

AN OVERVIEW OF THE GENUS *OCYPTAMUS* MACQUART, 1834, WITH  
A REVISION OF THE *OCYPTAMUS TRISTIS* SPECIES GROUP

by

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## ABSTRACT

### AN OVERVIEW OF THE GENUS *OCYPTAMUS* MACQUART, 1834, WITH A REVISION OF THE *OCYPTAMUS TRISTIS* SPECIES GROUP

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The family Syrphidae (Diptera) has around 6000 species worldwide, including many species commonly seen hovering over flowers where they feed and seek possible mates. Many of the genera mimic bees or wasps, thus sharing a similar habitus, and their identification can prove difficult without a proper identification key. To aid in the identification of Syrphidae, the first chapter of the thesis presents an online interactive photographic key to the nearctic genera of Syrphidae, richly illustrated with field and

laboratory images. One of the most speciose genera of the family is *Ocyptamus* Macquart, 1834, with around 300 species described. Recent studies suggest that *Ocyptamus* is paraphyletic with regards to the genera *Eosalpingogaster* Hull, 1949 and *Toxomerus* Macquart, 1855. The second chapter addresses this paraphyly through a phylogenetic analysis, based on morphological and molecular data, of 63 species currently or previously placed in the genus *Ocyptamus*. A monophyletic *Ocyptamus* was defined on the basis of cladistic principles, six new genera (*Fragosa*, *Hypocritanus*, *Maiana*, *Nuntianus*, *Relictanum* and *Victoriana*) were proposed and 10 names (*Atylobaccha*, *Calostigma*, *Hermesomyia*, *Hybobathus*, *Mimocalla*, *Orphnabaccha*, *Pelecinobaccha*, *Pipunculosyrphus*, *Pseudoscaeva* and *Styxia*) were resurrected. The third chapter considers the clade made up of *Pelecinobaccha*, *Relictanum* and *Atylobaccha*, revising the genera *Pelecinobaccha* and *Relictanum*, including 24 new species, 28 synonymized names, an identification key and distribution maps.

Keywords: Cladistics, Nearctic, Neotropical, *Ocyptamus*, Syrphidae, Taxonomy

*"This is our home - our roots go deep*

*Where our ancestors sleep*

*This is the land we've nursed for countless aeons*

*But never ours to keep"*

(Home, Daniel Gildenlow)



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### **Authorship for future publications**

The chapters from this thesis will be published as a collaborative work. The authorship for each chapter will be as follows:

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## Introduction and Literature Review

### The family Syrphidae

There are three currently recognized syrphid subfamilies (Eristalinae, Microdontinae and Syrphinae) (Thompson *et al.* 2010). The Eristalinae usually have saprophagous or (less commonly) phytophagous larvae. Microdontinae species are predators/scavengers within ant colonies. Syrphinae mostly have predaceous larvae that feed on phytophagous Hemiptera, mostly Sternorrhyncha such as Aphididae (aphids) and Pseudococcidae (mealybugs) but also some Auchenorrhyncha (Cercopidae) (Rojo *et al.* 2003). Most predaceous Syrphidae are currently allocated to the subfamily Syrphinae, including the tribe Pipizini. (Mengual *et al.* 2008; Ståhl *et al.* 2003).

### Systematics

The family Syrphidae was established by Latreille (1797) to accommodate the genus *Syrphus* Fabricius, 1775. The subfamily divisions of Syrphidae have varied considerably in time (from 2 (Vockeroth 1969) to 21 (Shiraki 1949)), as has the tribal classification (Thompson 1972; Vockeroth 1969; Williston 1887). Current classifications recognize 3 subfamilies and 13 tribes (Thompson *et al.* 2010).

Vockeroth (1969) revised the world genera of the tribe Syrphini (Syrphidae: Syrphinae), presenting keys and distributional data. Vockeroth observed that the neotropical Syrphini fauna had very diverse characters but most species were limited to only two genera (*Allograpta* Osten Sacken, 1875 and *Orphnabaccha* Hull, 1949). Vockeroth noticed that *Orphnabaccha* varied considerably in habitus and genitalic characters. He believed that the distinction between his new genera, *Hermesomyia*

Vockeroth and *Pseudoscaeva* Vockeroth, could become blurred with *Orphnabaccha* if more species of these three taxa were discovered.

Thompson (1969) considered the Microdontini to be an older lineage warranting the same rank as the two other subfamilies, Syrphinae and Milesiinae (= Eristalinae), and presented a phylogeny based on larval and male genitalic characters to justify the classification. Thompson (1972) wrote a generic revision of the subfamily Milesiinae from the neotropics and proposed a new family, Microdontidae. The tribe Pipizini, composed of species with predaceous larvae, was placed in the subfamily Milesiinae instead of Syrphinae, mainly on the basis of the adult morphological characters.

Based on the comparison of karyotypes of several Syrphidae species, Boyes and Brink (1972) suggested that the tribe Pipizini be placed with the Syrphinae rather than the Milesiinae (= Eristalinae), since most of the complements for the tribe were  $2n = 8$  and the arm ratios of the autosomes resembled those of the Syrphinae.

Vockeroth (1992) reviewed the Syrphinae of Canada, Alaska and Greenland, including 166 species in 22 genera. Five nearctic genera (*Dideomima* Vockeroth, 1969, *Leucopodella* Hull, 1949, *Pseudodoros* Becker, 1903, *Salpingogaster* Schiner, 1868 and *Xanthandrus* Verrall, 1901) were excluded from his study since all are restricted to the southern United States. Complete species keys were included for all genera studied. Vockeroth also transferred *Ocyptamus* from the Bacchini to the Syrphini due to the two-segmented aedeagus (Bacchini has a single segmented aedeagus). The tribe Pipizini was still considered part of the Eristalinae.



Skevington and Yeates (2000) used the mitochondrial 12s rDNA and 16s rDNA genes of 27 species of the superfamily Syrphoidea in a cladistic analysis that focused on the Pipunculidae. The study resulted in a topology with a monophyletic Microdontinae basal to the rest of Syrphidae, and a monophyletic Syrphinae. The support for both groups was weak, with a large amount of homoplasy occurring in both data sets. The study deemed Eristalinae paraphyletic and placed *Triglyphus fulvicornis* Bigot (only specimen from the tribe Pipizini) in a clade with other Eristalinae species.

The current subdivisions of the family are supported by the work of Ståhl *et al.* (2003). Their study used molecular data from the mitochondrial gene cytochrome c oxidase subunit I (COI) and the nuclear 28S rRNA gene to obtain phylogenetic relationships among the higher taxa of Syrphidae. In addition to the molecular data, they added adult (later compiled in Hippa (2005)) and larval (Rotheray & Gilbert 1999) morphological data to the phylogenetic analysis. The molecular data were analyzed in six different weighting schemes (for gaps and changes) to evaluate the sensitivity of the cladogram to alignment and analysis parameters. The combined analysis of morphological and molecular data used direct optimization, a maximum parsimony algorithm designed especially for this sort of analysis. The combined analysis of all the data resulted in 8 most parsimonious trees, and the classification was presented in a stability tree (majority rule consensus). The Ståhl *et al.* study placed the tribe Pipizini in Syrphinae.

Hippa & Ståhl (2005) revised, extended and analyzed the adult morphological dataset of Ståhl *et al.* (2003) including 119 characters of which 33 were novel vestiture characters such as the type and structure of thoracic hairs (e.g. branched versus

simple, bristly versus soft). Their cladistic analysis resulted in only one most parsimonious tree, supporting Syrphinae and Microdontinae as monophyletic groups and placing the tribe Pipizini as a sister group to Syrphinae. The subfamily Eristalinae was not recovered as monophyletic.

The (Microdontinae ((Pipizini+Syrphinae)+Eristalinae)) arrangement was also recovered in a phylogenetic study of lower Cyclorrhapha using larval characters (Rotheray & Gilbert 2008). That study was based on a small sample of specimens for the family (2 for Eristalinae, 2 for Microdontinae, 1 for Syrphinae and 1 for Pipizini) but it presents unique larval synapomorphies (e.g. presence of transverse lobe on the ventral surface of the anal segment for Pipizini+Syrphinae) which support this arrangement.

Mengual *et al.* (2008) tested the monophyly of the Syrphinae tribes plus Pipizini using sequences from the COI and 28S genes. 28S sequences were analyzed through direct optimization, without a previous sequence alignment. Pipizini was recovered inside the Syrphinae. The tribes Toxomerini and Paragini were recovered as monophyletic groups, Syrphini and Bacchini were not. Furthermore, *Toxomerus* and *Eosalpingogaster* were recovered inside the genus *Ocyrtamus*, rendering the latter paraphyletic.

### **The neotropical Syrphidae**

The Neotropical Region has a great diversity of Syrphidae, with many species awaiting formal description. An early key (Shannon 1927) covered all the neotropical genera known at that time, but the subsequent description of many new taxa (1930-50, mainly by C. H. Curran and F. M. Hull) rendered the key obsolete. Hull (1949b) wrote a

review of the Syrphidae genera of the world, but his descriptions were incomplete and sometimes misleading (Thompson 1972).

Thompson (1981) presented a taxonomic analysis of the Syrphidae from the West Indies. The study recognized 129 species in 27 genera, presented geographical distribution records and discussed the economic importance of Syrphidae as pollinators and predators. Thompson (1999) wrote a key to the genera of neotropical Syrphidae, and included a glossary of current taxonomic terms used for the family. Thompson *et al.* (2010) summarized the current knowledge on adults and larvae of Syrphidae from Central America, presenting generic keys for both life stages. They were aware of the recent studies questioning the monophyly of Eristalinae and the position of Pipizini (Mengual *et al.* 2008; Rotheray & Gilbert 2008; Ståhls *et al.* 2003) but retained the Pipizini in the Eristalinae for 'pragmatic reasons'.

### **Species concept and cladistics**

This study relies largely on distinct morphological traits adult flies to make distinctions between species. Species delimitations are then further supported by distributional data, larval habits and molecular evidence.

Cladistic analysis can be used to determine phylogenetic relationships among taxa using morphological, ecological, molecular, geographical, behavioural, and biochemical data/character states that may be shared between the target taxa. Cladistics, or phylogenetic systematics, arranges taxa according to shared character states inherited from a common ancestor, or homologies. There are two types of homologies: plesiomorphies (primitive) and apomorphies (derived). Cladistic

methodology arranges the taxa using apomorphies, since they are characters inherited from a direct common ancestor that are uniquely shared by the group being studied. Plesiomorphies, primitive characteristics, are inherited from a more remote ancestor to the group being studied and are shared by more taxa which are not part of the target group. The group supported by shared apomorphies (= synapomorphies) is called a monophyletic group or natural group. Occasionally, one character may appear to support more than one clade in an analysis (homoplasy) and its position may change in the cladogram depending on how it is optimized (Hennig 1999; Lipscomb 1998).

Cladistic analysis yields branching diagrams that can be extrapolated into a systematic classification, where nested groups of branches (clades) represent a supra-specific hierarchy. Branching diagrams (cladograms) can also be presented as phylogenetic trees, i.e. evolutionary hypotheses of the origin of the groups being studied (Hennig 1999; Lipscomb 1998).

This study uses adult morphological characters to establish clades which can be considered for recognition as higher taxa (genera, subgenera and species groups), rather than characters from immature stages. Adult characters are used to establish clades because adult specimens are easier to obtain than eggs or larvae. After associating immature stages with adults, more characters will be available to test and corroborate clades.

The large (around 300 species) genus *Ocyptamus s.l.* shows such a wide range of shape, size and colour that a generic diagnosis accounting for all species is difficult if not impossible. By way of illustration, Thompson's (1999) key requires 9 characters to

distinguish *Ocyptamus s.l.* from *Toxomerus*. This problem could be solved by creating a very large, instantly recognizable group including *Toxomerus* and *Ocyptamus s.l.*, but such a taxon would be so large and diverse it would have little predictive power. In my opinion, speciose and hard to diagnose taxa such as *Ocyptamus s.l.* are better addressed through more restricted concepts (separate and more readily diagnosable genera, subgenera or species groups) developed on the basis of careful cladistic analyses. Taxa based on well-supported clades will remain stable even with the discovery of new species, since these species will share the synapomorphies of the previously defined groups. It is desirable to rank and diagnose the clades in a way that permits others to identify the groups most efficiently, accurately, and predictively.

### **Genus *Ocyptamus***

Larvae of the New World genus *Ocyptamus* Macquart (Thompson *et al.* 1976; Thompson 1999; Wirth *et al.* 1965) often prey on common crop pests, mainly soft bodied Hemiptera (Aquad & Trevizani 2005; Rojo *et al.* 2003). Identification of *Ocyptamus* species is complicated since keys (Curran 1941; Hull 1949a) do not include all known species and rely heavily on characters such as face color or extension of yellow markings on the abdomen, which are known to vary among syrphids depending on the pupa's environmental temperature (Dusek & Laska 1974; Marriott & Holloway 1998) with cooler temperatures resulting in darker adults.

When *Baccha* Fabricius, 1805 was defined, no type specimen was explicitly determined. Partington (1835) later designated *B. elongata* Fabricius, 1805 as the type specimen. But Fabricius was known to give his type specimens lengthy descriptions,

which was the case of the species *B. cylindrica* Fabricius, 1805 (overlooked by later authors) which is currently in *Ocyptamus*. Partington's determination was still a sound choice since on the footnote of the *Baccha* page, Fabricius describes his genus as "... abdomine elongato, basi tenuissimo, apice incrassato [...] alis hyalinis" which roughly translates to "elongated abdomen, narrow base, enlarged apex [...] hyaline wing", which fits *B. elongata* (*B. cylindrica* has a parallel sided abdomen with partially dark wings). Furthermore, *B. elongata* was the only species that Fabricius described that occurred in the Danish flora (Fabricius was a Dane).

The genus *Ocyptamus* Macquart, 1834 was treated as a synonym of *Baccha* until Shannon and Aubertin (1933) revalidated it on the basis of "... presence of a transverse row of fine bristles anteriorly on the dorsum of the thorax, and by the narrow unstricted abdomen". Dusek and Laska (1967) and Vockeroth (1969) were the first to notice that melanostomines (= Bacchini) had an unsegmented aedeagus, different from the segmented aedeagus of the syrphines (which was the case of all the *Baccha* (= *Ocyptamus*) that were restricted to the New World). Boyes *et al.* (1971; 1973) pointed to a difference between the karyotypes of the different species of *Baccha* ( $2n = 6$  for *Baccha* s.s. and  $2n = 8$  and  $2n = 10$  for the *Baccha* from the neotropics (= *Ocyptamus*)). Thompson *et al.* (1976) reclassified all the *Baccha* species from Central and South America as *Ocyptamus*. The genus currently is restricted to the New World and the diversity is predominantly Neotropical. Of the 297 described species, only 22 occur in the Nearctic Region (Thompson 1999). Current keys (since early 1980's) for *Ocyptamus* species cover only some sub-generic or regional groupings (Thompson 1981; Thompson & Zumbado 2000), which limits species identification.

The genus *Ocyptamus* as a whole hasn't been reviewed or revised since Hull's (1949a) treatment of the New World *Baccha*, with only the subgenus *Ocyptamus* (*Mimocalla*) being revised by Thompson and Zumbado (2000). The high number of *Ocyptamus* morpho-species identified in recent publications on Syrphidae faunistics (Marinoni *et al.* 2004; Reemer 2010) reflects the urgent need for a revision.

The species and species groups currently treated as *Ocyptamus* have been placed in different taxa in the past. Shannon (1927) erected *Pelecinobaccha* as a subgenus for *Baccha* to accommodate the species *P. peruviana* which has a very long abdomen and "bears a superficial resemblance to *Pelecinus polyturata* (Hymenoptera)", and the genus *Calostigma* for *C. elnora*, which has a straight M1 vein and a black apical spot on the wing. Hull (1937) erected the genus *Pipunculosyrphus* based on the large eyes, hidden postpronotum, shortened abdomen and the lack of an alula. Hull later considered *Pipunculosyrphus* to be a subgenus of *Baccha* (Hull 1949a). The genus *Hybobathus*, represented by *H. quadrilineatus* (= *Ocyptamus quadrilineatus*), was described by Enderlein (1938) as close to *Mesogramma*, *Antlops* and *Mistrophen* (= *Toxomerus*) but was distinguished by "Die fühlern sitzen auf einer poliert glatten beuligen anschwellung des vorderen stirnteiles" which roughly translates to 'antenna placed on a produced frons'. Hull (1943) erected the subgenera *Styxia* (greatly inflated and swollen head, pilose eyes), *Mimocalla* (vein R4+5 and M1 sinuous) and *Therantha* (scape, pedicel and basoflagellomere elongated) for *Baccha*. Hull (1949) tentatively subdivided *Baccha* into nine species-groups spread out in five subgenera, one of which was *Ocyptamus* (or *funnebris* group). Hull (1949) proposed the new genus *Orphnabaccha* (pilose metasternum), and the new *Baccha* subgenera *Aulacibaccha* (consisting of his

*obsoleta* group, abdomen distinctly emarginated on at least fourth and fifth segments), *Dioprosopa* (junior subjective synonym of *Pseudodoros*) and *Pipuncullosyrphus* (as mentioned above). Furthermore, Hull describes the species groups *cultrata* (ochre flies with sub-spatulate to oval abdomens), *lepida* (light ochraceous flies with inverted 'V' shaped spots on abdomen), *lineata* (similar to *lepida* but with raised opaque ocellar triangle), *pirata* (flies with parallel-sided abdomen with transverse bands) and *tristis* (dark flies with petiolate abdomen) as "subdivisions of the genus *Baccha*", and *obscuricornis* (slender flies with black face) and *victoria* (slender flies with yellow face) as part of "*Baccha, sensu stricto*". Hull also erects the new subgenus *Leucopodella* (*Atylobaccha*) for *B. flukiella* Curran, 1941, describing them as "small flies" with "hyaline wings and simple femora", but on page 102 of the same work he treats the group as a genus ("*Atylobaccha flukiella*").

The genera *Hermesomyia* and *Pseudoscaeva* proposed by Vockeroth (1969) were treated as subjective synonyms of *Ocyptamus* by Thompson et al. (1976). Vockeroth stated that their terminalia were very similar but they were otherwise "strikingly" different (parallel-sided or oval abdomens with black opaque markings and yellow bands (*Hermesomyia*) or with pairs of bands to absence of any yellow marking (*Pseudoscaeva*)). Vockeroth stated that *Hermesomyia* and *Pseudoscaeva* were very closely related to, and might even belong to, *Orphnabaccha*. Boyes et al. (1973) also alluded to the similar karyotypes shared by *Allograptia*, *Orphnabaccha* and *Pseudoscaeva*.

Thompson (1981) delimited eight species-groups in *Ocyptamus* based on the species from the West Indies (*caldus* (= *Orphnabaccha* Hull), *capitatus* (= *Mimocalla*



Hull), *cylindricus* (= *Ocyptamus*, *sensu stricto* = *funnebris* species group from Hull (1949)), *elnora* (= *Calostigma* Shannon), *lepidus*, *lineatus*, *parvicornis* and *stenogaster*). Thompson's *O. lepidus* and *O. lineatus* species groups are similar to Hull's (1949). The *O. parvicornis* group consists of reddish-orange, slender flies, with males that have a pair of long apical extensions on the 5<sup>th</sup> sternite. Based on the description of the *O. stenogaster* group, it seems to consist of some of the species from both the *obscuricornis* and *victoria* groups from Hull (1949).

The genus *Ocyptamus* and some of its species-groups were recognized as natural groups in a phylogenetic study using only external morphological characters by Miranda (2005). However, that analysis also placed *Salpingogaster nigra* Schiner, 1868 inside *Ocyptamus*, where it was supported as the sister group to the *Ocyptamus* (*Mimocalla*) clade. Hull (1949) had previously alluded to the paraphyly of *Ocyptamus* (treated mostly as *Baccha*) with regard to *Salpingogaster*, saying that “the subgenus of *Baccha*, *Mimocalla*, appears to be an annectant group [to *Salpingogaster*]”. A recent molecular study showed that both *Toxomerus* and *Eosalpingogaster* render *Ocyptamus* paraphyletic (Mengual *et al.* 2008). Despite mounting evidence for its paraphyletic nature, *Ocyptamus* has yet to be given a modern revision at the species level since it was redefined by Thompson *et al.* (1976). A comprehensive revision of the entire genus is beyond the scope of a single thesis, but the current work takes the first necessary steps towards such a revision by reviewing the species groups of *Ocyptamus* and revising one of the more significant putative monophyletic lineages, the *O. tristis* species-group.

## Hypotheses and objectives

### Hypotheses

H<sub>01</sub>: The *O. tristis* species group is a monophyletic group. H<sub>02</sub>: *Ocyptamus* is not a monophyletic group and its component lineages require reclassification according to cladistic principles.

### Objectives

1. Put *Ocyptamus* and related genera in context and make them readily recognisable through the development of a generic key to the Syrphidae of North America. (Chapter 1)
2. Obtain morphological and molecular character data from exemplars of all putative *Ocyptamus* species group taxa. (Chapter 2 and 3)
3. Test the monophyly of the *O. tristis* species group and other named *Ocyptamus* lineages through cladistic methodology. (Chapter 2)
4. Redefine the genus *Ocyptamus* according to cladistic principles, describing and naming new taxa as necessary. (Chapter 2)
5. Conduct a taxonomic revision of the *tristis* species group. (Chapter 3)

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## **Chapter I: “An interactive photographic key to the nearctic Syrphidae”**

### **Abstract**

Representatives of the conspicuous and diverse family Syrphidae are found worldwide, and adults of many species are of considerable economic importance as pollinators. Due to their relatively large size, frequently colourful appearance and conspicuous habits, many (if not most) syrphid genera are readily identifiable in the field with the help of proper identification tools. This study aims to provide such a tool by taking advantage of the opportunities provided to taxonomists by the combination of newly available techniques and equipment for digital macrophotography and new opportunities for publishing photo-rich products on the web. We have developed an interactive photographic key which is intuitive to use yet comprehensive, covering all genera of Syrphidae in the Nearctic Region. Every page is fully illustrated, with accompanying text designed to highlight important characters. The key will also serve as a portal to more information on each taxon it identifies.

**Keywords:** flower fly, hover fly, North America, online keys.

## Introduction

The [Global Taxonomy Initiative](#) (last accession date: December 29<sup>th</sup> 2010), developed through the [Convention on Biodiversity](#), states in its opening page that “Effective conservation and management of biodiversity depends in large part on our understanding of taxonomy. Unfortunately, inadequate taxonomic information and infrastructure, coupled with declining taxonomic expertise, hinders our ability to make informed decisions about conservation, sustainable use and sharing of the benefits derived from genetic resources.” Taxonomists contribute to the removal of this impediment through reviews and revisions. Reviews of generic classifications give access and context to generic identifications, and highlight problems with existing generic definitions and diagnoses. Revisions of supra-specific taxa (e.g. genera) resolve taxonomic problems by discovering new species, defining the component species, offering phylogenetic analyses with insights into the evolution of its lineages and contributing information on the biology and distribution of the group.

Identification keys are among the most important components of taxonomic reviews. The construction of functional and current identification keys requires expert taxonomic knowledge, both of the group under review and the higher taxon to which that group belongs. Good keys not only yield names, but also serve as portals to additional information such as genus/species information (biology, distribution, molecular data, etc.) and associated keys (for example, a generic key should serve as an access point for species keys).



A key should be easy to use and easy to access. Adequately illustrated keys ease identification by integrating images with text, rather than using lengthy character descriptions that rely on a previous understanding of the taxonomy involved. Making the key available online and with free access (through peer-reviewed e-journals such as the Canadian Journal of Arthropod Identification ([CJAI](#))) renders the key available to anyone in the world with internet access. Internet keys are easily updated (or, in the case of formally published keys, linked to updated information). The best keys are based on authoritative reviews and reflect the best current science; this can be assured by peer-review and publication in peer-reviewed e-journals.

Recent scrutiny of the family Syrphidae (Diptera) has raised questions about the monophyly of the subfamily Eristalinae, led to proposals for rearrangement of several tribes, and identified several genera in need of revision (e.g. *Ocyptamus*) (Mengual *et al.* 2008; Ståhl *et al.* 2003). The present study reviews the current knowledge and uses the existing generic concepts for the Syrphidae genera from the Nearctic Region. While attempting to delineate higher taxa for the key, some genera were exposed as difficult to distinguish from others (e.g. reflected in the use of inconspicuous characters in some of the couplets), while other genera were clarified (e.g. distinct genera are keyed out early). The current understanding of these generic concepts is made accessible through an online interactive photographic key.

## **Methodology**

### **Material examined**

Specimens from all nearctic genera and subgenera of Syrphidae recognized in the current literature (Thompson 2010; Vockeroth & Thompson 1987; Wirth *et al.* 1965) were used for illustrating the key. Specimens were obtained from the University of Guelph Insect Collection (DEBU), the Canadian National Collection of Arthropods (CNC, Ottawa, Canada) and the Smithsonian Institution (USNM, Washington D.C., USA).

Characters were illustrated using high-magnification photographs of pinned specimens. A Cannon EOS 1DS camera was used, and different combinations of lenses were attached depending on the degree of magnification needed. The camera, mounted on a computer-controlled focusing rail, took several photos of each specimen, from the most proximal to the most distal focus point at regular intervals. These raw images were imported to a PC through the Capture One Pro software. The pictures were then exported from Capture One Pro as .tiff files to be later combined in one fully focused .tiff image using the Combine Z software (using the default 'Do Stack' command). The processed images were later retouched in Adobe Photoshop CS4, by adjusting the black and white levels, cropping and sharpening. Wherever possible, the key was supplemented with live fly photos taken mainly by S. A. Marshall. Additional live images were taken by J. H. Skevington and A. D. Young, and a few were provided by [BugGuide](#) contributors (P. Alexander, T. Bentley, R. Hemberger, G. McDonald, T. Murray, H. S. Parker and H. Wisch). All live photos are credited in their lower corners.

## **Taxon pages**

The digital key directs the user to a generic name which is in turn linked to a taxon page with additional pictures, diagnostic information, checklist of nearctic species, province/state records and a button which links to the genus page on the [Encyclopedia of Life website](#).

The species checklist was based on records in Systema Diptorum (Thompson 2010). Maps with province/state records were generated through Adobe Illustrator CS4, based on Systema Diptorum and material at our disposition. Whole provinces/states were colored if there was at least one record from the province/state.

## **Interactive photographic key setup and mechanics**

The key was developed in Microsoft PowerPoint: Mac 2008 v.12.2.7 (.pptx format) on an iMac 2009 running Mac OS X 10.5.8, will be converted to html using the PPTools PPT2HTML software and will be submitted for consideration in [CJAI](#).

Previous published keys (Stubbs & Falk 1983; Thompson 1972; Vockeroth & Thompson 1987; Vockeroth 1992) served as a starting framework for the interactive photographic key. In addition, novel characters are presented that can be more easily assessed with and without the aid of a microscope. All characters are illustrated by a photo, and in some cases insets are used to help the user locate the character.

There are two types of page formats in the key. One type (multi-option format) has clickable pictures or boxes with text describing diagnostic characters for unique taxa or a group of taxa. The user is then directed to choose from one of the options displayed or to click a button to proceed to another slide with different options. The

other type (dichotomous format) has two clickable buttons representing contrasting characters to select from. The picture/box (multi-option format) or button (dichotomous format) may be a taxon identification, which will link to the proper taxon page, or a link to another multi-option or dichotomous page.

Taxa with unique characters are displayed early in the key for quick identification. Superficially similar taxa are grouped together and linked to further pages detailing the character states necessary to properly distinguish between them.

All pages contain a back button which will take the user to the previously viewed slide. Alternatively, the back button on the user's browser can be used for the same purpose. On the pages that pertain to a group of taxa of similar habitus there is a button, beside the back button, to return to the page where the key initially branched off to the current group.

### **Discussion and conclusions**

The Manual of Nearctic Diptera key to genera of Syrphidae (Vockeroth & Thompson 1987) is a great work and a valuable tool, but is useful mainly to entomologists who have experience with Syrphidae taxonomy. Like all previously published syrphid keys, it includes some problem characters, such as the emargination of the abdominal tergites or the condition of the postpronotum, which can be difficult to see and interpret in good specimens and impossible to see in poor ones.

The key is a mixture of standard dichotomous couplets and polytomous (multiple access) frames rather than a matrix based key because such fixed path keys because

use the expertise of the authors to guide the user through a specific pathway to identification.

The new digital key to syrphid genera will be published in a free access digital journal available to anyone with internet access, including mobile devices. The key sets the stage for generic revisions, and may also serve as an access portal to such revisions (and their species keys) as they are published. The interactive photographic key will be available in [CJAI](#).

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## **Chapter II: “A combined molecular and morphological phylogenetic analysis of the genus *Ocyptamus*, Macquart, 1834 (Diptera, Syrphidae): new generic classification of the former *Ocyptamus* species”**

### **Abstract**

With nearly 300 described species, *Ocyptamus* Macquart is the second most speciose genus of Syrphidae in the New World, and the most diverse genus of Syrphinae. *Ocyptamus* as a whole was last revised by Hull (1949a). The genus is here reviewed using morphological characters, especially female and male genitalia, and molecular characters including regions of the mitochondrial 12S, COI and CytB genes, and the nuclear AATS, CAD and 28S genes. *Ocyptamus* is shown to be paraphyletic with regards to *Eosalpingogaster* Hull and *Toxomerus* Macquart and is revised in a narrower sense. Six new genera (*Fragosa* gen.nov., *Hypocritanus* gen.nov., *Maiana* gen.nov., *Nuntianus* gen.nov., *Relictanum* gen.nov. and *Victoriana* gen.nov.) are erected for species previously included in *Ocyptamus*, and the following older generic names are resurrected: *Atylobaccha* Hull, *Calostigma* Shannon, *Hermesomyia* Vockeroth, *Hybobathus* Enderlein, *Mimocalla* Hull, *Orphnabaccha* Hull, *Pelecinosbaccha* Shannon, *Pipunculosyrphus* Hull and *Pseudoscaeva* Vockeroth.

**Keywords:** New World, flower fly, morphology, taxonomy.

## Introduction

### ***Ocyptamus* Macquart**

*Ocyptamus* Macquart, 1834 is the second most speciose genus (~300 spp.) of Syrphidae in the Neotropical Region (the first being *Copestylum* Macquart, 1846 (~320 spp.)) (Thompson 1999) and is closely related to the genus *Toxomerus* Macquart and the genus *Eosalpingogaster* Hull (Mengual *et al.* 2008; Mengual & Thompson 2011).

Austen (1893) separated the New World *Baccha* (= *Ocyptamus*) into three groups: dark flies with a petiolate abdomen (group I), ferruginous/ochraceous flies with a petiolate abdomen (group II), and ferruginous/yellowish flies with a broad and flat abdomen (group III). Hull (1949a) attempted to further divide the New World *Baccha* into several subgenera and species groups, and also proposed new genera closely related to *Baccha*. Vockeroth (1969) described two new genera (*Hermesomyia* and *Pseudoscaeva*) that he considered close to Hull's *Orphnabaccha*. Thompson *et al.* (1976) transferred all of Hull's (1949a) *Baccha* (with the exception of *B. elongata*) to *Ocyptamus* and synonymized the genera *Callisyrphus* Frey, *Calostigma* Shannon, *Hermesomyia* Vockeroth, *Orphnabaccha* Hull, *Pipuncullosyrphus* Hull, and *Pseudoscaeva* Vockeroth to *Ocyptamus*. Thompson (1981a) expanded on Hull's (1949a) group definitions by presenting a more extensive diagnosis for each group. To date, only one part of *Ocyptamus*, *O. (Mimocalla)*, has been fully reviewed (Thompson & Zumbado 2000).

Some recent phylogenetic studies point to the paraphyly of *Ocyptamus* (Mengual *et al.* 2008; Miranda 2005), suggesting that the generic definition should be re-



evaluated. This study aims to test the monophyly of the genus *Ocyptamus* through cladistic analysis using extensive morphological and molecular data. Based on the resulting hypotheses, this study also aims to define recognizable monophyletic groups, and to present a key for their identification.

### **Molecular analysis**

The genes used in this study were the mitochondrial 12S Ribosomal DNA (12S), Cytochrome *b* (CytB) and Cytochrome *c* Oxidase Subunit I (COI) and the nuclear 28S Ribosomal DNA (28S), Alanine-tRNA Synthetase (AATS) and a fragment (roughly from base position 560 to 3180) of the carbamoyl phosphate synthase domain of CAD (CAD). The work of Gibson *et al.* (2011) summarizes the history of the use of these genes and their related primers in Diptera.

The target genes were chosen based on sequencing success and phylogenetic usefulness in previous studies (Gibson *et al.* 2011; Mengual *et al.* 2008; Moulton & Wiegmann 2004) and also influenced by the Insect Molecular Laboratory at the Agriculture and Agri-Food Canada Neatby Building (Ottawa, Canada) (Gibson *et al.* 2010b). Many of the oligonucleotides (primers) used in this study (Table 1) were developed in the Insect Molecular Laboratory, and a summary can be found in the work of Gibson *et al.* (2011).

## **Material and Methods**

### **Specimens**

In addition to specimens from the University of Guelph Insect Collection (DEBU, Guelph, Canada), specimens were borrowed from the Canadian National Collection of

Insects (CNCI, Ottawa, Canada), United States National Museum (USNM, at the Smithsonian Institution, Washington D.C., USA), American Museum of Natural History (AMNH, New York, USA), Museu de Zoologia da Universidade de São Paulo (MZUSP, São Paulo, Brazil), Coleção de Entomologia Padre Jesus Santiago Moure (DZUP, Curitiba, Brazil) and Instituto Nacional de Biodiversidad (INBio, San José, Costa Rica).

The *Ocyptamus* species groups used as an initial framework for this study were based on previous literature (Hull 1949a; Thompson 1981a; Thompson & Zumbado 2000), and are summarized on Table 2. Outgroup taxa were chosen on the basis of recent phylogenetic studies (Mengual 2008). A representative selection of 63 (47 for molecular) species of *Ocyptamus* plus 17 (12 for molecular) outgroup taxa were studied (Table 3). References for larval prey of *Ocyptamus* species are summarized in Table 5 and on Cladogram 5.

Specimens for the molecular study were collected by sweep netting or hand-collecting, preserved in 90-95% ethanol, and placed in a -20°C or -80°C freezer until extraction. The voucher data and unique identifiers for the specimens used for the molecular study are presented in Table 4.

## **Molecular data**

### **DNA Extraction, PCR amplification and sequencing**

Genomic DNA extractions were obtained with the QIAGEN DNeasy kit (Qiagen Inc., Santa Clara, CA, USA). Following extraction, specimens were critical-point dried or dehydrated through three successive 24h baths of ethyl acetate and then air dried. Specimens were deposited as vouchers at the CNC, DEBU, INBio and MZSP (Table 4).

Amplification, purification, sequencing and contig assembly were carried out as described in Gibson et al. (2010a; 2010b). Base frequencies were calculated in PAUP\* 4.0b10 (Swofford 2003).

It was not possible to obtain a full molecular dataset for some taxa (Table 3). The 28S and COI sequences for *Eosalpingogaster conopida*, *Ocyptamus gastrostactus*, *O. tiarella* and *O. wulpianus* (Mengual et al. 2008) were obtained from the [NCBI Entrez Taxonomy](#) webpage. The remaining molecular data were newly acquired for this study. Genbank accession numbers for the sequences are presented on Table 4.

### **Sequence alignment**

All sequences were aligned using ClustalX v2.0.3 (Larkin et al. 2007). Sequences were checked for gross differences against original contigs. Sequences from protein coding genes were first set to be coloured by amino acid (In Mesquite: Matrix/Color Matrix Cells/Color Nucleotide by Aminoacid) and then checked for stop codons (In Mesquite: Characters/List of Characters/Codon Position/Minimize Stop Codons). Stop codons in the reading frame would have base calls corrected by comparing the sequence against the original contigs or trace files. 28S sequences were initially aligned with ClustalX, but afterwards their stem and loop regions were manually aligned to the sequences presented in Hancock et al. (1988) and Kjer et al. (1994). The following unconstrained stem and loop regions (based on the numbering of Hancock et al. 1988 28S representation) were excised due to excessive variation between taxa and an inability to unambiguously align base pairs between them: 3749-3774, 3862-3876, 3967-3987, 4133-4135 and 4148-4165.

## **Phylogenetic analyses**

### **Parsimony analyses**

All molecular datasets were analyzed in TNT v1.1 (Goloboff *et al.* 2003). The combined molecular dataset used all taxa with at least one molecular sequence available. All analyses used Traditional Search (Analyze/Traditional Search) with the following parameters: random seed 666, 10,000 replications, TBR with 5 'trees saved per replication', and 'replace existing trees' box checked. After the analysis, if more than one parsimonious cladogram was found, a strict consensus cladogram (Nelsen) was generated and saved with the resulting cladograms.

### **Bayesian analyses**

The GTR+I+G model of character evolution was chosen for all genes through MrModelTest2.3 (Nylander 2004) under the AIC (Akaike Information Criterion) (Posada & Buckley 2004).

Bayesian analysis was run on a parallel version of MrBayes (v.3.1.2) on a computer cluster at the Cyberinfrastructure for Phylogenetic Research (CIPRES) (Miller *et al.* 2010). Settings and parameters are the same as those used by Gibson *et al.* (2010b) except the dataset was partitioned into 6 genes, ngen set to 40,000,000 (sufficient to reach stationary at generation 35,576,000, i.e., standard deviation split frequencies < 0.003), burninfrac set to 0.25, printfreq and samplefreq set to 1,000. The final cladogram is presented as a majority rule consensus tree from all resulting cladograms.

## **Morphological data**

Besides the specimens used in the molecular analyses, extra taxa were added to the morphological matrix to broaden the sample for each group (Table 3). Choice of extra specimens was based on material availability (if there were at least one male and one female) and quality (no parts missing and most characters clearly visible). Characters used in this study were from the external morphology and genitalia of the female and male adults (Appendix 1).

Terminalia were cleared in heated 85% lactic acid for 10 to 25 minutes. After the clearing process, male terminalia had the epandrium separated from the hypandrium, and female terminalia were extended by compressing them dorso-ventrally.

External morphological characters of importance were illustrated using high-magnification photographs of pinned specimens with a Cannon EOS 1DS camera mounted on a computer-controlled focusing rail. Series of photographs from the same structure at different foci were later combined in one fully focused .tiff image using Combine Z5.1 software (Hadley 2006).

Terminalia were photographed using a Nikon Coolpix camera attached to a standard Zeiss microscope, with F-stop set between 9 and 10 and underexposed by  $\frac{1}{2}$  to 1 stop. The series of photographs were treated as above. All processed images were retouched in Adobe Photoshop CS4, by adjusting the black and white levels, cropping and sharpening.

### **Choice of characters**

The morphological matrix has 112 characters including coloration, pile and female and male genitalic characters. The external morphology of most Syrphidae seems to be very prone to homoplasy, especially when mimetic coloration is involved. Many characters were divided into nearly species-specific states (uninformative autapomorphies) to distinguish them from character states that seem to define larger groups (informative synapomorphies). Since it was not possible to select a subset of characters with “higher weight” (Cladograms 6-14), i.e. relatively unequivocal polarity and homology, all 112 characters were included in the analysis. The justification and/or the relevant putative synapomorphic states for each character used in this study are included in Appendix 1.

### **Structures**

Morphological terminology follows Cumming & Wood (2009), and Thompson (1999) for Syrphidae specific terminology.

The term “occiput” is used to refer to the narrow sclerotized region immediately adjacent to the posterior margin of the eye, where distinct rows of pile are present. It is interpreted as divided into two main areas, a dorsal  $\frac{1}{4}$  and a ventral  $\frac{3}{4}$  (Fig.1).

The terms ‘pale’ and ‘dark’ were usually used instead of naming specific colours on the structures. The original colours usually fade away on preserved specimens, but the patterns of pale and dark remain the same.

The overall shape of the abdomen varies considerably between species of *Ocyptamus* (Fig.13-20)). Some of the shapes mentioned in the text are defined below:

- Oval (Fig.13): width slightly increases on 2<sup>nd</sup> abdominal segment, and decreases at apex of 4<sup>th</sup> or on 5<sup>th</sup>.
- Petiolate (Fig.14-15): either the 2<sup>nd</sup> abdominal tergite has a constriction narrower than the 1<sup>st</sup> abdominal segment or it is much narrower than the 1<sup>st</sup> and following segments.
- Parallel-sided (Fig.18-20): abdominal segments have similar width.
- Spatulate (Fig.17): the 2<sup>nd</sup> abdominal segment is rectangular, long and of similar width to the 1<sup>st</sup> abdominal segment, the 3<sup>rd</sup> or 4<sup>th</sup> segment usually becomes wider towards the apex.
- Narrow/delicate (Fig.16): with very long and narrow abdominal segments, the 2<sup>nd</sup> tergite lateral margins almost envelop the segment ventrally and give it a cylindrical appearance; abdomen usually slightly widened at apex of the 3<sup>rd</sup> abdominal segment.

### **Ratios**

All characters used in the analyses are discrete. Length/width or width/length sclerite ratios were described using the smallest width observed. The width at the middle of the c cell was used to describe the alula/c cell ratio. For abdomen/thorax ratio, the abdomen was measured from the baso-medial margin of the 1<sup>st</sup> tergite to the apex of the 5th tergite, and the thorax was measured from the base of the scutellum to the posterior margin of the postpronotum.

## **Phylogenetic analysis**

The exclusively morphological data analysis had only *Paragus* (*Pandasyophthalmus*) *haemorrhous*, *Eosalpingogaster conopida* and the *Toxomerus* species as outgroup taxa.

The morphological data matrix (Appendix 2) and resulting cladograms were analyzed in TNT as described for the gene datasets above, except that the data format was set to 32 states (Format/Data Format/32 states). Characters were equally weighted for the analysis, and multistate characters were analyzed as unordered. Character states above the 9<sup>th</sup> state are translated into a letter (as shown in Appendix 1) in the matrix due to requirements of the matrix editing software (Mesquite v.2.74 (Maddison and Maddison 2010)).

A character state interpreted as a synapomorphy at one level of the cladogram, might occur independently at a different level due to convergence or reversal (i.e. it might be homoplasious). Unique synapomorphies (that occur only once in the whole cladogram) are indicated by an asterisk (\*) in the text. Only unequivocal synapomorphies, i.e. those that are common to all 'most parsimonious' cladograms, are scored on the strict consensus cladogram.

## **Total evidence analysis**

The morphological dataset and combined molecular dataset were concatenated into a single matrix in .tnt format. Data format was set to 32 states. Gaps were treated as an additional state. All characters were treated as unordered and of equal weight. Taxa with no DNA data were coded as missing data for the respective gene partition.



Phylogenetic analysis followed the settings for the separate morphological data analysis. There was no Bayesian analysis for the total evidence data.

### **Node support**

Bootstrap (standard) and Jackknife (36% probability of character exclusion) supports for all analyses were calculated in TNT (Analysis/Resampling) with 1000 replications (except for the combined dataset of the molecular analysis which used 10000 replications). Cut-off was set at 50.

Bremer support for all analyses and partitioned Bremer support for the total evidence analysis were obtained in TNT with the aid of the bremer.run (included with the TNT software) and the pbsup.run (Peña & Wahlberg 2008) scripts.

## **Results**

### **Molecular analysis**

#### **Individual gene analyses**

The fragment size of the aligned sequences varied from 412 bp (12S) to 2686 bp (CAD). There was an A/T bias on all genes varying from 52% (AATS) to 80% (12S). Base frequencies were homogeneous ( $24 < \chi^2 < 139$ ,  $p > 0.85$ ,  $df = 58$ ) for all taxa on all genes. The percentage of characters that are constant varied from 58% (AATS) to 81% (28S). The percentage of characters that are parsimony-informative varied from 12% (12S&28S) to 36% (AATS). All sequence characteristics are summarized in Table 6.

The parsimony analyses resulted in the following number of most parsimonious cladograms for each gene analysis: 10459 for 12S, 13980 for 28S, 2885 for AATS, 2294 for CAD, 14 for COI and 2 for CytB.

The strict consensus topologies between the genes agree very little, but some groups were recovered as monophyletic in the different analyses:

- *O. cylindricus* group: all except 28S.
- *O. elnora* group: all except 12S and CAD. The species *O. croceus* was recovered as the sister taxa to this arrangement on the AATS, COI and CytB analyses.
- *O. fascipennis* + *O. lemur* group: all analyses.
- *O. lepidus* group except *O. croceus*: all the recognized *O. lepidus* group species plus *O. bromleyi*, *O. cf. zenillia* and *O. cf. zoroaster* were recovered in a single clade on the CytB analysis. The clade containing *O. cf. zoroaster*, *O. crocatus*, *O. luctuosus* and *O. vierecki* was recovered on the AATS and COI analyses.
- *O. lineatus* group: recovered in the CAD and COI analyses, also recovered without *O. rubricosus* in the 28S and CytB analyses. *O. sp.14* (*O. arx* group) was recovered associated to *O. lineatus* group species in all analyses minus 12S.
- *O. amplus* group: recovered in all analyses except 12S. *O. tiarella* is included in this clade as a sister taxon to the remaining *O. amplus* group (COI) or as sister taxon to (*O. priscilla* + *O. cf. lativentris*) (28S).

- *O. stenogaster* group: recovered in all analyses except 12S and CAD. *O. titania* was recovered as the sister taxon to this group in the 28S and COI analyses.
- *O. tristis* group: recovered only on AATS (without *O. zeteki*) and CAD analyses. *O. sp.4* (species similar to the *O. arx* group) and *O. sp.27* (*O. tristis* group that are similar to the *O. stenogaster* group) were recovered embedded in this clade. The taxa from the *O. peruvianus* group (*O. sp.52* and *O. ovipositorius*) were resolved in a clade with *O. adspersus* inside the *O. tristis* group clade on the AATS and CAD analyses. *O. flukiella* (*O. flukiella* group), when resolved in a clade (CAD and Cytb), was always associated with *O. tristis* group species.

*O. cf. pumilus* (*O. callidus* group) was never unambiguously resolved with a specific group. *O. wulpianus* (*O. wulpianus* group) was resolved as the sister taxon to the whole ingroup including *Toxomerus* (28S) or forming a clade with *Toxomerus* embedded in the ingroup (COI). *O. sp.* (*O. eblis* group) was only fully resolved on the CytB analysis, where it was the sister taxon to the clade (*Toxomerus* (*O. cylindricus* group (*Paragus* + *Salpingogaster*))). *O. melanorrhinus* was resolved as the sister taxon to either *Toxomerus* (28S), *O. cf. attenuata* (CAD), *Eosalpingogaster conopida* (COI) or to *O. zeteki* (CytB). *O. cf. attenuata* was resolved as the sister taxon to either *O. rubricosus* (28S), *O. melanorrhinus* (CAD) or to the *O. fascipennis* + *O. lemur* group (COI).

The *O. amplus* group was recovered as the sister clade to the remaining ingroup, including the *O. cylindricus* group and *Toxomerus*, on the CAD, COI and CytB analyses.

The *O. cylindricus* group was recovered as the sister clade to the remaining ingroup, including *Toxomerus*, on the CAD and COI analyses.

All analyses but 12S recovered a *Toxomerus* clade (*T. politus* + *T. virgulatus*) and *Eosalpingogaster conopida* embedded in the ingroup clade.

### **Combined dataset**

#### **Parsimony analysis**

The combined molecular dataset totalled 6982 characters. Of the total characters, 26% are parsimony-informative and 66% are constant. Base frequencies reveal an A/T bias (66%) and are heterogeneous across all taxa ( $\chi^2 > 606$ ,  $p < 0.01$ ).

The combined molecular dataset resulted in one most parsimonious cladogram (Cladogram 1, 11746 steps). *Eosalpingogaster conopida* and *Toxomerus* were resolved in separate clades inside the ingroup clade. The following groups were recovered:

- *O. cf. attenuata* + *O. cf. melanorrhinus* group.
- *O. cylindricus* group.
- *O. elnora* group.
- *O. fascipennis* + *O. lemur* group.
- *O. lepidus* group: including *O. bromleyi*, *O. cf. zenillia*, *O. cf. zoroaster*, and minus *O. croceus*, although weakly supported (Bremer 1, not recovered on Bootstrap and Jackknife). The internal clade (*O. vierecki* (*O. crocatus* (*O.*

*luctuosus* + *O. cf. zoroaster*))) was strongly supported (Bremer 19, Bootstrap 98, Jackknife 99).

- *O. lineatus* group: including the *O. arx* group.
- *O. amplus* group: including *O. tiarella*.
- *O. stenogaster* group: with *O. titania* as the sister taxon.
- *O. tristis* group: with (*O. zeteki* + *O. sp.53*) as sister group to (*O. flukiella* + remaining *O. tristis* group). *O. sp.4* (*O. tristis* group similar to the *O. arx* group) and *O. sp.27* (*O. tristis* group that are similar to the *O. stenogaster* group) were recovered embedded in this group. The taxa from the *O. peruvianus* group (*O. sp.52* and *O. ovipositorius*) were resolved in a clade with *O. adspersus*.

Higher relationships that were recovered with some support (Bremer  $\geq 2$  and Bootstrap and Jackknife  $> 50$ ) were:

- (*O. amplus* group + *O. cylindricus* group + *O. wulpianus* + (*S. conopida* + *Toxomerus* clade + remaining ingroup)).
- (*S. conopida* + *Toxomerus* clade + remaining ingroup).
- (*O. croceus* + *O. elnora* group).
- ((*O. croceus* + *O. elnora* group) (*O. vierecki* (*O. crocatus* (*O. luctuosus* + *O. cf. zoroaster*))) *O. cf. zenillia* + *O. cf. chapadensis* + *O. bromleyi*).
- ((*O. fascipennis* + *O. lemur*) + *O. stenogaster* group + *O. tristis* group).

## Bayesian analysis

The final cladogram (from a sample of 43214 cladograms, Cladogram 2) has the *Toxomerus* clade and *Eosalpingogaster conopida* embedded in the ingroup with a posterior probability of 1.00. Groups, and their posterior probabilities, recovered are as follows:

- *O. amplus* group, including *O. tiarella* (1.00).
- *O. cylindricus* group, minus *O. fascipennis* and *O. lemur* (1.00).
- *O. cf. attenuata* + *O. cf. melanorrhinus*<sup>1</sup> group (1.00); with *Eosalpingogaster conopida* as sister taxon (0.63).
- *O. elnora* group (1.00) and with *O. croceus* as a sister taxon (1.00).
- *O. lepidus* group, with *O. elnora* group embedded (1.00).
- *O. lineatus* group, with the *O. arx* group embedded (1.00).
- *O. stenogaster* group (1.00) and with *O. titania* as the sister taxon (1.00).
- *O. fascipennis* + *lemur* group (1.00).
- *O. tristis* group including *O. flukiella* (1.00).

The Bayesian analysis places *O. wulpianus* as the sister taxon to the *O. amplus* group (including *O. tiarella*), but with posterior probability of 0.55. The *O. eblis* group is placed in a clade as the sister taxon to the *O. lepidus* group (0.85), and this clade as the sister group to the remaining ingroup (0.93) minus the groups *O. wulpianus*, *O.*

*cylindricus*, *O. amplus*, *O. globiceps*, *O. diversifasciatus* and the clade (*conopida*(*cfattenuata* + *cfmelanorrhinus*1)). The *O. callidus* group is the sister group to the (*O. lineatus* group(*O. stenogaster* group((*fascipennis* + *lemur*)(*O. tristis* group)))) clade (0.90). All other relationships found in the parsimony analysis were recovered with values between 0.92 and 1.00.

### **Morphological analysis**

The morphological dataset analysis resulted in 6 most parsimonious cladograms (length 1351, Cladogram 3). Recovered monophyletic groups and their synapomorphies (\* = non homoplastic) are as follows:

- *O. callidus* group: 46-0, 49-2, 72-4, 82-2\*, 86-2, 102-2, 108-1\*.
- *O. cylindricus* group: 19-9, 20-3, 21-4, 44-10(A)\*, 59-1\*, 60-5\*, 81-6, 89-3\*, 106-2\*, 110-13(D)\*, 111-9\*.
- *O. fascipennis* + *O. lemur* group: 18-1, 19-4, 26-3, 51-0, 53-0, 72-6\*, 78-0, 92-12(C)\*, 93-3, 94-5, 110-21(N).
- *O. lineatus* group + *O. arx* group: 16-1, 18-6, 23-1, 25-3, 48-3, 54-2, 89-5, 92-6, 104-5\*. The exclusively *O. lineatus* group is paraphyletic with regards to the *O. arx* group.
- *O. capitatus* group: 23-1, 25-4\*, 28-3, 57-0, 86-1\*, 89-10(A)\*, 91-12(C)\*, 107-13(D)\*, 108-2.

- *O. stenogaster* group: 13-1, 19-3, 23-2, 38-3\*, 39-0, 47-1\*, 51-0, 53-0, 64-8, 107-11(B).
- (*O. adspersus* + *O. ovipositorius* + *O. sp 52*) group: 16-0, 26-3, 64-2, 69-1, 94-2\*, 100-17(H), 110-23(Q).

### **Total evidence analysis**

The total evidence dataset analysis recovered 12 most parsimonious cladograms (length 13043). The strict consensus cladogram is presented in Cladograms 4 and 5. Recovered monophyletic groups, and their morphological synapomorphies (\* = non homoplastic), are as follows:

- *O. callidus* group: 18-3, 51-3, 64-3, 72-4, 79-8\*, 82-2\*, 86-2, 102-2, 105-9\*, 108-1\*, 110-11(B)\*, 111-8\*.
- *O. cylindricus* group: 0-1, 8-5, 10-2, 14-10(A)\*, 19-9, 27-1, 44-10(A)\*, 59-1\*, 60-5\*, 62-4\*, 89-3\*.
- *O. lepidus* group (including *O. bromleyi*, *O. cf. zenillia* and *O. cf. zoroaster* but minus *O. croceus*): 38-2, 62-0, 64-7. (*O. vierecki* *O. crocatus* ((*O. luctuosus* + *O. cultrinus*)(*O. abata* + *O. cf. zoroaster*))) : 28-1.
- *O. lineatus* group (including the *O. arx* group): 1-3, 25-3, 28-2, 57-2, 62-2.
- *O. capitatus* group: 13-3, 23-1, 25-4\*, 28-3, 30-3, 45-1, 86-1\*, 89-10(A)\*, 91-12(C)\*, 108-2. Including *O. conjunctus* and *O. conopida*: 4-3, 5-3, 7-3, 16-0, 20-0, 56-1, 64-5\*, 65-1, 66-1, 67-1, 68-2\*, 94-1.



- *O. fascipennis* + *O. lemur* group: 4-3, 18-1, 19-4, 23-1, 26-3, 34-0, 37-2, 43-3, 53-0, 72-6\*, 73-20(M)\*, 85-1, 92-12(C)\*, 105-13(D)\*, 106-21(N).
- *O. titania* + *O. sp. 09* group: 4-4, 19-0, 46-5, 55-0, 91-10(A), 108-3.
- *O. amplius* group: 3-6, 35-1, 44-11(B), 54-3, 57-1\*, 61-1, 89-7. Including *O. wulpianus* and *O. tiarella*: 5-5, 14-16(G)\*, 46-4\*, 80-4, 94-4.
- *O. stenogaster* group: 3-2, 7-6, 13-1, 14-2, 23-2, 26-3, 44-2, 47-1\*, 53-0, 84-1, 85-1, 100-14(E)\*, 105-25(S)\*. With (*O. titania* + *O. sp. 09*) as the sister group: 28-1, 30-1, 62-0, 70-0, 73-2, 77-1, 92-7\*.
- *O. tristis* group including *O. flukiella*: 3-0, 25-3, 94-0. Minus *O. flukiella*, *O. sp. 53* and *O. zeteki*: 19-9, 22-1, 86-3\*, 88-1\*, 89-11(B)\*, 90-15(F)\*, 91-14(E)\*, 107-16(G).

Higher relationships that were resolved with at least 50% Bootstrap support were:

- ((*O. stenogaster* group(*O. titania* + *O. sp. 09*)) ((*O. fascipennis* + *O. lemur*) (*O. tristis* group including *O. flukiella*))) : 94-5\*.
- ((*O. fascipennis* + *O. lemur*) (*O. tristis* group including *O. flukiella*)) : 7-0, 9-0, 10-0, 11-0, 40-3, 55-2.

The following arrangements had weak support (Bremer < 4, not recovered in Bootstrap and Jackknife analyses):

- ((*O. tiarella* + *O. wulpianus*) *O. amplus* group). The morphological synapomorphies recovered were: 5-5, 14-16(G)\*, 46-4\*, 80-4, 94-4.
- The ((*O. tiarella* + *O. wulpianus*) *O. amplus* group) clade was recovered as the sister group to the following arrangement: (*O. cylindricus* group (*Toxomerus* (*O. eblis* ((*O. conjunctus* (*S. conopida* + *O. capitatus* group)) (*O. parvicornis* (*O. cf. attenuata* + *O. melanorrhinus*)) *O. callidus* group + remaining *Ocyptamus*))). The morphological synapomorphies recovered were: 6-1, 15-5\* and 45-2\*.

*O. diversifasciatus* was resolved as the sister taxon to the *Allograpta* clade (Bremer 4, Bootstrap 59, Jackknife 70) with the following morphological synapomorphies: 4-5\*, 34-2\*, 37-3, 41-1\*, 54-3, 57-2, 61-1 and 94-1.

## Discussion and conclusions

The total evidence dataset cladogram (Cladogram 4) was chosen as the preferred representation of the evolution of the groups studied, since it includes representatives of all the putative *Ocyptamus* species groups. The total evidence analysis lacked molecular data for some groups, and this reduced the resolution and support for some of the groups. The combined molecular dataset cladogram (Cladogram 1) was fully resolved in a single cladogram, with good support for several of the arrangements, and best agreed with the Bayesian analysis cladogram (Cladogram 2). Therefore, the combined molecular dataset cladogram was referred to for support of groups not recovered in the total evidence cladogram. The individual gene analyses on their own were either poorly resolved or had weak clade support.

The morphological analysis had weaker clade support (Bremer < 2, Bootstrap and Jackknife < 50) for the basal nodes than the combined molecular and total evidence analyses, probably because of a high degree of homoplasy present in the dataset. A high level of homoplasy in shape and colour characters is not surprising as many syrphids are mimics of aculeate Hymenoptera, and convergence towards the same models may lead to an abundance of homoplastic characters. The strict morphological analysis (Cladogram 3) resulted in many of the same monophyletic groups as the combined molecular analysis (Cladogram 1), including those recognized here as named taxa, but the relationships between these distinct clades were resolved differently. However, the partitioned Bremer support demonstrated that when analysed together with the molecular data (total evidence analysis, cladogram 5) the morphological data was congruent with all resulting nodes. This is consistent with one of the fundamental

assumptions of parsimony analysis (Farris 1983), that homoplastic characters are unlikely to be congruent so the synapomorphic characters will resolve the cladogram regardless of homoplasy in the dataset. Although the strict morphological analysis was resolved with few polytomies, the basal nodes were all weakly supported giving little confidence in the topology presented. The morphological matrix could be improved with the reassessment of homology in each character. Instead of adding all possible characters observed, removing characters prone to homoplasy (e.g. colour characters and preabdominal tergite shapes) and either coding the states differently or giving higher weight to states that are unlikely to have evolved more than once (e.g. the dark pollinosity of the ocellar triangle in the *O. lepidus* group and the 7<sup>th</sup> tergite shape in the *O. tristis* group), might result on a different topology with better support to the basal nodes.

The unique (non-homoplastic) morphological synapomorphies listed below represent the synapomorphies that were common to all most parsimonious trees from the total evidence dataset.

The genera *Toxomerus* and *Eosalpingogaster* were resolved among the species of *Ocyptamus*, rendering the latter paraphyletic. This paraphyly is in agreement with a previous study (Mengual *et al.* 2008). Unique morphological synapomorphies supporting this arrangement with *Toxomerus* and *Eosalpingogaster* include entirely dark metatibia (15-5) and a frons with white pollen concentrated laterally and continuous with the face (45-2). The genus *Toxomerus* was recovered as the sister group to the ingroup taxa minus the *O. amplus* and *O. cylindricus* groups. *Eosalpingogaster conopida* was

recovered among the ingroup taxa, usually in a clade with *O. conjunctus* and the *O. capitatus* group.

The monophyly of the genus *Toxomerus* was supported by the following unique morphological synapomorphies: 3<sup>rd</sup> abdominal tergite with central pair of black vittae on a pale background (20-5), ventral portion of occiput with 4/3/4 rows of pile (24-8), tubercle medially positioned and gently convex ventrally (44-4), frons with white pollen homogenously distributed but sparse laterally (45-4), female 8<sup>th</sup> sternite sub-quadrangular with sclerotized apical structures that fold inside the segment (91-5) and with a triangular apical process between the bases of the surstyli (99-1). *Toxomerus* species are usually small to medium flies, usually with an abdominal pattern of narrow black vittae on a pale background, with male ocellar triangle distanced from eye contiguity and females with a heavy sclerotized spot medially on the 8<sup>th</sup> tergite. *Toxomerus* has already been reviewed for the West Indies (Thompson 1981a) and Brazil (Borges & Couri 2009), and the 'larger species' of the New World (Metz & Thompson 2001). *Toxomerus* was recovered as a natural group in a recent study (Mengual *et al.* 2008). Since *Toxomerus* monophyly and status as a separate genus are not contested, and its placement in the resulting cladograms render *Ocyptamus* paraphyletic, *Ocyptamus* and its subgroups require redefinition according to cladistic principles (see following sections).

*Eosalpingogaster conopida* was never recovered with other *Salpingogaster* species. Instead, it was recovered as either the sister taxon to the *O. cf. attenuata* + *O. cf. melanorrhinus*1 clade (combined molecular analysis), or in a clade with *O. conjunctus* and the *O. capitatus* group (total evidence analysis). *Eosalpingogaster*

*conopida* shares some similarities with *O. conjunctus* and the *O. capitatus* group, such as the obliquely inserted metasternum, petiolate abdomen and differentiated ventral macrotrichia on the metafemur. *Eosalpingogaster conopida* was recovered as the sister taxon to the *O. capitatus* group on the total evidence analysis and shared the following unique morphological synapomorphies: veins R4+5 and M1 sinuous (75-3 and 76-1), surstylus inserted internal to the epandrium (101-1) and hypandrium quadrangular and short, flattened in profile (106-5). *Eosalpingogaster conopida* is still very distinct from both *O. conjunctus* and the *O. capitatus* group as seen by the larger tubercle, scutum with a single white pollinose vitta, absence of pile on dorsal portion of katepisternum, presence of ventral spines on the metafemur, metathoracic epimera apices very close to each other, bare alula, and very long and narrow 2<sup>nd</sup> abdominal segment. *Eosalpingogaster* shows a larval prey preference towards Dactylopiidae (Hemiptera, Sternorrhyncha) (Rojo *et al.* 2003), unlike any other group studied here. It is clear that *Eosalpingogaster conopida* is not part of the *Salpingogaster* clade (as shown by Mengual *et al.* (2008) and Mengual & Thompson (2011)) and that it possesses discrete characters that distinguish it from *O. conjunctus* and the *O. capitatus* groups.

Some *Ocyrtamus* species groups in this study show a very specific range of larval prey preference (Table 5 and Cladogram 5). It is possible that the formation of these different groups followed the intense radiation of Sternorrhyncha (Hemiptera) between the early Triassic and late Cretaceous (Grimaldi 2005). These cyclorrhaphan flies probably had little competition for resources from other flies, since South America (remnant from Gondwana and isolated from the other continents) had only primitive flies present, which also would've helped the ancestor of these syrphids to radiate. More

studies on the life history and larval/pupal morphology will certainly benefit in the delimitation of the groups presented in this study.

### **Genus *Pseudoscaeva* Vockeroth**

*Pseudoscaeva* Vockeroth, 1969: 123 (type species *Syrphus diversifasciatus* Knab, 1914 (original designation)).

*Ocyptamus diversifasciatus* species group.

Figure: 34, 73a-b.

Diagnosis: **Head.** Face normal (~ 1/3 of head's width) and mostly pale with a medial narrow dark vitta; tubercle ventrally positioned, convex ventrally and almost straight dorsally. Antennal insertions separated. Frons wide (~ 2/5 of head's width). Female ocellar triangle ~4 ocelli-width from lateral eye margin. Dorsal occiput with 2-3 rows of pile. **Thorax.** Scutum dark without distinct pollinose pattern, and without distinct anterior row of pile. Scutellum mostly pale and usually with dark margin. Anterior anepisternum pilose. Katatergum pilose. Metaepisternum bare. Metasternum bare. Dorsal lobe of calypter with long marginal pile. Metafemur with anterior row of long white pile. **Wing.** Alula normal (~3 times the width of the c cell). Wing hyaline and mostly bare. **Abdomen.** Abdomen slightly oval; abdominal tergites with dull black pollinose fascia divided by medial pale fascia. **Genitalia.** Female 7<sup>th</sup> tergite rectangular and wide; 8<sup>th</sup> tergite as a large trapezoidal sclerotization. Male basiphallus reduced, distiphallus mostly membranous but with dorsal triangular sclerotized region.

Included species: *P. diversifasciata* (Knab, 1914), *P. meridionalis* (Fluke, 1950), *P. schoenemanni* (Enderlein, 1938), *P. sericea* (Walker, 1836).

*Ocyptamus diversifasciatus* was recovered basal to the *Allograptia* clade. The (*O. diversifasciatus* + *Allograptia*) clade shares the following unique morphological synapomorphies: frons with a medial pale arc (4-5), katatergum pilose (34-2) and 3<sup>rd</sup> abdominal tergite with longer erect pile laterally (41-1). *O. diversifasciatus* also has a mostly bare wing as in some species of *Allograptia* (e.g. *A. obliqua*). Vockeroth (1969) believed that his new genus *Pseudoscaeva* (= *O. diversifasciatus* group) was very closely related to *Orphnabaccha* (= *O. amplus* group). Vockeroth also suggested that the ancestors of *Allograptia* and *Orphnabaccha* entered South America and underwent great species radiations in the early Tertiary. Current evidence suggests that an *O. diversifasciatus* group + *Allograptia* ancestor would have branched off before the ancestor of the *O. amplus* group and the remaining ‘*Ocyptamus*’. The diverse and overlapping body plans that the (*O. diversifasciatus* group + *Allograptia*) and the *O. amplus* group seem to share might be due to converging characters (homoplasies). These homoplasies might be the reason why *O. diversifasciatus* comes out with *Allograptia* and not the *O. amplus* group in the total evidence analysis. *O. diversifasciatus* has characters that distinguish it from *Allograptia* and bring it closer to the *O. amplus* group, such as the pilose patch on the anterior anepisternum and similar male genitalia, but the lack of molecular data for this species prevents further speculation on its position in the cladogram. In view of the lack of evidence linking *O. diversifasciatus* to the *O. amplus* group, the genus *Pseudoscaeva* Vockeroth is



ressurrected (stat.rev.) to accommodate *P. diversifasciata* and related species. This should be reconsidered when *Allograpta* and the *O. amplus* group are revised.

**Genera *Hermesomyia* Vockeroth, *Orphnabaccha* Hull and  
*Pipunculosyrphus* Hull**

*Hermesomyia* Vockeroth, 1969: 121 (type species *Hermesomyia bacchiformis* Vockeroth, 1969 (original designation) = *Baccha wulpiana* Lynch Arribalzaga, 1891).

*Baccha pirata* species group. Hull, 1949a.

*Ocyptamus wulpianus* species group.

Figures: 19.

Diagnosis: **Head.** Face normal (~ 1/3 of head's width) and entirely pale; tubercle globose. Antennal insertions confluent. **Thorax.** Scutum with metallic pollen, and without distinct anterior row of pile. Scutellum entirely pale or dark medially. Anterior anepisternum pilose. Katatergum with long microtrichia. Metaepisternum pilose. Metasternum bare. Dorsal lobe of calypter with long pile on margin and pile usually black. **Wing.** Alula linear but twice the width of c cell. Wing entirely dark and entirely microtrichose. **Abdomen.** Abdomen parallel-sided and elongated; abdominal tergites with sub-basal pale fascia. **Genitalia.** Male basiphallus reduced, distiphallus mostly membranous but with dorsal triangular sclerotized region.

Included species: *H. wulpiana* (Lynch Arribalzaga, 1891).

Notes: *H. wulpiana* larvae are known aquatic predators of other invertebrates in bromeliads (Rotheray et al. 2000).

*Orphnabaccha* Hull, 1949a: 93 (type species *Baccha coerulea* Williston, 1891 (original designation)).

*Mercurymyia* Fluke, 1950: 140 (type species *Epistrophe caldus* Walker, 1852 (original designation)). Proposed as a subgenus of *Stenosyrphus*. Synonymy Thompson et al. 1976: 11.

*Ocyptamus caldus* species group. Thompson, 1981a.

*Ocyptamus amplus* species group.

Figures: 1, 8, 13, 41, 62.

Diagnosis: **Head.** Face normal (~ 1/3 of head's width) and always dark medially; tubercle convex ventrally and almost straight dorsally. Antennal insertions usually separated on male and almost separated on female. Frons wide (~ 2/5 of head's width). Female ocellar triangle ~3 ocelli-width from lateral eye margin. Dorsal occiput usually with 1 row on male and 2 rows on female (or both with 2 rows). **Thorax.** Scutum usually dark and with metallic pollen, and without distinct anterior row of pile. Anterior anepisternum pilose. Katatergum with long microtrichia. Metaepisternum bare. Metasternum usually pilose. Dorsal lobe of calypter with long pile on margin. Metafemur sometimes with longer pile on anterior surface. **Wing.** Alula usually normal (~3 times the width of c cell). **Abdomen.** Abdomen oval, parallel-sided or slightly petiolate; abdominal tergites immaculate or with pale fasciae. **Genitalia.** Female 7<sup>th</sup> tergite as pair of sclerotized stripes; 8<sup>th</sup> tergite as a long narrow triangular sclerotization; 8<sup>th</sup> sternite as a pair of lateral long narrow sclerotizations. Male distiphallus either with dorsal triangular

sclerotization, or with long thick setae, or with wide ventral sclerotization and lateral sclerotized stripes.

Included species: *O. aequilineata* (Hull, 1945), *O. agilis* (Bigot, 1884), *O. ampla* Fluke, 1942, *O. calda* Walker, 1852, *O. cerberus* (Hull, 1943), *O. coerulea* (Williston, 1891), *O. decipiens* (Williston, 1891), *O. delimbata* (Enderlein, 1938), *O. diversa* (Williston, 1891), *O. dolorosa* (Hull, 1950), *O. elegans* (Giglio-Tos, 1892), *O. erratica* (Williston, 1888), *O. flavigaster* (Hull, 1944), *O. fraterna* (Bigot, 1884), *O. fuscicosta* (Lynch Arribalzaga, 1891), *O. golbachii* (Fluke, 1950), *O. jactator* (Loew, 1861), *O. lanei* (Fluke, 1950), *O. laticauda* (Curran, 1941), *O. lativentris* (Curran, 1941), *O. lauta* (Giglio-Tos, 1892), *O. limbus* (Enderlein, 1938), *O. nodosa* (Hull, 1930), *O. opaca* (Fluke, 1950), *O. priscilla* (Hull, 1943), *O. pteronis* (Fluke, 1942), *O. superba* (Thompson, 1981), *O. trabis* (Fluke, 1942), *O. tribiniciata* (Enderlein, 1938), *O. virga* (Fluke, 1942), *O. volcana* (Fluke, 1942).

*Pipuncullosyrphus* Hull, 1937: 29 (type species *Pipuncullosyrphus globiceps* Hull, 1937 (original designation)).

*Baccha* (*Pipuncullosyrphus*). Hull, 1949a.

*Ocyrtamus globiceps* species group.

Figures: 7, 20, 40.

Diagnosis: **Head.** Face narrow (between a  $\frac{1}{4}$  and a  $\frac{1}{3}$  of head's width) and entirely pale; tubercle ventrally positioned. Antennal insertions separated. Frons very narrow ( $\sim\frac{1}{4}$  of head width). Female ocellar triangle  $\sim 1$  ocellus-width from lateral eye

margin. Female dorsal occiput with only 1 row of pile. **Thorax.** Scutum is usually distinctly orange to some extent, and without a distinct anterior row of pile. Scutellum dark. Anterior anepisternum pilose. Katatergum with long microtrichia. Metaepisternum bare. Metasternum bare. Dorsal lobe of calypter with margin bare. Metafemur with normal pile. **Wing.** Alula absent. Wing entirely light yellow to light brown. **Abdomen.** Abdomen parallel-sided to slightly spatulate; abdominal tergites with pale inverted 'V' shaped macula (4<sup>th</sup> tergite might have a pair of oblique vittae instead). **Genitalia.** Female 7<sup>th</sup> tergite rectangular wide, 8<sup>th</sup> tergite trapezoidal with acute projection on apical margin, 8<sup>th</sup> sternite as a pair of lateral triangular sclerotizations. Male basiphallus teardrop-shaped and distiphallus with a ventral row of short thick setulae.

Included species: *P. globiceps* Hull, 1937, *P. scintillans* (Hull, 1943), *P. tiarella* (Hull, 1944).

The *Ocyptamus amplus* group was frequently recovered as the sister clade to the remaining ingroup + *Eosalpingogaster conopida* + *Toxomerus*. *Ocyptamus tiarella* (*O. globiceps* group) was recovered either inside the *O. amplus* group clade (combined molecular analyses) or together with *O. wulpianus* (*O. wulpianus* group) as the sister clade to the *O. amplus* group (total evidence). The *O. amplus* group (sensu stricto) had the unique character of separated (male) or almost separated (female) antennal insertions (57-1). The *O. amplus* group species vary considerably in habitus, with parallel-sided to oval abdomens, and with abdominal markings ranging from *Syrphus*-like to immaculate with shiny white pile. They usually have a wide face, frons and vertex, female 8<sup>th</sup> tergite as a long, narrow, triangular sclerotized area, female 8<sup>th</sup> sternite as a lateral pair of long and narrow sclerotized areas, and female post-abdomen

with extensive membranous region between the segments. The male phallus has three distinct types (as described by Vockeroth (1969)), that were restricted to the *O. amplus* group clade (with the exception of character 111-11(B) which is shared with the *O. diversifasciatus* and *O. wulpianus* groups). The restricted molecular data (only 28S and COI data) for *O. wulpianus* and *O. tiarella* and the different positions of *O. wulpianus* in the analyses prevents further speculations on the *O. amplus* group. Due to the redefinition of *Ocyptamus* and its former groups, it is necessary to resurrect the genera *Hermesomyia* (stat.rev.) and *Orphnabaccha* (stat.rev.) as described by Vockeroth (1969). *Hermesomyia* Vockeroth (= *Ocyptamus wulpianus* group) is distinguished from *Orphnabaccha* (= *Ocyptamus amplus* group) species by its linear alula, and elongated, parallel-sided abdomen with pale fasciae. The *Ocyptamus globiceps* group is very distinct from *Orphnabaccha* (= *Ocyptamus amplus* group), since the face and frons are very narrow, the female dorsal occiput has only 1 row of pile, the scutum is usually distinctly orange to some extent, and the alula is absent. Since the *Ocyptamus globiceps* group can't be unambiguously assigned to *Orphnabaccha* and to avoid leaving its species in *incertae sedis*, the genus *Pipunculosyrphus* Hull is resurrected (stat.rev.). Boyes *et al.* (1973) had previously distinguished *Orphnabaccha* from other *Baccha* (= several genera from the current study) by the  $2n = 8$  karyotype (in contrast to the  $2n = 10$ ), which was similar to the *Allograpta* and *Pseudoscaeva* karyotypes. A revision considering *Allograpta*, *Hermesomyia*, *Orphnabaccha*, *Pipunculosyrphus* and *Pseudoscaeva* is required to better define the boundaries of these genera.

## Genus *Ocyptamus* Macquart

*Ocyptamus* Macquart, 1834: 554 (type species *Ocyptamus fascipennis* Macquart, 1834 (subsequent designation by Coquillett, 1910: 577) = *Baccha fascipennis* Say, 1823).

*Cryptamus* Stahl, 1883: 97. Misspelling.

*Baccha* (*Ocyptamus*). Hull, 1949a.

*Baccha funebris* species group. Hull, 1949a.

*Ocyptamus cylindricus* species group. Thompson, 1981a.

Figures: 5, 18, 28, 33, 35, 42, 44, 66.

Diagnosis: **Head.** Face very narrow ( $\sim\frac{1}{4}$  of head width) and entirely pale or sometimes with a narrow medial dark vitta; tubercle ventrally positioned and gently convex towards antennal bases but forming a concavity before them. Antennal insertions confluent or separate. Pedicel proximal-apical margin with narrow extension over basoflagellomere; female basoflagellomere long and wide, much longer than scape+pedicel, and tapering towards apex; male basoflagellomere similar to female but only as long as scape + pedicel. Frons normal ( $\sim\frac{1}{3}$  of the head width). Female ocellar triangle  $\sim 1$  ocellus-width from lateral eye margin. Dorsal occiput with 2 rows of pile.

**Thorax.** Scutum brown-pollinose with 3 inconspicuous vittae of differently oriented pollen, usually with lateral pale spots anterior to transverse suture and on post-alar callus, and with a row of very long shiny pile anteriorly. Scutellum usually entirely dark but sometimes with pale margin. Anterior anepisternum pilose. Katatergum with long

microtrichia. Metaepisternum usually pilose. Metasternum bare. Dorsal lobe of calypter with normal pile on margin but shorter than ventral lobe pile. Male metafemur usually with longer pile on anterior surface. **Wing.** Alula normal (~3 times the width of c cell). Wing usually mostly dark (at least basal  $\frac{1}{2}$ ). **Abdomen.** abdomen parallel-sided and elongated, sometimes shorter and slightly oval, and usually immaculate. **Genitalia.** Female 7<sup>th</sup> tergite with one- or three-pronged sclerotized pattern, 8<sup>th</sup> tergite with a three-pronged sclerotized pattern. Male subepandrial sclerite usually greatly elongated; basiphallus slightly teardrop-shaped, distiphallus more sclerotized than basiphallus and with posterior dentate border.

Included species: *O. antiphates* Walker, 1849, *O. calla* (Curran, 1941), *O. cylindricus* (Fabricius, 1781), *O. dimidiatus* (Fabricius, 1781), *O. fasciatus* (Roder, 1885), *O. funebris* Macquart, 1834, *O. fuscipennis* (Say, 1823), *O. gastrostactus* (Wiedemann, 1830), *O. icarus* Reemer, 2010, *O. inca* (Curran, 1939), *O. infuscatus* (Bigot, 1884), *O. iris* Austen, 1893, *O. medina* (Telford, 1973), *O. papilionarus* (Hull, 1943), *O. princeps* (Hull, 1944), *O. stolo* (Walker, 1852), *O. tarsalis* (Walker, 1836).

Notes: *O. antiphates* is the only observed pollinator for *Phragmipedium pearcei* (family Orchidaceae) (Robert Pemberton, personal communication).

The *O. cylindricus* group was recovered in all analyses with strong support. The unique morphological synapomorphies recovered were as follows: metafemur with basal  $\frac{1}{2}$  pale on female, and mostly dark but sometimes pale on base to different extents on the male (14-10(A)), tubercle ventrally positioned and gently convex towards antennal bases but forming a concavity before them (44-10(A)), pedicel proximal-apical

margin with narrow extension over basoflagellomere (59-1), female basoflagellomere long and wide, much longer than scape+pedicel, male basoflagellomere as long as scape + pedicel (60-5), basoflagellomere widened and slightly tapering towards apex (62-4) and female 7<sup>th</sup> tergite with one- or three-pronged sclerotized pattern (89-3). Additional unique morphological synapomorphies recovered in the strict morphological analysis were: hypandrium quadrangular with dorsal bridge extended basally (106-2), postgonite with straight apex and acute dorsal and ventral apical (more produced) extremities, and ventral surface concave (110-13(D)), and distiphallus with a posterior dentate margin (111-9). Species in this group have a pale face, sometimes with a narrow medial dark vitta, a brown-pollinose scutum with 3 inconspicuous vittae of differently oriented pollen, scutum with a row of very long shiny pile anteriorly, scutum usually with lateral pale spots anterior to transverse suture and on post-alar callus, abdomen elongated and parallel-sided or short and slightly oval, abdomen that is usually immaculate, the wings are usually mostly dark (at least basal ½), and the subepandrial sclerite is usually greatly elongated. The larvae are known to prey only on Aphididae (Hemiptera, Sternorrhyncha) species. This study definitely leaves *O. fascipennis* (Wiedemann, 1830) (not *O. fascipennis* Macquart, 1834 = *O. fuscipennis* (Say, 1823)) and *O. lemur* out of this assemblage (see redefinition below). Although a revision of the group is in order to account for all included species, the above synapomorphies are sufficient to characterize this group. This group includes the type of *Ocyptamus* Macquart.



## Genus *Mimocalla* Hull

*Mimocalla* Hull, 1943a: 46 (type species *Baccha capitata* Loew, 1863 (original designation)). Proposed as a subgenus of *Baccha*.

*Therantha* Hull, 1943a: 47 (type species *Baccha atypica* Curran, 1930 (original designation) = *Syrphus conjunctus* Wiedemann, 1830). Proposed as a subgenus of *Baccha*.

*Ocyptamus capitatus* species group. Thompson, 1981a.

Figures: 14, 43, 48, 69.

Diagnosis: **Head.** Face normal (~1/3 of head width) and usually pale, sometimes with dark median vitta; tubercle ventrally positioned. Antennal insertions confluent. Frons wide (~2/5 of head width). Female ocellar triangle ~1 ocellus-width from lateral eye margin. Dorsal occiput with 2 rows of pile; ventral occiput with a posterior row of simple pile. **Thorax.** Scutum with 3 vittae of golden pollen on a dull black background and middle vitta interrupted medially, and with anterior row of longer pile but row with shorter pile in the middle. Scutellum usually pale. Anterior anepisternum pilose. Katatergum with long microtrichia. Metaepisternum pilose. Metasternum bare. Dorsal lobe of calypter with very short pile. Metacoxa and metatrochanter with dense thick black pile. **Wing.** Alula normal (~1.5 times wider than c cell). Wing hyaline or light brown but darker on basal cells (basal, c and sc); vein R4+5 and M1 sinuous. **Abdomen.** Abdomen petiolate; abdominal tergites usually narrowly pale on base; male and female post-abdomen enlarged. **Genitalia.** Female 7<sup>th</sup> tergite involving the whole segment on apical margin; 8<sup>th</sup> tergite rectangular with differentiated central triangular sclerotization;

8<sup>th</sup> sternite sub-quadrangular with slightly expanded apical corners. Male with enlarged epandrium and cercus; surstylus reduced; distiphallus dome-shaped.

Included species: *M. bonariensis* (Bréthes 1905), *M. capitata* (Loew 1863), *M. erebus* (Hull 1943), *M. gigantea* (Schiner 1868), *M. nymphaea* (Hull 1943), *M. tristani* Zumbado 2000, *M. willistoni* (Thompson 1976).

Notes: Known larvae of *Mimocalla* are predators of Aleyrodidae, Coccidae and Diaspididae (Hemiptera, Sternorrhyncha) (Rojo *et al.* 2003; Thompson & Zumbado 2000).

The *O. capitatus* group is easily diagnosed and cannot be unambiguously assigned to any other broader taxon concept that would include other groups here studied, so it is here treated as a separate genus (*Mimocalla* Hull). Characters recovered as unique morphological synapomorphies on the total evidence analysis were: ventral region of occiput with a posterior row of simple pile (25-4), male and female post-abdomen enlarged (86-1), female 7<sup>th</sup> tergite involving the whole segment on apical margin (89-10(A)) and female 8<sup>th</sup> sternite sub-quadrangular with slightly expanded apical corners (91-12(C)). The *O. capitatus* group superficially resembles the genus *Salpingogaster* (S.) Schiner, but can be distinguished by the rows of pile on the occiput (2-3 rows in the *O. capitatus* group), wider and shorter 2<sup>nd</sup> abdominal segment, lack of ventral spines on the metafemur and less sinuous R4+5 and M1 veins. The male genitalia of the *O. capitatus* group are unique in having a complex dome-shaped distiphallus, an enlarged epandrium with reduced surstyli, and greatly enlarged cerci.

The *O. capitatus* group has already been revised (as *Ocyptamus (Mimocalla)*) by Thompson & Zumbado (2000).

### ***Mimocalla conjuncta* species group**

*Mimocalla conjuncta* species group.

*Ocyptamus conjunctus* species group.

Figures: 29, 63.

Diagnosis: **Head.** Face normal (~1/3 of head width) and entirely pale; tubercle ventrally positioned. Antennal insertions separated. Antenna elongated, with segments of equal length. Frons normal (~1/3 of the head width). Ocellar triangle with dull black pollen and surrounded by white pollen; female ocellar triangle ~1 ocellus-width from lateral eye margin. Dorsal occiput with 1 row of pile. **Thorax.** Scutum with 3 vittae of golden pollen on a dull black background and middle vitta interrupted medially. Scutellum pale. Anterior anepisternum pilose. Katatergum with inconspicuous microtrichia. Metaepisternum pilose. Metasternum bare. Dorsal lobe of calypter with very short pile. Metacoxa and metatrochanter with dense thick black pile; metafemur with normal pile. **Wing.** Alula of normal width (~3 times the width of c cell). Wing light brown or hyaline with dark anterior margin. **Abdomen.** Abdomen petiolate; abdominal tergites narrowly pale on base and 4<sup>th</sup> and 5<sup>th</sup> tergites also with central pair of pale vittae. **Genitalia.** Female 7<sup>th</sup> tergite highly sclerotized and concave dorsally; 8<sup>th</sup> tergite bordered by heavier sclerotization. Male surstylus with enlarged apical 1/3 bearing many setae. Postgonite strongly tapering towards apex but with a slightly expanded and

rounded apex. Basiphallus small, distiphallus large with sclerotization encircling base and extending strongly apically at its tip.

Included species: *M. conjuncta* (Wiedemann, 1830).

*O. conjunctus* was recovered as the poorly supported sister taxon to the (*Eosalpingogaster*+*O. capitatus* group) clade (Cladogram 4). Autapomorphies for the *O. conjunctus* group are the elongated antenna with segments of equal length (60-1 and 61-2), female 7<sup>th</sup> tergite highly sclerotized and concave dorsally (89-8), female 8<sup>th</sup> tergite bordered by heavier sclerotization (90-16(G)), large surstylus with enlarged apical 1/3 bearing many setae (100-28(V) and 104-15(F)), subepandrial sclerite rectangular wide with basal corners extended and curving towards each other (105-26(T)), postgonite strongly tapering towards apex, but with a slightly expanded, rounded apex (110-22(P)), basiphallus small, and distiphallus large with sclerotization encircling base and extending strongly apically at its tip (111-13(D)). More data is required to confirm the relationship between *O. conjunctus* and *Mimocalla*, but for now *O. conjunctus* is to be treated as part of the genus *Mimocalla*.

### ***Mimocalla sargoides* species group**

*Mimocalla sargoides* species group.

Figures: 80, 81.

Diagnosis: **Head.** Face pale; tubercle ventrally positioned. Frons wide (~2/5 of head width), mostly pale and with a central black triangular macula. Female ocellar triangle ~3 times its length from the posterior eye margin. Occiput homogeneously

white-pollinose. Dorsal occiput with 2 rows of pile. **Thorax.** Scutum dark with pale lateral margins, except a dark spot posterior to transverse suture; scutum with 3 golden pollinose vittae, median vitta interrupted medially; transverse suture with golden pollen; scutum with anterior irregular rows of longer pile. Scutellum pale with median hyaline fascia. Anterior anepisternum pilose. Katatergum with long microtrichia. Metaepisternum pilose. Metasternum with a few pile. Dorsal lobe of calypter with normal and black pile. Metacoxa and metatrochanter with dense thick black pile. Metafemur with long, thick, black pile on dorsal and ventral surfaces. **Wing.** Alula normal (~2 times wider than c cell). Wing hyaline with dark anterior margin (dark on cells c, sc, r1, r2+3 and anterior ½ of r). **Abdomen.** Abdomen slightly oval; 2<sup>nd</sup> abdominal tergite with baso-lateral hyaline quadrangular areas; abdominal tergites narrowly pale on base and apex. **Genitalia.** Not studied.

Included species: *M. flata* (Hull, 1940), *M. sargoides* (Macquart, 1850).

Notes: Larvae of this genus are known to feed on membracid nymphs (Hemiptera, Auchenorrhyncha, Membracidae) on *Inga* sp. (Fabaceae). *Mimocalla flata* is likely a junior synonym of *M. sargoides* (F.C. Thompson, personal communication).

The species *O. sargoides* (Macquart, 1850) couldn't be added to any of the analyses due to time constraints. It is distinguished from other *Ocyptamus* by the pale metafemur with long, thick, black pile, the slightly oval and orange abdomen, and the hyaline quadrangular areas on the 2<sup>nd</sup> abdominal tergite. This species looks closely related to *Mimocalla*, sharing a similar scutum pollinose pattern and the metacoxa and metatrochanter with densely arranged thick and black pile. Furthermore, the abdomen

coloration resembles *Mimocalla*, with the pale basal margins and baso-lateral pale maculae on the 2<sup>nd</sup> abdominal tergite. However, *O. sargoides* lacks the distinct sinuous R4+5 and M1 veins, and the enlarged genitalia of *Mimocalla*. In view of the lack of molecular data, and to avoid erecting another genus, *O. sargoides* is considered a part of the genus *Mimocalla*.

### **Genus *Victoriana***

*Victoriana* gen.nov. (type species *Baccha melanorrhina* Philippi, 1865).

*Baccha victoria* species group, in part. Hull, 1949a.

- *Victoriana melanorrhina* species group

Figures: 3, 36, 59, 70.

Diagnosis: Body brown. **Head.** Face narrow or normal (between a ¼ to ~1/3 of head width), entirely pale or with medial dark vitta; tubercle dorsally positioned. Antennal insertions confluent. Frons normal (~1/3 of the head width). Female ocellar triangle ~1 ocellus-width from lateral eye margin. Dorsal occiput with 1 row of pile. **Thorax.** Scutum dark, sometimes pale laterally, and without distinct anterior row of pile. Scutellum pale to mostly dark. Anterior anepisternum pilose. Katatergum with short microtrichia that gives the sclerite a ‘velvet’ appearance. Metaepisternum pilose. Metasternum bare. Dorsal lobe of calypter with very short to normal pile (shorter than ventral lobe pile) on margin. **Wing.** Alula absent. Wing hyaline to light brown. **Abdomen.** Abdomen parallel-sided, narrow and elongated, sometimes slightly spatulate. **Genitalia.** Female 7<sup>th</sup> tergite as pair of sclerotized stripes; 8<sup>th</sup> tergite as a

narrow triangular sclerotization. Male postgonite either has a straight apical margin with dorsal and ventral apical extremities acute, or is elongated and tapers towards the apex; basiphallus teardrop-shaped, distiphallus membranous but with dorsal sclerotized triangular region.

Included species: *V. attenuata* (Williston, 1891), *V. duida* (Hull, 1947), *V. lugubris* (Philippi, 1865), *V. melanorrhina* (Philippi, 1865), *V. mentor* (Curran, 1930), *V. sagittiferus* (Austen, 1893), *V. sativa* (Curran, 1941), *V. selene* (Hull, 1949), *V. variegatus* (Macquart, 1842).

Etymology: The name is an homage to my first daughter. The name is to be treated as feminine.

Notes: Although the phylogenetic analysis resolves *V. cf. attenuata* with *V. cf. melanorrhina*, I reluctantly leave it with this group, since *V. cf. attenuata* has male genitalia very similar to the *O. lepidus* group species. The included species were based on their original descriptions and images of the type specimens.

- *Victoriana parvicornis* species group

*Ocyptamus parvicornis* species group. Thompson, 1981a.

Figures: 30, 38.

Diagnosis: Body orange. **Head.** Face pale and of normal width (~1/3 of head width); tubercle ventrally positioned. Frons very narrow (~1/4 of head width). Antennal insertions confluent. Female ocellar triangle adjacent to lateral eye margin. Dorsal occiput with 1 to 2 rows of pile. **Thorax.** Scutum without distinct anterior row of pile.

Anterior anepisternum pilose. Katatergum with inconspicuous microtrichia. Metaepisternum pilose. Metasternum bare. Dorsal lobe of calypter with margin bare. Metafemur with normal pile. **Wing.** Alula very narrow and inconspicuous (narrower than c cell). Wing mostly hyaline, sometimes with dark apical spot. **Abdomen.** Abdomen petiolated and narrow; male 4<sup>th</sup> sternite with pair of apico-lateral extensions. **Genitalia.** Female 7<sup>th</sup> tergite as pair of quadrangular sclerotizations; 8<sup>th</sup> tergite rectangular and with setae. Male surstyli asymmetrical and connected medially by a sclerotized bridge; hypandrium compact with very short postgonite; phallus heavily sclerotized and enlarged.

Included species: *V. ferruginea* (Thompson 1981), *V. parvicornis* (Loew, 1861), *V. neoparvicornis* (Telford, 1973).

The (cf. *attenuata* + cf. *melanorrhinus*) clade does not share any unique synapomorphies, but the clade was retained in some of the analyses, and had good support on the combined molecular analysis. The overall habitus is similar, with a more dorsally inserted tubercle, an elongated, narrow, parallel-sided abdomen, absent alula and reduced anal lobe. *O. parvicornis* was the sister taxon to this clade (Cladogram 4) supported by the unique bare pattern on the female wing (bare on base to basal ¼ of c, basal 2/3 of r and most of bm except for apico-posterior margin (74-10(A))). *O. parvicornis* is also superficially similar to the two other species, with the exception that its tubercle is more ventrally inserted and its overall color is orange (in contrast to the brown with pale abdominal markings of the other clade).



The genitalia of *O. parvicornis*, *O. cf. attenuata* and *O. cf. melanorrhinus* are very distinct from each other. The male of *O. parvicornis* has a pair of apico-lateral extensions on the 4<sup>th</sup> sternite, an asymmetrical pair of surstyli that are connected medially by a sclerotized bridge (Fig.38), a compact hypandrium with very short postgonite and a heavily sclerotized and enlarged phallus. *O. cf. attenuata* looks similar to the *O. lepidus* group species, with the subepandrial sclerite extended apically as a pair of short lobes and the hypandrium with ventral pile sub-apically. Differently from the *O. lepidus* group, the postgonite in *O. cf. attenuata* has a straight apical margin with dorsal and ventral extremities acute and strongly produced. Furthermore, *O. cf. attenuata* always came out with *O. cf. melanorrhinus* in the combined molecular and total evidence analyses, never with the remaining *O. lepidus* group species. The two *O. cf. melanorrhinus* morpho-species differ from the two previous species in having an M1 vein strongly oblique (ending far from where it leaves M), an elongated surstylus with a slightly swollen apex, and an elongated postgonite that tapers towards the apex. The female of *O. parvicornis* has a rectangular 8<sup>th</sup> tergite bearing setae and a 10<sup>th</sup> tergite divided into a pair of distinct plates, while *O. cf. melanorrhinus* has a narrow triangular 8<sup>th</sup> tergite without setae and a 10<sup>th</sup> tergite reduced to a pair of narrow sclerotized strips.

The above species groups are distinct, and they are here treated as two species groups of *Victoriana* although more data is required to clarify their relationships.

### **Genus *Styxia* Hull**

*Styxia* Hull, 1943a: 46 (type species *Styxia eblis* Hull, 1943 (original designation)). Proposed as a subgenus of *Baccha*.

*Ocyptamus eblis* species group.

Figures: 2, 9, 17, 47, 71.

Diagnosis: **Head.** Face wide ( $\sim\frac{1}{2}$  of head width) and pale only on latero-dorsal  $\frac{1}{2}$ ; tubercle ventrally positioned. Gena wide. Antennal insertions separated. Frons normal ( $\sim\frac{1}{3}$  of head width). Frontal triangle with short lateral pale streaks. Female ocellar triangle  $\sim 1$  ocellus-width from lateral eye margin. Eye sometimes densely pilose. Dorsal occiput with 2 rows of pile; occiput pollinosity homogenously distributed but differently oriented medially. **Thorax.** Scutum dark and sparse pollinose with 4 vittae of absence of pollen, and without distinct anterior row of pile. Scutellum dark. Anterior anepisternum pilose. Katatergum with long microtrichia. Metaepisternum bare. Metasternum bare. Dorsal lobe of calypter with normal pile on margin but shorter than ventral lobe pile; ventral lobe of calypter entirely black. Metafemur with normal pile. **Wing.** Alula normal ( $\sim 3$  times the width of c cell). Wing mostly dark with hyaline or lighter areas medially, bare on the lighter/hyaline areas. **Abdomen.** Abdomen spatulate; abdominal tergites with only margins on baso-lateral  $\frac{1}{2}$  pale. **Genitalia.** Female 7<sup>th</sup> tergite as a pair of narrow triangular sclerotizations; 8<sup>th</sup> segment basally compressed. Male basiphallus teardrop-shaped, distiphallus membranous but with dorsal sclerotized triangular region.

Included species: *S. ariela* (Hull, 1944), *S. eblis* Hull, 1943.

The *O. eblis* group was recovered as the sister taxon to the remaining ingroup on the total evidence analysis (minus *Hermesomyia*, *Ocyptamus*, *Orphnabaccha*, *Pipunculosyrphus* and *Pseudoscaeva*) and on the combined molecular analysis (minus the clade (*conopida*(cf. *attenuata* + cf. *melanorrhinus*1))). The *O. eblis* group has some

discrete autapomorphies such as face pale only on latero-dorsal  $\frac{1}{2}$  (3-10(A)), frontal triangle with short lateral pale streaks (5-9), wing mostly dark but with hyaline or lighter areas medially (18-12(C) and 19-12(C)), occiput pollinosity homogenously distributed but differently oriented medially (55-3), wing bare on the lighter/hyaline areas (74-12(C)), and female 8<sup>th</sup> segment basally compressed (91-13(D)). Furthermore, species from this group have a large face and gena, and a spatulate abdomen. The *O. eblis* group corresponds to *Styxia* Hull, so that name is resurrected here (stat.rev.).

*S. eblis* was originally distinguished from other species of *Baccha* by its pilose eye. There are a few undescribed species that are certainly very close to *S. eblis* (and that agree with the above synapomorphies), but have bare eyes instead.

### **Genus *Maiana***

*Maiana* gen.nov. (type species *Baccha pumila* Austen, 1893).

*Baccha lepidus* species group, in part. Hull, 1949a.

*Ocyptamus callidus* species group.

Figures: 12, 24, 60.

Diagnosis: **Head.** Face pale and narrow (between a  $\frac{1}{4}$  and a  $\frac{1}{3}$  of head width); tubercle weak and medially positioned. Antennal insertions confluent. Frons normal (~ $\frac{1}{3}$  of the head width). Female ocellar triangle ~1 ocellus-width from lateral eye margin. Dorsal occiput with 2 rows of pile. **Thorax.** Scutum with 3 golden pollinose vittae, and without distinct anterior row of pile. Scutellum pale. Anterior anepisternum pilose. Katatergum with short microtrichia that gives the sclerite a 'velvet' appearance.

Metaepisternum pilose. Metasternum bare. Dorsal lobe of calypter with normal pile on margin but pile shorter than ventral lobe pile. Metafemur with normal pile. **Wing.** Alula narrow (as wide as c cell). Wing hyaline. **Abdomen.** Abdomen slightly petiolate; abdominal tergites with 'L'-shaped pale markings; 1<sup>st</sup> abdominal segment trapezoidal and short; 2<sup>nd</sup> abdominal segment slightly constricted; male 4<sup>th</sup> abdominal sternite with right side produced and acute. **Genitalia.** Female 7<sup>th</sup> tergite as a pair of lateral rectangular sclerotizations; 8<sup>th</sup> tergite 'boomerang' shaped with sides weakly sclerotized. Male genitalia enlarged; subepandrial sclerite enlarged and strongly convex on dorsal surface, with sides directed ventrally; hypandrium pilose on apico-ventral lobes; postgonite rudimentary; phallus heavily sclerotized and cone-shaped.

Included species: *M. callida* Hine, 1914, *M. immaculata* Macquart, 1842, *M. pumila* Austen, 1893.

Etymology: the name refers to the Mayan civilization that inhabited the Guatemala region where the type specimen of *B. callida* was collected, and it is also an homage to my second daughter. The name is to be treated as feminine.

The *O. callidus* group is distinct from the remaining groups due to its unique characters: a short trapezoidal 1<sup>st</sup> abdominal segment (79-8), male 4<sup>th</sup> abdominal sternite with right side produced and acute (82-2), subepandrial sclerite enlarged and strongly curving with sides directed ventrally (105-9), hypandrium pilose on apico-ventral lobes (108-1), rudimentary postgonite (110-11(B)), and phallus heavily sclerotized and cone-shaped (111-8). The flies from this group can be more readily recognized by the 3 golden pollinose vittae on the scutum, narrow alula, 2<sup>nd</sup> abdominal

segment slightly constricted, pair of 'L'-shaped pale markings on the abdomen and the male's enlarged genitalia. Besides the synapomorphies that support the monophyly of this group, it can't be properly placed in any other of the groups studied here. This species group requires genus rank to maintain consistency with the rest of the groups in the cladogram.

### **Genera *Calostigma* Shannon and *Nuntianus***

*Calostigma* Shannon, 1927: 8 (type species *Calostigma elnora* Shannon, 1927 (original designation)).

*Callostigma* Curran, 1930c: 8. Misspelling.

*Callistigma* Hull, 1944b: 41. Misspelling.

*Ocryptamus elnora* species group. Thompson, 1981a.

Figures: 27, 31, 46.

Diagnosis: **Head.** Face very narrow ( $\sim 1/4$  of head width) and pale; tubercle large and ventrally positioned. Antennal insertions confluent. Frons normal ( $\sim 1/3$  of head width), and without white pollen. Female ocellar triangle  $\sim 1$  ocellus-width from lateral eye margin. Vertex without pollen, shiny. Dorsal occiput with 2 rows of pile. **Thorax.** Scutum pale laterally from postpronotum to post-alar callus, and without distinct anterior row of pile. Scutellum dark medially, pale on whole margin. Anterior anepisternum pilose. Katatergum with short microtrichia that gives the sclerite a 'velvet' appearance. Metaepisternum pilose. Metasternum bare. Margin of dorsal lobe of calypter with normal pile, but pile shorter than on ventral lobe margin. Metafemur pale with sub-basal and

sub-apical dark rings; metafemur with long, erect pile on anterior surface. **Wing.** Alula narrow (as wide as c cell). Wing hyaline with apical dark spot. Vein M1 straight. **Abdomen.** Abdomen petiolate; abdominal tergites with pairs of pale vittae on a black background. **Genitalia.** Female 7<sup>th</sup> tergite reduced to a pair of narrow sclerotizations; 8<sup>th</sup> tergite as a narrow triangular sclerotization; 8<sup>th</sup> sternite as a pair of sclerotized stripes. Male surstylus triangular and long; postgonite rectangular, with dorso- and ventro-apical short acute extremities; basiphallus teardrop-shaped, distiphallus membranous but with dorsal sclerotized triangular region.

Included species: *C. coreopsis* (Hull, 1944), *C. elnora* Shannon, 1927, *C. exigua* (Williston, 1888), *C. ornatipes* (Curran, 1927), *C. striata* (Walker, 1852).

*Nuntianus* gen.nov. (type species *Baccha crocata* Austen, 1893).

*Baccha lepidus* species group, in part. Hull, 1949a.

*Ocyptamus lepidus* species group. Thompson, 1981a.

Figures: 39, 45, 61, 72.

Diagnosis: **Head.** Face narrow to very narrow (between a ¼ and less than a 1/3 of head width) and usually pale; tubercle usually weak and medially positioned, slightly concave dorsally and ventrally. Antennal insertions confluent. Frons very narrow (~¼ of head width) to normal (~ 1/3 of head width), white pollen usually homogeneously distributed but sparse on a median vitta and absent dorsal to lunule. Female ocellar triangle adjacent or ~1 ocellus-width from lateral eye margin. Vertex either homogeneously covered by dull white pollen, or with sparse white pollen, or without

pollen and shiny. Dorsal occiput with 1 row of pile. **Thorax.** Scutum usually pale laterally from postpronotum to post-alar callus, and usually without distinct anterior row of pile. Scutellum usually entirely pale. Anterior anepisternum pilose or bare. Katatergum usually with short microtrichia that gives the sclerite a 'velvet' appearance. Metaepisternum pilose or bare. Metasternum bare. Dorsal lobe of calypter margin bare or with normal pile but shorter than ventral lobe pile. Metafemur with normal pile. **Wing.** Alula usually narrow (as wide as c cell). Wing either hyaline or entirely light yellow to light brown. Vein M1 sometimes straight. **Abdomen.** Abdomen either parallel-sided, slightly petiolate or spatulate; abdominal tergites pattern variable. **Genitalia.** Female 7<sup>th</sup> tergite usually lightly sclerotized basally and laterally; 8<sup>th</sup> tergite variable. Male surstylus with homogeneously distributed setulae or setae; subepandrial sclerite usually 'wing' shaped and with apical projecting lobes between bases of surstyli; hypandrium usually oval and quite robust apically, with ventral pilosity sub-apically or apically; postgonite with sub-apical acute dorsal extremity and either rounded or acute ventral extremity; basiphallus teardrop-shaped, distiphallus membranous but with dorsal sclerotized triangular region.

Included species: *N. abata* (Curran, 1938), *N. aeneus* (Williston, 1891), *N. aeolus* (Hull, 1943), *N. anona* (Hull, 1943), *N. arabella* (Hull, 1947), *N. aurora* (Hull, 1943), *N. banksi* (Hull, 1941), *N. bromleyi* (Curran, 1929), *N. chapadensis* (Curran, 1930), *N. confusus* (Goot, 1964), *N. crocatus* (Austen, 1893), *N. croceus* (Austen, 1893), *N. cubana* (Hull, 1943), *N. cultratus* (Austen, 1893), *N. cymbellina* (Hull, 1944), *N. debasa* (Curran, 1941), *N. delicatissimus* (Hull, 1943), *N. diffusus* (Curran, 1939), *N. fervidus* (Austen, 1893), *N. filii* (Doesburg, 1966), *N. flavens* (Austen, 1893), *N. geijskesi*

(Doesburg, 1966), *N. gilvus* (Austen, 1893), *N. grata* (Curran, 1941), *N. halcyone* (Hull, 1949), *N. harlequinus* (Hull, 1948), *N. hippolyte* (Hull, 1957), *N. hyalipennis* (Curran, 1930), *N. inornatus* (Walker, 1836), *N. io* (Hull, 1944), *N. iona* (Curran, 1941), *N. isthmus* (Thompson, 1976), *N. laudabilis* (Williston, 1891), *N. lepidus* (Macquart, 1842), *N. lucretia* (Hull, 1949), *N. luctuosus* (Bigot, 1884), *N. micropyga* (Curran, 1941), *N. minius* (Hull, 1943), *N. murinus* (Curran, 1930), *N. nasutus* (Williston, 1891), *N. neptunos* (Hull, 1943), *N. neuralis* (Curran, 1934), *N. niobe* (Hull, 1943), *N. nora* (Curran, 1941), *N. obliquus* (Curran, 1941), *N. oblongus* (Walker, 1852), *N. octomaculatus* (Thompson, 1976), *N. oriel* (Hull, 1942), *N. phillipianus* (Enderlein, 1938), *N. pola* (Curran, 1939), *N. prenes* (Curran, 1930), *N. prudens* (Curran, 1934), *N. pullus* (Sack, 1921), *N. punctifrons* (Williston, 1891), *N. pyxia* (Hull, 1943), *N. saffrona* (Hull, 1943), *N. spatulatus* (Giglio-Tos, 1892), *N. subchalybeus* (Walker, 1857), *N. urania* (Hull, 1949), *N. vanessa* (Hull, 1949), *N. verona* (Curran, 1941), *N. victoria* (Hull, 1941), *N. vierecki* (Curran, 1930), *N. virgilio* (Hull, 1942), *N. wilhelmina* (Doesburg, 1963), *N. xanthopterus* (Wiedemann, 1830), *N. xantippe* (Hull, 1949), *N. zenillia* (Curran, 1941), *N. zilla* (Hull, 1943), *N. zita* (Curran, 1941), *N. zobeide* (Hull, 1943), *N. zoroaster* (Hull, 1943).

Etymology: the name refers to the word ‘messenger’ or ‘message’. The name is to be treated as masculine.

The species from the *O. lepidus* group were recovered in a clade with the *O. elnora* group in the combined molecular analysis. This clade was not recovered in the total evidence analysis. If not for the *O. elnora* group, all taxa from this clade would possess quite distinct features such as: female 7<sup>th</sup> tergite lightly sclerotized basally and



laterally, surstylus with homogeneously distributed setulae or setae, subepandrial sclerite wing-shaped and with apical projecting lobes between bases of surstyli, hypandrium oval and quite robust apically, and hypandrium with ventral pilosity subapically. The species from the *O. lepidus* group usually have a vertex homogeneously covered by dull white pollen, scutellum entirely pale, abdomen slightly petiolate, parallel-sided or spatulate, and wings entirely light yellow to brown (this diversity of habitus is best seen in (*O. vierecki* (*O. croceus* (*O. luctuosus* + *O. cf. zoroaster*))) which was strongly supported in the combined molecular analysis). It is unexpected that *O. croceus* would come out so closely with the *O. elnora* group despite the discrete characters that it shares with the remaining *O. lepidus* group species.

The (*O. croceus* (*O. elnora* group)) wasn't recovered in the total evidence analysis, but was strongly supported on the combined molecular analysis (Cladogram 1). In an attempt to obtain better resolution with the total evidence dataset, a separate analysis had *O. striatus* excluded. This separate analysis resulted in the same cladogram topology, but this time it recovered (*O. croceus* (*O. elnora* group)) (Bremer 2, Bootstrap 74, Jackknife 79) and (*O. lepidus* species (*O. croceus* (*O. elnora* group))) (Bremer 5, Bootstrap 72, Jackknife 81). Based on the combined molecular and the separate total evidence analyses, it seems that the *O. elnora* group (if *O. striatus* is excluded) is part of the *O. lepidus* group.

Shannon erected the genus *Calostigma* for flies that had a straight M1 vein and an apical dark spot on the wing. Thompson (1981a) observed that his *O. elnora* group, that he determined to be equivalent to Shannon's *Calostigma*, had two distinct subgroups: "One for those small, mainly yellowish flies that have yellow scutella, and

brownish yellow and almost completely microtrichose wings” (group 1) “and another for those larger, mainly black and yellow flies, that have partially black scutella and hyaline and extensively bare wings” (group 2). The current study adds additional characters to Thompson’s subgroups: group 1 has 3 long and white pollinose vittae on the scutum, the lateral pair wider than the median vitta, and the abdominal tergites are mainly pale with apical dark vittae; group 2 has 3 narrow and white pollinose vittae, a median and long vitta and a pair of lateral short vittae, and abdominal tergites mainly dark with complete pale narrow vittae. If the new characters and the apical spot on the wing are taken into consideration, group 1 includes the species *O. hyalipennis*, *O. isthmus*, *O. neuralis* and *O. obliquus*, and the group 2 includes *O. coreopsis*, *O. elnora*, *O. exiguus*, *O. ornatipes* and *O. striatus*. Group 2 is the true *Calostigma* Shannon, since it includes the type species *O. elnora*.

*O. striatus* (the only representative of *Calostigma* sensu Shannon in this study) is very distinct from the species of the *O. lepidus* group and Thompson’s 1<sup>st</sup> group. In addition to the characters mentioned above, *O. striatus* has 2 rows of pile on the dorsal occiput, the female has the 7<sup>th</sup> tergite reduced to a pair of narrow sclerotizations, the 8<sup>th</sup> tergite is a narrow triangular sclerotization, the 8<sup>th</sup> sternite is a pair of sclerotized stripes and the male has a long triangular surstylus.

Since *Calostigma* is clearly distinct from the *O. lepidus* group and Thompson’s (1981a) 1<sup>st</sup> group, and *O. striatus* is recovered outside the *O. lepidus* clade in some of the most parsimonious cladograms, it seems possible that *Calostigma* forms a separate group outside of the *O. lepidus* clade. The genus *Calostigma* Shannon is here resurrected (stat.rev.) to include *C. striatus* and similar species.

Since Thompson's (1981a) 1<sup>st</sup> group was always recovered as the sister group to *O. croceus*, and in the same clade as the remaining species of the *O. lepidus* group, a new genus (*Nuntianus* gen.nov.) is erected to include the species from both groups.

### **Genus *Hybobathus* Enderlein**

*Hybobathus* Enderlein, 1938: 233 (type species *Hybobathus quadrilineatus* Enderlein, 1938 (original designation)).

*Hypobathus* Fluke, 1956: 217. Misspelling.

*Callisyrphus* Frey, 1946: 154 (type species *Syrphus rubricosus* Wiedemann, 1830 (original designation)).

*Calliscaeva* Frey, 1946: 171. Incorrect original spelling of *Callisyrphus* (revision by Fluke, 1956: 199).

*Aulacibaccha* Hull, 1949a: 96 (type species *Baccha titan* Hull, 1947a (original designation) = *Baccha arx* Fluke, 1936). Proposed as a subgenus of *Baccha*.

*Baccha lineatus* species group. Hull, 1949a.

*Ocyptamus lineatus* species group. Thompson, 1981a.

*Ocyptamus arx* species group.

Figures: 11, 15, 21-23, 49, 65.

Diagnosis: **Head.** Face pale and of normal width (~1/3 of head width); tubercle ventrally positioned. Antennal insertions separated. Frons wide (~2/5 of head width). Ocellar triangle dull black-pollinose and surrounded by dense white pollen. Female

ocellar triangle ~2 ocelli-width from lateral eye margin. Dorsal occiput with 1 row of pile.

**Thorax.** Scutum either covered in dense white pollen with 3-4 vittae or absence of pollen or with 3 vittae of golden pollen that are joined together by a circular pollinose area posteriorly, and with anterior row of longer pile that sometimes has shorter pile in the middle. Scutellum pale. Anterior anepisternum pilose. Katatergum with either short or long microtrichia. Metaepisternum pilose. Metasternum bare. Dorsal lobe of calypter with margin either bare, or with very short pile, or normal pile (but shorter than ventral lobe pile). Metafemur usually with normal pile. **Wing.** Alula usually normal (~3 times the width of c cell) but sometimes narrow. Wing usually yellow on at least the basal ½.

**Abdomen.** Abdomen petiolate; abdominal tergites with pairs of narrow pale vittae.

**Genitalia.** Female 7<sup>th</sup> tergite as a pair of narrow sclerotizations; 8<sup>th</sup> tergite as narrow triangular sclerotization; 8<sup>th</sup> sternite as pair of sclerotized stripes. Male postgonite rectangular with acute dorsal and ventral (more produced) apical extremities and oblique apex; basiphallus teardrop-shaped, distiphallus membranous but with dorsal sclerotized triangular region.

Included species: *H. anera* (Curran, 1939), *H. arx* (Fluke, 1936), *H. bivittatus* (Curran, 1941), *H. cobboldia* (Hull, 1958), *H. cubensis* (Macquart, 1850), *H. druida* (Hull, 1947), *H. flavipennis* (Wiedemann, 1830), *H. idana* (Curran, 1941), *H. lineatus* (Macquart, 1846), *H. lividus* (Schiner, 1868), *H. macropyga* (Curran, 1941), *H. myrtella* (Hull, 1960), *H. nectarinus* (Hull, 1942), *H. norina* (Curran, 1941), *H. notatus* (Loew, 1866), *H. obsoletus* (Curran, 1941), *H. pennatus* (Hull, 1943), *H. persimilis* (Curran, 1930), *H. phaeopterus* (Schiner, 1868), *H. placivus* (Williston, 1888), *H. quadrilineatus* Enderlein, 1938, *H. rubricosus* (Wiedemann, 1830), *H. ryl* (Hull, 1943), *H. silacea*

(Austen, 1893), *H. thecla* (Hull, 1943), *H. vittiger* (Hull, 1949), *H. wiedemanni* (Enderlein, 1938), *H. zenia* (Curran, 1941).

Notes: Records present in the literature point to thrips (Thysanoptera) and psyllids (Hemiptera, Sternorrhyncha, Psylloidea, Psyllidae) as larval prey for this group, a unique preference among the studied groups. A revision of this group might lead to further sub-divisions besides the *H. arx* group, such as the *Hybobathus* s.s. group (3 vittae of absence of pollen on scutum, and metafemur and metatibia with long thick black pile).

The *O. lineatus* group was recovered with the *O. arx* group in a single clade in all analyses. This group of flies can be easily identified by the overall pale colour, entirely pale face, the distinct dull black ocellar triangle amidst a vertex/vertical triangle of dense white pollen, wings usually yellow tinged on at least the basal ½, petiolate abdomen, and pairs of narrow pale vittae on the abdominal tergites. The *O. lineatus* group species also have a black scutum covered in dense white pollen with 3 to 4 vittae of absence of pollen, while the *O. arx* group has 3 vittae of golden pollen that are joined together by a circular pollinose area posteriorly. The flies from the *O. arx* group are larger (~15mm) and have a more distinctly petiolate abdomen (narrow 2<sup>nd</sup> abdominal segment and distinctly widened 3<sup>rd</sup> and 4<sup>th</sup> segments). The genus *Hybobathus* Enderlein is resurrected (stat.rev.) to accommodate the species from the *O. lineatus* and *O. arx* groups.

### **Genus *Hypocritanus***

*Hypocritanus* gen.nov. (type species *Baccha fascipennis* Wiedemann, 1830).

Figures: 51, 67.

Diagnosis: **Head.** Face narrow (between a  $\frac{1}{4}$  and a  $\frac{1}{3}$  of head width) and either pale or mostly dark; tubercle ventrally positioned. Frons normal ( $\sim\frac{1}{3}$  of head width). Antennal insertions confluent. Female ocellar triangle  $\sim 1$  ocellus-width from lateral eye margin. Dorsal occiput with 1 row of pile. **Thorax.** Scutum dark, and with anterior row of longer pile. Scutellum mostly pale but darker laterally. Anterior anepisternum pilose. Katatergum with long microtrichia. Metaepisternum pilose. Metasternum bare. Dorsal lobe of calypter with normal pile on margin (but shorter than ventral lobe pile). Male metafemur with longer pile on anterior surface. **Wing.** Alula mostly bare except for apical  $\frac{1}{4}$ . Wing hyaline with a median dark triangular marking; most of cells c, r and bm bare. **Abdomen.** Abdomen elongated, narrow, and parallel-sided; abdominal tergites with either quadrangular or triangular pale maculae baso-laterally. **Genitalia.** Female 7<sup>th</sup> tergite rectangular and wide; 8<sup>th</sup> tergite rectangular, wide and with distinct concavity on posterior margin; 10<sup>th</sup> tergite as a pair of sclerites connected by basal narrow bridge, sclerites fuse into cerci apico-laterally by a narrow strip. Male subepandrial sclerite quadrangular, with baso-lateral corners extended as 'wings'; basiphallus teardrop-shaped, distiphallus membranous but with dorsal sclerotized triangular region.

Included species: *H. fascipennis* Wiedemann, 1830, *H. lemur* Osten Sacken, 1877.

Etymology: the name alludes to the latin word 'hypocrites' which relates to 'actor' or 'mime'. The name is to be treated as masculine.

All analyses recovered *O. fascipennis* and *O. lemur* as sister taxa. Both taxa are unrelated to *Ocyptamus* s.s., and possess the following unique morphological synapomorphies: alula mostly bare except for apical  $\frac{1}{4}$  (72-6), wing with most of cells c, r and bm bare (73-20(M)), female 10<sup>th</sup> tergite divided as a pair of sclerites connected by narrow bridge basally and fusing into cerci apico-laterally by a narrow strip (92-12(C)), and subepandrial sclerite quadrangular with baso-lateral corners extended as 'wings' (105-13(D)). The flies of this group have hyaline wings with a median dark triangular marking, an elongated, narrow, parallel-sided abdomen, and quadrangular or triangular pale maculae baso-laterally on the abdominal tergites. Furthermore, its species are known to prey only on mealybugs (Hemiptera, Sternorrhyncha, Coccoidea, Pseudococcidae) (Rojo *et al.* 2003).

### **Genus *Fragosa***

*Fragosa* gen.nov. (type species *Baccha stenogaster* Williston, 1888).

*Baccha obscuricornis* species group. Hull, 1949a.

*Baccha victoria* species group, in part. Hull, 1949a.

*Ocyptamus stenogaster* species group. Thompson, 1981a.

Figures: 4, 10, 16, 25, 26, 37, 50, 64.

Diagnosis: delicate flies. **Head.** Face narrow to very narrow (between around a  $\frac{1}{4}$  to less than a  $\frac{1}{3}$  of head width). Frons usually of normal width ( $\sim\frac{1}{3}$  of head width). Antennal insertions confluent. Female ocellar triangle adjacent or  $\sim 1$  ocellus-width from lateral eye margin. Dorsal occiput usually with 2 rows of pile. **Thorax.** Scutum without

distinct anterior row of pile. Anterior anepisternum pilose. Katatergum with short microtrichia that gives the sclerite a 'velvet' appearance. Metaepisternum pilose. Metasternum bare. Dorsal lobe of calypter either bare, with normal pile (but shorter than ventral lobe pile) or with longer darker pile on margin. Metafemur with normal pile. **Wing.** Alula absent. Male wing light brown; anal lobe reduced. **Abdomen.** Abdominal segments very long and very narrow; 1<sup>st</sup> segment crescent-shaped with lateral extremities directed laterally; tergites usually with quadrangular pale maculae on the baso-lateral corners of the 3<sup>rd</sup> and 4<sup>th</sup> abdominal tergites. **Genitalia.** Female 7<sup>th</sup> tergite usually quadrangular; 8<sup>th</sup> tergite rectangular with concave basal and apical margins; 10<sup>th</sup> tergite as a pair of separate sclerites connected to each other by a basal narrow strip. Male basiphallus teardrop-shaped, distiphallus membranous but with dorsal sclerotized triangular region.

Etymology: the name refers to the 'fragile' aspect of these flies. It is to be treated as feminine.

- *F. stenogaster* species group.

Diagnosis: **Head.** Face usually dark dorsal to tubercle; tubercle pointed and medially positioned. Frons dark. Frons/frontal triangle rugose. Frontal triangle white pollen concentrated laterally. Female ocellar triangle distanced less than its length from posterior eye margin. Occiput pollinosity homogeneously distributed. **Thorax.** Scutum dull pale-pollinose with sub-median pair of weak white pollinose patches on anterior region, sometimes with weak vittae in place of patches. Scutellum pale. Post-metacoxal bridge almost complete. Metafemur pale. **Wing.** Female wing hyaline; female wing bare



on basal  $\frac{1}{4}$  to most of c, basal  $\frac{1}{3}$  to  $\frac{1}{2}$  of r, and baso-anterior margin of bm. **Genitalia.** Male epandrium enlarged; hypandrium reduced; surstylus quadrangular with filiform apical extension; subepandrial sclerite quadrangular, strongly convex on dorsal surface, with sides directed ventrally.

Included species: *F. argentina* (Curran, 1939), *F. deceptor* (Curran, 1930), *F. filiola* (Shannon, 1927), *F. hyacinthia* (Hull, 1947), *F. oenone* (Hull, 1949), *F. provocans* (Curran, 1939), *F. rugosifrons* (Schiner, 1868), *F. stenogaster* (Williston, 1888), *F. zephyrea* (Hull, 1947).

- *F. titania* species group.

Diagnosis: **Head.** Face pale; tubercle non-pointed and ventrally positioned. Frons narrow (less than a  $\frac{1}{3}$  of head width) and pale on ventral  $\frac{1}{4}$  to  $\frac{1}{2}$  lateral to lunule. Frons/frontal triangle smooth. Frontal triangle white pollen homogeneously distributed but oriented ventro-dorsally. Female ocellar triangle distanced more than its length from the posterior eye margin. Occiput with pollen differently oriented dorsally. Dorsal occiput sometimes with 1 row of pile. **Thorax.** Scutum shiny black. Scutellum mostly black. Metathoracic epimera extended dorsal to the metacoxa but not so close to each other. Metafemur with sub-apical dark band. **Wing.** Female wing hyaline basally and gradually turning light brown towards apex; female wing bare on basal  $\frac{1}{3}$  to  $\frac{2}{3}$  of c, and bases of r and bm. **Genitalia.** Male epandrium and hypandrium of similar size; surstylus sub-quadrangular with extended apex; subepandrial sclerite rectangular wide with basal corners slightly extended and round.

Included species: *F. filissima* (Hull, 1943), *F. macer* (Curran, 1930), *F. mara* (Curran, 1941), *F. tenuis* (Walker, 1852), *F. titania* (Hull, 1943).

The *O. stenogaster* group was always recovered in a clade, with *O. titania* (or (*O. titania* + *O. sp. 09*)) as its sister taxon supported by a unique morphological synapomorphy (female 10<sup>th</sup> tergite as a pair of separate sclerites connected to each other by a basal narrow strip (92-7)). The *O. stenogaster* group was supported by the following unique morphological synapomorphies: rugose frons/frontal triangle (47-1), quadrangular surstyli with filiform apical extension (100-14(E)), and quadrangular subepandrial sclerite strongly curving, with sides directed ventrally (105-25(S)). Further distinct characters for the *O. stenogaster* group would be the face dark dorsal to tubercle, tubercle pointed and medially positioned, entirely pale scutellum, an almost complete post-metacoxal bridge, an enlarged epandrium, and a reduced hypandrium. *O. titania* and *O. sp. 09* can be distinguished from the *O. stenogaster* group by the pale face, tubercle non-pointed and more ventrally positioned, narrower frons which is pale on ventral ¼ to ½ lateral to lunule, frontal triangle with white pollen homogeneously distributed but oriented ventro-dorsally, female ocellar triangle distanced more than its length from the posterior eye margin, occiput with pollen differently oriented dorsally, shiny scutum, entirely black scutellum, metafemur with sub-apical dark band, metathoracic epimera extended dorsal to the metacoxa but not so close to each other, and female wing bare only on basal 1/3 to 2/3 of c, and bases of r and bm. The ((*O. titania* + *O. sp. 09*) *O. stenogaster* group) clade includes very delicate flies (superficially similar to *Baccha* and *Leucopodella*) that lack an alula, have a reduced anal lobe, have very long, very narrow abdominal segments, have a crescent-shaped 1<sup>st</sup> abdominal

segment with lateral extremities directed laterally, and usually with quadrangular pale maculae on the baso-lateral corners of the 3<sup>rd</sup> and 4<sup>th</sup> abdominal tergites. The similarities between both groups, and the support given to them in a single clade, suggested the creation of a genus with two species groups.

**Genera *Atylobaccha* Hull, *Pelecinobaccha* Shannon and *Relictanum***

*Atylobaccha* Hull, 1949a: 94 (type species *Baccha flukiella* Curran, 1941 (original designation)). Proposed as a genus.

*Ocyptamus flukiella* species group.

Figures: 6.

Diagnosis: **Head.** Face very narrow (around ¼ of head width) and entirely dark; tubercle very weak, face convex in profile. Frons narrow (between ¼ and 1/3 of head width). Antennal insertions confluent. Female ocellar triangle adjacent to lateral eye margin. Dorsal occiput with 1 row of pile. **Thorax.** Scutum entirely dark with anterior row of longer pile, anterior row with shorter pile medially. Scutellum entirely dark. Anterior anepisternum pilose. Katatergum with short microtrichia that gives the sclerite a 'velvet' appearance. Metaepisternum bare. Metasternum bare. Dorsal lobe of calypter with normal pile on margin (but shorter than ventral lobe pile). Male metafemur with normal pile. Metabasitarsomere dark but with apex pale. **Wing.** Alula normal (~3 times the width of c cell). Wing hyaline to light brown, entirely microtrichose. **Abdomen.** Abdomen petiolate with 2<sup>nd</sup> segment very narrow and long; 3<sup>rd</sup> and 4<sup>th</sup> abdominal tergites with central pair of short pale vittae and sub-basal lateral pair of pale fasciate maculae. **Genitalia.** Female 7<sup>th</sup> tergite rectangular and wide; 8<sup>th</sup> tergite rectangular and wide with

basal and apical margin shallowly concave; 10<sup>th</sup> tergite reduced to a pair of quadrangular sclerotizations with narrow baso-lateral projections. Male subepandrial sclerite rectangular, wide and narrow, with baso-lateral corners slightly extended and acute; basiphallus teardrop-shaped, distiphallus membranous but with dorsal sclerotized triangular region.

Included species: *A. flukiella* Curran, 1941.

Notes: *Atylobaccha* currently includes only the species *A. flukiella* (Curran, 1941), but there are undescribed species with laterally pale frons and without distinct pale markings on the abdomen. These undescribed species otherwise agree with the rest of the diagnosis. Due to the confusion on Hull's (1949a) work where he initially describes *Atylobaccha* as a subgenus of *Leucopodella*, but later in his key identify it as a genus, it is required that the original proper rank be determined to assure stability in the use of the name. As first reviser, I determine that the proper original rank for *Atylobaccha* was that of genus.

*Pelecinobaccha* Shannon, 1927: 10 (type species *Baccha peruviana* Shannon, 1927 (original designation)). Proposed as a subgenus of *Baccha*.

Diagnosis: **Head.** Face narrow to normal (between 1/4 to around 1/3 of head width) and mostly dark; tubercle ventrally positioned. Frons normal (~1/3 of head width). Antennal insertions usually confluent. Female ocellar triangle usually ~2 ocellus-width from lateral eye margin. Dorsal occiput with 2 rows of pile. **Thorax.** Scutum with anterior row of longer pile, anterior row with shorter pile medially, usually entirely dark and without any discernible pattern of pollinosity. Scutellum usually entirely dark. Anterior

anepisternum pilose. Katatergum with short to long microtrichia. Metaepisternum pilose. Metasternum bare. Dorsal lobe of calypter with normal pile on margin (but shorter than ventral lobe pile). Male metafemur with normal pile. Metabasitarsomere usually bicoloured, at least basal  $\frac{1}{2}$  dark. **Wing.** Alula usually 2-3 times larger than c cell, rarely reduced or absent. Wing usually with extensive dark markings and entirely microtrichose. **Abdomen.** Abdomen petiolate or very narrow and very long; abdominal tergites with pattern variable. **Genitalia.** Female 7<sup>th</sup> tergite with basal pair of long apodemes; 8<sup>th</sup> tergite triangular in dorsal view and notched posteriorly, with basal crest flanking posterior notch; 10<sup>th</sup> tergite usually reduced and fused to dorsal surface of cercus. Male subepandrial sclerite usually trapezoidal and with slightly extended posterior corners; basiphallus teardrop-shaped, distiphallus membranous but with dorsal sclerotized triangular region.

*P. (Pelecinobaccha)* Shannon, 1927: 10 (type species *Baccha peruviana* Shannon, 1927 (original designation)). Proposed as a subgenus of *Baccha*.

*Baccha tristis* species group, in part. Hull, 1949a.

*Ocyptamus tristis* species group, in part.

*Ocyptamus peruvianus* species group.

Figures: 53, 55, 58, 74-77.

Diagnosis: **Head.** Face narrow to normal (between  $\frac{1}{4}$  to around  $\frac{1}{3}$  of head width) and mostly dark. Antennal insertions confluent or separated. Female ocellar triangle 1-2 ocellus-width from lateral eye margin. Dorsal occiput with 2 rows of pile.

**Thorax.** Scutum with anterior row of longer pile, anterior row with shorter pile medially, entirely dark and usually without any discernible pattern of pollinosity. Scutellum entirely dark. Katatergum with short microtrichia that gives the sclerite a 'velvet' appearance. Dorsal lobe of calypter with normal pile on margin (but shorter than ventral lobe pile). Male metafemur with normal pile. Metabasitarsomere usually bicoloured, rarely entirely dark. **Wing.** Alula normal (~3 times the width of c cell), rarely with base as wide as the width of c cell. Wing usually with extensive dark markings and entirely microtrichose, rarely with bare areas. **Abdomen.** Abdomen petiolate; abdominal tergites with pattern variable. **Genitalia.** Female 10<sup>th</sup> tergite reduced and fused to dorsal surface of cercus. Male subepandrial sclerite usually trapezoidal and with slightly extended posterior corners.

Included species: *P. (Pelecinobaccha) alicia* (Curran, 1941), *P. (Pelecinobaccha) beatricea* (Hull, 1942), *P. (Pelecinobaccha) clarapex* (Wiedemann, 1830), *P. (Pelecinobaccha) concinna* (Williston, 1891), *P. (Pelecinobaccha) cora* (Curran, 1941), *P. (Pelecinobaccha) costata* (Say, 1829), *P. (Pelecinobaccha) cryptica* (Hull, 1942), *P. (Pelecinobaccha) dracula* (Hull, 1943), *P. (Pelecinobaccha) eruptova* (Hull, 1943), *P. (Pelecinobaccha) hiantha* (Hull, 1943), *P. (Pelecinobaccha) hirundella* (Hull, 1944), *P. (Pelecinobaccha) ida* (Curran, 1941), *P. (Pelecinobaccha) mexicana* (Curran, 1930), *P. (Pelecinobaccha) peruviana* Shannon, 1927, *P. (Pelecinobaccha) pilipes* (Schiner, 1868), *P. (Pelecinobaccha) telescopica* (Curran, 1930), *P. (Pelecinobaccha) transatlantica* (Schiner, 1868), *P. (Pelecinobaccha) tristis* (Hull, 1930), *P. (Pelecinobaccha) sp.nov.1*, *P. (Pelecinobaccha) sp.nov.2*, *P. (Pelecinobaccha) sp.nov.3*, *P. (Pelecinobaccha) sp.nov.4*, *P. (Pelecinobaccha) sp.nov.5*, *P.*

(*Pelecinobaccha*) sp.nov.6, *P. (Pelecinobaccha)* sp.nov.7, *P. (Pelecinobaccha)* sp.nov.8, *P. (Pelecinobaccha)* sp.nov.9, *P. (Pelecinobaccha)* sp.nov.10, *P. (Pelecinobaccha)* sp.nov.11, *P. (Pelecinobaccha)* sp.nov.12, *P. (Pelecinobaccha)* sp.nov.13, *P. (Pelecinobaccha)* sp.nov.14.

*P. (Calumnia)* subgen.nov. (type species *Baccha brevipennis* Schiner, 1868)

Included species: *P. (Calumnia) aster* (Curran, 1941), *P. (Calumnia) brevipennis* (Schiner, 1868), *P. (Calumnia) levissima* (Austen, 1893), *P. (Calumnia) vera* (Hull, 1944), *P. (Calumnia)* sp.nov.1, *P. (Calumnia)* sp.nov.2, *P. (Calumnia)* sp.nov.3, *P. (Calumnia)* sp.nov.4.

Diagnosis: **Head.** Face narrow (between  $\frac{1}{4}$  and  $\frac{1}{3}$  of head width), usually mostly dark, sometimes mostly yellow but dark medially dorsal to tubercle. Antennal insertions confluent. Female ocellar triangle 1-3 ocellus-width from lateral eye margin. Dorsal occiput with 2 rows of pile, anterior row sometimes inconspicuous. **Thorax.** Scutum entirely dark and usually without any discernible pattern of pollinosity. Scutellum entirely dark, rarely pale basally. Pleuron pile usually short and appressed. Katatergum with long microtrichia. Dorsal lobe of calypter sometimes with very short pile on margin. Male metafemur with normal pile. Metabasitarsomere entirely dark to bicoloured. **Wing.** Alula narrow (less than c cell width) to absent. Wing entirely hyaline to light brown; entirely microtrichose, rarely with bare basal areas. **Abdomen.** Abdomen very narrow and very long; 3<sup>rd</sup> abdominal tergite usually with latero-medial pair of fasciate pale maculae, 4<sup>th</sup> with baso-lateral sub-quadrangular pale maculae, and sometimes with central pair of pale vittae. **Genitalia.** Female 10<sup>th</sup> tergite either reduced and fused to

dorsal surface of cercus or as a transverse sclerite that fuses baso-ventrally to cercus. Male subepandrial sclerite usually rectangular and wide, with short baso-lateral extensions.

Etymology: The name refers to the word 'lie', because it would be untrue if these flies were identified as species from the genus *Fragosa* (to which they resemble). The name is to be treated as feminine.

*P. (Noxana)* subgen.nov. (type species *Baccha adspersa* Fabricius, 1805)

Figures: 52, 54, 57.

Diagnosis: **Head.** Face narrow (between  $\frac{1}{4}$  and  $\frac{1}{3}$  of head width), entirely dark, rarely pale laterally. Antennal insertions confluent to distinctly separated. Female ocellar triangle 1-3 ocellus-width from lateral eye margin. Dorsal occiput with 2 rows of pile. **Thorax.** Scutum entirely dark and with pair of pollinose vittae. Scutellum entirely dark, rarely entirely pale. Katatergum with short to long microtrichia. Dorsal lobe of calypter with normal pile on margin (but shorter than ventral lobe pile). Male metafemur with normal pile, rarely with thicker and longer pile on apical  $\frac{1}{2}$ . Metatarsus dark. **Wing.** Alula narrow (as wide as c cell) to normal ( $\sim 3$  times the width of c cell). Wing with at least base or anterior margin darker, entirely microtrichose. **Abdomen.** Abdomen petiolate; abdominal tergites pattern variable. **Genitalia.** Female 10<sup>th</sup> tergite usually reduced to a transverse sclerite that extends apico-laterally and fuses medially into the cercus. Male subepandrial sclerite variable.



Included species: *P. (Noxana) adspersa* (Fabricius, 1805), *P. (Noxana) mima* (Hull, 1949), *P. (Noxana) oviphora* (Hull, 1943), *P. (Noxana) ovipositoria* (Hull, 1943), *P. (Noxana) sp.nov.1*, *P. (Noxana) sp.nov.2*, *P. (Noxana) sp.nov.3*, *P. (Noxana) sp.nov.4*.

Etymology: The name refers to 'darkness', which reflects the pitch black coloration of the head and metatarsus of these flies. The name is to be treated as feminine.

*P. (Pseudoaulacibaccha)* subgen.nov. (type species *Baccha ada* Curran, 1941)

Figures: 78, 79.

Diagnosis: **Head.** Face of normal width (~1/3 of head width), entirely pale or with a medial dark vitta. Antennal insertions confluent. Female ocellar triangle ~2 ocellus-width from lateral eye margin. Dorsal occiput with 2 rows of pile. **Thorax.** Scutum dark with pale lateral margin and with 3 golden pollinose vittae. Scutellum dark, base pale. Katatergum with long microtrichia. Dorsal lobe of calypter with normal pile on margin (but shorter than ventral lobe pile). Male metafemur with normal pile. Metabasitarsus entirely pale to bicoloured. **Wing.** Alula normal (~3 times the width of c cell). Wing with at least basal cells darker, sometimes basal ½ dark, entirely microtrichose. **Abdomen.** Abdomen petiolate; 3<sup>rd</sup> and 4<sup>th</sup> abdominal tergites with central pair of pale ovalate vittae. **Genitalia.** Female 10<sup>th</sup> tergite fused to dorsal surface of cercus. Male subepandrial sclerite quadrangular or rectangular long, with basal margin concave.

Included species: *P. (Pseudoaulacibaccha) ada* (Curran, 1941), *P. (Pseudoaulacibaccha) pandora* (Hull, 1942), *P. (Pseudoaulacibaccha) summa* (Fluke, 1936).

Etymology: The name refers to the similarity between these species and the *H. arx* group (described as *Aulacibaccha* by Hull (1949a)) from the genus *Hybobathus*. The name is to be treated as feminine.

*Relictanum* gen.nov. (type species *Baccha crassa* Walker, 1852)

*Baccha tristis* species group, in part. Hull, 1949a.

*Ocyptamus tristis* species group, in part.

Figures: 56.

Diagnosis: **Head.** Face narrow (between a  $\frac{1}{4}$  to  $\frac{1}{3}$  of head width) and mostly dark, rarely pale laterally; tubercle ventrally positioned. Frons normal ( $\sim\frac{1}{3}$  of head width). Antennal insertions confluent. Female ocellar triangle  $\sim 1$  ocellus-width from lateral eye margin. Dorsal occiput with 1 row of pile. **Thorax.** Scutum with anterior row of longer pile, entirely dark and usually without any discernible pattern of pollinosity. Scutellum entirely dark. Anterior anepisternum pilose. Katatergum with short microtrichia that gives the sclerite a 'velvet' appearance. Metaepisternum pilose. Metasternum bare. Dorsal lobe of calypter with normal pile on margin (but shorter than ventral lobe pile). Male metafemur with normal pile. **Wing.** Alula usually 2-3 times larger than c cell, rarely as wide as c cell. Wing hyaline or entirely light brown, usually entirely microtrichose. **Abdomen.** Abdomen petiolate, 2<sup>nd</sup> abdominal segment usually very narrow and long; abdominal tergites with pattern variable. **Genitalia.** Female 7<sup>th</sup> tergite rectangular with posterior margin concave; 8<sup>th</sup> tergite sub-quadrangular to trapezoidal, usually with basal and apical margins concave; 10<sup>th</sup> tergite with apico-medial notch and fused apically or laterally to cercus, setulate. Male subepandrial sclerite usually

trapezoidal and with slightly extended posterior corners; basiphallus teardrop-shaped, distiphallus membranous but with dorsal sclerotized triangular region.

Included species: *R. braziliensis* (Curran, 1939), *R. crassum* (Walker, 1852), *R. fiametta* (Hull, 1943), *R. johnsoni* (Curran, 1934), *R. nero* (Curran, 1939), *R. schwarzi* (Curran, 1939), *R. shropshirei* (Curran, 1930), *R. sp.nov.1*, *R. sp.nov.2*.

Etymology: The name is a reference to the word 'leftover', which was what happened to the *O. tristis* group species that were resolved in a separate clade and not with the *Pelecinobaccha* genus. The name is to be treated as neutral.

The *O. tristis* group (sensu lato) was always recovered including *O. flukiella* (*O. flukiella* group). The white pollinosity restricted to a lateral pair of oval/triangular maculae on the frontal triangle is present only on this clade. The combined molecular analysis recovered a basal clade (*O. zeteki* + *O. sp. 53*) to this assemblage, although with weak support. The (*O. zeteki* + *O. sp. 53*) clade wasn't recovered in the total evidence analysis, but the lack of coding of female characters for *O. sp. 53* might be responsible for this. The flies from this clade are similar to *O. flukiella*, small (6-10mm) and with a narrow long 2<sup>nd</sup> abdominal segment, but they have a distinct tubercle and their female cercus is covered by setulae (*O. flukiella* has a very weak tubercle and cercus without setulae).

One clade stands out in the analyses (*O. tristis* group minus *O. zeteki*, *O. sp. 53* and *O. flukiella*), and is supported by the following unique morphological synapomorphies: female post-abdomen distinct (86-3), female 6<sup>th</sup> segment conspicuous (88-1), female 7<sup>th</sup> tergite modified with long basal extensions (89-11(B)), female 8<sup>th</sup>

tergite modified into a triangular plate with basal crest (90-15(F)), and female 8<sup>th</sup> sternite as a pair of lateral rectangular sclerotizations with short apico-ventral extensions (91-14(E)). Furthermore, it is common for the female to have the 6<sup>th</sup> segment as a single conical sclerite (characteristic lost on *O. sp. 27* and incompletely fused on *O. sp. 04*) and the male surstylus to have ventral setulae concentrated only on its apex. The female 10<sup>th</sup> tergite is usually fused to the dorsal surface of the cerci and the cercus has only a single row of pile on its apical margin. The clade (*O. adspersus* (*O. sp. 52* + *O. ovipositorius*)) is an exception to the previous statement, since the 10<sup>th</sup> tergite is a narrow sclerotization with apico-lateral extensions that merge with the cerci, and the cerci has some pilosity medially. There are four distinct kinds of habitus in the *O. tristis* s.s. group (= *O. tristis* group minus *O. zeteki* and *O. sp. 53*): dark flies with petiolate abdomen and dark metatarsus (*adspersus* group); dark flies with petiolate abdomen and bicoloured metatarsus (*O. peruvianus* group); dark flies similar to *Fragosa* (*O. sp. 27*); and flies similar to the *H. arx* group from the genus *Hybobathus* (*O. sp. 04*).

The genus *Pelecinobaccha* Shannon (type species *Baccha peruviana* Shannon, 1927) is hereby resurrected and elevated to genus rank to accommodate the species from the *O. tristis* s.s. group (Fig. 52-55, 57, 58) (stat. rev.). *Pelecinobaccha* Shannon has four distinct groups that are treated as separate subgenera below. The genus *Atylobaccha* Hull, 1949 (type species *Baccha flukiella* Curran, 1941) is resurrected since *A. flukiella* (Fig. 6) was always recovered as the sister taxon to *Pelecinobaccha*, and never intermixed with *O. zeteki* and *O. sp. 53*. The genus *Relictanum* gen.nov. (Fig. 56) is erected to hold the species related to the clade (*O. sp. 53* + *O. zeteki*).

**Key to the genera, subgenera and species groups of the former genus  
*Ocyptamus* (= *Ocyptamus* s.l.)**

1. Wing almost completely bare (Figs. 73a-b) ..... *Pseudoscaeva* Vockeroth
- Wing mostly microtrichose ..... 2
2. Abdomen oval, mainly orange and without a distinct pattern of markings (Fig. 80); 2<sup>nd</sup> abdominal tergite with baso-lateral hyaline areas; metafemur pale and with long, thick, orange pile (Fig. 81) ..... *M. sargoides* (Macquart, 1850)
- Abdomen variable; 2<sup>nd</sup> abdominal segment without hyaline areas; if metafemur pale and with long, thick pile, then pile black and abdominal tergites with 4 pale vittae ..... 3
3. Anterior anepisternum bare; vein M1 usually straight (Fig. 72) ..... some *Nuntianus* gen.nov.
- Anterior anepisternum with a pilose patch; vein M1 usually sinuous ..... 4
4. Pedicel with narrow projection over basoflagellomere (Fig. 33); basoflagellomere sub-triangular, usually large on female; scutum with distinct anterior row of longer pile; abdomen parallel-sided to slightly oval ..... *Ocyptamus* Macquart
- Pedicel margin rounded, without an extension over basoflagellomere; basoflagellomere oval to rounded; scutum usually without an anterior row of longer pile; abdomen variable ..... 5
5. Eye sometimes pilose (Figs. 2 and 9); wing mostly dark but with hyaline areas on baso-medial cells (Fig. 71); abdomen spatulate (Fig. 17) ..... *Styxia* Hull

- Eye never pilose; wing never dark with hyaline areas on baso-medial cells; abdomen variable..... 6
  
- 6. Metasternum usually pilose; face more than a 1/3 of the head's width; male phallus with long spines apically OR postgonite bifurcate OR postgonite tooth-like (Fig. 41); flies with oval, parallel-sided or slightly petiolate abdomens; some species similar to the genus *Syrphus* (Fig. 13)..... *Orphnabaccha* Hull
  
- Metasternum never pilose; face usually around a 1/3 or less of head's width; male genitalia never with long spines on phallus, and never with a bifurcate or tooth-like postgonite; abdomen variable, never similar to *Syrphus*..... 7
  
- 7. Abdominal tergites with yellow 'L' shaped markings (Fig. 60); male genitalia usually enlarged ..... *Maiana* gen.nov.
  
- Abdominal tergites differently marked; male genitalia variable ..... 8
  
- 8. Face gently convex; facial tubercle weak (Fig. 6); metepisternum bare ... *Atylobaccha* Hull (*A. flukiella* (Curran, 1941))
  
- Face with distinct medial tubercle; metepisternum bare or pilose ..... 9
  
- 9. Metepisternum bare; abdomen with 'V' shaped yellow maculae (Fig. 20) that may be separated into pair of oblique vittae ..... *Pipunculosyrphus* Hull
  
- Metepisternum usually pilose; if metepisternum bare, abdomen differently marked ...  
..... 10

10. Antennal segments of similar length (Fig. 63) ..... *Mimocalla conjuncta*  
(Wiedemann, 1830)
- Basoflagellomere longer than scape and pedicel separately; scape and pedicel never distinctly elongated..... 11
11. Vein R4+5 and M1 distinctly sinuous (Fig. 68, 69) ..... 12
- Vein R4+5 slightly sinuous to straight, M1 not so sinuous (Fig. 70, 71) ..... 13
12. Postmetacoxal bridge almost complete, metathoracic epimera narrowly separated (Fig. 32); metafemur with ventral spines ..... *Eosalpingogaster* Hull
- Postmetacoxal bridge incomplete, metathoracic epimera widely separated; metafemur with thickened pile ventrally (Fig. 29) ..... *Mimocalla* Hull
13. Ocellar triangle dull black-pollinose and surrounded by dense white pollen (Fig. 11); dorsal occiput with a single row of pile ..... 14 (*Hybobathus* Enderlein)
- Ocellar triangle never contrasted as above, either entirely white-pollinose (Fig. 12) or with sparse pollinosity (Fig.10); dorsal occiput pilosity variable..... 15
14. Scutum covered by dense pale pollen, with sub-shining vittae (Fig. 21, 22); medium-sized flies (7-10mm) ..... *Hybobathus* Enderlein
- Scutum black with three golden pollinose vittae that merge posteriorly into a semi-circle pollinose area anterior to scutellum (Fig. 23); large flies (~15mm) ..... *Hybobathus* Enderlein - *H. arx* group

15. Alula linear; abdomen elongated and parallel-sided with sub-basal yellow fasciae (Fig. 19)..... *Hermesomyia* Vockeroth
- Alula variable; abdomen never elongated and parallel-sided with sub-basal yellow fasciae..... 16
16. Orange flies with narrow abdomen (Fig. 30); male with pair of long apical extensions laterally on 4<sup>th</sup> sternite ..... *Victoriana* gen.nov. - *V. parvicornis* group
- If the abdomen is narrow, than the overall body colour is dark brown to black, never orange; male never with such extensions on 4<sup>th</sup> sternite..... 17
17. Abdomen parallel-sided, narrow (but not delicate) and elongated (Fig. 59, 67); 3<sup>rd</sup> abdominal tergite with subbasal pair of quadrangular/triangular maculae that sometimes forms a complete fascia ..... 18
- Abdomen usually petiolate (Fig. 14, 15) or very narrow and very long (delicate, Fig. 16, 64), if parallel-sided, narrow and elongated, then 3<sup>rd</sup> abdominal tergite never with pair of subbasal quadrangular/triangular maculae ..... 19
18. Facial tubercle positioned on ventral ½; wing with small, central, dark, triangular macula (Fig. 67); alula present..... *Hypocritanus* gen.nov.
- Facial tubercle positioned on dorsal ½ (Fig. 3); wing either entirely hyaline or light brown; alula absent ..... *Victoriana* gen.nov. - *V. melanorrhina* group



19. Scutum shining black with 3 narrow white pollinose vittae, medial vitta longer (Fig. 27); wing hyaline with apical dark spot; vein M1 straight (Fig. 31); abdominal tergites black with 5 narrow pale vittae ..... *Calostigma* Shannon

- Scutum usually dull, if shining black, then either with 3 long white pollinose vittae (Fig. 24) or no distinct pattern (Fig. 25); wing never mostly hyaline with dark apical spot; vein M1 sinuous, if straight then abdominal tergites mostly pale with ~3 apical dark vittae (Fig. 61); abdominal tergites never with 5 pale vittae ..... 20

20. Scutum yellow laterally (Fig. 61); scutellum usually yellow, rarely mostly dark; wing usually light yellow; abdomen either parallel-sided, petiolate or spatulate (as in Fig. 17), never narrow and delicate; subepandrial sclerite extended beyond base of surstyli as pair of lobes (Fig. 39); if subepandrial sclerite not extended beyond base of surstyli, then M1 straight (Fig. 72) ..... *Nuntianus* gen.nov.

- Scutum and scutellum usually entirely black, if scutum yellow laterally or scutellum mostly yellow, then either scutum with distinct pattern of golden pollinose vittae on a black background (as in Fig. 24) and with central pair of pale ovalate vittae on abdominal tergites, or abdomen very narrow and delicate (Fig. 16, 64); wings hyaline or mostly dark brown; abdomen either petiolate (Figs. 56-58) or very narrow, long and delicate (Figs. 16 and 64)..... 21

21. Face mostly yellow, sometimes with dark macula dorsal to tubercle (Fig. 10); alula absent (as in Fig. 70), abdomen very narrow and delicate through all its extent (Figs. 16 and 64); male surstylus quadrangular and either with extended apex or apical filiform projection (Fig. 37); female 7<sup>th</sup> tergite without apodemes..... 22 (*Fragosa* gen.nov.)

- Face mostly dark (Fig. 6), rarely mostly yellow; alula usually present, sometimes reduced to less than the c cell width; abdomen usually petiolate; if alula absent and abdomen very narrow and delicate, then face mostly dark, male surstylus sub-triangular, and female 7<sup>th</sup> tergite with long baso-lateral apodemes ..... 23

22. Face dark above tubercle; tubercle medially positioned and pointed (Fig. 4); frons/frontal triangle rugose (Fig. 10); scutum dull; scutellum pale (Fig. 25) ..... *Fragosa* gen.nov. - *F. stenogaster* group

- Face entirely pale; tubercle more ventrally positioned and rounded; frons/frontal triangle smooth; scutum shining black.; scutellum mostly black (Fig. 26) *Fragosa* gen.nov. - *F. titania* group

23. Scutum with 3 golden pollinose vittae on a black background (middle vitta usually complete and narrow, others tapered and incomplete, not reaching the scutellum) and usually pale laterally (Fig. 78); female 6<sup>th</sup> segment fused only on apical 1/3 ..... *Pelecinobaccha* (*Pseudoaulacibaccha*) subgen.nov.

- Scutum without distinct patterns of pollinosity and entirely dark; female 6<sup>th</sup> segment divided into tergite and sternite or as a single conical sclerite ..... 24

24. Dorsal occiput with two or more rows of pile, anterior row sometimes short but still distinct (arrow on Fig. 74); female 6<sup>th</sup> segment normally modified into a single conical sclerite with no distinction between tergite and sternite (Figs. 76 and 77); if the female 6<sup>th</sup> segment is divided into tergite and sternite, then the dorsal occiput has two rows of pile..... *Pelecinobaccha* Shannon

- Dorsal occiput with a single row of pile (arrow on Fig. 75); female 6<sup>th</sup> segment divided into tergite and sternite.....25

25. Facial tubercle very weak, face gently convex (Fig. 6); female cercus without setulae; male surstylus sub-triangular ..... *Atylobaccha* Hull

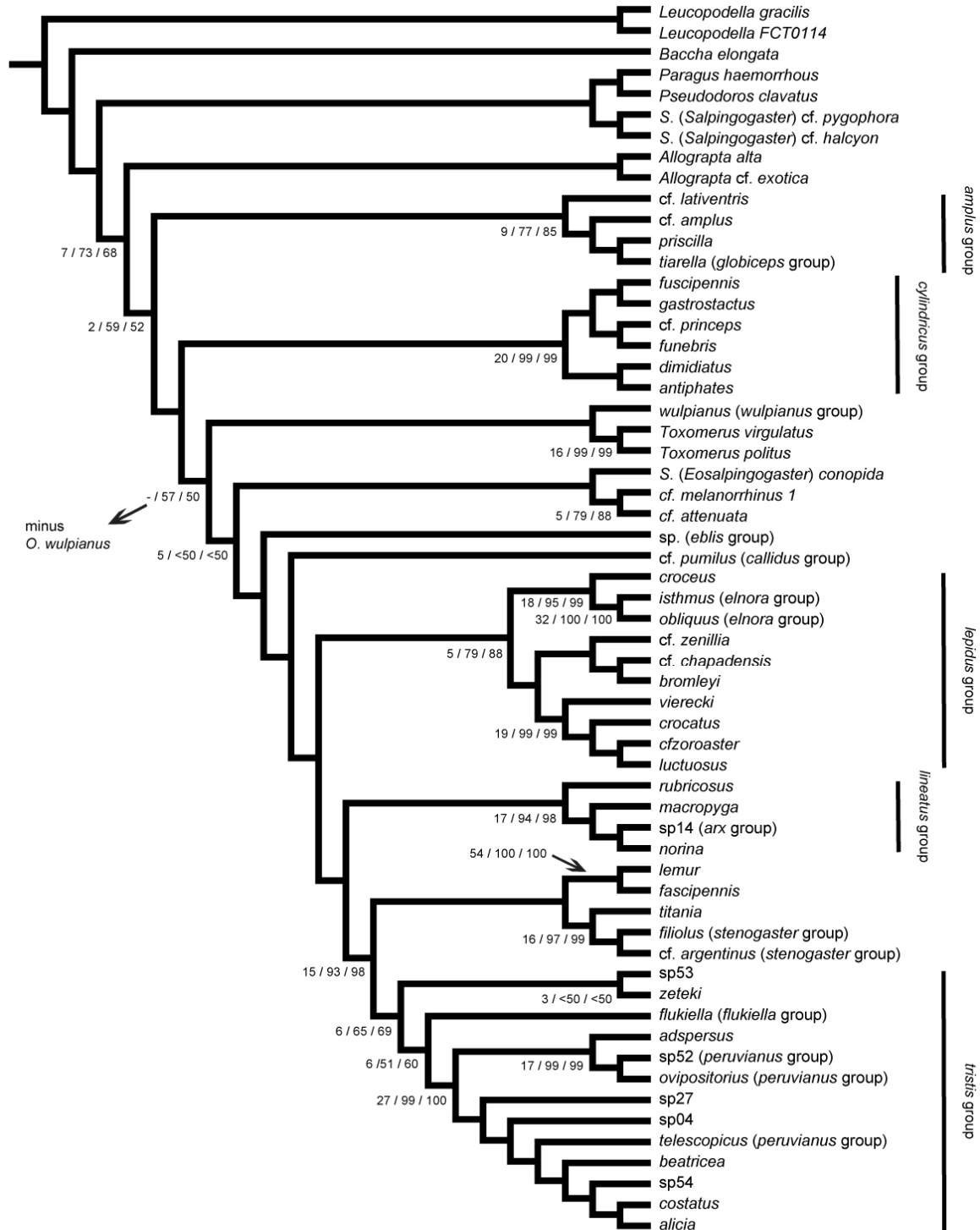
- Facial tubercle distinct; female cercus with setulae dorsally (as in Fig. 50); male surstylus quadrangular with extended apical corner ..... *Relictanum* gen.nov.

### Final considerations

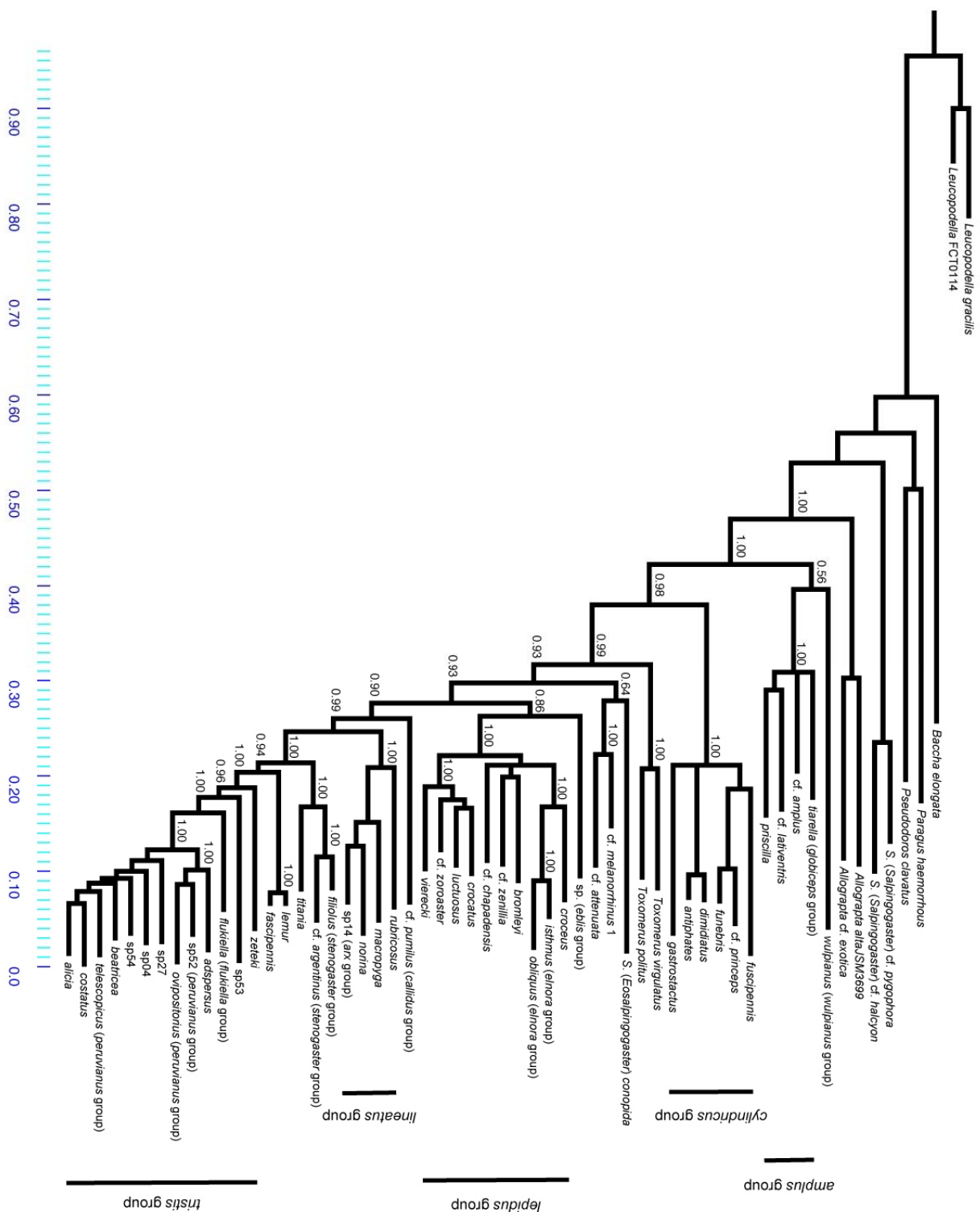
The genera *Fragosa*, *Hypocritanus*, *Pelecinobaccha*, *Atylobaccha* and *Relictanum* form a monophyletic group with high support from the combined molecular analysis (Cladogram 1) and some support from the total evidence analysis (Cladogram 4). The monophyly of the group is supported by a unique morphological synapomorphy which is the dorsally sclerotized female cercus (94-5). It is still not completely clear if *Hypocritanus* is the sister group to *Fragosa* or to the clade (*Relictanum* (*Atylobaccha* (*Pelecinobaccha*))). The surstylus shape of the *F. stenogaster* group seems like a highly modified form of the quadrangular surstylus with extended apical corner (shared by the genera *Hypocritanus* and *Relictanum* and the *F. titania* group). The filiform extension on the surstylus found on the *F. stenogaster* group seems like the result of further extension, and loss of setulae, of the extended apical corner. Further possible evidence of close relationship is the postgonite shape (gently curved towards an acute dorso-apical extremity) shared by the *F. stenogaster* group, *Hypocritanus* and *O. zeteki*. The ancestral taxon of this grouping was probably similar to *Hypocritanus*, with the abdomen taking a more slender shape in *Fragosa* and becoming more petiolate in the

(*Relictanum* (*Atylobaccha* + *Peleciniobaccha*)) clade. The ancestral larvae probably fed on Pseudococcidae with a shift occurring to Coccidae in the (*Relictanum* (*Atylobaccha* + *Peleciniobaccha*)) clade. The range of prey families (although it seems restricted to the superfamily Coccoidea) that these genera attack might be greater than what is apparent, since most of the prey records come only from observation of introduced pests in agricultural crops.

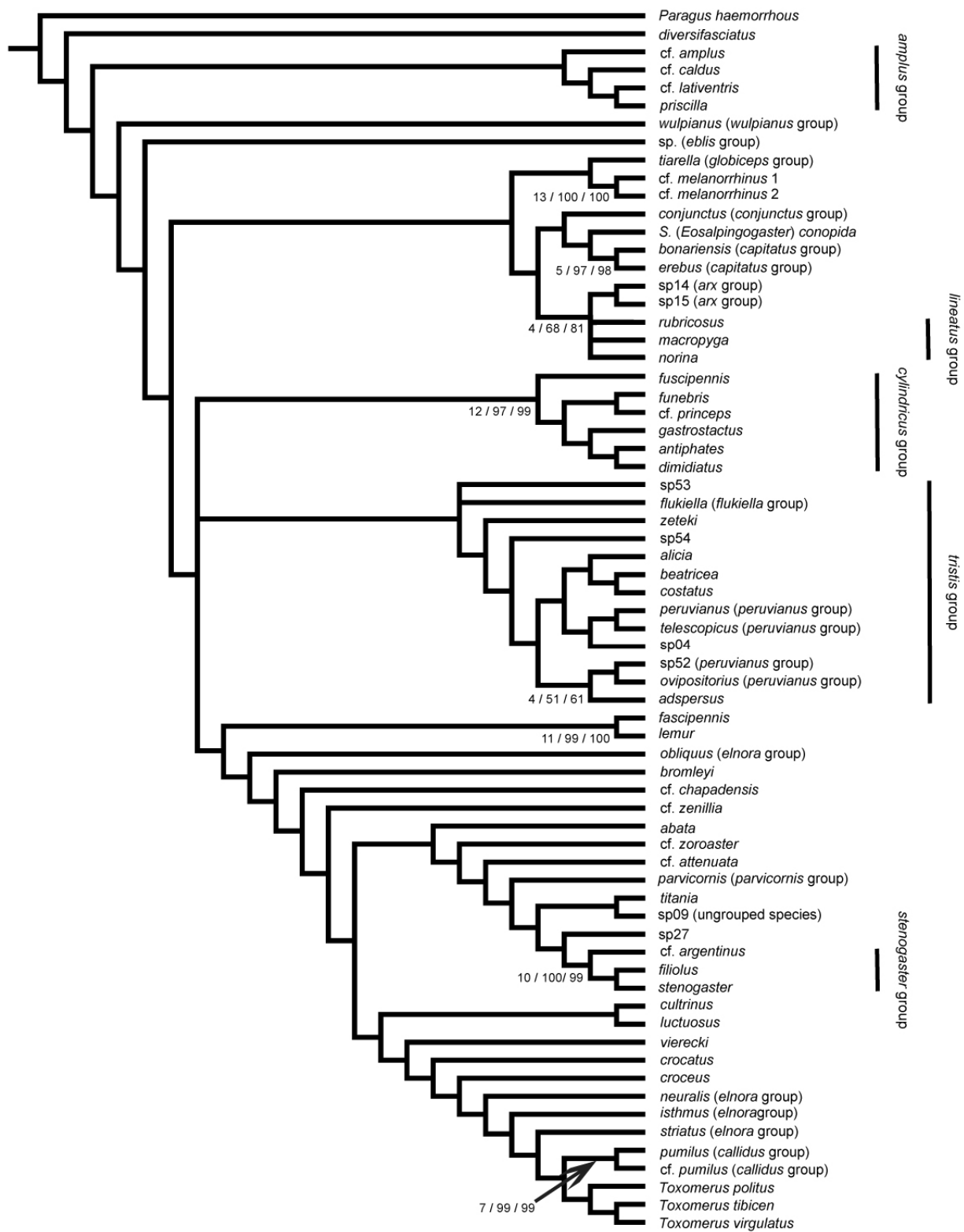
## Cladograms



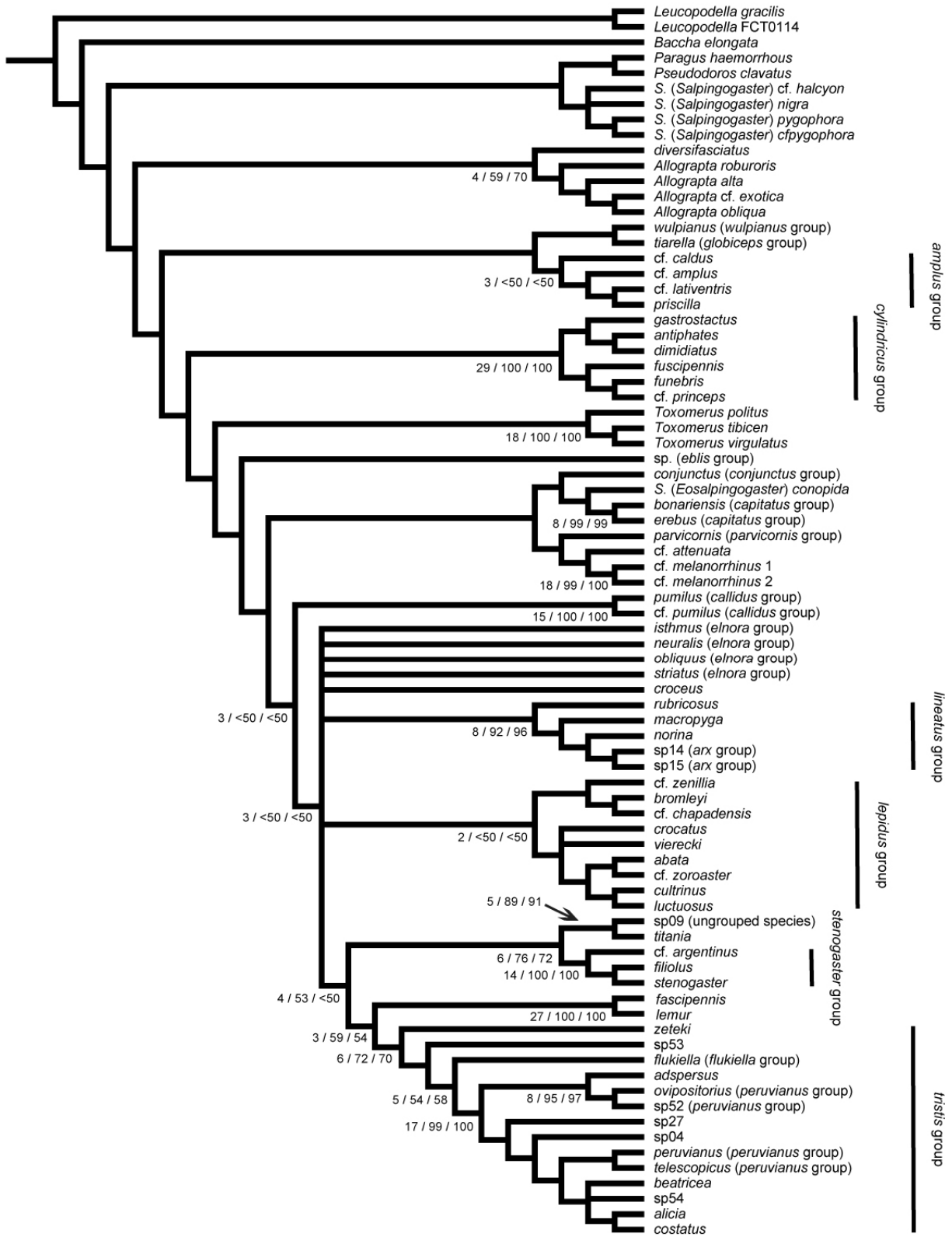
Cladogram 1. Combined molecular analysis most parsimonious tree. Numbers below a node are Bremer / Bootstrap / Jackknife support.



Cladogram 2. Bayesian analysis tree with relative branch length. Numbers before or above a clade are posterior probability values.

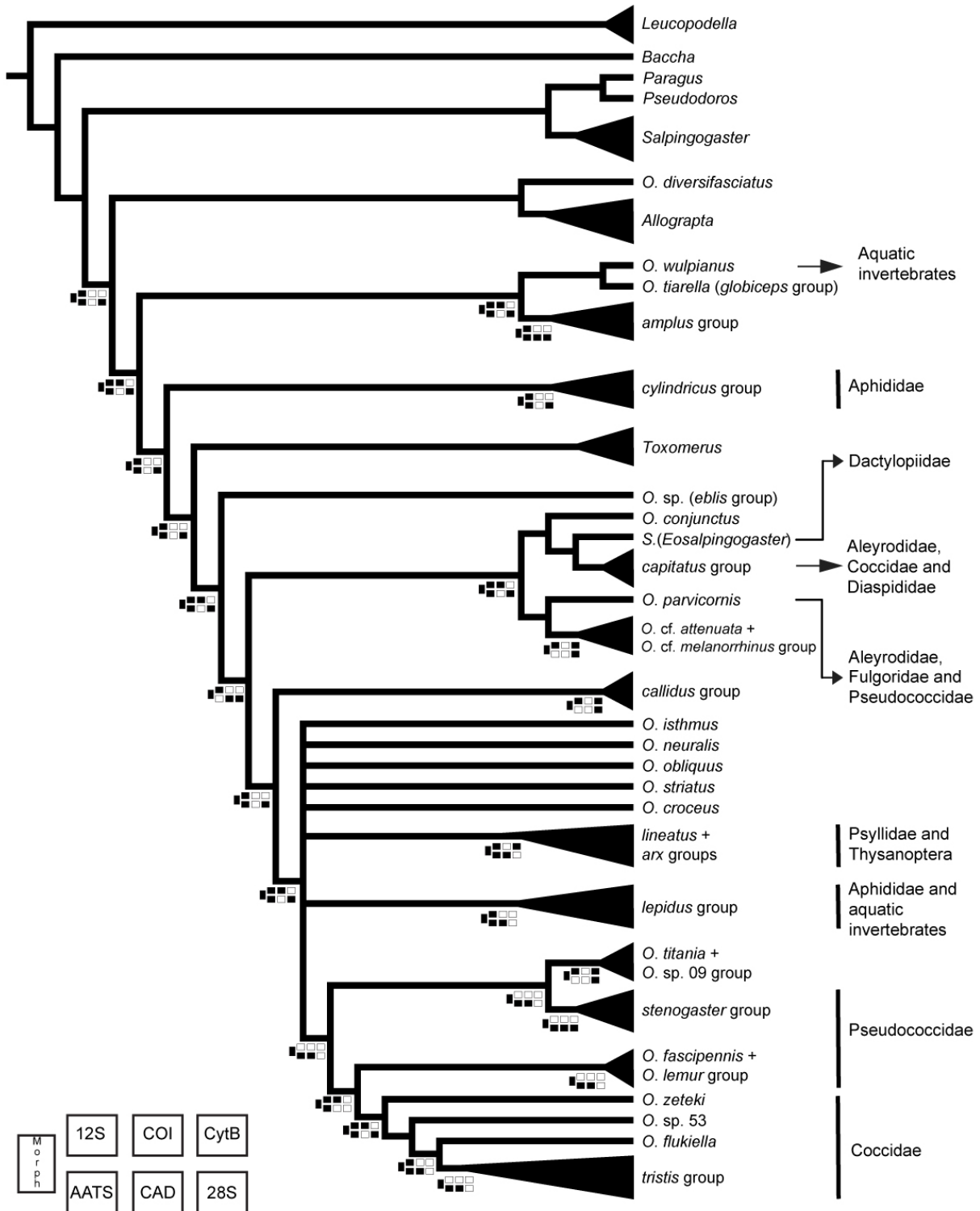


Cladogram 3. Morphological analysis strict consensus tree. Numbers below a clade are Bremer / Bootstrap / Jackknife supports.

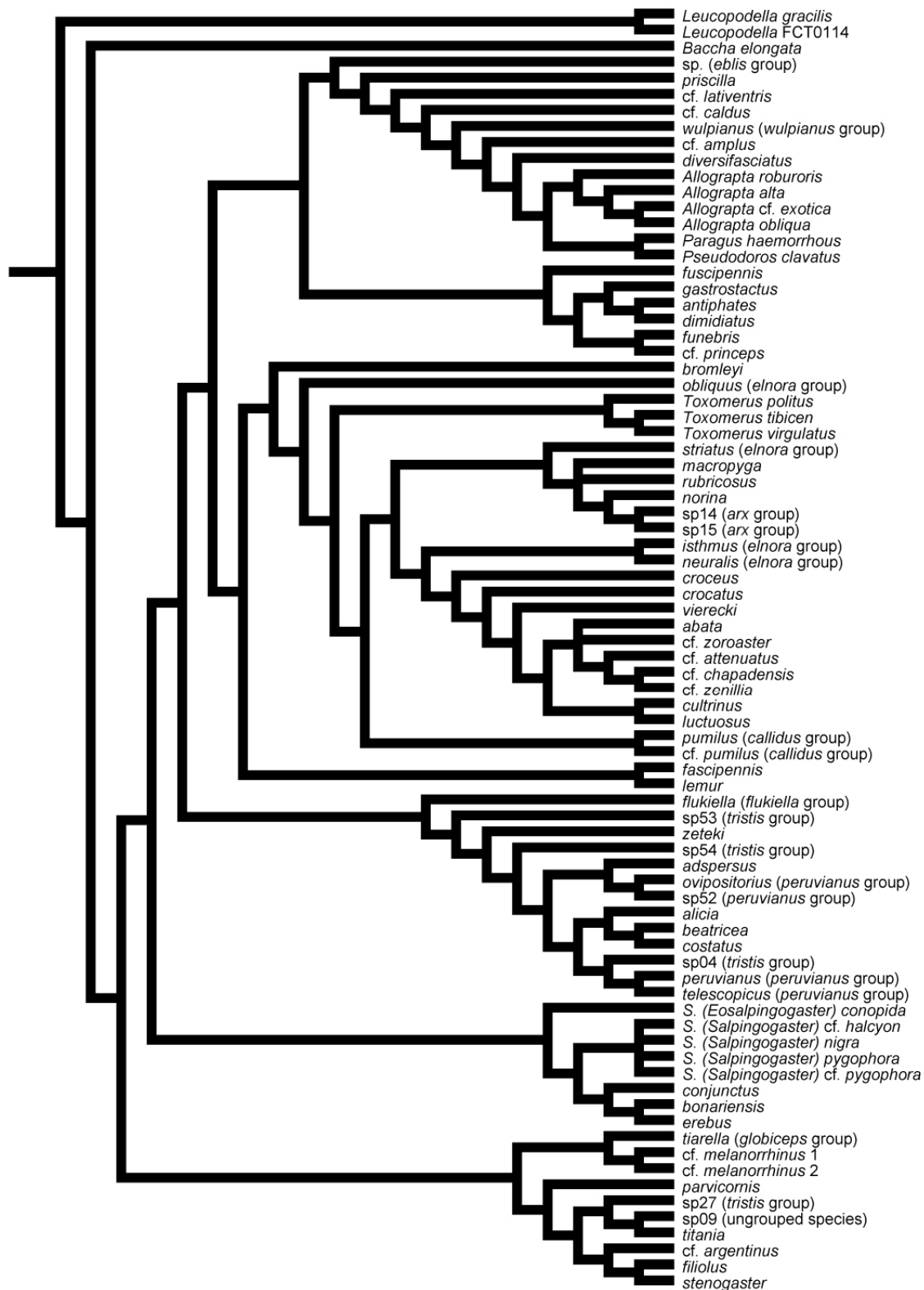


Cladogram 4. Total evidence analysis strict consensus tree. Numbers below a clade are Bremer / Bootstrap / Jackknife supports.

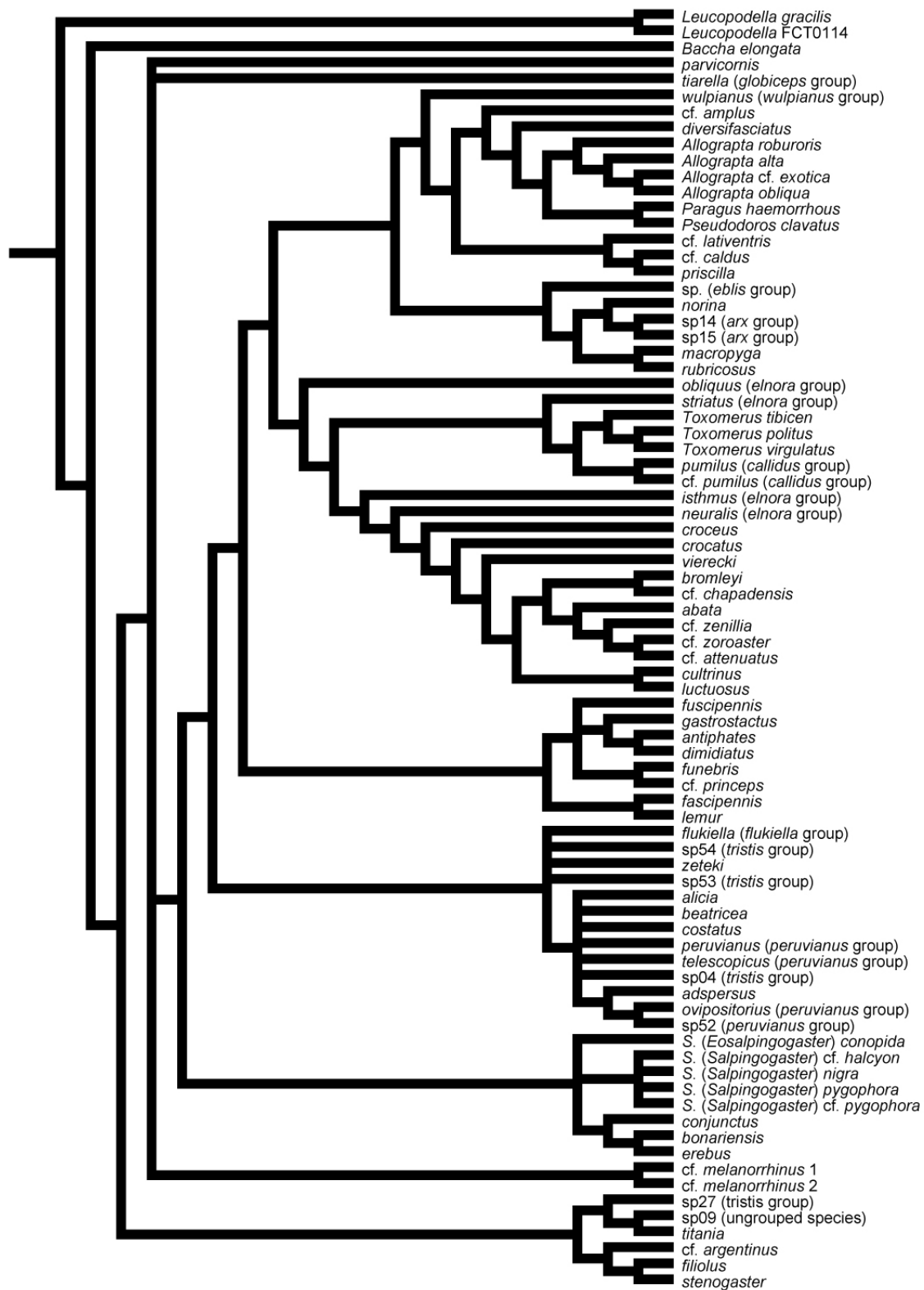




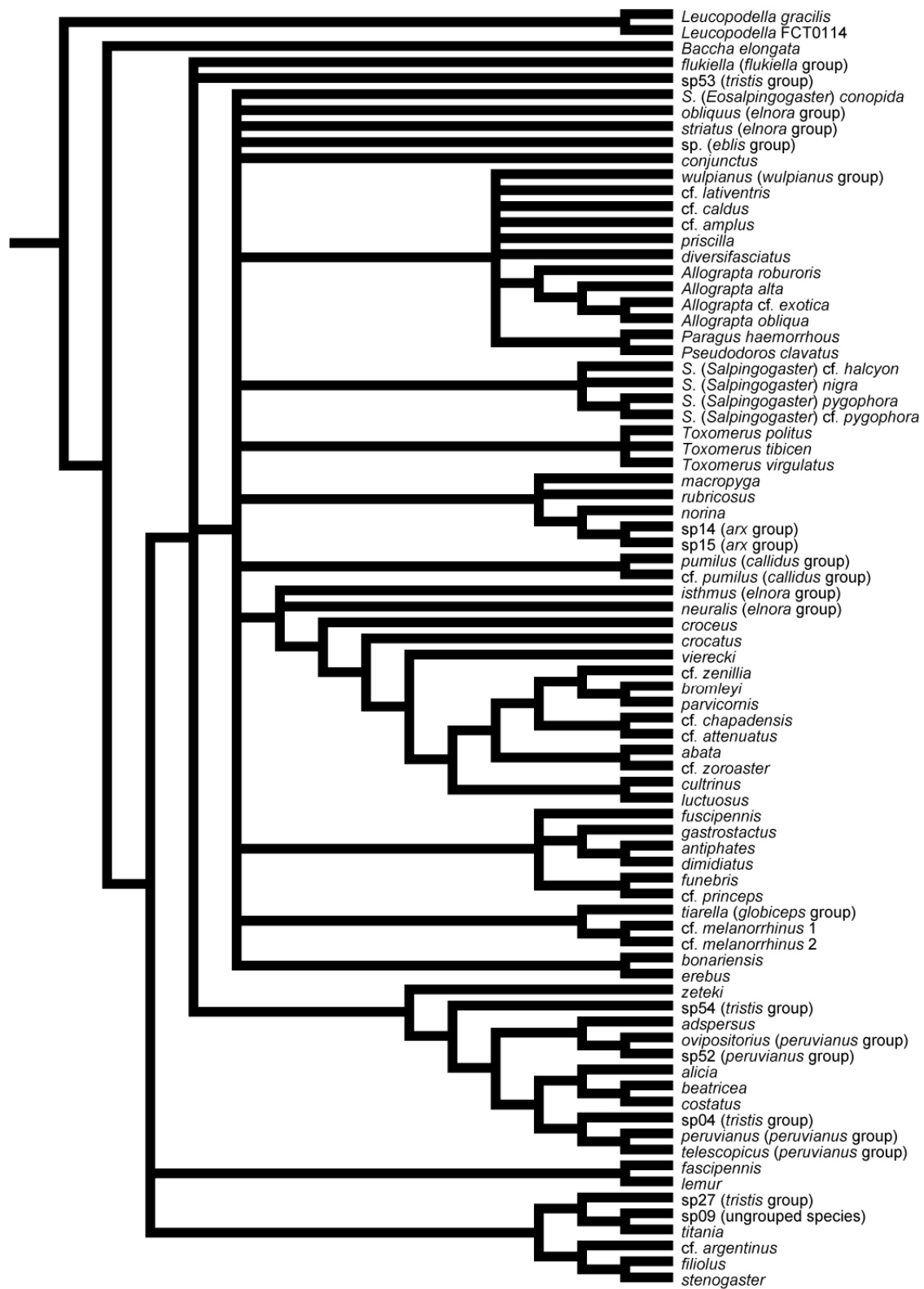
Cladogram 5. Total evidence analysis strict consensus tree. Filled boxes below a clade are partitions with positive partitioned Bremer supports. Bars to the right indicate larval prey.



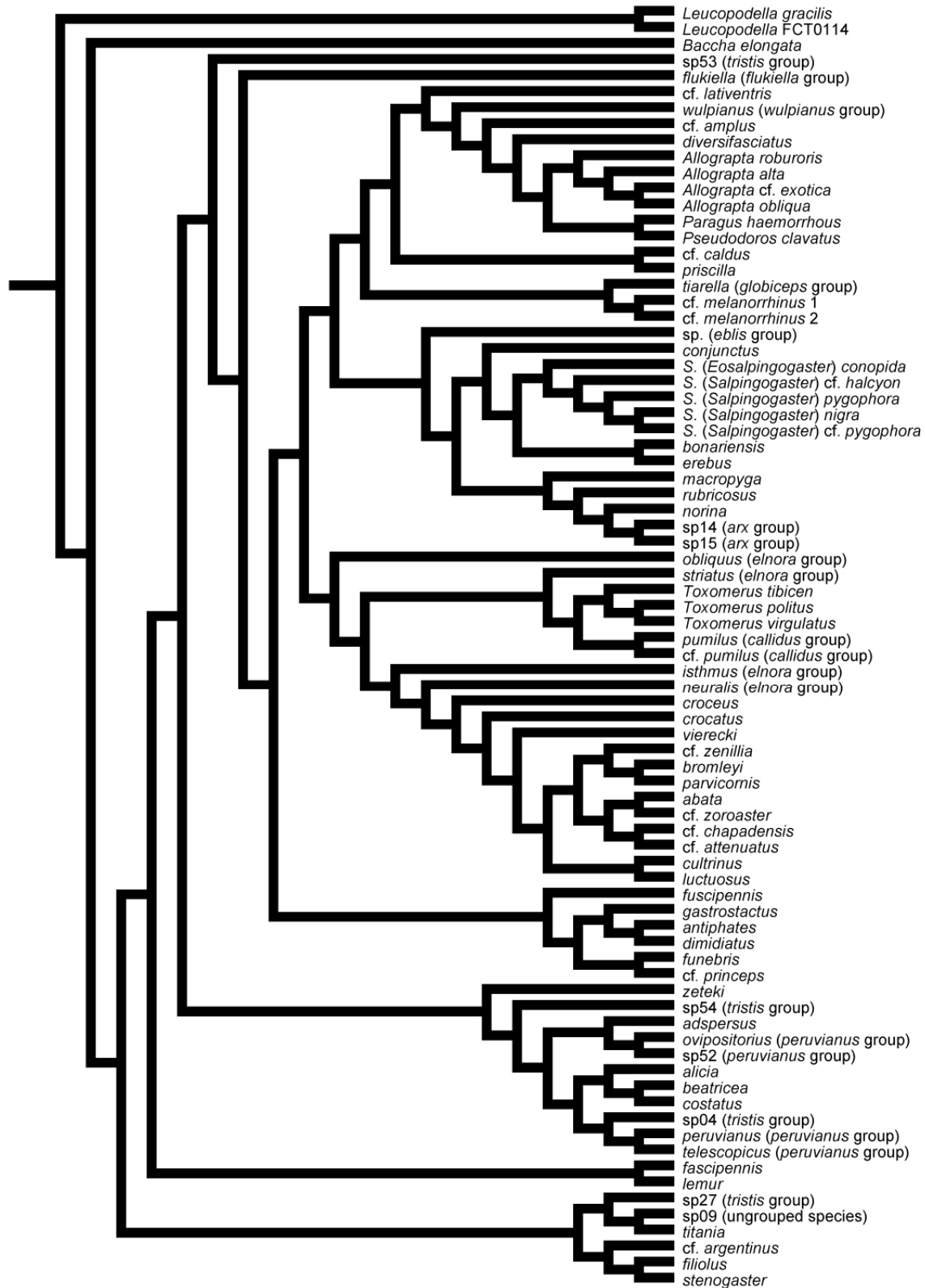
Cladograms 6. Strict consensus cladogram based on 8 most parsimonious cladograms using all morphological characters.



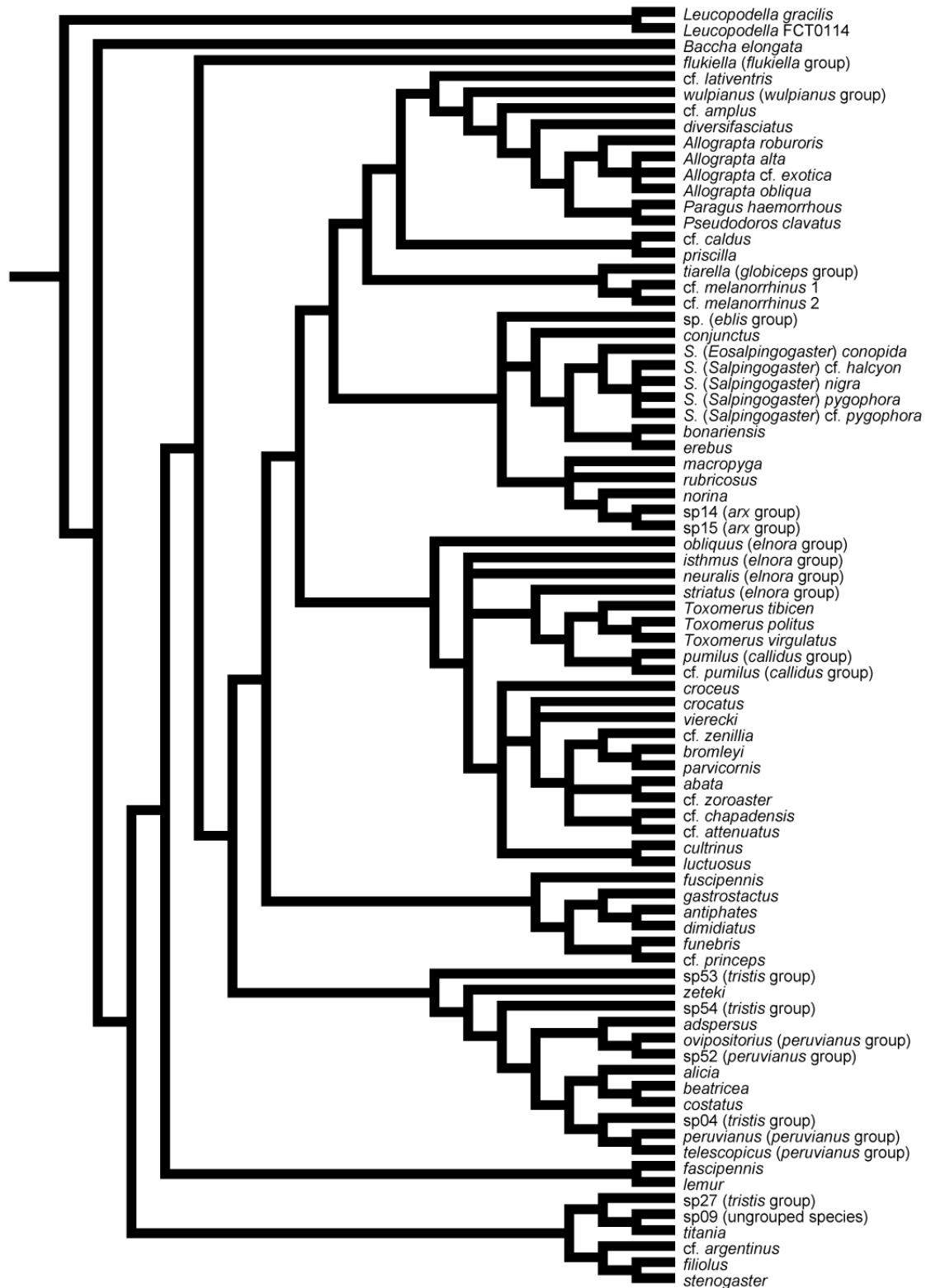
Cladogram 7. Strict consensus cladogram based on 22 most parsimonious cladograms with colour characters (3-21) removed from the analysis.



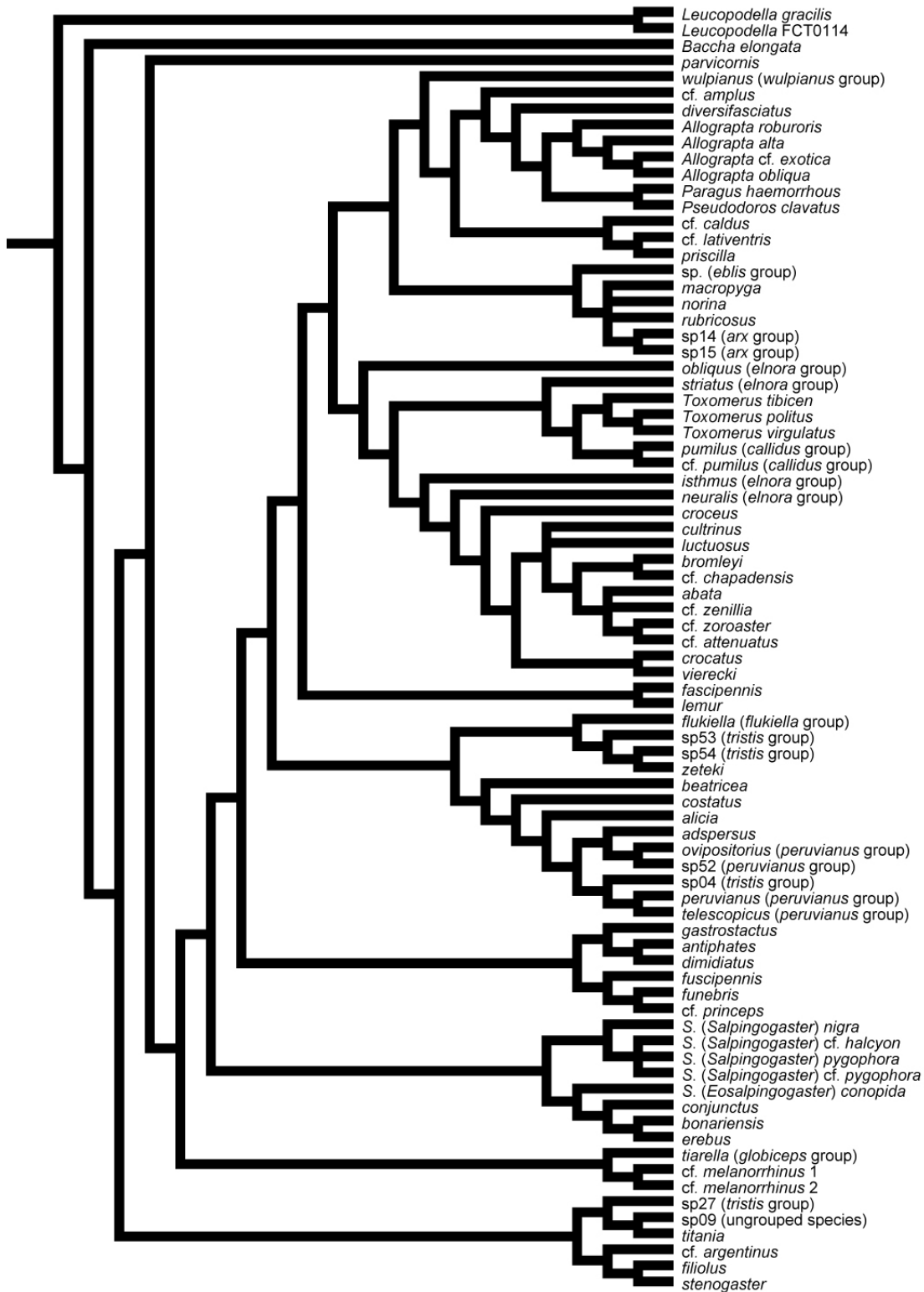
Cladogram 8. Strict consensus cladogram based on 46 most parsimonious cladograms with pile characters (22-41) removed from the analysis.



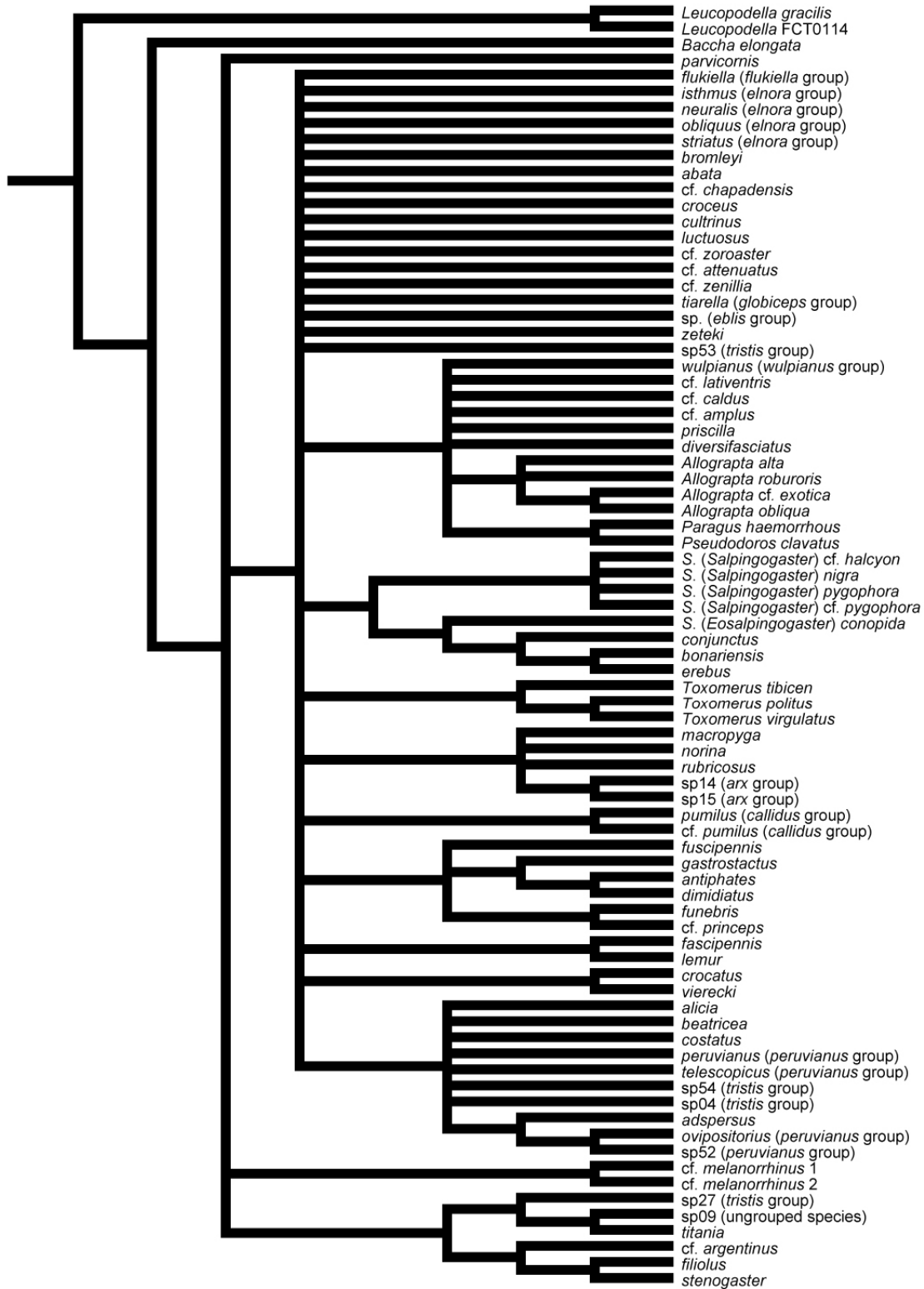
Cladogram 9. Strict consensus cladogram based on 8 most parsimonious cladograms with colour and pile characters (3-41) removed from the analysis.



Cladogram 10. Strict consensus cladogram based on 81 most parsimonious cladograms with colour, pile and head proportion characters (0-41) removed from the analysis.

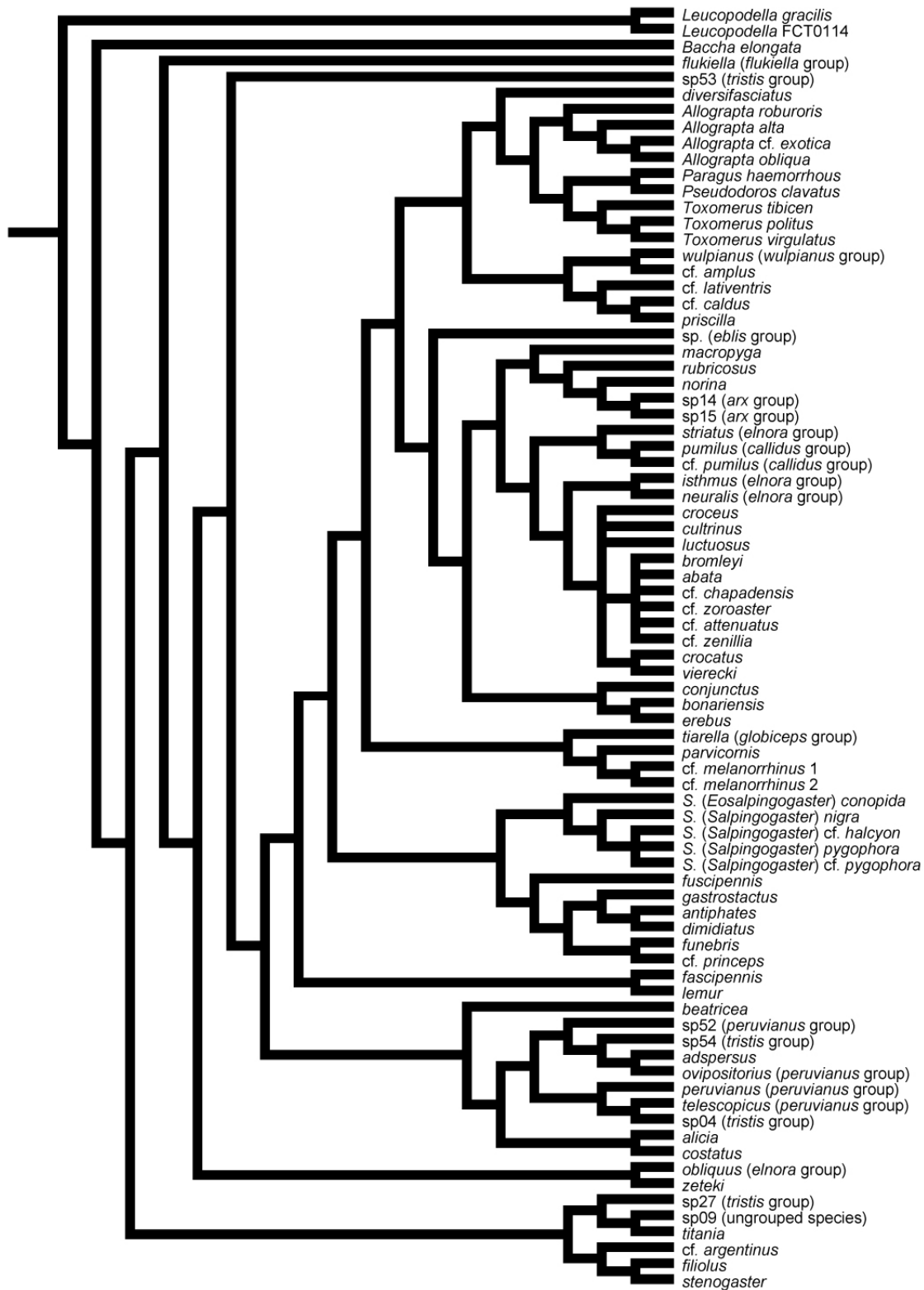


Cladogram 11. Strict consensus cladogram based on 8 most parsimonious cladograms with selected characters (0, 1, 3-5, 7-15, 17, 22, 23, 25-26, 41) removed from the analysis.

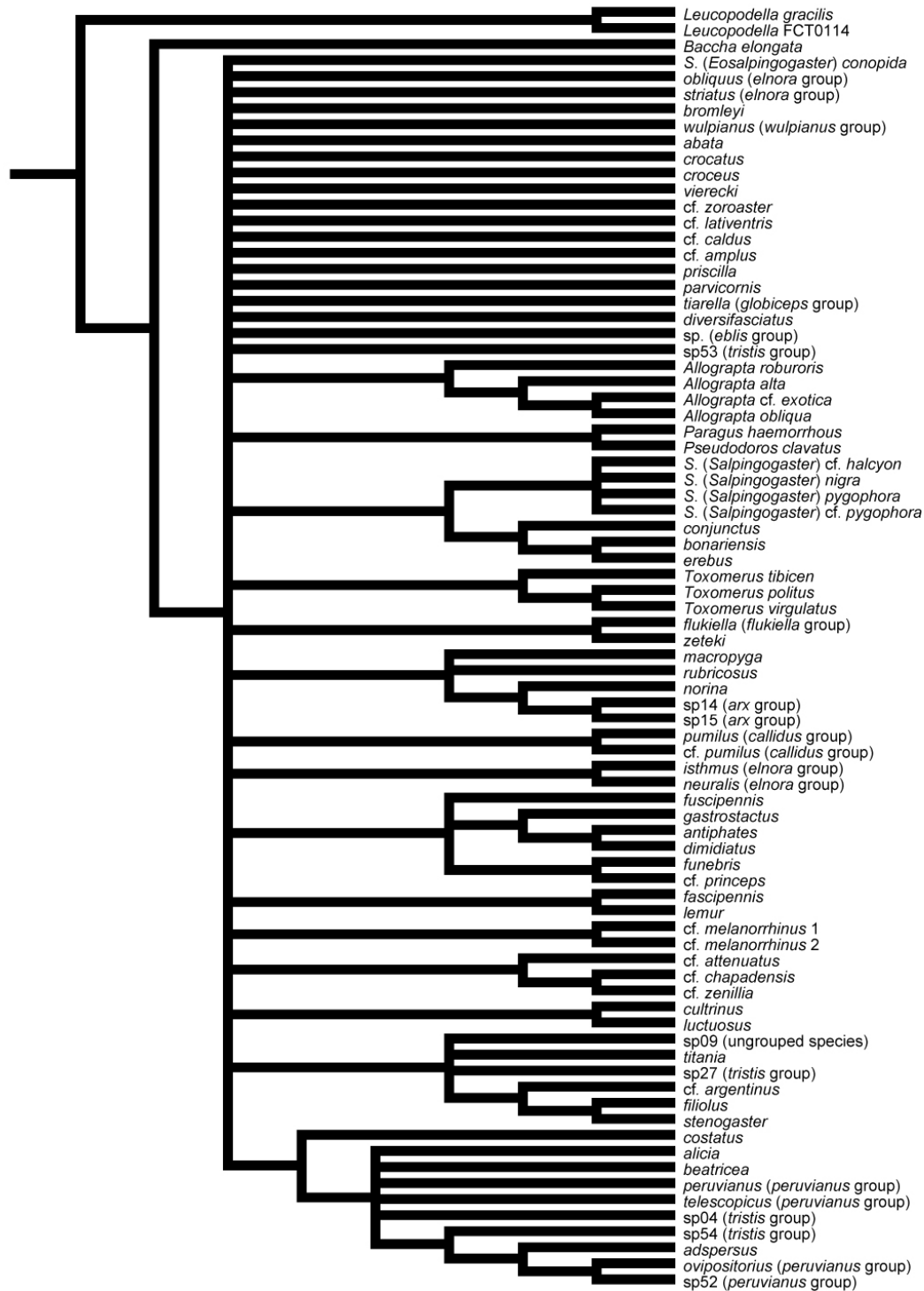


Cladogram 12. Strict consensus cladogram based on 510 most parsimonious cladograms with selected characters (0, 1, 3-5, 7-15, 17, 22, 23, 25-26, 41, 43, 53, 55-57, 67, 72, 78, 84) removed from the analysis.





Cladogram 13. Strict consensus cladogram based on 8 most parsimonious cladograms with selected characters (0-41, 43, 53, 55-57, 67, 72, 78, 84) removed from the analysis.



Cladogram 14. Strict consensus cladogram based on 80 most parsimonious cladograms with selected characters (0-5, 8-15, 17, 19, 23-26, 28, 30-32, 37-41, 48, 51, 54-56, 58, 69, 72-74, 77, 78, 81, 84, 85, 88, 97, 102, 103) removed from the analysis.

## Tables

Gene location	Gene	Orientation	Primer name	Sequence 5' -> 3'
Mitochondrial	12S	Forward	12S <sub>Bi</sub>	AAGAGCGACGGGCGATGTGT
		Reverse	12S <sub>ai</sub>	AAACTAGGATTAGATACCCTATTAT
	COI	Forward	COI-Dipt-2411F LCO1490 C1-J-2183 LEPF1	GCHACWATAATTATTGCHGTNCC GGTCAACAAATCATAAAGATATTGG CAACATTTATTTTGATTTTTTGG ATTCAACCAATCATAAAGATATTGG
		Reverse	HCO2198 LEPR1 C1-N-2191 TL2-N-3014	TAACTTCAGGGTGACCAAAAAATCA TAACTTCTGGATGTCCAAAAATCA CCCGGTAAATTAATAATAAACTTC TCCATTGCACTAATCTGCCATATTA
	CytB	Forward	CytB-Dipt-11035F CB-J-10933	GGNTTYKCNGTNGAYAAYGC GTTTTACCTTGAGGACAAATATC
		Reverse	593R TS1-N-11683	ACDGGDCGDGCYCCRATTCA AAATTCTATCTTATGTTTTCAAAAC
Nuclear	28S	Forward	rc28AB F-2	ACTACCCCTGAATTTAAGCA GGATTTTYYTKAGTAGCGGCG
		Reverse	28C	GCTATCCTGAGGGAACTTCGG
	AATS	Forward	1F40 AATS-Dipt-562F 2F AATS-Dipt-631F	GNATGAAYCARTTYAARCCNAT CGNGCHGGHGGHAARCAYAAAYGA TAYCAYCAYACNTTYTTYGARATG ATGYTNNGGHAMYTGGTCNTTYGG
		Reverse	1R244 AATS-Dipt-840R 492R	CATNCCRCARTCNATRTGYTT GGNCCNVITYTCNCCCATYTCCC CGATTRWAYTGWRTRAANACHARRTTCC
	CAD	Forward	CAD-Dipt-757F 581F2 787F CAD-Dipt-1326F 1753F CAD-Dipt-1911F CAD-Dipt-2344F	AGYAAAYGGNCCNGGHGAYCC GGWGGWCAAACWGCWYTMAAYTGYGG GGDGTNACNGCNTGYTTYGARCC GGNTCNCARGCNATHAARGC GGNGGNYTNGGNTCNGGNTTYGC TGYATHACNGTNTGYAAYATGG
		Reverse	843R 1098R 1753R 2059R 2341R 3187R	GGHAGYTCNATGAARAGYGTNGG GCYTTYTGRAANGCYTCYCRAA TTNGGNAGYTGNCNCCCAT GCRAANCCNGANCCNARNCCNCC GCRTAYTGDATRTTRCAYTCDCC CCNACRCTYTTTCATNGARCTDCC GCRCTRCDATNGAYTCNGG

**Table 1.** List of oligonucleotides (primers).

<i>Ocyptamus</i> species group name	Hull 1949	Vockeroth 1969	Thompson 1981 <i>Ocyptamus</i> group	Current placement
Group <b>amplus</b>	<i>Orphnabaccha</i>	<i>Orphnabaccha</i>	species group <i>caldus</i>	<i>Orphnabaccha</i>
Group <b>arx</b>	<i>Baccha</i> ( <i>Aulacibaccha</i> )	not treated	not treated	<i>Hybobathus</i> ; <i>Hybobathus</i> <i>arx</i> species group
Group <b>callidus</b>	<i>Baccha</i> , species group <i>lepidus</i> , in part	not treated	not treated	<i>Maiana</i>
Group <b>capitatus</b>	<i>Baccha</i> ( <i>Mimocalla</i> )	not treated	species group <i>capitatus</i>	<i>Mimocalla</i>
Group <b>conjunctus</b>	<i>Therantha</i>	not treated	not treated	<i>Mimocalla</i> ; <i>Mimocalla</i> <i>conjunctus</i> species group
Group <b>cylindricus</b>	<i>Baccha</i> ( <i>Ocyptamus</i> ), species group <i>funnebris</i>	not treated	species group <i>cylindricus</i>	<i>Ocyptamus</i>
Group <b>diversifasciatus</b>	not treated	<i>Pseudoscaeva</i>	not treated	<i>Pseudoscaeva</i>
Group <b>ebilis</b>	<i>Styxia</i>	not treated	not treated	<i>Styxia</i>
Group <b>elnora</b>	<i>Calostigma</i>	not treated	species group <i>elnora</i>	Part in <i>Calostigma</i> , part in <i>Nuntianus</i>
Group <b>flukiella</b>	<i>Leucopodella</i> ( <i>Atylobaccha</i> )	not treated	not treated	<i>Atylobaccha</i>
Group <b>globiceps</b>	<i>Baccha</i> ( <i>Pipunculosyrphus</i> )	not treated	not treated	<i>Pipunculosyrphus</i>
Group <b>lepidus</b>	<i>Baccha</i> , species group <i>lepidus</i>	not treated	species group <i>lepidus</i>	<i>Nuntianus</i>
Group <b>lineatus</b>	<i>Baccha</i> , species group <i>lineatus</i>	not treated	species group <i>lineatus</i>	<i>Hybobathus</i>
Group <b>parvicornis</b>	<i>Baccha</i> , species group <i>victoria</i>	not treated	species group <i>parvicornis</i>	<i>Victoriana</i> ; <i>Victoriana</i> <i>parvicornis</i> species group
Group <b>peruvianus</b>	<i>Pelecinobaccha</i>	not treated	not treated	<i>Pelecinobaccha</i>
Group <b>stenogaster</b>	<i>Baccha</i> , species group <i>obscuricornis</i> and <i>victoria</i>	not treated	species group <i>stenogaster</i>	<i>Fragosa</i>
Group <b>tristis</b>	<i>Baccha</i> , species group <i>tristis</i>	not treated	not treated	Part in <i>Pelecinobaccha</i> , part in <i>Relictanum</i>
Group <b>wulpianus</b>	<i>Baccha</i> , species group <i>pirata</i>	<i>Hermesomyia</i>	not treated	<i>Hermesomyia</i>

**Table 2.** *Ocyptamus* species groups.

Outgroup	Species	Gene sequences
Subfamily <b>Syrphinae</b>	<i>Baccha elongata</i> (Fabricius, 1775)	all, except only fragment of CAD
Tribe Bacchini	<i>Leucopodella gracilis</i> (Williston, 1891)	all
	<i>L. sp. FCT0114</i>	all
Subfamily <b>Syrphinae</b>	<i>Allograpta alta</i> Curran, 1936	all
Tribe Syrphini	<i>A. cf. exotica</i>	all
	<i>A. exotica</i> (Wiedemann, 1830)	-
	<i>A. roburoris</i> (Fluke, 1942)	-
	<i>Eosalpingogaster conopida</i> (Philippi, 1865)	28S, COI
	<i>Pseudodoros clavatus</i> (Fabricius, 1794)	all
	<i>Paragus (Pandasyophthalmus) haemorrhous</i> (Meigen, 1822)	all
	<i>S. (Salpingogaster) cf. halcyon</i>	all
	<i>S. (Salpingogaster) cf. pygophora</i>	all
	<i>S. (Salpingogaster) nigra</i> Schiner, 1868	-
	<i>S. (Salpingogaster) pygophora</i> Schiner, 1868	-
Subfamily <b>Syrphinae</b>	<i>Toxomerus politus</i> (Say, 1893)	all
Tribe Toxomerini	<i>T. tibicen</i> (Wiedemann, 1830)	-
	<i>T. virgulatus</i> (Macquart, 1850)	all
<hr/>		
Ocyptamus ingroups	Species	Gene sequences
Group <b>flukiella</b>	<i>O. flukiella</i> (Curran, 1941)	all
Group <b>arx</b>	<i>O. sp.14</i>	all
	<i>O. sp.15</i>	-
Group <b>callidus</b>	<i>O. cf. pumilus</i>	all
	<i>O. pumilus</i> (Austen, 1893)	-
Group <b>cylindricus</b>	<i>O. antiphates</i> (Walker, 1849)	all
	<i>O. cf. princeps</i>	all
	<i>O. dimidiatus</i> (Fabricius, 1781)	all
	<i>O. fuscipennis</i> (Say, 1823)	all
	<i>O. funebris</i> Macquart, 1834	all
	<i>O. gastrostactus</i> (Wiedemann, 1830)	28S, COI
Group <b>elnora</b>	<i>O. isthmus</i> Thompson, 1976	all
	<i>O. neuralis</i> (Curran, 1934)	-
	<i>O. obliquus</i> (Curran, 1941)	all
	<i>O. striatus</i> (Walker, 1852)	-
Group <b>wulpianus</b>	<i>O. wulpianus</i> (Lynch-Arribalzaga, 1891)	28S, COI
Group <b>lepidus</b>	<i>O. abata</i> (Curran, 1938)	-
	<i>O. cf. chapadensis</i>	all
	<i>O. crocatus</i> (Austen, 1893)	all
	<i>O. croceus</i> (Austen, 1893)	all, except CAD
	<i>O. cultrinus</i> (Curran, 1939)	-

**Table 3.** Taxa sampled and gene fragments obtained.

	<i>O. luctuosus</i> (Bigot, 1884)	all, except only fragment of CAD
	<i>O. vierecki</i> (Curran, 1930)	all
Group <b>lineatus</b>	<i>O. macropyga</i> (Curran, 1941)	all
	<i>O. norina</i> (Curran, 1941)	all
	<i>O. rubricosus</i> (Wiedemann, 1830)	all
Group <b>capitatus</b>	<i>O. bonariensis</i> (Brèthes, 1905)	-
	<i>O. erebus</i> (Hull, 1943)	-
Group <b>amplus</b>	<i>O. cf. ampla</i>	all
	<i>O. cf. calda</i>	-
	<i>O. cf. lativentris</i>	all
	<i>O. priscilla</i> (Hull, 1943)	all
Group <b>parvicornis</b>	<i>O. parvicornis</i> (Loew, 1861)	-
Group <b>peruvianus</b>	<i>O. ovipositorius</i> (Hull, 1943)	all
	<i>O. peruvianus</i> (Shannon, 1927)	-
	<i>O. sp.52</i>	all
	<i>O. telescopicus</i> (Curran, 1930)	all, except AATS and CAD
Group <b>globiceps</b>	<i>O. tiarella</i> (Hull, 1944)	28S, COI
Group <b>diversifasciatus</b>	<i>O. diversifasciatus</i> (Knab, 1914)	-
Group <b>stenogaster</b>	<i>O. cf. argentinus</i>	all, except only fragment of CAD
	<i>O. filiulus</i> (Shannon, 1927)	all
	<i>O. stenogaster</i> (Williston, 1888)	-
Group <b>ebilis</b>	<i>O. sp.</i>	28S, COI, CytB
Group <b>conjunctus</b>	<i>O. conjunctus</i> (Wiedemann, 1830)	-
Group <b>tristis</b>	<i>O. adspersus</i> (Fabricius, 1805)	all
	<i>O. alicia</i> (Curran, 1941)	all
	<i>O. beatricea</i> (Hull, 1942)	all
	<i>O. costatus</i> (Say, 1829)	all
	<i>O. zeteki</i> (Curran, 1930)	all, except only fragment of CAD
	<i>O. sp.04</i>	all, except only fragment of CAD
	<i>O. sp.27</i>	all
	<i>O. sp.53</i>	all
	<i>O. sp.54</i>	all
Ungrouped species	<i>O. bromleyi</i> (Curran, 1929)	all
	<i>O. cf. attenuata</i>	all, except CytB
	<i>O. cf. melanorrhinus</i> 1	all
	<i>O. cf. melanorrhinus</i> 2	-
	<i>O. cf. zenillia</i>	all
	<i>O. cf. zoroaster</i>	all
	<i>O. fascipennis</i> (Wiedemann, 1830)	all
	<i>O. lemur</i> (Osten Sacken, 1877)	all
	<i>O. titania</i> (Hull, 1943)	all, except CytB and only fragment of CAD
	<i>O. sp.09</i>	-

**Table 3.** Taxa sampled and gene fragments obtained (cont.).

Taxon	Voucher data information	Lab code	Mitochondrial			Nuclear		
			12S	COI	CytB	28S	AATS	CAD
<i>Allograpta alta</i> Curran, 1936	VENEZUELA, Estado Lara: Yacambu Ntl.Prk.; along main road 9°43'03"N, 69°98'07"W 1660m; IX-04/2008 M.D.Jackson. Deposited at CNC.	JSS25238						
<i>A. cf. exotica</i>	VENEZUELA, Estado Lara: Yacambu Ntl.Prk.;Park Office Area; 9°42'25"N, 69°34'38"W 1549m; IX-06/2008 M.D.Jackson. Deposited at CNC.	JSS25239						
<i>Baccha elongata</i> (Fabricius, 1775)	USA: CA: Humboldt Co.: Praine creek redwoods state park, near entrance to south fork trail; ~50m; 15.VIII.2005 41°22'N, 124°1'W; Sunny glade along creek in primary rainforest; J. & A. Skevington. Deposited at CNC.	JSS25206						
<i>Baccha elongata</i> (Fabricius, 1775)	USA: OR: Lincoln Co.: Table Mountain Area: 12.VIII.2005 44°27'N 123°50'W; ~675m; J. & A. Skevington. Deposited at CNC.	JSS25207						
<i>Leucopodella gracilis</i> (Williston, 1891)	BRASIL. São Paulo, Estação Biológica de Boracéia, 23°39.211'S 45°53.398'W, 01 Dez 2008. Col. R. Falaschi & D. de S. Amorim. Deposited at MZSP.	CAV22						

**Table 4.** Voucher data and GenBank accession numbers.

<i>L. sp.</i> FCT0114	VENEZUELA, Estado Lara: Trail into Yacambu N.P.9°41'59"N, 69°38'52"W 1904m; ix-05/2008 M.D.Jackson. Deposited at CNC.	JSS25235						
<i>Ocyptamus sp. (eblis group)</i>	COLOMBIA. Deposited at Instituto de Investigación de Recursos Biológicos Alexander Von Humboldt (Colombia).	CAVXM074						
<i>O. cf. ampla (amplus group)</i>	BRASIL. Paraná, Piraquara, 14 Jun 2007.Col. M. G. Hermes. Deposited at DZUP.	CAV37						
<i>O. sp.04 (tristis group)</i>	PERU. Junín, Chanchamayo, San Ramón, Sector Quebrada Santa Rosa, "Fundo Génova", Malaise trap, 11°05'44.4"S 75°21'19.6"W, 1080m., 07-10 Jul 2008. Col. X. Mengual. Depostied at CEUA (Coleccion Entomologica de la Universidad de Alicante - Spain).	CAVXM057						
<i>O. sp.14 (arx group)</i>	PERU. Junín, Chanchamayo, San Ramón, Sector Quebrada Santa Rosa, "Fundo Génova", Malaise trap, 11°05'44.4"S 75°21'19.6"W, 1080m., 07-10 Jul 2008. Col. X. Mengual. Depostied at CEUA (Coleccion Entomologica de la Universidad de Alicante - Spain).	CAVXM025						
<i>O. sp.27 (tristis group)</i>	VENEZUELA: CARABOBO: Henri Pitier National park, Portachuelo Pass, 15 Sep 2008, 10°20'51"N, 67°41'16"W, J.Skevington, 1143m. Deposited at CNC.	JSS25216						

**Table 4.** Voucher data and GenBank accession numbers (cont.).



<i>O. sp.52 (peruvianus group)</i>	PERU. Junín, Chanchamayo, San Ramón, Sector Quebrada Santa Rosa, "Fundo Génova", Malaise trap, 11°05'44.4"S 75°21'19.6"W, 1080m., 07-10 Jul 2008. Col. X. Mengual. Deposited at CEUA (Coleccion Entomologica de la Universidad de Alicante - Spain).	CAVXM030						
<i>O. sp.53 (tristis group)</i>	VENEZUELA: CARABOBO: Henri Pitier National park, Portachuelo Pass, 15 Sep 2008, 10°20'51"N, 67°41'16"W, J. Skevington, 1143m. Deposited at CNC.	JSS25218						
<i>O. sp.54 (tristis group)</i>	COSTA RICA. Limón, Verágua research station, small hilltop behind butterfly garden, 09°55.520N 83°11.439W. 14 Sep 2008. Col. G.F.G. Miranda. Deposited at INBio.	CAV38						
<i>O. adspersus</i> (Fabricius, 1805)	PERU: Amazonia Lodge, Malaise Trap, 12°52'15"S 71°22'11"W, 23-24.X.2006; ~465m, J. Skevington. Deposited at CNC.	JSS25231						
<i>O. alicia</i> (Curran, 1941)	BRASIL. São Paulo, Estação Biológica de Boracéia, 23°39.240'S 45°53.384'W, 01 Dez 2008. Col. G.F.G. Miranda. Deposited at MZSP.	CAV6						

**Table 4.** Voucher data and GenBank accession numbers (cont.).

<i>O. antiphates</i> (Walker, 1849)	(FR-GY) Régina: Kaw, Kaw Mountains, Point Road 40 (PR40) (rain forest edge (garden)), ca. 300m, 7.XII.2006, PT, leg. Keijo Sarv, sample of FR-GY/2006/084 - (Syrphidae), sorted by Marc Pollet. Deposited at CNC.	JSS25236						
<i>O. beatricea</i> (Hull, 1942)	VENEZUELA: CARABOBO: Henri Pitier National park, Portachuelo Pass, 15 Sep 2008, 10°20'51"N, 67°41'16"W, J.Skevington, 1143m. Deposited at CNC.	JSS25214						
<i>O. bromleyi</i> (Curran, 1929)	VENEZUELA: Estado Carabobo: Portachuelo: 10°20'51"N 67°41'16"W; 1143m., IX-13-15/2008; M.D.Jackson. Deposited at CNC.	JSS25240						
<i>O. cf. argentinus</i>	ARGENTINA: Tucumán: Siámbon, Siámbon river; sweeps; 1.xi.2008; 1124m.; 26°46'14"S; 65°26'41"W; JF Gibson. Deposited at CNC.	JSS25227						
<i>O. cf. attenuata</i>	C.R.: Guanacaste, Rincón de la Vieja. 1.5Km SW Puesto Las Pailas, 10°45'53"N 85°21'40"W, 650m, 17 Aug 2010, G.F.G. Miranda. Debu00332235. Deposited at INBio.	JSS22253						

**Table 4.** Voucher data and GenBank accession numbers (cont.).

<i>O. cf. chapadensis</i>	VENEZUELA: CARABOBO: Henri Pitier National park, Portachuelo Pass, 13 Sep 2008, 10°20'51"N, 67°41'16"W, J.Skevington, 1143m. Deposited at CNC.	JSS25222						
<i>O. cf. lativentris</i>	VENEZUELA: CARABOBO: Henri Pitier National park, Portachuelo Pass, 15 Sep 2008, 10°20'51"N, 67°41'16"W, J.Skevington, 1143m. Deposited at CNC.	JSS25215						
<i>O. cf. melanorrhinus</i> 1	CHILE: Parque Nacional La Campana; 21.xi.2008; 32°58'58"S 71°08'02"W; 401m; J. Skevington. Deposited at CNC.	JSS25224						
<i>O. cf. princeps</i>	VENEZUELA: CARABOBO: Henri Pitier National park, Portachuelo Pass, 15 Sep 2008, 10°20'51"N, 67°41'16"W, J.Skevington, 1143m. Deposited at CNC.	JSS25213						
<i>O. cf. pumilus</i>	PERU. Junín, Chanchamayo, San Ramón, Sector Quebrada Santa Rosa, "Fundo Génova", Malaise trap, 11°05'44.4"S 75°21'19.6"W, 1080m., 07-10 Jul 2008. Col. X. Mengual. Deposited at CEUA (Coleccion Entomologica de la Universidad de Alicante - Spain).	CAVXM061						

**Table 4.** Voucher data and GenBank accession numbers (cont.).

<i>O. cf. zenillia</i>	ARGENTINA: Tucumán: San Javier, Hotel Sol San Javier, meadow Malaise trap; 31.x-5.xi.2008; 1258m; 26°47'54"S 65°21'28"S; JH Skevington, JF Gibson. Deposited at CNC.	JSS25226						
<i>O. cf. zoroaster</i>	VENEZUELA: Estado Lara: Trail into Yacambu N.P.; 9°41'59"N, 69°38'52"W; 1904m; IX-05/2008; M.D.Jackson. Deposited at CNC.	JSS25243						
<i>O. costatus</i> (Say, 1829)	NC:Granville Co.: Picture Creek area: 35.125°N 78.739°W ~500m 22.VII-5.VIII.2009 M.T. RL Blinn I Miko. Deposited at CNC.	JSS25244						
<i>O. crocatus</i> (Austen, 1893)	VENEZUELA: ARAGUA: Henri Pitier National Park, scrubby yard near Choroni; 12.ix.2008; 10°28'31"N 67°36'19"W; J.Skevington, 205m. Deposited at CNC.	JSS25220						
<i>O. croceus</i> (Austen, 1893)	(FR-GY) Régina: Kaw, Kaw Mountains, Point Road 40 (PR40) (rain forest edge (garden)), ca. 300m, 20.I-24.II.2007, MT, leg. Keijo Sarv, sample of FR-GY/2006/084 - (Syrphidae), sorted by Marc Pollet. Deposited at CNC.	JSS25210						

**Table 4.** Voucher data and GenBank accession numbers (cont.).

<i>O. dimidiatus</i> (Fabricius, 1781)	VENEZUELA: CARABOBO: Henri Pitier National park, Portachuelo Pass, 13 Sep 2008, 10°20'51"N, 67°41'16"W, J.Skevington, 1143m. Deposited at CNC.	JSS25219						
<i>O. fascipennis</i> (Wiedemann, 1830)	CANADA: ON: Constance bay; 45°29'02"N 76°04'52"W; Malaise Trap in Oak Savannah, 31.v- 8.vi.2006;J.Skevington. Deposited at CNC.	JSS25209						
<i>O. filiolus</i> (Shannon, 1927)	CHILE: Santiago, Hilltop 33°25'12"S 70°37'48"W, 865m; 22.xi.2008, J. Skevington. Deposited at CNC.	JSS25223						
<i>O. flukiella</i> (Curran, 1941)	PERU. Junín, Chanchamayo, San Ramón, Sector Quebrada Santa Rosa, "Fundo Génova", Malaise trap, 11°05'44.4"S 75°21'19.6"W, 1080m., 07- 10 Jul 2008. Col. X. Mengual. Depostied at CEUA (Coleccion Entomologica de la Universidad de Alicante - Spain).	CAVXM033						
<i>O. fuscipennis</i> (Say, 1823)	USA: NC: Swain Co., Great Smoky Mountains National Park, Big Cove Road, Site#4 35°30.635'N, 83°17.874'W, 19- 26.v.2001;B.Wiegmann. Deposited at CNC.	JSS25204						
<i>O. funebris</i> Macquart, 1834	BRASIL. São Paulo, Estação Biológica de Boracéia, Sobrevoando uma Piperaceae, 23°39.174'S 45°53.428'W, 01 Dez 2008. Col. G.F.G. Miranda. Deposited at MZSP.	CAV36						

**Table 4.** Voucher data and GenBank accession numbers (cont.).

<i>O. gastrostactus</i> (Wiedemann, 1830)	VENEZUELA, Lara, Tarabana. 500 m. 1-VIII-2006. Leg.: E. Arcaya. Det.: X. Mengual. Depostied at CEUA (Coleccion Entomologica de la Universidad de Alicante - Spain).	-	-	EU409132	-	EU409187	-	-
<i>O. isthmus</i> Thompson, 1976	ARGENTINA: Tucumán: Paruqe Sierra de San Javier, Rio Muerto trail; sweeps; 666m; 4.xi.2008; JF Gibson 26°47'16"S 65°19'53"W. Deposited at CNC.	JSS25228						
<i>O. lemur</i> (Osten Sacken, 1877)	USA: OR: Hamey Co., Blitzen River @ Page Springs, 42°47'N 118°51'W, 1300m; 28.vii-6.viii.2005 coll. GW Courtney; Malaise. Deposited at CNC.	JSS25208						
<i>O. luctuosus</i> (Bigot, 1884)	Rio Grande 01.XI.2008. Deposited at CNC.	JSS25245						
<i>O. macropyga</i> (Curran, 1941)	PERU: Amazonia Lodge, Malaise Trap, 12°52'15"S 71°22'11"W, 23-24.X.2006; ~465m, J. Skevington. Deposited at CNC.	JSS25230						
<i>O. norina</i> (Curran, 1941)	PERU: Amazonia Lodge, Malaise Trap, 12°52'15"S 71°22'11"W, 23-24.X.2006; ~465m, J. Skevington. Deposited at CNC.	JSS25237						
<i>O. obliquus</i> (Curran, 1941)	BRASIL. São Paulo, Estação Biológica de Boracéia, Sobrevoando uma Bromeliacea, 23°39.211'S 45°53.398'W, 01 Dez 2008. Col. G.F.G. Miranda. Deposited at MZSP.	CAV12						

**Table 4.** Voucher data and GenBank accession numbers (cont.).

<i>O. ovipositorius</i> (Hull, 1943)	PERU. Junín, Chanchamayo, San Ramón, Sector Quebrada Santa Rosa, "Fundo Génova", Malaise trap, 11°05'44.4"S 75°21'19.6"W, 1080m., 07-10 Jul 2008. Col. X. Mengual. Deposited at CEUA (Coleccion Entomologica de la Universidad de Alicante - Spain).	CAVXM031						
<i>O. priscilla</i> (Hull, 1943)	ARGENTINA: SALTA: Quebrada de San Lorenzo, 07.xi.2008, 24°43'44"S 65°30'14"W, 1477m; J.Skevington. Deposited at CNC.	JSS25225						
<i>O. rubricosus</i> (Wiedemann, 1830)	VENEZUELA: CARABOBO: Henri Pittier National park, Portachuelo Pass, 13 Sep 2008, 10°20'51"N, 67°41'16"W, J.Skevington, 1143m. Deposited at CNC.	JSS25212						
<i>O. telescopicus</i> (Curran, 1930)	COSTA RICA. Limón, Verágua research station, small hilltop behind butterfly garden, 09°55.520N 83°11.439W. 14 Sep 2008. Col. G.F.G. Miranda. Deposited at INBio.	CAV39						
<i>O. tiarella</i> (Hull, 1944)	VENEZUELA, Edo. Aragua. P.N. Henri Pittier, Portachuelo, 1152 m. 26-I-2007. N10°20.828' W067°41.309'. Leg.: A. Martínez. Det.: X. Mengual. Deposited at CEUA (Coleccion Entomologica de la Universidad de Alicante - Spain).	-	-	EU241744	-	EU241792	-	-

**Table 4.** Voucher data and GenBank accession numbers (cont.).

<i>O. titania</i> (Hull, 1943)	VENEZUELA: Aragua:PN H. Pitier, Rancho grande, Portachuelo, 1143m; Malaise; 10°20'51"N 67°41'16"W 13-14.ix.2008; E.M.Fisher, J.Skevington, M.Jackson. Deposited at CNC.	JSS25229						
<i>O. vierecki</i> (Curran, 1930)	VENEZUELA: Estado Aragua: Road from Maracay to Choroni, 10°21'22"N 67°85'19"W, ~1500m, ix-12/2008. M.D.Jackson. Deposited at CNC.	JSS25234						
<i>O. wulpianus</i> (Lynch-Arribalzaga, 1891)	ARGENTINA, Jujuy prov., 36km S Jujuy, Arroyo Las Lanzas; Malaise trap in wooded, damp wash; 24°27.25'S 65°17.83'W. 1278 m., 27-X/14-XI-2003. Leg.: M.E. Irwin & F.D. Parker. Det.: F.C. Thompson. Deposited at Finnish Museum of Natural History (MZH).	-	-	EF127356	-	EF127437	-	-
<i>O. zeteki</i> (Curran, 1930)	PERU: Amazonia Lodge, Malaise Trap, 12°52'15"S 71°22'11"W, 23-24.X.2006; ~465m, J. Skevington. Deposited at CNC.	JSS25232						
<i>Paragus</i> ( <i>Pandasyophthalmus</i> ) <i>haemorrhous</i> (Meigen, 1822)	USA: NC: Swain Co., Great Smoky Mountains National Park, Big Cove Road, Site#4 35°30.635'N, 83°17.874'W, 19-26.v.2001;B.Wiegmann. Deposited at CNC.	JSS25205						

**Table 4.** Voucher data and GenBank accession numbers (cont.).



<i>Pseudodoros clavatus</i> (Fabricius, 1794)	VENEZUELA: LARA: Creek valley below Sanare, 8.ix.2008; 9°49'14"N, 69°37'06"W J.Skevington, 901m. Deposited at CNC.	JSS25211						
<i>Eosalpingogaster conopida</i> (Philippi, 1865)	CHILE, Region IV, Limari prov., Fundo Agua Amarilla, 7km N Los Vilos; Malaise in stable dunes, 58 m., 31°50.96'S 71°29.60'W. 28-XII-2003/8-I-2004. Leg.: M.E. Irwin. Det.: F.C. Thompson. Deposited at Finnish Museum of Natural History (MZH).	-	-	EF127359	-	EF127440	-	-
<i>S. (Salpingogaster) cf. halcyon</i>	BRASIL. Paraná, Piraquara, Manaciais da Serra, 14 Jun 2007.Col. M. G. Hermes. Deposited at DZUP.	CAV1						
<i>S. (Salpingogaster) cf. pygophora</i>	VENEZUELA: CARABOBO: Henri Pitier National Park, Portachuelo Pass, 13 IX 2008: 10°20'51"N, 67°41'16"W, J. Skevington; 1143m. Deposited at CNC.	JSS25221						
<i>Toxomerus politus</i> (Say, 1893)	VENEZUELA: Estado Carabobo: Portachuelo: 10°20'51"N 67°41'16"W; 1143m.,IX-13-15/2008; M.D.Jackson. Deposited at CNC.	JSS25242						
<i>T. virgulatus</i> (Macquart, 1850)	VENEZUELA: Estado Carabobo: Portachuelo: 10°20'51"N 67°41'16"W; 1143m.,IX-13-15/2008; M.D.Jackson. Deposited at CNC.	JSS25241						

**Table 4.** Voucher data and GenBank accession numbers (cont.).

<b>Ocyptamus species group</b>	<b>Species</b>	<b>Larval prey</b>	<b>Reference</b>	
Group <b><i>amplus</i></b>	-	-	-	
Group <b><i>arx</i></b>	-	-	-	
Group <b><i>callidus</i></b>	-	-	-	
Group <b><i>capitatus</i></b>	<i>O. bonariensis</i>	Aleyrodidae (Hemiptera, Sternorrhyncha) Coccidae (Hemiptera, Sternorrhyncha, Coccoidea) Diaspididae (Hemiptera, Sternorrhyncha, Coccoidea)	Rojo et al. 2003	
	<i>O. capitatus</i>	Coccidae (Hemiptera, Sternorrhyncha, Coccoidea)	Rojo et al. 2003	
	<i>O. tristani</i>	Coccidae (Hemiptera, Sternorrhyncha, Coccoidea)	Thompson & Zumbado 2000	
	<i>O. willistoni</i>	? Aphididae (Hemiptera, Sternorrhyncha, Aphidomorpha)	Thompson & Zumbado 2000	
Group <b><i>conjunctus</i></b>	-	-	-	
Group <b><i>cylindricus</i></b>	<i>O. antiphates</i>	Aphididae (Hemiptera, Sternorrhyncha, Aphidomorpha)	Rojo et al. 2003	
	<i>O. cylindricus</i>	Aphididae (Hemiptera, Sternorrhyncha, Aphidomorpha)	Rojo et al. 2003	
	<i>O. dimidiatus</i>	Aphididae (Hemiptera, Sternorrhyncha, Aphidomorpha)	Rojo et al. 2003	
	<i>O. fasciatus</i>	Aphididae (Hemiptera, Sternorrhyncha, Aphidomorpha)	Rojo et al. 2003	
	<i>O. funebris</i>	Aphididae (Hemiptera, Sternorrhyncha, Aphidomorpha)	Rojo et al. 2003	

**Table 5.** Larval prey records.

	<i>O. fuscipennis</i>	Aphididae (Hemiptera, Sternorrhyncha, Aphidomorpha)	Rojo et al. 2003	
	<i>O. gastrostactus</i>	Aphididae (Hemiptera, Sternorrhyncha, Aphidomorpha)	Rojo et al. 2003	
Group <b><i>diversifasciatus</i></b>	-	-	-	
Group <b><i>ebilis</i></b>	-	-	-	
Group <b><i>elnora</i></b>	-	-	-	
Group <b><i>flukiella</i></b>	-	-	-	
Group <b><i>globiceps</i></b>	-	-	-	
Group <b><i>lepidus</i></b>	<i>O. cubanus</i>	Aphididae (Hemiptera, Sternorrhyncha, Aphidomorpha)	Rojo et al. 2003	In <i>Vriesea</i> bromeliads
	<i>O. luctuosus</i>	Aquatic predator on other insect larvae	Rotheray et al. 2000	
Group <b><i>lineatus</i></b>	<i>O. lividus</i>	Thysanoptera	Rojo et al. 2003	
	<i>O. norina</i>	Psyllidae (Hemiptera, Sternorrhyncha, Psylloidea) Thysanoptera	Rojo et al. 2003	
Group <b><i>lineatus</i></b>	<i>O. persimilis</i>	Psyllidae (Hemiptera, Sternorrhyncha, Psylloidea)	Peréz & Iannacone 2009	
	<i>O. zenia</i>	Thysanoptera	Rojo et al. 2003	
Group <b><i>parvicornis</i></b>	<i>O. ferrugineus</i>	Aleyrodidae (Hemiptera, Sternorrhyncha)	Thompon 1981	
	<i>O. parvicornis</i>	Aleyrodidae (Hemiptera, Sternorrhyncha) Fulgoridae (Hemiptera, Auchenorrhyncha , Fulgoromorpha) Pseudococcidae (Hemiptera, Sternorrhyncha, Coccoidea)	Rojo et al. 2003	
Group <b><i>peruvianus</i></b>	-	-	-	

**Table 5.** Larval prey records (cont.).

Group <b><i>stenogaster</i></b>	<i>O. argentinus</i>	Pseudococcidae (Hemiptera, Sternorrhyncha, Coccoidea)	Rojo et al. 2003	
	<i>O. deceptor</i>	Pseudococcidae (Hemiptera, Sternorrhyncha, Coccoidea)	Rojo et al. 2003	
	<i>O. sativus</i>	Aleyrodidae (Hemiptera, Sternorrhyncha)	Rojo et al. 2003	
	<i>O. stenogaster</i>	Pseudococcidae (Hemiptera, Sternorrhyncha, Coccoidea)	Rojo et al. 2003	
Group <b><i>tristis</i></b>	<i>O. braziliensis</i>	Coccidae (Hemiptera, Sternorrhyncha, Coccoidea)	This study	
	<i>O. costatus</i>	Coccidae (Hemiptera, Sternorrhyncha, Coccoidea)	Rojo et al. 2003; Vanek & Potter 2010	Aphididae is not confirmed on the referenced record
	<i>O. sp.16</i>	Coccidae (Hemiptera, Sternorrhyncha, Coccoidea)	This study	
Group <b><i>wulpianus</i></b>	<i>O. wulpianus</i>	Aquatic predator on other insect larvae	Rotheray et al. 2000	In <i>Vriesea</i> bromeliads
Ungrouped species	<i>O. fascipennis</i>	Pseudococcidae (Hemiptera, Sternorrhyncha, Coccoidea)	Rojo et al. 2003	
	<i>O. lemur</i>	Pseudococcidae (Hemiptera, Sternorrhyncha, Coccoidea)	Rojo et al. 2003	
	<i>O. mentor</i>	Aleyrodidae (Hemiptera, Sternorrhyncha) Pseudococcidae (Hemiptera, Sternorrhyncha, Coccoidea)	Rojo et al. 2003	
	<i>O. sargoides</i>	? Coccidae (Hemiptera, Sternorrhyncha, Coccoidea) Pseudococcidae (Hemiptera, Sternorrhyncha, Coccoidea)	Rojo et al. 2003	

**Table 5.** Larval prey records (cont.).

	Individual genes						Combined dataset
	12S	28S	AATS	CAD	COI	CytB	
# characters analysed	412	988	597	2686	1515	733	6982
% constant characters	79	81	58	64	61	57	66
% parsimony-informative characters	12	12	36	25	31	34	26
Average nucleotide frequencies (%)							
A	39	35	26	29	31	35	32
C	8	15	21	20	14	13	15
G	12	19	27	24	15	10	18
T	41	31	26	27	40	42	34

**Table 6.** Sequence characteristics.

## Figure plates

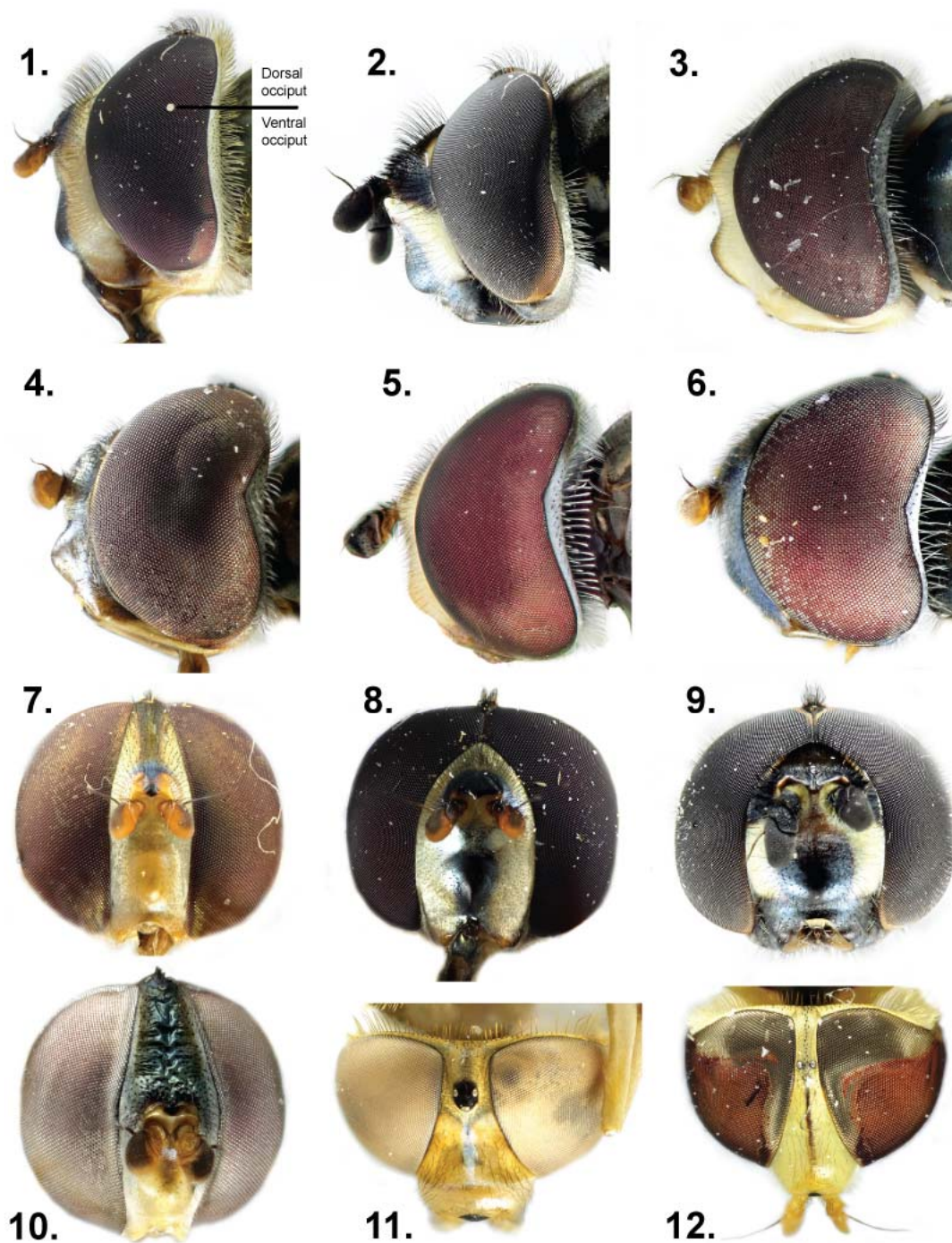


Figure 1-6. Head, lateral: 1. *Orphnabaccha* cf. *calda*. 2. *Styxia eblis*. 3. *Victoriana* cf. *melanorrhina*. 4. *Fragosa stenogaster*. 5. *Ocyptamus antiphates*. 6. *Atylobaccha flukiella*. 7-9. Head, anterior: 7. *Pipunculossyrphus tiarella*. 8. *Orphnabaccha* cf. *calda*. 9. *Styxia eblis*. 10. Head, oblique dorsal, *Fragosa stenogaster*. 11-12. Head, dorsal: 11. *Hybobathus norina*. 12. *Maiana pumila*.



Figure 13-20. Abdomen, dorsal: 13. *Orphnabaccha* cf. *calda*. 14. *Mimocalla capitata*. 15. *Hybobathus arx*. 16. *Fragosa titania*. 17. *Styxia eblis*. 18. *Ocyptamus funebris*. 19. *Hermesomyia wulpianus*. 20. *Pipuncul syrphus tiarella*.



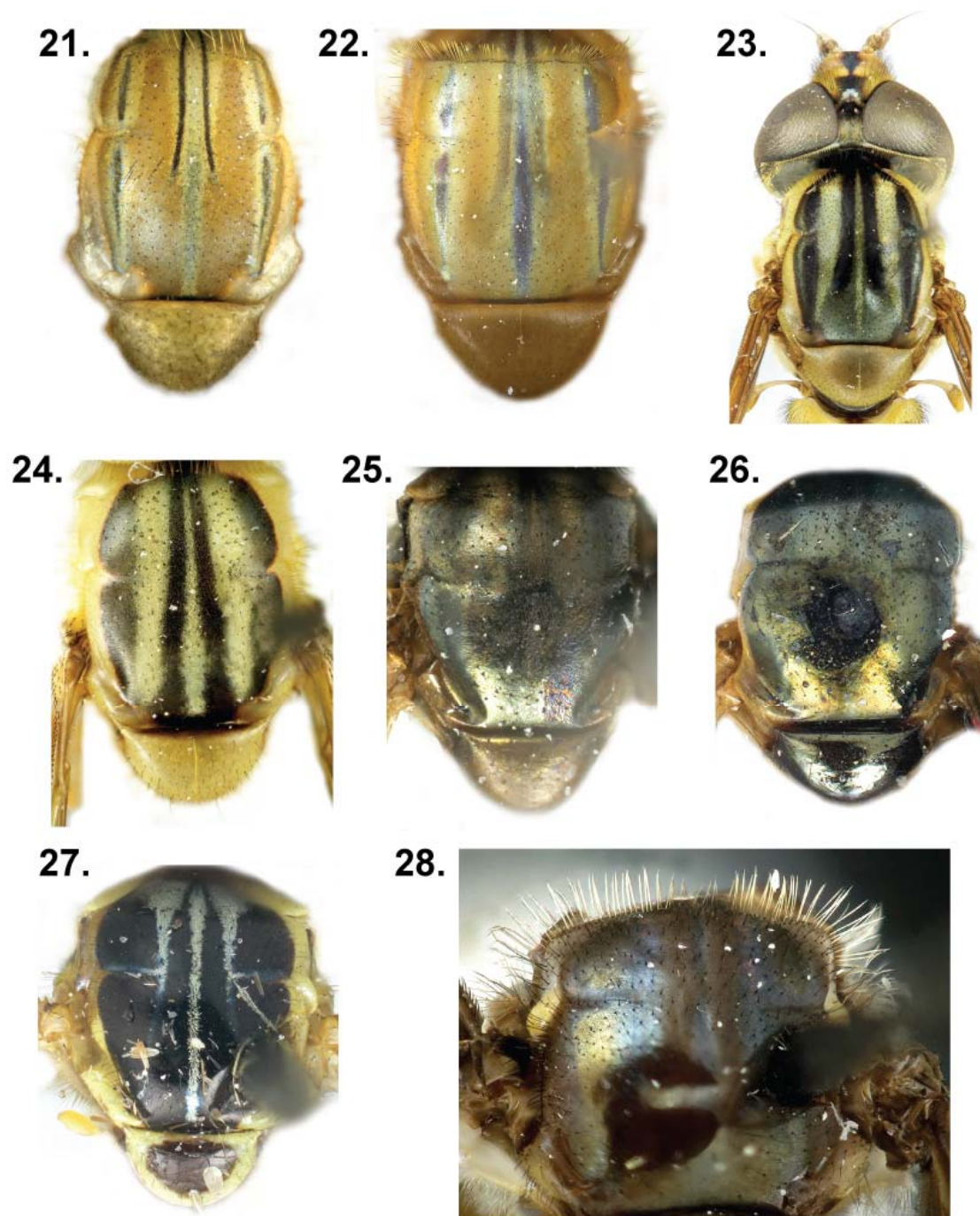
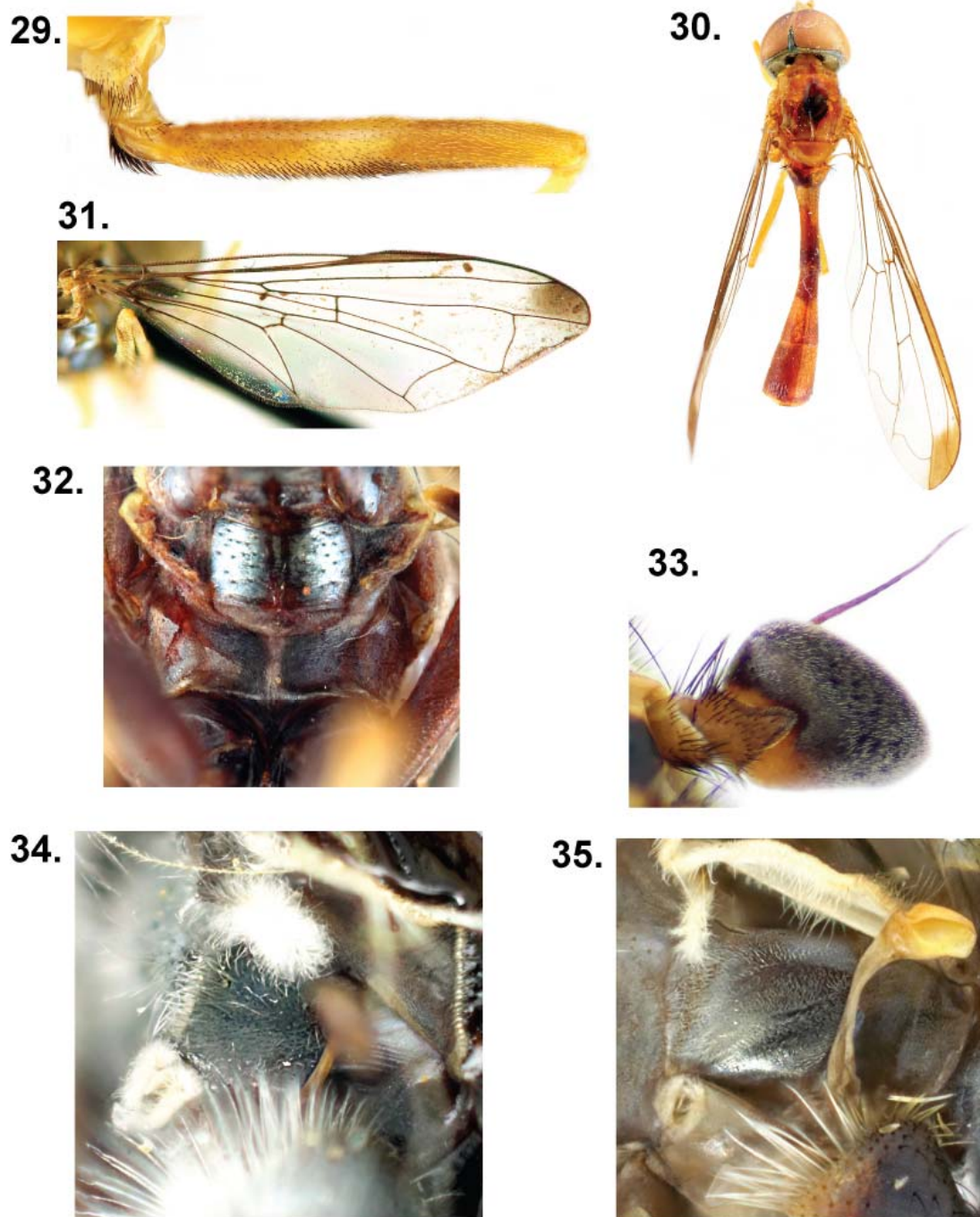
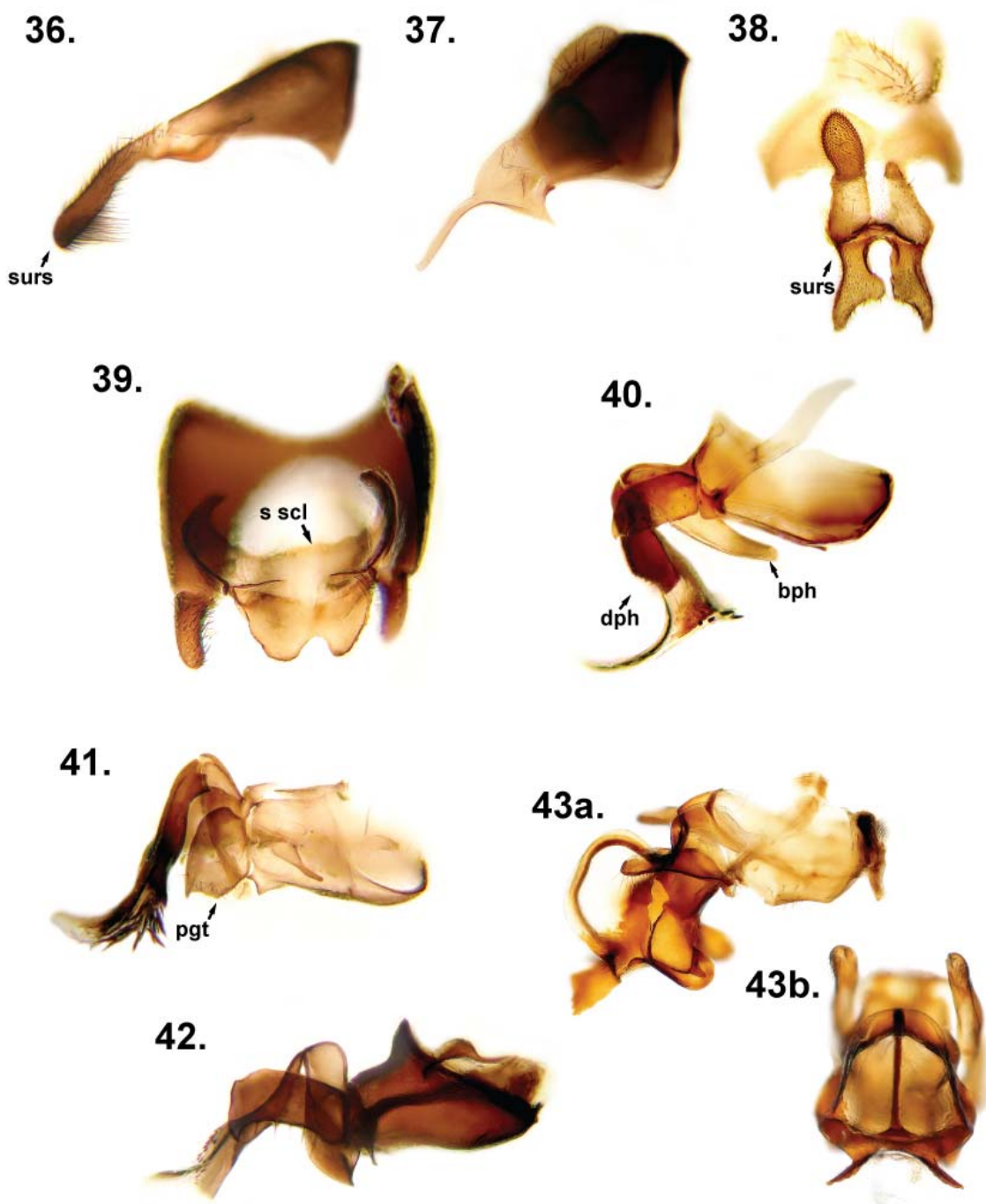


Figure 21-27. Thorax, dorsal: 21. *Hybobathus norina*. 22. *Hybobathus rubricosus*. 23. *Hybobathus arx*. 24. *Maiana pumila*. 25. *Fragosa stenogaster*. 26. *Fragosa* sp.. 27. *Calostigma striata*. 28. Thorax, oblique dorsal, *Ocyptamus antiphates*.

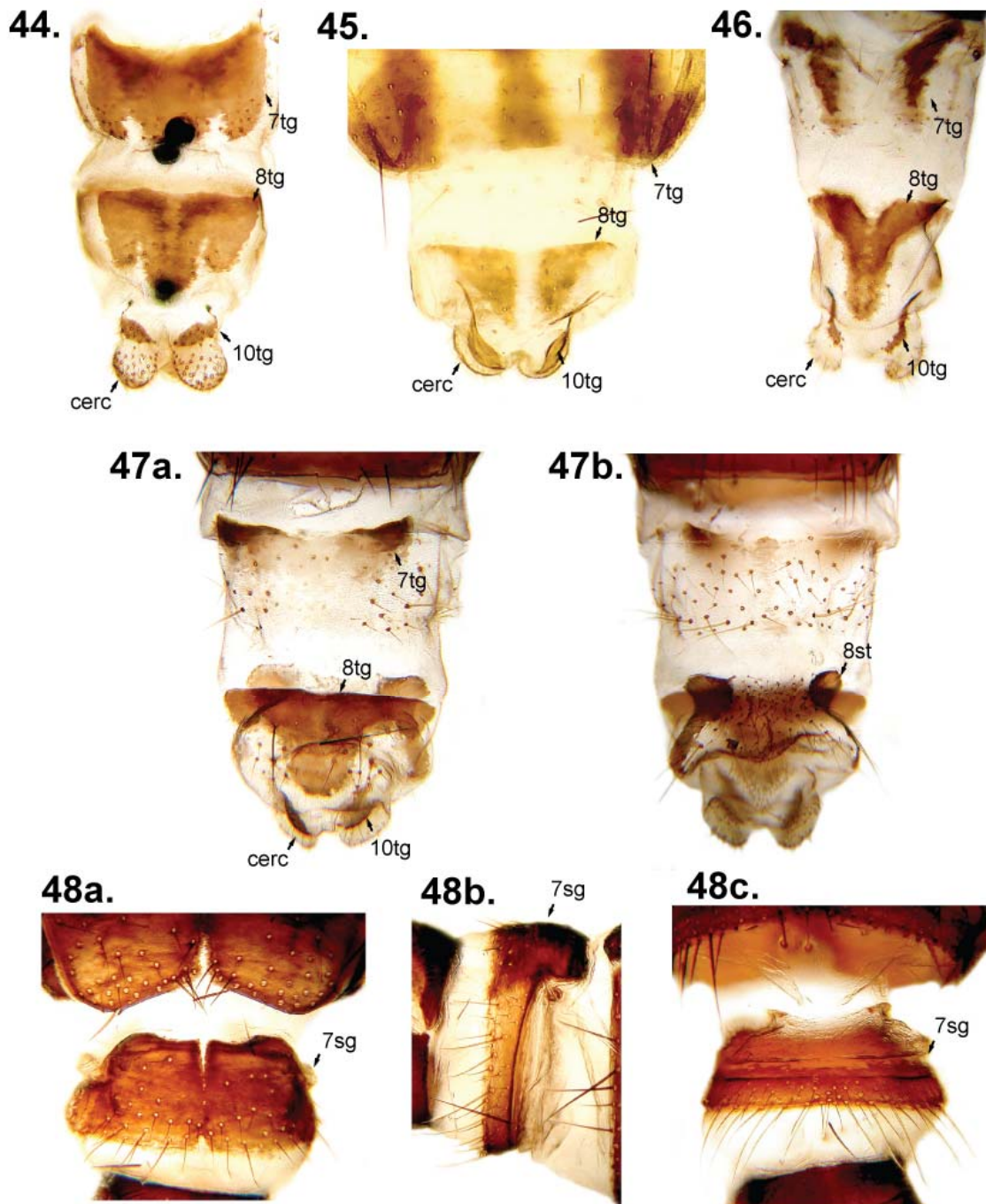




Figures. 29. Metafemur, lateral, *Mimocalla conjuncta*. 30. Habitus, dorsal, *Victoriana parvicornis*. 31. Wing, *Calostigma striata*. 32. Postmetacoxal bridge, posterior, *Eosalpingogaster conopida*. 33. Antenna, lateral, *Ocyptamus antiphates*. 34-35. Katatergum, oblique posterior: 34. *Pseudoscaeva diversifasciata*. 35. *Ocyptamus antiphates*.

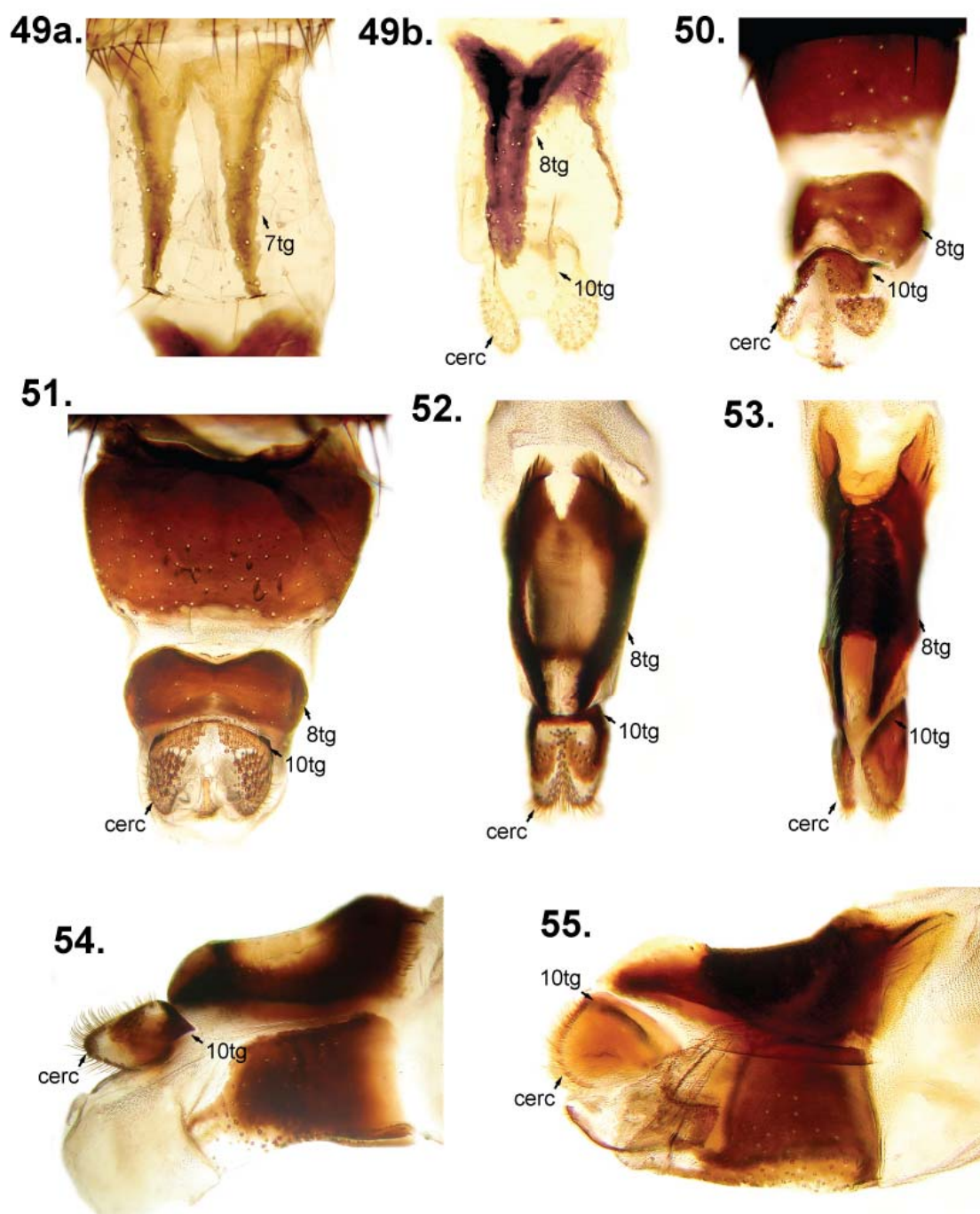


Figures 36-43. Male genitalia: 36-39. Epandrium: 36. Lateral, *Victoriana* cf. *melanorrhina*. 37. Lateral, *Fragosa stenogaster*. 38. Anterior, *Victoriana parvicornis*. 39. Ventral, *Nuntianus abata*. 40-42. Hypandrium, lateral: 40. *Pipunculosyrphus* sp. 41. *Orphnabaccha* cf. *ampla*. 42. *Ocyptamus fuscipennis*. 43. Hypandrium, *Mimocalla bonariensis*: a. Lateral. b. Anterior. bph: basiphallus, dph: distiphallus, pgt: postgonite, s scl: subepandrial sclerite, sur: surstylus.



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Figures 49-55. Female genitalia: 49. *Hybobathus macropyga*: a. 7th tergite, dorsal. b. 8th tergite, dorsal. 50-53. Dorsal: 50. *Fragosa cf. argentina*. 51. *Hypocritanus fascipennis*. 52. *Pelecinobaccha (Noxana) adspersa*. 53. *P. (Pelecinobaccha) clarapex*. 54-55. Apex, lateral: 54. *P. (Noxana) adspersa*. 55. *P. (Pelecinobaccha) clarapex*. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus.

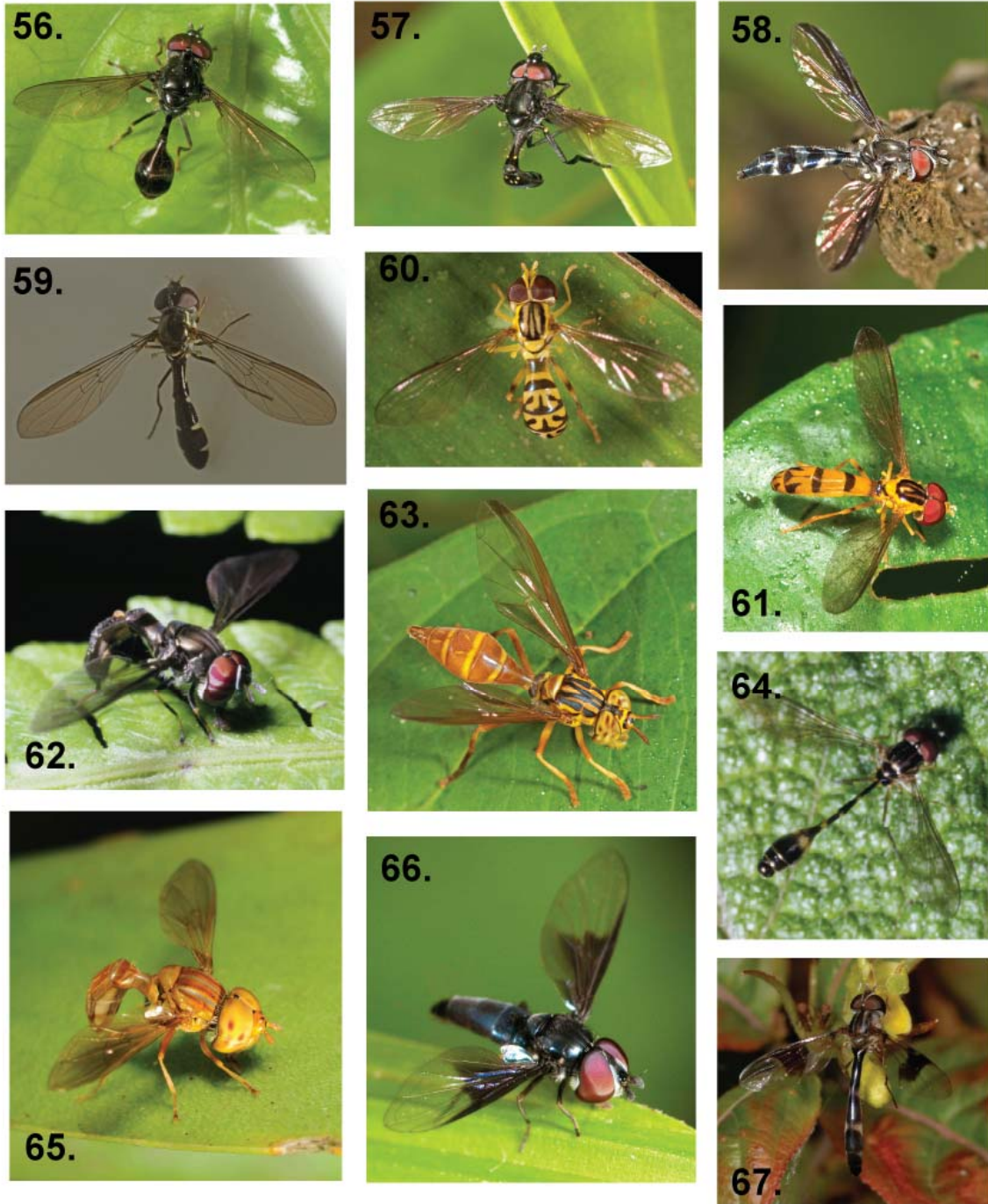
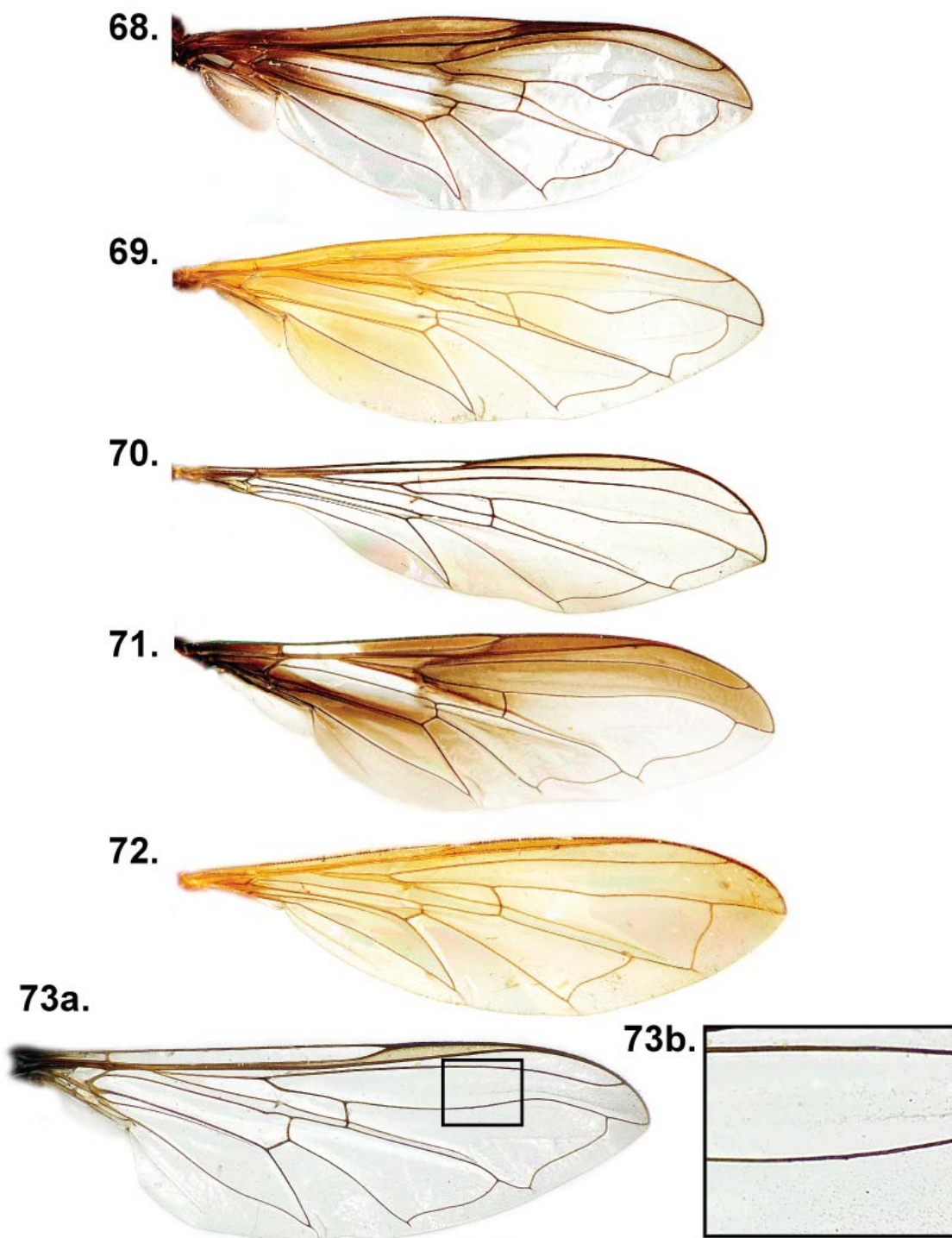
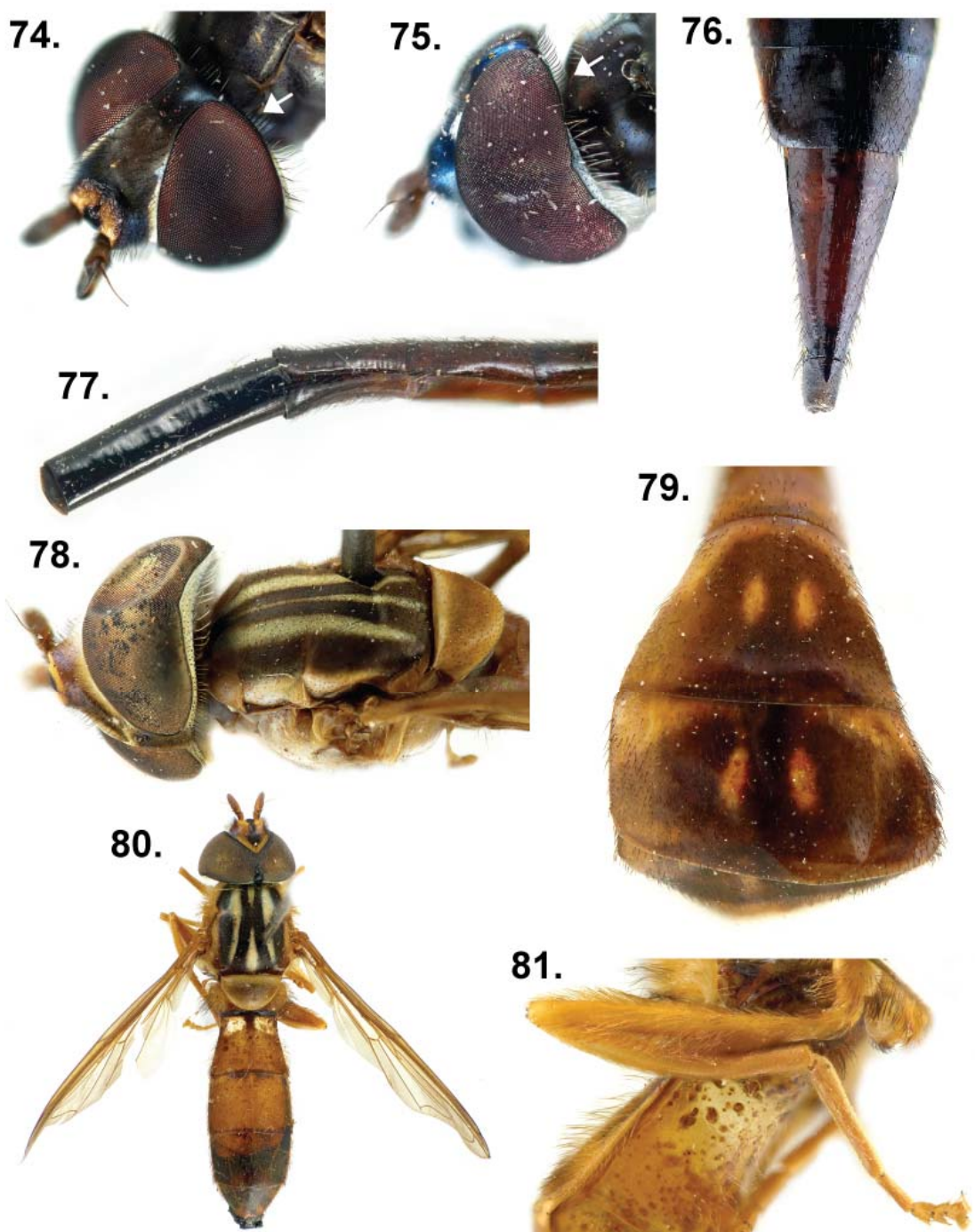


Figure 56-67. Habitus: 56. *Relictanum crassum* (Walker, 1852). 57. *Pelecinobaccha* (Noxana) *adspersa* (Fabricius, 1805). 58. *P. (Pelecinobaccha) costata* (Say, 1829). 59. *Victoriana melanorrhina* (Phillipi, 1865). 60. *Maiana pumila* (Austen, 1893). 61. *Nuntianus croceus* (Austen, 1893). 62. *Orphnabaccha* sp. 63. *Mimocalla conjuncta* (Wiedemann, 1830). 64. *Fragosa* cf. *filiola*. 65. *Hybobathus rubricosus* (Wiedemann, 1830). 66. *Ocyptamus antiphates* (Walker, 1849). 67. *Hypocritanus fascipennis* (Wiedemann, 1830). All pictures by Steve A. Marshall.





Figures 68-73. Wing: 68 *Eosalpingogaster conopida*. 69. *Mimocalla erebus*. 70. *Victoriana* cf. *mellanorrhina*. 71. *Styxia eblis*. 72. *Nuntianus neuralis*. 73a-b. *Pseudoscaeva diversifasciatus*: a. Wing. b. Bare membrane detail.



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## Appendix 1 - Character List

### 0.Face <width in relation to head>

- 0. narrow (between  $\frac{1}{4}$  and  $\frac{1}{3}$  of head width)
- 1. very narrow ( $\sim \frac{1}{4}$  of head width)
- 2. normal ( $\sim \frac{1}{3}$  of head width)
- 3. wide ( $\sim \frac{1}{2}$  of head width)

Comments: The face is visibly larger in the *O. eblis* group (character state 3) and very narrow in the *O. cylindricus* group (character state 1).

### 1.Frons <width in relation to head>

- 0. narrow (between  $\frac{1}{4}$  and  $\frac{1}{3}$  of head width)
- 1. very narrow ( $\sim \frac{1}{4}$  of head width)
- 2. normal ( $\sim \frac{1}{3}$  of head width)
- 3. wide ( $\sim \frac{2}{5}$  of head width)
- 4. very wide ( $\sim \frac{1}{2}$  of head width)

Comments: The frons is visibly wider (character state 3) in the species groups *O. amplus*, *O. arx*, *O. diversifasciatus*, *O. lineatus* and *O. capitatus*.

### 2.Vertex <vertex width/head width ratio>

- 0. normal,  $\sim \frac{1}{6}$  of head width
- 1. very narrow, below  $\frac{1}{20}$  of head width
- 2. narrow, around  $\frac{1}{10}$  of head width
- 3. wide, above  $\frac{1}{5}$  of head width

Comments: The vertex isn't as wide as the frons in most species, only in the *O. amplus* and *O. diversifasciatus* groups does it get visibly wider (character state 3).

The *O. parvicornis* group is the only group with a very narrow vertex (character state 1).

### 3.Face

- 0. entirely dark
- 1. entirely pale
- 2. mostly pale, dark dorso-medially to tubercle to different extents
- 3. mostly pale, with medial, very narrow dark vitta dorsal to tubercle
- 4. mostly dark, narrowly pale laterally

5. lateral 1/3 pale with medial dark vitta that has the same width throughout
6. mostly pale with medial narrow dark vitta ( $\leq 1/5$  of face width)
7. mostly dark, with small pale triangular maculae latero-ventrally to tubercle
8. mostly dark, pale laterally and on a medial vitta
9. with medial wide dark vitta, vitta narrows ventral to tubercle to about 1/3 of the face width
- 10.A. mostly dark, pale on dorso-latero  $\frac{1}{2}$
- 11.B. with medial dark vitta that narrows ventral to tubercle to about 1/5 of the face width
- 12.C. with medial dark vitta (1/3 of face width) that either doesn't reach the oral margin or reaches the oral margin and also has a sub-lateral pair of dark vittae

Comments: Most of the species groups have a entirely pale face (character state 1).

The middle of the face is darkened to different extents and certain patterns only occur in specific groups such as the *O. capitatus* group (character state C), the *O. eblis* group (character state A), and the *O. tristis* group (character states 9 and B).

#### 4.Frons <color>

0. entirely dark
1. entirely pale
2. mostly pale with medial dark vitta
3. mostly dark, narrowly pale laterally
4. mostly dark, pale on ventral  $\frac{1}{2}$  to  $\frac{1}{4}$  lateral to lunule
5. with medial curved pale fascia

Comments: The frons has a very specific pattern (character state 2) in the species groups *O. arx*, *O. callidus*, *O. lepidus* and *O. lineatus*.

#### 5.Frontal triangle

0. entirely dark
1. entirely pale
2. pale laterally until the eye contiguity, but pale disconnected from pale from face
3. dorsal  $\frac{1}{2}$  pale, ventral  $\frac{1}{2}$  dark surrounding antennal insertions



4. pale laterally until the eye contiguity
5. pale laterally, not reaching the eye contiguity
6. mostly pale, dark anterior to eye contiguity and usually with central dark macula
7. mostly pale with central dark macula
8. mostly pale, dark medially above lunule
9. mostly dark, with lateral short pale streaks
- 10.A. mostly pale, with medial narrow dark vitta
- 11.B. mostly dark with a medial curved pale fascia dorsal to lunule

Comments: The frontal triangle behaves differently than the frons pattern due to sexual dimorphism. Specific patterns are restricted to certain groups such as the *O. arx* and *O. lineatus* groups and *O. striatus* (character state 6). Character state 5 is present only in the *O. globiceps* and *O. wulpianus* groups, *O. cf. amplus*, and certain species of the *O. tristis* group. *O. diversifasciatus* and *O. eblis* have specific character states not found in any other group. When the frontal triangle is pale laterally, the pale color is continuous from the face, except on *O. erebus* (character state 2).

#### 6.Lunule central black macula

0. absent
1. as poorly defined darker area
2. well defined from surrounding area

Comments: The central black macula on the lunule is distinct in most *Ocyptamus* groups with the exception of the groups *O. amplus*, *O. cylindricus*, *O. diversifasciatus*, *O. eblis*, and *O. wulpianus*.

#### 7.Scutum lateral margin

0. dark
1. pale from postpronotum to post-alar callus
2. mostly dark, but with a pale spot on the notopleura, anterior to the transverse suture, and on the post-alar callus
3. mostly pale, but dark between transverse suture and post-alar callus, dark sometimes reduced to a spot posterior to suture

4. mostly dark, but with a pale spot on the notopleura, anterior to the transverse suture
5. pale sub-laterally from post-pronotum to transverse suture
6. mostly pale, but dark between postpronotum and transverse suture
7. mostly dark, pale on post-alar callus
8. dark on male, pale on female

Comments: The lateral margins of the scutum are entirely dark (character state 0) in the groups *O. amplus*, *O. diversifasciatus*, *O. eblis*, *O. flukiella*, *O. globiceps*, and *O. tristis*. There are specific pale patterns on the lateral margins of the scutum that are restricted to the *O. cylindricus* (character state 2) and *O. stenogaster* group (character states 6 and 8).

#### 8. Scutellum

0. dark
1. pale
2. mostly dark, pale on base and apex
3. dark medially and basally, lateral and apical margin continuously pale
4. mostly dark, pale on apical margin
5. mostly dark, pale laterally
6. mostly pale, dark basally
7. dark medially, pale on whole margin
8. mostly dark, base pale
9. mostly pale, darker laterally
- 10.A. basal ½ dark, apical ½ pale
- 11.B. mostly pale, dark sub-apically
- 12.C. mostly pale, usually dark on whole margin

Comments: The scutellum is usually unicolorous. A dark and pale scutellar pattern is restricted to specific groups such as the *O. cylindricus* (character state 5) and *O. capitatus* (character state 2) species groups, and the species *O. fascipennis* and *O. lemur* (character state 9), and *O. cf. melanorrhinus* 1 and 2 (character state 4). Character state C only occurs in the *O. diversifasciatus* group.

#### 9. Anterior anepisternum <color>

0. dark

1. pale

Comments: The anterior anepisternum reflects the overall coloration of some groups (e.g. pale in the *O. lineatus* group).

10. Posterior  $\frac{1}{2}$  of posterior anepisternum and dorso-posterior katepisternum

0. dark

1. pale

2. dark on male, pale on female

Comments: The pale vitta that extends from the posterior  $\frac{1}{2}$  of the posterior anepisternum and ends in the dorso-posterior area of the katepisternum is very distinct when present. Although widespread in the groups studied, its absence distinguishes certain groups (e.g. *O. fascipennis* and *O. lemur* from the rest of the *O. cylindricus* group). The sexual dimorphism (character state 2) is restricted to some species, and most of them are part of the *O. cylindricus* group.

11. Anepimeron

0. dark

1. pale in some degree at least on female

Comments: Same note as on character 9.

12. Katepimeron

0. dark

1. pale

2. dark on male, pale on female

Comments: Same note as on character 9. The sexually dimorphic character state 2 is restricted to the *O. stenogaster* group.

13. Katatergum

0. dark

1. mostly pale, dark on ventro-posterior margin

2. pale

3. anterior  $\frac{1}{2}$  pale, posterior  $\frac{1}{2}$  dark

4. mostly dark with anterior pale vitta

Comments: The katatergum is entirely dark in most species. The distinct character state of mostly pale with a dark ventro-posterior margin (1) is present in all representatives of the *O. arx*, *O. elnora* (with the exception of *O. obliquus*), *O. conjunctus*, *O. lineatus*, *O. stenogaster* species groups and the species *O. sp.04* (*O. tristis* group) and *O. cf. melanorrhinus* 2.

#### 14. Metafemur <color>

0. pale with sub-apical dark ring
1. mostly dark, apex pale
2. pale
3. basal ½ pale, apical ½ dark
4. basal ½ dark on female, entirely pale on male
5. mostly dark, basal 1/3 and apex pale
6. mostly pale, base and sub-apical ring dark
7. dark
8. mostly pale but medially dark on female, mostly dark with sub-apical pale ring on male
9. pale with sub-basal and sub-apical dark rings
- 10.A. basal ½ pale on female, male usually mostly dark but sometimes pale to different extents on base
- 11.B. pale with sub-apical dark ring on female, mostly dark and only apex pale on male
- 12.C. mostly dark, ventral side pale (female) or only ventral basal ½ pale
- 13.D. with dark sub-apical ring on female, with dark basal ½ and sub-apical ring on male
- 14.E. mostly dark with only apex pale on female, mostly pale with sub-apical dark ring on male
- 15.F. pale dorsally, dark ventrally
- 16.G. mostly dark, base pale
- 17.H. medial ½ and apex dark
- 18.K. with base and sub-apical ring dark on female, mostly dark except apex pale on male

19.L. mostly dark but base, baso-ventral  $\frac{1}{2}$  and apex pale

Comments: The metafemur pattern is highly variable, but it is constant in some species groups such as *O. capitatus* (character state F), *O. cylindricus* (character state A), and *O. stenogaster* (character state 2). Character state E is uniquely shared by *O. cultrinus* and *O. luctuosus*.

#### 15. Metatibia

0. base (less than basal  $\frac{1}{2}$ ) pale
1. pale on female, dark on male
2. pale
3. pale with sub-basal dark ring and apical  $\frac{1}{4}$  dark
4. with medial  $\frac{1}{2}$  dark
5. dark
6. mostly dark, base and apical  $\frac{1}{4}$  pale
7. mostly dark with pale medial ring, sometimes with pale apex as well
8. mostly dark with basal  $\frac{2}{5}$  pale on female, with basal  $\frac{1}{4}$  and medial ring pale on male
9. mostly dark with apical  $\frac{1}{4}$  pale on female, pale on male
- 10.A. mostly dark with sub-apical pale ring on female, dark on male
- 11.B. mostly pale, apical  $\frac{1}{3}$  dark
- 12.C. mostly pale with small medial dark ring
- 13.D. mostly pale, apical  $\frac{1}{5}$  dark
- 14.E. pale on female, dark with darker medial ring on male

Comments: The metatibia is usually dark in *Ocyptamus* but some character states are constant within groups such as *O. arx* (character state 6) and *O. cylindricus* (character state 5).

#### 16. Metabasitarsomere

0. dark
1. pale
2. mostly dark, apex pale
3. mostly pale, base dark

Comments: The bicoloured metabasitarsomere characteristic of the *O. tristis* group also occurs in other species (e.g. *O. gastrostactus* and *O. rubricosus*). The basitarsomere may be mostly pale with only its base dark (character state 3) or mostly dark with only the apex pale (character state 2), the former being less widespread and the latter commonly occurring among *O. tristis* group species.

#### 17. Ventral calypter

- 0. pale
- 1. pale with margin and pile dark brown
- 2. entirely black
- 3. grey with black margin and pile

Comments: The ventral calypter is usually entirely pale, with no distinction between its membrane and its margin. Contrary to sclerite coloration, when the ventral calypter has a different coloration it doesn't fade much, with the difference in coloration between the membrane and margin clearly visible. Character state 1 is restricted to the *O. lepidus* species group and to some species of the *O. elnora* and some ungrouped species. Character state 2 is restricted to the *O. eblis* group and state 3 to the *O. tristis* group.

#### 18. Male wing

- 0. hyaline basally but gradually turning light brown towards apex
- 1. with small triangular marking extending from c and/or sc to crossvein bm-cu or base of cua1, basal cells usually dark
- 2. light brown
- 3. hyaline with, at most, stigma dark
- 4. baso-anterior margin orange/light brown, black/dark brown on anterior margin from apex of sc towards apex of R2+3
- 5. hyaline or light brown with darker basal, c and sc cells
- 6. light to dark yellow
- 7. hyaline with apical black spot covering apex of r2+3 and sometimes apex of r1 as well
- 8. basal ½ or more dark
- 9. mostly dark, at most apical or posterior margin with hyaline regions

- 10.A. light yellow on basal, c, sc and r cells
- 11.B. basal and c cells dark, also with central dark triangular macula
- 12.C. mostly dark but hyaline on base of c and basal regions of r and bm
- 13.D. hyaline with dark anterior margin, cells r and r2+3 dark
- 14.E. hyaline with dark grey apical spot

Comments: The wing shows sexual dimorphism in several species, so the wing was coded separately for each sex. The mostly dark brown wings (character states 8 and 9) are restricted to the *O. cylindricus* and *O. tristis* groups and the yellow wings (character state 6) are restricted to the *O. lepidus* and *O. lineatus* groups. The mostly hyaline wing with only the stigma darkened (character state 3) is uncommon. Character state 1 was shared only by *O. fascipennis* and *O. lemur*.

#### 19.Female wing

- 0. hyaline basally but gradually turning light brown towards apex
- 1. dark brown, with sub-apical hyaline band
- 2. light brown
- 3. hyaline
- 4. with triangular marking extending from c and/or sc to crossvein bm-cu or base of cua1, basal cells usually dark
- 5. anterior margin light brown until apex of R2+3
- 6. baso-anterior margin orange/light brown, anterior margin light/dark brown from apex of sc to apex of R2+3
- 7. light to dark yellow
- 8. hyaline with apical dark spot covering apex of cell r2+3 and/or r1
- 9. basal ½ or more dark brown
- 10.A. with central large dark triangular macula, c cell dark
- 11.B. light yellow to light brown on basal ½
- 12.C. dark brown but lighter on bm, dm, cua1 and anal lobe
- 13.D. yellow on basal, c and sc cells
- 14.E. hyaline except dark brown on bc, c and sc cells
- 15.F. hyaline with dark anterior margin, cell r2+3 dark

Comments: The wing shows sexual dimorphism in several species, so it was treated differently for each sex. The character states behave similarly as in character 18, and are also constant for the *O. capitatus* (character state D) and *O. lineatus* (character state B) species groups. Character state 6 is restricted to the *O. amplus* species group.

20.3<sup>rd</sup> abdominal tergite

0. base either with a narrow pale fascia or fasciate maculae
1. with medial pale fasciate maculae
2. with sub-basal pale fascia(e)
3. immaculate
4. with sub-basal pale fasciate maculae
5. mostly pale with central pair of dark vittae
6. with sub-basal pale maculae not reaching lateral margins
7. dark with pair(s) of pale vittae
8. mostly pale, with medial narrow dark vitta extending from dark apex, sometimes with sub-lateral pair as well
9. with sub-basal pale triangular maculae laterally, maculae distanced from each other
- 10.A. with sub-basal spotted maculae on male, immaculate on female
- 11.B. lateral margin with basal and/or medial pair of small pale spots
- 12.C. with central pale inverted "V" macula
- 13.D. with only lateral margins of basal ½ pale
- 14.E. with 4 medial pale spots
- 15.F. with baso-lateral pale triangular maculae very close to each other and pale apical margin
- 16.G. with medial short pale fasciate maculae
- 17.H. with pair of medial large pale triangular maculae that usually cover most of the basal 2/3 leaving only the basal corners dark
- 18.K. with sub-basal pale quadrangular maculae laterally, maculae sometimes form a complete fascia
- 19.L. basal ½ pale, margin and apical ½ dark



20. M. with 6 pale spots

21. N. with central short pale vittae flanked by short fasciate maculae

Comments: The coloration of abdominal sclerites is a result of extension or recession of the dark and pale areas. This might seem highly homoplastic, but certain patterns are constant in groups such as in *O. arx* and *O. lineatus* (character state 7), *O. cylindricus* (character state 3) and *O. stenogaster* (character state B). Some are unique to their group such as in *O. eblis* (character state D) and *O. globiceps* (character state C).

21.4th abdominal tergite

0. base either with a narrow pale fascia or fasciate maculae
1. with medial pale fasciate maculae
2. with medial pair of pale vittae and sub-lateral oblique pair
3. mostly orange and immaculate
4. dark and immaculate
5. with pair of sub-basal pale fasciate maculae
6. mostly pale with central pair of dark vittae
7. with pair(s) of pale vittae
8. with pair of medial pale triangular maculae, maculae anteriorly incised and sometimes seem completely separated into short oblique vittae
9. mainly pale with narrow dark vittae extending from apex or with pair of large pale 'inverted V' maculae
10. A. with sub-basal spotted maculae on male, dark and immaculate on female
11. B. with basal pair of pale quadrangular/trapezoidal maculae
12. C. with sub basal pale fascia(e)
13. D. with only lateral margin on basal  $\frac{1}{2}$  pale
14. E. with medial pale spots
15. F. with sub-basal pale quadrangular maculae laterally, maculae sometimes form a complete fascia
16. G. pale on basal  $\frac{1}{2}$  except for a medial narrow dark vitta
17. H. with 6 pale spots

18. K. with sub-basal pale triangular maculae laterally

19. L. with central pale inverted "V" macula, sometimes divided into pair of oblique vittae

Comments: Same note as on character 20. Constant characters states are present in the groups *O. arx* and *O. lineatus* (character state 7), *O. cylindricus* (character state 4) and *O. stenogaster* (character state B). Some are unique to their group such as in *O. eblis* (character state D) and *O. globiceps* (character state L).

22. Occiput dorsal  $\frac{1}{4}$  <rows of pile>

- 0. with 1 row of pile
- 1. with 2 rows of pile
- 2. with 2 rows of pile dorsally and 3 rows ventrally
- 3. with 1 row of pile on male, with 2 rows of pile on female
- 4. with 3-4 rows of pile

Comments: The number of rows of pile on the occiput varies distinctly between the groups. The dorsal region of the occiput has usually one row of pile (character state 0) but in some groups it develops into two distinct rows (character state 2) as in the *O. tristis* group (but not on *O. zeteki* and *O. sp.53*). The sexual dimorphism (character state 3) is restricted to two species of the *O. amplus* group.

23. Occiput dorsal  $\frac{1}{4}$  <pile colour>

- 0. with dark pile
- 1. with pale pile
- 2. with dark pile on anterior row(s) and pale pile on posterior row
- 3. with dark pile on male, with pale pile on female

Comments: The type of pile on the dorsal occiput varies between simple and black to flattened and pale. Character state 2 is present in all *O. stenogaster* group species and state 3 is restricted to two species in the *O. amplus* group.

24. Occiput ventral  $\frac{3}{4}$  <rows of pile>

- 0. with 2 rows of pile dorsally and 3 rows ventrally
- 1. with 1 row of pile dorsally and 3 rows ventrally
- 2. with 2 rows of pile distanced from each other
- 3. with 3 rows of pile

4. with ~5 rows of pile
5. mostly with 4 rows of pile but reducing to 3 rows medially
6. mostly with 3 rows of pile but reducing to 1-2 rows ventrally, ventral rows distanced from eye margin
7. mostly with 2 rows of pile, but reducing to 1 row medially
8. mostly with 5 rows of pile but reducing to 3-4 rows ventrally
9. with 2 rows of pile
- 10.A. mostly with 3 rows of pile, but reducing to 2 rows medially

Comments: As in character 22, but the number of rows and how densely they are arranged are more variable. Most groups have character state A, but there are states that are restricted to certain groups, such as to the *O. cf. melanorrhinus* 1 and 2 (character state 6), *O. parvicornis* (character state 2) and *O. amplus* and *O. wulpianus* groups (character state 3).

#### 25. Occiput ventral $\frac{3}{4}$ <pile shape>

0. with flattened pile
1. with simple pile
2. with simple pile on male, with flattened pile on female
3. with mostly flattened pile, with some simple pile on anterior row(s)
4. with flattened pile on anterior row(s), with simple pile on posterior row

Comments: The ventral occiput pile varies from simple to flattened, and may also vary between its rows. Character state 2 is restricted to the *O. flukiella* group and state 4 to the *O. capitatus* group. Character state 3 is present in all species of the *O. arx* and *O. lineatus* groups.

#### 26. Pile on scutum and scutellum

0. normal and homogeneously distributed
1. short and appressed
2. short and erect
3. longer on male than on female

Comments: The sexual dimorphism character state (3) is shared by all species in the *O. arx* and *O. stenogaster* species groups. Character state 3 is also shared by *O. fascipennis* and *O. lemur*.

27. Scutum anterior row of distinct pile

- 0. absent
- 1. continuous
- 2. interrupted in the middle by shorter pile

Comments: The anterior row of pile on the scutum was one of the characters used by previous authors to distinguish *Ocyptamus* s.s. from other groups. The row is not restricted to the *O.* s.s. group and may be interrupted medially in some groups.

28. Sub-scutellar fringe

- 0. sparse laterally, absent medially
- 1. absent
- 2. weak, inconspicuous
- 3. well developed
- 4. sparse
- 5. well developed on male, weak on female

Comments: The sub-scutellar fringe sexually dimorphic character state (5) is restricted to the *O. arx*, *O. eblis* and *O. wulpianus* species groups, and *O. norina*.

Character state 4 is restricted to *O. cf. melanorrhinus* 1 and 2.

29. Anterior anepisternum <pile>

- 0. bare
- 1. with 1 row of pile
- 2. with pilose patch

Comments: The anterior anepisternum pile patch (character state 2) is one of the characters that identify *Ocyptamus* in current generic keys to Syrphidae. It is absent in some species of the *O. elnora* group and in the *O. croceus* species.

30. Pile on postero-dorsal corner of posterior anepisternum

- 0. short and appressed
- 1. very short and sparse
- 2. long and erect
- 3. short and erect

Comments: The posterior ½ of the posterior anepisternum is always pilose, but its pile characteristics vary distinctly between groups. The very short and sparse pile

(character state 1) is present in the *O. conjunctus*, *O. lepidus*, *O. parvicornis* and *O. stenogaster* groups, and some ungrouped species.

### 31.Pile on anterior anepimeron

- 0. pale
- 1. pale, very sparse and inconspicuous
- 2. partially dark

Comments: The anterior anepimeron usually has pale and conspicuous pile (character state 0). It becomes partially dark (character state 2) in a few groups, and only in *O. conjunctus* is it inconspicuous (character state 1).

### 32.Pile on dorsal katepisternum

- 0. pale
- 1. absent, with dense microtrichia instead
- 2. pale, sparse and inconspicuous

Comments: The pile on the dorsal region of the katepisternum is pale and conspicuous in *Ocyptamus*. Only in the *O. conjunctus* and *O. stenogaster* species groups, and the species *O. cf. zenillia* the pile is inconspicuous.

### 33.Metaepisternum

- 0. pilose
- 1. bare

Comments: The pilose metepisternum (character state 0) is another character that identifies *Ocyptamus* in generic keys for Syrphidae. The pilose character state is not ubiquitous though, and the bare state (1) is found in the *O. amplus*, *O. diversifasciatus*, *O. eblis* and *O. globiceps* species groups. It also changes to bare within the *O. cylindricus* group.

### 34.Katatergum <vestiture>

- 0. with long, appressed microtrichia, looks similar to pile
- 1. with short and inconspicuous microtrichia
- 2. pilose
- 3. with short microtrichia, which gives the sclerite a 'velvet' appearance

Comments: The katatergum microtrichia are usually very densely arranged in *Ocyptamus* (except in *O. conjunctus* and *O. parvicornis*), giving the sclerite a

‘velvety’ appearance. The microtrichia may be long (character state 0) and similar to actual pile, but lack a socket insertion on the sclerite and are flattened (contrary to what is seen in the *O. diversifasciatus* group).

### 35. Metasternum

- 0. bare
- 1. pilose

Comments: The pilose metasternum (character state 1) is exclusive to the *O. amplus* group.

### 36. Metacoxa and metatrochanter

- 0. with normal dark or pale pile
- 1. with thick and dense dark pile

Comments: The thick and dense dark pile on the metacoxa and metatrochanter are found only in the *O. capitatus* and *O. conjunctus* groups.

### 37. Metafemur <pile>

- 0. with normal pile
- 1. with long and thick black pile on apical ½
- 2. with longer and erect pile on anterior surface only on male
- 3. with longer and erect pile on anterior surface of both sexes
- 4. with slightly longer and erect pile on baso-posterior surface

Comments: Character state 2 is only found in the *O. amplus*, *O. cylindricus* and *O. vulpianus* species groups. Character state 4 is restricted to *O. cf. melanorrhinus* 1 and 2.

### 38. Marginal pile of dorsal calypter

- 0. very short
- 1. normal, but much shorter than ventral calypter pile
- 2. either absent or inconspicuous and sparse
- 3. mostly normal and pale, but with a few longer and darker pile dorsally
- 4. long, at least ½ the length of the ventral calypter pile

Comments: The marginal pile of the dorsal calypter is usually distinct although much shorter than the marginal pile of the ventral calypter (character state 1) in *Ocyptamus*. The pile is long (character state 4) only in the *O. amplus* group. The

shorter pile (character state 0) and the lack of any pile (character state 2) are characteristic of some groups.

#### 39. Marginal pile of ventral calypter

- 0. longer dorsally
- 1. normal
- 2. long
- 3. very short

Comments: The marginal pile of the ventral calypter is usually long (character state 2) throughout *Ocyptamus*. The longer marginal pile on only one side of the calypter (character state 0) characterizes the *O. globiceps* and *O. stenogaster* species groups and *O. cf. melanorrhinus* 1 and 2.

#### 40.2<sup>nd</sup> abdominal segment

- 0. with very long and erect pile laterally, pile very distanced from each other
- 1. without differentiated pile laterally
- 2. base with long, erect and abundant pile laterally
- 3. with long, erect and abundant pile laterally
- 4. with long, erect and abundant pile laterally on male, female without differentiated pile
- 5. base with long, erect and sparse pile laterally

Comments: Character state 3 is present in all species of the *O. amplus* group and is shared by *O. fascipennis* and *O. lemur*. Character state 4 only occurs in the groups *O. eblis*, *O. lineatus* and *O. tristis*.

#### 41.3<sup>rd</sup> abdominal tergite <pile>

- 0. mostly with short and appressed pile
- 1. with long and erect pile laterally
- 2. covered with shining pale pile
- 3. mostly with short, appressed and thick pile
- 4. very sparse pilose

Comments: Character state 1 is restricted to the *O. diversifasciatus* group, state 2 to the *O. amplus* and *O. wulpianus* groups, state 3 to the *O. arx* and *O. conjunctus* groups and state 4 to the *O. globiceps* group.

#### 42.Oral margin

- 0. around level of antennal insertions
- 1. projected forward beyond antennal insertions

Comments: The projection of the oral margin is only present in the outgroups (e.g. *Toxomerus*).

#### 43.Gena

- 0. narrow in profile, seen as an elongated triangle ventrally
- 1. normal in profile
- 2. very broad in profile
- 3. very narrow, scarcely seen in profile, seen as a short triangle ventrally
- 4. narrow in profile, seen as a greatly elongated triangle ventrally
- 5. broad in profile, seen as a trapezoid ventrally
- 6. broad in profile, seen as a large triangle ventrally

Comments: The gena is very broad in the *O. amplus*, *O. diversifasciatus* and *O. eblis* species groups. In the remaining groups the gena decreases in size, sometimes narrowing to the point of being difficult to visualize in lateral profile, but from a ventral angle the shape is always distinct (as an elongated isosceles triangle or a small equilateral triangle).

#### 44.Tubercle

- 0. absent, face straight in profile
- 1. weak, face gently convex in profile
- 2. ventrally positioned
- 3. medially positioned and pointed
- 4. medially positioned and gently receding ventrally in a convex manner
- 5. medially positioned and receding very slightly ventrally, practically straight from apex
- 6. dorsally inserted
- 7. ventrally positioned and convex dorsally to antennal insertions
- 8. ventrally positioned and large
- 9. weak, face concave dorsal and ventral to tubercle in profile
- 10.A. ventrally positioned and slightly concave dorsally



11. B. ventrally positioned and concave dorsally

12. C. dorsally positioned and gently receding ventrally in a convex manner

Comments: The tubercle is a distinct facial feature in *Ocyptamus*. From the lateral profile, its apex may be either dorsal (character state 6, *O. cf. melanorrhinus* 1 and 2), medial (character state 3, *O. stenogaster* group) or ventral to the midline of the face (most other character states in *Ocyptamus*). The size of the tubercle changes the curvature of the face as it is seen in character state A (*O. cylindricus* group) and B (for the *O. amplus* and *O. diversifasciatus* groups).

45. Frons <pollen>

0. mostly covered by pale pollen, except for a medial narrow bare area
1. either with sparse pale pollen or without pollen
2. with pale pollen concentrated laterally and oriented dorso-ventrally
3. with pale pollen concentrated laterally as a semi-circular/triangular macula
4. with mostly homogeneously distributed pale pollen, except sparse laterally
5. with pale pollen concentrated laterally and oriented ventro-dorsally
6. with pale pollen concentrated on medial vitta with differently oriented patches
7. with mostly homogeneously distributed pale pollen, except sparse on a medial vitta
8. with mostly homogeneously distributed pale pollen oriented ventro-dorsally, except sparse medially
9. with mostly homogeneously distributed pale pollen, except for a medial inverted 'Y' bare area

Comments: The frons pollinosity is concentrated in different areas and sometimes is differently oriented (which can be observed from either a dorsal or a ventral angle). Character state 3 occurs only in the *O. tristis* group and *O. sp. 09* (ungrouped), and state 7 in the *O. lepidus* group, *O. bromleyi*, *O. cf. zenillia* and *O. cf. zoroaster*.

46. Frontal triangle <pollen>

0. with pale pollen concentrated laterally, sometimes only narrowly
1. either with sparse pale pollen or without pollen
2. with pale pollen concentrated laterally as a semi-circular/triangular macula

3. with mostly homogenously distributed pale pollen oriented dorso-ventrally
4. with mostly homogeneously distributed pale pollen, but medial and lateral pollen differently oriented
5. with mostly homogeneously distributed pale pollen oriented ventro-dorsally

Comments: Due to sexual dimorphism, the male frontal triangle pollinosity is distributed differently than in the female frons, but also shows restricted distribution as seen in character states 2 (*O. tristis* group) and 4 (*O. amplus* and *O. wulpianus*).

#### 47.Frons/frontal triangle rugosity

0. absent, or limited to a small area
1. present

Comments: The distinctly rugose frons/frontal triangle (character state 1) is exclusive to the *O. stenogaster* group.

#### 48.Lateral pollen from face to frons/frontal triangle

0. continuous
1. interrupted at the level of the antennae
2. continuous but microtrichia changes orientation from one region to the other
3. indiscernible

Comments: The pollinosity on the face and frons/frontal triangle are usually continuous, having the same orientation from one region to the other. It is truly absent between the two regions (character state 1) only in *O. sp.09* (ungrouped) and some species of the *O. tristis* group.

#### 49.Ocellar triangle <pollen>

0. at most with sparse pollen as its surroundings
1. with dull dark pollen contrasting to surrounding pale pollen
2. with dense pale pollen as its immediate surroundings
3. without pollen

Comments: The pollinosity on the ocellar triangle is usually sparse and gives the ocellar triangle a dull appearance. In some groups the ocellar triangle is surrounded by dense pale pollen but medially it has dense black pollen (character state 1, in the

*O. arx*, *O. conjunctus* and *O. lineatus* groups), or is entirely covered by dense pale pollen (character state 2), or has no pollinosity at all (character state 3, as in the groups *O. elnora*, *O. stenogaster* and some species of the *O. tristis* group).

50. Ocellar triangle <disposition>

- 0. not protuberant
- 1. protuberant
- 2. very protuberant

Comments: The ocellar triangle is elevated in the *O. arx*, *O. conjunctus*, *O. lineatus* species groups and the species *O. striatus*. The ocellar triangle is also elevated in two species from the *O. tristis* group (*O. adspersus* and, greatly so, *O. ovipositorius*).

51. Male ocellar triangle <distance from posterior eye margin>

- 0. distanced less than its length from posterior eye margin
- 1. distanced its length from posterior eye margin
- 2. distanced 1.5-2 times its length from posterior eye margin
- 3. distanced 2.5-3 times its length from posterior eye margin

Comments: The distance from the ocellar triangle to the posterior eye margin is very distinct in the *O. callidus* group (character state 3).

52. Male anterior ocellus <distance from eye contiguity>

- 0. adjacent to eye contiguity
- 1. distanced from eye contiguity

Comments: An anterior ocellus separated from the eye contiguity is only present in the outgroups (e.g. *Toxomerus*).

53. Female ocellar triangle <distance from posterior eye margin>

- 0. distanced 1 times or less its length from posterior eye margin
- 1. distanced 3 or more times its length from posterior eye margin
- 2. distanced ~1.5 times its length from posterior eye margin
- 3. distanced 2-2.5 times its length from posterior eye margin

Comments: The female ocellar triangle is usually separated by more than its length from the posterior eye margin. A separation of less than its length (character state 0, *O. diversifasciatus*, *O. eblis* and *O. stenogaster* groups and *O. fascipennis* and *O.*

*lemur*) or more than 3 times its length (species *O. bromleyi*, *O. neuralis* and *O. parvicornis*) are restricted to certain groups.

#### 54. Female lateral ocellus

0. distanced 1 times or less an ocellus-width from eye margin, but not adjacent
1. distanced 3 ocelli-width from eye margin due to protuberant ocellar triangle
2. distanced 1.5-2 ocelli-width from eye margin
3. distanced more than 2 but less than 3 ocelli-width from eye margin
4. adjacent to eye margin

Comments: Character state 2 occurs only in the *O. arx* and *O. lineatus* groups and *O. sp. 04* (*O. tristis* group). Character state 3 occurs only in the *O. amplus* and *O. diversifasciatus* groups.

#### 55. Occiput pale pollen

0. homogeneously distributed, but differently oriented dorsally
1. homogeneously distributed
2. concentrated ventrally, pollen dark and sparse dorsally
3. homogeneously distributed, but differently oriented medially

Comments: The occiput is always covered by pale pollinosity, but the pollinosity is sometimes differently oriented in different areas. The *O. eblis* group is the only group where the pollinosity is differently oriented medially (character state 3).

#### 56. Eye posterior margin

0. almost straight
1. rounded
2. triangular
3. with medial small triangular region

Comments: The posterior eye margin sometimes has an indentation on the posterior margin, which is used to distinguish *Ocyptamus* (rounded to sub-triangular) from *Toxomerus* (triangular) in current generic keys for Syrphidae. The sub-triangular and triangular states overlap between the two genera so they were coded as one in this study (character state 2).

#### 57. Antennal insertions

- 0. confluent
- 1. separated on male, partially separated on female
- 2. separated on both sexes

Comments: In most *Ocyptamus* species the antennal insertions are confluent. The sexually dimorphic state (1) is present only in the *O. amplus* group.

#### 58. Antennae

- 0. very close to each other
- 1. distance from each other equal to height of antennal insertion
- 2. distance from each other greater than height of antennal insertion
- 3. close to each other, less than height of antenna insertion

Comments: The distance between the antennae vary greatly between species, but they are at their greatest distance (character state 2) in the *O. amplus* and *O. eblis* groups.

#### 59. Pedicel proximal-apical margin

- 0. rounded
- 1. with extension over basoflagellomere, more distinct on female

Comments: The narrow extension from the pedicel over the basoflagellomere (1) is exclusive to the *O. cylindricus* group.

#### 60. Basoflagellomere <length in relation to scape and pedicel>

- 0. as long as or slightly longer than scape + pedicel
- 1. as long as scape and pedicel
- 2. as long as pedicel, but longer than scape
- 3. long, much longer than scape + pedicel
- 4. shorter than scape + pedicel
- 5. long and wide on female, much longer than scape+pedicel, as long as scape + pedicel on male

Comments: The overall size of the basoflagellomere in relation to its preceding segments has exclusive states in the *O. conjunctus* (character state 1), *O. cylindricus* (character state 5) and *O. wulpianus* (character state 4) species groups, and *O. cf. melanorrhinus* 1 and 2 (character state 2).

#### 61.Scape

- 0. short, as long as wide or shorter
- 1. long, longer than wide
- 2. much longer than wide

Comments: The scape is usually short in *Ocyptamus*, except in the *O. amplus* (state 1), *O. conjunctus* (state 2) and *O. diversifasciatus* (state 1) species groups.

#### 62.Basoflagellomere <shape>

- 0. rounded, as long as wide
- 1. oval, short
- 2. oval, long, ~1.5 times longer than wide
- 3. elongate, 2 times or more longer than wide
- 4. widened, slightly tapering apically
- 5. oval short on male, oval long on female

Comments: The basoflagellomere has a distinct shape (character state 4) exclusive to the *O. cylindricus* group.

#### 63.Body

- 0. without small pits
- 1. covered by small pits

Comments: Character state 1 is exclusive to *Paragus* and *Pseudodoros*.

#### 64.Scutum

- 0. without distinct pollinose pattern
- 1. covered by dense pale pollen, with 3-4 sub-shining vittae
- 2. with sparse pale pollen, with 4 sub-shining vittae
- 3. with 3 vittae of golden pollen
- 4. with 3 vittae of golden pollen and vittae joined together posteriorly by a circular pollinose area
- 5. with 3 vittae of golden pollen, middle vitta interrupted medially
- 6. with median pair of closely positioned pale pollinose vittae, with dull dark pollen on regions between and flanking the vittae
- 7. with sparse pale pollen, pollen concentrated on medial and sub-medial pair of weak vittae

8. with sub-medial pair of weak pale pollinose patches on anterior region;  
might have weak vittae in place
9. with medial pale pollinose vitta, flanked by pair of brown pollinose vittae;  
with sparse pale pollen between pair of vitta and sides of scutum
- 10.A. shining, with medial narrow pale pollinose vitta and sub-medial pair of  
shorter vitta
- 11.B. with medial pale pollinose vitta
- 12.C. covered with 'metallic' pollen
- 13.D. shining, with some brown pollen anteriorly
- 14.E. with 3 narrow pale pollinose vittae separated by black dull pollen;  
scutum with 'metallic-blue' reflection laterally
- 15.F. covered by brown pollen, with 3 medial inconspicuous vittae of  
differently oriented pollen
- 16.G. red/orange without distinct pollinose pattern

Comments: The scutum is usually covered by pollinosity in *Ocyptamus*. This pollinosity forms different patterns due to its concentration and distribution in the scutum, as seen in the *O. amplus* (character state C), *O. arx* (character state 4), *O. callidus* (character state 3) and *O. lineatus* (character state 1) species groups. There are cases where the pollen is so sparse or restricted in its distribution that the scutum is actually shining in most of its extent, as seen on the species *O. striatus* (character state A), and *O. sp. 09* and *O. titania* (character state D).

#### 65. Metasternum <position to thorax>

0. not developed, sclerite narrow dorsal to metacoxa
1. developed and obliquely inserted, sclerite wide dorsal to metacoxae

Comments: The metasternum is usually reduced and only visible from a ventral angle in *Ocyptamus* species, except for the *O. capitatus* and *O. conjunctus* groups which have a well developed metasternum that is clearly visible in lateral profile (character state 1).

#### 66. Postmetacoxal bridge

0. complete
1. incomplete, metathoracic epimera extended

2. incomplete, metathoracic epimera very close to each other with little membrane separating them
3. incomplete, metathoracic epimera not extended

Comments: The postmetacoxal bridge is incomplete in *Ocyptamus*, but the *O. stengoaster* group, and a few species in the *O. tristis* group, have it nearly complete, with the apices of the metathoracic epimera almost touching each other (character state 2).

#### 67.Female protarsus <compared to male>

0. normal
1. widened
2. narrowing from the 2<sup>nd</sup> tarsomere to the last

Comments: There is usually no difference between the protarsus of females and males in *Ocyptamus*, but in the *O. capitatus*, *O. conjunctus*, *O. eblis* species groups and some species of the *O. tristis* group, the females have distinctly wider tarsomeres than the males.

#### 68.Metafemur <ventral macrotrichia>

0. without distinct macrotrichia
1. with setulae
2. with thick pile

Comments: *O. capitatus* and *O. conjunctus* have distinct thick dark pile ventrally on the metafemur (character state 2), not seen in any other *Ocyptamus* species.

#### 69.Plumula

0. either absent or much shorter than subalare
1. short, as long as subalare
2. long, about 2 times as long as subalare

Comments: This character was used following the work of Mengual et al. (2009). This character is highly variable in *Ocyptamus*, but some states were constant in the *O. amplus* (character state 2) and *O. arx* (character state 1) species groups.

#### 70.Calypter

0. reduced, dorsal and ventral lobe with similar width
1. dorsal lobe narrower than ventral lobe



Comments: The ventral lobe of the calypter is usually much wider than the dorsal lobe in *Ocyptamus*, but in the groups *O. lepidus* and *O. stenogaster* it is reduced to a width similar to the dorsal lobe.

#### 71.Alula

0. narrow (as wide as c cell)
1. absent
2. convex, 2-3 times larger than c cell
3. very narrow and inconspicuous, narrower than c cell
4. narrow basally, wider and greatly convex apically; around the width of c cell or much wider
5. linear and 2 times wider than c cell

Comments: The alula may be reduced to the width of the c cell (character state 0 in the groups *O. callidus*, *O. elnora* and *O. lepidus* species groups) or lacking (character state 1 in the *O. globiceps*, *O. stenogaster* species groups as well as some ungrouped species) in *Ocyptamus*.

#### 72.Alula <microtrichosity>

0. bare
1. very sparse microtrichose
2. microtrichose
3. posterior half microtrichose
4. anterior half microtrichose
5. bare on basal ½ on male, mostly bare on posterior ½ (except for apex) on female
6. mostly bare, except for apical ¼
7. mostly bare except for anterior margin and apex
8. mostly bare, with sparse microtrichosity on posterior margin and apex

Comments: When the alula is present and visible, there are patterns of microtrichosity that are restricted to the *O. callidus* (character state 4), *O. diversifasciatus* (character state 8) and *O. parvicornis* (character state 0) species groups, and the species *O. fascipennis* and *O. lemur* (character state 6).

#### 73.Male wing <microtrichosity on cells c, r and bm>

0. bare on base of c, basal 1/3 of r and basal 2/3 of bm
1. bare on basal 1/2 to 2/3 of c, r (might have some small patch of microtrichosity on apex) and most of bm (apical 1/4 microtrichose to different extents) with small apical microtrichose fold
2. bare on basal 1/3 to 1/4 of c, basal 1/4 to 1/5 of r and base of bm
3. bare on c, r and bm
4. bare on basal 1/2 and most of anterior margin of c, microtrichose on r and bm
5. bare on basal 1/3 of c, entirely bare on r and bm (except microtrichose on apical fold)
6. microtrichose on c, r and bm
7. microtrichose on c, bare on posterior 1/2 and anterior apex of r, and most of bm
8. microtrichose on r, bare on basal 2/5 of c and basal 1/4 of bm
9. bare on basal 1/4 of c, most of r (except for some sparse microtrichosity on apex) and most of bm (except for fold)
- 10.A. microtrichose on c, bare on baso-posterior 2/3 of r and basal 2/3 of bm (except for bases)
- 11.B. bare on basal 1/3 to 1/4 of c, baso-posterior 1/2 of r and baso-anterior margin to most of anterior 1/2 of bm
- 12.C. microtrichose on r, bare on base of c and basal 1/3 of bm
- 13.D. microtrichose on c, bare on posterior 1/2 of r and anterior margin of bm
- 14.E. bare on basal 1/3 of c, small basal patches on r and basal 3/4 of the anterior margin of bm
- 15.F. microtrichose on r and bm, bare on basal 1/5 of c
- 16.G. bare on base of c and small baso-anterior patch on r and bm
- 17.H. microtrichose on c, bare on baso-posterior 1/2 of r and baso-anterior 1/2 of bm
- 18.K. microtrichose on c and bm, bare on baso-posterior 1/2 of r
- 19.L. bare on basal 1/2 of c, basal 1/2 of r and base of bm

20. M. bare on  $\frac{3}{4}$  or more of c,  $\frac{3}{4}$  or more of r and most of bm (except for apex)

21. N. bare on basal  $\frac{1}{4}$  of c, basal  $\frac{1}{2}$  of anterior margin and basal  $\frac{1}{5}$  of posterior margin of r, and basal  $\frac{4}{5}$  of bm

22. O. bare on basal  $\frac{1}{3}$  of c, baso-anterior area of r and basal  $\frac{1}{4}$  of bm

Comments: The wing is entirely microtrichose in most *Ocyptamus* species, but the extent of bare regions (that extend into the cells c, r and bm specifically) characterize the groups *O. capitatus* (character state 7) and *O. stenogaster* (character states 2 and L) and the species *O. fascipennis* and *O. lemur* (character state M).

74. Female wing <microtrichosity on cells c, r and bm>

0. bare on base of c, base of r and basal  $\frac{1}{2}$  of bm

1. bare on basal  $\frac{2}{3}$  of c, entirely bare on r and bm (except microtrichose on apical fold)

2. bare on basal  $\frac{1}{3}$  of c, base of r and basal  $\frac{1}{5}$  of bm

3. bare on c, r and bm

4. microtrichose on r and bm, mostly bare on c (except for apex)

5. bare on basal  $\frac{1}{3}$  of c, r (except for some small microtrichose patches) and bm (except for fold)

6. microtrichose on c, r and bm

7. microtrichose on c, mostly bare on r (except some sparse microtrichia on baso-anterior  $\frac{1}{2}$ ) and bm (except for posterior margin)

8. bare on basal  $\frac{1}{2}$  of c, r (except for apex) and basal  $\frac{3}{4}$  of bm

9. microtrichose on c, bare on baso-posterior  $\frac{2}{3}$  of r and basal  $\frac{2}{3}$  of bm (except for microtrichose bases)

10. A. bare on base to basal  $\frac{1}{4}$  of c, basal  $\frac{2}{3}$  of r and most of bm (except for apico-posterior margin)

11. B. bare on basal  $\frac{1}{3}$  to  $\frac{2}{3}$  of c, basal  $\frac{1}{5}$  of r and base of bm

12. C. with a basal bare patch on c, bare on baso-posterior  $\frac{1}{2}$  of r and most of the anterior  $\frac{1}{2}$  of bm

13. D. microtrichose on r and bm, bare on anterior margin and basal  $\frac{1}{3}$  of bm

- 14.E. microtrichose on c, bare on mid-anterior patch on r and basal  $\frac{3}{4}$  of bm
- 15.F. bare on basal  $\frac{1}{4}$  to  $\frac{2}{5}$  of c, basal  $\frac{1}{3}$  to basal  $\frac{2}{5}$  of r, and baso-anterior margin of bm
- 16.G. bare on base of c, baso-anterior  $\frac{1}{2}$  of r, anterior margin and basal  $\frac{2}{3}$  of bm
- 17.H. microtrichose on c, mostly bare on r (except microtrichose on apico-posterior  $\frac{1}{3}$ ), and bare on bm
- 18.K. bare on c (except for apex), basal  $\frac{1}{2}$  of r, base and baso-anterior  $\frac{1}{2}$  of bm
- 19.L. bare on basal  $\frac{3}{4}$  or more of c, basal  $\frac{3}{4}$  or more of r and most of bm (except for apex)
- 20.M. microtrichose on c, bare on basal  $\frac{1}{2}$  of r and baso-anterior  $\frac{1}{2}$  of bm
- 21.N. microtrichose on r, bare on basal  $\frac{3}{4}$  of c and basal  $\frac{1}{3}$  of bm

Comments: The pattern of microtrichosity doesn't behave in the same way in the female as it does in the male, and it didn't show much correlation with the male character state, so it was coded separately. The character state B was exclusive to the species *O. sp. 09* and *O. titania*.

#### 75.Vein M1

- 0. slightly sinuous
- 1. nearly straight, joins R4+5 at the same level it leaves M
- 2. very sinuous
- 3. very sinuous, more so the posterior curve
- 4. very outwardly oblique, joining R4+5 very far from where it left M

Comments: The straight M1 vein (character state 1) is exclusive to the *O. elnora* and *O. flukiella* groups. The *O. capitatus* group is the only one that has a very sinuous M1 vein (character state 3) in *Ocyptamus*.

#### 76.Vein R4+5

- 0. somewhat straight
- 1. sinuous
- 2. greatly dipped into cell r4+5

Comments: Vein R4+5 is only sinuous (character state 1) in the *O. capitatus* group.

#### 77. Anal lobe

- 0. normal and convex basally
- 1. reduced and straight basally

Comments: The anal lobe is usually basally convex in *Ocyptamus*, but it narrows in the *O. globiceps*, *O. parvicornis*, *O. stenogaster* species groups and in *O. cf. melanorrhinus* 1 and 2, a few of the ungrouped species and *O. sp. 27* (*O. tristis* group).

#### 78. Abdomen

- 0. very long, more than 3 times the length of the thorax
- 1. less than 1.5 times the length of the thorax
- 2. between 1.6 and 2 times as long as thorax
- 3. long, between 2.1 and 2.9 times as long as thorax
- 4. male long, female very long

Comments: The abdomen length in relation to the rest of the body is very discrete in some groups (e.g. character state 0 in the *O. stenogaster* group), and the sexual dimorphism observed (character state 4) was restricted to the *O. tristis* group.

#### 79. 1<sup>st</sup> abdominal tergite

- 0. crescent shaped with lateral surface narrow
- 1. crescent shaped with lateral surface wide
- 2. with sides sub-acute, directed laterally
- 3. with sides pronged
- 4. greatly constricted medially, constriction wide, floating sclerite wide
- 5. longer medially, apical margin slightly lobate, lateral margins convex towards base
- 6. crescent shaped and narrow
- 7. greatly constricted medially, constriction narrow, floating sclerite triangular
- 8. trapezoidal short
- 9. crescent shaped with enlarged lateral lobes
- 10.A. trapezoidal short with medial concave notch on posterior margin
- 11.B. greatly constricted medially, constriction narrow, floating sclerite narrow

- 12.C. crescent shaped, lateral extremities slightly enlarged, and with notch on anterior margin
- 13.D. greatly constricted medially, constriction narrow, with no floating sclerite
- 14.E. strongly constricted medially on female, constriction narrow, with no floating sclerite; crescent shaped on male with enlarged lateral lobes
- 15.F. crescent shaped with laterally directed extremities
- 16.G. sides sub-acute, positioned dorsally, directed dorsally
- 17.H. greatly constricted medially, constriction wide, with no floating sclerite
- 18.K. trapezoidal, lateral extremities rounded
- 19.L. crescent shaped, posterior margin greatly concave

Comments: The 1<sup>st</sup> abdominal tergite proved to be a very plastic in shape. It had restricted character states for the *O. amplus* and *O. globiceps* (character state H) species groups, *O. callidus* (character state 8), *O. capitatus* (character state G) and some species of the *O. tristis* group (character state K).

#### 80.Male 2nd abdominal segment

- 0. very narrow and very long, more than 7 times longer than smallest width
- 1. rectangular, wide
- 2. long, not so narrow
- 3. rectangular long
- 4. quadrangular
- 5. trapezoidal with very wide apical margin and strongly constricted base
- 6. long, not so narrow, and slightly expanded apically
- 7. rectangular long, slightly expanded apically
- 8. very long and narrow
- 9. rectangular long, narrow

Comments: The shape of the 2<sup>nd</sup> abdominal segment is distinct between groups, even those groups that share similar habitus. The very narrow and long state (0) is only present in the *O. flukiella* and *O. stenogaster* species groups, and a few species of the *O. tristis* group, *O. sp. 09* and *O. titania*. Character state 6 is present in the *O. arx*, *O. capitatus* and *O. conjunctus* groups.

#### 81.Female 2nd abdominal segment

0. very narrow and very long, more than 7 times longer than smallest width
1. rectangular wide
2. long, not so narrow
3. trapezoidal
4. quadrangular
5. triangular
6. rectangular long
7. constricted basally, widened apically
8. long and narrow

Comments: The shape of the 2<sup>nd</sup> abdominal segment is not always the same in the female as in the male, and some states are shared by different groups such as character 5 on *O. capitatus* and *O. conjunctus*.

#### 82. Male 4<sup>th</sup> abdominal sternite

0. simple
1. with pair of apico-lateral extensions
2. with apico-lateral right slightly produced and acute

Comments: The male 4<sup>th</sup> abdominal sternite has long extensions (character state 1) in the *O. parvicornis* group and is slightly produced on the right side (character state 2) on the *O. callidus* group.

#### 83. Male 5<sup>th</sup> abdominal sternite

0. simple
1. with pair of apico-lateral folds
2. greatly reduced on right side

Comments: The male 5<sup>th</sup> abdominal sternite is greatly reduced on the right side only on the species *O. antiphates* and *O. dimidiatus*.

#### 84. Male 5<sup>th</sup> tergite

0. not visible
1. rectangular, wide and short, more than 2 times wider than long
2. rectangular and wide, less than or around 2 times wider than long
3. wide and very short
4. sub-quadrangular

Comments: The male 5<sup>th</sup> tergite is usually rectangular and wide (character state 2) in *Ocyptamus*. The decrease in length (character states 1 and 3) or the almost quadrangular shape (character state 4) are believed to be shared by smaller subsets of species inside the species groups.

85.Female 5<sup>th</sup> segment shape

- 0. wide and very short, more than 3 times wider than long
- 1. sub-quadrangular
- 2. rectangular and wide
- 3. rectangular and long

Comments: The female 5<sup>th</sup> tergite is usually rectangular wide (character state 2), but the almost quadrangular shape (character state 1) is believed to form smaller subsets of species within species groups.

86.Male and female post-abdominal segments

- 0. smaller than pre-abdominal segments
- 1. similar or slightly larger than pre-abdominal segments
- 2. large and bulging only on male
- 3. larger/longer only on female

Comments: The post-abdominal segments are usually reduced, but they might be developed in the male (character state 2, in the *O. callidus* species group and *O. macropyga* and *O. filiulus*), the female (character state 3, exclusive to the *O. tristis* group) or both sexes (character state 1, exclusive to the *O. capitatus* group).

87.Female 6th abdominal segment

- 0. divided into tergite and sternite
- 1. with tergite and sternite fused on apical 1/3, poorly fused on basal 2/3
- 2. with tergite and sternite fused, forming a single cylindrical sclerite

Comments: The female 6<sup>th</sup> abdominal segment is a single sclerite (character state 2) only in the *O. tristis* group.

88.Female 6th abdominal segment <length>

- 0. shorter than 5<sup>th</sup> segment
- 1. conspicuous, similar to 5<sup>th</sup> segment
- 2. long



Comments: The female 6<sup>th</sup> abdominal segment is only longer than the 5<sup>th</sup> segment in the *O. tristis* group.

89. Female 7<sup>th</sup> tergite

0. rectangular wide and narrow
1. rectangular wide
2. as pair of quadrangular sclerotizations
3. rectangular, with one- or three-pronged sclerotized pattern
4. as pair of lateral rectangular wide sclerotizations
5. as pair of narrow triangular sclerotizations, tergite sometimes sclerotized laterally as well
6. quadrangular
7. as pair of sclerotized stripes
8. highly sclerotized, concave dorsally, and with short baso-lateral projections
9. lightly sclerotized basally and laterally
10. A. as a highly sclerotized band that extends apico-laterally surrounding the whole segment
11. B. with pair of long basal apodemes

Comments: The female 7<sup>th</sup> tergite has a great diversity of shapes, with distinct forms in the *O. arx* and *O. lineatus* groups (character state 5), *O. capitatus* (character state A), *O. cylindricus* (character state 3), *O. stenogaster* (character state 6) and *O. tristis* group (character state B).

90. Female 8<sup>th</sup> tergite

0. as a narrow sclerotized fascia, projected medially on anterior margin
1. as a large triangular sclerotization
2. rectangular narrow, lightly sclerotized
3. rectangular
4. quadrangular
5. with central sclerotized vitta
6. trapezoidal
7. as a large shield-like sclerotization with a heavily sclerotized spot

8. as a narrow triangular sclerotization
9. boomerang-shaped with sides weakly sclerotized
- 10.A. with pair of triangular sclerotizations
- 11.B. as a short triangular sclerotization
- 12.C. rectangular, concave on apical and posterior margin, apical margin concavity varies from distinct to very shallow
- 13.D. rectangular, but with central differentiated triangular sclerotization
- 14.E. trapezoidal, with acute projection on apical margin
- 15.F. modified into a triangular plate with basal crest, usually less sclerotized medially
- 16.G. with narrow triangular sclerotization, bordered by heavier sclerotization
- 17.H. trapezoidal with concave posterior margin
- 18.K. rectangular, with a three-pronged sclerotization

Comments: The female 8<sup>th</sup> tergite is as plastic as the 7<sup>th</sup>, with group specific states such as the triangular plate (character state F) present only in the *O. tristis* group.

#### 91. Female 8<sup>th</sup> sternite

0. as a short triangular sclerotization
1. as a rectangular sclerotization with apical margin concave
2. as a large triangular sclerotization
3. as a rectangular sclerotization
4. as a basal narrow rectangular sclerotization, with apico-lateral projections (either blunt, triangular, or narrow and elongated)
5. sub-quadrangular, with sclerotized apical structures that fold inside the segment
6. rectangular with apico-lateral acute projections and baso-lateral dorsal extensions
7. as a pair of oval sclerotizations, densely pilose between the sclerotizations
8. variable, but with a medial small triangular notch on posterior margin
9. as a pair of lateral sclerotized stripes
- 10.A. as a lateral pair of triangular sclerotizations
- 11.B. as a lateral pair of large rectangular/trapezoidal sclerotizations

- 12.C. sub-quadrangular with slightly expanded apical corners
- 13.D. with pair of sinuous lateral sclerotizations, which compress the segment basally
- 14.E. as a pair of lateral rectangular sclerotizations, with short apico-ventral extension

Comments: The female 8<sup>th</sup> sternite may assume different shapes and be either a single sclerite or a pair of sclerites, and adopts specific states in the *O. capitatus* (character state C), *O. eblis* (character state D) and *O. tristis* (character state E) species groups.

#### 92.Female 10<sup>th</sup> tergite

- 0. as a pair of separate sclerites, with basal extension into abdomen
- 1. as a pair of separate sclerites, without basal extensions
- 2. as a pair of small rectangular wide sclerotizations close to each other
- 3. as a pair of separate sclerotizations, each one fused apically to base of cerci
- 4. indistinct from cercus
- 5. as pair of separate sclerites seemingly continuous to cerci, with basal extension into abdomen
- 6. as pair of separate strips of sclerotization, with basal extension into abdomen
- 7. as pair of separate sclerites connected by narrow strip basally, with basal extension into abdomen
- 8. fused to dorsal surface of cercus but still distinct from it
- 9. as pair of separate sclerites fused to each other laterally, with basal extension into abdomen
- 10.A. as a narrow sclerotization with apico-lateral extensions that merge with cercus forming a continuous structure with the latter
- 11.B. as pair of separate rectangular plates that merge with the base of the cerci forming a continuous structure, and with basal extension into abdomen

12. C. as pair of separate narrow sclerites connected by narrow bridge basally and fusing into cerci apico-laterally by a narrow strip, and with basal extension into abdomen

Comments: The female 10<sup>th</sup> tergite only shows the modifications of character states 8 and A in the *O. tristis* group, and state 9 in the *O. stengoaster* group.

93. Female cercus <pilosity>

- 0. with whole surface pilose
- 1. homogeneously covered by setulae
- 2. with only apical margin pilose (1 row of pile)
- 3. entirely pilose and with setulae dorsally
- 4. with only apical margin pilose (2 or more rows of pile)

Comments: The female cercus pilosity varies in its distribution, but the *O. tristis* group is the only group with the pile restricted to the margin of the cercus. The presence of setulae is not homologous to the other states in this character and should be treated as a separate character.

94. Female cercus

- 0. overall well sclerotized
- 1. sclerotized apically
- 2. sclerotized medially
- 3. with no visible sclerotization
- 4. sclerotized ventrally
- 5. sclerotized dorsally

Comments: The areas of the cercus that are sclerotized are unique to certain groups, such as character state 5 to the *O. stenogaster* group and *O. fascipennis* and *O. lemur* and character state 2 in some species of the *O. tristis* group.

95. Female cercus large pits

- 0. absent
- 1. present apico-ventrally

Comments: The large pits in the female cercus are only found in *Allograpta* species.

96. Male 8<sup>th</sup> sternite

- 0. simple, rounded at apex

1. with apical projection
2. with sub-apical short projection
3. with basal long projection

Comments: The male 8<sup>th</sup> sternite is usually unmodified in *Ocyptamus*, but some species have projections on this sclerite (character state 2 on *O. cf. amplus*, *O. cf. princeps* and *O. funebris*, and state 3 on *O. parvicornis*).

#### 97.Epandrium

0. with apical sides broadly separated
1. with apical sides approximated
2. with apical sides nearly touching
3. closed around cerci

Comments: Some species groups of *Ocyptamus* have the apices of the cercus approximated to the point where they enclose the cerci (character state 3) in *O. parvicornis*.

#### 98.Male cercus

0. unmodified, usually oval
1. with anterior cylindrical extension
2. enlarged and modified for clasping

Comments: Only the *O. capitatus* group and the *O. pumilus* species have a modified male cercus.

#### 99.Apical process (of subepandrial sclerite) between surstyli

0. absent
1. triangular
2. bilobate

Comments: Only the *O. lepidus* group has a bilobate process between the bases of the surstyli.

#### 100.Surstylus

0. cylindrical and curved
1. sinuous and knife-like, perpendicularly positioned to epandrium plane
2. triangular
3. sub-oval

4. oval long, flat and slightly curved
5. sub-oval long
6. sub-quadrangular with extended apex
7. sub-oval with expanded basal 3/5
8. sub-rectangular and large
9. with medial bridge joining to other surstylus
- 10.A. cylindrical and 'L'-shaped
- 11.B. digitiform long
- 12.C. rectangular large with expanded apex
- 13.D. lanceolate leaf-like and large
- 14.E. quadrangular with filiform apical extension bent halfway through
- 15.F. either oval, curving slightly apically and acute or with setulae on dorso-lateral surface
- 16.G. lanceolate
- 17.H. sub-triangular
- 18.K. knife-like and short, dorsal margin convex, ventral margin straight
- 19.L. rectangular with apico-lateral projection
- 20.M. sub-rectangular with concave dorsal margin
- 21.N. rectangular and large, usually with a short acute apex
- 22.P. sub-triangular and long
- 23.Q. rectangular
- 24.R. bilobated, baso-ventral lobe reduced
- 25.S. triangular short
- 26.T. enlarged, irregular and asymmetrical
- 27.U. sub-cylindrical, elongated and slightly swollen medially
- 28.V. oval and large, with expanded apical 1/3

Comments: The surstyli is often very species specific, but overall similarities can be delimited for certain groups, as in the *O. callidus* (character state R), *O. capitatus* (character state U), *O. stenogaster* (character state E) and *O. tristis* (character state 3 and H) groups and *O. cf. melanorrhinus* 1 and 2 species (character state B).

101.Surstylus insertion

- 0. external to epandrium
- 1. internal to epandrium

Comments: The *O. capitatus* group is the only group where the surstylus is inserted internally to the epandrium.

#### 102. Surstyli bases

- 0. very distanced from each other, more than the width of the cerci
- 1. distanced from each other by roughly the width of the cerci
- 2. very close to each other, almost touching
- 3. close to each other
- 4. fused together

Comments: The distance between the bases of the surstyli is shared by subset of species in the groups. The surstyli are fused together (character state 4) only in *O. parvicornis*.

#### 103. Male cercus <distance from surstylus base>

- 0. close to surstylus base
- 1. distanced from surstylus base
- 2. slightly distanced from surstylus base

Comments: The cercus is separated from the surstylus base (character state 1) in *Salpingogaster* s.s. and is slightly distanced (character state 2) in some species of *Ocyptamus*.

#### 104. Ventral surface of surstylus

- 0. with very sparse setulae
- 1. with setulae concentrated on anterior margin of apical  $\frac{1}{2}$
- 2. with setulae concentrated on apex and anterior margin, innermost setulae longer
- 3. with setulae concentrated basally, sparse towards apex
- 4. with setae concentrated on apex and some sparse on anterior margin
- 5. with setulae concentrated on apical  $\frac{1}{3}$ , sparse and longer on posterior margin, bare elsewhere
- 6. with setae concentrated on apical  $\frac{1}{3}$ , setulae on mid  $\frac{1}{3}$ , and bare on base

7. with homogeneously distributed setae
8. with setulae distributed in patches
9. with homogeneously distributed setulae
- 10.A. with setulae on apical ½
- 11.B. with setulae concentrated on apex and some sparse on anterior margin
- 12.C. with setulae concentrated on apical margin, sparse on apex
- 13.D. with setulae concentrated on apex
- 14.E. with setae on apical 2/3
- 15.F. with setae densely distributed on apical ½, sparse on basal ½
- 16.G. without setulae, but with setulae on dorsal surface
- 17.H. with setulae concentrated on posterior margin

Comments: The ventral setulae on the surstylus have restricted distribution in the *O. tristis* group, the species *O. fascipennis* and *O. lemur* (character state A), *O. cf. melanorrhinus* 1 and 2 (character state 6), and between *O. sp. 09*, *O. sp. 53*, *O. titania* and *O. zeteki* (character state A).

#### 105. Male subepandrial sclerite

0. triangular and large, with rounded apical margin and central unsclerotized area
1. quadrangular, tapering to ½ its width apically
2. rectangular wide
3. quadrangular with basal corners slightly extended laterally
4. rectangular wide and narrow
5. rectangular long, constricted medially and slightly wider apically
6. reduced, apical margin extends between bases of surstyli as an acute projection
7. rectangular wide with basal corners slightly extended posteriorly and acute
8. quadrangular, with apical corners slightly extended
9. enlarged, dorsal surface convex, sometimes with antero-lateral lobes projecting beyond epandrium
- 10.A. 'manta ray' shaped



11. B. rectangular wide with basal corners slightly extended posteriorly and round
12. C. either rectangular long with narrow basal corners projecting posteriorly or 'teardrop' shaped, long with basal corners projecting laterally
13. D. quadrangular with baso-lateral corners extended as 'wings'
14. E. trapezoidal, with basal and apical corners extended
15. F. 'wing' shaped and wide, basal corners slightly to greatly extended, and with apical projecting lobes
16. G. rectangular wide with basal corners greatly extended
17. H. 'butterfly' shaped
18. K. 'wing' shaped
19. L. trapezoidal, with posterior corners slightly extended
20. M. as a pair of triangular/diamond shaped sclerites, which join medially
21. N. rectangular wide, with basal corners greatly extended and straight
22. P. sub-quadrangular, with convex lateral margins and slightly extended posterior corners
23. Q. 'swallowtail' shaped
24. R. rectangular long
25. S. quadrangular with dorsal surface convex, with basal corners slightly extended
26. T. rectangular wide, basal margin with great concavity, basal corners acute
27. U. 'five-point star' shaped

Comments: The subepandrial sclerite is very plastic and has group specific shapes in many of the *Ocyptamus* groups.

#### 106. Hypandrium <dorsal profile>

0. oval, with narrow dorsal bridge
1. oval on basal 1/3, quadrangular and wider on apical 2/3
2. quadrangular, with dorsal bridge extended basally
3. oval but constricted before apex, apex as an inverted trapezoid

4. oval on at least basal 2/3, apex quadrangular and much narrower than basal 2/3
5. quadrangular and short, flat in lateral profile
6. sub-quadrangular
7. 'teardrop' shaped with short dorsal bridge, and mid-lateral ventral notch
8. 'teardrop' shaped with sub-apical ventro-lateral lobes, dorsal bridge very narrow and with extended lip
9. basal ½ oval, apical ½ quadrangular and of same width as basal ½
- 10.A. rectangular, with narrow dorsal bridge
- 11.B. rectangular and short
- 12.C. trapezoidal and long
- 13.D. oval, and robust apically
- 14.E. oval, with basal half expanded ventrally
- 15.F. 'teardrop' shaped, with dorsal bridge extended basally, sometimes with sub-apical ventro-lateral lobes
- 16.G. almost circular, with dorsal bridge extended dorsally
- 17.H. rectangular, and robust apically
- 18.K. rectangular and very long, dorsal bridge very wide
- 19.L. 'teardrop' shaped, much smaller than epandrium
- 20.M. basal ½ oval, apical ½ quadrangular and narrower than basal ½
- 21.N. 'teardrop' shaped, of similar size to epandrium
- 22.P. quadrangular and short, robust on apical ½ in lateral profile
- 23.Q. quadrangular, dorsal bridge extended basally but unsclerotized medially
- 24.R. oval, robust on apical ½ in lateral profile
- 25.S. oval, with wide dorsal bridge, flat in lateral profile

Comments: As in character 105, the hypandrium overall shape is group-specific, as seen in the *O. lepidus* group (character state F), *O. stenogaster* (character state S) and *O. tristis* (character state L).

107. Hypandrium ventral notch

0. absent, hypandrium whole ventrally

1. oval and extending to base, narrow to very narrow on basal  $\frac{1}{2}$
2. rounded, narrow and on apical  $\frac{1}{2}$  to  $\frac{2}{3}$
3. sub-rectangular and on apical  $\frac{2}{3}$
4. quadrangular, wide and leaving little sclerotized surface posteriorly
5. trapezoidal and on apical  $\frac{1}{3}$  to  $\frac{3}{4}$
6. rectangular, short and on apex
7. triangular and extending almost to the base
8. oval and on apical  $\frac{3}{4}$
9. diamond-shaped, lateral notches extend dorsally
- 10.A. rounded, short and on apical  $\frac{1}{4}$
- 11.B. oval, narrow and on apical  $\frac{3}{4}$
- 12.C. with straight lateral margins and rounded/triangular posterior margin, and on apical  $\frac{1}{2}$  to  $\frac{2}{3}$
- 13.D. rectangular, wide and on apex
- 14.E. oval, elongated and on apical  $\frac{2}{3}$
- 15.F. rounded leaving little sclerotized surface posteriorly
- 16.G. diamond shaped, lateral notches do not extend dorsally
- 17.H. rounded leaving little sclerotized surface posteriorly, with short medial triangular projection on posterior margin
- 18.K. rounded, wide and on apical  $\frac{1}{2}$  to  $\frac{3}{4}$

Comments: The hypandrium is usually open ventrally to different extents. Specific states are restricted to certain groups as in the *O. arx* group and *O. norina* (character state 9), the *O. callidus* group (character state A), *O. capitatus* group (character state D), the *O. lepidus* group (character state F), the *O. lineatus* group (character state G), the *O. stenogaster* group and *O. fascipennis* and *O. lemur* (character state B).

108.Ventral surface of hypandrium <pilosity>

0. bare
1. pilose on apico-ventral lobes
2. pilose apico-laterally
3. pilose sub-apically on lateral surface

4. with very few pile sub-apically on one side
5. with very few pile sub-apically on both sides

Comments: When the ventral surface of the hypandrium is pilose, the pile is restricted to specific areas in the *O. callidus* (character state 1), *O. eblis* and *O. lepidus* (character state 3) species groups. Character state 2 is shared by the *O. capitatus* group, *O. parvicornis* group, some species from the *O. elnora* group and the species *O. cf. melanorrhinus* 1 and 2.

#### 109. Postgonite <fusion>

0. free and articulated to hypandrium
1. fused at its base to hypandrium

Comments: The postgonite is fused to the hypandrium in *Allograpta*.

#### 110. Postgonite <shape>

0. oval, with apex slightly expanded, with acute baso-ventral projection and heavy sclerotized spina baso-dorsally
1. triangular, dorsally oriented
2. short and with pair of basally oriented acute projections
3. rectangular and robust, with apico-dorsal corner rounded and slightly protuberant
4. thin and with a medial lamella
5. sub-oval and short
6. narrow, short and with a knife-like extension on ventro-apical extremity
7. quadrangular, short and with concave apical margin
8. with a sub-basal protuberance on the lateral surface
9. with sub-apical acute dorsal extremity and rounded/acute ventral extremity, dorsal surface concave
- 10.A. rectangular, with oblique apical margin and acute dorso- and ventro-apical extremities, ventro-apical extremity more produced
- 11.B. much reduced
- 12.C. rectangular, with short dorso- and ventro-apical acute extremities

- 13.D. rectangular with ventral surface concave, with straight apical margin and acute dorso- and ventro-apical extremities, ventro-apical extremity more produced
- 14.E. slightly concave on ventral surface and concave on dorsal surface, with straight apical margin and dorso- and ventro-apical acute extremities, both extremities strongly produced
- 15.F. long, with wide basal 1/3, and with mid-dorsal acute projection, apex might taper and curve into a ventral acute extremity
- 16.G. digitiform
- 17.H. 'tooth' shaped and with apico-ventral acute extremity
- 18.K. bifurcate
- 19.L. quadrangular and short, with concave apical margin and dorso- and ventro-apical curved acute extremities
- 20.M. 'knife' shaped with ventral margin straight
- 21.N. short/elongated with apex curving into a dorsal acute extremity
- 22.P. strongly tapering towards apex, but with a rounded and slightly expanded apex
- 23.Q. rectangular, with straight dorsal surface and dorso- and ventro-apical acute extremities
- 24.R. 'spindle' shaped

Comments: As on character 100, the postgonite can be very species-specific, but there are shapes that are restricted to certain groups such as in the *O. amplus* (character state H), *O. arx* and *O. lineatus* (character state A), *O. callidus* (character state B), *O. capitatus* (character state G), *O. cylindricus* (character state D) species groups, and between *O. fascipennis* and *O. lemur* (character state N).

#### 111.Phallus

0. as a single structure
1. with basiphallus heavily sclerotized and with pair of apical acute lobes, without setulae
2. with swollen basiphallus, heavily sclerotized and with setulae

3. with large basiphallus flanking the base of the distiphallus with a pair of lamellas that have dentate borders
4. with 'hood' shaped and non-ornamented basiphallus, which is larger than the distiphallus
5. with flattened basiphallus, much smaller and less sclerotized than distiphallus
6. as a single, enlarged and heavily sclerotized structure
7. with 'teardrop' shaped (rounded with acute posterior margin) basiphallus, distiphallus with dorsal sclerotized triangular region
8. enlarged, heavily sclerotized and 'cone' shaped
9. with slightly 'teardrop' shaped basiphallus, and a more sclerotized distiphallus that has a posterior dentate border
- 10.A. with a 'dome' shaped distiphallus, which has a medial sclerotized band that extends laterally on its apex
- 11.B. with a reduced basiphallus, distiphallus with dorsal sclerotized triangular region
- 12.C. with 'hood' shaped basiphallus, which has a crenate margin
- 13.D. with a reduced basiphallus, distiphallus with dorsal sclerotized triangular region that encircles the base and extends strongly at its apex
- 14.E. with 'teardrop' shaped basiphallus, distiphallus with several thick setae
- 15.F. with 'teardrop' shaped basiphallus, distiphallus with a ventral row of thick setulae
- 16.G. with a reduced basiphallus, distiphallus with a ventral wide 'shield' and heavy sclerotized stripes laterally

Comments: Most species of *Ocyptamus* have a phallus with two distinct components (the basiphallus and distiphallus), but primitively the phallus is believed to be a single structure (e.g. *Leucopodella*). Character state 7 is the most widespread in the genus, but it changes in the *O. amplus* group (character states B, e and G), *O. callidus* group (character state 8), *O. capitatus* group (character state A), *O. conjunctus* group (character state D), *O. cylindircus* group (character state 9),

*O. diversifasciatus* (character state B), *O. globiceps* (character state F), *O. parvicornis* group (character state C) and *O. wulpianus* group (character state B).

## Appendix 2 - Character Matrix

Taxa / Characters	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
<i>Leucopodella gracilis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Leucopodella</i> FCT0114	0	?	?	?	?	0	0	0	0	0	0	0	0	0	0	0	0	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?		
<i>Allograpta alta</i>	2	2	3	6	3	4	0	6	7	0	2	1	0	1	8	A	0	0	2	2	C	3	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Allograpta</i> cf. <i>exotica</i>	3	?	?	?	6	?	3	0	0	1	1	1	1	1	1	0	3	1	2	3	?	2	2	3	0	3	0	0	0	3	0	2	2	0	1	2	1	0	3	1	2	3
<i>Allograpta obliqua</i>	2	2	3	1	3	1	0	2	1	1	1	1	1	1	0	3	1	0	3	3	2	2	2	3	1	3	0	0	0	3	0	2	0	0	1	2	1	0	3	1	2	3
<i>Allograpta robororis</i>	3	4	3	1	5	1	0	2	1	0	1	0	0	0	4	A	0	1	2	2	1	1	2	0	4	0	0	0	3	0	2	0	0	1	2	1	0	3	1	2	3	
<i>Baccha elongata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	A	0	0	0	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
<i>Paragus haemorrhous</i>	2	0	3	5	0	1	0	0	0	0	0	0	0	2	1	2	1	0	3	3	4	2	2	5	0	0	0	0	3	0	2	0	0	1	0	0	0	3	1	2	3	
<i>Pseudodors clavatus</i>	2	2	3	5	3	3	0	0	2	0	0	0	0	0	1	0	0	0	3	4	6	5	2	1	5	0	0	0	0	3	0	2	0	0	1	0	0	0	0	1	2	2
<i>Salpingogaster</i> cf. <i>halcyon</i>	2	?	?	?	1	?	2	0	7	2	0	1	0	0	4	6	C	0	0	4	?	3	4	0	0	7	1	1	0	1	1	1	2	0	1	0	0	0	2	3	1	
<i>Salpingogaster nigra</i>	2	2	2	9	3	2	1	3	2	0	1	0	0	0	7	0	0	0	4	6	4	4	0	0	7	1	1	0	0	1	1	1	1	2	0	1	0	0	0	2	1	1
<i>Salpingogaster pygophora</i>	2	2	2	1	3	2	0	3	1	1	1	1	0	0	6	2	1	1	4	6	3	4	0	0	7	1	1	0	0	1	1	1	1	2	0	1	0	0	0	2	3	1
<i>Salpingogaster</i> cf. <i>pygophora</i>	2	?	?	?	1	?	4	0	3	B	1	1	1	0	6	B	0	0	4	?	3	4	0	0	7	1	1	0	1	1	1	1	2	0	1	0	0	0	2	3	1	
<i>Salpingogaster</i> ( <i>Eosalingogaster</i> ) <i>conopida</i>	2	3	0	4	3	4	0	5	6	0	0	0	0	1	0	3	1	0	3	1	F	D	2	0	A	0	1	2	1	2	1	1	1	0	0	0	0	0	2	1	1	
<i>Toxomerus politus</i>	2	2	0	1	3	1	0	1	1	0	1	0	0	2	2	0	0	3	3	5	6	4	1	8	0	0	0	0	3	2	2	0	0	0	3	0	0	0	1	2	1	
<i>Toxomerus tibicen</i>	2	2	2	1	3	1	0	1	3	0	1	0	0	0	5	0	0	3	3	5	6	4	2	8	0	3	0	3	2	2	0	0	0	3	0	0	0	0	1	2	1	
<i>Toxomerus virgulatus</i>	2	2	0	1	3	1	0	1	3	0	1	0	0	0	5	0	0	3	3	5	6	2	0	8	0	0	0	3	2	2	0	0	0	3	0	0	0	0	1	2	1	
<i>Ocyptamus abata</i>	0	2	2	1	2	8	2	1	1	1	1	1	0	0	D	8	0	1	2	5	G	8	0	0	A	0	3	0	1	2	1	0	0	0	3	0	0	0	0	2	1	1
<i>Ocyptamus adpersus</i>	0	2	0	0	0&9	0	0	2	0	0	0	0	0	0	7	5	0	3	8	9	E	E	1	0	A	3	3	2	3	2	2	0	0	0	0	0	0	0	0	1	2	4
<i>Ocyptamus alicia</i>	2	2	0	9	3	5	2	0	0	0	2	0	0	0	1	5	2	0	9	1	3&7	4	1	0	A	3	0	2	3	2	2	2	0	0	0	0	0	0	0	1	2	3
<i>Ocyptamus antiphates</i>	1	2	2	1	0	4	1	2	5	0	0	0	0	0	1	A	5	0	8	9	1	3	4	1	1	A	0	0	1	3	2	2	2	0	1	0	0	0	2	1	2	1
<i>Ocyptamus beatrix</i>	2	2	2	B	3	5	2	0	0	0	1	0	0	0	1	5	2	0	8	1	3&7	7	1	0	A	3	2	2	3	2	2	0&2	0	0	0	0	0	0	0	1	2	4
<i>Ocyptamus bonariensis</i>	2	3	0	C	3	3	2	3	2	0	1	1	0	3	F	0	0	0	5	D	0	0	1	1	A	4	2	2	3	2	3	0	0	0	0	0	1	0	0	2	2	1
<i>Ocyptamus bromleyi</i>	0	2	2	1	3	1	2	3	8	0	1	0	0	0	0	0	0	0	2	3	G	8	0	1	A	0	0	1	3	2	2	0	0	0	3	0	0	0	1	2	2	
<i>Ocyptamus</i> cf. <i>argentinus</i>	0	2	0	2	0	0	2	6	1	1	1	1	1	2	2	0	0	0	2	3	B	B	1	2	A	0	3	0	1	2	1	0	0	0	3	0	0	0	3	0	1	
<i>Ocyptamus</i> cf. <i>attenuata</i>	0	?	?	?	1	?	1	2	1	1	1	1	1	0	?	?	1	1	E	?	N	8	0	0	A	0	?	0	1	2	1	0	0	0	3	0	0	0	2	1	1	
<i>Ocyptamus</i> cf. <i>chapadensis</i>	0	?	?	?	1	?	A	2	1	1	?	?	?	?	?	D	0	0	?	N	?	7	0	0	9	0	?	0	3	2	3	0	0	0	0	0	0	0	2	2	2	
<i>Ocyptamus</i> cf. <i>lativentris</i>	2	3	3	7	0	0	1	0	0	0	0	0	0	0	1	0	1	0	5	6	3	4	3	3	A	0	0	0	3	2	2	2	0	1	0	0	1	0	0	4	2	3
<i>Ocyptamus</i> cf. <i>melanorhinus</i> 1	2	?	?	?	5	?	0	2	0	4	0	?	?	?	?	?	?	5	0	0	2	?	9	B	0	0	0	6	?	0	4	2	3	0	0	0	3	0	0	4	0	1
<i>Ocyptamus</i> cf. <i>melanorhinus</i> 2	2	2	0	6	0	0	2	3	4	1	1	1	1	1	C	5	0	0	2	3	9	B	0	0	6	0	3	0	4	2	3	0	0	0	3	0	0	0	4	0	1	
<i>Ocyptamus</i> cf. <i>princeps</i>	1	2	2	1	0	0	1	2	5	0	0	0	0	0	0	A	5	0	0	9	9	3	4	1	2	A	3	0	1	3	2	2	0	0	0	0	0	0	1	2	1	
<i>Ocyptamus</i> cf. <i>pumilus</i>	0	?	?	?	1	?	1	2	1	1	1	1	1	0	0	2	1	0	3	?	8	9	1	0	A	0	0	0	3	2	2	0	0	0	3	0	0	0	1	2	1	
<i>Ocyptamus</i> cf. <i>zonilia</i>	0	0	2	2	2	?	2	1	1	1	1	1	1	0	?	?	?	?	7	?	7	?	0	A	0	?	0	?	2	1	0	2	0	0	0	0	0	?	2	1	?	
<i>Ocyptamus</i> cf. <i>zoraster</i>	0	0	2	1	2	1	2	1	1	1	1	1	0	0	D	7	0	1	2	0	G	8	0	1	9	0	0	0	1	2	1	0	0	0	3	0	0	0	2	1	1	
<i>Ocyptamus conjunctus</i>	2	2	0	1	3	3	2	3	1	1	1	1	1	1	2	2	0	0	2	F	0	0	0	0	A	0	2	0	1	2	1	1	2	0	1	0	1	0	0	2	1	
<i>Ocyptamus costatus</i>	2	2	2	B	3	5	2	0	0	0	1	0	0	0	3	0	0	0	D	F	9	K	1	2	A	0	0	2	3	2	2	0	0	0	0	0	0	1	2	3		
<i>Ocyptamus crocatus</i>	1	1	2	1	2	8	2	1	1	1	1	1	0	0	0	2	1	1	2	7	H	9	0	0	9	0	0	3	0	1	2	3	0	0	0	3	0	0	0	2	1	1
<i>Ocyptamus croceus</i>	1	1	2	1	2	1	2	1	1	1	1	1	1	2	0	2	1	1	6	7	8	9	0	0	A	0	0	0	3	0	3	0	0	0	3	0	0	0	1	1	1	
<i>Ocyptamus cultratus</i>	0	0	2	1	2	A	2	1	1	1	1	1	3	9	1	0	6	7	2	9	0	1	0	A	0	?	0	3	0	3	0	0	0	0	0	0	0	0	1	2	1	
<i>Ocyptamus dimidiatus</i>	1	2	2	5	0	0	1	4	0	0	2	0	0	0	A	5	0	0	8	9	3	4	1	1	A	0	0	0	1	3	2	2	2	0	1	0	0	0	2	1	2	1
<i>Ocyptamus diversifasciatus</i>	2	3	3	B	5	B	0	C	0	0	0	0	0	0	K	0	0	0	3	2	C	2	1	4	0	0	0	3	2	2	0	0	1	2	0	0	3	1	2	3		
<i>Ocyptamus erebus</i>	2	3	0	C	3	2	2	3	2	0	0	0	0	3	F	0	0	0	5	D	0	0	1	1	A	4	2	2	3	2	3	0	0	0	0	0	1	0	0	2	1	
<i>Ocyptamus fuscipennis</i>	0	2	2	1	3	0	2	0	9	0	0	0	0	0	0	0	0	0	1	4	9	K	0	1	A	0	3	1	3	2	2	0	0	0	0	0	0	0	2	1	2	3
<i>Ocyptamus filiolus</i>	0	2	0	2	0	0	2	8	1	1	2	1	2	1	2	1	0	0	2	3	B	B	1	2	A	0	3	0	1	2	1	0	0	0	3	0	0	0	1	2	1	
<i>Ocyptamus funebris</i>	1	2	2	1	0	0	1	2	5	0	0	0	0	0	A	5	0	0	9	9	3	4	1	2	A	3	0	1	3	2	2	0	0	0	0	0	0	0	2	1		



Taxa / Characters	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81		
<i>Leucopodella gracilis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Leucopodella</i> FCT0114	0	0	0	0	?	0	0	0	0	0	0	?	?	0	0	0	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	?	0	0	0	0	0	0	0	?		
<i>Allograpta alta</i>	1	1	6	2	1	1	0	3	3	0	0	0	0	2	1	2	2	2	0	4	1	2	0	C	0	3	0	0	2	1	2	2	E	3	4	0	0	0	2	4	4	3	
<i>Allograpta cf. exotica</i>	1	1	6	7	1	0	3	3	0	0	0	?	?	2	2	2	2	0	1	2	0	0	0	3	7	0	2	1	2	2	2	?	4	0	0	2	4	4	?	?			
<i>Allograpta obliqua</i>	1	1	6	7	1	1	0	3	3	0	0	0	0	2	1	0	2	0	0	1	2	0	0	0	3	0	0	2	1	2	3	3	3	4	4	0	0	2	4	4	1		
<i>Allograpta roboris</i>	1	1	2	2	1	1	0	3	0	0	0	0	2	3	1	0	2	2	0	1	2	0	0	0	3	0	0	2	1	2	2	4	4	4	0	0	1	4	1	3			
<i>Baccha elongata</i>	0	0	0	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0			
<i>Paragus haemorrhous</i>	2	1	4	5	1	1	0	3	3	0	1	1	2	2	0	1	2	0	0	3	1	3	1	0	0	3	0	0	2	2	1	3	3	0	0	0	0	1	5	1	1		
<i>Pseudodoros clavatus</i>	3	1	4	5	3	1	0	0	3	0	0	0	2	2	1	1	2	1	0	3	1	3	1	0	1	3	0	0	2	2	1	5	5	0	0	0	0	3	6	2	2		
<i>Salpingogaster cf. halcyon</i>	0	0	1	2	?	1	0	0	0	0	2	0	?	?	0	3	0	3	0	2	0	1	0	6	1	0	0	?	1	0	1	4	0	6	?	2	2	0	3	3	8	?	
<i>Salpingogaster nigra</i>	3	0	1	2	1	0	0	3	0	0	0	0	3	4	0	3	0	3	0	2	0	1	0	6	1	0	0	1	0	1	4	0	7	7	2	2	0	3	3	8	8		
<i>Salpingogaster pygophora</i>	0	0	1	2	1	1	0	0	0	0	2	0	3	0	0	3	0	3	0	2	0	1	0	6	1	0	0	1	0	1	4	0	6	6	2	2	0	3	3	8	8		
<i>Salpingogaster cf. pygophora</i>	0	0	1	2	?	1	0	0	0	0	2	0	?	?	0	3	0	3	0	3	0	2	0	1	0	6	1	0	?	1	0	1	4	0	6	?	2	2	0	3	3	8	?
<i>Salpingogaster (Eosalpingogaster) conopida</i>	3	0	0	8	2	0	0	0	3	0	2	0	3	0	1	1	2	3	0	0	1	0	B	1	2	1	1	0	1	2	0	1	1	3	1	0	3	2	8	2			
<i>Toxomerus politus</i>	0	1	0	4	4	1	0	2	0	0	2	1	2	0	1	2	0	3	0	0	0	2	0	9	0	3	0	0	1	1	2	2	1	8	0	0	0	2	7	1	1		
<i>Toxomerus tibicen</i>	0	1	0	4	1	1	0	2	3	0	3	1	3	0	1	2	0	1	0	0	0	2	0	9	0	3	0	0	1	1	2	2	1	1	0	0	0	2	7	1	1		
<i>Toxomerus virgulatus</i>	0	1	0	4	1	0	2	3	0	3	1	3	0	1	2	0	3	0	0	0	2	0	9	0	3	0	0	1	1	2	2	1	1	0	0	0	2	7	1	1			
<i>Ocyptamus abato</i>	0	0	0	9	7	1	0	3	2	0	1	0	3	4	2	2	0	3	0	0	0	0	7	0	1	0	0	0	0	0	2	6	6	0	0	0	0	3	C	2	2		
<i>Ocyptamus adspersus</i>	0	0	0	2	3	2	0	1	3	1	1	0	3	2	2	2	0	1	0	0	0	2	0	2	0	3	0	0	1	1	2	2	6	6	0	0	0	3	1	7	7		
<i>Ocyptamus alicia</i>	0	0	0	2	2	0	0	0	0	0	0	0	3	2	2	2	0	1	0	0	0	1	0	8	0	3	0	0	2	1	2	2	6	6	0	0	0	3	K	2	7		
<i>Ocyptamus antiphates</i>	0	0	3	A	2	0	0	0	0	0	2	0	3	0	2	2	2	3	1	5	0	4	F	0	3	0	0	2	1	2	2	6	6	4	0	0	0	2	7	1	1		
<i>Ocyptamus beatrix</i>	0	0	0	2	2	0	0	0	0	0	2	0	3	0	2	2	0	3	0	0	0	2	0	8	0	3	1	0	2	1	2	2	6	6	0	0	0	3	K	2	2		
<i>Ocyptamus bonariensis</i>	0	0	1	2	1	1	0	0	0	0	2	0	3	0	1	1	0	1	0	0	0	2	0	5	1	1	1	2	0	1	2	2	7	7	3	1	0	3	G	6	5		
<i>Ocyptamus bromleyi</i>	0	0	3	2	7	0	0	2	0	0	2	0	1	4	1	2	0	0	0	0	0	0	0	7	0	3	0	0	2	1	2	2	H	M	0	0	0	3	C	9	2		
<i>Ocyptamus cf. argentinus</i>	0	0	3	2	1	1	0	3	0	0	0	0	1	2	3	0	0	0	0	0	0	0	0	8	0	3	?	0	0	1	0	4	9	?	0	0	1	0	F	0	0		
<i>Ocyptamus cf. attenuata</i>	0	0	0	C	?	1	0	3	0	0	1	0	?	?	1	2	0	3	0	0	0	0	0	7	0	1	?	0	0	0	1	-	N	?	0	0	1	0	F	0	0		
<i>Ocyptamus cf. chapadensis</i>	0	0	0	9	?	1	0	3	0	0	1	0	?	?	1	2	0	0	0	0	0	0	0	7	0	1	?	0	0	0	0	2	6	?	0	0	0	3	C	2	?		
<i>Ocyptamus cf. lativentris</i>	2	0	1	2	8	4	0	0	0	0	0	0	2	3	2	2	2	0	0	1	2	0	C	0	3	0	0	2	1	2	5	K	H	4	0	0	2	H	3	3			
<i>Ocyptamus cf. melanorrhinus 1</i>	0	0	1	6	?	3	0	0	0	0	1	0	?	?	0	1	0	1	0	2	0	0	0	8	0	3	?	0	1	1	1	-	G	?	4	0	1	3	C	2	?		
<i>Ocyptamus cf. melanorrhinus 2</i>	0	0	1	6	2	3	0	0	0	0	1	0	2	0	0	1	0	1	0	1	0	2	0	0	8	0	3	0	0	1	1	1	-	B	A	4	0	1	3	C	2	2	
<i>Ocyptamus cf. princeps</i>	0	0	3	A	2	0	0	0	0	0	2	0	3	4	2	2	0	3	1	5	0	4	F	0	3	0	0	1	1	2	2	6	6	4	0	0	0	3	7	3	6		
<i>Ocyptamus cf. pumilus</i>	0	0	3	9	?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Ocyptamus cf. zenilla</i>	0	0	0	C	?	?	0	0	2	0	?	?	3	4	1	2	0	0	0	0	0	0	0	7	0	1	0	0	0	0	0	0	2	?	6	0	0	0	3	C	?	2	
<i>Ocyptamus cf. zoroaster</i>	0	0	0	9	7	1	0	3	2	0	1	0	3	4	2	2	0	0	0	0	0	0	0	7	0	1	0	0	0	0	1	-	6	6	0	0	0	1	0	C	2	2	
<i>Ocyptamus conjunctus</i>	3	0	1	2	6	1	0	2	1	1	2	0	3	0	1	1	2	1	0	1	2	2	0	5	1	1	1	2	0	1	2	2	D	6	0	0	0	3	9	6	5		
<i>Ocyptamus costatus</i>	0	0	0	2	2	0	0	0	0	0	1	0	2	0	1	2	0	1	0	0	0	1	0	8	0	3	0	0	1	1	2	7	6	6	0	0	0	3	L	2	2		
<i>Ocyptamus crocatus</i>	0	0	3	9	7	1	0	3	2	0	2	0	3	4	1	2	0	0	0	0	0	0	0	7	0	1	0	0	0	0	0	2	6	6	0	0	0	3	A	3	6		
<i>Ocyptamus croceus</i>	0	0	3	9	7	1	0	3	0	0	2	0	3	4	1	2	0	0	0	0	0	1	0	7	0	1	0	0	0	0	0	2	6	6	0	0	0	3	A	3	6		
<i>Ocyptamus cultratus</i>	0	0	3	9	7	1	0	3	2	0	1	0	3	4	1	2	0	0	0	0	0	1	0	7	0	1	0	0	0	0	1	2	6	6	0	0	0	3	A	3	6		
<i>Ocyptamus dimidiatus</i>	0	0	3	A	2	0	0	0	0	0	2	0	3	0	2	2	2	3	1	5	0	4	F	0	3	0	0	2	1	2	2	6	6	4	0	0	0	2	7	1	1		
<i>Ocyptamus diversifasciatus</i>	1	0	5	B	9	0	0	0	0	0	0	0	0	3	0	0	2	1	0	0	1	2	0	0	0	3	0	0	2	1	2	8	3	3	4	0	0	2	4	1	3		
<i>Ocyptamus erebus</i>	0	0	1	2	1	1	0	0	0	0	2	0	3	0	1	1	0	1	0	0	0	2	0	5	1	1	1	2	0	1	2	2	7	D	3	1	0	3	G	6	5		
<i>Ocyptamus fascipennis</i>	0	0	3	2	2	0	0	0	0	0	0	0	0	0	2	2	0	3	0	0	0	1	0	7	0	3	0	0	2	1	2	6	M	L	0	0	0	0	L	2	2		
<i>Ocyptamus filiolus</i>	0	0	0	3	2	0	1	0	3	0	0	0	0	0	1	2	0	0	0	0	0	0	0	8	0	2	0	0	0	0	1	-	L	K	0	0	1	0	F	0	0		
<i>Ocyptamus funebis</i>	0	0	3	A	2	0	0	0	0	0	2	0	3	0	2	2	0	3	1	5	0	4	F	0	3	0	0	1	1	2	2	6	6	4	0	0	0	3	7	3	6		
<i>Ocyptamus fuscipennis</i>	0	0	3	A	2	0	0	0	0	0	2	0	3	0	2	2	0	3	1	5																							

Taxa / Characters	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	
<i>Leucopodella gracilis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Leucopodella</i> FCT0114	0	0	0	?	0	?	?	?	?	?	?	?	?	?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Allograpta alta</i>	0	0	2	2	0	0	0	1	1	1	1	0	1	1	0	0	0	0	0	2	0	2	0	1	1	Q	2	0	1	1	2
<i>Allograpta</i> cf. <i>exotica</i>	0	0	2	?	0	?	?	?	?	?	?	?	?	?	0	0	0	0	2	0	2	0	1	1	Q	2	0	1	1	2	
<i>Allograpta obliqua</i>	0	0	2	2	0	0	0	1	1	1	1	0	1	1	0	0	0	0	2	0	2	0	1	1	Q	2	0	1	1	2	
<i>Allograpta robuoris</i>	0	0	2	0	0	0	0	1	1	2	1	0	1	1	0	0	0	0	2	0	1	0	2	1	Q	2	0	1	1	2	
<i>Baccha elongata</i>	0	0	2	1	0	0	0	0	2	3	0	0	3	0	0	0	0	0	0	0	0	0	3	2	R	1	0	0	2	0	
<i>Paragus haemorrhous</i>	0	0	1	0	0	0	0	0	3	8	2	0	3	0	0	0	0	0	K	0	1	0	0	3	3	0	0	0	3	1	
<i>Pseudodoros clavatus</i>	0	0	3	0	0	0	0	0	4	8	3	0	3	0	0	0	0	0	L	0	1	0	0	2	Q	4	0	0	4	3	
<i>Salpingogaster</i> cf. <i>halcyon</i>	0	1	2	?	2	?	?	?	?	?	?	?	?	?	1	0	2	0	F	0	1	1	G	4	4	K	0	0	6	4	
<i>Salpingogaster nigra</i>	0	1	2	2	2	0	0	6	5	6	4	0	0	0	1	0	2	0	F	0	1	1	0	4	4	0	0	0	5	4	
<i>Salpingogaster pygophora</i>	0	1	2	2	2	0	0	6	5	6	4	0	0	0	1	0	2	0	F	0	1	1	0	4	4	K	0	0	6	4	
<i>Salpingogaster</i> cf. <i>pygophora</i>	0	1	2	?	2	?	?	?	?	?	?	?	?	?	1	0	2	0	F	0	1	1	0	4	4	K	0	0	6	4	
<i>Salpingogaster</i> ( <i>Essalpingogaster</i> ) <i>conopida</i>	0	0	1	2	0	0	0	1	K	4	0	0	4	0	0	0	2	0	A	1	1	0	0	5	C	0	0	0	7	5	
<i>Toxomerus politus</i>	0	0	2	2	0	0	0	2	7	5	1	0	0	0	0	0	0	1	N	0	1	0	4	6	6	7	0	0	8	6	
<i>Toxomerus tibicen</i>	0	0	2	2	0	0	0	0	7	5	1	0	0	0	0	0	0	1	N	0	1	0	4	6	6	6	0	0	8	6	
<i>Toxomerus virgulatus</i>	0	0	2	2	0	0	0	2	7	5	1	0	0	0	0	0	0	1	N	0	1	0	4	6	6	6	0	0	8	6	
<i>Ocyptamus abata</i>	0	0	2	3	0	0	0	9	6	A	0	0	3	0	0	0	0	2	S	0	1	0	7	F	D	F	3	0	9	7	
<i>Ocyptamus adspersus</i>	0	0	2	2	3	2	2	B	F	E	A	4	2	0	0	0	0	0	H	0	1	0	D	L	M	G	0	0	Q	7	
<i>Ocyptamus alicia</i>	0	0	2	2	3	2	2	B	F	E	8	2	0	0	0	1	0	0	3	0	1	0	D	L	M	C	0	0	9	7	
<i>Ocyptamus antiphates</i>	0	2	1	2	0	0	0	3	K	4	5	0	3	0	0	2	0	0	1	0	2	2	0	C	2	C	0	0	D	9	
<i>Ocyptamus beatricea</i>	0	0	2	2	3	2	1	B	F	E	8	2	0	0	0	0	0	0	3	0	1	0	D	L	M	C	0	0	9	7	
<i>Ocyptamus bonariensis</i>	0	0	2	3	1	0	0	A	D	C	0	0	1	0	0	0	2	0	U	1	1	0	0	M	5	D	2	0	G	A	
<i>Ocyptamus bromleyi</i>	0	0	4	1	0	0	0	2	C	A	0	0	3	0	0	0	0	2	M	0	1	0	7	F	D	F	3	0	9	7	
<i>Ocyptamus</i> cf. <i>argentinus</i>	0	0	1	1	0	0	0	6	C	4	7	3	5	0	0	0	0	0	E	0	1	0	0	S	L	B	0	0	N	7	
<i>Ocyptamus</i> cf. <i>attenuata</i>	0	0	2	?	?	?	?	?	?	?	?	?	?	?	?	0	0	2	4	0	1	2	9	F	S	8	3	0	E	7	
<i>Ocyptamus</i> cf. <i>chapadensis</i>	0	0	4	?	?	?	?	?	?	?	?	?	?	?	?	0	0	2	4	0	1	2	9	F	D	F	3	0	9	7	
<i>Ocyptamus</i> cf. <i>lativentris</i>	0	0	2	2	0	0	0	7	8	9	0	0	4	0	0	0	0	0	8	0	1	0	0	P	G	C	0	0	H	G	
<i>Ocyptamus</i> cf. <i>melanorhinus</i> 1	0	0	2	?	0	?	?	?	?	?	?	?	?	?	0	1	0	0	B	0	2	2	6	E	C	E	2	0	F	7	
<i>Ocyptamus</i> cf. <i>melanorhinus</i> 2	0	0	2	1	0	0	0	7	8	A	6	0	3	0	0	1	0	0	B	0	2	2	6	E	C	E	2	0	F	7	
<i>Ocyptamus</i> cf. <i>princeps</i>	0	0	4	2	0	0	0	3	K	4	0	0	3	0	2	1	0	0	4	0	3	0	4	C	2	C	0	0	D	9	
<i>Ocyptamus</i> cf. <i>pumilus</i>	2	0	2	?	2	?	?	?	?	?	?	?	?	?	0	0	0	0	R	0	2	0	0	9	8	A	1	0	B	8	
<i>Ocyptamus</i> cf. <i>zenillia</i>	?	?	?	1	?	?	?	0	1	B	A	0	0	3	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>Ocyptamus</i> cf. <i>zoraster</i>	0	0	2	1	0	0	0	9	B	4	0	0	3	0	0	0	0	2	S	0	1	0	7	F	D	H	3	0	9	7	
<i>Ocyptamus conjunctus</i>	0	0	2	2	0	0	0	8	G	4	0	0	1	0	0	0	0	0	V	0	1	0	F	T	8	4	0	0	P	D	
<i>Ocyptamus costatus</i>	0	0	2	2	3	2	1	B	F	E	8	2	0	0	0	1	0	0	3	0	1	0	D	L	M	C	0	0	9	7	
<i>Ocyptamus crocatus</i>	0	0	2	2	0	0	0	9	B	A	0	0	3	0	0	0	0	2	S	0	1	2	7	F	D	8	3	0	9	7	
<i>Ocyptamus croceus</i>	0	0	2	2	0	0	0	9	6	A	0	0	3	0	0	0	0	2	G	0	1	0	H	F	D	8	3	0	9	7	
<i>Ocyptamus cultrinus</i>	0	0	2	2	0	0	0	9	6	A	0	0	3	0	0	0	0	2	M	0	1	0	9	F	D	F	3	0	9	7	
<i>Ocyptamus dimidiatus</i>	0	2	1	2	0	0	0	3	K	4	5	0	3	0	0	2	0	0	1	0	2	2	0	C	2	C	0	0	D	9	
<i>Ocyptamus diversifasciatus</i>	0	0	1	2	0	0	0	1	1	4	0	0	1	0	0	0	0	0	5	0	1	0	0	N	G	C	0	0	R	B	
<i>Ocyptamus erebus</i>	0	0	2	2	1	0	0	A	D	C	0	0	0	0	0	0	2	0	U	1	1	0	0	M	5	D	2	0	G	A	
<i>Ocyptamus fascipennis</i>	0	0	2	1	0	0	0	1	C	4	C	3	5	0	0	0	0	0	6	0	1	0	A	D	N	B	0	0	N	7	
<i>Ocyptamus filiulus</i>	0	0	1	1	2	0	0	6	C	4	9	3	5	0	0	0	0	0	E	0	1	0	0	S	L	B	0	0	N	7	
<i>Ocyptamus funebris</i>	0	0	4	2	0	0	0	3	K	4	0	0	3	0	0	2	1	0	4	0	3	0	4	C	2	C	0	0	D	9	
<i>Ocyptamus fuscipennis</i>	0	0	2	2	0	0	0	3	K	4	0	0	3	0	0	0	0	0	5	0	1	0	4	P	2	1	0	0	D	9	
<i>Ocyptamus fluviella</i>	0	0	2	2	0	0	0	1	C	4	0	0	0	0	0	0	0	0	H	0	1	0	0	7	E	5	0	0	9	7	
<i>Ocyptamus gastrotractus</i>	0	0	1	2	0	0	0	3	8	4	5	0	3	0	0	0	0	0	7	0	3	2	0	C	1	C	0	0	D	9	
<i>Ocyptamus isthmus</i>	0	0	2	?	?	?	?	?	?	?	?	?	?	?	?	0	0	0	P	0	1	0	0	G	9	8	2	0	9	7	
<i>Ocyptamus lemur</i>	0	0	2	1	0	0	0	1	C	4	C	3	5	0	0	0	0	0	6	0	1	0	A	D	N	B	0	0	N	7	
<i>Ocyptamus luctuosus</i>	0	0	2	2	0	0	0	9	6	A	0	0	3	0	0	0	0	2	S	0	1	0	7	F	D	F	3	0	9	7	
<i>Ocyptamus macropyga</i>	0	0	3	2	2	0	0	0	5	8	9	6	0	3	0	0	0	0	T	0	1	0	8	H	P	G	4	0	A	7	
<i>Ocyptamus neuralis</i>	0	0	2	2	0	0	0	5	A	A	0	0	0	0	0	1	0	0	Q	0	1	0	0	A	9	8	2	0	9	7	
<i>Ocyptamus norina</i>	0	0	2	2	0	0	0	5	8	9	6	0	3	0	0	1	0	0	P	0	3	0	5	8	7	9	0	0	A	7	
<i>Ocyptamus obliquus</i>	?	?	?	2	0	0	0	0	H	9	0	0	1	0	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>Ocyptamus ovipositorius</i>	0	0	2	3	3	2	1	B	F	E	A	4	2	0	0	0	0	0	H	0	1	0	D	L	B	3	0	0	Q	7	
<i>Ocyptamus parvicornis</i>	1	0	4	1	0	0	0	2	3	4	0	1	4	0	3	3	0	0	9	0	4	0	C	Q	H	H	2	0	L	C	
<i>Ocyptamus peruvianus</i>	0	0	4	3	3	2	2	B	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>Ocyptamus priscilla</i>	0	0	2	?	?	?	?	?	?	?	?	?	?	?	?	1	0	0	8	0	3	0	0	P	F	1	0	0	H	G	
<i>Ocyptamus pumilus</i>	2	0	3	2	2	0	0	4	9	7	1	0	0	0	0	0	1	0	R	0	2	0	0	9	8	A	1	0	B	8	
<i>Ocyptamus rubricosus</i>	0	0	2	2	0	0	0	5	8	9	0	0	3	0	0	1	0	0	4	0	1	0	9	K	7	G	0	0	A	7	
<i>Ocyptamus</i> sp. ( <i>Styxia</i> group)	0	0	1	2	0	0	0	5	B	D	0	0	3	0	0	0	0	0	G	0	1										

**Chapter III: A revision of the genera *Pelecinobaccha* Shannon and *Relictanum* gen.nov., and redescription of *Atylobaccha flukiella* (Curran, 1941) (Diptera: Syrphidae)**

**Abstract**

Recent phylogenetic analyses of *Ocyptamus* Macquart, 1834 (Diptera, Syrphidae) confirmed the paraphyly of this genus and provided evidence to divide it into several monophyletic subgroups, of which the largest is the clade traditionally treated as the *Ocyptamus tristis* species group. This group is here redefined and divided into the three genera *Atylobaccha* Hull 1949, *Pelecinobaccha* Shannon, 1927 and *Relictanum* gen.nov., with the description of 24 new species (22 in *Pelecinobaccha* and 2 in *Relictanum*) and the redescription of 34 species (26 in *Pelecinobaccha*, 7 in *Relictanum* and *Atylobaccha flukiella* Curran, 1941)). *Pelecinobaccha* is divided into *P. (Calumnina)* subgen.nov., *P. (Noxana)* subgen.nov., *P. (Pelecinobaccha)* Shannon, 1927 and *P. (Pseudoaulacibaccha)* subgen.nov. The former three subgenera are revised. An identification key, figure plates and distribution maps for all species from this study are also presented.

**Keywords:** Systematics, Taxonomy, flower fly.

## Introduction

*Ocyptamus* Macquart, 1834 contains most of the New World species that were previously allocated to the genus *Baccha* Fabricius, 1805 (Thompson et al. 1976). While all these species were still considered *Baccha* Hull (1943a) suggested an outline of sub-generic divisions and depicted a putative evolutionary development scheme based on abdominal characters. Later, Hull (1949a) refined his group concepts and attempted to describe them. Although Hull did great work in creating the initial hypotheses of subdivisions within *Baccha*, his hypotheses were not further examined (with the exception of *Mimocalla* (Thompson & Zumbado 2000)). In an attempt to continue the revision of the species groups formerly of *Ocyptamus*, the *O. tristis* (= *Pelecinobaccha* Shannon and *Relictanum* gen. nov.) group was chosen as a new starting point.

Hull (1949a) stated that the *tristis* group was the most diverse neotropical group of *Baccha*, and briefly describes the group as follows: “characterized by somber color with the face black or blue or blue black, but sometimes yellowish along the sides. The abdomen is always petiolate [...] is sometimes entirely black or black with steel blue areas [...] show prominent opaque black patterns which occasionally have yellowish vittate spots enclosed. In most species [...] the hind basitarsi are contrastingly colored with black on the apical segments and the basal segments white or yellowish.” Hull also noted that the petiolate abdomen, although distinctive, occurred in different groups of *Baccha*. Hull mentioned the condition of the female 6<sup>th</sup> segment as a unique character of the *O. tristis* group, but seemed to focus too much on the petiolate abdomen and its opaque black markings. Species such as *O. zeteki* (Curran, 1930) are left in the *O. tristis* group due to the markings and *O. peruvianus* (Shannon, 1927) was kept in

*Pelecinobaccha* Shannon simply because the abdomen is very long. In both previous examples, the female 6<sup>th</sup> segment is never addressed.

F. C. Thompson (personal communication) made small changes to the list of species present in the *O. tristis* group. His comments, as well as Hull's original arrangement, were used as a starting point for the sampling of species in this study.

Chapter II pointed to the monophyly of a group in which the female genitalia was highly modified (*Pelecinobaccha* Shannon) and a group formed by the *tristis* group species that lacked this modification (*Relictanum* gen.nov.). The species *Atylobaccha flukiella* (Curran, 1941) was always recovered as the sister taxon to *Pelecinobaccha*.

## **Material and Methods**

### **Specimens**

In addition to specimens from the University of Guelph Insect Collection (DEBU, Guelph, Canada), specimens were borrowed from the Canadian National Collection of Insects (CNC, Ottawa, Canada), United States National Museum (USNM, at the Smithsonian Institution, Washington D.C., USA), American Museum of Natural History (AMNH, New York, USA), Coleccion Entomologica de la Universidad de Alicante (CEUA, Alicante, Spain), Museu de Zoologia da Universidade de São Paulo (MZUSP, São Paulo, Brazil), Coleção de Entomologia Padre Jesus Santiago Moure (DZUP, Curitiba, Brazil) and Instituto Nacional de Biodiversidad (InBio, San José, Costa Rica).

Type material was studied as listed in the “material examined” section of the species descriptions. Type material was borrowed from the following museums:

AMNH - American Museum of Natural History (New York, NY, USA)

ANSP - The Academy of Natural Sciences (Philadelphia, PA, USA)

BMNH - British Museum of Natural History (London, UK)

CNC - Canadian National Collection of Insects (Ottawa, ON, Canada)

CUIC - Cornell University Insect Collection (Ithaca, NY, USA)

MC - Universitetets Zoologiske Museet (Copenhagen, Denmark)

MCZ - Museum of Comparative Zoology (Cambridge, MA, USA)

USNM - United States National Museum (Washington, D.C., USA)

MNH-Wien - Vienna Museum of Natural History (Vienna, Austria)

The type material studied, type-localities and type repositories are indicated in the synonymy list below the valid species name. Additional label information is indicated in the “material examined” section of each description, including all the label information and unique identifiers for each specimen organized in alphabetical order by country, state/province/department and by earliest date. The unique identifiers include acronyms (CNC, DEBU, INBio, etc. as identified above) that indicate where the material is deposited. Specimens with the JSS identifier are deposited at the CNC. Each specimen label information is separated by a semicolon (;), and when the information starts with an ellipsis (...) it means it shares part of the information from the previous specimen.

Missing dates and collector information are substituted by a '?'. The total number of males and females examined is highlighted prior to the material examined list, if there was more than one specimen from the same locality and date, the number of specimens collected is indicated within parentheses after the label information.

Genitalia were dissected as described in Chapter II.

### **Images**

External morphological characters of importance were illustrated using high-magnification photographs of pinned specimens with a Cannon EOS 1DS camera mounted on a computer-controlled focusing rail. The .tiff files were combined into one fully focused .tiff image using the Combine Z5.1 software.

Terminalia were photographed using a Nikon Coolpix camera attached to a standard Zeiss microscope, with F-stop set between 9 and 10 and underexposed by  $\frac{1}{2}$  to 1 stop. The images were treated as above.

All processed images were retouched with Adobe Photoshop CS4 by adjusting the black and white levels, cropping and sharpening.

### **Characters**

The term "occiput" is used to refer to the narrow sclerotized stretch immediately adjacent to the posterior margin of the eye, where the distinct rows of pile are present. It is usually interpreted as divided into 2 main areas, a dorsal  $\frac{1}{4}$  and a ventral  $\frac{3}{4}$ .

Occasionally, the middle portion (middle  $\frac{1}{2}$ ) is differentiated from both dorsal and ventral regions.

Some species have subshining markings on their abdominal tergites, clearly distinct from the surrounding dull black pollinosity. This is also present in poorly preserved specimens of otherwise pale-marked species.

The terms tergite and sternite are used for all female abdominal sclerites except for the cercus. Following Cumming and Wood (2009), segment 9 is considered absent. The different components of the male genitalia are outlined in Fig. 11.

Body and wing length are usually presented as a range of measurements, with the extreme values taken from the smallest and largest specimen in the material examined. If the value differed by .1 or .2 from .0 or .5mm, it was rounded to nearest half millimetre.

## **Results, Discussion and Conclusions**

The *tristis* group (formerly in *Ocyptamus*) has proven to be more variable than initially suspected. *Pelecinobaccha* Shannon (species with modified female genitalia) is composed of 4 distinct sub-groups (described below). *Atylobaccha flukiella* (Curran, 1941) (small flies with very weak tubercle) was recovered as the sister group to *Pelecinobaccha* (Chapter II, Cladogram 1). The remaining *tristis* group species form the new genus *Relictanum* (flies similar to *Atylobaccha* but with a distinct tubercle and



pilose metaepisternum) which is sister to the (*Atylobaccha* + *Pelecinobaccha*) clade (Chapter II). All genera are described below.

The family Coccidae (Hemiptera, Sternorrhyncha) seems to be the preferred prey for larvae of *Pelecinobaccha* and *Relictanum* (as referenced in Chapter II).

### ***Atylobaccha* Hull, 1949**

Hull (1949) describes *Atylobaccha* as a subgenus of *Leucopodella* for the “quite small peculiar species, *flukiella* Curran, with its hyaline wings and simple femora”. However, later in Hull’s key the taxon is treated as a separate genus.

*Atylobaccha* are mostly black small flies (~6mm), facial tubercle very weak, gena very narrow and inconspicuous (seen as a short triangle from ventral view), male with simple pile on ventral region of occiput, scutum without distinct anterior row of pile, metaepisternum bare, metatibia pale with medial ½ dark, metabasitarsomere with apex pale, 2<sup>nd</sup> abdominal segment long and narrow, 3<sup>rd</sup> and 4<sup>th</sup> abdominal tergites with central pair of pale vittae, surstylus sub-triangular, subepandrial sclerite rectangular and wide with short acute basal corners, and hypandrium oval with basal ½ expanded ventrally.

### ***Atylobaccha flukiella* (Curran, 1941) redescription**

*Atylobaccha flukiella* (Curran, 1941)

*Baccha flukiella* Curran, 1941. Curran, 1941: 275. Type-locality: Brazil, Santa Catarina, Nova Teutônia. Holotype male AMNH. Hull, 1949a: 198 (fig. 39, male abdomen).

*Ocyptamus flukiella*. Thompson et al. 1976: 18 (catalog citation).

Map: 1. Figures: 1.

**Male. Head:** Black; face narrow, slightly convex with very weak tubercle, white pilose; lunule entirely black; frontal triangle mostly shining black, with very weak protuberance medially, with lateral white pollen on ventral  $\frac{1}{2}$ , continuous from face pollen, black pilose; vertical triangle with only 1 median row of pile; ocellar triangle distanced its length from posterior eye margin; eye contiguity 2.5 times longer than vertical triangle length; eye posterior indentation triangular and at level of antennae insertion; antennae insertions confluent; antennal bases very close to each other, antenna dark brown, basoflagellomere pale baso-ventrally, oval short; occiput dorsal  $\frac{1}{4}$  with sparse white pollen, ventral  $\frac{3}{4}$  densely white-pollinose, dorsal  $\frac{1}{4}$  with 1 row of simple black pile, middle  $\frac{3}{4}$  with 2 rows of scale-like white pile, anterior row shorter.

**Thorax:** Scutum black, sometimes shiny, with sparse white pollen and inconspicuous sub-median antero-postero pair of pollinose vittae, black or white pilose, pile slightly longer on notopleuron, anterior row with slightly longer pile interrupted in the middle by shorter pile; scutellum black, white pilose, sparse white-pollinose, subscutellar fringe white; pleuron black, sometimes slightly pale on posterior  $\frac{1}{2}$  of posterior anepisternum, white pilose on anepisternum, dorso- and ventro-posterior katepisternum, anterior

anepimeron and meron, metepisternum bare, katatergum with short microtrichia that gives it a velvet-like appearance; plumula very short and white; calypter white, dorsal lobe fringe with distinct pile, but still shorter than pile from ventral lobe fringe; halter white to light yellow.

**Wing:** Hyaline to light brown; entirely microtrichose; alula 2 times larger than c cell apically, entirely microtrichose.

**Legs:** Legs mostly pale, coxae black, mostly white pilose; profemur and protibia usually with light brown sub-apical band, protarsus brown; mesofemur usually with light brown sub-apical band; metafemur with sub-apical dark brown band, metatibia with medial dark brown band, metabasitarsomere mostly dark brown but apex pale, remaining metatarsomeres pale.

**Abdomen:** Dark brown; about 3 times longer than thorax; 1st tergite crescent-shaped, usually with wide lateral surface, with very long, mostly pale, pile; 2<sup>nd</sup> segment long and narrow, 6 times longer than its smallest width, with medial pair of fasciate pale maculae, with sub-apical arcuate fascia of dull black pollen extended posteriorly as medial vitta, pile appressed and black dorsally, remaining long, erect and white; 3<sup>rd</sup> tergite trapezoidal, 2.5 times longer than smallest width, with central pair of short pale vittae and sub-basal pair of lateral fasciate pale maculae, sometimes connected basally to

vittae, with central triangular macula of dull black pollen, pollen absent on maculae, with mainly appressed black pile, 3<sup>rd</sup> sternite rectangular, long and narrow; 4<sup>th</sup> tergite sub-quadrangular usually slightly longer, fasciate maculae sometimes triangular, remaining characters as on 3<sup>rd</sup>; 5<sup>th</sup> tergite rectangular and wide, with 4 short pale vittae, dull pollinose region divided into 3 median vittae, remaining characteristics as on 4<sup>th</sup>.

**Genitalia:** Epandrium wide but short, cercus with 3 regular rows of pile; surstylus sub-triangular short, directed ventrally, with very sparse ventral setulae; subepandrial sclerite rectangular, wide and narrow, with short acute baso-lateral corners, homogenously sclerotized; hypandrium oval, with basal  $\frac{1}{2}$  expanded ventrally, ventral notch trapezoidal and on apical  $\frac{1}{2}$ ; phallapodeme well sclerotized and tapering towards base; basiphallus teardrop-shaped from a dorsal view, with posterior extremity rounded, distiphallus as an anterior triangular sclerotization, smaller than basiphallus; postgonite with few pile baso-ventrally, ventral surface slightly concave, dorsal surface straight, apex rounded, with dorsal acute extremity.

**Female:** Like male except: frons narrow but widens from vertex, white pilose; vertex narrow, lateral white pollen reaches ocellar triangle; ocellar triangle 1.5-2 times its length from posterior eye margin and adjacent to lateral eye margin; alula narrower than on male; 2<sup>nd</sup> abdominal segment lateral pile shorter; 3<sup>rd</sup> tergite shorter; 4<sup>th</sup> rectangular and wide; 6<sup>th</sup> segment short, a  $\frac{1}{3}$  of the length of the 5<sup>th</sup>. **Genitalia:** 7<sup>th</sup> tergite rectangular and wide, with pile only on apical  $\frac{1}{2}$ , 7<sup>th</sup> sternite mostly membranous; 8<sup>th</sup> tergite rectangular and wide with shallow notch on anterior and posterior margin, 8<sup>th</sup> sternite as pair of triangular sclerotizations; 10<sup>th</sup> tergite reduced to a pair of

quadrangular sclerotizations, with narrow baso-lateral projection, 10th sternite not discernible; cercus separate from 10<sup>th</sup> tergite, densely pilose and overall well sclerotized.

**Length.** 5.5-7mm; wing 4-5mm.

**Distribution.** Brazil (Rio de Janeiro, Santa Catarina), Peru (Junín).

**Material examined.** (**4 males**) BRAZIL. Santa Catarina, Nova Teutônia, 300-500m, 27°11'S 52°23'W, ?? Jun 1964, F. Plaumann (2 specimens); Rio de Janeiro, Itatiaia, Macieiras, 1800m., ?? Jan 1948, C.D. Andretta. PERU. Junín, Chanchamayo, San Ramón, Sector Quebrada Santa Rosa, "Fundo Génova", Malaise trap, 11°05'44.4"S 75°21'19.6"W, 1080m., CAVXM033, 07-10 Jul 2008, X. Mengual. (**2 females**) BRAZIL. Santa Catarina, Nova Teutônia, 300-500m, 27°11'S 52°23'W, ?? Jun 1964, F. Plaumann; ..., Ponte Serrado, 26°54'S 51°58'W, 02 Mar 1962, F. Plaumann.

### Genus *Pelecinobaccha* Shannon

*Pelecinobaccha* Shannon, 1927: 10 (type species *Baccha peruviana* Shannon, 1927 (original designation)). Proposed as a subgenus of *Baccha*.

Description: **Male. Head:** Dark red, dark brown, bluish-black or black; face narrowing slightly ventral to tubercle, slightly concave dorsal to tubercle, sometimes pale laterally, rarely mostly pale (e.g. *P. aster*), widely white-pollinose laterally, pollen sparse to absent on tubercle apex, usually white pilose laterally except black ventral to antenna, with distinct sub-ventral median tubercle, anterior oral margin sparsely white pilose; gena narrow (appears as an elongated triangle from ventral view); lunule usually black but sometimes distinctly pale above antennal insertion, bare, shiny; frontal triangle sometimes pale laterally, with dull brown pollen medially and silvery-white pollen laterally that sometimes is restricted to oval/triangular maculae, usually with long, erect, black pile; ocellar triangle 1-2 times its length from posterior eye margin; eye contiguity slightly shorter to 2 times longer than vertical triangle length; antennae dark, basoflagellomere oval and at least slightly longer than wide, black pilose, arista dark red; occiput usually with sparse dark pollen on dorsal  $\frac{1}{4}$  and dense silvery-white pollen on ventral  $\frac{3}{4}$ , rarely entirely white-pollinose (e.g. *P. ovipositoria*), dorsal  $\frac{1}{4}$  usually with 2 regular rows of simple black pile, pile usually shorter on anterior row, posterior row sometimes with white and scale-like pile, middle  $\frac{1}{2}$  with 2-4 regular rows of pile, posterior row always with longer, scale-like white pile, anterior rows ranging from scale-like white pile to simple black pile, ventral  $\frac{1}{4}$  with 2-3 irregular rows of white, scale-like pile, usually with shorter pile on anterior row.

**Thorax:** Prothorax dark with sparse, dull pollinosity, without pile; scutum entirely dark red, brown, bluish-black or black, dull pollinose, with a rectangular area of concentrated pollen anterior to scutellum, markings, if present, formed by vittae of pale pollen, pilosity usually erect, with anterior row of longer white pile that sometimes has shorter pile in the middle, notopleuron with pile longer anterior to transverse suture, pile slightly thicker and densely arranged latero-posteriorly to transverse suture; scutellum usually as dark as scutum and covered by dull pollen; pleuron dark, sometimes with pale markings, sparse white-pollinose, microtrichia longer on anterior  $\frac{1}{2}$  of katatergum ('velvet'-like), with pile on anterior anepisternum, posterior  $\frac{1}{2}$  of posterior anepisternum, anterior anepimeron, ventro- and dorso-posterior katepisternum, katepimeron and subappressed on metaepisternum, pile on katepimeron and metaepisternum sometimes inconspicuous; metasternum dark, bare and very narrow dorso-laterally to metacoxa; metaepimeron flared laterally on posterior  $\frac{1}{2}$  being connected to body by a membrane; post metacoxal bridge incomplete, usually metathoracic epimera widely separated; calypter dorsal lobe narrow, with marginal fringe of short pile on dorsal lobe and long branching pile on ventral lobe.

**Wing:** Usually with dark brown markings basally and rarely with bare areas; alula absent (rare, e.g. *P. (Calumnia) invisibilis*) to ~4 times larger than c cell, rarely with bare areas.

**Legs:** Procoxa with only 1 row of pile antero-apically, protrochanter bare ventrally, profemur with sparse pile on basal  $\frac{1}{2}$  and slightly longer pile on baso-ventral  $\frac{1}{2}$ , densely arranged pale pile ventro-laterally on apex of protibia and ventrally on protarsus; mesofemur bare to sparsely pilose ventrally and with posterior row of longer black pile, mesotibia with ventro-apical short, thick, black pile, first and second mesotarsomeres with densely arranged pale pile and short, thick, black pile intermixed ventrally, mesobasitarsus thinner than mesotibia and slightly thinner than remaining mesotarsomeres; metacoxa with distinctly longer pile, basal  $\frac{1}{2}$  of metafemur with only sparse pile ventrally, metatarsus usually bicoloured but in some species entirely dark (e.g. *P. adspersa*), metabasitarsomere usually with no more than apical  $\frac{1}{2}$  pale (*P. ada* usually with  $\frac{2}{3}$  to  $\frac{3}{4}$  pale); pile usually the same color as background.

**Abdomen:** Usually petiolate but sometimes parallel-sided or narrow, 1<sup>st</sup> abdominal segment crescent shaped with lateral extremities directed laterally or posteriorly, with long and erect pile laterally, usually bare or with shorter and sparse pile dorso-medially; 2<sup>nd</sup> abdominal segment longer than wide, usually constricted medially and sometimes very narrow and long (e.g. *P. sp. 27*); remaining abdominal segments variable; sterna dark, well sclerotized. **Genitalia:** Small; epandrium and cercus densely microtrichose; epandrium trapezoidal in lateral view; base of surstylus articulated to epandrium apico-ventrally, usually flattened dorso-ventrally; subepandrial sclerite usually trapezoidal with slightly extended posterior corners and homogeneously sclerotized; hypandrium usually sub-oval with a narrower quadrangular apical  $\frac{1}{3}$ , ventral anterior notch variable, ventral



surface bare; postgonite apex either with acute dorsal and ventral extremities or with only dorsal extremity acute, pilose on baso-ventral surface.

**Female:** Usually very similar to male except: frons usually of normal width, distinctly widening from vertex; pro- and mesotarsomeres sometimes enlarged; wing and abdominal markings sometimes differ from male; 2<sup>nd</sup> abdominal tergite usually shorter and wider than male but still longer than wide; 5<sup>th</sup> segment rarely with tergite and sternite fused apically; 6<sup>th</sup> segment tergite and sternite usually completely fused laterally, entirely dark with short appressed black pile. **Genitalia:** Strongly sclerotized, 7<sup>th</sup> tergite bare, with pair of long baso-lateral extensions (apodemes) into 6<sup>th</sup> segment, apodemes usually as long as the 6<sup>th</sup> segment; extensive membranous region between 7<sup>th</sup> and 8<sup>th</sup> segments, pile restricted to region immediately apical to 7<sup>th</sup> tergite; 7<sup>th</sup> sternite modified into separate pair of lateral sclerites, dorsally fused to sides of 7<sup>th</sup> tergite; 8<sup>th</sup> tergite triangular in dorsal view, notched posteriorly, sometimes unsclerotized medially, with basal crest flanking posterior notch, usually with a pair of rounded apices; 8<sup>th</sup> sternite as pair of lateral rectangular sclerotizations, with pair of apical narrow extensions that fold into the segment; 10<sup>th</sup> tergite usually reduced and fused to dorsal surface of cercus; 10<sup>th</sup> sternite, if visible, just a narrow sclerite with a few pile; cercus usually with only 1 row of pile on apical margin.

**Comments:** *Pelecinobaccha* Shannon was proposed as a subgenus of *Baccha* because of *B. peruviana* Shannon and its elongated abdomen with segments 2-6 of similar length. Hull (1949a) further added *B. telescopica* to the subgenus.

Although many female specimens seem to have a dorso-ventrally flattened 6<sup>th</sup> segment ‘ovipositor’ (and sometimes an apical ‘ridge’ *sensu* Hull, 1949), this is an artefact of preservation. I’ve seen the 6<sup>th</sup> segment slightly laterally flattened (natural condition, more easily preserved in females with longer 6<sup>th</sup> segments), dorsally flattened and a range of intermediate conditions in the same species series. This artefact is most likely due to sudden dehydration of the tissues and collapsing of the sclerite walls, a phenomenon even more common in material pinned straight from alcohol. This effect sometimes also hinders the observation of the shape of some of the abdominal tergites, due to ‘curving’ of the lateral margin.

I consider that the common cylindrical 6<sup>th</sup> segment on the female (Fig. 16c) is actually formed from the lateral fusion of its tergite and sternite based on the observation of incomplete fusion between these sclerites in the *Pseudoaulacibaccha* group (see below). This is further supported by evidence of incomplete lateral sclerite fusion of the female 5<sup>th</sup> segment on other species (e.g. *P. telescopica*, Fig. 39a).

As mentioned above, the female terminalia is very different from other syrphids (Fig. 10c-f). The 7<sup>th</sup> tergite is somewhat shortened and possesses a pair of very long baso-lateral apodemes. The 7<sup>th</sup> sternite is modified into a pair of separate lateral rods, partially fused to the tergite laterally and with short ventral apodemes into the 6<sup>th</sup> segment, leaving the ventral-most side of the segment membranous. The 8<sup>th</sup> tergite is

modified into a triangular sclerite that is naturally folded longitudinally. The 8<sup>th</sup> sternite is usually divided into a pair of lateral lightly sclerotized regions which are connected by a basal narrow sclerotized bridge and have apico-ventral extensions that fold into the segment. I assume that the 10<sup>th</sup> tergite (epiproct of some authors) is either a narrow transversal stripe or divided into a pair of sclerites, both conditions are usually fused to the dorsal margin of the cerci, demonstrated by a distinct thickening of that region on the cercus. The cercus is usually very bare and has only a single row of pile along its apico-ventral margin. The resting condition of the female terminalia is always laterally flattened, and the segments are usually easily extended by light dorso-ventral compression of the 6<sup>th</sup> segment in dissections.

It is assumed that the female terminalia is extended by hydraulic pressure of the haemolymph due to dorso-ventral compression of the pre-abdominal segments. This is suggested by the presence of massive muscular tissue on the 5<sup>th</sup> segment of *P. adspersa* attached from tergite to sternite (Fig. 10a). The unique condition of the long baso-lateral apodemes of the 7<sup>th</sup> and the basal crest of the 8<sup>th</sup> tergite are most likely used to pull the modified terminalia back into the abdominal cavity.

The fact that the ventral region of the female terminalia is mostly membranous, and that the terminalia has a more acute shape while in rest, is believed to ease the insertion of the terminalia underneath the 'scale' of scale insects (Hemiptera, Sternorrhyncha, Coccidae). After insertion, the female probably extends and expands the terminalia, as described above, raising the scale enough to move the apex of the terminalia close enough to lay an egg.

When the female 6<sup>th</sup> segment is elongate, the male terminalia has an elongated surstylus and hypandrium (e.g. *P. telescopica*). Furthermore, in species in which the female has an elongated 6<sup>th</sup> segment, the 2<sup>nd</sup> segment is shorter than the male's. Both patterns are believed to arise from sexual selection (Eberhard 1985), with longer female 6<sup>th</sup> segments requiring males with longer 2<sup>nd</sup> abdominal segments to reach the female terminalia and male terminalia with extended components to maintain proper manipulation of the female.

There are four distinct monophyletic groups in *Pelecinobaccha* that are treated as subgenera: *P. (Calumnia)*, *P. (Noxana)*, *P. (Pelecinobaccha)* and *P. (Pseudoaulacibaccha)*.

Included species for *P. (Pelecinobaccha)*: *P. (Pelecinobaccha) alicia* (Curran, 1941), *P. (Pelecinobaccha) alucard* sp.nov., *P. (Pelecinobaccha) andrettae* sp.nov., *P. (Pelecinobaccha) avispa* sp.nov., *P. (Pelecinobaccha) beatricea* (Hull, 1942), *P. (Pelecinobaccha) capesorum* sp.nov., *P. (Pelecinobaccha) clarapex* (Wiedemann, 1830), *P. (Pelecinobaccha) concinna* (Williston, 1891), *P. (Pelecinobaccha) cora* (Curran, 1941), *P. (Pelecinobaccha) costata* (Say, 1829), *P. (Pelecinobaccha) cryptica* (Hull, 1942), *P. (Pelecinobaccha) dracula* (Hull, 1943), *P. (Pelecinobaccha) eruptova* (Hull, 1943), *P. (Pelecinobaccha) hiantha* (Hull, 1943), *P. (Pelecinobaccha) hirundella* (Hull, 1944), *P. (Pelecinobaccha) humillima* sp.nov., *P. (Pelecinobaccha) ida* (Curran, 1941), *P. (Pelecinobaccha) manuelorum* sp.nov., *P. (Pelecinobaccha) mexicana* (Curran, 1930), *P. (Pelecinobaccha) morgani* sp.nov., *P. (Pelecinobaccha) nubilorum* sp.nov., *P. (Pelecinobaccha) peruviana* Shannon, 1927, *P. (Pelecinobaccha) pilinigridentis* sp.nov., *P. (Pelecinobaccha) pilipes* (Schiner, 1868), *P. (Pelecinobaccha)*

*pucallpa* sp.nov., *P. (Pelecinobaccha) seara* sp.nov., *P. (Pelecinobaccha) telescopica* (Curran, 1930), *P. (Pelecinobaccha) tica* sp.nov., *P. (Pelecinobaccha) transatlantica* (Schiner, 1868), *P. (Pelecinobaccha) tristis* (Hull, 1930), *P. (Pelecinobaccha) unica* sp.nov., *P. (Pelecinobaccha) wyatti* sp.nov..

***P. (Calumnia)* subgen.nov.**

Type species *Baccha brevipennis* Schiner, 1868.

Included species: *P. (Calumnia) aster* (Curran, 1941), *P. (Calumnia) brevipennis* (Schiner, 1868), *P. (Calumnia) gracilitas* sp.nov., *P. (Calumnia) invisibilis* sp.nov., *P. (Calumnia) levissima* (Austen, 1893), *P. (Calumnia) portachueloi* sp.nov., *P. (Calumnia) vera* (Hull, 1944), *P. (Calumnia) vesca* sp.nov.

Diagnosis/comments: These flies are very similar to the genus *Fragosa* with very long and narrow 2<sup>nd</sup> and 3<sup>rd</sup> abdominal segments, with similar markings on the abdominal tergites and usually lacking an alula. Contrary to *Fragosa*, *P. (Calumnia)* species have very different male genitalia and a modified female genitalia as all other *Pelecinobaccha* species.

***P. (Noxana)* subgen.nov.**

Type species *Baccha adspersa* Fabricius, 1805.

Included species: *P. (Noxana) adspersa* (Fabricius, 1805), *P. (Noxana) duopuncta* sp.nov., *P. (Noxana) menguali* sp.nov., *P. (Noxana) mima* (Hull, 1949), *P. (Noxana) oviphora* (Hull, 1943), *P. (Noxana) ovipositoria* (Hull, 1943), *P. (Noxana) squamagula* sp.nov., *P. (Noxana) waynei* sp.nov..

Diagnosis/comments: The species from this subgenus have a black head and metatarsus, usually with lateral triangular/oval spots of silver-white pollinosity on the frons/frontal triangle separated from the lateral pollen from the face. The female 10<sup>th</sup> tergite is usually reduced to a transverse band that extends apico-laterally merging into the cercus medially.

***P. (Pseudoaulacibaccha) subgen.nov.***

Type species *Baccha ada* Curran, 1941

Included species: *P. (Pseudoaulacibaccha) ada* (Curran, 1941), *P. (Pseudoaulacibaccha) pandora* (Hull, 1942), *P. (Pseudoaulacibaccha) summa* (Fluke, 1936).

Diagnosis/comments: *P. (Pseudoaulacibaccha) ada* (Curran, 1941) is readily distinguished from the other *Pelecinobaccha* by the pale lateral margin and the golden pollinose vittae on the scutum, the largely pale metabasitarsomere and the incomplete fusion of the sclerites on the 6<sup>th</sup> segment.

The overall appearance of *P. (Pseudoaulacibaccha) ada* resembles species from the *H. arx* group (genus *Hybobathus*), which consists of relatively large yellowish “[...]petiolate flies, with raised, opaque, bicoloured occellarium with distinct light-colored vittae upon the abdomen.” (Hull 1949). The *H. arx* group species examined show that the face is entirely pale, the scutum has distinct golden pollinose vittae which merge posteriorly into a golden pollinose area and the vittate markings on the abdominal tergites are narrow. Despite the superficial similarity, *P. (Pseudoaulacibaccha)* differs clearly from the *H. arx* group by the following characters: the golden pollinose vittae on

the scutum do not merge posteriorly, the medial vittate markings of the abdominal tergites are more ovalate, and the female terminalia is modified (as described above for *Pelecinobaccha*).

The *P. (Pseudoaulacibaccha)* subgenus was discovered late in this study, and it was not further revised.

***P. (Pseudoaulacibaccha) ada* (Curran, 1941) redescription**

*Pelecinobaccha (Pseudoaulacibaccha) ada* (Curran, 1941) **comb. nov.**

*Baccha ada* Curran, 1941. – Curran, 1941: 278. Type-locality: Brazil, Santa Catarina, Nova Teutônia. Holotype male AMNH. Hull, 1949a: 135 (redescription), 195 (fig. 20, female abdomen), 217 (fig. 116, male abdomen).

*Ocyptamus ada*. Thompson et al. 1976: 12 (catalog citation).

*Baccha susio* Hull, 1941. – Hull, 1941: 61. Type-locality: Brazil, São Paulo, Avanhadava. Holotype female CNC. Hull, 1949a: 171 (redescription), 221 (fig. 138, abdomen). **n. syn.**

*Ocyptamus susio*. Thompson et al. 1976: 28 (catalog citation).

Map: 4. Figures: 2.

**Male. Head:** Brown; face pale on lateral  $\frac{1}{4}$ ; gena light brown; lunule distinctly pale above antennal insertion, central macula connected to frontal triangle color by a weak light brown median vitta; frontal triangle pale laterally until eye contiguity, with golden pollen homogenously distributed with a small dorso-lateral region visible only from a dorso-posterior view, white pollen restricted laterally and continuous from face with a small dorsal patch of differently oriented pollen; only frontal prominence protuberant; vertical triangle with most of its pile restricted to a single row; ocellar triangle distanced its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye with sub-triangular indentation on posterior margin positioned slightly dorsal to antennal insertion; antennae insertions confluent, ventral sclerotized margin slightly extended dorsally; antenna brown; occiput homogenously white-pollinose, dorsal  $\frac{1}{4}$  with 2 rows of simple black pile, anterior row shorter, ventral  $\frac{3}{4}$  with 2-3 rows of white, scale-like pile, anterior rows slightly shorter.

**Thorax:** Scutum dark brown, sometimes pale laterally, with a dull pollinose sub-median pair of golden vittae tapering posteriorly but not reaching scutellum, and a median (usually complete) narrow golden vitta, pilosity mainly black but longer and white on notopleura and white laterally between transverse suture and post-alar callus, anterior row of shining white pile with shorter pile in the middle; scutellum light brown with a darker median fascia, black pilose; subscutellar fringe normal, black medially and white laterally; pleuron dark brown, slightly pale on posterior anepisternum, dorso-posterior portion of katepisternum and katatergum, white pilose on anterior anepisternum, posterior  $\frac{1}{2}$  of posterior anepisternum, anterior anepimeron, dorso- and ventro-posterior



katepisternum, katepimeron, and metaepisternum; plumula white and of normal length; calypter golden, fringe sometimes darker; halter light brown, capitulum yellow to orange.

**Wing:** Mostly hyaline, dark on c, basal  $\frac{1}{2}$  of r cell, and stigma, entirely microtrichose; alula normal, 2 times basally and 3 times apically larger than c cell, hyaline, entirely microtrichose.

**Legs:** Proleg light brown, profemur darker, basal  $\frac{1}{2}$  and apex of protibia pale; mesoleg light brown, mesofemur darker, mesotibia mostly pale except for a slight darkening sub-apically, ventral setae on apex of mesotibia and mesotarsus light golden; metaleg dark brown, pale on apex of metafemur, base of metatibia and apical  $\frac{2}{3}$  to  $\frac{3}{4}$  of metabasitarsomere to fourth metatarsomere.

**Abdomen:** Dark brown, 3.6 times longer than thorax; 1<sup>st</sup> tergite light brown, palest laterally, mostly black pilose but pile longer and white baso-laterally; 2<sup>nd</sup> tergite long, 4.3 times longer than smallest width, baso-lateral  $\frac{1}{3}$  pale to indistinct from the rest of the tergite, pile black, normal and appressed, with sub-apical central triangular region of dull black pollen; 3rd tergite trapezoidal and long, 2.6 times longer than smallest width, with baso-lateral pale triangular maculae and central pair of pale vittate spots, with large central triangular region of dull black pollen, pile short, appressed and black; 4th tergite sub-quadrangular, slightly longer than wide, central spots longer, remaining

characteristics as in 3rd; 5th tergite rectangular and wide, with central vittae that may connect to baso-lateral triangles, remaining characteristics as in 3rd. **Genitalia:** cercus with 1 regular row of pile on medial margin and 2 regular rows outward; surstylus directed apico-ventrally, short, with rounded apex, with weak setulae (around 8) on apico-ventral margin, pilose on dorsal surface; subepandrial sclerite quadrangular, with shallow concavity medially on apical margin; hypandrium with ventral notch quadrangular and extending on anterior 1/2; distiphallus anterior surface curved anteriorly on apex; phallapodeme well sclerotized and slightly enlarged on base; postgonites with pile mainly on ventral surface, ventral surface straight, dorsal surface slightly concave with small convexity before apex, apex slightly convex anteriorly, with small rounded ventral extremity and acute dorsal extremity.

**Female:** Similar to male except: frons pale laterally almost until ocellar triangle, with golden pollen oriented differently only in front of ocellar triangle and white lateral pollen with no patch of differently oriented pollen; ocellar triangle 3 times its length from posterior eye margin and ~2.5 ocelli-width from lateral eye margin; dorsal occipital pile may fade to a pale yellow; scutum pale laterally, sometimes with a few black pile anterior to transverse suture on notopleura; subscutellar fringe very short and black to inconspicuous; 2nd abdominal tergite shorter than on male, 2.6 times longer than smallest width, dull pollinose region smaller, lateral pile much shorter than on male; 3rd tergite shorter than on male, 4th tergite rectangular and wide; 6th segment conical, divided into separate tergite and sternite inconspicuously on most of its extension but distinctly fused at apex, 1.1 times longer than its smallest width and 1.4 times longer

than 5th. **Genitalia:** 7<sup>th</sup> tergite triangular, with basal apodeme extending for 2/3 of the length of the 6<sup>th</sup> segment, 7<sup>th</sup> segment lateral sclerite triangular; 8<sup>th</sup> tergite unsclerotized medially appearing as a pair of separate sclerites, basal crest weakly sclerotized and uniform, without extended ridges; cercus with 1 row of pile on apical margin.

**Length.** 8.5-14.5mm; wing 8.0-10.5mm.

**Distribution.** Brazil (Mato Grosso, Paraná, Santa Catarina, São Paulo).

**Material examined.** (**7 males**) BRAZIL. Santa Catarina, Nova Teutônia, 27°11'S 52°23'W, 22 Oct 1939, F. Plaumann (Paratype *Baccha ada*, CNC Diptera 161384); ..., 500m, Frank M. Hull Collection C.N.C. 1973, ?? Mar 1948 (4 specimens, CNC Diptera 161386-8, 161391); ..., 300-500m, 1 Nov 1952 (CNC Diptera 161390); ..., ?? Dez 1969 (CNC Diptera 161389). (**13 females**) BRAZIL. Mato Grosso, Maracaju, Frank M. Hull Collection C.N.C. 1973, ?? May 1937, Serviço Febre Amarela M. E. S. Bras. (CNC Diptera 161392); Paraná, Iguassú, ?? Dez 1941, Com. E. N. V. (CNC Diptera 161393); São Paulo, S. Avanhanda[v]a, Holotype *susio* access [red label], Holotype *Baccha susio* Hull CNC No 20528 [red label], 28 Apr 1908, ? (Holotype *Baccha susio*). Santa Catarina, Nova Teutônia, 27°11'S 52°23'W, 15 Oct 1939, F. Plaumann (Paratype *Baccha ada*); ..., 24 Oct 1939, F. Plaumann (Paratype *Baccha ada*, CNC Diptera 161385); ..., 300-500m, ?? Dez 1966 (CNC Diptera 161394); ..., ?? Jan 1968; ..., ??

Feb 1968 (2 specimens, CNC Diptera 161396-7); ..., ?? Nov 1969 (3 specimens, CNC Diptera 161398-400); ..., ?? Dez 1969 (CNC Diptera 161401).

**Comments:** Hull (1949) states that *Baccha susio* differs from *B. ada* as follows: “in the distinctly shorter fourth and fifth abdominal segments (of female) and the absence of coppery or purplish reflection along the sides of the mesonotum. In *ada* the vittae of the fourth segment tend to be disconnected from the basal fascia and the lower occipital cilia are distinctly less flattened and coarse.” The length of the abdominal segments varies slightly among specimens of both type species, mainly due to artefacts of preservation. The “coppery reflection”, a mixture of background shine plus sparse pollinosity, is slightly visible on the *B. susio* holotype, although difficult to assess due to the poor state of the specimen. It is common for the abdominal vittae to vary among specimens from the same series. Finally, there is no difference between the occipital pile of the type specimens. *B. susio* is hereby considered a junior synonym of *B. ada*.

***Pelecinobaccha* sensu lato species key**

1. Scutum usually pale laterally and always with 3 golden pollinose vittae on a black background; female abdomen with 6<sup>th</sup> tergite and sternite fused only on apical 1/3

..... *Pelecinobaccha* (*Pseudoaulacibaccha*)

- Scutum entirely dark, without distinct patterns of pollinosity; female 6<sup>th</sup> segment divided into tergite and sternite or more broadly fused into a single conical sclerite ..... 2

2. Alula greatly reduced or absent, visible membrane at most 1/5 of c cell width; 2<sup>nd</sup> and 3<sup>rd</sup> abdominal segments narrow, more than 10 times as long as smallest width ..... 3

- Alula distinct, if reduced then at least 1/2 the width of c cell; 3<sup>rd</sup> abdominal segment never so long and narrow, less than 4 times as long as smallest width ..... 6

3. Alula present but less than 1/5 of c cell width; metaepimera widely separated dorsal to metacoxa, gap between both sclerites similar to 1<sup>st</sup> sternite width; apex of metabasitarsomere and remaining tarsomeres pale ..... 4

- Alula absent; metaepimera approximated dorsal to metacoxa, separated by a gap equal to or less than a 1/3 of the 1<sup>st</sup> sternite width; metatarsus entirely dark ..... 5

4. Face dark above tubercle; frons/frontal triangle smooth; southern Brazil

..... *Pelecinobaccha* (*Calumnina*) *aster*

- Face entirely pale; frons/frontal triangle rugose; Amazon region ..... *Pelecinobaccha*  
(*Calumnia*) *vera*

5. Frons/Frontal triangle entirely dark or, at most, slightly pale latero-ventrally; Brazil  
(<1000m alt.) ..... *Pelecinobaccha* (*Calumnia*) *invisibilis*

- Frons/Frontal triangle distinctly pale laterally; Peru and Venezuela (>1000m alt.)  
..... *Pelecinobaccha* (*Calumnia*) *vesca*

6. Face mainly pale, with central dark spot or small dark area extending medially from  
anterior extremity of the tubercle to antennal base ..... 7

- Face mainly dark or with wide medial dark vitta ..... 8

7. Scutellum entirely dark; alula distinct although reduced to ½ the width of c cell; 4<sup>th</sup>  
abdominal tergite with central pale vittae ..... *Pelecinobaccha* (*Calumnia*) *portachueloi*

- Scutellum pale basally; alula linear, as wide as c cell, widening slightly at apex; 4<sup>th</sup>  
abdominal tergite with baso-lateral quadrangular pale maculae ..... *Pelecinobaccha*  
(*Calumnia*) *gracilitas*

8. Female 6<sup>th</sup> abdominal segment divided into tergite and sternite; only females through this option ..... 9
- Female 6<sup>th</sup> abdominal segment as a single sclerite or males ..... 10
9. Wing entirely microtrichose ..... *Pelecinobaccha* (*Pelecinobaccha*) *dracula*, in part
- Wing bare medially on bm and anteriorly on cup cells ..... *Pelecinobaccha* (*Pelecinobaccha*) *concinna*, in part
10. Male posterior row of dorsal occiput with scale-like white pile; only males through this option ..... 11
- Male posterior row of dorsal occiput with at least some simple black pile or females . 14
11. Dorsal occiput with 3 rows of pile; katapisternum black pilose ventrally; dorsal lobe of calypter reduced (1/3 of the length of the ventral lobe) ..... *Pelecinobaccha* (*Pelecinobaccha*) *pucallpa*
- Dorsal occiput with 2 rows of pile; katapisternum white pilose ventrally; dorsal lobe of calypter normal (1/2 of the length of the ventral lobe) ..... 12

12. Lunule with diffuse central macula; metacoxa with mainly black pile; phallapodeme enlarged medially; postgonite narrow, apex with acute sub-apical dorsal extremity and rounded ventral extremity.....*Pelecinobaccha (Pelecinobaccha) alucard*

- Lunule with distinct central macula; metacoxa entirely white pilose; phallapodeme not enlarged; postgonite normal, apex with acute dorsal and ventral extremities ..... 13

13. Wing bare medially on bm and anteriorly on cup cells; basiphallus with posterior extremity gently curved and long, dorsal surface almost quadrangular in lateral view; apex of distiphallus strongly curved posteriorly; usually medium-sized flies (~12mm)  
.....*Pelecinobaccha (Pelecinobaccha) concinna*, in part

- Cells bm and cup microtrichose; basiphallus with posterior extremity short and bent posteriorly, dorsal surface slightly convex in lateral view; apex of distiphallus slightly curved posteriorly; usually small flies (~8mm)..... *Pelecinobaccha (Pelecinobaccha) dracula*, in part

14. Ocellar triangle distinctly protuberant; occiput uniformly white-pollinose, sometimes dorsal area with differently oriented pollen ..... 15

- Ocellar triangle not protuberant; dorsal occiput with dull or sparse pollen ..... 16

15. Scutellum pale; pleuron white pilose .....*Pelecinobaccha (Noxana) ovipositoria*



- Scutellum dark brown to black; pleuron with black pile on anterior anepisternum and dorsally on posterior anepisternum ..... *Pelecinobaccha (Noxana) oviphora*

16. Female 2<sup>nd</sup> to 6<sup>th</sup> abdominal segments rectangular, very long and of similar length; male 2<sup>nd</sup> to 4<sup>th</sup> abdominal segments rectangular and very long, 3<sup>rd</sup> and 4<sup>th</sup> segments wider than 2<sup>nd</sup>; abdominal segments never very narrow; frons/frontal triangle with lateral small oval maculae of white pollen separated from facial pollen ..... *Pelecinobaccha (Pelecinobaccha) peruvian*

- At least one of these segments shorter than the remaining ones; if the male abdominal segments are of similar length, then either 2<sup>nd</sup> and 3<sup>rd</sup> segments very narrow or pollinosity of frons/frontal triangle continuous from face pollinosity ..... 17

17. Legs pale, except for sub-apical light to dark brown macula on femora and dark brown metatibia; all tarsi black; female 2<sup>nd</sup> abdominal segment rectangular and long, 2 times as long as wide; female 5<sup>th</sup> tergite and sternite fused on apical 2/3..... 18

- Legs differently colored, if all tarsi dark, then legs mainly dark; if 2<sup>nd</sup> abdominal segment rectangular and long, then more than 3 times as long as wide; female 5<sup>th</sup> segment usually divided into tergite and sternite, at most with apex fused ..... 19

18. Wing with basal  $\frac{1}{2}$  dark; alula at least twice the width of c cell..... *Pelecinobaccha*  
*(Noxana) mima*
- Wing mostly hyaline, only bc, c and sc cells dark; alula narrow, around the same width  
as c cell ..... *Pelecinobaccha (Noxana) menguali*
19. Metatarsus completely dark; if apical metatarsomeres slightly paler, then  
basimetatarsomere entirely dark ..... 20
- Metatarsus distinctly bicoloured (dark and pale), basimetatarsomere with at least apex  
pale ..... 26
20. Legs entirely black..... 21
- Some legs with pale regions ..... 22
21. Dorsal katepisternum with only white pile; 3<sup>rd</sup> and 4<sup>th</sup> abdominal tergites with a pair  
of central and sublateral pale spots; frons/frontal triangle with lateral triangular spots of  
white pollen ..... *Pelecinobaccha (Noxana) adspersa*
- Dorsal katepisternum with some black pile; 3<sup>rd</sup> and 4<sup>th</sup> abdominal tergites at most with  
a central pair of pale spots; frontal triangle with lateral streaks of white pollen  
..... *Pelecinobaccha (Noxana) duopuncta*

22. 3<sup>rd</sup> and 4<sup>th</sup> abdominal tergites with lateral pale spots and median, short, pale vittae  
..... *Pelecinobaccha (Noxana) waynei*
- 3<sup>rd</sup> and 4<sup>th</sup> abdominal tergites without median pale vittae ..... 23
23. 2<sup>nd</sup> and 3<sup>rd</sup> abdominal segments very long and of similar length (5 times as long as  
smallest width) ..... 24
- 2<sup>nd</sup> abdominal segment long, 3<sup>rd</sup> abdominal segment trapezoidal (2 times as long as  
smallest width) ..... 25
24. Wings light to dark brown; alula narrow, apex twice the width of base; female 2<sup>nd</sup>  
abdominal segment with sub-basal and sub-apical pair of dull black pollinose spots  
..... *Pelecinobaccha (Calumnia) levissima*
- Wing hyaline, anterior margin dark; alula narrow, with same width from base to apex;  
female 2<sup>nd</sup> abdominal segment with sub-apical fascia of dull black pollen that extends  
medially towards base ..... *Pelecinobaccha (Calumnia) brevipennis*
25. 3<sup>rd</sup> and 4<sup>th</sup> (and 5<sup>th</sup> on female) abdominal tergites with distinct baso-lateral sub-  
triangular pale maculae; pro- and mesoleg pale; basal ½ of metafemur pale  
..... *Pelecinobaccha (Pelecinobaccha) costata*

- 3<sup>rd</sup> and 4<sup>th</sup> (and 5<sup>th</sup> on female) abdominal tergites with baso-lateral pale streaks; pro- and mesoleg mainly dark, all tibiae with basal half pale; metafemur entirely dark

..... *Pelecinobaccha (Noxana) squamagula*

26. Katepisternum black pilose; mesonotum, scutellum and metacoxa pile black, long, erect and densely arranged, distinctly long anterior to transverse suture (Fig. 37e-f); posterior anepisternum with densely arranged pile; scutellum with pile as long or longer than pile on scutum ..... 27

- Katepisternum white pilose, if with some black pile, then mesonotum, scutellum and metacoxa without densely arranged pile ..... 29

27. Metafemur and metatibia with long and thick black pile (Fig. 37a); male with wing mainly hyaline except for dark region basally (until crossvein h); female wing hyaline except dark basally from cell bm to anterior margin; female with basal 4 pro- and mesotarsomeres enlarged and widened ..... *Pelecinobaccha (Pelecinobaccha) pilipes*

- Metalegs without such distinct pile; wing with dark anterior margin; only males through this option ..... 28

28. Antennal insertions separated; frontal triangle lateral white pollinosity restricted to ventral traces; lateral pollinosity oriented ventro-dorsally between face and frontal triangle (Fig. 36a) ..... *Pelecinobaccha (Pelecinobaccha) pilinigridentis*

- Antennal insertions confluent; lateral pollinosity oriented dorso-ventrally between face and frontal triangle (Fig. 16a) ..... *Pelecinobaccha (Pelecinobaccha) tristis*

29. Wing mostly hyaline, but antero-basal portion (stigma and/or cells r, c, and basal portions of r1 and r2+3) sometimes light gray/brown; wing never distinctly marked..... 30

- Wing with darker regions extending into more cells than above, sometimes entirely dark or with dark areas faded to around the veins ..... 31

30. Male with 2<sup>nd</sup> abdominal segment long, narrow and cylindrical; 2<sup>nd</sup> abdominal tergite of both sexes with central narrow pale fasciae; 3<sup>rd</sup> and 4<sup>th</sup> abdominal tergites with median pair of short pale vittae and a pair of small baso-lateral pale triangular maculae ..... *Pelecinobaccha (Pelecinobaccha) avispas*

- 2<sup>nd</sup> abdominal segment shorter, wider and non-cylindrical; female 2<sup>nd</sup> abdominal tergite with lateral pale triangular maculae; 3<sup>rd</sup> and 4<sup>th</sup> abdominal tergites with pair of large baso-lateral pale triangular maculae ..... *Pelecinobaccha (Pelecinobaccha) hiantha*

31. Frons/frontal triangle with pale maculae or entirely pale laterally .....	32
- Frons/frontal triangle entirely dark.....	44
32. Wing dark, apical cells sometimes lighter medially; only males through this option	33
- Wing with hyaline regions .....	35
33. 2 <sup>nd</sup> abdominal segment very long (around 3-3.5x as long as wide); apical metatarsomere pale; face mainly pale below tubercle, sometimes with a narrow black median vitta; abdomen long and narrow, slightly widening after 2 <sup>nd</sup> abdominal segment; only males through this option.....	<i>Pelecinobaccha (Pelecinobaccha) seara</i>
- 2 <sup>nd</sup> abdominal segment usually less than 3x as long as wide; apical metatarsomere dark, darker than 2 <sup>nd</sup> and 3 <sup>rd</sup> metatarsomeres; face mainly dark below tubercle; abdomen distinctly widens after 2 <sup>nd</sup> abdominal segment .....	34
34. 2 <sup>nd</sup> abdominal segment usually with a median pair of oblique pale fasciae (sometimes inconspicuous or absent) (Fig. 17a); 3 <sup>rd</sup> and/or 4 <sup>th</sup> abdominal tergites with a central pair of narrow vittae, vittae either pale or subshining; usually small flies (6-8mm) .....	<i>Pelecinobaccha (Pelecinobaccha) alicia - para variation</i>

- 2<sup>nd</sup> abdominal segment without maculae (Fig. 17b); 3<sup>rd</sup> and 4<sup>th</sup> abdominal tergites without central maculae; usually medium-sized flies (~10mm).....*Pelecinobaccha* (*Pelecinobaccha*) *alicia*

35. Female wing with a distinct dark basal region, a pre-apical hyaline band and a dark apical spot; wing with all dark and hyaline regions well defined; if wing apical spot diffuse, then cup cell and anal lobe mostly hyaline basally; only females through this option ..... 36

- Females without apical dark spot on wing or males..... 38

36. Apical 1/3 of metabasitarsomere pale; wing usually with cup cell and anal lobe mostly hyaline basally .....*Pelecinobaccha* (*Pelecinobaccha*) *beatricea*

- Metabasitarsomere with at most apex (less than a 1/3) pale; wing with cup cell and anal lobe homogenously dark, with at least basal region of cup dark ..... 37

37. 6<sup>th</sup> abdominal segment long (2x as long as basal width); 3<sup>rd</sup> to 5<sup>th</sup> abdominal tergites with central pair of pale vittae; anterior anepimeron with white pile only; usually small flies (6-8mm) .....*Pelecinobaccha* (*Pelecinobaccha*) *alicia* - para variation

- 6<sup>th</sup> abdominal segment short (as long as basal width); 3<sup>rd</sup> to 5<sup>th</sup> abdominal tergites without central pair of pale vittae; anterior anepimeron with at least some black pile dorsally; usually medium-sized flies (~10mm).... *Pelecinobaccha (Pelecinoabaccha) alicia*

38. Frons/frontal triangle white pollinosity restricted laterally ..... 39

- Frons/frontal triangle with lateral pair of triangular/narrow oval maculae of white pollen ..... 41

39. Cell cup with basal ½ or more hyaline....*Pelecinoabaccha (Pelecinoabaccha) beatricea*

- Cell cup mostly dark, always dark on apex and whole anterior margin (posterior to vein CuP)..... 40

40. Subscutellar fringe either absent or with short and black pile; basal 2/3 of mesotibia pale; cell dm with only apex or apical 1/5 hyaline..... *Pelecinoabaccha (Pelecinoabaccha) hirundella*

- Subscutellar fringe with long and white pile, pile not so long on female; basal ½ of mesotibia pale, almost basal 2/3 on female; cell dm with apical 1/4 or 1/3 hyaline .....*Pelecinoabaccha (Pelecinoabaccha) ida*



41. Cell cup with basal  $\frac{1}{2}$  or more hyaline, females with basal  $\frac{3}{4}$  distinctly hyaline  
.....*Pelecinobaccha (Pelecinobaccha) cryptica*
- Cell cup mostly dark, always dark on apex and whole anterior margin (posterior to vein CuP), females at most with basal  $\frac{1}{2}$  hyaline.....42
42. Notopleuron with black pile immediately anterior to transverse suture  
.....*Pelecinobaccha (Pelecinobaccha) cora*
- Notopleuron with pale pile anterior to transverse suture .....43
43. Abdominal tergites with pale vittae; female 6th segment as long as 5<sup>th</sup>  
.....*Pelecinobaccha (Pelecinobaccha) clarapex*
- Abdominal tergites immaculate; female 6<sup>th</sup> segment twice the length of the 5<sup>th</sup>  
.....*Pelecinobaccha (Pelecinobaccha) transatlantica*
44. Wing with distinct pre-apical hyaline band and apical dark spot; only females  
.....*Pelecinobaccha (Pelecinobaccha) alicia*
- Wing without distinct apical spot .....45

45. Frons/frontal triangle with lateral pair of triangular/semi-circular maculae of white pollen.....	46
- Frons/frontal triangle with white pollen restricted laterally and not extending towards middle.....	63
46. Most of wing dark, with apical $\frac{1}{4}$ or less hyaline; cell r4+5 with basal $\frac{1}{2}$ or more dark (sometimes diffuse apically) .....	47
- Only basal $\frac{1}{2}$ of wing dark; cell r4+5 completely hyaline or only with a small basal portion dark .....	54
47. Abdominal tergites with central faint pale vittae; pleuron pile white; light brown small fly; 2 <sup>nd</sup> abdominal tergite very narrow and long; fly similar to the genus <i>Relictanum</i> ; only males through this option .....	<i>Pelecinobaccha (Pelecinobaccha) humillima</i>
- Characters not on the above combination.....	48
48. Posterior anepisternum pale on posterior $\frac{1}{2}$ .....	49
- Posterior anepisternum entirely dark.....	50

49. Cell cup entirely dark..... *Pelecinobaccha* (*Pelecinobaccha*)  
*clarapex*

- Cell cup with basal ½ or more hyaline..... *Pelecinobaccha* (*Pelecinobaccha*)  
*cryptica*

50. All tibiae mainly dark, with no distinct pale regions; 2<sup>nd</sup> abdominal segment ~4 times as long as smallest width; 3<sup>rd</sup> abdominal segment trapezoidal and long, slightly longer than 2<sup>nd</sup> segment; female 6th segment very long, 5-6 times as long as smallest width. 51

- Some tibiae have pale basal regions; 2<sup>nd</sup> abdominal segment ~2.5 times as long as smallest width; 3<sup>rd</sup> abdominal segment trapezoidal and short; only males through this option ..... 52

51. Frontal triangle lateral pollinose maculae extended towards middle; subscutellar pile normal; 1<sup>st</sup> abdominal segment with white and black pile..... *Pelecinobaccha*  
(*Pelecinobaccha*) *telescopica*

- Frontal triangle lateral pollinose maculae only slightly extended towards middle; subscutellar pile long; 1<sup>st</sup> abdominal segment entirely white pilose..... *Pelecinobaccha*  
(*Pelecinobaccha*) *unica*

52. Dorsal region of posterior anepisternum and anterior anepimeron with black pile; 1<sup>st</sup> abdominal tergite dorsal ½ with black pile ..... *Pelecinobaccha (Pelecinobaccha) transatlantica*

- Pleuron entirely white pilose; 1<sup>st</sup> abdominal tergite mainly white pilose, sometimes with some black pile dorso-basally ..... 53

53. Pale on basal 1/3 of protibia, basal ½ of mesotibia and basal ¼ to 1/5 of metatibia; surstylus rectangular on lateral view; subepandrial sclerite trapezoidal; hypandrium ventral notch on anterior ½ ..... *Pelecinobaccha (Pelecinobaccha) transatlantica*

- Tibiae pale only on base; surstylus sub-oval in lateral view; subepandrial sclerite rectangular and wide; hypandrium ventral notch on anterior 2/3 ..... *Pelecinobaccha (Pelecinobaccha) morgani*

54. Pro- and mesotibia with at least basal ½ pale; only females through this option ..... 55

- Tibiae either entirely dark or with only base pale ..... 57

55. Basal 1/4 of metatibia pale; female 2<sup>nd</sup> abdominal segment sub-quadrate (1.5 times as long as wide); female 6<sup>th</sup> abdominal segment 2 times as long as 5<sup>th</sup> segment ..... *Pelecinobaccha (Pelecinobaccha) transatlantica*

- Metatibia at most with base pale; female 2<sup>nd</sup> abdominal segment long ( $\geq 3$  times as long as wide); female 6<sup>th</sup> abdominal segment as long as 5<sup>th</sup> segment ..... 56

56. Cell cup entirely dark.....*Pelecinobaccha (Pelecinobaccha) clarapex*

- Cell cup distinctly dark only on apical  $\frac{1}{4}$ .....*Pelecinobaccha (Pelecinobaccha) cryptica*

57. White pilose on posterior anepisternum, anterior anepimeron and anterior to transverse suture on the notopleuron; calypter white to light brown..... 58

- With some black pile on anterior anepimeron and anterior to the transverse suture on the notopleuron; calypter or calypter margin dark brown to black ..... 60

58. Antennal insertions almost separated, with long medial sclerotized division  
.....*Pelecinobaccha (Pelecinobaccha) wyatti*

- Antennal insertions confluent ..... 59

59. Metabasitarsomere with only apex pale ..... *Pelecinobaccha (Pelecinobaccha) andrettae* (variation)

- Metabasitarsomere with apical  $\frac{1}{2}$  pale ..... *Pelecinobaccha (Pelecinobaccha) cora*

60. Metabasitarsomere with apical ½ or slightly less pale; male 3<sup>rd</sup> abdominal segment trapezoidal, apex much wider than base; female 2<sup>nd</sup> abdominal segment 2.5 times as long as wide; female 6<sup>th</sup> abdominal segment conical and shorter than its basal width.. 61

- Metabasitarsomere with apical 1/3 pale; male 3<sup>rd</sup> abdominal segment trapezoidal and long, apex slightly wider than base; female 2<sup>nd</sup> abdominal segment rectangular (2x as long as wide); female 6<sup>th</sup> abdominal segment cylindrical and very long (7x as long as wide)..... 62

61. Calypter light brown, pile darker than margin; apices of cells r1 and r2+3 light brown; hypandrium ventral notch quadrangular; only males through this option

..... *Pelecinobaccha* (*Pelecinobaccha*) *cora*

- Calypter grey with black margin and black pile; apices of cells r1 and r2+3 hyaline; hypandrium ventral notch oval ..... *Pelecinobaccha* (*Pelecinobaccha*) *andrettae*

62. Lunule entirely shining black; posterior anepisternum white pilose; subscutellar fringe with short pile; female 5<sup>th</sup> abdominal tergite and sternite fused at the apex; only females through this option ..... *Pelecinobaccha* (*Pelecinobaccha*) *telescopica*

- Lunule pale above the antenna; posterior anepisternum with some black pile;  
subscutellar fringe with long pile; female 5<sup>th</sup> abdominal tergite and sternite completely  
separated .....*Pelecinobaccha (Pelecinobaccha) eruptova*

63. Antennal insertions confluent ..... 64

- Antennal insertions separated; sometimes the middle division is unsclerotized at the  
point it reaches the lunule ..... 68

64. Metabasitarsomere with only apex pale; 2<sup>nd</sup> abdominal segment long, 2.5-3.5 times  
as long as wide; only males through this option ..... 65

- Metabasitarsomere with apical 1/5 or more pale; 2<sup>nd</sup> abdominal segment very long,  
usually more than 3.5 times as long as wide ..... 66

65. 2<sup>nd</sup> abdominal segment usually with a median pair of oblique pale fasciae  
(sometimes inconspicuous or absent); 3<sup>rd</sup> and/or 4<sup>th</sup> abdominal tergites with a central  
pair of narrow vittae, vittae either pale or subshining; usually small flies (6-8mm)  
.....*Pelecinobaccha (Pelecinobaccha) alicia* - para variation

- 2<sup>nd</sup> abdominal segment without maculae; 3<sup>rd</sup> and 4<sup>th</sup> abdominal tergites without central  
maculae; usually medium-sized flies (~10mm)... *Pelecinobaccha (Pelecinobaccha) alicia*

66. Middle occiput anterior rows mainly dark pilose; pleuron entirely dark..... 67

- Middle occiput anterior rows mainly with scale-like pale pile; pleuron usually pale on posterior ½ of posterior anepisternum and dorso-posterior katepisternum

..... *Pelecinobaccha (Pelecinobaccha) mexicana*

67. Metabasitarsomere pale on apical ½ or slightly less; 2<sup>nd</sup> sternite with long, erect white pile on basal ½; postgonite apex rounded ventrally; female 7<sup>th</sup> tergite as long as wide medially..... *Pelecinobaccha (Pelecinobaccha) manuelorum*

- Metabasitarsomere pale on apical ¼ or less; 2<sup>nd</sup> sternite at most with sparse, short, appressed black pile; postgonite apex with acute ventral extremity; female 7<sup>th</sup> tergite narrower, sclerite wider than long medially ....*Pelecinobaccha (Pelecinobaccha) hiantha*

68. Antennal insertions almost separated, medial division unsclerotized at the point it reaches the lunule; apical 1/4 of cell r1 and apical 2/5 of r2+3 distinctly hyaline, no diffuse or small dark markings..... *Pelecinobaccha (Pelecinobaccha) hirundella* (some males)

- Antennal insertions separated; apical regions of cells r1 and r2+3 mainly dark or with diffuse dark markings ..... 69



69. At least dorso-posterior of the posterior anepisternum black pilose

..... *Pelecinobaccha (Pelecinobaccha) nubilorum*

- Posterior anepisternum and anterior anepimeron white pilose; only females through  
this option ..... 70

70. Alula 3 times wider apically than c cell; 3<sup>rd</sup> to 5<sup>th</sup> abdominal tergites immaculate,  
except female 3<sup>rd</sup> abdominal tergite with basal pair of pale maculae; female 6<sup>th</sup>  
abdominal segment long, 2x the length of the 5<sup>th</sup>; female 8<sup>th</sup> tergite unsclerotized  
medially ..... *Pelecinobaccha (Pelecinobaccha) tica*

- Alula narrow, at most twice as wide as c cell; 3<sup>rd</sup> to 5<sup>th</sup> abdominal tergites with central  
pair of very long pale vittae; female 6<sup>th</sup> segment as long as 5<sup>th</sup>; female 8<sup>th</sup> tergite  
sclerotized medially ..... 71

71. Face pale on lateral 1/3; central macula of the lunule connected to frons color by a  
narrow dark vitta; 7<sup>th</sup> segment lateral sclerite sub-triangular, narrowing apically; apices  
of 8<sup>th</sup> tergite long; found on <1600m. of altitude ..... *Pelecinobaccha (Pelecinobaccha)*  
*capessorum*

- Face entirely black; central macula of the lunule continuous with frons color; 7<sup>th</sup>  
segment lateral sclerite sub-rectangular, slightly narrower apically than basal width;  
apices of 8<sup>th</sup> tergite short; found on >2300m. of altitude ..... *Pelecinobaccha*  
*(Pelecinobaccha) nubilorum*

## Species descriptions

*Pelecinozaccha* (*Calumnina*) *aster* (Curran, 1941) **comb. nov.**

*Baccha aster* Curran, 1941. – Curran, 1941: 278. Type-locality: Brazil, Santa Catarina, Nova Teutônia. Holotype male AMNH. Hull, 1949a: 200 (fig. 41, male abdomen, mislabelled as female), 232 (fig. 187, male abdomen), 238 (fig. 216, female abdomen).

*Ocyptamus aster*. Thompson et al. 1976: 13 (catalog citation).

Map: 4. Figures: 3.

**Male. Head:** Dark brown; face pale with a medial dark brown vitta that is narrow ventral to tubercle and expands to 1/3 of the face width dorsally; lunule pale, with teardrop-shaped black macula medially, connected to frons color by median black vitta; frontal triangle dark, pale laterally except around eye contiguity, dull brown-pollinose medially and with very sparse white pollen dorso-laterally, frontal prominence only slightly protuberant; vertical triangle with a median row of black pile; ocellar triangle distanced its length from the posterior eye margin; eye contiguity longer than vertical triangle length; eye posterior indentation at level of antennae insertion; antennae insertions confluent; occiput with dull pollen on dorsal  $\frac{1}{4}$  and concentrated white pollen on ventral  $\frac{3}{4}$ ; occiput dorsal  $\frac{1}{4}$  with 1-2 rows of simple black pile, anterior row with short pile,

posterior row sometimes white, ventral  $\frac{3}{4}$  with 2-3 rows of white scale-like pile, anterior rows shorter.

**Thorax:** Scutum dark brown, dull brown-pollinose, with white pollen forming a weak pair of sub-median vittae on anterior  $\frac{2}{3}$ , mainly black pilose, pile white laterally, with anterior row of shining white pile, interrupted in the middle; scutellum dark brown, white pilose, subscutellar fringe long and white; pleuron black, white on posterior  $\frac{1}{2}$  of posterior anepisternum and dorso-posterior region of katepisternum, entirely white pilose, most pile appressed; plumula very short and white; calypter white to yellow; halter yellow, capitulum sometimes orange.

**Wing:** Light brown, entirely microtrichose, cup cell narrow; alula inconspicuous, a short membranous area near the base of the anal lobe, a  $\frac{1}{5}$  of c cell width, bare.

**Legs:** Procoxa, protrochanter, apical  $\frac{1}{2}$  of profemur, apical  $\frac{1}{3}$  protibia, apical  $\frac{3}{4}$  of probasitarsomeres and 4th to 5th protarsomeres brown, pale elsewhere, mostly white pilose; mesocoxa, mesofemur on sub-apical  $\frac{1}{4}$ , apical  $\frac{1}{3}$  of mesotibia, mesobasitarsomere and the 2 apical mesotarsomeres brown, pale elsewhere, mostly black pilose, posterior row of mesofemur with white and black pile intermixed; metalegs brown, base and apex of metafemur, base of metatibia, apex of metabasitarsomere until 4th metatarsomere pale, pile on metacoxa and metatrochanters mostly white.

**Abdomen:** Dark brown; ~5.5 times longer than thorax; 1st tergite pale laterally, entirely white pilose, pile longer laterally; 2<sup>nd</sup> tergite very long, ~13 times longer than its smallest width, with pair of sub-apical lateral pale spots, dull black-pollinose dorsally and laterally immediately posterior to pale maculae, pile short, appressed and black; 3rd tergite trapezoidal and long, ~12 times longer than smallest width, with sub-median lateral oval pale maculae, with narrow central triangular region of dull black pollen, pile appressed and black; 4th tergite rectangular, ~2.5 times longer than wide, with large, baso-lateral, quadrangular, pale maculae, dull black-pollinose except on pale maculae, remaining characteristics as on 3rd; 5th tergite sub-quadrangular, without pale maculae, dull black-pollinose medially, remaining characteristics as on 3<sup>rd</sup>. **Genitalia:** Cercus with 1 regular row of pile on medial margin and 2-3 regular rows outward; surstylus oval, directed apico-ventrally, with setulae ventrally, mostly concentrated on apical ¼ and a few on a sub-median row, pilose on the dorsal surface; subepandrial sclerite rectangular and wide with short baso-lateral extensions, homogeneously sclerotized; hypandrium ventral notch rounded and extending on anterior ½; phallapodeme enlarged basally, homogeneously sclerotized except for base; basiphallus posterior projection blunt and short; distiphallus apex straight; postgonites ventral and dorsal surface mostly straight, apex convex anteriorly, with enlarged rounded ventral extremity and very short acute dorsal extremity.

**Female:** Like male except: face vitta narrower; frons black with pale lateral margin on ventral 1/3, with a shining medial vitta, lateral white pollinosity more distinct; ocellar triangle ~1.5 times its length from the posterior eye margin and ~1 ocellus-width from lateral eye margin; wing more hyaline; apical 1/4 of mesotibia brown and mesobasitarsomere entirely pale; 2<sup>nd</sup> abdominal tergite 10 times longer than its smallest width; 3rd tergite 6.5 times longer than smallest width; 4<sup>th</sup> tergite maculae smaller to absent; 5th tergite sub-quadrangular; 6th segment rectangular, slightly longer than wide, divided into tergite and sternite. **Genitalia:** 7<sup>th</sup> tergite with long anterior acute projection, 7<sup>th</sup> segment lateral sclerite slightly oval, acute baso-ventrally, with more extensive fused basal area to 7<sup>th</sup> tergite, 7<sup>th</sup> sternite weakly sclerotized but with posterior long acute projection medially; 8<sup>th</sup> tergite unsclerotized medially, basal crest weak, 8<sup>th</sup> sternite unsclerotized medially; 10<sup>th</sup> tergite as a pair of sclerites fused to dorsal surface of the cerci; cercus narrowed and curved basally, forming an acute baso-ventral projection, with 1 row of pile on apical margin.

**Length.** 11.5-14.5mm; wing 8-9.5mm.

**Distribution.** Brazil (Santa Catarina).

**Material examined.** (**6 males**) BRAZIL. Santa Catarina, Nova Teutônia, 300-500m, 27°11'S 52°23'W, 25 Oct 1939, F. Plaumann (CNC Diptera 161284); ..., ?? Jan 1966

(CNC Diptera 161286); ..., ?? Nov 1969 (3 specimens, CNC Diptera 161285, 161287-8); ..., ?? Dec 1971 (**4 females**) BRAZIL. Santa Catarina, Nova Teutônia, 300-500m, 27°11'S 52°23'W, 30 May 1939, F. Plaumann (CNC Diptera 161289); ..., ?? Mar 1948 (CNC Diptera 161290); ..., ?? Nov 1969 (CNC Diptera 161291); ..., ?? Oct 1971.

*Pelecinobaccha (Calumnina) brevipennis* (Schiner, 1868) **comb. nov.**

*Baccha brevipennis* Schiner, 1868. - Schiner, 1868: 341. Type-locality: "South America". Types male and female MNH-Wien (not examined). Hull, 1949a: 204 (fig. 64, male abdomen), 268 (fig. 343, male wing).

*Ocyptamus brevipennis*. Thompson et al. 1976: 13. (catalog citation)

*Baccha micropelecina* Shannon, 1927. - Shannon, 1927: 10. Type-locality: Bolivia, Tumupasa. Holotype female USNM. Hull, 1949a: 250 (fig. 269, female abdomen). **n. syn.**

*Ocyptamus micropelecinus*. Thompson et al. 1976: 22. (catalog citation)

Map: 4. Figures: 4.

**Male. Head:** Black; lunule entirely black and very rugose until middle of frontal triangle; frontal triangle bare on rugose area, dull black-pollinose dorso-medially, white pollen restricted to small ventro-lateral spots; vertical triangle with 1 row of short black pile; ocellar triangle ~1.5 times its length from the posterior eye margin; eye contiguity shorter than vertical triangle length; eye posterior indentation ventral to the antennae insertion; antennae insertions confluent, ventral margin has a short dorsal extension; occiput homogenously white-pollinose; occiput dorsal  $\frac{1}{4}$  with 2 rows of simple black pile,

anterior row intermittent and with very short pile, middle  $\frac{2}{4}$  with 2-3 rows, anterior rows sometimes with simple black pile, posterior row with long, white, scale-like pile, ventral  $\frac{1}{4}$  with 2-3 rows of white, scale-like pile, anterior row shorter.

**Thorax:** Scutum black, with pair of anterior patches of dull brown pollen, with very short black pile, pile longer and white laterally posterior to transverse suture, with anterior row of short shining white pile interrupted in the middle; scutellum dark brown, with very short black pile, subscutellar fringe absent; pleuron black, with short appressed white pile, pile of metepisternum inconspicuous; plumula absent; calypter white, ventral lobe narrow, dorsal lobe bare; halter white to yellow.

**Wing:** Entirely hyaline, entirely microtrichose; alula linear, slightly narrower than c cell, hyaline, entirely microtrichose.

**Legs:** Prolegs pale, light brown on basal  $\frac{1}{4}$  and posterior surface of profemur and small sub-apical region on protibia, protarsus dark brown; mesolegs dark brown, apex of mesofemur and basal  $\frac{2}{5}$  of mesotibia pale, mostly white pilose on apex of mesofemur and basal  $\frac{1}{4}$  of mesotibia, mesofemur posterior row mostly white pilose; metalegs dark brown, apex of metafemur and basal  $\frac{1}{4}$  of metatibia pale, pile on metacoxa and metatrochanters white.



**Abdomen:** Dark brown; ~5 times longer than thorax, whole abdomen with very short black pile; 1<sup>st</sup> tergite pale laterally; 2<sup>nd</sup> tergite very long and narrow, ~7 times longer than its smallest width, with pair of sub-apical lateral pale fasciate maculae, with sub-apical fascia of dull black pollen connected to a medial narrow vitta that ends before the base, bare dorsally; 3rd tergite very long and narrow, ~7 times longer than smallest width, with lateral pair of fasciate pale maculae medially, maculae may extend diffusely posteriorly, median vitta of dull black pollen expands slightly posteriorly, remaining characteristics as on 2nd; 4th tergite trapezoidal and long, ~5 times longer than smallest width, with lateral sub-basal pair of pale triangular maculae, entirely pilose; 5th tergite sub-quadrangular, immaculate, entirely pilose. **Genitalia:** Cercus with 1 row of pile on medial margin and 3 rows outward; surstylus very short and oval, directed apically, with many setulae (around 35) ventrally but thicker and concentrated on anterior margin and a few of the basal setulae are distinctly longer, with a few pile on the dorsal surface; subepandrial sclerite quadrangular with slightly concave posterior margin, homogeneously sclerotized; hypandrium short and rectangular, with ventral rectangular notch on anterior  $\frac{1}{2}$ ; phallapodeme  $\frac{1}{2}$  the length of the hypandrium, homogeneously sclerotized, with sub-acute base; distiphallus anterior surface straight; postgonites short, ventral surface straight, dorsal surface slightly concave, apex strongly convex, with acute ventral and dorsal extremities.

**Female:** Like male except: frons normal width, rugose on ventral  $\frac{1}{3}$ , black, dull brown-pollinose medially, dull black-pollinose spot dorsal to frontal prominence, lateral white pollinosity continuous from face pollinosity; ocellar triangle ~2 times its length from the

posterior eye margin and ~2 ocelli-width from lateral eye margin; scutum with white pollen laterally and forming a pair of sub-median antero-posterior vittae and a median postero-anterior one, lateral pale pile shorter posterior to transverse suture; legs pale, dark brown sub-apically on mesofemur, on apical  $\frac{1}{2}$  of metafemur, apical  $\frac{2}{3}$  of metatibia and all tarsi, posterior row of mesofemur with short pile basally; whole abdomen with very short black pile; 2<sup>nd</sup> tergite very long, ~5.5 times longer than its smallest width, with pair of median lateral fasciate pale spots, medial vitta of dull black pollen doesn't expand posteriorly; 3rd tergite long, ~4 times longer than smallest width, pale on sub-median lateral margin; 4th tergite long, ~2.5 times longer than wide, usually immaculate sometimes with pair of median pale vitta on basal  $\frac{1}{2}$ ; 5th tergite rectangular and long, ~1.5 times longer than wide, sclerites fused laterally on apical  $\frac{1}{2}$ , immaculate; 6th segment whole, very short, ~1/3 of the length of the 5th tergite. **Genitalia:** 7<sup>th</sup> tergite rectangular narrow, with very short anterior notch medially, basal extensions 1/2 the length of the 6th segment, 7<sup>th</sup> segment lateral sclerite rectangular, without acute baso-ventral extremities, joining 7<sup>th</sup> tergite by narrow sclerotized strip on dorso-posterior corner; 8<sup>th</sup> tergite unsclerotized medially but with a sub-apical narrow well sclerotized strip that extends baso-medially as an acute projection, basal crest extended posteriorly, 8<sup>th</sup> sternite reduced to a pair of separate triangular sclerotizations, each with sub-basal unsclerotized areas; 10<sup>th</sup> tergite as a transverse sclerotized stripe, that extends ventro-basally on each side and fuses to basal surface of cercus; cercus with apical margin concave and with 2 irregular rows of pile.

**Length.** 9-11mm; wing 5.5-6.5mm.

**Distribution.** Bol via (La Paz), Ecuador (Nap ), Peru (Cuzco, Madre de Dios, Ucayali), Venezuela (Amazonas).

**Material examined.** (**8 males**) ECUADOR. Napo, Coca, Napo R., 250m, 25-30 Apr 1965, L. Pena (CNC Diptera 161328). PERU. Cuzco, Pilcopata, 13 Feb 1978, P.M. Marsh; Madre de Dios, Avispas, 400m., 10-20 Sep 1962, L. Pena (3 specimens, CNC Diptera 161329-31); ..., Manu, Rio Manu, Pakitza, Malaise trap, 250m, 12 7'S 70 58'W, 9-23 Sep 1988, W.N. Mathis; [Ucayali], Pucallpa, 18 Nov 1947, J. Shunke (CNC Diptera 161327); ..., Unini, 22 Oct [19]03, ? (CNC Diptera 161323). (**4 females**) PERU. Madre de Dios, Avispas, 400m., 10-20 Sep 1962, L. Pena (2 specimens, CNC Diptera 161332-3); ..., Manu, Rio Manu, Pakitza, 250m, 12 7'S 70 58'W, 9-23 Sep 1988, W.N. Mathis. VENEZUELA. [Amazonas], T. F. Amaz., Cerro de la Neblina, Basecamp, 140m, 0 50'N 66 9'44''W, 13-20 Feb 1984, D. Davies & T. McCabe.

*Pelecinobaccha (Calumnina) gracilitas* **sp.nov.**

Type-locality: Brazil, Amazonas, Manaus, Km. 65, Boa Vista Rd. 3°5.725'S  
59°55.376'W. Holotype male CNC.

Map: 5. Figures: 5.

**Male. Head:** Black; face pale with a narrow medial black vitta from tubercle apex to antennal base where it becomes diffuse, entirely white pilose; lunule mostly dark, very slightly pale above antennae insertions; frontal triangle black, pale laterally, white-pollinose laterally, connected to pollen from face, black pilose medially, pile white on pale region around frontal prominence; vertical triangle with a median row of long black pile; ocellar triangle distanced its length from the posterior eye margin; eye contiguity as long as vertical triangle length; eye posterior indentation at level of antennae insertion; antennae insertions confluent; occiput with sparse white pollen on dorsal  $\frac{1}{4}$  and more concentrated on ventral  $\frac{3}{4}$ ; occiput dorsal  $\frac{1}{4}$  with 1-2 rows of simple black pile, anterior row with very short pile, middle  $\frac{2}{4}$  with 2-3 rows of white scale-like pile, anterior rows shorter, ventral  $\frac{1}{4}$  with 2 regular rows of white, scale-like pile.

**Thorax:** Scutum black, dull brown-pollinose, with white pollen forming a weak pair of sub-median vittae and a narrow median vitta on anterior  $\frac{2}{3}$ , mainly white pilose, pile

slightly longer on notopleuron, with anterior row of shining white pile, interrupted in the middle; scutellum black, pale on basal 1/3, white pilose, subscutellar fringe long and white; pleuron black, white on posterior 1/2 of posterior anepisternum and dorso-posterior region of katepisternum, entirely white pilose; plumula long and white; calypter white; halter yellow.

**Wing:** Hyaline with anterior dark margin (dark on cells bc, c, sc and basal 1/3 of r1) or light brown slightly darker on same regions as hyaline variation, entirely microtrichose; alula linear, expanding slightly apically, 2/3 of the width of c cell basally to 2 times larger than c cell apically, hyaline, bare on posterior 1/2.

**Legs:** Prolegs pale, procoxa, protrochanter, apico-dorsal 1/2 of profemur, small sub-apical macula on protibia, basal 1/2 of probasitarsomeres and 3rd to 5th tarsomeres brown; mesolegs mostly pale, mesocoxa, mesotrochanter, mesofemur basal and apical 1/3, sub-apical ventral spot on mesotibia and the 2 apical mesotarsomeres brown, mostly white pilose, black pilose on apical 1/3 of mesofemur, posterior row of mesofemur with white pile basally; metalegs brown, base and apex of metafemur, basal 1/3 of metatibia and apical 1/3 of metabasitarsomere until 4th metatarsomere pale, pile on metacoxa and metatrochanters mostly white.

**Abdomen:** Black; ~4.5 times longer than thorax; 1st tergite pale laterally, entirely white pilose, pile longer laterally; 2<sup>nd</sup> tergite very long, ~9.5 times longer than its smallest width, with pair of sub-median lateral pale spots, dull black-pollinose on baso-dorsal  $\frac{3}{4}$  and laterally immediately posterior to pale maculae, pile mostly short and appressed, long and erect laterally, white laterally and basally, remaining black; 3rd tergite trapezoidal and long, ~8 times longer than smallest width, with sub-basal lateral oval pale maculae, with narrow central triangular region of dull black pollen, pile mainly appressed and black, with some longer and erect white pile on baso-lateral corners; 4th tergite rectangular and long, with sub-basal lateral quadrangular pale maculae, with short, appressed, white pile on baso-lateral corners, remaining characteristics as on 3rd; 5th tergite rectangular and wide, without pale maculae, with a small triangular region of dull black pollen, pile short, appressed and black. **Genitalia:** Cercus with 1 regular row of pile on medial margin and 3 regular rows outward; surstylus sub-oval, with a short medial curved fold on basal  $\frac{1}{2}$ , directed ventrally, with sparse setulae ventrally on apex (around 20) and 4 setulae basally, pilose anteriorly on the dorsal surface; subepandrial sclerite rectangular and wide with short baso-lateral extensions, homogeneously sclerotized; hypandrium ventral notch rounded and extending on anterior  $\frac{2}{3}$ ; basiphallus posterior acute projection short; distiphallus apex straight; postgonites ventral and dorsal surface mostly straight, apex convex anteriorly, with enlarged acute ventral extremity and very short acute dorsal extremity.

**Female.** Like male except: face with only a black spot on tubercle's apex; lunule pale above antennae insertions, central maculae broadly connected to frons color; frons

black with pale lateral margin on ventral 4/5, sparse white-pollinose; vertex with 1 row of short black pile; ocellar triangle ~2 times its length from the posterior eye margin and ~1 ocellus-width from lateral eye margin; scutellum with short white pile, subscutellar fringe normal and white; wing hyaline with anterior dark margin (dark on cells bc, c, sc, basal  $\frac{1}{2}$  anterior to vein sv on cell r, basal  $\frac{1}{2}$  of r1 and infuscated on base of r2+3); alula mostly bare, with a few microtrichia on anterior margin; whole probasitarsomeres and 3rd protarsomeres pale; mesofemur with apical 2/3 brown; basal  $\frac{1}{4}$  of metatibia and apical  $\frac{1}{2}$  of metabasitarsomere until 4th metatarsomere pale; 2<sup>nd</sup> abdominal tergite 6.8 times longer than its smallest width; 3rd tergite 4.5 times longer than smallest width, 5th tergite sub-quadrangular; 6th segment divided into tergite and sternite. **Genitalia:** 7<sup>th</sup> tergite with long anterior acute projection, with a pair of lateral, narrow basal extensions into the 6<sup>th</sup> segment, extensions 2/3 the length of the 6th, 7<sup>th</sup> segment lateral sclerite oval, acute baso-ventrally, 8<sup>th</sup> tergite entirely sclerotized, apex whole, basal crest weak, 8<sup>th</sup> sternite whole, weakly sclerotized medially.

**Length.** 11-13.5mm; wing 7.5-10.5mm.

**Distribution.** Brazil (Amazonas, Santa Catarina), Colombia (Boyaca).

**Material examined.** (2 *males*) BRAZIL. [Amazonas], Manaus, Km. 65, Boa Vista Rd., 14 Mar 1973, B.V. Peterson (Holotype *Pelecinobaccha* (*Calumnia*) *gracilitas*, CNC

Diptera 161193). COLOMBIA. Boyaca, Muzo, 900m, Frank M. Hull Collection C.N.C.  
1973, ?? ??? 1936, J. Bequaert (CNC Diptera 161192). (**1 female**) BRAZIL. Santa  
Catarina, Nova Teutônia, 300-500m, 27°11'S 52°23'W, ?? Dez 1948, F. Plaumann  
(CNC Diptera 161191).

**Etymology:** The specific epithet refers to the slender aspect of the fly. The name is to  
be treated as a noun in apposition.



*Pelecinobaccha (Calumnina) invisibilis* **sp.nov.**

Type-locality: Brasil, Rio de Janeiro, Petropolis, R. Ueter, 22°30.278'S 43°10.940'W.

Holotype female CNC.

Map: 5. Figures: 6.

**Male. Head:** Shining black; face with lateral  $\frac{1}{4}$ - $\frac{1}{5}$  and dorsal to oral margin pale; lunule slightly pale above antennae insertions and slightly rugose; frontal triangle shiny, pale laterally on ventral  $\frac{1}{3}$  or until eye contiguity, with white pollen laterally connected to pollen from face, pile longer close to eye contiguity, antennal base prominence slightly protuberant; vertical triangle with 1 row of black pile; ocellar triangle  $\sim 1.5$  times its length from the posterior eye margin; eye contiguity  $\frac{2}{3}$  the length of the vertical triangle; eye posterior indentation ventral to the antennae insertion; antennae insertions confluent, ventral margin has a short dorsal extension; occiput dorsal  $\frac{1}{4}$  sparse white-pollinose, remaining occiput homogenously white-pollinose; occiput dorsal  $\frac{1}{4}$  with 1 row of simple black pile, sometimes with an anterior row of very short pile, middle  $\frac{2}{4}$  with 2-3 rows of white, scale-like pile, anterior rows shorter, ventral  $\frac{1}{4}$  with 2 rows of white, scale-like pile.

**Thorax:** Scutum shining black, with sparse white pollen anteriorly and on notopleuron, with short pile, mainly black pilose, white pilose laterally, and on an irregular row anteriorly, pile very short on notopleuron; scutellum shining black, small ( $\frac{1}{2}$  the width of the scutum), with very short white pile, subscutellar fringe absent; pleuron black, pale on posterior margin of posterior anepisternum and dorso-posterior katepisternum, with very short, appressed, sparse, white pile, pile of metepisternum inconspicuous, katatergum long microtrichosity mostly on posterior  $\frac{1}{2}$ ; plumula absent; calypter white, with very short and sparse pile on fringes, ventral lobe narrow; halter white; metaepimera extended dorso-posteriorly to metacoxa, and with apices approximated.

**Wing:** Entirely hyaline, bare on cell *bc*, basal  $\frac{3}{4}$  of *c*, basal  $\frac{1}{3}$  of *r*, basal  $\frac{1}{4}$  of *bm* and base of *cup*, *cup* cell narrow; alula absent.

**Legs:** Prolegs and mesolegs pale, coxae, 4<sup>th</sup> and 5<sup>th</sup> tarsomeres brown, dorso-apical  $\frac{1}{3}$  of femora sometimes light brown, white pilose; metalegs dark brown, basal  $\frac{2}{3}$  and apex of metafemur and basal  $\frac{1}{4}$  of metatibia pale, pile pale laterally on metacoxa, on metatrochanters and on pale regions.

**Abdomen:** Dark brown; ~7.5 times longer than thorax, whole abdomen with short, appressed, black pile; 1<sup>st</sup> tergite pale on lateral extremities, mostly bare, but with sparse short white pile laterally, pile long dorso-laterally; 2<sup>nd</sup> tergite very long and narrow, 15

times longer than its smallest width, with pair of baso-lateral pale maculae and a sub-apical lateral pale fasciate maculae that almost meet dorsally, pile sparse, white laterally; 3rd tergite very long and narrow, slightly expanding towards apex, 14 times longer than smallest width, with lateral pair of small fasciate pale maculae medially, pile scarce and white on basal  $\frac{1}{2}$ ; 4th tergite trapezoidal and long, 2.8 times longer than smallest width, with lateral sub-basal pair of pale rectangular maculae; 5th tergite rectangular and wide. **Genitalia:** Cercus with 2 rows of pile on medial margin and 2 rows outward; surstylus oval with medial curved fold on basal  $\frac{2}{3}$ , directed ventrally, with setulae ventrally, thicker and concentrated on apical margin (around 11), thinner and sparse on remaining of surface (around 13) with a few pile medially on the dorsal surface; subepandrial sclerite rectangular and wide with small baso-lateral projections; hypandrium oval on basal  $\frac{1}{2}$ , wider and quadrangular on apical  $\frac{1}{2}$ , with ventral rounded notch on anterior  $\frac{3}{4}$ ; phallapodeme  $\frac{1}{2}$  the size of the hypandrium, mostly weakly sclerotized, apex and apico-dorsal  $\frac{2}{3}$  well sclerotized; basiphallus with blunt posterior extremity; distiphallus anterior surface straight; postgonites ventral surface straight, dorsal surface slightly concave, apex convex anteriorly, with acute dorsal extremity and, slightly extended, oval ventral extremity.

**Female:** Like male except: frons normal width, pale on baso-lateral  $\frac{1}{2}$ ; ocellar triangle ~1.5 times its length from the posterior eye margin and ~3 ocelli-width from lateral eye margin; 2<sup>nd</sup> and third metatrochanters light brown; 5th tergite rectangular and long; 6th segment divided into tergite and sternite. **Genitalia:** 7<sup>th</sup> tergite with acute anterior margin, basal extensions  $\frac{2}{3}$  the length of the 6th segment, 7<sup>th</sup> segment lateral sclerite

triangular; 8<sup>th</sup> tergite entirely sclerotized, apex with a pair of acute extremities, basal crest short, 8<sup>th</sup> sternite unsclerotized medially; 10<sup>th</sup> tergite large and distinct, fused to the dorsal margin of the cerci, forming a short, ventral, acute projection close to cercus; cercus lanceolate and directed ventrally, with 1-2 rows of pile on apical margin.

**Length.** 9.5mm; wing 5.5mm.

**Distribution.** Brazil (Rio de Janeiro, Santa Catarina).

**Material examined.** (**2 males**) UNKNOWN. [no label] (CNC Diptera 161194). BRAZIL. Santa Catarina, Nova Teutônia, 300-500m, 27°11'S 52°23'W, ?? Nov 1969, F. Plaumann (CNC Diptera 161195). (**1 female**) BRAZIL. [Rio de Janeiro], Petropolis, R. Ueter, ?? ??? ????, ? (Holotype *Pelecinobaccha (Calumnia) invisibilis*, CNC Diptera 161196).

**Comments:** This species is very similar to the genus *Fragosa*. They have a slightly rugose frontal triangle/frons, long slender abdomen and lack an alula. However, the face is more extensively dark and the female genitalia is typical of *Pelecinobaccha*.

**Etymology:** The specific epithet is an adjective for 'invisible'.

*Pelecinobaccha (Calumnia) levissima* (Austen, 1893) **comb. nov.**

*Baccha levissima* Austen, 1893. - Austen, 1893: 146, pl. 4: fig 15 (habitus). Type-locality: Brazil, region of Amazon. Holotype male BMNH (not examined). Hull, 1949a: 238 (fig. 220, male abdomen), 268 (fig. 337, male wing).

*Ocyptamus levissimus*. Thompson et al. 1976: 21. (catalog citation)

*Baccha bassleri* Curran, 1939. - Curran, 1939: 8. Type-locality: Peru, Middle Rio Ucayali. Holotype male AMNH. Hull, 1949a: 238 (fig. 219, male abdomen), 256 (fig. 297, male wing). **n. syn.**

*Ocyptamus bassleri*. Thompson et al. 1976: 13. (catalog citation)

Map: 5. Figures: 7.

As in *P. (Calumnia) brevipennis* except: **Male**. Ocellar triangle distanced less than its length from the posterior eye margin; eye contiguity longer than vertical triangle length; occiput middle  $\frac{2}{4}$  anterior rows always with simple black pile, scutum mostly covered by brown pollen and with median vitta of absence of pollen, anterior row with very short shining white pile barely visible; plumula virtually absent, some specimens with a few short pile on dorso-posterior margin of dorso-medial anepimeron; calypter dorsal lobe with marginal fringe of short sparse pile; wing entirely light brown; alula narrow as c cell

basally, but expanding abruptly on apex to 3 times its basal width, light brown; legs dark brown, mesofemur posterior row with dark pile; if maculae present on abdominal tergites, then maculae very faint. **Genitalia:** Surstylus slightly longer, directed ventrally, with more setulae apically; subepandrial sclerite quadrangular with more pronounced concave posterior margin; hypandrium sub-oval with narrower quadrangular apical 1/3; phallapodeme longer, 2/3 the length of the hypandrium; distiphallus anterior surface slightly sinuous; postgonites dorsal surface straight, apex gently convex, with acute dorsal extremity and slightly rounded ventral extremity.

**Female:** Like male except: frons normal width, rugose on ventral 1/4, black, dull brown-pollinose medially, dull black-pollinose in a diamond-shaped region dorsal to frontal prominence, white-pollinose lateral maculae larger and not continuous to lateral pollen from face; ocellar triangle ~1.5 times its length from the posterior eye margin and ~1 ocellus-width from lateral eye margin; scutum dull brown-pollinose, with white pollen laterally and forming a pair of sub-median vittae, pile posterior to transverse suture dark, without anterior row of shining white pile; wing lighter; legs pale, mesofemur with sub-apical ring of light brown, apical 2/5 of metafemur, metatibia and all tarsi dark brown, posterior row of mesofemur with shorter pile; abdomen ~5.5 times longer than thorax, whole abdomen with very short black pile; 2<sup>nd</sup> tergite very long, 5 times longer than its smallest width, with sub-apical fascia and sub-basal spots of dull black pollen, fascia sometimes interrupted medially; 3rd tergite long, ~3.5 times longer than smallest width, dull black maculae as on 2<sup>nd</sup> tergite; 4th tergite long, ~2.5 times longer than wide; 5th segment sclerites fused laterally on apical 1/2; 6th segment whole, very short, a 1/3 of

the length of the 5th segment. **Genitalia:** 7<sup>th</sup> tergite triangular short; 8<sup>th</sup> tergite sub-apical stripe not extended baso-medially, basal crest short; cercus with apical margin slightly undulate and with ~4 irregular rows of pile on ventral ½.

**Length.** 11-13mm; wing 6.5-7.5mm.

**Distribution.** Brazil (“region of Amazon”), Peru (Madre de Dios, Ucayali).

**Material examined.** (**3 males**) PERU. Madre de Dios, Manu, Rio Manu, Pakitza, 250m, 12°7’S 70°58’W, 9-23 Sep 1988, A. Freidberg (USNM); [Ucayali], Pucallpa, 18 Nov 1947, J. Shunke (CNC Diptera 161334); ..., 03 Dec 1947 (CNC Diptera 161335). (**3 females**) PERU. Madre de Dios, Avispas, 400m., 10-20 Sep 1962, L. Pena (CNC Diptera 161337); ..., Chiforongo, 11 Oct 1963, L.E. Pena (CNC Diptera 161336); [Ucayali], Pucallpa, Frank M. Hull Collection C.N.C. 1973, 05 Feb 1948, J. Shunke (CNC Diptera 161338).

**Comments:** Austen distinguished *Baccha levissima* from *B. brevipennis* by “the yellow spots on the abdomen and by the infuscated wings”. The yellow spots don’t seem to be a reliable character since they do occur on specimens of *P. (Calumnia) brevipennis*, and specimens of *P. (Calumnia) levissima* usually have only faint maculae. Still, the wings

are very distinct between the two species. The additional characters of the redescription give greater support to the separation between both species. The type specimen of *B. bassleri* is missing the abdominal segments beyond the 2<sup>nd</sup>, but the remaining characters available on the specimen agree with the redescription of *P. (Calumnia) levissima*.



*Pelecinobaccha (Calumnia) portachueloi* **sp.nov.**

Type-locality: Venezuela, Carabobo, Henri Pitier National Park, Portachuelo Pass, 1143m, 10°20'51"N 67°41'16"W. Holotype male CNC.

Map: 4. Figures: 8a-d.

**Male. Head:** Black; face mainly pale, dark brown restricted medially above tubercle; lunule pale above antennae insertion, central macula broadly fused to frontal triangle color; frontal triangle pale laterally except around eye contiguity, with silvery-white pollen restricted laterally, visible from an antero-ventral view, frontal prominence slightly protuberant, almost same level as frontal triangle; vertical triangle with 1 row of pile; ocellar triangle distanced its length from the posterior eye margin; eye contiguity slightly longer than vertical triangle length; eye with sub-triangular indentation on posterior margin positioned at level of antenna insertion; antennae insertions confluent, ventral sclerotized margin extended dorsally, antennae black; occiput dorsal 1/3 with 2 rows of simple black pile, anterior row with shorter pile, reduced to 1 row ventrally, ventral 2/3 with 2-3 rows of white, scale-like pile, anterior row slightly shorter and with black pile dorsally until posterior eye indentation.

**Thorax:** Scutum black, dull brown-pollinose, with inconspicuous vittae of postero-anteriorly oriented pollen sub-medially, mainly black pilose, longer anterior to transverse suture on notopleuron, white pilose anteriorly to scutellum and on anterior ½ of the notopleuron, with anterior irregular row of shining white pile, of the same length as remaining pile from the scutum; scutellum black, mainly black pilose with some pale pile basally, subscutellar fringe white and long; pleuron dark brown, pale on posterior ½ of posterior anepisternum and dorso-posterior portion of katepisternum, white pilose, except mainly black pilose on anterior anepimera (some white pile dorsally); plumula white and short; calypter light yellow; halter white.

**Wing:** Entirely dark, lighter on posterior margin, entirely microtrichose; alula very reduced, apex at most ½ the width of the c cell.

**Legs:** Prolegs light brown, pale on apex of profemur, base of protibia and third protarsomeres; mesolegs dark brown, pale on apex of mesofemur and basal 2/3 of mesotibia; metalegs dark brown, pale on apex of metafemur, base of metatibia and apical 1/5 of metabasitarsomere and remaining metatarsomeres.

**Abdomen:** Black, 2.7 times longer than thorax; 1<sup>st</sup> tergite black, black pilose except white baso-ventrally; 2<sup>nd</sup> tergite long, 5.4 times longer than smallest width, with pair of sub-lateral pale maculae, with sub-apical central long triangular region dull black-

pollinose, pile black, long and erect laterally, but short and appressed dorsally; 3rd tergite trapezoidal and long, 4.6 times longer than smallest width, with short pale vittate maculae on baso-lateral corners and central pair of pale vittate maculae, with large central triangular region of dull black pollen, pile short, appressed and black, 3rd sternite narrow and long; 4th tergite rectangular and long, 1.4 times longer than wide, baso-lateral corners pale, with a central pair of pale vittate maculae that fade basally and reappear on the base, remaining characteristics as on 3rd; 5th tergite rectangular and wide, with pair of short central pale vittae on basal  $\frac{1}{2}$ , remaining characteristics as in 3rd. **Genitalia:** Cercus with 1 regular row of pile on medial margin and 2 regular rows outward; surstylus directed ventrally, rectangular with rounded apex, with strong setulae on ventral surface, 6 short ones basally, 1 medially and 23 on apical  $\frac{1}{3}$  until apical margin, sparse pilose on basal  $\frac{2}{3}$  of the dorsal surface, pile shorter posteriorly; subepandrial sclerite crescent-shaped with a pair of short apical extensions; hypandrium with ventral notch extending on anterior  $\frac{2}{3}$  with a rectangular posterior margin; distiphallus smooth and anterior surface straight; phallapodeme normal and tapers on basal  $\frac{1}{3}$ ; postgonites ventral and dorsal surface straight, apex convex anteriorly, with acute dorsal extremity and slightly convex ventrally, postgonites curve outward on apical  $\frac{2}{3}$ .

**Female:** No female available.

**Length.** 10.5mm; wing 7.5mm.

**Distribution.** Venezuela (Carabobo).

**Material examined.** (*1 male*) VENEZUELA. Carabobo, Henri Pitier Natl. Park, Portachuelo pass, 10°20'51''N 67°41'16''W, 1143m., 13.IX.2008, J. Skevington (JSS25140) (Holotype *Pelecinobaccha (Calumnia) portachueloi*).

**Etymology:** The specific epithet is a reference to the pass where the specimen was collected. It is to be treated as noun in apposition.

*Pelecinobaccha (Calumnia) vera* (Hull, 1943) **comb. nov.**

*Baccha vera* Hull, 1943. – Hull, 1943a: 50 (also Hull, 1944a:10). Type-locality: “Amazon”. Holotype female BMNH (not examined). Hull, 1949a: 200 (fig. 43, female abdomen), 272 (fig. 353, female wing).

*Ocyptamus vera*. Thompson et al. 1976: 29 (catalog citation).

**Male.** No male available.

**Female.** Similar to *P. (Calumnia) aster* except: **Head:** Face entirely pale; frons shining steel-blue. **Thorax:** Scutum shining black, pollinose vittae broad; subscutellar fringe absent. **Wing:** Hyaline. **Legs:** Prolegs and mesolegs mostly pale, with a sub-apical ring on femur and 2 last tarsomeres light brown; metalegs pale on base and apex of metafemur, basal 2/5 of metatibia, apex of metabasitarsomere, and 2<sup>nd</sup> and 3<sup>rd</sup> metatarsomeres. **Abdomen:** 2<sup>nd</sup> tergite without pale maculae; 4<sup>th</sup> tergite with lateral pale maculae positioned sub-basally; 6<sup>th</sup> segment whole, not divided into tergite and sternite. **Genitalia:** Not dissected.

**Length.** ~11mm.

**Distribution.** “Amazon”.

**Material examined.**

**Comments:** The description was based on Hull’s (1944) original description and supplemented with information obtained from the Diptera curator at the BMNH (Nigel Wyatt).

*Pelecinobaccha (Calumnina) vesca* **sp.nov.**

Type-locality: Peru, Cuzco, Quincemil, 13°13.048'S 70°44.458'W. Holotype female CNC.

Map: 5. Figures: 9.

**Male. Head:** Shining black; face pale with a medial dark brown vitta that is narrow ventral to tubercle and expands to 1/3 of the face width dorsally; lunule pale above antennae insertions but not greatly extended; frontal triangle shiny, pale laterally until eye contiguity, if white pollen present, then very sparse, antennal base prominence distinctly protuberant; vertical triangle with 1 row of black pile; ocellar triangle distanced its length from the posterior eye margin; eye contiguity slightly longer than vertical triangle length; eye posterior indentation ventral to the antennae insertion; antennae insertions confluent, ventral margin has a short dorsal extension; occiput dorsal 1/4 dull black, remaining occiput homogenously white-pollinose; occiput dorsal 1/4 with 2 rows of simple black pile, anterior row with shorter pile, middle 2/4 with 2-3 rows of white, scale-like pile, anterior rows shorter, ventral 1/4 with 2 rows of white, scale-like pile, but pile thinner than that of the middle.

**Thorax:** Scutum shining black, with brown pollen in a small area anteriorly, with short black pile, without distinct anterior row; scutellum shining black, with very short black pile, subscutellar fringe absent; pleuron black, pale on posterior margin of posterior anepisternum and dorso-posterior katepisternum, with very short, appressed, sparse, white pile, except for pile of anterior anepisternum which is longer, erect and black, pile of metepisternum inconspicuous, katatergum without long microtricosity on a medial triangular area; plumula absent; calypter white, with very short pile on fringes, ventral lobe narrow; halter yellow, capitulum orange; metaepimera extended dorso-posteriorly to metacoxa, and with apices approximated.

**Wing:** Light brown, bare on cell bc, basal 1/5 of c, base of r, basal 1/6 of bm and basal 2/5 of cup, cup cell narrow; alula absent.

**Legs:** Prolegs mostly pale, procoxa, apical 1/2 of profemur and apical 1/3 of protibia light brown, protarsomeres brown except pale on apex of probasitarsomeres and 2nd protarsomeres, black pilose; mesolegs pale, mesocoxa, apical 1/3 of mesofemur (except for apex), apical 1/3 to 1/4 of mesotibia, mesobasitarsomere and 4<sup>th</sup> to 5<sup>th</sup> mesotarsomeres brown, black pilose; metalegs dark brown, metatrochanters, base and apex of metafemur, basal 1/6 of metatibia pale, basal 1/2 of metafemur sometimes light brown, black pilose, metacoxa mainly white pilose.



**Abdomen:** Shining black, tergites with black dull pollinosity medially; ~6.5 times longer than thorax, whole abdomen with short, appressed, black pile; 1<sup>st</sup> tergite pale on lateral extremities, mostly bare, but with sparse short white pile laterally, some dorsal pile black; 2<sup>nd</sup> tergite very long and narrow, ~15 times longer than its smallest width, with pair of sub-apical lateral pale fasciate maculae, pile sparse; 3rd tergite very long and narrow, slightly expanding towards apex, ~14 times longer than smallest width, with lateral pair of fasciate pale maculae medially; 4th tergite trapezoidal and long, ~5 times longer than smallest width, with lateral basal pair of pale rectangular maculae; 5th tergite rectangular and wide. **Genitalia:** Cercus with 2 rows of pile on medial margin and 3 rows outward; surstylus oval with medial curved fold on basal 2/3, directed ventrally, with setulae ventrally, restricted to apex (around 12) and 1 setulae medially, with pile medially on the dorsal surface; subepandrial sclerite rectangular and wide with small baso-lateral projections; hypandrium oval on basal 1/2, slightly wider and quadrangular on apical 1/2, with ventral triangular notch on anterior 2/3; phallapodeme 1/2 the size of the hypandrium, mostly weakly sclerotized, apex and apico-dorsal 2/3 well sclerotized; basiphallus with blunt posterior extremity; distiphallus anterior surface curved anteriorly; postgonites ventral surface straight, dorsal surface slightly concave, apex convex anteriorly, with acute dorsal extremity and, slightly extended, sub-acute ventral extremity.

**Female:** Like male except: frons normal width, pale on baso-lateral 1/2, bare medially, pile mostly white, pile around antennal base white; pile short; ocellar triangle ~2 times its length from the posterior eye margin and ~1 ocellus-width from lateral eye margin;

eye posterior indentation dorsal to level of antennae insertions; posterior anepisternum with posterior  $\frac{1}{2}$  pale, anterior anepisternum pile white, bare area on katatergum smaller; wing hyaline, apex light brown, bare on bc cell, basal  $\frac{2}{3}$  of c, base of r, basal  $\frac{1}{3}$  of bm and basal  $\frac{1}{2}$  of cup; pro and mesolegs white pilose; protibia mostly pale, 3rd protarsomeres light brown; mesofemur with apical  $\frac{1}{4}$  brown, mesotibia mostly pale, mesobasitarsomere with apex pale; basal  $\frac{1}{3}$  of metatibia, apex of metabasitarsomere, 2nd and 3rd metatarsomeres pale; abdominal maculae almost meet dorsally; 5th tergite sub-quadrangular; 6th segment divided into tergite and sternite. **Genitalia:** 7<sup>th</sup> tergite with acute anterior margin, 7<sup>th</sup> segment lateral sclerite triangular; 8<sup>th</sup> tergite unsclerotized medially, apex with a pair of acute extremities, basal crest short and weak, 8<sup>th</sup> sternite unsclerotized medially; 10<sup>th</sup> tergite fused to the dorsal margin of the cerci; cercus form a baso-ventral, short, curved, acute projection, with 1 row of pile on apical margin.

**Length.** ~12.5mm; wing ~8mm.

**Distribution.** Peru (Cuzco), Venezuela (Carabobo).

**Material examined.** (**5 males**) PERU. Cuzco, Quincemil, 13-31 Aug 1962, L. Pena (4 specimens, CNC Diptera 161197-200). VENEZUELA. Carabobo, Henri Pitier National Park, Portachuelo Pass, 1143m, 10°20'51"N 67°41'16"W 15 Sep 2008, J. H.

Skevington (**3 females**) PERU. Cuzco, Quincemil, 13-31 Aug 1962, L. Pena (Holotype *Pelecinobaccha* (*Calumnia*) *vesca* (CNC Diptera 161201) and 2 other specimens (CNC Diptera 161202, 161402)).

**Comments:** Like *P. (Calumnia) invisibilis*, these flies are very similar to the genus *Fragosa*, but *P. (Calumnia) vesca* has a smooth frons/frontal triangle and the typical modified female genitalia of *Pelecinobaccha*.

**Etymology:** The specific epithet is an adjective for 'thin'.

*Pelecinobaccha (Noxana) adspersa* (Fabricius, 1805) **comb. nov.**

*Baccha adspersa* Fabricius, 1805. – Fabricius, 1805: 200. Type-locality: ‘America meridionali’. Holotype female MC (not examined). Hull, 1943a: 65 (fig. 2, alula); Hull, 1949a: 137 (redescription), 198 (fig. 33, male abdomen).

*Ocyptamus adspersus*. Thompson et al. 1976: 12 (catalog citation).

*Baccha signifera* Austen, 1893. - Austen, 1893: 145. Type-locality: Brazil, Amazonas. Holotype Male BMNH (not examined). **n. syn.**

*Ocyptamus signiferus*. Thompson et al. 1976: 27. (catalog citation).

*Baccha punctata* Shannon, 1927. - Shannon, 1927: 11. Type-locality: Bolivia, Beni, San Antonio. Holotype male USNM.

Map: 6. Figures: 10, 11.

**Male. Head:** Shining bluish black; slightly reddish black on oral margin; lunule entirely black, slightly pale above antennae insertion; frontal triangle black pilose, with pair of median oval spots of silvery-white pollen laterally disconnected from the pollen from the face; vertical triangle with most black pile forming a central single row ending dorsal to anterior ocellus; ocellar triangle ~1.5 times its length from the posterior eye margin; eye contiguity slightly longer than vertical triangle length; eye posterior indentation slightly

ventral to level of antenna insertion; antennae insertions confluent, ventral margin with short dorsal extension; occiput dorsal  $\frac{1}{4}$  with 2 regular rows of simple black pile, anterior row pile short and posterior row pile long, middle  $\frac{2}{4}$  with 1-3 regular anterior rows of simple long black pile and 1 regular posterior row of scale-like and very long white pile, ventral  $\frac{1}{4}$  with 2-3 irregular rows of scale-like white pile, sometimes with sparse simple black pile anteriorly.

**Thorax:** Prothorax shining black; scutum shining bluish black, brown-pollinose in a pair of antero-posterior oriented sub-median vittae and white-pollinose on a median vitta which ends at the posterior  $\frac{2}{3}$ , pollen absent around vittae, white-pollinose sub-laterally, pollen very sparse or absent laterally, with anterior row of shining white pile interrupted in the middle; scutellum shining black, black pilose, pile slightly longer than on scutum, sub-scutellar ventral fringe long and black; pleuron shining bluish black, white-pollinose, white pilose except black pilose on dorso-posterior of posterior anepisternum (densely arranged), dorsal anterior anepimera, and mixed white and black pile on ventral posterior katepisternum, pile inconspicuous on katepimeron; plumula short, brown; calypter gray with black margin, short black pile on dorsal lobe and long pale and black pile on ventral lobe; halter brown to black, capitulum light yellow.

**Wing:** Mostly hyaline except for dark brown basal  $\frac{1}{2}$  (dark on cells bc, c, sc, r, basal  $\frac{1}{2}$  of r1, base of r2+3, small basal portion of r4+5, bm, base of dm, base of cua1, and

slightly lighter on cup and anal lobe), entirely microtrichose, alula brown, large, 2 times basally to 3 times apically larger than c cell, entirely microtrichose.

**Legs:** Prolegs brown with pale diffuse areas to entirely dark brown, procoxa bluish-black on basal 2/3, protarsus dark brown; mesolegs brown with basal pale diffuse areas to entirely dark brown, mesotarsi dark brown, mesocoxa with only 1 row of longer pile antero-apically, bare to sparse pile ventrally on mesotrochanter; metalegs entirely dark brown, pile distinctly longer on metacoxa, dense and thick black pile ventrally and laterally on metabasitarsomere, less dense on 2<sup>nd</sup> and mostly pale on remaining metatarsomeres, metabasitarsomere thick and long, remaining metatarsomeres decrease in size.

**Abdomen:** ~2 times longer than thorax, black; basal membranous region with a large quadrate black sclerotized region connected to 1<sup>st</sup> tergite; 1<sup>st</sup> tergite with long black pile, pile sometimes pale latero-ventrally, sparse pilose to bare medially; 2<sup>nd</sup> tergite long, ~4 times longer than its smallest width, shiny except with triangular dull black-pollinose region sub-apically, with a pair of round white maculae sub-apically inside dull region, basal ½ with white erect pile laterally and bare dorsally, apical ½ with erect black pile; 3<sup>rd</sup> tergite trapezoidal, apex ~1.5 times wider than base, with 4 central white round maculae, one lateral sub-basal pair, and another medial sub-apical pair, mostly dull black-pollinose, shiny apically and laterally, with appressed black pile; 4<sup>th</sup> tergite sub-quadrate, remaining characteristics as on 3<sup>rd</sup>; 5<sup>th</sup> tergite wider than long and similar to

3<sup>rd</sup> except entirely shiny. **Genitalia:** Epandrium notched dorso-posteriorly; cercus with 2 distinct rows of pile on medial margin, 3 irregular rows of pile outward; surstylus sub-triangular with strong setulae well distributed on ventral, concave side, with thin sclerotized layer dorsally, pilose on baso-dorsal ½; subepandrial sclerite with a pair of posteriorly directed processes; hypandrium ventral notch extending on anterior ½ and with rounded posterior margin; distiphallus anterior surface sinuous; postgonites with sparse pilosity, ventral surface straight, apex convex, with acute ventral and dorsal extremities and lateral ridge.

**Female:** Like male except vertex mostly bare, ocellar triangle ~3 times its length from the posterior eye margin and ~3 ocelli-width from lateral eye margin; no visible anterior row of pile on scutum; 2<sup>nd</sup> abdominal tergite shorter and wider, apical width wider than basal, 2.7 times longer than smallest width, baso-lateral 2/3 pale; 3<sup>rd</sup> tergite much wider on apex; 4<sup>th</sup> tergite rectangular and wide; 6<sup>th</sup> segment conical, as long as wide, laterally compressed, slightly shorter than 5<sup>th</sup> tergite. **Genitalia:** Strongly sclerotized; 7<sup>th</sup> tergite short, basal extensions well sclerotized, wide, long (as long as the 6<sup>th</sup> segment), curved and flexed dorsally, very short to absent pair of short latero-ventral extensions, 7<sup>th</sup> segment lateral sclerite narrow, slightly curved and tapering apically, 7<sup>th</sup> segment with dorso-central area bare; 10<sup>th</sup> tergite fused basally to cercus; cerci fused together baso-dorsally, with 1-2 rows of pile on inner margin.

**Length.** 8.5-12mm; wing 6.5-8.5mm

**Distribution.** Bolivia (Beni, La Paz), Brazil (Goiás, Mato Grosso, Santa Catarina, São Paulo), Colombia (Boyaca, Meta), Ecuador (Napo), Guiana, Panama (Canal Zone), Peru (Junín, Lima, Madre de Dios, Ucayali).

**Material examined.** (**18 males**) BOLIVIA. Beni, Rurrenabaque, Mulford BioExpl, Frank M. Hull Collection C.N.C. 1973, ?? ??? 1921-1922, W. M. Mann (CNC Diptera 161292). BRAZIL. Mato Grosso, Faz. Primavera, Rio Paraná, ?? Oct 1954, [E.] Rabello (2 specimens); ..., Utiariti, Rio Papagaio, Mt., ?? Oct 1966, [K.] Lenko & Pereira; Santa Catarina, Nova Teutônia, 300-500m, 27°11'S 52°23'W, ?? Jan 1966, F. Plaumann; São Paulo, Araçatuba, Rio Jacarecatinga, ?? Oct 1961, [J.] Lane & [E.] Rabello. COLOMBIA. Boyaca, Muzo, 900m, Frank M. Hull Collection C.N.C. 1973, ?? ??? 1936, J. Bequaert (3 specimens, CNC Diptera 161293-5); Meta, Restrepo, 500m, Frank M. Hull Collection C.N.C. 1973, ?? ??? 1936, J. Bequaert (3 specimens). ECUADOR. Napo, Jatun Sacha Biol. Res. 6 km E Misahuali, 1°4'S 70°36'W, ~450m, 29 Apr-8 May 2002, E. Westman; ..., K. Glover. GUIANA. Bartica, C. H. Curran Collection Acc. 31144, Frank M. Hull Collection C.N.C. 1981, 30 Jan 1913, ? (CNC Diptera 161296). PANAMA. Barro Colo[rado Island], ?? ??? ????, F. M. Hull (CNC Diptera 161297); Darien, along road in vicinity of El Real de Santa Maria, 26 May 1977, J. Bird. PERU. [Ucayali], Pucallpa, Frank M. Hull Collection C.N.C. 1973, 4 Dec 1947, J. Schunke (CNC Diptera 161298). (**12 females**) BOLIVIA. La Paz, San Juanito, nr. Teoponte, 500m., 15°29'42S 67°47'48W, 8 Apr 2001, S. A. Marshall (DEBU00149667). BRAZIL. Goiás, Campinas,



“141”, “*Baccha adspersa* Fabr. // X.936 Det. H. S. Lopes”, ?? Jan 1936, R. Spitz; Santa Catarina, Nova Teutônia, 300-500m, 27°11’S 52°23’W, ?? Jan 1965, F. Plaumann (CNC Diptera 161299); ..., ?? Jan 1966; ..., ?? Oct 1967; São Paulo, Avanhandava, ?? Feb 1946, M.P. Barretto. ECUADOR. Napo, Jatun Sacha Biol. Res. 6 km E Misahuali, 1°4’S 70°36’W, ~450m, 29 Apr-8 May 2002, P. Careless; ..., 1 May 2002, O. Lonsdale. PERU. [Junín], Chanchamayo, Frank M. Hull Collection C.N.C. 1973, 8 Mar [19]48, J. Schunke (CNC Diptera 161300); [Lima], Iquitos, Frank M. Hull Collection C.N.C. 1973, ?? Mar-Apr 1931 R. C. Shannon (CNC Diptera 161301); Madre de Dios, Avispas, 400m., 10-20 Sep 1962, L. Pena (CNC Diptera 161303); [Ucayali], Pucallpa, Frank M. Hull Collection C.N.C. 1973, 4 Dec 1947, J. Schunke (CNC Diptera 161302).

**Comments:** The holotype wasn’t examined since this is a readily recognizable species and all specimens agree well with the description.

*Pelecinobaccha (Noxana) duopuncta* **sp.nov.**

Type-locality: Costa Rica, San José, Est. Santa Elena, Las Nubes, 1210m, 9°59.240'N 83°57.723'W. Holotype male INBio.

Map: 7. Figures: 8e-h.

**Male. Head:** Black; face pollen concentrated ventral to tubercle and laterally ventral to frontal prominence, white pile only on ventral  $\frac{1}{2}$ ; lunule entirely black; frontal triangle with pair of median lateral streaks of silvery-white pollen; vertical triangle with black pile in a single median row; ocellar triangle distanced its length from the posterior eye margin; eye contiguity as long as vertical triangle length; eye posterior indentation at level of antenna insertion; antennae insertions confluent, ventral margin with short dorsal extension; occiput dorsal  $\frac{1}{4}$  with 2 rows of simple black pile, anterior row shorter, middle  $\frac{2}{4}$  with 2-3 anterior rows of simple black pile and 1 posterior row of long scale-like white pile, ventral  $\frac{1}{4}$  with 2-3 irregular rows of scale-like white pile.

**Thorax:** Scutum black, sparse dull brown-pollinose, with black erect pile, with anterior uninterrupted row of longer shining white pile; scutellum black, black pilose, pile slightly longer than on scutum, sub-scutellar fringe long and black; pleuron black, mainly black pilose except white pilose antero-ventrally on anterior anepisternum, meron and

metaepisternum, also with a few white pile on dorsal katepisternum; plumula normal, brown; calypter gray with black margin; halter brown, capitulum light yellow.

**Wing:** Mostly dark brown on basal 2/3 (dark on cells bc, c, sc, r, basal 3/4 of r1, basal 2/5 of r2+3, base of r4+5, bm, basal 1/3 of dm, cup and basal 1/3 of cua1), remaining of wing lighter, entirely microtrichose; alula brown on anterior 1/2, large, 1.8 times basally to 4 times apically larger than c cell, entirely microtrichose.

**Legs:** All legs black, some femora apices sometimes slightly pale.

**Abdomen:** Black, ~3 times longer than thorax; 1<sup>st</sup> tergite mostly black pilose, white pilose on ventral 1/3, bare dorso-medially; 2<sup>nd</sup> tergite long, ~3 times longer than its greatest width, pale on baso-lateral 1/2 margin, with central rectangular region of dull black pollen that extends to lateral margin sub-apically, pile appressed dorsally and longer and erect laterally, white on baso-lateral 4/5, remaining pile black; 3<sup>rd</sup> tergite trapezoidal, ~2 times longer than smallest width, pale on baso-lateral corners and with a pair of central small vittate pale maculae, with large central triangular region of dull black pollen, mainly with appressed black pile, pile white and erect on baso-lateral 1/2; 4<sup>th</sup> tergite rectangular and wide, with a pair of central small vittate pale maculae, entirely with black appressed pile, remaining characteristics as on 3<sup>rd</sup>; 5<sup>th</sup> tergite shorter than 4th, lateral margin pale, remaining characteristics as on 4th. **Genitalia:** Cercus with 1

row of pile on medial margin and 3 irregular rows of pile outward; surstylus sub-oval in lateral view, directed ventrally, pilose on dorso-basal  $\frac{1}{2}$ , with setulae (around 30) ventrally on anterior  $\frac{1}{3}$  and on basal  $\frac{1}{3}$ ; subepandrial sclerite trapezoidal in ventral view; hypandrium notch extending on anterior  $\frac{3}{5}$ , with slightly concave margin; distiphallus anterior surface straight; postgonites short, ventral and dorsal surfaces straight, apex slightly convex, with acute dorsal extremity and short acute ventral extremity.

**Female:** No female available.

**Length.** 11.5mm; wing 8mm.

**Distribution.** Costa Rica (San José).

**Material examined.** (**1 male**) COSTA RICA. Prov. San José, Est. Santa Elena, Las Nubes, 1210m, L\_S\_371750\_507800, #7888, 05-21 Jul 1996, M. Segura (INBIO CRI002 469636) (Holotype *Pelecinobaccha (Noxana) duopuncta*).

**Comments:** F.C. Thompson's '*Ocyptamus* CR-31' keys out to this species.

**Etymology:** The specific epithet is a noun phrase in apposition and means 'two points'.

*Pelecinobaccha (Noxana) menguali* **sp.nov.**

Type-locality: Peru, Junín, San Ramón, Sector Quebrada Santa Rosa, “Fundo Génova”, small river, 1066m, 11°05′44.1″S 75°21′17.1″W. Holotype female CEUA.

Map: 7. Figures: 12a-b.

**Male.** No male available.

**Female.** As in *P. mima* except: Frons extremely rugose on dorsal surface of the frontal prominence, white pollen sparse on dorsal 1/3 of frons, occiput ventral pile all white and scale-like. Scutum lateral 1/3 and scutellum pollen with a metallic blue shine; pleuron pile short and appressed, metaepisternum and metaepimeron dark brown; calypter white, dorsal lobe bare; plumula absent; halter white. Wing hyaline with only bc, c and sc dark brown; alula narrow, as wide as c cell. Metatibia pale only on basal ¼, pile of metacoxa entirely white. 2<sup>nd</sup> and 3<sup>rd</sup> abdominal tergites parallel sided, 4<sup>th</sup> tergite widens slightly towards apex; all abdominal pile very short; 2<sup>nd</sup> tergite baso-lateral corners pale, with pair of fasciate narrow maculae medially; 3<sup>rd</sup> tergite basal ½ pale except for lateral margin; 4<sup>th</sup> tergite similar in colour to 3<sup>rd</sup>, but also with a narrow dark brown vitta medially. **Genitalia:** 7<sup>th</sup> tergite rectangular, wide and narrow, weakly sclerotized medially, 7<sup>th</sup> segment lateral sclerite rectangular narrow, connected baso-dorsally to 7<sup>th</sup>

tergite by sclerotized stripe, without baso-ventral extensions; 8<sup>th</sup> tergite unsclerotized medially and appearing as reduced to a pair of sclerites, basal crest wide; 10<sup>th</sup> tergite reduced to a narrow sclerotized strip, with apico-lateral extensions fused ventrally to cercus.

**Length.** 13mm; wing 6mm.

**Distribution.** Peru (Junín).

**Material examined.** (*1 female*) PERU. Junín, Chanchamayo, San Ramón, Sector Quebrada Santa Rosa, “Fundo Génova”, small river, 11°05′44.1″S 75°21′17.1″W, 1066m, CAVXM030, 07-10 Jul 2008, X. Mengual (Holotype *Pelecinobaccha* (*Noxana*) *menguali*).

**Etymology:** The specific epithet is an homage to Dr. Ximo Mengual, colleague syrphidologist that collected some of the specimens, not restricted to this species, used in this study. The name is to be treated as a noun in the genitive case.

*Pelecinobaccha (Noxana) mima* (Hull, 1949) **comb. nov.**

*Baccha mima* Hull, 1949 – Hull, 1949a: 188. Type-locality: Peru. Holotype female CNC.

*Ocyptamus mimus*. Thompson et al. 1976: 22 (catalog citation).

Map: 7.

**Male.** No male available.

**Female. Head:** Black; tubercle large and without pollen; lunule almost entirely black, with small pale regions above antennae insertions; frons with central spot of brown dull pollen, shining white pollen laterally, connected to pollen from face and expanding medially as triangular maculae dorsal to central spot, dorsal 1/3 without pollen; frontal prominence bare and with no pollen; antennal insertions confluent; vertex with a single median row of pile; ocellar triangle ~2 times its length from posterior eye margin, and ~1 ocellus-width from lateral eye margin; occiput dorsal 1/3 with 2 rows of simple black pile, anterior row very short, middle 2/4 with 1-2 anterior rows of simple black pile, posterior row with much longer, scale-like white pile, ventral 1/4 with 2-3 rows of scale-like white pile, anterior rows shorter.



**Thorax:** Black; scutum mainly with sparse white pollen and a central pair of dull brown pollinose vittae, mainly with very short black pile, notopleuron white pilose, anterior row of shining white pile not so distinct and largely interrupted in the middle; scutellum black, with very short black pile, subscutellar fringe very short and black; pleuron black but metaepisterna and metaepimera pale, white pilose; calypter yellow, dorsal lobe with normal fringe; plumula short and yellow; halter yellow.

**Wing:** Basal  $\frac{1}{2}$  light brown (brown on cells bc, c, sc, r, basal  $\frac{1}{2}$  of r1, basal  $\frac{1}{5}$  of r2+3, base of r4+5, bm, basal  $\frac{1}{6}$  of dm, cup, basal  $\frac{1}{4}$  of cua1 and the anal lobe), entirely microtrichose; alula normal, 1.4 times basally to 3 times apically larger than c cell, light brown, entirely microtrichose.

**Legs:** All legs mainly pale, all tarsi black, pile white to yellow on pale regions; profemur with sub-apical light brown macula; mesofemur with sub-apical light brown macula, black pile sparse on mesofemur but concentrated on lateral row on apical  $\frac{2}{3}$ ; sub-apical  $\frac{1}{3}$  of metafemur and most of metatibia dark brown, metatibia pale on base and apex, pile black on lateral  $\frac{1}{2}$  of metacoxa.

**Abdomen:** Greatly elongated, 4.6 times longer than thorax, 2nd to 4th abdominal tergites of similar lengths but narrowing towards apex, dark brown; 1st tergite pale on lateral  $\frac{1}{6}$ , white pilose, a few black pile baso-dorsally, pile longer on baso-ventral  $\frac{1}{2}$ ,

remaining pile normal to very short towards middle; 2nd tergite rectangular very long, 2.6 times longer than smallest width, pale on baso-lateral  $\frac{3}{4}$ , with very short black pile; 3rd tergite long, 3.8 times longer than smallest width, pale on baso-lateral  $\frac{1}{3}$ , with very short black pile; 4th tergite long, 2.8 times longer than smallest width, with very short black pile; 5th tergite rectangular, 1.4 times longer than smallest width, and fused to sternite on apical  $\frac{3}{4}$ ; 6th segment whole, laterally compressed,  $\frac{1}{3}$  of the length of the 5th. **Genitalia:** Not dissected.

**Length.** 11.5mm; wing 6.5mm.

**Distribution.** Peru (Ucayali).

**Material examined.** (1 *female*) PERU. [Ucayali], Pucallpa, Holotype *Baccha mima* Hull CNC N°20570 [red label], 8 Nov 1947, J. Schunke (Holotype *Baccha mima*).

*Pelecinobaccha (Noxana) oviphora* (Hull, 1943) **comb. nov.**

*Baccha oviphora* Hull, 1943 – Hull, 1943a: 73. Type-locality: Colombia, Muzo. Holotype female CNC. Hull, 1949a: 232 (fig. 191, female abdomen).

*Ocyptamus oviphorus*. Thompson et al. 1976: 24 (catalog citation).

Map: 6. Figures: 12c-f.

**Male.** No male available.

**Female. Head:** Shining black; face with white pollen sparse, concentrated laterally, pollen oriented dorso-ventrally except for small patch oriented differently ventral to frontal prominence, entirely white pilose, tubercle large and without pollen; lunule narrowly pale above antennae insertions, central black macula distinct with small dorsal pale spot, otherwise color confluent with frons; frons white dull pollinose, with median oval macula of dull dark pollen, pollen absent on dorsal 1/3 and ventro-lateral 1/3, with shining white pollen in small latero-medial spots, mainly black pilose; antennae pale, scape with thicker pile, basoflagellomere oval long, entirely pale or with dorsal 1/2 dark brown, antennal insertions confluent to distinctly separated; vertex protuberant, without pollen, with a single median row of black pile ending dorsal to posterior ocelli; ocellar

triangle ~2 times its length from posterior eye margin, and ~3 ocelli-width from lateral eye margin; occiput mostly white-pollinose, pollen concentrated close to eye margin, dorsal 1/4 with brown pollen oriented ventro-dorsally; occiput dorsal 1/3 with posterior row of long simple black pile and an anterior row with shorter pile, middle 2/4 with posterior row of long scale-like white pile and 2-3 anterior rows of shorter simple black pile, ventral 1/4 with 2-3 rows of scale-like white pile, anterior rows shorter and some of sometimes black.

**Thorax:** Black; scutum dull brown-pollinose with a pair of sub-median vittae of dull blue pollen, black pilose, anterior row of shining white pile not so distinct and largely interrupted in the middle; scutellum black, black pilose, subscutellar fringe black; pleuron mostly black, pale on posterior anepimeron, white pilose except black pilose on anterior anepisternum, on dorso-posterior of the posterior anepisternum and a few dorsally on the anterior anepimeron; calypter yellow, dorsal lobe darker, fringe and pile black; plumula normal and dark brown; halter dark yellow, capitulum brown.

**Wing:** Basal 1/2 dark brown (dark on cells bc, c, basal 2/3 of sc, r, basal 1/3 of r1, base of r2+3, bm, most of cup, base of cua1 and basal 2/3 of the anal lobe), entirely microtrichose; alula large, 3 times basally to 4.75 times apically larger than c cell, dark, entirely microtrichose.

**Legs:** Prolegs light brown, protibia to apical tarsomere dark brown to black; mesolegs dark brown, mesotarsus black; metalegs black, sometimes metacoxa, metatrochanter and basal 1/2 of metafemur light brown, metabasitarsomere swollen, pile on dorsal and ventral margin of metatibia slightly longer and thicker.

**Abdomen:** Dark brown, 4 times longer than thorax; 1st tergite pale on apical margin, black pilose with a few white pile baso-laterally; 2nd tergite rectangular, slightly inflated on apical ½, 1.7 times longer than smallest width, with sub-apical fascia of dull light brown pollen, mainly with appressed black pile, white on baso-lateral ½; 3rd tergite rectangular and long, slightly narrowing until apex, 1.3 times longer than smallest width, with inconspicuous short pair of vittae medially, with central triangular region of dull light brown pollen, sub-shining where the pair of vittae occur, with appressed black pile; 4th tergite rectangular and long, 2 times longer than smallest width, dark brown with medial short pale vittae, densely covered with minute white pile; 5th tergite rectangular and long, 1.4 times longer than smallest width, dark brown, remaining characteristics as on 4th; 6th segment conical short, 1.8 times shorter than 5th, dark brown. **Genitalia:** 7<sup>th</sup> tergite rectangular, wide and narrow, 7<sup>th</sup> segment lateral sclerite rectangular narrow, connected baso-dorsally to 7<sup>th</sup> tergite by sclerotized stripe, without baso-ventral extensions; 8<sup>th</sup> tergite unsclerotized medially but with narrow sub-basal sclerotized bridge, basal crest weak; 8<sup>th</sup> sternite as lateral pair of rectangular sclerotizations; 10<sup>th</sup> tergite reduced to a narrow transverse strip, fused to cercus by apico-lateral extensions; cercus with 1 row of pile on apical margin.

**Length.** 8.5 mm; wing 6.5 mm.

**Distribution.** Colombia (Boyaca), Peru (Junín), Suriname.

**Material examined.** (**3 females**) COLOMBIA. Boyaca, Muzo, 900m, Holotype oviphora [red label], Holotype *Baccha oviphora* Hull CNC no.28522 [red label], ?? ??? 1936, J. Bequaert (Holotype *Baccha oviphora*). PERU. Junín, Chanchamayo, San Ramón, Sector Quebrada Santa Rosa, “Fundo Génova”, 11°05′44.4″S 75°21′19.6″W, 1080m., 07-09 Jul 2008. Col. X. Mengual. SURINAME. Para, Colakreek (nr. Zanderij), 5° 27′58″N-55° 13′47″W, 23 Mar 2006, M. Reemer.

**Comments:** The type specimen 4<sup>th</sup> abdominal segment is completely yellow, but this colouration seems to be caused by the high concentration of fat and/or eggs in that segment (that can be seen through the body wall). Colouration of abdominal tergites is sometimes hard to determine since they are easily affected by internal organ decomposition, which creates smear patterns on the internal surface.

*Pelecinobaccha (Noxana) ovipositoria* (Hull, 1943) **comb. nov.**

*Baccha ovipositoria* Hull, 1943 – Hull, 1943a: 76. Type-locality: Colombia. Holotype female CNC. Hull, 1949a: 230 (fig. 178, abdomen).

*Ocyptamus ovipositorius*. Thompson et al. 1976: 24 (catalog citation).

*Baccha amabilis* Hull, 1943 - Hull, 1943b: 39. Type-locality: Peru. Holotype male USNM. Hull, 1949: 192 (fig. 4, abdomen), 276 (fig. 367, wing) **n. syn.**

*Ocyptamus amabilis*. Thompson et al. 1976: 14 (catalog citation).

*Baccha cordelia* Hull, 1949 - Hull, 1949a: 186. Type-locality: Peru. Holotype female CNC. **n. syn.**

*Ocyptamus cordelia*. Thompson et al. 1976: 15 (catalog citation).

Map: 6. Figures: 13.

**Female. Head:** Shining black; face with white pollen sparse, concentrated laterally, pollen oriented dorso-ventrally except for small patch oriented differently ventral to frontal prominence, entirely white pilose, tubercle large and without pollen; lunule mainly pale, central black macula sometimes diffuse and weakly connected to frons color; frons white dull pollinose, with median oval macula of dark pollen, pollen absent on dorsal 1/3 and ventro-lateral 1/3, with shining white pollen in small latero-medial spots, mainly

white pilose with some black pile intermixed; frontal prominence bare and with no pollen; antennae dark orange, scape with thicker pile, basoflagellomere oval long, with ventral  $\frac{1}{2}$  pale, antennal insertions confluent, ventral margin sometimes with narrow dorsal sclerotized extension that separates insertions; vertex protuberant, without pollen, with a single median row of black pile ending dorsal to posterior ocelli; ocellar triangle  $\sim 3$  times its length from posterior eye margin, and  $\sim 3$  ocelli-width from lateral eye margin; occiput homogeneously white-pollinose; occiput dorsal  $\frac{1}{4}$  with posterior row of long scale-like white pile, or long simple black pile or the 2 types intermixed, 1-2 anterior rows with shorter, simple black pile, middle  $\frac{2}{4}$  with posterior row of long scale-like white pile and 2-3 anterior rows of shorter simple black pile, ventral  $\frac{1}{4}$  with 2-3 rows of scale-like white pile, anterior rows shorter and some of its dorsal pile sometimes black.

**Thorax:** Black; scutum dull brown-pollinose with a pair of sub-median vittae of dull blue pollen, sometimes with a median white pollinose vitta, mainly black pilose, notopleuron white pilose but area anterior to transverse suture sometimes black pilose, anterior row of shining white pile not so distinct and largely interrupted in the middle; scutellum pale, black pilose, subscutellar fringe normal and black to long and white; pleuron pale medially (on posterior  $\frac{1}{2}$  of posterior anepisternum, anterior anepimera, dorso-posterior of katepisternum, katepimeron and meron) to entirely black, white pilose, ventro-posterior katepisternum sometimes with a few black pile; calypter yellow, dorsal lobe fringe darker; plumula normal to long and yellow; halter brown, capitulum yellow to light orange.



**Wing:** Basal  $\frac{1}{2}$  dark brown (dark on cells bc, c, basal  $\frac{2}{3}$  of sc, r, basal  $\frac{1}{3}$  of r1, basal  $\frac{1}{6}$  of r2+3, base of r4+5, bm, basal  $\frac{1}{7}$  of dm, most of cup, basal  $\frac{1}{4}$  of cua1 and the anal lobe), entirely microtrichose; alula large, 1.4 times basally to 4 times apically larger than c cell, dark, entirely microtrichose.

**Legs:** Prolegs pale, probasitarsomeres brown to black, remaining tarsomeres black, protarsomeres narrow from 2nd to 5th; mesolegs pale, mesobasitarsomeres sometimes light brown, 2nd to 5th mesotarsomeres black; metalegs black, metacoxa, metatrochanters and basal  $\frac{3}{5}$  of metafemur pale, metabasitarsomere swollen.

**Abdomen:** Light brown to orange, apex sometimes black, 4.9 times longer than thorax; 1st tergite black pilose on dorsal  $\frac{1}{2}$ , remaining pile white; 2nd tergite rectangular, slightly inflated on apical  $\frac{1}{2}$ , 2 times longer than smallest width, sometimes with pair of central vittate pale maculae on apical  $\frac{1}{2}$ , mainly with appressed black pile, white on baso-lateral  $\frac{1}{2}$ ; 3rd tergite rectangular and long, slightly narrowing until apex, 1.3 times longer than smallest width, with sub-median pair of long pale vittae, each vittae connected sub-basally to pair of sub-lateral pale vittae that are sometimes absent, with appressed black pile; 4th tergite rectangular and long, 1.5 times longer than smallest width, with sub-median pair of pale vittae, sometimes with a sub-lateral pair of pale vittae, densely covered with minute white pile; 5th tergite rectangular and long, 1.4 times longer than smallest width, brown to black, sometimes with pair of small pale maculae basally,

remaining characteristics as on 4th; 6th segment conical short, 1.8 times shorter than 5th, brown to black. **Genitalia:** 7<sup>th</sup> tergite sub-triangular short, with blunt and jagged apex, weakly sclerotized but with strong sclerotized apical margin, 7<sup>th</sup> segment lateral sclerite rectangular narrow, connected baso-dorsally to 7<sup>th</sup> tergite by sclerotized stripe, without baso-ventral extensions; 8<sup>th</sup> tergite unsclerotized medially but with narrow sub-basal sclerotized bridge, basal crest weak; 8<sup>th</sup> sternite as lateral pair of rectangular sclerotizations; 10<sup>th</sup> tergite reduced to a narrow transverse strip, fused to cercus by an apico-lateral extension; cercus with 1 row of pile on apical margin.

**Male:** Like female except: Face pile black laterally ventral to antennae insertions; lunule central macula sometimes reduced to a small black spot; frontal triangle with black dull pollen dorsally, entirely black pilose; vertical triangle not so distinctly protuberant; ocellar triangle ~2 times its length from posterior eye margin; eye contiguity slightly shorter than vertical triangle length; sub-scutellar fringe pile normal, black laterally and white medially; dorsal lobe of calypter darker, margin black; dark not so distinct but more extensive on wing (dark on cell sc, basal 2/3 of r1, basal 1/3 of r2+3, basal 1/4 of r4+5, basal 1/4 of dm and basal 1/3 of cua1); abdomen 2.9 times longer than thorax; 1st tergite sometimes mainly black pilose, with a few white pile ventrally and on dorsal margin; 2nd tergite long, 1.8 times longer than smallest width, with central pair of weak pale spots, pile white on baso-lateral 2/3; 3rd tergite sub-quadrangular, lateral vittae 1/2 the length of the median vittae; 4th tergite as male's 3rd; 5th tergite rectangular and wide, 1.6 times wider than long, dark brown, with pair of central pale vittae connected basally to sub-lateral shorter pair, with short appressed black pile; genitalia black, distinct from pre-

abdomen. **Genitalia:** Cercus with 2 rows of pile on medial margin, 3 irregular rows of pile outward; surstylus short and sub-oval in lateral view, but narrows apically, with strong setulae ventrally (around 25) concentrated on apical margin and sparse on anterior 1/3, pilose on apico-dorsal 1/2; subepandrial sclerite rectangular and wide, slightly concave on posterior margin and slightly convex on anterior margin; hypandrium short and rectangular, with ventral notch extending on apical 3/5; phallapodeme well sclerotized medially on basal 1/2, well sclerotized dorsally on apical 1/2; basiphallus pilose laterally, with short posterior extremity, distiphallus anterior surface straight; postgonites short, dorsal and ventral surface almost straight, apex slightly convex, with acute dorsal extremity and rounded ventral extremity.

**Length.** 9-9.5mm; wing 6-7mm.

**Distribution.** Bolivia (La Paz), Ecuador (Napo), Peru (Cuzco, Loreto, Ucayali), Suriname.

**Material examined.** (**5 males**) PERU. [Loreto], Iquitos, Type n° 56422 U.S.N.M. [red label], ?? Mar-Apr 1931, R.C.Shannon (Holotype *Baccha amabilis*); ..., Tahuato-river, Varzea, 04°23.716S-73°15.677W, 1-15 Aug 2009, T.J.A. Faasen; [Ucayali], Pucallpa, Frank M. Hull Collection C.N.C. 1973, 8 Dec 1947, J. Schunke (2 specimens, CNC Diptera 161282). SURINAME. Para, SE of Zanderij, road to Kraka, 5° 25'18"N-55°

11°23'W, 16 Mar 2006, M. Reemer. (**7 females**) BOLIVIA. La Paz, Alto Rio Beni, south of Rio Inicua, 1100m., 15-18 Jan 1976, L. E. Peña. ECUADOR. Napo, Jatun Sacha Biol. Res., 6 km E Misahualli, 1°4'S 70°36'W, ~450m., 29 Apr-8 May 2002, T. Eles. PERU. Cuzco, Quincemil, 780m., 13-31 Aug 1962, L. Pena; Loreto, Tahuato-river, Varzea, 04°23.716S-73°15.677W, 1-15 Aug 2009, T.J.A. Faasen (2 specimens); ..., 01 Feb 2010; [Ucayali], Pucallpa, cordelia [red typewriter letters on yellow paper], Holotype *Baccha cordelia* Hull 12 Dec 1947 [red label], J. Schunke (Holotype *Baccha cordelia*).

**Comments:** The description was based on the females since these specimens were in better conditions than the males. Reemer (2010) already alluded to the fact that *B. amabilis* and *B. cordelia* could be synonyms, but he didn't consider *B. ovipositoria*. Hull may have overlooked the similarities between *B. amabilis* and *B. ovipositoria* because they were male and female, respectively, and the slight differences between them are due to sexual dimorphism. The differences raised by Hull (1949a) to distinguish *B. cordelia* from *B. ovipositoria* ("[*B. cordelia*] related to *ovipositoria* Hull, but without the medial vitta upon the second segment and with quite different proportions to the abdominal segments") were not convincing since the medial vitta of dull pollinosity is variable among the specimens studied and the proportion of the abdominal segments is affected by the state of preservation of both specimens.

As in *P. (Noxana) oviphora*, the overall coloration of the abdomen is hard to determine.

*Pelecinozaccha* (*Noxana*) *squamagula* **sp.nov.**

Type-locality: Brazil, Santa Catarina, Nova teutônia, 300-500m, 27°11'S 52°23'W.

Holotype female CNC.

Map: 7. Figures: 14.

**Male. Head:** Black; face with lateral  $\frac{1}{4}$  pale; gena dark red; lunule slightly pale above antennae insertions, usually very reduced; frontal triangle if pale laterally, restricted to ventral  $\frac{1}{4}$ , brown pollen restricted to median rectangular area, white-silver pollen continuous from face restricted to lateral margin except around eye contiguity; vertical triangle with 3 rows of pile, but most pile concentrated in a single median row; ocellar triangle distanced its length from posterior eye margin; eye contiguity shorter than vertical triangle length; eye posterior indentation at level of antennae insertion; antennae insertions almost separated, division weakly sclerotized dorsally; antennae dark red to dark brown; occiput dorsal  $\frac{1}{4}$  with 2 rows of simple black pile, anterior row shorter, middle  $\frac{2}{4}$  with 3-4 rows of white, scale-like pile, anterior rows shorter and some pile black, ventral  $\frac{1}{4}$  with 2-3 rows of white, scale-like pile.

**Thorax:** Scutum black, mainly dull pollinose with weak pair of sub-median vittae of white pollen, mainly black pilose, pile longer on notopleuron and usually white anterior

to callus of transverse suture, anterior row of shining white pile with shorter pile in the middle; scutellum dark brown, with long, black pile, subscutellar fringe long and black; pleuron black, white pilose except black postero-dorsally on posterior anepisternum and anterior anepimera; plumula long and white; calypter white; halter yellow, capitulum yellow to light orange.

**Wing:** Hyaline with dark anterior margin (dark on cells bc, c, sc, and diffusely on basal 1/3 of r1), entirely microtrichose; alula normal, 2 times basally to 4 times apically larger than c cell, hyaline, entirely microtrichose.

**Legs:** Prolegs dark brown, apex of profemur and basal 1/3 to 1/2 of protibia pale; mesolegs dark brown, apex of mesofemur and basal 1/2 to 2/3 of mesotibia pale; metalegs black, basal 1/4 to 1/3 of metatibia pale, metatarsus entirely black.

**Abdomen:** Black, 3.2 times longer than thorax; 1<sup>st</sup> tergite with white pile basally, dorsally and ventrally, remaining pile black, some specimens mainly white pilose; 2<sup>nd</sup> tergite long, 2.8 times longer than its smallest width, pile long, erect and black, white on baso-lateral 1/2, shorter and appressed dorsally, with sub-apical central triangular region of dull black pollen; 3rd tergite trapezoidal, 1.6 times longer than smallest width, pale on baso-lateral 2/3 of the tergite margin, with large central triangular region of dull black pollen, this region with a small medial indentation on posterior margin, pile appressed

and black, slightly longer and white baso-laterally; 4th tergite rectangular and wide, pale on basal  $\frac{1}{2}$  of the tergite lateral margin, dull pollen region with longer indentation, remaining character as on 3rd tergite; 5th tergite rectangular and wide, entirely dark brown, dull black pollen restricted to tree central vittae, remaining characteristics as in 4th. **Genitalia:** Cercus with 1 regular row of pile on medial margin and 3 regular rows outward; surstylus long, directed anteriorly, with setulae (around 16) concentrated ventrally on apex, pilose on basal  $\frac{1}{2}$  of the dorsal surface; subepandrial sclerite weakly sclerotized medially, with posterior margin slightly concave and apical margin notched; hypandrium with ventral notch extending on anterior  $\frac{2}{3}$ ; distiphallus smooth and anterior surface straight; postgonites with pile mainly on ventral surface, ventral surface straight, extended baso-ventrally, dorsal surface concave, apex slightly convex anteriorly, with slightly convex ventral extremity and acute dorsal extremity.

**Female:** Like male except: frons pale laterally on ventral  $\frac{1}{2}$ ; ocellar triangle ~2 times its length from posterior eye margin and ~1.5 ocelli-width from lateral eye margin; scutum pile shorter, and all white on whole notopleuron; scutellum with mainly white pile, subscutellar fringe red to black; pleuron pile all white; wing might also be dark on cell r, basal  $\frac{1}{2}$  of r1 and basal  $\frac{1}{5}$  of r2+3; 1st abdominal tergite mainly white pilose; pale regions on 3rd and 4th tergite sometimes triangular in shape, 5th tergite with almost whole lateral margin pale, dull pollen region on 4th tergite narrower and sometimes divided into a pair of large fasciate maculae; 6th segment conical normal, slightly shorter than its smallest width and as long as the 5th. **Genitalia:** 7<sup>th</sup> tergite with triangular apex, basal extensions as long as the 6<sup>th</sup> segment, 7<sup>th</sup> segment lateral sclerite

rectangular; 8<sup>th</sup> tergite central region unsclerotized appearing as reduced to a pair of sclerites, basal crest large; 10<sup>th</sup> tergite reduced to a weakly sclerotized stripe, fused baso-ventrally to cercus; cercus with one row of pile on apical margin.

**Length.** 7-10.5mm; wing 5.5-7.5mm.

**Distribution.** Bolivia (Beni), Brazil (Santa Catarina), Colombia (Cundinamarca).

**Material examined.** (**7 males**) BRAZIL. Santa Catarina, Nova Teutônia, 300-500m, 27°11'S 52°23'W, ?? Dez 1966, F. Plaumann (2 specimens, CNC Diptera 161160, 161164); ..., ?? Nov 1969 (3 specimens, CNC Diptera 161161-3). COLOMBIA. [Cundinamarca], Anapoima, predator Ceroplastes on Maracuyá, 79-503, ?? Nov 1978, I. Cure & L. Nuñez (2 specimens, USNM ENT 00257684 & ...686). (**5 females**) BOLIVIA. Beni, Rurrenabaque, 175m, 10-23 Oct 1956, L. E. Pena (CNC Diptera 161165). BRAZIL. Santa Catarina, Nova Teutônia, 300-500m, 27°11'S 52°23'W, ?? Nov 1969, F. Plaumann (Holotype *Pelecinobaccha (Noxana) squamagula*, CNC Diptera 161166); ..., ?? Oct 1970. COLOMBIA. [Cundinamarca], Anapoima, predator Ceroplastes on Maracuyá, 79-503, ?? Nov 1978, I. Cure & L. Nuñez (2 specimens, USNM ENT 00257668 & ...681).



**Comments:** The author has some specimens where the larvae were reared with *Ceroplastes* sp. (Hemiptera, Coccidae) on passion fruit.

**Etymology:** The specific epithet means 'appetite for scales'. It is to be treated as a noun in apposition.

*Pelecinobaccha (Noxana) waynei* **sp.nov.**

Type-locality: Peru, Madre de Dios, Pakitza, Rio Manu, 250m, 12°7'S 70°58'W.

Holotype male USNM.

Map: 7. Figures: 15a-c.

**Male. Head:** Black; lunule slightly pale above antennae insertions; frontal triangle black pilose, with pair of median oval spots of silvery-white pollen laterally; vertical triangle with 3 rows of pile, but most pile concentrated in a single median row; ocellar triangle ~1.5 times its length from posterior eye margin; eye contiguity slightly longer than vertical triangle length; eye indentation at level of antenna insertion; antennae insertions confluent, ventral margin with short dorsal extension; occiput dorsal  $\frac{1}{4}$  with 1 row ventrally and 2 rows dorsally of simple black pile, anterior row shorter, middle  $\frac{3}{4}$  with 2-3 rows of scale-like white pile, posterior row much longer, sometimes with some black pile dorsally, ventral  $\frac{1}{4}$  with 2 rows of scale-like white pile.

**Thorax:** Scutum black, brown-pollinose, pollen differently oriented on a pair of antero-posterior sub-median vittae, with black erect pile and anterior row of thin white pile widely interrupted in the middle; scutellum black, with short black pile, sub-scutellar

fringe short and black; pleuron black, white pilose but sparse; plumula short, white; calypter white; halter light yellow to light orange.

**Wing:** Infuscated, stigma darker, entirely microtrichose, alula infuscated, normal, 1.75 times basally to 2.8 times apically larger than c cell, entirely microtrichose.

**Legs:** Prolegs dark brown, base and apex of profemur pale, base to basal 1/5 and apex of protibia pale; mesolegs dark brown, base and apex of mesofemur and at most basal 1/3 of mesotibia pale; metalegs dark brown, base and apex of metafemur and basal 1/4 of metatibia pale, metacoxa pile white.

**Abdomen:** ~4 times longer than thorax, black; 1<sup>st</sup> tergite mainly with long black pile, white baso-ventrally; 2<sup>nd</sup> tergite slightly constricted medially, ~4 times longer than its smallest width, with a pair of pale fasciate spots sub-medially, with rectangular black dull pollinose region medially that expands laterally sub-apically, entirely black pilose, pile erect laterally and appressed dorsally; 3<sup>rd</sup> tergite rectangular and long, ~3 times longer than smallest width, slightly widening apically, with one pair of sub-median lateral pale spots and one pair of sub-median pale vittate spots, with large central triangular region of dull black pollen, with appressed black pile; 4<sup>th</sup> tergite rectangular and long, remaining characteristics as on 3<sup>rd</sup>; 5<sup>th</sup> tergite rectangular and wide, without maculae, remaining characteristics as on 4<sup>th</sup>. **Genitalia:** Cercus with 2 rows of pile on medial

margin, 3 irregular rows of pile outward; surstylus teardrop-shaped in lateral view, oriented ventrally, with strong setulae (around 25) mostly concentrated on ventro-anterior and apical margins, with thin sclerotized layer dorsally on apical 2/3, sparse pilose dorsally; subepandrial sclerite rectangular with a pair of short posteriorly directed processes, lateral margin darker; hypandrium with ventral notch extending on anterior 1/2, posterior margin with a second short notch; distiphallus smooth and anterior surface slightly sinuous; postgonites with sparse pilosity, ventral and dorsal surfaces straight, apex convex anteriorly, convex on ventral extremity and acute on dorsal extremity.

**Female:** No female available.

**Length.** 8-8.5mm; wing 5.5-6mm.

**Distribution.** Peru (Madre de Dios), Venezuela (Zulia).

**Material examined.** (**5 males**) PERU. Madre de Dios, Manu, Erika (near Salvacion), 550m, 5-6 Sep 1988, A. Freidberg (USNM ENT 00257666); ..., Manu Wildlife Center, Resaca near canopy tower, CNC DIPTERA #4142 [white label with blue border], 28 Oct 2006, J. H. Skevington; ..., Rio Manu, Pakitza, 250m, 12°7'S 70°58'W, 9-23 Sep 1988, W. N. Mathis (USNM ENT 00257661); ..., Malaise trap, 9-23 Sep 1988, W. N. Mathis

(USNM ENT 00257663) (Holotype *Pelecinobaccha (Noxana) waynei*). VENEZUELA.  
Zulia, El Tucuco (45 km SW of Machiques), 5-6 Jun 1976, A. S. Menke & D. Vincent  
(USNM ENT 00257714).

**Etymology:** The specific epithet is an homage to Dr. Wayne N. Mathis, whom collected several of the specimens used in this study. It is to be treated as a noun in the genitive case.

*Pelecinobaccha (Pelecinobaccha) alicia* (Curran, 1941) **comb. nov.**

*Baccha alicia* Curran, 1941. – Curran, 1941: 280. Type-locality: Brazil, Santa Catarina, Nova Teutônia. Holotype female AMNH. Hull, 1949a: 140 (redescription), 195 (fig. 15, female abdomen), 214 (fig. 112, male abdomen).

*Ocyptamus alicia*. Thompson et al. 1976: 12 (catalog citation).

*Baccha para* Curran, 1941. – Curran, 1941: 280. Type-locality: Brazil, Santa Catarina, Nova Teutônia. Holotype female AMNH. Hull, 1949a: 163 (redescription), 194 (fig. 11, female abdomen), 214 (fig. 106, male abdomen), 216 (fig. 115, male abdomen), 262 (fig. 314, female wing, fig. 317 male wing). **n. syn.**

*Ocyptamus para*. Thompson et al. 1976: 24 (catalog citation).

*Baccha sappho* Hull, 1943. – Hull, 1943a: 69. Type-locality: Brazil, Santa Catarina, Nova Teutônia. Holotype female AMNH. Hull, 1949a: 170 (redescription), 224 (fig. 57, female abdomen), 262 (fig. 316, female wing). **n. syn.**

*Ocyptamus sappho*. Thompson et al. 1976: 26 (catalog citation).

*Baccha vanda* Hull, 1943. – Hull, 1943d: 69. Type-locality: Brazil, Santa Catarina, Nova Teutônia. Holotype male AMNH. Hull, 1949a: 174 (redescription), 214 (fig. 110, male abdomen), 222 (fig. 148, female abdomen), 262 (fig. 315, female wing). **n. syn.**

*Ocyptamus vanda*. Thompson et al. 1976: 29 (catalog citation).

Map: 10. Figures: 16, 17.

**Male. Head:** Dark brown; face pale on lateral  $\frac{1}{5}$ ; lunule usually pale above antennae insertions, with central black maculae connected to the frontal triangle color by narrow dark vitta; frontal triangle entirely black to pale laterally except around eye contiguity, silvery-white pollen laterally continuous from face and might seem interrupted above antenna insertion, vertical triangle with black pile forming a central single row; ocellar triangle distanced its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye with sub-triangular indentation on posterior margin at level of antenna insertion; antennae insertions confluent, ventral margin with short dorsal extension; pile longer on scape; occiput dorsal  $\frac{1}{4}$  with 2 rows of simple black pile, posterior row longer, middle  $\frac{2}{4}$  with 2-3 rows of pile, anterior rows mostly black pilose, some scale-like white pile ventrally, posterior row with longer, scale-like white pile, ventral  $\frac{1}{4}$  with 3 irregular rows of scale-like white pile.

**Thorax:** Scutum dark brown, white-pollinose on notopleuron, with pair of sub-median tapering vittae and a weak median one of white pollen, usually inconspicuous, pile normal and black, notopleuron white pilose but pile black anterior to transverse suture, with anterior row of white pile with shorter pile in the middle; scutellum dark brown with mixed long and short black pile, subscutellar fringe long and black; pleuron dark, sometimes slightly pale on posterior  $\frac{1}{2}$  of posterior anepisternum and dorso-posterior of katepisternum, white pilose except black pilose on dorso-posterior of the posterior

anepisternum and on the anterior anepimera; plumula normal and golden; calypter white to yellow; halter stem brown, capitulum light yellow to light orange.

**Wing:** Mainly dark, diffuse on posterior margin, entirely microtrichose; alula mostly hyaline with anterior margin darker, normal, 1.5 times basally to 3.5 times apically larger than c cell, entirely microtrichose

**Legs:** Prolegs dark brown, apex of profemur and basal  $\frac{1}{2}$  of protibia sometimes pale to light brown; mesolegs dark brown, apex of mesofemur and basal  $\frac{1}{2}$  of mesotibia sometimes yellow to light brown; metalegs dark brown, yellow to light brown on basal  $\frac{1}{4}$  of metatibia and from apex of metabasitarsomere until at least 3rd metatarsomere, 4th metatarsomere light brown, 5th metatarsomeres brown, metacoxa white pilose dorsally.

**Abdomen:** Dark brown to black, 3-3.5 times longer than thorax; 1st tergite black pilose latero-medially, white pilose elsewhere, sometimes mainly white pilose; 2<sup>nd</sup> tergite long, 2.5-3.5 times longer than its smallest width, entirely dark or with small median sub-lateral vittate/fasciate pale maculae, with large rectangular region of dull black pollen medially that expands to lateral margin sub-apically, with short, appressed black pile dorsally and longer, erect, black pile laterally, white and erect on base and baso-lateral  $\frac{1}{2}$ ; 3rd tergite trapezoidal, 2-2.5 times longer than smallest width, sometimes pale on baso-lateral  $\frac{2}{3}$  and with a pair of vittate pale maculae medially, maculae sometimes



inconspicuous (sub-shining), with large triangular macula of dull black pollen medially, with appressed black pile, white on baso-lateral  $\frac{1}{2}$ ; 4th tergite sub-quadrangular, slightly wider than long, sometimes with baso-lateral pale triangles, remaining characteristics as on 3rd; 5th tergite either rectangular, wide and narrow or sub-quadrangular, entirely dark, dull black-pollinose medially but with pair of medial vittae of absence of pollen, with appressed black pile; 3rd sternum dull black-pollinose on a medial spot. **Genitalia:** Cercus with 1-2 regular rows of pile on medial margin and 3 irregular rows outward; surstylus short to slightly elongate, directed ventrally, with rounded apex, with strong setulae ventrally (around 12) sparse on apical  $\frac{1}{4}$  or more concentrated on apical margin, with very little of the dorsal thin sclerotized layer, pilose on basal  $\frac{1}{2}$  of the dorsal surface; subepandrial sclerite with lateral margin darker, short, quadrangular, posterior margin concave, anterior lateral corners extended; hypandrium mainly closed on ventral side; distiphallus smooth and anterior surface straight; postgonites with pile mainly on ventral surface, ventral surface expanded, straight, dorsal surface straight to slightly concave, apex convex anteriorly, with acute dorsal extremity, and rounded ventral extremity.

**Female:** Like male except: sometimes more extensively pale on face; if frons with pale lateral margin, these end medially; ocellar triangle 1.5-2 times its length from posterior eye margin and  $\sim 2$  ocelli-width from lateral eye margin; scutellum with mainly short black pile, subscutellar fringe usually with white pile medially; notopleuron, dorso-posterior of posterior anepisternum and anterior anepimera sometimes entirely white pilose, some specimens have a few black pile in these regions; pleuron sometimes pale

on posterior ½ of posterior anepisternum e dorso-posterior region of katepisternum; wing with sub-apical hyaline band (hyaline on apex of cell r1, 4th/5 of r2+3, 3rd/4 of r4+5 and apex of dm), leaving a distinct apical dark spot; legs usually with lighter regions than males; 2nd to 5th abdominal tergites with dull pollen restricted to a wide triangular medial region, 2nd tergite rectangular and long but shorter than male (2-2.5 times longer than wide), entirely black or with medial fasciate pale maculae; 3rd tergite trapezoidal, shorter than on male; 5th tergite entirely black or with distinct medial vittate pale maculae; 4th and 5th tergite with lateral margin mostly pale; 6th segment as long as or twice as long as 5<sup>th</sup> segment. **Genitalia:** 7<sup>th</sup> tergite normal but with anterior margin distinctly extended, apex rounded to acute, with a pair of lateral, weakly sclerotized, very long (as long as the 6<sup>th</sup> segment), narrow basal extensions into the 6<sup>th</sup> segment, extensions slightly expanded on basal ½, 7<sup>th</sup> segment lateral sclerite sub-triangular from a lateral view, narrow to large, anterior extremity blunt, posterior extremity acute, 7<sup>th</sup> sternite absent, 7<sup>th</sup> segment with central ventral longitudinal area bare, 8<sup>th</sup> tergite basal crest weakly sclerotized, cercus enlarged and with 1 row of pile on inner ventral margin only.

**Length.** 6.5-10.5mm; wing 5-8.5 mm.

**Distribution.** Brazil (Minas Gerais, Paraná, Rio de Janeiro, São Paulo, Santa Catarina).

**Material examined. (277 males)** BRAZIL. Santa Catarina, Nova Teutônia, 27°11'S 52°23'W, nitidula [pink label], holotype vanda [red label], 10 Jun 1936, F. Plaumann (Holotype *Baccha vanda*); ..., 22 Feb 1936 (Paratype *Baccha vanda*, CNC Diptera 161372); ..., 24 Feb 1937 (Paratype *Baccha vanda*, CNC Diptera 161371); ..., 15 Oct 1939 (Paratype *Baccha para*, CNC Diptera 161379); ..., *Baccha para* Curran ♂ Allotype [red label], 28 Oct 1939 (Allotype *Baccha para*); ..., 300-500m, ?? Nov 1952 (CNC Diptera 161272); ..., 23 Nov 1959 (CNC Diptera 160866); ..., 25 Nov 1959 (2 specimens, CNC Diptera 160867-8); ..., 28 Nov 1959 (2 specimens, CNC Diptera 160869-70); ..., 1 Dez 1959 (5 specimens, CNC Diptera 160871-5); ..., 2 Dez 1959 (2 specimens, CNC Diptera 160876-7); ..., 7 Sep 1960 (CNC Diptera 161273); ..., 5 Oct 1960 (2 specimens, CNC Diptera 160878); ..., 6 Oct 1960 (3 specimens, CNC Diptera 160879-80 and 160966); ..., 3 Nov 1960 (CNC Diptera 160881); ..., 18 Nov 1960 (2 specimens, CNC Diptera 160882-3); ..., 23 Nov 1960 (CNC Diptera 160884); ..., 16 Oct 1961 (CNC Diptera 160967); ..., ?? Aug 1963; ..., ?? Dez 1964 (39 specimens, CNC Diptera 160885-93, 160968-92, 161040-1, 161268, 161274, 161281); ..., ?? Jan 1965 (10 specimens, CNC Diptera 160894-6, 160993-8); ..., ?? Dez 1966 (17 specimens, CNC Diptera 160897-910, 160999, 161000, 161269); ..., ?? May 1967 (2 specimens); ..., ?? Jun 1967 (CNC Diptera 160911); ..., ?? Oct 1967 (2 specimens); ..., ?? Nov 1969 (95 specimens, CNC Diptera 160912-65, 161001-30, 161043, 161260, 161270-1, 161275-9); ..., ?? Dez 1969 (13 specimens, CNC Diptera 161031-6, 161039, 161042, 161261-6, 161280); ..., ?? Jan 1970 (2 specimens, CNC Diptera 161037, 161267); ..., ?? Feb 1970 (CNC Diptera 161038); ..., ?? Oct 1970 (39 specimens); ..., ?? Nov 1970 (8 specimens); ..., ?? Dez 1970 (12 specimens); ..., ?? Nov 1971 (4 specimens); São

Paulo, Barueri, 12 Aug 1957, K. Lenko. (**129 females**) BRAZIL. Minas Gerais, Tiradentes, hilltop nr. town Serra Tiradentes, 1200m, 16 Nov 1990, S. A. Marshall; Paraná, Iguassú, Frank M. Hull Collection C.N.C. 1973, ?? Dez 1941, Com. E. N. V. (2 specimens, CNC Diptera 161044, 161096); Rio de Janeiro, Itatiaia, Maromba, ?? Aug 1946, [M.P.] Barretto; Santa Catarina, Nova Teutônia, 27°11'S 52°23'W, 7 Feb 1937, F. Plaumann (Paratype *Baccha vanda*, CNC Diptera 161373); ..., 6 Jul 1937 (Paratype *Baccha sappho*, CNC Diptera 161377); ..., 4 Nov 1938; ..., 15 Oct 1939; ..., 18 Oct 1939 (Paratype *Baccha para*, CNC Diptera 161380); ..., 25 Oct 1939; ..., *Baccha para* Curran ♀ Holotype [red label], 28 Oct 1939 (Holotype *Baccha para*); ..., Frank M. Hull Collection C.N.C. 1973, 500m, ?? Mar 1948 (CNC Diptera 161045); ..., 300-500m, 1 Nov 1952 (CNC Diptera 161046); ..., 13 Nov 1959 (CNC Diptera 161047); ..., 6 Oct 1960 (2 specimens, CNC Diptera 161048-9); ..., 11 Oct 1960 (CNC Diptera 161097); ..., 11 Oct 1964 (3 specimens); ..., ?? Dez 1964 (16 specimens, CNC Diptera 161050-7, 161098-105, 161255, 161257-8); ..., ?? Jan 1965 (6 specimens, CNC Diptera 161058, 161106-8, 161252-3); ..., ?? Feb 1965 (CNC Diptera 161109); ..., ?? Dez 1965 (CNC Diptera 161125); ..., ?? Jan 1966 (2 specimens); ..., ?? Dez 1966 (7 specimens, CNC Diptera 161059-61, 161095, 161110-2); ..., ?? Oct 1967; ..., ?? Nov 1969 (46 specimens, CNC Diptera 161062-93, 161113-24, 161259); ..., ?? Dez 1969 (6 specimens, CNC Diptera 161094, 161126-7, 161251, 161254); ..., ?? Jan 1970 (CNC Diptera 161256); ..., ?? Oct 1970 (20 specimens); ..., ?? Nov 1970 (2 specimens); ..., ?? Dez 1970 (4 specimens).

**Comments:** Curran (1941) states that the females of *Baccha alicia* were similar to *B. para* but differed in having a shorter and non-cylindrical sixth abdominal segment. The condition of the 6<sup>th</sup> segment was also the character that separated both species in Curran's key. Non-cylindrical doesn't apply to this species, for what Curran saw was an artefact of preservation (as discussed in the *Pelecinobaccha* diagnosis). I have series of specimens that fit Curran's description, but the 6<sup>th</sup> segment condition varies from cylindrical to flattened. Furthermore, the female genitalia showed no difference between the cylindrical and the flattened condition. Curran mentioned in his description of *B. alicia* that the "Opaque on the third segment usually partly or entirely divided by a pair of reddish vittae, which may be connected in front with large, lateral reddish triangles that extend to the middle of the segment laterally, the vittae sometimes absent and the lateral spots reduced[...]". This is a clear sign of intraspecific variation which can be observed on the *B. para* specimens as well. The central vittae are either distinctly pale, sub-shining, or barely visible underneath the dull black pollinosity. On the description of *B. para*, Curran (1941) states that "It is by no means certain that all of the males belong with the females and it is possible that some of them should be placed with [*Baccha*] *alicia*. However, there seems to be no good way to separate the males of these two species". Since the two forms determined below by the current study may or may not have the fasciate maculae on the 2<sup>nd</sup> tergite, and in view of the slight differences that usually are related to different sizes of the male specimens, it seems plausible to assume that the different 6<sup>th</sup> segment observed by Curran is but a variation inside the same species. Since all the specimens are sympatric and there is no obvious set of morphological characters that distinguishes the males as well, *B. para* and *B. alicia* are

here treated as synonyms. Being the first reviser of this group, and as stated in article 24.2.1. of the International Code of Zoological Nomenclature (ICZN), I determine that *B. alicia* is the senior synonym since both species were simultaneously described (article 24 of the ICZN).

When Hull (1943a) described *B. sappho* he compared it to *Baccha para* and noted that *B. sappho* had a shorter sixth abdominal segment. Hull did not make any mention about *B. alicia* in his descriptions of *B. sappho*. Hull's only distinction for his species was the same as Curran's for *B. alicia*.

Hull (1943d) described *B. vanda*, comparing it to *B. para*. I have studied both types, and Hull's description, and found his observations insufficient to treat *B. vanda* as a separate species. The face coloration, scutum pollinosity and abdominal markings are a mixture of preservation artefact and intraspecific variation.

*P. (Pelecinobaccha) alicia* has two common forms, a medium sized and a small form (*para* variation), which usually differ as follows:

Medium sized flies (~10mm): The males have slightly longer, rectangular surstylus with sparse setulae on ventro-apical ¼. The females have the 6<sup>th</sup> segment as long as the 5<sup>th</sup>, the 7<sup>th</sup> tergite with a rounded apex, and a triangular and narrow 7<sup>th</sup> segment lateral sclerite.

Small flies (6-8mm, not counting the 6th segment): The males have shorter and sub-quadrate surstylus with setulae concentrated on the ventro-apical margin. The females usually have central pairs of pale vittae on the 3<sup>rd</sup>-5<sup>th</sup> abdominal tergites, although sometimes the vittae are very weak, the 6<sup>th</sup> segment very long (2 times longer

than the 5<sup>th</sup>), the 7<sup>th</sup> tergite with acute apex and a triangular and wide 7<sup>th</sup> segment lateral sclerite.

Other males of this species have a slightly elongate epandrium, with apically directed, slightly lanceolate surstylus. These males also have a white subscutellar fringe, mainly white pile anterior to the transverse suture on the notopleuron, on the posterior anepisternum and on the anterior anepimera, and apical  $\frac{1}{4}$  to  $\frac{1}{5}$  of the metabasitarsomere pale. White pile occurring in these regions is common among males and females of this species, although not so predominant as in this variation.

*Pelecinobaccha* (*Pelecinobaccha*) *alucard* **sp.nov.**

Type-locality: Costa Rica, Guanacaste, Eco Museo, Río Aguas Claras, 420m, 10°15'N 84°59'W. Holotype male INBio.

Map: 10. Figures: 15d-g.

**Male. Head:** Black; face slightly pale on lateral  $\frac{1}{4}$ , usually with only a few black pile ventral to antennae insertion; lunule pale above antennae insertion, central macula diffuse brown, not so distinct and weakly connected to frontal triangle color; frontal triangle with silvery-white pollen continuous from face and restricted to lateral margin, brown-pollinose medially; vertical triangle with 3 rows of pile, but most pile concentrated in a single median row; ocellar triangle  $\sim 1.5$  times its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye with sub-triangular indentation on posterior margin positioned slightly dorsal to antenna insertion; antennae insertions confluent, ventral margin with short dorsal extension; occiput dorsal  $\frac{1}{4}$  with posterior row of white scale-like pile and anterior row of shorter simple black pile, middle  $\frac{2}{4}$  with 3-4 rows of scale-like white pile, posterior row longer, anterior rows sometimes with a few simple black pile dorsally, ventral  $\frac{1}{4}$  with 3 irregular rows of scale-like white pile.



**Thorax:** Scutum black, mainly dull pollinose, white-pollinose on notopleuron, with long black pile, pile longer on notopleuron, with anterior uninterrupted row of scale-like white pile; scutellum black, with long, black pile, subscutellar fringe long and white, sometimes with a few black pile laterally; pleuron black, white pilose except black on dorso-posterior  $\frac{1}{2}$  of posterior anepisternum and anterior anepimera, the pile is densely arranged on the posterior anepisternum; plumula white and long; calypter white; halter stem brown, capitulum yellow.

**Wing:** Hyaline with anterior margin darker (cells bc, c and sc, diffusely dark on basal  $\frac{1}{2}$  of r1 and basal  $\frac{2}{3}$  of r), entirely microtrichose; alula large, 1.5 times basally to 3 times apically larger than c cell, hyaline, entirely microtrichose.

**Legs:** Prolegs brown, apex of profemur and base of protibia pale, remaining basal  $\frac{1}{2}$  of protibia light brown; mesolegs dark brown, apex of mesofemur and base of mesotibia pale, remaining basal  $\frac{1}{2}$  of mesotibia light brown; metalegs dark brown, slightly pale on base of metatibia, pale on apical  $\frac{1}{5}$  of metabasitarsomere to third metatarsomere, fourth metatarsomere light brown, fifth metatarsomere brown, metacoxa pile white dorso-laterally.

**Abdomen:** Black, 2.4 times longer than thorax; 1<sup>st</sup> tergite mainly black pilose, pile white baso-ventrally; 2<sup>nd</sup> tergite rectangular, 1.5 times longer than its smallest width, with

central triangular region of dull black pollen, pile white on base and baso-lateral 2/3, remaining pile black, pile erect on base and laterally, remaining pile appressed; 3rd tergite trapezoidal, 1.2 times longer than smallest width, slightly pale on baso-lateral corners, with large central triangular region of dull black pollen, pile appressed and black, slightly longer, erect and white baso-laterally; 4th tergite rectangular and wide, pile appressed and black, white on baso-lateral 1/2, central triangular region of dull black pollen with 3 small extensions basally; 5th tergite rectangular and wide, with 3 central vittae of dull black pollen, pile appressed and black, white laterally. **Genitalia:** Cercus with 1-2 irregular rows of pile on medial margin and 2 irregular rows outward; surstylus sub-quadrangle on lateral view, directed ventrally, with setulae (around 10) ventrally on apical corner, pilose on basal 2/3 of the dorsal surface; subepandrial sclerite crescent shaped; hypandrium with squared notch extending on anterior 3/5, with few pile ventro-apically; basiphallus posterior apex strongly curved posteriorly, distiphallus anterior surface straight; phallapodeme widened medially; postgonites narrow, ventral surface straight, dorsal surface straight, apex rounded, with acute sub-apical dorsal extremity.

**Female:** No female available.

**Length.** 6.5-9.5mm; wing 5-7mm.

**Distribution.** Costa Rica (Guanacaste, Puntarenas).

**Material examined.** (**4 males**) COSTA RICA. Guanacaste, Eco Museo, Río Aguas Claras, 420m, L\_N\_252800\_438500, #47846, 20 Jun 1997, F. Alvarado (3 specimens, INBIO CRI002 572631 (Holotype *Pelecinobaccha (Noxana) alucard*), ...632 & ...662); Puntarenas, Isla Chira, Pueblo Montero, 0m, L\_N\_233800\_406400, #84193, 28 Jul 2005, J. Azofeifa, J. Gutiérrez & I. Lopez (INB0003968103 INBIOCRI COSTA RICA).

**Comments:** The external morphology of this species is very similar to *P. dracula*, but the genitalia are very different between them.

**Etymology:** The specific epithet is the word 'Dracula' spelt backwards. It is to be treated as a noun in apposition.

*Pelecinobaccha (Pelecinobaccha) andrettae* **sp.nov.**

Type-locality: Ecuador, Napo, Jatun Sacha Biol. Res., 6 km E Misahuali, ~450m, 1°4'S 70°36'W. Holotype female DEBU.

Map: 8. Figures: 18.

**Male. Head:** Black; face with pale lateral  $\frac{1}{4}$ , widely white-pollinose laterally until at middle level of frontal prominence; lunule sometimes with slightly pale medially curving vittae dorsal to antennae insertions that almost join dorsally and leave a darker central macula; frontal triangle black pilose, with pair of triangular maculae of silvery-white pollen centro-laterally; vertical triangle with most black pile forming a central single row ending dorsal to anterior ocellus; ocellar triangle  $\sim 1.5$  times its length from posterior eye margin; eye contiguity 1-1.5 times longer than vertical triangle length; eye with sub-triangular indentation on posterior margin slightly dorsal to level of antenna insertion; antennae insertions confluent, antennae dark red to black; occiput dorsal  $\frac{1}{4}$  with 2 rows of simple black pile, anterior row very short, middle  $\frac{2}{4}$  with 1-2 anterior rows of simple long black pile and 1 regular posterior row of very long non-tapering scale-like white pile, ventral  $\frac{1}{4}$  with 2-3 irregular rows of tapering scale-like white pile.

**Thorax:** Prothorax black; scutum black, dull brown-pollinose with inconspicuous sub-median antero-posterior pair of sparse pollinose vittae and semi oval macula of differently oriented pollen anterior to scutellum, with white (variation) or black erect pile, longer on the notopleuron anterior to the transverse suture, longer, densely arranged and posteriorly oriented laterally from above the wing base towards the callus, with anterior row of shining white pile interrupted in the middle; scutellum dark red to black, dull pollinose, sparse black pilose, subscutellar fringe long and black or white (variation); pleuron black, sparse white-pollinose, entirely white pilose (variation) except some specimens with black pile on anterior anepisternum and some on dorso-posterior of posterior anepisternum, dark red on anterior anepimera; plumula normal and golden; calypter gray with black margin, short black pile on dorsal lobe and long black pile on ventral lobe; halter yellow to black, capitulum light yellow.

**Wing:** Hyaline except for dark brown basal 1/2 (cells bc, c, sc, basal ½ of r1, base of r2+3, small basal portion of r4+5, r, bm, base of dm, basal ½ of cua1 and most of cup except for a sometimes paler posterior margin), entirely microtrichose, alula brown, large, 2x basally to 2.5x apically larger than c cell, entirely microtrichose.

**Legs:** Prolegs reddish brown, procoxa darker on basal 2/3, apex of profemur slightly lighter; mesolegs reddish brown, black pilose, mesocoxae with only 1 row of longer pile antero-apically, bare to sparse pile ventrally on mesotrochanter, bare ventrally and with a row of long pile laterally on mesofemur, mesotibia with ventro-apical black setae;

metalegs dark brown, white from apical  $\frac{1}{4}$  (variation) or  $\frac{1}{2}$  of metabasitarsomere to apical metatarsomere, black pilose, white on white regions, distinctly longer on metacoxa, sparse ventrally on basal  $\frac{1}{2}$  of metafemur, metabasitarsomere thick and long, remaining tarsomeres decrease in size.

**Abdomen:** ~4 times longer than thorax, black; 1<sup>st</sup> tergite short, with narrow lateral lobes, shiny, long black and pale pilose laterally, black sparse pilose to bare medially, sometimes entirely white pilose (variation); 2<sup>nd</sup> tergite slightly constricted medially, long, ~5 times longer than its smallest width, with sub-apical dull black-pollinose triangular region, with long black erect pile laterally and short appressed dorsally; 3<sup>rd</sup> tergite trapezoidal, ~3 times wider apically than basally, with large central dull black pollinose triangle, with appressed black pile; 4<sup>th</sup> tergite sub-quadrate with one median or a pair of sub-median dull black pollinose triangles and similar to 3<sup>rd</sup>; 5<sup>th</sup> tergite wider than long, dull pollinose basally extending slightly apically through 3 central vittae, and similar to 3<sup>rd</sup>. **Genitalia:** Small; epandrium notched posteriorly, densely microtrichose; cercus with 1 to 2 regular rows of pile on medial margin, 3 irregular rows of pile outward, densely microtrichose; surstylus directed forward, with 5 irregular rows of setulae on ventral, slightly concave side, setulae weaker basally, long pilose on dorsal surface; subepandrial sclerite with a pair of posteriorly directed short processes, lateral margin darker, apical central portion directed dorsally and detached from the processes connected to the base of the surstyli; hypandrium ventral notch extending on anterior  $\frac{2}{3}$ ; distiphallus smooth and dorsal surface slightly concave, phallapodeme tapers dorso-ventrally on basal  $\frac{1}{3}$ ; postgonites with sparse pilosity except on apex, pile longer

baso-ventrally, ventral surface slightly concave, apex rounded ventrally, convex anteriorly and acute dorsally.

**Female:** Like male except: Frons with brown pollen medially from dorsal  $\frac{1}{2}$  to vertex; vertex central row with shorter pile; ocellar triangle  $\sim 2.5$  times its length from posterior eye margin and  $\sim 1$  ocellus-width from lateral eye margin; posterior  $\frac{1}{2}$  of posterior anepisternum and dorso-posterior region of katepisternum sometimes slightly paler; 2<sup>nd</sup> to 4<sup>th</sup> protarsomeres and 3<sup>rd</sup> and 4<sup>th</sup> mesotarsomeres slightly swollen; 2<sup>nd</sup> abdominal tergite shorter, baso-lateral  $\frac{2}{3}$  sometimes slightly pale and expanding dorsally sub-apically; 3<sup>rd</sup> tergite shorter and sometimes with basal pale fascia widely interrupted in the middle; 4<sup>th</sup> tergite rectangular and wide, sometimes with a basal pale fascia widely interrupted in the middle and a central dull black pollinose triangle; 5<sup>th</sup> tergite  $\frac{1}{2}$  as long as the 4<sup>th</sup> and sometimes with basal pale fasciate spots; 6<sup>th</sup> segment conical, 'ovipositor'-like, laterally compressed, as long as 5<sup>th</sup> tergite. **Genitalia:** Strongly sclerotized; 7<sup>th</sup> tergite with anterior margin triangular, basal extensions as long as the 6<sup>th</sup> segment and sometimes weak (variation), and with pair of short latero-ventral extensions; 7<sup>th</sup> segment lateral sclerite right triangle shaped; 8<sup>th</sup> tergite weakly sclerotized medially, sometimes appearing as a pair of separate sclerites; cercus with 1 row of marginal pile, overall well sclerotized.

**Length.** 7.5-11.5mm; wing 6-9mm.

**Distribution.** Colombia (Amazonas), Ecuador (Napó, Pastaza), Peru (Huanuco, Loreto, Madre de Dios).

**Material examined.** (**6 males**) COLOMBIA. Amazonas, Letitia, 185m., 19-26 Feb 1972, D. Ward & A. Forsyth (CNC Diptera 160765). ECUADOR. Napó, Jatun Sacha Biol. Res. 6 km E Misahuali, 1°4'S 70°36'W, ~450m, 1 May 2002, M. Buck (DEBU00177910); Pastaza, Pompeya, Napó R., 14-22 May 1965, L. Pena (CNC Diptera 160764). PERU. Madre de Dios, Avispas, 400m, 20-30 Sep 1962, L. Pena (CNC Diptera 160763); ..., Manu, Rio Manu, Pakitza, 12°7'S 70°58'W, 250m, 9-23 Sep 1988, A. Freidberg (USNM ENT 00257731); ..., W. N. Mathis (USNM ENT 00257673). (**17 females**) ECUADOR. Napó, Jatun Sacha Biol. Res. 6 km E Misahuali, 1°4'S 70°36'W, ~450m, 1 May 2002, O. Lonsdale (DEBU00186892); ..., M. Buck (DEBU00177909 (Holotype *Pelecinobaccha* (*P.*) *andrettae*)); ..., 2 May 2002, M. Buck (DEBU00177961). PERU. Huanuco, Cochicote, 9 Sep 1965, J. C. Hitchcock, Jr. (USNM ENT 00257743); ; [Loreto], Putumayo, Lachorrera, 17-20 Aug 1920, ? (CNC Diptera 160769); Madre de Dios, Avispas, 400m, 10-20 Sep 1962, L. Pena (4 specimens, CNC Diptera 160768, 160770, 160771 and 160775); ..., 20-30 Sep 1962, L. Pena (5 specimens, CNC Diptera 160766, 160767 and 160772-4); ..., Manu, Erika (near Salvacion), 550m, 5-6 Sep 1988, A. Freidberg (2 specimens, USNM ENT 00257741 & 00257742); ..., Rio Manu, Pakitza, 12°7'S 70°58'W, 250m, 9-23 Sep 1988, A. Freidberg (USNM ENT 00257740).



**Comments:** The variation specimens have mainly white pile on the pleuron and the 1<sup>st</sup> abdominal tergite, and the metabasitarsomere is pale only on its apical ¼. A few specimens also have central vittae on the 4<sup>th</sup> and 5<sup>th</sup> abdominal tergites that are either pale and weak or sub-shining.

**Etymology:** The specific epithet is an homage to my beloved wife. It is to be treated as a noun in the genitive case.

*Pelecinobaccha (Pelecinobaccha) avisvas* **sp.nov.**

Type-locality: Peru, Madre de Dios, Avispas, 400m, 12°53'S 71°8'W. Holotype female CNC.

Map: 11. Figures: 19.

**Male. Head:** Dark brown; face pale on lateral  $\frac{1}{4}$ ; gena slightly pale anteriorly; lunule usually distinctly pale above antennae insertion, central macula broadly fused to frontal triangle color; frontal triangle pale laterally except around eye contiguity, with silvery-white pollen restricted laterally; vertical triangle with 1 row of pile; ocellar triangle distanced its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye with sub-triangular indentation on posterior margin positioned at level of antenna insertion; antennae insertions confluent, ventral sclerotized margin extended dorsally, antennae brown; occiput dorsal  $\frac{1}{4}$  with 2 rows of simple black pile, anterior row with very short pile, middle  $\frac{2}{4}$  with 2-3 rows of white, scale-like pile, anterior row slightly shorter, ventral  $\frac{1}{4}$  with 2 regular rows of scale-like white pile.

**Thorax:** Scutum dark brown, dull pollinose, with inconspicuous vittae of pale pollen sub-medially, mainly white pilose, longer anterior to transverse suture on notopleuron, with anterior row of shining white pile interrupted in the middle; scutellum white pilose,

subscutellar fringe white and long; pleuron dark brown, pale on posterior  $\frac{1}{2}$  of posterior anepisternum and dorso-posterior portion of katepisternum, entirely white pilose; plumula white and short; calypter white; halter light yellow.

**Wing:** Entirely light gray, stigma slightly dark, entirely microtrichose; alula normal, as large as basally and 2 times larger apically than c cell, hyaline, entirely microtrichose.

**Legs:** Prolegs dark brown, pale on apex of procoxa, base and apex of profemur and basal  $\frac{1}{2}$  of protibia; mesolegs dark brown, pale on base and apex of mesofemur and basal  $\frac{2}{3}$  of mesotibia; metalegs dark brown, pale on base and apex of metafemur, basal  $\frac{1}{4}$  to  $\frac{1}{3}$  of metatibia and apex of metabasitarsomere to fourth metatarsomere.

**Abdomen:** Dark brown, 3.6 times longer than thorax; 1<sup>st</sup> tergite black, white pilose; 2<sup>nd</sup> tergite long, 4.8 times longer than smallest width, with pair of median fasciate pale maculae, with sub-apical central triangular region dull black-pollinose, pile mainly black, long and erect, but short and appressed dorsally, white pilose on lateral basal  $\frac{1}{2}$ ; 3rd tergite trapezoidal and long, 2.7 times longer than smallest width, with sub-basal lateral corners with triangular pale maculae and central pair of small pale vittate spots, with large central triangular region of dull black pollen, pile short, appressed and black; 4th tergite sub-quadrangular, slightly longer than wide, remaining characteristics as in 3rd; 5th tergite rectangular and wide, without baso-lateral pale maculae, remaining

characteristics as in 3rd. **Genitalia:** Cercus with 1 regular row of pile on medial margin and 2 regular rows outward; surstylus directed anteriorly, expanded ventrally on apical 2/3, with rounded apex, with strong setulae (around 12) on apico-ventral margin, small dorso-medial apex constituted of a thin sclerotized layer, pilose on basal 1/2 of the dorsal surface; subepandrial sclerite divided into a pair of small triangular sclerites; hypandrium with ventral notch extending on anterior 2/3; distiphallus smooth and anterior surface slightly concave; phallapodeme short and tapers on basal 1/3; postgonites narrow, with pile mainly on ventral surface, ventral surface slightly expanded, straight, dorsal surface slightly concave, apex convex anteriorly, with acute dorsal extremity.

**Female:** Similar to male except: Pale on face almost on lateral 1/3; frons pale on lateral ventral 1/2 only; ocellar triangle ~1.5 times its length from posterior eye margin and ~1 ocellus-width from lateral eye margin; ventral 3/4 of occiput with 2-3 rows of white, scale-like pile, anterior rows slightly shorter; scutum with pair of pale pollinose vittae sub-medially; most of protibia and mesotibia pale, metatibia with basal 1/3 pale, metabasitarsomere with apical 1/5 to 1/4 pale; wing hyaline, but very light brown on baso-anterior 1/2 (slightly brown on cells bc, c, r, basal 1/2 of r1; basal 1/5 of r2+3 and bm); 2nd abdominal tergite shorter than on male, 2.3 times longer than smallest width, dull pollinose region smaller, lateral pile much shorter than on male; 3rd tergite shorter than on male, 4th tergite sub-quadrangular, slightly wider than long; 5th tergite rectangular and wide, with pair of baso-lateral pale triangular maculae; 6th segment conical, as long as its smallest width and slightly longer than 5th. **Genitalia:** 7<sup>th</sup> tergite

short, basal extensions as long as the 6<sup>th</sup> segment, 7<sup>th</sup> segment lateral sclerite narrow apically but extended baso-ventrally into 6<sup>th</sup> segment, 8<sup>th</sup> tergite medial area lightly sclerotized, basal crest straight, apex acute, cercus with 1 row of pile on apical margin.

**Length.** 7.5-8.5mm; wing 6.5mm.

**Distribution.** Bolivia (La Paz), Ecuador (Napo), Peru (Cuzco, Madre de Dios).

**Material examined.** (**8 males**) PERU. Cuzco, Quincemil, 780m, 13-31 Aug 1962, L. Pena (3 specimens, CNC Diptera 160863-5); Madre de Dios, Manu, Erika (near Salvacion), 550m, 5-6 Sep 1988, A. Freidberg (2 specimens, USNM ENT 00257677 & ...679); ..., Malaise trap, 9-23 Sep 1988, W. N. Mathis (3 specimens, USNM ENT 00257667, ...676 & ...678). (**23 females**) UNKNOWN. [no label] (CNC Diptera 160862). BOLIVIA. La Paz, Heath River Wildlife Centre. – 21 Km SSW Puerto Heath, rainforest, Malaise, 12 40'S 68 42'W, 1-11 May 2007, S. M. Paiero (debu00288120). ECUADOR. Napo, Coca, Napo R., 250m, ?? May 1965, L. Pena (CNC Diptera 160843). PERU. Cuzco, Quincemil, 13-31 Aug 1962, L. Pena (CNC Diptera 160844); Madre de Dios, Avispas, 400m., 10-20 Sep 1962, L. Pena (9 specimens, CNC Diptera 160845-53); ..., 20-30 Sep 1962 (6 specimens, CNC Diptera 160854-59, Holotype *Pelecinobaccha* (*Pelecinobaccha*) *avispas*, CNC Diptera 160860); ..., 1-15 Oct 1962 (CNC Diptera

160861); ..., Manu, Rio Manu, Pakitza, 250m, 12°7'S 70°58'W, 9-23 Sep 1988, W. N. Mathis (2 specimens, USNM ENT 00257674 & ...680).

**Etymology:** The specific epithet is the region where most of the specimens were collected. It is to be treated as a noun in apposition.

*Pelecinobaccha* (*Pelecinobaccha*) *beatricea* (Hull, 1942) **comb. nov.**

*Baccha beatricea* Hull, 1942. – Hull, 1942b: 73. Type-locality: Brazil, São Paulo.

Holotype female CNC. Hull, 1949a: 144 (redescription), 203 (fig. 53, female abdomen), 221 (fig. 137, male abdomen), 273 (fig. 354, male wing), 285 (fig. 391, female wing).

*Ocyptamus beatricea*. Thompson et al. 1976: 13 (catalog citation).

*Baccha leucopoda* Hull, 1948. – Hull, 1948: 5. Type-locality: Brazil, Goiás. Holotype female CNC. Hull, 1949a: 160 (redescription), 212 (fig. 100, female abdomen). **n. syn.**

*Ocyptamus leucopodus*. Thompson et al. 1976: 21 (catalog citation).

Map: 11. Figures: 20.

**Male. Head:** Dark red to black; face distinctly pale on lateral  $\frac{1}{4}$ , and sometimes lateral  $\frac{1}{3}$  ventral to tubercle, white pilose laterally except black ventral to antenna, with distinct tubercle sparsely white pilose; gena dark red; lunule with central black maculae, distinctly pale above antenna insertion and around macula, usually separating macula from black of frontal triangle or leaving a narrow dark vitta; frontal triangle pale laterally except around eye contiguity, black pilose, with silvery-white pollen restricted laterally, continuous from face, and dull pollen medially; vertical triangle with most black pile forming a central single row ending dorsal to anterior ocellus; ocellar triangle 1-1.5

times its length from posterior eye margin; eye contiguity longer than vertical triangle length; eye with sub-triangular indentation on posterior margin slightly dorsal to level of antenna insertion; antennae insertions narrowly separated; occiput dorsal  $\frac{1}{4}$  with 2 regular rows of black pile, anterior very short and posterior long, middle  $\frac{2}{4}$  with 3 irregular rows of white scale-like pile, posterior row longer, ventral  $\frac{1}{4}$  with 2 irregular rows of scale-like white pile.

**Thorax:** Prothorax dark brown; scutum dark brown, mostly brown dull pollinose, with very short, erect, black pile, slightly longer laterally posterior to transverse suture and longer and white on notopleuron anterior to transverse suture, with anterior row of shining white pile interrupted in the middle; scutellum brown to dark brown, with inconspicuous black pile, sub-scutellar fringe with white and long pile; pleuron brown, pale on posterior  $\frac{1}{2}$  of posterior anepisternum and dorso-posterior portion of katepisternum, white pilose but anterior anepisternum sometimes with some golden pile; plumula short, brown; calypter white, sometimes golden on margin and fringe pile; halter brown, capitulum dark orange.

**Wing:** With dark anterior margin that extends posteriorly on the middle, sometimes diffuse to hyaline apically (dark on cells bc, c, sc, r1, r2+3 except  $\frac{1}{3}$  antero-posterior portion, r, basal  $\frac{1}{3}$  of r4+5, bm, basal  $\frac{1}{2}$  of dm, anterior margin and apical  $\frac{1}{6}$  of cup, and most of cua1), entirely microtrichose, alula with only anterior margin dark, large, 2.5 times basally to 4.5 times apically larger than c cell, entirely microtrichose.



**Legs:** Prolegs dark brown, profemur light brown, protibia pale on basal 2/3, probasitarsi sometimes pale on apex; mesolegs dark brown, apex of mesofemur light brown, basal 1/2 to 2/3 of mesotibia pale; metalegs dark brown, apex of metafemur and base of metatibia pale, apical 1/3 to 1/4 of metabasitarsomere and remaining metatarsomeres white, last metatarsomere orange, metacoxa with white pile dorso-laterally.

**Abdomen:** ~3.5 times longer than thorax, dark brown; 1<sup>st</sup> tergite sparse to bare dorso-medially, pile white; 2<sup>nd</sup> tergite long, 4-4.5 times longer than its smallest width, sometimes slightly pale on baso-lateral 2/3, with long triangular maculae of dull black pollen sub-apically pointing to the base, with short, appressed black pile, and longer, erect, white pile on baso-lateral 1/2 (inconspicuous in some specimens); 3rd tergite trapezoidal and long, with a pair of small vittate pale maculae medially and a pair of triangular pale maculae baso-laterally, maculae sometimes inconspicuous and viewed as sub-shining markings, with large triangular macula of dull black pollen medially, with appressed black pile; 4th tergite rectangular, slightly longer than wide, and similar to 3rd; 5th tergite rectangular, wide and narrow, with a pair of central vittate pale maculae, dull black-pollinose medially; sterna dull black-pollinose on apical 1/2 of 2nd to 4th.

**Genitalia:** epandrium not notched posteriorly, cercus with 1 regular row of pile on medial margin and 3 irregular rows outward; surstylus directed apically, with rounded apex, with strong setulae on ventral, slightly concave side, with very little of the dorsal thin sclerotized layer, pilose on basal 1/2 of the dorsal surface; subepandrial sclerite well

sclerotized all over, short, quadrangular but with posterior corners extended laterally; hypandrium with ventral notch extending on anterior 2/3; distiphallus smooth and anterior surface straight; postgonites with pile mainly on ventral surface, ventral surface slightly concave, dorsal surface slightly concave but convex on apical 1/2, apex convex anteriorly, with acute ventral and dorsal extremities, dorsal extremity longer than ventral.

**Female:** Like male except: Frons with pale lateral margin covering basal 1/2 or 2/3; vertex with 1 central row of very short pile directed forward and ending dorsal to anterior ocellus, ocellar triangle ~2 times its length from posterior eye margin and ~1 ocellus-width from lateral eye margin; scutum sometimes with sub-median pair of white pollinose vittae on anterior 2/3; wing hyaline on most of cell r1 apex, apical 1/2 of r2+3 and apical 3/4 of r4+5, that sometimes leaves an apical dark spot on the apex; 2nd abdominal tergite with a weaker dull macula, all pile appressed and black; 5<sup>th</sup> tergite with baso-lateral pale triangular maculae that sometimes are connected to medial vittae; 6<sup>th</sup> segment as long as 5<sup>th</sup> tergite. **Genitalia:** 7<sup>th</sup> tergite normal, with a pair of lateral, weakly sclerotized, long (as long as the 6<sup>th</sup> segment), narrow basal extensions into the 6<sup>th</sup> segment, with pair of short latero-ventral extensions, 7<sup>th</sup> segment lateral sclerite narrow apically but wider basally, 7<sup>th</sup> segment with central longitudinal area bare, extensive intersegmental membranous region between 7<sup>th</sup> and 8<sup>th</sup> segments, cercus with 1 row of pile on inner margin.

**Length.** 11-14.5mm; wing 8.5-11.5mm.

**Distribution.** Argentina (Corrientes, Misiones), Brazil (Goiás, Mato Grosso, Paraná, Santa Catarina, São Paulo), Paraguay (Caazapá, Guairá, Paraguari), Venezuela (Carabobo).

**Material examined. (63 males)** ARGENTINA. Corrientes, Ytuzaingo, ?? Sep, 1982, Fritz (USNM ENT 00257745); [Misiones], Iguazu Falls, ?? Oct 1927, R. C. & E. Shannon (USNM ENT 00257750); Misiones, 5 km porto Iguazo, behind Hotel Orquideas, 1-6 Feb 1992, S. A. Marshall. BRAZIL. Paraná, Londrina, Mata dos Godoy, 28 Jan-2 Feb 1990, S. A. Marshall (2 specimens); Santa Catarina, Nova Teutônia, 27°11'S 52°23'W, Frank M. Hull Collection C.N.C. 1973, 19 Nov 1934 (CNC Diptera 160793), F. Plaumann; ..., 21 Nov 1936 (CNC Diptera 160794); ..., 28 Oct 1939; ..., 500m, ?? Mar 1948 (4 specimens, CNC Diptera 160795-8); ..., 300-500m, 13 Nov 1956 (CNC Diptera 160827); ..., 1 Feb 1958 (CNC Diptera 160799); ..., 1 Dez 1959 (CNC Diptera 160800); ..., 2 Dez 1959 (CNC Diptera 160801); ..., 18 Dez 1959 (CNC Diptera 160802); ..., 22 Dez 1959 (CNC Diptera 160803); ..., 29 Dez 1959 (CNC Diptera 160804); ..., ?? Dez 1964 (CNC Diptera 160805); ..., ?? Jan 1966 (5 specimens); ..., ?? Feb 1966 (CNC Diptera 160806); ..., ?? Mar 1966 (2 specimens); ..., ?? Oct 1967; ..., ?? Feb 1968 (CNC Diptera 160807); ..., ?? Nov 1968 (CNC Diptera 160808); ..., ?? Nov 1969 (12 specimens, CNC Diptera 160809-20); ..., ?? Dez 1969 (2 specimens, CNC Diptera 160821); ..., ?? Jan 1970 (CNC Diptera 160822); ..., ?? Nov 1970 (3 specimens); ..., ?? Dez 1970 (2 specimens); São Paulo, Pompeia, Frank M. Hull

Collection C.N.C. 1973, ?? Nov 1939, [M.P.] Barretto (CNC Diptera 160823); ..., Porto Cabral, Rio Paraná, Frank M. Hull Collection C.N.C. 1973, 15-30 Oct 1941, L. Travassos, Filho (CNC Diptera 160824); ..., Pres. Epitácio, Pto. Albano, Rio Paraná, ?? Oct [19]54, J. Lane; ..., E. Rabello (2 specimens); ..., Sto. Amaro, ?? Oct [19]62, J. Lane. PARAGUAY. [Caazapá], Pastore[o], 28 Jan ????, D. Wees (CNC Diptera 160825); ..., N Pastoreo, 3-6 Jan 1972, ?; [Guairá], Villarica, ?? Nov ????, F. Schade (CNC Diptera 160826); Paraguari, Ybycui (25 km SE), in Ybycui National Park, 12-24 Apr 1980, P. J. Spangler et al. (2 specimens, USNM ENT 00257747 & ...748); San Pedro, Rio Ypane Cororo, ?? Dez 1983, M. A. Fritz (USNM ENT 00257746). (**54 females**) UNKNOWN. Piedris B., S. W. Williston collection, Am. Mus. Nat. Hist. Dept. Invert. Zool. n° 19186, ?? Apr ????, ?. ARGENTINA. Corrientes, Ytuzaingo, ?? Sep, 1982, Fritz (USNM ENT 0025744); Misiones, 5 km porto Iguazo, behind Hotel Orquideas, 1-6 Feb 1992, S. A. Marshall. BRAZIL. Goiás, Campinas, Frank M. Hull Collection C.N.C. 1973, ?? Dez 1935, Borgmeier & S. Lopes (CNC Diptera 161240); ..., “142”, “Baccha ?clarapex Wied. // XII 36 Det. H. S. Lopes”, ?? Jan 1936, R. Spitz; ..., ?? Jan 1938, Spig (CNC Diptera 161241); ..., Baccha clarapex var. fumaria n.v. Hull (Holotype *Baccha leucopoda*, CNC Diptera 161226); ..., Corumbá [de Goiás], F. Manjolinho, ?? Nov 1945, [M.P.] Barretto; Mato Grosso, Maracaju, Frank M. Hull Collection C.N.C. 1973, ?? May 1937, ? (CNC Diptera 161227); Paraná, Iguassu, Frank M. Hull Collection C.N.C. 1973, ?? Dez 1941, Com. E. N. V. (CNC Diptera 161228); Santa Catarina, Nova Teutônia, Frank M. Hull Collection C.N.C. 1973, 27°11'S 52°23'W, 20 Oct 1930, F. Plaumann; ..., 29 Oct 1939 (2 specimens, CNC Diptera 161229); ..., 27 Nov 1957 (CNC Diptera 161242); ..., 1 Dez 1959 (CNC Diptera

161243); ..., 2 Dez 1959 (CNC Diptera 161230); ..., 29 Dez 1959 (CNC Diptera 161231); ..., 16 Jan 1960 (CNC Diptera 161232); ..., 29 Jan 1960 (CNC Diptera 161244); ..., 6 Oct 1960 (CNC Diptera 161233); ..., ?? Jan 1965 (CNC Diptera 161234); ..., ?? Feb 1965 (CNC Diptera 161245); ..., ?? Dez 1965 (2 specimens, CNC Diptera 161235-6); ..., ?? Jan 1966 (5 specimens); ..., ?? Feb 1966 (2 specimens); ..., ?? Nov 1966; ..., ?? Jan 1967 (CNC Diptera 161227); ..., ?? Nov 1969 (7 specimens, CNC Diptera 161238-9, 161246-50); ..., ?? Nov 1970 (3 specimens); ..., ?? Dez 1970 (5 specimens); São Paulo, Barueri, 26 May 1966, K. Lenko; ..., Holotype *beatricea* [red label], Holotype *Baccha beatricea* Hull CNC nº20504 [red label], Cid. Jardins, ?? Dec 1940, J. Lane (Holotype *Baccha beatricea*); ..., Itaporanga, N. B. Antonina, ?? Jan 1946, [M.P.] Barretto; ..., Mogi Guacu, Campininha, 23-28 Oct 1970, J. W. Boyes (CNC Diptera 160828). PARAGUAY. [Caazapá], Pastoreo, 3-7 Jan 1972, ?. VENEZUELA. Carabobo, Henri Pitier National Park, Portachuelo Pass, 10 20'51"N 67 41'16"W, 1143m, 13 Sep 2008, J. Skevington (JSS25251); ..., 15 Sep 2008 (JSS25214).

**Comments:** The females are very similar to the males varying only in wing pattern. This is very distinctive since, in most *Pelecinobaccha* species, females vary at least on the size and shape of the abdominal segments in relation to the males.

Two female specimens from Venezuela (JSS25251 and JSS25214) differ slightly from the above description but are considered a variation since the genitalia agrees with the species description. The specimens have darker wings which leave the cup cell and the anal lobe mostly dark, and the hyaline region is actually a light brown tinge. In

addition, the subscutellar fringe, the postero-dorsal corner of the posterior anepisternum, and the anterior anepimeron have black pile and the abdomen is completely devoid of pale markings.

*Pelecinobaccha (Pelecinobaccha) capesorum* **sp.nov.**

Type-locality: Peru, Cuzco, Pau-cartambo, Puente San Pedro, 50 km NW Pilcopata, 1600m, 12°41'S 72°16'W. Holotype female USNM.

Map: 8. Figures: 21a-d.

**Male.** No male available.

**Female. Head:** Black; face pale on lateral 1/3; lunule pale above antennae insertion, central macula narrowly connecting to frons color; frons with white-silver pollen continuous from face and restricted to lateral margin, dull gray pollinose medially; vertex with black pile in 3 rows of pile, but most pile concentrated in median row; ocellar triangle ~2 times its length from posterior eye margin and ~1 ocellus-width from lateral eye margin; eye posterior indentation at level of antennae insertion; antennae insertions separated; occiput dull dark-pollinose on dorsal 1/4, remaining white-pollinose; occiput dorsal 1/4 with 2 rows of simple black pile, anterior row very short, middle 2/4 with 2-3 rows scale-like white pile, anterior rows shorter, some pile black and simple dorsally, ventral 1/4 with 2-3 irregular rows of scale-like white pile

**Thorax:** Scutum black, mostly black dull pollinose, white on notopleuron and slightly posterior to transverse suture laterally, with a pair of sub-median and one median complete vittae of pale gray pollen, with short white pile, postero-latero transverse suture inclusive, longer on notopleuron, with anterior row of longer shining white pile, interrupted in the middle with shorter pile; scutellum dark brown, with metallic-shining pollen, with short white pile, subscutellar fringe long and white; pleuron black, white pilose; plumula normal and brown; calypter yellow; halter brown, capitulum orange.

**Wing:** Mostly hyaline with anterior margin dark brown (cells bc, c, sc, r, r1, r2+3 except for postero-apical 2/3, base of r4+5 and bm), entirely microtrichose; alula hyaline, narrow expanding slightly on apical 1/2, as large as basally to 1.9 times larger apically than c cell, entirely microtrichose.

**Legs:** Prolegs brown, pale on profemur apex and basal 3/5 of protibia, probasitarsomere pale apically and on lateral surface, 2<sup>nd</sup> to 4<sup>th</sup> protarsomeres enlarged and dark brown, apical protarsomere light brown; mesolegs brown, apex of mesofemur, basal 3/4 and apex of mesotibia, and mesobasitarsomere pale, 2<sup>nd</sup> to 4<sup>th</sup> mesotarsomeres enlarged and dark brown, apical mesotarsomere light brown, ventral setae on mesobasitarsomere orange; metalegs dark brown, apex of metafemur, base of metatibia, apical 1/2 of the metabasitarsomere and remaining metatarsomeres pale, apical metatarsomere light brown, with some white pile dorsally on metacoxa.



**Abdomen:** Dark brown; ~3.5 times longer than thorax; 1<sup>st</sup> tergite white pilose, a few black pile baso-laterally; 2<sup>nd</sup> tergite long, ~4 times longer than its smallest width, pale on baso-lateral ½, with pair of latero-median small triangular pale maculae, with small central triangular region of dull black pollen, mainly with short appressed black pile, white on baso-lateral ½; 3<sup>rd</sup> tergite trapezoidal and long, ~3 times longer than smallest width, with pair of basal sub-lateral pale vittae extending ½ the length of the tergite and pair of median pale vittae extending ¾ of the length of the tergite, latter pair of vittae waned basally, with 3 central vittae of dull black pollen, mainly with appressed black pile, white on baso-lateral ½; 4th tergite sub-quadrangular, slightly wider than long, with pair of basal sub-lateral small triangular pale maculae and pair of median pale vittae extending 4/5 of the length of the tergite, with pair of large triangular maculae of dull black pollen, pollen absent on baso-lateral corners, apex and where the vittae occur, with appressed black pile, some pile white on baso-lateral corners; 5th tergite rectangular and wide, with pair of central pale vittae almost reaching the apical margin and slightly pale on basal sub-lateral maculae, dull black-pollinose except laterally and where vittae occur, with appressed black pile; 6th segment conical, as long as 5th.

**Genitalia:** 7<sup>th</sup> tergite triangular, basal extensions slightly shorter than 6<sup>th</sup> segment, some pile occurring on apex, 7<sup>th</sup> segment lateral sclerite sub-triangular, greatly narrowing apically, acute baso-ventral extensions short; 8th tergite entirely sclerotized, with basal and apical median notches, pair of apices long, basal crest normal; 8th sternite unsclerotized medially, short; 10<sup>th</sup> tergite reduced to a pair of sclerites fused to the dorsal surface of the cerci, weakly sclerotized, not projecting beyond cercus marginal

pile; cercus with sub-basal ventral extension, and with 1 row of pile on apical margin, cerci narrowly fused dorsally.

**Length.** 12mm; wing 9.5mm.

**Distribution.** Peru (Cuzco).

**Material examined.** (*1 female*) PERU. Cuzco, Pau-cartambo, Puente San Pedro (50 km NW Pilcopata), 1600m, 03 Sep 1988 (USNM ENT 00257756 (Holotype *Pelecinobaccha (P.) capesorum*)).

**Comments:** This species is similar to *P. nubilorum* but can be distinguished by the laterally pale face and genitalic characters.

**Etymology:** The specific epithet refers to the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), funding agency for the senior author's PhD program. It is to be treated as a noun in the genitive case.

*Pelecinobaccha* (*Pelecinobaccha*) *clarapex* (Wiedemann, 1830) **comb. nov.**

*Syrphus clarapex* Wiedemann, 1830. – Wiedemann, 1830: 684. Type-locality: Brazil.

Holotype female MNH-Wien.

*Baccha colombiana* Curran, 1941. – Curran, 1941: 282. Type-locality: Colombia, Magdalena. Holotype male AMNH. Hull, 1949a: 215 (fig.109, abdomen), 271 (fig. 346, wing). **n. syn.**

*Ocyptamus colombianus*. Thompson et al. 1976: 14 (catalog citation).

Map: 13. Figures: 22.

**Male. Head:** Black; face pale on lateral 1/4; lunule usually pale above antennae insertions, central macula separated from or narrowly touching the frontal triangle color; frontal triangle sometimes pale laterally but not greatly extended, with white pollen restricted to lateral narrow oval spots, connected to face pollen by very narrow vittae of differently oriented pollen; vertical triangle with a single median row of pile; ocellar triangle ~2 times its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye with sub-triangular indentation positioned at level of antenna insertion; antennae insertions confluent, ventral margin with short dorsal extension, antennae dark brown; occiput dorsal ¼ with 2 rows of simple black pile, anterior row with very short pile, middle 2/4 with 2-3 rows of scale-like white pile, anterior rows

shorter, sometimes a few pile are simple and black, ventral  $\frac{1}{4}$  with 2-3 rows of white, scale-like pile, anterior rows slightly shorter.

**Thorax:** Scutum black, mainly dull pollinose with pair of sub-median white pollinose vittae, tapering posteriorly, and a median weaker postero-anterior vittae, with mainly black pile, longer anterior to scutellum, pile white and slightly longer on notopleuron, anterior row of shining white pile with shorter pile in the middle; scutellum black, with golden pile, subscutellar fringe long and white; pleuron black, pale on posterior  $\frac{1}{2}$  of the posterior anepisternum and dorso-posterior portion of katepisternum, mainly white pilose, pile golden on dorso-posterior  $\frac{1}{2}$  of posterior anepisternum and anterior anepimera; plumula golden and normal; calypter yellow to greyish, middle pile of ventral lobe have brownish apical  $\frac{1}{2}$ ; halter yellow, capitulum sometimes orange.

**Wing:** Mainly dark brown, light brown on apex of r2+3, apical  $\frac{1}{2}$  of r4+5, apical  $\frac{1}{2}$  of dm, apex of cua1 and anal lobe, entirely microtrichose; alula normal, 1.25 times basally and 3.8 times apically larger than c cell, light brown, entirely microtrichose.

**Legs:** Prolegs dark brown, apical  $\frac{1}{2}$  of profemur sometimes slightly lighter, basal  $\frac{1}{2}$  of protibia light brown; mesolegs dark brown, apex of mesofemur pale, basal  $\frac{2}{3}$  of mesotibia pale; metalegs dark brown, pale on apex of metafemur and apical  $\frac{1}{3}$  of metabasitarsomere to fourth metatarsomere, fifth metatarsomere slightly dark.

**Abdomen:** Dark brown, 3.6 times longer than thorax; 1<sup>st</sup> tergite with erect white pile; 2<sup>nd</sup> tergite long, 5 times longer than its smallest width, baso-lateral 2/3 of the tergite sometimes pale, pile black, normal and appressed dorsally, long and erect laterally, white on basal 2/3, with sub-apical central triangular region of dull black pollen; 3rd tergite trapezoidal and long, 3.3 times longer than smallest width, with baso-lateral 1/2 to 2/3 of the tergite pale and pair of short vittate central maculae, with large central triangular region of dull black pollen, pile short, appressed and black, slightly longer and pale baso-laterally; 4th tergite rectangular and wide, with baso-lateral pale triangles that don't connect to central vittate maculae, dull black pollen absent only on base and apex, remaining characteristics as on 3rd; 5th tergite rectangular and wide, remaining characteristics as on 4th. **Genitalia:** Cercus with 1 regular row of pile on medial margin and 2 irregular rows outward; surstylus directed apico-ventrally, with setulae (around 12) on ventral apex, stronger apically, very few pile on basal 1/2 of the dorsal surface; subepandrial sclerite short and trapezoidal, with a pair of lateral extensions articulated to base of the surstyli; hypandrium with ventral notch extending on anterior 1/2 and with a rounded posterior margin; distiphallus smooth and anterior surface slightly curved anteriorly on apex; phallapodeme well sclerotized throughout, enlarging basally; postgonites with few short pile on ventral surface, ventral surface slightly concave, lateral surface slightly expanded ventrally, dorsal surface slightly concave basally but otherwise straight and directed in a dorsal direction, apex convex anteriorly, with convex ventral extremity and acute dorsal extremity.

**Female:** Similar to male except: Ocellar triangle ~2 times its length from posterior eye margin and 1-1.5 ocelli-width from lateral eye margin; wing with basal  $\frac{1}{2}$  dark (dark on cells bc, c, sc, basal  $\frac{1}{2}$  of r1, basal  $\frac{1}{3}$  r2+3, base of r4+5, basal  $\frac{1}{2}$  to  $\frac{1}{3}$  of dm, cup, basal  $\frac{1}{2}$  of cua1 and most of the anal lobe), remaining hyaline; protibia sometimes with basal  $\frac{1}{2}$  light brown to yellow; metabasitarsomere with slightly less than apical  $\frac{1}{2}$  to apical  $\frac{1}{3}$  white; 2nd abdominal tergite shorter, 3.3 times longer than smallest width, with much shorter pile; 3<sup>rd</sup> abdominal tergite shorter, 2 times longer than its smallest width; 6th segment conical normal, slightly shorter than its smallest width and as long as the 5th. **Genitalia:** 7<sup>th</sup> tergite normal, as wide as median length, apex triangular or straight, 7<sup>th</sup> segment lateral sclerite normal, with acute basal extremities and blunt apical extremities; 8<sup>th</sup> tergite with central region well sclerotized, apex 2-pronged, basal crest short, anterior margin to basal crest smooth.

**Length.** 8.5-10mm; wing 7-8mm.

**Distribution.** Bolivia (Beni), Brazil (Goiás, Mato Grosso, São Paulo), Colombia (Boyaca, Magdalena), Costa Rica (Puntarenas, San José), Ecuador (Pichincha), Guatemala (Suchitepéquez), Peru (Madre de Dios), Venezuela (Zulia).

**Material examined.** (*10 males*) BRAZIL. São Paulo, Araçatuba, Faz. Jacarecatinga, 10-15 Jun 1963, Rabello; ..., Cidade Azul, ?? Feb 1946, M.P. Barretto. COLOMBIA.

Magdalena, Cerro Patron, Rio Frio, 4000ft, C.H.Curran Collection Acc. 31144, *Baccha colombiana* Curran Holotype [red label], 12 Sep 1927, G. Sals (Holotype *Baccha colombiana*). COSTA RICA. Puntarenas, Centro Peninsular Karen Mongense, 300m, L\_N\_206090\_421100, #49708, 23 Nov 1997, F. Alvarado (INBIO CRI002 412021); ..., R. Priv. Karen Mogensen, Send. El Viejo Nispero, 300-500m, Libre, L\_N\_205600\_420300, #74548, 8 Jul 2003, D. Briceño (INB0003739669 INBIOCRI COSTA RICA); ..., 315m, L\_N\_205600\_420300, #74547, 3 Jul 2003, Y. Cardenas (INB0003739531 INBIOCRI COSTA RICA); San José, Alto Tigre, 750m, L\_N\_210700\_504000, #46355, 15 May 1997, F. A. Quesada (INBIO CRI002 563999); ..., #48052, 15 May 1997, M. A. Zumbado (2 specimens, INBIO CRI002 578404 & 578405). ECUADOR. Pich[incha]. Pr., 47 km S Sto. Domingo, Rio Palenque Station, 250m, 17-25 Feb 1979, S. A. Marshall. VENEZUELA. Zulia, El Tucuco (45 km SW of Machiques), 5-6 Jun 1976, A. S. Menke & D. Vincent (USNM ENT 00257691). (**19 females**) BOLIVIA. Beni, Huachi, Mulford Bio Expl, ?? ?? 1921-22, Wm M. Mann (CNC Diptera 161132). BRAZIL. "Brasilia", *clarapex* Wiedemann, ?? ??? ????, Winthem (Holotype *Syrphus clarapex*); Goiás, Corumbá [de Goiás], Faz. Monjolinho, ?? Nov 1945, [M.P.] Barretto; Mato Grosso, Três Lagoas, Faz. Floresta, 13-20 Sep 1964, Exp. Dept. Zool.; São Paulo, Araçatuba, Cidade Azul, ?? Feb 1946, M.P. Barretto; ..., Barueri, 13 Apr 1957, K. Lenko; ..., Cajuru, Cássia dos Coqueiros, ?? Oct 1954, M.P. Barretto; ..., ?? Feb 1955; ..., Castilho, marg. esq. r. Paraná, 19 Oct 1964, Exp. Depo. Zool.; ..., H. Florestal, ?? Mar 1952, M. Carrera & M.A. d'Andretta. COLOMBIA. Boyaca, Muzo, 900m, Frank M. Hull Collection C.N.C. 1973, ?? ??? 1936, J. Bequaert (2 specimens, CNC Diptera 161128, 161131). COSTA RICA. Puntarenas, Lepanto, R.

Priv. Karen Mogensen, Send. El Viejo Nispero, 300-400m, red. con aguamiel,  
L\_N\_205300\_419750, #75451, 23 Sep 2003, Y. Cardenas (2 specimens,  
INB0003768190 & ...8208 INBIOCRI COSTA RICA); ..., #75452, 25 Sep 2003, Y.  
Cardenas (INB0003768268 INBIOCRI COSTA RICA). GUATEMALA. Such[itépéquez],  
Variedades, 500ft., 30 Aug 1947, ?. PERU. Madre de Dios, Avispas, 400m., 20-30 Sep  
1962, L. Pena (2 specimens, CNC Diptera 161129-30). VENEZUELA. Zulia, El Tucuco  
(45 km SW of Machiques), 5-6 Jun 1976, A. S. Menke & D. Vincent (USNM ENT  
00257660).

**Comment:** One female specimen from Bolivia was in poor condition, with no abdominal markings visible and the genitalia apex mostly washed out in the clearing process. The specimen is also slightly larger (length 12mm and wing length 10mm), the tibiae are darker and the 2<sup>nd</sup> abdominal tergite is 4 times longer than its smallest width.



*Pelecinobaccha (Pelecinobaccha) concinna* (Williston, 1891) **comb. nov.**

*Baccha concinna* Williston, 1891 – Williston, 1891: 38. Type-locality: Mexico, Guerrero, Chilpancingo. Type female BMNH (not examined).

*Ocyptamus concinnus*. Thompson et al. 1976: 15 (catalog citation).

Map: 11. Figures: 23.

As in *P. (Pelecinobaccha) dracula* except: **Male.** Wing bare on most of posterior ½ of cell bm and anterior margin of cup. **Genitalia:** Surstylus setulae shorter, basiphallus posterior apex long and gently curved posteriorly, distiphallus anterior surface strongly curved posteriorly; postgonites ventral apical extremity more rounded. **Female.** 2<sup>nd</sup> tergite rectangular and long, ~1.5 times longer than smallest width. **Genitalia:** 7<sup>th</sup> tergite with some pile on apical ½, apical margin slightly concave; 8<sup>th</sup> tergite with short extensions at the dorsal start of the basal crest, considerably pilose.

**Length.** 9-11mm; wing 7-8.5mm.

**Distribution.** Guatemala, Mexico (Chiapas, Guerrero).

**Material examined.** (**4 males**) GUATEMALA. Purchased from Fritz Plaumann by Paul H. Arnaud, Jr., Collection of Paul Arnaud Jr. [green label] ?? April 1966, ? (USNM ENT 00257738). MEXICO. Chiapas, 25Mi N Huixtla, 3200 ft., Malaise trap, 4 Jun 1969, ? (CNC Diptera 161219); ..., Finca Prusia (33Km S. Jaltenango, 1000m, 10-12 May 1985, A.Freidberg (USNM ENT 00257739); ..., Tuxtla Gutierrez, ?? Jul 1959, N.L.H.Krauss (USNM ENT 00257734). (**1 female**) MEXICO. Chiapas, 20-25 Mi NE Huixtla, 3000', 01 Jun 1969, H.J.Teskey (CNC Diptera 161220).

**Comments:** The type specimens were studied by Nigel Wyatt from the BMNH, and he confirmed the wing microtrichosity difference between *B. concinna* and *B. dracula*.

*Pelecinobaccha (Pelecinobaccha) cora* (Curran, 1941) **comb. nov.**

*Baccha cora* Curran, 1941. – Curran, 1941: 281. Type-locality: Brazil, Mato Grosso, Chapada. Holotype male AMNH. Hull, 1949a: 144 (redescription), 194 (fig.16, male abdomen, mislabelled as female), 278 (fig. 374, male wing), 284 (fig. 390, male wing).

*Ocyptamus cora*. Thompson et al. 1976: 15 (catalog citation).

*Baccha anthinone* Hull, 1949. - Hull, 1949a: 179. Type-locality: Peru, Ucayali. Pucallpa. Holotype male unknown. **n. syn.**

*Ocyptamus anthinone*. Thompson et al. 1976: 12 (catalog citation).

Map: 11. Figures: 24.

**Male. Head:** Black; face pale on lateral  $\frac{1}{4}$  and slightly extends medially below tubercle; lunule black, slightly pale above antennae insertion, central macula broadly connected to frontal triangle color; frontal triangle sometimes slightly pale in small lateral vittae under pollinose maculae, with white pollen restricted to lateral narrow oval spots connected to face pollen by narrow lateral vittae of differently oriented pollen, brown dull pollinose medially; vertical triangle with a single median row of pile; ocellar triangle distanced its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye with posterior indentation positioned at level of antenna insertion; antennae

insertions confluent, ventral margin with short dorsal extension; occiput dorsal  $\frac{1}{4}$  with 2 rows of simple black pile, anterior row with shorter pile, middle  $\frac{2}{4}$  with posterior row of long scale-like white pile, and 2-3 anterior rows with shorter, simple and black pile, ventral  $\frac{1}{4}$  with 2-3 rows of white, scale-like pile, anterior rows slightly shorter.

**Thorax:** Scutum dark brown, mainly dull brown-pollinose, white-pollinose on notopleuron, with short black pile, pile slightly longer on notopleuron and anterior to scutellum, with anterior row of longer white pile interrupted in the middle by shorter pile; scutellum dark brown, black pilose, subscutellar fringe long and black or sometimes pale; pleuron dark brown and slightly pale on posterior  $\frac{1}{2}$  of the posterior anepisternum and dorso-posterior portion of katepisternum, at least ventro-posterior katepisternum black pilose usually mostly black pilose except white pilose on ventro-posterior  $\frac{1}{2}$  of posterior anepisternum and dorso-posterior katepisternum; plumula golden and normal; calypter light brown, margin darker; halter yellow, capitulum orange.

**Wing:** Basal  $\frac{1}{2}$  dark brown (on cells bc, c, sc, r, basal  $\frac{2}{3}$  of r1, basal  $\frac{1}{3}$  of r2+3, basal portion of r4+5, bm, basal  $\frac{1}{3}$  of dm, cup and basal  $\frac{1}{2}$  of cua1), the remaining of cells r1 and r2+3 are light brown and sometimes faded, the rest of the wing hyaline, entirely microtrichose; alula large, 1.5 times basally and 4.25 times apically larger than c cell, anterior  $\frac{1}{2}$  dark, entirely microtrichose.

**Legs:** Pro and mesolegs dark brown, apex of femora and base of tibiae slightly pale; metalegs black, apical 1/2 of metabasitarsomere to at least fourth metatarsomeres white, fifth metatarsomeres sometimes light brown.

**Abdomen:** Dark brown, 3.75 times longer than thorax; 1<sup>st</sup> tergite entirely black pilose or entirely white pilose (Chapada specimens); 2<sup>nd</sup> tergite long, 5 times longer than its smallest width, pale laterally on basal 3/4, with central elongated triangular region of dull black pollen, pile black, appressed dorsally, white, long and erect laterally; 3rd tergite trapezoidal and long, 3-3.5 times longer than smallest width, baso-lateral corners of the tergite pale, with large central triangular region of dull black pollen, pile short, appressed and black; 4th tergite quadrangular, entirely black but sometimes with central pair of faint pale vittae, remaining characteristics as on 3rd; 5th tergite rectangular and wide, with 3 central short vittae of dull black pollen, remaining characteristics as in 4th.

**Genitalia:** Cercus with 1 row of pile on medial margin and 3 irregular rows outward; surstylus with a sub-quadrangular apex, directed apico-ventrally, with setulae (around 12) on ventral apex, concentrated on the apical margin, pilose on dorsal surface; subepandrial sclerite trapezoidal, apico-medial region raised dorsally, weakly sclerotized on apico-lateral 1/2; hypandrium ventral notch quadrangular and extending on anterior 1/2; distiphallus anterior surface slightly undulated, apex slightly curved anteriorly; phallapodeme well sclerotized throughout with expanded base; postgonites slightly expanded baso-ventrally, ventral surface concave on medial surface, lateral surface expanded ventrally and straight, dorsal surface straight and with sub-apical

convexity, apex convex anteriorly, with convex ventral extremity and acute dorsal extremity.

**Female:** Similar to male except: face pale region slightly more extended; frons pale laterally on ventral  $\frac{1}{2}$  or entirely black, white-pollinose maculae more triangular; vertex narrow; ocellar triangle 2-2.5 times its length from posterior eye margin and  $\sim 1$  ocellus-width from lateral eye margin; eye posterior indentation slightly dorsal to antennae insertions; anterior row of dorsal occiput with very short pile; black pile sometimes absent in front of transverse suture on notopleuron; pleuron mainly white pilose, only ventro-posterior katepisternum black pilose, anterior anepisternum sometimes with a few black pile; wing hyaline on apices of r1 and r2+3; metabasitarsomere sometimes with slightly less than apical  $\frac{1}{2}$  pale; 1<sup>st</sup> tergite sometimes with white pile dorsally and on basal  $\frac{1}{2}$ ; 2<sup>nd</sup> tergite shorter, 3.3 times longer than smallest width, pollinose macula with anterior extension narrow and short, pile shorter; 3<sup>rd</sup> tergite shorter, 1.9 times longer than smallest width, sometimes with central pair of faint pale vittae, disconnected from pale lateral corners; 4<sup>th</sup> tergite rectangular and wide, 1.4 times wider than long, with baso-lateral pair of narrow fasciate pale maculae and sometimes a central pair of faint pale vittae; 5<sup>th</sup> tergite sometimes with baso-median pair of short faint pale vittae; 6<sup>th</sup> segment normal, as long as 5<sup>th</sup>. **Genitalia:** 7<sup>th</sup> tergite rectangular, wide and narrow, 2 times wider than long, basal extensions  $\frac{3}{4}$  of the 6<sup>th</sup> segment's length, 7<sup>th</sup> segment lateral sclerite sub-triangular, with acute baso-ventral extremities; 8<sup>th</sup> tergite with central region unsclerotized, apex 2-pronged, basal crest short; cercus with sub-basal small convex extension.

**Length.** 11-14mm; wing 10.5-11.5mm.

**Distribution.** Bolivia (La Paz), Brazil (Goiás, Mato Grosso), Peru (Huanuco, Madre de Dios).

**Material examined.** (**7 males**) BOLIVIA. La Paz, San Juanito, nr. Teoponte, 500m., 15°29'42S 67°47'48W, 8 Apr 2001, S. A. Marshall (2 specimens, DEBU00149576 & DEBU00149599). BRAZIL. [Mato Grosso], Chapada, Cornell U. Lot 653 Sub. 7, Frank M. Hull Collection C.N.C. 1973, ?? ??? ???? (CNC Diptera 161218); ..., S. W. Williston Collection, *Baccha cora* Curran Holotype [red label], ?? ??? ???? (Holotype *Baccha cora*). PERU. Huanuco, Tingo Maria, 2200 ft., 27 May 1947, J. C. Pallister; ..., ?? Nov 1949, H. A. Allard (USNM ENT 00257682); Madre de Dios, Rio Tambopata Res, 30 air km. SW Pto. Maldonado, 290m, subtropical moist forest, 21-25 Nov 1979, J. B. Heppner (USNM ENT 00257675). (**3 females**) BRAZIL. Mato Grosso, Utariti, Rio Papagaio, ?? Nov 1966, [K.] Lenko & Pereira; ..., Chapada, S. W. Williston Collection, *Baccha cora* Curran Allotype [red label], ?? ??? ???? (Allotype *Baccha cora*). PERU. Madre de Dios, Manu, Erika (near Salvacion), 550m, 5-6 Sep 1988, A. Freidberg (USNM ENT 00257689).

**Comments:** The 'Chapada' specimens vary from the other specimens by having mainly white pile on the 1<sup>st</sup> abdominal tergite.

Close to *P. clarapex* and *P. andrettae* sp.nov., but distinguished by the notopleuron with black pile anteriorly to the transverse suture, male wing with apices of r1 and r2+3 light brown, the hypandrium with a quadrangular ventral notch, and the female medially weakly sclerotized 8<sup>th</sup> tergite.



*Pelecinobaccha (Pelecinobaccha) costata* (Say, 1829) **comb. nov.**

*Baccha costata* Say, 1829. - Say, 1829: 161. Type-locality: USA, Indiana. Holotype adult ANSP (not examined). Hull, 1949a: 147 (redescription), 224 (fig. 152, female abdomen), 228 (fig. 169, male abdomen), 280 (fig. 376, wing).

*Ocyptamus costatus*. Thompson et al. 1976: 15 (catalog citation).

*Baccha costalis* Wiedemann, 1830. - Wiedemann, 1830: 97. Type-locality: Unknown. Lectotype NMW (not examined).

*Baccha tarchetius* Walker, 1849. - Walker, 1849: 549. Type-locality: USA, Georgia. Lectotype BMNH (not examined).

Map: 14. Figures: 25.

**Male. Head:** Black; face with lateral 1/3 pale, a few black pile ventral to antennae insertions; lunule entirely black, sometimes slightly pale above antennae insertions; frontal triangle pale laterally until dorsal to frontal prominence or ventral 2/3, continuous from face, brown dull pollinose medially, white-silver pollen continuous from face restricted to lateral margin except around eye contiguity, pile white laterally on pale region lateral to frontal prominence; vertical triangle with 3 irregular rows of pile on posterior 1/3, most pile concentrated in a single median row anteriorly; ocellar triangle

distanced its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye posterior indentation at level of antennae insertion; antennae insertions confluent, ventral margin with dorsal extension; occiput dorsal 1/3 with posterior row of long scale-like white pile and anterior row of short simple black pile, middle 1/3 with 2-3 rows of white, scale-like pile, anterior rows much shorter, ventral 1/4 with 2 rows of scale-like white pile.

**Thorax:** Scutum black, mainly sparse dull brown-pollinose, with weak anterior pair of sub-median vittae of concentrated pollen, white-pollinose on notopleuron, mainly white pilose, pile slightly longer and shining on notopleuron and anterior continuous row; scutellum dark brown, white pilose, subscutellar fringe long and white; pleuron white on posterior 1/2 of posterior anepisternum and dorso-posterior katepisternum, white pilose; plumula long and white; calypter white; halter light yellow, stem sometimes brown, capitulum sometimes light red.

**Wing:** Hyaline with dark anterior margin (dark on cells bc, c, sc, r, r1, r2+3 and basal 1/3 of bm), entirely microtrichose; alula large, 2.5 times basally to 4.5 times apically larger than c cell, hyaline, mostly bare, microtrichose on apex, sparse microtrichose on base and anterior margin.

**Legs:** Prolegs pale, dorsal apex of profemur and apical 1/3 of protibia sometimes light brown, protarsus light brown to brown, baso-ventral 1/3 of profemur with white pile; mesolegs pale, apical 1/4 of mesotibia sometimes light brown, mesotarsi light brown to brown, white pilose on mesocoxa, mesotrochanter and posterior row basal 1/2; metalegs dark brown, basal 1/2 of metafemur and basal 1/3 of metatibia pale, 2<sup>nd</sup> to 4<sup>th</sup> metatarsomeres sometimes dark red, metacoxa mainly white pilose.

**Abdomen:** Black, 3.4 times longer than thorax; 1<sup>st</sup> tergite white pilose; 2<sup>nd</sup> tergite long, 3.4 times longer than its smallest width, with central rectangular region of dull black pollen that extends laterally sub-apically, pile long, erect and white on base and laterally except for apex, remaining pile shorter, appressed and black; 3rd tergite trapezoidal and long, 2.6 times longer than smallest width, with pair of sub-basal lateral pale oval maculae, with large central triangular region of dull black pollen, pile appressed and black, longer, erect and white on baso-lateral 1/2, 3rd sternite rectangular and long; 4th tergite sub-quadrangular, 1.25 times longer than wide, with pair of baso-lateral large pale oval maculae, dull pollen region with indentation on posterior margin, remaining character as on 3rd tergite; 5th tergite rectangular and wide, entirely dark brown, dull black pollen restricted to tree central vittae or just a central one, all pile appressed and black. **Genitalia:** Cercus with 2 regular rows of pile on medial margin and 3 regular rows outward; surstylus sub-oval, directed ventrally, with setulae ventrally on apex (around 10), a pair medially and another pair basally, pilose on basal 2/5 of the dorsal surface; subepandrial sclerite sub-quadrangular, apex trapezoidal, homogeneously sclerotized; hypandrium ventral notch extending on anterior 2/3, notch posterior margin triangular;

distiphallus apex slightly curved anteriorly; postgonites ventral surface convex but concave sub-apically, dorsal surface concave, apex convex anteriorly, with convex ventral extremity and acute dorsal extremity.

**Female:** Like male except: frons pale laterally on ventral  $\frac{1}{4}$ , with sparse white pollen differently oriented medially; ocellar triangle  $\sim 1.5$  times its length from posterior eye margin and  $\sim 0.5$  ocelli-width from lateral eye margin; occiput middle  $\frac{1}{3}$  with 2-4 rows of pile; scutum median vittae more distinct, with white pollen laterally; wing might also be dark on basal  $\frac{1}{2}$  of cell bm; 2nd abdominal tergite shorter, 2.6 times longer than wide, with small triangular region of dull black pollen, pile shorter; 3rd tergite shorter, 1.5 times longer than smallest width, lateral pale maculae larger and trapezoidal, dull pollen restricted to large median fascia, indented on its posterior margin and with lanceolate extension on anterior margin; 4th tergite rectangular and wide, with baso-lateral trapezoidal pale maculae, dull pollinose region divided medially, baso-lateral white pile appressed; 5th tergite, dull pollen restricted to a central vitta, remaining characteristics as on female 4th; 6th segment conical normal, as long as the 5th. **Genitalia:** 7<sup>th</sup> tergite normal, with triangular apex, basal extensions as long as 6<sup>th</sup> segment, 7<sup>th</sup> segment lateral sclerite rectangular triangular, narrowing slightly apically, with narrow baso-ventral extensions; 8<sup>th</sup> tergite central region unsclerotized, basal crest weak ventrally, 8<sup>th</sup> sternite unsclerotized medially; 10<sup>th</sup> tergite reduced to a pair of stripes fused to dorsal surface of cerci; cercus with one row of pile on apical margin.

**Length.** 7-11mm; wing 5.5-8mm.

**Distribution.** Canada (Ontario), Cuba, USA (Alabama, Florida, Georgia, Mississippi, New York, North Carolina, Ohio, South Carolina, Tennessee, Virginia).

**Material examined.** (**17 males**) CANADA. Ontario, Essex Co., Windsor, Ojibway Prairie, 30 Jul 2002, M. Buck (debu01116089); ..., Etobicoke Garden, 7 Sep 1997, B. Larson (debu01053210); ..., Leamington, Pt. Pelee N. P., 17 Jul 1985, K. N. Barber (debu00019828); ..., Lambton Co., Pinnery PP, Beach #7, Col. # 764, 15 Jul 1994, N. Carmichael (debu01046688). USA. Florida, Highlands Co., Archbold Biological Station, 14 Apr 1963, J. G. & B. L. Rozen (2 specimens); ..., Marion Co., Silver Springs Woods, Ocala Nt. Fgr., 15-22 Apr 1984, S. A. Marshall (2 specimens, debu01053676 & 01053677); Georgia, Liberty Co., St. Catherines Island, 18-21 Sep 1972, F. C. & B. J. Thompson; ..., 15-20 Oct 1990, E. Quinter & J. Stark (2 specimens); ..., Telfair Co., McCrae Little Ocmulgee St. Pk., 24 Apr 1984, S. A. Marshall (debu01053212); North Carolina, Graham Co., Highlands, 35.05 -83.1833, 29 Jun 1957, W.R.M. Mason (CNC Diptera 48593); ..., 1158m, 15 Jul 1964, J.W. Boyes (CNC Diptera 518); ..., Jackson Co., Gt. Smokey Mtn. Natl. Pk., 23 Aug 1964, B. S. Heming; Virginia, Floyd Co., Buffalo Mountain, 2.5 km W of Moles Road, 36.796056 -80.476167, 1211m, 24 Jul 2009, J. Skevington (2 specimens, CNC Diptera 18639, 18911). (**64 females**) CANADA. Ontario, Elgin Co., Fingal Wildlife Management Area, 42.679484 -81.326601, 10 Jul 1999, I. Carmichael (CNC Diptera 20211); ..., Essex Co., Pelee I., Porchuk property,

Malaise, 22-25 Jul 2002, B. Porchuk (debu00198142); ..., Etobicoke Garden, 7 Sep 1997, B. Larson (debu01053214); ..., Hald.-Norfolk Reg., Manester tract, 6 km NNW, St. Williams, sandy field, 3 Aug 2001, M. Buck (2 specimens, debu00166015 & 00166016); ..., Point Pelee, 41.95617 -82.3333, 17 Mar 1925, G.S. Walley (CNC Diptera 82964). USA. Alabama, Baldwin Co., Bayton Park (site 12), 31.15 -88.533, Malaise trap, 15 Dez 2004, W.E. Benton (CNC Diptera 82963); Florida, Alachua Co., Gainesville, 29.65 -82.3166, Malaise trap, 15-22 Apr 1987, Wahl & Mason (CNC Diptera 82959); ..., Highlands Co., Archbold Biological Station, lake Placid, 27.189663 - 82.338131, 02 Jan 1986, R.W. Dawson (CNC Diptera 82994); ..., Liberty Co., Torreya State Park, 30.570563 -84.947288, 15 Apr 1952, G.S. Walley (CNC Diptera 82993); ..., Marion Co., Silver Springs Woods, Ocala Nt. Fgr., 15-22 Apr 1984, S. A. Marshall (debu01053211); Georgia, Clay Co., Brasstown Bald, 34.872314 -83.8099, 1463m, 19 Aug 1957, J.G. Chilcott (CNC Diptera 82952); ..., Liberty Co., St. Catherines Island, 18-21 Sep 1972, F. C. & B. J. Thompson; ..., 10-15 May 1991, E. Quinter & A. Sharkov; ..., Rabun Co., Pine Mountain, 33.675951 - 84.11491, 427m, 27 Jun 1957, J.R. Vockeroth (CNC Diptera 82951); ..., Satolah, 34.9833 -83.1833, 610m, 01 Jul 1957, J.R. Vockeroth (CNC Diptera 82987); ..., 720m, 07 Jul 1957, W.R.M. Mason (CNC Diptera 82950); Mississippi, Agr. Col. Miss., 30.8 -89.6833, 09 May 1922, ? (CNC Diptera 82992); ..., 23 Jul 1922, ? (CNC Diptera 82988); ..., Lafayette Co., Oxford, 34.3666 -89.6833, 09 May 1922, F.M. Hull (9 specimens, CNC Diptera 82953, 82954, 82955, 82957, 82960, 82989, 82990, 82991, 82995); New York, Nassau Co., Inwood, 40.618909 -73.749526, 26 Aug 1947, F.M. Schott (CNC Diptera 82941); North Carolina, Franklin Co., 35.182317 -83.381543, 610m, 17 Jun 1957, W.R.M. Mason (CNC Diptera

82968); ..., 914m, 20 Jun 1957 (4 specimens, CNC Diptera 82943, 82944, 82967, 82969); ..., 10mi W of Franklin, 35.1666 -83.366666, W. R. Mason (CNC Diptera 499); ..., Graham Co., Highlands, Horse Cove, 35.044535 -83.161816, 914m, 27 Jun 1957, J.R. Vockeroth (3 specimens, CNC Diptera 82945, 82980, 82981); ..., Highlands, 35.05 -83.1833, 1158m, 22 Jun 1957, J.R. Vockeroth (CNC Diptera 82971); ..., 27 Jun 1957 (CNC Diptera 82946); ..., 1067m, 29 Jun 1957, W.R.M. Mason (CNC Diptera 82970); ..., 1158m, 15 Jul 1964, J.W. Boyes (4 specimens, CNC Diptera 82972, 82973, 82974, 82975); ..., Blue Valley Lookout, 35.052591 -83.198859, 1067m, 27 Jun 1957, J.R. Vockeroth (5 specimens, CNC Diptera 82947, 82976, 82977, 82978, 82979); Ohio, Lawrence Co., Dean St. Forest, 13 Jul 1989, S. A. Marshall (debu01053215); South Carolina, Aiken Co., 33.56042 -81.71955, 13 May 1957, W.R.M. Mason (CNC Diptera 82958); ..., 23 Jun 1957 (CNC Diptera 82982); ..., Beaufort Co., Hilton Head Island, 32.194098 -80.72711, 12 Jul 1965, H.F. Howden (CNC Diptera 82986); ..., Greenwood Co., Kirksey, 34.0166 -82.0333, W.R.M. Mason (CNC Diptera 516) ..., Pickens Co., Clemson College, 34.677049 -82.8387543, ?? ??? 1920, M.R. Smith (5 specimens, CNC Diptera 82948, 82949, 82983, 82984, 82985); Tennessee, Sevier Co., Indian Gap, Great Smoky Mountains National Park, 35.6166 -83.4333, 1585m, 28 May 1957, W.R.M. Mason (CNC Diptera 82965); ..., 18 Jun 1957 (CNC Diptera 82966); Virginia, Augusta Co., Reddish Knob lookout, 14.5 km W Briery Branch, 28.462306 -79.241667, 21 Jul 2009, M.M. Locke (2 specimens, CNC Diptera 82961, 82962); ..., Fairfax Co., Falls Church, 38.8666 -77.1666, 27 Aug 1947, N. Banks (CNC Diptera 82942).

**Comments:** This species' larva is known to feed on *Toumeylla liriodendri* (Hemiptera, Sternorrhyncha, Coccoidea, Coccidae) and *Neolecanium cornuparvum* (Hemiptera, Sternorrhyncha, Coccoidea, Coccidae) (Rojo *et al.* 2003; Vanek & Potter 2010). The record for *Aphis cracivora* (Hemiptera, Sternorrhyncha, Aphidomorpha, Aphididae) in Bugg & Dutcher (1989) is not valid, since the authors only collected the adult, never seeing any larva prey on the aphid.

*P. costata* is the only *Pelecinobaccha* species occurring north of Mexico, and it is restricted to eastern North America.



*Pelecinobaccha (Pelecinobaccha) cryptica* (Hull, 1942) **comb. nov.**

*Baccha cryptica* Hull, 1942. - Hull, 1942a: 97. Type-locality: Paraguay, Villarica.

Holotype male MCZ. Hull, 1949a: 149 (redescription), 216 (fig. 121, male abdomen).

*Ocyptamus crypticus*. Thompson et al. 1976: 15 (catalog citation).

Map: 9. Figures: 26.

**Male. Head:** Dark brown to black; face pale on lateral 1/3; lunule usually pale above antennae insertion, central macula distinct and narrowly connected to frontal triangle color; frontal triangle entirely black but sometimes pale laterally on ventral 3/4, pale sometimes very faded, with silvery-white pollen restricted to lateral triangular spots, but connected to the pollen from the face by ventral-dorsal oriented pollen; vertical triangle with 1 row of pile; ocellar triangle distanced its length from posterior eye margin; eye contiguity slightly longer than vertical triangle length; eye with sub-triangular indentation positioned slightly dorsal to level of antenna insertion; antennae insertions confluent, ventral margin with short dorsal extension; occiput dorsal 1/4 with 2 rows of simple black pile, anterior row with very short pile, middle 2/4 with 2-3 rows of scale-like white pile, anterior rows shorter and pile sometimes simple and black dorsally, ventral 1/4 with 2 rows of scale-like white pile, anterior row slightly shorter.

**Thorax:** Scutum dark brown to black, mainly dull brown-pollinose with inconspicuous pair of sub-median vittae of pollen visible from a posterior view, white pilose, pile longer on notopleuron, with distinct anterior row of shining white pile with shorter pile in the middle; scutellum dark brown to black, with mainly short black pile intermixed with some longer white pile or mainly with long white pile (variation), subscutellar fringe normal to long (variation) and white; pleuron black, slightly pale on posterior  $\frac{1}{2}$  of the posterior anepisternum and dorso-posterior portion of katepisternum, white pilose; plumula white and long; calypter yellow with apical  $\frac{1}{2}$  of medial pile on ventral lobe brown or entirely white (variation); halter light yellow.

**Wing:** With dark anterior margin that extends posteriorly on the middle, hyaline baso-posteriorly and apically (dark on cells bc, c, sc, r, basal  $\frac{3}{4}$  of r1, basal  $\frac{2}{3}$  of r2+3, diffusely on basal  $\frac{1}{3}$  to  $\frac{1}{2}$  of r4+5, bm, and basal  $\frac{1}{2}$  to  $\frac{4}{5}$  of dm, diffusely dark on apical  $\frac{1}{2}$  of cup and most of cua1), entirely microtrichose, alula brown on anterior  $\frac{1}{2}$  or mostly hyaline (variation), large, 1.5 times basally to 4.5 times apically larger than c cell, entirely microtrichose.

**Legs:** Prolegs dark brown, profemur sometimes light brown, basal  $\frac{1}{2}$  of protibia pale; mesolegs dark brown, basal  $\frac{1}{2}$  to  $\frac{2}{3}$  of mesotibia pale; metalegs dark brown, white on apical  $\frac{2}{5}$  to  $\frac{1}{2}$  of metabasitarsomere and remaining metatarsomeres, rarely fifth metatarsomere slightly orange.

**Abdomen:** Dark brown, 3.8 times longer than thorax; 1<sup>st</sup> tergite with long white pile; 2<sup>nd</sup> tergite long, 5 times longer than its smallest width, baso-lateral 2/3 of the tergite sometimes pale, pile black, short and appressed, long, erect and white on baso-lateral 2/3, with sub-apical central triangular region of dull black pollen; 3rd tergite trapezoidal and long, 3.4 times longer than smallest width, entirely dark, sometimes with weak baso-lateral triangular maculae and median small vittate pale maculae, with large central triangular region of dull black pollen, pile short, appressed and black, sometimes white baso-laterally (variation); 4th tergite sub-quadrangular, sometimes slightly longer than wide (variation), remaining characteristics as on 3rd; 5th tergite rectangular and wide, median vittate spots longer, remaining characteristics as on 4th. **Genitalia:** Cercus with 1 regular row of pile on medial margin and 2 irregular rows outward; surstylus directed apico-ventrally, lanceolate or oval (variation) in lateral view, with weak setulae (around 18) on ventro-apical 1/3, sometimes with stronger and more homogenously distributed setulae on apical 1/2 (variation), homogenously pilose on the dorsal surface or more concentrated on basal 1/2 (variation); subepandrial sclerite sub-quadrangular, with small medial notch on posterior margin; hypandrium with ventral notch extending on anterior 1/2; distiphallus smooth and anterior surface curving gently towards apex; phallapodeme wide, well sclerotized throughout and tapers posteriorly; postgonites with few short pile on ventral surface, ventral surface straight, lateral surface slightly expanded ventrally or not at all (variation), dorsal surface slightly concave with slight convexity sub-apically or not (variation), apex convex anteriorly, with convex ventral extremity and acute dorsal extremity.

**Female:** Similar to male except: pollen connecting maculae from frons to face mostly in the same orientation; ocellar triangle ~2 times its length from posterior eye margin and ~1.5 ocelli-width from lateral eye margin; frons sometimes slightly pale laterally but not greatly extended and with dull brown pollen dorso-medially; vertex narrow; wing less extensively dark (only basal 3/5 on r1, basal 1/3 of r2+3, base of r4+5, basal 1/3 of dm, distinctly on apical 1/3 of cup and basal 1/2 of cua1); 2nd abdominal tergite shorter, 3.3 times longer than smallest width; 3<sup>rd</sup> abdominal tergite shorter, 2 times longer than its smallest width; 6th segment conical normal, slightly shorter than its smallest width and shorter than the 5th. **Genitalia:** 7<sup>th</sup> tergite with convex anterior margin, basal extensions 1/3 the length of the 6th segment, 7<sup>th</sup> segment lateral sclerite triangular, narrow on anterior extremities, with short acute baso-ventral extremities, 8<sup>th</sup> tergite unsclerotized medially appearing as a pair of sclerites, apices narrow, basal crest short, 8<sup>th</sup> sternite widely unsclerotized medially.

**Length.** 13-15mm; wing 10-11.5mm.

**Distribution.** Brazil (Goiás, Mato Grosso, Minas Gerais, Paraná, Rio de Janeiro, São Paulo), Paraguay (Guairá).

**Material examined.** (12 *males*) BRAZIL. Goiás, Corumbá, F. Monjolinho, ?? Nov 1945, [M.P.] Barretto; [Mato Grosso], Chapada, S. W. Williston collection, Am. Mus. Nat. Hist.

Dept. Invert. Zool. nº 19187, ?? ?? ????, ?; [Paraná], Rondon, 500m, 24°38'S 54°07'W, FC Thompson collection 1974-75, ?? ??? 196?, F. Plaumann (USNM ENT 00257649); [Rio de Janeiro], Itatiaia, 700m, '29', 1 Jan 1972, ?; São Paulo, Araçatuba, Cidade Azul, ?? Feb 1946, M.P. Barretto; ..., Córrego Azul, ?? Mar 1947 (2 specimens); ..., Avanhadava, ?? Feb 1946; ..., [Cajuru], Cássia dos Coqueiros, ?? Feb 1955; ..., Pompeia, Frank M. Hull Collection C.N.C. 1973, ?? Jan 1943, [M.P.] Barretto (CNC Diptera 161204); Santa Catarina, Nova Teutônia, 300-500m, 27°11'S 52°23'W, ?? Nov 1969, F. Plaumann (CNC Diptera 161203). PARAGUAY. [Guairá], Villarica, M.C.Z. Type 26150 [red label], ?? Mar ????, F. Schade (holotype *Baccha cryptica*). (**5 females**) BRAZIL. Minas Gerais, Dolores de Indaia, '27454', ?? Dez 1950, P. Pereira; [Paraná], Rondon, 500m, 24°38'S 54°07'W, FC Thompson collection 1974-75, ?? ??? 196?, F. Plaumann (USNM ENT 00257648); São Paulo, Avanhadava, ?? Feb 1946, M.P. Barretto; Santa Catarina, Nova Teutônia, 300-500m, 27°11'S 52°23'W, ?? Nov 1969, F. Plaumann (CNC Diptera 161205); ..., FC Thompson collection 1974-78, ?? Oct 1974 (USNM ENT 00257647).

**Comment:** The 'variation' specimens always have entirely dark frons/frontal triangle, very distinct dark regions on basal ½ of r4+5 and apical ¼ of cell cup, and the phallapodeme on the males usually joins the base of the basiphallus close to the level of the base of the postgonites.

*Pelecinobaccha (Pelecinobaccha) dracula* (Hull, 1943) **comb. nov.**

*Baccha dracula* Hull, 1943 – Hull, 1943c: 52. Type-locality: Honduras. Holotype male CNC. Hull, 1949a: 152 (redescription), 232 (fig. 205, abdomen).

*Ocyptamus dracula*. Thompson et al. 1976: 17 (catalog citation).

Map: 9. Figures: 27.

**Male. Head:** Black; face pale on lateral  $\frac{1}{4}$  to  $\frac{1}{5}$ ; lunule pale above antennae insertion, central macula distinct and connected to frontal triangle color by narrow vitta, connection sometimes weak; frontal triangle with silvery-white pollen continuous from face and restricted to lateral margin, brown-pollinose medially; vertical triangle with 3 rows of pile, but most pile concentrated in a single median row; ocellar triangle  $\sim 1.5$  times its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye with sub-triangular indentation on posterior margin positioned at level of the antenna insertion; antennae insertions confluent, ventral margin with short dorsal extension; occiput dorsal  $\frac{1}{4}$  with posterior row of white scale-like pile and anterior row of slightly shorter simple black pile, middle  $\frac{2}{4}$  with 3-4 rows of scale-like white pile, posterior row longer, anterior rows sometimes with some simple black pile dorsally, ventral  $\frac{1}{4}$  with 3 irregular rows of scale-like white pile.

**Thorax:** Scutum black, mainly dull pollinose, white-pollinose on notopleuron and on pair of sub-median inconspicuous vittae, with black pile, pile longer on notopleuron, with anterior uninterrupted row of scale-like white pile; scutellum black, black pilose, pile longer on apical margin, subscutellar fringe long and white, sometimes with some black pile laterally; pleuron black, white pilose except sometimes black on anterior anepimera, and have a few black pile dorso-posteriorly on posterior anepisternum; plumula white and long; calypter white; halter stem brown, capitulum yellow.

**Wing:** Hyaline with anterior margin darker (cells bc, c, sc, basal  $\frac{1}{2}$  to  $\frac{2}{3}$  of r and diffusely dark on basal  $\frac{1}{2}$  of r<sub>1</sub>), entirely microtrichose; alula large, 1.7 times basally to 4 times apically larger than c cell, hyaline, entirely microtrichose.

**Legs:** Prolegs brown, apex of profemur and apex and basal  $\frac{1}{2}$  of protibia pale; mesolegs dark brown, apex of mesofemur and basal  $\frac{2}{3}$  of mesotibia pale; metalegs dark brown, basal  $\frac{1}{5}$  of metatibia and apical  $\frac{1}{3}$  of metabasitarsomere to third metatarsomere pale, fourth metatarsomere light brown, fifth metatarsomere brown, metacoxa and metatrochanters mainly white pilose.

**Abdomen:** Black, 2.6 times longer than thorax; 1<sup>st</sup> tergite black pilose dorsally, white pilose ventrally; 2<sup>nd</sup> tergite rectangular and long, 1.5 times longer than its smallest width, with central large arcuate fascia of dull black pollen, pile white on base and baso-lateral

2/3, remaining pile black, pile erect on base and laterally, remaining pile appressed; 3rd tergite trapezoidal, 1.25 times longer than smallest width, sometimes slightly pale on baso-lateral 1/2, with large central triangular region of dull black pollen, pile appressed and black, pile longer, erect and white baso-laterally; 4th tergite rectangular and wide, pile appressed and black, white on baso-lateral corners, with central triangular region of dull black pollen; 5th tergite rectangular and wide, with 3 central vittae of dull black pollen, pile appressed and black, white baso-laterally. **Genitalia:** Cercus with 1-2 irregular rows of pile on medial margin and 3 irregular rows outward; surstylus oval in lateral view, directed ventrally, with setulae (around 15) ventrally on apical 1/3, pilose on basal 2/3 of the dorsal surface; subepandrial sclerite lateral margin well sclerotized with concave posterior margin and anterior notch; hypandrium with notch extending on anterior 2/3, with few pile ventro-apically; basiphallus posterior apex strongly curved posteriorly, distiphallus anterior surface slightly curved posteriorly; phallapodeme ½ the length of the hypandrium, mostly weakly sclerotized; postgonites ventral surface slightly concave, dorsal surface straight, apex slightly convex with acute dorsal and ventral extremity and lateral ridge.

**Female.** Like male except: face pale on lateral 1/3; frons sometimes slightly pale on latero-ventral 2/5; ocellar triangle ~2.5 times its length from posterior eye margin and ~1 ocellus-width from lateral eye margin; anterior anepimera mainly white pilose, with very few black pile; 1<sup>st</sup> tergite mainly white pilose with less black pile dorsally; 2<sup>nd</sup> tergite sub-quadrangular long, with triangular central region of dull black pollen; 3<sup>rd</sup> tergite shorter, median dull black pollinose fascia with anterior notch and posterior small projection; 4<sup>th</sup>



tergite dull black pollen as on 3<sup>rd</sup>; 6<sup>th</sup> segment divided into tergite and sternite, short, as long as 5<sup>th</sup>. **Genitalia:** 7<sup>th</sup> tergite trapezoidal, with some pile only on apical 1/3; basal extensions ½ the length of the 6th segment, 7<sup>th</sup> segment lateral sclerite narrow, with weak baso-ventral extensions; 8<sup>th</sup> tergite long, with short baso-median notch and pair of well sclerotized apices, basal crest inconspicuous, 8<sup>th</sup> sternite divided into 2 long rectangular sclerites; 10<sup>th</sup> tergite reduced to a pair of short sclerites, not fused to cerci; cercus oval, slightly tapering basally and curving towards 10<sup>th</sup> tergite, pile present only in 2 irregular rows on apical margin and becoming sparse on apico-ventral ½.

**Length.** 8-12mm; wing 6.5-9mm.

**Distribution.** Costa Rica (Puntarenas), Guatemala (Cortés), Honduras (Colón), Mexico (Morelos, Quintana Roo), Peru (Huanuco, Junín).

**Material examined.** (**8 males**) COSTA RICA. Puntarenas, R. Priv Karen Mogensen, Send. Quebrada Pérez, 315m, Libre (aguamiel), L\_N\_205300\_419750, #74575, 3 Jul 2003, W. Porras (INB0003742283 INBIO COSTA RICA). GUATEMALA. [Cortés], Cacao, ?? ?? ????, ? (USNM ENT 00257732). HONDURAS. [Colón], Puerto Castillas, Holotype dracula [red label], Holotype *Baccha dracula* Hull CNC No 20512 [red label], 04 Apr ?? [19]26, R.H. Panter (Holotype *baccha dracula*). MEXICO. [Morelos], Cuernovaca, 15 Aug 1954, R. R. Dreisbach (CNC Diptera 161212); Quin[tana] Roo,

Felipe Carillo Puerto, 11-13 Oct 1986, R. J. McGinley (USNM ENT 00257737). PERU. Huanuco, Cayumba Puente, Alt. 2700 ft., 24 Oct 1941, J. C. Pallister; Junín, La Merced, 1000m, FS577, Boyes Cytolog. Coll. FS577 To remain in the C.N.C. [yellow label], 2 Dec 1970, J.W. Boyes (CNC Diptera 161213). (**3 females**) PERU. Huanuco, Cochicote, 98 and 122, 6 and 9 Set 1965, J. C. Hitchcock, Jr. (USNM ENT 00257736 and 00257735); ..., Tingo Maria, 2200 ft., 16 May 1947, J. C. Pallister.

**Comments:** The external morphology of this species is very similar to *P. alucard*, but *P. dracula* has an oval surstylus, a slightly curved distiphallus and longer postgonite with dorsal and ventral apical extremities and a lateral ridge on its apex.

*Pelecinobaccha (Pelecinobaccha) eruptova* (Hull, 1943) **comb. nov.**

*Baccha eruptova* Hull, 1943 – Hull, 1943b: 40. Type-locality: Peru, Loreto, Iquitos.

Holotype male USNM. Hull, 1949a: 204 (fig. 61, female abdomen), 276 (fig. 365, female wing)

*Baccha zerene* Hull, 1949 – Hull, 1949b: 245. Type-locality: Peru, Chanchamayo.

Holotype male CNC. **n. syn.**

Map: 10. Figures: 28.

**Male. Head:** Black; face narrowing slightly below tubercle, pale on lateral 1/3; lunule with black central macula, usually pale above antennae insertion and around macula but leaving a dark vitta connecting the macula to the frontal triangle color; frontal triangle entirely black, with silvery-white pollen laterally restricted to oval spots, disconnected from the pollen from the face; vertical triangle with 3 rows of pile, but most pile concentrated in a single median row; ocellar triangle ~1.5 times its length from posterior eye margin; eye contiguity slightly shorter than vertical triangle length; eye with sub-triangular indentation on posterior margin positioned slightly dorsal to level of antenna insertion; antennae insertions confluent, ventral sclerotized margin slightly extended dorsally; occiput dorsal ¼ with 2 rows of simple black pile, anterior row with

very short pile, middle  $\frac{2}{4}$  with 2-3 rows of pile, anterior rows simple and black, posterior row scale-like, long and white, ventral  $\frac{1}{4}$  with 2-3 irregular rows of scale-like white pile.

**Thorax:** Dark brown to black; cordiform region of sparse pollen anterior to scutellum, with mainly short, erect, black pile, longer on cordiform region, laterally anterior to transverse suture and on an anterior white pilose row (interrupted in the middle); scutellum dark brown, pile black and long, as long as cordiform region, subscutellar fringe long, pale medially and usually black laterally, with around 25 pile; pleuron usually entirely black, sometimes slightly pale on ventro-posterior of posterior anepisternum, white pilose, black pilose on ventro-posterior katepisternum, usually with black pile on anterior anepisternum, posterior  $\frac{1}{2}$  of posterior anepisternum and anterior anepimera, dorso-posterior katepisternum sometimes with black pile intermixed; plumula normal, yellow to light brown; calypter light brown with darker margin and fringe; halter yellow, apex of stem dark brown.

**Wing:** Basal  $\frac{1}{2}$  dark (cells bc, c, sc, basal  $\frac{2}{3}$  of r1, basal  $\frac{1}{3}$  of r2+3, r, base of r4+5, bm, basal  $\frac{1}{4}$  to  $\frac{1}{3}$  of dm, basal  $\frac{1}{3}$  or  $\frac{1}{2}$  of cua1, diffusely dark or darker on anterior margin of cup), entirely microtrichose; alula large, 2 times basally to 4 times apically larger than c cell, dark or anterior  $\frac{1}{2}$  dark, entirely microtrichose.

**Legs:** Prolegs dark brown, profemur sometimes light brown on basal 2/3; mesolegs dark brown; metalegs dark brown, pale from apical 1/3 or 1/4 of metabasitarsomere to apical metatarsomere.

**Abdomen:** Dark brown to black, 3.9 times longer than thorax; 1<sup>st</sup> tergite black pilose on dorsal 1/2, sometimes mainly black pilose; 2<sup>nd</sup> tergite long, 4 times longer than smallest width, pale on baso-lateral 2/3, with sub-apical central triangular region dull black-pollinose, pile black, long and erect laterally, short and appressed dorsally; 3rd tergite trapezoidal and long, 2.2 times longer than smallest width, baso-lateral corners with triangular faint pale maculae and sometimes with a pair of faint pale vittae medially, with large central triangular region of dull black pollen, pile short, appressed and black; 4th tergite sub-quadrangular to rectangular and long, remaining characteristics as in 3rd; 5th tergite either rectangular and wide or sub-quadrangular, remaining characteristics as in 3rd. **Genitalia:** Cercus with 1 regular row of pile on medial margin and 2 regular rows outward; surstylus directed ventrally, with rounded apex, with strong setulae (around 8) on ventral apex and 3-5 thinner setulae on remaining apical 1/2, dorso-medial 1/3 constituted of a thin sclerotized layer, pilose on basal 1/2 of the dorsal surface; subepandrial sclerite trapezoidal, apical margin with 3 small extensions, central one directed dorsally, lateral ones connected to base of the surstyli, posterior end almost straight; hypandrium with ventral notch extending on anterior 2/3; distiphallus smooth and anterior surface straight; phallapodeme tapers on basal 1/3; postgonites with pile mainly on ventral surface, ventral surface slightly expanded, convex until

dorso-apical extremity, dorsal surface slightly concave, apex convex anteriorly, with acute dorsal extremity.

**Female:** Similar to male except: pale on face and lunule more distinct; ocellar triangle ~2 times its length from posterior eye margin and ~1 ocellus-width from lateral eye margin; occiput middle with 3-4 rows of pile; cup and anal lobe distinctly entirely dark; 2nd abdominal tergite shorter than on male, 2.6 times longer than smallest width, light brown, dull pollinose region smaller, lateral pile much shorter than on male; 3rd tergite shorter than on male, baso-lateral  $\frac{1}{2}$  with wide quadrangular maculae; 4th tergite sub-quadrangular, longer than wide; 5th tergite slightly tapering towards apex, long, 1.3 times longer than smallest width; 6th segment long, 5.2 times longer than wide and 1.7 times longer than 5th tergite. **Genitalia:** 7<sup>th</sup> tergite short, basal extensions as long as the 6<sup>th</sup> segment, 7<sup>th</sup> segment lateral sclerite triangular, 7<sup>th</sup> segment with central dorsal longitudinal membranous area bare, 8<sup>th</sup> tergite central region unsclerotized, basal crest sclerotized, straight, apex more acute, cercus with 1 row of pile on apical margin.

**Length.** 12-12.5mm; wing 9-9.5mm.

**Distribution.** Brazil (Amazonas), Peru (Cuzco, Lima, Loreto, Madre de Dios, Ucayali).

**Material examined.** (**5 males**) BRAZIL. Amazonas, Manaus, km 65 Boa Vista Rd., 14 Mar 1973, B. V. Peterson (CNC Diptera 160831). PERU. Cuzco, Pilcopata, 13 Feb 1978, P. M. Marsh (USNM ENT 00257683); [Junín], Chanchamayo, Holotype *Baccha zerene* Hull CNC No 20536 [red label], 03 Jul ??48, J. Schunke (Holotype *Baccha zerene*); Madre de Dios, Manu, Rio Manu, Pakitza, 250m, 12°7'S 70°58'W, Malaise trap, 9-23 Sep 1988, W. N. Mathis (USNM ENT 00257693); [Ucayali], Pucallpa, 8 Nov 1947, J. Schunke (CNC Diptera 160830). (**3 females**) PERU. [Lima], Iquitos, Holotype [red label], Type No 56425 USNM [red label], ?? Mar-Apr 1931, R.C.S. Shannon (Holotype *Baccha eruptova*); Loreto, El Indio (Cerros de Contamana), 10 Sep [19]86, P. Hocking (USNM ENT 00257669); ..., Explorama Lodge, 80 km NE Iquitos on Amazon river, 24 Jun-20 Jul 1990, Menke & Awertschenko (USNM ENT 00257685); Madre de Dios, Manu, Erika (near Salvacion), 550m, 5-6 Sep 1988, A. Freidberg (USNM ENT 00257692).

**Comments:** One male specimen from Loreto (Peru) has a entirely white pilose posterior anepisternum, but this is considered as a variation.

*Pelecinobaccha* (*Pelecinobaccha*) *hiantha* (Hull, 1943) **comb. nov.**

*Baccha hiantha* Hull, 1943 – Hull, 1943a: 74. Type-locality: Brazil, Santa Catarina, Nova Teutônia. Holotype female AMNH. Hull, 1949a: 154 (redescription), 212 (fig. 96, female abdomen), 272 (fig. 356, female wing).

*Ocyptamus hiantha*. Thompson et al. 1976: 19 (catalog citation).

Female allotype of *Baccha zerene* Hull, 1949 – Hull, 1949b: 245. Type-locality: Peru, Chanchamayo. Allotype female CNC.

*Baccha zoe* Hull. nomen nudum (collection name).

Map: 9. Figures: 29.

**Male.** As in *P. (Pelecinobaccha) manuelorum* except: **Head:** Face pale on lateral 1/4, mainly white pilose except black ventral to antennal insertions; lunule usually distinctly pale, central black macula connected by dark vitta to frontal triangle color; vertical triangle with black pile concentrated on a medial row; ocellar triangle ~1.5 times its length from posterior eye margin; antennae insertions confluent, ventral margin with dorsal extension; occiput dorsal 1/4 with 2 rows of simple black pilosity, pile of anterior row very short, middle 2/4 with 3 rows of scale-like white pile, anterior rows shorter and with simple black pile dorsally, ventral 1/4 with 2-3 regular rows of scale-like white pile



**Thorax:** Scutum mostly brown dull pollinose, pollen more concentrated on notopleuron, with inconspicuous sub-median short pair of vittae of concentrated pale pollen, with erect black pile, longer on notopleuron anterior to transverse suture and anterior to scutellum, with anterior row of shining white pile interrupted medially; anterior anepimeron usually white pilose, dorso-posterior of posterior anepisternum has only a few black pile dorsally, rarely with posterior anepisternum, anterior anepimeron and katepisternum black pilose; plumula normal; halter capitulum yellow.

**Wing:** Mostly dark with posterior margin diffuse light brown (dark on cells bc, c, sc, r, r1, r2+3 and bm, remaining cells diffusely light brown), alula diffusely light brown with anterior margin darker.

**Legs:** Prolegs dark brown, only apex of profemur and base of protibia pale; mesolegs dark brown, basal  $\frac{1}{4}$  of mesotibia light brown; metalegs dark brown, pale on apical  $\frac{1}{4}$  of the metabasitarsomere and remaining metatarsomeres, apical tarsomere sometimes light brown.

**Abdomen:** ~4 times longer than thorax; 2<sup>nd</sup> tergite usually pale on baso-lateral  $\frac{1}{2}$ , ~3 times longer than its smallest width, pile white baso-laterally, 2<sup>nd</sup> sternite with sparse short black pile or bare; 3<sup>rd</sup> tergite pale baso-laterally; 4th tergite rectangular and long.

**Genitalia:** Cercus with 1 regular rows of pile on medial margin, and 2 regular rows of pile outward, densely microtrichose; surstylus directed ventrally, ventral surface with around 12 setulae on apex and around 5 setulae sparsely distributed medially until the base, dorso-apical  $\frac{3}{4}$  pilose; subepandrial sclerite trapezoidal, slightly convex on posterior margin; hypandrium with ventral notch straight and extending on anterior  $\frac{1}{2}$ ; basiphallus posterior extension long, distiphallus apical margin strongly curved anteriorly; phallapodeme very weakly sclerotized on basal  $\frac{1}{3}$ ; postgonites with dense long pile ventrally except on ventro-apical  $\frac{1}{5}$ , ventral surface straight, dorsal surface ascending dorsally on apical  $\frac{2}{3}$ , apex concave, ventral and dorsal apices acute.

**Female:** Like male except: Face distinctly pale on lateral  $\frac{1}{3}$ ; ocellar triangle 2.5-3 times its length from posterior eye margin and  $\sim 1$  ocellus-width from lateral eye margin; the ventral margin dorsal extension between the antennae insertions sometimes distinctly sclerotized half way to dorsal margin; sometimes posterior anepisternum entirely white pilose; wing with dark regions well delimited and remaining of wing hyaline (dark on cells bc, c, sc, r, r<sub>1</sub>, r<sub>2</sub>+3 except for a medial region on posterior margin, basal  $\frac{1}{3}$  of r<sub>4</sub>+5, bm, basal  $\frac{2}{3}$  of dm, most of cua<sub>1</sub> and cup; anal lobe light brown); legs entirely dark brown but sometimes profemur and protibia mostly light brown, mesofemur and basal  $\frac{3}{4}$  of mesotibia light brown and basal  $\frac{1}{2}$  of metafemur light brown; metabasitarsomere pale on apical  $\frac{1}{3}$  or  $\frac{1}{4}$ ; 2<sup>nd</sup> to 4<sup>th</sup> protarsomeres and 3<sup>rd</sup> and 4<sup>th</sup> mesotarsomeres slightly swollen; metacoxa sometimes mainly black pilose; 2nd abdominal tergite shorter, 2.5-3 times longer than smallest width, region of dull black pollen triangular, 3rd abdominal tergite shorter,  $\sim 1.6$  longer than smallest width, with

baso-lateral pale triangles, 4th and 5th abdominal tergites rectangular and wide, remaining characteristics as on 3rd; 6<sup>th</sup> segment conical, 1.3 times longer than 5<sup>th</sup> tergite. **Genitalia:** 7<sup>th</sup> tergite rectangular, wide and narrow, apex convex and slightly extended, basal extensions slightly shorter than 6<sup>th</sup> segment, 7th segment lateral sclerite right triangle shaped; 8<sup>th</sup> tergite unsclerotized medially appearing as reduced to a pair of narrow separate sclerites, basal crest short; cercus with 1 row of marginal pile; 10<sup>th</sup> tergite reduced to a pair of sclerites, fused to the dorsal surface of the cerci; cercus with 1 row of pile on apical margin.

**Length.** 11-13mm; wing 9-10mm.

**Distribution.** Brazil (Goiás, Santa Catarina), Colombia (Boyaca), Costa Rica (Guanacaste, Puntarenas), Peru (Junín).

**Material examined.** (**7 males**) BRAZIL. Goias, Campinas, 8 Jan 1934, T. Borbmeier (CNC Diptera 160776); Paraná, Rondon, 24°38'S 54°07'L, ?? Mar 1956, F. Plaumann (CNC Diptera 161225). COSTA RICA. Guanacaste, Nandayure, Cerro Azul, 1050m, libre, L N 214769 39700, #77663, 13-16 Apr 2004, W. Porras (INB0003860405 INBIOCRI COSTA RICA); Puntarenas, Camino a las Tablas, horilla de un charral, 1200m, L\_S\_318300\_594400, #50799, 28 Jun 1998, E. Navarro (INB0003045917 INBIOCRI COSTA RICA); ..., Send. al Higueron Central, 2.5 km NE del Progreso,

1450m, L\_S\_318900\_597300, #48066, 3 Oct 1997, A. Picado (INBIO CRI002 576075);  
..., Send. a las Juntas, 2.5 km N. de Progreso, 1500m., L\_S\_320800\_594500, #48875,  
05 Nov 1997, E. Navarro (INBIO CRI002 409156). PERU. Junín, Chanchamayo,  
1100m, Holotype *Baccha zoe* Hull [red label], 16 Aug [19]48, J. Schunke. (**5 females**)  
BRAZIL. Santa Catarina, Nova Teutônia, 27°11'S 52°23'W, Holotype *hiantha* [red label],  
10 Nov 1936, F. Plaumann (Holotype *Baccha hiantha*). COLOMBIA. Boyaca, Muzo,  
900m, Frank M. Hull Collection C.N.C. 1973, ?? ??? 1936, J. Bequaert (CNC Diptera  
160778). COSTA RICA. Guanacaste, Santa Rosa Nat. Park, on *Piper marginatum*, #79-  
11358, 8 Aug 1979, A. Perry (USNM ENT 00257650); Puntarenas, Fca. Cafrosa, Tajo,  
1 km O del Tajo, 1500m, L\_S\_319350\_596470, #47403, 11 Jul 1997, A. Picado (INBIO  
CRI002 567582). PERU. [Junín], Chanchamayo, Allotype *Baccha zerene* Hull [red  
label], 17 Jul ??48, J. Schunke (Allotype *Baccha zerene*).

**Comments:** On tenereal specimens, the dark regions on the wing are sometimes reduced.

A single specimen from Chanchamayo (Peru, Junín) collected by J. Schunke, from Hull's personal collection and now in the CNC, has a red label written with "Holotype *Baccha zoe* Hull".

Very close to *P. (Pelecinobaccha) manuelorum* but can be distinguished by the anterior row of pile on the dorsal occiput, the pilosity on the 2<sup>nd</sup> abdominal sternite and genitalia characters.

*Pelecinobaccha* (*Pelecinobaccha*) *hirundella* (Hull, 1944) **comb. nov.**

*Baccha hirundella* Hull, 1944 – Hull, 1944b: 59. Type-locality: Brazil, Santa Catarina, Nova Teutônia. Holotype female AMNH. Hull, 1949a: 155 (redescription), 212 (fig. 99, female abdomen).

*Ocyptamus hirundella*. Thompson et al. 1976: 20 (catalog citation).

Map: 12. Figures: 30.

**Male. Head:** Dark brown; face pale on lateral  $\frac{1}{4}$ ; gena dark brown; lunule pale above antennae insertions, central maculae connected by a narrow to wide median dark vittae to frontal triangle color; frontal triangle usually entirely dark, some specimens pale laterally, white-silver pollen continuous from face restricted to lateral margin except around eye contiguity; vertical triangle with 3 rows of pile, but most pile concentrated in a single median row; ocellar triangle  $\sim 1.5$  times its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye posterior indentation slightly dorsal to level of antennae insertion; antennae insertions almost separated, ventral margin dorsal extension unsclerotized dorsally; occiput dorsal  $\frac{1}{4}$  with 2 rows of black pile, anterior row shorter, middle  $\frac{2}{4}$  with 2-3 rows of white scale-like pile, posterior row longer, with some simple black pile on anterior row, ventral  $\frac{1}{4}$  with 2-3 rows of scale-like white pile.

**Thorax:** Scutum dark brown, with weak pair of sub-median vittae and one weak median vitta of white pollen, mainly black pilose, slightly longer on notopleuron and white pilose anterior to callus of transverse suture, callus with white and black pile, with anterior row of shining white pile interrupted in the middle, pile as long as remaining pile of scutum; scutellum dark brown, with sparse short black pile, subscutellar fringe white and long; pleuron dark brown, some specimens slightly pale on posterior  $\frac{1}{2}$  of posterior anepisternum, white pilose; plumula long, white; calypter light yellow; halter brown, capitulum orange.

**Wing:** Basal  $\frac{2}{3}$  dark (cells bc, c, sc, r, basal  $\frac{3}{4}$  of r1, slightly less than basal  $\frac{2}{3}$  of r2+3, basal  $\frac{1}{2}$  of r4+5, bm, basal  $\frac{3}{4}$  of dm, cua1 and cup), entirely microtrichose; alula normal, 2 times basally and 4 times apically larger than c cell, hyaline, entirely microtrichose.

**Legs:** Prolegs brown, slightly pale on interior surface of profemur and basal  $\frac{1}{2}$  of protibia; mesolegs brown, apex of mesofemur pale, basal  $\frac{1}{2}$  of mesotibia slightly pale; metalegs brown, base of metatibia pale, apical  $\frac{1}{4}$  or  $\frac{1}{5}$  of metabasitarsomere until 4th metatarsomere pale.

**Abdomen:** Dark brown, ~3.5 times longer than thorax; 1st tergite white pilose, except pile black dorso-apically; 2<sup>nd</sup> tergite long, ~3.5 times longer than its smallest width, with

long triangular maculae of dull black pollen sub-apically pointing to the base, mainly black pilose, with long, erect pile laterally, white on baso-lateral 2/3, short and appressed black pile dorsally; 3rd tergite trapezoidal, usually pale on baso-lateral 1/2, with large triangular macula of dull black pollen medially, which sometimes has a medial pair of sub-shining vittate maculae, with appressed black pile, slightly longer and white on baso-lateral corners; 4th tergite quadrangular, slightly longer than wide, with appressed black pile, remaining characters as on 3rd; 5th tergite rectangular and wide, entirely dark brown, remaining characteristics as on 4th. **Genitalia:** Cercus with 1 regular row of pile on medial margin and 2-3 irregular rows outward; surstylus directed anteriorly, with strong setulae (around 16) on ventral 1/2, with very little of the dorsal thin sclerotized layer, pilose on basal 1/2 of the dorsal surface; subepandrial sclerite trapezoidal and short; hypandrium with ventral notch extending on anterior 1/2; distiphallus smooth and anterior surface curved anteriorly; postgonites with pile mainly on ventral surface, ventral surface straight, extended baso-ventrally, dorsal surface slightly concave with small convexity before apex, apex convex anteriorly, with slightly convex ventral extremity and acute dorsal extremity.

**Female:** Like male except: Frons pale laterally on ventral 2/3; vertex with one central row of shorter pile directed forward, ocellar triangle ~2 times its length from posterior eye margin and 1.5-2.5 ocelli-width from lateral eye margin; scutum pile shorter, entirely white on notopleuron; scutellum with shorter pile, subscutellar fringe very short and black to absent; pleuron pale on posterior 1/2 of posterior anepisternum and dorso-posterior of the katepisternum; wing darker (basal 2/3 of r2+3, 2/3 of r4+5 and most of

dm); basal ½ of protibia and basal 2/3 of mesotibia distinctly pale; 1st tergite pile shorter; 2nd tergite pile very short and appressed; 3rd and 4th tergites with narrower dull pollinose region and without pale baso-lateral margin; 4th tergite rectangular and wide; 6<sup>th</sup> segment conical short, 1.3 times wider than long at base and 1.4 times longer than 5<sup>th</sup> tergite. **Genitalia:** 7<sup>th</sup> tergite normal, but with apex “open”, basal extensions weakly sclerotized and as long as the 6<sup>th</sup> segment, 7<sup>th</sup> segment lateral sclerite right triangle shaped, acute baso-ventrally, 8<sup>th</sup> tergite unsclerotized medially appearing as a pair of sclerites, apex wide, basal crest short and weakly sclerotized, 8<sup>th</sup> sternite whole, weakly sclerotized medially.

**Length.** 8.5-10mm; wing 7-8mm.

**Distribution.** Brazil (Santa Catarina).

**Material examined.** (**7 males**) BRAZIL. Santa Catarina, Nova Teutônia, 300-500m, 27°11'S 52°23'W, ?? Dez 1964, F. Plaumann (5 specimens, CNC Diptera 161175-8, 161181); ..., ?? Dez 1966 (CNC Diptera 161179); ..., ?? Nov 1969 (CNC Diptera 161180). (**11 females**) BRAZIL. Santa Catarina, Nova Teutônia, 27°11'S 52°23'W, Holotype *hirundella* Hull [red label], 10 Oct 1936, F. Plaumann (Holotype *Baccha hirundella*); ..., 300-500m, 27°11'S 52°23'W, ?? Dez 1964, F. Plaumann (7 specimens,



CNC Diptera 161167-72); ..., ?? Jan 1965 (CNC Diptera 161173); ..., ?? Nov 1969 (CNC Diptera 161174); ..., ?? Dec 1970.

**Comments:** The type specimen of *B. hirundella* had its head loose in the unit tray and all pile from the occiput was missing, but overall it agrees with this redescription.

*Pelecinobaccha (Pelecinobaccha) humillima* **sp.nov.**

Type-locality: Costa Rica, Limón, Verágua Research Station, 09°55.520'N 83°11.439'W.

Holotype male INBio.

Map: 8. Figures: 21e-h.

**Male. Head:** Brown; face lateral  $\frac{1}{4}$  pale, with only a few black pile ventral to antennae insertion; lunule slightly pale above antennae insertions but leaving a wide dark vitta connecting the central macula to the frontal triangle color; frontal triangle with pair of median oval spots of silvery-white pollen laterally, pollen absent dorsally around lunule; vertical triangle with 1 median row of pile; ocellar triangle  $\sim 1.5$  times its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye posterior indentation at level of antennae insertion; antennae insertions confluent, ventral margin with short dorsal extension; occiput dorsal  $\frac{1}{4}$  with a row of simple black pile and an anterior row of very short simple black pile on dorsal  $\frac{1}{2}$  of this region, middle  $\frac{2}{4}$  with 3 rows of scale-like white pile, posterior row longer, anterior rows sometimes with a few simple black pile dorsally, ventral  $\frac{1}{4}$  with 2-3 irregular rows of scale-like white pile.

**Thorax:** Scutum brown, mainly brown dull pollinose, white-pollinose on anterior pair of short vittate maculae, black pilose, pile white and slightly longer on notopleuron and

anterior to scutellum, with anterior row of scale-like white pile interrupted in the middle; scutellum brown, black pilose but white pilose basally, subscutellar fringe normal and white; pleura brown but pale on posterior ½ of posterior anepisterna and dorso-posterior of katepisternum, white pilose; plumula normal and yellow; calypteres white, fringe light brown; halter white.

**Wing:** Entirely dark brown, slightly lighter on posterior margin, entirely microtrichose; alula normal, 1.5 times basally to 4 times apically larger than c cell, hyaline, entirely microtrichose.

**Legs:** Prolegs and mesolegs brown, apex of femora and basal 2/3 of tibiae pale, mesobasitarsomere slightly pale; metaleg brown, pale on apex of metafemur and base of metatibia, pale on apex of metabasitarsomere and remaining metatarsomeres, fifth metatarsomere light brown.

**Abdomen:** Brown, 3.3 times longer than thorax; 1<sup>st</sup> tergite white pilose; 2<sup>nd</sup> tergite narrow and very long, 6 times longer than its smallest width, with central elongated triangular region of dull black pollen, pile white on baso-lateral ½, remaining pile black, pile erect laterally, remaining pile appressed; 3rd tergite trapezoidal and long, 2.8 times longer than smallest width, with large central triangular region of dull black pollen and central pair of small vittate pale maculae, pile appressed and black, white baso-laterally;

4th tergite sub-quadrangular, pile appressed and black, remaining characteristics as on 3<sup>rd</sup>; 5th tergite rectangular and wide, remaining characteristics as on 4<sup>th</sup>. **Genitalia:** Cercus with 1 row of pile on medial margin and 3 rows outward; surstylus sub-oval on lateral view, directed apically, with setulae (around 14) ventrally on apex and 4 setulae basally, sparse pilose on basal ½ of the dorsal surface; subepandrial sclerite sub-trapezoidal, homogeneously sclerotized; hypandrium with ventral notch rounded and extending on anterior 2/3; basiphallus posterior extremity thick, distiphallus anterior surface undulated, apex curved anteriorly; postgonites ventral surface straight, dorsal surface slightly concave, apex with acute dorsal extremity and convex ventrally.

**Female.** No female available.

**Length.** 8.5mm; wing 6mm.

**Distribution.** Costa Rica (Limón), Venezuela (Zulia).

**Material examined.** (**2 males**) COSTA RICA. Limón, Verágua research station, small hilltop behind butterfly garden, 09°55.520N 83°11.439W, CAV 38, 14 Sep 2008, G.F.G. Miranda (Holotype *Pelecinobaccha (P.) humillima*). VENEZUELA. Zulia, El Tucuco

(45kmSW of Machiques), 5-6 Jun 1976, A. S. Menke & D. Vincent (USNM ENT 00257714).

**Comments:** This species is very similar to species of the genus *Relictanum* gen.nov., but it is distinguished from that genus by the presence of a second row of shorter pile on the dorsal occiput and the genitalic characters.

**Etymology:** The specific epithet is an adjective and it means 'humble' or 'small'.

*Pelecinobaccha (Pelecinobaccha) ida* (Curran, 1941) **comb. nov.**

*Baccha ida* Curran, 1941. - Curran, 1941: 279. Type-locality: Brasil, Santa Catarina, Nova Teutônia. Holotype male AMNH. Hull, 1949a: 156 (redescription), 194 (fig. 12, female abdomen; fig. 18 male abdomen), 262 (fig. 319, male wing), 274 (fig. 358, female wing).

*Ocyptamus ida*. Thompson et al. 1976: 20 (catalog citation).

*Baccha ida* var. *idella* Hull, 1949. - Hull, 1949a: 159 (fig. 107, male abdomen). Type-locality: Paraguay, Vilarica. Holotype male USNM.

Map: 13. Figures: 31.

**Male. Head:** Black; face pale on lateral 1/4; lunule pale above antennae insertion, central macula weakly connected to frontal triangle color by a diffuse brown median vitta; frontal triangle pale laterally until eye contiguity, with silvery-white pollen restricted laterally; vertical triangle with 3 rows of pile, but most pile concentrated in a single median row; ocellar triangle distanced its length from posterior eye margin; eye contiguity slightly shorter than vertical triangle length; eye with sub-triangular indentation on posterior margin positioned at level of antenna insertion; antennae insertions separated, division sometimes weakly sclerotized dorsally, antennae black; occiput dorsal ¼ with 2 rows of simple black pile, anterior row shorter, middle 2/4 with 2-3 rows

of pile, posterior row long, white and scale-like, anterior rows shorter, black and simple, ventral  $\frac{1}{4}$  with 2-3 rows of white, scale-like pile, anterior rows slightly shorter.

**Thorax:** Scutum black, with weak pair of sub-median vittae and a median one of white pollen, mainly black pilose, pile longer on notopleuron, black and white anterior to transverse suture, anterior row of shining white pile with shorter pile in the middle; scutellum dark brown, black pilose, subscutellar fringe long and white; pleuron dark brown, slightly pale on posterior anepisternum and dorso-posterior portion of katepisternum, entirely white pilose; plumula white and long; calypter white; halter yellow.

**Wing:** Basal  $\frac{2}{3}$  dark (cells bc, c, sc, r, basal  $\frac{3}{4}$  of r<sub>1</sub>, basal  $\frac{1}{2}$  of r<sub>2+3</sub>, basal  $\frac{1}{2}$  of r<sub>4+5</sub>, bm, basal  $\frac{2}{3}$  of dm and cup), entirely microtrichose; alula large, 1.8 times basally and 3.8 times apically larger than c cell, hyaline, entirely microtrichose.

**Legs:** Prolegs dark brown, apical  $\frac{1}{2}$  of profemur and basal  $\frac{1}{2}$  of protibia light brown; mesolegs dark brown, apex of mesofemur light brown, basal  $\frac{1}{2}$  of mesotibia light brown to yellow; metalegs dark brown, pale on apex of metafemur, base of metatibia and apical  $\frac{1}{3}$  of metabasitarsomere to fourth metatarsomere, fifth metatarsomere light brown, basal  $\frac{1}{2}$  of metafemur sometimes light brown.

**Abdomen:** Black, 3.2 times longer than thorax; 1<sup>st</sup> tergite with white pile ventro-laterally and dorsally, remaining pile black; 2<sup>nd</sup> tergite long, 2.9 times longer than its smallest width, baso-lateral 2/3 of the tergite margin is pale, pile black, normal and appressed dorsally, long and erect laterally, white on basal 2/3, remaining black, with sub-apical central triangular region of dull black pollen; 3rd tergite trapezoidal and long, 2 times longer than smallest width, with baso-lateral 2/3 of the tergite margin pale, with large central triangular region of dull black pollen and pair of central, sub-apical vittae of absence of pollen, pile short, appressed and black, slightly longer and pale baso-laterally; 4th tergite sub-quadrangular, longer than wide, remaining characteristics as in 3rd; 5th tergite rectangular and wide, remaining characteristics as in 3rd. **Genitalia:** Cercus with 1-2 regular rows of pile on medial margin and 2-3 regular rows outward; surstylus directed apico-ventrally, with setulae (around 24) on apico-ventral 1/2, pilose on 1/2 of the dorsal surface; subepandrial sclerite with a pair of expanded postero-lateral lobes; hypandrium with ventral notch extending on anterior 1/2; distiphallus smooth and anterior surface curved anteriorly on apex; phallapodeme weakly sclerotized posteriorly; postgonites with pile mainly on ventral surface, ventral surface straight, dorsal surface straight, apex slightly convex anteriorly, with convex ventral extremity and acute dorsal extremity.

**Female:** Similar to male except: frons pale laterally on ventral 1/2; ocellar triangle ~2.5 times its length from posterior eye margin and ~1.5 ocelli-width from lateral eye margin; antennae insertion might seem separated due to weak sclerotization of median division; scutum pile much shorter; scutellum pile shorter, subscutellar fringe normal; legs lighter



on pale regions, mesotibia with almost basal 2/3 pale; basal 2/3 to  $\frac{3}{4}$  dark on cell dm; 2nd abdominal tergite with much shorter pile; 3rd abdominal tergite shorter; 4th abdominal tergite rectangular and wide; 6th segment conical normal, slightly shorter than its smallest width and 1.3 times longer than 5th. **Genitalia:** 7<sup>th</sup> tergite normal, basal extensions as long as the 6<sup>th</sup> segment, 7<sup>th</sup> segment lateral sclerite right triangle shaped, with acute basal extremities, 7<sup>th</sup> segment with bare central dorsal longitudinal membranous area; 8<sup>th</sup> tergite central region sclerotized, apex 2-pronged, basal crest large, tergite lateral margin crenulated, 8th sternite reduced to a pair of rectangular sclerites; cercus with 1 row of pile on apical margin.

**Length.** 11-14.5mm; wing 8-10mm.

**Distribution.** Argentina (Tucuman), Brazil (Minas Gerais, Rio de Janeiro, Santa Catarina), Ecuador (Napo), Paraguay (Guairá, Paraguari).

**Material examined.** (**27 males**) ARGENTINA. Unknown, R. C. Shannon Collection, ??  
??? (USNM ENT 00257749); [Tucuman], Quebrada de lules, 24 Mar 1927, R. C. Shannon (USNM ENT 00257687). BRAZIL. Minas Gerais, Arceburgo, F. Fortaleza, ??  
Mar 1945, [M.P.] Barretto; Rio de Janeiro, Petropolis, Frank M. Hull Collection C.N.C.  
1973, 1 Mar 1914, ? (CNC Diptera 161133); Santa Catarina, Nova Teutônia, 27°11'S  
52°23'W, 16 Jun 1939, F. Plaumann (*Baccha ida* paratype); ..., 24 Oct 1939, F.

Plaumann (*Baccha ida* paratype); ..., 300-500m, ?? Nov 1952 (CNC Diptera 161134);  
 ..., ?? Feb 1964 (CNC Diptera 161135); ..., ?? Nov 1964 (CNC Diptera 161136); ..., ??  
 Dez 1964 (7 specimens, CNC Diptera 161137-43); ..., ?? Jan 1966; ..., ?? Nov 1969 (3  
 specimens, CNC Diptera 161144-6); ..., ?? Oct 1970 (2 specimens); ..., ?? Nov 1970;  
 ..., ?? Dez 1970 (2 specimens). PARAGUAY. Paraguari, Ybycui (25 km SE), in Ybycui  
 National Park, 12-24 Apr 1980, P. J. Spangler et al. (USNM ENT 00257688); [Guairá],  
 Villarica, Frank M. Hull Collection C.N.C. 1973, ?? Dec 1936, F. Schade (CNC Diptera  
 161147). (**17 females**) BRAZIL. Santa Catarina, Nova Teutônia, ?? Nov 1948, F.  
 Plaumann (CNC Diptera 161148); ..., 27°11'S 52°23'W, ?? Dez 1964; ..., 300-500m, ??  
 Mar 1958 (CNC Diptera 161149); ..., 8 Dez 1961 (CNC Diptera 161150); ..., ?? Dez  
 1964 (4 specimens, CNC Diptera 161151-4); ..., ?? Jan 1965 (CNC Diptera 161155); ...,  
 ?? Feb 1965 (CNC Diptera 161156); ..., ?? Jan 1966; ..., ?? Oct 1970 (2 specimens);  
 ..., ?? Nov 1970; ..., ?? Dez 1970. ECUADOR. Napo, 7 km S Baeza, 28 Mar 1983, G.  
 & M. Wood (CNC Diptera 161157). PARAGUAY. ?, Molinésome, ?? Oct ????, F.  
 Schade (CNC Diptera 161158).

*Pelecinobaccha (Pelecinobaccha) manuelorum* **sp.nov.**

Type-locality: Costa Rica, Puntarenas, 4.5 km NE Progreso, 8°28'N 82°51'W. Holotype female INBio.

Map: 8. Figures: 32.

**Male. Head:** Black; face sometimes with lateral traces to whole lateral 1/5 pale, black pilose laterally with golden or white pile on ventral 1/3; lunule pale, black central macula connected to frontal triangle color by narrow dark vitta; frontal triangle black pilose, with silvery-white pollen laterally, continuous from the face, and brown pollen medially, frontal prominence and frontal triangle protuberant; vertical triangle with black pile in 3 irregular rows; ocellar triangle distanced its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye with sub-triangular indentation on posterior margin at level of antenna insertion; antennae insertions narrowly confluent, ventral margin with long dorsal extension; occiput dorsal  $\frac{1}{4}$  with 2 rows of long simple black pile, middle  $\frac{2}{4}$  with 2-3 regular anterior rows of simple black pile and 1 regular posterior row of long scale-like white pile, ventral  $\frac{1}{4}$  with 2 irregular rows of scale-like white pile.

**Thorax:** Scutum black, mostly brown dull pollinose, sparse on transverse suture and white-pollinose on notopleuron, with sub-median short pair of vittae of concentrated pale pollen, with long erect black pile, longer on notopleuron anterior to transverse suture, golden to white anterior to scutellum, with continuous anterior row of shining white pile; scutellum dark brown, with metallic-shining pollen, long black pilose, pile longer than on scutum, sub-scutellar fringe long and golden to white with around 20 pile; pleuron black, white pilose except black pilose on dorso-posterior of posterior anepisternum (densely arranged), anterior anepimera, and a few black pile may occur on anterior anepisternum; plumula long, white; calypter entirely white; halter brown, capitulum orange.

**Wing:** Mostly hyaline with anterior margin diffuse dark brown (cells bc, c, sc, r1, anterior 2/3 of r2+3 and most of r), cell bm slightly dark, entirely microtrichose, alula usually hyaline, large, 2 times basally to 4 times apically larger than c cell, entirely microtrichose.

**Legs:** Prolegs black, profemur with apical half gradually becoming pale, distinct on inner side, protibia with basal half pale, black pilose, mesolegs black, apical 1/6 of mesofemur and basal 2/3 of mesotibia pale, mesocoxa with only 1 row of longer pile antero-apically, bare to sparse pile ventrally on mesotrochanter, mesofemur bare ventrally and with irregular rows of long pile laterally; metalegs black, pale on apex of metafemur, slightly less than the basal 1/2 of the metatibia and from the apical 1/2 of the metabasitarsomere

to the remaining tarsomeres, apical tarsomere slightly darker, black pilose, white on metacoxa and on white regions.

**Abdomen:** ~3 times longer than thorax, black; 1<sup>st</sup> tergite short with rounded lateral lobes, with long pile, black dorso-laterally and white ventro-laterally, with a row of white pile dorso-medially and sparse to bare medially; 2<sup>nd</sup> tergite long, slightly constricted medially, ~3.5 times longer than its smallest width, with rectangular black dull pollinose region medially, long, erect pile laterally, appressed dorsally, black, but white basally, 2<sup>nd</sup> sternite with long, erect white pile on basal ½; 3<sup>rd</sup> tergite trapezoidal and long and widening apically, ~2.5 times longer than smallest width, with baso-lateral vittate pale maculae, the maculae extend ½ the length of the tergite, dull black-pollinose except for baso-lateral corners and apex, with appressed black pile, slightly longer, erect and white on baso-lateral corners; 4th tergite sub-quadrate, with baso-lateral pale triangles, pollinose as 3rd tergite, with appressed black pile, white on pale corners; 5th tergite short, rectangular and wide, with appressed black pile; sterna black, well sclerotized except for some segments with slightly transparent basal regions. **Genitalia:** Epandrium notched posteriorly, densely microtrichose; cercus with 1 to 2 regular rows of pile on medial margin, 3 irregular rows of pile outward, densely microtrichose; surstylus directed ventrally, with 5 irregular rows of setulae on ventral, slightly concave side, long pilose on basal ½ of dorsal surface; subepandrial sclerite weakly sclerotized, with a pair of posteriorly directed short processes; hypandrium with ventral notch rounded and extending on anterior 2/3; distiphallus smooth, phallapodeme tapers dorso-ventrally on basal 1/3; postgonites with sparse pilosity except on apex, pile longer baso-ventrally,

expanded ventro-basally and slightly concave towards the apex on the ventral surface, apex rounded ventrally, convex anteriorly and acute dorsally.

**Female:** Like male except: Face distinctly pale on lateral 1/3, more extensively pale pilose; ocellar triangle ~2 times its length from posterior eye margin and ~1 ocellus-width from lateral eye margin; anterior row of pile shorter than posterior one on dorsal 1/4 of occiput; wing with dark anterior margin well delimited and not diffuse; profemur sometimes entirely pale, protibia sometimes with basal 2/3 pale; 2<sup>nd</sup> to 4<sup>th</sup> protarsomeres and 3<sup>rd</sup> and 4<sup>th</sup> mesotarsomeres slightly swollen; metafemur sometimes light brown on basal 1/2, metatibia with only basal 1/3 pale; metacoxa mostly with black pile; 2nd abdominal tergite shorter, lateral margin narrowly pale basally and wider on the apical 1/2, 3rd abdominal tergite shorter, with baso-lateral pale triangles, 4th abdominal tergite wider than long, with baso-lateral fasciate pale maculae, 6<sup>th</sup> segment conical, slightly longer than 5<sup>th</sup> tergite. **Genitalia:** Strongly sclerotized; 7<sup>th</sup> tergite rectangular normal, apex convex and slightly extended, basal extensions slightly shorter than 6<sup>th</sup> segment, with pair of short latero-ventral extensions, extensive membranous region between 7<sup>th</sup> and 8<sup>th</sup> segments; 8<sup>th</sup> tergite unsclerotized medially appearing as a pair of separate sclerites; 10<sup>th</sup> tergite as a pair of sclerites fused to the dorsal surface of the cerci; cercus with 1 row of pile on apical margin.

**Length.** 9.5-12.5mm; wing 7.5-10.5mm.

**Distribution.** Costa Rica (Puntarenas).

**Material examined.** (**5 males**) COSTA RICA. Puntarenas, Est. Las Alturas, 1 km Norte de Las Alturas, 1500m, L\_S\_322700\_591400, #6024, 28-30 Sep 1994, M. A. Zumbado (INBIO CRI002 494374); ..., San Luis, Fca. Buen Amigo Monteverde, 4 km S de la reserva, 1350m, con Red., L\_N\_250850\_449250, #474754, ?? Jul 1997, Z. Fuentes (INBIO CRI002 560229); ..., Send. Fila Palmital Chichiza, 4.5 km NE de Progreso, 1600m, L\_S\_319950\_598950, #47692, 13 Aug 1997, A. Picado (2 specimens, INBIO CRI002 559279 & 559285); ..., San Vito de Coto, Las Alturas Biol. Sta., 1500m, 14 Aug 1995, J.R. Vockeroth (CNC Diptera 160777). (**3 females**) COSTA RICA. Puntarenas, Monteverde Biol. Res., 1500m, cloud forest, 13 Jun 2000, M. Buck (DEBU 00118179); ..., Send. Fila Palmital Chiquisa, 4.5 km NE de Progreso, 1600m, L\_S\_319950\_598950, #47425, 16 Jul 1997, E. Navarro (INBIO CRI002 567876 (Holotype *Pelecinobaccha* (*P.*) *manuelorum*)); ..., Las Alturas Bio. Stn., 8°57'N 82°58'W, 15-1700m, 12-14 Aug 1995, S. A. Marshall.

**Etymology:** The specific epithet is an homage to Manuel Zumbado and Manuel Solis, colleagues and friends. It is to be treated as a noun in the genitive case.

*Pelecinobaccha (Pelecinobaccha) mexicana* (Curran, 1930) **comb. nov.**

*Baccha mexicanus* Curran, 1930. - Curran, 1930: 6 (nom. nov. for *lugubris* Williston).

Hull, 1949a: 216 (fig. 114, male abdomen), 254 (fig. 360, male wing).

*Baccha lugubris* Williston, 1891. - Williston, 1891: 37 (preocc. *Phillipi*, 1865). Type-

locality: Mexico, Tabasco, Venta de Zopilote, 2800 ft., Teapa; Guerrero, Chilpancingo, 4600 ft., Vera Cruz, Atoyac. Holotype male BM NH (not examined) and female AMNH.

*Baccha batesi* Curran, 1939. - Curran, 1939: 10. Type-locality: Guatemala, San

Sebatian, Reu. Holotype male AMNH. Hull, 1949a: 220 (fig. 136, female abdomen), 282 (fig. 382, female wing).

Map: 12. Figures: 33.

**Male. Head:** Black; face pale on lateral  $\frac{1}{3}$  to  $\frac{1}{4}$ ; lunule usually pale dorsal to antennae insertions, central black macula connected to frontal triangle color by median vitta; frontal triangle entirely black, with silvery-white pollen laterally, continuous from the face, and brown pollen medially; vertical triangle with 3 rows of pile, but most pile concentrated in a single median row; ocellar triangle  $\sim 1.5$  times its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye with sub-triangular indentation on posterior margin at level of antenna insertion; antennae insertions confluent, ventral margin with short dorsal extension; occiput dorsal  $\frac{1}{4}$  with 2 rows of



simple black pile, anterior row with very short pile, middle  $\frac{2}{4}$  with 3-4 rows of scale-like white pile, posterior row with very long pile, anterior rows shorter and sometimes with some simple black pile dorsal to indentation, ventral  $\frac{1}{4}$  with 2-3 rows of scale-like white pile.

**Thorax:** Scutum black, mostly brown dull pollinose, white-pollinose on notopleuron, with sub-median short pair of vittae of concentrated dull pollen, mainly black pilose, white on notopleuron and anterior to scutellum, usually with some black pile anterior to transverse suture on notopleuron, with anterior row of shining white pile with shorter pile medially; scutellum dark brown to black, with shining brown pollen, pile long and black, longer than on scutum, sub-scutellar fringe long and white; pleuron black, but usually pale to white on posterior  $\frac{1}{2}$  of posterior anepisternum and dorso-posterior katepisternum, white pilose; plumula long and white; calypter white; halter yellow to light brown, capitulum sometimes orange.

**Wing:** Dark brown, posterior margin lighter (dark on cells bc, c, sc, r, r1, r2+3 and bm, remaining cells gradually get lighter towards the posterior margin), entirely microtrichose, alulae infuscated, sometimes slightly brown on anterior margin, large, 1.4 times basally to 3.4 times apically larger than c cell, entirely microtrichose.

**Legs:** Prolegs brown to dark brown, profemur and base of protibia pale; mesolegs light brown to dark brown, apex of mesofemur and basal 2/3 of mesotibia pale; metalegs dark brown, pale on basal 1/2 of metafemur, base of metatibia and apical 1/4 to 1/5 of metabasitarsomere until 5th metatarsomere, 5th metatarsomere sometimes light brown, white pilose dorsally on metacoxa.

**Abdomen:** Dark brown to black, 3.9 times longer than thorax; 1<sup>st</sup> tergite black pilose median-laterally, white elsewhere; 2<sup>nd</sup> tergite long, 4 times longer than its smallest width, usually pale on baso-lateral 2/3, with rectangular black dull pollinose region medially, pile erect on base and laterally, appressed elsewhere, longer laterally, white on base and baso-lateral 2/3, black elsewhere; 3<sup>rd</sup> tergite trapezoidal and long, 2.8 times longer than smallest width, usually pale on baso-lateral 1/2 and with pale apical margin, with large central triangle of dull black pollen, with appressed black pile, erect and white on baso-lateral corners, 3rd sternite rectangular and long; 4th tergite sub-quadrangular long, 1.2 times longer than wide, with baso-lateral triangular pale maculae, with appressed black pile, white on baso-lateral corners, remaining characteristics as on 3rd; 5th tergite rectangular and wide, sometimes pale on baso-lateral corners, with 3 central vittae of dull black pollen, with appressed black pile.

**Genitalia:** Cercus with 2 irregular rows of pile on medial margin, 3 irregular rows of pile outward; surstylus long with rounded apex in lateral view, directed ventrally, with setulae ventrally, short on apical 1/4 (around 10) and slightly longer medially and basally (around 3 on each region), pilose on basal 1/2 dorsally; subepandrial sclerite homogeneously sclerotized, rectangular and long, slightly concave on posterior margin, trapezoidal

apically, with a pair of short extensions on apex; hypandrium ventral notch extending on anterior  $\frac{1}{2}$ , notch with straight posterior margin; basiphallus posterior extremity long, distiphallus with medial convexity on anterior surface, apex curved apically, phallapodeme well sclerotized dorsally, lighter ventrally; postgonites ventral surface straight, dorsal surface concave, apex rounded on ventral extremity and acute on dorsal extremity, convex anteriorly.

**Female:** Like male except: Frons normal, vertex narrow; lateral white pollen restricted to ventral  $\frac{3}{4}$  of frons; ocellar triangle ~2.5 times its length from posterior eye margin and ~1 ocellus-width from lateral eye margin; wing dark regions more sharply defined (dark brown on cells bc, c, sc, r, r1, r2+3 except for hyaline middle portion on posterior margin, base of r4+5 and bm, light brown on basal  $\frac{1}{2}$  of dm, apical  $\frac{1}{3}$  of cup and basal  $\frac{3}{4}$  of cua1, remaining cells hyaline); profemur sometimes entirely pale, protibia sometimes with basal  $\frac{2}{3}$  pale; 2<sup>nd</sup> to 4<sup>th</sup> protarsomeres and 3<sup>rd</sup> and 4<sup>th</sup> mesotarsomeres slightly swollen; metabasitarsomere sometimes with apical  $\frac{1}{3}$  pale; 1st abdominal tergite with less black pile; 2nd abdominal tergite shorter, 2.9 times longer than smallest width, pale on baso-lateral  $\frac{1}{2}$ , with central triangular region of dull black pollen; 3rd abdominal tergite shorter, 1.7 times longer than smallest width, with baso-lateral pale triangles; 4th abdominal tergite rectangular and wide, sometimes with baso-lateral fasciate pale maculae, 6<sup>th</sup> segment conical, normal, 1.2 times longer than 5<sup>th</sup> tergite.

**Genitalia:** 7<sup>th</sup> tergite rectangular with triangular apex, 7<sup>th</sup> segment lateral sclerite rectangular, with baso-ventral extensions; 8<sup>th</sup> tergite unsclerotized medially, basal crest normal, with sub-apical sclerotized bridge joining both halves, apex unsclerotized on

dorsal and apical margin, 8<sup>th</sup> sternite unsclerotized medially; cercus with 1 row of pile on apical margin.

**Length.** 11-14mm; wing 8.5-11mm.

**Distribution.** Costa Rica (Guanacaste, Limón), El Salvador (La Libertad), Guatemala (Alta Verapaz, Chimaltenango), Mexico (Chiapas, Guerrero, Morelos).

**Material examined.** (**12 males**) COSTA RICA. Guanacaste, R.V.S. Bosque Diria, Libre, 160m., L N 239623 361899, #73746, 13 Feb 2003, Y. Cardenas (INB0003717520 INBIOCRI COSTA RICA); ..., Río Boston, 300m., L\_N\_253350\_435900, #47847, 21 Jun 1997, F. Alvarado (2 specimens, INBIO CRI002 572690 & 572691); ..., Santa Cruz, Vista del Mar, Torre COCESNA, Red. com aguamiel, 972m., L N 235350 357500, #73744, 10 Feb 2003, Y. Cardenas (INB0003717457 INBIOCRI COSTA RICA). GUATEMALA. [Alta Verapaz], S. Cristobal, Santa Vera Paz, 17 May 1926, J. M. Aldrich (USNM ENT 00257758); [Chimaltenango], Yepocapa, ?? Aug 1949, H. T. Dalmat (USNM ENT 00257757). MEXICO. Chiapas, 15km. N Ocosingo, 20 May 1981, C.M. & O.S. Flint, Jr. (USNM ENT 00257751); ..., El Sumidero, 14 Sep 1974, G. Bohart & W. Hanson (USNM ENT 00257651); ..., Finca Prussia (33 km S. Jaltenango), 1000m., 10-12 May 1985, A. Freidberg (USNM ENT 00257753); Guerrero, Iguala, 33 Mi S, 1450', 5 Aug 1954, J. G. Chillcott (CNC Diptera 161324); Morelos, Cuernovaca, 14 Mi S, 3200',

3 Aug 1954, J. G. Chillcott (CNC Diptera 161322); ..., 35 Mi. S., Frank M. Hull Collection

C.N.C. 1981, 27 Aug [19]59, R.H. Painter & E.M. Painter (CNC Diptera 161325). (**8 females**) COSTA RICA. Guanacaste, Santa Cruz, Vista del Mar, Torre COCESNA, 972m., Manual (red. libre), L N 235340 357490, #56433, 16 Feb 2000, Y. Cardenas (INB0003077657); ..., Red com aguamiel, L N 235350 357500, #73744, 10 Feb 2003, Y. Cardenas (INB0003717459 INBIOCRI COSTA RICA); Limón, R. B. Hitoy Cerere, Send. Espavel, 560m., Libre, L S 401200 569800, #73453, 12-30 Mar 2003, F. Rojas, B. Gamboa & W. Arana (INB0003706638 INBIOCRI COSTA RICA). EL SALVADOR. [La Libertad], Santa Tecla, 06 Jun 1958, L. Bottimer (USNM ENT 00257759).

GUATEMALA. Chimaltenango, Yepocapa, Finca Recreo, 01 Sep 1949, O. Ochoa (USNM ENT 00257752). MEXICO. Chiapas, Finca Prussia (33 km S. Jaltenango), 1000m., 10-12 May 1985, A. Freidberg (USNM ENT 00257754 & 00257755); .., 6.0 km SW Ocosingo, 1400m, 22 Sep 1992, M. Wood (CNC Diptera 161326).

*Pelecinobaccha (Pelecinobaccha) morgani* **sp.nov.**

Type-locality: Bolivia, Beni, Rurrenabaque, 14°26'S 67°31'W. Holotype male CNC.

Map: 8. Figures: 34a-d.

**Male. Head:** Dark brown to black; face sometimes pale on lateral 1/4; lunule sometimes pale above antenna insertion, usually light brown around the central black macula, separating it from the frontal triangle color; frontal triangle with pair of oval spots of silvery-white pollen centro-laterally and dull dark pollen medially; vertical triangle with only 1 median row of pile; ocellar triangle distanced its length from posterior eye margin; eye contiguity slightly longer than vertical triangle length; eye posterior indentation at level antennae insertion; antennae insertions confluent, ventral margin with short dorsal extension; occiput dorsal 1/4 with 2 regular rows of simple black pile, anterior row shorter, middle 3/4 with a regular posterior row of very long scale-like white pile and 2 regular anterior rows of simple long black pile, some pile scale-like and white ventrally, ventral 1/4 with 2-3 irregular rows of scale-like white pile.

**Thorax:** Scutum dark brown to black, mainly dull pollinose, white-pollinose on notopleuron, sometimes with a pair of sub-median short tapering vitta of pale pollen, pile black, longer on notopleuron anterior to transverse suture and slightly longer anterior to

scutellum, with anterior row of long shining white pile interrupted in the middle, notopleuron sometimes with white pile but always with some black pile anterior to transverse suture; scutellum dark brown to black, pile long and black, subscutellar fringe long and black; pleuron black, white pilose; plumula white and long; calypter yellow; halter stem light brown, capitulum yellow to light orange.

**Wing:** Mostly dark, apical  $\frac{1}{4}$  and posterior margin slightly dark (dark on cells bc, c, sc, r, basal  $\frac{3}{4}$  of r1, basal  $\frac{2}{3}$  of r2+3, basal  $\frac{1}{2}$  to  $\frac{3}{5}$  of r4+5, bm, most of dm, cup and most of cua1), entirely microtrichose; alula slightly dark, large, 1.9 times basally to 3.75 times apically larger than c cell, entirely microtrichose.

**Legs:** Dark brown to black; apex of profemur and base of protibia pale; apex of mesofemur and base to basal  $\frac{1}{4}$  of mesotibia pale; apex of metafemur pale, apical  $\frac{1}{5}$  of metabasitarsomere until fourth metatarsomere pale, metacoxa sometimes with a few white pile dorsally.

**Abdomen:** Dark brown to black, ~2.5 times longer than thorax; 1<sup>st</sup> tergite white pilose; 2<sup>nd</sup> tergite long, ~2.5 times longer than its smallest width, with central triangular region of dull black pollen, pile long and erect on base and laterally, remaining appressed, black but white on base and baso-lateral  $\frac{2}{3}$ ; 3<sup>rd</sup> tergite trapezoidal, ~2 times longer than smallest width, with large central triangular macula of dull black pollen, with

appressed black pile, slightly longer, erect and white on baso-lateral corners, 3<sup>rd</sup> sternite rectangular and long; 4th tergite sub-quadrangular, with median dull black pollinose large arcuate fascia, pile black and appressed; 5th tergite rectangular and wide, dull black-pollinose medially, pile black and appressed. **Genitalia:** Surstylus directed obliquely apico-ventrally, sub-oval in lateral view, with setulae (around 13) ventrally on apical 1/3, sparsely pilose on dorsal surface; subepandrial sclerite rectangular and wide, slightly concave on anterior margin and with a small notch on posterior margin; hypandrium with notch extending on anterior 2/3; distiphallus with anterior surface straight, apex curved apically, phallapodeme heavily sclerotized basally; postgonites with sparse pilosity ventrally, apex rounded ventrally, convex anteriorly and with acute dorsal extremity.

**Female:** No female available.

**Length.** ~8mm; wing 6-6.5mm.

**Distribution.** Bolivia (Beni), Brazil (Mato Grosso, São Paulo), Peru (Madre de Dios).

**Material examined.** (**10 males**) BOLIVIA. Beni, Rurrenabaque, Mullford Expedition, ?? Nov 1921-22, W. M. Mann (Holotype *Pelecinobaccha (P.) morgani*, CNC Diptera



161216). BRAZIL. São Paulo, Araçatuba, Córrego Azul, ?? Mar 1947, M.P. Barretto; ..., Caraguatatuba, Res. Flor. – 40m., Exp. Dep. Zool., 7-14 Jul 1962, ?; ..., Juquiá, Frank M. Hull Collection C.N.C. 1973, ?? ??? ????, J. Lane (CNC Diptera 161217); Mato grosso, West Border, ?? May 1931, R. C. Shannon (USNM ENT 00257699); ... (USNM ENT 00257706). PERU. Madre de Dios, Avispas, 400m., 10-20 Sep 1962, L. Pena (CNC Diptera 161214); ... 20-30 Sep 1962 (CNC Diptera 161215); ... Rio Manu, Pakitza, 250m, 12°7'S 70°58'W, 9-23 Sep 1988, A. Freidberg (USNM ENT 00257697 & 00257708).

**Comments:** The external morphology is very similar to *P. transatlantica*, but *P. morgani* has a distinct surstylus, a rectangular and wide subepandrial sclerite and its postgonite is not greatly enlarged baso-ventrally.

**Etymology:** The specific epithet is an homage to Morgan D. Jackson, colleague and friend. It is to be treated as a noun in the genitive case.

*Pelecinobaccha (Pelecinobaccha) nubilorum* **sp.nov.**

Type-locality: Costa Rica, San José, Llano Bonito, 4.4 Km SO. del Cerro Ventisquero, 2450m, 9°27'N 83°32'W. Holotype female INBio.

Map: 13. Figures: 35.

**Male. Head:** Black; face with black pile laterally on dorsal  $\frac{1}{2}$ ; lunule pale above antennae insertion, central maculae broadly connecting to frons color; frontal triangle with white-silver pollen restricted to ventral  $\frac{1}{2}$  laterally, continuous from face but ventral pollen oriented ventro-dorsally, brown-pollinose medially, vertical triangle with 3 rows of pile, but most pile concentrated in a single median row; eye contiguity as long as vertical triangle length; ocellar triangle distanced its length from posterior eye margin; eye posterior indentation at level antennae insertion; antennae insertions separated; occiput dull dark-pollinose on dorsal  $\frac{1}{3}$ , remaining white-pollinose; occiput dorsal  $\frac{1}{4}$  with 2 rows of simple black pile, anterior row shorter, middle  $\frac{2}{4}$  with posterior row of long scale-like white pile, and 1-2 anterior rows of shorter, simple black pile, sometimes scale-like and white ventrally, ventral  $\frac{1}{4}$  with 2-3 irregular rows of scale-like white pile

**Thorax:** Scutum black, mostly brown dull pollinose, slightly white-pollinose on notopleuron, with a pair of sub-median vittae of concentrated dull pollen visible from a

posterior angle and sometimes a median narrow one, black pilose, longer on notopleuron, with anterior row of shining white pile with shorter pile medially; scutellum black, with metallic-shining pollen, with long black pile, subscutellar fringe long and white; pleuron black, white pilose, with some black pile on dorso-posterior of posterior anepisternum and anterior anepimera; plumula long and white to yellow; calypter yellow, margin and pile brown; halter brown, capitulum yellow to orange.

**Wing:** Infuscated with dark brown anterior margin (dark brown on cells bc, c, sc, r, r<sub>1</sub>, r<sub>2+3</sub>, except middle of posterior margin, and most of bm), entirely microtrichose; alula hyaline with anterior margin infuscated, narrow, 2 times basally to 3 times apically larger than c cell, entirely microtrichose.

**Legs:** Prolegs black, profemur apical 1/6 and base of protibia pale; mesolegs black, apex of mesofemur and base of mesotibia pale, remaining basal 1/2 of mesotibia pale, mesobasitarsomere pale to light brown, dorsal pile black on base to basal 1/2; metalegs black, pale on apex of metafemur, base of metatibia and apex of the metabasitarsomere until the 3rd metatarsomeres, metacoxa white pilose.

**Abdomen:** Black, ~3 times longer than thorax; 1<sup>st</sup> tergite mainly white pilose on baso-ventral 1/2 and baso-dorsally, remaining pile black; 2<sup>nd</sup> tergite long, ~3.5 times longer than its smallest width, with median sub-lateral pair of vittate pale maculae and median

black dull pollinose rectangular region, pile erect basally and laterally, remaining pile appressed, pile white on base and baso-lateral  $\frac{1}{2}$ , remaining pile black; 3<sup>rd</sup> tergite trapezoidal and long, ~3 times longer than smallest width, pale on baso-lateral  $\frac{1}{2}$  connected basally to pair of median short pale vittae, largely dull black-pollinose medially, mainly with black appressed pile, erect and white on baso-lateral  $\frac{1}{2}$ , 3<sup>rd</sup> sternite rectangular and long; 4th tergite rectangular and long, slightly longer than wide, pale on baso-lateral corners connected basally to median pair of pale vittae, dull black-pollinose on median triangular region, mainly with appressed black pile, baso-lateral  $\frac{1}{3}$  with erect white pile; 5th tergite rectangular and wide, pale on baso-lateral corners, with median pair of pale vittae, with 3 vittae of dull black pollen between the pale vittae, these pollinose vittae sometimes fused, entirely with appressed black pile; pale regions sometimes faint on abdominal segments. **Genitalia:** Cercus with 1 row of pile on medial margin and 3 rows outward; surstylus rectangular in lateral view, directed apico-ventrally, with weak setulae ventrally (around 24), shorter on apical  $\frac{1}{4}$  and base (around 21) and longer on the middle (around 3), sparse pilose on baso-dorsal  $\frac{2}{3}$ ; subepandrial sclerite sub-quadrangular, apex trapezoidal, posterior margin with trapezoidal notch, anterior margin slightly concave, homogenously sclerotized; hypandrium ventral notch extending on anterior  $\frac{2}{3}$ ; phallapodeme well sclerotized throughout; distiphallus anterior surface straight; postgonites lateral surface expanded ventrally on basal  $\frac{1}{2}$ , ventral and dorsal surfaces concave, apex ventral extremity rounded and large, extended ventro-apically, dorsal extremity acute and directed basally.

**Female (form of altitudes <1700m.):** Similar to male except: face slightly pale on ventro-lateral 1/3; frons with white-silver pollen continuous from face and restricted to lateral margin until ventral 2/3; ocellar triangle ~2 times its length from posterior eye margin and ~1 ocellus-width from lateral eye margin; occiput dull dark-pollinose on dorsal 1/5; anterior row of dorsal occiput very short, anterior rows of middle  $\frac{3}{4}$  of occiput with simple black pile restricted dorsally; scutum white-pollinose on notopleuron, with a pair of sub-median tapering vitta and an inconspicuous postero-anterior narrow median vittae of white pollen, with anterior continuous row of shining white pile; scutellum dorsal pile shorter; plumula brown; calypter gray, margin and pile darker; wing mostly hyaline with anterior margin dark brown (except r2+3 middle until apex of posterior margin hyaline); alula hyaline, normal, 1.4 times basally to 3.2 times apically larger than c cell; pro and mesolegs dark brown; profemur with apical  $\frac{1}{2}$  gradually becoming pale, protibia with basal  $\frac{1}{2}$  pale, 2nd to 4th protarsomeres slightly enlarged; apex of mesofemur and basal 1/2 of mesotibia pale, 2nd to 4th mesotarsomeres slightly enlarged, black pile on dorsal base of mesobasitarsomeres not so distinct; apical 1/3 to  $\frac{1}{4}$  of the metabasitarsomere to 4th metatarsomeres pale, apical metatarsomere slightly darker, some white pile dorsally on metacoxa; abdomen ~3.5 times longer than thorax; 1<sup>st</sup> tergite mainly black pilose, pile white baso-ventrally and dorsally; 2<sup>nd</sup> tergite long, slightly constricted medially, ~2.5 times longer than its smallest width, with median-lateral pale triangular maculae and median black dull pollinose triangular region, mainly with black appressed pile, erect and white on base and on baso-lateral  $\frac{1}{2}$ ; 3<sup>rd</sup> tergite trapezoidal and short, as long as smallest width, with pair of baso-lateral arcuate pale maculae connected basally to median pair of short pale vittae, pile erect and white

baso-laterally, 3<sup>rd</sup> sternite normal; 4th tergite rectangular and wide, entirely dark, with appressed black pile; 5th tergite rectangular and wide, entirely dark, remaining characteristics as on male 4th tergite; 6th segment long, ~1.5 times longer than 5<sup>th</sup>.

**Genitalia:** Strongly sclerotized; 7<sup>th</sup> tergite with extended apical margin, longer than on other form, basal extensions slightly shorter than 6<sup>th</sup> segment, 7<sup>th</sup> segment lateral sclerite sub-rectangular, acute baso-ventral extensions very short; 8th segment longer than on other form, 8th tergite entirely sclerotized, with basal and apical notches, basal crest short, 8th sternite unsclerotized medially.

**Female (form of altitudes >2300m.):** Similar to male except: black pile of face restricted ventrally to frontal prominence; frons with white-silver pollen continuous from face and restricted to lateral margin until ventral 2/3; ocellar triangle ~2 times its length from posterior eye margin and ~1 ocellus-width from lateral eye margin; occiput dull dark-pollinose on dorsal 1/5; anterior row of dorsal occiput very short, anterior rows of middle  $\frac{2}{4}$  of occiput with simple black pile restricted dorsally; scutum white-pollinose on notopleuron, with a pair of sub-median tapering vitta and an inconspicuous postero-anterior narrow median vittae of white pollen, pile white on notopleuron but sometimes with a few black pile immediately anterior to transverse suture; scutellum dorsal pile shorter; pleuron entirely white pilose; calypter white; wing mostly hyaline with anterior margin dark brown; alula hyaline, narrow, as wide as basally to 2.5 times wider apically than c cell; pro and mesolegs dark brown; profemur with apical  $\frac{1}{2}$  gradually becoming pale, protibia with basal  $\frac{1}{2}$  pale, probasitarsomeres brown, 2<sup>nd</sup> to 4<sup>th</sup> protarsomeres slightly enlarged and black; apex of mesofemur and basal 2/3 of mesotibia pale, middle

of mesotibia sometimes light brown, 2<sup>nd</sup> to 4<sup>th</sup> mesotarsomeres slightly enlarged and black, mesobasitarsomere entirely white pilose dorsally; basal ½ of metafemur pale, basal ¼ of metatibia pale; abdomen ~3.5 times longer than thorax; 1<sup>st</sup> tergite usually with fewer black pile; 2<sup>nd</sup> tergite ~3.5 times longer than its smallest width, pale maculae sometimes absent, with median black dull pollinose triangular region, mainly with black appressed pile, erect and white on base and on baso-lateral 2/3; 3<sup>rd</sup> tergite ~2 times longer than smallest width, 3<sup>rd</sup> sternite normal; 6th segment as long as 5<sup>th</sup>. **Genitalia:** Similar to the other form except 7<sup>th</sup> tergite with shorter apical margin and shorter 8th segment.

**Length.** 11.5-13mm; wing ~9mm.

**Distribution.** Costa Rica (Limón, Puntarenas, San José), Mexico (Guerrero).

**Material examined.** (**3 males**) COSTA RICA. Puntarenas, Monteverde, Cerro Chomogo, 1800m., 22-30 Aug 1996, M. Wood (CNC Diptera 161223); ..., Sendero a Cerro Echandi, primer Campamento borde de Tacotal, 900m., Red Mariposera, L\_S\_326500\_591700, #50838, 12-14 Apr 1998, M. Moraga (INB0003088849 INBIOCRI COSTA RICA); San José, Santa Ana, Zona Prot Cerro de Escazú, Bebedero, Alto Tapezco, 1760m., Rede con agua miel, L N 209000 518900, # 52373, 14 Jan 1999, M. A. Zumbado (INB0003034654 INBIOCRI COSTA RICA). (**9 females**) COSTA RICA.

Limón, P. Int. La Amistad, Send. a Cerro Hoffman, 2460m., Libre, L S 340258 577465, #73656, 24 Mar 2003, M. Alfaro (INB0003713242 INBIOCRI COSTA RICA); ..., Send. el Alto, 2500m., Libre, L S 340258 577465, #74177, 26 Jun 2003, M. Alfaro & R. Delgado (INB0003724521 INBIOCRI COSTA RICA); San José, Est. Cuereci, Sendero El Carbón, 5 Km al E. de Villa Mills, 2700m., L\_S\_390100\_500100, #7685, 01 Jun 1996, A. Picado (INBIO CRI002 452318); ..., Est. Santa Elena, Las Nubes, 1210m., L\_S\_371750\_507800, #7888, 5-21 Jul 1996, M. Segura (INBIO CRI002 469634 and 469711); ..., Send. La Bota, 3.5 Km al SE. del Cerro Chucuyo, 1690m., L\_S\_373400\_507300, #7891, 18-22 Jul 1996, M. Segura (INBIO CRI002 446931); ..., Llano Bonito, 4.4 Km SO. del Cerro Ventisquero, 2450m., L\_S\_378500\_513200, #46215, 4 May 1997, A. Picado (INBIO CRI002 504351 (Holotype *Pelecino baccha* (P.) *nubilorum*)); ..., San Gerardo de Dota, Albergue Savegre, Send. Los Robles, 2300-2450m., L\_S\_389000\_484200, #49970, 20-22 Jan 1998, M. A. Zumbado (INBIO CRI002 415918). MEXICO. [Guerrero], Gro 10Km S Filo de Caballos, 2700 m., 14 Jul 1992, D. M. Wood (CNC Diptera 161224).

**Comments:** Due to the overall external and genitalia similarity, I recognize two forms for the female of this species, one of altitudes below 1700m and another of altitudes above 2300m. The former has a shorter 3<sup>rd</sup> abdominal segment and longer 6<sup>th</sup> segment while the latter has a longer 3<sup>rd</sup> abdominal segment and shorter 6<sup>th</sup> segment, besides the other small variations described above.



**Comments:** F.C. Thompson's '*Ocyptamus* CR-41b' keys out to this species.

**Etymology:** The specific epithet refers to 'clouds'. It is to be treated as a noun in the genitive case.

*Pelecinobaccha (Pelecinobaccha) peruviana* (Shannon, 1927)

*Baccha peruviana* Shannon, 1927. Shannon, 1927:10. Type-locality: Peru, Chanchamayo. Holotype female USNM. Hull, 1949a: 207 (fig. 69, female abdomen; fig. 70, male abdomen).

*Ocyptamus peruvianus*. Thompson et al. 1976: 25 (catalog citation).

Map: 12. Figures: 34e-h.

**Male. Head:** Dark brown; face pale on lateral  $\frac{1}{5}$ , tubercle large and without pollen; lunule entirely dark brown, central black macula broadly connected to frons color; frontal triangle with shining white pollen in small latero-medial spots; antennal insertions confluent, ventral margin with short dorsal extension; vertical triangle with a single median row of pile; ocellar triangle  $\sim 1.5$  times its length from posterior eye margin; eye contiguity slightly shorter than vertical triangle length; occiput dorsal  $\frac{1}{3}$  with 2 rows of simple black pile, anterior row short, middle  $\frac{2}{4}$  with 2-3 rows of scale-like white pile, anterior rows shorter, dorsal anterior rows sometimes with black pile dorsally, ventral  $\frac{1}{4}$  with 2-3 rows of scale-like white pile, anterior rows shorter.

**Thorax:** Dark brown; scutum dull brown-pollinose, and sometimes with a pair of sub-median vittae of dull white pollen, mainly with short black pile, notopleuron white pilose but area anterior to transverse suture sometimes black pilose, anterior row of shining white pile not so distinct and largely interrupted in the middle; scutellum dark brown, with short black pile, subscutellar fringe normal and black; pleuron dark brown, sometimes slightly pale on dorso-posterior  $\frac{1}{2}$  of posterior anepisternum and dorso-posterior katepisternum, white pilose; calypter white; plumula normal and white; halter light brown.

**Wing:** Dark brown, lighter on apical  $\frac{1}{5}$ , entirely microtrichose; alula normal, around 2.5 times larger than c cell, entirely brown, entirely microtrichose.

**Legs:** Dark brown; profemur mostly brown; metacoxa pile white dorsally, remaining of metalegs missing.

**Abdomen:** Elongated, 3.9 times longer than thorax, dark brown; 1st tergite white pilose, a few black pile baso-dorsally; 2nd tergite rectangular and long, 4.1 times longer than smallest width, with central triangular macula of dull black pollen, with short appressed black pile dorsally and longer erect white pile laterally; 3rd tergite rectangular and long, 3.4 times longer than smallest width, with central triangle of dull black pollen with anterior bare incision, with appressed black pile but very sparse dorsally; 4th tergite

rectangular and long, 2.4 times longer than smallest width, pile not so sparse dorsally, remaining characteristics as on 3rd; 5th tergite sub-quadrangular, with dull black pollen medially, remaining characteristics as on 4th. **Genitalia:** Not dissected

**Female:** Like male except: head dark brown to black; face pale on lateral  $\frac{1}{4}$ , lunule sometimes pale above antennae insertions, central black macula broadly connected to frons color; frons dull brown-pollinose, shining white pollen in small latero-medial spots; vertex with a single median row of pile; ocellar triangle  $\sim 2$  times its length from posterior eye margin, and  $\sim 1$  ocellus-width from lateral eye margin; occiput dorsal  $\frac{1}{3}$  anterior row very short; wings with basal  $\frac{3}{4}$  dark brown (dark on cells bc, c, sc, r, basal  $\frac{3}{4}$  of r1, basal  $\frac{3}{5}$  of r2+3, basal  $\frac{1}{3}$  of r4+5, bm, basal  $\frac{1}{2}$  of dm, apical  $\frac{1}{2}$  of cup and basal  $\frac{1}{2}$  of cua1), alula normal, 1.3 times basally to 2.4 times apically larger than c cell, hyaline; all tibiae sometimes pale apically; prolegs and mesolegs sometimes light brown, and brown sub-apically on tibiae and whole tarsi; metalegs dark brown, metafemur sometimes light brown, apical  $\frac{1}{5}$  of metabasitarsomere until 4th metatarsomere pale; abdomen greatly elongated, 6.5 times longer than thorax, 2nd to 6th abdominal tergites of similar lengths but narrowing slightly towards apex, dark brown; 2nd tergite rectangular very long, 2.9 times longer than smallest width, with sub-apical pair of fasciate maculae of dull black pollen, mostly with appressed black pile, with some white pile on base and baso-lateral  $\frac{1}{4}$ ; 3rd tergite very long, 3 times longer than smallest width, with pair of central triangles of dull black pollen, with appressed black pile; 4th tergite very long, 3.8 times longer than smallest width, without dull black pollen, with sparse appressed black pile; 5th tergite as 4th, 3.6 times longer than smallest width,

and fused to sternite at apex; 6th segment cylindrical long, 5.8 times longer than smallest width and slightly longer than 5th. **Genitalia:** 7<sup>th</sup> tergite rectangular and wide, short, apical margin convex with short irregular medial projection, weakly sclerotized, 7<sup>th</sup> segment lateral sclerite triangular large, extending dorsally apical and contiguous to 7<sup>th</sup> tergite, baso-ventral extensions unsclerotized and as long as basal extensions of the 7<sup>th</sup> tergite.

**Length.** 14-16.5mm; wing 8.5-9mm.

**Distribution.** Peru (Junín).

**Material examined.** (**1 male**) PERU. [Junín], Cha[n]chamayo, Allotype n° 28761 U.S.N.M. [red label], ?? ?? ????, W.F.H. Rosenberg (Allotype). (**4 females**) PERU. [Junín], Chanchamayo, 1100m., Frank M. Hull Collection C.N.C. 1973, 19 Aug 1948, J. Schunke (CNC Diptera 161283); ..., Type n° 28761 U.S.N.M. [red label], ?? ?? ????, W.F.H. Rosenberg (Holotype *Baccha peruviana*); ..., Paratype n° 28761 U.S.N.M. [red label]; El Campamiento, Col. Perene, Frank M. Hull Collection C.N.C. 1973, 21 Jun 1920, Cornell Univ. Exp.

**Comments:** The male alula width is a rough approximation since the only specimen (allotype) is too damaged to assess it more precisely.

One female specimen is missing the 5<sup>th</sup> and 6<sup>th</sup> abdominal segments and the specimen dissected is missing the 8<sup>th</sup> segment onwards.

*Pelecinobaccha* (*Pelecinobaccha*) *pilinigridentis* **sp.nov.**

Type-locality: Costa Rica, Puntarenas, 1Km W Progreso, Zona Protectora Las Tablas, 1350m, 8°26'N 82°52'W. Holotype male INBio.

Map: 11. Figures: 36a-f.

**Male. Head:** Black; face with only black pile, ventral pile sometimes brown, with dense white pollen, apex of tubercle with no pollen, shiny; lunule pale above antennae insertion, central macula broadly connected dorsally to frontal triangle color; frontal triangle with silvery-white pollen restricted to small ventro-lateral traces, that connect to pollen from face by differently oriented pollen; vertical triangle with 3 rows of pile, but most pile concentrated in a single median row; ocellar triangle ~1.5 times its length from posterior eye margin; eye contiguity shorter than vertical triangle length; eye with sub-triangular indentation on posterior margin positioned slightly dorsal to antenna insertion; antennae insertions distinctly separated; antennae black; occiput dorsal  $\frac{1}{4}$  with 2 rows of simple black pile, anterior row shorter, middle  $\frac{2}{4}$  with 3-4 rows of pile, posterior row long, white and scale-like, anterior rows shorter, black and simple, ventral  $\frac{1}{4}$  with 3 irregular rows of white, scale-like pile, anterior rows slightly shorter.

**Thorax:** Scutum black, mainly dull pollinose with inconspicuous pair of sub-median vittae of white pollen visible from a posterior view, black pilose, pile longer than other *Pelecinozaccha* species, pile longer on notopleuron, anterior row black pilose with shorter pile in the middle; scutellum black, with long, black pile, shiny pollinose, pollen differently oriented on base from remaining of scutellum, subscutellar fringe long and black; pleuron black, with black pile on anterior anepisternum, posterior ½ of posterior anepisternum, anterior anepimera, ventro- and dorso-posterior katepisternum and katepimeron, with some white pile on ventro-posterior of posterior anepisternum, ventro- and dorso-posterior katepisternum, katepimeron and metaepisternum, the pile is densely arranged on the posterior anepisternum, anterior anepimera and dorso-posterior katepisternum; plumula dark golden and long; calypter grey, fringe black; halter stem dark grey, capitulum yellow.

**Wing:** Light brown, anterior margin dark (cells bc, c, sc, r, r<sub>1</sub>, r<sub>2+3</sub> and bm), entirely microtrichose; alula normal, 1.3 times basally and 3 times apically larger than c cell, light brown, darker dorsally, entirely microtrichose.

**Legs:** Prolegs dark brown, apical ½ of profemur slightly pale; mesolegs dark brown, apical 1/3 of mesofemur, basal ½ of mesotibia and apical ½ of mesobasitarsomere slightly pale; metalegs dark brown, pale on apex of metafemur and apical 1/4 of metabasitarsomere to third or fourth metatarsomere, fifth, and sometimes fourth, metatarsomere brown.



**Abdomen:** Black, 3 times longer than thorax; 1<sup>st</sup> tergite with long, erect, black pile and shiny pollen; 2<sup>nd</sup> tergite long, 3.5 times longer than its smallest width, with latero-median faint pale spots, pile very long, erect and black, shorter and appressed dorsally, with sub-apical central triangular region of dull black pollen; 3rd tergite trapezoidal, base very narrow, 2.5 times longer than smallest width, sometimes with faint pale baso-lateral corners and a pair of very short basal vittae, with large central triangular region of dull black pollen, absent where vittae might occur, pile short, appressed and black, slightly longer baso-laterally; 4th tergite rectangular and wide, pile short, appressed and black, dull black pollen absent only on base, apex and in some specimens in a pair of short central vittae; 5th tergite rectangular and wide, remaining characteristics as in 4th; 1st sternite with long pile. **Genitalia:** Cercus with 1-2 regular rows of pile on medial margin and 2-3 regular rows outward; surstylus long, directed ventrally, with setulae (around 16) ventrally on apex, pilose on basal ½ of the dorsal surface; subepandrial sclerite weakly sclerotized medially, with lateral lobes extended posteriorly, “M”shaped; hypandrium with ventral notch extending on anterior 2/3; distiphallus smooth and anterior surface straight; phallapodeme mostly weakly sclerotized; postgonites with pile mainly on ventral surface, ventral surface concave, extended baso-ventrally, dorsal surface concave, apex slightly convex anteriorly, with convex ventral extremity and acute dorsal extremity.

**Female:** no female available.

**Length.** 10-15mm; wing 7.5-10.5mm.

**Distribution.** Costa Rica (Puntarenas).

**Material examined.** (**5 males**) COSTA RICA. Puntarenas, Monteverde, 1500m, 14-20 May 1990, D. M. Wood (CNC Diptera 161159); ..., Quijada del Diablo, 3.1 km NE de Mellizas, 1800m, L\_S\_316900\_600600, #7702, 14-30 Jun 1996, E. Navarro (INBIO CRI002 452685); ..., Quebrada Quince, 1 km O Est. Progreso, Zona Protectora Las Tablas, 1350m, L\_S\_318600\_593500, #7894, 20 Jul 1996, L. Angulo (INBIO CRI002 447101 (Holotype *Pelecinobaccha (P.) pilinigridentis*)); San José, Est. Santa Elena, Las Nubes, 1210m, L\_S\_371750\_507800, #7888, 5-21 Jul 1996, M. Segura (INBIO CRI002 469633); ..., Sendero El Gringo, Est. Las Nubes de Santa Elena, 1500m, L\_S\_370700\_508850, #46796, 10 Jun 1997, E. Alfaro (INBIO CRI002 541683).

**Etymology:** The specific epithet is a noun phrase in apposition that means 'thick black hair'.

*Pelecinobaccha (Pelecinobaccha) pilipes* (Schiner, 1868) **comb. nov.**

*Baccha pilipes* Schiner, 1868. - Schiner, 1868: 342. Type-locality: "South America".  
Lectotype male MNH-Wien. Hull, 1949a: 210 (fig. 94, male abdomen), 272 (fig. 350, male wing).

*Ocyptamus pilipes*. Thompson et al. 1976: 25 (catalog citation).

*Baccha hirta* Shannon, 1927. - Shannon, 1927: 11. Type-locality: Bolívia, Beni, Ivon.  
Holotype male USNM. Hull, 1949a: 154 (redescription), 250 (fig. 271, male abdomen). **n. syn.**

*Ocyptamus hirtus*. Thompson et al. 1976: 20 (catalog citation).

Map: 9. Figures: 37.

**Male. Head:** Shiny black; face pale on lateral  $\frac{1}{4}$ , sometimes only slightly pale; gena dark brown; lunule black, slightly pale above antenna insertion; frontal triangle entirely black, white pollen restricted to latero-medial oval spots and a small patch of differently oriented pollen ventrally, not connected to face pollen; vertical triangle with 3 rows of pile, but most pile concentrated in a single row ending dorsal to anterior ocellus; ocellar triangle distanced its length from posterior eye margin; eye contiguity as long as the vertical triangle length; eye with sub-triangular indentation on posterior margin

positioned around level of antenna insertion; antennae insertions almost separated, ventral sclerotized margin extended dorsally, scape with longer pile; occiput usually dull dark-pollinose on dorsal 1/3 and white-pollinose on ventral 2/3; occiput dorsal 1/3 with 2 rows of simple black pile, anterior row slightly shorter, middle  $\frac{2}{4}$  with anterior 2-3 rows of simple black pile, posterior row longer, scale-like and white, ventral  $\frac{1}{4}$  with 2-3 irregular rows of scale-like white pile.

**Thorax:** Scutum black, dull black-pollinose but white-pollinose on notopleuron, with no distinct rectangular concentrated area anterior to scutellum, long black pile, densely arranged, slightly shorter laterally posterior to transverse suture, with anterior row slightly longer and sometimes white; scutellum dark brown, pile black and long, subscutellar fringe copious (around 60 pile), black and long, sometimes white; pleuron dark brown to black, with long black pile on anterior anepisternum, posterior  $\frac{1}{2}$  of posterior anepisternum, anterior anepimera, ventro- and dorso-posterior katepisternum, katepimeron and metaepisternum, these regions sometimes with white pile intermixed, the pile is densely arranged on the posterior anepisternum, anterior anepimera and dorso-posterior katepisternum; plumula long and dark brown; calypter and fringe black; halter dark brown, capitulum yellow to orange.

**Wing:** Mostly hyaline, dark on the stem cell, cell bc and base of bm, sometimes dark on cells c, sc, and basal regions of r1 and r2+3, either entirely microtrichose or with central

bare areas (see comments below); alula with anterior margin dark, large, 1 to 4 times larger than c cell, entirely microtrichose.

**Legs:** Prolegs dark brown; mesolegs dark brown; metalegs dark brown, pale on apex of metabasitarsomere, 2<sup>nd</sup> and 3rd metatarsomeres, metafemur and metatibia with densely arranged long pile.

**Abdomen:** Black, 2.7 times longer than thorax; 1st tergite mainly black pilose, pile white ventrally; 2<sup>nd</sup> tergite long, ~2.5 times longer than its smallest width, with curved fasciate region of dull black pollen medially that slightly expands basally, with mainly densely arranged long white pile, appressed black pile on apico-dorsal 1/2; 3rd tergite trapezoidal, sometimes pale on baso-lateral 1/2, with large triangular region of dull black pollen medially, with mainly appressed black pile, some longer erect white pile on baso-lateral corners, 3rd sternite dull black-pollinose on a medial spot; 4th tergite rectangular and wide, with pair of inconspicuous short central pale vittae and large baso-lateral pale triangles, might appear entirely black, with large triangular region of dull black pollen medially, pile appressed black pilose, white on baso-lateral corners; 5th tergite rectangular and narrow, wider than long, dull black-pollinose medially but with pair of medial vittae of absence of pollen, with appressed black pile. **Genitalia:** cercus with 1 regular row of pile on medial margin and 3 irregular rows outward; surstylus directed apically, with rounded apex, with strong setulae (around 10) concentrated on ventral

apical 1/3, with very little of the dorsal thin sclerotized layer, pilose on basal 1/2 of the dorsal surface; subepandrial sclerite quadrangular, antero-lateral corners slightly extended, postero-lateral corners extended posteriorly and laterally; hypandrium almost entirely open on ventral side; distiphallus smooth and anterior surface straight; phallapodeme with basal 1/3 poorly sclerotized; postgonites with pile mainly on ventral surface, ventral surface expanded, slightly convex until dorso-apical extremity, dorsal surface slightly concave, apex convex anteriorly, with acute dorsal extremity; apical membranous sac microtrichose.

**Female:** As male except: face usually distinctly pale laterally; frons broad; vertex with short pile concentrated on single row ending dorsal to anterior ocellus; ocellar triangle ~2 times its length from posterior eye margin and 1.5-2 ocelli-width from lateral eye margin; wing with basal 1/3 dark (dark on cell c, basal 1/2 of sc, basal 1/4 of r1, base of r2+3, 3/4 of r and bm, cup diffusely dark); alula entirely dark; the first 3 tarsomeres of the protarsus and mesotarsus greatly enlarged, 4th tarsomere normal, 5th tarsomere reduced; abdominal pile from 2nd tergite onward usually much shorter than on male, 3rd and 4th tergite usually with pale triangular maculae on baso-lateral corners, 6th segment short, segment base wider than long, as long as 5th. **Genitalia:** 7<sup>th</sup> tergite with undulated apex, basal extensions as long as the 6<sup>th</sup> segment; 7<sup>th</sup> segment lateral sclerite narrow and long, 7<sup>th</sup> segment with central dorsal longitudinal membranous area bare, 8<sup>th</sup> tergite central region well sclerotized, basal crest weakly sclerotized, cercus with 1-2 rows of pile on apical margin, with short basal extension.

**Length.** 9-11mm; wing 7-8.5mm.

**Distribution.** Bolivia (Beni), Brazil (Goiás, Mato Grosso), Colombia (Boyaca), Ecuador (Napo), Paraguay (Paraguari), Peru (Cuzco, Madre de Dios, Pasco), Venezuela.

**Material examined.** (**11 males**) BOLIVIA. Beni, Ivon, Mulford Biol Expl, Type no 28759 U.S.N.M. [red label], USNM 2052087, ?? Feb 1921-22, W. M. Mann (Holotype *Baccha hirta*). BRAZIL. Goiás, Corumbá, F. Monjolinho, ?? Nov 1945, [M.P.] Barretto; [Mato Grosso], Chapada, S. W. Williston Collection, Am. Mus. Nat. Hist. Dept. Invert. Zool. n°19195, ?? Jan ????, ?; ..., Utariti, Rio Papagaio Mt, ?? Oct 1966, [K.] Lenko & Pereira. ECUADOR. Napo, Coca, Napo R., 250m, 25-30 Apr 1965, L. Pena (CNC Diptera 160841). MEXICO. Tehautepec. Sumichrast, C. V. Riley collection, ?? ?? ????, ? (USNM ENT 00257703). PARAGUAY. Paraguari, Ybycui (25 km SE), in Ybycui National Park, 12-24 Apr 1980, P. J. Spangler et al. (USNM ENT 00257704). PERU. Madre de Dios, Avispas, 400m., 20-30 Sep 1962, L. Pena (CNC Diptera 160842). VENEZUELA. Lindig, *Baccha pilipes* Schin. [handwritten label], [label with unintelligible handwriting], Lectotype *Baccha pilipes* Schiner [red label], ?? ??? 1864, ? (Lectotype *Baccha pilipes*). (**13 females**) BRAZIL. [Mato Grosso], Chapada, S. W. Williston Collection, Am. Mus. Nat. Hist. Dept. Invert. Zool. n°19195, ?? ?? ????, ?. COLOMBIA. Boyaca, Muzo, 900m, Frank M. Hull Collection C.N.C. 1973, ?? ??? 1936, J. Bequaert (CNC Diptera 160832); Meta, Restrepo, 500m, Frank M. Hull Collection C.N.C. 1973,

?? ??? 1936, J. Bequaert (CNC Diptera 160833). ECUADOR. Limoncocha, 0°24' S, 76°40' W, 250m., 9-16 Mar 1976, G. E. Shewell (CNC Diptera 160834); Napo, Coca, Napo R., 250m, 25-30 Apr 1965, L. Pena (CNC Diptera 160835); ..., ?? May 1965 (3 specimens, CNC Diptera 160836-8). PERU. Cuzco, Quincemil, 780m, 13-31 Aug 1962, L. Pena (2 specimens, CNC Diptera 160839-40); Loreto, Iquitos (14 km W), 21 Feb 1984, W. N. Mathis (USNM ENT 00257696); Madre de Dios, Manu, Rio Manu, 250m., Pakitza, 12°7'S 70°58'W, 9-23 Sep 1988, Amnon Freidberg (USNM ENT 00257701); Pasco, Yonculmaz, R. Cacazú, 700m, 5 Apr 1984, P. Hocking (USNM ENT 00257705). VENEZUELA. Lindig, [label with unintelligible handwriting], Paralectotype *Baccha pilipes* Schiner [red label]?? ??? 1864, ? (Paralectotype *pilipes*)

**Comments:** The *Baccha pilipes* Schiner description doesn't refer to where the types were deposited but comments about "ein pärenchen" (a pair) of specimens from South America. Being the first reviewer of this species, I designate the male specimen from the type series of the MNH-Wien as the lectotype in order to stabilize the concept of this species.

One female from Venezuela and four males, from Bolivia, Ecuador, Peru and Venezuela, have distinct bare regions on their wing cells. The female is bare on the anterior margin of the c cell, apical 1/3 of r, middle 3/5 of r<sub>1</sub>, basal 6/7 of r<sub>2</sub>+3 (except on middle fold), basal 3/4 of r<sub>4</sub>+5 and baso-anterior margin of cup. The male from Ecuador is bare only in the middle anterior margin of r and the baso-anterior margin of the cup cell. The male from Peru and the lectotype are bare on basal 2/5 of c, most of



the apical 4/5 of r (microtrichose around sv vein), some regions on the middle anterior margin of r<sub>2+3</sub>, basal region and posterior to the sv vein on r<sub>4+5</sub>, median 3/5 of bm and basal 1/3 of cup cell. The holotype of *B. hirta* is bare on the middle 1/3 and posterior apex of r (except around the sv vein), base of r<sub>1</sub>, some regions on the anterior margin of r<sub>2+3</sub>, middle 1/3 of the anterior margin of bm and anterior margin of cup.

Bare areas on the wing are rare in the *Pelecinobaccha* group, but no other characters were found in these specimens to support separating them into different species. I believe that the bare condition is but an intraspecific variation.

*Pelecinobaccha (Pelecinobaccha) pucallpa* **sp.nov.**

Type-locality: Peru, Ucayali, Pucallpa, 8°23'S 74°33'W. Holotype Male CNC.

Map: 8. Figures: 36g-j.

**Male. Head:** Black; lunule pale around central black macula; frontal triangle dull brown-pollinose medially, white-silver pollen continuous from face restricted to lateral margin except around eye contiguity; vertical triangle with 3 rows of pile, but most pile concentrated in a single median row; ocellar triangle ~2 times its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye posterior indentation positioned dorsal to level of antennae insertion; antennae insertions confluent, ventral margin with short dorsal extension; occiput dorsal  $\frac{1}{4}$  with posterior row of white scale-like pile and 2 anterior rows of shorter simple black pile, middle  $\frac{2}{4}$  with 3-4 rows of scale-like white pile, posterior row longer, anterior rows shorter and irregular, pile is black and simple dorsally, ventral  $\frac{1}{4}$  with 2-3 irregular rows of scale-like white pile.

**Thorax:** Scutum black, mainly dull pollinose, but with white pollen concentrated laterally posterior to transverse suture and sparse throughout, with long black pile, longer on notopleuron, with anterior row of scale-like white pile interrupted in the middle; scutellum black, with long, black pile, subscutellar fringe long and light brown; pleuron black, white

pilose except black on dorso-posterior  $\frac{1}{2}$  of posterior anepisternum, anterior anepimera, dorso and ventro-posterior katepisternum, the pile is densely arranged on the posterior anepisternum; plumula normal and white; calypter dorsal lobe reduced to a  $\frac{1}{3}$  of the length of the ventral lobe, white; halter orange.

**Wing:** Hyaline with anterior margin slightly darker (cells bc, c and sc and diffusely dark on basal  $\frac{1}{2}$  of r1), entirely microtrichose; alula large, 1.5 times basally to 3.5 times apically larger than c cell, hyaline, entirely microtrichose.

**Legs:** Prolegs dark brown, apex of profemur and base and apex of protibia pale; mesolegs dark brown, apex of profemur and basal  $\frac{1}{2}$  of mesotibia pale; metalegs dark brown, apex of metafemur, apical  $\frac{2}{5}$  of metabasitarsomere to third metatarsomere pale, fourth and fifth metatarsomeres light brown.

**Abdomen:** Black, 2.4 times longer than thorax; 1<sup>st</sup> tergite mainly black pilose, pile white baso-ventrally; 2<sup>nd</sup> tergite long, 2 times longer than its smallest width, with central rectangular region of dull black pollen, pile long and black, white on basal  $\frac{1}{3}$  and baso-lateral  $\frac{2}{3}$ , pile erect on basal  $\frac{1}{3}$  and laterally, remaining pile shorter and appressed; 3rd tergite trapezoidal, 1.5 times longer than smallest width, with large central triangular region of dull black pollen, pile appressed and black, slightly longer, erect and white on baso-lateral corner; 4th tergite rectangular and long, pile appressed and black, white on

baso-lateral corner, with pair of central sub-lateral maculae and a median short vitta of dull black pollen; 5th tergite rectangular and wide, remaining characteristics as on 4th.

**Genitalia:** Epandrium baso-ventral margin with small fold; cercus with 1 row of pile on medial margin and 3 irregular rows outward; surstylus sub-quadrate on lateral view, directed ventrally, with setulae (around 15) ventrally on apical 1/3, pilose on basal 2/3 of the dorsal surface; subepandrial sclerite crescent shaped, anterior margin with small concavity; hypandrium with notch extending on anterior 2/3; basiphallus posterior apex short, distiphallus anterior surface straight; phallapodeme with narrower basal 1/2; postgonites ventral and dorsal surfaces concave, apex convex with acute ventral and dorsal extremities, ventral extremity more apically located than dorsal extremity.

**Female:** No female available.

**Length.** 10mm; wing 7.5mm.

**Distribution.** Peru (Ucayali).

**Material examined.** (1 *male*) PERU. [Ucayali], Pucallpa, 18 Nov 1947, J. Shunke (Holotype *Pelecinobaccha (P.) pucallpa*, CNC Diptera 161211).

**Etymology:** The specific epithet refers to the region where the specimen was collected.

It is to be treated as a noun in apposition.

*Pelecinobaccha* (*Pelecinobaccha*) *seara* **sp.nov.**

Type-locality: Brazil, Santa Catarina, Nova Teutônia, 300-500m, 27°11'S 52°23'W.

Holotype male CNC.

Map: 8. Figures: 38a-d.

**Male. Head:** Dark brown; face pale on lateral  $\frac{1}{4}$ ; lunule pale above antennae insertions, central maculae connected by a median dark vitta to frontal triangle color; frontal triangle pale laterally, white-silver pollen continuous from face restricted to lateral margin; vertical triangle long, with median single row of pile, ocellar triangle distanced its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye posterior indentation at level of antennae insertion; antennae insertions confluent; occiput dorsal  $\frac{1}{4}$  with 2 rows of simple black pile, anterior row with very short pile, middle  $\frac{2}{4}$  with 2-4 rows of white scale-like pile, posterior row longer, with some simple black pile on anterior row, ventral  $\frac{1}{4}$  with 2-3 rows of scale-like white pile.

**Thorax:** Scutum dark brown, usually pale on notopleuron anterior to transverse suture, with weak pair of sub-median vittae of concentrated pollen, mainly black pilose, slightly longer and white on notopleuron, with anterior row of shining white pile slightly interrupted in the middle; scutellum dark brown, white pilose, subscutellar fringe long

and white; pleuron dark brown, usually pale on posterior  $\frac{1}{2}$  of posterior anepisternum and dorso-posterior of katepisternum, white pilose; plumula normal and yellow; calypter light yellow; halter brown.

**Wing:** Entirely dark, entirely microtrichose; alula normal, 1.6 times basally to 2.4 times apically larger than c cell, infuscated, entirely microtrichose.

**Legs:** Prolegs brown, slightly pale on lateral surface of profemur and basal  $\frac{2}{3}$  of protibia; mesolegs brown, and similar to prolegs; metalegs dark brown, apex of metafemur and basal  $\frac{1}{3}$  of metatibia slightly pale, apex of metabasitarsomere and remaining metatarsomeres pale.

**Abdomen:** Dark brown, ~4 times longer than thorax; 1st tergite with white pile basally, dorsally and ventrally, remaining pile black; 2<sup>nd</sup> tergite long, ~4.5 times longer than its smallest width, pale on most of the baso-lateral  $\frac{2}{3}$ , with long rectangular maculae of dull black pollen medially extending laterally sub-apically, with mainly appressed black pile, longer laterally; 3rd tergite trapezoidal and long, ~3.5 times longer than smallest width, with baso-lateral pale triangles, some specimens with pair of central vittate maculae, with large triangular macula of dull black pollen medially, with appressed black pile; 4th tergite rectangular and long, remaining characters as on 3rd; 5th tergite rectangular and wide, baso-lateral margin slightly pale, remaining characteristics as on

4th. **Genitalia:** Cercus with 1-2 rows of pile on medial margin and 3 rows outward; surstylus long, directed apico-ventrally, with a few setulae (around 6) ventrally on apex, pilose on basal ½ of the dorsal surface; subepandrial sclerite sub-quadrangular widening basally, with a shallow concave basal margin; hypandrium with ventral notch extending on anterior 2/3; distiphallus smooth and anterior surface straight; postgonites with pile mainly on baso-ventral surface, ventral surface straight, slightly convex basally, dorsal surface straight, apex straight anteriorly, ventral extremity convex expanded apico-ventrally, dorsal extremity acute.

**Female:** No female available.

**Length.** 14-15.5mm; wing 12-12.5mm.

**Distribution.** Brazil (Santa Catarina).

**Material examined.** (**3 males**) BRAZIL. Santa Catarina, Nova Teutônia, 300-500m, 27°11'S 52°23'W, 2 Oct 1961, F. Plaumann (Holotype *Pelecinobaccha (P.) seara*, CNC Diptera 161186); ..., 24 Oct 1961 (CNC Diptera 161187); ..., ?? Nov 1969 (CNC Diptera 161185).



**Comments:** The males are somewhat similar to the male of *P. peruviana* but the disposition of the white pollen on the frontal triangle, the shape of the 3<sup>rd</sup> abdominal segment, the presence of weak abdominal pale vittae and the disjunct distribution of *P. seara* (Brazil (Santa Catarina)) distinguishes it from *P. peruviana*.

**Etymology:** The specific epithet refers to the municipality where Nova Teutônia is located, which is where Fritz Plaumann lived and collected most of his life. It is to be treated as a noun in apposition.

*Pelecinobaccha* (*Pelecinobaccha*) *telescopica* (Curran, 1930) **comb. nov.**

*Baccha telescopica* Curran, 1930 – Curran, 1930: 74. Type-locality: Colombia. Holotype female AMNH. Hull, 1943a: 44 (fig. 1, alula); Hull, 1949a: 205 (fig. 60, abdomen), 207 (fig. 71, abdomen), 276 (fig. 369, wing)

*Ocyptamus telescopicus*. Thompson et al. 1976: 28 (catalog citation).

*Baccha salpa* Hull, 1944. – Hull, 1944c: 40. Type-locality: Peru. Holotype male CUIC. Hull, 1949a: 169 (redescription), 224 (fig. 154, abdomen). **n. syn.**

*Ocyptamus salpa*. Thompson et al. 1976: 26 (catalog citation).

*Baccha arethusa* Hull, 1949. Hull, 1949a: 181. Type-locality: Peru, Ucayali, Pucallpa. Holotype female unknown. **n. syn.**

*Ocyptamus arethusa*. Thompson et al. 1976: 13 (catalog citation).

*Baccha stipa* Hull, 1949. Hull, 1949a: 110. Type-locality: Colombia. Holotype female CNC. **n. syn.**

*Ocyptamus stipa*. Thompson et al. 1976: 28 (catalog citation).

Map: 10. Figures: 39.

**Male. Head:** Shining black; face with pale lateral  $1/5$  to  $1/6$ , usually restricted to ventro-lateral  $1/2$ ; lunule inconspicuously pale above antennae insertion; frontal triangle black pilose, pair of oval spots of silvery-white pollen centro-laterally visible from dorsal view, connected to pollen from face by narrow differently oriented pollen; vertical triangle with some dull pollen, with most black pile forming a central single row ending dorsal to anterior ocellus; ocellar triangle distanced its length from posterior eye margin; eye contiguity slightly longer than vertical triangle length; eye with sub-triangular indentation on posterior margin dorsal to or at level of antenna insertion; antennae insertions confluent, antennae dark red, pedicel shorter dorsally, basoflagellomere oval short ( $\sim 1.2$  times longer than wide), sometimes slightly pale baso-ventrally on the medial surface, black pilose, arista reddish black; occiput dull dark-pollinose on dorsal  $1/3$  and white-pollinose on ventral  $2/3$ ; occiput dorsal  $1/3$  with 2 regular rows of simple black pile, anterior row shorter, middle with 1-2 regular anterior rows of simple long black or white pile and 1 regular posterior row of very long scale-like white pile, ventral  $1/3$  with 2 irregular rows of scale-like white pile.

**Thorax:** Prothorax black, dull pollinose; scutum black, mostly brown dull pollinose with no distinct pollen maculae, white-pollinose on notopleuron, with erect black pile, longer and sometimes also white laterally, anterior to transverse suture, with anterior row of shining white pile interrupted in the middle (visible from posterior view); scutellum black, with sparse dull brown pollen, black pilose, pile longer than on scutum, subscutellar fringe with normal black pile; pleuron shining black, white-pollinose, longer white microtrichia on anterior  $1/2$  of katatergum, white pilose, black pile might occur on anterior

anepisternum and dorsally on anterior anepimera; plumula normal, golden; calypter yellow, pile sometimes darker; halter yellow, capitulum sometimes darker basally.

**Wing:** Mostly dark except for apical 1/5 (dark on basal 5/6 of r1, basal 2/3 of r2+3 and basal 4/5 of dm), posterior margin sometimes also hyaline, entirely microtrichose, alula brown, normal, 2 times basally to 4 times apically larger than c cell, entirely microtrichose.

**Legs:** Prolegs dark brown; mesolegs dark brown, apex of profemur pale; metalegs dark brown, apex to apical 1/4 of metabasitarsomere to the 4th metatarsomere white, pile white dorso-laterally on metacoxa and on white regions.

**Abdomen:** ~3.5 times longer than scutum, dark brown; 1st tergite black pilose dorsally and white ventrally, with a row of white pile dorso-medially and bare medially; 2<sup>nd</sup> tergite slightly constricted medially, long, ~3.5 times longer than its smallest width, with sub-apical dull black-pollinose triangular region, basal 1/2 with white erect pile laterally and dorsally, apical 1/2 with erect black pile laterally and appressed dorsally; 3<sup>rd</sup> tergite trapezoidal and long, ~2.5 times longer than basal width, with large central triangle of dull black pollen, with appressed black pile; 4th tergite rectangular and long, remaining characteristics as on 3rd; 5th tergite rectangular and wide, remaining characteristics as on 3rd. **Genitalia:** Epandrium not notched posteriorly; cercus with 1 row of pile on

medial margin and 2 rows outward; surstylus long, rectangular with sub-triangular apex, directed apically, mostly with long pile on basal  $\frac{1}{2}$ , ventrally and dorsally, with 3 rows of setulae ventro-apically, very slightly concave on ventral side, without dorsal thin layer of sclerotization; subepandrial sclerite long, slightly concave ventrally, mostly rectangular, basal margin concave and articulated with base of dorsal arc of hypandrium, apical margin with 3 small extensions; hypandrium narrow and long, dorsal arc with long surface, base and apex very distanced from each other, with ventral notch extending on anterior  $\frac{3}{4}$ ; basiphallus with posterior extremity wide, distiphallus anterior surface smooth and slightly concave, membranous region with thick microtrichia; ejaculatory apodeme long, apex convex; phallapodeme long, mostly weakly sclerotized but strongly sclerotized at base and on a narrow central region that extends towards the apex; postgonites narrow and long, with pile only ventrally and on basal  $\frac{2}{3}$ , ventral surface gently curves dorsally at apical  $\frac{1}{3}$  until the dorsal acute extremity, dorsal surface slightly concave.

**Female:** Like male except: Frons with dull pollen dorso-laterally to white-pollinose maculae, vertex shiny, pile restricted to a single row, ocellar triangle  $\sim 2.5$  times its length from posterior eye margin and  $\sim 1$  ocellus-width from lateral eye margin, anterior row on dorsal  $\frac{1}{3}$  of occiput sometimes very short, basoflagellomere oval long ( $\sim 1.5$  times longer than wide), notopleuron sometimes with a few white pile anterior to transverse suture, wing with basal  $\frac{2}{3}$  dark (dark on basal  $\frac{3}{4}$  of  $r_1$ , basal  $\frac{1}{2}$   $r_{2+3}$ , basal  $\frac{1}{5}$  of  $r_{4+5}$ , basal  $\frac{1}{2}$  of  $dm$ ), profemur paler than male, mesofemur and basal  $\frac{1}{2}$  of metafemur sometimes paler, abdomen slightly widening at apex of 2<sup>nd</sup> tergite and

slightly narrowing at apex of 4<sup>th</sup> tergite, all pile black, short and appressed, 2<sup>nd</sup> abdominal tergite shorter than male, rectangular and long, 2.3 times longer than wide, 2<sup>nd</sup> tergite as long as 3<sup>rd</sup>, 4<sup>th</sup> tergite as long as 5<sup>th</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> tergites longer than 4<sup>th</sup> and 5<sup>th</sup>, 3<sup>rd</sup> and 4<sup>th</sup> tergites rectangular and long, 5<sup>th</sup> tergite slightly conical and longer than basal width, with tergite and sternite fused at apex, 1.7 times longer than wide, 6<sup>th</sup> segment very long, 5.8 times longer than wide. **Genitalia:** strongly sclerotized, 7<sup>th</sup> tergite short, with a pair of lateral, weakly sclerotized, very long (as long as the 6<sup>th</sup> segment), thin, basal extensions into the 6<sup>th</sup> segment, 7<sup>th</sup> segment lateral sclerite triangular wide, dorsally extended anteriorly to the 7<sup>th</sup> tergite, with very long pair of baso-ventral extensions, very weakly sclerotized and flexible, 7<sup>th</sup> segment with central longitudinal area bare dorsally and ventrally, extensive intersegmental membranous region between 7<sup>th</sup> and 8<sup>th</sup> segments, 8<sup>th</sup> tergite with basal crest undulate on inner margin, apex rounded, 8<sup>th</sup> sternite rectangular and wide.

**Length.** 12-12.5mm; wing 7.5-8.5mm.

**Distribution.** Bolivia (La Paz), Colombia (Boyaca), Peru (Amazonas, Junín, Madre de Dios).

**Material examined.** (**5 males**) PERU. [Junín], El Campamiento, Col. Perene, Holotype Cornell U. no 2200 [red label], Holotype salpa Hull [red label], 19 Jun 1920, Cornell

Univ. Exp. (Holotype *Baccha salpa*); Madre de Dios, Manu, Rio Manu, nr. Pakitza, 250m, 12°7'S 70°57'W, 9 Sep 1988, W. N. Mathis (2 specimens, USNM ENT 00257694 & ...711); ..., Pakitza, 250m, Malaise trap, 12°7'S 70°58'W, 9-23 Sep 1988, W. N. Mathis (USNM ENT 00257702); ..., Rio Tambopata Reserve, 30 km SW Puerto Maldonado, 290m, 12°12'S 69°16'W, tropical-MoistFor., 19 Sep-10 Oct 1984, D. A. Grimaldi. (**6 females**) BOLIVIA. La Paz, Heath River Wildlife Center, ~21 km SSW Puerto Heath, 12°40'S 68°42'W, 29 Apr-12 May 2007, J. H. Kits (DEBU00282419). COLOMBIA. Boyaca, Muzo, 900m, Frank M. Hull Collection C.N.C. 1973, ?? ??? 1936, J. Bequaert (Holotype *Baccha stipa*, CNC Diptera 160829). PERU. Madre de Dios, Manu, Rio Manu, Pakitza, 250m, Malaise trap, 12°7'S 70°58'W, 9-23 Sep 1988, A. Freidberg (USNM ENT 00257690); ..., Rio Tambopata Reserve, 30 km SW Puerto Maldonado, 290m, 12°12'S 69°16'W, tropical-MoistFor., 19 Sep-10 Oct 1984, D. A. Grimaldi (2 specimens); Amazonas, Montenegro, Bagua, 350m, 29 Sep-2 Oct 1963, Wygodzinsky.

*Pelecinobaccha* (*Pelecinobaccha*) *tica* **sp.nov.**

Type-locality: Costa Rica, Puntarenas, Est. las Alturas, 1500m, 8°56'N 82°50'W.

Holotype female INBio.

Map: 12. Figures: 38e-g.

**Male.** No male available.

**Female. Head:** Black; face pale on lateral 1/5; lunule pale to pale above antennae insertion, central black macula connected to frons color; frons with white-silver pollen continuous from face and restricted to lateral margin, dull brown-pollinose medially; vertex with black pile in a single median row, ocellar triangle ~2 times its length from posterior eye margin and ~1 ocellus-width from lateral eye margin; eye posterior indentation at level of antennae insertion; antennae insertions separated; occiput dull dark-pollinose on dorsal 1/5, remaining white-pollinose; occiput dorsal 1/4 with 1-2 rows of simple black pile, very short pile when anterior row present, middle 2/4 with 2-3 rows of scale-like white pile, anterior rows shorter, ventral 1/4 with 2-3 irregular rows of scale-like white pile



**Thorax:** Scutum black, mostly brown dull pollinose, white on notopleuron and slightly posterior to transverse suture laterally, with a pair of inconspicuous short sub-median tapering vittae of pale gray pollen, with short white pile, postero-latero transverse suture inclusive, longer on notopleuron, with anterior row of longer shining white pile, interrupted in the middle with shorter pile; scutellum black, with metallic-shining pollen, with short white pile, subscutellar fringe long and white; pleuron black, white pilose; plumula normal and white; calypter white; halter stem light brown, capitulum light orange.

**Wing:** Mostly hyaline with anterior margin dark brown (dark on cells bc, c, sc, r, r1 except for anterior sub-apical oval hyaline spot and r2+3 except hyaline on middle 3/5 of its posterior margin, most of bm light infuscated), entirely microtrichose; alula hyaline, normal, 1.4 times larger basally to 3 times larger apically than c cell, entirely microtrichose.

**Legs:** Prolegs dark brown, profemur pale laterally and on apex, basal 1/2 of protibia pale, probasitarsomere light brown remaining protarsomeres black, 2nd to 4th protarsomeres enlarged; mesolegs dark brown, apex and apico-lateral 1/5 of mesofemur and basal 3/5 of mesotibia pale, mesobasitarsomere light brown, remaining mesotarsomeres black, 2nd to 4th mesotarsomeres enlarged, some ventral setae on mesotarsi orange; metalegs dark brown, basal 1/3 of metafemur pale, apex of metafemur, base of metatibia, apical 1/3 of the metabasitarsomere until 3rd metatarsomeres pale, 4th

metatarsomeres light brown, apical metatarsomere brown, metacoxa mainly white pilose, pile black ventrally.

**Abdomen:** Dark brown; ~4 times longer than thorax; 1<sup>st</sup> tergite white pilose; 2<sup>nd</sup> tergite long, ~3 times longer than its smallest width, constricted medially, apex slightly wider than base, with pair of median sub-lateral oblique fasciate pale maculae, with central triangular macula of dull black pollen, mainly with short appressed black pile, slightly longer, erect and white on baso-lateral 2/3; 3<sup>rd</sup> tergite trapezoidal, ~1.5 times longer than smallest width, with pair of baso-median quadrangular pale maculae, with central wide triangular macula of dull black pollen, mainly with appressed black pile, white on baso-lateral corners; 4th tergite rectangular and wide, entirely black, remaining characteristics as on 3rd; 5th tergite rectangular, slightly wider than long, with appressed black pile; 6th segment cylindrical long, ~2 times longer than 5th. **Genitalia:** 7<sup>th</sup> tergite mostly rounded apically but with short acute extension on apex, apical 2/5 pilose, basal extensions hyaline, inconspicuous, 4/5 of the length of the 6<sup>th</sup> segment; 7<sup>th</sup> segment lateral sclerite rectangular, narrowing to ½ its width apically, without baso-ventral extensions; 8th tergite unsclerotized medially, basal crest normal, apex acute on lateral view; 8th sternite unsclerotized medially, short; cercus fused dorsally, weakly sclerotized, with a ventral sub-basal short extension.

**Length.** 11mm; wing 8mm.

**Distribution.** Costa Rica (Puntarenas).

**Material examined.** (*1 female*) COSTA RICA. Puntarenas, Est. Las Alturas, 1 km Norte de Las Alturas, 1500m, L\_S\_322700\_591400, #6271, 12-19 Ago 1995, M. A. Zumbado (INBIO CRI002 388846 (Holotype *Pelecinobaccha* (*P.*) *tica*)).

**Etymology:** The specific epithet refers to how Costa Ricans call themselves, ‘tico’ for men and ‘tica’ for women. It is to be treated as a noun in apposition.

*Pelecinobaccha (Pelecinobaccha) transatlantica* (Schiner, 1868) **comb. nov.**

*Baccha transatlantica* Schiner, 1868. – Schiner, 1868: 343. Type-locality: 'Brazil & Colombia'. Lectotype male MNH-Wien. Hull, 1949a: 216 (fig. 119, male abdomen; fig. 120 female abdomen), 284 (fig. 392, male wing; fig. 393, female wing).

*Ocyptamus transatlanticus*. Thompson et al. 1976: 28 (catalog citation).

*Baccha cybele* Hull, 1947. - Hull, 1947: 236. Type-locality: Paraguay, Vilarica. Holotype male AMNH. Hull, 1949a: 150 (redescription), 216 (fig. 117, male abdomen). **n. syn.**

*Ocyptamus cybele*. Thompson et al. 1976: 16 (catalog citation).

*Baccha limpidapex* Curran, 1941. - Curran, 1941: 282. Type-locality: Brazil, Mato Grosso, Chapada. Holotype male AMNH. Hull, 1949a: 212 (fig. 104, male abdomen), 282 (fig. 385, male wing). **n. syn.**

*Ocyptamus limpidapex*. Thompson et al. 1976: 21 (catalog citation).

*Baccha nitidula* Curran, 1930. - Curran, 1930: 9. Type-locality: Panama, Canal Zone, Barro Colorado Island. Holotype male AMNH. Hull, 1949a: 214 (fig. 105, male (?) abdomen). **n. syn.**

*Ocyptamus nitidulus*. Thompson et al. 1976: 23 (catalog citation).

*Baccha potentila* Hull, 1942. - Hull, 1942a: 100. Type-locality: Paraguay, Vilarica. Holotype male MCZ. Hull, 1949a: 167 (redescription), 212 (fig. 102, male abdomen). **n. syn.**

*Ocyptamus potentila*. Thompson et al. 1976: 25 (catalog citation).

*Baccha simulata* Curran, 1939. - Curran, 1939: 10. Type-locality: Peru, Lower Rio Tapiche. Holotype male AMNH. Hull, 1949a: 192 (fig. 2, male abdomen), 272 (fig. 352, male wing). **n. syn.**

*Ocyptamus simulatus*. Thompson et al. 1976: 27 (catalog citation).

Map: 12. Figures: 40.

**Male. Head:** Black to bluish black, face pale on lateral  $\frac{1}{4}$  to  $\frac{1}{3}$ ; lunule almost entirely black, slightly pale above antenna insertion; frontal triangle black pilose, with pair of oval spots of silvery-white pollen centro-laterally visible from dorsal view; vertical triangle with most black pile forming a central single row; ocellar triangle distanced its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye with sub-triangular indentation on posterior margin around or slightly dorsal to level of antenna insertion; antennae insertions narrowly separated to confluent, antennae dark red, basoflagellomere oval, sometimes slightly pale baso-ventrally on the medial surface, black pilose, arista dark red; occiput dorsal  $\frac{1}{4}$  with 2 regular rows of simple black pilosity, anterior row shorter, posterior row sometimes with white pile intermixed, middle  $\frac{2}{4}$  with 2 regular anterior rows of simple long black or white pile and 1 regular posterior row of very long scale-like white pile, ventral  $\frac{1}{4}$  with 2-3 irregular rows of scale-like white pile

**Thorax:** Scutum black, mostly dull brown-pollinose, pollen concentrated in a semi-circle anterior to scutellum, white-pollinose on notopleuron, sometimes with a pair of median antero-posteriorly oriented tapering vittae of pale pollen, pile black, longer and white or black (variation) on notopleuron anterior to transverse suture, with anterior row of long shining white pile interrupted in the middle; scutellum dark brown, with dull brown pollen and long black pile, subscutellar fringe black and long; pleuron black, usually entirely white pilose, sometimes with a few black pile dorsally on anterior anepisternum, on dorso-posterior of posterior anepisternum and dorsally on anterior anepimera (variation); plumula white and long; calypter white to yellow; halter light brown, capitulum yellow to orange.

**Wing:** With basal  $\frac{1}{2}$  to  $\frac{2}{3}$  dark (dark on basal cells, most of  $r_1$ , basal  $\frac{1}{2}$  to basal  $\frac{2}{3}$  of  $r_{2+3}$ , basal  $\frac{1}{3}$  to basal  $\frac{2}{3}$  of  $r_{4+5}$  and basal  $\frac{1}{2}$  to most of  $dm$ ) and remaining hyaline, entirely microtrichose, alula usually dark, large, 2x basally to 3x apically larger than c cell, entirely microtrichose.

**Legs:** Prolegs dark brown, protibia basal  $\frac{1}{3}$  to  $\frac{1}{2}$  diffusely pale; mesolegs dark brown, mesotibia basal  $\frac{1}{2}$  diffusely pale; metalegs dark brown, metatibia basal  $\frac{1}{5}$  pale, sometimes only base diffusely pale, apex of metabasitarsomere until fourth metatarsomere white, black pilose but white on white regions, metacoxa usually mostly white pilose.

**Abdomen:** ~3.5 times longer than thorax, black; 1<sup>st</sup> tergite short with rounded lateral lobes, with long pile, mostly white or black dorso-laterally and white ventro-laterally, and sparse to bare medially, sometimes with whole dorsal ½ black (variation); 2<sup>nd</sup> tergite long, slightly constricted medially, ~3 times longer than its smallest width, black with triangular black dull pollinose macula medially, pile long and erect laterally, appressed dorsally, mostly black, but sometimes white basally; 3<sup>rd</sup> tergite trapezoidal and long, widening apically, sometimes with slightly pale baso-lateral corners, dull black pollen forming a central vitta and a pair of sub-lateral narrow triangular maculae, with appressed black pile, slightly longer and erect on baso-lateral corners and sometimes white; 4th tergite sub-quadrangular, sometimes slightly pale baso-laterally, pollinose as 3rd tergite, with appressed black pile; 5th tergite short, rectangular and wide, with appressed black pile. **Genitalia:** Surstylus directed obliquely apico-ventrally, sub-oval in lateral view, medial margin straight on basal ½ and concave on apical ½, with 3 irregular rows of setulae on ventral, almost straight side, sparsely pilose on dorsal surface; subepandrial sclerite with slightly concave basal and lateral margin, middle section raises dorsally slowly from base; hypandrium with rounded ventral notch extending on anterior ½; distiphallus smooth, phallapodeme weakly sclerotized on most of basal region, sclerotization visible on apex and small dorso-apical portion; postgonites with sparse pilosity except on apex, pile longer baso-ventrally, enlarged baso-ventrally, apex rounded ventrally, convex anteriorly and acute, and basally directed, dorsally.

**Female:** Like male except: frons wide, rarely with small pale maculae laterally, with dull pollen sparse between silvery maculae and ocellar triangle, pile sparse medially, single central row of pile on vertex short, ocellar triangle 2-2.5 times its length from posterior eye margin and 1.5-2 ocellus-width from lateral eye margin; scutum usually with a sub-lateral tapering pair of vittae and a central narrow vitta constituted of white pollen, sometimes entirely white pilose or have white pile intermixed with black on notopleuron anterior to transverse suture; subscutellar fringe usually white or intermixed with black pile; wing with basal  $\frac{1}{2}$  dark (basal  $\frac{1}{2}$  of r1, basal  $\frac{1}{5}$  of r2+3, base of r4+5, basal  $\frac{1}{4}$  of bm); distinctly pale on basal  $\frac{1}{2}$  of protibia, distinctly pale on basal  $\frac{2}{3}$  of mesotibia; distinctly pale on basal  $\frac{1}{4}$  of metatibia, metabasitarsomere with apical  $\frac{1}{5}$  white; abdomen spatulate, gradually widening from 2<sup>nd</sup> to 4<sup>th</sup> abdominal tergites, abdominal tergites sometimes diffusely pale baso-laterally, 2<sup>nd</sup> abdominal tergite rectangular and longer than wide, slightly constricted in the middle, with black appressed pile, some slightly erect and white baso-laterally, 3<sup>rd</sup> abdominal tergite trapezoidal, as long as 2<sup>nd</sup>, with black appressed pile, 4<sup>th</sup> abdominal tergite rectangular and wider than long, 5<sup>th</sup> abdominal tergite as 4<sup>th</sup> but shorter, 6<sup>th</sup> segment conical, 'ovipositor'-like, robust, 1.5 times longer than 5<sup>th</sup> tergite. **Genitalia:** Strongly sclerotized; 7<sup>th</sup> tergite short, basal extensions  $\frac{2}{3}$  of 6<sup>th</sup> segment's length, with pair of latero-ventral extensions, bare on baso-ventral  $\frac{1}{2}$ ; 7<sup>th</sup> segment lateral sclerite right triangle shaped; extensive membranous region between 7<sup>th</sup> and 8<sup>th</sup> segments; 8<sup>th</sup> tergite unsclerotized medially appearing as reduced to a pair of separate sclerites; cercus with 1 row of marginal pile.

**Length.** 8.5-11.5mm; wing 6.5-7.5mm.



**Distribution.** Bolivia (Beni, La Paz, Santa Cruz), Brazil (Goiás, Mato Grosso, Paraná, São Paulo), Colombia (Meta, Valle del Cauca), Costa Rica (Guanacaste, Puntarenas), Ecuador (Napó, Orellana, Pastaza, Sucumbios, Zamora-Chinchipe), Panama (Canal Zone, Panamá), Paraguay (Canindeyú, Guairá), Peru (Amazonas, Huanuco, Loreto, Madre de Dios, Ucayali), Venezuela (Zulia).

**Material examined. (42 males)** BOLIVIA. Santa Cruz, 20 Oct 1946, S. Lopez (USNM ENT 00257700). BRAZIL. Goiás, Campinas, 8 Jan 1934, T. Borbmeier (CNC Diptera 160787); [Mato Grosso], Chapada, S. W. Williston Collection, ?? Nov ????, ? (Paratype *Baccha limpidapex*); ..., *Baccha limpidapex* Curran Holotype [red label] (Holotype *Baccha limpidapex*); ..., Maracaju, ?? May 1937, ? (USNM ENT 00257652); Paraná, Porto Cabral, Frank M. Hull Collection C.N.C. 1973 [white label], ?? Dec. 1941, Com. E.N.V. (CNC Diptera 160786); São Paulo, Araçatuba, Córrego Azul, ?? Mar 1947, M.P. Barretto; ..., Avanhandava, ?? Feb 1946, M.P. Barretto; ..., [Presidente Epitácio], Pto. Albano, ?? Oct [19]54, E. Rabello (4 specimens). COLOMBIA. Meta, Restrepo, 500m, ?? ??? 1936, J. Bequaert (CNC Diptera 160792); Valle [del Cauca], M. Zarzali Hde., El Medio, 950m, 17 Mar 1991, P. Silverstone-S. (USNM ENT 00257712). COSTA RICA. Guanacaste, Santa Cruz, Camino a la Esperanza, 420m, manual (red. libre), L N 238450 363050, #56088, 15 Jun 1999, Y. Cardenas (INB0003075064 INBIOCRI COSTA RICA); Puntarenas, R. Priv. Karen Mogensen, Send. El Viejo Nispero, 320-350m, libre, L\_N\_205600\_420300, #74606, 3 Jul 2003, Y. Cardenas (2 specimens,

INB0003744622 & ...44634 INBIOCRI COSTA RICA); ..., libre (aguamiel),  
L\_N\_205600\_420300, #74547, 3 Jul 2003, Y. Cardenas (INB0003739524 INBIOCRI  
COSTA RICA); ..., Send. Tres Rios, 300-500m, red. con aguamiel,  
L\_N\_205164\_419993, #74599, 26 Jun 2003, Y. Cardenas (INB0003744369 INBIOCRI  
COSTA RICA); ..., Lepanto, R. Priv. Karen Mogensen, Send. Quebrada Negra, 300-  
400m, red. con aguamiel, L\_N\_205600\_420300, #75453, 24 Sep 2003, Y. Cardenas  
(INB0003768302 INBIOCRI COSTA RICA). ECUADOR. Zamora[-Chinchipe],  
Cumbaratza, 700m, 30-31 Mar 1965, L. Pena (CNC Diptera 160791); [Sucumbios],  
Limoncocha, 250m, 0°24'S 76°40'W, 9-16 Mar 1976, G. E. Shewell (CNC Diptera  
160788); Napo, Lago Agrio (41 km W), 18 May 1975, A. B. Gurney (USNM ENT  
00257710); ..., Puerto Missahualli, 350m., ?? Feb 1983, M. Sharkey (CNC Diptera  
160785). PANAMA. Canal Zone, Barro Colorado Island, Type *Baccha nitidula* Curran  
no [red label], 22 Dez 1928, C. H. Curran (Holotype *Baccha nitidula*); [Panamá], Pacora,  
45-4519-Trap, 5 Feb 1945, H. H. Stage Ar-E (USNM ENT 00257709). PARAGUAY.  
[Canindeyú], SW Salto Del Guerra, 7-10 Dec ????, ?; [Guairá], Villarica, Holotype  
*Baccha cybele* Hull [red label], USNM 2052087, ?? Dec [19]36, F. Schade (Holotype  
*Baccha cybele*); ..., Frank M. Hull Collection C.N.C. 1973, [with extensive unreadable  
notes by F. M. Hull], ?? May 1938, F. Schade (CNC Diptera 160784); ..., ?? Nov 1968,  
F. Schade (CNC Diptera 160789); ..., M.C.Z. type 26153, ?? Mar ??? (Holotype  
*Baccha potentilla*). PERU. Loreto, Rio Aguaytia, 300m, ?? Jun 1947, W. Weyrauch; ...,  
San Antonio, '18', 25 Aug 1965, J. C. Hitchcock, Jr. (USNM ENT 00257725); Madre de  
Dios, Manu, 26-30 Oct 1963, L. Pena (CNC Diptera 160790); ..., Manu Wildlife Centre,  
Ressaca near canopy tower, CNC DIPTERA #4141 [white label with blue border], 28

Oct 2006, J. H. Skevington; ..., Rio Manu, Pakitza, 250m, 12°7'S 70°58'W, Malaise trap, 9-23 Sep 1988, W. N. Mathis (2 specimens, USNME ENT 00257698 & ...707); [Ucayali], Lower Rio Tapiche, F602v, Paratype *Baccha simulata* Curran [yellow label], H. Bassler Collection Acc. 33591, 19 Aug 1923, ? (Paratype *Baccha simulata*); ..., Middle Rio Ucayali, F [unreadable], Paratype *Baccha simulata* Curran [yellow label], H. Bassler Collection Acc. 33591, 18 Nov 1923, ? (Paratype *Baccha simulata*). VENEZUELA. Lindig, Bacha n. [label with handwriting], Lectotype *Baccha transatlantica* Schiner, 1868 [red label], ?? ??? 1864, ? (Lectotype *Baccha transatlantica*); ..., Paralectotype *Baccha transatlantica* Schiner [red label], [label with unintelligible handwriting] (Paralectotype *Baccha transatlantica*); Zulia, Los Angeles del Tucuco, rain forest vegetation, 15-16 Apr 1981, E. E. Grissell (USNM ENT 00257723); ..., El Tucuco (45 km SW of Machiques), 5-6 Jun 1976, A. S. Menke & D. Vincent (USNM ENT 00257713). (**25 females**)

BOLIVIA. Beni, Rurrenabaque, 175m, 10-23 Oct 1956, L. E. Pena (CNC Diptera 160780); La Paz, Heath River Wildlife Center, ~21 km SSW Puerto Heath, 12°40'S 68°42'W, 29 Apr-12 May 2007, J. H. Kits (DEBU00282417); ..., San Juanito, nr. Teoponte, 500m., 15°29'42S 67°47'48W, 8 Apr 2001, S. A. Marshall (DEBU00149606).

BRAZIL. ?, Novara R., [blank faded pink square paper], [unintelligible handwriting], Paralectotype *Baccha transatlantica* Schiner, 1868 [red label], ?? ??? ?????, ? (Paralectotype *Baccha transatlantica*); São Paulo, [Presidente Epitácio], Pto. Albano, ?? Oct [19]54, E. Rabello. COLOMBIA. Meta, Restrepo, 500m, ?? ??? 1936, J. Bequaert (CNC Diptera 160783); Vallo-Zarzal, Hac. El Medio, 950 msnm, hosp.: *Eucharis caucana*, 17 Mar 1991, P. Silverstone-Sookin (USNM ENT 00257733). ECUADOR. Past[aza] Prov ,Santa Clara, Ecuador Peace Corps, Smithsonian Institution, Aquatic

Insect Survey, 3 Jul 1976, P. M. Turner (USNM ENT 00257728); ..., Pompeya, Patstaza, Napo R., 14-22 May 1965, L. Pena (CNC Diptera 160779); Orellana, Yasuni Natl. Prk., Yasuni Research Stn., 250m., 0°40'50"S 76°24'2"W, 28 Apr-8 May 2009, [unintelligible]. PARAGUAY. [Canindeyú], Curubwaty, Salto Del Guaira, 27 Nov [19]71, ?. PERU. Amazonas, Pto. America, R. Putumayo, Cornell Exped. Lot 607 Sub 171, Frank M. Hull Collection C.N.C. 1973, 30 Aug-2 Sep 1930, ? (CNC Diptera 160782); Huanuco, Tingo Maria, 2200ft., 23 Nov 1941, J. C. Pallister; Loreto, El Indio (Cerro de Contamana), 10 Sep [19]86, P. Hocking (USNM ENT 00257729); ..., San Antonio, '10', 25 Aug 1965, J. C. Hitchcock, Jr. (USNM ENT 00257726); Madre de Dios, Avispas, 400m., 20-30 Sep 1962, L. Pena (CNC Diptera 160781); ..., Manu, Erika (near Salvacion), 550m, 5-6 Sep 1988, ?? (USNM ENT 00257727); ..., Rio Manu, nr. Pakitza, 250m, 12°7'S 70°57'W, 9 Sep 1988, W. N. Mathis (USNM ENT 00257722); ..., Pakitza, 250m, Malaise trap, 12°7'S 70°58'W, 9-23 Sep 1988, W. N. Mathis (USNM ENT 00257724); ..., Los Amigos Biol. Stn., 2-14 Jun 2006, S. Paiero & J. Klymko (DEBU00272015). VENEZUELA. Lindig, Paralectotype *Baccha transatlantica* Schiner, 1868 [red label], [label with unintelligible handwriting], ?? ??? 1864, ? (4 paralectotypes *Baccha transatlantica*); Zulia, El Tucuco (45 km SW of Machiques), 5-6 Jun 1976, A. S. Menke & D. Vincent (USNM ENT 00257730).

**Comments:** The type series of *Baccha transatlantica* from the MNH-Wien includes two males and four females from Venezuela, and one headless female from Brazil. Schiner stated that the specimens he worked with were eight specimens from Brazil and Colombia ("Ein Männchen und sieben Weibchen aus Brasilien und Columbien"). Since

most of the specimens in Schiner (1868) are referred to as simply coming from South America, it is possible to assume that the type series from the MNH-Wien is the same mentioned by Schiner. A male from the series has been designated as the lectotype, and the remaining specimens as paralectotypes.

The variation in the male wing color pattern may be due to eclosion age or depigmentation due to preservation, since the full extent of the pattern might still be delimited on the waning regions.

All specimens with variations in pile pattern had their genitalia dissected and proved identical. The holotypes of the species here synonymized varied slightly on these pile coloration characters and nothing more, not even the pattern of dull pollinosity on the abdominal tergites. As mentioned in the discussion, Hull relied heavily on the patterns of dull black pollinosity of the abdominal tergites to distinguish between the species of his *tristis* group. Furthermore, Hull was not concise on his description of the patterns, e.g. overestimating and underestimating in several occasions the sub-shinning markings. This can be seen in the abdominal drawing of *B. potentila* in Hull, 1949a (fig. 102), where he considers the sub-shinning markings worth notice on the 3<sup>rd</sup> tergite but did not consider them for *B. nitidula* (fig. 105) although the markings are present in both holotypes.

One specimen from Paraguay (CNC Diptera 160789) has a forked R2+3 vein, with a short R3 at the apex of the wing that doesn't reach the wing margin. Although a very distinctive character, this was considered to be a mutation in the specimen since the remaining characters agree with the species description above.

*Pelecinobaccha (Pelecinobaccha) tristis* (Hull, 1930) **comb. nov.**

*Baccha tristis* Hull, 1930. – Hull, 1930: 140. Type-locality: Mexico, Vera Cruz, Jalapa.

Holotype male ANSP. Hull, 1949a: 195 (fig. 19, male abdomen).

*Ocyptamus tristis*. Thompson et al. 1976: 29 (catalog citation).

Map: 10.

**Male. Head:** Black; face with only black pile, with dense white pollen, apex of tubercle with no pollen, shiny; lunule slightly pale above antennae insertions, central macula connected by medial vitta dorsally to frontal triangle color; frontal triangle with silvery-white pollen laterally continuous from face; vertical triangle with 3 rows of pile, but most pile concentrated in a single median row; ocellar triangle distanced its length from posterior eye margin; eye contiguity slightly longer than vertical triangle length; eye with sub-triangular indentation around level of antenna insertion; antennae insertions confluent, ventral margin with short dorsal extension; antennae dark brown, basoflagellomere pale on baso-ventral 1/3; occiput dorsal 1/4 with 2 rows of simple black pile, anterior row shorter, middle 2/4 with 3-4 rows of pile, posterior row long, white and scale-like, anterior rows shorter, black and simple, ventral 1/4 with 3 irregular rows of white, scale-like pile, anterior rows slightly shorter.

**Thorax:** Scutum black, mainly dull pollinose with inconspicuous pair of sub-median vittae of white pollen visible from a posterior view, black pilose, pile longer on notopleuron, anterior row white pilose with shorter pile in the middle; scutellum black, with long, black pile, shiny pollinose, pollen differently oriented on base from remaining of scutellum, subscutellar fringe long and dark brown to white; pleuron black, black pilose except mostly white pilose on katepimera and entirely white pilose on metaepisterna, the pile is densely arranged on the posterior anepisternum posterior margin; plumula yellow and long; calypter white, fringe brown; halter stem brown, capitulum yellow.

**Wing:** Light brown, anterior margin diffusely darker (cells bc, c, sc, r, r<sub>1</sub>, r<sub>2+3</sub> and bm), entirely microtrichose; alula normal, 1.5 times basally and 3.5 times apically larger than c cell, light brown, entirely microtrichose.

**Legs:** Legs dark brown, apex of femora and base of tibiae pale; pale on apical 1/4 of metabasitarsomere to third metatarsomeres, fourth and fifth metatarsomeres brown.

**Abdomen:** Black, 2.7 times longer than thorax; 1<sup>st</sup> tergite with long, erect, black pile; 2<sup>nd</sup> tergite long, 3.2 times longer than its smallest width, pile very long, erect and black, shorter and appressed dorsally, pile white on baso-dorsal 1/3 and baso-lateral 1/2, with sub-apical central triangular region of dull black pollen; 3rd tergite trapezoidal, 2.3 times

longer than smallest width, with large central triangular region of dull black pollen, pile short, appressed and black, slightly longer baso-laterally and white on baso-lateral 1/3; 4th tergite sub-quadrangular, slightly longer than wide, pile short, appressed and black, mostly with dull black pollen; 5th tergite rectangular and wide, dull black pollen restricted to 3 median vittae, remaining characteristics as on 4th; 1st sternite with long white pile.

**Genitalia:** Not dissected.

**Female:** No female available.

**Length.** 11.5mm; wing 9mm.

**Distribution.** Mexico (Vera Cruz).

**Material examined.** (*1 male*) MEXICO. Vera Cruz, Jalapa, 4400 ft., Type 6375 *Baccha tristis* Hull [red label], *Baccha tristis* n. sp. Type Hull [identification label], 12 Oct 1906, P.P. Calvert.

**Comments:** The type of *B. tristis* is unique amongst the material available. The only species in *Pelecinobaccha* that have the densely arranged black pile on the thorax are *P. pilipes* and *P. pilinigridentis*. Neither species has the frontal triangle pollinosity or the



confluent antennal insertions of the holotype of *B. tristis*. The holotype has its head glued to the thorax which might indicate that the specimen is actually a composite.

*Pelecinobaccha (Pelecinobaccha) unica* **sp.nov.**

Type-locality: Costa Rica, Puntarenas, Camino a Las Tablas, 1200m, 9°02'N 82°53'W.

Holotype male INBio.

Map: 10. Figures: 41a-d.

**Male. Head:** Black; face lateral 1/6 pale, homogenously white-pollinose except for tubercle apex; lunule pale dorsal to antennae insertions, central black macula disconnected from frontal triangle color; frontal triangle with pair of linear white pollinose maculae laterally connected to pollen from face by narrow lateral vittae of differently oriented pollen; vertical triangle with most black pile forming a central single row ending dorsal to anterior ocellus; ocellar triangle distanced its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye posterior indentation at level of antenna insertion; antennae insertions almost separated, medial division unsclerotized on dorsal 1/3; occiput dull dark-pollinose on dorsal 1/4 and white-pollinose on ventral 3/4; occiput dorsal 1/4 with 2 regular rows of simple black pile, anterior one shorter, middle 2/4 with 3-4 regular rows of pile, posterior row with very long scale-like white pile, anterior rows with shorter pile, simple and black on dorsal 1/2, scale-like and white on ventral 1/2, ventral 1/4 with 2-4 rows of scale-like white pile, rows become irregular ventrally.

**Thorax:** Scutum black, mainly brown dull pollinose, slightly white-pollinose on notopleuron, with erect black pile, slightly longer on notopleuron anterior to transverse suture, with anterior row of shining white pile interrupted in the middle; scutellum black, black pilose, pile slightly longer than on scutum, sub-scutellar fringe long and white medially remaining black; pleuron black, with longer microtrichia on anterior  $\frac{3}{4}$  of the katatergum and on the metaepimera, white pilose except black pilose dorso-posteriorly on posterior anepisternum and anterior anepimera; plumula long and white; calypter white, pile dark brown; halter yellow, capitulum light orange.

**Wing:** Mostly brown, becoming gradually diffuse around apical  $\frac{1}{5}$ , cells c and sc darker, entirely microtrichose, alula diffusely brown, normal, 1.3 times basally to 3.2 times apically larger than c cell, entirely microtrichose.

**Legs:** Legs dark brown; apical  $\frac{1}{4}$  of metabasitarsomere until the 4th metatarsomere pale, pile white laterally on metacoxa and on pale regions.

**Abdomen:** ~3 times longer than scutum, dark brown; 1st tergite entirely white pilose, long pile undulated apically; 2<sup>nd</sup> tergite long, ~4.5 times longer than its smallest width, with central rectangular region of black dull pollen, pollen expands laterally sub-apically, with long erect white pile basally and laterally, remaining pile short, appressed and

black; 3<sup>rd</sup> tergite trapezoidal and long, ~2.5 times longer than smallest width, pale on baso-lateral ½ and on inconspicuous baso-median pair of vittae, with large central triangular region of dull black pollen, mainly with appressed black pile, pile slightly longer, erect and white on baso-lateral ½; 4th tergite sub-quadrangular, slightly wider than long, pollen as on 3rd, with short appressed black pile; 5th tergite rectangular and wide, pollen area reduced, remaining characteristics as on 4th. **Genitalia:** Cercus with 1-2 rows of pile on medial margin and 3 rows outward; surstylus long, sub-oval on lateral view, directed apically, with long pile on baso-dorsal 2/3, with setulae (around 30) ventrally, setulae become weaker posteriorly and sparse basally and posteriorly; subepandrial sclerite rectangular, with narrow long apico-lateral extensions connected to the base of the surstyli, and long baso-lateral extensions; hypandrium narrow on apical 3/5 and rounded on basal 2/5, long, dorsal arc with long surface, base and apex very distanced from each other, with ventral notch extending on anterior 3/5; basiphallus rectangular in lateral view, with posterior extremity normal, distiphallus apex slightly curving apically; phallapodeme long, mostly weakly sclerotized but well sclerotized on a narrow sub-dorsal region that extends towards the apex; postgonites short, with pile only on baso-ventral ½ although pile sockets are visible on apical ½, dorsal and ventral surface almost straight, apex convex apically, with small acute dorsal extremity and convex ventral extremity.

**Female:** No female available.

**Length.** 12mm; wing 10mm.

**Distribution.** Costa Rica (Puntarenas).

**Material examined.** (1 *male*) COSTA RICA. Puntarenas, Camino a Las Tablas, horilla de um charral, 1200m, L\_S\_318300\_594400 #50799, 28 Jun 1998, E. Navarro (INB0003045918 INBIOCRI COSTA RICA (Holotype *Pelecinobaccha* (*P.*) *unica*)).

**Comments:** This species is similar to *P. telescopica*, but the sub-scutellar fringe has much longer pile, the 1<sup>st</sup> abdominal segment is entirely white pilose, and the genitalia is very distinct on the surstylus and postgonite.

**Etymology:** The specific epithet refers to the unique characteristics of the type specimen when compared to *P. telescopica*. It is to be treated as an adjective.

*Pelecinobaccha* (*Pelecinobaccha*) *wyatti* **sp.nov.**

Type-locality: Peru, Junín, Chanchamayo, 1000m, 11°12'S 75°35'W. Holotype male CNC.

Map: 8. Figures: 41e-h.

**Male. Head:** Black; face pale on lateral 1/3; lunule pale above antennae insertions and around central black macula, macula disconnected from frontal triangle color; frontal triangle with a pair of oval spots of silvery-white pollen centro-laterally, dull brown-pollinose medially; vertical triangle with a single median row of pile; ocellar triangle ~1.5 times its length from posterior eye margin; eye contiguity slightly shorter than vertical triangle length; eye posterior indentation at level of antennae insertions; antennae insertions almost separated, ventral margin dorsal extension unsclerotized dorsally before reaching lunule; occiput dorsal 1/3 with 2 regular rows of simple black pile, anterior row shorter, middle 1/3 with 3-4 rows of scale-like white pile, anterior rows shorter, with some simple black pile dorsally, ventral 1/3 with 2 irregular rows of scale-like white pile.

**Thorax:** Scutum black, mostly brown dull pollinose, white-pollinose on notopleuron, with short erect black pile, longer on notopleuron and white anterior to transverse suture,

with anterior row of shining white pile interrupted in the middle; scutellum dark brown, pile short and black, subscutellar fringe long and white; pleuron dark brown to black, pale on posterior  $\frac{1}{2}$  of posterior anepisternum and dorso-posterior katepisternum, white pilose; plumula long light brown to white; calypter light yellow, margin and pile light brown; halter light brown.

**Wing:** Apical  $\frac{1}{2}$ , anal lobe and posterior margin of cup cell hyaline, remaining dark (bc, c, sc, r, basal  $\frac{3}{5}$  of r1, basal  $\frac{1}{3}$  of r2+3, base of r4+5, bm, basal  $\frac{1}{4}$  of dm, anterior margin and apex of cup and basal  $\frac{1}{2}$  of cua1), entirely microtrichose; alula anterior  $\frac{1}{2}$  light brown, remaining hyaline, large, 2 times basally to 4 times apically larger than c cell, entirely microtrichose.

**Legs:** Pro- and mesolegs dark brown, femora with apex pale, mesotibia with basal  $\frac{2}{3}$  slightly pale; metalegs dark brown, metafemur slightly dark red on basal  $\frac{1}{2}$ , apical  $\frac{1}{2}$  of metabasitarsomere and remaining metatarsomeres white.

**Abdomen:** ~3 times longer than scutum, dark brown; 1st tergite white pilose; 2<sup>nd</sup> tergite long, ~4.5 times longer than its smallest width, pale laterally, with central elongated triangular region of dull black pollen, mainly with appressed black pile, baso-lateral  $\frac{3}{4}$  with white erect pile; 3<sup>rd</sup> tergite trapezoidal and long, ~3 times longer than smallest width, pale on baso-lateral  $\frac{1}{2}$ , with large central triangle of dull black pollen, with

appressed black pile but some pile white on baso-lateral corners; 4th tergite sub-quadrangular, slightly wider than long, with very weak pair of central short pale vittae, remaining characteristics as on 3rd; 5th tergite rectangular and wide, dull black pollen restricted to three central vittae, all pile appressed and black. **Genitalia:** Cercus with 1-2 rows of pile on medial margin and 2 rows outward; surstylus long with oval apex, directed apically, pilose dorsally on basal  $\frac{3}{4}$ , with setulae (around 10) ventro-apically, mostly concentrated on margin; subepandrial sclerite trapezoidal and short, lateral margin strongly sclerotized; hypandrium narrow and long, dorsal arc surface not greatly elongated, with ventral notch extending on anterior  $\frac{3}{5}$ ; basiphallus with short narrow posterior extremity, distiphallus anterior surface straight, apex slightly curved apically; phallapodeme long, well sclerotized throughout, curved ventrally on basal  $\frac{1}{3}$ ; postgonites normal, pilose on ventro-basal  $\frac{2}{3}$ , ventral margin of medial surface concave, lateral surface slightly convex, dorsal margin straight, apex convex, ventral extremity rounded, dorsal extremity acute.

**Female:** No female available.

**Length.** 14.5mm; wing 11.5mm.

**Distribution.** Peru (Junín).



**Material examined.** (*1 male*) PERU. [Junín], Chanchamayo, 1000m., 24 Feb 1941, J. Schunke (Holotype *Pelecinobaccha* (*P.*) *wyatti*, CNC Diptera 161221).

**Comments:** Close to *P. eruptova* and *P. telescopica*, but it is distinguished from both by the antennal insertions almost separated by a medial sclerotized stripe and the male genitalic characters.

**Etymology:** The specific epithet is an homage to Nigel Wyatt, Diptera curator at the BMNH.

### Genus *Relictanum* gen.nov.

Type species *Baccha crassa* Walker, 1852.

Included species: *R. adpersitum* sp.nov., *R. braziliensis* (Curran, 1939), *R. crassum* (Walker, 1852), *R. fiametta* (Hull, 1943), *R. johnsoni* (Curran, 1934), *R. magisadpersum* sp.nov., *R. nero* (Curran, 1939), *R. schwarzi* (Curran, 1939), *R. shropshirei* (Curran, 1930).

Description: **Male. Head:** Dark brown to black; face narrow, almost straight dorsal to tubercle, rarely pale laterally, widely white-pollinose laterally, pollen sparse to absent on tubercle apex, usually white pilose laterally except black ventral to antenna, with distinct sub-ventral median tubercle, anterior oral margin sparsely white pilose; gena narrow (appears as an elongated triangle from ventral view); lunule usually entirely black, sometimes pale above antenna insertion, bare, shiny; frontal triangle entirely black, with dull brown pollen medially and silvery-white pollen laterally that sometimes is restricted to oval spots/triangles, usually with long, erect, black pile; ocellar triangle 1-1.5 times its length from posterior eye margin; eye contiguity usually slightly shorter than vertical triangle length; antennae dark, basoflagellomere oval and at least slightly longer than wide, black pilose, arista dark red; occiput usually with sparse dark pollen on dorsal  $\frac{1}{4}$  and dense silvery-white pollen on ventral  $\frac{3}{4}$ , rarely entirely white-pollinose (e.g. *R. schwarzi*), dorsal  $\frac{1}{4}$  with 1 row of simple black or scale-like white pile, middle  $\frac{2}{4}$  with 2-3 regular rows of pile, posterior row always with longer, scale-like white pile, anterior rows ranging from scale-like white pile to simple black pile, ventral  $\frac{1}{4}$  with 2-3 irregular rows of white, scale-like pile, usually with shorter pile on anterior row.

**Thorax:** Prothorax dark, sparse dull pollinose, without pile; scutum dark brown to black, dull pollinose, with a rectangular concentrated area of pollen anterior to scutellum, markings, if present, formed by vittae of pale pollen, pilosity usually erect, with anterior row of longer white pile that sometimes has shorter pile in the middle, notopleuron with pile longer anterior to transverse suture, pile slightly thicker and densely arranged latero-posteriorly to transverse suture; scutellum as dark as scutum and covered by dull pollen; pleuron dark, sparse white-pollinose, microtrichia longer on anterior ½ of katatergum ('velvet'-like), with pile on anterior anepisternum, posterior ½ of posterior anepisternum, anterior anepimeron, ventro- and dorso-posterior katepisternum, katepimeron and sub-appressed on metaepisternum, pile on katepimeron and metaepisternum sometimes inconspicuous; metasternum dark, bare and very narrow dorso-laterally to metacoxa; metaepimeron flared laterally on posterior ½ being connected to body by a membrane; post metacoxal bridge incomplete, metathoracic epimera widely separated; calypter dorsal lobe narrow, with marginal fringe of short pile on dorsal lobe and long branching pile on ventral lobe.

**Wing:** Hyaline to entirely brown; alula linear to large, rarely with bare areas.

**Legs:** Procoxa with only 1 row of pile antero-apically, protrochanter bare ventrally, profemur with sparse pile on basal ½ and slightly longer pile on baso-ventral ½, with densely arranged pale pile ventro-laterally on apex of protibia and ventrally on

protarsus; mesofemur bare to sparsely pilose ventrally and with posterior row of longer black pile, mesotibia with ventro-apical short, thick, black pile, first and second mesotarsomeres with densely arranged pale pile and short, thick, black pile intermixed ventrally, mesobasitarsus thinner than mesotibia and slightly thinner than remaining mesotarsomeres; metacoxa with distinctly longer pile, basal ½ of metafemur with only sparse pile ventrally, metatarsus usually entirely dark, metabasitarsomere with at most apex pale; pile color usually same as background.

**Abdomen:** Petiolate, 1<sup>st</sup> abdominal tergite crescent shaped, with long and erect pile laterally, usually bare or with shorter and sparse pile dorso-medially; 2<sup>nd</sup> abdominal segment narrow and very long; 3<sup>rd</sup> abdominal segment triangular to trapezoidal; remaining abdominal tergites usually rectangular and wide; sterna dark, well sclerotized.

**Genitalia:** Small; epandrium and cercus densely microtrichose; epandrium trapezoidal in lateral view; surstylus usually quadrangular with slightly extended apical corner, base of surstylus articulated to epandrium apico-ventrally; subepandrial sclerite usually trapezoidal with slightly extended posterior corners and homogeneously sclerotized; hypandrium usually sub-oval with a narrower quadrangular apical 1/3, ventral surface usually bare, rarely with a few pile sub-apically (e.g. *R. magisadpersum*); postgonite narrow and elongated, with sub-apical dorsal acute extremity, pilose on baso-ventral surface.

**Female:** Usually very similar to male except: frons narrow; occiput dorsal pilosity and wing markings are sometimes different from the male. **Genitalia:** 7<sup>th</sup> tergite rectangular with concave posterior margin; 7<sup>th</sup> sternite usually absent, sometimes rectangular, with extensive membranous region between 7<sup>th</sup> and 8<sup>th</sup> segments; 8<sup>th</sup> tergite sub-quadrangular to trapezoidal and usually with basal and apical margins concave; 8<sup>th</sup> sternite present as pair of lateral rectangular/trapezoidal sclerotizations; 10<sup>th</sup> tergite with apico-medial notch, setulate and fused laterally or apically to cercus; 10<sup>th</sup> sternite, if visible, just a narrow sclerite with a few pile; cercus densely pilose and with dorsal setulae.

**Comments:** These are small (length 5-10mm), petiolate flies, with the scutum entirely dark, usually with only 1 row of pile on the dorsal region of the occiput and with a very narrow second abdominal segment.

Some *Orphnabaccha* species with bare metasternum may be confused with species of *Relictanum*, but the former is immediately distinguished by the ventral rows of pile of the occiput distanced from the eye margin, the face wider than 1/3 of the head's width, the wider 2<sup>nd</sup> abdominal segment, enlarged surstylus and distal portion of the distiphallus strongly curved anteriorly.

**Etymology:** The name is a reference to the word 'forsaken'. Since *Atylobaccha* came out as the sister group to *Pelecinobaccha*, this prevented giving these species a home in a monophyletic *Pelecinobaccha*. The name is to be treated as neutral.

### ***Relictanum* species key**

1. Metatarsus bicoloured (dark and pale); female dorsal occiput with black pile ..... 2
- Metatarsus entirely dark; female dorsal occiput with scale-like white pile ..... 4
  
2. Frontal triangle with silver white pollen restricted laterally and continuous with face pollen..... *Relictanum fiametta* (Hull, 1943)
- Frons/frontal triangle silver pollinosity forming a lateral pair of semi-circles, sometimes connected to face pollinosity ..... 3
  
3. Choose one of the **three** options:
  - a. Males.....*Relictanum crassum* (Walker, 1852), or *R. johnsoni* (Curran, 1941)  
(males unknown)
  - b. Female 5<sup>th</sup> abdominal segment sub-quadrangular ..... *Relictanum johnsoni*  
(Curran, 1934)
  - c. Female 5<sup>th</sup> abdominal segment rectangular, wider than long ..... *Relictanum crassum*  
(Walker, 1852)
  
4. 4<sup>th</sup> abdominal tergite with central pale markings ..... 5
- 4<sup>th</sup> abdominal tergite without pale markings ..... 7

5. 4<sup>th</sup> abdominal tergite with central pale vittae ..... *Relictanum schwarzi* (Curran, 1939)
- 4<sup>th</sup> abdominal tergite with 6 pale spots, 2 baso-laterally and 4 centrally..... 6
6. 3<sup>rd</sup> abdominal tergite with 4 pale spots; Brazil ..... *Relictanum adspersitum* sp.nov.
- 3<sup>rd</sup> abdominal tergite with 6 pale spots; Costa Rica and Venezuela..... *Relictanum magisadpersus* sp.nov.
7. Frons/frontal triangle with black (male) or white (female) pile, usually white pilose around antennal base; dorsal frons narrow as vertex; lateral ocelli on female touch eye margin; wing entirely microtrichose, entirely light brown (male) or mainly hyaline (female); alula linear but twice the width of the c cell .....*Relictanum nero* (Curran, 1939)
- Frons/frontal triangle usually with white pile; dorsal frons widening from vertex; lateral ocelli on female distanced from eye margin; wing usually with basal cells bare, if entirely microtrichose then wing with basal ½ dark; alula convex, 3 times the width of c cell ..... 8
8. Wing entirely microtrichose; only females ..... *Relictanum shropshirei* (Curran, 1930)
- Wing with bare basal cells..... *Relictanum braziliensis* (Curran, 1939)

## Species descriptions

*Relictanum adpersitum* **sp.nov.**

Type-locality: Brazil, São Paulo, Campinas region, Fazenda Pau d'algo, 80 km NW São Paulo, 22°90'S 47°04'W. Holotype female CNC.

Map: 2. Figures: 42.

**Male. Head:** Black; face narrow, almost straight dorsal to tubercle, lateral  $\frac{1}{4}$  pale, white pilose, black ventral to antennae base; lunule entirely black; frontal triangle entirely black, dull brown-pollinose and divided medially by narrow bare vitta, white-silver pollen continuous from face restricted to lateral margin almost until eye contiguity, black pilose; frontal prominence slightly protuberant at level of frontal triangle; vertical triangle with 1 median row of pile; ocellar triangle distanced its length from the posterior eye margin, eye contiguity slightly longer than vertical triangle length; eye posterior indentation at level of antennae insertion; antennae insertions confluent, antennae close together; occiput entirely white-pollinose, pollen sparse on dorsal  $\frac{1}{3}$ , dorsal  $\frac{1}{3}$  with 1 row of simple black pile, middle  $\frac{1}{3}$  with 2-3 rows of white scale-like pile, posterior row longer, with some simple black pile on anterior row, ventral  $\frac{1}{3}$  with 2 rows of scale-like white pile.



**Thorax:** Scutum dark brown to black, dull brown-pollinose with a sub-median antero-postero pair and one median vittae of differently oriented pollen, mainly white pilose, always with some black pile on notopleuron anterior to transverse suture, with anterior row of shining white pile, interrupted in the middle; scutellum dark brown to black, white pilose, subscutellar fringe long and white; pleuron black, white pilose; plumula normal and white; calypter gray with black margin; halter light yellow.

**Wing:** Hyaline, bare on cell bc and basal  $\frac{1}{3}$  of c; alula large, mainly 4 times larger than c cell throughout, entirely microtrichose.

**Legs:** All legs dark brown to black; apex of profemur and base of protibia pale; apex of mesofemur and basal  $\frac{1}{2}$  of mesotibia pale; apex of metafemur and basal  $\frac{1}{4}$  of metatibia pale, mainly white pilose on metacoxae and metatrochanters.

**Abdomen:** Dark brown to black; about 2.7 times longer than thorax; 1st tergite with black pile baso-laterally, remaining pile white, pile longer laterally; 2<sup>nd</sup> tergite long, 2 times longer than its smallest width, with large medial fascia of dull black pollen and a pair of sub-lateral white spots, pile erect laterally and on baso-dorsal  $\frac{1}{4}$ , white on baso-lateral  $\frac{3}{4}$ , black and appressed on apico-dorsal  $\frac{3}{4}$ ; 3rd tergite sub-quadrangular, slightly longer than wide, with large triangular macula of dull black pollen medially and 4 white spots, a basal pair sub-laterally and a central pair, with mainly appressed black pile but

with distinct shining white pile intermixed, better viewed from a dorso-anterior angle, pile slightly longer and erect on baso-lateral 1/2, 3rd sternite similar to tergite; 4th tergite sub-quadrangular wide, always with 6 spots, erect white pile restricted to baso-lateral corners, remaining characteristics as on 3rd; 5th tergite rectangular and wide, without erect lateral white pile and with only a central pair of white spots, remaining characteristics as on 4th. **Genitalia:** Cercus with 1 row of pile on medial margin and 2-3 rows outward; surstylus very long, crescent shaped, with large baso-dorsal crest and dorso-apical small projection, directed ventrally, without setulae, with weak pile throughout most of the dorsal surface; subepandrial sclerite rectangular and wide, slightly concave on anterior and posterior margin, homogenously sclerotized; hypandrium flattened, rectangular and long, ventro-anterior 2/3 weakly sclerotized and hyaline; phallapodeme 1/2 the size of the hypandrium, narrow and long; distiphallus smooth and anterior surface slightly straight; postgonites narrow and long, with few pile baso-ventrally, ventral surface straight, dorsal surface slightly concave, apex convex anteriorly, no ventral extremity and acute sub-apical dorsal extremity curved posteriorly.

**Female:** Like male except: face and frons entirely white pilose; lunule pale above antennae insertions but not extended dorsally, with central triangular black maculae broadly connected to frons color; frons narrow, white silver pollen concentrated on lateral margin, absent medially, sparse elsewhere; vertex very narrow, ocellar triangle ~2 times its length from posterior eye margin and adjacent to lateral eye margin; occiput entirely white pilose; scutum with sub-median pair of white pollinose vittae, all pile white on scutum, scutellum and pleuron; calypter white; wing hyaline, bare on bc, basal 1/2 of

c, basal ½ of r, basal ½ of bm and almost basal ½ of cup; legs with distinct pale regions and basal 2/3 of protibia pale; 1st tergite entirely white pilose; 3rd tergite trapezoidal wide, 2 times wider than long; 4<sup>th</sup> rectangular and wide; 6th segment short, divided into tergite and sternite, 3.4 times shorter than 5th segment. **Genitalia:** 7<sup>th</sup> tergite rectangular, with pile on apical 2/3, 7<sup>th</sup> sternite absent but with extensive membranous region (greater than the dorsal distance between the 6<sup>th</sup> and 8<sup>th</sup> segments); 8<sup>th</sup> tergite notched anteriorly and posteriorly, leaving a narrow bridge between the 2 halves, 8<sup>th</sup> sternite divided into a pair of lateral lobes, joined basally; 10<sup>th</sup> tergite notched anteriorly and with a convex posterior margin, 10<sup>th</sup> sternite reduced to a triangular sclerite; cercus basally fused by narrow strip to lateral margin of 10<sup>th</sup> tergite, densely pilose and with setulae directed basally on dorsum.

**Length.** 6.5-7.5mm; wing 5-6mm.

**Distribution.** Brazil (Santa Catarina, São Paulo).

**Material examined.** (**1 males**) BRAZIL. Santa Catarina, Nova Teutônia, 300-500m, 27°11'S 52°23'W, 22 Nov 1960, F. Plaumann (CNC Diptera 161190). (**2 females**) BRAZIL. São Paulo, Fazenda Pau d'alho, 80 km NW São Paulo, 28-29 Oct 1972, R.V. Peterson (Holotype *Relictanum adpersitum*, CNC Diptera 161188); Santa Catarina,

Nova Teutônia, 300-500m, 27°11'S 52°23'W, 27 Dez 1959, F. Plaumann (CNC Diptera 161189).

**Comments:** The markings of the abdomen promptly remind the observer of *Pelecinobaccha (Noxana) adspersa* (Fabricius, 1805), but the silver pollen restricted to the sides of the frontal triangle/frons, the divided female 6<sup>th</sup> segment and the unmodified female genitalia of *R. adspersitum* set these two species apart. The surstylus and hypandrium of this species are very distinct from other *Relictanum* species.

**Etymology:** The specific epithet is a reference to *P. adspersa*, to which it resembles. It is to be treated as a noun in apposition.

*Relictanum braziliensis* (Curran, 1939) **comb. nov.**

*Baccha braziliensis* Curran, 1939. – Curran, 1939: 9. Type-locality: Brazil, Mato grosso.  
Holotype female AMNH. Hull, 1949a: 213 (fig. 101, abdomen), 283 (fig. 387, wing).

*Ocyptamus braziliensis*. Thompson et al. 1976: 13 (catalog citation).

*Baccha martorelli* Telford, 1973. – Telford, 1973: 230. Type-locality: Porto Rico,  
Castañer. Holotype female WSU (not examined). 231 (fig. 3, abdomen). **n. syn.**

Map: 1. Figures: 43.

**Male. Head:** Dark brown to black; face narrow, almost straight dorsal to tubercle, white pilose, black around base of antennae; lunule usually entirely black; frontal triangle dull brown-pollinose medially but pollen sometimes absent in a narrow central region, white-silver pollen continuous from face restricted to lateral margin except around eye contiguity, white pilose; frontal prominence slightly protuberant at level of frontal triangle; vertical triangle with only 1 median row of pile; ocellar triangle distanced its length from posterior eye margin; eye contiguity 1.5 times longer than vertical triangle length; eye posterior indentation at level of antennae insertion; antennae insertions confluent; occiput dorsal  $\frac{1}{4}$  with dull black pollen, ventral  $\frac{3}{4}$  with white-silver pollen, dorsal  $\frac{1}{4}$  with 1 row of scale-like white pile, middle  $\frac{2}{4}$  with 2-3 rows of white scale-like

pile, anterior row shorter and with lanceolate pile, ventral  $\frac{1}{4}$  with 2 rows of scale-like white pile.

**Thorax:** Scutum black, with inconspicuous sub-median antero-postero pair of white pollinose vittae, white pilose, slightly longer pile on notopleuron and anterior row with distinct longer pile; scutellum black, white pilose, subscutellar fringe long and white; pleuron black, white pilose; plumula normal and white; calypter white; halter white to yellow.

**Wing:** Entirely light infuscated, bare on basal  $\frac{2}{5}$  of c and basal  $\frac{1}{4}$  of r; alula large, 3 times larger than c cell throughout, light infuscated, entirely microtrichose.

**Legs:** Legs dark brown to black; profemur apex pale, protibia basal  $\frac{1}{3}$  pale; apex of mesofemur and basal  $\frac{2}{5}$  of mesotibia pale; apex of metafemur and basal  $\frac{1}{4}$  of metatibia pale, metacoxa white pilose.

**Abdomen:** Dark brown to black; about 3 times longer than thorax; 1st tergite white pilose; 2<sup>nd</sup> tergite long, 2.2 times longer than its smallest width, with sub-apical arcuate fascia of dull black pollen with small medial basal projection, pile appressed and black dorsally, remaining erect and white, longer laterally; 3rd tergite trapezoidal, 1.26 times

longer than smallest width, with large triangular macula of dull black pollen medially, with mainly appressed black pile but with distinct shining white pile intermixed, 3rd sternite rectangular and long; 4th tergite sub-quadrangular, with pair of sub-median vittae of absence of dull pollen apically, remaining characters as on 3rd; 5th tergite rectangular and wide, dull pollinose region divided into 3 median vittae, remaining characteristics as on 4th. **Genitalia:** Cercus with 1-2 regular rows of pile on medial margin and 2 irregular rows outward; surstylus sub-quadrangular, directed ventrally, with ventro-apical corner extended, with setulae (around 16) ventro-apically except for ventro-apical corner, setulae longer medially; subepandrial sclerite deep concave anteriorly and posteriorly, homogeneously sclerotized; hypandrium sub-quadrangular, ventral notch with irregular margin on anterior  $\frac{1}{2}$ , with a few long pile (around 6) sub-apically on ventro-lateral margin; phallapodeme weakly sclerotized on basal  $\frac{1}{2}$ ; basiphallus with posterior extremity strongly curved back dorsally, distiphallus weakly sclerotized and anterior surface straight; postgonites narrow, curved, with few pile baso-ventrally, ventral surface convex, dorsal surface concave, apex acute, with lateral spine on apical  $\frac{1}{3}$ .

**Female:** Like male except: rarely with lateral  $\frac{1}{4}$  of face pale; pile white around base of antennae; frons narrow but widens from vertex; vertex narrow; ocellar triangle  $\sim 1.5$  times its length from posterior eye margin and  $\sim 0.5$  ocelli-width from lateral eye margin; basal  $\frac{1}{2}$  of r, base of r1 and baso-anterior  $\frac{1}{2}$  of bm might also be bare; protibia and mesotibia sometimes with basal  $\frac{1}{2}$  pale, basal  $\frac{1}{3}$  of metatibia pale; 2<sup>nd</sup> abdominal tergite slightly narrower, 2.7 longer than wide; 3<sup>rd</sup> tergite shorter and with wider apical

margin, black pollen recedes laterally on anterior corner, 3<sup>rd</sup> sternite similar to tergite; 4<sup>th</sup> rectangular and wide; 6th segment short, a 1/3 of the length of the 5<sup>th</sup>, divided into tergite and sternite. **Genitalia:** 7<sup>th</sup> tergite rectangular, normal, with pile only on apical 1/2, 7<sup>th</sup> sternite rectangular but weakly sclerotized; 8<sup>th</sup> tergite shallowly notched anteriorly and posteriorly, 8<sup>th</sup> sternite unsclerotized on median 1/2; 10th tergite notched anteriorly and with a small convex projection medially on posterior margin, with narrow basolateral projections, 10th sternite reduced to a triangular sclerite; cercus fused to lateral margin of 10<sup>th</sup> tergite, densely pilose and with setulae directed basally on dorsal 1/2.

**Length.** 6.5-7mm; wing ~5.5mm.

**Distribution.** Brazil (Goiás, Mato Grosso), Mexico (Jalisco), Porto Rico.

**Material examined.** (**3 males**) UNKNOWN. Rio, Ataca a *Pulvinaria*, Frank M. Hull Collection C.N.C. 1973, sp.nov. rel. to trilobatus also rel. to infanta [front], with silver hair like infanta but longer, no left spots on front. Dif. abd. figure from triloba [back; Hull's handwriting on his determination label], 17 Nov 1930, Dario (CNC Diptera 161209). BRAZIL. Goiás, Jataí, ?? Jan 1955, [M.] Carrera. MEXICO. Jalisco, Estacion de Biologia, Chamela, 1 Oct 1985, J. G. Rozen. (**3 females**) UNKNOWN. Rio, Ataca a *Pulvinaria*, Frank M. Hull Collection C.N.C. 1973, 17 Nov 1930, Dario (CNC Diptera 161208). BRAZIL. Mato Grosso, Poxoréu, Coronel Ponce, *Baccha braziliensis* Curran



Holotype [red label], ?? ??? ????, J. Lane (Holotype *Baccha braziliensis*). PORTO RICO. Rio Piedras, Malaise trap, *Baccha martorelli* para. Telford [yellow label], 19-22 Oct 1968, H.S. Telford (Paratype *Baccha martorelli*).

**Comments:** One male and one female, from an unknown locality, have a label indicating that they were fed on *Pulvinaria* sp. (Hemiptera: Coccidae).

Very close to *R. shropshirei*. Curran set the two species apart based on the dull maculae on the 5<sup>th</sup> abdominal tergite, where “[*B. braziliensis*] Fifth segment with three opaque triangles that are connected or narrowly separated posteriorly, [...]” which would be different from *B. shropshirei* “[...]the fifth with a median vitta on the basal two-thirds and an elongate oval, oblique spot extending from the base to the apical corners; [...]”. On close inspection of the type specimens, there are no differences between the markings, all behaving as in this redescription. But, as noted on *R. shropshirei* (see redescription below) they do differ in wing microtrichosity and some genitalic features.

The paratype of *B. martorelli* studied lacked its abdomen, but Telford (1973) indicates that the abdominal dark pollen patterns of this species are not variable. Although Telford compared his species to *B. shropshirei*, he did not compare it to *B. braziliensis*.

*Relictanum crassum* (Walker, 1852) **comb. nov.**

*Baccha crassa* Walker, 1852. Walker, 1852: 222. Type-locality: Brazil. Holotype male BMNH (not examined).

*Ocyptamus crassus*. Thompson et al. 1976: 15 (catalog citation).

*Baccha zeteki* Curran, 1930. Curran, 1930: 8. Type-locality: Panama, Canal Zone, Barro Colorado Island. Holotype male AMNH. Hull, 1949a: 175 (redescription), 204 (fig. 66, female abdomen). **n.syn.**

*Ocyptamus zeteki*. Thompson et al. 1976: 30 (catalog citation).

Map: 3. Figures: 44.

**Male. Head:** Black; lunule sometimes weakly pale dorsal to antennae insertions; frontal triangle brown dull pollinose, with pair of median oval spots of silvery-white pollen laterally, pollen sparse centrally, only frontal prominence protuberant; vertical triangle with 1 median row of pile; ocellar triangle ~1.5 times its length from posterior eye margin; eye contiguity slightly shorter than vertical triangle length; eye posterior indentation slightly ventral to antennae insertions; antennae insertions confluent; occiput dorsal  $\frac{1}{4}$  with 1 row of simple black pile, middle  $\frac{2}{4}$  with 2-3 rows of scale-like white pile,

posterior row longer, anterior rows sometimes with a few simple black pile dorsally, ventral  $\frac{1}{4}$  with 2-3 irregular rows of scale-like white pile.

**Thorax:** Scutum black, mainly dull pollinose, pollen concentrated on pair of anterior patches, white-pollinose on notopleuron, black pilose, white pilose on notopleuron and anterior to scutellum, usually with some black pile directly anterior to transverse suture, with anterior row of scale-like white pile with shorter pile in the middle; scutellum black, white pilose, subscutellar fringe long and white; pleuron black, white pilose; plumula gray and normal; calypter gray, fringe darker; halter stem light yellow to light brown, capitulum yellow.

**Wing:** Entirely hyaline to entirely brown, stigma usually darker, entirely microtrichose; alula normal, 1.7 times basally to 3.3 times apically larger than c cell, hyaline, entirely microtrichose.

**Legs:** All legs dark brown to black; apex of profemur and base of protibia pale, apex of protibia and 2<sup>nd</sup> protarsomere usually pale; apex of mesofemur, basal  $\frac{1}{4}$  of mesotibia and first 2 mesotarsomeres usually pale; basal  $\frac{1}{2}$  of metafemur sometimes pale, pale on apex of metafemur and base of metatibia, pale on apex of metabasitarsomere until 3<sup>rd</sup> or 4<sup>th</sup> metatarsomeres, 4<sup>th</sup> metatarsomere sometimes brown, 5<sup>th</sup> metatarsomere dark brown, metacoxae and metatrochanters white pilose.

**Abdomen:** Black, 3.2 times longer than thorax; 1<sup>st</sup> tergite mainly white pilose, sometimes with a few black pile baso-dorsally; 2<sup>nd</sup> tergite narrow and very long, 7.5 times longer than its smallest width, sometimes pale on baso-lateral 1/3, with a sub-basal and a sub-apical rounded maculae of dull black pollen which might join dorsally, pile long and erect laterally, appressed dorsally, sometimes base with erect pile, white on baso-lateral  $\frac{3}{4}$ , remaining pile black; 3rd tergite trapezoidal and long, 3.4 times longer than smallest width, sometimes with lateral sub-basal pair of pale maculae, with large central triangular region of dull black pollen, pile appressed and black, white on baso-lateral 1/3; 4th tergite sub-quadrangular long, 1.2 times longer than wide, baso-lateral corners sometimes with small pale maculae, pile appressed and black, with central pair of triangular maculae of dull black pollen; 5th tergite rectangular and wide, with small baso-median macula of dull black pollen, pile appressed and black.

**Genitalia:** Cercus with 1 row of pile on medial margin and 4-5 irregular rows outward; surstylus sub-quadrangular with extended apical corner on lateral view, directed apically, with long setulae (around 14) ventrally on apical  $\frac{3}{4}$  organized in transversal rows and 1-2 setulae basally, with very few pile (around 5) on basal  $\frac{1}{2}$  of the dorsal surface; subepandrial sclerite rectangular and wide, with baso-lateral corners extended and directed basally (as long as sclerite), homogeneously sclerotized; hypandrium with trapezoidal notch extending on anterior  $\frac{3}{5}$ , notch posterior margin straight; distiphallus anterior surface almost straight; postgonite ventral surface slightly concave medially, dorsal surface straight, both surfaces curving gently towards acute dorsal extremity of apex.

**Female:** Similar to male except: Face sometimes pale on lateral  $\frac{1}{4}$ ; maculae of white pollen on frons sometimes connected to pollen from face; ocellar triangle 2-3 times its length from posterior eye margin and  $\sim 1$  ocellus-width from lateral eye margin; calypter sometimes entirely white; wing hyaline but sometimes slightly dark on cells bc, c, sc, r, basal  $\frac{1}{3}$  of r1, base of r2+3 and bm; metafemur sometimes with only a sub-apical dark ring; 2nd abdominal tergite 5 times longer than smallest width, pile shorter and lateral pile appressed on apical  $\frac{1}{2}$ ; 3<sup>rd</sup> tergite shorter, 2.6 times longer than smallest width; 4<sup>th</sup> tergite rectangular and wide, 1.5 times wider than long; 5th tergite rectangular and wide, 2.45 times wider than long; 6th tergite rectangular and wide, much shorter than 5th tergite. **Genitalia:** 7<sup>th</sup> tergite rectangular, with concave posterior margin, baso-lateral corners very slightly extended, pilose on apical  $\frac{1}{2}$ , sometimes narrower, with straight posterior margin and pile more sparse and bare on a narrow medial region, 7<sup>th</sup> sternite absent but ventral membranous region pilose; 8<sup>th</sup> tergite sub-quadrangular wide and posterior margin as on 7<sup>th</sup> tergite, anterior margin slightly concave, pilose on apical  $\frac{1}{2}$ , anterior and posterior margins sometimes straight, 8<sup>th</sup> sternite unsclerotized medially, baso-dorsal corners slightly extended or not, entirely pilose; 10th tergite modified and fused to cercus forming a pair of separate rectangular sclerites, with long narrow baso-lateral extensions usually directed ventrally, apical  $\frac{1}{2}$  slightly enlarged, sparse pilose on basal  $\frac{3}{4}$ , densely pilose and with setae apically, apex sometimes curved in a ventral direction; spermatheca with small protuberances on  $\frac{1}{2}$  of its surface, sometimes large.

**Length.** 5.5-9.5mm; wing 4-7mm.

**Distribution.** Brazil (Amazonas, Distrito Federal, Pará, São Paulo), Colombia (Amazonas), Ecuador (Cotopaxi, Los Ríos, Napo, Sucumbios), Guyana, Panama (Canal Zone), Peru (Cuzco, Madre de Dios), Suriname, Trinidad.

**Material examined.** (**14 males**) BRAZIL. Distrito Federal, Parque Nacional, 1100m., 3 Mar 1970, J. M. & B. A. Campbell (CNC Diptera 161309); São Paulo, Araçatuba, Córrego Azul, ?? Mar 1947, M.P. Barretto (2 specimens); ..., Com I. O. Cruz, Ilha Seca, 18-26 Feb 1940, ? (CNC Diptera 161308). ECUADOR. Cotopaxi, Latacunga, 133 Km W, 1080' at blacklight, 25 Jul 1975, Langley & Cohen (USNM ENT 00257719); Napo, Puerto Misahualli, 350m., ?? Feb 1983, M. Sharkey (CNC Diptera 161310); [Sucumbios], Limoncocha, 0°24' S, 76°40' W, 250m., 9-16 Mar 1976, G. E. Shewell (CNC Diptera 161306). GUYANA. Mazaruni-Potaru District, Takutu Mountains, 6°15' N 59°5' W, 13 Dec 1983, P. J. Spangler & W. E. Steiner (USNM ENT 00257715). PANAMA. Canal Zone, Barro Colorado Island, Type *Baccha zeteki* Curran no [red label], 28 Jan 1929, C. H. Curran (Holotype *Baccha zeteki*); ..., Summit, ?? Nov 1946, N. L. H. Krauss (CNC Diptera 161304). PERU. Cuzco, Quincemil, 780m., 13-31 Aug 1962, L. Pena; Madre de Dios, Avispas, 400m., 10-20 Sep 1962, L. Pena (CNC Diptera 161305); ..., Manu, Rio Manu, nr. Pakitza, 12°17' S 70°57' W, 250m., 9 Sep 1988, W. N. Mathis (USNM ENT 00257717). SURINAME. Murisburg [?], 19 Jun 1961, P. H. v. Doesburg Jr. (CNC Diptera 161307); Raleigh Va-len-Voltzberg Res Foengoe, 4°43'[N]

56°12'[W], 26 Jan-15 Feb 1982, J. Carpenter & D. Trail (USNM ENT 00257720). (**18 females**) UNKNOWN. Frank M. Hull Collection C.N.C. 1973, ?? ?? ????, ? (CNC Diptera 161311). BRAZIL. Amazonas, Urucurituba, Exp. perm. Amaz., ?? Oct 1969, ?; Distrito Federal, Parque Nacional, 1100m., 3 Mar 1970, J. M. & B. A. Campbell (2 specimens, CNC Diptera 161312-3); Pará, Belém, Pôrto do SESP, Exp. perm. Amaz., ?? Sep 1969, ?; São Paulo, Avandava, ?? Feb 1946, M.P. Barretto; ..., Guaianazes, ?? Feb 1950, M. Carrera (CNC Diptera 161314); ..., Rio Paraná, Porto Cabral, 20-31 Mar 1944, Trav. Fo. & Carrera & E. Dente (CNC Diptera 161315). COLOMBIA. [Amazonas], Leticia, 20-26 Feb 1972, A. Sauvé (CNC Diptera 161321). ECUADOR. [Los Ríos], Rio Palenque, 0°35' S 79°22' W, 150m., 22-26 Feb 1976, G. & M. Wood (CNC Diptera 161316). PANAMA. Canal Zone, Barro Colorado Island, Type *Baccha zeteki* Curran no [red label], 22 Dez 1928, C. H. Curran (Allotype *Baccha zeteki*); ..., 11 Dez 1928 (Paratype *Baccha zeteki*); ..., 10 Jan 1929, C. H. Curran (CNC Diptera 161317); ..., 17 Jun 1978, Silberglied & Aiello (USNM ENT 00257716); ..., Frijoles, 10 Jul 1924, N. Banks (CNC Diptera 161318). PERU. Cuzco, Quincemil, 700m., 1-15 Nov 1962, L. Pena (2 specimens, CNC Diptera 161319-20); Madre de Dios, Avispas, 400m., 10-20 Sep 1962, L. Pena. TRINIDAD. W. L., 2 mi. S Valencia, 5 Jan 1979, M. A. & L. L. Ivie (USNM ENT 00257718).

**Comments:** The holotype for *Baccha crassa* is missing its head, but based on Nigel Wyatt's (Diptera curator at the BMNH) replies to my questions, the remaining parts of the type specimen agree with this redescription.

Although the male and female types of *B. zeteki* at the AMNH had no label indicating which one is the holotype, Curran's (1930) description states that the male is the holotype. Red labels indicating the holotype and the allotype were added to the specimens to make this distinction.



*Relictanum fiametta* (Hull, 1943) **comb. nov.**

*Baccha fiametta* Hull, 1943. Hull, 1943a: 75, 82 (fig.13, male abdomen). Type-locality: Panama, Canal Zone, Barro Colorado. Holotype male CNC. Hull, 1949a: 153 (redescription), 194 (fig. 13, male abdomen).

*Ocyptamus fiametta*. Thompson et al. 1976: 18 (catalog citation).

Map: 1.

**Male. Head:** Dark brown; face sparse white-pollinose but pollen concentrated laterally, white pilose but sparse to bare to middle of tubercle, tubercle normal; gena with sparse white pollinosity, with sparse short white pile anteriorly to bare posteriorly; lunule pale dorsal to antennae insertions and pale dorsal to central macula; frontal triangle dull white-pollinose medially, with silver white pollen restricted laterally and continuous from face, black pilose; frontal prominence protuberant; vertical triangle with a median row of black pile ending dorsal to anterior ocellus; ocellar triangle ~1.5 times its length from posterior eye margin; eye contiguity as long as vertical triangle length; eye posterior sub-triangular indentation at level of antennae insertion; antennae insertions confluent, basoflagellomere oval with ventral  $\frac{1}{2}$  pale; occiput dorsal  $\frac{1}{3}$  with dull black pollen, ventral  $\frac{2}{3}$  with silver white pollen, dorsal  $\frac{1}{3}$  with a row of simple black pile, ventral  $\frac{2}{3}$  with 2-3 rows of scale-like white pile, anterior rows shorter.

**Thorax:** Scutum dark brown, mainly dull brown-pollinose, pollen concentrated anterior to scutellum, white-pollinose on notopleuron, black pilose, white pilose and slightly longer on notopleuron, some white pile intermixed anterior to scutellum, with anterior row of longer shining white pile; scutellum dark brown, sub-scutellar fringe normal and white; pleuron dark brown, microtrichia longer on anterior  $\frac{1}{2}$  of katatergum, white pilose, very few pile on the katepimera; plumula short and white; calypter white; halter stem yellow, capitulum orange.

**Wing:** Hyaline, light brown on sc cell, entirely microtrichose; alula normal, 1.7 times basally to 3.3 times apically larger than c cell, hyaline, entirely microtrichose.

**Legs:** Brown, apex of femora and base of tibiae pale; 2<sup>nd</sup> to 5<sup>th</sup> metatarsomeres light brown; pile mainly black, white on lateral row of longer pile on mesofemur and on metacoxae; with black setae ventrally on apex of mesotibia and on mesobasitarsomeres.

**Abdomen:** Dark brown; about 3.4 times longer than thorax; 1st tergite white pilose, pile longer laterally; 2<sup>nd</sup> tergite narrow and very long, 8 times longer than its smallest width, with median long narrow rectangular macula of dull black pollen that extends to lateral margin sub-apically, mainly with short appressed black pile, pile slightly longer, erect

and white on baso-lateral 2/3; 3rd tergite trapezoidal and long, 3.7 times longer than smallest width, pale on baso-lateral corners, with central triangular macula of dull black pollen, with short appressed black pile; 4th tergite rectangular and wide, with pale baso-lateral corners, with pair of median oval spots of dull black pollen, with short appressed black pile; 5th tergite short, rectangular and wide, with a central small dull pollinose spot, with short appressed black pile. **Genitalia:** Not dissected.

**Female:** No female available.

**Length.** 10mm; wing 7mm.

**Distribution.** Panama (Canal Zone).

**Material examined.** (*1 male*) PANAMA. Canal Zone, Barro Colorado, Holotype *Baccha fiametta* Hull CNC n°19272, Frank M. Hull collection C.N.C. 1973 (Holotype *Baccha fiametta*).

*Relictanum johnsoni* (Curran, 1934) **comb. nov.**

*Baccha johnsoni* Curran, 1934. Curran, 1934: 392. Type-locality: Guyana, Bartica.  
Holotype female MCZ. Hull, 1949a: 159 (redescription), 252 (fig. 281, male abdomen).

*Ocyptamus johnsoni*. Thompson et al. 1976: 20 (catalog citation).

*Baccha plutonia* Hull, 1948. Hull, 1948: 2. Type-locality: Peru, Lima, Iquitos. Holotype female USNM. Hull, 1949a: 166 (redescription), 194 (fig. 17, female abdomen). **n. syn.**

*Ocyptamus plutonia*. Thompson et al. 1976: 25 (catalog citation).

*Baccha smarti* Curran, 1939. Curran, 1939: 10. Type-locality: Guyana, Mazaruni.  
Holotype female BMNH. **n. syn.**

*Ocyptamus smarti*. Thompson et al. 1976: 27 (catalog citation).

*Baccha trinidadensis* Curran, 1939. Curran, 1939: 11. Type-locality: Trinidad, Tabaquite. Holotype female AMNH. Hull, 1949a: 212 (fig. 98, female abdomen), 254 (fig. 284, female wing). **n. syn.**

*Ocyptamus trinidadensis*. Thompson et al. 1976: 28 (catalog citation).

Map: 1. Figures: 45a-d.

**Male.** No male available.

**Female.** Similar to *R. crassum* except: Face mostly black, pale reduced ventro-laterally; frons white pollinose maculae not connected to face pollen; vertex narrow; ocellar triangle ~2 times its length from posterior eye margin and ~1 ocellus-width from lateral eye margin; wing hyaline but slightly dark on cells bc, c, sc, basal 1/3 of r1, r, bm and cup; protibia and mesotibia with basal 1/3 to 1/2 pale; metatibia with basal 1/4 pale, metabasitarsomere apical 1/4 pale, fourth and fifth metatarsomeres slightly darker, metacoxae and metatrochanters entirely white pilose; 4<sup>th</sup> tergite sometimes sub-quadrangular, slightly longer than wide; 5th tergite sub-quadrangular, slightly wider than long. **Genitalia:** 7<sup>th</sup> tergite rectangular, with very short baso-lateral extensions and middle slightly convex, with pile only on apical 1/2 and sparse to bare medially, 7<sup>th</sup> sternite absent; 8<sup>th</sup> tergite slightly concave on posterior margin, baso-lateral corners acute and connected to 8<sup>th</sup> sternite, 8<sup>th</sup> sternite whole, with anterior notch; 10th tergite modified and fused to cercus forming a pair of rectangular sclerites narrowly fused basally, with long narrow baso-lateral extensions, apical 1/2 slightly enlarged, sparse pilose on basal 3/4, densely pilose and with setulae apically.

**Length.** 8-10.5mm; wing 6-7mm.

**Distribution.** Guyana, Ecuador (Napó), Peru (Cuzco, Huanuco, Lima), Trinidad.

**Material examined.** (6 *females*) BOLIVIA. La Paz, Covendo, Mulford Bio Expl 1921-22, ?? Sep ??, W.m. M. Mann (Paratype *Baccha plutonia*, CNC Diptera 161378). GUYANA. Bartica, Type *Baccha johnsoni* No. Curran [red label], Collection C.W. Johnson, Type 7662 [red label], 30 Jun 1901, ? (Holotype *Baccha johnsoni*). ECUADOR. Napo, Coca, Napo R., 250m, 25-30 Apr 1965, L. Pena (CNC Diptera 161206); ..., Jatun Sacha Biol. Res. 6 km E Misahuali, 1°4'S 70°36'W, ~450m, land slide in forest, Malaise, 30 Apr-7 May 2002, Buck et al. (DEBU00196386). PERU. Cuzco, Quincemil, 24-31 Oct 1962, [L. E.] Pena (CNC Diptera 161207); Huanuco, Tingo Maria, 2200ft., 14 May 1947, J. C. Pallister; [Lima], Iquitos, type [red label], Type no 51373 U.S.N.M. [red label], USNM 2052087, ?? Mar-Apr 1931 R. C. Shannon (Holotype *Baccha plutonia*). TRINIDAD. Arima Val., Simla Res. Station, 25 Jun - 29 Jul 1982, J. M. Carpenter & J. S. Edgerly.

**Comments:** Although all females examined look very similar to *R. crassum*, they all have a sub-quadrangular 5<sup>th</sup> abdominal segment and distinct genitalia that separate them from *R. crassum*.

The abdominal characters from the holotype of *B. smarti* were studied by the Diptera curator at the BMNH (Nigel Wyatt) at my request. Curran (1939) describes a female but states that the holotype is a male. The holotype is actually a female, and based on Wyatt's observations it agrees perfectly with this redescription.

*Relictanum magisadpersum* **sp.nov.**

Type-locality: Venezuela, Carabobo, Henri Pitier National Park, Portachuelo Pass, 1143m, 10°20'51"N 67°41'16"W. Holotype male CNC.

Map: 1. Figures: 46.

**Male.** Similar to *R. adpersitum* except: face entirely black, occiput pollen differently oriented dorsally; scutum mainly black pilose, with some white pile on notopleuron but always black pilose anterior to transverse suture, brown pollen at most concentrated as a pair of sub-medial vittae barely visible from a posterior angle, scutellum black pilose, subscutellar fringe black, pleuron sometimes with a few black pile dorsally on posterior  $\frac{1}{2}$  of posterior anepisterna; wing entirely infuscated; only basal  $\frac{1}{3}$  of mesotibia and base of metatibia pale; 3<sup>rd</sup> abdominal tergite trapezoidal slightly longer than basal width and with 6 white spots, one median pair sub-basally, another basal pair sub-laterally and a central pair. **Genitalia:** Cercus with 1 row of pile on medial margin and 2 irregular rows outward; surstylus sub-quadrangular with slightly extended apical corner on lateral view, with long setulae (around 16) ventrally on apical  $\frac{2}{3}$ , with very few pile (around 5) on basal  $\frac{1}{2}$  of the dorsal surface; subepandrial sclerite rectangular and wide, with baso-lateral corners slightly extended; hypandrium with trapezoidal notch extending on anterior  $\frac{1}{2}$ , notch posterior margin straight, with a few pile (around 3) sub-apically on

ventro-lateral surface; distiphallus anterior surface almost straight and short; postgonites narrow, with few pile on ventral 1/3, ventral surface twice undulated, dorsal surface slightly concave, apex rounded with sub-apical lateral spine.

**Female:** No female available.

**Length.** ~6mm; wing ~5mm.

**Distribution.** Costa Rica (Puntarenas), Venezuela (Carabobo).

**Material examined.** (**3 males**) COSTA RICA. Puntarenas, Z. P. Las Tablas, Las Alturas de Cotón, 1500-1600m, libre, L\_S\_323200\_589750, #74936, 27 Sep 2003, M. Alfaro (INB0003753312 INBIOCRI COSTA RICA); ..., San Vito de Coto, Las Alturas Biol. Sta., 1500m., 16 Aug 1995, J. R. Vockeroth (CNC Diptera 161222). VENEZUELA. Carabobo, Henri Pitier National Park, Portachuelo Pass, 10°20'51"N 67°41'16"W, 1143m, 15 Sep 2008, J.H.Skevington (JSS25218 (Holotype *Relictanum magisadpersum*)).

**Comments:** Very similar to *R. adpersitum* but immediately distinguished by the 6 spotted 3<sup>rd</sup> abdominal tergite.



**Etymology:** The specific epithet is a reference to the increased number of spots on the abdominal tergites of this species. It is to be treated as an adjective.

*Relictanum nero* (Curran, 1939) **comb. nov.**

*Baccha nero* Curran, 1939. – Curran, 1939: 8. Type-locality: Guyana, Kaieteur. Holotype male BMNH (not examined).

*Ocyptamus nero*. Thompson et al. 1976: 23 (catalog citation).

*Baccha infanta* Hull, 1943. – Hull, 1943a: 74. Type-locality: Colombia. Holotype male CNC. Hull, 1949a: 159 (redescription), 224 (fig. 151, abdomen). **n.syn.**

*Ocyptamus infanta*. Thompson et al. 1976: 21 (catalog citation).

*Baccha triloba* Hull, 1944. – Hull, 1944a: 7. Type-locality: “Amazon”. Holotype female BMNH. Hull, 1949a: 172 (redescription), 224 (fig. 153, abdomen), 258 (fig. 298, wing). **n. syn.**

*Ocyptamus trilobus*. Thompson et al. 1976: 28 (catalog citation).

*Baccha philodice* Hull, 1950. – Hull, 1950: 227. Type-locality: Peru, Chanchamayo. Holotype female CNC. **n. syn.**

*Ocyptamus philodice*. Thompson et al. 1976: 25 (catalog citation).

Map: 2. Figures: 47.

**Male. Head:** Black; face narrow, almost straight dorsal to tubercle, white pilose, black ventral to antennae base; gena black; lunule entirely black; frontal triangle entirely black, dull brown-pollinose medially and sometimes divided medially by narrow bare vitta, white-silver pollen continuous from face restricted to lateral margin except around eye contiguity, black pilose; frontal prominence slightly protuberant at level of frontal triangle; vertical triangle with 1 median row of pile; ocellar triangle distanced less than its length from posterior eye margin and adjacent to the lateral eye margin; eye contiguity 1.5 times longer than vertical triangle shorter length; eye posterior indentation at level of antennae insertion; antennae insertions confluent, antennae close together; occiput dorsal  $\frac{1}{4}$  with dull brown pollen, ventral  $\frac{3}{4}$  with white-silver pollen, dorsal  $\frac{1}{4}$  with 1 row of simple white or black pile, middle  $\frac{2}{4}$  with 2 rows of white scale-like pile, posterior row longer, with some simple black pile on anterior row, ventral  $\frac{1}{4}$  with 1-2 rows of scale-like white pile posteriorly, anterior region bare.

**Thorax:** Scutum black, with sub-median antero-postero pair of dull brown-pollinose vittae, mainly black pilose except for the anterior row of longer, shining, white pile, slightly interrupted in the middle; scutellum black, with sparse short black pile, subscutellar fringe normal and black; pleuron black, white pilose, sometimes with a few black pile dorsally on posterior  $\frac{1}{2}$  of posterior anepisterna; plumula short and gray; calypter white to gray with black margin; halter white to light orange.

**Wing:** Entirely light brown, entirely microtrichose; alula normal and linear, mainly 2.3 times larger than c cell throughout, light brown, entirely microtrichose.

**Legs:** Prolegs black, protibia sometimes with basal 1/3 pale; mesolegs black, apex of mesofemur and basal 1/3 of mesotibia sometimes pale; metalegs black, apex of metafemur and basal 1/4 of metatibia sometimes pale, metacoxa mainly white pilose.

**Abdomen:** Black; about 3 times longer than thorax; 1st tergite with white pile ventrally, remaining pile black, pile longer laterally; 2<sup>nd</sup> tergite long, 3.5 times longer than its smallest width, with sub-apical fascia of dull black pollen, mainly with appressed, black pile, pile erect laterally, white on baso-lateral 1/2; 3rd tergite trapezoidal, 2 times longer than smallest width, with large triangular macula of dull black pollen medially, with mainly appressed black pile but with distinct shining white pile intermixed, visible from a dorso-anterior angle, slightly longer and erect on baso-lateral corners, 3rd sternite much narrower than tergite; 4th tergite sub-quadrangular, with pair of sub-median sub-shining vittae apically, remaining characters as on 3rd; 5th tergite rectangular and wide, dull pollinose region divided into 3 median vittae, remaining characteristics as on 4th.

**Genitalia:** Cercus with 1-2 regular rows of pile on medial margin and 3 irregular rows outward; surstylus quadrangular in lateral view, with acute apical extremity and sub-apical dorsal convexity, directed ventrally, with weak setulae (around 20) throughout the ventral side but concentrated on ventro-apical margin, with very few pile on dorsal surface; subepandrial sclerite rectangular, with slightly extended basal corners;

hypandrium slightly rounded, with trapezoidal ventral notch extending on anterior  $\frac{1}{2}$ , basal notch margin rounded, with a few long pile (around 6) sub-apically on ventro-lateral margin; phallapodeme narrow; basiphallus with posterior extremity long and curved towards base of hypandrium, distiphallus smooth and anterior surface slightly curved posteriorly; postgonites narrow, with few pile on ventral  $\frac{1}{3}$ , ventral surface twice undulated, dorsal surface concave, apex rounded with sub-apical lateral spine.

**Female:** Like male except: slightly larger than males; face entirely white pilose; white pilose around frontal prominence; frons narrow; vertex very narrow, ocellar triangle  $\sim 1.5$  times its length from posterior eye margin and adjacent to lateral eye margin; scutum pollinose vittae white, notopleuron with sparse white pollen, all pile white on scutum, scutellum and pleuron; wing entirely dark, but lighter than male; basal  $\frac{1}{3}$  of protibia, basal  $\frac{1}{2}$  of mesotibia and basal  $\frac{1}{3}$  of metatibia pale; 1st tergite entirely white pilose; 3rd tergite sometimes with pair of sub-median sub-shining vittae, 3rd sternite similar to tergite; 4<sup>th</sup> rectangular and wide; 6th segment divided into tergite and sternite, 2 times shorter than 5th tergite. **Genitalia:** 7<sup>th</sup> tergite rectangular, normal, with pile only on apical  $\frac{1}{4}$ , 7<sup>th</sup> sternite absent, membranous region area greater than the 7<sup>th</sup> tergite; 8<sup>th</sup> tergite notched anteriorly, 8<sup>th</sup> sternite present; 10th tergite notched anteriorly and with a straight posterior margin, 10th sternite reduced to triangular sclerite; cercus basally fused by narrow strip to lateral margin of 10th tergite, densely pilose and with setulae directed basally on dorsal  $\frac{1}{2}$ .

**Length.** 5-7mm; wing 4-5.5mm.

**Distribution.** Bolivia (Beni, La paz), Brazil (Goiás), Colombia (Boyaca), French Guiana, Mexico (Chiapas), Peru (Cuzco, Huanuco, Junín, Madre de Dios).

**Material examined.** (**13 males**) BOLIVIA. Beni, 20 km W Laranjeiras, 3-5 Aug 1964, J. K. Bouseman & J. Lussenhop; La Paz, Alto Río Beni, south of Río Inicua, 1100m, 15-18 Jan 1976, L. E. Peña (2 specimens). BRAZIL. Goiás, Jataí, Faz. Nova Orlandia, ?? Jan 1964, Martins, Morgante & Silva. COLOMBIA. Boyaca, Muzo, 900m, Holotype *infanta* [red label], Holotype *Baccha infanta* Hull CNC No 20518 [red label], ?? ??? 1936, J. Bequaert (Holotype *Baccha infanta*, two specimens on the same pin). FRENCH GUIANA. 3.5 km N Saül, 3°38-40'N 53°-1/2 13'W, 160-260m, tropic forest, 4-12 Oct 1995, D. Grimaldi. MEXICO. Chiapas, Finca Prusia (33 km S. Jaltenango), 1000m, 10-12 May 1985, A. Freidberg (USNM ENT 00257659). PERU. Cuzco, Pau-Cartambo, Puente San Pedro (50 km NW Pilcopata), 1600m, 3 Sep 1988, A. Freidberg (USNM ENT 00257657); ..., Quincemil, 24-31 Oct 1962, [L.] Pena (CNC Diptera 161182); Huanuco, Rio Monzon, W of Tingo Maria, 20 Jun 1964, R. M. Straw (USNM ENT 00257654); Junín, La Merced, 1000m, FS574, Boyes Cytolog. Coll. FS574 To remain in the C.N.C. [yellow label], 2 Dec 1970, J.W. Boyes (CNC Diptera 161183); Madre de Dios, Manu, Rio Manu, Pakitza, 250m, 12°7'S 70°58'W, 9-23 Sep 1988, A. Freidberg (USNM ENT 00257655); ..., Erika (near Salvacion), 550m, 5-6 Sep 1988, A. Freidberg (USNM ENT 00257658). (**8 females**) UNKNOWN. Amazon, 66-53, Holotype [circular

white label with a red margin], Holotype *Baccha triloba* Hull [red label], ?? ??? ???? ?  
 (Holotype *Baccha triloba*). BOLIVIA. La Paz, Alto Río Beni, south of Río Inicua, 1100m,  
 15-18 Jan 1976, L. E. Peña. PERU. Cuzco, Pau-Cartambo, Puente San Pedro (50 km  
 NW Pilcopata), 1600m, 3 Sep 1988, A. Freidberg (USNM ENT 00257656); ...,  
 Quincemil, 13-31 Aug 1962, L. Pena (CNC Diptera 161184); [Junín], Chanchamayo,  
 1100m, Holotype *Baccha philodice* Hull [red label], Holotype *Baccha philodice* Hull CNC  
 No 20526 [red label], 16 Aug [19]48, J. Schunke (Holotype *Baccha philodice*); ...,  
 Paratype *Baccha philodice* Hull [yellow label], 8 Aug [19]48, J. Schunke (Paratype  
*Baccha philodice*); Madre de Dios, Manu, Rio Manu, Pakitza, 250m, 12°7'S 70°58'W, 9-  
 23 Sep 1988, A. Freidberg (USNM ENT 00257670); ..., nr. Pakitza, 12°17' S 70°57' W,  
 250m., 9 Sep 1988, W. N. Mathis (USNM ENT 00257671).

**Comments:** The holotype of *B. nero* fits this redescription perfectly, based on  
 information provided by Nigel Wyatt (Diptera curator at the BMNH). The female holotype  
 of *B. triloba* has the same characters as the male holotype of *B. infanta*, with the  
 exception of sexual dimorphism (e.g. vertex and frons width). The distinction raised by  
 Hull on *B. philodice* doesn't apply since he seemed to have overlooked that *B. infanta*  
 also had the pale region on the metatibia.

*Relictanum schwarzi* (Curran, 1939) **comb. nov.**

*Baccha schwarzi* Curran, 1939. Curran, 1939: 9. Type-locality: Colombia, Western Cordillera, Cali Dist. Holotype male AMNH. Hull, 1949a: 214 (fig. 111, male abdomen), 278 (fig. 375, male wing).

*Ocyptamus schwarzi*. Thompson et al. 1976: 27 (catalog citation).

Map: 2. Figures: 48.

**Male. Head:** Black; face narrow, almost straight dorsal to tubercle, pale on lateral 1/6, white pilose, black ventral to antennae base; lunule black, pale dorsal to antennae insertions, central black macula narrow and tapering ventrally; frontal triangle black, dull gray pollinose and divided medially by narrow bare vitta, white-silver pollen continuous from face and restricted to lateral margin almost until eye contiguity, with a few white pile dorso-medially, frontal prominence slightly protuberant; vertical triangle with 1 median row of pile; ocellar triangle ~1.5 times its length from posterior eye margin; eye contiguity slightly longer than vertical triangle length; eye posterior indentation at level of antennae insertion; antennae insertions confluent; occiput entirely white-pollinose, pollen sparse on dorsal 1/3, dorsal 1/3 with 1 row of scale-like white pile, middle 1/3 with a posterior row of long scale-like white pile and with 1-2 anterior rows of mostly shorter



simple black pile that become scale-like and white ventrally, ventral 1/3 with 2 rows of scale-like white pile.

**Thorax:** Scutum black, dull brown-pollinose, pollen differently oriented form a sub-median antero-postero pair vittae visible from a posterior angle, white pilose, sometimes with brown to black pile medially, always with black pile laterally posterior to transverse suture, with anterior continuous row of longer shining white pile; scutellum black, with long white pile, subscutellar fringe long white; pleuron black, white pilose, sometimes with a few black pile dorsally on posterior 1/2 of posterior anepisterna; plumula normal and white; calypter white, fringe sometimes darker; halter white to light yellow, capitulum sometimes light orange.

**Wing:** Entirely hyaline to light brown, stigma slightly darker, bare on cell bc and basal 1/4 of c; alula large, 1.8 times basally to 3.8 times apically larger than c cell, hyaline to light brown, entirely microtrichose.

**Legs:** Dark brown; profemur apical 1/4 brown, apex pale, protibia basal 1/4 and apex pale; apex of mesofemur, basal 2/5 and apex of mesotibia pale; base and apex of metafemur, and basal 1/4 of metatibia pale, mainly white pilose on metacoxae and metatrochanters.

**Abdomen:** Dark brown; about 2.8 times longer than thorax; 1st tergite mainly white pilose, with black pile baso-laterally; 2<sup>nd</sup> tergite long, 2.6 times longer than its smallest width, with central trapezoidal macula of dull black pollen, pile erect laterally and on basal 1/4, appressed elsewhere; white on basal 1/4 and baso-lateral 3/4, remaining pile black; 3rd tergite trapezoidal, 1.8 times longer than smallest width, sometimes pale on baso-lateral 1/2, with pair of central short vittate pale maculae, with large central triangular macula of dull black pollen, with mainly appressed black pile but with shining pile apically, better viewed from a dorso-anterior angle, pile longer and erect on baso-lateral 2/3, 3rd sternite trapezoidal narrow; 4th tergite sub-quadrangular, slightly wider than long, with pair of central long pale vittate maculae, dull pollinose macula sometimes longitudinally divided, erect white pile on baso-lateral 1/2, remaining characteristics as on 3rd; 5th tergite rectangular and wide, with a central pair of short to medium-sized pale vittate maculae, with 3 median vittae of dull black pollen, pile entirely appressed and black. **Genitalia:** Cercus with 1 row of pile on medial margin and 3 rows outward; surstylus sub-quadrangular in lateral view, apical corner slightly extended, directed ventrally, with weak setulae ventrally on apico-posterior margin and baso-anterior corner, and longer setulae on apico-anterior 1/3 (around 40), pilose on baso-dorsal 1/3; subepandrial sclerite rectangular and wide, posterior margin lateral corners extended, homogenously sclerotized; hypandrium flattened, ventral notch extending on anterior 3/5, with distinct ventral pile sub-apically; phallapodeme well sclerotized medially throughout; distiphallus short, weakly sclerotized, anterior surface straight; postgonites narrow and long, curving slightly dorsally on rounded apex, with acute sub-

apical dorsal extremity, ventral surface slightly convex and dorsal surface slightly concave, with distinct pile baso-ventrally.

**Female:** Like male except: face and frons entirely white pilose; frons narrow and without pollen medially, lateral white pollen reaches ocellar triangle; vertex very narrow, ocellar triangle ~2.5 times its length from posterior eye margin and adjacent to lateral eye margin; occiput pilosity entirely scale-like and white; scutum and pleuron entirely white pilose; wing bare on bc, basal  $\frac{1}{4}$  of c, basal  $\frac{1}{2}$  of r, basal  $\frac{1}{2}$  of bm and sometimes on base of cup; basal  $\frac{2}{5}$  to  $\frac{3}{5}$  of protibia pale; basal  $\frac{3}{5}$  of mesotibia pale; basal  $\frac{1}{3}$  of metatibia pale; 1st tergite entirely white pilose; 2<sup>nd</sup> tergite lateral pile white; 3rd tergite shorter, slightly longer than smallest width, pale on baso-lateral  $\frac{2}{3}$  of its margin, sometimes extended medially as transversal fasciate macula, dull pollen restricted to a median arcuate fascia; 4<sup>th</sup> rectangular and wide, dull pollinose region reduced; 6th segment short, divided into tergite and sternite, 2.1 times shorter than 5th segment.

**Genitalia:** 7<sup>th</sup> tergite rectangular, with slightly concave posterior margin, with pile on apical  $\frac{1}{2}$ , 7<sup>th</sup> sternite absent, with extensive membranous region, greater than the dorsal distance between the 6<sup>th</sup> and 8<sup>th</sup> segments; 8<sup>th</sup> tergite short, notched anteriorly and slightly concave on posterior margin, 8<sup>th</sup> sternite unsclerotized longitudinally and medially; 10th tergite notched anteriorly and with a convex posterior margin, with slender baso-lateral extensions, 10th sternite reduced to triangular sclerite; cercus basally fused to lateral margin of 10th tergite, with setulae directed basally on dorsum.

**Length.** 5-7.5mm; wing 4-6mm.

**Distribution.** Colombia (Cali), Costa Rica (Alajuela, Guanacaste, Puntarenas), Peru (Junín).

**Material examined. (8 males)** COSTA RICA. Prov. Alajuela, C. La Lana, San Ramón, 1200m., L\_N\_221750\_481050, #45327, 17 Jan 1997, M. A. Zumbado & F. C. Thompson (INBIO CRI002 499640 & 499645); ... R. Jesus, #45477, ?? Jan 1997, G. Carballo (INBIO CRI002 490937); Prov. Guanacaste, Macizo Miravalles, Estación Cabro Mucó, 1100m., Libre, L\_N\_299769\_411243, #74550, 20 Jun - 8 Jul 2003, J. D. Guitérrez (INB0003740230 INBIOCRI COSTA RICA); Prov. Puntarenas, Camino a San Luis, 1300m., L\_N\_252800\_447100, #46352, 28 Mar 1997, M. A. Zumbado (INBIO CRI002 563929); ... Coto Brus, Zona Prot Las Tablas, Cerro Pelón, 1520m., Manual (red. libre), L\_S\_319700\_596300, #56441, 28 Mar 2000, M. Alfaro (INB0003077815 INBIOCRI COSTA RICA); ... r. Priv. Karen Mongensen, Send. El Viejo Nispero, 315m., Libre (aguamiel), L\_N\_205600\_420300, #74547, 3 Jul 2003, Y. Cardenas (INB0003739529 INBIOCRI COSTA RICA); ... Send. Fila Palmital Chiquiza, 4.5 Km NE de Progreso, 1600m., L\_S\_319700\_598950, #50850, 1 Jul 1998, B. Gamboa (INB0003046416 INBIOCRI COSTA RICA). **(4 females)** COSTA RICA. Prov. Puntarenas, Finca Cafrosa, Tajo, 1 Km O. del Tajo, 1500m., L\_S\_319350\_596470, #48872, 17 Oct 1997, E. Navarro (INBIO CRI002 409017); ... Tajo, 1 Km. O. del Tajo, 1480m., L\_S\_319350\_596470, #51680, 30 Ago 1998, B. Gamboa (INB0003018463

INBIOCRI COSTA RICA), ...L\_S\_319350\_596470, #51682, 3 Set 1998

(INB0003018520 INBIOCRI COSTA RICA). PERU. Junín, Pampa Hermosa lodge,  
22km N of San Ramon, 10°59'18"S, 75°25'30"W, 1220m, F.I.T., 24-27 Nov 2007,  
D.Brzoska (debu00319415).

**Comments:** F.C. Thompson's '*Ocyptamus* CR-37' keys out to this species.

*Relictanum shropshirei* (Curran, 1930) **comb. nov.**

*Baccha shropshirei* Curran, 1930. – Curran, 1930: 7. Type-locality: Panama, Canal Zone. Holotype female AMNH. Hull, 1949a: 241 (fig. 231, abdomen), 283 (fig. 386, wing)

*Ocyptamus shropshirei*. Thompson et al. 1976: 27 (catalog citation).

Map: 1. Figures: 45d-e.

**Male.** No male available.

**Female:** As in *R. braziliensis* but wing entirely microtrichose and dark on basal  $\frac{1}{2}$  (dark on cells bc, c, sc, r, bm, cup, most of anal lobe, most of cua1, basal  $\frac{1}{2}$  of r1, basal  $\frac{1}{4}$  of r2+3, base of r4+5 and basal  $\frac{1}{3}$  of dm). The female 7<sup>th</sup> sternite is distinctly sclerotized, the 8<sup>th</sup> tergite is narrower, and the 10th tergite is narrow, strongly convex posteriorly and with fewer setulae.

**Length.** 6.5-7mm; wing 5-5.5mm.

**Distribution.** Mexico (Veracruz), Panama (Canal Zone), Venezuela (Zulia).

**Material examined.** (**4 females**) MEXICO. Veracruz, Acayucan, Frank M. Hull Collection C.N.C. 1981, 23 Oct 1957, R. & K. Dreisbach (CNC Diptera 161210). PANAMA. Canal Zone, Corozal, Type *Baccha shropshirei* Curran [red label], 16 Jan 1929, C. H. Curran (Holotype *Baccha shropshirei*). VENEZUELA. Zulia, El Tucuco (45 km SW of Machiques), 5-6 Jun 1976, A. S. Menke & D. Vincent (USNM ENT 00257662); ..., Los Angeles del Tucuco, 15-16 Apr 1981, A. S. Menke & L. Hollenberg (USNM ENT 00257665).

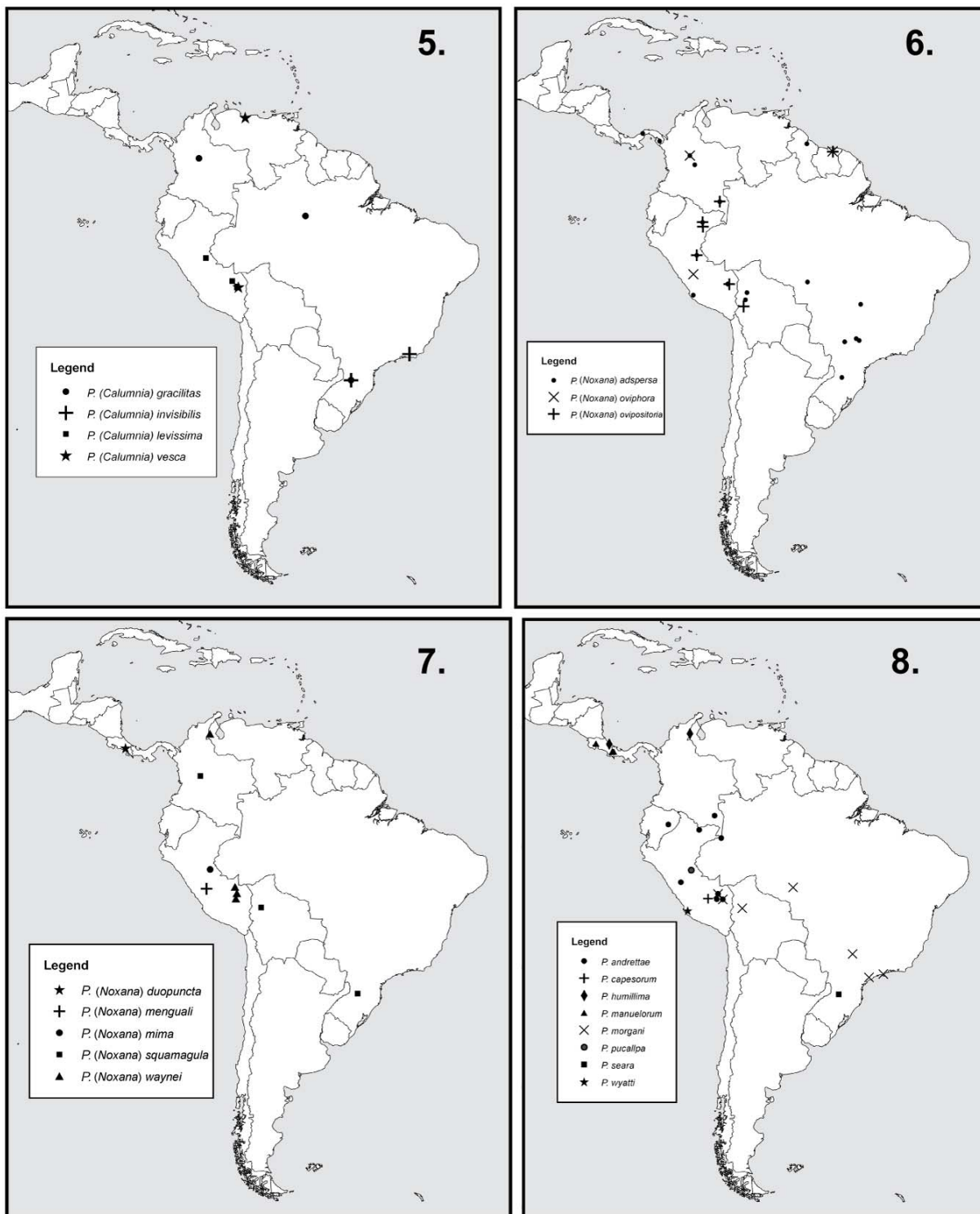
**Comments:** The wing differences between the types of *B. braziliensis* and *B. shropshirei* were noted by Reemer (2010) as well.

## Maps



Maps 1-4.





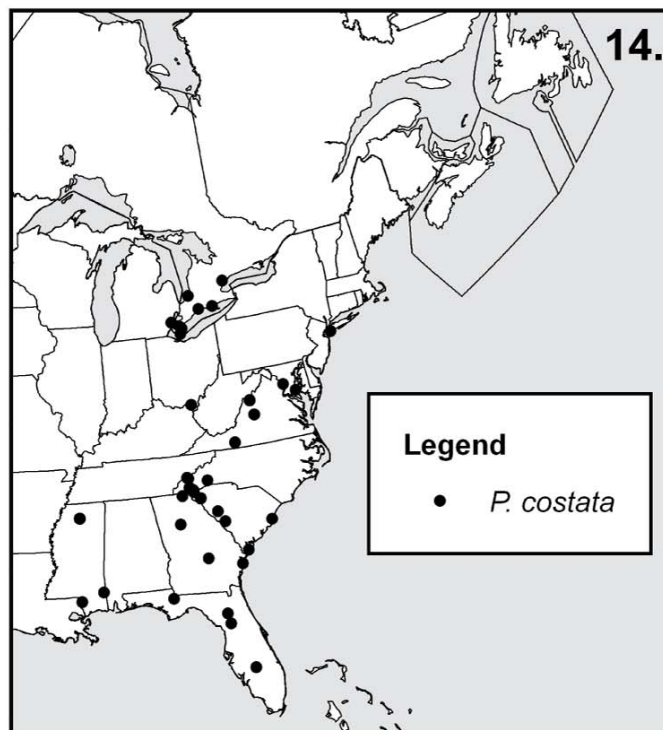
**Maps 5-8.**



Maps 9-10.

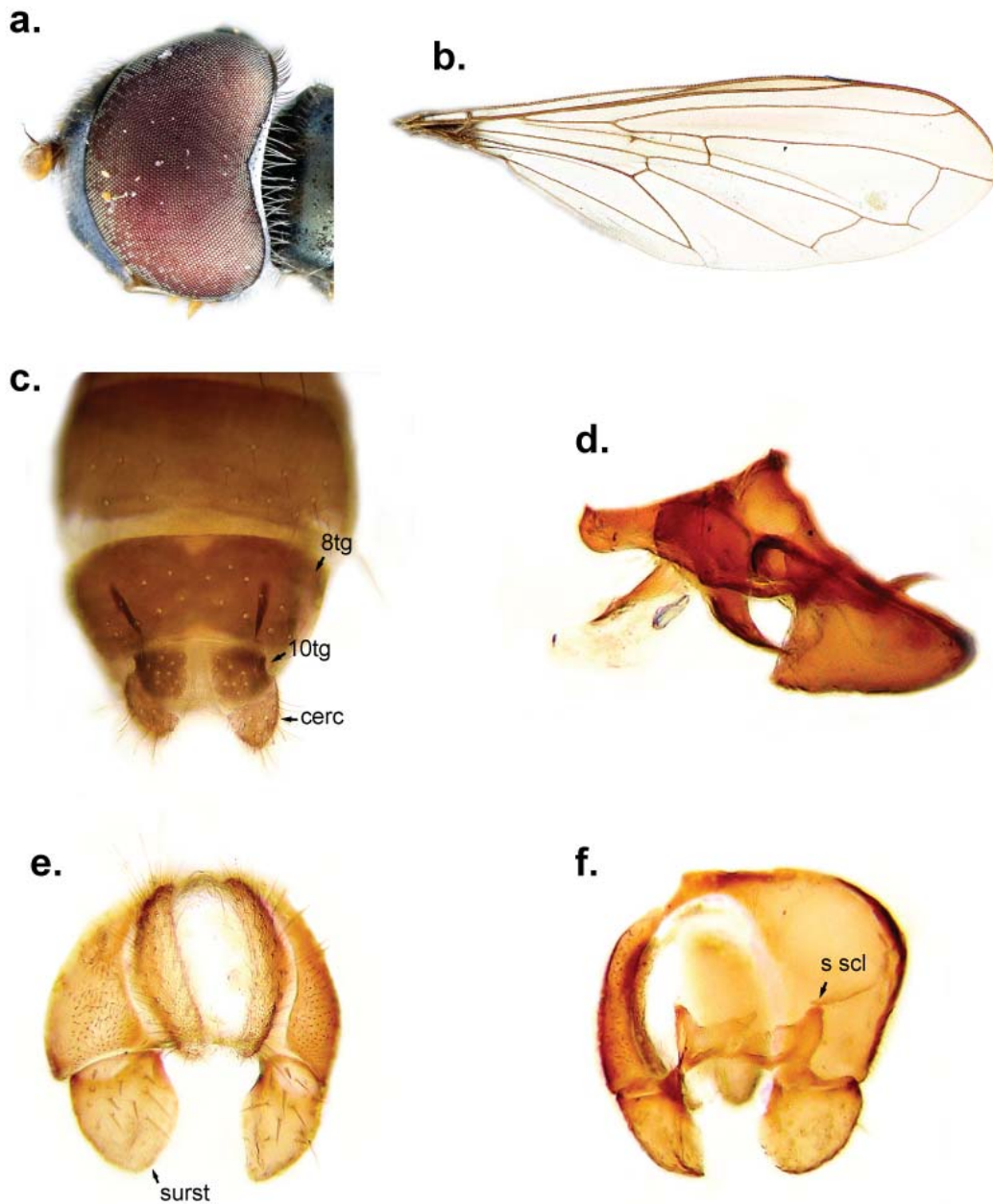


Maps 11-12.



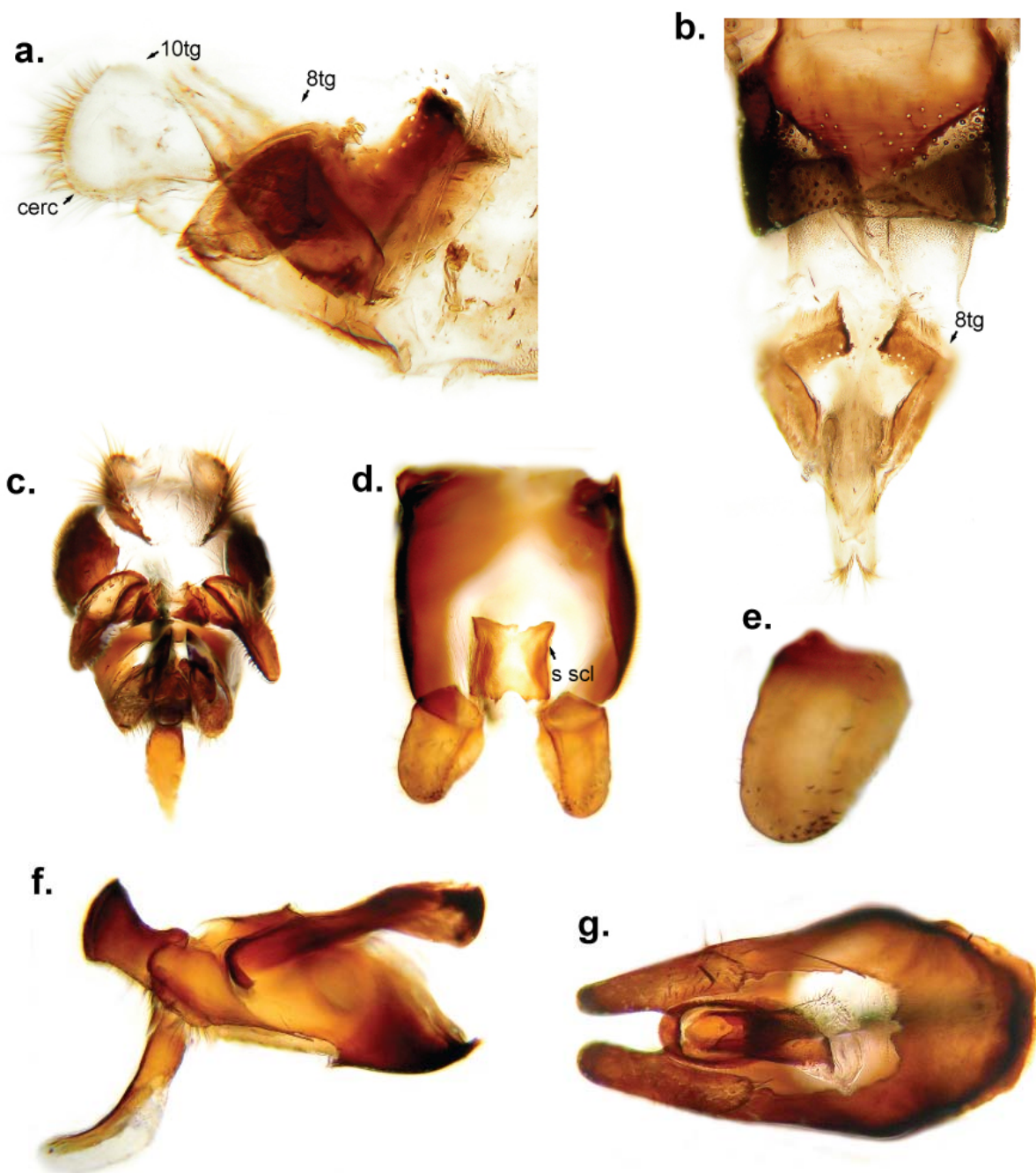
Maps 13-14.

# Figure plates

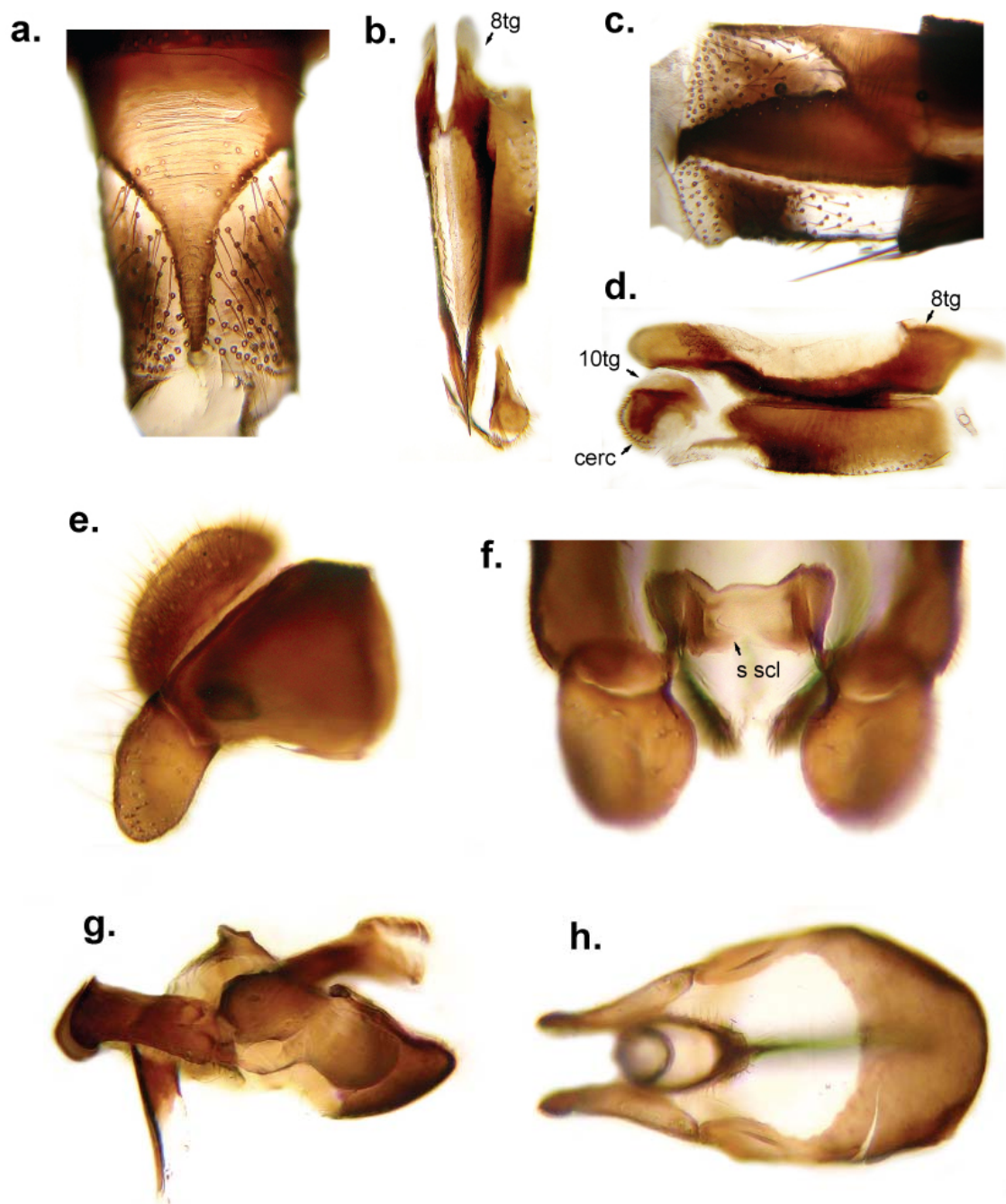


**Plate 1.** *Atylobaccha flukiella* (Curran, 1941). **a.** Head, lateral. **b.** Wing. **c.** Female genitalia, dorsal. **d-f.** Male genitalia: **d.** Hypandrium, lateral. **e.** Epan-drium, dorsal. **f.** Epan-drium ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite, surst: surstylus.



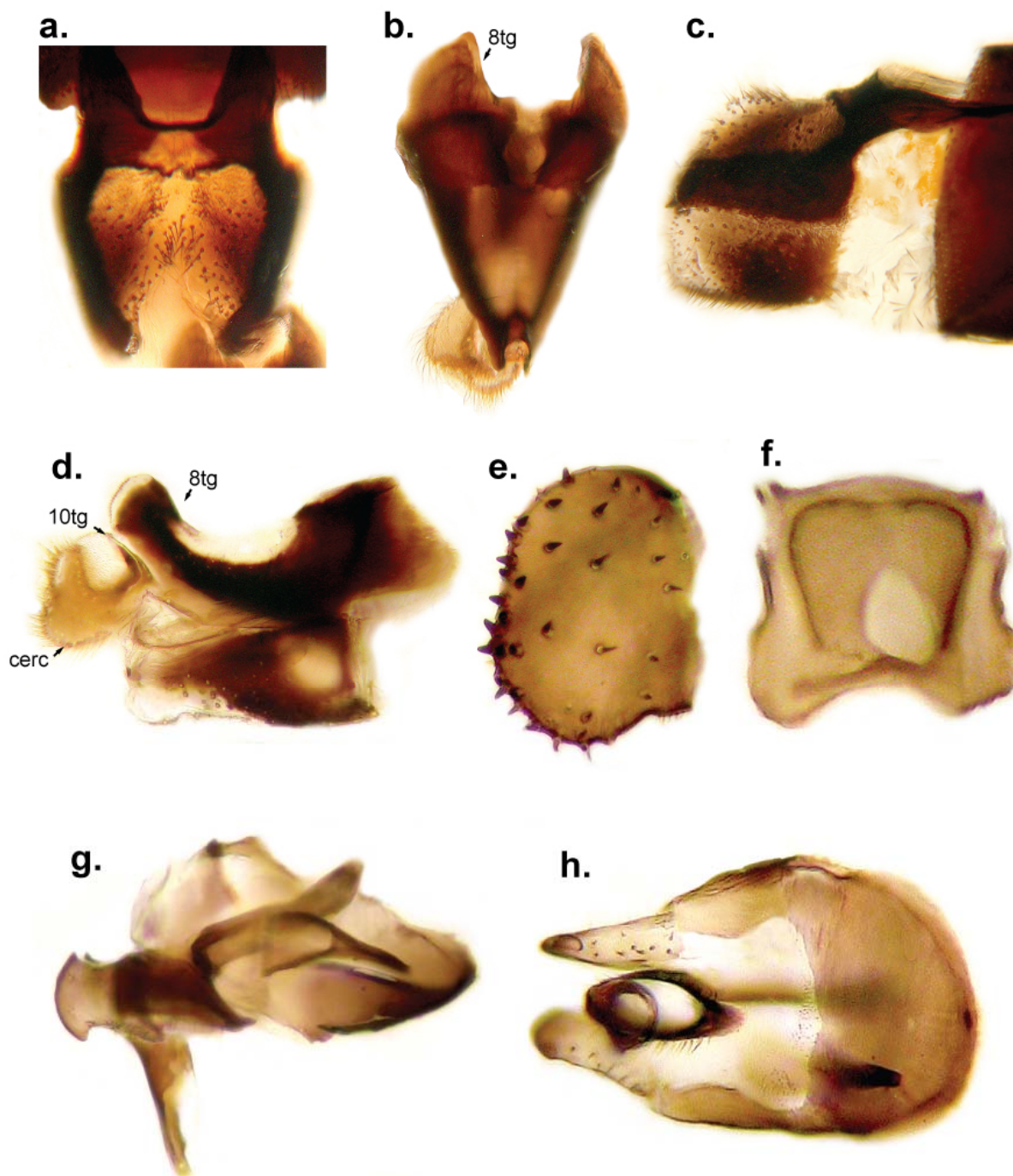


**Plate 2.** *Pelecinobaccha* (*Pseudoaulacibaccha*) *ada* (Curran, 1941). **a-b.** Female genitalia: **a.** Apex, lateral. **b.** Dorsal. **c-g.** Male genitalia: **c.** Genitalia, anterior. **d.** Epandrium, ventral. **e.** Surstylus, ventral. **f.** Hypandrium, lateral. **g.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.



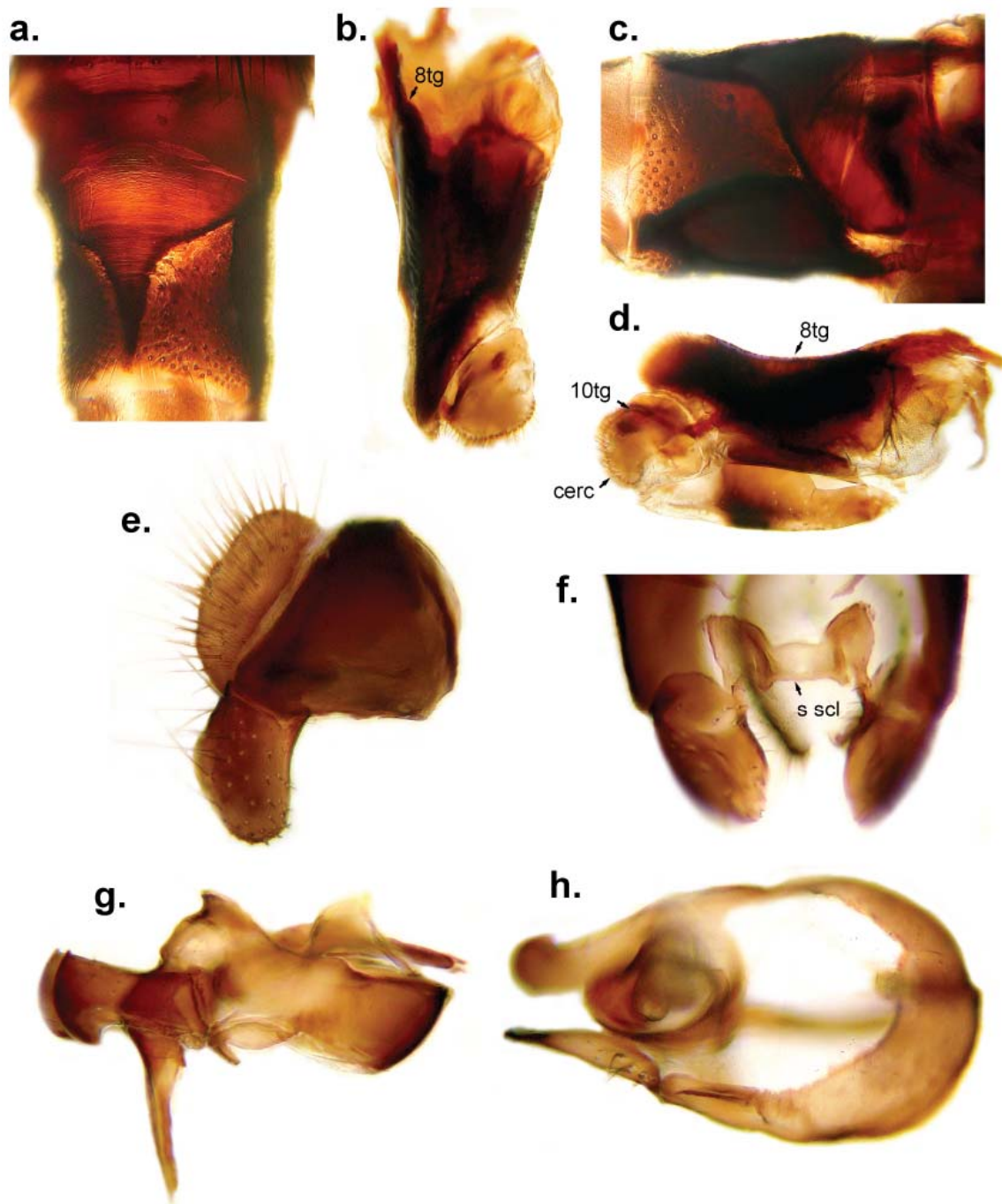
**Plate 3.** *Pelecinobaccha (Calumnina) aster* (Curran, 1941). **a-d.** Female genitalia: **a.** 7th tergite, dorsal. **b.** Apex, dorsal. **c.** 7th segment, lateral. **d.** Apex, lateral. **e-h.** Male genitalia: **e.** Epandrium, lateral. **f.** Epandrium, ventral. **g.** Hypandrium, lateral. **h.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.



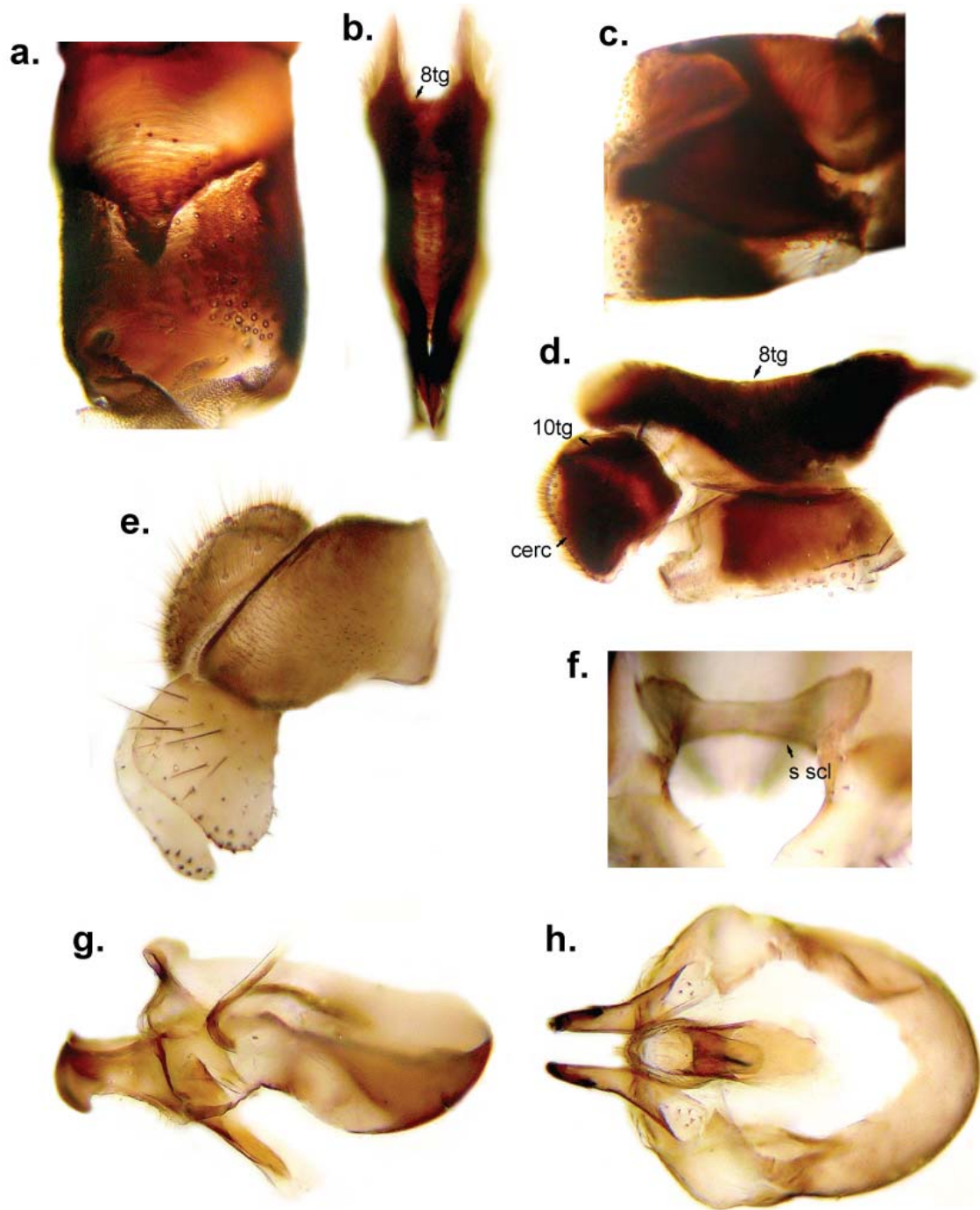


**Plate 4.** *Pelecinobaccha (Calumnia) brevipennis* (Schiner, 1868). **a-d.** Female genitalia: **a.** 7th tergite, dorsal. **b.** Apex, dorsal. **c.** 7th segment, lateral. **d.** Apex, lateral. **e-h.** Male genitalia: **e.** Surstylus, ventral. **f.** Subepandrial sclerite, dorsal. **g.** Hypandrium, lateral. **h.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus.

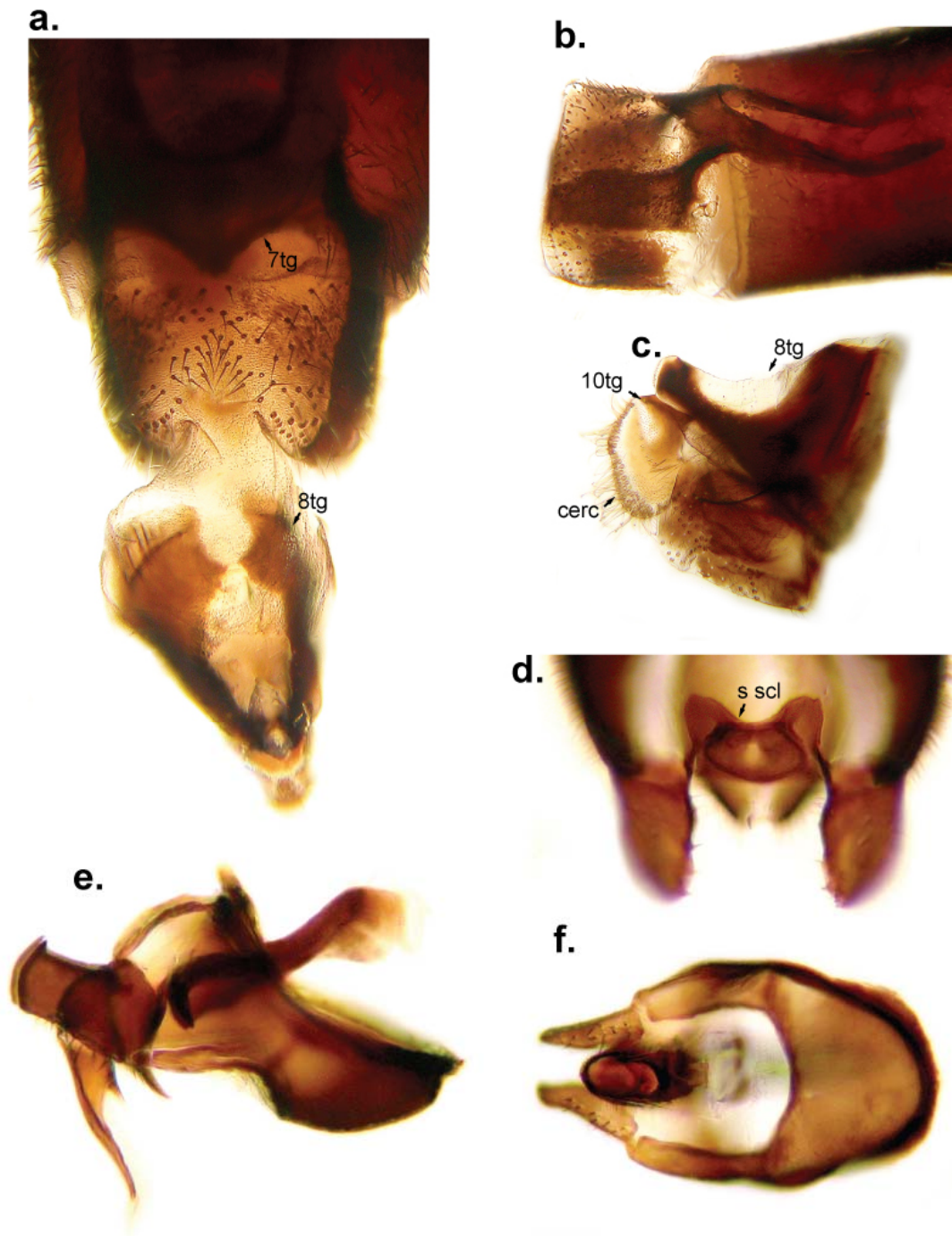




**Plate 5.** *Pelecinobaccha (Calumnina) gracilitas* sp.nov.. **a-d.** Female genitalia: **a.** 7th tergite, dorsal. **b.** Apex, dorsal. **c.** 7th segment, lateral. **d.** Apex, lateral. **e-h.** Male genitalia: **e.** Epandrium, lateral. **f.** Epandrium, ventral. **g.** Hypandrium, lateral. **h.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.

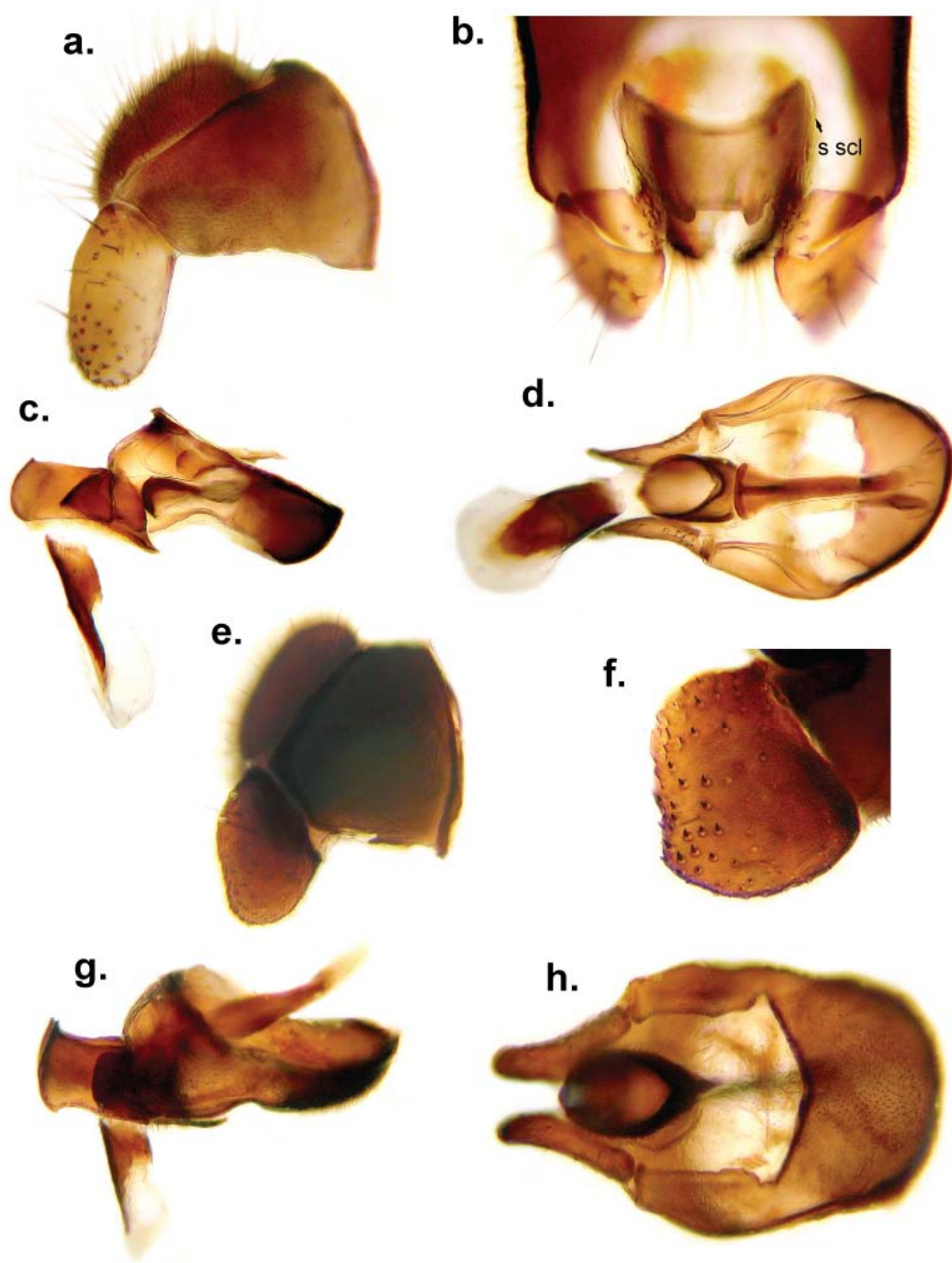


**Plate 6.** *Pelecinobaccha (Calumnina) invisibilis* sp.nov.. **a-d.** Female genitalia: **a.** 7th tergite, dorsal. **b.** Apex, dorsal. **c.** 7th segment, lateral. **d.** Apex, lateral. **e-h.** Male genitalia: **e.** Epandrium, lateral. **f.** Epandrium, ventral. **g.** Hypandrium, lateral. **h.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.

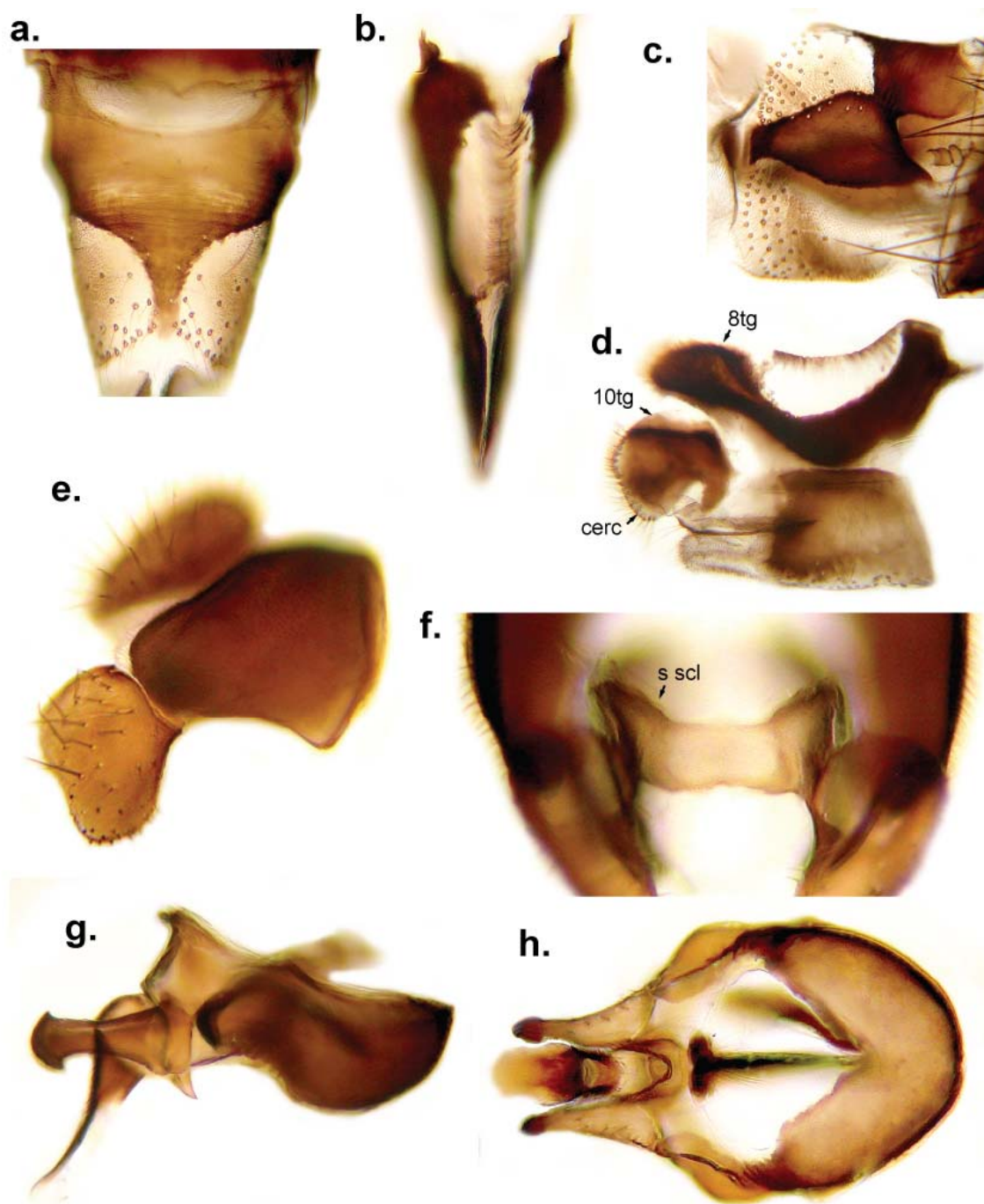


**Plate 7.** *Pelecinobaccha (Calumnina) levissima* (Auten, 1893). **a-c.** Female genitalia: **a.** Dorsal. **b.** 7th segment, lateral. **c.** Apex, lateral. **d-f.** Male genitalia: **d.** Epandrium, ventral. **e.** Hypandrium, lateral. **f.** Hypandrium, ventral. 7tg: 7th tergite, 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.

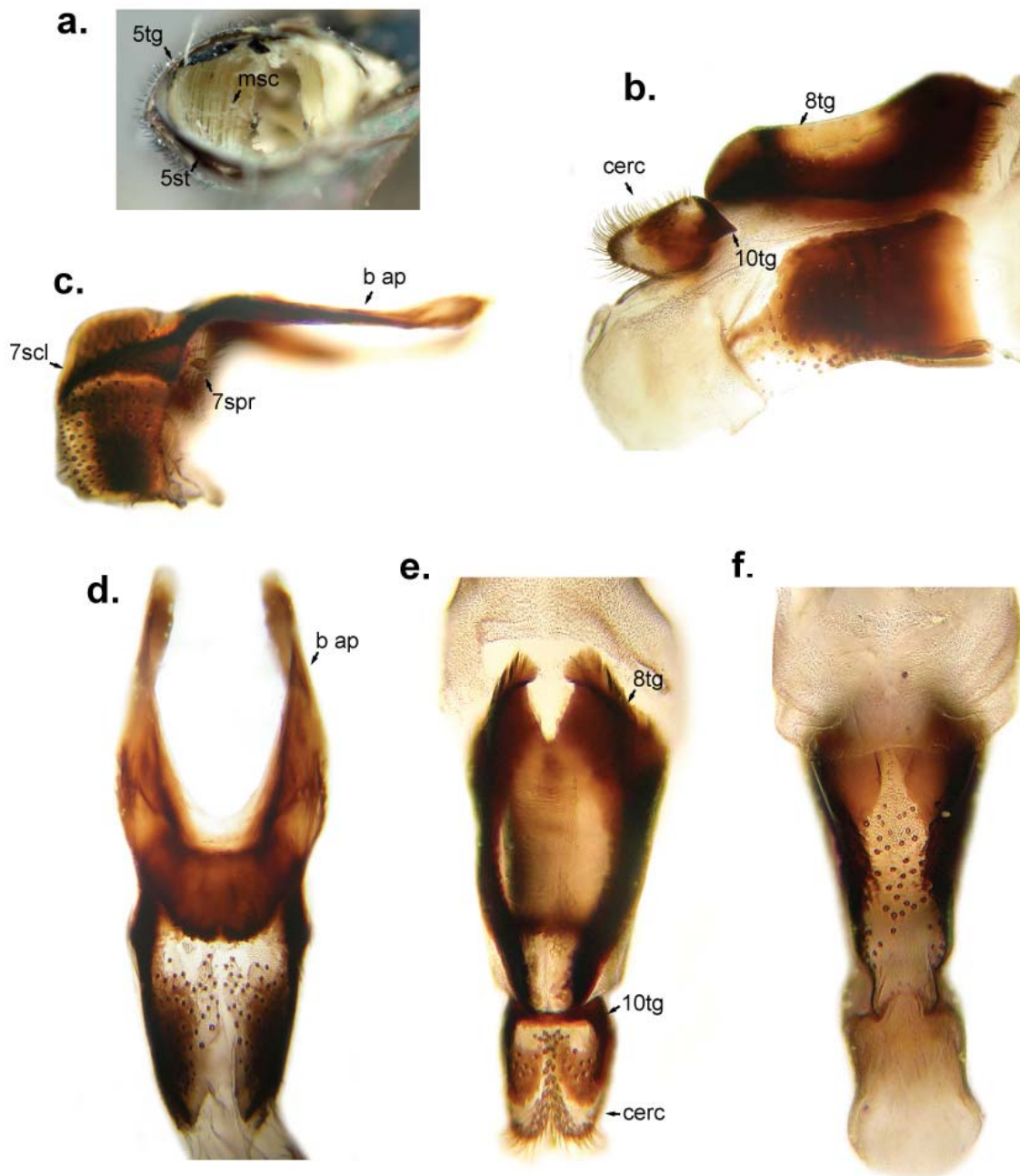




**Plate 8.** Male genitalia. **a-d.** *Pelecinobaccha (Calumnia) portachueloi* sp.nov.: **a.** Epandrium, lateral. **b.** Epandrium, ventral. **c.** Hypandrium, lateral. **d.** Hypandrium, ventral. **e-h.** *Pelecinobaccha (Calumnia) duopuncta* sp.nov.: **e.** Epandrium, lateral. **f.** Surstylus, oblique ventral. **g.** Hypandrium, lateral. **h.** Hypandrium, ventral. s scl: subepandrial sclerite.

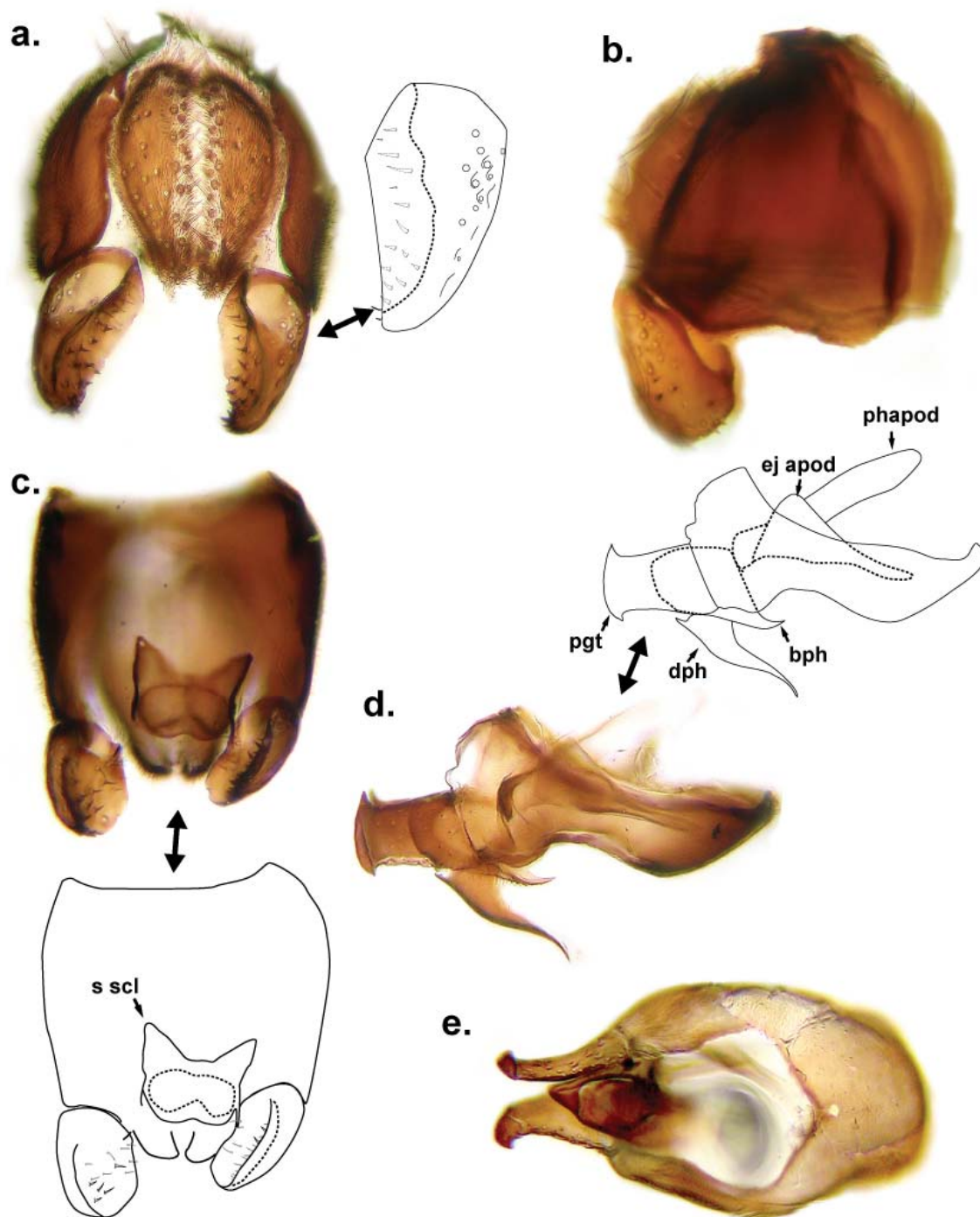


**Plate 9.** *Pelecinobaccha (Calumnia) vesca* sp. nov.. **a-c.** Female genitalia: **a.** 7th tergite, dorsal. **b.** 8th tergite, dorsal. **c.** 7th segment, lateral. **d.** Apex, lateral. **e-h.** Male genitalia: **e.** Epandrium, lateral. **f.** Epandrium, ventral. **g.** Hypandrium, lateral. **h.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.

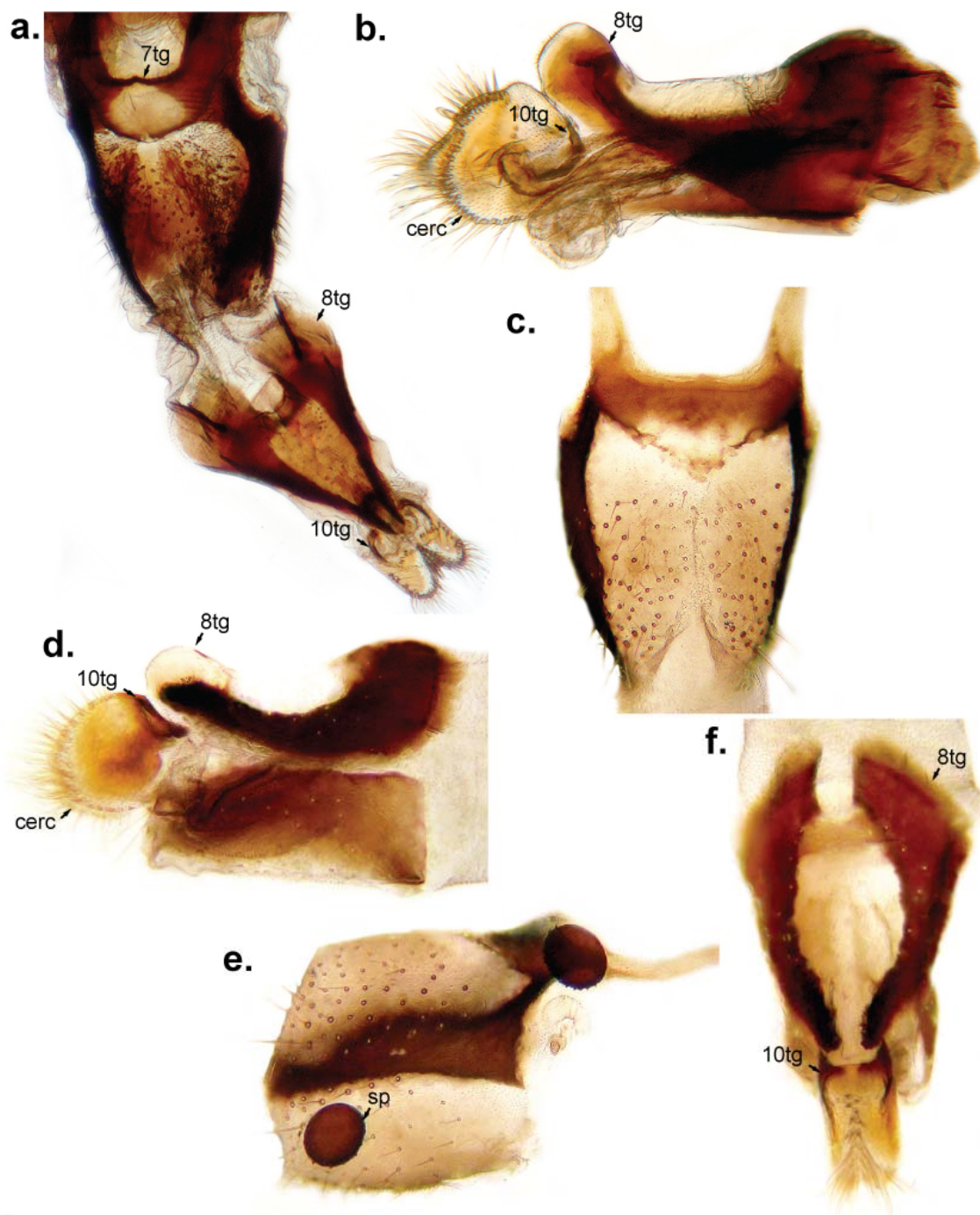


**Plate 10.** *Pelecinobaccha (Noxana) adspersus* (Fabricius, 1805), female. **a.** Cross section of 5th abdominal segment. **b-f.** Genitalia: **b.** Apex, lateral. **c.** 7th segment, lateral. **d.** 7th segment, dorsal. **e.** Apex, dorsal. **f.** Apex, ventral. 5st: 5th sternite, 5tg: 5th tergite, 7scl: 7th segment lateral sclerite, 7spr: 7th segment spiracle, 8tg: 8th tergite, 10tg: 10th tergite, b ap: basal apodeme of the 7th tergite, cerc: cercus, msc: muscular tissue.



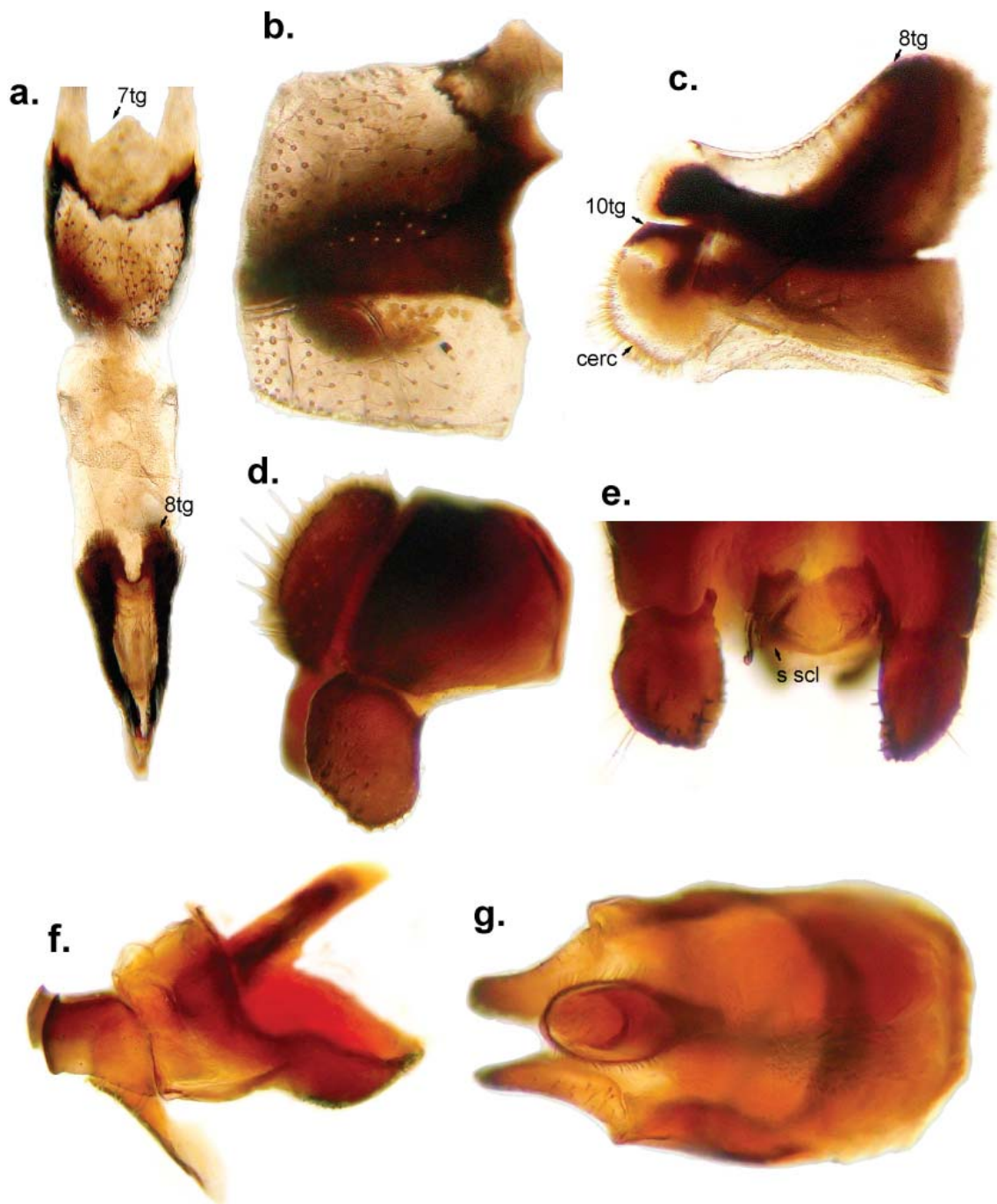


**Plate 11.** *Pelecinobaccha (Noxana) adspersus* (Fabricius, 1805), male genitalia. **a.** Epandrium, dorsal. **b.** Epandrium, lateral. **c.** Epandrium, ventral. **d.** Hypandrium, lateral. **e.** Hypandrium, ventral. bph: basiphallus, dph: distiphallus, ej ap: ejaculatory apodeme, phapod: phallapodeme, pgt: postgonites, scl: subepandrial sclerite.

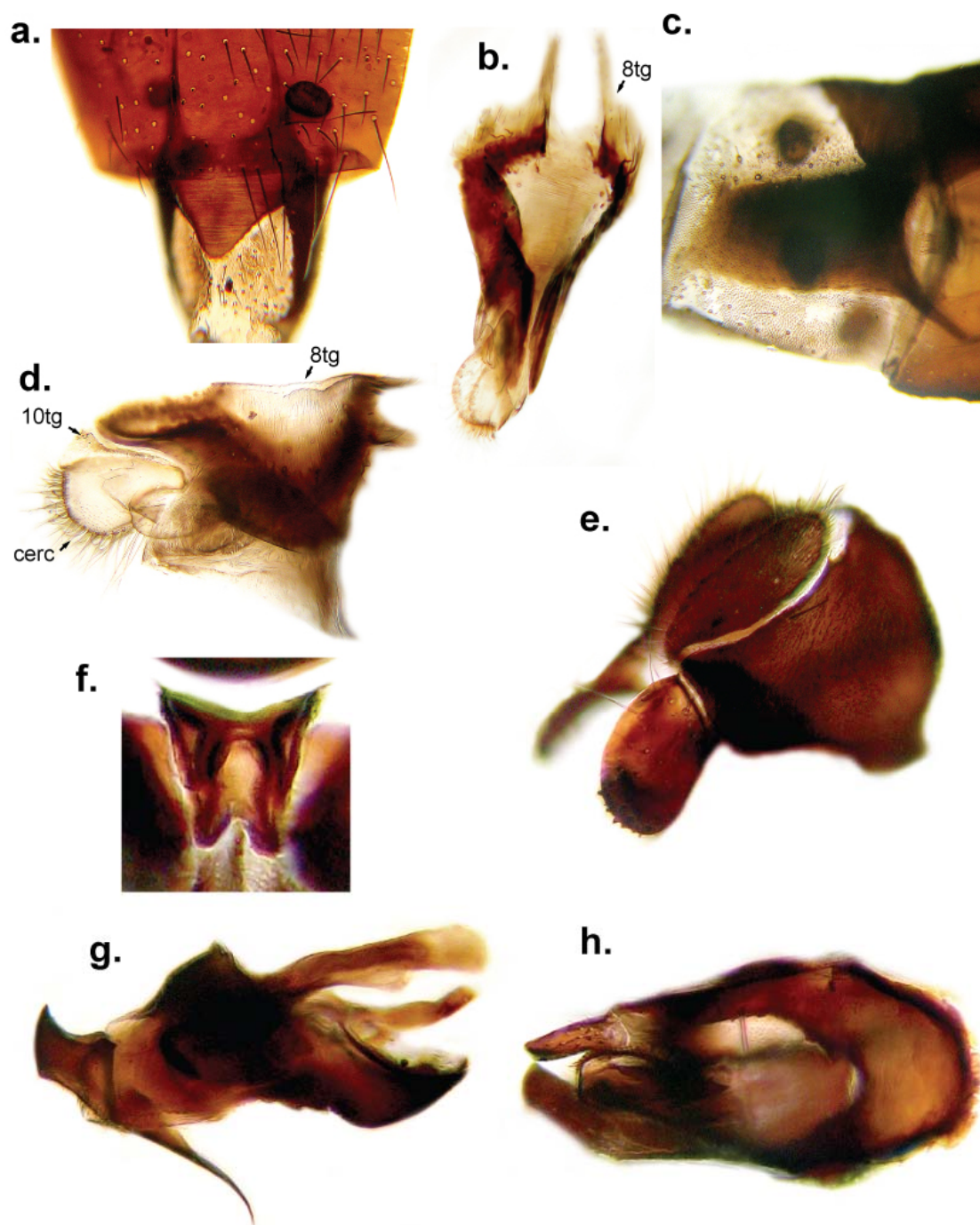


**Plate 12.** Female genitalia. **a-b.** *Pelecinobaccha (Noxana) menguali* n.sp.: **a.** Dorsal. **b.** Apex, lateral. **c-f.** *Pelecinobaccha (Noxana) oviphora* (Hull, 1943): **c.** 7th tergite, dorsal. **d.** Apex, lateral. **e.** 7th segment, lateral. **f.** Apex, dorsal. 7tg: 7th tergite, 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, sp: spermatheca.

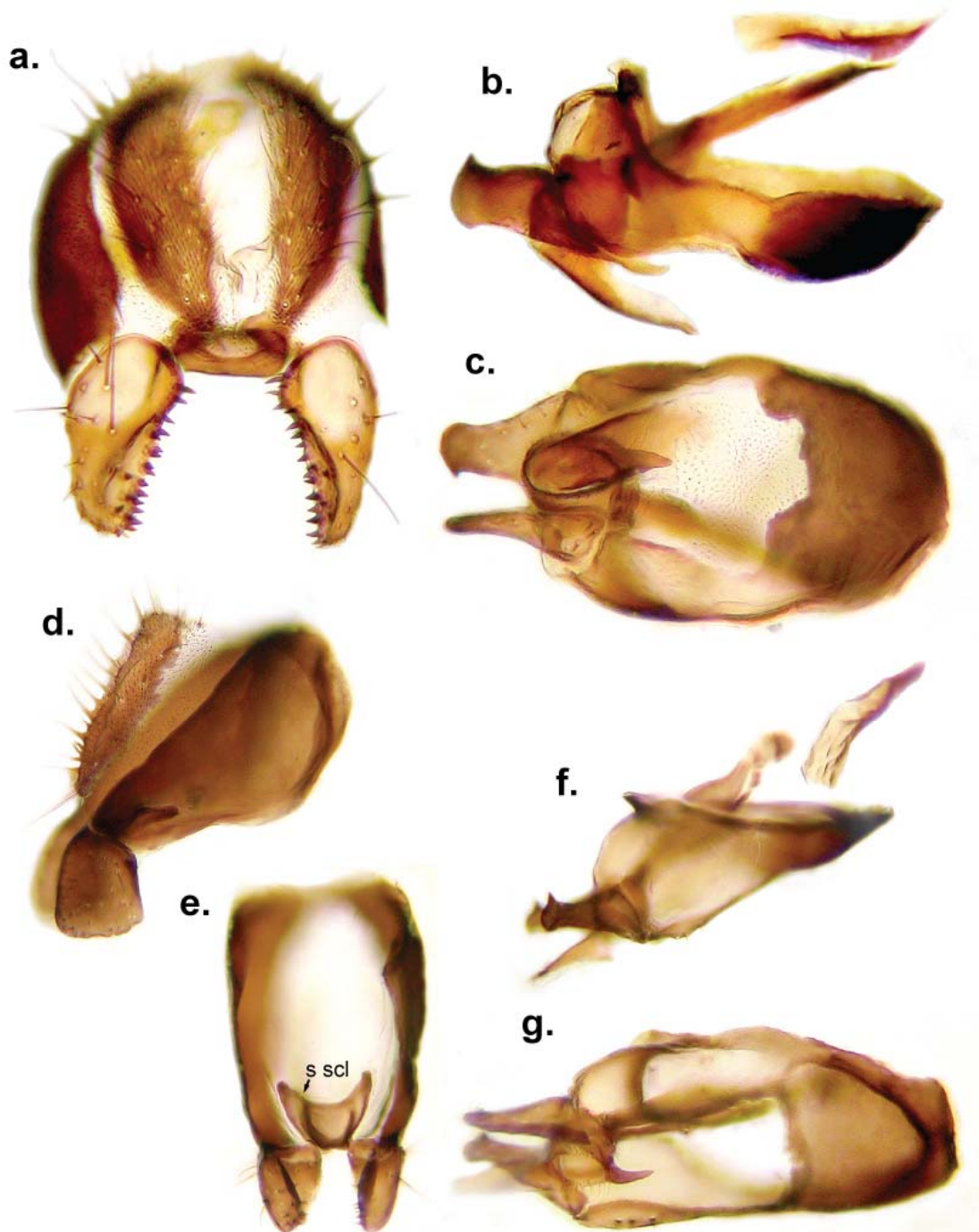




**Plate 13.** *Pelecinobaccha (Noxana) ovipositoria* (Hull, 1943). **a-d.** Female genitalia: **a.** Dorsal. **b.** 7th segment, lateral. **c.** Apex, lateral. **d-g.** Male genitalia: **d.** Epandrium, lateral. **e.** Epandrium, ventral. **f.** Hypandrium, lateral. **g.** Hypandrium, ventral. 7tg: 7th tergite, 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.

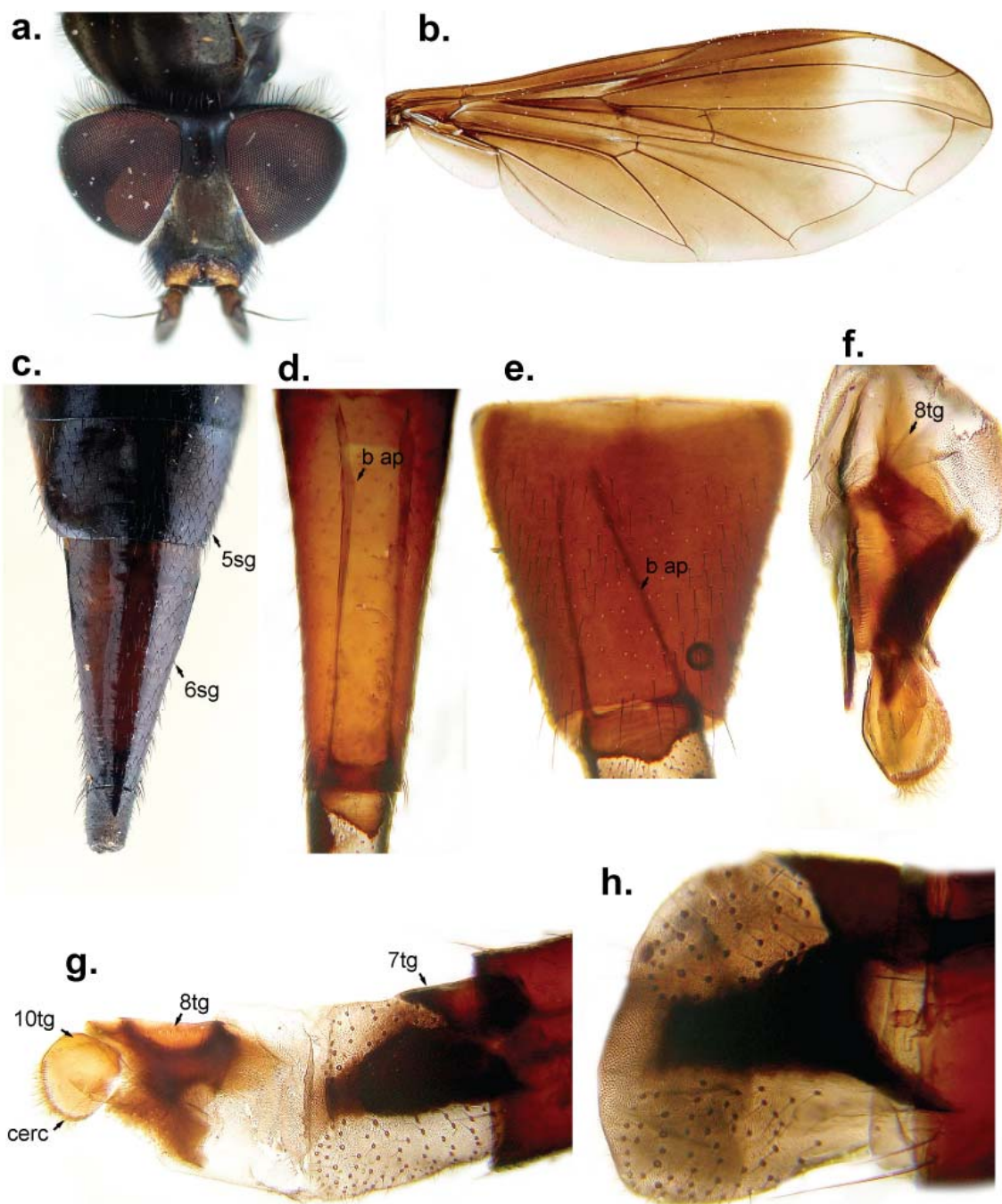


**Plate 14.** *Pelecinobaccha (Noxana) squamagula* sp.nov.. **a-d.** Female genitalia: **a.** 7th tergite, dorsal. **b.** Apex, dorsal. **c.** 7th segment, lateral. **d.** Apex, lateral. **e-h.** Male genitalia: **e.** Epandrium, lateral. **f.** Subepandrial sclerite, ventral. **g.** Hypandrium, lateral. **h.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus.

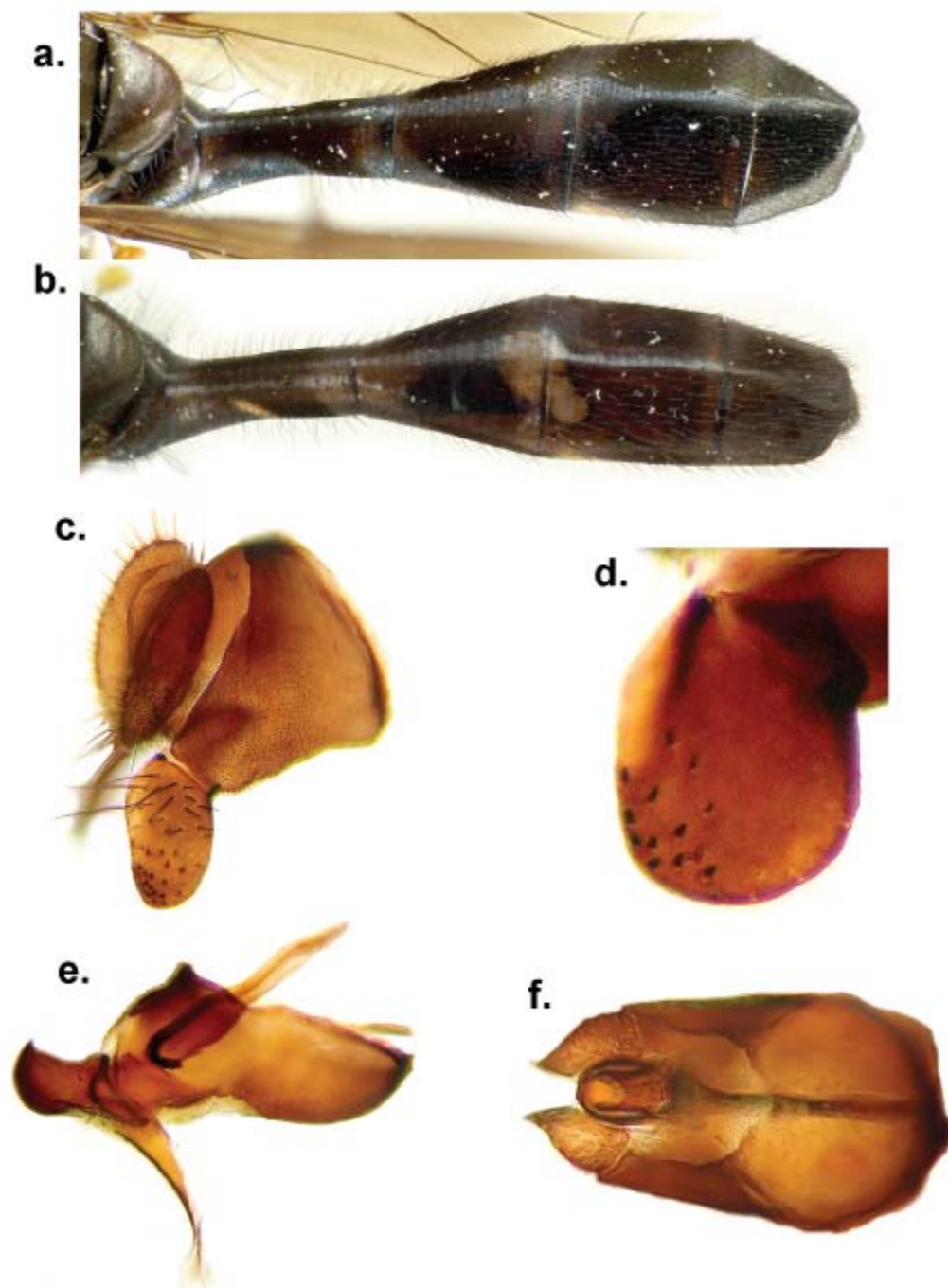


**Plate 15.** Male genitalia. **a-c.** *Pelecinobaccha (Noxana) waynei* sp.nov.: **a.** Epandrium, dorsal. **b.** Hypandrium, lateral. **c.** Hypandrium, ventral. **d-g.** *Pelecinobaccha (P.) alucard* sp.nov.: **d.** Epandrium, lateral. **e.** Epandrium, ventral. **f.** Hypandrium, lateral. **g.** Hypandrium, ventral. s scl: subepandrial sclerite.

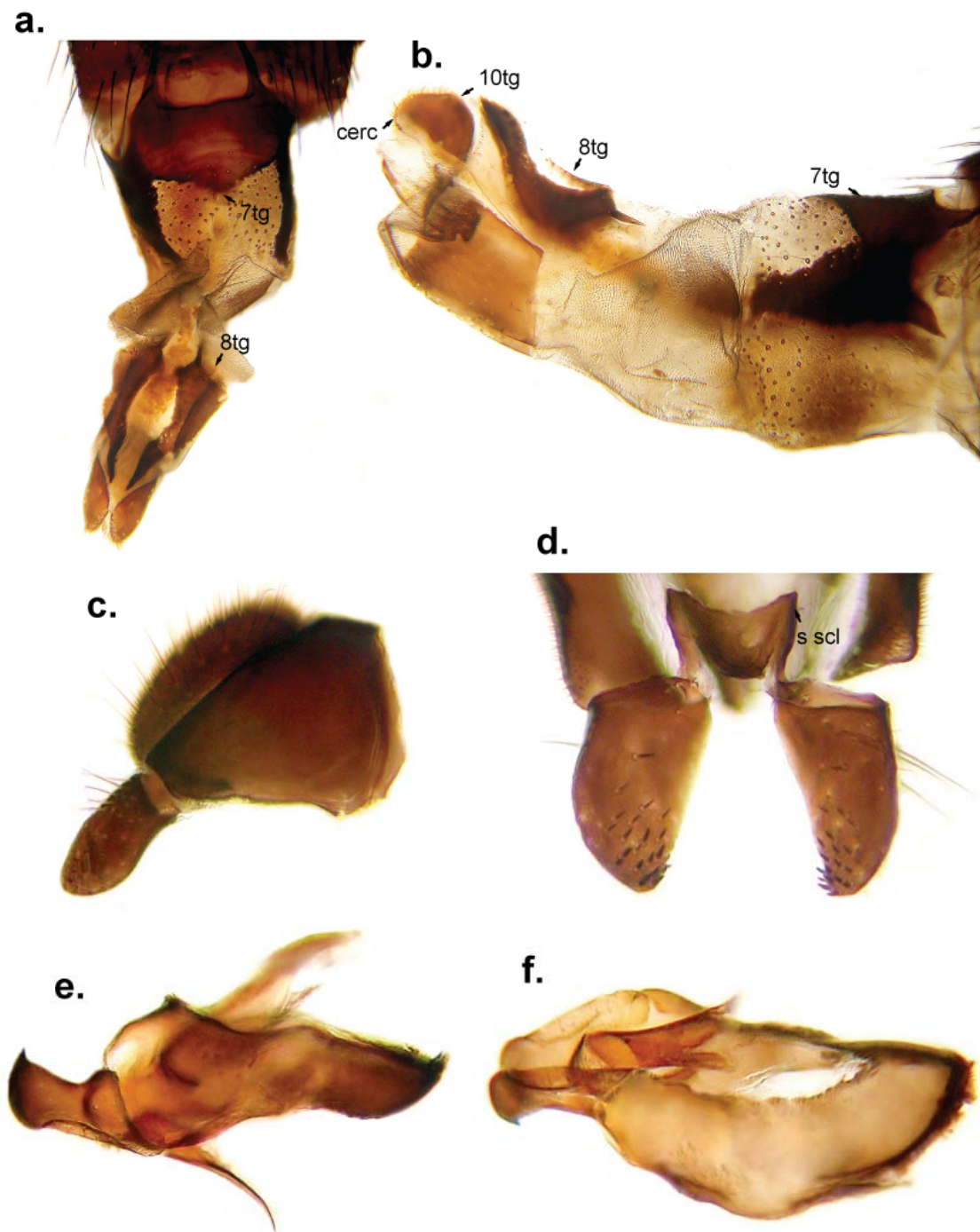




**Plate 16.** *Pelecinobaccha (P.) alicia* (Curan, 1941), female. **a.** Head, dorsal. **b.** Wing. **c.** Abdomen, apex, dorsal, variation. **d-h.** Genitalia: **d.** 6th and 7th segments, dorsal, variation. **e.** 6th and 7th segments, dorsal. **f.** Apex, dorsal. **g.** Apex, lateral, variation. **h.** 7th segment, lateral. 5sg: 5th segment, 6sg: 6th segment, 7tg: 7th tergite, 8tg: 8th tergite, 10tg: 10th tergite, b ap: basal apodeme of the 7th tergite, cerc: cercus.

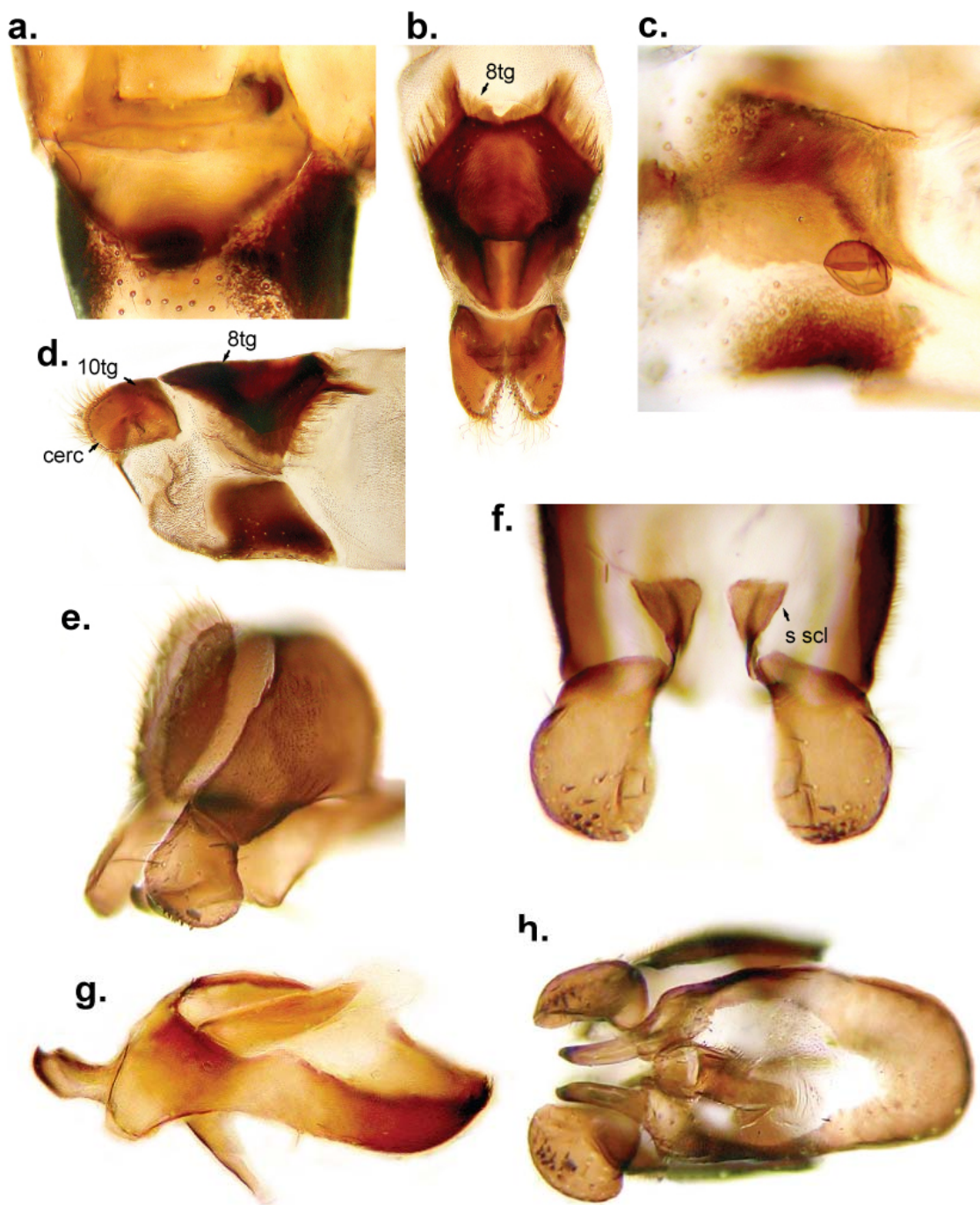


**Plate 17.** *Pelecinobaccha (P.) alicia* (Curran, 1941), male. **a-b.** Abdomen: **a.** Oblique dorsal. **b.** Oblique dorsal, variation. **c-f.** Genitalia: **c.** Epandrium, lateral, variation. **d.** Surstylus, ventral. **e.** Hypandrium, lateral. **f.** Hypandrium, ventral.

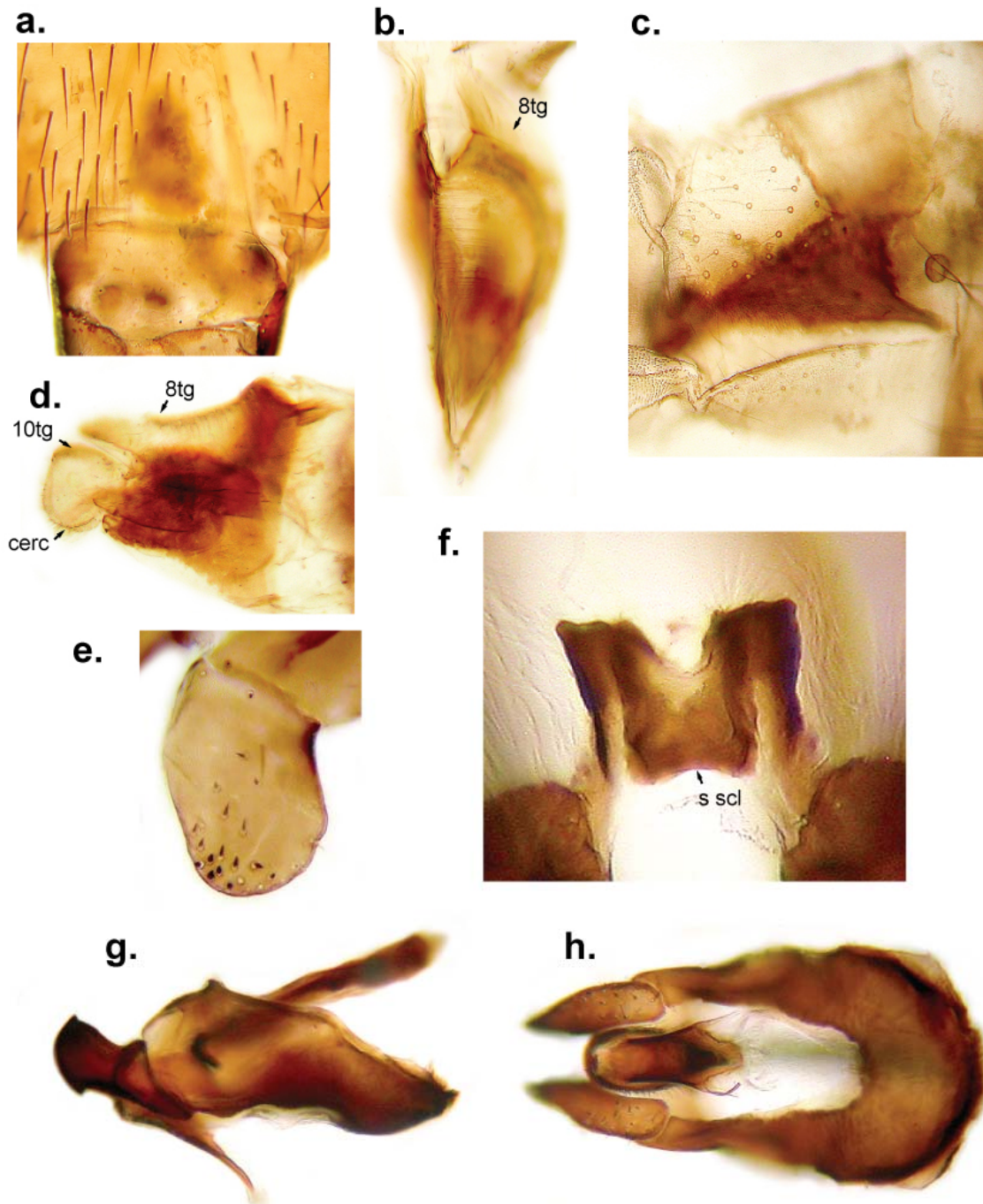


**Plate 18.** *Pelecinobaccha (P.) andrettae* n.sp.. **a-b.** Female genitalia: **a.** Dorsal. **b.** Lateral. **c-f.** Male genitalia: **c.** Epandrium, lateral. **d.** Epandrium, ventral. **e.** Hypandrium, lateral. **f.** Hypandrium, oblique ventral. 7tg: 7th tergite, 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.



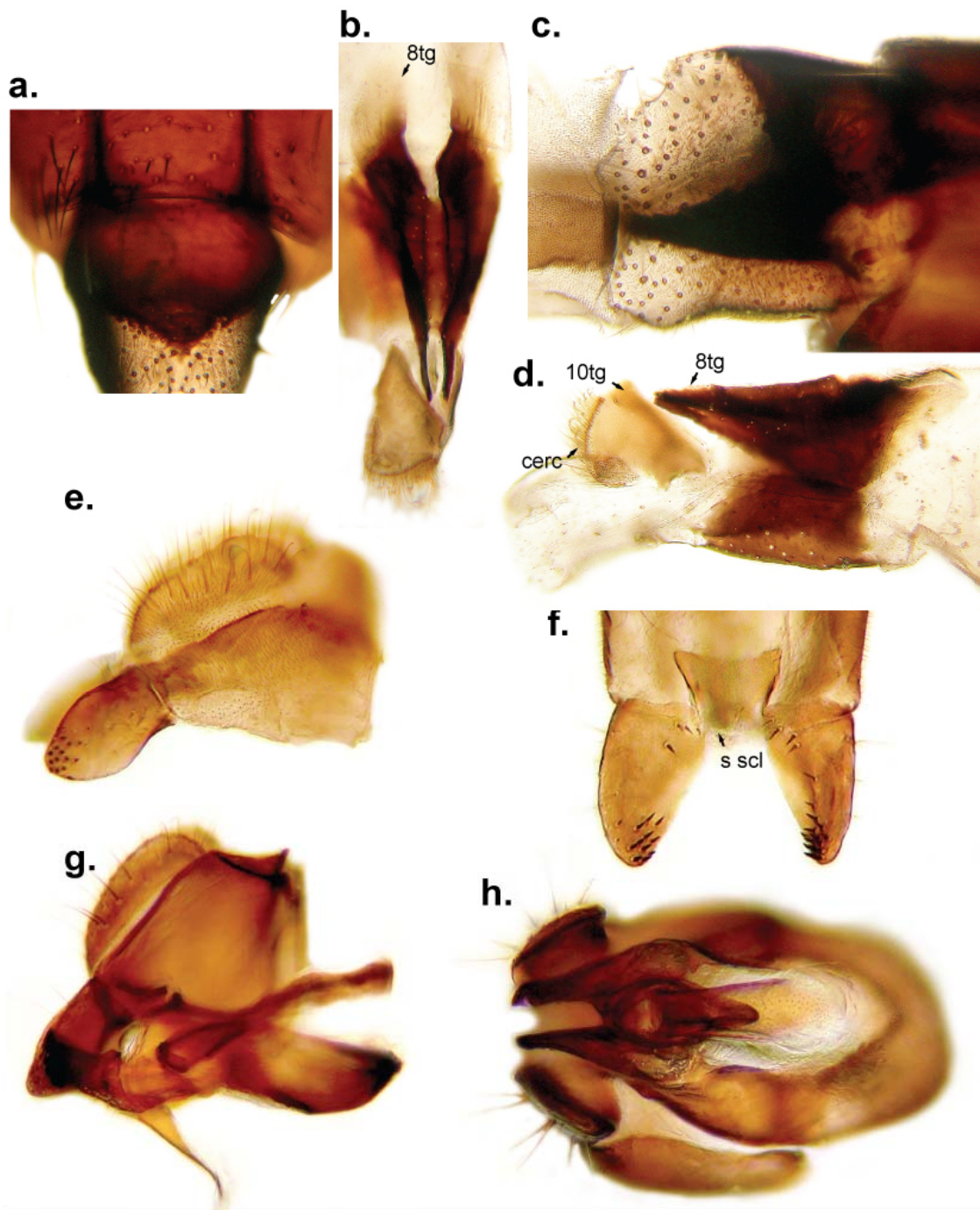


**Plate 19.** *Pelecinobaccha (P.) avispa* sp.nov.. **a-d.** Female genitalia: **a.** 7th tergite, dorsal. **b.** Apex, dorsal. **c.** 7th segment, lateral. **d.** Apex, lateral. **e-h.** Male genitalia: **e.** Lateral. **f.** Epandrium, ventral. **g.** Hypandrium, lateral. **h.** Ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.

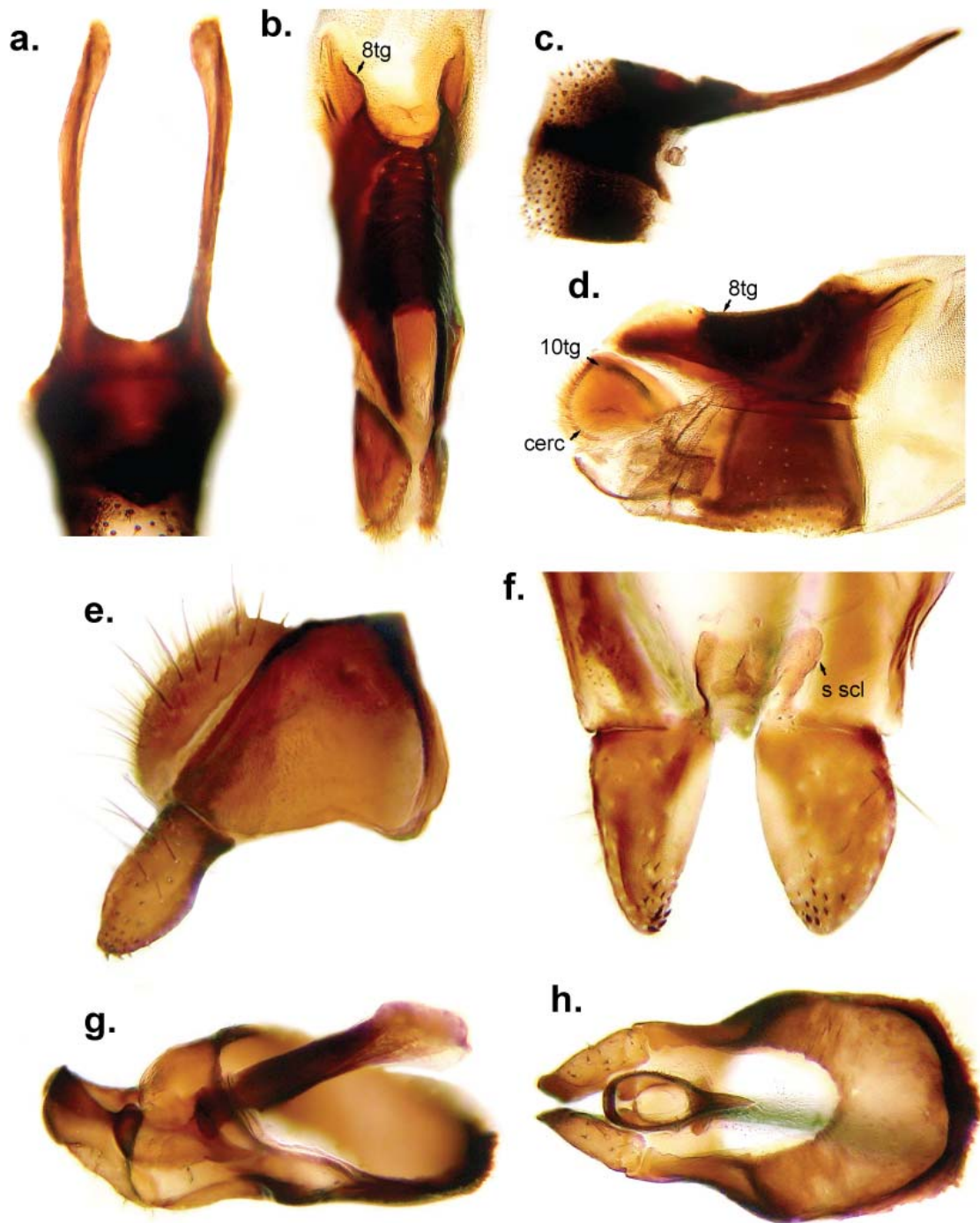


**Plate 20.** *Pelecinobaccha* (*P.*) *beatricea* n.sp.. **a-d.** Female genitalia: **a.** 7th tergite, dorsal. **b.** Apex, dorsal. **c.** 7th segment, lateral. **d.** Apex, lateral. **e-h.** Male genitalia: **e.** Surstylus, ventral. **f.** Epandrium, ventral. **g.** Hypandrium, lateral. **h.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.



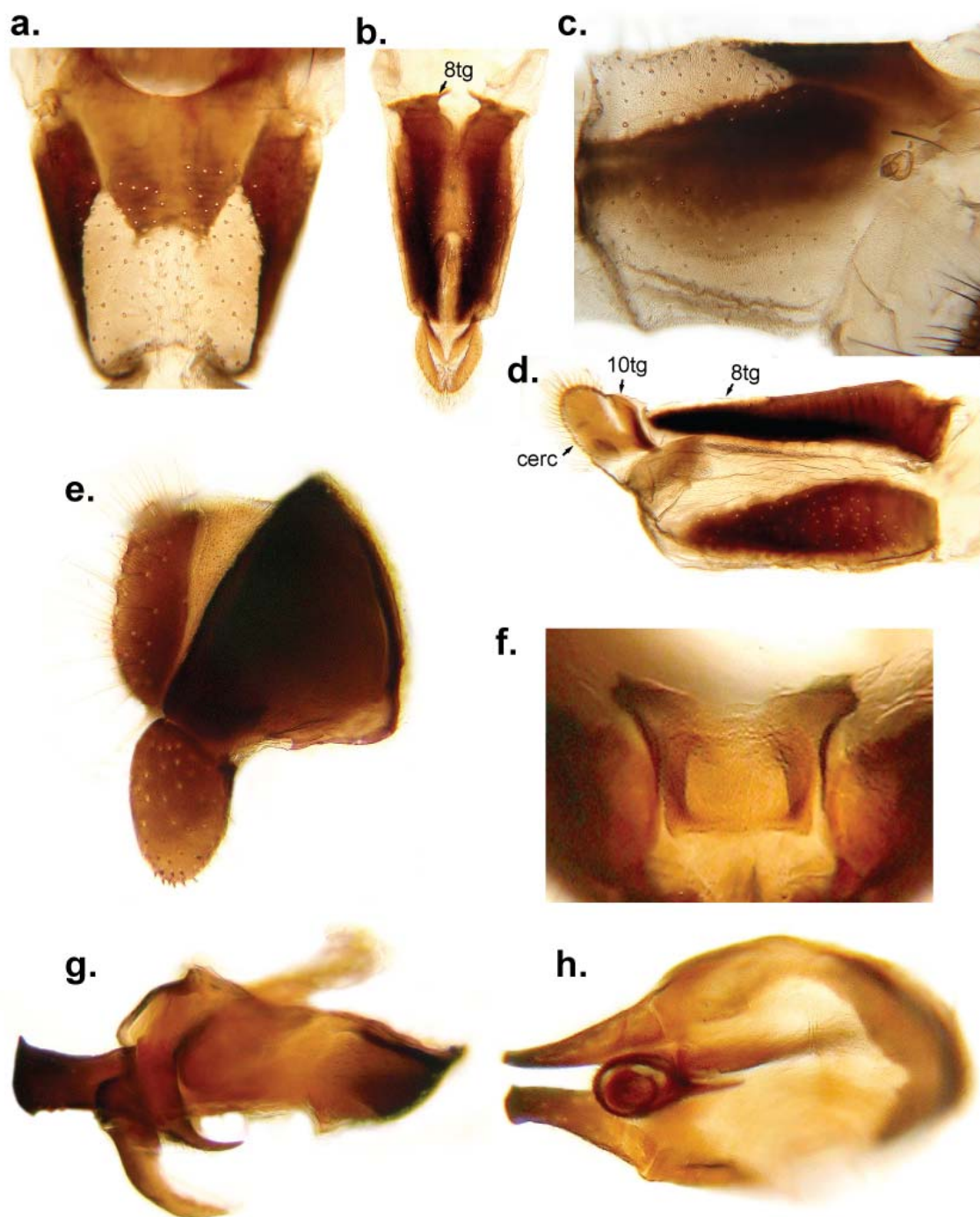


**Plate 21. a-d.** *Pelecinobaccha (P.) capesorum* sp.nov., female genitalia: **a.** 7th tergite, dorsal. **b.** Apex, dorsal. **c.** 7th segment, lateral. **d.** Apex, lateral. **e-h.** *Pelecinobaccha (P.) humillima* sp.nov., male genitalia: **e.** Epandrium, lateral. **f.** Epandrium, ventral. **g.** Lateral. **h.** Ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.

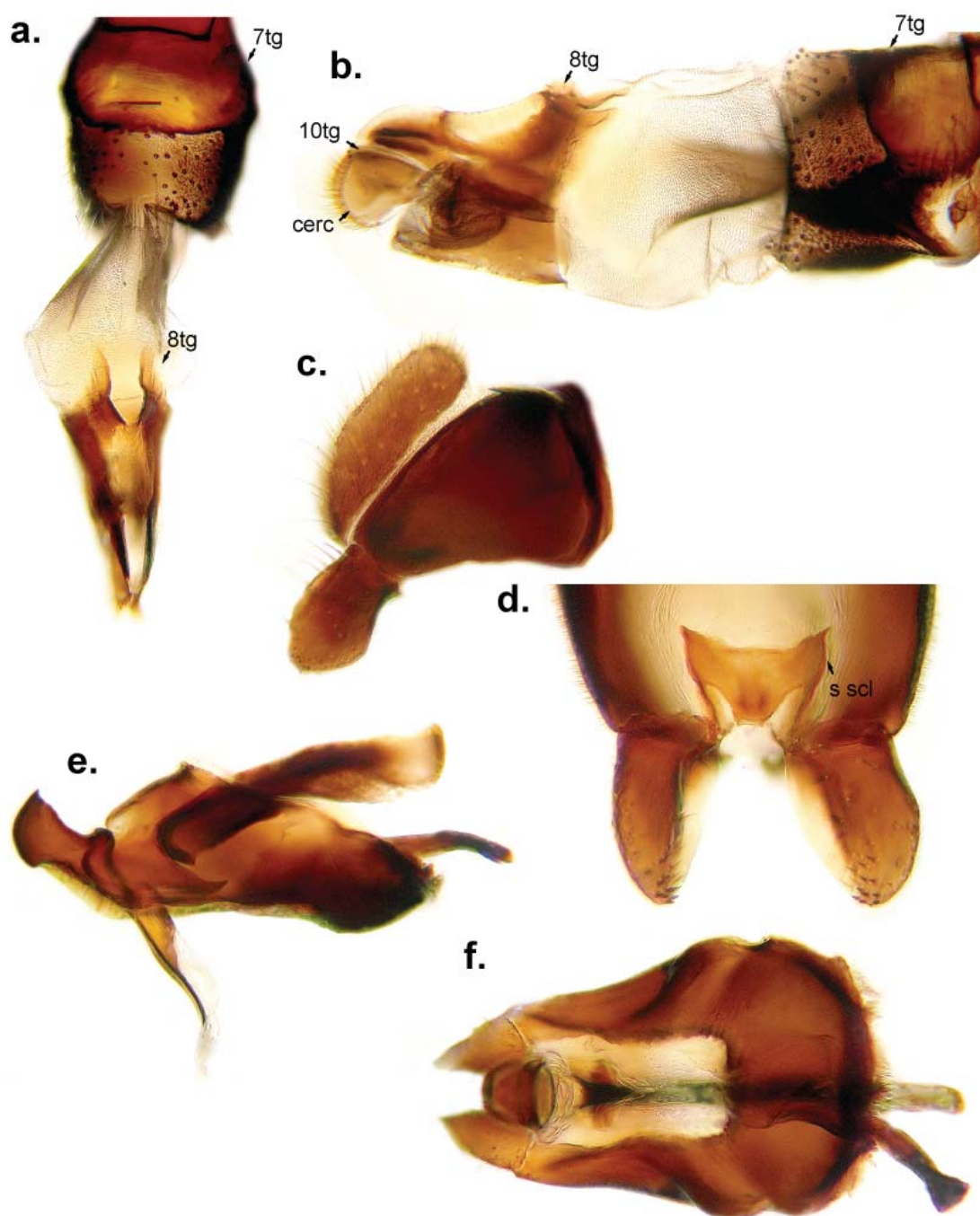


**Plate 22.** *Pelecinobaccha* (*P.*) *clarapex* (Wiedemann, 1830). **a-d.** Female genitalia: **a.** 7th tergite, dorsal. **b.** Apex, dorsal. **c.** 7th segment, lateral. **d.** Apex, lateral. **e-h.** Male genitalia: **e.** Epandrium, lateral. **f.** Epandrium, ventral. **g.** Hypandrium, lateral. **h.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.

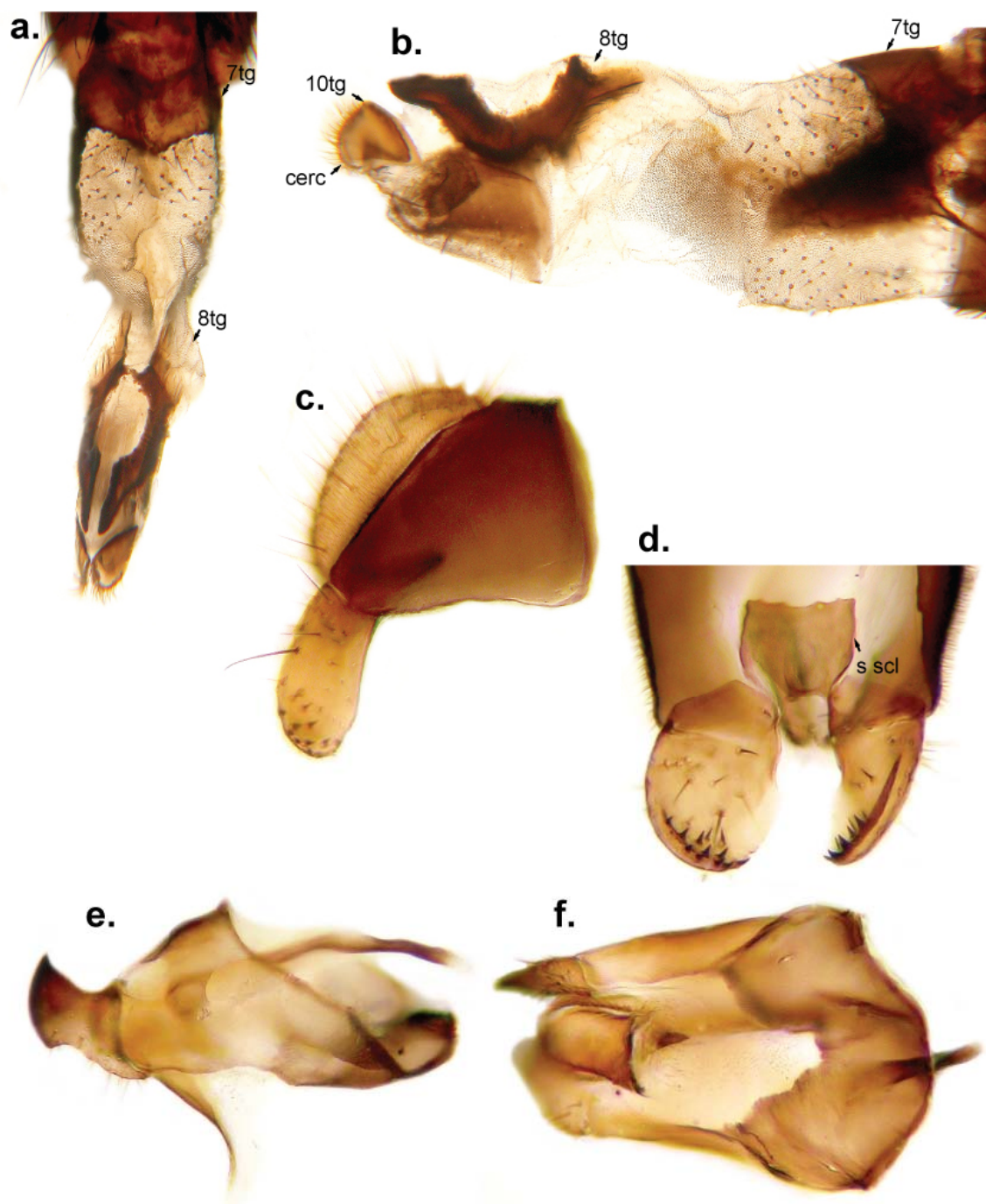




**Plate 23.** *Pelecinobaccha* (*P.*) *concinna* (Williston, 1891). **a-d.** Female genitalia: **a.** 7th tergite, dorsal. **b.** Apex, dorsal. **c.** 7th segment, lateral. **d.** Apex, lateral. **e-h.** Male genitalia: **e.** Epandrium, lateral. **f.** Subepandrial sclerite, ventral. **g.** Hypandrium, lateral. **h.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus.

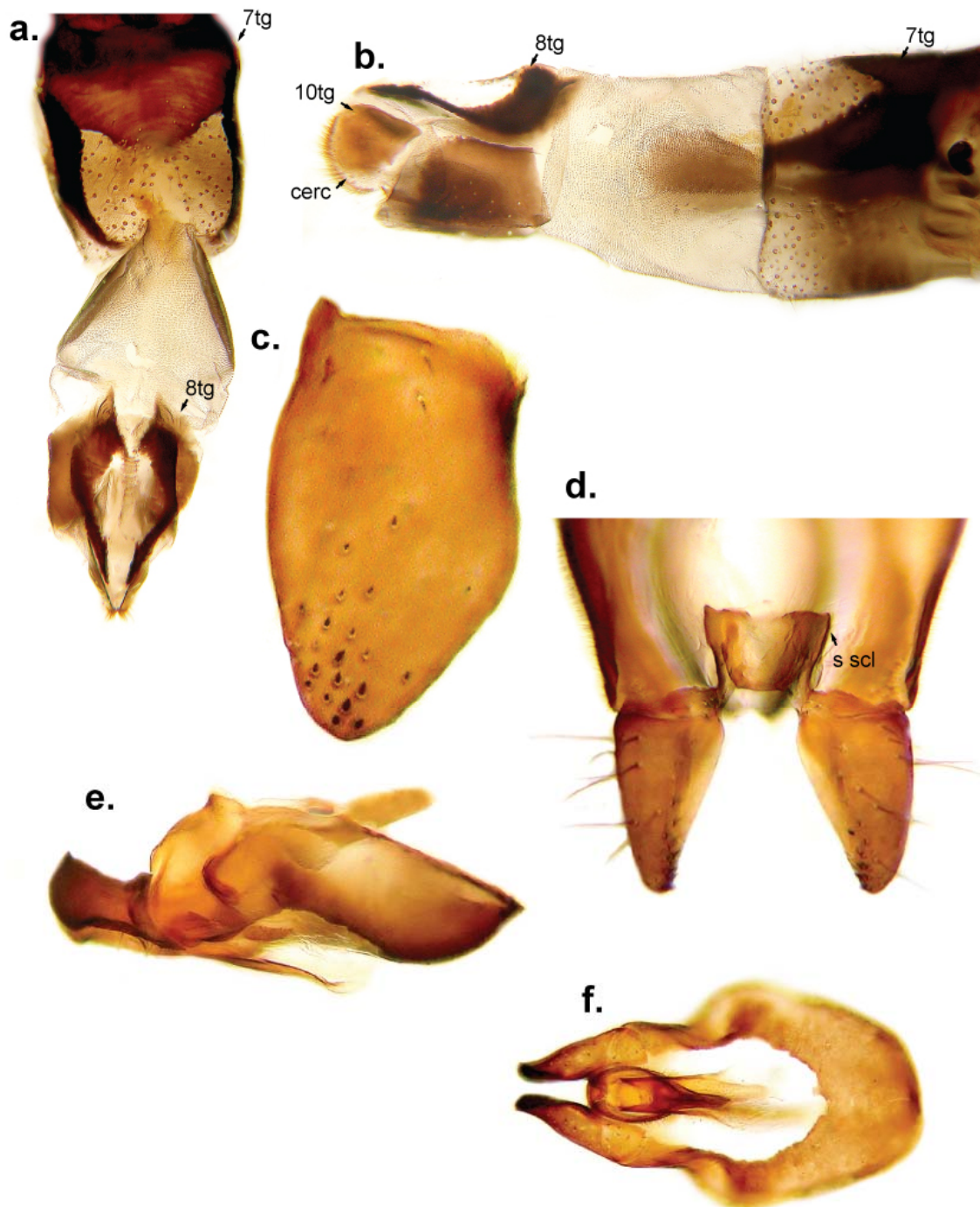


**Plate 24.** *Pelecinobaccha* (*P.*) *cora* (Curran, 1941). **a-b.** Female genitalia: **a.** Dorsal. **b.** Lateral. **c-f.** Male genitalia: **c.** Epandrium, lateral. **d.** Epandrium, ventral. **e.** Hypandrium, lateral. **f.** Hypandrium, ventral. 7tg: 7th tergite, 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.

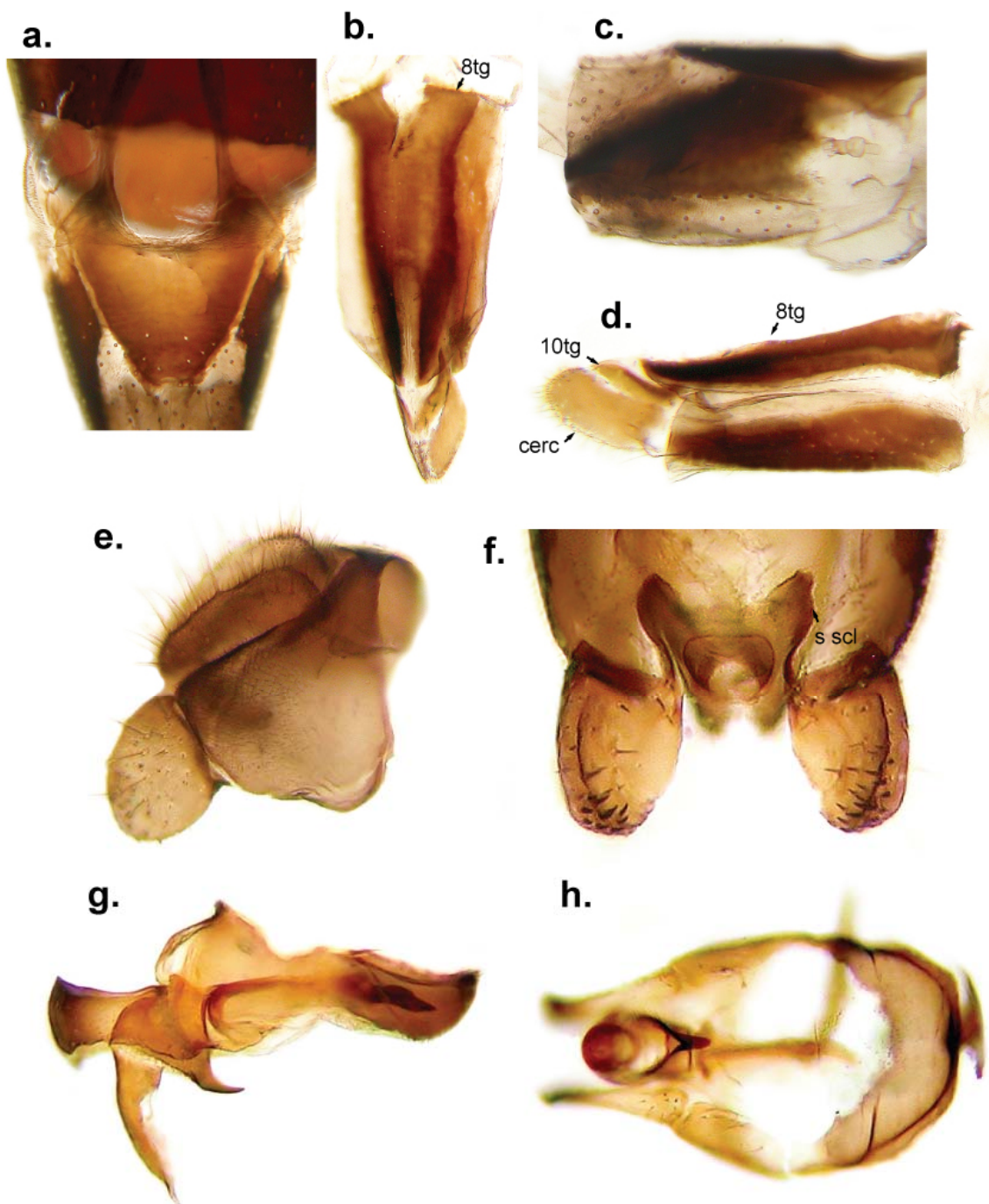


**Plate 25.** *Pelecinobaccha (P.) costata* (Say, 1829). **a-b.** Female genitalia: **a.** Dorsal. **b.** Lateral. **c-f.** Male genitalia: **c.** Epandrium, lateral. **d.** Epandrium, ventral. **e.** Hypandrium, lateral. **f.** Hypandrium, ventral. 7tg: 7th tergite, 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.



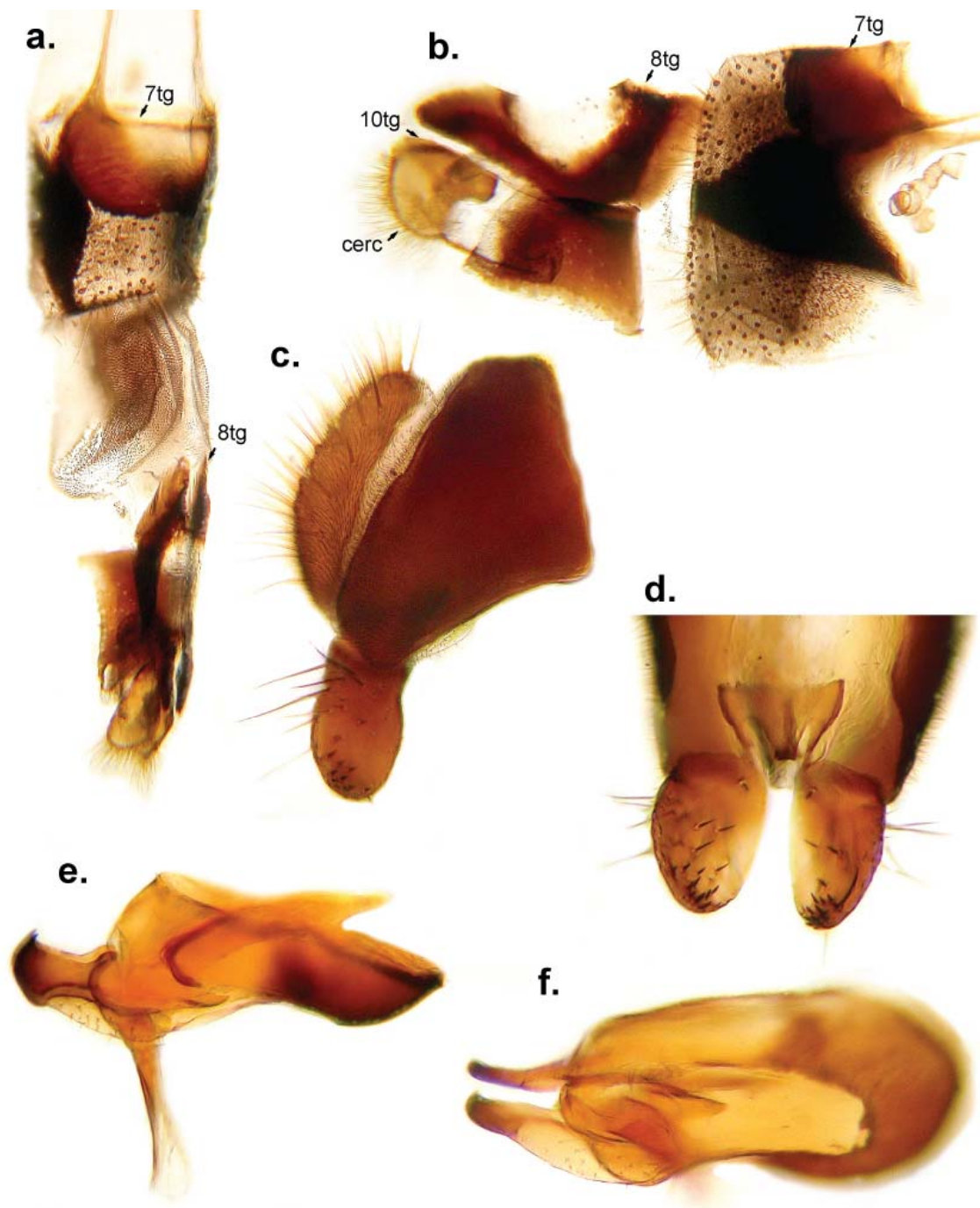


**Plate 26.** *Pelecinobaccha* (*P.*) *cryptica* (Hull, 1942). **a-b.** Female genitalia: **a.** Dorsal. **b.** Lateral. **c-f.** Male genitalia: **c.** Surstylus, ventral. **d.** Epandrium, ventral. **e.** Hypandrium, lateral. **f.** Hypandrium, ventral. 7tg: 7th tergite, 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.



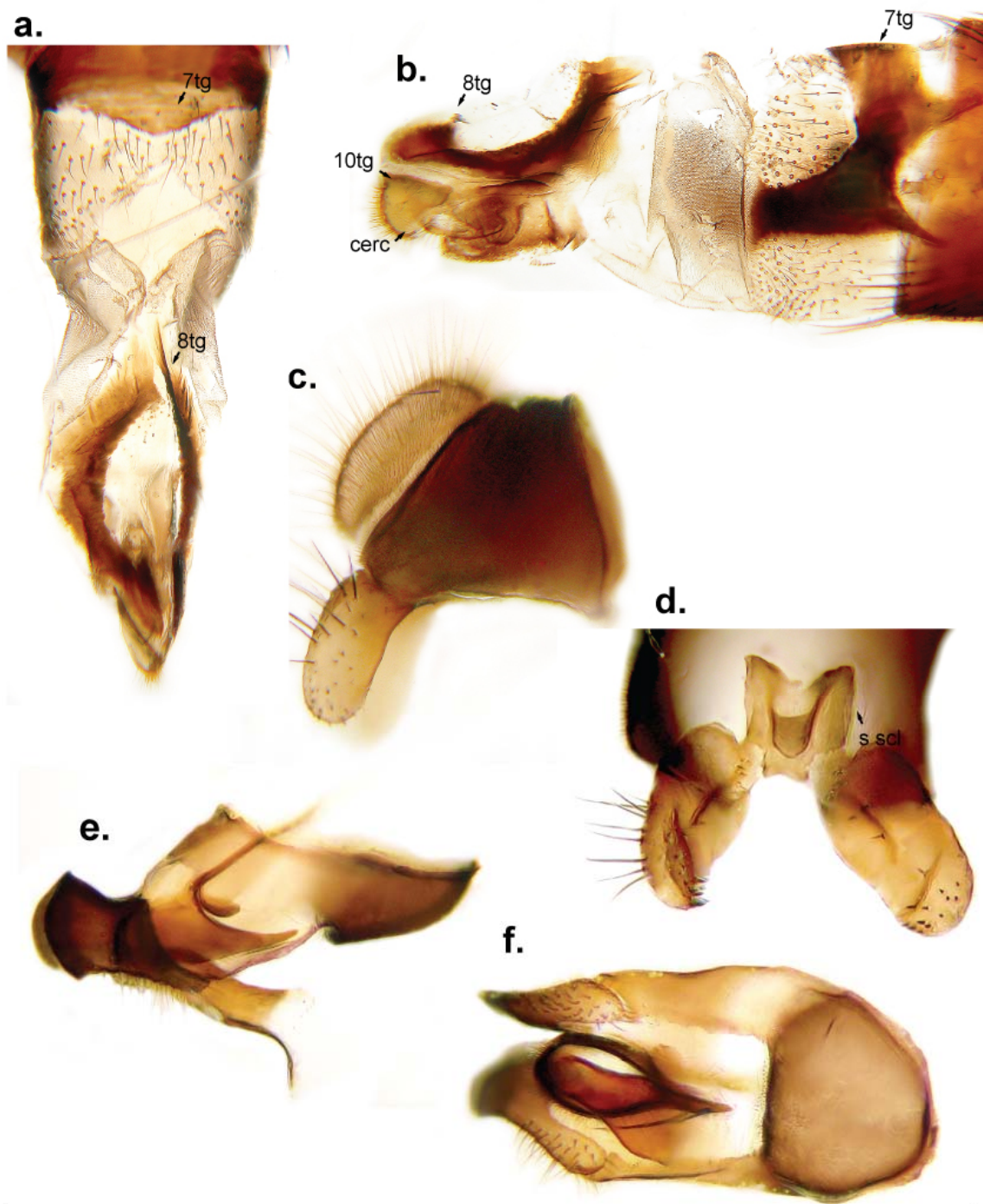
**Plate 27.** *Pelecinobaccha* (*P.*) *dracula* (Hull, 1943). **a-d.** Female genitalia: **a.** 7th tergite, dorsal. **b.** Apex, dorsal. **c.** 7th segment, lateral. **d.** Apex, lateral. **e-h.** Male genitalia: **e.** Epandrium, lateral. **f.** Epandrium, ventral. **g.** Hypandrium, lateral. **h.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.



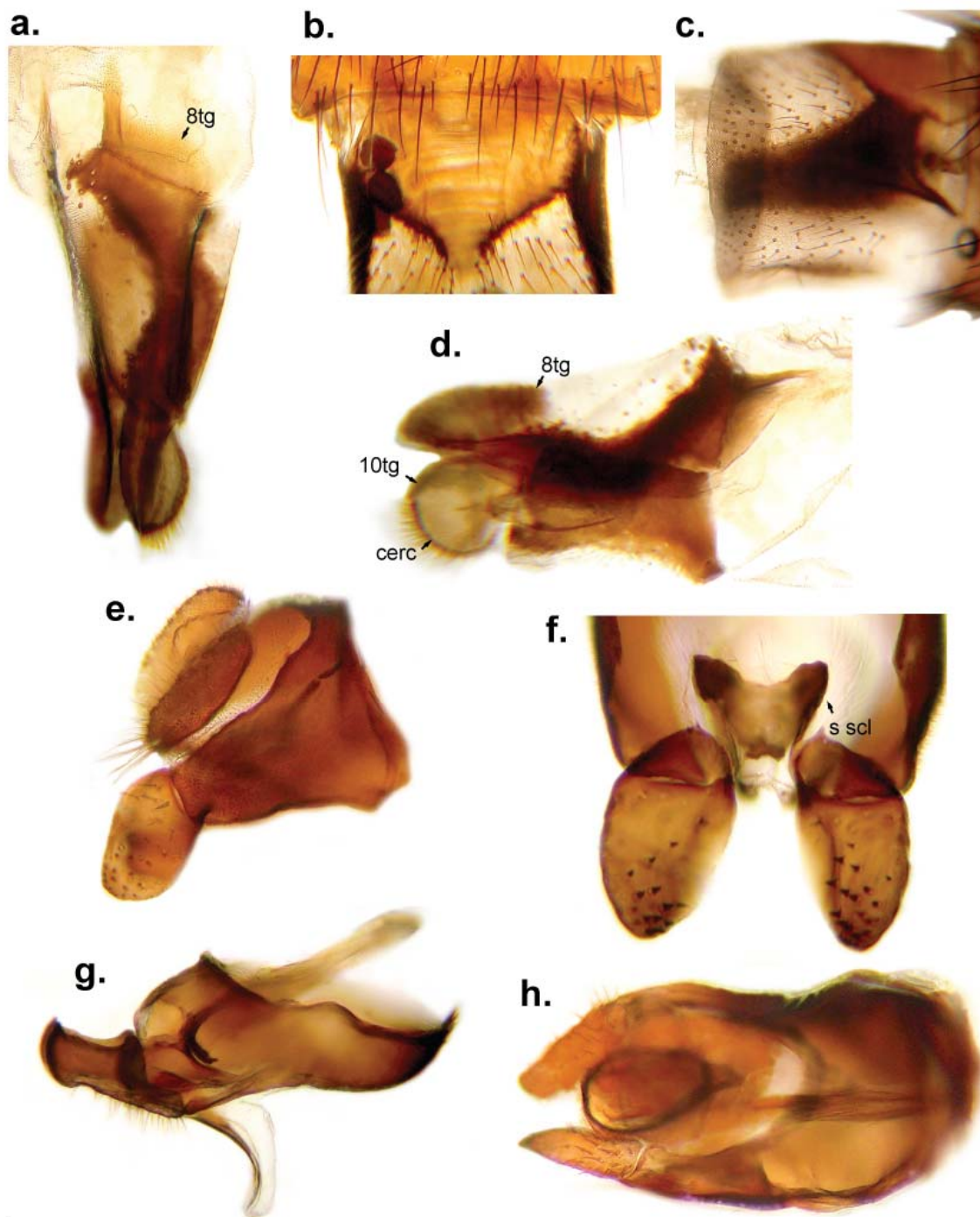


**Plate 28.** *Pelecinobaccha* (*P.*) *eruptova* (Hull, 1943). **a-b.** Female genitalia: **a.** Oblique dorsal. **b.** Lateral. **c-f.** Male genitalia: **c.** Epandrium, lateral. **d.** Epandrium, ventral. **e.** Hypandrium, lateral. **f.** Hypandrium, oblique ventral. 7tg: 7th tergite, 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.



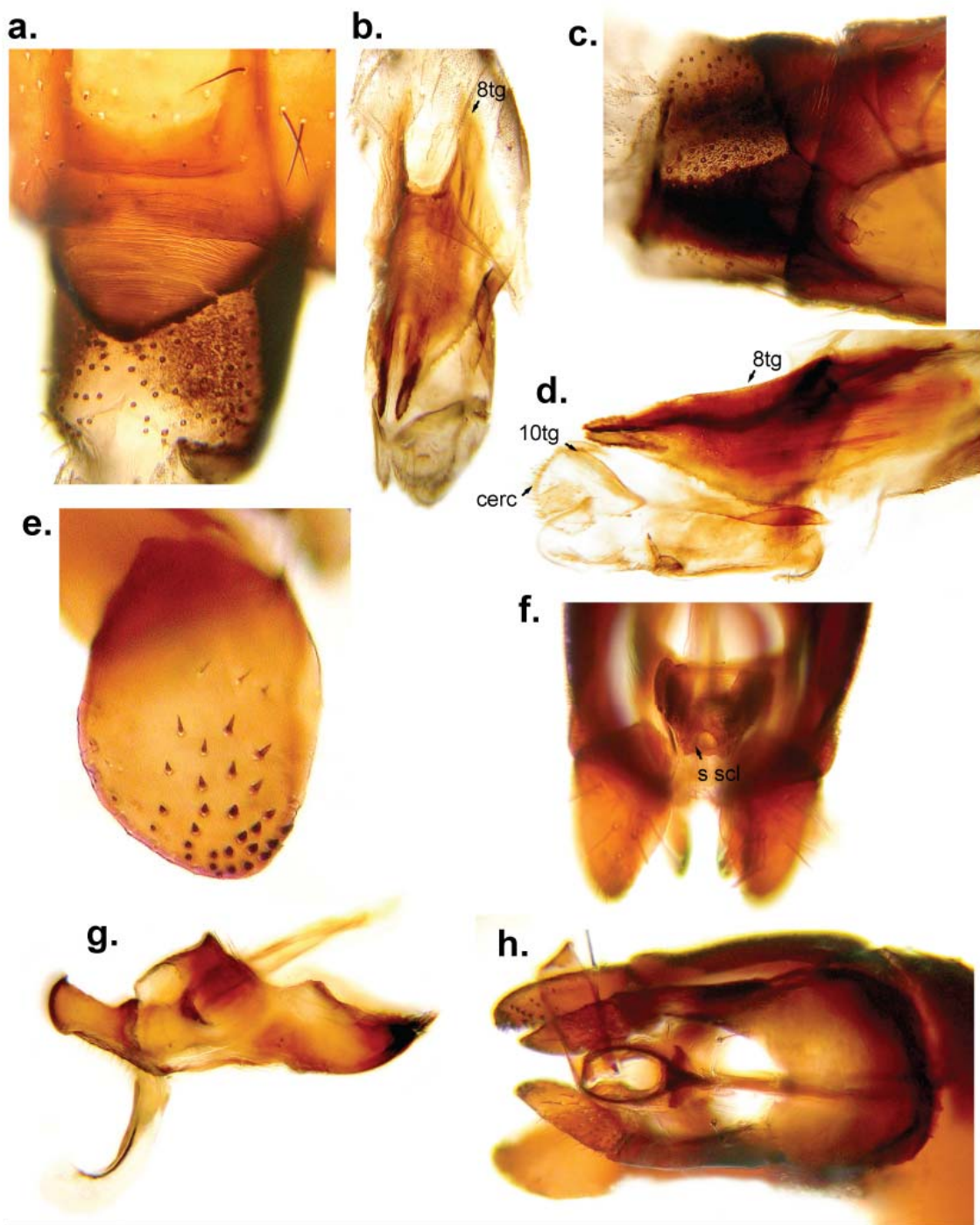


**Plate 29.** *Pelecinobaccha (P.) hiantha* (Hull, 1943). **a-b.** Female genitalia: **a.** Dorsal. **b.** Lateral. **c-f.** Male genitalia: **c.** Epandrium, lateral. **d.** Epandrium, ventral. **e.** Hypandrium, lateral. **f.** Hypandrium, ventral. 7tg: 7th tergite, 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.

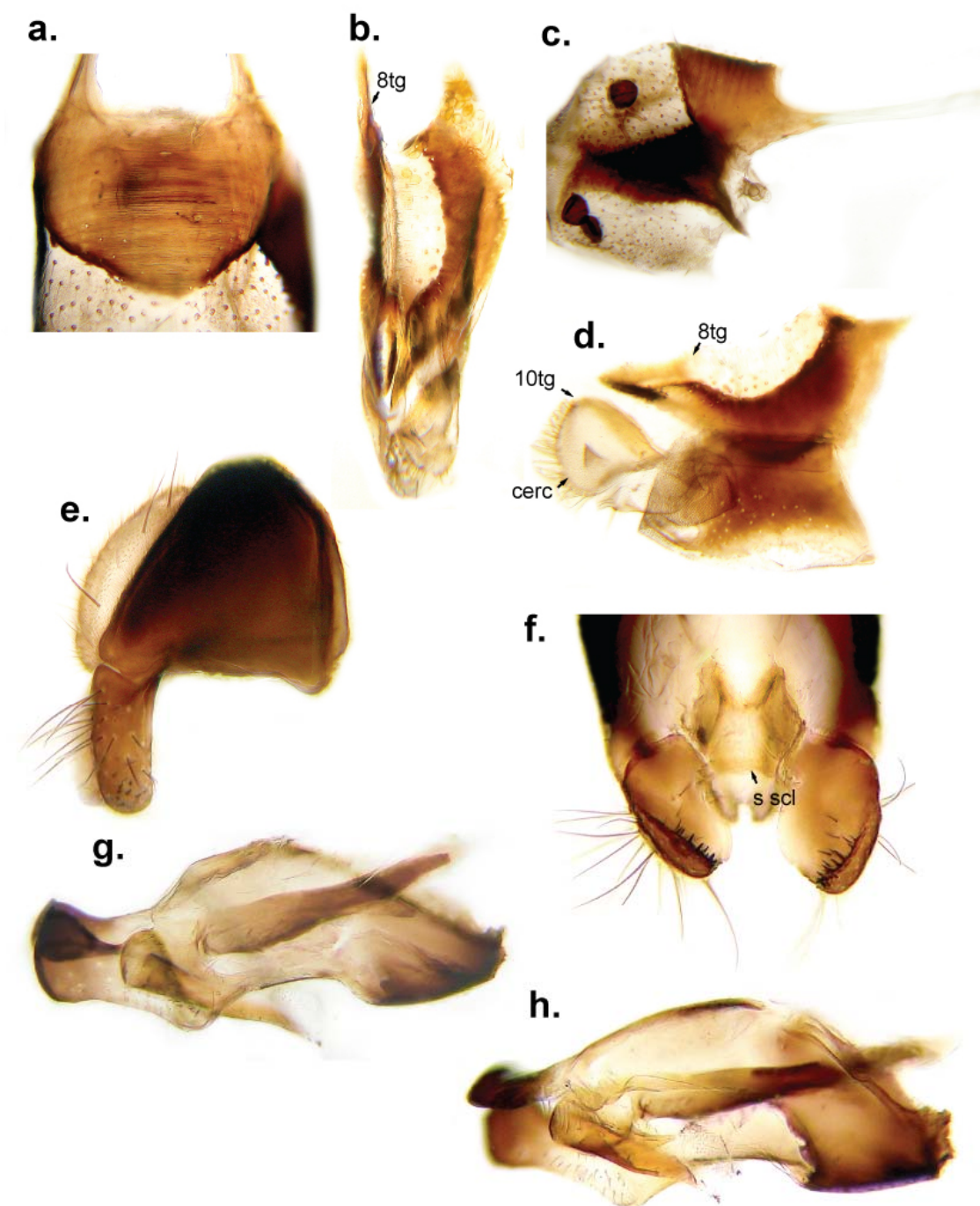


**Plate 30.** *Pelecinobaccha* (*P.*) *hirundella* (Hull, 1944). **a-d.** Female genitalia: **a.** Apex, oblique dorsal. **b.** 7th tergite, dorsal. **c.** 7th segment, lateral. **d.** Apex, lateral. **e-h.** Male genitalia: **e.** Epandrium, lateral. **f.** Epandrium, ventral. **g.** Hypandrium, lateral. **h.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.



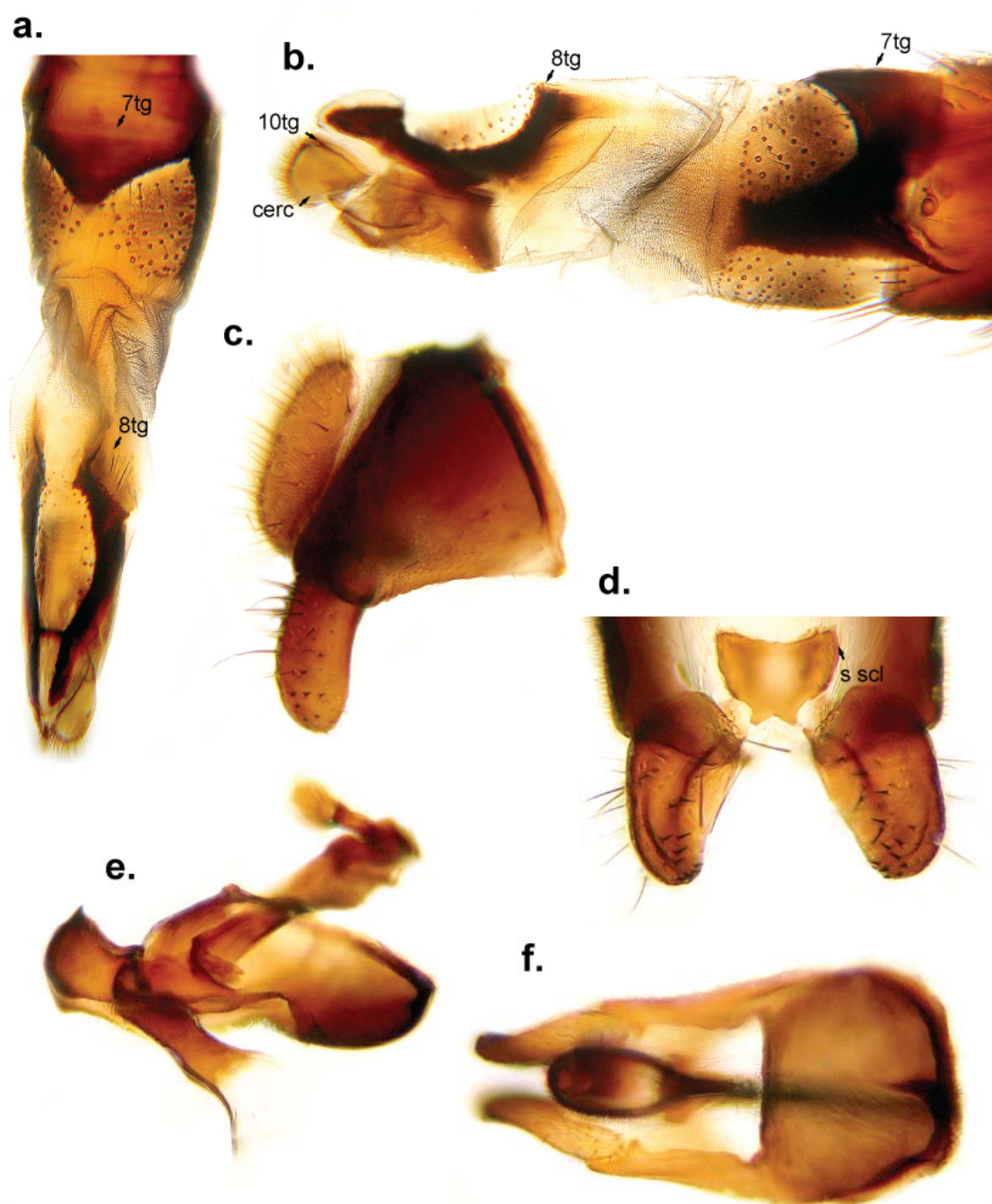


**Plate 31.** *Pelecinobaccha* (*P.*) *ida* (Curran, 1941). **a-d.** Female genitalia: **a.** 7th tergite, dorsal. **b.** Apex, dorsal. **c.** 7th segment, lateral. **d.** Apex, lateral. **e-h.** Male genitalia: **e.** Surstylus, ventral. **f.** Epandrium, ventral. **g.** Hypandrium, lateral. **h.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.

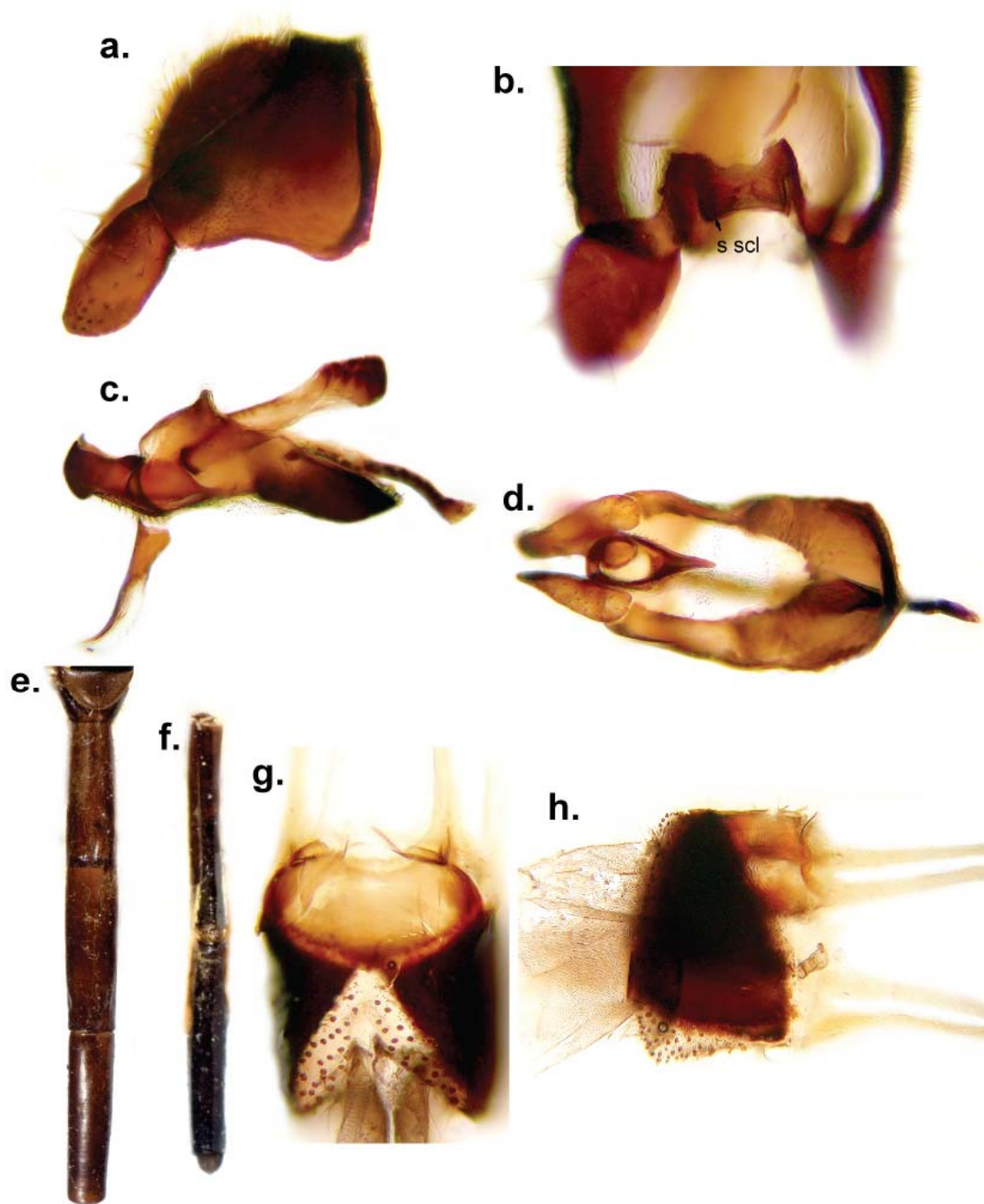


**Plate 32.** *Pelecinobaccha* (*P.*) *manuelorum* sp.nov. **a-d.** Female genitalia: **a.** 7th tergite, dorsal. **b.** Apex, dorsal. **c.** 7th segment, lateral. **d.** Apex, lateral. **e-h.** Male genitalia: **e.** Epandrium, lateral. **f.** Epandrium, ventral. **g.** Hypandrium, lateral. **h.** Hypandrium, oblique ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.

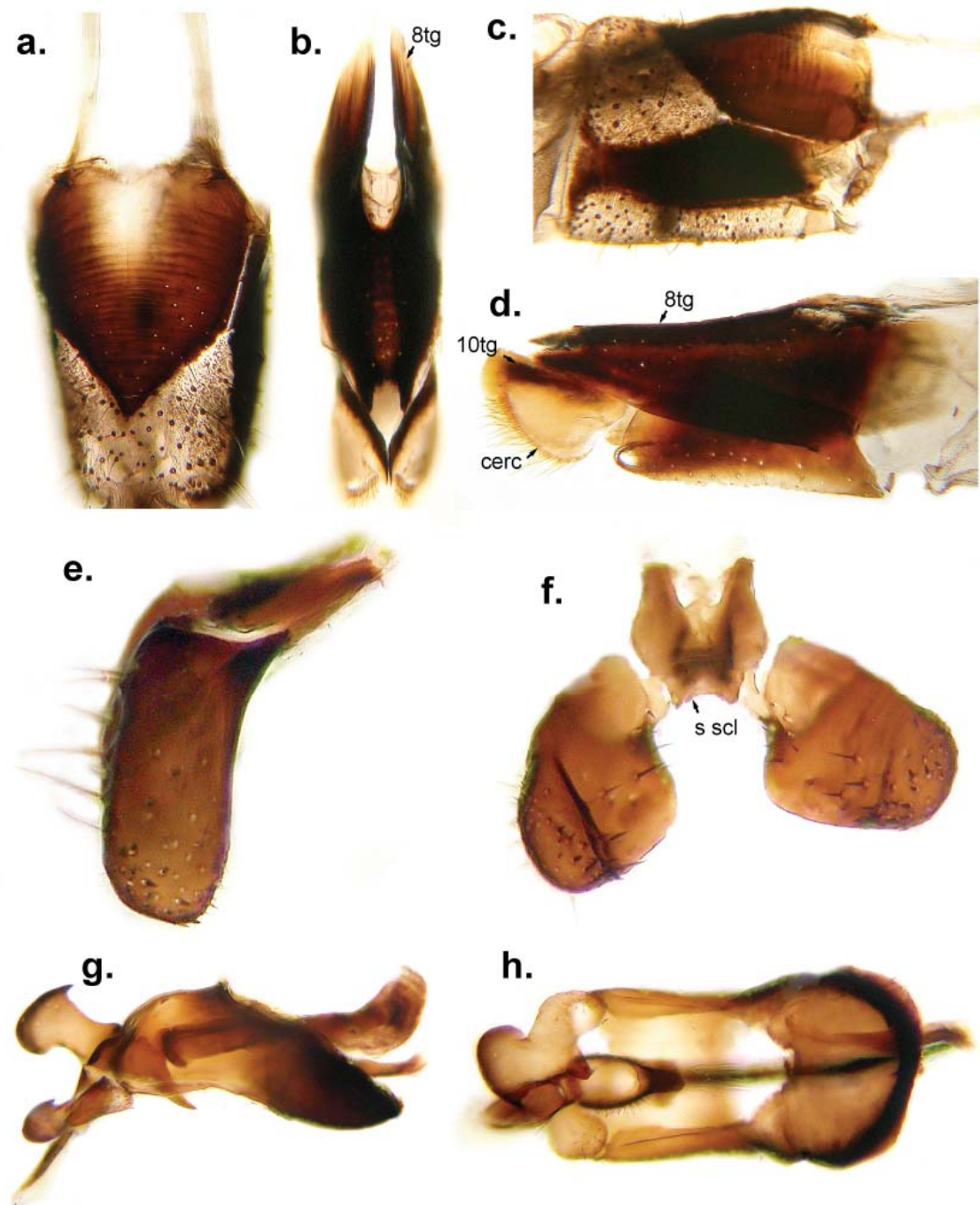




**Plate 33.** *Pelecinobaccha* (*P.*) *mexicana* (Curran, 1930). **a-b.** Female genitalia: **a.** Dorsal. **b.** Lateral. **c-f.** Male genitalia: **c.** Epandrium, lateral. **d.** Epandrium, ventral. **e.** Hypandrium, lateral. **f.** Hypandrium, ventral. 7tg: 7th tergite, 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.

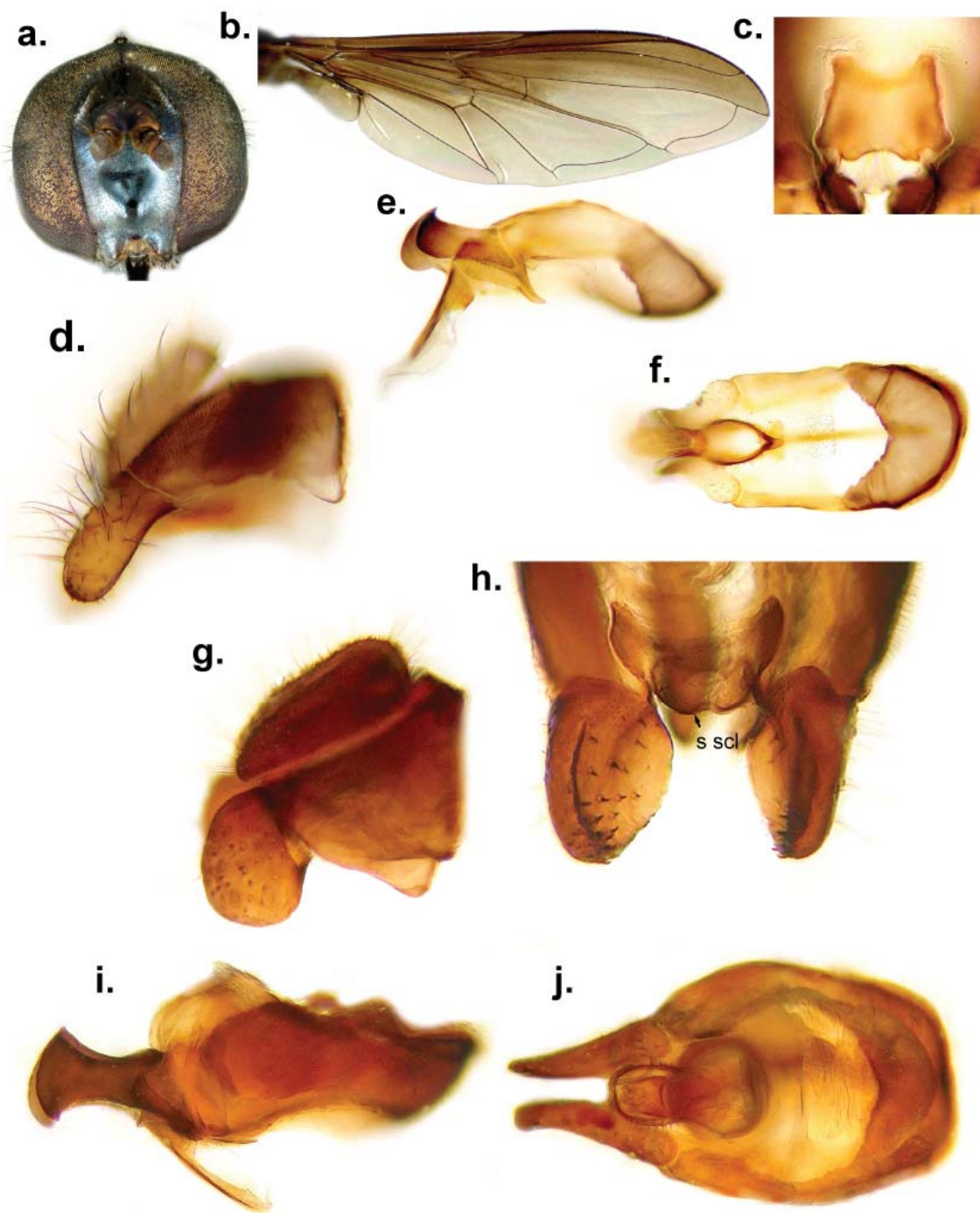


**Plate 34.** *Pelecinobaccha (P.) morgani* sp.nov.. **a-d.** Male genitalia: **a.** Epandrium, lateral. **b.** Epandrium, ventral. **c.** Hypandrium, lateral. **d.** Hypandrium, ventral. **e-h.** *Pelecinobaccha (P.) peruviana* (Shannon, 1927), female: **e.** Holotype, basal abdominal segments, dorsal. **f.** Holotype, 5th and 6th abdominal segments, dorsal. **g-h.** Genitalia: **g.** 7th tergite, dorsal. **h.** 7th segment, lateral. s scl: subepandrial sclerite.



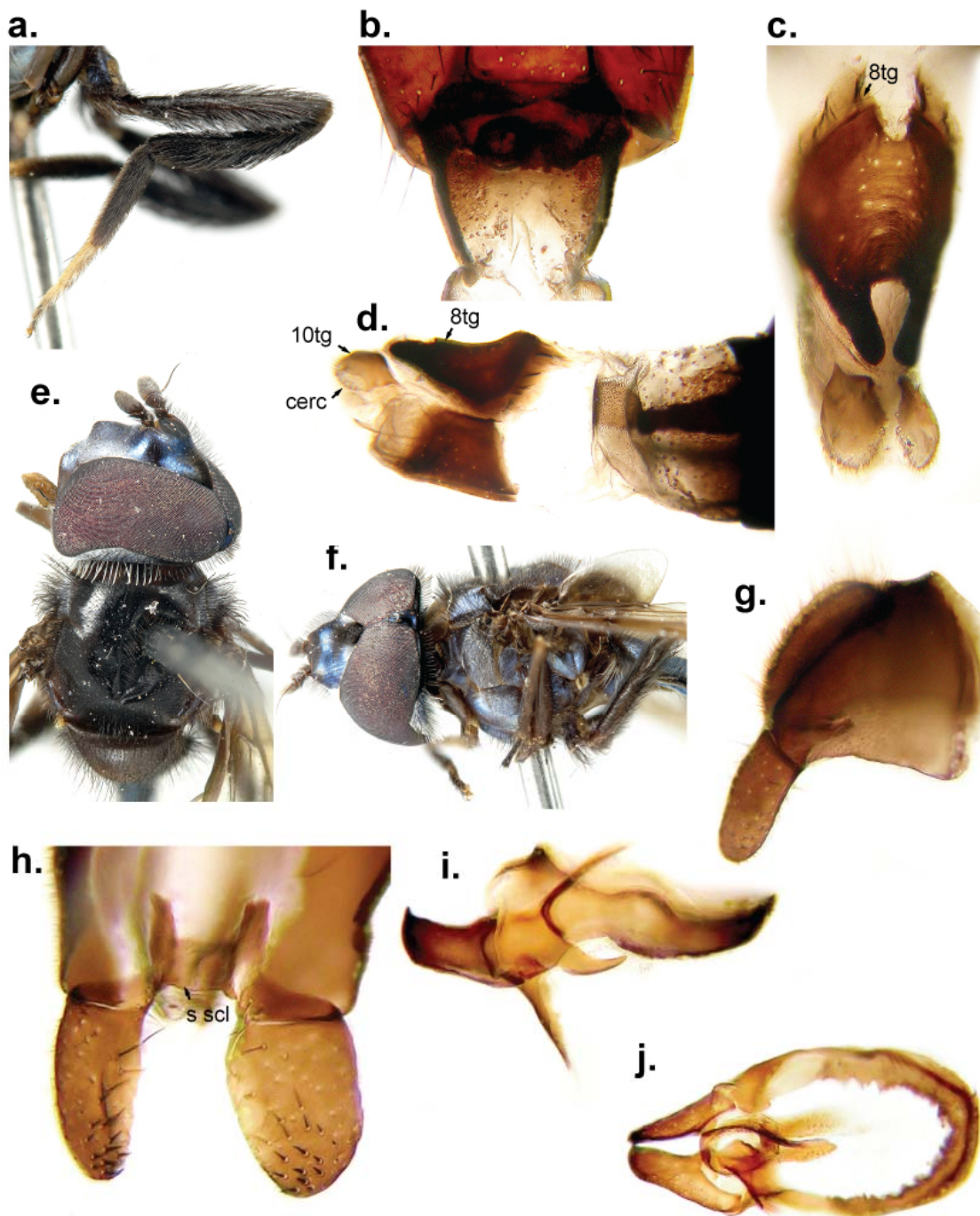
**Plate 35.** *Pelecinobaccha* (*P.*) *nubilorum* sp.nov.. **a-d.** Female genitalia: **a.** 7th tergite, dorsal. **b.** Apex, dorsal. **c.** 7th segment, lateral. **d.** Apex, lateral. **e-h.** Male genitalia: **e.** Surstylus, lateral. **f.** Surstylus, ventral. **g.** Hypandrium, lateral. **h.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.



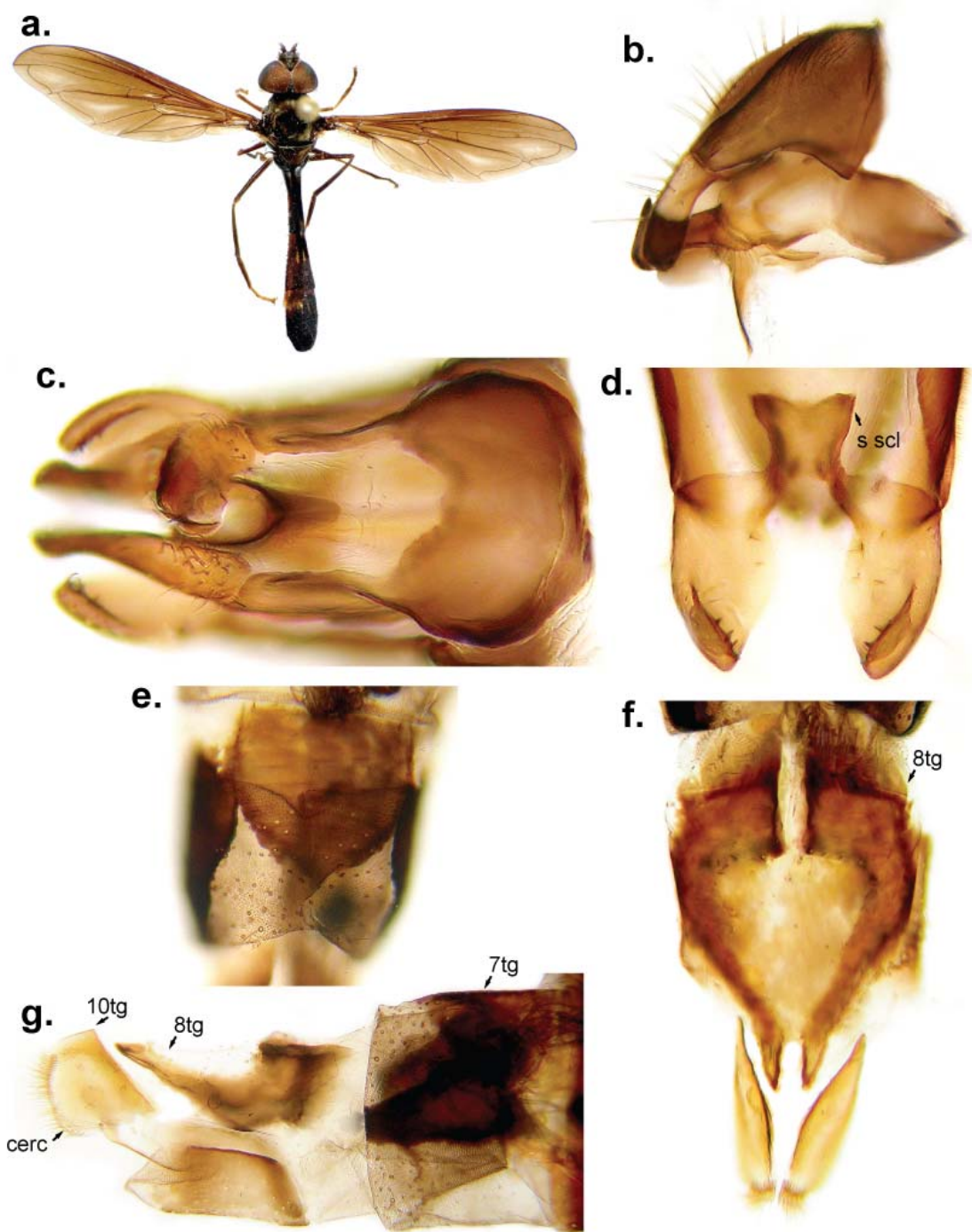


**Plate 36.** a-f. *Pelecinobaccha* (*P.*) *pilinigridentis* sp.nov., male: a. Head, anterior. b. Wing. c-f. Genitalia: c. Subepandrial sclerite, ventral. d. Epandrium, lateral. e. Hypandrium, lateral. f. Hypandrium, ventral. g-j. *Pelecinobaccha* (*P.*) *pucallpa* sp.nov., male genitalia: g. Epandrium, lateral. h. Epandrium, ventral. i. Hypandrium, lateral. j. Hypandrium, ventral. s scl: subepandrial sclerite.



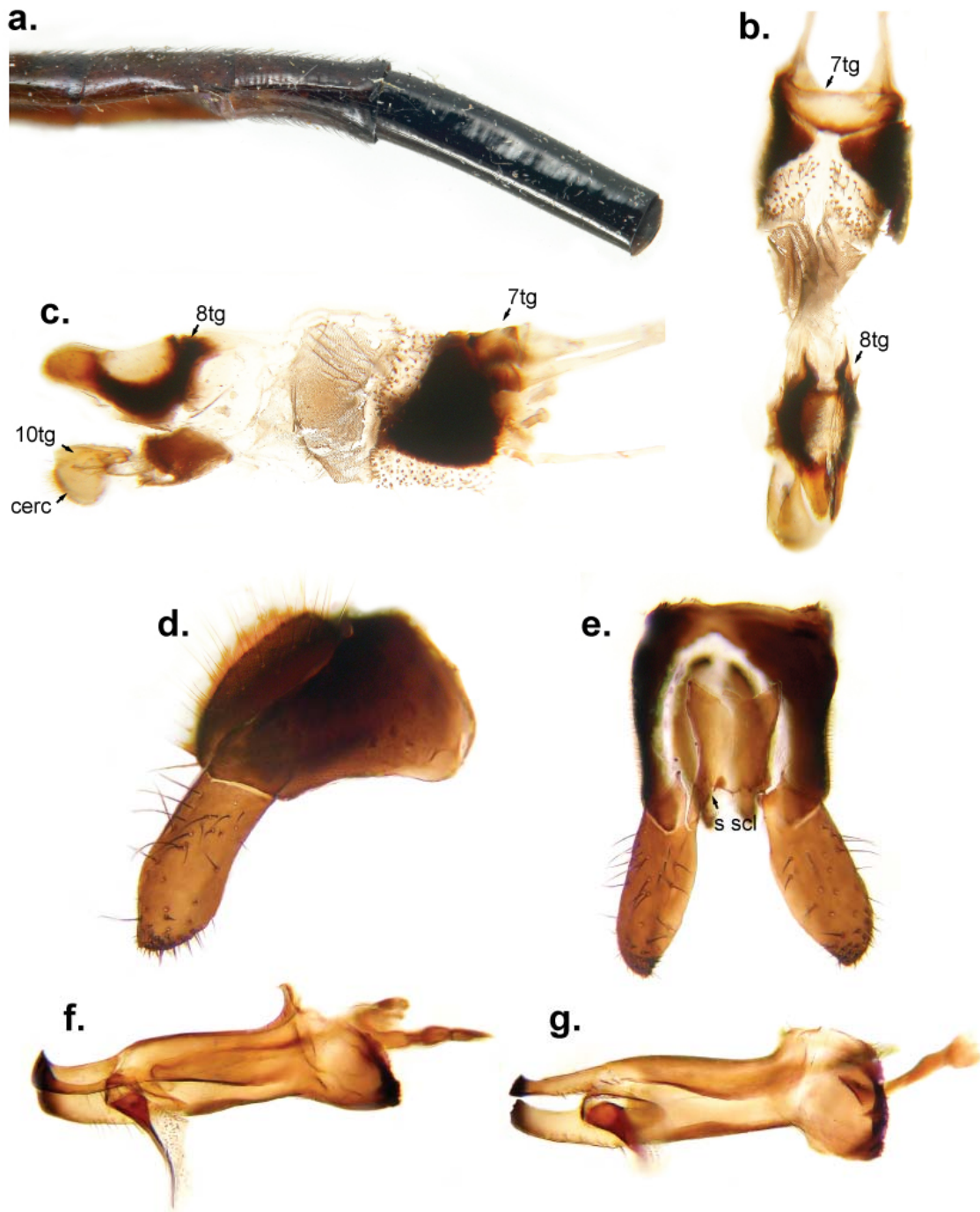


**Plate 37.** *Pelecinobaccha (P.) pilipes* (Schiner, 1868). **a-d.** Female: **a.** Metaleg, lateral. **b-d.** Genitalia: **b.** 7th tergite, dorsal. **c.** Apex, dorsal. **d.** Lateral. **e-j.** Male: **e.** Head and thorax, dorsal. **f.** Head and thorax, lateral. **g-j.** Genitalia: **g.** Epandrium, lateral. **h.** Epandrium, ventral. **i.** Hypandrium, lateral. **j.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.

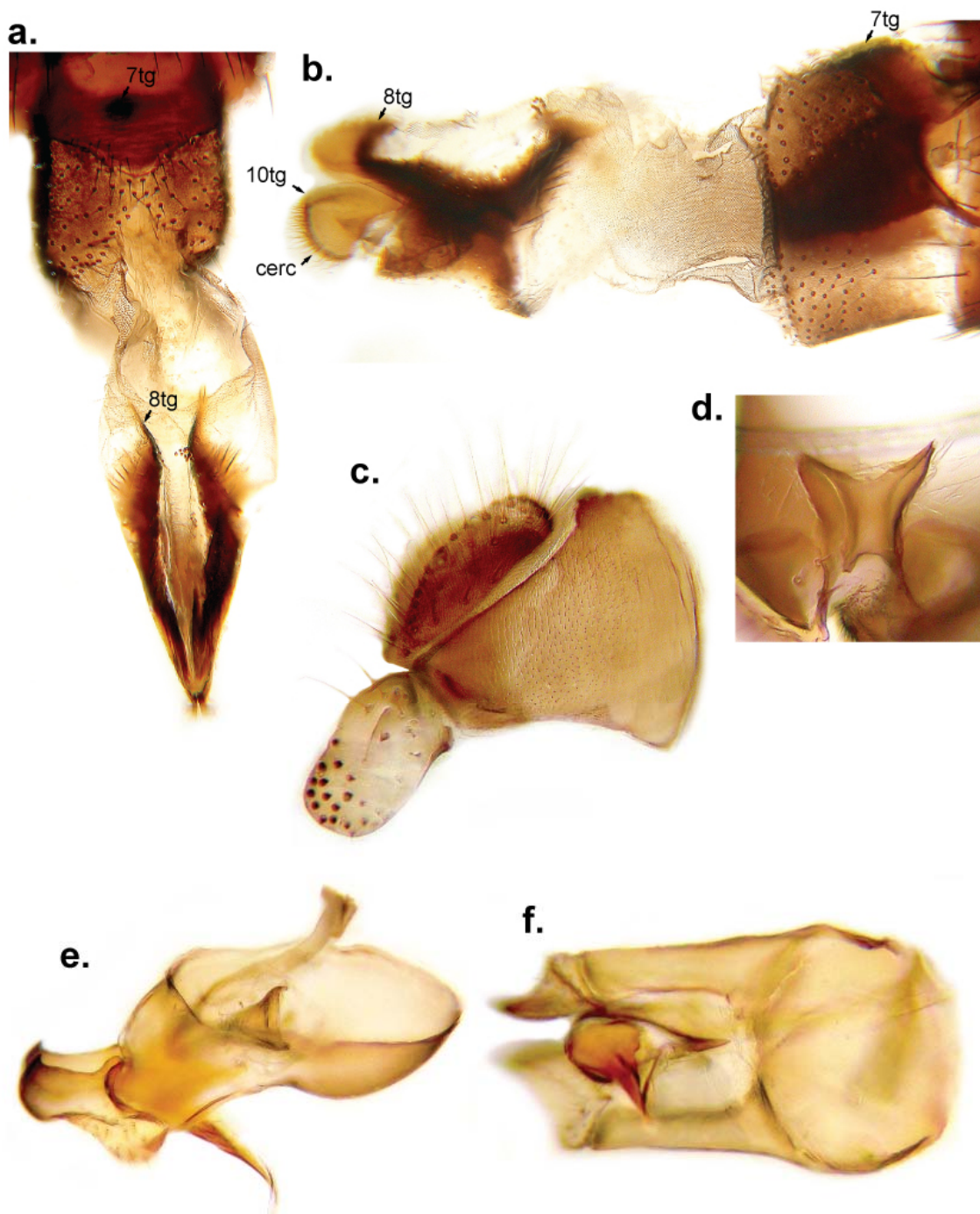


**Plate 38. a-d.** *Pelecinobaccha* (*P.*) *seara* sp.nov., male: **a.** Dorsal. **b-d.** Genitalia: **b.** Lateral. **c.** Ventral. **d.** Epandrium, ventral. **e-g.** *Pelecinobaccha* (*P.*) *tica* sp.nov., female genitalia: **e.** 7th tergite, dorsal. **f.** Apex, dorsal. **g.** Lateral. 7tg: 7th tergite, 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: sub-epandrial sclerite.

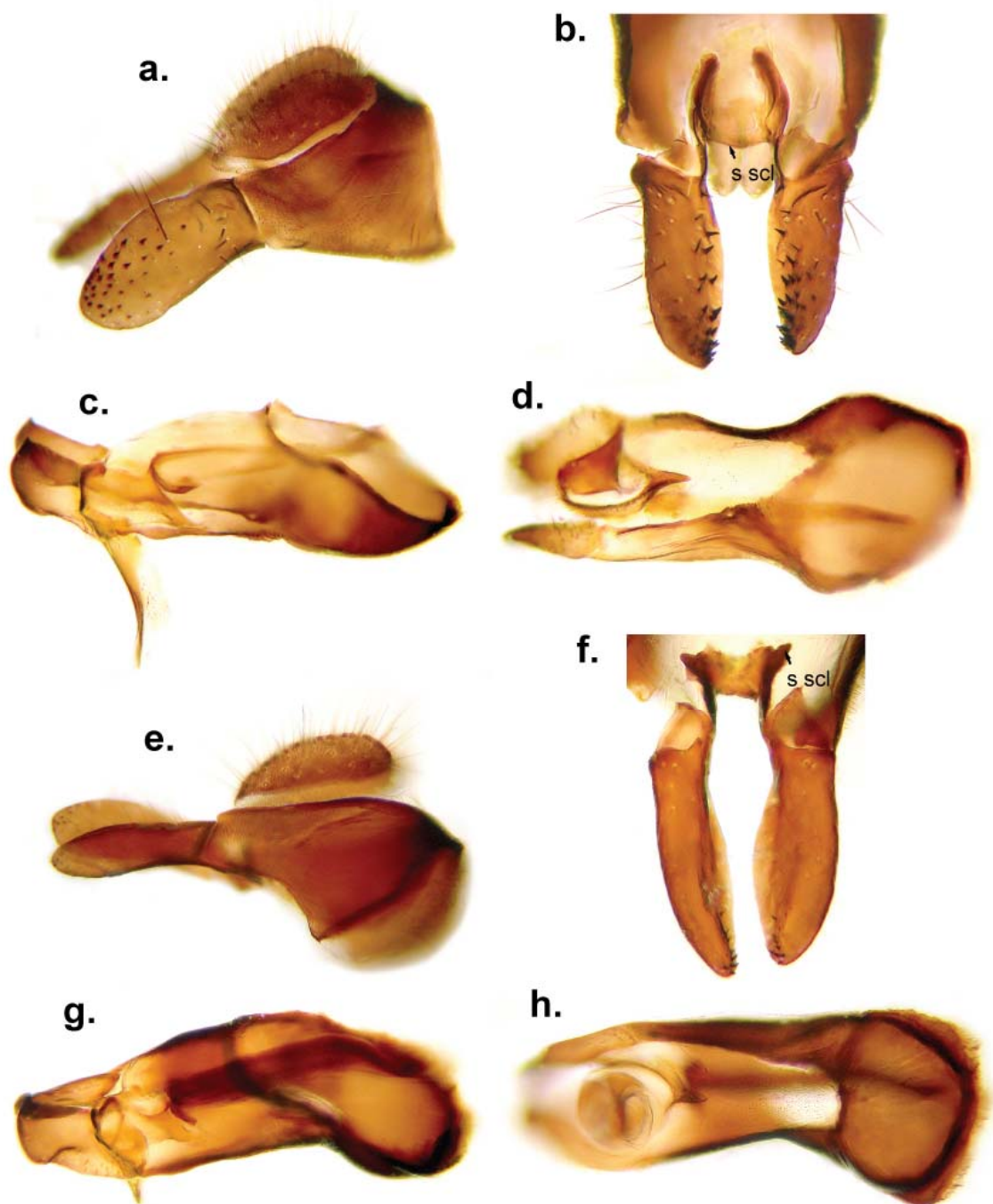




**Plate 39.** *Pelecinobaccha (P.) telescopica* (Curran, 1930). **a-c.** Female: **a.** Abdomen, apex, lateral. **b-c.** Genitalia: **b.** Dorsal. **c.** Lateral. **d-g.** Male genitalia: **d.** Epandrium, lateral. **e.** Epandrium, ventral. **f.** Hypandrium, oblique lateral. **f.** Hypandrium, ventral. 7tg: 7th tergite, 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.

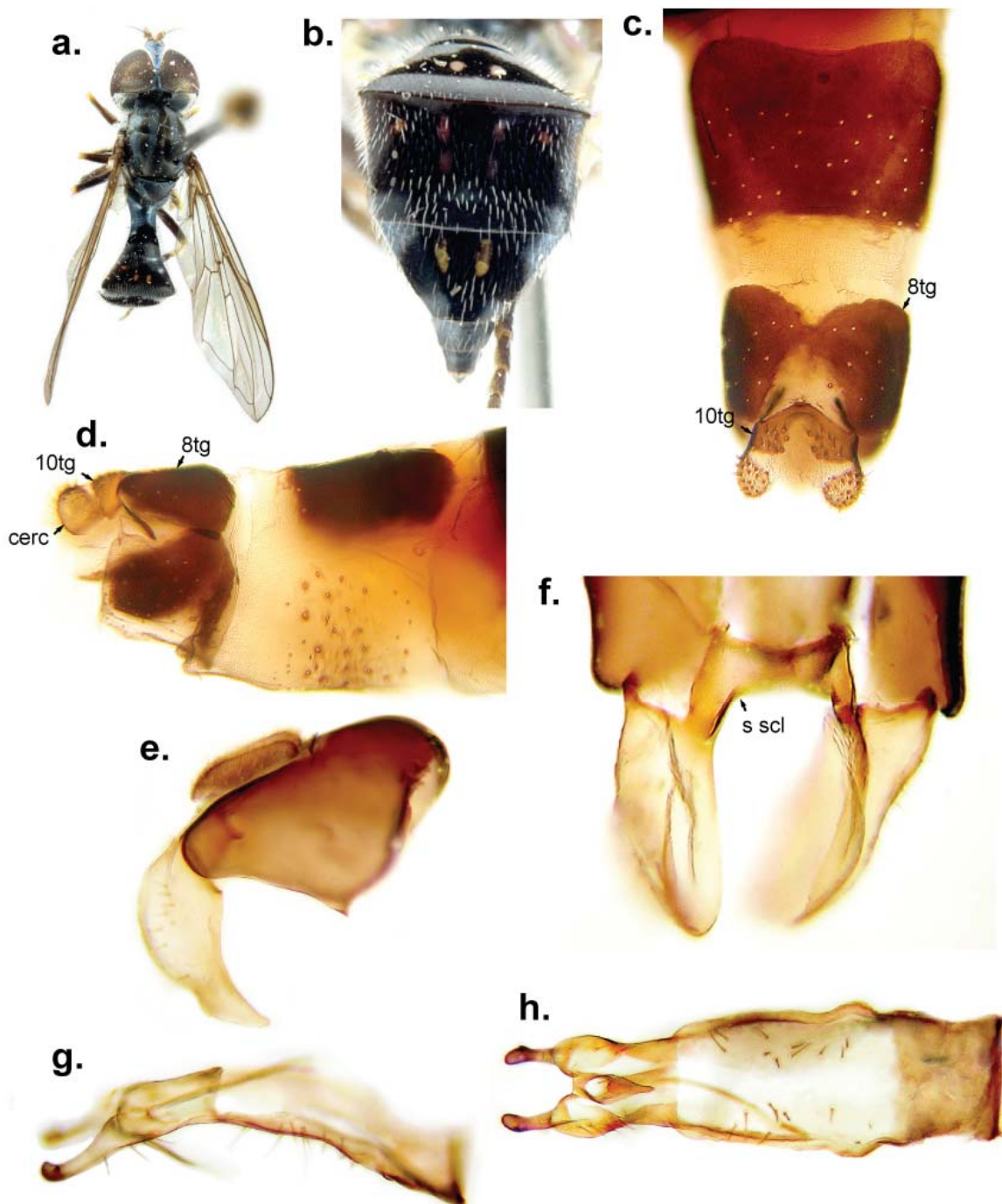


**Plate 40.** *Pelecinobaccha* (*P.*) *transatlantica* (Schiner, 1868). **a-b.** Female genitalia: **a.** Dorsal. **b.** Lateral. **c-f.** Male genitalia: **c.** Epandrium, lateral. **d.** Subepandrial sclerite, ventral. **e.** Hypandrium, lateral. **f.** Hypandrium, ventral. 7tg: 7th tergite, 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus.

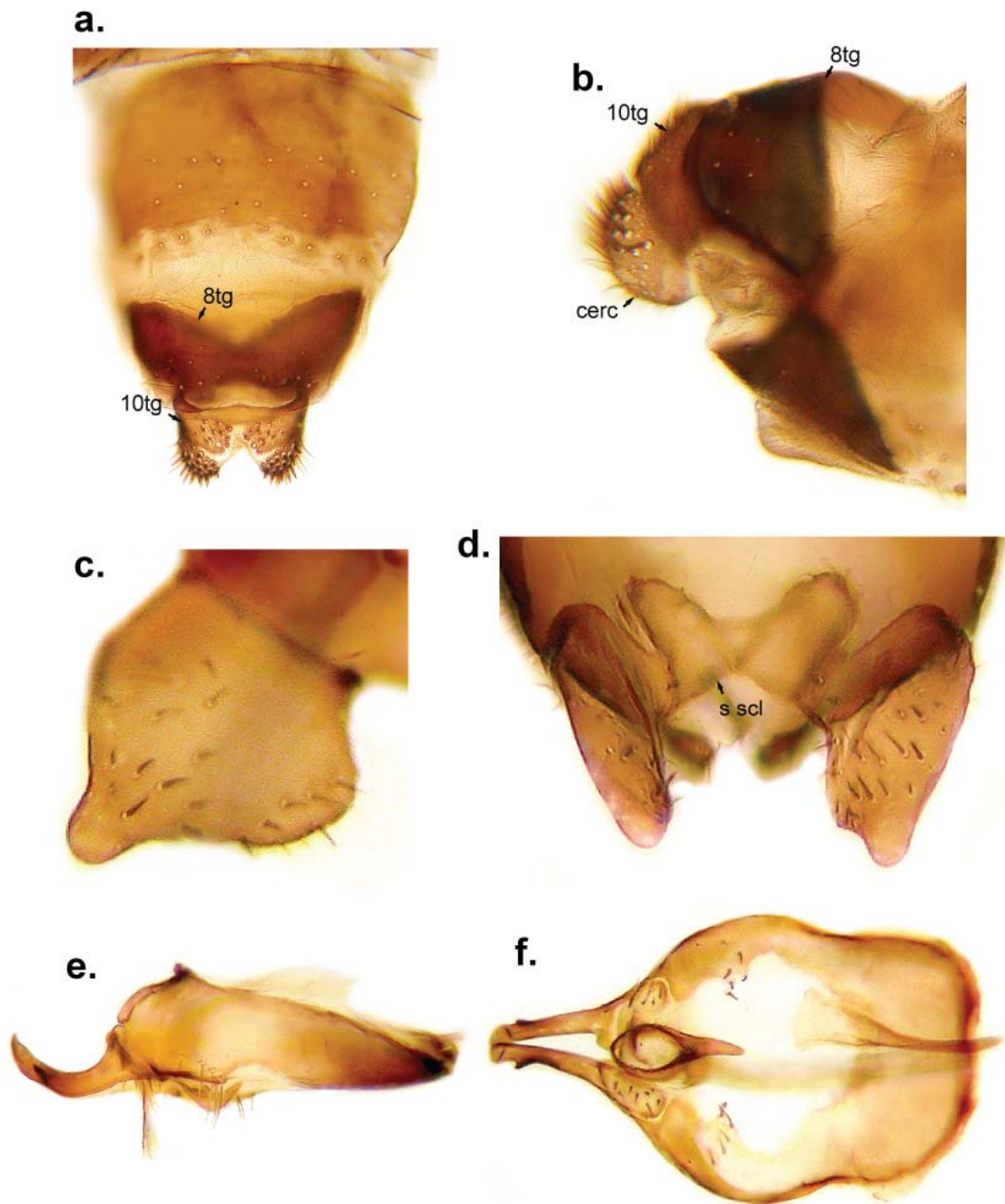


**Plate 41.** Male genitalia. **a-d.** *Pelecinobaccha (P.) unica* sp.nov.: **a.** Epandrium, lateral. **b.** Epandrium, ventral. **c.** Hypandrium, lateral. **d.** Hypandrium, ventral. **e-h.** *Pelecinobaccha (P.) wyatti* sp.nov.: **e.** Epandrium, lateral. **f.** Epandrium, ventral. **g.** Hypandrium, lateral. **h.** Hypandrium, ventral. s scl: subepandrial sclerite.



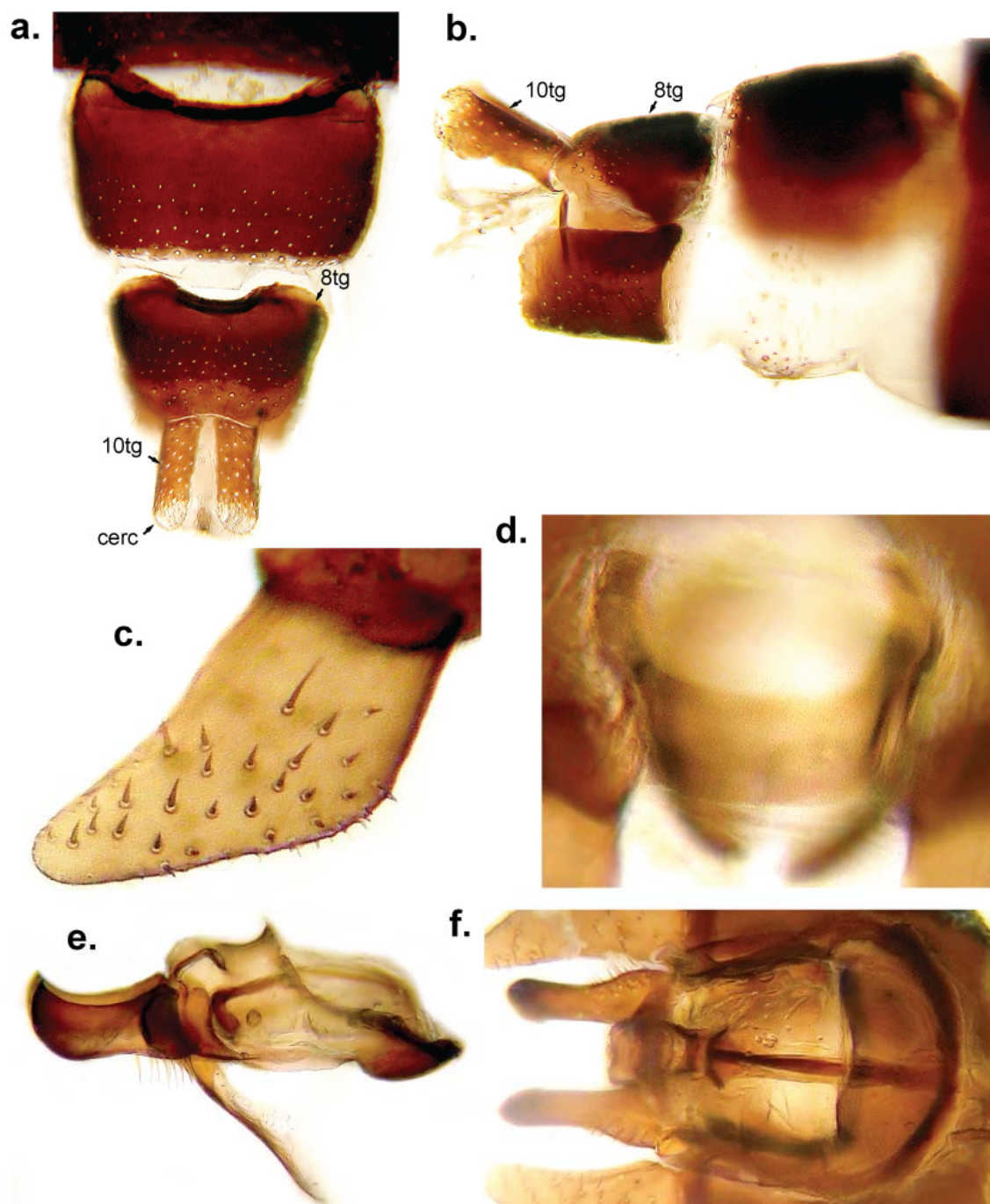


**Plate 42.** *Relictanum adpersitum* sp.nov. **a.** Female, holotype, dorsal. **b.** Abdomen, apex, holotype, dorsal. **c-d.** Female genitalia: **c.** Dorsal. **d.** Lateral. **e-h.** Male genitalia: **e.** Epandrium, lateral. **f.** Epandrium, ventral. **g.** Hypandrium, lateral. **h.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.



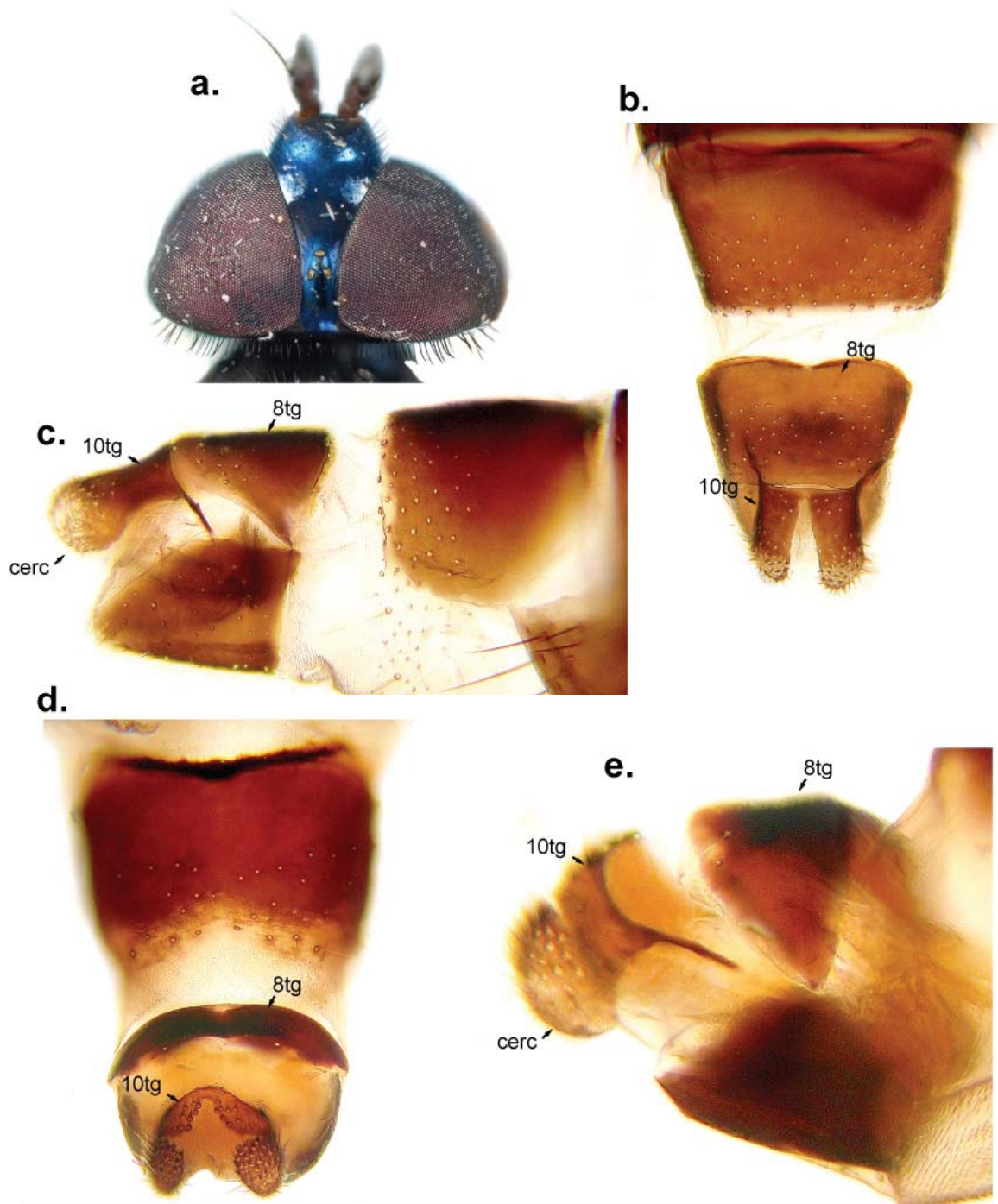
**Plate 43.** *Relictanum braziliensis* (Curran, 1939). **a-b.** Female genitalia: **a.** Dorsal. **b.** Apex, lateral. **c-f.** Male genitalia: **c.** Surstylus, ventral. **d.** Epandrium, ventral. **e.** Hypandrium, lateral. **f.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.



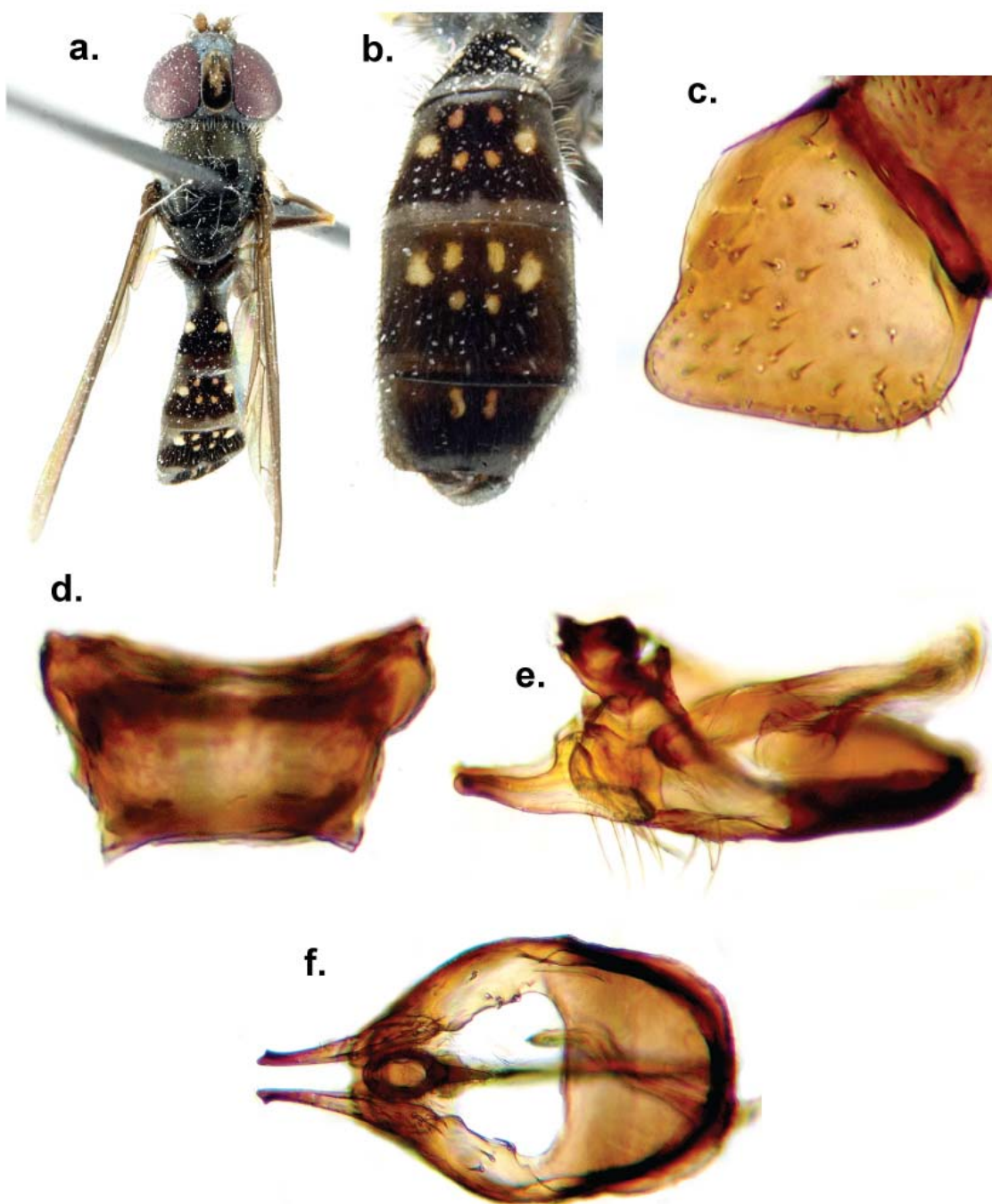


**Plate 44.** *Relictanum crassum* (Walker, 1852). **a-b.** Female genitalia: **a.** Dorsal. **b.** Lateral. **c-f.** Male genitalia: **c.** Surstylus, ventral. **d.** Subepandrial sclerite, ventral. **e.** Hypandrium, lateral. **f.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.

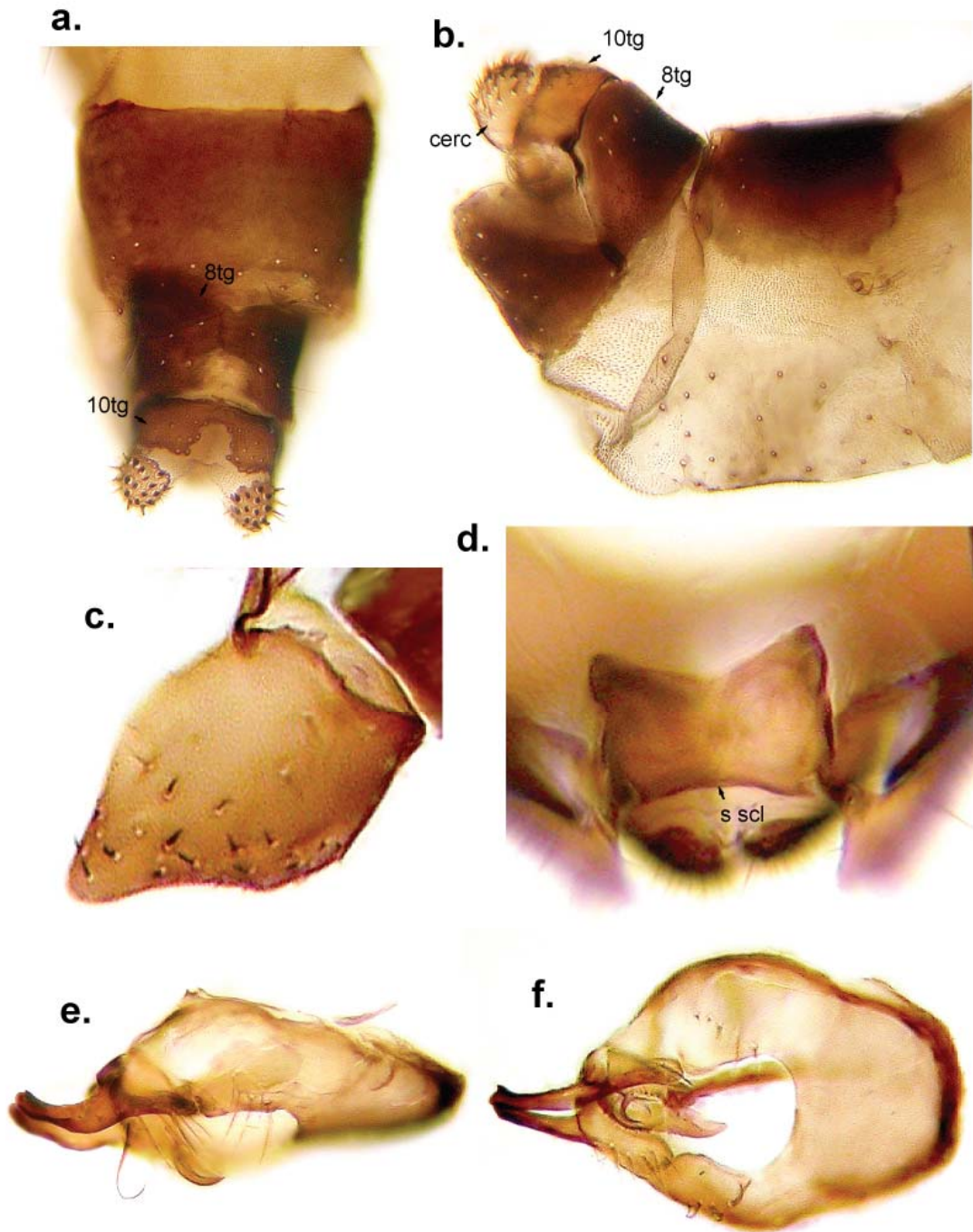




**Plate 45. a-d.** *Relictanum johnsoni* (Curran, 1934), female: **a.** Head, dorsal. **b-c.** Genitalia: **b.** Dorsal. **c.** Lateral. **d-e.** *Relictanum shropshirei* (Curran, 1930), female genitalia: **d.** Dorsal. **e.** Lateral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus.

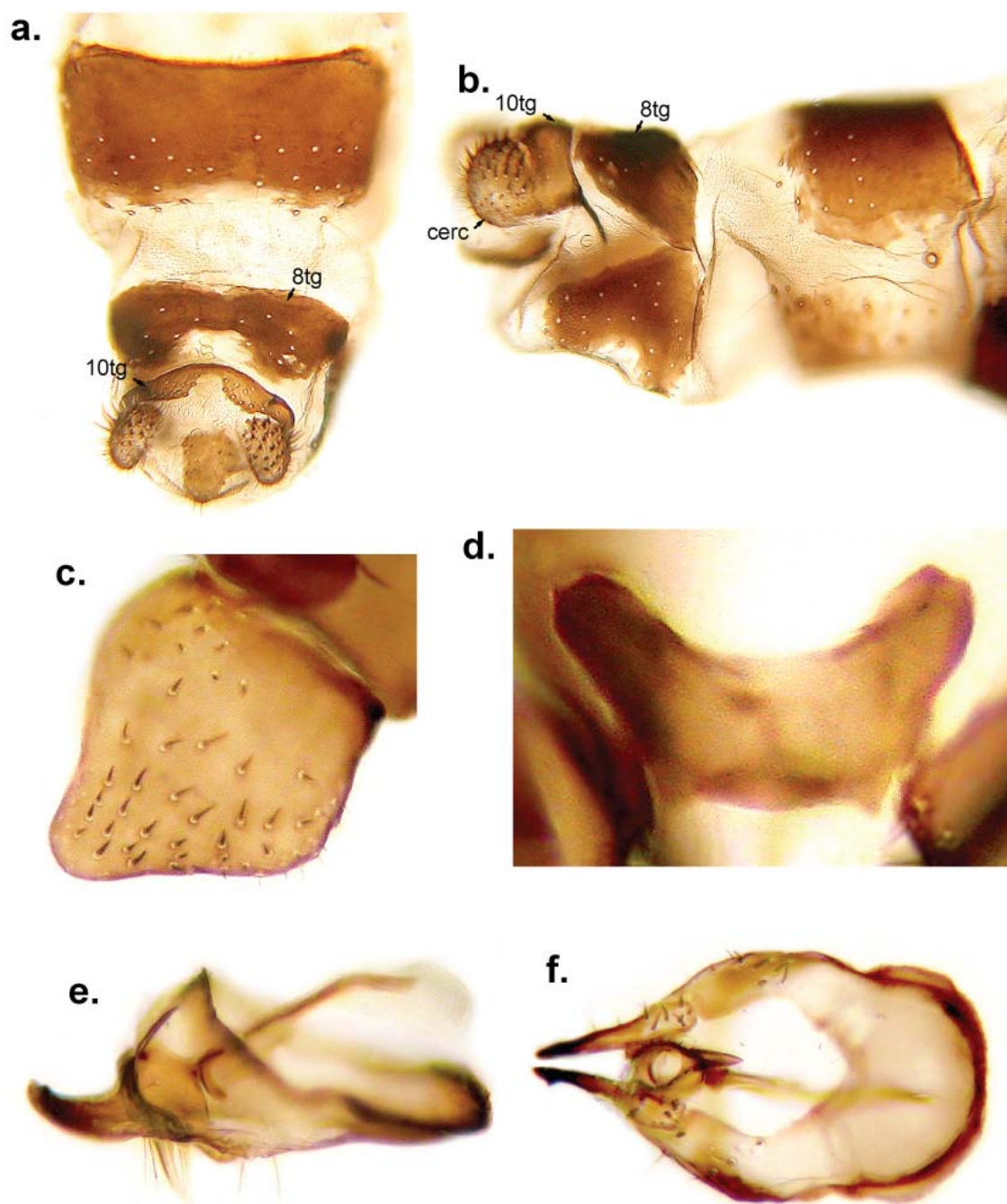


**Plate 46.** *Relictanum magisadpersum* sp.nov., male. **a.** Holotype, dorsal. **b.** Abdomen, apex, holotype, dorsal. **c-f.** Male genitalia: **c.** Surstylus, ventral. **d.** Suepandrial sclerite, ventral. **e.** Hypandrium, lateral. **f.** Hypandrium, ventral.



**Plate 47.** *Relictanum nero* (Curran, 1939). **a-b.** Female genitalia: **a.** Dorsal. **b.** Lateral. **c-f.** Male genitalia: **c.** Surstylus, ventral. **d.** Epandrium, ventral. **e.** Hypandrium, lateral. **f.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus, s scl: subepandrial sclerite.





**Plate 48.** *Relictanum schwarzi* (Curran, 1939). **a-b.** Female genitalia: **a.** Dorsal. **b.** Lateral. **c-f.** Male genitalia: **c.** Surstylus, ventral. **d.** Subepandrial sclerite, ventral. **e.** Hypandrium, lateral. **f.** Hypandrium, ventral. 8tg: 8th tergite, 10tg: 10th tergite, cerc: cercus.

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## Final conclusions

Chapter I reviewed the current knowledge of the nearctic genera of Syrphidae. An interactive photographic key was developed with richly illustrated couplets and will be published in an open-access, online format to improve the identification process and stimulate revisionary studies of the genera. While designing the key to account for all *Ocyptamus* nearctic species, some distinct characters were discovered for the putative monophyletic groups of the genus.

Cladistic analyses in chapter II rendered *Ocyptamus* paraphyletic with regards to *Toxomerus* and *Eosalpingogaster*. However, many natural groups in *Ocyptamus sensu lato* were resolved, with support from both molecular and morphological evidence. To reflect these natural groups, the genus *Ocyptamus* was redefined, new genera were proposed (*Fragosa*, *Hypocritanus*, *Maiana*, *Nuntianus*, *Relictanum* and *Victoriana*) and some genera were resurrected (*Atylobaccha*, *Calostigma*, *Hermesomyia*, *Hybobathus*, *Mimocalla*, *Orphnabaccha*, *Pelecinobaccha*, *Pipuncullosyrphus*, *Pseudoscaeva* and *Styxia*).

Chapter III presented a formal redescription of *Atylobaccha* and *Pelecinobaccha* and a description of *Relictanum*. The species of *Pelecinobaccha* and *Relictanum* were revised. Keys, illustrations of important characters and distribution maps for the species of the three genera were also included.

A new key to the genera previously included in *Ocyptamus* was developed to allow species to be readily assigned to these groups so that species revisions can follow.