

# RECONSIDERATION OF THE *LONGICEPS* SPECIES GROUP OF THE FEATHER LOUSE GENUS *COLUMBICOLA* (PHTHIRAPTERA: PHILOPTERIDAE) WITH DESCRIPTIONS OF TWO NEW SPECIES

Sarah E. Bush\* and Roger D. Price†

Natural History Museum, University of Kansas, Lawrence, Kansas 66045-7163. e-mail: bush@biology.utah.edu

**ABSTRACT:** We reconsidered the composition of the *longiceps* species group within *Columbicola*. Based primarily on head shape, the group is divided into the *longiceps* and the *cavifrons* groups, with 7 species in the former and 5 in the latter. Two new species are described: *Columbicola claytoni* (type host: *Ducula rufigaster* [Quoy and Gaimard]) and *Columbicola malenkeae* (type host: *D. pacifica* [J. F. Gmelin]). *Columbicola wolffhuegeli* (Eichler) is removed from synonymy with *Columbicola longiceps* (Rudow) and is recognized as a valid species. The true host for *Columbicola paradoxus* Tendeiro has been determined as *Lopholaimus antarcticus* (Shaw).

Since the taxonomic revision of the Old World species of *Columbicola* Ewing by Adams et al. (2005), we have collected additional specimens that warrant reexamination of the *longiceps* species group. As stated in the revisional work (Adams et al., 2005, p. 3587), this group is “. . . the most morphologically variable of the *Columbicola* species groups.” After consideration of the available material, we have concluded that this group should be divided into 2 groups (i.e., *longiceps* with 7 species and *cavifrons* with 5 species). We provide descriptions and content for each of these groups.

## MATERIALS AND METHODS

Newly collected specimens were mounted in Canada balsam on standard microscope slides according to the procedure described by Price et al. (2003). Newly collected specimens were deposited at the U.S. National Museum of Natural History (USNM; Washington, D.C.) and the Price Institute of Phthirapteran Research (PIPeR; University of Utah, Salt Lake City). Additional specimens were borrowed from the K. C. Emerson Entomology Museum, Oklahoma State University (OSU; Stillwater, Oklahoma). All louse specimens were examined under a Nikon DIC/phase contrast microscope (Nikon Instruments, Melville, New York), with appropriate data recorded and illustrations prepared. For the descriptions, all measurements are in millimeters. Abbreviations used are: APW, dorsoanterior head plate width; HW, head width; HL, head length at midline; HL/HW, ratio of head length to head width; SL, antennal scape length; PW, prothorax width; MW, metathorax width; GW, male genitalia width; and TL, total length at midline. Host classification follows that of Dickinson (2003).

## REDESCRIPTION

### *longiceps* species group (Figs. 1–16)

This group with 7 species found on *Ducula*, *Goura*, and *Lopholaimus* spp. (Table I). Members with divided and deeply indented anterior head margin (Fig. 3); each side of metanotum with 3 long, 1 short setae (Adams et al., 2005, fig. 3), male antenna with variable scape and third segment (Figs. 3, 11); male genitalic mesosome with “ribbonlike” transverse sclerite (Fig. 4). Female subgenital plate grooves variable (Figs. 8, 14).

The *longiceps* group includes *Columbicola mendesi* Adams et al. and *Columbicola gourae* Tendeiro, both described in Adams et al. (2005). Remaining 5 species include *Columbicola longiceps* (Rudow), *Columbicola claytoni* n. sp., *Columbicola wolffhuegeli* (Eichler) (removed from synonymy), *Columbicola malenkeae* n. sp., and *Columbicola par-*

*adoxus* Tendeiro. Another species, *Columbicola forficula* (Piaget), traditionally treated as a junior synonym of *C. longiceps*, is considered nomen dubium.

### *Columbicola longiceps* (Rudow)

#### Taxonomic summary

*Lipeurus longiceps* R. Rudow 1869.

Type host: “*Carpophaga perspicillata* Columbida aus Java” = *Ducula perspicillata* (Temminck).

#### Remarks

This species was redescribed by Tendeiro (1965) on the basis of only 2 females from the type host. When redescribed by Adams et al. (2005), no material was available from the type host.

Price et al. (2003) listed 10 host species for *C. longiceps* on the basis of the taxonomy of Dickinson (2003), which considered *Ducula lucuosa* (Temminck) and *Ducula spilorrhoea* (G. R. Gray) as subspecies of *Ducula bicolor* (Scopoli). Adams et al. (2005) described lice on 2 of the 10 hosts as a new species (i.e., *C. mendesi*). We were able to obtain and examine lice representing 5 of the remaining 8 host records. The morphology of these specimens varied from the descriptions of *C. longiceps* by Tendeiro (1965) and Adams et al. (2005). Our analysis of this material is presented later in this paper. The 3 host records for which we have no material, unfortunately, include the type host of *C. longiceps*. A more complete description of *C. longiceps* would require the collection of additional specimens from the type host. In the absence of additional material, especially males, we are conservatively retaining these 3 host records as *C. longiceps* (Table I).

### *Columbicola forficula* (Piaget)

#### Taxonomic summary

*Lipeurus forficula* Piaget 1885.

Type host: “*Epimachus albus* (Muséum de Leide)” = *Epimachus* sp. (Passeriformes: Paradisaeidae)—host error; nomen dubium.

#### Remarks

Earlier workers consistently placed this name as a junior synonym of *C. longiceps*. However, now that we have determined that the identity of *C. longiceps* is itself open to question, it is no longer possible to consider this synonymy as valid. Piaget (1885) described this species from a single female associated with an obviously incorrect host. Because the females of this species group are virtually inseparable and because there is no associated male and likely never will be one, *C. forficula* must be relegated to the status of nomen dubium.

### *Columbicola wolffhuegeli* (Eichler) (Figs. 1–4)

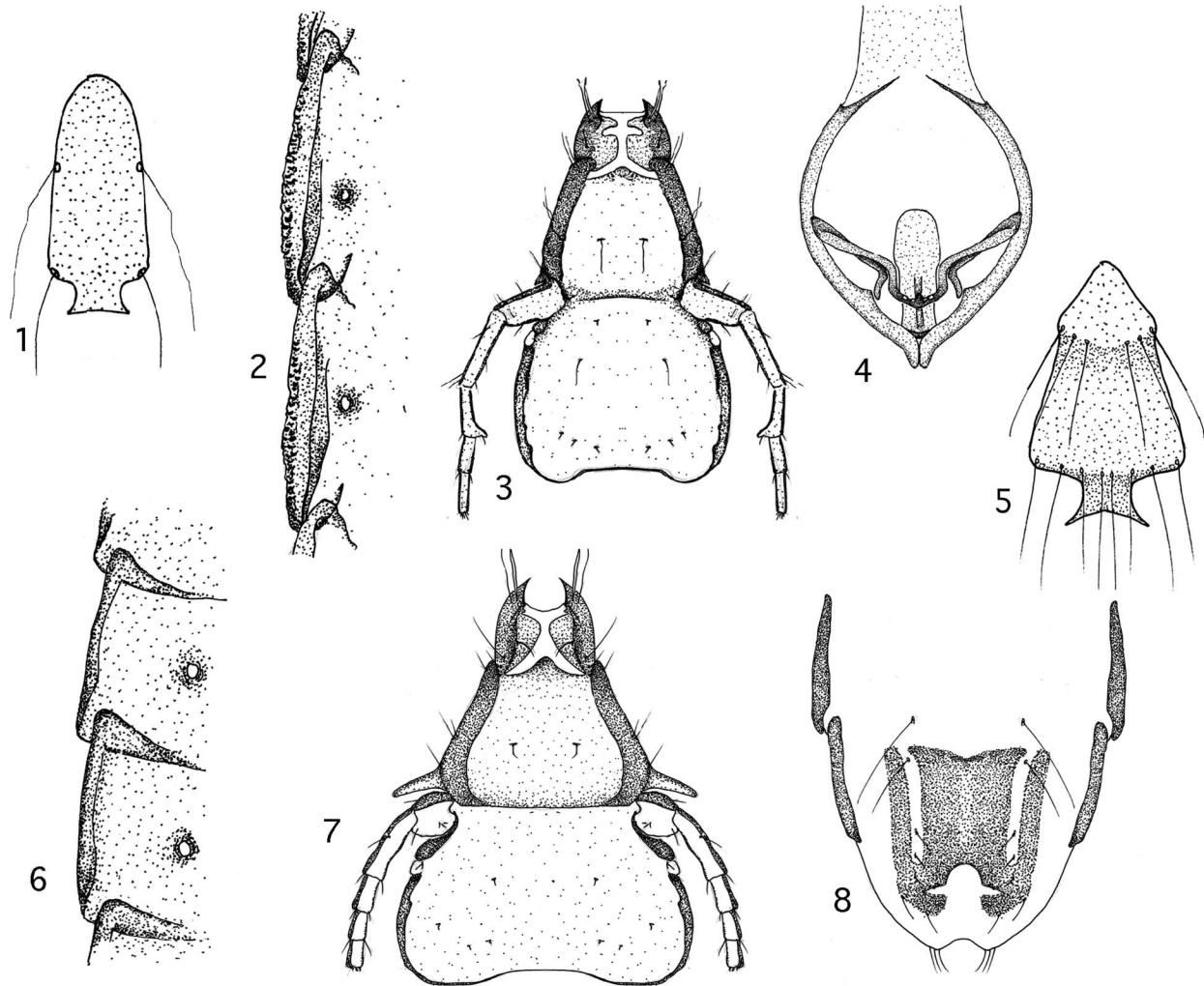
*Adult:* Body elongate. Thoracic sternal plate shaped as in Figure 1. Moderate scaling limited to pleural thickenings (Fig. 2).

*Male:* Head as in Figure 3; APW 0.17–0.18, HW 0.33–0.36, HL 0.57–0.61, HL/HW 1.68–1.76; scape enlarged, SL 0.12–0.13; medi-

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\* Current address: Department of Biology, University of Utah, 257 S. 1400 E., Salt Lake City, Utah 84112-0840.

† 4202 Stanard Circle, Fort Smith, Arkansas 72903-1906.



FIGURES 1–8. *Columbicola wolffhuegeli*: (1) thoracic sternal plate, (2) lateral abdomen, (3) male dorsal head, (4) male genitalia. *Columbicola paradoxus*: (5) thoracic sternal plate, (6) lateral abdomen, (7) female dorsal head, (8) female genitalia.

oposterior setae short, not reaching posterior head margin, 0.03 long. Thorax with PW 0.24–0.29, MW 0.31–0.36. Genitalia as in Figure 4; parameres thin and laterally rounded; ribbonlike transverse sclerite as shown; mesosome slender and sides parallel 0.08–0.09 long, GW 0.12–0.13. TL 2.25–2.41.

**Female:** Head with APW 0.18, HW 0.36–0.38, HL 0.61–0.63, HL/HW 1.63–1.75. Thorax with PW 0.28, MW 0.36–0.38. Subgenital plate similar to *C. claytoni* (Fig. 6), with groove short, rounded anteriorly, with distinct lateral expansion, and up to 4–5 setae (0.015 long) on each side.

#### Taxonomic summary

*Parasoricella wolffhuegeli* Eichler 1952.

**Type host:** “*Ducula luctuosa* (Temm.)” = *Ducula bicolor luctuosa* (Temminck).

**Material:** Six males, 6 females, ex *D. bicolor*, Australia: Northwest Territory, collected from 3 birds (USNM, PIPeR).

#### Remarks

The history of this name has been thoroughly treated by Adams et al. (2005). Their conclusion was to follow Tendeiro (1965) and consider *C. wolffhuegeli* a junior synonym of *C. longiceps*. A subsequent study of specimens from the type host has convinced us of the validity of *C. wolffhuegeli* as a distinct species. The details of the male genitalic structure are unique and quite different from those of the other species treated in this paper.

#### *Columbicola paradoxus* Tendeiro

(Figs. 5–8)

**Adult:** Body broad. Two rows of 6–8 setae across thoracic sternal plate (Fig. 5). Lateral abdomen and pleural thickenings not scaled (Fig. 6). Abdomen with spiracles positioned more medially than those of *C. claytoni* (Figs. 6, 10, respectively).

**Male:** Head with APW 0.18–0.19, HW 0.47–0.48, HL 0.64–0.65, HL/HW 1.33–1.38; scape only slightly enlarged, SL 0.10; medioposterior setae short, not reaching posterior head margin, 0.02–0.03 long. Thorax with PW 0.32–0.35, MW 0.44–0.45. Genitalia with parameres thin, laterally rounded, mesosome relatively broad, 0.13 long; GW 0.18–0.19, bordered by twisted, narrow transverse sclerites (Adams et al., 2005, fig. 157). TL 2.34–2.37.

**Female:** Head as in Figure 7; APW 0.18–0.21 HW 0.49–0.51, HL 0.66–0.70, HL/HW 1.32–1.43. Thorax with PW 0.34–0.35, MW 0.45–0.49. Subgenital plate (Fig. 8) with groove short, rounded anteriorly, with distinct lateral expansion and lateral setae as shown.

#### Taxonomic summary

**Type host:** “*Sphecotheres vieilloti flaviventris* Gould (Passeriformes: Orioliidae)” —host error.

**True host:** *Lopholaimus antarcticus* (Shaw).

**Material:** Three males, 5 females, ex *L. antarcticus*, Australia: New South Wales, collected from 1 bird (USNM, PIPeR).

TABLE I. Parasite-host list for *longiceps* and *cavifrons* species groups.

Louse species	Host species
<i>longiceps</i> species group	
<i>Columbicola longiceps</i> (Rudow)	<i>Ducula perspicillata</i> (Temminck)* <i>D. cineracea</i> (Temminck) <i>D. latrans</i> (Peale)
<i>C. mendesi</i> Adams et al.	<i>D. concinna</i> (Wallace)* <i>D. rosacea</i> (Temminck)
<i>C. wolffhuegeli</i> (Eichler)	<i>D. bicolor</i> (Scopoli)*
<i>C. claytoni</i> n. sp.	<i>D. rufigaster</i> (Quoy and Gaimard)* <i>D. chalconota</i> (Salvadori)
<i>C. malenkeae</i> n. sp.	<i>D. pacifica</i> (J.F. Gmelin)* <i>D. pistrinaria</i> Bonaparte
<i>C. gourae</i> Tendeiro	<i>Goura cristata</i> (Pallas)*
<i>C. paradoxus</i> Tendeiro	<i>Lopholaimus antarcticus</i> (Shaw)
<i>cavifrons</i> species group	
<i>C. cavifrons</i> (Taschenberg)	<i>D. aenea</i> (L.)*† <i>D. badia</i> (Scopoli)*† <i>D. forsteni</i> (Bonapart) <i>D. lacernulata</i> (Temminck) <i>D. melanochroa</i> (P.L. Sclater) <i>D. oceanica</i> (Lesson and Garnot) <i>D. pickeringii</i> (Cassin) <i>D. rosacea</i> (Temminck)
<i>C. sikorae</i> Eichler	<i>D. badia</i> (Scopoli)*
<i>C. xavieri</i> Tendeiro	<i>Ptilinopus occipitalis</i> Gray and Mitchell*
<i>C. harrisoni</i> Tendeiro	<i>D. pinon</i> (Quoy and Gaimard)*
<i>C. reedi</i> Adams et al.	<i>P. magnificus</i> (Temminck)*

\* Type host.

† Both *D. aenea* and *D. badia* were listed as type hosts by Taschenberg (1882) in his description of *C. cavifrons*, which was based on specimens from both host species.

## Remarks

Initially, the host of this louse was thought to be a figbird (*Sphenotheres vieilloti flaviventris*) found in northeastern Australia, thus making this louse the only example of a *Columbicola* from a noncolumbiform host. Tendeiro (1965) based this description on only 2 males. Despite concentrated efforts to collect *C. paradoxus* from figbirds, no additional specimens have been found (Adams et al., 2005). Recently, however, specimens of both sexes of this species were collected from the top-knot pigeon (*L. antarcticus*) by I. Mason (9 October 2003, ANWC-33906).

*Columbicola paradoxus* can be separated from other species of this group by the overall dimensions and the shape of the head. It also has a unique setal configuration on its thoracic sternal plate (Fig. 5). Illustrations are provided here only for the female head, thoracic sternal plate, lateral abdomen, and ventral terminalia because Adams et al. (2005) provided adequate descriptive details for the male. This is the first description of the female of this species.

## DESCRIPTION

### *Columbicola claytoni* n. sp. (Figs. 9–14)

**Adult:** Body elongate. Thoracic sternal plate noticeably scaled and shaped as in Figure 9. Pleural thickenings and lateral abdomen heavily scaled (Fig. 10).

**Male:** Head as in Figure 11; APW 0.16–0.18, HW 0.34–0.37, HL 0.57–0.64, HL/HW 1.63–1.79; scape enlarged, SL 0.13–0.15; medioposterior setae short, not reaching posterior head margin, 0.03–0.05 long. Thorax with PW 0.25–0.29, MW 0.33–0.38. Genitalia as in Figure 12; parameres thin and laterally rounded; ribbonlike transverse sclerite

as shown; mesosome broadly ovoid, 0.10 long; GW 0.16–0.18. TL 2.42–2.52.

**Female:** Head as in Figure 13; APW 0.17–0.19, HW 0.34–0.39, HL 0.60–0.63, HL/HW 1.54–1.79. Thorax with PW 0.27–0.29, MW 0.33–0.38. Subgenital plate (Fig. 14) with groove short, rounded anteriorly, with distinct lateral expansion and 2–4 setae (<0.01 long) on each side.

## Taxonomic summary

**Type host:** *Ducula rufigaster* (Quoy and Gaimard).

**Type material:** Holotype male, ex *D. rufigaster*, Papua, New Guinea: Wabo, 5 August 2002, D.H. Clayton and S.E. Al-Tamimi, SEA-302 (USNM). Paratypes, all from type host: 3 males, 5 females, same data as holotype; 4 males, 4 females, New Guinea (USNM, PIPeR): Mt. Bosawi, 16 May 1973, 103201 (OSU); 1 male, Neth. New Guinea: Vogelkop, 13 January 1962, L.W. Quate, BBM-NG 821 (OSU).

**Additional material:** Three males, 2 females, ex *Ducula chalconota* (Salvadori), New Guinea, collected from 2 birds (OSU, PIPeR).

**Etymology:** This species is named for Dale H. Clayton, University of Utah, Salt Lake City, in recognition of the 3 decades he has spent (so far) researching the ecology and evolutionary history of host–parasite interactions and in recognition of the interactions that inspired his wife to study lice too.

## Remarks

This species is recognized by the distinctive scaling of the lateral abdomen and by its distinctive male genitalic structure, especially the size and shape of the mesosomal plate (Fig. 12). The 2 species of hosts that share *C. claytoni* have contiguous ranges in New Guinea.

### *Columbicola malenkeae* n. sp. (Figs. 15, 16)

**Male:** Body elongate. Head as in Figure 15; APW 0.16–0.17, HW 0.34–0.36, HL 0.54–0.59, HL/HW 1.58–1.68; scape moderately enlarged, SL 0.11; medioposterior setae short, not reaching posterior head margin, 0.04 long. Thorax with PW 0.27–0.30, MW 0.32–0.37. Genitalia as in Figure 16; parameres laterally rounded; ribbonlike transverse sclerite extending well anterior to mesosome; mesosome sides parallel, with apical expansion 0.08–0.09 long, GW 0.16. TL 2.35–2.42.

**Female:** Unavailable.

## Taxonomic summary

**Type host:** *Ducula pacifica* (J. F. Gmelin).

**Type material:** Holotype male, ex *D. pacifica*, Vanuatu: Sanma, 18 June 2003, Loi Philemuo, AWK-2675 (USNM). Paratype, 1 male, same data as holotype (PIPeR).

**Additional material:** One male, ex *Ducula pistrinaria* Bonaparte, New Britain (PIPeR).

**Etymology:** This species is named for Jael R. Malenke, University of Utah, Salt Lake City, in recognition of her work on the evolutionary ecology of *Columbicola*.

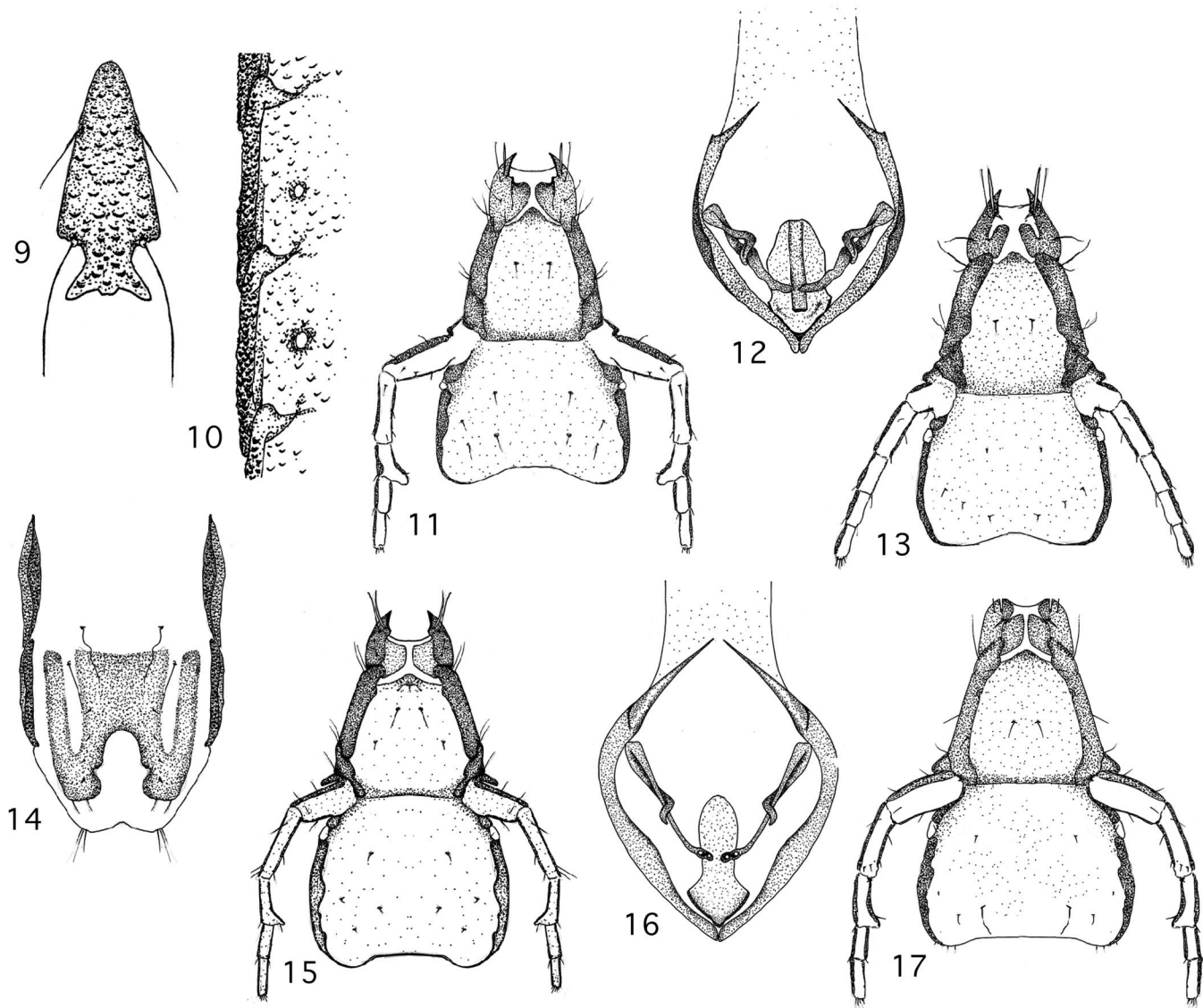
## Remarks

The configuration of the male genitalic structures, including the mesosome shape and size and the anterior placement of the transverse sclerite (Fig. 16), is unique among members of this species group.

## REDESCRIPTION

### *cavifrons* species group (Fig. 17)

This species group consists of 5 species formerly included in the *longiceps* species group (Adams et al., 2005). Its members are distinguished from those of the *longiceps* species group, as described above, in having an undivided evenly rounded to slightly indented anterior head margin (Fig. 17). As in the case of the *longiceps* species group, members of the *cavifrons* species group also have each side of the metanotum with 3 long, 1 short setae, the male antenna with an enlarged scape and spur present on the third segment, and the male genitalic mesosome with a ribbonlike transverse sclerite. Female subgenital plate grooves are variable. These species were adequately described in Adams



FIGURES 9–17. *Columbicola claytoni*: (9) thoracic sternal plate, (10) lateral abdomen, (11) male dorsal head, (12) male genitalia, (13) female dorsal head, (14) female genitalia. *Columbicola malenkeae*: (15) male dorsal head, (16) male genitalia. *Columbicola cavifrons*: (17) male dorsal head.

et al. (2005) and require no further treatment here. The 5 species of this group are found on the host genera *Ducula* and *Ptilinopus* (Table I).

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