



## Revision of the Neotropical genus *Malacophagomyia* (Diptera: Sarcophagidae) with description of a new species

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### Abstract

The small Neotropical genus *Malacophagomyia* Lopes is revised. Two previously recorded species from tropical South America are redescribed: *M. filamenta* (Dodge) and *M. kesselringi* Kano & Lopes. One new species is described, *M. rivadavia* sp. nov., from temperate southern South America. The structures of the male genitalia of the species of this genus are compared, and some female genitalic structures of *M. filamenta* are reinterpreted. Diagnostic characters to recognize the three species are given. Additionally, a key to described species of *Malacophagomyia* is presented.

**Key words:** Calypterae, Sarcophaginae, flesh flies, systematics, *Malacophagomyia*

### Introduction

The genus *Malacophagomyia* Lopes is a small group of Neotropical sarcophagine flies known from two described species. The genus was erected by Lopes (1966), with *Sarcophaga filamenta* Dodge, 1963 as the type species, on the basis of unique features of the male and female genitalia. Two years later, Kano & Lopes (1968) described a second species, *M. kesselringi*, from northeastern Brazil.

Lopes (1969, 1983) in his tribal array of the Sarcophaginae, placed the genus *Malacophagomyia* in the Sarcophagini. The generic definition is supported by the remarkable morphology of its genitalia bearing some distinctive characters, as follows: phallus with a median stylus very elongated, and a conspicuously recurving juxta arching over the lateral styli in lateral view; pregonite (gonocoxital lobe) with apex bent upwards, and with membranous (less sclerotized) area along ventral, inner margin and near the bent apical part (Pape 1996).

Regarding the biology of *Malacophagomyia* species, *M. filamenta* was recorded from gastropods by Lopes (1966). The genus was thought to be restricted to tropical areas of South America, but our new species occurs in temperate Argentina. We redescribe the male and female of *M. filamenta* and the male of *M. kesselringi*, especially focusing on features of the genitalia.

### Material and methods

Phallic structures of the male holotype of the new species were exposed using the technique described by Lopes (1973) and Dahlem and Naczi (2006), after keeping the specimen in a moist container for 24 hours. The genitalia of male and female specimens of *M. filamenta* were extracted and cleared in 10% potassium hydroxide, then transferred to 10% acetic acid, and washed in distilled water. The structures of genitalia were mounted on a concave slide for study and then preserved in glycerin and stored in plastic microvials pinned below the associated specimens.

The terminology used in the descriptions of external morphology follows that of McAlpine (1981) and

Cumming and Wood (2009), with the sole exception of the term postpedicel (Stuckenberg 1999) used in place of the term first flagellomere. The terminology of phallic (or aedeagal) structures follows Mello-Patiu and Pape (2000) and Giroux *et al.* (2010). The term “lateral plates” used for *Malacophagomyia* by Lopes (1966) is here replaced by the term harpes, which simply denotes the paired structures or sclerotized processes arising from the anterior margin of the phallic tube distal to the vesica and proximal to the median and lateral styli. Specifically, we accept the term “harpes” for these structures; although in *Malacophagomyia*, the definition of “processes [...] spreading ventromedially over the base of the lateral styli” is not observed as occur in *Sarcophaga* and *Lepidodexia* (Giroux *et al.* 2010). Clearly, the homology between the harpes and the so-called lateral plates of Lopes (1966) is still uncertain.

Head measurements are expressed as ratios. Body length was measured in millimeters, from the antennal base to the posterior margin of abdominal tergite 5 following the procedure used by Giroux and Wheeler (2009). Distance measurements between two points were digitally obtained with the software Leica Application Suite EZ Version 2.1.0. Line drawings were produced from images taken with a Leica EC3 digital camera mounted on a Leica S6D stereomicroscope.

All specimens cited belong to the following institutions (acronyms in parentheses):

American Museum of Natural History, New York, USA (AMNH); Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”, Buenos Aires, Argentina (MACN); Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil (MNRJ). The labels of the type specimens are cited verbatim, lines separated by a slash, different labels by double slash and comments given in square brackets.

### *Malacophagomyia* Lopes, 1966

*Malacophagomyia* Lopes, 1966: 316. Type species: *Sarcophaga filamenta* Dodge, 1963, by original designation.

**References.** Lopes, 1969: 44 (Neotropical catalog); Lopes, 1983: 318 (type genus of subtribe Malacophagomyiina); Pape, 1996: 43, 249 (diagnosis, world catalog); Pape & Dahlem, 2010: 1323 (key to Central America genera).

**Generic diagnosis.** The species of this genus share the following characters: head with whitish setae on gena and postgena; arista largely plumose; row of frontals not diverging strongly anteriorly at the level of pedicel; thorax black, with silvery-gray microtomentum and usual three strong black stripes; acrostichal setae not differentiated; posterior dorsocentral setae spaced as for four, the two anterior setae smaller than the posteriors; proepisternum bare; postalar wall distinctly setose; vein  $R_1$  setose, third costal section with ventral setae; two pairs of marginal scutellar setae, apical scutellar setae absent. Males without proclinate orbital setae, mid femur without ctenidium; abdominal sternite (ST) 3–4 bare medially, setose laterally; paired tuft of erect black spine-like setae on posterior corners of ST4; ST5 with posterior cleft bearing two arms with inner margins covered with several setae of normal size or more robust as tufts of strong black spine-like setae. Male genitalia with cerci fused along its entire length without cercal prong; pregonite with membranous area along the ventral margin and near the bent apical part; phallus with clear separation of basi- and distiphallus; vesica absent; harpes slender; median stylus very elongated and recurved; juxta arching over the lateral styli in lateral view, lateral styli composed of two distinct arms (an outer membranous arm, and an inner sclerotized arm).

We agree with Lopes (1966) and Pape (1996) that monophyly of *Malacophagomyia* is inferred principally on unique configuration of male genitalia. Morphology of the acrophallus (median stylus and lateral styli), and the pregonite are probably autapomorphic characters. Additionally, we believe that the cerci fused along its entire length, with absence of cercal prong, and the spine-like setae on ST4 are therefore possible autapomorphic characters. Several external characters (e.g., presence of ventral setae in the third costal sector or dorsal setae on  $R_1$ ) are very useful in the taxonomic definition of *Malacophagomyia*, but whether they are apomorphic at the genus level is uncertain. Further studies are needed to interpret this definition of *Malacophagomyia* within a phylogenetic context.

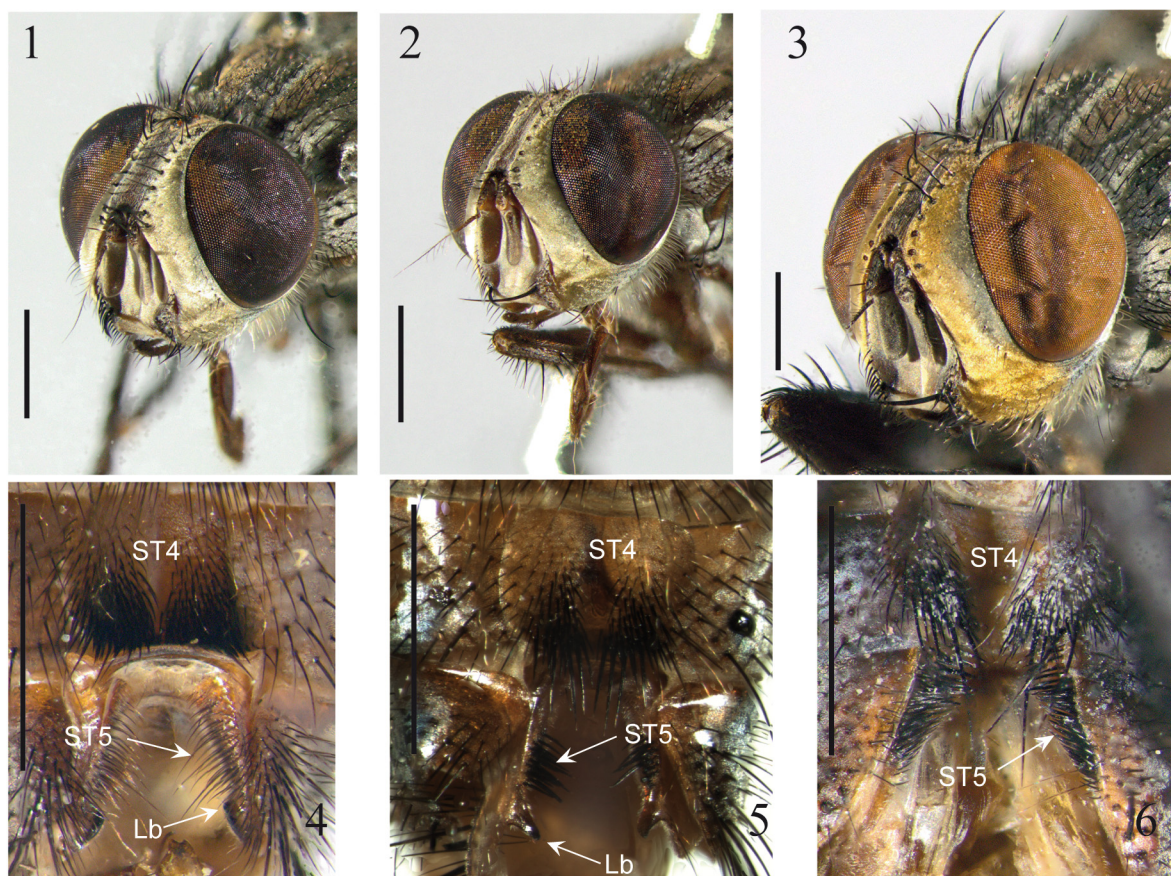
The female genitalia of *M. filamenta* also presents some uncommon features (Lopes 1966, 1983). The two main remarkable characters, which potentially may be useful in the definition of the genus, are: T6 (tergite VI+VII in the terminology used by Lopes [1966]) reduced, represented by a narrow sclerite; and vaginal plate remarkably developed and sclerotized (Figs 15–16).

The only published generic key including *Malacophagomyia* is that of Pape and Dahlem (2010). However, in

this key some specimens run with difficulty to *Malacophagomyia* because of variation in the posterior and posterodorsal setae (“bristle”) of the mid tibiae mentioned in couplet 39. We found some specimens with posterior and posterodorsal setae of the same size, and others without a posterodorsal seta. Comparing the conspicuous genitalia of *Malacophagomyia* with those of other Sarcophaginae ensures the recognition of specimens belonging to *Malacophagomyia*.

## Biology

Breeding records exist for *M. filamenta*, which has been obtained as larvae from dead snails. Lopes (1966, 1973) obtained this species from land pulmonate snails of the species *Solaropsis brasiliiana* (Deshayes) (Gastropoda: Pleurodontidae) and from freshwater snails of the genus *Pomacea* (Gastropoda: Ampullaridae). Additionally, our record of *M. kesselringi* from *Pomacea* sp. is the first rearing record for this species. Based on these records, the genus seems specialized on gastropods, although its role as a parasitoid or a necrophagous species remains unclear. Lopes (1966) stated that unlike other sarcophagids associated with snails (e.g., *Udamopyga* spp.), species of *Malacophagomyia* are very rare in nature, and consequently few specimens have been captured.



**FIGURES 1–6.** *Malacophagomyia* species, males. 1–3. Head, fronto-lateral view. 1. *Malacophagomyia filamenta* (Dodge). 2. *Malacophagomyia kesselringi* Kano & Lopes. 3. *Malacophagomyia rivadavia* n. sp., holotype. 4–6. Sternite 5. 4. *Malacophagomyia filamenta* (Dodge). 5. *Malacophagomyia kesselringi* Kano & Lopes. 6. *Malacophagomyia rivadavia* n. sp., holotype (MACN). Abbreviations: Lb, lobes of sternite 5; ST4, sternite 4; ST5, setae on inner surface of arms of sternite 5. Scale bars 1 mm.

## Key to species of *Malacophagomyia* (males only)

- 1 Parafacial and fronto-orbital plate with silvery microtomentum (Figs 1–2). Abdomen brown or reddish with gray microtomentum, T5 with lateral spots of silvery-gray microtomentum (Figs 7, 8). Surstylus small, elongated or rounded. Cerci with short

- setae or with long villous setae on basal 1/2 in dorsal view . . . . . 2
- Parafacial and fronto-orbital plate with golden microtomentum (Fig. 3). Abdomen black with gray microtomentum, T5 with latero-ventral part reddish, with lateral spots of light golden microtomentum (Fig. 22). Surstylus conspicuously large, broad, with rounded tip (Fig. 28). Cerci with long villous setae on basal 3/4 in dorsal view (Fig. 27). . . . . *M. rivadavia* sp. nov.
- 2 Syntergosternite 7+8 blackish. Cerci short (cerci length 2X cerci width), covered with short setae (Fig. 12). Arms of ST5 with several fine setae on its inner surface, and short posterior lobes (Fig. 4). . . . . *M. filamenta*
- Syntergosternite 7+8 reddish. Cerci elongated (cerci length 3X cerci width), covered with long villous setae on basal half (Fig. 19). Arms of ST5 with strong spine-like setae on inner surface, and elongated posterior lobes (Fig. 5). . . . . *M. kesselringi*



FIGURES 7–9. 7. *Malacophagomyia filamenta* (Dodge), male habitus. 8–9. *Malacophagomyia kesselringi* Kano & Lopes. 8. Male habitus, holotype (MNRJ). 9. Original labels of the holotype. Scale bars 1 mm.

***Malacophagomyia filamenta* (Dodge, 1963)**

(Figs 1, 4, 7, 10–16)

*Sarcophaga filamenta* Dodge, 1963: 240. Holotype male (AMNH; not examined). Type locality: Surinam (as “Dutch Guiana”), Paramaribo.

*Malacophagomyia filamenta*: Lopes, 1966: 316 (male, female, larvae I–III, figs 1–18); Kano & Lopes, 1968: 305 (distribution, fig. 5); Lopes, 1969: 44 (catalog); Lopes 1973: 281 (notes on biology); Lopes, 1983: 318 (larva I, fig. 88); Pape, 1996: 249 (catalog); Lopes, 2000: 172 (list); Mello-Patiu *et al.*, 2009: 179 (distribution).

Male (Fig. 7). Body length = 6.2–7.0 mm (n = 82).

Head. Head length at antennal base 1.13 head length at vibrissal level. Parafacial and fronto-orbital plate with silvery microtomentum (Fig. 1); parafacial plate with setae (somewhat larger on lower part) and row of setulae on upper half; fronto-orbital plate with sparse setulae; postcranium with silvery-gray microtomentum, with row of black occipital setae parallel to postorbitals and whitish setulae; eye bare; frontal vitta blackish; front at its narrowest point 0.21 head width; 6–10 frontal setae, the row of frontals not diverging strongly anteriorly at the level of pedicel; reclinate orbital setae present; inner vertical setae strong and reclinate, outer vertical setae 0.25–0.3X the inner verticals and divergent; ocellar triangle black with silvery microtomentum, with one pair of divergent and proclinate ocellar setae and supplementary setulae; postocellar and paraverticilar setae present; postocular area with silvery microtomentum; genal groove and genal dilation with silvery microtomentum; postgena with silvery-gray microtomentum and pale setae, gena with a few black setae anteriorly and pale setae on posterior part; face with silvery microtomentum; facial ridge with silvery microtomentum, with setae and stronger setulae close to vibrissa and fine setulae reaching the lower half; 9–11 subvibrissal setae; antenna brown, postpedicel with grayish microtomentum, length 0.29 head height, arista largely plumose; palpus brown with black setae on apical half.

Thorax. Black, with silvery-gray microtomentum; prescutum and scutum with dorsal and lateral stripes with silvery-gray microtomentum and three black bands; scutellum with intermediate stripes with silvery-gray; postpronotal lobe, notopleuron and anepisternum, katepisternum and anepimeron with spots of silvery-gray microtomentum; proepisternum silvery, bare; one strong proepisternal seta plus one weaker and shorter supplementary inferior seta, three katepisternal setae, postalar wall with setulae. Chaetotaxy: acrostichals 0+0, dorsocentrals 4 (not well differentiated, usually the presutural more developed in length) + 4 (spaced to four, the two anterior setae smaller than the posteriors and usually not differentiated), intra-alars 2+2, supra-alars 1–2+3 (the middle pair stronger), anterior postpronotal 1, basal postpronotal 2, postalars 2, notopleurals 4 (two larger and two smaller). Scutellum with two pairs of lateral scutellar setae, apical scutellar setae absent, and a pair of discal setae. Wing hyaline, tegula dark brown, whitish basicosta and brown veins, vein  $R_1$  basally setulose on 1/2 of its length,  $R_{4+5}$  setulose in proximal 0.6 of distance to crossvein r-m, costal spine not differentiated, third costal sector with ventral setae, cell  $r_{4+5}$  open at wing apex, lower calypter whitish. Legs with coxae, trochanters and femora with silvery microtomentum; middle femur without posteroventral ctenidium on its apical portion, 2–4 anterior and 2–4 anteroventral setae; middle tibia with 1 anterodorsal seta; hind femur with rows of anterodorsal and anteroventral setae; hind tibia with 2 anterodorsal setae well differentiated, 1 anteroventral, and 2 posterodorsal setae; hind femur somewhat villous basally; tarsi blackish.

Abdomen. Reddish-brown; sternites exposed with silvery microtomentum; T1+2–T5 with latero-ventral and dorsal spots with silvery microtomentum; T1+2–T4 each with one pair of lateral marginal setae, T4 with one pair of median marginal setae; T5 with a complete row of marginal setae; ST2–ST3 (and adjacent areas of tergites) with lateral villous setae; ST4 with tufts of black spine-like setae on posterior corners, bare medially; median margin of ST5 V-shaped, reddish-brown; arm of ST5 with several fine setae on its inner surface, and a darkened short posterior lobe (Fig. 4).

Genitalia. Syntergosternite 7+8 blackish, with a median spot of gray microtomentum, having a marginal row of weak setae and some smaller black hair-like setae basally; epandrium reddish-orange with thin gray microtomentum, with black hair-like setae; cerci short, covered with setae, without cercal prong (Fig. 12); cerci slightly curved in profile (Fig. 13); surstylus long with apical setae (Fig. 13); pregonite curved backward, bent at a right angle and pointed (Fig. 10); postgonite with one strong seta (Fig. 11); phallus without vesica; juxta well developed and sclerotized, curved upward at the anterior margin (lateral view), juxta bifid in ventral (or apical) view; lateral stylus well developed and complex with a pair of arms or processes, a lateral (outer) membranous

arm, and a well-sclerotized curved inner arm (Fig. 14); median stylus very elongated, strongly curved at the base and in apical third (lateral view); each harpes as a flat and membranous lobe (Fig. 14).

Female. Body length = 5.5–7.2 mm (n = 57).

Head. Differs from male in being wider, front at its narrowest point 0.35 head width; two well differentiated proclinate orbital setae; postpedicel larger, length 0.34 head height.

Thorax. Similar to male. Hind femur with 2–3 posteroventral setae.

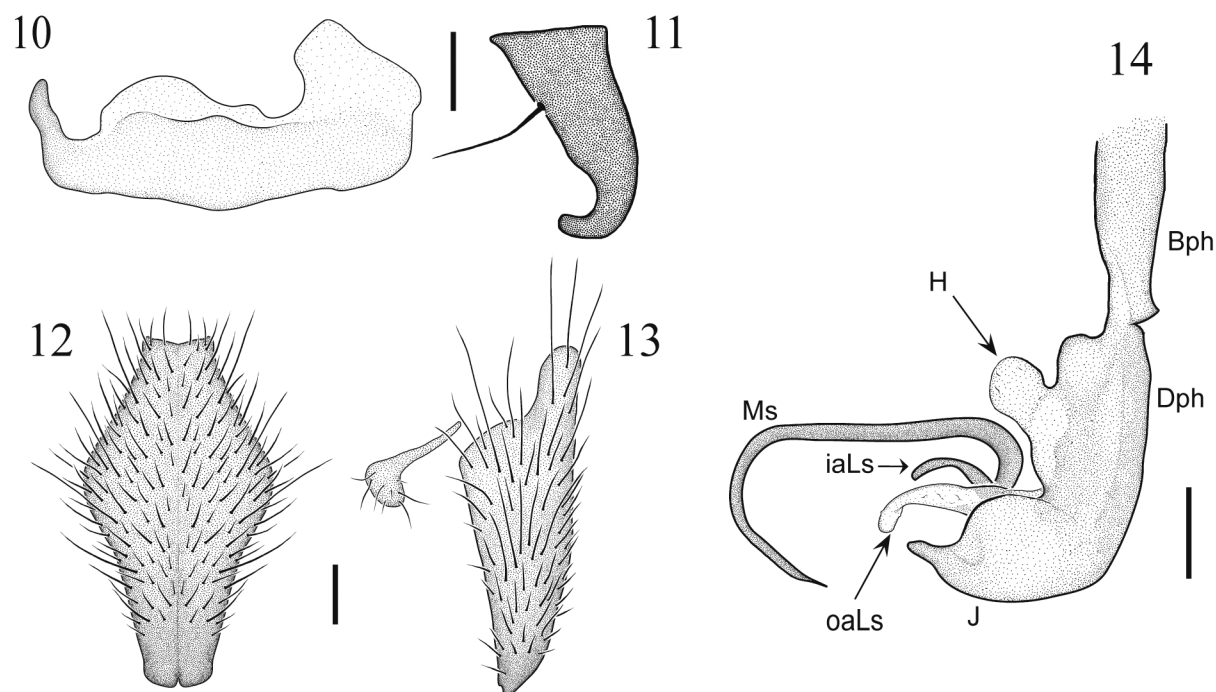
Abdomen. Similar to male, somewhat broader.

Genitalia. Tergite 6 (VI + VII of Lopes) reduced to a narrow sclerotized band with anterior margin adjacent to spiracle 7 (located in a large membranous area); epiproct (or anal tergite) membranous and represented by a few setae, cerci with setae (Fig. 16). ST5 long and narrow; ST6 and ST7 united but with a distinct streak between them, with rows of marginal setae especially laterally, and with a concave longitudinal median area; ST8 composed of two lateral plates, rounded on posterior margin, covered with microtrichiae and a membranous median area with setae on posterior part; vaginal plate conspicuous and well sclerotized, broad and exposed on posterior margin; hypoproct membranous, broad with longer setulae on posterior margin (Fig. 15).

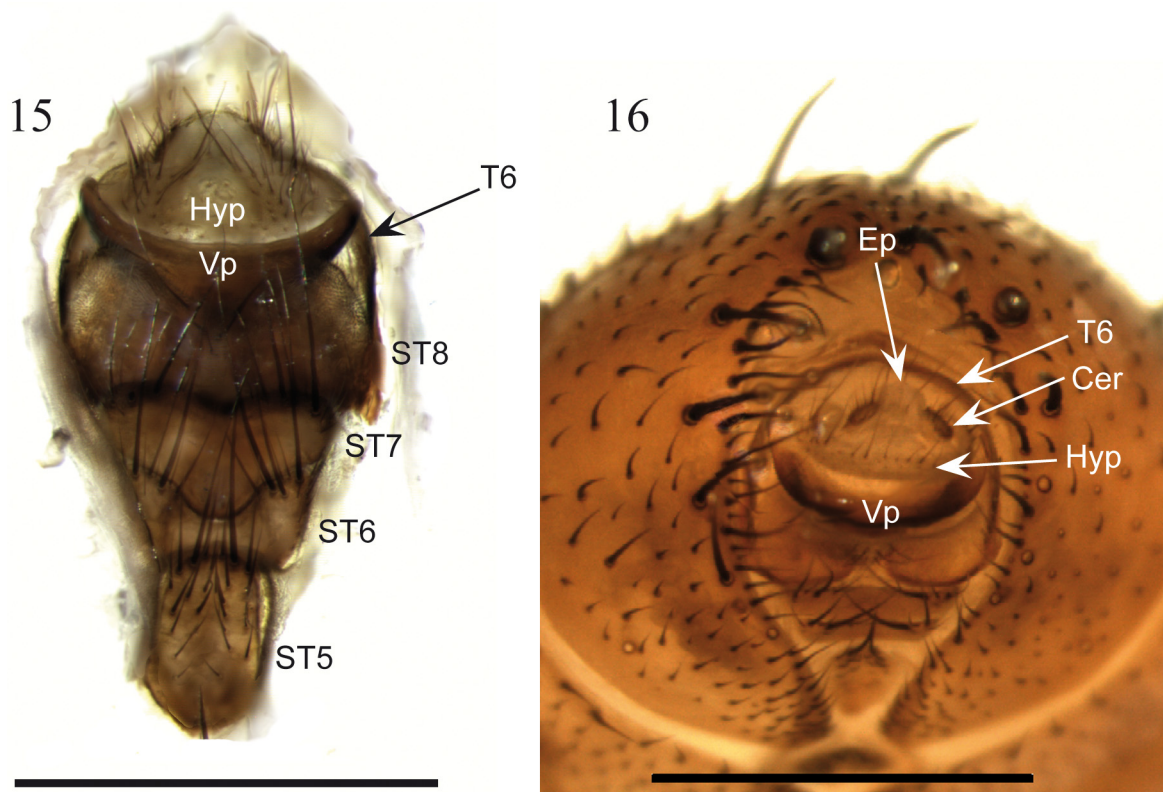
**Material examined. Bolivia:** 69 males, 47 females, Santa Cruz de la Sierra, XII 56 M. Alvarenga leg. (MNRJ). **Brazil:** 5 males, Belem, Pará, 25.VIII.65 H.S. Lopes leg. (MNRJ); 1 male, Rio de Janeiro, 04-IV-93 A. Khouri leg. (MNRJ); 7 males, 10 females, Rio de Janeiro, Mendanha, Campo Grande, I-52 H.S. Lopes leg. (MNRJ).

**Distribution.** Bolivia, Brazil (Pará, Rio de Janeiro), Surinam.

**Remarks.** Lopes (1966: 319) described for the first time the female of *M. filamenta* and defined the genital tergites as “Tergito 6 + 7 inteiramente ausente, representado pelos dois estigmas que se implantam na membrana, havendo um único tergito genital constituído por estreita faixa quitinosa que corresponde ao 9° esternito [sic]...”. Lopes (1966: 318, figs 9–10) illustrated this species, although without specifying any structures. We observed that the unique and narrow sclerotization is located in a posterior position but adjacent to spiracle 7, and hence we assume that this structure constitutes the posterior remains of tergite 6 (VI + VII according to Lopes’s usual nomenclature). Following the description of the female, Lopes (1966) provided interpretations of the functional morphology of male and female structures of the genitalia based on a fixed mating couple.



**FIGURES 10–14.** *Malacophagomyia filamenta* (Dodge), male genitalia. **10.** Pregonite, left lateral view. **11.** Postgonite, left lateral view. **12.** Cerci, posterior view. **13.** Cercus and surtylus, left lateral view. **14.** Phallus, left lateral view. Abbreviations: Bph, basiphallus; Dph, distiphallus; iaLs, inner arm of lateral stylus; H, harpes; J, juxta; Ms, median stylus; oaLs, outer arm of lateral stylus. Scale bars 0.1 mm.



**FIGURES 15–16.** *Malacophagomyia filamenta* (Dodge), female genitalia. **15.** Genitalia, ventral view. **16.** Genitalia, posterior view. Abbreviations: Cer, cercus; Ep, epiproct; Hyp, hypoproct; ST, sternite; T, tergite; Vp, vaginal plate. Scale bars 1 mm.

***Malacophagomyia kesselringi* Kano & Lopes, 1968**

(Figs 2, 5, 8–9, 17–21)

*Malacophagomyia kesselringi* Kano & Lopes, 1968: 303 (male, distribution, figs 1–5; Brazil, Paraíba, João Pessoa, Chaves Farm); Pape, 1996: 249 (catalog).

Male (Fig. 8). Body length = 6.3–6.5 mm (n = 3).

Character states are the same as in the previous description except as follows.

Head. Head length at antennal base 1.08 head length at vibrissal level. Parafacial and fronto-orbital plate with silvery microtomentum (Fig. 2); parafacial plate with row of setulae on upper half; frontal vitta dark brown; front at its narrowest point 0.22 head width; 6–7 frontal setae, outer vertical setae 0.3X the inner verticals and divergent; genal groove and genal dilation with silvery microtomentum; 8–9 subvibrissal setae; antenna brown, postpedicel with grayish microtomentum, length 0.28 head height; palpus brown with black setae on apical half.

Thorax. Scutellum with intermediate stripes with silvery-gray microtomentum; postpronotal lobe, notopleuron and anepisternum, katepisternum and anepimeron with spots of silvery-gray microtomentum. Chaetotaxy: dorsocentrals 3–4 (not well differentiated) + 4 (spaced to four, the two anterior setae smaller than the posteriors), intra-alars 2+2, supra-alars 1+3 (the middle pair stronger). Wing hyaline, tegula dark brown, whitish basicosta and brown veins, R<sub>1</sub> basally setulose on 1/2 of its length, R<sub>4+5</sub> setulose in proximal 0.6 of distance to crossvein r-m. Legs with middle femur with 2–3 anterior and 2–4 anteroventral setae; middle tibia with 1–2 anterodorsal setae; hind femur with rows of anterodorsal, anterior and anteroventral setae; hind tibia with 2 anterodorsal setae well differentiated, 1 anteroventral, and 2 posterodorsal setae; middle and hind femora somewhat villous basally; tarsi brown.

Abdomen. Reddish-brown; sternites exposed with silvery microtomentum; T1+2–T5 with latero-ventral and dorsal spots with silvery microtomentum; ST2–ST3 (and adjacent areas of tergites) with lateral villous setae; ST4

with a pair or tuft of black spine-like setae on posterior corners, bare medially; ST5 V-shaped, reddish-brown, arms of ST5 with tufts of strong black spine-like setae on its inner surface, and two long posterior lobes (Fig. 5).

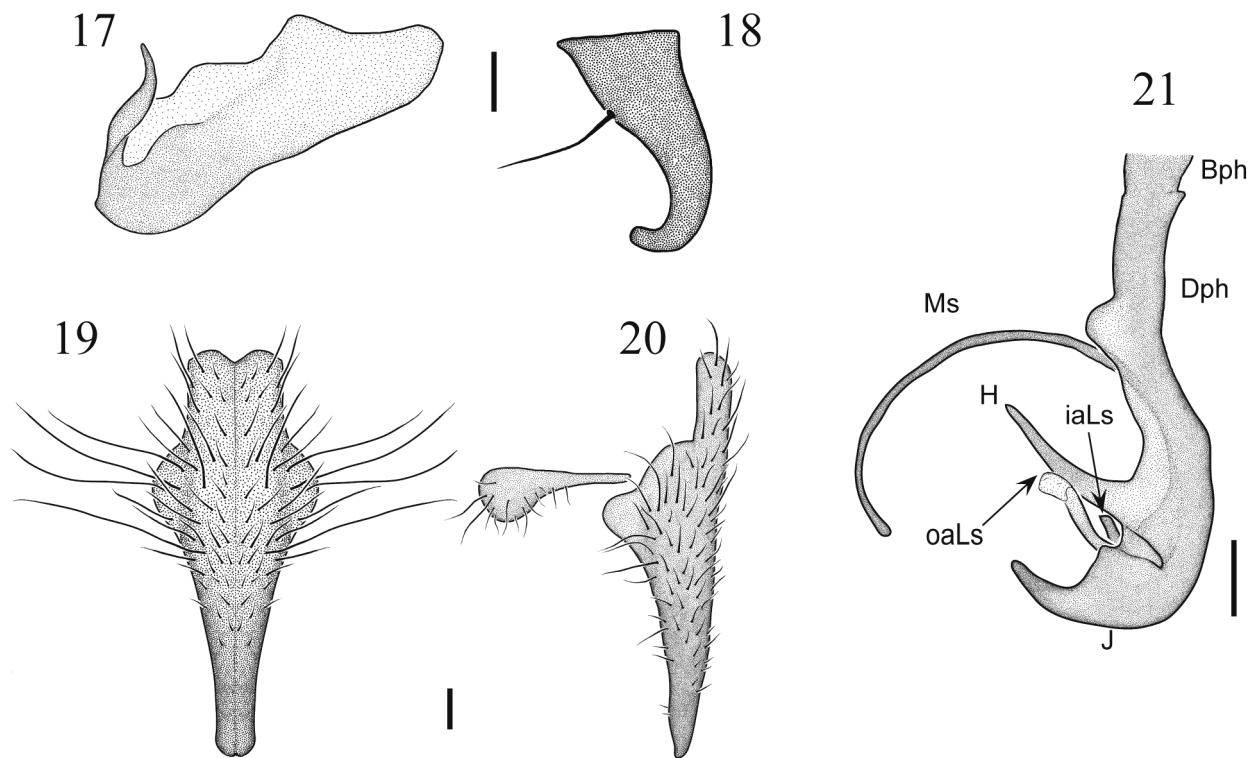
**Genitalia.** Syntergosternite 7+8 red, with a median spot of silver-yellowish microtomentum, having a marginal row of weak setae and some smaller black hair-like setae basally; epandrium reddish-orange with black hair-like setae; cerci long and narrowed in dorsal view, villous only on upper half margins, fused along its entire length with vestigial cercal prong (Fig. 19); cerci straight in profile (Fig. 20); surstyli small with rounded tip and villous setae (Fig. 20); pregonite strongly curved backward and pointed (Fig. 17); postgonite with one strong seta (Fig. 18); phallus without vesica; juxta (or apical plate) well developed and sclerotized, curved upward at the anterior margin (lateral view), juxta bifid in ventral (or apical) view (Fig. 21); lateral styli well developed and complex, composed of two arms or processes, a lateral (outer) membranous arm, and a well-sclerotized short inner arm (Fig. 21); median stylus greatly elongated and curved (lateral view), emerging dorsally to harpes; harpes well differentiated, sclerotized and pointed (Fig. 21).

Female. Unknown.

**Type material examined. Male holotype** (Fig. 9) (MNRJ), “Holotype [printed on red paper with black frame]” // “João Pessoa / Paraíba Br. [Brazil] / Chaves Farm. / Rokuro Kano / 17-II-68 [handwritten on white paper]” // “MNRJ [printed] / 2192 [handwritten on white paper with black frame]”. The holotype is in good condition, genitalia spread and totally exposed. **Male paratype** (MNRJ), “João Pessoa / Paraíba Br. [Brazil] / Chaves Farm. / Rokuro Kano / 17-II-68 [handwritten on white paper]” // “Paratype [printed on green paper with black frame]” // “N. [printed] 11.430 [handwritten] / Diptera / Inst. Oswaldo Cruz [printed on white paper]” The paratype has its abdomen partly extracted, structures of genitalia are dissected and cleared on a slide, otherwise in good condition. One slide, with abdominal ST3–5, pieces of abdominal tergites, cerci, and surstyli, phallus, pregonite, and postgonite belonging to the paratype, “N. [printed] 11.430 cx 192 [handwritten] / Diptera / Inst. Oswaldo Cruz [printed]” // “nr. 11.430 / cx. 192”.

**Other material examined. Brazil:** 1 male, from *Pommacea* sp., Pacatuba, Ceará, 350 m, 23-VII-1983, C.D. Freitas & H.C. Hime (MNRJ).

**Distribution.** Brazil (Ceará, Paraíba).



**FIGURES 17–21.** *Malacophagomyia kesselringi* Kano & Lopes, male genitalia. **17.** Pregonite, left lateral view. **18.** Postgonite, left lateral view. **19.** Cerci, posterior view. **20.** Cercus and surstylus, left lateral view. **21.** Phallus, left lateral view. Abbreviations: Bph, basiphallus; Dph, distiphallus; H, harpes; iaLs, inner arm of lateral stylus; J, juxta; Ms, median stylus; oaLs, outer arm of lateral stylus. Scale bars 0.1 mm.



**Remarks.** This species is externally similar to *M. filamenta* but differs in male genital morphology. Particularly, the shape of cerci, pregonite, and ST5 provide good diagnostic characters to separate these species. The rearing record of *M. kesselringi* obtained from *Pomacea* sp. is the first biological data obtained for this species.

***Malacophagomyia rivadavia* sp. nov.**

(Figs 3, 6, 22–29)

Male (Fig. 22). Body length = 8.8 mm.

Character states are the same as in the description of *M. filamenta* except as follows.

Head. Head length at antennal base 1.12 head length at vibrissal level. Parafacial and fronto-orbital plate with golden microtomentum, with a narrow strip of gray microtomentum near eye (Fig. 3); parafacial plate with a few setulae on upper half; frontal vitta brownish; front at its narrowest point 0.23 head width; 7 frontal setae; outer vertical setae 0.3X the inner vertical and divergent; genal groove and genal dilation with golden microtomentum; 8 subvibrissal setae; antenna black, postpedicel black with grayish microtomentum, length 0.27 head height; palpus blackish with black setae on the apical half.

Thorax. Scutellum with intermediate stripes with silvery-gray and one spot of golden microtomentum at posterior margin; postpronotal lobe, notopleuron and anepisternum with spots of yellowish-golden microtomentum; katepisternum and anepimeron with spots of silvery-gray microtomentum; Chaetotaxy: dorsocentrals 3–4 (not well differentiated) + 4 (spaced to four, the two anterior setae smaller than the posteriors), intra-alars 2+2 (anterior pair weak), supra-alars 1+3 (the middle pair stronger). Wing hyaline, tegula pale orange-brown, yellowish basicosta and dark brown veins,  $R_1$  basally setulose on 2/3 of its length,  $R_{4+5}$  setulose in proximal 0.8 of distance to crossvein r-m, Legs with middle femur with 2 anterior and 2 anteroventral setae; middle tibia with 2 anterodorsal setae; hind femur with rows of anterodorsal, anterior and anteroventral setae; hind tibia with a row of anterodorsal setae, 1 anteroventral seta, and 2 posterodorsal setae; middle and hind femora and tibiae somewhat villous; tarsi blackish.

Abdomen. Black; sternites exposed with silvery microtomentum; T1+2–T5 dorsally with silvery microtomentum; T1+2–T4 with latero-ventral spots of silvery microtomentum; T5 with latero-ventral part reddish, with lateral spots of light golden microtomentum; ST2–ST3 with lateral setae; ST4 with tufts of black spine-like setae on posterior corners, bare medially; ST5 V-shaped, reddish-brown, arms of ST5 with tufts of strong black spine-like setae on its inner surface (Fig. 6).

Genitalia. Syntergosternite 7+8 black, with a median spot of golden microtomentum, having a marginal row of setae and some smaller black hair-like setae basally; epandrium reddish-orange with black hair-like setae; cerci densely villous, with cercal prong fused (Fig. 27); cerci slightly curved forward in profile (Fig. 28); surstyli black, broad and rounded, with villous setae (Fig. 28); pregonite with sclerotized and bifid apex (Fig. 25); postgonite somewhat long with one strong seta (Fig. 26); phallus without vesica; juxta (or apical plate) well developed and sclerotized, curved upward in the anterior margin over the lateral styli (lateral view) (Figs 24, 29); lateral styli well developed and complex, composed of membranous lateral (outer) arms, and well sclerotized and long inner stylets (Figs 24, 29); median stylus greatly elongated and curved in lateral view; harpes well differentiated and spatulate (Figs 24, 29).

**Type material. Male holotype** (Fig. 23) (MACN): “Argentina, San Juan, / Rivadavia FCEfYn / S 31° 32' 34.11" / W 68° 34' 38.22" / 674 msnm 25-I-2006 / Muestra 18 tt Cerdo 1 / col: F. Aballay [printed on white label]” // “*Malacophagomyia rivadavia* / HOLOTYPE / Mulieri det. 2010 [printed on red label]”. The holotype is in good condition, left mid leg glued on card below the specimen.

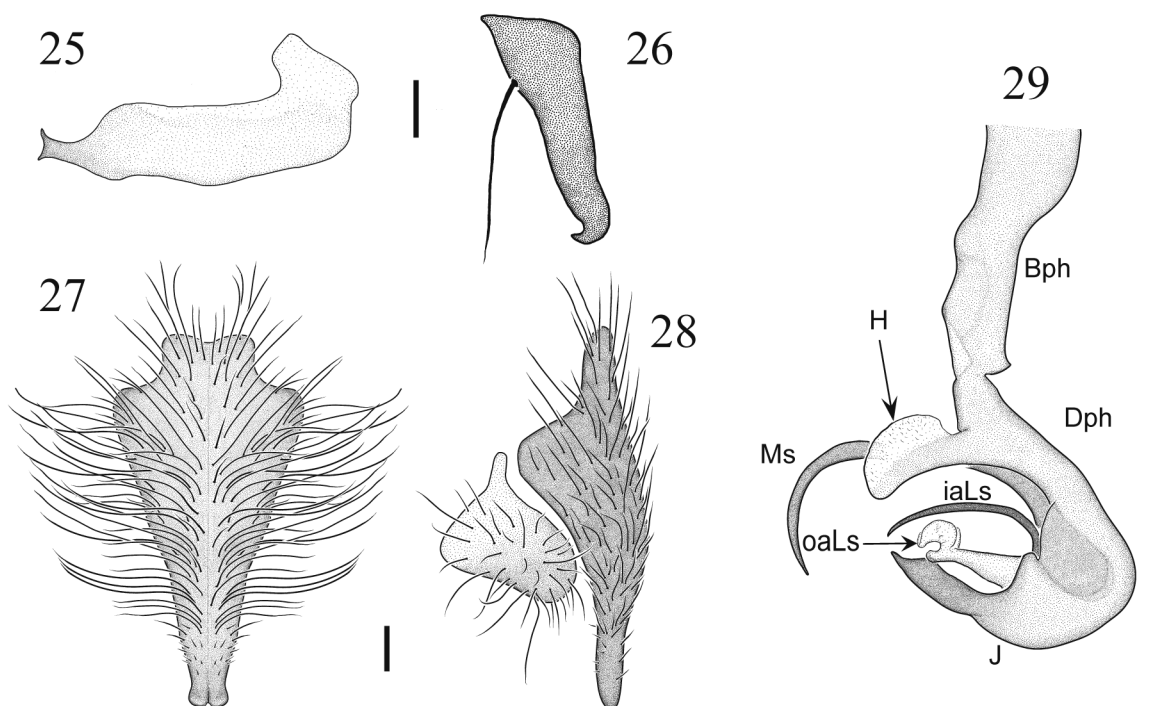
**Distribution.** Argentina (San Juan).

**Etymology.** A noun in apposition, referring to the name of the locality where the specimen was collected.

**Remarks.** *Malacophagomyia rivadavia* has the juxta apically more enlarged than in the other species of the genus. Additionally, the shape of its pregonite is not apically curved, as occurs in the other congeneric species. This new species constitutes the first record of the genus in a xeric biome from temperate areas of southern South America. The holotype of *M. rivadavia* was obtained during a forensic field experiment on a pig carcass.



**FIGURES 22–24.** *Malacophagomyia rivadavia* n. sp., holotype (MACN). Scale bar 1 mm. **22.** Male habitus, holotype. **23.** Original labels of the holotype. **24.** Phallus. Abbreviations Bph, basiphallus; H, harpes; iaLs, inner arm of lateral stylus; J, juxta; Ms, median stylus; oaLs, outer arm of lateral stylus. Scale bar 0.1 mm.



**FIGURES 25–29.** *Malacophagomyia rivadavia* n. sp., **25.** Pregonite, left lateral view. **26.** Postgonite, left lateral view. **27.** Cerci, posterior view. **28.** Cercus and surstylus, left lateral view. **29.** Phallus, left lateral view. Abbreviations: Bph, basiphallus; Dph, distiphallus; H, harpes; iaLs, inner arm of lateral stylus; J, juxta; Ms, median stylus; oaLs, outer arm of lateral stylus. Scale bars 0.1 mm.

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