; pan traps; CBFC. – **Santa Cruz** • 1 ♂; Siringalito, near Pampa Grande; 2 Oct. 1996; Bettella and Rossi leg.; DEBU.

ECUADOR – **Carchi** • 3 ♀♀; Bosque El Arrayán, 6 km E of San Gabriel; 2830 m a.s.l.; 1 Nov. 1999; S.A. Marshall leg.; sweeping; QCAZ • 1 ♂; Guandera Forest Reserve, 15 km E of San Gabriel; 3400 m a.s.l.; 1 Nov. 1999; S.A. Marshall leg.; hand; QCAZ. – **Loja** • 1 ♂, 2 ♀♀; Podocarpus National Park, Cajanuma, Bosque Nublado trail; 3000 m a.s.l.; 16–20 Feb. 2009; M. Pollet and A. De Braekeleer leg.; yellow pans; RBINS • 1 ♂, 1 ♀; same collection data as preceding; 20–27 Feb. 2009; RBINS • 1 ♂, 1 ♀; same data as for preceding; Los Miradores trail; 16–20 Feb. 2009; RBINS. – **Napo** • 1 ♀; Baeza; 1500 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; wet montane rainforest, Malaise trap; DEBU • 7 ♂♂, 4 ♀♀; Baeza; 1700 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; near small creek, wet montane forest/pasture, Malaise head; QCAZ • 2 ♂♂; SierrAzul Lodge, 14 km W of Cosanga; 2200 m a.s.l.; 5 Nov. 1999; S.A. Marshall leg.; forest, sweep; DEBU. – **Pichincha** • 1 ♀; 3.5 km SE of Tandayapa; 28 Oct. 1999; S.A. Marshall leg.; in green leaf litter (treefall); QCAZ • 2 ♂♂; 7 km SE of Nanegalito, trout farm ‘San Jose’; 1500 m a.s.l.; 27–30 Oct. 1999; S.A. Marshall leg.; riverine forest, treefall sweeps; QCAZ • 1 ♀; 10 km NW of Quito, valley near Hosteria San Jorge; 3050 m a.s.l.; 22–25 Oct. 1999; S.A. Marshall leg.; creek bed, pan traps; DEBU • 1 ♂; 15 km NW of Nono, road to Mindo; 2000 m a.s.l.; 23–25 Oct. 1999; S.A. Marshall leg.; pan traps; DEBU • 1 ♂; Bellavista Cloud Forest Reserve; 0°01′13″ S, 78°40′30″ W; 2200 m a.s.l.; 1 May 2011; S.A. Marshall leg.; pans near treefall; DEBU • 2 ♂♂, 1 ♀; Campamento Pichan, near Nono; 3200 m a.s.l.; 24 Oct.

1999; S.A. Marshall leg.; sweeping; QCAZ • 1 ♂; Cotopaxi National Park, Quebrada Mishahuaycu; 3600 m a.s.l.; 25 Oct. 1999; S.A. Marshall leg.; under streamside vegetation; DEBU • 2 ♂♂; same data as for preceding; 26 Oct.–8 Nov. 1999; pans along stream; QCAZ. – **Zamora-Chinchipe** • 2 ♀♀; San Francisco Biological Reserve, Canal trail; 3°58′30″ S, 79°04′25″ W; 2000 m a.s.l.; 18–25 Feb. 2009; M. Pollet and A. De Braekeleer leg.; blue pan traps; debu00368027/MYCRO1032-22 sequenced for CO1-5'; RBINS.

VENEZUELA – **Mérida** • 1 ♂, 1 ♀; same collection data as holotype; DEBU • 1 ♂, 1 ♀; 6 km S of Azulita, near road; 3 May 1988; S.A. Marshall leg.; DEBU. – **Trujillo** • 1 ♂; 10 km E of Bocono, Laguna de Lucerdo; 3 Mar. 1995; S.A. Marshall leg.; aspirated along river; DEBU • 4 ♂♂, 3 ♀♀; Bocono, road to Guaramacal; 2570 m a.s.l.; 2 Mar. 1995; S.A. Marshall leg.; creek bed; DEBU • 1 ♂; Guaramacal National Park, 14 km NE of Bocono; 2000 m a.s.l.; 25 Aug.–1 Sep. 1992; L. Masner leg.; DEBU • 1 ♂; Guaramacal National Park; 2000–3000 m a.s.l.; 26 Aug.–1 Sep. 1992; L. Masner leg.; car net; DEBU.

Description

Body (Fig. 71A). Length 2.7–3.9 mm. Head dark brown, bottom of frons orange; face, gena, and antennae brown. Frontal width 2.2–2.3 × frontal height. Two pairs of strong interfrontal bristles surmounting a fine third pair; anterior orbital 0.4–0.5 × length of posterior. Palpus pale brown, slightly swollen. Eye large, greatest height about 4.0 × shortest genal height. Thorax dark brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4 × length of posterior pair) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, hind leg darker. Fore femur with four large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical third. Wing (Fig. 7D) slightly infuscate. CS2 0.7–0.8 × CS3. Halter pale brown.

Male abdomen (Figs 71B–C, 72). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 0.8 × length and 1.3 × width of S4, laterally sparsely long-setose with a medial desclerotized patch and two posteromedial rows of setae above a small, dark central process. Anterior flange of S6+7 small, triangular, weakly developed. Sclerite A well developed, bean-shaped; sclerite B weakly sclerotized, narrow and arched; sclerite C absent; sclerites D and E fused, large, angulate; sclerite F large, elongate, distal third constricted and bent inwards; sclerite G large, rectangular; ring sclerite very weakly developed. Epandrium small, 0.2 × length of S8, height 1.5 × maximum length and 0.8 × maximum width, uniformly setose; perianal pads weakly developed but densely setulose. Pseudocercus absent; halves of subepandrial sclerite simple, slightly curved, fused medially forming a broad arc. Subcercus large, longer than surstylus, triangular in posterior view, tapered and blade-like in lateral view, apex rounded. Hypandrium with narrow anteromedial apodeme with two small posterior lobes. Surstylus simple, broad, subtriangular with ventral and posterior setae, apex bent slightly outwards. Postgonite large, gradually broadened anteriorly to about distal third then tapered to an asymmetrical point, apex slightly swollen. Phallapodeme long, apex dorsoventrally flattened; basiphallus elongate, curved, dorsally expanded to a point; distiphallus largely membranous, dorsoventrally flattened with two sinuate dorsolateral sclerites.

Female abdomen (Fig. 73). T7 broad, simple; T8 divided into two dark, lateral sclerites, posterolateral corners slightly expanded posteriorly. Epiproct broad, subtriangular, slightly desclerotized, entirely setulose and without dorsal pair of setae. Cercus short, apically pointed with long apical and dorsal setae. S7 broad, greatly extended posteromedially, apex flared (Y-shaped), posterior margin on either side of medial extension with two large posterior setae; S8 entirely membranous or absent. Three spermathecae, bulb stout, cylindrical, finely striate with deep but short invaginations on either end, invaginations with a finger-like, central process.

Distribution

Neotropical: Bolivia, Ecuador, Venezuela.

Remarks

Sclerocoelus lazulita sp. nov. resembles *S. nebulosus* sp. nov. and *S. paranebulosus* sp. nov., but has two large interfrontal bristles (as opposed to three in *S. nebulosus* and *S. paranebulosus*). All three species are among the basal lineages that lack the pseudocercus and elaborate subcercus of the *S. galapagensis* and *S. dasysternum* groups.

Sclerocoelus limbus sp. nov.

urn:lsid:zoobank.org:act:6921C506-F8A6-421E-88D3-0ABD4191CE97

Figs 7E, 75–77

Etymology

This name refers to the long fringe of thickened setae along the posterior margin of the male S5 (from the Latin '*limbus*', meaning 'border, edge, fringe, hem').

Material examined

Holotype

BOLIVIA • ♂; Cochabamba, 72 km E of Cochabamba; 2850 m a.s.l.; 3 Feb. 1999; R. Anderson leg.; Yungas, wet litter; CBFC debu00127173.

Paratypes

BOLIVIA – **Santa Cruz** • 1 ♀; Kara Huasi, Yungas de la Siberia, 26.4 km NW of Comarapa; 2600 m a.s.l.; 27 Jan. 1999; R. Anderson leg.; mixed yungas/bamboo litter; CBFC • 1 ♂; same data as for preceding; debu00111049/MYCRO901-21 sequenced for CO1-5'; DEBU.

PERU – **Cusco** • ♂; Wayqecha Biological Station, ~9 km NE of Challabamba; 13°11′18″ S, 71°35′06″ W; 3100 m a.s.l.; 7–8 Dec. 2011; S.A. Marshall leg.; MUSM.

Description

Body (Fig. 75A). Length 3.0–3.4 mm. Head dark brown, margin of frons, center of face, and antenna orange. Frontal width 2.2–2.3 × frontal height. Two pairs of large interfrontal bristles surmounting a fine third; anterior orbital 0.5–0.6 × length of posterior. Palpus pale brown. Eye large, greatest height about 3.0 × shortest genal height. Thorax dark brown, scutum shiny with slightly paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4 × length of posterior pair) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, femora apically yellow. Fore femur with four large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae along apical third. Wing (Fig. 7E) short, extending only to T3 or T4; infuscate. All veins distinguishable. CS2 0.6–0.7 × CS3. Halter significantly reduced, stem short and white, knob ~3.0 × size of ocellus and brown.

Male abdomen (Figs 75B–C, 76). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 broad, rectangular, 0.8 × length of S4, setae almost entirely restricted to posterior margin, medially pale with a dark, anteriorly Y-shaped, posteriorly triangular, posteromedial patch surrounded by 2 dark, rhombic sclerotized patches bearing thickened posterior setae. Anterior flange of S6+7 not developed. Sclerite A a small lobe not distinctly differentiated from S6+7; sclerite B long, dark, arched; sclerites C and D apparently absent; sclerite E small, dark, flattened ventrally, broadened dorsally and fused to sclerite F; sclerites F and G fused,

large, flat, and weakly sclerotized; ring sclerite indistinct. Epandrium small, 0.7× length of S8, height 1.9× maximum length and 0.7× maximum width, uniformly setose; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite relatively straight, medially fused. Cercus large, almost parallel-sided in posterior view, with a posterior bulge about midlength, basal half with 3 posterior setae and dense setulae. Hypandrium with long, thin anteromedial apodeme. Surstylus broadly rounded, bulging, laterally and ventrally densely setose with a bare, flattened, anterior lobe. Postgonite short, basal two-thirds relatively parallel-sided, apical third tapered, curved with dense setulae along inner surface, apex emarginate. Phallapodeme long, slightly sinuate; basiphallus round basally with a narrowed, neck-like extension to base of distiphallus; distiphallus large, largely membranous with a very broad, scoop-like ventral membrane and a curled, sinuate, dorsally setulose dorsomedial sclerite.

Female abdomen (Fig. 77). T7 broad, simple; T8 desclerotized dorsomedially, leaving two large, dark, lateral sclerites, posterolateral corners greatly expanded and rounded. Epiproct large, subrectangular, medially split, and sparsely setulose around setae. Cercus elongate, apically pointed with long, curved apical and dorsal setae. S7 broad, broadly desclerotized posteriorly with 4–6 large posterior setae; S8 reduced to a very small, setulose, medial sclerite. Hypoproct broad, densely setulose in apical third. Three spermathecae, bulb stout, spherical, finely striate with a deep basal and a shallow apical invagination, invaginations almost touching.

Distribution

Neotropical: Bolivia, Peru.

Remarks

Sclerocoelus limbus sp. nov. is easily recognized by the strongly shortened wings, strong posterior setae on the male S5, and almost semicircular lateral sclerites of the female T8. *Sclerocoelus limbus* has distinct cerci fused basally into a subanal plate, and it lacks separate pseudocerci or subcerci. These characters suggest that *S. limbus* and the similarly brachypterous species *S. aduncus* sp. nov., *S. flavus* sp. nov., and *S. meridensis* sp. nov. are among the few species in the genus basal to the large, derived groups characterized by separate subcerci and pseudocerci. All four species are associated with wet, green plant material in high elevation cloud forests or elfin forests in the Andes.

Sclerocoelus longibarbus sp. nov.

urn:lsid:zoobank.org:act:C39098D9-8ED4-482B-B895-10AD8C1B2F11

Figs 7F, 78–80

Etymology

This name refers to the elongate posteromedial patch of setulae on the male S5, especially in relation to that of the externally similar *S. latibarbus* (from the Latin words '*longus*', meaning 'long', and '*barba*', meaning 'beard').

Material examined

Holotype

GUATEMALA • ♂; Jutiapa, El Progresso, Cerro Pinalón; 15°05′01″ N, 89°56′42″ W; 2575 m a.s.l.; 29 Apr.–5 May 2009; treefall gap edge in cloud forest, Malaise trap; DEBU.

Paratypes

COSTA RICA – **Cartago** • 1 ♀; Tapantí National Park, La Esperanza del Guarco; 9°42′00″ N, 83°51′49″ W; 2700 m a.s.l.; 17–18 Aug. 2001; S.A. Marshall leg.; oak forest, treefall pans; DEBU.

– **Heredia** • 1 ♂, 2 ♀♀; Braulio Carrillo National Park, Barva Biological Station; 16 Feb. 2003; S.A. Marshall leg.; downed bromeliads sweep; DEBU.

GUATEMALA – **Jutiapa** • 6 ♂♂, 16 ♀♀; same data as for holotype; debu00347832/MYYRO779-20 sequenced for CO1-5'; DEBU • 6 ♂♂, 20 ♀♀; same data as for holotype; UVGC • 1 ♀; El Progresso, Cerro Pinalón; 15°05′06″ N, 89°56′42″ W; 30 May–5 May 2009; cloud forest, Malaise trap; DEBU. – **Quetzaltenango** • 6 ♀♀; 8 km SE of Quetzaltenango, Zunil; 2450 m a.s.l.; 17–19 Jun. 1993, J.S. Ashe and R.W. Brooks leg.; flight-intercept trap; SEMC • 4 ♀♀; same data as for preceding; 19–21 Jun. 1993; SEMC • 5 ♂♂, 9 ♀♀; same data as for preceding; 2480 m a.s.l.; 17–19 Jun. 1993; SEMC • 5 ♂♂, 10 ♀♀; same data as for preceding; 2500 m a.s.l.; DEBU • 1 ♂, 4 ♀♀; same data as for preceding; 19–21 Jun. 1993; SEMC • 1 ♂, 1 ♀; same data as for preceding; 2620 m a.s.l.; 17–19 Jun. 1993; SEMC • 5 ♂♂, 3 ♀♀; same data as for preceding; 2630 m a.s.l.; SEMC • 21 ♂♂, 31 ♀♀; same data as for preceding; 2650 m a.s.l.; SEMC • 3 ♂♂, 9 ♀♀; same data as for preceding; 19–21 Jun. 1993; DEBU • 2 ♀♀; 12 km SE of Quetzaltenango, Zunil, Fuentes Georginas; 2460 m a.s.l.; 21 Jun. 1993; R. Anderson leg.; cloud forest, litter; UVGC. – **Sacatepéquez** • 2 ♀♀; 5 km SE of Antigua; 14°32′14″ N, 90°41′40″ W; 2125 m a.s.l.; 10–13 Jun. 2009; hardwood forest, Malaise trap; DEBU. – **San Marcos** • 1 ♀; 6.4 km N of San Lorenzo; 18 Jul. 1986; J.M. Campbell leg.; sifted mushroom piles; CNCI • 4 ♀♀; 8 km NE of San Lorenzo; 10 Jul. 1986; J.M. Campbell leg.; flight-intercept trap; CNCI • 2 ♂♂, 4 ♀♀; same data as for preceding; 12 Jul. 1986; CNCI • 1 ♀; same data as for preceding; 13 Jul. 1986; CNCI • 4 ♂♂, 2 ♀♀; San Antonio Sacatepéquez; 2440 m a.s.l.; 29 Sep. 1987; M.J. Sharkey leg.; CNCI • 5 ♀♀; San Lorenzo; 19 Jul. 1986; J.M. Campbell leg.; flight-intercept trap; CNCI. – **Zacapa** • 1 ♂; 3.5 km SE of La Union; 1500 m a.s.l.; 23–25 Jun. 1993; J.S. Ashe and R.W. Brooks leg.; flight-intercept trap; SEMC • 1 ♂; 25 km N of Santa Cruz; 18 Nov. 1986; M. Sharkey leg.; moist banks of Rio Pasabien, sweep; CNCI • 3 ♂♂, 1 ♀; above San Lorenzo; 1800–2000 m a.s.l.; 8 Nov. 1986; M.J. Sharkey leg.; sweep; CNCI • 1 ♀; San Lorenzo; 1800 m a.s.l.; 11–13 Jul. 1986; L. LeSage leg.; pan traps in field; CNCI • 1 ♀; San Lorenzo; Dec. 1986; M.J. Sharkey leg.; Malaise trap; CNCI.

MEXICO – **Chiapas** • 1 ♀; 4 km SE of Custepec; 15°42′30″ N, 92°55′51″ W; 2100 m a.s.l.; 20 May 2008; cloud forest, Malaise trap; UVGC • 2 ♂♂; 5 km NNW of Coapilla; 17°10′56″ N, 93°09′06″ W; 1910 m a.s.l.; 25 May 2008; 2° mesophyll forest, Malaise trap; DEBU.

Description

Body (Fig. 78A). Length 2.9–4.5 mm. Head dark brown, lower fifth of frons orange; face, gena, and antennae brown. Frontal width 2.2–2.3× frontal height. Three pairs of strong interfrontal bristles surmounting a fine fourth pair; anterior orbital 0.6–0.7× length of posterior. Palpus pale brown. Eye large, greatest height 3.0–3.5× shortest genal height. Thorax dark brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.5× length of posterior pair) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, foreleg paler. Fore femur with 3–4 large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical third. Wing (Fig. 7F) slightly infuscate. CS2 subequal to CS3. Halter brown with pale apex.

Male abdomen (Figs 78B–C, 79). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 large, heart-shaped, 2.2× length of S4, deeply emarginate anteromedially, posterolaterally long-setose with a dark, elongate, posteromedial patch of dense setulae and a dark medial strip extending to anterior margin. Anterior flange of S6+7 very large, 2.7× as long as wide. Sclerite A indistinct from S6+7; sclerite B long, dark, and arched into genital pouch; sclerite C apparently absent; sclerite D large, dark, elongate and thick with a narrow basolateral process, originating underneath posteromedial patch of S5; sclerite E small, dark, subtriangular; sclerites F and G fused, very elongate, strongly sinuate and extending from

far right side of S5 to below sclerite D, sclerite G part with a patch of lateral setae; ring sclerite large, well developed. Epandrium moderate, 0.6× length of S8, height 1.1× maximum length and 0.7× maximum width, long-setose, posteroventral corner slightly reduced; anal fissure large and dorsally acute; perianal pads bulging and densely setulose but membranous. Pseudocercus large, separate from epandrium, and bearing three setae; halves of subepandrial sclerite thin, strongly arched, and medially fused. Subcercus with short inner part articulating with subepandrial sclerite dorsally, forming a small, posteriorly bent process ventrally, and a larger, triangular outer part with a curved, tapered, apicoventral process. Hypandrium with very thin and slightly sinuate anteromedial apodeme. Surstylus relatively short, broadly rounded posteriorly with a small triangular anterior lobe and a slight dorsal notch, lateral surface covered in thickened, papillae-like setulae, inner surface with dense setae. Postgonite large, flattened, apical third bent anteriorly, slightly expanded, pale, and striate. Phallapodeme very large, apex dorsoventrally flattened; basiphallus strongly dorsoventrally flattened basally and posteriorly separated into a triangular medial lobe and a pair of rounded lateral lobes; distiphallus short, largely membranous with a pair of dark, sinuate, dorsolateral sclerites and a broad, pale, ventral sclerite.

Female abdomen (Fig. 80). T7 broad, simple; T8 divided into a large, pale, dorsal sclerite and two large, dark, lateral sclerites, posterolateral corners slightly expanded and truncate. Epiproct large, ovoid, medially split, posteromedially desclerotized, and entirely setulose. Cercus elongate, apically rounded with long apical, dorsal, lateral, and apicoventral setae. S7 broad, posteromedially expanded into a rounded, desclerotized tab, with four large posterior setae; S8 divided into two very small, dark, lateral sclerites, each with a minute setula. Hypoproct with thickened ventromedial setulae. Three spermathecae, bulb stout, cylindrical, deeply striate with a very large apical invagination (this may be due to bulb collapsing into itself).

Distribution

Neotropical: Costa Rica, Guatemala, Mexico.

Remarks

Sclerocoelus longibarbus sp. nov. is most easily distinguished from the similar *S. latibarbus* sp. nov. by the long (more than twice as long as wide) posteromedial tuft on the male S5. *Sclerocoelus longibarbus* is one of several members of the *S. dasysternum* species group found in cloud forest habitats in Mexico and Central America.

Sclerocoelus lutosus sp. nov.

urn:lsid:zoobank.org:act:26D008D4-3881-4CDB-A7DB-5B2B1A99AEED

Figs 7G, 81–83

Etymology

This name reflects the muddy, riparian habitats recorded for most of the type specimens (from the Latin '*lutosus*', meaning 'muddy').

Material examined

Holotype

PERU • ♂; Cusco, 6.6 km S of Paucartambo; 13°22′49″ S, 71°36′17″ W; 3100 m a.s.l.; 13–16 May 2007; Marshall, Kits and Paiero leg.; along creek, yellow pans; MUSM debu00303223.

Paratypes

BOLIVIA – **La Paz** • 1 ♂, 1 ♀; 3 km E of Desaguadero, shore Lago Titicaca; 16°33′26″ S, 69°01′21″ W; 19 Apr. 2001; S.A. Marshall leg.; shoreline drift, sweeping; CBFC • 1 ♀; same data as for preceding;

DEBU • 1 ♂, 2 ♀♀; Altiplano, Pillapi, 70 km E of La Paz; 3780 m a.s.l.; 8 May 1964; J.L. Chudley leg.; field of alfalfa and grass; BMNH • 2 ♂♂, 5 ♀♀; same data as for preceding; 6 Apr. 1964; swept from *Esparo* sp. in erosion channel; BMNH • 1 ♀; same data as for preceding; 7 May 1964; BMNH • 1 ♀; same data as for preceding; under stones in erosion valley; BMNH • 1 ♂; Lake Titicaca, W Guaqui; 16°35′56″ S, 68°53′52″ W; 3810 m a.s.l.; 19 Apr. 2001; S.A. Marshall leg.; stream, sweep; DEBU.

PERU – **Cusco** • 3 ♂♂; same data as for holotype; DEBU • 2 ♂♂; same data as for holotype; MUSM.

Description

Body (Fig. 81A). Length 2.2–3.5 mm. Head dark brown, bottom edge of frons and anterior third of gena orange. Frontal width 2.3 × frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.5 × length of posterior. Palpus yellow. Eye large, greatest height about 3.5 × shortest genal height. Thorax dark brown, scutum with reddish lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.8 × length of posterior pair) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, hind tibia darker. Fore femur with four large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical half. Wing (Fig. 7G) slightly infuscate. CS2 subequal to CS3. Halter brown with white apex.

Male abdomen (Figs 81B–C, 82). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.1 × length of S4, long-setose with a deep posteromedial emargination. Anterior flange of S6+7 small, 0.8 × as long as wide. Sclerites A to F apparently absent; sclerite G large, elongate; ring sclerite dark, well developed. Epandrium moderate, 0.7 × length of S8, height 1.6 × maximum length and 0.8 × maximum width, uniformly long-setose; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite arched and completely separated. Subcercus large, wedge-shaped, basal section long-setose with a triangular anterior lobe, elongate posteroventral lobe slightly bent outwards with a small apical lobe. Hypandrium with long, sinuate anteromedial apodeme. Surstylus subrectangular, posteromedial margin constricted, anterolateral surface setose, apex with a claw-like inner lobe. Postgonite subtriangular, basal half broad, apical half tapered and slightly curved, apex with a small notch. Phallapodeme very large, dark, apical third curved downwards; basiphallus stout, posteriorly expanded; distiphallus large, basal third tubular and sclerotized, apical two-thirds expanded, largely membranous with a sinuate ventral sclerite, anteroapical membrane transversely grooved.

Female abdomen (Fig. 83). T7 broad, simple; T8 divided into a small, pale, dorsal sclerite and 2 large, broad, dark, lateral sclerites, posteroventral corners greatly expanded posteriorly. Epiproct broad, posteromedially pointed and desclerotized, and entirely setulose. Cercus elongate, spindle-shaped, with long dorsal, apical, and lateral setae. S7 very large, posteromedially pointed with four large posterior setae; S8 reduced to a pair of elongate lateral sclerites. Three spermathecae, bulb stout, cylindrical, finely striate with a shallow apical and basal invagination, each with a short, finger-like, central process.

Distribution

Neotropical: Bolivia, Peru.

Remarks

Sclerocoelus lutosus sp. nov. is externally similar to both *S. caligarius* sp. nov. and *S. frigidifrons* sp. nov., but can be separated from both species by the large anterior dorsocentral bristle, slightly larger eye (~3.5 × genal height), more uniformly setose male S5, narrow surstylus, and large lateral plates of the female T8. Like other basal species of the genus, *Sclerocoelus lutosus* is a high Andean species associated with decaying plant material above 3000 m a.s.l. Most records are from small deposits of debris along stream margins in otherwise relatively barren altiplano habitats.

Sclerocoelus mandibulum sp. nov.
urn:lsid:zoobank.org:act:624EB012-8E65-42D5-A039-FF8A9CAD323F
Figs 7H, 84–86

Etymology

This name refers to the male postgonite which, in lateral view, strongly resembles the mandible of a rodent (from the Latin '*mandibulum*', meaning 'jaw').

Material examined

Holotype

ECUADOR • ♂; Pichincha, Cotopaxi National Park, Quebrada Mishahuaycu; 3600 m a.s.l.; 26 Oct.–8 Nov. 1999; S.A. Marshall leg.; along stream, pan traps; QCAZ debu00139611.

Paratypes

BOLIVIA – **La Paz** • 1 ♂; Mapac, Lago Titicaca; 16°10′ S, 69°5′ W; 23 Apr. 1997; L. Masner leg.; CBFC.

ECUADOR – **Carchi** • 1 ♂; Cerro Pelado; 3200 m a.s.l.; 25 Jun. 1965; L.E. Peña leg.; CNCI • 1 ♂; Páramo, 14.1 km NW of El Angel; 3450 m a.s.l.; 1 Nov. 1999; S.A. Marshall leg.; under *Polylepis* litter; DEBU • 1 ♂; Troya; 2950 m a.s.l.; 11–13 Jun. 1965; L.E. Peña leg.; CNCI. – **Napo** • 3 ♂♂; near Lago Papallacta; 6 Nov. 1999; S.A. Marshall leg.; under tree branches (brown leaves); QCAZ. – **Pichincha** • 20 ♂♂, 5 ♀♀; same data as for holotype; DEBU • 21 ♂♂, 5 ♀♀; same data as for holotype; QCAZ.

Description

Body (Fig. 84A). Length 3.1–4.1 mm. Head dark brown, lower fifth of frons orange; face and gena brown; pedicel brown, postpedicel orange. Frontal width 2.2× frontal height. Three pairs of interfrontal bristles, middle pair largest; anterior orbital 0.5× length of posterior. Palpus brown. Eye large, greatest height about 3.5× shortest genal height. Thorax brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.5× length of posterior pair) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, hind tibia darker. Fore femur with four large ventral preapical setae. Dorsal surface of male mid tibia with a strong seta about midlength and a pair of large setae at about four-fifths; dorsal surface of female mid tibia with standard chaetotaxy. Ventral surface of male mid tibia with two rows of stout setae in apical third. Wing (Fig. 7H) slightly infuscate. CS2 subequal to CS3. Halter brown.

Male abdomen (Figs 84B–C, 85). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.0× length and 1.3× width of S4, posterolaterally long-setose and posteromedially emarginate with a broad, dark, rectangular, anteriorly setulose lobe projecting dorsally (into abdomen), emargination with long setae along margin. Anterior flange of S6+7 triangular, 1.0× as long as wide. Sclerite A not differentiated from S6+7; sclerite B reduced, pale, arched; sclerite C dark, well sclerotized and projecting ventrally off of S6+7; sclerites D and E fused, quadrate with a pale, deflexed left lobe; sclerite F large, thick and flattened with an elongate, angulate apicoventral process on left side; sclerite G very large, rounded, inflated, ring sclerite incorporated into right posterior margin. Epandrium very large, 0.8× length of S8, height 1.6× maximum length and 0.9× maximum width, densely setose, cleft between inner ventral corner and surstylus, and ventral margin projecting ventrally; perianal pads weakly developed. Pseudocercus undifferentiated; halves of subepandrial sclerite very thin, strongly arched, and narrowly contiguous. Subcercus large, with a ventrally bilobed, rectangular posterior part, a broad, rounded inner lobe extending to near anterodorsal corner of surstylus, and a long, dorsally curved, blade-like lobe originating from inner lobe. Hypandrium with thick, dorsoventrally flattened anteromedial apodeme.

Surstylus large, curved inwards, somewhat T-shaped with a rectangular, preapical posterior lobe and a triangular apical anteroventral lobe. Postgonite stout, gradually tapered, and apically curved anteriorly. Phallapodeme very large, dorsoventrally flattened; basiphallus dorsoventrally flattened near base, with a large, tapered epiphallus, distal part of basiphallus extending posteroventrally; distiphallus short, largely membranous with a pair of S-shaped ventrolateral sclerites and a V-shaped ventral sclerite.

Female abdomen (Fig. 86). T7 broad, simple; T8 divided into a small, pale, dorsal sclerite and two large, dark, lateral sclerites, posterolateral corners rounded. Epiproct pentagonal, posteromedially cleft (almost entirely divided), and entirely setulose. Cercus large, elongate, with large apical, dorsal, and apicoventral setae. S7 broad, broadly desclerotized posteriorly with six large posterior setae; S8 broad, medially pale with dark lateral edges bent ventrolaterally. Two spermathecae, bulb elongate, bean-shaped, finely striate with a wide, deep invagination on thicker end.

Distribution

Neotropical: Bolivia, Ecuador.

Remarks

Sclerocoelus mandibulum sp. nov. is an unusual species, with an elaborate subcercus superficially similar to the *S. regularis* group. However, the subcercus is fused to the epandrium and there is no trace of a pseudocercus. *Sclerocoelus mandibulum* also resembles *S. penai* sp. nov., another alpine species, in having a large subcercus with a strong inner lobe and a dark, microsetulose process posterior to the posteromedial setulose patch of the male S5, but it is distinguished by the larger size, hammer-shaped surstylus, and uniquely-shaped postgonite. It cannot be confidently placed in any of the named species groups.

Sclerocoelus masneri sp. nov.
urn:lsid:zoobank.org:act:634CD9CC-C617-4DFF-B008-85712887268A
Figs 7I, 87–89

Etymology

This name is in honour of Dr Lubomir Masner, whose collecting efforts yielded many of the specimens examined during the course of this revision, including most of the specimens of this species.

Material examined

Holotype

VENEZUELA • ♂; Aragua, Rancho Grande Biological Station; 10°21′ N, 67°41′ W; 1200 m a.s.l.; 11 May 1998; Ashe, Brooks and Hanley leg.; flight-intercept trap; DEBU debu00364945.

Paratypes

VENEZUELA – **Aragua** • 5 ♀♀; same data as for holotype; DEBU • 4 ♂♂, 8 ♀♀; Henri Pittier National Park Highway, Maracay-Choroni, km 19; 1330 m a.s.l.; 15 Apr. 1994; L. Masner leg.; creek; DEBU • 1 ♀; Henri Pittier National Park Highway, Maracay-Choroni, km 32; 100 m a.s.l.; 15 Apr. 1994; L. Masner leg.; forest; DEBU • 4 ♂♂; Henri Pittier National Park, Rancho Grande Biological Station; 14 May 1998; Ashe, Brooks and Hanley leg.; SEMC • 3 ♂♂; Henri Pittier National Park, Rancho Grande; 1100 m a.s.l.; 18 Aug.–3 Oct. 1992; L. Masner leg.; cloud forest, maxinet; DEBU • 23 ♂♂, 17 ♀♀; Henri Pittier National Park, Rancho Grande; 1500 m a.s.l.; 3 Sep. 1992; L. Masner leg.; DEBU • 1 ♀; Henri Pittier National Park, Rancho Grande, La Toma trail; 1100 m a.s.l.; 17 Apr. 1994; L. Masner leg.; DEBU • 15 ♂♂, 3 ♀♀; Henri Pittier National Park, Rancho Grande, La Toma trail; 9 Apr. 1994; L. Masner leg.; DEBU • 2 ♂♂; same data as for preceding; 9–10 Apr. 1994; DEBU • 4 ♂♂;

Henri Pittier National Park, Rancho Grande, Portachuelo Pass; 9 Apr. 1994; L. Masner leg.; DEBU • 1 ♀; Henri Pittier National Park, trail along Rancho Grande; 1225 m a.s.l.; 22–25 Jan. 1996; J. and A. Skevington leg.; Malaise in forest opening; DEBU • 1 ♂, 1 ♀; Maracay, Rancho Grande Biological Station; 1200 m a.s.l.; 25–28 Feb. 1995; S.A. Marshall leg.; wet area, pan traps; DEBU • 1 ♂; Maracay, Rancho Grande Biological Station; 8 Mar. 1995; S.A. Marshall leg.; sweep near station; DEBU • 2 ♀♀; Maracay, Rancho Grande; 1–10 Aug. 1987; Bordon and Peck leg.; cloud forest, flight-intercept trap; DEBU • 3 ♂♂; Rancho Grande Biological Station, Portachuelo Pass; 1400 m a.s.l.; 27 Feb. 1995; S.A. Marshall leg.; DEBU • 11 ♂♂, 2 ♀♀; Rancho Grande; 26 Feb. 1989; D.A. Grimaldi leg.; AMNH • 1 ♂; Rancho Grande, La Cumbre cloud forest; 1500 m a.s.l.; 1–10 Aug. 1987; Bordon and Peck leg.; flight-intercept trap; DEBU • 2 ♂♂, 1 ♀; Tiara, 1250 m a.s.l.; 12 Apr. 1994; L. Masner leg.; DEBU.

Description

Body (Fig. 87A). Length 2.8–3.2 mm. Head dark brown, lower quarter of frons, face, gena, and antenna yellow-orange. Frontal width 2.4–2.5× frontal height. Two pairs of strong interfrontal bristles surmounting a fine third pair (one female paratype has a third large interfrontal bristle on one side); anterior orbital 0.6–0.7× length of posterior. Palpus white. Eye very large, greatest height about 4.5× shortest genal height. Thorax brown, scutum with slightly paler lateral edges; postpronotum and anterior edge of anepisternum yellow. Two pairs of dorsocentral bristles (anterior pair only slightly larger than surrounding acrostichal setulae) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum bare. Legs yellow, hind tibia darker. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae along apical half. Wing (Fig. 7I) slightly infuscate. CS2 0.7–0.8× CS3. Halter pale brown.

Male abdomen (Figs 87B–C, 88). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 triangular, 2.2× length of S4, laterally long-setose with a dark, elongate patch of dense setulae flanked by patches of long setae and broad pale areas, patch of setulae bulging ventrally. Anterior flange of S6+7 very large, rectangular, 2.5× as long as wide. Sclerite A rounded, densely setulose with a pair of lateral setae, narrowly joined to S6+7; sclerites B and C absent; sclerites D and E dark, elongate, slightly sinuate, separate but closely associated, appearing as a single V-shaped sclerite; sclerite F large, dark, triangular, inner surface concave; sclerite G small, rounded, laterally with a patch of setulae; ring sclerite dark, well developed. Epandrium moderate, 0.7× length of S8, height 1.6× maximum length and 0.8× maximum width; perianal pads weakly developed. Pseudocercus elongate, separate from epandrium, and bearing three setae; halves of subepandrial sclerite curved (only inner half of an arch), connected medially by a broad, sheet-like sclerotization. Subcercus large, laterally flattened, trapezoidal with pointed anteroventral and posteroventral corners, posteroventral edge setulose and curved inwards. Hypandrium with sinuate, apically expanded anteromedial apodeme. Surstylus pure white, triangular with a rectangular anterobasal lobe and a curved, subtriangular lobe about midway along anteroventral edge, ventral surface of apical third densely setose. Postgonite moderate, slightly bent forwards, apex greatly expanded with a small, preapical, anterior lobe. Phallapodeme large, gently curved with a large, dorsal ‘fin’; basiphallus with a stout, knuckle-like basal part and an elongate antero-distal part which articulates with dorsal surface of distiphallus; distiphallus C-shaped in lateral view, largely membranous with a large, flattened dorsal sclerite and a pair of smaller posteroventral sclerites.

Female abdomen (Fig. 89). T7 broad, simple, posteromedially emarginate; T8 divided into a large, pale, dorsal sclerite and two large, dark, lateral sclerites, posterolateral corners slightly expanded and rounded. Epiproct large, broad, subtriangular, anteromedially and posteromedially desclerotized, and almost entirely setulose. Cercus elongate, apically pointed with long apical, dorsal, and apicoventral setae. S7 broad, long, posterior half desclerotized with 4–5 large posterior setae, each seta in desclerotization with a sclerotized base; S8 divided into two dark, rounded, lateral sclerites. Hypoproct with thickened

anteromedial setulae. Three spermathecae, bulb stout, bean-shaped, finely striate with large basal and subapical invaginations, subbasal invagination with a large, finger-like, central process.

Distribution

Neotropical: Venezuela.

Remarks

Sclerocoelus masneri sp. nov. is similar to other members of the *S. dasysternum* group but is easily recognized by the distinctive white surstylus, very long posteromedial patch of setulae on the male S5, apically expanded postgonite, and widely desclerotized posterior half of the female S7. *Sclerocoelus masneri* is known only from relatively low elevation cloud forests in Venezuela, where it seems to be relatively common; multiple collectors, including the senior author, have repeatedly collected this species in the cloud forest of Rancho Grande in Henri Pittier National Park. It is a member of the mostly Central American *S. dasysternum* group.

Sclerocoelus meridensis sp. nov.

urn:lsid:zoobank.org:act:A07F7F1A-CA3A-4B17-81A3-B685A4946DD9

Figs 7J, 90–92

Etymology

This name refers to the type locality of this species.

Material examined

Holotype

VENEZUELA • ♂; Mérida, Merida Teleférico, Loma Redonda; 4100 m a.s.l.; 22–29 Jun. 1989; S.B. Peck and J. Kukalova-Peck leg.; paramo, *Polylepis* grove, carrion traps; FMNH debu01041014.

Paratypes

VENEZUELA – **Mérida** • 1 ♂, 3 ♀♀; same data as for holotype; FMNH.

Description

Body (Fig. 90A). Length 2.7–3.4 mm. Head dark brown, lower portion of frons orange; face and gena dark brown, antennae brown; frontal vitta, interfrontal plate and orbital plate slightly paler and subshining. Frontal width 1.6–1.8 × frontal height. Three pairs of strong interfrontal bristles surmounting a smaller fourth pair; anterior orbital 0.4–0.5 × length of posterior. Ocelli reduced. Palpus yellow. Eye large, greatest height about 4.0 × shortest genal height. Thorax dark brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair 0.4 × length of posterior pair) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, trochanters and bases of femora paler. Fore femur with three large ventral preapical setae. Dorsal surface of mid tibia with an additional small anterior seta in the distal half. Ventral surface of male mid tibia with two rows of stout setae along apical quarter. Wing (Fig. 7J) short, extending almost to end of T2; strongly infuscate. M_1 and M_4 slightly converging apically. CS2 0.7 × CS3. Halter reduced to a small brown nub.

Male abdomen (Figs 90B–C, 91). S5 very broad, 1.2 × length of S4, uniformly setose posterolaterally, two small patches of slightly larger setae on either side of a dark, tear drop-shaped posteromedial lobe, anterior margin with a broad but short anteromedial expansion. Anterior flange of S6+7 small, triangular, 1.0 × as long as wide. Sclerite A indistinct from S6+7; sclerites B and C absent; sclerite D small, triangular, fused to S6; sclerite E (?) elongate, dark, scoop-shaped, extending dorsally into genital pouch (i.e., perpendicular to S5); sclerites F and G fused, sclerite F elongate and rectangular; sclerite

G large, bulging; ring sclerite fused to posterior surface of sclerite G. Epandrium large, 0.9× length of S8, height 1.6× maximum length and 0.8× maximum width, uniformly long-setose; anal fissure subtriangular; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite thin, sinuate, weakly developed. Subcerci fused anteromedially, elongate, triangular with apex curved posteriorly. Hypandrium with dorsoventrally flattened anteromedial apodeme. Surstylus large, 2.3× as long as deep, scoop-shaped, long-setose on inner and outer surfaces, scoop-shaped with a rectangular, densely setose inner anterior lobe. Postgonite elongate, almost parallel-sided, sinuate with tapered apex. Phallapodeme very large, sinuate, apical half dorsoventrally flattened; basiphallus subquadrate, wedge-shaped; distiphallus weakly sclerotized, with an elongate, tubular basal part and a flared, membranous apical part.

Female abdomen (Fig. 92). T7 broad, simple; T8 divided into two large, dark, lateral sclerites, posterolateral corners slightly expanded and rounded. Epiproct large, shield-like with posteromedial point, medially desclerotized, and setulose largely in the desclerotized area. Cercus stout, apically rounded with long apical, dorsal, and basolateral setae. S7 broad, subtriangular, posteromedially broadly desclerotized, posteriorly with 11–12 large posterior setae; S8 entirely membranous. Hypoproct with dense setulae in apical half. Three spermathecae, bulb cylindrical, apical third slightly constricted, finely striate with an apical and basal invagination, both with a small, finger-like, central process.

Distribution

Neotropical: Venezuela.

Remarks

Sclerocoelus meridensis sp. nov., along with the sympatric *S. flavus* sp. nov., can be distinguished from all other species of *Sclerocoelus* by the characteristically abbreviated wing (Fig. 7J) with a non-reduced alula. *Sclerocoelus meridensis* can be separated from *S. flavus* by its dark brown head, thorax, and legs, and characters of the male and female terminalia. *Sclerocoelus meridensis* has the complex genital pouch sclerites that define the genus but has neither the apomorphic asymmetrical spermathecae nor the differentiated subcerci of more derived species.

Sclerocoelus nebulosus sp. nov.

urn:lsid:zoobank.org:act:4FCD12CD-9769-462C-940A-2F9A1BCAEDCE

Figs 8A, 93–95

Etymology

The species name (from the Latin '*nebulosus*', meaning 'misty or cloudy') refers to the cloud forest habitat of this widespread Neotropical species.

Material examined

Holotype

ECUADOR • ♂; Pichincha, 3.5 km SE of Tandayapa; 28 Oct. 1999; S.A. Marshall leg.; in green leaf litter (treefall); QCAZ debu00116667.

Paratypes

COSTA RICA – **Cartago** • 1 ♂; Highway 2, km 95; 9°36′ N, 83°44′ W; 320 m a.s.l.; 1–7 Jun. 1985; H. Goulet and L. Masner leg.; CNCI • 2 ♂♂; Tapantí National Park; 1550 m a.s.l.; 7–12 Oct. 1999; Marshall and Buck leg.; pans in fallen tree; MNCR. – **Heredia** • 4 ♂♂; Moravia, near border of Braulio Carrillo National Park; 3–4 Mar. 1996; L. Masner leg.; creek bed, yellow pans; CNCI. – **Puntarenas** •

1 ♂; Monteverde Biological Reserve; 1500 m a.s.l.; 11–13 Jun. 2000; S.A. Marshall leg.; cloud forest; MNCR • 1 ♂; same data as for preceding; 14 Jun. 2000; M. Buck leg.; sweeping treefall and trail; DEBU.

ECUADOR – **Napo** • 4 ♂♂, 2 ♀♀; Baeza; 1700 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; near small creek, wet montane forest/pasture, Malaise head; QCAZ • 2 ♂♂, 2 ♀♀; Baeza, west along road; 1500 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; montane rainforest/pasture, Malaise trap; DEBU • 1 ♂, 1 ♀; SierrAzul Lodge, 14 km W of Cosanga; 2200 m a.s.l.; 5 Nov. 1999; S.A. Marshall leg.; forest sweep; QCAZ. – **Pichincha** • 8 ♂♂, 1 ♀; same data as for holotype; QCAZ • 1 ♂; 11.7 km SE of Tandayapa, road to Nono; 28 Oct. 1999; S.A. Marshall leg.; near stream, litter/wood; QCAZ • 1 ♂; 20 km N of Nono, road to Mindo; 1900 m a.s.l.; 24 Oct. 1999; S.A. Marshall leg.; path sweep; DEBU • 3 ♂♂; Bellavista Cloud Forest Reserve; 0°01′13″ S, 78°40′30″ W; 2200 m a.s.l.; 9–13 May 2009; S.A. Marshall leg.; debu00335515/MYCRO1029-22 sequenced for CO1-5'; DEBU • 1 ♂; Bellavista Reserve, ridge trails; 28 Oct. 1999; S.A. Marshall leg.; sweeping/aspirating; DEBU.

VENEZUELA – **Mérida** • 1 ♂, 1 ♀; Jají-La Azulita; 3 May 1988; S.A. Marshall leg.; roadside sweeps; DEBU • 1 ♂; Mérida, Los Chorros; 2100 m a.s.l.; 5 May 1988; S.A. Marshall leg.; sweep at trailhead; DEBU • 1 ♀; same data as for preceding; 23 Apr. 1988; decaying vegetation; DEBU • 1 ♂, 1 ♀; Santa Rosa; 1500 m a.s.l.; 24–30 Apr. 1988; S.A. Marshall leg.; trail, flight-intercept trap along spring; DEBU. – **Trujillo** • 1 ♂; 10 km E of Bocono, Laguna de Lucerdo; 1760 m a.s.l.; 3 Mar. 1995,; S.A. Marshall leg.; sweep; DEBU • 2 ♂♂, 8 ♀♀; Bocono, road to Guaramacal; 2570 m a.s.l.; 2 Mar. 1995; S.A. Marshall leg.; creek bed; DEBU • 5 ♂♂; Guaramacal National Park; 2000–3000 m a.s.l.; 26 Aug.–2 Sep. 1992; L. Masner leg.; car net; DEBU.

Description

Body (Fig. 93A). Length 3.1–3.6 mm. Head dark brown, lower fifth of frons and part of orbital plate orange; face, gena, and antennae slightly orangish. Frontal width 2.2–2.3× frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.6–0.7× length of posterior. Palpus brown. Eye large, greatest height about 4.0× shortest genal height. Thorax brown, scutum with orangish lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4× length of posterior pair) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, mid and hind femora slightly darker. Fore femur with four large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical half. Wing (Fig. 8A) slightly infuscate. CS2 0.7–0.8× CS3. Halter brown.

Male abdomen (Figs 93B–C, 94). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 0.8× length and 1.3× width of S4, laterally sparsely long-setose with two posteromedial rows of setae above a small, dark central process. Anterior flange of S6+7 small, weakly developed. Sclerite A narrow, densely setose; sclerite B weakly developed, arched; sclerite C fused to S6+7, twisted; sclerite D broad, short, closely associated with posteromedial part of S5; sclerite E subquadrate, partially fused to sclerite F; sclerite F large, elongate, slightly sinuate; sclerite G large, rectangular; ring sclerite well developed. Epandrium small, 0.4× length of S8, height 1.6× maximum length and 0.8× maximum width, uniformly setose; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite reduced, simple, straight and fused medially. Subcercus large, longer than surstylus, triangular in posterior view, rectangular in lateral view, apex slightly curved outwards with a small posteroventral tooth. Hypandrium with thin anteromedial apodeme. Surstylus simple, short, long-setose, quadrate with a slight anteroventral notch. Postgonite long, narrow, slightly curved anteriorly, very slightly tapered, apex notched. Phallapodeme long, apex dorsoventrally flattened; basiphallus elongate, slightly constricted about midlength; distiphallus largely membranous with two sinuate lateral sclerites.

Female abdomen (Fig. 95). T7 broad and long, simple; T8 entire but narrowed and desclerotized dorsomedially, appearing as two lateral plates, posterolateral corners expanded posteriorly. Epiproct broad, shield-like, medially desclerotized, and entirely bare. Cercus elongate, small with long apical and dorsal setae. S7 large, slightly pointed posteromedially with four large posterior setae; S8 large, weakly sclerotized, undivided. Three spermathecae, bulb stout, slightly ovoid, finely striate with deep invaginations on either end (basal invagination 1.5× apical invagination).

Distribution

Neotropical: Costa Rica, Ecuador, Venezuela.

Remarks

Sclerocoelus nebulosus sp. nov. is externally very similar to *S. lazulita* sp. nov. and *S. paranebulosus* sp. nov., which are also unplaced lineages lacking the derived characters of the named species groups. It can be separated from *S. lazulita* by the three large interfrontal bristles (only two interfrontals in *S. lazulita*), and from *S. paranebulosus* by the narrow postgonite. Females of *S. nebulosus* and *S. paranebulosus* are apparently indistinguishable on the basis of morphology. The holotype of *S. nebulosus* was collected in typical *Sclerocoelus* habitat (green leaf litter in mid to high elevation cloud forest) along with six species of the *S. caribensis* group (*S. andensis*, *S. binus* sp. nov., *S. caribensis*, *S. copiosus* sp. nov., *S. elephas* sp. nov., and *S. tantus* sp. nov.) and one other species (*S. xynos* sp. nov.).

Sclerocoelus nitidistylus sp. nov.

urn:lsid:zoobank.org:act:8D08C8DB-566E-4603-A1ED-8E009E135A15

Figs 1A, 8B, 96–98

Etymology

This name refers to the shining outer surface of the male surstylus (from the Latin '*nitidus*', meaning 'shiny, polished').

Material examined

Holotype

COSTA RICA • ♂; Puntarenas, Los Alturas trail to Cerro Chai; 1700–2100 m a.s.l.; 13–15 Aug. 1995; S.A. Marshall leg.; MNCR.

Paratypes

COSTA RICA – **Alajuela** • 2 ♂♂; Quesada, Albergue Pozo Verde; 1800 m a.s.l.; 10°15′15.1″ N, 84°22′18.4″ W; 21 Apr. 2023; S.A. Marshall leg.; from refuse pile under *Eciton burchellii* bivouac; DEBU • 2 ♂♂; same data as for preceding; MNCR • 2 ♂♂, 3 ♀♀; same data as for preceding; W. Porras leg.; MNCR. – **Cartago** • 1 ♂; Braulio Carrillo National Park; 500 m a.s.l.; 10 Apr. 1985; L. Masner leg.; rainforest; CNCI • 1 ♀; Braulio Carrillo National Park; 1400–1500 m a.s.l.; 11 Apr. 1985; H. Goulet and L. Masner leg.; cool moist riverbed, Selva Premontana; CNCI. – **Guanacaste** • 3 ♂♂, 4 ♀♀; Guanacaste National Park, Cacao Field Station; 1000–1100 m a.s.l.; 12–15 Feb. 1996; S.A. Marshall leg.; carrion traps; DEBU • 1 ♀; same data as for preceding; 700 m a.s.l.; 13–15 Feb. 1996; MNCR • 2 ♂♂; Guanacaste National Park, Cacao Field Station; 1100–1200 m a.s.l.; 15 Feb. 1996; S.A. Marshall leg.; MNCR • 1 ♂; Guanacaste National Park, Santa Rosa Station; 300 m a.s.l.; 11 Feb. 1996; S.A. Marshall leg.; dry riverbed; MNCR. – **Heredia** • 4 ♀♀; 6 km ENE of Vera Blanca; 10°11′ N, 84°07′ W; 2000 m a.s.l.; 21 Feb. 2002; DEBU • 1 ♂, 1 ♀; Moravia, near border of Braulio Carrillo National Park; 3–4 Mar. 1996; L. Masner leg.; creek bed, yellow pans; DEBU. – **Puntarenas** • 6 ♂♂; Monteverde Biological Reserve; 1500 m a.s.l.; 13 Jun. 2000; S.A. Marshall leg.; DEBU • 6 ♂♂, 3 ♀♀; same data as for preceding; MNCR • 1 ♂; same data as for preceding; M. Buck leg.; DEBU • 9 ♂♂,

3 ♀♀; same data as for preceding; 11–13 Jun. 2000; cloud forest; DEBU • 10 ♂♂, 4 ♀♀; same data as for preceding; MNCR • 10 ♂♂, 3 ♀♀; same data as for preceding; S.A. Marshall leg.; DEBU • 11 ♂♂, 3 ♀♀; same data as for preceding; MNCR • 1 ♀; same data as for preceding; 12 Jun. 2000; M. Buck leg.; on dung; DEBU • 50 ♂♂, 19 ♀♀; same data as for preceding; 11 Jun. 2000, M. Buck leg.; sweep; DEBU • 51 ♂♂, 19 ♀♀; same data as for preceding; MNCR • 8 ♂♂; same data as for preceding; 12–13 Jun. 2000; pans along stream; DEBU • 6 ♂♂; same data as for preceding; 13–14 Jun. 2000; pans along stream; MNCR • 1 ♂; same data as for preceding; 14 Jun. 2000; treefall sweep and pans; DEBU • 7 ♂♂, 4 ♀♀; same data as for preceding; 26 May 1998; S.A. Marshall leg.; sweep; DEBU • 13 ♂♂; Monteverde Biological Station, lower trail; 26 May 1998; S.A. Marshall leg.; MNCR • 1 ♂, 1 ♀; Monteverde; 10°18′ N, 84°48′ W; 1539 m a.s.l.; 24 Feb.–2 Mar. 1988; B. Hubley leg.; 1° tropical cloud forest, pan traps; ROME • 1 ♂; Monteverde, Pension Queteal; 10°18′ N, 84°49′ W; 24 May 1987; Norrbom and Max leg.; DEBU • 1 ♂, 2 ♀♀; Monteverde; 1500 m a.s.l.; 11–18 Jul. 1983; D.H. Lindeman leg.; fruit pitfall; CNCI • 1 ♂; Monteverde; 1500 m a.s.l.; 29 Feb. 1988; Mason and Wood leg.; rainforest; DEBU • 2 ♂♂; Monteverde; 1500–1800 m a.s.l.; 24–27 Feb. 1991; B.J. Sinclair leg.; trail sweep; DEBU • 2 ♂♂, 2 ♀♀; Monteverde; 1520 m a.s.l.; 15–23 Jul. 1983; D.H. Lindeman leg.; flight-intercept trap; CNCI • 1 ♂, 1 ♀; Monteverde; 23–27 Feb. 1991; B.J. Sinclair leg.; DEBU • 2 ♂♂; Monteverde, Finca Canada; 1500 m a.s.l.; 28 May–1 Jun. 1988; B.V. Brown leg.; treefall, Malaise trap DEBU • 3 ♂♂; Monteverde; 25 Feb. 1991; H. and A. Howden leg.; flight-intercept trap; DEBU • 1 ♂; Monteverde; 25 May 1998; S.A. Marshall leg.; sweep near Biological Station; DEBU. – **San José** • 1 ♂; San Gerardo de Dota; 2300 m a.s.l.; 9 Aug. 1995; S.A. Marshall leg.; sweep along forest stream; MNCR • 1 ♂; San Gerardo de Dota; 9°33′ N, 83°48′ W; 2400–2600 m a.s.l.; 8–9 Aug. 1996; S.A. Marshall leg.; near trail; DEBU • 1 ♀; San Gerardo de Dota, near Lodge; 9°33′ N, 83°48′ W; 2000 m a.s.l.; 9 Aug. 1995; S.A. Marshall leg.; stream in pasture, sweep; DEBU.

Other material examined

COSTA RICA – **Guanacaste** • 1 ♂; Area de Conservacion Guanacaste, Derrumbe; 10°55′45″ N, 85°27′51″ W; 1220 m a.s.l.; 12 Feb. 2015; D.H. Janzen and W. Hallwachs leg.; forest, Malaise trap; BIOUG32728-A03/GMCDQ410-17 sequenced for CO1-5'; BIOUG.

Description

Body (Figs 1A, 96A). Length 2.2–3.4 mm. Head dark brown, lower half of frons, gena, face, and antennae orange. Frontal width 2.3–2.4× frontal height. Two pairs of strong interfrontal bristles surmounting a fine third pair; anterior orbital 0.4–0.5× length of posterior. Palpus yellow. Eye very large, greatest height about 5.0× shortest genal height. Thorax brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4× length of posterior pair) separated by 7–8 rows of acrostichal setulae; prescutellar acrostichal setulae only slightly larger than others. Membrane around prosternum bare. Legs yellowish-brown, base of fore femur paler. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical third. Wing (Fig. 8B) slightly infuscate. CS2 0.7–0.8× CS3. Halter pale brown.

Male abdomen (Figs 96B–C, 97). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.8× length of S4, laterally sparsely setose with a dark, narrow, ventrally projecting patch of dense setulae flanked by pale setose areas. Anterior flange of S6+7 large, 2.0× as long as wide. Sclerite A dark, unmodified; sclerite B reduced to an indistinct filament arising from posterolateral corner of sclerite A; sclerite C broad but reduced and indistinct, arising from anterolateral corner of sclerite A; sclerite D well sclerotized, Y-shaped and bent distally; sclerite E dark, elongate, and slightly curved; sclerite F large, laterally concave, left side with an elongate apicoventral process; sclerite G small, dark, narrowly separated from sclerite F; ring sclerite small, dark. Epandrium moderate, 0.3× length of S8, height 1.4× maximum length and 0.7× maximum width, uniformly setose, posteroventral margin deeply emarginate; anal

fissure rounded; perianal pads weakly developed. Pseudocercus large, bearing three setae, and fused to posteroventral corners of epandrium; halves of subepandrial sclerite strongly arched, slightly flattened dorsally, and completely separate. Subcercus large, projecting posteriorly, elongate, apically bilobed, anteriorly with a short, dark, basal lobe. Hypandrium with Y-shaped anteromedial apodeme. Surstylus large, subtriangular, laterally concave and shining, inner surface setulose along a broad medial ridge and a dark carinate anterobasal lobe. Postgonite short, apically truncate and expanded, and posterolaterally crenulate. Phallapodeme very large, thick, apex dorsoventrally flattened; basiphallus small, tapered with a distinct, triangular epiphallus; distiphallus largely membranous.

Female abdomen (Fig. 98). T7 broad, slightly emarginate posteromedially; T8 divided into a small, pale dorsal sclerite and a pair of large, dark lateral sclerites, posteroventral corners pointed. Epiproct shield-like, medially pale, apically tapered and setulose. Cercus elongate, slightly tapered with long apical and dorsal setae. S7 broad, rounded, broadly and deeply desclerotized posteromedially with four large posterior setae; S8 a single small but well-developed sclerite. Three spermathecae, bulb spherical, finely striate with a small apical invagination and a deep basal invagination.

Distribution

Neotropical: Costa Rica.

Remarks

Sclerocoelus nitidistylus sp. nov. is similar to other members of the *S. dasysternum* group, but can be readily distinguished by the very shiny outer surface of the surstylus, almost beak-shaped subcercus, and the female S7 with a deep, semicircular posterior desclerotized area. *Sclerocoelus nitidistylus* is commonly collected in the cloud forests of Costa Rica, where it is one of four endemic Costa Rican *Sclerocoelus* species and one of the seven members of the *S. dasysternum* group found in Costa Rica.

Sclerocoelus ocellatus sp. nov.

urn:lsid:zoobank.org:act:6EB0AB11-D632-4787-B09F-A3C6886FD2DC

Figs 8C, 99–101

Etymology

This name refers to the greatly reduced eye of this species, smaller than that of any other species of *Sclerocoelus* (from the Latin '*ocellatus*', meaning 'having small eyes').

Material examined

Holotype

COSTA RICA • ♂; San José, Cerro de la Muerte, 20 km S of Empalme; 2800 m a.s.l.; Nov.–Dec. 1989; P. Hanson leg.; MNCR.

Paratypes

COSTA RICA – **Cartago** • 1 ♀; Highway 2, km 95; 9°36′ N, 83°44′ W; 3200 m a.s.l.; 1–7 Jun. 1985; H. Goulet and L. Masner leg.; DEBU. – **San José** • 1 ♀; same data as for holotype; MNCR.

Description

Body (Fig. 99A). Length 2.9–4.0 mm. Head dark brown, very bottom of frons orange; anterior half of gena orangish. Frontal width 2.2–2.3× frontal height. Three pairs of strong interfrontal bristles surmounting a fine fourth pair; anterior orbital 0.6× length of posterior. Palpus brown. Eye small, greatest height about 1.1–1.3× shortest genal height. Thorax dark brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.6× length of posterior pair) separated

by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, mid femur slightly darker. Fore femur with four large ventral preapical setae. Wing (Fig. 8C) infuscate. CS2 subequal to CS3. Halter brown.

Male abdomen (Figs 99B–C, 100). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.2× length of S4, sparely setose with a dark, elongate, posteromedial patch of dense setulae flanked by long-setose, pale patches. Anterior flange of S6+7 rectangular, 1.0× as long as wide. Sclerite A pale, setulose, and weakly fused to S6+7; sclerite B dark and strongly arched into genital pouch; sclerite C apparently absent; sclerite D dark, elongate, expanded where it articulates with left side of posteromedial lobe of S5; sclerite E dark, elongate, closely associated with sclerite D, together forming a V-shaped; sclerites F and G fused, sclerite F with an elongate posteroapical process on left side, sclerite G bulbous and setulose; ring sclerite well developed but thin. Epandrium moderate, 0.6× length of S8, height 1.4× maximum length and 0.8× maximum width, uniformly long-setose; perianal pads bulging but membranous. Pseudocercus small, fused to posterolateral corner of epandrium and overlapping base of subcercus, bearing 3 setae; halves of subepandrial sclerite strongly arched with inner arch broadened. Subcercus large, setulose, flattened posteriorly with a triangular posteroventral lobe curving inwards. Hypandrium with sinuate, evenly tapered anteromedial apodeme. Surstylus large, 1.4× as long as deep, bulbous, long-setose along inner surface with a small, triangular, inner anterobasal lobe. Postgonite short, sinuate, apically truncate with a slight constriction about midlength and a small, tooth-like, preapical anterior lobe. Phallapodeme large, slightly sinuate, with apex dorsoventrally flattened; basiphallus large, curved with an elongate, beak-like epiphallus and expanded distally along dorsal margin of distiphallus; distiphallus short, largely membranous with an elongate dorsal sclerite and a pair of short lateral sclerites.

Female abdomen (Fig. 101). T7 broad, simple; T8 divided into a large, pale, dorsal sclerite and two large, dark, lateral sclerites, posterolateral corners expanded and pointed. Epiproct large, subtriangular, entirely sparsely setulose with an additional posteromedial seta near posterior margin. Cercus elongate, apically rounded with long apical and dorsal setae. S7 broad, broadly desclerotized posteriorly and medially with four large posterior setae; S8 entirely membranous. Hypoproct with entirely densely setulae. Three spermathecae, bulb stout, subspherical, finely striate with shallow basal and subapical invaginations, both with a small, finger-like, central process.

Distribution

Neotropical: Costa Rica.

Remarks

Sclerocoelus ocellatus sp. nov. is easily distinguished from all other species of *Sclerocoelus* by its small eye (1.1–1.3× genal height). *Sclerocoelus ocellatus* is known from a few specimens collected in high elevation forests in the mountains south of San Jose, Costa Rica. It is one of four endemic Costa Rican *Sclerocoelus* species and one of the seven members of the *S. dasysternum* group found in Costa Rica.

Sclerocoelus paranebulosus sp. nov.
urn:lsid:zoobank.org:act:08E72442-9AB8-497D-8CA8-FD2BBA1EA24D
Figs 8D, 102–103

Etymology

This name refers to the overall similarities between this species and *Sclerocoelus nebulosus* sp. nov. (from the Greek '*para-*', meaning 'near, beside').

Material examined

Holotype

VENEZUELA • ♂; Mérida, 6 km S of Azulita, near road; 3 May 1988; S.A. Marshall leg.; DEBU.

Paratypes

COSTA RICA – **Cartago** • 1 ♂; Tapantí National Park; 1650–1750 m a.s.l.; 7 Oct. 1999; M. Buck leg.; trail sweep; debu00105688/MYCRO1030-22 sequenced for CO1-5'; MNCR.

VENEZUELA – **Mérida** • 3 ♂♂; same data as for holotype; DEBU • 1 ♂; Jají-La Azulita; 3 May 1988; S.A. Marshall leg.; roadside sweeps; DEBU • 2 ♂♂; Mérida, Los Chorros; 2200 m a.s.l.; 23 Apr. 1988; S.A. Marshall leg.; decaying vegetation; DEBU • 1 ♂; Mérida, Los Chorros, Santa Rosa Road; 30 Apr. 1988; S.A. Marshall leg.; sweep; DEBU.

Description

Body (Fig. 102A). Length 3.4 mm. Head dark brown, lower fifth of frons, face, and gena orange; antennae brown. Frontal width 2.3–2.4 × frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.5–0.6 × length of posterior. Palpus pale brown. Eye large, greatest height about 3.5 × shortest genal height. Thorax brown, scutum with orangish lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4 × length of posterior pair) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, hind leg darker. Fore femur with four large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical third. Wing (Fig. 8D) slightly infuscate. CS2 0.7–0.8 × CS3. Halter pale brown.

Male abdomen (Figs 102B–C, 103). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.1 × length and 1.1 × width of S4, laterally long-setose with a round posteromedial emargination and a loose cluster of setulae above a small, dark central process. Anterior flange of S6+7 1.0 × as long as wide. Sclerite A bean-shaped, apically densely setulose; sclerite B weakly developed, arched; sclerite C fused to S6+7, twisted; sclerite D broad, asymmetrical, closely associated with middle of posteromedial part of S5; sclerite E broad, folded, with a prominent, setose anteroventral lobe; sclerite F elongate, sinuate; sclerite G broad, triangular and narrowly fused to sclerite F; ring sclerite well developed. Epandrium small, 0.4 × length of S8, height 1.8 × maximum length and 0.8 × maximum width, uniformly setose; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite reduced, slightly curved, and widely separated. Subcercus large, longer than surstylus, triangular in posterior view, rectangular in lateral view, apex slightly curved outwards with a small posteroventral tooth. Hypandrium with thin anteromedial apodeme, lateral arms narrowly fused with base of anteromedial apodeme. Surstylus simple, short, long-setose, quadrate with a slight anteroventral notch. Postgonite broad, slightly sinuate, ventrally crenulate, anteroventral corner produced into a distinct, sharp process. Phallapodeme long with large dorsal 'fin'; basiphallus stout and connected to distiphallus by a neck-like distal part; distiphallus largely membranous, dorsoventrally flattened with two sinuate dorsolateral sclerites.

Female abdomen. Female unknown.

Distribution

Neotropical: Costa Rica, Venezuela.

Remarks

Sclerocoelus paranebulosus sp. nov. is externally similar to *S. lazulita* sp. nov. and *S. nebulosus* sp. nov., which are also among the unplaced lineages of *Sclerocoelus* that lack the derived characters of the

S. galapagensis and *S. dasysternum* groups. It differs from *S. lazulita* by the three large interfrontal bristles (versus two in *S. lazulita*), and from *S. nebulosus* by the broad postgonite. Females of *S. paranebulosus* and *S. nebulosus* appear to be indistinguishable. The holotype was collected in an area of mid to high-elevation cloud forest along with specimens of *S. lazulita* and *S. xynos* sp. nov.

Sclerocoelus pararegularis sp. nov.
urn:lsid:zoobank.org:act:14A6CF5C-1311-498F-955B-895D9186CD1A
Figs 8E, 104–105

Etymology

This name reflects the overall similarity of this species to the closely related *Sclerocoelus regularis* (Malloch, 1914) (from the Greek prefix '*para-*', meaning 'beside, near').

Material examined

Holotype

MEXICO • ♂; San Luis Potosí, 20 km W of Xilitla; 12 Jun.–6 Aug. 1983; S. and J. Peck leg.; cloud forest, flight-intercept trap; DEBU.

Paratype

MEXICO – **Veracruz** • 1 ♂; Sontecomapan; 20 Jun. 1969; B.V. Peterson leg.; CNCI.

Description

Body (Fig. 104A). Length 1.9–2.5 mm. Head brown, lower half of frons orange; face, gena, and antennae orange-brown. Frontal width 2.3–2.4 × frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.6–0.7 × posterior. Palpus yellow. Eye large, greatest height about 3.5 × shortest genal height. Thorax brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4 × length of posterior pair) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum bare. Legs pale brown, mid and hind femora darker. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical quarter. Wing (Fig. 8E) hyaline. CS2 0.7–0.8 × CS3. Halter pale brown.

Male abdomen (Figs 104B–C, 105). Dark brown, tergites reddish medially, posterior edges of tergites slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.6 × as long as S4, posterolaterally long setose with a very large desclerotized medial area (extending almost to anterior edge), a large, dark, rectangular, medial patch of very dense setulae, and a large, dark, anvil-shaped posteromedial sclerite. Anterior flange of S6+7 0.7 × as long as wide; S6+7 completely separated from S8. Sclerite A small, lightly sclerotized; sclerite B long, very narrow and arched; sclerite C absent; sclerite D well sclerotized and slightly sinuate; sclerite E slightly curved with an apical notch; sclerite F large and strongly constricted in mesial third; sclerite G small, about as large as ring sclerite; ring sclerite well sclerotized. Epandrium large, 0.4 × length of S8, height 1.4 × maximum length and 0.9 × maximum width, uniformly long-setose; perianal pads slightly sclerotized but densely setulose. Pseudocercus very small, bearing only a single seta; halves of subepandrial sclerite short and narrow, arched and very weakly fused medially. Subcercus large and shield-like with small lobes articulating with surstylus and epandrium, apex pointed inwards. Hypandrium with long, slightly desclerotized anteromedial apodeme. Surstylus very large and broad, twice as long as deep, concave, densely setose, with a small anterobasal lobe continuous with setose inner anterior ridge. Postgonite relatively long, very slightly sinuate, uniformly broad with a small preapical inner tooth and faint apical ridges. Phallapodeme large, apically bisinuate; basiphallus expanded posterodorsally with a notched central lobe and a pair of rounded, downturned lateral lobes, distally extending as an apically flared

tube-like section which articulates with distiphallus; distiphallus largely reduced with a broad dorsal sclerite and a narrow, U-shaped ventral sclerite.

Female abdomen. Female unknown.

Distribution

Neotropical: Mexico.

Remarks

Sclerocoelus pararegularis sp. nov. resembles *S. dominicensis* sp. nov., *S. irregularis* sp. nov., and *S. regularis* from which it can be distinguished by the darker legs, apically pointed subcercus, and sinuate postgonite.

Sclerocoelus parasordipes sp. nov.

urn:lsid:zoobank.org:act:17DB312E-34A0-47E2-9BCB-D3C2CC5E6D31

Figs 8F, 106–108

Etymology

This name reflects the similarity between this species and *S. sordipes* (Adams) (from the Greek '*para*', meaning 'beside or near').

Material examined

Holotype

MEXICO • ♂, Mexico, 6.4 km S of Amecameca; 520 m a.s.l.; 13 Aug. 1954; J.G. Chillcott leg.; CNCI.

Paratypes

CANADA – **Alberta** • 1 ♂; Writing-on-Stone Provincial Park, Birch N.; 31 Aug.–10 Sep. 1990; M. Klassen leg.; DEBU. – **British Columbia** • 1 ♀; Nancy Greene Park; Aug. 1980; S.A. Marshall leg.; sweep; DEBU • 1 ♂; Osoyoos, Mount Kobau; 560 m a.s.l.; 14 Jul.–23 Aug. 1991; D. Blades and C. Maier leg.; DEBU • 1 ♂; Skagit Valley Provincial Park, 12.9 km W Hope; 8–28 Jul. 1980; flight-intercept trap; DEBU • 1 ♀; Vancouver; University of British Columbia campus; 23 Jul. 1980; S.A. Marshall leg.; conifer duff; DEBU.

UNITED STATES OF AMERICA – **Arizona** • 1 ♀; Cochise Co., 12 km S of Sierra Vista, Ramsey Canyon; 10 Jun. 1987; B.V. Brown leg.; oak pine, Malaise; DEBU • 1 ♂; Cochise Co., 8.4 km W of Portal, Southwestern Research Station; 31°52′58″ N, 109°12′20″ W; 1650 m a.s.l.; 5 Jul. 1995; S.D. Gaimari leg.; Malaise trap; USNM • 1 ♀; Cochise Co., Chiracahua Mountains; 2130 m a.s.l.; 15–21 Jul. 1978; O. Kukal leg.; dung; DEBU • 1 ♂, 5 ♀♀; Cochise Co., Coronado National Forest, Coronado National Memorial; 11–15 Aug. 1984; L.B. Carlson leg.; dung trap; DEBU • 7 ♂♂, 15 ♀♀; Cochise Co., Coronado National Memorial; 11–15 Aug. 1984; B.V. Brown leg.; dung trap; DEBU • 1 ♀; Cochise Co., Portal, Southwestern Research Station, Chiricahua Mountains; 18–23 Aug. 1984; B.V. Brown leg.; mushroom trap; DEBU • 1 ♂; Cochise Co., Portal, Southwestern Research Station; 1645 m a.s.l.; 2 Aug. 1955; R.R. Dreisbach leg.; MSUC • 12 ♂♂, 7 ♀♀; Cochise Co., S of Sierra Vista, Ramsey Canyon; 24 Aug. 1984; B.V. Brown leg.; riparian forest, litter; DEBU • 1 ♀; Pima Co., Santa Rita Experimental Range, Florida Canyon; 2–5 May 2010; S.A. Marshall leg.; DEBU • 5 ♂♂, 12 ♀♀; Santa Cruz Co., NW Nogales, Sycamore Canyon, Hank and Yank Spring; 31°26′ N, 111°11′ W; 1220 m a.s.l.; 20–25 Aug. 1993; J.E. O'Hara leg.; Malaise trap; CNCI • 1 ♀; Santa Cruz Co., Patagonia Lake Recreational Area; 1370 m a.s.l.; 9–11 Aug. 1984; L. Carlson leg.; carrion trap; DEBU • 1 ♂; Santa Cruz Co., Santa Rita Mountains, Madera Canyon; 1675 m a.s.l.; Sep. 1970; A. Newton leg.; oak, human dung;

FMNH • 1 ♀; Santa Cruz Co., Santa Rita Mountains, Madera Canyon; 27 Apr. 1979; K.N. Barber leg.; DEBU. – **Colorado** • 1 ♂, 1 ♀; Jefferson Co., Littleton, Normandy Estates; 30 Jun. 1995; S. Fitzgerald leg.; compost; DEBU • 1 ♂; Larimer Co., Laporte, Jolly Ridge Farm; 12 Jun. 1995; S. Fitzgerald leg.; manure; DEBU. – **Texas** • 1 ♂, 1 ♀; Angelina Co., hill near Broaddus; 15 Jun. 1993; S.A. Marshall leg.; DEBU • 1 ♂; Brazos Co., College Station, Lick Creek Park; 26–28 Mar. 2000; M. Buck leg.; bottomland forest near creek, Malaise trap; DEBU • 1 ♀; Brazos Co., College Station; 2–24 Apr. 1987; R. Anderson leg.; oak savannah; DEBU • 1 ♂; Brazos Co., Koppe's Bridge, 8 km SW of College Station; 5–13 Apr. 1987; R.S. Anderson leg.; riparian ravine, Berlese funnel; DEBU • 1 ♀; Kimble Co., Llano River at County Road 385; 1 Apr. 2000; M. Buck leg.; riverbank; DEBU • 1 ♂; same data as for preceding; 1–2 Apr. 2000; floodplain forest, pans; DEBU • 1 ♀; same data as for preceding; riverbank, pan traps at muddy pond margin; DEBU • 1 ♀; Presidio Co., 4.8 km NE of Porvenir; 26 Sep. 1946; Patterson and Schmidt leg.; USNM.

MEXICO – **Baja California Sur** • 1 ♀; Sierra La Laguna; 1770–1850 m a.s.l.; 1 Sep. 1977; E. Fisher and R. Westcott leg.; collected from flight trap at edge of forest; CAS. – **Chihuahua** • 3 ♂♂; Santa Clara Canyon, 8 km W of Parrita; 21 Jun. 1956; J.W. McSwain and D.D. Linsdale leg.; BERK. – **Guerrero** • 1 ♀; Iguala; 1500 m a.s.l.; 18 Jul. 1962; H.E. Milliron leg.; CNCI.

Other material examined

CANADA – **Alberta** •1 ♂; Jasper National Park, NE of Jasper Lake; 53°11′35″ N, 117°57′04″ W; 958 m a.s.l.; 21 Jul. 2012; wetland, Malaise trap; BIOBus 2012 leg.; BIOUG08032-B06/SSJAE1118-13 sequenced for CO1-5'; BIOUG.

Description

Body (Fig. 106A). Length 2.4–2.7 mm. Head dark brown, bottom of frons orange; face, gena, and antennae dark brown. Frontal width 2.2–2.3 × frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.4–0.5 × length of posterior. Palpus yellow. Eye slightly reduced, greatest height about 2.5 × shortest genal height. Thorax brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.5 × length of posterior pair) separated by 8–9 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, mid and hind femora darker. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical third. Wing (Fig. 8F) slightly infuscate. CS2 0.7–0.8 × CS3. Halter brown with paler apex.

Male abdomen (Figs 106B–C, 107). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.3 × length of S4, laterally long-setose with a large, dark posteromedial patch of dense setulae flanked by broad pale areas and then dark vertical bands, anteromedially with a dark, transverse band. Anterior flange of S6+7 small, weakly developed. Sclerite A large, ovoid; sclerite B very narrow, curved along anterodorsal part of genital pouch; sclerite C thick, elongate; sclerite D small, closely associated with left side of posteromedial patch of S5; sclerite E elongate, left apex bifurcate; sclerite F large, elongate and narrow, reaching over to sclerite A; sclerite G large, elongate; ring sclerite weakly developed, pale. Epandrium moderate, 1.0 × length of S8, height 1.3 × maximum length and 0.6 × maximum width, uniformly setose, ventral margin broadly desclerotized; perianal pads weakly developed. Pseudocercus elongate, narrowly connected to epandrium, with three setae; halves of subepandrial sclerite arched, narrow but apicomedially expanded at articulation with subcercus, halves well separated. Subcercus with inner part forming a broad, flat anterior lobe and a long, tapered posteroventral lobe, outer part smaller with a broad lateral lobe extending anteriorly parallel to inner lobe. Hypandrium with very long, thin anteromedial apodeme. Surstylus small, triangular, long-setose posteriorly. Postgonite short, slightly angulate, tapered in apical half, apical third with a long anterolateral lobe, apex with posteroventral

bifurcation. Phallapodeme long, thin; basiphallus stout, curved, connected to distiphallus by a small, neck-like distal part; distiphallus largely membranous with two long, divergent dorsal sclerites and a U-shaped ventral sclerite.

Female abdomen (Fig. 108). T7 broad, simple; T8 divided into a broad, pale, dorsal sclerite and two broad, dark, lateral sclerites, ventral corners slightly produced. Epiproct broad, medially desclerotized, and entirely setulose. Cercus stout, blunt, with long apical and dorsal setae. S7 large, broad, posteriorly flat with four long posterior setae; S8 reduced to a pair of small, lateral sclerites, each bearing two setulae. Three spermathecae, bulb stout, subspherical, finely striate with a deep invagination on one end and a shallow invagination beside insertion point of duct, both invaginations with a finger-like, central process.

Distribution

Nearctic: Canada, United States of America; Neotropical: Mexico.

Remarks

Sclerocoelus parasordipes sp. nov., a widespread western Nearctic species known from British Columbia, Canada south to Guerrero, Mexico, is externally very similar to the eastern North American species *S. sordipes*. Male and female genitalia of these closely related species are similar; however, in *S. parasordipes* the pale medial area of the male S5 is smaller, with dark lateral lines separated from the anterior edge by about one-third the length of S5 and with a dark anterior band. The surstylus of *S. parasordipes* has a more concave anterobasal edge and the postgonite is of relatively uniform width and has an anterolateral lobe in the apical third. Female specimens of these apparently allopatric species cannot be distinguished without dissection.

Sclerocoelus penai sp. nov.

urn:lsid:zoobank.org:act:990F0BC7-41F7-4C7F-9725-6F2A1E54C80C

Figs 109–110

Etymology

This name is in honour of Luis E. Peña Guzman, the collector of the holotype and paratype specimens of the species.

Material examined

Holotype

BOLIVIA • ♂; Cochabamba, El Chapare, Yungas, S Corani; 2900 m a.s.l.; 29–31 Jan. 1976; L.E. Peña leg.; CBFC.

Paratype

BOLIVIA – **Cochabamba** • 1 ♂; same data as for holotype; CNCI.

Description

Body (Fig. 109A). Length 2.4–2.9 mm. Head dark brown, lower fifth of frons, including part of orbital plate, orange; antennae orange-brown. Frontal width 2.2–2.3 × frontal height. Three pairs of interfrontal bristles, first pair small, middle pair largest; anterior orbital 0.4–0.5 × length of posterior. Palpus brown. Eye large, greatest height about 3.0 × shortest genal height. Thorax dark brown, scutum with reddish lateral edges. Two pairs of dorsocentral bristles (anterior pair only slightly larger than surrounding acrostichal setulae) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, fore and mid femora darker. Fore femur with four large ventral preapical setae. Ventral

surface of male mid tibia with two rows of stout setae in apical quarter. Wing hyaline. CS2 0.7–0.8 × CS3. Halter dark brown.

Male abdomen (Figs 109B–C, 110). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.2 × length and 1.3 × width of S4, slightly emarginate anteromedially, broadly and deeply emarginate posteromedially with a dark, rounded, deflexed posteromedial lobe flanked by long, dense setae along margins of emargination, and a dark, posteriorly expanded, posteromedial process (may be homologous with sclerite D) originating at base of posteromedial lobe. Anterior flange of S6+7 large, 0.8 × as long as wide, rounded. Sclerite A large, bean-shaped, setose on posterior margin only; sclerite B dark, elongate, arched, left side connected to sclerite A; sclerite C absent; sclerite D dark, subquadrate; sclerites E and F fused, large, main part rounded with right side strongly tapered and left side with a prominent apicoventral process; sclerite G slightly reduced, short; ring sclerite large, pale. Epandrium small, 0.6 × length of S8, height 1.9 × maximum length and 0.7 × maximum width, sparsely setose; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite simple, dark, slightly curved and fused medially. Subcercus large, divided into two parts by a medial constriction: upper lobe slightly bent and covered posteroventrally in small scale-like processes, lower lobe membranous, bent anteriorly and ridged laterally. Hypandrium with long, narrow anteromedial apodeme, lateral arms narrowly fused to anteromedial apodeme. Surstylus subtriangular, rounded, and long-setose. Postgonite short, tubular with four short apical lobes. Phallapodeme large, apex dorsoventrally flattened and truncate; basiphallus stout, angulate, slightly elongated distally; distiphallus short, dorsal sclerite long, broadly bifurcate and sinuate, ventral sclerite smaller and bifurcate.

Female abdomen. Female unknown.

Distribution

Neotropical: Bolivia.

Remarks

Sclerocoelus penai sp. nov. is closely related to the more common and widely distributed *S. xynos* sp. nov., with which it shares a number of characters including a similar male S5 and a uniquely ventrally inflated subcercus. *Sclerocoelus penai* can be separated from *S. xynos* by the three pairs of subequal interfrontal bristles, rounded medial lobe projecting under the Y-shaped posteromedial process, and the uniquely-shaped postgonite.

Sclerocoelus plumiseta (Duda, 1925)
Figs 8G, 111–113

Leptocera (*Scotophilella*) *plumiseta* Duda, 1925: 185.
Leptocera (*Scotophilella*) *caudata* Duda, 1929: 35.

Leptocera (*Limosina*) *plumiseta* – Richards 1967: 15.
Leptocera (*Scotophilella*) *caudata* – Richards 1967: 15.
Sclerocoelus plumiseta – Marshall 1995: 284. — Roháček *et al*. 2001: 249.

Type material

Holotype (not examined)
Holotype ♀ labeled "Paraguay Babarczy 906, II–III" according to Duda (1925), in the Hungarian Natural History Museum, Budapest.

Material examined

BOLIVIA – **La Paz** • 2 ♂♂, 3 ♀♀; Chulumani, Apa-Apa Reserve; 16°21′15″ S, 67°30′21″ W; 2000 m a.s.l.; 1–3 Apr. 2001; S.A. Marshall leg.; pans in compost; DEBU. – **Santa Cruz** • 1 ♂; Siringalito, near Pampa Grande; 2 Oct. 1996; Bettella and Rossi leg.; DEBU.

BRAZIL – **Minas Gerais** • 1 ♂; Prado; 21 Feb. 1990; S.A. Marshall leg.; sweep along river; MZSP • 2 ♂♂; Riberian Riacho, near Prados; 24 Feb. 1990; S.A. Marshall leg.; floodplain, sweep; DEBU. – **Paraná** • 1 ♀; Curitiba campus; 10 Feb. 1990; S.A. Marshall leg.; sweep in forest with *Araucaria*; DEBU • 1 ♀; Morretes, 5 km S of Sapidontuva; 9 Feb. 1990; S.A. Marshall leg.; MZSP • 1 ♀; Palmas, Linha Alegria, Fazenda Cerro Chato; 26°30′09″ S, 51°40′13″ W; 1224 m a.s.l.; 3–4 Mar. 2015; Savaris and Norrbom leg.; on hill in campo, Malaise trap; USNM. – **Rio de Janeiro** • 1 ♂; Nova Friburgo, 10 km S of Sitio Edelweiss; 27 Jan. 1990; S.A. Marshall leg.; MZSP • 1 ♂; Nova Friburgo, Sitio Edelweiss; 26 Jan. 1990; S.A. Marshall leg.; Malaise trap; MZSP • 1 ♂; same data as for preceding; 26–27 Jan. 1990; DEBU. – **Santa Catarina** • 1 ♀; Nova Teutônia; 27°11′ S, 52°23′ W; 16 Oct. 1936; F. Plaumann leg.; BMNH • 1 ♂, 1 ♀; same data as for preceding; 26 Oct. 1936; BMNH • 1 ♂; same data as for preceding; Jul. 1937; BMNH • 1 ♀; same data as for preceding; 8 Jul. 1937; BMNH • 1 ♂; same data as for preceding; 17 Jul. 1937; BMNH • 1 ♀; same data as for preceding; 10 May 1938; BMNH • 1 ♂; same data as for preceding; 11 May 1938; BMNH • 2 ♂♂; same data as for preceding; 1 Jun. 1938; BMNH • 1 ♂; same data as for preceding; 11 Nov. 1938; BMNH • 1 ♀; same data as for preceding; 14 Nov. 1938; BMNH. – **São Paulo** • 1 ♂; Estación Biologica Boracea; 2 Dec. 2008; G.F.G. Miranda leg.; dung trap; MZSP • 5 ♂♂, 2 ♀♀; São José do Barreiro; 1650 m a.s.l.; Jan. 1969; M. Alvarenga leg.; Malaise trap; DEBU.

PERU – **Junín** • 1 ♂; Pampa Hermosa Lodge, 22 km N of San Ramon; 10°59′18″ S, 75°25′30″ W; 1220 m a.s.l.; 24–27 Nov. 2007; D. Brzoska leg.; flight-intercept trap; DEBU.

Redescription

Body (Fig. 111A). Length 2.4–3.4 mm. Head Dark brown, lower third of frons, gena, and face orange; antenna orange-brown. Frontal width 2.2–2.3 × frontal height. Three pairs of strong interfrontal bristles surmounting a fine fourth pair; anterior orbital 0.4–0.5 × length of posterior. Palpus yellow. Eye slightly reduced, greatest height about 2.5 × shortest genal height. Thorax dark brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4 × length of posterior pair) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, foreleg yellow. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical quarter. Wing (Fig. 8G) slightly infuscate. CS2 0.8–0.9 × CS3. Halter brown.

Male abdomen (Figs 111B–C, 112). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.2 × length of S4, laterally long-setose with a deep, setulose, posteromedial emargination flanked by a patch of 3 setae, and a dark, anvil-shaped, posteromedial sclerite. Anterior flange of S6+7 strong, triangular, 2.0 × as long as wide. Sclerite A circular, desclerotized and separate from S6+7; sclerite B dark, elongate, and arched; sclerite C absent; sclerite D dark, crescent-shaped and articulating with left corner of posteromedial sclerite of S5; sclerite E dark, elongate, sinuate, and articulating with right side of posteromedial sclerite of S5; sclerite F large, laterally concave, left side with an elongate apicoventral process; sclerite G small, dark, narrowly separated from sclerite F; ring sclerite small, dark. Epandrium small, 0.5 × length of S8, height 1.5 × maximum length and 0.9 × maximum width, uniformly setose, posteroventral margin slightly emarginate; perianal pads weakly developed. Pseudocercus not distinctly differentiated from cercus; halves of subepandrial sclerite stout, slightly arched, and fused medially. Subcercus large, triangular, slightly sinuate, and setulose in apical half, fused dorsally to form subanal plate. Hypandrium with long, thin anteromedial apodeme. Surstylus very large, slightly taller than height

of epandrium, curved inwards and posteriorly, apical half flattened with long setae, basal half with a setose posteroventral lobe and a short anterior lobe. Postgonite short, basal third curved with a triangular anterior lobe, middle third constricted, apical third truncate and expanded. Phallapodeme long but thin; basiphallus dorsoventrally flattened with a laterally compressed medial part and a pair of curved lateral arms; distiphallus with a sclerotized dorsal tube, apical part membranous with a flattened dorsal sclerite and a pair of sinuate lateral sclerites.

Female abdomen (Fig. 113). T7 broad, simple; T8 divided into a small, pale, dorsal sclerite and two large, dark, lateral sclerites, posterolateral corners slightly expanded posteriorly. Epiproct broad, ovoid, posteromedially desclerotized, and entirely setulose. Cercus elongate, pointed with long apical and dorsal setae. S7 large, posteromedially pointed with six large preapical setae; S8 reduced to a pair of small, dark, lateral sclerites. Three spermathecae, bulb large, bean-shaped, very finely striate with a wide, deep invagination on thicker end, invagination with a small, finger-like, central process.

Distribution

Neotropical: Bolivia*, Brazil*, Paraguay, Peru*.

Remarks

While the holotype of *Sclerocoelus plumiseta* (Duda, 1925) was not examined, this species is easily recognizable by the distinctive male genitalia (as illustrated in Duda 1929: fig. 1) of *Scotophilella caudata* Duda, 1929 [= *Leptocera* (*Scotophilella*) *plumiseta*]. This species is similar to species of the *S. regularis* species group, but can be easily separated by the basally constricted and apically curved surstylus, small posteromedial patch of setulae, and apically smooth postgonite. *Sclerocoelus plumiseta* is a southern South American species known from a variety of habitats below 2000 m a.s.l. It has a complex genital pouch as in the more derived clades, but the pseudocerci are not differentiated from the epandrium, the subcerci are simple and the surstylus is large and elongate.

Sclerocoelus punensis sp. nov.
urn:lsid:zoobank.org:act:076ADC38-4F25-4744-B9C7-5AD35CC10F33
Figs 8H, 114–115

Etymology

The species name reflects the high elevation habitat of this species.

Material examined

Holotype

BOLIVIA • ♂; La Paz, Lake Titicaca, W of Guaqui; 16°35′56″ S, 68°53′52″ W; 3810 m a.s.l.; 19 Apr. 2001; S.A. Marshall leg.; stream, sweep; CBFC.

Paratypes

PERU – **Cusco** • 7 ♂♂; Cusco, Quebradas Salineras; 3550 m a.s.l.; 3 Aug. 1971; C. and M. Vardy, leg.; BMNH. – **Junín** • 1 ♂; Ondores; 4100 m a.s.l.; 28–31 Dec. 1980; Gärdenfors, Hall and Samuelsson leg.; puna and wet pastures; MZLU.

Description

Body (Fig. 114A). Length 2.4–3.0 mm. Head dark brown, lower third of frons orange; face and gena orange-brown, antennae brown. Frontal width 2.3–2.4 × frontal height. Three pairs of strong interfrontal bristles surmounting a fine fourth pair; anterior orbital 0.4–0.5 × length of posterior. Palpus yellow. Eye slightly reduced, greatest height about 2.5 × shortest genal height. Thorax dark brown, scutum with paler

lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.7× length of posterior pair) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, mid and hind femora darker. Fore femur with four large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical third. Wing (Fig. 8H) hyaline. CS2 0.7–0.8× CS3. Halter brown.

Male abdomen (Figs 114B–C, 115). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.3× length of S4, posterolaterally long-setose, medially depressed and strongly darkened, lateral quarters darkened and anterior edge dark. Anterior flange of S6+7 not developed. Sclerites A not well differentiated from S6+7; sclerites, B, C, and D absent(?); sclerite E large, dark, tapered, and curved posteriorly; sclerite F large, dark and tapered; sclerite G small, not well developed; ring sclerite very large and very well sclerotized with a prominent mesial lobe. Epandrium very large, 0.9× length of S8, height 1.9× maximum length and 1.0× maximum width, uniformly setose with very long setae in anterolateral corners; perianal pads weakly developed. Pseudocercus inconspicuous, fused to epandrium; halves of subepandrial sclerite simple, slightly sinuate, and narrowly fused medially. Subcercus very large, triangular and apically curved posteriorly. Hypandrium with sinuate anteromedial apodeme. Surstylus with a broad anterolateral ridge bearing a row of long setae and an elongate, setose posteroventral lobe which has a prominent, bare, ventral process. Postgonite long, curved anteriorly, with a stout anterior lobe at about basal third and apex bent ventrally. Phallapodeme very large with sclerotized dorsal and ventral 'fins'; basiphallus wedge-shaped with a curved, beak-like epiphallus; distiphallus basally sclerotized with two large, apical membranous lobes.

Female abdomen. Female unknown.

Distribution

Neotropical: Bolivia, Peru.

Remarks

Sclerocoelus punensis sp. nov. is superficially similar to *S. puyensis* sp. nov. but can be distinguished by the medially depressed male S5, apically bifurcate surstylus, apically tapered subcercus, and sinuate postgonite. *Sclerocoelus punensis*, like other 'basal' *Sclerocoelus* lineages, is a high Andean species. All known specimens were collected above 3500 m a.s.l. The holotype is from Lake Titicaca (about 3800 m a.s.l.), where it was taken in the same samples as *S. lutosus* sp. nov. and close to where *S. mandibulum* sp. nov. was collected.

Sclerocoelus puyensis sp. nov.

urn:lsid:zoobank.org:act:536667FF-3D30-488A-884D-69EF326942CA

Figs 8I, 116–118

Etymology

This name reflects the collection data for the holotype and one paratype, which were aspirated under dead *Puya* stems.

Material examined

Holotype

ECUADOR • ♂; Carchi, Páramo El Angel, 18.2 km NW of El Angel; 3400 m a.s.l.; 3 Nov. 1999; S.A. Marshall leg.; aspirated under dead *Puya* stems; QCAZ debu00139744.

Paratypes

ECUADOR – **Carchi** • 1 ♀; same data as for holotype; DEBU • 1 ♂, 1 ♀; Páramo El Angel, 14.1 km NW of El Angel; 3450 m a.s.l.; 1 Nov. 1999; S.A. Marshall leg.; under *Polylepis* litter; QCAZ • 2 ♀♀;

Páramo El Angel, 17.3 km NW of El Angel; 3400 m a.s.l.; 31 Oct. 1999; S.A. Marshall leg.; QCAZ • 2 ♂♂; same data as for preceding; 1–3 Nov. 1999; pan traps among *Espeletia*; QCAZ. – **Pichincha** • 1 ♀; Campamento Pichan, near Nono; 3200 m a.s.l.; 24 Oct. 1999; S.A. Marshall leg.; dung; DEBU • 2 ♂♂; same data as for preceding; green leaf litter; DEBU • 4 ♂♂; Cotopaxi National Park, Quebrada Mishahuaycu; 3600 m a.s.l.; 26 Oct.–8 Nov. 1999; S.A. Marshall leg.; pans along stream; DEBU • 4 ♂♂; same data as for preceding; QCAZ • 4 ♂♂, 10 ♀♀; Valley near Hosteria San Jorge, 10 km NW of Quito; 3000 m a.s.l.; 23 Oct. 1999; S.A. Marshall leg.; pans in grass pile; DEBU • 5 ♂♂, 11 ♀♀; same data as for preceding; QCAZ.

Description

Body (Fig. 116A). Length 2.2–3.3 mm. Head dark brown, lower fifth of frons orange; face, gena, and antenna orange-brown. Frontal width 2.2× frontal height. Two pairs of strong interfrontal bristles surmounting a fine third pair; anterior orbital 0.5× length of posterior. Palpus yellow. Eye very large, greatest height about 4.5× shortest genal height. Thorax brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.5× length of posterior pair) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, femora darker. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical fifth. Wing (Fig. 8I) slightly infuscate. CS2 0.9× CS3. Halter brown.

Male abdomen (Figs 116B–C, 117). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.1× length of S4, anteromedial half pale, posterior half long-setose with a dark, triangular posteromedial area. Anterior flange of S6+7 large, 1.0× as long as wide. Sclerite A forming a large, pale, densely setulose, elongate rectangular piece; sclerites B and C absent; sclerite D small, dark, ovoid, originating at apex of posteromedial dark area of S5; sclerite E dark, elongate with a narrow, curled, mesial end; sclerite F dark with an elongate, rectangular mesial end; sclerite G very large, bulbous, ring sclerite large and integrated into posterior surface of sclerite G. Epandrium small, 0.4× length of S8, height 1.2× maximum length and 0.8× maximum width, long-setose; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite flat and medially fused. Subcercus large, triangular in posterior view with a large, dorsoventrally flattened apical process. Hypandrium with sinuate, dorsoventrally flattened anteromedial apodeme. Surstylus subquadrate with two small anterior lobes and a larger, curved, long-setose, posteroventral lobe. Postgonite short, basal half broad with a slight anterior emargination, apical half constricted and curved anteriorly, apex with a thin, sinuate process. Phallapodeme large, apex dorsoventrally flattened; basiphallus large, basal part stout and connected to distiphallus by a neck-like distal part, posteriorly with a large (almost as long as postgonite), sinuate epiphallus; distiphallus unusual, basal half sclerotized and gently sinuate, apical half bent posteriorly, extending parallel to basal half, ventrally flattened with large membranous ventral folds.

Female abdomen (Fig. 118). T7 broad, simple; T8 divided into a broad, membranous, dorsal sclerite and two large, dark, lateral sclerites, posterolateral corners slightly expanded and rounded. Epiproct large, subtriangular, medially split, anteromedially and posteriorly desclerotized, and setulose in posterior two-thirds. Cercus elongate, apically pointed with long apical, dorsal, lateral, and apicoventral setae. S7 very large, broadly desclerotized posteriorly with 4–5 large posterior setae; S8 divided into two small, dark, lateral sclerites. Hypoproct entirely setulose with short but thick ventromedial setae. Three spermathecae, bulb elongate, cylindrical but crumpled, finely striate with shallow invaginations at both ends (ducts connecting near middle), both with a stout, finger-like, central process.

Distribution

Neotropical: Ecuador.

Remarks

Sclerocoelus puyensis sp. nov. is superficially similar to *S. punensis* sp. nov. but can be distinguished by the medially flattened or even slightly convex male S5, apically tapered surstylus, apically flattened and posterodorsally projecting subcercus, and evenly curved postgonite. *Sclerocoelus puyensis*, like other 'basal' *Sclerocoelus* lineages, is a high Andean species. All known specimens are from over 3000 m a.s.l., mostly in relatively small pockets of moist decaying plant material such as fallen *Puya* (Bromeliaceae) stems, debris along high alpine streams, or prostrate *Polylepis* (Rosaceae) branches.

Sclerocoelus rectangularis (Malloch, 1914)
Figs 8J, 119–121

Leptocera (*Limosina*) *rectangularis* Malloch, 1914: 19.

Leptocera (*Scotophilella*) *rectangularis* – Spuler 1925: 151.
Leptocera (*Chaetopodella*) *rectangularis* – Duda 1925: 147. — Richards 1967: 11.
Chaetopodella rectangularis – Roháček 1983: 114.
Sclerocoelus rectangularis – Marshall 2001: 282. — Roháček *et al*. 2001: 249.

Type material

Holotype (not examined)
COSTA RICA • ♀; Cartago, Juan Viñas; 1000 m a.s.l.; 2 May 1910; P. Calvert leg.; forest brook; ANSP.

Paratypes (♂ from Alajuela examined by GKK in 2021, ♂♂ from Cartago examined by SAM in 1989)
COSTA RICA – **Alajuela** • 1 ♂; 950 m a.s.l.; 15 Sep. 1909; P. Calvert leg.; sweepings; ANSP. – **Cartago** • 2 ♂♂; same data as for holotype; ANSP • 1 ♂; Cartago; 1450 m a.s.l.; 3 Jan. 1910; P. Calvert leg.; sweeping over mud; ANSP.

Other material examined

COSTA RICA – **San José** • 4 ♂♂, 3 ♀♀; Jul.; H. Schmidt leg.; USNM.

DOMINICA – **Saint Peter Parish** • 1 ♀; 5 km S of Portsmouth at Jarige Road; 25 m a.s.l.; 23 Jun. 1989; M. Sörensson and B. Mårtensson leg.; MZLU.

DOMINICAN REPUBLIC – **Elías Piña** • 1 ♀; Sierra de Neiba, just north of crest, 6 km WNW of Angel Feliz; 18°41′ N, 71°47′ W; 1770 m a.s.l.; 15 Oct. 1991; C. Young, S. Thompson, R. Davidson and J. Rawlins leg.; mesic montane forest; CMNH. – **Independencia** • 4 ♂♂, 1 ♀; Sabana Real, 32 km NW of La Descubierta; 1800 m a.s.l.; 26 Nov. 1991; Masner and Peck leg.; cloud forest, trail sweeps; DEBU. – **La Vega** • 2 ♂♂; Manabao; 21 Jan. 1989; J.E. Swann leg.; sweep; DEBU • 2 ♂♂; Manabao; 22 Jan. 1989; S.A. Marshall leg.; near creek, sweep; DEBU. – **Pedernales** • 6 ♂♂, 7 ♀♀; 3.3 km NE of Los Arroyos; 18°15′ N, 71°45′ W; 1450 m a.s.l.; 16–18 Jul. 1990; L. Masner, J, Rawlins and C. Young leg.; wet montane forest, sweep samples; CMNH • 1 ♂, 9 ♀♀; 7 km NW of Los Arroyos; 18°16′ N, 71°44′ W; 1870 m a.s.l.; 15 Jul. 1990; L. Masner, C. Young and J. Rawlins leg.; flight-intercept trap; CMNH • 1 ♂, 3 ♀♀; 14.5 km N of Cabo Rojo; 18°03′ N, 71°39′ W; 165 m a.s.l.; 26–27 Sep. 1991; C. Young, S. Thompson, R. Davidson and J. Rawlins leg.; arid thornscrub; CMNH • 5 ♂♂, 1 ♀; 23.5 km N of Cabo Rojo; 18°06′ N, 71°38′ W; 540 m a.s.l.; 19–25 Jul. 1990; L. Masner, J. Rawlins and C. Young leg.; deciduous forest, flight-intercept trap; CMNH • 5 ♂♂, 2 ♀♀; 26 km N of Cabo Rojo; 18°06′ N, 71°38′ W; 730 m a.s.l.; 13–20 Jul. 1990; L. Masner, J. Rawlins and C. Young leg.; wet deciduous forest, flight-intercept trap; CMNH • 2 ♀♀; 26 km N of Cabo Rojo; 565 m a.s.l.; 29 Nov.–3 Dec. 1991; Masner and Peck leg.; evergreen dry forest, flight-intercept trap; DEBU • 1 ♂, 1 ♀; 28 km N of Cabo Rojo;

760 m a.s.l.; 29 Nov.–3 Dec. 1991; Masner and Peck leg.; evergreen dry forest, flight-intercept trap; DEBU • 1 ♂, 2 ♀♀; 37 km N of Cabo Rojo, 4 km E Las Abejas; 18°09′ N, 71°37′ W; 1440 m a.s.l.; 13–16 Jul. 1987; R.L. Davidson and J.E. Rawlins leg.; CMNH • 2 ♂♂, 2 ♀♀; 60 km NW of Cabo Rojo; 1200 m a.s.l.; 30 Nov. 1991; Masner and Peck leg.; cloud forest, sweep; DEBU • 1 ♀; Cabo Rojo, Alcoa Road, km 25; 17–20 Jan. 1989; S.A. Marshall and J.E. Swan leg.; sweep dry pond; DEBU • 1 ♂, 4 ♀♀; Cabo Rojo, Alcoa Road, km 26; 17–20 Jan. 1989; S.A. Marshall and J.E. Swann leg.; flight-intercept trap; DEBU • 2 ♂♂, 2 ♀♀; same data as for preceding; pans; DEBU • 5 ♂♂, 4 ♀♀; Las Abejas, 30 km N of Cabo Rojo; 1300 m a.s.l.; 17 Jan. 1989; S.A. Marshall leg.; cloud forest; DEBU • 3 ♂♂, 2 ♀♀; same data as for preceding; J.E. Swan leg.; DEBU • 42 ♂♂, 51 ♀♀; same data as for preceding; S.A. Marshall leg.; sweep; DEBU • 1 ♀; same data as for preceding; J.E. Swan leg.; sweep at sink hole; DEBU • 2 ♂♂, 1 ♀; same data as for preceding; 19 Jan. 1989; J.E. Swan leg.; sweep; DEBU • 9 ♂♂, 20 ♀♀; same data as for preceding; S.A. Marshall leg.; DEBU • 17 ♂♂, 32 ♀♀; Las Abejas, 38 km NNW of Cabo Rojo; 18°09′ N, 71°38′ W; 1250 m a.s.l.; 15 Jul. 1987; J.E. Rawlins and R.L. Davidson leg.; CMNH • 7 ♂♂, 7 ♀♀; Las Abejas, near Cabo Rojo; 1300 m a.s.l.; 19 Jan. 1989; S.A. Marshall leg.; cloud forest; DEBU • 25 ♂♂, 22 ♀♀; Las Abejas, near Cabo Rojo; 17 Jan. 1989; S.A. Marshall leg.; cloud forest, sweep; DEBU • 1 ♂, 2 ♀♀; same data as for preceding; 19 Jan. 1989, J.E. Swann leg.; DEBU • 97 ♂♂, 59 ♀♀; Sierra de Baoruca, Las Abejas Valley; 1300 m a.s.l.; 17 Jan. 1989; L. Masner leg.; cloud forest; DEBU. – **San Juan** • 1 ♀; La Ciénega; 1000 m a.s.l.; 12 Jan. 1989; S.A. Marshall leg.; trail sweep and Malaise trap near hut; DEBU • 1 ♀; La Ciénega; 11–22 Jan. 1989; S.A. Marshall and J.E. Swann leg.; flight-intercept trap; DEBU • 5 ♂♂, 4 ♀♀; La Ciénega, trail to Pico Duarte; 1200–1400 m a.s.l.; 12 Jan. 1989; S.A. Marshall leg.; sweep (wet); DEBU.

GUATEMALA – **Guatemala** • 1 ♀; Fraijanes, Finca San Antonio; 1800 m a.s.l.; 14 Feb. 1987; J. Manger leg.; DEBU. – **Quetzaltenango** • 2 ♀♀; 8 km SE of Quetzaltenango, Zunil; 2630 m a.s.l.; 17–19 Jun. 1993; J.S. Ashe and R.W. Brooks leg.; flight-intercept trap; SEMC. – **Sacatepéquez** • 1 ♀; 5 km SE of Antigua; 14°31′43″ N, 90°41′20″ W; 2330 m a.s.l.; 10–13 Jun. 2009; oak forest, Malaise trap; UVGC • 1 ♂; Antigua; Oct. 1965; N.L.H. Krauss leg.; USNM. – **San Marcos** • 1 ♂; 6.4 km N of San Lorenzo; 18 Jul. 1986; J.M. Campbell leg.; sifted mushroom piles; CNCI • 1 ♂, 1 ♀; 8 km N of San Lorenzo; 4–18 Jul. 1986; J.M. Campbell leg.; flight-intercept trap; CNCI • 7 ♂♂, 8 ♀♀; San Antonio Sacatepéquez; 2440 m a.s.l.; 29 Sep. 1987; M. Sharkey leg.; CNCI. – **Zacapa** • 1 ♂; San Lorenzo; 1800 m a.s.l.; 7–9 Jul. 1986; L. LeSage leg.; pan traps in abandoned field; CNCI • 1 ♂; same data as for preceding; 11–13 Jul. 1986; edge pine forest, attracted with eugenol; CNCI • 2 ♂♂; same data as for preceding; pitfall traps in field; CNCI.

HONDURAS – **El Paraíso** • 1 ♂, 11 ♀♀; Cerro Monserrat; 1800 m a.s.l.; 24 May 1994; H. Howden leg.; Malaise trap; DEBU • 3 ♂♂, 1 ♀; same data as for preceding; 30 May 1994; DEBU • 1 ♀; Cerro Monserrat, Yuscaran Paraiso; 24 Jan. 1995; R. Cordiro leg.; flight-intercept trap; DEBU. – **Francisco Morazán** • 1 ♂, 1 ♀; Cerro Uyuca; 1800 m a.s.l.; 10 May 1994; H. Howden leg.; Malaise trap; DEBU • 5 ♂♂, 4 ♀♀; same data as for preceding; 27 May 1994; DEBU • 1 ♂; same data as for preceding; 30 May 1994; DEBU • 3 ♀♀; same data as for preceding; 3 Jun. 1994; DEBU • 1 ♂; same data as for preceding; 6 Jun. 1994; DEBU • 1 ♀; Uyuca, San Antonio de Oriente; 6 Feb. 1995; R. Cordiro leg.; flight-intercept trap; DEBU. – **Olancho** • 4 ♀♀; La Muralla National Park; 15°05′49″ N, 86°44′17″ W; 1450 m a.s.l.; 4–7 Jul. 2002; Smith and Ocampo leg.; flight-intercept trap; DEBU.

JAMAICA – **Saint Andrew Parish** • 2 ♀♀; 8 km N of Irish Town; 1000 m a.s.l.; 8 Jun. 1989; M. Sörensson and B. Mårtensson leg.; MZLU • 1 ♂, 5 ♀♀; Hardwar Gap; 1200 m a.s.l.; 10 Jul. 1966; Howden and Becker leg.; CNCI • 1 ♂, 1 ♀; Holliwell Park at Hardwar Gap; 1200 m a.s.l.; 11 Jun. 1989; M. Sörensson and B. Mårtensson leg.; MZLU. – **Saint Peter Parish** • 1 ♀; 5 km S of Portsmouth at Jarige River; 25 m a.s.l.; 23 Jun. 1989; M. Sörensson and B. Mårtensson leg.; MZLU.

MEXICO – **Guerrero** • 1 ♂; Iguala; 1525 m a.s.l.; 18 Jul. 1962; H.E. Milliron leg.; CNCI. – **Hidalgo** • 2 ♂♂; 12.8 km from Zimapán; Jul. 1954; University of Kansas Mexico Expedition leg.; SEMC. – **Jalisco** • 1 ♀; 32 km SW of Tepatitlán; 1700 m a.s.l.; 20 Aug. 1954; University of Kansas Mexico Expedition leg.; SEMC. – **Michoacán** • 1 ♂, 2 ♀♀; Carapa; 2 Sep. 1938; L.J. Lipovsky leg.; SEMC • 3 ♂♂, 5 ♀♀; Morelia; 4 Sep. 1938; L.J. Lipovsky leg.; SEMC • 2 ♂♂; same data as for preceding; 7 Sep. 1938; SEMC. – **Morelos** • 11 ♂♂; 4.8 km S of Cuernavaca; 10 Aug. 1938; L.J. Lipovsky leg.; SEMC • 1 ♂; 6.4 km S of Tres Cumbres, km 57 ¾; 2600 m a.s.l.; 29 Aug.–4 Sep. 1971; A. Newton leg.; human dung; FMNH • 1 ♀; Cuernavaca; 1 Aug. 1938; L.J. Lipovsky leg.; SEMC • 2 ♂♂; Tres Cumbres; 20 Sep. 1938; L.J. Lipovsky leg.; SEMC. – **Querétaro** • 1 ♂; 4.6 km SE of San Joaquin; 20°53′05″ N, 99°31′51″ W; 2520 m a.s.l.; 16 Aug. 2009; M.G. Branstetter leg.; oak forest, sifted leaf litter; DEBU • 1 ♂; 13.1 km SSE of Huimilpan; 20°15′40″ N, 100°14′05″ W; 2615 m a.s.l.; 17 Aug. 2009; M.G. Branstetter leg.; oak forest, sifted leaf litter; DEBU • 1 ♀; 13.6 km SSE of Huimilpan; 20°15′08″ N, 100°15′18″ W; 2720 m a.s.l.; 17 Aug. 2009; L. Sáenz leg.; oak forest, sifted leaf litter; UVGC. – **San Luis Potosi** • 1 ♂, 1 ♀; 32.2 km W of Xilitla; 1615 m a.s.l.; 22 Jul. 1954; J.G. Chillcott leg.; CNCI • 1 ♂; 40 km W of Xilitla; 1700 m a.s.l.; 12 Jun.–6 Aug. 1983; S. and J. Peck leg.; pine-oak forest, flight-intercept trap; CNCI. – **Sinaloa** • 1 ♂, 3 ♀♀; 24 km W of El Palmito; 1500 m a.s.l.; 30 Jul. 1964; W.R.M. Mason leg.; CNCI.

VENEZUELA – **Aragua** • 2 ♀♀; Henri Pittier National Park, Maracay–Choroni Highway, km 19; 1330 m a.s.l.; 15 Apr. 1994; L. Masner leg.; creek; DEBU • 1 ♀; Maracay, Rancho Grande Biological Station; 1250 m a.s.l.; 5 Mar. 1995; S.A. Marshall leg.; sweep along trail; DEBU. – **Bolívar** • 1 ♀; 26 km N of Guasipati; 24 Jun.–12 Jul; 1987; S. and J. Peck leg.; sandy seasonally humid forest, flight-intercept trap; DEBU. – **Lara** • 3 ♂♂, 1 ♀; Yacambu; 1200 m a.s.l.; 7 May 1981; H. Townes leg.; cloud forest; CNCI • 1 ♀; Yacambu; 1200 m a.s.l.; 10 May 1981; H.K. Townes leg.; CNCI. – **Trujillo** • 1 ♂, 1 ♀; 10 km E of Bocono, Laguna de Lucerdo; 1760 m a.s.l.; 3 Mar. 1995; S.A. Marshall leg.; slash/compost; DEBU • 1 ♂, 1 ♀; same data as for preceding; sweep; DEBU • 7 ♂♂, 5 ♀♀; Bocono–Guaramacal Road; 2130 m a.s.l.; S.A. Marshall leg.; sweep wet litter; DEBU • 2 ♂♂, 1 ♀; Bocono, road to Guaramacal; 2130 m a.s.l.; 2 Mar. 1995; S.A. Marshall leg.; DEBU • 2 ♂♂, 1 ♀; same data as for preceding; sweep over mud; DEBU • 1 ♂; Guaramacal National Park, 14 km NE of Bocono; 2000 m a.s.l.; 25 Aug.–1 Sep. 1992; L. Masner leg.; DEBU • 1 ♂; Mosquey near Bocono; 1500 m a.s.l.; 24 Aug. 1992; L. Masner leg.; coffee plantation, maxinet; DEBU.

Redescription

Body (Fig. 119A). Length 2.4–3.4 mm. Head brown, lower quarter of frons orange; face, gena, and antennae dark brown. Frontal width 2.2–2.3 × frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.4–0.5 × length of posterior. Palpus yellow. Eye slightly reduced, greatest height about 2.5 × shortest genal height. Thorax brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4 × length of posterior pair) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum sometimes with a dark, semi-sclerotized, non-setulose patch. Legs brown, fore and hind femora darker. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical third. Wing (Fig. 8J) slightly infuscate. CS2 0.7–0.8 × CS3. Halter pale brown with white apex.

Male abdomen (Figs 119B–C, 120). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.5 × length of S4, laterally long-setose with a keyhole-shaped medial perforation flanked by outwardly flared flanges along posterolateral half, posterior edge of S5 with medial setulae and two dark subtriangular sclerites. Anterior flange of S6+7 2.0 × as long as wide, with an unusually deep cleft between S6 and S7. Sclerite A pale, setulose, extending to about midline; sclerite B small and indistinct; sclerite C long, narrow, and arched; sclerite D short, blade-like and apparently fused to left posteromedial sclerite of

S5; sclerite E long, apically bifurcate; sclerite F large and sinuate; sclerite G elongate with a rounded ventral lobe; ring sclerite thick but lightly sclerotized. Epandrium large, 0.6× length of S8, height 1.5× maximum length and 0.9× maximum width, uniformly setose; anal fissure large and triangular, widest at base; perianal pads moderately sclerotized but flat and narrow. Pseudocercus large, elongate, separate from epandrium and bearing 3–4 setae; halves of subepandrial sclerite dark, swollen, bilobed and broadly fused medially. Subcercus large and folded over itself, inner half elongate with a small posteroventral process, outer half broader and smooth with small lobes contacting surstylus and epandrium. Hypandrium with long, narrow anteromedial apodeme. Surstylus elongate, subrectangular, apically setose with a large anteroventral lobe. Postgonite elongate, sinuate, and tapered. Phallapodeme large with a broad dorsal 'fin'; basiphallus dorsoventrally flattened with two long posterior lobes; distiphallus well sclerotized, basal half with a serrate posterior ridge, apical half with a dark bifurcate ventral sclerite and large, distally flanged ventrolateral lobes.

Female abdomen (Fig. 121). T7 broad, posteroventral corners rounded; T8 very dark, separated dorsally by a small gap, posteroventral corners elongate and projecting dorsally. Epiproct broad, medially desclerotized, and setulose. Cercus broad and tapered anteriorly, with long apical and dorsal setae. S7 subtriangular with four large posterior setae; S8 reduced to two minute lateral sclerites, usually hidden under corners of T8. Three spermathecae, bulb spherical, finely striate with a shallow basal and deep subbasal invagination.

Distribution

Neotropical: Costa Rica, Dominica*, Dominican Republic*, Guatemala*, Honduras*, Jamaica*, Mexico*, Venezuela*.

Remarks

Sclerocoelus rectangularis appears to be closely related to the mostly Central American *S. dasysternum* group and it externally similar to most species in the group. *Sclerocoelus rectangularis* can be easily distinguished from all congeners by the darkened, non-sclerotized, non-setose patch in the membrane around the prosternum, raised medial flanges on the male S5, distinctively triangular anal fissure, and laterally folded surstylus. It is a relatively common species in Mexico, Central America, northern South America, and parts of the Caribbean, and is among the most frequently collected of the six Caribbean *Sclerocoelus* species (the other Caribbean species are the relatively widespread *S. dasysternum* sp. nov., *S. regularis*, *S. caribensis*, and *S. vulgatus* sp. nov., and the Dominican endemic *S. dominicensis* sp. nov.).

Sclerocoelus recurvatus sp. nov.

urn:lsid:zoobank.org:act:966F8022-9A56-45BC-B686-BB16ED448E40

Figs 9A, 122–124

Etymology

The species name (from the Latin '*recurvatus*', meaning 'recurved, bent backwards') refers to the recurved, hook-like projection of the female S8.

Material examined

Holotype

COSTA RICA • ♂; Heredia, Braulio Carrillo National Park, Barva Biological Station; 16 Feb. 2003; S.A. Marshall leg.; sweep downed bromeliads; MNCR debu00206369.

Paratypes

COSTA RICA – **Cartago** • 1 ♂, 2 ♀♀; Tapantí National Park, La Esperanza del Guarco; 9°42′00″ N, 83°51′49″ W; 2700 m a.s.l.; 17–18 Aug. 2001; S.A. Marshall leg.; oak forest, treefall pans; MNCR. – **Heredia** • 7 ♂♂, 5 ♀♀; same data as for holotype; DEBU • 7 ♂♂, 6 ♀♀; same data as for holotype; MNCR. – **San José** • 1 ♂; Cerro de la Muerte, km 10; 2500 m a.s.l.; 25 Feb. 1984; A. Howden leg.; carrion trap; DEBU • 1 ♀; San Gerardo de Dota; 9°33′ N, 83°48′ W; 9 Aug. 1995; S.A. Marshall leg.; disturbed area near river, sweep; DEBU.

Description

Body (Fig. 122A). Length 2.6–4.0 mm. Head dark brown; gena and antennae orange-brown. Frontal width 2.1–2.2 × frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.4–0.5 × length of posterior. Palpus off-white. Eye large, greatest height about 4.0 × shortest genal height. Thorax brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4 × length of posterior pair) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, hind tibia darker. Ventral surface of male mid tibia with two rows of stout setae in apical half. Wing (Fig. 9A) slightly infuscate. CS2 0.7–0.8 × CS3. Halter brown.

Male abdomen (Figs 122B–C, 123). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S4 broadly emarginate posteromedially. S5 rectangular, 1.1 × length of S4, slightly emarginate anteromedially, posterolaterally long-setose with a dark, elongate posteromedial patch of dense setulae flanked by narrow pale areas and then dark setose patches. Anterior flange of S6+7 small, 1.0 × as long as wide. Sclerite A pale, laterally setose; sclerites B and C reduced, indistinct from sclerite A; sclerite D dark, elongate, originating at left side of posteromedial patch of S5; sclerite E dark, broad with a narrow apical process; sclerite F large, elongate and curved; sclerite G elongate, narrow; ring sclerite small, weakly sclerotized. Epandrium small, 0.6 × length of S8, height 1.2 × maximum length and 0.6 × maximum width, sparsely long-setose, posteroventral corner slightly reduced; perianal pads dark, flattened, narrow, and densely setulose. Pseudocercus small, separate from epandrium, and bearing three setae; halves of subepandrial sclerite very strongly arched (U-shaped) and medially fused. Subcercus small with a narrow, rectangular posterior lobe and a broad, rounded anterior lobe. Hypandrium with stout, sinuate, Y-shaped anteromedial apodeme. Surstylus simple, setose, subrectangular with a slight anteroventral lobe and a weak anterodorsal carina. Postgonite elongate, curved, distally expanded and desclerotized. Phallapodeme relatively small, apex flattened dorsoventrally; basiphallus greatly expanded distally along dorsal margin of distiphallus, with an elongate, hooked epiphallus; distiphallus short, largely membranous with a pair of dark, sinuate dorsolateral sclerites.

Female abdomen (Fig. 124). T7 broad, simple; T8 divided into a small, pale, dorsal sclerite and two large, dark, lateral sclerites, posterolateral corners slightly expanded posteriorly and rounded. Epiproct elongate, rectangular, divided medially, and entirely setulose. Cercus relatively short, apically rounded with large apical, preapical, and dorsal setae. S7 broad, rectangular with four large posterior setae; S8 large, triangular with a large, dark, curved, ventral projection. Three spermathecae, bulb stout, spherical, finely grooved.

Distribution

Neotropical: Costa Rica.

Remarks

Sclerocoelus recurvatus sp. nov. is superficially similar to *S. synorios* sp. nov. differs by the rectangular male S5 with an elongate posteromedial setulose patch, stout surstylus, large recurved process on the

female S8, and elongate hypoproct. *Sclerocoelus recurvatus* and its probable sister species *S. grandicercus* sp. nov. are sympatric in the montane *Quercus* forests of Costa Rica. They are among the four endemic Costa Rican *Sclerocoelus* species and among the seven members of the *S. dasysternum* group found in Costa Rica.

Sclerocoelus regularis (Malloch, 1914)
Figs 9B, 125–127

Leptocera (*Limosina*) *regularis* Malloch, 1914: 19.

Leptocera (*Limosina*) *regularis* – Richards 1967: 15.
Leptocera (*Scotophilella*) *regularis* – Spuler 1925: 151.
Sclerocoelus regularis – Marshall 1995: 284. — Roháček *et al*. 2001: 249.

Type material

Holotype (examined by SAM in 1989)
COSTA RICA • ♂; Cartago, Juan Viñas; 760 m a.s.l.; 3 May 1910; P. Calvert leg.; forest edge, near brook; ANSP.

Paratypes (examined by SAM in 1989)
COSTA RICA – **Alajuela** • 1 ♀; Alajuela; 945 m a.s.l.; 9 Sep. 1909; P. Calvert leg.; ANSP • 1 ♀; same data as for preceding; 15 Sep. 1909; ANSP. – **Cartago** • 1 ♀; Cartago; 1450 m a.s.l.; 19 Feb. 1910; P. Calvert leg.; ANSP • 1 ♂, 2 ♀; Juan Viñas; 760 m a.sl.; 1–2 May 1910; P. Calvert leg.; forest brook; ANSP. – **Guanacaste** • 1 ♂; Filadelfia; 15–21 m a.s.l.; 18 Jan. 1910; P. Calvert leg.; sand/small stone beach by river side; ANSP.

Material examined

BELIZE – **Cayo** • 3 ♂♂; San Ignacio, Maya Mountain Lodge; 7 Jan. 1991; S.A. Marshall leg.; sweep; DEBU • 1 ♂; same data as for preceding; 19 Jan. 1991; sweep trail, morning; DEBU • 2 ♂♂; trail to Xunantunich; 18 Jan. 1991; S.A. Marshall leg.; DEBU

COSTA RICA – **Alajuela** • 2 ♂♂, 1 ♀; Río Peñas Blancas; 700 m a.s.l.; 18 Jul. 1986; L. Masner leg.; DEBU • 1 ♀; Volcán Tenorio, Bijagua Biological Station; 700 m a.s.l.; 20 Jun. 2000; M. Buck leg.; cut wet field, pan traps; DEBU • 91 ♂♂, 43 ♀♀; same data as for preceding; 16 Jun. 2000; sweeping decayed vegetation; DEBU • 1 ♂; Volcán Tenorio, N slope near Bijagua Biological Station; 700 m a.s.l.; 18 Jun. 2000; S.A. Marshall leg.; sweep over *Atta* mound; DEBU • 1 ♂; Volcán Tenorio, N slope, trail to laguna; 1000 m a.s.l.; 18 Jun. 2000; S.A. Marshall leg.; sweeping; DEBU. – **Cartago** • 9 ♂♂, 5 ♀♀; Highway 2, km 67; 6 Aug. 1995; S.A. Marshall leg.; roadside; DEBU • 1 ♂; Nov. 1953; N.L.H. Krauss leg.; USNM • 1 ♂; La Suiza de Turrialba; Aug.; P. Schild leg.; ("S*cotophilella rectangularis* Mal. det Spuler"); USNM • 1 ♂; Río Grande de Orosí, near Tapantí National Park; 1100–1150 m a.s.l.; 10–11 Oct. 1999; Marshall and Buck leg.; bromeliads, leaf pile, sweeping and pans; DEBU • 1 ♂; same data as for preceding; 9 Oct. 1999; floodplain and forest; DEBU • 1 ♂; Tapantí National Park; 1650–1750 m a.s.l.; 7 Oct. 1999; S.A. Marshall leg.; sweep trail; DEBU • 2 ♂♂; Tapantí National Park, above Ranger Station; 1250 m a.s.l.; 12 Oct. 1999; S.A. Marshall leg.; sweep trail/road; DEBU • 4 ♂♂, 2 ♀♀; Tapantí National Park, near west entrance, trail to hydro tower/creek; 1150 m a.s.l.; 11 Oct. 1999; Marshall and Buck leg.; sweep; DEBU • 1 ♂, 1 ♀; Tapantí National Park, outside near west entrance; 1150 m a.s.l.; 8–9 Oct. 1999; Marshall and Buck leg.; sweep trail; DEBU • 2 ♂♂; Turrialba, Catie; 500 m a.s.l.; 4 Sep. 1986; L. Masner leg.; CNCI. – **Guanacaste** • 1 ♀; Area de Conservacion Guanacaste, Pailas Dos; 10°45′46.8″ N, 85°20′02.4″ W; 831 m a.s.l.; 11 Oct. 2018; D. Janzen and W. Hallwachs leg.; moist lowland forest,

Malaise trap; BIOUG60977-F02/PLFDV252-20 sequenced for CO1-5'; BIOUG • 1 ♂; Guanacaste National Park, Cacao Field Station; 20 Feb. 1996; S.A. Marshall leg.; DEBU • 1 ♂, 1 ♀; Guanacaste National Park, Estación Cacao; 1100–1200 m a.s.l.; 15 Feb. 1996; S.A. Marshall leg.; DEBU • 1 ♂, 2 ♀♀; same data as for preceding; 1200–1400 m a.s.l.; 20 Feb. 1996; DEBU • 1 ♂; Guanacaste National Park, Estación Cacao, SW side of Volcán Cacao; 1000–1400 m a.s.l.; Sep.–Dec. 1989; R. Blanco and C. Chavez leg.; MNCR • 1 ♂; same data as for preceding; 800–1600 m a.s.l.; 4 Aug. 1993, M.A. Zumbado leg.; MNCR • 1 ♀; Guanacaste National Park, Estación Maritza; 600 m a.s.l.; 13 Feb. 1996; S.A. Marshall leg.; DEBU • 7 ♂♂; Guanacaste National Park, Estación Mengo, SW side of Volcán Cacao; 10°55′43″ N, 85°28′10″ W; 1100 m a.s.l.; Feb. 1989; GNP Biodiversity Survey leg.; MNCR • 3 ♀♀; Guanacaste National Park, Estación Pitilla, 9 km S of Santa Cecelia; 700 m a.s.l.; 14 Feb. 1996; S.A. Marshall leg.; DEBU • 1 ♂, 1 ♀; same data as for preceding; 18 Apr.–19 May 1993, P. Ríos leg.; MNCR • 1 ♂, 3 ♀♀; same data as for preceding; 21 Feb. 1996, S.A. Marshall leg.; DEBU • 3 ♂♂, 1 ♀; Guanacaste National Park, road to Cacao Field Station; 750 m a.s.l.; 12 Feb. 1996; S.A. Marshall leg.; near stream, sweep, DEBU. – **Heredia** • 1 ♂, 6 ♀♀; Braulio Carrillo National Park; 10°10′ N, 84°07′ W; 500 m a.s.l.; 10 Apr. 1985; H. Goulet and L. Masner leg.; CNCI • 1 ♂; Puerto Viejo de Sarapiquí, La Selva Biological Station; 22–25 Apr. 1989; B. Brown and D. Feener leg.; SHo+SOR second growth, Malaise trap; LACM • 5 ♂♂, 3 ♀♀; Santa Domingo, INBio Park; 9°58′23″ N, 84°05′30″ W; 6–7 Mar. 1996; L. Masner leg.; urban, yellow pans; DEBU. – **Limón** • 1 ♀; Estrella Valley, Pandora; 20 Feb. 1984; H. Howden leg.; flight-intercept trap; DEBU. – **Puntarenas** • 1 ♂, 3 ♀♀; 2000 m a.s.l.; 12 Jul. 1995; S.A. Marshall leg.; DEBU • 1 ♀; Las Alturas Biological Station; 8°57′ N, 82°58′ W; 1500–1700 m a.s.l.; 12–14 Aug. 1995; S.A. Marshall leg.; DEBU • 1 ♂; Las Alturas; 1500 m a.s.l.; 12 Aug. 1995; S.A. Marshall leg.; forest-pasture margin, sweep; DEBU • 1 ♀; Monteverde Reserve; 1500 m a.s.l.; 15–20 Aug. 1986; L. Masner leg.; DEBU • 1 ♀; Monteverde; 1500 m a.s.l.; 29 Feb. 1980; W.R. Mason leg.; cloud forest, CNCI • 2 ♂♂, 1 ♀; Monteverde, San Luis Ecolodge, Espajito trail; 1–24 Mar. 2007; P.D. Careless leg.; Malaise trap; DEBU • 2 ♂♂; Osa Peninsula, Corcovado National Park, San Pedrillo; 8°37′00″ N, 83°44′06″ W; 13 Aug. 2001; K.N. Barber leg.; DEBU • 1 ♂; Peñas Blancas, E Monteverde Reserve; 10°18′ N, 84°49′ W; 900 m a.s.l.; 25 May 1987; A. Norrbom leg.; on rotten banana plants; DEBU. – **San José** • 1 ♂, 4 ♀♀; "V:15.VII"; H. Schmidt leg.; USNM • 1 ♂; "V:16.VII"; H. Schmidt leg.; USNM • 1 ♂; San Antonio de Escazú; 1300 m a.s.l.; 4–5 Mar. 1996; L. Masner leg.; creek bed, yellow pans; DEBU • 1 ♂; San Carlos, La Virgen; 9°34′50″ N, 84°07′51″ W; 821 m a.s.l.; 24 Feb. 2006; S.A. Marshall leg.; 2° forest, sweep; DEBU • 3 ♂♂, 1 ♀; San Carlos, Riosparaiso Reserve, Pecarí Station, 16 km NNE of Quepos; 13–15 Apr. 2006; S.A. Marshall leg.; DEBU • 1 ♂; Zurquí de Moravia; 1600 m a.s.l.; 30 May 1998; S.A. Marshall leg.; DEBU • 1 ♀; Zurquí de Moravia; 1600 m a.s.l.; Mar. 1981; P. Hanson leg.; MNCR.

EL SALVADOR – **San Salvador** • 5 ♂♂, 2 ♀♀; Los Chorros; 20 Jun. 1963; D.Q. Cavagnaro and M.E. Irwin leg.; CAS.

GUATEMALA – **Izabal** • 1 ♂; Las Escobas; 15 Jul. 1986; L. LeSage leg.; rainforest, sweeping; CNCI.

HONDURAS – **El Paraíso** • 1 ♂; Cerro Montserrat; 1800 m a.s.l.; 24 May 1994; H. Howden leg.; Malaise trap; DEBU.

PANAMA – **Chiriquí** • 4 ♂; Las Lagunas, 4.5 km SW of Hato del Volcán; 2550 m a.s.l.; 1–8 Jun. 1977; S. and J. Peck leg.; sweeps; DEBU

TRINIDAD – **Saint George** • 1 ♂; Curepe; 10°38′ N, 61°24′ W; 17 Dec. 1978; F.D. Bennett leg.; Malaise trap; DEBU

VENEZUELA – **Aragua** • 1 ♂, 1 ♀; El Limón, Pozo del Diablo; 570 m a.s.l.; 13 Apr. 1994; L. Masner leg.; DEBU • 1 ♂; Henri Pittier National Park, La Trilla; 200 m a.s.l.; 11 Apr. 1994; L. Masner leg.;

CNCI • 1 ♀; Henri Pittier National Park, Portachuelo Pass, Rancho Grande; 10 Apr. 1994; L. Masner leg.; CNCI • 1 ♀; Maracay, Rancho Grande Biological Station; 8 Mar. 1995; S.A. Marshall leg.; sweep near station; DEBU • 1 ♂; Rancho Grande; 26 Feb. 1989; D.A. Grimaldi leg.; AMNH. – **Bolívar** • 1 ♂; Grande Sabana; 27 Dec. 1987; M. Sanborne leg.; Malaise edge; DEBU • 3 ♀♀; 26 km N of Guasipati; 24 Jun.–12 Jul. 1987; S. and J. Peck leg.; sandy seasonally humid forest, flight-intercept trap; DEBU • 1 ♂; Rancho Grande, 12–30 Dec. 1987; M. Sanborne leg.; Malaise-intercept; DEBU. – **Carabobo** • 1 ♂; Palmichal; 1000 m a.s.l.; 21 Aug. 1992; L. Masner leg.; DEBU. – **Lara** • 1 ♂; Yacambú; 1200 m a.s.l.; 10 May 1981; H. Townes leg.; CNCI • 2 ♂♂, 1 ♀; same data as for preceding; 7 May 1981; cloud forest; CNCI. – **Mérida** • 1 ♂; 20 km S of Azulita; 2 Apr. 1988; A.T. Finnamore leg.; cloud forest, sweep; DEBU • 41 ♂♂, 26 ♀♀; La Punta, Rio Chama; 25 Apr. 1988; S.A. Marshall leg.; sweep; DEBU • 5 ♂♂, 2 ♀♀; Mérida "Fac." Forest; 1800 m a.s.l.; 11 May 1981; L. Masner leg.; old coffee plantation; DEBU. – **Trujillo** • 5 ♂♂, 10 ♀♀; Guaramacal National Park, 14 km NE of Boconó; 2000 m a.s.l.; 25 Aug.–1 Sep. 1992; L. Masner leg.; DEBU • 5 ♂♂; Mosquey near Boconó; 1500 m a.s.l.; 24 Aug. 1992; L. Masner leg.; coffee plantation, maxinet; DEBU.

Redescription

Body (Fig. 125A). Length 1.8–2.9 mm. Head brown, lower half of frons, face, and antennae orange; gena orange-brown. Frontal width 2.4–2.5 × frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.6–0.7 × length of posterior. Palpus yellow. Eye large, greatest height about 3.5 × shortest genal height. Thorax brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4 × length of posterior pair) separated by 8–9 rows of acrostichal setulae. Membrane around prosternum bare. Legs yellow, hind femur slightly darker. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical quarter. Wing (Fig. 9B) hyaline. CS2 0.7–0.8 × CS3. Halter pale brown.

Male abdomen (Figs 125B–C, 126). S5 rectangular, 1.1 × as long as S4, posterolaterally long setose with a very large desclerotized medial area (extending almost to anterior edge), a large, dark, rectangular, medial patch of very dense setulae, and a large, dark, anvil-shaped posteromedial sclerite. Anterior flange of S6+7 1.5 × as long as wide; S6+7 completely separated from completely from S8. Sclerite A small, lightly sclerotized; sclerite B reduced and very narrow; sclerite C absent; sclerite D well sclerotized and L-shaped; sclerite E small, fitting into a depression in distal half of large sclerite F; sclerite G small, about as large as ring sclerite; ring sclerite well sclerotized with a small mesial flange. Epandrium large, 0.7 × length of S8, height 1.3 × maximum length and 0.7 × maximum width, uniformly long-setose; perianal pads weakly developed but densely setulose. Pseudocercus very small, bearing only a single seta; halves of subepandrial sclerite short and stout, swollen where they contact subcercus and very weakly fused medially. Subcercus large and shield-like with small lobes articulating with surstylus and epandrium. Hypandrium with long, slightly sinuate anteromedial apodeme. Surstylus very large and broad, twice as long as deep, concave, setae largely restricted to around apex (i.e., lateral surface with only a few isolated setae) with a pointed anterobasal lobe and a deep emargination about halfway down an inner anterior ridge. Postgonite relatively short, angulate, concave ventrally, apex swollen with prominent ridges. Phallapodeme large, gradually broadened towards apex; basiphallus expanded posterodorsally with a pointed central lobe and a pair of rounded, downturned lateral lobes; distiphallus largely reduced with a broad dorsal sclerite and a narrow, U-shaped ventral sclerite.

Female abdomen (Fig. 127). T7 broad, posteromedially shortened; T8 divided into a small, pale dorsal sclerite and two dark lateral sclerites with angulate posteroventral corner. Epiproct small, pale, and posteromedially setulose. Cercus narrow and elongate with a large apical seta and a moderate preapical seta. S7 broad, rounded posteriorly with six large posterior setae; S8 reduced to two dark, ovoid lateral sclerites. Three spermathecae present, single one larger than paired ones, bulb bean-shaped and smooth with a slight basal invagination.

Distribution

Costa Rica, El Salvador*, Guatemala*, Honduras*, Panama*, Trinidad*, Venezuela*.

Remarks

Sclerocoelus regularis resembles *S. dominicensis* sp. nov., *S. irregularis* sp. nov., and *S. pararegularis* sp. nov., from which it differs in having a largely bare surstylus and a notched inner ridge on the surstylus; females of these species appear to be indistinguishable on the basis of morphology.

Sclerocoelus riparius sp. nov.

urn:lsid:zoobank.org:act:B17308FF-26F3-4EF6-BFCD-7886877D4637

Figs 9C, 128–130

Etymology

This name reflects the riparian habitat that many of the type specimens of this species have been collected from (from the Latin '*riparius*', meaning 'that inhabits the banks or rivers, riparian').

Material examined

Holotype

ECUADOR • ♂; Pichincha, Cotopaxi National Park, Quebrada Mishahuaycu; 3600 m a.s.l.; 25 Oct. 1999; S.A. Marshall leg.; under streamside vegetation; QCAZ debu00108976.

Paratypes

ECUADOR – **Carchi** • 2 ♂♂, 2 ♀♀; Guandera Forest Reserve, 15 km E of San Gabriel; 3400 m a.s.l.; 1 Nov. 1999; S.A. Marshall leg.; hand; QCAZ • 1 ♀; same data as for preceding; sweep forest trail. – **Napo** • 1 ♂; near Lago Papallacta; 3400 m a.s.l.; 4–8 Nov. 1999; S.A. Marshall leg.; forest above lake, pans/dung; DEBU • 1 ♂, 2 ♀♀; Quito-Baeza pass; 4000 m a.s.l.; 6 Nov. 1999; S.A. Marshall leg.; roadside ditch, green leaves of branches touching ground; QCAZ • 1 ♀; Quito-Baeza Road; 4000 m a.s.l.; 10–18 Feb. 1983; L. Masner leg.; pan traps in open paramo; DEBU • 1 ♂; Quito-Baeza Road; 4100 m a.s.l.; Mar. 1983; H. Tituana leg.; pan traps in paramo; DEBU. – **Loja** • 1 ♀; Podocarpus National Park, Cajanuma, Bosque Nublado trail; 3000 m a.s.l.; 16–20 Feb. 2009; M. Pollet and A. De Braekeleer leg.; yellow pans; RBINS. – **Pichincha** • 1 ♀; Campamento Pichan, near Nono; 24 Oct. 1999; S.A. Marshall leg.; sweep; QCAZ • 1 ♀; Cotopaxi National Park, Lago Limpiopungo; 3800 m a.s.l.; 25 Oct.–8 Nov. 1999; S.A. Marshall leg.; shore, pan traps; QCAZ • 2 ♂♂; Cotopaxi National Park, Quebrada Mishahuaycu; 3600 m a.s.l.; 25 Oct. 1999; S.A. Marshall leg.; near stream, pan traps; QCAZ. – **Zamora-Chinchipe** • 1 ♀; San Francisco Biological Reserve, Canal trail; 3°58′30″ S, 79°04′25″ W; 2000 m a.s.l.; 18–25 Feb. 2009; M. Pollet and A. De Braekeleer leg.; yellow pan traps; RBINS.

Description

Body (Fig. 128A). Length 3.2–5.3 mm. Head dark brown, lower quarter of frons and face yellow; anterior quarter of gena and antenna orange. Frontal width 2.0–2.1 × frontal height. Three pairs of large interfrontal bristles surmounting a fine fourth pair; anterior orbital 0.6–0.7 × length of posterior; several setulae present at bases of interfrontal and orbital setae. Palpus yellow. Eye large, greatest height about 3.5 × shortest genal height. Thorax dark brown, scutum with slightly paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4 × length of posterior pair) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, foreleg paler. Fore femur with three large ventral preapical setae. Dorsal surface of mid tibia with a small pair of setae at about ⅓, a large anterior seta just above ½ and a large pair of setae at about ¾. Ventral surface of male mid tibia with two rows of stout setae along apical half. Wing (Fig. 9C) slightly infuscate. CS2 subequal to CS3. Halter dark brown.

Male abdomen (Figs 128B–C, 129). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 large, trapezoidal, 1.5 × length of S4, posterolaterally long-setose, posteromedial area with two wide, pale areas and a broad patch of mixed setae (long, thin setae and shorter, thick setae). Anterior flange of S6+7 small, triangular 1.0 × as long as wide. Sclerite A pale, indistinct from S6+7; sclerite B broad, arched and fused to sclerite A; sclerite C dark, C-shaped, fused to right side of sclerite A; sclerites D and E fused (?), forming a broad, dark, diamond-shaped, posteromedial sclerite; sclerite F large, broad, rounded, entirely setulose; sclerite G reduced, almost circular, fused to sclerite F; ring sclerite well developed. Epandrium small, 0.4 × length of S8, height 1.6 × maximum length and 0.8 × maximum width, uniformly long-setose; perianal pads weakly developed. Pseudocercus fused to epandrium and bearing a single seta; halves of subepandrial sclerite gently arched, completely separate. Subcercus large, triangular in lateral view, apical third curved backwards. Hypandrium with long, bisinuate anteromedial apodeme. Surstylus large, yellow-brown, subtriangular with a triangular, inner, anterobasal lobe, apical half with long ventral setae. Postgonite elongate, apical two-thirds bent at about a right angle to basal third, tapered, apex truncate. Phallapodeme long, apical third bent downwards; basiphallus large, boxy with a small posterodorsal epiphallus; distiphallus large, entirely membranous.

Female abdomen (Fig. 130). T7 broad, simple, posteromedially desclerotized; T8 divided into a large, pale, triangular, dorsal sclerite and two large, dark, lateral sclerites, posterolateral corners greatly expanded and rounded. Epiproct large, subrectangular, medially split, and setulose around bases of setae. Cercus elongate, apically rounded with long apical, dorsal, and apicoventral setae. S7 broad, posterior third desclerotized with four large posterior setae; S8 divided into two dark, teardrop-shaped, lateral sclerites. Hypoproct strongly pointed anteriorly with thickened ventral setulae. Three spermathecae, bulb stout, gumdrop-shaped, finely striate with large subbasal and apical invaginations, both with a small, finger-like, central process.

Distribution

Neotropical: Ecuador.

Remarks

Sclerocoelus riparius sp. nov. is superficially very similar to *S. altus* sp. nov., but differs by the bicoloured gena, male S5 with posteromedial row of thickened setae, and mostly straight postgonite. Like other basal species of the genus, *Sclerocoelus riparius* is a high Andean species associated with decaying plant material above 3000 m. Most records are from small deposits of debris along stream margins in otherwise relatively barren altiplano habitats.

Sclerocoelus rostrum sp. nov.

urn:lsid:zoobank.org:act:631F57AF-83C7-4E58-8BFC-FE9533B43378

Figs 131–132

Etymology

This name refers to the beak-like surstylus and triangular subcercus (from the Latin '*rostrum*', meaning 'beak, bill, snout').

Material examined

Holotype

MEXICO • ♂; Hidalgo, 5 km N of Zicualtipán, Highway 105; 2500 m a.s.l.; 23 Jun. 1986; M. Sörensson and B. Mårtensson leg.; MZLU.

Description

Body (Fig. 131A). Length 2.5 mm. Head dark brown, lower third of frons orange; face, gena, and antennae orange-brown. Frontal width 2.2× frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.6–0.7× length of posterior. Palpus brown. Eye large, greatest height about 4.0× shortest genal height. Thorax dark brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4× length of posterior pair) separated by 8–9 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, fore and hind femora darker. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical half. Wing slightly infuscate. CS2 0.8× CS3. Halter pale brown.

Male abdomen (Figs 131B–C, 132). Dark brown, posterior edges of tergites slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 2.0× length of S4, sparsely setose with large, dark, rectangular, slightly bulging posteromedial patch of dense setulae flanked by pale setose areas. Anterior flange of S6+7 very large, 1.2× as long as wide, extending to anterior margin of S4. Sclerite A dark, unmodified; sclerite B thin, arched; sclerite C reduced, indistinct; sclerite D dark, broad, arising from left side of posteromedial process of S5; sclerite E dark, elongate; sclerite F large, subtriangular with a narrow apicoventral process on left side; sclerite G dark, club-shaped, fused to anterior edge of sclerite F; ring sclerite well sclerotized, outer side much thicker than inner side, and with a short posteroventral lobe. Epandrium large, 0.8× length of S8, height 1.7× maximum length and 0.8× maximum width, uniformly setose; perianal pads weakly developed but setulose. Pseudocercus well developed, narrowly fused with posteroventral corners of epandrium, and bearing three setae; halves of subepandrial sclerite broad, very strongly arched, expanded and broadly fused medially. Subcercus projecting posteriorly, elongate, apically flattened and twisted, anteriorly with a short, dark, basal lobe. Hypandrium with thick, laterally flattened, Y-shaped anteromedial apodeme. Surstylus large, subtriangular, apex slightly curled ventrally, outer surface setose, inner surface with a dark anterodorsal lobe. Postgonite long, mushroom-shaped, greatly expanded anteriorly and posteriorly in distal half, posteroventrally striate and curled laterally. Phallapodeme very large, dark, apex dorsoventrally flattened; basiphallus small with a short, triangular epiphallus; distiphallus large, with a short, heavily sclerotized dorsal sclerite and a pair of long, heavily sclerotized, J-shaped ventrolateral sclerites.

Female abdomen. Female unknown.

Distribution

Neotropical: Mexico.

Remarks

Sclerocoelus rostrum sp. nov. is known from only a single male specimen that differs from all congeners in having a triangular, beak-like surstylus, large, triangular subcercus, postgonite broadly expanded apically, and S5 with a stout posteromedial patch of dense setae. It is one of eight congeners found in Mexico, and one of two known only from Mexico.

Sclerocoelus sordipes (Adams, 1904)

Limosina sordipes Adams, 1904: 455.
Limosina evanescens Tucker, 1907: 102.

Leptocera (*Scotophilella*) *evanescens* – Spuler 1925: 160. — Richards 1965: 724.
Leptocera (*Limosina*) *sordipes* – Richards 1965: 724.
Sclerocoelus sordipes – Marshall 1995: 284.

Diagnosis

Externally almost indistinguishable from *S. parasordipes* sp. nov. but differs as follows: male S5 with a very large medial pale area, dark lateral lines almost reaching anterior margin (cf. Marshall 1995: fig. 9); surstylus with a convex anterobasal edge (cf. Marshall 1995: figs 1–3); postgonite narrowly constricted without an anterolateral lobe in the apical third (cf. Marshall 1995: fig. 5).

Material examined

CANADA – **Manitoba** • 1 ♂; Winnipeg, University of Manitoba campus; 29 Jun.–2 Aug. 1984; R.E. Roughley leg.; DEBU. – **New Brunswick** • 2 ♀♀; Saint Andrews, Gibson Lake; 10 Jul. 1978; S.A. Marshall leg.; carrion pitfall traps; DEBU • 1 ♂; same data as for preceding; 11 Aug. 1978; DEBU • 1 ♀; Saint Andrews; 20 May 1978; A. Konecny leg.; old [wrack] bed, pan trap; DEBU • 1 ♀; Saint Andrews; 6 May 1978; Marshall and Konecny leg.; DEBU • 3 ♂♂; same data as for preceding; 20 May 1978; DEBU • 1 ♀; same data as for preceding; 26 May 1978; DEBU • 1 ♂; same data as for preceding; 12 May 1978; S.A. Marshall leg.; DEBU • 3 ♀♀; same data as for preceding; 22 May 1978; DEBU • 1 ♂, 1 ♀; same data as for preceding; 26 May 1978; DEBU • 1 ♀; same data as for preceding; 30 May 1978; DEBU • 1 ♀; Saint Andrews; 28 May 1978; S.A. Marshall leg.; Malaise trap; DEBU • 1 ♀; same data as for preceding; 26 May 1978; old [wrack] bed, pan trap; DEBU • 1 ♀; same data as for preceding; 6 Jun. 1978; DEBU • 1 ♀; same data as for preceding; 15 Aug. 1979; dead seagull; DEBU • 1 ♀; Kent Co., Kouchibouguac National Park; 18 May 1977; B. Cooper leg.; DEBU • 1 ♂; same data as for preceding; 25 Jun. 1977; J.R. Vockeroth leg.; DEBU. – **Nova Scotia** • 1 ♂; Blomidon; 27 Aug. 1989; S.A. Marshall leg.; moss in small stream; DEBU • 4 ♂♂, 1 ♀; Cape Breton Highlands National Park, Lone Shieling; 11 Jul. 1983; Borkent leg.; maple forest, Malaise trap; DEBU • 1 ♀; Cape Breton Highlands National Park, Mackenzie Mountain; 300 m a.s.l.; 29 Aug. 1983; *Picea–Betula*, Malaise trap; DEBU • 1 ♀; Cape Breton Highlands National Park; Mackenzie Mountain; 300 m a.s.l.; 4 Jul. 1983; J.R. Vockeroth leg.; mixed forest, Malaise trap; DEBU • 18 ♂♂, 22 ♀♀; Cape Breton Island, South Harbour; 12 Jul. 1983; J.R. Vockeroth leg.; mixed forest, Malaise trap; DEBU • 1 ♂; Kejimkujik National Park, Grafton Lake; 44°22′59″ N, 65°12′7″ W; 103 m a.s.l.; 3 Aug. 2009; forest, pitfall trap; BIObus 2009 leg.; 09BBEDI-2416/BBDEE453-10 sequenced for CO1-5'; BIOUG. – **Ontario** • 1 ♀; 6 km S of Perth; 28 Aug. 1987; J.R. Vockeroth leg.; marshy stream shore, sweep; DEBU • 5 ♂♂, 6 ♀♀; 11.3 km E of Griffith; 8 Jul. 1989; B.E. Cooper leg.; DEBU • 1 ♀; Algonquin Provincial Park, Swan Lake Station, Scott Lake survey; 23–30 Jun. 1994; A5 shore, pans; DEBU • 1 ♀; same data as for preceding; 18–31 Jul. 1994; C1 shore, Malaise trap; DEBU • 1 ♂; same data as for preceding; 26 Jul.–5 Aug. 1994; S.A. Marshall leg.; C5 shore, pans; DEBU • 1 ♀; Blair, RARE, Cruickston Creek; 43°22′40″ N, 80°20′58″ W; 20–23 Jun. 2006; Cheung and Bergeron leg.; yellow pans in woodchips; DEBU • 1 ♂; Blair, RARE, The Dells; 43°22′55″ N, 80°20′32″ W; 20 Jun.–17 Jul. 2006; Bergeron and Cheung leg.; Malaise trap; DEBU • 1 ♂; Burlington, Bronte Creek Provincial Park; 1–5 Jun. 1983; Brown and Marshall leg.; Malaise trough; DEBU • 1 ♂; Caliper Lake Provincial Park; 49°03′26″ N, 93°54′49″ W; 25 Jun. 2001; S.A. Marshall leg.; DEBU • 1 ♀; Chaffey's Lock, Queens University Biological Station; 1–5 Sep. 1985; S. Peck leg.; fields and forest, evening car netting; DEBU • 3 ♂♂, 8 ♀♀; Cumberland; Jul. 1975; L. Ling leg.; Malaise trap; DEBU • 1 ♂; Dorcas Bay; 6 Nov. 1998; S.A. Marshall leg.; DEBU • 1 ♀; Dunks Bay; 45°14′59″ N, 81°38′27″ W; 27 Jul. 1997; S.A. Marshall leg.; DEBU • 1 ♀; Dunks Bay; 5–12 Jul. 1999; S.A. Marshall leg.; dune, Malaise trap; DEBU • 1 ♀; Fathom Five National Marine Park, Bears Rump Island; 23 Jun.–26 Jul. 1995; T. Woodcock and S.A. Marshall leg.; juniper moss, pan trap; DEBU • 1 ♂; Fathom Five National Marine Park, Flowerpot Island; 12–30 May 1995; T. Woodcock and S.A. Marshall leg.; dry cedar duff, pan trap; DEBU • 1 ♂; Fergus; 12 May 1992; S.A. Marshall leg.; black composter; DEBU • 1 ♂; same data as for preceding; 12–15 Jun. 1992; DEBU • 1 ♂; Gooderham, Burnt River; 16 Jun. 1993; E.R. Barr leg.; Malaise trap; DEBU • 1 ♂; Guelph, University of Guelph Dairy Bush; 30 Jun. 1993; D.C. Caloren leg.; vegetation sweep; DEBU • 3 ♂♂, 3 ♀♀; Guelph, University of Guelph Dairy Bush; 30 Oct. 1984; B.V. Brown leg.; leaf litter; DEBU • 1 ♂, 1 ♀; Haliburton; 1 Jul. 1990; S.A.

Marshall leg.; newly bulldozed road; DEBU • 1 ♂, 1 ♀; Hamilton; 28 Jun. 1980; M Sanborne leg.; Malaise trap; DEBU • 1 ♂; same data as for preceding; 19 Jul. 1980; DEBU • 3 ♂♂, 5 ♀♀; same data as for preceding; 31 Jul. 1980; DEBU • 1 ♂, 2 ♀♀; same data as for preceding; 14 Aug. 1980; DEBU • 1 ♂; same data as for preceding; 4–18 Aug. 1980; DEBU • 2 ♂♂, 1 ♀; same data as for preceding; 28 Aug. 1980; DEBU • 1 ♂, 2 ♀♀; Hilton Beach; 6–27 Jun. 1987; J.E. Swann leg.; cedar swamp, pan traps; DEBU • 1 ♀; same data as for preceding; 2–15 Aug. 1987; DEBU • 1 ♀; Hilton Beach; 18 Aug. 1992; J.E. Swann leg.; field, Malaise trap; DEBU • 1 ♂; Hilton Beach; 6 Oct. 1992; J.E. Swann leg.; Malaise trap at edge of hardwood forest of field; DEBU • 1 ♂, 3 ♀♀; Icewater Creek watershed, 12.7 km NNE of Searchmont, Whitman Dam Road, mile 10.5; 21–28 Jul. 1986; riparian meadow-alder thicket, Malaise trap; DEBU • 2 ♂♂, 9 ♀♀; Icewater Creek watershed; 46°53′42″ N, 84°03′24″ W; 10–24 Jul. 1998; K.N. Barber leg.; moist depression in mixed forest *Thalictrum/Eupatorium*, pitfalls; DEBU • 1 ♀; Long Point Provincial Park; 21–30 Jul. 1983; Carlson and Marshall leg.; Malaise head; DEBU • 2 ♂♂, 6 ♀♀; same data as for preceding; 30 Jul.–5 Aug. 1983; DEBU • 1 ♂; Manester Track, 6 km NNW of St. Williams; 8 Jun. 2001; M. Buck leg.; forest, dung pans; DEBU • 2 ♂♂, 2 ♀♀; Middleville to White Lake Road; 27 Apr. 1986; S. and J. Peck leg.; evening car netting; DEBU • 1 ♂; Nepean; 26 Oct. 1989; L. Masner leg.; flight-intercept trap near log pile; DEBU • 1 ♀; Ottawa, Hôpital Montfort Woods; Aug. 1993; J.R. Vockeroth leg.; yellow pans; DEBU • 3 ♂♂, 4 ♀♀; Ottawa, near Uplands Airport; 25 Jul. 1987; J.M. Cumming leg.; Malaise trap; DEBU • 1 ♂ Ottawa; 19 Jun. 1989; J.R. Vockeroth leg.; swept over bare path in *Acer* wood, at dusk (1800 hr EST); DEBU • 1 ♂; Ottawa; 19 Apr. 1990; J.R. Vockeroth leg.; damp ditch in *Acer* wood; DEBU • 1 ♂, 2 ♀♀; same data as for preceding; 24 Aug. 1991; DEBU • 1 ♂, 2 ♀♀; Ottawa; Jul. 1990; J.R. Vockeroth leg.; bus shelter; DEBU • 1 ♂; Ottawa; Oct. 1990; J.R. Vockeroth leg.; DEBU • 4 ♂♂, 5 ♀♀; Point Pelee National Park; 41°59′ N, 82°27′ W; 20–25 Jul. 1999; A. Tesolin leg.; Malaise and pan trap; DEBU • 4 ♂♂, 2 ♀♀; Point Pelee National Park; 10 Aug. 1999; O. Lonsdale leg.; wooded area by W beach, Malaise/pan traps; DEBU • 11 ♂♂, 15 ♀♀; Point Pelee National Park, Visitor Centre; 10–15 May 2000; O. Lonsdale leg.; Malaise trap and pans; DEBU • 8 ♂♂, 17 ♀♀; same data as for preceding; 15–22 May 2000; DEBU • 1 ♂; same data as for preceding; 22–29 May 2000; DEBU • 1 ♂, 3 ♀♀; same data as for preceding; 16–23 Jun. 2000; DEBU • 1 ♀; same data as for preceding; 23 Jun.–4 Jul. 2000; DEBU • 1 ♂, 2 ♀♀; same data as for preceding; 22–30 Jul. 2000; DEBU • 1 ♀; same data as for preceding; 26 Sep.–10 Oct. 2000; DEBU • 2 ♂♂; same data as for preceding; 10–18 Oct. 2000; DEBU • 1 ♂; Rideau Ferry, Big Rideau Lake; 24 Aug. 1985; S. and J. Peck leg.; forest and field, evening car netting; DEBU • 3 ♂♂, 3 ♀♀; Rondeau; 25 Jun. 1982; S.A. Marshall leg.; DEBU • 1 ♂; St. Joseph Island; 9 Aug. 1992; J.E. Swann leg.; forest edge, Malaise trap; DEBU • 1 ♀; Thousand Islands National Park; 31 May 1983; S.A. Marshall leg.; Malaise head; DEBU • 1 ♀; Tobermory, Spring Cove and vicinity; 14 Jul. 1996; S.A. Marshall leg.; DEBU • 1 ♂; Windsor, 1.5 km S of Ojibway Prairie; 22 Sep. 2001; S.M. Paiero leg.; forest-prairie edge, Malaise trap; DEBU • 3 ♀♀; Windsor, Ojibway Prairie; 30–31 Jul. 2002; M. Buck leg.; white pans; DEBU • 1 ♂; Windsor; 19–26 Jul. 1982; S.A. Marshall leg.; Malaise trap; DEBU. – **Quebec** • 1 ♂; Montebello; 18 Aug. 1987; J.R. Vockeroth leg.; dry streambed, sweep; DEBU. – **Saskatchewan** • 1 ♀; Grasslands National Park, Val Marie; 23 Aug. 1997; Marshall and Finnamore leg.; prairie dog raised emergence trap; DEBU.

UNITED STATES OF AMERICA – **Arkansas** • 3 ♂♂, 2 ♀♀; Polk Co., 20.9 km NW of Mena, Rich Mountain; 850 m a.s.l.; 1–3 Jun. 1979; S. and J. Peck leg.; mesic oak-hickory; DEBU. – **Georgia** • 1 ♀; Forsyth; 2 Jun. 1970; DEBU. – **Illinois** • 1 ♂, 1 ♀; Cook Co., Willow Springs; 18 Oct. 1942; H.S. Dybas leg.; forest floor, among leaves; DEBU. – **Indiana** • 1 ♂, 2 ♀♀; Lawrence Co., Hoosier National Forest, Donaldson trail; 19 May 1991; J.E. Swann leg.; DEBU • 1 ♂; Lawrence Co., Hoosier National Forest; 12 Jul. 1989; S.A. Marshall leg.; sweeps in forest; DEBU • 26 ♂♂, 21 ♀♀; Orange Co., Pioneer Mothers Memorial Forest; 12 Jul. 1989; S.A. Marshall leg.; sweep near open ant nest; DEBU. – **Kentucky** • 1 ♀; Laurel Co., 24 km W of London; 4–30 Jun. 1984; S.A. Marshall leg.; oak, flight-intercept trap; DEBU. – **New Hampshire** • 3 ♀♀; Coos Co., 1.6 km NE of East Inlet Dam; 12–24 Jun. 1986; D.S. Chandler leg.; flight-intercept trap; DEBU • 6 ♀♀; same data as for preceding; 10–24

Jul. 1986; DEBU • 1 ♂, 4 ♀♀; same data as for preceding; 25 Jul.–7 Aug. 1986; DEBU • 2 ♂♂, 4 ♀♀; same data as for preceding; 8–21 Aug. 1986; DEBU • 1 ♀; Coos Co., Norton Pool, 4.8 km NE of East Inlet Dam; 27 May–11 Jun. 1986; D.S. Chandler leg.; flight-intercept trap; DEBU • 2 ♀♀; same data as for preceding; 12–24 Jun. 1986; DEBU • 2 ♀♀; same data as for preceding; 25 Jun.–9 Jul. 1986; DEBU • 2 ♀♀; same data as for preceding; 10–24 Jul. 1986; DEBU • 1 ♂, 5 ♀♀; Rockingham Co., 1.6 km SW of Durham; 11–18 Jun. 1987; D.S. Chandler leg.; flight-intercept trap; DEBU • 2 ♂♂, 1 ♀; Strafford Co., 1.6 km SW of Durham; 27 Apr.–11 May 1987; D.S. Chandler leg.; flight-intercept trap; DEBU • 3 ♂♂, 7 ♀♀; Strafford Co., Spruce Hole, 4.8 km SW of Durham; 29 Jul.–6 Aug. 1987; D.S. Chandler leg.; flight-intercept trap; DEBU • 6 ♂♂, 22 ♀♀; same data as for preceding; 25 Sep.–14 Oct. 1987; DEBU • 19 ♂♂, 46 ♀♀; same data as for preceding; 15–17 Oct. 1987; DEBU • 16 ♂♂, 11 ♀♀; same data as for preceding; 8–14 Nov. 1987; DEBU • 1 ♂; Strafford Co., Spruce Hole Bog; 22–25 Jun. 1986; S.A. Marshall leg.; pan trap; DEBU. – **New York** • 1 ♂; Albany Co., Clarkesville, Onesquethaw Cave; 6 Nov. 1982; S.A. Marshall leg.; DEBU • 14 ♂♂, 40 ♀♀; Greene Co., Cairo; 1 Jul. 1980; S.A. Marshall leg.; decaying grass; DEBU • 1 ♂; Suffolk Co., Riverhead, Long Island "Veg. Res. Fm."; 30 Aug. 1988; CNCI. – **North Carolina** • 2 ♂♂; Bladen Co., Singletary Lake Sate Park; 34°35′00″ N, 78°27′30″ W; 14–18 May 2001; S.A. Marshall leg.; near water, sweep slash pile; DEBU • 2 ♂♂, 1 ♀; Jackson Co., Cullowhee, Cane Creek; 670 m a.s.l.; 6–17 Jun. 1984; S.A. Marshall leg.; Malaise/pan trap; DEBU. – **Ohio** • 2 ♀♀; Champaign Co., Cedar Bog Nature Preserve; 6–20 Jun. 1980; L. Watrovs leg.; DEBU • 8 ♂♂, 3 ♀♀; Lawrence Co., Wayne National Forest, Vesuvius Recreational Area; 13 Jul. 1989; S.A. Marshall leg.; sweep in forest; DEBU • 2 ♂♂; Morgan Co., Wayne National Forest, Wildcat Hollow; 14 Jul. 1989; S.A. Marshall leg.; wet grass clippings; DEBU • 1 ♂; same data as for preceding; 17 Jul. 1989; floodplain, sweep; DEBU. – **South Carolina** • 1 ♂; Barnwell Co., Barnwell; 10–18 Apr. 1989; S.A. Marshall leg.; mushroom traps in oak forest; DEBU. – **Tennessee** • 1 ♂; Blount Co., Great Smoky Mountains National Park, Middle Prong Little River; 35°38′24″ N, 83°41′42″ W; 25 Jul. 1999; J. Cooper leg.; light trap; DEBU • 2 ♂♂; Sevier Co., Great Smoky Mountains National Park, western tributary of Porter's Creek, 0.8 km SW of access gate; 22 Jul. 1999; J. Cooper; DEBU. – **Virginia** • 1 ♂; Giles Co., New River; 17 May 1997; S.A. Marshall leg.; DEBU.

Distribution

Nearctic: Canada, United States of America.

Remarks

Sclerocoelus sordipes is externally very similar to *S. parasordipes* sp. nov. (from western North America), from which it differs only in the features described above. Females of these two species are indistinguishable externally and were associated with conspecific males on the basis of collecting localities. *Sclerocoelus sordipes* is a common eastern Nearctic species, found from Manitoba to Nova Scotia and south to Georgia. We have collected it most often on moist decaying plant material, including lawn clippings and leaf piles in forested areas.

Sclerocoelus subbrevipennis (Frey, 1954)

Limosina subbrevipennis Frey, 1954: 35.

Leptocera (*Limosina*) *subbrevipennis* – Richards 1980: 620.
Sclerocoelus subbrevipennis – Marshall 1997: 104.

Diagnosis

Body length 2.2 mm. Membrane around prosternum bare. Male S5 rectangular, posteromedially pale, bilobed, and covered in short, flattened setulae (cf. Marshall 1997: figs 54, 56); perianal pads well developed and dark; surstylus subtriangular with a rectangular anteroventral lobe bearing a posteroventral

patch of thickened setae (cf. Marshall 1997: figs 52–53); postgonite very narrow and strongly sinuate (cf. Marshall 1997: fig. 55). Female S8 hourglass-shaped, lateral margins curved outwards into two prominent ridges (cf. Marshall 1997: fig. 59).

Material examined

TRISTAN DA CUNHA – **Inaccessible Island** • 1 ♂; SW of Denstone Hill; 37°02′ S, 12°12′ W; 14 Oct. 1989; H.M. Barber leg.; albatross nest; DEBU.

Distribution

South Atlantic: Tristan de Cunha (Inaccessible Island, Nightingale Island)

Remarks

Sclerocoelus subbrevipennis (Frey) is the only unequivocal *Sclerocoelus* species with a distribution outside the New World, and one of only four species found outside the Neotropical region. The close relationship between *S. subbrevipennis* and Neotropical members of the *S. galapagensis* group was documented by Marshall (1997) and we are confident that the species is correctly placed. Although undoubtedly a *Sclerocoelus*, it is clearly distinct from all other species we have examined so there is no evidence that it is secondarily introduced to Tristan da Cunha. Some of the type specimens were collected in bird nests and in rotting vegetation.

Sclerocoelus synorios sp. nov.

urn:lsid:zoobank.org:act:86808438-F122-4007-9C83-FF8343EBB199

Figs 9D, 133–135

Etymology

This name reflects the distribution of this species, which spans the border between Mexico and the United States (from the Greek '*sýnoro*', meaning 'border, boundary, limit').

Material examined

Holotype

MEXICO • ♂; Baja California Sur, Sierra Laguna, La Laguna, 31.5 km ENE of Todos Santos; 1800 m a.s.l.; 12–18 Dec. 1979; C.E. Griswold leg.; CAS.

Paratypes

MEXICO – **Baja California Sur** • 1 ♀; same data as for holotype; CAS. – **Chiapas** • 2 ♂♂; 5 km NE of Coapilla; 17°10′34″ N, 93°07′59″ W; 1990 m a.s.l.; 25 May–14 Jun. 2008; 2° mesophyll forest, Malaise trap; DEBU • 2 ♂♂, 1 ♀; same data as for preceding; UVGC. – **Mexico** • 1 ♀; 1.6 km E of Ixtapan de la Sal, km 78; 1900 m a.s.l.; 31 Aug.–6 Sep. 1971; A. Newton leg.; "Trop/Dec/Jun.", human dung; FMNH.

UNITED STATES OF AMERICA – **Arizona** • 1 ♂; Flagstaff, Oak Creek Canyon, at Sterling Canyon; 1800 m a.s.l.; 17–25 Jul. 1979; S. and J. Peck leg.; riparian woods, Malaise trap; DEBU.

Description

Body (Fig. 133A). Length 2.3–3.6 mm. Head dark brown, lower fifth of frons orange, orange area extending along orbital plate; gena reddish. Frontal width 2.2–2.3 × frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.6–0.7 × length of posterior.

Palpus orange. Eye large, greatest height about 3.5 × shortest genal height. Thorax dark brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.4 × length of posterior pair) separated by 6–7 rows of acrostichal setulae. Membrane around prosternum bare. Legs dark brown, tarsomeres paler. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical quarter. Wing (Fig. 9D) slightly infuscate. CS2 0.8–0.9 × CS3. Halter brown.

Male abdomen (Figs 133B–C, 134). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 2.0 × as long as wide, sparsely setose, anterior half with two narrow, converging pale stripes, posteromedially with a large, dark, slightly bulging patch of dense setulae flanked by pale areas and dark, setose patches. Anterior flange of S6+7 very large, 1.1 × as long as wide. Sclerite A small, dark; sclerite B large, broad, arched; sclerite C absent; sclerite D short, broad, club-shaped, arising from left side of posteromedial process of S5; sclerite E elongate, sinuate, slightly folded over itself; sclerite F large, rectangular with an elongate, deflexed, apicoventral process on left side; sclerite G elongate, curved; ring sclerite dark, small. Epandrium moderate, 0.7 × length of S8, height 1.1 × maximum length and 0.7 × maximum width, uniformly setose, posterior setae larger, posteroventral corner slightly emarginate; anal fissure broadly triangular; perianal pads strongly protruding, elongate, dark, curved, dorsally setulose, ventrally setose. Pseudocercus large, separate from epandrium, bearing three strong setae; halves of subepandrial sclerite narrow, strongly arched, and fused medially. Subcercus with a short inner part, articulating with subepandrial sclerite dorsally, forming a small, posteriorly bent process ventrally, and an outer part with short lobes articulating with surstylus and subcercus. Hypandrium with narrow, sinuate anteromedial apodeme. Surstylus subquadrate, slightly elongate, laterally setulose, ventrally setose, inner surface with a large carinate lobe extending from near middle to anterodorsal corner. Postgonite flattened, curved anteriorly, apex slightly expanded, pale, and striate. Phallapodeme large, apex dorsoventrally flattened; basiphallus strongly dorsoventrally flattened basally, apically notched, and distally expanded, extending along dorsal margin of distiphallus; distiphallus short, with a pale, broad, sheath-like ventral sclerite and a pair of dark, narrow dorsolateral sclerites.

Female abdomen (Fig. 135). T7 broad, simple; T8 divided into a small, pale, dorsal sclerite and two large, dark, lateral sclerites, posterolateral corners expanded posteriorly. Epiproct broad, medially desclerotized (especially posteromedially), and entirely setulose. Cercus elongate, apically pointed with long apical and dorsal setae. S7 broad, posteromedially pointed with 4–5 large posterior setae; S8 reduced to a thin, curved sclerite with dark lateral edges. Three spermathecae, bulb stout, bean-shaped, finely striate with a deep, broad invagination on thicker end, invagination with a finger-like, central process.

Distribution

Nearctic: United States of America; Neotropical: Mexico.

Remarks

Sclerocoelus synorios sp. nov. is superficially similar to *S. recurvatus* sp. nov. but differs by the asymmetrical (strongly reduced on the right side) male S5 with a stout posteromedial setulose patch, elongate surstylus, strongly reduced female S8, and relatively stout hypoproct. *Sclerocoelus synorios* is a mostly Mexican species also known from a single record just across the border into Arizona, making it one of three *Sclerocoelus* species known from the United States. It is one of eight congeners found in Mexico, two of which are known only from Mexico. One of the apparent Mexican endemics (*S. rostrum* sp. nov.) is in the *S. dasysternum* group along with *S. synorios* sp. nov.; the other endemic (*S. pararegularis* sp. nov.) is in the *S. regularis* group.

Sclerocoelus tantus sp. nov.
urn:lsid:zoobank.org:act:A3F1AA4B-F179-484A-BF53-4B9206DEFE7D
Figs 9E, 136–138

Etymology

The species name (from the Latin '*tantus*', meaning 'so much, so many') reflects the abundance of *S. tantus* sp. nov., specimens of which constitute almost 19% of the Neotropical *Sclerocoelus* specimens in the University of Guelph Insect Collection.

Material examined

Holotype

VENEZUELA • ♂; Mérida, Mérida, Los Chorros; 2100 m a.s.l.; 5 May 1988; S.A. Marshall leg.; sweep at trail head; DEBU.

Paratypes

ARGENTINA – **Salta** • 6 ♂♂; 22 km N of La Caldera, El Ucumar; 1150 m a.s.l.; 2–30 Dec. 1987; S. and J. Peck leg.; subtropical humid forest, Malaise flight-intercept trap; CNCI • 10 ♂♂, 4 ♀♀; La Caldera; 1500 m a.s.l.; 27 Feb. 1992; S.A. Marshall leg.; roadside forest sweep; DEBU.

BRAZIL – **Rio de Janeiro** • 15 ♂♂, 20 ♀♀; Teresopolis, trail to Pedra do Sino; 1300–1700 m a.s.l.; 25 Jan. 1990; S.A. Marshall leg.; DEBU • 15 ♂♂, 20 ♀♀; same data as for preceding; MNRJ.

ECUADOR – **Napo** • 2 ♀♀; Baeza, west along road; 1500 m a.s.l.; 16–19 May 1987; Coote and Brown leg.; montane rainforest/pasture, Malaise trap; ROME. – **Pichincha** • 8 ♂♂, 7 km SE of Nanegalito, trout farm 'San Jose'; 1500 m a.s.l.; 27–30 Oct. 1999; S.A. Marshall leg.; riverine forest, treefall sweep; DEBU • 8 ♂♂, 5 ♀♀; same data as for preceding; QCAZ • 12 ♂♂, 5 ♀♀; Maquipucuna Biological Reserve; 0°07′34″ N, 78°27′57″ W; 1200 m a.s.l.; 27–28 Apr. 2002; M. Buck leg.; sweep; QCAZ • 7 ♂♂, 12 ♀♀; Maquipucuna Biological Reserve; 1200 m a.s.l.; 29 Oct. 1999; S.A. Marshall leg.; river trail, sweep; DEBU;

PARAGUAY – **Caazapá** • 1 ♂, 6 ♀♀; Hermosa, San Rafael Reserve, Lopez family property; 26°19′15″ S, 55°44′55″ W; 90 m a.s.l.; 3–6 Dec. 2000; Z.H. Falin leg.; flight-intercept trap; DEBU.

PERU – **Cusco** • 1 ♂; Cock-of-the-Rock Lodge; 13°03′21″ S, 71°32′46″ W; 1380 m a.s.l.; 18–20 Oct. 2006; J. Skevington leg.; Malaise trap; MUSM.

VENEZUELA – **Aragua** • 1 ♂; Colonia Tower; 2300 m a.s.l.; 10 Mar. 1995; S.A. Marshall leg.; sweep steep forest trail; DEBU. – **Mérida** • 12 ♂♂, 18 ♀♀; same data as for holotype; DEBU. – **Trujillo** • 7 ♂♂, 11 ♀♀; 10 km E of Bocono, Laguna de Lucerdo; 1760 m a.s.l.; 3 Mar. 1995; S.A. Marshall leg.; slash/compost; DEBU • 3 ♀♀; same data as for preceding; sweep; DEBU • 4 ♂♂, 1 ♀; Bocono, road to Guaramacal; 2130 m a.s.l.; 2 Mar. 1995; S.A. Marshall leg.; mud sweep; DEBU • 1 ♀; same data as for preceding; 2200 m a.s.l.; under dung; DEBU • 2 ♀♀; Bocono-Guaramacal Road; 2130 m a.s.l.; S.A. Marshall leg.; wet litter sweep; DEBU •1 ♀; Bocono-Guaramacal Road; 3000 m a.s.l.; 3 Mar. 1995, S.A. Marshall leg.; wet debris along stream; DEBU.

Other material examined

ARGENTINA – **Jujuy** • 1 ♀; Calilegua National Park, El Cortadeval km 6; 800 m a.s.l.; 18–28 Dec. 1987; S. and J. Peck leg.; forest, Malaise trap; DEBU • 2 ♀♀; Calilegua National Park, Estación El Cero; 900 m a.s.l.; 18–28 Dec. 1987; S. and J. Peck leg.; forest, Malaise/flight-intercept trap; DEBU • 1 ♀; Calilegua National Park, Mirador; 600 m a.s.l.; 18–28 Dec. 1987; S. and J. Peck leg.; forest,

Malaise/flight-intercept trap; DEBU. – **Misiones** • 1 ♀; 5 km E of Puerto Iguazú; 2–7 Feb. 1992; S.A. Marshall leg.; flight-intercept trap/pan/dung pans; DEBU • 2 ♂♂, 2 ♀♀; 5 km E of Puerto Iguazú; 3 Feb. 1992; S.A. Marshall leg.; sweep by small stream; DEBU • 1 ♂, 3 ♀♀; 5 km E of Puerto Iguazú; 1–6 Feb. 1992; S.A. Marshall leg.; sweep Malaise behind Hotel Orquidaes; DEBU. – **Salta** • 1 ♂, 6 ♀♀; 17 km N of La Caldera, Alto de la Sierra; 1550 m a.s.l.; 2–30 Dec. 1987; S. and J. Peck leg.; subtropical humid forest, Malaise/flight-intercept trap; DEBU • 131 ♂♂, 398 ♀♀; 22 km N of La Caldera, El Ucumar; 1550 m a.s.l.; 2–30 Dec. 1987; S. and J. Peck leg.; subtropical humid forest, Malaise/flight-intercept trap; DEBU • 1 ♀; 30 km E of Salta, Campo Quijano, El Alisal; 18–20 Feb. 1992; S.A. Marshall leg.; forest remnant, flight-intercept trap; DEBU • 4 ♂♂, 4 ♀♀; 30 km E of Salta, Campo Quijano, El Alisal; 18 Feb. 1992; S.A. Marshall leg.; forest vestige; DEBU • 21 ♂♂, 10 ♀♀; 30 km E of Salta, Campo Quijano, 20 Feb. 1992; S.A. Marshall leg.; forest vestige, sweep; DEBU • 55 ♂♂, 15 ♀♀; same data as for preceding; 24 Feb. 1992; wet debris along stream; DEBU • 17 ♂♂, 4 ♀♀; same data as for preceding; 20 Feb. 1992; stream debris, leaf litter; DEBU • 3 ♂♂, 1 ♀; same data as for preceding; sweep, dung; DEBU • 125 ♂♂, 81 ♀♀; 40 km N of Salta, Camino La Cornisa; 27 Feb. 1992; S.A. Marshall leg.; roadside, forest sweep; DEBU • 3 ♂♂; 50 km W of Chicoana, El Maray; 28 Feb. 1992; S.A. Marshall leg.; dry area, sweep pampas grass along creek; DEBU • 1 ♂, 1 ♀; Campo Quijano; 28 Feb. 1992; S.A. Marshall leg.; Malaise/flight-intercept trap; DEBU • 17 ♂♂, 8 ♀♀; Cañada La Gotera, 15 km W of Chicoana; 16–28 Feb. 1992; S.A. Marshall leg.; forest remnant; DEBU • 19 ♂♂, 19 ♀♀; same data as for preceding; 19 Feb. 1992; S.A. Marshall leg.; sweeping wet litter; DEBU • 1 ♀; Cañada La Gotera; 16–28 Feb. 1992; S.A. Marshall leg.; pan traps; DEBU • 1 ♂, 1 ♀; El Rey National Park, Pozo Verde Trail, km 5; 950 m a.s.l.; 5–15 Dec. 1987; S. and J. Peck leg.; Yungas forest, Malaise/flight-intercept trap; DEBU • 16 ♂♂, 39 ♀♀; El Rey National Park, Pozo Verde Trail, km 7; 1000 m a.s.l.; 5–15 Dec. 1987; S. and J. Peck leg.; Yungas forest, Malaise/flight-intercept trap; DEBU • 2 ♀♀; El Rey National Park, Rio La Sala; 900 m a.s.l.; 5–10 Dec. 1987; S. and J. Peck leg.; open stream side in forest, Malaise/flight-intercept trap; DEBU • 127 ♂♂, 87 ♀♀; La Caldera; 1500 m a.s.l.; 27 Feb. 1992; S.A. Marshall leg.; roadside, forest sweep; DEBU • 14 ♂♂, 20 ♀♀; La Caldera, Camino La Cornisa; 27 Feb. 1992; S.A. Marshall leg.; roadside sweep; DEBU • 3 ♀♀; Rosario De Lerma, INESALT yard; 16–28 Feb. 1992; S.A. Marshall leg.; Malaise trap; DEBU • 1 ♂, 1 ♀; Rosario De Lerma; 19 Feb. 1992; S.A. Marshall leg.; swept in hedgerow ditch; DEBU • 3 ♀♀; same data as for preceding; 24 Feb. 1992; swept over bulldozed road; DEBU • 4 ♀♀; same data as for preceding; swept over foul ditch; DEBU.

BOLIVIA – **La Paz** • 13 ♂♂, 9 ♀♀; 0.5 km SE of Coroico; 16°11′ S, 67°44′ W; 15 Apr. 2001; S.A. Marshall leg.; DEBU • 2 ♂♂, 2 ♀♀; 10 km NW of Caranavi, road to ENTEL tower; 15°46′35″ S, 67°35′48″ W; 1400 m a.s.l.; 13 Apr. 2001; S.A. Marshall leg.; DEBU • 2 ♂♂; 23 km NW of Caranavi; 14 Apr. 2001; S.A. Marshall leg.; roadside/stream, sweep; DEBU • 1 ♂; 38 km S of Guanay; 7–12 Apr. 2001; S.A. Marshall leg.; roadside stream, pan traps; DEBU • 26 ♂♂, 17 ♀♀; Chulumani, Apa-Apa Reserve; 16°21′15″ S, 67°30′21″ W; 2000 m a.s.l.; 1 Apr. 2001; S.A. Marshall leg.; sweep; DEBU • 1 ♀; San Antonio, 8 km S of Mapiri; 15°20′56″ S, 68°13′31″ W; 11 Apr. 2001 S.A. Marshall leg.; dung baits; DEBU. – **Santa Cruz** • 2 ♂♂, 2 ♀♀; Siringalito, near Pampa Grande; 2 Oct. 1996; Bettella and Rossi leg.; DEBU.

BRAZIL – **Minas Gerais** • 1 ♀; Prado; 21 Feb. 1990; S.A. Marshall leg.; sweep along river; MZSP. – **Paraná** • 1 ♂; Curitiba, 30 km SE of SEBR 277; 6 Feb. 1990; S.A. Marshall leg.; MZSP • 11 ♂♂, 7 ♀♀; Curitiba; 5 Feb. 1990; S.A. Marshall leg.; under fallen epiphyte in Mata near National History Museum; DEBU • 1 ♀; Curitiba, University campus; 2–5 Feb. 1990; S.A. Marshall leg.; wet areas, flight-intercept trap/pans; MZSP • 12 ♂♂, 9 ♀♀; Curitiba campus; 10 Feb. 1990; S.A. Marshall leg.; sweep in forest with *Araucaria*; MZSP • 3 ♂♂, 4 ♀♀; east of Curitiba, near Ponta Grossa; 800 m a.s.l.; 8 Feb. 1990; S.A. Marshall leg.; swept along road; MZSP • 28 ♂♂, 24 ♀♀; east of Curitiba; 8 Feb. 1990; S.A. Marshall leg.; swept near creek debris; DEBU • 3 ♀♀; Londrina, Parque Municipal Arthur Thomas; 1 Feb. 1990; S.A. Marshall leg.; sweep; MZSP • 4 ♂♂, 2 ♀♀; Londrina; 29 Jan. 1990; S.A. Marshall leg.;

sweep; DEBU. – **Rio de Janeiro** • 14 ♂♂, 26 ♀♀; Muri, near Hotel Garlipp; 2 Mar. 1990; S.A. Marshall leg.; sweep over trail; MZSP • 25 ♂♂, 16 ♀♀; Nova Friburgo, Sitio Edelweiss; 26–27 Jan. 1990; S.A. Marshall leg.; Malaise trap; MZSP • 16 ♂♂, 15 ♀♀; Nova Friburgo, 10 km S of Sitio Edelweiss; 27 Jan. 1990; S.A. Marshall leg.; DEBU • 1 ♂, 2 ♀♀; Nova Friburgo, 10 km S of Sitio Edelweiss, Muri; 1–28 Feb. 1990; S.A. Marshall leg.; Malaise head; MZSP • 10 ♂♂, 7 ♀♀; Nova Friburgo; 27 Jan. 1990; S.A. Marshall leg.; along creek; MZSP • 13 ♂♂, 8 ♀♀; Teresópolis; 1200 m a.s.l.; 13 Mar. 1990; S.A. Marshall leg.; swept near river; MZSP • 47 ♂♂, 128 ♀♀; Teresópolis, trail to Pedra do Sino; 1300–1700 m a.s.l.; 25 Jan. 1990; S.A. Marshall leg.; sweep; DEBU • 47 ♂♂, 128 ♀♀; same data as for preceding; MZSP • 3 ♀♀; Teresópolis, trail to Pedra do Sino; 1500–2000 m a.s.l.; 14 Mar. 1998; S.A. Marshall leg.; DEBU. – **São Paulo** • 20 ♂♂, 10 ♀♀; São Paulo, Jaraguá; 8 Feb. 1990; S.A. Marshall leg.; MZSP.

ECUADOR – **Napo** • 5 ♀♀; Baeza; 1500 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; wet montane rainforest, Malaise trap; DEBU • 1 ♀; Baeza; 1500–1700 m a.s.l.; 14 May 1987; L.D. Coote leg.; wet montane forest/pasture, sweeping; DEBU • 5 ♂♂, 4 ♀♀; Baeza; 1550 m a.s.l.; 15–19 May 1987; L.D. Coote and B.V. Brown leg.; wet montane rainforest/pasture, Malaise trap off stone trail; ROME • 3 ♂♂, 3 ♀♀; Baeza; 1700 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; wet montane rainforest/pasture, near small creek, Malaise head; ROME • 1 ♂, 4 ♀♀; Baeza, W along road; 1500 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; montane rainforest/pasture, Malaise trap; DEBU. – **Pichincha** • 8 ♂♂, 14 ♀♀; 3.5 km SE of Tandayapa; 28 Oct. 1999; S.A. Marshall leg.; in green leaf litter (treefall); DEBU • 1 ♀; 7 km SE of Nanegalito, trout farm 'San Jose'; 1500 m a.s.l.; 30 Oct. 1999; S.A. Marshall leg.; DEBU • 2 ♀♀; same data as for preceding; 30–31 Oct. 1999; river edge, pan traps; DEBU • 46 ♂♂, 17 ♀♀; same data as for preceding; 27–30 Oct. 1999; riverine forest, sweep treefalls; DEBU • 3 ♂♂, 1 ♀; 7 km SE of Nanegalito, trout farm 'San Jose'; 27 Oct. 1999; S.A. Marshall leg.; on logs/sweep; DEBU • 1 ♂; 8 km N of Nono, road to Mindo; 25 Oct. 1999; S.A. Marshall leg.; roadside, sweeping; DEBU • 1 ♂; 11.7 km SE of Tandayapa, road to Nono; 28 Oct. 1999; S.A. Marshall leg.; near stream, litter/wood; DEBU • 1 ♂; Bellavista Could Forest Reserve; 0°01′13″ S, 78°40′30″ W; 2200 m a.s.l.; 9–13 May 2009; S.A. Marshall leg.; DEBU • 2 ♀♀; Bellavista Reserve; 2200 m a.s.l.; 30 Oct. 1999; S.A. Marshall leg.; DEBU • 3 ♀♀; Bellavista Reserve, ridge trail; 28 Oct. 1999; S.A. Marshall leg.; sweeping/aspirating; DEBU • 4 ♂♂, 1 ♀; Bellavista Reserve, trail B; 30 Oct. 1999; S.A. Marshall leg.; sweeping; DEBU • 27 ♂♂, 8 ♀♀; Maquipucuna Biological Reserve; 0°07′34″ N, 78°37′57″ W; 1200 m a.s.l.; 27–28 Apr. 2002; M. Buck leg.; sweep; DEBU • 1 ♀; Maquipucuna Biological Reserve; 1200 m a.s.l.; 27 Oct. 1999; S.A. Marshall leg.; on leaves or small dung bait; DEBU • 29 ♂♂, 26 ♀♀; Maquipucuna Biological Reserve, main trail; 1300 m a.s.l.; 27 Oct. 1999; S.A. Marshall leg.; DEBU • 2 ♂♂, 1 ♀; Maquipucuna Biological Reserve, river trail; 1200 m a.s.l.; 27 Oct. 1999; S.A. Marshall leg.; DEBU • 54 ♂♂, 36 ♀♀; same data as for preceding; 29 Oct. 1999; sweeping; DEBU. – **Zamora-Chinchipe** • 4 ♂♂, 1 ♀; 8 km NW of Zamora, mouth of Río Sabanilla; 1420 m a.s.l.; 1 Nov. 1987; C. Young, R. Davidson and J. Rawlins leg.; CMNH • 1 ♂; San Francisco Biological Reserve, Río San Francisco trail; 3°58′30″ S, 79°04′25″ W; 2000 m a.s.l.; 25 Feb.–3 Mar. 2009; M. Pollet and A. De Braekeleer leg.; yellow pan traps; RBINS.

PARAGUAY – **Caazapá** • 5 ♂♂, 21 ♀♀; Hermosa, San Rafael Reserve, Lopez family property; 26°19′15″ S, 55°44′55″ W; 90 m a.s.l.; 3–6 Dec. 2000; Z.H. Falin leg.; flight-intercept trap; DEBU.

PERU – **Cusco** • 3 ♂♂; Cock-of-the-Rock Lodge; 13°03′21″ S, 71°32′46″ W; 1380 m a.s.l.; 18–20 Oct. 2006; J. Skevington leg.; Malaise trap; DEBU.

VENEZUELA – **Aragua** • 1 ♂; Colonia Tovar; 2300 m a.s.l.; 10 Mar. 1995; S.A. Marshall leg.; sweep steep forest trail; DEBU • 1 ♀; Henri Pittier National Park, Rancho Grande, Portachuelo Pass; 9 Apr. 1994; L. Masner leg.; DEBU. – **Lara** • 1 ♂, 27 ♀♀; Yacambú; 1200 m a.s.l.; 7 May 1981; H. Townes leg.;

cloud forest; CNCI. – **Trujillo** • 8 ♂♂, 12 ♀♀; 10 km E of Bocono, Laguna de Lucerdo; 1760 m a.s.l.; 3 Feb. 1995; S.A. Marshall leg.; slash/compost; DEBU • 1 ♂, 4 ♀♀; same data as for preceding; sweep; DEBU • 5 ♂♂, 2 ♀♀; Bocono, road to Guaramacal; 2130 m a.s.l.; 2 Mar. 1995; S.A. Marshall leg.; sweep mud; DEBU • 2 ♀♀; same data as for preceding; 2200 m a.s.l.; under dung; DEBU • 1 ♂, 2 ♀♀; Bocono–Guaramacal Road; 2130 m a.s.l.; S.A. Marshall leg.; sweep wet litter; DEBU • 1 ♂; Bocono–Guaramacal Road; 3000 m a.s.l.; 3 Mar. 1995; S.A. Marshall leg.; wet debris along stream; DEBU • 2 ♂♂; Guaramacal National Park; 2000–3000 m a.s.l.; 26 Aug.–1 Sep. 1992; L. Masner leg.; car net; DEBU • 14 ♂♂, 27 ♀♀; Guaramacal National Park, 14 km NE of Bocono; 2000 m a.s.l.; 25 Aug.–1 Sep. 1992; L. Masner leg.; DEBU • 8 ♂♂, 1 ♀; Mosquey near Bocono; 1500 m a.s.l.; 24 Aug. 1992; L. Masner leg.; coffee plantation, maxinet; DEBU.

Description

Body (Fig. 136A). Length 2.3–3.8 mm. Head brown, lower quarter of frons orange; face, gena, and antennae orange-brown. Frontal width 2.3–2.4 × frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.6–0.7 × length of posterior. Palpus yellow. Eye large, greatest height about 3.5 × shortest genal height. Thorax brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair only slightly larger than surrounding acrostichal setulae) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum sometimes with a small, setula-bearing sclerite. Legs brown, foreleg slightly paler. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical third. Wing (Fig. 9E) slightly infuscate. CS2 0.7–0.8 × CS3. Halter pale brown.

Male abdomen (Figs 136B–C, 137). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 almost quadrate, 2.3 × length of S4 with anterior third underneath S4; posterolaterally sparsely long-setose, left side strongly reduced posterolaterally, with a dark, deflexed, trapezoidal medial patch of very dense setulae flanked by desclerotized areas. Anterior flange of S6+7 2.0 × as long as wide. Sclerite A small with short setae; sclerite B and sclerite C absent; sclerite D triangular, blade-like and attached to posteromedial lobe of S5; sclerite E long, tapered, and sinuate; sclerite F long and tapered, with a short anterobasal lobe; sclerite G very large, U-shaped; ring sclerite indistinct and slightly desclerotized. Epandrium large, 1.1 × length of S8, height 1.2 × maximum length and 0.6 × maximum width, uniformly setose with larger setae posteroventrally; posterior third of epandrium separated from anterior two-thirds by a deep lateral groove extending halfway up epandrium; anal fissure triangular, widest at base; perianal pads bulging slightly. Pseudocercus small, separate from epandrium and bearing 3 setae; halves of subepandrial sclerite reduced to a pair of arches fused medially forming an M-shape and articulating basally with subcercus. Subcercus with large inner part posteroventrally extended into a prominent process and a smaller process which forms a U-shaped connection between subcerci; outer part with a broadly rounded lobe articulating with surstylus and a hooked lobe contacting pseudocercus. Hypandrium with long, thin anteromedial apodeme. Surstylus stout, wider than deep, densely setose with a prominent anteroventral lobe and a bare inner lobe. Postgonite short, strongly curved anteriorly, tapered with apex blunt and notched and a long posteroventral lobe at about midlength. Phallapodeme very large with a tall dorsal ‘fin’; basiphallus stout with two large lateral plates, divergent basally and distally fused with trunk-like epiphallus; distiphallus largely membranous, reduced to a broad, distally bifurcate dorsal sclerite and a pair of small ventral sclerites.

Female abdomen (Fig. 138). T7 broad, posteromedially shortened; T8 divided into a small, pale dorsal sclerite and two dark lateral sclerites with elongate, acute posteroventral corner. Epiproct small, pale, and setulose. Cercus short and blunt with large apical and dorsal setae. S7 broad, rounded posteriorly with four large posterior setae; S8 reduced to two dark, ovoid lateral sclerites. Two spermathecae, bulb spherical and finely striate with a basal invagination.

Distribution

Neotropical: Argentina, Bolivia, Brazil, Ecuador, Paraguay, Peru, Venezuela.

Remarks

Sclerocoelus tantus sp. nov. is closely related to *S. copiosus* sp. nov. and *S. elephas* sp. nov., which also have a distinctive trunk-like epiphallus, but differs by the trapezoidal posteromedial setulose patch on the male S5, stout surstylus with a prominent anterodorsal lobe, rectangular female S7, and spherical spermatheca with a basal invagination. *Sclerocoelus tantus* is a frequently collected and widespread South American species often found with other species of the *S. galapagensis* group.

Sclerocoelus tridens sp. nov.

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Figs 9F, 139–141

Etymology

This name refers to the additional ventromedial strip of slightly thickened setulae on the female hypoproct, giving a trident-shaped pattern of setulae (from the Latin '*tridens*', meaning 'three-tined, having three prongs or teeth').

Material examined

Holotype

ECUADOR • ♂; Napo, Quito–Baeza Road; 4000 m a.s.l.; 10–18 Feb. 1983; L. Masner leg.; elfin forest, pan traps; QCAZ.

Paratypes

BOLIVIA – **Cochabamba** • 1 ♂; South Corani, Yungas El Chapare; 2900 m a.s.l.; 29–31 Jan. 1976; L.E. Peña leg.; CBFC.

ECUADOR – **Napo** • 1 ♀; Quito-Baeza Pass; 4000 m a.s.l.; 1 Mar. 1979; S.A. Marshall leg.; elfin forest, dung trap; QCAZ. – **Pichincha** • 1 ♂; 12 km NW of Papallacta west slope; 3840 m a.s.l.; 11–12 Oct. 1987; C. Young, R. Davidson and J. Rawlins leg.; subpáramo mixed grass/woodland; CMNH • 1 ♂; 46 km E of Quito; 4000 m a.s.l.; 2–6 Mar. 1976; S. Peck leg.; elfin forest, dung; DEBU • 1 ♂; Bellavista Reserve; 0°00′54″ S, 78°40′56″ W; 2200 m a.s.l.; 1 May 2011; S.A. Marshall leg.; treefall; QCAZ • 1 ♂; Cotopaxi National Park, Lago Limpiopungo; 3800 m a.s.l.; 25 Oct. 1999; R. Anderson leg.; paramo, shrub litter; DEBU • 1 ♀; Cotopaxi National Park, Quebrada Mishahuaycu; 3600 m a.s.l.; 26. Oct.–8 Nov. 1999; S.A. Marshall leg.; pans along stream; DEBU.

Description

Body (Fig. 139A). Length 3.2–4.4 mm. Head dark brown, lower frons, face, and antennae orange; anterior third of gena orange. Frontal width 2.2–2.3 × frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.4–0.5 × length of posterior. Palpus yellow. Eye large, greatest height about 4.0 × shortest genal height. Thorax dark brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair distinct, 0.5 × length of posterior pair) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, hind tibia darker. Fore coxa with row of stout setae along inner surface; fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical two-thirds. Wing (Fig. 9F) hyaline. CS2 subequal to CS3. Halter pale brown with white apex.

Male abdomen (Figs 139B–C, 140). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 1.0× length of S4, laterally setose, posterior margin unpigmented with a row of long, tubercle-based setae and two rows of 4–5 short, stout, posteromedial setae. Anterior flange of S6+7 small, weakly developed. Sclerite A small, fused to S6+7; sclerite B long, dark, arched into genital pouch; sclerite C elongate with a small posteromedial lobe; sclerite D dark, subtriangular, and lying against posteromedial margin of S5; sclerite E absent; sclerites F and G fused into a large, inflated sclerite with dense setulae on left third; ring sclerite incorporated into posterior margin of sclerite F+G. Epandrium moderate, 0.5× length of S8, height 1.7× maximum length and 0.8× maximum width, uniformly setose; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite thin, slightly curved, and fused medially. Subcercus simple, triangular, posteriorly setulose and ventrally extended as a curved, almost bare process. Hypandrium with thin anteromedial apodeme. Surstylus slightly elongate, distally setose, posterolaterally convex and setulose, anterolaterally bare and concave, inner surface flat and bare. Postgonite simple, elongate, and apically tapered. Phallapodeme long, apex dorsoventrally flattened; basiphallus stout and connected to distiphallus by a short, neck-like distal part; distiphallus largely membranous with a small dorsal sclerite and a pair of sinuate ventral sclerites.

Female abdomen (Fig. 141). T7 broad, simple; T8 entire but dorsally desclerotized, appearing as two lateral sclerites, posteroventral corners rounded and expanded. Epiproct elongate, medially pale, appearing split, and entirely bare of setulae. Cercus elongate, apically pointed with large apical and dorsal setae. S7 rounded posteriorly, broadly desclerotized with six large posterior setae; S8 entirely membranous/absent. Hypoproct with a sclerotized ventromedial strip. Vagina with an internal, dark, crescent-shaped sclerite. Three spermathecae, bulb stout, spherical, finely striate with a broad, deep invagination on both ends.

Distribution

Neotropical: Bolivia, Ecuador.

Remarks

Sclerocoelus tridens sp. nov. can be reliably separated from all congeners by the anteroventral strip of the female hypoproct covered in slightly thickened setulae, transverse crescent-shaped vaginal sclerite, and thin, straight postgonite. Although *Sclerocoelus tridens* has clearly differentiated subcerci that are well separated from the epandrium, they are relatively simple and there is no trace of the pseudocercus characteristic of the *S. galapagensis*, *S. regularis*, and *S. dasysternum* groups. As is often the case for *Sclerocoelu*s species outside those derived species groups, *S. tridens* is a high Andean species.

Sclerocoelus turpis sp. nov.

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Figs 9G, 142–143

Etymology

This name refers to the water conditions in the area this species was collected from, as well as the locality itself (Poço Feio = Ugly Well) (from the Latin '*turpis*', meaning 'ugly, filthy, unsightly').

Material examined

Holotype

BRAZIL • ♂; Rio de Janeiro, Nova Friburgo, Lumiar, Poço Feio; 26 Jan. 1990; S.A. Marshall leg.; sweep near falls (dirty); MZSP.

Description

Body (Fig. 142A). Length 2.6 mm. Head dark brown, most of frons orange; face, gena, and antenna yellow-brown. Frontal width 2.2–2.3× frontal height. Three pairs of strong interfrontal bristles surmounting a fine fourth pair; anterior orbital 0.6× length of posterior. Palpus yellow. Eye slightly reduced, greatest height about 2.5× shortest genal height. Thorax dark brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair 0.4× length of posterior pair) separated by 7–8 rows of acrostichal setulae. Prescutellar acrostichals very large. Membrane around prosternum bare. Legs yellow, hind leg reddish. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical third. Wing (Fig. 9G) slightly infuscate. CS2 0.7–0.8× CS3. Halter pale brown.

Male abdomen (Figs 142B–C, 143). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 broad, rectangular, 1.2× length of S4, posterolaterally long-setose and with a large medial setulose patch. Anterior flange of S6+7 not developed. Sclerite A setulose, indistinct from S6+7; sclerite B weakly developed; sclerite C short, bulging and fused to S6+7; sclerite D dark, elongate, and articulating with left side of sclerite F; sclerite E dark, broad; sclerites F and G fused, large, slightly twisted along right side; ring sclerite thin but well developed. Epandrium large, 0.6× length of S8, height 1.7× maximum length and 0.7× maximum width, uniformly setose; anal fissure triangular and relatively narrow; perianal pads bulging but membranous. Pseudocercus absent; halves of subepandrial sclerite thin and transverse, fused medially and arched with two small ventral lobes where it articulates with subcercus. Subcercus short, subtriangular with an elongate posterior lobe curving inwards and a triangular dorsal lobe that articulates with subepandrial sclerite. Hypandrium with long, sinuate anteromedial apodeme. Surstylus very large and broad, twice as long as deep, concave, with dense setae on inner and outer surfaces and a small, triangular, inner anterobasal lobe. Postgonite short, slender with a small sub-basal anterior lobe and apex flattened and curved inwards. Phallapodeme large, curved; basiphallus with an elongate epiphallus and distally expanded along dorsal margin of distiphallus; distiphallus largely membranous with a pair of long, narrow, sinuate lateral sclerites and a smaller, broader, sinuate posteroventral sclerite.

Female abdomen. Female unknown.

Distribution

Neotropical: Brazil.

Remarks

Several features, including mitt-like surstyli, strongly modified epiphallus with lateral lobes and the medially fused subcerci, suggest a close relationship to *S. dominicensis* sp. nov., *S. irregularis* sp. nov., *S. pararegularis* sp. nov., and *S. regularis*. *Sclerocoelus turpis* sp. nov. differs by the very large setulose patch on the male S5, transverse genital pouch sclerite F+G, and apically flattened postgonite. *Sclerocoelus turpis* is known from a single male collected in a disturbed riparian habitat in the Atlantic coastal forest of Brazil.

Sclerocoelus vulgatus sp. nov.

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Figs 9H, 144–146

Etymology

The species name (from the Latin '*vulgatus*', meaning 'make common') refers to the abundance and wide distribution of *S. vulgatus* sp. nov. in Central and South America.

Material examined

Holotype

COSTA RICA • ♂; Puntarenas, Monteverde Reserve; 1500 m a.s.l.; Feb. 1980; W. Mason leg.; cloud forest; MNCR.

Paratypes

COSTA RICA – **Puntarenas** • 13 ♂♂, 32 ♀♀; same data as for holotype; CNCI • 14 ♂♂, 33 ♀♀; same data as for holotype; MCR. – **San José** • 1 ♂, 1 ♀; Moravia, Zurquí de Moravia, Tower path; 10°02′58″ N, 84°00′57″ W; 1600 m a.s.l.; 30 Aug.–6 Sep. 2013; Proyecto ZADBI leg.; Malaise trap #1, 0 m.; MNCR.

Other material examined

COSTA RICA – **Alajuela** • 1 ♀; Quesada, Albergue Pozo Verde; 1800 m a.s.l.; 10°15′15.1″ N, 84°22′18.4″ W; 21 Apr. 2023; S.A. Marshall leg.; from foliage over refuse pile under *Eciton burchellii* bivouac; DEBU • 22 ♂♂; Volcán Tenorio, N slope; 1000 m a.s.l.; 18 Jun. 2000; S.A. Marshall leg.; trail to laguna, sweeping; DEBU • 1 ♂; Volcán Tenorio, N slope near Bijagua Biological Station; 700 m a.s.l.; 18 Jun. 2000; S.A. Marshall leg.; sweep over *Atta* mound; DEBU. – **Cartago** • 1 ♂; La Suiza de Turrialba; Jul., P. Schild leg.; ("*L. Opacifrons coxata* Stenh. Det Spuler"); USNM • 2 ♂♂; La Suiza de Turrialba; Jul., P. Schild leg.; ("*L. Scotophilella rectangularis* Mal. det Spuler"); USNM • 1 ♂; same data as for preceding; Aug.; USNM • 1 ♂; La Suiza de Turrialba; Jul.; P. Schild leg.; ("*L. Scotophilella regularis* Mal. det Spuler"); USNM • 1 ♀; Tapantí National Park; 1550 m a.s.l.; 7–12 Oct. 1999; Marshall and Buck leg.; pans in fallen tree; DEBU • 5 ♂♂, 2 ♀♀; Tapantí National Park; 1650–1750 m a.s.l.; 7 Oct. 1999; S.A. Marshall leg.; sweep trail; DEBU • 3 ♂♂; Tapantí National Park, above ranger station; 1250 m a.s.l.; 12 Oct. 1999; S.A. Marshall leg.; sweep trail/road; DEBU • 2 ♂♂, 1 ♀; Tapantí National Park, Arboles Caídos Trail; 1200 m a.s.l.; 4 Oct. 1999; Marshall and Buck leg.; trail sweep; DEBU • 1 ♂; same data as for preceding; 1300 m a.s.l.; 9/11 Oct. 1999; S.A. Marshall leg.; sweep; DEBU • 3 ♀♀; Tapantí National Park, Macizo de la Muerte, La Esperanza del Guarco; 9°42′00″ N, 83°51′49″ W; 2700 m a.s.l.; 17–18 Aug. 2001; S.A. Marshall leg.; oak forest, treefall pans; DEBU • 2 ♂♂; Tapantí National Park, near Catarata trail; 1450 m a.s.l.; 4 Oct. 1999; S.A. Marshall leg.; roadside, sweeping leaf litter; DEBU • 34 ♂♂, 4 ♀♀; Tapantí National Park, near west entrance; 1150 m a.s.l.; 11 Oct. 1999; Marshall and Buck leg.; trail to hydro tower/creek, sweeping; DEBU • 21 ♂♂, 7 ♀♀; Tapantí National Park, outside near west entrance; 1150 m a.s.l.; 8–9 Oct. 1999; Marshall and Buck leg.; sweep trail; DEBU • 1 ♀; Tapantí National Park, Ranger Station; 1200 m a.s.l.; 7–12 Oct. 1999; M. Buck leg.; hand/pan traps in decaying vegetation; DEBU • 4 ♂♂, 2 ♀♀; same data as for preceding; pans in kitchen refuse; DEBU • 1 ♀; same data as for preceding; 9–12 Oct. 1999; Buck and Marshall leg.; human dung, hand and traps; DEBU. – **Heredia** • 1 ♂; 16 km SSE of La Virgen; 10°16′ N, 84°05′ W; 1050–1150 m a.s.l.; 20 Feb. 2001; transect; DEBU • 7 ♂♂, 4 ♀♀; Braulio Carrillo National Park; 1400–1500 m a.s.l.; 11 Apr. 1985; H. Goulet and L. Masner leg.; cool moist river bed, Selva Premontana; CNCI • 2 ♂♂; Moravia, near border of Braulio Carrillo National Park; 3–4 Mar. 1996; L. Masner leg.; creek bed, yellow pans; CNCI. – **Puntarenas** • 1 ♀; Area de Conservacion Guanacaste, Derrumbe; 10°55′45″ N, 85°27′51″ W; 1220 m a.s.l.; 30 Oct. 2014; D.H. Janzen and W. Hallwachs leg.; forest, Malaise trap; BIOUG31500-D07/GMCDA368-16 sequenced for CO1-5'; BIOUG • 2 ♂♂; 2000 m a.s.l.; 12 Jul. 1995; S.A. Marshall leg.; DEBU • 1 ♂; Las Alturas Biological Station; 1550 m a.s.l.; 17 Aug. 1995; T. Pape leg.; DEBU • 2 ♂♂, 1 ♀; Las Alturas; 1500 m a.s.l.; 12 Aug. 1995; S.A. Marshall leg.; forest-pasture margin, sweep; DEBU • 1 ♂, 1 ♀; Las Alturas; 1500–1700 m a.s.l.; 12 Aug. 1995; S.A. Marshall leg.; sweep; DEBU • 3 ♂♂; Las Alturas; 1600 m a.s.l.; 11–14 Aug. 1995; S.A. Marshall leg.; Malaise trap; DEBU • 5 ♂♂, 1 ♀; same data as for preceding; 15. Aug. 1995; ground *Eciton* raid; DEBU • 2 ♂♂; same data as for preceding; swept over dung; DEBU • 1 ♂; Las Alturas, trail to Cerro Chai; 1700–2100 m a.s.l.; 13–15 Aug. 1995; S.A. Marshall leg.; DEBU • 18 ♂♂, 2 ♀♀; Monteverde

Biological Reserve; 1500 m a.s.l.; 26 May 1998; S.A. Marshall leg.; sweep; DEBU • 82 ♂♂, 22 ♀♀; same data as for preceding; 11 Jun. 2000; M. Buck leg.; cloud forest, sweep; DEBU • 1 ♀; same data as for preceding; S.A. Marshall leg.; on log over trail; DEBU • 1 ♂, 1 ♀; same data as for preceding; 12 Jun. 2000; on dung; DEBU • 49 ♂♂, 9 ♀♀; same data as for preceding; 11–13 Jun. 2000; cloud forest; DEBU • 2 ♀♀; same data as for preceding; 12–13 Jun. 2000; M. Buck leg.; cloud forest, pans along stream; DEBU • 20 ♂♂, 4 ♀♀; same data as for preceding; 13 Jun. 2000; S.A. Marshall leg.; DEBU • 2 ♂♂, 3 ♀♀; same data as for preceding; 13–14 Jun. 2000; M. Buck leg.; cloud forest, pans along stream; DEBU • 7 ♂♂, 2 ♀♀; same data as for preceding; 14 Jun. 2000; sweeping treefall and trail; DEBU • 20 ♂♂, 32 ♀♀; same data as for preceding; treefall sweep and pans; DEBU • 1 ♀; Monteverde Biological Station; 1500 m a.s.l.; 12 Jun. 2000; M. Buck leg.; white pans in kitchen compost; DEBU • 2 ♂♂, 5 ♀♀; same data as for preceding; 13 Jun. 2000; DEBU • 11 ♂♂, 1 ♀; Monteverde Biological Station, lower trail; 26 May 1998; S.A. Marshall leg.; DEBU • 4 ♀♀; Monteverde Reserve; 1550 m a.s.l.; 15–20 Jul. 1986; L. Masner leg.; CNCI • 5 ♂♂, 16 ♀♀; Monteverde Reserve; 1500 m a.s.l.; 15–20 Aug. 1986; L. Masner leg.; CNCI • 2 ♂♂, 2 ♀♀; Monteverde; 1500 m a.s.l.; 20 Feb. 1980; D.M. Wood leg.; CNCI • 2 ♂♂, 14 ♀♀; Monteverde; 1500 m a.s.l.; 29 Feb. 1980; W.R. Mason leg.; cloud forest; CNCI • 2 ♂♂, 6 ♀♀; same data as for preceding; Mason and Wood leg.; rainforest; CNCI • 4 ♂♂, 7 ♀♀; Monteverde; 1500 m a.s.l.; 11–18 Jul. 1983; D.H. Lindeman leg.; fruit pitfall trap; CNCI • 2 ♂♂, 4 ♀♀; same data as for preceding; 1520 m a.s.l.; flight-intercept trap; CNCI • 1 ♂, 1 ♀; same data as for preceding; 15–23 Jul. 1983; CNCI • 2 ♂♂, 3 ♀♀; same data as for preceding; 18–25 Jun. 1983; CNCI • 1 ♂; Monteverde, 25 Feb. 1991; H. and A. Howden leg.; flight-intercept trap; CNCI • 1 ♀; same data as for preceding; 27 Feb. 1991; dung traps; CNCI • 8 ♂♂, 12 ♀♀; same data as for preceding; flight-intercept trap; CNCI • 3 ♂♂, 1 ♀♀; Monteverde, Finca Canada; 1500 m a.s.l.; 5 Jun. 1988; B.V. Brown leg.; DEBU • 1 ♀; Monteverde, high pass between Pacific and Atlantic slopes; 10°18′ N, 84°48′ W; 1570 m a.s.l.; 3 Feb. 1986; A. Forsyth leg.; ROME • 4 ♂♂; Monteverde, Pension Queteal; 10°18′ N, 84°49′ W; 24 May 1987; A. Norrbom leg.; on human dung; DEBU • 6 ♂♂; Monteverde; 25 May 1998; S.A. Marshall leg.; sweep near Biological Station; DEBU • 1 ♂; San Gerardo; 1200 m a.s.l.; 15 Dec. 1994; D.C. Caloren leg.; sweep in banana grove; DEBU. – **San José** • 21 ♂♂, 4 ♀♀; Highway 2, km 68; 6 Aug. 1995; D.C. Caloren leg.; around *Sphagnum* bog/pond, sweeping; DEBU • 2 ♂♂, 1 ♀; San Gerardo de Dota; 9 Aug. 1995; S.A. Marshall leg.; disturbed area near river, sweep; DEBU • 1 ♂; Zurquí de Moravia; 1600 m a.s.l.; Mar. 1981; P. Hanson leg.; DEBU.

GUATEMALA – **Baja Verapaz** • 13 ♂♂, 50 ♀♀; 4.8 km W of Purulhá; 1680 m a.s.l.; 29 Jun.–3 Jul. 1993; J.S. Ashe and R.W. Brooks leg.; flight-intercept trap; SEMC • 13 ♂♂, 17 ♀♀; 7.4 km S of Purulhá; 1650 m a.s.l.; 2–3 Jul. 1993; J.S. Ashe and R.W. Brooks leg.; flight-intercept trap; SEMC • 1 ♀; 17 km N of Salama, Highway 5; 1700 m a.s.l.; 25 Jun.–3 Jul. 1993; J.S. Ashe and R.W. Brooks leg.; flight-intercept trap; SEMC • 1 ♂; Biotopo Quetzal; 15°12′44″ N, 90°12′57″ W; 1740 m a.s.l.; 7–10 May 2009; cloud forest, near stream, Malaise trap; UVGC. – **Quetzaltenango** • 2 ♀♀; 8 km SE of Quetzaltenango, Zunil; 2630 m a.s.l.; 17–19 Jun. 1993; J.S. Ashe and R.W. Brooks leg.; flight-intercept trap; SEMC. – **San Marcos** • 1 ♀; 8 km N of San Lorenzo; 4–18 Jul. 1986; J.M. Campbell leg.; flight-intercept trap; DEBU • 2 ♀♀; same data as for preceding; 13 Jul. 1986; DEBU. – **Zacapa** • 1 ♀; 1.5 km E of Rio Mondo; 350 m a.s.l.; 27 Jun. 1993; R.W. Brooks and J.S. Ashe leg.; flight-intercept trap; SEMC • 4 ♂♂, 25 ♀♀; 3.5 km SE of La Union; 1500 m a.s.l.; 23–25 Jun. 1993; J.S. Ashe and R.W. Brooks leg.; flight-intercept trap; SEMC • 4 ♂♂, 7 ♀♀; same data as for preceding; 25–27 Jun. 1993; SEMC.

HONDURAS – **Olancho** • 21 ♂♂, 19 ♀♀; La Muralla National Park; 15°05′49″ N, 86°44′17″ W; 1450 m a.s.l.; 4–7 Jul. 2002; Smith and Ocampo leg.; flight-intercept trap; DEBU.

MEXICO – **Chiapas** • 1 ♂, 4 ♀♀; 5 km NNW of Coapilla; 17°10′56″ N, 93°09′06″ W; 1910 m a.s.l.; 25 May 2008; 2° mesophyll forest, Malaise trap; DEBU • 12 ♂♂, 25 ♀♀; Logos de Montebello, Lago Pojoj; 1500 m a.s.l.; 2–12 Jun. 1990; B. Gill and H. Howden leg.; flight-intercept trap; DEBU.

NICARAGUA – **Jinotega** • 1 ♀; Reserva Natural Cerro Kilambé; 13°34′09″ N, 85°39′27″ W; 1500 m a.s.l.; 23 May 2011; cloud forest, ex. sifted leaf litter; DEBU.

PANAMA – **Chiriquí** • 1 ♂; Hartmann's Finca; 1700 m a.s.l.; 28 Jun.–3 Jul. 1981; B. Gill leg.; DEBU.

PERU – **Loreto** • 1 ♂; 1.5 km N of Teniente Lopez; 230–305 m a.s.l.; 22 Jul. 1993; R. Leschen leg.; flight-intercept trap; DEBU.

TOBAGO – **Eastern Tobago** • 1 ♂, 5 ♀♀; Charlotteville, Mon-o-War Bay cottages; 26–31 Jun. 1993; S. and J. Peck leg.; littoral rainforest, UV light; DEBU.

VENEZUELA – **Aragua** • 1 ♀; Henri Pittier National Park, Portachuelo Pass, Rancho Grande; 10 Apr. 1994; L. Masner leg.; Malaise trap; CNCI.

Description

Body (Fig. 144A). Length 2.4–3.8 mm. Head dark brown, lower third of frons, gena, and antennae orange; face orange-brown. Frontal width 2.2–2.3× frontal height. Three pairs of strong interfrontal bristles surmounting a very fine fourth pair; anterior orbital 0.5–0.6× length of posterior. Palpus yellow. Eye large, greatest height about 4.0× shortest genal height. Thorax brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair only slightly larger than surrounding acrostichal setulae) separated by 7–8 rows of acrostichal setulae. Membrane around prosternum bare. Legs brown, trochanters and fore femur yellow. Fore femur with three large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical third. Wing (Fig. 9H) slightly infuscate. CS2 0.7–0.8× CS3. Halter pale brown with white apex.

Male abdomen (Figs 144B–C, 145). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S5 rectangular, 2.0× length of S4, posterolaterally long-setose, posteromedially with a long, dark, deflexed patch of very dense setulae flanked by wide desclerotized patches. Anterior flange of S6+7 very large, 1.0× as long as wide and longer than S5. Sclerite A lightly sclerotized, separated from S6+7; sclerite B long, very thin, and arched; sclerite C absent; sclerite D oblong, anteriorly bilobed; sclerite E long, basally notched; sclerite F large with a long, tapered distal lobe; sclerite G elongate, distally fused to sclerite F; ring sclerite well sclerotized with a small mesial lobe. Epandrium moderate, 0.6× length of S8, height 1.5× maximum length and 0.8× maximum width, uniformly setose; perianal pads weakly developed. Pseudocercus small, separate from epandrium, and bearing two setae; halves of subepandrial sclerite simple, strongly arched and broadly fused medially. Subcercus elongate, wedge-shaped in posterior view and triangular in lateral view with a broad, flat, anterior inner lobe. Hypandrium with thick anteromedial apodeme. Surstylus simple, triangular, anterior edge setose with a small basal lobe, lateral surface almost white, posterior edge dark. Postgonite short, apex broadened and crenulate with a large preapical anterior lobe. Phallapodeme large, thick, with a short dorsal 'fin'; basiphallus elongate, sinuate with a short, flat epiphallus and bifurcate apex extending beyond junction with distiphallus; distiphallus dorsoventrally flattened with very dark J-shaped ventrolateral sclerites.

Female abdomen (Fig. 146). T7 broad, very dark at least laterally; T8 divided into a small, pale dorsal sclerite and two broad, black lateral sclerites, ventrolateral corners expanded posteriorly. Epiproct small, medially pale, and posteriorly setulose. Cercus elongate, tapered with long apical and preapical setae. S7 rounded, posterior margin widely desclerotized with six large posterior setae; S8 variously developed, from a single well sclerotized plate (in Costa Rican specimens) to two well separated, desclerotized lateral plates (in some Guatemalan specimens). Three spermathecae, bulb elongate, bean-shaped, finely striate with a large subapical invagination.

Distribution

Neotropical: Costa Rica, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Tobago.

Remarks

Sclerocoelus vulgatus sp. nov. is externally similar to most species in the *S. dasysternum* group but differs by the bicoloured outer surface of the surstylus, large preapical anterior lobe on the postgonite, and only slightly ventrolaterally expanded lateral plates of the female T8. As the etymology of the species name suggests, *Sclerocoelus vulgatus* is one of the most frequently collected *Sclerocoelus* species across a wide Neotropical range, mostly in Mexico and Central America as is typical for members of the *S. dasysternum* group**.**

Sclerocoelus xynos sp. nov.

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Figs 9I, 147–149

Etymology

The species name (from the Greek '*xynos*', meaning 'common') reflects the abundance and widespread distribution of this species.

Material examined

Holotype

VENEZUELA • ♂; Mérida, 6 km S of Azulita, near road; 3 May 1988; S.A. Marshall leg.; DEBU.

Paratypes

BOLIVIA – **La Paz** • 1 ♂, 2 ♀♀; 10 km NW of Caranavi, road to ENTEL tower; 1700 m a.s.l.; 13 Apr. 2001; S.A. Marshall leg.; bamboo dung pans; CBFC • 1 ♂; 23 km NE of Caranavi; 14 Apr. 2001; S.A. Marshall leg.; roadside/stream sweep; CBFC.

ECUADOR – **Napo** • 11 ♂♂, 2 ♀♀; 4.2 km S of Cosanga, pipeline trail; 2200 m a.s.l.; 7 Nov. 1999; S.A. Marshall leg.; QCAZ • 5 ♂♂, 1 ♀; 5 km N of El Chaco; 15 Feb. 1983; M. Sharkey leg.; Malaise trap and wet net; CNCI • 2 ♀♀; El Chaco; 2000 m a.s.l.; 15-23 Feb. 1983; L. Masner and M. Sharkey leg.; Malaise trap; CNCI.

VENEZUELA – **Lara** • 9 ♂♂, 1 ♀; Yacambu; 1200 m a.s.l.; 7 May 1981; H. Townes leg.; cloud forest; CNCI. – **Mérida** • 7 ♂♂, 3 ♀♀; same data as for holotype; DEBU • 5 ♂♂; Jají; 27 Apr. 1988; S.A. Marshall leg.; cloud forest, flight-intercept trap; DEBU • 12 ♂♂, 2 ♀♀; Jají to La Azulita; 3 May 1988; S.A. Marshall leg.; roadside sweeps; DEBU • 1 ♂; Los Chorros; 1–5 Apr. 1988; S.A. Marshall leg.; flight-intercept trap; DEBU • 2 ♂♂; same data as for preceding; leaf debris; DEBU • 5 ♂♂, 3 ♀♀; Los Chorros; 23 Apr. 1988; S.A. Marshall leg.; sweeps; DEBU • 3 ♂♂, 5 ♀♀; Mucui, 10 km E of Tobay; 2000 m a.s.l.; 28 Apr. 1981; H. Townes leg.; CNCI • 1 ♂; Santa Rosa Road; 24 Apr. 1988; S.A. Marshall leg.; vegetation along trail; DEBU • 1 ♂; Santa Rosa Trail; 23–30 Apr. 1988; S.A. Marshall leg.; flight-intercept trap; DEBU.

Other material examined

ARGENTINA – **Salta** • 7 ♂♂, 50 ♀♀; 22 km N of La Caldera, El Ucumar; 1550 m a.s.l.; 2–30 Dec. 1987; S. and J. Peck leg.; subtropical humid forest, Malaise/flight-intercept trap; CNCI • 1 ♂; 40 km N of Salta, Camino La Cornisa; 1500 m a.s.l.; 27 Feb. 1992; S.A. Marshall leg.; forest; DEBU.

BOLIVIA – **La Paz** • 1 ♂; 10 km NW of Caranavi, road to ENTEL tower; 15°46′35″ S, 67°35′48″ W; 1400 m a.s.l.; 13 Apr. 2001; S.A. Marshall leg.; DEBU • 1 ♂, 2 ♀♀; same data as for preceding; dung pans; DEBU • 1 ♂, 2 ♀♀; same data as for preceding; 1700 m a.s.l.; bamboo dung pans; DEBU • 1 ♂; 23 km NE of Caranavi; 14 Apr. 2001; S.A. Marshall leg.; roadside/stream sweep; DEBU • 3 ♀♀; Chulumani, Apa-Apa Reserve; 16°21′15″ S, 67°30′21″ W; 2000 m a.s.l.; 1–3 Apr. 2001; S.A. Marshall leg.; pan traps; DEBU • 1 ♂; same data as for preceding; 1 Apr. 2001; sweep; DEBU. – **Santa Cruz** • 1 ♂; Siringalito, near Pampa Grande; 2 Oct. 1996; Bettella and Rossi leg.; DEBU • 1 ♂; Yungas de la Siberia, 26.4 km NW of Comarapa; 2640 m a.s.l.; 28 Jan. 1999; R. Anderson leg.; Yungas, mixed litter; DEBU.

ECUADOR – **Loja** • 1 ♀; Podocarpus National Park, Bombuscaro, Higuerones trail; 1000 m a.s.l.; 21–25 Feb. 2009; M. Pollet and A. De Braekeleer leg.; yellow pans; RBINS • 1 ♀; Podocarpus National Park, Cajanuma, Bosque Nublado trail; 3000 m a.s.l.; 20–27 Feb. 2009; M. Pollet and A. De Braekeleer leg.; yellow pans; RBINS. – **Napo** • 1 ♀; 4.8 km W of El Chaco; 1750 m a.s.l.; 7 Nov. 1999; S.A. Marshall leg.; DEBU • 1 ♂; 17 km NE of Baeza; 1400 m a.s.l.; 3–6 Mar. 1976; S. Peck leg.; dung trap; DEBU • 30 ♂♂, 22 ♀♀; Baeza; 1500 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; wet montane rainforest, Malaise trap; DEBU • 62 ♂♂, 34 ♀♀; Baeza; 1550 m a.s.l.; 15–19 May 1987; L.D. Coote and B.V. Brown leg.; wet montane rainforest/pasture, Malaise trap off stone trail; ROME • 6 ♂♂, 6 ♀♀; Baeza; 1700 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; wet montane rainforest/pasture, near small creek, Malaise head; ROME • 1 ♂; Baeza; 5 Mar. 1979; S.A. Marshall leg.; DEBU • 3 ♂♂, 6 ♀♀; Baeza, W along road; 1500 m a.s.l.; 16–19 May 1987; L.D. Coote and B.V. Brown leg.; montane rainforest/pasture, Malaise trap; DEBU • 3 ♂♂, 1 ♀; El Chaco; 2000 m a.s.l.; 15–23 Feb. 1983; L. Masner and M. Sharkey leg.; Malaise trap; CNCI • 1 ♀; Quito–Baeza Pass; 4000 m a.s.l.; 4–8 Nov. 1999; S.A. Marshall leg.; pan traps in moss; DEBU • 1 ♀; SierrAzul Lodge, 14 km W of Cosanga; 2200 m a.s.l.; 5 Nov. 1999; S.A. Marshall leg.; forest, sweep; DEBU • 1 ♂, 1 ♀; SierrAzul Reserve, 14 km W of Cosanga; 0°40′55″ S, 77°56′09″ W; 2200 m a.s.l.; 9–10 May 2002; Buck and Paiero leg.; Malaise trap; DEBU • 1 ♀; same data as for preceding; 9 May 2002; M. Buck leg.; sweep trail; DEBU • 2 ♂♂, 1 ♀; same data as for preceding; 9–10 May 2002; M. Buck leg.; treefall, yellow pans; DEBU • 1 ♀; same data as for preceding; 10–11 May 2002; Marshall and Paiero leg.; debu00194781/MYCRO919-21 sequenced for CO1–5′; DEBU • 1 ♂, 3 ♀♀; Yanayacu Biological Station; 0°36′ S, 77°53′ W; 2000–2500 m a.s.l.; 25 Apr.–13 May 2019; Yau and Marshall leg.; DEBU. – **Pichincha** • 2 ♂♂, 4 ♀♀; 3.5 km SE of Tandayapa; 28 Oct. 1999; S.A. Marshall leg.; in green leaf litter (treefall); DEBU • 7 ♂♂, 5 ♀♀; 7 km SE of Nanegalito, trout farm ‘San Jose’; 1500 m a.s.l.; 27–30 Oct. 1999; S.A. Marshall leg.; riverine forest, sweeping treefalls; DEBU • 1 ♂, 4 ♀♀; Bellavista Cloud Forest Reserve; 0°01′13″ S, 78°40′30″ W; 2200 m a.s.l.; 9–13 May 2009; S.A. Marshall leg.; DEBU • 1 ♂, 1 ♀; same data as for preceding; 1 May 2011; pans near treefall DEBU • 4 ♂♂, 5 ♀♀; Bellavista Reserve; 2150 m a.s.l.; 30 Oct. 1999; S.A. Marshall leg.; on sifted litter; DEBU • 1 ♂, 1 ♀; same data as for preceding; 2200 m a.s.l.; 30 Oct. 1999; DEBU • 1 ♀; Bellavista Reserve, ridge trail; 2200 m a.s.l.; 28–30 Oct. 1999; pans near dung; S.A. Marshall leg.; DEBU • 7 ♂♂, 2 ♀♀; Bellavista Reserve, ridge trail; 28 Oct. 1999; S.A. Marshall leg.; sweeping/aspirating; DEBU • 1 ♂; Bellavista Reserve, trail B; 30 Oct. 1999; S.A. Marshall leg.; sweeping; DEBU • 1 ♀; Cotopaxi National Park, Quebrada Mishahuaycu; 3600 m a.s.l.; 16 Oct.–8 Nov. 1999; S.A. Marshall leg.; along stream, pan traps; DEBU • 1 ♀; Maquipucuna Biological Reserve, main trail; 1300 m a.s.l.; 27 Oct. 1999; S.A. Marshall leg.; DEBU • 1 ♀; Maquipucuna Biological Reserve, river trail; 1200 m a.s.l.; 29 Oct. 1999; S.A. Marshall leg.; sweep; DEBU. – **Zamora-Chinchipe** • 1 ♀; 8 km NW of Zamora, mouth of Río Sabanilla; 1420 m a.s.l.; 1 Nov. 1987; C. Young, R. Davidson and J. Rawlins leg.; CMNH • 2 ♀♀; San Francisco Biological Reserve, Atajo Trail; 3°58′30″ S, 79°04′25″ W; 2000 m a.s.l.; 14–18 Feb. 2009; M. Pollet and A. De Braekeleer leg.; yellow pan traps, RBINS • 4 ♂♂, 15 ♀♀; same data as for preceding; 18–25 Feb. 2009; RBINS • 1 ♂, 1 ♀; same data as for preceding; 25 Feb.–3 Mar. 2009; RBINS • 4 ♂♂, 1 ♀; San Francisco Biological Reserve, Canal Trail; 3°58′30″ S, 79°04′25″ W; 2000 m a.s.l.; 18–25 Feb.

2009; M. Pollet and A. De Braekeleer leg.; blue pan traps; RBINS • 8 ♂♂, 14 ♀♀; same data as for preceding; 13–18 Feb. 2009; red pan traps; RBINS • 1 ♂, 4 ♀♀; same data as for preceding; yellow pan traps; RBINS • 16 ♂♂, 12 ♀♀; same data as for preceding; 17–25 Feb. 2009; DEBU • 19 ♂♂, 19 ♀♀; same data as for preceding; 18–25 Feb. 2009; RBINS • 6 ♂♂, 16 ♀♀; same data as for preceding; 25 Feb.–3 Mar. 2009; DEBU • 7 ♂♂, 12 ♀♀; same data as for preceding; white pan traps; DEBU • 3 ♂♂, 5 ♀♀; San Francisco Biological Reserve, Río San Francisco Trail; 3°58′30″ S, 79°04′25″ W; 2000 m a.s.l.; 18–25 Feb. 2009; M. Pollet and A. De Braekeleer leg.; yellow pan traps; RBINS • 2 ♀♀; same data as for preceding; 25 Feb.–3 Mar. 2009; RBINS.

PERU – **Cusco** • 3 ♂♂, 1 ♀; Cock-of-the-Rock Lodge; 13°03′21″ S, 71°32′46″ W; 1380 m a.s.l.; 18–20 Oct. 2006; J. Skevington leg.; Malaise trap; DEBU • 34 ♂♂, 45 ♀♀; Cock-of-the-Rock Lodge, NE of Paucartambo; 13°03′18″ S, 71°32′42″ W; 1120 m a.s.l.; 4–9 Nov. 2007; D. Brzoska leg.; flight-intercept trap; DEBU. – **Junín** • 3 ♀♀; Pampa Hermosa Lodge, 22 km N of San Ramon; 10°59′18″ S, 75°25′30″ W; 1220 m a.s.l.; 24–27 Nov. 2007; D. Brzoska leg.; flight-intercept trap; DEBU.

VENEZUELA – **Aragua** • 1 ♂; Henri Pittier National Park, Rancho Grande; 1500 m a.s.l.; 3 Sep. 1992; L. Masner leg.; DEBU • 1 ♀; Henri Pittier National Park, Rancho Grande, La Toma trail; 9 Apr. 1994; L. Masner leg.; DEBU • 2 ♀♀; Rancho Grande, La Cumbre cloud forest; 1500 m a.s.l.; 1–10 Aug. 1987; Bordon and Peck leg.; flight-intercept trap; DEBU. – **Lara** • 1 ♀; Yacambú; 1200 m a.s.l.; 7 May 1981; H. Townes leg.; cloud forest; CNCI. – **Mérida** • 1 ♂, 1 ♀; Jají to La Azulita; 3 May 1988; S.A. Marshall leg.; roadside sweeps; DEBU • 9 ♂♂, 13 ♀♀; Mérida, Los Chorros; 2300 m a.s.l.; 23–30 Apr. 1988; S.A. Marshall leg.; flight-intercept trap; DEBU • 1 ♀; Mérida, Los Chorros; 1–5 May 1988; S.A. Marshall leg.; dung trap; DEBU • 1 ♂, 1 ♀; same data as for preceding; leaf litter, flight-intercept trap; DEBU • 1 ♀; Mérida, Los Chorros, Santa Rosa Road; 30 Apr. 1988; S.A. Marshall leg.; sweep; DEBU • 1 ♂, 1 ♀; Mérida, Los Chorros; 23 Apr. 1988; S.A. Marshall leg.; sweep; DEBU • 1 ♂, 1 ♀; Mérida, Santa Rosa Road; 25–30 Apr. 1988; S.A. Marshall leg.; pasture/cloud forest edge, Malaise trap; DEBU • 9 ♂♂, 11 ♀♀; Santa Rosa Trail; 1500 m a.s.l.; 24–30 Apr. 1988; S.A. Marshall leg.; flight-intercept trap along spring; DEBU. – **Táchira** • 1 ♀; 38 km NE of San Cristóbal; 2100 m a.s.l.; 18–20 Jun. 1974; S. Peck leg.; carrion; DEBU. – **Trujillo** • 2 ♂♂, 1 ♀; 10 km E of Bocono, Laguna de Lucerdo; 1760 m a.s.l.; 3 Mar. 1995; S.A. Marshall leg.; slash/compost; DEBU • 1 ♀; Bocono–Guaramacal Road; 2130 m a.s.l.; S.A. Marshall; sweep wet litter; DEBU • Guaramacal National Park; 2000–3000 m a.s.l.; 26 Aug.–1 Sep. 1992; L. Masner leg.; car net; DEBU.

Description

Body (Fig. 147A). Length 2.3–3.8 mm. Head dark brown, very bottom edge of frons orange; face and gena dark brown, antennae orange; frontal vitta, interfrontal plate and orbital plate slightly paler and shiny. Frontal width 2.3–2.4× frontal height. Two pairs of strong interfrontal bristles surmounting a very fine third pair; anterior orbital 0.4–0.5× length of posterior. Palpus yellow. Eye large, greatest height about 3.5× shortest genal height. Thorax dark brown, scutum with paler lateral edges. Two pairs of dorsocentral bristles (anterior pair only slightly larger than surrounding acrostichal setulae) separated by 7–8 rows of acrostichal setulae. Intra-alar setae not enlarged; prescutellar acrostichal setulae only slightly larger than others. Membrane around prosternum bare. Legs brown, trochanters and bases of femora paler. Fore femur with four or five large ventral preapical setae. Ventral surface of male mid tibia with two rows of stout setae in apical third. Wing (Fig. 9I) slightly infuscate. CS2 0.7–0.8× CS3. Halter brown with paler stem.

Male abdomen (Figs 147B–C, 148). Dark brown, posterior edges of tergites sometimes slightly desclerotized. T2–5 and S2–4 uniformly long-setose with large posterolateral setae. S4 sometimes with a distinct posteromedial process which overlaps S5. S5 rectangular, 1.2× length of S4, anterior edge often overlapped by S4; posterolaterally long-setose, very broadly posteromedially emarginate, densely

setose along lateral margins of emargination, with short setae in emargination and a dark T-shaped medial sclerite. Anterior flange of S6+7 1.0× as long as wide. Sclerites A, B, and C fused, forming a continuous arc extending from S6 to middle of S5; sclerites D and E fused, short and slightly x-shaped; sclerite F large, bulging with an elongate apical process on left side; sclerite G small, rounded; ring sclerite narrow, fused to sclerite G. Epandrium small, 0.4× length of S8, height 1.8× maximum length and 0.8× maximum width, uniformly setose; perianal pads weakly developed. Pseudocercus absent; halves of subepandrial sclerite short, slightly sinuate and continuous medially. Subcercus large, with a large, setulose main part, a small apical sclerotized lobe, and a large anteroventral membranous lobe attached to small lobe. Hypandrium with narrow anteromedial apodeme. Surstylus small, subtriangular, posteriorly setose and anteriorly concave. Postgonite short, broad with two inner anterior lobes and a large, dark, curved posteroventral lobe. Phallapodeme large, gently curved; basiphallus stout, curved, and connected to distiphallus by a neck-like distal part; distiphallus largely membranous with a broad, U-shaped dorsal sclerite and a narrow ventral sclerite.

Female abdomen (Fig. 149). T7 broad, simple; T8 divided into a pale dorsal sclerite and a pair of dark lateral sclerites with rounded posteroventral corners. Epiproct small, pale, with 2 dorsal setae. Cercus elongate, narrow and tapered with long apical and preapical setae. S7 broad, posteromedially pointed with four large posterior setae; S8 reduced to a pair of very small lateral sclerites. Three spermathecae, bulb spherical, finely striate and with a deep apical invagination and a shallow basal invagination.

Distribution

Neotropical: Argentina, Bolivia, Ecuador, Peru, Venezuela.

Remarks

Sclerocoelus xynos sp. nov. is closely related to *S. penai* sp. nov., with which it shares a number of characters including a similar male S5 and a uniquely inflated ventral subcercus. *Sclerocoelus xynos* can be separated from *S. penai* by the two pairs of large interfrontal bristles preceded by a much smaller pair, evenly concave posteromedial margin of the male S5 with the distinctive T-shaped posteromedial process, and the two anterior lobes of the postgonite. The holotype was collected along with specimens of *S. lazulita* sp. nov. and *S. paranebulosus* sp. nov. All four species are basal to the large derived clade including the *S. dasysternum* and *S. galapagensis* groups.

Species incertae sedis

Sclerocoelus clarae (Papp, 1973)

Limosina clarae Papp, 1973: 388.

Limosina clarae – Papp 1984: 96.
Sclerocoelus clarae – Roháček *et al*. 2001: 249.

Material examined

No material of "*Sclerocoelus clarae*" was examined.

Distribution

Palaearctic: Mongolia.

Remarks

Roháček *et al*. (2001) tentatively treated this species as a *Sclerocoelus* based on the brief description and figures of female terminalia in Papp (1973), but it differs from all other species of *Sclerocoelus* in having

a narrow alula, four subequal interfrontal bristles, and an upcurved R_{4+5} ending far from the apex of the wing. Papp (1973) noted the presence of a midventral and apicoventral seta on the mid tibia, but did not specify if this was present in just the female (as is typical of all *Sclerocoelus*) or if this was present in both sexes (other male *Sclerocoelus* have a double row of apicoventral setae and no midventral). It seems unlikely that *Sclerocoelus* occurs in Central Asia, and we prefer to treat this species as incertae sedis pending further study.

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References

Adams C.F. 1904. Notes and descriptions of North American Diptera. *The Kansas University Science Bulletin* 2 (14): 433–455.

Cumming J.M. & Wood D.M. 2017. 3. Adult morphology and terminology. *In*: Kirk-Spriggs A.H. & Sinclair B.J. (eds) *Manual of Afrotropical Diptera. Vol. 1. Introductory Chapters and Keys to Diptera Families*. Suricata 4, South African National Biodiversity Institute, Pretoria.

Duda O. 1925. Die außereuropäischen Arten der Gattung *Leptocera* Olivier – *Limosina* Macquart (Dipteren) mit Berücksichtigung der europäischen Arten. *Archiv für Naturgeschichte Abteilung A, Berlin* 90 (11): 5–215.

Duda O. 1929. Die Ausbeute der deutschen Chaco-Expedition 1925/26 (Diptera). VI. Sepsidae, VII. Piophilidae, VIII. Cypselidae, IX. Drosophilidae un X. Chloropidae. *Konowia* 8 (1): 33–50.

Ekrem T., Willassen E. & Stur E. 2010. Phylogenetic utility of five genes for dipteran phylogeny: A test case in the Chironomidae leads to generic synonymies. *Molecular Phylogenetics and Evolution* 27: 261–271 https://doi.org/10.1016/j.ympev.2010.06.006

Frey R. 1954. Diptera Brachycera and Sciaridae von Tristan da Cunha (with a contribution by J. Bequaert). *Results of the Norwegian Scientific Expedition to Tristan da Cunha 1937–1938, Oslo* 4 (26): 1–55.

Goloboff P.A. & Catalano A.C. 2016. TNT version 1.5, including a full implementation of phylogenetic morphometrics. *Cladistics* 32: 221–238. https://doi.org/10.1111/cla.12160

Han H.-Y. & Ro K.-E. 2016. Molecular phylogeny of the superfamily Tephritoidea (Insecta: Diptera) reanalysed based on expanded taxon sampling and sequence data. *Journal of Zoological Systematics and Evolutionary Research* 54: 276–288. https://doi.org/10.1111/jzs.12139

Heath T.A., Hedtke S.M. & Hillis D.M. 2008. Taxon sampling and the accuracy of phylogenetic analyses. *Journal of Systematics and Evolution* 46: 239–257.

Kekkonen M., Mutanen M., Kaila L., Nieminen M. & Hebert P.D.N. 2015. Delineating species with DNA barcodes: a case of taxon dependent method performance in moths. *PLoS ONE* 10(4): e0122481. https://doi.org/10.1371/journal.pone.0122481

Kuwahara G.K. & Marshall S.A. 2020. A revision of the Neotropical genus *Chespiritos* (Diptera: Sphaeroceridae: Limosininae). *European Journal of Entomology* 117: 164–189. https://doi.org/10.14411/eje.2020.019

Lindsay K. & Marshall S.A. 2023. A revision of *Scipopus* Enderlein including the subgenera *Scipopus* s. str., *Phaeopterina* Frey and *Parascipopus* subgen. nov. (Diptera, Micropezidae, Taeniapterinae). *European Journal of Taxonomy* 904: 1–189. https://doi.org/10.5852/ejt.2023.904.2323

Maddison W., Li D., Bodner M., Zhang J., Xin X., Liu Q. & Liu F. 2014. The deep phylogeny of jumping spiders (Araneae, Salticidae). *ZooKeys* 440: 57–87. https://doi.org/10.3897/zookeys.440.7891

Maddison W.P. & Maddison D.R. 2023. Mesquite: a modular system for evolutionary analysis. Version 3.81. Available from http://www.mesquiteproject.org [accessed 21 Jan. 2025].

Malloch J.R. 1914. Costa Rican Diptera collected by Philip P. Calvert, Ph.D., 1909–1910. *Transactions of the American Entomological Society, Philadelphia* 40: 1–36.

Marshall S.A. 1995. *Sclerocoelus* and *Druciatus*, new genera of New World Sphaeroceridae (Diptera; Sphaeroceridae; Limosininae). *Insecta Mundi* 9 (3–4): 283–289.

Marshall S.A. 1997. A revision of the *Sclerocoelus galapagensis* group (Diptera: Sphaeroceridae: Limosininae). *Insecta Mundi* 11 (2): 97–115.

Marshall S.A. 2000. *Chespiritos*, a new genus of Limosininae (Diptera: Sphaeroceridae) from Costa Rica. *Proceedings of the Entomological Society of Washington* 102 (3): 609–612.

Marshall S.A. 2001. A review of the southern South American genus *Gyretria* Enderlein (Diptera: Sphaeroceridae: Limosininae). *Proceedings of the Entomological Society of Washington* 103 (2): 282–290.

Marshall S.A. & Dong H. 2008. *Parasclerocoelus*, a new south temperate genus of Limosininae (Diptera: Sphaeroceridae). *Studia Dipterologica* 15: 223–230.

Marshall S.A. & Yau T. 2014. *Paramosina*, a new genus of high Andean Limosininae (Diptera: Sphaeroceridae). *Zootaxa* 3872 (4): 393–397. https://doi.org/10.11646/zootaxa.3872.4.7

Marshall S.A., Luk S.P.L. & Dong H. 2014. A revision of the New Zealand species of *Howickia* Richards. *Zootaxa* 3887 (1): 1–36. https://doi.org/10.11646/zootaxa.3887.1.1

Nixon K.C. 2002. Winclada ver. 1.61, published by author, Ithaca, NY, USA.

Papp L. 1973. Sphaeroceridae (Diptera) from Mongolia. *Acta Zoologica Academiae Scientiarum Hungaricae* 19: 369–425.

Papp L. 1984. Family Sphaeroceridae. *In:* Soós Á. & Papp L. (eds) *Catalogue of Palaearctic Diptera*. Vol. 10. Akadémiai Kiadó, Budapest.

Ratnasingham S. & Hebert P.D. 2007. BOLD: The Barcode of Life Data System (https://www.barcodinglife.org). *Molecular Ecology Notes* 7 (3): 355–364. https://doi.org/10.1111/j.1471-8286.2007.01678.x

Ratnasingham S. & Hebert P.D.N. 2013. A DNA-based registry for all animal species: The Barcode Index Number (BIN) System. *PLoS ONE* 8 (7): e66213. https://doi.org/10.1371/journal.pone.0066213

Richards O.W. 1965. Family Sphaeroceridae. *In:* Stone A. (ed.) *A Catalog of the Diptera of America North of Mexico.* U.S. Department of Agriculture Handbook 276, Washington.

Richards O.W. 1967. Family Sphaeroceridae (Borboridae). *In*: Vanzolini E.P. & Papavero N. (eds) *A Catalogue of the Diptera of the Americas South of the United States*. Vol. 72. Departamento de Zoologia, Secretaria da Agricultura, Sãu Paulo.

Richards O.W. 1980. 57. Family Sphaeroceridae. *In:* Crosskey R.W. (ed.) *Catalogue of the Diptera of the Afrotropical Region*. British Museum (Natural History), London.

Roháček J. 1983. A monograph and re-classification of the previous genus *Limosina* Macquart (Diptera, Sphaeroceridae) of Europe. Part II. *Beiträge zur Entomologie, Berlin* 33: 3–195.

Roháček J., Marshall S.A., Norrbom A.L., Buck M., Quiros D.I. & Smith I. 2001. *World Catalog of Sphaeroceridae*. Slezské zemské Museum, Opava.

Spuler A. 1925. North American species of the subgenus *Scotophilella* Duda (Diptera, Borboridae). *Journal of the New York Entomological Society* 33 (3): 147–162.

Stamatakis A. 2014. RAxML version 8: a tool for phylogenetic analysis and post-analysis of large phylogenies. *Bioinformatics* 30 (9): 1312–1313. https://doi.org/10.1093/bioinformatics/btu033

Tucker E.S. 1907. Some results of desultory collection of insects in Kansas and Colorado. *The Kansas University Science Bulletin* 4: 51–107.

Wheeler T.J. 2009. Large-scale neighbor-joining with NINJA. *In:* Salzberg S.L. & Warnow T. (eds) *Proceedings of the 9th Workshop on Algorithms in Bioinformatics*. Springer, Berlin.

Winkler I.S., Scheffer S.J. & Mitter C. 2009. Molecular phylogeny and systematics of leaf-mining flies (Diptera: Agromyzidae): delimitation of *Phytomyza* Fallen sensu lato and included species groups, with new insights on morphological and host-use evolution. *Systematic Entomology* 34: 260–292. https://doi.org/10.1111/j.1365-3113.2008.00462.x

Yau T. & Marshall S.A. 2018. A revision of the genus *Bromeloecia* Spuler (Diptera: Sphaeroceridae: Limosininae). *Zootaxa* 4445: 1–115. https://doi.org/10.11646/zootaxa.4455.1.1

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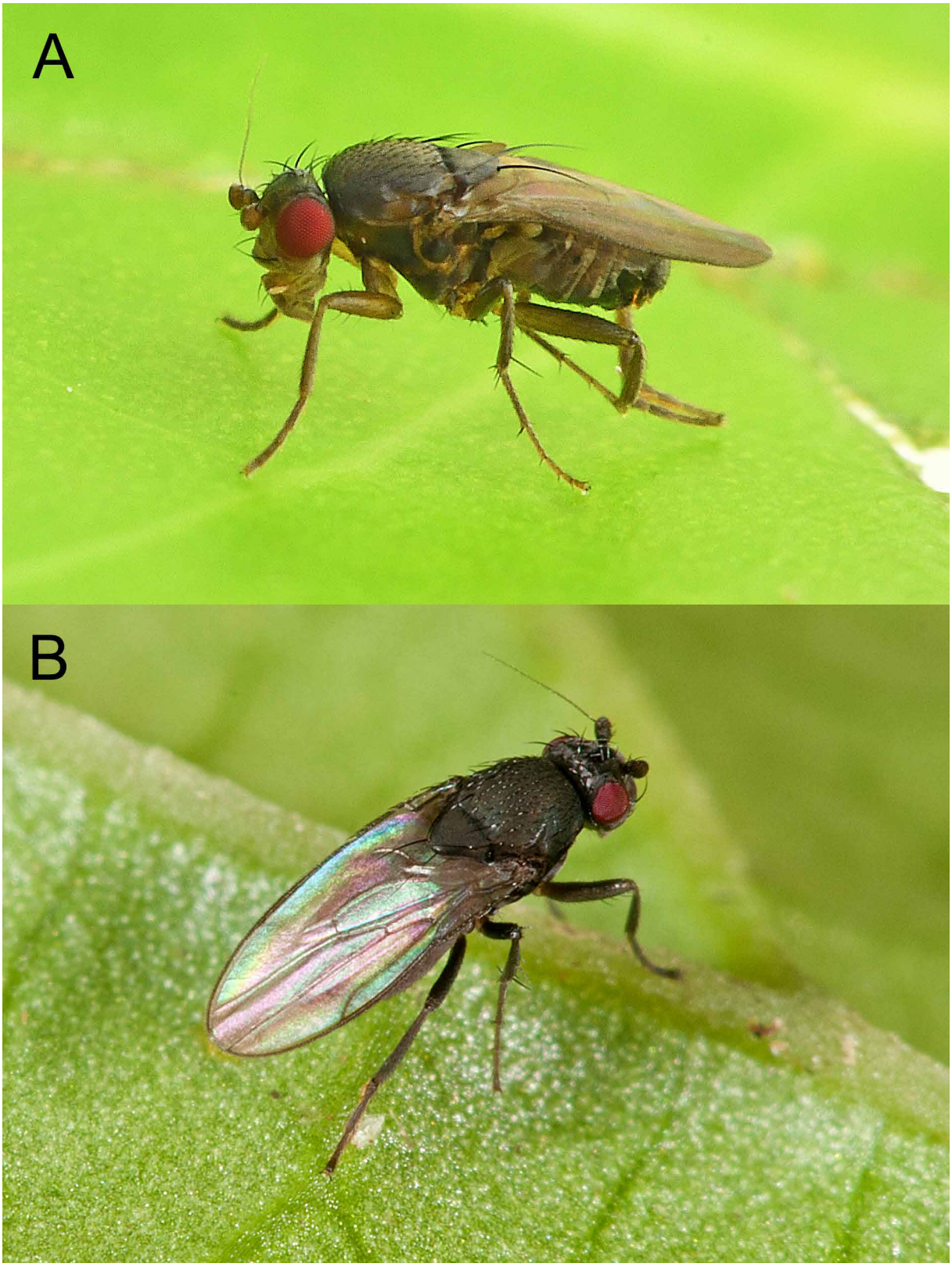


Fig. 1. *Sclerocoelus* Marshall, 1995, live specimens. **A**. *Sclerocoelus nitidistylus* sp. nov. near an *Eciton* bivouac in Alajuela Province, Costa Rica. **B**. Probably *Sclerocoelus copiosus* sp. nov. from Bellavista Cloud Forest Reserve, Ecuador.

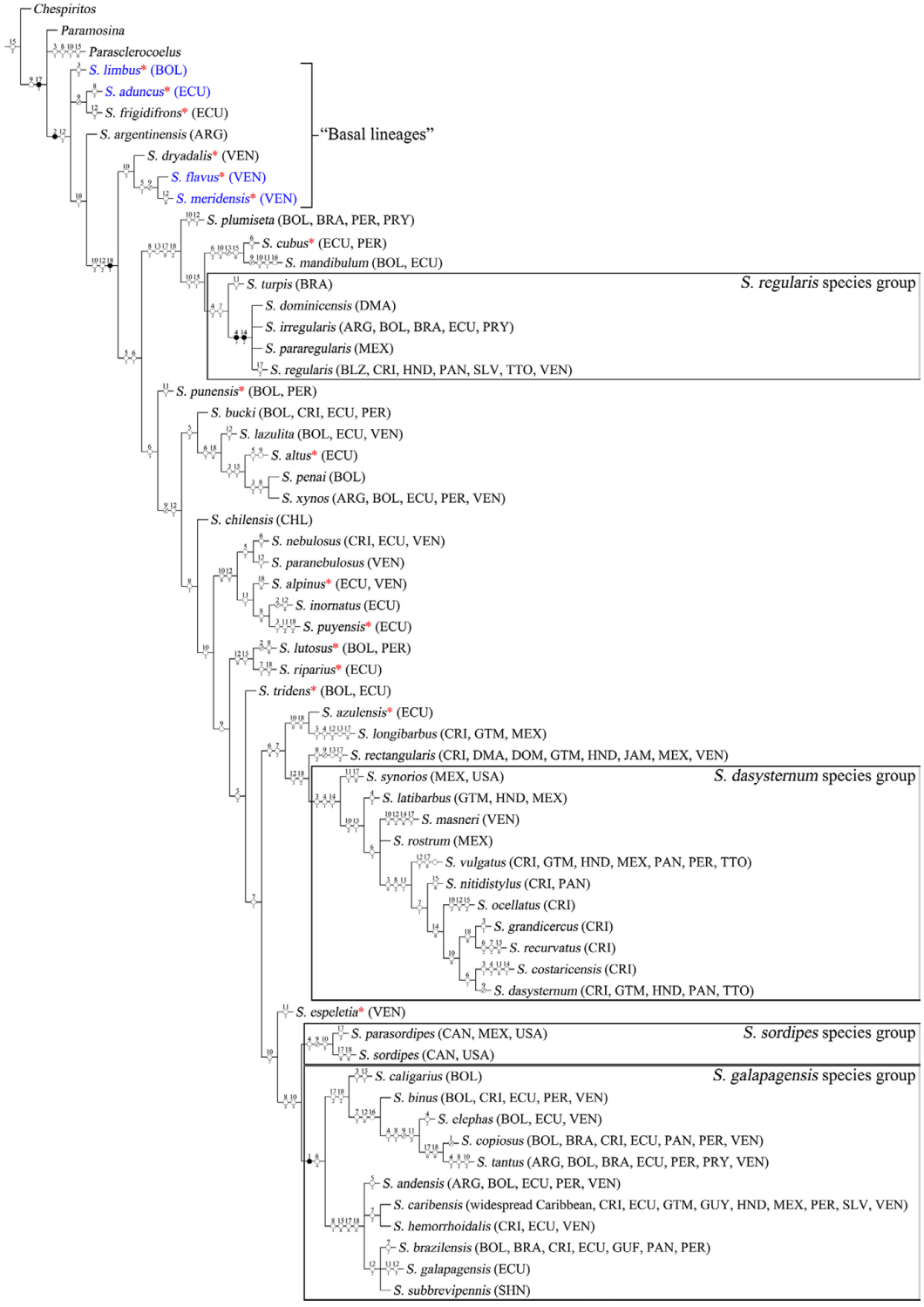


Fig. 2. Phylogeny of *Sclerocoelus* Marshall, 1995 based on the morphological character states in Table 1. The cladogram was rooted by *Paramosina* Marshall, 2014, *Chespiritos* Marshall, 2000, and *Parasclerocoelus* Marshall & Dong, 2008 as outgroups. Solid circles indicate unique synapomorphies, empty circles indicate homoplasies, and crossed circles indicate reversals. Numbers above circles indicate the character number, numbers below the circles indicate multistate character states (unordered). Species names highlighted in blue indicate brachypterous species. Red asterisks (*) beside species names indicate high elevations (2800+ m a.s.l.).

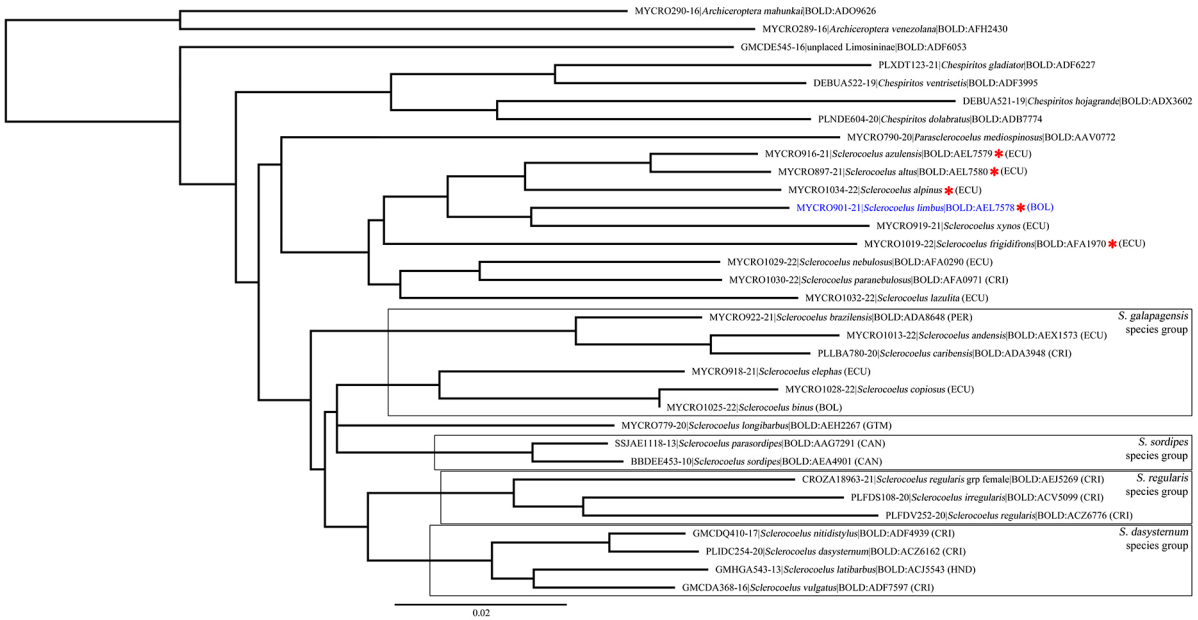


Fig. 3. Nearest neighbour tree based on CO1 barcodes for *Sclerocoelus* Marshall, 199**5.** *Archiceroptera* Papp, 1977, *Chespiritos* Marshall, 2000, and *Parasclerocoelus* Marshall & Dong, 2008 were selected as outgroups. Order of information: sample code | species | barcode index number (if assigned). CO1 data can be found in dataset DS-SCLROCLS on boldsystems.org. Species names highlighted in blue indicate brachypterous species. Red asterisks (*) beside species names indicate high elevations (2800+ m a.s.l.).

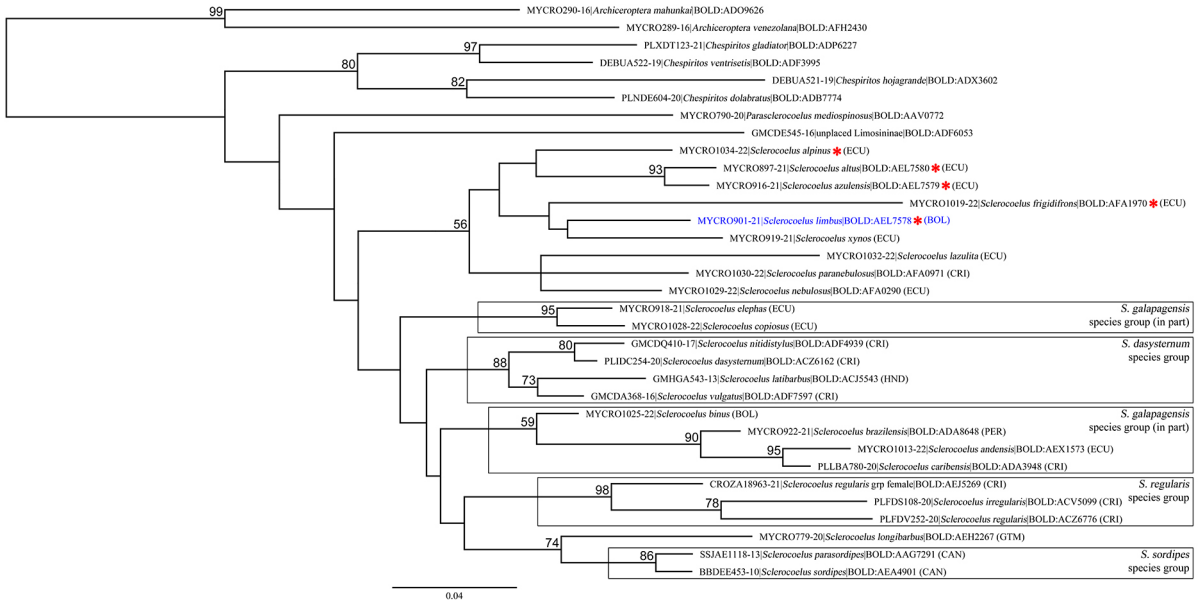


Fig. 4. Maximum likelihood tree based on CO1 barcodes for *Sclerocoelus* Marshall, 1995, with *Archiceroptera* Papp, 1977, *Chespiritos* Marshall, 2000, and *Parasclerocoelus* Marshall & Dong, 2008 selected as outgroups. Order of information: sample code | species | barcode index number (if assigned). CO1 data can be found in dataset DS-SCLROCLS on boldsystems.org. Species names highlighted in blue indicate brachypterous species. Red asterisks (*) beside species names indicate high elevations (2800+ m a.s.l.).

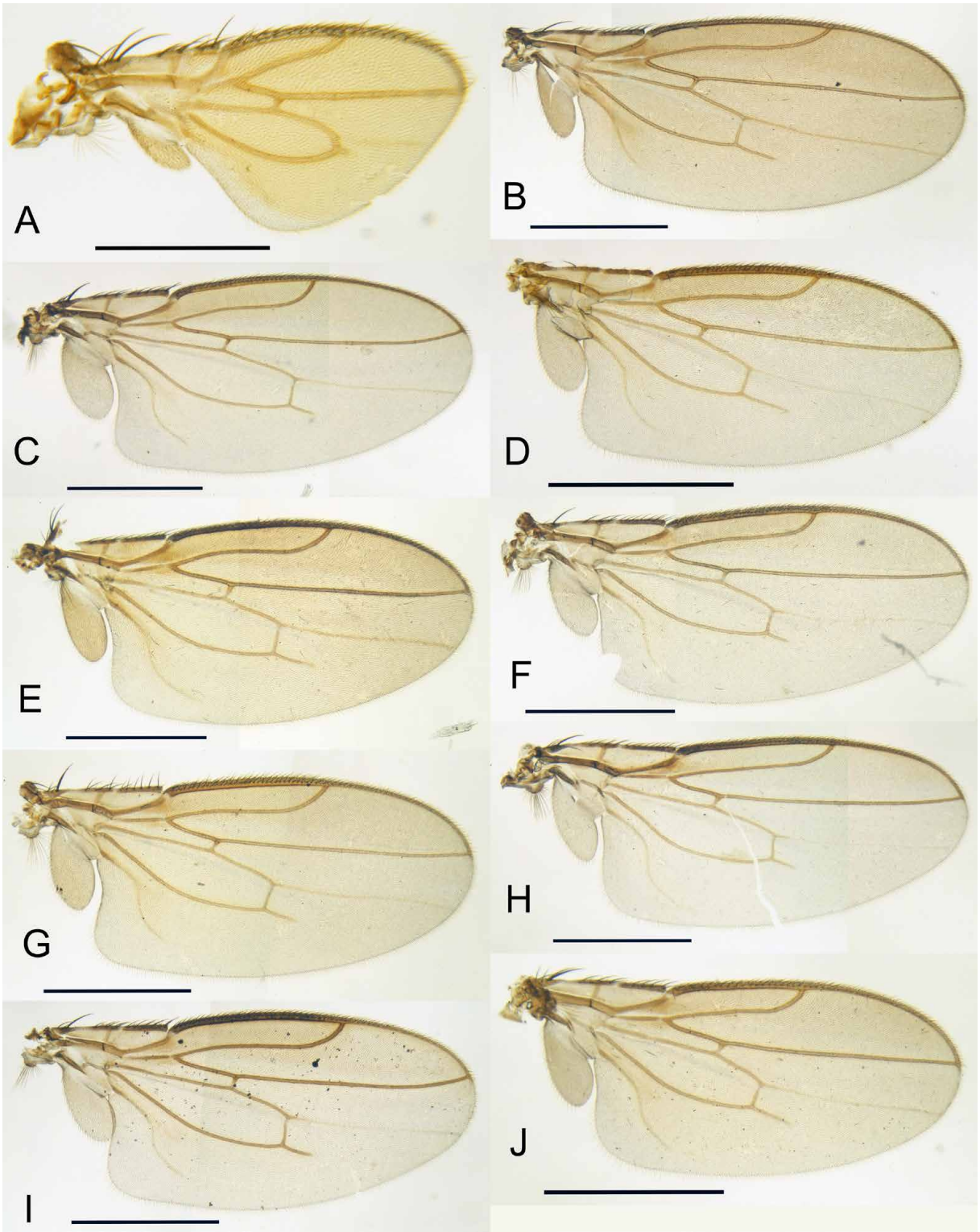


Fig. 5. *Sclerocoelus* Marshall, 1995, left wings, ventral view. **A**. *Sclerocoelus aduncus* sp. nov. **B**. *Sclerocoelus alpinus* sp. nov. **C**. *Sclerocoelus altus* sp. nov. **D**. *Sclerocoelus argentinensis* sp. nov. **E**. *Sclerocoelus azulensis* sp. nov. **F**. *Sclerocoelus binus* sp. nov. **G**. *Sclerocoelus bucki* sp. nov. **H**. *Sclerocoelus caligarius* sp. nov. **I**. *Sclerocoelus chilensis* sp. nov. **J**. *Sclerocoelus copiosus* sp. nov. Scale bars: A–J = 0.5 mm.

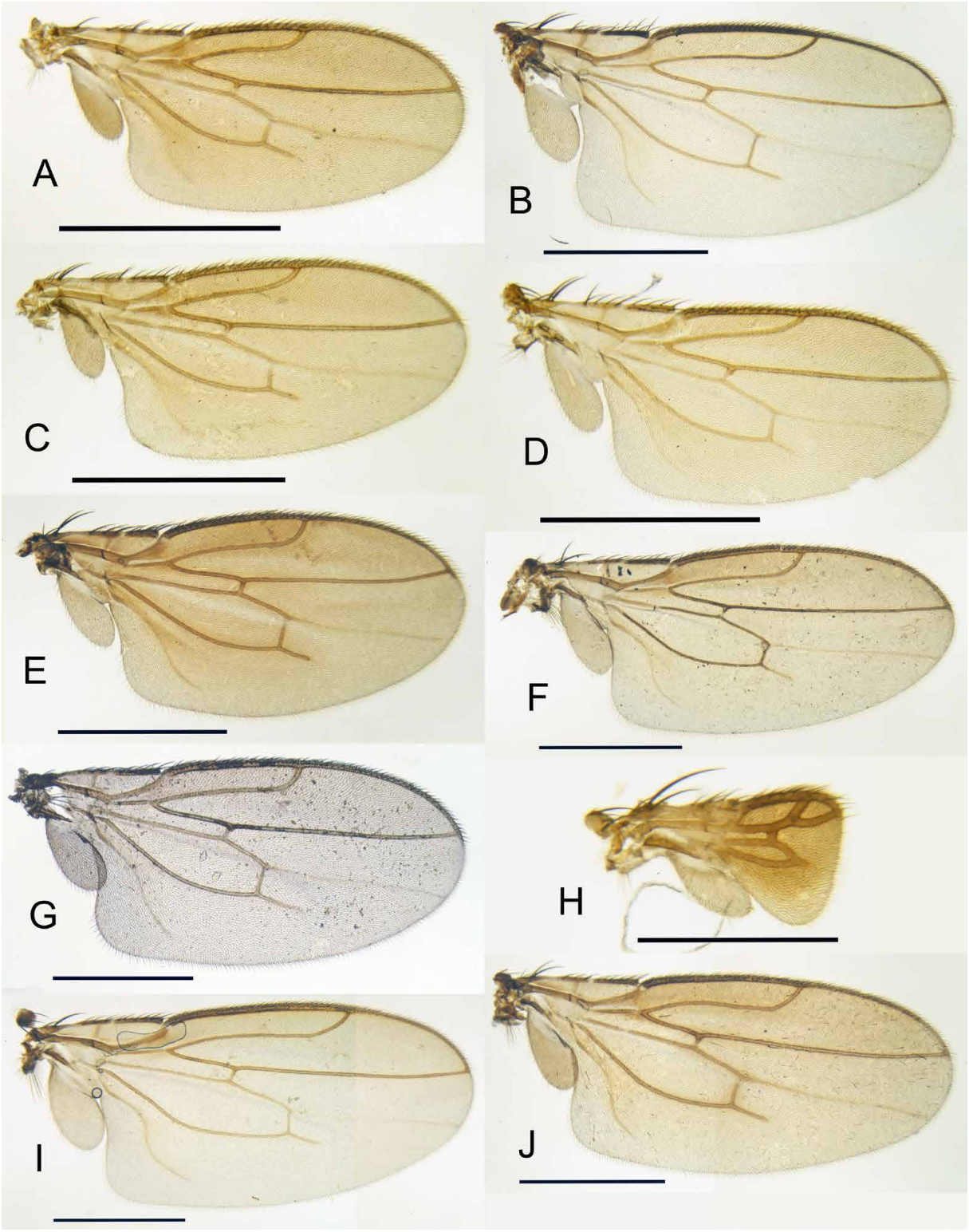


Fig. 6. *Sclerocoelus* Marshall, 1995, left wings, ventral view. **A**. *Sclerocoelus costaricensis* sp. nov. **B**. *Sclerocoelus cubus* sp. nov. **C**. *Sclerocoelus dasysternum* sp. nov. **D**. *Sclerocoelus dominicensis* sp. nov. **E**. *Sclerocoelus dryadalis* sp. nov. **F**. *Sclerocoelus elephas* sp. nov. **G**. *Sclerocoelus espeletia* sp. nov. **H**. *Sclerocoelus flavus* sp. nov. **I**. *Sclerocoelus frigidifrons* sp. nov. **J**. *Sclerocoelus grandicercus* sp. nov. Scale bars: A–J = 0.5 mm.

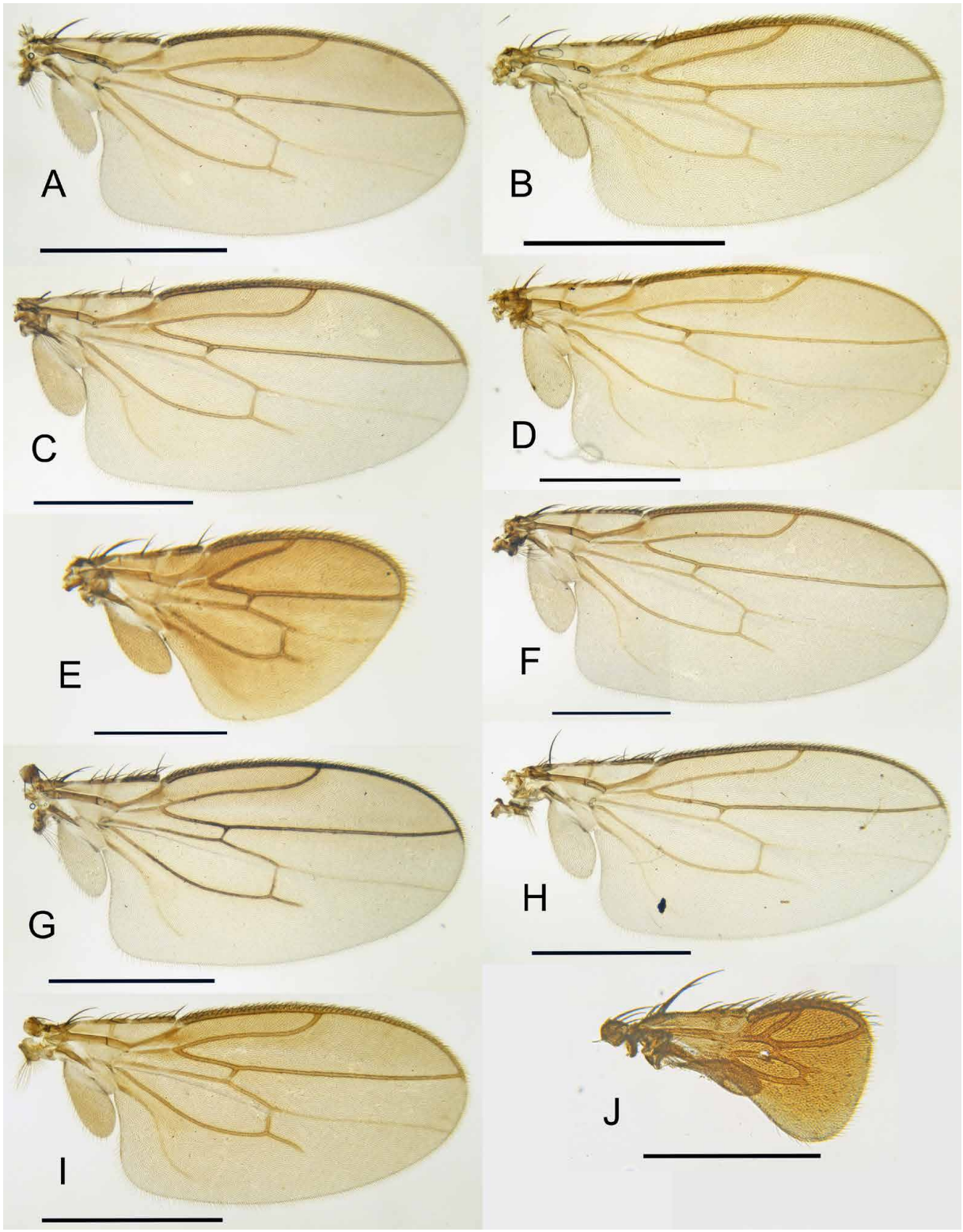


Fig. 7. *Sclerocoelus* Marshall, 1995, left wings, ventral view. **A**. *Sclerocoelus inornatus* sp. nov. **B**. *Sclerocoelus irregularis* sp. nov. **C**. *Sclerocoelus latibarbus* sp. nov. **D**. *Sclerocoelus lazulita* sp. nov. **E**. *Sclerocoelus limbus* sp. nov. **F**. *Sclerocoelus longibarbus* sp. nov. **G**. *Sclerocoelus lutosus* sp. nov. **H**. *Sclerocoelus mandibulum* sp. nov. **I**. *Sclerocoelus masneri* sp. nov. **J**. *Sclerocoelus meridensis* sp. nov. Scale bars: A–J = 0.5 mm.

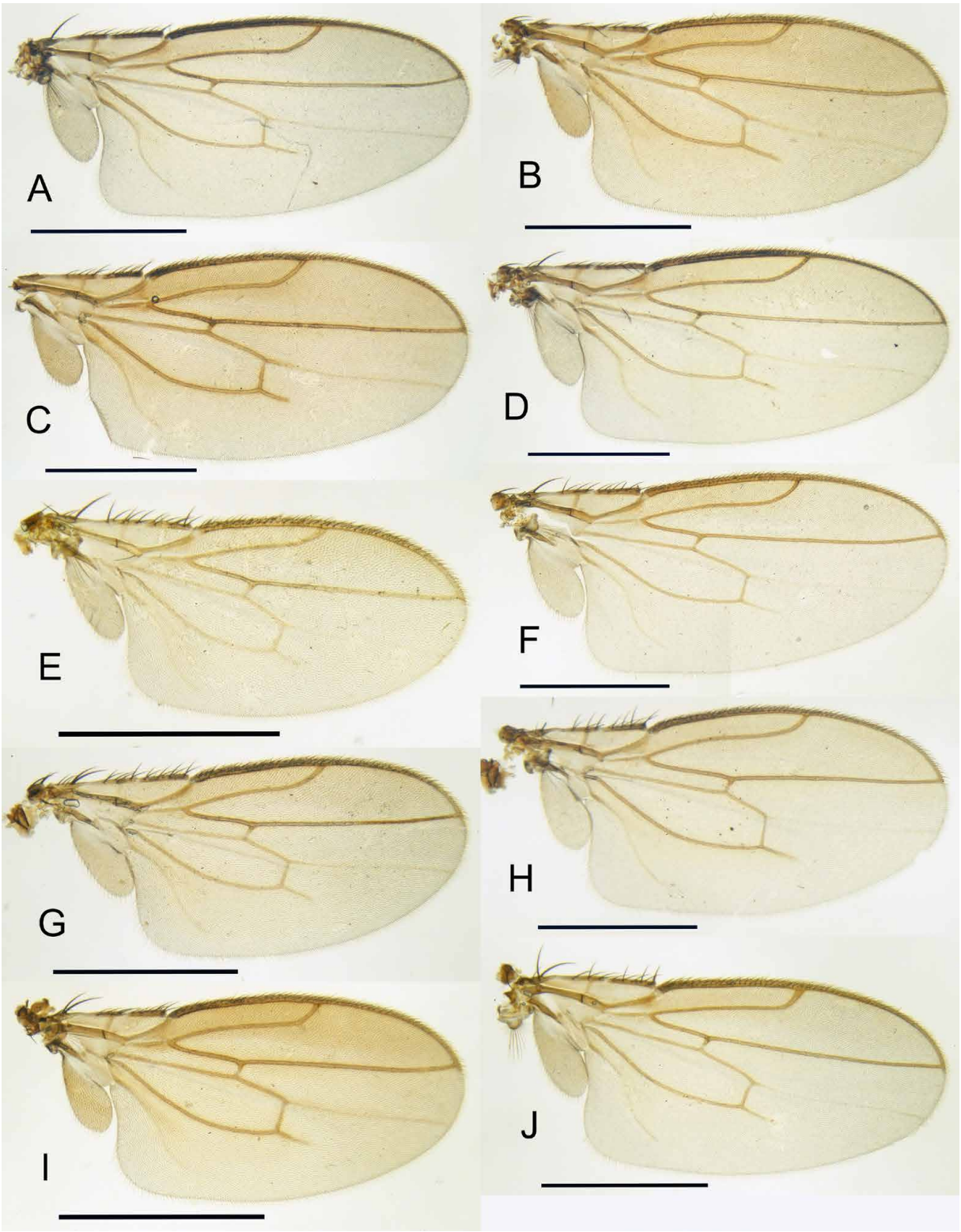


Fig. 8. *Sclerocoelus* Marshall, 1995, left wings, ventral view. **A**. *Sclerocoelus nebulosus* sp. nov. **B**. *Sclerocoelus nitidistylus* sp. nov. **C**. *Sclerocoelus ocellatus* sp. nov. **D**. *Sclerocoelus paranebulosus* sp. nov. **E**. *Sclerocoelus pararegularis* sp. nov. **F**. *Sclerocoelus parasordipes* sp. nov. **G**. *Sclerocoelus plumiseta* (Duda, 1925) **H**. *Sclerocoelus punensis* sp. nov. **I**. *Sclerocoelus puyensis* sp. nov. **J**. *Sclerocoelus rectangularis* (Malloch, 1914). Scale bars: A–J = 0.5 mm.

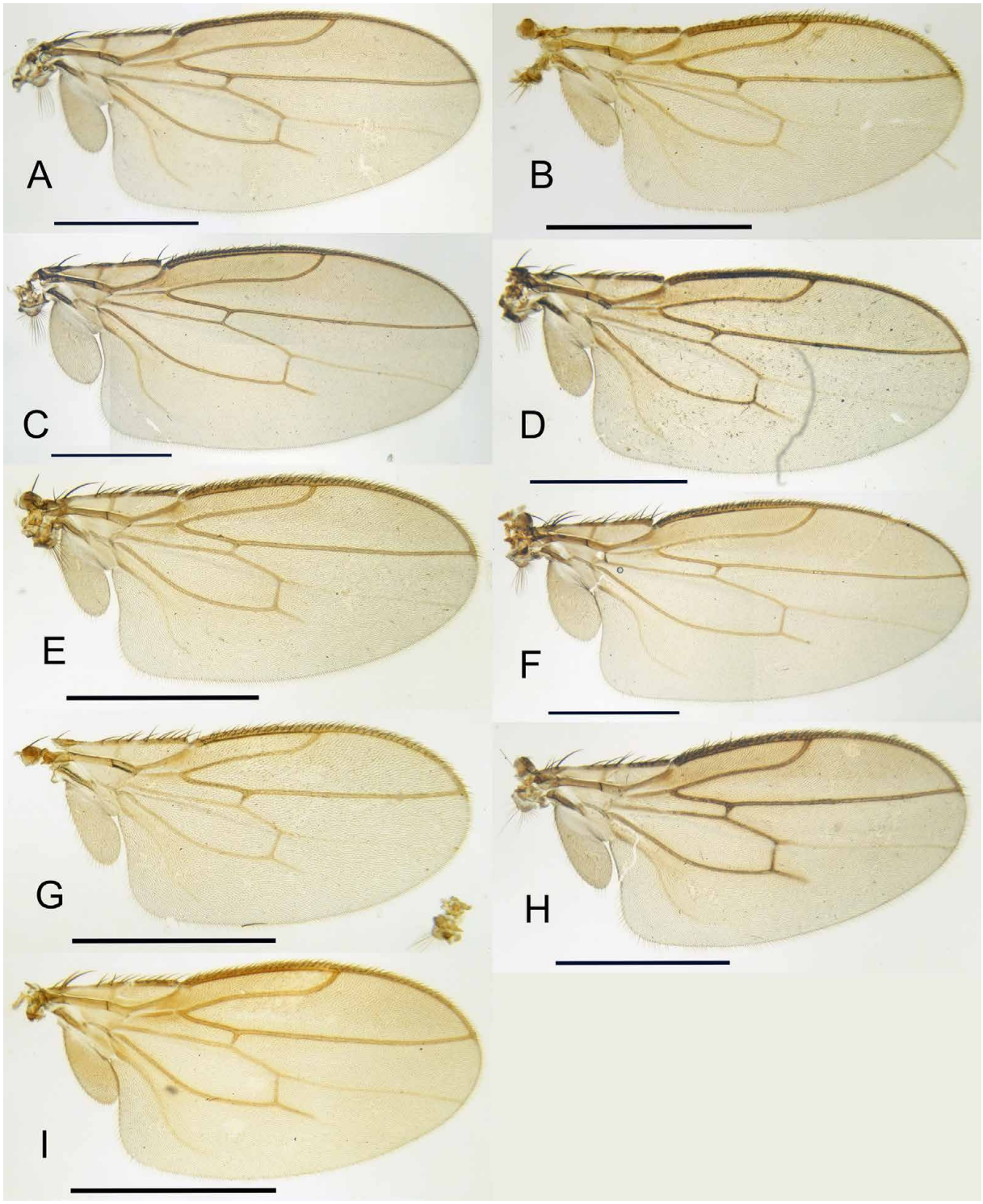


Fig. 9. *Sclerocoelus* Marshall, 1995, left wings, ventral view. **A**. *Sclerocoelus recurvatus* sp. nov. **B**. *Sclerocoelus regularis* (Malloch, 1914). **C**. *Sclerocoelus riparius* sp. nov. **D**. *Sclerocoelus synorios* sp. nov. **E**. *Sclerocoelus tantus* sp. nov. **F**. *Sclerocoelus tridens* sp. nov. **G**. *Sclerocoelus turpis* sp. nov. **H**. *Sclerocoelus vulgatus* sp. nov. **I**. *Sclerocoelus xynos* sp. nov. Scale bars: A–H = 0.5 mm.

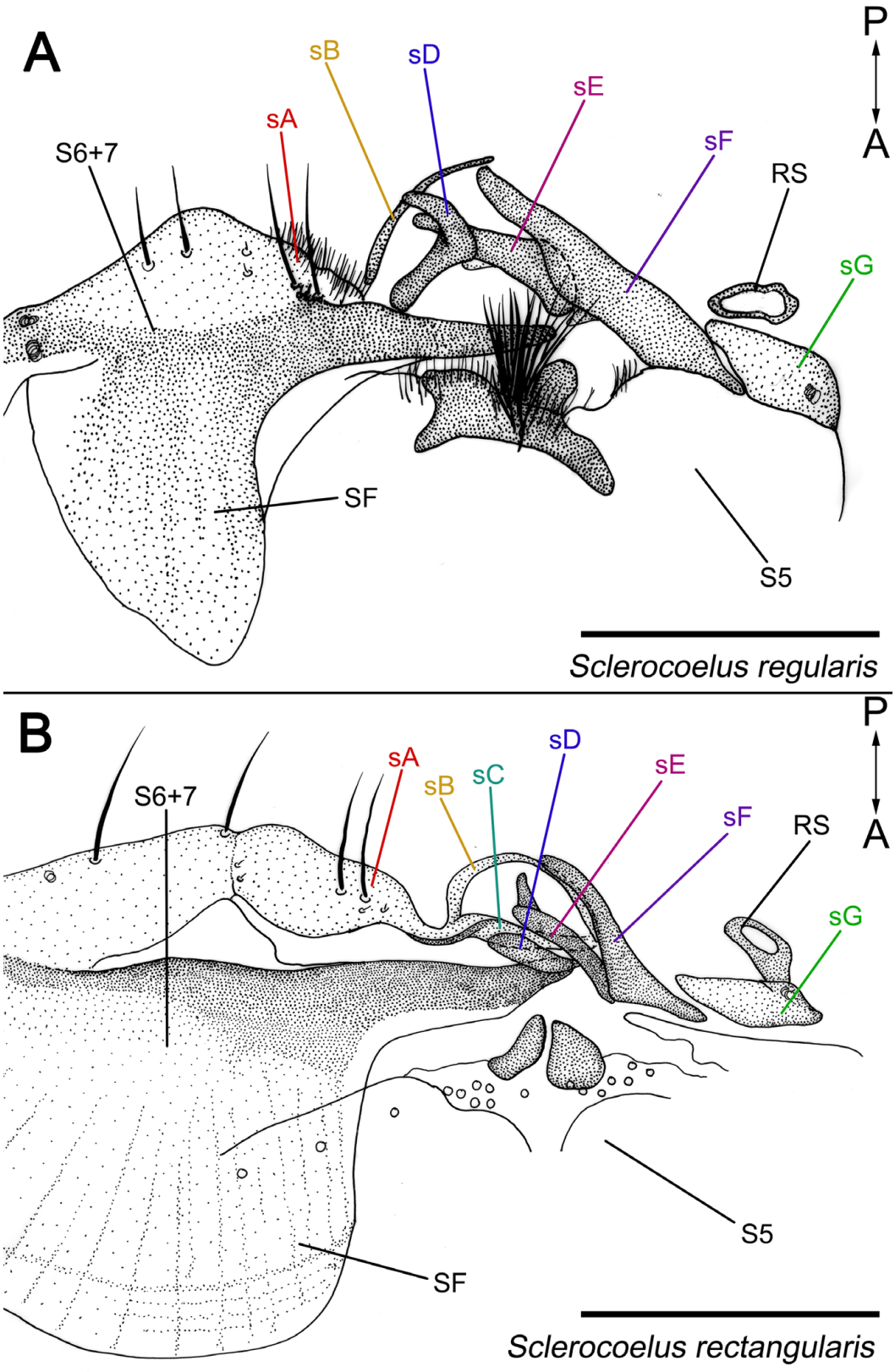


Fig. 10. *Sclerocoelus* Marshall, 1995, genital pouch sclerite diagram. **A**. *Sclerocoelus regularis* (Malloch, 1914) genital pouch. **B**. *Sclerocoelus rectangularis* (Malloch, 1914) genital pouch. Compasses in upper right corners indicate anterior (A) and posterior (P) orientation. Scale bars: A–B = 0.25 mm.

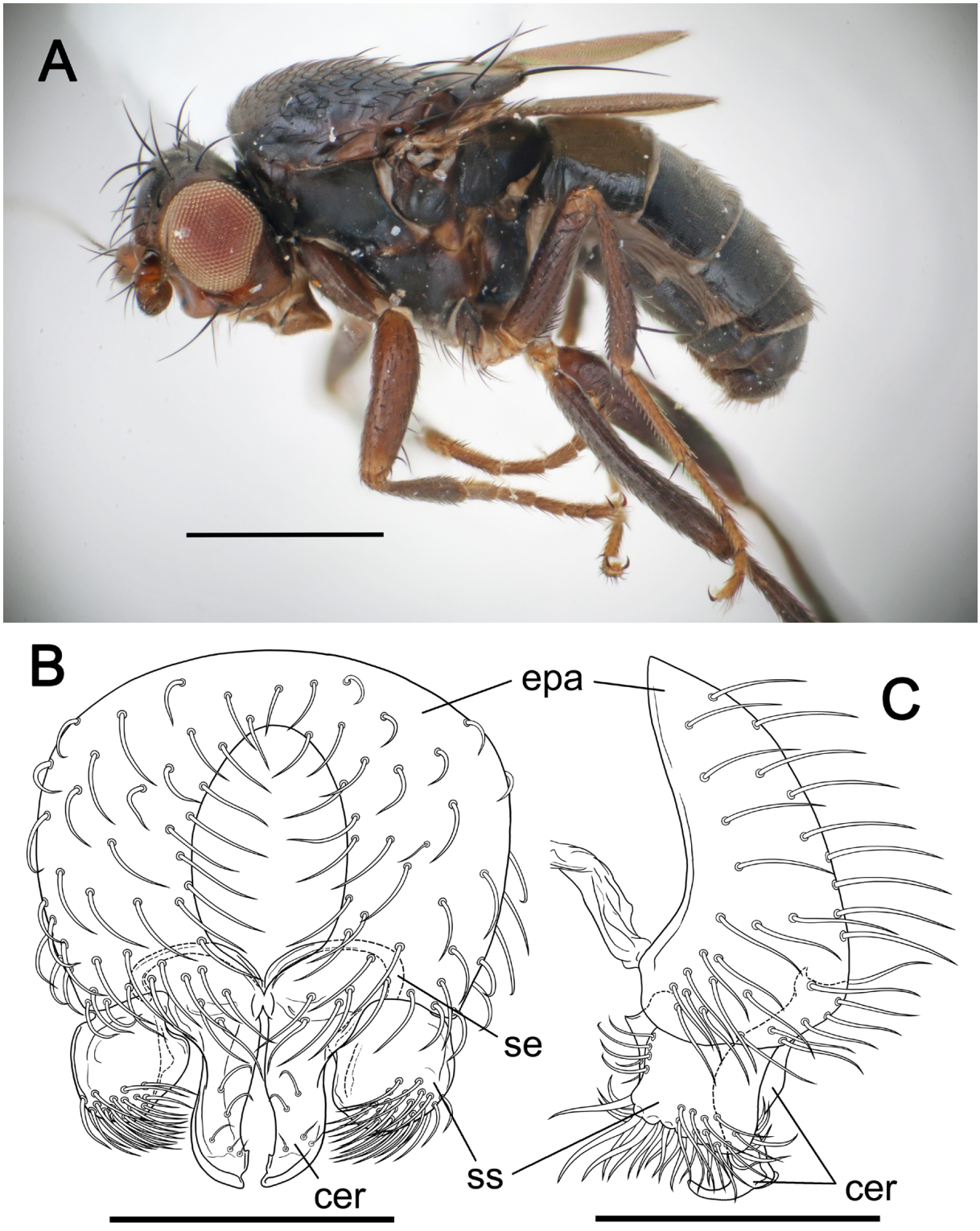


Fig. 11. *Sclerocoelus aduncus* sp. nov. **A**. Male holotype habitus, lateral view (debu00115508). **B**. Male paratype terminalia, posterior view (debu00115545). **C**. Male paratype terminalia, lateral view (debu00115545). Abbreviations: cer = cercus; epa = epandrium; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

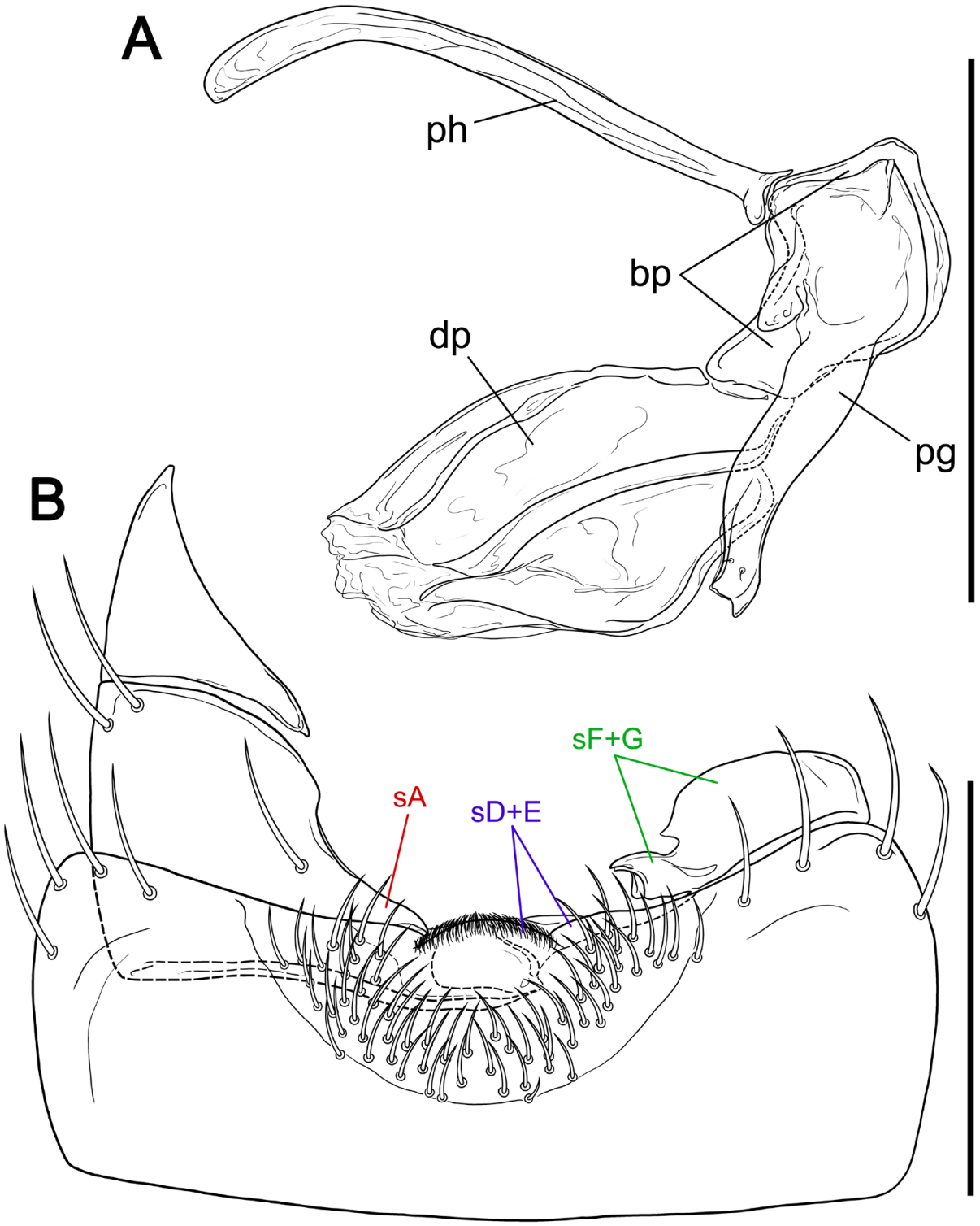


Fig. 12. *Sclerocoelus aduncus* sp. nov., paratype (debu00115545) **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A–B = 0.25 mm.

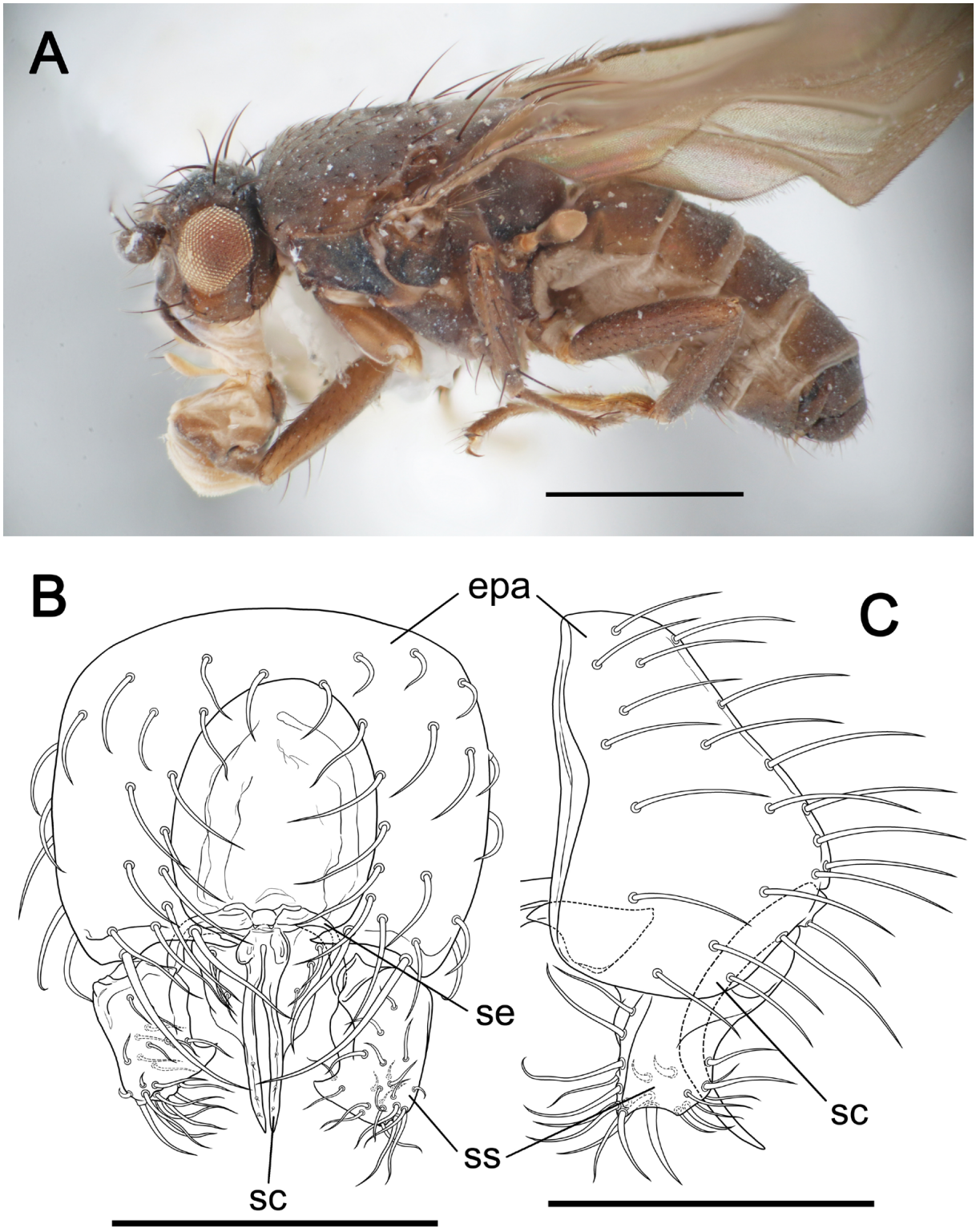


Fig. 13. *Sclerocoelus alpinus* sp. nov. **A**. Male paratype habitus, lateral view (debu00112027). **B**. Male paratype terminalia, posterior view (debu00111282). **C**. Male paratype terminalia, lateral view (debu00111282). Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

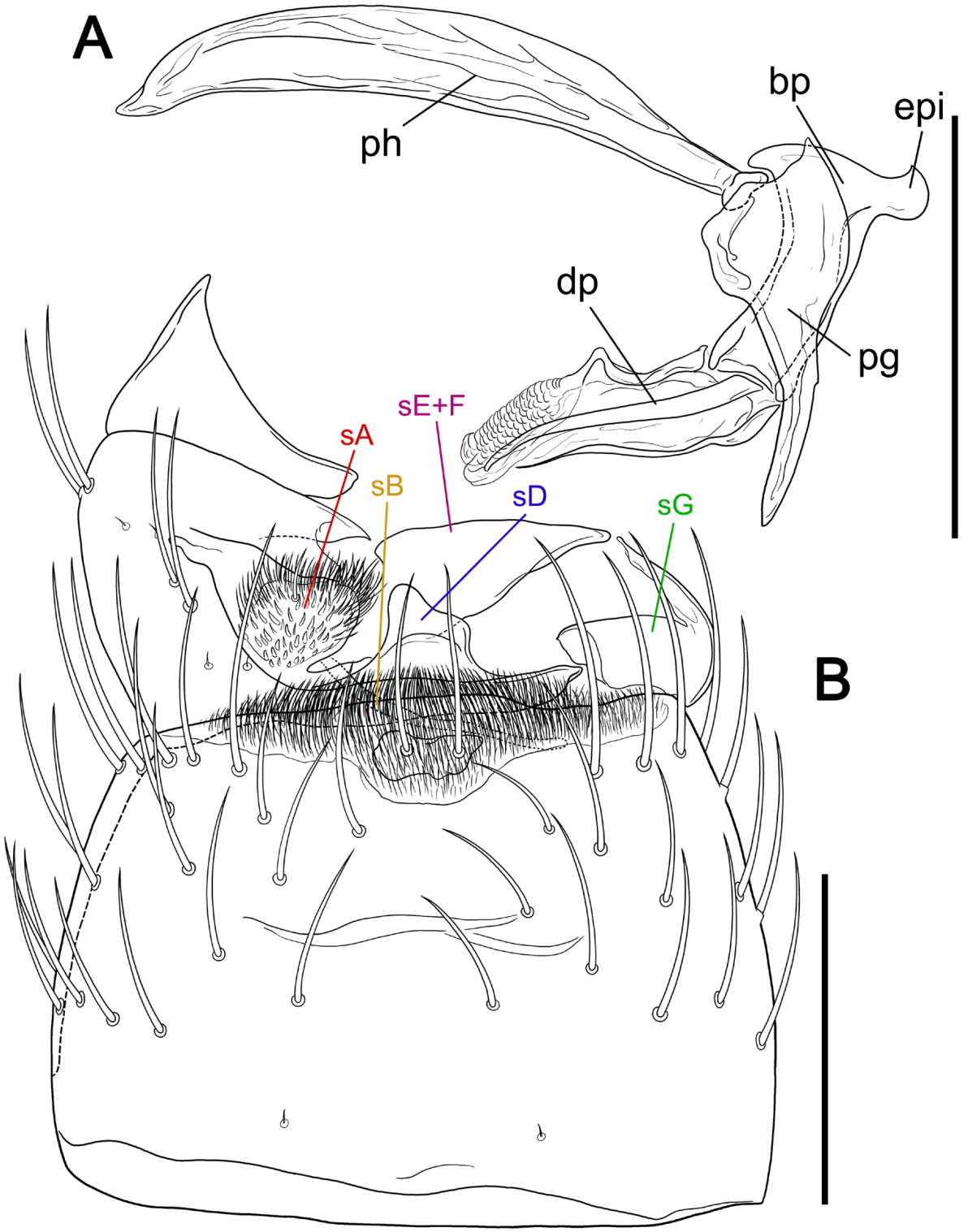


Fig. 14. *Sclerocoelus alpinus* sp. nov., paratype (debu00111282). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus, dp = distiphallus, epi = epiphallus, pg = postgonite, ph = phallapodeme. Scale bars: A–B = 0.25 mm.

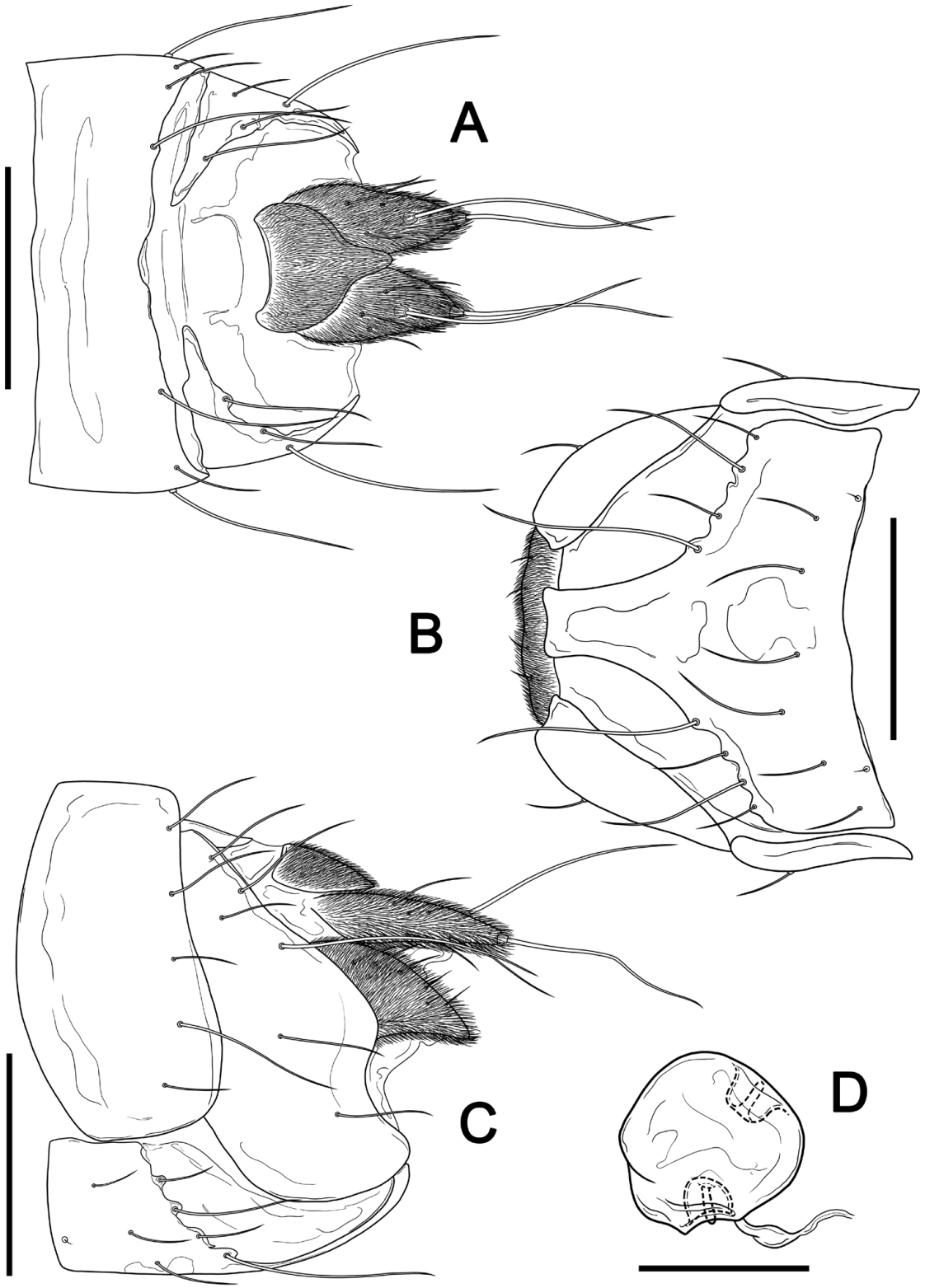


Fig. 15. *Sclerocoelus alpinus* sp. nov., paratype (debu00108073). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.04 mm.

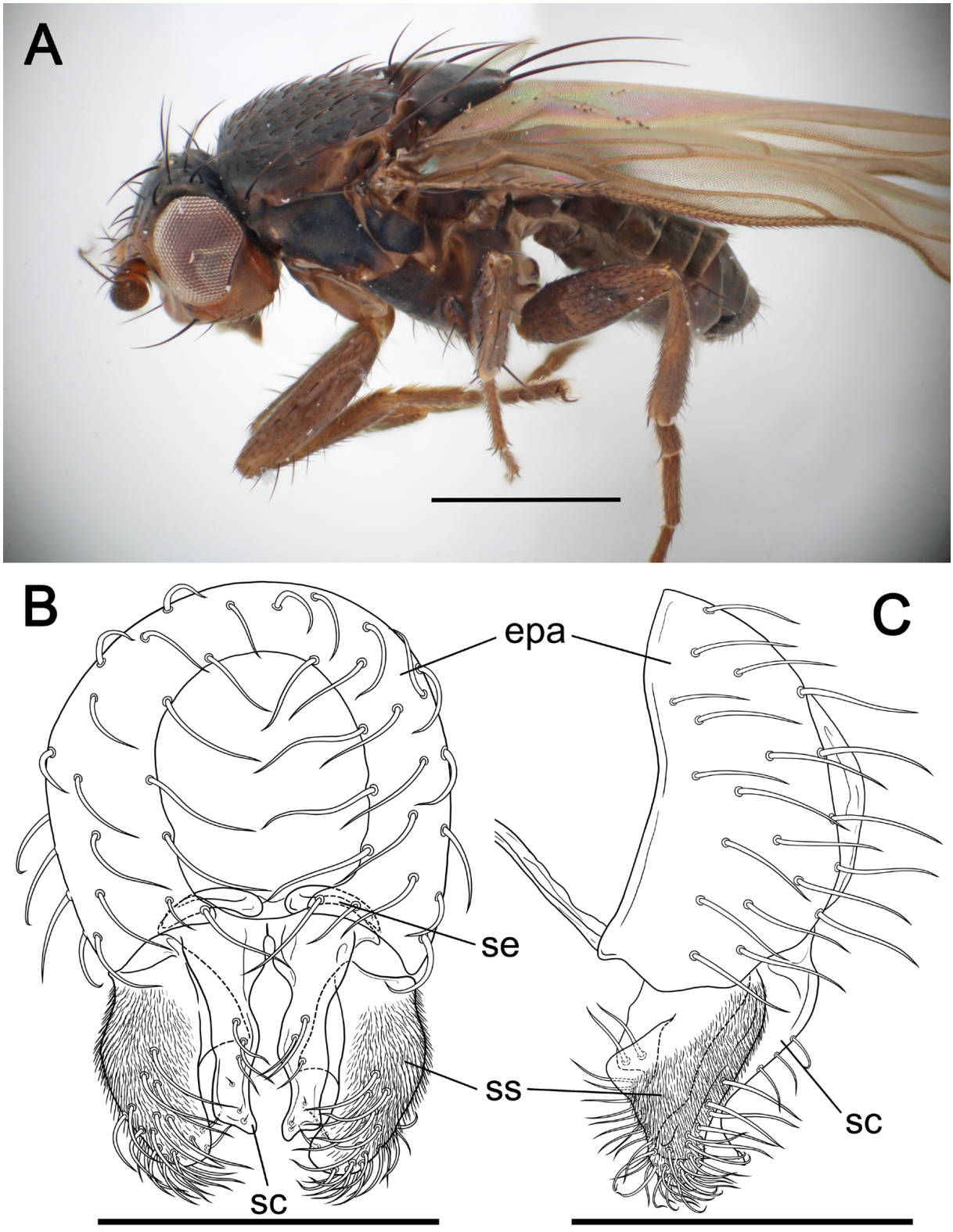


Fig. 16. *Sclerocoelus altus* sp. nov. **A**. Male paratype habitus, lateral view (debu00115967). **B**. Male paratype terminalia, posterior view (debu00108896). **C**. Male paratype terminalia, lateral view (debu00108896). Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

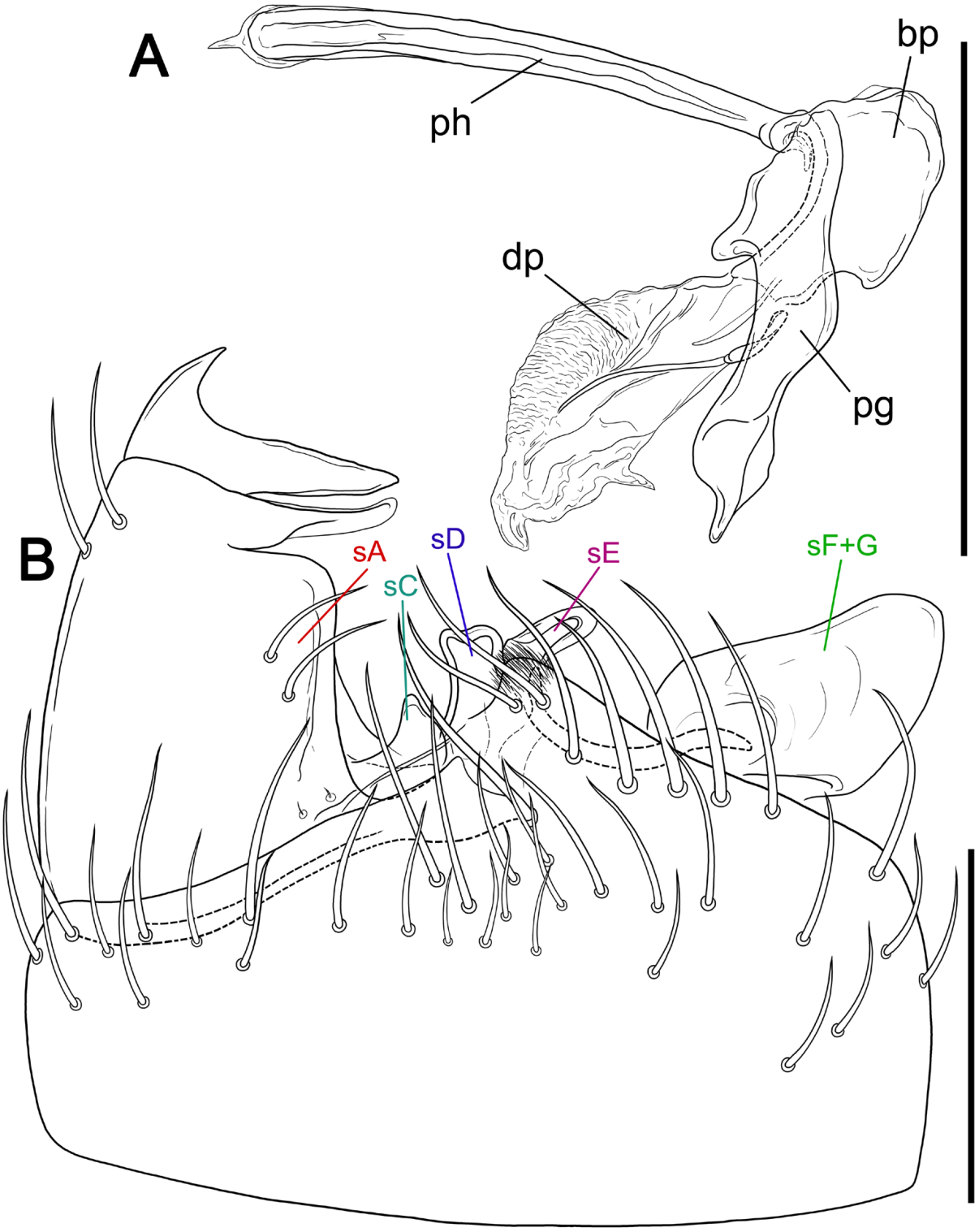


Fig. 17. *Sclerocoelus altus* sp. nov., paratype (debu00108896). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A–B = 0.25 mm.

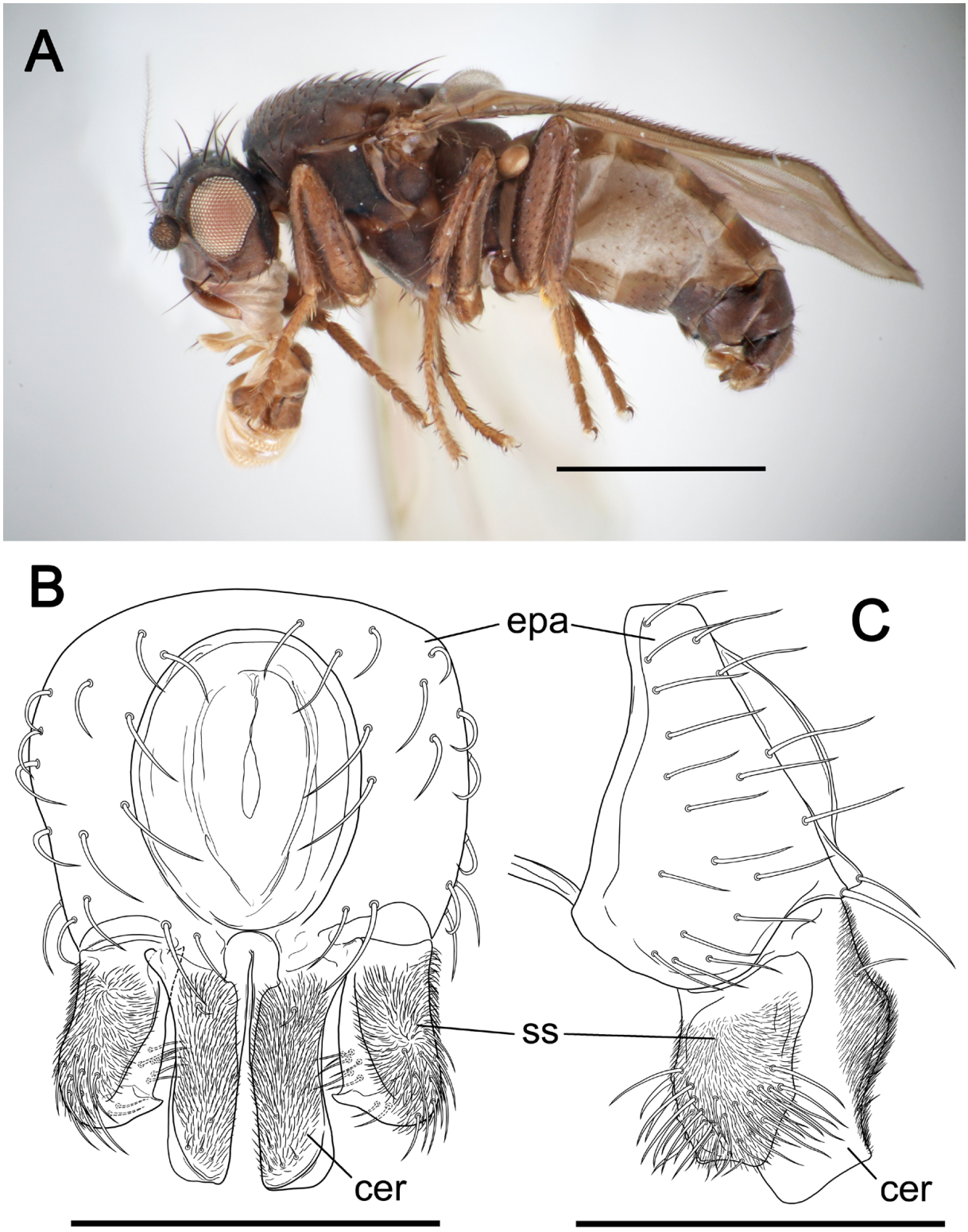


Fig. 18. *Sclerocoelus argentinensis* sp. nov., male holotype (DEBU). **A**. Male habitus, lateral view. **B**. Male terminalia, posterior view. **C**. Male terminalia, lateral view. Abbreviations: cer = cercus; epa = epandrium; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

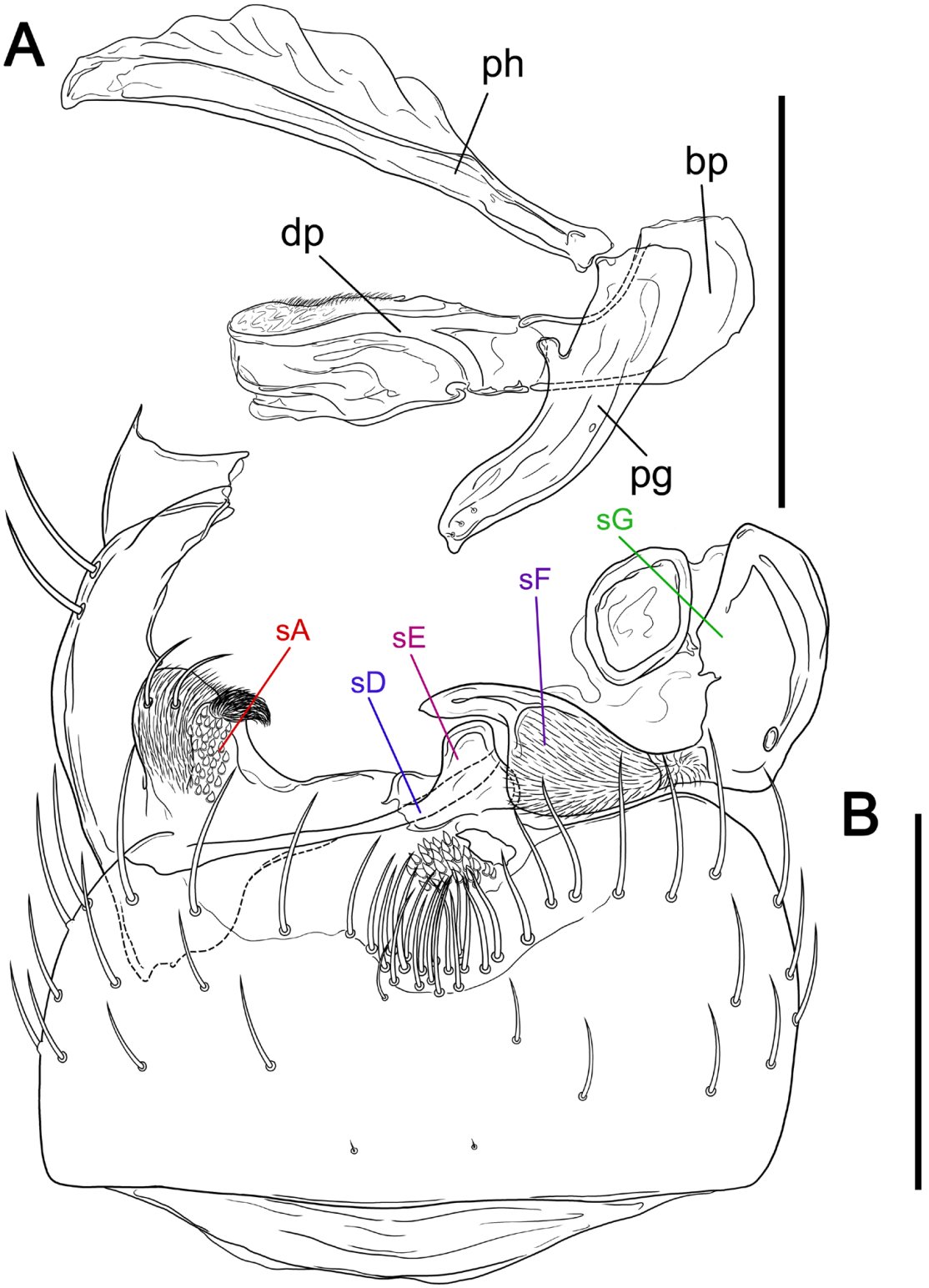


Fig. 19. *Sclerocoelus argentinensis* sp. nov., male holotype (DEBU). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.20 mm; B = 0.25 mm.

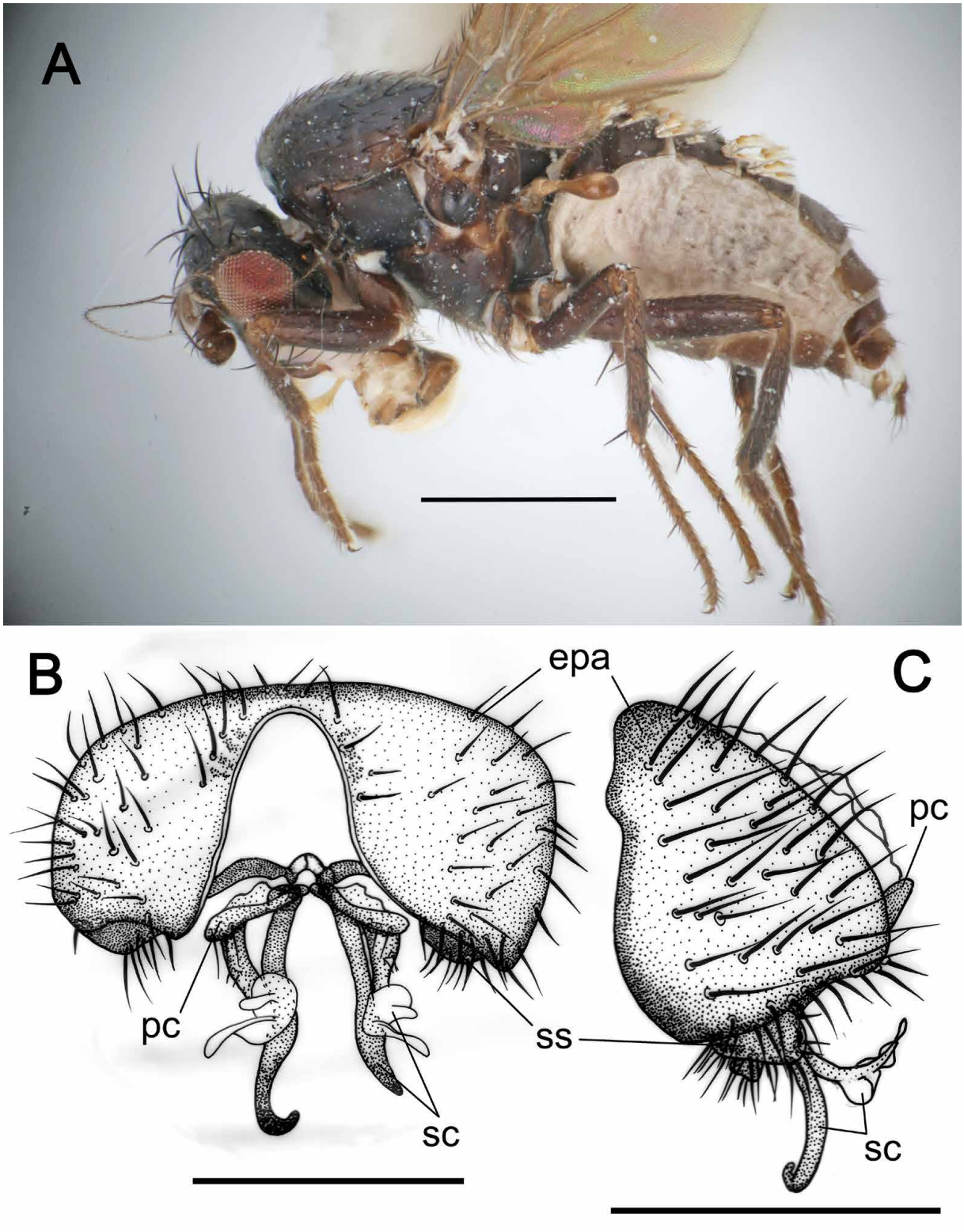


Fig. 20. *Sclerocoelus azulensis* sp. nov. **A**. Female paratype habitus, lateral view (debu00194878). **B**. Male holotype terminalia, posterior view (QCAZ). **C**. Male holotype terminalia, lateral view (QCAZ). Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

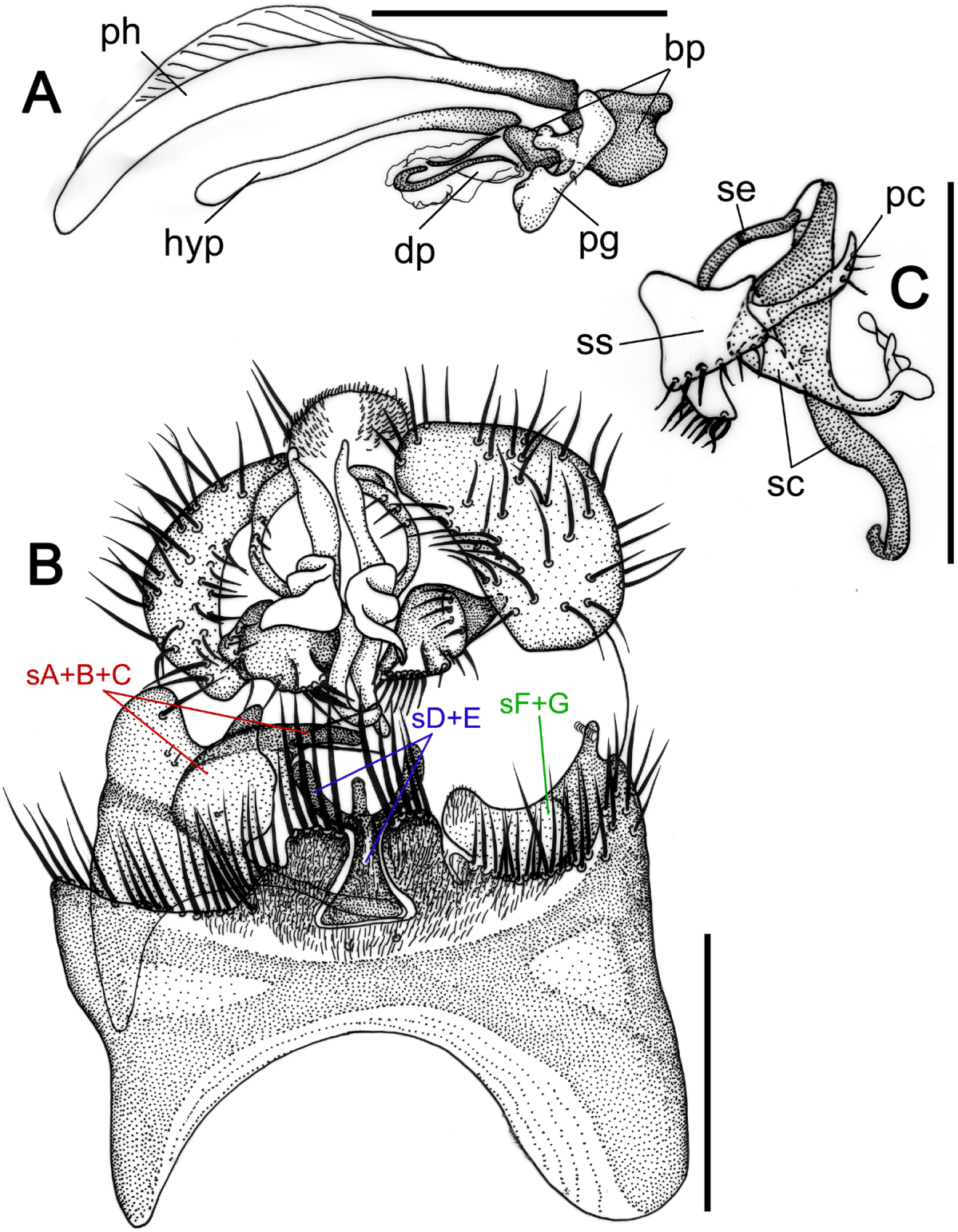


Fig. 21. *Sclerocoelus azulensis* sp. nov., male holotype (QCAZ). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Subcercal complex, lateral. Abbreviations: bp=basiphallus; dp=distiphallus; hyp=hypandrium; pc=pseudocercus; pg=postgonite; ph=phallapodeme; sc=subcercus; se=subepandrial sclerite; ss=surstylus. Scale bars: A=0.13 mm; B–C=0.25 mm.

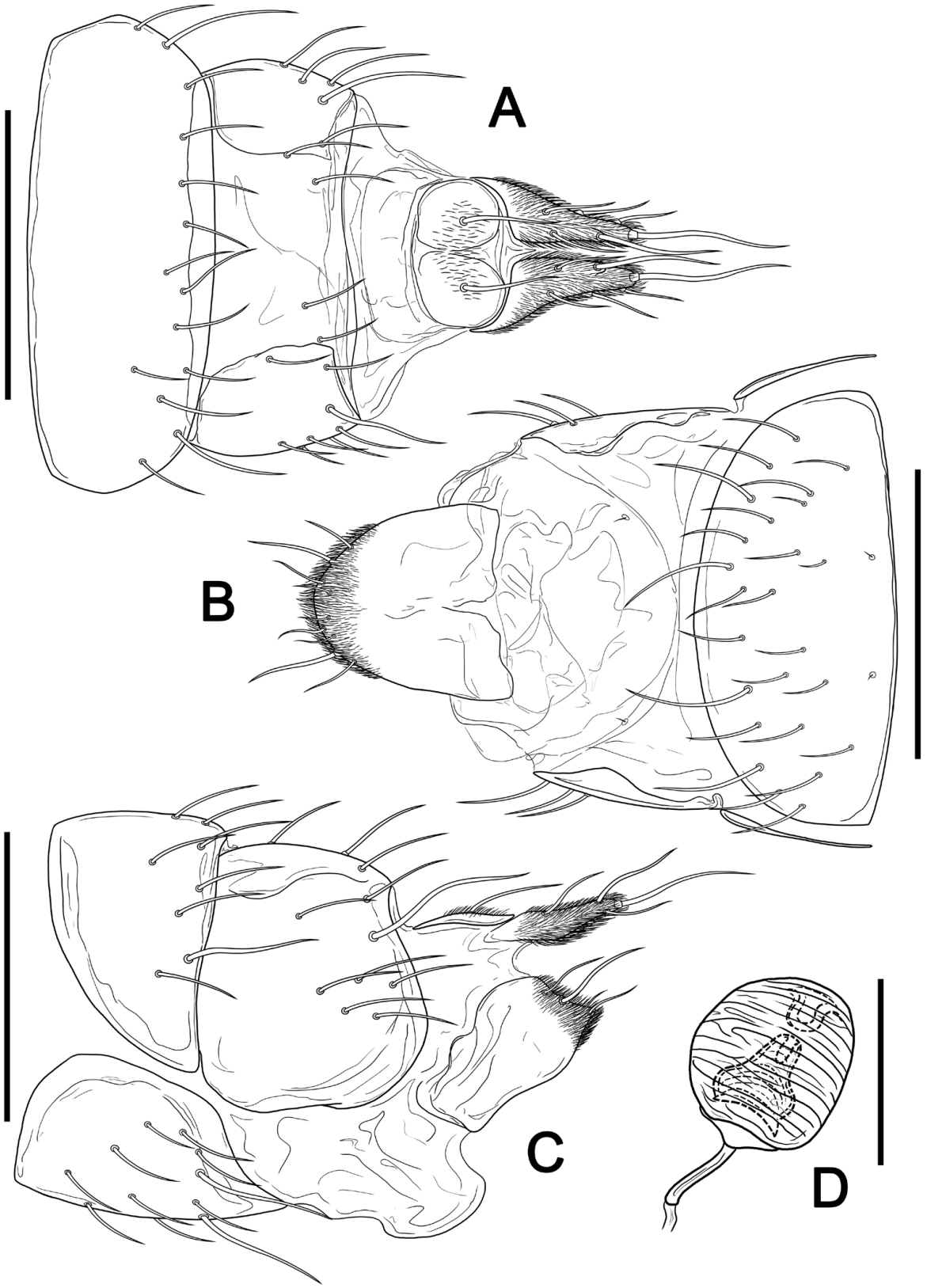


Fig. 22. *Sclerocoelus azulensis* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.05 mm.

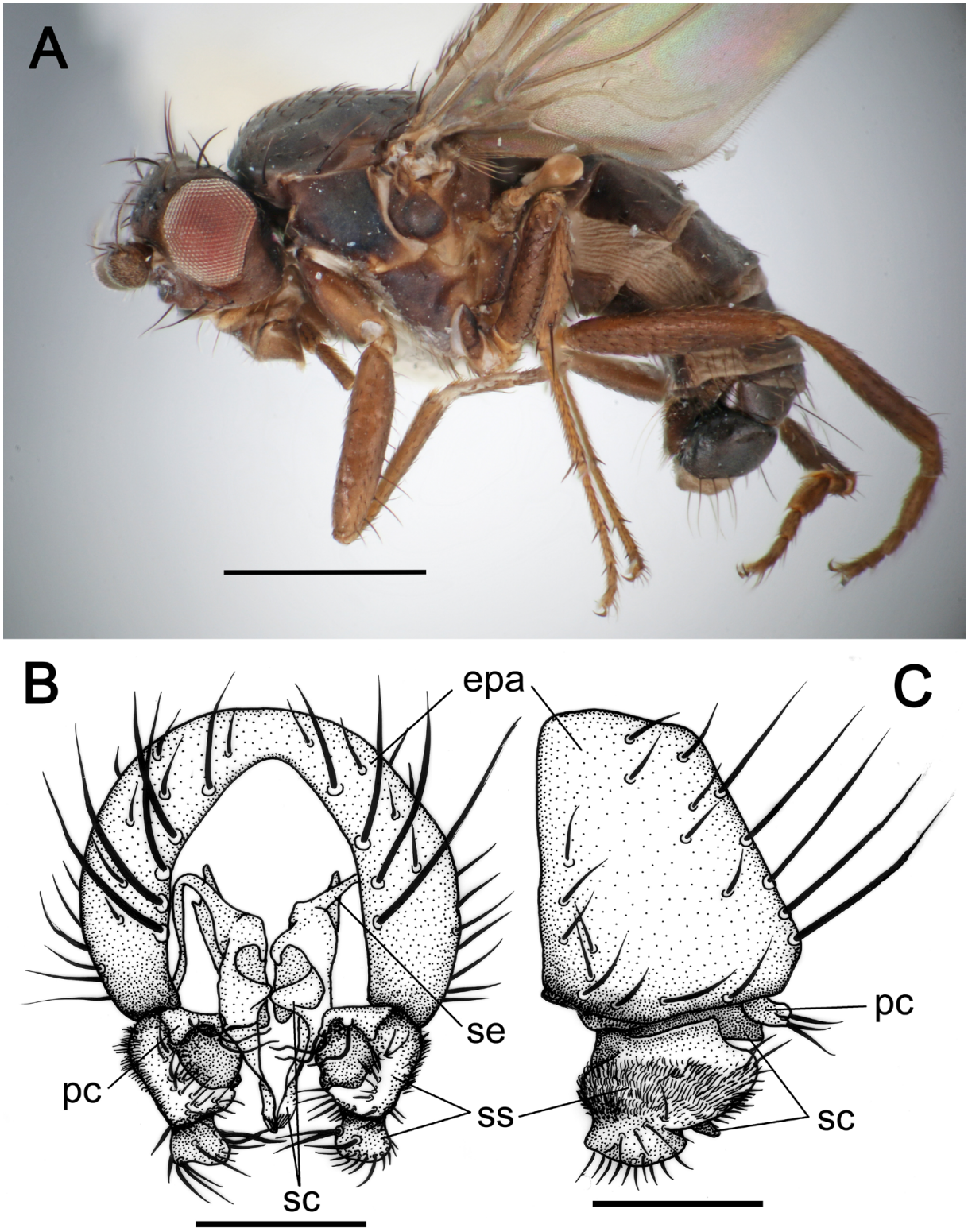


Fig. 23. *Sclerocoelus binus* sp. nov. **A**. Male paratype habitus, lateral view (debu00165685). **B**. Male paratype terminalia, posterior view. **C**. Male paratype terminalia, lateral view. Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

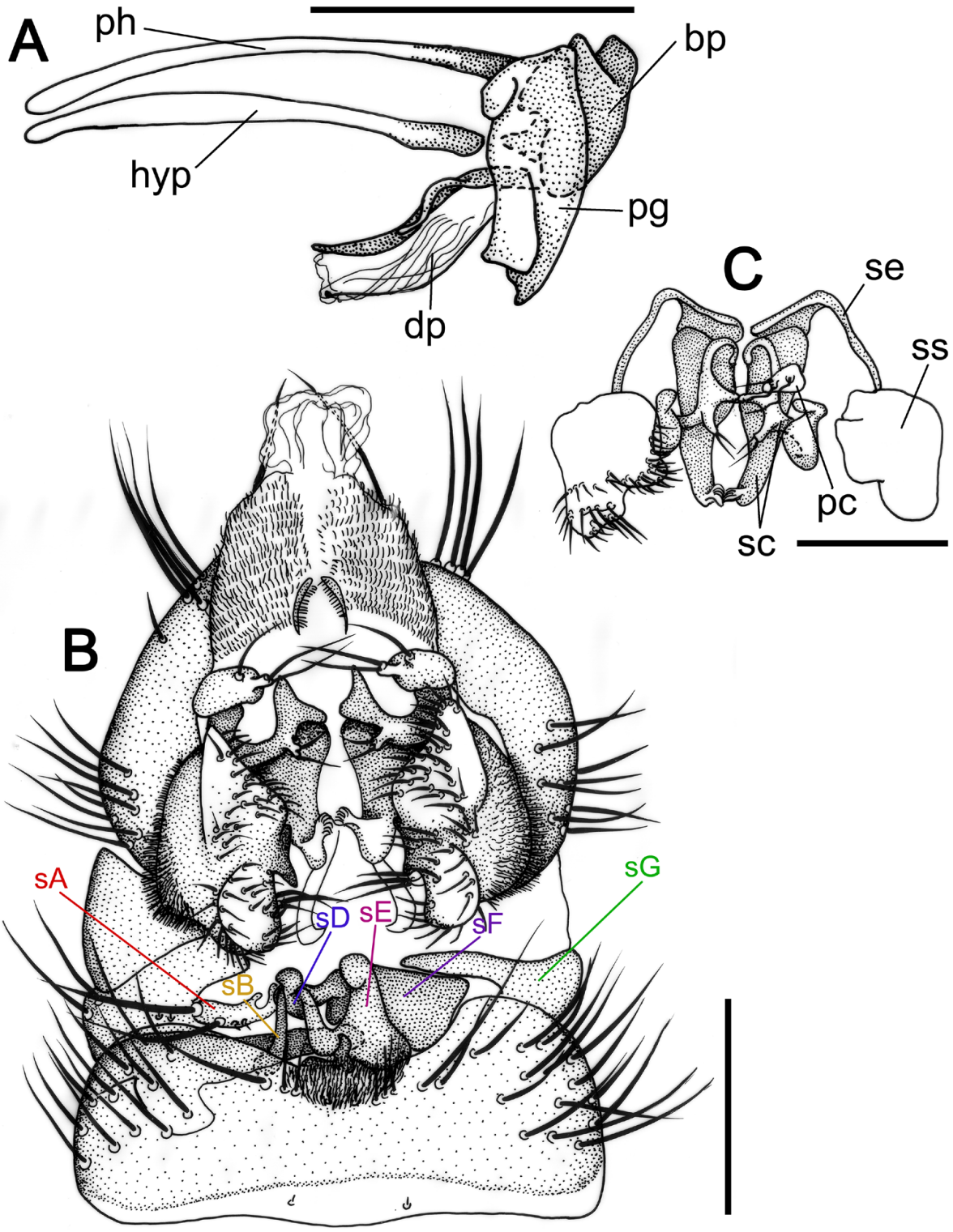


Fig. 24. *Sclerocoelus binus* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Subcercal complex, posterior view. Abbreviations: bp = basiphallus; dp = distiphallus; hyp = hypandrium; pc = pseudocercus; pg = postgonite; ph = phallapodeme; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 0.13 mm; B–C = 0.25 mm.

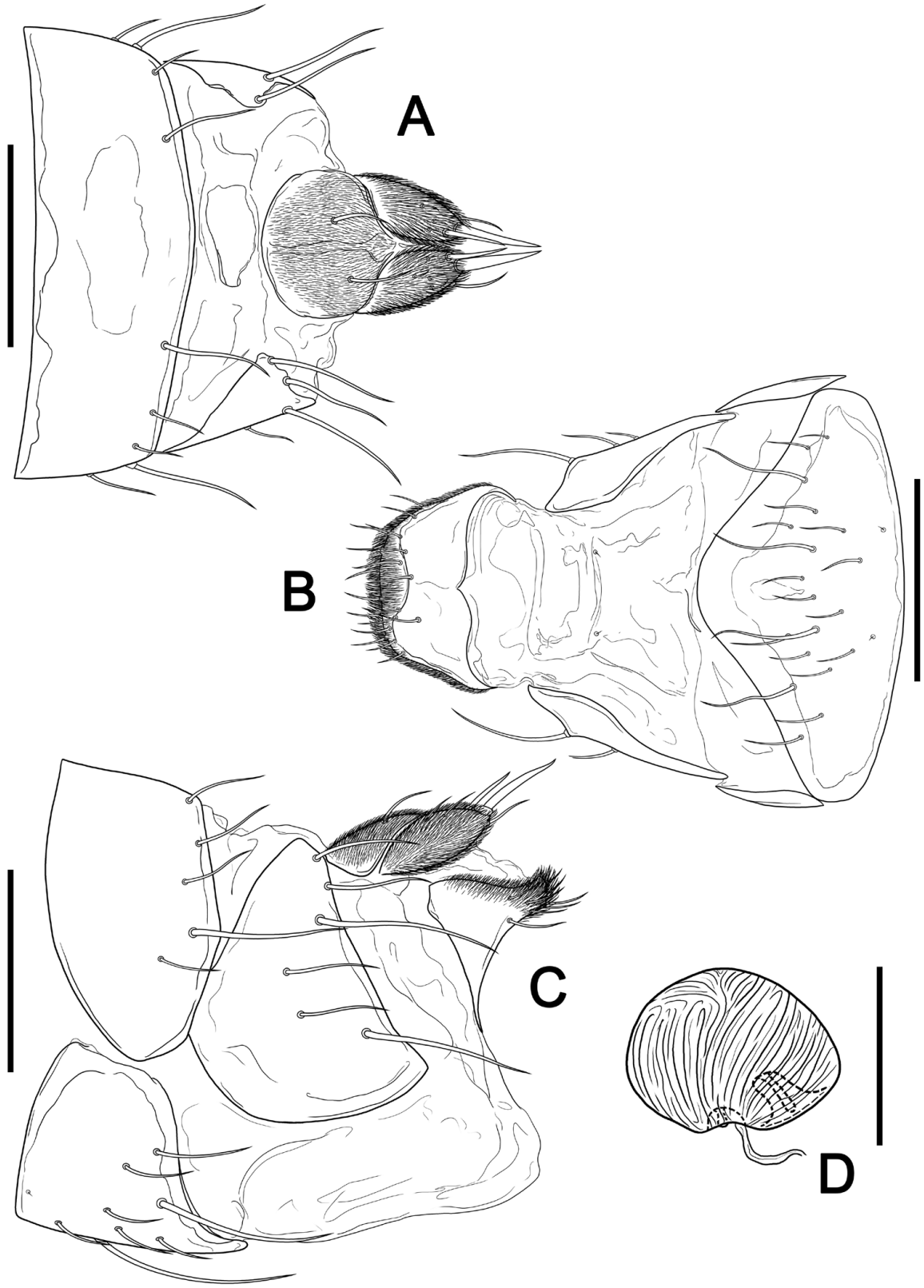


Fig. 25. *Sclerocoelus binus* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.05 mm.

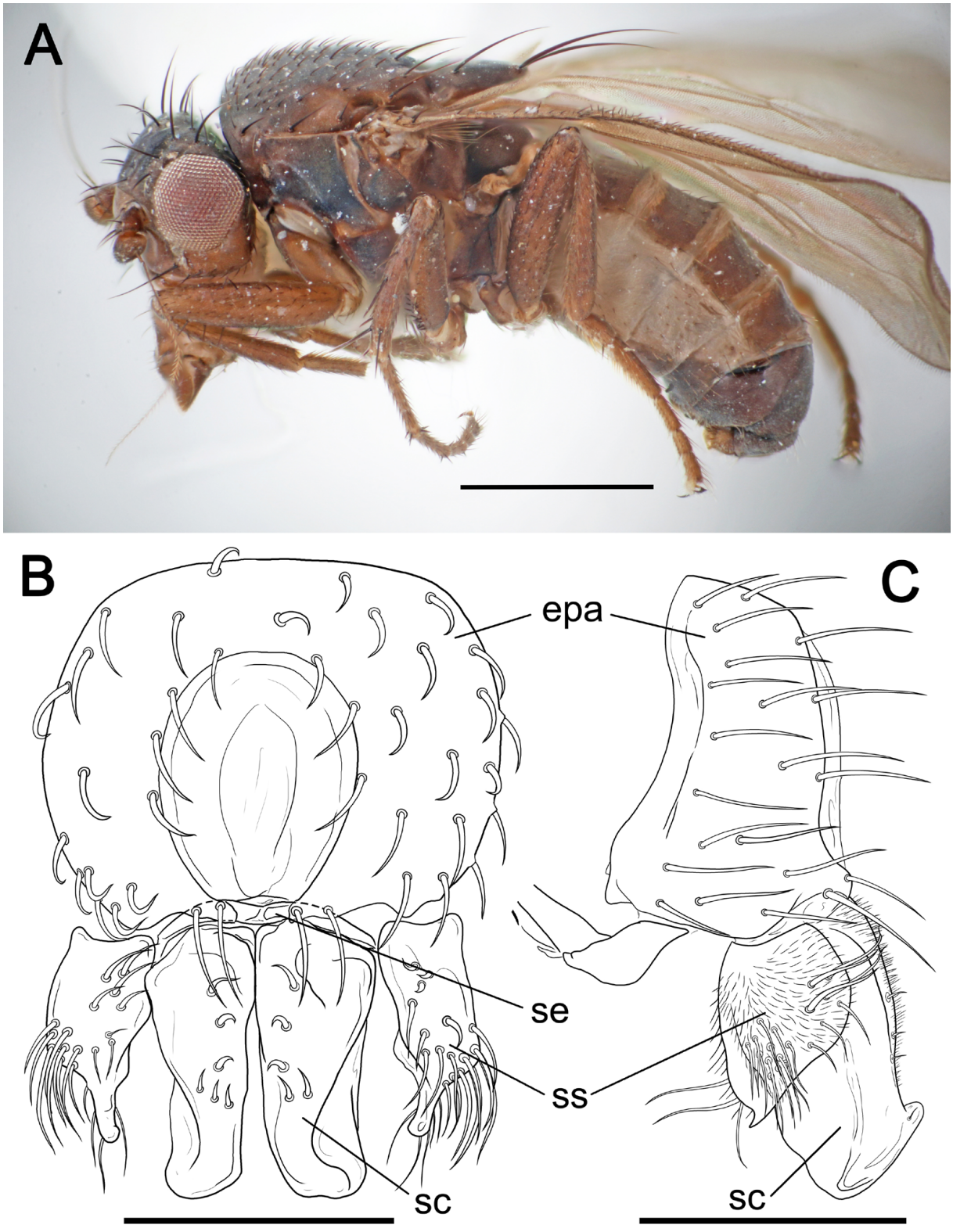


Fig. 26. *Sclerocoelus bucki* sp. nov. **A**. Male paratype habitus, lateral view (debu00103467). **B**. Male paratype terminalia, posterior view (debu00104316). **C**. Male paratype terminalia, lateral view (debu00104316). Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

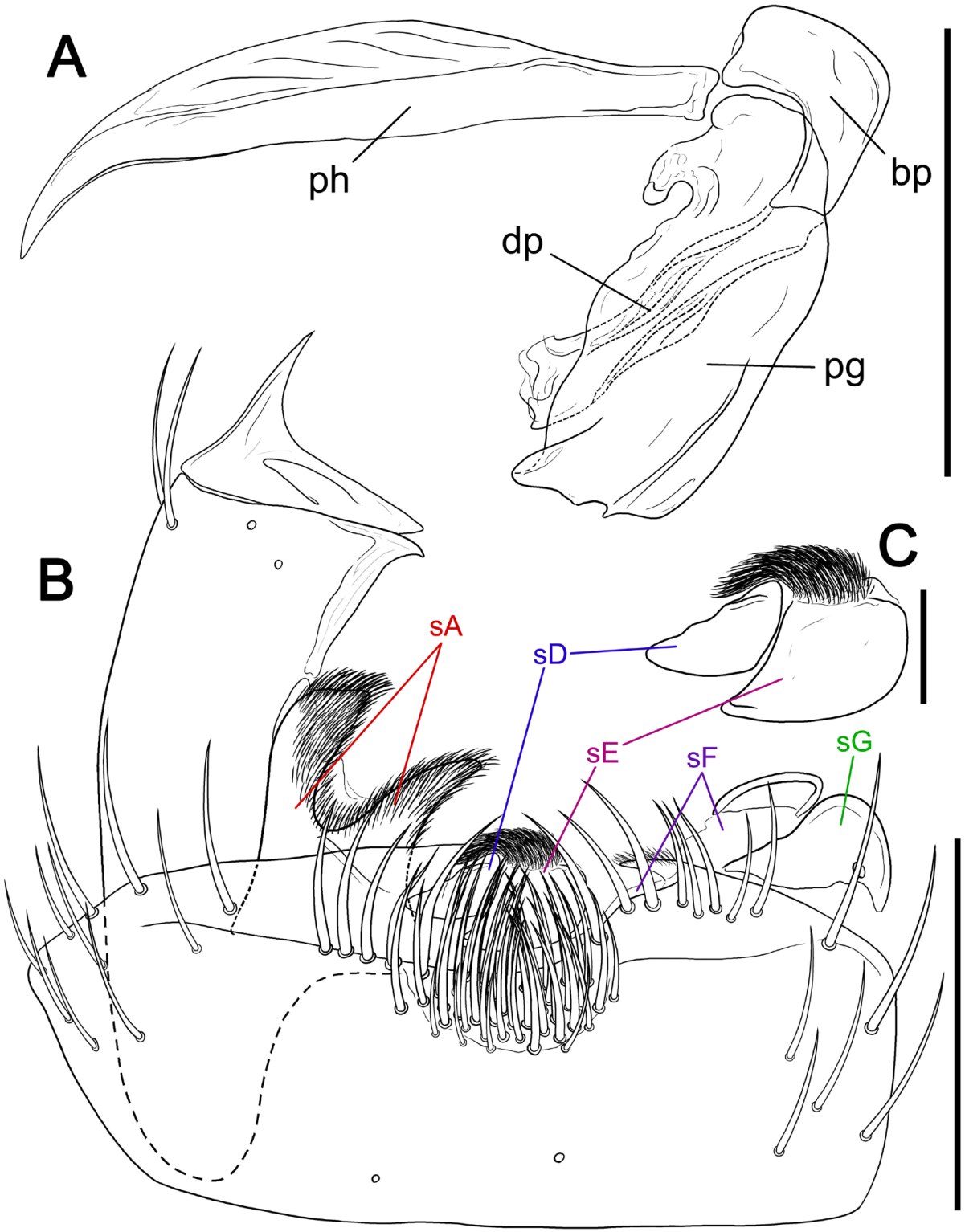


Fig. 27. *Sclerocoelus bucki* sp. nov., paratype (debu00104316). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Genital pouch sclerites D and E, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; hyp = hypandrium; pc = pseudocercus; pg = postgonite; ph = phallapodeme; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A–B = 0.25 mm; C = 0.01 mm.

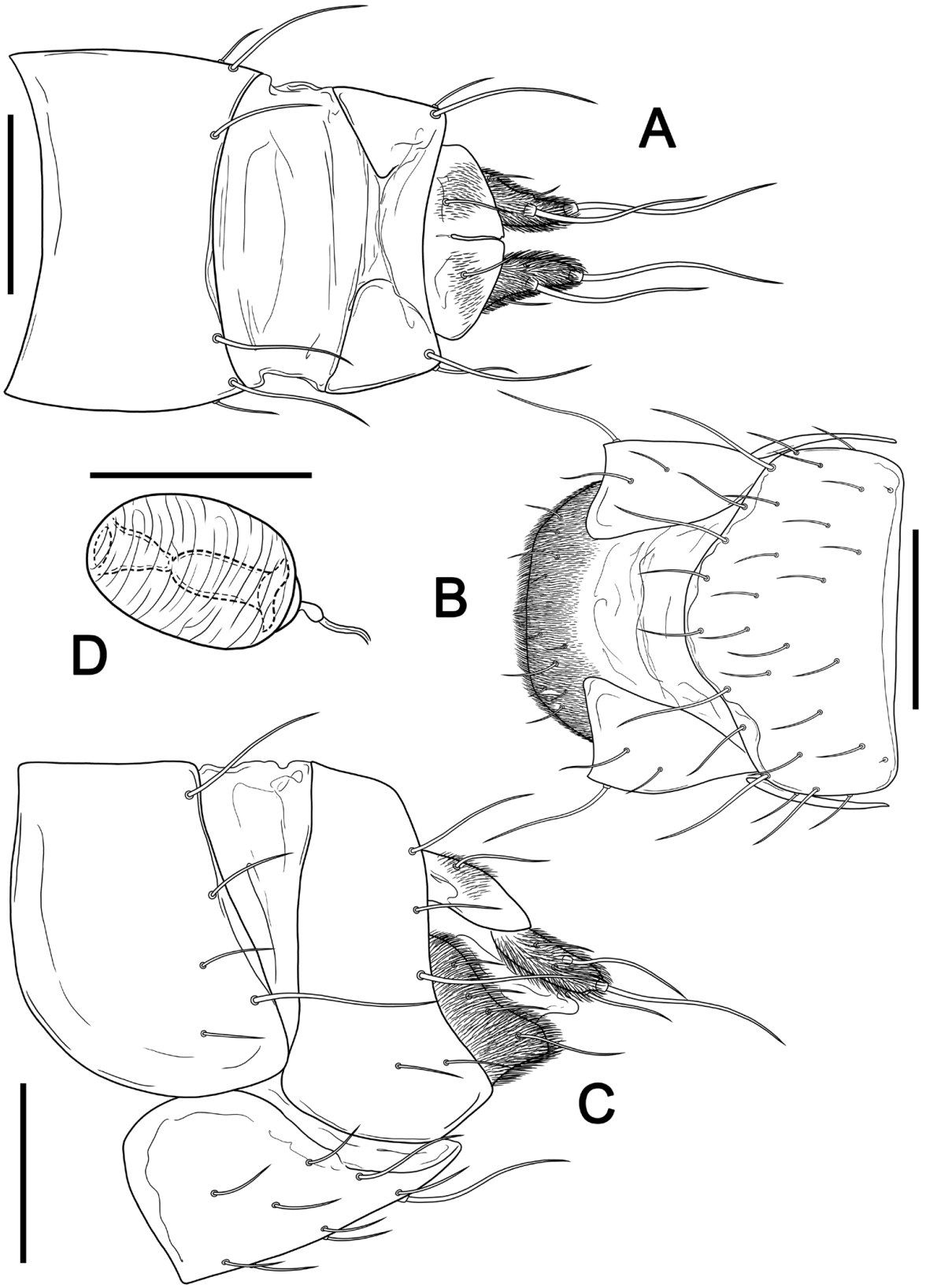


Fig. 28. *Sclerocoelus bucki* sp. nov., paratype (debu00339876). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.05 mm.

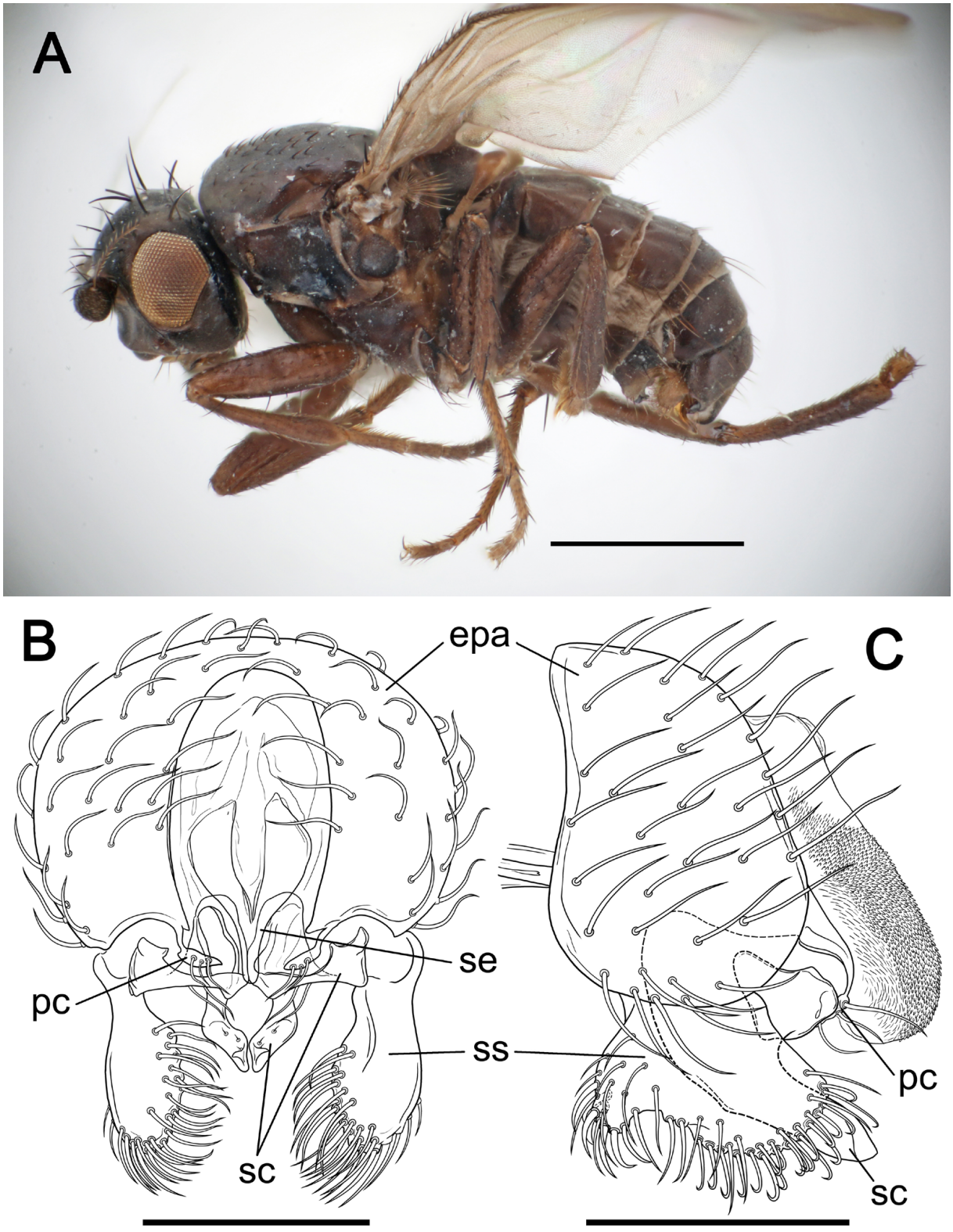


Fig. 29. *Sclerocoelus caligarius* sp. nov. **A**. Male holotype habitus, lateral view (debu00165694). **B**. Male paratype terminalia, posterior view (debu00165592). **C**. Male paratype terminalia, lateral view (debu00165592). Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

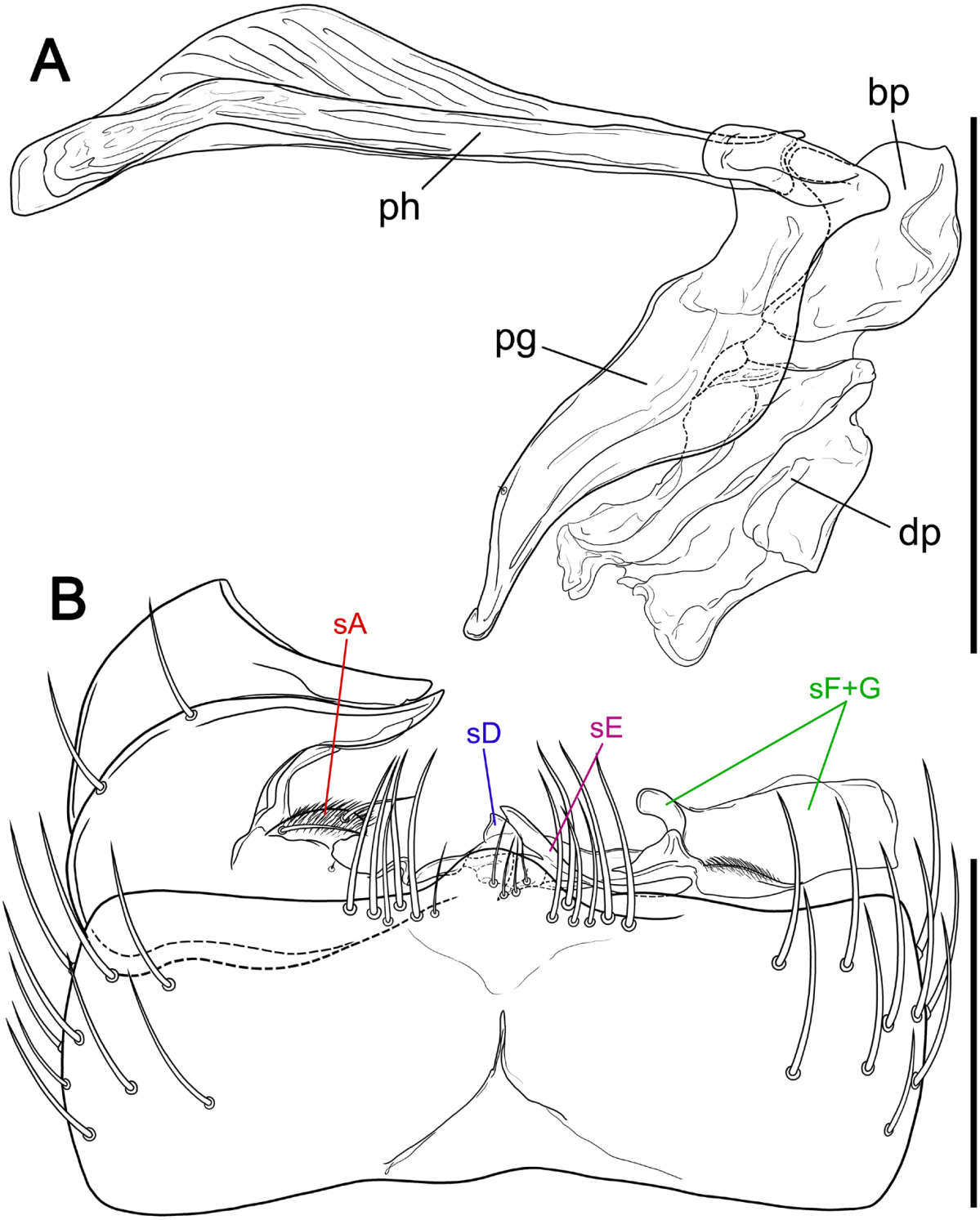


Fig. 30. *Sclerocoelus caligarius* sp. nov., paratype (debu00165592). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A–B = 0.25 mm.

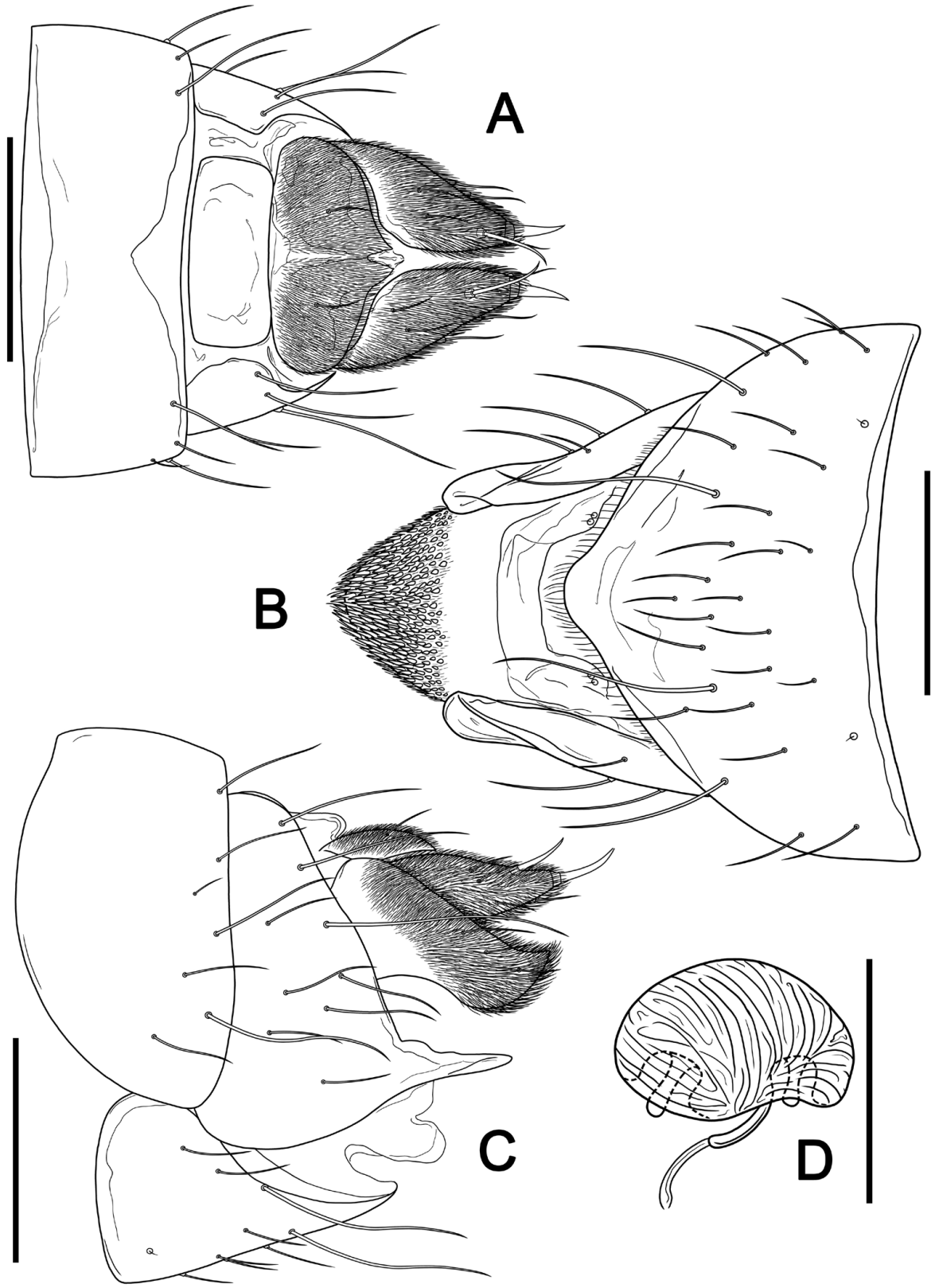


Fig. 31. *Sclerocoelus caligarius* sp. nov., paratype (debu00165701). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.05 mm.

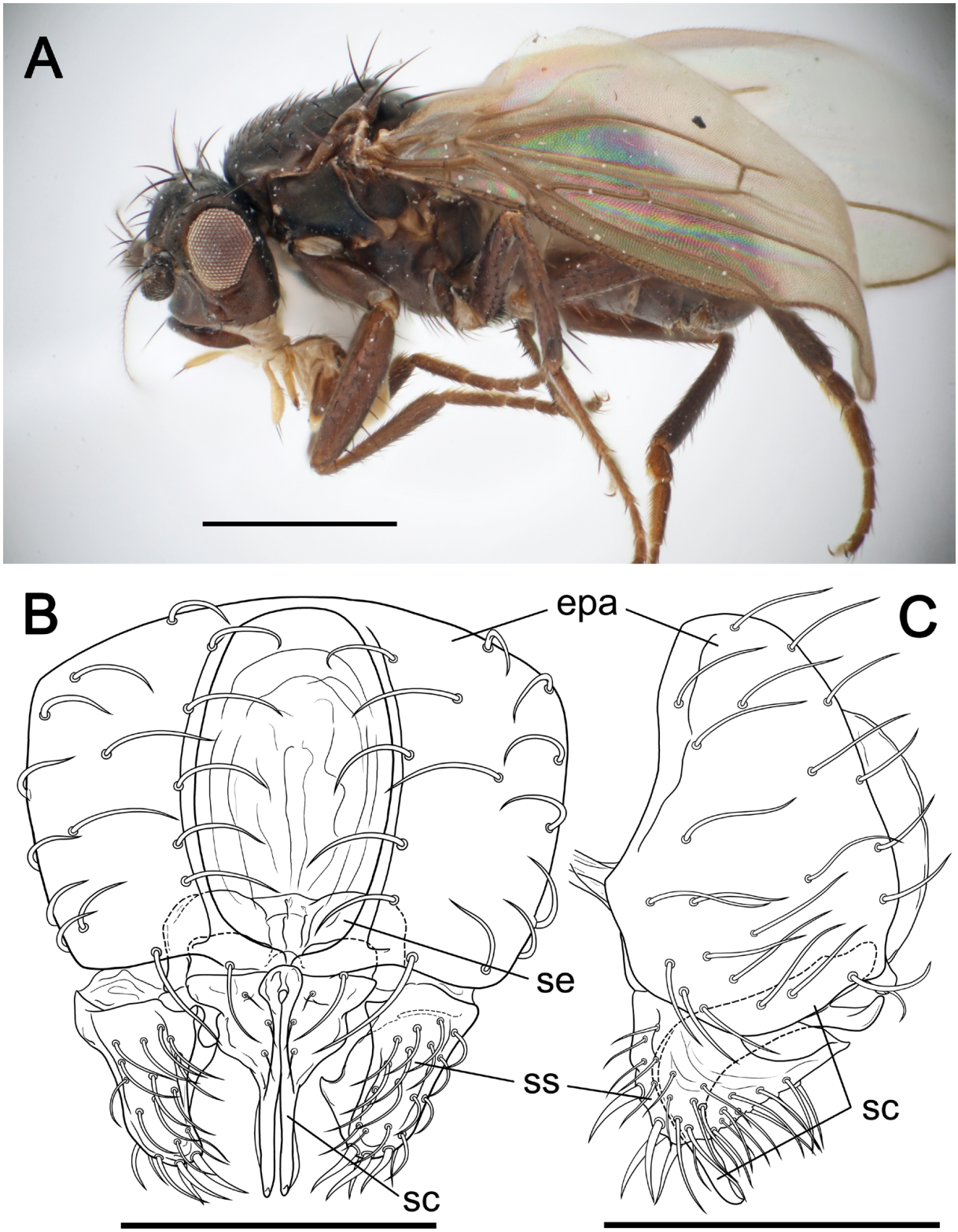


Fig. 32. *Sclerocoelus chilensis* sp. nov. **A**. Male holotype habitus, lateral view (debu00310625). **B**. Male paratype terminalia, posterior view (debu00310638). **C**. Male paratype terminalia, lateral view (debu00310638). Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

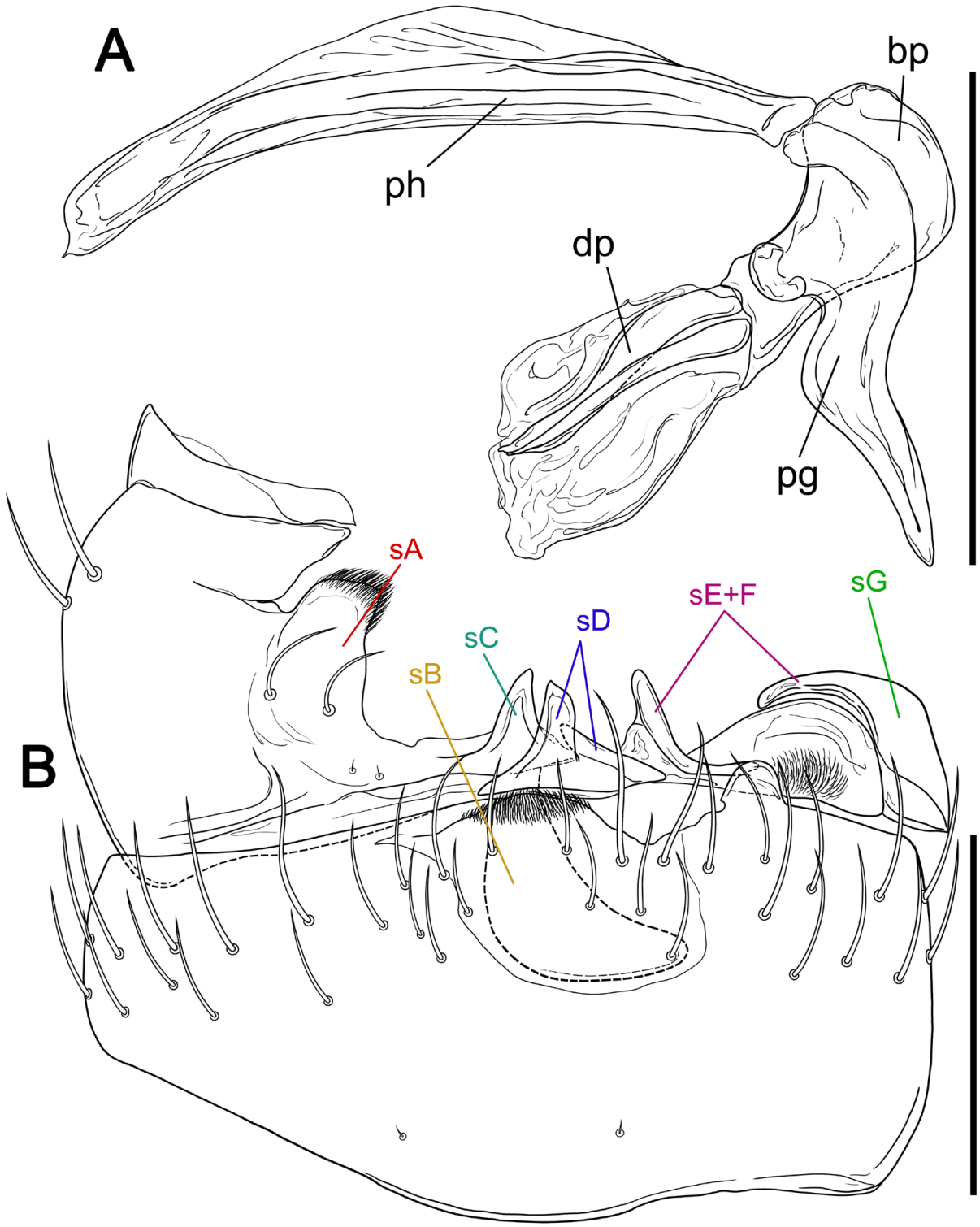


Fig. 33. *Sclerocoelus chilensis* sp. nov., paratype (debu00310638). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A–B = 0.25 mm.

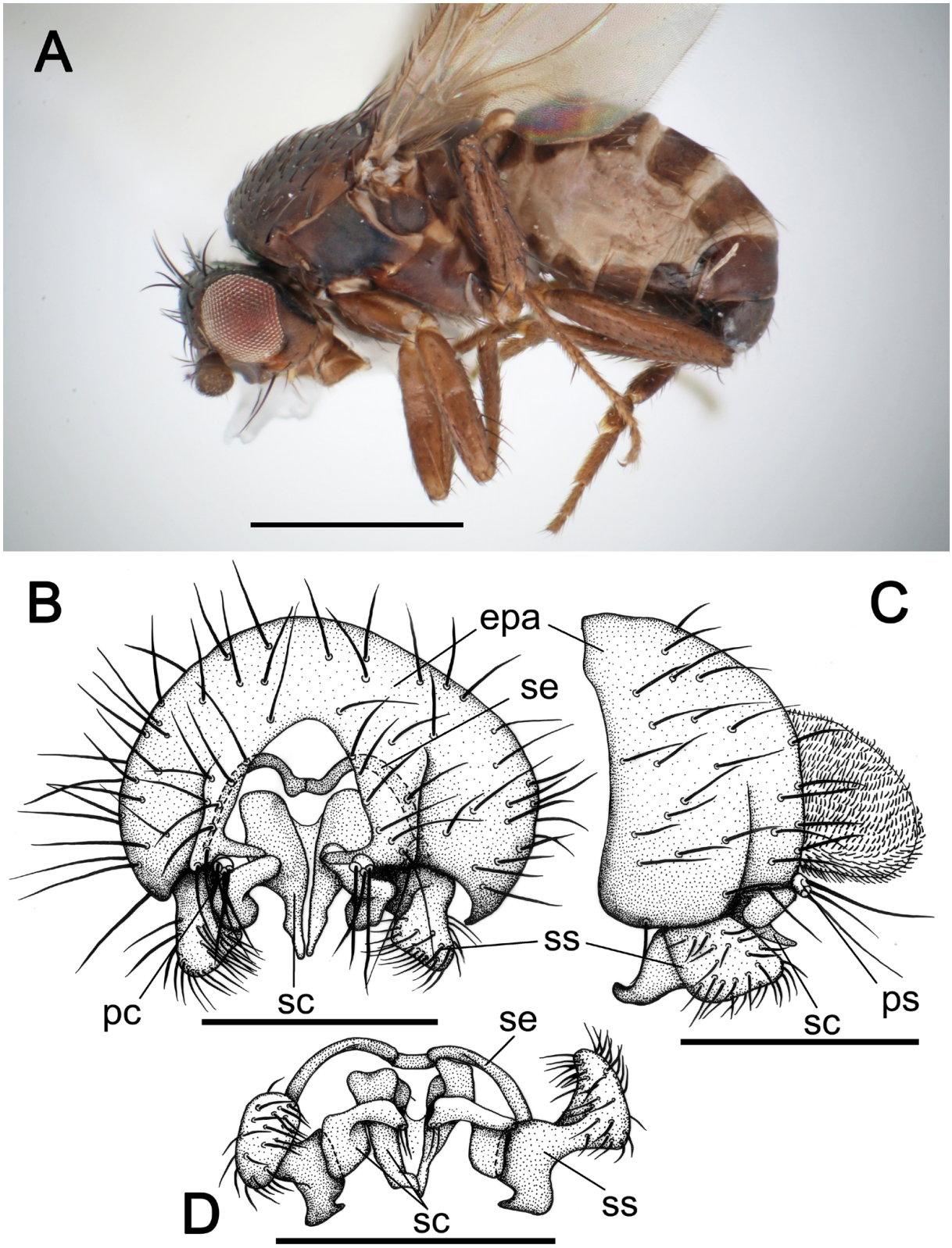


Fig. 34. *Sclerocoelus copiosus* sp. nov., paratype. **A**. Male habitus, lateral view. **B**. Male terminalia, posterior view. **C**. Male terminalia, lateral view. **D**. Subcercal complex, ventral view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–D = 0.25 mm.

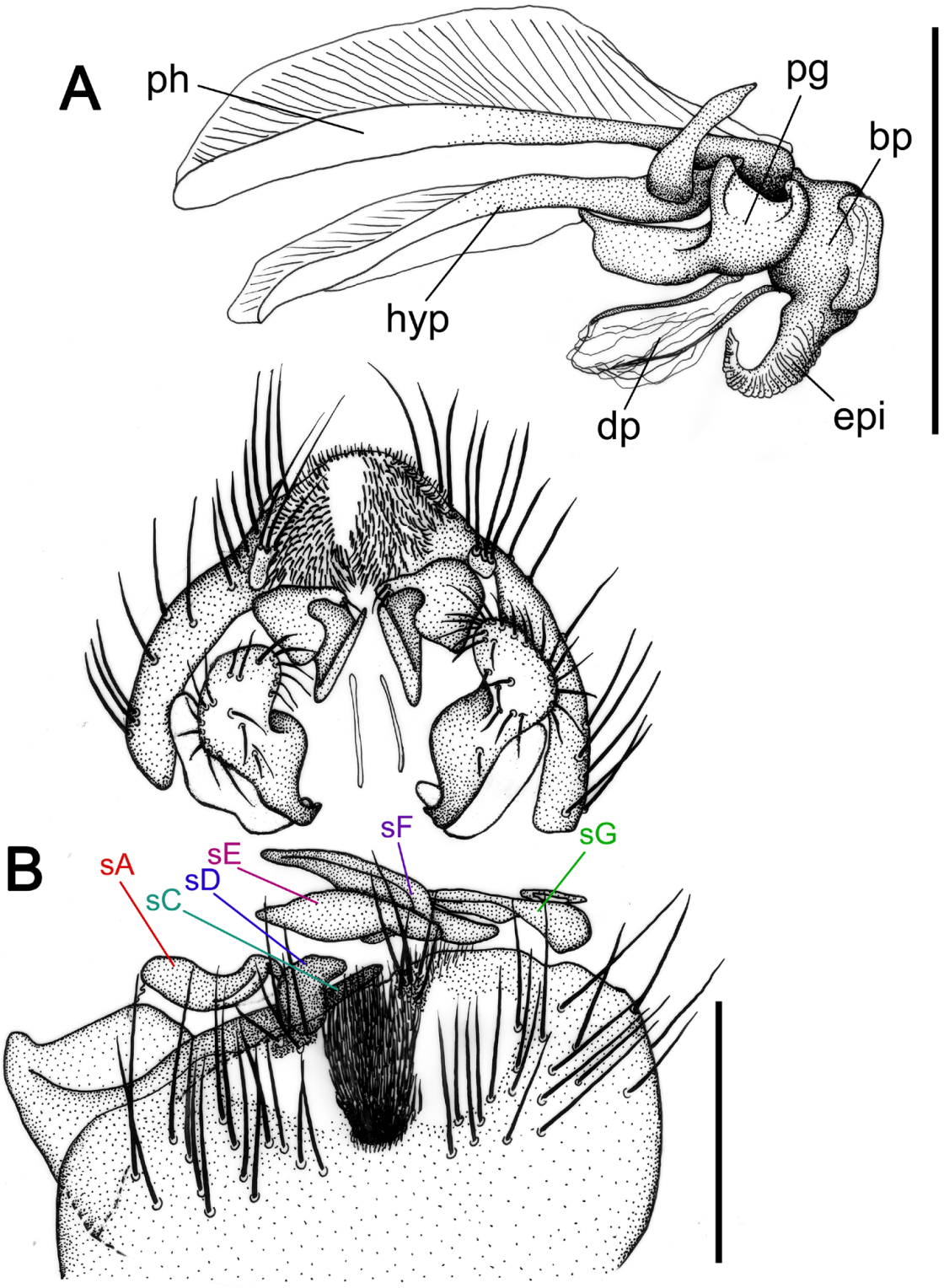


Fig. 35. *Sclerocoelus copiosus* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus, dp = distiphallus; epi = epiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme. Scale bars: A–B = 0.25 mm.

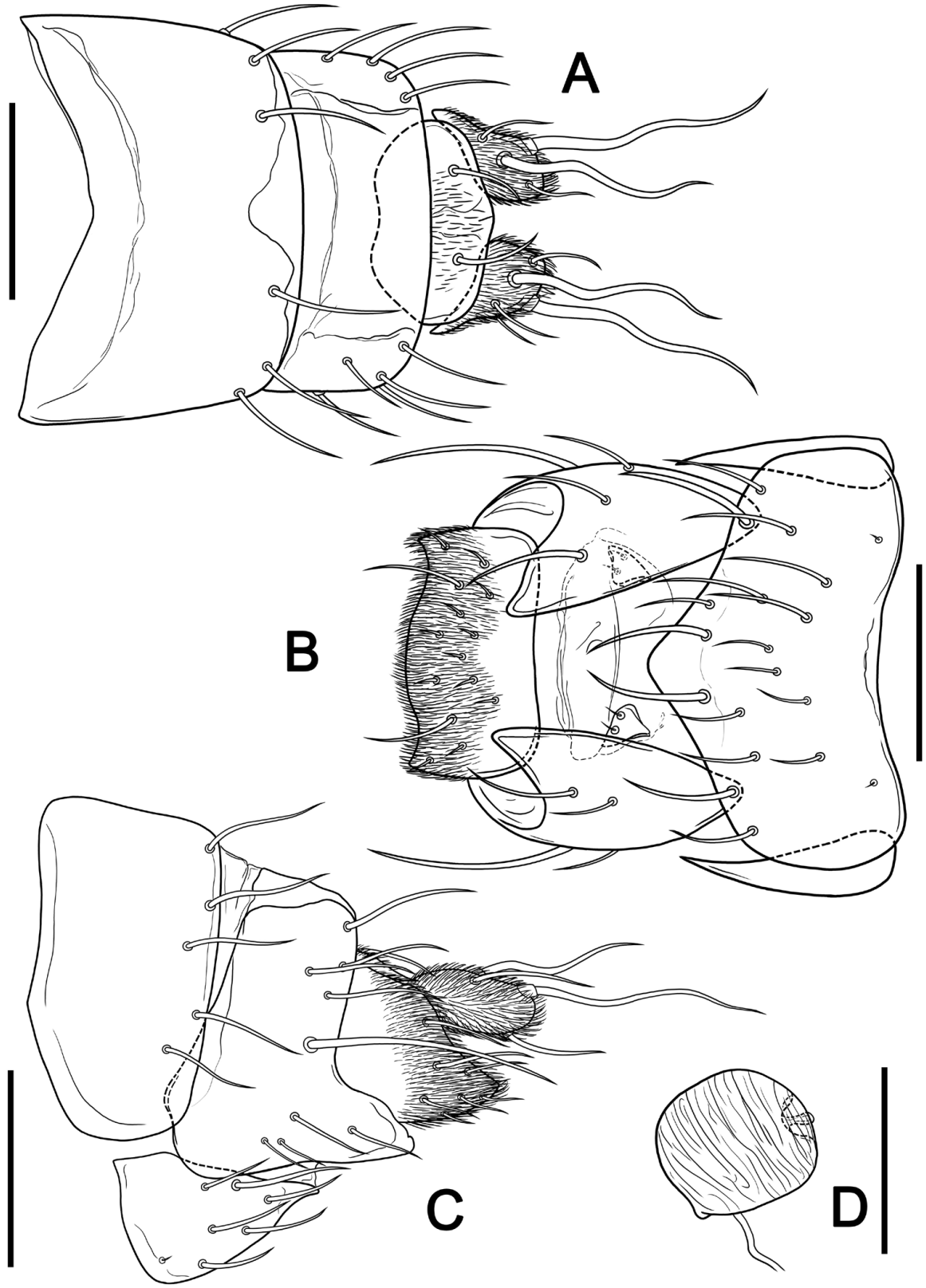


Fig. 36. *Sclerocoelus copiosus* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.05 mm.

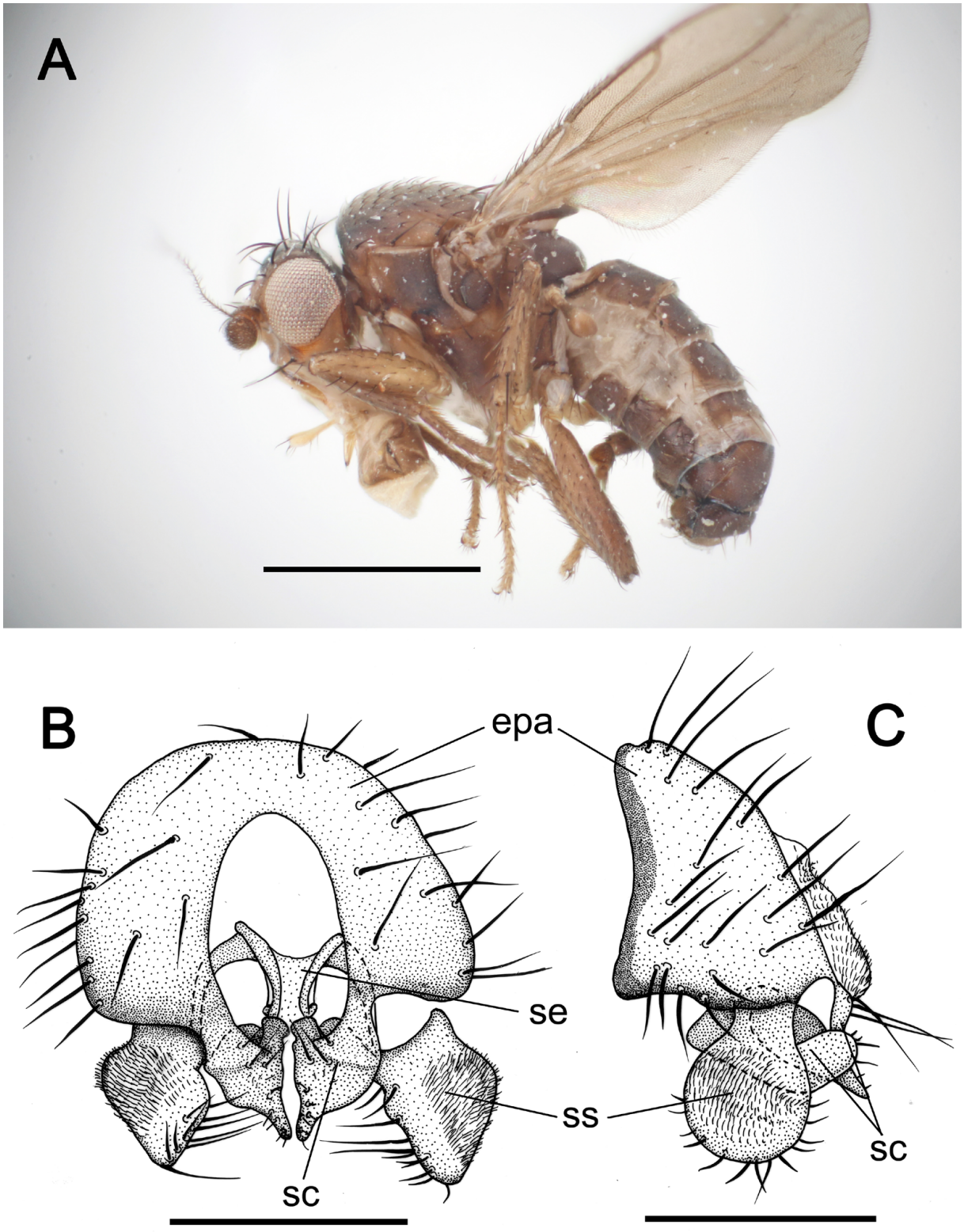


Fig. 37. *Sclerocoelus costaricensis* sp. nov. **A**. Male paratype habitus, lateral view (debu00126233). **B**. Male paratype terminalia, posterior view. **C**. Male paratype terminalia, lateral view. Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

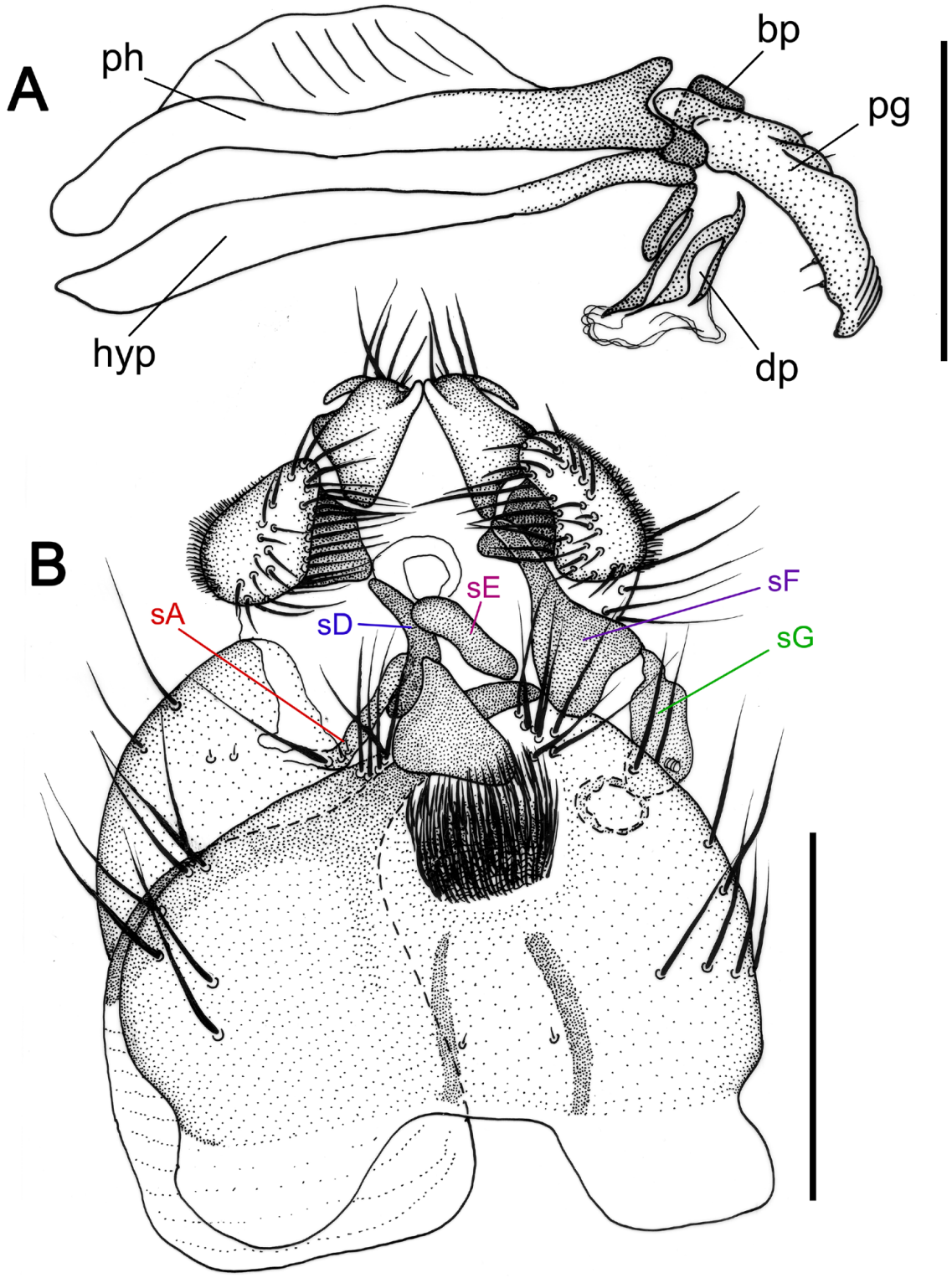


Fig. 38. *Sclerocoelus costaricensis* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

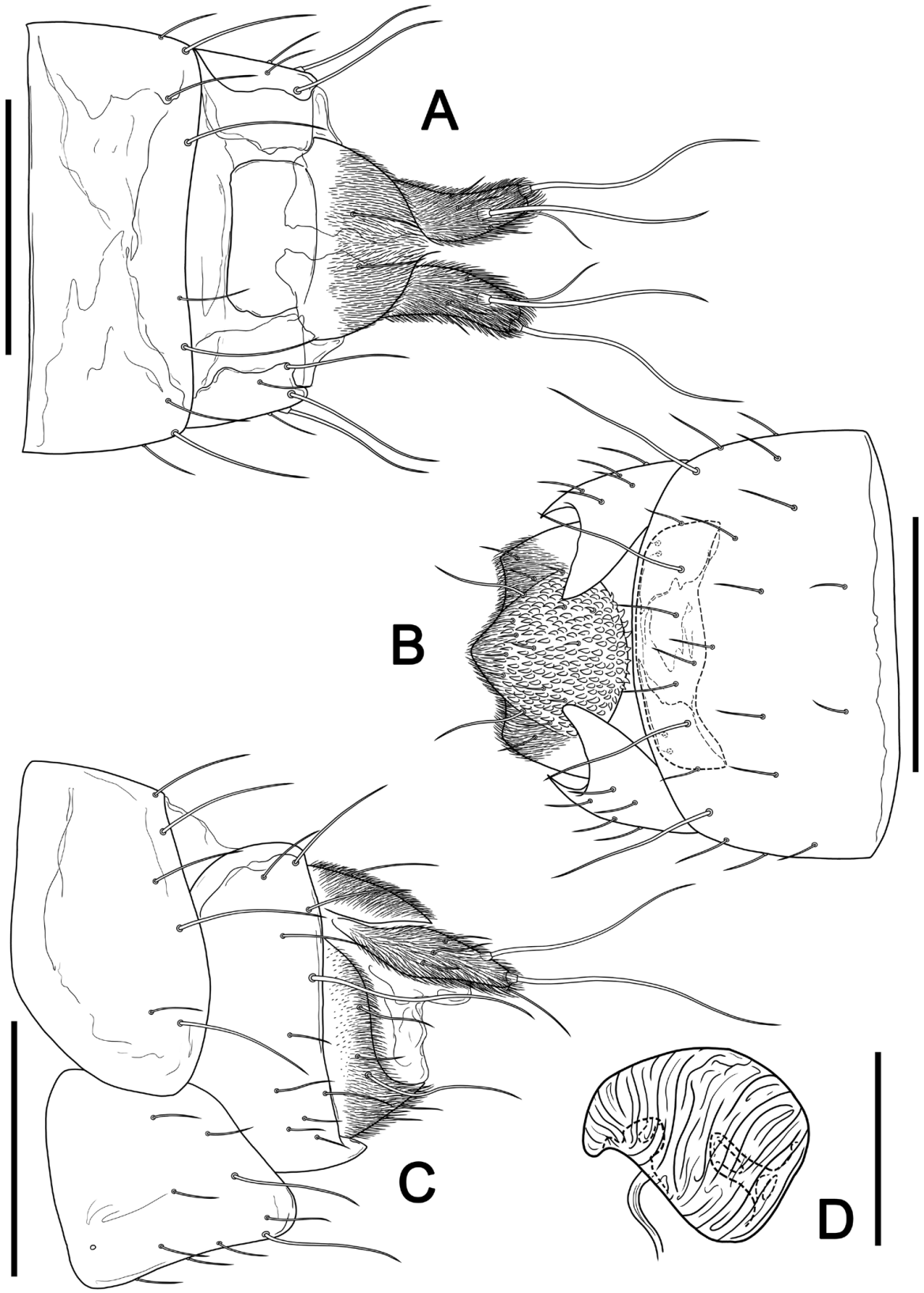


Fig. 39. *Sclerocoelus costaricensis* sp. nov., paratype (debu00131484). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

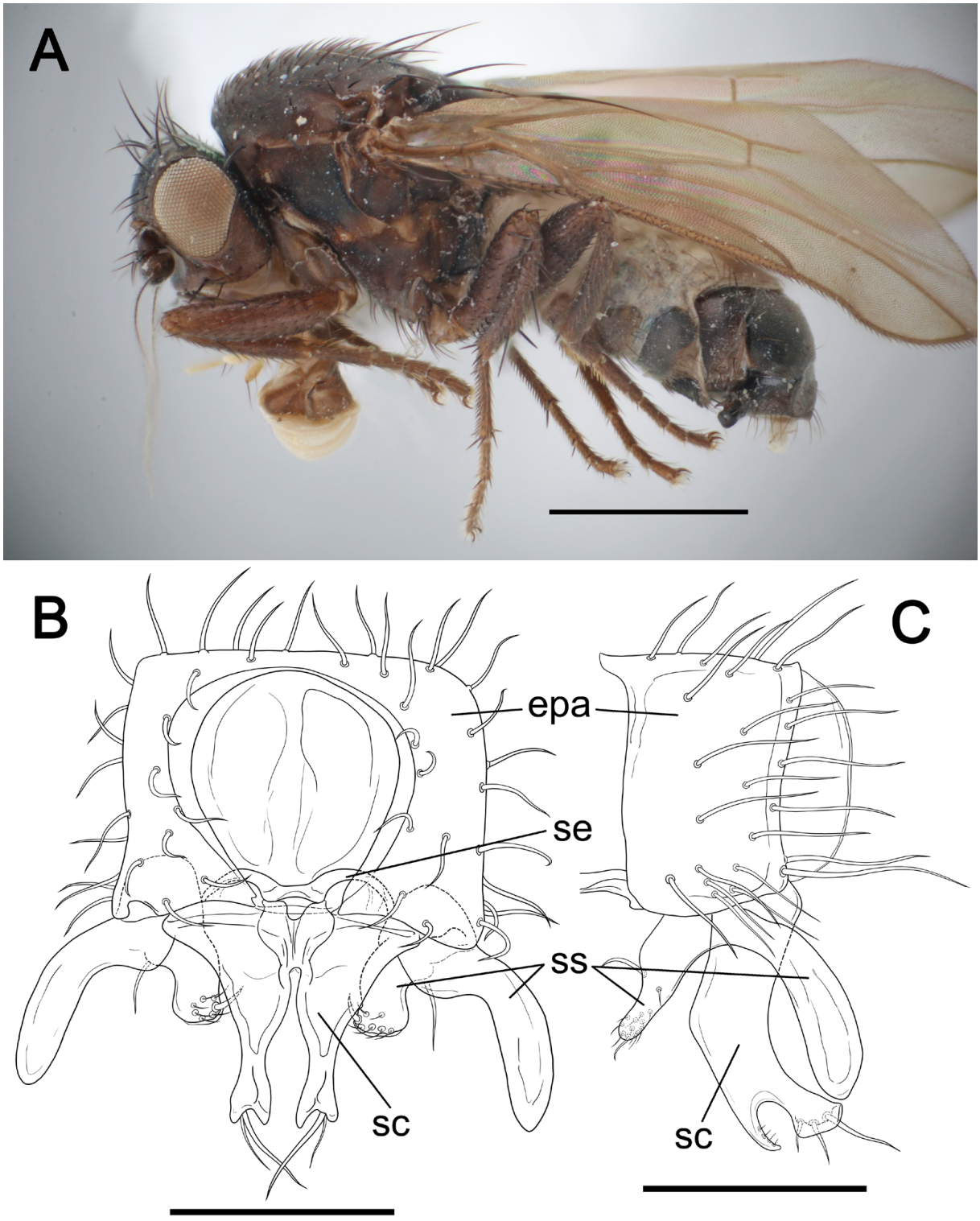


Fig. 40. *Sclerocoelus cubus* sp. nov. **A**. Male paratype habitus, lateral view (debu00139367). **B**. Male paratype terminalia, posterior view (debu00108746). **C**. Male paratype terminalia, lateral view (debu00108746). Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

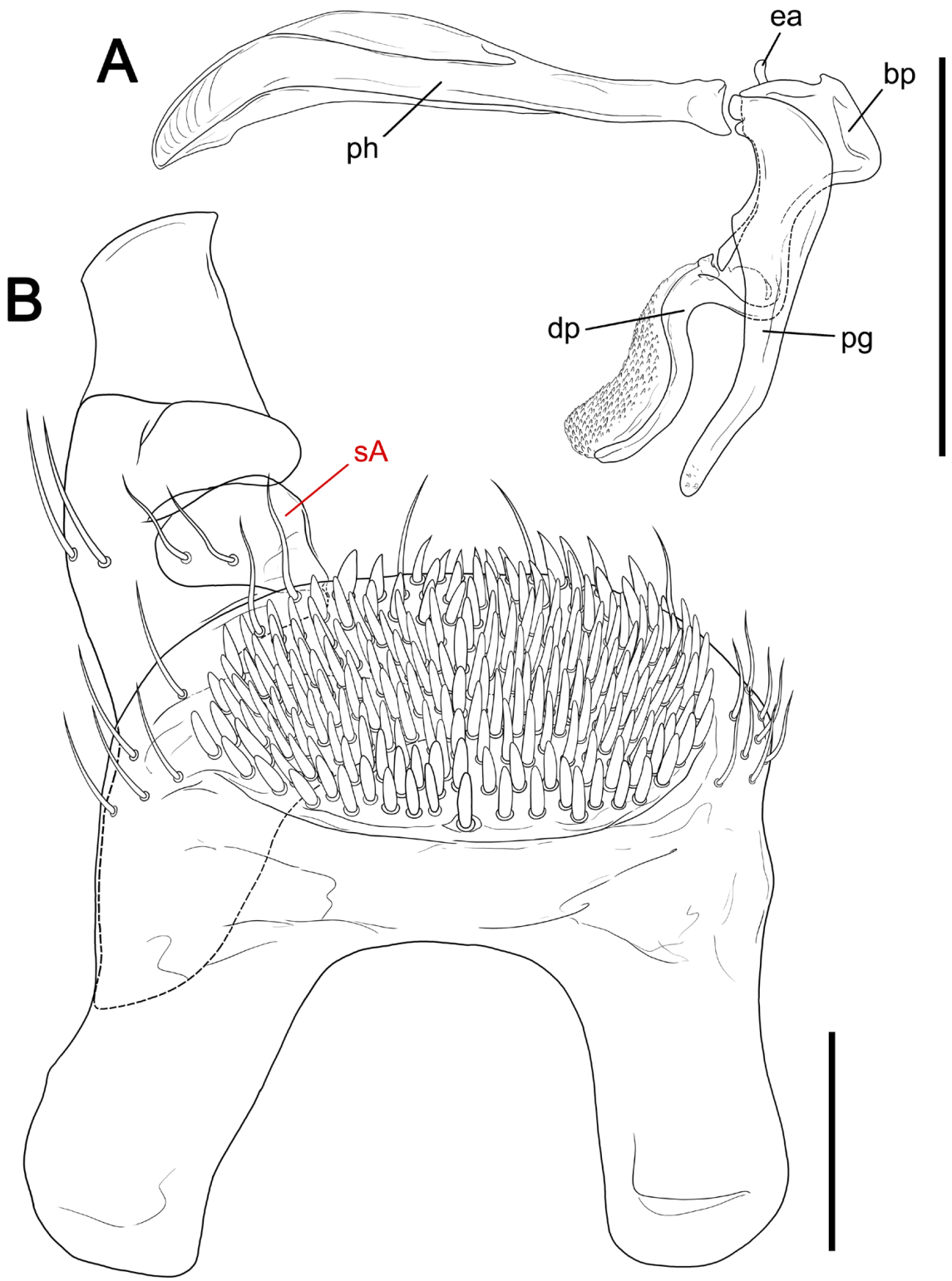


Fig. 41. *Sclerocoelus cubus* sp. nov., paratype (debu00108746) **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

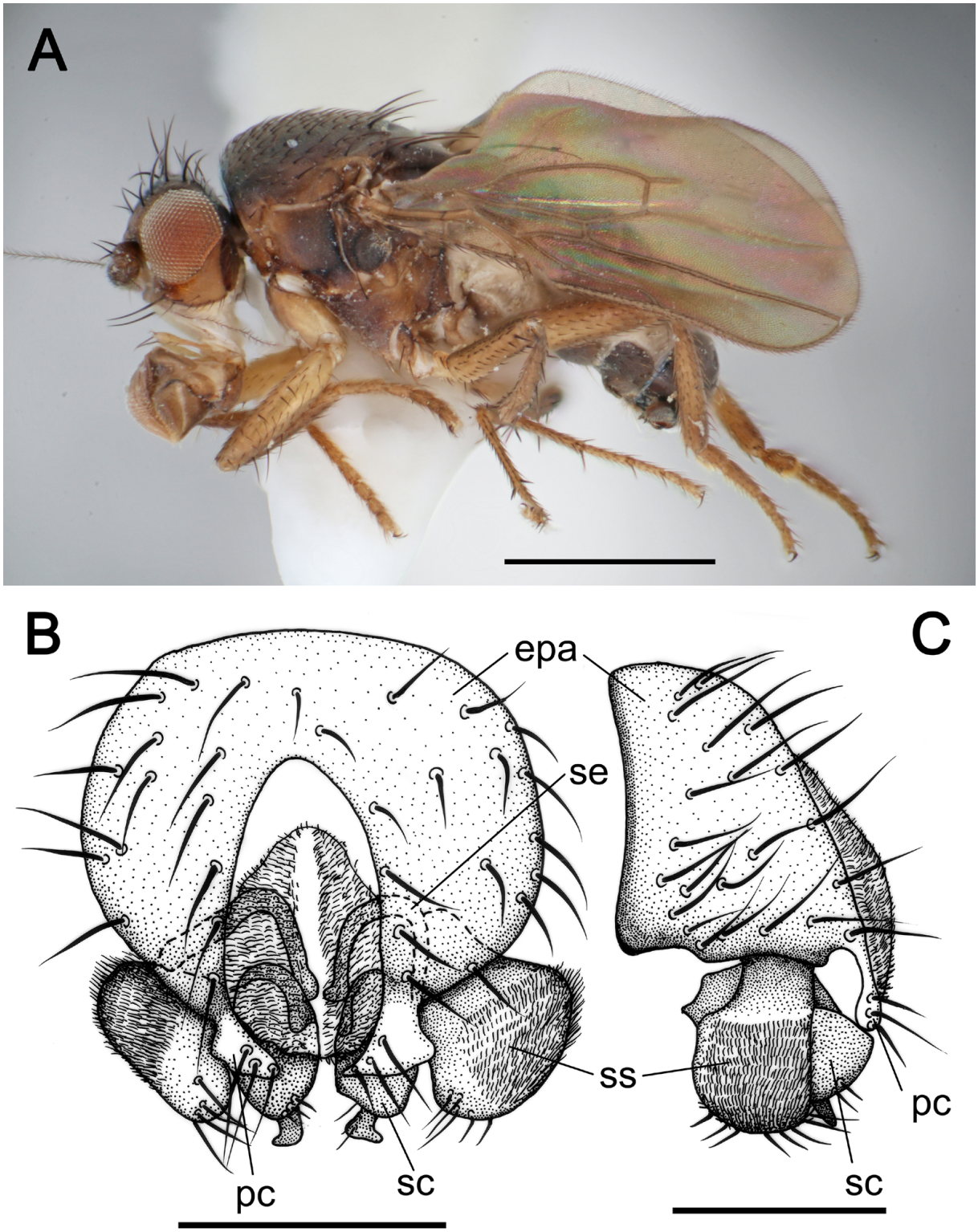


Fig. 42. *Sclerocoelus dasysternum* sp. nov. **A**. Male holotype habitus, lateral view (MNCR). **B**. Male paratype terminalia, posterior view. **C**. Male paratype terminalia, lateral view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

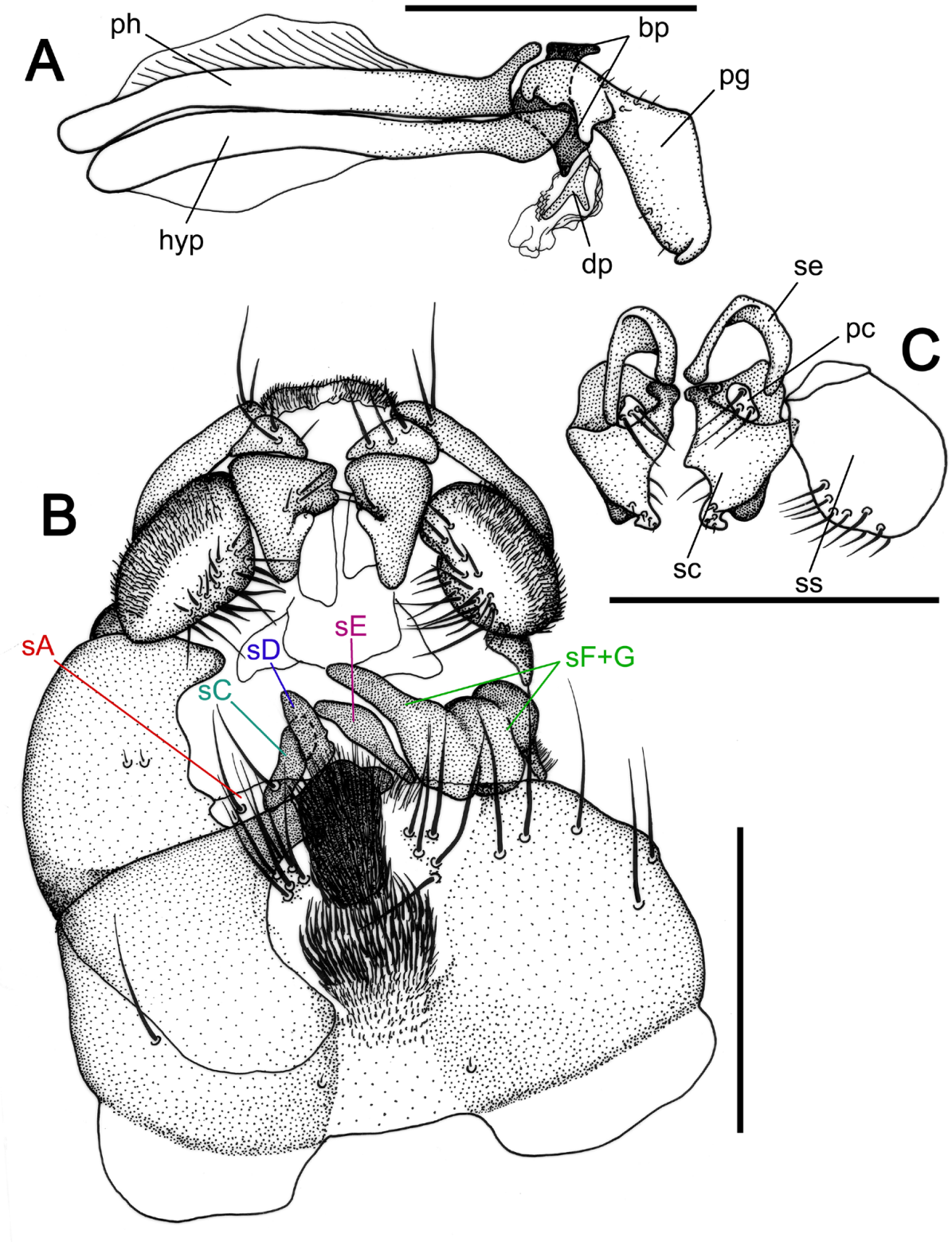


Fig. 43. *Sclerocoelus dasysternum* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Subcercal complex, posterior view. Abbreviations: bp=basiphallus; dp=distiphallus; hyp=hypandrium; pc=pseudocercus; pg=postgonite; ph=phallapodeme; sc=subcercus; se=subepandrial sclerite; ss=surstylus. Scale bars: A=0.13 mm; B–C=0.25 mm.

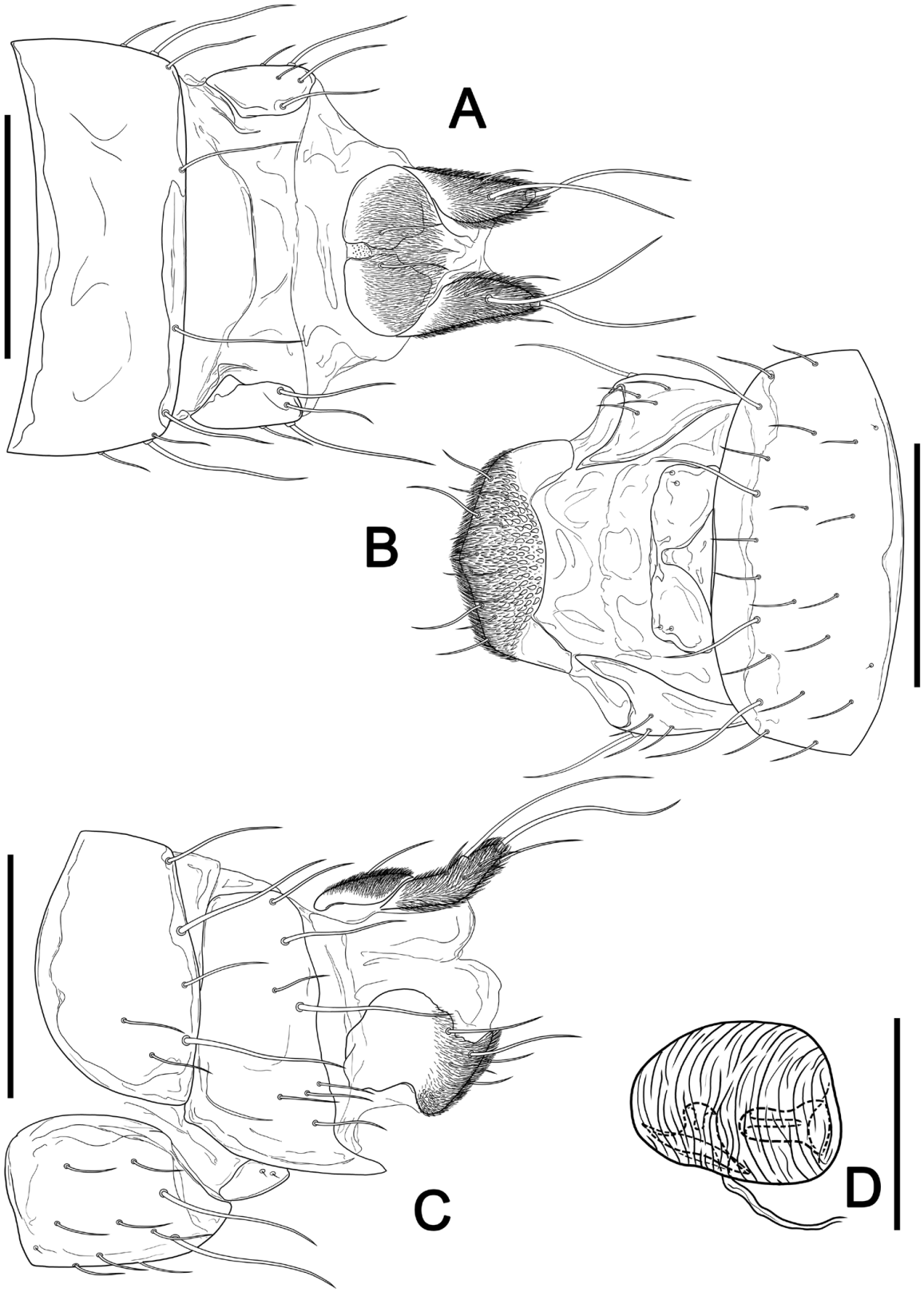


Fig. 44. *Sclerocoelus dasysternum* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.04 mm.

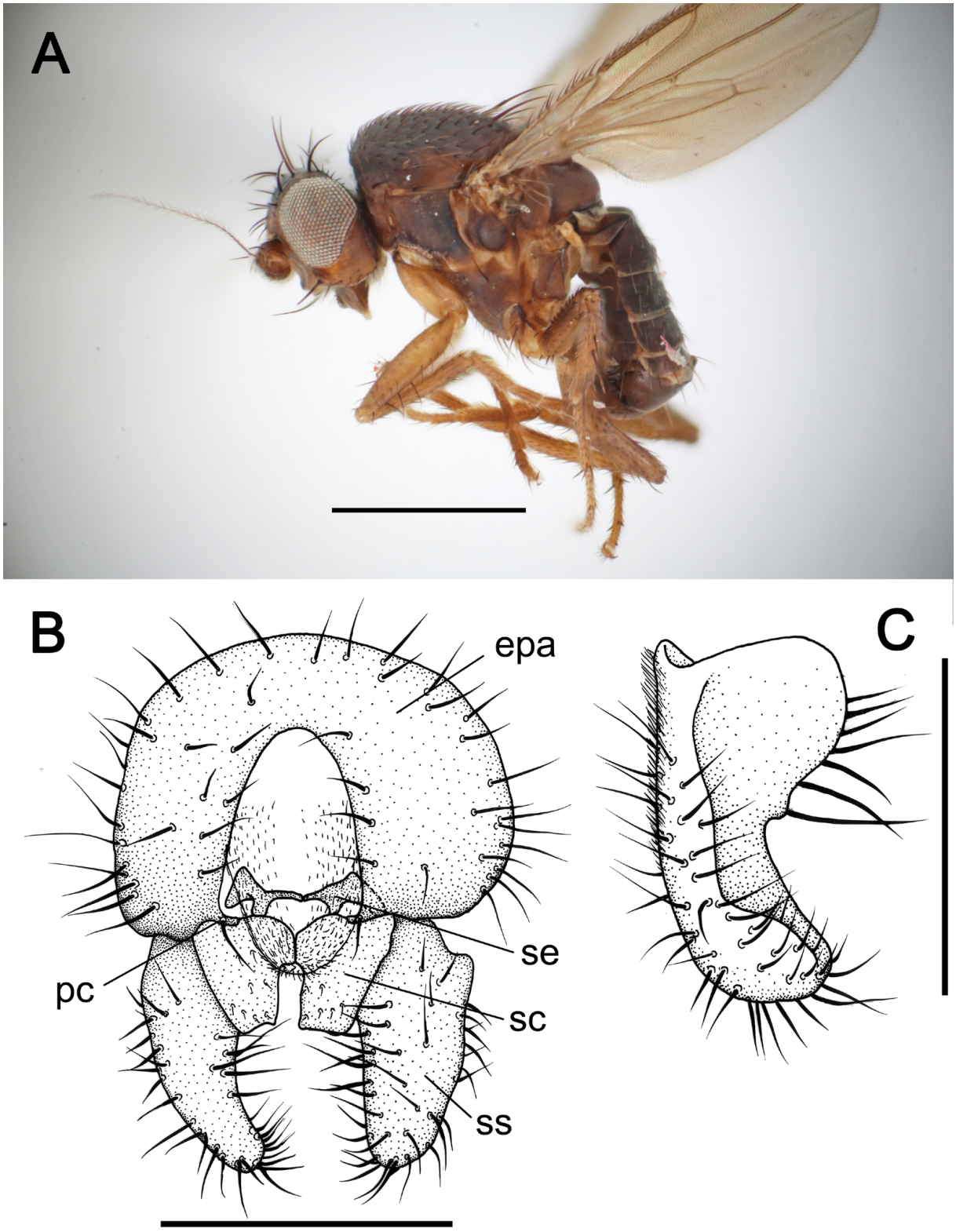


Fig. 45. *Sclerocoelus dominicensis* sp. nov. **A**. Male paratype habitus, lateral view. **B**. Male holotype terminalia, posterior view (USNM). **C**. Holotype left surstylus, posterior view (USNM). Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B = 0.25 mm; C = 0.20 mm.

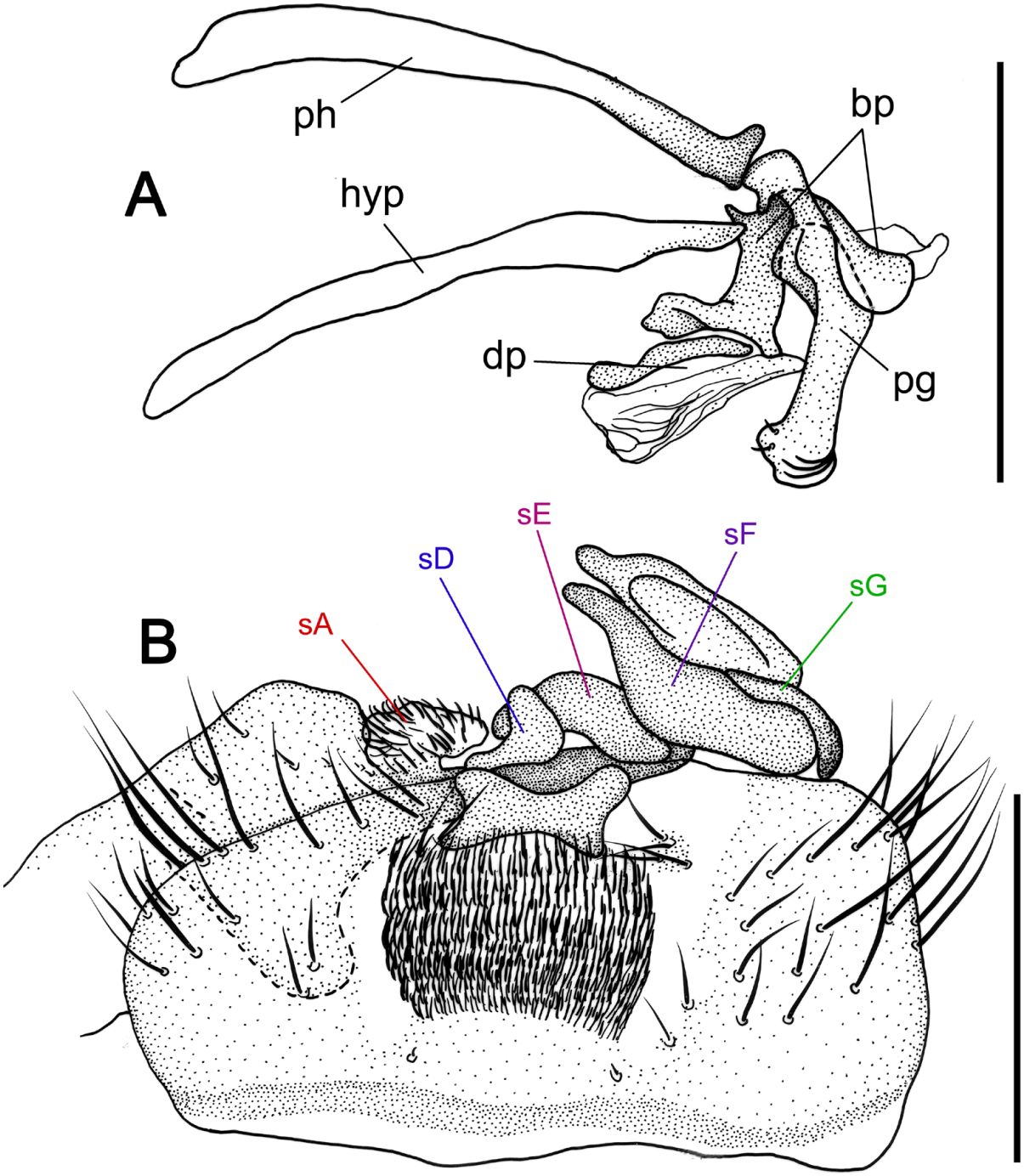


Fig. 46. *Sclerocoelus dominicensis* sp. nov., male holotype (USNM). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

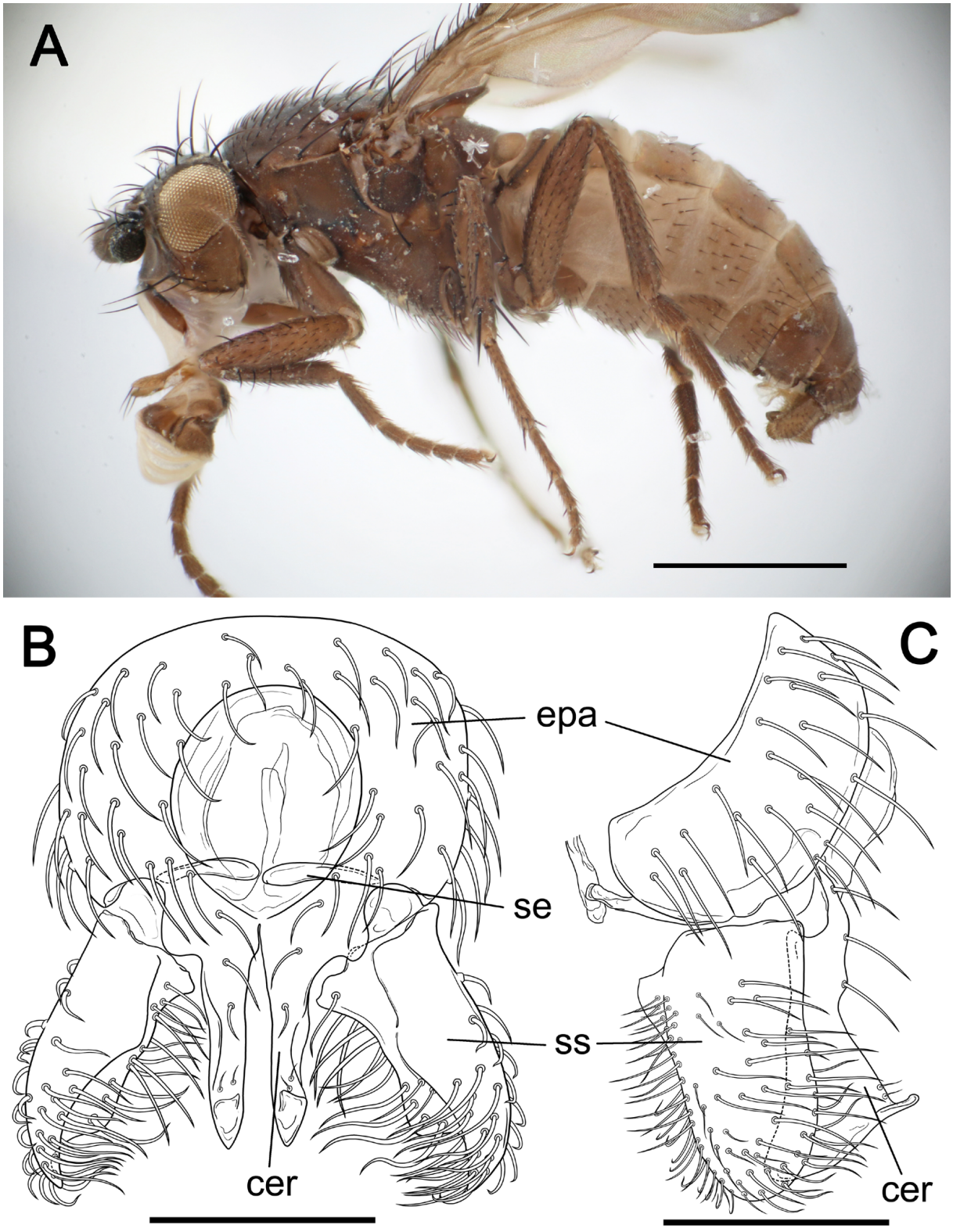


Fig. 47. *Sclerocoelus dryadalis* sp. nov., paratype. **A**. Male habitus, lateral view. **B**. Male terminalia, posterior view. **C**. Male terminalia, lateral view. Abbreviations: cer = cercus; epa = epandrium; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

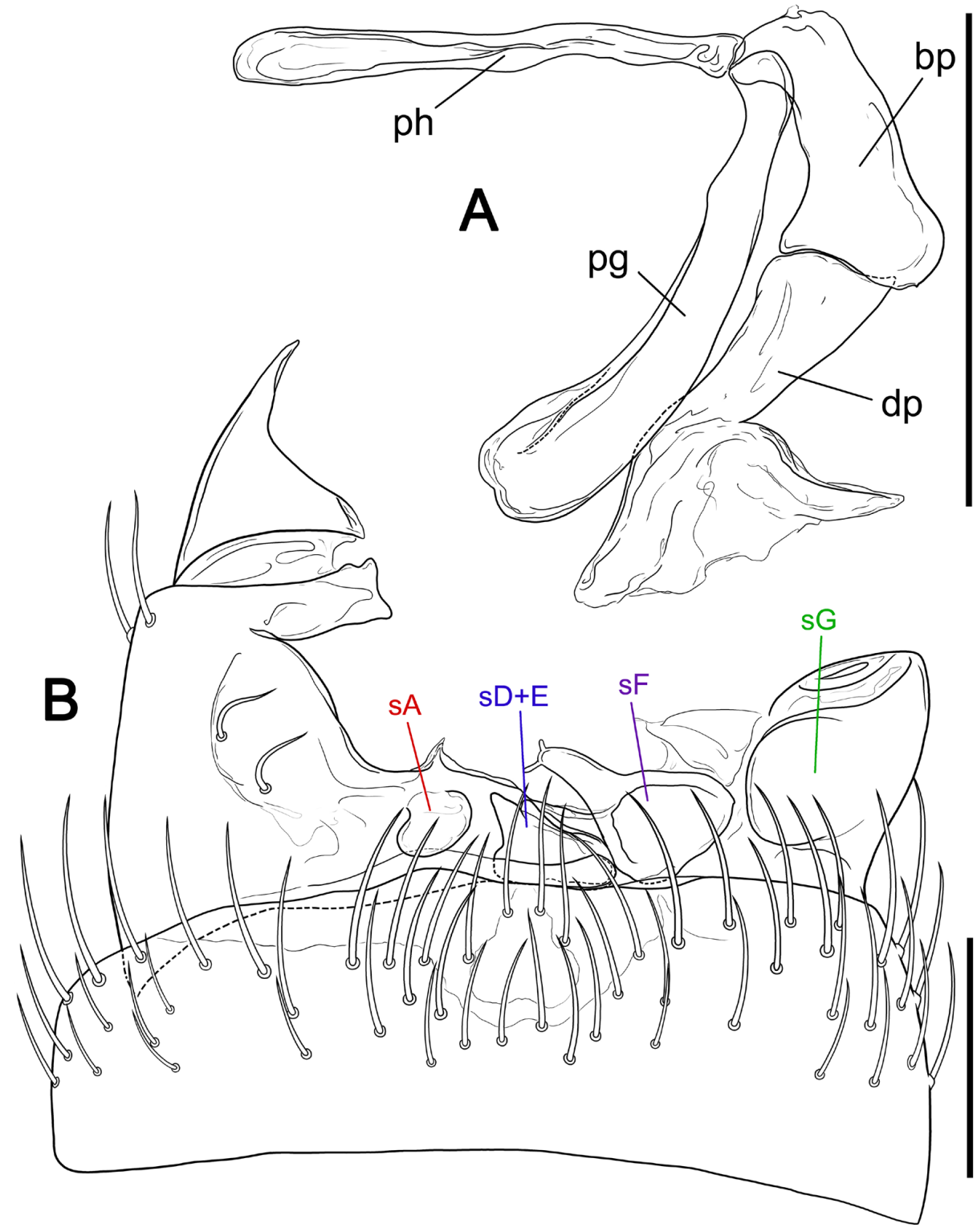


Fig. 48. *Sclerocoelus dryadalis* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

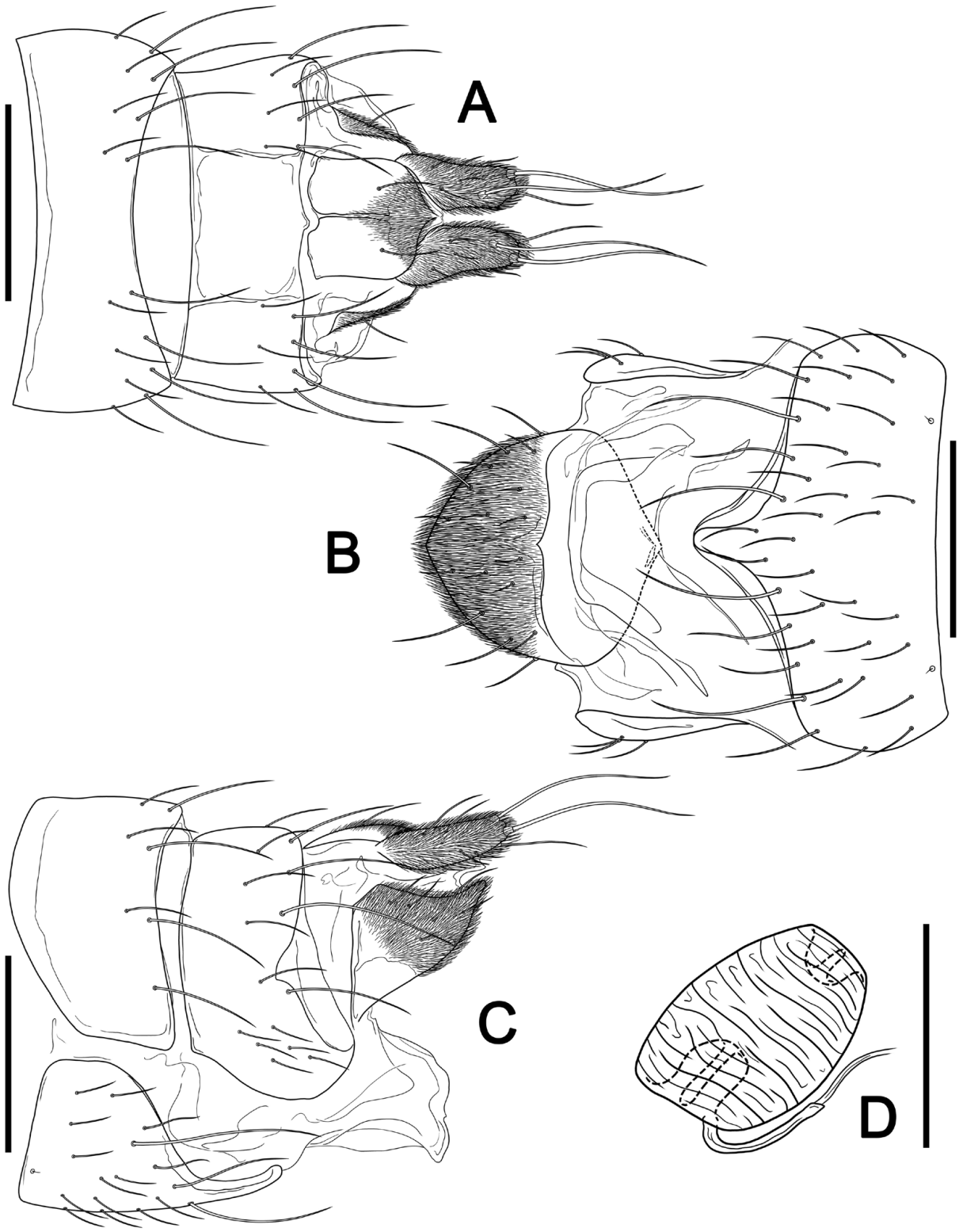


Fig. 49. *Sclerocoelus dryadalis* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.05 mm.

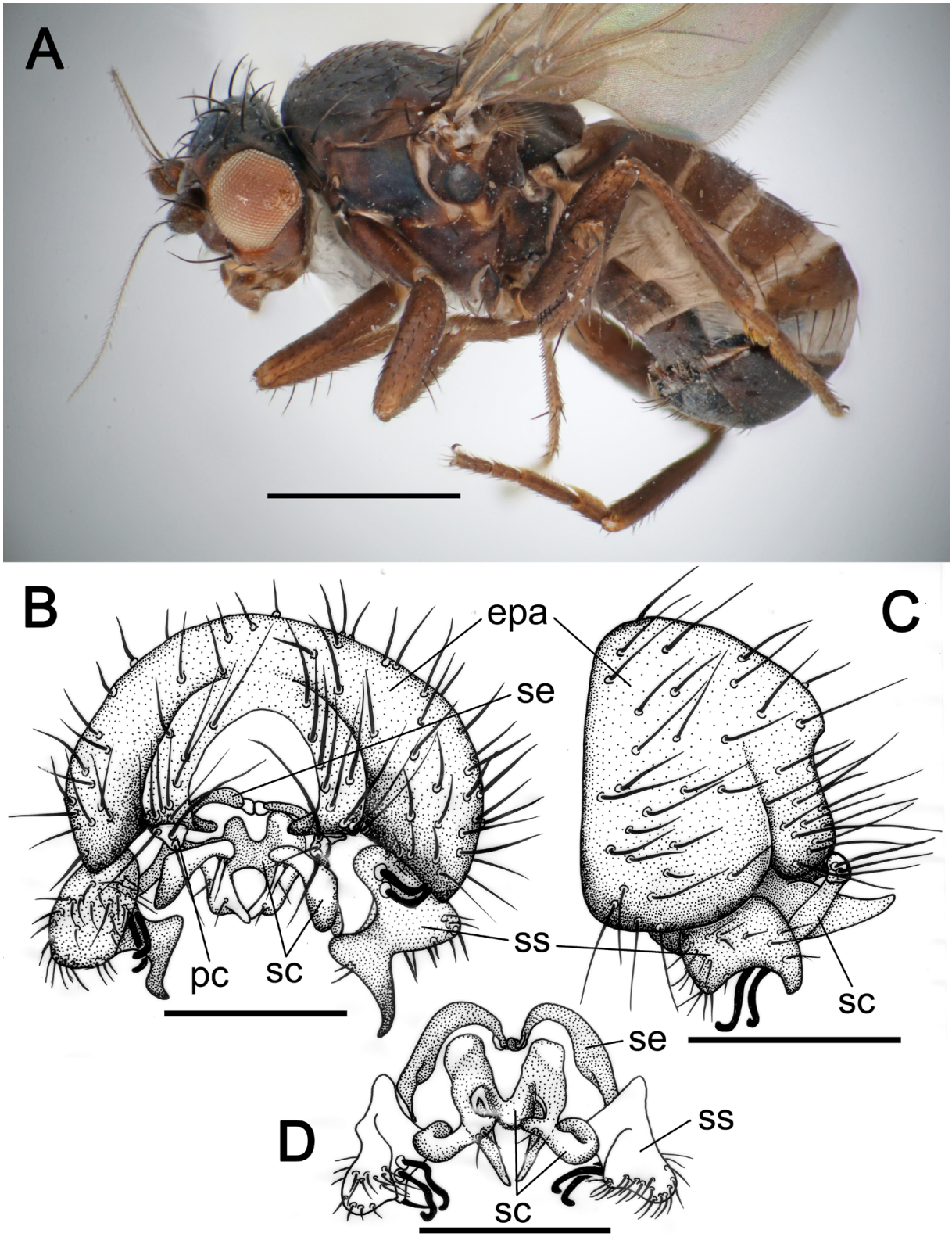


Fig. 50. *Sclerocoelus elephas* sp. nov. **A**. Male habitus, lateral view. **B**. Male terminalia, posterior view. **C**. Male terminalia, lateral view. **D**. Subcercal complex, posterior view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–D = 0.25 mm.

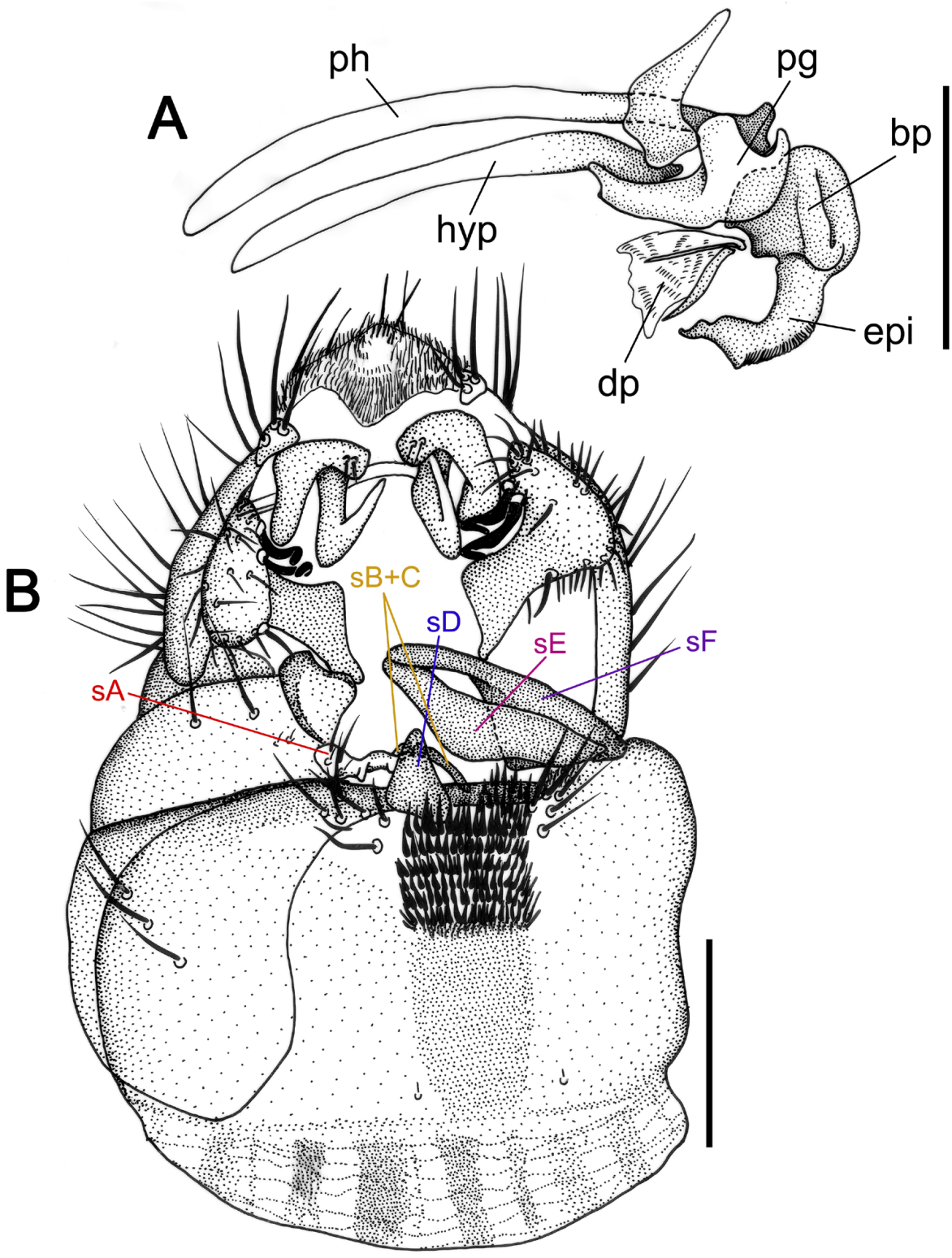


Fig. 51. *Sclerocoelus elephas* sp. nov. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; epi = epiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

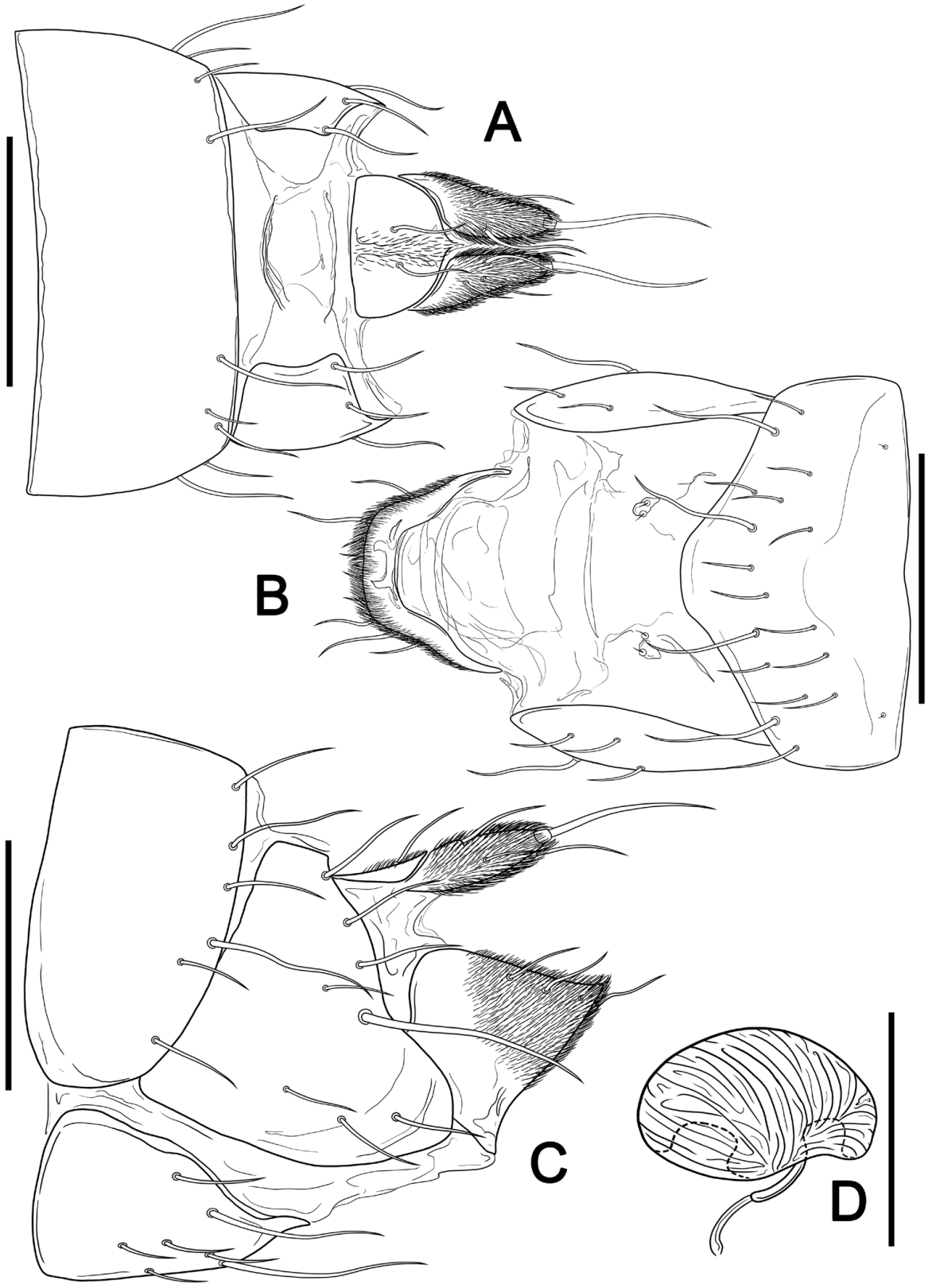


Fig. 52. *Sclerocoelus elephas* sp. nov. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

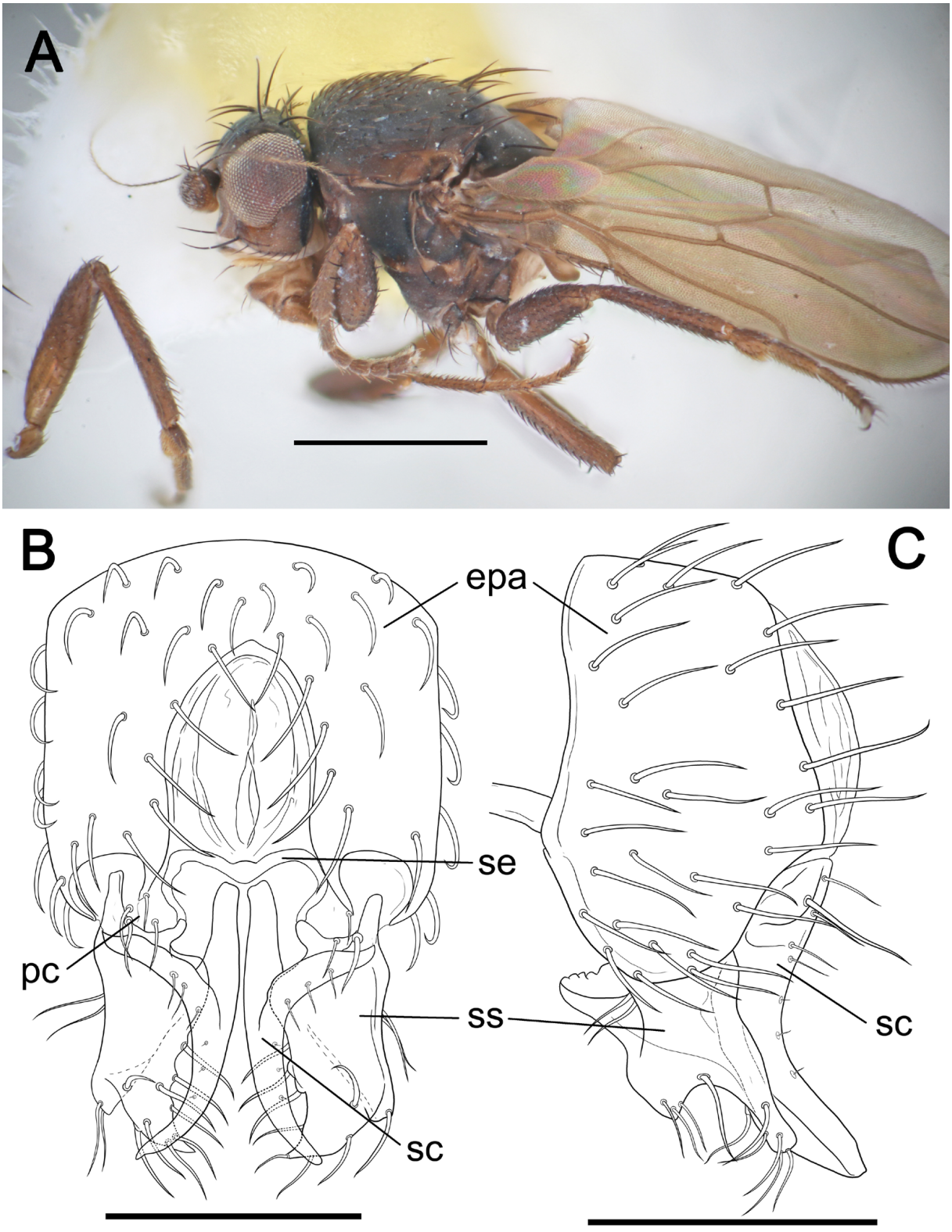


Fig. 53. *Sclerocoelus espeletia* sp. nov., paratype. **A**. Male habitus, lateral view. **B**. Male terminalia, posterior view. **C**. Male terminalia, lateral view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

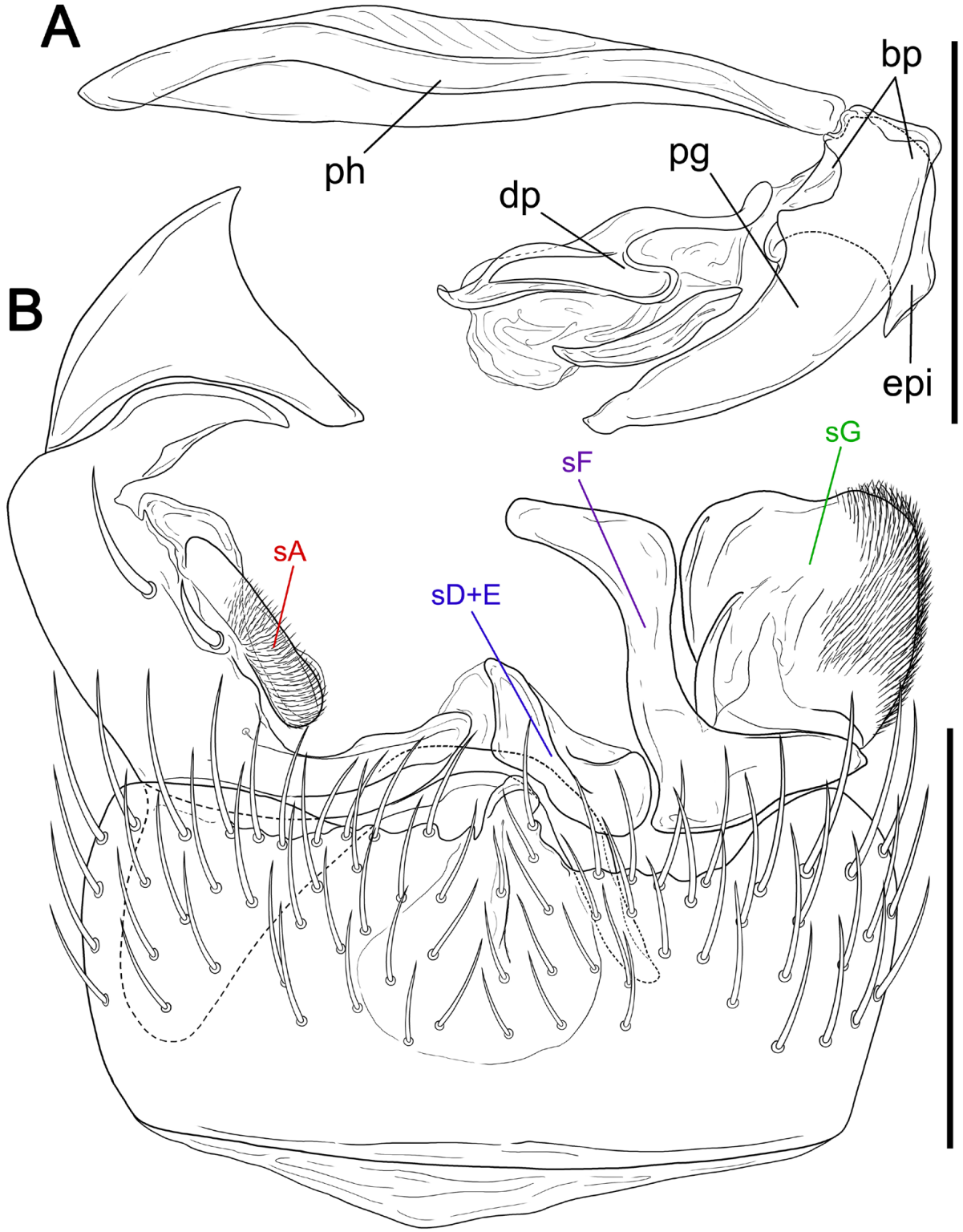


Fig. 54. *Sclerocoelus espeletia* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; epi = epiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

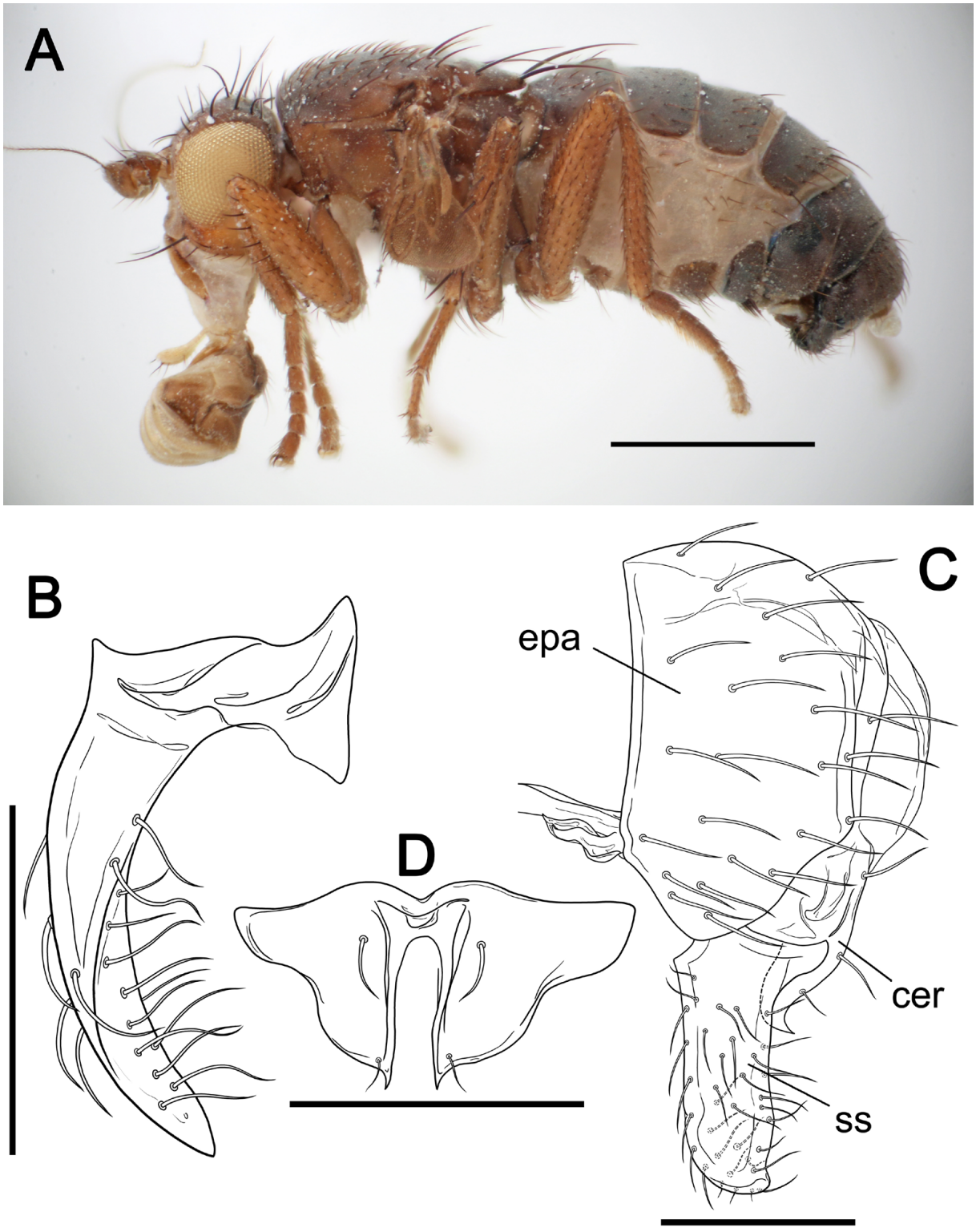


Fig. 55. *Sclerocoelus flavus* sp. nov. **A**. Male paratype habitus, lateral view (debu01041019). **B**. Holotype left surstylus, posterior view (USNM). **C**. Male holotype terminalia, lateral view (USNM). **D**. Holotype cercus, posterior view (USNM). Abbreviations: cer = cercus; epa = epandrium; ss = surstylus. Scale bars: A = 1.0 mm; B–D = 0.25 mm.

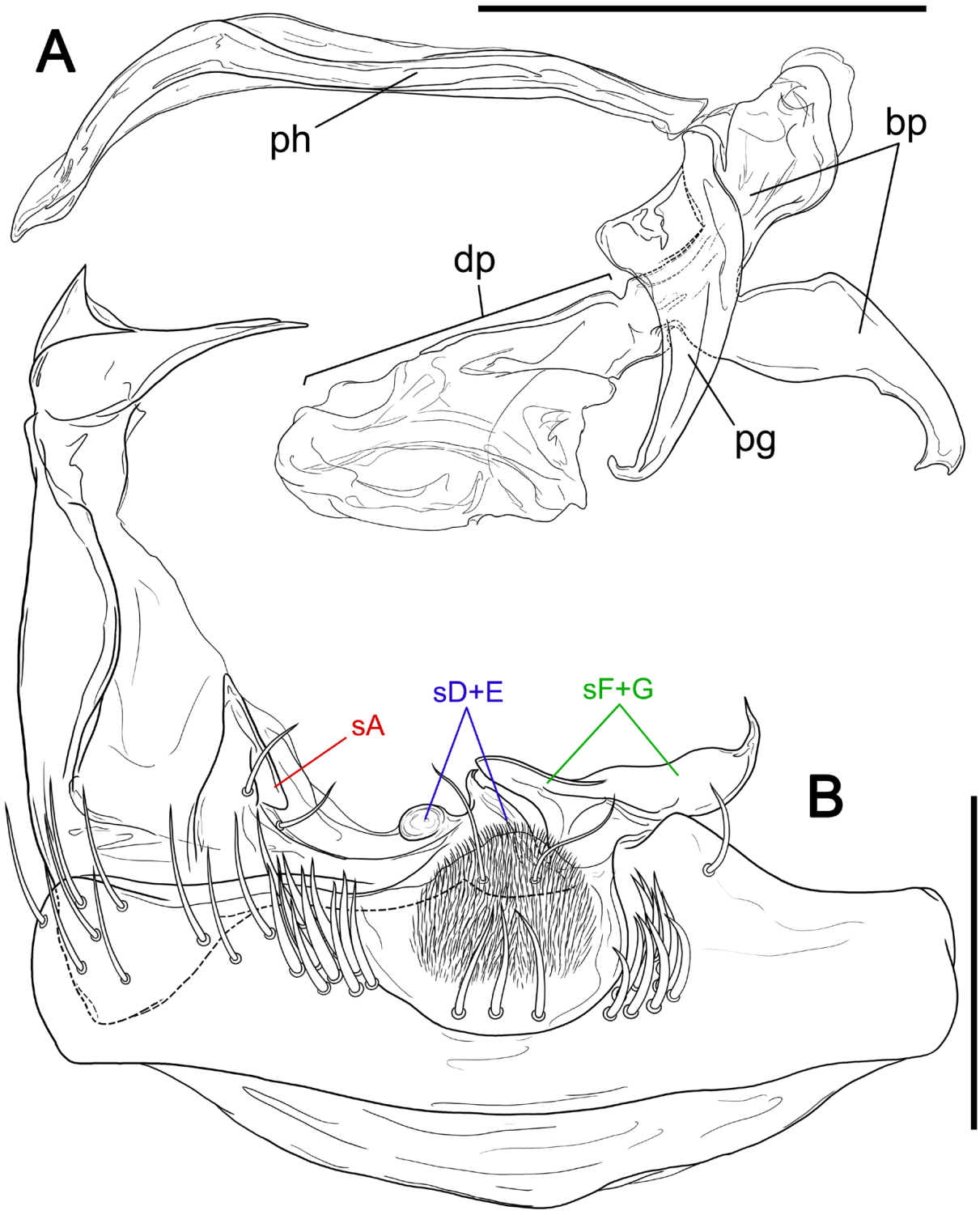


Fig. 56. *Sclerocoelus flavus* sp. nov., male holotype (USNM). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

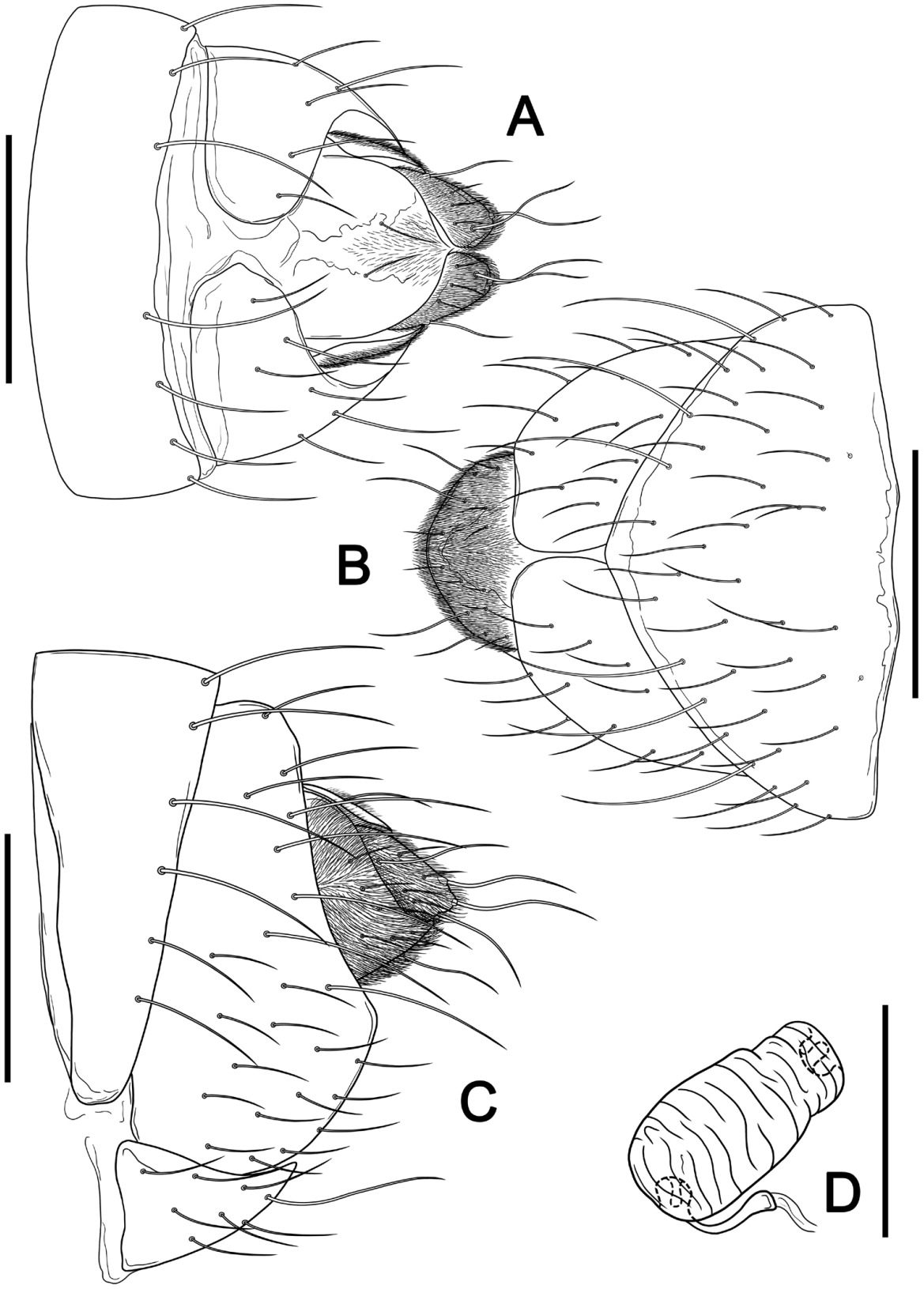


Fig. 57. *Sclerocoelus flavus* sp. nov., paratype (debu01041018). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

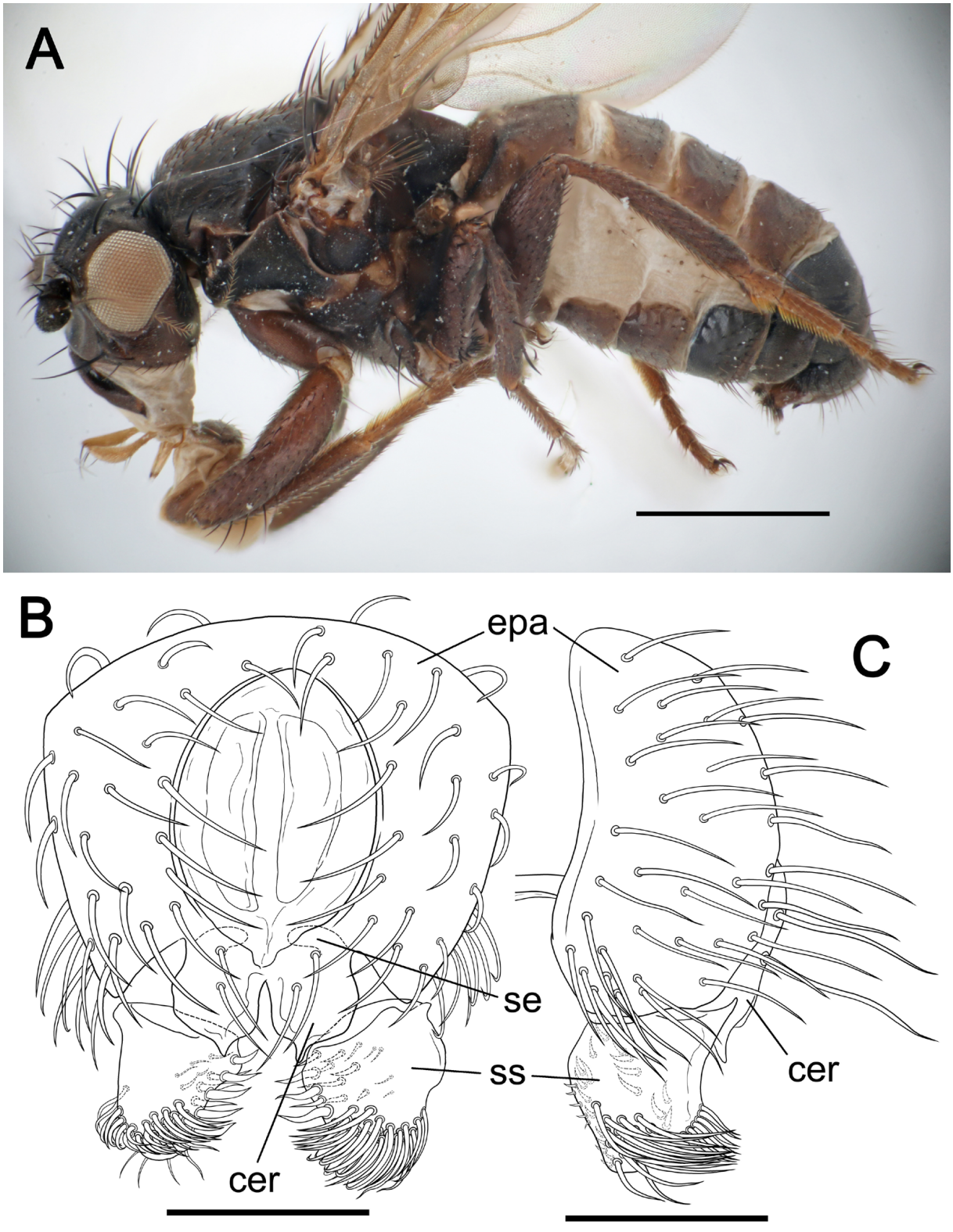


Fig. 58. *Sclerocoelus frigidifrons* sp. nov. **A**. Male paratype habitus, lateral view (debu00142443). **B**. Male paratype terminalia, posterior view (debu00139644). **C**. Male paratype terminalia, lateral view (debu00139644). Abbreviations: cer = cercus; epa = epandrium; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

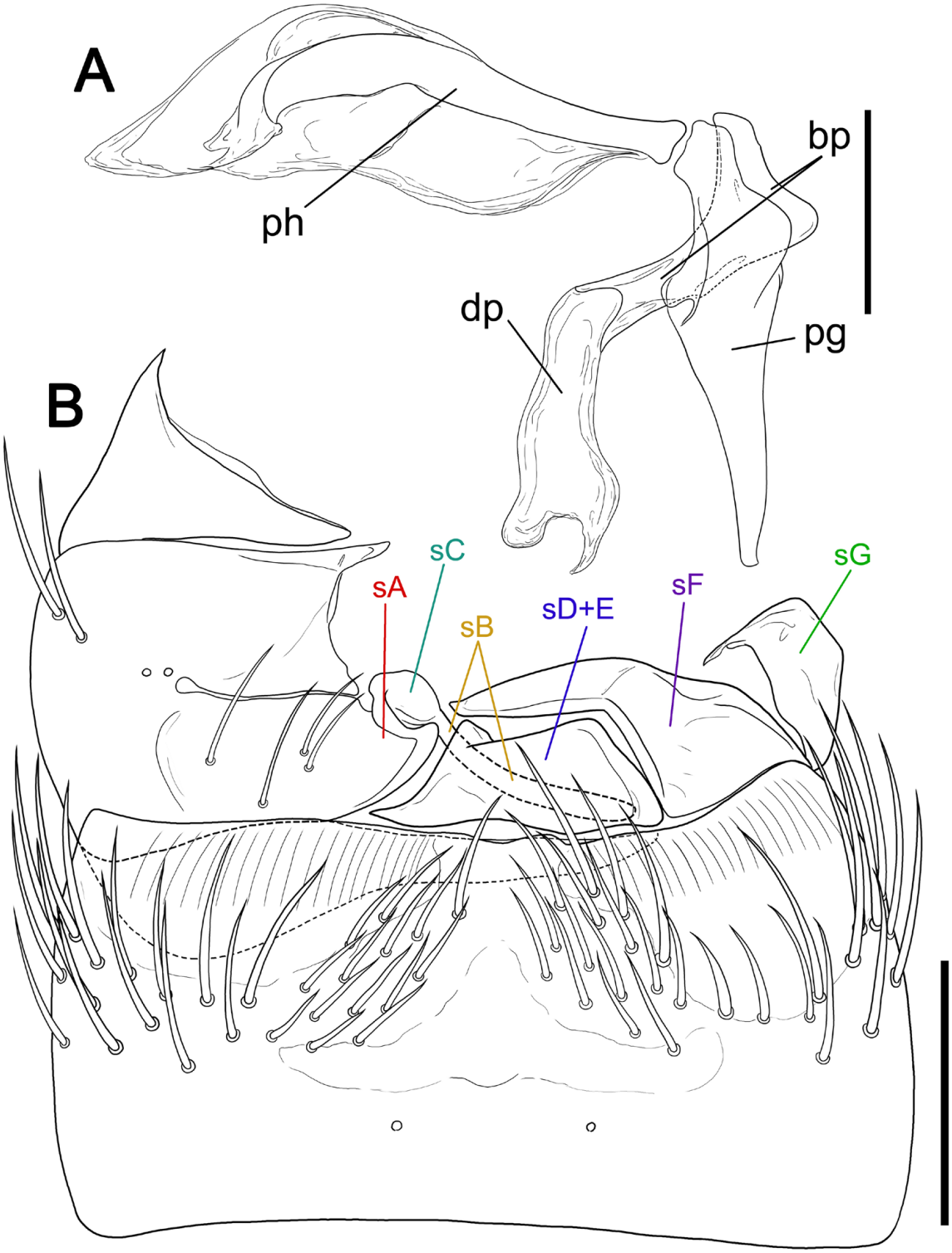


Fig. 59. *Sclerocoelus frigidifrons* sp. nov., paratype (debu00139644). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

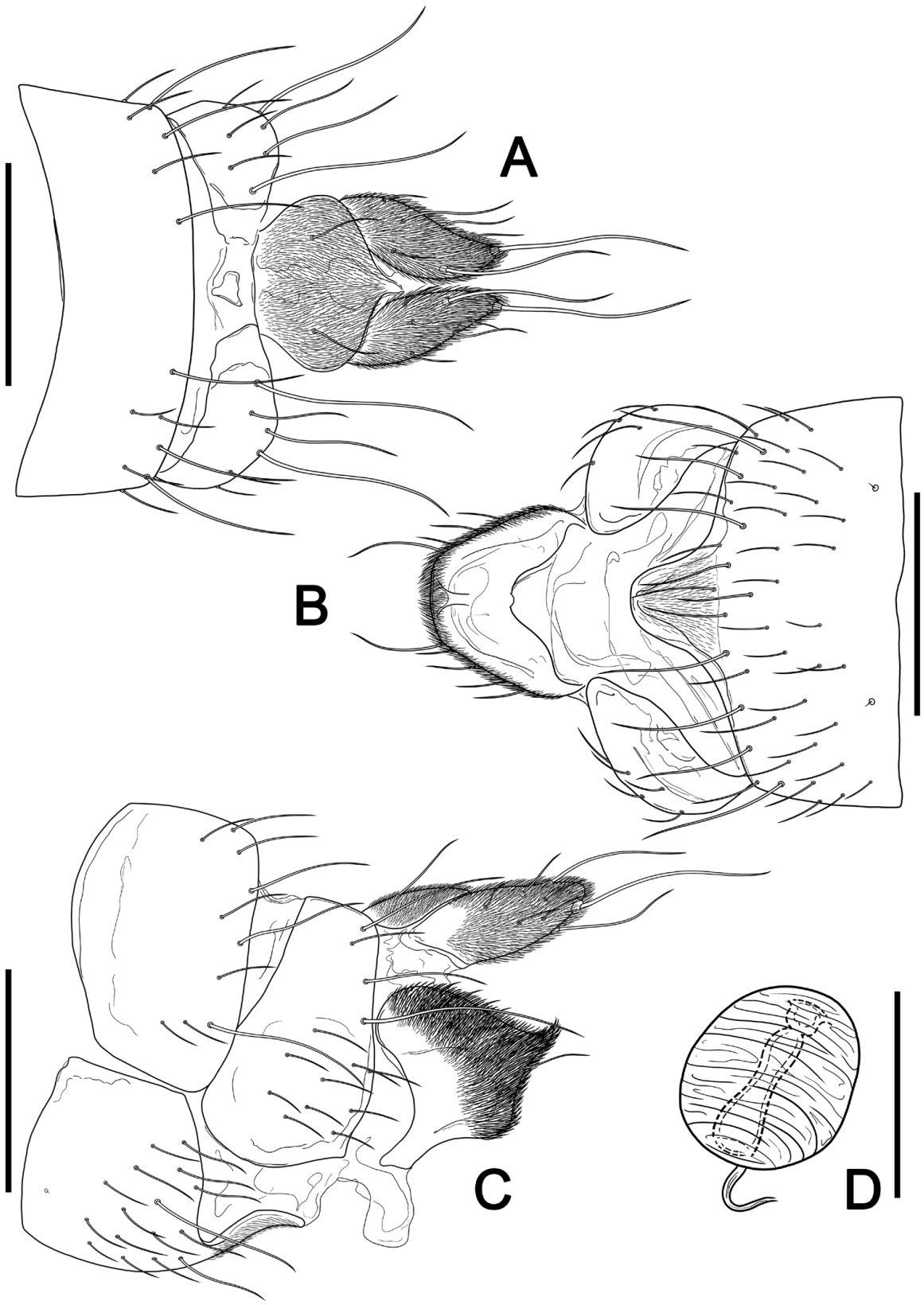


Fig. 60. *Sclerocoelus frigidifrons* sp. nov., paratype (debu00142033). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.04 mm.

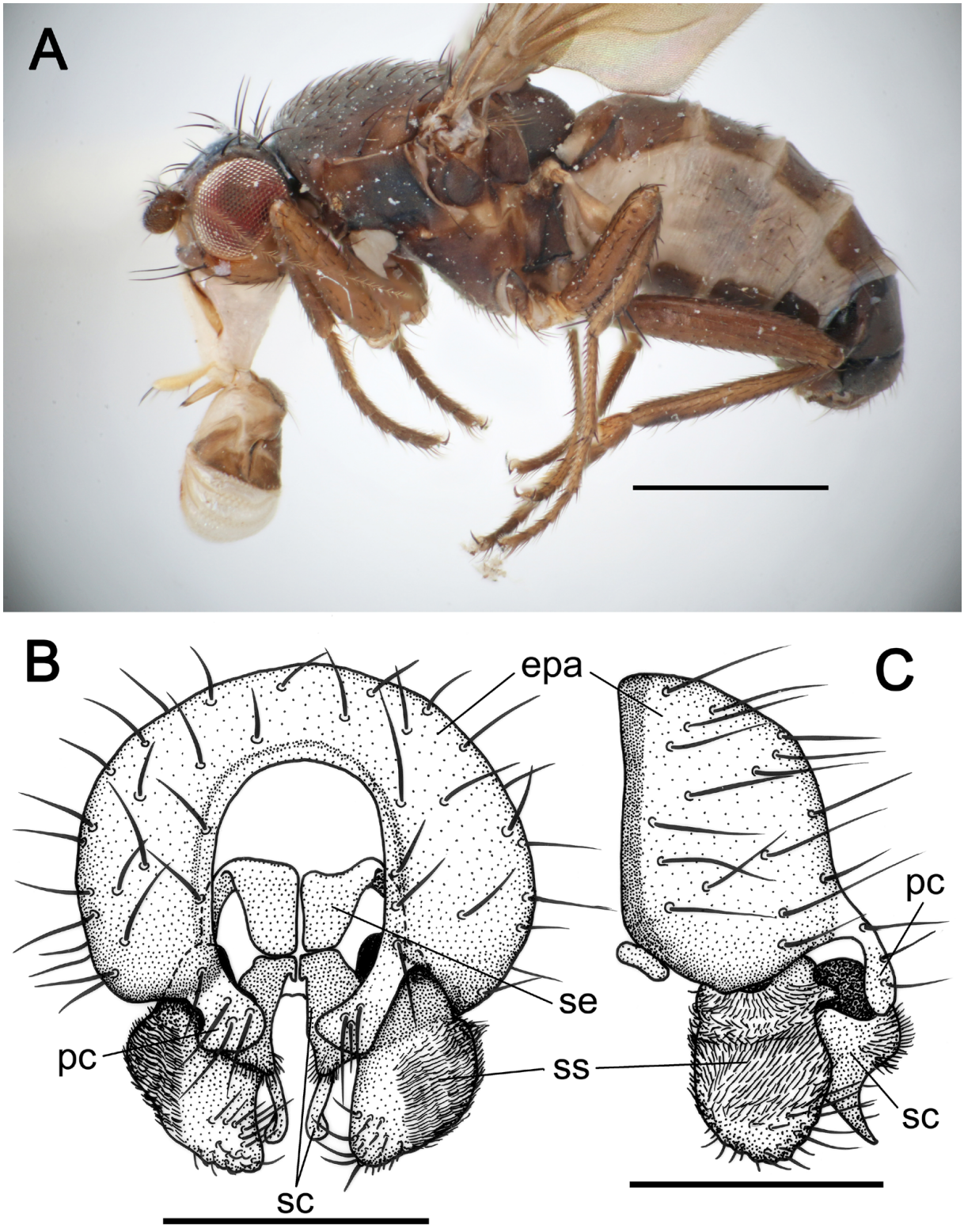


Fig. 61. *Sclerocoelus grandicercus* sp. nov. **A**. Male holotype habitus, lateral view (debu00203263). **B**. Male paratype terminalia, posterior view. **C**. Male paratype terminalia, lateral view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

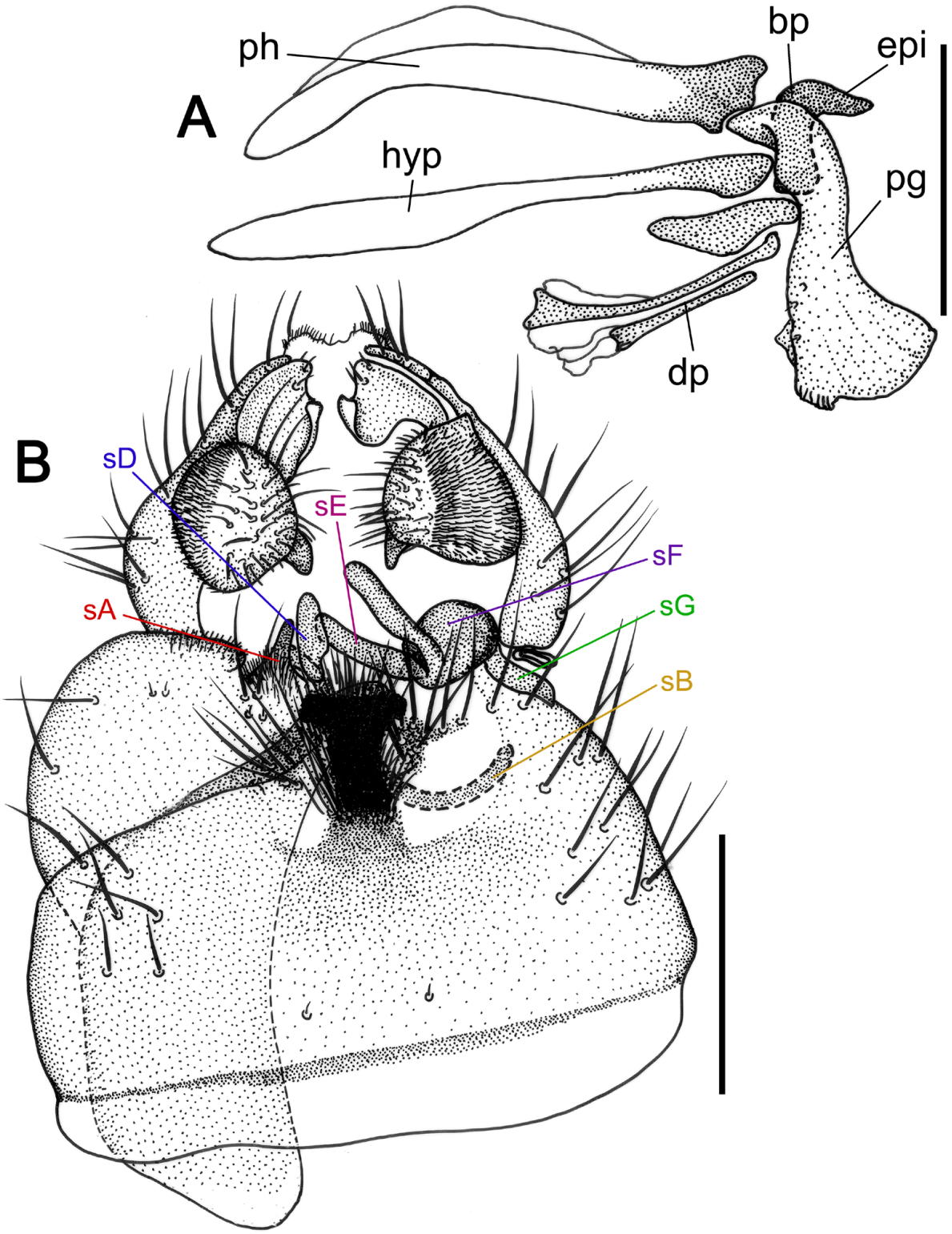


Fig. 62. *Sclerocoelus grandicercus* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; epi = epiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

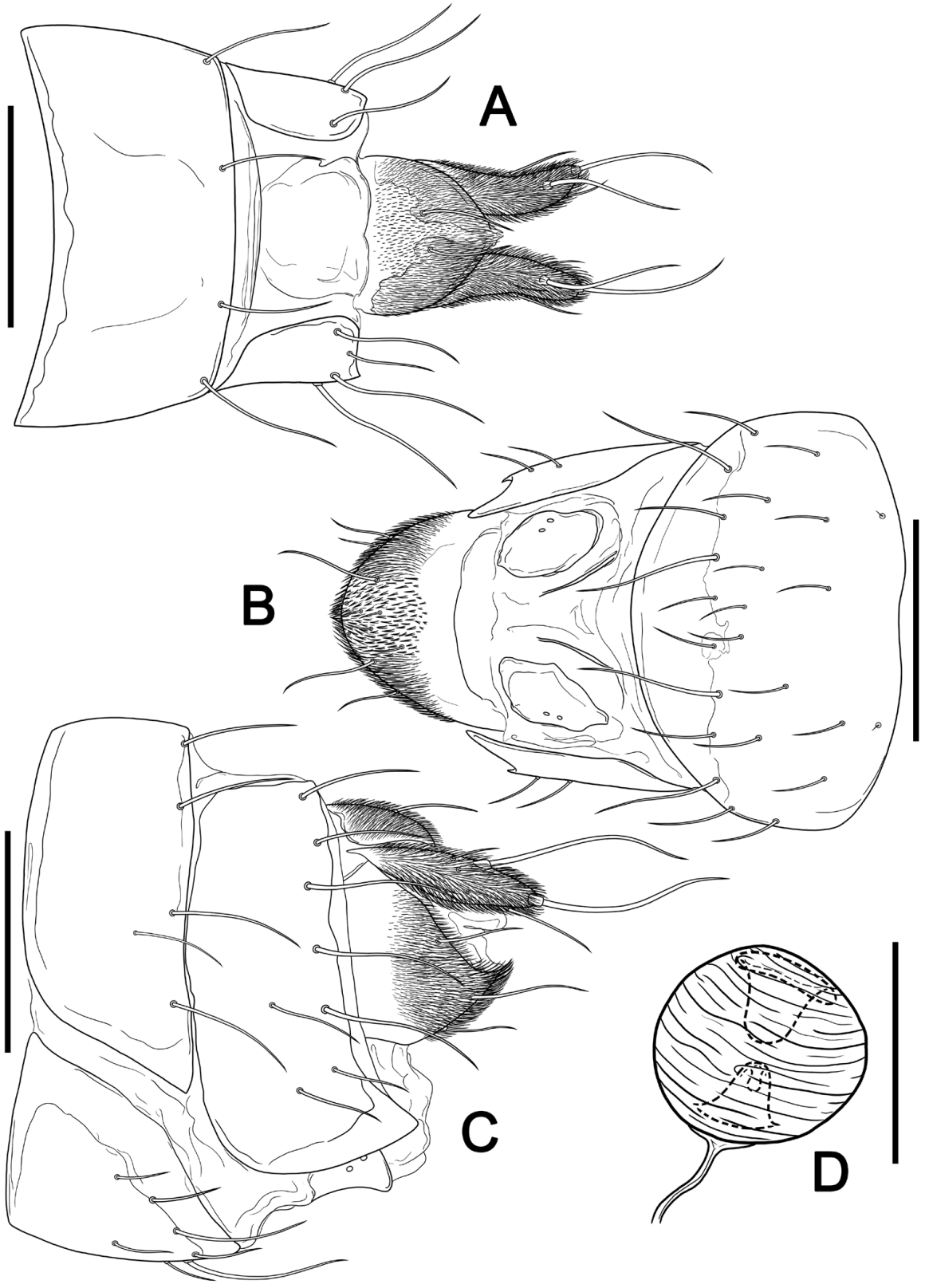


Fig. 63. *Sclerocoelus grandicercus* sp. nov., paratype (debu00206850). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

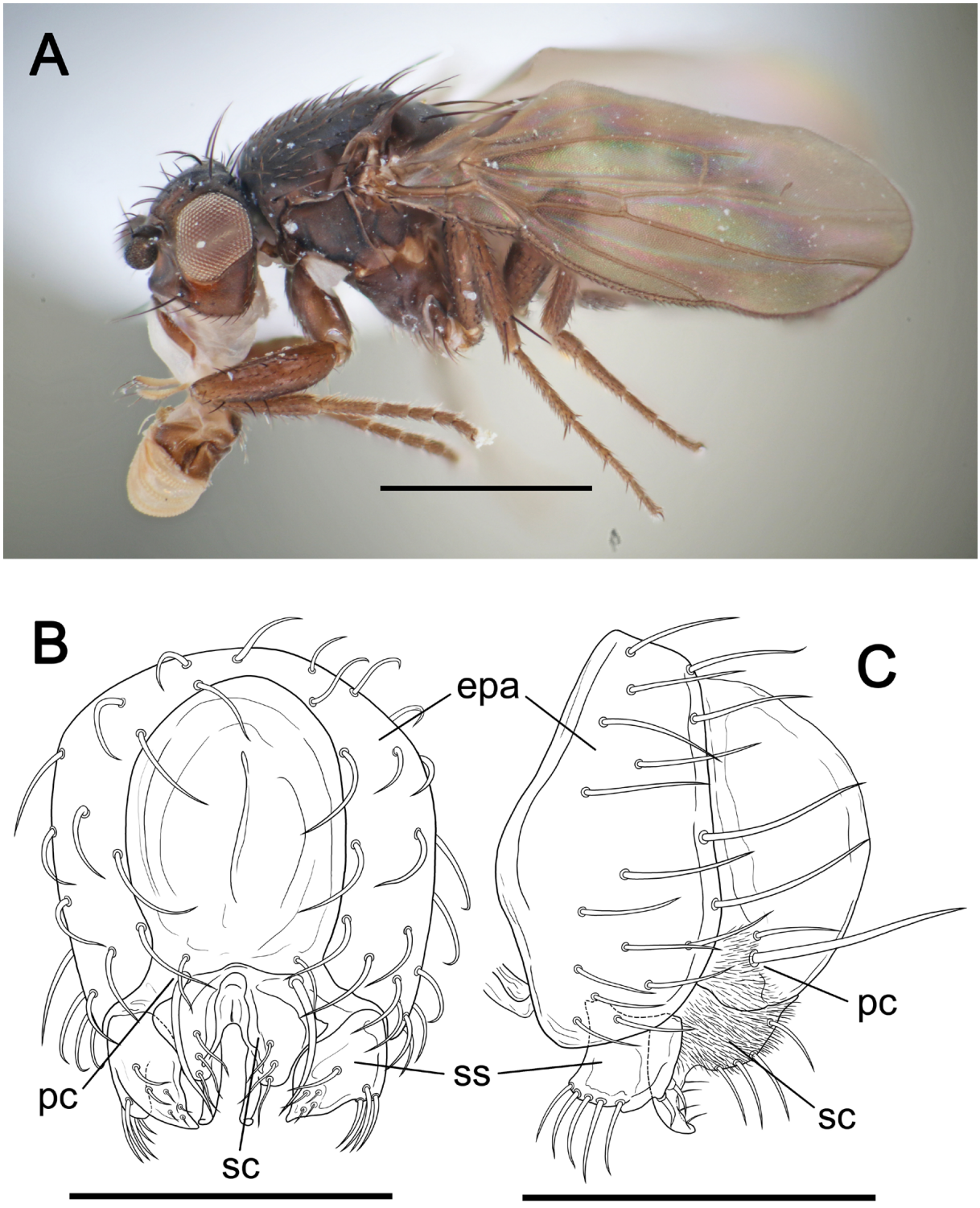


Fig. 64. *Sclerocoelus inornatus* sp. nov. **A**. Male holotype habitus, lateral view (debu00111727). **B**. Holotype left surstylus, posterior view (debu00111727). **C**. Male holotype terminalia, lateral view (debu00111727). Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

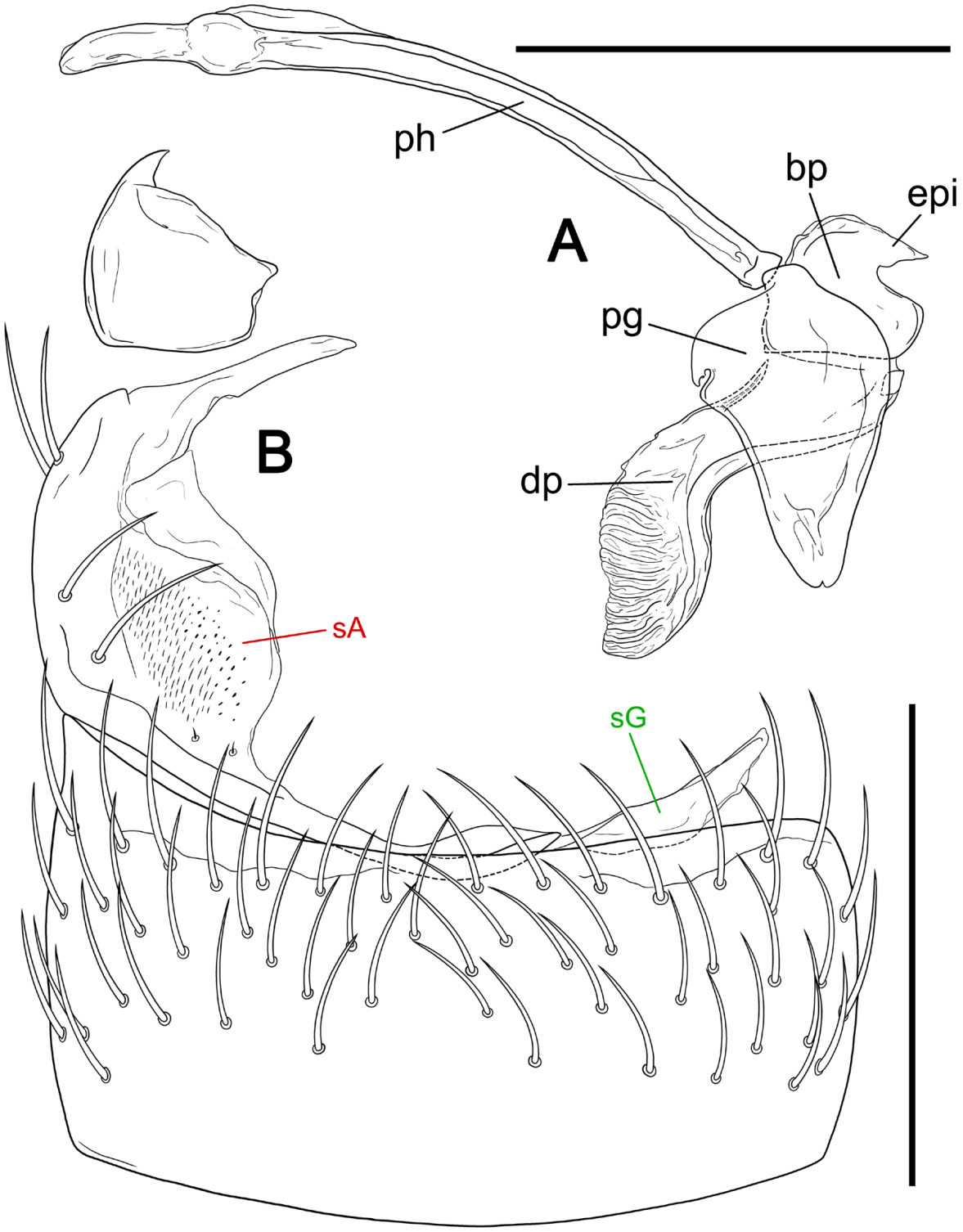


Fig. 65. *Sclerocoelus inornatus* sp. nov., male holotype (debu00111727). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; epi = epiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

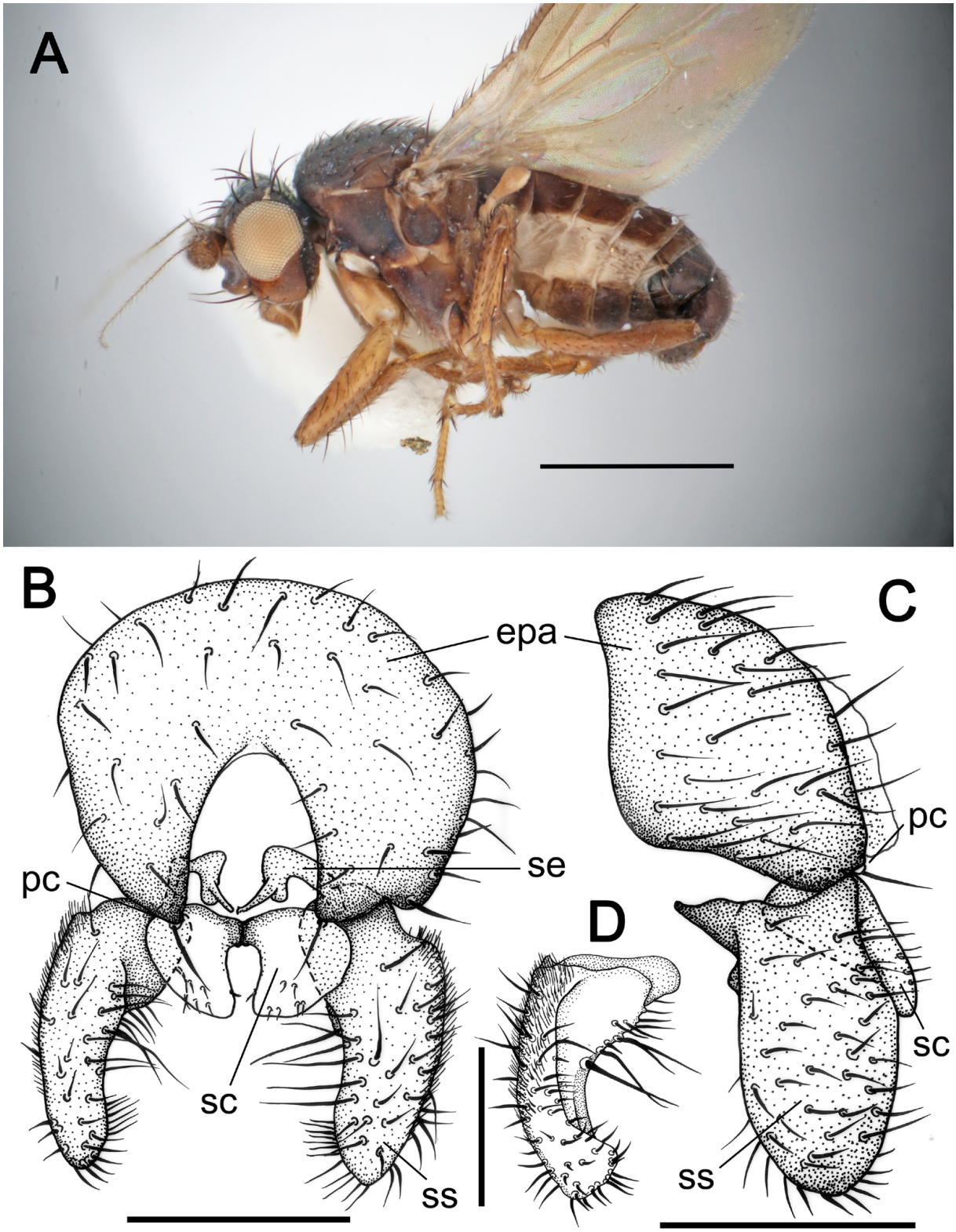


Fig. 66. *Sclerocoelus irregularis* sp. nov. **A**. Male paratype habitus, lateral view (debu00141598). **B**. Male paratype terminalia, posterior view. **C**. Male paratype terminalia, lateral view. **D**. Left surstylus, posterior view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–D = 0.25 mm.

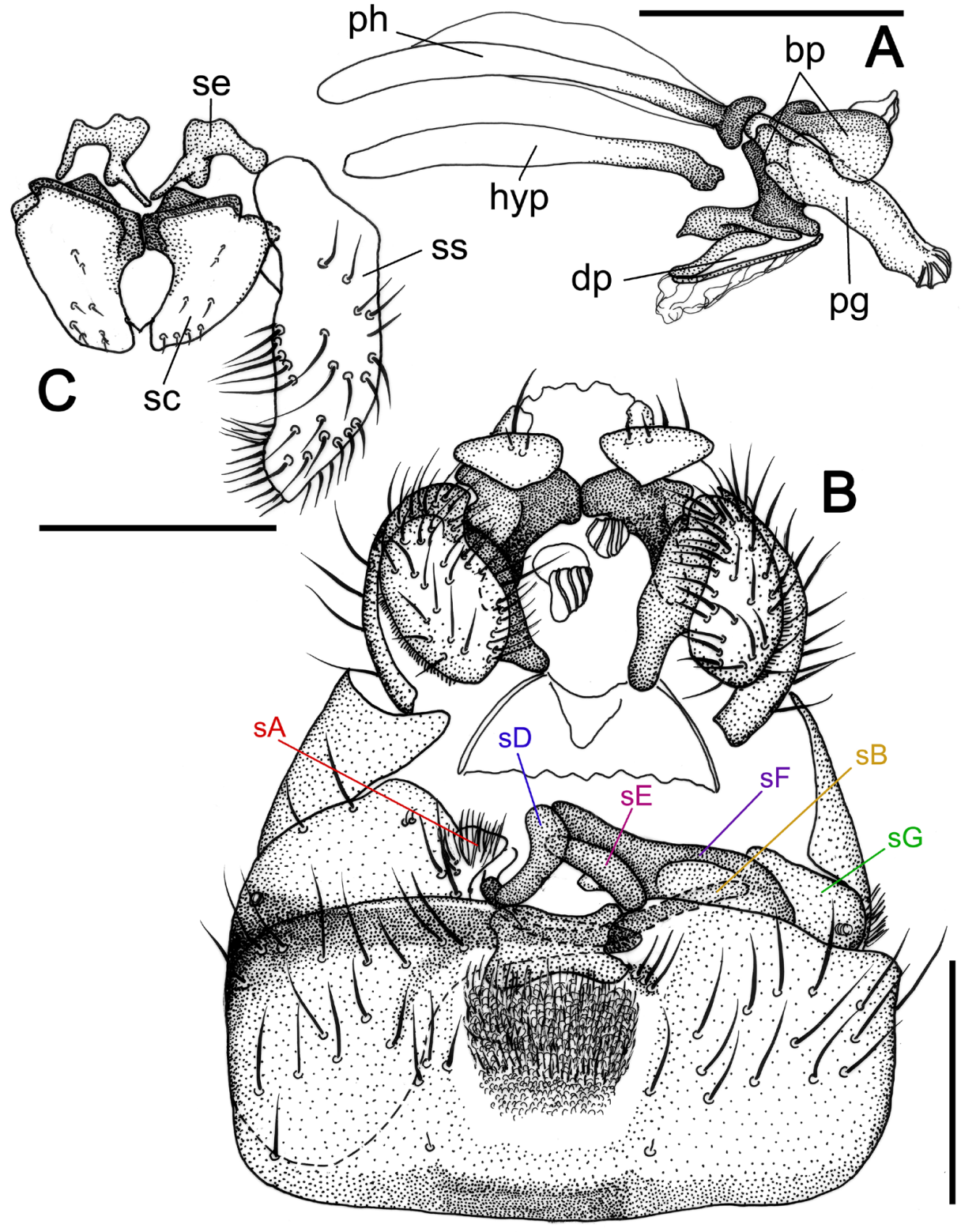


Fig. 67. *Sclerocoelus irregularis* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Subcercal complex, posterior view. Abbreviations: bp = basiphallus; dp = distiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 0.13 mm; B = 0.25 mm.

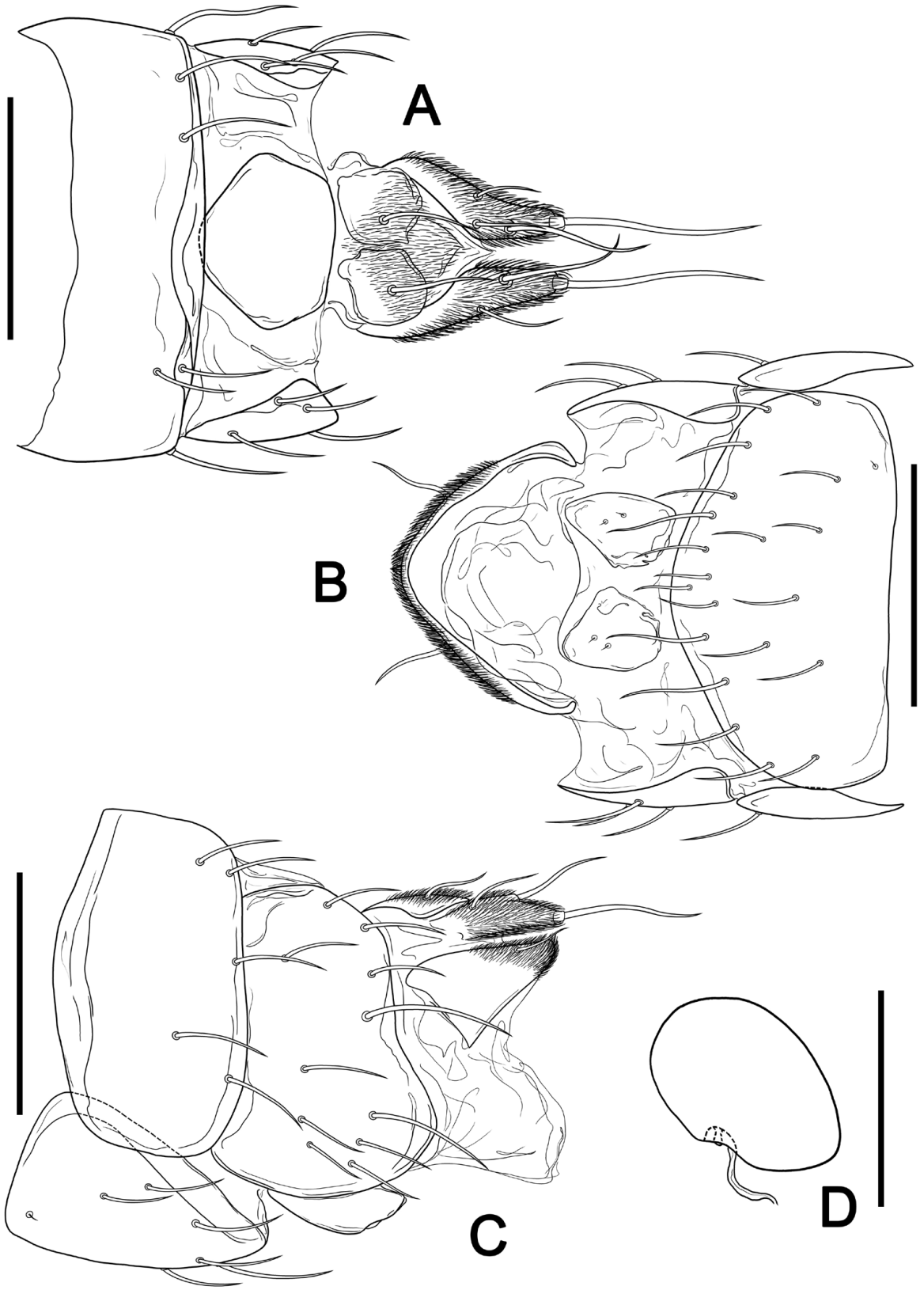


Fig. 68. *Sclerocoelus irregularis* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

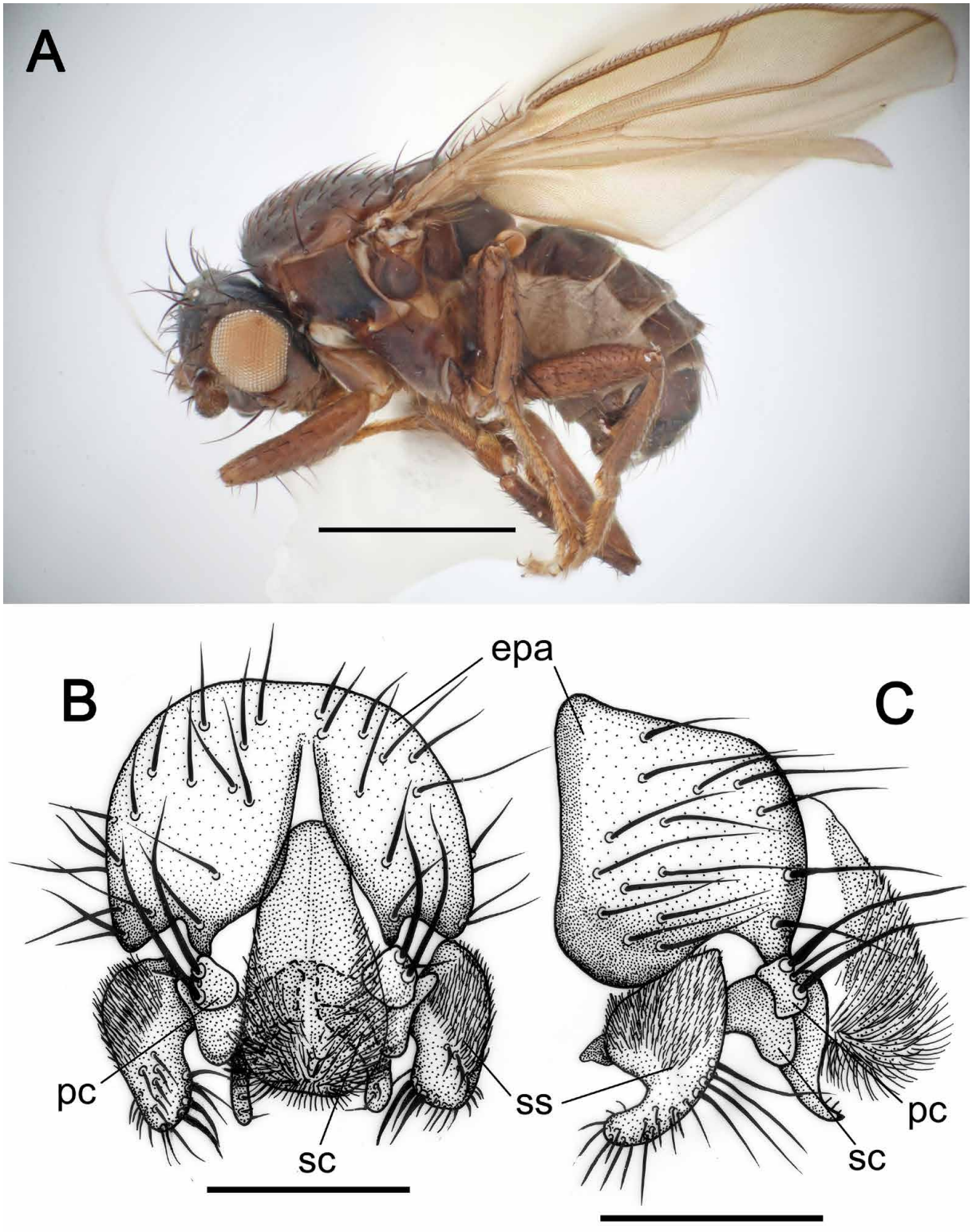


Fig. 69. *Sclerocoelus latibarbus* sp. nov., paratype. **A**. Male habitus, lateral view. **B**. Male terminalia, posterior view. **C**. Male terminalia, lateral view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

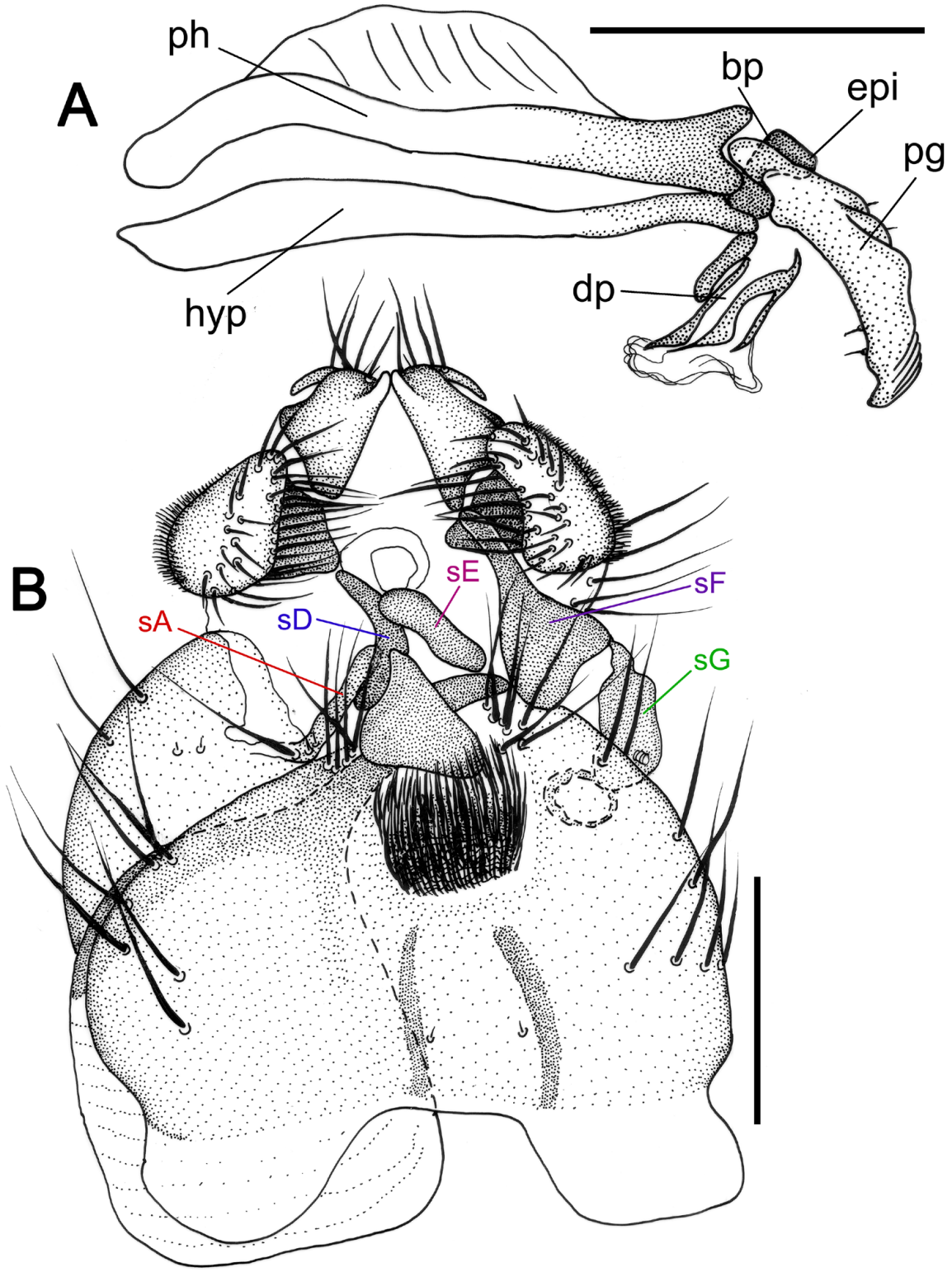


Fig. 70. *Sclerocoelus latibarbus* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; epi = epiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

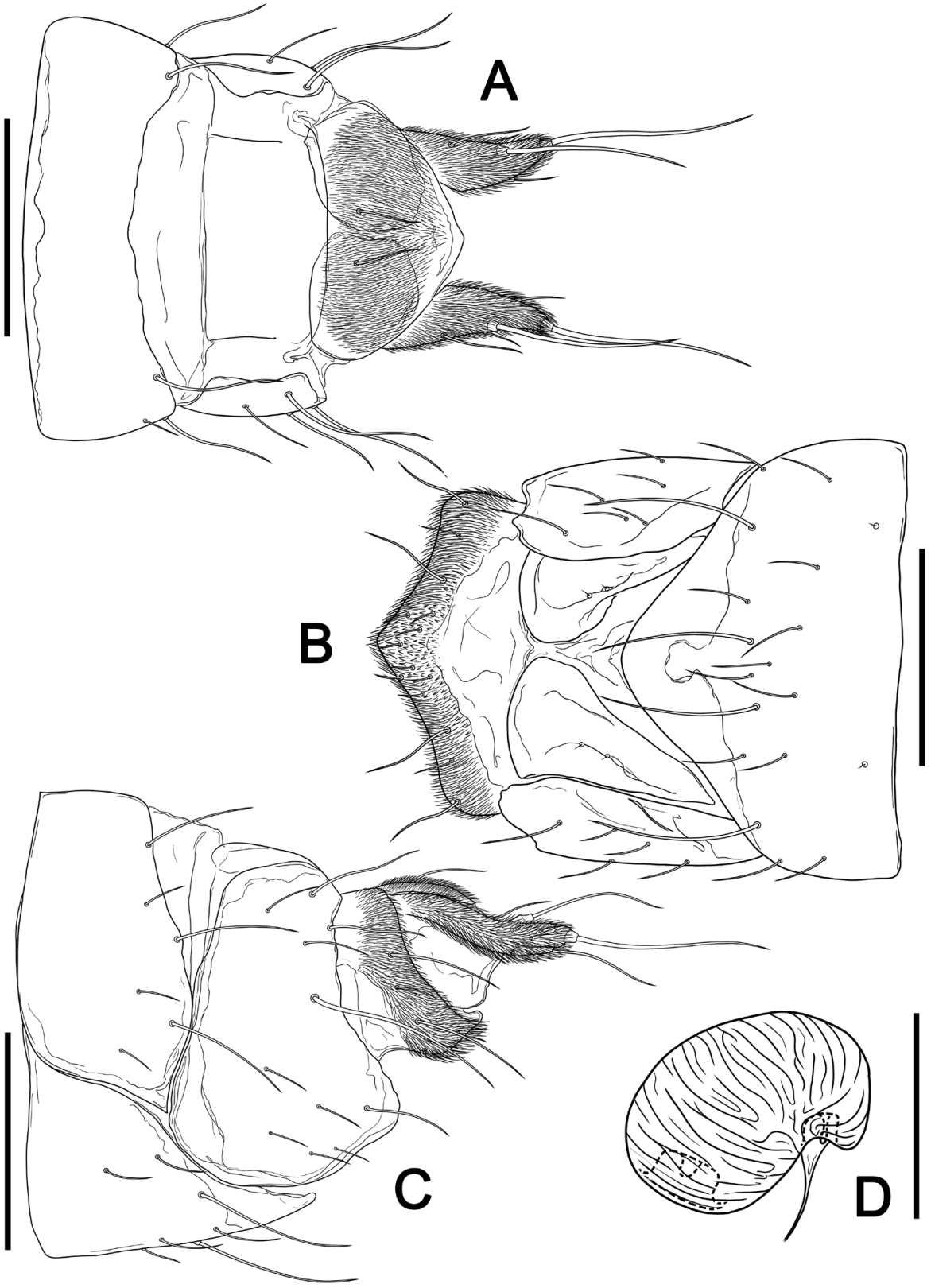


Fig. 71. *Sclerocoelus latibarbus* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

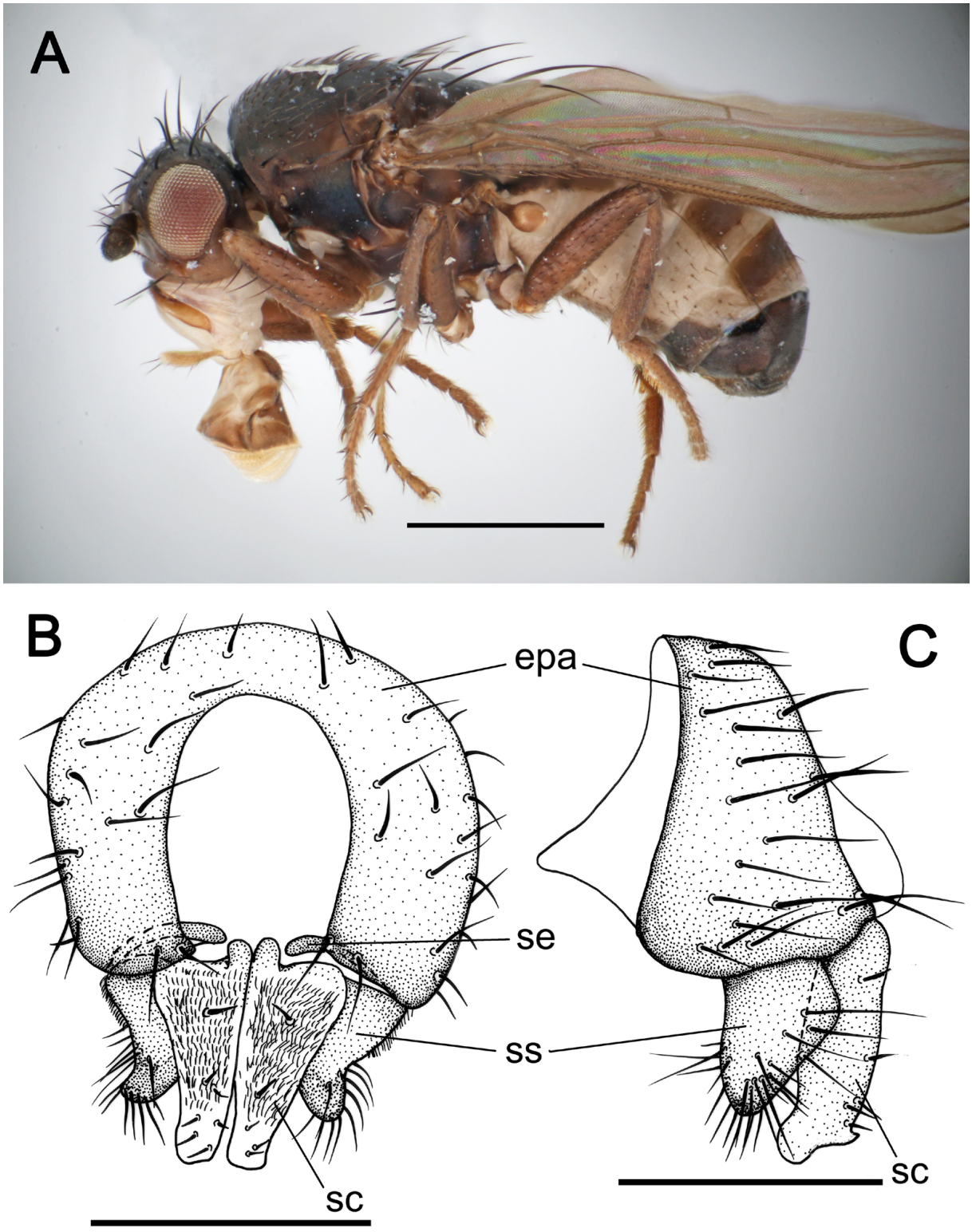


Fig. 72. *Sclerocoelus lazulita* sp. nov. **A**. Male paratype habitus, lateral view (debu00115184). **B**. Male paratype terminalia, posterior view. **C**. Male paratype terminalia, lateral view. Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

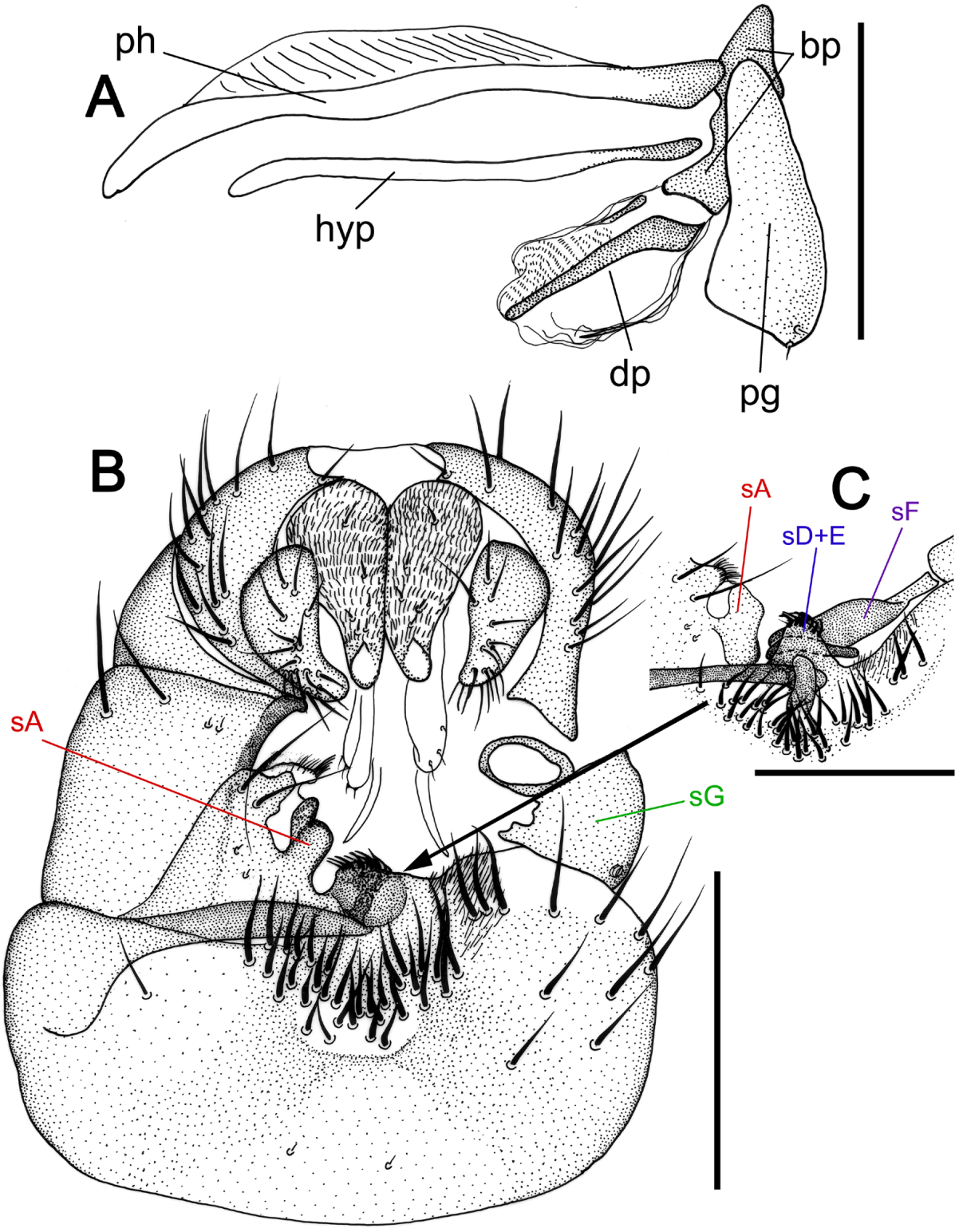


Fig. 73. *Sclerocoelus lazulita* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Genital pouch sclerites A–F, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm; C = 0.15 mm.

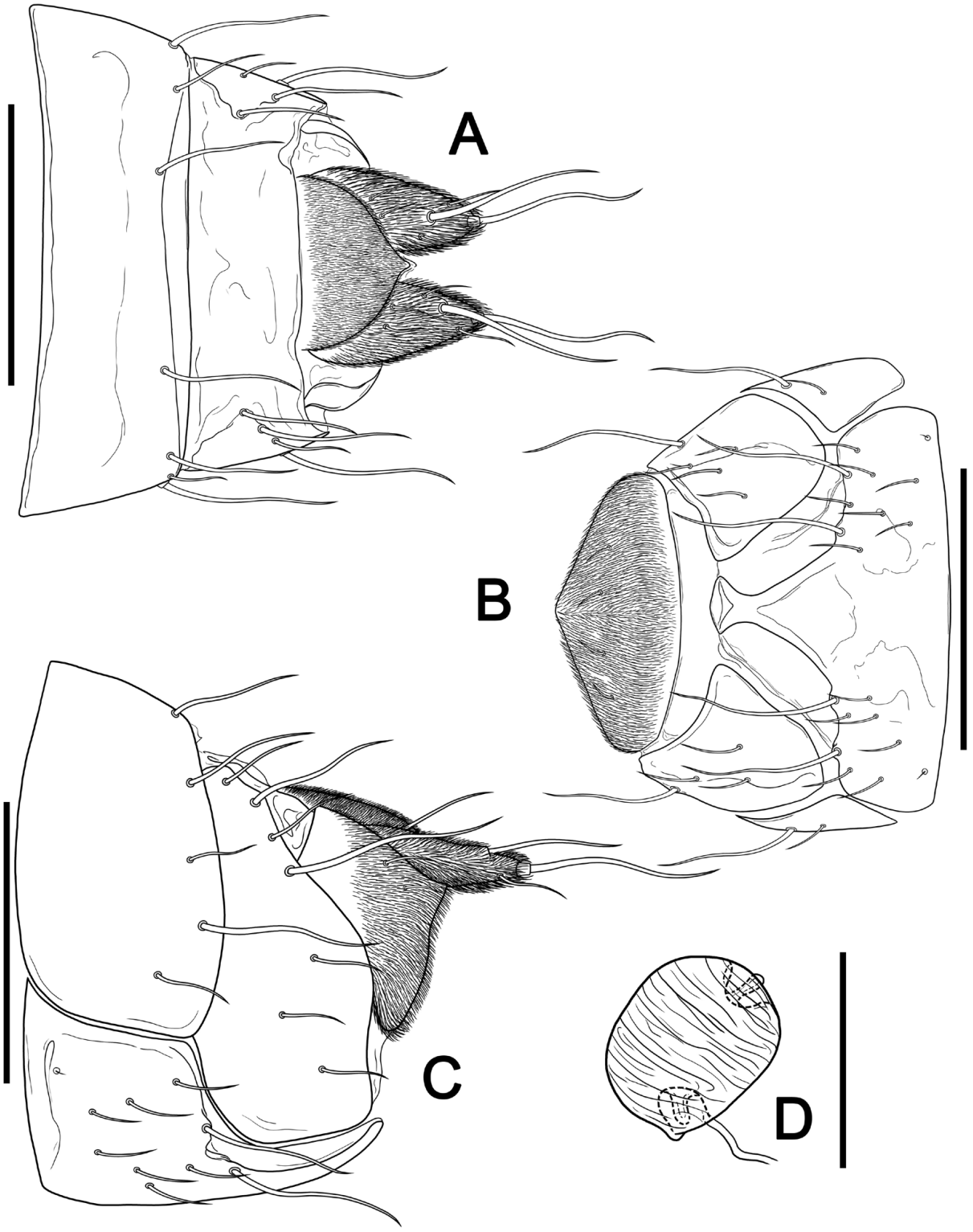


Fig. 74. *Sclerocoelus lazulita* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

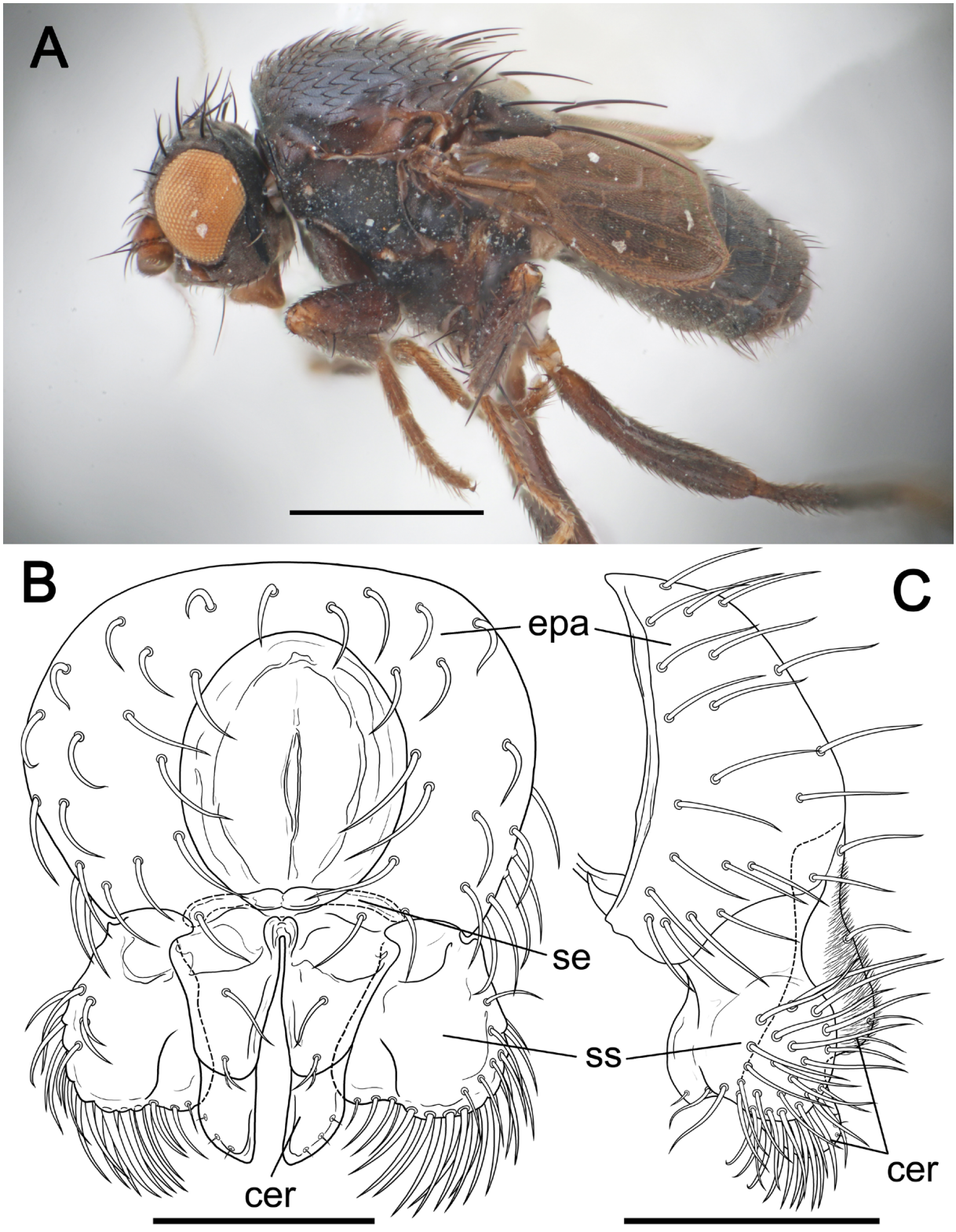


Fig. 75. *Sclerocoelus limbus* sp. nov. **A**. Male paratype habitus, lateral view (debu00111049). **B**. Male holotype terminalia, posterior view (debu00127173). **C**. Male holotype terminalia, lateral view (debu00127173). Abbreviations: cer = cercus; epa = epandrium; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

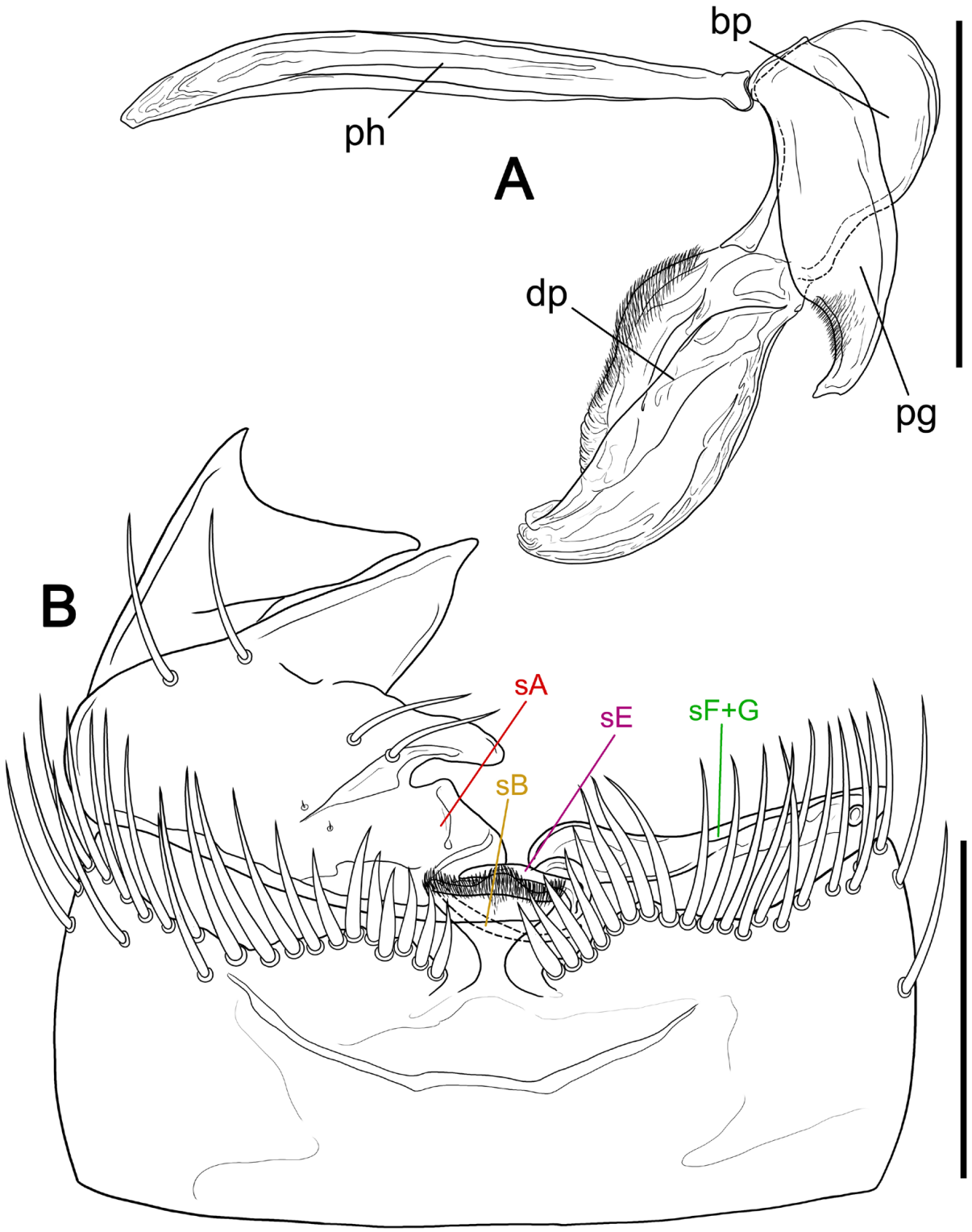


Fig. 76. *Sclerocoelus limbus* sp. nov., male holotype (debu00127173). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

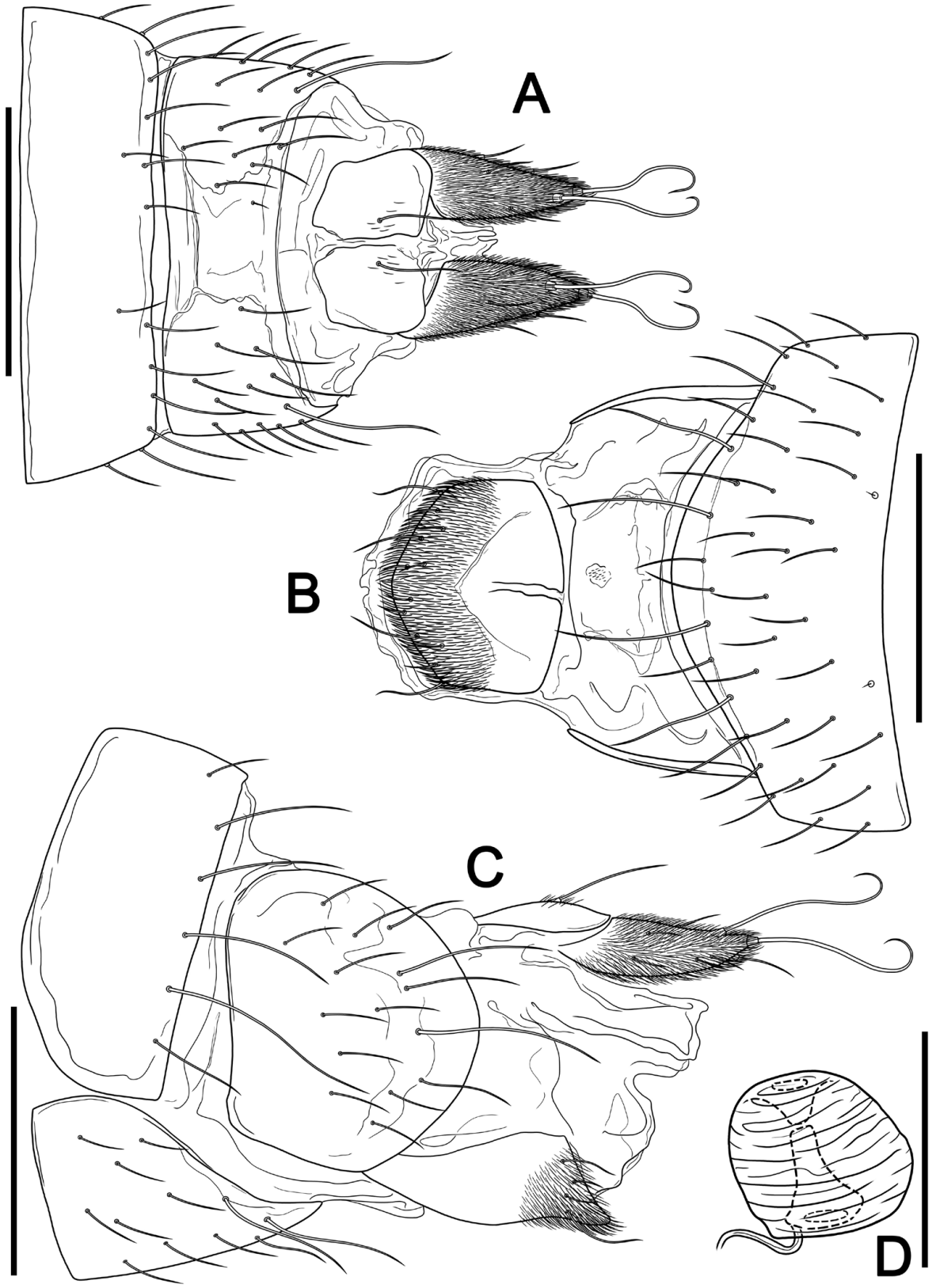


Fig. 77. *Sclerocoelus limbus* sp. nov., paratype (debu00111051). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

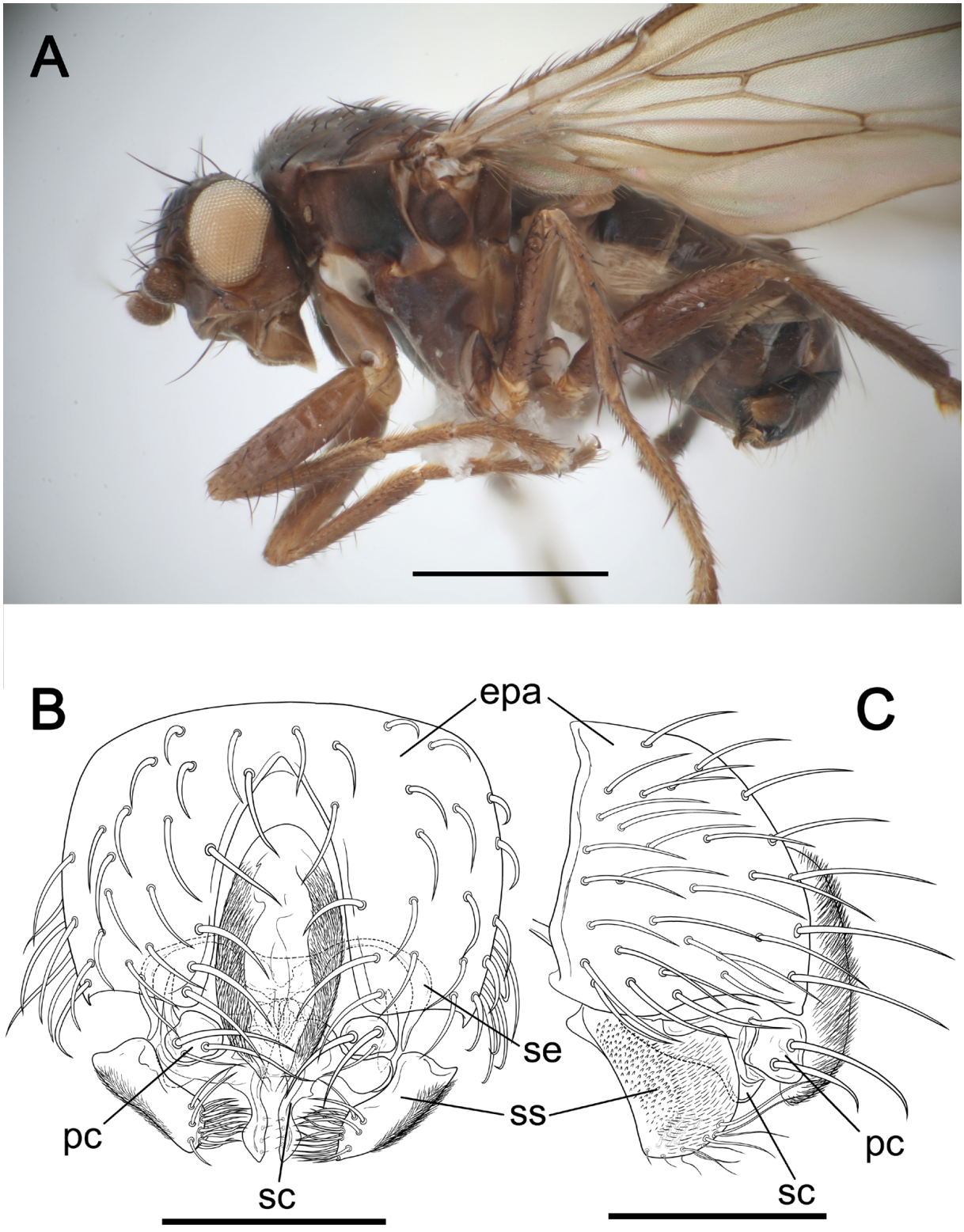


Fig. 78. *Sclerocoelus longibarbus* sp. nov. **A**. Male holotype habitus, lateral view (DEBU). **B**. Male paratype terminalia, posterior view. **C**. Male paratype terminalia, lateral view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

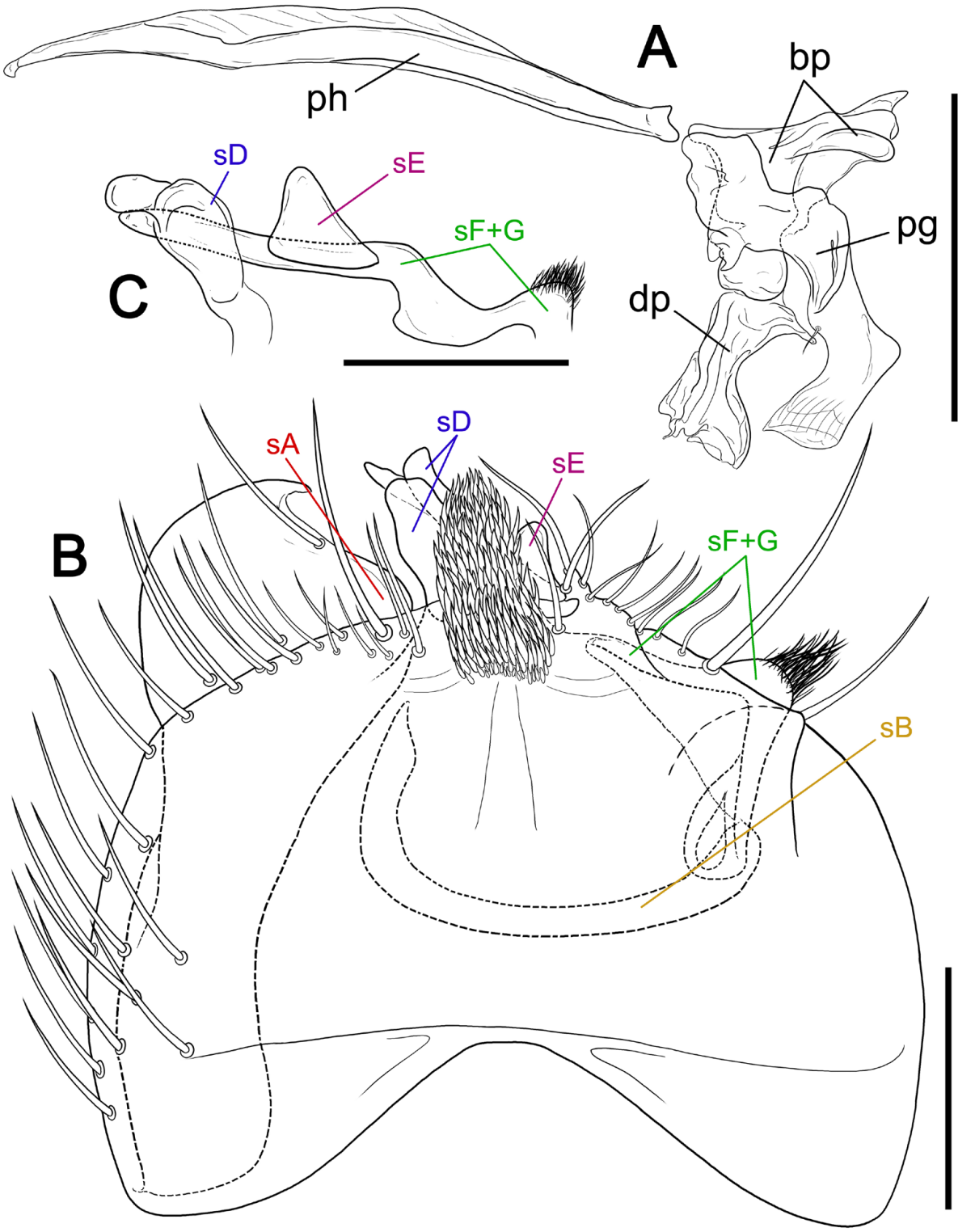


Fig. 79. *Sclerocoelus longibarbus* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Genital pouch sclerites D–G, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B–C = 0.25 mm.

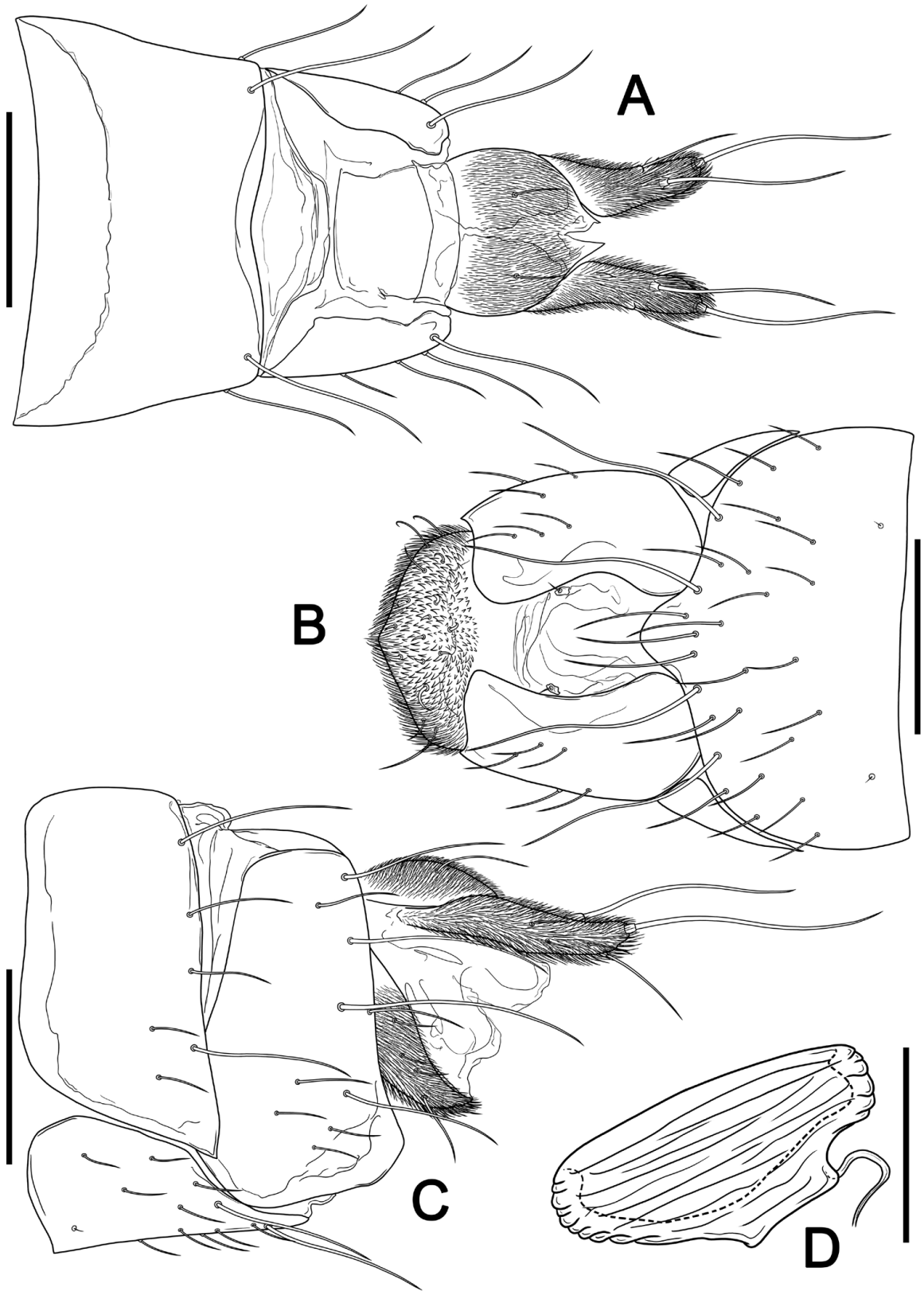


Fig. 80. *Sclerocoelus longibarbus* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.05 mm.

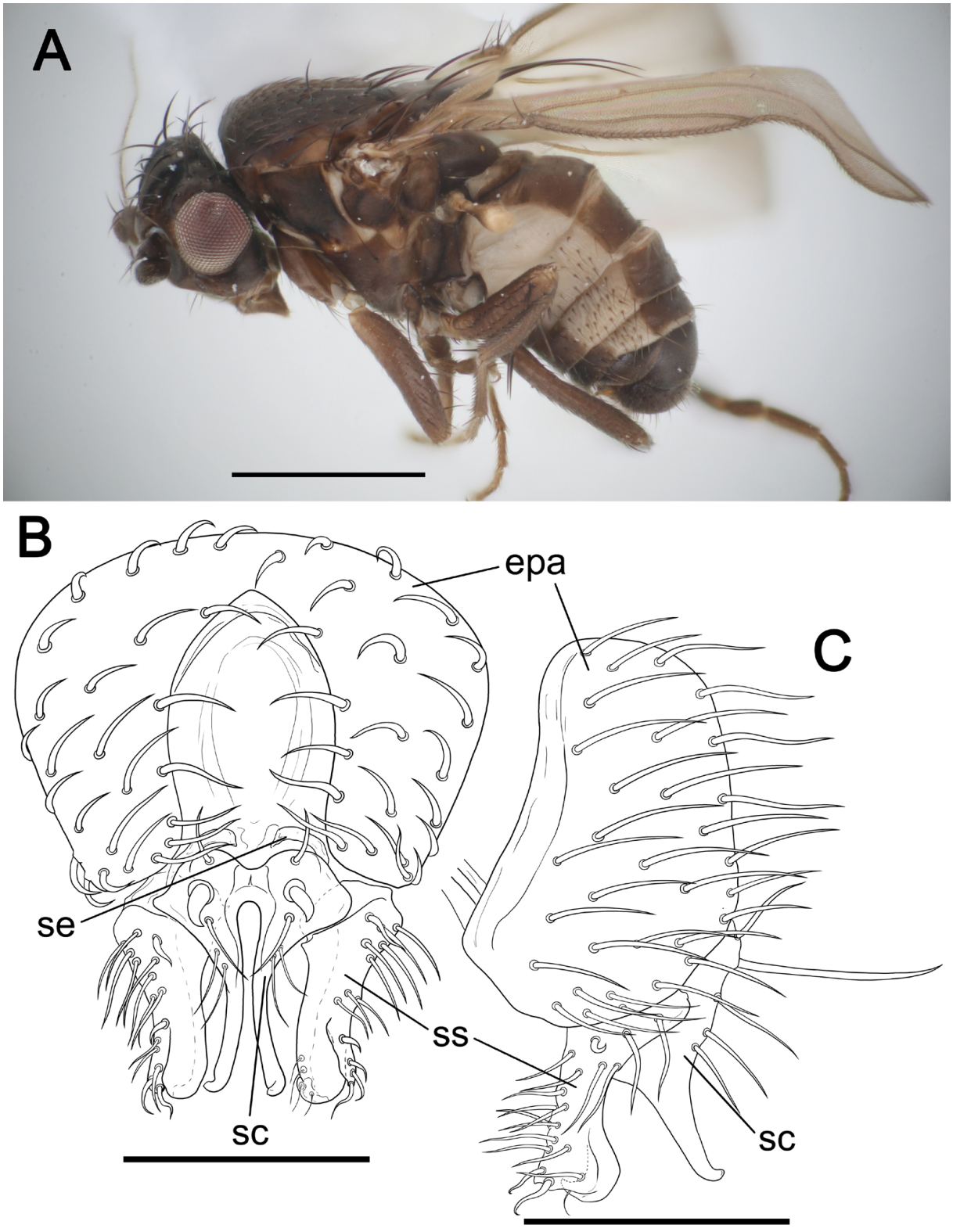


Fig. 81. *Sclerocoelus lutosus* sp. nov. **A**. Male paratype habitus, lateral view (debu00177249). **B**. Male paratype terminalia, posterior view (debu00303243). **C**. Male paratype terminalia, lateral view (debu00303243). Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

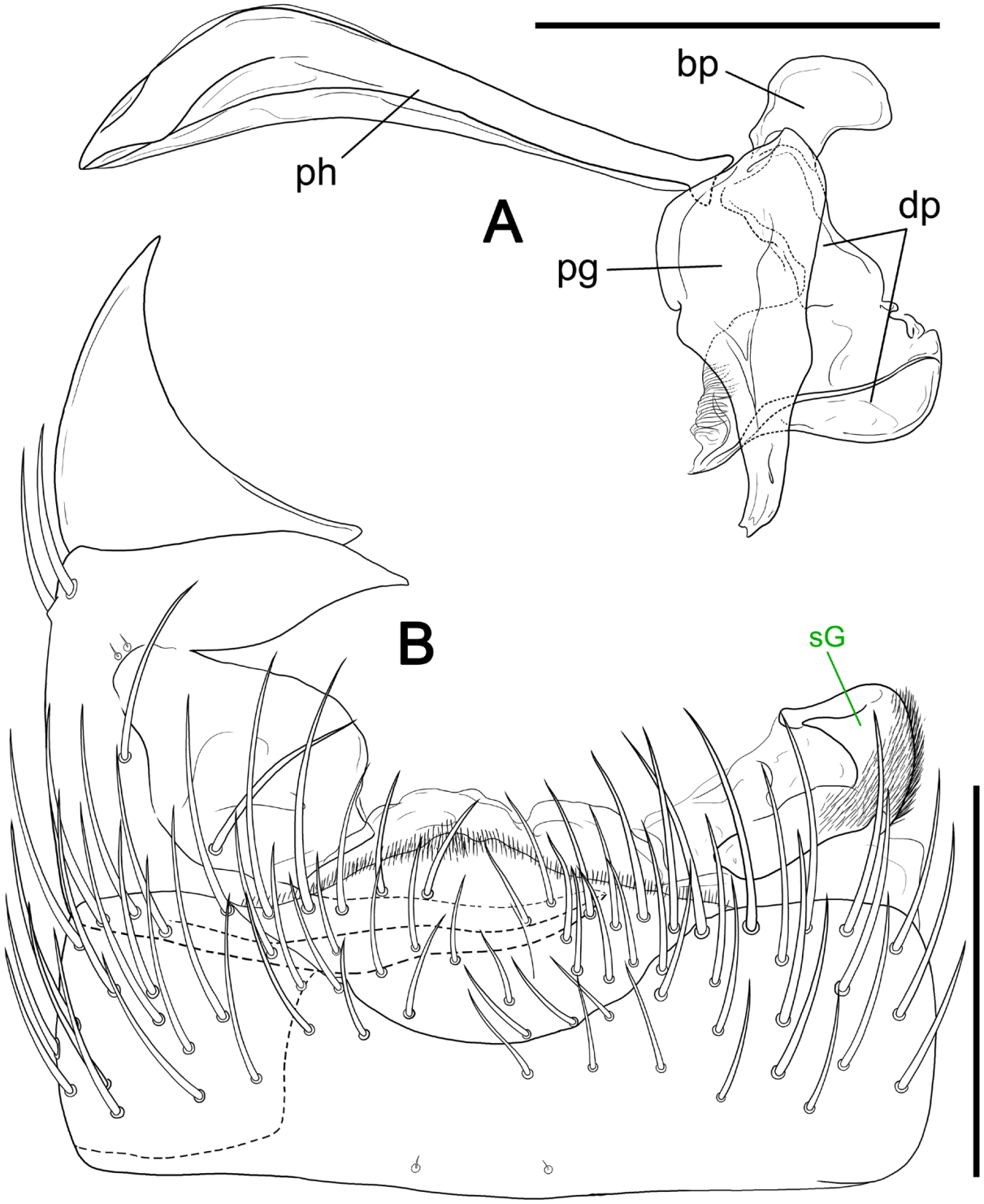


Fig. 82. *Sclerocoelus lutosus* sp. nov., paratype (debu00303243). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus, dp = distiphallus, pg = postgonite, ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

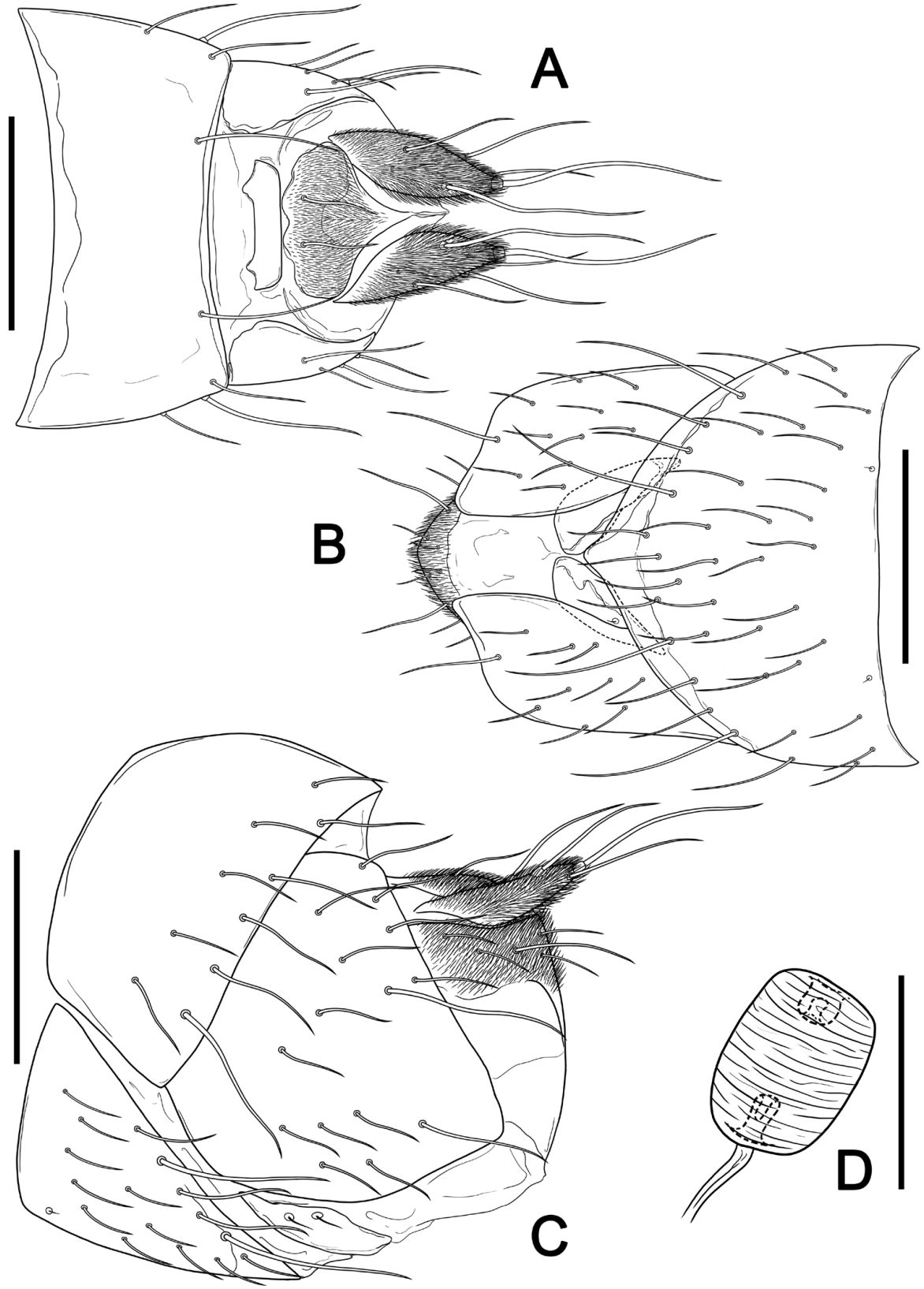


Fig. 83. *Sclerocoelus lutosus* sp. nov., paratype (debu00177264). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

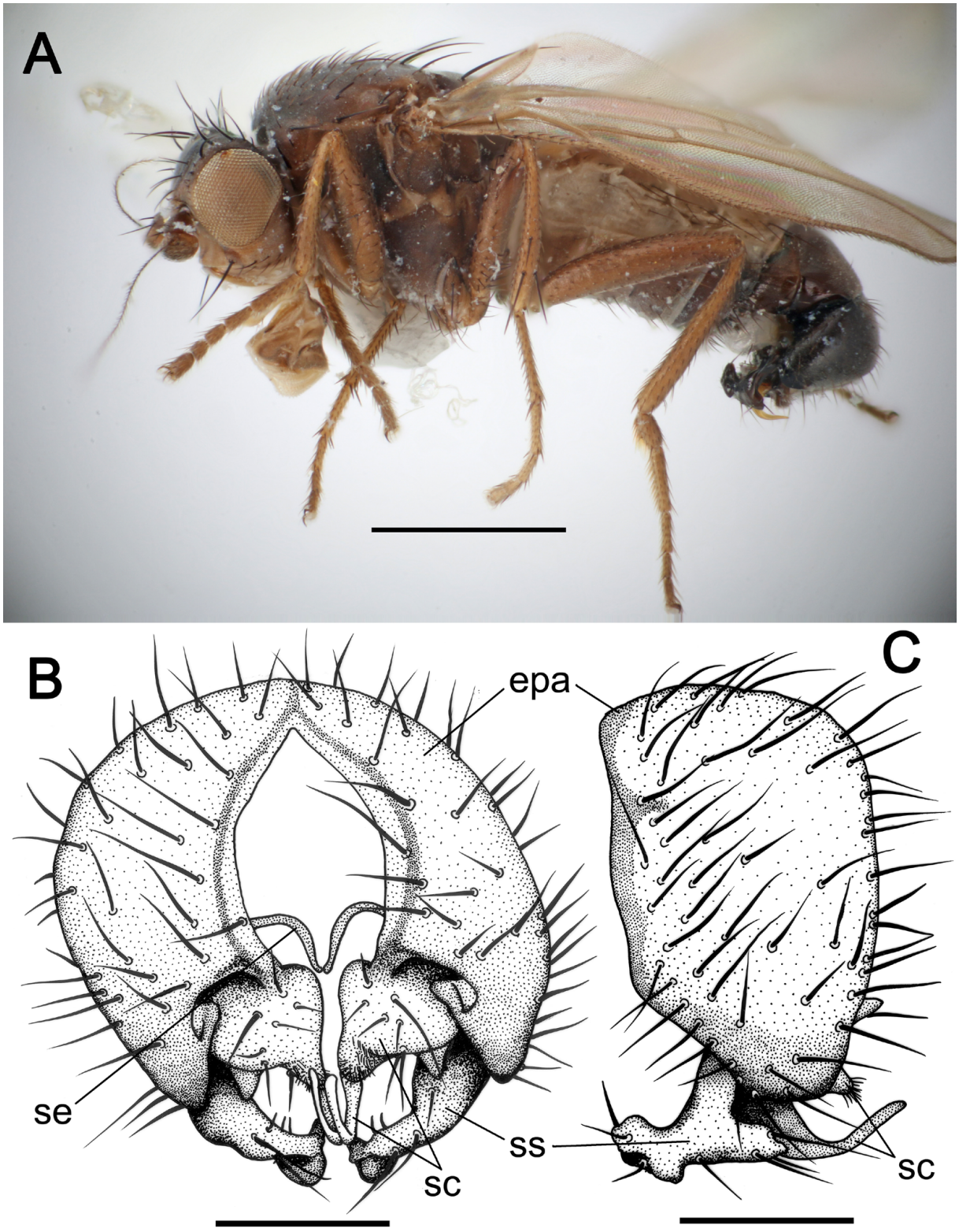


Fig. 84. *Sclerocoelus mandibulum* sp. nov. **A**. Male holotype habitus, lateral view (debu00139611). **B**. Male paratype terminalia, posterior view (debu00139228). **C**. Male paratype terminalia, lateral view (debu00139228). Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

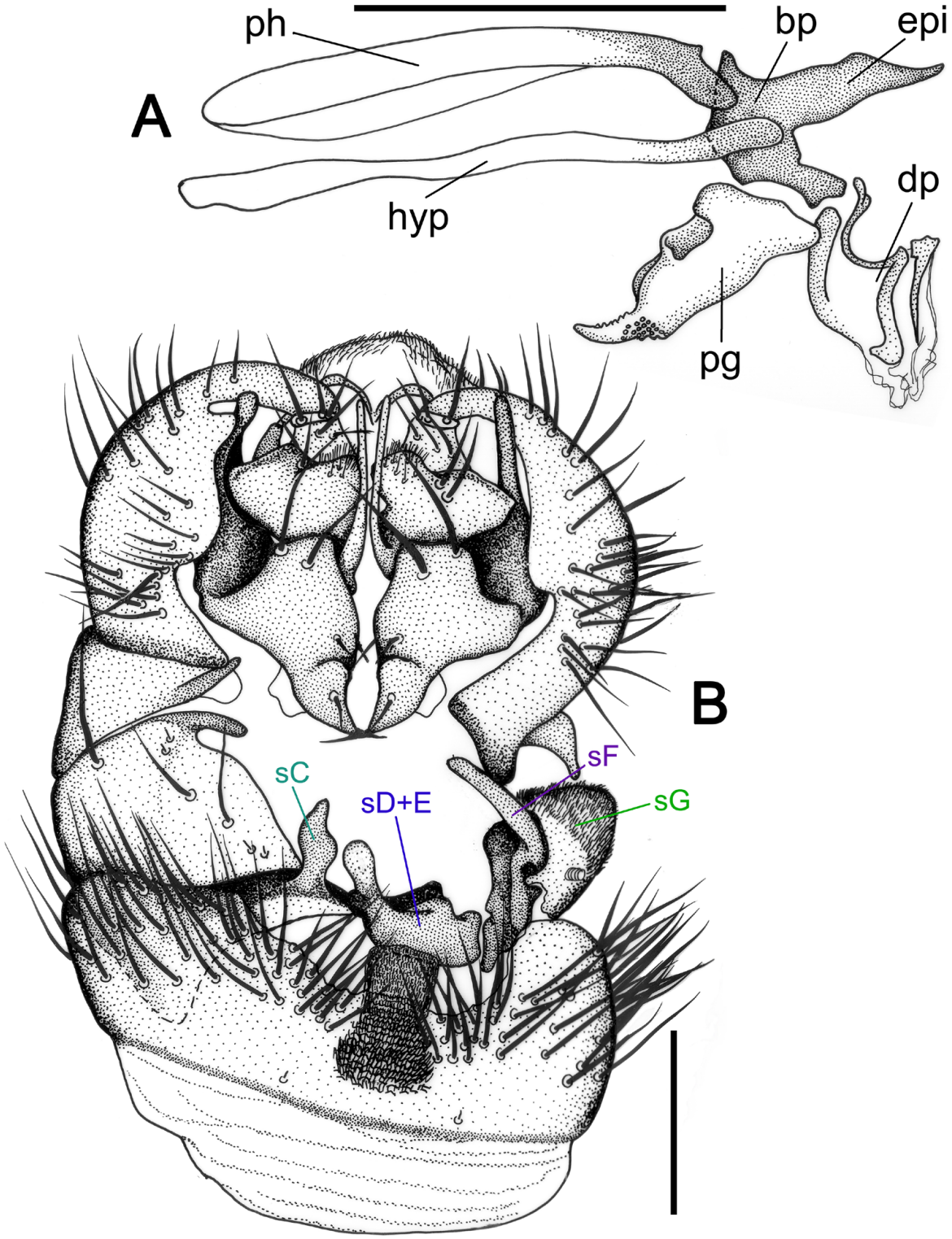


Fig. 85. *Sclerocoelus mandibulum* sp. nov., paratype (debu00139228). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; epi = epiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

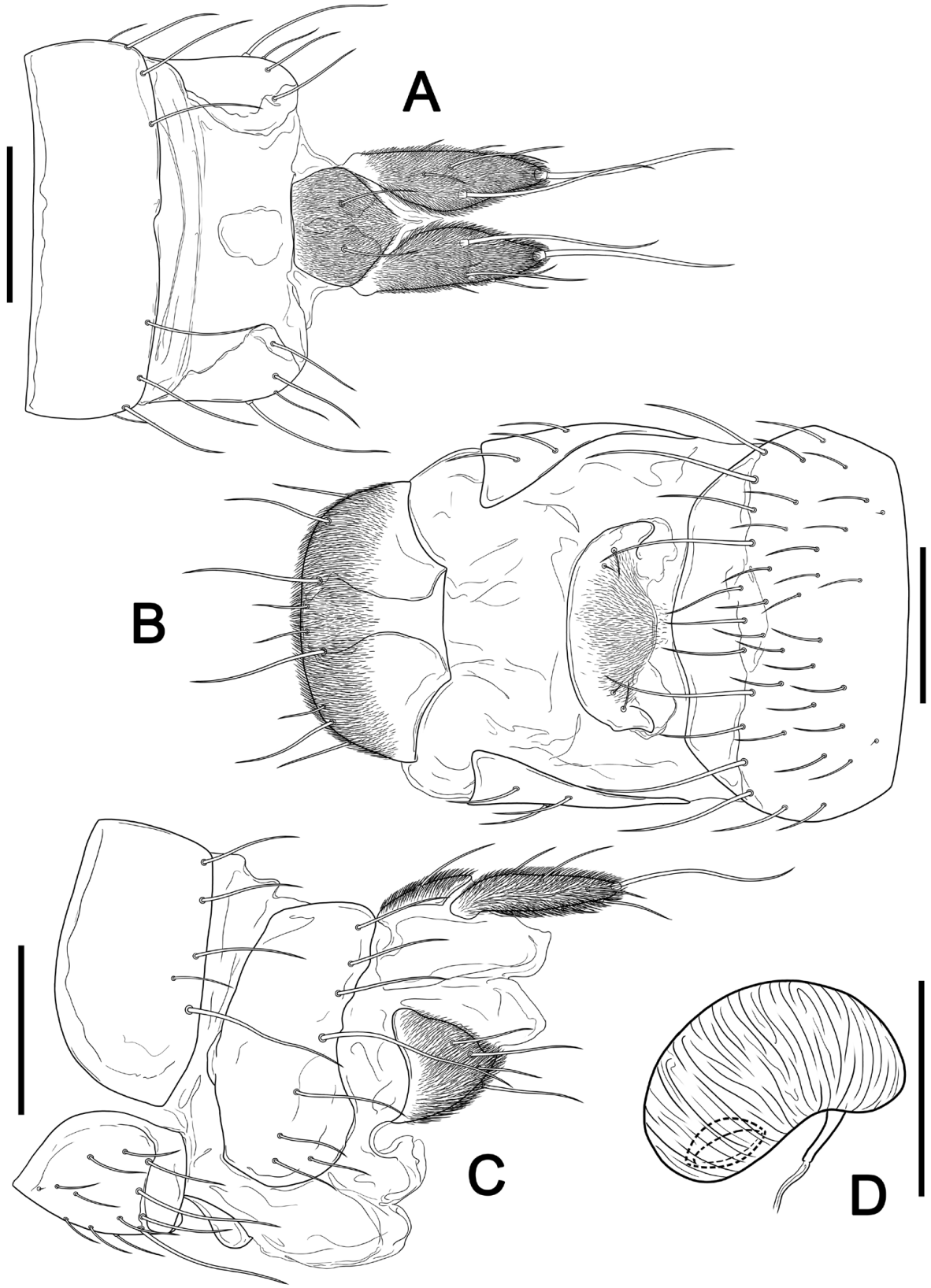


Fig. 86. *Sclerocoelus mandibulum* sp. nov., paratype (debu00142185). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

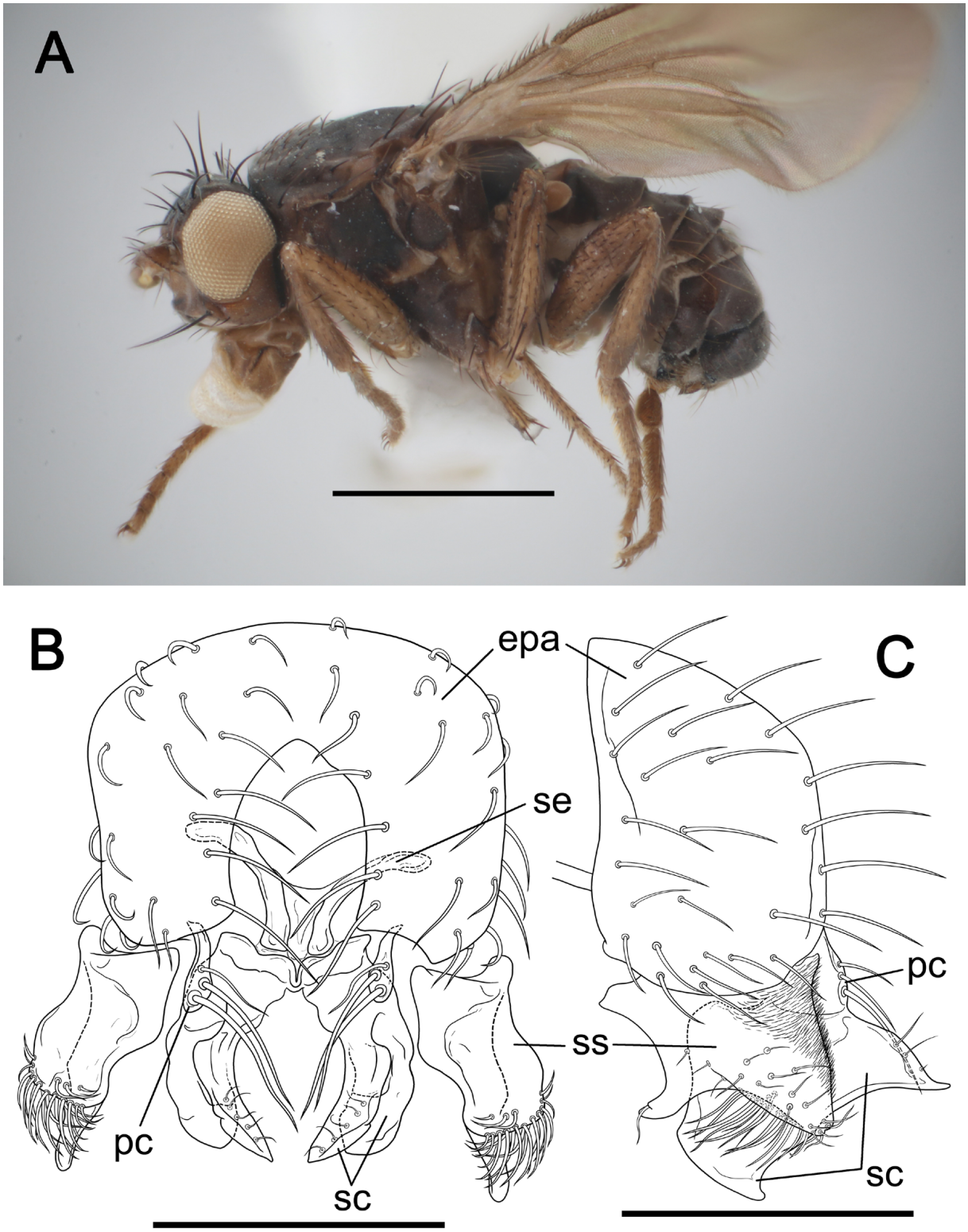


Fig. 87. *Sclerocoelus masneri* sp. nov., paratype. **A**. Male habitus, lateral view. **B**. Male terminalia, posterior view. **C**. Male terminalia, lateral view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

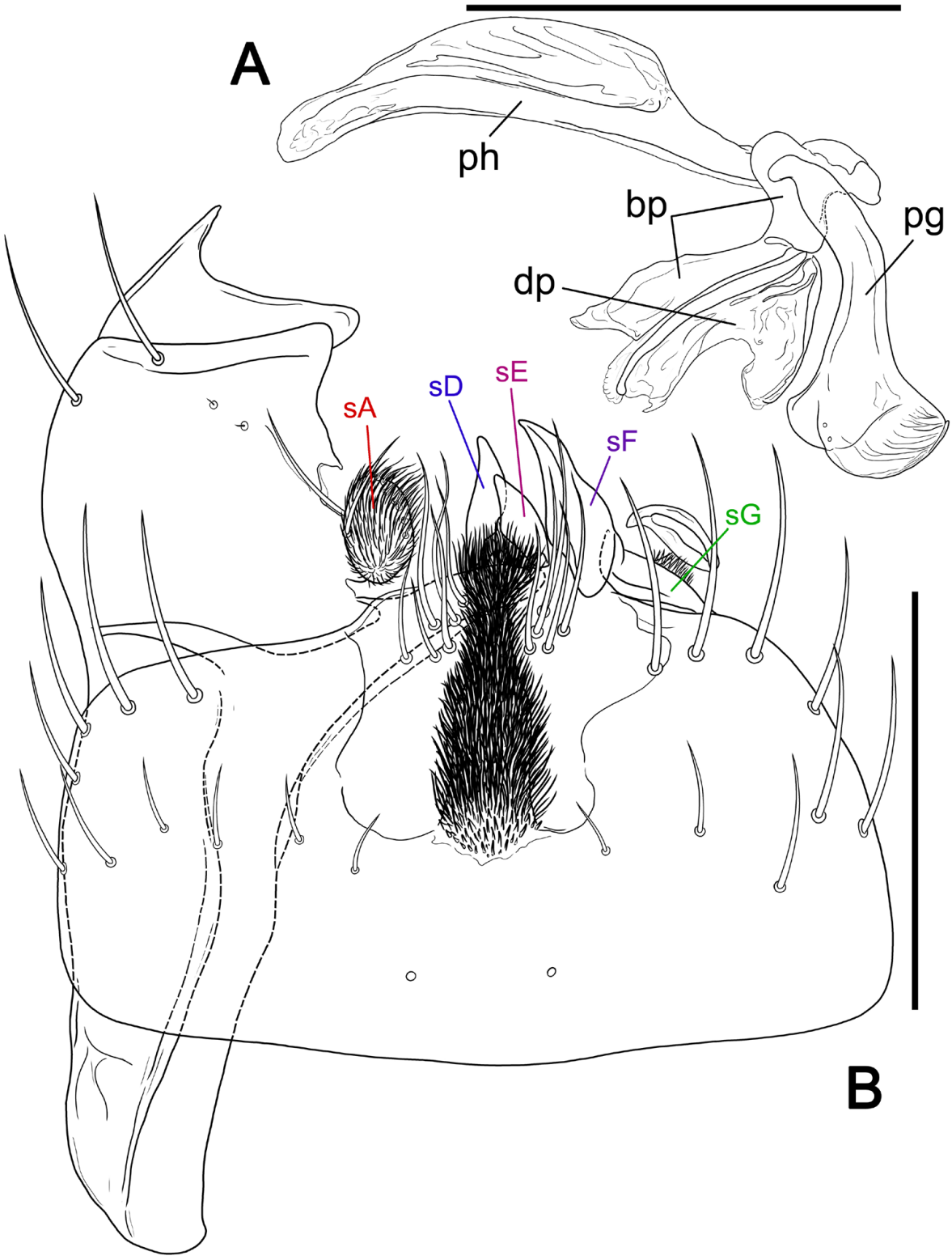


Fig. 88. *Sclerocoelus masneri* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

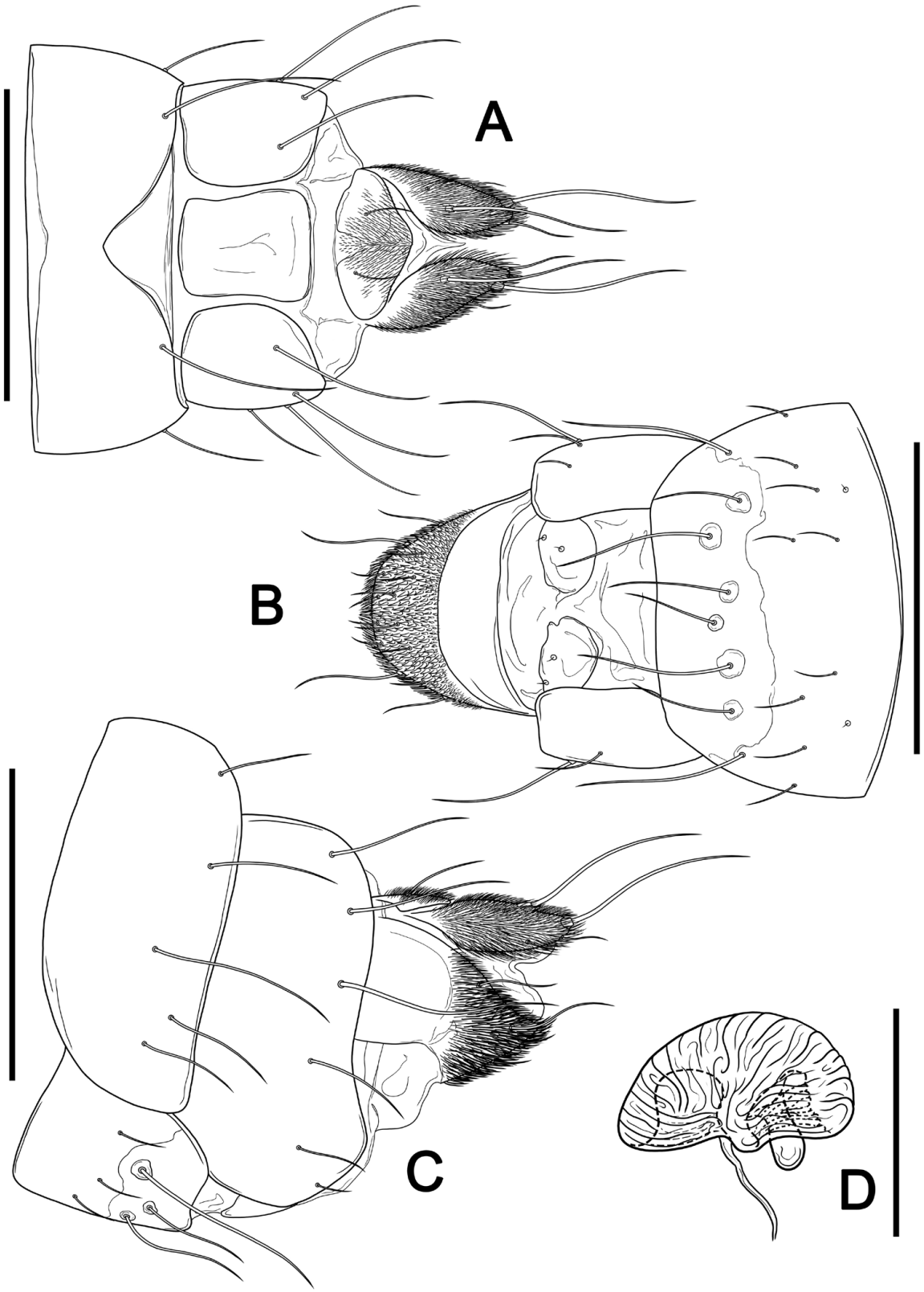


Fig. 89. *Sclerocoelus masneri* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

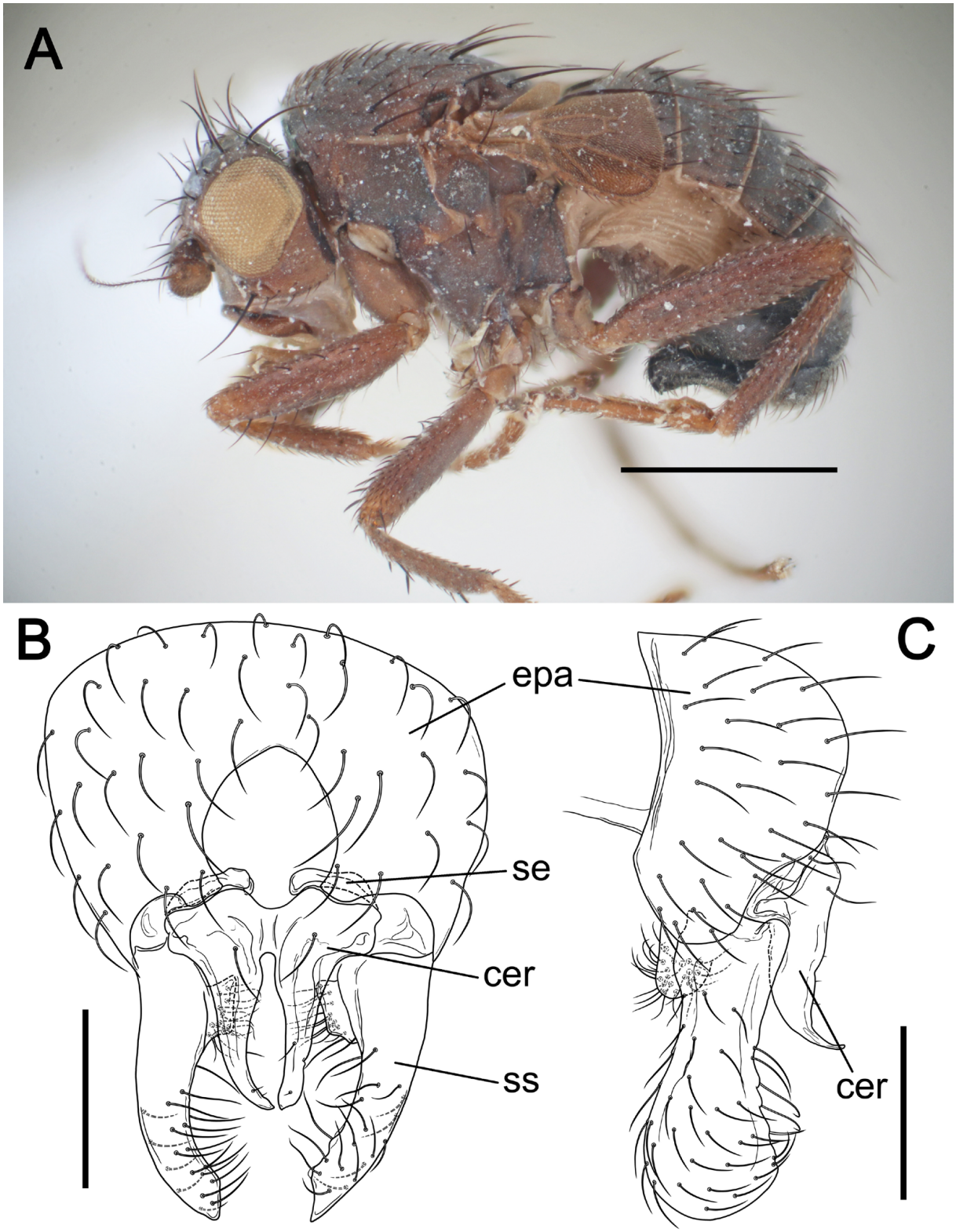


Fig. 90. *Sclerocoelus meridensis* sp. nov. **A**. Male holotype habitus, lateral view (debu01041014). **B**. Male paratype terminalia, posterior view (debu01041005). **C**. Male paratype terminalia, lateral view (debu01041005). Abbreviations: cer = cercus; epa = epandrium; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

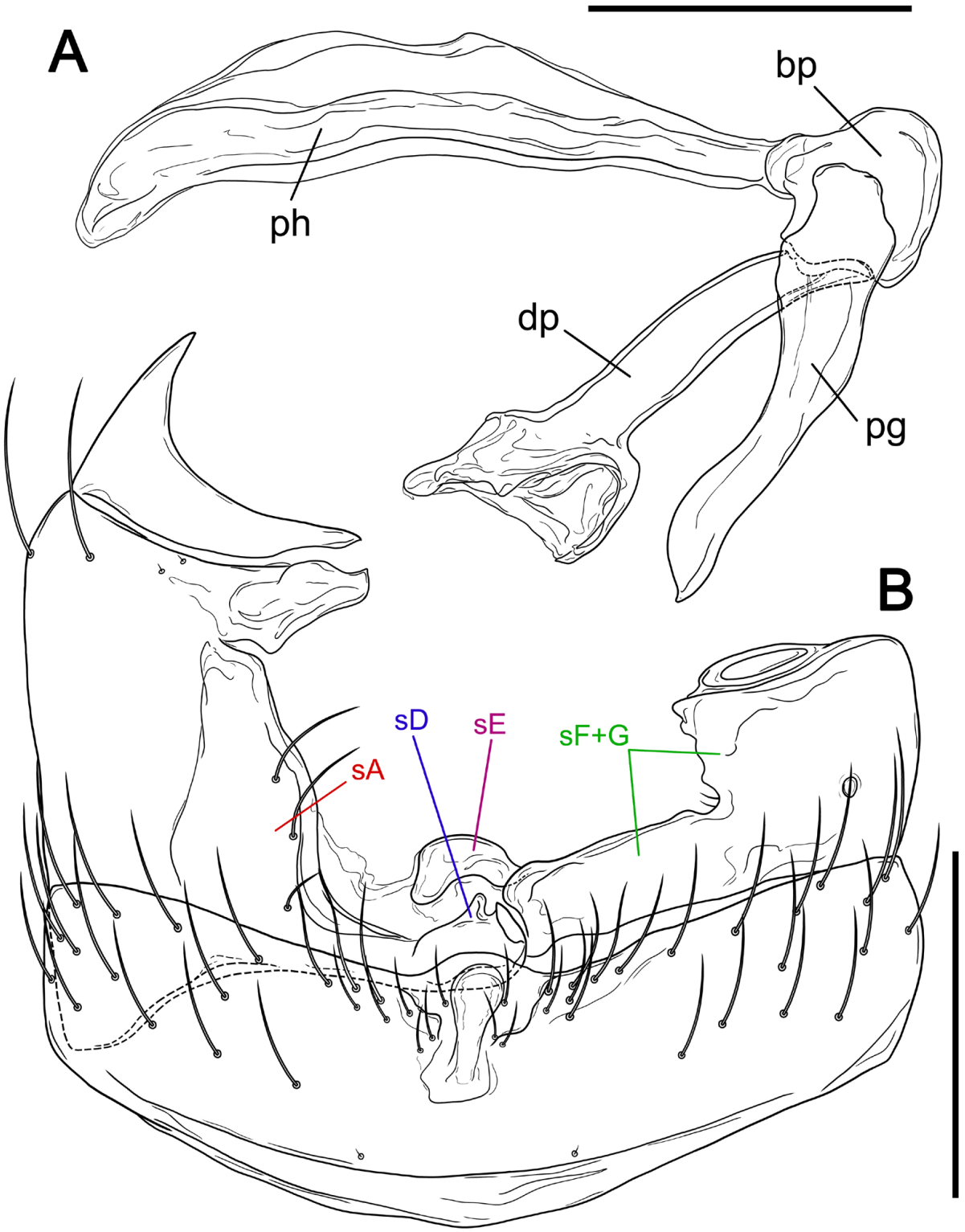


Fig. 91. *Sclerocoelus meridensis* sp. nov., paratype (debu01041005). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

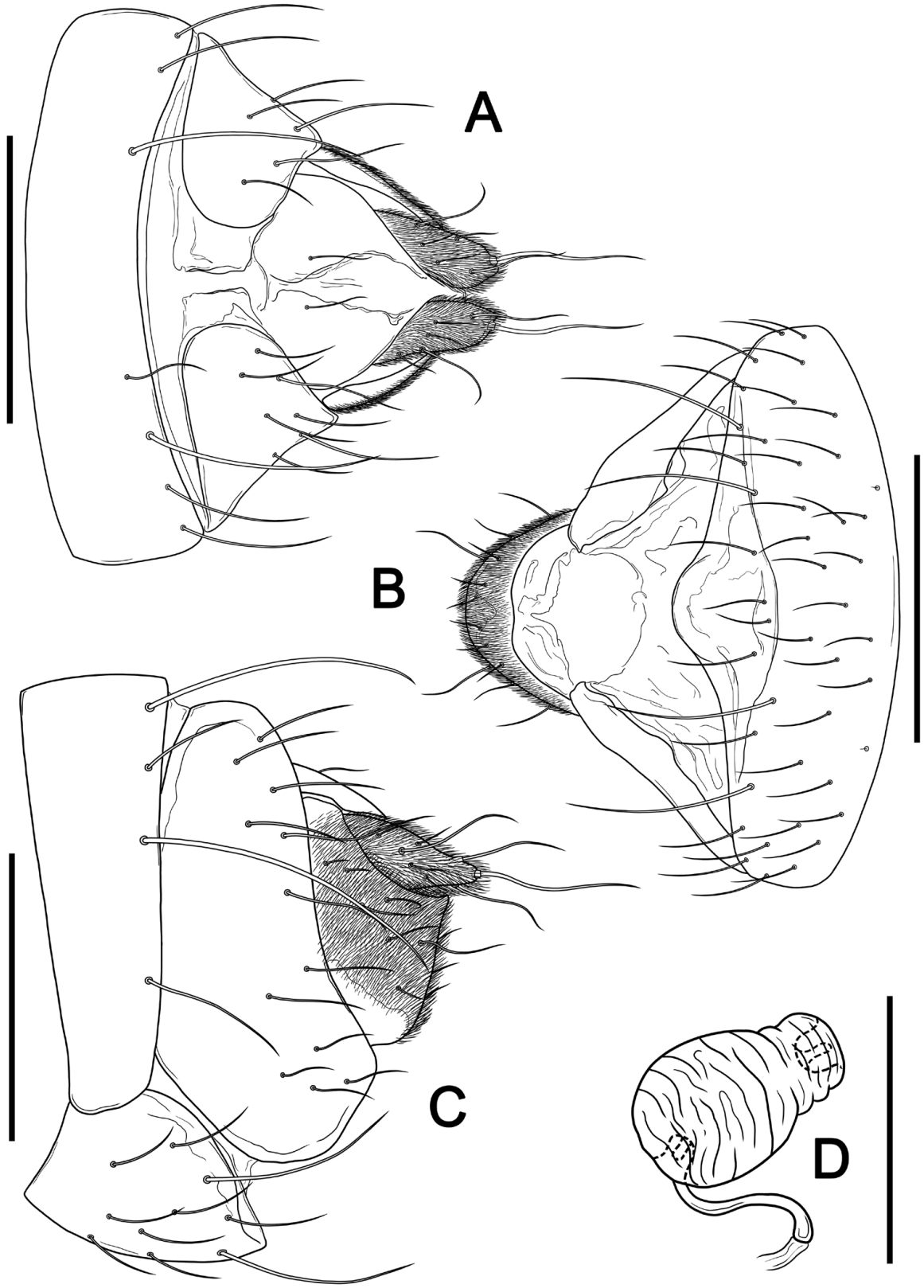


Fig. 92. *Sclerocoelus meridensis* sp. nov., paratype (debu01041009). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

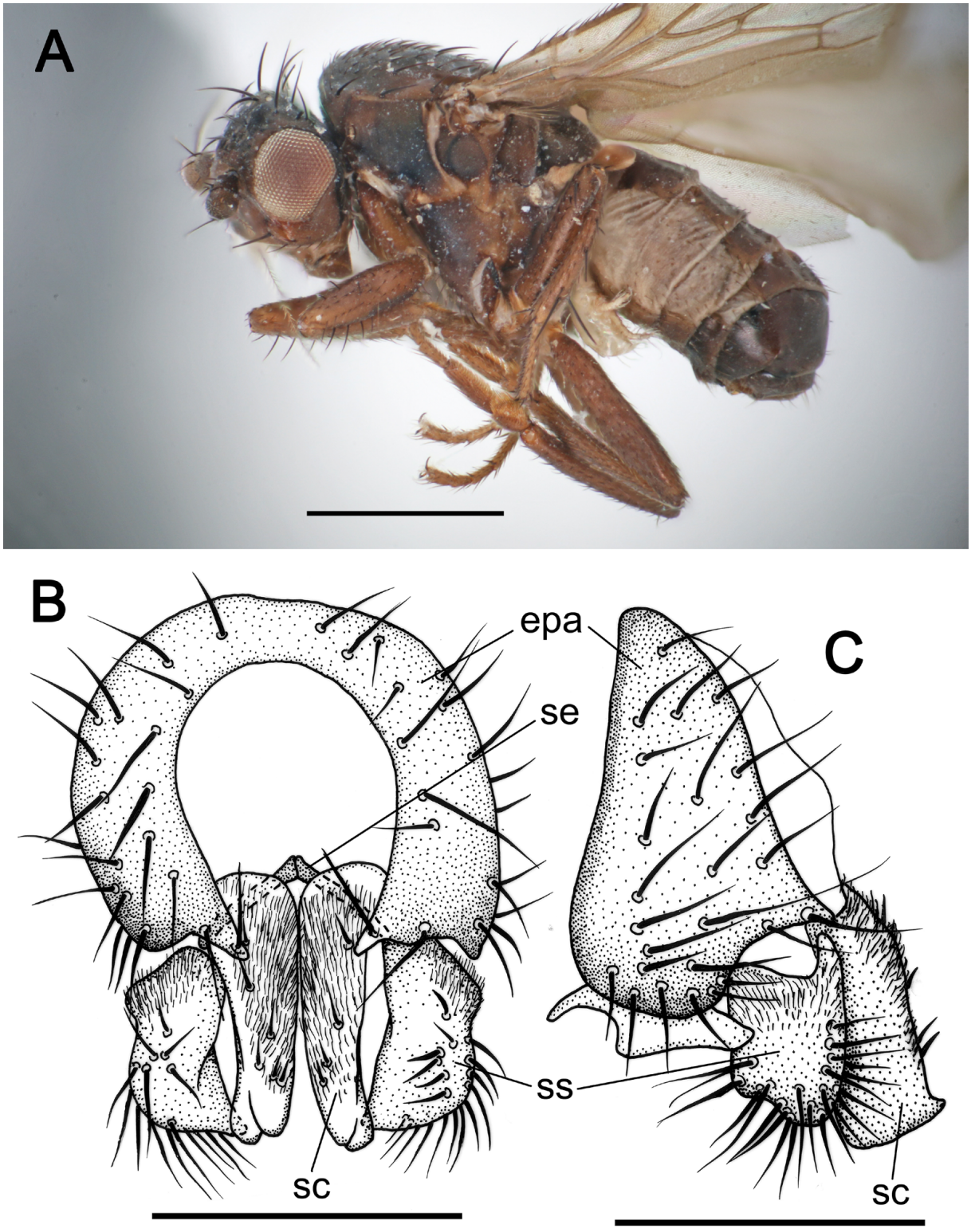


Fig. 93. *Sclerocoelus nebulosus* sp. nov. **A**. Male paratype habitus, lateral view (debu00116063). **B**. Male paratype terminalia, posterior view. **C**. Male paratype terminalia, lateral view. Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

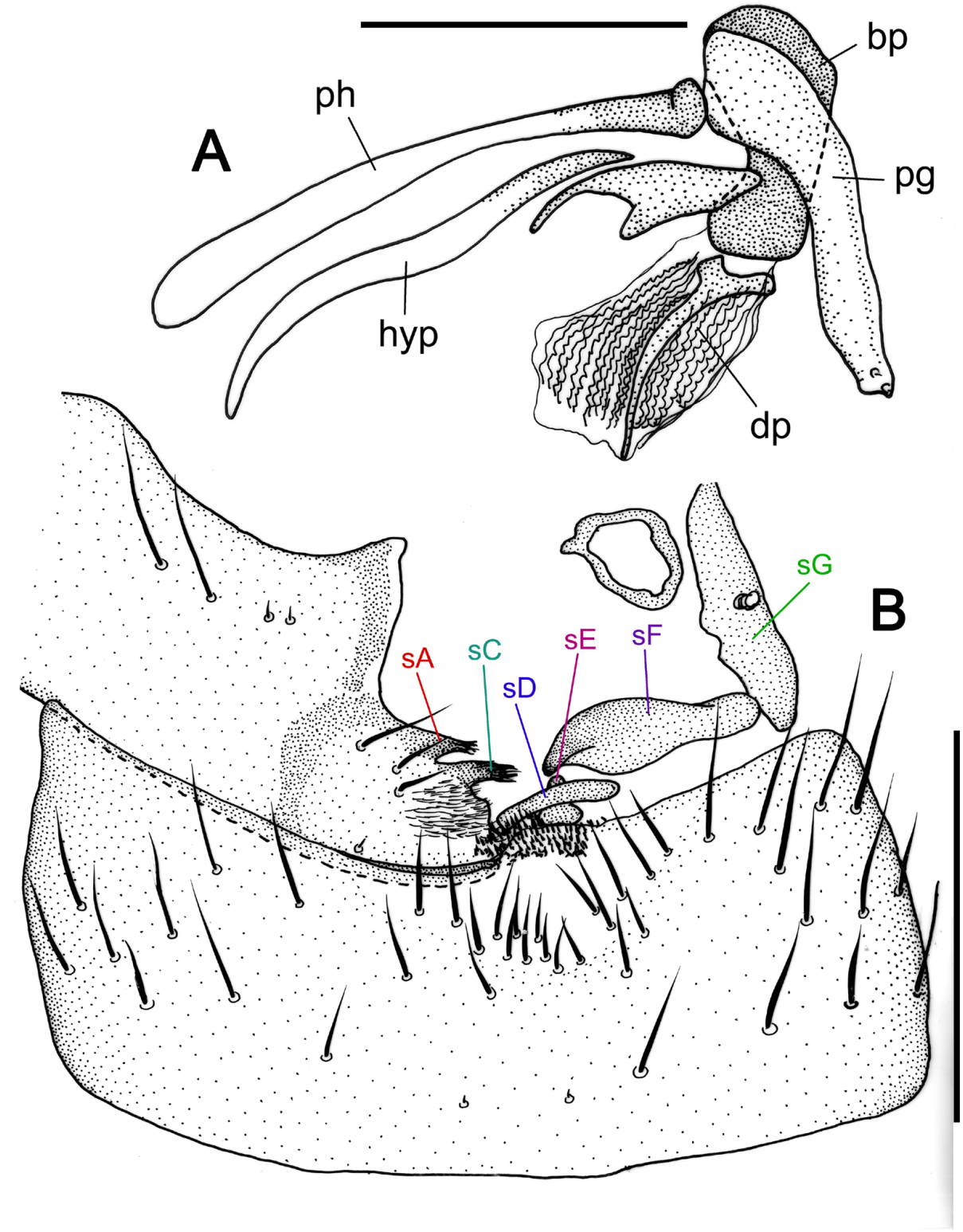


Fig. 94. *Sclerocoelus nebulosus* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

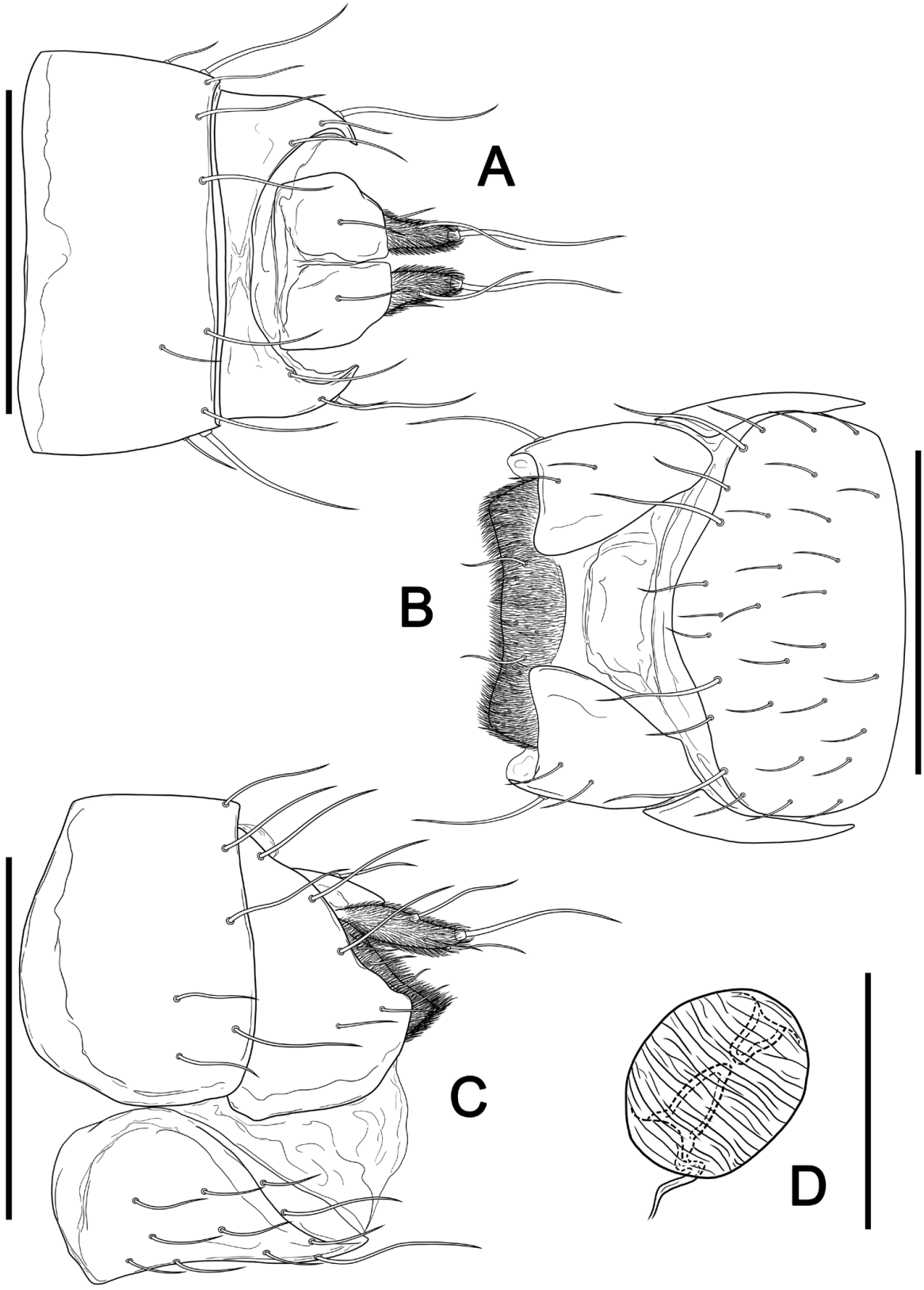


Fig. 95. *Sclerocoelus nebulosus* sp. nov., paratype (debu00116674). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

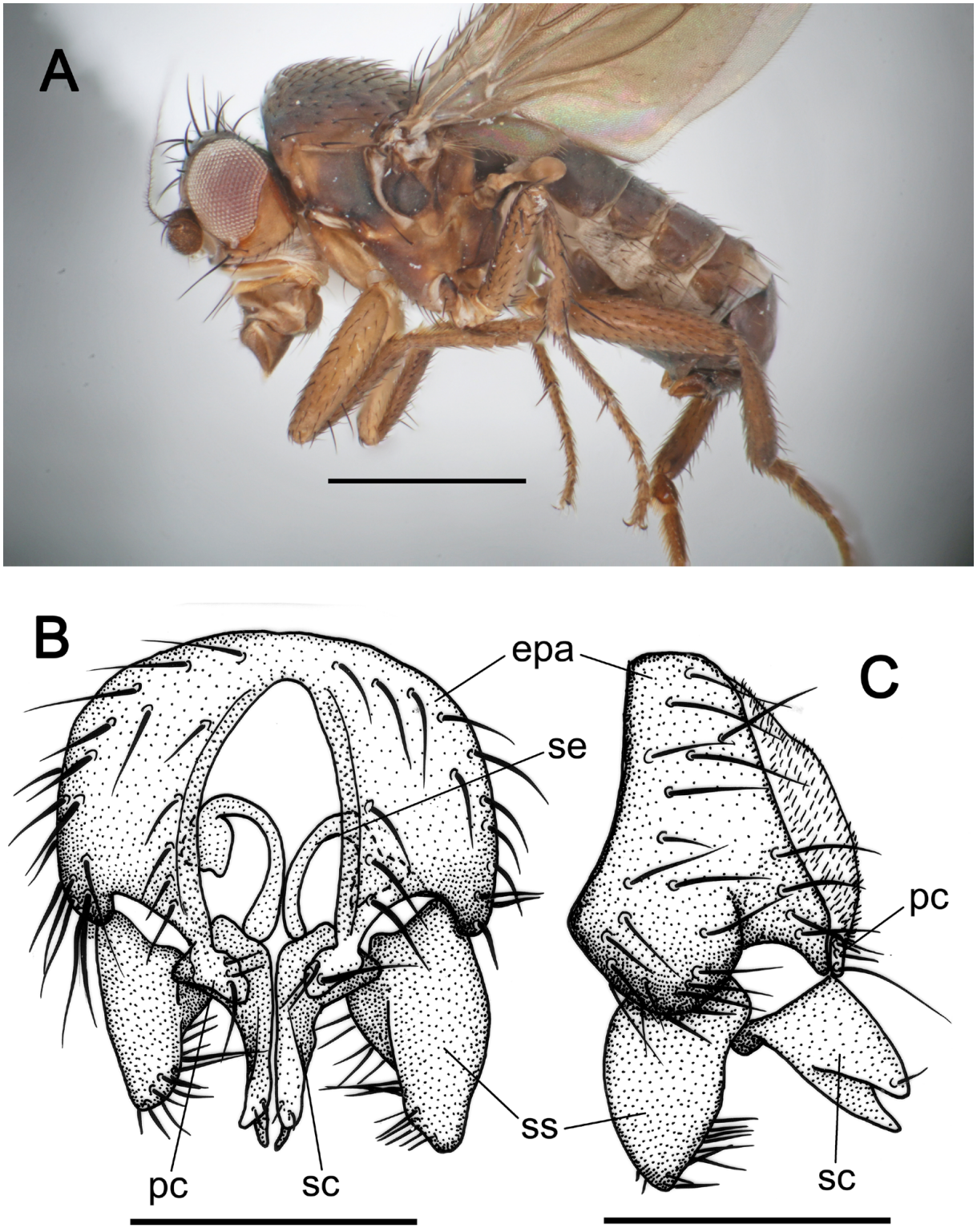


Fig. 96. *Sclerocoelus nitidistylus* sp. nov. **A**. Male paratype habitus, lateral view (debu00125692). **B**. Male paratype terminalia, posterior view. **C**. Male paratype terminalia, lateral view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

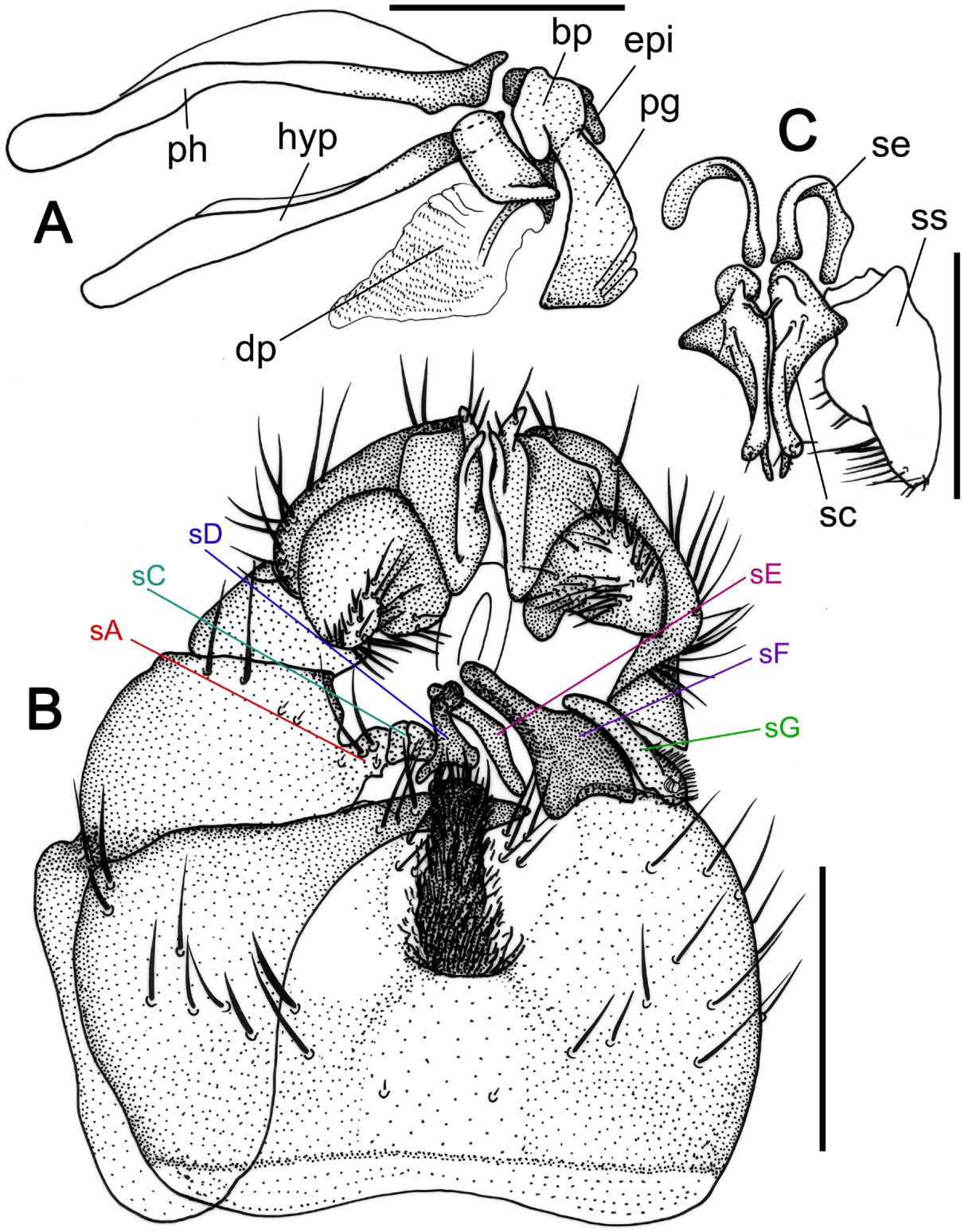


Fig. 97. *Sclerocoelus nitidistylus* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Subcercal complex, posterior view. Abbreviations: bp = basiphallus; dp = distiphallus; epi = epiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme; sc (subcostal); se = subepandrial sclerite; ss = surstylus. Scale bars: A = 0.13 mm; B = 0.25 mm; C = 0.10 mm.

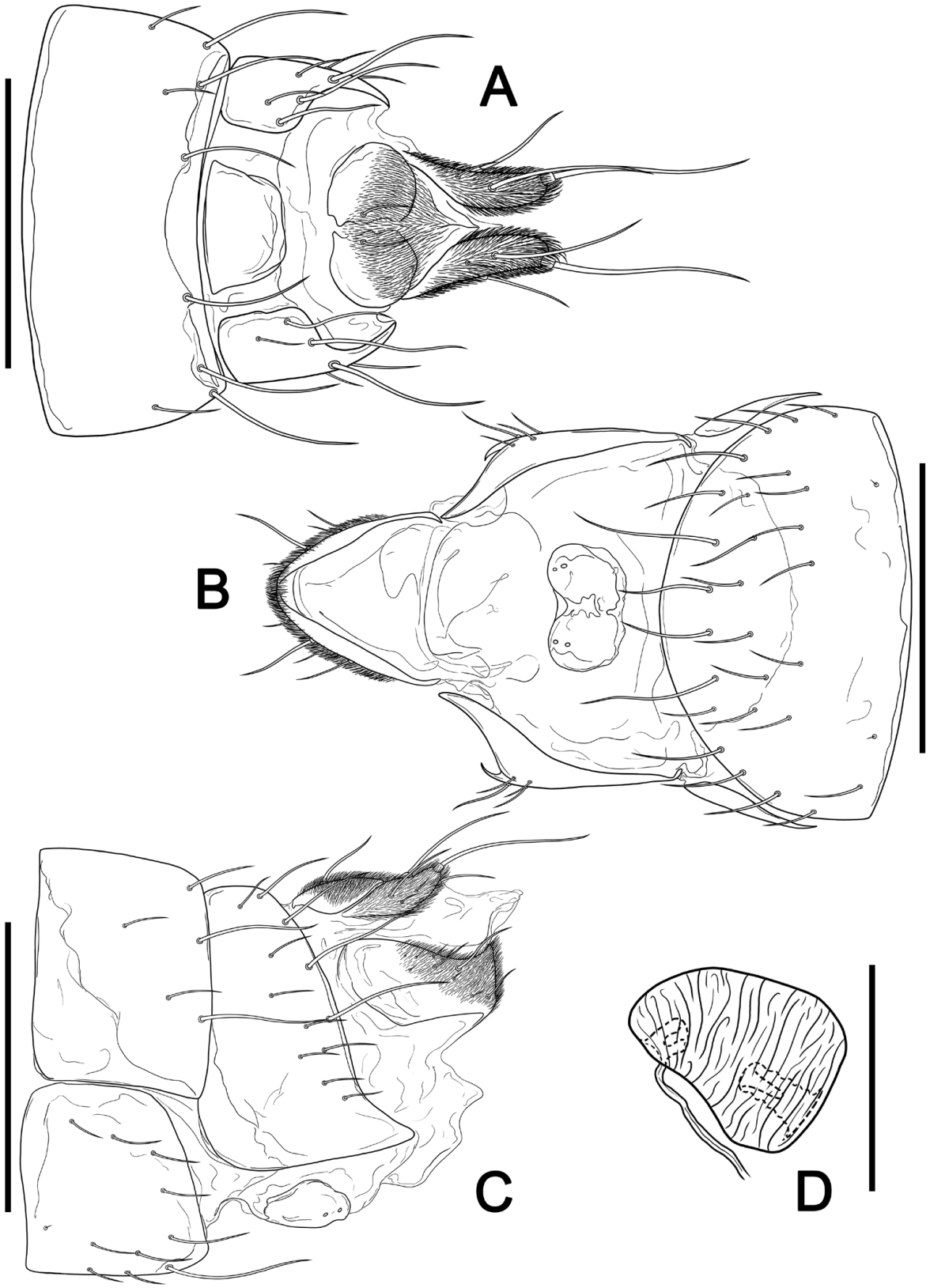


Fig. 98. *Sclerocoelus nitidistylus* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

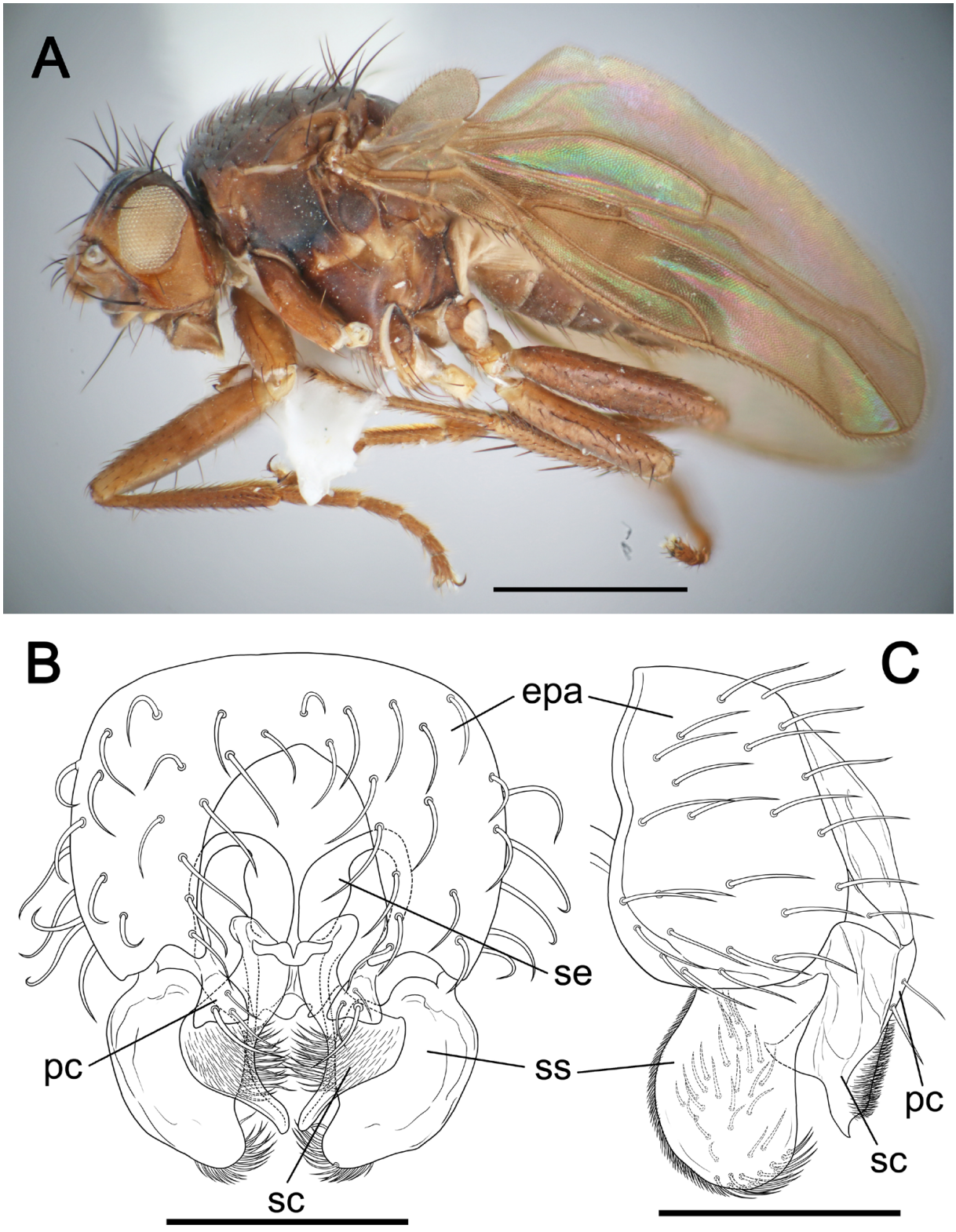


Fig. 99. *Sclerocoelus ocellatus* sp. nov. **A**. Female paratype habitus, lateral view. **B**. Male holotype terminalia, posterior view (MNCR). **C**. Male holotype terminalia, lateral view (MNCR). Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

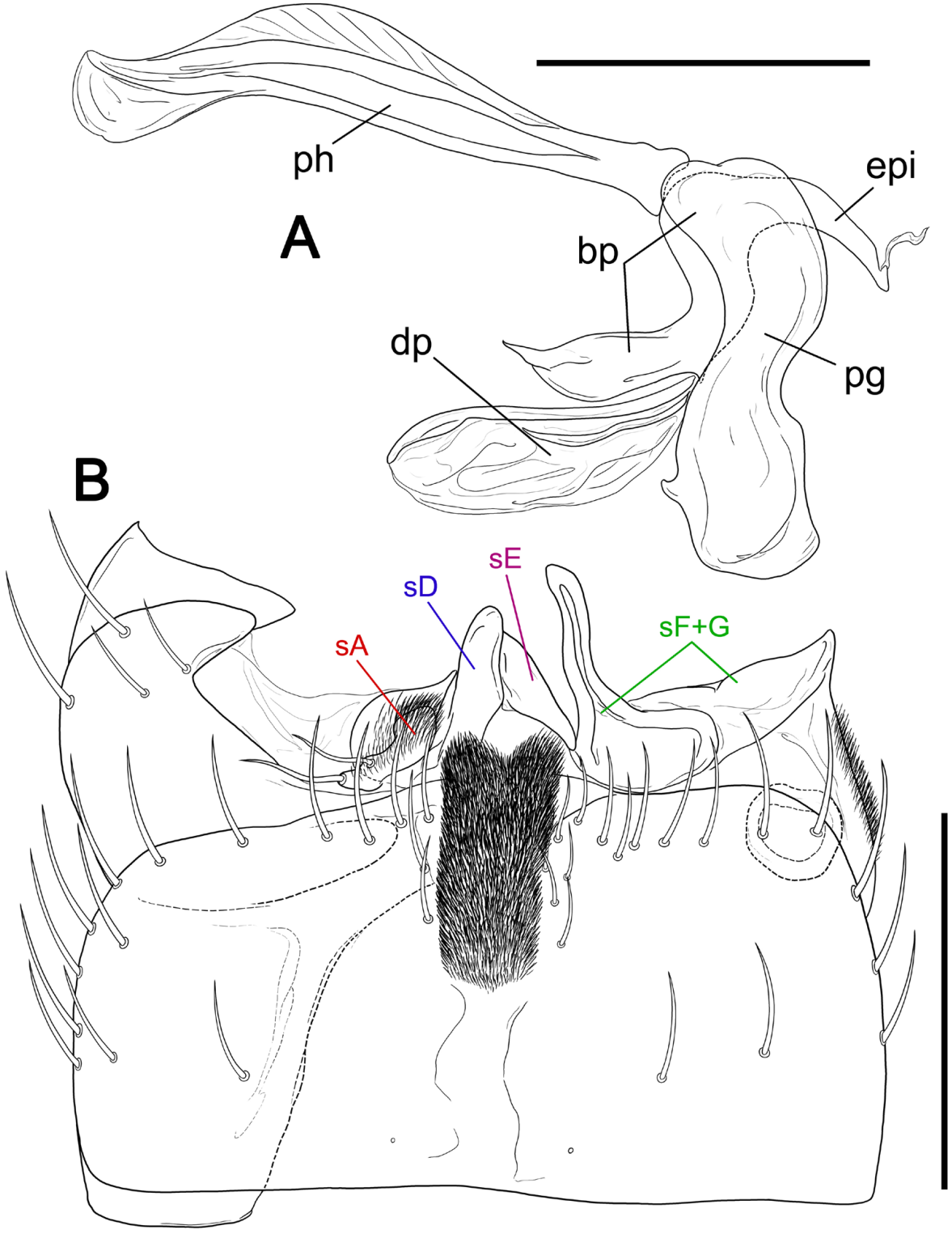


Fig. 100. *Sclerocoelus ocellatus* sp. nov., male holotype (MNCR). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; epi = epiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

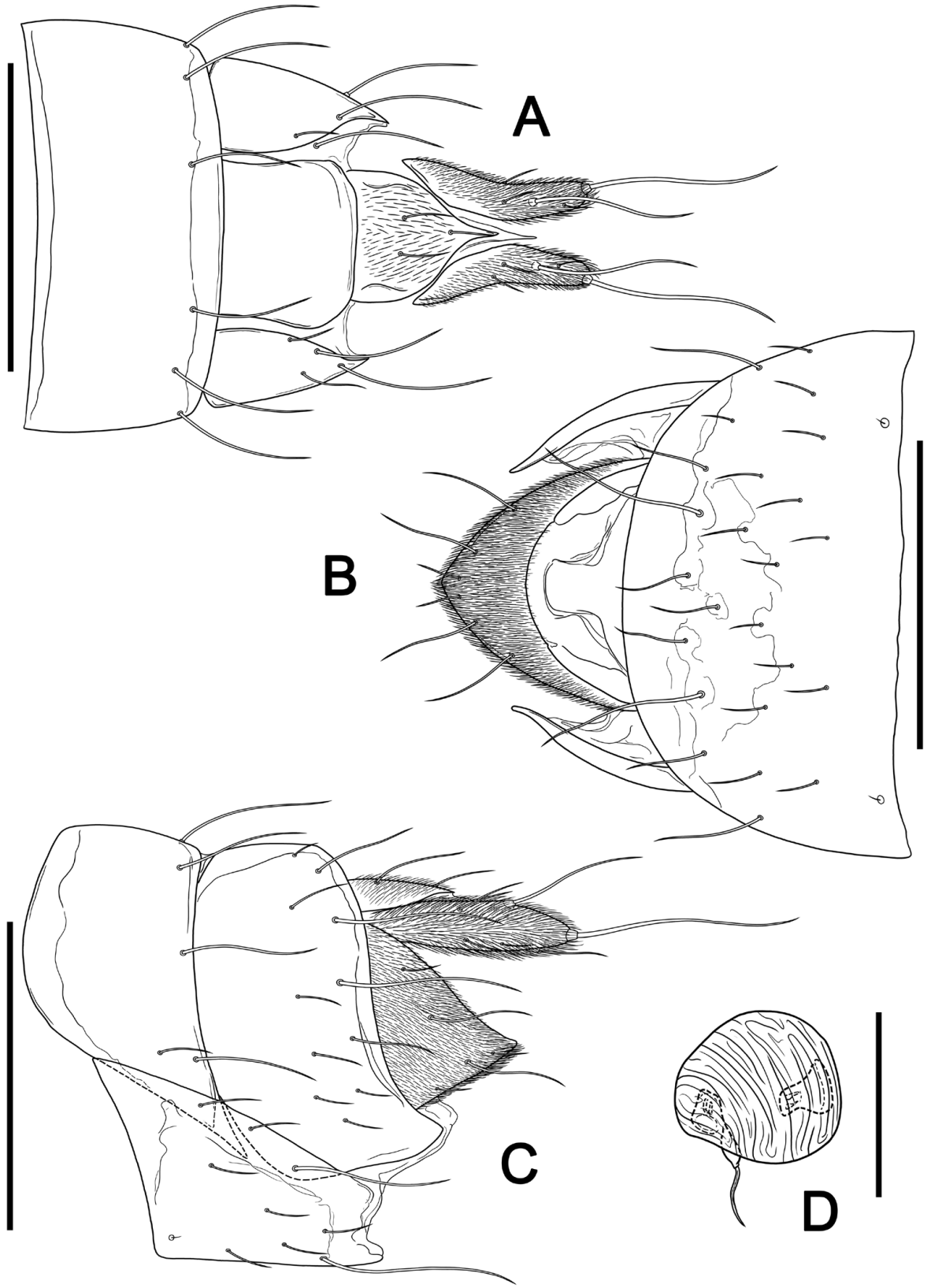


Fig. 101. *Sclerocoelus ocellatus* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

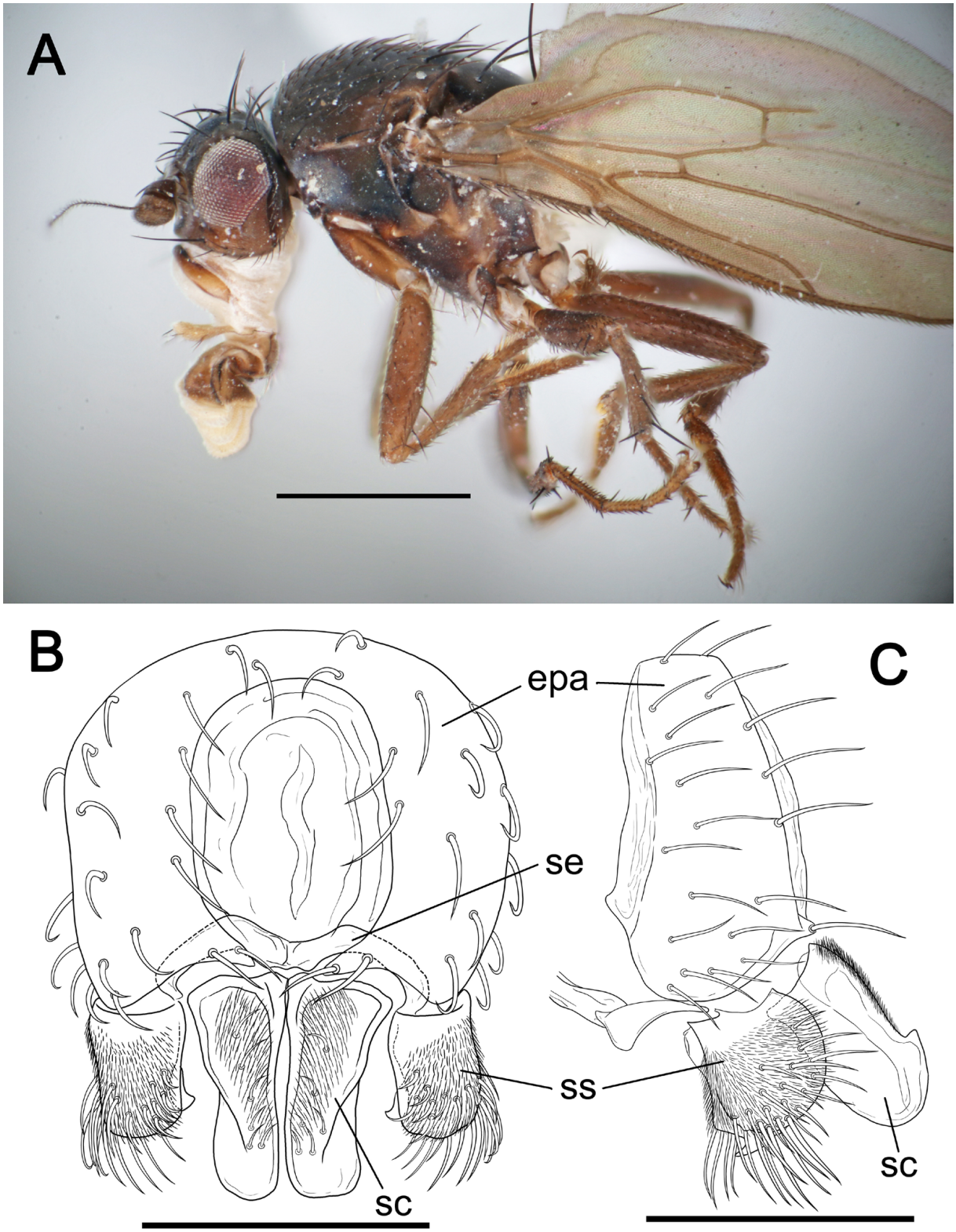


Fig. 102. *Sclerocoelus paranebulosus* sp. nov., paratype. **A**. Male habitus, lateral view. **B**. Male terminalia, posterior view. **C**. Male terminalia, lateral view. Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

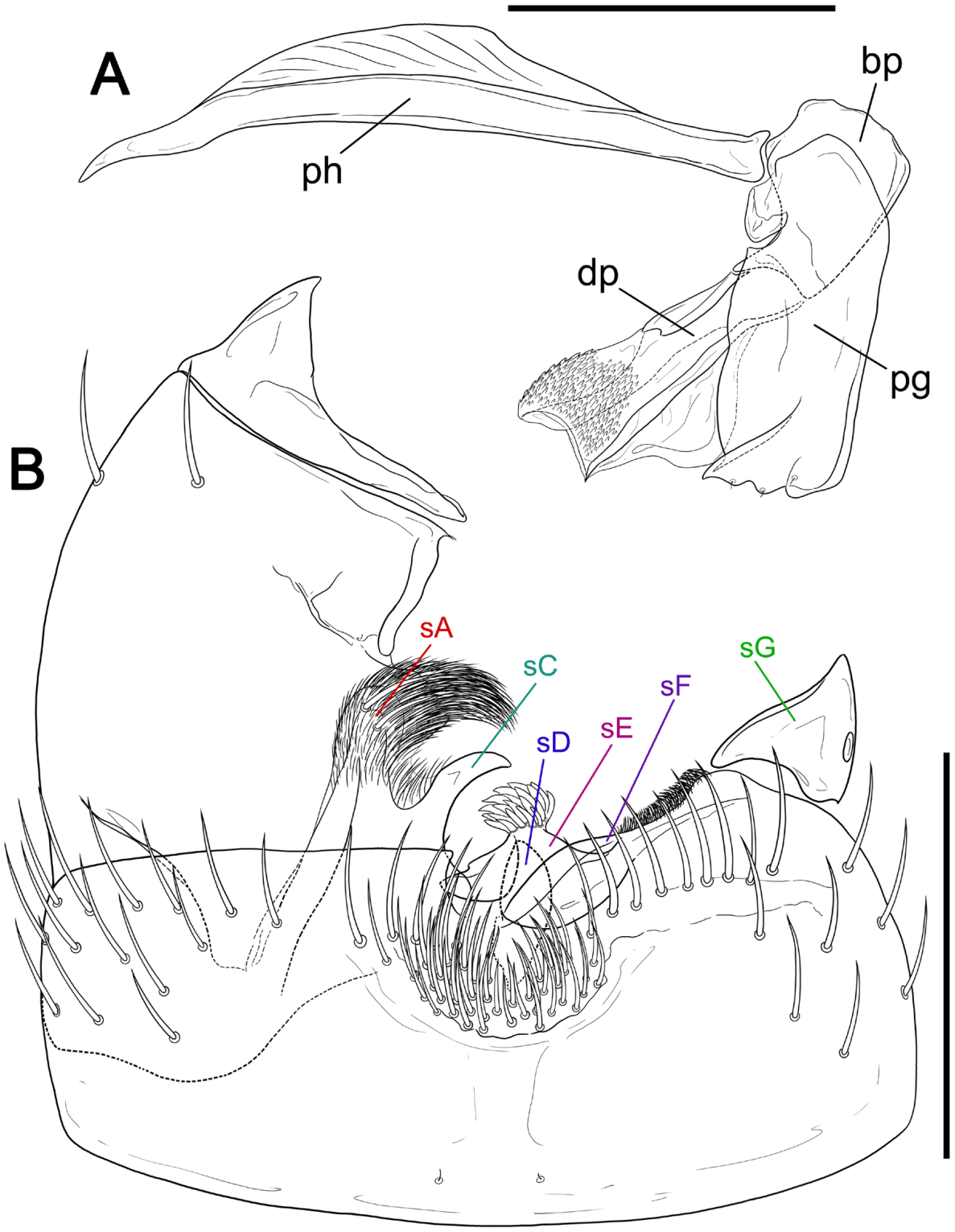


Fig. 103. *Sclerocoelus paranebulosus* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

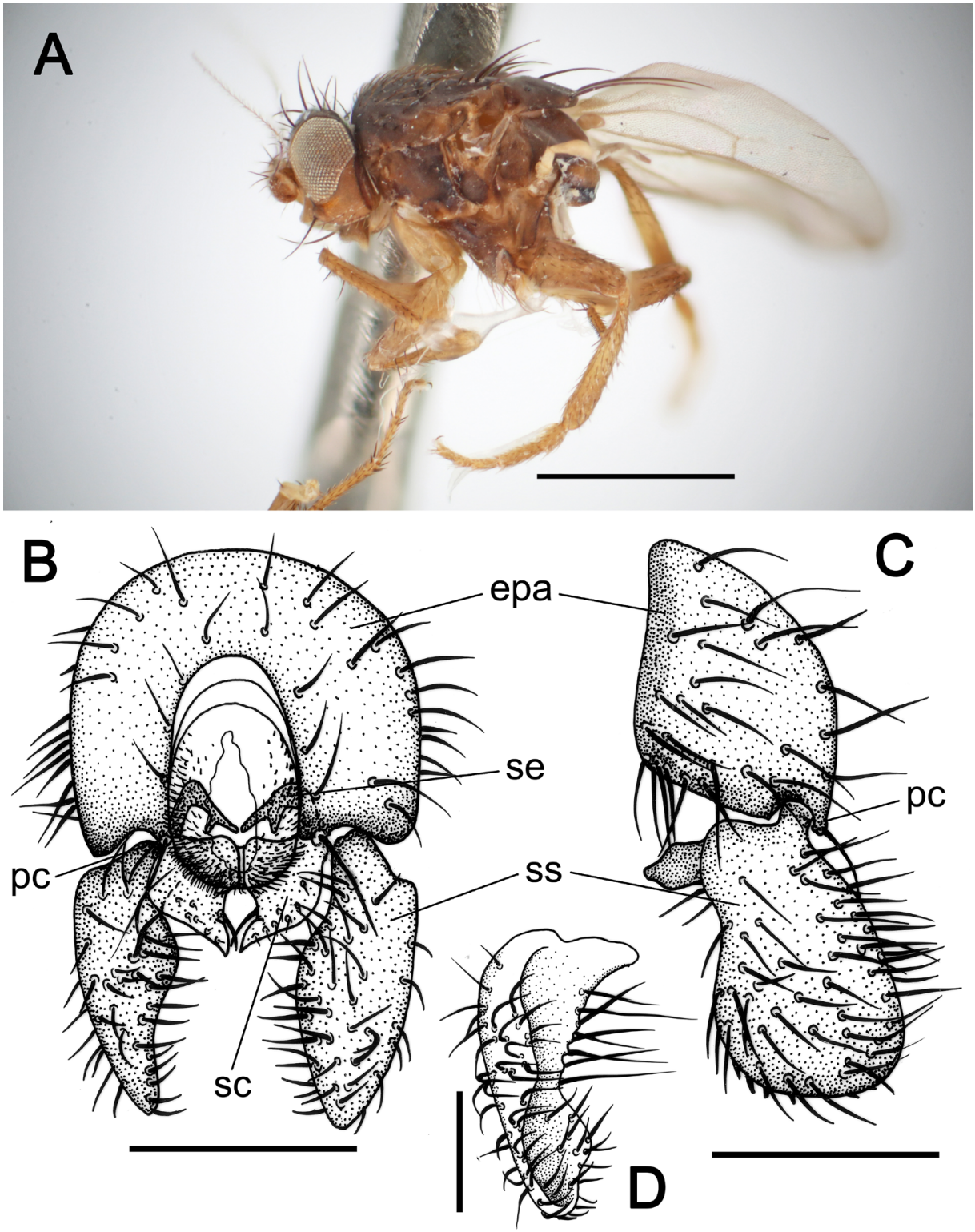


Fig. 104. *Sclerocoelus pararegularis* sp. nov., paratype. **A**. Male habitus, lateral view. **B**. Male terminalia, posterior view. **C**. Male terminalia, lateral view. **D**. Right surstylus, anterior view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm; D = 0.13 mm.

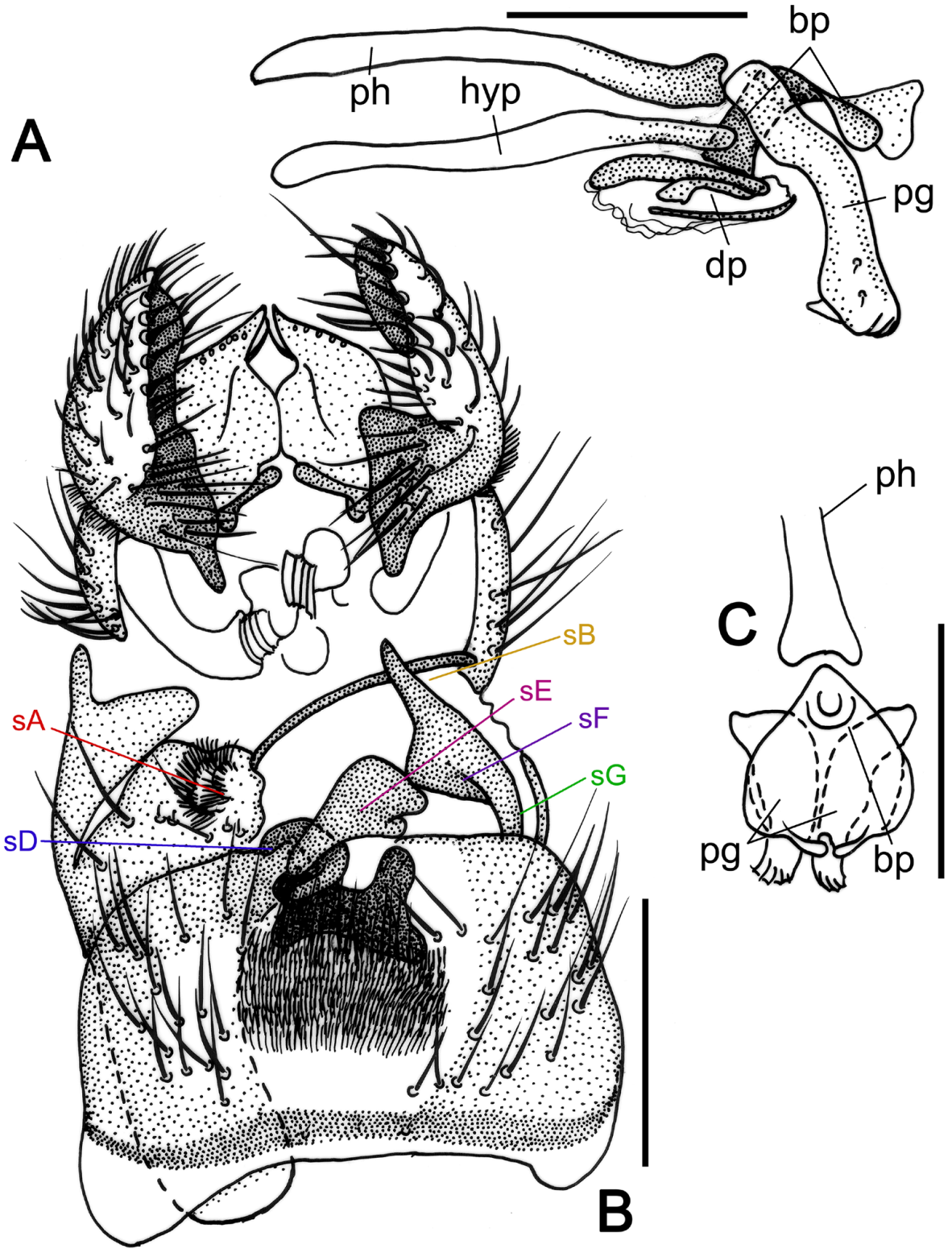


Fig. 105. *Sclerocoelus pararegularis* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Aedeagus and associated structures, posterior view. Abbreviations: bp=basiphallus; dp=distiphallus; hyp=hypandrium; pg=postgonite; ph=phallapodeme. Scale bars: A=0.13 mm; B=0.25 mm; C=0.10 mm.

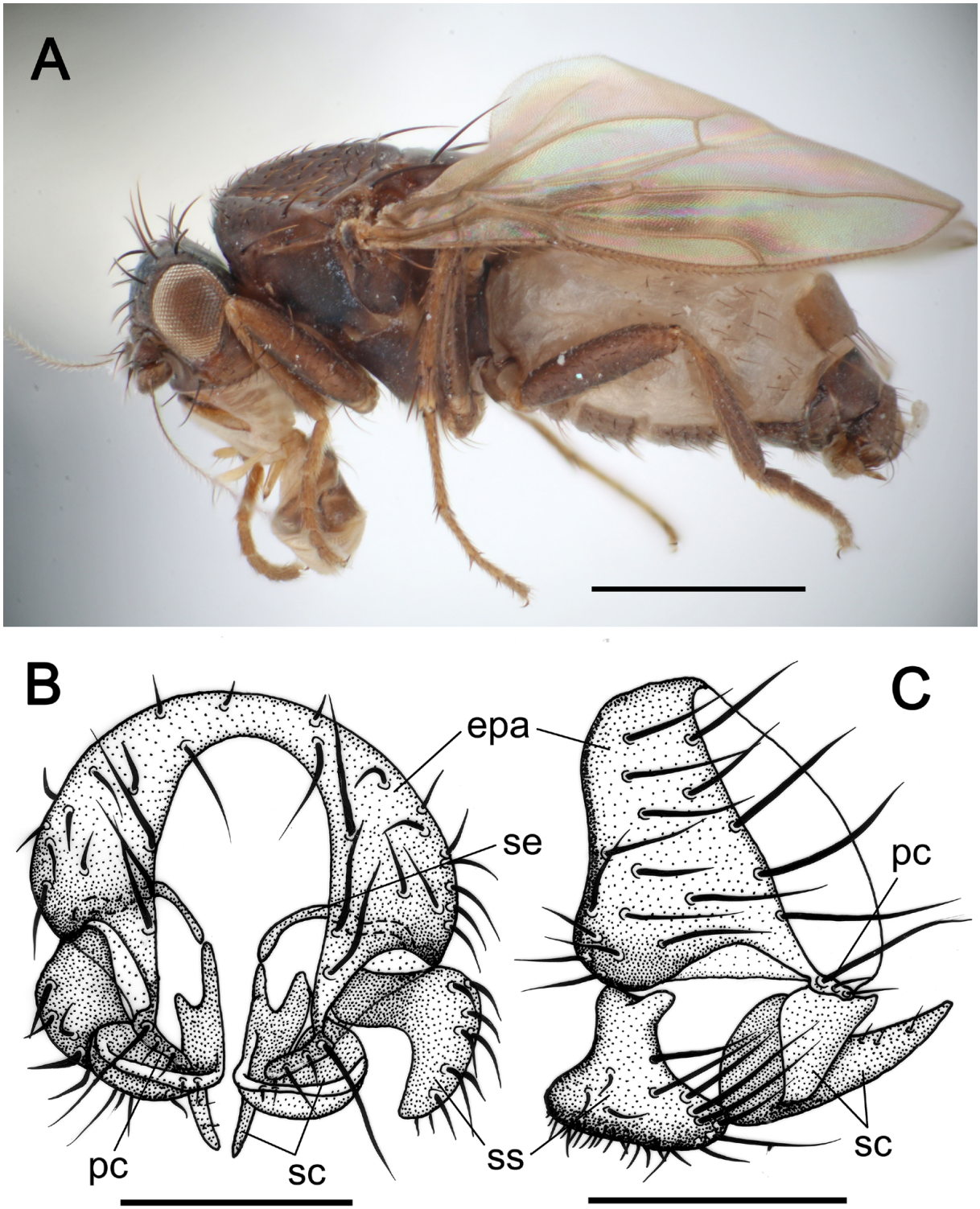


Fig. 106. *Sclerocoelus parasordipes* sp. nov., paratype. **A**. Male habitus, lateral view. **B**. Male terminalia, posterior view. **C**. Male terminalia, lateral view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

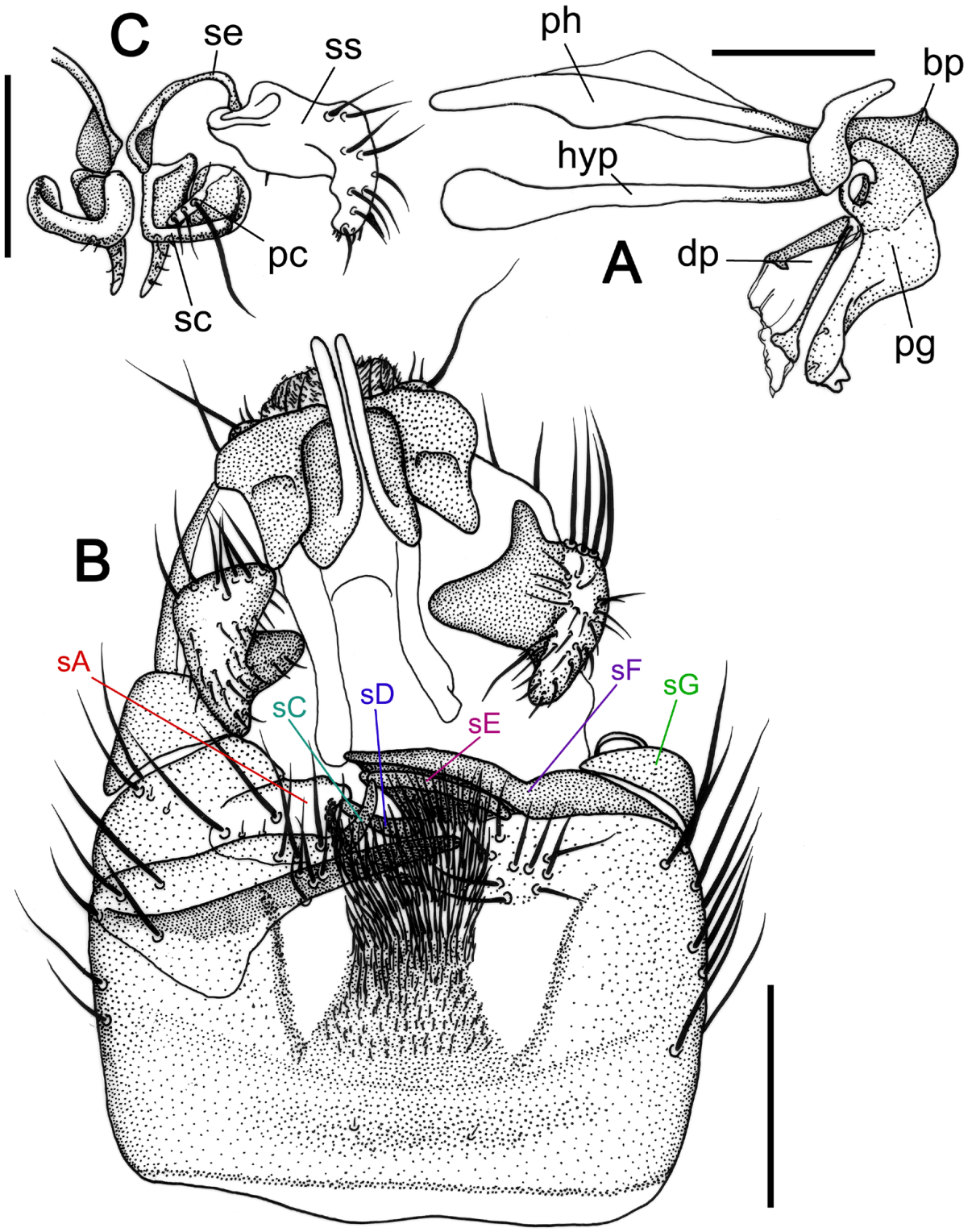


Fig. 107. *Sclerocoelus parasordipes* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Subcercal complex, posterior view. Abbreviations: bp=basiphallus; dp=distiphallus; hyp=hypandrium; pc=pseudocercus; pg=postgonite; ph=phallapodeme; sc=subcercus; se=subepandrial sclerite; ss=surstylus. Scale bars: A=0.13 mm; B=0.25 mm; C=0.10 mm.

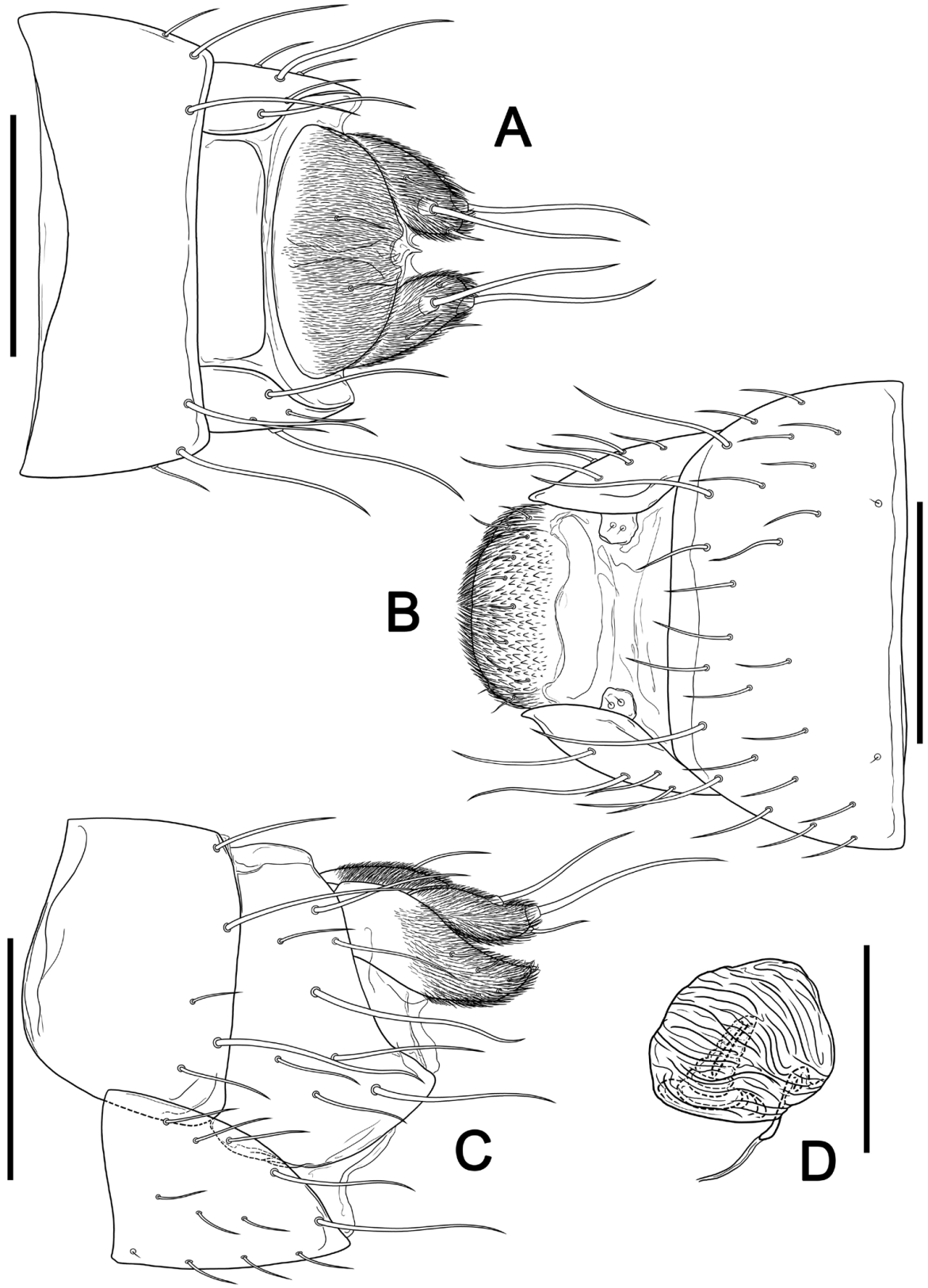


Fig. 108. *Sclerocoelus parasordipes* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

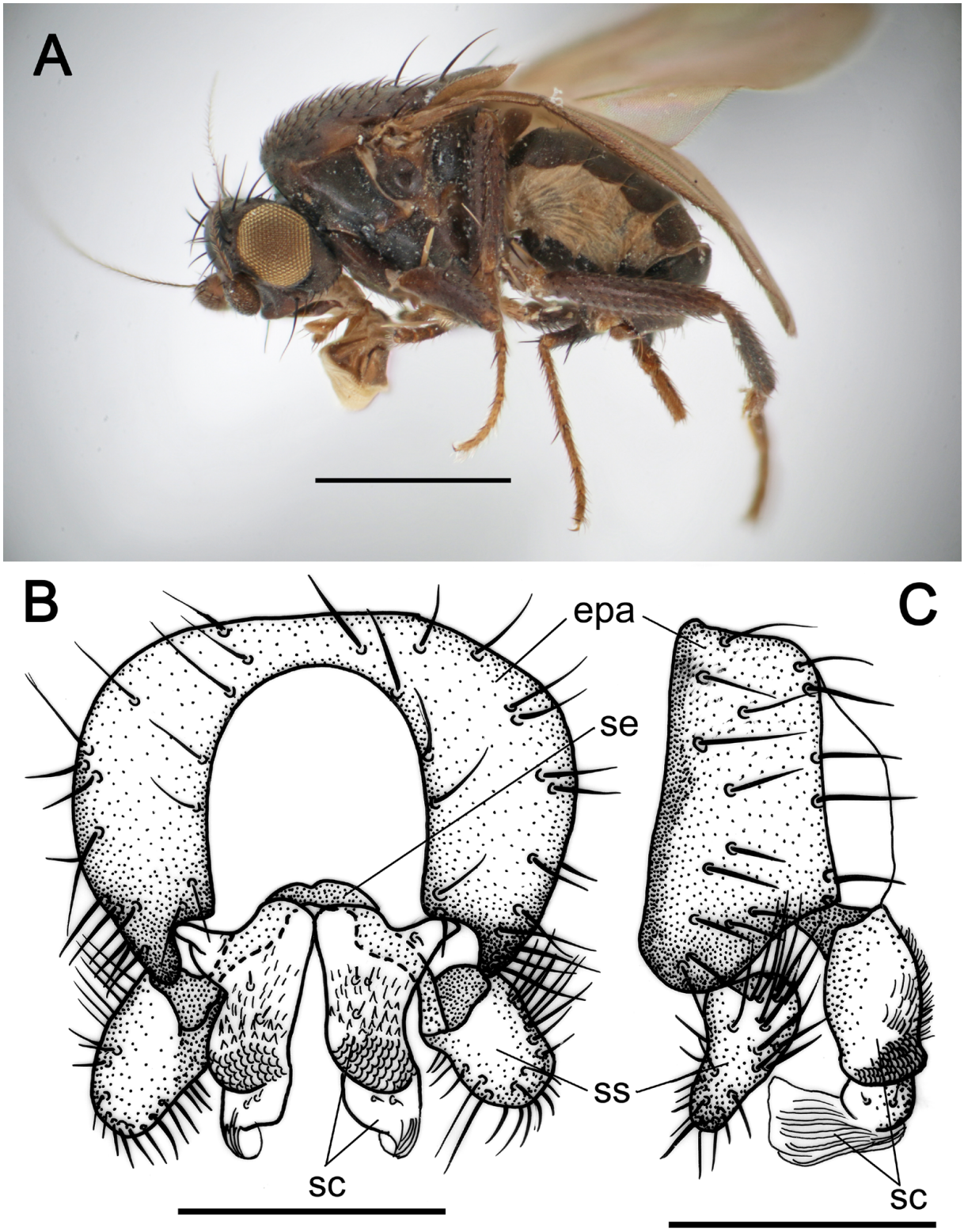


Fig. 109. *Sclerocoelus penai* sp. nov. **A**. Male paratype habitus, lateral view. **B**. Male holotype terminalia, posterior view (CBFC). **C**. Male holotype terminalia, lateral view (CBFC). Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

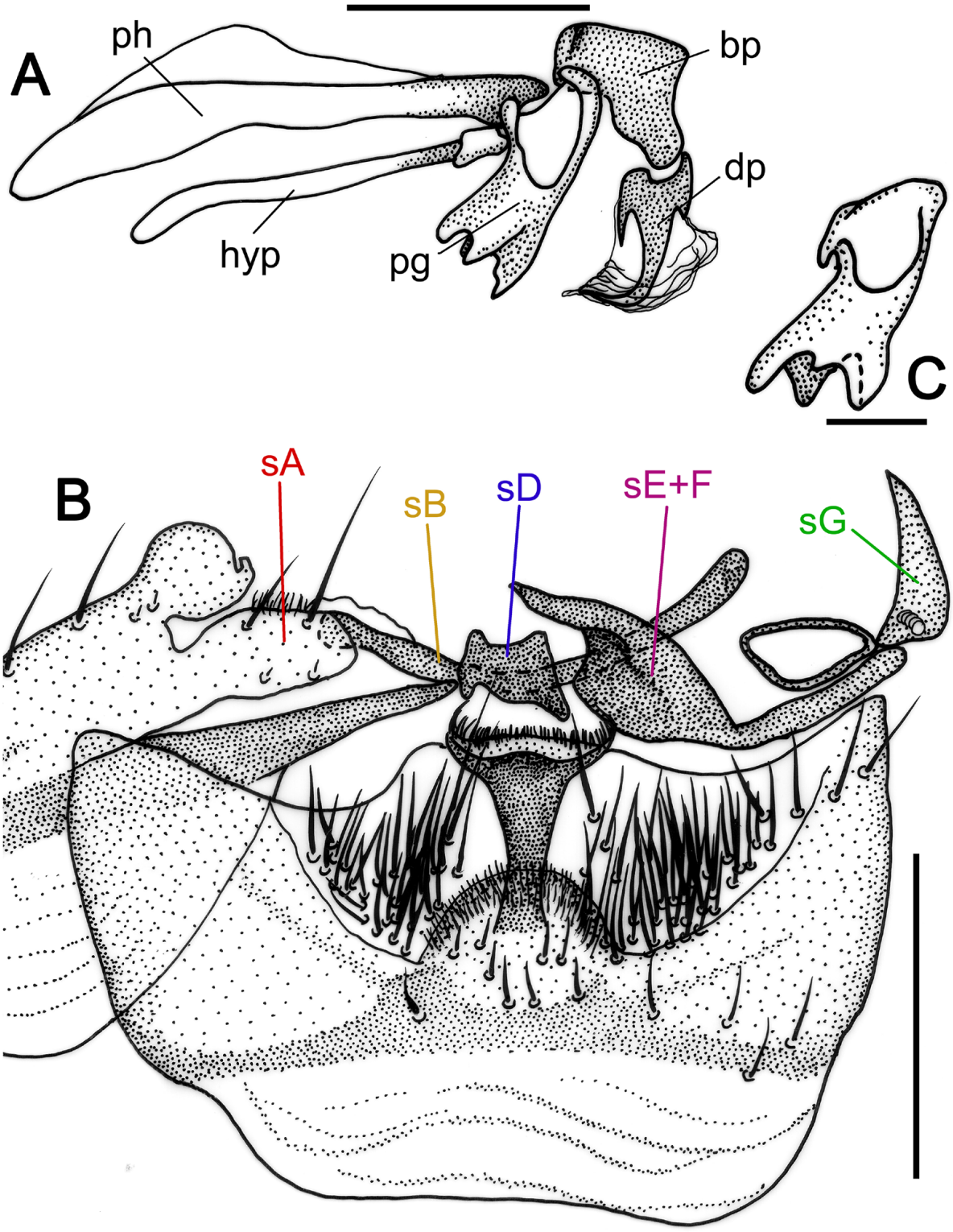


Fig. 110. *Sclerocoelus penai* sp. nov., male holotype (CBFC). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Right postgonite, lateral view. Abbreviations: bp = basiphallus; dp = distiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm; C = 0.05 mm.

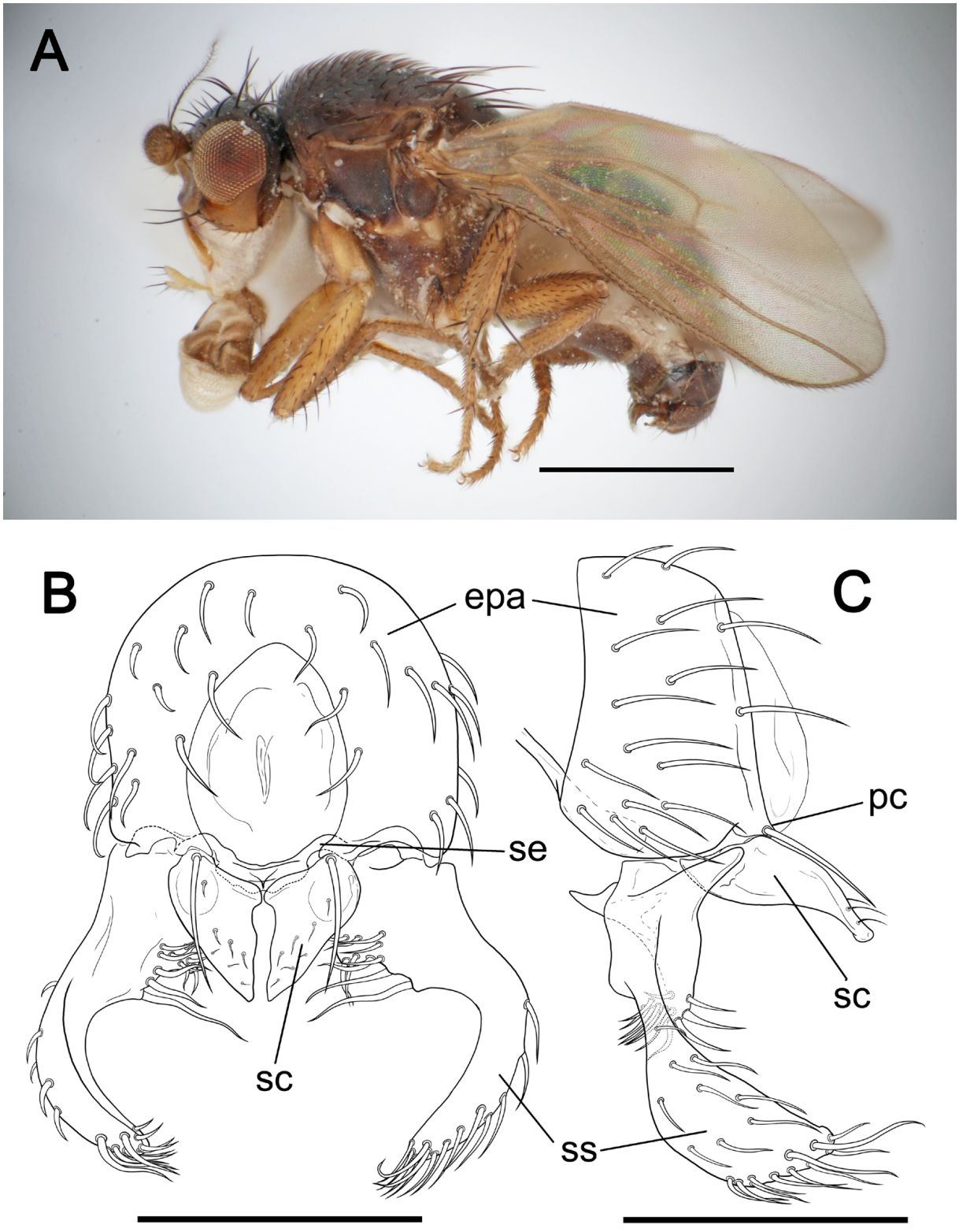


Fig. 111. *Sclerocoelus plumiseta* (Duda, 1925). **A**. Male habitus, lateral view (debu00189930). **B**. Male terminalia, posterior view (debu00189419). **C**. Male terminalia, lateral view (debu00189419). Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

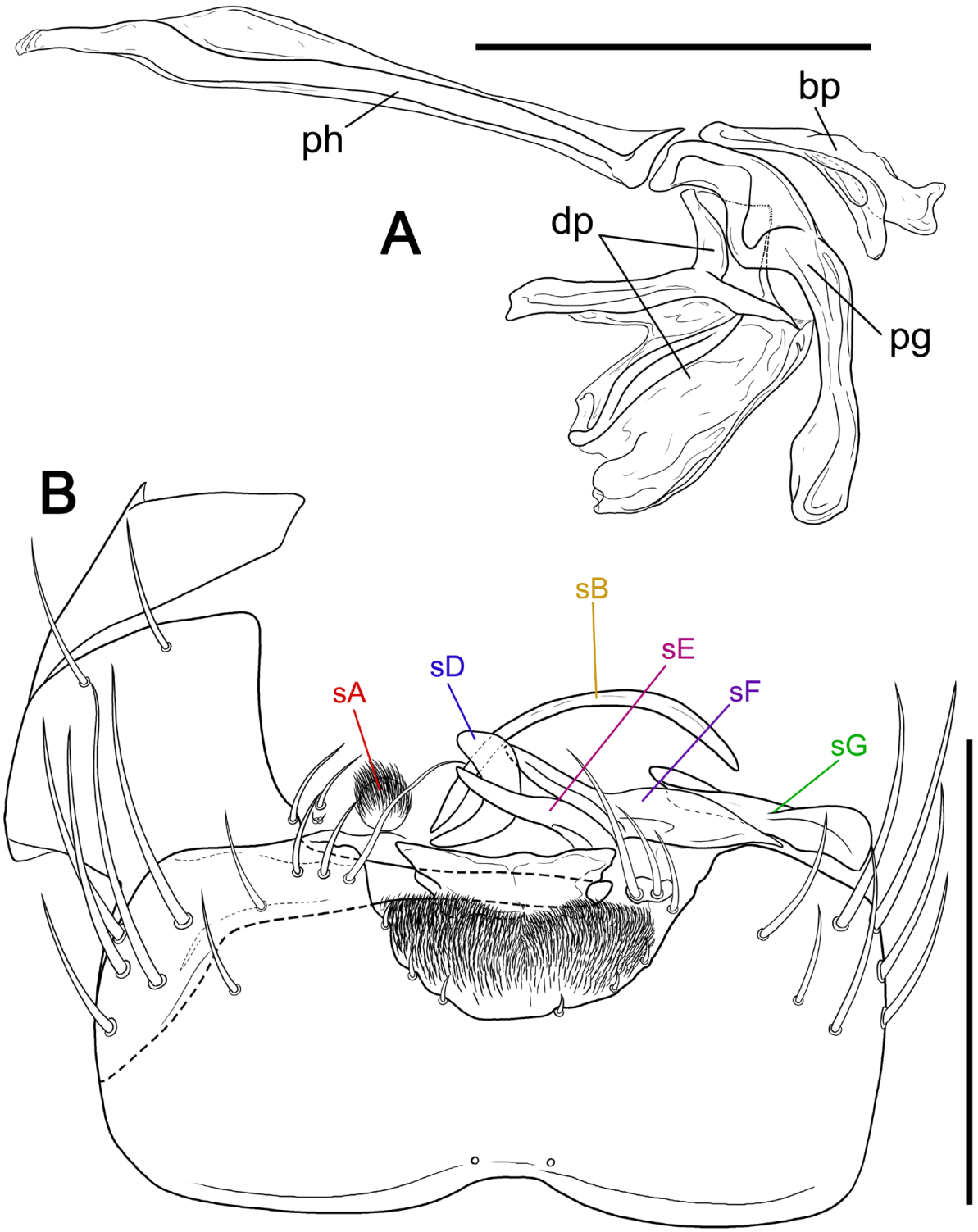


Fig. 112. *Sclerocoelus plumiseta* (Duda, 1925) (debu00189419). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

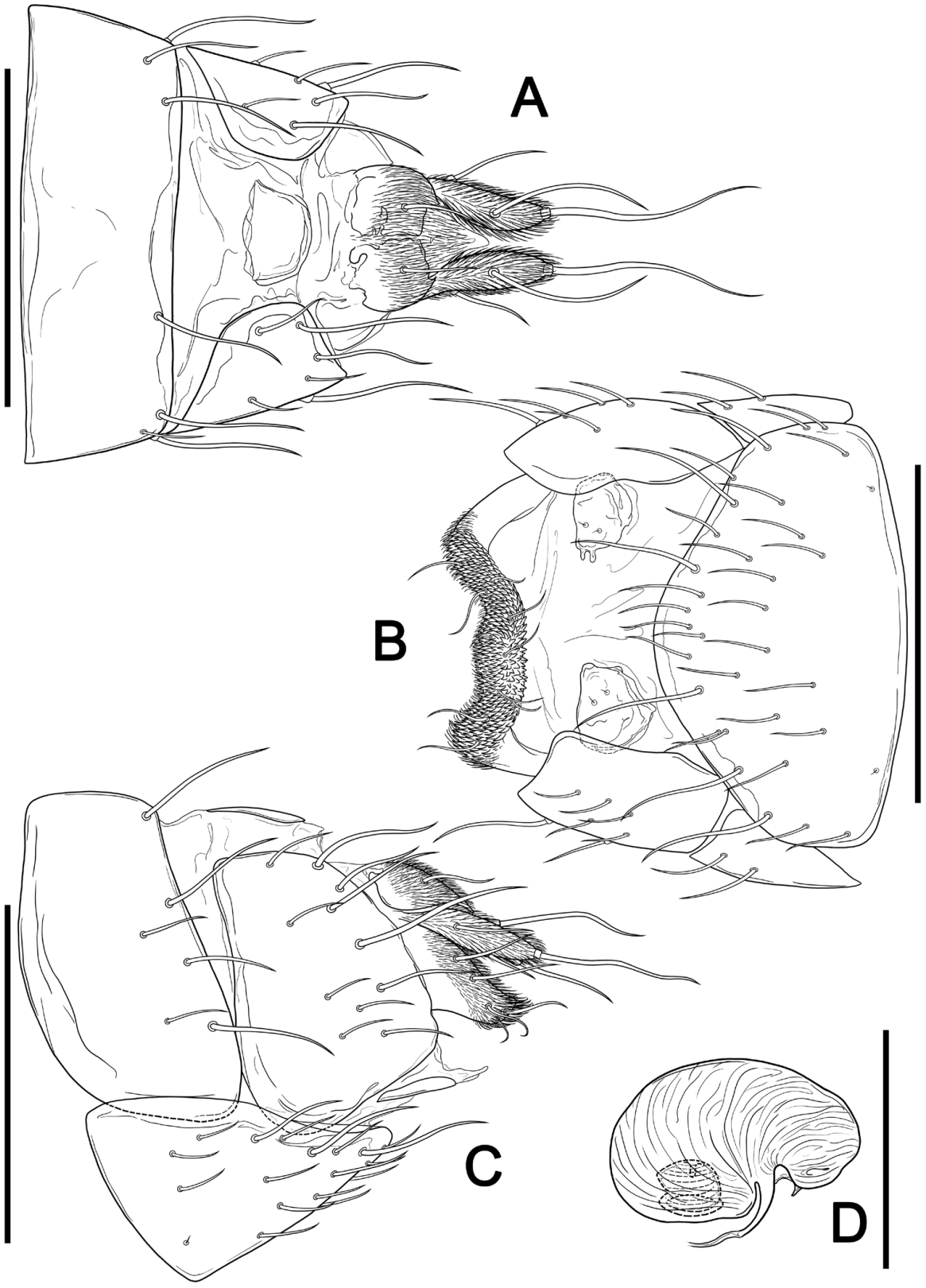


Fig. 113. *Sclerocoelus plumiseta* (Duda, 1925) (debu00189941). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

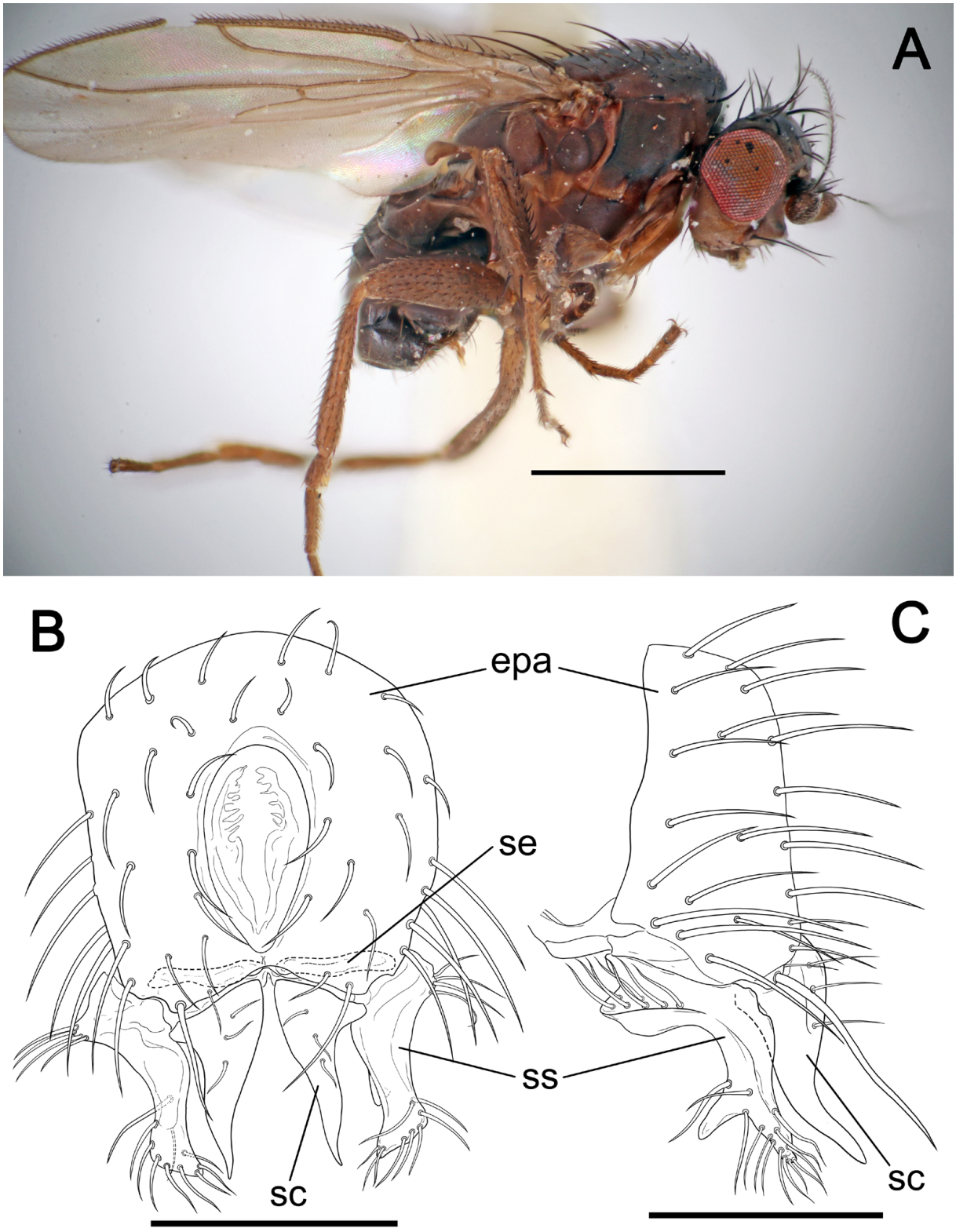


Fig. 114. *Sclerocoelus punensis* sp. nov. **A**. Male holotype habitus, lateral view (CBFC). **B**. Male paratype terminalia, posterior view. **C**. Male paratype terminalia, lateral view. Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

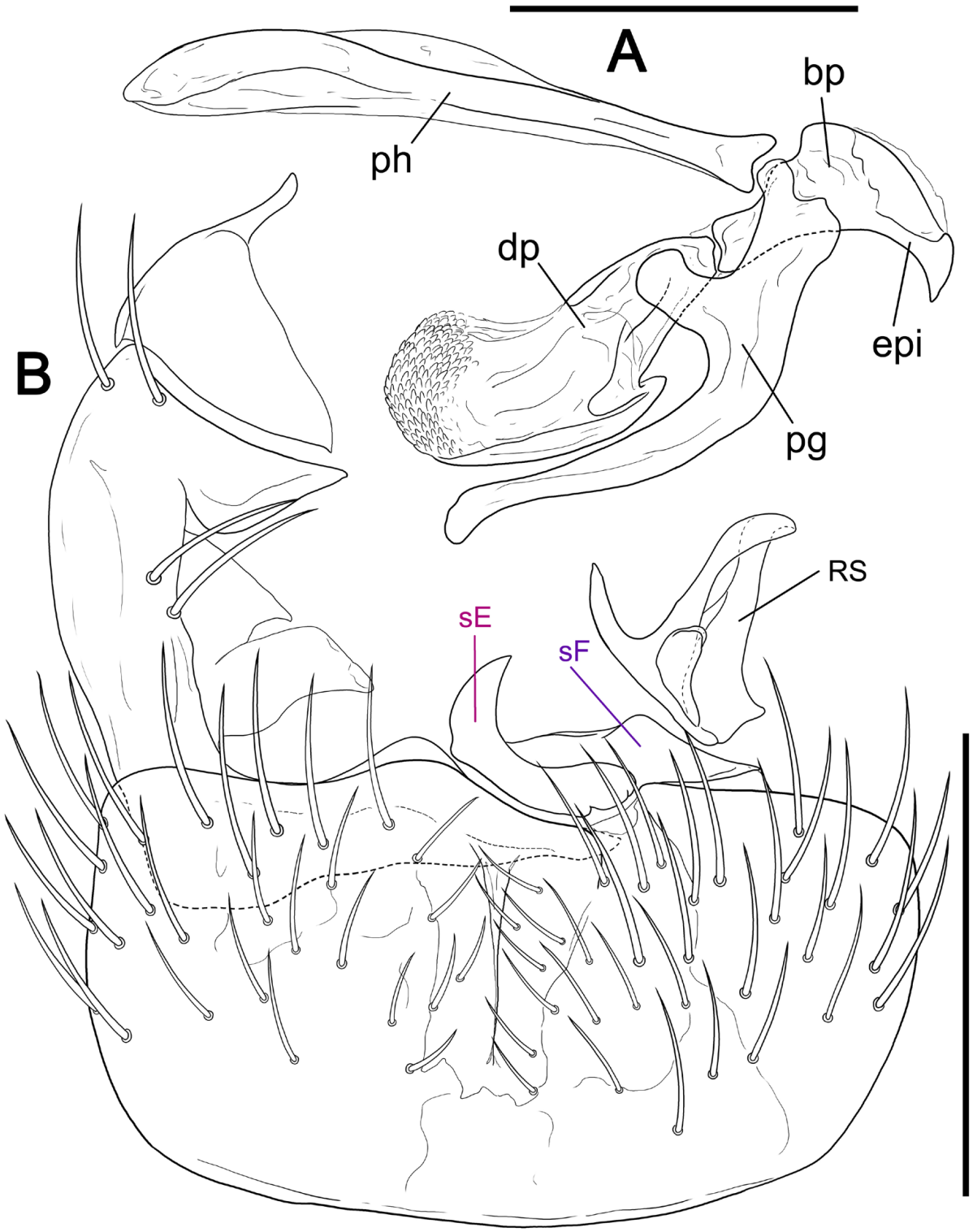


Fig. 115. *Sclerocoelus punensis* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; epi = epiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme; RS (ring sclerite). Scale bars: A = 0.13 mm; B = 0.25 mm.

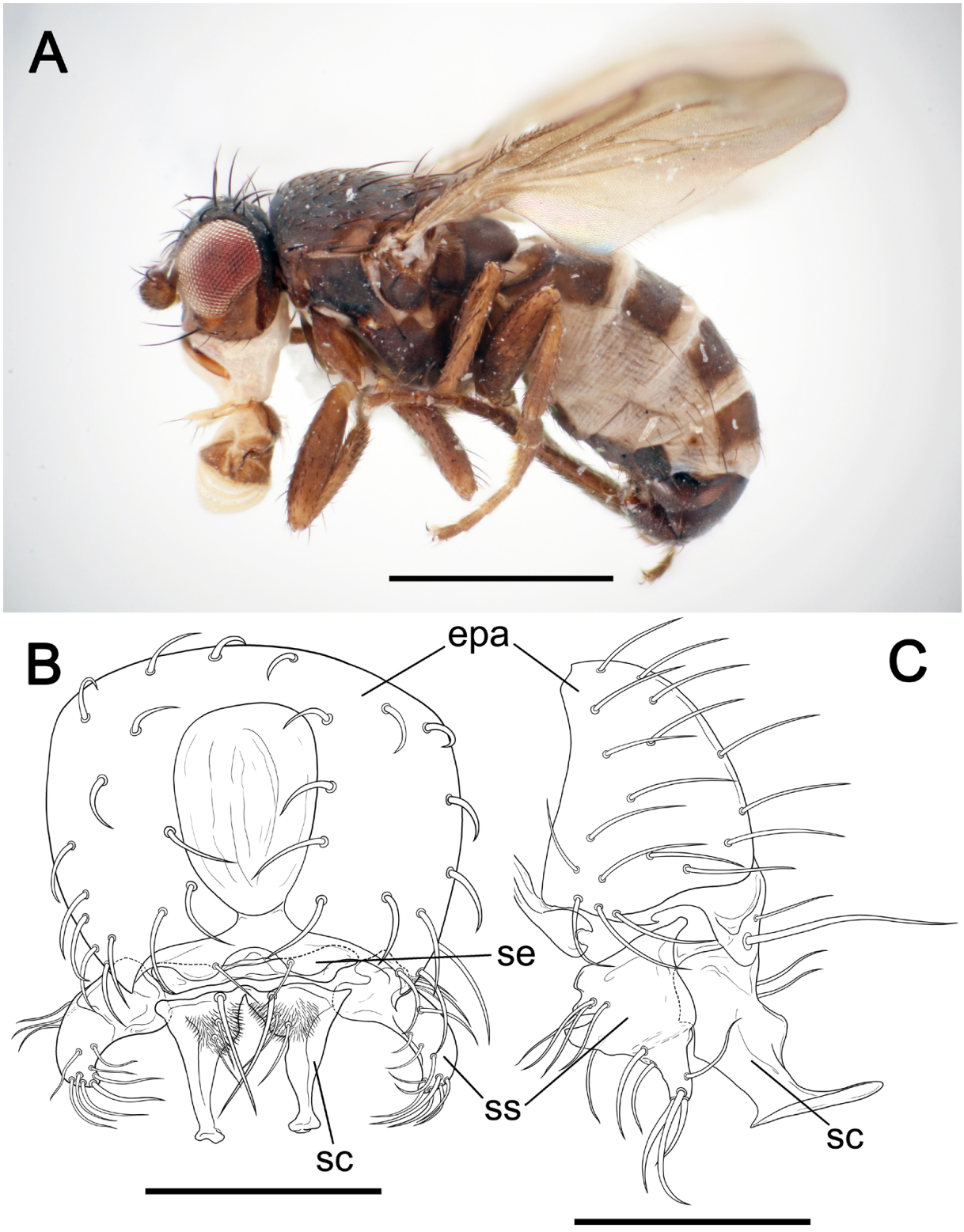


Fig. 116. *Sclerocoelus puyensis* sp. nov. **A**. Male paratype habitus, lateral view (debu00115607). **B**. Male paratype terminalia, posterior view (debu00139089). **C**. Male paratype terminalia, lateral view (debu00139089). Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

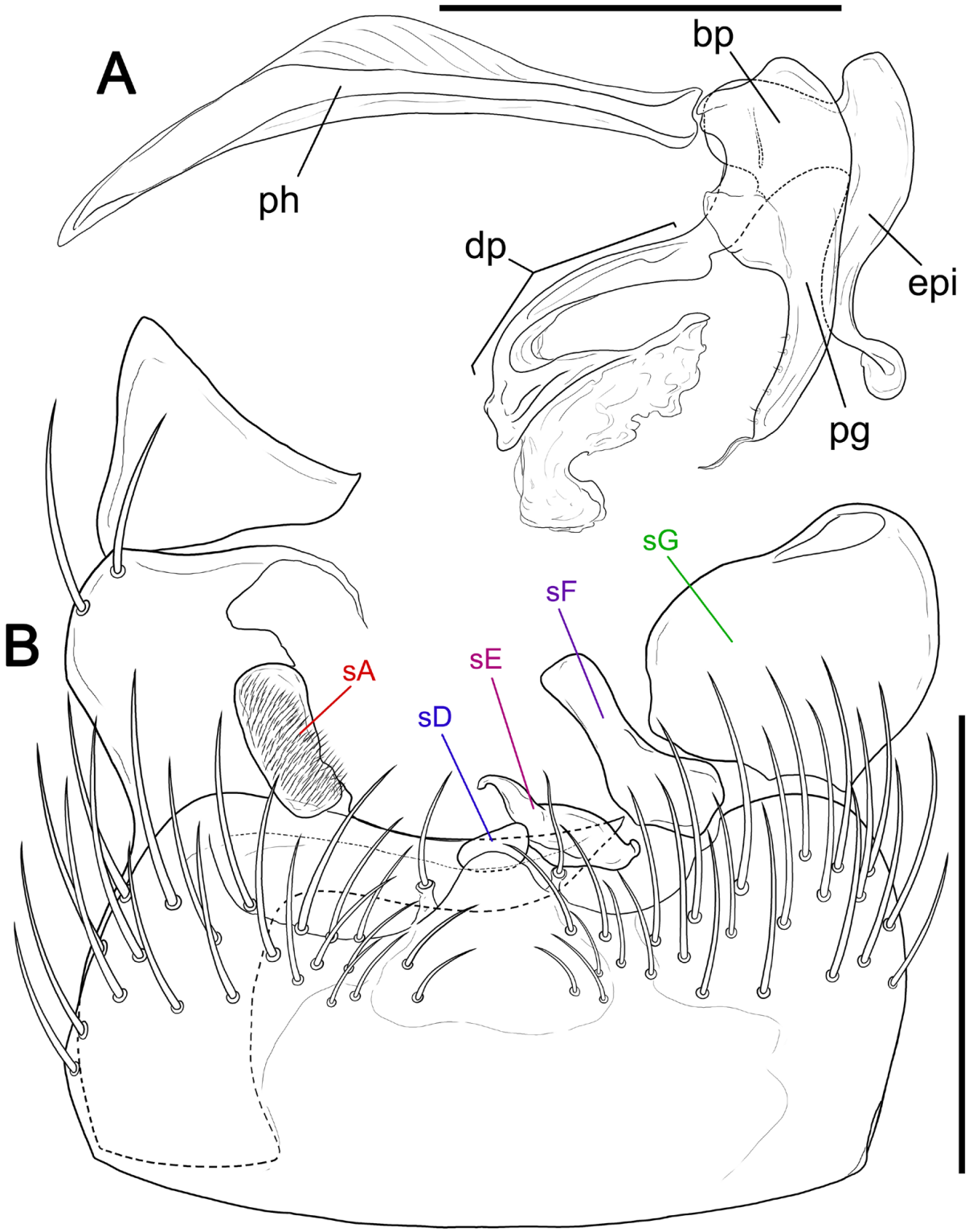


Fig. 117. *Sclerocoelus puyensis* sp. nov., paratype (debu00139089). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus, dp = distiphallus, epi = epiphallus, hyp = hypandrium, pg = postgonite, ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

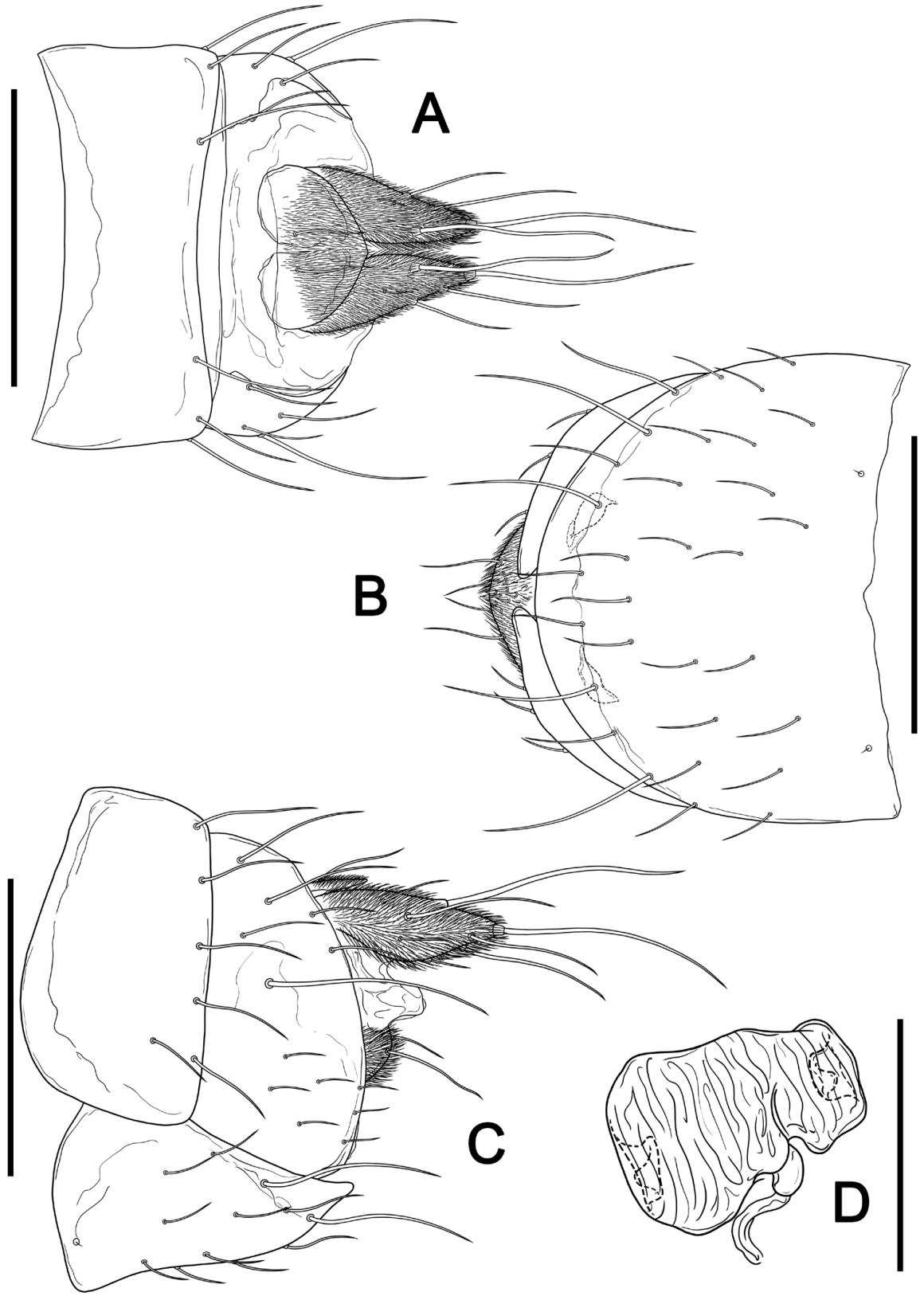


Fig. 118. *Sclerocoelus puyensis* sp. nov., paratype (debu00115564). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

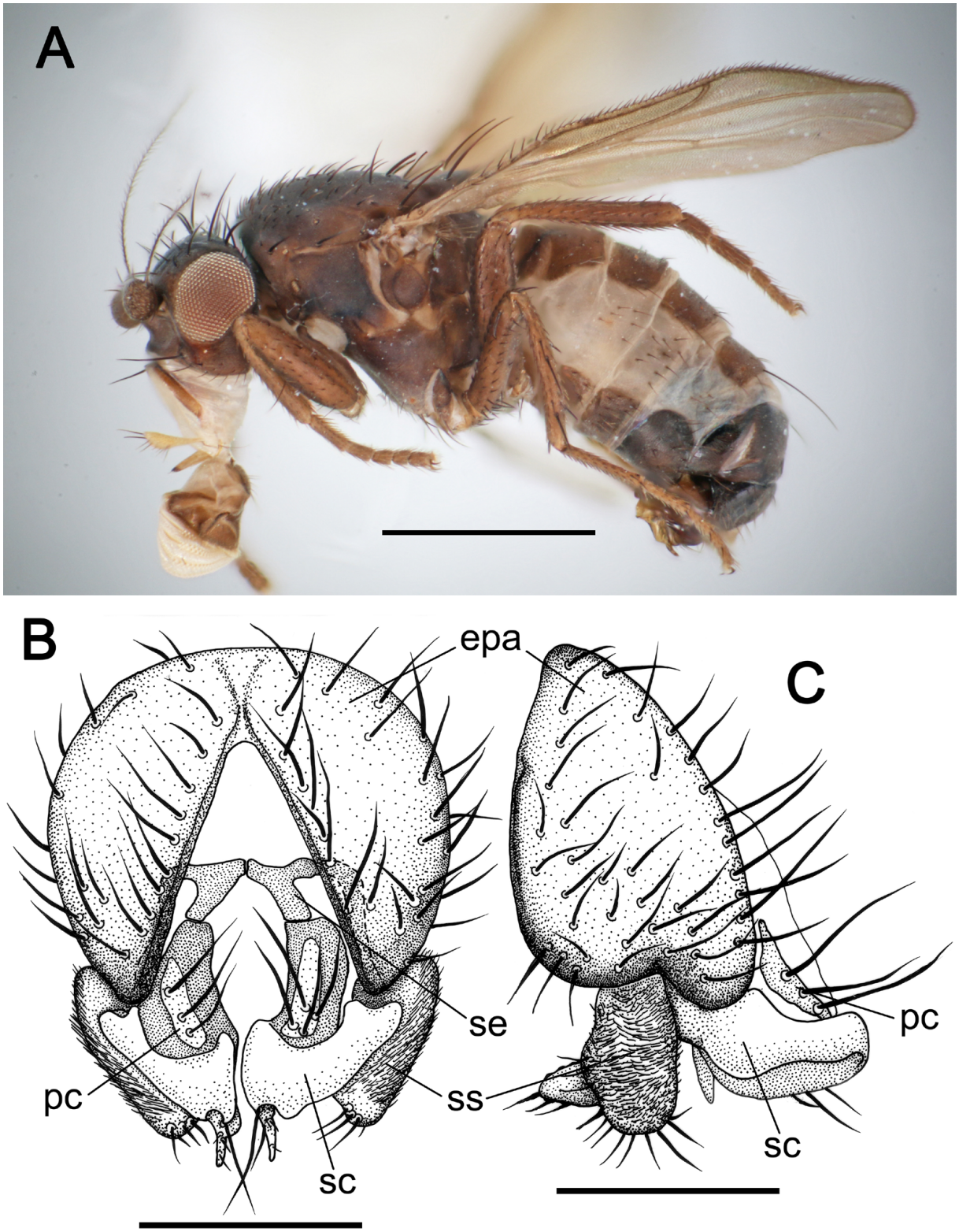


Fig. 119. *Sclerocoelus rectangularis* (Malloch, 1914). **A**. Male habitus, lateral view. **B**. Male terminalia, posterior view. **C**. Male terminalia, lateral view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

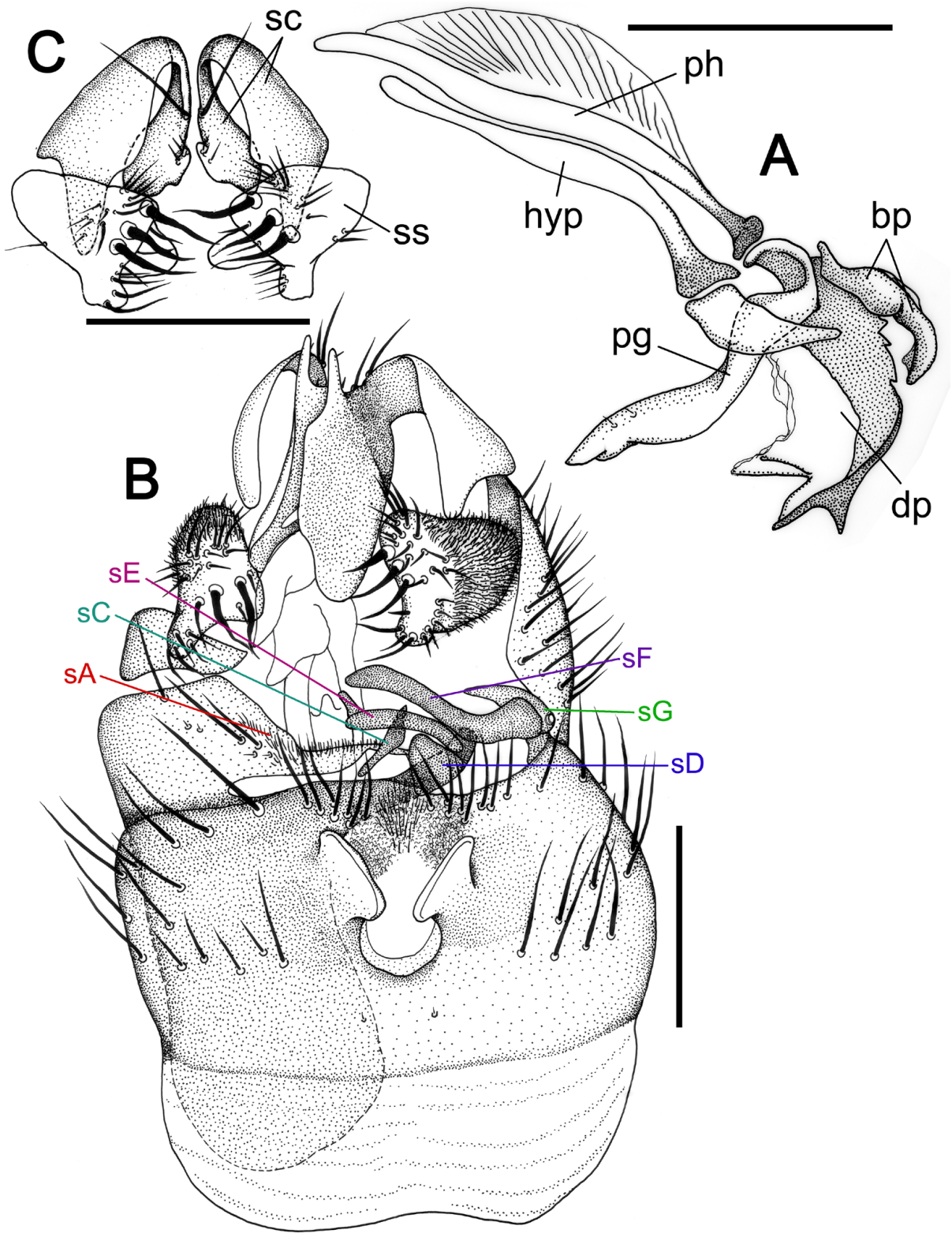


Fig. 120. *Sclerocoelus rectangularis* (Malloch, 1914). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Subcercal complex, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme; sc = subcercus; ss = surstylus. Scale bars: A = 0.13 mm; B–C = 0.25 mm.

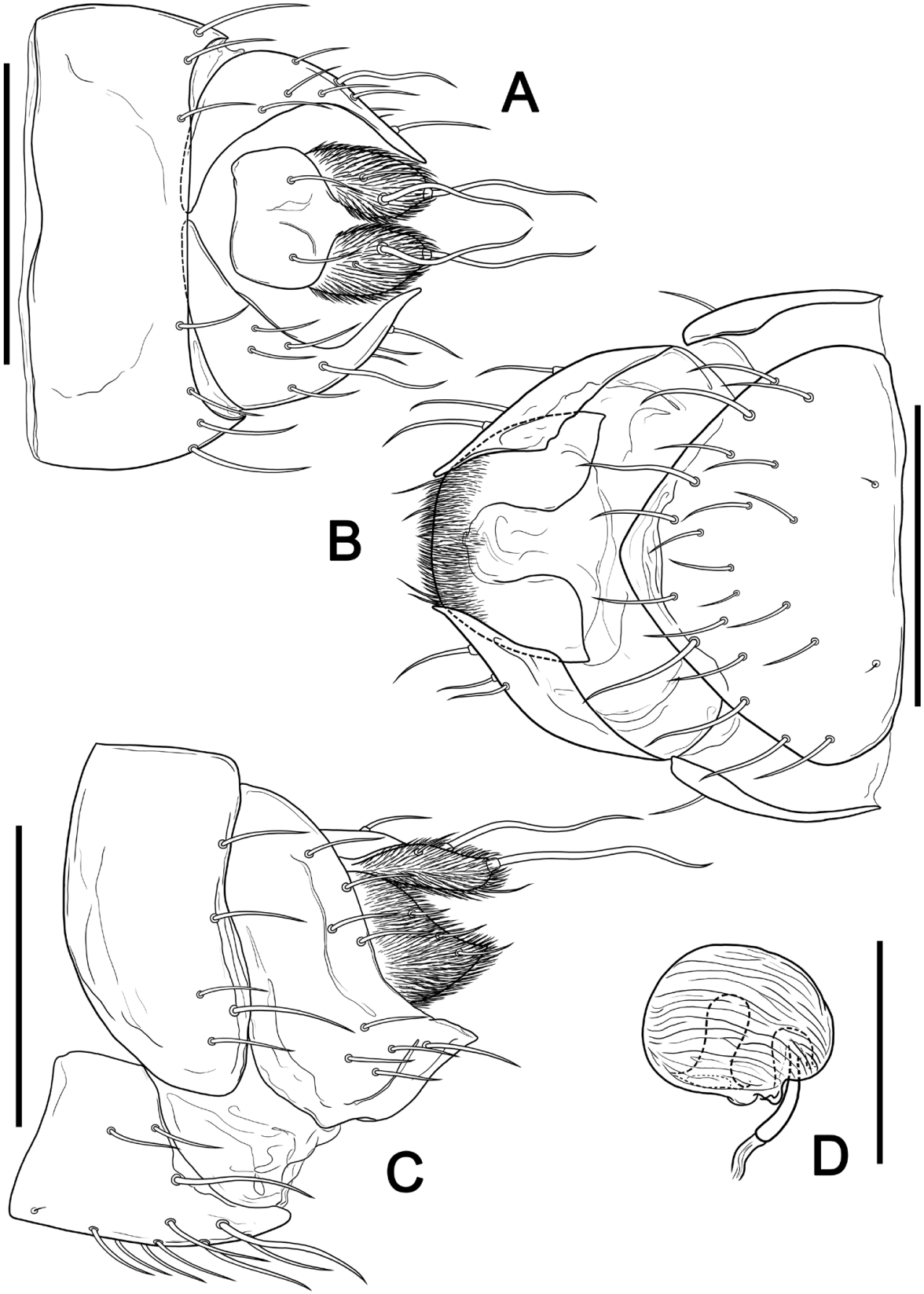


Fig. 121. *Sclerocoelus rectangularis* (Malloch, 1914). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

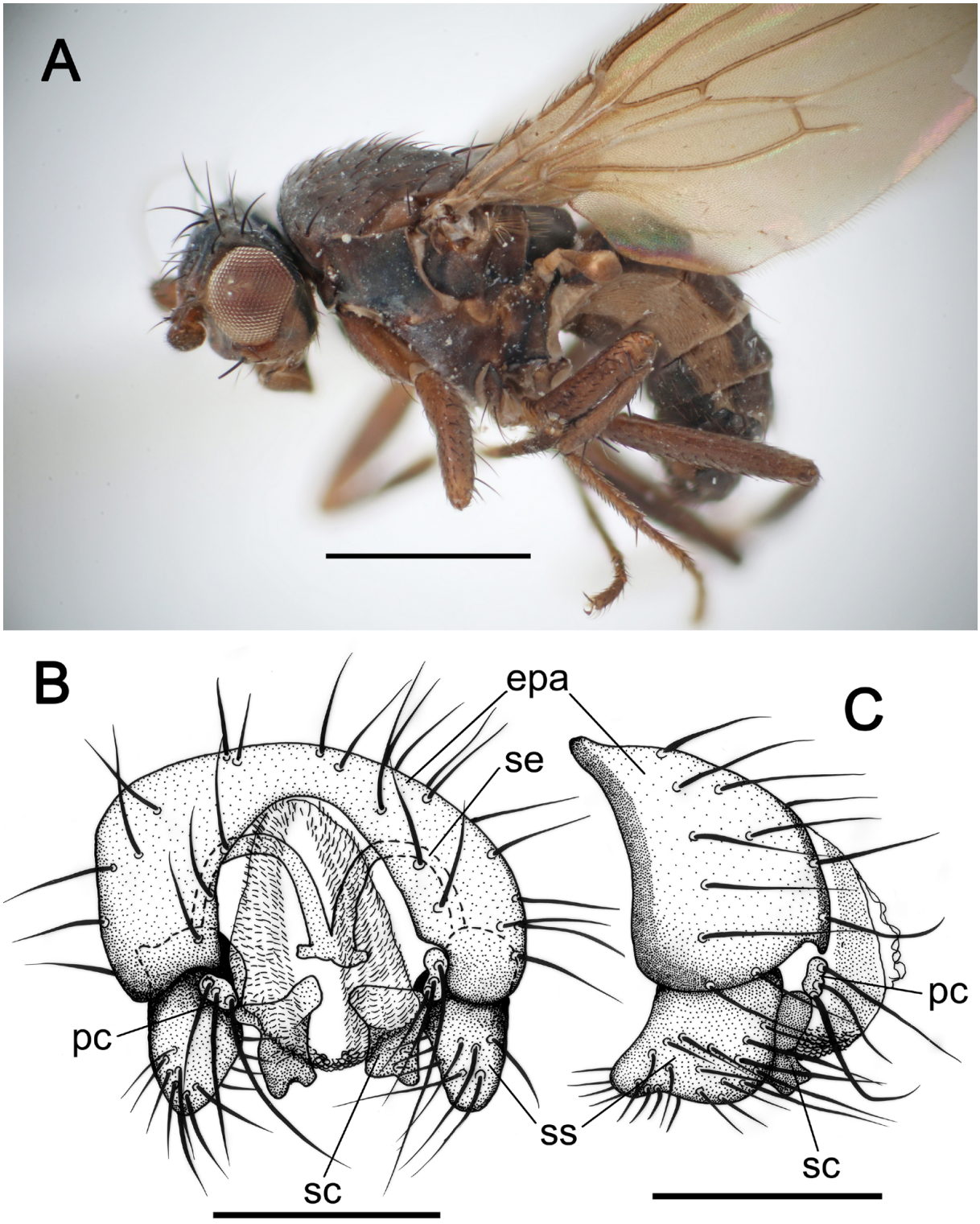


Fig. 122. *Sclerocoelus recurvatus* sp. nov. **A**. Male paratype habitus, lateral view (debu00206383). **B**. Male paratype terminalia, posterior view (debu00206370). **C**. Male paratype terminalia, lateral view (debu00206370). Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

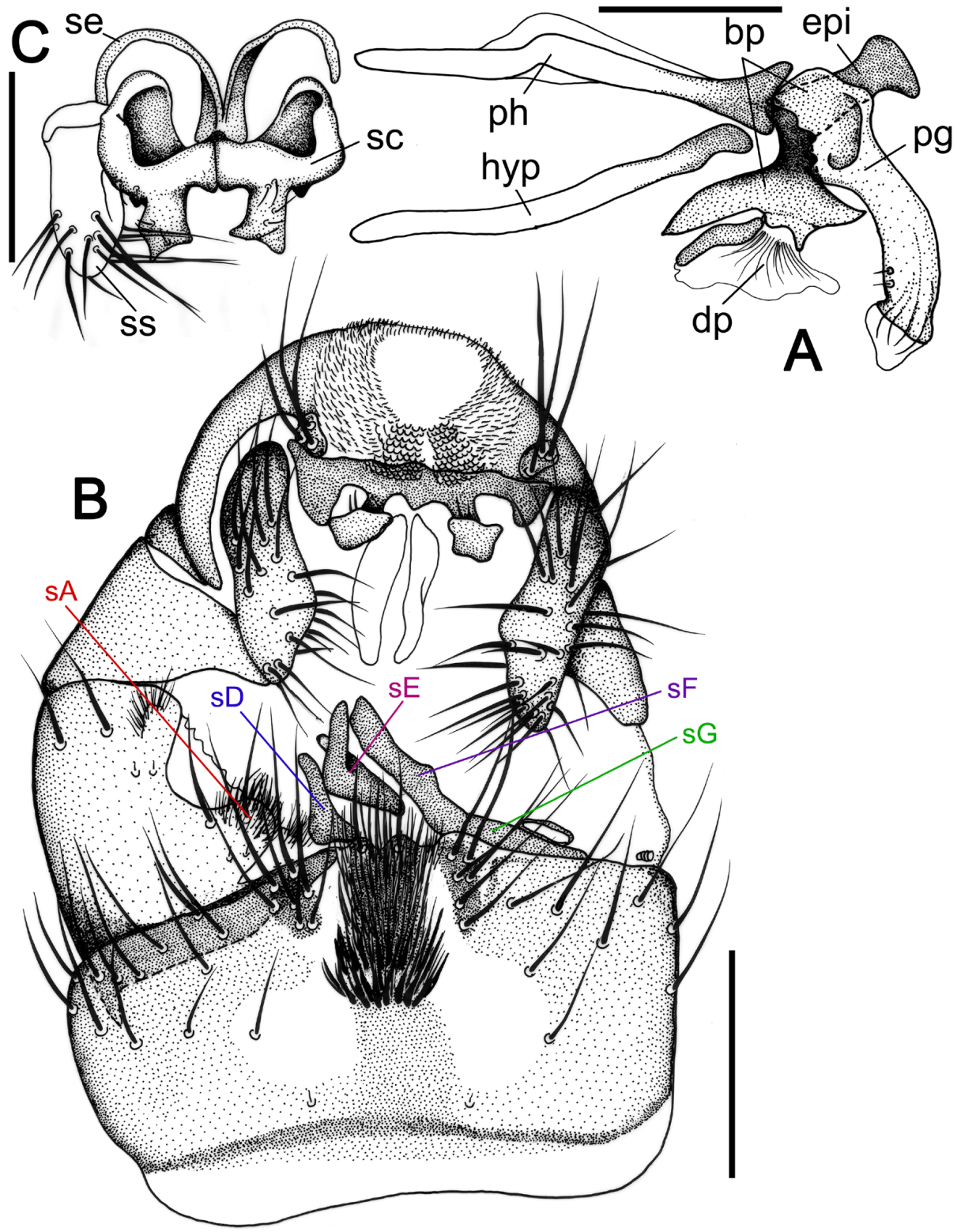


Fig. 123. *Sclerocoelus recurvatus* sp. nov., paratype (debu00206370). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Subcercal complex, posterior view. Abbreviations: bp = basiphallus; dp = distiphallus; epi = epiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 0.13 mm; B = 0.25 mm; C = 0.10 mm.

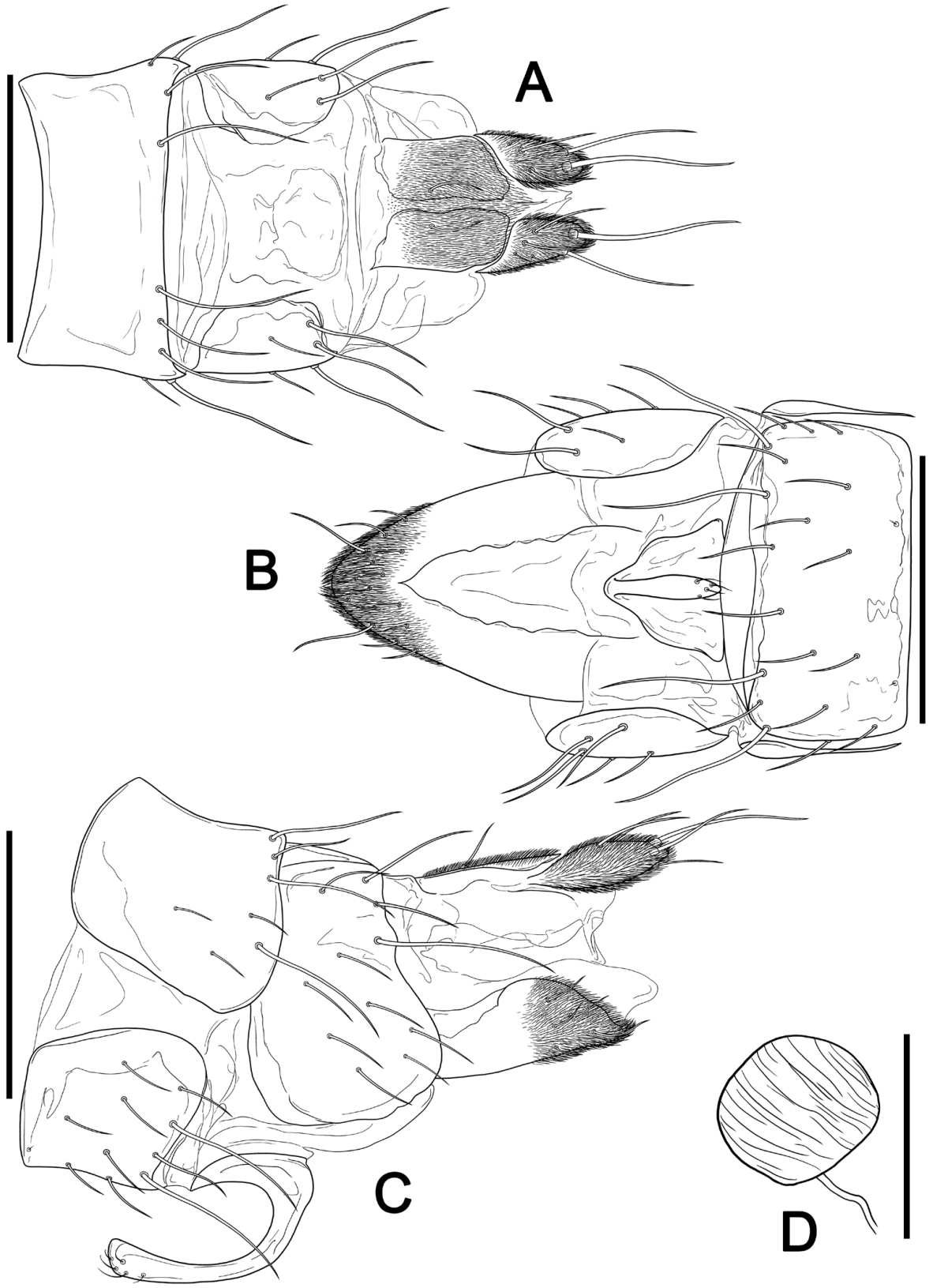


Fig. 124. *Sclerocoelus recurvatus* sp. nov., paratype (debu00203294). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

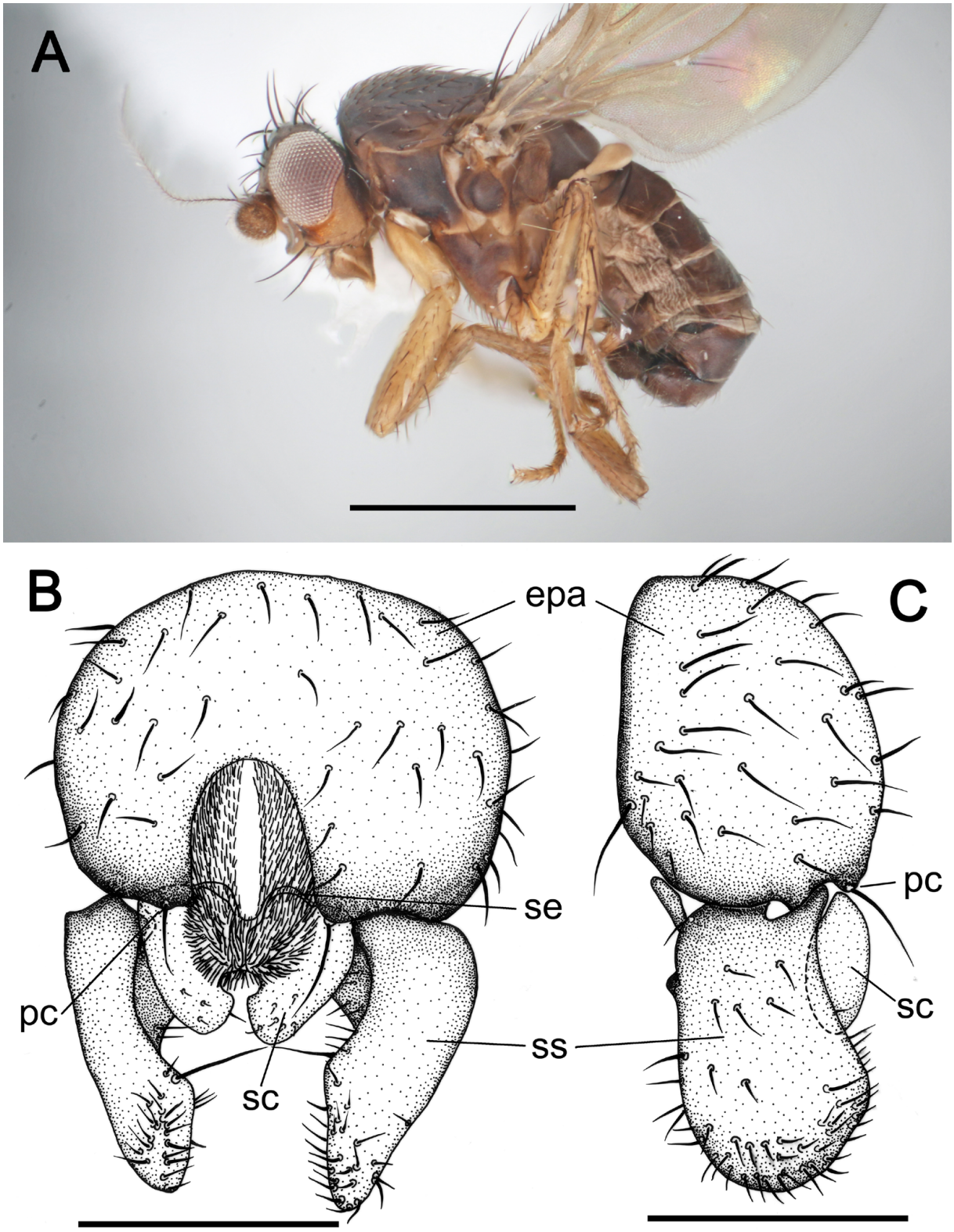


Fig. 125. *Sclerocoelus regularis* (Malloch, 1914). **A**. Male habitus, lateral view. **B**. Male terminalia, posterior view. **C**. Male terminalia, lateral view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

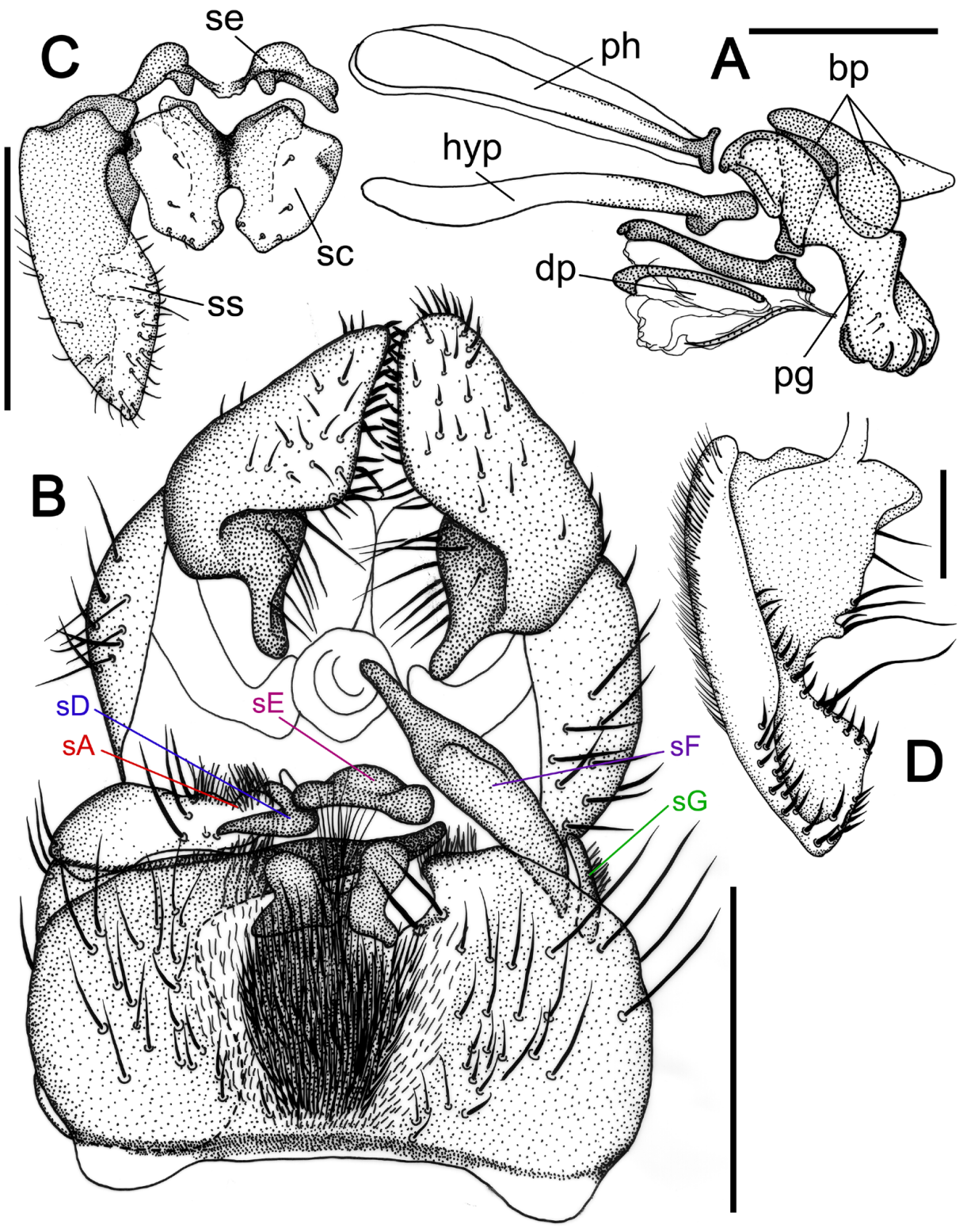


Fig. 126. *Sclerocoelus regularis* (Malloch, 1914). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Subcercal complex, posterior view. **D**. Left surstylus, posterior view. Abbreviations: bp = basiphallus; dp = distiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 0.13 mm; B–C = 0.25 mm; D = 0.10 mm.

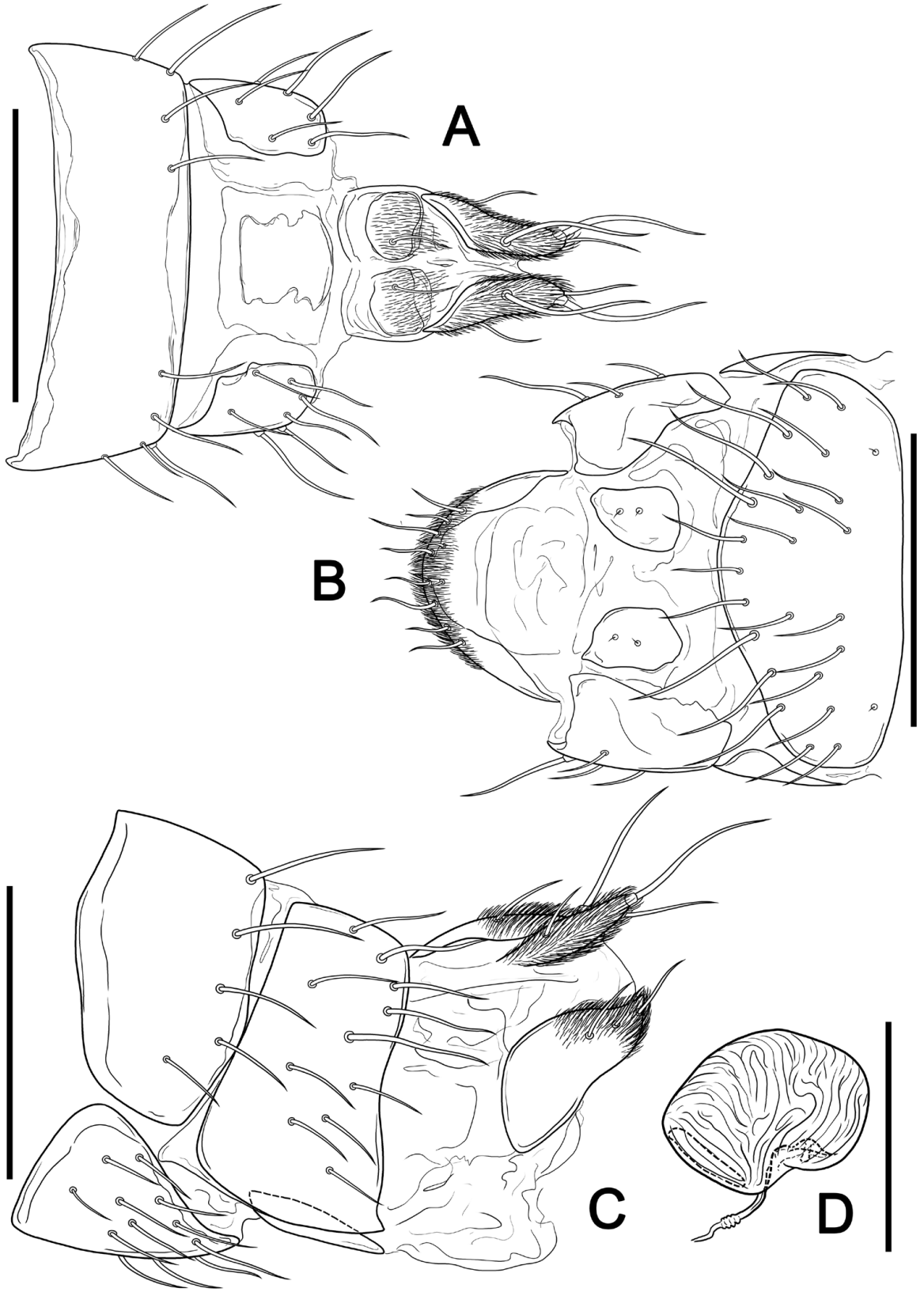


Fig. 127. *Sclerocoelus regularis* (Malloch, 1914). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

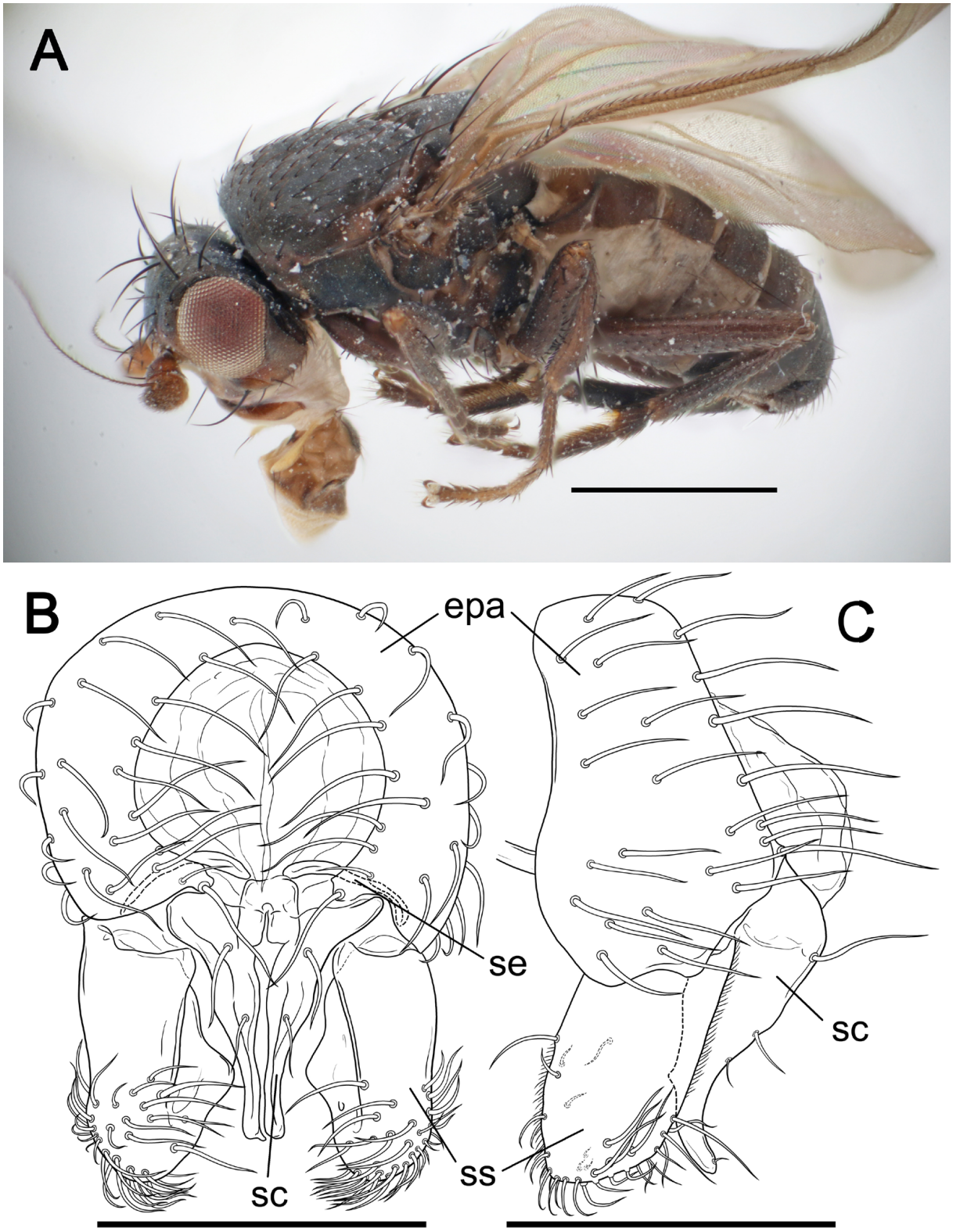


Fig. 128. *Sclerocoelus riparius* sp. nov. **A**. Male paratype habitus, lateral view (debu00111470). **B**. Male paratype terminalia, posterior view (debu00112663). **C**. Male paratype terminalia, lateral view (debu00112663). Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

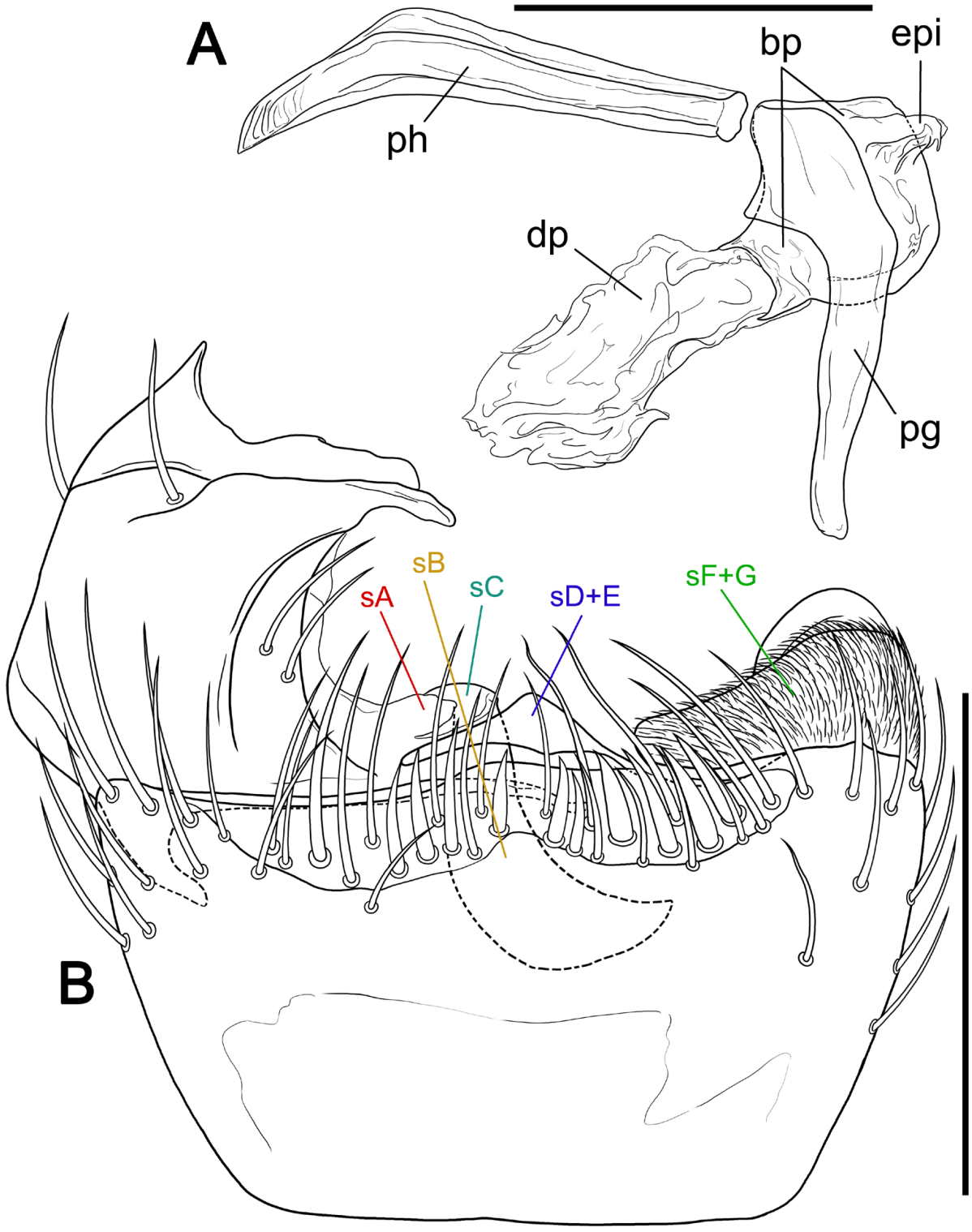


Fig. 129. *Sclerocoelus riparius* sp. nov., paratype (debu00112663). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; epi = epiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

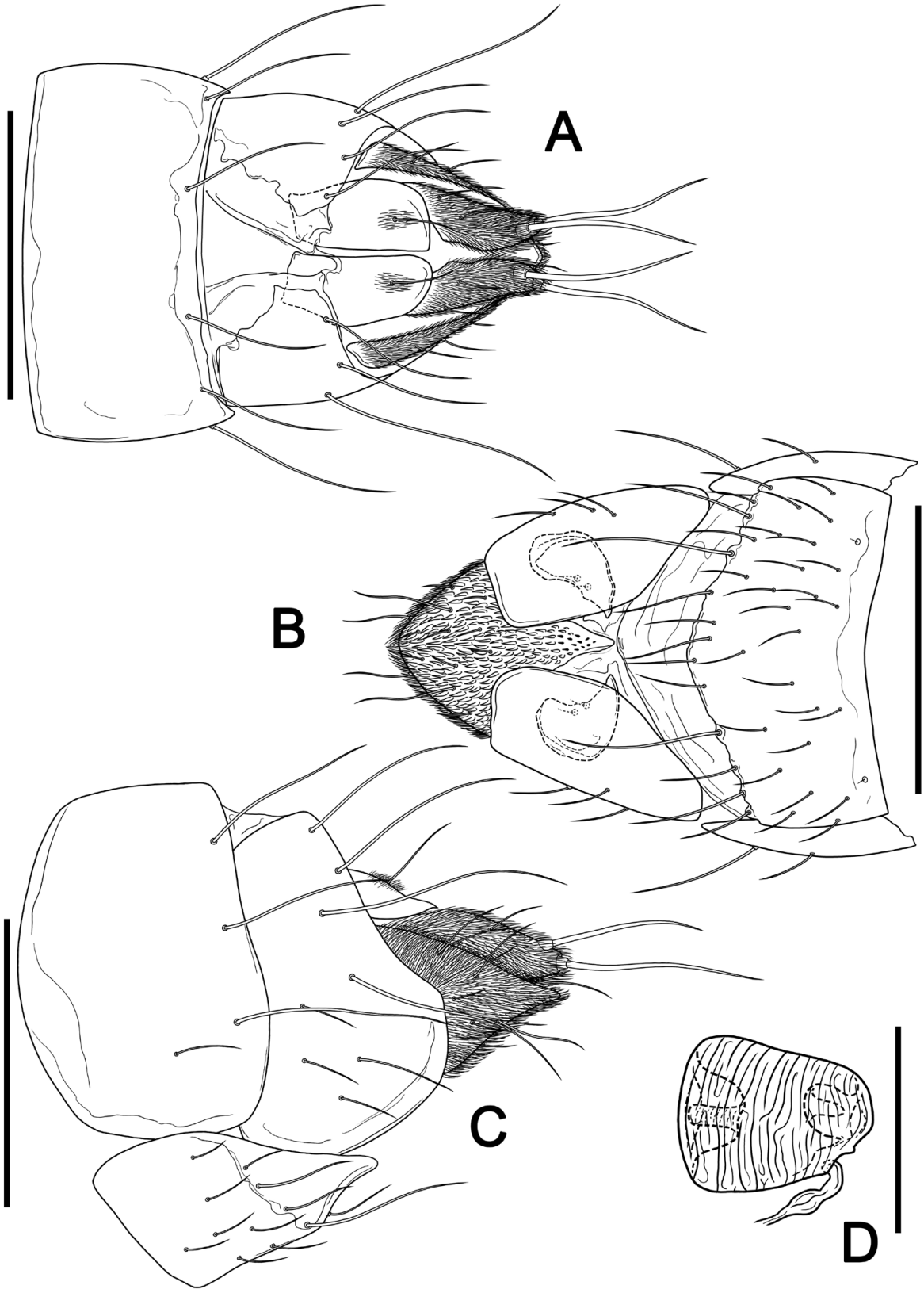


Fig. 130. *Sclerocoelus riparius* sp. nov., paratype (debu00111576). **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

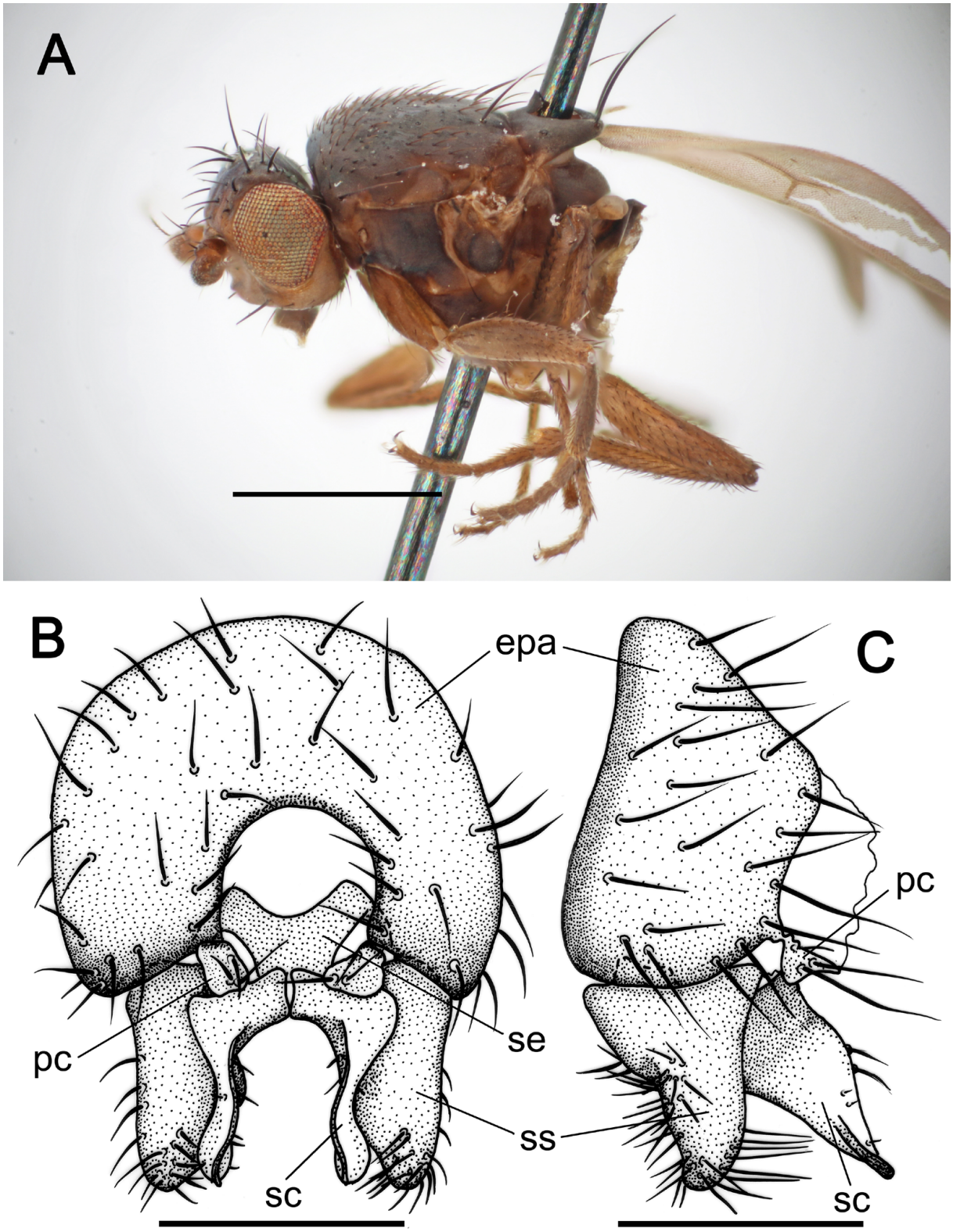


Fig. 131. *Sclerocoelus rostrum* sp. nov., male holotype (MZLU). **A**. Habitus, lateral view. **B**. Terminalia, posterior view. **C**. Terminalia, lateral view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

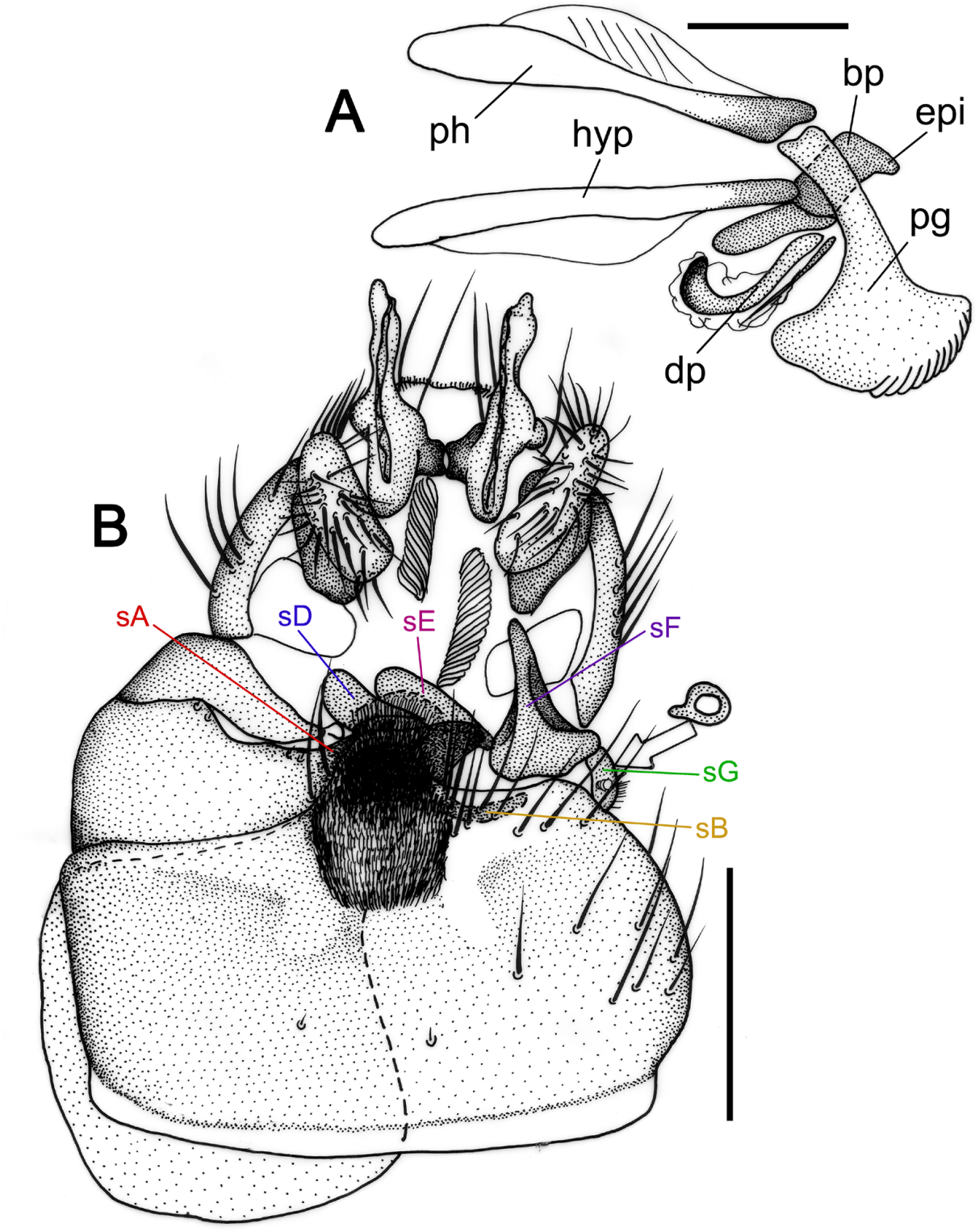


Fig. 132. *Sclerocoelus rostrum* sp. nov., male holotype (MZLU). **A**. Aedeagus and associated structures, lateral view. **B**. S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; epi = epiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

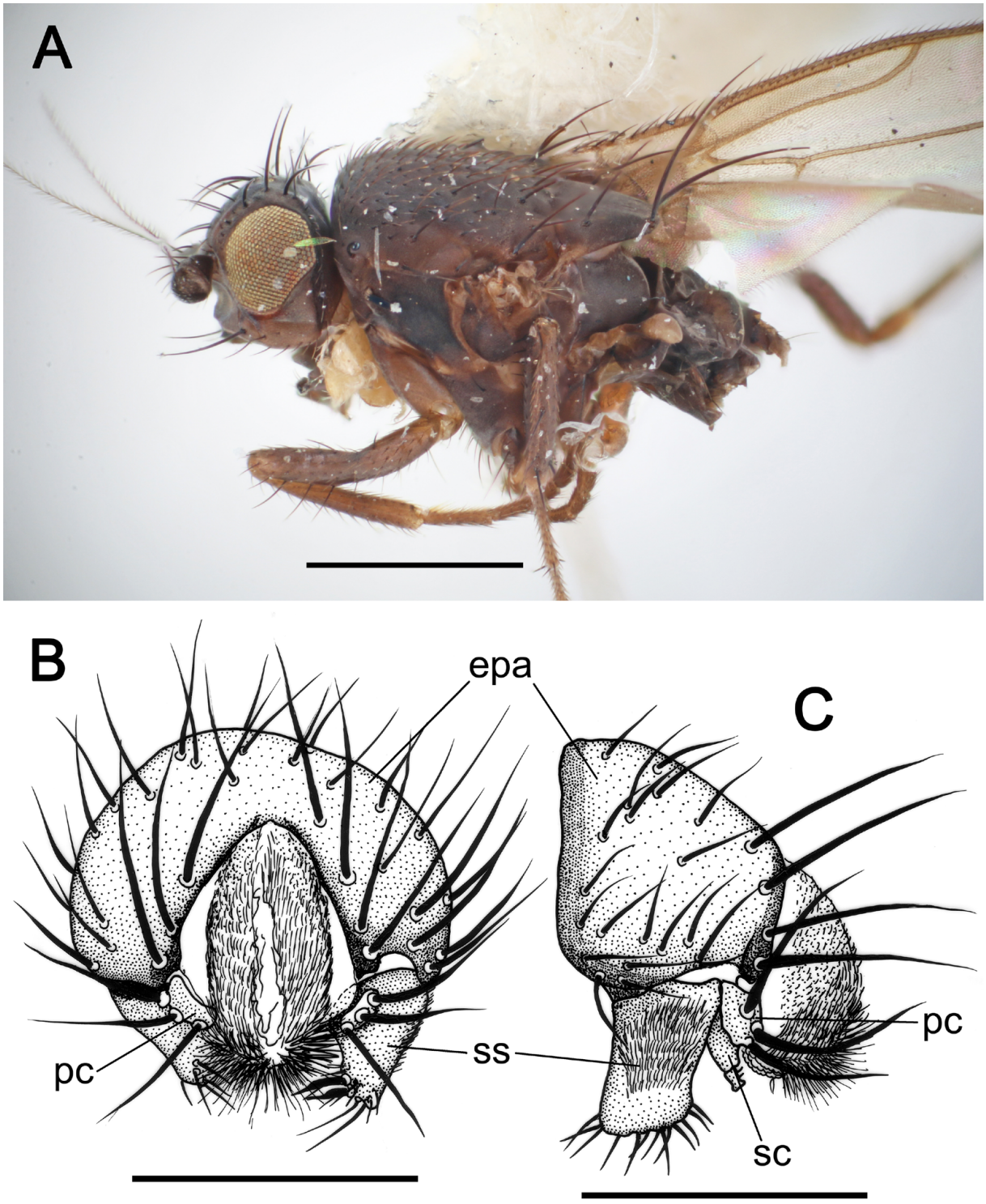


Fig. 133. *Sclerocoelus synorios* sp. nov., male holotype (CAS). **A**. Habitus, lateral view. **B**. Terminalia, posterior view. **C**. Terminalia, lateral view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

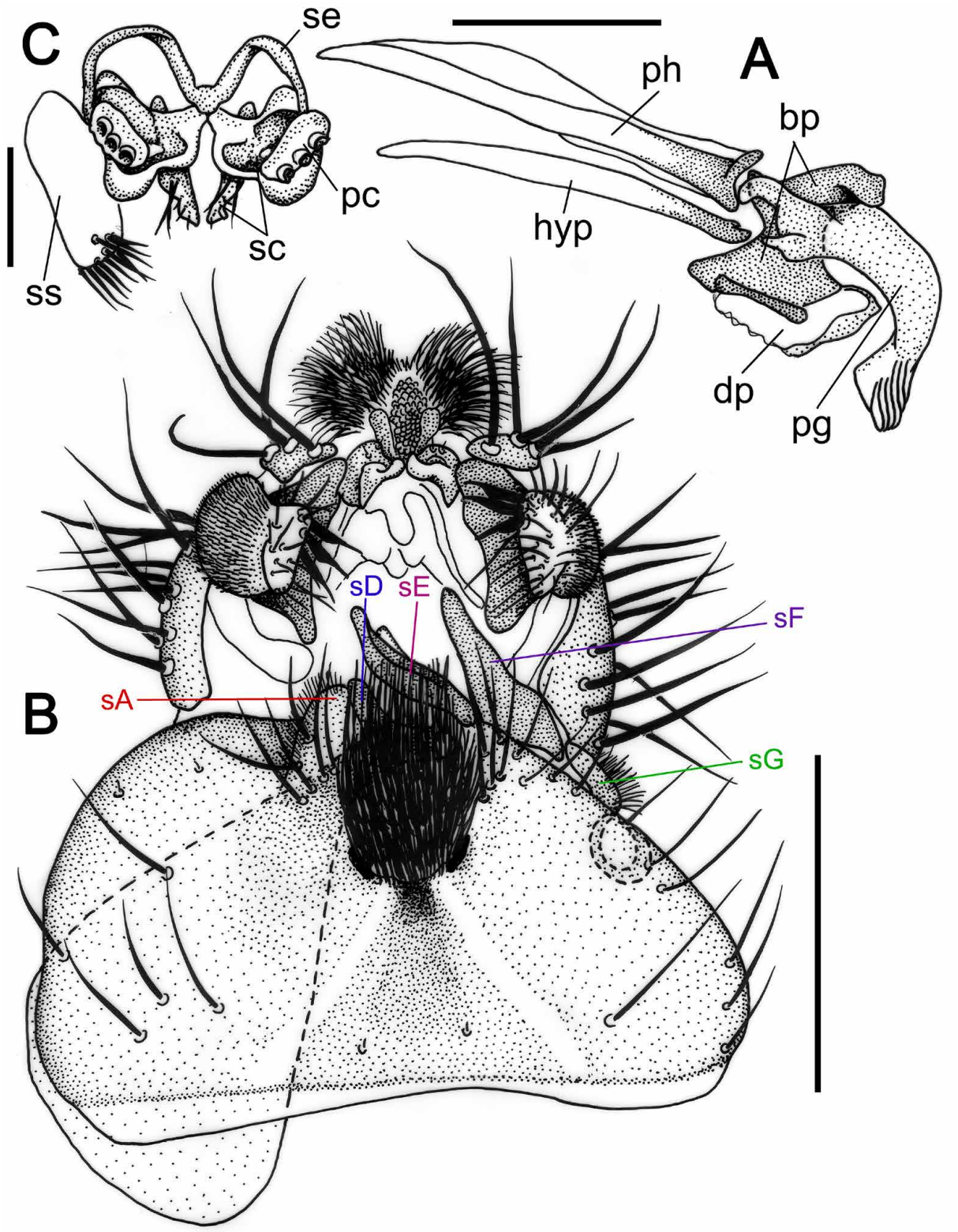


Fig. 134. *Sclerocoelus synorios* sp. nov., male holotype (CAS). **A**. Aedeagus and associated structures, lateral view. **B**. S5 and genital pouch, ventral view. **C**. Subcercal complex, posterior view. Abbreviations: bp = basiphallus; dp = distiphallus; hyp = hypandrium; pc = pseudocercus; pg = postgonite; ph = phallapodeme; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 0.13 mm; B = 0.25 mm; C = 0.10 mm.

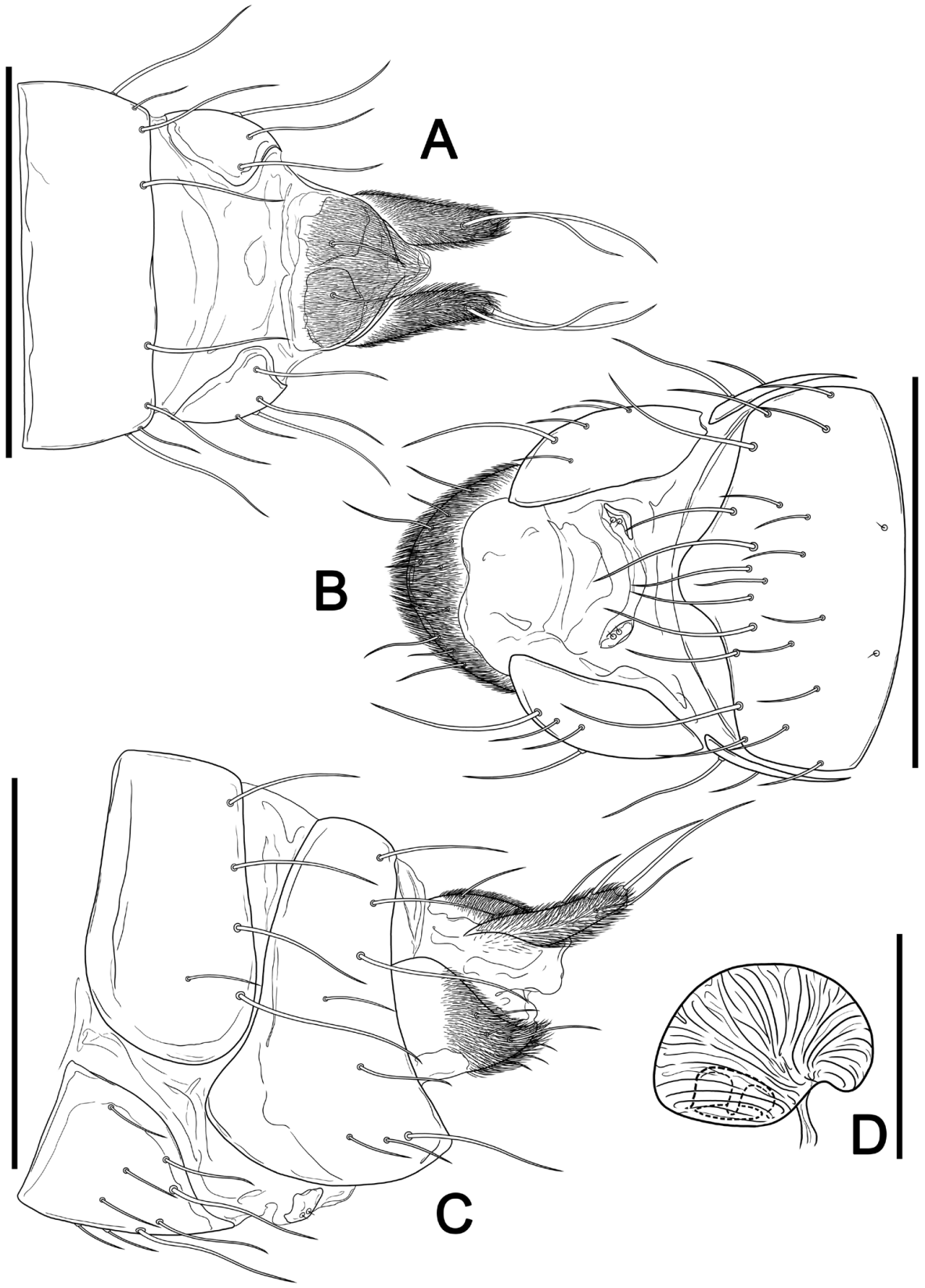


Fig. 135. *Sclerocoelus synorios* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

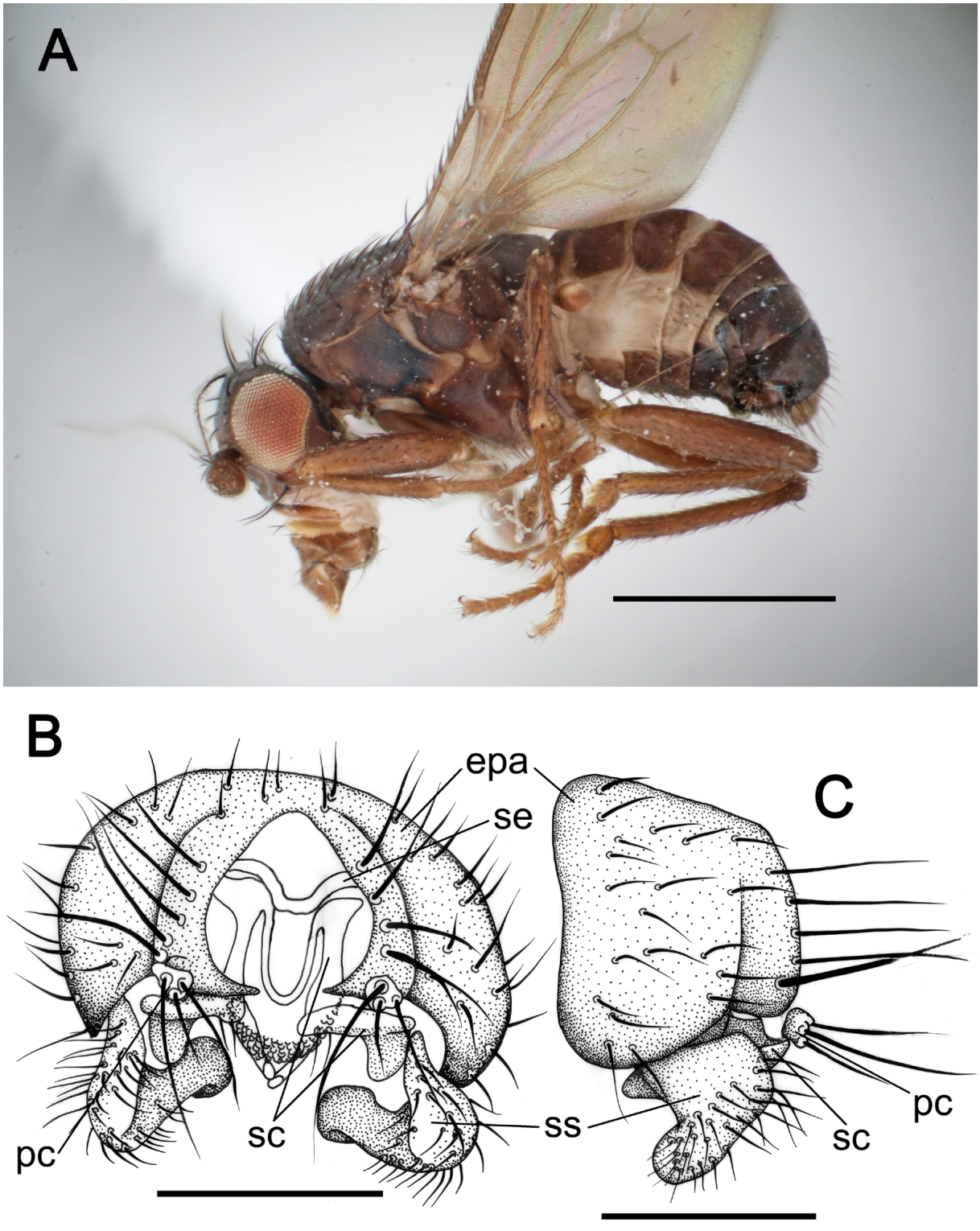


Fig. 136. *Sclerocoelus tantus* sp. nov., paratype. **A**. Male habitus, lateral view. **B**. Male terminalia, posterior view. **C**. Male terminalia, lateral view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

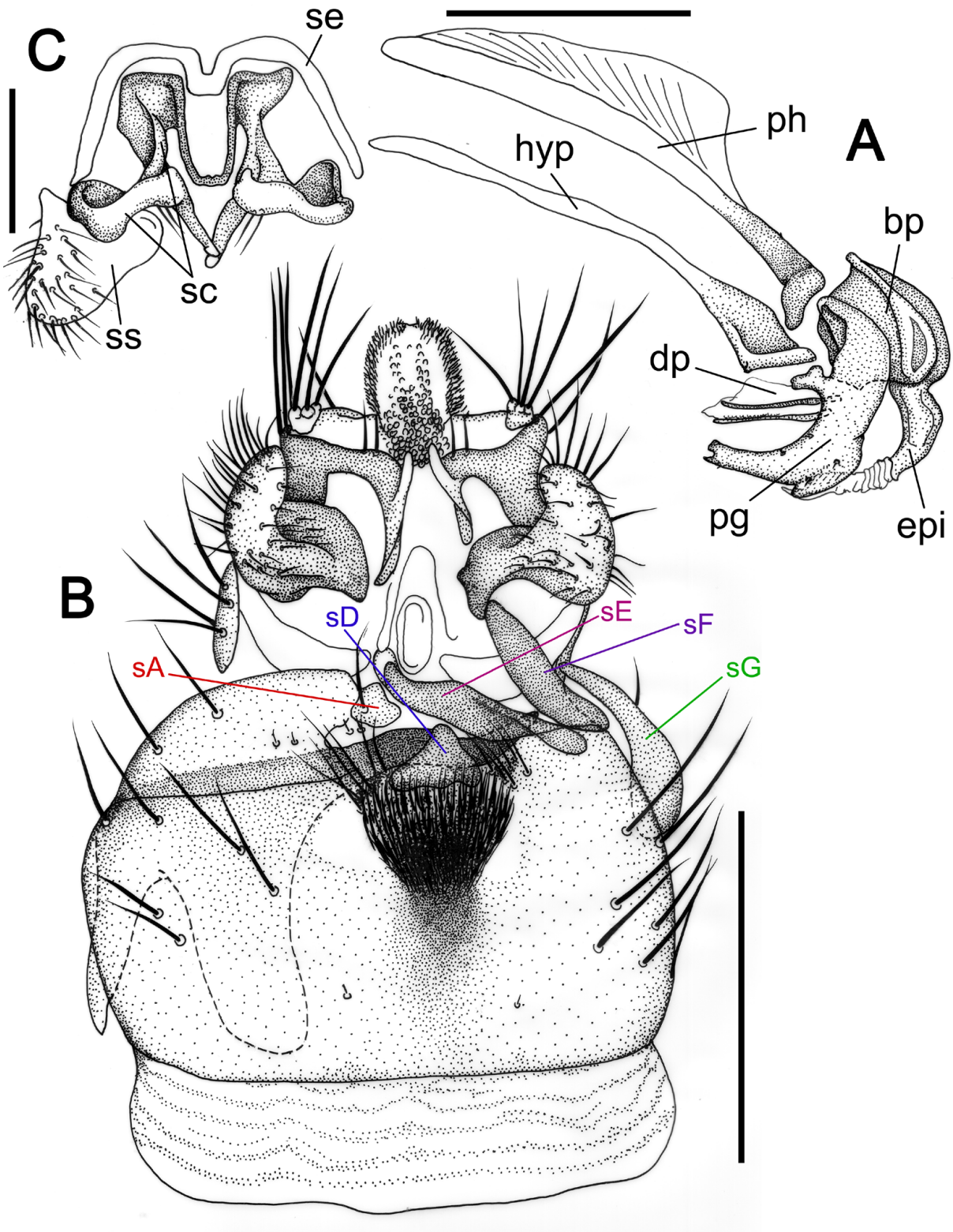


Fig. 137. *Sclerocoelus tantus* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Subcercal complex, posterior view. Abbreviations: bp = basiphallus; dp = distiphallus; epi = epiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 0.13 mm; B = 0.25 mm; C = 0.10 mm.

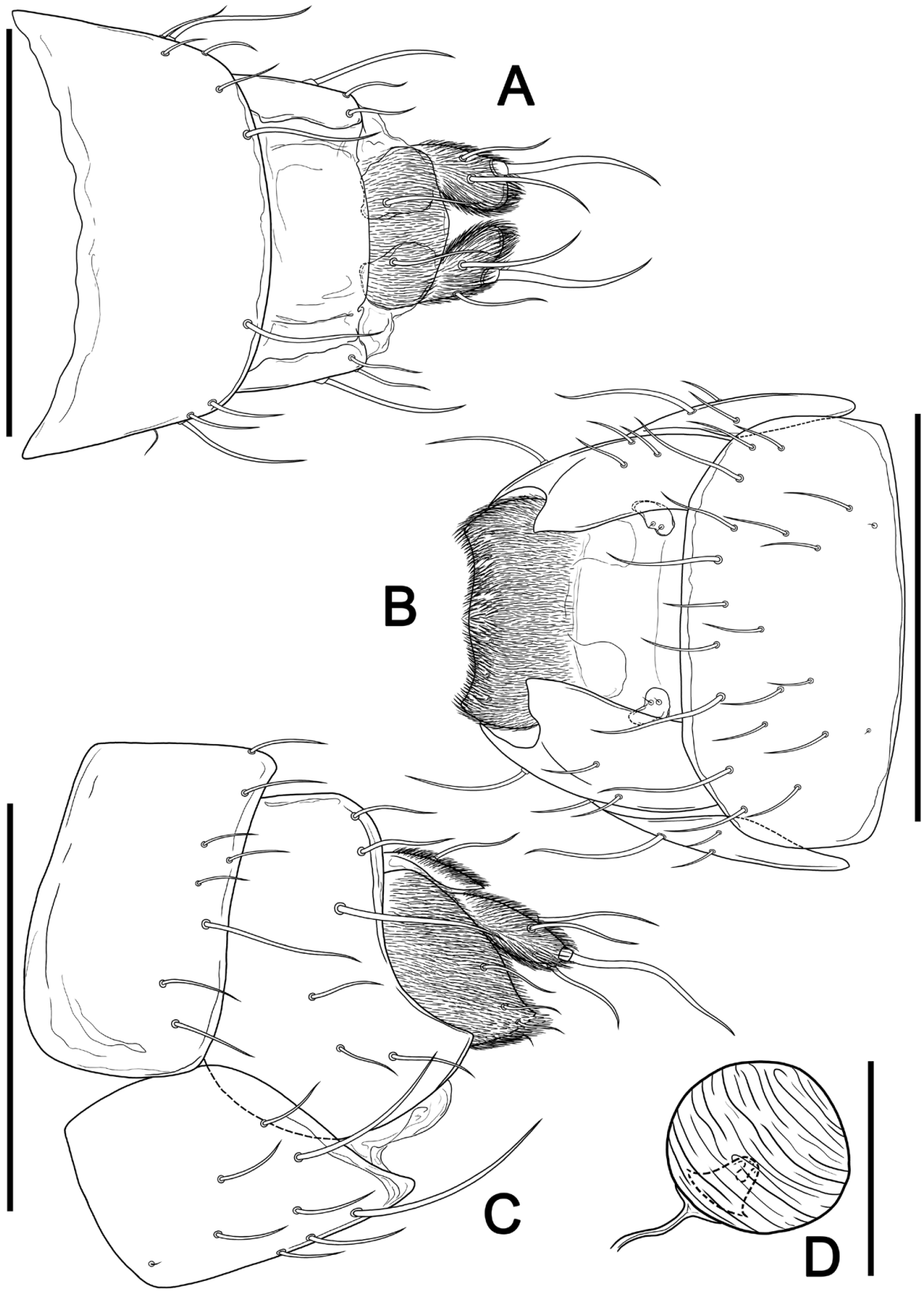


Fig. 138. *Sclerocoelus tantus* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

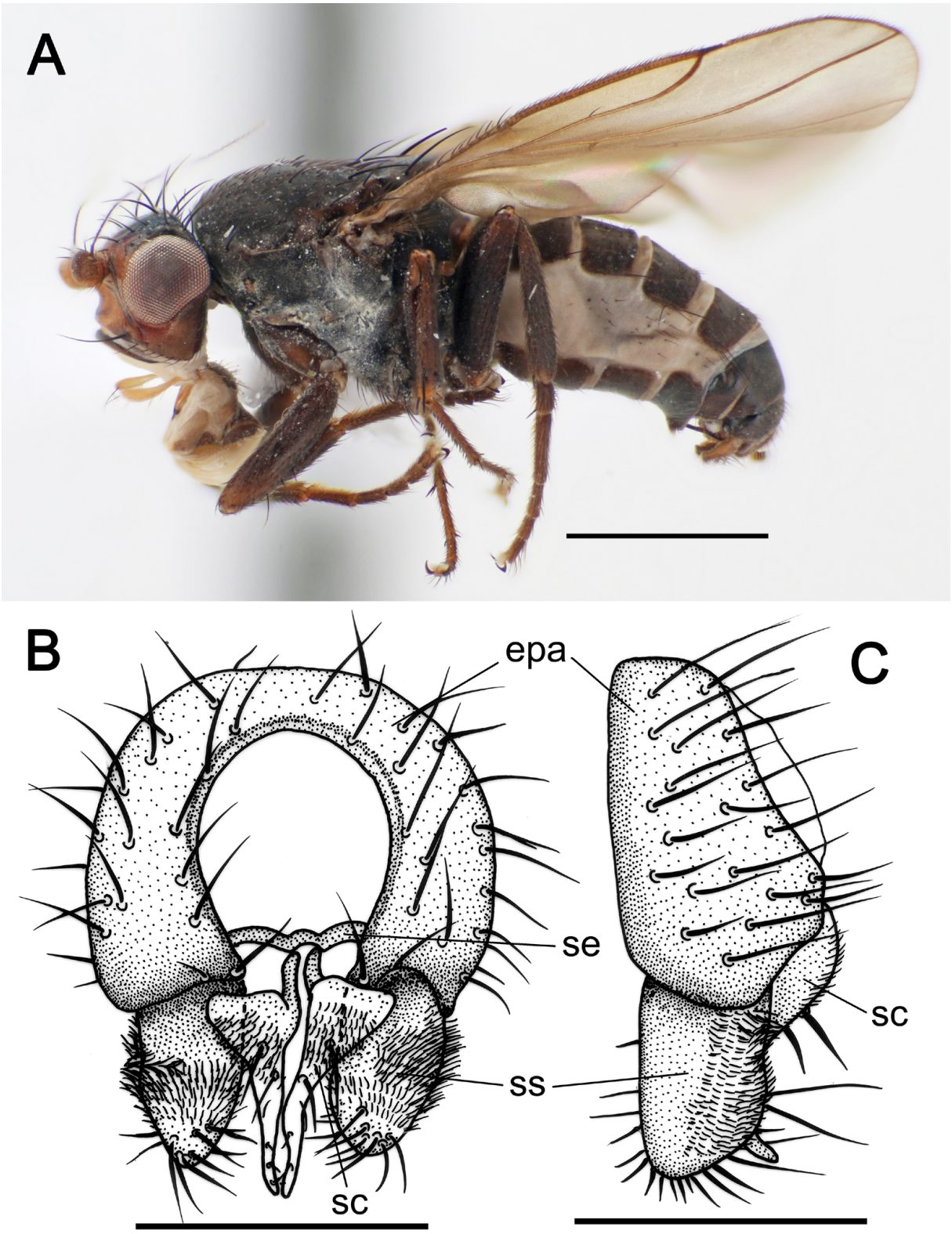


Fig. 139. *Sclerocoelus tridens* sp. nov. **A**. Male paratype habitus, lateral view (debu00339889). **B**. Male paratype terminalia, posterior view. **C**. Male paratype terminalia, lateral view. Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

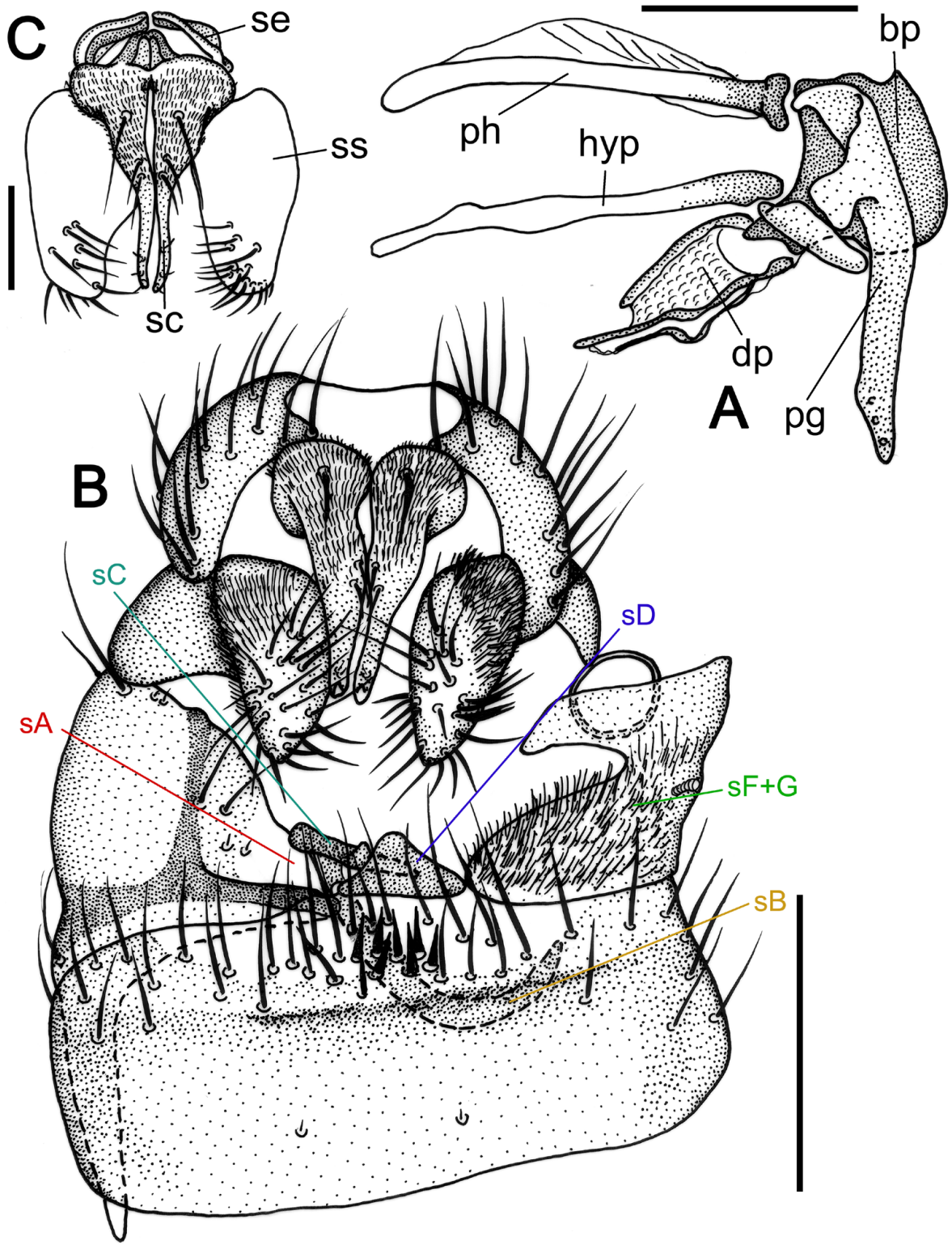


Fig. 140. *Sclerocoelus tridens* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Subcercal complex, posterior view. Abbreviations: bp = basiphallus; dp = distiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 0.13 mm; B = 0.25 mm; C = 0.10 mm.

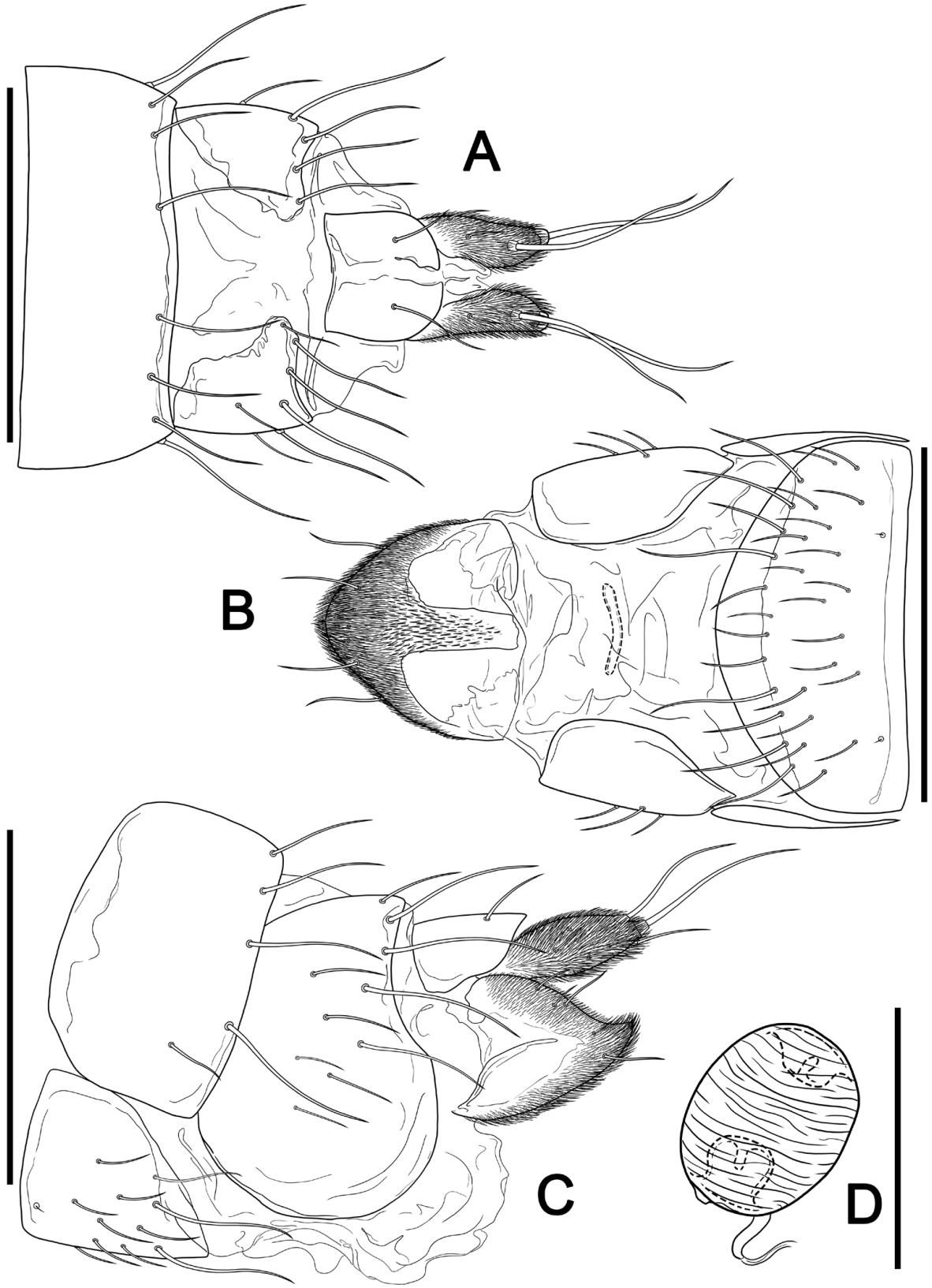


Fig. 141. *Sclerocoelus tridens* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

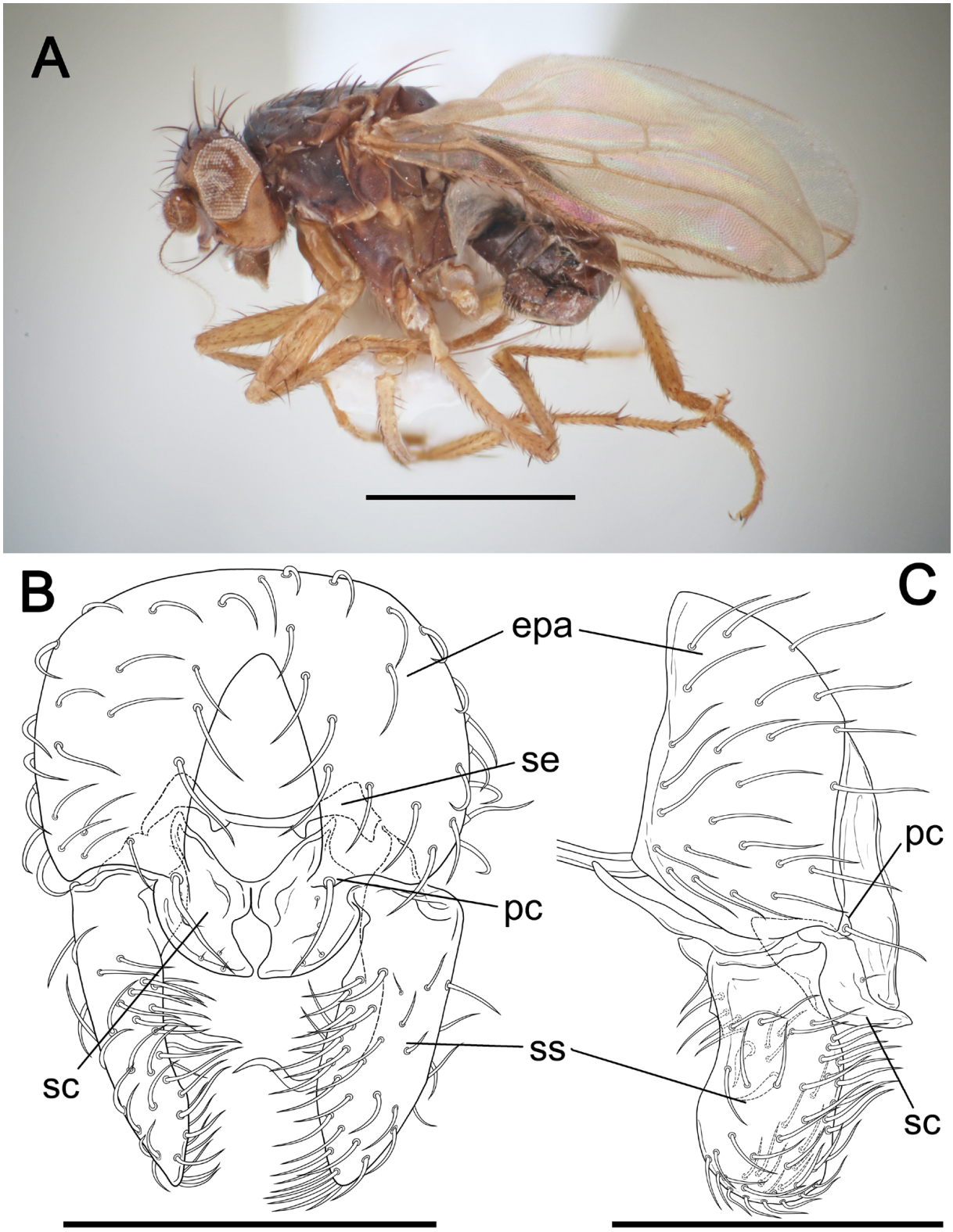


Fig. 142. *Sclerocoelus turpis* sp. nov., male holotype (MZSP). **A**. Habitus, lateral view. **B**. Terminalia, posterior view. **C**. Terminalia, lateral view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

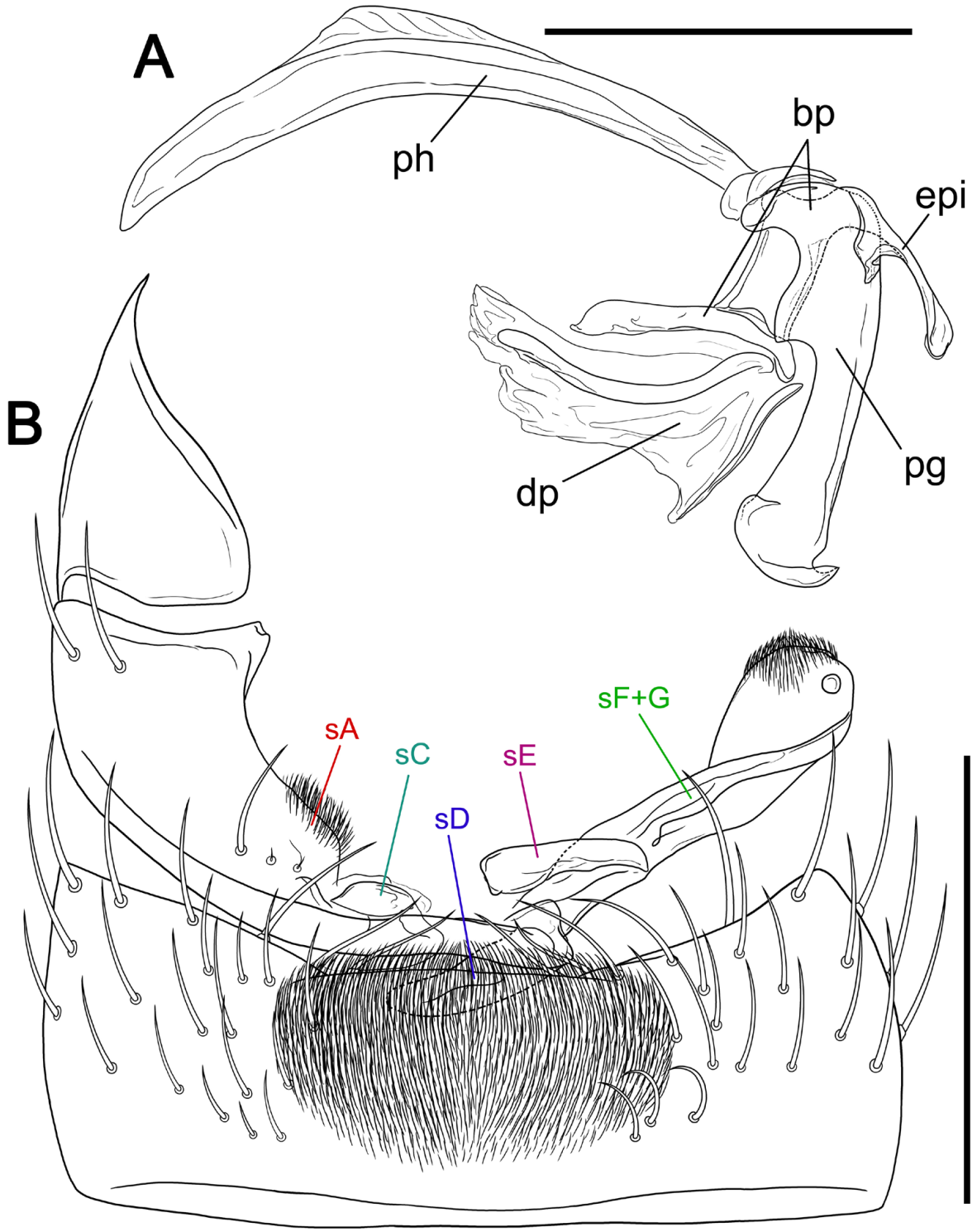


Fig. 143. *Sclerocoelus turpis* sp. nov., male holotype (MZSP). **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. Abbreviations: bp = basiphallus; dp = distiphallus; epi = epiphallus; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm.

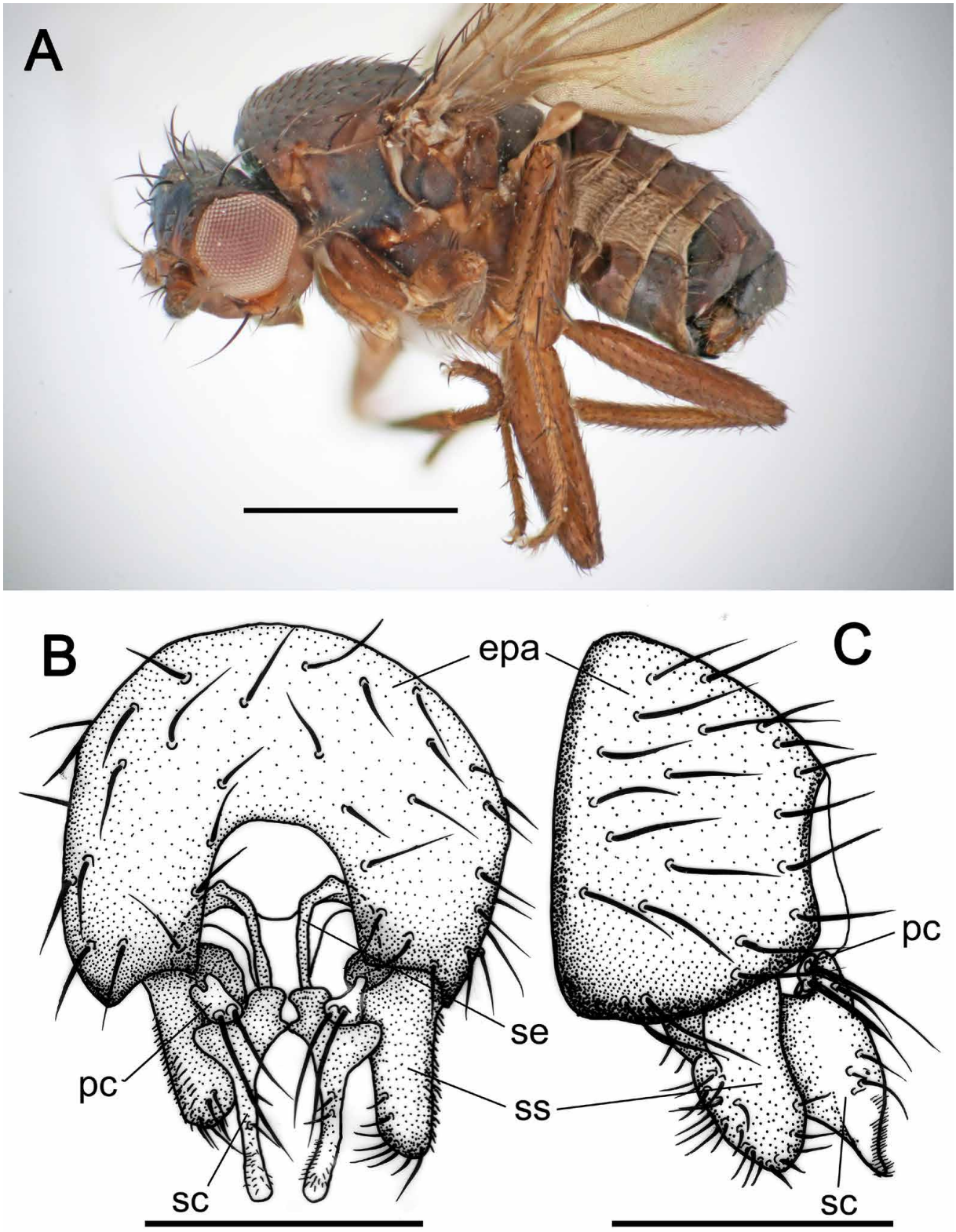


Fig. 144. *Sclerocoelus vulgatus* sp. nov., paratype. **A**. Male habitus, lateral view. **B**. Male terminalia, posterior view. **C**. Male terminalia, lateral view. Abbreviations: epa = epandrium; pc = pseudocercus; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

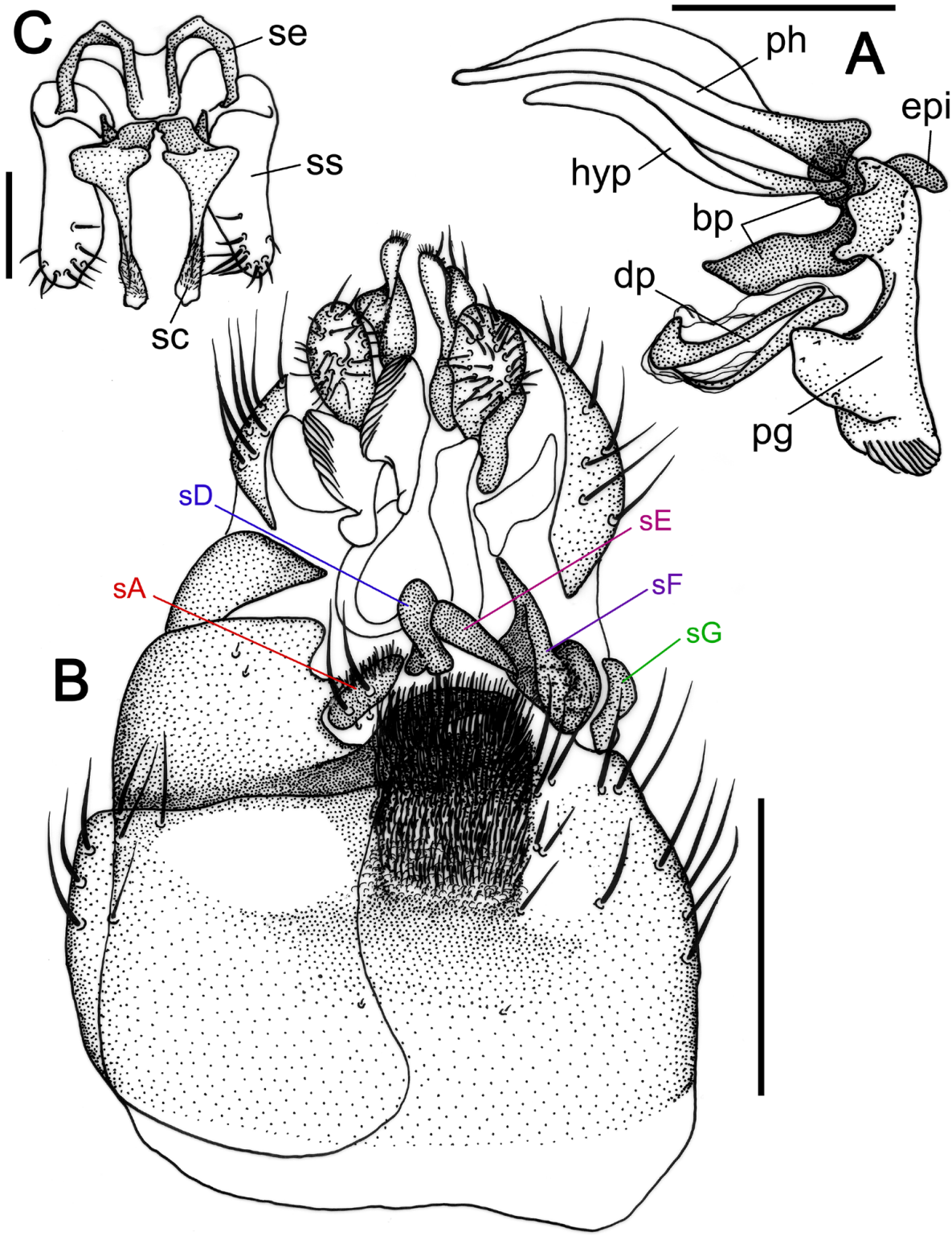


Fig. 145. *Sclerocoelus vulgatus* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Subcercal complex, posterior view. Abbreviations: bp = basiphallus; dp = distiphallus; epi = epiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 0.13 mm; B = 0.25 mm; C = 0.10 mm.

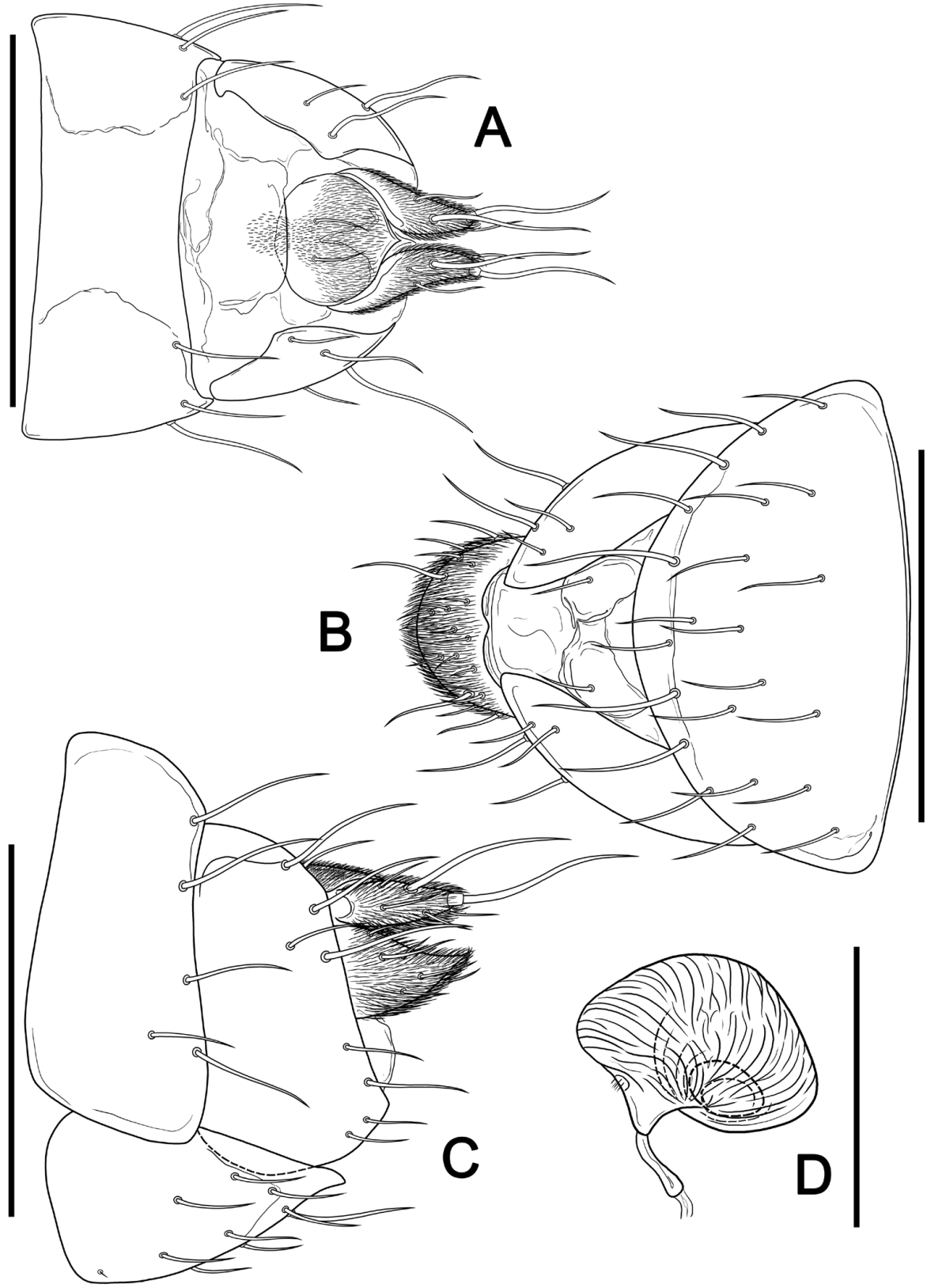


Fig. 146. *Sclerocoelus vulgatus* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.

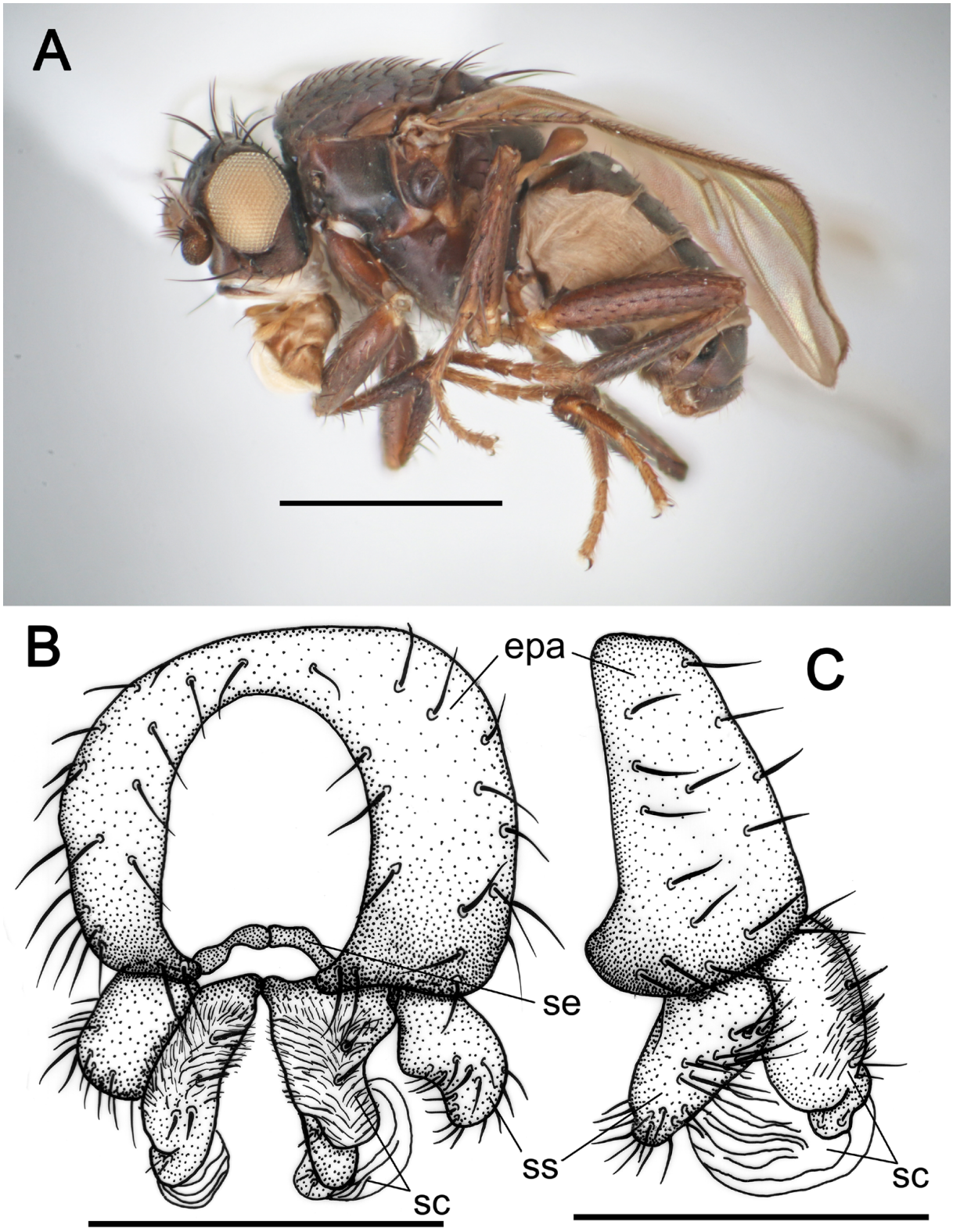


Fig. 147. *Sclerocoelus xynos* sp. nov., paratype. **A**. Male habitus, lateral view. **B**. Male terminalia, posterior view. **C**. Male terminalia, lateral view. Abbreviations: epa = epandrium; sc = subcercus; se = subepandrial sclerite; ss = surstylus. Scale bars: A = 1.0 mm; B–C = 0.25 mm.

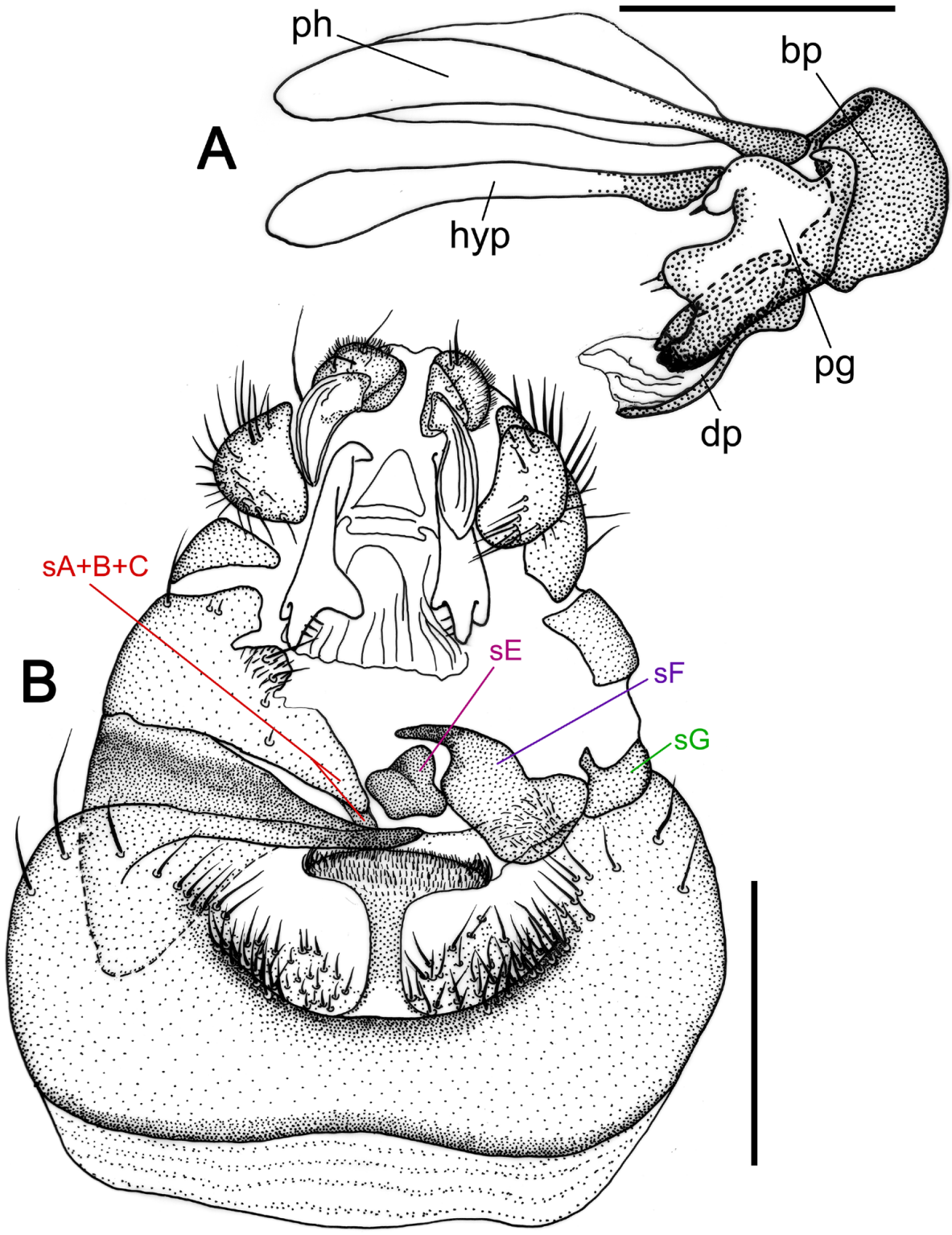


Fig. 148. *Sclerocoelus xynos* sp. nov., paratype. **A**. Aedeagus and associated structures, lateral view. **B**. Male S5 and genital pouch, ventral view. **C**. Subcercal complex, posterior view. Abbreviations: bp = basiphallus; dp = distiphallus; hyp = hypandrium; pg = postgonite; ph = phallapodeme. Scale bars: A = 0.13 mm; B = 0.25 mm; C = 0.10 mm.

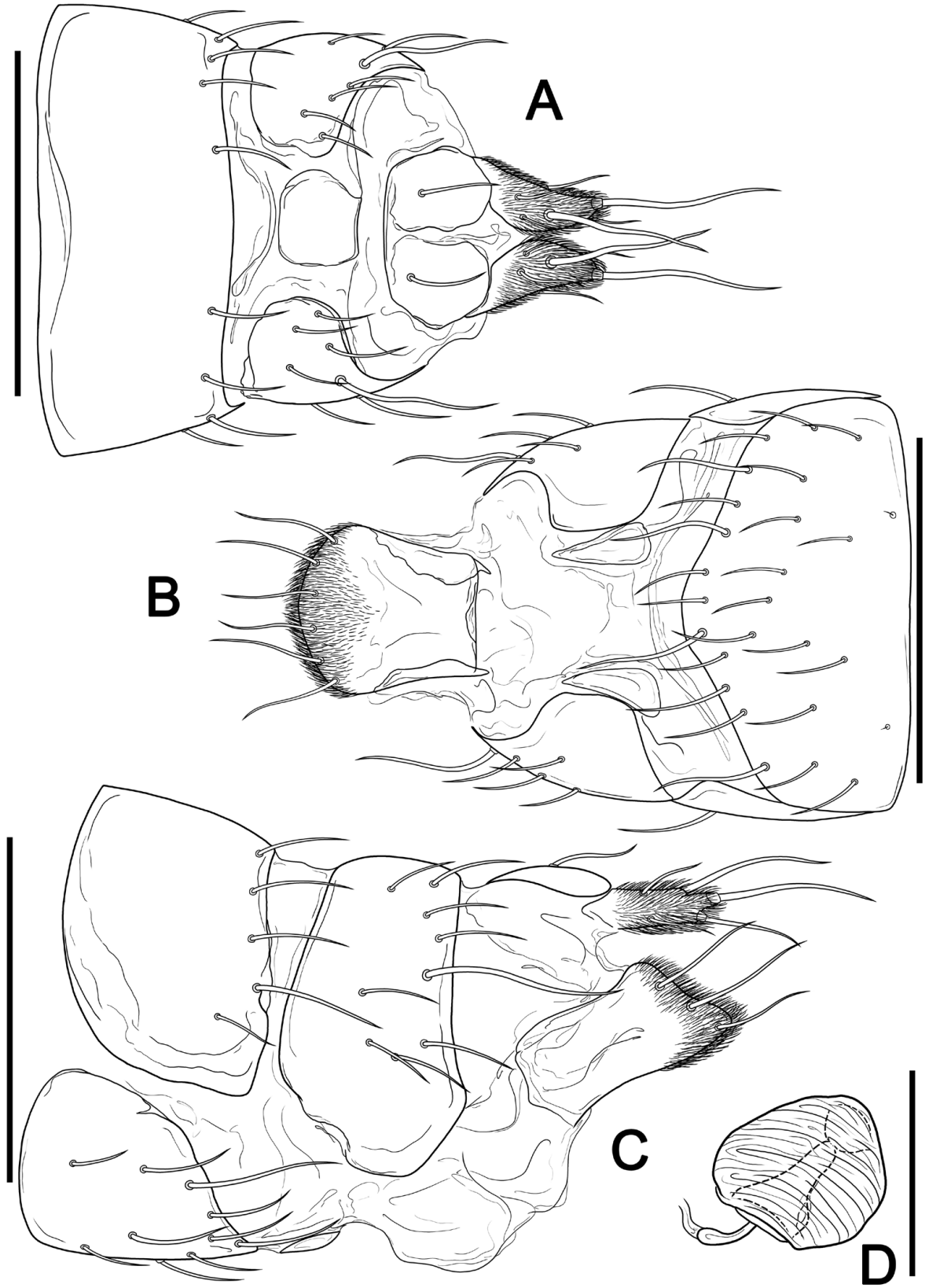


Fig. 149. *Sclerocoelus xynos* sp. nov., paratype. **A**. Female terminalia, dorsal view. **B**. Female terminalia, ventral view. **C**. Female terminalia, lateral view. **D**. Spermatheca. Scale bars: A–C = 0.25 mm; D = 0.03 mm.