

# A Taxonomic Study of the Genus *Cuculiphilus* (Mallophaga: Menoponidae)<sup>1</sup>

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## ABSTRACT

The genus *Cuculiphilus* is considered to include 4 subgenera—*Cuculiphilus*, *Carrikeria*, *Falcophilus*, and *Aegyphiphilus*; the species within each are discussed. There are 4 new synonymies: *C. (Cuculiphilus) snodgrassi* (Kellogg

and Kuwana) (= *C. coromandus* Uchida, *C. coromandus* var. *Centropi* Quadri, *C. pupiya* Ansari), and *C. (Falcophilus) alternatus* (Osborn) (= *F. coragypsis* Eichler). A key is given to the subgenera and species.

The amblyceran genus *Cuculiphilus* Uchida, 1926, was established for 3 species of lice each parasitic, respectively, on a species of the avian orders Cuculiformes, Coraciiformes, and Strigiformes, with *Pediculus fasciatus* Scopoli from *Cuculus canorus* L. as the type-species. Since then, however, *Cuculiphilus coromandus* Uchida has been considered by Hopkins (1947) to be a straggler from a cuculiform to the designated coraciiform type-host and *Colpocephalum pamei* McGregor, included by Uchida (1926) as a *Cuculiphilus* from a strigiform host, has been shown by Price and Beer (1963) to belong to *Kurodaia* Uchida, 1926. The genera *Falcophilus* Guimarães, 1942; *Aegyphiphilus* Eichler, 1944; and *Carrikeria* Hopkins, 1947, were subsequently described and include lice related to the *Cuculiphilus* of cuckoos but occurring on the Falconiformes and Galliformes. Clay (1947) and Hopkins and Clay (1952), having recognized the morphological similarities of *Cuculiphilus*, *Falcophilus*, and *Aegyphiphilus*, treat them all as *Cuculiphilus*. However, Eichler (1944, 1948), as well as certain other workers, still considers them distinct genera. The affinities of *Carrikeria* to *Cuculiphilus* apparently have not been previously discussed.

After examining specimens of *Cuculiphilus*, *Falcophilus*, *Aegyphiphilus*, and *Carrikeria*, we here provide evidence for recognition of these groups as subgenera of *Cuculiphilus*, review the taxonomic status of the currently recognized species, and report upon additional hosts. This study is especially desirable since most of the known species are unrecognizable from their descriptions and the classifications at the generic level were never based on any sound taxonomic revision of the entire complex. By way of

summary, a key is presented to the subgenera and the included species.

For this study, 89 adult lice were examined from 7 genera and 9 species of Falconiformes, 218 from 12 genera and 21 species of Cuculiformes, and 3 from 1 genus and 1 species of Galliformes. All specimens represented material mounted on microscope slides. Values in parentheses following a statement of range represent the mean; all measurements are in millimeters.

## Genus *Cuculiphilus* Uchida

All observed specimens of the subgenera *Cuculiphilus*, *Falcophilus*, *Aegyphiphilus*, and *Carrikeria* resemble one another as follows; for brevity, these characteristics will not be repeated in subsequent descriptions. Little sexual dimorphism other than abdominal sternal chaetotaxy, terminal abdominal segments, and females at times larger. Head (Figs. 8-11) with distinct preocular slit. Middorsal head setae minute, characteristically arranged. Each side with 1 long inner occipital seta and 1 long and 1 medium outer occipital setae set close together. Occipital and preocular nodi and associated carinae well defined. Terminal antennal segment divided (Fig. 12).

Pronotum usually with 8 marginal setae on each side. Prosternal plate well developed, without setae, but with median external process (Figs. 25-28); 2 setae anterior to plate. Mesosternal plate extensively developed, well pigmented. Metasternal plate trapezoidal, with 2 short and 4-12 long setae (Figs. 34-38). Femur III with 4-5 comb rows of short spiniform setae.

Abdominal tergites I-VIII of approximately equal length, undivided, and lacking anterior setae. Tergo-central setae medium to very long. Postspiracular setae very long on all segments, with short seta outermost on I-II. Sternite I greatly reduced (Fig. 8) or

<sup>1</sup> Paper no. 5582, Scientific Journal Series, Minnesota Agricultural Experiment Station, St. Paul, Minnesota 55101. Accepted for publication December 18, 1964.

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apparently absent (Fig. 9), never bearing setae. Sternites II-VIII with marginal and anterior setae. Females with 1-2 lateral comb rows on sternite III, 3 on IV; males with 1-2 comb rows on sternite III, 2 on both IV and V.

Females typically with sternites VII-IX fused, but with partial separation laterally between VII-VIII (Figs. 8-11); rarely only VIII-IX fused (Fig. 7). Margin of vulva with evenly spaced medium setae. Vestiture of microtrichia associated with characteristically shaped female genital chamber within segment VIII (Figs. 29-33). Female anus as in Figs. 8-11; setae of dorsal and ventral margins essentially similar; no inner setae. Male having anterior margin of sternite VII with pair of projections passing into segment VI and having genital plate extending posteriorly beyond very short last tergite (Figs. 1-4).

Thus, the species within *Cuculiphilus*, *Carrikeria*, *Falcophilus*, and *Aegyphiphilus* share several significant features that set them apart as a group from other lice of the extensive menoponid *Colpocephalum*-complex. Also, we believe ample evidence has been documented here to justify the recognition of each as a distinct taxon. The only point of conjecture is whether these 4 taxa should themselves be recognized as distinct genera, either ungrouped or within their own subfamily, or simply as subgenera of *Cuculiphilus*. We have decided upon the latter choice to keep these related taxa together in what we believe the most logical system based upon our present knowledge. To recognize the 4 taxa as genera would necessitate classification within the Menoponidae at the supra-generic level to retain their relationship as a group. However, we feel more extensive information must become available for all menoponid lice before such classification is justified.

The species within each subgenus not only form a morphologically closely related group, but, in turn, each subgenus is distributed on a well-defined bird group—*Cuculiphilus* on the Cuculiformes, *Carrikeria* on the Opisthocomidae of the Galliformes, *Falcophilus* on the Cathartidae, and *Aegyphiphilus* on a subfamily (Aegyptiinae) of the Accipitridae, both of the latter within the Falconiformes.

#### Subgenus *Cuculiphilus* Uchida

*Cuculiphilus* Uchida, 1926. J. Coll. Agr. Tokyo 9: 47. Type-species: *Pediculus fuscicornis* Scopoli.

This subgenus contains species restricted in their known distribution to birds of the order Cuculiformes and distinguishable from those of the other subgenera by the following combination of characters: (1) Abdominal sternite I present and distinct from sternite II; (2) Tergite VII of males without stout spiniform setae; chaetotaxy of tergites VI-VIII similar for both sexes; (3) Head without pair of ventral sclerotized processes arising near base of palpi; (4) Male genitalia (Figs. 13-19) close to *Carrikeria*; much smaller than and quite distinct from those of *Falcophilus* and *Aegyphiphilus*; median piece of distal sclerotized area unbranched; (5) Both sexes consistently smaller than members of the other subgenera;

(6) Prosternal plate shaped characteristically, with short median process (Fig. 28); (7) Microtrichia within female genital chamber distributed as in Fig. 30; area between vulval and ventral anal margins without microtrichia; margin of vulva even.

#### *Cuculiphilus (Cuculiphilus) fasciatus* (Scopoli)

*Pediculus fasciatus* Scopoli, 1763. Entomol. Carniolica: 383. Type-host: *Cuculus canorus* L.  
*Pediculus cuculi* J. C. Fabricius, 1775. Syst. Entomol.: 807. Nomen novum for *Pediculus fasciatus* Scopoli.  
*Liothenn phanerostrigmaton* Nitzsch, 1818. Germa's Mag. Entomol. 3: 300. Nomen novum for *Pediculus fasciatus* Scopoli.  
*Menopon phanerostrigma* Giebel, 1861. Z. Ges. Naturwiss. 18: 305. Nomen novum for *M. phanerostrigmaton* (Nitzsch).

FEMALE (Fig. 8).—Gular setae 3+3 or 3+4, with at least posterior 2 pairs long, of nearly equal length. Marginal pronotal seta 5 less than 0.038 long, very thin, often minute to absent, considerably weaker than pronotal seta 1. Metanotal margin with 8 long, 1-2 short setae; metasternal plate with 2 long, 1 short setae on each side (Fig. 37); metasternal plate index (MPI), calculated as length of plate at midline divided by its posterior width, of 1.8 or more. Marginal abdominal tergal setae: I, 12; II, 13-15; III, 14-16; IV, 16-17; V-VI, 16; VII, 14-16; VIII, 12-15. Sterna setae: II, 21-25 (23.4); III-IV, 22-28 (25.6); V, 54-60 (56.8); VI, 34-42 (39.6); VII, 24-29 (27.0). Sternite II with 1-2 short detached marginal setae on each side. Two lateral comb rows on sternite III: row 1, or posterior row, with 28-34 (30.3) setae, row 2, 12-25 (19.1); 3 comb rows on IV: rows 1 and 2 with 22-30 (25.4) setae, row 3, 8-17 (13.3). Sternites VII-VIII fused medially; vulval margin with 23-25 setae, having median setae at least 0.075 long. Anus with 24-28 (26.2) setae ventrally, 22-25 (24.0) dorsally.

MALE (Fig. 1).—Abdominal sternites with fewer setae: II, 13-18; III, 17-19; IV, 16-20; V, 21-22; VI, 30-31; VII, 15-17. Sternite II with 0-1 short detached marginal setae. Sternites III-V each with 2 lateral comb rows: III: row 1 with 24-27 setae, row 2, only 4-6; IV: row 1, 20-26 setae, row 2, 17-25; V: row 1, 12-15 setae, row 2, 3-10. Genitalia as in Fig. 13.

Dimensions.—Preocular width, ♀ 0.47-0.51, ♂ 0.44-0.46; temple width, ♀ 0.64-0.66, ♂ 0.59; prothorax width, ♀ 0.40-0.42, ♂ 0.36-0.37; total length, ♀ 1.83-2.06, ♂ 1.47-1.54; ♂ genitalia width, 0.15-0.17.

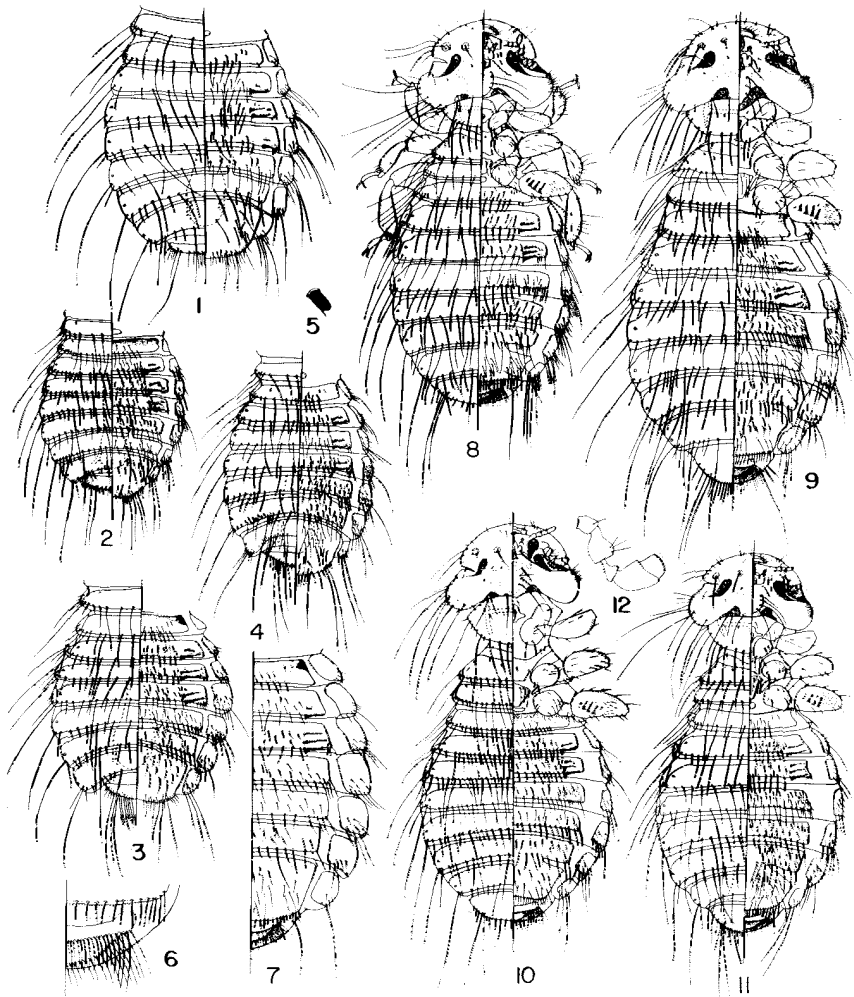
Material Examined.—1 ♀, 2 ♂ (neoparatypes of *C. fasciatus*), *Cuculus canorus canorus*, Poland; 3 ♀, *C. c. gularis* Stephens, N. Rhodesia; 1 ♀, *C. c. telephonus*, Japan.

#### *Cuculiphilus (Cuculiphilus) platygaster* (Giebel)

*Menopon platygaster* Giebel, 1874. Insecta Epizoa: 290. Type-host: *Scythrops novaezelandiae* Latham.  
*Menopon interpolatum* Piaget, 1880. Pediculinæ: 493. Type-host: None given; perhaps *Scythrops novaezelandiae* Latham.

**FEMALE.**—As for *Cuculiphilus fasciatus*, except as follows: Gular setae 3+3, but anterior 2 pairs shorter than posterior pair. MPI 1.5 or less. Setae medialis and adjacent to postspiracular seta on I-II much longer than outermost seta. Sternite II without lateral detached marginal setae (Fig. 7). Second comb row

of sternite III absent to poorly developed, with 0-6 (3.0) setae; first row slightly shorter, with 18-25 (21.5) setae. Fewer sternal setae on V, 46-47. Median marginal vulval setae less than 0.050 long. Dorsal anal fringe of 29-31 setae. Sternal pigmentation and presence of intersegmental line between sternites



FIGS. 1-4.—Male abdomens. 1, *Cuculiphilus fasciatus*; 2, *C. megaspinus*; 3, *C. contrastus*; 4, *C. alternatus*. FIG. 5.—Spiniform seta, male tergite VII, *C. alternatus*. FIG. 6.—Ventral female terminaha, *C. alternatus*. FIG. 7.—Ventral female abdomen, *C. polygaster*. FIGS. 8-11.—Females. 8, *C. fasciatus*; 9, *C. contrastus*; 10, *C. megaspinus*; 11, *C. alternatus*. FIG. 12.—Female antenna, *C. alternatus*.

VII-VIII indicate that these sclerites may not be fused medially; if this is so, this would be the only species of *Cuculiphilus* known having this separation.

**MALE.**—With gula, metasternal plate, and seta adjacent to postspiracular seta on I-II as for female. Additionally separable from males of *C. fasciatus* by the following. Abdominal sternites with fewer setae: II-V, 9-14 (11.3); VI, 19-24 (20.8); VII, 12-16 (13.5). Only single short comb row on sternite III, of 8-14 (10.7) setae; more setae in both comb rows on V; row 1, 18-23 (20.8); row 2, 11-20 (15.3). Male genitalia as in Fig. 14. Smaller in certain dimensions: preocular width, 0.40-0.42; temple width, 0.54-0.56; total length, 1.14-1.32 (although abdomens somewhat telescoped).

Dr. Clay has compared the female and male types of *Menopon interpolatum* with the above descriptions; she reports that the characters agree, in so far as they are visible, except for the female having 52 setae on sternite V.

**Material Examined.**—2 ♀, 6 ♂, *Scythrops novae-hollandiae*, Australia.

#### *Cuculiphilus (Cuculiphilus) decoratus* (Kellogg)

*Menopon decoratum* Kellogg, 1896, Proc. Calif. Acad. Sci. (2) 6: 526. Type-host: *Elanus leucurus* (Vieillot)—probably error.

**FEMALE.**—Unknown.

**MALE.**—In poor condition, but with the following discernible features. Metasternal plate with 3-4 long, 1 short setae on each side. Sternites III-V each with 2 comb rows: III, row 1, 20-26 (24.3) setae; row 2, 5-15 (8.8); IV, row 1, 25-28 (26.7); row 2, 24-30 (27.3); V, row 1, 14-20 (17.7); row 2, 18-22 (20.3). Genitalia as in Fig. 16. Dimensions close to those of *C. fasciatus*, being 0.02-0.05 larger in most measurements, with total length of 1.72.

This species presumably was described from a male, a female, and a nymph. However, the 2 specimens on the type-slide are both males. One of them could have been mistaken for a female or a nymph, since its genitalia are missing; the fate of the third specimen is unknown.

The host record from *Elanus leucurus* (Falconiformes) is believed in error since several features, including size and shape of the genitalia, are clearly those of the subgenus *Cuculiphilus*. Emerson (1949) has recognized this and changed the host to the euculiform *Coccyzus americanus occidentalis* Ridgway. All *Cuculiphilus* we have examined from this host species have been from *C. americanus americanus* (L.) from the Eastern United States; however, these lice all have males with essentially only 1 comb row on abdominal sternite III, with only 2 long, 1 short setae on at least 1 and usually both sides of metasternal plate, and with different genitalia from *Cuculiphilus decoratus* (Fig. 16 vs. Fig. 17). Therefore, *Cuculiphilus* from *Coccyzus americanus americanus* are not *Cuculiphilus decoratus*, whose type-host is still open to question.

**Material Examined.**—2 ♂ (types), *Elanus leucurus*, California.

#### *Cuculiphilus (Cuculiphilus) snodgrassi*

(Kellogg and Kuwana)

*Menopon snodgrassi* Kellogg and Kuwana, 1902, Proc. Wash. Acad. Sci. 4: 486. Type-host: *Coccyzus melanocoryphus* Vieillot.

*Menopon galapagensis* Kellogg and Kuwana, 1902, Proc. Wash. Acad. Sci. 4: 487. Type-hosts: *Geospiza conirostris* and *Nesomimus macdonaldi*—both errors. True host probably *Coccyzus melanocoryphus* Vieillot (see Emerson 1949: 91).

*Cuculiphilus coromandus* Uchida, 1926, J. Coll. Agr. Tokyo 9: 49. Type-host: *Entomothera coromanda major* (Tenninck and Schlegel)—error. New SYNONYMY.

*Cuculiphilus coromandus* var. *Centropi* Qadri, 1935, Z. Parasitenk. 8: 231. Type-host: *Centropus sinensis* (Stephens). New SYNONYMY.

*Cuculiphilus puhya* Ansari, 1951, Proc. Nat. Inst. Sci. India 17: 158. Type-host: *Clamator jacobinus jacobinus* (Boddlaert). New SYNONYMY.

**FEMALE.**—Specimens presumably from type-host with head, thorax, and dorsal abdomen close to *Cuculiphilus fasciatus*, except for MPI less than 1.6. Ventral abdomen differs in having no lateral marginal detached setae on sternite II; more setae on sternites III-VII: 32, 32-37, 72-93, 48-64, 37-48, respectively; median vulval setae shorter, 0.050 or less; and more ventral (26-30) and dorsal (28-30) anal setae. Specimens from *Coccyzus americanus* with gular setae 3+3, 3+4, or 4+4. Metasternal plate with 2-3 long, 1 short setae on each side. Sternal setae: III, 29-35 (33.7); IV, 27-43 (35.1); V, 62-88 (74.7); VI, 50-58 (54.0); VII, 36-44 (40.5). Anus dorsally with 28-36 (31.2) setae.

**MALE.**—Unavailable from type-host. Specimens from *Coccyzus americanus* with head and thorax as for female, except gular setae always 3+3. Sternal abdominal chaetotaxy close to *Cuculiphilus fasciatus*, but with only 1 well-developed comb row of 11-20 (15.4) setae on sternite III, with weak to absent second row of 0-4 (0.8) setae. Genitalia different from all foregoing species (Fig. 17).

The descriptions of *Cuculiphilus snodgrassi* and *C. galapagensis* were from only 1 and 3 females, respectively. The type of *C. snodgrassi* cannot be located in the Kellogg collection now housed at the University of California and it may be lost. We have obtained the types of *C. galapagensis*, consisting of 2 females from *Nesomimus* and 2 females from *Geospiza*, although only a single female and 2 nymphs were recorded from the latter host.

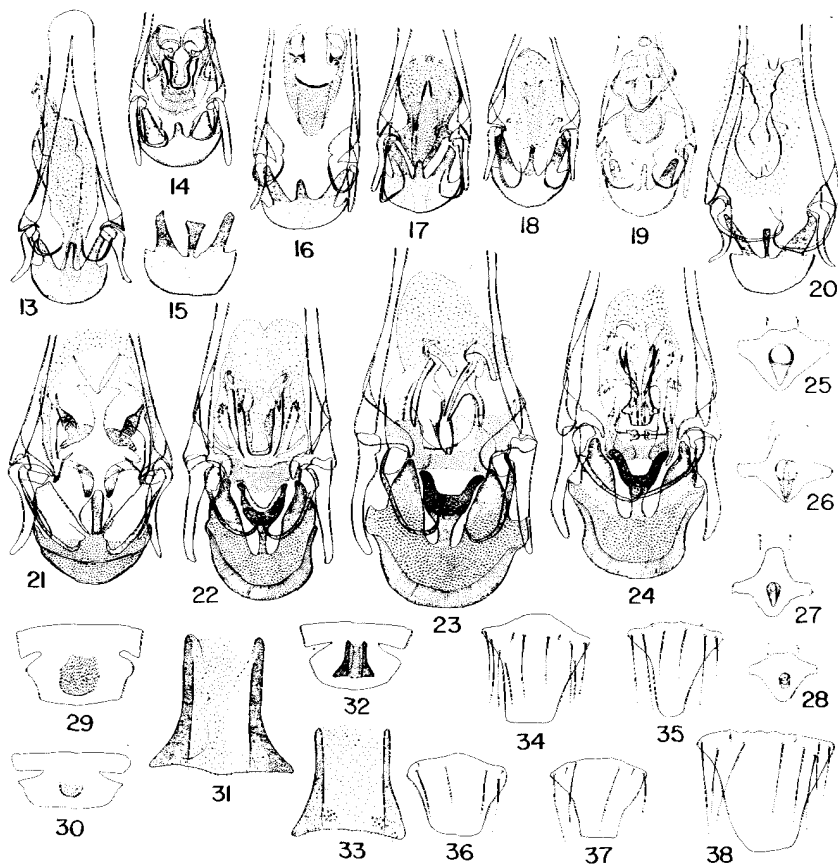
As pointed out by Hopkins (1947), the host given by Uchida (1926) for *Cuculiphilus coromandus* is undoubtedly in error. Hopkins believed the actual host to be *Cuculus canorus telephonus*, citing as evidence for this the fact that the collection data given by Uchida for both *Cuculiphilus fasciatus* and *C. coromandus* were identical. Unfortunately, such is not the case. The data are identical, except that the *C. fasciatus* specimens were collected on May 25, 1917, and the *C. coromandus* on May 25, 1915, a difference of 2 years. We have studied the holotype of *C. coromandus* and found it to differ in several ways (e.g., MPI of 1.4; more sternal setae on II-VII; no lateral detached marginal setae on sternite II; median mar-

ginal vulval setae less than 0.040 long) from all *C. fasciatus* we have seen, including a specimen from *Cuculus canorus telephonus* from Japan. In other words, while we agree with Hopkins on the incorrect host given for *C. coromandus*, this species should not be a synonym of *C. fasciatus*, but rather is conspecific with *C. snodgrassi*.

Specimens from *Centropus*, *Clamator*, and several other Old World genera of Cuculiformes agree well with the above description based on *Coccyzus* lice, except for having (1) metasternal plate with 2-6 long, 1 short setae on each side (see Fig. 34);

(2) females occasionally with a single detached seta on 1 or both sides of sternite II; (3) males with 0-11 (4.5) setae in anterior comb row on sternite III, often broken into several pieces when more than 3 such setae present; and (4) male genitalia with median piece of distal sclerotized area varying from that of Fig. 17 to that of Fig. 15. None of these features, however, affords a reliable means for separation and all these lice are considered conspecific.

*Material Examined*.—1 ♀, *Coccyzus melanocoryphus*, Falkland Islands; 2 ♀ from both *Nesomimus macdonaldi* and *Geospiza conirostris* (types of *C.*



Figs. 13-24.—Male genitalia. 13, *Cuculiphilus fasciatus*; 14, *C. platygaster*; 15, *C. snodgrassi* (from *Centropus sinensis*); 16, *C. decoratus*; 17, *C. snodgrassi* (from *Coccyzus americanus*); 18, *C. upak*; 19, *C. fasciiventris* (from *Endynamis scolopacea*); 20, *C. megaspinus*; 21, *C. contrastus*; 22, *C. alternatus*; 23, *C. cathartaebaeae*; 24, *C. zonatus*. Figs. 25-28.—Prosternal plates. 25, *C. contrastus*; 26, *C. alternatus* ♀; 27, *C. alternatus* ♂; 28, *C. fasciatus*. Figs. 29-33.—Female genital chambers. 29, *C. contrastus*; 30, *C. fasciatus*; 31-32, *C. alternatus*; 33, *C. zonatus*. Figs. 34-38.—Metasternal plates. 34, *C. snodgrassi* (from *Centropus sinensis*); 35, *C. alternatus*; 36, *C. fasciiventris* (from *Endynamis scolopacea*); 37, *C. fasciatus*; 38, *C. contrastus*.

*galapagensis*; 17 ♀, 14 ♂, *C. americanus*, USA, Peru, Shetland Islands; 3 ♀, 2 ♂, *C. minor* (Gmelin), Mexico; 1 ♀ (holotype of *C. coromandus*), *Entomothera coromanda*, Japan; 47 ♀, 11 ♂, *Centropus sinensis*, Rajputana; 14 ♀, 9 ♂, *C. senegalensis* (L.), Bechuanaland, Senegal, Egypt; 2 ♀, *C. superciliosus* Hemprich and Ehrenberg, Tanganyika; 2 ♀ (including paratype of *C. pupiata*), 7 ♂, *Clamator jacobinus*, Kenya, Punjab; 8 ♀, 6 ♂, *C. glandarius* (L.), Arabia, Palestine; 1 ♀, 7 ♂, *Rhopodytes diardi* (Lesson), Malaya, Ceylon; 4 ♀, *Cacomantis merulinus* (Scopoli), Malaya; 2 ♀, *Surniculus lugubris* (Horsfield), Ceylon, Philippine Islands; 3 ♀, 2 ♂, *Rhamphococyx curvirostris harringtoni* (Sharpe), Philippine Islands; 1 ♀, *Chrysococyx cupreus* (Shaw), Belgian Congo.

#### *Cuculiphilus (Cuculiphilus) hototogisu* Uchida

*Cuculiphilus fasciatus* var. *hototogisu* Uchida, 1926, J. Coll. Agr. Tokyo 9: 48. Type-host: *Cuculus intermedius intermedius* = *Cuculus poliocephalus poliocephalus* Latham.

Uchida (1926) indicated that his specimens agreed closely with *Cuculiphilus fasciatus*, but differed sufficiently in chaetotaxy of abdominal sternites to entitle it to varietal rank. We have examined 2 females from *Cuculus poliocephalus* from Madagascar and found them to resemble *C. snodgrassi* instead of *C. fasciatus*. Unfortunately, the short series and condition of the females do not permit definite conclusions. It is preferable, in the absence of males and additional females, to maintain this species name at present.

The illustration of the male genitalia of *C. hototogisu* by Uchida (1926) is so generalized that it could be that of any species of cuculiform *Cuculiphilus*. In discussing comb rows on the abdominal sternites, Uchida mistakenly associates combs only on sternites III and IV with a male and combs on sternites III, IV, and V with a female, when the reverse is true.

#### *Cuculiphilus (Cuculiphilus) upak* Ansari

*Cuculiphilus upak* Ansari, 1951, Proc. Nat. Inst. Sci. India 17: 156. Type-host: *Hierococyx varius* = *Cuculus varius* Vahl.

FEMALE.—Head and thorax close to *Cuculiphilus fasciatus*, but gular setae usually 4+4 (1 specimen with 3+3, 2 with 3+4) and metasternal plate of 4 specimens with 3 long setae on 1 side. Abdominal tergites III–VII with fewest marginal setae of any known species, except *C. fasciiventris* Carriker and possibly *C. platygaster*: III, 11–13 (11.6); IV, 11–14 (12.3); V, 12–14 (13.6); VI, 14–15 (14.3); VII, 13–14 (13.8). Sternite V with more setae, 62–81 (71.4); usually no detached lateral marginal setae on sternite II. Median marginal vulval setae between 0.050 and 0.075 long.

MALE.—Also close to *C. fasciatus*. Gular setae 4+4. Abdominal tergites I–VII each with only 12 marginal setae. Genitalia (Fig. 18) much like those of *C. fasciatus*, with possible differences as illustrated.

*Material Examined*.—23 ♀ (including paratype of

*C. upak*), 1 ♂, *Cuculus varius*, Nepal, Punjab; 1 ♀, *C. solitarius* Stephens, Zululand.

#### *Cuculiphilus (Cuculiphilus) fasciiventris* Carriker

*Cuculiphilus fasciiventris* Carriker, 1955, Bol. Entomol. Venezol. 11: 44. Type-host: *Piaya cayana mehleri* Bonaparte.

FEMALE.—Quite close to *Cuculiphilus upak*, perhaps indistinguishable from some specimens. Gular setae 3+3. Metasternal plate (Fig. 36) with only 2 long, 1 short setae on each side; MPI less than 1.4. Median vulval setae less than 0.050.

MALE.—Specimen from type-host with head, thorax, and abdominal tergites I–VIII much as for female. Only 1 well-developed comb row on each side of sternite III, 2 on IV and V. Sternal setae: II–V, 19–23; VI, 33; VII, 17; VIII, 8. Genitalia as in Fig. 19, with distinctive transverse sclerotized piece located in midregion of genital sac.

*Material Examined*.—1 ♀, 1 ♂ (the latter from same series as type), *Piaya cayana mehleri*, Costa Rica, Venezuela; 2 ♀, 4 ♂, *Eudynamis scolopacea* (L.), Thailand, Maldives Islands, Nepal, Philippine Islands; 1 ♂, *Rhopodytes sumatranus* (Raffles).

#### Subgenus *Carrikeria* Hopkins

*Carrikeria* Hopkins, 1947, Ann. Mag. Nat. Hist. (11) 13: 182. Type-species: *Menacanthus megaspinus* Carriker. *Ctenomenacanthus* Conci, 1947, Boll. Soc. Entomol. Ital. 77: 31. Type-species: *Menacanthus megaspinus* Carriker.

The subgenus *Carrikeria* contains but a single species that has been found only on the hoatzin (Galliformes: Opisthocomidae). It may be separated from members of the other subgenera by the following combination of characters: (1) Abdominal sternite I present and distinct from sternite II; (2) Tergite VII of males without stout spiniform setae; chaetotaxy of tergites VI–VIII similar for both sexes; (3) Head with pair of ventral sclerotized processes arising near base of palpi (Fig. 10); (4) Male genitalia (Fig. 20) close to *Cuculiphilus*; median piece of distal sclerotized area unbranched; (5) In size, intermediate between *Falcophilus* and *Aegypiphilus*; (6) Prosternal plate as for *Falcophilus* (Figs. 26–27); (7) Microtrichia within female genital chamber and ventral terminalia as for *Cuculiphilus*.

#### *Cuculiphilus (Carrikeria) megaspinus* (Carriker)

*Menacanthus megaspinus* Carriker, 1940, Lloydia 3: 293. Type-host: *Opisthocomus hoatzin* (P. L. S. Müller).

FEMALE (Fig. 10).—Gular setae 3+3 or 3+4, with posterior 2 pairs much longer than anterior pair. Margin of pronotum with 8–10 setae on each side; seta 5 over 0.038 long, similar in size to seta 1. Metanotal margin with 8–10 long and 10 short setae; metasternal plate with 3–4 long, 1 short setae on each side; MPI of 1.5. Marginal abdominal tergal setae: I, 21–23; II–VI, 27–35; VII, 22–27; VIII, 14–15. Sternal setae: II, 27–28; III–IV, 34–39; V, 82–96; VI, 51–55; VII, 39–40. Sternite II without detached

lateral marginal setae; comb rows on III-IV as for *Cuculiphilus fasciatus*; additionally, 7-10 setae on lateroposterior margin of V suggestive of comb row. Sternites VII-VIII fused medially; vulval margin with 33-34 setae, with median setae approximately 0.050 long. Anus with 31 setae ventrally, 33-35 dorsally, with setae longer laterally.

MALE (Fig. 2).—Metanotal margin with only 8 long, 2 short setae. Fewer marginal abdominal tergal setae on I-VII: I, 13; II-VII, 21-26; more on VIII, 19. Fewer abdominal sternal setae: II, 21; III-V, 26-30; VI, 43; VII, 29. Genitalia as in Fig. 20.

*Dimensions*.—Preocular width, ♀ 0.56, ♂ 0.53; temple width, ♀ 0.74-0.75, ♂ 0.70; prothorax width, ♀ 0.53, ♂ 0.49; total length, ♀ 2.19-2.32, ♂ 1.80; ♂ genitalia width, 0.19.

*Material Examined*.—2 ♀, 1 ♂, *Opisthocomus hoazin*, British Guiana.

### Subgenus *Falcophilus* Guimarães

*Falcophilus* Guimarães, 1942. Pap. Avulsos Dep. Zool. São Paulo 2: 241. Type-species: *Menopon alternatum* Osborn.

*Culturiphilus* Eichler, 1948. Entomologist 81: 251. Nomen novum for *Falcophilus* Guimarães.

The subgenus *Falcophilus* contains species restricted in known distribution to birds of the family Cathartidae (Falconiformes). Interestingly, Guimarães (1942) selected *M. alternatum* as the type-species for his genus, yet he used material from *Coragyps atratus foctens* (Lichtenstein) for both his generic discussion as well as his description of *M. alternatum*, whose type-host is *Cathartes aura* L. Then Eichler (1948), in providing a synopsis of *Falcophilus*, described the lice from *Coragyps atratus* as a new species. Our study has now re-established the conspecificity of the *Cathartes* and *Coragyps* materials.

The species of the subgenus *Falcophilus* are distinguished from those of the other subgenera by the following combination of characters: (1) Abdominal sternite I present and separate from sternite II; (2) Tergite VII of males with stout spiniform setae of unusual structure (Figs. 4-5); males differ markedly from females in chaetotaxy of abdominal tergites VI-VIII; (3) Head without pair of ventral sclerotized processes arising near base of palpi; (4) Male genitalia (Figs. 22-24) considerably larger than *Cuculiphilus* and *Carrikeria* and approximately same size as *Aegyphiphilus*; structure considerably different from the other subgenera, with bifurcate Y-shaped median piece of distal sclerotized area; (5) Both sexes of approximately equal size, considerably larger than *Cuculiphilus* and somewhat smaller than *Aegyphiphilus* and *Carrikeria*; (6) Prosternal plate shaped as in Figs. 26-27, with relatively long median process and with anterior portion narrower and longer for males; (7) Characteristic sclerotization and distribution of microtrichia within female genital chamber (Figs. 31-33); area between vulval and ventral anal margin with microtrichia; margin of vulva quite irregular (see Fig. 6).

### *Cuculiphilus (Falcophilus) alternatus* (Osborn)

*Menopon alternatum* Osborn, 1902. Ohio Nat. 2: 175. Type-host: *Cathartes aura* (L.).

*Falcophilus coragyps* Eichler, 1948. Entomologist 81: 251. Type-host: *Coragyps atratus foctens* (Lichtenstein). NEW SYNONYMY.

FEMALE (Fig. 11).—Specimens from type-host as follows. Gular setae long, 4+4 or 4+5. Marginal pronotal seta 5 as for *Cuculiphilus*. Metanotum with 9-11 long, 2 short marginal setae. Metasternal plate with 2-4 long, 1 short setae on each side (Fig. 35); MPI approximately 3.0. Marginal abdominal tergal setae: I, 13-16; II, 14-18; III, 14-16; IV-V, 15-16; VI, 16-18; VII, 15-17; VIII, 11-12. Abdominal sternal setae: II, 24-34 (27.3); III-IV, 34-39 (35.8); V, 73-97 (82.2); VI, 53-64 (59.5); VII, 34-52 (46.0). Each side of sternite III with 2 comb rows, of 20-40 setae; sternite IV with 3 such rows, of 15-35 setae. Vulval margin with 25-31 (28.5) setae. Internal structure of genital chamber (Fig. 31) having microtrichia single and evenly distributed over entire area; distal width of 0.23-0.26, tapered laterally. Anus ventrally with 30-38 (33.0) setae, dorsally 31-39 (34.4).

MALE (Fig. 4).—Specimens from type-host with more setae on abdominal tergites V-VIII: V, 17-24 (20.4); VI, 24-31 (27.2); VII with 21-24 slender setae and 22-34 (28.1) short stout spiniform setae (11-18 such spiniform setae on each side); VIII with at least 25 minute to very long setae. Sternal setae: II-III, 19-28 (23.3); IV-V, 24-37 (32.0); VI, 63-74 (66.4); VII, 48-61 (54.2). Sternites III-V each with 2 lateral comb rows: III, row I with 34-42 (36.8) setae, row 2, 12-22 (18.0); IV, row 1, 24-37 (33.5), row 2, 29-36 (32.3); V, row 1, 19-27 (23.3), row 2, 20-31 (24.1). Genitalia as in Fig. 22.

*Dimensions*.—Preocular width, ♀ 0.47-0.56, ♂ 0.48-0.54; temple width, ♀ 0.61-0.72, ♂ 0.61-0.68; prothorax width, ♀ 0.45-0.52, ♂ 0.45-0.50; total length, ♀ 2.13-2.29, ♂ 2.00-2.13; ♂ genitalia width, 0.24-0.26.

Examination of extensive material from both *Cathartes aura* and *Coragyps atratus*, including the holotype of *F. coragyps*, has convinced us that there is no known basis for considering these separate species. The 2 series agree both qualitatively, including identical male genitalia, and quantitatively, with an occasional specimen from *Coragyps* lying slightly outside a given range for lice from *Cathartes*, but this divergence is of no significance.

*Material Examined*.—24 ♀, 15 ♂, *Cathartes aura*, USA, Canada, British Guiana; 17 ♀ (including holotype of *F. coragyps*), 8 ♂, *Coragyps atratus*, USA, Canada, Panama, Peru, Chile; 1 ♂, *Cathartes urubitinga* Pelzelin (no data); 1 ♀ from both *Gymnogyps californianus* (Shaw) and "swallow tailed kite" (no data).

### *Cuculiphilus (Falcophilus) zonatus* (Piaget)

*Menopon fasciatum* Rudow, 1869 (nec Scopoli, 1763), Z. Ges. Naturwiss. 34: 403. Type-host: *Sarcophagus gryphus* = *Vultur gryphus* L.  
*Menopon zonatum* Piaget, 1885, Pediculus Suppl.: 152.

Type-host: *Sarcoramphus gryphus* = *Vultur gryphus* L.

*Menopon fascioferum* Harrison, 1916, *Parasitology* 9: 36. Nomen novum for *Menopon fasciatum* Rudow, 1869.

**FEMALE.**—Close to *C. alternatus*, but differs as follows. Metasternal plate occasionally with 2 long, 1 short setae on 1 or both sides. Tendency for fewer abdominal sternal setae on V, 58-74 (64.3), and VI, 45-50 (47.1). Internal structure of genital chamber (Fig. 33) distally narrower (0.18-0.21), with bluntly rounded lateral corners; microtrichia in lateroposterior corners of central region as illustrated, forming patch distinctly different from remainder of microtrichia.

**MALE.**—As for *C. alternatus*, except for fewer stout spiniform setae on tergite VII (5-9 (7.0) on each side or 12-16 (14.0) per specimen) and for differences in genitalic structure (Fig. 24), principally involving lateral lobelike projections on each side of penis.

Dr. Clay has examined the lectotype of *Menopon zonatum* and found it to agree with the descriptive details as given here.

**Material Examined.**—1 ♀, 1 ♂, *Vultur gryphus*, Colombia; 10 ♀, 4 ♂, "Condor vulture", England.

*Cuculiphilus (Falcophilus) cathartaepapae* (Nitzsch)

*Menopon cathartaepapae* Nitzsch, 1861, Z. Ges. Naturwiss. 17: 518. Type-host: *Sarcoramphus papa* (L.).

*Menopon breviceps* Giebel, 1874, *Insecta Epitaxia*: 279. Type-host: *Sarcoramphus papa* (L.).

We have available only 1 male from *S. papa* from Trinidad. This specimen resembles males of *C. zonatus* in all details, except for the genitalia. Although the genitalia have been somewhat distorted in mounting, there are still no visible lateral projections of the penis (Fig. 23) as found for *C. zonatus*.

*Cuculiphilus (Falcophilus) punctatus* (Gervais)

*Liothem punctatum* Gervais, 1849, In Gay, *Hist. Fis. Polit. Chile* 4: 104. Type-host: Falcones = Falconiformes.

Hopkins (1949) has pointed out that this species is certainly identifiable as a *Falcophilus* and that "Unfortunately the absence of a proper host-record renders a closer identification of *Cuculiphilus punctatus* (Gervais) impossible unless the type should survive." Thus, being unaware of the whereabouts of the type and having no clue as to which member of the Falconiformes may represent the type-host, we can attempt no placement of this louse.

Subgenus *Aegyppophilus* Eichler

*Aegyppophilus* Eichler, 1944, *Deut. Entomol. Z.* 1943: 56. Type-species: *Aegyppophilus gypsis* Eichler.

The subgenus *Aegyppophilus* contains species restricted in known distribution to birds of the subfamily Aegypinae (Falconiformes: Accipitridae). They may be distinguished from lice of the other subgenera by the following combination of characters: (1) Abdominal sternite I either absent or perhaps fused with sternite II; (2) Tergite VII of males without stout spiniform setae; little sexual dimorphism

for abdominal tergal chaetotaxy; (3) Head without pair of ventral sclerotized processes arising near base of palpi; (4) Male genitalia (Fig. 21) distinctively shaped, as large as those of *Falcophilus*, but without Y-shaped median structure; (5) Both sexes larger than *Cuculiphilus* and *Carrikeria*; females larger than and males approximately same size as *Falcophilus*; (6) Prosternal plate and median process as in Fig. 25; (7) Microtrichia within female genital chamber distributed as in Fig. 29; area between vulval and ventral anal margins without microtrichia; margin of vulva even.

*Cuculiphilus (Aegyppophilus) gypsis* Eichler

*Aegyppophilus gypsis* Eichler, 1944, *Deut. Entomol. Z.* 1943: 57. Type-host: *Gyps fulvus* (Hablizl).

*Cuculiphilus (Aegyppophilus) secundus* Eichler and Zlotorzycza

*Aegyppophilus secundus* Eichler and Zlotorzycza, 1963, *Acta Parasitol. Polonica* 11: 217. Type-host: *Gyps ruppelli* = *Gyps ruppelli* (A. F. Brühl).

It is unfortunate that we have inadequate material from the type-host of both *C. gypsis* and *C. secundus* to enable us to ascertain the status of names applicable to *Aegyppophilus*. The descriptions of all 3 *Aegyppophilus* species are so lacking in detail that we are unable to discern any means for morphological separation. We have studied the female specimen (holotype) from *Gyps fulvus* upon which Eichler (1944) based both *C. gypsis* as well as the genus *Aegyppophilus* itself; this specimen is in very poor condition, with the majority of its setae missing and with all observable features identical with females of *C. contrastus* Eichler and Zlotorzycza.

Whereas *C. gypsis* was described from the 1 female, with males still apparently unknown, and *C. contrastus* from only 2 females, with males presumably of this species available to us but unknown to Eichler and Zlotorzycza (1963), *C. secundus* was described solely from a single male. Without males of either *C. gypsis* or *C. contrastus*, it is understandable why Eichler and Zlotorzycza (1963) provide no significant differentiating features for *C. secundus*. The descriptive details of the male of *C. secundus* that are given, as well as those visible from a photomicrograph, agree with the males we have of *C. contrastus*.

It is our feeling that the description of these lice as 3 species is unjustified on the basis of presently known material and that they may well prove to be conspecific with *C. gypsis*. However, at least until males of *C. gypsis* and females of *C. secundus* become available, our decision is to continue recognition of these names and to provide here only a description of *C. contrastus*.

*Cuculiphilus (Aegyppophilus) contrastus* Eichler and Zlotorzycza

*Aegyppophilus contrastus* Eichler and Zlotorzycza, 1963, *Acta Parasitol. Polonica* 11: 216. Type-host: *Pseudogyps bengalensis* (Gmelin).

**FEMALE** (Fig. 9).—Gular setae 3+3 or 3+4, long.



Marginal pronotal seta 5 over 0.063 long, comparable in size to seta 1. Metasternal plate with 3-5 long, 1 short setae on each side (Fig. 38); MPI approximately 2.0. Margin of metanotum with 13-16 setae. Marginal abdominal tergal setae: I-II, 22-23; III, 24-25; IV, 23-26; V-VI, 25-27; VII, 21-23. Abdominal sternal setae: II, 31-36 (with 1 detached seta on 1 side); III, 36-52; IV, 43-46; V, 90-107; VI, 62-69; VII, 48-54. Sternite III with 2 comb rows, IV with 3, each with 21-43 setae. Vulval margin with 33-37 setae, all between 0.050-0.075 long. Anus ventrally and dorsally with 32-34 setae.

**MALE (Fig. 3).**—Only 10 marginal metanotal setae. Fewer abdominal tergal setae: I-II, 14-16; III, 17; IV, 18; V-VI, 21-23; VII, 19-22. Fewer abdominal sternal setae: II, 26-30; III-IV, 30-34; V, 34-40; VI, 56-65; VII, 44-45. Sternites III, IV, and V with 2 well-developed lateral comb rows each, with setal range as for female, except anterior row on III with only 6-16 setae. Genitalia as in Fig. 21.

**Dimensions.**—Preocular width, ♀ 0.60-0.62, ♂ 0.56-0.57; temple width, ♀ 0.82-0.84, ♂ 0.76-0.77; prothorax width, ♀ 0.54-0.57, ♂ 0.51; total length, ♀ 2.40-2.62, ♂ 2.02-2.07; ♂ genitalia width, 0.25-0.26.

**Material Examined.**—2 ♀, 2 ♂, *Pseudogyps bengalensis*, India.

#### A KEY TO THE SUBGENERA AND SPECIES OF *Cuculiphilus*

1. Head with ventral sclerotized process arising near each palpal base (Fig. 10) (*Carrikeria* Hopkins)
  - megaspinus* (Carriker)
- Head without ventral sclerotized process arising near each palpal base
  2. Abdominal sternite I absent. Male genitalia as in Fig. 21. (*Aegyphiphilus* Eichler)
    - contrastus* Eichler and Zlotorzeyka
  - Abdominal sternite I present. Male genitalia as in Figs. 13-19, 22-24
    3. Microtrichia of female genital chamber as in Fig. 30. Males without stout spiniform setae on abdominal tergite VII; genitalia as in Figs. 13-19 (*Cuculiphilus* Uchida)
    4. Microtrichia of female genital chamber as in Figs. 31-33. Males with stout spiniform setae on abdominal tergite VII; genitalia as in Figs. 22-24 (*Falcophilus* Guimarães)
    9. Females unknown. Males with anterior (second) comb row of 5-15 (8.8) setae on each side of sternite III; genitalia as in Fig. 16
      - decoratus* (Kellogg)
- Females. Males often with less-developed second comb row on sternite III; genitalia as in Figs. 13-15, 17-19
  5. Females usually with fewer than 50 setae on sternite V; only 0-6 setae in second comb row on both sides of sternite III. Males with fewer than 15 sternal setae on III-V; genitalia as in Fig. 14
    - platygaster* (Giebel)
  - Females with more than 50 setae on sternite V; with 2 well-developed comb rows on at least 1 side of sternite III. Males with 15 or more sternal setae on III-V; genitalia as in Figs. 13, 15, 17-19
    6. All, or much less often all but 1, of tergites III-VII with 14 or fewer marginal setae, including postspiracular setae
      7. Two or more of tergites III-VII with more than 14 marginal setae, including postspiracular setae

7. Gular setae usually 4+4; MPI greater than 1.7. Male genitalia as in Fig. 18
  - upak* Ansari
- Gular setae 3+3; MPI less than 1.4. Male genitalia as in Fig. 19
  - fasciiventris* Carriker
8. Metasternal plate with 2 long, 1 short setae on both sides (MPI greater than 1.8). Female with fewer than 60 setae on sternite V; longer median marginal vulval setae over 0.075 long. Male genitalia as in Fig. 13
  - fasciatus* (Scowell)
- Metasternal plate with variable chaetotaxy (MPI less than 1.7). Female with more than 60 setae on sternite V; longer median marginal vulval setae less than 0.050 long. Male genitalia as in Figs. 15, 17 (males of *hototogus* Uchida unavailable)
  - snodgrassi* (Kellogg and Kuwana)
  - hototogus* Uchida
9. Females not seen. Males with 5-9 stout spiniform setae on each side (total of 12-16) of tergite VII and genitalia as in Fig. 23
  - catharicaepape* (Nitzsch)
- Females. Males either with stout spiniform setae as above and genitalia as in Fig. 24 or with 11-18 such setae on each side (total of 22-34) and genitalia as in Fig. 22
  10. Females with internal structure of genital chamber as in Fig. 33; abdominal sternites V and VI with 58-74 and 45-50 setae, respectively. Males with 5-9 stout spiniform setae on each side (total of 12-16) of tergite VII; genitalia as in Fig. 24
    - zonatus* (Piaget)
  - Females with internal structure of genital chamber as in Fig. 31; abdominal sternites V and VI with 73-97 and 53-64 setae, respectively. Males with 11-18 stout spiniform setae on each side (total of 22-34) of tergite VII; genitalia as in Fig. 22
    - alternatus* (Osborn)

#### ACKNOWLEDGMENTS

We thank Dr. Theresa Clay, British Museum (Natural History), and Dr. K. C. Emerson, Stillwater, Oklahoma, for their assistance, including the loan of many important specimens and their critical examination of this manuscript. Additionally, we thank the following for the loan of specimens: Dr. M. Beier, Naturhistorisches Museum, Vienna; Dr. George W. Byers, University of Kansas; Dr. J. F. Gates Clarke, United States National Museum; Dr. C. Don MacNeill, California Academy of Sciences; Dr. J. E. H. Martin, Ottawa, Canada; Miss Martha L. Noller, University of Arizona; Dr. L. L. Pechuman, Cornell University; Dr. Jerry A. Powell, University of California; and Dr. H. Weidner, Hamburg, Germany.

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*Reprinted from the*

ANNALS OF THE ENTOMOLOGICAL SOCIETY OF AMERICA

Volume 58, Number 4, pp. 546-555, July, 1965