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Two new genera of phorid flies, *Macgrathphora* and *Aurisetiphora*, from Costa Rica (Diptera: Phoridae), with recommendations for naming new genera in the family

BRIAN V. BROWN
Entomology Department, Natural History Museum of Los Angeles County, 900 Exposition Boulevard, Los Angeles, CA, 90007, USA.
bbrown@nhm.org

Abstract

Two new genera and four new species of metopinine phorid fly are described from Costa Rica. ***Macgrathphora*** new genus is described with the following **new species**: *M. caribbea, M. longifurca*, and *M. pacifica*. In particular, *M. caribbea* is one of the most abundant phorids collected in a recent inventory project in Northwestern Costa Rica. *Aurisetiphora* **new genus** is described for a single species, *A. maggiesnowae* **new species**, from a site in the Central Valley, near San José. Guidelines for describing new genera within the Phoridae, especially the Metopininae, are given, and genus *Synaptophora* Brown is synonymized with *Dohrniphora* Dahl (**new synonymy**).

Key words: tropical, new species, Diptera, biodiversity

Introduction.

The Phoridae are a large family of small flies, with about 4500 species that range between 0.4-5 mm in body length. They have a great variety of life histories, although the majority of known lifestyles are as parasitoids (Brown 2018; Disney 1994). They are profoundly understudied throughout the world (e.g., Srivathsan *et al.* 2019), but especially in the New World tropics (Brown 2010; Brown *et al.* 2018a). Even after extensive work on the fauna of Costa Rica, there are many species that remain undescribed and unclassified in a described genus.

In a family like the Phoridae, where the taxonomy is plagued by genera known only from the morphology of specimens of one sex, one could justifiably wonder what the criteria for recognizing new genera might be. This is especially true for subfamily Metopininae, which is dominated by diverse, numerically dominant groups such as *Megaselia* Rondani, *Apocephalus* Coquillett, and the *Metopina*-group of genera (Brown 2010). Previous workers, especially Borgmeier (who described much of the New World fauna) would base new genera on unusual or striking character states (autapomorphies) without attempting to synthesize data on whether close relatives were available with which to group them. Often, genera were based on males or females only, a problem in some groups for which there is extensive sexual dimorphism. In this paper, I offer some suggestions for whether recognizing new genera is advisable, and then proceed to describe species of two distinctive new genera collected in Costa Rica.

Methods

All specimens were collected in Malaise traps, many during the Hymenoptera of Costa Rica project (Hanson & Gauld 1995), and most were dried with hexamethyldisilane (Brown 1993) and mounted by gluing on insect pins with white glue. Specimens from Janzen and Hallwachs' (2020) study of the insects of the Área de Conservación Guanacaste were examined in alcohol, then slide mounted in Canada balsam after dehydration in clove oil. DNA barcodes of these specimens were obtained through the Biodiversity of Life Initiative in Guelph, Ontario, Canada (Ratnasingham & Hebert 2007) and are stored in BOLD (Biodiversity of Life Database) under their Barcode Index

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Numbers (BINs—Ratnasingham & Hebert 2013). The depository museums for specimens are the Museo Nacional de Costa Rica (MNCR), Museo de Invertebrados G.B. Fairchild, Universidad de Panamá (MIUP), and the Natural History Museum of Los Angeles County (LACM).

Species of *Macgrathphora* new genus are extremely similar; therefore, the species descriptions are limited to the DNA barcodes (known for only two of the species), and the diagnostic wing venation.

Taxonomy

Recognition of new genera of Phoridae

The history of scientific research on this group, in addition to the biological characteristics of the flies, allows the proposal of some guidelines for consideration before describing new genera. Of course, I do not assert that these guidelines will eliminate taxonomic errors, but they should reduce them.

New genera are proposed when there is a perceived gap between characteristics of the new specimen(s) and existing taxa, such that there is no evidence for placing the new specimens in any known genus. Of course, the interpretation of the significance of the gap is subjective, and evidence for placing any specimens in existing genera depends on an understanding of the synapomorphic states proposed to justify these genera, if any. Often, the synapomophic justification of a genus has not been proposed or adequately justified, and some are likely to be non-monophyletic.

As a general rule, **if there is good evidence (i.e. one or more synapomophies) that a unknown specimen is related to a known genus, then unless differences from the known genus are truly exceptional, I would be reluctant to recognize a new genus assignment**. This is because there are two possibilities for the situation: the new specimens are part of a sister-taxon to the known genus, or it is something that has diverged extensively within the genus. Distinguishing the difference between the two is often difficult. As an example, the genus *Apocephalus* contains many relatively unspectacular ant-parasitizing species, but one group, the *A. wheeleri* group (Brown *et al.* 2018b), have extravagant enlarged antennal flagellomeres and a greatly divergent way of life, attacking cantharoid beetles. Originally, these species were placed in a subgenus *Mesophora* Borgmeier, and some reviewers of my manuscripts suggested recognition of *Mesophora* as a separate genus. Our molecular phylogenetic analysis of *Apocephalus* (Brown *et al.* 2018b), however, demonstrated how unwise this would have been, as "*Mesophora*" species were embedded deep within the genus and downgraded to a species group rather than a subgenus.

The situation for recognizing new genera is more clear-cut for the *Metopina*-group of genera, as defined by Brown (1992). This group contains many species with wingless and brachypterous females, such as those of *Puliciphora* Dahl, but an exception is the females of *Metopina* (which are usually fully-winged). The males are less diverse and striking in their body forms, and are nearly impossible to link to females based on morphology alone. Eventually, DNA barcoding or rearing studies will solve this problem, as males will be linked to their respective females. For now, however, description of a distinctive new male in this group risks putting a new name on a something that is already known under a different name from females. Therefore, the guideline here is **within the *Metopina*-group do not describe new genera based on males only**. Unfortunately, this common sense recommendation was recently violated by Namaki Khameneh *et al.* (2021) in their description of *Iranphora*, which looks to me like a slightly derived *Puliciphora*.

The genus *Apocephalus* is one of the largest in the family, and, as mentioned previously, has a variety of body forms, from flattened, limuloid species, to more typical cylindrical species. Borgmeier tended to describe new genera similar to *Apocephalus* based on the presence of anepisternal setae (*Pleurophorina* Borgmeier), unusual frontal setation (*Anaclinusa* Borgmeier), enlarged flagellomere 1 (the previously mentioned *Mesophora*), lack of wing vein R_{2+3}, or a combination of all these. To properly diagnose *Apocephalus*, however, females are needed to assess the structure of the oviscape. Males have elongate cerci that might seem to be diagnostic, but other parasitoid genera have this character as well. Therefore, I would echo the advice above for the *Metopina*-group genera, that **for males with long cerci (suspected males of parasitoid females), do not describe new genera based on males only.**

The most difficult decisions are made for specimens that appear to be slightly unusual *Megaselia*. This genus, with its nearly 2000 described species, is morphologically varied as it is currently recognized. In fact, I regard some Old World species of *Megaselia* to be divergent enough to warrant separate genera, but it is difficult to demonstrate

this without a phylogenetic analysis. Further difficulties arise because *Megaselia* probably is not monophyletic as currently organized (Hartop *et al.* 2020), so unusual, potentially new genera cannot be excluded from it. Characters that are frequently used to separate new genera from existing taxa, such as a setose anepisternum, lack of R_{2+3}, enlarged flagellomeres, distinctive mouthparts, missing frontal setae, and modified genitalia all occur within *Megaselia* species. Therefore, we need to look at the diagnosis of *Megaselia* given by Disney (1981) as the most succinct characterization of the genus, and **strongly question new metopinine genera that have all of the following traits in combination:**

1) Hind tibia with one longitudinal palisade and at least a posterodorsal row of setulae.
2) Ventral interfrontal setae that are parallel or convergent.
3) Scutum with dense random setulae (Brown 2007).
4) Wing vein R_{2+3} present.
5) Female terminalia with cerci clearly present and terminalia not in the form of a piercing oviscape.
6) Anterior scutellar seta subequal to or smaller than posterior.
7) First flagellomere of antenna rounded.

Unfortunately, until the phylogenetic relationships of *Megaselia* are resolved, we will not have a definitive answer to the question "what is a *Megaselia*?"

The best arguments for new genera are based on some kind of phylogenetic hypothesis; for instance, species of the new genus *Hirotophora* Brown *et al.* (2015) were clearly misplaced in *Chaetopleurophora*, as they had synapomorphic characters of the pleuron, such as a concave mesepimeron, otherwise found in hypocerine phorids (Brown *et al.* 2015). Unfortunately, such justifications are not common when new genera are proposed.

Further miscellaneous suggestions for (not) describing new genera are as follows: **do not describe new genera only based on the presence or absence of anepisternal setae**. There are enough genera that have species with bare or setose anepisterna (such as *Megaselia* and *Apocephalus*, for instance) that this is clearly not advisable. Similarly, describing new genera based on other relatively variable characters in isolation is not recommended, for instance **do not describe new genera based only on the absence of wing vein R_{2+3}**. A final guideline like these is **do not describe new genera based only on a limuloid body form**. Unfortunately, I did this in the past, in recognizing the Afrotropical genus *Synaptophora* (Brown 1992), which now appears to be a limuloid *Dohrniphora* Dahl species. In spite of its limuloid appearance, the single female specimen of *Synaptophora critica* has lateral sclerotization of the 7th abdominal segment, a character found only in *Dohrniphora* (and one species of the closely related *Diplonevra* Lioy). Because of the presence of this hypothesized synapomorphic character, I hereby synonymize *Synaptophora* Brown as a junior subjective synonym of *Dohrniphora* (**new synonymy**), with the **new combination** *Dohrniphora critica* (Brown).

A final piece of advice is **do not describe a new genus just because a specimen does not key out in the latest key to phorid genera**, that of Disney (1994). A corollary of this final advice is **do not describe a new genus if you do not know phorids well on a worldwide scale**. Furthermore, **when describing a new genus, do not diagnose it only against the closest taxa in the key**. A newly described genus should be compared to its closest relatives, which might or might not be the nearest taxa in the key. There is enough recent work on phorid phylogeny and classification that a suitable comparison could be made (e.g., Ament 2017; Brown *et al.* 2015). This is just common sense, but probably will be the suggestion that is most ignored.

New taxa

Macgrathphora new genus

Figs. 1–3, 5–9, 11–13

Type species: *Macgrathphora caribbea* Brown (here designated).

Diagnosis. Metopininae (anepisternum divided, midtibia without isolated setae, epandrium and hypandrium fully separate). Four proclinate supra-antennal setae present. Notopleural cleft fringed with long microtrichia present. Hind tibial setal palisade and posterodorsal setal row (found in species of *Megaselia* and many similar genera) absent. Differing from *Metopina*-group genera (sensu Brown 1992), by the largely symmetrical male terminalia and

presences of wing vein R_{2+3}. Differs from virtually all other metopinine phorids by the inflated Rs (especially in females) and the strongly downward pointing male cercus. In the key of Disney (1994) to phorid genera of the world, it runs to couplet 186, where it matches neither option (*Woodiphora* Schmitz and *Beckerina* Malloch). In the key of Brown (2010) to Central American phorid genera, it runs to couplet 90, where it again can be distinguished from *Woodiphora* Schmitz and *Gymnophora* Macquart by the swollen Rs vein and ventrally reflexed male cercus. All of these genera (and some others) share with *Macgrathphora* the presence of a notopleural suture or other notopleural gland opening, and thus might be part of a natural group.

General description. Body length 0.8–0.9 mm. Color light brown.

Head. Frons short, ocellar triangle disproportionally large. Distinct frontal furrow present. Frontal setation consists of usual 12 setae in 3 rows (4-4-4), with 4 subequal supra-antennal setae; dorsal and ventral interfrontal setae medioclinate. First flagellomere rounded, enlarged, with several subcuticular pit sensilla; arista dorsal. Palpus small.

Thorax. Scutal setulae sparse. Anepisternum divided, bare. Two notopleural setae present. Small to large notopleural cleft with fringe of long microtrichia present in males only. Scutellum with two pairs of subequal setae.

Wing. Sc well-developed, fusing with R_1 at the latter's midlength. Rs inflated, thick, especially in females. R_{2+3} present.

Legs. All legs with sparse, light-colored setulae; lacking enlarged setae, longitudinal setal palisades, and setal rows.

Abdomen. Dufour's mechanism not observed. Tergites large, unmodified in both sexes.

Male terminalia. Epandrium short, triangular; cercus pointing ventrally.

Female terminalia. Large tergites present on segments 1–6 and posterior segments not modified into a parasitic ovipositor.

Derivation of name. The genus is named for Frank McGrath, a bodybuilder who has exceptional vascularity (and thus inflated veins). Latinization of McGrath requires the insertion of an "a" between the "M" and "c".

Included species. From examination of the material at hand, it appears that there are at least three species of this genus in Central America and northern South America.

Natural history. Unknown.

***Macgrathphora caribbea* new species**
(Figs. 1, 5, 6, 11)

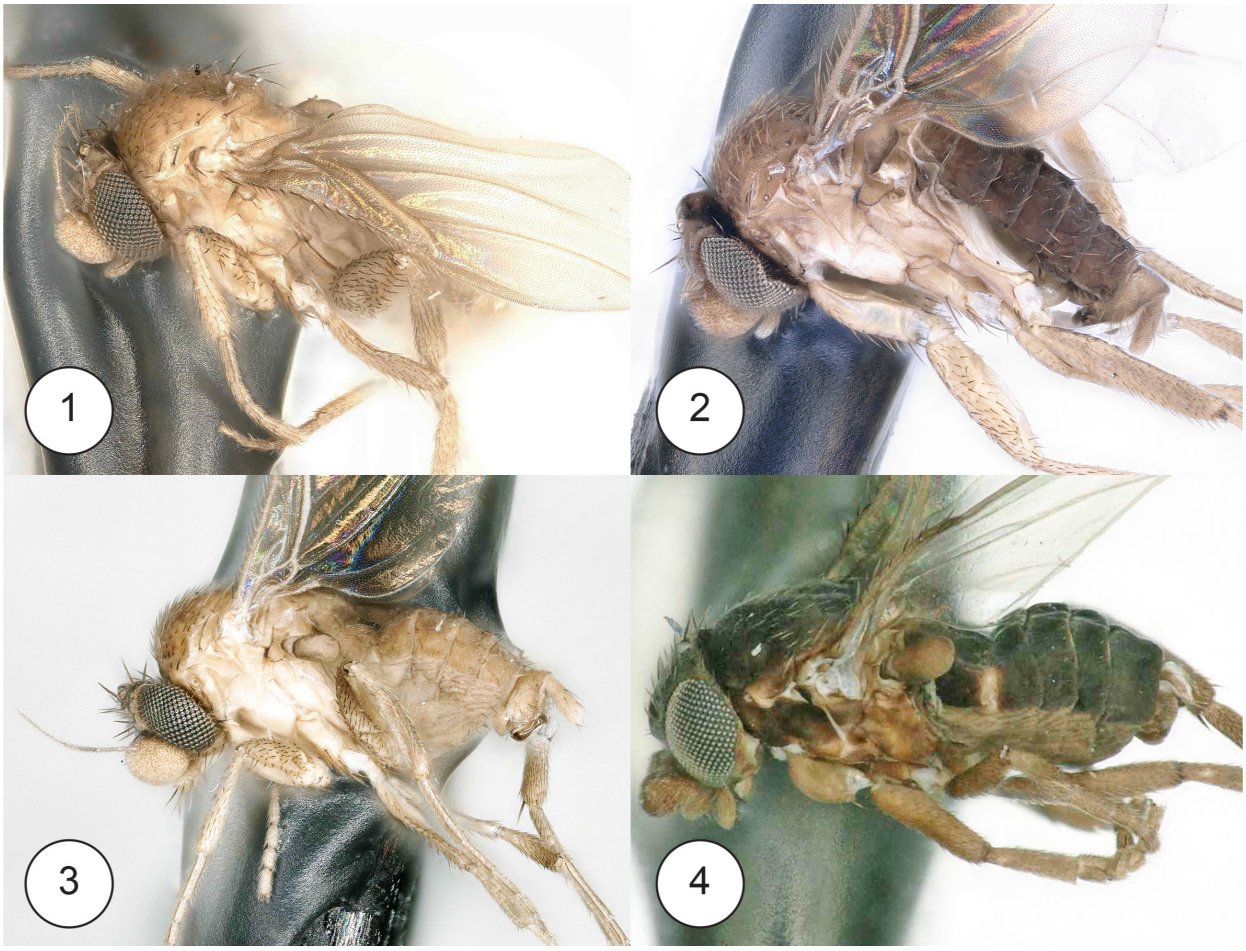
HOLOTYPE. ♂, slide mounted. BOLD specimen number GMACB559-15. COSTA RICA: Guanacaste: Área de Conservación Guanacaste, Sector San Cristobal, Estación San Gerardo, 10.88°N, 85.389°W,575m, 9–16.ix.2013, D.Janzen, W. Hallwachs, Malaise trap (MUCR).

PARATYPES. COSTA RICA: Guanacaste: 5♂, same data as holotype (GMACB500-15, GMAC1001-15, GMACB1120-15, GMACB1332-15, GMACB509-15), 2♂, 26.viii.2013 (GMACA119-15, GMACA1049-15), 1♂, 23.ix. 2013 (GMACC287-15), 1♀, 7.x.2013 (GMACD010-15) (LACM, MUCR). Heredia: Chilamate, 10.45°N, 84.08°W, 75 m, 1♂, v.1989, P.Hanson, Malaise trap (LACM); La Selva Biological Station, 10.43°N, 84.02°W, 40 m, 1♀, 1-6.vii.1993, B.Brown,D.Feener, Malaise trap CCL 850 (LACM), 1♂, 22-26.vi.1993, B.Brown,D.Feener, Malaise trap #4 (LACM), 1♀, 6-11.vii.1993, B.Brown,D.Feener, Malaise trap #4, SSO 50 (LACM). Limon: 16km W Guapiles, 10.15°N, 83.92°W, 400 m, 1♂, 1♀, iii–v.1990, P. Hanson, Malaise trap (LACM).

Diagnosis. The wing venation of this species is extremely distinctive, with vein Rs being more swollen than in the other species of the genus, and the relative costal ratios different (as in the key, below).

In BOLD, this species is in BIN BOLD:ACS8553. The nearest neighbor in BOLD, based on the CO1 DNA barcode, is a Holarctic Region species of *Megaselia*, identified as *M. zonata* in BIN BOLD:AAG3266. There are other species of *Macgrathphora* in the Neotropical Region, however, that have been barcoded (as discussed above) whose sequences should be closer to those of *Macgrathphora caribbea* (see *M. longifurca* new species, below).

The cluster width for the 175 sequences of this BIN in BOLD is 1.31%, and thus below the threshold established by Hartop *et al.* (2021) for concern about containing multiple species. I have not examined specimens from the entire range of haplotypes, however photographs on the BOLD site indicate that this species is congruent with this BIN.



FIGURES 1–4. Habitus, male, lateral. 1. *Macgrathphora caribbea* new species. 2. *Macgrathphora longifurca* new species. 3. *Macgrathphora pacifica* new species. 4. *Aurisetiphora maggiesnowae* new species.

Holotype DNA barcode:
AACTTTATATTTTATTTTCGGGGCTTGAGCAGGAATAGTGGGAACATCCCTAAGAATTATAATTCGAGC
TGAATTAGGACACCCTGGTGCCTT----------
AATTGGAGATGACCAAATTTATAATGTTATTGTTACTGCTCATGCATTTATTATAATTTTTTTTATAGTTAT
ACCTATCATAATAGGAGGATTTGGAAATTGATTAGTACCCTTAATATTAGGGGCCCCTGATATAGCATTT
CCTCGAATAAATAATATAAGATTTTGATTACTCCCTCCTTCATTAACTTTACTATTGGCAAGCAGTATAGT
AGAAAATGGGGCTGGTACCGGCTGAACAGTTTACCCTCCTCTATCCTCTAGAATTGCCCATAGAGGAG
CGTCTGTAGATTTAGCAATTTTTTCTTTACATTTAGCCGGAATCTCCTCTATTTTAGGAGCGGTCAATTT
TATTACTACTATTATTAATATACGCTCTTCTGGAATTACCTTTGACCGTATACCTTTATTTGTATGATCCGT
AGGTATTACTGCAATTTTGCTACTACTCTCATTACCAGTGTTAGCCGGAGCAATTACAATATTACTAACA
GACCGAAACTTTAATACTTCATTCTTCGACCCTGC-------

Distribution. This species is known from the Caribbean (eastern) slope rain forest of Costa Rica. BOLD records are all from Estación Biologica San Gerardo, as is the holotype. At 178 specimens, it was the ninth commonest phorid in the ACG project, and the second commonest from the Estación San Gerardo site.

Etymology. The species name *caribbea* refers to the Caribbean coastal rain forest of Costa Rica, where all specimens have been collected.

***Macgrathphora longifurca* new species**
(Figs 2, 7, 8, 12)

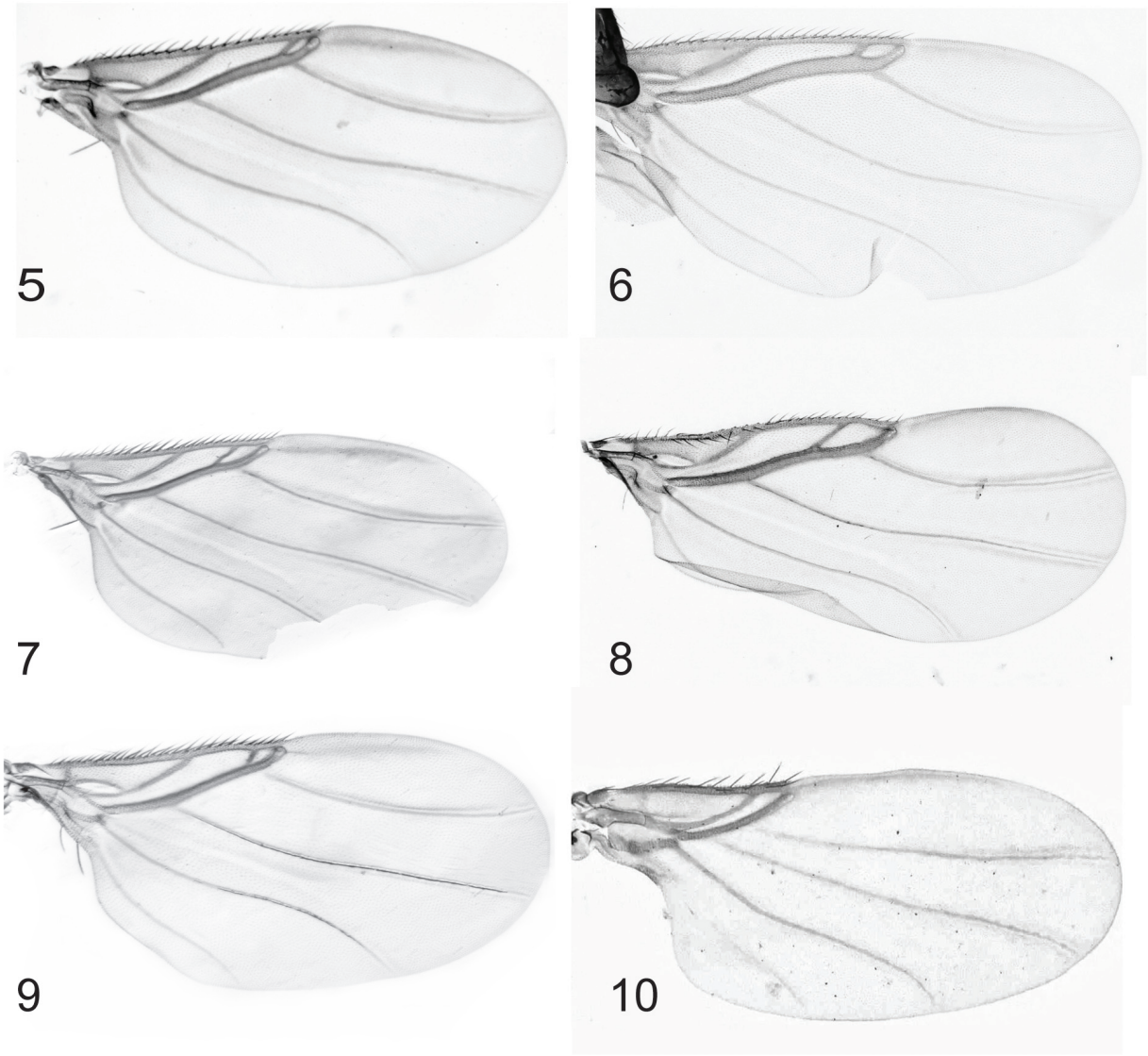
HOLOTYPE. ♂, slide mounted. PANAMA: Barro Colorado Island, Drayton Tr., 9.15°N, 79.85°W, 31.v.2014, H. Barrios and Y. Basset, Malaise trap (GMPAB675-18) (MIUP).

PARATYPES. ECUADOR: Manabi: Cerro Pata de Pajaro, 0°N, 75.95°W, 300m, 1♂, 19–21.vi.1996, P.Hibbs, Malaise trap (LACM). PANAMA: same locality as holotype, 1♂, 7–14.x.1992, Malaise trap, J.Pickering 995, 1♂, same data as holotype (LACM). COSTA RICA: Limón: Pandora, Estrella Valley, 9.73°N, 82.97°W, 1♂, 29.iii.1984, G.V.Manley, Malaise trap (LACM). Puntarenas: 3km SW Rincon, 8.68°N, 83.48°W, 10m, 1♂, vii–ix.1990, P.Hanson, Malaise trap (LACM). San José: Zurquí de Moravia, 10.05°N, 84.01°W, 1♂, ix–x.1990, P.Hanson, Malaise trap (LACM), 1♂, 22.x–12.xi.2012, Malaise trap #1, ZADBI-186, 2♂, 2♀, 4–11.x.2013, Malaise trap #1, ZADBI-1242 (LACM, MUCR).

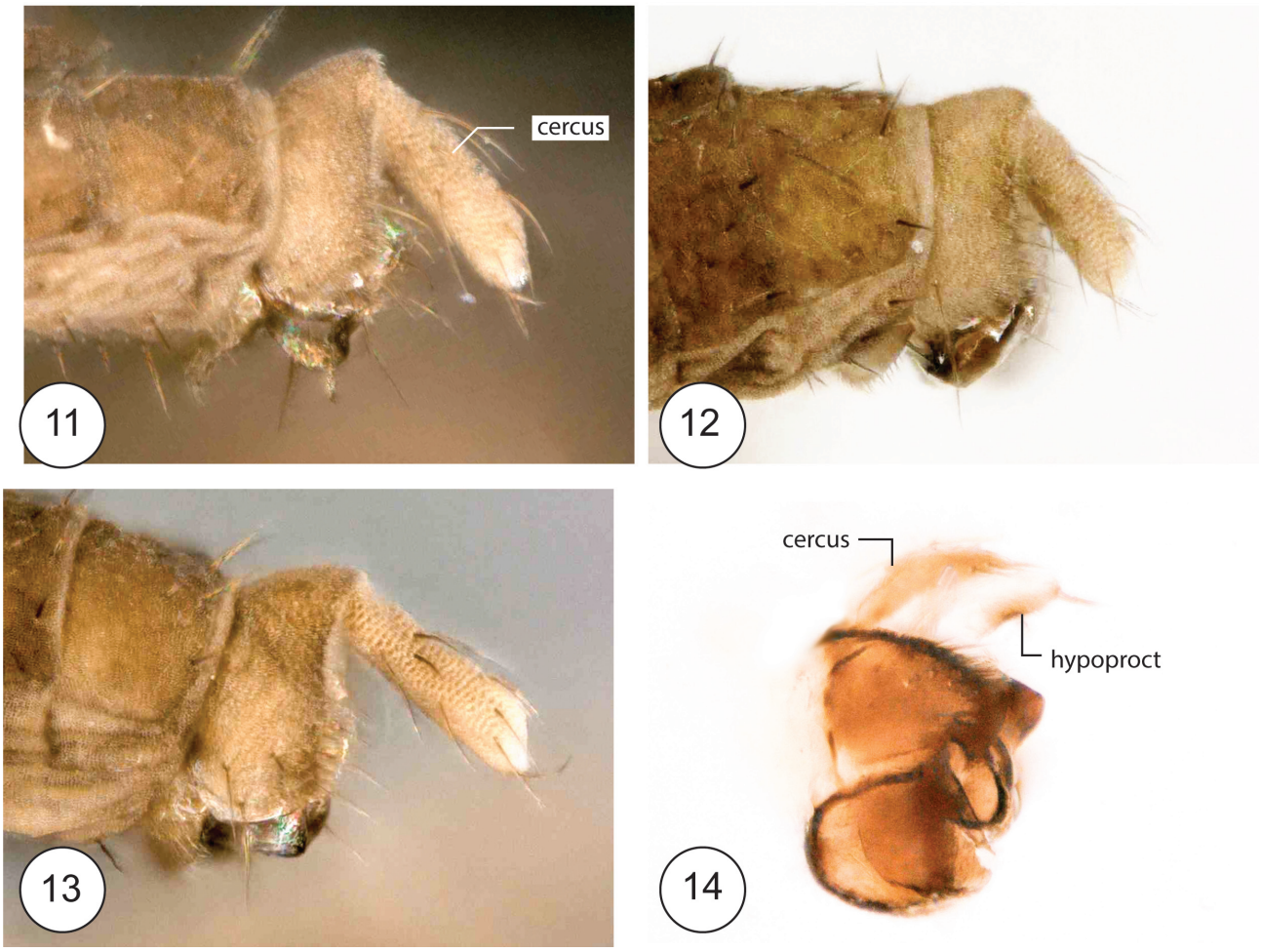
Diagnosis. The wing venation differs from that of *M. carribea* in that the swelling of Rs is less pronounced, the radial fork, especially R_{2+3}, is longer, and M_1 appears to arise more distally than the base of the R-fork (Figs. 7–8).

In BOLD, this species is in BIN BOLD:ACG3720. The nearest neighbor in BOLD, based on the CO1 DNA barcode, is BOLD:AED5813, a BIN for a species from Africa in the study of Srivathsan *et al.* (2019) for which no specimens are photographed. Emily Hartop kindly sent me a photograph of this species, however, and it is a *Megaselia* that looks completely unlike *Macgrathphora*.

The cluster width for the 55 sequences of this BIN in BOLD is 0.92%, and thus below the threshold established by Hartop *et al.* (2021) for concern about containing multiple species. I have not examined specimens from the entire range of haplotypes, however. The barcodes for this BIN differ from those of the previous species (BOLD: ACS8553) by about 11–13%.



FIGURES 5–10. Wing male. 5–6. *Macgrathphora caribbea* new species. 5. Male. 6. Female. 7–8. *Macgrathphora longifurca* new species. 7. Male. 8. Female. 9. *Macgrathphora pacifica* new species, male. 10. *Aurisetiphora maggiesnowae* new species, male.



FIGURES 11–14. Male genitalia, left lateral. 11. *Macgrathphora caribbea* new species. 12. *Macgrathphora longifurca n*ew species. 13. *Macgrathphora pacifica* new species. 14. *Aurisetiphora maggiesnowae* new species.

Holotype barcode:
TTATACTTTATTTTTGGGGCTTGAGCAGGAATAGTAGGAACATCATTAAGAATCATAATTCGAGCTGAA
TTAGGTCATCCCGGTGCTTTAATTGGAGATGATCAAATTTATAATGTAATTGTAACTGCCCATGCTTTTA
TTATAATTTTTTTTATAGTAATACCTATTATAATAGGAGGATTTGGAAATTGACTAGTCCCTTTAATATTAG
GTGCTCCAGATATAGCCTTTCCTCGAATAAATAATATAAGATTTTGATTATTACCTCCTTCTCTTACCTTA
CTATTAGCCAGAAGCATAGTAGAAAATGGAGCTGGTACAGGATGAACCGTTTACCCTCCACTTTCTTC
AAATATTGCTCATAGTGGAGCATCAGTTGATTTAGCAATTTTTTCTCTTCACTTAGCAGGAATTTCATCT
ATTTTAGGAGCAGTAAATTTTATTACTACTATTATTAATATACGATCTTCAGGTATTACTTTTGACCGTAT
ACCTTTATTTGTATGATCAGTAGGTATCACTGCAATTTTATTACTACTTTCTTTACCTGTTTTAGCAGGA
GCAATTACAATATTATTAACTGATCGAAATTTTAATACTTCATTTTTTGACCCTGCTGGAGGTGGAGATC
CTATTTTATACCAACATTTATT----------.

Distribution. This species is known from both lowland and middle elevations sites in Central and South America. The BOLD database has records for both lowland dry forest (Pacific slope) and lowland tropical forest (Caribbean slope) in the ACG. From what can be seen in the photographs on the BOLD web site, they are all conspecific with the holotype and paratype from Panama, and thus congruent with the BIN.

Etymology. The species name refers to the elongate R-fork.

***Macgrathphora pacifica* new species**
(Figs. 3, 9, 13)

HOLOTYPE. ♂. COSTA RICA: Puntarenas: 3km SW Rincon, 8.68°N, 83.48°W, 10m, ♂, vii–ix, 1990, P.Hanson, Malaise trap [LACMN ENT 043400] (MUCR).

PARATYPES. 1♂, same data as holotype. 3♂, 5km SW Rincon, 8.70°N, 83.51°W, 40m, B.V.Brown, V.Berezovskiy, Malaise trap (LACM). ECUADOR: Pichincha: 17 km E Santo Domingo, above Tinalandia, 1150m, 2♂, 9–13.v.1987, B.Brown, L.Coote, montane forest (LACM).

Diagnosis. The wing venation of this species differs from that of the otherwise similar *M. caribbea* in that costal sector 1 is much longer than sector 2, and Rs is less swollen and not increasing in size distally. Otherwise, the two species are extremely similar. The female is unknown.

No sequence information is available for this species.

Distribution. This species is known from the Pacific lowlands of the base of the Osa Peninsula in Costa Rica, and from a mid-elevation forest in Ecuador.

Etymology. The species name *pacifica* refers to the Pacific Ocean coast of Costa Rica, where most specimens have been collected.

Key to species

1. Origin of vein M_1 distal to origin of R_{2+3}; (Figs. 7–8); R-fork long . . . . . *M. longifurca* new species
- Origin of M_1 close to origin of R_{2+3} (Figs. 5, 6, 9); R-fork short 2
2. Costal sector 1 (distance along costa from humeral crossvein to R_1) only slightly longer than 2 (distance along costa from R_1 to R_{2+3}) (Figs. 5–6); Rs expanded distally, much thicker than costa. . . . . *M. caribbea* new species
- Costal sector 1 approximately 2x sector 2 (Fig. 9) ; Rs only slightly expanded, not increased in size distally (Fig. 9) . . . . . *M. pacifica* new species

***Aurisetiphora* new genus**

Type species. *Aurisetiphora maggiesnowae* new species.

Diagnosis. Metopininae. Body matte brown. Frontal macrosetae golden brown instead of black. Lacking dense black setulae on scutum; instead scutum with scattered golden-brown setae. Hind tibia without setal palisades or rows of setae.

This genus is differentiated from most other metopinines by the lack of dense setulae on the scutellum (as discussed in Brown 2007; Brown *et al.* 2015). An exception that also lacks dense dorsal scutal setae is *Platydipteron balli* Brown; however, that species has a shiny black body and is strongly limuloid in body structure.

Etymology. From Latin for "gold-bristled phorid", referring to the color of the main setae on the body.

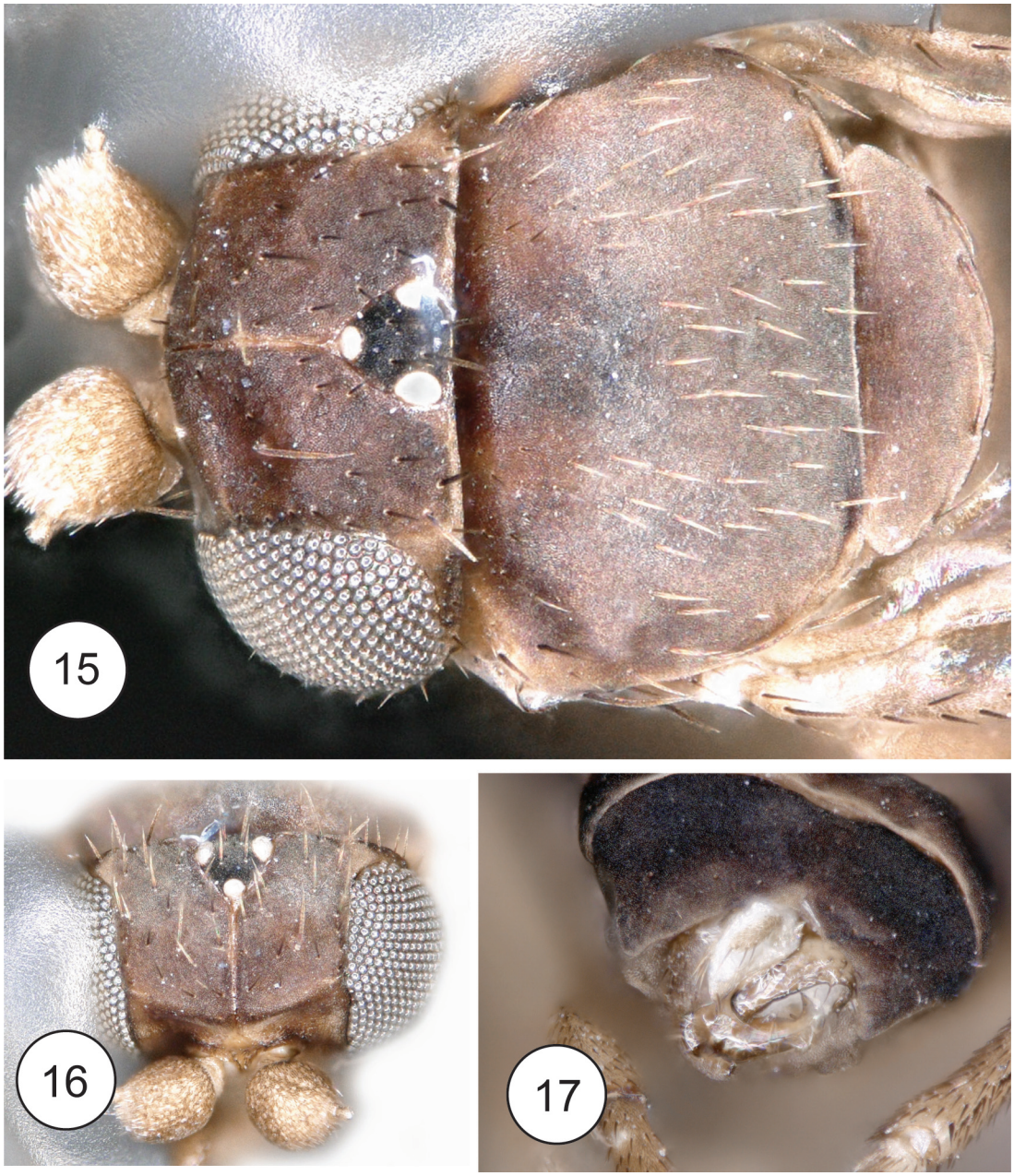
Natural history. Unfortunately, we know nothing about these flies, other than their propensity to fly into Malaise traps.

***Aurisetiphora maggiesnowae* new species**
(Figs. 4, 10, 14–17)

Holotype. ♂. COSTA RICA: San José: Ciudad Colón, 9.92°N, 84.25°W, 800m, xii.1989, P. Hanson, Malaise trap [LACM ENT 047296] (MUCR).

Paratypes. One ♂ with the same data as the holotype, one ♂, ii.1990 (LACM).

Description. Male (female unknown). Metopininae. Frons broad, dark-colored, matte, with fine sculpturing. Median furrow present. Frontal setae small, thin, light-colored, barely distinguished from sparse scattered frontal setulae; homology of major frontal setae uncertain, presence of supra-antennal setae unclear. Vertex with both ocellar and postocellar setal pairs. Flagellomere 1 enlarged, oval, arista subapical. Palpus cylindrical, brown, with small setae.



FIGURES 15–17. *Aurisetiphora maggiesnowae* new species. 15. Head and thorax, dorsal. 16. Frons, anterior. 17. Male genitalia, posterior.

Scutum dark-colored, with fine, scattered golden setulae only, without usual dense, black setulae. Notopleuron with 2 setae. Scutellum large, with 4 subequal, curved setae. Parapsidal suture strongly flared, reaching small, round anterior spiracle. Anepisternum, bare, divided, with dorsoventral furrow reaching parapsidal suture. Pleural sclerites with microtrichia except on venter of anepisternum.

Wing well-developed. Costa short, 0.36 wing length. Costal setulae long, scattered. Vein R_{2+3} absent; radial veins curved smoothly towards anterior margin. Halter large, brown.

Legs thick, light brown, without enlarged setae or setal palisades. Tarsomeres short.

Abdominal tergites dark brown, ventral membrane gray.

Male terminalia with epandrium rounded, broad, with large posteromedial process extending from right side to left side. Phallus consolidated, largely consisting of basal ring and funnel-shaped structure. Cercus broad, curved, apically narrowed. Hypoproct elongate.

Etymology. Named for a family friend, Maggie Snow.

Distribution. Known only from a single site in Costa Rica near Ciudad Colón. This is a topographically com-

plex area, and the site where many interesting phorids have been captured. On several occasions we tried to re-collect this fauna at the nearby Universidad de la Paz, but apparently the habitat is different there. According to Paul Hanson (personal communication), the site is closer to the town of Ciudad Colon, located 100 meters straight west of "Centro de Restauración Cristiano Dios es Amor".

Discussion

Based on collections made in the last 30 years, even "well-collected" Costa Rica has a large number of phorids that defy classification in existing genera. More field work is definitely needed to document their ranges and life histories, especially in light of climate change and perceived losses of insect faunas.

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