European Journal of Taxonomy 989: 245–265
https://doi.org/10.5852/ejt.2025.989.2897
ISSN 2118-9773
www.europeanjournaloftaxonomy.eu
2025 · Santos J.R. *et al.*

Research article

urn:lsid:zoobank.org:pub:F82DBAF2-6C88-4D80-BD59-306A205C9559

Five new species of *Microcerella* Macquart, 1851 (Diptera: Sarcophagidae) from the Andean Region

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Abstract. Five new species of *Microcerella* Macquart, 1851 are described from the Andean Region: one from Argentina, *Microcerella obscura* sp. nov., two from Chile, *Microcerella desertum* sp. nov. and *Microcerella grinteri* sp. nov., one from Ecuador, *Microcerella hyperbole* sp. nov., and one from Peru, *Microcerella jimi* sp. nov. The male morphology is documented with photographs and illustrations, including details of the terminalia for all new species. New morphological structures in the phallus are observed for these new species of *Microcerella*, the median and lateral processes.

Keywords. Morphology, taxonomy, flesh flies, Sarcophaginae, phallic structures.

Santos J.R., Mello-Patiu C.A., Couri M.S. & Mulieri P.R. 2025. Five new species of *Microcerella* Macquart, 1851 (Diptera: Sarcophagidae) from the Andean Region. *European Journal of Taxonomy* 989: 245–265. https://doi.org/10.5852/ejt.2025.989.2897

Introduction

Flesh flies of the genus *Microcerella* Macquart are widely distributed in the Neotropical Region with a few species reaching the Nearctic Region, and many species are narrow endemics associated with cold highland environments in temperate South America. Information on the biology of species of *Microcerella* is sparse, but it seems to be one of the larger genera of saprophagous species in the New World Sarcophagidae, currently comprising 81 described species (Pape 1990, 1996; Mulieri *et al.* 2015). The classification of the genus has an intricate history that has oscillated between the "splitter" view of

H.S. Lopes operating with the tribe Microcerellini (including an inflated number of monotypic genera) (Lopes 1982, 1989), and the "lumper" view of T. Pape, who synonymized (with a few exceptions) the entire tribe under the current concept of *Microcerella* (Pape 1990, 1996). Subsequent papers have followed an expanded concept proposed by Pape (1990, 1996) of *Microcerella* (e.g., Giroux *et al.* 2010; Mulieri *et al.* 2015; Buenaventura & Pape 2018). Recently, some studies provided the first attempts at reconstructing phylogenetic relationships within the Sarcophaginae using morphological (Giroux *et al.* 2010; Buenaventura & Pape 2018) and molecular data (Buenaventura 2021), but with very low representation of species of *Microcerella*. Since there is not a comprehensive phylogenetic study providing an understanding of the evolution of this genus, the multiple monotypic genera (=20 of 32) in Microcerellini sensu Lopes (1982, 1989) do not convey much information. In contrast, the broader concept of *Microcerella* of Pape (1990, 1996) is taxonomically more useful until a cladistic analysis challenges its monophyly and provides a well-corroborated resolution with strongly supported monophyletic groups. In recent years, several new species of *Microcerella* have been described from the Andean Region of South America, indicating that much knowledge remains to be gained of this genus (Mariluis 2002, 2004, 2006; Mulieri & Mariluis 2009; Mulieri *et al.* 2015). Herein, we describe an additional five new species of *Microcerella* from the Andean Region, adopting the broad concept of the genus proposed by Pape (1990, 1996).

Material and methods

The descriptions are based on material from the California Academy of Sciences, San Francisco, California, United States (CAS), the Museu Nacional, Universidade Federal do Rio de Janeiro, Brazil (MNRJ) and the Canadian National Collection of Insects, Arachnids and Nematodes, Ontario, Canada (CNC). Label information for holotypes is cited verbatim, with lines separated by a forward slash, different labels separated by a double forward slash, and comments given in square brackets. Geographic distributions are based on the labels of the type material and are given by country, with provinces, states, or departments in parentheses. Recognition of species as new to science was facilitated by the extensive collections at CAS, CNC, MNRJ, and Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires, Argentina (MACN).

Male terminalia were dissected in a 90% lactic acid solution warmed in a bain-marie for 10–40 minutes. The dissected terminalia were temporarily mounted in glycerin on glass slides. Photographs were produced with a Leica M205C stereo microscope equipped with a Leica DFC450 digital camera (in CNC); with a NIKON SMZ1270 stereo microscope and a NIKON ECLIPSE E200 compound microscope (in MNRJ); and with a Leica M205C stereo microscope equipped with a Leica MC190 digital camera (in MNRJ). Composite images were merged in Helicon Focus ver. 8.1.0 and edited in Adobe Photoshop CS6. Line drawings were produced by hand using a camera lucida and vectorized in Adobe Illustrator CS6. After examination and illustration, the terminalia were washed in distilled water, followed by ethanol, and then placed in a microvial filled with glycerin, which was pinned with its respective specimen.

General terminology follows Cumming & Wood (2017), with the abbreviations 'T' and 'ST' for abdominal tergites and sternites, respectively; Mello-Patiu & Pape (2000) was used for the phallic morphology, with the term 'paraphallus' adopted from Whitmore *et al.* (2013).

Abbreviations of morphological terms

ce = cercus
ju = juxta
ls = lateral stylus
mp = median process
ms = median stylus

po = postgonite
pp = paraphallus
pr = pregonite
su = surstylus
ve = vesica

Results

Taxonomy

Class Insecta Linnaeus, 1758
Order Diptera Linnaeus, 1758
Family Sarcophagidae Macquart, 1834
Subfamily Sarcophaginae Macquart, 1834
Genus *Microcerella* Macquart, 1851

Microcerella obscura sp. nov.
urn:lsid:zoobank.org:act:781F2D21-1598-4DF0-A826-5610248E772D
Figs 1–2

Diagnosis

Male: head without proclinate orbital setae; wings with vein R_1 setulose; terminalia with epandrium orange (Fig. 2D), basiphallus and distiphallus distinctly separated by a dorsal membranous strip (Fig. 1C), and vesica with a superior and inferior projection, the inferior one with a serrated margin (Fig. 1C–D).

Etymology

The species epithet '*obscura*', from Latin and treated as an adjective, refers to the dark phallic structures.

Type material

Holotype

ARGENTINA • ♂, terminalia dissected and stored in a microvial with glycerin; "Argentina: Pr. [Province] Catamarca / Cuesta Minas Capillitas / 3000m Pastizal J.L.Neff / #refers to host & date. [printed on white paper] // 84573 [printed on white paper] // Collection of the / CALIFORNIA ACADEMY / OF SCIENCES San / Francisco Calif. [printed on white paper] // *Microcerella* / sp. / T. Pape det. 1987 [handwritten, with T. Pape det. printed] // HOLOTYPE [printed on red paper] // *Microcerella obscura* sp. nov. / Santos, Mello-Patiu, / Couri & Mulieri 2025" [handwritten on white paper] // CASENT / 8451106 [printed on white paper]"; CASENT8451106; CAS.

Description

Male (n = 1)

Measurements. Length: 9 mm.

Head. Parafacial, fronto-orbital plate and postocular orbit dark brown with silver pruinosity (Fig. 2A–C); facial ridge with few setae on lower ¼; parafacial with row of setulae close to eye, similar in size to subvibrissal setae; frons about 0.27 × head width at level of ocellar triangle; frontal vitta blackish (Fig. 2B–C); 7–9 well-developed frontal setae reaching level of apex of pedicel; rows of frontal setae parallel except anteriormost 3 divergent; reclinate orbital seta present, proclinate orbital setae absent; ocellar setae as developed as upper frontals; [outer vertical seta broken]; gena and genal groove with silvery pruinosity (Fig. 2A, C); gena with black setae; postgena silvery-gray pruinose with black

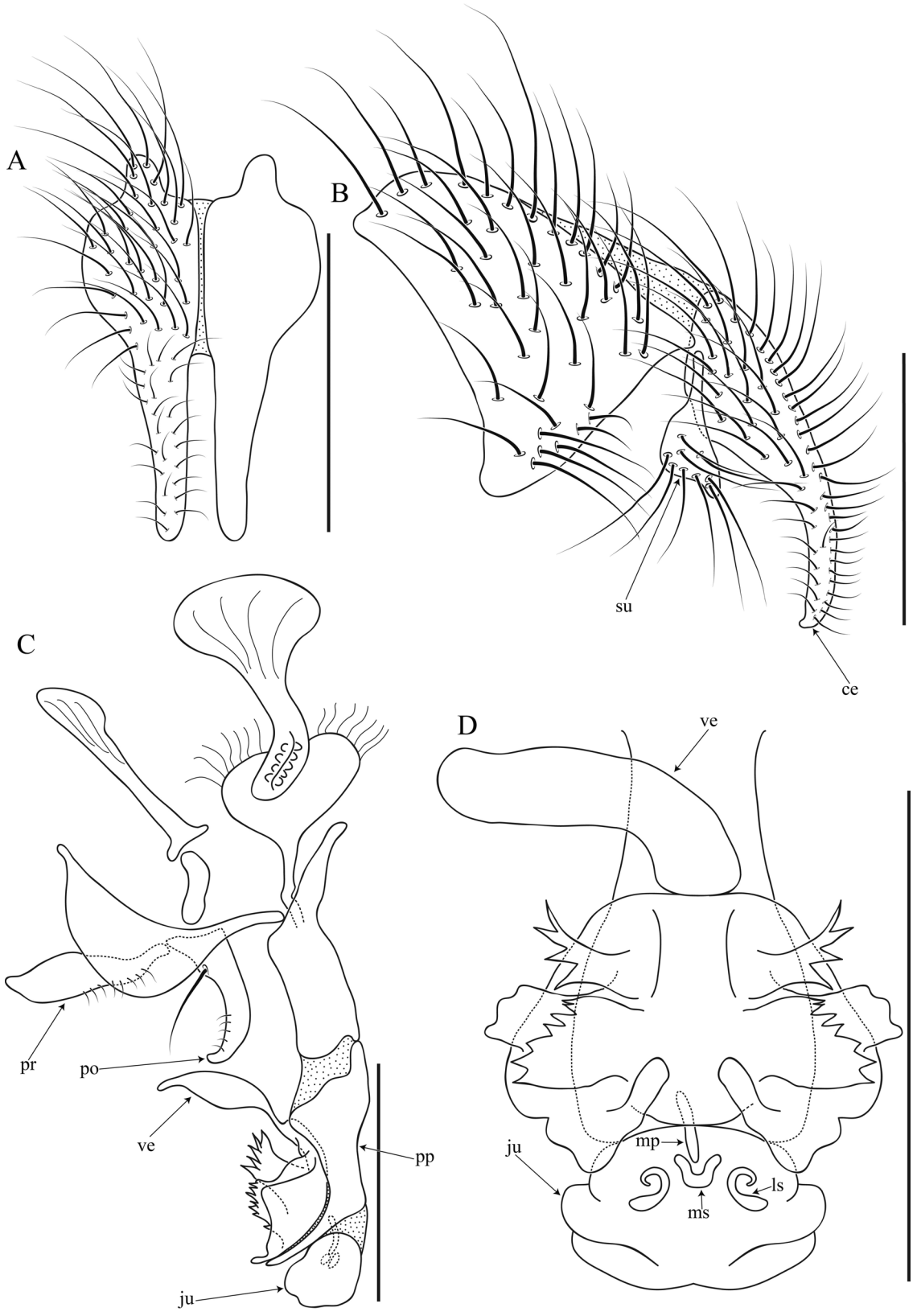

Fig. 1. *Microcerella obscura* sp. nov., holotype, ♂ (CAS), Argentina, Catamarca. **A**. Cerci, posterior view. **B**. Epandrium, cercus and surstylus, lateral view. **C**. Phallus and associated structures, lateral view. **D**. Distiphallus, ventral view. Abbreviations: see Material and methods. Scale bars = 0.5 mm.

setae; antenna black (Fig. 2A, C); first flagellomere approximately 1.5 ×as long as pedicel; arista short pubescent on basal half (Fig. 2C); palpus blackish (Fig. 2A, C).

THORAX. Dark brown with silver pruinosity (Fig. 2A–B); chaetotaxy: acrostichals 0 +? [pin inserted in the middle], dorsocentrals 2+3, intra-alars 1+2, supra-alars 1+3, postpronotals 3, notopleurals 4; postalar wall bare; postalar callus with 2 setae; scutellum with pair of basal and pair of subapical setae, pair of discal setae and without apical setae; katepisternum with 3 setae almost in straight line; meral setae 5; proepisternum bare.

WING. Hyaline, with dark brown veins (Fig. 2A–B); tegula dark brown; basicosta yellowish; vein R_{4+5} with setulae dorsally at basal ⅔ of distance to crossvein r-m; vein R_1 setulose; cell r_{4+5} open at wing margin; costal spine differentiated; third costal sector bare ventrally.

LEGS. Blackish-brown, pulvilli yellowish-brown (Fig. 2A); mid femur with 2 median anterior setae, row of anteroventral setae, 2 preapical posterior setae, row of posteroventral setae, and without ctenidium;

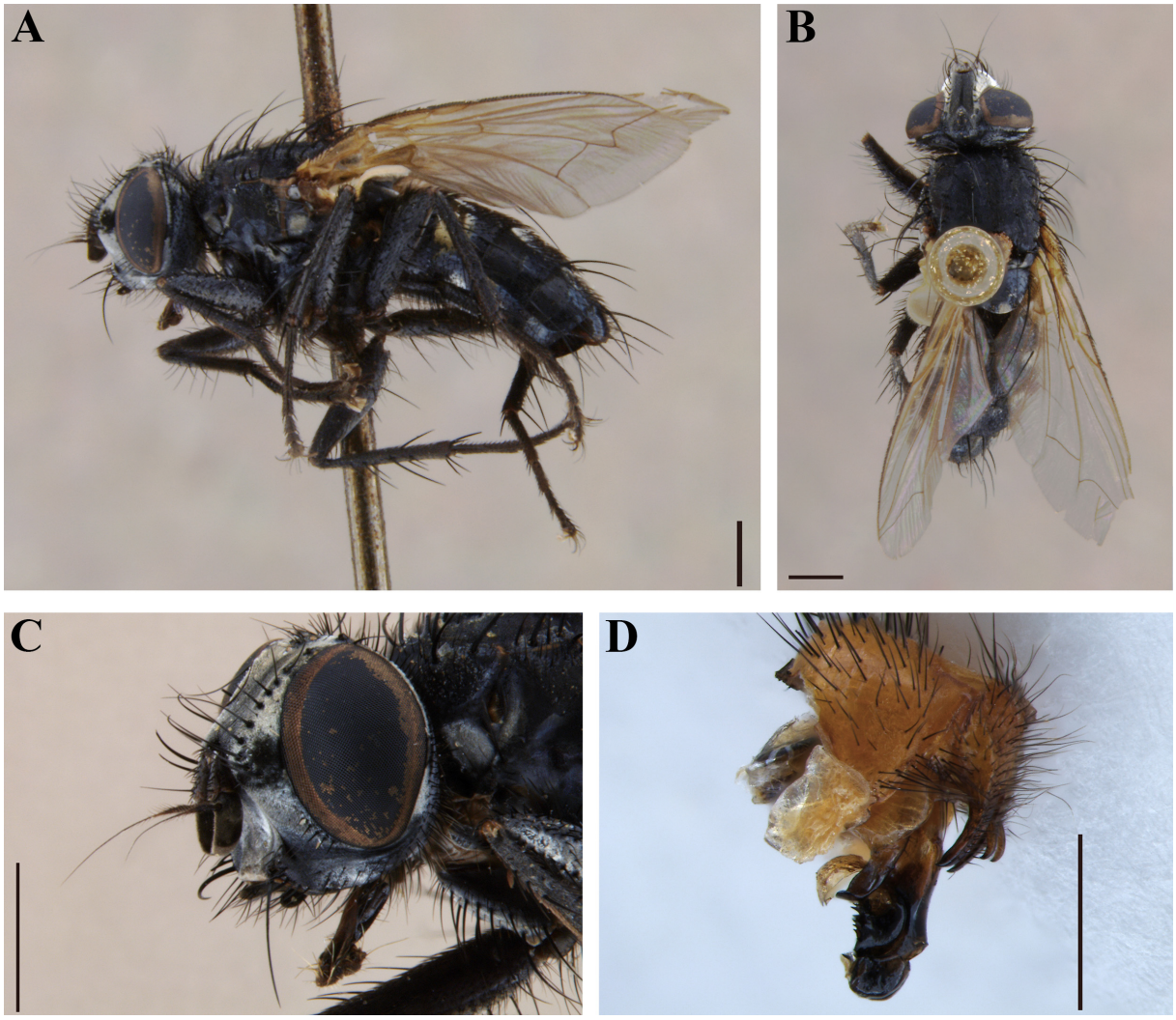

Fig. 2. *Microcerella obscura* sp. nov., holotype, ♂ (CAS), Argentina, Catamarca. **A**. Habitus, lateral view. **B**. Habitus, dorsal view. **C**. Head, anterolateral view. **D**. Terminalia, lateral view. Scale bars: A–C = 1.0 mm; D = 0.5 mm.

mid tibia with 2 median anterior setae, 2 median posterior setae and 2 posterior setae in apical third; hind trochanter without ventromedian pad of short, spiniform setae.

Abdomen. Dark brown with silvery-gray pruinosity and slightly yellowish pruinosity laterally (Fig. 2A); T4 with pair of median marginal setae and pair of lateral marginal setae; T5 with row of marginal setae; ST2–4 with marginal setae slightly more developed than discal setae; ST5 with membranous window, arms approximately 2.5 × of base length, and dense setae pattern.

Terminalia. Syntergosternite 7+8 and apex of phallus black, other structures orange (Fig. 2D); cercus with numerous long setae in basal half and short and sparse setae in apical half; cercal prongs divergent dorsally and rounded (Fig. 1A–B); surstylus clavate, with long apical setae (Fig. 1B); pregonite straight, almost same length as postgonite (Fig. 1C); postgonite with apex pointed and curved and a short seta inserted on anterior margin near base (Fig. 1C); postgonal apodeme short and rectangular (Fig. 1C); basiphallus and distiphallus distinctly separated by dorsal membranous strip (Fig. 1C); paraphallus with ventro-apical projection (Fig. 1C); vesica with superior and an inferior projection, inferior one with serrated margin (Fig. 1C–D); juxta distinctly separated from paraphallus (Fig. 1C–D); acrophallus formed by median stylus, median process, and pair of lateral styli (Fig. 1C–D); median stylus almost straight, median process tubular and lateral stylus curved (Fig. 1C–D).

Female

Unknown.

Remarks

Microcerella obscura sp. nov. is morphologically similar to *M. austrohartigia* Pape, 1990, and *M. multidentata* (Lopes, 1981). These three species can be separated by the configuration of the serrated margin of the inferior projection of the vesica, which in *M. obscura* has different-sized serrations and is inserted almost in a straight line (Fig. 1C–D), in *M. multidentata* it also has different-sized serrations but is inserted in a pointed projection (Lopes 1981: figs 60–61), and in *M. austrohartigia* it has similar-sized serrations and is inserted almost in a straight line (Lopes 1981: figs 46–49).

Distribution

Argentina (Catamarca).

Microcerella desertum sp. nov.

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Figs 3–4

Diagnosis

Male: head with 1 proclinate orbital seta; wings with vein R_1 bare or with 1–2 setae; terminalia with epandrium orange (Fig. 4D), basiphallus and distiphallus distinctly separated by a dorsal membranous strip (Fig. 3D), and vesica with a superior and inferior projection, the superior one bifurcated in ventral view and the inferior one with a pointed projection (Fig. 3D–E).

Etymology

The species epithet '*desertum*', treated as a noun in apposition, refers to the Atacama Desert, the type locality of the new species.

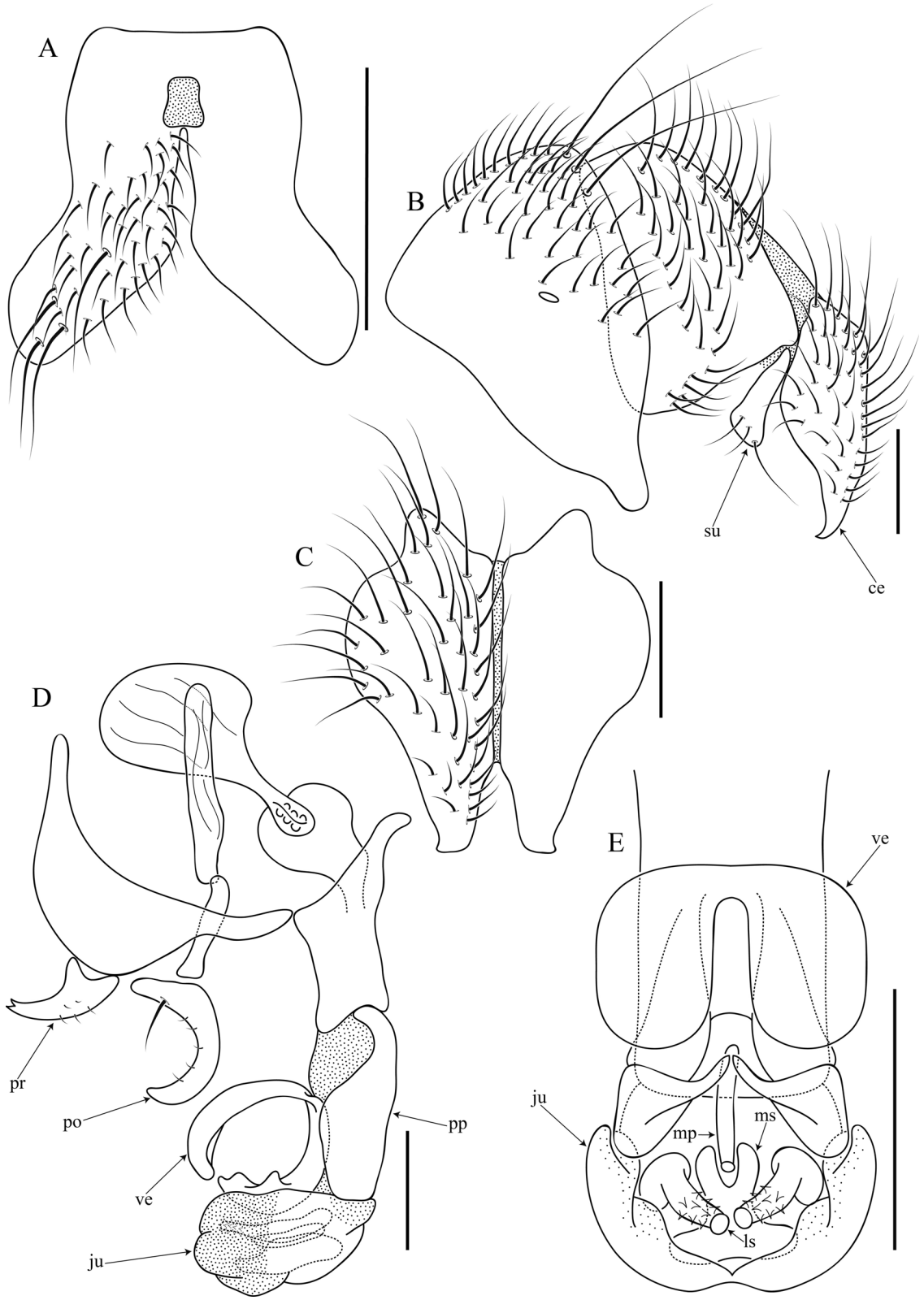

Fig. 3. *Microcerella desertum* sp. nov., holotype, ♂ (CAS), Chile, Atacama. **A**. Sternite 5, ventral view. **B**. Syntergosternite 7+8, epandrium, cercus and surstylus, lateral view. **C**. Cerci, posterior view. **D**. Phallus and associated structures, lateral view. **E**. Distiphallus, ventral view. Abbreviations: see Material and methods. Scale bars: B–E = 0.2 mm; A = 0.5 mm.

Type material

Holotype

CHILE • ♂, terminalia dissected and glued to a small piece of cardboard pinned under the specimen; "Chile, Atacama Prov. [Province] / 8 km N. Estancia Cas- / tilla, 30.VI.1966 / Mike E. Irwin & / Nelson Hitchins O. / Cal. Acad. Sci. Coll. [printed on white paper] // HOLOTYPE [printed on red paper] // *Microcerella desertum* sp. nov. / Santos, Mello-Patiu, / Couri & Mulieri 2025 [handwritten on white paper] // CASENT / 8451925 [printed on white paper]"; CASENT8451925; CAS.

Paratypes

CHILE • 1 ♂, with left fore and mid leg glued to a small piece of cardboard and exposed terminalia; same data as for holotype; MNRJ • 1 ♂, with left fore and mid leg glued to a small piece of cardboard, right foreleg lost and abdomen dissected and stored in a microvial with glycerin pinned under the specimen; same data as for holotype; CASENT 8451940; CAS.

Description

Male (n = 3)

Measurements. Length: 6–8 mm.

Head. Parafacial, fronto-orbital plate and postocular orbit dark brown with silvery pruinosity (Fig. 4A–C); facial ridge with setae on lower quarter; parafacial with sparse setulae close to eye, 2 similar in size to subvibrissal setae; frons about 0.36–0.38x head width at level of ocellar triangle; frontal vitta blackish (Fig. 4C); 8–12 well-developed frontal setae reaching level of apex of pedicel; rows of frontal setae parallel except anteriormost 3–6 divergent; reclinate orbital seta present, 1 proclinate orbital seta present; ocellar setae as developed as upper frontals; outer vertical seta 1.5 × as long as postocular setae; gena and genal groove with silver pruinosity (Fig. 4C); gena with black setae; postgena silvery-gray pruinose with black setae; antenna black (Figs 4A, 4C); first flagellomere approximately 2 × as long as pedicel; arista micropubescent on basal half (Fig. 4C); palpus blackish (Figs 4A, 4C).

Thorax. Dark brown with silvery pruinosity (Fig. 4A–B); chaetotaxy: acrostichals 0+0, dorsocentrals 3+3, intra-alars 1+2, supra-alars 1+3, postpronotals 3, notopleurals 4; postalar wall bare; postalar callus with 2 setae; scutellum with pair of basal and pair of subapical setae, pair of apical setae present or absent, and pair of discal setae present or absent; katepisternum with 3 setae almost in straight line; meral setae 5–7; proepisternum bare.

Wing. Hyaline, with dark brown veins (Fig. 4A–B); tegula dark brown; basicosta yellowish; vein R_{4+5} with setulae dorsally at basal ⅔ of distance to crossvein r-m; vein R_1 bare or with 1–2 setae; cell r_{4+5} open at wing margin; costal spine differentiated; third costal sector bare ventrally.

Legs. Blackish-brown, pulvilli yellowish-brown (Fig. 4A); mid femur with 3 median anterior setae, row of anteroventral setae, 2 preapical posterior setae, row of posteroventral setae, and without ctenidium; mid tibia with 2 median anterior setae, 2 median posterior setae and 2 posterior setae in apical third; hind trochanter without ventromedian pad of short, spiniform setae.

Abdomen. Dark brown with silvery pruinosity (Fig. 4A–B); T4 with pair of median marginal setae and pair of lateral marginal setae; T5 with row of marginal setae; ST2–4 with marginal setae more developed than discal setae; ST5 with a membranous window, arms approximately 2.5 × of base length, and dense setae pattern (Fig. 3A).

Terminalia. Syntergosternite 7+8 and apex of phallus black, other structures orange (Fig. 4D); cercus with numerous setae in basal half and sparse setae in apical half; cercal prongs divergent dorsally and

pointed (Fig. 3B–C); surstylus almost triangular, with sparse apical setae (Fig. 3B); pregonite slightly curved, longer than postgonite, with apex bifurcated (Fig. 3D); postgonite with apex rounded and curved and short seta inserted on anterior margin near base (Fig. 3D); postgonal apodeme long and rectangular (Fig. 3D); basiphallus and distiphallus distinctly separated by dorsal membranous strip (Fig. 3D); vesica with superior and inferior projection, superior one bifurcated in ventral view and inferior one with pointed projection (Fig. 3D–E); juxta distinctly separated from paraphallus (Fig. 3D); acrophallus formed by median stylus, median process, and pair of lateral styli (Fig. 3D–E); median stylus almost straight in lateral view, median process tubular and lateral stylus with conspicuous spines in apex (Fig. 3D–E).

Female

Unknown.

Remarks

Microcerella desertum sp. nov. is morphologically similar to *M. spinigena* (Rondani, 1864). These species can be separated by the single proclinate orbital seta present in the male of *M. desertum*, which

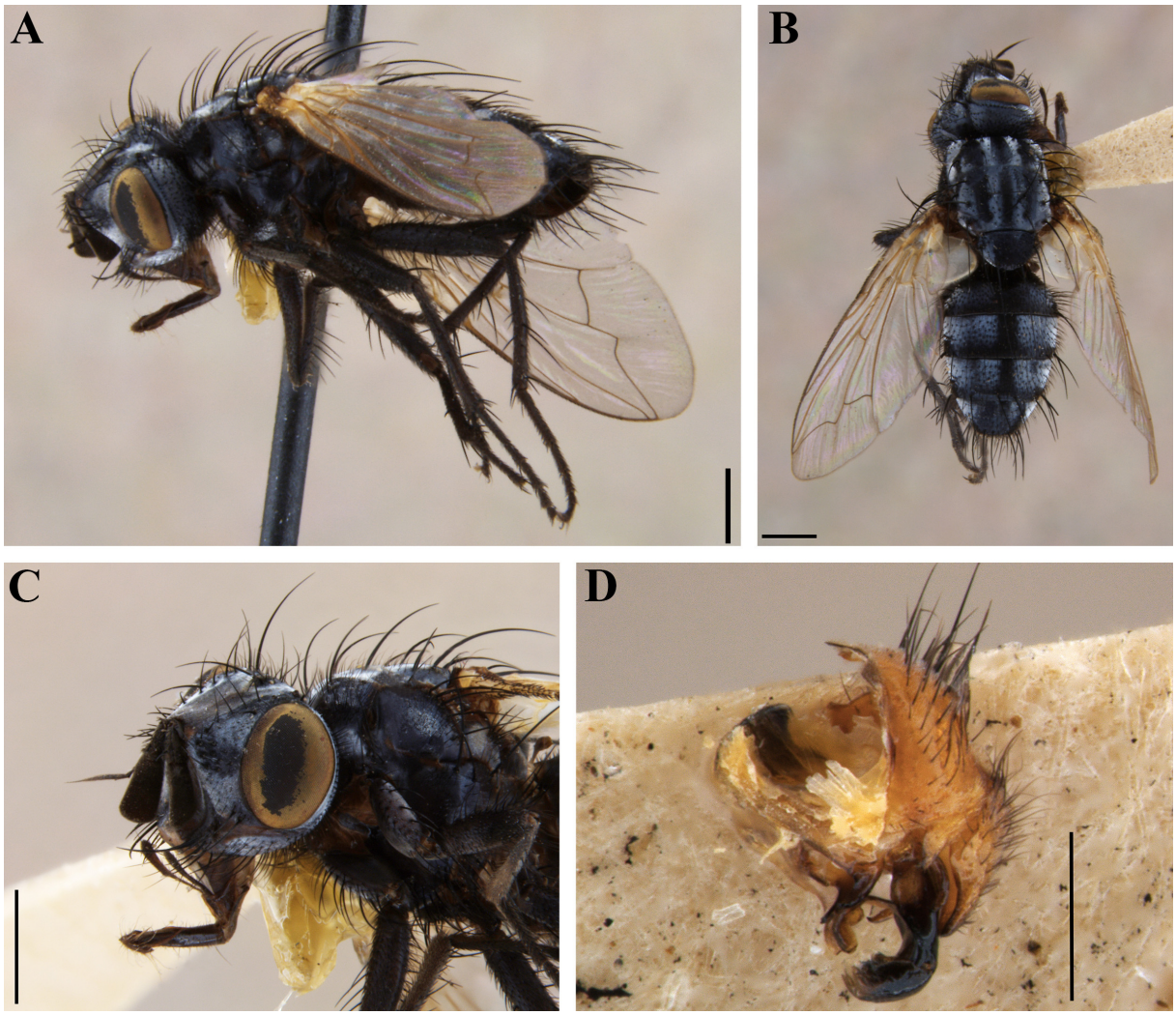

Fig. 4. *Microcerella desertum* sp. nov., holotype, ♂ (CAS), Chile, Atacama. **A**. Habitus, lateral view. **B**. Habitus, dorsal view. **C**. Head, anterolateral view. **D**. Terminalia, lateral view. Scale bars: A–C = 1.0 mm; D = 0.5 mm.

is absent in *M. spinigena*, as well as by the cercal prong being shorter than the base of the cercus, and juxta with an apical margin forming lobes in *M. desertum* (Fig. 3B–E), whereas in *M. spinigena* the cercal prong is longer than the base of the cercus, and juxta with straight apical margin (Mulieri *et al.* 2015: figs 187–188, 190).

Distribution

Chile (Atacama).

Microcerella grinteri sp. nov.
urn:lsid:zoobank.org:act:FCDCA0B4-7B07-4207-9FFB-91CD67087EB1
Figs 5–6

Diagnosis

Male: head without proclinate orbital setae; wings with vein R_1 bare; terminalia with epandrium orange (Fig. 6D), basiphallus and distiphallus fused dorsally without a dorsal membranous strip (Fig. 5C), and vesica with a superior and inferior projection, the inferior one with serrated margin (Fig. 5C–D).

Etymology

The species epithet '*grinteri*' ('grinter' + 'i'), masculine genitive, is given in honor of Christopher C. Grinter (Collection Manager of Entomology at CAS).

Type Material

Holotype

CHILE • ♂, terminalia dissected and stored in a microvial with glycerin pinned under the specimen; "Chile, Santiago Prov. / Farellones, 2600 m. / III.20.1966, M.E. Irwin / 33º21'S. 70º20'W. [printed on white paper] // HOLOTYPE [printed on red paper] // *Microcerella grinteri* sp. nov. / Santos, Mello-Patiu, / Couri & Mulieri 2025 [handwritten on white paper] // CASENT / 8451582 [printed on white paper]"; CASENT8451582; CAS.

Description

Male (n = 1)

Measuremenst. Length: 12 mm.

Head. Parafacial, fronto-orbital plate and postocular orbit dark brown with slightly silver pruinosity (Fig. 6A–C); facial ridge with setae on lower third; parafacial with row of setulae close to eye, similar in size to subvibrissal setae; frons about 0.22 × head width at level of ocellar triangle; frontal vitta blackish (Fig. 6B); 11–12 well-developed frontal setae reaching level of apex of pedicel; rows of frontal setae parallel except anteriormost 2 divergent; reclinate orbital seta present, proclinate orbital setae absent; ocellar setae as developed as upper frontals; outer vertical seta undifferentiated from postocular setae; gena and genal groove with silver pruinosity (Fig. 6A, C); gena with black setae; postgena silvery-gray pruinose with blackish setae; antenna black (Fig. 6A, C); first flagellomere approximately 3 × as long as pedicel; arista micro pubescent on basal half (Fig. 6C); palpus blackish.

Thorax. Dark brown with silvery-gray pruinosity (Fig. 6A–B); chaetotaxy: acrostichals 0+0, dorsocentrals 3 (anteriormost shorter) + 3 (the anteriormost shorter), intra-alars 1+2, supra-alars 1+3, postpronotals 3, notopleurals 4; postalar wall bare; postalar callus with 2 setae; scutellum with pair of basal and pair of subapical setae, pair of apical setae, and pair of discal setae; katepisternum with 3 setae almost in straight line; meral setae 11; proepisternum bare.

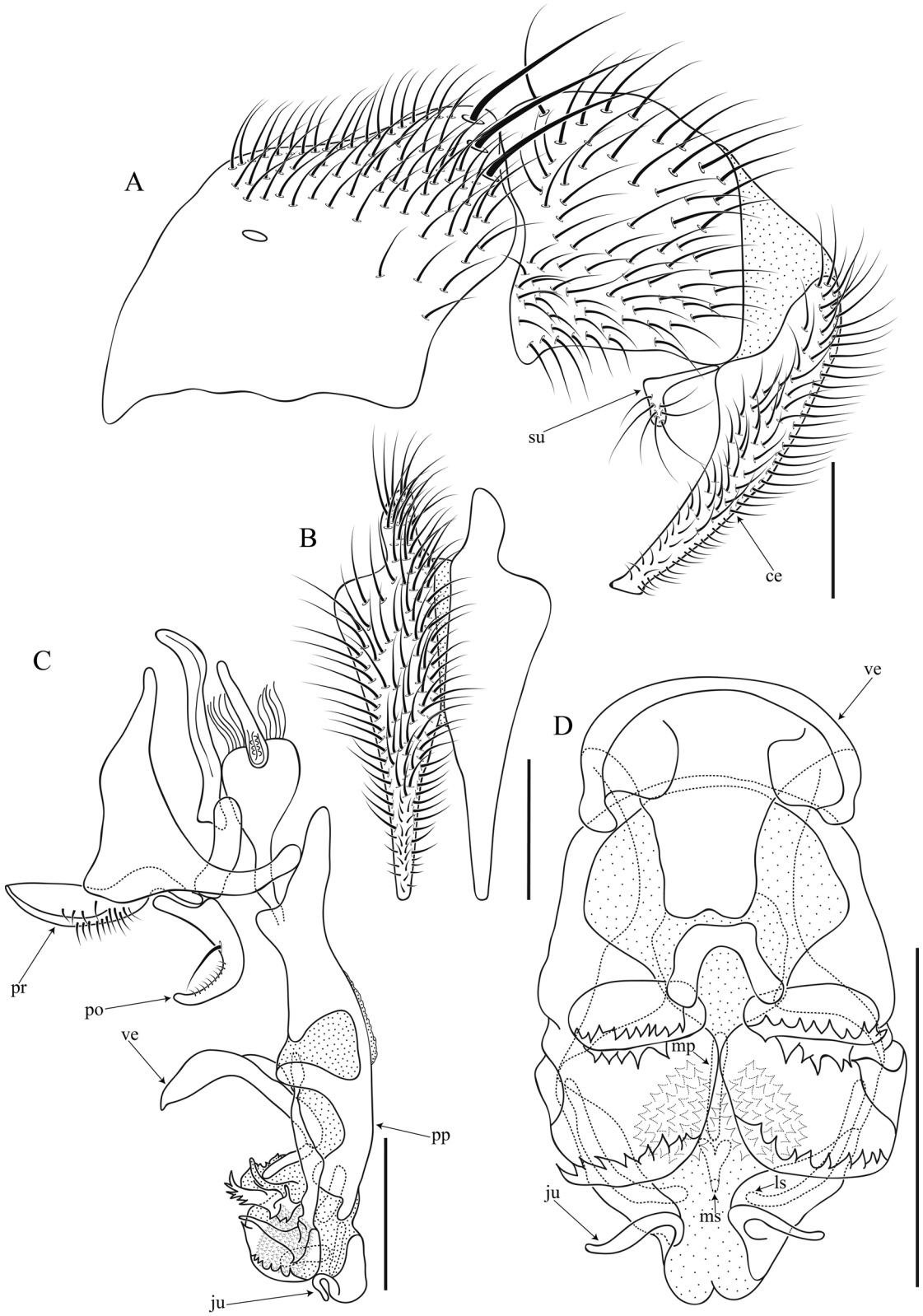

Fig. 5. *Microcerella grinteri* sp. nov., holotype, ♂ (CAS), Chile, Santiago. **A**. Syntergosternite 7+8, epandrium, cercus and surstylus, lateral view. **B**. Cerci, posterior view. **C**. Phallus and associated structures, lateral view. **D**. Distiphallus, ventral view. Abbreviations: see Material and methods. Scale bars = 0.5 mm.

Wing. Hyaline, with dark brown veins (Fig. 6A–B); tegula dark brown; basicosta yellowish; vein R_{4+5} with setulae dorsally at basal ½ of distance to crossvein r-m; vein R_1 bare; cell r_{4+5} open at wing margin; costal spine not differentiated; third costal sector bare ventrally.

Legs. Blackish-brown, pulvilli yellowish-brown (Fig. 6A); mid femur with 3 median anterior setae, row of anteroventral setae, 2 preapical posterior setae, row of posteroventral setae, and without ctenidium; mid tibia with 2 median anterior setae, 1 median posterior seta and 2 posterior setae in apical third; hind trochanter without ventromedian pad of short, spiniform setae.

Abdomen. Dark brown with silvery-gray pruinosity and yellowish pruinosity laterally (Fig. 6A); T4 without pair of median marginal setae and pair of lateral marginal setae; T5 with row of marginal setae; ST2–4 with marginal setae slightly more developed than discal setae; ST5 with membranous window, arms approximately 3 × of base length, and dense setae pattern.

Terminalia. Syntergosternite 7+8 and apex of phallus and cercus black, other structures orange (Fig. 6D); cercus with numerous setae; cercal prongs divergent dorsally and rounded (Fig. 5A–B); surstylus

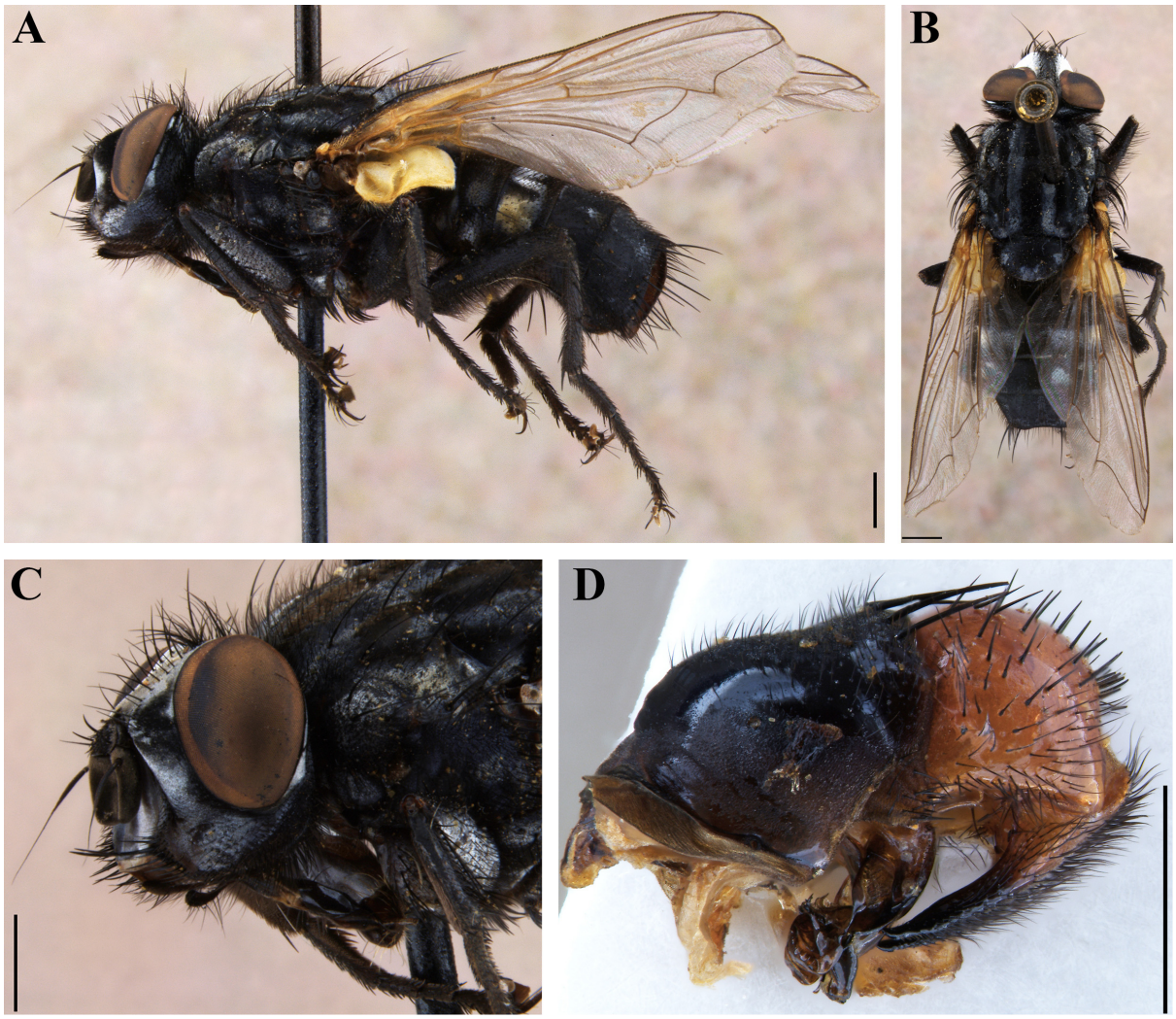

Fig. 6. *Microcerella grinteri* sp. nov., holotype, ♂ (CAS), Chile, Santiago. **A**. Habitus, lateral view. **B**. Habitus, dorsal view. **C**. Head, anterolateral view. **D**. Terminalia, lateral view. Scale bars = 1.0 mm.

boomerang-like, with long apical setae (Fig. 5B); pregonite straight, almost same length as postgonite (Fig. 5C); postgonite with apex rounded and curved and short seta inserted on anterior margin near middle (Fig. 5C); postgonal apodeme long and rectangular (Fig. 5C); basiphallus and distiphallus fused dorsally without dorsal membranous strip (Fig. 5C); vesica with superior and an inferior projection, inferior one with serrated margin (Fig. 5C–D); juxta distinctly separated from paraphallus with anterior projection (Fig. 5C–D); acrophallus formed by median stylus, median process, and pair of lateral styli (Fig. 5C–D); median stylus almost straight, median process tubular and lateral stylus slightly curved (Fig. 5C–D).

Female

Unknown.

Remarks

Microcerella grinteri sp. nov. is morphologically similar to *M. quimaliensis* (Lopes, 1982) but can be separated by the almost straight cercus in lateral view, the hat-like superior projection of the vesica, and the juxta being shorter than paraphallus (Fig. 5C–D); while in *M. quimaliensis*, the cercus is evidently curved in lateral view, the superior projection of the vesica is stick-like, and the juxta is approximately as long as the paraphallus (Lopes 1982: figs 48–52).

Distribution

Chile (Santiago).

Microcerella hyperbole sp. nov.

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Figs 7–8

Diagnosis

Male: head without proclinate orbital setae; wings with vein R_1 bare; terminalia with epandrium black (Fig. 8D), basiphallus and distiphallus fused dorsally without a dorsal membranous strip (Fig. 7D), and vesica with a superior and inferior projection, the superior one little developed and the inferior one pointed (Fig. 7D–E).

Etymology

The species epithet ‘hyperbole’, from Greek and treated as a noun in apposition, refers to the exaggerated complexity of the phallic structures.

Type material

Holotype

ECUADOR • ♂, T4, T5 and terminalia dissected and stored in a microvial with glycerin pinned under the specimen; “Ecuador / V. Cotopaxi / m 3250 / 4-VI-83 / Coll. Lassos [handwritten on white paper] // Microcerellini / Det. B.E. Cooper 1985 [printed on white paper] // *Microcella* / sp. nov.11 / Det.: J.R. Santos 2022 [printed on white paper] // HOLOTYPE [printed on red paper] // *Microcerella hyperbole* sp. nov. / Santos, Mello-Patiu, / Couri & Mulieri 2025 [printed on white paper]”; CNC.

Description

Male (n = 1)

Measurements. Length: 7 mm.

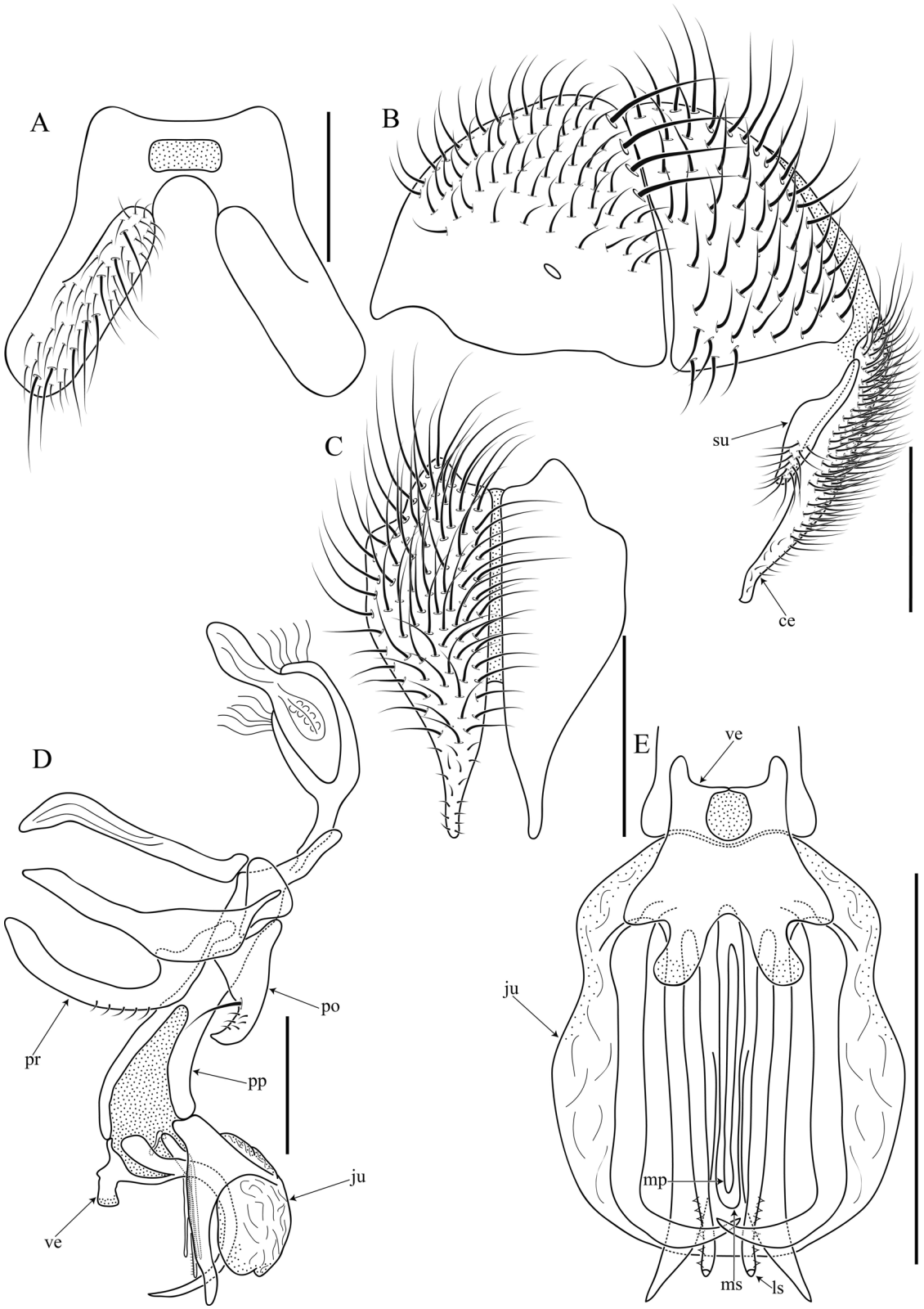

Fig. 7. *Microcerella hyperbole* sp. nov., holotype, ♂ (CNC), Ecuador, Cotopaxi. **A**. Sternite 5, ventral view. **B**. Syntergosternite 7+8, epandrium, cercus and surstylus, lateral view. **C**. Cerci, posterior view. **D**. Phallus and associated structures, lateral view. **E**. Distiphallus, ventral view. Abbreviations: see Material and methods. Scale bars = 0.5 mm.

HEAD. Parafacial, fronto-orbital plate and postocular orbit dark brown with silver pruinosity (Fig. 8A–C); facial ridge with setae on lower third; parafacial with row of setulae close to eye, similar in size to subvibrissal setae; frons about 0.27 head width at level of ocellar triangle; frontal vitta blackish; 8–9 well-developed frontal setae reaching level of apex of pedicel; rows of frontal setae parallel except anteriormost 2 divergent; reclinate orbital seta present, proclinate orbital setae absent; ocellar setae as developed as upper frontals; outer vertical seta undifferentiated from postocular setae; gena and genal groove with silver pruinosity (Fig. 8A, C); gena with black setae; postgena silvery-gray pruinose with blackish setae; antenna black (Fig. 8C); first flagellomere approximately 1.5 × as long as pedicel; arista micro pubescent on basal half (Fig. 8C); palpus blackish (Fig. 8A, C).

THORAX. Dark brown with silvery-gray pruinosity (Fig. 8A–B); chaetotaxy: acrostichals 1+0, dorsocentrals 2 (well developed) + 3 (well developed), intra-alars 1+2, supra-alars 1+3 (the anteriormost shorter), postpronotals 3, notopleurals 4; postalar wall bare; postalar callus with 2 setae; scutellum with pair of basal and pair of subapical setae, apical setae absent, and discal setae absent; katepisternum with 3 setae almost in straight line; meral setae 5; proepisternum bare.

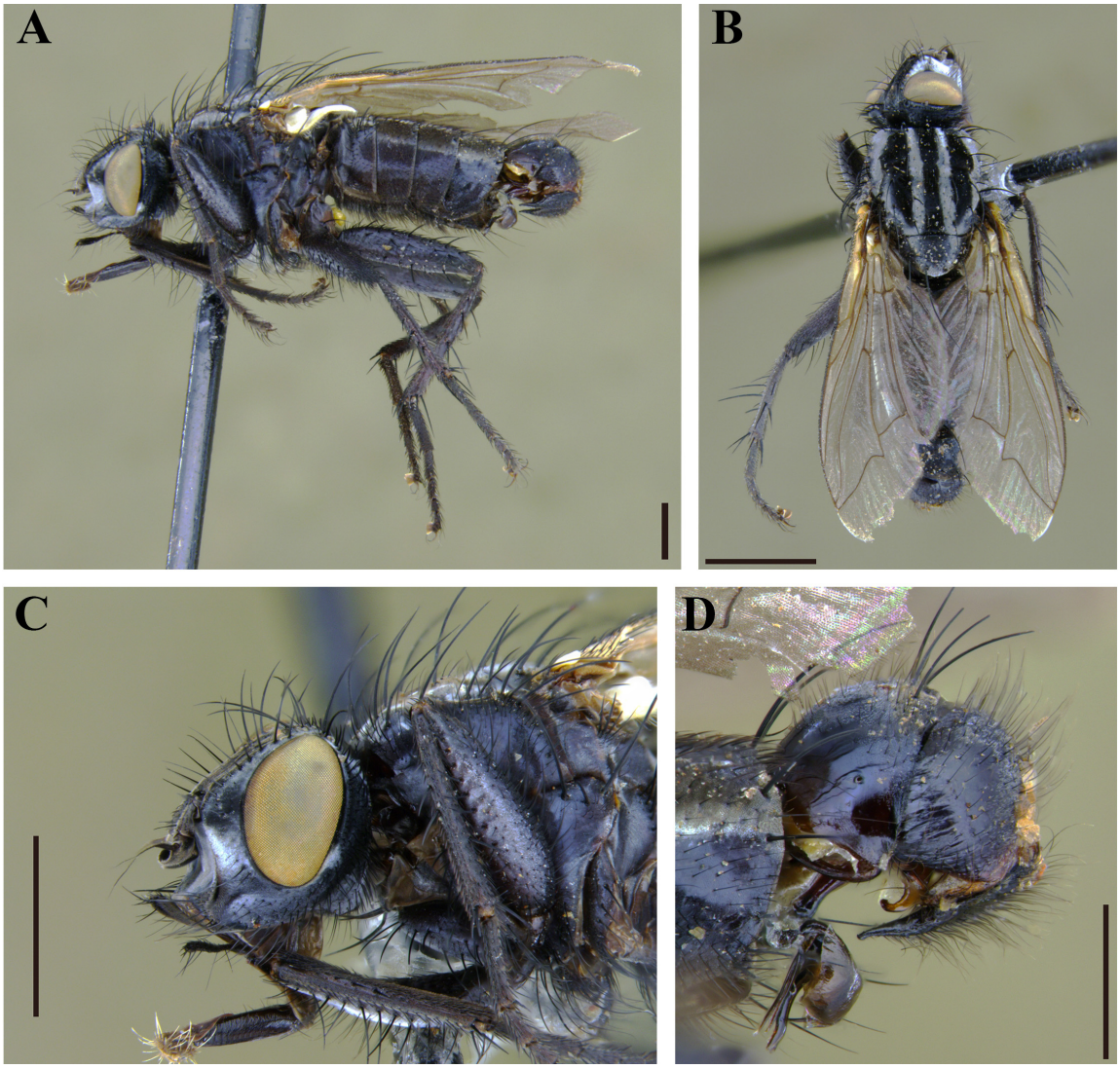

Fig. 8. *Microcerella hyperbole* sp. nov., holotype, ♂ (CNC), Ecuador, Cotopaxi. **A**. Habitus, lateral view. **B**. Habitus, dorsal view. **C**. Head, lateral view. **D**. Terminalia, lateral view. Scale bars = 1.0 mm.

Wing. Hyaline, with dark brown veins (Fig. 8A–B); tegula dark brown; basicosta yellowish; vein R4+5 with setulae dorsally at basal ½ of distance to crossvein r-m; vein R1 bare; cell r4+5 open at wing margin; costal spine differentiated; third costal sector bare ventrally.

Legs. Blackish-brown, pulvilli yellowish-brown (Fig. 8A); mid femur with 3 median anterior setae, row of anteroventral setae, 2 preapical posterior setae, row of posteroventral setae, and without ctenidium; mid tibia with 2 median anterior setae, 1 median posterior seta and 2 posterior setae in apical third; hind trochanter without ventromedian pad of short, spiniform setae.

Abdomen. Dark brown with silvery-gray pruinosity (Fig. 8A); T4 without pair of median marginal setae and pair of lateral marginal setae; T5 with row of marginal setae; ST2–4 with marginal setae similar in size of discal setae; ST5 with membranous window, arms approximately 3 × of base length, and dense setae pattern (Fig. 7A).

Terminalia. Black (Fig. 8D); cercus with numerous setae in basal half and sparse setae in apical half; cercal prongs divergent dorsally and rounded (Fig. 7B–C); surstylus bacilliform, with apical setae (Fig. 7B); pregonite slightly curved and longer than postgonite (Fig. 7D); postgonite with apex pointed and short seta inserted on anterior margin near middle (Fig. 7D); postgonal apodeme broad (Fig. 7D); basiphallus and distiphallus fused dorsally without dorsal membranous strip (Fig. 7D); vesica with superior and inferior projection, superior one little developed and inferior one pointed (Fig. 7D–E); juxta distinctly separated from paraphallus with long pointed anterior projection (Fig. 7D–E); acrophallus formed by median stylus, median process, and pair of lateral styli (Fig. 7D–E); median stylus, median process and lateral stylus almost straight with lateral stylus with spines in apex (Fig. 7D–E).

Female

Unknown.

Remarks

Microcerella hyperbole sp. nov. is morphologically similar to *M. rufipes* (Lopes, 1982) but can be separated by the vesica being smooth and the juxta with a long pointed anterior projection (Fig. 7D–E), while the vesica has numerous projections and a smooth juxta in *M. rufipes* (Lopes 1982: figs 62–64).

Distribution

Ecuador (Cotopaxi).

Microcerella jimi sp. nov.

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Figs 9–10

Diagnosis

Male: head without proclinate orbital setae; wings with vein R_1 bare; terminalia with epandrium orange, basiphallus and distiphallus fused dorsally without a dorsal membranous strip (Fig. 9D), and vesica with a superior and inferior projection, the superior one C-like in lateral view and the inferior one with pointed lobes (Fig. 9D–E).

Etymology

The species epithet '*jimi*' ('jim' + 'i'), masculine genitive, is given in honor of Jim O'Hara (CNC).

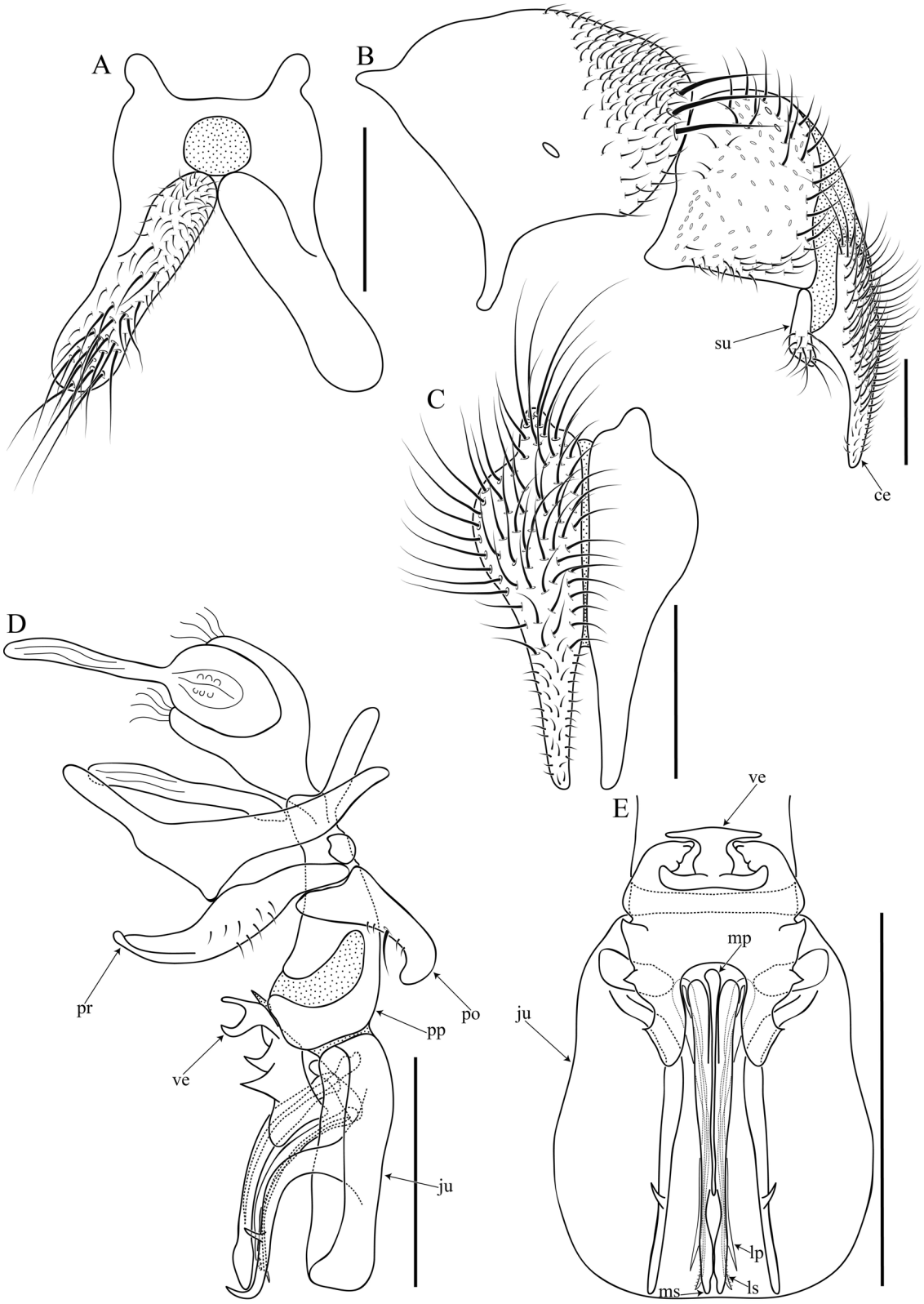

Fig. 9. *Microcerella jimi* sp. nov., holotype, ♂ (CNC), Peru, Puna. **A**. Sternite 5, ventral view. **B**. Syntergosternite 7+8, epandrium, cercus and surstylus, lateral view. **C**. Cerci, posterior view. **D**. Phallus and associated structures, lateral view. **E**. Distiphallus, ventral view. Abbreviations: see Material and methods. Scale bars = 0.5 mm.

Type material

Holotype

PERU • ♂, abdomen dissected and stored in a microvial with glycerin pinned under the specimen; "La Huerta, Puno / Peru 3800 m. / 24-28.XI.1955 / L.E. Pena [printed on white paper] // // *Microcella* / sp. nov.12 near / *M. carchia* / Det.: J.R. Santos 2022 [printed on white paper] // HOLOTYPE [printed on red paper] // *Microcerella jimi* sp. nov. / Santos, Mello-Patiu, / Couri & Mulieri 2025 [printed on white paper]"; CNC.

Description

Male (n = 1)

Measurements. Length: 9 mm.

Head. Parafacial, fronto-orbital plate and postocular orbit dark brown with silvery pruinosity (Fig. 10A–C); facial ridge with setae on lower third; parafacial with row of setulae close to eye, similar in size to subvibrissal setae; frons about 0.32 head width at level of ocellar triangle; frontal vitta blackish (Fig. 10B–C); 9–10 well-developed frontal setae reaching level of apex of pedicel; rows of frontal setae parallel except anteriormost 3 divergent; reclinate orbital seta present, proclinate orbital setae absent; ocellar setae as developed as upper frontals; outer vertical seta 2 × as long as postocular setae; gena and genal groove with silver pruinosity (Fig. 10A, C); gena with black setae; postgena silvery-gray pruinose with black setae; antenna black (Fig. 10A, C); first flagellomere approximately 2 × as long as pedicel; arista micro pubescent on basal half (Fig. 10C); palpus blackish (Fig. 10A, C).

Thorax. Dark brown with silvery pruinosity (Fig. 10A–B); chaetotaxy: acrostichals 2 (anteriormost shorter) + 0, dorsocentrals 2+3, intra-alars 1+2, supra-alars 1+2, postpronotals 3, notopleurals 4; postalar wall bare; postalar callus with 2 setae; scutellum with pair of basal and pair of subapical setae, apical setae absent, and discal setae absent; katepisternum with 3 setae almost in straight line; meral setae 7–8; proepisternum bare.

Wing. Hyaline, with dark brown veins (Fig. 10A–B); tegula dark brown; basicosta yellowish; vein R4+5 with setulae dorsally at ⅓ of distance to crossvein r-m; vein R1 bare; cell r4+5 open at wing margin; costal spine differentiated; third costal sector bare ventrally.

Legs. Blackish-brown, pulvilli yellowish-brown (Fig. 10A); mid femur with 2 median anterior setae, row of anteroventral setae, 2 preapical posterior setae, row of posteroventral setae, and without ctenidium;

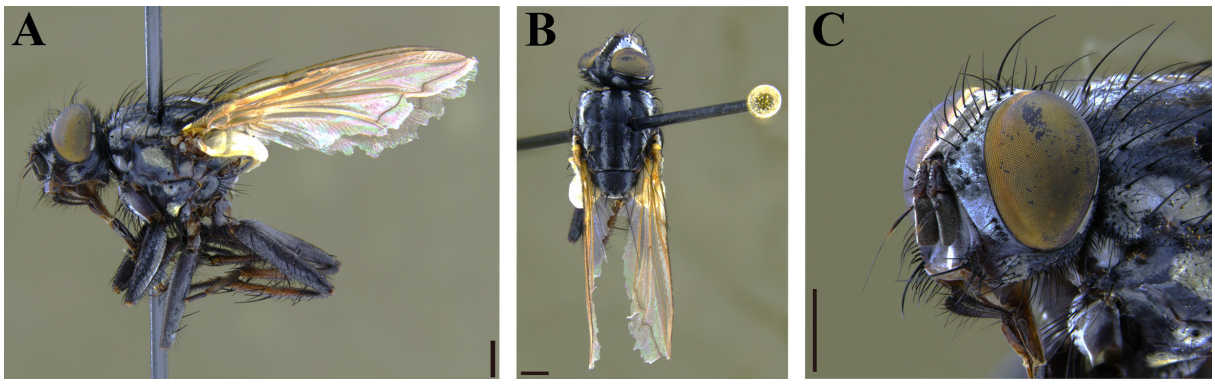

Fig. 10. *Microcerella jimi* sp. nov., holotype, ♂ (CNC), Peru, Puna. **A**. Habitus, lateral view. **B**. Habitus, dorsal view. **C**. Head, lateral view. Scale bars = 1.0 mm.

mid tibia with 2 median anterior setae, 2 median posterior setae and 2 posterior setae in apical third; hind trochanter without ventromedian pad of short, spiniform setae.

Abdomen. Dark brown with silvery pruinosity; T4 with pair of median marginal setae and pair of lateral marginal setae; T5 with row of marginal setae; ST2–4 with marginal setae more developed than discal setae; ST5 with membranous window, arms approximately 2 × of base length, and dense setae pattern (Fig. 9A).

Terminalia. Syntergosternite 7+8 and apex of phallus black, other structures orange; cercus with numerous setae in basal half and sparse setae in apical half; cercal prongs divergent dorsally and rounded (Fig. 9B–C); surstylus almost rectangular, with apical setae (Fig. 9B); pregonite straight and longer than postgonite (Fig. 9D); postgonite with apex rounded and curved and short seta inserted on anterior margin in middle (Fig. 9D); postgonal apodeme short and oval (Fig. 9D); basiphallus and distiphallus fused dorsally without dorsal membranous strip (Fig. 9D); vesica with superior and inferior projection, superior one C-like in lateral view and inferior one with pointed lobes (Fig. 9D–E); juxta distinctly separated from paraphallus with median anterior projection (Fig. 9D); acrophallus formed by median stylus, median process, pair of lateral styli and pair of lateral processes (Fig. 9D–E); median stylus, median process, lateral stylus and lateral process almost straight with lateral stylus with spines in apex (Fig. 9D–E).

Female

Unknown.

Remarks

Microcerella jimi sp. nov. is morphologically similar to *M. carchia* Pape, 1990 but can be separated by the juxta being apically straight and its median anterior projection having a conspicuous spine in the apical half (Fig. 9D–E), whereas in *M. carchia* the juxta is apically bilobed and its median anterior projection has no spine (Lopes 1982: figs 56–58).

Distribution

Peru (Puna).

Discussion

The five new species of *Microcerella* described in this paper allowed for the identification of new structures in the sarcophagine phallus. In his description of the glans (= acrophallus) of *Microcerella jujuyensis* (Lopes, 1981), Lopes (1981: fig. 70) described this species as having a median process, a median stylus and paired lateral styli. The lateral styli are homologous to the lateral styli, and the median process is homologous to the median stylus, as supported by the phallic morphology adopted in this study (Mello-Patiu & Pape 2000) and consistent with the phylogenetic interpretation by Buenaventura & Pape (2018), Whitmore *et al.* (2013), and Giroux *et al.* (2010). The median stylus of *M. jujuyensis*, described by Lopes (1981), is here reinterpreted as a new structure in the acrophallus, referred to as the median process. The median process is a tube-like structure that opens apically and seems partially sheathed by the median stylus (Fig. 3E). In addition, we observed an additional pair of tube-like structures in the acrophallus, only found in *M. jimi* sp. nov., here named as lateral processes (Fig. 9E). Further studies are necessary to recognize the homologies of these structures and their occurrence within the subfamily Sarcophaginae.

Acknowledgements

We are thankful to the Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq for providing a postdoctoral fellowship to J.R. Santos (Proc. 151008/2023-0). This research was also supported by the Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro – FAPERJ (Proc. 210.604/2023); by The Ernst Mayr Travel Grants in Animal Systematics of the Museum of Comparative Zoology of Harvard University allowing J.R. Santos to visit the collection at the CNC; and to CNPq (Proc. 303414/2018-9) for financial support to M.S. Couri. We are grateful to C.C. Grinter (CAS), J.E. O'Hara (CNC) and B.J. Sinclair (CNC), who facilitated access to the collections under their care. J.R. Santos is especially grateful to J.E. O'Hara (CNC) for all the support given during his visit in Ottawa, Canada. We are also grateful to the reviewers Thomas Pape (Natural History Museum of Denmark) and Daniel Whitmore (Staatliches Museum für Naturkunde Stuttgart), who provided useful and constructive comments to this paper.

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Manuscript received: 20 August 2024
Manuscript accepted: 7 February 2025
Published on: 9 May 2025
Topic editor: Tony Robillard
Section editor: Torbjørn Ekrem
Desk editor: Eva-Maria Levermann