Review of *Formicaricola* (Phthiraptera: Philopteridae) from Ground Antbirds (Passeriformes: Formicariidae)

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ABSTRACT The genus *Formicaricola*, previously thought to contain 8 species, has been determined to consist of only 2: *F. analoides* Carriker (type host: *Formicarius analis saturatus* Ridgway) and *F. willisi* Oniki and Emerson [type host: *Chamaeza campanisona* (Lichtenstein)]. Six species described by Carriker are placed as junior synonyms of *F. analoides*: *F. costaricensis* (type host: *Formicarius analis umbrosus* Ridgway), *F. mexicana* (type host: *Formicarius analis moniliger* Sclater), *F. sanctaemartae* (type host: *Formicarius analis virescens* Todd), *F. beni* [type host: *Formicarius analis analis* (d'Orbigny and Lafresnaye)], *F. colmae* (type host: *Formicarius colma amazonicus* Hellmayr), and *F. chocoana* (type host: *Formicarius nigricapillus destructus* Hartert). *Formicaricola analoides* is redescribed and illustrated.

KEY WORDS Phthiraptera, Ischnocera, *Formicaricola*, antbirds, *Formicarius*, *Chamaeza*

AT PRESENT, 8 species of the ischnoceran chewing louse genus *Formicaricola* Carriker are recognized. All occur on ground antbirds of the Neotropical family Formicariidae (Passeriformes). The genus and the 1st 7 species were described by Carriker (1957). The 8th species was subsequently described by Oniki and Emerson (1982).

Collection of a series of *Formicaricola* specimens by the junior author in Peru (Clayton et al. 1992) served as the stimulus for this article. In our attempt to identify these lice, we concluded that a review of all taxa in the genus was necessary, because the Carriker (1957) descriptions were of no value in determining the identity of our lice; we have provided precautionary remarks about the use of Carriker descriptions and material elsewhere (Price and Clayton 1993).

All measurements are in millimeters. Host classification to species follows Sibley and Monroe (1990), that of subspecies follows Peters (1951).

Formicaricola Carriker

Formicaricola Carriker 1957: 430. Type species: *Formicaricola analoides* Carriker 1957

This genus is characterized by the female having tergites on abdominal segments II (1st apparent segment)–VIII distinctly separated medially, the terminal abdominal segment deeply incised, the subgenital plate with both fine and short heavier setae at its posterior margin, and an absence of prominent stout setae on a ventral tubercle lateroposterior to the subgenital plate; the male having abdominal tergites on II–IX distinctly separated medially, the terminal abdominal segment evenly rounded, and the genitalia with unique structures, especially involving the shape of the parameres; and both sexes having a relatively slender head and body, similar antennae, and a distinct medioanterior dorsal head plate.

The only other philopterid genus currently recognized from hosts within the Formicariidae is *Formicaphagus*, described by Carriker (1957) and containing 15 species described by him. Of these species, 12 are from hosts within the Thamnophilidae and 3 from the Formicariidae. Although the peculiarity of their male genitalia is similar to that of *Formicaricola*, and thereby different from other lice, the head and body are of a much broader type. It is possible that these genera might not deserve separation, but we believe it is best to recognize both genera for the present.

Formicaricola analoides Carriker

(Figs. 1–3)

Formicaricola analoides Carriker 1957: 431. Type host: *Formicarius analis saturatus* Ridgway.

Formicaricola costaricensis Carriker 1957: 433. Type host: *Formicarius analis umbrosus* Ridgway. New synonymy.

Formicaricola mexicana Carriker 1957: 433. Type host: *Formicarius analis moniliger* Sclater. New synonymy.

Formicaricola sanctaemartae Carriker 1957: 434. Type host: *Formicarius analis virescens* Todd. New synonymy.

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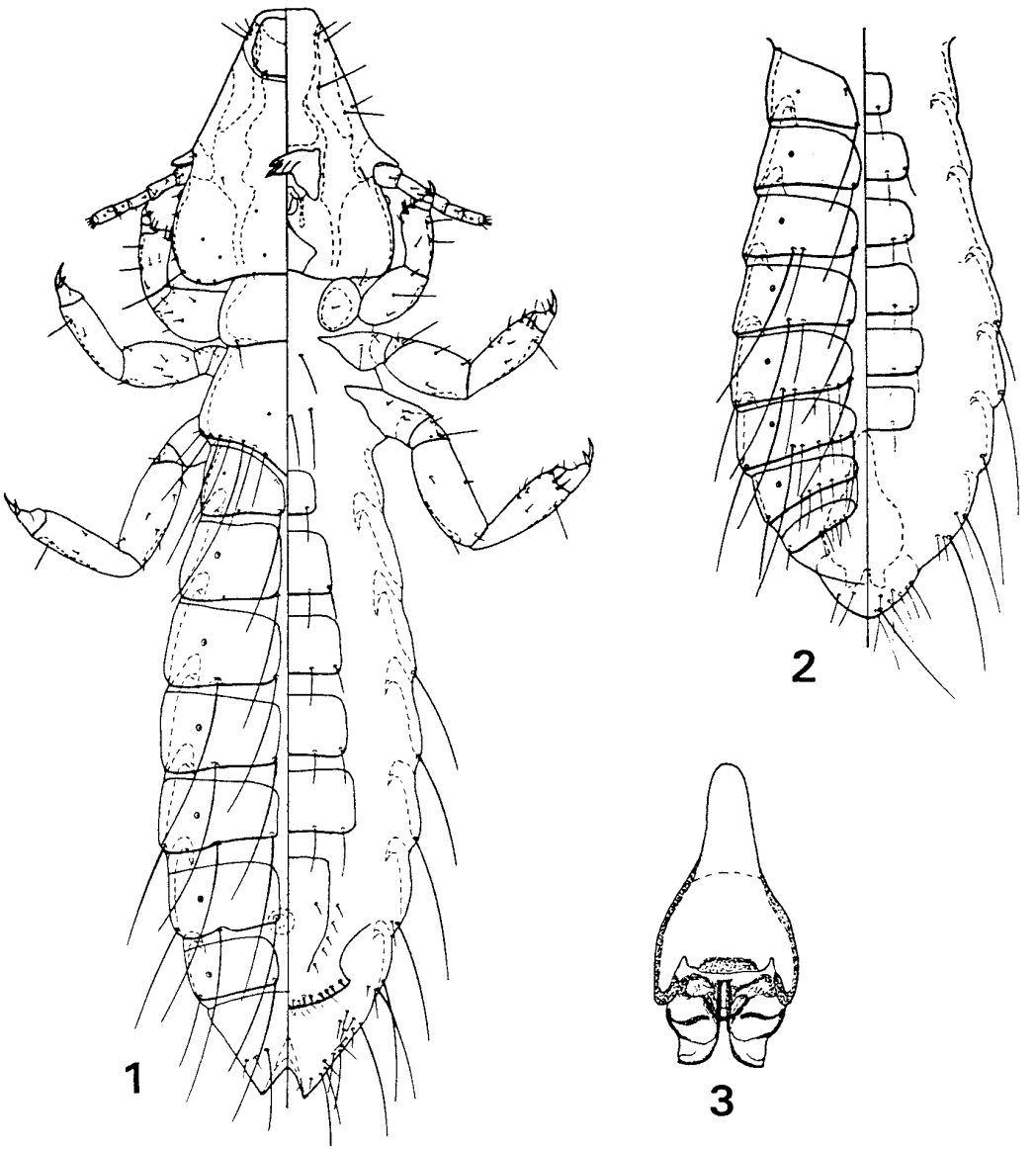

Figs. 1–3. *F. analoides*: (1) female, (2) male, (3) male genitalia. Figs. 1 and 2 illustrate ventral features to the right of the midline and dorsal features to the left.

Formicaricola beni Carriker 1957: 434. Type host: *Formicarius analis analis* (d'Orbigny & Lafresnaye). New synonymy.

Formicaricola colmae Carriker 1957: 436. Type host: *Formicarius colma amazonicus* Hellmayr. New synonymy.

Formicaricola chocoana Carriker 1957: 438. Type host: *Formicarius nigricapillus destructus* Hartert. New synonymy.

Description. Female as in Fig. 1. Metanotum with 6–8 marginal setae on each side; thoracic sternum with 1–2 anterior, 2–5 posterior setae. Each abdominal tergite on II–III and VIII with 1 seta, IV–VII with 2; tergites on II either with medioanterior sensillum or with minute seta in this position. Each side of posteriormost tergum with 1–2 short setae laterally, 1 medium to long seta medial to these. Total abdominal sternal setae on II, 2;

III–VI, 2–6; posterior margin of subgenital plate with 5–9 fine setae and 4–10 short heavier setae on each side. Pleura on II–III without setae, IV with 0–1, V–VII with 1–4, VIII with 4–7. Each side of last segment ventrally with 12–20 setae.

Male with head and thorax much as for female. Abdomen as in Fig. 2. Each abdominal tergite on II–III with 1 seta, IV–V with 2–5, VI–VIII with 5–9, posteriormost tergum with 4–8 setae. Sternal setae on II, 2; III–VI, 2–6; VII, 2–3. Pleura on II–III without setae, IV with 0–1, V with 1–2, VI–VII with 2–3, VIII with 3–4. Each side of last segment ventrally with 3–4 setae. Genitalia as in Fig. 3, with mesomeral details as shown and with short broad parameres.

Dimensions of female: temple width, 0.40–0.45; head length, 0.50–0.56; dorsoanterior plate length, 0.13–0.15; dorsoanterior plate width, 0.14–0.15; prothorax width, 0.25–0.29; metathorax width, 0.31–0.39; abdomen width at V, 0.42–0.53; total length, 1.91–2.27.

Dimensions of male: temple width, 0.37–0.43; head length, 0.46–0.53; dorsoanterior plate length, 0.13–0.14; dorsoanterior plate width, 0.13–0.15; prothorax width, 0.22–0.27; metathorax width, 0.29–0.35; abdomen width at V, 0.36–0.43; total length, 1.59–1.86; genitalia width, 0.11–0.13; genitalia length, 0.20–0.24.

Material. HOLOTYPE ♂, ALLOTYPE ♀ of *Formicaricola analoides*, ex *Formicarius a. saturatus*, COLOMBIA: Zaragoza; 7 ♀♀ ex *F. a. saturatus*, COLOMBIA, TRINIDAD, VENEZUELA; 1 ♀ ex *F. a. panamensis* Ridgway, COLOMBIA; 4 ♀♀ ex *F. analis*, PANAMA, BRAZIL. HOLOTYPE ♂, ALLOTYPE ♀, 2 ♀ PARATYPES of *F. costaricensis*, ex *F. a. umbrosus*, COSTA RICA: Guapiles; 2 ♀♀, same data except Guacimo. HOLOTYPE ♂, 1 ♂ PARATYPE of *F. mexicana*, ex *F. a. moniliger*, MEXICO: Cerro Tuxtla; 1 ♂ ex *F. analis*, TRINIDAD. HOLOTYPE ♂, 1 ♂ PARATYPE of *F. sanctaemartae*, ex *F. a. virescens*, COLOMBIA: Los Gorros. HOLOTYPE ♂ of *F. beni*, ex *F. a. analis*, BOLIVIA: Santa Ana. HOLOTYPE ♀, 3 ♀ PARATYPES of *F. colmae*, ex *F. c. amazonicus*, VENEZUELA: Rio Caura; 1 ♀, 1 ♂, ex *F. colma*, BRAZIL. HOLOTYPE ♀, 1 ♀ PARATYPE of *F. chocoana*, ex *F. n. destructus*, COLOMBIA: Rio Jurubida; 1 ♀, same except Rio San Juan. 4 ♀♀, 3 ♂♂, ex *F. rufipectus* Salvin, PERU: Cerro de Pantiacolla.

Remarks. A study of the type material, including the holotypes, allotypes, and most of the paratypes of all 7 of the Carriker taxa, has convinced us that they are indistinguishable. With lice known from 4 of the 5 recognized species of *Formicarius*, it would appear that the louse genus *Formicaricola* is represented by only the single species on this host genus. Additional collecting will be necessary to confirm this, but this is our conclusion based on available material.

As further evidence of Carriker's a priori assumption of a high degree of host-louse specificity, even in the absence of supporting meaningful morphological features, we note that he described 5 of his species from subspecies of the same host taxon. Three of his species were based only on male specimens and 2 of them only on females. Although Carriker noted vague differences between his taxa, these features are primarily artifacts of mounting or inadequate observation.

Formicaricola willisi Oniki & Emerson

Formicaricola willisi Oniki and Emerson 1982: 193. Type host: *Chamaeza campanisona* (Lichtenstein).

Remarks. No illustrations for this species are provided here, as Oniki and Emerson (1982) gave excellent drawings for the female, male, and male genitalia of *F. willisi*. All dimensions fall within the limits of those given for *F. analoides*. The principal means of separating the 2 species are that the female of *F. willisi* has each side of the subgenital plate with 13–17 fine setae and 11–17 short heavy setae, the pleura with 2–3 setae on V, 3–5 on VI, 4–6 on VII, and 12–20 on VIII, and the venter of each side of the last segment with 30–40 setae. The male of *F. willisi* has 3–4 pleural setae on VII, 5–7 on VIII, and markedly different mesomeral and parameral details of the genitalia (Oniki and Emerson 1982).

Carriker (1957) surmised that *Formicaricola* was limited to hosts of the genus *Formicarius*. However, Oniki and Emerson (1982) reported these lice from *Chamaeza*, and this broadens the known distribution of this louse genus. Further collecting will be necessary to further define the host limits between the related genera *Formicaricola* and *Formicaphagus*. Because the former is known from only 5 species of Formicariidae and the latter from 3 other species, this leaves >50 host species in this family (Sibley and Monroe 1990) yet to be sampled.

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