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THE GENUS *RAMPHASTICOLA* CARRIKER (PHTHIRAPTERA: AMBLYCERA: MENOPONIDAE) FROM THE TOUCANS (PICIFORMES: RAMPHASTIDAE), WITH DESCRIPTION OF A NEW SPECIES

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Abstract.—The diagnostic characteristics of the genus *Ramphasticola* Carriker are re-evaluated. They are of sufficient magnitude to justify the removal of *Ramphasticola* from synonymy with *Myrsidea* Waterston and merit its recognition as a distinct genus. The currently recognized three species of *Ramphasticola* are illustrated and redescribed. A **new species, *R. moylei***, from the type host *Ramphastos tucanus cuvieri* Wagler in Peru, is described.

Key Words: chewing lice, *Ramphasticola,* Phthiraptera, Menoponidae, toucans, Ramphastidae

The chewing lice of the genus *Myrsidea* Waterston from toucans have not been the subject of systematic work for over 40 years. There are more than 200 species of the genus recognized, with the majority of these on avian hosts within the Passeriformes. Three species are known from hummingbirds (Apodiformes: Trochilidae) (Dalgleish and Price 2003) and 14 *Myrsidea* names currently are associated with species on toucans (Piciformes: Ramphastidae). Six of these originally were described in the genus *Ramphasticola* Carriker and the remaining eight were placed in what we now consider as typical *Myrsidea* (see Price et al. 2003).

Hopkins and Clay (1952) did not recognize *Ramphasticola* as a distinct genus, including it within the *Myrsidea.* Without the benefit of having seen any material of *Ramphasticola* and ignoring the opinion of Carriker (Carriker and Diaz-Ungria 1961), Price et al. (2003) followed Hopkins and Clay (1952) and maintained *Ramphasticola* as a junior synonym of *Myrsidea.* However, having now studied Carriker's original type specimens and other material for all six R*amphasticola* names, we concur with Carriker that *Ramphasticola* merits generic status. It is our purpose here to give diagnostic details for the three species that we recognize to support the description of a new species. The redescriptions are accompanied by dorsoventral illustrations of female body shape, with details of the taxonomically important thoracic area. Male recognition is quite tenuous. Although there are some useful characters for males, *Ramphasticola* females are most easily and reliably identified to species.

In the following descriptions, all measurements are in millimeters. Abbreviations

are TW, temple width; HL, head length; PW, prothorax width; MW, metathorax width; ANW, female anus width; TL, total length; and GL, male genitalia length. Host classification below orders follows that of Dickinson (2003). The holotype and paratypes of the new species are at the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Abbreviations for the collectors of the lice are: MAC (M. A. Carriker, Jr), KE (K. Eckhardt), JH (J. Hill), DFL (D. F. Lane), and JDW (J. D. Weckstein).

Genus *Ramphasticola* Carriker

Ramphasticola Carriker 1949:305. Type species: *Ramphasticola hirsuta* Carriker, by original designation.

This genus was described by Carriker (1949) to accommodate the new species, *R. hirsuta,* from a toucan host. A second species, *R. niethammeri,* was described by Eichler (1954), but later was recognized as the subspecies *R. hirsuta niethammeri* by Carriker and Diaz-Ungria (1961) when the descriptions of the additional two species and two subspecies were given. Although there are some features in common with *Myrsidea,* a number of very important ones are different and justify the recognition of *Ramphasticola* as separate from *Myrsidea.* The principal features for separation of *Ramphasticola* are: (1) absence of an aster of strong setae on each lateroposterior corner of an enlarged sternite II; (2) female with thoracic segments much enlarged and completely separated from each other; (3) female with a distinctive thoracic and/or abdominal chaetotaxy (see Figs. 1–4); and (4) three of four species with outer occipital setae long, of length equal to inner occipital setae. Consistent with both Carriker and Diaz-Ungria (1961) and Price et al. (2003), we recognize here three of the previously described species as valid and the remaining three as junior synonyms.

Ramphasticola hirsuta Carriker (Fig. 1)

Ramphasticola hirsuta Carriker 1949:305. Type host: *Ramphastos swainsonii* Gould.

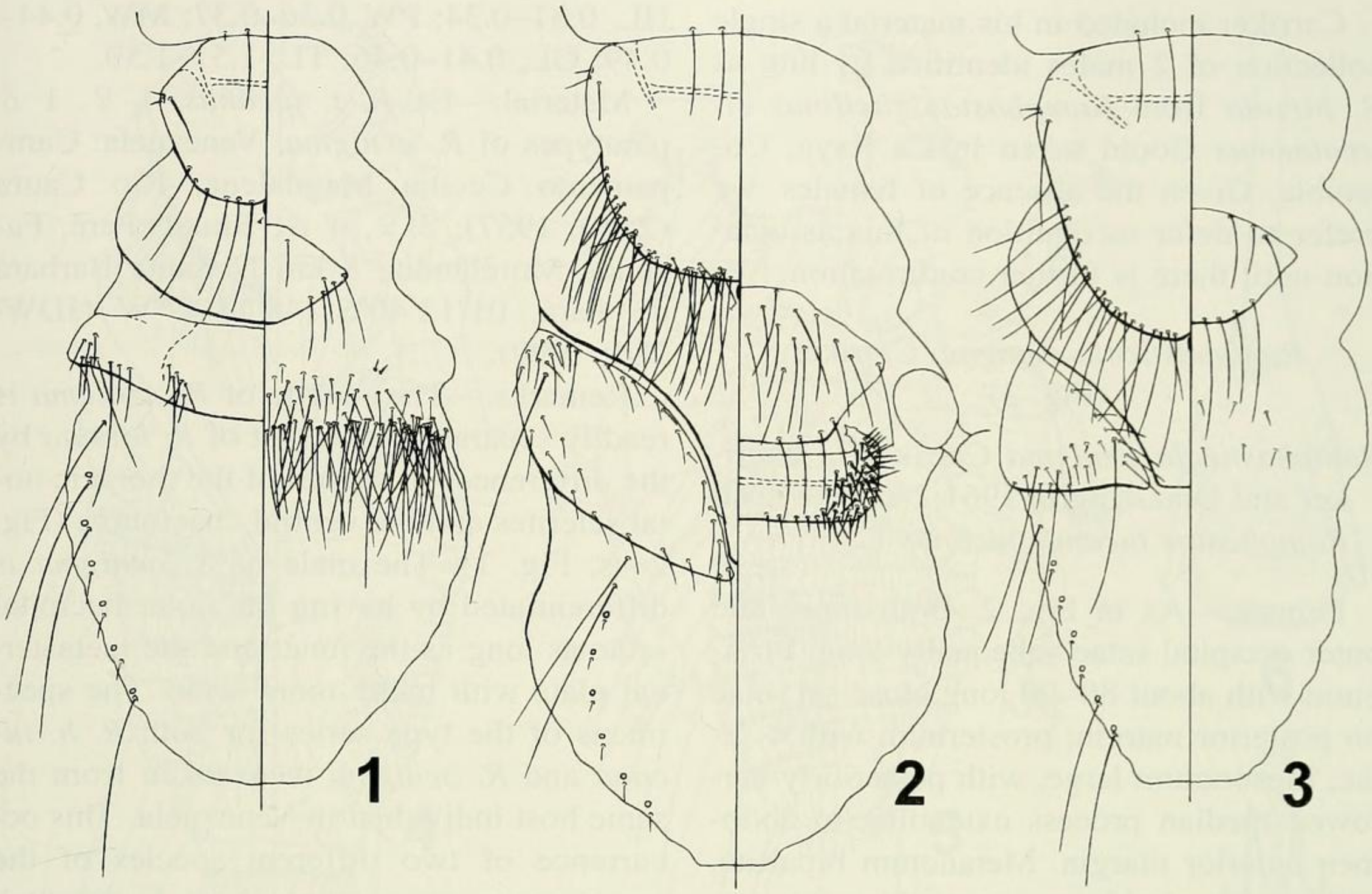
Ramphasticola niethammeri Eichler 1954: 40. Type host: *Ramphastos tucanus cuvieri* Wagler.

Ramphasticola hirsuta ambigua Carriker in Carriker and Diaz-Ungria 1961:19. Type host: *Ramphastos ambiguus ambiguus* Swainson.

Ramphasticola hirsuta tucana Carriker in Carriker and Diaz-Ungria 1961:21. Type host: *Ramphastos tucanus tucanus* L.

Female.—As in Fig. 1. Inner occipital setae long, outer minute. Pronotum with 8–13 long setae at posterior margin. Mesonotum large, evenly rounded posteriorly. Metanotum much wider than long, with sparse dorsal chaetotaxy distributed in 4 patches; metasternal plate ventral to mesonotum, 0.30–0.34 wide, diamond-shaped, with 6–12 setae. Sternite II represented by 50 or so short setae anterior to highly irregular dense row of about 100 mostly long setae. Postspiracular setae very long on II-IV and VIII, short on V-VII. Anus with 35–41 ventral fringe setae, 31–33 dorsal. Subgenital plate with 15–16 marginal setae. Dimensions: TW, 0.49–0.53; HL, 0.35–0.36; PW, 0.36–0.40; MW, 0.62–0.68; ANW, 0.21–0.27; TL, 1.62–1.76.

Male.—Head as for female. Thorax and abdomen much as in Fig. 5. Pronotum with 7–13 long marginal posterior setae; mesonotum and metanotum approximately equal in size, with latter having 10 marginal setae; metasternal plate with 7–9 setae. Abdominal tergites and sternites without any unusual enlargment. Tergites I–VI with 21–35 setae; VII, 17–22; VIII, 9–12. Postspiracular setae very long on I–IV and VI–VIII, shorter on V. Sternal setae: I, 0; II, 41–58; III–IV, 29–43; V–VII, 41–53; VIII, 25–35. Genitalia and genital sac sclerites as in Figs. 6 and 7. Dimensions: TW, 0.45–0.48; HL,



Figs. 1–3. Female dorsoventral thorax and abdomen. 1, *Ramphasticola hirsuta.* 2, *R. aenigma.* 3, *R. mirabile.*

0.31–0.33; PW, 0.31–0.34; MW, 0.40–0.47; GL, 0.44–0.48; TL, 1.46–1.51.

Material.—Ex *Ramphastos swainsonii,* 1 ♀, 2 ♂ (including "Type" pair and paratype ♂ of *Ramphasticola hirsuta*), Colombia: Santander N., Bella Vista (MAC-4643; 1943); 4 ♀, 1 ♂, Colombia: Chocó, Rio Jurubidá (MAC-19873; 1951); 1 ♀, Panama: La Laguna (200157; 1963). Ex *R. t. cuvieri,* 3 ♀, 1 ♂, Brazil: Pará, ca 139 km SSW Santarem, W of Rio Tapajós, Alto Rio Arapiuns, 02°59.55′S, 55°50.37′W (JDW-458; 2000); 1 ♀, 2 ♂, Brazil: Mato Grosso, E bank Rio Teles Pires, 1.2 km up river from mouth Rio Cristalino, 09°38′22″S, 55°55′25″W (JDW-244; 1999); 1 ♀, 1 ♂, Brazil: Amazonas, Fazenda Toshiba, ca 8 km NE Careiro, 03°47′S, 60°17′W (JDW-482; 2000); 2 ♀, 1 ♂, Peru: Loreto, 86 km SE Juanjui on E bank upper Rio Pauya, 07°35′10″S, 75°56′01″W (DFL-1252; 2000); 1 ♀, 1 ♂, Peru: Loreto, 7 km SW Jeberos, 05°18′48″S, 76°16′32″W (KE-112; 2001); 1 ♀, Peru: Huacomayo (MAC; 1931); 1 ♂, Peru: Sapasoa (MAC; 1933); 1 ♀, Bolivia: Huanay, Rio Bopi (MAC-9494; 1934); 1 ♂, Venezuela: Sta. Elena, Gran Sabana (MAC; 1946). Ex *R. t. tucanus,* 2 ♀ paratypes of *R. h. tucana,* Venezuela: Campamento Cecilia Magdalena, Rio Caura (2539; 1957); 1 ♂ paratype of *R. h. tucana,* Venezuela: Campamento Cecilia Magdalena, Rio Caura (2540; 1957); 3 ♀, Guyana: Kartago Pt. (JH; 1984). Ex *R. a. ambiguus,* 3 ♀ (holotype, paratypes of *R. h. ambigua*), Colombia: Belén, Dept. Huila (MAC-22009; 1952).

Remarks.—*Ramphasticola hirsuta* differs from the other known members of this genus in having modestly modified female thoracic segments, minute outer occipital setae, and metasternal shape and chaetotaxy similar to toucan *Myrsidea.* The male genitalia are similar to those of *M. peruviana* Eichler. The best differentiating feature is the possession by the female *R. hirsuta* of numerous long close-set setae across the anterior sternum (Fig. 1), this undoubtedly being responsible for the specific name of "hirsuta."

Carriker included in his material a single collection of 2 males identified by him as *R. hirsuta* from *Ramphastos vitellinus citreolaemus* Gould taken in La Raya, Colombia. Given the absence of females, we prefer to defer recognition of this association until there is further confirmation.

Ramphasticola aenigma Carriker
(Fig. 2)

Ramphasticola aenigma Carriker in Carriker and Diaz-Ungria 1961:24. Type host: *Ramphastos tucanus tucanus* L.

Female.—As in Fig. 2. Both inner and outer occipital setae subequally long. Pronotum with about 80–90 long close-set setae on posterior margin; prosternum with 4 setae. Mesonotum large, with posteriorly narrowed median process extending to abdomen anterior margin. Metanotum bipartite, with each part oblong, encroaching into lateral margin of mesonotum, with sparse peripheral chaetotaxy; metasternal plate ventral to mesonotum, large, 0.43–0.44 wide, hexagonal-shaped, with about 25–35 long setae. Probable sternite II represented by wide sclerite posterior to metasternum, with about 100 short heavy setae, these concentrated on lateral portions of plate. Postspiracular setae very long on I–II, short on III–VIII. Anus with 40–41 ventral fringe setae, 24–28 dorsal. Subgenital plate with 17–18 marginal setae. Dimensions: TW, 0.59–0.61; HL, 0.36–0.38; PW, 0.50–0.52; MW, 0.71–0.79; ANW, 0.26–0.28; TL, 1.88–1.89.

Male.—Much as in Fig. 5. Pronotum with 17–21 long posterior marginal setae; prosternum with 4–5 setae. Metanotum with 13–17 marginal, 17–35 anterior setae; metasternal plate with 32–36 setae. Tergites I-IV with 23–27 setae; V, 17–20; VI-VII, 14–17; VIII, 9–10. Postspiracular setae very long on II–IV and VI–VIII, shorter on I and V. Sternal setae: I, 0; II, 33–44; III–V, 40–48; VI, 37–42; VII, 30–31; VIII, 10–12. Genitalia and genital sac sclerites as in Figs. 6 and 7. Dimensions: TW, 0.47–0.51; HL, 0.31–0.34; PW, 0.36–0.37; MW, 0.44–0.49; GL, 0.41–0.46; TL, 1.51–1.59.

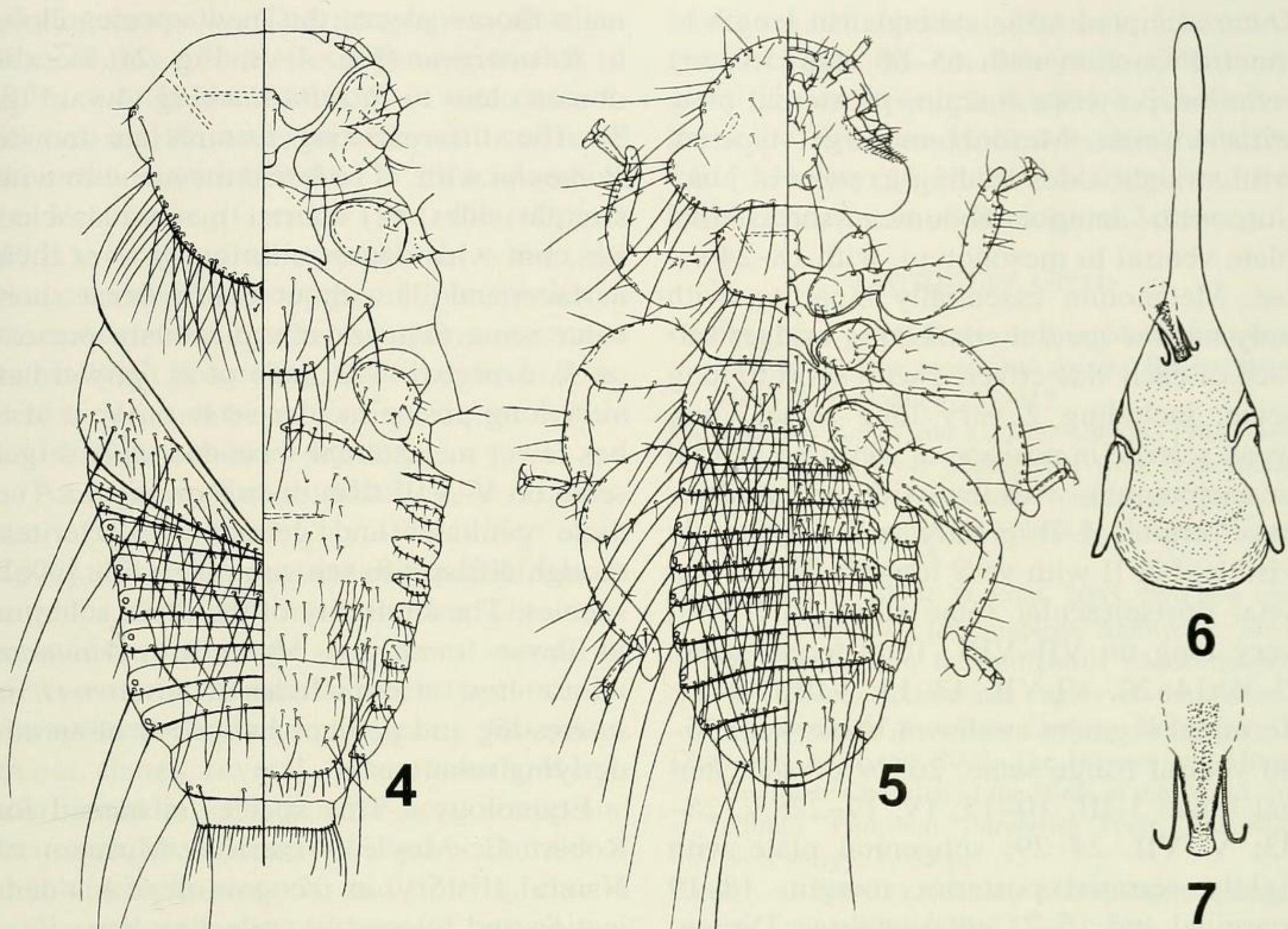
Material.—Ex *R. t. tucanus,* 1 ♀, 1 ♂ paratypes of *R. aenigma,* Venezuela: Campamento Cecilia Magdalena, Rio Caura (2540; 1957); 2 ♀, 4 ♂, Brazil: Pará, Fazenda Morelândia, 8 km N Santa Barbara do Pará, 01°12′40″S, 48°14′47″W (JDW-284; 1999).

Remarks.—The female of *R. aenigma* is readily separated from that of *R. hirsuta* by the differences in shapes of the thoracic notal sclerites and the ventral chaetotaxy (Fig. 2 vs. Fig. 1). The male of *R. aenigma* is differentiated by having the outer occipital setae as long as the inner and the metasternal plate with many more setae. The specimens of the type series for both *R. h. tucana* and *R. aenigma* were taken from the same host individual in Venezuela. This occurrence of two different species of the same genus on a single host is unusual. However, this pattern is also known for doves and their lice (Johnson et al. 2002). Both sexes of these *Ramphasticola* species are readily identifiable, minimizing the possibility of incorrect association other than through host cross-contamination.

Ramphasticola mirabile Carriker
(Fig. 3)

Ramphasticola mirabile Carriker *in* Carriker and Diaz-Ungria 1961:26. Type host: *Ramphastos tucanus cuvieri* Wagler.

Female.—As in Fig. 3. Head as for *R. aenigma.* Pronotum disproportionately large, with 43–45 long posterior marginal setae, these more widely spaced than for *R. aenigma.* Mesonotum large, with posteriorly narrowed median process broad and flattened at juncture with abdomen. Metanotum bipartite, with each part relatively small, well separated, with chaetotaxy as shown; metasternal plate ventral to pronotum, large, with 15–16 setae. Sternites not delineated, with only sparse short setae. Postspiracular setae very long on II and VII–VIII, much shorter on III–VI. Anus



Figs. 4–7. *Ramphasticola moylei.* 4, Female dorsoventral thorax and abdomen. 5, Entire male dorsoventral. 6, Male genitalia. 7, Male genital sac sclerites.

with 30–31 ventral fringe setae, 23–28 dorsal. Subgenital plate with 18–19 marginal setae. Dimensions: TW, 0.59–0.60; HL, 0.36; PW, 0.54; MW, 0.61–0.62; ANW, 0.26–0.27; TL, 1.53–1.58.

Male.—Much as in Fig. 5. Pronotum with 13–14 long posterior marginal setae. Metanotum with 12–16 marginal setae; metasternal plate with numerous setae, but mostly obscured. Tergites I–II with 18–20 setae; III–VI, 20–29; VII, 18–23; VIII, 14–15. Postspiracular setae very long on II–IV and VI–VIII, shorter on I and V. Sternal setae: I–II, obscured; III, 36–38; IV–VI, 44–52; VII, 32–40; VIII, 15–21. Genitalia and genital sac sclerites as in Figs. 6 and 7. Dimensions: TW, 0.47–0.49; HL, 0.31–0.32; PW, 0.34–0.36; MW, 0.42–0.44; GL, 0.44–0.50; TL, 1.22–1.33.

Material.—Ex *R. t. cuvieri,* 3 ♀, 3 ♂ (including holotype ♀, allotype ♂, 4 paratypes of *R. mirabile*), Bolivia: Chiñiri, Rio Bopi (MAC-9752; 1934).

Remarks.—As with the other species of the genus, the female of *R. mirabile* has distinctively different shapes and chaetotaxy associated with the thoracic segments (Fig. 3 vs. Figs. 1–2). The male of *R. mirabile* is separable from that of *R. hirsuta* on the basis of its long outer occipital setae and its thoracic chaetotaxy, which are similar to *R. aenigma.* Males are tenuously separable from *R. aenigma* by having fewer pronotal and metanotal setae and more tergal and sternal setae on the posterior segments.

Ramphasticola moylei Hellenthal, Price, and Weckstein, new species

(Figs. 4–7)

Type host.—*Ramphastos tucanus cuvieri* Wagler.

Female.—As in Fig. 4; head as in Fig. 5.