Revision of the genus *Rhinoprosopa* (Diptera: Syrphidae)

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Abstract—The New World flower fly genus *Rhinoprosopa* Hull, 1942 (Diptera: Syrphidae) is revised and two new species are described: *R. hulli* Mengual, **new species** (Costa Rica) and *R. zophina* Mengual, **new species** (Costa Rica). Diagnoses, illustrations, synonymies, and distributional data are given for all known species. An identification key to all seven species is also provided.

Résumé—Le genre de syrphes du Nouveau Monde *Rhinoprosopa* Hull, 1942 (Diptera: Syrphidae) est révisé et deux nouvelles espèces sont décrites: *R. hulli* Mengual, **nouvelle espèce** (Costa Rica) et *R. zophina* Mengual, **nouvelle espèce** (Costa Rica). Les diagnostics, illustrations, synonymies et des données de répartition sont donnés pour toutes les espèces connues. Une clé d'identification pour les sept espèces est également fournie.

Introduction

Rhinoprosopa Hull, 1942 (Diptera: Syrphidae) is a small flower fly genus that is distributed in the Neotropics (from Mexico and the West Indies to Peru), and it may occur in the Nearctic Region (Mexico: Durango, Nuevo León) (Thompson *et al.* 1976; Thompson 1999). These flower flies are scarce in collections, but easy to identify by their face greatly produced anteriorly, antennal pits distinctly separated, plumula absent, metasternum glabrous, and abdomen narrowly to strongly petiolate (Mengual *et al.* 2009; Thompson *et al.* 2010). Four of the five known species were originally described as *Rhinoprosopa* (Hull 1937, 1942, 1943a, 1943b, 1947), but species citations in the recent literature have been done under the genus *Allograpta* Osten Sacken, 1875 (see Mengual *et al.* 2009).

Hull (1937) gave an extensive description of his new genus *Oligorhina* Hull, 1937, based on two females of the species *Oligorhina aenea* Hull, 1937. Later, he proposed a new name for his taxon, *Rhinoprosopa* Hull, 1942, as *Oligorhina* was preoccupied in Coleoptera (Hull 1942). In 1943, Hull (1943a) described a new species of *Rhinoprosopa* from Peru, *Rhinoprosopa flavophylla* Hull, 1943. The same year, Hull (1943b) described another species from Ecuador, *Rhinoprosopa lucifer* Hull, 1943. Just a few years later, Hull (1947) described another species of this genus from Costa Rica, *Rhinoprosopa sycorax* Hull, 1947. Later, in his work about New World *Baccha* Fabricius, 1805, Hull provided an identification key for the four species "of large, petiolate flies with triangularly produced or peaked face" (Hull 1949a). Together with the key, Hull (1949a) illustrated the abdomens of the four species of *Rhinoprosopa* and the wing of *R. sycorax*.

In his masterpiece about genera of flower flies, Hull (1949b) diagnosed the genus *Rhinoprosopa* to distinguish it from similar ones, and discussed its affinities to *Baccha* and to his *Epistrophe* Walker, 1852 group (including *Allograpta*). Hull (1949b) also provided illustrations of facial profiles for *R. flavophylla* and *R. aenea*.

Years later, Vockeroth (1973) synonymised *Rhinoprosopa* under *Allograpta* based on adult morphological and male genitalic characters, moving it to the tribe Syrphini. Thompson *et al.* (1976) listed *Rhinoprosopa* under *Allograpta* as a new synonym, although it was already synonymised by Vockeroth (1973). Thompson *et al.* (1976) also changed the gender of *Allograpta lucifera*, and gave

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broader distribution data for *A. nasuta* (Bigot, 1884) and *A. sycorax*. In his revision of the syrphid fauna of the West Indies, Thompson (1981) provided a new description of *A. aenea* based on the paratype.

Vockeroth (1973) also transferred *Sphaerophoria nasuta* Bigot, 1884 to *Allograpta* as he considered this species as part of *Rhinoprosopa*. He also designated *Sphaerophoria nasuta* Bigot, 1888 as a junior synonym of this species. Bigot (1884) described *Sphaerophoria nasuta* based on a male from Mexico. Years later, he described another male of this species, also from Mexico, with the same name (Bigot 1888). Giglio-Tos (1893) synonymised both names under *Baccha*. However, Aldrich (1905) mentioned that there were two different species, and listed *Baccha nasuta* (Bigot, 1884) under *Baccha* and *Sphaerophoria nasuta* Bigot, 1888 under *Sphaerophoria* LePeletier and Serville, 1828. Thompson *et al.* (1976) synonymised both names under *Allograpta nasuta* (Bigot, 1884).

More recently, Thompson *et al.* (2000) described a sixth species of *Rhinoprosopa*, *Allograpta* (*Rhinoprosopa*) *zumbadoi* Thompson, 2000. The new species was quite different from the others, with an abrupt facial tubercle, unique colour pattern, and long, thick pile covering the second tergum in males. Later, Mengual *et al.* (2009) transferred *Allograpta zumbadoi* to a new subgenus, *Allograpta* (*Costarica*) Mengual and Thompson, 2009. Thompson (2012) proposed the new name *Tiquicia* Thompson, 2012 for the subgenus *Costarica* because the later was a junior homonym of a name validated by Koçak and Kemal (2008) for a grasshopper. Thompson (2012) also elevated all subgenera of *Allograpta* to the genus level. Consequently, *Rhinoprosopa* Hull, 1942 is again considered a valid genus.

In this work, I revise the genus *Rhinoprosopa* and describe two new species. I also provide an identification key and illustrate all species of *Rhinoprosopa*.

Materials and methods

Differential diagnoses, synonymies, and distributions are given for all species included in the study. New species are described in full, with terminology following Thompson (1999). An asterisk (*) in the distribution statement means records from the literature or from Systema Dipterorum (Thompson 2013). The codens used for collections follow the standard of the Systema Dipterorum (Thompson 2013), and their equivalents are given below:

AMNH – American Museum of Natural History, New York, New York, United States of America.
CSCA – California State Collection of Arthropods, Sacramento, California, United States of America.
CNC – Canadian National Collections of Insects, Ottawa, Ontario, Canada.
CUIC – Cornell University Insect Collection, Ithaca, New York, United States of America.
DEBU – University of Guelph Insect Collection, Guelph, Ontario, Canada.
INBio – Instituto Nacional de Biodiversidad (INBio), Santo Domingo de Heredia, San José, Costa Rica.
JS – John Smit, personal collection, Utrecht, Utrecht, the Netherlands.
MCZ – Museum of Comparative Zoology, Cambridge, Massachusetts, United States of America.
MZCR – Museo de Zoologia, Universidad de Costa Rica, San José, Costa Rica.
MZH – Finnish Museum of Natural History, Helsinki, Uusimaa, Finland.
OUMNH – Oxford University Museum of Natural History, Oxford, United Kingdom.
RMNH – Naturalis Biodiversity Centre [formerly Rijksmuseum van Natuurlijke Historie], Leiden, South Holland, the Netherlands.
USNM – National Museum of Natural History, Washington, DC, United States of America.
ZFMK – Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Nordrhein-Westfalen, Germany.

In the description of type labels, the contents of each label is enclosed within double quotation (“ ”), italics denote handwriting, and the individual lines of data are separated by a forward slash (/).

All measurements are in mm and were taken using a reticule in a Leica M165 C microscope (Wetzlar, Hesse, Germany). Photographs were composed using the software CombineZP based on images of pinned specimens taken with a Canon EOS40D mounted on a Microptics Camlift (Visionary Digital, Santa Monica, California, United States of America) and the help of Adobe Lightroom (version 4.0) (San Jose, California, United States of America).

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Key to species of *Rhinoprosopa*

1. Alula broad, broader than cell c, almost as broad as cell bm (Figs. 6, 56, 66). 8
— Alula narrow, linear, at most as broad as cell c (Figs. 19, 37). 2

2. Pleura mostly yellow: anepimeron, katatergum, katepimeron, and meron all yellow (Figs. 11, 16, 30, 45). 6
— Pleura darker; some of these sclerites (anepimeron, katatergum, katepimeron, or meron) black (Figs. 21, 39, 41).. 3

3. Facial tubercle absent, in lateral view, facial profile straight or concave (Figs. 7, 23–26). Katatergum and katepimeron dark; anepisternum yellow, katepisternum mostly yellow, and anterior anepimeron yellow (Figs. 21, 22).. 5
— Facial tubercle present, small or large, facial profile convex (Figs. 39, 41, 48). Pleuron darker. 4

4. Tergum 2 with broad, subquadrangular yellow maculae (Figs. 46, 50). Scutellum usually yellow or bronze, not black, sometimes with light yellow fascia anteriorly. Pleuron lighter in colour, with anepisternum, dorsal katepisternum, meron, and katatergum pale yellow, without a clear colour* (Fig. 49). Metaepisternum yellow (Mexico to Ecuador). . . . . *R. nasuta* (Bigot)
*This couplet is due to some darker specimens of *R. nasuta*, which may not properly key out in couplet 2.
— Tergum 2 with narrow, oblique maculae or none (Figs. 4, 37, 39, 41, 42). Scutellum black, sometimes bronze, with contrasting yellow fascia on anterior margin. Pleuron clearly black, except katepisternum with dorsal yellow macula, or without, anterior anepimeron pale yellow, and posterior anepisternum yellow on posterior 1/2. Metaepisternum usually black (Colombia, Costa Rica, Ecuador, Peru, Venezuela). . . . . *R. lucifer* Hull

5. Oral margin notched, produced forward. Dark facial vitta not reaching eye margin dorsally (Figs. 32, 33). Facial profile slightly concave in lateral view (Fig. 33). Metafemur yellow on basal 1/2, metarsi dark (Colombia, Peru, Venezuela). . . . . *R. flavophylla* Hull
— Oral margin not notched, almost straight. Dark facial vitta broad, reaching eye margin dorsally in males, or ocellar triangle in females (Figs. 23–26). Facial profile straight in lateral view (Figs. 21, 22), with a small expansion below antennae (Figs. 24, 26). Metafemur dark, metatarsi yellow (Costa Rica). . . . . *R. hulli* Mengual, new species

6. Frons and frontal triangle with medial broad, black triangular macula (continuation of facial vitta) reaching dorsally the eye margin (in males), or reaching the black area at vertical triangle (in females) (Figs. 47, 48, 51, 52) (Mexico to Ecuador). . . . . *R. nasuta* (Bigot)
— Frons and frontal triangle mostly yellow, densely orange pollinose, with medial black triangular macula not reaching dorsally the eye margin (in males) or medially interrupted, not reaching black area at vertical triangle (in females) (Figs. 12, 15, 32). In females: if dark macula reaches vertical triangle, the width of this vitta about 1/4 as wide as frons width medially (Fig. 34).. 7

7. Facial tubercle present (Figs. 8, 17). Oral margin not notched, almost straight. Scutum black, bronze pollinose (Figs. 10, 18). Abdomen orangish yellow with brown pattern, abdominal yellow maculae or fascia broad (Figs. 10, 18); overall broader, more parallel-sided, tergum 2 as broad as scutellum at posterior margin (West Indies).. . . . . *R. aenea* Hull
— Facial tubercle absent (Figs. 30, 33). Oral margin notched, produced forward. Scutum orange or pale yellow, bronze pollinose (Fig. 31). Abdomen mostly black in background with yellow markings (Figs. 30, 31); narrow, petiolate, tergum 2 narrower than scutellum at posterior margin (Colombia, Peru, Venezuela). . . . . *R. flavophylla* Hull
*Some specimens of *R. flavophylla* are lighter than the holotype and may not properly key out in couplet 2.

8. Face with small tubercle (Figs. 58, 60). Oral margin not notched, almost straight (Figs. 58, 60). Facial black vitta narrow, not extending laterally to oral margin; in female, as wide as the distance between eyes at posterior ocelli level (Figs. 57–60). Notopleuron and area supra-alar mostly yellow pilose (not always) (Colombia, Costa Rica). . . . . *R. sycorax* Hull
— Face without tubercle (Figs. 71, 73). Oral margin notched, produced forward (Figs. 70, 71, 73). Face darker, facial black vitta broader, extending laterally below antennae, making the snout totally dark (Figs. 71, 73). Notopleuron and area supra-alar mostly black pilose (not always) (Costa Rica). . . . . *R. zophina* Mengual, **new species**

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Rhinoprosopa Hull, 1942

Oligorhina Hull, 1937: 30 (preoccupied by Fairmaire and Germain 1863). Type species: *Oligorhina aenea* Hull, 1937 (original designation).

Rhinoprosopa Hull, 1942: 23 (new name for *Oligorhina* Hull, 1937).

Mengual *et al.* (2009) gave a complete diagnosis and a systematic overview of the genus *Allograpta*, including *Rhinoprosopa* as a subgenus. They also included the described species and geographic distribution. The following diagnosis is modified from Mengual *et al.* (2009).

Diagnosis. Face greatly produced anteriorly, with small tubercle or no tubercle, triangular in profile; oral opening about 5.5 times as long as wide, with oral apex greatly extended beyond level of antennal base; antenna short, with scape and basoflagellomere slightly longer than broad; antennal pits distinctly separated; eyes bare, dichoptic. Anterior anepisternum bare; metaepisternum bare; metasternum bare; plumula absent; subscutellar pile fringe absent; wing microtrichose, without apical dark macula; alula present, narrow, linear or broad, at most as wide as cell bm. Abdomen narrowly to strongly petiolate, not emarginated; tergum 2 without long pile in males; male genitalia: superior lobes fused to sternum 9, and aedeagus segmented (Fig. 9).

Natural history. Nothing is known about the immature stages of *Rhinoprosopa* (Thompson *et al.* 2010). Adults have been seen and collected on flowers, and one can assume they feed on pollen and nectar as many other syrphid adults.

Systematics. From the beginning, Hull related his new genus *Rhinoprosopa* with *Baccha* (Hull 1943c), and included it in the tribe Bacchini (Hull 1949a, 1949b). Interestingly, all his species were described in articles with *Baccha* species descriptions (nowadays under the genus *Ocyptamus* Macquart, 1834). Hull (1949b) mentioned *Rhinoprosopa* as example of his "prosotype" concept in Bacchini: species of a group with the most advanced or farthest developed morphological characters (Hull 1949b: 272), but he was doubtful about the closest group of *Rhinoprosopa*: if it was *Baccha* (current *Ocyptamus*) because the bare metasternum and petiolate abdomen, or the closest group was the *Epistrophe* complex (including *Allograpta*), with similar face.

In his superb revision of the tribe Syrphini, Vockeroth (1969) pointed out the similarity between *Allograpta* and *Rhinoprosopa* male genitalia, and suggested convergent evolution in abdominal shape to explain the inclusion in Bacchini. Vockeroth thought *Rhinoprosopa* was derived from an *Allograpta*-like species and that *Rhinoprosopa* was a sister group of some or all of the New World *Allograpta*, but only New World species (Vockeroth 1969, 1973). Although *Rhinoprosopa* differs from *Allograpta* by having a bare metasternum, it also lacks the pile on anterior anepisternum and on metaepisternum (below posterior spiracle) diagnostic of most of Neotropical *Baccha* (current *Ocyptamus*) (Vockeroth 1969).

Vockeroth (1973) synonymised *Rhinoprosopa* under *Allograpta*, and moved the species to Syrphini; a concept followed by Thompson *et al.* (1976) and Thompson (1981, 1999). Thompson *et al.* (2000) considered the species group of *Rhinoprosopa* as a subgenus, from which *Allograpta zumbadoi* Thompson, 2000 derived (currently in the genus *Tiquicia* Thompson, 2012). Mengual *et al.* (2009) recognised six subgenera and two species groups within *Allograpta*. Thompson (2012) elevated all subgenera of *Allograpta* to the generic level, including *Rhinoprosopa*.

Previously, molecular evidence pointed out the high diversity of lineages among the *Allograpta-Sphaerophoria* clade (Mengual *et al.* 2008a, 2008b, 2012) and the need to recognise this diversity. Mengual *et al.* (2008a) resolved *Sphaerophoria* into the *Allograpta* clade, *Allograpta* as a paraphyletic group and the subgenus *Fazia* Shannon, 1927 in a different clade. Mengual *et al.* (2008b, 2012) found that *Tiquicia* (as subgenus *CR* or *Costarica*), *Antillus* Vockeroth, 1969, *Rhinoprosopa*, and part of *Fazia* were grouped together as a sister group of *Allograpta* + *Fazia* in part + *Sphaerophoria* + *Exallandra* Vockeroth, 1969. It was evident that the concept of *Allograpta* of Vockeroth (1969, 1973) was paraphyletic.

Geographical distribution. *Rhinoprosopa* is a New World genus, which ranges from Mexico (including some Nearctic parts such as Durango and Nuevo León) to Peru, Ecuador, Colombia Venezuela, and the West Indies (Hispaniola, Cuba).

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Remarks. *Rhinoprosopa* comprises seven species in total, two new species described here. However, there might be more species in this genus. Vockeroth (1969, 1973) mentioned three males of "an apparently undescribed species from Ecuador", but I could not find those specimens in the CNC.

There are no species groups designated within *Rhinoprosopa*, and male genitalia among species show insignificant differences. *Rhinoprosopa* species have male genitalia as in Figure 9, with inconspicuous differences in surstylus shape. Nonetheless, one can find some similarities among different species: presence/absence of facial tubercle, light/dark pleura, or size of alula.

Rhinoprosopa aenea (Hull, 1937)

(Figs. 1, 2, 8, 10–18, 34)

Oligorhina aenea Hull, 1937: 31. Type Locality: Haiti, Mt. La Hotte, Desbarrière (holotype female, MCZ, original designation).

Baccha aenea: Fluke 1956 (catalogue citation, misidentified in part).

Rhinoprosopa aenea: Hull 1942 (new combination); Hull 1943a (citation); Hull 1943b (citation); Hull 1943c (key); Hull 1949a (key, figs.); Hull 1949b (figs.); Fluke 1957 (catalogue citation); Vockeroth 1969 (citation).

Allograpta aenea: Vockeroth 1973 (studied material); Thompson *et al.* 1976 (catalogue citation); Thompson 1981 (redescription, citation, key); Thompson *et al.* 2000 (key); Mengual *et al.* 2008a (list); Mengual *et al.* 2008b (list); Mengual *et al.* 2009 (figs., list).

Allograpta sp. 5: Mengual *et al.* 2008b (DNA voucher XP145).

Differential diagnosis. Species very distinct, with abdominal maculae large, mostly joined medially. Abdomen largely orange, yellow pleuron and narrow alula. It differs from *R. flavophylla* by the facial tubercle (absent in *R. flavophylla*), oral margin straight, and abdominal maculae larger.

Length (4): body, 10.0–13.0 (12.0) mm; wing, 9.0–10.0 (9.5) mm.

Distribution: Cuba, Hispaniola, West Indies*.

Material examined. Holotype, female, "Desbarriere/Mt. La Hotte/nr 4000 ft./Oct. 12-14" "Haiti/1934/Darlington" "M.C.Z./Type/*22468*" [red] "*Oligorhina/aenea/Hull*" [white, red, margin] "Jan.-July 2003/MCZ Image/Database" "MCZ-ENT/00022468" [barcode] (MCZ). **Paratype**, female, "Desbarriere/Mt. La Hotte/nr 4000 ft. /Oct. 12-14" "Haiti/1934/Darlington" "*PARATYPE/aenea/Hull*" [orange] "PARATYPE/*Oligorhina/aenea Hull*/CNC No. *19262*" (CNC).

Additional material. CUBA: Granma, Pico Turquino, N. side, 4500-6000 ft., 18-20.vi.1936, Darlington (1 ♀, CNC; #186417). **DOMINICAN REPUBLIC**: Independencia Prov., road from El Aguacate to Puerto Escondido, sitio de flores, 13.viii.2006, D. Perez, voucher specimen MZH_XP145 (1 ♀, ZFMK); Independencia Prov., Sierra de Neiba, Los Bolos, on way down from cloud forest, ~1300 m., 9.vii.2003, D. Perez, R. Bastardo, B. Hierro (day) (1 ♂, ZFMK; USNM ENT 00038316); Independencia Prov., RD-110 ~100 m up from El Sitio del Agua, cloud forest, 1520 m., 18º39.339'N 71º39.279'W, 27.iii.2003, D. Perez, R. Bastardo, B. Hierro (day) (1 ♀, USNM; USNM ENT 00038315); La Vega Prov., P.N. Armando Bermúdez, RD-255 La Compartición - Pico Duarte, 2450-3087 m., 1.vii.2004, D. Perez (2 ♀, USNM; USNM ENT 00038325, USNM ENT 00038326); La Vega Prov., P.N. Armando Bermúdez, RD-256 La Compartición - Los Tablones, 2450-1110 m., 3.vii.2004, D. Perez (1 ♀, USNM; USNM ENT 00038328); La Vega Prov., P.N. Armando Bermúdez, RD-251 Los Tablones - La Laguna, 1270-1980 m., 30.vi.2004, D. Perez (2 ♂ 2 ♀, USNM; USNM ENT 00038320, USNM ENT 00038321, USNM ENT 00038323, USNM ENT 00038324); La Vega Prov., P.N. Armando Bermúdez, RD-253 Trail Agüita Fría - La Compartición, 2450-2650 m., 1.vii.2004, D. Perez (3 ♂ 1 ♀, USNM; 1 ♀, ZFMK; USNM ENT 00038322, USNM ENT 00038318, USNM ENT 00038319, USNM ENT 00038327, USNM ENT 00038329); La Vega Prov., Reserva Científica Ébano Verde, RD-150 Trail Loma La Golondrina - La Sal, 12.vii.2003, D. Perez, R. Bastardo, B. Hierro (3 ♀, USNM; USNM ENT 00038308, USNM ENT 00038309, USNM ENT 00038310); La Vega Prov., Reserva Científica Ébano Verde, RD-151 La Sal, 1043 m., 19º04.101'N 70º34.089'W, 12.vii.2003, D. Perez, R. Bastardo, B. Hierro (night) (1 ♂ 1 ♀, USNM; USNM ENT 00038314, USNM ENT 00038311); La Vega Prov., Reserva Científica Ébano Verde, RD-023 Loma Casabito, 1390 m., 340-522 mE 2106-146 mN, 31.i.2002, R. Bastardo, B. Hierro,

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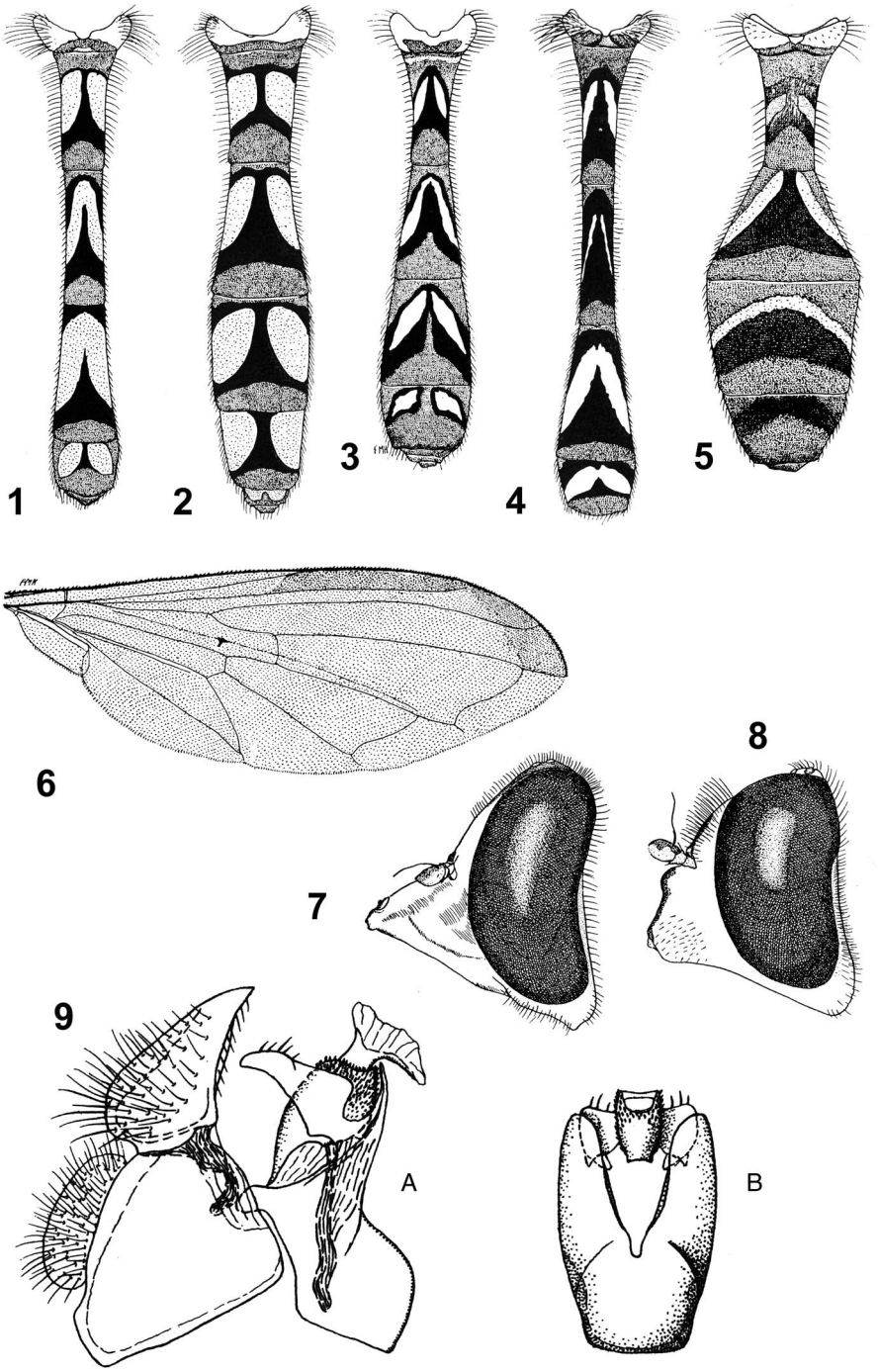
Fig. 1–9. Abdomen, dorsal view of: 1, *Rhinoprosopa aenea*, male; 2, *Rhinoprosopa aenea*, holotype female; 3, *Rhinoprosopa flavophylla*, holotype female; 4, *Rhinoprosopa lucifer*, paratype male; 5, *Rhinoprosopa sycorax*, holotype female. 6. *Rhinoprosopa sycorax*, wing, holotype female. Head, lateral view of: 7, *Rhinoprosopa flavophylla*, holotype female; 8, *Rhinoprosopa aenea*, male. 9. *Rhinoprosopa nasuta*: a, male genitalia, lateral view; b, stenum 9, superior lobes and aedeagal base, ventral view. (Figs. 1–6 from Hull 1949a; Figs. 7–8 from Hull 1949b; Fig. 9 from Vockeroth 1973).



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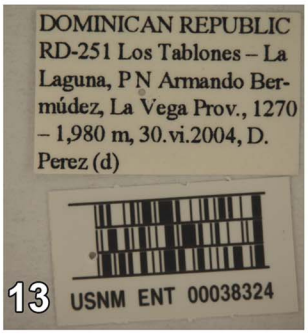
Figs. 10–18. *Rhinoprosopa aenea*, female: 10, dorsal view; 11, lateral view; 12, frontal view; 13, labels. *Rhinoprosopa aenea*, male: 14, labels; 15, frontal view; 16, lateral view; 17, frontolateral view of head; 18, dorsal view.



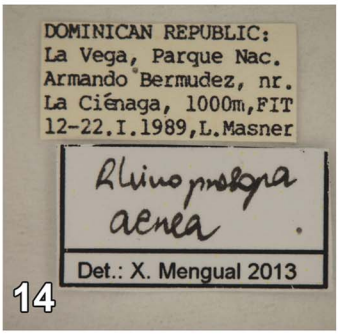


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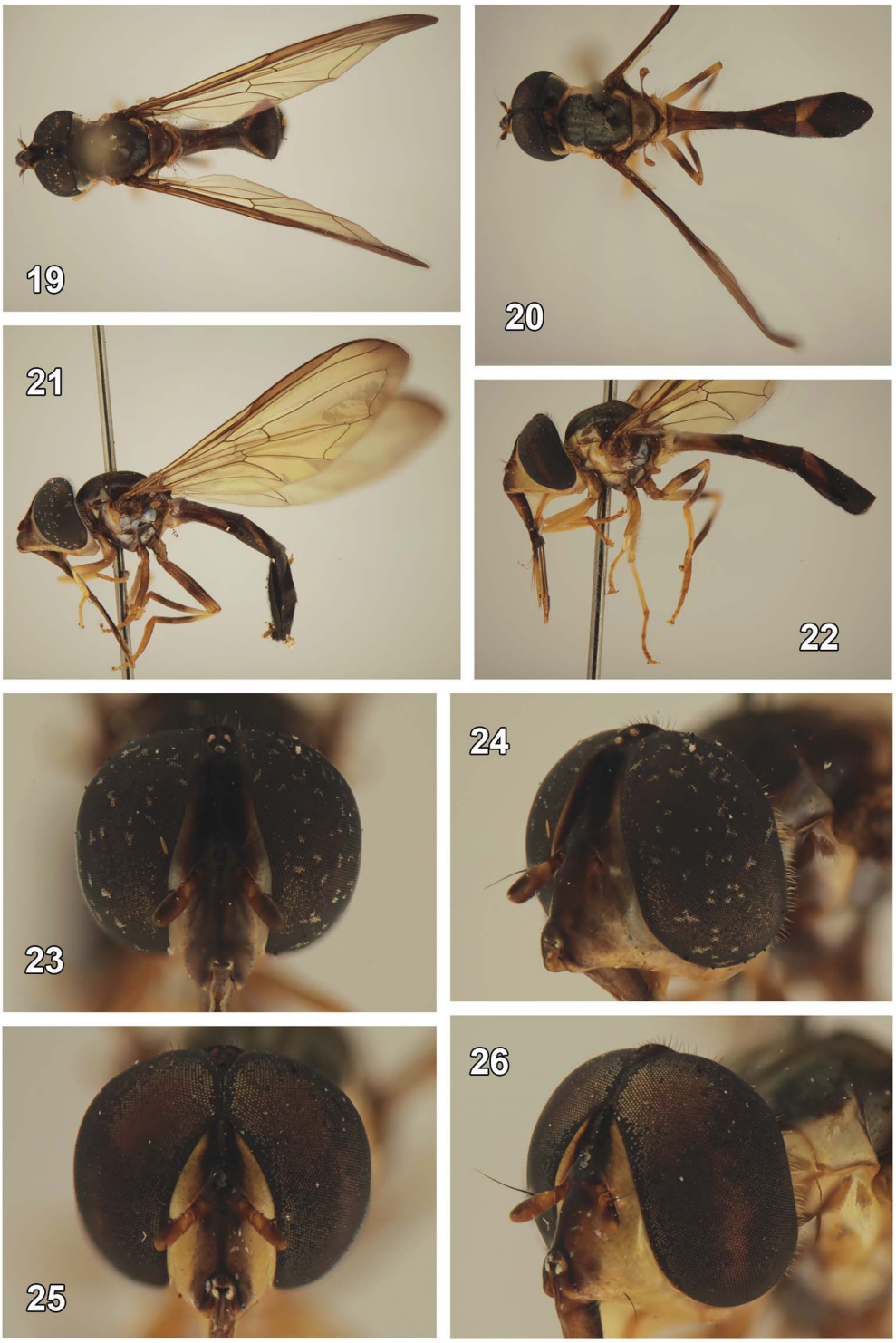
Fig. 19–26. *Rhinoprosopa hulli*: 19, paratype female, dorsal view; 20, holotype male, dorsal view; 21, paratype female, lateral view; 22, holotype male, lateral view; 23, paratype female, frontal view; 24, paratype female, frontolateral view of head; 25, holotype male, frontal view; 26, holotype male, frontolateral view of head.



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D. Perez (2 ♀, USNM; USNM ENT 00038312, USNM ENT 00038313); La Vega Prov., Reserva Científica Ébano Verde, RD-177 El Arroyazo, 25-26.xi.2003, D. Perez, R. Bastardo (1 ♀, USNM; USNM ENT 00038317); La Vega Prov., P.N. Armando Bermúdez, nr. La Ciénaga, 1000 m., 12-22.i.1989, L. Masner (1 ♂, ZFMK); La Vega Prov., P.N. Armando Bermúdez, subida Pico de la Cotorra, 5.xi.2012, D. Perez, C. Ramírez (1 ♀, ZFMK).

Remarks. Here there is incongruence: Hull originally described *R. aenea* from two females (Hull 1937), but the illustration from the paratype (Hull 1949a) is a male abdomen, which is confirmed and noted in the text (Hull 1949a: 222, 223; fig. 147). The paratype belongs to the Hull's collection (currently at CNC), and it is a female. Thus, the drawing of the male abdomen is not from the paratype.

Mengual *et al.* (2008b) published the specimen DNA voucher XP145 as *Allograpta* sp. 5 (GenBank accession numbers EU241731, EU241778, and EU241829). After its re-study, this specimen is clearly identified as *Rhinoprosopa aenea* and it was collected in Dominican Republic, instead of Costa Rica as originally stated.

Rhinoprosopa flavophylla Hull, 1943

(Figs. 3, 7, 29–33)

Rhinoprosopa flavophylla Hull, 1943: 139. Type Locality: Peru, Perené Valley, El Campamiento (holotype female, CUIC, original designation). Hull 1943c (key); Hull 1949a (key, figs.); Hull 1949b (figs.); Fluke 1957 (catalogue citation).

Allograpta flavophylla: Vockeroth 1973 (list); Thompson *et al.* 1976 (catalogue citation); Thompson *et al.* 2000 (key); (list); Mengual *et al.* 2009 (list); Montoya *et al.* 2012 (list, distribution).

Differential diagnosis. Species with narrow alula and pleuron dark posteriorly, with yellow markings on anepisternum, katepisternum and anepimeron. Scutellum yellow, although sometimes difficult to assess. This species has no facial tubercle protruding in lateral view as in *R. aenea*, *R. nasuta*, or *R. lucifer*, but the face is perfectly smooth, round as in *R. zophina*. *Rhinoprosopa hulli* has no facial tubercle, but a little facial expansion can be distinguished in dorsal view, and the facial profile is a bit convex laterally.

Length (2): body, 12.0–12.5 (12.3) mm; wing, 11.0–11.5 (11.3) mm.

Distribution: Colombia*, Peru, Venezuela.

Redescription. Male. *Head.* Face produced anteriorly, triangular in profile, shorter in length than eye width, without tubercle, yellow with medial dark vitta from oral margin to antennal bases and continues dorsally, scarcely black pilose; oral margin notched, protruding laterally beyond the clypeus; gena yellow, black pilose; lunule black; frons yellow with a triangular medial black macula (continuation of the facial vitta), which does not reach the eye margin, scarcely black pilose; vertical triangle black, black pilose; antenna orangish yellow, black pilose, basoflagellomere brown dorsally; arista brown, bare; eye bare; occiput black on dorsal 2/3, grey pollinose, yellow on ventral 1/3, yellow pilose on ventral 2/3 and black pilose on dorsal 1/3.

Thorax. Scutum orangish yellow, darker medially, copper pollinose, yellow and black pilose, mostly black pilose; postpronotum yellow, bare; notopleuron yellow, yellow pilose; supraalar area and postalar callus dark pilose; scutellum dark yellow, lighter basally, dark pilose, subscutellar fringe absent. Pleuron yellow, orangish brown posteriorly, yellow pilose; metasternum bare; calypter yellow with black margin; halter dark brown; posterior spiracular fringes yellow. *Wing*. Wing membrane yellow, darker anteriorly and apically, entirely microtrichose; alula narrow, narrower than cell bm. *Legs*. Proleg and mesoleg yellow, tarsi slightly darker, black and yellow pilose; metafemur yellow on basal 1/2–2/3, black on apical 1/3–1/2, metatibia and metatarsus black.

Abdomen. Strongly petiolate, not emarginated, black pilose. Tergum 1 yellow, black posteriorly; tergum 2 black, lighter basally, with two subquadrangular, oblique yellow maculae, which may join medially; tergum 3 black, with similar maculae; tegum 4 dark with an inverted V-shaped fascia, thinner than the maculae in terga 2 and 4; tergum 5 dark, with a similar inverted V-shaped fascia but broader; sterna yellow, black pilose.

Material examined. Holotype, female, "El Campamiento/Col. Perene, Peru/21 June '20/ Cornell Univ. Exp." "HOLOTYPE/Cornell U./No. *2246*" [red] "*Holotype*/*flavophylla*" [red] "♀ HOLOTYPE/*Rhinoprosopa*/*flavophylla*/*Hull*" [white, left margin red] (CUIC).

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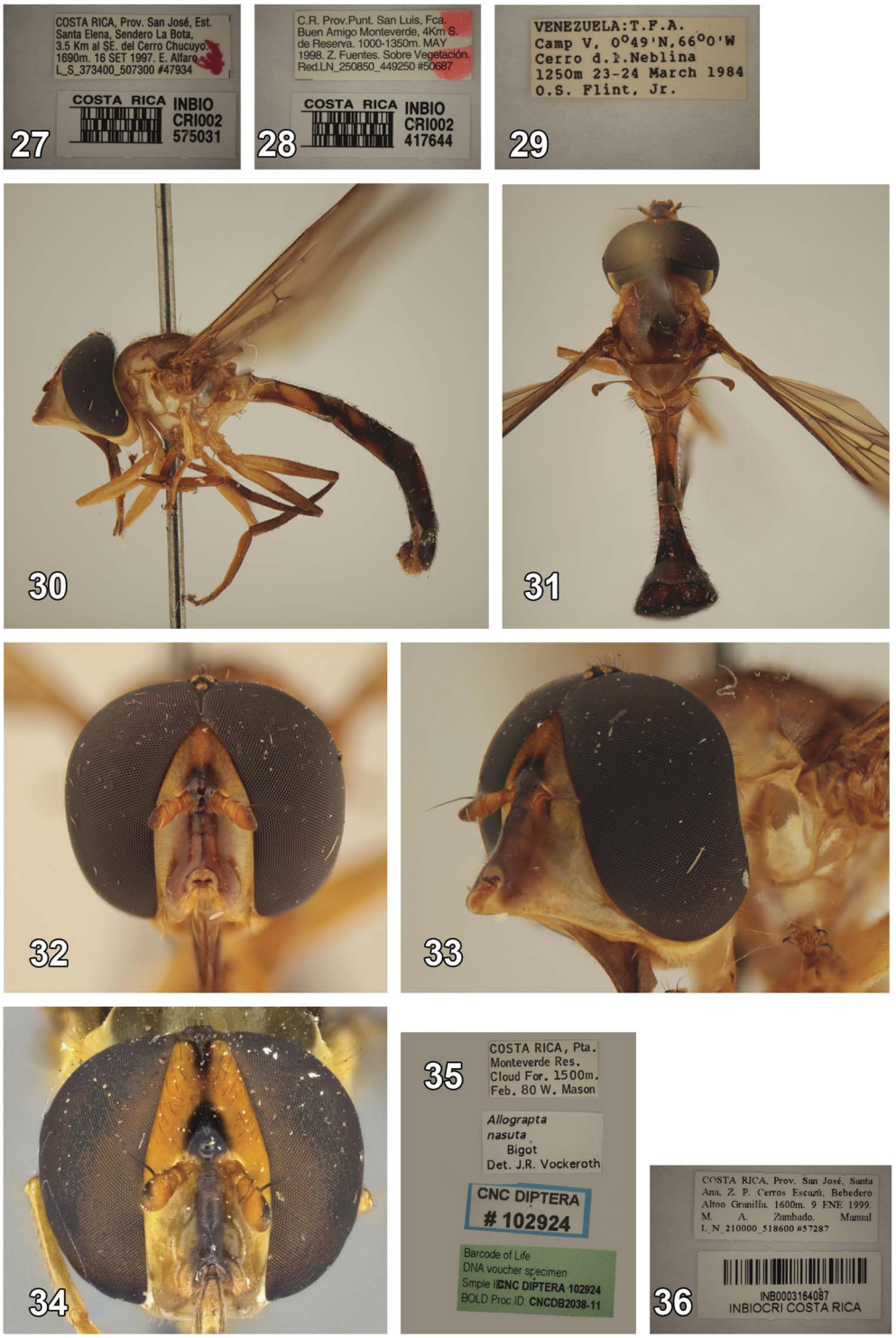
Fig. 27–36. *Rhinoprosopa hulli*: 27, holotype male, labels; 28, paratype female, labels. *Rhinoprosopa flavophylla*, male: 29, labels; 30, lateral view; 31, dorsal view; 32, frontal view; 33, frontolateral view of head. 34. *Rhinoprosopa aenea*, paratype female, frontal view. *Rhinoprosopa nasuta*, labels: 35, male; 36, female.



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Additional material. PERU: Huanuca, Tingo Maria, U.N.A.S., 18.ii.1972, L. Schuster, on flower of *Campelia zanonia* (Comelinaceae) (1 ♂, USNM; USNM ENT00036290). **VENEZUELA**: Amazonas State, Cerro de la Neblina, T.F.A., Camp V, 1250 m., 0°49'N 66°0'W, 23-24. iii.1984, O.S. Flint, Jr (1 ♂, USNM; 1 ♂, ZFMK; USNM ENT00890770, USNM ENT00890787).

Remarks. Specimens from Costa Rica identified as *R. flavophylla* belong mostly to *Rhinoprosopa hulli*. To avoid further confusion, a male from Venezuela was used for the redescription.

The two male specimens from Venezuela are lighter than the holotype (scutum pale orange, katatergum and katepimeron dark orange), but the head shape, oral margin, and overall morphology are similar. These males have the pleuron not clearly darkened and may key out incorrectly in couplet 2. For this reason, this species appears twice in the key.

Rhinoprosopa hulli Mengual, new species

(Figs. 19–28)

Differential diagnosis. Species similar to *R. flavophylla*, but it has the oral margin straight, not notched, a broad, dark facial vitta reaching eye margin dorsally in males, and metatarsi yellow. It differs from *R. lucifer* by having the metafemur dark, pale yellow on apical 1/6 or less, and the metabasitarsomere yellow. It has no clear facial tubercle, but face is not smooth and round medially as in *R. flavophylla* or *R. zophina*.

Type locality. Costa Rica, San José Prov., Estación Santa Elena, Sendero La Bota, 3.5 km al SE del Cerro Chucuyo, 1690 m.

Etymology. This new species is named after Frank Montgomery Hull (1901–1982), for his enormous contribution to Dipterology. Species epithet to be treated as a noun in the genitive case.

Description. Male. *Head.* Face produced anteriorly, triangular in profile, without clear tubercle but a little expansion below antennae, yellow with broad, medial black vitta from oral margin to antennal bases and continues dorsally to eye margin, scarcely yellow pilose with a few black pile; oral margin not notched; gena yellow, yellow pilose; lunule black; frons yellow with a medial black vitta (continuation of the facial vitta), scarcely black pilose; vertical triangle black, pollinose, black pilose; antenna orangish yellow, black pilose, basoflagellomere brown, lighter basally; arista brown, bare; eye bare; occiput black on dorsal 2/3, grey pollinose, yellow on ventral 1/3, yellow pilose on ventral 2/3 and black pilose on dorsal 1/3.

Thorax. Scutum black, yellow laterally, grey pollinose, yellow pilose; postpronotum yellow, bare; notopleuron and postalar callus yellow, yellow pilose; scutellum yellow, grey pollinose, dark pilose with two long, black setulous pile, subscutellar fringe absent. Pleuron yellow anteriorly, black posteriorly: anatergum, katatergum, katepimeron, meron, and metaepisternum black, yellow pilose; metasternum bare; calypter yellow with black margin; halter yellow; posterior spiracular fringes yellow. *Wing*. Wing membrane yellow, darker anteriorly and apically, entirely microtrichose; alula narrow, as narrow as costal cell. *Legs*. Proleg and mesoleg yellow, black and yellow pilose; metafemur dark, yellow on apical 1/6; metatibia dark, yellow on basal 1/3–1/2; metatarsus yellow.

Abdomen. Strongly petiolate, not emarginated, black pilose. Tergum 1 yellow, black posteriorly; tergum 2 black, with two lateromedial, linear, oblique yellow maculae, which may be diffuse; tergum 3 black, with two oblique yellow maculae, which may join medially; terga 4 and 5 dark; sterna light, black pilose.

Female. Similar to male except for normal sexual dimorphism.

Variation. There is a very dark female from Cordillera de Tilarán (Costa Rica), which has oblique maculae on tergum 2 (although very diffuse), but the rest of the abdomen appears black.

Some other specimens may have the metafemur pale yellow on the basal 1/3 (Figs. 20, 22). Others may have the ventral part of the katepisternum and anterior anepisternum darker.

Length (4): body, 11.0–13.0 (12.2) mm; wing, 9.0–11.0 (10.5) mm.

Distribution: Costa Rica.

Material examined. Holotype, male, pinned, deposited at the Instituto Nacional de Biodiversidad (INBio), Santo Domingo de Heredia, Costa Rica. Original labels: "COSTA RICA, Prov. San José, Est./Santa Elena, Sendero La Bota,/3.5 Km al SE. del Cerro Chucuyo,/1690 m. 16 SET 1997. E. Alfaro/L_S_373400_507300

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#47934" "COSTA RICA INBIO/CRI002/575031" [barcode] "HOLOTYPE/*Rhinoprosopa/hulli/ Mengual 2013*" [red, handwritten except first line]. **Paratypes:** "PARATYPE/*Rhinoprosopa/hulli/ Mengual 2013*" [yellow], **COSTA RICA**: San José Prov., Est. Santa Elena, Sendero La Bota, 3.5 km al SE del Cerro Chucuyo, 1690 m., L_S_373400_507300, 18.iii.1997, M. Segura #45358 (1 ♂, USNM; INBIO CRI002535942); San José Prov., Est. Las Nubes de Santa Elena, Fca de Olman Bonilla, 1450 m., L_S_372500_507700, 1. x.1995, A. Picado #6310 (1 ♀, INBio; 1 ♀, ZFMK; INBIO CRI002328785, INBIO CRI00328783); Puntarenas Prov., San Luis, Fca. Buen Amigo Monteverde, 4 km S de Reserva, 1000-1350 m., LN_250850_449250, v.1998, Z. Fuentes, sobre vegetación #50687 (1 ♀, USNM; INBIO CRI002417644); Puntarenas Prov., Cordillera de Tilarán, Monteverde Biol. stat., 1782 m., 10°19'31.7''N 84°48'07.6''W, 14-18.viii.2010, M. Reemer & J.T. Smit (1 ♀, ZFMK); Heredia Prov., 16 km SSE La Virgen, 1050-1150 m., 10-16.iii.2001, M.A. Zumbado, LN-250000, 527100 (1 ♂, ZFMK; 1 ♂, INBio; INBIOCRI INB0003910642, INBIOCRI INB0003910643).

Remarks. Most of the studied specimens were identified as *R. flavophylla* mainly because until now it was the only known species without a clear facial tubercle. *Rhinoprosopa flavophylla* has a different facial profile, with the oral margin notched, but it has a little expansion, which is not a facial tubercle.

Rhinoprosopa lucifer Hull, 1943

(Figs. 4, 37–44)

Rhinoprosopa lucifer Hull, 1943: 216. Type Locality: Ecuador, Piñas (holotype male, AMNH, original designation). Hull 1947 (citation); Hull 1943c (key); Hull 1949a (key, figs.); Fluke 1957 (catalogue citation).

Allograpta lucifer: Vockeroth 1973 (list); Thompson *et al.* 2000 (key).

Allograpta lucifera: Thompson *et al.* 1976 (catalogue citation); Mengual *et al.* 2008b (list); Mengual *et al.* 2009 (list); Montoya *et al.* 2012 (list, distribution).

Allograpta aenea: Mengual *et al.* 2008b (DNA voucher XP79).

Allograpta flavophylla: Mengual *et al.* 2012 (DNA voucher XP79).

Allograpta sycorax: Mengual *et al.* 2008b (DNA voucher XP147).

Differential diagnosis. This species is difficult to distinguish. Scutellum mostly black or dark grey, posterior half of the pleuron dark, metaepisternum usually black, with small facial tubercle. It differs from *R. nasuta* by the thin, oblique abdominal maculae on tergum 2.

Length (4): body, 11.5–13.0 (12.2) mm; wing, 10.0–10.5 (10.3) mm.

Distribution: Colombia, Costa Rica, Ecuador, Peru, Venezuela.

Material examined. Holotype, male, "Piñas, Ecuad/1600 meters" "25-VII-41/D.B, Laddey" "Holotype/lucifer" [red] "Baccha/(Rhinoprosopa)/ lucifer Hull" (AMNH).

Additional material. COLOMBIA: Valle del Cauca, San Antonio, Cerro La Horqueta, 76° 37'60" W 3°29'14"N, 24.ii.2006, B.J. & F.C. Thompson (1 ♀, USNM; USNM ENT00035864). **COSTA RICA**: INBio code: 3439, voucher specimen MZH_XP147 (1 ♀, ZFMK); Limón Prov., P. INt. La Amistad, Valle del Silencio, Sendero Circular, 2450 m., L_S_340258_577465, 28. ix.2003, D. Rubí #75712 (1 ♂, USNM; INBIO INB003788082); Limón Prov., P. INt. La Amistad, Valle del Silencio, Sendero Circular, 2450 m., L_S_340258_577465, 20-22.ix.2003, D. Rubí #75039 (1 ♀, USNM; INBIO INB003757508); Limón Prov., P. INt. La Amistad, Valle del Silencio, Sendero al Jardín Natural, 2400 m., L_S_341290_577409, 4.x.2003, R. Delgado #75045 (1 ♀, USNM; INBIO INB003757828); Cartago Prov., P.N. Tapantí, Site 2. 11.i.2005, 1500 m., G. Ståhls, voucher specimen MZH_XP79 (1 ♂, ZFMK); Cartago Prov., P.N. Tapantí-Macizo de la Muerte, Rancho Negro, 1700–1900 m., L_N_186158_560971, 12. iii.2002, M. Alfaro #67219 (1 ♀, USNM; INBIO INB003440475); Cartago Prov., P.N. Tapantí, 1650–1750 m., 1.x.1999, Marshall & Buck (1 ♀, DEBU; debu00107425); Cartago Prov., Alto El Roble, 2200 m., L_N_189900_552200, 20. x.2002, M. Alfaro, red de golpe #71712 (1 ♀, USNM; INBIO INB003543305); Cartago Prov., R. Grande de Orosi, desde Puente R. Dos Amigos hasta la Represa, 1400–1800 m., L_N_186600_562000, 1-11.ii.1996, R. Delgado #6948 (1 ♀, USNM; INBIO CRI002395431); Cartago Prov., Sendero Rancho Negro, 1580 m.,

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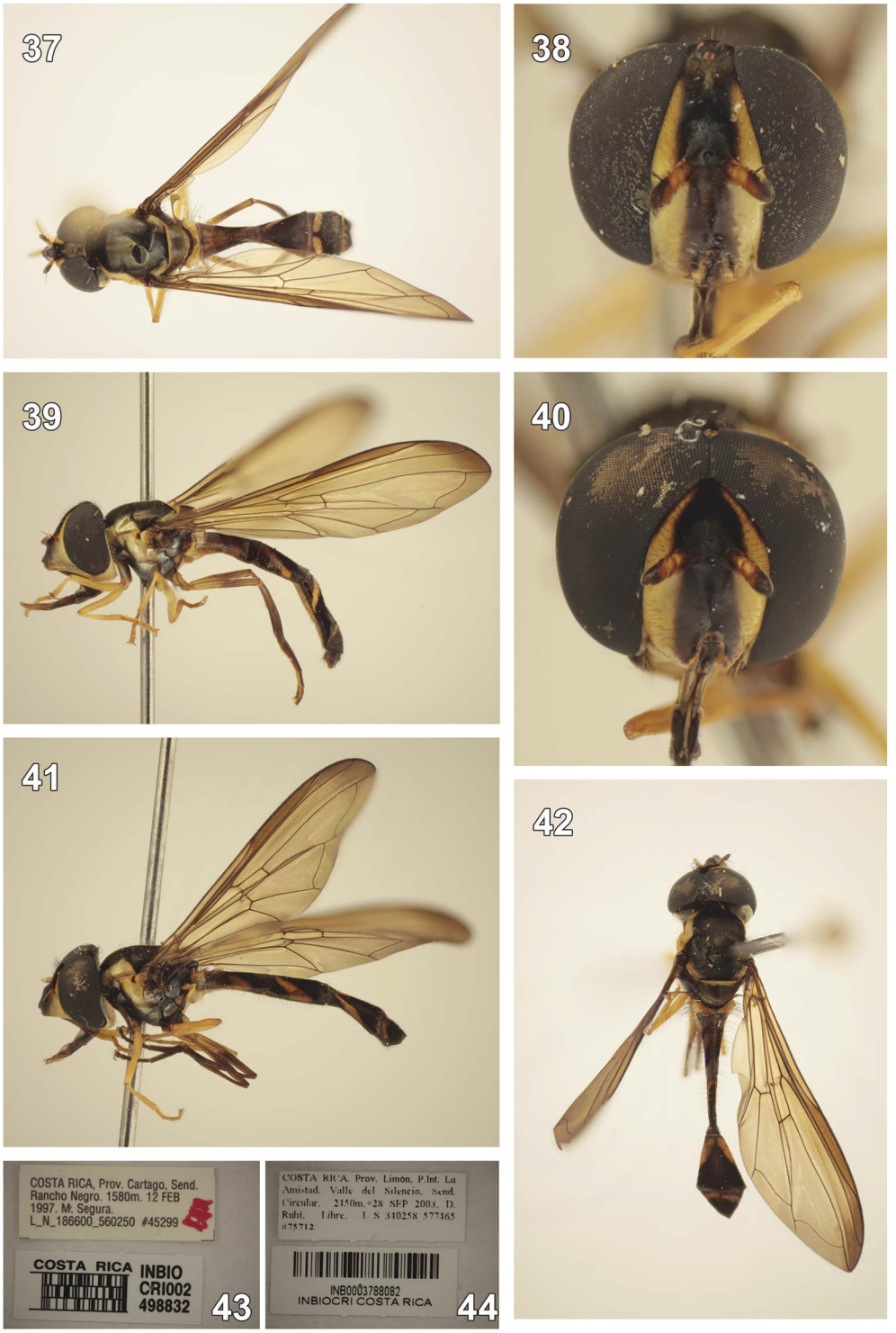
Fig. 37–44. *Rhinoprosopa lucifer*: 37, female, dorsal view; 38, female, frontal view; 39, female, lateral view; 40, male, frontal view; 41, male, lateral view; 42, male, dorsal view; 43, female, labels; 44, male, labels.



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L_N_186600_560250, 12.ii.1997, M. Segura #45299 (1 ♀, USNM; INBIO CRI002498832). **PERU**: Cusco, Aguas Calientes, 13°09' S 72°31' W, 10-11.v.2004, J.T. Smit (1 ♂, JS); Cusco, Wayqecha Biol. Stn., ~9 km NE Challabamba, ~2800 m., 13°10'S 71°35'W, 13-15.v.2007, cloud forest, S.M. Paiero (1 ♂, DEBU; debu00303156); Cusco, Wayqecha Biol. Stn., Trocha Oso vic., 2557 m., 13°10'08"S 71°35'11"W, 11.xii.2011, Norrbom, Steck, Sutton & Nolazco (1 ♂, ZFMK); Lima, Yauyos, Callanga (1 ♂, RMNH); Madre de Dios, Manu, Manu National Park, Cock-of-the-Rock Lodge, 13°03'21"S 71°32'46"W, 18.x.2006, ~1380 m., J. Skevington (1 ♀ in alcohol, CNC; Mol.Spec. # 1877, J. Skevington Specimen # 19243). **VENEZUELA**: Merida, Mucuy Fish Hatchery, 7 km E Tabay, 6600 f., 10-13.ii.1978, J.B. Heppner (1 ♂, USNM).

Remarks. I accept the original epithet "*lucifer*" as the correct spelling as a name in apposition, although I do consider the gender of the genus to be feminine (International Commission on Zoological Nomenclature 1999, Article 34.2.1). Hull (1942) did not state the gender for *Rhinoprosopa*, but *-prosopa* is the feminine form of *prosopon* (Greek word, neuter, meaning face, front; Brown 1956).

Mengual *et al.* (2008b, 2012) published the specimens DNA voucher XP79 (GenBank accession numbers EU241729, EU241776, and EU241827) as *Allograpta aenea* and *Allograpta flavophylla* respectively. Mengual *et al.* (2008b) published the specimens DNA voucher XP147 (GenBank accession numbers EU241732, EU241779, and EU241830) as *Allograpta sycorax*. After a careful re-study, these two specimens are identified as *Rhinoprosopa lucifer* but there is a molecular pairwise distance of 0.1% between their COI sequences.

The above current concept of this species might involve more than one taxon, but I cannot confirm this. Some specimens from Peru look a bit different, but I cannot measure those differences.

Rhinoprosopa nasuta (Bigot, 1884), new combination

(Figs. 9, 35, 36, 45–52)

Sphaerophoria nasuta Bigot, 1884: 103. Type Locality: "Mexico" (holotype male, OUMNH, original designation). Giglio-Tos, 1893 (description); Aldrich 1905 (catalogue citation); Kertész 1910 (catalogue citation); Hull 1943c (possible new combination); Fluke 1956 (catalogue citation).

Sphaerophoria nasuta Bigot, 1888: 253. Type Locality: "Mexico" (holotype male, OUMNH, original designation). Preoccupied Bigot 1884, junior homonym; synonymised by Giglio-Tos 1893 and Thompson *et al.* 1976. Giglio-Tos 1893 (list); Aldrich 1905 (catalogue citation); Kertész 1910 (catalogue citation); Fluke 1956 (catalogue citation).

Baccha nasuta Williston, 1891: 35. Type Locality: "Mexico" (syntype 1 male and 1 female, unknown]. Synonymised by Giglio-Tos 1893.

Allograpta nasuta: Vockeroth 1973 (studied material, figs.); Thompson *et al.* 1976 (catalogue citation); Thompson *et al.* 2000 (key); Mengual *et al.* 2009 (list).

Allograpta neonasuta Thompson *in litt.*: Mengual *et al.* 2008b (list). Nomen nudum.

Allograpta neonasuta (Bigot, 1884): Mengual *et al.* 2008b (DNA voucher XP91). Nomen nudum.

Differential diagnosis. Species with narrow alula, pleuron mostly yellow, facial tubercle and dark facial vitta reaching the eyes or the ocellar triangle dorsally. Similar to *R. aenea*, but abdomen darker in colouration and facial vitta reaching the eyes dorsally. It differs from *R. flavophylla* by having facial tubercle and dark facial vitta reaching the eyes dorsally.

Length (4): body, 11.0–11.5 (11.2) mm; wing, 8.0–9.0 (8.5) mm.

Distribution: Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Mexico (Chiapas, Durango, Nuevo León, Veracruz), Venezuela.

Material examined. Holotype, male, "Holo-/type" [round, red margin] "*S. nasuta*/EX COLL. BIGOT" "*Baccha nasuta*/(Bigot) (1884)/d.L. Knutson'69" (OUMNH).

Holotype of *Sphaerophoria nasuta* Bigot, 1888 (junior synonym): male, "*Mexique*" "*Sphaerophoria?/nasuta ♂/n.sp. Epedict./Paril. Mail/1888 M. Bigot/nec lron Gen nov./Mexique*" [handwriting, underlined words are not possible to read clearly] "*S. nasuta*/EX COLL. BIGOT" "*Baccha nasuta*/ (Bigot) (1888)/d.L. Knutson'69" (OUMNH).

Additional material. COLOMBIA: Dpto Valle del Cauca, Palmira, Corrg. La Buitrera, Nirvana, 1440–1530 m., 14.ii.2006, X. Mengual, voucher specimen MZH_XP91 (1 ♀, ZFMK).

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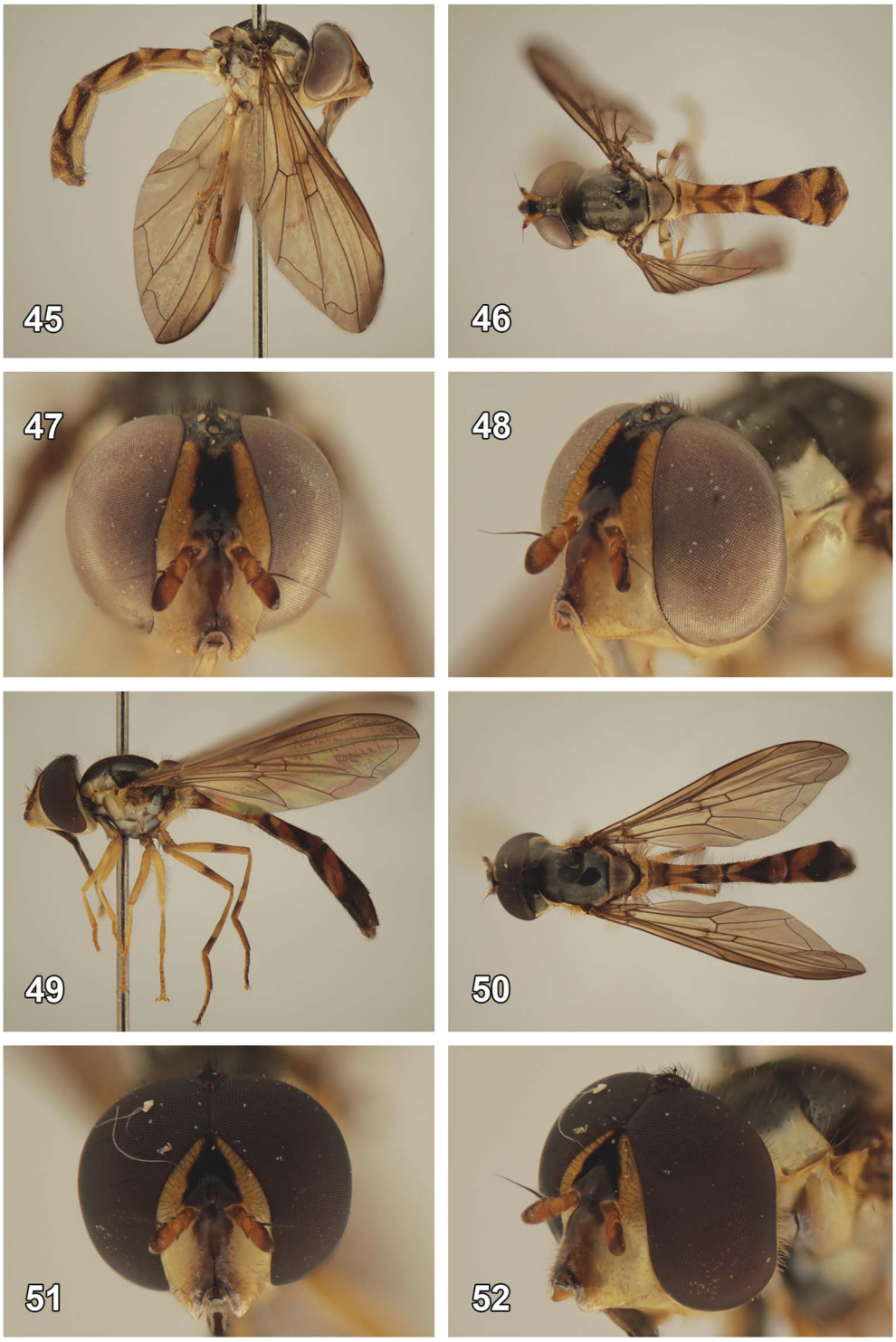
Fig. 45–52. *Rhinoprosopa nasuta*, female: 45, lateral view; 46, dorsal view; 47, frontal view; 48, frontolateral view of head. *Rhinoprosopa nasuta*, male: 49, lateral view; 50, dorsal view; 51, frontal view; 52, frontolateral view of head.



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COSTA RICA: San José Prov., San Gerardo de Dota, 2200–2600 m., 7-10.viii.1995, J.M. Cumming (1 ♂ 1 ♀, CNC; CNC DIPTERA # 225202, 225203); San José Prov., San Gerardo de Dota, 9.33°N 8.48°W, 2300 m., roadside, 8.viii.1995, D.C. Caloren (2 ♀, DEBU; debu01049436, debu01046435); San José Prov., Est. Cuerici, Sendero al Mirador, 4.6 km E de Villa Mills, 2640 m., L_S_389700_499600, 3.i.1996, B. Gamboa #6768 (1 ♀, USNM; INBIO CRI002331847); San José Prov., Est. Santa Elena, Viejo, Santa Elena, Las Nubes, 1210 m., L_S_371750_507800, 3-10-viii.1995, A. M. Maroto #5446 (1 ♂, USNM; INBIO CRI002251247); San José Prov., Santa Ana, Z.P. Cerro Escazú, Bebedero Alto Granilla, 1600 m., L_N_210000_518600, 9.i.1999, M. A. Zumbado #57287 (1 ♂, USNM; INBIO INB0003164087); San José Prov., 25.iii.1997, M. A. Zumbado #46350 (1 ♂, USNM; INBIO CRI002552758); Cartago Prov., San José, 15 km SE Empalme, 2600 m., xii.1988, Hanson (2 ♀, MZCR); Cartago Prov., El Guarco, San Isidro, Estación La Esperanza, 2450 m., L_N_549250_185700, 16.ii.2011, R. Delgado #61845 (1 ♀, USNM; INBIO INB003157898); Puntarenas Prov., Las Tablas, ENE Las Mellizas, 15 km ENE San Vito, 28.v.1987, A.L. Norrbom, sweeping *Bidens pilosa* L. (1 ♂, USNM); Puntarenas Prov., San Luis, Cerro Amapala, Monteverde, 1300 m., L_N_249200_448850, 27.i.1997, Z, Fuentes, red de golpe #45267 (1 ♂, USNM; INBIO CRI002534466); Puntarenas Prov., Monteverde Res., cloud forest, 1500 m., ii.1980, W. Mason (1 ♀, CNC; CNC DIPTERA # 102924); Alajuela Prov., R. Jesus, C. La Lana, San Ramón, 1200 m., L_N_221750_481050, i.1997, G. Carballo #45477 (1 ♀, USNM; INBIO CRI002490973); Heredia Prov., R. B. Chompipe, 2100 m., L_N_229900_528600, 3.i.1994, M. Zumbado #2657 (1 ♂, USNM; INBIO CRI001725640). **ECUADOR**: Bolívar Prov., Chota R., Carchi, 2000 m., 10.vi.1965, L. Peña (Pena in the original label) (2 ♂, CNC; 1 ♂, ZFMK; CNC DIPTERA # 149509, 186458, 178134). **EL SALVADOR**: Monte Cristo, 26.iii.1978, D.R. Barger (1 ♂, USNM). **GUATEMALA**: Suchitepéquez, Santa Barbara, Ref. Quetzal UVG, 1600 m., Lat.: 14.5417598495 Lon.: -91.1972949818, 26-30.iv.2007, Camposeco y Monzón (1 ♀, USNM); Baia Verapáz, Pantín, Finca Santa Rosa, 1600.m, 20.xi.2007, J. Monzón, B. Sutton, G. Steck, All. Norrbom (1 ♀, USNM); Quetza Itenango, Zunil, Fuentes Georginas, 91°28'48.67"14°45'0.11", 2456 m., 25.i-18-ii.2007, J. Monzón, F. Camposeco (7 ♂, USNM). **MEXICO**: Chiapas, 10 mi NE San Cristobal, 7500 feet, 13.v.1969, H.J. Teskey (1 ♂ 1 ♀, CNC; CNC DIPTERA # 178132, #178136); Chiapas, San Cristobal de las Casas, 7087 ft., 25.v.1969, B.V. Peterson (1 ♂, CNC; CNC DIPTERA # 178133) Chiapas, 1 km S of Rayon, 1400 m., 19.ix.1987, A. L. Norrbom, sweeping *Erigeron karwinskianus* DC. M-7 (1 ♀, USNM); Chiapas, NW of Union Juarez, S slope Volcán Tacaná, Chiquihuites, 15°05'N 92°06'W, 1800–2000 m., 14-18.xi.1994, L. E. Carroll & C. Estrada (1 ♂, USNM); Chiapas, Cerro de Huitepec, 16°45'38"N 92°40'50"W, 2200 m., 4.iv.2007, M. Reemer (1 ♀, ZFMK); Durango, 14 mi SW El Salto, 8000 ft., 26.vi.1964, W.R.M. Mason (1 ♀, USNM); Durango, El Salto, 10 mi W, 9000 ft., 12.vi.1964, W.R.M. Mason (1 ♀, CNC; CNC DIPTERA # 178135); Nuevo León, 15 mi S Monterrey, 23.ii.1972, F. Parker & D. Miller (1 ♀, USNM); Veracruz, Orizaba, i.1945, N.L.H. Krauss (1 ♂, USNM). **VENEZUELA**: Estado Lara, P.N. Yacambú, sector "El Blanquito", along the road, point 1, 20.i.2007, X. Mengual (1 ♂, ZFMK); Estado Miranda, San Antonio de los Altos, IVIC, Centro de Ecología, 1680–1690 m., 10°24.069'N 66°58.667'W, 22.i.2007, X. Mengual (1 ♂, ZFMK).

Remarks. Some dark specimens are difficult to key out properly in couplet 2. The yellow colouration of the pleuron may be confused with a kind of grey, and key out to couplet 3. For this reason, there is an extra step in the identification key (couplet 4) to distinguish these dark specimens.

Thompson (*in litt.*) used the name *Allograpta* (*Rhinoprosopa*) *neonasuta* for this taxon when it became a secondary junior homonym of *Allograpta nasuta* Macquart, 1842 after Vockeroth (1973) placed *A. nasuta* Bigot, 1884 under the genus *Allograpta*. Mengual *et al.* (2008b) used this new name for the DNA voucher specimen XP91 (GenBank accession numbers EU241730, EU241777, and EU241828). Because this new name was never properly published and Thompson (2012) considered *Rhinoprosopa* as a valid genus different from *Allograpta*, *Rhinoprosopa nasuta* (Bigot, 1884) must be used for this taxon as a new combination.

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Rhinoprosopa sycorax Hull, 1947

(Figs. 5, 6, 53–62)

Rhinoprosopa sycorax Hull, 1947: 239. Type Locality: Costa Rica, La Suiza (holotype female, USNM, original designation). Hull 1949a (key, figs.); Fluke 1957 (catalogue citation).

Allograpta sycorax: Vockeroth 1973 (studied material); Thompson *et al.* 1976 (catalogue citation); Thompson *et al.* 2000 (key); Mengual *et al.* 2008b (list); Mengual *et al.* 2009 (list); Montoya *et al.* 2012 (list, distribution).

Differential diagnosis. This is one of two species with a broad alula; easy to distinguish from *R. zophina* by the facial tubercle, oral margin not notched and dark facial vitta not extending laterally towards oral margin. *Rhinoprosopa sycorax* has, in general, a broader abdomen than the rest of the species, but this difference could not be measured efficiently.

Length (4): body, 10.0–11.0 (10.8) mm; wing, 8.5–10.0 (9.5) mm.

Distribution: Colombia, Costa Rica, Venezuela*.

Material examined. Holotype, female, "*12 IX*" "COSTA RICA/La Suiza '24/P. Schild" "*Holotype/Rhinoprosopa/sycorax/Hull*" [red] (USNM).

Additional material. COLOMBIA: Valle del Cauca, Buenaventura, 70 km E, Anchicayá, 400 m., 17-20.ii.1970, D.M. Wood (1 ♀, CNC; CNC DIPTERA # 102947). **COSTA RICA**: Puntarenas Prov., Las Cruces, 1191 m., 8.78578° N 82.95995°W, 28.vii.2010, J.H. Skevington (4 ♀, CNC; 1 ♀, ZFMK; J. Skevington # 22154, 22155, 221569, 22153, 22152); Puntarenas Prov., Las Cruces, 1191 m., 8.78578°N 82.95995°W, 30.vii.2010, J.H. Skevington (1 ♀, CNC; J. Skevington # 22183); Puntarenas Prov., OTS Reserve, along Melissa trail, sweeping, 3.viii.2010, K.M. Bayless, A.T. Burke (1 ♀, ZFMK); Alajuela Prov., Peñas Blancas, 700 m., 12.i-2.ii.1987, E. Cruz, MT, primary rain forest (1 ♂ 8 ♀, CNC; 1 ♀, ZFMK; CNC DIPTERA # 149510, 149512, 149513, 149515, 102948, 102949, 102950, 102951, 149511, 149514); Alajuela Prov., Bijagua, Albergue de Heliconias, 10°42'48"N 85°02'27"W, 1000–1100 m., ridge trail, 18.vi.2000, N.E. Woodley (1 ♀, USNM; USNM ENT00031106); Cartago Prov., R. Grande de Orosi, Sector el Humo, 1400–1700 m., L_N_189500_560200, v.1997, R. Guzman #46360 (1 ♂, USNM; INBIO CRI002552251); San José Prov., San Carlos, La Virgen, 9°34'50"N 84°07'51"W, 821 m., secondary forest, 25.ii.2006, S.M. Paiero (1 ♂, DEBU; debu00256567).

Rhinoprosopa zophina Mengual, new species

(Figs. 63–73)

Differential diagnosis. One of only two species with broad alula. It differs from *R. sycorax* by the absence of facial tubercle, oral margin notched and broader facial vitta. It differs from *R. flavophylla* and *R. lucifer* by the broad alula.

Type locality. Costa Rica, Cartago Province, Río Grande de Orosi, Administ. hasta senda La Pava, orilla de quebrada, 1150–1600 m.

Etymology. The specific epithet is derived from the Greek *zophos* meaning darkness, dusk, gloom (Brown 1956: 876). Species epithet to be treated as an adjective.

Description. Male. *Head.* Face produced anteriorly, triangular in profile, without tubercle, yellow with broad, medial dark vitta reaching oral margin laterally, from oral margin to antennal bases and continues dorsally, yellow pilose; oral margin notched, protruding laterally beyond the clypeus; gena yellow, yellow pilose; lunule black; frons yellow with broad medial black vitta (continuation of the facial vitta), which reaches the eye margin, black pilose; vertical triangle black, pollinose, black pilose; antenna orangish yellow, black pilose, basoflagellomere dark brown dorsally; arista brown, bare; eye bare; occiput black on dorsal 2/3, grey-yellow pollinose, yellow on ventral 1/3, yellow pilose on ventral 2/3 and black pilose on dorsal 1/3.

Thorax. Scutum black, yellow laterally, bronze pollinose, yellow and black pilose, mostly black pilose; postpronotum yellow, bare; notopleuron yellow, black pilose; supra-alar area and postalar callus black pilose; scutellum yellow, lighter basally, pollinose, dark pilose, subscutellar fringe absent. Pleuron black, except katepisternum black with dorsal yellow macula, anterior anepisternum pale yellow, posterior anpisternum yellow on posterior 1/2–2/3, anepimeron yellow on anterior 1/2, yellow and black pilose; metasternum bare; calypter yellow with black margin; halter with yellow capitulum and brown pedicel; posterior

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Fig. 53–62. *Rhinoprosopa sycorax*: 53, female, dorsal view; 54, female, lateral view; 55, male, male, lateral view; 56, male, dorsal view; 57, female, frontal view; 58, female, frontolateral view of head; 59, male, frontal view; 60, male, frontolateral view of head; 61, male, labels; 62, female, labels.

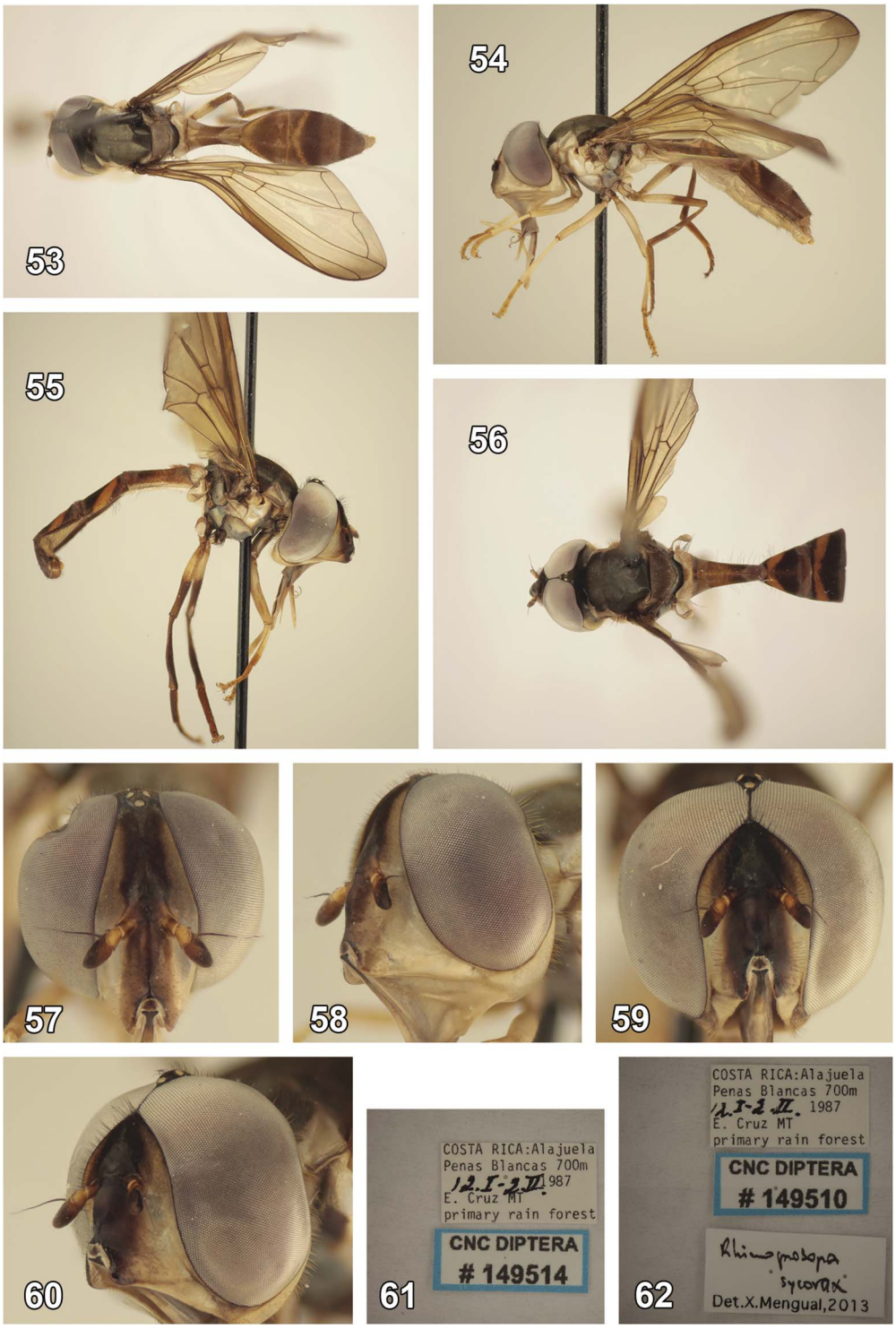

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Fig. 63–69. *Rhinoprosopa zophina*: 63, female, dorsal view; 64, female abdomen, posterior view; 65, female, lateral view; 66, male, male, dorsal view; 67, male, lateral view; 68, female, labels; 69, male, labels.

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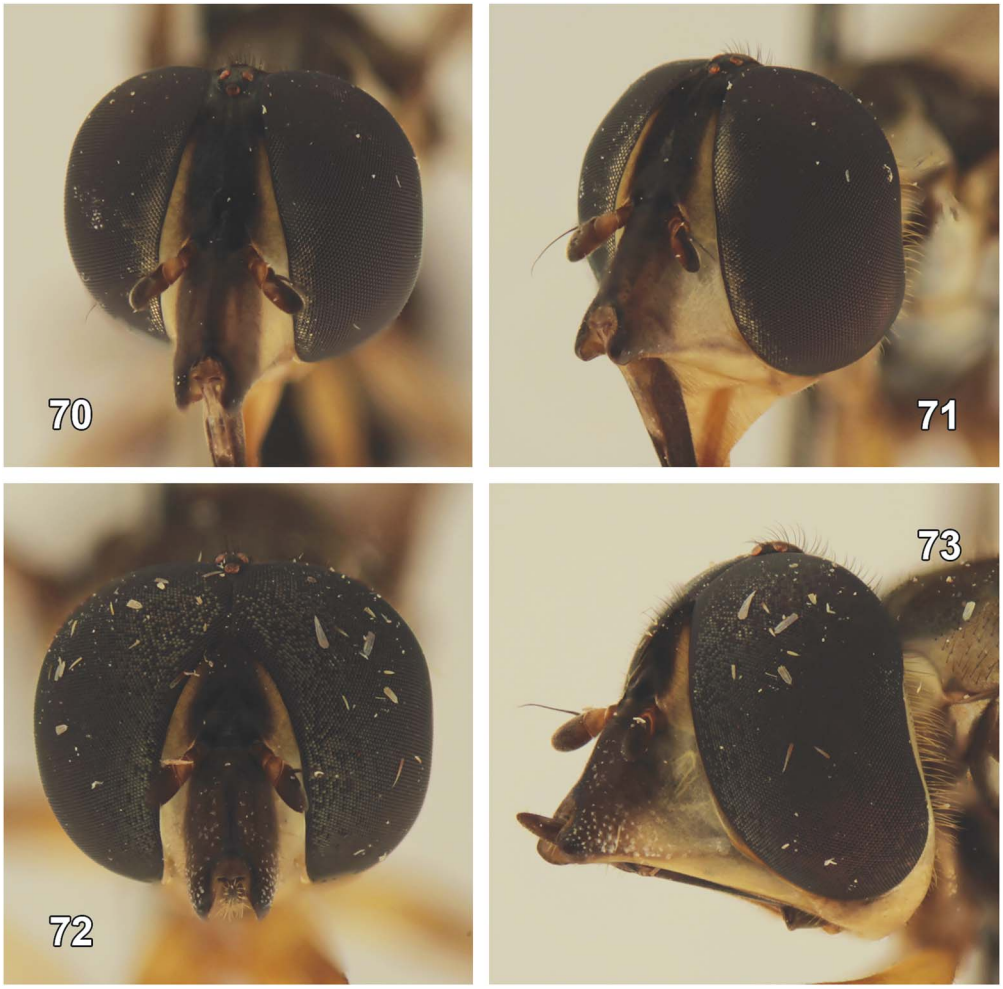
Fig. 70–73. *Rhinoprosopa zophina*: 70, female, frontal view; 71, female, frontolateral view of head; 72, male, frontal view; 73, male, frontolateral view of head.



spiracular fringes yellow. *Wing*. Wing membrane yellow, darker anteriorly and apically, entirely microtrichose; alula broad, much broader than costal cell. *Legs*. Proleg and mesoleg yellow, black and yellow pilose; metafemur yellow on basal 1/2, black on apical 1/2, metatibia and metatarsus black.

Abdomen. Strongly petiolate, not emarginated, black pilose. Tergum 1 yellow, black posteriorly; tergum 2 black or dark brown, lighter basally, with two lateral yellow maculae; tergum 3 dark, with a broad, medial, inverted U-shaped fascia; tegum 4 similar, but fascia more diffuse and narrowing towards lateral margin; tergum 5 dark, lighter basally without clear yellow markings; sterna yellow, black pilose.

Female. Similar to male except for normal sexual dimorphism.

Variation. As mentioned before, coloration is quite variable and some darker specimens present no clear yellow markings on tergum 4.

Length (4): body, 11.0–13.0 (12.0) mm; wing, 9.0–10.0 (9.5) mm.

Distribution: Costa Rica.

Material examined. Holotype, male, pinned, deposited at the Instituto Nacional de Biodiversidad (INBio), Santo Domingo de Heredia, Costa Rica. Original labels: "COSTA RICA. Cartago,

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R. Grande/de Orosi, Administ. hasta Send. La/Pava, 1150-1600 m OCT 1995. R./Delgado, Orilla de Quebrada./L_N_192500_560400 #6368" "HOLOTYPE/*Rhinoprosopa/zophina/Mengual 2013*" [red, handwritten except first line] "COSTA RICA INBIO/CRI002/445453" [barcode]. **Paratypes:** "PARATYPE/*Rhinoprosopa/zophina/Mengual 2013*" [yellow], **COSTA RICA**: Guanacaste Prov., Macizo Miravalles, Estación Cabro Muco, 1100 m., 24.ix-4.x.2003, J.D. Gutiérrez, libre, L_N_299769_411243 #75638 (1 ♂ 1 ♀, USNM; INBIOCRI INB0003783855, INBIOCRI INB0003783844); Guanacaste Prov., Macizo Miravalles, Estación Cabro Muco, 1100 m., 24.ix-5.x.2003, B. Hernández, libre, L_N_299769_411243 #75638 (1 ♂, INBio; INBIOCRI INB0003772908); Guanacaste Prov., P.N. Guanacaste, Est. Cacao, lado SO Volcan Cacao, 800–1600 m., vii.1993, J.F. Quesada, L_S_323300_375700 #2218 (1 ♂, INBio; INBIO CRI001953490); Cartago Prov., Sect. Quebrada Segunda, Administ. hasta Send La Pava, 115–1600 m., ii.1997, R. Guzman, L_N_192500_560400 #4561 (1 ♂, ZFMK; INBIO CRI00253948); Cartago Prov., P.N. Tapantí, 1250 m., 18–28.ii.1993, F.A. Quesada, L_N_194000_560000 (1 ♀, ZFMK; INBIO CRI001211396); Puntarenas Prov., Res. Biol. Monteverde, Est. La Casona, x.1991, J.C. Saborio, L_N_253250_449700 (1 ♀, INBio; INBIO CRI000578244); Puntarenas Prov., Est. Biol. Monteverde, 1500 m., 10°19.138'N 84° 48.508'W, 15–18.viii.2010, M. Hauser (1 ♂, CSCA); Limón Prov., 16 km W Guápiles, 400 m., xii.1989, P. Hanson (1 ♀, MZCR).

Remarks. Most of the specimens of this new species were identified as *R. lucifer* due to the dark pleuron, or as *R. flavophylla* because of the lack of facial tubercle. The size of the alula is crucial to properly identify specimens. This species is only known from Costa Rica.

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References

Aldrich, J.M. 1905. A catalogue of North American Diptera. Smithsonian Miscellaneous Collections, **46**: 1–680.

Bigot, J.M.F. 1884. Dipteres nouveaux ou peu connus. 24 partie, XXXII: Syrphidi (2 partie). Especes nouvelles, no. III. Annales de la Société Entomologique de France. ser. 6, **4**: 73–116.

Bigot, J.M.F. 1888. Dipteres nouveaux ou peu connus. 34e partie, XLII: Diagnoses de nouvelles especes. Annales de la Société Entomologique de France. ser. 6, **8**: 253–270.

Brown, R.W. 1956. Composition of scientific words, a manual of methods and a lexicon of materials for the practice of logotechnics. Published by the author, Baltimore, Maryland, United States of America.

Fairmaire, M.L. and Germain, P. 1863. Révision des Coléoptères du Chili. Annales de la Société Entomologique de France. ser. 4, **3**: 225–284.

Fluke, C.L. 1956. Catalogue of the family Syrphidae in the Neotropical Region (Diptera). Revista Brasileira de Entomologia, **6**: 193–268.

Fluke, C.L. 1957. Catalogue of the family Syrphidae in the Neotropical Region (Diptera). Revista Brasileira de Entomologia, **7**: 1–181.

Giglio-Tos, E. 1893. Ditteri del Messico. Parte II. Syrphidae–Conopidae–Pipunculidae. C. Clausen, Torino, Italy.

https://doi.org/10.4039/tce.2014.25 Published online by Cambridge University Press

Hull, F.M. 1937. New species of exotic syrphid flies. Psyche, **44**: 12–32.

Hull, F.M. 1942. Some flies of the genus *Mesogramma*. Proceedings of the New England Zoölogical Club, **20**: 17–24.

Hull, F.M. 1943a. New species of *Baccha* and related flies. Entomological News, **54**: 135–140.

Hull, F.M. 1943b. New species of the genera *Baccha* and *Rhinoprosopa* (Syrphidae). Journal of the Washington Academy of Sciences, **33**: 214–216.

Hull, F.M. 1943c. The New World species of the genus *Baccha*. Entomologica Americana, **23**: 42–99. 10 plates.

Hull, F.M. 1947. Some American syrphid flies. Psyche, **54**: 230–240.

Hull, F.M. 1949a. The genus *Baccha* from the New World. Entomologica Americana, **27**: 89–285, 47 plates.

Hull, F.M. 1949b. The morphology and interrelationship of the genera of syrphid flies, recent and fossil. Transactions of the Zoological Society of London, **26**: 257–408. doi:10.1111/j.1096-3642.1949.tb00224.x.

International Commission on Zoological Nomenclature. 1999. International Code of Zoological Nomenclature, 4th edition, The International Trust for Zoological Nomenclature, London, United Kingdom.

Kertész, K. 1910. Catalogus dipterorum hucusque descriptorum. Volume 7. Museum Nationale Hungaricum, Budapest, Hungary.

Koçak, A.O. and Kemal, M. 2008. Replacement names among the genus and family group taxa in Orthoptera. Centre for Entomological Studies, Miscellaneous Papers, **141**: 1–5.

Mengual, X., Ruiz, C., Rojo, S., Ståhls, G., and Thompson, F.C. 2009. A conspectus of the flower fly genus *Allograpta* (Diptera: Syrphidae) with description of a new subgenus and species. Zootaxa, **2214**: 1–28.

Mengual, X., Ståhls, G., and Rojo, S. 2008a. First phylogeny of predatory hoverflies (Diptera, Syrphidae, Syphinae) using mitochondrial COI and nuclear 28 S rRNA genes: conflict and congruence with the current tribal classification. Cladistics, **24**: 543–562. doi:10.1111/j.1096-0031.2008.00200.x.

Mengual, X., Ståhls, G., and Rojo, S. 2008b. Molecular phylogeny of *Allograpta* (Diptera, Syrphidae) reveals diversity of lineages and non-monophyly of phytophagous taxa. Molecular Phylogenetics and Evolution, **49**: 715–727. doi:10.1016/j.ympev.2008.09.011.

Mengual, X., Ståhls, G., and Rojo, S. 2012. Is the megadiverse genus *Ocyptamus* (Diptera, Syrphidae) monophyletic? Evidence from molecular characters including the secondary structure of 28 S rRNA. Molecular Phylogenetics and Evolution, **62**: 191–205. doi:10.1016/j.ympev.2011.09.014.

Montoya, A.L., Pérez, S.P., and Wolff, M. 2012. The diversity of flower flies (Diptera: Syrphidae) in Colombia and their Neotropical distribution. Neotropical Entomology, **41**: 46–56. doi:10.1007/s13744-012-0018-z.

Thompson, F.C. 1981. The flower flies of the West Indies (Diptera: Syrphidae). Memoirs of the Entomological Society of Washington, **9**: 1–200.

Thompson, F.C. 1999. A key to the genera of the flower flies (Diptera: Syrphidae) of the Neotropical Region including descriptions of new genera and species and a glossary of taxonomic terms. Contributions on Entomology, International, **3**: 321–378.

Thompson, F.C. 2012. *Costarica* Mengual & Thompson, 2009 (Insecta: Diptera: Syrphidae) junior homonym of *Costarica* Koçak & Kemal, 2008 (Insecta: Orthoptera): proposed replacement by *Tiquicia* nom. nov. Zootaxa, **3360**: 68.

Thompson, F.C. 2013. Syrphidae. Systema Dipterorum [online]. Available from http://www.diptera.org [accessed 10 October 2013].

Thompson, F.C., Rotheray, G.E., and Zumbado, M.A. 2010. Family Syrphidae. *In* Manual of Central America Diptera, Volume 2. *Edited by* B.V. Brown, A. Borkent, J.M. Cumming, D.M. Wood, N.E. Woodley, and M.A. Zumbado. National Research Council Press, Ottawa, Ontario, Canada. Pp. 763–792.

Thompson, F.C., Thompson, B.J., and Fairman, J.E. 2000. Only in Costa Rica: new Neotropical flower flies (Diptera: Syrphidae). Studia Dipterologica, **7**: 33–43.

Thompson, F.C., Vockeroth, J.R., and Sedman, Y.S. 1976. Family Syrphidae. Catalogue of the Diptera of America South of the United States, **46**: 1–195.

Vockeroth, J.R. 1969. A revision of the genera of the Syrphini (Diptera, Syrphidae). Memoirs of the Entomological Society of Canada, **62**: 1–176.

Vockeroth, J.R. 1973. Three additional synonyms of *Allograpta* (Diptera: Syrphidae). The Canadian Entomologist, **105**: 1101–1104.

Williston, S.W. 1891. Fam. Syrphidae. *In* Biologia Centrali-Americana. Zoologia. Insecta. Diptera, Volume III. *Edited by* F.D. Godman and O. Salvin. R.H. Porter, London, United Kingdom. Pp. 1–56.

https://doi.org/10.4039/tce.2014.25 Published online by Cambridge University Press