



New host records and descriptions of five new species of *Myrsidea* Waterston, 1915 (Phthiraptera: Menoponidae) from passerine birds (Aves: Passeriformes)

MICHEL P. VALIM^{1,4}, ROGER D. PRICE² & KEVIN P. JOHNSON³

¹Zoology-Bird Division, The Field Museum, 1400 South Lake Shore Drive, Chicago, Illinois 60605, USA.

E-mail: mpvalim@hotmail.com

²1409 Burnham Court, Fort Smith, Arkansas 72903, USA. E-mail: rpricelice2@aol.com

³Illinois Natural History Survey, University of Illinois, 1816 South Oak Street, Champaign, Illinois 61820, USA.

E-mail: kjohnson@inhs.uiuc.edu

⁴Corresponding author

Abstract

Three species of previously described *Myrsidea* from the birds *Lochmias nematura obscurata* Cabanis, *Automolus ochrolaemus* (Tschudi, 1844) (both Furnariidae) and *Pachyrhamphus cinnamomeus* Lawrence, 1861 (Cotingidae) are redescribed, including new host and geographical records. Five new species of *Myrsidea* from the Neotropics are described and illustrated. These species and their type hosts are: *M. waterstoni* n. sp. from *Anabacerthia variegaticeps* (Sclater), *M. meyi* n. sp. from *Syndactyla subalaris* (Sclater) (Furnariidae), *M. dalgleishi* n. sp. from *Glyphorhynchus spirurus* (Vieillot) (Dendrocolaptidae), *M. cicchinoi* n. sp. from *Rhynchocyclus olivaceus* (Temminck) (Tyrannidae), and *M. castroae* n. sp. from *Atlapetes albinucha gutturalis* (Lafresnaye) (Emberizidae). Sequences of a portion of the mitochondrial cytochrome oxidase I (COI) gene for four of these new species were highly divergent from those of other species of *Myrsidea*.

Key words: *Myrsidea*, chewing lice, new species, new host records, redescrptions, Neotropics, phylogeny, taxonomy

Introduction

Myrsidea Waterston, 1915 is the most speciose genus of parasitic lice (Phthiraptera) with about 350 described species (Sychra 2010). Members of this genus parasitize species of Passeriformes, Piciformes, and Apodiformes. This paper describes five new species of *Myrsidea* from Neotropical songbirds (Aves: Passeriformes) and reports new morphological and distributional data for three other species previously described.

In the following descriptions, all measurements are in millimeters. Abbreviations are: DHS, dorsal head setae (*sensu* Clay, 1969); TW, temple width; HL, head length at midline; PW, prothorax width; PSPL, prosternal plate length; MW, metathorax width; MSPL, metasternal plate length; AWIV, abdomen width at segment IV; ANW, female anus width; GL, male genitalia length; GSL, male genital sclerite length; and TL, total length. Host classification below the ordinal level follows Dickinson (2003).

Most of the holotypes and paratypes of the new species are deposited in the collection of the Illinois Natural History Survey (INHS), Champaign, Illinois, USA. Where indicated, some types are deposited in the Museu de Zoologia, Universidade de São Paulo, Brazil (MZUSP). Other specimens studied are held in the Field Museum of Natural History, Chicago, Illinois, USA (FMNH) and in the Museum für Naturkunde, Humboldt-Universität, Berlin, Germany (MNHU). Sequences from a portion of the mitochondrial cytochrome oxidase I (COI) gene were obtained from each of the new species with methods described by Johnson *et al.* (2002) and compared to sequences of other *Myrsidea* spp. to assess the genetic distinctiveness of each new species.

***Myrsidea* Waterston, 1915**

Type species. *Myrsidea victrix* Waterston, 1915, by original designation.

A thorough characterization of this genus may be found in Clay (1966) and in papers referring to some of the host groups treated herein (Dalglish & Price 2005; Price *et al.* 2005; Price & Dalglish, 2007).

***Myrsidea strobilisternata* Eichler, 1956**

(Figs. 1–2, 15, 18)

Type host. *Lochmias nematura obscurata* Cabanis, 1873—the Sharp-tailed Streamcreeper (Furnariidae).

Female (n = 1). Habitus as in Fig. 1. Hypopharynx reduced, DHS10, 0.06 long; DHS11, 0.11 long. Gula with 5+6 setae on each side. Metanotum slightly enlarged, posterior margin rounded with 14 setae. Metasternal plate and postspiracular setae not observed. Tergites I–IV enlarged, posterior margin of tergite I damaged, tergite II rounded, III with median convexity, and IV rounded. With conspicuous median gap in each tergal setal row. Tergal setae: I, 17; II, 18; III, 23; IV, 19; V, 17; VI, 14; VII–VIII, 6. Sternal setae: II, each aster of 4 setae, posterior margin with 17 and anteriorly with at least 2; III, 27; IV, ~24; V, 32; VI, 35; VII, 26; VIII–IX with 10 marginal and 13 anterior setae. Dimensions: TW, 0.45; HL, 0.29; PW, 0.28; PSPL, 0.12; MW, 0.48; MSPL, 0.18; AWIV, 0.58; ANW, 0.20; TL, 1.53.

Male (n = 2). Habitus as in Fig. 2. DHS10, 0.05 long; DHS11, 0.98 long. Gula with 4 (rarely 5 on one side) setae on each side. Metanotum with 8 setae on posterior margin, metasternal plate with 6 setae, as in Fig. 18. Setae of femoral brush, 12–15. Metanotum and abdomen as in Fig. 10. Tergal setae: I, 11–14; II, 14; III, 15–16; IV, 14–15; V, 12–14; VI, 10–12; VII, 10–12; VIII, 8–10. Conspicuous median gap in each tergal setal row. Postspiracular setae shortest (0.11–0.12) on III, V and VI, longer (0.18) on I, and extremely long (0.30–0.39) on II, IV, VII and VIII. Sternal setae: II, each aster of 4 setae, posterior margin with 12–13 and anteriorly with 5–6; III, 18–19; IV, 24; V, 26–27; VI, 26–29; VII, 19–20; VIII, 10. Genital sac sclerite similar to that of *M. ochrolaemi* (Fig. 12). Dimensions: TW, 0.39–0.40; HL, 0.28; PW, 0.26; PSPL, 0.10–0.12; MW, 0.34–0.35; MSPL, 0.14–0.15; AWIV, 0.43–0.44; GL, 0.40–0.41; GSL, 0.07; TL, 1.23–1.24.

Material examined. Female holotype (WEC 3910a), ex *Lochmias nematura obscurata*, Bolivia: no precise locality, no date, B. Garlepp leg. (O. Sychra pers. comm.) deposited in MNHU. Two males and 1 nymph, ex *Lochmias nematura*, Peru: Cuzco, 20 km NW Pilcopata, elev. 900 m, 29 November 1985, D.H. Clayton coll., at FMNH.

Remarks. This species is unique among *Myrsidea* from furnariids by having a reduced hypopharynx and only 4 setae in each aster. The most distinctive characters of the male of *M. strobilisternata* are the shape of the metasternal plate (Fig. 18), the chaetotaxy of the metanotum (with only 8 setae on the posterior margin), and the chaetotaxy of tergites VII–VIII (Fig. 15).

***Myrsidea ochrolaemi* Sychra, 2007**

(Figs. 3–6, 9–12, 16, 19)

Type host. *Automolus ochrolaemus* (Tschudi, 1844) – the Buff-throated Foliage-gleaner (Furnariidae).

Female (n = 23). Habitus as in Figs. 3, 4. Hypopharynx fully developed, DHS10, 0.05 long; DHS11, 0.10 long. Gula with 4 setae on each side (rarely 3 or 5 on one side). Metanotum with 11–17 setae on posterior margin. Metanotum and abdomen as in Fig. 9. Tergites unmodified, of similar size, with conspicuous median gap in each tergal setal row limited to segments IV–VIII. Postspiracular setae shortest (0.10–0.14) on III, V and VI, longer (0.22) on I, and extremely long (0.32–0.58) on II, IV, VII and VIII. Each pleurite III–VII with about 5–7 short marginal setae. Anus with 40–47 ventral fringe setae, 38–48 dorsal.

The following chaetotaxic and morphometric data for female specimens are given separately for each host species:

From *Automolus ochrolaemus* (n = 6): Setae of femoral brush, 13–17. Tergal setae: I, 24–31; II, 26–31; III, 26–29; IV, 23–31; V, 19–26; VI, 18–24; VII, 15–20; VIII, 8–12. Sternal setae: II, each aster of 5 setae (rarely 4 on one

side), posterior margin with 10–12 and anteriorly with 8–10; III, 23–29; IV, 41–45; V, 41–48; VI, 40–42; VII, 19–24; VIII–IX with 12–14 marginal and 17–22 anterior setae. Dimensions: TW, 0.47–0.50; HL, 0.33–0.34; PW, 0.32–0.35; PSPL, 0.12; MW, 0.49–0.56; MSPL, 0.16–0.17; AWIV, 0.65–0.69; ANW, 0.25–0.27; TL, 1.57–1.67.

From *Automolus infuscatus* (Sclater, 1856) (n = 4): Setae of femoral brush, 12–17. Tergal setae: I, 26–30; II, 25–30; III, 26–28; IV, 22–29; V, 20–24; VI, 20–21; VII, 17–19; VIII, 10–13. Sternal setae: II, each aster of 5 setae, posterior margin with 10–12 and anteriorly with 7–8; III, 22–29; IV, 39–42; V, 40–45; VI, 36–40; VII, 22–25; VIII–IX with 12–15 marginal and 20–22 anterior setae. Dimensions: TW, 0.46–0.48; HL, 0.33; PW, 0.31–0.32; PSPL, 0.12; MW, 0.47–0.51; MSPL, 0.15–0.17; AWIV, 0.63–0.67; ANW, 0.24–0.27; TL, 1.46–1.55.

From *Anabacerthia variegaticeps* (Sclater, 1857) (n = 1): Setae of femoral brush, 14–15. Tergal setae: I, 35; II, 37; III, 29; IV, 28; V–VI, 22; VII, 17; VIII, 8. Sternal setae: II, each aster of 5 setae, posterior margin with 11 and anteriorly with 7; III, 25; IV, 46; V, 47; VI, 40; VII, 21; VIII–IX with 17 marginal and 22 anterior setae. Dimensions: TW, 0.50; HL, 0.34; PW, 0.32; PSPL, 0.13; MW, 0.54; MSPL, 0.17; AWIV, 0.70; ANW, 0.28; TL, 1.74.

Male (n = 20). Habitus as in Figs. 5–6. Gula with 4 setae on each side (rarely 3 or 5 on one side). Metanotum with 11–13 setae on posterior margin, metasternal plate with 6–8 setae, as in Fig. 19. Metanotum and abdomen as in Fig. 10. With conspicuous median gap in each tergal setal row limited to segments III–VIII. Postspiracular setae as for female. Genitalia as in Fig. 11, broad sac sclerite with concave lateral projections as in Fig. 12.

The following chaetotaxic and morphometric data for male specimens are given separately for each host species:

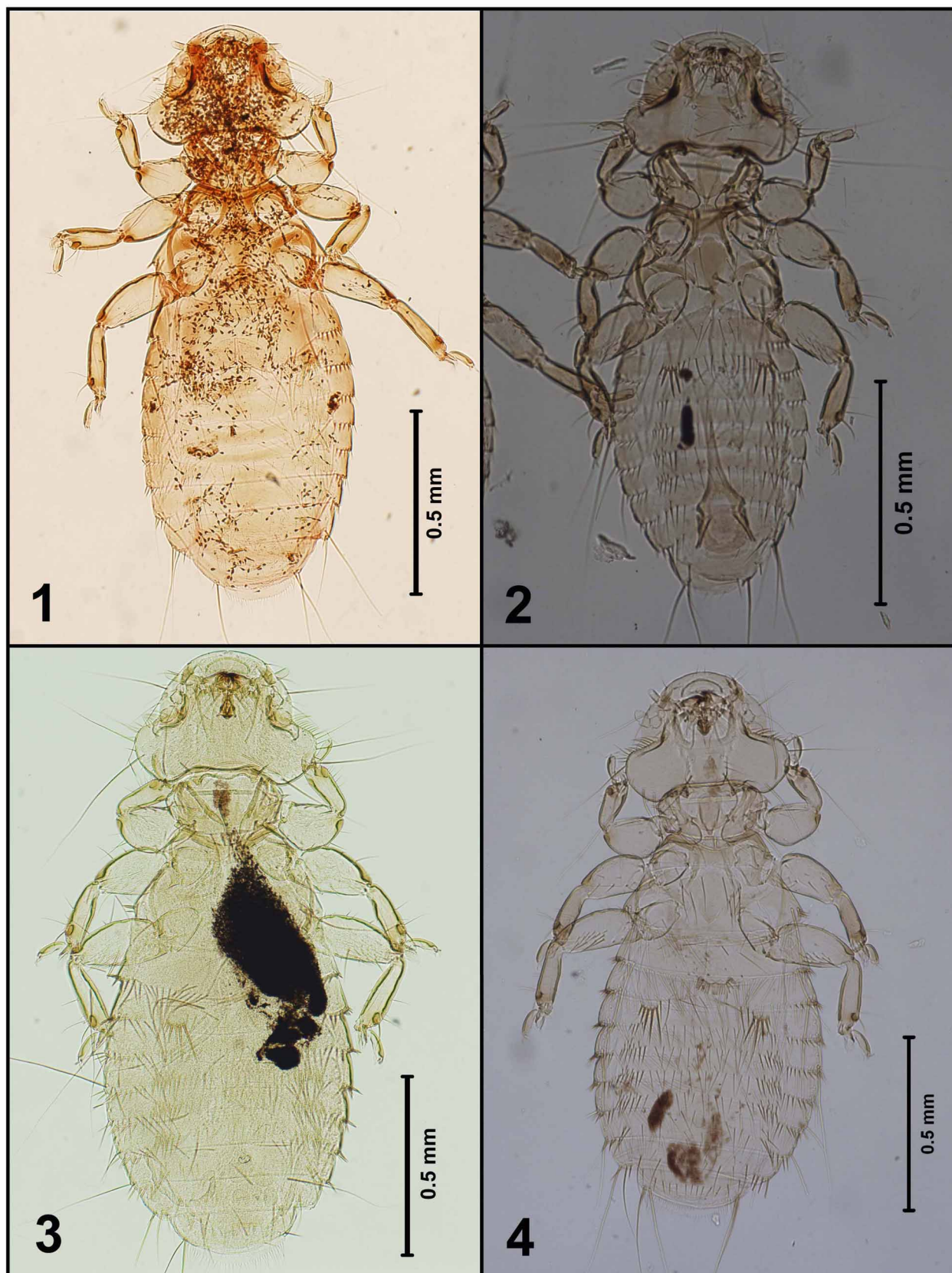
From *Automolus ochrolaemus* (n = 6): Setae of femoral brush, 12–13. Tergal setae: I, 19–22; II, 20–23; III–IV, 19–24; V, 19–21; VI, 17–20; VII, 16–19; VIII, 10–13. Sternal setae: II, each aster of 5 setae (rarely 4 or 6 on one site), posterior margin with 11–15 and anteriorly with 8–13; III, 21–25; IV, 29–36; V, 31–35; VI, 29–34; VII, 20–25; VIII, 10–12. Dimensions: TW, 0.44–0.46; HL, 0.30–0.32; PW, 0.30–0.31; PSPL, 0.10–0.12; MW, 0.40–0.43; MSPL, 0.13–0.14; AWIV, 0.49–0.52; GL, 0.42–0.48; GSL, 0.07–0.08; TL, 1.33–1.42.

From *Automolus infuscatus* (n = 4): Setae of femoral brush, 12–14. Tergal setae: I, 17–23; II, 19–22; III, 19–24; IV, 19–21; V, 18–20; VI, 18–21; VII, 17–19; VIII, 10–12. Sternal setae: II, each aster of 5 setae, posterior margin with 11–13 and anteriorly with 8–9; III, 19–21; IV, 27–31; V, 29–32; VI, 27–32; VII, 20–23; VIII, 11–14. Dimensions: TW, 0.42–0.43; HL, 0.28–0.31; PW, 0.28–0.30; PSPL, 0.10–0.11; MW, 0.37–0.39; MSPL, 0.13–0.15; AWIV, 0.47–0.49; GL, 0.42–0.45; GSL, 0.06–0.07; TL, 1.27–1.31.

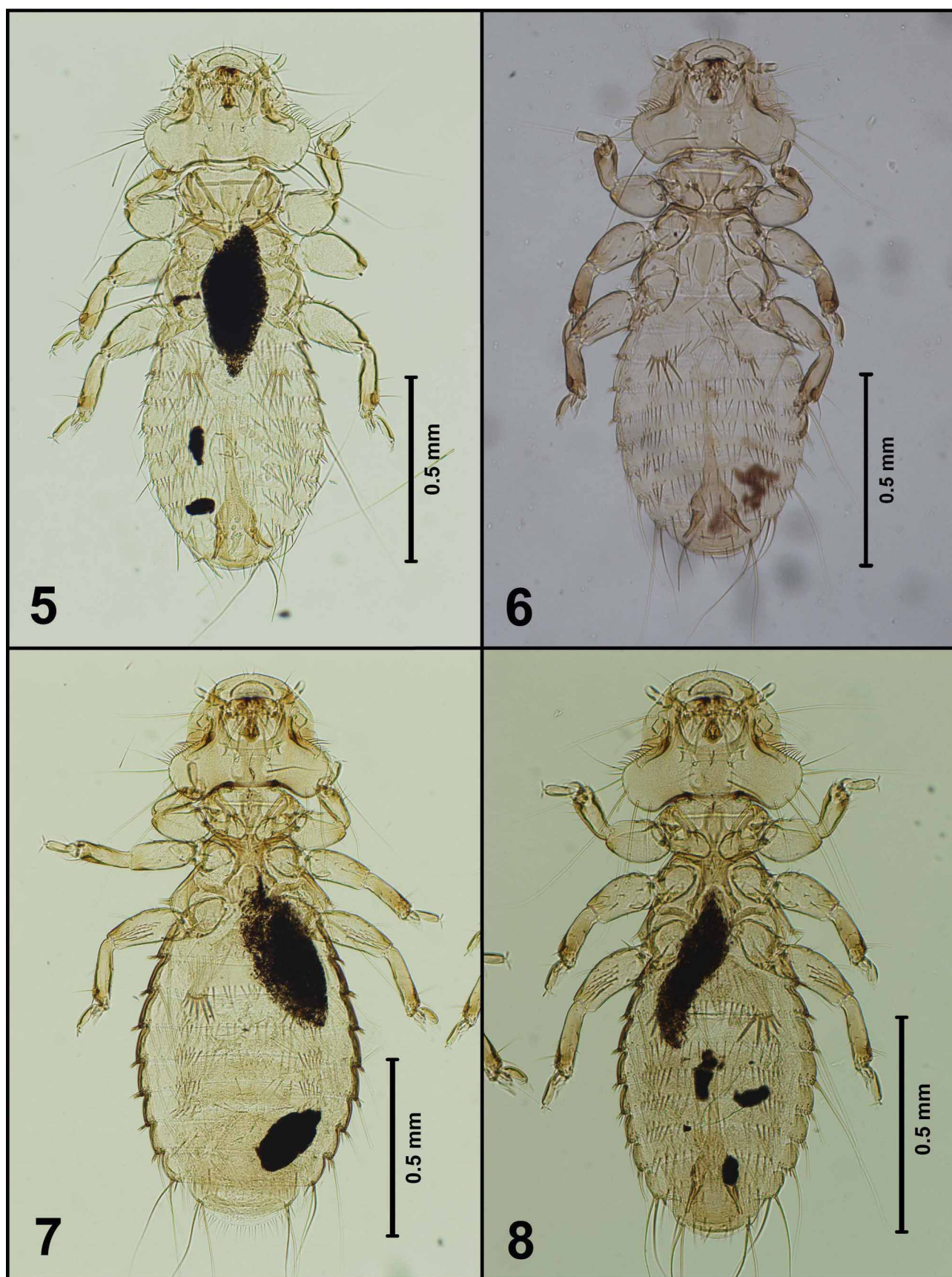
From *Anabacerthia variegaticeps* (n = 1): Setae of femoral brush, 12–14. Tergal setae: I, 22; II, 24; III–IV, 23; V–VI, 19; VII, 18; VIII, 11. Sternal setae: II, each aster of 5 setae, posterior margin with 12 and anteriorly with 11; III, 19; IV, 31; V, 34; VI, 29; VII, 22; VIII, 11. Dimensions: TW, 0.45; HL, 0.31; PW, 0.30; PSPL, 0.12; MW, 0.43; MSPL, 0.12; AWIV, 0.50; GL, 0.46; GSL, 0.07; TL, 1.38.

Material examined. 3 females (one female DNA voucher Myp.Auoch.5.1.2006.16), ex *Automolus ochrolaemus exsertus* Bangs, 1901, JMD867 FMNH# 410611, Panama: Charco Azul, 2 March 2006, K.P. Johnson coll.; 1 male and 1 female, ex *A. ochrolaemus exsertus*, JMD874 FMNH# 410616, Panama: Charco Azul, 2 March 2006, K.P. Johnson coll.; 1 male and 2 females, ex *A. ochrolaemus*, Fisher #1088, Costa Rica: Puntarenas, Monte Anivo Lodge, 13Km N. Portero Grande, 16 March 1995, R.C. Dalgleish coll.; 1 male and 2 females, ex *A. ochrolaemus*, Peru: ExplorNapa Camp, Rio Nafa, SE Iquitos, 15 June 1989, R.C. Dalgleish coll.; 3 males and 1 female, ex *A. ochrolaemus*, Fisher and JS #3082, Costa Rica: San Jose, Tinamaste, 12 km SW San Isidro de El General, 1 February 2000, R.C. Dalgleish coll.; 4 males and 4 females, ex *A. ochrolaemus*, Peru: Madre de Dios, Cerro de Pantia-colla, elev. 1030 m, above Palotoa river, 26 August 1985, D.H. Clayton coll., at FMNH; 1 male and 5 nymphs, ex *A. ochrolaemus*, #85-128, Peru: Madre de Dios, Hda. Amazonia, near Atalaya Ridge, elev. 550 m, 8 August 1985, D.H. Clayton coll., at FMNH; 8 males and 9 females, ex *A. infuscatus*, Venezuela: Edo. Bolívar, 60 km E Sta. Elena, January 1987, R.C. Dalgleish coll.; 1 male and 1 female, ex *Anabacerthia variegaticeps*, JK06-241, Panama: Fortuna, 25 February 2006, K.P. Johnson coll. Two pairs from *A. ochrolaemus* (no number, from Iquitos, Peru; and #3082, from San Jose, Costa Rica) in MZUSP, remaining specimens in INHS.

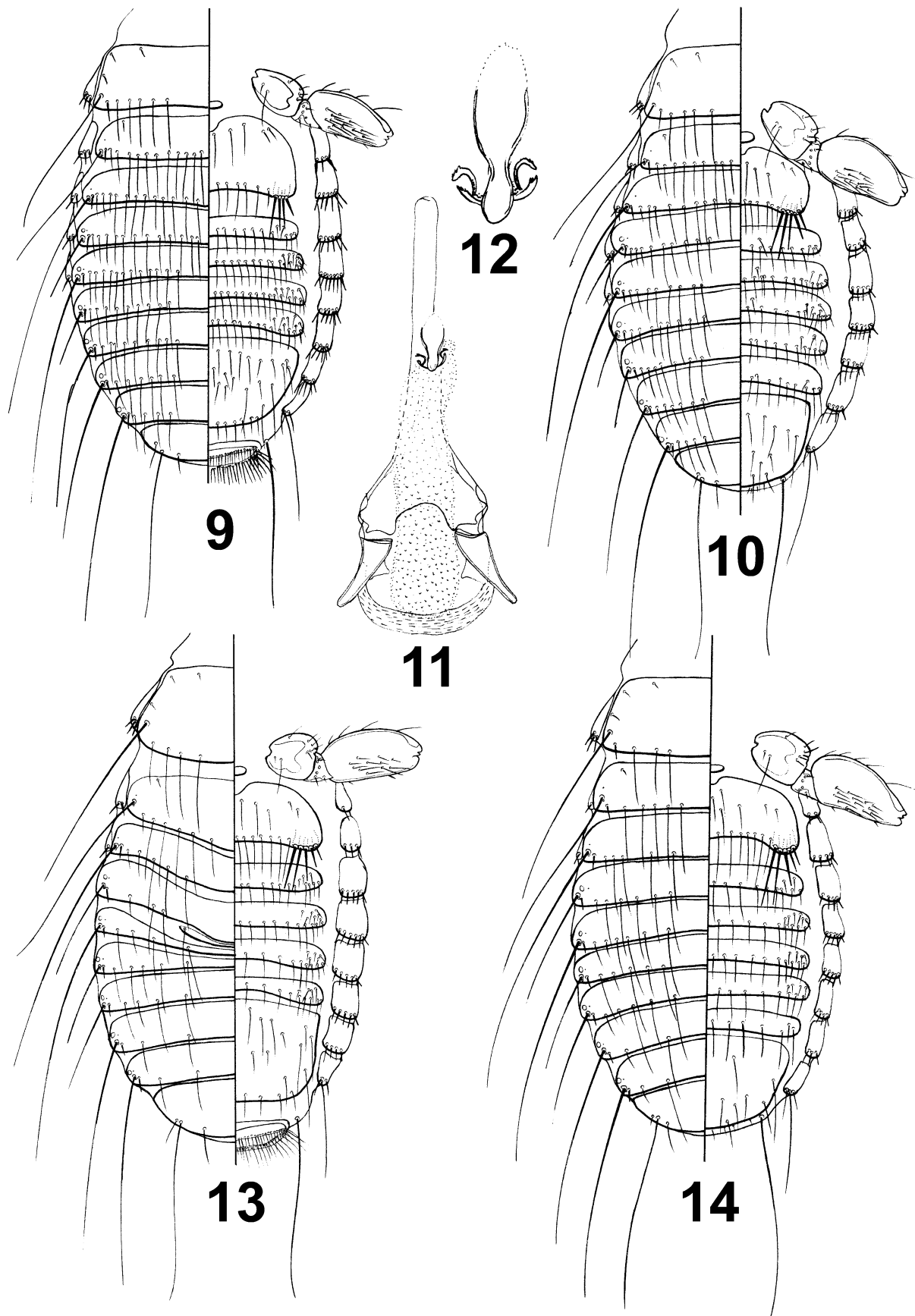
Remarks. This species was recently described (Sychra in Sychra *et al.* 2007). Although its description is precise enough to recognize the species, the original drawings were published in such small size and low quality that it is difficult to accurately interpret some structures. Therefore, we included new drawings for this species in order to avoid misidentifications resulting from incorrect interpretations of the original illustrations. Furthermore, due to our finding of this louse species on host species other than the type host, we have provided some chaetotaxic and morphometric data separately for specimens from the other hosts.



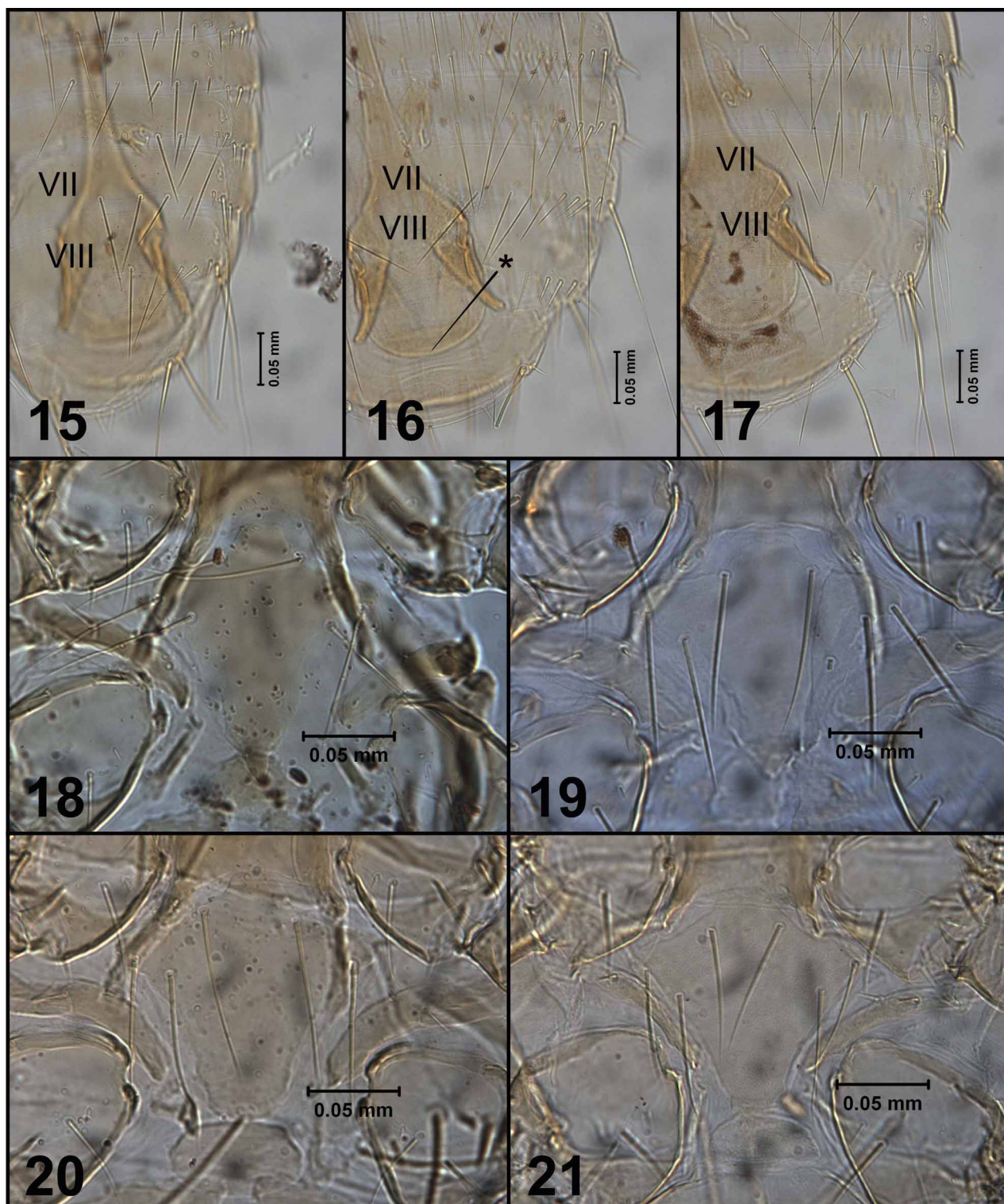
FIGURES 1–4. *Myrsidea strobiloesternata*: (1) female holotype; (2) male. *Myrsidea ochrolaemi*: (3) female holotype; (4) additional female from *Automolus ochrolaemus*.



FIGURES 5–8. *Myrsidea ochrolaemi*: (5) male paratype; (6) additional male from *Automolus ochrolaemus*. *Myrsidea calvi*: (7) female holotype; (8) male paratype.



FIGURES 9–14. *Myrsidea ochrolaemi*: (9) metathorax and dorsoventral abdomen of female; (10) metathorax and dorsoventral abdomen of male; (11) male genitalia; (12) male genital sac sclerite. *Myrsidea waterstoni* n. sp.: (13) metathorax and dorsoventral abdomen of female; (14) metathorax and dorsoventral abdomen of male.



FIGURES 15–21. Dorsal view of *Myrsidea* male terminalia: (15) *M. strobiloesternata*; (16) *M. ochrolaemi* from *Anabacerthia variegaticeps*; (17) *M. waterstoni* n. sp. Metasternal plate and sternite I of males: (18) *M. strobiloesternata*; (19) *M. ochrolaemi*; (20) *M. waterstoni* n. sp.; (21) *M. meyi* n. sp. Asterisk indicates an inferred tergal seta.

***Myrsidea waterstoni* Valim, Price & Johnson n. sp.**

(Figs. 13–14, 20, 24–25)

Type host. *Anabacerthia variegaticeps* (Sclater, 1857)—the Scaly-throated Foliage-gleaner (Furnariidae).

Female (n = 1). Habitus as in Fig. 24. Hypopharynx fully developed, DHS10, 0.07 long; DHS11, 0.11 long. Gula with 4 setae on each side. Metanotum with 10 setae on posterior margin. Setae of femoral brush, 11–14. Metanotum and abdomen as in Fig. 13. Tergite I enlarged with medioposterior convexity resulting in distortion of tergites II–V. Tergite III with slender posterior detached plate bearing its medial postero-tergal pair of setae, and compressing tergites IV–V medially. Tergites VI–VIII unmodified and of similar size. With conspicuous median gap in each tergal setal row. Tergal setae: I, 14; II, 15; III, 12; IV, 13; V, 14; VI, 11; VII–VIII, 8. Postspiracular setae shortest (0.11–0.21) on III, V and VI, and extremely long (0.34–0.44) on I, II, IV, VII and VIII. Sternal setae: II, each aster of 5 setae, posterior margin with 14 and anteriorly with 10; III, 27; IV, 35; V, 28; VI, 24; VII, 16; VIII–IX with 6 marginal and 6 anterior setae. Each pleurite III–VII with about 5–6 short marginal setae. Anus with 34 ventral fringe setae, 31 dorsal. Dimensions: TW, 0.49; HL, 0.35; PW, 0.29; PSPL, 0.11; MW, 0.46; MSPL, 0.14; AWIV, 0.58; ANW, 0.22; TL, 1.51.

Male (n = 1). Habitus as in Fig. 25. Gula with 3 setae on each side. Metanotum with 10 setae on posterior margin, metasternal plate with 5 setae, as in Fig. 5. Setae of femoral brush, 13. Metanotum and abdomen as in Fig. 14. Tergal setae: I, 13; II, 14; III, 16; IV–V, 15; VI, 13; VII–VIII, 8. Conspicuous median gap in each tergal setal row. Postspiracular setae as for female. Sternal setae: II, each aster of 5 setae, posterior margin with 15 and anteriorly with 10; III, 21; IV–V, 31; VI, 24; VII, 14; VIII, 4. Genital sac sclerite similar to that of *M. ochrolaemi*, much as in Fig. 12. Dimensions: TW, 0.47; HL, 0.33; PW, 0.31; PSPL, 0.11; MW, 0.41; MSPL, 0.14; AWIV, 0.52; GL, 0.44; GSL, 0.07; TL, 1.41.

Type material. Female holotype (DNA voucher Mysp.Anvar.5.1.2006.4), ex *Anabacerthia variegaticeps*, JMD 780 FMNH# 410612, Panama: Fortuna, 25 February 2006, K.P. Johnson coll. Paratype: 1 male, same data as holotype.

Remarks. The female of *M. waterstoni* **n. sp.** can be easily distinguished from other species of *Myrsidea* found on furnariids (e.g. *M. strobilisternata*, *M. calvi* Sychra, 2007, and *M. ochrolaemi*) by the presence of a detached plate on tergite III. In the male, the most distinctive morphological character is the chaetotaxy of tergites VII–VIII (see Figs. 15–17).

Etymology. This species is named after James Waterston (1879–1930), in honor of his description of the genus *Myrsidea*.

Myrsidea meyi Valim, Price and Johnson **n. sp.**

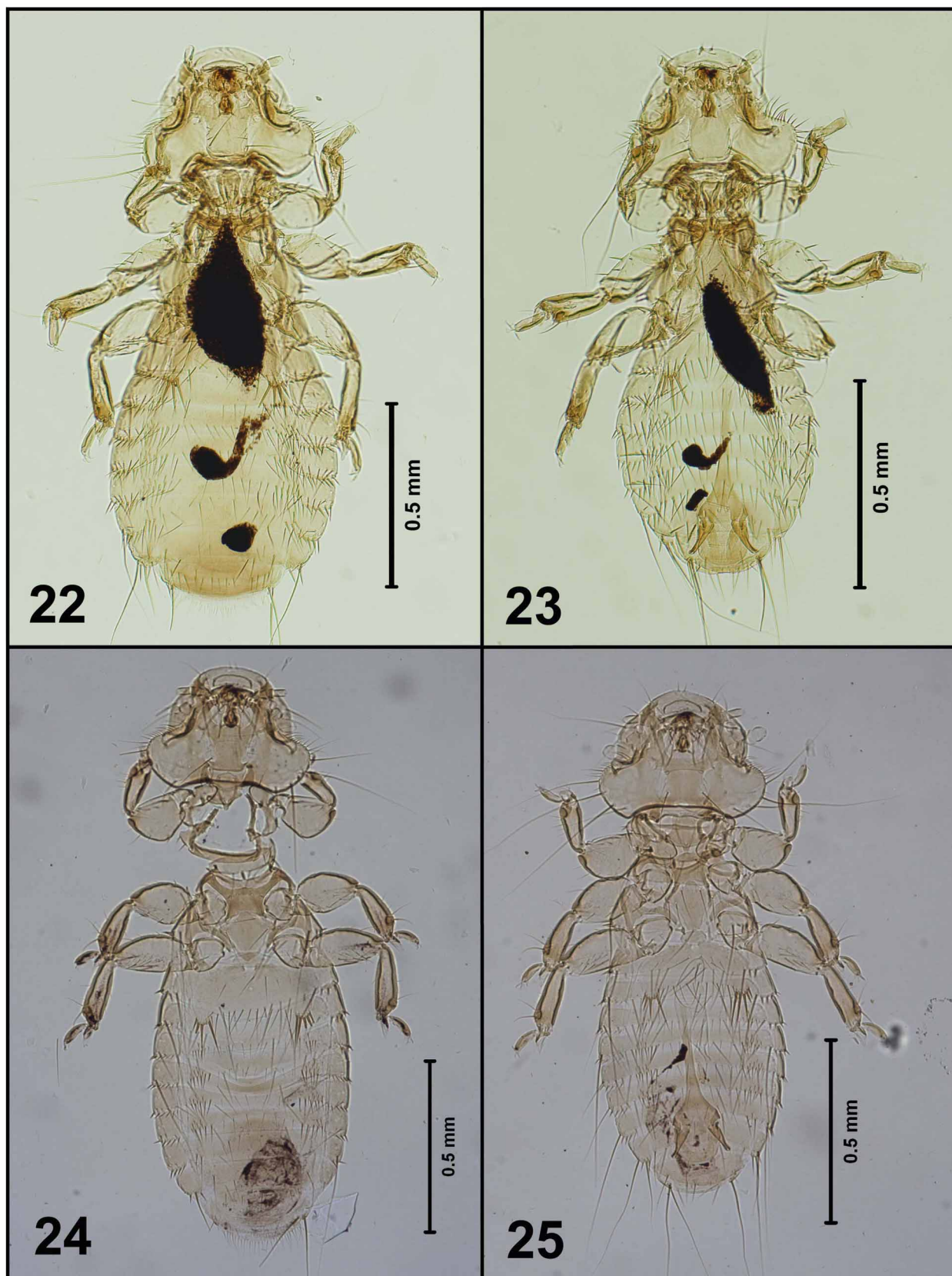
(Figs. 21, 26–27, 30–32)

Type host. *Syndactyla subalaris* (Sclater, 1859)—the Lineated Foliage-gleaner (Furnariidae).

Female (n = 1). Habitus as in Fig. 26. Hypopharynx fully developed, DHS10, 0.08 long; DHS11, 0.11 long. Gula with 4 setae on each side. Metanotum with 7 setae on posterior margin. Setae of femoral brush, 14. Metanotum and abdomen as in Fig. 30. Metanotum enlarged posteriorly, tergite I divided into two pieces, one on each side of the metanotum, tergites II–IV with median setae finer and placed anteriorly from the posterior margin, tergite V compressed by IV with setae on its posterior margin, tergites VI–VII unmodified and of similar size. With conspicuous median gap in each tergal setal row. Tergal setae: I, 10; II, 16; III, 17; IV–VI, 18; VII, 12; VIII, 6. Postspiracular setae shortest (0.11–0.15) on III, V and VI, and extremely long (0.30–0.43) on I, II, IV, VII and VIII. Sternal setae: II, each aster of 5 setae, posterior margin with 13 and anteriorly with 10; III, 25; IV, 31; V, 30; VI, 25; VII, 19; VIII–IX with 13 marginal and 12 anterior setae. Each pleurite III–VII with about 5–7 short marginal setae. Anus with 36 ventral fringe setae, 31 dorsal. Dimensions: TW, 0.49; HL, 0.34; PW, 0.31; PSPL, 0.12; MW, 0.50; MSPL, 0.15; AWIV, 0.65; ANW, 0.24; TL, 1.54.

Male (n = 2). Habitus as in Fig. 27. Gula with 4 setae on each side (one paratype with 3 on each side). Metanotum with 6 setae on posterior margin, metasternal plate with 6 setae as in Fig. 21. Setae of femoral brush, 11–14. Metanotum and abdomen as in Fig. 31. Conspicuous median gap in each tergal setal row. Tergal setae: I, 6–7; II, 13–14; III, 14–16; IV, 15–16; V, 16; VI, 14–15; VII, 9–11; VIII, 8. Postspiracular setae as for female. Sternal setae: II, each aster of 5 setae, posterior margin with 8–11 and anteriorly with 8; III, 20–22; IV, 22–24; V, 22–25; VI, 22–24; VII, 14–15; VIII, 6–9. Genital sac sclerite as in Fig. 32. Dimensions: TW, 0.45; HL, 0.31; PW, 0.29–0.30; PSPL, 0.10–0.11; MW, 0.39–0.41; MSPL, 0.13; AWIV, 0.49; GL, 0.42–0.46; GSL, 0.06; TL, 1.23–1.33.

Type material. Female holotype, ex *Syndactyla subalaris*, JK06-276, Panama: Palo Seco, 25 February 2006, K.P. Johnson coll. Paratypes: 1 male, same data as holotype; 1 male (DNA voucher Mysp.Syub.5.1.2006.3), same data as holotype except JK06-325, 27 February 2006. One male paratype (JK06-325) at MZUSP.



FIGURES 22–25. *Myrsidea souleyetii*: (22) female holotype; (23) male paratype. *Myrsidea waterstoni* n. sp.: (24) female holotype; (25) male paratype.

Other specimens. 1 nymph (DNA voucher Mysp.Sysub.6.6.2007.2), same data as holotype; 1 nymph (DNA voucher Mysp.Sysub.6.6.2007.4), same data as holotype except JK06-325, 27 February 2006.

Remarks. Females of *M. meyi* **n. sp.** are morphologically separable from the other species found on furnariids (e.g. *M. strobilisternata*, *M. calvi*, *M. ochrolaemi*, and *M. waterstoni* **n. sp.**) by the division of tergite I into two lateral pieces (entire in other species) and by the placement of setal insertions on tergal segments II–IV on the middle portion of segments instead of on the posterior margin. Males are unique in the reduction of number and size of setae on tergite I (Fig. 31).

Etymology. This species is named after Eberhard Mey (Naturhistorisches Museum im Thüringer Landesmuseum Heidecksburg, Rudolstadt, Germany), in recognition of his contributions to the taxonomy of lice.

***Myrsidea dalglishi* Valim, Price & Johnson n. sp.**

(Figs. 28–29, 33–35)

Type host. *Glyphorynchus spirurus* (Vieillot, 1819)—the Wedge-billed Woodcreeper (Dendrocolaptidae).

Female (n = 3). Habitus as in Fig. 28. Hypopharynx fully developed, DHS10, 0.03 long; DHS11, 0.09 long. Gula with 4 setae on each side (rarely 5 on one side). Metanotum with 9–11 setae on posterior margin. Setae of femoral brush, 11–14. Metanotum and abdomen as in Fig. 33. Tergites of similar size, tergite I with very slight medioposterior convexity. With a conspicuous median gap in each tergal setal row. Tergal setae: I, 10–13; II, 12–14; III, 14–17; IV, 13–15; V, 14–16; VI, 14–15; VII, 11–12; VIII, 9–10. Postspiracular setae shortest (0.11–0.17) on III, V, VI and VII, and extremely long (0.24–0.38) on I, II, IV, and VIII. Sternal setae: II, each aster of 3 setae (rarely 4 on one side), posterior margin with 11–14 and anteriorly with 7–8; III, 18–22; IV, 22–24; V, 25–27; VI, 19–21; VII, 8–10; VIII–IX with 9–10 marginal and 7–9 anterior setae. Each pleurite III–VII with about 4–5 short marginal setae. Anus with 30–34 ventral fringe setae, 30–34 dorsal. Dimensions: TW, 0.41; HL, 0.28–0.29; PW, 0.24–0.25; PSPL, 0.10; MW, 0.37–0.39; MSPL, 0.13–0.14; AWIV, 0.50–0.51; ANW, 0.18–0.20; TL, 1.29–1.36.

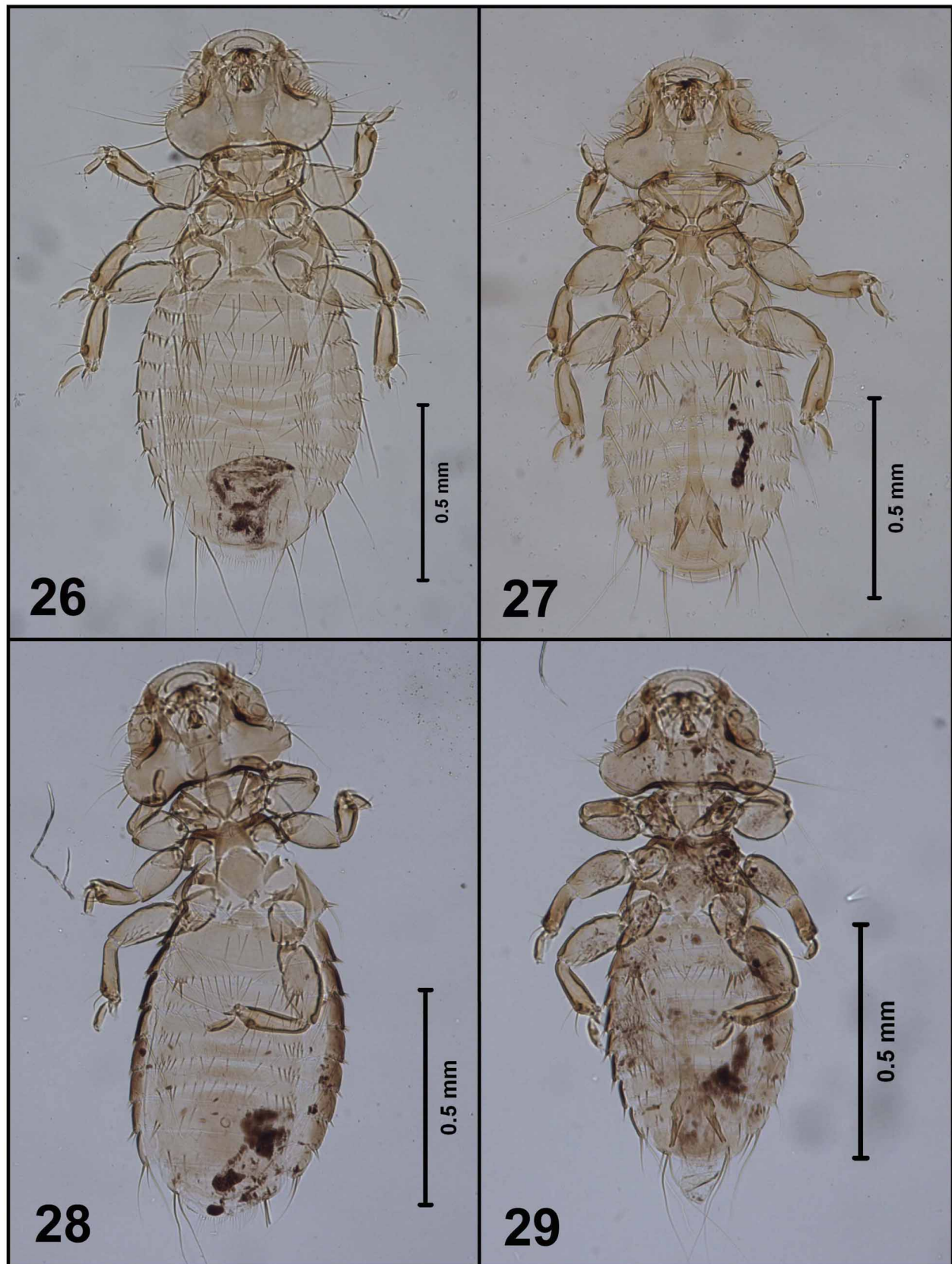
Male (n = 3). Habitus as in Fig. 29. Gula with 4 setae on each side. Metanotum with 6–10 setae on posterior margin, metasternal plate with 6 setae. Setae of femoral brush, 10–11. Metanotum and abdomen as in Fig. 34. Tergal setae: I, 10–12; II, 11–12; III–IV, 12–13; V, 12; VI, 10–12; VII, 9–10; VIII, 8. A conspicuous median gap in each tergal setal row. Postspiracular setae as for female. Sternal setae: II, each aster of 3 setae (rarely 4 on one site), posterior margin with 12 and anteriorly with 7; III, 17; IV, 18–20; V, 21–22; VI, 18–19; VII, 9–10; VIII, 5–6. Genital sac sclerite as in Fig. 35, rounded apically, without lateral projections. Dimensions: TW, 0.39; HL, 0.26; PW, 0.23–0.24; PSPL, 0.09; MW, 0.32–0.33; MSPL, 0.12; AWIV, 0.40–0.41; GL, 0.35–0.36; GSL, 0.09–0.10; TL, 1.07–1.09.

Type material. Holotype female, ex *Glyphorynchus spirurus*, Costa Rica: San Jose, Tinamaste, 12 km SW San Isidro de El General, 1 February 2000, R.C. Dalglish, Fisher & JS #3078. Paratypes: 2 males and 2 females, same data as holotype. One pair of paratypes at MZUSP.

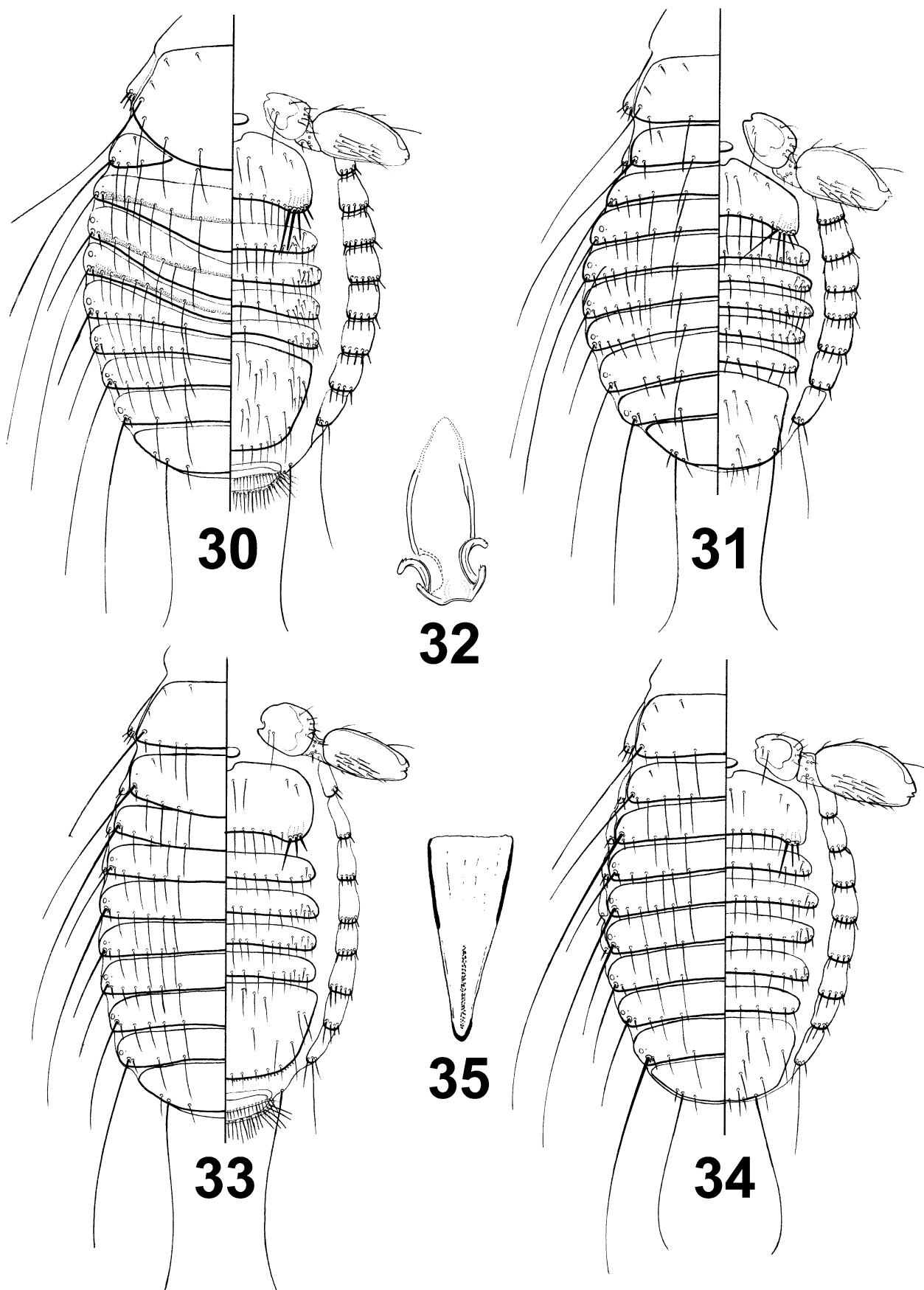
Additional material. 1 male and 1 nymph, ex *G. spirurus*, #1103, PERU: Madre de Dios, Cerro de Pantiacolla, elev. 680 m, 16 November 1985, D.H. Clayton coll., at FMNH; 1 nymph, ex *G. spirurus*, same data except 9 November 1985, at FMNH.

Remarks. *Myrsidea dalglishi* **n. sp.** can be easily distinguished from *M. souleyetii* Sychra, 2007 (Figs. 22, 23) by its smaller measurements and by the length of postspiracular setae on VII in both sexes (long in *M. souleyetii*). Males can be distinguished by sternite VII with reduced number of setae (20 setae in *M. souleyetii*), curvature of parameres (strongly curved in *M. souleyetii*), and the distinct male genital sclerites. This new species was previously found by Sychra *et al.* (2007) on *G. spirurus* also in Costa Rica, but it was regarded as “*Myrsidea* sp. 2” after the examination and description of only one female specimen. The color pattern described by those authors is also present in our specimens of *M. dalglishi* **n. sp.** (see Figs. 28, 29).

Etymology. This species is named after Robert C. Dalglish (1940–2009) in recognition of his contributions to the taxonomy of lice, especially his efforts in studying the genus *Myrsidea*.



FIGURES 26–29. *Myrsidea mейi* n. sp.: (26) female holotype; (27) male paratype. *Myrsidea dalgleishi* n. sp.: (28) female holotype; (29) male paratype.



FIGURES 30–35. *Myrsidea meyi* n. sp.: (30) metathorax and dorsoventral abdomen of female; (31) metathorax and dorsoventral abdomen of male; (32) male genital sac sclerite. *Myrsidea dalgleishi* n. sp.: (33) metathorax and dorsoventral abdomen of female; (34) metathorax and dorsoventral abdomen of male; (35) male genital sac sclerite.

***Myrsidea cicchinoi* Valim, Price & Johnson n. sp.**

(Figs. 36–37, 42–44)

Type host. *Rhynchocyclus olivaceus* (Temminck, 1820)—the Olivaceous Flatbill (Tyrannidae).

Female (n = 4). Habitus as in Fig. 36. Hypopharynx fully developed, DHS10, 0.02 long; DHS11, 0.08 long. Gula with 4 setae on each side (rarely 3 or 5 on one side). Metanotum with 8–9 setae on posterior margin. Setae of femoral brush, 12–16. Metanotum and abdomen as in Fig. 42. Tergites unmodified, of similar size. With conspicuous median gap in each tergal setal row. Tergal setae: I, 12–15; II, 13–17; III, 16–18; IV, 14–18; V, 16; VI, 12–15; VII, 8–9; VIII, 8. Postspiracular setae shortest (0.30–0.37) on I, III, V, and VI, and longer (0.40–0.50) on II, IV, VII and VIII. Sternal setae: II, each aster of 4 setae (rarely 3 on one side), posterior margin with 15–16 and anteriorly with 9; III, 24–30; IV, 28–32; V, 32–40; VI, 26–35; VII, 10–15; VIII–IX with 10–12 marginal and 9–10 anterior setae. Each pleurite III–VII with about 6–7 short marginal setae. Anus with 36–42 ventral fringe setae, 36–44 dorsal. Dimensions: TW, 0.48–0.49; HL, 0.32–0.34; PW, 0.31–0.32; PSPL, 0.11–0.12; MW, 0.45–0.46; MSPL, 0.15; AWIV, 0.59–0.65; ANW, 0.24–0.25; TL, 1.62–1.68.

Male (n = 2). Habitus as in Fig. 37. Gula with 4 setae on each side. Metanotum with 9 setae on posterior margin, metasternal plate with 6 setae. Metanotum and abdomen as in Fig. 43. Setae of femoral brush, 12–14. Tergal setae: I, 11; II, 15; III, 16; IV, 15; V, 11; VI, 13; VII–VIII, 8. Conspicuous median gap in each tergal setal row. Postspiracular setae as for female. Sternal setae: II, each aster of 4 setae, posterior margin with 13 and anteriorly with 9; III, 22; IV–V, 29; VI, 25; VII, 12; VIII, 7. Genital sac sclerite as in Fig. 44, rounded apically and with thin subapical lateral projections. Dimensions: TW, 0.46; HL, 0.32; PW, 0.32; PSPL, 0.11; MW, 0.39; MSPL, 0.14; AWIV, 0.49; GL, 0.46; GSL, 0.10; TL, 1.35.

Type material. Holotype female, ex *Rhynchocyclus olivaceus*, GMS 1838, Panama: Lago Bayano, 13 February 2006, K.P. Johnson coll. Paratypes: 1 male (DNA voucher Mysp.Rholi.6.6.2007.7), same data as holotype; 2 females (one female DNA voucher Mysp.Rholi.6.6.2007.6), same data as holotype, except GMS 1776, 12 February 2006; 1 male and 1 female (male DNA voucher Mysp.Rholi.4.24.2006.3), same data as holotype, except GMS 1809, 12 February 2006. One pair of paratypes (GMS 1809) at MZUSP.

Remarks. This species belongs to the “*pitangi* species group” (*sensu* Price *et al.* 2005), being easily distinguished from others of the group by the presence of an extra spiniform seta on the lateral margin of tergites II–VIII, as well as the lateral seta associated with the post-spiracular seta, *sensu* Clay (1970) in both sexes (Figs. 42, 43). In females, tergites I–II are practically unmodified, and in males the genital sac sclerite (Fig. 44) is slightly different from that of *M. flaviventris* Price, Hellenthal & Dalglish, 2005 (see their fig. 12).

Etymology. This species is named after Armando C. Cicchino (Universidad Nacional de Mar del Plata, Mar del Plata, Argentina) in recognition of his many contributions to louse taxonomy, especially taxa from South America.

***Myrsidea cinnamomei* Dalglish & Price, 2005**

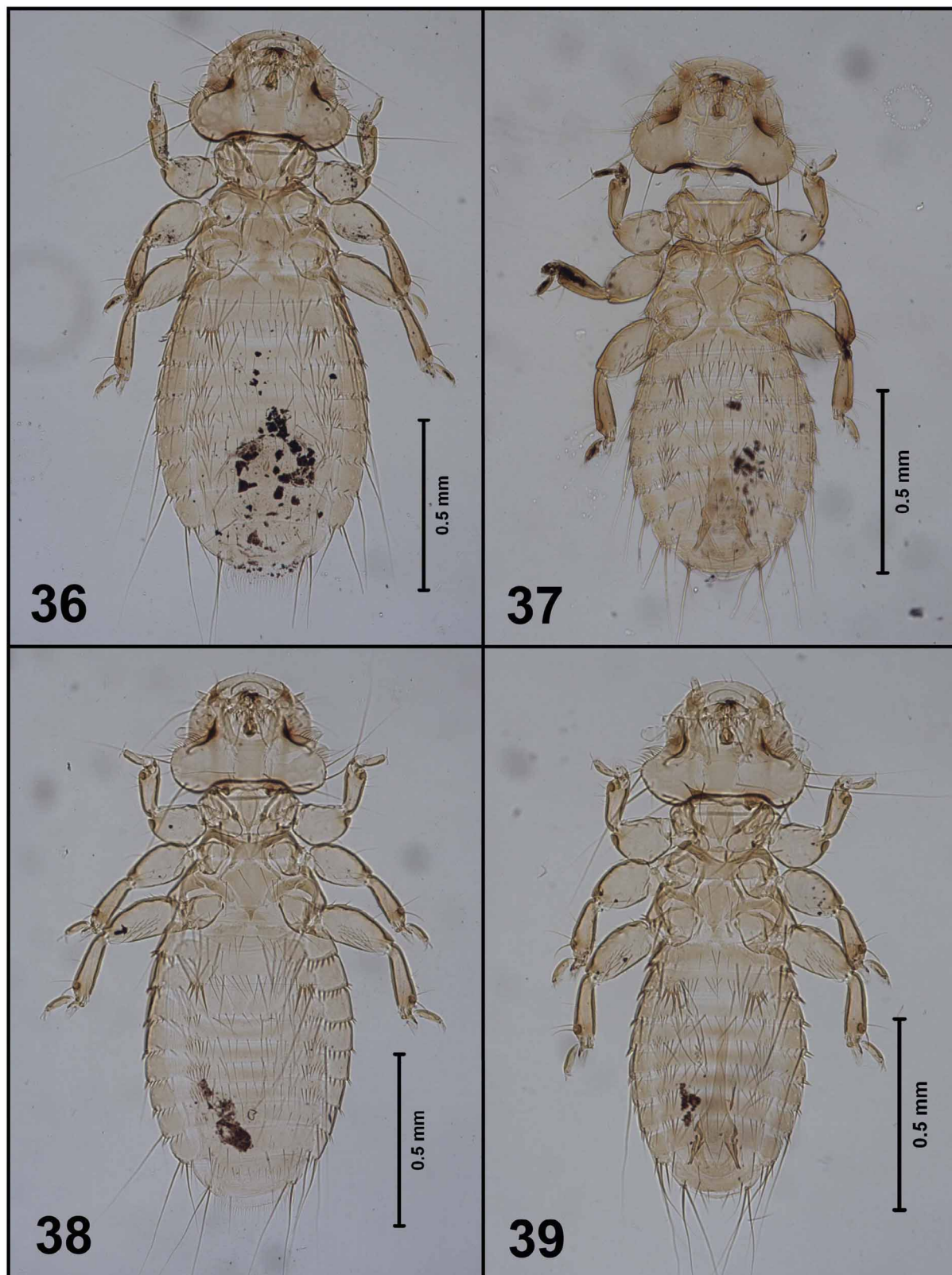
(Fig. 38–39, 45)

Type host. *Pachyramphus cinnamomeus* Lawrence, 1861 – the Cinnamon Becard (Cotingidae).

Female (n = 2). Habitus as in Fig. 38. Hypopharynx fully developed, DHS10, 0.06 long; DHS11, 0.10 long. Gula with 5 setae on each side. Metanotum with 11–13 setae on posterior margin. Setae of femoral brush, 23–25. Tergite I enlarged with broadly rounded medioposterior prolongation resulting in distortion of tergites II–IV. Tergites V–VIII unmodified and of similar size. With conspicuous median gap in each tergal setal row. Tergal setae: I, 14–19; II, 17–18; III, 16–18; IV, 17–18; V, 15–16; VI, 11–14; VII, 8–11; VIII, 8. Postspiracular setae shortest (0.17–0.19) on III, V and VI, and extremely long (0.28–0.54) on I, II, IV, VII and VIII. Sternal setae: II, each aster of 4 setae (one specimen with 5 on both sides), posterior margin with 19 and anteriorly with 7; III, 23–26; IV, 37–40; V, 43–45; VI, 34–38; VII, 14–17; VIII–IX with 11–13 marginal and 9–10 anterior setae. Each pleurite III–VII with about 6–10 short marginal setae. Anus with 37 ventral fringe setae, 36–41 dorsal. Dimensions: TW, 0.45–0.48; HL, 0.34–0.35; PW, 0.30; PSPL, 0.12–0.13; MW, 0.46–0.47; MSPL, 0.18; AWIV, 0.60–0.63; ANW, 0.23–0.25; TL, 1.57–1.62.

Male (n = 1). Habitus as in Fig. 39. Gula with 5 setae on each side. Metanotum with 10 setae on posterior margin, metasternal plate with 6 setae. Setae of femoral brush, 20–21. Tergal setae: I, 10; II–III, 16; IV, 14; V, 16; VI,

15; VII, 12; VIII, 8. Conspicuous median gap in each tergal setal row. Postspiracular setae as for female. Sternal setae: II, each aster of 4 setae (rarely 5 on one side), posterior margin with 14 and anteriorly with 8; III, 21; IV, 34; V, 37; VI, 31; VII, 19; VIII, 6. Genital sac sclerite as in Fig. 45. Dimensions: TW, 0.44; HL, 0.30; PW, 0.29; PSPL, 0.11; MW, 0.40; MSPL, 0.15; AWIV, 0.47; GL, 0.43; GSL, 0.10; TL, 1.36.



FIGURES 36–39. *Myrsidea cicchinioi*: (36) female holotype; (37) male paratype. *Myrsidea cinnamomei*: (38) female; (39) male.

Material examined. 1 male and 1 female (female DNA voucher Mysp.Pahom.4.24.2006.4), ex *Pachyramphus homochrous* Sclater, 1859, GMS 1814, Panama: Lago Bayano, 16 February 2006, K.P. Johnson coll. 1 female, same data, except GMS 1815.

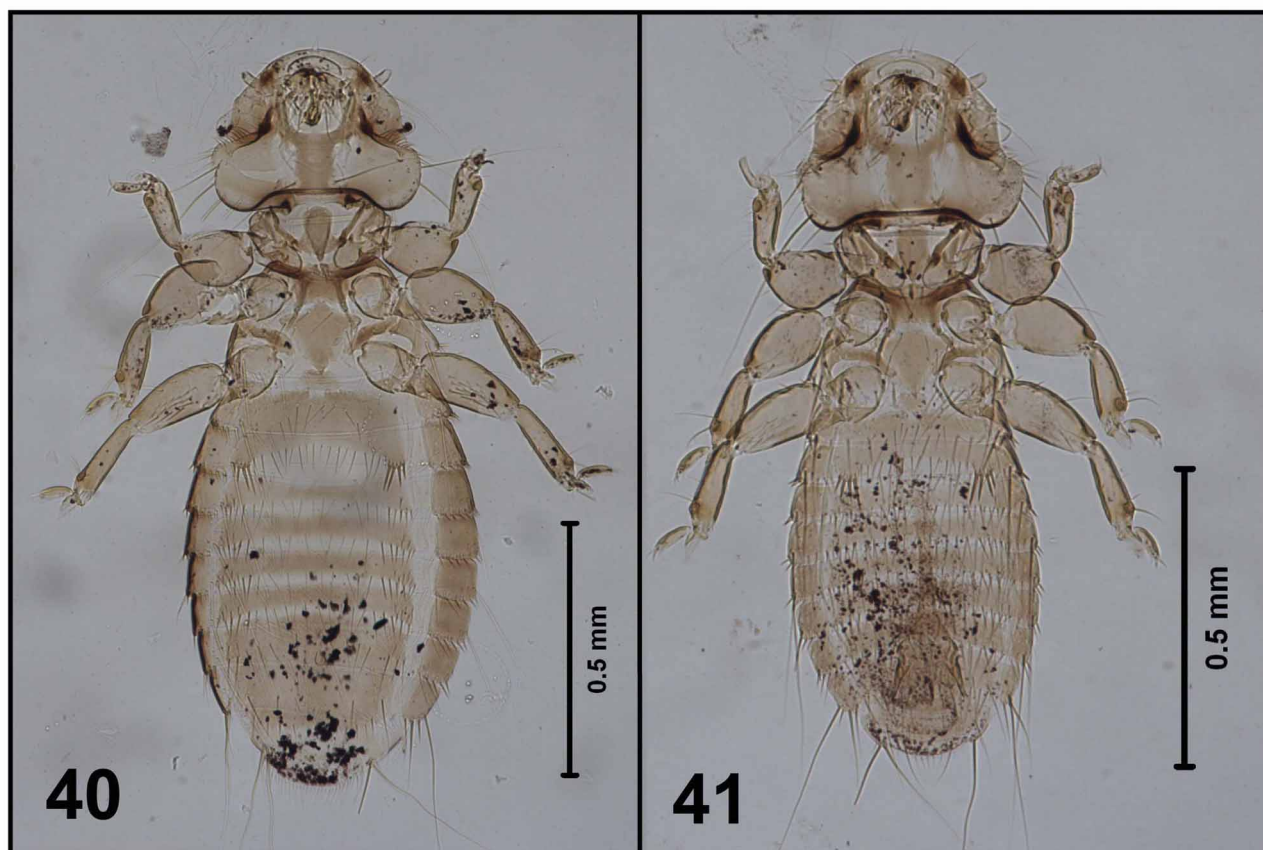
Remarks. This species was described by Dalglish & Price (2005) from 8 specimens collected on *Pachyramphus cinnamomeus* from Costa Rica. It is herein redescribed to add new data based on material from an additional host species, in particular the variability in the shape of the genital sac sclerite of the male (compare Fig. 45 with fig. 3 in Dalglish & Price 2005). In other aspects, our 3 specimens from *P. homochrous* agree with the original description of *M. cinnamomei*. This sample represents a new host-association and a new geographical record for this louse species.

***Myrsidea castroae* Valim, Price and Johnson n. sp.**

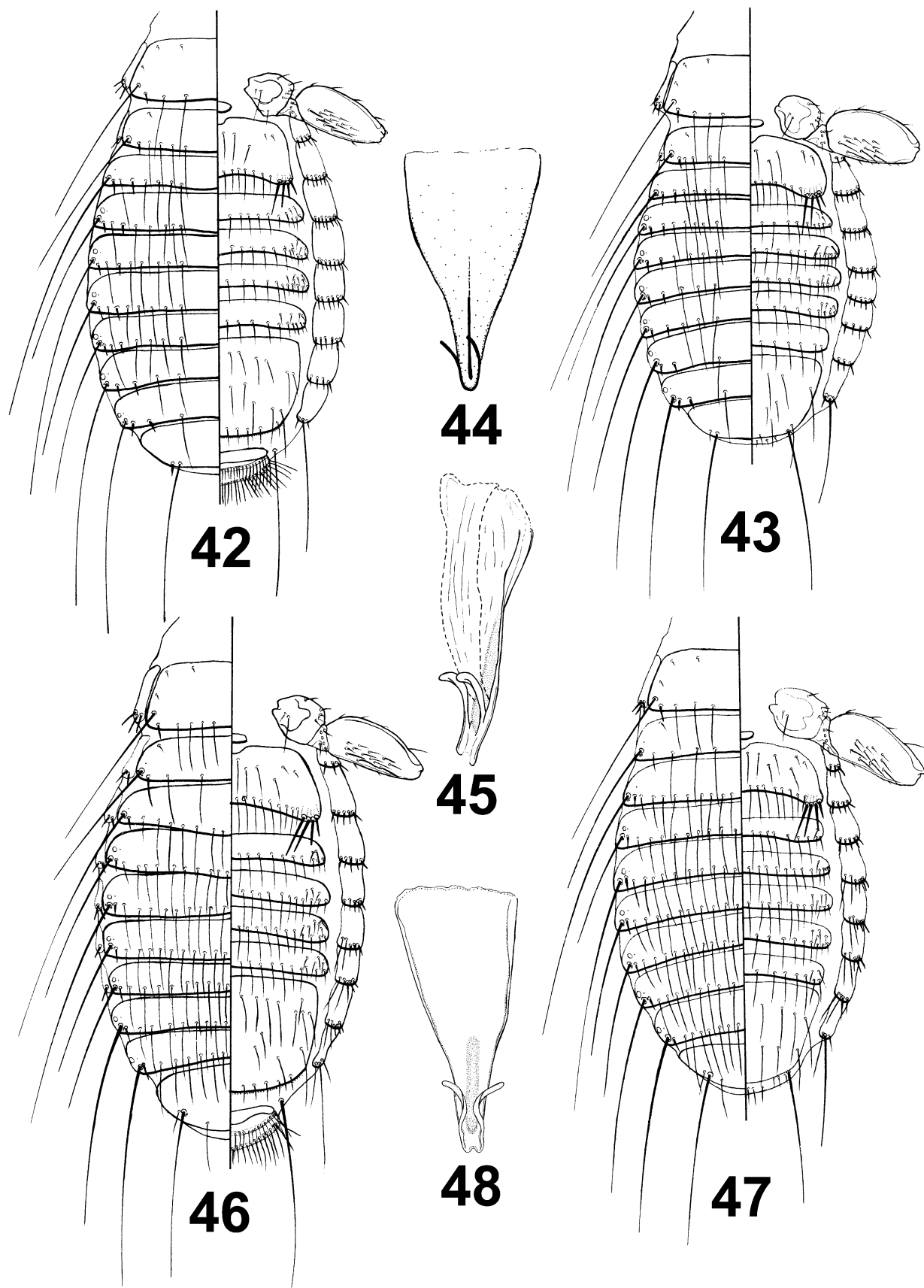
(Figs. 40–41, 46–48)

Type host. *Atlapetes albinucha gutturalis* (Lafresnaye, 1843)—the White-naped Brush-Finch (Emberizidae).

Female (n = 3). Habitus as in Fig. 40. Hypopharynx fully developed, DHS10, 0.03 long; DHS11, 0.11 long. Gula with 4 setae on each side (rarely 5 on one side). Metanotum with 11–13 setae on posterior margin. Setae of femoral brush, 11–16. Metanotum and abdomen as in Fig. 46. Abdomen with tergites of similar size, tergites II–III with very slight medioposterior convexity. Tergal setae, except on I, with continuous row across segment. Tergal setae: I, 8; II, 18–19; III, 23–26; IV, 23; V, 23–24; VI, 22–25; VII, 19–20; VIII, 16. Postspiracular setae shortest (0.18–0.25) on I, III, V, and VI, and extremely long (0.36–0.44) on II, IV, VII and VIII. Sternal setae: II, each aster of 4 setae, posterior margin with 17–18 and anteriorly with 10–12; III, 24–26; IV, 28; V, 32–37; VI, 31; VII, 16–18; VIII–IX with 10 marginal, 9–10 anterior setae. Sternite III concave anteriorly. Each pleurite II–V with about 5 short marginal setae, 2 of these long on V–VIII. Anus with 33 ventral fringe setae, 30–32 dorsal. Dimensions: TW, 0.42–0.43; HL, 0.29; PW, 0.28–0.29; PSPL, 0.10; MW, 0.42–0.43; MSPL, 0.14; AWIV, 0.58–0.59; ANW, 0.19–0.20; TL, 1.41–1.47.



FIGURES 40–41. *Myrsidea castroae* n. sp.: (40) female holotype; (41) male paratype.



FIGURES 42–48. *Myrsidea cicchinoi*: (42) metathorax and dorsoventral abdomen of female; (43) metathorax and dorsoventral abdomen of male; (44) male genital sac sclerite. *Myrsidea cinnamomei*: (45) male genital sac sclerite. *Myrsidea castroae* **n. sp.**: (46) metathorax and dorsoventral abdomen of female; (47) metathorax and dorsoventral abdomen of male; (48) male genital sac sclerite.

Male (n = 1). Habitus as in Fig. 41. Gula with 4 setae on each side. Metanotum with 11 setae on posterior margin, metasternal plate with 7 setae. Setae of femoral brush, 12–13. Metanotum and abdomen as in Fig. 47. Tergal setae, except on I, with continuous row across segment. Tergal setae: I, 10; II, 22; III, 22; IV, 25; V, 24; VI, 25; VII, 20; VIII, 18. Tergal and postspiracular setae as for female. Sternal setae: II, each aster of 4 setae, posterior margin with 16 and anteriorly with 13; III, 21; IV, 25; V, 30; VI, 26; VII, 18; VIII, 8. Long setae on pleurites on IV–VII. Genital sac sclerite as in Fig. 48, with slight apical indentation and distinct subapical lateral projections. Dimensions: TW, 0.39; HL, 0.29; PW, 0.27; PSPL, 0.10; MW, 0.36; MSPL, 0.12; AWIV, 0.43; GL, 0.38; GSL, 0.09; TL, 1.20.

Type material. Holotype female, ex *Atlapietes albinucha gutturalis*, GMS 1990, PANAMA: Palo Seco, 22 February 2006, K.P. Johnson coll. Paratypes: 1 male and 2 females (females DNA voucher Mysp.Atgut.6.6.2007.8 and Mysp.Atgut.4.26.2006.4), same data as holotype. One female paratype at MZUSP.

Remarks. This species belongs to the “*campestris* species group” (*sensu* Price and Dalgleish, 2007). It is morphologically close to *Myrsidea coronatae* Price & Dalgleish, 2007 by lacking a median gap in tergal rows for both sexes. However, *M. castroae* n. sp. can be easily distinguish by its smaller total length (males of *M. coronatae* 1.29–1.35; females 1.61–1.66) as well as by other measurements; by a smaller number of setae on tergite I in both sexes (males of *M. coronatae* 16–18, females 13–15); by tergites I–III only slightly enlarged (with modest medio-posterior convexity in *M. coronatae*); by lacking long setae on pleurite IV of females; and by differences in the male genital sac sclerite. The result of the analyses of partial sequences of the mitochondrial COI gene (Fig. 49) shows *M. castroae* n. sp. sister to *M. rozsai*. Females of *M. castroae* n. sp. differ from those of *M. rozsai* (II, 23–26; III–IV, 27–32) by fewer numbers of setae on tergites II–IV and the males of *M. castroae* n. sp. differ from those of *M. rozsai* (I, 18–22) by fewer number of setae on tergite I.

Etymology. This species is named after Dolores del C. Castro (Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata, La Plata, Argentina) in recognition of her many contributions to the taxonomy of South American lice.

Discussion

Analyses of partial sequences of the mitochondrial COI gene (GenBank Accession numbers JN638820–22, FJ171286, FJ171288) indicate that each of the four new species for which fresh material for sequencing was available is highly differentiated from other species of *Myrsidea* that have been sequenced (Fig. 49). Genetic divergences between each of these four new species and any other species of *Myrsidea* exceeded 17% in all cases. While phylogenetic analysis of this rapidly evolving gene cannot conclusively resolve relationships within this genus, some of the new species are closely related to other species of *Myrsidea* from the same host family: *M. meyi* with *M. ochrolaemi* from Furnariidae and *M. cicchinoi* with *M. olivacei* from Tyrannidae.

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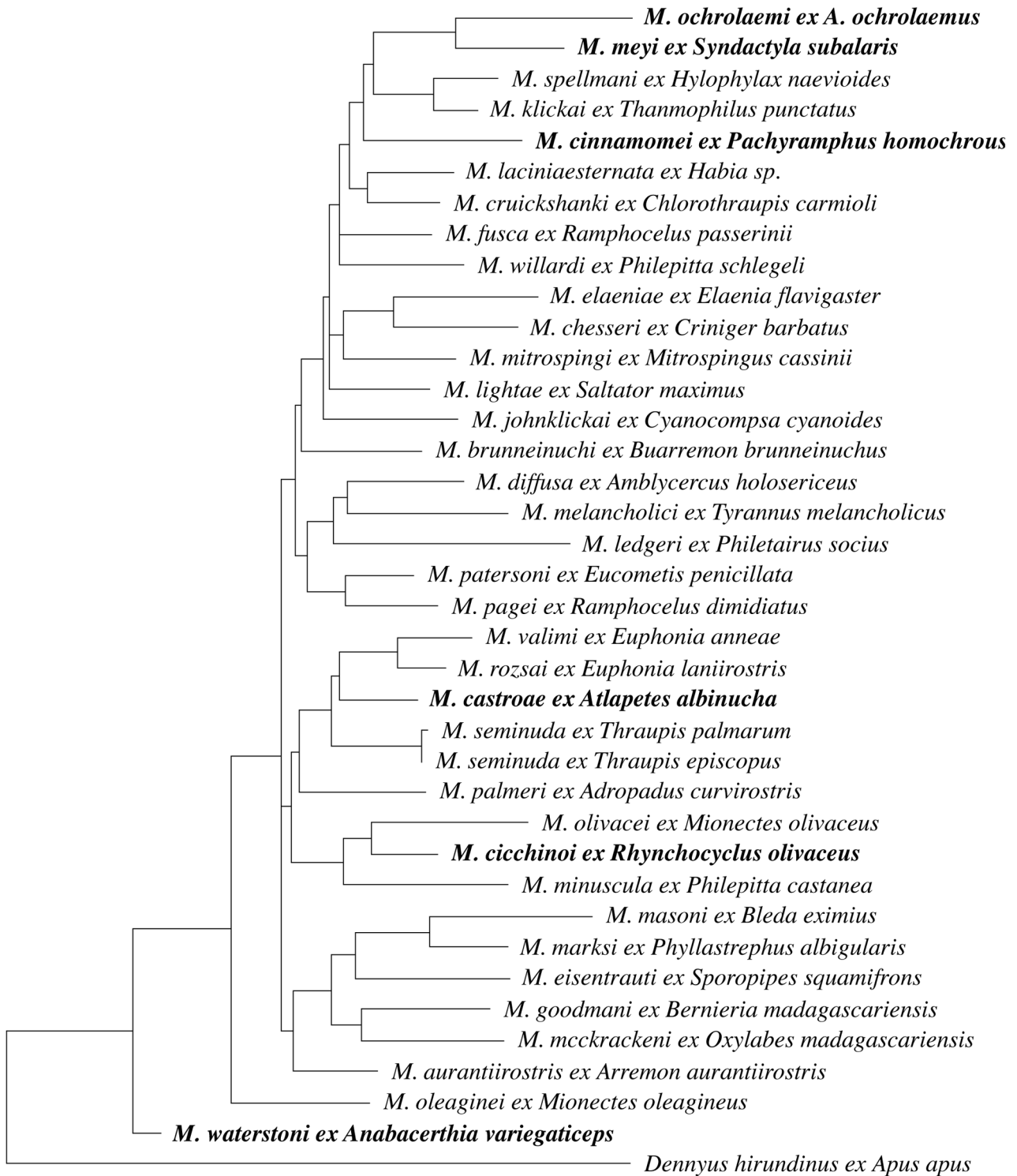


FIGURE 49. Phylogeny based on maximum likelihood analysis of 379 bp of the mitochondrial COI gene for *Myrsidea* species analyzed by Price and Johnson (2009) and additional species described or redescribed in this paper (bold names). Search involved 10 random addition replicates with the GTR+I+G model following Price and Johnson (2009).

References

- Clay, T. (1966) Contributions towards a revision of *Myrsidea* Waterston. I. (Menoponidae: Mallophaga). *Bulletin of the British Museum (Natural History) - Entomology*, 17, 327–395.
- Clay, T. (1969) A key to the genera of the Menoponidae (Amblycera: Mallophaga: Insecta). *Bulletin of the British Museum (Natural History) - Entomology*, 24, 3–26.
- Clay, T. (1970) The Amblycera (Phthiraptera: Insecta). *Bulletin of the British Museum (Natural History) - Entomology*, 25, 75–98.
- Dalgleish, R.C. & Price, R.D. (2005) Two new species of the genus *Myrsidea* Waterston (Phthiraptera: Menoponidae) from cotingas (Passeriformes: Cotingidae). *Zootaxa*, 983, 1–6.
- Dickinson, E.C. (2003) *The Howard and Moore Complete Checklist of the Birds of the World*. 3rd edition. Princeton University Press, Princeton, New Jersey, 1,039 pp.
- Eichler, W. (1956) Mallophaga. In: Niethammer, G. (Ed.) *Zur Vogelwelt Boliviens (Teil II, Passeres)*. *Bonner Zoologische Beiträge*, 7, 84–150.
- Johnson, K.P., Adams, R.J. & Clayton, D.H. (2002) The phylogeny of the louse genus *Brueelia* does not reflect host phylogeny. *Biological Journal of the Linnean Society*, 77, 233–247.
- Price, R.D. & Dalgleish, R.C. (2007) *Myrsidea* Waterston (Phthiraptera: Menoponidae) from the Emberizidae (Passeriformes), with descriptions of 13 new species. *Zootaxa*, 1467, 1–18.
- Price, R.D., Hellenthal, R.A. & Dalgleish, R.C. (2005) The genus *Myrsidea* Waterston (Phthiraptera: Menoponidae) from tyrant-flycatchers (Passeriformes: Tyrannidae), with descriptions of 13 new species. *Zootaxa*, 1048, 1–20.
- Price, R.D. & Johnson, K.P. (2009) Five new species of *Myrsidea* Waterston (Phthiraptera: Menoponidae) from tanagers (Passeriformes: Thraupidae) in Panama. *Zootaxa*, 2200, 61–68.
- Sychra, O. (2010) *Myrsidea* Waterston 1915 (Amblycera: Menoponidae). Abstracts from the Fourth International Conference on Phthiraptera (ICP4), Urgup, Turkey. *Türkiye Parazitoloji Dergisi*, 34, Suppl. 1, 34.
- Sychra, O., Literák, I., Capek, M. & Havlíček, M. (2007) Chewing lice (Phthiraptera) from Ovenbirds, Leaf-tossers and Woodcreepers (Passeriformes: Furnariidae: Furnariinae, Sclerurinae, Dendrocolaptinae) from Costa Rica, with descriptions of four new species of the genera *Rallicola* and *Myrsidea*. *Caribbean Journal of Science*, 43(1), 117–126.