

Redescriptions of three species in the louse genus *Myrsidea* (Insecta: Phthiraptera: Amblycera)

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Abstract

Three species of chewing lice in the genus *Myrsidea* are redescribed and illustrated. They are: *Myrsidea aegithali* Blagoveshtchensky, 1940 from *Aegithalos caudatus alpinus* (Hablizl, 1783); *Myrsidea flavida* (Piaget, 1880) from *Eurylaimus ochromalus* Raffles, 1822; and *Myrsidea franciscocoli* Conci, 1942 from *Cinclus cinclus* (Linnaeus, 1758). These species are like “type species”, characterising three groups of morphotypes. Redescriptions are made from the type material. Lectotype and paralectotypes are designated for *M. aegithali*. We increase knowledge of the intraspecific morphological variability of these species, including phylogenetically informative characteristics, and a new host association for *M. aegithali* from *Aegithalos concinnus*.

Key words: *Myrsidea*, redescriptions, lice, host, morphotype-group, lectotype

Introduction

The chewing louse genus *Myrsidea* is the most speciose genus of the order Phthiraptera (Price *et al.* 2003). Kolencik *et al.* (2024) recognized 382 species and reported 269 new host associations for unidentified *Myrsidea* spp., many of which are likely to represent new species. Although the number of known species of the genus *Myrsidea* appears extensive when compared to the other louse genera, it is still relatively small when compared to the number of species likely to be discovered. For example, 29 *Myrsidea* species were recorded in Brazil; however, Valim and Weckstein (2013) estimated that approximately 930 undiscovered species existed in that country, and Gustafsson *et al.* (2025) estimated that the global diversity of *Myrsidea* would be over 4,200 species. To deal with such a great diversity Kolencik *et al.* (2024: 37) suggested to divide *Myrsidea* species into 63 morphotypes based on similarities and differences among male genital sac sclerites. That approach followed Klockenhoff (1984), who stated that *Myrsidea* species should be arranged into “species groups” according to the morphology of the male genital sac sclerites. Additionally, Clay (1966) noticed that *Myrsidea* species from birds belonging to the same family shared common features.

In this study, we redescribed three species of *Myrsidea* that were insufficiently described. Each one of these species is the “type species” for three morphotype-groups suggested by Kolencik *et al.* (2024), as follows: 1) *Myrsidea aegithali* Blagoveshtchensky, 1940 ex *Aegithalos caudatus alpinus* (Hablizl, 1783) is the sole species of the *aegithali* morphotype; 2) *Myrsidea flavida* (Piaget, 1880) ex *Eurylaimus ochromalus* Raffles, 1822 is the sole species of the *flavida* morphotype; 3) *Myrsidea franciscocoli* Conci, 1942 ex *Cinclus cinclus* (Linnaeus, 1758) is a species belonging to the *franciscocoli* morphotype-group.

We record some intraspecific morphological variability in these species. Our work will assist in constructing a morphological dataset needed for a phylogenetic analysis, to better understand the relationships

among the species of *Myrsidea*. We also designate a lectotype and paralectotypes of *M. aegithali* from the syntype series.

Material and methods

The specimens examined for this study were obtained from collections deposited in the following institutions:

MFNB—Eichler's Collection, Museum für Naturkunde, Berlin, Germany.

MMBC—Balát's Collection, Moravian Museum, Brno, Czech Republic.

MSNG—Conci's Collection, Museo Civico di Storia Naturale „Giacomo Doria”, Genoa, Italy.

NHML—Piaget's Collection, Natural History Museum, London, United Kingdom.

PIPeR—Elbel's Collection, *Price Institute for Parasite Research*, Department of Biology, University of Utah, Salt Lake City, United States of America.

PMSL—Brelj's Collection, Slovenian Museum of Natural History, Ljubljana, Slovenia.

USNM—National Museum of Natural History, Smithsonian Institution, Washington, D.C., United States of America.

VETUNI—University of Veterinary Sciences, Brno, Czech Republic.

ZISP—Blagoveshtchensky's Collection, Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia.

Morphological nomenclature follows that in Kolencik *et al.* (2024). Notes regarding locality have been transcribed from slide labels and, when necessary, translated from Cyrillic to Latin alphabet (particularly for slides from the Blagoveshtchensky's Collection). No further modifications were made, and we cannot guarantee their accuracy. The taxonomy and nomenclature of birds follow IOC Bird World List ver. 14.2 (Gill *et al.* 2024). All measurements are in millimetres.

Abbreviations for dimensions (see Kolencik *et al.* 2024: 48, fig. 731): HL, head length (along midline); POW, preocular width (at the level of alveoli of *dhs 11*); TW, head temple width (at the widest part, i.e., at the level of alveoli of *dhs 31*); *sl*–5, length of aster setae (measured from innermost setae to lateral ones); PW, prothorax width (distance between the widest part of pronotum); MW, metanotum width (the widest part of metanotum at its posterior part); AWIV, abdomen width (measured at the widest part of pleurite IV); ANW, anus width (in females; distance between the basis of the most lateral setae on each side of the anal fringe); GW, genital apparatus width (in males; taken between the lateral sides of the proximal end of parameres); GL, genital apparatus length (in males); GSL, genital sclerite length (in males); TL, total length (along midline).

Results

Systematics

Class Insecta Linnaeus, 1758: 339.

Order Psocodea Hennig, 1966: 187.

Suborder Troctomorpha Roesler, 1944: 127.

Infraorder Phthiraptera Haeckel, 1896: 703.

Parvorder Amblycera Kellogg, 1896: 68.

Family Menoponidae Mjöberg, 1910: 26.

Genus *Myrsidea* Waterston, 1915

Myrsidea Waterston, 1915: 13.

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

Acolpocephalum Ewing, 1927: 88.

Allomyrsidea Conci, 1942b: 31.

Australmenopon Conci, 1942b: 31.

Corvomenopon Conci, 1942b: 31.

Myrsidella Eichler, 1951: 49.

Alcediniphilus Ansari, 1951: 189.

Densidea Złotorzycka, 1964: 171.

Vulgidea Złotorzycka, 1964: 172.

Liquidea Złotorzycka, 1964: 173.

Lanimenopon Złotorzycka, 1964: 177.

Eichlerinopon Złotorzycka, 1964: 179.

Neomyrsidella Złotorzycka, 1964: 182.

Wolfdietrichia Złotorzycka, 1973: 51.

Myrsidea aegithali (Blagoveshtchensky, 1940)

(Figs 1–6, 20–24)

Myrsidea aegithali Blagoveshtchensky, 1940: 39, fig. 11.

Myrsidea aegithali Blagoveshtchensky, 1940; Price *et al.* 2003: 127.

Type host: *Aegithalos caudatus alpinus* (Hablizl, 1783) (Passeriformes, Aegithalidae)—Northern long-tailed tit.

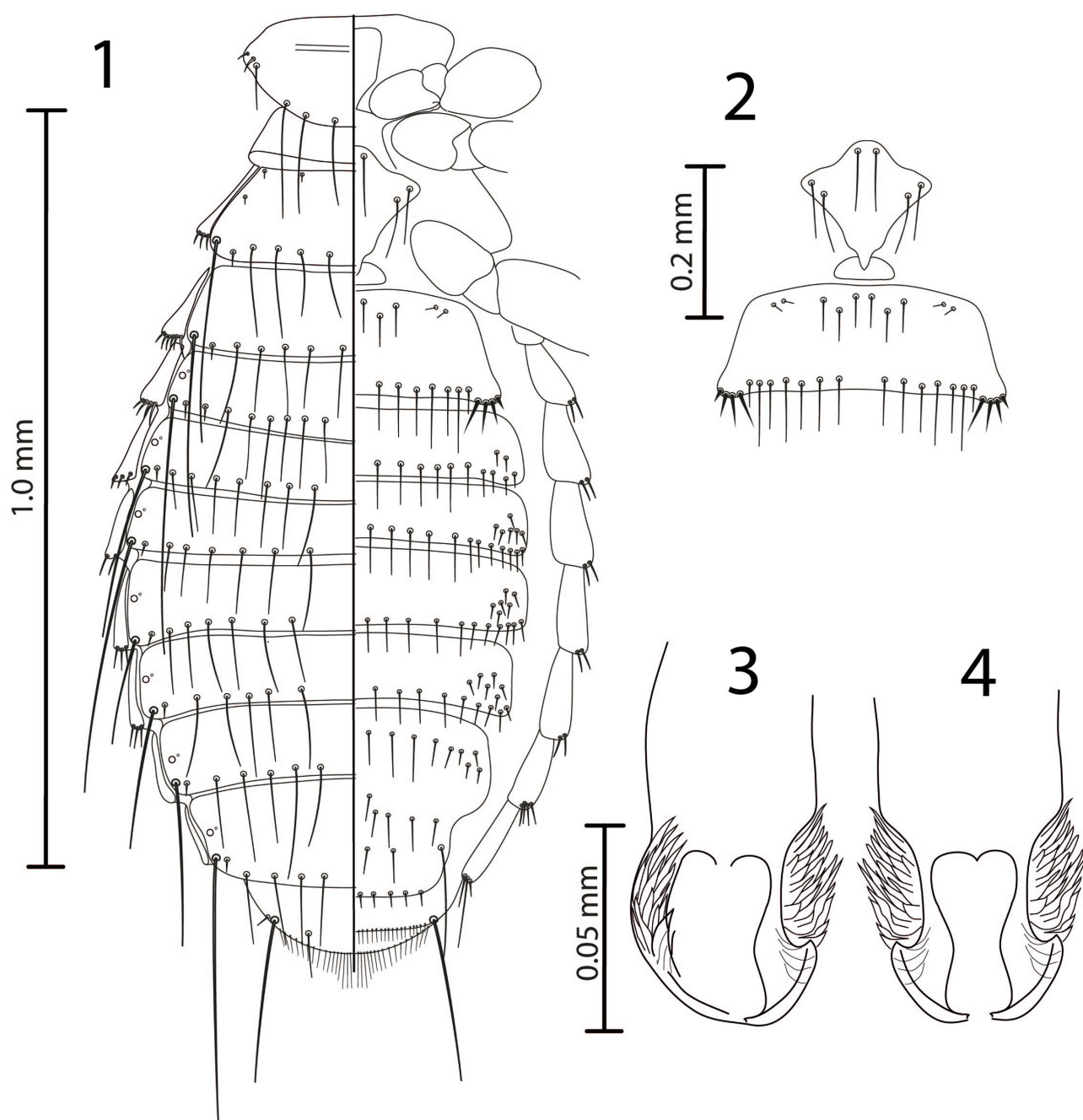
Type locality: Azerbaijan. Alekseevka (former name of Dashtatiuk village) and Kumbashi, Lankaran Region (Алексеевка, Кумбаши, Ленкоранский район).

Diagnosis

Myrsidea aegithali is distinctly characterized by its male genital sac sclerite, which is unique within the genus *Myrsidea*. The sclerite is large, with a broadly rounded distal margin and densely fringed patches on the lateral sides (Figs 3–4). Hence, Kolencik *et al.* (2024: 38) established the *aegithali* morphotype-group for this species. Females are diagnosed by the following combination of characters: hypopharyngeal sclerites weakly developed (Fig. 23); abdominal segments with well-defined median gap in each row of tergal setae, and slightly modified tergites. II–III (Figs 1, 5). Nevertheless, a detailed description of females of similar species is necessary for a reliable differentiation.

Descriptions

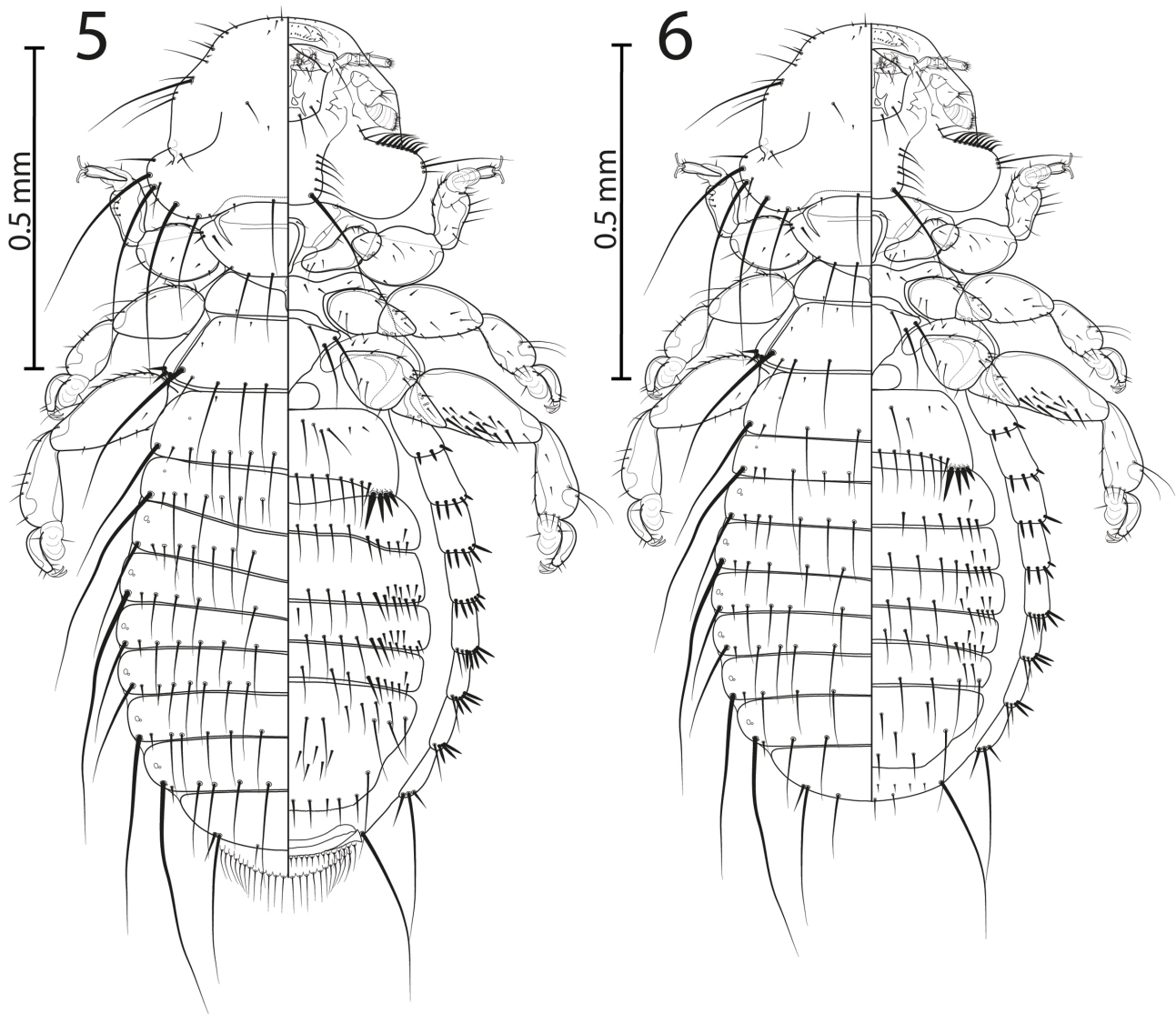
Female (n = 14). As in Figs 1, 5, 20, 23. Some data from the lectotype female (Figs 20, 22) are given in square brackets. Hypopharyngeal sclerites weakly developed (Fig. 23). Length of *dhs* 10, 0.04–0.05 [0.04]; *dhs* 11, 0.09–0.11 [0.09]; ratio *dhs* 10/11, 0.42–0.50 [0.44]. *Ls* 5 0.02–0.06 long, latero-ventral fringe with 9–10 [10] setae. Gula with 5–7 [5–6] setae on each side. Pronotum with 6 (5 in one case) [6] setae on posterior margin and 3 [3] short spiniform setae at each lateral corner. Prosternal plate with rounded anterior margin. First tibia with 3 [3] outer ventro-lateral and 3 [3] dorso-lateral setae. Mesonotum undivided. Metanotum not enlarged, with 6–8 [8] marginal setae (the most posterolateral setae are not included); metasternal plate with 6 [6] setae; metapleurites with 2–3 [3] short strong spiniform setae. Femur III with 13–16 [14–15] setae in ventral setal brush.



FIGURES 1–4. *Myrsidea aegithali* (ex *Aegithalos caudatus*): **1**, dorso-ventral views of female thorax and abdomen. **2**, female metasternal plate and sternites I–II. **3–4**, male genital sac sclerites.

Tergites not enlarged, with straight posterior margin, only tergites II–III with slightly convex margin (Figs 1 and 5). Abdominal segments with well-defined median gap in each row of tergal setae. Tergal setae (postspiracular setae and short associated setae on tergites II–VIII are not included): I, 9–12 [9]; II, 8–15 [13]; III, 11–14 [14]; IV, 10–13 [11]; V, 8–12 [16]; VI, 8–13 [9]; VII, 8–11 [11]; VIII, 5–9 [7]. Postspiracular setae very long on tergites II, IV and VIII (0.30–0.38) [0.31–0.34]; long on I, III and VII (0.18–0.29) [0.21–0.26]; and short on V and VI (0.11–0.18) [0.11–0.15]. Inner posterior seta of last tergum not longer than anal fringe setae with length 0.07–0.10 [0.07–0.08]; length of short lateral marginal seta of last segment, 0.04–0.06 [0.04]. Pleural setae: I, 4–6 [5]; II, 5–7 [5]; III, 4–7 [4–5]; IV, 5–6 [5–6]; V, 4–5 [4–5]; VI, 3–4 [4]; VII, 3 [3]; VIII, 3 [3]. Pleurites I–III with only short spine-like setae; with slender and longer setae on: IV, 1–2; V, 1–3; VI, 1–4; VII, 1–2; without anterior setae. Pleurite VIII with inner setae (0.06–0.10) twice as long as outer (0.02–0.05). Anterior margin of sternal plate II without a medial notch.

Sternal setae: I, 0 [0]; II, 4 (in one case 5) [4] in each aster (Fig. 2), aster setae length: $s1$, 0.05–0.06; $s2$, 0.04–0.05; $s3$, 0.03–0.04; $s4$, 0.02–0.03, $s5$, 0.02–0.03; with 12–14 [13] marginal setae between asters, 3–5 [4] medioanterior; III, 17–25 [23]; IV, 25–35 [32]; V, 31–36 [31]; VI, 26–35 [28]; VII, 16–22 [16]; VIII–IX, 19–26; and 8–13 [10] setae on slightly serrated or almost smooth vulval margin; sternites III–VII with medioanterior setae: III, 1–2; IV, 2–3; V, 2–3; VI, 2–3; VII, 2. Anal fringe formed by 28–33 [30] dorsal and 28–35 [33] ventral setae.



FIGURES 5–6. *Myrsidea aegithali* (ex *Aegithalos concinnus*), dorso-ventral views: 5, female. 6, male.

Dimensions (ex *Aegithalos caudatus*): TW, 0.42–0.44 [0.42]; POW, 0.33–0.35 [0.33]; HL, 0.24–0.27 [0.24]; PW, 0.28–0.30 [0.29]; MW, 0.41–0.46 [0.42]; AWIV, 0.68–0.70 [0.67]; ANW, 0.17–0.20 [0.18]; TL, 1.48–1.59 [1.53]. Dimensions (ex *Aegithalos concinnus*): TW, 0.38–0.39; POW, 0.31; HL, 0.25–0.26; PW, 0.25–0.26; MW, 0.38–0.40; AWIV, 0.56–0.61; ANW, 0.18; TL, 1.31–1.35.

Male (n = 9). As in Figs 6, 2, 24, Hypopharyngeal sclerites weakly developed. Length of *dhs 10*, 0.04; *dhs 11*, 0.08–0.09; ratio *dhs 10/11*, 0.44–0.50. *Ls5* 0.05–0.07 long, latero-ventral fringe with 9–11 setae. Gula with 5–6 setae on each side. Pronotum with 6 setae on posterior margin and 3 short spiniform setae at each lateral corner. Prosternal plate with rounded anterior margin. First tibia with 3 outer ventro-lateral and 3 dorso-lateral setae. Mesonotum undivided. Metanotum not enlarged with 3–5 marginal setae (the most posterolateral setae are not included); metasternal plate with 5–6 setae; metapleurites with 2–3 short spiniform strong setae. Femur III with 10–15 setae in ventral setal brush.

Abdominal segments with well-defined median gap in each row of tergal setae. Tergal setae (postspiracular setae and short associated setae on tergites II–VIII are not included): I, 4–6; II, 7–10; III, 6–10; IV, 8–10; V, 7–9;

VI, 6–8; VII, 4–6; VIII, 4–5. Postspiracular setae very long on tergites II, IV and VIII (0.29–0.36); long on I and VII (0.17–0.23); and short on III, V and VI (0.10–0.17). Length of inner posterior seta of last tergum, 0.06–0.08; short lateral marginal seta of last segment, 0.02. Pleural setae: I, 3–4; II, 4–5; III, 4–5; IV, 4–5; V, 3–5; VI, 3–4; VII, 3; VIII, 3 (2 in one case on one side). Pleurites with only short spine-like setae; pleurites with slender and longer setae: IV, 1–3; V, 1; VI, 1; VII, 1; pleurites without anterior setae. Pleurite VIII with inner setae (0.04–0.06) twice as long as outer (0.02–0.03). Anterior margin of sternal plate II without a medial notch. Sternal setae: I, 0; II, 3–4 in each aster, aster setae length: *s1*, 0.03–0.06; *s2*, 0.02–0.05; *s3*, 0.02–0.04; *s4*, 0.01–0.03; with 8–14 marginal setae between asters, 4–7 medioanterior; III, 12–19; IV, 14–28; V, 21–24; VI, 19–24; VII, 11–15; VIII, 9–10; remainder of plate, 6; and with 3 setae posteriorly; sternites III–VII with medioanterior setae: IV, 2; V, 2–3; VI, 1; VII, 1–3. With 8 internal anal setae. Genital sac sclerite as in Figs 3–4, quite large with broadly rounded distal margin and densely fringed patches on the lateral sides. The medio-distal part of the sclerite is less sclerotized, forming a central pale area. The outline of the proximal margin of the plate is indistinguishable.

Dimensions ex *A. caudatus*: TW, 0.38–0.40; POW, 0.30–0.32; HL, 0.24–0.26; PW, 0.24–0.27; MW, 0.31–0.36; AWIV, 0.42–0.52; GW, 0.10–0.13; GL, 0.35–0.40; ParL, 0.07–0.09; GSL, 0.08–0.11; TL, 1.07–1.28. Dimensions ex *A. concinnus*: TW, 0.35; POW, 0.28; HL, 0.23; PW, 0.22; MW, 0.30; AWIV, 0.42; GW, 0.10; GL, 0.34; ParL, 0.08; GSL, 0.10; TL, 1.18.

Material examined

Ex *Aegithalos caudatus alpinus* (Hablizl, 1783)—Northern long-tailed tit.

Lectotype ♀ designated below: AZERBAIJAN, Alexejevka, Lankaran Region, 10 Mar. 1934, I.S. Shtrom (ZISP 364). **Paralectotypes**: AZERBAIJAN, 3♀♀, 3♂♂, same locality as lectotype, 23 Feb. 1934, I.S. Shtrom leg. (ZISP 212–214); 4♀♀, 2♂♂, Kumbashi, Lankaran Region, 9–10 Mar. 1934 (ZISP Nos 332, 358, 363, 364).

Non-types

Ex *Aegithalos caudatus* (Linnaeus, 1758)—Long-tailed tit

RUSSIA: 2♀♀, 2♂♂, unknown locality, 21 Jun. 1940 (ZISP 7a), identified by Blagoveshtchensky.

Ex *Aegithalos caudatus* cf. *caudatus* (Linnaeus, 1758)—Long-tailed tit

RUSSIA: 1♀, Krasnojarskiy kr., Usinskiy tr. st., Kulumys, 12 Jun. 1940 (ZISP 43), identified by Blagoveshtchensky.

Ex *Aegithalos caudatus europaeus* (Hermann, 1804)—European long-tailed tit

CZECH REPUBLIC: 2♀♀, 2♂♂, Břeclav-Kančí obora, 24 Feb. 1954 (MMBC 689); 1♀, Břeclav-Kančí obora, 25 Feb. 1954, identified by Balát (MMBC 680).

Ex *Aegithalos concinnus annamensis* (Robinson & Kloss, 1919)—Black-throated bushtit

VIETNAM: 2♀♀, 1♂, NP Bidoup-Nui Ba, 11 Sep. 2012, VETUNI (LB074, LB076, LB077); 2♀♀, NP Bidoup-Nui Ba, 14 Sep. 2012 (VETUNI LB139).

Designation of Lectotype

Considering the incomplete original description of *Myrsidea aegithali*, the several syntypes available in the Blagoveshtchensky's Collection, and the new host records for this louse species, we believe it is advisable to designate a syntype female as the lectotype. Therefore, here we designate the best preserved syntype female as the lectotype of *Myrsidea aegithali*, with data as given above and deposited in ZISP (364, Fig. 20).

Remarks

Myrsidea aegithali is the only known species of *Myrsidea* from members of the family Aegithalidae (see Kolencik *et al.* 2024: 38). The original Russian description includes scarce data, without setal counts and lacking some diagnostic characters used by Clay (1966). There can be no doubt that *Aegithalos caudatus alpinus* is a regular and natural host of *M. aegithali* because Blagoveshtchensky (1940) examined specimens from seven different host individuals. We have found two additional samples collected by Blagoveshtchensky but not included in his original description, one of which represents a new host record because, according to the location, it was most likely collected from the nominotypical subspecies *Aegithalos caudatus caudatus*. Furthermore, we have added two new host records for *M. aegithali*: the European subspecies of the long-tailed tit, *Aegithalos caudatus europaeus*, and the black-throated bushtit *Aegithalos concinnus annamensis*. These new host records also extend the known geographical distribution of *M. aegithali* from Europe to southeast Asia. Specimens from the black-throated bushtit collected in Vietnam (Figs 5–6) exhibit minor morphological differences, especially smaller dimensions, when compared with the type specimens. However, we believe that these differences fall well within the intraspecific variation of this louse species and may be due to the different sizes of their hosts: mean body length 5.41–5.54 cm (without tail) and weight 7.22–7.39 g for *A. caudatus* against 4.82–4.96 cm (without tail) and 5.72–5.97 g for *A. concinnus* (see Li *et al.* 2010). Also del Hoyo *et al.* (2008) mentioned weight 6.2–10.4 g and 4–9 g for *A. caudatus* and *A. concinnus*, respectively.

This phenomenon, where larger birds harbour larger parasites belonging to the same genus—Harrison's Rule—has been well documented for lice by Harnos *et al.* (2017).

Myrsidea flavida (Piaget, 1880)

(Figs 7–13, 25–28)

Menopon flavidum Piaget, 1880: 438, pl. XLII: fig. 5.

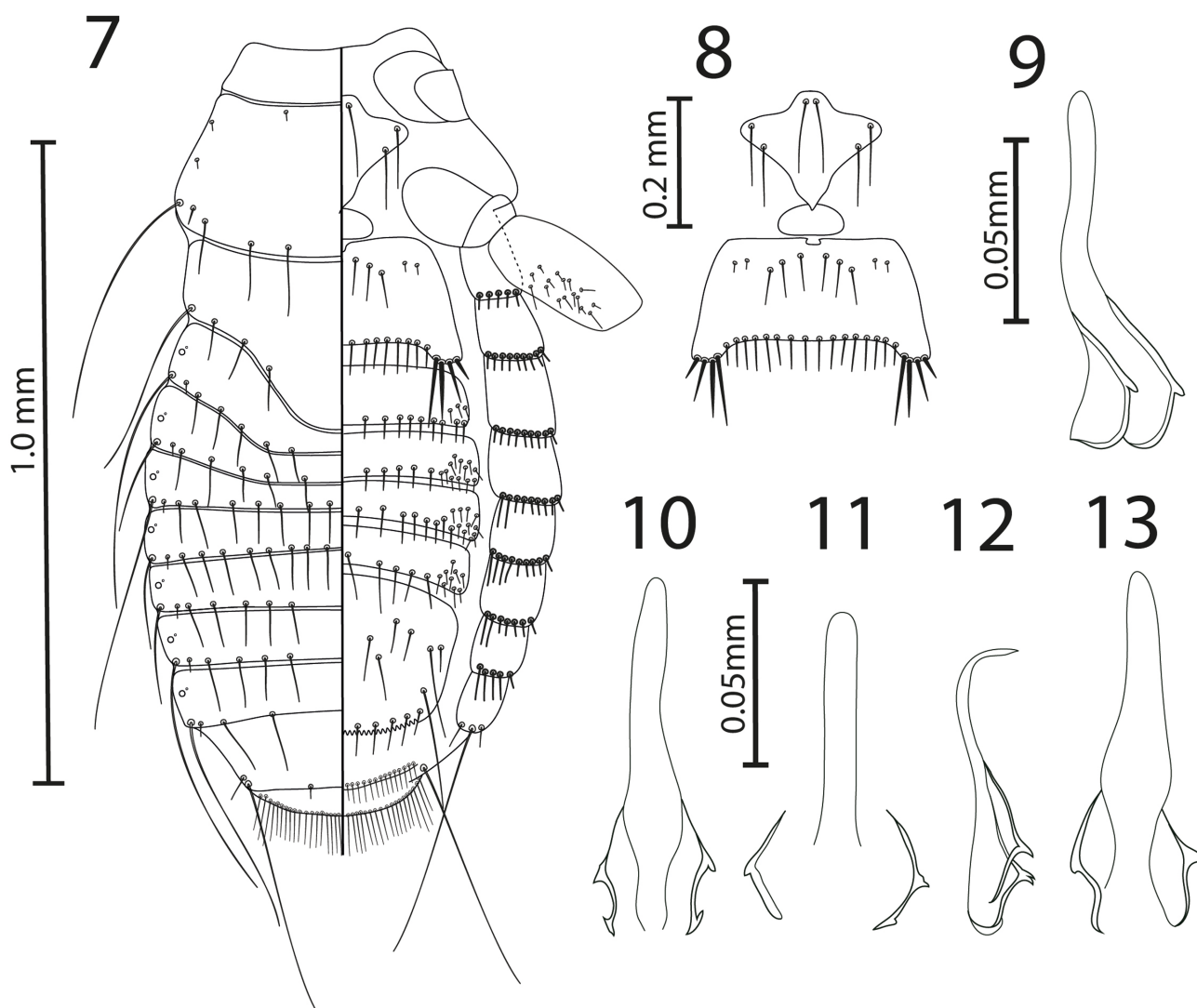
Myrsidea flavida (Piaget, 1880); Price *et al.* 2003: 129.

Type host: *Eurylaimus ochromalus* Raffles, 1822 (Passeriformes, Eurylaimidae)—Black-and-yellow broadbill.

Type locality: Unknown.

Diagnosis

Myrsidea flavida is easily identified by its unique male genital sac sclerite—long and narrow with a poorly developed distal margin and short distal arms forming a small lateral hook (Figs 9–13). Kolencik *et al.* (2024: 40) established the *flavida* morphotype-group for this species. Females are defined by the following combination of characters: metanotum slightly enlarged; tergite I enlarged with a deep mediocentral convexity; tergites II–IV modified by enlarged tergite I; abdominal segments I–III and VI–VIII with well-defined median gap on each row of tergal setae; segments IV–V with a continuous row of tergal setae (Fig. 7).



FIGURES 7–13. *Myrsidea flavida*: 7, dorso-ventral views of female thorax and abdomen. 8, female metasternal plate and sternites I–II. 9–13, various views of the male genital sac sclerite.

Descriptions

Female (n = 2). As in Figs 7, 27. Hypopharyngeal sclerites fully developed (Fig. 27). Length of *dhs* 10, 0.03–0.04; *dhs* 11, 0.10–0.11; ratio *dhs* 10/11, 0.25–0.36. *LS* 5 0.06 long; latero-ventral fringe with 11 setae. Gula with 3–5 setae on each side. Pronotum with 6 setae on the posterior margin and 3 short spiniform setae on each lateral corner. Prosternal plate with rounded anterior margin. First tibia with 3 outer ventro-lateral and 3–4 dorso-lateral setae. Mesonotum undivided. Metanotum enlarged, with 6–9 marginal setae (the most posterolateral setae are not included); metasternal plate with 6 setae; metapleurites with 3 short strong spiniform setae. Femur III with 15–16 setae in ventral setal brush.

Tergites modified as follows: tergite I enlarged with deep mediocentral convexity; II strongly modified by enlarged tergite I, with straight mediocentral margin; III slightly modified by enlarged tergite I (Fig. 7). Abdominal segments I–III and VI–VIII with well-defined median gap on each row of tergal setae; abdominal segments IV–V with a continuous row of tergal setae. Tergal setae (postspiracular setae and short associated setae on tergites II–VIII are not included): I, 5–8; II, 8–11; III, 10; IV, 14–22; V, 12–21; VI, 9–13; VII, 7–12; VIII, 3–4. Postspiracular setae very long on II, IV, VII and VIII (0.36–0.45); long on I (0.26); and short on III, V and VI (0.10–0.18). Inner posterior seta of last tergum not longer than anal fringe setae with length 0.02; length of short lateral marginal seta of last segment, 0.05–0.06. Pleural setae: I, 5–6; II, 9; III, 9–11; IV, 8–10; V, 8–9; VI, 6–7; VII, 5–6; VIII, 3. Pleurites

without anterior setae; pleurites I–III with only short spine-like setae; pleurite IV with 2–3 long slender setae; V with 3–4; VI with 2; VII with 4; Pleurite VIII one with inner seta (0.05–0.07 long) and an outer seta (0.05–0.08) plus a very long median seta (Fig. 7). Anterior margin of sternal plate II with a medial notch (Fig. 8). Sternal setae: I, 0; II, 4 on each aster, aster setae length: *s1*, 0.07–0.09; *s2*, 0.05; *s3*, 0.04; *s4*, 0.03–0.04; with 16–18 marginal setae between asters, 6 medioanterior (Fig. 8); sternite III, 20–24 setae; IV, 32–34; V, 34–36; VI, 28; VII, 13–15; VIII–IX, 8; and 9–10 setae on deeply serrated vulval margin. Sternites III–VII without medioanterior setae. Anal fringe formed by 32–36 dorsal and 30–31 ventral setae.

Dimensions: TW, 0.41–0.44; POW, 0.34–0.36; HL, 0.33; PW, 0.28–0.30; MW, 0.48–0.55; AWIV, 0.65–0.70; ANW, 0.21–0.26; TL, 1.63–1.70.

Male (n = 5). As in Figs 26, 28. Some data from the lectotype male (Figs 25–26) are in square brackets. Hypopharyngeal sclerites fully developed (Fig. 28). Length of *dhs 10*, 0.02–0.03; *dhs 11*, 0.09–0.11; ratio *dhs 10/11*, 0.20–0.33. *Ls5* 0.06–0.07 long, latero-ventral fringe with 9–11 [9–10] setae. Gula with 4–5 [4–5] setae on each side. Pronotum with 6 [6] setae on posterior margin and 3 [3] short spiniform setae on each lateral corner. Prosternal plate with rounded anterior margin. First tibia with 3 [3] outer ventro-lateral and 4 [4] dorso-lateral setae. Mesonotum undivided. Metanotum not enlarged, with 4–6 [4] marginal setae (the most posterolateral setae are not included); metasternal plate with 6 [6] setae; metapleurites with 3 [3] short spiniform strong setae. Femur III with 13–16 [15–17] setae in ventral setal brush.

Abdominal segments with well-defined median gap on each row of tergal setae. Tergal setae (postspiracular setae and short associated setae on tergites II–VIII are not included): I, 7–8 [10]; II, 8–9 [10]; III, 6–8 [11]; IV, 6–9 [10]; V, 6–7 [7]; VI, 4–6 [7]; VII, 4–7 [7]; VIII, 4 [4]. Postspiracular setae very long on II, IV, VII and VIII (0.42–0.54); long on I (0.14–0.19); short on III, V and VI (0.10–0.13). Length of inner posterior seta of last tergum, 0.05–0.07; short lateral marginal seta of last segment, 0.02. Pleural setae: I, 3–5 [4]; II, 5–8 [6]; III, 6–8 [7]; IV, 5–7 [6]; V, 5–6 [6]; VI, 4–6 [5]; VII, 4–5 [4]; VIII, 3 [3]. All pleurites with only short spine-like setae, and without anterior setae. Pleurites IV, 1–2 [1]; V, 1–3 [2]; VI, 1–3 [2]; VII, 2–3 [2] with slender and longer setae. Pleurite VIII with inner setae (0.05–0.07) twice as long as outer (0.02–0.04). Anterior margin of sternal plate II with a medial notch. Sternal setae: I, 0 [0]; II, 3–4 [4] in each aster, aster setae length: *s1*, 0.08–0.09; *s2*, 0.05–0.06; *s3*, 0.04–0.05; *s4*, 0.04–0.04; with 15–18 [16] marginal setae between asters, 2–6 [6] medioanterior; III, 17–20 [19]; IV, 18–24 [26]; V, 26–28 [35]; VI, 18–30 [27]; VII, 14–16 [15]; VIII, 2–4 [4]; remainder of plate, 6–7 [6]; and with 4–6 [4] setae posteriorly; sternites III–VII without medioanterior setae. With 6–8 [8] internal anal setae. Genital sac sclerite long and narrow with poorly developed distal margin that can be easily distorted; distal arms (*sensu* Kolencik *et al.* 2024) short, forming a small lateral hook (Figs 9–13).

Dimensions: TW, 0.38–0.41 [0.43]; POW, 0.31–0.33 [0.33]; HL, 0.29–0.30 [0.29]; PW, 0.26–0.29 [0.29]; MW, 0.29–0.38 [0.38]; AWIV, 0.46–0.50 [0.48]; GW, 0.13–0.15 [0.10]; GL, 0.38–0.43 [0.44]; ParL, 0.08–0.09 [0.08]; GSL, 0.07–0.09 [0.08]; TL, 1.33–1.37 [1.36].

Material examined

Ex *Eurylaimus ochromalus* Raffles, 1822—Black-and-yellow broadbill

Lectotype ♂: locality and collection date unknown (Piaget's Collection 813—NHML UK010711664).

Non-types

Ex *Eurylaimus ochromalus* Raffles, 1822—Black-and-yellow broadbill

THAILAND: 1♂, 1♀ Phatthalung Muang Ban Na., Na Wong, 9 Sep. 1963, Wanit Songprakob leg. (Elbel's Collection, PIPeR 7137–8) identified by R.D. Price; 1♀, 3 ♂♂, same locality, 9 Mar. 1963 (USNM).

Ex *Eurylaimus* sp.

1♀, locality and date unknown, (Eichler's Collection, MFNB).

Ex *Motacilla alba*

TAIWAN (FORMOSA): 1♀, 1♂, (as *Myrsidea* cf. *dukhunensis*), Ping-tung Hsien, Fang Liao, 4 Apr. 1960, (Elbels' Collection, PIPeR 10236); 1♀, 1♂, same data (USNM). These four specimens are regarded as stragglers (Kolencik *et al.* 2024: Appendix).

Remarks

The original description of *Myrsidea flavida* provides only scarce morphometric data and poor-quality illustrations, hence our redescription supported by illustrations from both sexes. *Myrsidea flavida* is one of three known species of *Myrsidea* from hosts of the family Eurylaimidae (Sychra *et al.* 2014; Chu *et al.* 2019; Kolencik *et al.* 2024). *Myrsidea claytoni* Hellenthal & Price, 2003 and *M. palmai* Hellenthal & Price, 2003 were originally described from bulbuls (Pycnonotidae): *Pycnonotus eutilotus* (Jardine & Selby, 1837) from Sarawak, and *Alophoixus ochraceus* (Moore, F, 1854) from Thailand, respectively (Hellenthal & Price 2003). However, *M. claytoni* was subsequently recorded on *Cymbirhynchus macrorhynchus* (Gmelin, JF, 1788) (Eurylaimidae) in Vietnam by Sychra *et al.* (2014), and *M. palmai* was recorded on *Serilophus lunatus* (Gould, 1834) (Eurylaimidae) in China by Chu *et al.* (2019). These two species differ from *M. flavida* by the male genital sac sclerite (see above for detailed description of *M. flavida*), which in *M. claytoni* and *M. palmai* have distal arms strongly curved laterally to form conspicuous hook-like projections, and lateral arms with deeply serrated lateral margins and proximal part continuing to a quite large subapical projection of an irregular shape (see Figs. 217–218 in Kolencik *et al.* 2024). Therefore, Kolencik *et al.* (2024: 38) placed the latter two species in the *palmai* morphotype-group.

Myrsidea franciscoloi (Conci, 1942)

(Figs 14–19, 29–32)

Myrsidea franciscoloi Conci, 1942a: 287; figs 1–3.

Myrsidea franciscoloi Conci, 1942a; Price *et al.* 2003: 129.

Type host: *Cinclus cinclus aquaticus* (Bechstein, 1797) (Passeriformes, Cinclidae)—White-throated dipper.

Type locality: Liguria, Italy.

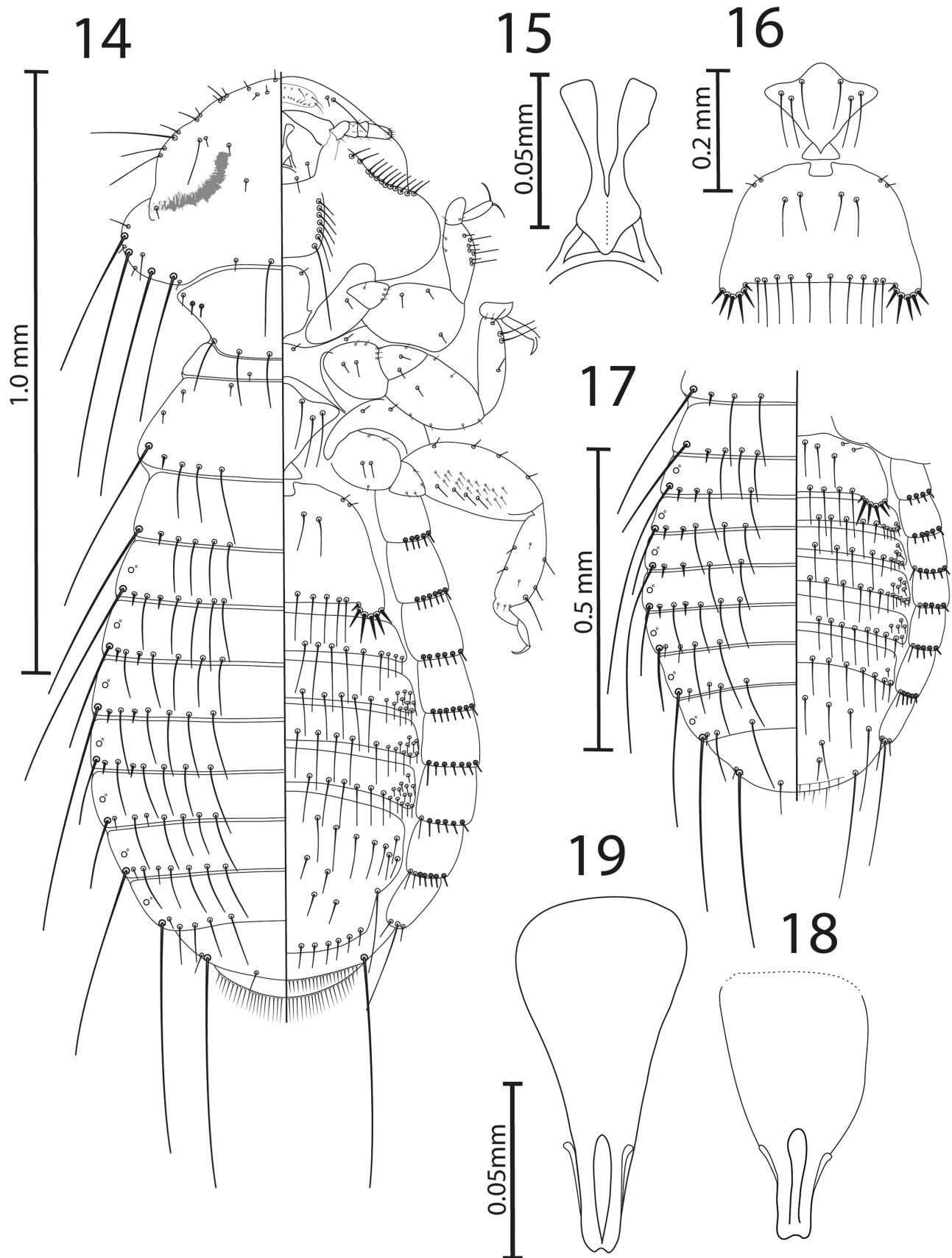
Diagnosis

Both sexes of *Myrsidea franciscoloi* can be identified by the partially reduced hypopharyngeal sclerites (Fig. 15), gula with 6–7 setae on each lateral side, and with 1–2 strong spine-like setae on each postero-lateral margin of the metanotum and tergites I–V (Fig. 14). Such spine-like setae on those sclerites are quite unique within the genus *Myrsidea*. Males have an elongated genital sac sclerite with a triangular plate, distally tapered, with thin lateral arms and short, broad median sclerotization (Figs 18–19). Females are further identified by non-enlarged tergites with straight posterior margins and wide median gaps on each row of tergal setae (Fig. 14). Nevertheless, detailed descriptions of males and females of similar species are still necessary for their reliable differentiation.

Descriptions

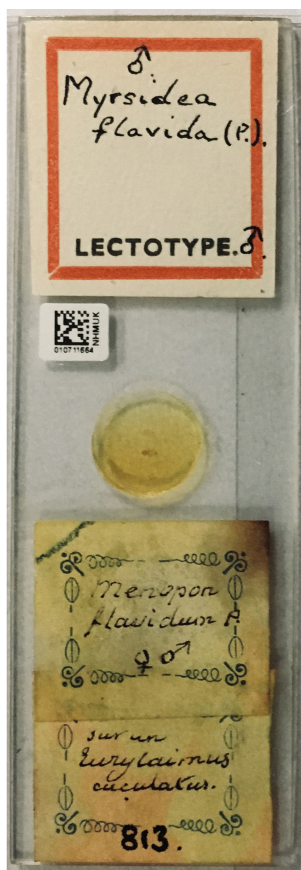
Female (n = 23). As in Figs 14, 30, 32. Some data from the allotype female (Fig. 30) are in square brackets. Hypopharyngeal sclerites partially reduced (Fig. 15). Length of *dhs* 10, 0.07–0.09 [0.07]; *dhs* 11, 0.08–0.12 [0.10]; ratio *dhs* 10/11, 0.69–1.00 [0.70]. *Ls* 5 0.05–0.08 long, latero-ventral fringe with 8–10 [8–9] setae. Gula with 6–7 [7] setae on each side. Pronotum with 6 [6] setae on posterior margin and 3–4 [3] short spiniform setae at each lateral corner. Prosternal plate with rounded anterior margin. First tibia with 3 [3] outer ventro-lateral and 4 [4] dorso-lateral setae. Mesonotum undivided. Metanotum not enlarged, with 6–8 marginal setae (the most posterolateral

setae are not included); metasternal plate with 6–7 [6] setae; metapleurites with 2–3 [3] short strong spiniform setae. Femur III with 14–18 [16] setae in ventral setal brush.



FIGURES 14–19. *Myrsidea franciscoloi*: **14**, dorso-ventral views of female. **15**, hypopharynx. **16**, female metasternal plate and sternites I–II. **17**, dorso-ventral views of male abdomen, **18–19**, male genital sac sclerites.

25



26



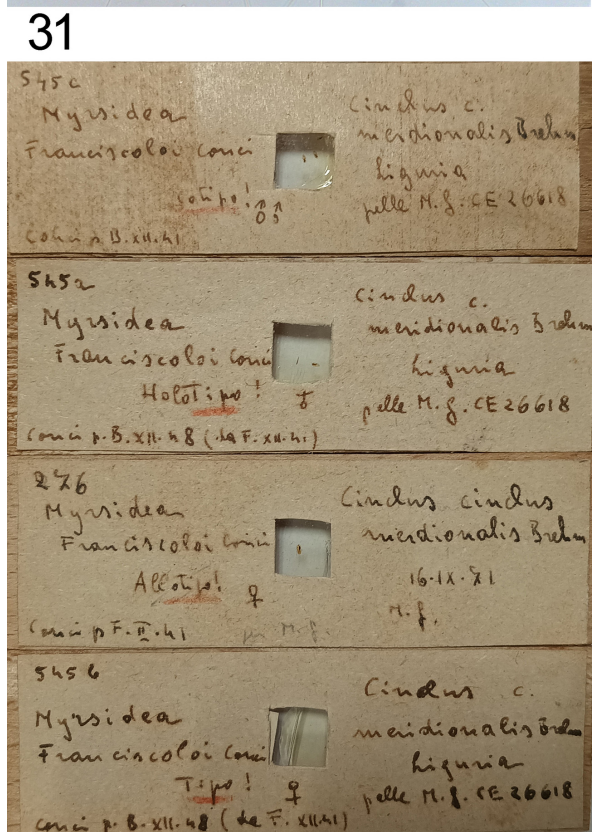
27



28



FIGURES 25–28. *Myrsidea flavida*: 25, slide with lectotype. Habitus: 26, lectotype male. 27, female. 28, male.



FIGURES 29–32. *Myrsidea franciscoloi*, habitus: **29**, holotype male. **30**, allotype female. **31**, slides with type specimens. **32**, female from *Cinclus pallasii*.

Tergites not enlarged, all with straight posterior margin. Abdominal segments with well-defined median gap on each row of tergal setae. Tergal setae (postspiracular setae and short associated setae on tergites II–VIII are not included): I, 9–12; II, 8–12; III, 9–12; IV, 10–16; V, 8–14 [8]; VI, 7–12; VII, 6–10 [6]; VIII, 4 [4]. Short, strong, spine-like setae associated to postspiracular setae on tergites II–V. In addition to these setae there is one seta of the same type on each side of tergites II–V and on metanotum and tergite I (Fig. 14). Postspiracular setae very long on II, IV and VIII (0.35–0.46) [0.37–0.40]; long on I and VII (0.20–0.35) [0.23–0.30]; and short on III, V and VI (0.10–0.18) [0.12–0.14]. Inner posterior seta of last tergum not longer than anal fringe setae with length 0.03–0.06 [0.05]; length of short lateral marginal seta of last segment, 0.04–0.05. Pleurites without anterior setae, but with short spine-like setae on their posterior margins, as follows: I, 4–7 [5]; II, 6–9 [7]; III, 6–9 [7–8]; IV, 5–9 [7–8]; V, 6–8 [6–7]; VI, 5–7 [6]; VII, 4–6 [5]; VIII, 3 [3]; also with slender and longer setae on IV, 1–2; V, 1–3 [1–2]; VI, 1–2 [1]; VII, 1–2 [1–2]; pleurite VIII with inner setae (0.03–0.06) [0.06] as long as outer (0.03–0.05) [0.05]. Anterior margin of sternal plate II with a medial notch. Sternal setae: I, 0 [0]; II, 4–5 [4] in each aster (Fig. 16), aster setae length: *s*1, 0.05–0.07; *s*2, 0.04–0.07; *s*3, 0.04–0.06; *s*4, 0.03–0.05; *s*5, 0.03–0.05; with 10–15 marginal setae between asters, 3–6 medioanterior; III, 21–30; IV, 26–37; V, 30–35; VI, 25–34 [29]; VII, 13–16 [16]; VIII–IX, 8–12 [7]; and 10–17 [11] setae on serrated vulval margin; sternites III–VII without medioanterior setae. Anal fringe formed by 28–43 [37] dorsal and 30–37 [32] ventral setae.

Dimensions: TW, 0.46–0.53 [0.46]; POW, 0.36–0.38 [0.36]; HL, 0.27–0.32 [0.28]; PW, 0.29–0.34 [0.30]; MW, 0.42–0.48 [0.44]; AWIV, 0.56–0.67 [0.58]; ANW, 0.20–0.25 [0.23]; TL, 1.36–1.62 [1.38].

Male (n = 13). As in Figs 17, 29. Some data from the holotype male (Fig. 29) are in square brackets. Hypopharyngeal sclerites partially reduced (Fig. 15). Length of *dhs* 10, 0.06–0.08 [0.08]; *dhs* 11, 0.08–0.12 [0.09]; ratio *dhs* 10/11, 0.60–0.89 [0.89]. *Ls* 5 0.06–0.08 [0.07] long, latero-ventral fringe with 8–9 [7–8] setae. Gula with 6–7 setae on each side. Pronotum with 6 [6] setae on posterior margin and 3 [3] short spiniform setae on each lateral corner. Prosternal plate with rounded anterior margin. First tibia with 3 [3] outer ventro-lateral and 4 [4] dorso-lateral setae. Mesonotum undivided. Metanotum not enlarged with 4–6 [4] marginal setae (the most posterolateral setae are not included); metasternal plate with 6 setae; metapleurites with 2–3 (1 in one case on one side) [2] short spiniform strong setae. Femur III with 10–12 [11] setae in ventral setal brush.

Abdominal segments with a wide median gap in each row of tergal setae. Tergal setae (postspiracular setae and short associated setae on tergites II–VIII are not included): I, 4–8 [7]; II, 7–13 [8]; III, 7–12 [10]; IV, 8–12 [8]; V, 6–12 [9]; VI, 5–12 [7]; VII, 4–8 [4]; VIII, 3–4 [3]. Postspiracular setae very long on II, IV and VIII (0.32–0.44) [0.35–0.46]; long on I and VII (0.22–0.35) [0.26–0.29]; and short on III, V and VI (0.05–0.17) [0.06–0.14]. Length of inner posterior seta of last tergum, 0.04–0.09 [0.04]; short lateral marginal seta of last segment, 0.01–0.03 [0.02]. Pleurites without anterior setae, but with short spine-like setae on their posterior margins, as follows: I, 3–4 [5]; II, 5–6 [6]; III, 5–6 [6–7]; IV, 5–6 [6]; V, 4–5 [5–6]; VI, 2–4 [5]; VII, 2–4 [4–3]; VIII, 2–3 [3], and with slender and longer setae as follows: IV, 1 [1]; V, 1–2 [1–2]; VI, 1–2 [1–2]; VII, 2–3; pleurite VIII with inner setae (0.04–0.05) [0.04] twice as long as outer (0.02) [0.02–0.03]. Anterior margin of sternal plate II with a medial notch. Sternal setae: I, 0 [0]; II, 4–5 [4–5] in each aster, aster setae length: *s*1, 0.06–0.07; *s*2, 0.04–0.06; *s*3, 0.04–0.05; *s*4, 0.03–0.04; *s*5, 0.03–0.04; with 9–12 [9] marginal setae between asters, 3–6 medioanterior; III, 20–28 [20]; IV, 23–29 [23]; V, 23–31 [26]; VI, 18–27 [22]; VII, 12–15 [13]; VIII, 2–4 [4]; remainder of plate, 6–7 [6]; and with 5–7 [6] setae posteriorly; sternites III–VII with medioanterior setae: IV, 2–3 [3]; V, 6–7 [7]; VI, 2–5 [2]. With 8–9 [8] internal anal setae. Genital sac sclerite as in Figs 18–19, elongated with a broad, flattened triangular plate with distal tapering. Lateral arms are thin, almost invisible in some specimens. The median sclerotization is short and broad. The distal margin with slight apical indentation (slightly indented apex).

Dimensions: TW, 0.39–0.45 [0.41]; POW, 0.32–0.37 [0.33]; HL, 0.24–0.30 [0.27]; PW, 0.25–0.30 [0.26]; MW, 0.34–0.38 [0.34]; AWIV, 0.45–0.50 [0.45]; GW, 0.13–0.16 [0.15]; GL, 0.37–0.42 [0.45]; ParL, 0.08–0.10 [0.10]; GSL, 0.10–0.11 [0.10]; TL, 1.08–1.33 [1.12].

Material examined

Ex *Cinclus cinclus aquaticus* (Bechstein, 1797)

Holotype ♂, ITALY, Liguria, date unknown, Conci's Collection (skin CE26618, MSNG 545a). **Allotype** ♀, same locality as the holotype, 19 Sep. 1871 (Conci's Collection, MSNG 276). **Paratypes** 1♀, 2♂♂, same data as the holotype (Conci's Collection, MSNG 545b & 545c); 1♂ same data as the holotype (NHML UK010661924).

Non-types

Ex *Cinclus cinclus aquaticus* (Bechstein, 1797)

SLOVENIA: 7♀♀, 4 ♂♂, Polhov Gradec, 7 Dec. 1964 (Breljih's Collection, PMSL).

Ex *Cinclus cinclus leucogaster* (Bonaparte, 1850)

RUSSIA: 3♀♀, 1♂, Krasnojarskiy kr., Usinskiy tr. st., Kulumys, 6 Jun. 1940 (Blagoveshtchensky's Collection, ZISP); 11♀♀, 6♂♂, Naryn us., 27 Feb. 1913, Sharkrotma 7000 fut. (Blagoveshtchensky's Collection, ZISP).

Ex *Cinclus cinclus* (Linnaeus, 1758)

CZECH REPUBLIC: 5♀♀, 2♂♂, Kouty nad Desnou, 7 Aug. 1949 (Balát's Collection, MMBC 422); 1♀, same data (NHML UK010661925); 2♂♂, same data (B.M. 1951-325—NHML UK010661922-23). MONTENEGRO: 1♂, Durmitor, 26 Jun. 1958 (Breljih's Collection, USNM 465).

Ex *Cinclus pallasii* (Temminck, 1820)

KOREA: 2♀♀, Kwang-Nung, Kyunggi, 11 Dec. 1964, H.E. McClure (USNM SE-1585); 1♀, same data (B.M. 1965-555—NHML UK010661927). Note: All 3♀♀ identified by T. Clay.

Remarks

The original description of *Myrsidea franciscoloi* does not include the minimum of 20 characters which should be given in a description of a *Myrsidea* species, according to Clay (1966). *Myrsidea franciscoloi* is the only *Myrsidea* species known from the host family Cinclidae. It has been recorded from *Cinclus cinclus aquaticus* in central and southern Europe: Bulgaria (Ilieva 2009), Czech Republic, Slovakia (Balát 1956, 1977), Germany (Spitznagel 1985), Italy (Conci 1942a), and United Kingdom (Fowler & Hodson 1991). In addition, Doyle *et al.* (2005) reported *M. franciscoloi* from *C. cinclus hibernicus* Hartert, 1910 in Ireland. In this paper, we add records from Montenegro and Slovenia, and record *M. franciscoloi* from a new host, *C. cinclus leucogaster*, from the mountainous areas of central Asia (Gill *et al.* 2024). Price *et al.* (2003: 129, 337) listed *Cinclus pallasii* as a valid host of *M. franciscoloi* without a reference, but this host-louse association was recorded in the review by Kolencik *et al.* (2024: Appendix 1) for two females from Korea. We have examined the same two females and confirm their identity as *M. franciscoloi*. It is possible that Price *et al.* (2003) included unpublished data from slide labels of lice deposited at the USNM.

Kolencik *et al.* (2024: 45) established the *franciscoloi* morphotype-group for species with a relatively common type of male genital sac sclerite and named it according to the first-described species of the group. The male genital sac sclerite of this morphotype-group is present in 30 species of *Myrsidea* parasitizing birds from nine passerine families and hummingbirds (Kolencik *et al.* 2024: Table S3). However, species of the *franciscoloi* morphotype-group do not form monophyletic groups (Kolencik *et al.* 2024). A reliable character to distinguish *M. franciscoloi* from other *Myrsidea* species is the presence of 1–2 strong spine-like setae on the postero-lateral margin of the metanotum and tergites I–V. This character is not common among *Myrsidea* species. In addition to *M. franciscoloi*, Kolencik *et al.* (2024: 33) reported it in *Myrsidea singularis* Tandan, 1972 (host family Leiothrichidae), and *Myrsidea victoriae* Soto-Madrid & Sychra [in Soto-Madrid *et al.*], 2020 (host family

Pellorneidae). However, these two latter species differ in the type of male genital sac sclerite, and they belong to two different morphotype-groups: *singularis* and *monilegeri*, respectively (Kolencik *et al.* 2024: 41, 42). Further research on both morphological and genetic data of all species placed in the *franciscoloi* morphotype-group is necessary to assess whether *M. franciscoloi* represents a separate evolutionary lineage associated with the host family Cinclidae only. Considering the significant phylogenetic influence of host families on the *Myrsidea* phylogeny (Kolencik *et al.* 2022), incorporating genetic data is crucial for better understanding and accurate classification of the morphotype-groups and their relationship to the host families.

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