



Five new species of *Myrsidea* Waterston (Phthiraptera: Menoponidae) from tanagers (Passeriformes: Thraupidae) in Panama

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Abstract

There are 23 species of *Myrsidea* recognized from passerine thraupid hosts. Five new species parasitic on members of this avian family are described. They and their type hosts are *Myrsidea rozsai* ex the Thick-billed Euphonia, *Euphonia lanirostris* d'Orbigny & Lafresnaye, *M. cruickshanki* ex the Carmiol's Tanager, *Chlorothraupis carmioli* (Lawrence), *M. patersoni* ex the Grey-headed Tanager, *Eucometis penicillata* (Spix), *M. pagei* ex the Crimson-backed Tanager, *Ramphocelus dimidiatus* Lafresnaye, and *M. valimi* ex the Tawny-capped Euphonia, *Euphonia annea* Cassin. The first species is placed in the *bonariensis* species group, while the remaining four are placed in the *fusca* species group. Sequences of a portion of the mitochondrial cytochrome oxidase I (COI) gene were compared to other species of *Myrsidea* and were highly divergent.

Key words: chewing lice, *Myrsidea*, Phthiraptera, Menoponidae, Passeriformes, Thraupidae

Introduction

There are 23 recognized species of the genus *Myrsidea* Waterston from passerine hosts in the family Thraupidae and in the "genera incertae sedis" immediately following that family (as defined in Dickinson 2003). These include 22 species treated by Price and Dalglish (2006) and a new species subsequently described by Sychra in Sychra *et al.* (2007). After recent extensive collecting in Panama using ethyl acetate fumigation (Clayton *et al.* 1992), we have material that enables us to describe five new species of *Myrsidea* from tanagers (Thraupidae) and allies.

In the following descriptions, all measurements are in millimeters. Abbreviations are TW, temple width; HL, head length at midline; PW, prothorax width; MW, metathorax width; AWIV, abdomen width at segment IV; ANW, female anus width; GL, male genitalia length; and TL, total length. Host classification below that of order follows Dickinson (2003). The parenthetical number following each female and male heading is for the number of specimens examined.

Holotypes of the new species are in the collection of the Illinois Natural History Survey, Champaign. Paratypes are distributed between that collection and that of the Fairchild Museum, University of Panama. Sequences from a portion of the mitochondrial cytochrome oxidase I (COI) gene were obtained from each of the new species using methods described by Johnson *et al.* (2002) and compared to sequences of other *Myrsidea* species to assess the genetic distinctiveness of the new species.

Genus *Myrsidea* Waterston

Myrsidea Waterston 1915: 12. Type species: *Myrsidea victrix* Waterston by original designation.

A thorough characterization of this genus may be found in Clay (1966) and in the papers referred to by Price and Dalgleish (2006). In order to avoid needless repetition, we will make generous reference to the descriptions, illustrations, and keys in the earlier work in which Price and Dalgleish (2006) discussed all 22 of the then known species of *Myrsidea* from hosts in the Thraupidae.

The first new species described below belongs to the *bonariensis* species group as discussed in Price and Dalgleish (2006), with both sexes having the majority to all of the abdominal segments with a continuous row of tergal setae across each segment, without a well-defined median gap in these rows.

Myrsidea rozsai Price and Johnson, new species

Type host. *Euphonia laniirostris* d'Orbigny & Lafresnaye, the Thick-billed Euphonia.

Female (3). Gula with 4 or 5 setae on each side. Metanotum and dorsal abdomen shaped as in Price and Dalgleish (2006: Fig. 10). Metanotum not enlarged, posterior margin with 8–12 setae; metasternal plate with 6 setae. Abdominal tergite I slightly enlarged with gently curved posterior margin, II–III with small medioposterior convexity. Tergal setae: I, 9–10; II, 23–26; III–IV, 27–32; V–VI, 25–28; VII, 22–24; VIII, 16–19. Postspiracular setae extremely long on II, IV, and VIII (>0.35 long), considerably shorter on I, III, V, and VI (<0.20 long), and intermediate between these lengths on VII. Sternal setae: II, 4 in each aster, 16–19 marginal between asters, 13–15 anterior; III, 21–25; IV, 27–33; V, 30–34; VI, 27–32; VII, 16–17; VIII–IX, 19–22. Anus with 31–37 setae in each ventral and dorsal fringe. Dimensions: TW, 0.42–0.43; HL, 0.30–0.31; PW, 0.27–0.29; MW, 0.42–0.44; AWIV, 0.59–0.61; ANW, 0.20–0.21; TL, 1.50–1.56.

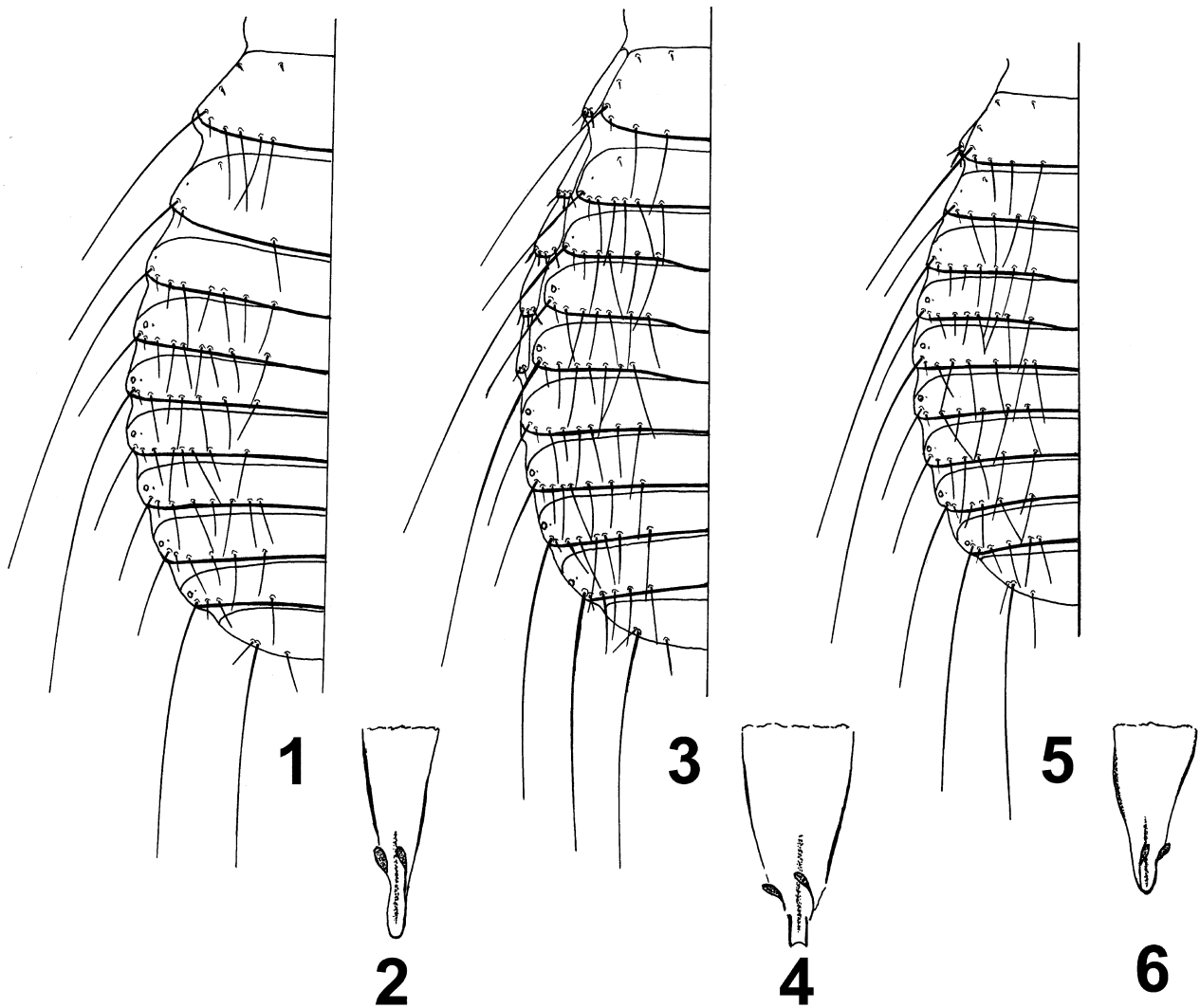
Male (3). Much as in Price and Dalgleish (2006: Fig. 1) except for having more numerous abdominal tergal and sternal setae. Gula with 5, sometimes 4, setae on each side. Metanotal posterior margin with 10–11 setae; metasternal plate with 6 setae. Tergal setae: I, 18–22; II, 25–28; III–VI, 25–33; VII, 24–30; VIII, 19–21. Postspiracular setae as for female. Sternal setae: II, 4, less often 3, in each aster, 15–17 marginal between asters, 14–16 anterior; III, 24–28; IV, 25–32; V, 30–35; VI, 27–33; VII, 17–22; VIII, 10. Genital sac sclerite as in Price and Dalgleish (2006: Fig. 7), tapered apically, with median dark line and small subapical process on each side. Dimensions: TW, 0.39; HL, 0.28; PW, 0.27–0.28; MW, 0.35; AWIV, 0.41–0.43; GL, 0.38–0.40; TL, 1.20–1.24.

Type material. Holotype female, ex *E. laniirostris*, PANAMA: Serrania del Maje, 15 Feb 2006, JMD 595, K Johnson. Paratypes: 2 females, 2 males, same data as holotype; 1 male, same except Charco Azul, 2 Mar 2006, JMD 916.

Remarks. This species is morphologically very similar to *M. violaceae* Price and Dalgleish ex *Euphonia violacea* (Linnaeus), with both the female and male keying to *M. violaceae* in couplets 10 and 9, respectively. The female of *M. rozsai* is separated by having fewer setae on tergite I, more setae on tergites II–IV and sternites III–IV, a greater total length, and a tendency for other dimensions to be larger. While there are no clearcut characters separating the males of these two species, that of *M. rozsai* has a greater total length, other dimensions at the upper limits for *M. violaceae*, and a tendency for more sternal setae on VII–VIII.

Etymology. This species is named for Lajos Rózsa, Hungarian Natural History Museum, Budapest, in recognition of his many contributions to louse ecology.

The four new species described below belong to the *fusca* species group as discussed in Price and Dalgleish (2006), with both sexes having a well-defined median gap in the rows of tergal setae.



FIGURES 1–6. 1–2. *Myrsidea cruickshanki*. 1. Female metanotum and dorsal abdomen. 2. Male genital sac sclerite. 3–4. *M. patersoni*. 3. Female metanotum and dorsal abdomen. 4. Male genital sac sclerite. 5–6. *M. valimi*. 5. Female metanotum and dorsal abdomen. 6. Male genital sac sclerite.

***Myrsidea cruickshanki* Price and Johnson, new species**

(Figs. 1, 2)

Type host. *Chlorothraupis carmioli* (Lawrence), the Carmiol's Tanager.

Female (7). Gula usually with 5 setae on each side, sometimes only 4. Metanotum and dorsal abdomen as in Fig. 1. Metanotum not enlarged, posterior margin with 10–12 setae; metasternal plate with 6–7 setae. Tergite I much enlarged, remainder smaller, with II–III curved due to compression by I, and remainder normal. Tergal setae: I, 6; II, 14–16; III–V, 16–19; VI, 14–16; VII, 11–14; VIII, 8. Postspiracular setae extremely long on II, IV, and VIII (>0.40 long), considerably shorter on III, V, VI, and VII (<0.20 long), and intermediate to these in length on I. Sternal setae: II, 4 in each aster, 15–18 marginal between asters, 8–10 anterior; III, 23–27; IV, 29–34; V, 32–36; VI, 24–32; VII, 17–20; VIII–IX, 19–23. Anus with 32–39 setae in each ventral and dorsal fringe. Dimensions: TW, 0.48–0.50; HL, 0.32–0.33; PW, 0.30–0.33; MW, 0.46–0.48; AWIV, 0.59–0.66; ANW, 0.24–0.25; TL, 1.66–1.72.

Male (4). Gula with 5, sometimes 6, setae on each side. Metanotal posterior margin with 11–12 setae; metasternal plate with 6 setae. Tergal setae: I, 11–13; II, 18–21; III–V, 17–22; VI, 16–18; VII, 14–15; VIII, 10–12. Postspiracular setae as for female. Sternal setae: II, 4 in each aster, 16–19 marginal between asters, 8–12 anterior; III, 20–25; IV, 26–29; V, 28–31; VI, 26–31; VII, 19–20; VIII, 11–12. Genital sac sclerite as in Fig. 2, with elongate slender apical portion. Dimensions: TW, 0.42–0.44; HL & PW, 0.29–0.31; MW, 0.38–0.39; AWIV, 0.48–0.49; GL, 0.41–0.45; TL, 1.32–1.38.

Type material. Holotype female, ex *C. carmioli*, PANAMA: Serrania del Maje, 15 Feb 2006, JMD 581, K Johnson. Paratypes: 2 females, 1 male, same data as holotype; 2 females, 1 male, same except JMD 608; 1 male, same except JMD 610; 2 females, 1 male, same except Palo Seco, 24 Feb 2006, JK06-244.

Remarks. Even though the female of *M. cruickshanki* keys to *M. fusca* (Carriker) in couplet 14 and the male cannot be successfully identified through couplets 12 and 13, both are readily distinguished from those of the other members of the *fusca* species group by having their postspiracular setae on tergite VII as short as those on V and VI and much shorter than the extremely long setae on VIII. Both sexes of *M. cruickshanki* additionally usually have five gular setae on each side. The female has fewer setae on most abdominal tergites, especially on VIII, and a tendency for larger dimensions, while the male has fewer setae on sternite VII and more setae on sternite VIII.

Etymology. This species is named for Robert Cruickshank, Lincoln University, Canterbury, New Zealand, in recognition of his contributions to the systematics of lice.

***Myrsidea patersoni* Price and Johnson, new species**

(Figs. 3, 4)

Type host. *Eucometis penicillata* (Spix), the Grey-headed Tanager.

Female (6). Gula with 4 setae on each side, sometimes 3 or 5. Metanotum and dorsal abdomen as in Fig. 3. Metanotum not enlarged, posterior margin with 8–10 setae; metasternal plate with 5–6 setae. All tergites of essentially similar length, I with straight margin, II, III, and occasionally IV with very slight medioposterior convexity, remainder with straight margin. Tergal setae: I, 12–15; II, 14–16; III–VI, 15–18; VII, 14–16; VIII, 11–14. Postspiracular setae extremely long on II, IV, VII, and VIII (>0.40 long), considerably shorter on III, V, and VI (<0.22 long), intermediate to these in length on I. Sternal setae: II, 4 in each aster, 15–21 marginal between asters, 7–9 anterior; III, 21–28; IV, 33–36; V, 35–42; VI, 32–34; VII, 16–20; VIII–IX, 19–24. Anus with 33–38 setae in each ventral and dorsal fringe. Dimensions: TW, 0.48–0.49; HL, 0.32–0.33; PW, 0.29–0.31; MW, 0.44–0.47; AWIV, 0.65–0.69; ANW, 0.23–0.24; TL, 1.62–1.65.

Male (4). Gula with 4, sometimes 3, setae on each side. Metanotal posterior margin with 6–8 setae; metasternal plate with 4–6 setae. Tergal setae: I, 10–12; II, 12–14; III–VI, 13–17; VII, 13–16; VIII, 10–12. Postspiracular setae as for female. Sternal setae: II, 4 in each aster, 14–16 marginal between asters, 8–10 anterior; III, 19–24; IV, 26–29; V, 31–33; VI, 27–31; VII, 14–18; VIII, 6–8. Genital sac sclerite as in Fig. 4, with parallel-sided terminally truncated apical portion. Dimensions: TW, 0.44–0.45; HL, 0.30–0.31; PW, 0.28–0.30; MW, 0.38–0.42; AWIV, 0.50–0.52; GL, 0.47–0.49; TL, 1.29–1.37.

Type material. Holotype female, ex *E. penicillata*, PANAMA: Charco Azul, 2 Mar 2006, JMD 861, K Johnson. Paratypes: 1 female, 2 males, same data as holotype; 3 females, 2 males, same except JMD 859; 1 female, same except JMD 895.

Remarks. The female of *M. patersoni* goes to *M. surinami* Price and Dalgleish and *M. ramphoceli* Price and Dalgleish in couplet 21, but does not satisfy either of these species. Both of these two have very long to extremely long postspiracular setae on all tergites and also differ in some dimensions and numbers of setae. The male of *M. patersoni* keys to *M. rufi* Price and Dalgleish in couplet 19. The differing genital sac sclerites distinguish these species. The female of *M. rufi* has a pronounced medioposterior convexity of tergite II, something lacking for *M. patersoni*.

Etymology. This species is named for Adrian Paterson, Lincoln University, Canterbury, New Zealand, in recognition of his contributions to the systematics of lice.

***Myrsidea pagei* Price and Johnson, new species**

Type host. *Ramphocelus dimidiatus* Lafresnaye, the Crimson-backed Tanager.

Female (3). Gula with 4 setae on each side. Metanotum and dorsal abdomen as for *M. patersoni* (Fig. 3). Metanotum not enlarged, posterior margin with 11 setae; metasternal plate with 5–7 setae. Tergites of essentially similar size, with I having straight posterior margin, II–III with obvious convexity, and IV–VI with only slight convexity due to compression by segments anterior to them. Tergal setae: I, 13–14; II, 15–16; III–VI, 15–18; VII, 14–15; VIII, 11–12. Postspiracular setae extremely long on II, IV, VII and VIII (>0.40 long), considerably shorter on I, III, V, and VI (usually <0.30 long). Sternal setae: II, 4 in each aster, 14–18 marginal between asters, 7–8 anterior; III, 22–25; IV, 30–33; V, 34–36; VI, 28–30; VII, 15–17; VIII–IX, 22–26. Anus with 32–36 ventral, 35–38 dorsal fringe setae. Dimensions: TW, 0.47–0.48; HL, 0.32–0.33; PW, 0.30–0.31; MW, 0.46–0.48; AWIV, 0.63–0.66; ANW, 0.23–0.24; TL, 1.58–1.64.

Male (4). Gula with 4, sometimes 5, setae on each side. Metanotal posterior margin with 7–8 setae; metasternal plate with 5–6 setae. Tergal setae: I, 9–12; II, 13–15; III–V, 14–18; VI–VII, 14–16; VIII, 11–13. Postspiracular setae as for female. Sternal setae: II, 4, less often 3, in each aster, 13–16 marginal between asters, 8–10 anterior; III, 19–20; IV, 24–25; V, 28–31; VI, 24–26; VII, 17–18; VIII, 6–7. Genital sac sclerite as for *M. patersoni* (Fig. 4). Dimensions: TW, 0.42–0.44; HL, 0.30–0.31; PW, 0.27–0.29; MW, 0.39–0.40; AWIV, 0.46–0.49; GL, 0.43–0.46; TL, 1.26–1.30.

Type material. Holotype female, ex *R. dimidiatus*, **PANAMA:** Serrania del Maje, 15 Feb 2006, JK06-025, K Johnson. Paratypes: 1 female, 3 males, same data as holotype; 1 female, 1 male, same except 17 Feb 2006, JMD 712.

Remarks. This species is close morphologically to *M. patersoni*, differing from the other species of the group in the same ways as the latter. These two species are separable by *M. pagei* having the female with a more obvious medioposterior convexity on tergites II and III and fewer setae on the abdominal sternites, and the male with fewer sternal setae on IV–VI.

Etymology. This species is named for Rod Page, University of Glasgow, United Kingdom, in recognition of his contributions to the systematics and electronic taxonomic resources for lice.

***Myrsidea valimi* Price and Johnson, new species**

(Figs. 5, 6)

Type host. *Euphonia anaeae* Cassin, the Tawny-capped Euphonia.

Female (3). Gula with 4, sometimes 3, setae on each side. Metanotum and dorsal abdomen as in Fig. 5. Metanotum not enlarged, posterior margin with 9 setae; metasternal plate with 6 setae. Tergites all of essentially similar size, with II–IV having very slight convexity. Tergal setae: I, 12–13; II, 16; III, 17–18; IV, 15–17; V–VI, 13–16; VII, 12–14; VIII, 9–13. Postspiracular setae extremely long on II, IV, and VIII (>0.35 long), considerably shorter on I, III, V, and VI (<0.20 long), and intermediate between these in length on VII. Sternal setae: II, 4 in each aster, 13–15 marginal between asters, 10–12 anterior; III, 23–25; IV, 23–28; V, 29–31; VI, 21–24; VII, 12–13; VIII–IX, 15–18. Anus with 25–34 setae in each ventral and dorsal fringe. Dimensions: TW, 0.40–0.41; HL, 0.28–0.29; PW, 0.26–0.28; MW, 0.38–0.41; AWIV, 0.49–0.55; ANW, 0.17–0.18; TL, 1.34–1.41.

Male (3). Metanotal posterior margin with 8–10 setae; metasternal plate with 6 setae. Tergal setae: I, 12–14; II–VI, 12–18; VII–VIII, 10–13. Postspiracular setae as for female. Sternal setae: II, 3, less often 4, in each aster, 11–12 marginal between asters, 9–10 anterior; III, 19–20; IV–VI, 21–25; VII, 12–13; VIII, 5–7. Genital

sac sclerite as in Fig. 6, broadly triangular with blunt rounded apical tip. Dimensions: TW, 0.36–0.39; HL & PW, 0.26–0.28; MW, 0.34–0.35; AWIV, 0.39–0.44; GL, 0.38–0.39; TL, 1.13–1.16.



FIGURE 7. Phylogeny based on maximum likelihood analysis of 379 bp of the mitochondrial COI gene. Search involved 10 random addition replicates using a GTR+I+G model. Branches are proportional to substitutions per site (scale indicated). Bold names indicate species described in this study. *M.* = *Myrsidea*.

Type material. Holotype female, ex *E. anneae*, **PANAMA:** Fortuna, 27 Feb 2006, JMD 840, K Johnson. Paratypes: 1 female, 2 males, same data as holotype; 1 female, 1 male, same except Palo Seco, 23 Feb 2006, GMS 2008.

Remarks. The female of this species keys close to *M. venustae* Price and Dalglish and *M. diglossae* Price and Dalglish in couplets 19 and 20, respectively, while the male keys only to the latter species in couplet 16, probably limited to that because the male of *M. venustae* is still unknown. The female of *M. valimi* is separated from both of these other species by having fewer tergal and sternal setae than *M. diglossae* and more in those positions than *M. venustae*. The male of *M. valimi* also has fewer tergal and sternal setae on most segments than does *M. diglossae*.

Etymology. This species is named for Michel P. Valim, Belo Horizonte, Brazil, in recognition of his deep interest in the taxonomy of the chewing lice and his past and anticipated future contributions to the subject.

Discussion

Price and Dalglish (2006) described 18 new species of *Myrsidea* with a high degree of host specificity within the passerine family Thraupidae. Each of the new species described here was collected from a single host species. There are likely many more new species of *Myrsidea* awaiting collection and description from birds in the family Thraupidae, which contains well over 200 species.

Data from partial sequences of the mitochondrial COI gene (GenBank Accession Numbers FJ171282, F171287, GQ454448-50; Fig. 7) support the genetic distinctiveness of each of the new species from each other and from other species of *Myrsidea*. Genetic divergences between the new species and any other species of *Myrsidea* were greater than 14.5% in all comparisons. While phylogenetic analyses of this single gene region do not resolve phylogenetic relationships with strong support, *Myrsidea patersoni* appears as the sister taxon of *M. pagei*, as suggested on the basis of morphology (see above). In addition, *M. valimi* appears as sister to *M. rozsai* in this analysis. However, these two species, while occurring on the same host genus, are in two different species groups. More data are needed from additional genes before phylogenetic relationships among *Myrsidea* species can be resolved with confidence (e.g. Bueter *et al.* 2009).

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