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Microphorella similis sp. nov. from Switzerland, a close relative of the type species, *M. praecox* (Loew) (Diptera: Dolichopodidae: Parathalassiinae)

SCOTT E. BROOKS[1] & HANS ULRICH[2]

[1]*Diptera Unit, Canadian National Collection of Insects, Invertebrate Biodiversity, Agriculture and Agri-Food Canada, K.W. Neatby Building, 960 Carling Avenue, Ottawa, Ontario, K1A 0C6, CANADA*
E-mail: Scott.Brooks@AGR.GC.CA
[2]*Zoologisches Forschungsmuseum Alexander Koenig, Adenauerallee 160, 53113 Bonn, GERMANY*
E-mail: h.ulrich.bonn@t-online.de

Abstract

Microphorella similis Brooks, a new Palaearctic species, is described and illustrated. It is very closely related to *M. praecox* (Loew, 1864), the type species of the genus. The new species is known from Leuk-Pfynwald in the Swiss Alps, where it was found sympatrically with *M. praecox* on gravel in the floodplain of the Rhône River in May. A diagnosis and abridged redescription of *M. praecox* is also provided, including detailed illustrations of the male genitalia. Both *M. praecox* and the new species share several features in common with the recently described Tunisian species, *M. cassari* Gatt, 2011.

Key words: Dolichopodidae, Parathalassiinae, *Microphorella*, Palaearctic, new species

Introduction

The genus *Microphorella* Becker, as currently conceived, includes 19 species from most parts of the world, and it is expected that numerous additional species remain to be discovered and described. There is no evidence, however, that this generic concept is monophyletic. The diagnosis in use to distinguish *Microphorella* from the other described parathalassiine genera is obsolete and largely based on the possession of a reduced anal area of the wing in combination with the absence of features that characterize the other genera with this wing type (i.e., *Chimerothalassius* Shamshev & Grootaert, *Eothalassius* Shamshev & Grootaert, *Thalassophorus* Saigusa). In future revisionary studies of *Microphorella*, a detailed knowledge of the type species and its allies will be essential. The aim of the present study is to provide a contribution to this knowledge.

Microphorella praecox (Loew), the type species of *Microphorella*, was described from Silesia, Poland (Loew 1864) and was subsequently recorded from several countries in northeastern and eastern central Europe (Chvála 1988). More recently it was recorded from the Swiss Alps (Merz 1998). Dr. B. Merz sent part of his catches to the junior author (HU), who recognized two forms, or species. The discovery of these two forms is of particular interest as it affects current knowledge of the type species of *Microphorella*, its identity and possible variation. Subsequently, HU was invited by B. Merz on a joint collecting trip, and was led to the localities where numbers of specimens of both forms could be collected and preserved in ethanol in perfect condition, without shrinkage or nearly so. Most of the present study is based on this material. A detailed study of distinctive characters by the senior author (SEB), including the male postabdomen, yielded sufficient differences to justify distinction of two closely related species. One species was found to agree with the type series of *M. praecox*, while the other one will be described here as new.

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Materials and methods

Specimens examined in this study are deposited in the Museum für Naturkunde der Humboldt-Universität, Berlin, Germany (ZMHB), Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany (ZFMK), the Muséum d'Histoire Naturelle, Geneva, Switzerland (MHNG), and the Canadian National Collection of Insects, Ottawa, Canada (CNC). The majority of the new material from Switzerland consists of flies preserved in 75% ethanol. Some of these flies deposited in the CNC have been critical-point dried and mounted on pins. Label data for primary types are cited verbatim. Labels are listed with data from each label in quotation marks and separated by a semicolon. Lines on labels are delimited by a slash (/) and annotations are placed in square brackets, i.e. [ ].

Terms used for adult structures primarily follow Cumming and Wood (2009), except for the antenna and wing venation where Stuckenberg (1999) and Saigusa (2006) are followed respectively. In the system outlined by Saigusa (2006), the dipteran wing vein A_1 is homologized with the mecopteran CuP, and consequently CuA_1 is termed M_4, whereas CuA_2 is CuA, the anal cell is cell cua, and the anal vein (A_1+CuA_2) is CuP+CuA (Fig. 3). Homologies of the male terminalia follow Brooks and Cumming (2011, 2012). Macrotrichia are referred to as bristles, setae, setulae, or hairs depending on relative decreasing size.

Habitus and head photomicrographs (Figs. 1–2) are based on flies submerged in ethanol and appear darker, more shining-metallic than the critical-point dried specimens which have regained their grey-pruinose appearance. Male and female terminalia were macerated in 85% lactic acid heated in a microwave oven. Figures of the male genitalia are oriented with the anatomically dorsal and ventral parts directed towards the top and bottom of the page, respectively, following Sinclair and Cumming (2006, figs. 347–350). Body and wing length measurements are based on both dried and alcohol preserved specimens. Wing length is measured from the basicosta to the wing apex.

Systematics

***Microphorella similis* Brooks sp. nov.**
(Figs. 1A, 1B, 2A, 2B, 3A–C, 4, 5, 6, 7)

Type material. HOLOTYPE ♂ from Leuk-Pfynwald, Switzerland labelled: "Schweiz, Wallis [=Valais],/ Leuk-Pfynwald,/ Rhône-Kiesbett,/ 16.V.2000 H. Ulrich"; "HOLOTYPE/ *Microphorella similis*/ Brooks" (ZFMK, in ethanol). **PARATYPES:** 28♂, 29♀, same locality and date as holotype (ZFMK, in ethanol); 3♂, 3♀, same data (MHNG, in ethanol); 3♂, 3♀, same data (CNC, in ethanol); 17♂, 28♀, Leuk-Pfynwald, 27.V.1999, B. Merz (MHNG, in ethanol); 3♂, 2♀, same data (CNC, critical-point dried and mounted on pins from ethanol).

Diagnosis. *Microphorella similis* **sp. nov.** is a medium-sized species for the genus (body length 1.4–1.9 mm), shining white when dry and with white setae, with long pointed antennae, which most closely resembles *Microphorella praecox* (Loew), the type species. The characters shared with *M. praecox* and those differing from it are enumerated under 'Comparison' following the detailed description. It is easily distinguished from other species of *Microphorella* by the following combination of features: postpedicel (Figs. 1B, 4A) elongate, roughly conical; stylus (Figs. 1B, 4A) claw-shaped, curved ventrad and pointed, distinctly shorter than postpedicel in male, at most subequal in female; male mid leg with tarsomere 1 bowed and bearing a ventral comb-like row of hook-like setae (Fig. 4B); wing venation modified with R_{4+5} and M_1 sinuous, cell r_{2+3} narrowing before apex and broadening again to apex, M_2 and M_4 subparallel beyond cell dm, costal section between M_1 and M_2 distinctly longer than section between M_2 and M_4 (Figs. 1A, 3A, 3C); hypopygium with ventral epandrial process (Fig. 6A) Y-shaped with ventral arm of furca thick and lacking basal hump-like projection, left postgonite lobe (Figs. 6A, 6E) with bifurcate apex, phallus (Figs. 6A, 6E) bearing pointed process near middle and lacking longitudinal serration; female terminalia (Fig. 7) with acanthophorite setae, sternite 8 with apex narrow and bifurcate, cercus rounded and setose.

Description. **Male**: Body length 1.4–1.7 mm, wing length 1.3–1.6 mm. Dark brown ground colour with dense greyish-white pruinosity, with faint bluish-green and bronze metallic tinges at certain angles, legs with pruinosity slightly less dense, joints and tarsi paler. Setae and pubescence of body and legs white. **Head** (Figs. 1B, 2A): Ovoid in lateral view; slightly broader than high in anterior view. Neck inserted slightly above middle of head. Ocellar triangle conspicuous. Occiput weakly concave on upper median part above occipital foramen. Dichoptic; eyes

entirely covered with ommatrichia, medial edge with weak emargination adjacent to antenna, ommatidia smaller anterodorsally. Frons greyish, over 2X broader than high, widening above. Face and clypeus conclourous with frons. Face narrowest at middle, about 1.7–2.0X width of anterior ocellus. Clypeus not separated from face, slightly higher than broad, widening below, apical margin truncate, weakly produced. Bristles of head well-differentiated; dorsal bristles strong: 1 pair of inclinate fronto-orbitals well-separated from base of antenna and arising very close to posterior ocellus, 1 pair of lateroclinate anterior ocellars, 1 pair of small posterior ocellars, 1 pair of strong widely spaced inclinate postocellars, 1–3 pairs of lateroclinate verticals; postocular setae short and uniserial; postgena with longer scattered setae around edge of mouth-opening. Antenna (Figs. 1B, 4A) entirely dark brown, inserted above middle of head in profile; scape short, funnel-shaped; pedicel subequal in length to scape, spheroidal with subapical circlet of setulae; postpedicel elongate, about 3X longer than wide, clothed in fine setulae, roughly conical (not bulb-shaped) but with broad basal and narrow distal portions set off against each other, broad basal portion subequal in length to narrow distal portion; stylus stout, claw-shaped (i.e. evenly tapering from base to pointed tip and gently curved ventrad), about 1/3–1/2 (rarely 3/4) length of postpedicel, with minute hairs. Palpus ovoid with lower margin straight, dark brown, clothed with minute pile, apical half with several short setulae on outer surface, sensory pit present. Proboscis short, projecting ventrally; epipharyngeal carina present; epipharyngeal blades narrow; labellum with 6 geminately sclerotized pseudotracheae. Gena narrow. **Thorax**: Mesoscutum moderately arched, prescutellar depression apparent. Prosternum fused with proepisternum forming precoxal bridge. Proepisternum with 1 upper setula and 1 lower setula. Antepronotum narrow with 1–2 pale setula per side. Postpronotal lobe distinct with several small setulae. Mesonotum shield-shaped in dorsal view, longer than wide, bristles well-differentiated. Acrostichal setae absent, except for 1 pair on extreme anterior margin of mesoscutum; 6–8 dorsocentral bristles (posteriormost bristle strongest, anterior bristle short), 1 presutural supra-alar bristle, 3 postsutural supra-alar bristles (anteriormost bristle at suture), 2 notopleural bristles, and 1 post-alar bristle per side. Scutellum crescent-shaped in dorsal view with 1 pair of strong bristles. Mesopleuron bare. Halter pale brownish-white. **Legs**: Mostly clothed with white setulae, tarsal claws, pulvilli and empodium normally developed on all legs. *Foreleg*: Coxa with setae on anterior surface; femur slightly longer than tibia, with row of erect posteroventral setae; tibia slender with row of 4–5 long erect posterior setae, with adjacent row of erect ventral setae; tarsus slightly shorter than tibia, somewhat compressed laterally; tarsomere 1 slightly shorter than combined length of tarsomeres 2–5, lacking spinose anterior tubercle at base; tarsomeres 2–4 decreasing slightly in length apically; tarsomere 5 subequal in length to tarsomere 2, apex lacking medial finger-like process. *Midleg*: Coxa with row of several setae on anterior surface above apical margin; femur subequal in length to tibia, with row of 7–8 long erect posteroventral setae, lacking dense tuft of short setulae at middle third; tibia slender; tarsus shorter than tibia; tarsomere 1 bowed with ventral comb-like row of hook-like setae, with 2 strong basiventral setae and 4 short dark spine-like apicoventral setae (Fig. 4B), subequal to combined length of tarsomeres 2–5; tarsomeres 2–4 decreasing slightly in length apically, each with usually 4 short dark spine-like apicoventral setae; tarsomere 5 subequal in length to tarsomere 3, apex lacking medial finger-like process. *Hindleg*: Coxa with 3–4 setulae on outer surface; femur slightly longer than tibia; tibia slender; tarsus slightly shorter than tibia; tarsomere 1 subequal to combined length of tarsomeres 2–5, with spinose posteroventral tubercle at base; tarsomeres 2–4 decreasing slightly in length apically; tarsomere 5 subequal in length to tarsomere 3, apex lacking medial finger-like process. **Wing** (Figs. 3A, 3B): Hyaline, veins dark brown, about 2.5X longer than wide. Pterostigma indistinct, membrane entirely covered with minute microtrichia, alula absent. Costa circumambient. Extreme anterior base of costa with 2 anterodorsal setae. Anterior section of costa (between base and R_{4+5}) bearing double row of spine-like setae, setae of ventral row stronger. Posterior section of costa (i.e. beyond R_{4+5}) with setae finer and longer. Costal section proximal to apex of R_1 with setae larger, spine-like and more widely spaced. Longitudinal veins complete, reaching wing margin, except anal vein (CuP+CuA) absent, Sc faint apically. R_1 reaching costa beyond middle of wing (or beyond base of M_2). Base of Rs originating opposite humeral crossvein. R_{2+3} more or less straight. Cell r_{2+3} narrowing before apex where R_{4+5} curves forward, broadening to apex (veins R_{2+3} and R_{4+5} divergent). R_{4+5} and M_1 sinuous, curving forward then backward, diverging apically. M_2 and M_4 nearly straight and subparallel beyond cell dm. Costal section between M_1 and M_2 distinctly longer than costal section between M_2 and M_4. CuA rounded. Short r-m crossvein present in basal portion of wing, distal to base of R_{4+5}. Crossvein bm-m incomplete. Cell dm present with veins M_2 and dm-m, cell extending to middle of wing, base of M_2 sometimes faint to indiscernible from wing membrane. Cells br, bm and cua in basal fourth of wing. Cells bm and cua broader than br. Cell cua

closed, ovoid. Anal lobe not developed. Calypter with fine pale setae. **Abdomen** (Figs. 1A, 5): Abdominal muscle plaques present. Tergite 1 with scattered setae; tergites 2–6 with scattered posteromarginal setae, setae stronger laterally on tergites 2–4; sternites 2–4 setose; sternite 4 emarginate medially, right and left side with series of long posteromarginal setae; sternite 5 with projecting pregenitalic process, apex of process expanded and weakly emarginate, base of process with pair of short projections posteriorly, sternite with 2–3 setulae laterad process otherwise bare; sternite 6 sometimes with pair of close-set setulae per side, otherwise bare; segment 7 bare. Segments 1–4 mostly symmetrical with simple tergites and sternites; segments 5–7 narrowed, somewhat more heavily sclerotized (especially segments 6 and 7) and laterally compressed to form cavity on right side for hypopygium. Sternite 6 strongly produced ventrally. Sternite 7 simple, not contorted, lacking pregenitalic process. Sternite 8 slightly wider than long, subrectangular, setose; tergite 8 forming narrow sclerotized U-shaped band, laterally fused to posterior margin of sternite 8. *Hypopygium* (Figs. 5, 6): Lateroflexed to right; inverted with posterior end directed anteriorly; large and globular, about 1/2 length of abdomen; asymmetrical. Epandrium divided into left and right lamellae. Left epandrial lamella (Fig. 6A) narrowly constricted at middle with broad dorsal and ventral portions, ventral epandrial portion partially overlapping left side of hypandrium and fused to hypandrium along lower edge but epandrial margin distinct; ventral epandrial process (Fig. 6A) basally articulated, Y-shaped with apical half broadly furcate, dorsal arm narrow, curved and tapering apically, ventral arm thick with ventral setula near midlength and lacking hump-like projection at base. Left surstylus (Figs. 6A, 6C) complex, dorsal and ventral lobes separated by shallow U-shaped cleft through which left postgonite lobe protrudes. Dorsal lobe of left surstylus (Fig. 6A) with thumb-like outer lobe bearing stout apical seta, and slender medial lobe with shallowly furcate apex. Ventral lobe of left surstylus broad in lateral view (Fig. 6A), with complex multilobate medial projection (Fig. 6C). Right epandrial lamella (Figs. 5B, 6D) partially overlapping right side of hypandrium, not fused with hypandrium; apical portion of epandrial lamella broad with, rounded apicoventral projection below ventral surstylus; basal portion of epandrial lamella with deep dorsal emargination bordering ventral margin of right cercus. Right surstylus (Fig. 6D) with dorsal and ventral lobes separated by deep cleft through which right postgonite lobe protrudes. Dorsal lobe of right surstylus (Fig. 6D) with subtriangular outer lobe bearing apical seta, and slender club-like medial lobe with expanded apex. Ventral lobe of right surstylus broad with tapered base, with narrow dorsoapical process and 2 strong hook-like setae along ventroapical margin. Hypandrium (Figs. 5A, 5B, 6A, 6E) large, reniform, posterior end deeply notched with associated longitudinal furrow forming shallow cavity for phallus, with 2 short dentiform projections left of notch. Postgonite with basal internal portion cradling base of phallus (Figs. 6A, 6E), left side with broad anterolateral apodeme; left and right postgonite lobes protruding out from between dorsal and ventral lobes of surstylus. Left postgonite lobe (Fig. 6A) with basal portion slender and curved, apical portion broad with complex cuticular projections medially, apex bifurcate. Right postgonite lobe (Fig. 6E) broad basally, apical half narrower with fine pointed apical process. Phallus elongate, J-shaped (Figs. 6A, 6E), left side with pointed process near middle and second smaller pointed process preapically. Ejaculatory apodeme (Figs. 6A, 6E) laterally flattened, keel-like, with broad apex. Hypoproct (Figs. 6A, 6B) projected as pair of upturned slender asymmetrical non-setose lobes. Cerci (Figs. 5C, 6B, 6E) asymmetrical, basilateral portion of right cercus enlarged and rounded; right and left cercus each with elongate apicolateral projection, apicomedial tubercle bearing 2 bristles (tubercle longer on left), and row of 3 setae along medial margin.

Female: Body length 1.7–1.9 mm, wing length 1.4–1.8 mm. Similar to male except as follows: **Head** (Fig. 2B): Face about 2.3–2.8X width of anterior ocellus; antenna with stylus subequal to 2/3 length of postpedicel. **Thorax**: Notopleuron sometimes with additional weaker setae in addition to 2 strong notopleural bristles. **Legs**: *Foreleg*: Femur without row of erect posteroventral setae; tibia without posterior and ventral rows of erect setae. *Midleg*: Femur without row of long erect posteroventral setae; tarsomere 1 not bowed, without ventral comb-like row of hook-like setae, without strong basiventral setae. **Wing** (Fig. 3C): Costal setae proximal to apex of R_1 not enlarged and widely spaced. R_{4+5} and M_1 with curvature less pronounced. **Abdomen**: Tapering posteriorly, apical segments partially retracted into segment 5; tergite and sternite 6 with row of well-developed posteromarginal setae. Terminalia (Fig. 7) with tergite 7 complete, narrow medially; sternite 7 complete; tergite 8 complete, not divided medially, anterior margin darkened and emarginate (Fig. 7B), not fused with sternite 8 anterolaterally (Fig. 7A); sternite 8 complete, narrowing apically to short bifurcate tip (Fig. 7C); tergite 10 medially divided, with 2 long acanthophorite setae on each side (Fig. 7B); sternite 10 medially divided into a pair of narrow elongate bands (Fig. 7C); cercus short, rounded and fleshy, outer surface with several long setae; spermatheca an unsclerotized unpigmented tube with sperm pump at base (Fig. 7B).

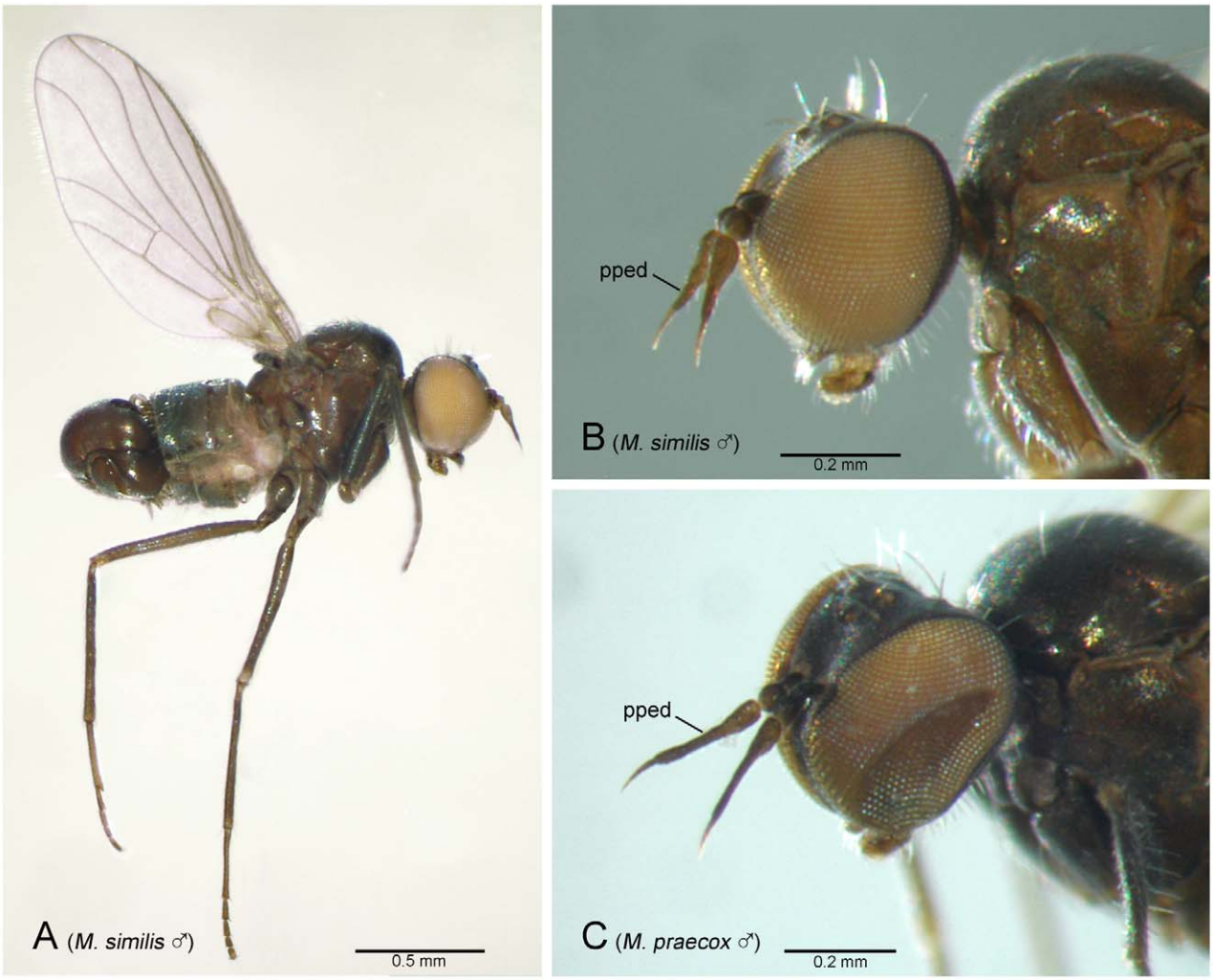

FIGURE 1. (A) *Microphorella similis* **sp. nov.**, male habitus photograph; (B) *Microphorella similis* **sp. nov.**, male head and antennae in anterolateral view; (C) *Microphorella praecox* (Loew), male head and antennae in anterolateral view. Photomicrographs are based on flies submerged in ethanol. Abbreviation: pped—postpedicel.

Distribution. *Microphorella similis* is currently known only from the type locality at Leuk-Pfynwald, Switzerland.

Comparison with *Microphorella praecox*. *Microphorella similis* most closely resembles *M. praecox*, the type species. It shares with *M. praecox* the following externally discernible characters: antenna (Figs. 1B, 1C, 4A; see also Chvála 1988, fig. 4) with postpedicel elongate, roughly conical, with broad basal portion and narrow distal portion, stylus claw-shaped (i.e., evenly tapered from base to pointed tip and gently curved ventrad), distinctly shorter than postpedicel in male, at most subequal in female, female terminalia (Fig. 7) with sternite 8 narrow and bifurcate apically.

Microphorella similis differs from *M. praecox* as follows: postpedicel shorter and stylus longer (Fig. 1B) (postpedicel longer and stylus shorter in *M. praecox*, Fig. 1C), R_{4+5} and M_1 sinuous (Figs. 3A, 3C) (straight in *M. praecox*, Figs. 3D, 3F), ventral epandrial process lacking hump-like projection on ventral arm of furca (Figs. 6A) (projection present in *M. praecox*; Fig. 8A), left postgonite lobe with bifurcate apex (Figs. 6A) (pointed in *M. praecox*, Fig. 8A), phallus bearing pointed process near middle and lacking longitudinal serration (Figs. 6A, 6E) (process absent and serration present in *M. praecox*, Figs. 8A, 8C), right cercus with basilateral portion enlarged (Fig. 6B) (less developed in *M. praecox*, Fig. 8B).

Remarks. The type series of *M. similis* was collected (along with specimens of *M. praecox*) by sweeping above gravel in the floodplain of the Rhône River during mid May. Besides the type series detailed above, additional specimens of *M. similis* from the same two collecting events at Leuk-Pfynwald, are deposited in the ZFMK and MHNG.

Etymology. The specific epithet is derived from the Latin *similis* (=similar) referring to the similarity of this species to *Microphorella praecox* (Loew), the type species of *Microphorella*.

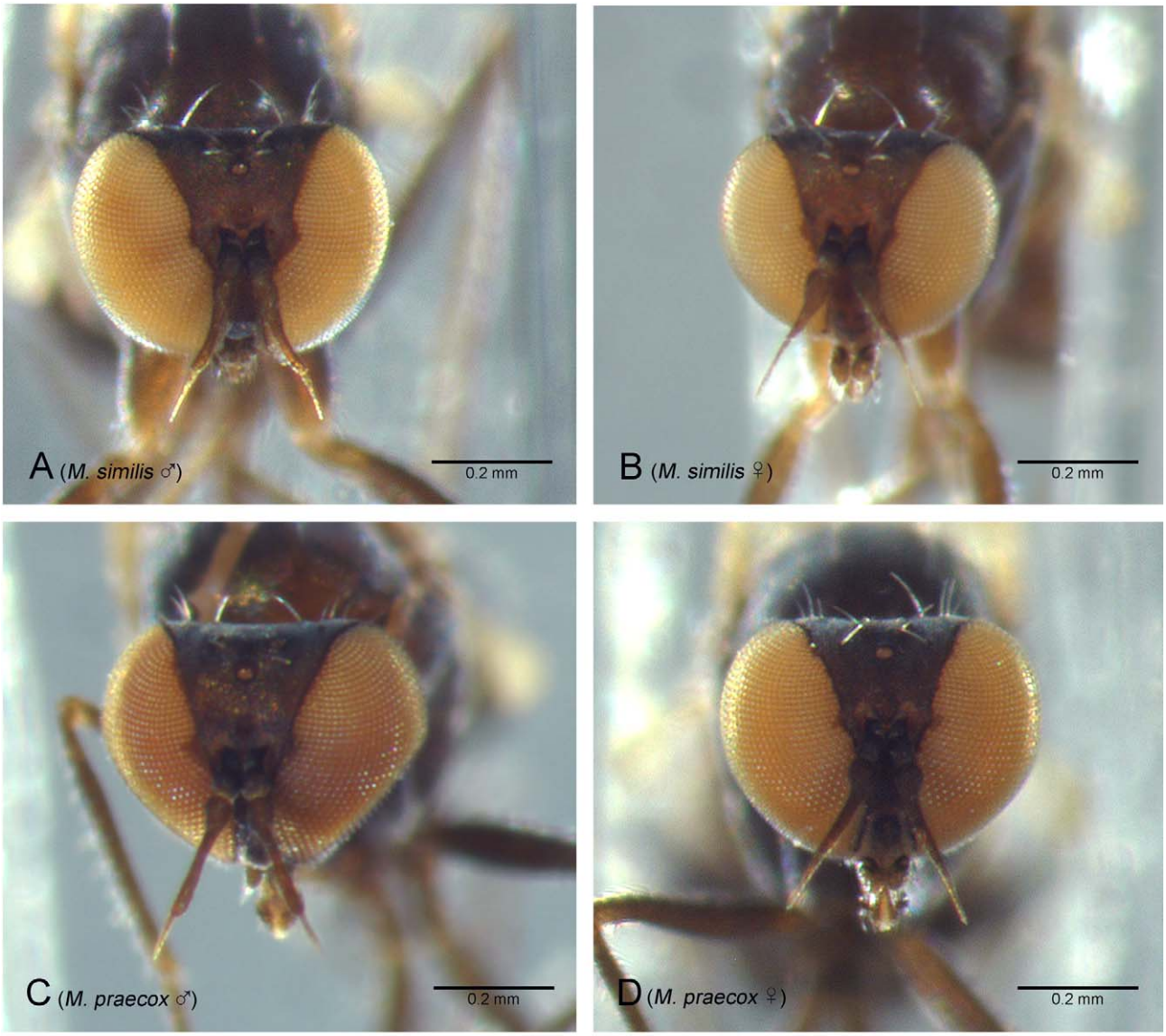

FIGURE 2. Heads in anterior view: (A) *Microphorella similis* **sp. nov.**, male; (B) *Microphorella similis* **sp. nov.**, female; (C) *Microphorella praecox* (Loew), male (left eye depressed by shrinkage in its middle and lower parts); (D) *Microphorella praecox* (Loew), female. Photomicrographs are based on flies submerged in ethanol.

Microphorella praecox (Loew)

(Figs. 1C, 2C, 2D, 3D–F, 8)

Microphorus praecox Loew, 1864: 47.
Microphorella praecox (Loew): Becker, 1909: 28.

Type material examined. LECTOTYPE ♂ (designated by Chvála, 1983) from Polish Silesia (as "Schlesien"), Poland, labelled: "Karlowitz/ 10.5.[18]46."; [small square purple label]; "Microphorus/ praecox/ m."; "10570"; "*Lectotypus*" [red label]; "Zool. Mus./ Berlin" [pale green label] (ZMHB). **PARALECTOTYPES: POLAND:** 1♂, 2♀, with same data as lectotype (ZMHB); 1♂, Posen, 1.V.1841, H. Loew [lacking red paralectotype label] (ZMHB); 1♀, same data except 14.V.1842 [lacking red paralectotype label] (ZMHB) (see Remarks).

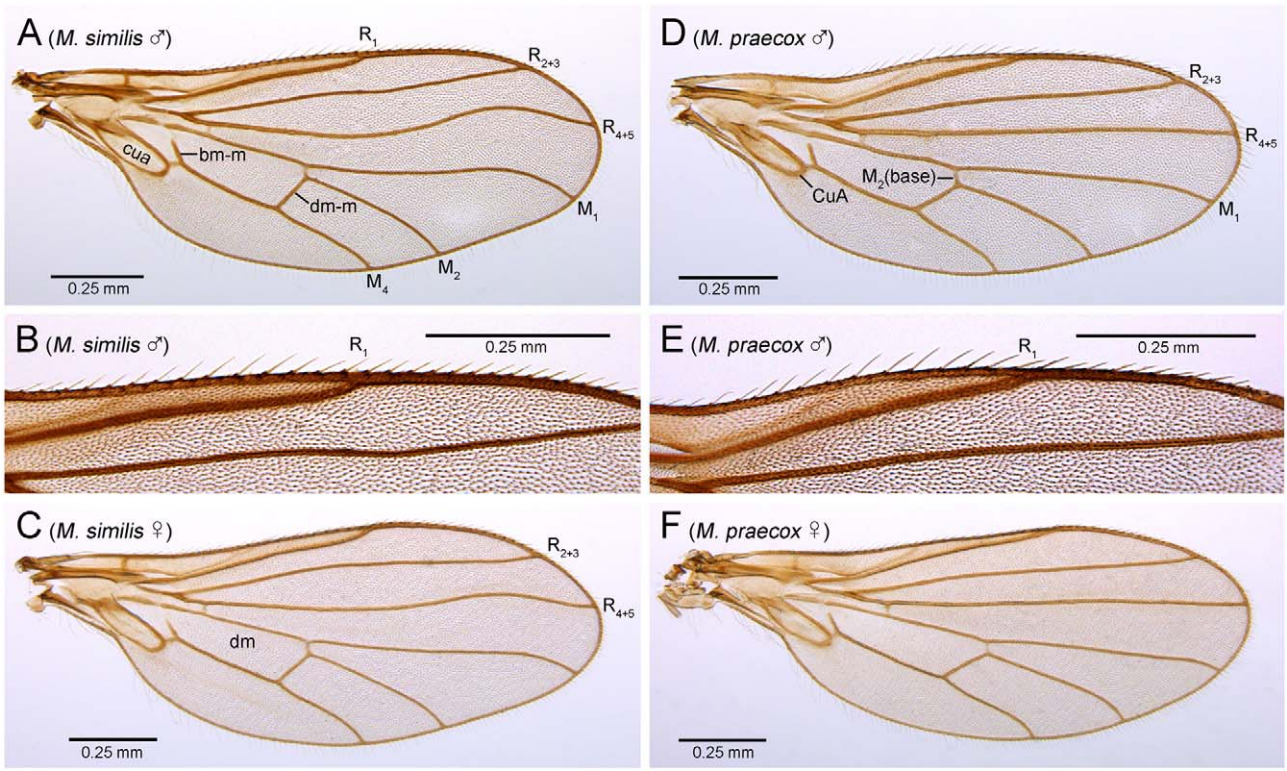

FIGURE 3. Wings: (A) *Microphorella similis* **sp. nov.**, male; (B) *Microphorella similis* **sp. nov.**, male, close-up of anterior margin showing costal setae; (C) *Microphorella similis* **sp. nov.**, female; (D) *Microphorella praecox* (Loew), male; (E) *Microphorella praecox* (Loew), male, close-up of anterior margin showing costal setae; (F) *Microphorella praecox* (Loew), female. Abbreviations: bm-m—basal medial crossvein; cua—anterior cubital (=anal) cell; CuA—anterior branch of cubital vein; dm—discal medial cell; dm-m—discal medial crossvein; M_1—1st medial vein; M_2—2nd medial vein; M_4—4th medial vein; R_1—1st radial vein; R_{2+3}—2nd + 3rd radial vein; R_{4+5}—4th + 5th radial vein.

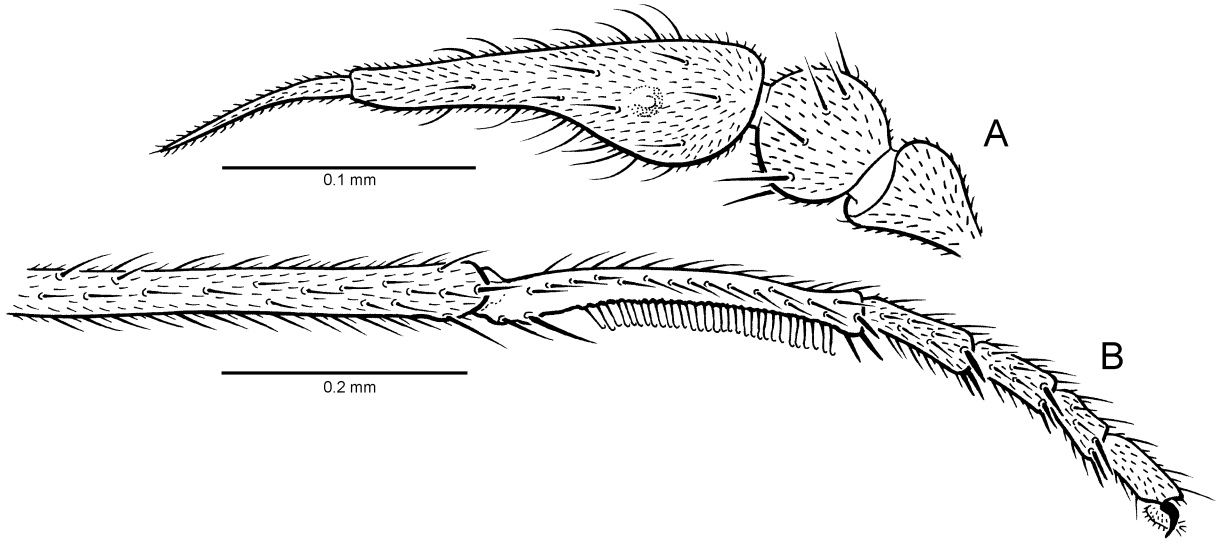

FIGURE 4. *Microphorella similis* **sp. nov.**, male: (A) left antenna, lateral view; (B) midleg, apex of tibia and tarsus, anterior view.

Other material examined. SWITZERLAND: Valais: 1♂, 2♀, Leuk-Pfynwald, Rhône- Kiesbett, 16.V.2000, H. Ulrich (ZFMK, in ethanol); 1♂, 1♀, Leuk-Pfynwald, 27.V.1999, B. Merz (MHNG, in ethanol); 1♂, 1♀, same data (CNC, critical-point dried and mounted on pins from ethanol).

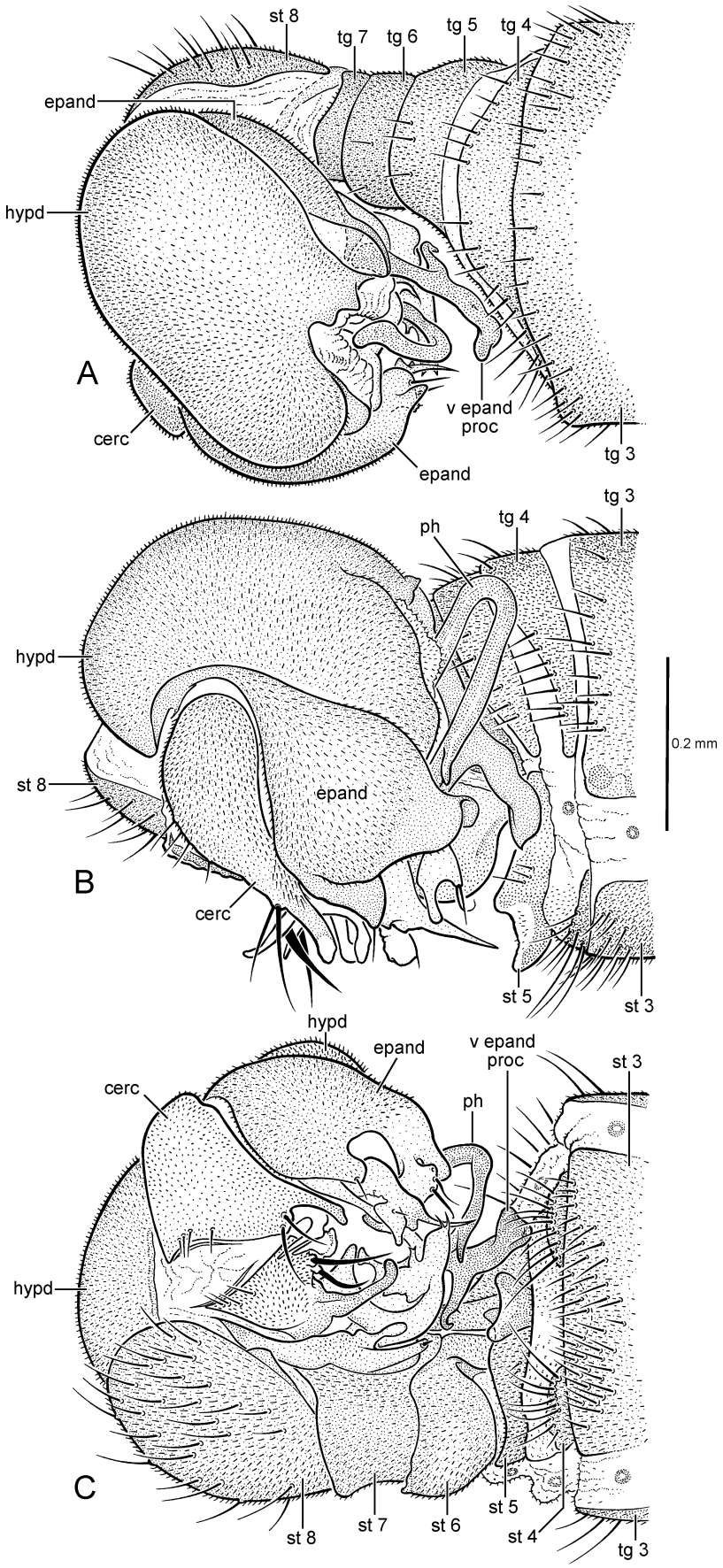

FIGURE 5. *Microphorella similis* **sp. nov.**, posterior portion of male abdomen: (A) dorsal view; (B) right lateral view; (C) ventral view. Abbreviations: cerc—cercus; epand—epandrium; hypd—hypandrium; ph—phallus; st—sternite; tg—tergite; v epand proc—ventral epandrial process.

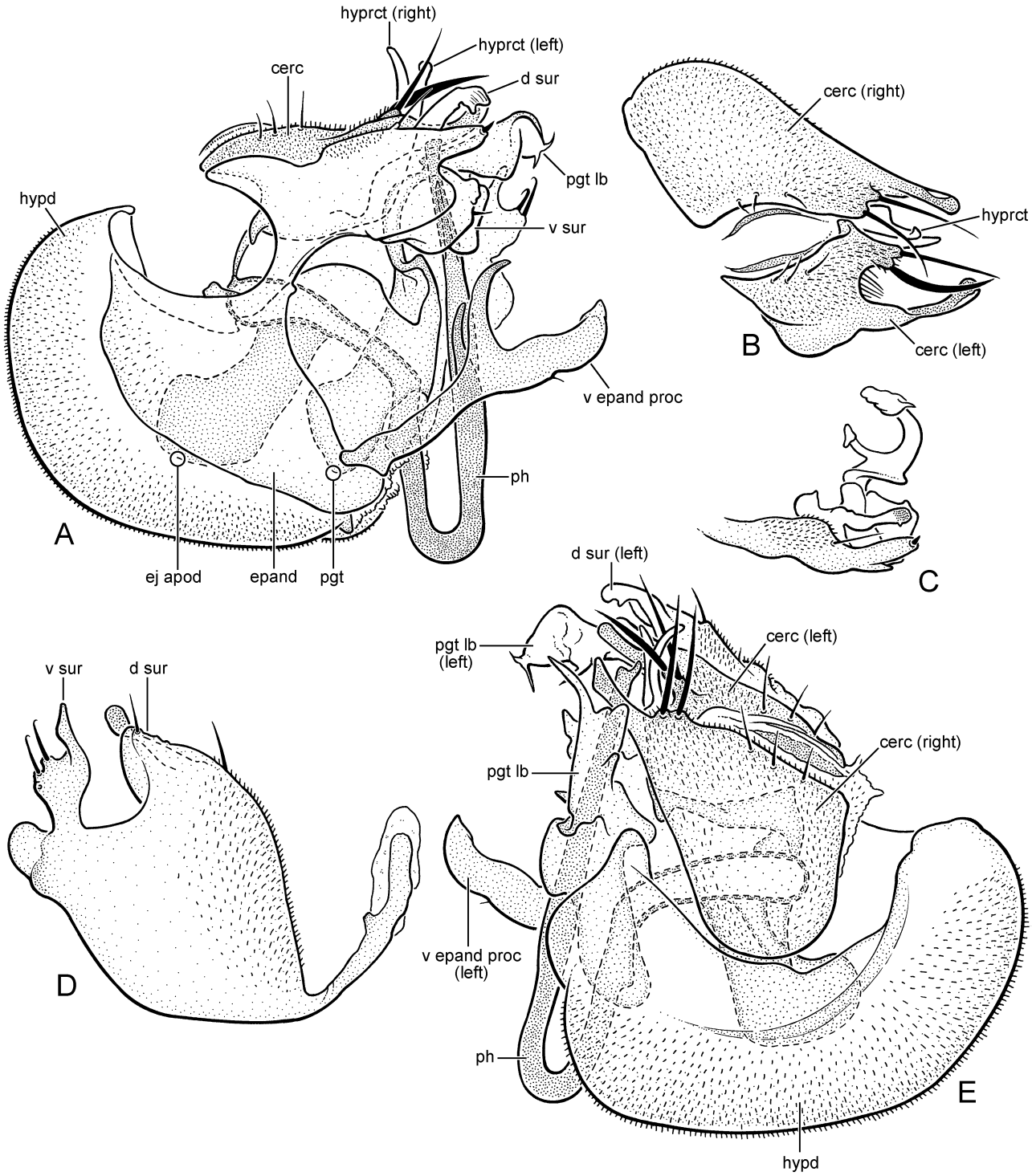

FIGURE 6. *Microphorella similis* **sp. nov.**, male terminalia: (A) hypopygium, left lateral view; (B) cerci (dorsal view); (C) left surstylus (dorsal view); (D) right epandrial lamella, right lateral view; (E) hypopygium, right lateral view (right epandrial lamella removed). Abbreviations: cerc—cercus; d sur—dorsal lobe of surstylus; ej apod—ejaculatory apodeme; epand—epandrium; hypd—hypandrium; hyprct—hypoproct; pgt—postgonite; pgt lb—postgonite lobe; ph—phallus; st—sternite; tg—tergite; v epand proc—ventral epandrial process; v sur—ventral lobe of surstylus.

Diagnosis. *Microphorella praecox* (Loew) is a medium-sized species for the genus (body length 1.2–2.0 mm), shining white when dry and with white setae, with long pointed antennae, which most closely resembles *M. similis* (see 'Comparison' section of *M. similis* above for a list of characters shared with *M. praecox* and those differing from it). It is distinguished from other *Microphorella* species by the following combination of features: postpedicel (Fig. 1C) elongate, roughly conical; stylus (Fig. 1C; see also Chvála 1988, fig. 4) claw-shaped, curved ventrad and

pointed, distinctly shorter than postpedicel; male mid leg with tarsomere 1 bowed and bearing a ventral comb-like row of hook-like setae (cf. Fig. 4B); wing venation (Figs. 3D, 3F) with R_{4+5} and M_1 straight, cell r_{2+3} not narrowing before apex; M_2 and M_4 weakly divergent beyond cell dm, costal section between M_1 and M_2 only slightly longer than section between M_2 and M_4; hypopygium with ventral epandrial process Y-shaped with ventral arm of furca slender and curved with hump-like projection at base (Fig. 8A), left postgonite lobe (Fig. 8A) with pointed apex, phallus with longitudinal serration and lacking pointed process near middle (Figs. 8A, 8C); female terminalia (cf. Fig. 7) with acanthophorite setae, sternite 8 with apex narrow and bifurcate, cercus rounded and setose.

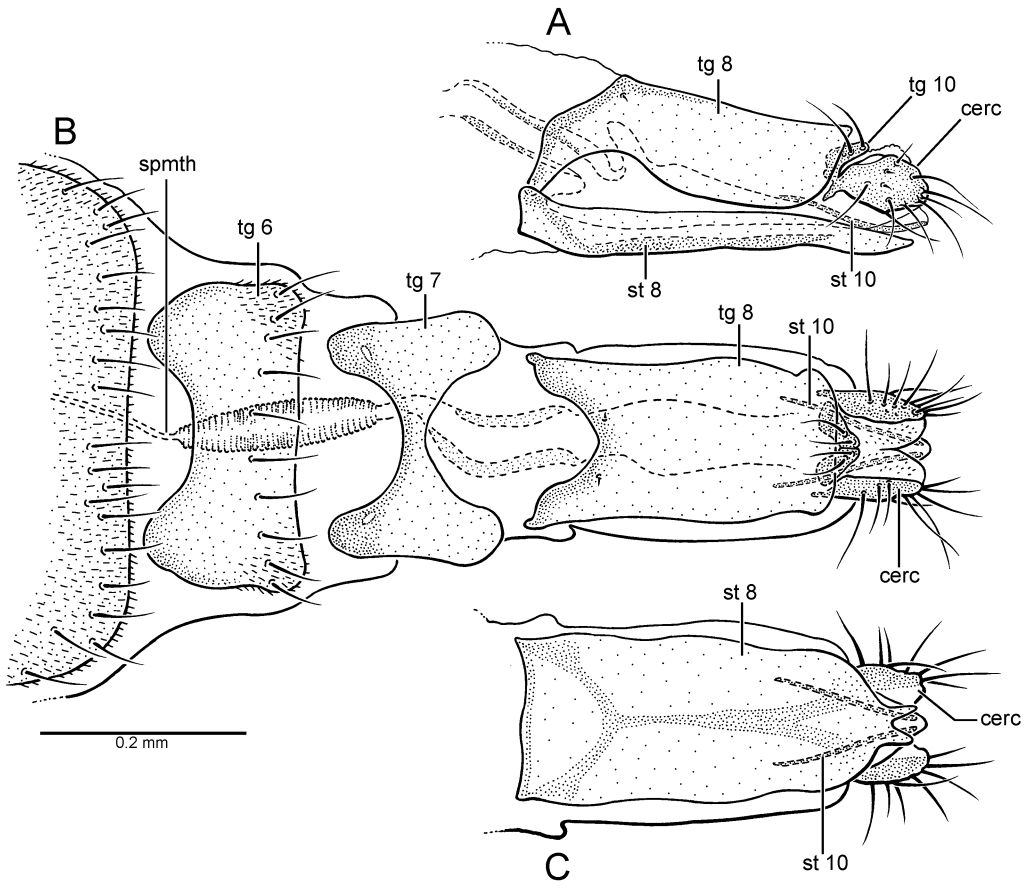

FIGURE 7. *Microphorella similis* **sp. nov.**, female terminalia: (A) left lateral view; (B) dorsal view; (C) ventral view. Abbreviations: cerc—cercus; spmth—spermatheca; st—sternite; tg—tergite.

Redescription. *Microphorella praecox* was redescribed and illustrated in detail by Chvála (1988, figs. 4, 15, 16–18). The following redescription includes supplemental details in light of the discovery of the closely related *M. similis*. **Male**: Body length 1.2–1.6 mm, wing length 1.4–1.6 mm. **Head** (Figs. 1C, 2C): Similar to *M. similis* except: face about 1.5–1.6X width of anterior ocellus, fronto-orbital bristles situated somewhat more anterior to posterior ocellus; antenna (Fig. 1C; see also Chvála 1988, fig. 4) with postpedicel about 4X longer than wide, broad basal portion about 1/2 length of narrow distal portion; stylus claw-shaped, 1/4–1/3 length of postpedicel. **Thorax**: Similar to *M. similis*. **Legs**: Similar to *M. similis*. **Wing** (Figs. 3D, 3E): Similar to *M. similis* except: cell r_{2+3} not distinctly narrowing before apex; R_{4+5} and M_1 straight, diverging apically; M_2 and M_4 weakly divergent beyond cell dm; costal section between M_1 and M_2 only slightly longer than costal section between M_2 and M_4. **Abdomen**: Similar to *M. similis* except: *Hypopygium* (Fig. 8): Ventral epandrial process (Fig. 8A) with broader apical furcation, ventral arm slender and curved with hump-like projection at base; dorsal lobe of left surstylus (Fig. 8A) with slender medial lobe rounded apically, not shallowly furcate; ventral lobe of left surstylus with similar complex multilobate medial projection (cf. Fig. 6C); basal portion of right epandrial lamella with dorsal emargination slightly less pronounced (Fig. 8C); apical portion of left postgonite lobe (Figs. 8A, 8C) with complex cuticular projections medially, apex narrow, pointed, not bifurcate; phallus (Figs. 8A, 8C), with longitudinal serration,

lacking pointed process near middle, with short pointed preapical process present; right cercus (Fig. 8B) with basilateral portion less developed.

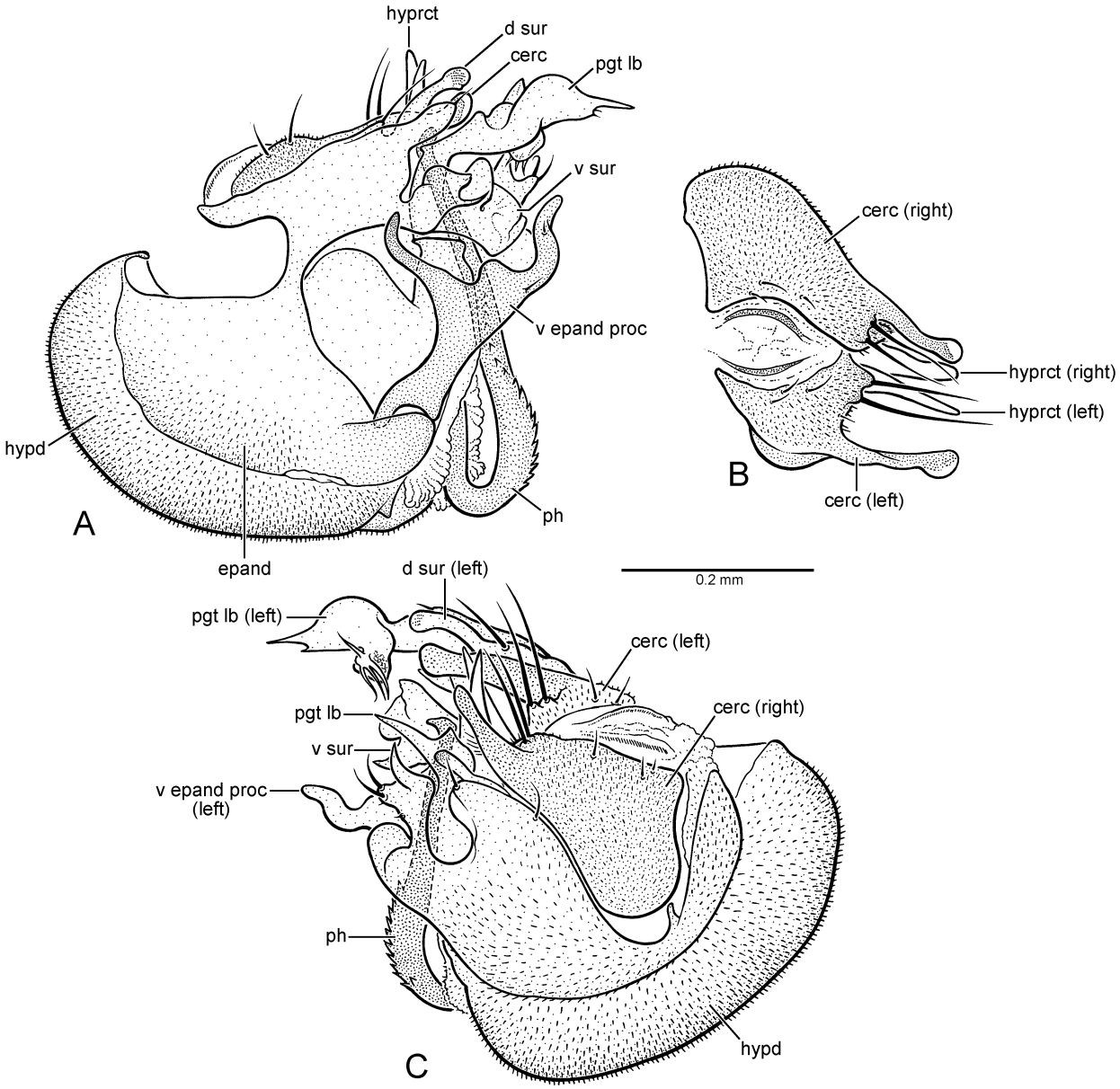

FIGURE 8. *Microphorella praecox* (Loew), male terminalia: (A) hypopygium, left lateral view; (B) cerci (dorsal view); (C) hypopygium, right lateral view. Abbreviations: cerc—cercus; d sur—dorsal lobe of surstylus; epand—epandrium; hypd—hypandrium; hyprct—hypoproct; pgt lb—postgonite lobe; ph—phallus; st—sternite; tg—tergite; v epand proc—ventral epandrial process; v sur—ventral lobe of surstylus.

Female: Body length 1.8–2.0 mm, wing length 1.4–1.7 mm. Similar to male except as follows: **Head** (Fig. 2D): Face about 1.7–2.3X width of anterior ocellus; antennal stylus length from little more than half to 2/3 length of postpedicel; postpedicel with broad basal portion about equal in length to narrow distal portion. **Legs**: *Foreleg*: Femur without row of erect posteroventral setae; tibia without posterior and ventral rows of erect setae. *Midleg*: Femur without row of long erect posteroventral setae; tarsomere 1 not bowed, without strong basiventral setae, without ventral comb-like row of hook-like setae. **Wing** (Fig. 3F): Costal setae proximal to apex of R_1 not enlarged and widely spaced. **Abdomen**: Terminalia similar to that of *M. similis* (cf. Fig. 7).

Distribution. *Microphorella praecox* occurs in central and northern Europe and has been recorded from the Italian mainland, Switzerland, Germany, Slovakia, Hungary, Poland, Finland and northwestern Russia (Zelenegorsk) (Chvála 1988, 1989, 2011). As noted by Chvála (1988), the record of this species from the

Ostrobottnia borealis (ObS) region of Finland by Krogerus (1932) cannot be confirmed because the material has been lost. Some of the distribution records of *M. praecox* may actually refer to *M. similis* and need to be validated.

Remarks. Adults of *Microphorella praecox* are known to occur on sandy river banks from April to June in Central Europe (Chvála 1983, 1988; Shamshev & Grootaert 2004). The Swiss material from 1999 and 2000 listed above was collected (along with specimens of *M. similis*) by sweeping above gravel in the floodplain of the Rhône River in May.

Chvála (1983, 1988) considered the male paralectotype collected on 1.V.1841 and the female paralectotype collected on 14.V.1842 to be from Karlowitz (= Karlowice Wielkie NE of Nysa, Poland). However, it seems more likely that these two specimens are the paralectotypes from Posen (Poznań) that Chvála (1983, 1988) considered to be lost. Both specimens lack locality labels, an indication of material that was collected by Loew at his home, in Posen (J. Ziegler, pers. comm., December, 2011).

Discussion

At present, *Microphorella* is a very poorly defined genus on a world scale and is likely paraphyletic (Ulrich 2004; Cumming & Brooks 2006; Brooks & Cumming 2010, 2011, 2012). Continued phylogenetic and morphological studies that include the type species (i.e., *M. praecox*) are required to discern the limits of *Microphorella* on a world basis, and subdivide its species into a natural classification. In the present study we have taken steps towards this end by developing a more complete knowlege of the morphology of *M. praecox* and its relationships.

The newly described Swiss species *M. similis* and *M. praecox* form a distinctive lineage of Palaearctic *Microphorella* characterized by the synapomorphic antennal form with an elongate, roughly conical postpedicel (not bulb-shaped), and a claw-shaped stylus (Figs. 1B, 1C, 4A). These two species also share an unusual and apparently uniquely derived feature of the female terminalia, in which the apex of sternite 8 is narrowed and bifurcate (Fig. 7C). The differences between *Microphorella praecox* and *M. similis* are enumerated in the 'Comparision' section of the new species; however, some further clarification is required regarding the relative lengths of the postpedicel and antennal stylus of the two species. The ranges of stylus length in proportion to postpedicel length of each species and sex are as follows:

M. praecox males: 1/4–1/3
M. similis males: 1/3–1/2
M. praecox females: >1/2–2/3
M. similis females: 2/3–1

The ranges observed in each sex of the two species meet but do not overlap, whereas there is a gap in the ranges between the sexes within each species. This appears like a continuous range of variation from the plesiomorphic condition in the female of *M. similis*, via the *praecox* female and the *similis* male, to the apomorphic extreme in the male of *M. praecox*. If the shape and relative proportions of the postpedicel and stylus were the only distinguishing characters, this could perhaps be taken as evidence of one variable species. We believe, however, that the recognition of *M. similis* as a distinct species is well-justified based on several other consistent morphological differences (see characters listed in the 'Comparision' section of this species above). *Microphorella similis* and *M. praecox* likely constitute a pair of sister species, because they share the claw-shaped stylus as a synapomorphy, and each differs from the other in at least one autapomorphy (e.g., sinuous R_{4+5} and M_1 in *M. similis*; serrate phallus, more derived antennal evolution in *M. praecox*).

Microphorella similis and *M. praecox* also share a number of features in common with the recently decribed Tunisian species *M. cassari* Gatt, 2011, including the possession of white macrotrichia on the head, thorax and legs; palpus with a sensory pit; male wing with a series of enlarged spine-like setae along the anterior costal margin proximal to R_1 (Figs. 3A, 3B, 3D, 3E; see also Gatt (2011, fig. 3)); male fore tibia with a posterior row of long erect setae; male mid leg with the tarsomere 1 bowed and bearing a ventral comb-like row of hook-like setae (Fig. 4B); male genitalia with a Y-shaped ventral epandrial process (Figs. 6A, 8A; see also Gatt (2011, fig. 7)), and an elongate apicolateral projection on the cercus (Figs. 6B, 8B; see also Gatt (2011 fig. 6)); female terminalia with acanthophorite setae, fleshy setose cerci, and sternite 10 divided into narrow elongate bands (Fig. 7; see also Gatt

(2011 figs. 10–12)). The phylogenetic significance of these features is presently unclear. However, if future studies reveal the suspected result that *Microphorella* is indeed paraphyletic and a more restricted concept of the genus is required, then some of these characters may prove important in defining that revised generic concept.

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