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Five new species of *Myrsidea* Waterston (Phthiraptera: Menoponidae) from antshrikes and antbirds (Passeriformes: Thamnophilidae)

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Abstract

Five new species of *Myrsidea* parasitic on members of the avian family Thamnophilidae are described herein. They and their type hosts are *Myrsidea klickai* ex the Northern Slaty Antshrike, *Thamnophilus punctatus* (Shaw, 1809), *M. dacostai* ex the Barred Antshrike, *Thamnophilus doliatus* (Linnaeus, 1764), *M. spellmani* ex the Spotted Antbird, *Hylophylax naevioides* (Lafresnaye, 1847), *M. milleri* ex the Rufous-throated Antbird, *Gymnopithys rufigula* (Boddaert, 1783), and *M. mayermae* ex the White-faced Antbird, *Pithys albifrons* (Linnaeus, 1766). A portion of the mitochondrial COI gene for some of these and other species of *Myrsidea* was sequenced to compare genetic divergences.

Key words: chewing lice, sequence, mitochondrial COI

Introduction

At present, *Myrsidea mcleannani* Sychra, 2006, is the only species of *Myrsidea* recognized from hosts in the passerine family Thamnophilidae as delimited by Dickinson (2003). Herein we describe and illustrate five new species of *Myrsidea* from thamnophilid hosts from Panama, Peru, and Venezuela.

In the following descriptions, all measurements are in millimeters. Abbreviations are TW, temple width; HL, head length; 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 quantified.

Holotypes for three of the new species, as indicated by "(USNM)", are in the collection of the National Museum of Natural History, Smithsonian Institution, Washington, D.C.; those of the other two new species, as indicated by "(INHS)", are in the collection of the Illlinois Natural History Survey, Champaign. Paratypes are distributed between these two collections.

Sequences of a portion of the mitochondrial COI gene were obtained for two of the species described herein. These were compared to sequences of other *Myrsidea* to evaluate the genetic distinctiveness of these species and their possible phylogenetic relationships.

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Genus *Myrsidea* Waterston

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

A thorough characterization of this genus may be found in Clay (1966). We provide here only the characters we have found to be pertinent to the delineation of the genus as it pertains to the thamnophilid lice.

Head (Fig. 1) evenly rounded anteriorly; lacking lateral slit or notch; with long inner and minute outer occipital seta on each side; each temple margin with 4 very long setae; without ventral sclerotized processes; gula with 4, less often 3 or 5, setae on each side with posterior seta heavier and longer than those anterior to it.

Thorax (Fig. 1) with pronotum lacking central setae; with 3 short setae at each lateral angle and 6 longer posterior marginal setae. Mesonotum well defined, with 2 minute medioanterior setae adjacent to postnotum and 2 minute setae at posterior margin. Metanotum not enlarged, without central setae, but with 6 short anterior setae around periphery and with very long seta at lateroposterior corner in addition to other marginal setae. Prosternal plate well developed, elongate, with 2 short anterior setae; metasternal plate prominent, diamond shaped; venter of femur III with setal brush.

Abdomen (Figs. 1, 2) having undivided tergites; without anterior setae except for a very small seta near lateroanterior corner on each side of tergite I (not included in setal count); tergal setal rows with pronounced gap in center of each row; sternite I small, without setae; sternite II enlarged, with aster of small number of heavy setae at each lateroposterior corner. Postspiracular setae very long on I (0.17–0.33), extremely long on II, IV, and VIII (at least 0.40), shorter on III, V, and VI (0.12–0.20), and usually at least 0.35 on VII. Pleurites without anterior setae. Female anus oval, without inner setae. Female subgenital plate of fused sternites VII–IX; setae given for VII represent those anteriorly located on region of segment VII, and those for VIII–IX are the remainder of the plate setae. Male subgenital plate of fused sternites VIII–IX; setae given for VIII represent those anteriorly located on region of segment VIII; the remainder of the plate setae are not quantified; genitalia of characteristic shape (Fig. 4), with spinous sac having distinctively shaped associated sclerite (Figs. 3, 5).

Sexual dimorphism is limited to males having smaller dimensions, often sparser abdominal chaetotaxy, and differences associated with the posterior abdomen. Female and male abdominal tergites are essentially unmodified, with the pattern of postspiracular setal lengths similar for both sexes; female tergites II, III, and IV with at most only a very slight medioposterior convexity. The above-listed characters and those below for each of the two species groups will not be repeated in the species descriptions.

klickai species group

Both sexes of the three species of this group with only 3–4 setae in each aster on sternite II. The male genital sac sclerite (Fig. 3) elongate and slender, 0.075–0.085 long, apically bifurcate, with median dark line and usually with a small process on each side. The female subgenital plate has its posterior margin only lightly spiculate, and the inner terminal setae on tergite IX 0.050–0.100 (mean = 0.075; n = 15) long, inserted 0.020–0.060 (mean = 0.033; n = 20) from base of each very long seta (Fig. 2).

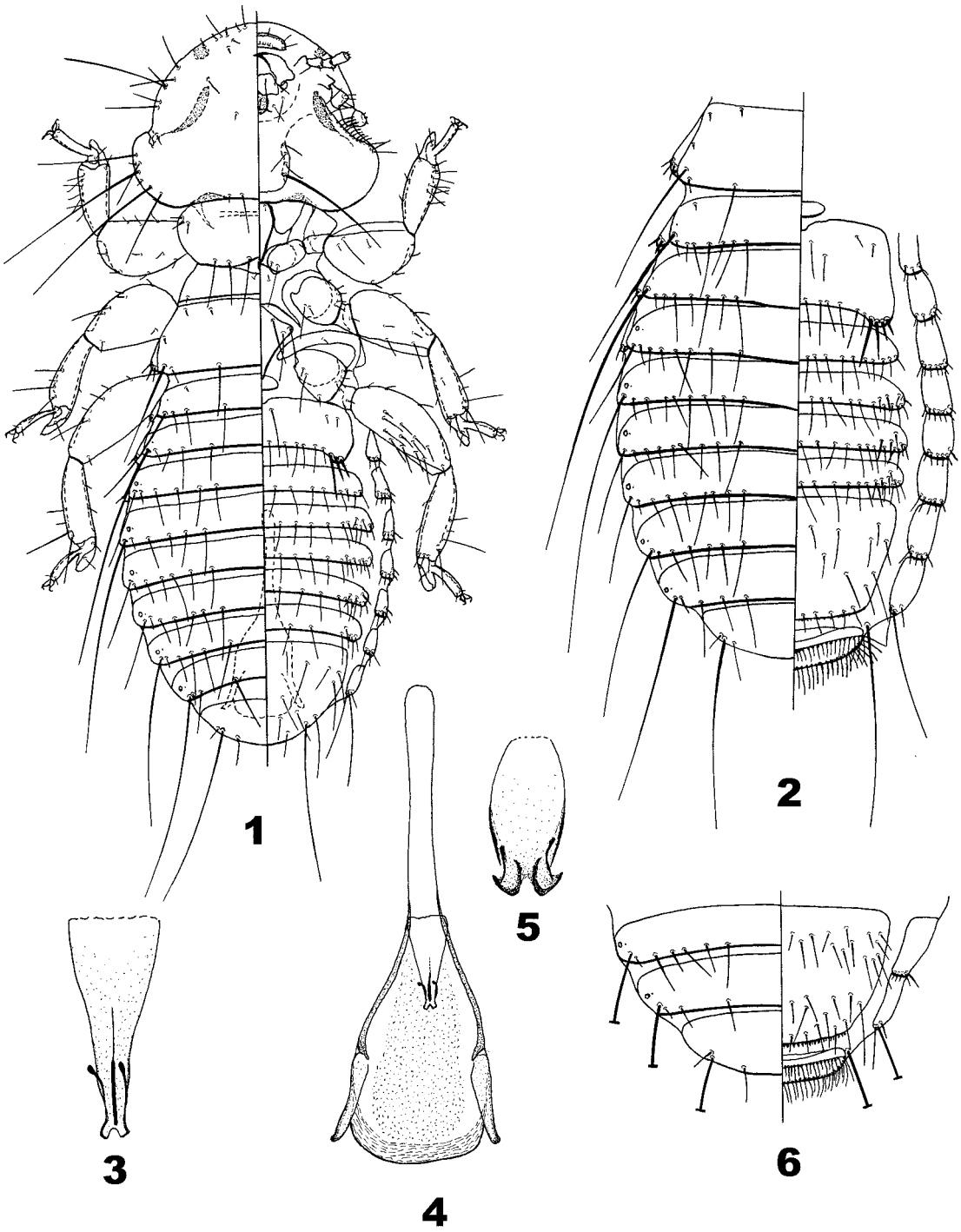
Myrsidea klickai Price, Johnson, and Dalgleish, new species (Figs. 1–4)

Type host. *Thamnophilus punctatus* (Shaw, 1809), the Northern Slaty Antshrike.

Female (5). Metanotum and dorsoventral abdomen as in Fig. 2. Metanotal posterior margin with 6 setae; metasternal plate with 6, much less often 7, setae. Tergal setae: I, 14–16; II, 15–16; III, 15–17; IV, 14–18; V, 16–19; VI, 16–18; VII, 14–17; VIII, 9–10. Sternal setae: II, 12–17 marginal between asters, 7–8 anterior; III,

18–21; IV, 27–34; V, 29–33; VI, 27–31; VII, 9–12; VIII–IX, 16–19. Anus with 38–42 ventral, 39–46 dorsal fringe setae. Dimensions: TW, 0.46–0.49; HL, 0.32–0.34; PW, 0.30–0.32; MW, 0.43–0.45; AWIV, 0.60–0.63; ANW, 0.23–0.25; TL, 1.50–1.57.

Male (3). As in Fig. 1. Metanotum and metasternal plate as for female. Tergal setae: I, 7–8; II, 10–12; III–IV, 11–12; V–VI, 12–14; VII, 11–12; VIII, 8. Sternal setae: II, only 3 in each aster, 11–14 marginal between asters, 5–9 anterior; III, 14–18; IV, 23–26; V, 23–27; VI, 22–25; VII, 10–12; VIII, 6–10. Dimensions: TW, 0.43–0.45; HL, 0.31–0.32; PW, 0.28–0.30; MW, 0.38; AWIV, 0.47–0.49; GL, 0.40–0.41; TL, 1.23–1.32.



FIGURES 1–6. 1–4. *Myrsidea klickai*. 1. Entire dorsoventral male. 2. Female metanotum and dorsoventral abdomen. 3. Male genital sac sclerite. 4. Male genitalia. 5–6. *M. milleri.* 5. Male genital sac sclerite. 6. Female dorsoventral terminalia.

Type material. Holotype male (INHS), ex *T. punctatus*, **PANAMA:** Serriana del Maje, 16 Feb. 2006, JMD 649, K. Johnson. Paratypes: (INHS) 1 female, same data as holotype; 2 females, 1 male, **PANAMA**: Lago Bayano, 12 Feb. 2006, GMS 1768, K. Johnson; 1 female, same except GMS 1770; (USNM) 1 female, 1 male, **PANAMA**: Lago Bayano, 12 Feb. 2006, GMS 1768.

Remarks. This species is separated from the following two species of the group by the combination of dimensions and number of metanotal marginal setae of both sexes, length of male genitalia, and number of setae on male abdominal tergites and dorsal anal fringe of the female.

Etymology. This species is named for John Klicka, Marjorie Barrick Museum, University of Nevada, Las Vegas, in recognition of his assistance in collecting the lice used in this study and for his work on avian systematics.

Myrsidea dacostai Price, Johnson, and Dalgleish, new species

Type host. *Thamnophilus doliatus* (Linnaeus, 1764), the Barred Antshrike.

Female (3). Metanotum with 7–8 marginal setae; metasternal plate with 5–7 setae. Tergal setae: I, 16–18; II, 15–19; III, 15–18; IV, 18–19; V, 19–21; VI, 19–20; VII, 16–18; VIII, 9–12. Sternal setae: II, 14–16 marginal between asters, 8–9 anterior; III, 21–23; IV, 29–34; V, 33–37; VI, 30–33; VII, 8–11; VIII–IX, 18–21. Anus with 45–47 ventral, 44–50 dorsal fringe setae. Dimensions: TW, 0.49–0.50; HL, 0.33–0.34; PW, 0.31–0.33; MW, 0.48–0.51; AWIV, 0.67–0.72; ANW, 0.25–0.28; TL, 1.58–1.66.

Male (2). Metanotum with 7–8 marginal setae; metasternal plate with 4–5 setae. Tergal setae: I, 9; II–III, 14–15; IV, 15–16; V, 17–18; VI, 15–16; VII, 11–13; VIII, 8–9. Sternal setae: II, 11–12 marginal between asters, 8–9 anterior; III, 19–20; IV, 24–26; V–VI, 27–28; VII, 14; VIII, 9–12. Dimensions: TW, 0.45–0.46; HL, 0.31–0.32; PW, 0.28–0.29; MW, 0.41–0.42; AWIV, 0.53; GL, 0.44–0.46; TL, 1.36–1.37.

Type material. Holotype male (USNM), ex *T. doliatus*, **NE PERU:** 50 km SE Iquitos, Explor Ama Camp, Rio Yanamoto, 20 June 1989, R.C.D. *et al*. Paratypes: (USNM) 2 females, same data as holotype; (INHS) 1 female, 1 male, same data as holotype.

Remarks. Both sexes of *M. dacostai* are larger in most dimensions than for *M. klickai* and they also have more marginal metanotal and abdominal tergal setae.

Etymology. This species is named for Jeff DaCosta, Marjorie Barrick Museum, University of Nevada, Las Vegas, in recognition of his assistance in collecting the lice used in this study and for his work on bird systematics.

Myrsidea spellmani Price, Johnson, and Dalgleish, new species

Type host. *Hylophylax naevioides* (Lafresnaye, 1847), the Spotted Antbird.

Female (3). Metanotum with 6–8 marginal setae; metasternal plate with 6 setae. Tergal setae: I, 12–14; II, 14–16; III, 15–17; IV–V, 16–17; VI, 14–17; VII, 11–14; VIII, 8–10. Postspiracular setae on VII only 0.25 long, shorter than on VIII. Sternal setae: II, 12–16 marginal between asters, 11–12 anterior; III, 21–24; IV, 30–31; V, 29–32; VI, 26–27; VII, 9–13; VIII–IX, 19–22. Anus with 30–36 ventral, 25–33 dorsal fringe setae. Dimensions: TW, 0.45–0.47; HL, 0.29–0.32; PW, 0.28–0.29; MW, 0.42–0.44; AWIV, 0.56–0.59; ANW, 0.20–0.21; TL, 1.41–1.42.

Male (2). Metanotum with 6–7 marginal setae; metasternal plate with 6 setae. Tergal setae: I, 9–10; II, 11–14; III, 15–16; IV, 16; V, 14; VI, 13–14; VII, 10–11; VIII, 8. Sternal setae: II, 11 marginal between asters, 9–10 anterior; III, 17–20; IV, 23–27; V, 24–26; VI, 23–24; VII, 12–14; VIII, 6–8. Postspiracular setae on VII <0.20 long, much shorter than on VIII. Dimensions: TW, 0.42; HL, 0.28–0.29; PW, 0.27–0.28; MW, 0.37; AWIV, 0.46–0.47; GL, 0.40–0.41; TL, 1.23–1.24.

Type material. Holotype male (INHS), ex *H. naevioides*, **PANAMA:** Rio Mono, 20 Feb. 2006, JKO6-112, K. Johnson. Paratypes: (INHS) 2 females, same data as holotype; (USNM) 1 female, 1 male, same data as holotype.

Remarks. This species is the smallest of the three species in this group, with both sexes having shorter postspiracular setae on VII and dimensions smaller than those of *M. dacostai*. This separation is further supported by the male having more tergal setae on III–IV than *M. klickai* and the female having fewer anal fringe setae and a larger number of anterior setae on sternite II.

Etymology. This species is named for Garth Spellman, Black Hills State University, Spearfish, South Dakota, in recognition of his assistance in collecting the lice used in this study and for his work on bird systematics.

mcleannani species group

Both sexes of the three species of this group with 5–6 setae in each aster on sternite II. The male genital sac sclerite (Fig. 5) broader and shorter than for the *klickai* group, 0.050–0.060 long, without a median dark line, and each apical side with a pronounced outwardly curved process. The female has the posterior margin of its subgenital plate strongly spiculate and shorter inner terminal setae on tergite IX inserted more toward the midline, 0.030–0.070 (mean = 0.042; n = 25) long, inserted 0.055–0.095 (mean = 0.069; n = 27) from base of each very long seta (Fig. 6).

Myrsidea mcleannani Sychra

Myrsidea mcleannani Sychra in Sychra *et al.* 2006: 52. Type host: *Phaenostictus mcleannani* (Lawrence, 1860).

This species was the first *Myrsidea* described from a member of the Thamnophilidae. It was described and illustrated in Sychra *et al.* (2006), and we need not repeat the details. Use of descriptive features will be limited to the minimum value for each range as given by Sychra *et al.* (2006) for certain dimensions and tergal setal counts for *M. mcleannani* as they are sufficient for comparison with our new species.

Female. Tergal setae (minimum value): I, 10; II, 17; III–IV, 20; V–VI, 19; VII, 14. Dimensions (minimum value): TW, 0.51; HL, 0.33; PW, 0.33; MW, 0.50; AWIV, 0.69; ANW, 0.31; TL, 1.70.

Male. Tergal setae (minimum value): I, 10; II, 16; III–IV, 20; V–VI, 18; VII, 16. Dimensions (minimum value): TW, 0.46; HL, 0.31; PW, 0.30; MW, 0.41; AWIV, 0.53; GL, 0.47; TL, 1.44.

Remarks. Both sexes of this species are readily separated from the other two species of this group by the consistently larger dimensions and more setae on the majority of the abdominal tergites.

Myrsidea milleri Price, Johnson, and Dalgleish, new species (Figs. 5–6)

Type host. *Gymnopithys rufigula* (Boddaert, 1783), the Rufous-throated Antbird.

Female (8). Metanotum with 6 marginal setae; metasternal plate with 5–6 setae. Tergal setae: I, 8–12; II, 12–18; III–V, 16–19; VI, 15–18; VII, 10–14; VIII, 8. Sternal setae: II, 16–19 marginal between asters, 7–11 anterior; III, 18–22; IV, 30–36; V–VI, 34–41; VII, 25–29; VIII–IX, 20–28. Anus with 32-37 setae in each ventral and dorsal fringe. Dimensions: TW, 0.45–0.47; HL and PW, 0.30–0.33; MW, 0.42–0.45; AWIV, 0.61–0.66; ANW, 0.23–0.27; TL, 1.54–1.62.

Male (6). Metanotum with 6, much less often 5, marginal setae; metasternal plate with 4–6 setae. Tergal setae: I, 8–10; II, 13–15; III, 15–17; IV, 16–19; V–VI, 14–18; VII, 11–13; VIII, 8. Sternal setae: II, 14–15

marginal between asters, 8–10 anterior; III, 15–17; IV, 24–25; V, 28–33; VI, 26–30; VII, 17–22; VIII, 8–10. Dimensions: TW, 0.41–0.43; HL, 0.27–0.31; PW, 0.27–0.30; MW, 0.37–0.39; AWIV, 0.47–0.48; GL, 0.40–0.44; TL, 1.25–1.31.

Type material. Holotype male (USNM), ex *G. rufigula*, **VENEZUELA:** Edo. Bolivar, 60 km E Sta. Elena, Jan. 1987, R.C. Dalgleish. Paratypes: (USNM) 6 females, 4 males, same data as holotype; (INHS) 2 females, 2 males, same data as holotype.

Remarks. The dimensions of *M. milleri* are similar to those of the next species, both being distinctly smaller than those of *M. mcleannani*. The specific points for separating these two smaller species will be discussed under the remarks for the following species.

Etymology. This species is named for Matthew Miller, University of Alaska Museum, Fairbanks, in recognition of his assistance in collecting the lice used in this study and for his work on birds in Panama.

Myrsidea mayermae Price, Johnson, and Dalgleish, new species

Type host. *Pithys albifrons* (Linnaeus, 1766), the White-faced Antbird.

Female (6). Metanotum with 6, less often 7, marginal setae; metasternal plate with 5–7 setae. Tergal setae: I, 8–12; II, 14–16; III, 14–19; IV–VI, 14–17; VII, 10–14; VIII, 8, less often 7. Sternal setae: II, 12–15 marginal between asters, 7–9 anterior; III, 22–26; IV, 30–35; V, 34–43; VI, 33–37; VII, 24–27; VIII–IX, 21–24. Anus with 31–37 setae in each fringe. Dimensions: TW, 0.44–0.46; HL and PW, 0.30–0.32; MW, 0.41–0.45; AWIV, 0.57–0.63; ANW, 0.23–0.25; TL, 1.47–1.51.

Male (8). Metanotum with 6 marginal setae; metasternal plate with 4–6 setae. Tergal setae: I, 8–9; II, 12–15; III, 13–16; IV, 12–15; V–VI, 11–14; VII, 8–11; VIII, 8. Sternal setae: II, 10–13 marginal between asters, 7–9 anterior; III, 14–18; IV, 17–26; V, 23–27; VI, 20–27; VII, 13–16; VIII, 4–6. Dimensions: TW, 0.40–0.43; HL, 0.28–0.31; PW, 0.27–0.29; MW, 0.35–0.37; AWIV, 0.45–0.48; GL, 0.41–0.46; TL, 1.22–1.32.

Type material. Holotype male (USNM), ex *P. albifrons*, **VENEZUELA:** Edo. Bolivar, 60 km E Sta. Elena, Jan. 1987, R.C. Dalgleish. Paratypes: (USNM) 4 females, 5 males, same data as holotype; (INHS) 2 females, 2 males, same data as holotype.

Remarks. Both *M. milleri* and *M. mayermae* share similar small dimensions, thereby differing from *M. mcleannani*. Features for recognizing *M. mayermae* include female with a shorter total length, male with fewer tergal setae on IV–VII and fewer sternal setae on IV–VIII, and both sexes with fewer marginal setae between the asters on sternite II.

Etymology. This species is named for Peggy Guitton-Mayerma, University of Alaska Museum, Fairbanks, in recognition of her assistance in collecting the lice used in this study.

Discussion

The six species of *Myrsidea* described to date from thamnophilid hosts form a very tight-knit morphological assemblage. The number of heavy setae in each aster on sternite II of both sexes, the shape and size of the male genital sac sclerite, the spiculation of the female posterior subgenital plate margin, and the length and position of the inner marginal setae on female tergite IX form the principal means for segregating these species into two clearly defined groups of three species each. However, differentiation of species within each group is not based on what we would consider to be profound features. Only by using dimensions and certain setal counts have we been able to offer means for species recognition.

Sequences of a 379 base pair portion of the mitochondrial COI gene (GenBank accession Nos. EU650228, EU650229) were obtained from *M. klickai* and *M. spellmani*. Fresh specimens of the other species

described herein were not available for DNA sequencing. The divergence between these two species for this gene region was 12.1%. This level of divergence is similar to that reported for other very closely related species of *Myrsidea* (Johnson and Price 2006, Price and Johnson 2006). Given the host specificity reported here and the fact that only six of the over 200 species of Thamnophilidae have *Myrsidea* recorded from them, we expect that many more species of *Myrsidea* await discovery and description from this bird family.

Phylogenetic analysis of these sequences and several other species of *Myrsidea* indicate that the *Myrsidea* from thamnophilids (*klickai* and *spellmani*) are each closely related (Fig. 7) and may have nearest relatives among the *Myrsidea* of other suboscine passerines (i.e. *Myrsidea elaeniae* on Tyrannidae). Given the morphological simliarities among the species described from Thamnophilidae and the high divergence from other *Myrsidea* in DNA sequences (Fig. 7), it seems likely that these species will all form a monophyletic group.

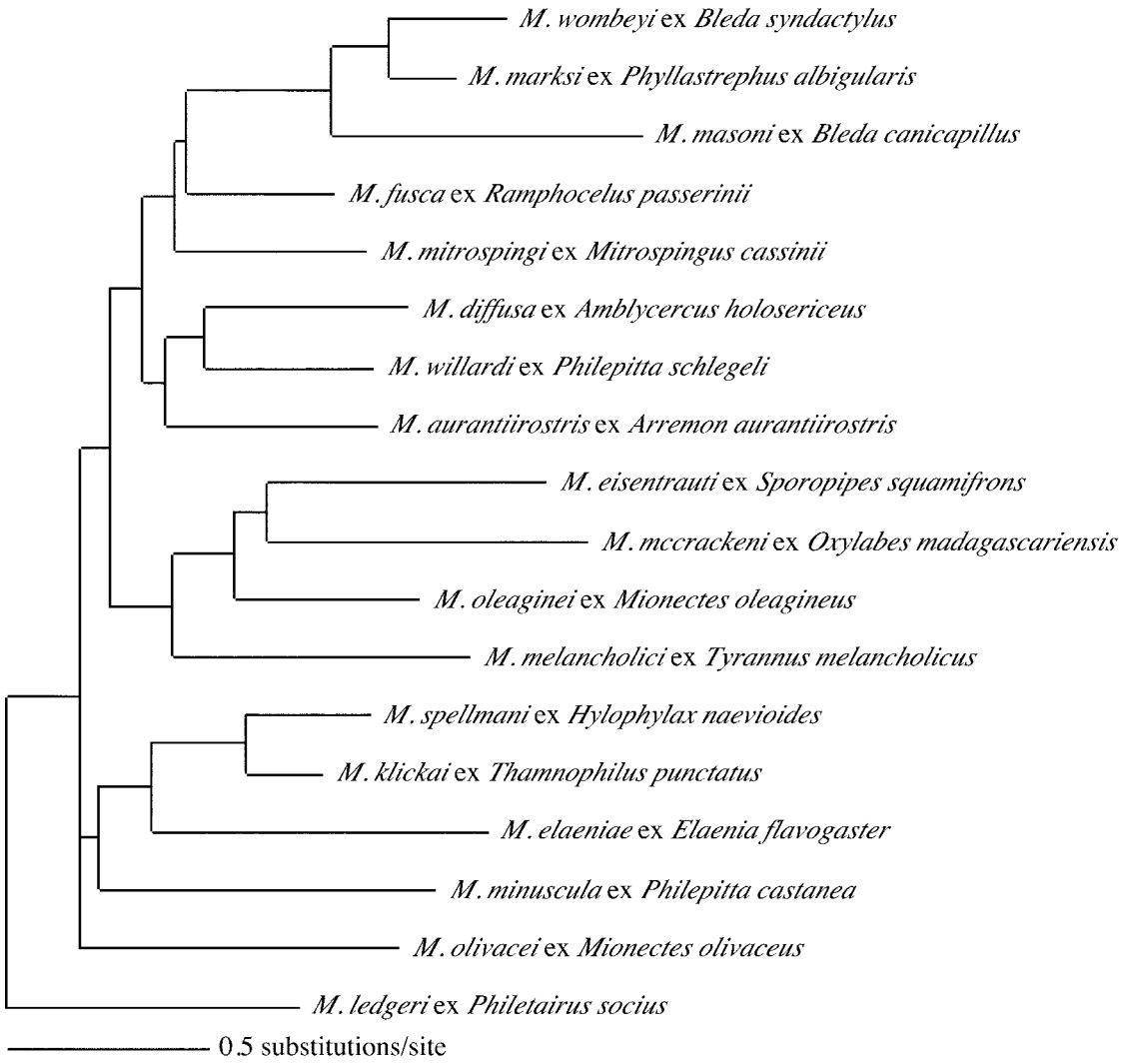


FIGURE 7. Phylogenetic tree based on maximum likelihood analysis of a 379 base pair portion of the mitochondrial COI gene. Search involved 10 random addition replicates using a GTR + I + G model. Branches are proportional to substitutions per site (scale indicated). *M.* = *Myrsidea*.

Acknowledgments

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