



# Morphological variation in *Guimaraesiella* Eichler, 1949 (Phthiraptera: Ischnocera: Philopteridae: Brueelia-complex)

Daniel R. Gustafson\*, Sarah E. Bush\*

<sup>1</sup> Guangdong Key Laboratory of Animal Conservation and Resources, Guangdong Public Laboratory of Wild Animal Conservation and Utilization, Guangdong Institute of Applied Biological Resources, Guangzhou, Guangdong, China;

<sup>2</sup> Department of Biology, University of Utah, Salt Lake City, Utah, USA.



*Guimaraesiella* Eichler, 1949, is the most morphologically heterogeneous genus in the *Brueelia*-complex. Interspecific differences in genitalia, head shape, extent of dorsal preantennal suture, and abdominal chaetotaxy can be extensive. Moreover, the genus *Guimaraesiella* is known from a vast range of host families, and are likely to occur on most passeriform families across the world [1, 2]. In many cases, lice that are genetically and morphologically indistinguishable are known to parasitize multiple host species, including hosts from different host families [1].

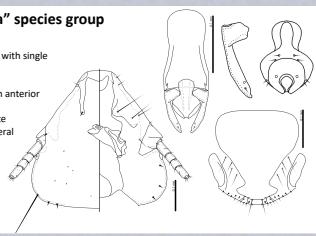
Many of the known *Guimaraesiella*, and most of the roughly 150 undescribed species we have examined, are morphologically similar to the type species. However, some morphologically distinct species, such as *Guimaraesiella menurelyae* (Coïne, 1859), are phylogenetically nested inside this group of *Guimaraesiella* [1]. Delimitation of groups within this genus is therefore problematic, especially as the undescribed diversity is larger than the described diversity. Several genera have previously been proposed for smaller groups within this genus, but these have not been based on an extensive survey of character variation within *Guimaraesiella* or the *Brueelia*-complex. The recently erected genera *Callaeirmus* Mey, 2017, *Mohoaticus* Mey, 2017, and *Philemonellus* Mey, 2017, are all synonymous with *Guimaraesiella*.

## "Guimaraesiella barbata" species group

- Head rounded pentagonal
- Ventral sclerite of male genitalia with single anterior extension
- Distal mesosome smooth
- Gonopore terminal, with smooth anterior margin
- Dorsal anterior plate not separate
- Female subgenital plate with lateral submarginal extensions
- aps: IV-VII (also in female)

Hosts: Malacoptidae

Range: Afrotropical



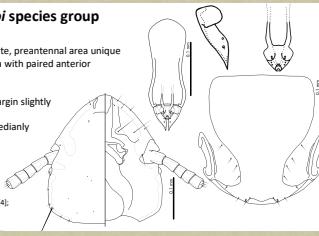
## "Guimaraesiella cicchinoi" species group

- Head dome-shaped
- Dorsal anterior plate not separate, preantennal area unique
- Ventral sclerite of male genitalia with paired anterior extensions
- Distal mesosome smooth
- Gonopore terminal, anterior margin slightly rugose
- Female subgenital plate with medially displaced cross-piece
- aps: V-VII

Hosts: Trigonidae

Range: Neotropical

Note: Head and female genitalia redrawn from [4]; male genitalia redrawn from [2].



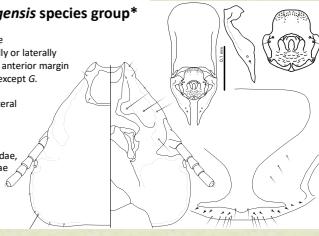
## "Guimaraesiella galapagensis" species group\*

- Head pentagonal
- Ventral sclerite absent or diffuse
- Distal mesosome rugose centrally or laterally
- Gonopore ventral, with smooth anterior margin
- Dorsal anterior plate separate (except G. *brunneum*)
- Female subgenital plate with lateral submarginal bulges
- aps: IV-VII or V-VII

Hosts: Cardinalidae, Mimidae, Turdidae, Passerellidae, Thraupidae, Tyrannidae

Range: Neotropical

Note: Head and male genitalia redrawn from [5]; female genitalia from [3]; male genitalia from [6]; no scales in original; male genitalia redrawn from [2].

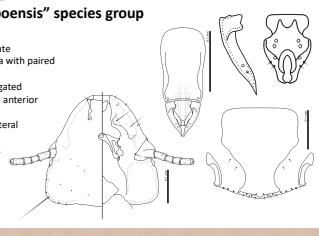


## "Guimaraesiella limopoensis" species group

- Head dome-shaped
- Dorsal anterior plate not separate
- Ventral sclerite of male genitalia with paired anterior extensions
- Distal mesosome smooth, elongated
- Gonopore ventral, with smooth anterior margin
- Female subgenital plate with lateral submarginal bulges
- aps: absent on all tergopleurites

Hosts: Malacoptidae

Range: Afrotropical



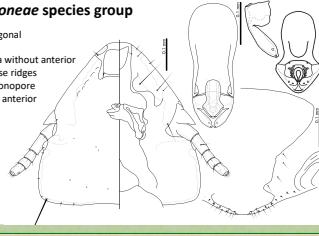
## "Guimaraesiella myiophoneae" species group

- Head rounded triangular-pentagonal
- Dorsal anterior plate separate
- Ventral sclerite of male genitalia without anterior extension, but with lateral diffuse ridges
- Distal mesosome rugose near gonopore
- Gonopore ventral, with smooth anterior margin
- Female subgenital plate with lateral submarginal bulges
- aps: IV-VII

Hosts: Turdidae

Range: Indo-Malayan

Note: Very large species.



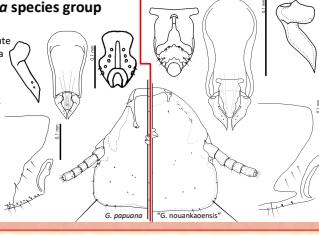
## "Guimaraesiella papuana" species group

- Head variable
- Dorsal anterior plate not separate
- Ventral sclerite of male genitalia with single anterior extension
- Distal mesosome smooth
- Gonopore terminal
- Female subgenital plate with or without lateral submarginal bulges
- aps: IV-VII, V-VII, or VI-VII

Hosts: Over 60 families

Range: Global

Species shown: *G. papuana* redrawn from [2].

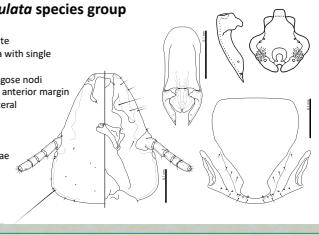


## "Guimaraesiella sexmaculata" species group

- Head rounded trapezoidal
- Dorsal anterior plate not separate
- Ventral sclerite of male genitalia with single anterior extension
- Distal mesosome with paired rugose nodi
- Gonopore ventral, with smooth anterior margin
- Female subgenital plate with lateral submarginal bulges
- aps: V-VII

Hosts: Dicruridae, Oriolidae, Vangidae

Range: Afrotropical, Indo-Malayan



We here outline 14 species groups within *Guimaraesiella*, and place known species into these groups as far as possible, based on original descriptions and examinations of type specimens and other material. Some known species are too poorly described to be placed in any group, and are here considered *incertae sedis* within *Guimaraesiella*. Several of the species groups suggested here (marked with \*) may warrant recognition as subgenera in the future. This includes the *G. diaprepes* species group, for which the subgeneric name *Mohoaticus* Mey, 2017, is available. We have seen additional undescribed species from almost all these groups.

The primary characters sets used for species group delimitations are: structure of the male mesosome; structure of the female subgenital plate; structure of the preantennal area; presence/absence of *accessory post-spiracular setae* (aps) on male tergopleurites (absent in females unless otherwise indicated).

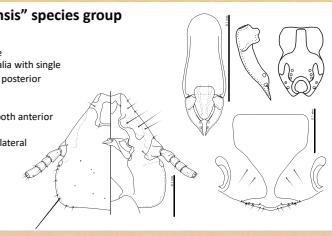
This poster is not issued for permanent scientific record or purposes of zoological nomenclature, and is not regarded as published within the meaning of the International Code for Zoological Nomenclature (ICZN), Ed. 4, Article 8.2 and 8.3. Detailed accounts, with more thorough illustrations, redescriptions of all new species mentioned here, are under preparation. New species are therefore given here in citation marks and non-italicized.

## "Guimaraesiella capensis" species group

- Head rounded pentagonal
- Dorsal anterior plate separate
- Ventral sclerite of male genitalia with single anterior extension and broad posterior extension reaching gonopore
- Distal mesosome smooth
- Gonopore terminal, with smooth anterior margin
- Female subgenital plate with lateral submarginal extensions
- aps: VII only

Hosts: Platysteiridae

Range: Afrotropical

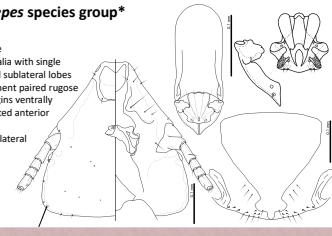


## "Guimaraesiella diaprepes" species group\*

- Head pentagonal
- Dorsal anterior plate separate
- Ventral sclerite of male genitalia with single anterior extension and paired sublateral lobes
- Distal mesosome with prominent paired rugose nodi and sinuous lateral margins ventrally
- Gonopore ventral, with serrated anterior margin and lateral hooks
- Female subgenital plate with lateral submarginal extensions
- aps: V-VII

Hosts: Fringillidae, Tityridae

Range: Hawaiian, Neotropical

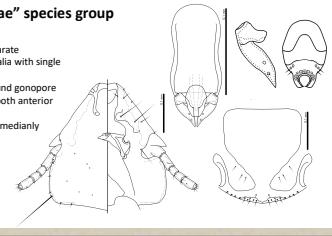


## "Guimaraesiella ghanae" species group

- Head rounded pentagonal
- Dorsal anterior plate not separate
- Ventral sclerite of male genitalia with single anterior extension
- Distal mesosome rugose around gonopore
- Gonopore terminal, with smooth anterior margin
- Female subgenital plate with medially displaced cross-piece
- aps: VI-VII

Hosts: Malacoptidae

Range: Afrotropical

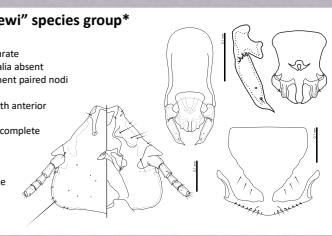


## "Guimaraesiella mcgregori" species group\*

- Head rounded pentagonal
- Dorsal anterior plate not separate
- Ventral sclerite of male genitalia absent
- Distal mesosome with prominent paired nodi and lob-like rugose areas
- Gonopore ventral, with smooth anterior margin, often decorated
- Female subgenital plate with complete cross-piece
- aps: IV-VII

Hosts: Leiothrichidae, Pellorneidae

Range: Indo-Malayan

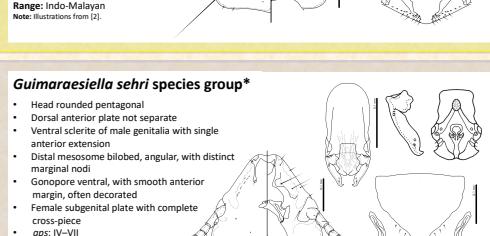


## "Guimaraesiella pandolura" species group

- Head rounded pentagonal
- Dorsal anterior plate separate
- Ventral sclerite of male genitalia with single anterior extension
- Distal mesosome with extensive rugose area
- Gonopore ventral, with smooth anterior margin
- Female subgenital plate without lateral bulges or extensions
- aps: VI-VII

Hosts: Campephagidae

Range: Indo-Malayan

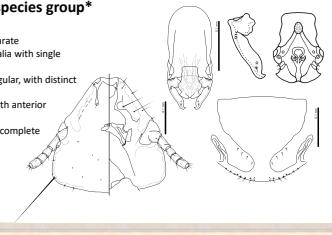


## "Guimaraesiella sebastodes" species group\*

- Head rounded pentagonal
- Dorsal anterior plate not separate
- Ventral sclerite of male genitalia with single anterior extension
- Distal mesosome bilobed, angular, with distinct marginal nodi
- Gonopore ventral, with smooth anterior margin
- Female subgenital plate with complete cross-piece
- aps: IV-VII

Hosts: Leiothrichidae

Range: Indo-Malayan

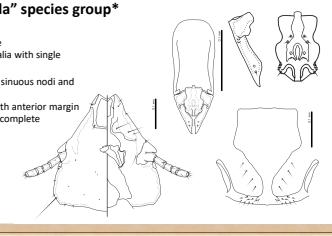


## "Guimaraesiella tenella" species group\*

- Head pentagonal
- Dorsal anterior plate separate
- Ventral sclerite of male genitalia with single anterior extension
- Distal mesosome with paired rugose nodi and lateral rugose areas
- Gonopore ventral, with smooth anterior margin
- Female subgenital plate with complete cross-piece
- aps: V-VII

Hosts: Timaliidae

Range: Indo-Malayan



## *Guimaraesiella Eichler, 1949*

*Docophorus* Nitisch, 1816: 280 (in partum).

*Degeeriella* Anseli, 1906: 60 (in partum).

*Bruelia* Kolek, 1936: 257 (in partum).

*Guimaraesiella* Eichler, 1949: 11.

*Xobugirado* Eichler, 1949: 13.

*Allobruelia* Eichler, 1949: 36.

*Abdominalia* Eichler, 1949: 37.

*Maculinimus* Zlotycka, 1964: 247 (in partum).

*Olivinimus* Zlotycka, 1964: 246 (in partum).

*Allorhinimus* Zlotycka, 1964: 266.

*Nitischius* Mey & Bush, 2017: 101.

*Callaeirmus* Mey, 2017: 92 (new synonymy) [3].

*Philemonellus* Mey, 2017: 145 (new synonymy) [3].

*Mohoaticus* Mey, 2017: 173 (new synonymy) [3].

Type species: *Docophorus subalbibicus* Piaget, 1885:6

[= *Docophorus papuanus* Eichler, 1879: 475] ex *Paradisea minor* Shaw, 1809, by original designation.

Included species (arranged by species group):

"Guimaraesiella barbata" species group

"Guimaraesiella barbata" n. sp.

"Guimaraesiella capensis" species group

"Guimaraesiella capensis" n. sp.

"Guimaraesiella cicchinoi" species group

*Guimaraesiella cicchinoi* (Valim & Weckstein, 2011)

*Guimaraesiella insolta* (Cicchino, 1983)

*Guimaraesiella sueta* (Valim & Weckstein, 2011)

"Guimaraesiella diaprepes" species group

*Guimaraesiella diaprepes* (Kellogg, 1902)

*Guimaraesiella bucharica* (Ansari, 1955)

*Guimaraesiella oahuensis* n. sp.

"Guimaraesiella erythrothorax" (Cicchino, 1983)

*Guimaraesiella galapagensis* (Kelllogg & Kuwana, 1902)

*Guimaraesiella incerta* (Cicchino, 1983)

*Guimaraesiella pallidula* (Garrison, 1916)

*Guimaraesiella polyglotta* (Williams, 1983)

*Guimaraesiella saltatora* (Carriker, 1956)

"Guimaraesiella ghanae" species group

"Guimaraesiella ghanae" n. sp.

"Guimaraesiella limopoensis" species group

"Guimaraesiella limopoensis" n. sp.

"Guimaraesiella mcgregori" species group

"Guimaraesiella mcgregori" n. sp.

"Guimaraesiella myiophoneae" species group

*Guimaraesiella myiophoneae* (Clay, 1936)

*Guimaraesiella neodauvanae* (Najer & Sychra [in Najer et al.], 2012) ??

"Guimaraesiella pandolura" species group

*Guimaraesiella pandolura* Gustafson & Bush, 2017

"Guimaraesiella papuana" species group

*Guimaraesiella addolatlor* (Cicchino, 1986)

*Guimaraesiella amseli* (Eichler, 1951)

*Guimaraesiella callaeirmi* (Valim & Palma, 2015)

*Guimaraesiella capitata* (Ansari, 1955)

*Guimaraesiella chiquitana* (Cicchino, 1986)

*Guimaraesiella chiquitanae* (Najer & Sychra [in Najer et al.], 2012)

*Guimaraesiella chiquitanae* (Sychra & Najer [in Najer et al.], 2012)

*Guimaraesiella chiquitanae* (Ansari, 1956)

*Guimaraesiella magellonica* (Cicchino, 1986)

*Guimaraesiella marginata* (Burmeister, 1838)

*Guimaraesiella nitischii* (Ponton, 1871)

*Guimaraesiella nouakhaensis* n. sp.

*Guimaraesiella oahuensis* (Ansari, 1956)

*Guimaraesiella pallida* (Piaget, 1880)

*Guimaraesiella papuana* (Giebel, 1879)

*Guimaraesiella pentheriana* (Mey, 2017) n. comb. [3]

*Guimaraesiella pointii* (Ansari, 1955)

*Guimaraesiella rhamphocilla* (Cicchino, 1983) ??

*Guimaraesiella sagittaria* (Ansari, 1955)

*Guimaraesiella samoensis* (Mey, 2017) n. comb. [3]

*Guimaraesiella satelles* (Nitisch [in Giebel], 1866)

*Guimaraesiella setifer* (Piaget, 1885)

*Guimaraesiella similes* (Cicchino, 1986)

*Guimaraesiella timorensis* (Mey, 2017) n. comb. [3]

*Guimaraesiella tristis* (Giebel, 1874)

*Guimaraesiella turdina* (Ansari, 1956)

*Guimaraesiella visciorni* (Denn, 1842)

*Guimaraesiella wallacei* (Mey & Baker, 2014)

*Guimaraesiella obsoeta* (Carriker, 1956)

*Guimaraesiella atricippula* (Cicchino, 1983)

*Guimaraesiella bisetosa* (Piaget, 1885)

*Guimaraesiella concava* (Eichler [in Niemehmer, 1956])

*Guimaraesiella granatensis* (Soler-Cruz et al., 1987)

*Guimaraesiella hafifari* (Balat, 1981)

*Guimaraesiella interposta* (Kellogg, 1899)

*Guimaraesiella lati* (Giebel, 1874)

*Guimaraesiella nigrispinata* (Piaget, 1890)

*Guimaraesiella niquittoi* (Carriker, 1963)

*Guimaraesiella ptiliphaga* (Carriker, 1963)

*Guimaraesiella schistacea* (Cicchino, 1983)

*Guimaraesiella subacuto* (Piaget, 1880)

*Guimaraesiella tauris* (Eichler [in Niemehmer, 195