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New data on the taxonomy and distribution of ten Neotropical chewing lice of the genus *Myrsidea* (Phthiraptera: Menoponidae), including the description of a new species

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Abstract

The new species *Myrsidea alexanderi* is described and illustrated ex *Pheugopedius maculipectus* (Troglodytidae) from Honduras. Redescriptions and illustrations are given for both sexes of *Myrsidea chiapensis* ex *Calocitta formosa* from Costa Rica, and the male of *M. dissimilis* ex *Progne chalybea* from Brazil. Also, seven other previously known species or subspecies of the louse genus *Myrsidea* are recorded and discussed from passerine birds of the Neotropical Region, as follows: *Myrsidea antiqua*, *Myrsidea balteri*, *Myrsidea diffusa*, *Myrsidea nesomimi borealis*, *Myrsidea paleno*, *Myrsidea psittaci* and *Myrsidea serini*. Our data increase knowledge of intraspecific morphological variability within these species, and also of their host and geographical distribution. New host-louse associations are: *Agelaioides badius* for *M. psittaci*; *Basileuterus culicivorus* and *Myiothlypis leucoblephara* for *M. paleno*; *Mimus saturninus* for *M. nesomimi borealis*; and *Icterus dominicensis* and *Molothrus rufoaxillaris* for *Myrsidea* sp.

Key words: chewing lice, Phthiraptera, Amblycera, *Myrsidea*, new species, redescriptions, new host-louse associations, Neotropical Region, passerine

Introduction

The chewing louse genus *Myrsidea* Waterston, 1915 is the most speciose among Phthiraptera with more than 350 described species (Valim & Weckstein 2013), of which almost 200 species parasitise birds of the Neotropical Region. However, these numbers probably represent only a fragment of its true diversity. Valim & Weckstein (2013) estimated that only in Brazil nearly 930 unnamed *Myrsidea* species may be discovered in the future. Moreover, our knowledge of the geographical distribution and host-louse associations of *Myrsidea* species in different parts of the Neotropical Region is uneven. While there is relatively good knowledge for Brazil and Costa Rica (Valim & Weckstein 2013; Sychra *et al*. 2014), data are very limited for other countries. For example, despite the large number of passerine species living in Honduras, only *Myrsidea mirabilis* (Carriker, 1903) from *Psarocolius wagleri* (Gray, 1844) and *Myrsidea balteri* Clay, 1968 from *Quiscalus mexicanus* (Gmelin, 1788) have been recorded from that country, while only *Myrsidea fallax* Kéler, 1938 from *Cyanocorax cyanomelas* (Vieillot, 1818) and *Myrsidea psittaci* Carriker, 1955 from *Molothrus bonariensis* (Gmelin, 1789) have been recorded from Paraguay (Valim & Cicchino 2015a; González-Acuña *et al*. 2006, respectively).

Here we present new data on taxonomy, morphology and distribution of *Myrsidea* species found on wild birds of the passerine families Corvidae, Hirundinidae, Icteridae, Mimidae, Parulidae, Troglodytidae and Turdidae from Brazil, Costa Rica, Honduras and Paraguay. The aims of this paper are: (1) to describe and illustrate one new species; (2) to redescribe and illustrate both sexes of *Myrsidea chiapensis* Zavaleta, 1944, and the male of *M. dissimilis*; (3) to increase knowledge of intraspecific morphological variability of seven other Neotropical species of *Myrsidea*.

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Material and methods

Between 2004 and 2014, at various locations in four countries of the Neotropical Region (Brazil, Costa Rica, Honduras and Paraguay), mist nets were used to trap wild birds which were examined for the presence of chewing lice. For details of the coordinates of study sites in Brazil, Costa Rica and Paraguay, and detailed methods of collection and slide-mounting of chewing lice see Sychra *et al*. (2014). Study sites in Honduras were: Atlántida, Tela, Botanical Garden Lancetilla (15°44' N, 87°27' W) and Islas de la Bahía, Utila (16°06' N, 86°54' W).

Some of the louse samples studied in this paper, belonging to previously described species, differ from their original descriptions or redescriptions by setal counts and dimensions. In these cases, we present our data together with those from the original descriptions or redescriptions, but if our setal counts and dimensions are fully consistent with those in the original descriptions, the latter are not repeated here.

Contrary to the setal counting system used in our previous papers (Kounek *et al*. 2011, 2013; Sychra *et al*. 2014), we adopted here the system used by Clay (1966, 1968) and Valim & Weckstein (2013) for metanotal and tergal setae, as follows: (1) the number of metanotal setae does not include the most posterolateral setae; (2) the number of tergal setal on tergite I does not include the postspiracular setae; and (3) the numbers of tergal setal on tergites II–VIII neither include the postspiracular setae nor the short associated setae. We agree with Valim & Weckstein (2013) in that the system provided by Clay (1966) avoids counting constant setae, removes the duplications or anomalous absence of constant setae, and allows to better compare characters based on their primary homology rather than solely using characters useful for differentiating taxa. Therefore, to avoid misunderstandings, we urge authors to make careful comparison of *Myrsidea* descriptions based on the two different systems.

In the following descriptions, all measurements are in millimeters. Abbreviations for dimensions are: TW, temple width; POW, preocular width; HL, head length at midline; PW, prothorax width; MW, metathorax width; AWIV, abdomen width at level of segment IV; TL, total length; ANW, female anus width; GW, male genitalia width; GSL, genital sac sclerite length.

The taxonomy and nomenclature of the birds follow those in Clements *et al*. (2015). The ten species dealt with below are arranged in alphabetical order. All samples, including the type specimens of the new species described in this paper, are deposited in the Moravian Museum, Brno, Czech Republic (MMBC).

Systematics

Phthiraptera Haeckel 1896: 703.

Amblycera Kellogg, 1896a: 68.

Menoponidae Mjöberg, 1910: 26.

***Myrsidea* Waterston, 1915: 12.**

***Myrsidea alexanderi* new species**
(Figs 1–4, 15–16)

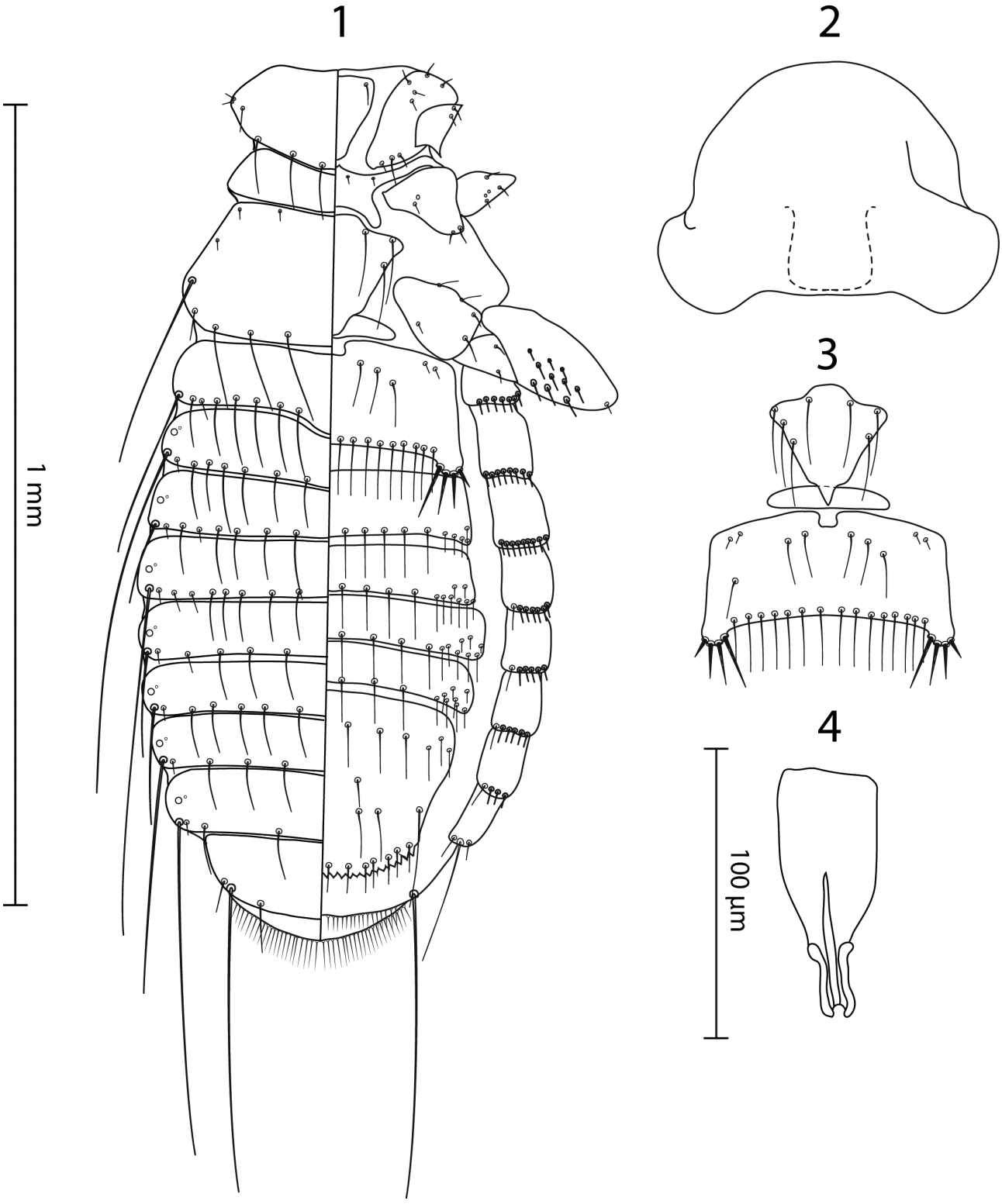
Type host. *Pheugopedius maculipectus* Lafresnaye, 1845—Spot-breasted wren (Troglodytidae).

Type locality. Atlántida, Tela, Botanical Garden Lancetilla, Honduras (15°44' N, 87°27' W).

Type material. Ex *Pheugopedius maculipectus*: Holotype ♀, Atlántida, Tela, Botanical Garden Lancetilla, Honduras (15°44' N, 87°27' W), 10–16 Aug. 2014, I. Literak leg. Paratypes: 3♀, 5♂ with same data as holotype (MMBC—O. Sychra Ho01–04).

Diagnosis. Among the *Myrsidea* species from troglodytid hosts, both sexes of *Myrsidea alexanderi* are morphologically very similar to those of *Myrsidea bessae* Price, Johnson & Dalgleish, 2008 ex *Cantorchilus semibadius* Salvin, 1870 (Troglodytidae) from Panamá, in the following combination of characters: fully developed hypopharynx; sternite II rectangular; tergite VIII with 4 setae; and small dimensions. However, females of *M. alexanderi* are easily distinguished from those of *M. bessae* by (1) tergite I with a pronounced medioposterior

convexity; (2) larger number of setae on tergites I–III (total number of setae on these three tergites ranges between 48–55, but between 41–45 in *M. bessae*); (3) smaller dimensions, especially TW (0.40–0.42 vs. 0.44–0.46) and MW (0.40–0.43 vs. 0.44–0.47). Males of *M. alexanderi* differ from those of *M. bessae* by (1) larger number of setae on metanotum (range 11–13; 6–9 in *M. bessae*); (2) smaller dimensions, especially TW (0.38–0.40 vs. 0.41) and MW (0.34–0.35 vs. 0.37–0.38).



FIGURES 1–4. *Myrsidea alexanderi* **n. sp.**: **1**, dorso-ventral view of female thorax and abdomen. **2**, head shape. **3**, female metasternal plate and sternites I–II. **4**, male genital sac sclerite.

Female (n = 4). Head shape as in Figs 2 and 15. Hypopharyngeal sclerites fully developed. Length of dorsal head seta (DHS) 10, 0.052–0.055; DHS 11, 0.10–0.11 long; ratio DHS 10/11, 0.44–0.55. Labial setae 5, (*ls5*) 0.05 long, latero-ventral fringe with 9–10 setae. Gula with 4 setae on each side. Pronotum with 6 setae on posterior margin and 3 short spiniform setae at each lateral corner. First tibia with 3 outer ventro-lateral and 4–5 dorso-lateral setae. Metanotum not enlarged; posterior margin straight with 9–11 setae; metasternal plate with 5–7 setae (Fig. 3); metapleurites with 2–3 short strong spiniform setae. Femur III with 9–12 setae in ventral setal brush. Metanotum and abdomen as in Fig. 1. Tergite I with a pronounced medioposterior convexity, other tergites with straight posterior margin. Median gap present in each tergal setal row. Tergal setae: I, 14–17; II, 12–15; III–IV, 12–14; V, 9–13; VI, 9–11; VII, 6; VIII, 4. Postspiracular setae extremely long (0.40–0.44) on II, IV, VIII; long (0.19–0.30) on I and VII; and short (0.12–0.16) on III, V–VI. Inner posterior seta of last tergum (IPTS) not longer than anal fringe setae with length 0.06–0.09; length of short lateral marginal seta of last segment (LMTS), 0.04–0.05. Pleurites I–VII with only short spine-like setae. Pleural setae: I, 5–7; II–III, 8–10; IV, 7–8; V, 5–7; VI, 5–6; VII, 4; VIII, 3. Pleurite VIII with inner setae (0.04–0.05) as long as outer (0.04). Sternite II largely rectangular with anterior margin with a medial notch (Fig. 3). Sternal setae: I, 0; II, 4 in each aster, aster setae length: s1, 0.07–0.08; s2, 0.05–0.07; s3, 0.04–0.05; s4, 0.03–0.04; with 15–18 marginal setae between asters, 5–7 anterior; III, 20–23; IV, 26–28; V, 26–30; VI, 26–28; VII, 12–17; VIII–IX, 7–9; vulva with posterior margin serrated bearing 13–14 setae; without medioanterior setae on sternites III–VII. Anal fringe formed by 42–43 dorsal and 32–34 ventral setae. Dimensions: TW, 0.40–0.43; POW, 0.30–0.33; HL, 0.30–0.31; PW, 0.27–0.30; MW, 0.40–0.42; AWIV, 0.50–0.53; ANW, 0.20–0.21; TL, 1.38–1.40.

Male (n = 5). As in fig. 16. Length of DHS 10, 0.046–0.050; DHS 11, 0.088 long; ratio DHS 10/11, 0.53–0.57. *Ls5* 0.04 long, latero-ventral fringe with 9 setae. Gula with 4–5 setae on each side. Metanotum not enlarged; posterior margin straight with 9–11 setae; metasternal plate with 5–6 setae; metapleurites with 3 short strong spiniform setae. Femur III with 8–10 setae in ventral setal brush. Median gap present in each tergal setal row. Tergal setae: I, 8; II, 10–11; III, 9–12; IV, 9–11; V, 10–12; VI, 7; VII, 6; VIII, 4. Postspiracular setae extremely long (0.40–0.44) on II and VIII; very long (0.29–0.36) on IV; long (0.16–0.23) on VII; and short (0.10–0.14) on I, III, V–VI. IPTS, 0.04–0.05 long; LMTS, 0.01 long. Pleurites I–VII with only short spine-like setae. Pleural setae: I, 3–4; II–V, 5–6; VI, 4–5; VII, 4; VIII, 3. Sternite II rectangular with anterior margin with a medial notch (Fig. 16). Sternal setae: I, 0; II, 3–4 in each aster, aster setae length: s1, 0.05–0.07; s2, 0.03–0.05; s3, 0.02–0.04; s4, 0.03; with 11–12 marginal setae between asters, 4–6 anterior; III, 17–18; IV, 22; V, 21–23; VI, 20–23; VII, 14–15; VIII 6–8; remainder of plate, 46–68; and with 34–4 setae posteriorly; without medioanterior setae on sternites III–VII. With 8 internal anal setae. Genital sac sclerite as in Fig. 4. Dimensions: TW, 0.38–0.40; POW, 0.31; HL, 0.29; PW, 0.25–0.26; MW, 0.34–0.35; AWIV, 0.42–0.44; GW, 0.10; GSL, 0.09; TL, 1.13–1.19.

Etymology. This species is named in honor of Alexander Vörös, the godson of the first author.

Remarks. This is the first record of chewing lice from *Pheugopedius maculipectus*.

Myrsidea antiqua Ansari, 1956

Myrsidea antiqua Ansari, 1956: 174, figs 10a–h.
Myrsidea antiqua Ansari, 1956; Clay 1966: 372, figs 16, 23, 43, 60, 77; pl. I: fig. 4.
Myrsidea antiqua Ansari, 1956; Price *et al.* 2003: 128.
Myrsidea antiqua Ansari, 1956; Kounek *et al.* 2013: 203.

Type host. *Turdus grayi grayi* Bonaparte, 1838—Clay-colored thrush (Turdidae).

Type locality. Tlacotalpam , México.

Material examined. Ex *Turdus grayi megas* W. Miller & Griscom, 1925: 7♀, 15♂, Atlántida, Tela, Botanical Garden Lancetilla, Honduras (15°44' N, 87°27' W), 10–16 Aug. 2014, I. Literak leg.

Remarks. This species was redescribed from *T. grayi grayi* and *Turdus fumigatus aquilonalis* (Cherrie, 1909) by Clay (1966) and from *T. grayi casius* (Bonaparte, 1855) by Kounek *et al.* (2013: 204, 220). This is the first record of *Myrsidea antiqua* from Honduras and from *T. grayi megas*, the only subspecies of *T. grayi* present in Honduras (Clements *et al.* 2015). We recognized two phenotypes of *M. antiqua* differing in the length of the female postspiracular setae VI. Our specimens differ from those redescribed by Clay (1966) and by Kounek *et al.* (2013) in setal counts and dimensions, as follows (data from Clay (1966) and Kounek *et al.* (2013) are in parentheses):

Female (n = 7). First tibia with 4–5 (5–6) outer dorso-lateral setae. Femur III with 23–31 (22–24) setae in ventral setal brush. Tergal setae: IV, 21–22 (14–21); V, 18–21 (15–20). Length of postspiracular setae: VI—short, 0.15 (n = 1) or long, 0.24–0.29 (n = 6) (short, 0.13–0.16). Sternal setae: II, 4–5 (4) in each aster, 16–18 (12–16) marginal setae between asters, 7–12 (9–12) anterior, III, 30–35 (25–31); V, 37–41 (33–40); VII, 15–16 (10–14); vulval margin 12–14 (13–15) setae. Dimensions: PW, 0.31–0.33 (0.32–0.35); MW, 0.41–0.50 (0.45–0.51); AWIV, 0.61–0.64 (0.64–0.67); ANW, 0.24–0.29 (0.23–0.24); TL, 1.65–1.78 (1.59–1.74).

Male (n=15). Metanotum posterior margin straight with 14 (10–12) setae. First tibia with 4–5 (5–6) outer dorso-lateral setae. Setae of femoral brush, 20–24 (17–22). Sternal setae: II, 3–4 (4) in each aster, 5–6 (8–10) anterior, VIII, 16 (17–21). Dimensions: HL, 0.32–0.34 (0.28–0.33); GW, 0.13 (0.11–0.12); GSL, 0.10 (0.09); TL, 1.38–1.45 (1.30–1.43).

Myrsidea balteri Clay, 1968

Myrsidea balteri Clay, 1968: 222, figs 9, 16, 30; pl. 4: fig. 5.
Myrsidea balteri Clay, 1968; Price *et al.* 2003: 128.

Type host. *Quiscalus mexicanus mexicanus* (Gmelin, 1788)—Great-tailed grackle (Icteridae).

Type locality. Roatan Islands, Honduras.

Material examined. Ex *Quiscalus mexicanus*: 5♀, 5♂**,** Islas de la Bahía, Utila, Honduras (16°06' N, 86°54' W), 22–27 Aug. 2014, I. Literak leg.

Remarks. Our specimens differ from the original description of *M. balteri* by setal counts and dimensions, as follows (data from Clay (1968) are in parentheses):

Female (n = 5). Femur III with 19–22 (13–18) setae in ventral setal brush. Tergal setae: IV, 14–16 (11–14); VI, 9–13 (9–12). Sternal setae: III, 34–38 (28–34); IV, 42–47 (31–37); V, 33–35 (29–32); VI, 26 (16–24). Dimensions: TW, 0.54–0.57 (0.54–0.56); POW, 0.39–0.40 (0.36); HL, 0.35–0.36 (0.36); PW, 0.35 (0.36); TL, 1.80 (1.75).

Male (n = 5). Metanotum posterior margin straight with 9–10 (10–12) setae. Femur III with 15–18 (12–14) setae in ventral setal brush. Tergal setae: II, 12 (14–16). Sternal setae: II, 19–20 (16–18) marginal setae between asters; III, 31–32 (26–30); IV, 38–40 (29–36); V, 36–38 (24–32); VI, 25–30 (22–27); VIII, 21 (16–20); Dimensions: TW, 0.51–0.53 (0.50–0.51); POW, 0.36–0.37 (0.34); HL, 0.35 (0.34); PW, 0.31–0.34 (0.32); TL, 1.50–1.57 (1.39).

Myrsidea chiapensis Zavaleta, 1944
(Figs 5–10, 17–18)

Myrsidea chiapensis Zavaleta, 1944: 204, fig. 4.
Myrsidea chiapensis Zavaleta, 1944; Price *et al.* 2003: 128.

Type host. *Calocitta formosa azurea* Nelson, 1897—White-throated magpie-jay (Corvidae).

Type locality. Cacahoatán, Chiapas, México.

Material examined. Ex *Calocitta formosa*: 12♀, 17♂, Rincón de la Vieja, Costa Rica (10°46' N, 85°18' W), 19 Aug. 2009, O. Sychra & I. Literak leg.

Remarks. *Myrsidea chiapensis* was described by Zavaleta (1944) from México. This is the first record of this species from Costa Rica. Zavaleta (1944) only gave four dimensions for each sex, which we have placed within parentheses in our redescription.

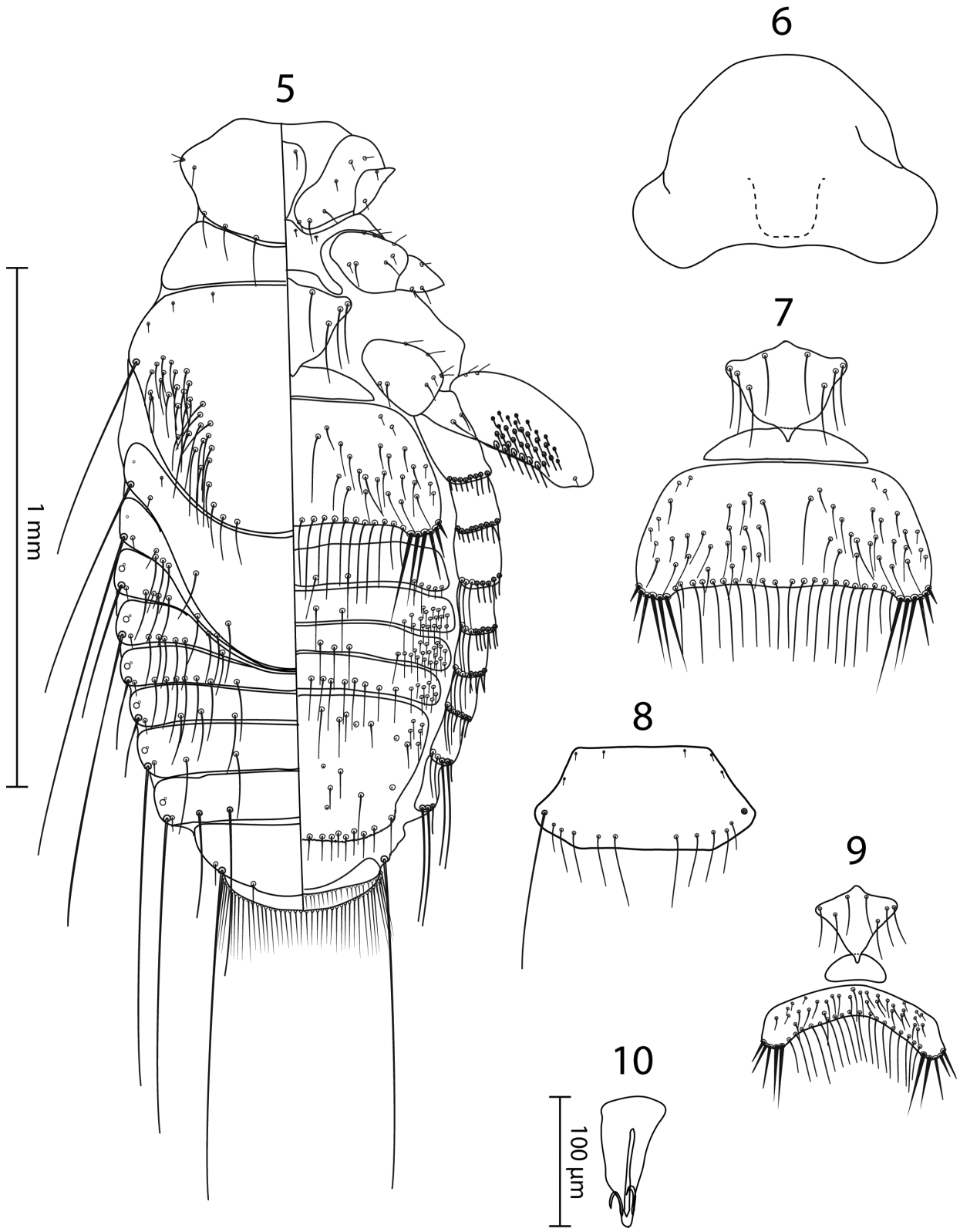
Diagnosis. *Myrsidea chiapensis* differs from all other *Myrsidea* species parasitic on members of the family Corvidae in setal counts and dimensions. Although Valim & Cicchino (2015a) only dealt with the species of *Myrsidea* from Neotropical jays of the genus *Cyanocorax* Boie, 1826*, M. chiapensis* can be included in couplet 2 of their key to species. We suggest to add this species as follows:

2a *Females*: metanotum not enlarged; 8 anterior setae on sternite II. *Males*: < 10 anterior setae on sternite II; long and thin setae on pleurites V–VIII ..... *Myrsidea melanocyanei* Valim & Cicchino, 2015a

2b *Females*: metanotum much enlarged (Fig. 5); 26–47 anterior setae on sternite II. *Males*: > 10 anterior setae on sternite II; long and thin setae on pleurites III–VIII 2ba

2ba *Females*: Metanotum with 49–64 setae; vulval margin straight. *Males*: tergites VI–VII with 29–35 setae added together; sternite IV with 45–53 setae . . . . . *Myrsidea chiapensis* Zavaleta, 1944

2bb *Females*: Metanotum with 10–16 setae; vulval margin concave. *Males*: tergites VI–VII with 20–26 setae added together; sternite IV with 33–41 setae . . . . . *Myrsidea cristatelli* Valim & Cicchino, 2015



FIGURES 5–10. *Myrsidea chiapensis*: **5**, dorso-ventral view of female thorax and abdomen. **6**, head shape. **7**, female metasternal plate and sternites I–II. **8**, male metanotum. **9**, male metasternal plate and sternites I & II. **10**, male genital sac sclerite.

Female (n = 12). As in fig. 18. Head shape as in Fig. 6. Hypopharyngeal sclerites fully developed. Length of DHS 10, 0.06–0.087; DHS 11, 0.105–0.112 long; ratio DHS 10/11, 0.57–0.78. *Ls5* 0.08–0.09 long, latero-ventral fringe with 11 (in one female 10 and 12) setae. Gula with 4 setae on each side. Pronotum with 6 setae on posterior margin and 3 short spiniform setae at each lateral corner. First tibia with 3 outer ventro-lateral and 5 dorso-lateral setae. Metanotum very enlarged, depressing tergites; posterior margin roughly rounded with 47–62 setae grouped in large irregular patch of 21–31 short setae on each side. Metasternal plate with 6–8 setae (Fig. 7); metapleurites with 6–8 short strong spiniform setae. Femur III with 29–33 setae in ventral setal brush. Metanotum and abdomen as in Fig. 5. Tergite I enlarged with roughly rounded posterior margin, conspicuously compressing tergites II–IV. Median gap present in each tergal setal row. Tergal setae: I, 4; II–IV, 11–13; V, 12–15; VI, 4–6; VII, 3–4; VIII, 4. Postspiracular setae extremely long (0.40–0.59) on I, II, IV, VII–VIII; long (0.24–0.27) on III; and short (0.07–0.11) on V–VI. IPTS not longer than anal fringe setae with length 0.05–0.07; LMTS, 0.04–0.06 long. Pleural setae: I, 6–8; II–III, 8–10; IV, 7–9; V–VI, 6–8; VII, 4–5; VIII, 3. Pleurites I–II with only short spine-like setae; III–VII with 2–4 slender and longer setae. Pleurite VIII with inner setae (0.08–0.09) three times as long as outer (0.25–0.27). Sternite II largely rectangular with anterior margin without a medial notch (Fig. 7). Sternal setae: I, 0; II, 5–6 in each aster, aster setae length: s1, 0.14–0.18; s2, 0.13–0.15; s3, 0.09–0.13; s4, 0.05–0.10; s5, 0.04–0.07; s6, 0.04–0.06; with 16–21 marginal setae between asters, 26–47 anterior; III, 15; IV, 36–41; V, 37–44; VI, 35–40; VII, 20–25; VIII–IX, 12–17; vulva with posterior margin slightly serrated bearing 15–19 setae; without medioanterior setae on sternites III–VII. Anal fringe formed by 34–39 dorsal and 39–42 ventral setae. Dimensions: TW, 0.58–0.60 (0.60); POW, 0.44–0.48; HL, 0.34–0.37 (0.36); PW, 0.39–0.40; MW, 0.61–0.68; AWIV, 0.73–0.80 (0.70); ANW, 0.30; TL, 1.76–1.90 (1.85).

Male (n = 17). As in fig. 17. Length of DHS 10, 0.065–0.087; DHS 11, 0.107–0.115 long; ratio DHS 10/11, 0.58–0.78. *Ls5* 0.08 long, latero-ventral fringe with 11 setae. Gula with 4–5 setae on each side. First tibia with 3 and 3–6 outer lateral ventral and dorsal setae, respectively. Metanotum enlarged (Fig. 8); posterior margin straight with 9–13 setae. Metasternal plate with 7–8 setae; metapleurites with 3–4 short spiniform strong setae. Femur III with 27–29 setae in ventral setal brush. Median gap present in each tergal setal row. Tergal setae: I, 12–15; II, 16–18; III, 15–21; IV, 17–21; V, 18–23; VI, 16–19; VII, 13–16; VIII, 6–10. Postspiracular setae: extremely long (0.40–0.60) on II, IV, VII–VIII; very long (0.30–0.33) on I; and short (0.10–0.20) on III, V–VI. IPTS, 0.04–0.06 long; LMTS, 0.03–0.04 long. Pleural setae: I, 4–6; II, 5–8; III, 7–10; IV, 6–8; V, 6–7; VI, 5–6; VII, 4–5; VIII, 3. Pleurite I with only short spine-like setae; II, with 1–3; and III–VII with 2–5 slender and longer setae. Pleurite VIII with inner setae (0.04–0.06) three times as long as outer (0.13–0.18). Sternite II narrow and arched with anterior margin without a medial notch (Figs 9 and 18). Sternal setae: I, 0; II, 5 in each aster, aster setae length: s1, 0.13–0.16; s2, 0.10–0.14; s3, 0.09–0.11; s4, 0.06–0.10; s5, 0.04–0.05; with 16–20 marginal setae between asters, 18–28 anterior; III, 26–30; IV, 45–53; V, 48–49; VI, 43–49; VII, 35–40; VIII, 19–26; remainder of plate, 14–15; and with 4 setae posteriorly; with medioanterior setae on sternites III–VIII: III–V, 0–4; VI, 2–5; VII, 5–8; VIII, 6–8. With 8 internal anal setae. Genital sac sclerite as in Fig. 10. Dimensions: TW, 0.52–0.54 (0.50); POW, 0.38–0.40; HL, 0.31–0.34 (0.26); PW, 0.34–0.36; MW, 0.45–0.52; AWIV, 0.56–0.61; GW, 0.13; GSL, 0.10; TL, 1.50–1.58 (1.53).

Myrsidea diffusa (Kellogg, 1899)

Colpocephalum diffusum Kellogg, 1899: 40, pl. 4: figs 3–4.
Myrsidea diffusa (Kellogg, 1899); Clay, 1968: 209, figs 11–13.
Myrsidea diffusa (Kellogg, 1899); Price *et al.* 2003: 129.

Type host. *Amblycercus holosericeus* (Deppe, 1830)—Yellow-billed cacique (Icteridae).

Type locality. Panamá.

Material examined. Ex *Amblycercus holosericeus*: 2♀, 2♂, Hitoy Cerere Biological Reserve, Costa Rica (9°40' N, 85°05' W), 23–24 Aug. 2004, I. Literak leg.

Remarks. This is the first record of *Myrsidea diffusa* from Costa Rica. Our specimens differ from those redescribed by Clay (1968) by setal counts and dimensions, as follows (data from Clay (1968) are in parentheses):

Female (n = 2). Gula with 4–6 (4–5) setae on each side. Metanotum not enlarged; posterior margin straight with 9–10 (9) setae. Metasternal plate with 4–5 (6–8) setae. Femur III with 12–15 (14–16) setae in ventral setal brush. Tergal setae: I, 5 (10); II, 8–9 (10); III, 10–11 (10); V, 11–12 (13); VI, 9–10 (12); VII, 6–7 (11); VIII, 4 (6).

Sternal setae: II, 19–20 (20) marginal setae between asters, 6–9 (6) anterior; III, 28–29 (27); IV, 26–27 (24); V, 23–24 (25); VI, 17 (19); VII, 10–12 (17); VIII–IX, 15–16 (14); vulva with posterior margin serrated bearing 12–14 (8) setae. Dimensions: TW, 0.52–0.53 (0.51); POW, 0.38 (0.36); HL, 0.34–0.36 (0.34); PW, 0.32–0.33 (0.34); TL, 1.65–1.70 (1.67).

Male (n = 2). Metanotum not enlarged; posterior margin straight with 7 (6) setae. Tergal setae: I, 7 (9); II, 10–11 (14); III, 12–15 (13); IV, 14–15 (16); V, 13–14 (13); VI, 11–12 (12); VII, 8–9 (9); VIII, 4–6 (5). Sternal setae: II, 19–20 (17) marginal setae between aster, 6–7 (6) anterior; III, 28–30 (28); IV, 27–28 (27); V, 23–27 (26); VI, 22–24 (24); VII, 20–22 (21); VIII, 18–23 (24). Dimensions: TW, 0.46–0.47 (0.46); POW, 0.35–0.36 (0.33); HL, 0.32–0.34 (0.31); PW, 0.29–0.30 (0.30); TL, 1.40–1.43 (1.42).

Myrsidea dissimilis (Kellogg, 1896)

(Figs 11–14, 19)

Menopon dissimile Kellogg, 1896b: 536, pl. 73: fig. 5.
Myrsidea dissimilis (Kellogg, 1896); Price *et al.* 2003: 129.

Type host. *Progne subis* (Linneaus, 1758)—Purple martin (Hirundinidae).

Type locality. Lawrence, Kansas, U.S.A.

Material examined. Ex *Progne chalybea*: (Gmelin, 1789)—Grey-breasted Martin (Hirundinidae): 1♂, Ivinhema River, Mato Grosso do Sul, Brazil (22°31' S, 53°30' W), 12 Aug. 2006, I. Literak leg.

Remarks. This is the first record of *Myrsidea dissimilis* from Brazil. *Progne chalybea* is listed as a host for *M. dissimilis* in Price *et al*. (2003). In the following redescription of our single male, we give its dimensions, together with those given by Kellogg (1896b) in parentheses:

Male (n = 1). Head shape as in Figs 12 and 19. Hypopharyngeal sclerites reduced. Length of DHS 10, 0.035; DHS 11, 0.095 long; ratio DHS 10/11, 0.37. *Ls5* 0.09 long, latero-ventral fringe with 13–14 setae. Gula with 4–5 setae on each side. Pronotum with 6 setae on posterior margin and 3 short spiniform setae at each lateral corner. First tibia with 3 outer ventro-lateral and 6–7 dorso-lateral setae. Metanotum not enlarged; posterior margin straight with 7 setae. Metasternal plate with 10 setae; metapleurites with 2 short strong spiniform setae. Femur III with 36–40 setae in ventral setal brush. Abdominal segments with continuous row of tergal setae across each segment (Fig. 11). Tergal setae: I, 13; II, 28; III, 42; IV, 50; V, 52; VI, 48; VII, 40; VIII, 23; including tergo-anterior setae: I, 1; II, 12, III, 17; IV, 24, V, 29; VI, 26; VII, 21, VIII, 12. Postspiracular setae extremely long (0.47–0.50) on II, IV, VIII; very long (0.40–0.43) on VI–VII; long (0.31) on III; and short (0.24–0.25) on I and V. IPTS and LMTS 0.04 long. Pleural setae: I, 5–6; II, 10–11; III–V, 11–13; VI–VII, 9–10; VIII, 4. Pleurites I–II with only short spine-like setae; III–VII with 3–5, slender and longer setae; with anterior setae: II, 2; III, 3–4; IV–VIII, 4–5. Pleurite VIII with both inner setae (0.09–0.13) twice as long as outer (0.05). Sternite II rectangular with anterior margin without a medial notch (Fig. 13). Sternal setae: I, 0; II, 4–5 in each aster, aster setae length: s1, 0.05–0.06; s2, 0.05–0.06; s3, 0.04–0.05; s4, 0.04; with 14 marginal setae between asters, 15 anterior; III, 23; IV, 52; V, 67; VI, 57; VII, 30; VIII, 13; remainder of plate, 6; and with 4 setae posteriorly; with medioanterior setae on sternites VI–VIII: VI–VII, 2–4; VIII, 1. With 8 internal anal setae. Genital sac sclerite as in Fig. 14. Dimensions: TW, 0.54 (0.55); POW, 0.40; HL, 0.35 (0.35); PW, 0.35; MW, 0.50; AWIV, 0.62; GW, 0.10; GSL, 0.13; TL, 1.76 (1.80).

Myrsidea nesomimi borealis Palma & Price, 2010

Myrsidea nesomimi borealis Palma & Price, 2010: 140, Fig. 11.

Type host. *Mimus parvulus* (Gould, 1937)—Galapágos mockingbird (Mimidae).

Type locality. Isla Marchena, Galápagos Islands, Ecuador.

Material examined. Ex *Mimus saturninus* (Lichtenstein, 1823)—Chalk-browed mockingbird (Mimidae): 2♀, 1♂, Nova Andradina, Mato Grosso do Sul, Brazil (22°15' S, 53°21' W), 17 Jul. 2006, I. Literak leg.

Remarks. This is a new host-louse association for *Myrsidea nesomimi borealis* and the first record from Brazil. Palma & Price (2010) described two subspecies—*M. nesomimi nesomimi* and *M. nesomimi borealis*—from

the four species of mockingbirds endemic to the Galápagos Islands: *Mimus macdonaldi* Ridgway, 1890 and *Mimus trifasciatus* (Gould, 1837) (for *M. nesomimi nesomimi*); *Mimus parvulus* (Gould, 1837) and *Mimus melanotis* (Gould, 1837) (for *M. nesomimi borealis*). These four mockingbirds have a different island distribution within the Galápagos (see Clements *et al.* 2015) and a relatively distant phylogenetic relationship with *Mimus saturninus* (see Lovette *et al*. 2012). Palma & Price (2010: 142) implied that the allopatric island distribution of the four mockingbird hosts may have contributed to the differentiation of *Myrsidea nesomimi* in two lineages that they identified as different subspecies. These two louse taxa were also shown to be genetically different by Štefka *et al.* (2011: 298), at least between the populations from the two type hosts. Our material from the South American mainland is not morphologically close to *M. nesomimi nesomimi*, which is restricted to the oldest islands in the Galápagos archipelago, while *M. nesomimi borealis* occupies the rest of the islands (Palma & Price 2010: fig. 11). Although we identified our sample as *M. nesomimi borealis*, more material and genetic studies are needed to confirm both the taxonomic status of *Myrsidea* lice from mainland mockingbirds and their relationships with the Galápagos taxa. Our specimens differ from the original description by Palma & Price (2010) by setal counts and dimensions, as follows (data from Palma & Price (2010) are in parentheses):

Female (n = 2). Tergal setae: I, 4–5 (4); VI, 11–14 (9–13). Sternal setae: II, 8–9 (10–19) anterior setae; III, 16–21 (20–27). Anus with 45–47 (34–46) dorsal fringe setae. Dimensions: TW, 0.51–0.52 (0.46–0.50); HL, 0.34–0.37 (0.32–0.35); AWIV, 0.68–0.70 (0.61–0.67); ANW, 0.25–0.26 (0.21–0.23); TL, 1.65–1.70 (1.53–1.68).

Male (n = 1). Tergal setae: I, 6 (8–10); III, 6 (10–15); IV, 9 (10–14); V, 8 (9–13). Sternal setae: II, 8 (11–15) anterior setae. Dimensions: TW, 0.47 (0.41–0.46).

Myrsidea paleno Kounek & Sychra, 2011

Myrsidea paleno Kounek & Sychra, 2011 *in* Kounek *et al*. 2011: 60, figs 9–11.

Type host. *Parkesia motacilla* (Vieillot, 1809)—Louisiana waterthrush (Parulidae).

Type locality. Barbilla National Park, Costa Rica.

Material examined. Ex *Basileuterus culicivorus* (Deppe, 1830)—Golden-crowned warbler (Parulidae): 1 ♀, San Rafael National Park, Paraguay (26°30' S, 55°47' W), 21 Aug. 2012, I. Literak leg.

Ex *Myiothlypis leucoblephara* (Vieillot, 1817)—White-browed warbler (Parulidae): 1 ♀**,** San Rafael National Park, Paraguay (26°30' S, 55°47' W), 18 Aug. 2012, I. Literak leg.

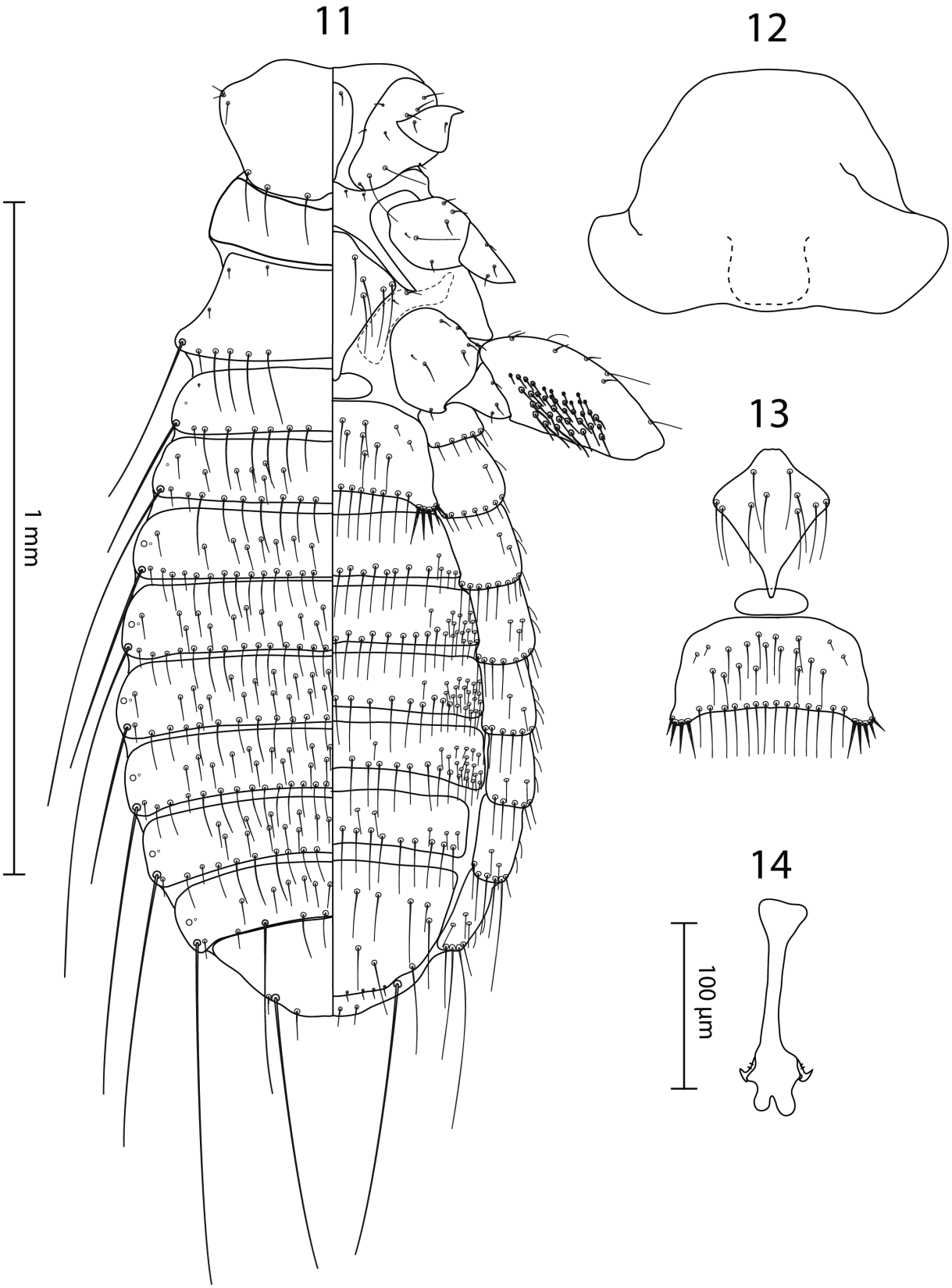
Remarks. These are two new host-louse associations for *Myrsidea paleno* and also first records from Paraguay. Our specimens differ from the original description of *M. paleno* by setal counts and dimensions, as follows (data from Kounek *et al.* (2011) are in parentheses):

Female ex *Basileuterus culicivorus* (n = 1). Length of DHS 10, 0.055 (0.060); DHS 11, 0.093 (0.100–0.110) long. Metanotum not enlarged; posterior margin straight with 11 (8–9) setae. Metasternal plate with 6 (7–8) setae. Tergal setae: I, 8 (11–13); II, 11 (12–14); III–IV, 10 (12–13); V, 7 (12); VI, 6 (7–9); VII, 5 (4). Sternal setae: II, 14 (13) marginal setae between asters, 6 (4) anterior; IV, 32 (28); VII, 13 (10); VIII–IX, 8 (12). Dimensions: HL, 0.31 (0.23–0.30); PW, 0.28 (0.26); AWIV, 0.51 (0.53).

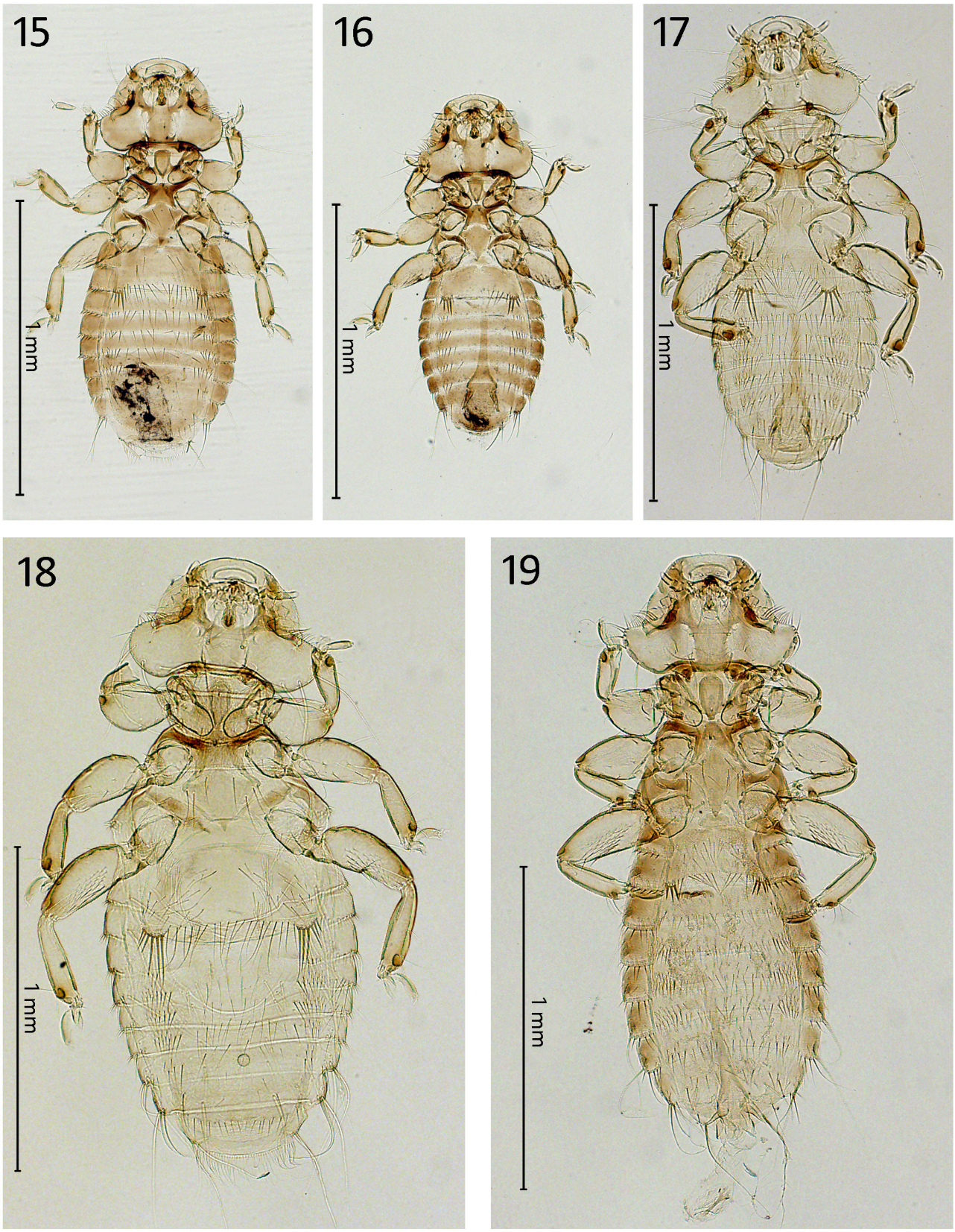
Female ex *Myiothlypis leucoblephara* (n = 1). Length of DHS 10, 0.050 (0.060); DHS 11, 0.088 (0.100–0.110) long. Tergal setae: II, 10 (14–16); III, 9 (12–15); IV, 10 (12–13); V, 8 (12); VI, 6 (7–9). Sternal setae: II, 15 (14) marginal setae between asters, 5 (6) anterior; III, 19 (21–23); IV, 31 (28); V, 28 (29–32); VI, 23 (24–25); VII, 14 (10); VIII–IX, 8 (12); vulva with posterior margin serrated bearing 12 (9–10) setae. Dimensions: HL, 0.31 (0.23–0.30); PW, 0.28 (0.26); AWIV, 0.51 (0.53); ANW, 0.20 (0.19); TL, 1.38 (1.40).

Myrsidea psittaci Carriker, 1955

Myrsidea psittaci Carriker, 1955: 38, figs 3–4.
Myrsidea psittaci Carriker, 1955; Clay 1968: 227.
Myrsidea psittaci Carriker, 1955; Price *et al*. 2003: 131.
Myrsidea psittaci Carriker, 1955; Valim & Cicchino 2015b: 497, table 1.



FIGURES 11–14. *Myrsidea dissimilis*: **11**, dorso-ventral view of male thorax and abdomen. **12**, head shape. **13**, male metasternal plate and sternites I–II. **14**, male genital sac sclerite.



FIGURES 15–19. Habitus. *Myrsidea alexanderi* **n. sp.**: **15,** holotype female; **16**, paratype male. *Myrsidea chiapensis*: **17**, male; **18**, female. *Myrsidea dissimilis*: **19**, male.

TABLE 1. List of hosts and the *Myrsidea* lice recorded from them in this study.

Host family & species	P	E	*Myrsidea* species	♂	♀	Nymphs	Country
Corvidae							
Calocitta formosa (Swainson, 1827)	1	1	*Myrsidea chiapensis* Zavaleta, 1944	17	12	32	Costa Rica
Hirundinidae							
Progne chalybea (Gmelin, 1789)	1	2	*Myrsidea dissimilis* (Kellogg, 1896)	1	0	0	Brazil
Icteridae							
Agelaioides badius (Vieillot, 1819)	2	2	***Myrsidea psittaci* Carriker, 1955	0	3	2	Brazil
<< " " " >>	2	2	*Myrsidea serini* (Séguy, 1944)	4	1	1	Paraguay
Amblycercus holosericeus (Deppe, 1830)	2	3	*Myrsidea diffusa* (Kellogg, 1899)	2	2	1	Costa Rica
Icterus dominicensis (Linnaeus, 1766)	1	1	***Myrsidea* sp.	0	0	1	Costa Rica
Molothrus bonariensis (Gmelin, 1789)	2	10	*Myrsidea* sp.	0	0	4	Brazil
<< " " " >>	0	1		–	–	–	Paraguay
Molothrus rufoaxillaris Cassin, 1866	1	2	***Myrsidea* sp.	0	0	1	Brazil
<< " " " >>	0	1		–	–	–	Paraguay
Quiscalus mexicanus (Gmelin, 1788)	2	4	*Myrsidea balteri* Clay, 1968	5	5	5	Honduras
Mimidae							
Mimus saturninus (Lichtenstein, 1823)	1	1	***Myrsidea nesomimi borealis* Palma & Price, 2010	1	2	7	Brazil
Parulidae							
Basileuterus culicivorus (Deppe, 1830)	2	13	***Myrsidea paleno* Kounek & Sychra, 2011	0	1	3	Paraguay
Geothlypis aequinoctialis (Gmelin, 1789)	0	2		–	–	–	Paraguay
Myiothlypis leucoblephara (Vieillot, 1817)	2	7	***Myrsidea paleno* Kounek & Sychra, 2011	0	1	2	Paraguay
Setophaga pitiayumi (Vieillot, 1817)	0	6		–	–	–	Paraguay
Troglodytidae							
Henicorhina leucosticta (Cabanis, 1847)	0	3		–	–	–	Honduras
Pheugopedius maculipectus Lafresnaye, 1845	4	5	** *Myrsidea alexanderi* n. sp.	5	4	16	Honduras
Turdidae							
Turdus grayi megas W. Miller & Griscom, 1925	13	15	*Myrsidea antiqua* Ansari, 1956	15	7	21	Honduras

P = number of birds parasitized; E = number of birds examined; ** = new host-louse association.

Type host. *Amazona ochrocephala* (Gmelin, 1788)—Yellow-crowned amazon. In error, possibly *Molothrus oryzivorus* (Gmelin, 1788)—Giant cowbird (see Clay 1968: 227).

Type locality. Urama, Carabobo, Venezuela.

Material examined. Ex *Agelaioides badius* (Vieillot, 1819)—Bay-winged cowbird (Icteridae): 3♀**,** Margarida at the foothills of the Cerra de Bodoquena, Brazil (21°30' S, 56°40' W), 21 Jul. 2006, I. Literak leg.

Remarks. This is the first record of *Myrsidea psittaci* from Brazil. Also, *Agelaioides badius* is a new host for this species of *Myrsidea*, which has been previously recorded from six passerine species, all belonging to the family Icteridae, as follows: *Molothrus oryzivorus* (Gmelin, 1788) and *Chrysomus icterocephalus* (Linnaeus, 1766) by Clay (1968: 228) and Price *et al*. (2003: 131); *Pseudoleistes virescens* (Vieillot, 1819) and *Molothrus bonariensis* (Gmelin, 1789) by Cicchino (1987: 184); *Amblyramphus holosericeus* (Scopoli, 1786) by Valim & Cicchino (2015b: 497); and *Agelasticus thilius* (Molina, 1782) by González-Acuña *et al*. (2006: 212) and Cicchino & Valim (2015: 240). Our specimens differ from the redescription of *M. psittaci* given by Clay (1968) by setal counts and dimensions, as follows (data from Clay (1968) are in parentheses):

Female (n = 3). Length of DHS 10, 0.073–0.088 (0.056–0.064). Tergal setae: II, 11–12 (12–15); IV, 12–15 (16–18); VI, 14–15 (13–14); VII, 13–14 (10–12). Sternal setae: II, 8–11 (10–16) anterior setae; IV, 36–44 (33–43); V, 35–42 (37–45); VIII–IX, 13–16 (21–23). Dimensions: TW, 0.46–0.47 (0.53); POW, 0.36 (0.37); HL, 0.30–0.31 (0.32); PW, 0.31 (0.35); TL, 1.58 (1.59).

Myrsidea serini (Séguy, 1944)

Menopon serini Séguy, 1944: 80, fig. 84.
Myrsidea serini (Séguy, 1944); Klockenhoff 1984: 18, figs 1–4.
Myrsidea serini (Séguy, 1944); Price *et al*. 2003: 131.
Myrsidea serini (Séguy, 1944); Price & Dalgleish 2007: 12, fig. 39.
Myrsidea serini (Séguy, 1944); Cicchino & Valim 2015: 232, figs 1–33.

Type-host. *Serinus serinus* (Linnaeus, 1766)—European serin.

Type locality. Unknown.

Material examined. Ex *Agelaioides badius* (Vieillot, 1819)—Bay-winged cowbird (Icteridae): 1♀, 4♂, Los Tres Gigantes Biological Station in the Pantanal, Paraguay (20°04' S, 50°09' W), 6 Sep. 2012, I. Literak leg.

Remarks. This is the first record of *Myrsidea serini* from Paraguay. This species was redescribed by Klockenhoff (1984) and Price & Dalgleish (2007) from several hosts of the passerine families Fringillidae and Emberizidae. Cicchino & Valim (2015) recorded *M. serini* from a fringillid host but also from two species of Icteridae, including *Agelaioides badius* from Argentina. We compared our specimens with those described by Cicchino & Valim (2015) from the same host species and found that they differ in setal counts and dimensions, as follows (data from Cicchino & Valim (2015) are in parentheses):

Female (n = 1). Length of DHS 10, 0.100 (0.080–0.090); DHS 11, 0.105 (0.80) long; ratio DHS 10/11, 0.95 (1.00–1.13). Gula with 4–5 (5) setae on each side. Metanotum not enlarged; posterior margin straight with 10 (7–9) setae. Femur III with 16–17 (17–19) setae in ventral setal brush. Tergal setae: VII, 4 (5–6). Sternal setae: II, 4 in each aster, 14 marginal setae between asters, 5 anterior, i.e. 27 (32–35) in total; III, 23 (24); VI, 29 (26–28). Dimensions: TW, 0.44 (0.45–0.46); MW, 0.44 (0.47–0.48); AWIV, 0.60 (0.65–0.71); TL, 1.60 (1.63–1.71).

Male (n = 4). Metasternal plate with 5 (6) setae. Tergal setae: I, 12 (10–11). Sternal setae: II, 4–5 in each aster, 13 marginal setae between asters, 4 anterior, i.e. 25–27 (19–22) in total; III, 19 (30–34); V, 32 (33); VI, 23 (25–27); VII, 13 (15–17). Dimensions: TW, 0.40 (0.42); TL, 1.28 (1.39–1.41).

Discussion

Besides the description of a new species and redescriptions of two known ones, this contribution includes first records of *Myrsidea* lice from *Myiothlypis leucoblephara* and *Pheugopedius maculipectus*, and four new host-louse associations for previously known species of *Myrsidea*, as follows: *Basileuterus culicivorus* and *Myiothlypis leucoblephara* for *M. paleno*, *Mimus saturninus* for *M. nesomimi borealis*, and *Agelaioides badius* for *M. psittaci*.

Although we were unable to identify to species samples of *Myrsidea* from *Icterus dominicensis* (Linnaeus, 1766) and from *Molothrus rufoaxillaris* Cassin, 1866 because they contain only one nymph each, both represent new host-louse associations.

Our material of seven previously described species of *Myrsidea* differ slightly from original descriptions or redescriptions, particularly in setal counts and dimensions. Our data increase knowledge of both their intraspecific morphological variability and their geographical distribution (see Table 1). *Myrsidea antiqua* previously known from Costa Rica, México and Trinidad (Clay 1966; Kounek *et al*. 2013) was found in Honduras. *Myrsidea chiapensis*, previously known from México (Zavaleta 1944) and *Myrsidea diffusa*, previously known from Colombia and Panamá (Clay 1968) were both found in Costa Rica. *Myrsidea dissimilis* and *M. nesomimi* previously known from the U.S.A. (Kellogg 1896b) and the Galápagos Islands (Ecuador) (Palma & Price 2010) respectively, were both found in Brazil. *Myrsidea paleno*, previously known from Costa Rica (Kounek *et al*. 2011) was found in Paraguay. *Myrsidea psittaci*, previously known from Argentina, Bolivia, Colombia, Paraguay, Trinidad & Tobago and Venezuela (Clay 1968; González-Acuña *et al*. 2006; Cicchino & Valim 2015; Valim & Cicchino 2015b) was found in Brazil. Finally, *Myrsidea serini* previously known from Argentina, Chile, England, France, Morocco, New Zealand, Romania and Spain (Cicchino & Valim 2015) was found in Paraguay.

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