

Taxonomic Review of *Cotingacola* (Phthiraptera: Philopteridae) from the Cotingas (Passeriformes: Tyrannidae), with Descriptions of Two New Species

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ABSTRACT The genus *Cotingacola* currently contains 14 species and subspecies described by Carriker. A careful examination of these reveals only 6 valid taxa with 8 names placed as junior synonyms. These new synonymies are *Cotingacola rupicolae colombiana*, *C. latigastra*, *C. temporalis* and *C. longicrucis*, synonyms of *C. rupicolae*; *C. foramina*, *C. graciligastra* and *C. tityra*, synonyms of *C. tergalis*; *C. acuticeps*, a synonym of *C. dimorpha*. Two new species are described from Peruvian material: *C. stotzi* (type host: *Querula purpurata*) and *C. fitzpatricki* (type host: *Lipaugus subularis*). A key is provided for identification of the 8 species.

KEY WORDS Ischnocera, *Cotingacola*, Tyrannidae, Cotinginae, cotingas, host specificity

AT PRESENT, 14 species and subspecies of the ischnoceran chewing louse genus *Cotingacola* Carriker are recognized, of which 12 are recorded from cotingas in the neotropical subfamily Cotinginae (Passeriformes: Tyrannidae) and 1 each is recorded (erroneously—see below) from the subfamilies Tyranninae and Tityrinae (Tyrannidae). The genus and 13 species and subspecies were originally described by Carriker (1956) who subsequently described a 14th species (Carriker 1963).

Collection of *Cotingacola* specimens from 3 host species in Peru (Clayton et al. 1992) served as the stimulus for this article. In our attempt to identify these lice, it became necessary to review all of the taxa in the genus as Carriker's descriptions were too imprecise to be of value. For precautionary remarks about the use of Carriker descriptions and material, see Price and Clayton (1993).

All measurements are in millimeters. Abbreviations for measured structures are explained the 1st time they are used. Host classification to species follows Sibley and Monroe (1990), and that of subspecies follows Peters (1979). Characters given in the key hold for both sexes unless otherwise stated. Holotypes of the new species will be deposited in The Field Museum (Chicago), and paratypes, as numbers allow, will be in the collections of that museum and those of the University of Minnesota (St. Paul) and Oklahoma State University (Stillwater).

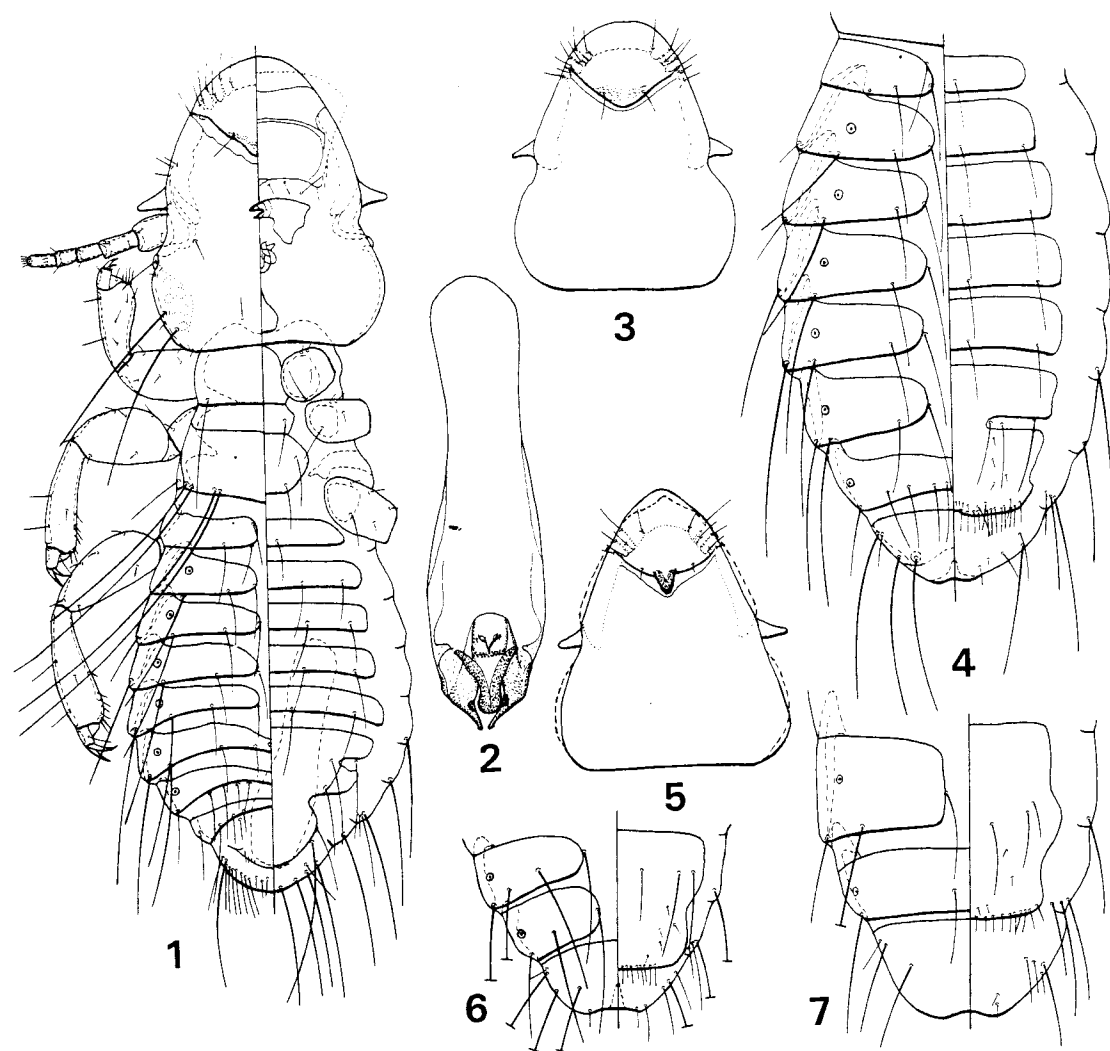
Cotingacola Carriker

Cotingacola Carriker, 1956: 366. Type species: *Cotingacola rupicolae* Carriker, 1956.

Typical individuals in this genus are characterized as follows: Both sexes with head and thoracic chaetotaxy much as in Fig. 1, with head rounded to tapered anteriorly, marginal carina uninterrupted, distinct medioanterior dorsal plate rounded posteriorly, conic conspicuous, and antennae similar. Abdomen (Fig. 4) with tergites on segments II (1st apparent segment)–VII distinctly separated medially, each side with 3 setae on line with to medial of spiracle, tergite VIII not divided medially and sternal plates weakly developed with II having 2 setae, III–VI each with 4 setae. Female with single row of fine marginal setae on subgenital plate (Fig. 4). Male with genitalia (Fig. 2) having broad basal apodeme, short inwardly directed parameres, and variable medioposterior structures. There is little sexual dimorphism except that associated with the dimensions, terminalia, and genitalia. For brevity, these features will not be repeated in species descriptions except for cases in which they differ from the above description.

Cotingacola has uncertain affinities with a number of relatively similar genera occurring on other avian orders and families. *Cotingacola* members are recognized by their anteriorly rounded head with a complete marginal carina in conjunction with their occurrence on cotinga hosts. The only other philopterid lice presently recognized from cotinga hosts are 5 species of *Pseudocophorus* Carriker and 2 species of *Philopterus* Nitzsch. These genera are quite different morphologically from *Cotingacola*.

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Figs. 1-7. *C. rupicolae*. (1) Male; (2) male genitalia; (3) female head outline; (4) female abdomen. *C. parmipapillae*. (5) Female head outline (solid line for distorted type specimen; dashed line for specimen ex *Cephalopterus ornatus*); (6) female terminalia. *C. tergalis*. (7) Female terminalia.

Cotingacola rupicolae Carriker
(Figs. 1-4)

Cotingacola rupicolae rupicolae Carriker, 1956: 367.
Type host: *Rupicola peruviana saturata* Cabanis and Heine.

Cotingacola rupicolae colombiana Carriker, 1956: 369.
Type host: *Rupicola peruviana aequatorialis* Taczanowski. New synonymy.

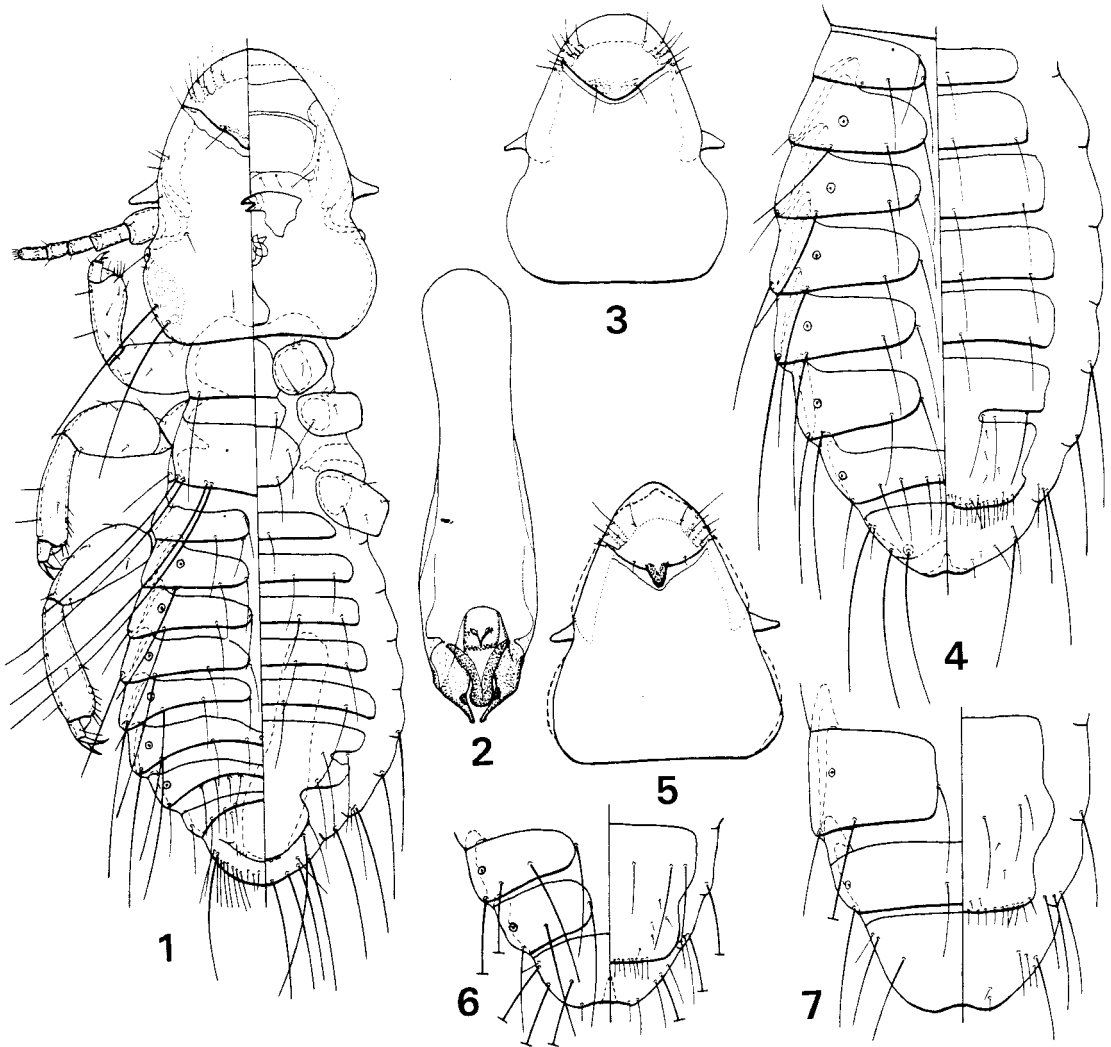
Cotingacola latigastra Carriker, 1956: 369. Type host:
Cotinga nattererii (Boissonneau). New synonymy.

Cotingacola temporalis Carriker, 1956: 370. Type host:
Pipreola riefferii riefferii (Boissonneau). New synonymy.

Cotingacola longicrucis Carriker, 1956: 371. Type host:
Rhytipterna simplex fredrici (Bangs and Penard)-
error. New synonymy.

Male and Female. Head (Figs. 1 and 3) evenly rounded anteriorly, head length (HL)/temple width (TW), 1.12-1.30. Abdomen relatively broad, total length (TL)/abdomen width at segment V (AWV), 2.64-3.13. Male as in Fig. 1, tergite on VII narrowed medially but not clearly divided, last tergite with row of medium setae on each side, genitalia (Fig. 2) with small fragile V-shaped penis and other structures as shown. Female larger than male with abdomen as in Fig. 4, subgenital plate with 25-35 marginal setae.

Dimensions of Male. Preocular width (POW), 0.33-0.39; TW, 0.40-0.46; HL, 0.51-0.56; dorsoanterior plate length (DPL), 0.16-0.19; prothorax width (PW),



Figs. 1-7. *C. rupicolae*. (1) Male; (2) male genitalia; (3) female head outline; (4) female abdomen. *C. parmipapillae*. (5) Female head outline (solid line for distorted type specimen; dashed line for specimen ex *Cephalopterus ornatus*); (6) female terminalia. *C. cingalis*. (7) Female terminalia.

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error. New synonymy.

Male and Female. Head (Figs. 1 and 3) evenly rounded anteriorly, head length (HL)/temple width (TW), 1.12-1.30. Abdomen relatively broad, total length (TL)/abdomen width at segment V (AWV), 2.64-3.13. Male as in Fig. 1, tergite on VII narrowed medially but not clearly divided, last tergite with row of medium setae on each side, genitalia (Fig. 2) with small fragile V-shaped penis and other structures as shown. Female larger than male with abdomen as in Fig. 4, subgenital plate with 25-35 marginal setae.

Dimensions of Male. Preocular width (POW), 0.33-0.39; TW, 0.40-0.46; HL, 0.51-0.56; dorsoanterior plate length (DPL), 0.16-0.19; prothorax width (PW),

0.26-0.32; metathorax width (MW), 0.37-0.42; AWV, 0.51-0.58; TL, 1.41-1.64; genitalia width (GW), 0.12-0.13; genitalia length (GL), 0.42-0.52.

Dimensions of Female. POW, 0.35-0.42; TW, 0.48-0.52; HL, 0.56-0.60; DPL, 0.18-0.20; PW, 0.30-0.34; MW, 0.40-0.45; AWV, 0.61-0.67; TL, 1.81-1.97.

Material. HOLOTYPE: ♂, ALLOTYPE: ♀, 3 ♂, 1 ♀ PARATYPES of *Cotingacola rupicolae* ex *Rupicola peruviana saturata*, BOLIVIA: 4 ♂♂, 1 ♀ ex *R. p. saturata*, PERU: 3 ♂♂, 2 ♀♀ ex *R. peruviana* (Latham), PERU: 2 ♂♂, 1 ♀ ex *R. peruviana*, ECUADOR. HOLOTYPE: ♂, ALLOTYPE: ♀, 4 ♂, 3 ♀ PARATYPES of *C. rupicolae colombiana* ex *R. p. aequatorialis*, COLOMBIA: 6 ♂♂, 14 ♀♀ ex *R. p. aequatorialis*, COLOMBIA. HOLOTYPE: ♀ of *C. latigastra* ex *Cotinga nattererii*, COLOMBIA. HOLOTYPE: ♂, ALLOTYPE: ♀, 4 ♂ PARATYPES of *C. temporalis* ex *Pipreola r. riefferii*, COLOMBIA. HOLOTYPE: ♂ of *C. longicrucis* ex *Rhytipterna simplex fredrici*-error, BOLIVIA.

Discussion. A study of the type material, including the holotypes, allotypes, and many paratypes of the 5 Carriker names associated with this species, has convinced us that they are indistinguishable. Two of the Carriker (1956) species, including *C. longicrucis* synonymized above, were based on material supposedly from tyrannid subfamilies other than Cotinginae. Each of these species is associated with but a single louse specimen. It is most likely that these are cases of contamination or straggling as each is a synonym of a previously described species from the Cotinginae. The genus *Cotingacola* should no longer be considered parasites of members of non-Cotinginae hosts.

This species is readily separated from others of the genus by the head shape (Figs. 1 and 3), the unique male genitalia (Fig. 2), and dimensional differences.

Cotingacola parmipapillae Carriker (Figs. 5 and 6)

Cotingacola parmipapillae Carriker, 1956: 372. Type host: *Pyroderus scutatus scutatus* (Shaw).

Female. Head (Fig. 5) with conspicuous medioposterior projection of dorsal head plate. Solid line of Fig. 5 indicating head shape of Carriker type material for species, this likely due to distortion from poor specimen preparation and slide mounting; dashed line giving more likely normal shape of head, with slight medioanterior protuberance. HL/TW, 1.14-1.17. Abdominal sternites III-VI each with at least 6 setae. Abdomen with TL/AWV, 3.19-3.27. Terminalia (Fig. 6) with tergite VIII distinctly divided medially, subgenital plate with 15-16 marginal setae. Male unknown.

Dimensions of Female. POW, 0.40-0.43; TW, 0.51-0.52; HL, 0.58-0.61; DPL, 0.21-0.23; PW, 0.28-0.32; MW, 0.35-0.43; AWV, 0.54-0.56; TL, 1.70-1.88.

Material. HOLOTYPE: ♀, 1 ♀ PARATYPE of *Cotingacola parmipapillae* ex *Pyroderus s. scutatus*, BRAZIL. 7 ♀♀ ex *Cephalopterus ornatus* Geoffroy Saint-Hilaire, BOLIVIA.

Discussion. This species is easily distinguished from all others of the genus by the unusual head shape, the shape of the dorsal head plate (Fig. 5), the large number of setae on abdominal sternites, and the medial division of tergite VIII (Fig. 6). Even though the male is unknown, it likely shares most, if not all, of these features and should be equally well separated.

Although Carriker (1956) did not include a female paratype, we found a 2nd female on the type slide and presume it to be paratype material that he overlooked.

The series of 7 females of this species originally labelled by Carriker as "*Cotingacola gracilis* Carr. paratypes" was confusing because Carriker (1956) made no mention of any females in his description of *C. gracilis*. These 7 females are unique and quite different from *C. gracilis*, something that Carriker may have subsequently realized but, for some reason, did not choose to correct on the slide labels. The 2 females of the type series for *C. parmipapillae* are poorly prepared and mounted, suffering from gross distortion and obstruction by internal material. The poor quality of these specimens makes the true nature of the anterior head margin and general head shape questionable, as we discussed above in reference to Fig. 5. None of the other features for these 7 females differ from those of *C. parmipapillae*. Therefore, these specimens are best considered members of *C. parmipapillae*.

Cotingacola tergalis Carriker (Figs. 7-10)

Cotingacola tergalis Carriker, 1956: 373. Type host: *Pipreola aureopectus aureopectus* (Lafresnaye).

Cotingacola foramina Carriker, 1956: 375. Type host: *Pipreola intermedia signata* (Hellmayr). New synonymy.

Cotingacola graciligastra Carriker, 1956: 377. Type host: *Pipreola arcuata arcuata* (Lafresnaye). New synonymy.

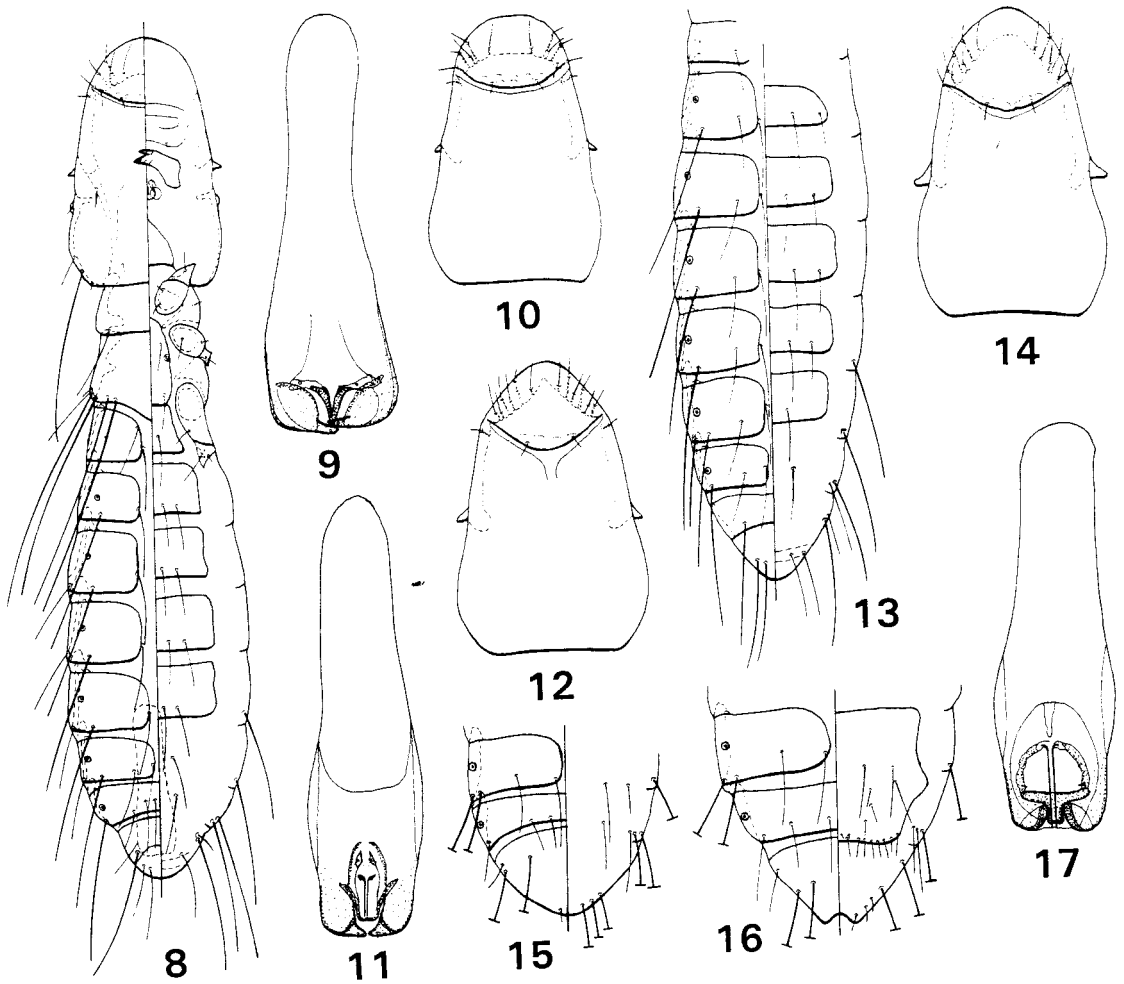
Cotingacola tityra Carriker, 1956: 379. Type host: *Tityra inquisitor buckleyi* Salvin and Godman-error. New synonymy.

Male and Female. Head (Figs. 8 and 10) evenly rounded anteriorly; HL/TW, 1.33-1.52, conic small and inconspicuous. Abdomen relatively narrow; TL/AWV, 4.12-5.06; with only 2 setae medially of spiracle on each of tergites III-VI. Male as in Fig. 8; genitalia (Fig. 9) with prominent V-shaped penis, 0.020-0.025 long. Female with terminalia as in Fig. 7, subgenital plate with 18-23 marginal setae.

Dimensions of Male. POW, 0.23-0.28; TW, 0.28-0.32; HL, 0.42-0.45; DPL, 0.11-0.12; PW, 0.19-0.21; MW, 0.22-0.25; AWV, 0.31-0.35; TL, 1.47-1.57; GW, 0.07; GL, 0.27-0.29.

Dimensions of Female. POW, 0.27-0.30; TW, 0.31-0.34; HL, 0.44-0.47; DPL, 0.11-0.13; PW, 0.20-0.23; MW, 0.24-0.28; AWV, 0.35-0.41; TL, 1.69-1.86.

Material. HOLOTYPE: ♂, ALLOTYPE: ♀, 1 ♂, 1 ♀ PARATYPES of *Cotingacola tergalis* ex *Pipreola a. au-*



Figs. 8–17. *C. tergalis*. (8) Male; (9) male genitalia; (10) female head outline. *C. gracilis*. (11) Male genitalia; (12) male head outline; (13) male abdomen. *C. dimorpha*. (14) Female head outline; (15) male terminalia; (16) female terminalia; (17) male genitalia.

reopectus, COLOMBIA. HOLOTYPE: ♂, ALLOTYPE: ♀ of *C. foramina* ex *Pipreola intermedia signata*, BOLIVIA. HOLOTYPE: ♂ of *C. graciligastra* ex *Pipreola a. arcuata*, VENEZUELA. HOLOTYPE: ♀ of *C. tityra* ex *Tityra inquisitor buckleyi*-error, COLOMBIA.

Discussion. A study of the type specimens, including the holotypes, allotypes, and paratypes of the 4 Carriker names associated with this species, has convinced us that the specimens are indistinguishable. *C. tityra* represents a Carriker (1956) species based on material supposedly from the tyrannid subfamily Tityrinae. It is obvious, as in the above similar case, that this is most likely a case of contamination or straggling and that the genus *Cotingacola* no longer should be considered parasites of members of non-Cotinginae hosts.

Carriker (1956) based his description of *C. tergalis* only on the holotype and allotype, but we found an additional male and female paratype in his collection.

This species is readily separated from others of the genus by the head shape and the small conii (Figs. 8 and 10), the reduced chaetotaxy of the abdominal tergites (Fig. 8), the unique male genitalia (Fig. 9), and the small dimensions.

Cotingacola gracilis Carriker
(Figs. 11–13)

Cotingacola gracilis Carriker, 1956: 376. Type host: *Cephalopterus ornatus* Geoffroy Saint-Hilaire.

Male. Head as in Fig. 12; HL/TW, 1.42–1.44, conii very small, abdomen (Fig. 13) narrow, TL/AWV, 4.57–5.00. Genitalia (Fig. 11) with slender parallel-sided penis, 0.035 long, and other structures as shown. Female unknown.

Dimensions of Male. POW, 0.34–0.35; TW, 0.38–0.39; HL, 0.54–0.56; DPL, 0.17–0.18; PW, 0.23–0.26;

MW, 0.30–0.32; AWV, 0.36–0.37; TL, 1.69–1.80; GW, 0.09; GL, 0.32–0.35.

Material. HOLOTYPE: ♂, 1 ♂ PARATYPE of *Cotingacola gracilis* ex *Cephalopterus ornatus*, BOLIVIA.

Discussion. The slender abdomen of this species is similar to 2 other species of *Cotingacola*: *C. tergalis*, described above, and *C. dimorpha* Carriker, described below. It is separated from *C. tergalis* by differences in abdominal chaetotaxy, markedly different genitalia structure (Fig. 11 versus Fig. 9), and larger dimensions. It is separated from *C. dimorpha* by its larger head dimensions and shorter penis (Fig. 11 versus Fig. 17).

Cotingacola dimorpha Carriker

(Figs. 14–17)

Cotingacola dimorpha Carriker, 1956: 376. Type host: *Procnias tricarunculata* (J. and E. Verreaux).

Cotingacola acuticeps Carriker, 1956: 378. Type host: *Pipreola aureopectus aureopectus* (Lafresnaye)–probable error. New synonymy.

Male and Female. Head as in Fig. 14; HL/TW, 1.41–1.56. Abdomen relatively narrow; TL/AWV, 4.00–4.46. Male terminalia as in Fig. 15, genitalia (Fig. 17) with narrow parallel-sided penis, 0.07 long, and other structures as shown; parameres may be flexed anterior in specimen illustrated. Female terminalia as in Fig. 16, subgenital plate with 15–17 marginal setae.

Dimensions of Male. POW, 0.26–0.28; TW, 0.32–0.33; HL, 0.50; DPL, 0.17–0.18; PW, 0.21–0.22; MW, 0.28–0.31; AWV, 0.35–0.36; TL, 1.56–1.57; GW, 0.09; GL, 0.36.

Dimensions of Female. POW, 0.33; TW, 0.39; HL, 0.55; DPL, 0.18–0.19; PW, 0.27–0.28; MW, 0.32–0.34; AWV, 0.46; TL, 1.84–1.89.

Material. HOLOTYPE: ♂, ALLOTYPE: ♀, 1 ♀ PARATYPE of *Cotingacola dimorpha* ex *Procnias tricarunculata*, COSTA RICA. HOLOTYPE: ♂ of *C. acuticeps* ex *Pipreola aureopectus aureopectus*–probable error, COLOMBIA.

Discussion. This species with its narrow abdomen is closest to the foregoing 2 species. Its differences have already been discussed.

Our reason for suspecting an error in the host association of the single male of *C. acuticeps* with *Pipreola a. aureopectus* is that the same host specimen supplied the type series of *C. tergalis*. There is no evidence that cotingid individuals have more than a single species of *Cotingacola*, and we question this host association of a single distorted louse specimen.

Cotingacola meridae Carriker

(Figs. 18–21)

Cotingacola meridae Carriker, 1963: 31. Type host: *Pipreola riefferii melanolaema* (Sclater).

Male and Female. Head as in Fig. 19; HL/TW, 1.23–1.36. Abdomen relatively broad; TL/AWV, 3.39–4.12. Male terminalia much as in Fig. 20, genitalia (Fig. 21)

with prominent slender parallel-sided penis, 0.06–0.07 long, and other structures as shown. Female terminalia as in Fig. 18, subgenital plate with 26–32 marginal setae.

Dimensions of Male. POW, 0.34–0.37; TW, 0.38–0.43; HL, 0.50–0.53; DPL, 0.16–0.17; PW, 0.24–0.27; MW, 0.32–0.37; AWV, 0.43–0.51; TL, 1.56–1.76; GW, 0.11–0.12; GL, 0.35–0.38.

Dimensions of Female. POW, 0.38; TW, 0.42–0.43; HL, 0.54–0.56; DPL, 0.16–0.17; PW, 0.27–0.28; MW, 0.38–0.39; AWV, 0.50–0.57; TL, 1.98–2.06.

Material. HOLOTYPE: ♂, ALLOTYPE: ♀ of *Cotingacola meridae* ex *Pipreola riefferii melanolaema*, VENEZUELA. 4 ♂♂, 3 ♀♀ ex *Pipreola arcuata*, VENEZUELA.

Discussion. The male of *C. meridae* with its long penis (Fig. 21) is closest to that of *C. dimorpha* but is distinguished by its larger dimensions, broader abdomen, and much smaller HL/TW and TL/AWV values. The female with its large number of marginal subgenital plate setae is similar to *C. rupicolae* but is recognizable by its smaller size, narrower abdomen, and larger HL/TW and TL/AWV ratios.

The series of 7 lice from *P. arcuata* was erroneously identified by Carriker as *C. graciligastra*. This action by him was probably because a louse from this same host species was the type for *C. graciligastra*, a species that we have placed in synonymy with *C. tergalis* and that is markedly different from *C. meridae*.

Cotingacola stotzi Clayton and Price, new species

(Figs. 22–25)

Type Host: *Querula purpurata* (P.L.S. Muller).

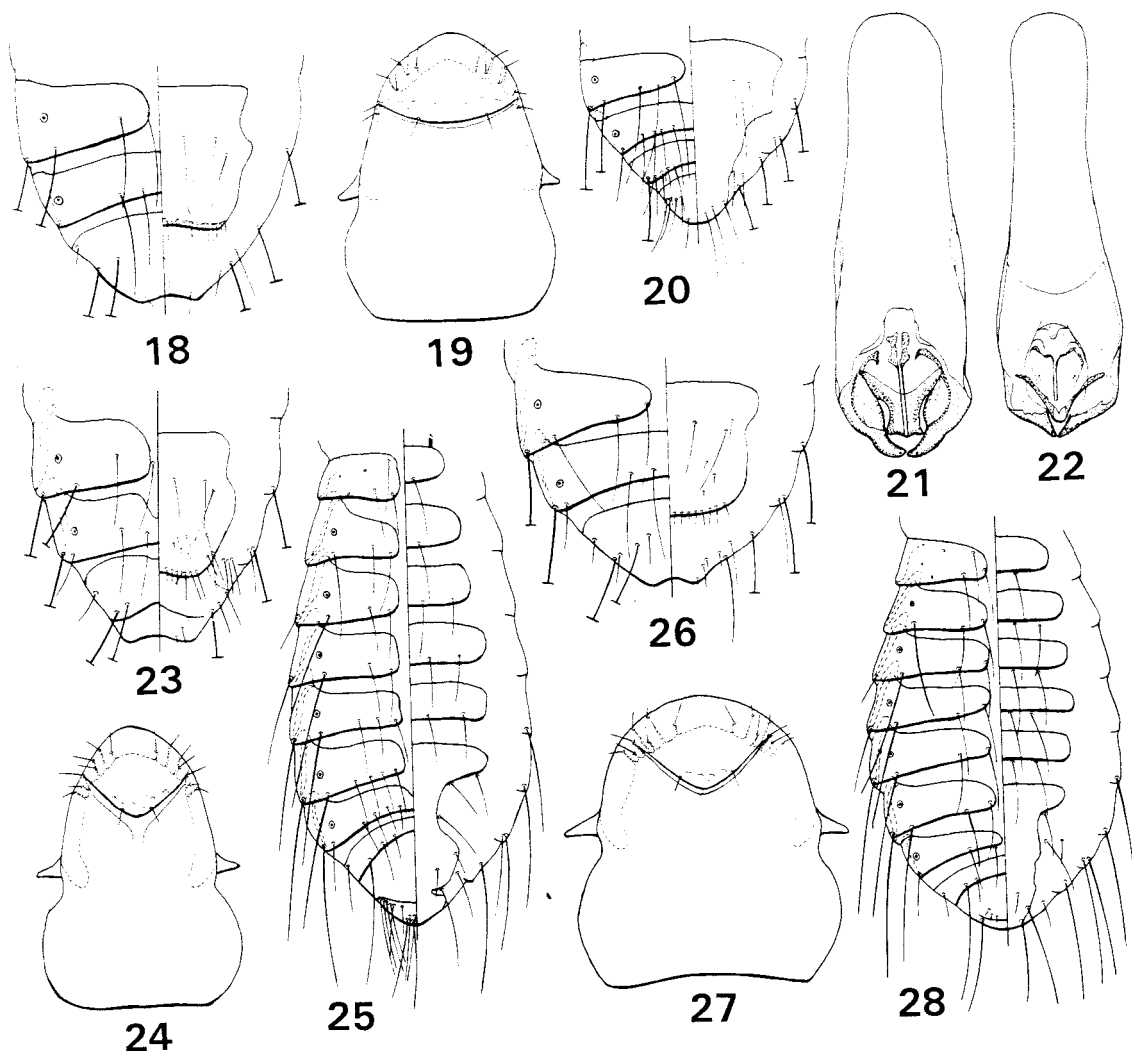
Male and Female. Head as in Fig. 24; HL/TW, 1.30–1.38. TL/AWV, 3.31–3.92. Male abdomen (Fig. 25) with tergite VIII having medioanterior indentation, genitalia (Fig. 22) with narrow parallel-sided penis 0.05 long, and other structures as shown. Female terminalia as in Fig. 23, subgenital plate with 11–15 marginal setae, lateral setae longer than median setae, each side with cluster of 5 or so medium setae lateroanterior to this marginal row.

Dimensions of Male. POW, 0.37–0.39; TW, 0.45–0.46; HL, 0.61–0.62; DPL, 0.19–0.20; PW, 0.32–0.33; MW, 0.44; AWV, 0.54–0.59; TL, 2.07–2.15; GW, 0.14–0.15; GL, 0.49–0.53.

Dimensions of Female. POW, 0.38–0.40; TW, 0.46–0.50; HL, 0.61–0.66; DPL, 0.19–0.21; PW, 0.32–0.35; MW, 0.44–0.49; AWV, 0.61–0.71; TL, 2.35–2.55.

Type Material. HOLOTYPE: ♂ ex *Querula purpurata*, PERU: Dept. Madre de Dios, Cerro de Pantiacolla, 600 m, 17 December 1985, D. H. Clayton. PARATYPES: 2 ♀♀ same data as holotype; 2 ♂♂, 8 ♀♀ same data except 1,030 m, above Rio Palotoa, 29 August 1985.

Discussion. This species is readily separated from all others of the genus by both sexes having the greatest head length and total length, the male having unique large genitalia (Fig. 22) and the female having a subgenital plate (Fig. 23) with longer lateral marginal setae and a cluster of setae lateroanterior to this row.



Figs. 18–28. *C. meridae*. (18) Female terminalia; (19) female head outline; (20) male terminalia; (21) male genitalia. *C. stotzi*. (22) Male genitalia; (23) female terminalia; (24) female head outline; (25) male abdomen. *C. fitzpatricki*. (26) Female terminalia; (27) female head outline; (28) male abdomen.

Etymology. This species is named for D. F. Stotz of The Field Museum, Chicago, who was instrumental in the field work that yielded this and other new species of Peruvian lice.

Cotingacola fitzpatricki Clayton and Price, new species
(Figs. 26–28)

Type host: *Lipaugus subalaris* Sclater.

Male and Female. Head (Fig. 27) broad; HL/TW, 1.09–1.17. Abdomen broad; TL/AWV, 2.82–3.08. Male abdomen (Fig. 28) with tergite VIII divided medially, genitalia essentially as for *C. gracilis* (Fig. 11) with narrow parallel-sided penis, 0.03–0.04 long. Female terminalia as in Fig. 26, subgenital plate with 12–15 marginal setae.

Dimensions of Male. POW, 0.30–0.32; TW, 0.37–0.38; HL, 0.41–0.43; DPL, 0.13–0.15; PW, 0.22–0.24;

MW, 0.30–0.32; AWV, 0.42–0.46; TL, 1.26–1.36; GW, 0.08; GL, 0.25–0.28.

Dimensions of Female. POW, 0.33–0.36; TW, 0.40–0.42; HL, 0.44–0.47; DPL, 0.14–0.15; PW, 0.23–0.25; MW, 0.33–0.35; AWV, 0.48–0.54; TL, 1.42–1.65.

Type Material. HOLOTYPE: ♂ ex *Lipaugus subalaris*, PERU: Dept. Madre de Dios, Cerro de Panticollá, 1,030 m. above Rio Palotoa, 29 August 1985. D. H. Clayton. PARATYPES: 2 ♂♂, 2 ♀♀ same data except 24 August 1985; 4 ♀♀ same data except 31 August 1985; 1 ♂ same data except 3 September 1985.

Discussion. This species is easily distinguished from all other *Cotingacola* taxa by its head shape (Fig. 27), the short head length, and short overall length of both sexes. The HL/TW and TL/AWV values are similar to those for *C. rupicolae*, but the latter has a markedly different head shape and male genitalia. The male

genitalia of *C. fitzpatricki* are surprisingly similar to those of *C. gracilis* (Fig. 11), but the latter has a very different head shape, a longer head and body reflected by larger HL/TW and TL/AWV values, and other dimensional and structural differences.

Etymology. This species is named for J. W. Fitzpatrick, Cornell University, in appreciation for advising the senior author's Ph.D. work and for leading the Peruvian expedition on which this new species was collected.

Key to the Species of *Cotingacola*

1. Dorsal head plate with medioposterior process (Fig. 5), each abdominal sternite with >5 setae *parmipapillae* Carriker
- Dorsal head plate without such process, each abdominal sternite with <5 setae 2
2. Temple width <0.36 and abdominal tergites III-VI with 2 setae mediad of spiracle (Fig. 8). Male genitalia with V-shaped penis 0.020-0.025 long (Fig. 9) *tergalis* Carriker
- Temple width >0.36 and/or abdominal tergites III-VI with 3 such setae. Male genitalia with penis otherwise 3
3. Female with >23 marginal subgenital plate setae. Male genitalia with very small V-shaped penis (Fig. 2) or slender penis 0.06-0.07 long (Fig. 21) 4
- Female with <20 marginal subgenital plate setae. Male genitalia otherwise 5
4. TL/AWV<3.20. Female TW>0.46. Male genitalia as in Fig. 2 *rupicolae* Carriker
- TL/AWV>3.30. Female TW<0.45. Male genitalia as in Fig. 21 *meridae* Carriker
5. Head broadly rounded (Fig. 27), HL/TW<1.20, TL/AWV<3.15 *fitzpatricki* Clayton and Price, n. sp.
- Head slender (Figs. 12 and 24), HL/TW>1.25, TL/AWV>3.25 6
6. TW>0.43, HL>0.59. Male genitalia (Fig. 22) >0.12 wide, tergite VIII medioanteriorly indented (Fig. 25) *stotzi* Clayton and Price, n. sp.
- TW<0.43, HL<0.59. Male genitalia (Figs. 11 and 17) <0.11 wide, tergite VIII either entire or medially divided 7
7. Penis of male genitalia (Fig. 11) <0.045 long, TW>0.36. Female unknown. Ex *Cephalopterus* in Bolivia *gracilis* Carriker
- Penis of male genitalia (Fig. 17) >0.055 long, TW<0.35. Ex *Procnias* in Costa Rica *dimorpha* Carriker

Discussion

Among passerine birds, cotingas are 2nd only to the birds of paradise in diversity of morphology and behavior (Snow 1982). Characters delimiting cotingid relationships have been hotly debated for more than a century with considerable disagreement as to which of the approximately 30 genera should be included in

Table 1. List of *Cotingacola* species and their hosts

<i>Cotingacola</i> species	Host species
<i>dimorpha</i>	<i>Procnias tricarunculata</i> ^a
<i>fitzpatricki</i> , n. sp.	<i>Lipaugus subalaris</i> ^a
<i>gracilis</i>	<i>Cephalopterus ornatus</i> ^a
<i>meridae</i>	<i>Pipreola arcuata</i> ^a
	<i>Pipreola riefferii</i> ^a
<i>parmipapillae</i>	<i>Cephalopterus ornatus</i> ^a
	<i>Ptyroderus scutatus</i> ^b
<i>rupicolae</i>	<i>Cotinga nattererii</i> ^a
	<i>Pipreola riefferii</i> ^a
	<i>Rupicola peruviana</i> ^d
<i>stotzi</i> , n. sp.	<i>Querula purpurata</i> ^b
<i>tergalis</i>	<i>Pipreola arcuata</i> ^a
	<i>Pipreola aureopectus</i> ^a
	<i>Pipreola intermedia</i> ^a

Host subfamily from Snow (1982):

^a Procnatiinae.

^b Querulinae.

^c Cotinginae.

^d Rupicolinae.

the family Cotingidae (relegated to a subfamily of Tyrannidae by Sibley and Monroe 1990). All of the host genera from which we have lice are included in Snow's traditional cotingid group, which, along with several additional genera, Prum (1990) considered monophyletic on the basis of a cladistic analysis of morphological traits.

The complexity of cotinga relationships motivates us to compare their classification with that of the lice described herein. We hasten to add that, in the absence of a phylogeny for the lice, which we have not attempted to reconstruct, we are unable to test formal hypotheses regarding bird-lice cospeciation (see Page et al. 1996). However, an examination of patterns of host use among *Cotingacola* species can point to instances of host switching by lice among hosts that are sympatric and share the same habitat (Clayton 1990).

Four of the 8 *Cotingacola* species we recognize are known from a single host species (Table 1), 2 of the 8 from multiple hosts of *Pipreola*, and the remaining 2 from different host genera.

One of this last group, *C. rupicolae*, has been collected from 3 genera of hosts, although the record from *Cotinga* should be viewed with caution because it is based only on a single louse specimen. The records of *C. rupicolae* from *Rupicola* and *Pipreola* are based on multiple specimens of lice and are thus more certain. The occurrence of *C. rupicolae* on both host genera is somewhat surprising inasmuch as these birds are neither closely related nor morphologically similar. Although they are sympatric and sometimes found in similar habitats, *Rupicola peruviana* is nearly twice as large as *Pipreola riefferii*. This indicates that host body size is not a determinant of *Cotingacola* host use as it is for some other groups of bird lice (e.g., D. M. Tompkins and D.H.C., University of Stirling, Stirling, Scotland, and University of Utah, Salt Lake City, unpublished data). *Rupicola* is a member of the (traditional) cotingid cock-of-the-rock subfamily Rupicoli-

nae, and *Pipreola* is a member of the "typical cotinga" subfamily Cotinginae; however, various authors have questioned whether *Rupicola* is even a cotingid (reviewed in Snow 1982). The occurrence of *C. rupicolae* on *Rupicola* suggests that the members of this genus are in fact cotingas, in accordance with the findings of Prum (1990).

The 2nd louse with hosts in different genera, *C. parmipapillae*, is known from *Pyroderus scutatus* and *Cephalopterus ornatus* (Table 1), both of which are members of the (traditional) fruitcrow subfamily Querulinae (Snow 1982). Both host species are large-bodied widespread taxa that are partially sympatric. *Pyroderus* and *Cephalopterus* are probably also sister taxa (Snow 1982). Therefore, it is quite possible that host sharing in this case reflects a common evolutionary history of the hosts. However, analysis of phylogenetic data will be necessary to rigorously test this hypothesis.

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