A Review of Machaerilaemus (Phthiraptera: Amblycera: Menoponidae) from the Passeriformes (Aves), with the Description of Five New Species

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ABSTRACT.—The 25 nominal species of the menoponid genus Machaerilaemus have been studied, with 10 determined to be valid and 13 to be new junior synonyms and two assigned to another genus. Descriptions are given for the previously described species and for five new species: M. cyanocitae (type host Cyanocitta cristata), M. diglossae (type host Diglossa baritula), M. laticapitus (type host Leptasthenura aegithaloides), M. tangarae (type host Tangara larvata) and M. hirsutus (type host "Honeycreeper"). A key is provided for identification of the 15 species now recognized in the genus.

INTRODUCTION

The chewing louse genus Machaerilaemus Harrison has 25 species, two of which recently have been assigned to another genus (Price and Dalgleish, 2002). The remaining 23 are distributed among the families Corvidae, Drepaniidae, Emberizidae, Estrildidae, Formicariidae, Furnariidae, Icteridae, Mimidae, Paradisaeidae, Ploceidae and Tyrannidae of the avian order Passeriformes. These lice are not collected very often, especially when compared with the frequency of other genera collected from these hosts. We have obtained the type material of all but four of these taxa. Thirteen of these taxa were based on a single female holotype, three on a female/male pair, and seven on multiple specimens of at least one sex. With a strongly biased sex ratio of almost six times as many females as males, species recognition within the genus is almost exclusively relegated to female characteristics. This has presented problems in defining the species, but not to the degree that we believe they detract from the significance of our study or its conclusions.

Machaerilaemus is unusual within the chewing lice in that before this revision no junior synonyms were recognized and there have been no new species described since 1966. Considering that the majority of the nominal species is based upon grossly inadequate descriptions by Carriker, Emerson and Eichler, the genus is in need of revision. Before 1944, a variety of authors had described eight species of Machaerilaemus, only one of which is placed in synonymy here. However, we regard as valid only 3 of 15 species described since. Carriker (1944, 1949, 1956) described nine new species, only one of which we consider valid. Emerson (1947, 1954) described three new species, none of which we consider valid. Eichler

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described a single new species that we do not consider valid. Single species described by Price and Emerson (1965) and Balát (1966) are valid.

Our purposes in this article are to describe and illustrate the 10 previously described Machaerilaemus species that we consider valid, thereby establishing 13 junior synonyms where appropriate, and to describe and illustrate five new species that we found in the course of this study. Finally, we present a key for the identification of all 15 recognized species.

All measurements are given in millimeters. Abbreviations for dimensions are: TW, head width; HL, head length; PW, prothorax width; MW, metathorax width; AWIV, abdomen width at segment IV; ANW, width of female anus; TL, total length; GL, male genitalia length from anteriormost end of basal apodeme to tip of parameres. The taxonomy of the hosts follows that of Howard and Moore (1991). The Machaerilaemus species cluster into four distinctive groups based primarily on gular structure, dimensions and chaetotaxy. For brevity, characters given for the genus and species groups will not be repeated in the species descriptions.

Genus Machaerilaemus Harrison


This genus is characterized by the following features: Little sexual dimorphism except that associated with terminalia, smaller male dimensions and reduced number of male setae. Head approximately twice as wide as long; without preocular notch or slit; alveoli of temple setae 26 and 27 closely associated (Fig. 1); antennal fossa deep, with antenna inserted in it and often not exposed beyond head margin; nodi and associated carinae weak; hypopharynx with weak sclerites. Thorax with well developed prosternal plate, tapered to posterior point, with central setae; outer central pronotal seta longer than minute inner seta; metasternal plate likely representing fusion of sternite I with true metasternum; venter of femur III without ctenidia or well-developed brush; only 2 medioanterior mesosotal setae associated with postnotum. Abdomen with no tergites enlarged, divided, or with anterior setae; postspiracular setae very long and outermost on tergites I–VIII; lateral areas of sternites without ctenidia or brushes; female subgenital plate composed of sternite VII partially fused with VIII–IX; female anus oval, without inner setae; posterior margin of female subgenital plate with median convexity; male genitalia with prominent outwardly directed pointed parameres and relatively simple mesosomal structure (Fig. 2), differing among species only in size.

malleus species group

The four species of this group are characterized by their large size (e.g., female TW>0.80, male TW>0.78); prominent subcircular gular plate open at top (Figs. 3, 5, 6); absence of any ventral head spines; posterior metanotal margin with total of 10 setae, including 8 very long and 2 short setae; large number of prosternal setae (21–38); possession of short medioanterior spiniform setae at least on sternites II–V (Fig. 4); and very long temple setae 23 (0.13–0.21 long) and 25 (0.34–0.53 long) (Fig. 4).

While the species of this group are different from those of the remaining groups and were placed in the genus Hirundoecus by Ewing (1930), we prefer to follow the lead of Hopkins and Clay (1952) in considering Hirundoecus as a junior synonym of Machaerilaemus. With only one exception, all known hosts for these species are within the avian family Hirundinidae.
Figs. 1–6.—1–4. Machaerilaemus malleus: (1) female temple setae 21–27 (numbering laterad from midline); (2) male genitalia; (3) female gula and thoracic sternal plates; (4) female dorsoventral. 5. M. americanus, female gula and thoracic sternal plates. 6. M. gigas, female gula and thoracic sternal plates

*Machaerilaemus malleus* (Burmeister)
(Figs. 1–4)

_Eureum malleus_ Burmeister, 1838:441. Type host: *Hirundo rustica* Linnaeus.

Female: As in Fig. 4. Prosternum with 21–28 setae, mesosternum with 9–12 setae, and metasternum shaped as in Fig. 3 and with 13–20 setae. Marginal tergal setae: I, 11–12; II, 12–16; III–IV, 15–17; V–VII, 15–21; VIII, 14–18. Sternal setae: II, 23–34; III, 30–51; IV–V, 35–54; VI, 22–40; VII, 17–27; subgenital plate, 34–43. Anus with 40–49 dorsal, 39–48 ventral
fringe setae. Dimensions: TW, 0.82–0.91; HL, 0.36–0.40; PW, 0.63–0.72; MW, 0.75–0.86; AWIV, 1.06–1.29; ANW, 0.31–0.33; TL, 2.24–2.43.

Male: Similar to female, except for tergites III–VIII with 14–17 setae and slightly smaller dimensions: TW, 0.79; PW, 0.54–0.60; MW, 0.63–0.70; AWIV, 0.93–0.97; TL, 1.97; GL, 0.56–0.62.

Remarks: This species is known only from swallows, being recorded here from four species of Hirundo from North America, Africa and Asia.

Material: [Hirundinidae]—Ex Hirundo rustica, 1 female, Thailand. Ex H. abyssinica (Guerin-Meneville), 1 female, South Africa. Ex H. fulva (Vieillot), 3 females, USA: Texas. Ex H. spilodera (Sundevall), 3 females, 2 males, South Africa.

*Machaelaema*us americanus (Ewing)

(Fig. 5)


Female: Much as for *M. malleus*, except for different shape of metasternal plate (Fig. 5) and tendency for larger dimensions: TW, 0.97; HL, 0.43; PW, 0.79; MW, 0.87; AWIV, 1.27; ANW, 0.34; TL, 2.05.

Male: Unavailable.

Remarks: Ewing (1930) described the female and male, designated them as cyotypes, and used them as the basis for his new genus *Hirundoeus*. He was apparently unaware of its similarity with *M. malleus*, which at that time was placed in the genus *Eurema* of which he had seen no material. Emerson (1947) redescribed *M. americanus* based on the female, the male not being available. No male was found for our study and, given the history, we hereby designate the female as the holotype. We believe that *M. americanus* is at most tenuously separable from *M. malleus*, awaiting confirmation by the collection of more material.

Material: [Hirundinidae]—Ex *Progne s. subis*, female holotype of *H. americanus*, USA: New Mexico.

*Machaelaema*us gigas Carriker

(Fig. 6)

*Machaelaema gigas* Carriker, 1949:299. Type host: *Fluvicola pica pica* (Boddaert).

Female: Much as for *M. malleus*, except for concave posterior margin of metasternal plate (Fig. 6) and smaller dimensions: TW, 0.82; HL, 0.35; PW, 0.63; MW, 0.68; AWIV, 1.02; ANW, 0.29; TL, 1.98.

Male: Unknown.

Remarks: This represents the only species of this group described from a single female. Much as is the case for *M. americanus*, *M. gigas* is at best tenuously distinguished from the preceding two species by the shape of the metasternal plate and its dimensional differences. Carriker (1949) mistook the first abdominal segment for the metathorax, this leading to his erroneously giving the MW as 0.78, instead of its actual much narrower 0.68. Unfortunately, an unusually large percentage of Carriker’s material was associated with the wrong host. Such is probably the case with *M. gigas*; however, in the absence of additional *Machaelaema* from *Fluvicola pica*, it is prudent to retain this record.

Material: [Tyrannidae]—Ex *Fluvicola p. pica*, female holotype of *M. gigas*, Colombia.

*Machaelaema*us clayae (Balát)

*Hirundoeus clayae* Balát, 1966:20. Type host: *Riparia riparia* (Linnaeus) [Hirundinidae].

No material of this species was available for study. Balát (1966), in a study of a series of
13 females and 8 males from Czechoslovakia, compared his new species only to *M. malleus*. Most of the differences that he gave are of little diagnostic value. However, he did provide dimension values consistent with members of the *malleus* group. In addition, he illustrated the prosternal plate and listed 32–39 prosternal setae, a condition unique and apart from the other related lice. This prosternal plate chaetotaxy in conjunction with the type host leads us to recognize this as a valid species.

**raggiana species group**

The single species of this group is readily separable from those of the other groups by its small dimensions (*e.g.*, female TW, 0.53–0.55, male TW, 0.45–0.47); characteristic “U”-shaped gula (Fig. 7); presence of prominent ventral head spine at each lateroanterior corner (Fig. 7); posterior metanotal margin with 11–14 setae, including typically an assortment of long to short setae; presence of only 4–8 prosternal setae; absence of short medioanterior spiniform setae on any sternites; and short temple seta 23 (0.04–0.05 long) and medium temple seta 25 (0.11–0.16 long).

**Machaerilaemus raggiana** Price and Emerson

(Fig. 7)


Female: Illustrations and descriptive details are given by Price and Emerson (1965) and will not be repeated here. Principal distinguishing features are shown in Fig. 7.

Male: Much as for female, except for smaller size, reduced number of abdominal setae, and terminalia differences, as given in Price and Emerson (1965).

Remarks: Unique among all known species of *Machaerilaemus, M. raggiana* is easily recognized by the conspicuous lateroanterior ventral head spines and the shape of the gula. To date, this species is known only for the type series from New Guinea.

Material: [Paradiseaeidae]—Ex *Paradisaea raggiana*, holotype female, 6 female, 6 male paratypes of *M. raggiana*, New Guinea.

**maestus species group**

The three species of this group are characterized by their modest but wide ranging dimensions (*e.g.*, female TW, 0.55–0.70, male TW, 0.45–0.57); prominent solid gular plate, without any indication of opening within it (Figs. 8, 10); presence of very small and difficult to discern ventral spines between bases of labial and maxillary palpi (Fig. 9); posterior margin of metanotum with total of 9–11 setae, typically with 8 very long and 2 short setae; prosternum with 4–15 setae; absence of short medioanterior spiniform setae on sternites (Fig. 9); and very short temple seta 23 (0.01–0.06 long) and 25 (0.01–0.05 long).

The three species of *Machaerilaemus* in this group infest a variety of hosts. They are recorded here from 28 species of passerines representing six families.

**Machaerilaemus maestus** (Kellogg and Chapman)

(Figs. 8, 9)

*Menopon maestum* Kellogg and Chapman, 1899:130. Type host: *Zonotrichia atricapilla* (Gmelin).

*Machaerilaemus juninensis* Carriker, 1944:75. Type host: *Agriornis montana insolens* Sclater and Salvin.

NEW SYNONYMY.

*Machaerilaemus robertsi* Carriker, 1944:74. Type host: *Cnemarchus rupifennis = Polioxolmis rupifennis* (Taczanowski). NEW SYNONYMY.
Machaerilaemus bolivianus Carricker, 1944:76. Type host: Muscisaxicola capistrata borealis = M. capistrata (Burmeister). NEW SYNONYMY.

Machaerilaemus tachuris Carricker, 1944:77. Type host: Tachuris rubrigaster grandis = T. rubrigaster alticola (Berlepsch and Stolzmann). NEW SYNONYMY.

Machaerilaemus atrocephalus Carricker, 1944:78. Type host: Asthenes modesta rostrata = Thiropogaga m. rostrata (Berlepsch). NEW SYNONYMY.

Machaerilaemus submaestum Emerson, 1947:215. Type host: “Blue-backed Tanager” = Buthraupis montana (d’Orbigny and Lafresnaye). NEW SYNONYMY.
Machaerilaemus melospizae Emerson, 1954:45. Type host: Melospiza melody samuelis (Baird). NEW SYNONYMY.
Machaerilaemus niethammeri Eichler, 1956:103. Type host: Muscisaxicola maculirostris maculirostris d’Orbigny and Lafresnaye. NEW SYNONYMY.

Female: As in Fig. 9. Gular plate shaped as in Fig. 8. Prosternum and mesosternum each with 8–15 setae, metasternum with 11–14 setae. Marginal tergal setae: I, 9–11; II, 10–14; III-V, 10–19; VI, 10–15; VII–VIII, 8–13. Sternal setae: II, 16–33; III–VI, 29–48; VII, 25–38; subgenital plate, 20–38. Anus with 37–49 setae in each fringe. Dimensions: TW, 0.55–0.62; HL, 0.23–0.28; PW, 0.37–0.42; MW, 0.44–0.55; AWIV, 0.61–0.85; ANW, 0.23–0.29; TL, 1.21–1.68.

Male: Differing from female as follows. Reduced number of setae. Prosternum with 4–7 setae, mesosternum with 8–9 setae, metasternum with 7–15 setae. Marginal tergal setae: II–IV, 10; V–VI, 9–11; VII, 10; VIII, 8–9. Sternal setae: II, 9–15; III–VI, 12–21; VII, 10–15. Smaller dimensions: TW, 0.45–0.48; HL, 0.21–0.24; PW, 0.28–0.29; MW, 0.33–0.38; AWIV, 0.47–0.55; TL, 1.00–1.12; GL, 0.35–0.39.

Remarks: This species of Machaerilaemus is widely distributed among at least 21 host species in the families Emberizidae (nine in USA, one in Bolivia, one in Canada), Furnariidae (two in South America), Mimidae (one in USA) and Tyrannidae (seven, all in South America). There is no evidence that M. maestus is found outside of the Western Hemisphere. It is separated from the other two species of the group by the shape of its gular plate in conjunction with its dimensions.

In establishing the eight new junior synonymies given for M. maestus, we examined the types of the seven species described by Carriker (1944) and Emerson (1947, 1954). In the absence of type material, we exercised judgement on the Eichler (1956) name by a study of lice from the type host. All of these species were described from females, with six of the eight being based on a single specimen. The descriptions included little information of value, and there was nothing about the lice we studied that gave us any doubt as to their synonym status. This is yet another example of authors being locked on the idea that each host species must have its unique louse species, even in the absence of morphological support. The descriptions are so fraught with shortcomings, such as meaningless generalizations and misinterpretation of structures, as to render them useless.

Material: [Emberizidae]—Ex Zonotrichia atricapilla, 2 females, including holotype of M. maestum, USA: Alaska, California. Ex Z. albigollis (Gmelin), 3 females, USA: Massachusetts, New Jersey, South Carolina. Ex Z. leucophrys (Forster), 1 female, USA: California. Ex Pipilo erythrophthalmus (Linnaeus), 31 females, 1 male, USA: California, Georgia, Maryland, Mississippi, New York, Oregon; Canada: British Columbia. Ex Passerculus sandwichensis (Gmelin), 2 females, USA: South Carolina. Ex Passerella iliaca (Merrem), 7 females, USA: New York. Ex Poocetes gramineus (Gmelin), 1 female, USA: Michigan. Ex Aimophila carpalis (Coues), 1 female, USA: Arizona. Ex Melospiza melody (Wilson), 3 females, 1 male, including female holotype of M. melospizae, USA: California, Kansas, New Hampshire. Ex Junco hyemalis (Linnaeus), 3 females, USA: New Hampshire. Ex Buthraupis montana, 2 female types of M. submaestum, Bolivia. [Furnariidae]—Ex Cinclodes fuscus (Vieillot), 2 females, Chile. Ex Thrripophaga modesta rostrata, female holotype of M. atrocephalus, Peru. [Mimidae]—Ex Toxostoma rufum (Linnaeus), 1 female, USA: New York. [Tyrannidae]—Ex Muscisaxicola maculirostris, 3 females, Chile. Ex M. alpina (Jardine), 1 female, Peru. Ex M. rufivertex d’Orbigny, 6 females, 2 males, Chile. Ex M. capistrata, female holotype of M. bolivianus, Bolivia. Ex Polioenas rufipennis, 3 females, including holotype and 2 paratypes of M. robertsi, Peru. Ex Tachuris rubrigaster, female holotype of M. tachuris, Bolivia. Ex Agriornis montana insolens, female holotype of M. juninensis, Peru.
Machaerilaemus cyanocittae Price, Hellenthal and Dalgleish, new species

Type host: Cyanocitta cristata (Linnaeus).

Female: Similar to M. maestus, but with tendency for more setae on sternite V–VI, 35–54; VII, 26–44. Larger dimensions: TW, 0.64–0.70; HL, 0.28–0.31; PW, 0.42–0.49; MW, 0.51–0.61; AWIV, 0.68–0.91; ANW, 0.29–0.33; TL, 1.53–1.88.

Male: Also similar to M. maestus, but, as with the female, marked tendency for more setae on certain sternites: IV, 20–23; V, 18–25; VI, 18–21. Also, larger dimensions than for M. maestus. TW, 0.54–0.57; HL, 0.24–0.27; PW, 0.35–0.38; MW, 0.40–0.45; AWIV, 0.57–0.67; TL, 1.22–1.38; GL, 0.41–0.44.

Remarks: The larger dimensions, especially of the head, and setal differences associated with certain abdominal sternites distinguish this species from M. maestus. This separation is further supported by M. cyanocittae occurring only on six species of jays within the family Corvidae, while no M. maestus are known from birds within this family. All of the collections of this species were from hosts within the USA and Mexico.

Type material: [Corvidae]—Ex Cyanocitta cristata, female holotype, USA: State College, Mississippi, 15 Apr. 1937, E. W. Stafford; 3 female, 1 male paratypes, same as holotype; 3 female paratypes, same except 19 Nov. 1939; 2 male paratypes, same except 18 Nov. 1936, R. B. Austin; 4 female paratypes, USA: East Falls Ch., Virginia, 15 Sept. 1921, E. A. Chapin; 1 female paratype, USA: Woodlawn, Maryland, 19 May 1963, H. Brackbill, Lot 63–13807; 1 female paratype, USA: Valdosta, Georgia, 18 Oct. 1935, H. Hixon, Bish. #26186; 1 female paratype, USA: Highlands Co., Florida, 27 Feb. 1995, A95-057. Holotype and majority of paratypes at Oklahoma State University (Stillwater); 5 female paratypes at National Museum of Natural History (Washington, D.C.) and 1 female paratype at the University of Minnesota (St. Paul).

Other material: [Corvidae]—Ex Aphelocoma ultramarina (Bonaparte), 9 females, Mexico: Coahuila. Ex Cyanocitta stelleri (Gmelin), 1 female, USA: Utah. Ex Cyanocorax yncas Boddaert, 1 female, Mexico: Tamaulipas. Ex Nucifraga columbiana (Wilson), 9 females, 2 males, USA: California, Arizona, Colorado, Montana. Ex Perisoreus canadensis (Linnaeus), 1 female, USA: Colorado.

Machaerilaemus plociei Bedford

(Fig. 10)

Machaerilaemus plociei Bedford, 1920:168. Type host: "Waxbill" = Quelea quelea (A. Smith) [Ploceidae].

No material of this species was available for study. However, the description by Bedford (1920) was sufficient, given the unique nature of the gular plate (Fig. 10), to afford easy separation from all other known members of this group, as well as of the entire genus.

laticorpus species group

The seven species of this group are characterized by their modest dimensions (e.g., female TW<0.65, male TW<0.55); gular plate with large conspicuous circular “hole” in center (Figs. 11, 12, 15); often presence of very small but difficult to discern ventral head spine between bases of maxillary and labial palpi (Fig. 14); posterior margin of metanotum with 10–15 setae, typically with 10 very long and 2 short setae; prothorium with 9–22 setae; absence of any short medioanterior spiniform setae on sternites (Fig. 14); and very short pentad 23 (0.01–0.03 long) and medium pentad seta 25 (0.07–0.21 long).

We have recorded these seven species as infesting 28 species of passerine hosts in seven
families. There are no records of the same species of bird having more than one species of *Machaerilaemus*.

*Machaerilaemus laticorpus* (Carriker)
(Figs. 12–14)

*Menopon laticorpus* Carriker, 1903:190. Type host: *Thamnophilus doliatus* (Linnaeus).
*Machaerilaemus latifrons* Harrison, 1915:390: Type host: *Poeppilia goudiae* = *Chloeia goudiae* (Gould).

**NEW SYNONYMY.**

*Machaerilaemus poecilotis* Carriker, 1944:69. Type host: *Pogonotrichus poecilotis* = *Phyllocaridae poecilotis* (Sclater). **NEW SYNONYMY.**

*Machaerilaemus insignis* Carriker, 1944:70. Type host: *Ochthoeca rustipectoralis testricialis* Chapman. **NEW SYNONYMY.**
Machaerilaenus icterus Emerson, 1954:46. Type host: Icterus sclateri alticola = I. pustulatus alticola Miller and Griscom. NEW SYNONYM.

Machaerilaenus picturatus Carriker, 1956:143. Type host: Cercomacra nigricans nigricans Sclater. NEW SYNONYM.

Female: As in Fig. 14. Head with indistinct to absent “Y”-shaped suture. Width of gula “hole,” 0.045–0.075. Prosternum with 9–22 setae, mesosternum with 9–16, metasternum with 19–41. Marginal tergal setae: I, 11–15; II, 12–19; III–VI, 14–24; VII, 11–19; VIII, 10–16. Sternal setae: II, 20–42; III–VII, 27–53; subgenital plate, 31–52. Anus with 31–46 setae in each fringe. Dimensions: TW, 0.52–0.59; HL, 0.23–0.29; PW, 0.35–0.43; MW, 0.44–0.55; AWTV, 0.61–0.86; ANW, 0.21–0.30; TL, 1.22–1.69.

Male: Similar to female, except as follows. Marginal tergal setae: II, 10–16; III–VI, 10–19; VII, 10–14; VIII, 8–12. Sternal setae: II, 14–26; III–VII, 12–39. Terminalia as in Fig. 13. Dimensions: TW, 0.45–0.53; HL, 0.20–0.27; PW, 0.30–0.36; MW, 0.34–0.43; AWIV, 0.47–0.64; TL, 0.99–1.22; GL, 0.30–0.43.

Remarks: This species is widely distributed among 23 host species in the families Emberizidae (one in USA, two in Asia, nine in Central and South America), Estrildidae (one in uncertain locality), Formicariidae (three in Central and South America), Furnariidae (one in South America), Icteridae (two in USA, two in Central and South America) and Tyrannidae (two in South America). From this, it can be seen that most of the M. maestus from emberizid hosts were collected in North America while only one of twelve emberizid collections of M. laticorpus was from this region. Recognition of M. laticorpus from other species in this group may be attained by the gula shape and width of its central hole and the small number of abdominal tergal and sternal setae.

Our remarks under M. maestus are equally applicable here to account for four of these five new junior synonymys. Carriker (1944, 1949) and Emerson (1954) based each of their four new species on only a single female, without any substantiating descriptive support, other than a unique type host being involved. We were able to study the type specimens for all six names involved here and have drawn our conclusions from them.

Material: [Emberizidae]—Ex “Grassquit,” 5 females, 1 male, British West Indies. Ex Arrenmonops conirostris (Bonaparte), 2 females, Costa Rica. Ex Chondestes grammacus (Say), 3 females, USA: Utah. Ex Emberiza rustica Pallas, 2 females, 1 male, Korea. Ex E. rutila Pallas, 1 female, Korea. Ex Eucometis penicillata (Spix), 5 females, 2 males, Costa Rica. Ex Loxigilla violacea (Linnaeus), 4 females, Jamaica. Ex Oryzoborus angolensis (Linnaeus), 5 females, 3 males, Costa Rica, Peru. Ex Ramphocelus carbo (Pallas), 12 females, 3 males, Peru, Venezuela. Ex Thrautis palmarum (Wied), 1 male, Trinidad. Ex T. episcopus (Linnaeus), 1 male, Trinidad. Ex Zonotrichia capensis (P. L. S. Muller), 9 females, 4 males, Costa Rica, Venezuela. [Estrildidae]—Ex Chloroibia gouldiae, 2 female types of M. latifrons, (no locality). [Formicariidae]—Ex Thamnophilus doliatus, female holotype, male allotype of M. laticorpus, Costa Rica. Ex Myrmotherula gutturalis Sclater and Salvin, 1 female, Guyana. Ex Cercomacra n. nigricans, female holotype of M. picturatus, Colombia. [Furnariidae]—Ex Thripophaga pyrrholaeca (Vieillot), 2 females, Chile. [Icteridae]—Ex Aglaia phoeniceus (Linnaeus), 5 females, 2 males, USA: New York, Ohio, Utah. Ex Curaeus curaeus (Molina), 3 males, Chile. Ex Euphagus carolinus (P. L. S. Muller), 4 females, USA: Alaska, Mississippi. Ex Icterus p. alticola, female holotype of M. icterus, Guatemala. [Tyrannidae]—Ex Ochthoea rubidacola estricristis, female holotype of M. insignis, Peru. Ex Phylloscartes poecilotis, female holotype of M. poecilotis, Peru.

Machaerilaenus hawaiensis (Kellogg and Chapman)

Menopon hawaiensis Kellogg and Chapman, 1902:165. Type host: Chlorodrepanis virens = Hemignathus virens (Rothschild).
Female: Similar to *M. laticorpus*, except as follows. Marginal tergal setae: I, 26; II–VI, 36–38; VII, 30; VIII, 24.

Male: Unknown.

Remarks: Kellogg and Chapman (1902) described *M. hawaiiensis* from the female holotype taken in Maui, Hawaii. We obtained this type but, because of its dreadful remounting attempt, we were unable to obtain any useful information other than the few dimensions given above. However, the illustration of this specimen in the original description shows the abdominal tergites with numerous marginal setae, many more than associated with any of the other species of this group. Also, it shows the pronotal margin with 10 long setae and a very short seta between each pair, a condition unlike any species that we have seen. Whether these illustrated features are accurate or simply artistic interpretation, the abysmal condition of the type specimen and absence of any further material leave us no choice but to recognize this as a valid species. The host represents the only case of *Machaerilaemus* from the family Drepanididae. As with Carriker, the host associations of species described by Kellogg are often suspect, thus caution should be exercised in making too much of this record.

Material: [Drepanididae]—Ex *Hemignathus vires*, female type of *M. hawaiiensis*, Hawaii.

*Machaerilaemus diglossae* Price, Hellenthal and Dalgleish, new species

(Fig. 15)

Type host: *Diglossa baritula* Wagler.

Female: Very similar to *M. laticorpus*. Head with distinct broad "Y"-shaped suture. Width of gula "hole," 0.080–0.085. Some dimensions near upper limits of *M. laticorpus*: TW, 0.58–0.59; HL, 0.25–0.27; PW, 0.41–0.43.

Male: Also very similar to *M. laticorpus*. Head and gula "hole" as for female. Dimensions: TW, 0.50; HL, 0.22; PW, 0.33–0.34; GL, 0.31–0.33.

Remarks: While admittedly this species is very similar to *M. laticorpus*, the consistently larger width of the gula hole and the presence of the prominent "Y" suture on the dorsum of the head serve to separate the species. We would have been suspicious had we not had an excellent series of seven specimens representing both sexes and all specimens supported these two characters as outside of the range for the large number of specimens we studied of *M. laticorpus*. The only known host for this species is a member of the genus *Diglossa* in the Emberizidae.


*Machaerilaemus laticapitus* Price, Hellenthal and Dalgleish, new species

Type host: *Leptasthenura aegithaloides* (Kittlitz).

Female: As for *M. laticorpus*, except as follows. Width of gula "hole," 0.055–0.065. Metasternum with 31–41 setae. Marginal tergal setae: I, 14–18; II, 16–21; III–VI, 18–24; VII, 17–21. Dimensions: TW, 0.60–0.62; HL, 0.27–0.29; PW, 0.41–0.44; MW, 0.53–0.58; ANW, 0.27–0.29.

Male: Unknown.

Remarks: All specimens of this new species show head and thorax dimensions as consistently larger than those of *M. laticorpus*. There is also a tendency to have more marginal
tergal setae on most segments. The width of the gula “hole” distinguishes this species from *M. diglossae*.

Type material: [Furnariidae]—Ex *Leptasthenura aegithaloides*, female holotype, Chile: Copiapó, 3 Oct. 1980, M. A. Marin. 8 female paratypes, same as holotype. All specimens at Oklahoma State University (Stillwater).

*Machaerilaenus tangarae* Price, Hellenthal and Dalgleish, new species

Type host: *Tangara larvata* (Du Bus).


Male: Unknown.

Remarks: The consistently larger temple width and relatively small numbers of sternal setae group this species with *M. laticapitus*. However, the smaller number of metasternal setae will separate all specimens of these two species. This is further supported by a tendency for *M. tangarae* to have fewer marginal tergal setae and a wider gula “hole”.


Other material: [Emberizidae]—Ex *T. ictercephala*, 3 females, Costa Rica.

*Machaerilaenus hirsutus* Price, Hellenthal and Dalgleish, new species

Type host: “Honeycreeper”—perhaps *Chlorophanes spiza* (Linnaeus).

Female: As for *M. laticorpus*, except as follows. Width of gula “hole,” 0.075–0.095. Prosternal with 11–17 setae, mesosternum with 13–16, metasternum with 38–40. Marginal tergal setae: I, 14–16; II, 19–21; III, 21–23; IV–VI, 22–26; VII, 19–23; VIII, 15–19. Sternal setae: II, 46–52; III, 60–69; IV, 64–72; V, 69–74; VI, 60–65; VII, 55–64; subgenital plate, 52–66. Dimensions: TW, 0.62–0.64; HL, 0.27–0.29; PW, 0.46–0.47; MW, 0.57–0.63; AWIV, 0.82–0.86; ANW, 0.24–0.27; TL, 1.50–1.60.

Male: Unknown.

Remarks: The very large head and thorax dimensions and the large number of abdominal sternal setae distinguish this new species from all others in this group.

Type material: [Emberizidae]—Ex “Honeycreeper,” female holotype, British West Indies: Providencias, 22 July 1930, H. S. Peters, Bish. #15143. 1 female paratype, as for holotype except Cayman Id., Little Cayman, 12 Sept. 1990, Bish. #15398; 1 female paratype same as above paratype except Bish. #15400. All specimens in the National Museum of Natural History (Washington, D.C.).

*Machaerilaenus complexus* Malcomson

(Fig. 11)


Female: All quantitation and dimensions well within ranges for *M. laticorpus*. Gula as in Fig. 11, without any evidence of lateral spinous processes.

Male: Not available.

Remarks: Even with only the female holotype for study, it is obvious from the original description, which includes both sexes, that the gula structure is unique among the known *Machaerilaenus*.
Material: [Emberizidae]—Ex Spizella pusilla, female holotype of *M. complexus*, USA: Pennsylvania.

**Key to the Species of *Machaerilaemus***

1. Lateroanterior ventral spines on head (Fig. 7) ............................................ raggianae
   Lateroanterior head lacking such spines ..................................................... 2

2. Gular plate shaped as in Figs. 3, 5, 6; abdominal sternites II–V with short medioanterior spiniform setae (Fig. 4); temple width > 0.75 .................................................. 3
   Gular plate otherwise; abdominal sternites without short medioanterior spiniform setae; temple width < 0.71 ................................................................. 6

3. Prosternal plate with > 30 setae ................................................................. clayae
   Prosternal plate with < 30 setae ........................................................................ 4

4. Metasternal plate with concave posterior margin (Fig. 6); prothorax width < 0.65, head length < 0.36, metathorax width < 0.74 ............................................ giganus
   Metasternal plate with flat posterior margin (Figs. 3, 5); prothorax width > 0.65, head length > 0.36, metathorax width > 0.74 ....................................................... 5

5. Temple width > 0.94, prothorax width > 0.75 .............................................. americanus
   Temple width < 0.94, prothorax width < 0.75 .................................................. malleus

6. Gula solid, without central "hole" (Figs. 8, 10) ............................................ 7
   Gula with central "hole" (Figs. 11, 12, 15) ...................................................... 9

7. Gula heart-shaped, with closely-appressed pointed lateral processes (Fig. 10) ........ ploccei
   Gula not shaped as above (Fig. 8) ................................................................. 8

8. Female temple width > 0.63, male > 0.50 ....................................................... cyanocinctae
   Female temple width < 0.63, male < 0.50 ......................................................... maestus

9. Gula lacking lateral spinous processes (Fig. 11) .............................................. complexus
   Gula with lateral spinous processes (Figs. 12, 15) ........................................... 10

10. Abdominal tergites II–VI each with > 30 marginal setae .................................. hawaiensis
    Abdominal tergites II–VI each with < 27 marginal setae .................................. 11

11. Temple width at least 0.60 ........................................................................... 12
    Temple width < 0.60 ..................................................................................... 14

12. Abdominal sternites III–VI each with > 58 setae .......................................... hirsutus
    Abdominal sternites III–VI each with < 55 setae ........................................... 13

13. Metasternal plate with > 30 setae ............................................................... laticapitus
    Metasternal plate with < 30 setae ................................................................. tangaranae

14. Large "hole" in gula, 0.080–0.085 wide (Fig. 15); head with distinct broad dorsal "Y" suture ................................................................. diglossae
    Smaller "hole" in gula, not > 0.075 wide (Fig. 12); head with indistinct to absent "Y" suture ................................................................. laticornens

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