European Journal of Taxonomy 800: 1–88
https://doi.org/10.5852/ejt.2022.800.1683
ISSN 2118-9773
www.europeanjournaloftaxonomy.eu
2022 · Gustafsson D.R. *et al.*

Monograph

urn:lsid:zoobank.org:pub:213B577F-867D-4ECD-AD2C-48ACA71801B5

The ischnoceran chewing lice (Phthiraptera: Ischnocera) of bulbuls (Aves: Passeriformes: Pycnonotidae), with descriptions of 18 new species

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Abstract. The ischnoceran chewing lice known from bulbuls are discussed and revised, and 18 new species are described. These are: *Brueelia celer* sp. nov. from *Pycnonotus cafer bengalensis* Blyth, 1845 and *Pycnonotus cafer primrosei* Deignan, 1949; *Brueelia colindalei* sp. nov. from *Hemixos castanonotus canipennis* Seebohm, 1890; *Brueelia doisuthepensis* sp. nov. from *Alophoixus ochraceus ochraceus* (Moore, 1858); *Brueelia galeata* sp. nov. from *Alophoixus pallidus henrici* (Oustalet, 1896); *Brueelia hermetica* sp. nov. from *Pycnonotus barbatus layardi* Gurney, 1879; *Brueelia leiae* sp. nov. from *Alophoixus flaveolus burmanicus* (Oates, 1899); *Brueelia robertrankini* sp. nov. from *Pycnonotus jocosus jocosus* (Linnaeus, 1758) and *Pycnonotus jocosus pattani* Deignan, 1948; *Brueelia yunnanensis* sp. nov. from *Ixos mcclellandii similis* (Rothschild, 1921); *Guimaraesiella brunneomarginata* sp. nov. from *Pycnonotus goiaver samarensis* Rand & Rabor, 1960 and *Pycnonotus goiaver personatus* Hume, 1873; *Guimaraesiella caligogularis* sp. nov. from *Pycnonotus plumosus plumosus* Blyth, 1845 and *Alophoixus bres tephrogenys* (Jardine & Selby, 1833); *Guimaraesiella cinnamomea* sp. nov. from *Iole propinqua propinqua* (Oustalet, 1903) and *Iole viridescens cinnamomeoventris* Baker, 1917; *Guimaraesiella ixi* sp. nov. from *Ixos mcclellandii peracensis* (Hartert & Butler, 1898); *Guimaraesiella lorica* sp. nov. from *Hypsipetes leucocephalus nigerrimus* Gould, 1863; *Guimaraesiella mayoensis* sp. nov. from *Hypsipetes everetti everetti* (Tweeddale, 1877); *Guimaraesiella phlaoalopha* sp. nov. from *Alophoixus pallidus henrici* (Oustalet, 1896); *Philopteroides holosternus* sp. nov. from *Pycnonotus goiavier goiavier* (Scopoli, 1786); *Philopteroides longiclypeatus* sp. nov. from *Hypsipetes everretti samarensis* Rand & Rabor, 1959; *Philopteroides haerixos* sp. nov. from *Ixos mcclellandii holtii* (Swinhoe,

1861) and *Alophoixus pallidus henrici* (Oustalet, 1896). The following new host records are provided: *Hemixos castanonotus canipennis* Seebohm, 1890, for *Guimaraesiella flavala* (Najer & Sychra in Najer *et al*., 2012); *Pycnonotus blanfordi conradi* (Finsch in Finsch & Conrad, 1873) for *Philopteroides cucphuongensis* Mey, 2004. *Philopterus cucphuongensis* is tentatively redescribed and illustrated based on specimens from a non-type host species. The species descriptions of the following species are amended slightly, based on re-examinations of type specimens: *Brueelia alophoixi* Sychra in Sychra *et al*., 2009; *Guimaraesiella cucphuongensis* (Najer & Sychra in Najer *et al*., 2012); *Guimaraesiella flavala* (Najer & Sychra in Najer *et al*., 2012). We propose to move *Philopterus hiyodori* Uchida, 1949, to the genus *Craspedorrhynchus* Kéler, 1938. The species *Sturnidoecus acutifrons* (Uchida, 1949) and *Penenirmus guldum* (Ansari, 1955) are considered species inquirenda. An updated checklist of ischnoceran lice known from bulbuls is provided, as well as a key to all ischnoceran species known from bulbuls.

Keywords. Philopteridae, *Brueelia*, *Guimaraesiella*, *Philopteroides*, Pycnonotidae.

Gustafsson D.R., Najer T., Zou F. & Bush S.E. 2022. The ischnoceran chewing lice (Phthiraptera: Ischnocera) of bulbuls (Aves: Passeriformes: Pycnonotidae), with descriptions of 18 new species. *European Journal of Taxonomy* 800: 1–88. https://doi.org/10.5852/ejt.2022.800.1683

Introduction

The bulbuls (Pycnonotidae Gray, 1840) comprise a group of about 150 species of medium-sized songbirds distributed throughout most of Africa, South Asia, and the Indo-Malayan region, with a few species occurring outside these regions (Shakya & Sheldon 2017; Clements *et al*. 2019). Despite the large number and broad geographical range of bulbul species, little is known about their ischnoceran lice. The most recent checklist of chewing lice of the world (Price *et al.* 2003) lists only five species of ischnoceran lice associated with three species of bulbuls. Since then, only six other species of Ischnocera Kellogg, 1896 have been described from bulbul hosts (Mey 2004; Sychra *et al.* 2009; Najer *et al*. 2012; Gustafsson & Bush 2017). Our current knowledge of ischnoceran lice parasitizing bulbuls comprises 11 species from 10 host species.

With few exceptions, the ischnoceran lice parasitizing bulbuls fall into three genera: *Brueelia* Kéler, 1936, *Guimaraesiella* Eichler, 1949, and *Philopteroides* Mey, 2004. All three genera are widely distributed on non-bulbul hosts, and no genus of lice is known to be specific only to bulbuls. However, the species of *Brueelia* and *Philopteroides* occurring on bulbuls belong to species groups that are known only from bulbuls (Gustafsson & Bush 2017; see below). In contrast, the species of *Guimaraesiella* known from bulbuls belong to a species group that is widely distributed on a large number of passerine host families (Gustafsson & Bush 2017; Gustafsson *et al*. 2019a).

Here, we review the species of ischnoceran lice known from bulbul hosts, and describe and illustrate 18 new species in the genera *Brueelia*, *Guimaraesiella* and *Philopteroides*. We suggest that two described species should be regarded as species inquirenda due to the inadequate original descriptions. Another species (*Ph. hiyodori* Uchida, 1949) is moved to the genus *Craspedorrhynchus* Kéler, 1938; this genus is restricted to raptors and it seems most likely that this species was described from contaminations or stragglers. We provide two new host records, and confirm some records from non-type hosts previously published by Chu *et al*. (2019). We provide a tentative redescription with complete illustrations of *Philopteroides cucphuongensis* Mey, 2004, as well as keys to the identification on all species of ischnoceran lice known from bulbuls.

Material and methods

All examined specimens were previously slide-mounted in Canada balsam or Hoyer's medium, and deposited in the following collections: BPBM = Berenice Pauahi Bishop Museum, Honolulu, Hawaii, United States; GIABR = Institute of Zoology, Guangdong Academy of Sciences, Guangzhou, Guangdong, China; MMBC = Moravian Museum, Brno, Czechia; NHML = Natural History Museum, London, United Kingdom; PIPR = Price Institute for Parasite Research, University of Utah, Salt Lake City, Utah, United States; UMSP = University of Minnesota, St. Paul, Minnesota, United States.

Most specimens were examined and measured with a Nikon Eclipse E600 microscope (Nikon, Belmont, California, United States) fitted with an Olympus DP25 camera (Olympus, Center Valley, Pennsylvania, United States) and digital measuring software (ImageJ 1.48v, Wayne Rasband, https://imagej.nih.gov). Specimens deposited at the GIABR were examined with a Nikon Eclipse N*i* microscope (Nikon, Tokyo, Japan) and measured from live images in Evos FL Auto (Thermo Fischer Scientific, Hong Kong, China). Illustrations were made by hand with the aid of drawing tubes attached to the respective microscopes, scanned, and compiled and edited digitally in GIMP (www.gimp.org).

Terminology for morphological and setal characters follows Clay (1951), Mey (1994, 2004), Gustafsson & Bush (2017), and Najer *et al*. (2020).

The following abbreviations are used for morphological and setal characters. These follow the standards outlined by Gustafsson & Bush (2017) and Najer *et al*. (2020), and are shown in Figs 1–7 for *Guimaraesiella*, Figs 50–56 for *Brueelia*, and Figs 106–111 for *Philopteroides*. All setal characters are written in italics for clarity:
ads = anterior dorsal seta
ames = anterior mesosomal seta
aps = accessory postspiracular seta
dsms = dorsal submarginal seta
mts1–3 = marginal temporal seta 1–3
pmes = posterior mesosomal seta
pos = preocular seta
ps = pleural seta
pst1–2 = parameral setae 1–2
s4 = postantennal head sensillum 4
ss = sutural seta
sts = sternal seta
tps = tergal posterior seta
vms = vulval marginal setae
vos = vulval oblique setae
vss = vulval submarginal setae

Abbreviations used for measurements (all in millimeters). Standards of measurement follow Najer *et al*. (2020). Measurements for all species can be found in Tables 1–2:
ADPL = anterior dorsal plate length (at midline)
ADPW = anterior dorsal plate width
ANW = anterior notch width
AW = abdominal width (at posterior end of segment V)
GW = genital width (male)
HL = head length (at mid-line)
HW = head width (at temples)
PAL = preantennal head length

PAW = preantennal head width
POL = post-antennal head length
PRW = prothoracic width
PTW = pterothoracic width
SGPW = subgenital plate width
TL = total length (at midline)
TRL = trabeculum length
TRW = trabeculum width

Host taxonomy follows Clements *et al*. (2019), except for Chinese hosts, which follows Zheng (2017). To avoid confusion, the following two-letter abbreviations are used for genus-level taxa:
Al. = *Alophoixus*
Br. = *Brueelia*
Cr. = *Craspedorrhynchus*
Gu. = *Guimaraesiella*
He. = *Hemixos*
Hy. = *Hypsipetes*
Io. = *Iole*
Ix. = *Ixos*
Ma. = *Manorina*
Pe. = *Penenirmus*
Po. = *Philopteroides*
Py. = *Pycnonotus*
St. = *Sturnidoecus*

Results

Species descriptions

Phthiraptera Haeckel, 1896
Ischnocera Kellogg, 1896
Philopteridae Burmeister, 1838
Brueelia-complex sensu Gustafsson & Bush, 2017

Genus ***Guimaraesiella*** Eichler, 1949

Nirmus Nitzsch, 1818: 291 (in partim).
Degeeriella Neumann, 1906: 60 (in partim).
Brueelia Kéler, 1936: 257 (in partim).
Xobugirado Eichler 1949: 13.
Allobrueelia Eichler, 1951: 36 (in partim).
Allobrueelia Eichler, 1952: 74 (near-verbatim redescription).
Allonirmus Złotorzycka, 1964: 263.
Nitzschnirmus Mey & Barker, 2014: 101.
Callaenirmus Mey, 2017: 92.
Philemoniellus Mey, 2017: 145.

Type species

Docophorus subalbicans Piaget, 1885: 6 (= *Docophorus papuanus* Giebel, 1879: 475, by original designation).

Geographical distribution

Global, except Antarctica.

Host associations

Widely distributed across most families of Passeriformes Linnaeus, 1758; some species occur on Trogoniformes American Ornithological Union, 1886.

Remarks

Based on a general impression of the head shape ("more docophoroid broad-headed" than the *Br. guldum* species group [= *Bruelia* s. str.]), Mey & Barker (2014) mention a *Br. flavala* species group that includes: *Br. flavala*, *Br. cucphuongensis*, and *Br. wallacei* Mey & Barker, 2014, all of which are now placed in *Guimaraesiella* (Gustafsson & Bush 2017). However, *Guimaraesiella* parasitizing bulbuls do not form a monophyletic group within *Guimaraesiella* in the phylogeny of Bush *et al.* (2016), and we have found no morphological characters that unite the species found on bulbuls with *Gu. wallacei* and separate them from other species of *Guimaraesiella*. Thus, we here consider these species part of the "core group" of *Guimaraesiella* (Gustafsson *et al*. 2019a), within the subgenus *Gu.* (*Guimaraesiella*).

Notably, the phylogeny of Bush *et al.* (2016) indicates that species of *Guimaraesiella* from African bulbuls are more closely related to species from other African birds than they are to species from Asian bulbuls. Indeed, some of the African species of *Guimaraesiella* found on bulbuls are also found on passerines from different families (Bush *et al.* 2016: fig. 3b, clade A-2). In contrast, *Guimaraesiella* from Asian bulbuls are more host-specific; they are known only from bulbuls (Bush *et al.* 2016: fig. 3a, clade A-1).

Guimaraesiella flavala (Najer & Sychra in Najer *et al.*, 2012)

Brueelia flavala Najer & Sychra in Najer *et al*., 2012: 42.

Guimaraesiella flavala – Gustafsson & Bush 2017: 221.

Material examined

Paratypes (ex *Hemixos flavala*)
VIETNAM • 2 ♀♀; Ninh Binh Province, Cuc Phuong, Botanical Garden; 20°14′55.2″ N 105°42′45.7″ E; 7 Feb. 2010; I. Literak leg.; ID: O. Sychra; V18; MMBC.

Non-type material (ex *Hemixos castanonotus canipennis*)
CHINA • 1 ♀; Guanxi Province, Shiwandashan National Park; 20 Apr. 2005; S.E. Bush and D.H. Clayton leg.; host MBR-6686; lice P-894; NHML [on same slide as holotype of *Brueelia colindalei* sp. nov.].

Type locality

Botanical Garden, Cuc Phuong, Ninh Binh Province, Vietnam.

Type host

Hemixos flavala Blyth, 1845 – ashy bulbul.

Other hosts

Hemixos castanonotus Swinhoe, 1870 – chestnut bulbul. *Hemixos castanonotus canipennis* Seebohm, 1890. **New host record.**

Remarks

The female examined from China corresponds well with the original description and illustration of *Guimaraesiella flavala*, except that the preantennal area is somewhat longer and narrower than originally illustrated (Najer *et al*. 2012: fig. 3e). We tentatively consider this specimen to represent *G. flavala*, but more specimens are needed to confirm this identification. Our specimen constitutes a new host subspecies association, as well as the first record of this species from China.

Guimaraesiella flavala was originally illustrated as having a complete cross-piece along the vulval margin. We examined two paratype females to establish whether or not this cross-piece is present. The distal submarginal plate of *Gu. flavala* is almost entirely translucent, and the extent of the sclerotization along the vulval margin is difficult to assess; this is also the case in the examined female specimen from China. In at least one paratype female, the lateral section of the vulval margin is hyaline on one side. We interpret this to mean that there is no complete cross-piece in *Gu. flavala*, but more specimens are needed to establish the shape of the distal subgenital plate and its lateral submarginal bulges.

Guimaraesiella cucphuongensis (Najer & Sychra in Najer *et al.*, 2012)

Brueelia cucphuongensis Najer & Sychra in Najer *et al.*, 2012: 44.

Guimaraesiella cucphuongensis – Gustafsson & Bush 2017: 221.

Material examined

Paratype (ex *Pycnonotus finlaysoni*)
VIETNAM • 1 ♀; Ninh Binh Province, Cuc Phuong National Park, area surrounding tourist centre and ranger station; 20°20′54.9″ N 105°35′51.1″ E; 4 Feb. 2010; I. Literak leg.; ID: O. Sychra; V21; MMBC.

Type locality

“Area surrounding tourist centre and ranger station”, Cuc Phuong National Park, Ninh Binh Province, Vietnam.

Type host

Pycnonotus finlaysoni Stickland, 1844 – stripe-throated bulbul.

Other hosts

Iole propinqua (Oustalet, 1903) – grey-eyed bulbul; *Rubigula flaviventris* (Tickell, 1833) – black-crested bulbul.

Remarks

Guimaraesiella cucphuongensis was originally illustrated as having a complete cross-piece along the vulval margin. As this character is unusual within *Guimaraesiella*, we examined one of the paratypes to establish whether or not this illustration is accurate. The distal subgenital plate is poorly sclerotized in this species, and the exact extent of the distal plate is not easy to see. However, on at least one side in the examined paratype, the vulval margin is hyaline laterally, and no complete cross-piece can be seen. Instead, the distal subgenital plate appears to be similar to that of *Gu. cinnamomea* sp. nov. (Fig. 7).

Guimaraesiella cinnamomea sp. nov.
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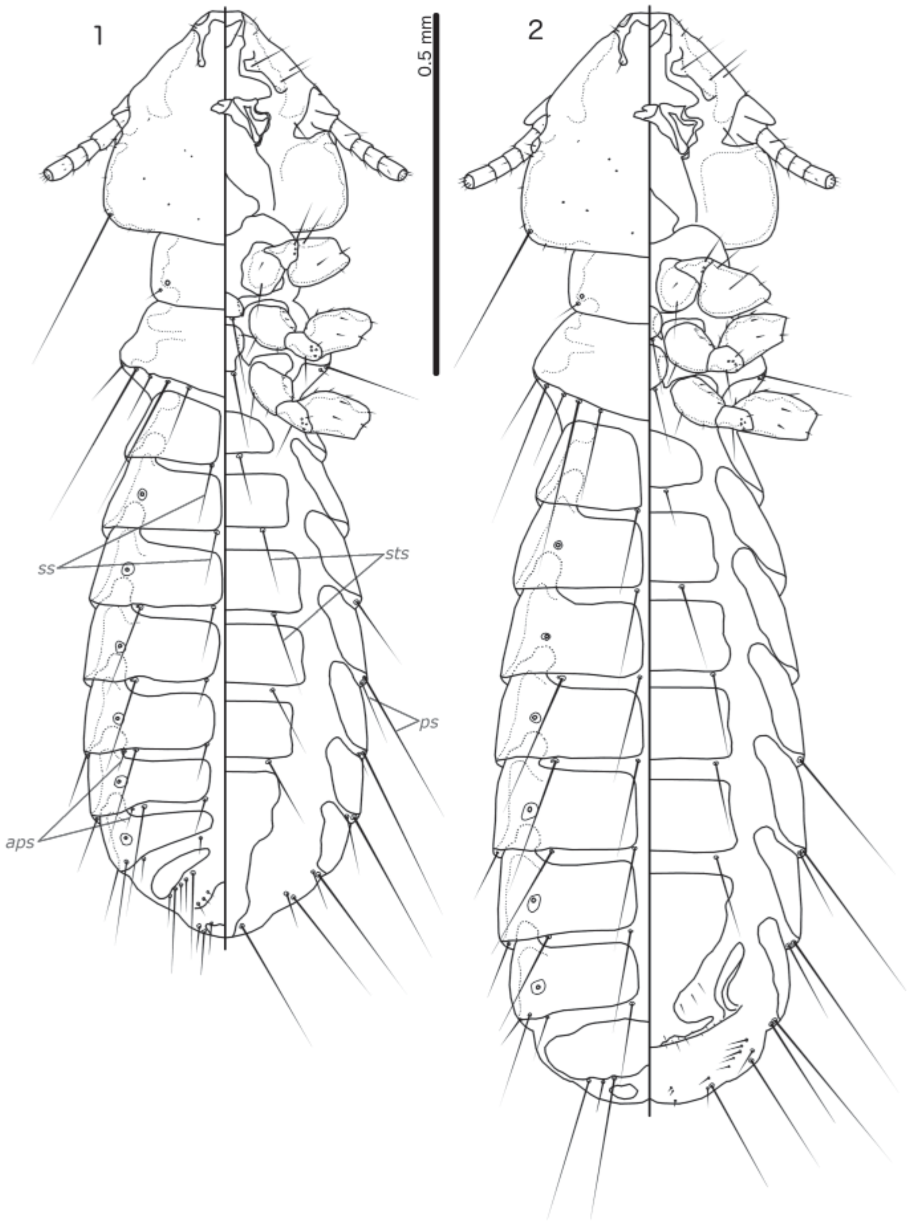
Figs 1–7

Diagnosis

Guimaraesiella cinnamomea sp. nov. is most similar to *Guimaraesiella caligogularis* sp. nov.; they share the following combination of characters: dorsal preantennal suture reaches *ads* (Figs 3, 38); male tergopleurites IV–V without *aps*, but tergopleurite VI with *aps* (Figs 1, 36); male tergopleurite VIII with 1 *tps* on each side (Figs 1, 36); proximal mesosome only slightly constricted distally (Figs 6, 41).

These two species can be separated by the following characters: female abdominal segment IV without *ps* in *Gu. cinnamomea* sp. nov. (Fig. 2), but with 1 *ps* on each side in *Gu. caligogularis* sp. nov. (Fig. 37); male abdominal segment V with 2 *ps* on each side in *Gu. cinnamomea* sp. nov. (Fig. 1), but with 1 *ps* on each side in *Gu. caligogularis* sp. nov. (Fig. 36); anterior extension of ventral sclerite broad in *Gu. caligogularis* sp. nov. (Fig. 41) but narrow in *Gu. cinnamomea* sp. nov. (Fig. 6; anterior end not clearly visible in examined specimens); overall shape of mesosome differs between *Gu. cinnamomea* sp. nov. (Fig. 6) and *Gu. caligogularis* sp. nov. (Fig. 41).



Figs 1–2. *Guimaraesiella cinnamomea* sp. nov. **1**. Male habitus, dorsal and ventral views. **2**. Female habitus, dorsal and ventral views. Abbreviations: *aps* = accessory post-spiracular seta; *ps* = paratergal seta; *ss* = sutural seta; *sts* = sternal seta.

Etymology

The species name is derived from Latin '*cinnamon*' for 'cinnamon', referring to the pigmentation of this species and the subspecific name of the host.

Material examined

Holotype (ex *Iole viridescens cinnamomeoventris*)
THAILAND • 1 ♂; Ranong Province, Kra Buri District [as Kru Bur], Pak Chan; 6 May 1964; W. Songprakob [as Songphabob] and W. Suwan Laong; WS933; BPBM.

Paratypes (ex *Iole viridescens cinnamomeoventris*)
THAILAND • 2 ♂♂, 3 ♀♀; same collection data as for holotype; BPBM.

Non-type material (ex *Iole propinqua propinqua*)
THAILAND • 1 ♀; Loei Province, Dan Sai, Kok Sathon, Phu Lom Lo Mountains; 14 Feb. 1955; R.E. Elbel leg.; RE-4633, [RT-]B-31189; BPBM.

Type host

Iole viridescens cinnamomeoventris Baker, 1917 – olive bulbul.

Other host

Iole propinqua propinqua (Oustalet, 1903) – gray-eyed bulbul.

Description

Both sexes

Head pentagonal (Fig. 3), lateral margins of preantennal area straight to slightly convex, anterior end slightly elongated and narrowed, frons narrow, straight to slightly concave. Marginal carina narrowing markedly in anterior end, median margin almost straight to slightly irregular. Dorsal anterior plate with shallowly concave anterior margin and irregular lateral margins. Ventral anterior plate almost triangular, but with moderately concave anterior margin and blunt posterior end. Dorsal preantennal suture reaches *ads*, *dsms*, and lateral margins of head. Preantennal nodi extended medianly. Head chaetotaxy as in Fig. 3. Coni almost reach distal margins of scapes. Temples rounded. Temporal marginal carina slender, largely regular. Thoracic and abdominal segments as in Figs 1–2. Base pigmentation conspicuously cinnamon in mounted specimens, darkening in head carina and nodi, gular plate, proepimera, metepisterna, and lateral sections of tergopleurites.

Male

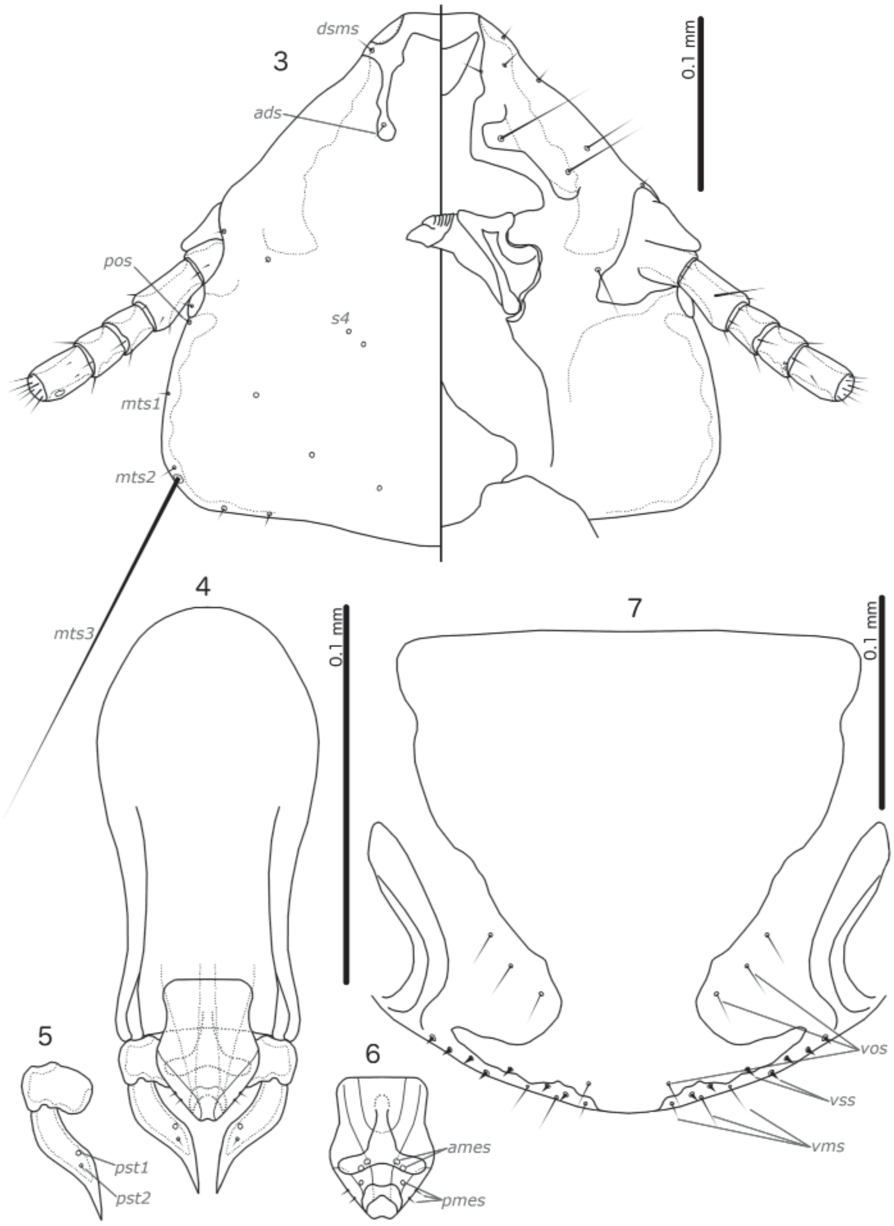
Thoracic and abdominal chaetotaxy as in Fig. 1. Basal apodeme slender (Fig. 4), anterior end rounded, lateral margins slightly constricted at mid-length. Proximal mesosome broad (Fig. 6), only slightly narrowed distally, with straight anterior margin. Proximal end of ventral sclerite not clearly visible in examined males. Mesosomal lobes bulging somewhat in anterior end, slender distally; 3 *ames* sensilla on each side; 2 *pmes* microsetae on lateral margins of mesosome. Gonopore broad, deeply concave distally but almost straight proximally. Parameral heads as in Fig. 5. Parameral blades attenuated and elongated distally; *pst1–2* as in Fig. 5. Measurements as in Table 1.

Female

Thoracic and abdominal chaetotaxy as in Fig. 2. Subgenital plate with slightly convex anterior margin and wide anchor-shaped lateral submarginal extensions almost reaching lateral ends of vulval margin (Fig. 7). Vulval margin distinctly rounded, with 2–3 short, slender *vms* and 4–7 short, thorn-like *vss* on each side; 3–4 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements as in Table 1.

Remarks

The female specimen from *Iole propinqua propinqua* is larger and paler than females from the type host. Head shape and other characters are similar between the females from both host species, and we tentatively consider all the specimens listed above conspecific.



Figs 3–7. *Guimaraesiella cinnamomea* sp. nov. **3**. Male head, dorsal and ventral views. **4**. Male genitalia, dorsal view. **5**. Male paramere, dorsal view. **6**. Male mesosome, ventral view. **7**. Female subgenital plate and vulval margin, ventral view. Abbreviations: *ads* = anterior dorsal seta; *ames* = anterior mesosomal seta; *dsms* = dorsal submarginal seta; *mts1–3* = marginal temporal seta 1–3; *pmes* = posterior mesosomal seta; *pos* = preocular seta; *pst1–2* = parameral setae 1–2; *s4* = postantennal head sensillum 4; *vms* = vulval marginal setae; *vos* = vulval oblique setae; *vss* = vulval submarginal setae.

Table 1 (continued on next two pages)**.** Measurements of the species described here. Means (in brackets) only included for samples sizes >10. Abbreviations: AW = abdominal width; HL = head length; HW = head width; N = number; PRW = prothoracic width; PTW = pterothoracic width; TL = total length. Genus abbreviations: *Br.* = *Brueelia*; *Gu.* = *Guimaraesiella*; *Po.* = *Philopteroides*. For additional measurements for the species of *Philopteroides* Mey, 2004, see Table 2.

Louse	**Host**	**Sex**	**N**	**TL**	**HL**	**HW**	**PRW**	**PTW**	**AW**
Br. celer	*Pycnonotus cafer bengalensis*	♂	11[1]	1.38–1.62 (1.50)	0.31–0.34 (0.32)	0.26–0.29 (0.28)	0.17–0.19 (0.18)	0.23–0.27 (0.25)	0.26–0.38 (0.32)
		♀	30[2]	1.55–1.93 (1.72)	0.33–0.36 (0.34)	0.28–0.31 (0.30)	0.17–0.20 (0.19)	0.26–0.30 (0.28)	0.31–0.45 (0.38)
	Py. c. primrosei	♂	2	1.37–1.63	0.29–0.33	0.25–0.28	0.17–0.22	0.24–0.29	0.33–0.41
		♀	1	1.88	0.35	0.31	0.21	0.30	0.46
Br. colindalei	*Hemixos castanonotus canipennis*	♂	3	1.25–1.66	0.28–0.33	0.25–0.31	0.17–0.22	0.24–0.29	0.28–0.40
		♀	7	1.74–1.94	0.34–0.36	0.31–0.33	0.22–0.24	0.28–0.32	0.41–0.45
Br. doisuthepensis	*Alophoixus ochraceus ochraceus*	♂	1	1.42	0.30	0.28	0.18	0.25	0.37
		♀	1	1.72	0.34	0.31	0.23	0.29	0.41
Br. galeata	*Alophoixus pallidus henrici*	♂	1	1.52	0.31	0.29	0.20	0.27	0.35
		♀	1	1.75	0.35	0.31	0.22	0.28	0.40
Br. hermetica	*Pycnonotus barbatus layardi*	♂	4[4]	1.52–1.56	0.32–0.33	0.25–0.28	0.15–0.17	0.25–0.27	0.33–0.38
		♀	4	1.62–1.84	0.32–0.37	0.28–0.30	0.17–0.18	0.27–0.29	0.37–0.43
Br. leiae	*Ixos mcclellandii similis*	♂	2	1.47–1.50	0.34	0.31	0.21	0.27–0.28	0.35–0.38
		♀	2	1.60–1.77	0.33–0.36	0.29–0.32	0.21–0.22	0.27–0.28	0.35–0.39
Br. robertrankini	*Pycnonotus jocosus jocosus*	♂	1	1.47	0.31	0.28	0.20	0.25	0.36
	Py. j. pattani	♂	3	1.46–1.57	0.31	0.28–0.29	0.18–0.20	0.25–0.28	0.31–0.32
		♀	4[3]	1.72–1.82	0.33–0.37	0.30–0.33	0.19–0.22	0.28–0.30	0.35–0.44
Br. yunnanensis	*Alophoixus flaveolus burmanicus*	♂	9	1.38–1.67	0.31–0.34	0.26–0.32	0.19–0.21	0.25–0.30	0.34–0.41
		♀	19	1.56–1.94 (1.75)	0.33–0.37 (0.35)	0.28–0.33 (0.31)	0.19–0.22 (0.21)	0.26–0.32 (0.29)	0.37–0.50 (0.44)
Gu. brunneomarginata	*Pycnonotus goiavier samarensis*	♂	7[5]	1.12–1.27	0.29–0.31	0.31–0.35	0.19–0.21	0.26–0.30	0.36–0.41
		♀	10[6]	1.39–1.50	0.33–0.36 (0.34)	0.34–0.39 (0.37)	0.21–0.23 (0.22)	0.30–0.33 (0.31)	0.44–0.40 (0.47)

Table 1 (continued).

Louse	Host	Sex	N	TL	HL	HW	PRW	PTW	AW
	Py. g. personatus	♂	1	1.18	0.30	0.33	0.20	0.28	0.38
		♀	4	1.42–1.57	0.33–0.34	0.37–0.38	0.22–0.28	0.31–0.36	0.44–0.48
Gu. caligogularis	*Pycnonotus plumosus plumosus*	♂	1	1.11	0.29	0.30	0.18	0.25	0.35
	Alophoixus bres tephrogenys	♂	1[7]	---	0.30	0.33	0.19	0.29	0.35
		♀	1	1.44	0.32	0.35	0.22	0.30	0.45
Gu. cinnamomea	*Io. propinqua propinqua*	♀	1	1.65	0.36	0.38	0.23	0.32	0.51
	Iole viridescens cinnamomeoventris	♂	3	1.26–1.29	0.31–0.32	0.25–0.34	0.20–0.21	0.28–0.29	0.39–0.41
		♀	3	1.41–1.51	0.33–0.34	0.36–0.37	0.21–0.23	0.30–0.32	0.41–0.45
Gu. ixi	*Ixos mcclellandii peracensis*	♂	2	1.12–1.22	0.31–0.33	0.33–0.34	0.19–0.20	0.27–0.28	0.35
		♀	2	1.43–1.52	0.35	0.36–0.37	0.22	0.30–0.31	0.40–0.46
Gu. lorica	*Hypispetes leucocephalus nigerrimus*	♂	3	1.14–1.30	0.32–0.33	0.33–0.36	0.19–0.21	0.28–0.31	0.36–0.43
		♀	3	1.50–1.56	0.36–0.37	0.38–0.39	0.22–0.23	0.32–0.33	0.45–0.49
Gu. mayoensis	*Hypispetes everetti everetti*	♂	5	1.08–1.21	0.31–0.32	0.33–0.34	0.19–0.20	0.26–0.29	0.35–0.38
		♀	11[8]	1.35–1.56 (1.45)	0.33–0.35 (0.34)	0.34–0.39 (0.37)	0.20–0.23 (0.22)	0.28–0.33 (0.31)	0.41–0.50
Gu. phlaoalopha	*Alophoixus pallidus henrici*	♂	4	1.29–1.34	0.33–0.34	0.35–0.36	0.20–0.21	0.28–0.29	0.39–0.43
		♀	3	1.55–0.59	0.35–0.37	0.38–0.39	0.22–0.23	0.31–0.33	0.44–0.52
Po. cucphuongensis	*Pycnonotus blanfordi conradi*	♂	2	1.12–1.16	0.41–0.42	0.38–0.39	0.25–0.26	0.36–0.37	0.50–0.54
		♀	4	1.36–1.52	0.45–0.47	0.43–0.45	0.29–0.30	0.43–0.45	0.61–0.70
Po. flavala	*Alophoixus flaveolus burmanicus*	♂	3	1.21–1.34	0.42–0.45	0.40–0.46	0.28–0.29	0.38	0.51–0.54
	Alophoixus pallidus henrici	♂	3	1.16–1.19	0.42–0.46	0.39–0.43	0.25–0.27	0.32–0.38	0.47–0.48
		♀	4	1.24–1.53	0.43–0.51	0.40–0.49	0.25–0.30	0.35–0.42	0.49–0.58
	Hemixos flavala	♂	2	1.28	0.43	0.40–0.41	0.28	0.38	0.57–0.60

Table 1 (continued)**.**

Louse	Host	Sex	N	TL	HL	HW	PRW	PTW	AW
		♀	3	1.39–1.54	0.46–0.48	0.40–0.46	0.28–0.31	0.39–0.41	0.56–0.65
Po. haerixos	*Ixos mcclellandii holtii*	♂	3	1.15–1.20	0.41–0.42	0.38–0.39	0.25	0.33–0.34	0.48–0.50
		♀	4	1.33–1.47	0.43–0.45	0.39–0.43	0.25–0.27	0.34–0.38	0.52–0.61
Po. holosternus	*Pycnonotus goiavier goiavier*	♂	1	1.22	0.43	0.44	0.28	0.38	0.60
		♀	2	1.35–1.40	0.44	0.43	0.26–0.28	0.37–0.40	0.63–0.67
Po. longiclypeatus	*Hypsipetes everetti samarensis*	♂	3[9]	1.02	0.40–0.42	0.36–0.39	0.22	0.31–0.34	0.39–0.43
		♀	4[10]	1.06–1.14	0.40–0.41	0.37–0.40	0.22–0.25	0.32–0.35	0.41–0.48

[1] N for TL = 10.
[2] N for AW = 26.
[3] N for TL = 3.
[4] N for TL, HL = 3.
[5] N for TL = 6.
[6] N for TL = 4.
[7] Abdomen broken distally, and TL cannot be accurately measured.
[8] N for AW = 8.
[9] N for TL = 2.
[10] N for TL, HL = 3.

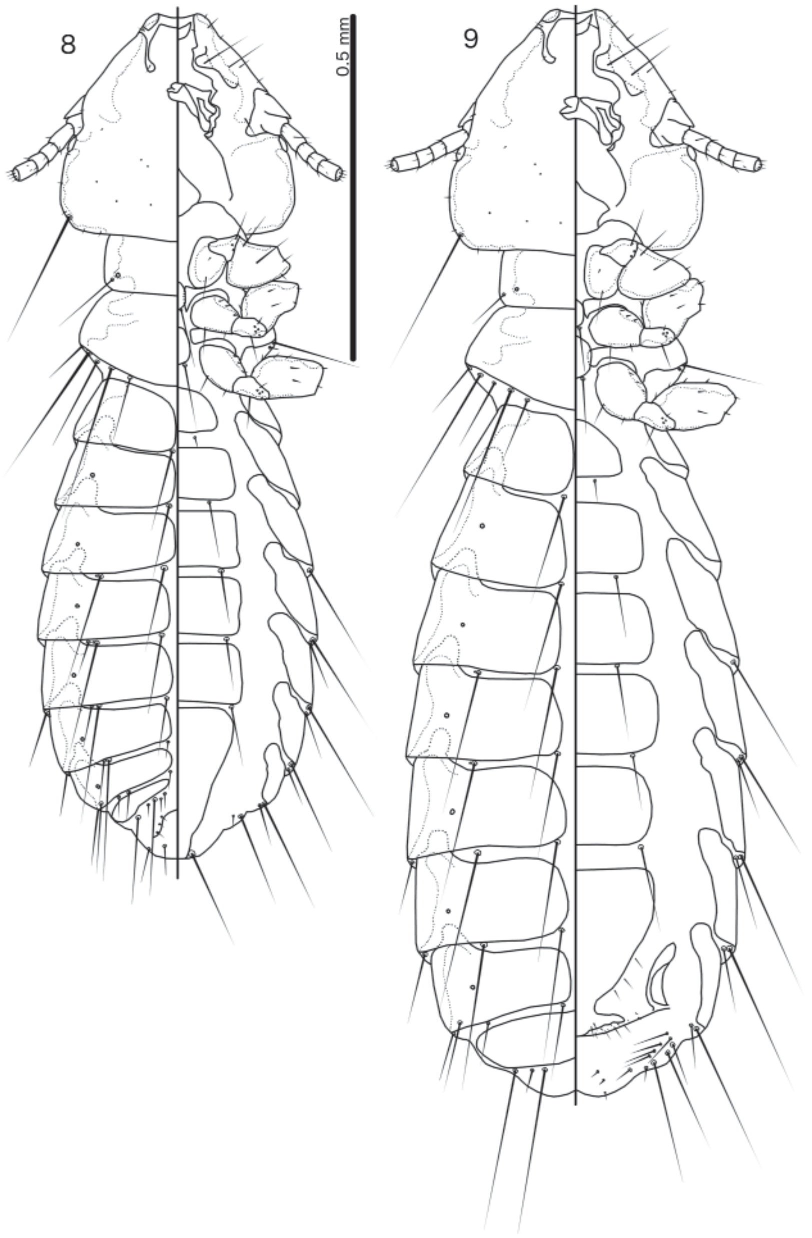
Guimaraesiella brunneomarginata sp. nov.

urn:lsid:zoobank.org:act:B13C707A-E735-4D58-846C-4A36DA8FE950

Figs 8–14

Diagnosis

Guimaraesiella brunneomarginata sp. nov. is most similar to *Guimaraesiella cucphuongensis* (Najer & Sychra in Najer *et al*., 2012), with which it shares the following characters: *aps* absent on male tergopleurite IV, but present on male tergopleurite V (Fig. 8); female abdominal segment IV with 1 *ps* on each side (Fig. 9); female abdominal segment V with 2 *ps* on each side (Fig. 9).



Figs 8–9. *Guimaraesiella brunneomarginata* sp. nov. **8**. Male habitus, dorsal and ventral views. **9**. Female habitus, dorsal and ventral views.

These two species can be separated by the following characters: male tergopleurite VIII with 1 *tps* on each side in *Gu. cucphuongensis*, but with 2 *tps* on each side in *Gu. brunneomarginata* sp. nov. (Fig. 8); male abdominal segment IV with 2 *ps* on each side in *Gu. cucphuongensis*, but with only 1 *ps* on each side in *Gu. brunneomarginata* sp. nov. (Fig. 8); female vulval margin with at least 12 thorn-like *vss* in total in *Gu. brunneomarginata* sp. nov. (Fig. 14), but with at most 11 thorn-like *vss* in total in *Gu. cucphuongensis*.

Etymology

The species name is derived from the Latin '*brunneus*' for 'brown' and '*margo*' for 'edge', referring to the pigmentation patterns of the abdomen.

Material examined

Holotype (ex *Pycnonotus goiavier samarensis*)

PHILIPPINES • ♂; Leyte Island, Mount Lobi Range, Tambis Burauen; 3 Jun. 1964; D.S. Rabor leg.; B-106; BPBM.

Paratypes

PHILIPPINES • 2 ♂♂, 6 ♀♀, same collection data as for holotype; BPBM • 2 ♂♂, same locality and collector as for holotype; 7 May 1964; B-410; BPBM • 1 ♂, 4 ♀♀; same locality and collector as for holotype; 4 May 1964; B-171; BPBM • 1 ♂; same locality and collector as for holotype; 6 May 1964; B-318; BPBM.

Non-type material (ex *Pycnonotus goiavier personatus*)

MALAYSIA • 1 ♂, 4 ♀♀; [Kelantan?], R[antau?] Panjang; 6 Apr. 1962; M-01275; UMSP.

Type host

Pycnonotus goiavier samarensis Rand & Rabor, 1960 – yellow-vented bulbul.

Other host

Pycnonotus goiavier personatus Hume, 1873.

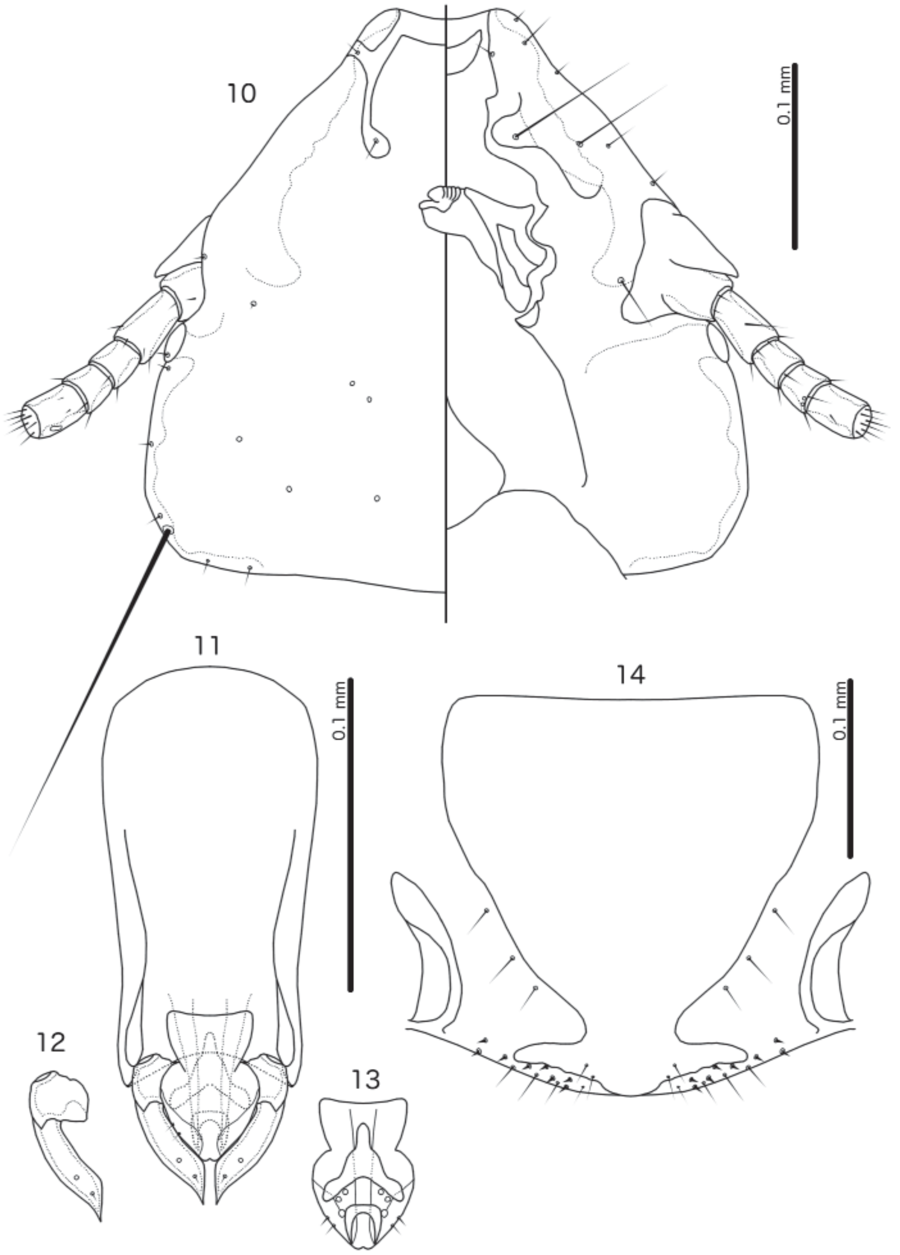
Description

Both sexes

Head irregularly pentagonal (Fig. 10), lateral margins of preantennal head clearly convex proximally, but concave in anterior third, frons shallowly concave. Marginal carina broad, narrowing only near anterior end, median margin shallowly irregular. Dorsal anterior plate with shallowly concave anterior margin and convex lateral margins. Ventral anterior plate crescent shaped. Dorsal preantennal suture reaches lateral margins of head, *dsms* and *ads*, and in some specimens extend medianly to *ads*. Preantennal nodi extended medianly. Head chaetotaxy as in Fig. 10. Coni sharp, reaching to or slightly beyond distal margin of scape. Temples rounded. Temporal marginal carina narrow, widening anteriorly. Thoracic and abdominal segments as in Figs 8–9. Pigmentation differs between material from the two host subspecies. Material from *Pycnonotus goiavier samarensis*: base pigmentation of head pale brown, base pigmentation of thorax and abdomen translucent; head nodi, marginal and marginal temporal carinae, gular plate, proepimera, metepisterna, and lateral sections of tergopleurites dark brown. Material from *Py. g. personatus*: base pigmentation of all body pale yellow brown, not darker on head; head nodi, marginal and temporal marginal carinae, gular plate, proepimera, and metepisterna medium-brown; sternal and subgenital plates pale brown, darker in female than in male; lateral sections of tergopleurites dark brown.

Male

Thoracic and abdominal chaetotaxy as in Fig. 8. Basal apodeme rectangular with rounded anterior end, widening anteriorly (Fig. 11), not or only slightly constricted at mid-length. Proximal mesosome broad (Fig. 13), roughly trapezoidal, with slightly concave anterior margin and convex lateral margins, constricted in distal end. Ventral sclerite short, not thickened anteriorly, and not approaching anterior margin of proximal mesosome. Mesosomal lobes broad, gently rounded; 3 *ames* sensilla on each side; 2 *pmes* microsetae on lateral margins of mesosome. Gonopore broad, distal margin deeply concave. Parameral heads as in Fig. 12. Parameral blades slender, extended slightly in distal end; *pst1–2* as in Fig. 12. Measurements as in Table 1.



Figs 10–14. *Guimaraesiella brunneomarginata* sp. nov. **10**. Male head, dorsal and ventral views. **11**. Male genitalia, dorsal view. **12**. Male paramere, dorsal view. **13**. Male mesosome, ventral view. **14**. Female subgenital plate and vulval margin, ventral view.

Female

Thoracic and abdominal chaetotaxy as in Fig. 9. Subgenital plate with wide lateral submarginal extensions (Fig. 14), lateral ends of these extensions bent posteriorly. Vulval margin gently rounded with straight central part, with 3–4 short, slender *vms* and 6–8 short, thorn-like *vss* one each side; 4–7 short, slender *vos* on each side of subgenital plate; distal 1–2 *vos* median to *vss*. Measurements as in Table 1.

Remarks

Material from the two host subspecies differs in pigmentation patterns (see above). The male from *Pycnonotus goiavier personatus* has a shorter head than males from *Py. g. samarensis*, but the male genitalia are indistinguishable between material from the two host subspecies. We here treat all material as conspecific.

Guimaraesiella mayoensis sp. nov.

urn:lsid:zoobank.org:act:621D4015-6DA4-446A-B1C6-62CEF4D42D79

Figs 15–21

Diagnosis

Guimaraesiella mayoensis sp. nov. is most similar to *Gu. phlaoalopha* sp. nov., with which it shares the following characters: male tergopleurites IV–V without *aps*, but tergopleurite VI with *aps* (Figs 15, 43); dorsal preantennal suture reaching *ads* (Figs 17, 45); male tergopleurite VIII with 2 *tps* on each side (Fig. 15, 43); female abdominal segment IV with *ps* (Figs 15, 44).

These two species can be separated by the following characters: abdominal segment IV with 1 *ps* on each side in both sexes in *Gu. phlaoalopha* sp. nov. (Figs 43–44), but with 2 *ps* on each side in *Gu. mayoensis* sp. nov. (Figs 15–16); male abdominal segments VI–VII with 3 *ps* on each side in *Gu. mayoensis* sp. nov. (Fig. 15), but with only 2 *ps* on each side in *Gu. phlaoalopha* sp. nov. (Fig. 43); proximal mesosome constricted distally and with clearly concave anterior margin in *Gu. phlaoalopha* sp. nov. (Fig. 48), but barely or not constricted distally and with straight or slightly convex anterior margin in *Gu. mayoensis* sp. nov. (Fig. 20); shape of ventral sclerite of mesosome differs between species (Figs 20, 48), and sclerite with proximal thickening in *Gu. phlaoalopha* sp. nov. (Fig. 48) that is absent in *Gu. mayoensis* sp. nov. (Fig. 20).

Etymology

The species name is derived from the type locality.

Material examined

Holotype (ex *Hypsipetes everetti everetti*)

PHILIPPINES • ♂; Mindanao, Davao Province, Mount Mayo, Limot Mati; 11 Jun. 1965; D.S. Rabor leg.; B-8263; BPBM.

Paratypes

PHILIPPINES • 4 ♂♂, 12 ♀♀, 2 nymphs; Mindanao, Davao Province, Mount Mayo, Unloh Mati; 3200–4200 ft a.s.l.; 9 Nov. 1965; D.S. Rabor leg.; B-8717; BPBM.

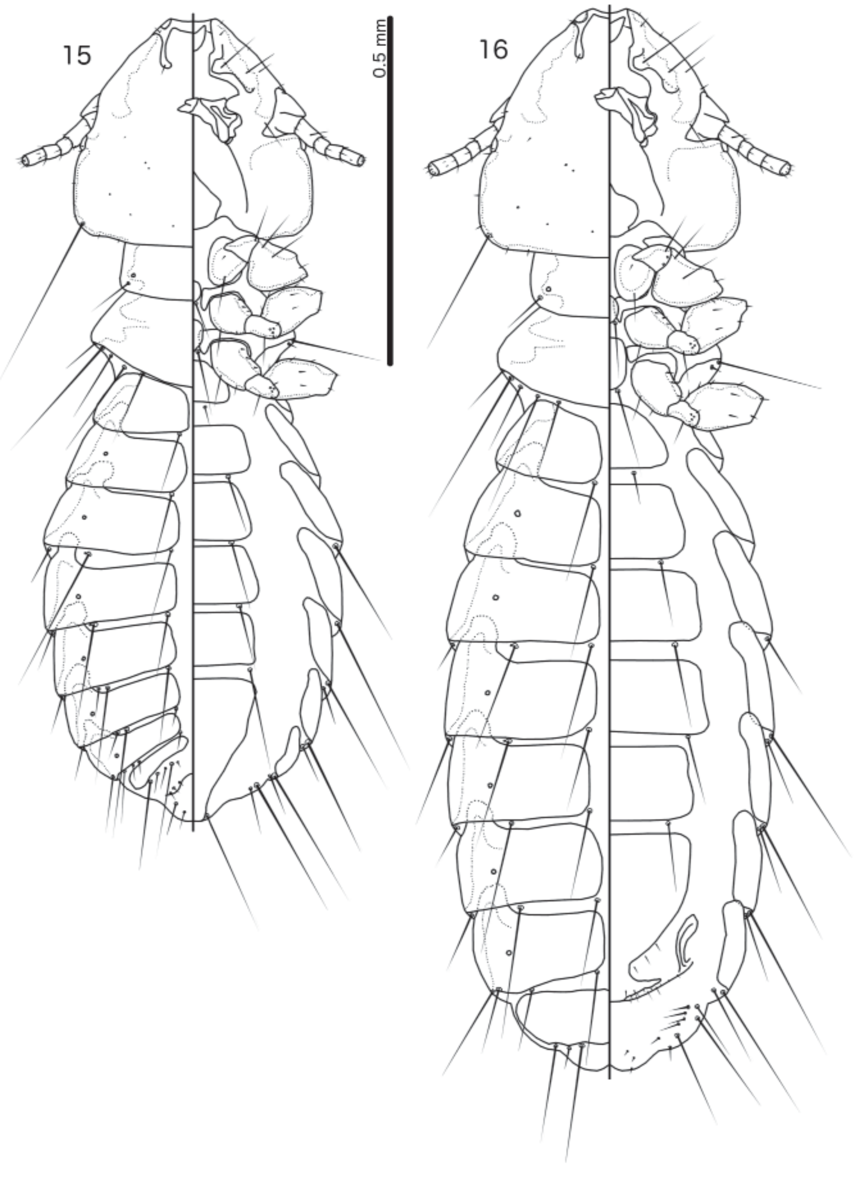
Type host

Hypsipetes everetti everetti (Tweeddale, 1877) – yellowish bulbul.

Description

Both sexes

Head pentagonal, short (Fig. 17), lateral margins of preantennal head slightly convex, but anterior fourth straight to concave, frons concave. Marginal carina broad, narrowing slightly in anterior end, median margins irregular, posterior end relatively narrow. Dorsal anterior plate with shallowly concave anterior margin and convex lateral margins. Ventral anterior plate pale, and often difficult to see, roughly triangular, but with anterior margin concave. Dorsal preantennal suture reaches *ads*, in some specimens extends slightly median to *ads*; suture reaches lateral margins of head. Preantennal nodi extended slightly medianly. Head chaetotaxy as in Fig. 17. Coni reach beyond distal margins of scapes. Lateral margins of postantennal head almost parallel. Temples gently rounded. Temporal marginal carina slender, and postocular nodi very slight. Thoracic and abdominal segments as in Figs 15–16. Base pigmentation very

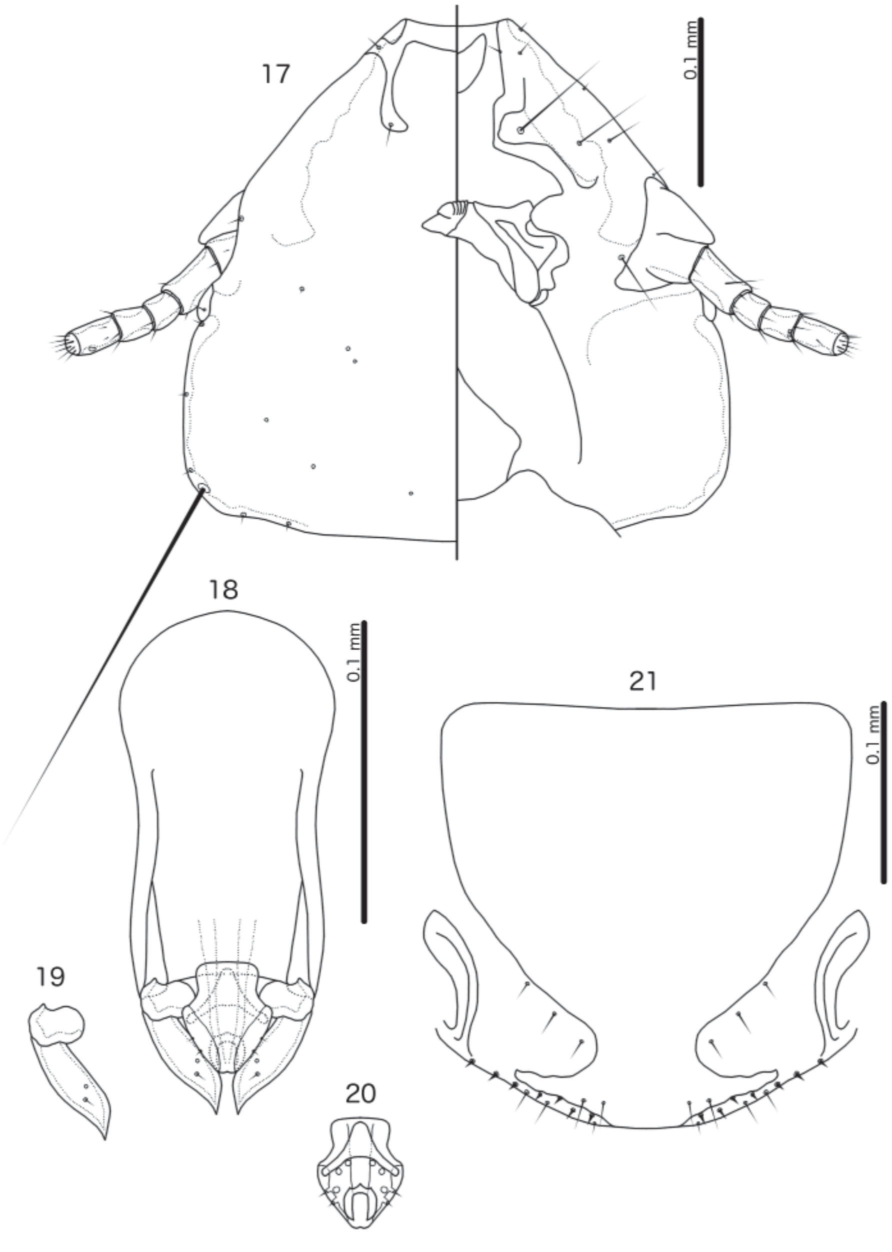


Figs 15–16. *Guimaraesiella mayoensis* sp. nov. **15**. Male habitus, dorsal and ventral views. **16**. Female habitus, dorsal and ventral views.

pale brown, only slightly darker in head carina and nodi, gular plate, proepimera, and metepisterna. Lateral sections of tergopleurites II–IV pale, in more posterior segments distinctly darker.

Male

Thoracic and abdominal chaetotaxy as in Fig. 15. Basal apodeme broad (Fig. 18), clearly but shallowly constricted at mid-length. Proximal mesosome short, roughly square-shaped (Fig. 20). Ventral sclerite without anterior thickening, short and broad, almost reaching anterior margin of mesosome. Mesosomal lobes slender; 3 *ames* sensilla on each side; 2 *pmes* microsetae on lateral margins of mesosome. Gonopore inverse U-shaped, with small, pointed extensions on anterior margin. Parameral heads as in Fig. 19.



Figs 17–21. *Guimaraesiella mayoensis* sp. nov. **17**. Male head, dorsal and ventral views. **18**. Male genitalia, dorsal view. **19**. Male paramere, dorsal view. **20**. Male mesosome, ventral view. **21**. Female subgenital plate and vulval margin, ventral view.

Parameral blades broad, stocky, narrowing suddenly near distal end, with tips bent laterally; *pst1–2* as in Fig. 19. Measurements as in Table 1.

Female

Thoracic and abdominal chaetotaxy as in Fig. 16. Distal subgenital plate largely translucent, and here illustrated approximately (Fig. 21); lateral submarginal extensions reach more than halfway to lateral ends of vulval margin. Vulval margin gently rounded (Fig. 21), with 3–4 short, slender *vms* and 6–8 short, thorn-like *vss* on each side; 5–7 short, slender *vos* on each side of subgenital plate; distal 1–2 *vos* median to *vms*. Measurements as in Table 1.

Guimaraesiella lorica sp. nov.

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Figs 22–28

Diagnosis

Guimaraesiella lorica sp. nov. is most similar to *Guimaraesiella caligogularis* sp. nov., with which it shares the following characters: male tergopleurites IV–V without *aps*, but tergopleurite VI with *aps* (Figs 22, 36); male abdominal segment VI with 3 *ps* on each side (Figs 22, 36); proximal mesosome trapezoidal, constricted distally (Figs 27, 41); female abdominal segment IV with 1 *ps* on each side and segment V with 2 *ps* on each side (Figs 23, 37).

These two species can be separated by the following characters: dorsal preantennal suture does not reach lateral margin of head in *Gu. lorica* sp. nov. (Fig. 24) but reaches lateral margin of head in *Gu. caligogularis* sp. nov. (Fig. 38); male abdominal segment V with 1 *ps* on each side in *Gu. caligogularis* sp. nov. (Fig. 36), but with 2 *ps* on each side in *Gu. lorica* sp. nov. (Fig. 22); proximal mesosome more constricted distally in *Gu. lorica* sp. nov. (Fig. 27) than in *Gu. caligogularis* sp. nov. (Fig. 41); distal mesosome more broadly rounded in *Gu. caligogularis* sp. nov. (Fig. 41) than in *Gu. lorica* sp. nov. (Fig. 27); ventral sclerite slender with thickening in proximal end in *Gu. lorica* sp. nov. (Fig. 27), but generally massive without such thickening in *Gu. caligogularis* sp. nov. (Fig. 41).

Etymology

The species name is derived from the Latin '*loricus*' for 'corselet', referring to the distinct narrowing of the mesosome.

Material examined

Holotype (ex *Hypsipetes leucocephalus nigerrimus* [as *H. madagascariensis nigerrimus*])
TAIWAN • ♂; Liu Kuei; no date; T.C. Maa leg.; TMT 1562–1567; NHML.

Paratypes

TAIWAN • 1 ♂, 1 ♀; same collection data as for holotype; UMSP • 1 ♀; Puli, Nantou Hsien; Jan. 1964; same collector and host as for preceding except TMT 42-47; PIPR • 1 ♂; same collection data as for preceding; UMSP • 1 ♂, 1 ♀; same locality, collector and host as for preceding except Nov.–Dec. 1963; TMT 572–573; UMSP.

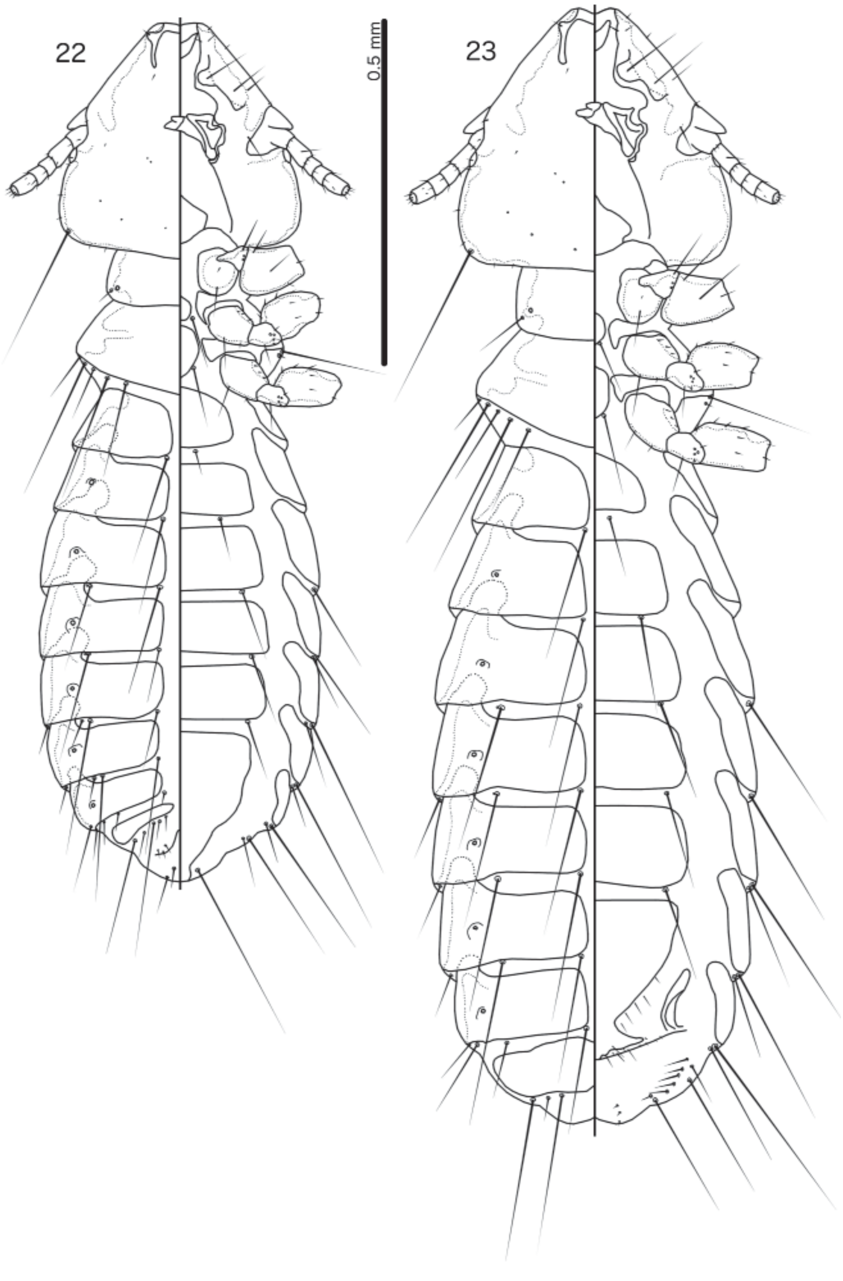
Type host

Hypsipetes leucocephalus nigerrimus Gould, 1863 – black bulbul.

Description

Both sexes

Head pentagonal (Fig. 24), lateral margins of preantennal head straight to slightly convex, frons concave. Marginal carina moderate, narrowing slightly anteriorly, with shallowly undulating median margins. Dorsal anterior plate with shallowly concave anterior margin and slightly convex lateral margins. Ventral anterior plate roughly triangular, but with deeply concave anterior margin. Narrow dorsal preantennal suture does not reach *ads* in 2 examined males, and reaches *ads* on only one side in 2 examined females; in 2 males and 1 female suture reaches *ads*; suture does not reach lateral margins of head. Preantennal nodi moderate, not extended medianly. Head chaetotaxy as in Fig. 24. Coni do not reach distal margin of

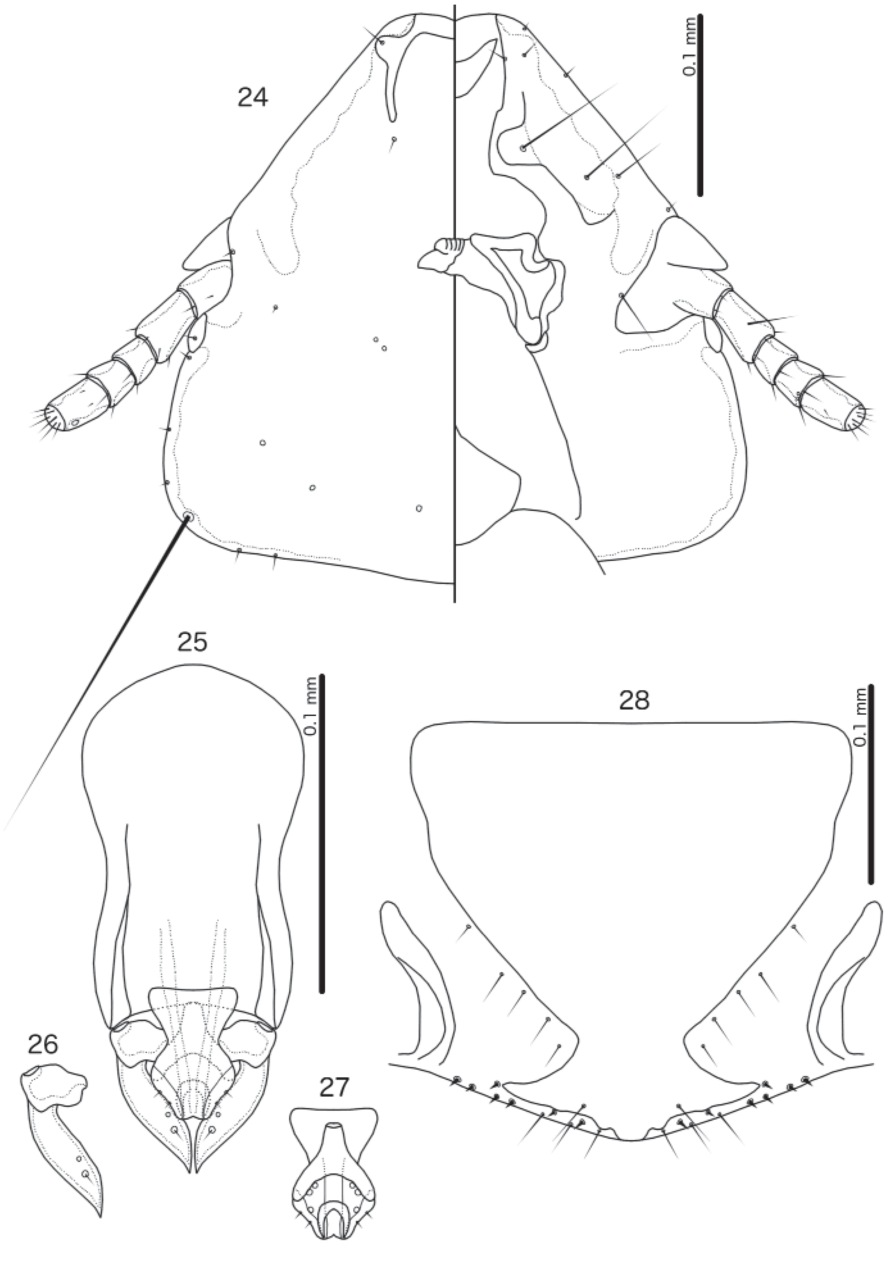


Figs 22–23. *Guimaraesiella lorica* sp. nov. **22**. Male habitus, dorsal and ventral views. **23**. Female habitus, dorsal and ventral views.

scapes. Temples rounded, temporal marginal carina slender, of more or less constant thickness. Thoracic and abdominal segments as in Figs 22–23. Base color pale brown yellow, darkening to pale brown on marginal carina, head nodi, gular plate, proepimera, and metepisterna, and to medium brown on lateral section of tergopleurites.

Male

Thoracic and abdominal chaetotaxy as in Fig. 22. Basal apodeme broad (Fig. 25), constricted at mid-length. Proximal mesosome trapezoidal (Fig. 27). Ventral sclerite short, with thickened anterior end. Mesosomal lobes bulging slightly in anterior end, slender distally; 3 *ames* sensilla on each side; 2 *pmes*



Figs 24–28. *Guimaraesiella lorica* sp. nov. **24**. Male head, dorsal and ventral views. **25**. Male genitalia, dorsal view. **26**. Male paramere, dorsal view. **27**. Male mesosome, ventral view. **28**. Female subgenital plate and vulval margin, ventral view.

microsetae on lateral margins of mesosome. Gonopore deeply crescent shaped. Parameral heads as in Fig. 26. Parameral blades stocky, narrowing only near distal end; *pst1–2* as in Fig. 26. Measurements as in Table 1.

Female

Thoracic and abdominal chaetotaxy as in Fig. 23. Subgenital plate broad (Fig. 28), with slender, somewhat diffuse, lateral submarginal extensions that reach slightly more than halfway to lateral ends of vulval margin. Vulval margin gently rounded (Fig. 28), with 3 short, slender *vms* and 6–7 short, thorn-like *vss* on each side; 4–6 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements as in Table 1.

Guimaraesiella ixi sp. nov.

urn:lsid:zoobank.org:act:7ED99A0B-945C-42B5-9A9D-7431C5BF1A1D

Figs 29–35

Diagnosis

Guimaraesiella ixi sp. nov. is not particularly similar to any other species of *Guimaraesiella* known from bulbuls, and can be separated from all other species by the following combination of characters: male tergopleurites IV–V without *tps* (Fig. 29); proximal mesosome narrow distally (Fig. 34); gonopore slenderly crescent shaped (Fig. 34); dorsal preantennal suture reaching *ads* and lateral margin of head (Fig. 31); male tergopleurite VI without *aps* (Fig. 29); abdominal segment IV with 2 *ps* on each side in both sexes (Fig. 29); proximal mesosome slender (Fig. 34); ventral sclerite of mesosome with anterior thickening (Fig. 27).

Etymology

The species name is derived from the generic name of the type host.

Material examined

Holotype (ex *Ixos mcclellandii peracensis* [as *Hypsipetes mcclellandii* or *Microscelis mcclellandii*]) MALAYSIA • ♂; Mount Brinchang; 17 Mar. 1963; M-02631; NHML.

Paratypes

MALAYSIA • 1 ♀; same collection data as for holotype; NHML • 1 ♂; same locality as for holotype; 11 Dec. 1962; M-00685; NHML • 1 ♀; same locality and date as for holotype; M-00683; NHML.

Type host

Ixos mcclellandii peracensis (Hartert & Butler, 1898) – mountain bulbul.

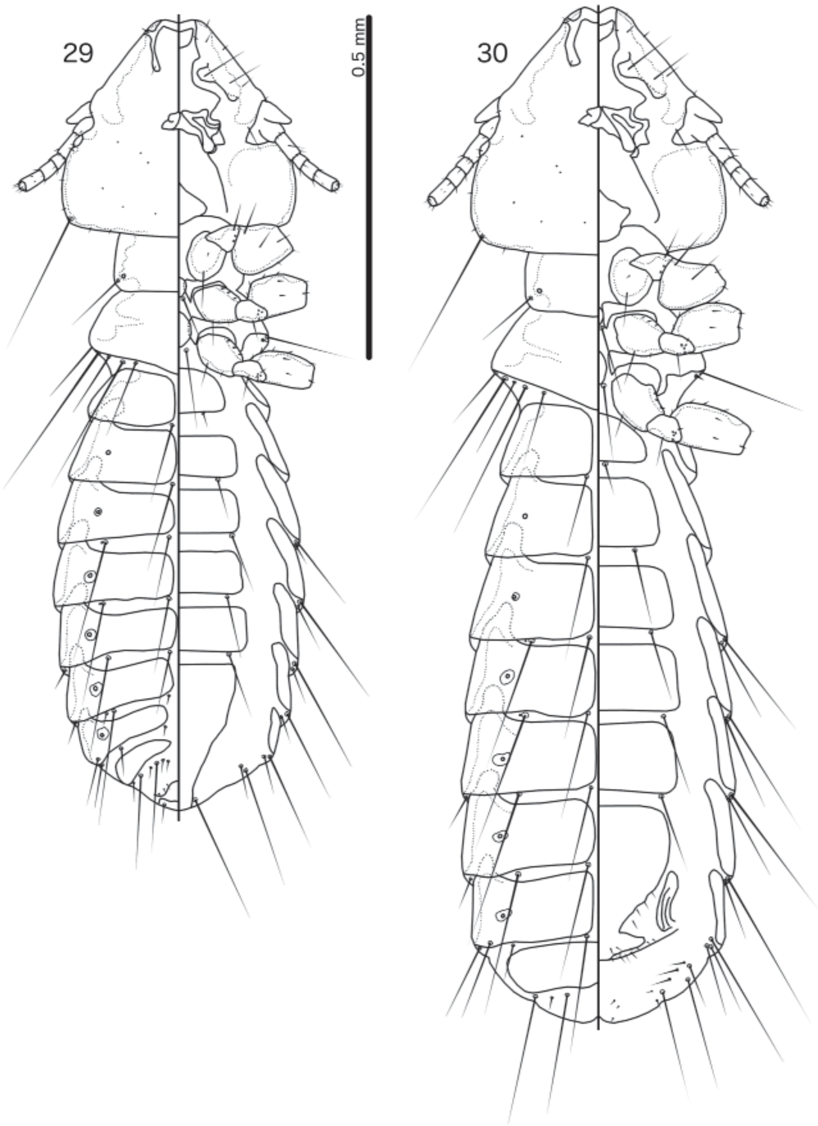
Description

Both sexes

Head pentagonal (Fig. 31), lateral margins of preantennal head more or less straight, frons slightly concave. Marginal carina slender, gradually narrowing anteriorly, median margin only slightly undulating. Dorsal anterior plate narrowing posteriorly, with shallowly concave anterior margin and convex lateral margins. Ventral anterior plate short, bowl-shaped with slightly concave anterior margin. Dorsal preantennal suture reaches *ads* and lateral margins of head. Preantennal nodi extended medianly. Head chaetotaxy as in Fig. 31. Coni reach beyond distal margin of scapes. Lateral margins of postantennal head slightly convex. Temples sharply rounded. Temporal marginal carina slender, only slightly irregular. Thoracic and abdominal segments as in Figs 29–30. Base pigmentation very faint, most of body translucent, except preantennal and preocular nodi, gular plate, proepimera, metepisterna and lateral sections of tergopleurites pale brown.

Male

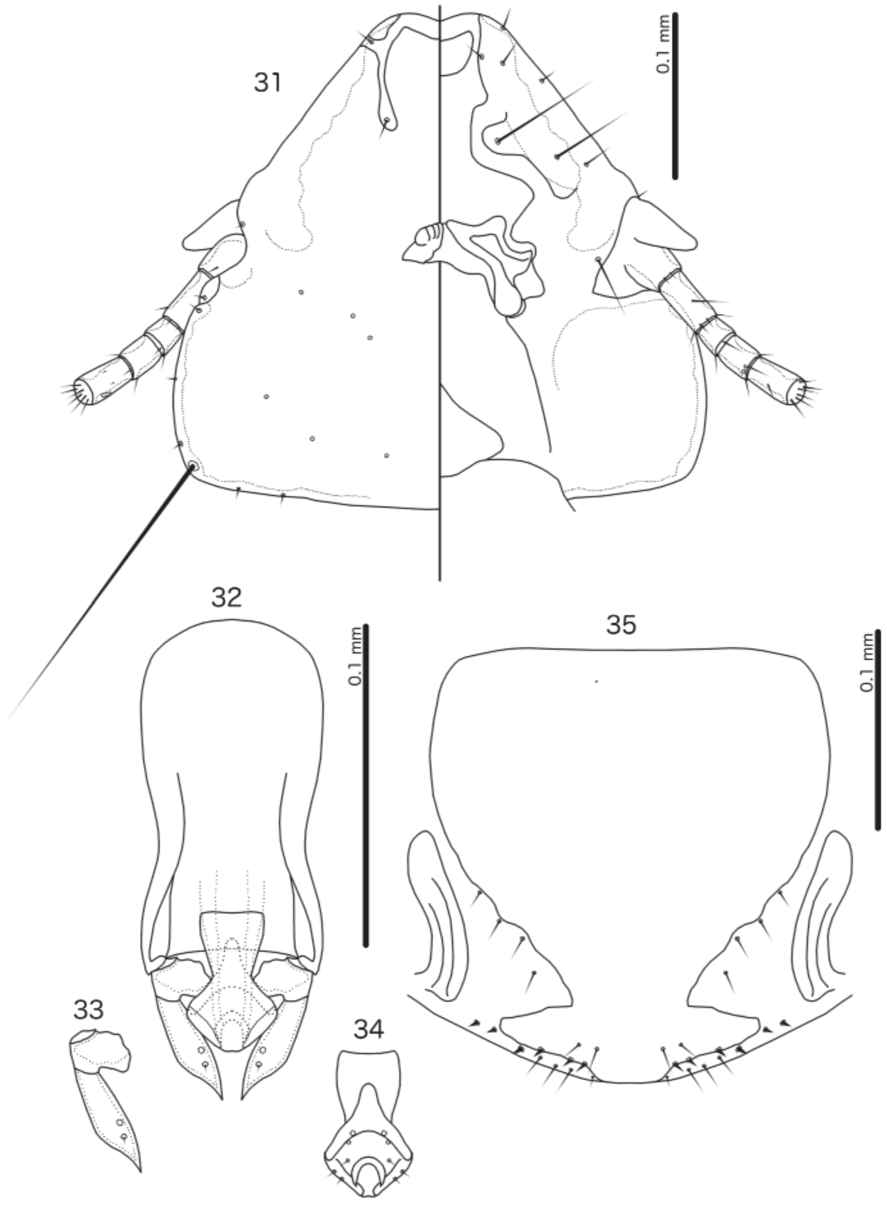
Thoracic and abdominal chaetotaxy as in Fig. 29. Basal apodeme short, constricted distally from mid-length (Fig. 32). Proximal mesosome trapezoidal (Fig. 34). Ventral sclerite slender, anterior end rounded, not thickened, not reaching anterior margin of proximal mesosome. Mesosomal lobes rounded triangular; 3 *ames* sensilla on each side, distal seta on each side apparently longer than two proximal setae; 2 *pmes* microsetae on lateral margins of mesosome. Gonopore deeply crescent shaped. Parameral heads as in Fig. 33. Parameral blades stout, in shape of hunting knife, narrowing only distally; *pst1–2* as in Fig. 33. Measurements as in Table 1.



Figs 29–30. *Guimaraesiella ixi* sp. nov. **29**. Male habitus, dorsal and ventral views. **30**. Female habitus, dorsal and ventral views.

Female

Thoracic and abdominal chaetotaxy as in Fig. 30. Subgenital plate broad in distal end (Fig. 35), with blunt and broad lateral submarginal extensions. Vulval margin curved, with 3–4 short, slender *vms* and 5–7 short, thorn-like *vss* on each side; 5–6 short, slender *vos* on each side of subgenital plate; distal 1–2 *vos* median to *vss*. Measurements as in Table 1.



Figs 31–35. *Guimaraesiella ixi* sp. nov. **31**. Male head, dorsal and ventral views. **32**. Male genitalia, dorsal view. **33**. Male paramere, dorsal view. **34**. Male mesosome, ventral view. **35**. Female subgenital plate and vulval margin, ventral view.

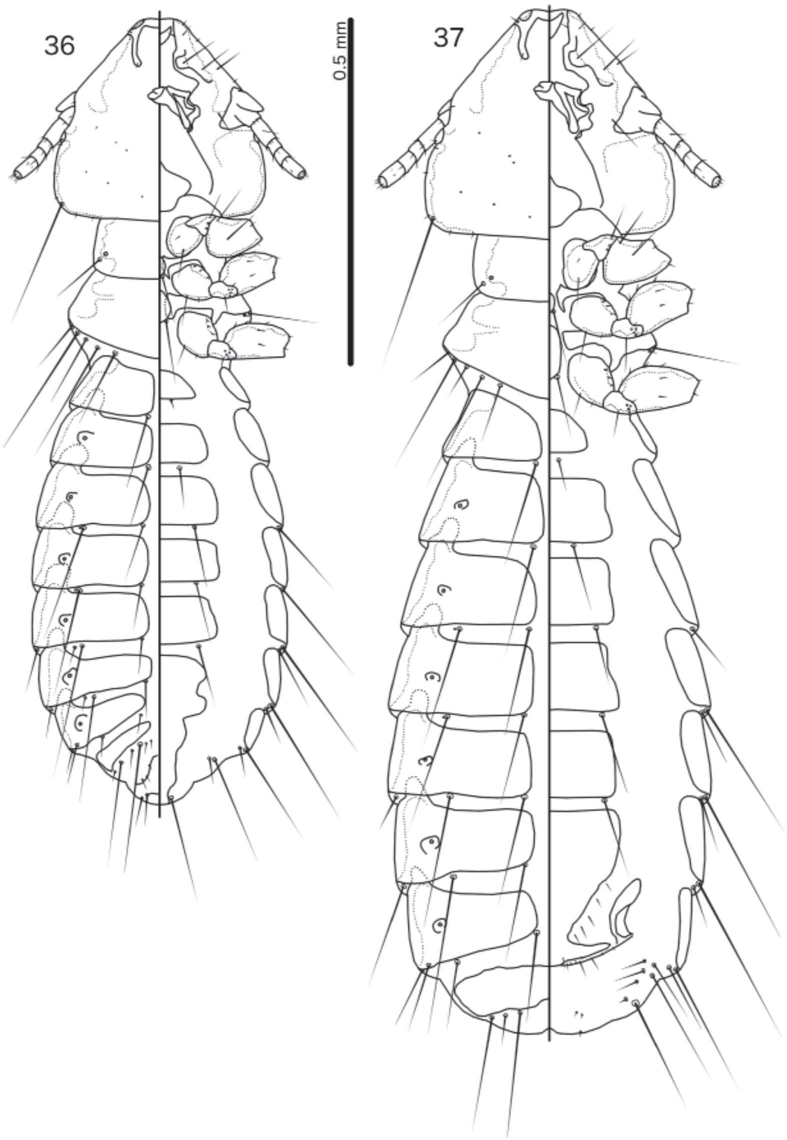
Guimaraesiella caligogularis sp. nov.

urn:lsid:zoobank.org:act:70132E02-5ED3-4988-9EBC-7E1DD2F40FEE
Figs 36–42

Diagnosis

Guimaraesiella caligogularis sp. nov. is most similar to *Guimaraesiella cinnamomea* sp. nov., with which it shares the following characters: dorsal preantennal suture reaches *ads* (Figs 3, 39); male tergopleurites IV–V without *aps*, but tergopleurite VI with *aps* (Figs 1, 36); male tergopleurite VIII with 1 *tps* on each side (Figs 1, 36); proximal mesosome only slightly constricted distally (Figs 6, 41).

These two species can be separated by the following characters: female abdominal segment IV with 1 *ps* on each side in *Gu. caligogularis* sp. nov. (Fig. 37), but without *ps* in *Gu. cinnamomea* sp. nov. (Fig. 2); male abdominal segment V with 2 *ps* on each side in *Gu. cinnamomea* sp. nov. (Fig. 1), but with



Figs 36–37. *Guimaraesiella caligogularis* sp. nov. **36**. Male habitus, dorsal and ventral views. **37**. Female habitus, dorsal and ventral views.

1 *ps* on each side in *Gu. caligogularis* sp. nov. (Fig. 36); anterior extension of ventral sclerite broad in *Gu. caligogularis* sp. nov. (Fig. 41), but narrow in *Gu. cinnamomea* sp. nov. (Fig. 6); distal mesosome more broadly rounded in *Gu. caligogularis* sp. nov. (Fig. 41) than in *Gu. cinnamomea* sp. nov. (Fig. 6).

Etymology

The species name is derived from Latin '*caligo*' for 'dark', and '*gula*' for 'throat', referring to the dark gular plate.

Material examined

Holotype (ex *Pycnonotus plumosus plumosus*)
MALAYSIA • ♂; [Petaling District], Subang [Jaya]; 1 Mar. 1962; M-00947; NHML.

Non-type material (ex *Alophoixus bres tephrogenys* [as *Criniger bres*])
MALAYSIA • 1 ♂, 1 ♀; Terengganu [as Trengganu]; 102º 37′ E, 5º25′ N, 2600 ft a.s.l.; 3 Mar. 1974; Gn. Lawit exped.; Brit. Mus. 1974-2; NHML.

Type host

Pycnonotus plumosus plumosus Blyth, 1845 – olive-winged bulbul.

Other host

Alophoixus bres tephrogenys (Jardine & Selby, 1833) – gray-cheeked bulbul.

Description

Both sexes

Head pentagonal (Fig. 38), lateral margins of preantennal head straight, frons slightly concave. Marginal carina moderate, narrowing anteriorly, median margin slightly irregular. Dorsal anterior plate roughly square-shaped, with shallowly concave anterior margin and slightly convex lateral margins. Ventral anterior plate crescent shaped. Dorsal preantennal suture reaches *ads* and lateral margins of head. Preantennal nodi extended medianly. Head chaetotaxy as in Fig. 38. Coni with convex margins do not reach distal margin of scapes. Temples rounded. Marginal temporal carina moderate, irregular. Thoracic and abdominal segments as in Figs 36–37. Base pigmentation pale brown with slight reddish tint, except preantennal nodi, gular plate, proepimera, metepisterna, and lateral sections of tergopleurites a medium reddish brown. Reddish tint absent in material from *Alophoixus bres tephrogenys*, which is also generally paler.

Male

Thoracic and abdominal chaetotaxy as in Fig. 36. Basal apodeme short, slender, widening distally, slightly constricted at mid-length (Fig. 39). Proximal mesosome broad, trapezoidal (Fig. 41), anterior margin slightly concave, lateral margins converging slightly distally. Ventral sclerite broad, anterior end rounded and nearly reaching proximal margin of mesosome. Mesosomal lobes broad, distal end broadly flattened; 3 *ames* sensilla on each side; 2 *pmes* microsetae on lateral margins of mesosome. Gonopore crescent shaped, lateral margins slightly rugose. Parameral heads as in Fig. 40. Parameral blades broad, narrowing in distal third; *pst1–2* as in Fig. 40. Measurements as in Table 1.

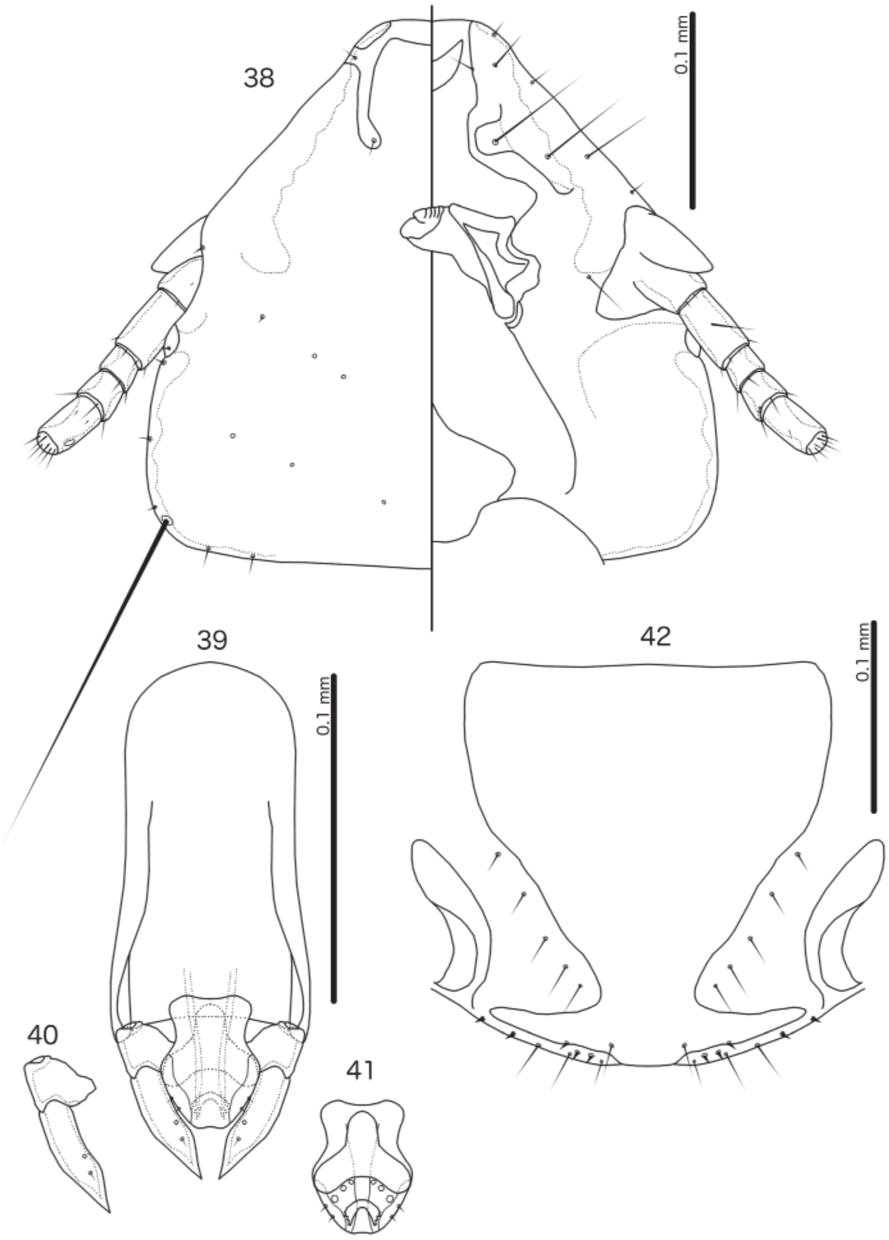
Female

Thoracic and abdominal chaetotaxy as in Fig. 37. Subgenital plate broad distally (Fig. 42), and lateral submarginal extensions almost reach lateral ends of vulval margin. Vulval margin gently rounded (Fig. 42), with 2–3 short, slender *vms* and 5 short, thorn-like *vss* on each side; 3–6 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements as in Table 1.

Remarks

The male specimen from *Al. b. tephrogenys* is indistinguishable from the male from the type host in all characters except pigmentation patterns; the specimens from *Al. b. tephrogenys* are paler than the holotype. We consider these specimens to be conspecific.

A female specimen from the type host (NHML) has a distorted head, and different pigmentation patterns compared to the female from the non-type host, and can therefore not with certainty be identified as *Gu. caligogularis* sp. nov. Illustrations of the female *Gu. caligogularis* sp. nov. are therefore based on the female from *Al. b. tephrogenys*.



Figs 38–42. *Guimaraesiella caligogularis* sp. nov. **38**. Male head, dorsal and ventral views. **39**. Male genitalia, dorsal view. **40**. Male paramere, dorsal view. **41**. Male mesosome, ventral view. **42**. Female subgenital plate and vulval margin, ventral view.

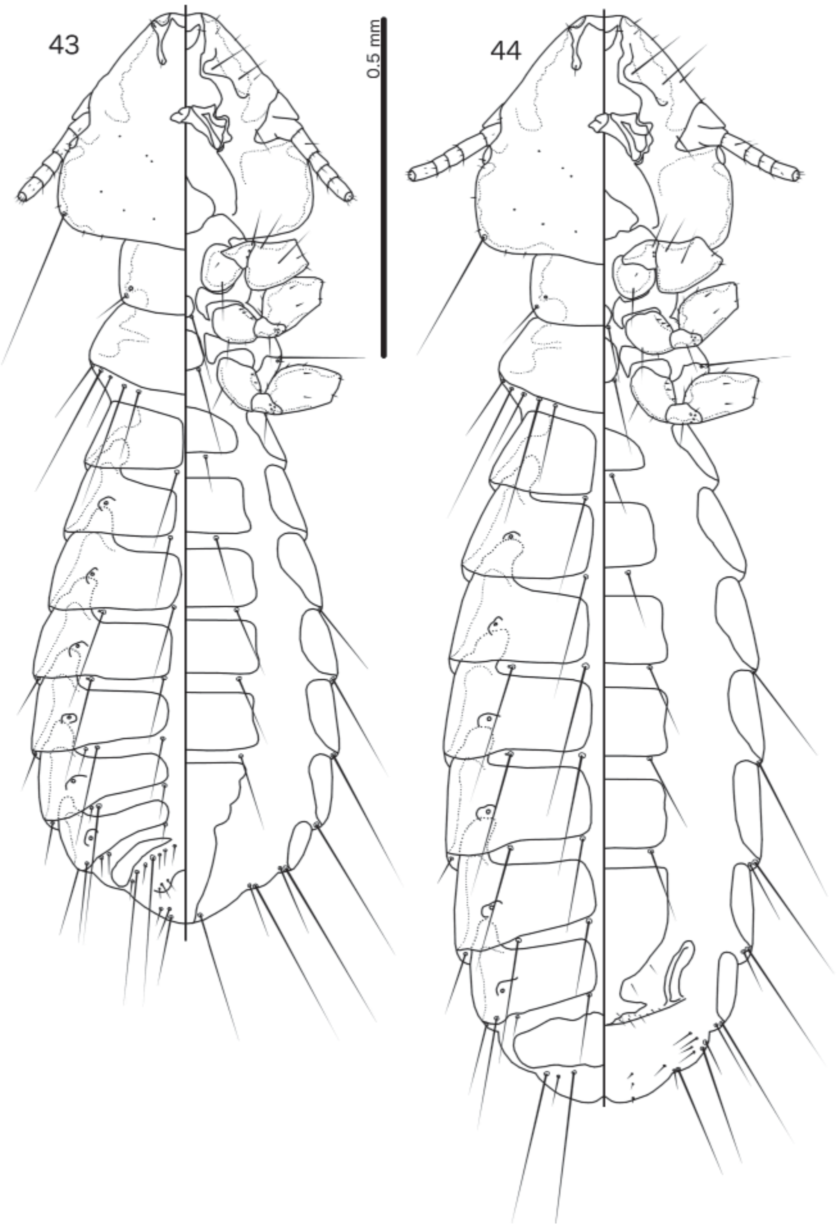
Guimaraesiella phlaoalopha sp. nov.

urn:lsid:zoobank.org:act:E175E798-E94F-4D28-846D-81EA2D0A14C2

Figs 43–49

Diagnosis

Guimaraesiella phlaoalopha sp. nov. is most similar to *Gu. mayoensis* sp. nov., with which it shares the following characters: male tergopleurites IV–V without *aps*, but tergopleurite VI with *aps* (Figs 15, 43); dorsal preantennal suture reaching *ads* (Figs 17, 45); male tergopleurite VIII with 2 *tps* on each side (Figs 15, 43); female abdominal segment IV with at least 1 *ps* on each side (Figs 15, 44).



Figs 43–44. *Guimaraesiella phlaoalopha* sp. nov. **43**. Male habitus, dorsal and ventral views. **44**. Female habitus, dorsal and ventral views.

These two species can be separated by the following characters: abdominal segment IV with 1 *ps* on each side in both sexes in *Gu. phlaoalopha* sp. nov. (Figs 43–44), but with 2 *ps* on each side in *Gu. mayoensis* sp. nov. (Figs 15–16); male abdominal segments VI–VII with 3 *ps* on each side in *Gu. mayoensis* sp. nov. (Fig. 14), but with only 2 *ps* on each side in *Gu. phlaoalopha* sp. nov. (Fig. 43); shape of proximal mesosome and ventral sclerite differs between species (Figs 20, 48), and sclerite with proximal thickening in *Gu. phlaoalopha* sp. nov. (Fig. 48) that is absent in *Gu. mayoensis* sp. nov. (Fig. 20).

Etymology

The species name is derived from '*phlao*', Greek for 'to crush', and '*alophos*', Greek for 'without a crest', referring to the host genus name.

Material examined

Holotype (ex *Alophoixus pallidus henrici*)
CHINA • ♂; Guangxi Province, Shiwandashan National Park; 23 Apr. 2005; [S.E.] Bush and [D.H.] Clayton leg., TJD-6332; P-950; NHML.

Paratypes
CHINA • 1 ♀; same collection data as for holotype; NHML • 1 ♂, 1 ♀; same collection data as for holotype; PIPR • 1 ♀; same locality and collectors as for holotype; 16 Apr. 2005; TJD-6185; P-705; PIPR • 2 ♂♂; same locality and collectors as for holotype; 2 May 2005; MBR-6747; P-793; PIPR.

Type host

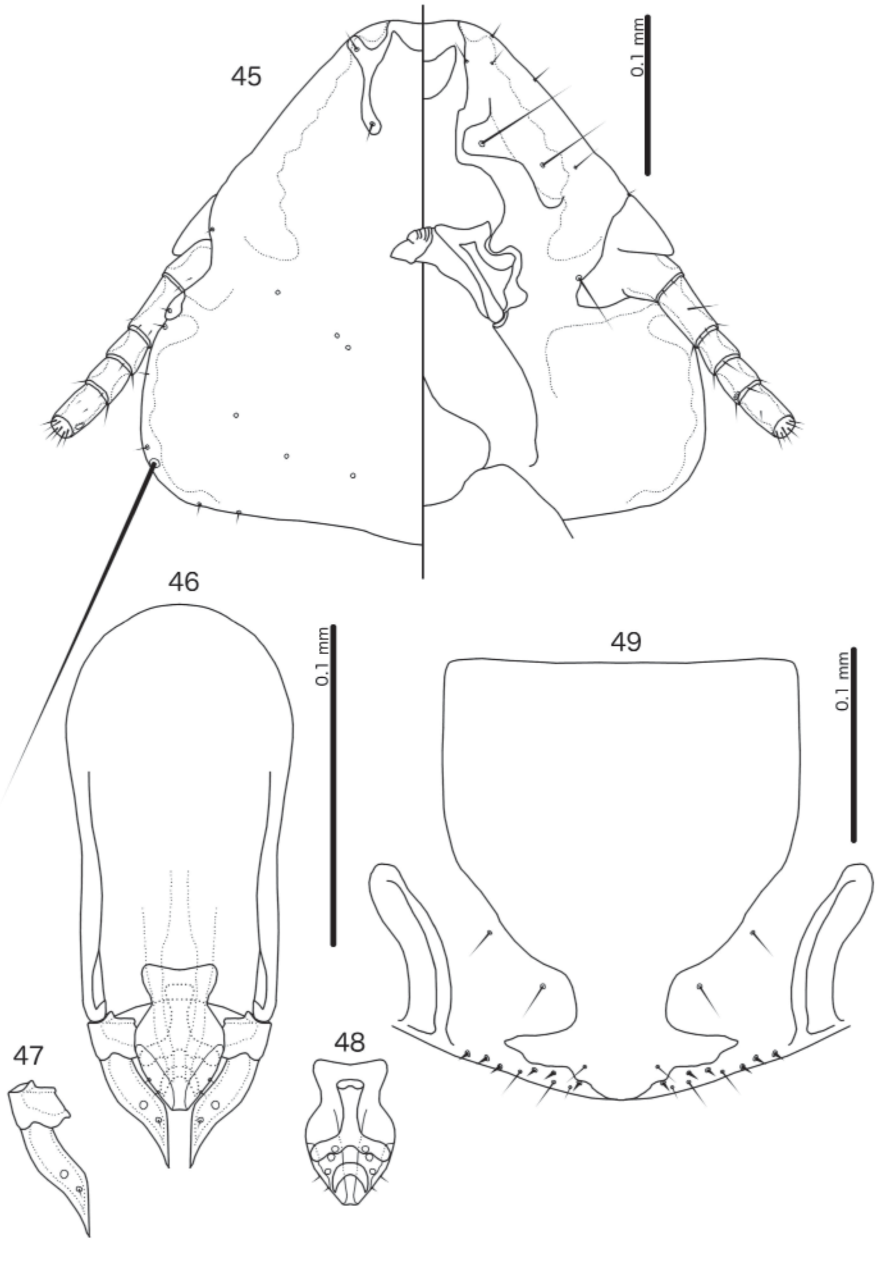
Alophoixus pallidus henrici (Oustalet, 1896) – puff-throated bulbul.

Description

Both sexes
Head pentagonal (Fig. 45), lateral margins of preantennal head slightly convex, frons straight to slightly concave. Marginal carina gradually narrowing anteriorly, with irregular inner margin. Dorsal preantennal suture reaches *ads* and *dsms*, but does not reach lateral margin of head. Dorsal anterior plate broad, with deeply concave anterior margin and convex lateral margins. Ventral anterior plate broadly crescent shaped. Preantennal nodi extended medianly. Head chaetotaxy as in Fig. 45. Coni do not reach distal margin of scapes. Temples rounded. Temporal marginal carina slender, irregular. Thoracic and abdominal segments as in Figs 43–44. Base pigmentation pale yellow, darkening slightly on marginal carina, gular plate, proepimera, metepisterna, and lateral sections of tergopleurites.

Male
Thoracic and abdominal chaetotaxy as in Fig. 43. Basal apodeme widened and rounded anteriorly (Fig. 46), lateral margins straight to slightly constricted at mid-length. Proximal mesosome broad (Fig. 48), narrowing distally, with shallowly concave anterior margin. Ventral sclerite reaching to near proximal margin of mesosome, thickened anteriorly. Mesosomal lobes long but narrow, gently rounded; 3 *ames* sensilla on each side; 2 *pmes* microsetae on lateral margins of mesosome. Gonopore widely crescent shaped. Parameral heads as in Fig. 47. Parameral blades elongated distally; *pst1–2* as in Fig. 47. Measurements as in Table 1.

Female
Thoracic and abdominal chaetotaxy as in Fig. 44. Subgenital plate with wide, irregular lateral submarginal extensions and broad stalk between the main and terminal part (Fig. 49). Vulval margin gently rounded, slightly flattened medianly (Fig. 49), with 3 short, slender *vms* and 4–6 short, thorn-like *vss* on each side; 3 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements as in Table 1.



Figs 45–49. *Guimaraesiella phlaoalopha* sp. nov. **45**. Male head, dorsal and ventral views. **46**. Male genitalia, dorsal view. **47**. Male paramere, dorsal view. **48**. Male mesosome, ventral view. **49**. Female subgenital plate and vulval margin, ventral view.

Genus ***Brueelia*** Kéler, 1936

Philopterus Nitzsch, 1818: 288 (in partim).
Nirmus Nitzsch, 1818: 291 (in partim).
Degeeriella Neumann, 1906: 60 (in partim).
Painjunirmus Ansari, 1947: 285.
Allobrueelia Eichler, 1951: 36 (in partim).
Nigronirmus Złotorzycka, 1964: 248.
Spironirmus Złotorzycka, 1964: 261.

Serinirmus Soler Cruz *et al.*, 1987: 244.
Plesionirmus Mey, 2017: 144.
Neosittiella Mey, 2017: 149.

Type species

Brueelia rossittensis Kéler, 1936: 257 [= *Nirmus brachythorax* Giebel, 1874: 134] (by original designation).

Brueelia alophoixi **species group**

Diagnosis

Species in the *Brueelia alophoixi* species group can be distinguished from other species of *Brueelia* by the following combination of characters: post-antennal head sensillum *s4* present (Fig. 52); thumb-like projection from the ventral carina into the clypeo-labral suture anteriorly (Fig. 52); *ss* present on female tergopleurite VIII (Fig. 51); lateral and median folds of the distal mesosome absent (Fig. 55).

Geographical distribution

Africa, and South and East Asia.

Host associations

All species except one are known from hosts in the Pycnonotidae (see below).

Remarks

Mey & Barker (2014: 79) mention a *Brueelia guldum* species group, which they defined as "narrow-headed". No other species was included in this *guldum*-group, which was only compared with species now placed in *Guimaraesiella* (see above). Not all morphological characters defining the *Br. alophoixi* species group can be seen in the illustrations of *Br. guldum* Ansari, 1955 (Ansari 1958a), and we only tentatively include this species in the *Br. alophoixi* species group. For this reason, we here refer to the group of *Brueelia* living on bulbuls as the *Br. alophoixi* species group here.

The specimens of the *Brueelia alophoixi* species group included in the phylogeny of Bush *et al.* (2016: fig. 3e, clade I-2) formed a monophyletic group with good support. This included both specimens from African and Asian hosts, reinforcing the morphological similarity among *Brueelia* species from bulbuls in both faunal regions.

Brueelia alophoixi Sychra in Sychra *et al.*, 2009

Brueelia alophoixi Sychra in Sychra *et al.*, 2009: 155.

Material examined

Paratypes (ex *Alophoixus pallidus*)
VIETNAM • 4 ♀♀; Bac Kan Province, Ba Be National Park, Bo Lu; 6 Jul. 2008; I. Literák, N.M. Hung and P. Podzemny leg.; ID O. Sychra-V01–04; MMBC.

Type host

Alophoixus pallidus (Swinhoe, 1870) – puff-throated bulbul.

Type locality

Bo Lu, Ba Be National Park, Bac Kan province, Vietnam.

Remarks

The original description of *Br. alophoixi* depicted the female without a cross-piece along the vulval margin. We have re-examined the paratypes of this species, and found that a cross-piece is present. The cross-piece and connection to the subgenital plate of *Br. alophoixi* is similar to that of *Brueelia galatea* sp. nov. (Fig. 84), but the connection is in general a bit broader, and the cross-piece somewhat narrower medianly.

Brueelia guldum Ansari, 1955

Brueelia guldum Ansari, 1955: 54.

Brueelia guldum – Ansari 1956: 394 (unnecessary redescription as a new species). — Ansari 1958a: 49 (unnecessary redescription as a new species).

Type host

Pycnonotus cafer intermedius Blyth, 1846 – red-vented bulbul.

Type locality

Pakistan, specific location not given.

Remarks

Ansari (1955, 1956, 1958a) published this species as new three times. None of these descriptions are very detailed, and only the 1958 description includes illustrations. In these illustrations, the thumb-like processes of the ventral carinae are not evident, and there are no *ss* on the female tergopleurite VIII. However, Ansari's illustrations are often incorrect and incomplete; for instance, in the illustrations for *Br. guldum*, there is no cross-piece along the vulval margin (Ansari 1958a: fig. 22), no *sts* on abdominal segment II (ibid., fig. 16), no dorsal head setae (Ansari 1958a: fig. 16), and no setae in the area posterior to the vulval margin Ansari 1958a: fig. 23). These characters are present in all species of *Brueelia*, and would be expected also for *Br. guldum*. Ansari's specimens are presumed lost (Naz *et al.* 2020), and new material from the type host is needed to evaluate whether or not this species belongs in the *Br. alophoixi* species group. Based on gross morphology and host associations, we tentatively include *Br. guldum* in the *Br. alophoixi* species group, but this needs confirmation.

Brueelia schoddei (Mey, 2017)

Plesionirmus schoddei Mey, 2017: 145 species inquirenda.

Brueelia schoddei – Gustafsson *et al*. 2019b: 266.

Type host

Manorina melanocephala (Latham, 1802) – noisy miner, erroneous host.

Type locality

Dresden, Germany (captive host).

Remarks

Brueelia schoddei was originally described from *Manorina melanocephala*, a honeyeater (Meliphagidae Vigors, 1825) kept in captivity in Germany. As argued by Gustafsson *et al*. (2019b), the morphological characters of this species indicate that it belongs in the *Br. alophoixi* species group, suggesting that the natural host of this species is a bulbul. The association of *Br. schoddei* with *Ma. melanocephala* was most likely caused by straggling from another bird kept in captivity. A second species of *Brueelia* belonging to the same '*Plesionirmus*' group was mentioned by Mey (2017: 145) having been collected from skins of the same honeyeater species from South Australia. No bulbuls are native to Australia, but the red-whiskered bulbul, *Pycnonotus jocosus* (Linnaeus, 1758), has been introduced to New South Wales (Paton 1985) and is locally common in Southeast Australia (Menkhorst *et al*. 2017). It is possible that this specimen is a straggler from a red-whiskered bulbul, but no details were given by Mey (2017), other than the statement that this specimen was not conspecific with *Br. schoddei*.

We have examined material of the *Brueelia*-complex from 28 species of honeyeaters from across their range, including lice from *Ma. melanocephala*. None of these lice belonged to the genus *Brueelia*. Genera in the *Brueelia*-complex that naturally occur on honeyeaters are *Guimaraesiella* Eichler, 1949, *Melibrueelia* Valim & Palma, 2014, *Aratricerca* Gustafsson & Bush, 2017, and *Melinirmus* Mey, 2017.

Attempts to contact Eberhard Mey to examine his specimens, or to get more information about their morphology, have not been productive. Specimens described by Mey (2017) will supposedly be deposited in the Zentralmagasin Naturwissenschaftlicher Sammlungen Halle/Saale, but they are currently not available. Ultimately, an examination of the type specimens of this species, and the specimen collected from a noisy miner in the wild, will be necessary to establish the true identity of *Br. schoddei*, and to establish the natural host of this species.

Brueelia doisuthepensis sp. nov.

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Figs 50–56

Diagnosis

Brueelia doisuthepensis sp. nov. is most similar to *Brueelia yunnanensis* sp. nov., with which it shares the following characters: abdominal segment IV with 1 *ps* on each side in both sexes (Figs 50–51, 99–100); abdominal segment VII with 2 *ps* on each side in both sexes (Figs 50–51, 99–100); female abdominal segment VI with 1 *ps* on each side (Figs 51, 100); male tergopleurite IV without *aps* (Figs 50, 99); male tergopleurite VIII with 1 *tps* on each side (Figs 50, 99); proximal mesosome rectangular (Figs 55, 104).

These two species can be separated by the following characters: differences in head shape (Figs 52, 101); rugose area of mesosome covering more than half of mesosomal lobes in *Br. doisuthepensis* sp. nov. (Fig. 55), but covering only distal margin of mesosomal lobes in *Br. yunnanensis* sp. nov. (Fig. 104); gonopore more slenderly crescent shaped in *Br. doisuthepensis* sp. nov. (Fig. 55) than in *Br. yunnanensis* sp. nov. (Fig. 104); proximal part of parameres more elongated in *Br. doisuthepensis* sp. nov. (Fig. 54) than in *Br. yunnanensis* sp. nov. (Fig. 103); female subgenital plate with distinct distal 'neck' connecting plate to cross-piece in *Br. doisuthepensis* sp. nov. (Fig. 56), but with shorter connection in *Br. yunnanensis* sp. nov. (Fig. 105). Apparent differences in female vulval chaetotaxy may be due to the small number of specimens examined, and may overlap.

Etymology

The species name is derived from the type locality.

Material examined

Holotype (ex *Alophoixus ochraceus ochraceus*)
THAILAND • ♂; Chiang Mai Province, Doi Su Thep; 10 Apr. 1962; K. Thonglongya leg.; 745; BPBM.

Paratypes

THAILAND • 1 ♀; same collection data as for holotype; BPBM.

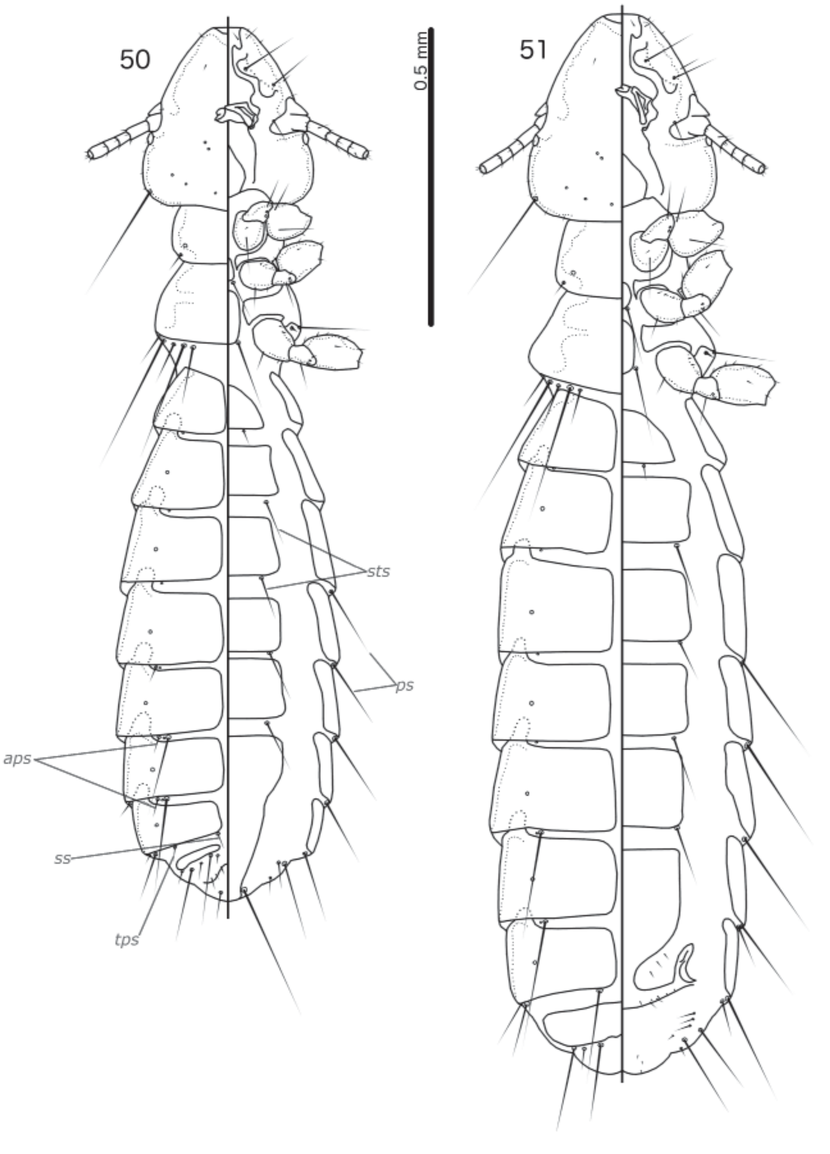
Type host

Alophoixus ochraceus ochraceus (Moore, 1858) – ochraceous bulbul (*ochraceus*).

Description

Both sexes

Head flat dome-shaped (Fig. 52), lateral margins of preantennal area convex, frons broadly flattened. Marginal carina slender, shallowly displaced and translucent at osculum, median margin of lateral sections weakly undulated. Ventral anterior plate not pigmented and therefore not visible. Head chaetotaxy as in Fig. 52; *pos* located far behind eye. Lateral margins of postantennal head more or less parallel, temples

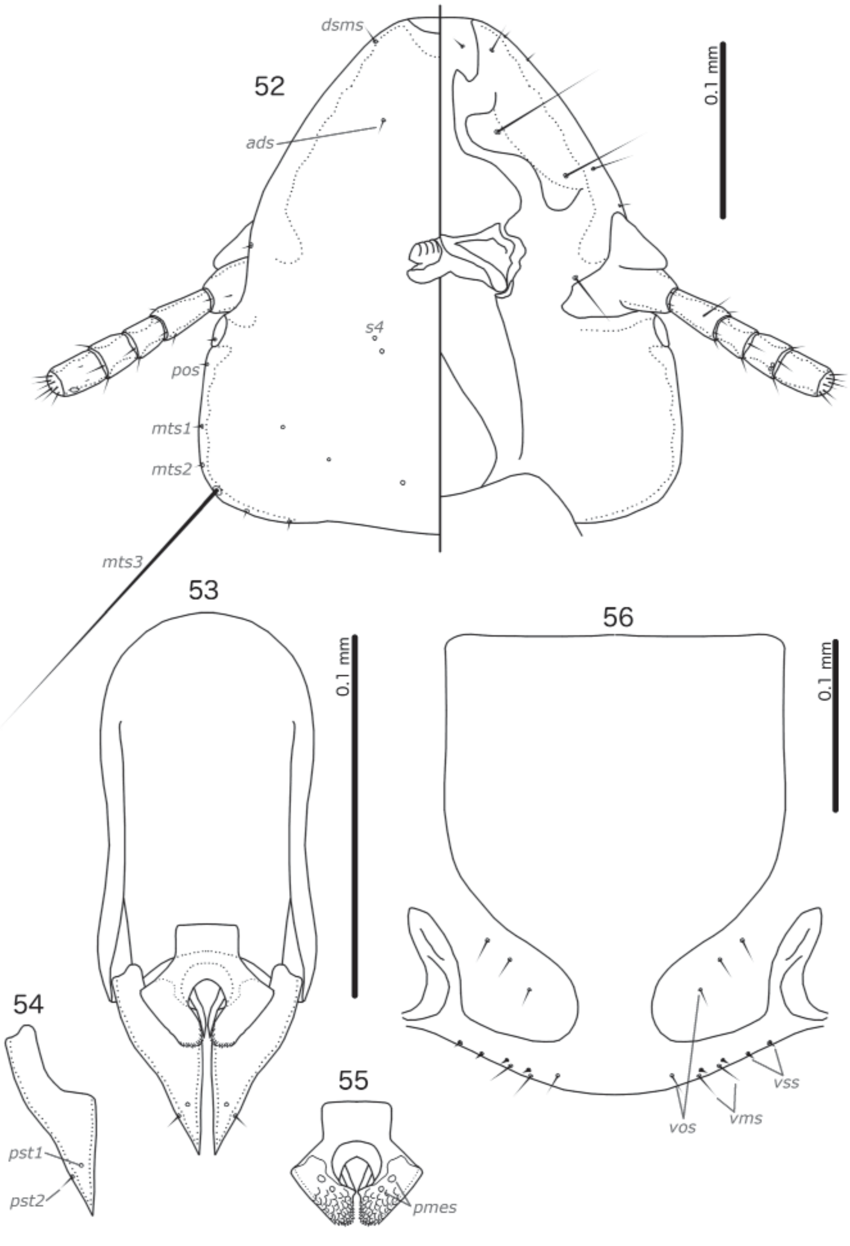


Figs 50–51. *Brueelia doisuthepensis* sp. nov. **50**. Male habitus, dorsal and ventral views. **51**. Female habitus, dorsal and ventral views. Abbreviations: *aps* = accessory post-spiracular seta; *ps* = paratergal seta; *ss* = sutural seta; *sts* = sternal seta; *tps* = tergal posterior seta.

rounded, occiput slightly rounded. Thoracic and abdominal segments as in Figs 50–51. Pigmentation nearly uniform, pale yellow, but marginal carina, preantennal nodi, proepimera, metepisterna, and lateral sections of tergopleurites slightly darker.

Male

Thoracic and abdominal chaetotaxy as in Fig. 50; *ss* not visible on segments V–VII in single examined male, but may be present. Basal apodeme short and broad (Fig. 53), only slightly constricted at mid-



Figs 52–56. *Brueelia doisuthepensis* sp. nov. **52**. Male head, dorsal and ventral views. **53**. Male genitalia, dorsal view. **54**. Male paramere, dorsal view. **55**. Male mesosome, ventral view. **56**. Female subgenital plate and vulval margin, ventral view. Abbreviations: *ads* = anterior dorsal seta; *dsms* = dorsal submarginal seta; *mts1–3* = marginal temporal seta 1–3; *pmes* = posterior mesosomal seta; *pos* = preocular seta; *pst1–2* = parameral setae 1–2; *s4* = postantennal head sensillum 4; *vms* = vulval marginal setae; *vos* = vulval oblique setae; *vss* = vulval submarginal setae.

length. Proximal mesosome roughly rectangular (Fig. 55), not visibly narrowed posteriorly. Mesosomal lobes broad, intensely rugose in medio-distal end, and with most of ventral surface scaly; 2 *pmes* sensilla latero-distal to gonopore. Gonopore crescent shaped, with no lateral extensions. Penile arms do not reach beyond distal margin of mesosomal lobes. Parameres elongated distally (Fig. 54); *pst1–2* as in Fig. 54. Measurements as in Table 1.

Female

Abdomen of single examined female slightly distorted, and here illustrated approximately. Thoracic and abdominal chaetotaxy as in Fig. 51. Subgenital plate as in Fig. 56, with 2 short, slender *vms* and 4 short, thorn-like *vss* on each side; 4 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements as in Table 1.

Brueelia hermetica sp. nov.

urn:lsid:zoobank.org:act:77AEF596-6D93-4B3C-8D65-54ECAFD28188

Figs 57–63

Diagnosis

Brueelia hermetica sp. nov. is one of only two species in the *Br. alophoixi* species group in which males lack *ps* on abdominal segment IV, the other being *Br. robertrankini* sp. nov. These two species can be separated by the following characters: male tergopleurite V with *ss* and *aps* in *B. robertrankini* sp. nov. (Fig. 64), but without these setae in *Br. hermetica* sp. nov. (Fig. 57); male tergopleurite VIII with *tps* in *Br. hermetica* sp. nov. (Fig. 57), but without *tps* in *Br. robertrankini* sp. nov. (Fig. 64); head of *Br. hermetica* sp. nov. flat dome-shaped (Fig. 57), but that of *Br. robertrankini* sp. nov. rounded pentagonal (Fig. 66); proximal mesosome, mesosomal lobes, and gonopore of different shapes (Figs 62, 69); parameres proportionately much longer in *Br. robertrankini* sp. nov. (Fig. 68) than in *Br. hermetica* sp. nov. (Fig. 61); female abdominal segment VII with 2 *ps* on each side in *Br. robertrankini* sp. nov. (Fig. 65), but with only 1 *ps* on each side in *Br. hermetica* sp. nov. (Fig. 58); female subgenital plate and vulval margin of different shape in the two species (Figs 63, 70; note that parts of the subgenital plate of *Br. hermetica* sp. nov. are very poorly sclerotized in examined specimens, and here illustrated approximately).

Etymology

The species epithet is in reference to the similarity in shape between the head and the proximal mesosome, in correspondence with the Hermetic maxim 'as above, so below'. The name is ultimately derived from Hermes, the Greek herald and messenger of the gods, the namesake of Hermes Trismegistus, the thrice-greatest Hermes, who is the purported author of the Emerald Tablets in which this maxim is inscribed.

Material examined

Holotype (ex *Pycnonotus barbatus layardi*)

SOUTH AFRICA • ♂; Transvaal, Pretoria; 2 Aug. 1969; Brit. Mus. 1972–19; NHML.

Paratypes

SOUTH AFRICA • 3 ♂♂, 4 ♀♀; same collection data as for holotype; NHML.

Type host

Pycnonotus barbatus layardi Gurney, 1879 – common bulbul.

Description

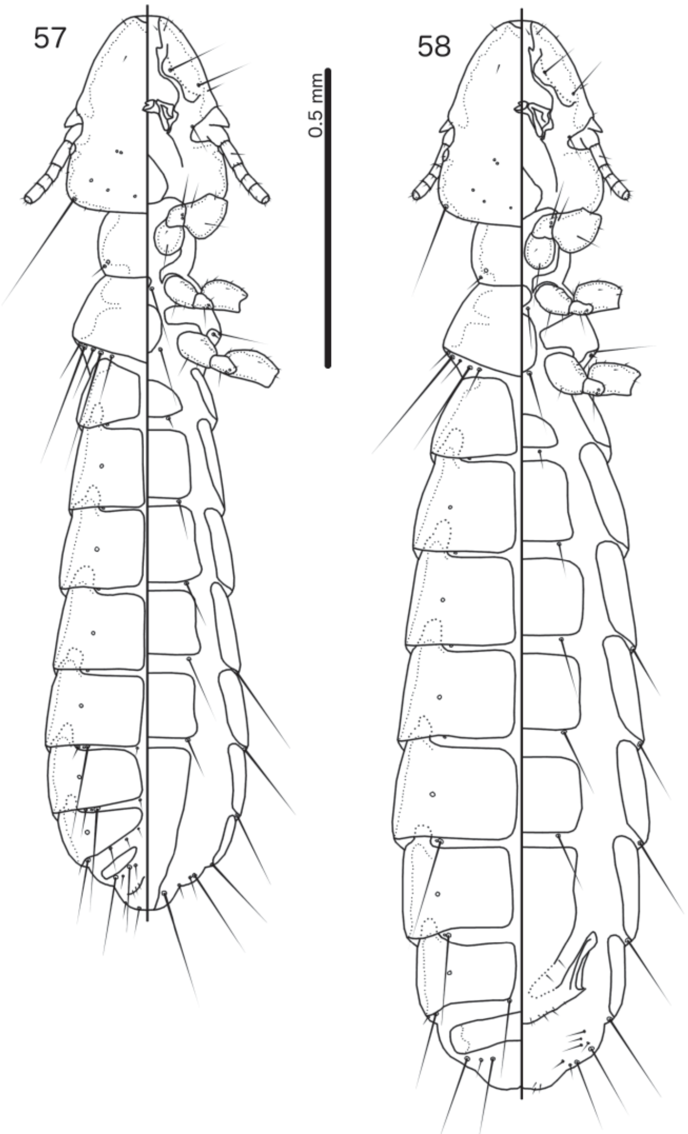
Both sexes

Head flat dome-shaped (Fig. 59), lateral margins of preantennal area convex, frons rounded to slightly flattened. Marginal carina of moderate, uneven, width, deeply displaced but not widened at osculum.

Ventral anterior plate not visible. Ventral carinae with small median 'thumbs' near anterior end of pulvinus. Head chaetotaxy as in Fig. 59; *pos* situated behind eye. Preantennal nodi moderate, bulging. Pre- and postocular nodi of similar size. Marginal temporal carina of moderate, uneven, width. Gular plate lanceolate. Thoracic and abdominal segments as in Figs 57–58. Base pigmentation translucent; marginal and marginal temporal carina, head nodi, anterior margins of antennal sockets, proepimera, metepisterna, and lateral margins of tergopleurites medium brown.

Male

Thoracic and abdominal chaetotaxy as in Fig. 57; abdominal segment IV without *ps*; tergopleurite V without *ss* and *aps*. Basal apodeme short and broad, not constricted medianly (Fig 60). Proximal mesosome broadly bell-shaped, anteriorly rounded, elongated (Fig. 62). Mesosomal lobes narrow, angled at mid-length, with rugose fringe along distal margin; 2 *pmes* on each side lateral to gonopore. Gonopore wider than long, somewhat angular, without lateral extensions. Penile arms reach beyond

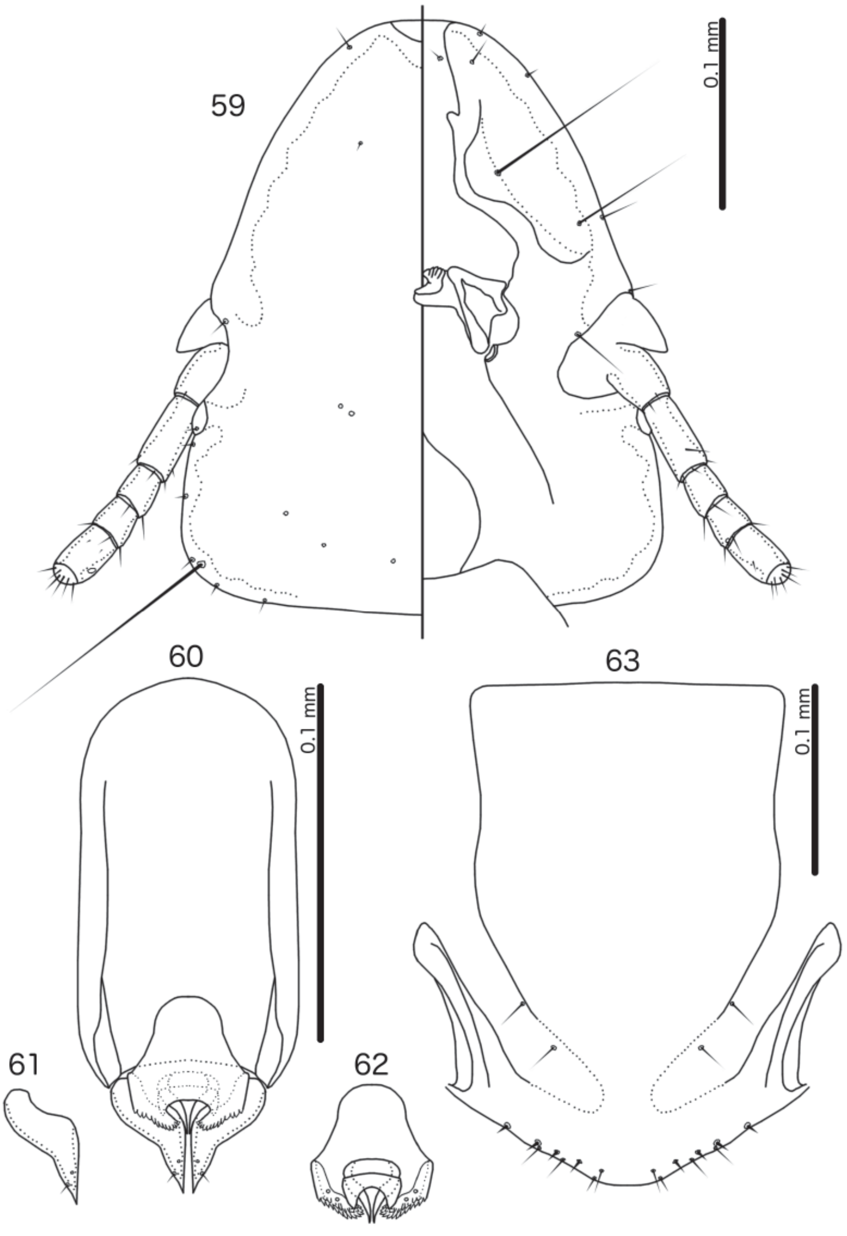


Figs 57–58. *Brueelia hermetica* sp. nov. **57**. Male habitus, dorsal and ventral views. **58**. Female habitus, dorsal and ventral views.

distal margin of mesosome. Parameres proportionately short, slightly elongated distally, with distinct angle at mid-length (Fig. 61); *pst1–2* as in Fig. 61. Measurements as in Table 1.

Female

Thoracic and abdominal chaetotaxy as in Fig. 58. Subgenital plate slender, probably connected to cross-piece by narrow neck, but this section poorly sclerotized in examined specimens and illustrated approximately based on what can be seen (Fig. 63). Vulval margin centrally distinctly rounded, with straight oblique lateral parts, 3–4 short, slender *vms* and 4–5 short, thorn-like *vss* on each side; 3–4 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements as in Table 1.



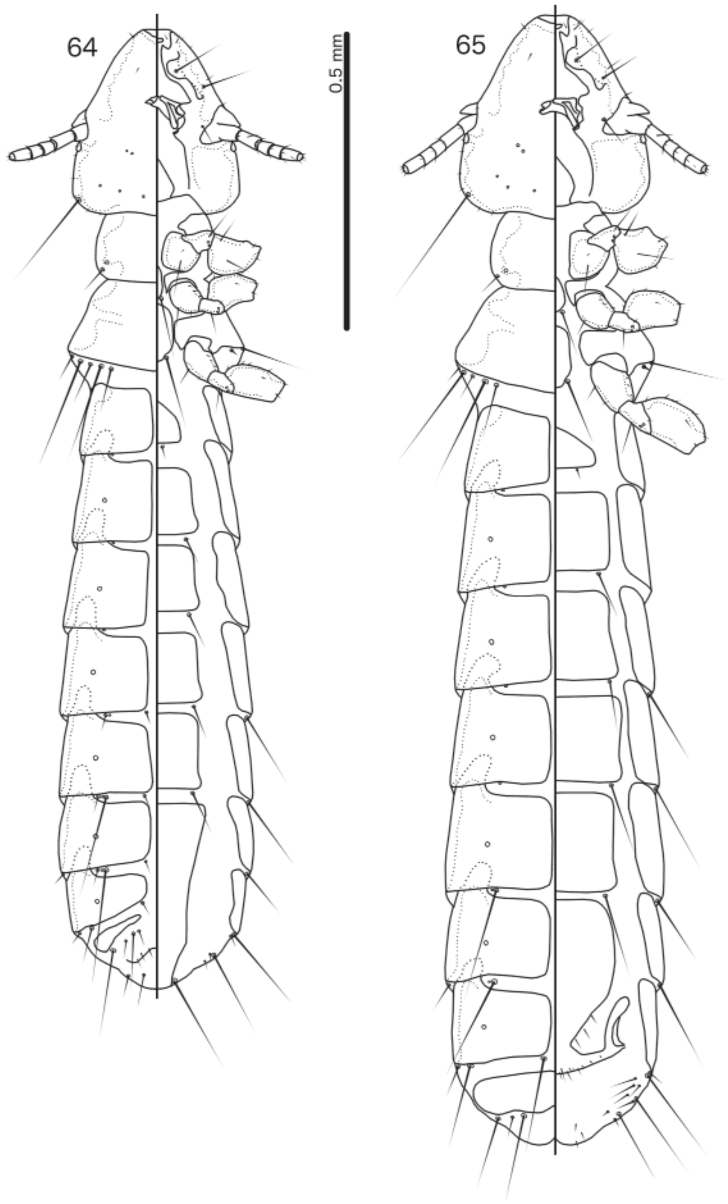
Figs 59–63. *Brueelia hermetica* sp. nov. **59**. Male head, dorsal and ventral views. **60**. Male genitalia, dorsal view. **61**. Male paramere, dorsal view. **62**. Male mesosome, ventral view. **63**. Female subgenital plate and vulval margin, ventral view.

Brueelia robertrankini sp. nov.

urn:lsid:zoobank.org:act:A7B7512D-23D8-4904-857A-F97A1077C631
Figs 64–70

Diagnosis

Brueelia robertrankini sp. nov. is most similar to *Br. colindalei* sp. nov., with which it shares the medianly pointed proximal mesosome (Figs 69, 90), the rounded pentagonal head (Figs 66, 87), and most characters of the abdominal chaetotaxy (Figs 64–65, 85–86). These two species can be separated by the following characters: abdominal segment IV in males without *ps* in *Br. robertrankini* sp. nov. (Fig. 64), but with *ps* in *Br. colindalei* sp. nov. (Fig. 85); male tergopleurite VIII without *tps* in *Br. robertrankini* sp. nov. (Fig. 64), but with *tps* in *Br. colindalei* sp. nov. (Fig. 85); female abdominal segment IV in *Br. robertrankini* sp. nov. with *ps* (Fig. 65), but without *ps* in *Br. colindalei* sp. nov.



Figs 64–65. *Brueelia robertrankini* sp. nov. **64**. Male habitus, dorsal and ventral views. **65**. Female habitus, dorsal and ventral views.

(Fig. 86); proximal mesosome and mesosomal lobes on different shapes (Figs 69, 90); parameres much longer in *Br. robertrankini* sp. nov. (Fig. 68) than in *Br. colindalei* sp. nov. (Fig. 89); female genitalia of *Br. colindalei* sp. nov. imperfectly known (see below), but subgenital plate appears to be broader and vulval margin more rounded in *Br. robertrankini* sp. nov. (Fig. 70) than in *Br. colindalei* sp. nov. (Fig. 91).

Etymology

The species name is in honor of the British author Robert Rankin (not to be confused with the other Robert Rankin), as a heartfelt thank-you for the many far-fetched books he has written. These have provided the first author with endless joy over the last decades; moreover, it is a fact well known to those who know it well that 2021 marks the 40th anniversary of Rankin as a published author. Thus, given the specific name of the host, an associated louse named *Brueelia robertrankini* sp. nov. seems apropos, if you know what we mean (and we are sure that you do).

Material examined

Holotype (ex *Pycnonotus jocosus jocosus*)
THAILAND • ♂; Chieng Mai Province, Doi Pha Hom Pok; 24 Nov. 1965; Maps. 2712; BPBM.

Paratypes (ex *Pycnonotus jocosus pattani*)
CHINA • 2 ♂♂, 2 ♀♀; Guangxi Province, Shiwandashan National Park; 4 May 2005; [S.E.] Bush and [D.H.] Clayton leg.; MBR-6761; P-783; PIPR • 1 ♂; same locality, date and collectors as for preceding; MBR-6758; P-776; PIPR • 1 ♀; same locality and collectors as for preceding; 23 Apr. 2005; MBR-6704; P-946; PIPR [slide also contains an unidentified *Brueelia* s. str. ♀] • 1 ♀; same locality and collector as for preceding; TJD-6231; P-948; PIPR.

Type host

Pycnonotus jocosus jocosus (Linnaeus, 1758) – red-whiskered bulbul.

Other hosts

Pycnonotus jocosus pattani Deignan, 1948.

Description

Both sexes
Head convex rounded pentagonal (Fig. 66), lateral margins of preantennal area convex, frons flattened to slightly concave. Marginal carina gradually narrowing anteriorly, moderately displaced and translucent but not widened at osculum; lateral sections with distinct undulations of median margins. Ventral anterior plate flattened oval, with brown pigmentation. Head chaetotaxy as in Fig. 66; *pos* located far behind eye. Temples rounded, occiput convex. Thoracic and abdominal segments as in Figs 64–65. Pigmentation generally very pale brown, except marginal and temporal marginal carinae, preantennal, preocular, and postocular nodi, proepimera, metepisterna, and lateral tergopleurites moderate brown.

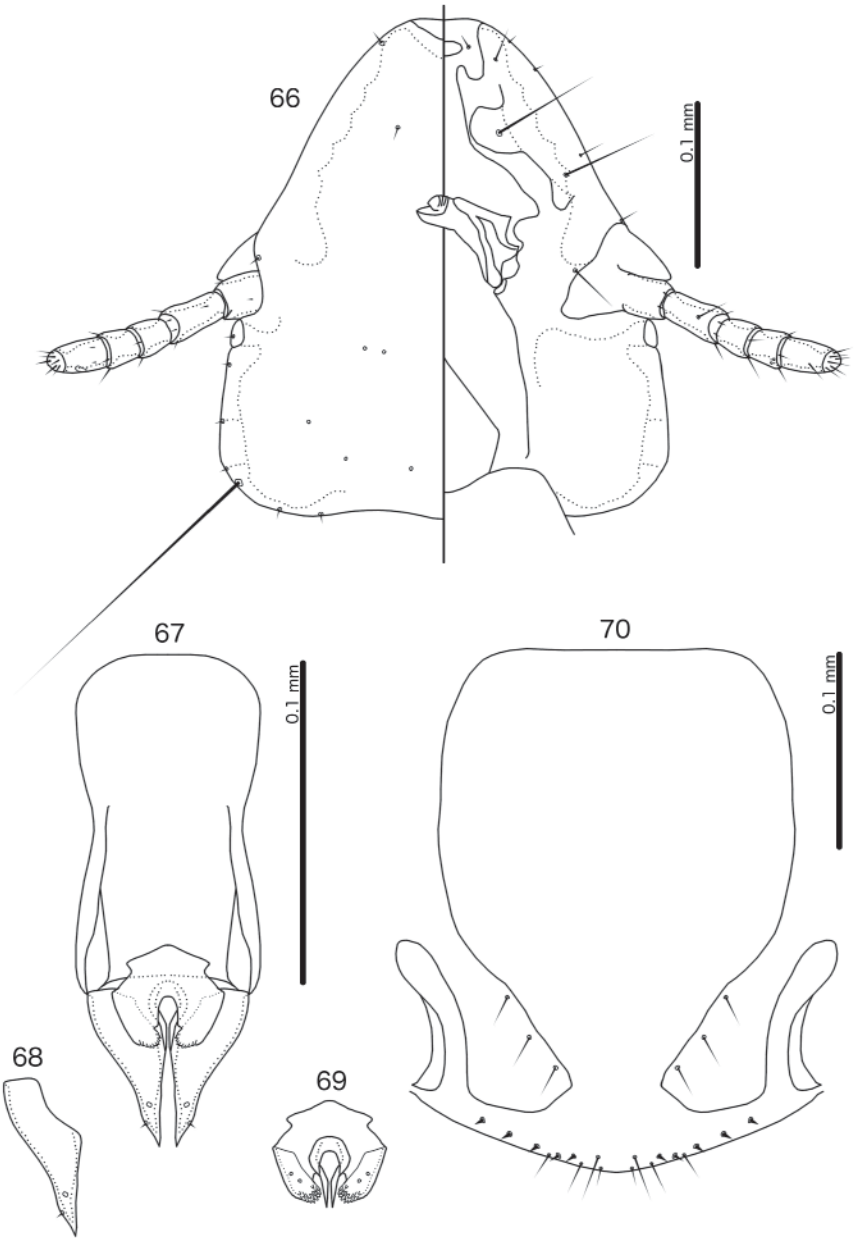
Male
Thoracic and abdominal chaetotaxy as in Fig. 64. Basal apodeme short (Fig. 67), constricted at mid-length, with straight anterior margin. Proximal mesosome broad, anterior margin convergent to median point, its distal constriction creating small lateral protrusions (Fig. 69). Mesosomal lobes broad, somewhat elongated, with moderately rugose postero-median margins; 2 *pmes* sensilla latero-distal to gonopore. Gonopore crescent shaped, with distal margin deeply concave; no lateral extensions. Penile arms reach distal to mesosomal lobes. Parameres elongated distally, narrowing markedly near distal tips; *pst1–2* as in Fig. 68. Measurements as in Table 1.

Female

Thoracic and abdominal chaetotaxy as in Fig. 65. Subgenital plate barrel-shaped, with almost quadratic anterior half (Fig. 70), distal connection to cross-piece broad. Vulval margin gently rounded (Fig. 70), with 2–3 short, slender *vms* and 4–7 short, thorn-like *vss* on each side; 3–4 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements as in Table 1.

Remarks

No significant differences have been found between material from the two host subspecies.



Figs 66–70. *Brueelia robertrankini* sp. nov. **66**. Male head, dorsal and ventral views. **67**. Male genitalia, dorsal view. **68**. Male paramere, dorsal view. **69**. Male mesosome, ventral view. **70**. Female subgenital plate and vulval margin, ventral view.

Brueelia celer sp. nov.

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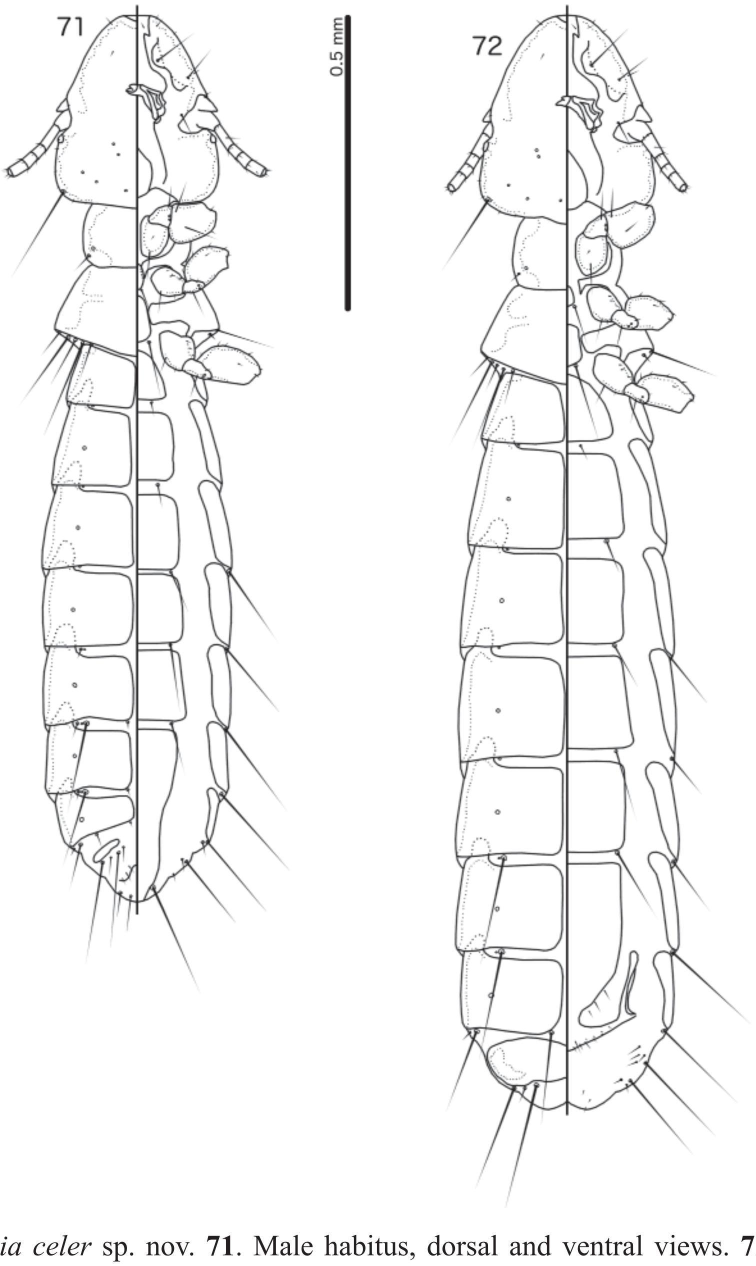
Figs 71–77

Diagnosis

Brueelia celer sp. nov. is most similar to *Br. pseudognatha* Gustafsson & Bush, 2017, with which it shares the following characters: abdominal segments IV and VII in both sexes with 1 *ps* on each side (Figs 71–72); female abdominal segment VI with only 1 *ps* on each side (Fig. 72); male tergopleurite IV without *aps*, male tergopleurite VIII with *tps* (Fig. 71); overall shape of proximal mesosome rather broadly rounded (Fig. 76); vulval margin convergent to median point (Fig. 77).

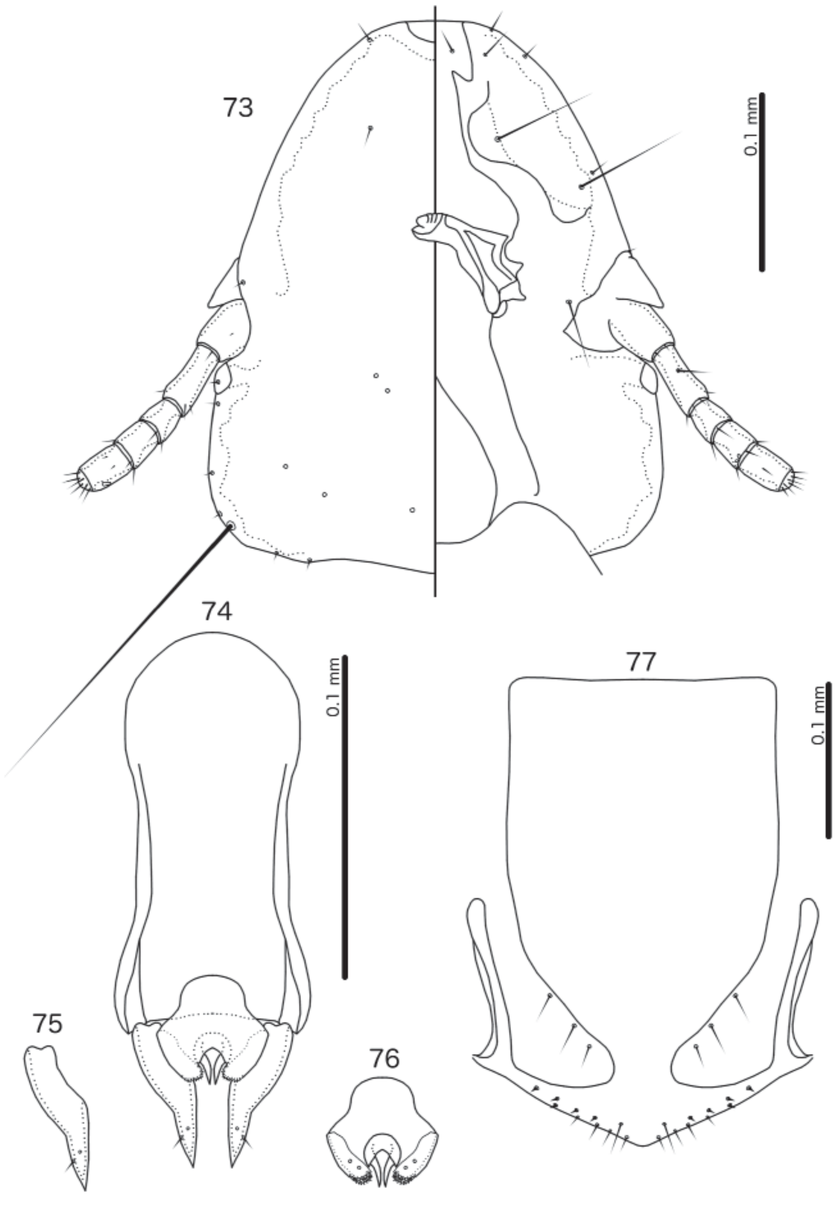


Figs 71–72. *Brueelia celer* sp. nov. **71**. Male habitus, dorsal and ventral views. **72**. Female habitus, dorsal and ventral views.

These two species can be separated by the following characters: male tergopleurite VIII with 2 *tps* on each side in *Br. pseudognatha*, but with only 1 *tps* on each side in *Br. celer* sp. nov. (Fig. 71); proximal mesosome gently rounded in *Br. pseudognatha*, but with median bulge in *Br. celer* sp. nov. (Fig. 76); parameres proportionately more elongated in *Br. celer* sp. nov. (Fig. 75) than in *Br. pseudognatha*; gonopore crescent shaped in *Br. celer* sp. nov. (Fig. 76), but rounded in *Br. pseudognatha*; mesosomal lobes broader in *Br. pseudognatha* than in *Br. celer* sp. nov. (Fig. 76); differences in shape of female subgenital plate (Fig. 77).

Etymology

The species name is derived from the Latin '*celer*' for 'swift', referring to the sleek, slender appearance of this species.



Figs 73–77. *Brueelia celer* sp. nov. **73**. Male head, dorsal and ventral views. **74**. Male genitalia, dorsal view. **75**. Male paramere, dorsal view. **76**. Male mesosome, ventral view. **77**. Female subgenital plate and vulval margin, ventral view.

Material examined

Holotype (ex *Pycnonotus cafer bengalensis* [as *Py. haemorrhous benghalensis*])
NEPAL • ♂; Mar. 1937; R. Meinertzhagen leg.; 9112; NHML [marked with blue dot on slide].

Paratypes
NEPAL • 7 ♂♂, 18 ♀♀; same collection data as for holotype; NHML • 3 ♂♂, 23 ♀♀; same collection data as for holotype except 9110; NHML.

Non-type material (ex *Pycnonotus cafer primrosei* [as *Py. haemorrhous burmanicus*])
INDIA • 2 ♂♂, 1 ♀; Nagaland [as Assam], Kohima; 29 Jan. 1952; R. Meinertzhagen leg.; 19882, Brit. Mus. 1952-143; NHML.

Type host

Pycnonotus cafer bengalensis Blyth, 1845 – red-vented bulbul.

Other host

Pycnonotus cafer primrosei Deignan, 1949.

Description

Both sexes
Head convex dome-shaped (Fig. 73), lateral margins of preantennal head convex, frons rounded to slightly flattened. Marginal carina slender, moderately displaced and translucent but not widened at osculum, median margin undulating. Ventral anterior plate not visible. Head chaetotaxy as in Fig. 73; *pos* located near posterior margin of eye. Temples rounded, occiput slightly convex. Thoracic and abdominal segments as in Figs 71–72. Base pigmentation pale brown, darkening at median margin of marginal carina, margins of antennal socket, lateral section of postantennal head including pre- and postocular nodi and marginal temporal carina, proepimera, metepisterna, and lateral sections of tergopleurites.

Male
Thoracic and abdominal chaetotaxy as in Fig. 71. Basal apodeme long (Fig. 74), constricted at mid-length, with rounded anterior margin. Proximal mesosome broad, rounded (Fig. 76). Mesosomal lobes slender, with restricted rugose area near medio-distal margin; 2 *pmes* sensilla on each side latero-distal to gonopore. Gonopore crescent shaped, stocky; no lateral extensions. Penile arms reach slightly beyond distal margin of mesosomal lobes. Parameres stocky, elongated distally; *pst1–2* as in Fig. 75. Measurements as in Table 1.

Female
Thoracic and abdominal chaetotaxy as in Fig. 72. Subgenital plate long and slender (Fig. 77), with straight anteriora and lateral margins, distal connection to cross-piece broad. Vulval margin straightly convergent to rounded median point (Fig. 77), with 2–5 short, slender *vms* and 3–5 short, thorn-like *vss* on each side; 3–5 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements as in Table 1.

Remarks

We found no significant differences between specimens from the two host subspecies, and consider specimens from both host subspecies to be conspecific.

Brueelia galeata sp. nov.

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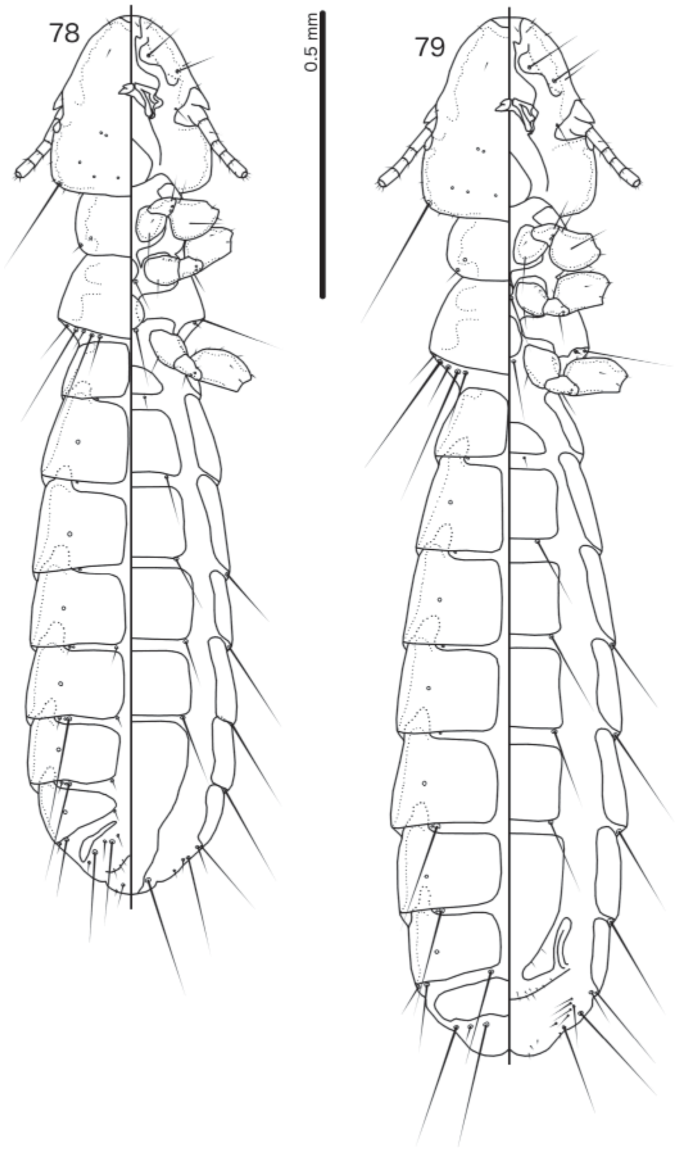
Figs 78–84

Diagnosis

Brueelia galeata sp. nov. is most similar to *Br. celer* sp. nov. and *Br. pseudognatha* Gustafsson & Bush, 2017, with which it shares the following characters: abdominal segments IV and VII in both sexes with 1 *ps* on each side (Figs 71–72, 78–79); female abdominal segment VI with only 1 *ps* on each side (Figs 72, 79); male tergopleurite IV without *aps* (Figs 71, 78); head rounded dome-shaped (Figs 73, 80) and relatively narrow rugose area on distal ends of mesosomal lobes (Figs 76, 83). With *Br. celer* sp. nov. it further shares basal apodeme of male genitalia with rounded anterior margin (Figs 74, 81); proximal mesosome with convex anterior and lateral margins, without lateral projections (Figs 76, 83); stocky



Figs 78–79. *Brueelia galeata* sp. nov. **78**. Male habitus, dorsal and ventral views. **79**. Female habitus, dorsal and ventral views.

crescent-shaped gonopore (Figs 76, 83) and penile arms reaching beyond distal end of mesosomal lobes (Figs 76, 83).

Brueelia galeata sp. nov. can be separated from the other two species by the absence of *tsp* on male tergopleurite VIII in *Br. galeata* sp. nov. (Fig. 78); at least 1 *tps* on each side is present in the other two species (Fig. 71). Moreover, females of *Br. galeata* sp. nov. can be separated from females of the other two species by the shape of the vulval margin: gently rounded in *Br. galeata* sp. nov. (Fig. 84), but convergent to a median point in the other two species (Fig. 77).

Moreover, *Br. galeata* sp. nov. can be separated from *Br. celer* sp. nov. by the following characters: proximal mesosome with flattened, somewhat angular median bulge in *Br. galeata* sp. nov. (Fig. 83), but with rounded, elongated bulge in *Br. celer* sp. nov. (Fig. 76); distal mesosome more rounded in *Br. celer* sp. nov. (Fig. 76) than in *Br. galeata* sp. nov. (Fig. 83); male tergopleurite V with *ss* in *Br. galeata* sp. nov. (Fig. 78), but without *ss* in *Br. celer* sp. nov. (Fig. 71); female subgenital plate widening anteriorly, with convex anterior margin in *Br. galeata* sp. nov. (Fig. 84), but with proximal half of about the same width and concave anterior margin in *Br. celer* sp. nov. (Fig. 77).

Brueelia galeata sp. nov. can be separated from *Br. pseudognatha* by the following additional characters: head proportionately wider and with more rounded preantennal area in *Br. galeata* sp. nov. (Fig. 80) than in *Br. pseudognatha*; proximal mesosome gently rounded in *Br. pseudognatha* but flattened and somewhat angular in *Br. galeata* sp. nov. (Fig. 83); gonopore crescent shaped in *Br. galeata* sp. nov. (Fig. 83), but rounded in *Br. pseudognatha*.

Brueelia alophoixi was described from the same host species, but these two species can be separated by the following characters: preantennal area trapezoidal in *Br. alophoixi*, but rounded in *Br. galeata* sp. nov. (Fig. 80); male tergopleurite VIII with *tps* in *Br. alophoixi*, but without *tps* in *Br. galeata* sp. nov. (Fig. 78); male abdominal segment VII with 2 *ps* on each side in *Br. alophoixi*, but with 1 *ps* on each side in *Br. galeata* sp. nov. (Fig. 78); female abdominal segments VI–VII with 2 *ps* on each side in *Br. alophoixi*, but with only 1 *ps* each on each side in *Br. galeata* sp. nov. (Fig. 79); proximal mesosome rounded in *Br. alophoixi*, but with broadly flattened convex anterior margin in *Br. galeata* sp. nov. (Fig. 83).

Etymology

The species name is derived from '*galeatus*', Latin for 'helmeted'. In particular, we are here referring to the traditional Roman helmet, the '*galea*', which is reminiscent of the gonopore of this species.

Material examined

Holotype (ex *Alophoixus pallidus henrici*)

THAILAND • ♂; Chieng Mai Province, Doi Pui; 11 Feb. 1965; H.E. McClure leg.; SE-1912; BPBM.

Paratype

THAILAND • 1 ♀; same collection data as for holotype; BPBM.

Type host

Alophoixus pallidus henrici (Oustalet, 1896) – puff-throated bulbul.

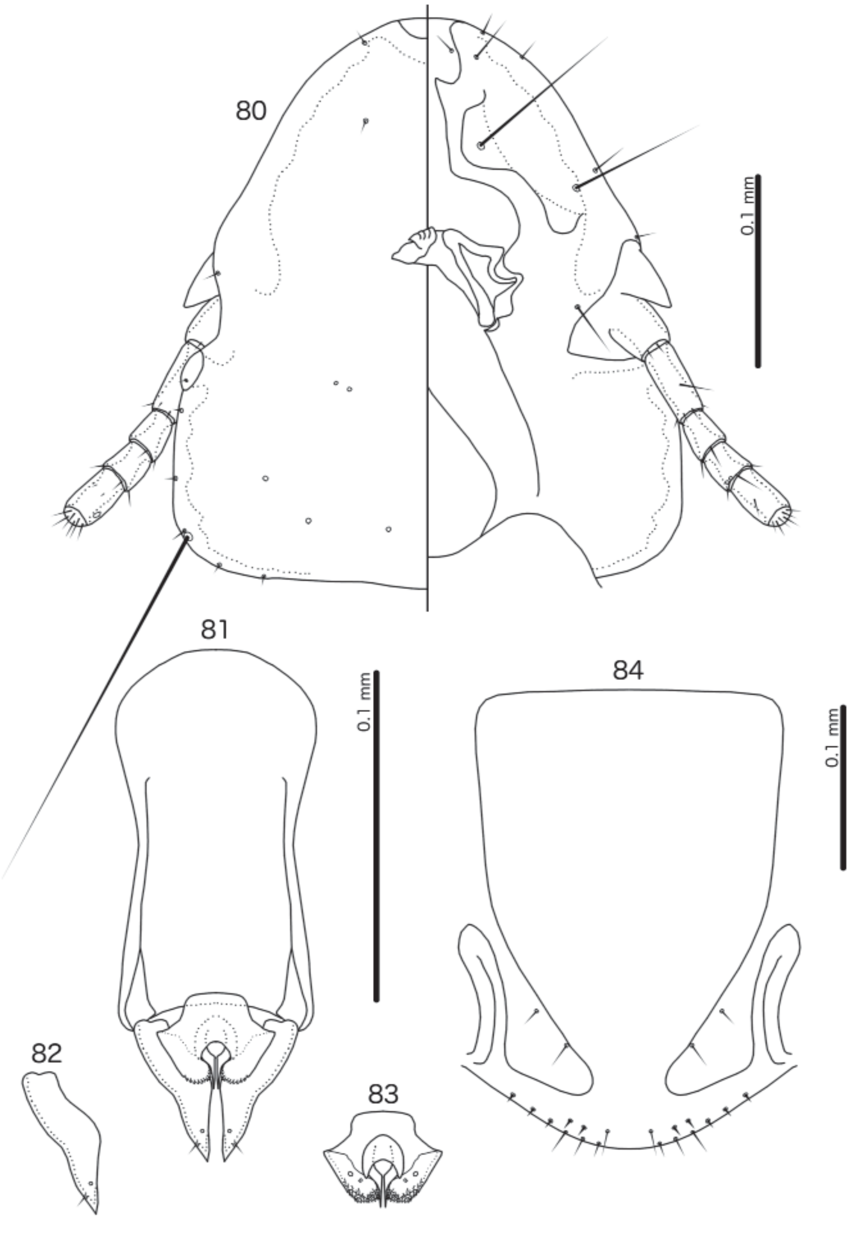
Description

Both sexes

Head flat dome-shaped (Fig. 80), lateral margins of preantennal head convex, frons rounded in male, slightly flattened in female. Marginal carina moderate, shallowly displaced and translucent but not widened at osculum; lateral sections with shallowly undulating median margins. Ventral anterior plate not visible. Head chaetotaxy as in Fig. 80; *pos* located far behind eye. Temples rounded, occiput more or less straight. Thoracic and abdominal segments as in Figs 78–79. Base pigmentation pale yellow-brown, except lateral sections of marginal carina, head nodi, proepimera, and lateral sections of tergopleurites slightly darker.

Male

Thoracic and abdominal chaetotaxy as in Fig. 78. Basal apodeme short, constricted at mid-length (Fig. 81). Proximal mesosome short, wide, flattened (Fig. 83). Mesosomal lobes broad, narrowing proximally, not elongated, with intensely rugose postero-median margins; 2 *pmes* sensilla latero-distal to



Figs 80–84. *Brueelia galeata* sp. nov. **80**. Male head, dorsal and ventral views. **81**. Male genitalia, dorsal view. **82**. Male paramere, dorsal view. **83**. Male mesosome, ventral view. **84**. Female subgenital plate and vulval margin, ventral view.

gonopore. Gonopore relatively long, broadly crescent shaped, with a hint of rounded angle on the anterior margin, distal margin deeply concave; no lateral extensions. Penile arms reach distal to mesosomal lobes. Parameres extended distally (Fig. 82), distal end broad; *pst1–2* as in Fig. 82. Measurements as in Table 1.

Female

Thoracic and abdominal chaetotaxy as in Fig. 79. Subgenital plate long and slender, widening anteriorly (Fig. 84), distal connection to cross-piece broad, cross-piece broad. Vulval margin rounded (Fig. 84), with 3 short, slender *vms* and 5 short, thorn-like *vss* on each side; 3 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements as in Table 1.

Brueelia colindalei sp. nov.

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Figs 85–91

Brueelia sp. ex *Hemixos castanonotus* Pycnonotidae 225 Bush *et al.*, 2016: 745, fig. 3e.

Brueelia alophoixi Sychra *et al.* in Sychra *et al.*, 2009 sensu lato – Chu *et al.* 2019: 337.

Diagnosis

Brueelia colindalei sp. nov. is most similar to *Br. alophoixi* Sychra in Sychra *et al.*, 2009, with which it shares the following characters: visible ventral anterior plate (Fig. 87); male abdominal segment IV with 1 *ps* on each side and segment VII with 2 *ps* on each side (Fig. 85); male tergopleurite IV without *aps* (Fig. 85); male tergopleurite VIII with 2 *tps* on each side (Fig. 85); short and broad male basal apodeme, constricted at mid-length and with rounded anterior margin (Fig. 88); female abdominal segment VI with 2 *ps* on each side (Fig. 86); head shape pentagonal (Fig. 87).

These two species can be separated by the following characters: lateral margins of preantennal head more or less straight in *Br. alophoixi*, but convex in *Br. colindalei* sp. nov. (Fig. 87); head proportionately broader in *Br. alophoixi* than in *Br. colindalei* sp. nov. (Fig. 87); female abdominal segment IV with *ps* in *Br. alophoixi*, but without *ps* in *Br. colindalei* sp. nov. (Fig. 86); differences in shape of proximal mesosome (Fig. 90); distal mesosome more rounded in *Br. colindalei* sp. nov. (Fig. 90) than in *Br. alophoixi*.

Etymology

The species name is in honor of our friend and colleague Dr Colin Dale (University of Utah, Salt Lake City, Utah, USA), in recognition of his research elucidating interactions between lice and their endosymbiontic bacteria.

Material examined

Holotype (ex *Hemixos castanonotus canipennis*)

CHINA • ♂; Guangxi Province, Shiwandashan National park; 20 Apr. 2005; [S.E.] Bush and [D.H.] Clayton; MBR-6686; P-894; NHML [slide also contains female *Guimaraesiella flavala*].

Paratypes

CHINA • 1 ♂, 1 ♀; same locality and collectors as for holotype; 17 Apr 2005; MBR-6668; P-894; PIPR • 1 ♂, 6 ♀♀; Guangdong Province, Zhaoqing County, Dinghushan National Park; 17 Jul 2015; X. Chu and D. He leg.; J2713; GD-PHTH-00280–00282; GIABR.

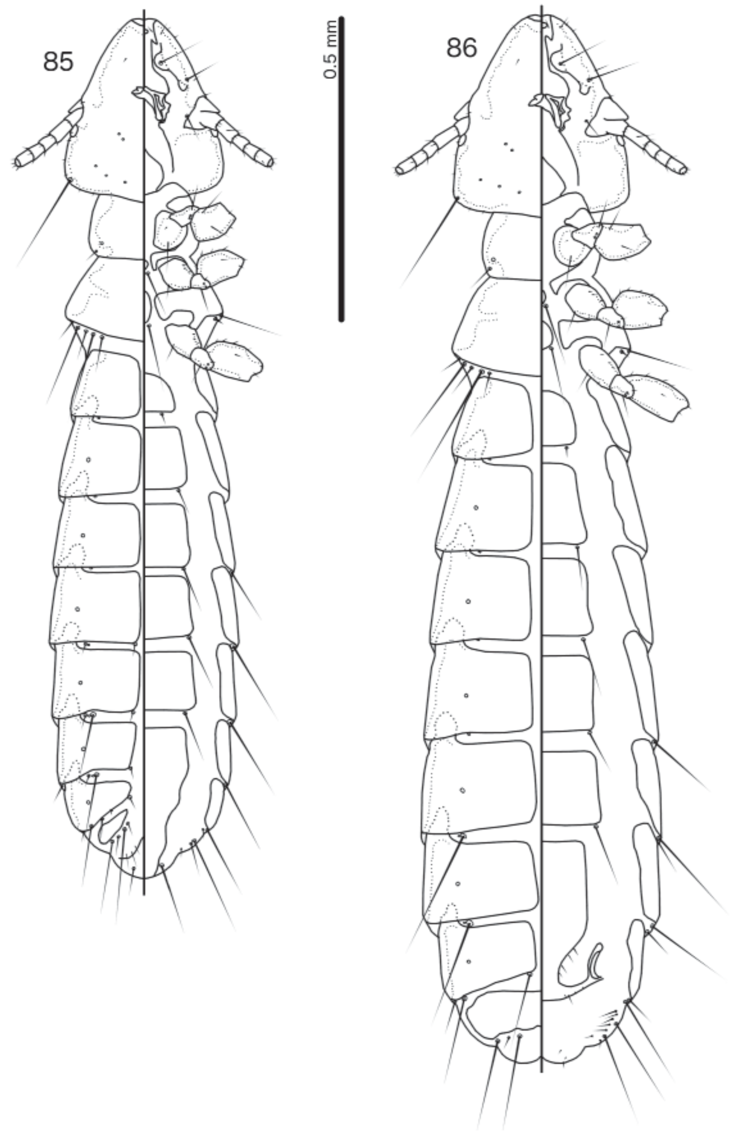
Type host

Hemixos castanonotus canipennis Seebohm, 1890 – chestnut bulbul.

Description

Both sexes

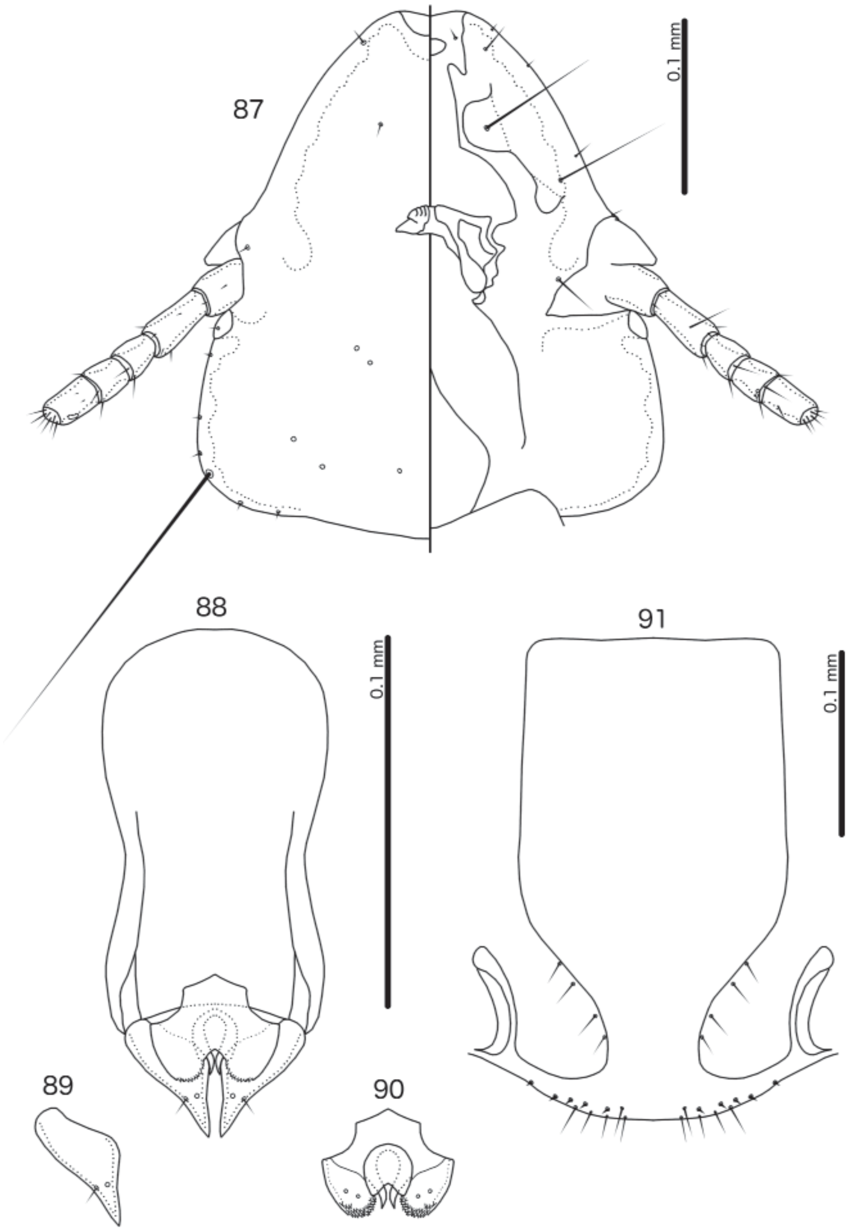
Head convex dome-shaped (Fig. 87), lateral margins of preantennal area convex, frons slightly concave. Marginal carina translucent and moderately displaced at osculum; lateral sections with moderate undulations of median margin. Ventral anterior plate oval, with yellow pigmentation. Head chaetotaxy as in Fig. 87; *pos* located far behind eye. Temples rounded, occiput convex. Thoracic and abdominal segments as in Figs 85–86. Pigmentation pale yellow, except preantennal, preocular, and postocular nodi, proepimera, metepisterna, and lateral tergopleurites moderate brown.



Figs 85–86. *Brueelia colindalei* sp. nov. **85**. Male habitus, dorsal and ventral views. **86**. Female habitus, dorsal and ventral views.

Male

Thoracic and abdominal chaetotaxy as in Fig. 85. Basal apodeme short (Fig. 88), constricted at mid-length. Proximal mesosome broad, with anterior margin concavely convergent to median point (Fig. 90). Mesosomal lobes broad, drop-shaped, moderately rugose on postero-median margins; 2 *pmes* sensilla latero-distal to gonopore. Gonopore largely rounded, without lateral extensions, distal margin deeply concave. Penile arms do not reach beyond distal margin of mesosomal lobes. Parameres partially everted in both examined males, and here illustrated approximately (Fig. 89). Measurements as in Table 1.



Figs 87–91. *Brueelia colindalei* sp. nov. **87**. Male head, dorsal and ventral views. **88**. Male genitalia, dorsal view. **89**. Male paramere, dorsal view. **90**. Male mesosome, ventral view. **91**. Female subgenital plate and vulvalmargin, ventral view.

Female

Thoracic and abdominal chaetotaxy as in Fig. 86. Subgenital plate roughly rectangular, in some specimens broader than illustrated, with broad connection to cross-piece. Vulval margin seemingly flattened medianly (Fig. 91), with at least 3–5 slender *vms* and 3–5 short, thorn-like *vss* on each side; 4 slender *vos* on each side of subgenital plate, 1 *vos* near *vms*. Measurements as in Table 1.

Remarks

Specimens from Guangdong are slightly larger than specimens from Guangxi; however, given that so few specimens were examined from each place, we do not consider this significant, and have presented all measurements under one heading in Table 1.

Brueelia colindalei sp. nov. was included in the phylogeny of Bush *et al*. (2016), represented by four specimens from different host species, all from South China. It is possible that, at least locally, *Br. colindalei* sp. nov. occurs naturally on all these hosts (*Ixos mcclellandii*, *Spizixos semitorques*, *Emberiza godlewskii* Taczanowski, 1874). However, other specimens examined from *Ixos mcclellandii* are not conspecific with *Br. colindaeli*, and one of the hosts in Bush *et al*. (2016) is an emberizid. We prefer not to count these bird species as hosts of *Br. colindalei* sp. nov. until this has been confirmed.

Brueelia leiae sp. nov.

urn:lsid:zoobank.org:act:F7FB213E-08DD-41DF-9EB6-75AA1D9509D9

Figs 92–98

Brueelia alophoixi Sychra *et al.* in Sychra *et al.*, 2009 sensu lato – Chu *et al.* 2019: 337.

Diagnosis

Brueelia leiae sp. nov. is most similar to *Br. doisuthepensis* sp. nov. and *Br. yunnanensis* sp. nov., with which it shares the following characters: abdominal segment IV in both sexes with *ps*, and abdominal segment VII in both sexes with 2 *ps* on each side (Figs 50–51, 92–93, 99–100); female abdominal segment VI with 1 *ps* on each side (Figs 51, 93, 100); male tergopleurite IV without *aps* and tergopleurite VIII with only 1 *tps* on each side (Figs 50, 92, 99).

Brueelia leiae sp. nov. can be separated from the other two species by the broader frons (Figs 52, 94, 101), more rounded proximal mesosome (Figs 55, 97, 104), and cup-shaped female subgenital plate with rounded lateral margins (Figs 56, 98, 105). In *Br. leiae* sp. nov., male tergopleurite VII has 1 *tps* on each side (Fig. 92), but this is absent in the other two species (Figs 50, 99).

In addition, *Br. leiae* sp. nov. can be separated from *Br. doisuthepensis* sp. nov. by the following characters: marginal carina wider in *Br. leiae* sp. nov. (Fig. 94) than in *Br. doisuthepensis* sp. nov. (Fig. 52); differences in the shape of the mesosomal lobes (Figs 55, 97); shape of the vulval margin (Figs 56, 98).

Moreover, *Br. leiae* sp. nov. can be separated from *Br. yunnanensis* sp. nov. by the following characters: overall head shape (Figs 94, 101); shape of mesosomal lobes (Figs 97, 104); extent of rugose area on distal mesosome (Figs 97, 104).

Etymology

The specific epithet is in honor of Ms Lujia Lei, formerly a student of DRG's at the Guangdong Institute for Zoology, as a small compensation for her hard work in the field and in the lab, braving torrential rain, sleepless mountain nights, hundreds of brown shrikes, terrestrial leeches and the possibility of snakes. Reliable, diligent, and all-round great students like her are rare.

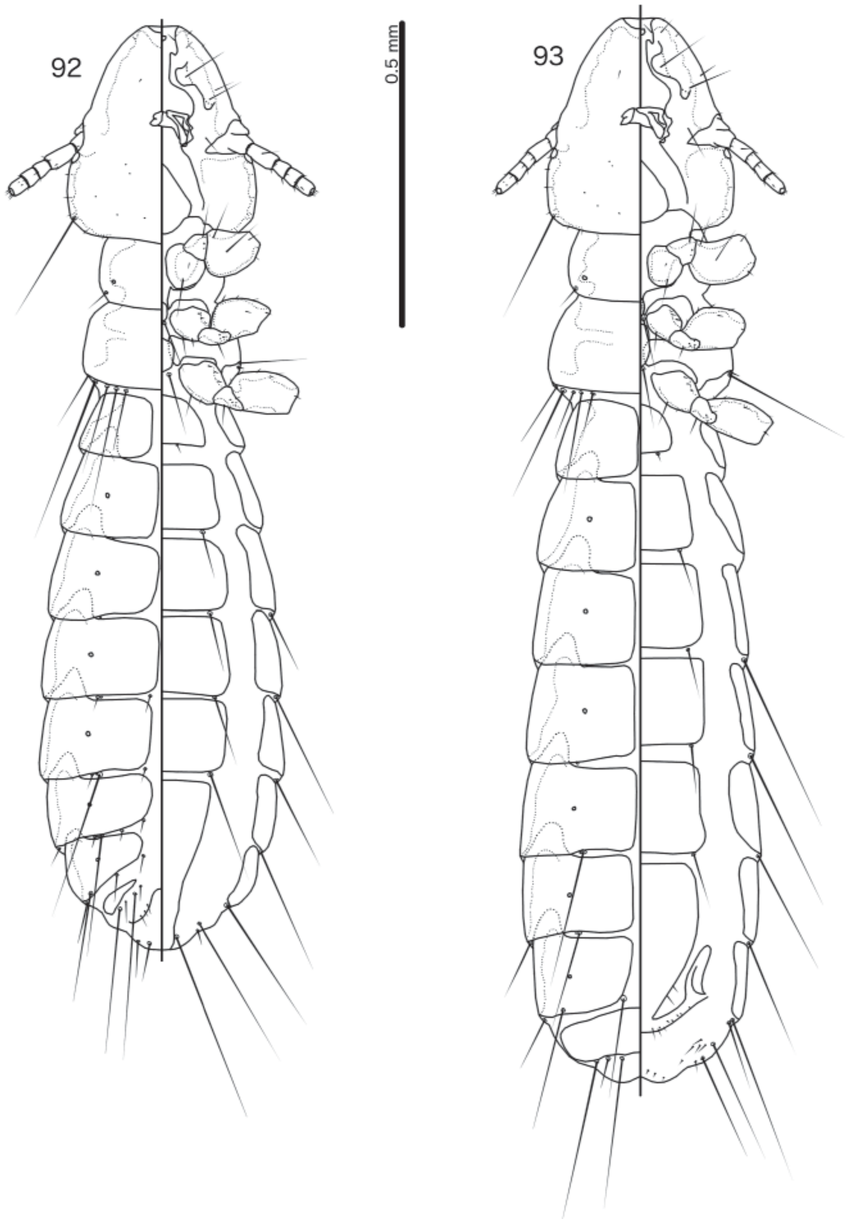
Material examined

Holotype (ex *Ixos mcclellandii similis*)

CHINA • ♂; Yunnan Province, Wenshan Zhuang and Miao Autonomous Prefecture, Malipo County, Daping Township, Gaojingliang Village; 15 Jun. 2016; Y. Wu and X. Chu leg.; J3100; GD-PHTH-00276; GIABR.

Paratypes

CHINA • 1 ♂, 2 ♀♀; same collection data as for holotype; GD-PHTH-00277–00279; GIABR.



Figs 92–93. *Brueelia leiae* sp. nov. **92**. Male habitus, dorsal and ventral views (GD-PHTH-00276) (GIABR). **93**. Female habitus, dorsal and ventral views (GD-PHTH-00278) (GIABR).

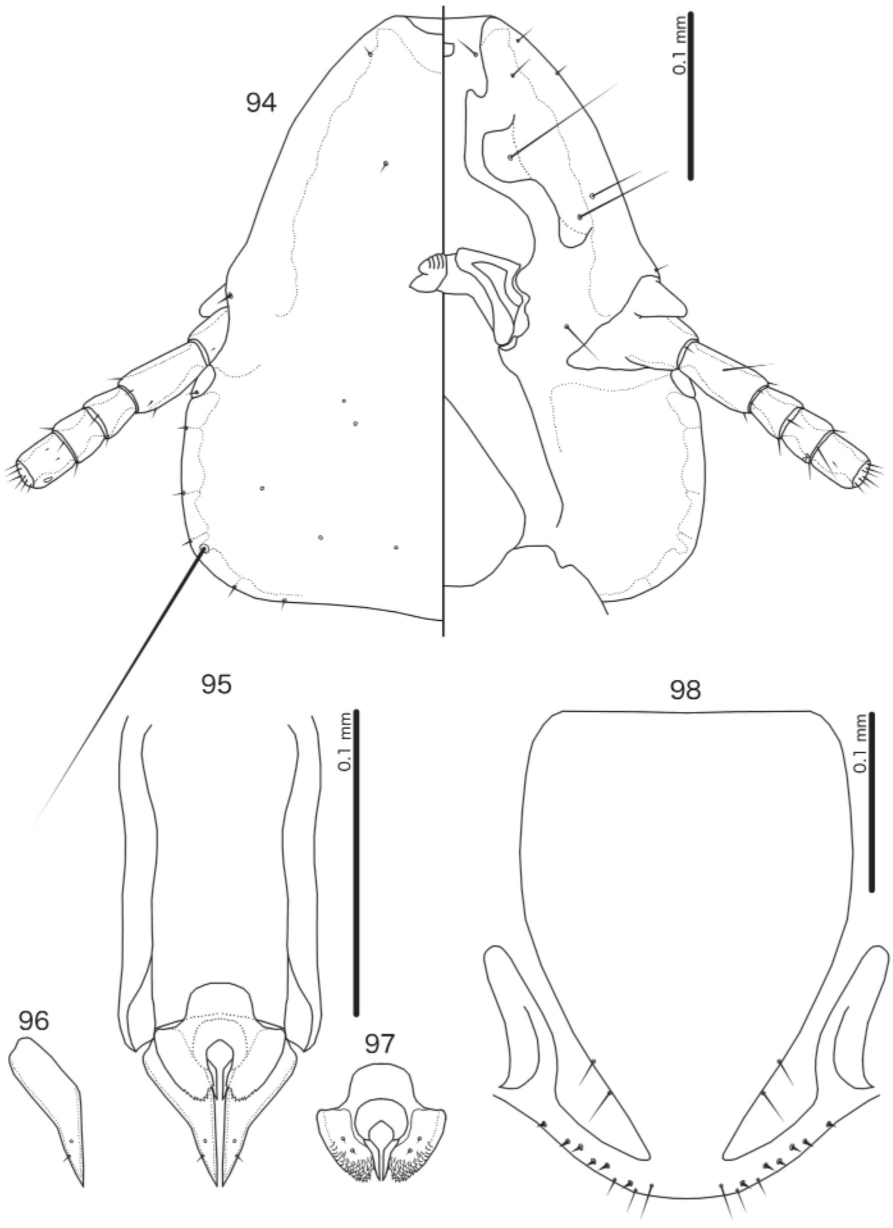
Type host

Ixos mcclellandii similis (Rothschild, 1921) – mountain bulbul.

Description

Both sexes

Head flat dome-shaped (Fig. 94), lateral margins of preantennal area convex, frons flattened to slightly concave. Marginal carina broad, moderately displaced and widened at osculum; width more or less even throughout except for near frons. Ventral anterior plate small, somewhat rectangular. Head chaetotaxy



Figs 94–98. *Brueelia leiae* sp. nov. (94–97: GD-PHTH-00276 (GIABR); 98: (GD-PHTH-00278) (GIABR)). **94**. Male head, dorsal and ventral views. **95**. Male genitalia, dorsal view. **96**. Male paramere, dorsal view. **97**. Male mesosome, ventral view. **98**. Female subgenital plate and vulval margin, ventral view.

as in Fig. 94; *pos* located far behind eye. Temples rounded, occiput convex. Thoracic and abdominal plates as in Figs 92–93. Pigmentation pale yellowish brown, except head carinae and nodi, proepimera, and lateral sections of tergopleurites darker brown.

Male

Thoracic and abdominal chaetotaxy as in Fig. 92. Basal apodeme more or less rectangular, not constricted at mid-length (Fig. 95); proximal section not visible in examined specimens. Proximal mesosome elongated, rounded (Fig. 97). Mesosomal lobed rounded, broad, with extensive rugose areas in medio-distal ends; 2 *pmes* sensilla postero-lateral of gonopore on each side. Gonopore large, crescent shaped. Penile arms reach to distal margin of mesosome. Parameres elongated, with *pst1–2* as in Fig. 96. Measurements as in Table 1.

Female

Thoracic and abdominal chaetotaxy as in Fig. 93. Subgenital plate slender, truncated obovate (Fig. 98). Vulval margin straight, slightly convex medianly (Fig. 98), with 0–2 short, slender *vms* and 3–6 short, thorn-like *vss* on each side; 3–4 short, slender *vos* on each side of subgenital plate; distal 1 *vos* median to *vss*. Measurements as in Table 1.

Remarks

One examined female has an *aps* on one side of tergopleurite VII, but this is absent on the other side and on both sides in the other female; we have not illustrated this seta, as *aps* are usually absent in females of *Brueelia* spp., and is here presumably an aberration.

Brueelia yunnanensis sp. nov.

urn:lsid:zoobank.org:act:81C511D9-E4C9-4E90-8587-2BF455C4EC05

Figs 99–105

Brueelia alophoixus Najer & Sychra in Najer *et al.*, 2012 sensu lato – Chu *et al.* 2019: 337.

Diagnosis

Brueelia yunnanensis sp. nov. is most similar to *Brueelia doisuthepensis* sp. nov., with which it shares the following characters: abdominal segment IV with 1 *ps* on each side in both sexes (Figs 50–51, 99–100); abdominal segment VII with 2 *ps* on each side in both sexes (Figs 50–51, 99–100); female abdominal segment VI with 1 *ps* on each side (Figs 51, 100); male tergopleurite IV without *aps* (Figs 50, 99); male tergopleurite VIII with 1 *tps* on each side (Figs 50, 99); proximal mesosome rectangular (Figs 55, 104).

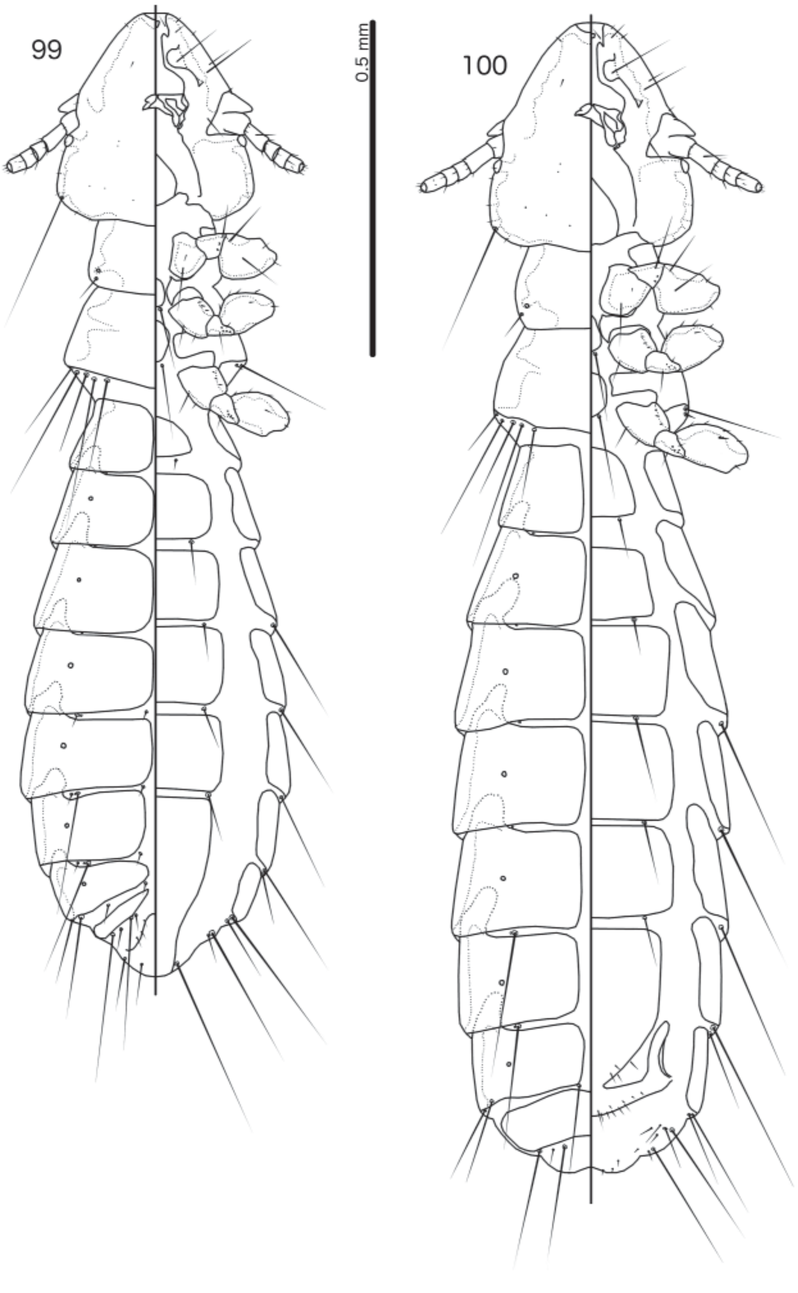
These two species can be separated by the following characters: differences in head shape (Figs 52, 101), with *Br. yunnanensis* sp. nov. having proportionately wider temples, with a blunter angle at *mts3* than in *Br. doisuthepensis* sp. nov.; the portion of the temple margin between *mts3–5* is more flattened in *Br. yunnanensis* sp. nov., making the head look somewhat angular; lateral margins of preantennal head are more straight in *Br. yunnanensis* sp. nov. (Fig. 101) than in *Br. doisuthepensis* sp. nov. (Fig. 52); rugose area of mesosome covering more than half of mesosomal lobes in *Br. doisuthepensis* sp. nov. (Fig. 55), but covering only distal margin of mesosomal lobes in *Br. yunnanensis* sp. nov. (Fig. 104); posterior cutout of the gonopore larger in *Br. doisuthepensis* sp. nov. (Fig. 55) than in *Br. yunnanensis* sp. nov. (Fig. 104); parameres more elongated in *Br. doisuthepensis* sp. nov. (Fig. 54) than in *Br. yunnanensis* sp. nov. (Fig. 103); female subgenital plate with distinct distal 'neck' connecting plate to cross-piece in *Br. doisuthepensis* sp. nov. (Fig. 56), but with shorter connection in *Br. yunnanensis* sp. nov. (Fig. 105). Apparent differences in female vulval chaetotaxy may be due to the small number of specimens examined, and may overlap.

Etymology

The specific epithet is derived from the type locality.

Material examined

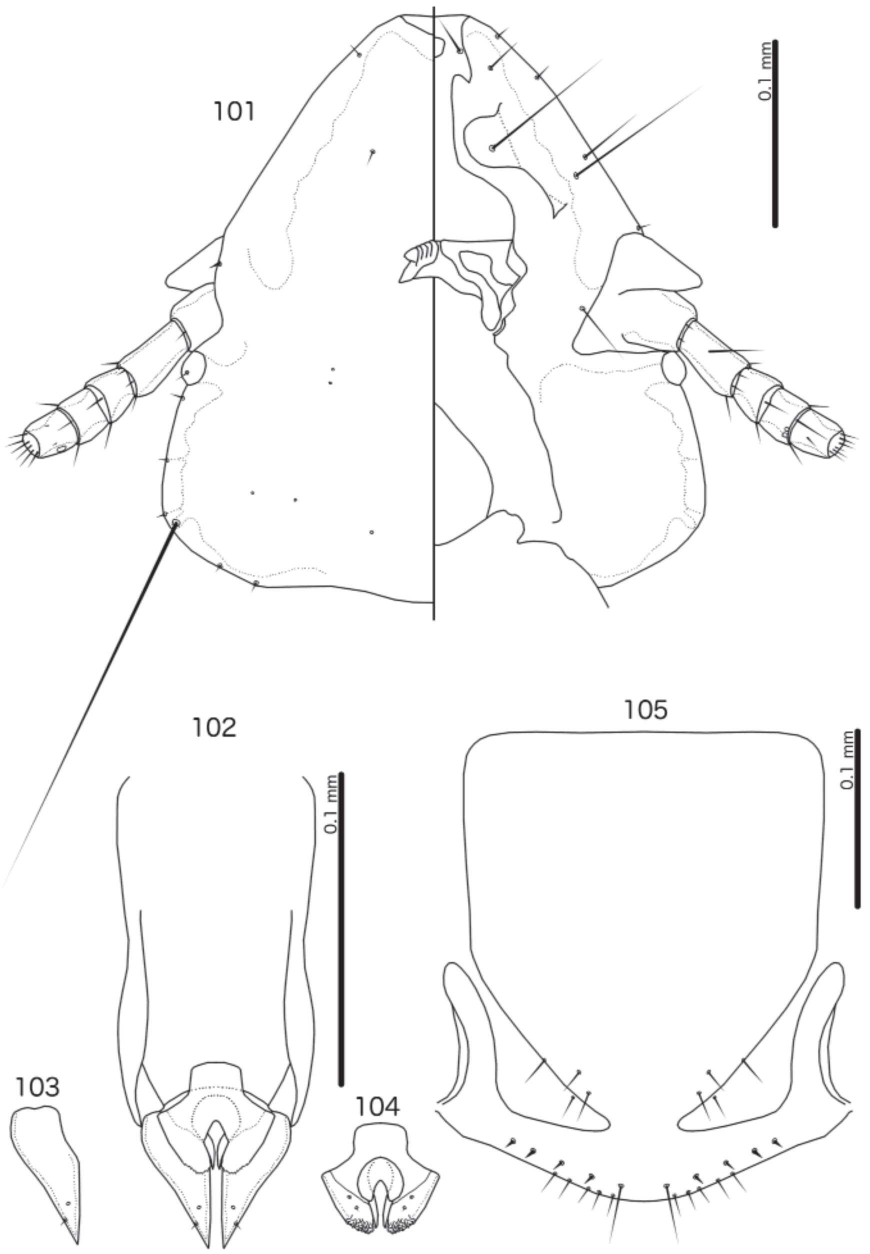
Holotype (ex *Alophoixus flaveolus burmanicus*)
CHINA • ♂; Yunnan Province, Dehong Dai and Jingpo Autonomous Prefecture, Yingjiang County, Nabang Township, Dao Nong Village, Banyan King; 14 Aug. 2013; Y. Wu and L. Zhao leg.; J1819; GD-PHTH-00284; GIABR.



Figs 99–100. *Brueelia yunnanensis* sp. nov. **99**. Male habitus, dorsal and ventral views (GD-PHTH-00284) (GIABR). **100**. Female habitus, dorsal and ventral views (GD-PHTH-00286) (GIABR).

Paratypes

CHINA • 2 ♂♂, 2 ♀♀; same collection data as for holotype; GD-PHTH-00284–00286; GIABR • 1 ♀; same locality and collector as for holotype; 30 Dec. 2012; host J0560; GD-PHTH-00298; GIABR • 2 ♀♀; same collection data as for holotype; host J0562; GD-PHTH-00299–00300; GIABR • 1 ♂, 1 ♀; same collection data as for holotype; host J0563; GD-PHTH-00301–00302; GIABR • 1 ♀; same locality and collectors as for holotype; 2 Jan. 2013; host J0598; GD-PHTH-00303; GIABR • 1 ♂, 1 ♀; same collection data as for holotype; host J0608; GD-PHTH-00304–00305; GIABR • 1 ♂, 1 ♀; same locality as for holotype; 27 May 2013; Y. Zhang and Z. Huang leg.; host J1388; GD-PHTH-00309; GIABR •



Figs 101–105. *Brueelia yunnanensis* sp. nov. (101–104: GD-PHTH-00284 (GIABR); 105: (GD-PHTH-00286) (GIABR)). **101**. Male head, dorsal and ventral views. **102**. Male genitalia, dorsal view. **103**. Male paramere, dorsal view. **104**. Male mesosome, ventral view. **105**. Female subgenital plate and vulval margin, ventral view.

3 ♀♀; Yunnan Province, Dehong Dai and Jingpo Autonomous Prefecture, Yingjiang County, Hongbeng River; 25 May 2013; Y. Wu and L. Zhao leg. host J1052; GD-PHTH-00287–00289; GIABR • 2 ♂♂, 1 ♀; same collection data as for preceding; host J1050; GD-PHTH-00290–00292; GIABR • 1 ♂, 1 ♀; same locality and collectors as for preceding; 26 May 2013; host J1060; GD-PHTH-00293–00295; GIABR • 1 ♂, 1 ♀; same collection data as for preceding; host J1057; GD-PHTH-00296–00297; GIABR • 1 ♀; same locality as for preceding; 3 Jan. 2013; Y. Wu and X. Che leg.; host J1010; GD-PHTH-00306; GIABR • 2 ♀♀; Yunnan Province, Dehong Dai and Jingpo Autonomous Prefecture, Ruili City, Huyu Township, Weijiao Village; 15 May 2013; Y. Zhang and Z. Huang leg.; host J1176; GD-PHTH-00307–00308; GIABR • 1 ♀; same locality and collectors as for preceding; 16 May 2013; host J1208; GD-PHTH-00310; GIABR.

Type host

Alophoixus flaveolus burmanicus (Oates, 1899) – white-throated bulbul.

Description

Both sexes

Head rounded pentagonal (Fig. 101), frons narrow and flattened, lateral margins of preantennal area slightly convex. Marginal carina broad, of irregular width, narrowing at frons, and moderately displaced but not much widened at osculum. Head chaetotaxy as in Fig. 101; *pos* situated far behind eye. Temples somewhat angular, with area between *mts3-5* flattened; occiput convex. Thoracic and abdominal segments as in Figs 99–100. Pigmentation yellowish brown, only markedly darker at head nodi, proepimera, metepisterna, and lateral margins of tergopleurites.

Male

Thoracic and abdominal chaetotaxy as in Fig. 99. Basal apodeme roughly rectangular, but proximal margin not visible; slightly constricted at about mid-length (Fig. 102); proximal end not clearly visible in examined specimens. Proximal mesosome convexly rectangular, elongated (Fig. 104). Mesosomal lobes narrowing anteriorly, with rugose area limited to near posterior margin; 2 *pmes* sensilla posterior to gonopore on each side. Gonopore crescent shaped, stout. Penile arms do not reach posterior margin of mesosome. Parameres stout, elongated, with *pst1–2* as in Fig. 103. Measurements as in Table 1.

Female

Thoracic and abdominal chaetotaxy as in Fig. 100. Subgenital plate very broad, roughly quadratic, but with broad connection to wide cross-piece (Fig. 105). Vulval margin bulging somewhat medianly (Fig. 105), with 3–5 short, slender *vms* and 4–5 short, thorn-like *vss* on each side; 4–5 short, slender *vos* on each side; distal 1 *vos* median to *vss*. Measurements as in Table 1.

Philopterus-complex

Genus ***Philopteroides*** Mey, 2004

Philopterus Nitzsch, 1818: 288 (in partim).
Docophorus Nitzsch, 1818: 289 (in partim).
Bitrabeculus Uchida, 1948: 317 (in partim).
Philopteroides Mey, 2004: 173.
Tyranniphilopterus Mey, 2004: 182 (in partim).

Type species

Philopteroides novaezelandiae Mey, 2004: 174, by original designation.

Remarks

The species of *Philopteroides* parasitizing bulbuls appear to form a homogenous group within the *Philopteroides mitsusui* species group sensu Valim & Palma (2013). In particular, the species known from bulbuls are united by the following characters: Mesosome covers central ⅓ of distal margin of basal apodeme (Figs 109, 115); parameres curved medianly (Figs 109–110, 115–116); at least some of sternal plates III–VI reduced in female, with accessory lateral sternal plates (if visible) clearly separated from central sternal plates in at least some segments (Figs 107, 113). In males of most species, at least sternal plate III is reduced in the same way (Fig. 106), but in *Ph. cucphoungensis* the central sternal plate may be connected to the accessory lateral sternal plates (Mey 2004: fig. 23d), and in *Ph. holosternus* sp. nov. male sternite III is entire (Fig. 112).

Philopteroides kayanobori (Uchida, 1948)

Bitrabeculus kayanobori Uchida, 1948: 322, fig. 8.

Philopterus kayanobori – Hopkins & Clay 1952: 285.
Philopteroides kayanobori – Mey 2004: 174.

Type host

Spizixos semitorques cinereicapillus Swinhoe, 1871 – collared finchbill.

Material examined

Non-type material (identity uncertain) (ex *Spizixos semitorques cinereicapillus*)
CHINA • 2 ♀♀; Hunan Province, Tea station in Badagong Mountain Reserve; 23 Jul. 2012; D. Su leg.; J0102; GD-PHTH-00311; GIABR.

Type locality

"Bohosho, Dist. Nanto, Formosa" = Nantou County, Taiwan.

Remarks

Bitrabeculus kayanobori was placed in *Philopteroides* by Mey (2004), without justification. The original description and illustration of this species was based on a single male and single female (Uchida 1948), and fits with the description of the genus *Philopteroides*, except that the illustration indicates three temporal macrosetae on each side, whereas other species of *Philopteroides* only have two temporal macrosetae on each side. If correct, this character separates *Ph. kayanobori* from all other known species of *Philopteroides*.

We examined two female *Philopteroides* from the mainland host subspecies *Spizixos semitorques semitorques* Swinhoe, 1861. These specimens were reported as *Po. kayanobori* by Chu *et al*. (2019); however, these specimens do not have *ps* on abdominal segment III, as in the original illustrations of this species. Moreover, both specimens have only two temporal macrosetae on each side. As Uchida (1948) only illustrated the male, and both our specimens are female, we cannot presently confirm whether these specimens are conspecific with *Po. kayanobori*.

Philopteroides flavala Najer & Sychra in Najer *et al*., 2012

Philopteroides flavala Najer & Sychra in Najer *et al*., 2012: 39.

Type host

Hemixos flavala Blyth, 1845 – ashy bulbul.

Other hosts

Hemixos castanonotus Swinhoe, 1870 – chestnut bulbul. *Alophoixus flaveolus burmanicus* (Oates, 1899) – white-throated bulbul [Chu *et al*. 2019: 337]; *Alophoixus pallidus henrici* (Oustalet, 1869) – puff-throated bulbul [Chu *et al*. 2019: 337]; *Iole propinqua* (Oustalet, 1903) – grey-eyed bulbul [Najer *et al.* 2021]; *Ixos mcclellandii holtii* (Swinhoe, 1861) – mountain bulbul [Najer *et al.* 2021]

Type locality

Botanical Garden, Cuc Phuong, Ninh Binh, Vietnam.

Material examined

Non-type material (ex *Alophoixus pallidus henrici*)
CHINA • 1 ♂, 3 ♀♀; Guangxi Province, Jingxin County; 2 Oct. 2004; S.E. Bush leg.; AN-456, P-458; PIPR • 1 ♂, 1 ♀; Guangxi Province, Chongzou Prefecture, Jiangzhou District, Zouzhou Township, Guanghe Village, Pairu; 30 May 2016; Y. Wu and X. Chu leg,; host J2991; GD-PHTH-00320–00321; GIABR • 1 ♂; Yunnan Province, Honghe Hani and Yi Autonomous Prefecture, Hekou County, Hekou Township, Basa Village; 4 Jun. 2016; same collector as for preceding; host J3023; GD-PHTH-00319; GIABR.

Non-type material (ex *Alophoixus flaveolus burmanicus*)
CHINA • 2 ♂♂; Yunnan Province, Dehing Dai and Jingpo Autonomous Prefecture, Ruili City, Huyu Township, Weijiao Village; 16 May 2013; Y. Zhang and Z. Huang leg.; J1208; GD-PHTH-00322–00323; GIABR • 1 ♂, 1 nymph; Yunnan Province, Dehong Dai and Jingpo Autonomous Prefecture, Yingjiang County, Nabang Township, Dao Nong Village, Banyan King; 27 Dec. 2012; Y. Wu and L. Zhao leg.; host J0516; GD-PHTH-00324–00325; GIABR.

Non-type material (ex *Hemixos flavala flavala*)
CHINA • 1 ♂, 2 ♀♀; Yunnan Province, Dehong Dai and Jingpo Autonomous Prefecture, Yingjiang County, Hongbeng River; 26 May 2013; Y. Wu leg.; J1063; GD-PHTH-00312–00314; GIABR • 1 ♂, 1 ♀; same locality as for preceding; 23 May 2013; Y. Wu and X. Che leg.; host J1027; GD-PHTH-00315–00316; GIABR.

Remarks

Specimens from *Alophoixus flaveolus burmanicus* and *A. pallidus henrici* examined by us are indistinguishable from the illustrations of Najer *et al*. (2012), and we agree with Chu *et al*. (2019) that these specimens represent *Po. flavala*. Chu *et al*. (2019) also reported this species from *Hypsipetes leucocephalus* (Gmelin, 1789), but the male on which this report was based was misidentified (see below).

Philopteroides cucphuongensis Mey, 2004
Figs 106–111

Type host

Pycnonotus finlaysoni eous Riley, 1940 – stripe-throated bubul.

Other hosts

Pycnonotus blanfordi conradi (Finsch in Finsch & Conrad, 1873) – streak-eared bulbul new host record. *Brachypodius melanoleucos* (Eyton, 1839) – black-and-white bulbul [Najer *et al.* 2021]; *Pycnonotus xanthorrhous xanthorrhous* Anderson, 1869 – brown-breasted bulbul [Najer *et al.* 2021].

Material examined

Non-type material (ex *Pycnonotus blanfordi conradi*)

THAILAND • 2 ♂♂, 4 ♀♀; Lampang Province, Pang La; 5 Feb 1953; R.E. Elbel and H.G. Deignan leg.; RE-2243, RT-B-22711; BPBM.

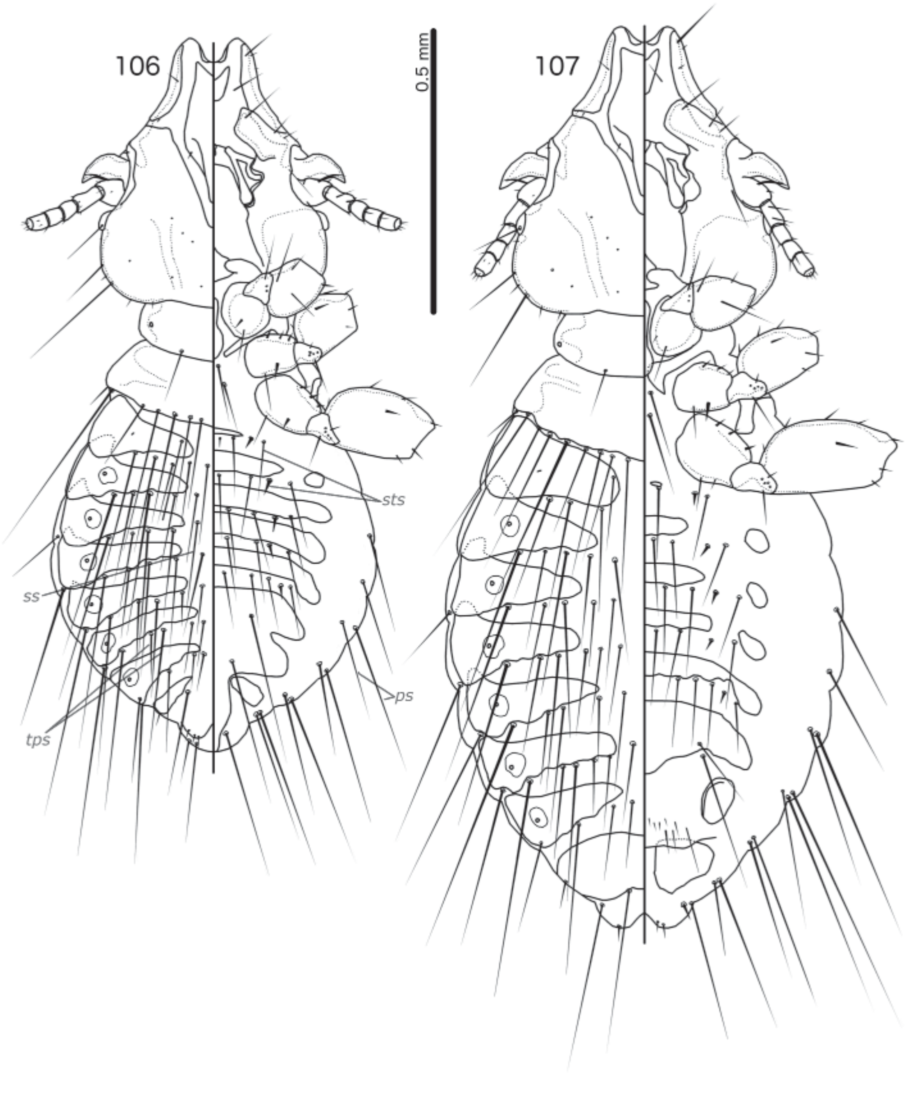
Type locality

Cuc Phuong National park, Vietnam.

Description

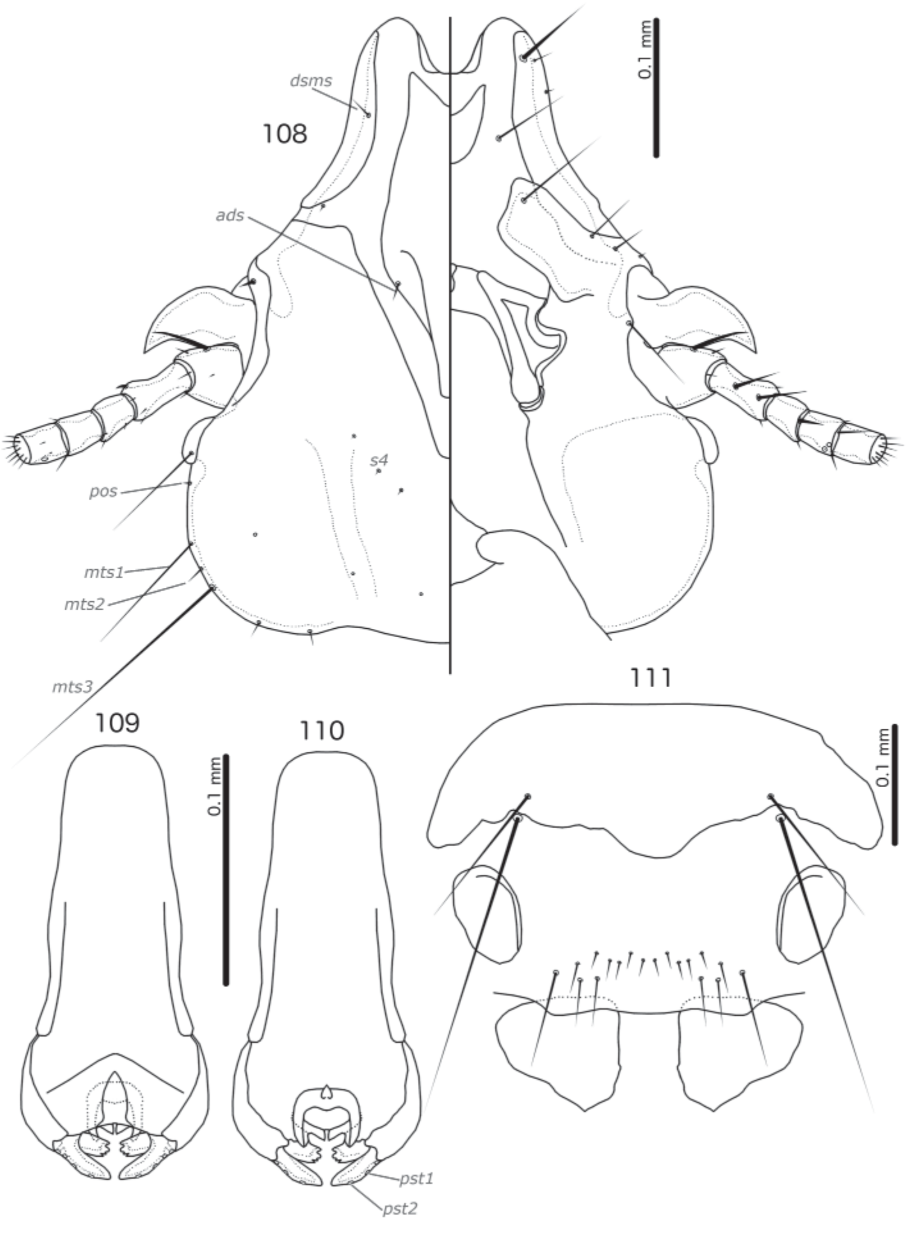
Both sexes

Head shape as in Fig. 108, lateral margins of preantennal area concave, frons deeply concave, with central sclerotization divided medianly. Dorsal anterior plate with deeply concave anterior margin, convex lateral margins in anterior end, and slender posterior elongation that reaches posterior to mandibles.



Figs 106–107. *Philopteroides cucphuongensis* Mey, 2004. **106**. Male habitus, dorsal and ventral views. **107**. Female habitus, dorsal and ventral views. Abbreviations: *ps* = paratergal seta; *ss* = sutural seta; *sts* = sternal seta; *tps* = tergal posterior seta.

Ventral anterior plate crescent shaped, with deeply concave anterior margin. Lobes of ventral carinae transparent and hard to see in many specimens. Head chaetotaxy as in Fig. 108. Thoracic and abdominal segments as in Figs 106–107. Tergopleurites III–VIII with translucent fenestrae around spiracular opening; plates only barely reaching ventral surface. Base pigmentation pale brown, darker on dorsal and ventral anterior plates, preantennal nodi, temporal carinae, and proepimera, very dark brown on marginal carinae anterior to lobes of ventral carinae.



Figs 108–111. *Philopteroides cucphuongensis* Mey, 2004. **108**. Male head, dorsal and ventral views. **109**. Male genitalia, dorsal view. **110**. Male genitalia, ventral view. **111**. Female subgenital plate and vulval margin, ventral view. Abbreviations: *ads* = anterior dorsal seta; *dsms* = dorsal submarginal seta; *mts1–3* = marginal temporal seta 1–3; *pos* = preocular seta; *pst1–2* = parameral setae 1–2; *s4* = postantennal head sensillum 4.

Male

Thoracic and abdominal chaetotaxy as in Fig. 106. Metanotum with 7–9 *mms* on each side. Sternal plate II very small and may be divided medianly; sternal plate III with accessory lateral plate; sternites IV–VI wide, with no separation between central and lateral plates. Subgenital plate with large, oblong lateral plate on segment IX+X. Basal apodeme long, widening gently in distal end (Fig. 109). Dorsal thickening of mesosome slender, mitre-shaped. Gonopore wide, inverse U-shaped, with small triangular process on anterior margin and median thickening (Fig. 110). Distal processes of mesosome broad with rugose median margins. Parameres simple; 2 sensilla on lateral margin of basal paramere, and 2 sensilla on lateral margin in distal half of each paramere. Measurements as in Tables 1–2.

Female

Thoracic and abdominal chaetotaxy as in Fig. 107. Metanotum with 9–11 setae on each side. Sternal plate II very small, divided medianly or absent; sternal plates III–V with accessory lateral plates; sternal plate VI wide, with narrow connection to accessory lateral plate. Lateral ends of subgenital plate bending posteriorly, median section with distinct bulge. Vulval margin more or less straight with a sublateral bulge on each side (Fig. 111), with 5 short and 3 long setae on each side. Subvulval plates broad, with blunt distal ends. Measurements as in Tables 1–2.

Remarks

No type specimens of *Po. cucphuongensis* or specimens from the type host of this species were examined. The specimens examined are largely indistinguishable from the original description of *Po. cucphoungensis*, with the following exceptions: female abdominal segment VII with 3 *ps* on each side in our specimens (Fig. 107), but with 2 *ps* on each side in specimens from type host; *mts1* significantly shorter than *mts3* in our specimens (Fig. 108), but of similar length in specimens from type host; male central sternal plate III clearly separated from accessory lateral sternal plates in our specimens (Fig. 106), but closer together and in some cases fused in specimens from the type host. The preantennal head is also slightly narrower in specimens from the type host than in our specimens (Fig. 108), but the shape is similar. Measurements are largely overlapping between specimens from the two hosts (Table 1).

We consider these differences to be insufficient to separate these specimens from *Po. cucphuongensis*, and consider *Pycnonotus blanfordi conradi* to be a new host record for this species; moreover, this is the first record of *Po. cucphuongensis* from Thailand. However, the original illustrations of *Po. cucphuongensis* are only partial, and e.g., the male genitalia are illustrated with dorsal and ventral features mixed. It is possible that more detailed comparisons of the male genitalia and other characters will necessitate the separation of these specimens as a separate species. We here provide a description and illustrations of our specimens, to complement those of Mey (2004).

Philopteroides holosternus sp. nov.

urn:lsid:zoobank.org:act:4ACFDCEE-4214-4FAB-AF53-0EAD86F9C20D
Figs 112–117

Diagnosis

Philopteroides holosternus sp. nov. does not appear particularly close to any other species of *Philopteroides* known from bulbuls. It can be separated from all other species in the genus known from bulbuls by the following characters: male sternal plates III–VI entire, with no lateral accessory sternal plates present (Fig. 112); dorsal sclerite of mesosome with elongated, bifid proximal end (Fig. 115); distal basal apodeme with central ridge that appears to lie dorsal to dorsal sclerite and bear one sensillum on each side (Fig. 115); gonoporal complex unique among species known from bulbuls (Fig. 116).

Table 2. Additional measurements for the species of *Philopteroides* Mey, 2004 described here. Abbreviations: ADPL = anterior dorsal plate length; ADPW = anterior dorsal plate width; ANW = anterior notch width; GW = genital width (male); N = number; PAL = preantennal head length; PAW = preantennal head width; POL = post-antennal head length; SGPW = subgenital plate width; TRL = trabeculum length; TRW = trabeculum width.

Louse	Host	Sex	N	SGPW	GW	PAW	PAL	TRL	TRW	POL	ADPW	ANW	ADPL
Po. cucphuongensis	*Pycnonotus blanfordi conradi*	♂	2	0.31–0.33	0.08	0.27–0.28	0.18–0.19	0.08–0.09	0.04	0.20	0.09–0.10	0.09–0.10	0.13
		♀	4	0.34–0.39	–	0.31–0.32	0.21–0.22	0.09–0.11	0.04–0.05	0.23–0.24	0.11–0.12	0.09–0.11	0.15–0.16
Po. flavala	*Alophoixus flaveolus burmanicus*	♂	3^1	0.30	0.08–0.09	0.33–0.41	0.23–0.24	0.09–0.10	0.04–0.05	0.23	0.10–0.11	0.10–0.11	0.21–0.23
	Alophoixus pallidus henrici	♂	4	0.28–0.30	0.08–0.09	0.28–0.32	0.21–0.24	0.10	0.04–0.05	0.20–0.29	0.10	0.08–0.10	0.16–0.24
		♀	3	0.26–0.28	–	0.29–0.36	0.21–0.25	0.10–0.12	0.04–0.06	0.21–0.26	0.10–0.13	0.08–0.11	0.15–0.24
	Hemixos flavala	♂	2^2	0.31	0.09	0.30–0.34	0.23–0.24	0.09	0.04	0.22–0.23	0.10-0.11	0.09–0.10	0.22–0.25
		♀	3^3	0.31	–	0.30–0.36	0.25–0.26	0.09–0.10	0.04–0.05	0.24–0.26	0.11–0.13	0.09	0.24
Po. haerixos	*Ixos mcclellandii holtii*	♂	3	0.28–0.29	0.08–0.09	0.27–0.28	0.21–0.22	0.10–0.11	0.04–0.05	0.20–0.21	0.10	0.06–0.08	0.15–0.16
		♀	4	0.25–0.30	–	0.28–0.30	0.21–0.23	0.10–0.11	0.04–0.05	0.21–0.23	0.10–0.11	0.07–0.09	0.15–0.17
Po. holosternus	*Pycnonotus goiavier goiavier*	♂	1	0.37	0.09	0.31	0.20	0.10	0.04	0.22	0.10	0.08	0.14
		♀	2	0.34	–	0.31	0.21	0.10	0.04	0.22–0.23	0.11	0.07–0.08	0.15–0.16
Po. longiclypeatus	*Hypsipetes everetti samarensis*	♂	3	0.24–0.27	0.08	0.24–0.25	0.19–0.21	0.08–0.09	0.03–0.04	0.19–0.21	0.09–0.10	0.05–0.07	0.14–0.17
		♀	4^4	0.24–0.26	–	0.26	0.20–0.21	0.07–0.08	0.03–0.04	0.19–0.21	0.10	0.04–0.06	0.15–0.16

[1,2,3] N for SGPW = 1; [4] N for SGPW = 3.

Etymology

The species name is derived from the Greek words ‘*holos*’ for ‘whole’, and ‘*sternon*’ for ‘chest’, referring to the broad sternal plates and uninterrupted sternal plate of male abdominal segment III.

Material examined

Holotype (ex *Pycnonotus goiavier goiavier*)

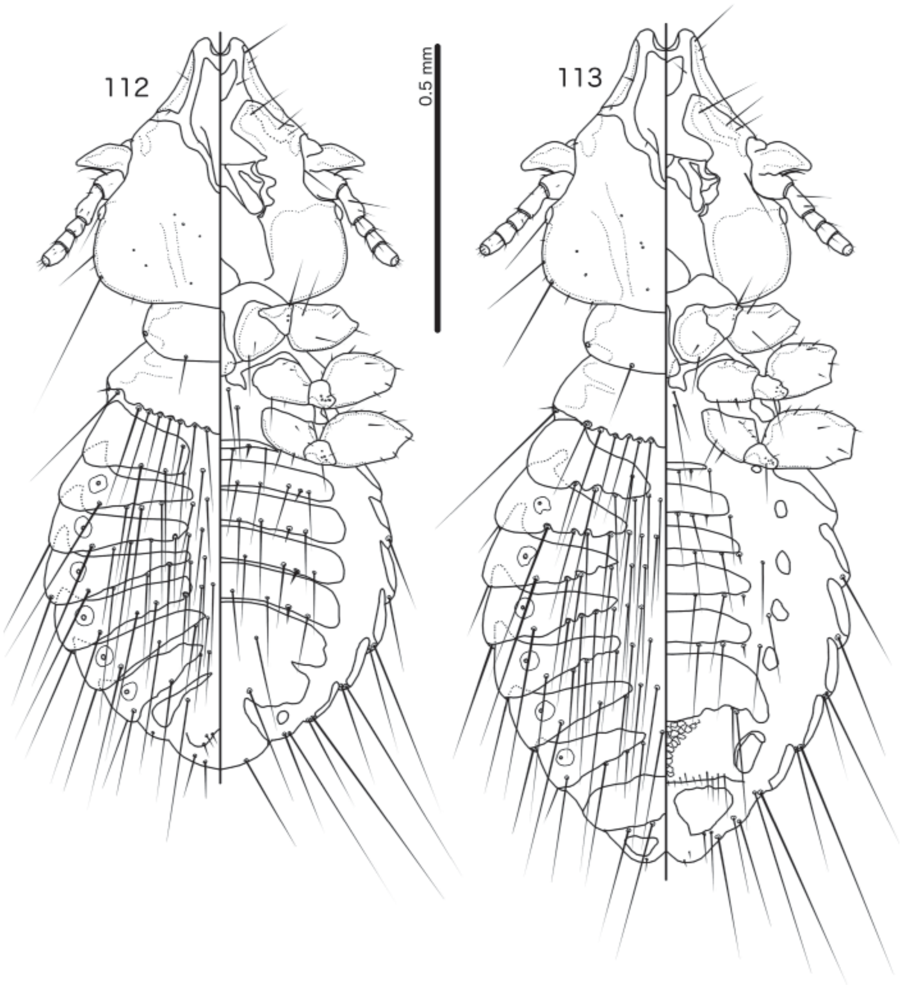
PHILIPPINES • ♂; Negros Oriental, Siaton; 6 Feb. 1965; H.E. McClure leg.; SE-1760, 23710 on reverse; BPBM.

Paratypes

PHILIPPINES • 1 ♀; same locality, collector and host as for holotype; SE-1755, 23709 on reverse; BPBM • 1 ♀; Negros [Oriental], Siaton, Maloh; 2 Mar. 1965; H.E. McClure leg.; MAPS-5E2081, 23711 on reverse; BPBM.

Type host

Pycnonotus goiavier goiavier (Scopoli, 1786) – yellow-vented bulbul.

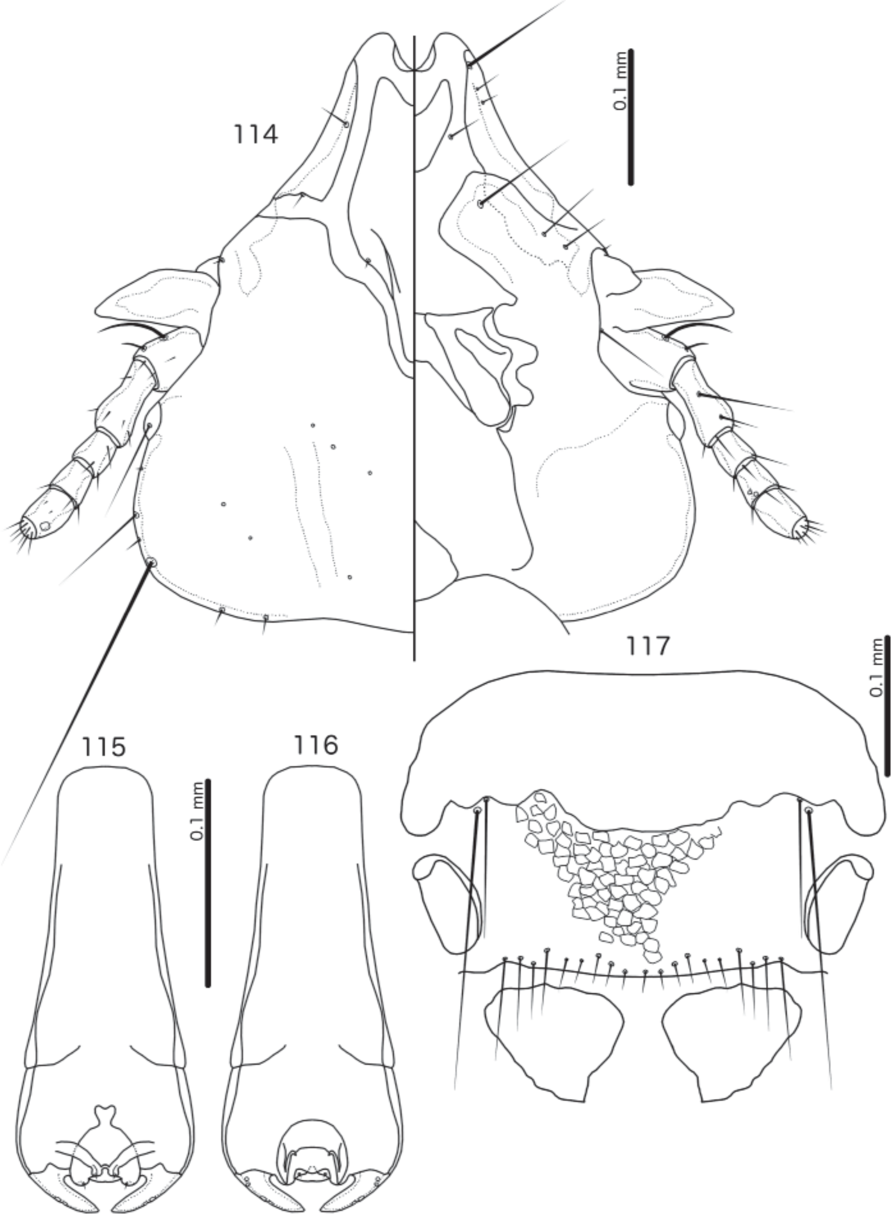


Figs 112–113. *Philopteroides holosternus* sp. nov. **112**. Male habitus, dorsal and ventral views. **113**. Female habitus, dorsal and ventral views.

Description

Both sexes

Head shape as in Fig. 114, lateral margins of preantennal area shallowly concave, frons deeply concave, with central sclerotization medianly continuous. Dorsal anterior plate as in Fig. 114. Ventral anterior plate rounded triangular, anterior margin concave. Lobes of ventral carina trapezoidal, widening medianly. Head chaetotaxy as in Fig. 114. Thoracic and abdominal segments as in Figs 112–113; sternal plates broad. Pigmentation differs between sexes, with female much darker than male. Tergopleurites III–VIII with translucent fenestrae around spiracular openings.



Figs 114–117. *Philopteroides holosternus* sp. nov. **114**. Male head, dorsal and ventral views. **115**. Male genitalia, dorsal view. **116**. Male genitalia, ventral view. **117**. Female subgenital plate and vulval margin, ventral view.

Male

Thoracic and abdominal chaetotaxy as in Fig. 112. Metanotum with 8–9 setae on each side. Base pigmentation light brown, except posterior elongation of dorsal anterior plate, temporal carinae, and proepimera medium brown. Sternal plate II medianly continuous; sternal plates III–VI broad, long, not divided into central and accessory plates. Subgenital plate large, with small irregular accessory plate on segment IX+X. Basal apodeme broad (Fig. 115), narrowing markedly in anterior end, with slightly convex anterior margin. Distal end of basal apodeme with arched, medianly convergent dorsal ridges (Fig. 115). Dorsal thickening of mesosome with bifid anterior extension. Gonopore wide, crescent shaped, distally with wide, blunt nodes (Fig. 116); 1 sensillum on each lobe. Parameres simple (Fig. 116), 2 sensilla on lateral margin of basal paramere, and 2 sensilla on lateral margin in distal half of each paramere. Measurements as in Tables 1–2.

Female

Thoracic and abdominal chaetotaxy as in Fig. 113. Metanotum with 7–9 setae on each side. Base pigmentation pale brown, except marginal carina, dorsal anterior plate, preantennal nodi, temporal and temporal marginal carinae, proepimera, prosternal plate, lateral and posterior sections of metanotum, and lateral sections of tergopleurites medium brown. Sternal plate II short but wide (Fig. 113), medianly continuous, and with small lateral accessory plate on each side; sternal plates III–VI wide, with small lateral accessory plates on each side. Subgenital plate as in Fig. 117. Surface between subgenital plate and vulval margin with faint reticulation. Vulval margin more or less straight (Fig. 117), with 4–5 long and 4–5 short setae on each side. Subvulval plates broad, distal end widely pointed. Measurements as in Tables 1–2.

Philopteroides longiclypeatus sp. nov.

urn:lsid:zoobank.org:act:65995C7C-D0A2-40B5-8A19-A5CA73A1F2FC

Figs 118–123

Diagnosis

Philopteroides longiclypeatus sp. nov. is most similar to *Philopteroides haerixos* sp. nov., with which it shares the following characters: abdominal segment III without *ps* in both sexes (Figs 118–119, 124–125); male sternite III with lateral accessory sternal plate present and separate from central sternal plate (Figs 118, 124); dorsal sclerotization of mesosome broad, roughly triangular (Figs 121, 127); no median dorsal ridges on distal end of basal apodeme (Figs 121, 127).

Philopteroides longiclypeatus sp. nov. can be separated from *Po. haerixos* sp. nov. by the following characters: head coni slender elongated in *Po. longiclypeatus* sp. nov. (Fig. 120), but broad bulky in *Po. haerixos* sp. nov. (Fig. 126); sternal plate II absent in both sexes in *Po. haerixos* sp. nov. (Figs 124–125), but present in *Po. longiclypeatus* sp. nov. (Figs 118–119); male basal apodeme narrowing anteriorly in *Po. longiclypeatus* sp. nov. (Figs 121–122), but in all its length more or less equally wide in *Po. haerixos* sp. nov. (Figs 127–128); gonoporal complex of different structure (Figs 122, 128); female subgenital plate with elongated, slender postero-lateral extensions in *Po. longiclypeatus* sp. nov. (Fig. 123), but without such extensions in *Po. haerixos* sp. nov. (Fig. 129); mesometasternal plate absent or poorly sclerotized in *Po. haerixos* sp. nov. (Figs 124–125), but clearly visible in *Po. longiclypeatus* sp. nov. (Figs 118–119).

Etymology

The species name is derived from the Latin words ‘*longus*’ for ‘long’ and ‘*clypeus*’ for ‘shield’, referring to the long dorsal anterior plate.

Material examined

Holotype (ex *Hypsipetes everetti samarensis*)

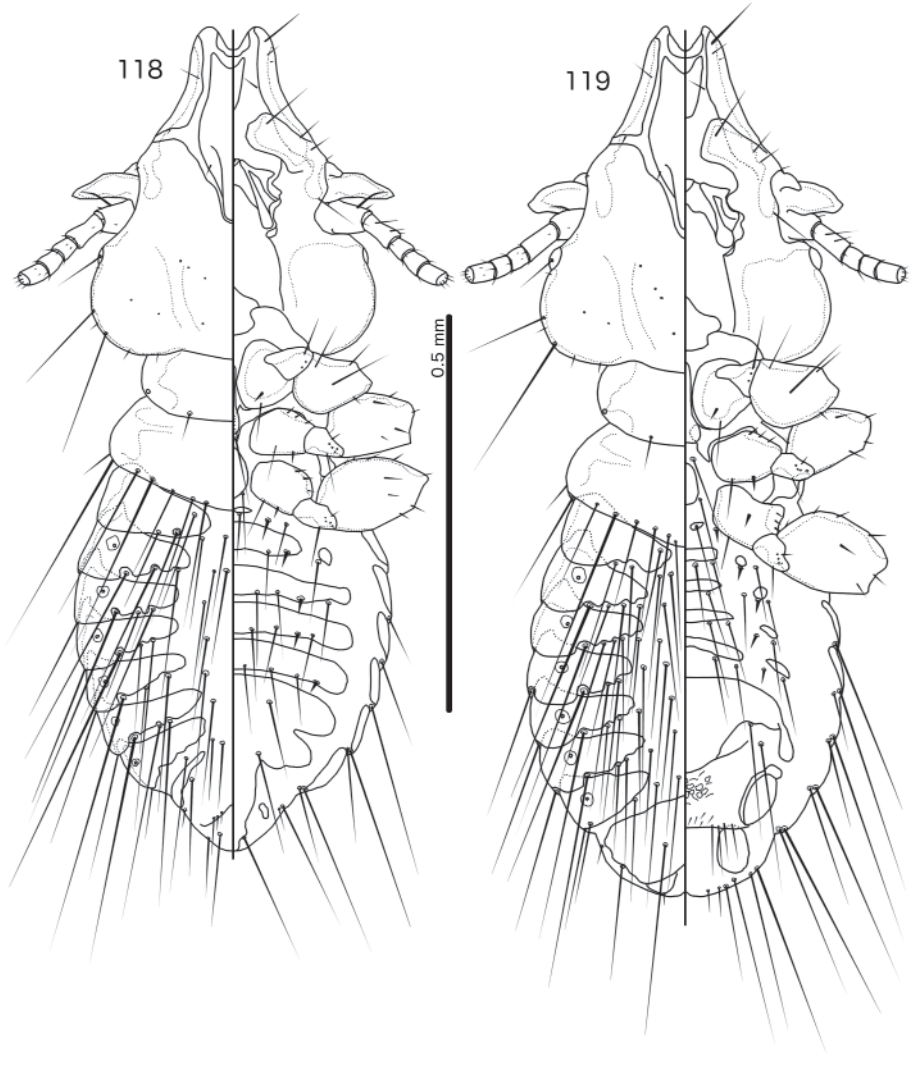
PHILIPPINES • ♂; Leyte Island, Mahaplag, Mount Kabalanti-am, Bulog Peak; 1 Jul. 1964; D.S. Rabor leg.; B-3553; BPBM.

Paratypes

PHILIPPINES • 1 ♂; same collection data as for holotype; BPBM • 1 ♂, 3 ♀♀; same locality, collector and host as for holotype; 24 Jun. 1964; BBM-2757; BPBM • 1 ♀; Leyte Island, Mahaplag, Mount Kabalanti-am, Paniniklan; 21 Jun. 1964; N. Wilson leg,; BBM-2558; BPBM.

Type host

Hypsipetes everetti samarensis Rand & Rabor, 1959 – yellowish bulbul.

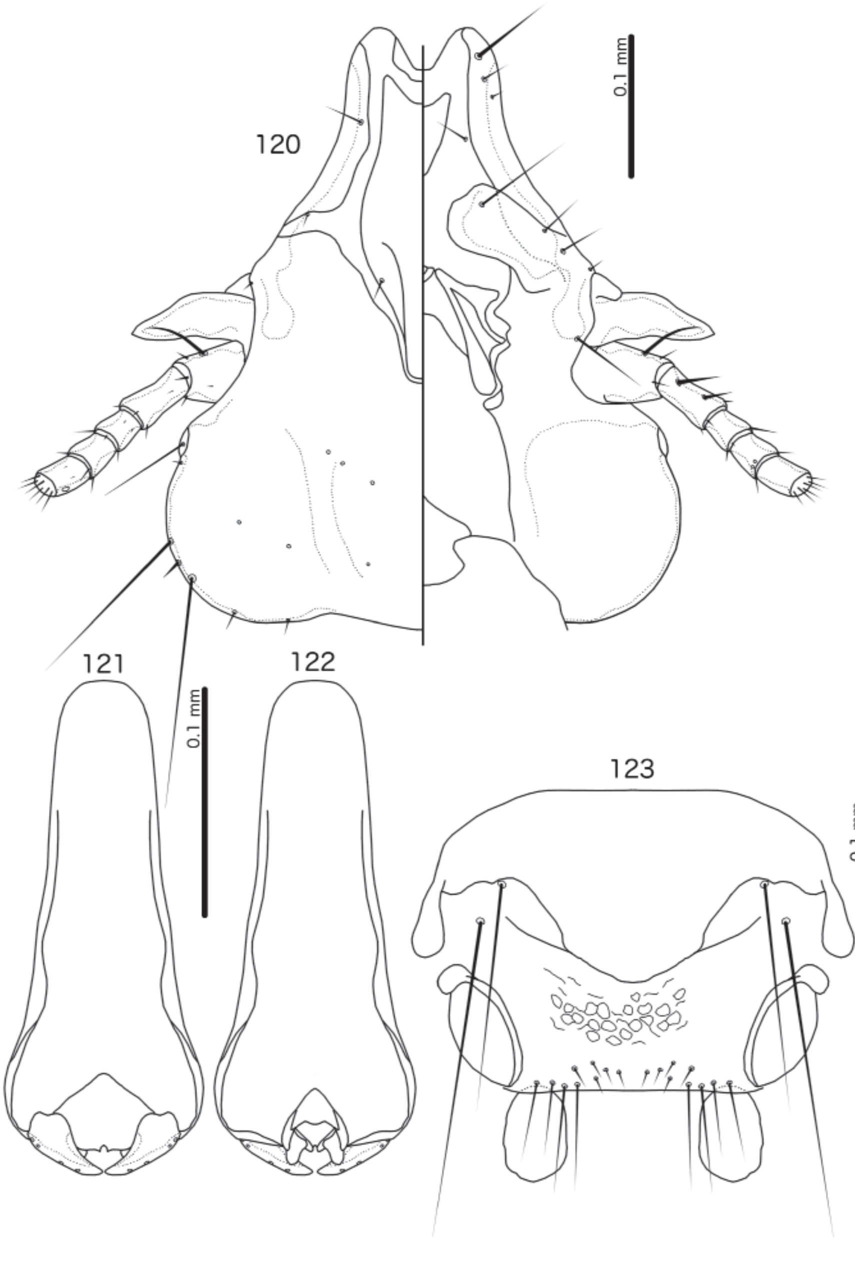


Figs 118–119. *Philopteroides longiclypeatus* sp. nov. **118**. Male habitus, dorsal and ventral views. **119**. Female habitus, dorsal and ventral views.

Description

Both sexes

Head shape as in Fig. 120, anterior end narrow and elongated, lateral margins of preantennal head slightly concave, frons deeply concave, with central sclerotization medianly continuous. Dorsal anterior plate with moderately concave anterior margin, convex lateral margins in anterior end, and slender posterior elongation that does not reach beyond mandibles. Ventral anterior plate elongated triangular, with concave anterior margin. Lobes of ventral carinae roughly rectangular. Head chaetotaxy as in Fig. 120. Thoracic and abdominal segments as in Figs 118–119. Tergopleurites III–VIII with small translucent fenestrae



Figs 120–123. *Philopteroides longiclypeatus* sp. nov. **120**. Male head, dorsal and ventral views. **121**. Male genitalia, dorsal view. **122**. Male genitalia, ventral view. **123**. Female subgenital plate and vulval margin, ventral view.

around spiracular openings; plates barely reaching ventral surface. Base pigmentation moderate yellow, only mandibles and parts of preantennal nodi and marginal carina darker.

Male

Thoracic and abdominal chaetotaxy as in Fig. 118. Metanotum with 6–7 setae on each side. Sternal plate II very small, divided medianly; sternal plate III with lateral accessory plate on each side; sternal plates IV–VI wide, without accessory plates. Subgenital plate large, with small, irregular lateral accessory plate on segment IX+X. Basal apodeme long, slender (Fig. 121), widening distally. Dorsal thickening of mesosome diffuse but broad, roughly triangular (Fig. 121). Gonopore wide, anterior margin with blunt median point (Fig. 122), distally with bilobed median processes on each side. Parameres simple (Fig. 121); 2 sensilla on lateral margin of basal paramere, and 2 sensilla on lateral margin in distal half of each paramere. Measurements as in Tables 1–2.

Female

Thoracic and abdominal chaetotaxy as in Fig. 119. Metanotum with 6–7 setae on each side. Sternal plate II small, divided medianly; sternal plates III–VI small, in some specimens with median part much narrowed, each with small accessory plate on each side, in more posterior segments often oblong. Subgenital plate as in Fig. 123, lateral sections with slender posterior extensions, detached from subgenital plate in some specimens; median section with wide, often angular, posterior bulge. Surface between subgenital plate and vulval margin densely reticulated. Vulval margin slightly concave, with 4 long and 3 short setae on each side. Subvulval plates small, oval. Measurements as in Tables 1–2.

Remarks

Abdominal size is variable among female specimens examined. We have illustrated a female with a proportionately small abdomen, but note that other specimens have proportionately larger abdomens, similar to those of other species treated here. Structurally, there are no differences between the abdomens of these females, and we do not consider these differences meaningful. We illustrate the smaller-bodied specimens here to highlight the possible variation in body shapes among specimens of *Philopteroides*.

Philopteroides haerixos sp. nov.

urn:lsid:zoobank.org:act:B529D973-4C45-44DC-8109-34C87204441F
Figs 124–129

Diagnosis

Philopteroides haerixos sp. nov. is most similar to *Philopteroides longiclypeatus* sp. nov., with which it shares the following characters: abdominal segment III without *ps* in both sexes (Figs 118–119, 124–125); male sternite III with lateral accessory sternal plate present and separate from central sternal plate (Figs 118, 124); dorsal sclerotization of mesosome broad, roughly triangular (Figs 121, 127); no median dorsal ridges on distal end of basal apodeme (Figs 121, 127).

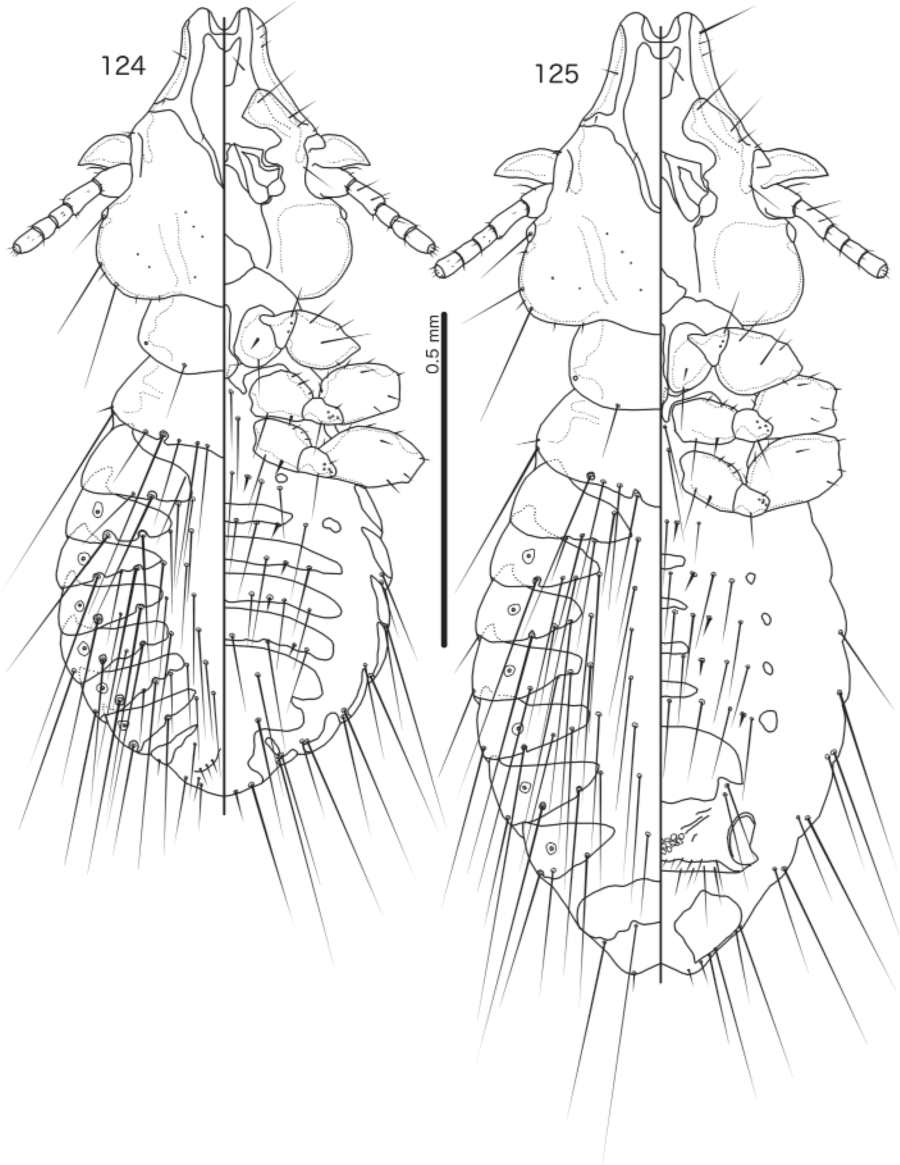
Philopteroides haerixos sp. nov. can be separated from *Po. longiclypeatus* sp. nov. by the following characters: head coni broad bulky in *Po. haerixos* sp. nov. (Fig. 126), but slender elongated in *Po. longiclypeatus* sp. nov. (Fig. 120); sternal plate II absent in both sexes in *Po. haerixos* sp. nov. (Figs 124–125), but present in *Po. longiclypeatus* sp. nov. (Figs 118–119); male basal apodeme in all its length more or less equally wide in *Po. haerixos* sp. nov. (Figs 127–128), but narrowing anteriorly in *Po. longiclypeatus* sp. nov. (Figs 121–122); gonoporal complex of different structure (Figs 122, 128); female subgenital plate with elongated, slender postero-lateral extensions in *Po. longiclypeatus* sp. nov. (Fig. 123), but without such extensions in *Po. haerixos* sp. nov. (Fig. 129); mesometasternal plate absent or poorly sclerotized in *Po. haerixos* sp. nov. (Figs 124–125), but clearly visible in *Po. longiclypeatus* sp. nov. (Figs 118–119).

Etymology

The species name is derived from the Latin '*haereo*', for 'I attach myself (to)', and the genus of the type host, *Ixos* Temminck, 1825

Material examined

Holotype (ex *Ixos mcclellandii holtii*)
CHINA • 1 ♂; Guangxi Province, Jingxin County; 30 Sep. 2004; S.E. Bush leg.; ATP-2004-141; P-395; NHML.



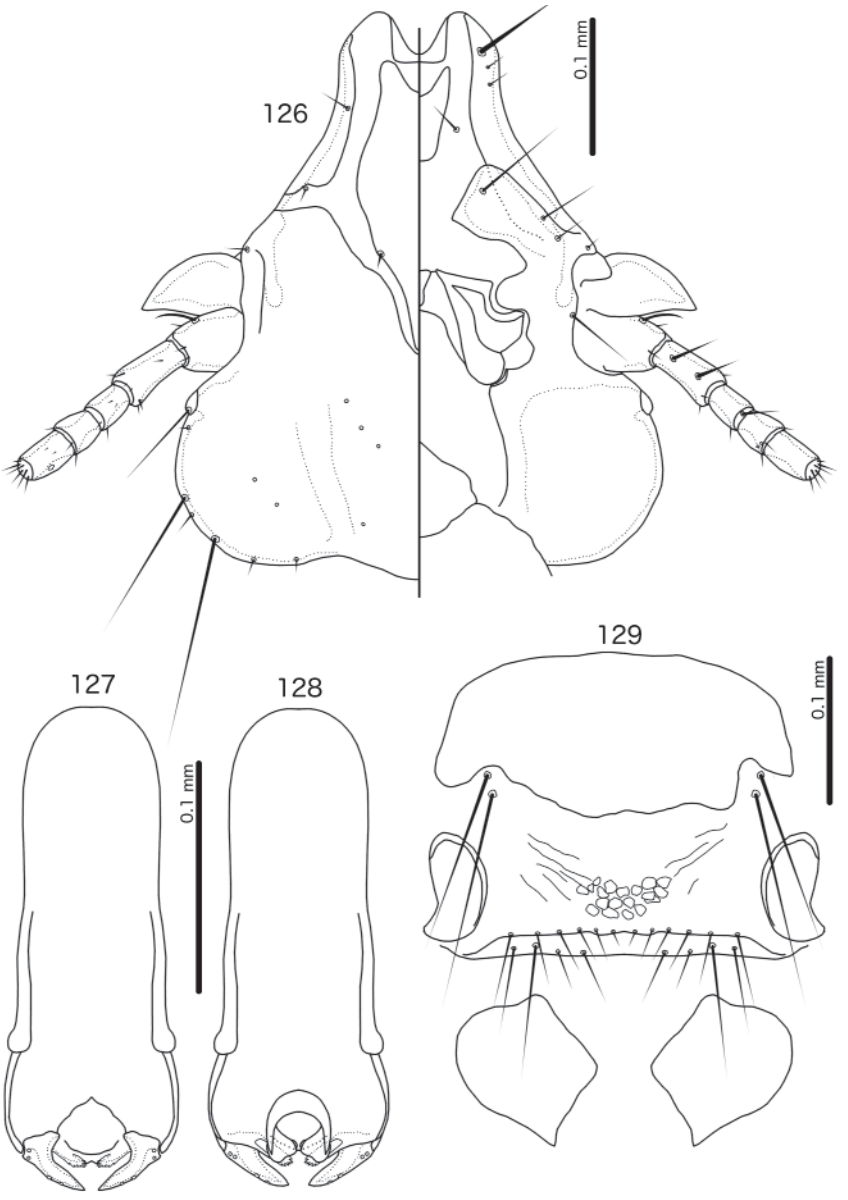
Figs 124–125. *Philopteroides haerixos* sp. nov. **124**. Male habitus, dorsal and ventral views. **125**. Female habitus, dorsal and ventral views.

Paratypes

CHINA • 1 ♀; same locality and collector as for holotype; 30 Sep. 2004; ATP-2004-49; P-137; NHML • 1 ♂, 2 ♀♀; same locality and collector as for holotype; 28 Sep. 2004; ATP-2004-113, P-325; PIPR • 2 ♀♀; same collection data as for preceding; GC-2004-29, P-521; PIPR.

Type host

Ixos mcclellandii holtii (Swinhoe, 1861) – mountain bulbul.



Figs 126–129. *Philopteroides haerixos* sp. nov. **126**. Male head, dorsal and ventral views. **127**. Male genitalia, dorsal view. **128**. Male genitalia, ventral view. **129**. Female subgenital plate and vulval margin, ventral view.

Description

Both sexes

Head shape as in Fig. 126, lateral margins of preantennal head concave, frons deeply concave, with central sclerotization medianly continuous. Dorsal anterior plate with deeply concave anterior margin, convex lateral margins, and moderate posterior extension reaching beyond mandibles. The posterior extension continually outgoing from the rest of the plate, without clear angle or separation. Ventral anterior plate trapezoidal, with deeply concave anterior margin. Lobes of ventral carinae rectangular, bulging slightly posteriorly in median section. Head chaetotaxy as in Fig. 126. Thoracic and abdominal chaetotaxy as in Figs 124–125. Base pigmentation yellowish brown, except marginal carina, preantennal nodi, and proepimera slightly darker. Male sternal and subgenital plates brown with slight reddish tint; female sternal and subgenital plates the same yellowish color as tergopleurites.

Male

Thoracic and abdominal chaetotaxy as in Fig. 124. Metanotum with 6–7 setae on each side. Sternal plate II absent but small, rounded lateral accessory plate present; sternal plate III with lateral accessory plate; sternal plates IV–VI wide, without accessory plates. Subgenital plate large, with small kidney-shaped accessory plate on segment IX+X. Basal apodeme long (Fig. 127), only slightly more narrow proximally than distally. Dorsal thickening of mesosome rounded triangular (Fig. 127). Gonopore deeply crescent shaped (Fig. 128), with rounded anterior margin, distally with blunt, lobe-like median extensions. Parameres simple (Fig. 127); 2 sensilla on lateral margin of basal paramere, and 2 sensilla on lateral margin in distal half of each paramere. Measurements as in Tables 1–2.

Female

Thoracic and abdominal chaetotaxy as in Fig. 125. Metanotum with 6–7 setae on each side. Sternal plate II absent or very small at base of median-most setae; sternal plates III–VI small with small, often irregularly shaped, lateral accessory plates. Subgenital plate as in Fig. 128, lateral sections only slightly extended posteriorly. Surface between subgenital plate and vulval margin with some reticulation in postero-median section. Vulval margin more or less straight, with 4–5 long and 3–4 short setae on each side. Subvulval plates large, distal ends pointed and curving slightly medianly. Measurements as in Tables 1–2.

Philopteroides sp. indet. 1

Philopteroides flavala – Najer & Sychra in Najer *et al*. 2012: 39. — Chu *et al*. 2019: 337.

Host

Hypsipetes leucocephalus ambiens (Mayr, 1942) – black bulbul.

Material examined (ex *Hypsipetes leucocephalus ambiens*)

CHINA • 1 ♂; Yunnan Province, Dehong Dai and Jingpo Autonomous Prefecture, Ruili City, Huyu Township, Weijiao Village; 16 May 2013; Y. Zhang and Z. Huang leg.; J1195; GD-PHTH-00317; GIABR.

Remarks

We have re-examined the male *Philopteroides* reported from *H. l. ambiens* by Chu *et al.* (2019) in light of the new descriptions and the key constructed for this manuscript. This specimen has male genitalia that are similar to those of *Po. longiclypeatus* sp. nov., but with a larger and more semi-circular gonopore. Moreover, on segments III–IV the lateral accessory sternal plates are connected to the central sternal plate by a slightly narrowed "isthmus". Unfortunately, the male is poorly cleared, and cannot be described. However, as we do not consider it conspecific with *Po. flavala*, we hereby remove this record from the list of hosts from which this species is known.

Philopteroides sp. indet. 2

Philopteroides flavala – Najer & Sychra in Najer *et al*. 2012: 39. — Chu *et al*. 2019: 337.

Host

Hemixos castanonotus canipennis Seebohm, 1890 – chestnut bulbul.

Material examined

CHINA • 1 ♀; Guangdong Province, Ruyang, Nanling National Natural Forest, Babaoshan Management Station; 11 Apr. 2013; Q. Zhang, Y. Zhang and Z. Huang leg.; ex *Hemixos castanonotus canipennis* J0830; GD-PHTH-00319; GIABR.

Remarks

In light of these new descriptions, we re-examined the specimen of *Philopteroides* reported by Chu *et al*. (2019) from *H. c. canipennis*. The specimen is poorly cleared, and many characters used in our key cannot be seen; in our key, it is impossible to get beyond couplet 9 for this specimen. Overall, there seem to be no characters that directly contradict the statement that this specimen represents *Po. flavala*, but we prefer to consider this specimen to be unidentified, as the identity cannot be established with certainty. We therefore hereby remove *H. c. canipennis* from the host list of *Po. flavala*.

Dubious records

Craspedorrhynchus hiyodori (Uchida, 1949)

Philopterus hiyodori Uchida, 1949: 546, fig. 14.

Craspedorrhynchus hiyodori – Hopkins & Clay 1952: 91.
Philopterus hiyodori – Price *et al*. 2003: 131.
Tritrabeculus hiyodori – Mey 2001: 126.

Type host

Hypsipetes amaurotis amaurotis (Temminck, 1830) – brown-eared bulbul.

Type locality

Nii-jima Island, Izu Seven Islands Group, Tokyo Prefecture, Japan.

Remarks

The combination of characters illustrated by Uchida (1949) are incompatible with all known genera in the *Philopterus*-complex sensu Mey (2004). Hopkins & Clay (1952: 91) placed this species in *Craspedorrhynchus* "with some doubt", but did not expand on this placement. Indeed, the characters in the original illustration and description of this species agree well with those of most species of *Craspedorrhynchus*. Uchida (1949: 546) also stated that this species belonged to "Piaget's group *Delatatoclypeati* infesting the birds of prey", further supporting the removal of this species to *Craspedorrhynchus*.

Specifically, the hyaline margin of *Philopterus hiyodori* is without median sclerotization, emarginate medially, and extends lateral to the marginal carina. The dorsal anterior plate is elongate and tongue-like, without lateral extensions near *ads*. At least some preantennal setae appear to be dorsal, and the two anterior-most of these appear to be elongated and thickened compared to the other illustrated preantennal setae. The eyes are extended posteriorly. Apart from the *os*, three temporal setae on each side are illustrated as macrosetae; the identity of these is not clear, but they appear to be *mts1–3*. In the illustration, there is a dotted line along the median pterothorax, which is described as "separated by a narrow, uncoloured, mesal linear space" in the text; this suggests that the pterothorax is divided by a median suture. All these characters are found in *Craspedorrhynchus* (see Gállego *et al*. 1987; Mey 2001), except that posteriorly extended eyes are limited to a few species in this genus (e.g., Mey 2001: fig. 14).

Mey (2001) treated this species as a member of *Tritrabeculus* Uchida, 1948, but gave no details. Later, Mey (2004) did not include *Ph. hiyodori* in *Tritrabeculus*, limiting this genus to two species known from cuckoo-shrikes. The following characters mentioned or illustrated by Uchida (1949) separate *Ph. hiyodori* from *Tritrabeculus*: frons hyaline throughout in *Ph. hiyodori*, but medianly sclerotized in *Tritrabeculus*; *Ph. hiyodori* with four temporal macrosetae, but *Tritrabeculus* with only two temporal macrosetae; at least two preantennal setae on each side situated on the hyaline frons in *Ph. hiyodori*, but no setae situated in hyaline section in *Tritrabeculus*.

We hereby move *Philopterus hiyodori* to the genus *Craspedorrhynchus*, where it was previously placed by Hopkins & Clay (1952). As this genus is otherwise only found on raptors, it seems probable that *Cr. hiyodori* was described from stragglers. In the same publication, Uchida (1949) lists records of *Philopterus milvi* (Mjöberg, 1910) [= *Craspedorrhynchus spathulatus* (Giebel, 1875)], *Philopterus nisi* (Denny, 1842), and *Philopterus platyrhynchus* (Nitzsch, 1818) [= *Craspedorrhynchus haematopus* (Scopoli, 1763)], but none of his material is from the same locality as his specimens of *Cr. hiyodori*. A detailed study of the type specimens, if they remain, will be needed to establish whether *Cr. hiyodori* is synonymous with any of the other species of *Craspedorrhynchus* known from Japan.

Penenirmus guldum (Ansari, 1955)

Sturnidoecus guldum Ansari, 1955: 59.

Sturnidoecus guldum – Ansari 1956: 396; 1958b: 78.
Penenirmus guldum – Gustafsson & Bush 2017: 321.

Type host

Pycnonotus cafer intermedius Blyth, 1846 – red-vented bulbul.

Type locality

Pakistan, specific locality not provided.

Remarks

Ansari (1955, 1956, 1958b) described this species as new three times, but only Ansari (1958b) included enough details to be able to place this species accurately. As argued by Gustafsson & Bush (2017), this species belongs in *Penenirmus* Clay & Meinertzhagen, 1938, rather than *Sturnidoecus* Eichler, 1944. The type specimens of this species are presumed to be lost (Naz *et al.* 2020), and it has never been described or illustrated in sufficient detail. It should be considered a species inquirenda. No other species of *Penenirmus* have been described from any species of bulbul, but the genus is widely distributed across a large range of hosts (Price *et al.* 2003), and is generally poorly known, so species parasitizing bulbuls may have been overlooked. It is also possible that Ansari's specimens constituted stragglers or contaminations. Until more red-vented bulbuls have been examined, and it has been established whether or not *Pe. guldum* naturally occurs on this host species, *Pe. guldum* should be considered a species inquirenda.

Sturnidoecus acutifrons (Uchida, 1949)

Philopterus sturni var. *acutifrons* Uchida, 1949: 549.

Sturnidoecus acutifrons – Hopkins & Clay 1952: 344.

Type host

Hypsipetes amaurotis ogawae Hartert, 1907 – brown-eared bulbul.

Type locality

Amami-Oshima, Kagoshima Prefecture, Japan.

Remarks

Philopterus acutifrons was based on a single female, which was never illustrated or described in detail. It was separated from *Philopterus sturni* [= *Sturnidoecus sturni* (Schrank, 1776)] based on differences in measurements, the shape of the frons, and the lack of setae on posterior corners of the prothorax. In *Philopteroides*, the pronotal setae are situated more medianly, which may be interpreted as an 'absence' of setae on the pronotum. Similarly, the frons of *Philopteroides* on bulbuls is generally narrower and more deeply emarginated than in *Sturnidoecus sturni* (cf. Fig. 108 with Gustafsson & Bush 2017: fig. 379). However, as at least some of Uchida's species appear to be described from stragglers or contaminations (see above), it is possible that his specimen of *P. acutifrons* is a straggler that could belong to any head louse ecomorph genus occurring in Japan. Without examining specimens it is impossible to know what genus this belongs to; the species is in need of redescription, and should presently be considered a species inquirenda. If the type specimen is lost, it may be best to consider this name a nomen dubium, as it cannot reliably be placed in any genus.

Key to the ischnoceran lice known from bulbuls (Pycnonotidae Gray, 1840)

The species listed as "Dubious records" above have not been included in this key. *Brueelia schoddei* (Mey, 2017), which belongs to the same species group as the *Brueelia* species listed here, is not described in sufficient detail to be placed in the key.

1. Trabecula present (Fig. 108); dorsal anterior plate entirely surrounded by dorsal preantennal suture (Fig. 108); male mesosome fused to basal apodeme (Figs 109–110); female subvulval plates present (Fig. 111)............ 2
– Trabecula absent (Figs 3, 52); dorsal anterior plate absent (Fig. 52) or, if present, not separated from roof of head posteriorly (Fig. 3); male mesosome separate from basal apodeme (Figs 4, 53); female subvulval plates absent (Figs 2, 51)............ 12

2. Abdominal segment III with *ps*............ ***Philopteroides kayanobori*** (Uchida, 1948)
– Abdominal segment III without *ps* (Figs 106–107)............ 3

3. Male............ 4
– Female............ 8

4. Sternite III complete, with no separate accessory lateral sternal plate (Fig. 112)............
.... ***Philopteroides holosternus*** sp. nov.
– Sternite III with accessory lateral sternal plates either completely separate from central sternal plate (Fig. 106), or if continuous with central plate then point of fusion is much constricted into an 'isthmus'............ 5

5. Gonopore roughly circular, closed or nearly closed distally ....
.... ***Philopteroides flavala*** Najer & Sychra in Najer *et al*., 2012
– Gonopore not closed or nearly closed distally (Figs 122, 128) 6

6. Dorsal sclerotization of mesosome narrow, tongue-like (Fig. 109)..
....***Philopteroides cucphuongensi***s Mey, 2004.
– Dorsal sclerotization of mesosome broad, roughly triangular (Figs 121, 127) 7

7. Sternal plate II absent (Fig. 124), head coni broadly triangular (Fig. 126) ....
....***Philopteroides haerixos*** sp. nov.
– Sternal plate II present (Fig. 118), head coni finger-like elongated (Fig. 120)...................................
....***Philopteroides longiclypeatus*** sp. nov.

8. Central sternal plate VI continuous with accessory lateral sternal plate (Fig. 107) ....
....***Philopteroides cucphoungensis*** Mey, 2004
– Central sternal plate VI separated from accessory lateral sternal plate (Fig. 113) 9

9. Central sternal plate II absent (Fig. 125) ....***Philopteroides haerixos*** sp. nov.
– Central sternal plate II present (Fig. 113) [but may be separated medianly into two small plates (Fig. 119), or significantly reduced] 10

10. Subgenital plate with long, slender postero-lateral extensions (Fig. 123)..
....***Philopteroides longiclypeatus*** sp. nov.
– Subgenital plate without such extensions (Fig. 117) 11

11. Sternal plates IV–VI wide, reaching laterally to at least site of thorn-like *ss* (Fig. 113); tergopleurites V–VI with 7 setae on each side (Fig. 113)................................***Philopteroides holosternus*** sp. nov.
– Sternal plates narrower, not reaching site of thorn-like *ss*; tergopleurites V–VI with 5–6 setae on each side.. ***Philopteroides flavala*** Najer & Sychra in Najer *et al*., 2012

12. Dorsal preantennal suture present (Fig. 3).. 13
– Dorsal preantennal suture absent (Fig. 52).. 29

13. Male 14
– Female... 22

14. Tergopleurite IV with *aps* ....***Guimaraesiella flavala*** Najer & Sychra in Najer *et al*., 2012
– Tergopleurite IV without *aps* (Fig. 1).. 15

15. Tergopleurite V with *aps* (Fig. 8) 16
– Tergopleurite V without *aps* (Fig. 1) 17

16. Tergopleurite VIII with 1 *tps* on each side; abdominal segment IV with 2 *ps* on each side...............
....***Guimaraesiella cucphuongensis*** (Najer & Sychra in Najer *et al*., 2012)
– Tergopleurite VIII with 2 *tps* on each side (Fig. 8); abdominal segment IV with 1 *ps* on each side (Fig. 8) ....***Guimaraesiella brunneomarginata*** sp. nov.

17. Tergopleurite VI without *aps* (Fig. 29)...***Guimaraesiella ixi*** sp. nov.
– Tergopleurite VI with *aps* (Fig. 1) 18

18. Dorsal preantennal suture not reaching *ads* (Fig. 24)........................ ***Guimaraesiella lorica*** sp. nov.
– Dorsal preantennal suture reaching *ads* (Fig. 3).. 19

19. Tergopleurite VIII with 1 *tps* on each side (Fig. 1).. 20
– Tergopleurite VIII with 2 *tps* on each side (Fig. 15).. 21

20. Abdominal segment V with 1 *ps* on each side (Fig. 36); anterior extension of ventral sclerite broad (Fig. 41), basal apodeme narrowing anteriorly (Fig. 39)........ ***Guimaraesiella caligogularis*** sp. nov.
– A bdominal segment V with 2 *ps* on each side (Fig. 1); anterior extension of ventral sclerite slender (Fig. 6), basal apodeme widening anteriorly (Fig. 4) .... ***Guimaraesiella cinnamomea*** sp. nov.

21. Abdominal segment IV with 1 *ps* on each side (Fig. 43); abdominal segments VI–VII each with 2 *ps* on each side (Fig. 43), proximal mesosome outgoing into antero-lateral projections, ventral sclerite with anterior sclerotization (Fig. 48) .... ***Guimaraesiella phlaoalopha*** sp. nov.
– Abdominal segment IV with 2 *ps* on each side (Fig. 15); abdominal segments VI–VII each with 3 *ps* on each side (Fig. 22), proximal mesosome trapezoidal, with slightly convex anterior margin, ventral sclerite without anterior sclerotization (Fig. 20).........................***Guimaraesiella mayoensis*** sp. nov.

22. Abdominal segment IV without *ps* (Fig. 2) .... ***Guimaraesiella cinnamomea*** sp. nov.
– Abdominal segment IV with at least 1 *ps* on each side (Fig. 9) 23

23. Abdominal segment IV with 2 *ps* on each side (Fig. 16) 24
– Abdominal segment IV with 1 *ps* on each side (Fig. 9) 25

24. Abdominal segment V with 2 *ps* on each side (Fig. 30)..........................***Guimaraesiella ixi*** sp. nov.
– Abdominal segment V with 3 *ps* on each side (Fig. 16).............***Guimaraesiella mayoensis*** sp. nov.

25. Abdominal segment V with 1 *ps* on each side (Fig. 44).......... ***Guimaraesiella phlaoalopha*** sp. nov.
– Abdominal segment V with 2 *ps* one each side (Fig. 9) 26

26. Vulval margin with at most 11 thorn-like *vss* in total (Fig. 42)................................ ***Guimaraesiella cucphuongensis*** (Najer & Sychra in Najer *et al*., 2012) and ***Guimaraesiella caligogularis*** sp. nov.[1]
– Vulval margin with at least 12 thorn-like *vss* in total (Fig. 14) 27

27. Dorsal preantennal suture does not reach *ads* (Fig. 24)...................... ***Guimaraesiella lorica*** sp. nov.
– Dorsal preantennal suture reaches *ads* (Fig. 10)... 28

28. Dorsal preantennal suture extends median to *ads*...
.... ***Guimaraesiella flavala*** (Najer & Sychra in Najer *et al*., 2012).
– Dorsal preantennal suture does not extend median to *ads* ....
.... ***Guimaraesiella brunneomarginata*** sp. nov.

29. Male 30
– Female.. 40[2]

30. Abdominal segment IV without *ps* (Fig. 64) 31
– Abdominal segment IV with *ps* (Fig. 50) 32

31. Tergopleurite V with *ss* and *aps* (Fig. 64)...***Brueelia robertrankini*** sp. nov.
– Tergopleurite V without *ss* and *aps* (Fig. 57)..***Brueelia hermetica*** sp. nov.

32. Tergopleurite IV with *aps* .... ***Brueelia guldum*** Ansari, 1955
– Tergopleurite IV without *aps* (Fig. 50) 33

33. Abdominal segment VII with 2 *ps* on each side (Fig. 50) 34
– Abdominal segment VII with 1 *ps* on each side (Fig. 71) 38

34. Tergopleurite VIII with only 1 *tps* on each side (Fig. 50) 35
– Tergopleurite VIII with at least 2 *tps* on each side (Fig. 85) 37

35. Proximal mesosome rounded (Fig. 97); *tps* present on tergopleurite VII (Fig. 92)............................ .... ***Brueelia leiae*** sp. nov.
– Proximal mesosome rectangular (Fig. 55); *tps* absent on tergopleurite VII (Fig. 50).................... 36

36. Head shape as in Fig. 52; rugose section of mesosome extensive (Fig. 55); gonopore narrowly crescent shaped (Fig. 55) ....***Brueelia doisuthepensis*** sp. nov.
– Head shape as in Fig. 101; rugose area of mesosome limited to near distal margin (Fig. 104); gonopore shaped as in Fig. 104 ....***Brueelia yunnanensis*** sp. nov.

37. Lateral margins of preantennal head convex (Fig. 87); proximal mesosome convergent to median point (Fig. 90) ....***Brueelia colindalei*** sp. nov.
– Lateral margins of preantennal head more or less straight; proximal mesosome rounded................. .... ***Brueelia alophoixi*** Sychra in Sychra *et al*., 2009

38. Tergopleurite VIII without *tps* (Fig. 78) ....***Brueelia galeata*** sp. nov.
– Tergopleurite VIII with *tps* (Fig. 71) 39

39. Proximal mesosome gently rounded...................***Brueelia pseudognatha*** Gustafsson & Bush, 2017
– Proximal mesosome with broad median extension (Fig. 76) ....***Brueelia celer*** sp. nov.

40. Abdominal segment IV without *ps* (Fig. 86) ....***Brueelia colindalei*** sp. nov.
– Abdominal segment IV with *ps* (Fig. 72) 41

41. Abdominal segment VI with 2 *ps* on each side ..... ***Brueelia alophoixi*** Sychra in Sychra *et al*., 2012
– Abdominal segment VI with only 1 *ps* on each side (Fig. 65) 42

42. Abdominal segment VII with 2 *ps* on each side (Fig. 51) ....***Brueelia doisuthepensis*** sp. nov., ***Brueelia leiae*** sp. nov., ***Brueelia robertrankini*** sp. nov., ***Brueelia yunnanensis*** sp. nov.[3]
– Abdominal segment VII with only 1 *ps* on each side (Fig. 58) ....***Brueelia pseudognatha*** Gustafsson & Bush, 2017, ***Brueelia celer*** sp. nov., ***Brueelia galeata*** sp. nov., and ***Brueelia hermetica*** sp. nov.[4]

[1] No clear characters separate females of these two species, although the males are well separated (see text). The female subgenital plate of *Gu. cucphuongensis* was originally illustrated with a complete cross-piece, but reexamination of the specimens show that no such cross-piece exists in this species, and that the distal subgenital plate is more similar to that of *Gu. caligogularis* sp. nov.

[2] The female of *Brueelia guldum* has never been illustrated or described adequately, and the type material is presumed to be lost (Naz *et al*. 2020). Females of this species are therefore not included in this key.

[3] Females of these four species have identical abdominal chaetotaxy and overlapping vulval chaetotaxy, and are best separated by head shape or the shape of the subgenital plate and cross-piece.

[4] Females of these four species have identical abdominal chaetotaxy and overlapping vulval chaetotaxy, and are best separated by head shape or the shape of the subgenital plate and cross-piece.

Discussion

A phylogenetic study of bulbuls by Shakya & Sheldon (2017) found that the family (Pycnonotidae) is divided into two major clades. One of these clades included only genera that are endemic to Africa, whereas the other clade included mostly Asian birds, with a few species that appear to have colonized

Africa secondarily. We examined many chewing lice from bulbuls, including specimens from Asia and Africa. The lice we examined were divided into three genera: *Guimaraesiella*, *Brueelia*, and *Philopteroides*.

Guimaraesiella from bulbuls

The genus *Guimaraesiella* is widely distributed across both of the major bulbul clades (Table 3). To date, *Guimaraesiella* has not been described from African bulbul genera, but undescribed species have been reported by Bush *et al*. (2016), Light *et al.* (2016), and Gajdosova *et al*. (2020). In the phylogeny of Bush *et al.* (2016), *Guimaraesiella* parasitizing bulbuls were placed in two different groups: lice collected from four Asian bulbul species were placed in a clade with *Guimaraesiella* from other passerines, mainly from the Indo-Malayan and Australasian regions (Bush *et al*. 2016: fig. 3, clade A1), and lice from ten African bulbul species were nested in another clade containing *Guimaraesiella* from other Africa passerines (Bush *et al*. 2016: fig. 3, clade A2). The Asian bulbul *Guimaraesiella* in clade A1 are all part of the "core group" of *Guimaraesiella* (Gustafsson *et al*. 2019a), whereas the African species in clade A2 are not. The morphological variation among species in clade A2 is largely unexplored, and several species groups appear to be involved (DRG, unpublished data). As no African *Guimaraesiella* were studied in detail here, we cannot presently assess their phylogenetic relationships.

Brueelia from bulbuls

In contrast to *Guimaraesiella*, the *Brueelia* known from bulbuls all parasitize hosts belonging to the Asian clades in the phylogeny of Shakya & Sheldon (2017). Two species of *Brueelia* are known from African hosts, but these are found on bulbuls in the genus *Pycnonotus*, which is an Asian radiation of bulbuls that colonized Africa secondarily. To date, no species of *Brueelia* are known from bulbul genera endemic to Africa. In the phylogeny of Bush *et al.* (2016: fig. 3e, clade I-2), the species of *Brueelia* from bulbuls formed a single well-supported clade.

With the exception of *Br. guldum*, all species of *Brueelia* from bulbuls fall into a single morphological group, here called the *Br. alophoixi* species group. This group is characterized by a combination of characters that are either rare among other species of *Brueelia*, or found only in this group. Notably, almost all *Brueelia* species included in the phylogeny of Bush *et al*. (2016) were almost genetically identical; most of their samples are conspecific with the species here described as *Brueelia colindalei* sp. nov. Additional sampling is needed to understand the relationship between *Br. guldum* and other species of *Brueelia* known from bulbuls.

Philopteroides on bulbuls

With the species described here, only six species of *Philopteroides* are known from bulbuls, of which one (*Po. kayanobori*) is inadequately described and poorly known. The described species are all from hosts belonging to the Asian bulbul clade in the phylogeny of Shakya & Sheldon (2017). However, undescribed species have been reported from African hosts belonging to the African clade of bulbuls (Light *et al*. 2016). Notably, nearly every host sampled by Light *et al*. (2016) appears to be parasitized by a genetically distinct lineage of *Philopteroides*. This suggests that *Philopteroides* may be widely distributed across bulbuls, and that bulbuls may harbor a large, relatively unstudied, radiation of lice.

Host and geographic specificity

The family Pycnonotidae is quite diverse; it includes about 150 species in 26 genera. We are just beginning to understand the diversity of lice on these hosts; ischnoceran lice are known from just 24 bulbul species, which is ~16% of bulbul diversity. Thus, it is premature for in-depth analyses of the specificity of these lice. However, a few general patterns are beginning to emerge. All three of these genera of lice found on bulbuls are quite widely distributed on other passerines (Mey 2004; Valim & Palma 2013; Bush *et al.* 2016, Gustafsson & Bush 2017).

Table 3. Host associations of *Brueelia* Kéler, 1938, *Guimaraesiella* Eichler, 1949, and *Philopteroides* Mey, 2004 on hosts in the family Pycnonotidae, including undescribed species reported in, e.g., phylogenetic publications. Abbreviations: *Br.* = *Brueelia*; *Gu.* = *Guimaraesiella*; *Po.* = *Philopteroides.* Published reports of undescribed species are only included in those cases where no described species are known from a given host genus. As specimens reported by McClure *et al*. (1973) were not identified to species level, have not been described since, and were not examined by us, we have not been able to include these records in this table. References are given only to unidentified species; for references to reports of identified species, see the text. The non-type hosts of *Brueelia colindalei* sp. nov. reported by Bush *et al.* (2016) are not included here, until these host associations can be confirmed.

Host genus	***Brueelia*** **Kéler, 1938**	***Guimaraesiella*** **Eichler, 1949**	***Philopteroides*** **Mey, 2004**	Notes
Andropadus	–	–	–	
Alophoixus	*Br. alophoixi* *Br. doisuthepensis* *Br. galeata* *Br. yunnanensis*	*Gu. caligogularis* *Gu. phlaoalopha*	*Po. flavala*	
Arizelocichla	–	*Guimaraesiella* sp.	–	1
Atimastillas	–	–	–	
Baeopogon	–	–	–	
Bleda	–	*Guimaraesiella* sp.	*Philopteroides* sp.	2
Brachypodius	–	–	*Po. cucphuongensis*	4
Calyptocichla	–	–	–	
Chlorocichla	–	*Guimaraesiella* sp.	–	3
Criniger	–	*Guimaraesiella* sp.	–	2
Eurillas	–	*Guimaraesiella* sp.	*Philopteroides* sp.	2
Hemixos	*Br. colindalei*	*Gu. flavala*	*Po. flavala*	
Hypsipetes	–	*Gu. lorica* *Gu. mayoensis*	*Po. longiclypeatus*	
Iole	–	*Gu. cinnamomea* *Gu. cucphuongensis*	*Po. flavala*	4
Ixonotus	–	–	–	
Ixos	*Br. leiae*	*Gu. ixi*	*Po. haerixos* *Po. flavala*	4
Neolestes	–	–	–	
Nok	–	–	–	
Phyllastrephus	–	*Guimaraesiella* sp.	*Philopteroides* sp.	2
Pycnonotus	*Br. celer* *Br. guldum* *Br. hermetica* *Br. pseudognatha* *Br. robertrankini*	*Gu. brunneomarginata* *Gu. caligogularis* *Gu. cucphuongensis*	*Po. cucphuongensis* *Po. holosternus*	
Rubigula	–	–	–	
Setornis	–	–	–	
Spizixos	–	–	*Po. kayanobori*	
Stelgidillas	–	*Guimaraesiella* sp.	–	2
Thescelocichla	–	–	–	
Tricholestes	–	–	–	

[1] Bush *et al.* (2016), Gajdosova *et al*. (2020).

[2] Bush *et al*. (2016), Light *et al*. (2016); some reported as "*Brueelia*".

[3] Takano *et al.* (2018), reported as "*Brueelia*".

[4] Najer *et al.* (2021).

Among the few known species of lice from bulbuls, a considerable amount of variation in specificity is apparent. Species of *Brueelia* found on bulbuls are quite host specific, with most species being associated with only a single host species, or in a few cases, two host species in a single host genus. Similarly, *Philopteroides* spp. on bulbuls tend to be restricted to a single host species (Valim & Palma 2013); however, based on the few known species of *Philopteroides* from bulbuls, it is clear that this genus can be much less specific. For example, *Po. flava* is known from four host species (Najer *et al*. 2012; Chu *et al.* 2019; this paper). *Guimaraesiella* spp. on bulbuls are more catholic, and often parasitize several bulbul species, and even different host genera (Table 4). At the other side of this spectrum, the grey-eyed bulbul (*Io. propinqua*) is parasitized by different species of *Guimaraesiella* in different parts of its range (Table 5). This is not to say, however, that these lice are extremely host specific, because both of these species of lice also parasitize other species of bulbuls.

The distribution of lice on bulbuls appears to be heavily influenced by geography. At a gross level, the relationships between groups of *Guimaraesiella* from bulbuls appear to mirror the biogeography of their hosts. At a smaller geographic scale, lice seem to be moving among sympatric hosts. For example, *Gu. cucphuongensis* is found on three different species of bulbuls that all occur in the same region of Vietnam. Geography also appears to be important in the host associations of *Brueelia* on bulbuls. For example, the louse *Brueelia colindalei* sp. nov. is found on *Hemixos castanonotus*, and appears (based on sequence similarity, Bush *et al.* 2016) to be found on three other bulbul species and a sparrow in the same geographic region (*Ixos mcclellandii*, *Spizixos semitorques*, *Pycnonotus xanthorrhous* and *Emberiza godlewskii*). Yet, *Ixos mcclellandii* in Yunnan, China, is parasitized by a different species of *Brueelia*, *Br. leiae* sp. nov. Among the few *Philopteroides* known from bulbuls, at least two are known from multiple host species that live in the same region. In all, it seems that geography influences host associations for lice in *Brueelia*, *Guimaraesiella*, and *Philopteroides*. Additional sampling of bulbuls and other passerines from the same regions is necessary to understand how specific these parasites are, and to understand how transmission among related and unrelated hosts influences the distribution of diversity of these groups.

Abiotic factors may also play a role in the distribution of these lice. As a general rule, *Brueelia* appears to occur mainly on hosts living in drier environments, whereas *Guimaraesiella* occurs on species living in more humid environments. This is seen among lice on ‘babblers’ (Timaliidae s. lat.): species of *Guimaraesiella* are widely distributed across babblers that occur in rainforests (Gustafsson *et al*. 2019c), whereas babblers in drier environments are parasitized by species of *Brueelia* (Gustafsson & Bush 2017). Similarly, Takano *et al.* (2019) found species of *Brueelia* on different hosts throughout dry sampling localities in South Africa, but only found *Guimaraesiella* in the most humid locality. In the humid Congo Basin, Light *et al*. (2016) found only *Guimaraesiella* (identified as *Brueelia* in their phylogeny). As most of the bulbuls in the African clade are rainforest birds, this may explain the lack of records of *Brueelia* from bulbul genera endemic to Africa. Additional sampling of more birds, especially in the drier regions of Africa, is sorely needed (as stressed by Gustafsson *et al*. 2019d).

The amblyceran genus *Myrsidea* Waterston, 1915, forms an interesting parallel case to the genera treated here. Lice in this genus known from bulbuls also include species occurring on several host species in the same region as well as lice restricted to single host subspecies. Moreover, lice in the genus *Myrsidea* appear to occur throughout the Pycnonotidae, though they are better known from Asian hosts than from African hosts (Hellenthal & Price 2003; Johnson & Price 2006). Notably, none of the species groups of *Myrsidea* erected by Hellenthal & Price (2003) are limited to any single clade in the bulbul phylogeny of Shakya & Sheldon (2017).

Table 4. Checklist of ischnoceran lice known from bulbuls. The non-type hosts of *Brueelia colindalei* sp. nov. reported by Bush *et al.* (2016) are not included here, until these host associations can be confirmed.

Louse species	Host species
Brueelia alophoixi Sychra in Sychra *et al*., 2009	*Alophoixus pallidus* (Swinhoe, 1870)
Brueelia celer sp. nov.	*Pycnonotus cafer bengalensis* Blyth, 1845 *Pycnonotus cafer primrosei* Deignan, 1949
Brueelia colindalei sp. nov.	*Hemixos castanonotus canipennis* Seebohm, 1890
Brueelia doisuthepensis sp. nov.	*Alophoixus ochraceus ochraceus* (Moore, 1858)
Brueelia galeata sp. nov.	*Alophoixus pallidus henrici* (Oustalet, 1896)
Brueelia guldum Ansari, 1955	*Pycnonotus cafer intermedius* Blyth, 1846
Brueelia hermetica sp. nov.	*Pycnonotus barbatus layardi* Gurney, 1879
Brueelia leiae sp. nov.	*Ixos mcclellandii similis* (Rothschild, 1921)
Brueelia pseudognatha Gustafsson & Bush, 2017	*Pycnonotus nigricans superior* Clancey, 1959
Brueelia robertrankini sp. nov.	*Pycnonotus jocosus jocosus* (Linnaeus, 1758) *Pycnonotus jocosus pattani* Deignan, 1948
Brueelia yunnanensis sp. nov.	*Alophoixus flaveolus burmanicus* (Oates, 1899)
Guimaraesiella brunneomarginata sp. nov.	*Pycnonotus goiavier personatus* Hume, 1873 *Pycnonotus goiavier samarensis* Rand & Rabor, 1960
Guimaraesiella caligogularis sp. nov.	*Alophoixus bres tephrogenys* (Jardine & Selby, 1833) *Pycnonotus plumosus plumosus* Blyth, 1845
Guimaraesiella cinnamomea sp. nov.	*Iole viridescens cinnamomeoventris* Baker, 1917 *Iole propinqua propinqua* (Oustalet, 1903)
Guimaraesiella cucphuongensis (Najer & Sychra in Najer *et al*., 2012)	*Iole propinqua simulator* (Deignan, 1948) *Pycnonotus finlaysoni* Strickland, 1844 *Rubigula flaviventris* (Tickell, 1833)
Guimaraesiella flavala (Najer & Sychra in Najer *et al*., 2012)	*Hemixos castanonotus castanonotus* Swinhoe, 1870 *Hemixos flavala* Blyth, 1845
Guimaraesiella ixi sp. nov.	*Ixos mclellandii peracensis* (Hartert & Butler, 1898)
Guimaraesiella lorica sp. nov.	*Hypsipetes leucocephalus nigerrimus* Gould, 1863
Guimaraesiella mayoensis sp. nov.	*Hypsipetes everetti everetti* (Tweeddale, 1877)
Guimaraesiella phlaoalopha sp. nov.	*Alophoixus pallidus henrici* (Oustalet, 1896)
Philopteroides cucphuongensis Mey, 2004	*Brachypodius melanoleucus* (Eyton, 1839) *Pycnonotus blanfordi conradi* (Finsch in Finsch & Conrad, 1873) *Pycnonotus finlaysoni eous* Riley, 1940 *Pycnonotus xanthorrhous xanthorrhous* Anderson, 1869
Philopteroides flavala Najer & Sychra in Najer *et al*., 2012	*Alophoixus flaveolus burmanicus* (Oates, 1899) *Alophoixus pallidus henrici* (Oustalet, 1896) *Hemixos castanonotus* Swinhoe, 1870 *Hemixos flavala* Blyth, 1845 *Iole propinqua* (Oustalet, 1903) *Ixos mcclellandii holtii* (Swinhoe, 1861)
Philopteroides haerixos sp. nov.	*Ixos mcclellandii holtii* (Swinhoe, 1861)
Philopteroides holosternus sp. nov.	*Pycnonotus goiavier goiavier* (Scopoli, 1786)
Philopteroides kayanobori (Uchida, 1948)	*Spizixos semitorques cinereicapillus* Swinhoe, 1871
Philopteroides longiclypeatus sp. nov.	*Hypsipetes everetti samarensis* Rand & Rabor, 1959
Dubious records	
Craspedorrhynchus hiyodori (Uchida, 1949)	*Hypsipetes amaurotis amaurotis* (Temminck, 1830)
Penenirmus guldum (Ansari, 1955)	*Pycnonotus cafer intermedius* Blyth, 1846
Sturnidoecus acutifrons (Uchida, 1949)	*Hypsipetes amaurotis ogawae* Hartert, 1907
Unknown bulbul host	
Brueelia schoddei (Mey, 2017)	*Manorina melanocephala* (Latham, 1802) in error

Table 5. Host-louse list of the ischnoceran lice known from bulbuls. As the natural host of *Brueelia schoddei* (Mey, 2017) is unknown, this species is not listed here. Species marked with an asterisk (*) are dubious; see text for details. The non-type hosts of *Brueelia colindalei* sp. nov. reported by Bush *et al.* (2016) are not included here, until these host associations can be confirmed.

Host species	**Louse species**
Alophoixus bres tephrogenys (Jardine & Selby, 1833)	*Guimaraesiella caligogularis* sp. nov.
Alophoixus flaveolus burmanicus (Oates, 1899)	*Brueelia yunnanensis* sp. nov.
	Philopteroides flavala Najer & Sychra in Najer *et al*., 2012
Alophoixus ochraceus ochraceus (Moore, 1858)	*Brueelia doisuthepensis* sp. nov.
Alophoixus pallidus (Swinhoe, 1870)	*Brueelia alophoixi* Sychra in Sychra *et al*., 2009
Alophoixus pallidus henrici (Oustalet, 1896)	*Brueelia galeata* sp. nov.
	Guimaraesiella phlaoalopha sp. nov.
	Philopteroides flavala Najer & Sychra in Najer *et al*., 2012
Brachypodius melanoleucos (Eyton, 1839)	*Philopteroides cucphuongensis* Mey, 2004
Hemixos castanonotus Swinhoe, 1870	*Philopteroides flavala* Najer & Sychra in Najer *et al*., 2012
Hemixos castanonotus canipennis Seebohm, 1890	*Brueelia colindalei* sp. nov.
	Guimaraesiella flavala (Najer & Sychra in Najer *et al*., 2012)
Hemixos castanonotus castanonotus Swinhoe, 1870	*Guimaraesiella flavala* (Najer & Sychra in Najer *et al*., 2012)
Hemixos flavala Blyth, 1845	*Guimaraesiella flavala* (Najer & Sychra in Najer *et al*., 2012)
	Philopteroides flavala Najer & Sychra in Najer *et al*., 2012
Hypsipetes amaurotis amaurotis (Temminck, 1830)	*Craspedorrhynchus hiyodori* (Uchida, 1949)*
Hypsipetes amaurotis ogawae Hartert, 1907	*Sturnidoecus acutifrons* (Uchida, 1949)*
Hypsipetes everetti everetti (Tweeddale, 1877)	*Guimaraesiella mayoensis* sp. nov.
Hypsipetes everetti samarensis Rand & Rabor, 1959	*Philopteroides longiclypeatus* sp. nov.
Hypsipetes leucocephalus nigerrimus Gould, 1863	*Guimaraesiella lorica* sp. nov.
Iole propinqua (Oustalet, 1903)	*Guimaraesiella cucphuongensis* (Najer & Sychra in Najer *et al*., 2012)
	Philopteroides flavala Najer & Sychra in Najer *et al*., 2012
Iole propinqua propinqua (Oustalet, 1903)	*Guimaraesiella cinnamomea* sp. nov.
Iole viridescens cinnamomeoventris Baker, 1917	*Guimaraesiella cinnamomea* sp. nov.
Ixos mcclellandii holtii (Swinhoe, 1861)	*Philopteroides haerixos* sp. nov.
	Philopteroides flavala Najer & Sychra in Najer *et al*., 2012
Ixos mcclellandii peracensis (Hartert & Butler, 1898)	*Guimaraesiella ixi* sp. nov.
Ixos mcclellandii similis (Rothschild, 1921)	*Brueelia leiae* sp. nov.
Pycnonotus barbatus layardi Gurney, 1879	*Brueelia hermetica* sp. nov.
Pycnonotus blanfordi conradi (Finsch in Finsch & Conrad, 1873)	*Philopteroides cucphuongensis* Mey, 2004
Pycnonotus cafer bengalensis Blyth, 1845	*Brueelia celer* sp. nov.
Pycnonotus cafer intermedius Blyth, 1846	*Brueelia guldum* Ansari, 1955*
	Penenirmus guldum (Ansari, 1955)
Pycnonotus cafer primrosei Deignan, 1949	*Brueelia celer* sp. nov.
Pycnonotus finlaysoni Strickland, 1844	*Guimaraesiella cucphuongensis* (Najer & Sychra in Najer *et al*., 2012)
Pycnonotus finlaysoni eous Riley, 1940	*Philopteroides cucphuongensis* Mey, 2004
Pycnonotus goiavier goiavier (Scopoli, 1786)	*Philopteroides holosternus* sp. nov.
Pycnonotus goiavier personatus Hume, 1873	*Guimaraesiella brunneomarginata* sp. nov.
Pycnonotus goiavier samarensis Rand & Rabor, 1960	*Guimaraesiella brunneomarginata* sp. nov.
Pycnonotus jocosus jocosus (Linnaeus, 1758)	*Brueelia robertrankini* sp. nov.
Pycnonotus jocosus pattani Deignan, 1948	*Brueelia robertrankini* sp. nov.
Pycnonotus nigricans superior Clancey, 1959	*Brueelia pseudognatha* Gustafsson & Bush, 2017
Pycnonotus plumosus plumosus Blyth, 1845	*Guimaraesiella caligogularis* sp. nov.
Pycnonotus xanthorrhous xanthorrhous Anderson, 1869	*Philopteroides cucphuongensis* Mey, 2004
Rubigula flaviventris (Tickell, 1833)	*Guimaraesiella cucphuongensis* (Najer & Sychra in Najer *et al*., 2012)
Spizixos semitorques cinereicapillus Swinhoe, 1871	*Philopteroides kayanobori* (Uchida, 1948)
Unknown bulbul host	
Brueelia schoddei (Mey, 2017)	

Summary

With these descriptions, the number of ischnoceran chewing lice known from bulbul hosts has increased from 7 to 25 (not including dubious records). The majority of ischnoceran species parasitizing bulbuls are known from Southeast Asia, though many unidentified species have been reported from Africa. With the descriptions and key provided here, we hope to facilitate further research into the ischnoceran lice of bulbuls. The potential co-occurrence of all three genera of lice on most or all species of bulbuls would make them ideal for studies of intraspecific competition among lice, and the range in geographic and host specificity provides interesting opportunities to study co-evolutionary and ecological factors (e.g., mixed-species flocks or abiotic factors) governing the diversification and distribution of lice.

Acknowledgements

This research was funded by grant 36/07 1.4 from the Swedish Taxonomic Initiative, grant NSF-DEB-1050706 from the National Science Foundation of the United States, grant GIABR-GJRC201701 from the Introduction of Full-Time High-Level Talent Fund of the Institute of Zoology, Guangdong Academy of Sciences, grant 2018GDASCX-0809 from the Introduction of Full-Time High-Level Talent Fund of the Guangdong Academy of Sciences, grant 31961123003 from the National Natural Science Foundation of China, and grant 2019QN01N968 from the Pearl River Talent Recruitment Program of Guangdong Province. These agencies had no influence in the design or execution of this study. Computational resources of TN were supplied by the project "e-Infrastruktura CZ" (e-INFRA LM2018140) provided within the program Projects of Large Research, Development and Innovations Infrastructures. We would like to thank Paul Brown (NHML) and Paul Tinerella (UMSP) who prepared loans of specimens, and the late Robert E. Elbel who collected many of the specimens in the BPBM collection.

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Manuscript received: 17 May 2021
Manuscript accepted: 10 December 2021
Published on: 9 March 2022

Topic editor: Nesrine Akkari
Desk editor: Kristiaan Hoedemakers