An illustrated identification key to Nearctic genera of Empidoidea (exclusive of Dolichopodidae sensu stricto) (Diptera)

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Abstract

The Empidoidea (exclusive of Dolichopodidae sensu stricto), or "dance flies", are a diverse group of Diptera that include six families and 72 genera in the Nearctic Region. An illustrated key to the dance fly genera is presented, updating the 1981 key from the "Empididae" chapter of the *Manual of Nearctic Diptera*, utilizing over 600 colour photographs displaying many unique characters as well as some rarely seen or photographed genera. Since publication of the *Manual* chapter, 14 generic names have been added (or updated), five generic names have been removed and two undescribed genera are now recognized. Currently, 953 Nearctic species of Empidoidea (exclusive of Dolichopodidae sensu stricto) have been described. A brief synopsis of each genus is included providing information on number of species, taxonomic literature, biology, defining morphological characters and Nearctic distribution.

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Introduction

The superfamily Empidoidea has traditionally included two families: Empididae (dance flies) and Dolichopodidae (long-legged flies). Empidoids are very widespread from tundra to deserts and alpine streams to marine coastlines. Both adults and larvae are predaceous on a wide variety of soft-bodied arthropods (Sinclair & Cumming 2006). In addition, they are important pollinators, especially for early spring flowers and in colder ecological zones (Lefebvre et al. 2014). There are more than 13000 described species in the world and 2250 described species in Canada and the United States (Table 1).

The most recent keys to genera of the Empidoidea in the Manual of Nearctic Diptera recognized two families: Empididae (Steyskal & Knutson 1981) and Dolichopodidae (Robinson & Vockeroth 1981), but numerous taxonomic changes have been since proposed. As many as nine families are now recognized in the Empidoidea, although not all have been accepted by specialists. For the Nearctic Region, the former "Empididae" as treated in the Manual of Nearctic Diptera has been divided into five families: Atelestidae, Brachystomatidae, Empididae, Hybotidae and Iteaphilidae, as well as the subfamilies Microphorinae and Parathalassiinae which are now classified within the family Dolichopodidae sensu lato (Table 1) (Sinclair & Cumming 2006; Sinclair & Shamshev 2021). The remaining Dolichopodidae are now referred to as the Dolichopodidae sensu stricto and the Nearctic genera of that large group can be identified using the key in Bickel (2009). The main families of Empidoidea can be identified using the key to families and genus groups in Sinclair & Cumming (2006: 82) and using "Key Four" in Marshall (2012: 580).

There have also been changes in subfamily classification, with several newly proposed groups. In North America, these new or revised subfamilies include Bicellariinae, Brochellinae, Oedaleinae, Ragadinae, Trichininae and Trichopezinae (Table 1) (Sinclair & Cumming 2006; Yang et al. 2007; Sinclair 2016; Wahlberg & Johanson 2018).

In addition to changes in family status, there have been numerous taxonomic changes to the genera of "Empididae" in the Nearctic Region since Steyskal & Knutson (1981). These include 14 generic names added or updated, five generic names removed and two undescribed genera recognized (Table 2). These taxonomic changes support the urgent need to update the 1981 key to "Empididae" presented in the Manual of Nearctic Diptera to allow identification of the 72 genera currently recognized in the Region (Table 1).

Table 1. Classification and number of species of Nearctic Empidoidea.

Family	Subfamily	Genus	Author, Year	No. of Species
Iteaphilidae		*Iteaphila*	Zetterstedt, 1838	35
Empididae	Brochellinae	*Brochella*	Melander, 1928	1
	Clinocerinae	*Asymphyloptera*	Collin, 1933	2
		Clinocera	Meigen, 1803	42
		Dolichocephala	Macquart, 1823	7
		Oreothalia	Melander, 1902	5
		Proclinopyga	Melander, 1928	6
		Roederiodes	Coquillett, 1901	8
		Trichoclinocera	Collin, 1941	16
		Wiedemannia	Zetterstedt, 1838	7
	Empidinae	*Empis*	Linnaeus, 1758	91
		Hesperempis	Melander, 1906	5
		Hilara	Meigen, 1822	43
		Lamprempis	Wheeler & Melander, 1901	undescribed (1)
		Philetus	Melander, 1928	3
		Porphyrochroa	Melander, 1928	undescribed (2)
		Rhamphomyia	Meigen, 1822	205
	Hemerodromiinae	*Chelifera*	Macquart, 1823	22
		Chelipoda	Macquart, 1823	7
		Hemerodromia	Meigen, 1822	22
		Metachela	Coquillett, 1903	3
		Neoplasta	Coquillett, 1895	12
	Oreogetoninae	*Oreogeton*	Schiner, 1860	8
	Ragadinae	*Hormopeza*	Zetterstedt, 1838	7
		Ragas	Walker, 1837	4
		Zanclotus	Wilder, 1982	2
Atelestidae	Atelestinae	*Meghyperus*	Loew, 1850	2
Brachystomatidae	Brachystomatinae	*Anomalempis*	Melander, 1928	2
		Brachystoma	Meigen, 1822	4
	Trichopezinae	*Apalocnemis*	Philippi, 1865	undescribed (1)
		Boreodromia	Coquillett, 1903	1
		Ceratempis	Melander, 1928	1
		Gloma	Meigen, 1822	3
		Heleodromia	Haliday, 1833	6
		Niphogenia	Melander, 1928	2
		Sabroskyella	Wilder, 1982	1
		Saigusamyia	Sinclair, 2021	3
		Undescribed genus A		2
		Undescribed genus B		undescribed (1)
Hybotidae	Bicellariinae	*Bicellaria*	Macquart, 1823	12
		Hoplocyrtoma	Melander, 1928	2
	Hybotinae	*Euhybus*	Coquillett, 1895	13
		Hybos	Meigen, 1803	1
		Syndyas	Loew, 1857	6

		Syneches	Walker, 1852	11
	Ocydromiinae	*Leptopeza*	Macquart, 1828	5
		Ocydromia	Meigen, 1820	1
	Oedaleinae	*Allanthalia*	Melander, 1928	undescribed (1)
		Anthalia	Zetterstedt, 1838	12
		Euthyneura[1]	Macquart, 1836	6
		Oedalea	Meigen, 1820	4
	Tachydromiinae	*Allodromia*	Smith, 1962	1
		Baeodromia	Cumming, 2007	1
		Chersodromia	Walker, 1849	8
		Crossopalpus	Bigot, 1857	15
		Drapetis	Meigen, 1822	18
		Elaphropeza	Macquart, 1828	2
		Megagrapha	Melander, 1928	3
		Micrempis	Melander, 1928	10
		Platypalpus	Macquart, 1828	117
		Stilpon	Loew, 1859	13
		Symballophthalmus	Becker, 1889	1
		Tachydromia	Meigen, 1803	15
		Tachyempis	Melander, 1928	6
		Tachypeza	Meigen, 1830	18
	Trichininae	*Trichina*	Meigen, 1830	1
		Trichinomyia	Tuomikoski, 1959	5
Dolichopodidae sensu lato	Microphorinae	*Microphor*	Macquart, 1828	5
		Schistostoma	Becker, 1902	28
	Parathalassiinae	*Microphorella*	Becker, 1909	10
		Parathalassius	Mik, 1891	12
		Thalassophorus	Saigusa, 1986	1
Dolichopodidae sensu stricto				1301
Total				2254

[1] Of two original spellings (*Euthyneura* and *Euthinevra*) in Macquart (1836), *Euthinevra* was chosen by Macquart via Article 24.2.4 of the Code (International Commission on Zoological Nomenclature 1999) (see Evenhuis et al. 2016), but *Euthyneura* is used here as it is in prevailing usage in compliance with Article 33.3.1.

Diagnosis of Empidoidea

Members of the superfamily Empidoidea can be characterized by the following combination of features:

- Antenna with apical flagellum consolidated into a compact, single-segmented postpedicel bearing a distinct robust stylus or arista-like stylus.
- Mouthparts with palpus one-segmented.
- Mouthparts with labrum usually armed at apex with epipharyngeal blades.
- Head without ptilinal fissure.
- Wing with vein CuA short, ending in vein CuA+CuP, usually near wing base.
- Wing with cell cua closed, never reaching wing margin.
- Wing with cell dm usually present, but if not, then R_{4+5} and M_{1+2} not forked.
- Legs often with one pair possessing raptorial modifications.
- Legs with apical tarsomere usually bearing two broad, flattened pads below tarsal claws.
- Male terminalia either unrotated, twisted 45º to 90º to right, or rotated 90º to 180º to right and lateroflexed; often asymmetrical.
- Female terminalia with or without acanthophorous spines.
- Female terminalia with one spermatheca internally.

Conveniently, Empidoidea (exclusive of Dolichopodidae sensu stricto) can generally be differentiated from similar Dolichopodidae (sensu

stricto) (see Bickel 2009) by their lack of green metallic body colouration. However, some empidoids (e.g., most *Lamprempis* Wheeler & Melander and *Porphyrochroa* Melander) are metallic blue or blue-green and some dolichopodids (sensu stricto) are not metallic. A more precise separation of Dolichopodidae (sensu stricto) from the remaining Empidoidea is provided in our key, particularly in couplets 4 and 73, based on differences in wing venation. Some bombyliid and asiloid groups (e.g., Therevidae sensu lato), as well as *Bolbomyia* Loew (Rhagionidae sensu lato), can be confused with empidoids, but these flies generally have a larger wing cell cua that attains, or nearly attains, the wing margin and they lack predaceous modifications on either legs or mouthparts. A few platypezids (e.g., *Microsania* Zetterstedt) can also be confused with empidoids, but the antennal arista of these small flies is comprised of three articles, rather than two articles (as in the stylus of most empidoids), and the acrostichal setae of the thorax are uniserial, rather than biserial or absent.

Biology of the Empidoidea

The Empidoidea (exclusive of Dolichopodidae sensu stricto) represent a large group of mostly predaceous flies. Adults are often found in various riparian forest habitats, on leaves, tree trunks, aquatic vegetation, or in stream beds and seepage habitats, although some taxa are associated with more open areas such as fields, marshes, coastal zones and beaches (Collin 1961; Cumming & Sinclair 2009). Adults capture various arthropod prey, including small to medium sized Diptera, Hemiptera, Thysanoptera, Lepidoptera, Trichoptera, Hymenoptera, Neuroptera, Ephemeroptera, Plecoptera, Coleoptera, Collembola, and Acari (Tuomikoski 1952; Smith 1969; Cumming & Sinclair 2008).

A number of genera visit flowers as adults, presumably to obtain nectar, but at least a few groups (e.g., *Anthalia* Zetterstedt, *Euthyneura* Macquart, *Iteaphila* Zetterstedt, *Schistostoma* Becker) meet their protein requirements by feeding on pollen (Downes & Smith 1969; Chvála 1983; Sinclair & Shamshev 2012, 2021; Brooks & Cumming 2022). Many empidoids are important pollinators, especially during the spring, in high altitude ecological zones and higher latitudes (Kevan 1972; Lefebvre et al. 2014; Sinclair & Shamshev 2021). Larvae are generally found in moist soil, rotten wood, dung, or in aquatic habitats (Cumming & Sinclair 2009; Cumming et al. 2018) and appear to be predaceous on various arthropods, particularly other Diptera larvae (Cumming & Cooper 1993).

Many species mate on the ground or on vegetation, whereas others gather in mating swarms (Downes 1969; Chvála 1976, 1983). The synchronized movement of adult flies within these mating swarms is the basis for the common name "dance flies" that is sometimes used for the entire group. Members of one large subfamily, the Empidinae, transfer nuptial gifts from male to female during courtship and mating (Cumming 1994). Depending on the species, these nuptial gifts include prey, various types of inedible objects, or secreted balloons (Sinclair et al. 2013). Within the Empidinae, mate choice is generally performed by females that visit male-dominated swarms. However, many species exhibit sex-role reversed courtship behaviour where females

Table 2. Summary of taxonomic changes to the North American genera of Empidoidea since Steyskal and Knutson (1981).

Genera added to North American fauna	
Allodromia Smith, 1962	*Micrempis testacea* Melander, 1928 transferred by Chillcott & Teskey (1983)
Asymphyloptera Collin, 1933	species collected in 1980s and 1990s and described (Sinclair 2015)
Baeodromia Cumming, 2007	genus described for *Drapetis pleuritica* Melander, 1928
Crossopalpus Bigot, 1857	previously a subgenus of *Drapetis* Meigen, 1822
Elaphropeza Macquart, 1828	previously a subgenus of *Drapetis* Meigen, 1822
Lamprempis Wheeler & Melander, 1901	one undescribed species first collected in 1990s
Microphor Macquart, 1828	change in spelling for *Microphorus*
Porphyrochroa Melander, 1928	two undescribed species recently identified
Sabroskyella Wilder, 1982	genus and species described
Saigusamyia Sinclair, 2021	genus and species described
Schistostoma Becker 1902	genus newly recorded in North America
Thalassophorus Saigusa, 1986	species described (Brooks & Cumming 2011)
Trichinomyia Tuomikoski, 1959	genus newly recorded in North America
Zanclotus Wilder, 1982	genus and species described
Undescribed genus A	two described species currently in *Apalocnemis*
Undescribed genus B	one undescribed species identified
Genera removed from North American fauna	
Anthepiscopus Becker, 1891	junior synonym of *Iteaphila* (Sinclair & Shamshev 2021)
Charadrodromia Melander, 1928	junior synonym of *Platypalpus* (Shamshev & Grootaert 2012)
Phyllodromia Zetterstedt, 1837	*P. americana* Melander, 1947 transferred to *Chelipoda* (MacDonald 1993)
Thanategia Melander, 1928	junior synonym of *Chelifera* (MacDonald 1988)
Toreus Melander, 1906	junior synonym of *Hesperempis* (Cumming et al. 2014)

gather in swarms to await males that choose mates. These species exhibit many female secondary sexual characters used in courting males, such as enlarged wings, pinnate leg scales, and eversible abdominal pleural sacs (Cumming 1994).

Material & methods

Specimens and photography

Pinned specimens were selected from the Canadian National Collection of Insects, Arachnids and Nematodes (CNC), Ottawa, Canada and photographed with a Leica camera model DFC5400 using Leica Application Suite X, except as noted in the key and Acknowledgements. Additional photos of live empidoid flies were provided by the photographers and used with permission, as noted in the figure captions and Acknowledgements.

Specimen preparation

Adult empidoids (especially smaller specimens) are best collected directly into 75% ethanol and later critical-point-dried. This prevents shrinkage and distortion often seen in specimens that are mounted directly and allowed to air-dry. Larger specimens can also be mounted on pins directly or preserved in paper triangles, which helps to preserve flat and straight wings. Dried specimens are best glued directly to pins, which allows for easy manipulation and study. Terminalia can be cleared in hot 85% lactic acid, using either a hot plate or microwave oven.

Character selection

The text and character selection is modified from Steyskal & Knutson (1981) and Cumming & Sinclair (2009), with input from Collin (1961). Terms used in the key follow those described in Cumming & Wood (2017).

How to use the key

In the following key to genera, photos of each described character are provided below each couplet. Arrows and labels point out or highlight key features described in the couplet text. Hyperlinks advance the user to the next couplet and to each genus synopsis page. Each couplet has a "back button" (blue arrow at top left corner) which allows the user to return to the previous couplet. Hyperlinks are also included on each genus synopsis page to allow the user to return to the couplet where the genus is identified.

(Key, acknowledgments, and references follow.)

Key to Nearctic genera of Empidoidea
(exclusive of Dolichopodidae sensu stricto)

The illustrated identification key presented here updates the key to "Empididae" of North America north of Mexico by Steyskal & Knutson (1981) in the *Manual of Nearctic Diptera*. This updated key compliments the generic key to "Empididae" in the *Manual of Central American Diptera* by Cumming & Sinclair (2009), which covers Central America and northern Mexico. Together these keys will also help identify most genera found in South America, except for some endemic genera that occur mainly in Chile and Argentina.

START KEY

1 Wing reduced or miniaturized to only slightly longer than thorax (Figs A, B): GO TO COUPLET 2

FIGURES: (**A**) *Chersodromia parallela* (Melander), dorsolateral view of body. (**B**) *C. parallela*, dorsal view of body.

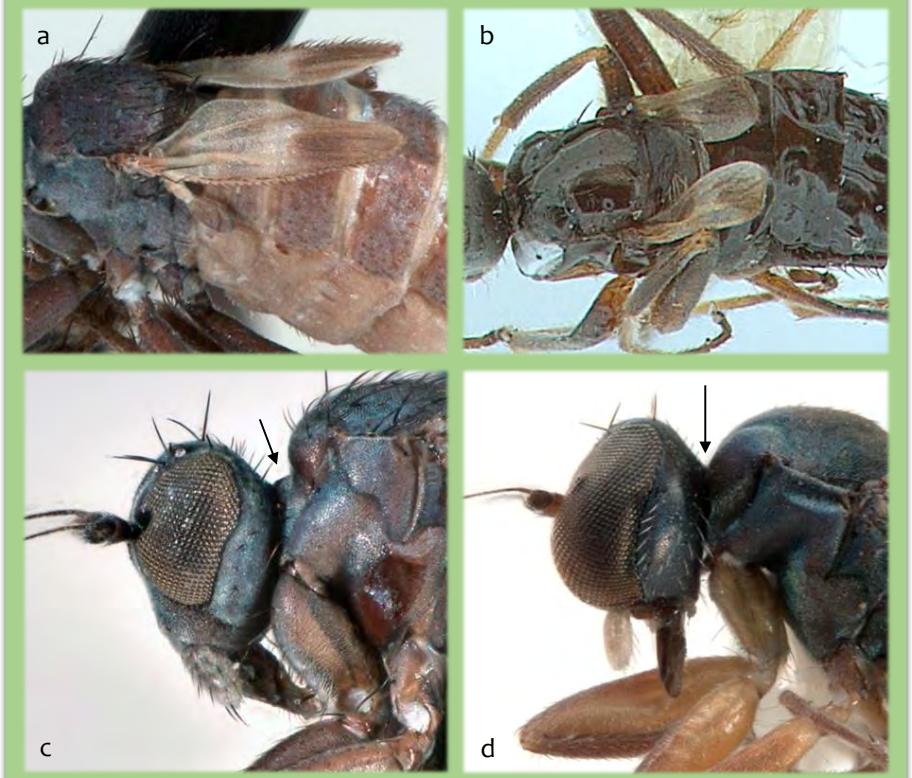
1' Wing well developed, at least twice as long as thorax (Fig. a): GO TO COUPLET 4

FIGURE: (**a**) *Hilara* sp., habitus.

2 Wing narrow, with light round spots (Fig. A); neck arising from near top of head (Fig. B); CLINOCERINAE [in part]: ***DOLICHOCEPHALA*** Macquart [in part]

FIGURES: (**a**) Wing of *Dolichocephala borkenti* Sinclair & MacDonald. (**b**) Head and thorax of *D. argus* Melander.

2' Wing triangular (Fig. a) or rounded (Fig. b), often with darkened apex; neck arising well below top of head (Figs c, d); TACHYDROMIINAE [in part]: **GO TO COUPLET 3**

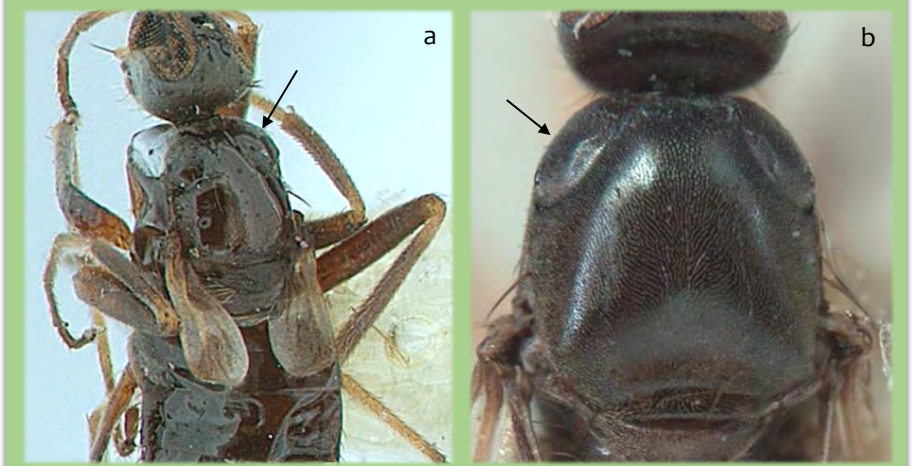


FIGURES: (**A**) Wings and body of *Chersodromia parallela* (Melander), dorsolateral view. (**B**) Wings and body of *Tachyempis* sp., dorsal view; photo by J. Runyon. (**C**) Head and thorax of *C. parallela*. (**D**) Head and thorax of *Tachyempis* sp.

3 Wing triangular (Fig. A); thorax with postpronotal lobe not distinctly differentiated, small (Figs A, B); legs with strong, erect setae (Fig. C): ***CHERSODROMIA*** Walker [in part]

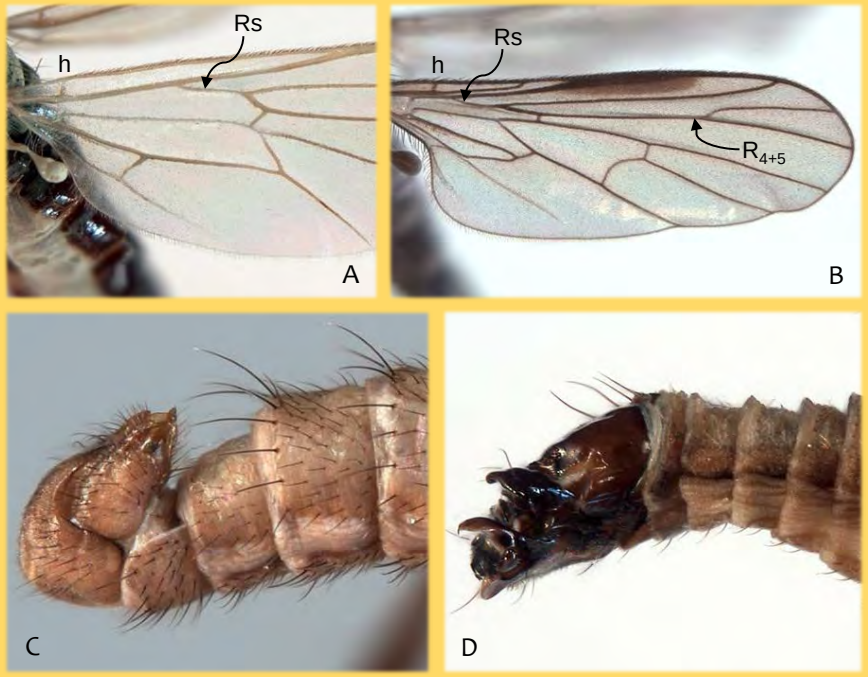
FIGURES: (**A**) Wings and body of *Chersodromia parallela* (Melander), dorsolateral view. (**B**) Thorax of *C. parallela*, dorsal view. (**C**) *C. parallela*, habitus.

3' Wing rounded (Fig. a); thorax with postpronotal lobe distinctly differentiated, large and usually elongate (Figs a, b); legs without strong, erect setae: ***TACHYEMPIS*** Macquart [in part]



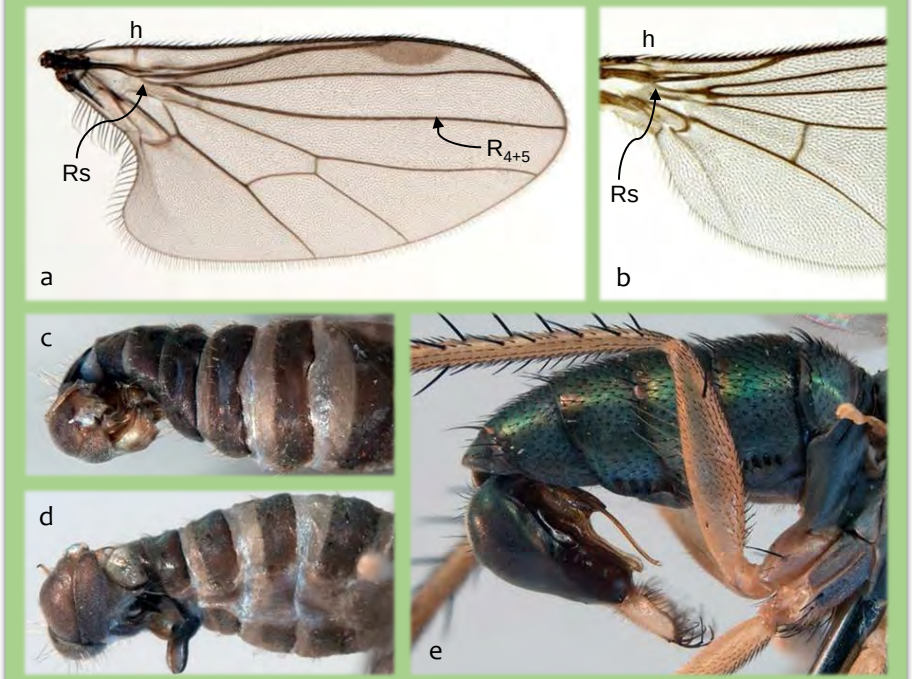
FIGURES: (**a**) Wings and body of *Tachyempis* sp., dorsal view; photo by J. Runyon. **(b)** Thorax of *Tachyempis* sp., dorsal view.

4 Wing (Figs A, B) with vein Rs originating distal to level of crossvein h (except some *Anthalia*); vein R4+5 branched or unbranched; male terminalia not rotated forward beneath or beside abdomen (Figs C, D): **GO TO COUPLET 5**



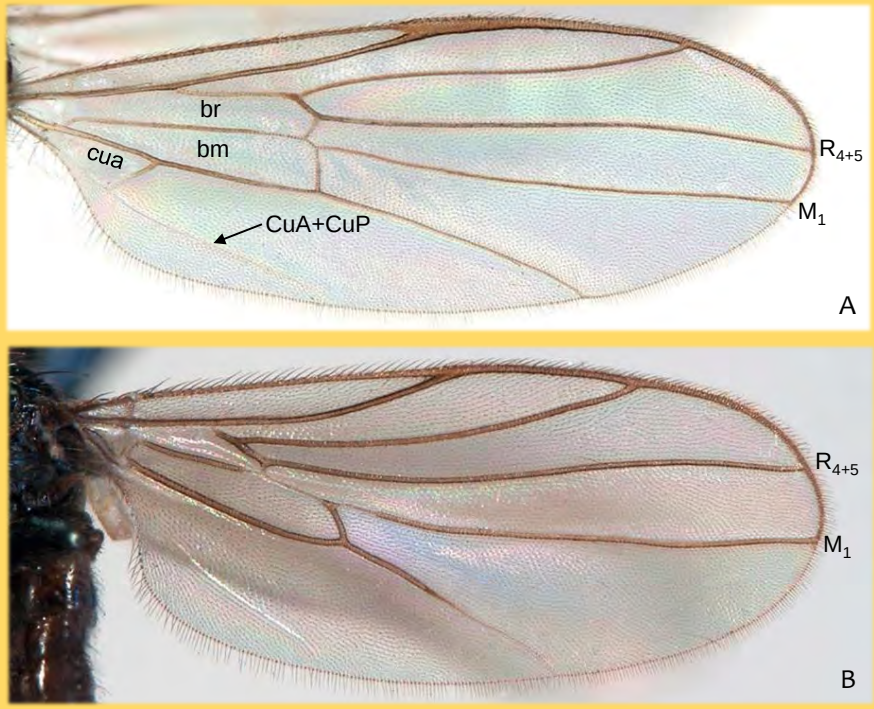
FIGURES: (**A**) Wing of *Platypalpus harpiger* Melander. (**B**) Wing of *Hilara* sp. (**C**) Abdomen and male terminalia of *Hilara* sp. (**D**) Abdomen and male terminalia of *Stilpon chillcotti* Cumming. Abbreviations: h – humeral crossvein; R4+5 – radial vein; Rs – radial sector.

4' Wing (Figs a, b) with vein Rs originating at or near level of crossvein h; vein R4+5 unbranched; male terminalia (Figs c–e) rotated forward and flexed to right, lying beside or beneath abdomen; DOLICHOPODIDAE sensu lato: **GO TO COUPLET 73**



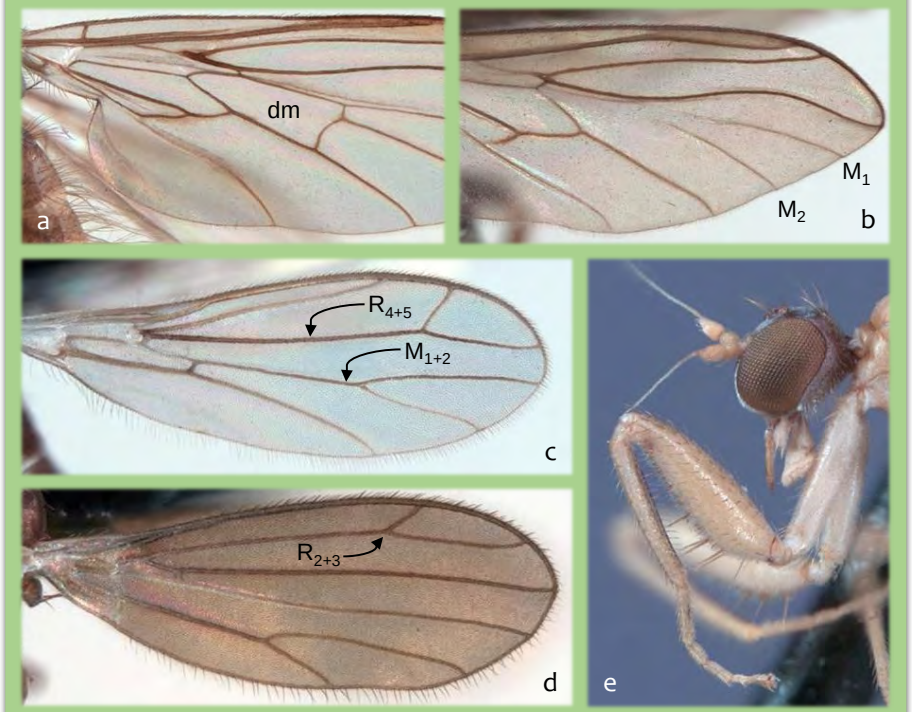
FIGURES: (**a**) Wing of *Microphor obscurus* Coquillett. (**b**) Wing of *Chrysotus* sp. (**c–d**) Abdomen of male *Thalassophorus arnaudi* Brooks & Cumming, dorsal (c) and lateral (d) views. (**e**) Abdomen of male *Dolichopus cuprinus* Wiedemann, lateral view. Abbreviations: h – humeral crossvein; R4+5 – radial vein; Rs – radial sector.

5 Wing (Figs A, B) with cell dm absent, neither vein R4+5 nor M1 forked; all veins running without branching to wing margin; cell cua usually lacking, but when present (Fig. A), shorter than cells bm and br with vein CuA+CuP weak and faint; TACHYDROMIINAE (HYBOTIDAE): GO TO COUPLET 6



FIGURES: (**A**) Wing of *Platypalpus glacialis* Melander. (**B**) Wing of *Crossopalpus setiger* (Loew). Abbreviations: bm – basal medial cell; br – basal radial cell; cua – anterior cubital cell; CuA+CuP – anterior branch + posterior branch of cubital vein; M1 – medial vein; R4+5 – radial vein.

5' Wing with cell dm present (Fig. a) or absent (Figs b–d); when that cell absent, veins R4+5, and/or M1+2 forked (Figs b, c, vein M1+2 evanescent in *Bicellaria* and *Hoplocyrtoma*), or vein R2+3 forked to wing margin (Fig. d), or foreleg markedly raptorial (Fig. e); cell cua usually present, if absent vein R4+5 forked: GO TO COUPLET 20

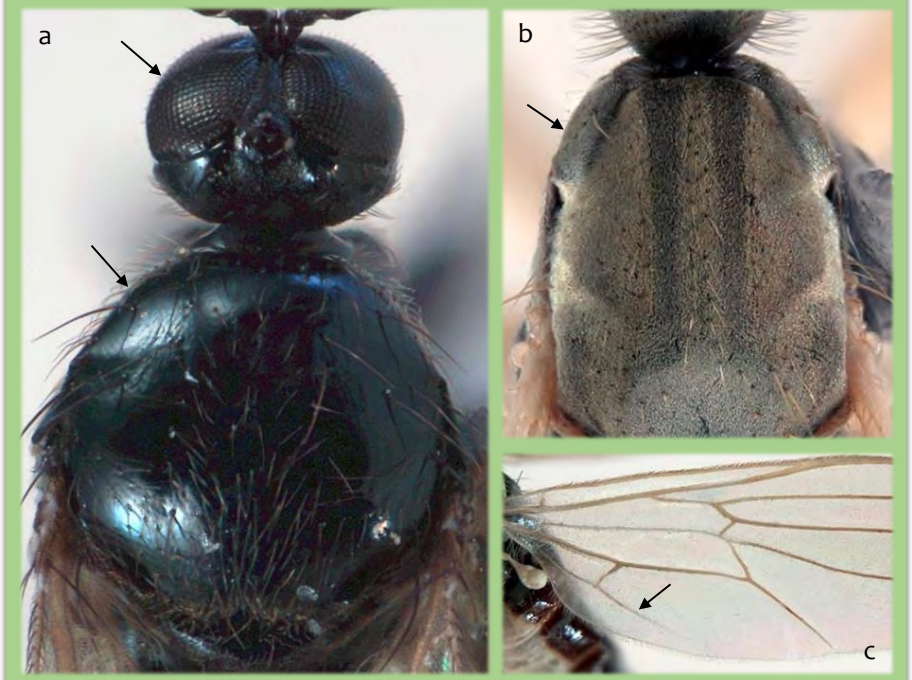


FIGURES: (**a**) Wing of *Rhamphomyia* sp. (**b**) Wing of *Hoplocyrtoma femorata* (Loew). (**c**) Wing of *Hemerodromia oratoria* Strobl. (**d**) Wing of *Asymphyloptera* sp. (Australia). (**e**) Foreleg and head of *Chelipoda praestans* Melander. Abbreviations: dm – discal medial cell; M1+2, M1, M2 – medial veins; R2+3, R4+5 – radial veins.

6 Thorax with postpronotal lobe distinctly differentiated, large and usually elongate (Fig. A); wing with vein CuA+CuP absent (Figs B, C); eyes bare (Fig. A): GO TO COUPLET 7

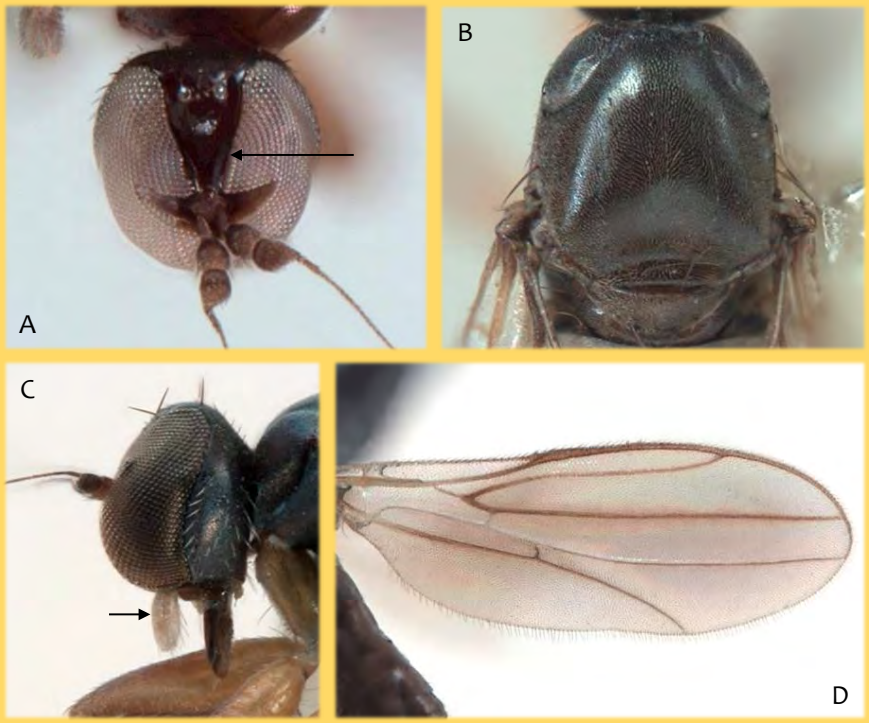
FIGURES: (**A**) Head and thorax of *Tachypeza corticalis* (Melander). (**B**) Wing of *Tachypeza* sp. (**C**) Wing of *Tachydromia* sp.

6' Thorax with postpronotal lobe not distinctly differentiated, usually small (Fig. a), if somewhat large (Fig. b), then wing with vein CuA+CuP present (Fig. c); eyes with tiny ommatrichia (Fig. a), or bare: GO TO COUPLET 9



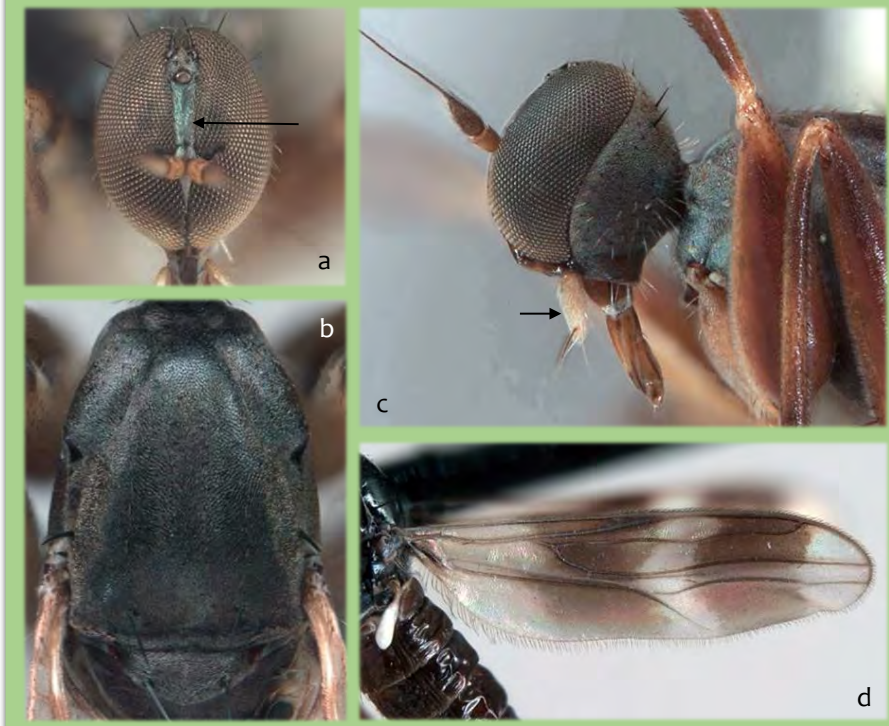
FIGURES: (**a**) Thorax of *Crossopalpus setiger* (Loew). (**b**) Thorax of *Platypalpus* sp. (**c**) Wing of *Platypalpus harpiger* Melander.

7 Head with frons fairly broad and V-shaped, sides divergent above (Fig. A); thorax with scutum only slightly longer than broad (Fig. B); palpus usually oval, often subequal in length to short proboscis (Fig. C); wing usually hyaline to slightly infuscate (Fig. D): ***TACHYEMPIS*** Melander



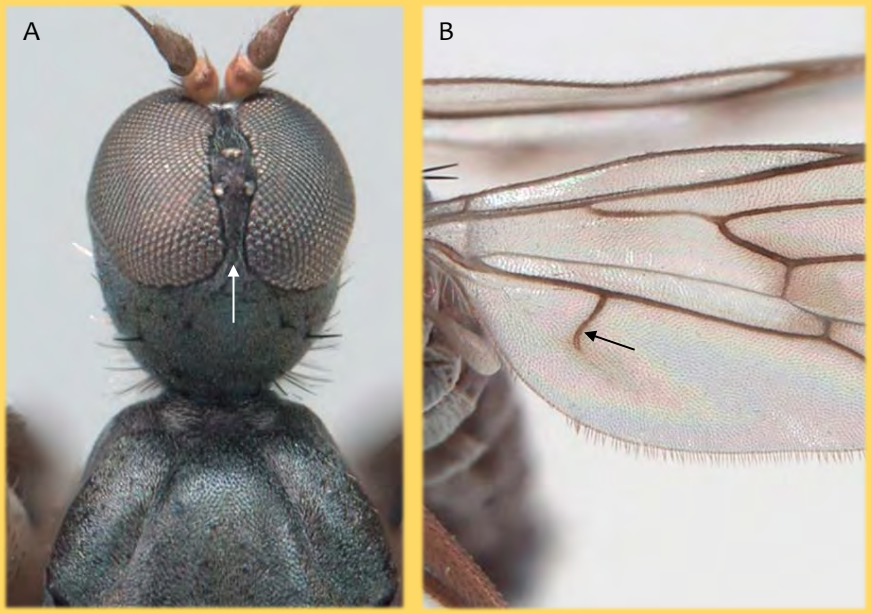
FIGURES: (**A**) Head of *Tachyempis* sp., dorsal view. (**B**) Thorax of *Tachyempis* sp. (**C**) Head of *Tachyempis* sp., lateral view. (**D**) Wing of *Tachyempis* sp.

7' Head with frons narrow, sides nearly parallel (Fig. a); thorax with scutum much longer than broad (Fig. b); palpus usually narrow and shorter than proboscis (Fig. c); wing usually patterned with crossbands (Fig. d) or heavily infuscate: **GO TO COUPLET 8**



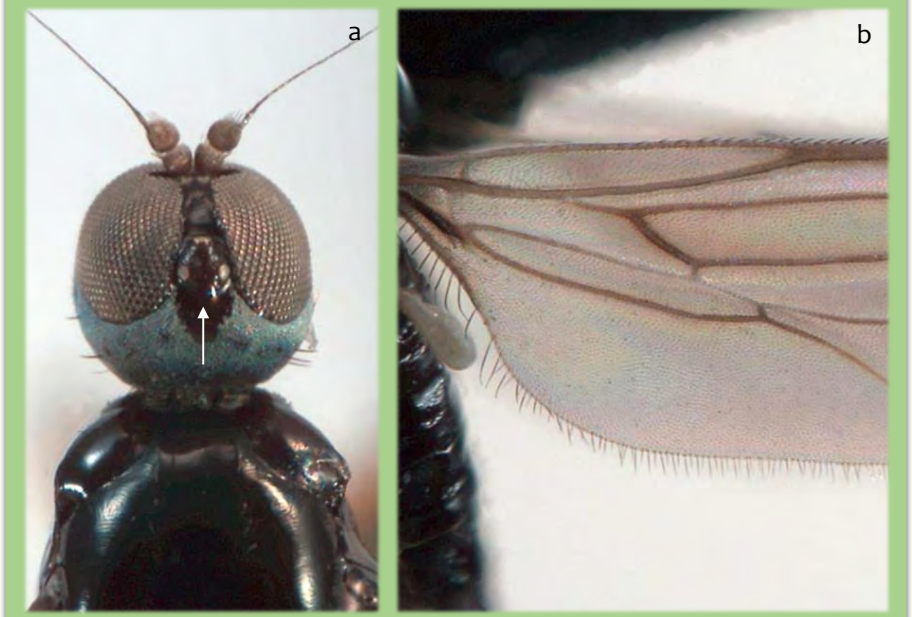
FIGURES: (**a**) Head of *Tachypeza corticalis* (Melander), anterior view. (**b**) Thorax of *T. corticalis*. (**c**) Head of *T. corticalis*, lateral view. (**d**) Wing of *Tachydromia* sp.

8 Eyes with upper margins extending far beyond ocellar tubercle, slightly convergent or parallel behind ocellar tubercle with distance between eyes usually slightly narrower than frons (Fig. A); wing with vein CuA usually present (Fig. B): ***TACHYPEZA*** Meigen



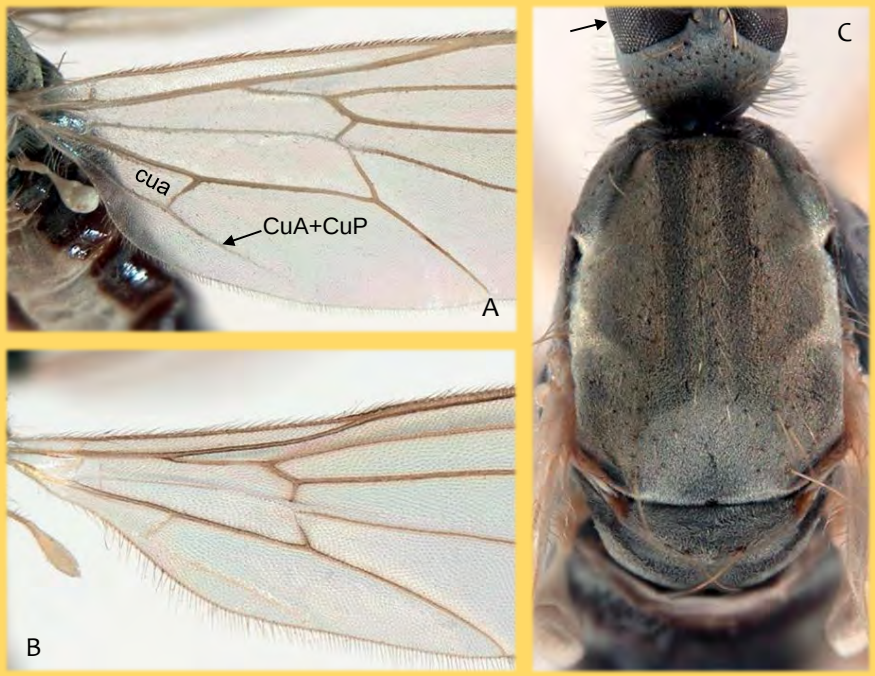
FIGURES: (**A**) Head of *Tachypeza corticalis* (Melander), dorsal view. (**B**) Wing of *Tachypeza* sp.

8' Eyes with upper margins closer to level of ocellar tubercle, divergent near ocellar tubercle with distance between eyes wider than frons (Fig. a); wing with vein CuA absent (Fig. b): ***TACHYDROMIA*** Meigen



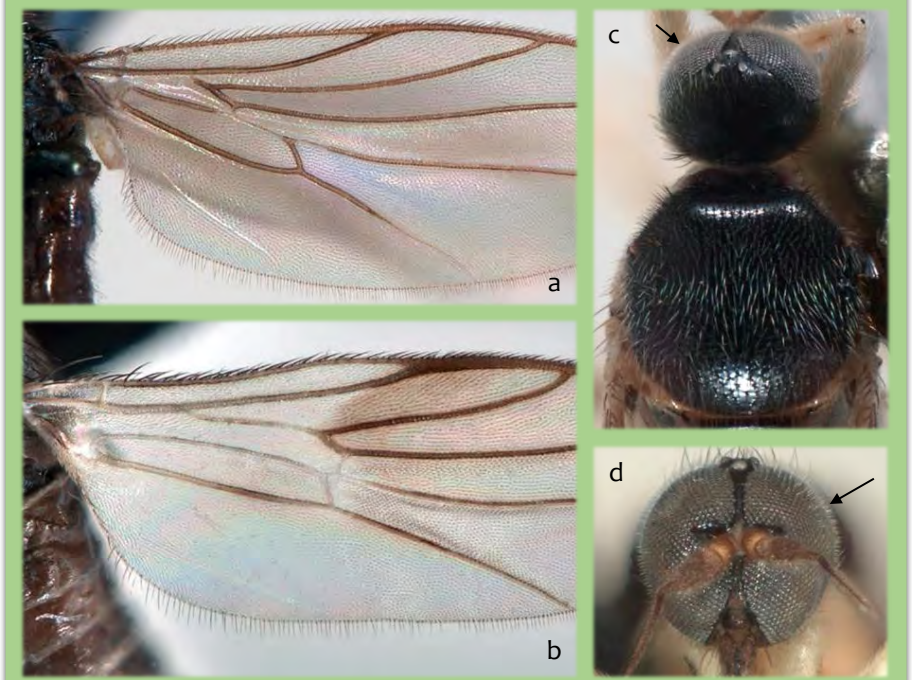
FIGURES: (**a**) Head of *Tachydromia* sp., dorsal view. (**b**) Wing of *Tachydromia* sp.

9 Wing cell cua more or less formed with vein CuA usually distinct and vein CuA+CuP present (Figs A, B), although sometimes both veins faint (Fig. B); thorax with scutum longer or slightly longer than broad (Fig. C); eyes bare (Fig. C): GO TO COUPLET 10



FIGURES: (**A**) Wing of *Platypalpus harpiger* Melander. (**B**) Wing of *Symballophthalmus* sp. (**C**) Head and thorax of *Platypalpus* sp. Abbreviations: cua – anterior cubital cell; CuA+CuP – anterior branch + posterior branch of cubital vein.

9' Wing cell cua absent without vein CuA, vein CuA+CuP sometimes apparent but usually faint (Figs a, b); thorax with scutum not longer than broad (Fig. c); eyes with tiny ommatrichia (Figs c, d): GO TO COUPLET 12



FIGURES: (**a**) Wing of *Crossopalpus setiger* (Loew). (**b**) Wing of *Chersodromia* sp. (**c**) Head and thorax of *Megagrapha exquiseta* Malloch, dorsal view. (**d**) Head of *M. exquiseta*, anterior view.

10 Legs with mid femur thickened, armed with rows of spine-like setae and/or longer bristle-like setae ventrally; mid tibia often ending in sharp spur (Fig. A): ***PLATYPALPUS*** Macquart [in part]

FIGURE: (**A**) Midleg of *Platypalpus* sp.

10' Legs with mid femur slender, not thickened; mid tibia usually without spur, rarely ending in short black spur (Fig. a): GO TO COUPLET 11

FIGURE: (**a**) Midleg of *Symballophthalmus masoni* Chillcott.

11 Wing without anal lobe, narrowly tapered to base (Fig. A); small sized specimens (3–4 mm); eastern: ***SYMBALLOPHTHALMUS*** Becker

FIGURE: (**A**) Wing of *Symballophthalmus* sp.

11' Wing with narrow anal lobe, moderately broad at base (Fig. a); tiny to very small specimens (less than 2 mm); western: ***PLATYPALPUS*** Macquart [in part]

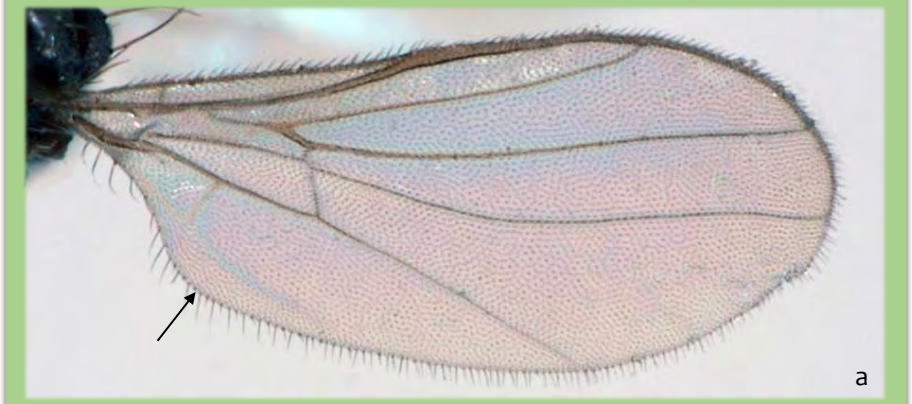


FIGURE: (**a**) Wing of *Platypalpus tanbarkiensis* Shamshev & Grootaert.

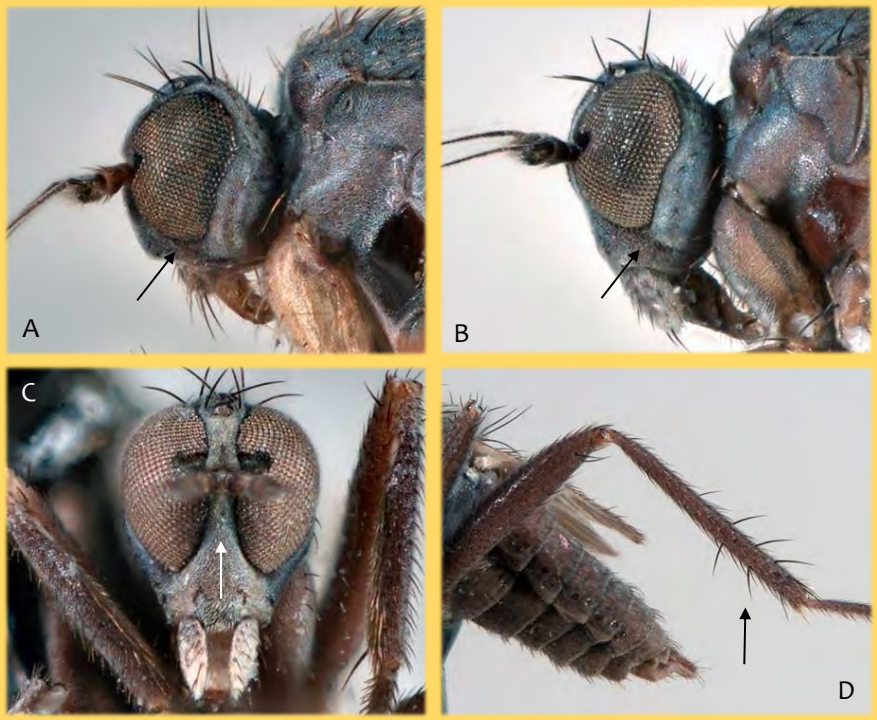
12 Wing with cells br and bm aligned apically (Figs A–D):
GO TO COUPLET 13

FIGURES: (**A**) Wing of *Chersodromia* sp. (**B**) Wing of female *Megagrapha exquiseta* Malloch. (**C**) Wing of *Micrempis bomboxynon* Chillcott. (**D**) Wing of *Allodromia wirthi* Chillcott (Dominica). Abbreviations: bm – basal medial cell; br – basal radial cell.

12' Wing with cell br ending distinctly short of apex of cell bm (Figs a, b):
GO TO COUPLET 16

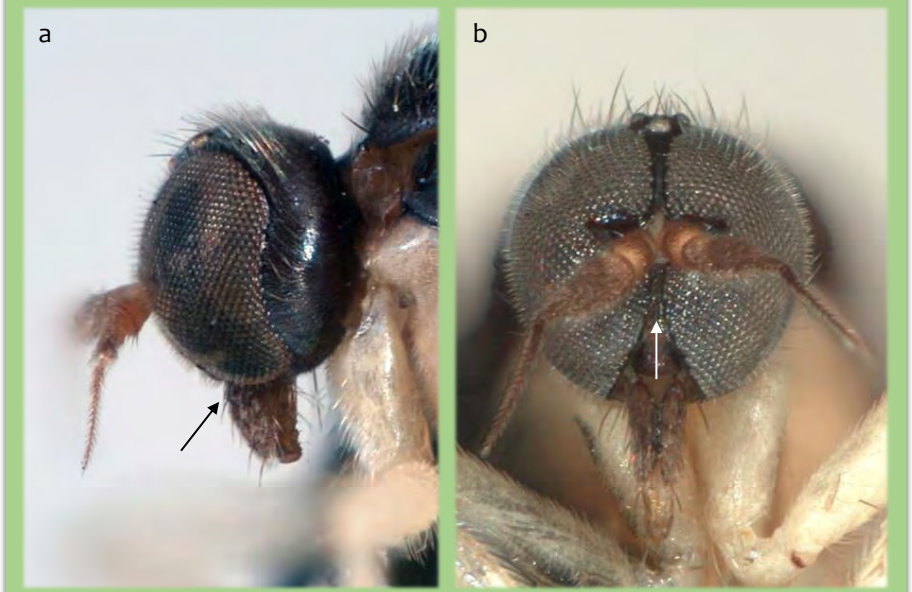
FIGURES: (**a**) Wing of *Crossopalpus setiger* (Loew). (**b**) Wing of *Elaphropeza* sp. Abbreviations: bm – basal medial cell; br – basal radial cell.

13 Head with gena distinctly extended below eye (Figs A–C); eyes usually widely separated on face and frons (Fig. C); legs with strong bristle-like setae, particularly on hind tibia (Fig. D): ***CHERSODROMIA*** Walker [in part]



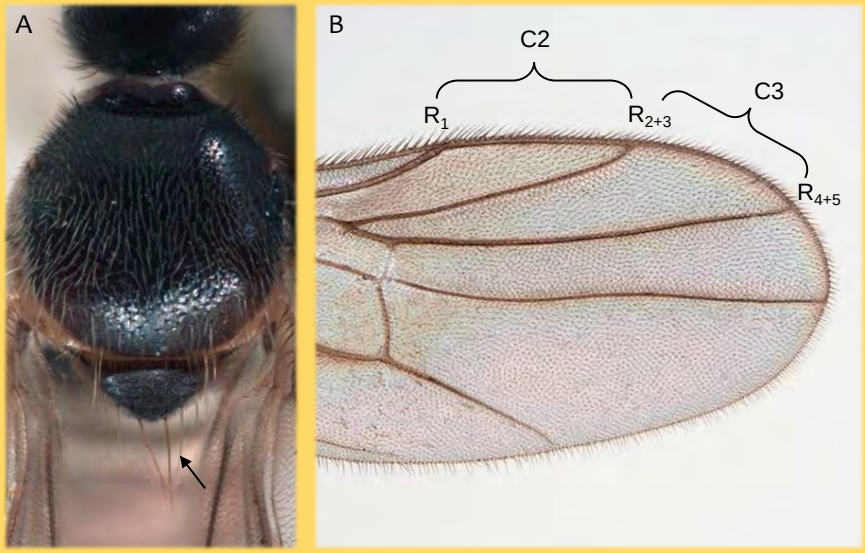
FIGURES: (**A**) Head of *Chersodromia* sp., lateral view (**B**) Head of *Chersodromia* sp., lateral view (**C**) Head of *Chersodromia* sp., anterior view (**D**) Hindleg of *C. parallela* (Melander).

13' Head with gena scarely extended below eye (Fig. a); eyes at least nearly contiguous on face (Fig. b); leg chaetotaxy variable: **GO TO COUPLET 14**



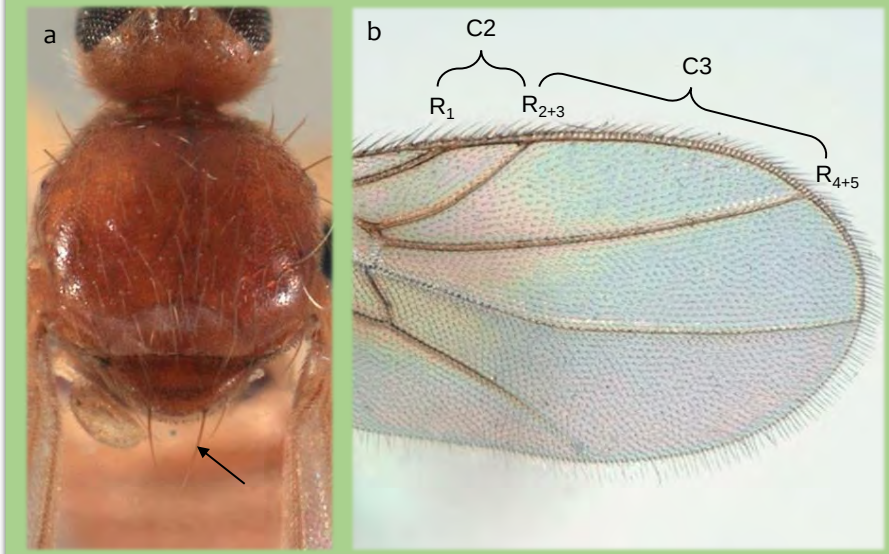
FIGURES: (**a**) Head of *Megagrapha exquiseta* Malloch, lateral view. (**b**) Head of *M. exquiseta*, anterior view

14 Thorax with 3–4 pairs of strong scutellar setae (Fig. A); wing with vein R2+3 straight or only slightly curved so that second costal section (C2) between veins R1 and R2+3 usually longer than, or at least equal to, third section (C3) between veins R2+3 and R4+5 (Fig. B): ***MEGAGRAPHA*** Melander



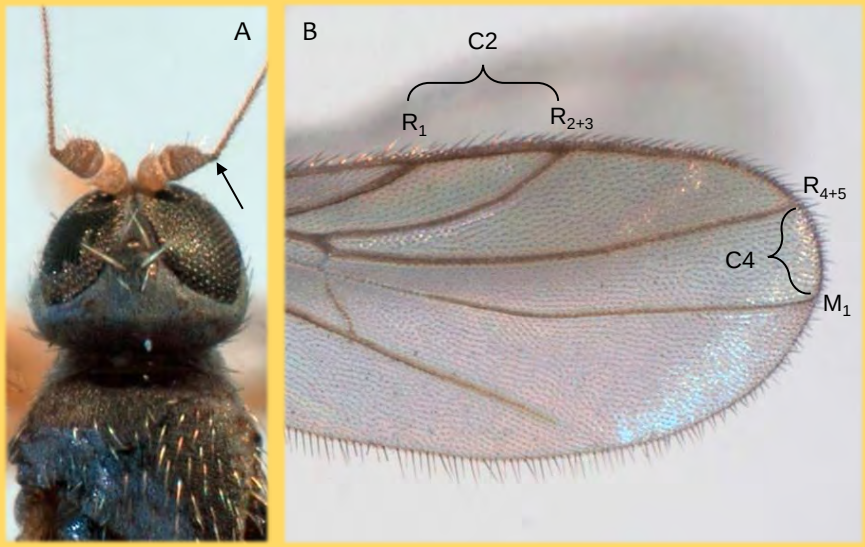
FIGURES: (**A**) Thorax of *Megagrapha exquiseta* Malloch. (**B**) Wing of *M. exquiseta*. Abbreviations: C2, C3 – costal sections; R1, R2+3, R4+5 – radial veins.

14' Thorax with 1–2 pairs of strong scutellar setae (Fig. a); wing with vein R2+3 strongly curved upwards so that second costal section (C2) between veins R1 and R2+3 distinctly shorter than third section (C3) between veins R2+3 and R4+5 (Fig. b): **GO TO COUPLET 15**



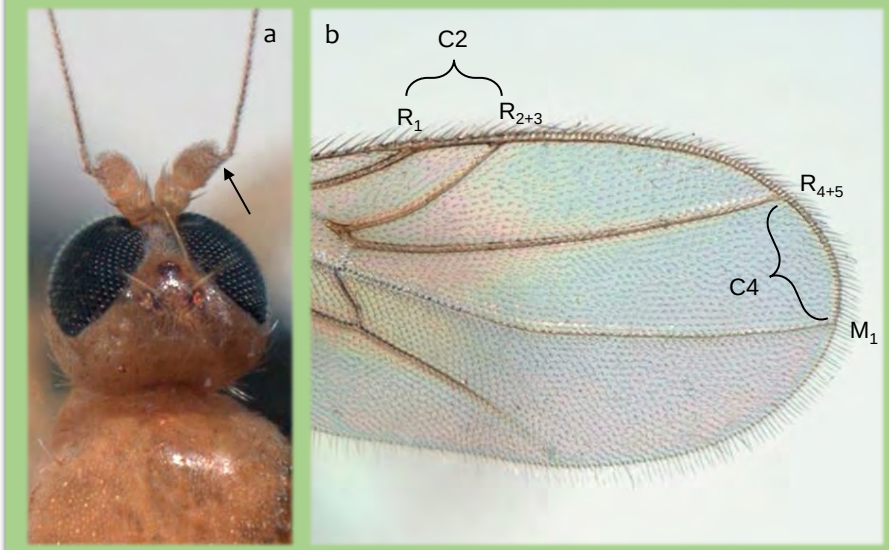
FIGURES: (**a**) Thorax of *Allodromia wirthi* Chillcott (Dominica). (**b**) Wing of *A. wirthi* (Dominica). Abbreviations: C2, C3 – costal sections; R1, R2+3, R4+5 – radial veins.

15 Antenna with arista-like stylus terminal (Fig. A); wing with second costal section (C2) between veins R1 and R2+3 longer than fourth section (C4) between veins R4+5 and M1 (Fig. B); male terminalia with short non-filamentous phallus: ***MICREMPIS*** Melander



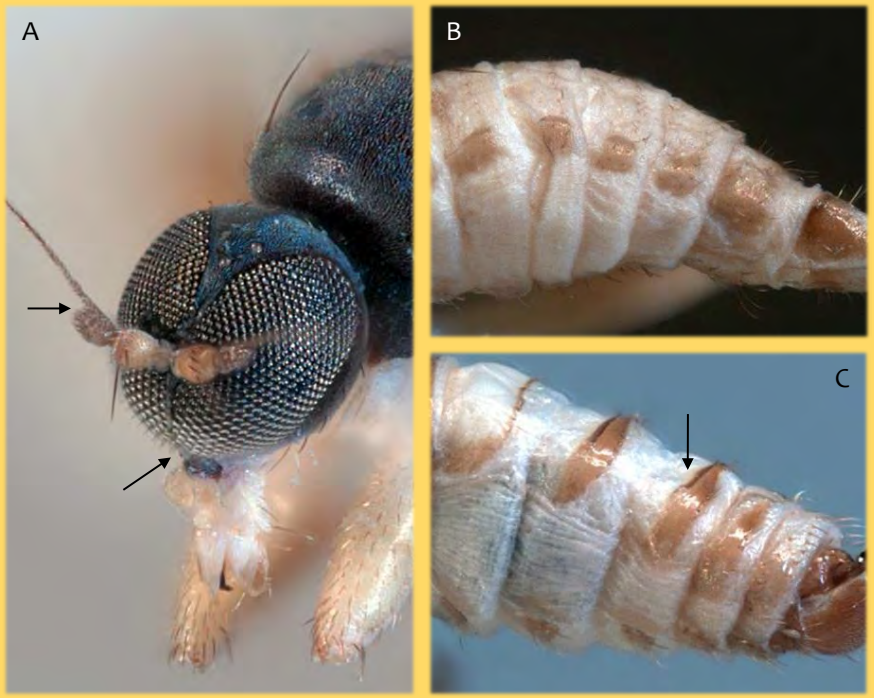
FIGURES: (**A**) Head of *Micrempis bomboxynon* Chillcott. (**B**) Wing of *M. bomboxynon*. Abbreviations: C2, C4 – costal sections; M1 – medial vein; R1, R2+3, R4+5 – radial veins.

15' Antenna with arista-like stylus subterminal and dorsal (Fig. a); wing with second costal section (C2) between R1 and R2+3 shorter or equal to fourth section (C4) between veins R4+5 and M1 (Fig. b); male terminalia with long filamentous phallus: ***ALLODROMIA*** Smith



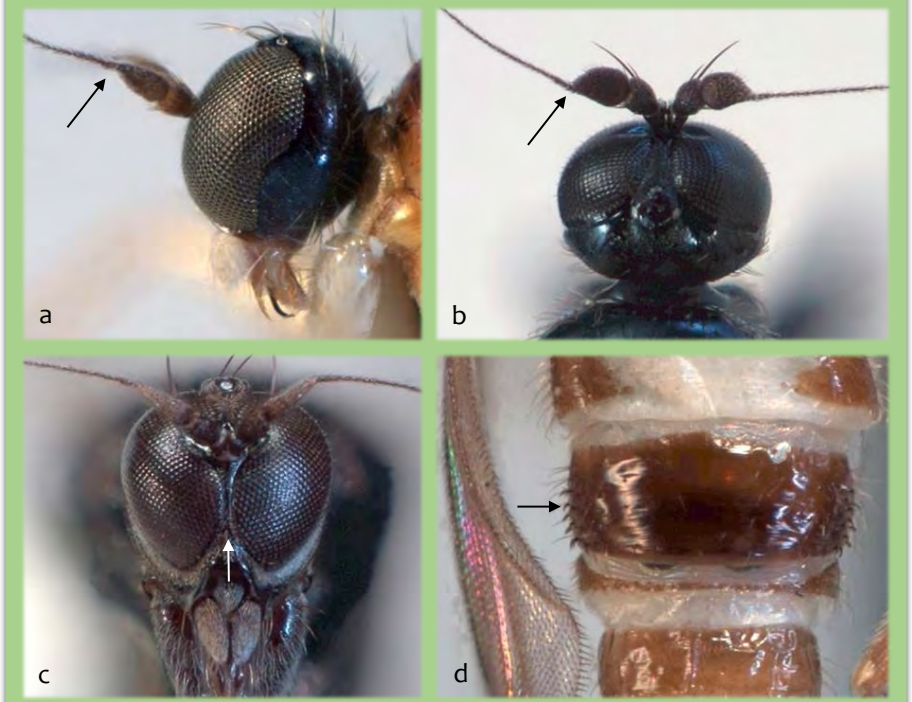
FIGURES: (**a**) Head of *Allodromia wirthi* Chillcott (Dominica). (**b**) Wing of *A. wirthi* Chillcott (Dominica). Abbreviations: C2, C4 – costal sections; M1 – medial vein; R1, R2+3, R4+5 – radial veins.

16 Antenna with arista-like stylus dorsal, postpedicel short and round (Fig. A); eyes contiguous on face (Fig. A); abdominal tergites without squamiform (scale-like) setae (Figs B, C): GO TO COUPLET 17



FIGURES: (**A**) Head of *Baeodromia pleuritica* (Melander). (**B**) Abdomen of *Stilpon chillcotti* Cumming, lateral view. (**C**) Abdomen of *Baeodromia* sp. (Costa Rica), lateral view.

16' Antenna with arista-like stylus terminal or subterminal, postpedicel short-oval or lanceolate or conical (Figs a, b); eyes usually narrowly separated on face (Fig. c), if apparently contiguous then some abdominal tergites with squamiform (scale-like) setae laterally (Fig. d): GO TO COUPLET 18

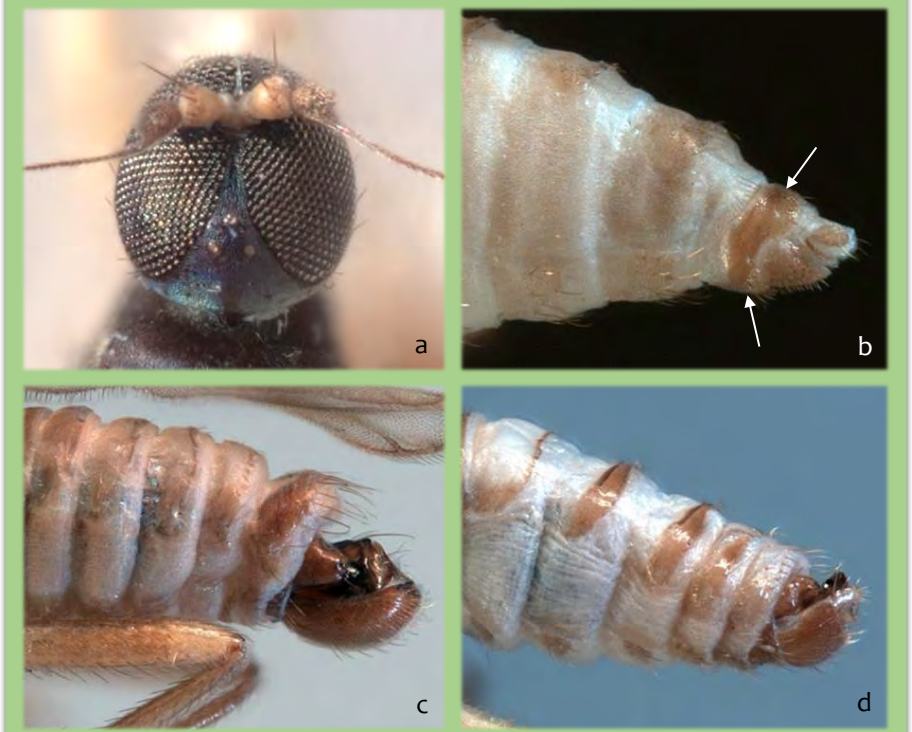


FIGURES: (**a**) Head of *Elaphropeza* sp. (**b**) Head of *Crossopalpus setiger* (Loew), dorsal view. (**c**) Head of *C. setiger*, anterior view. (**d**) Abdominal tergites of *Elaphropeza* sp., dorsal view.

17 Head with margins of frons nearly parallel (Fig. A); male terminalia large (Fig. C) with one slender internal apodeme; female terminalia with tergite and sternite 8 separated laterally (Fig. B): ***STILPON*** Loew

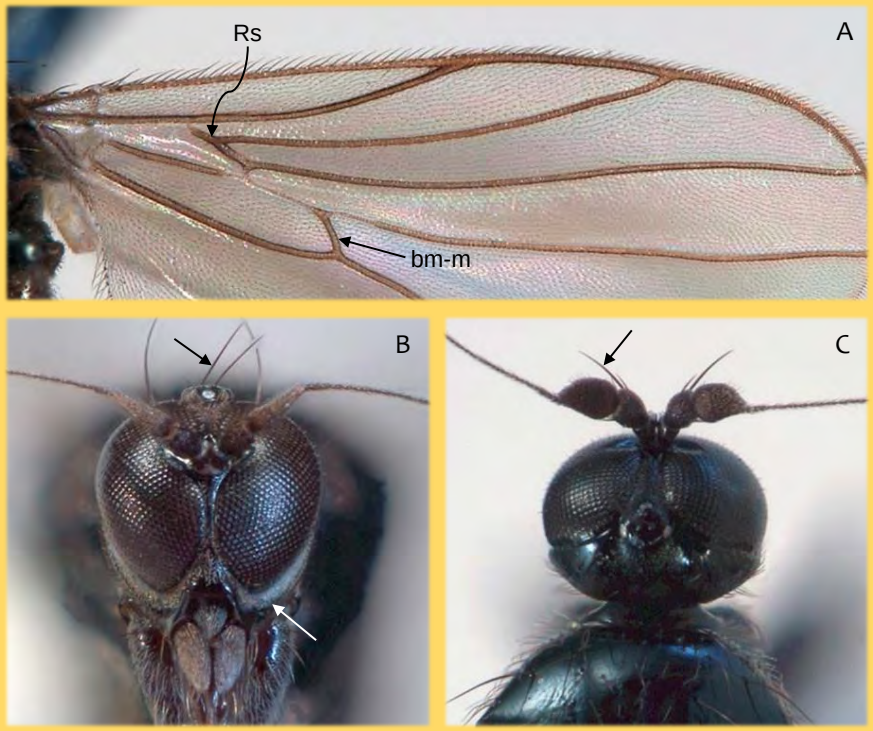
FIGURES: (**A**) Head of *Stilpon chillcotti* Cumming, dorsal view. (**B**) Female terminalia of *S. chillcotti*. (**C**) Abdomen and male terminalia of *S. chillcotti*.

17' Head with margins of frons strongly divergent dorsally (Fig. a); male terminalia small (Figs c, d) with two slender internal apodemes; female terminalia with tergite and sternite 8 fused together laterally to form ring segment (Fig. b): ***BAEODROMIA*** Cumming



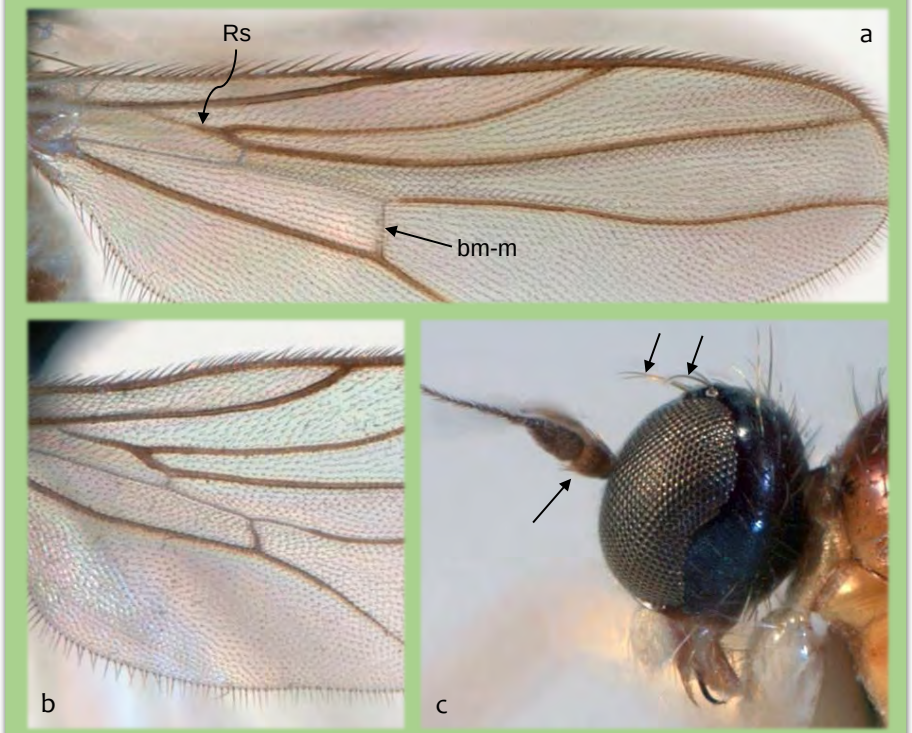
FIGURES: (**a**) Head of *Baeodromia pleuritica* (Melander), dorsal view. (**b**) Female terminalia of *B. pleuritica*. (**c**) Abdomen and male terminalia of *Baeodromia* sp. (Costa Rica). (**d**) Abdomen and male terminalia of *Baeodromia* sp. (Costa Rica).

18 Wing vein Rs short, as short or shorter than bm-m crossvein (Fig. A); head with gena distinctly developed below eye (Fig. B); 1 pair of ocellar setae present (Fig. B); antennal pedicel with distinct ventral bristle-like seta (Fig. C): ***CROSSOPALPUS*** Bigot



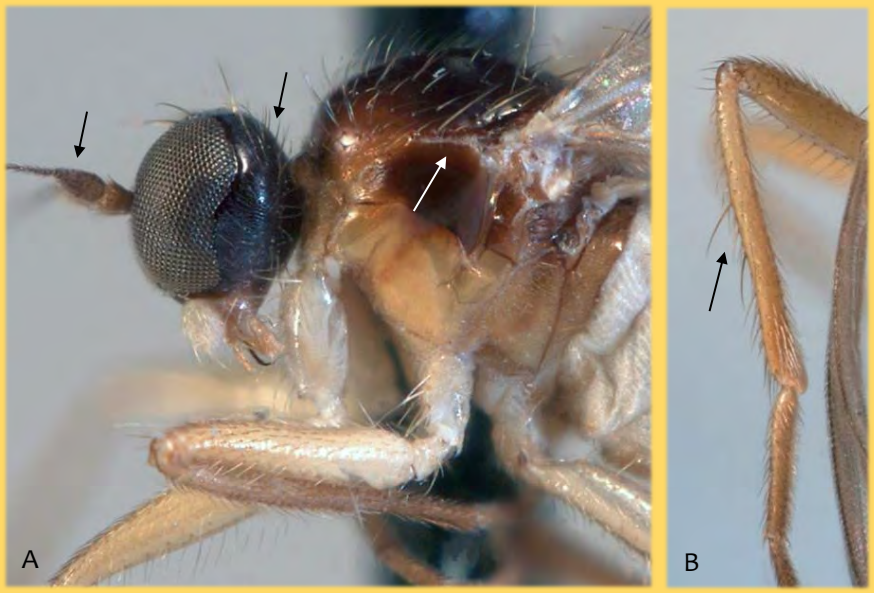
FIGURES: (**A**) Wing of *Crossopalpus setiger* (Loew). (**B**) Head of *C. setiger*, anterior view. (**C**) Head of *C. setiger*, dorsal view. Abbreviations: bm-m – basal medial crossvein; Rs – radial sector.

18' Wing vein Rs long, longer than bm-m crossvein (Figs a, b); head with gena scarcely extended below eye; 2 pairs of ocellar setae present (Fig. c); pedicel usually without distinct ventral bristle-like seta (Fig. c): **GO TO COUPLET 19**



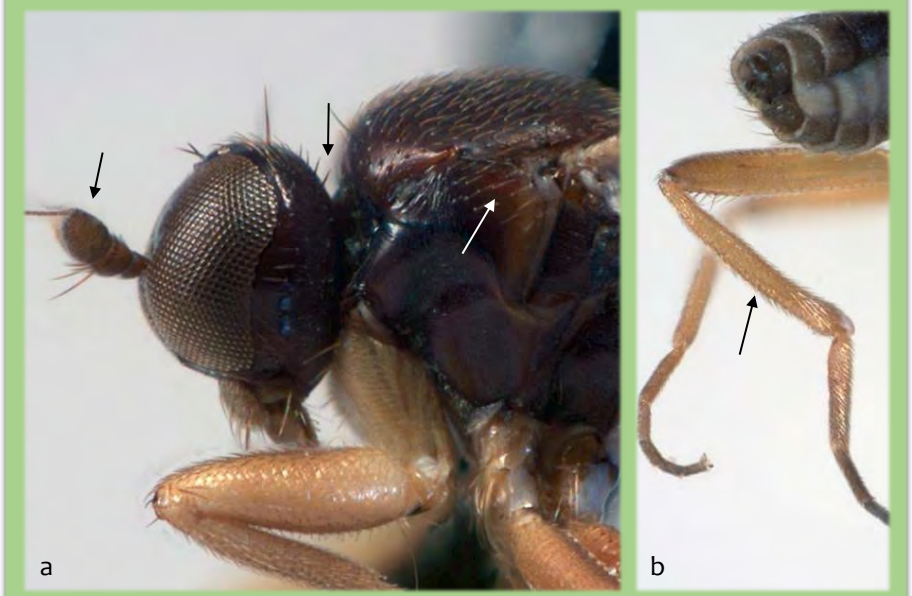
FIGURES: (**a**) Wing of *Elaphropeza* sp. (**b**) Wing of *Drapetis* sp. (**c**) Head of *Elaphropeza* sp. Abbreviations: bm-m – basal medial crossvein; Rs – radial sector.

19 Thorax with anepisternum bare and shiny (Fig. A); antenna with postpedicel conical to lanceolate (Fig. A); head with occiput convex (Fig. A); hind tibia usually with 1–2 long erect anterodorsal bristle-like setae (Fig. B); body often with yellowish markings: ***ELAPHROPEZA*** Macquart



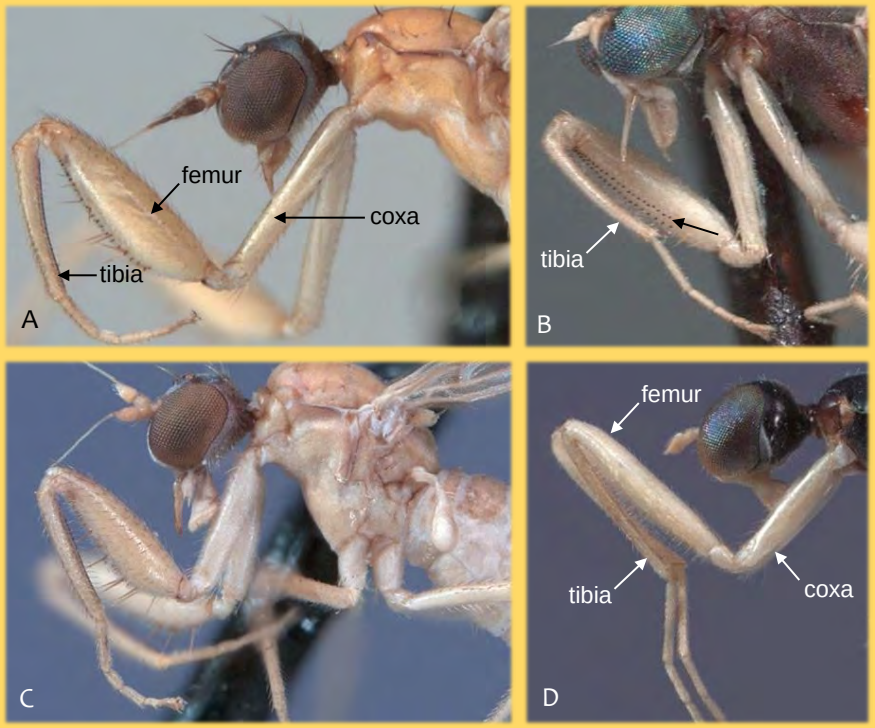
FIGURES: (**A**) Head and thorax of *Elaphropeza* sp. (**B**) Hindleg of *Elaphropeza* sp.

19' Thorax with scattered setulae on anepisternum, at least dorsally (Fig. a), if bare (rarely) then anepisternum tomentose; antenna with postpedicel oval to conical (Fig. a); head with occiput somewhat flattened (Fig. a); hind tibia without long anterodorsal bristle-like setae (Fig. b), occasionally with fringe of fine dorsal setae; body primarily dark brown to black: ***DRAPETIS*** Meigen



FIGURES: (**a**) Head and thorax of *Drapetis* sp. (**b**) Hindleg of *Drapetis* sp.

20 Fore coxa at least two-thirds length of fore femur (Figs A–D); fore femur with 1–2 rows of black, peg-like setae ventrally (Figs A, B); fore femur width usually 2–3 times that of fore tibia (Figs A, C, except *Neoplasta*, Fig. D); HEMERODROMIINAE (EMPIDIDAE): GO TO COUPLET 21

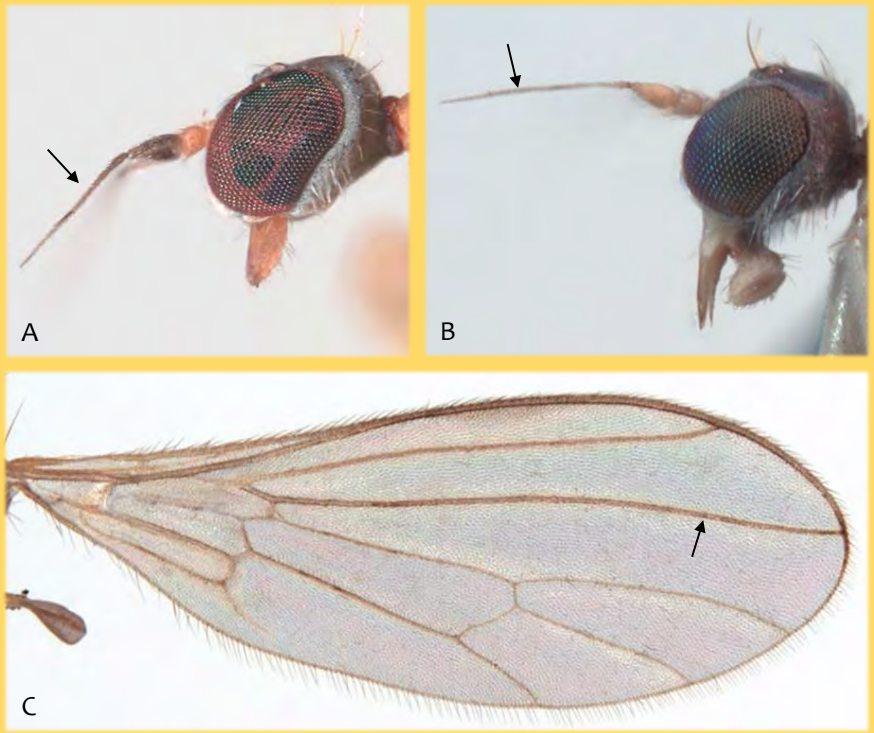


FIGURES: (**A**) Foreleg, head and thorax of *Chelipoda elongata* (Melander). (**B**) Foreleg and head of *Hemerodromia glabella* MacDonald. (**C**) Foreleg, head and thorax of *Chelipoda praestans* Melander. (**D**) Foreleg and head of *Neoplasta deyrupi* MacDonald & Turner.

20' Fore coxa (Fig. a) less than two-thirds length of fore femur; fore femur lacking black, peg-like setae ventrally (bristle-like setae present in some taxa); fore femur width usually less than 1.5 times that of fore tibia: GO TO COUPLET 25

FIGURE: (**a**) Foreleg, head and thorax of *Hilara* sp.

21 Antenna ending in long, slender arista-like stylus, twice as long as postpedicel (Figs A, B); wing vein R4+5 unbranched (Fig. C): ***CHELIPODA*** Macquart



FIGURES: (**A**) Head of *Chelipoda elongata* (Melander). (**B**) Head of *C. praestans* Melander. (**C**) Wing of *C. praestans*.

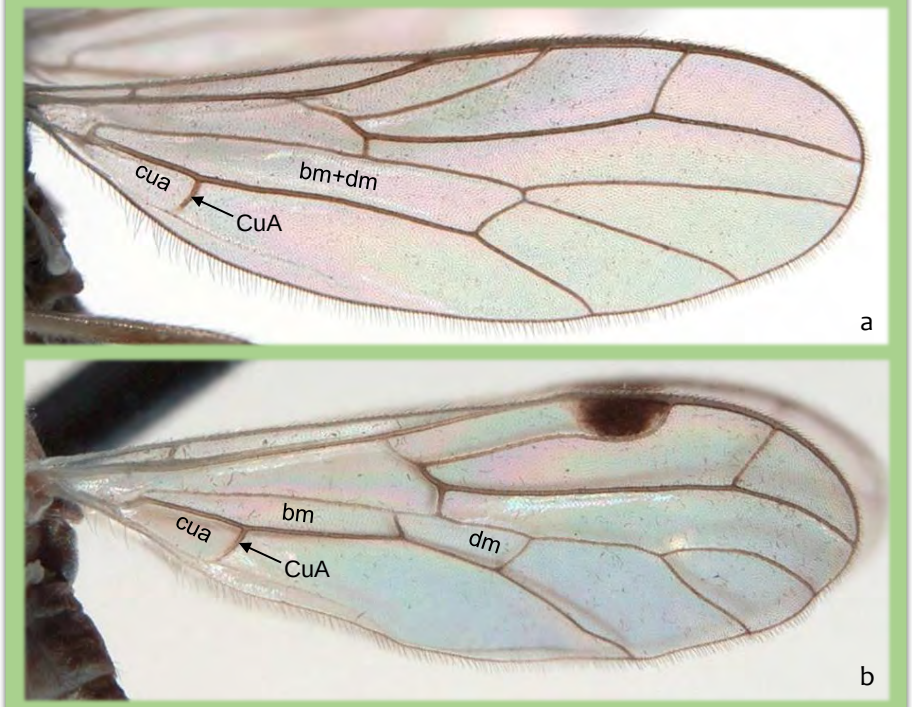
21' Antenna ending in short stylus (Figs a, b); wing vein R4+5 branched (Fig. c): GO TO COUPLET 22

FIGURES: (**a**) Head of *Hemerodromia glabella* MacDonald. (**b**) Head of *Metachela collusor* (Melander). (**c**) Wing of *Neoplasta paramegorchis* MacDonald & Turner.

22 Wing (Fig. A) with cell cua, vein CuA and cell dm absent; cell bm not extending to mid-length of wing: ***HEMERODROMIA*** Meigen

FIGURE: (**A**) Wing of *Hemerodromia oratoria* Fallén. Abbreviation: bm – basal medial cell.

22' Wing with cell cua and vein CuA present (Figs a, b); cell dm (Fig. b), or cell bm+dm (Fig. a) present; cell bm+dm extending beyond mid-length of wing: **GO TO COUPLET 23**



FIGURES: (**a**) Wing of *Neoplasta paramegorchis* MacDonald & Turner. (**b**) Wing of *Chelifera subnotata* MacDonald. Abbreviations: bm – basal medial cell; bm+dm – basal medial cell + discal medial cell; cua – anterior cubital cell; CuA – anterior branch of cubital vein; dm – discal medial cell.

23 Wing (Fig. A) with veins M1 and M2 arising separately from fused cell bm+dm: ***NEOPLASTA*** Coquillett

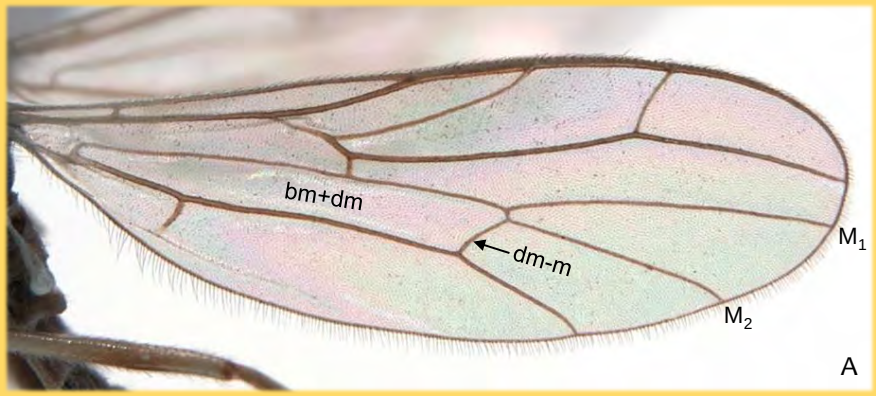
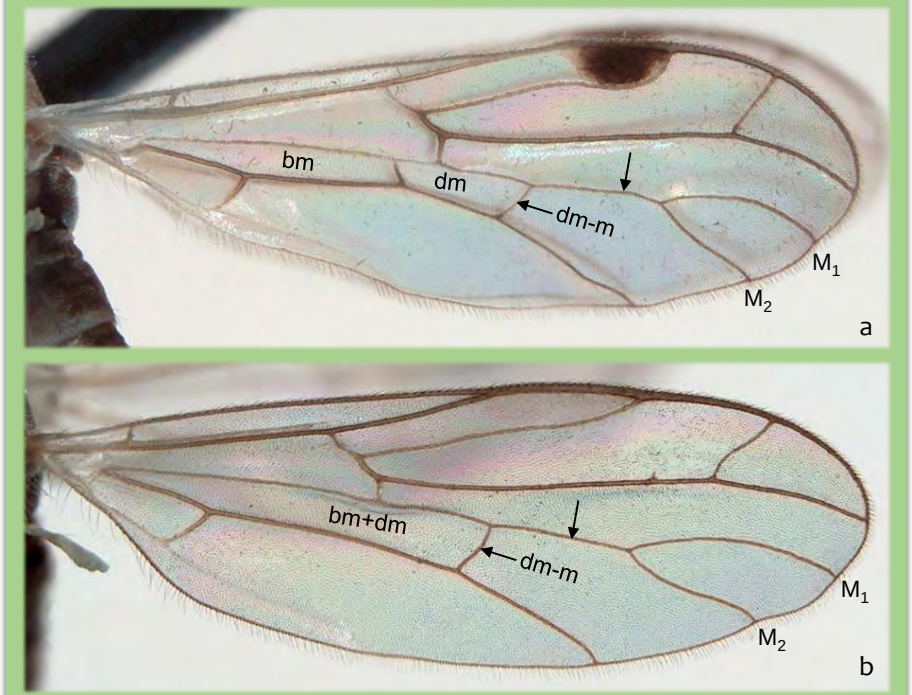


FIGURE: (**A**) Wing of *Neoplasta paramegorchis* MacDonald & Turner. Abbreviations: bm+dm – basal medial cell + discal medial cell; dm-m – discal medial crossvein; M1, M2 – medial veins.

23' Wing (Figs a, b) with veins M1 and M2 petiolate, with common stem arising from anterior end of crossvein dm-m: **GO TO COUPLET 24**



FIGURES: (**a**) Wing of *Chelifera subnotata* MacDonald. (**b**) Wing of *Metachela collusor* (Melander). Abbreviations: bm – basal medial cell; bm+dm – basal medial cell + discal medial cell; dm – discal medial cell; dm-m – discal medial crossvein; M1, M2 – medial veins.

24 Wing (Fig. A) with cells bm and dm fused, crossvein bm-m absent: ***METACHELA*** Coquillett

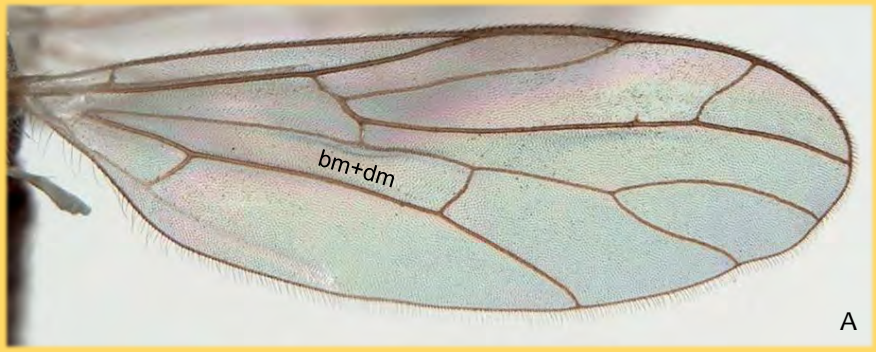


FIGURE: (**A**) Wing of *Metachela collusor* (Melander). Abbreviation: bm+dm – basal medial cell + discal medial cell.

24' Wing (Fig. a) with cells bm and dm separated by crossvein bm-m: ***CHELIFERA*** Macquart

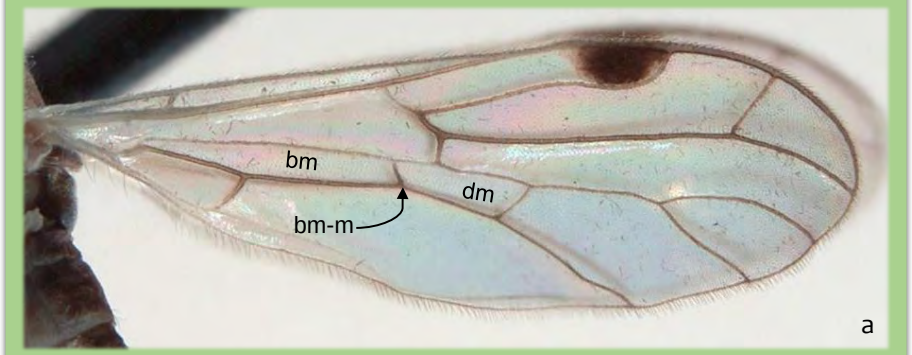
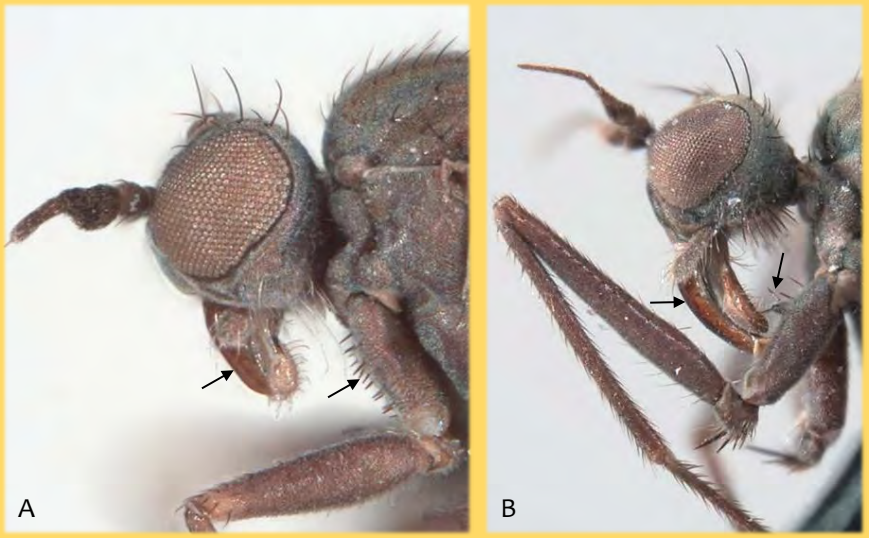


FIGURE: (**a**) Wing of *Chelifera subnotata* MacDonald. Abbreviations: bm – basal medial cell; bm-m – basal medial crossvein; dm – discal medial cell.

25 Fore coxa with erect, spine-like setae, sometimes on tubercle (Figs A, B); mouthparts with labrum recurved, large and prominent (Figs A, B); RAGADINAE (EMPIDIDAE) [in part]: GO TO COUPLET 26

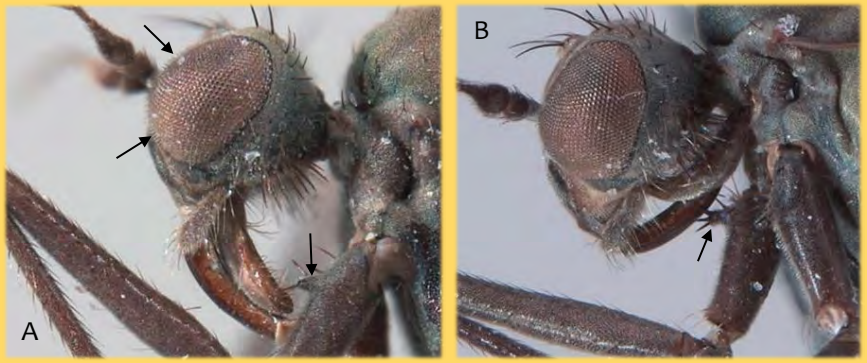


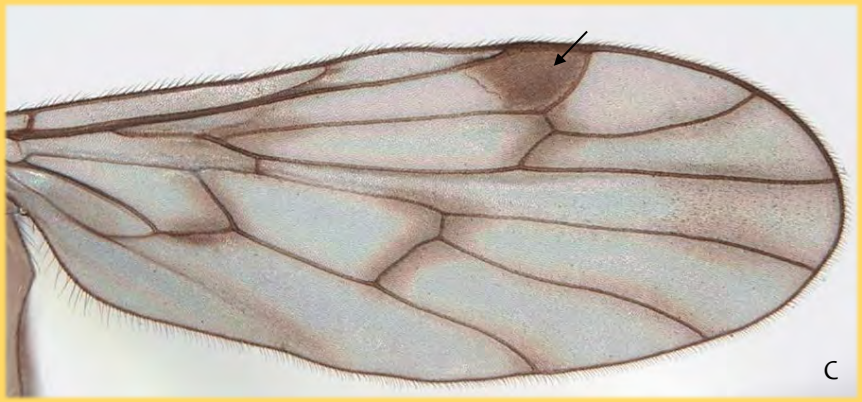
FIGURES: (**A**) Head and foreleg of *Ragas alpina* Sinclair & Saigusa. (**B**) Head and foreleg of *Zanclotus dioktes* Wilder.

25' Fore coxa without erect, spine-like setae (Figs a–d); mouthparts with labrum variable in shape and size (Figs a–d), straight or recurved, large and prominent to relatively small and mostly concealed: GO TO COUPLET 27

FIGURES: (**a**) Head and fore coxa of *Niphogenia* sp. (**b**) Head and fore coxa of *Empis lucida* Zetterstedt. (**c**) Head and fore coxa of *Anomalempis archon* Melander. (**d**) Head and fore coxa of *Hilara* sp.

26 Fore coxa with spine-like setae confined to short tubercle (Figs A, B); wing with pterostigma rounded (Fig. C); eyes with dense pubescence (ommatrichia, Fig. A): ***ZANCLOTUS*** Wilder



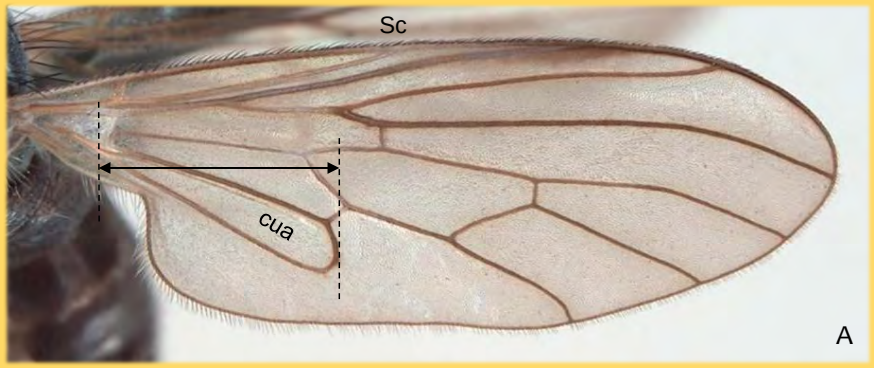


FIGURES: (**A**–**B**) Head and foreleg of *Zanclotus dioktes* Wilder. (**C**) Wing of *Z. dioktes*.

26' Fore coxa with spine-like setae widespread (Fig. A); wing with pterostigma narrow, elongate (Fig. B); eyes bare (Fig. A): ***RAGAS*** Walker

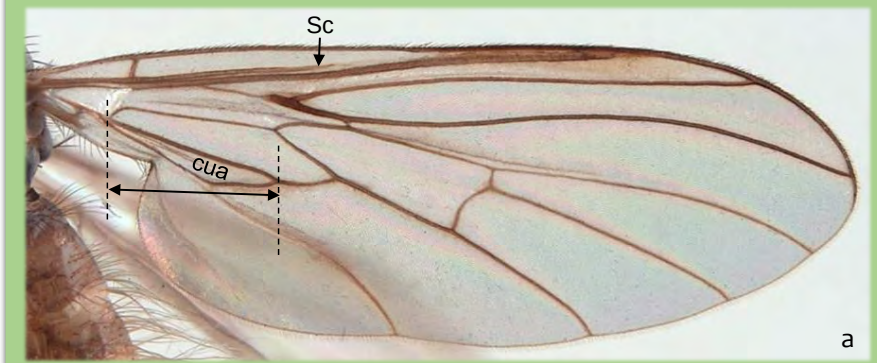
FIGURES: (**a**) Head and fore coxa of *Ragas alpina* Sinclair & Saigusa. (**b**) Wing of *R. alpina*.

27 Wing with cell cua at least one-third length of wing and vein Sc complete, reaching costa (Figs A, B); BRACHYSTOMATINAE (BRACHYSTOMATIDAE): GO TO COUPLET 28



FIGURES: (**A**) Wing of *Anomalempis archon* Melander. (**B**) Wing of *Brachystoma robertsonii* Coquillett. Abbreviations: cua – anterior cubital cell; Sc – subcostal vein.

27' Wing usually with cell cua one-quarter length of wing (Fig. a); if cua longer and nearly one-third length of wing (Fig. b), then vein Sc incomplete, not reaching costa, and often hidden by R1 (Fig. b): GO TO COUPLET 29



FIGURES: (**a**) Wing of *Rhamphomyia* sp. (**b**) Wing of *Hybos reversus* Walker. Abbreviations: cua – anterior cubital cell; R1 – radial vein; Sc – subcostal vein.

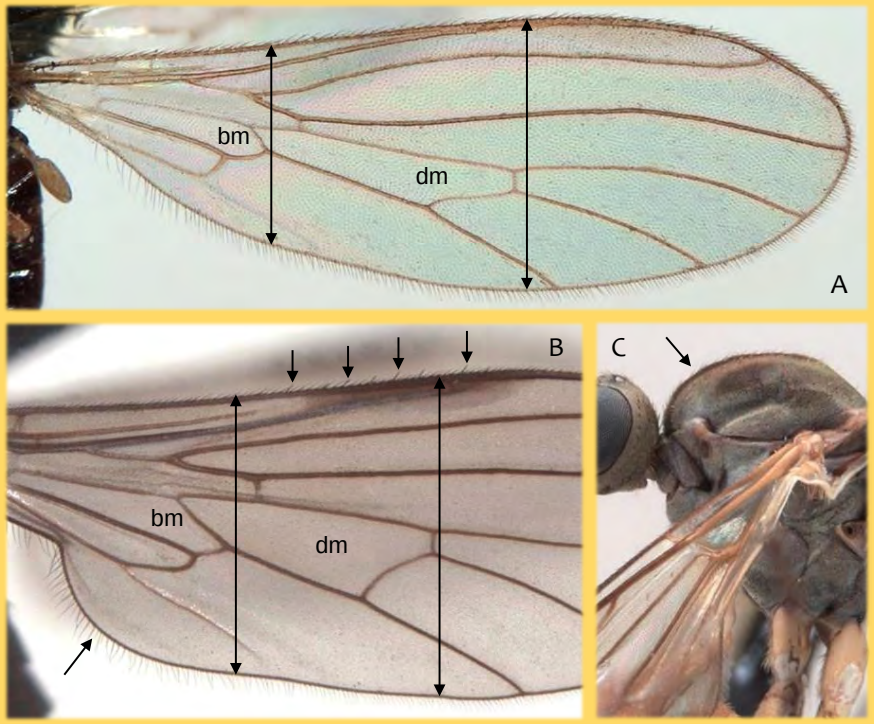
28 Wing vein R4+5 unbranched (Fig. A); antenna with thick stylus (Fig. B): ***ANOMALEMPIS*** Melander

FIGURES: (**A**) Wing of *Anomalempis archon* Melander. (**B**) Head and thorax of *A. archon*.

28' Wing vein R4+5 branched (Fig. a); antenna with arista-like stylus (Fig. b): ***BRACHYSTOMA*** Meigen

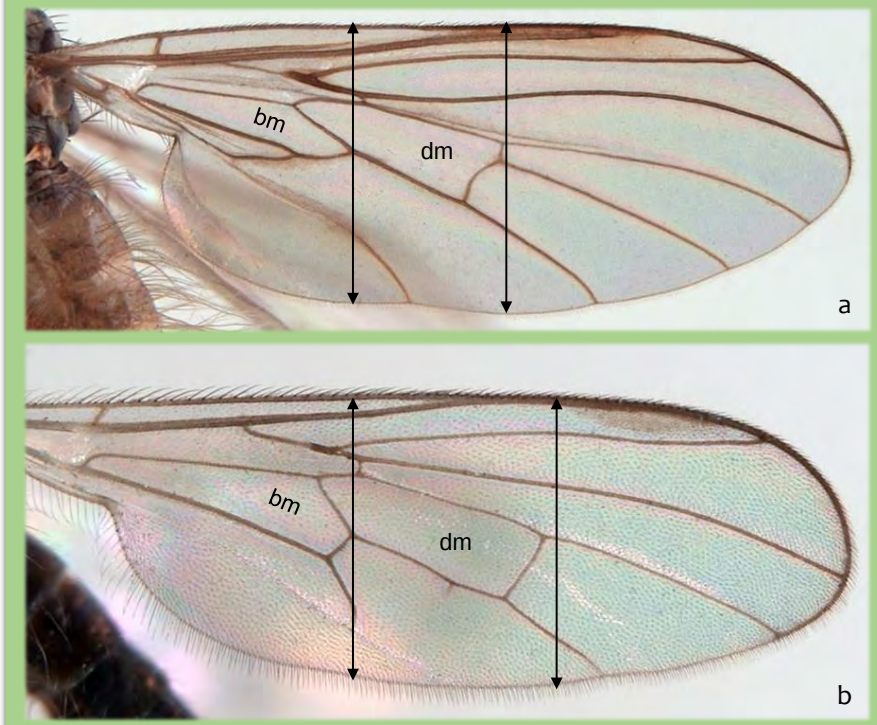
FIGURES: (**a**) Wing of *Brachystoma robertsonii* Coquillett. (**b**) Head and thorax of *B. robertsonii*.

29 Wing with anal lobe not developed; wing narrower at apex of cell bm than at apex of cell dm (Fig. A); in doubtful cases (Fig. B), costa with strong, erect setae (Fig. B) or thoracic setae greatly reduced (Fig. C): GO TO COUPLET 30



FIGURES: (**A**) Wing of *Boreodromia bicolor* (Loew). (**B**) Wing of *Proclinopyga* sp. (**C**) Thorax of *Hesperempis neomexicana* (Melander). Abbreviations: bm – basal medial cell; dm – discal medial cell.

29' Wing with anal lobe well developed, angular; wing as broad or broader at apex of cell bm than at apex of cell dm (Figs a, b) (except *Empis leptogastra* Loew and allies); costa rarely with strong, erect setae (Figs a, b); thoracic setae variable, usually well developed: GO TO COUPLET 45



FIGURES: (**a**) Wing of *Rhamphomyia* sp. (**b**) Wing of *Hybos reversus* Walker. Abbreviations: bm – basal medial cell; dm – discal medial cell.

30 Face extending beyond base of palpus (Fig. A); antennal postpedicel elongate-oval, without stylus (Fig. A); BROCHELLINAE (EMPIDIDAE): ***BROCHELLA*** Melander

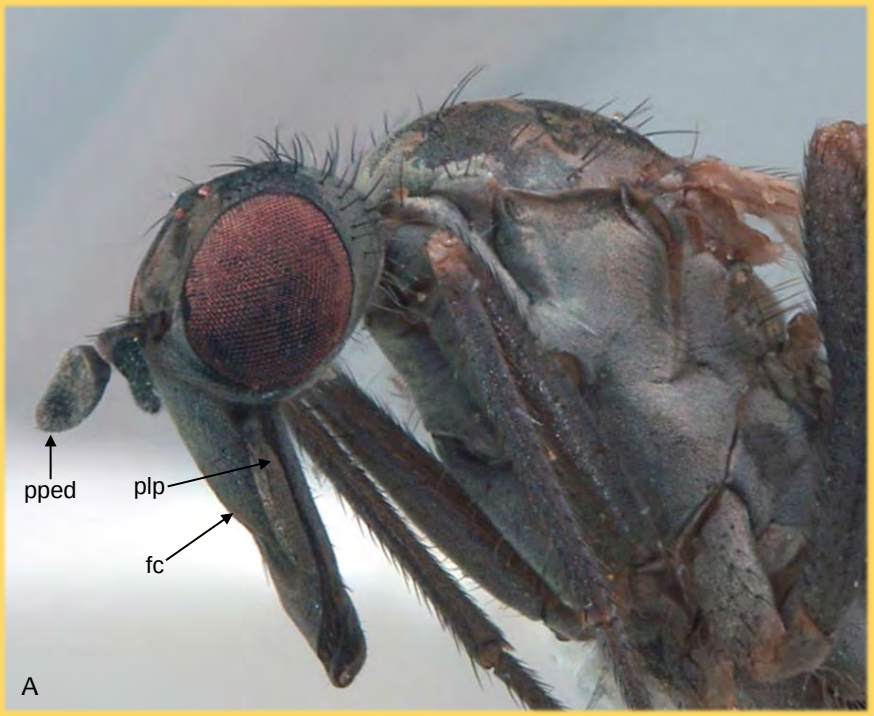
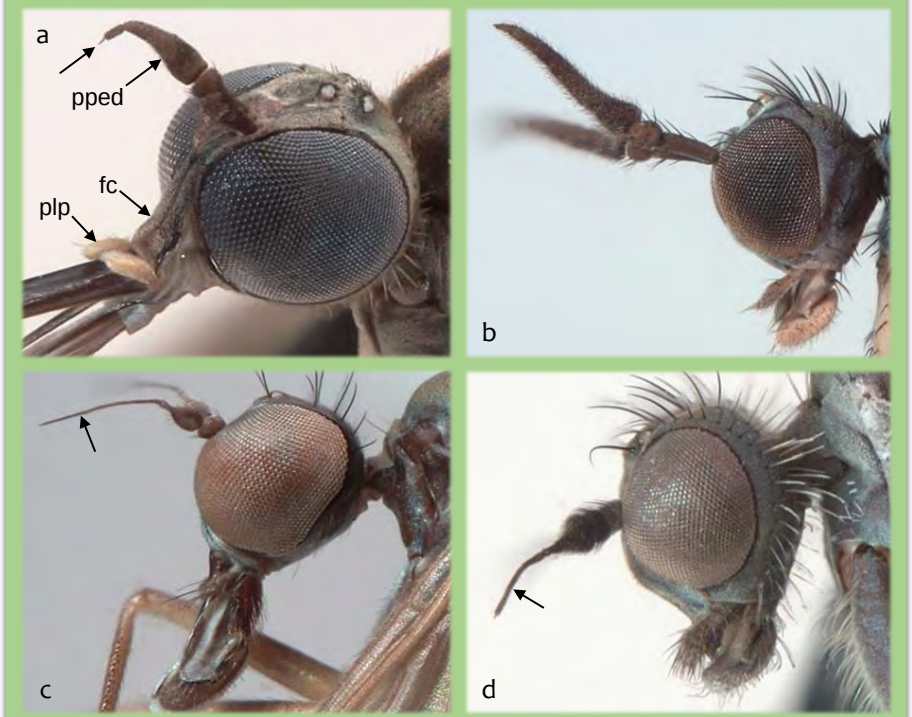


FIGURE: (**A**) Head and thorax of *Brochella monticola* Melander. Abbreviations: fc – face; plp – palpus; pped – postpedicel.

30' Face ending at base of palpus (Fig. a); postpedicel narrowed, variable in length, with stylus (Figs a, c, d), or without stylus (Fig. b): GO TO COUPLET 31



FIGURES: (**a**) Head of *Hesperempis neomexicana* (Melander). (**b**) Head of *Niphogenia* sp. (**c**) Head of *Heleodromia cranehollowensis* Cumming & Coovert. (**d**) Head of *Proclinopyga* sp. Abbreviations: fc – face; plp – palpus; pped – postpedicel.

31 Thoracic setae greatly reduced (Fig. A); EMPIDINAE (EMPIDIDAE) [in part]: ***HESPEREMPIS*** Melander

FIGURE: (**A**) Head and thorax of *Hesperempis neomexicana* (Melander).

31' Thoracic setae usually well developed and distinct (Fig. a): GO TO COUPLET 32

FIGURE: (**a**) Head and thorax of *Niphogenia* sp.

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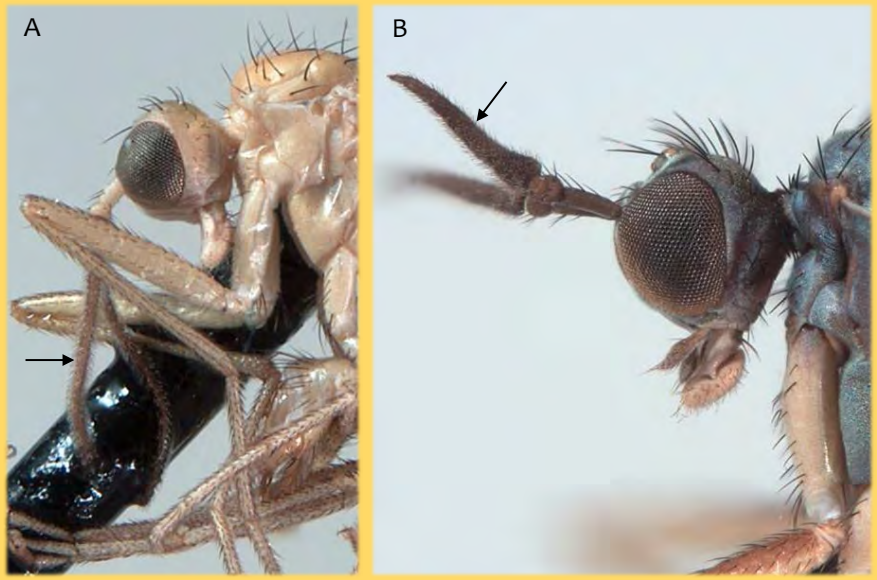
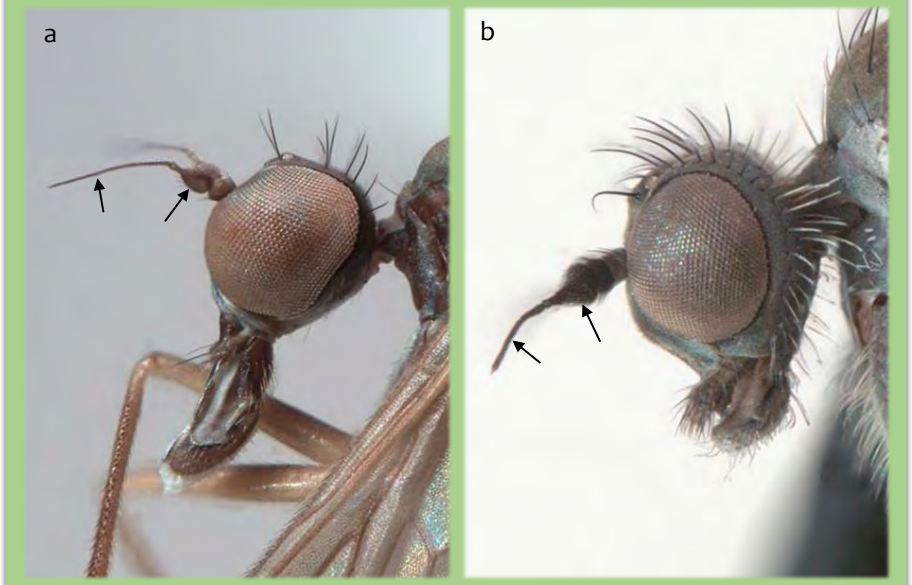
32 Antenna with postpedicel elongate, without evident stylus, at most with minute, peg-like terminal sensillum (Figs A, B); TRICHOPEZINAE (BRACHYSTOMATIDAE) [in part]: GO TO COUPLET 33



FIGURES: (**A**) Head of *Ceratempis longicornis* Melander. (**B**) Head of *Niphogenia* sp.

32' Antenna with postpedicel not elongate, with stylus or arista-like stylus (Figs a, b): GO TO COUPLET 34



FIGURES: (**a**) Head of *Heleodromia cranehollowensis* Cumming & Coovert. (**b**) Head of *Proclinopyga* sp.

doi:10.3752/cjai.2023.48

33 Body mostly yellowish brown (Fig. A); thorax with acrostichal setae absent or reduced to several setulae at extreme anterior section of scutum (Fig. B): ***CERATEMPIS*** Melander

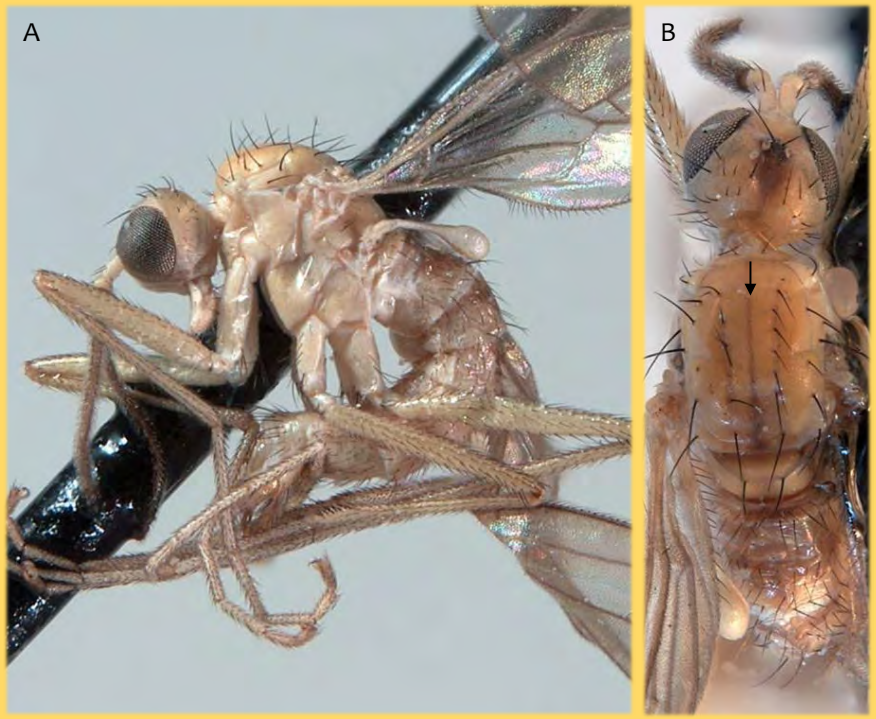


FIGURE: (**A**) Male of *Ceratempis longicornis* Melander, habitus. (**B**) Head and thorax of *C. longicornis*, dorsal view.

33' Body brown to dark brown (Fig. a); thorax with acrostichal setae forming distinct row, extending to prescutellar depression (Fig. b): ***NIPHOGENIA*** Melander

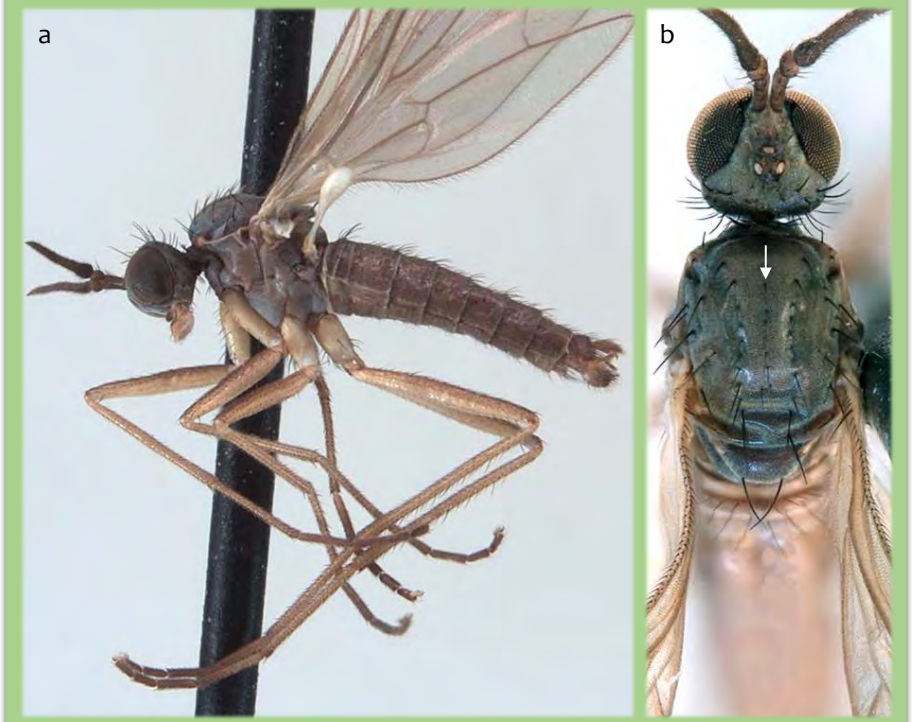
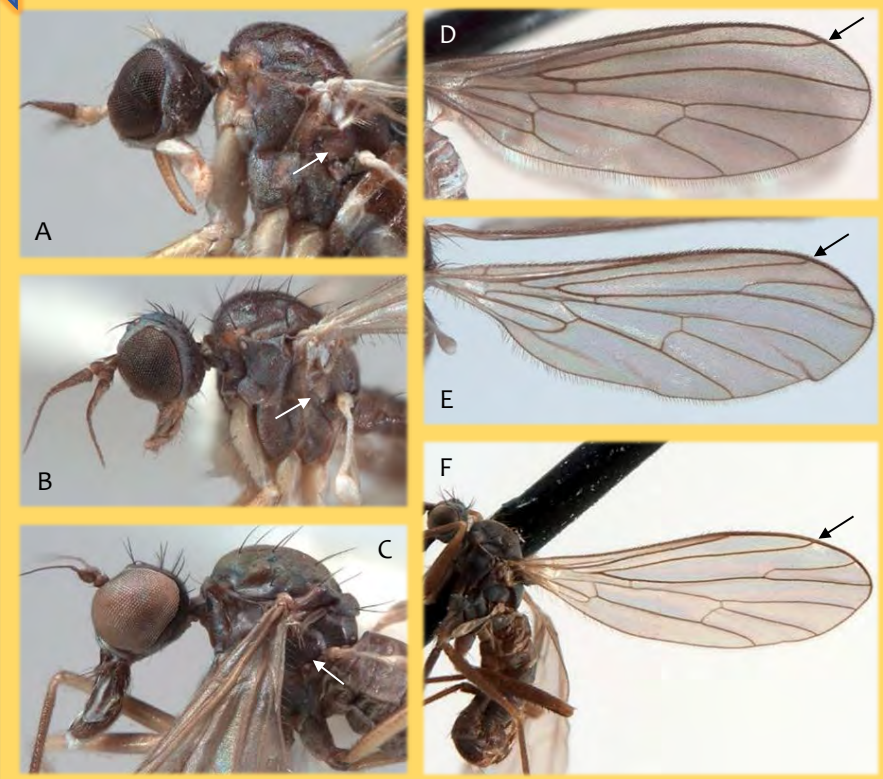


FIGURE: (**a**) Male of *Niphogenia* sp., habitus. (**b**) Head and thorax of *Niphogenia* sp., dorsal view.

34 Thorax with laterotergite bare (Figs A–C, white arrows); wing vein R2+3 unbranched (Figs D–F); TRICHOPEZINAE (BRACHYSTOMATIDAE) [in part]: GO TO COUPLET 35



FIGURES: (**A**) Head and thorax of *Boreodromia bicolor* (Loew). (**B**) Head and thorax of *Sabroskyella rancheria* Wilder. (**C**) Head and thorax of *Heleodromia cranehollowensis* Cumming & Coovert. (**D**) Wing of *Heleodromia pullata* (Melander). (**E**) Wing of *S. rancheria*. (**F**) Body and wing of *Saigusamyia harkrideri* Sinclair.

34' Thorax with laterotergite setose (Figs a, b, yellow arrows); if bare (Fig. c, white arrow), then wing vein R2+3 branched (Fig. d); CLINOCERINAE (EMPIDIDAE): GO TO COUPLET 38

FIGURES: (**a**) Thorax of *Oreothalia sierrensis* Wilder. (**b**) Thorax of *Trichoclinocera hamifera* (Melander). (**c**) Thorax of *Asymphyloptera* sp. (Australia). (**d**) Wing of *Asymphyloptera* sp. (Australia).

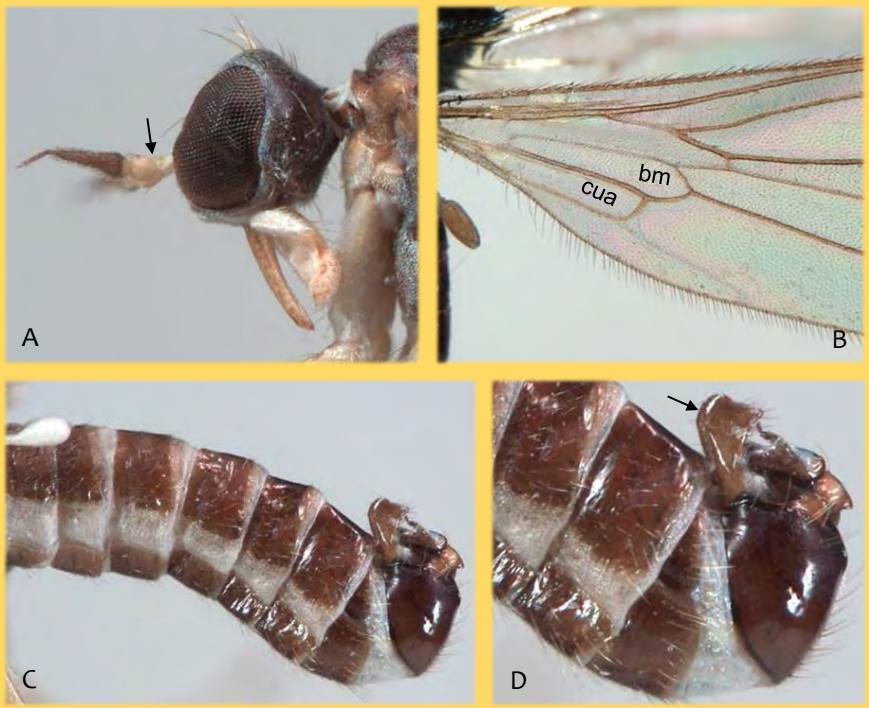
35 Wing vein R4+5 unbranched (Figs A, B): **GO TO COUPLET 36**

FIGURES: (**A**) Wing of *Boreodromia bicolor* (Loew). (**B**) Wing of *Heleodromia pullata* (Melander).

35' Wing vein R4+5 branched (Figs a, b): **GO TO COUPLET 37**

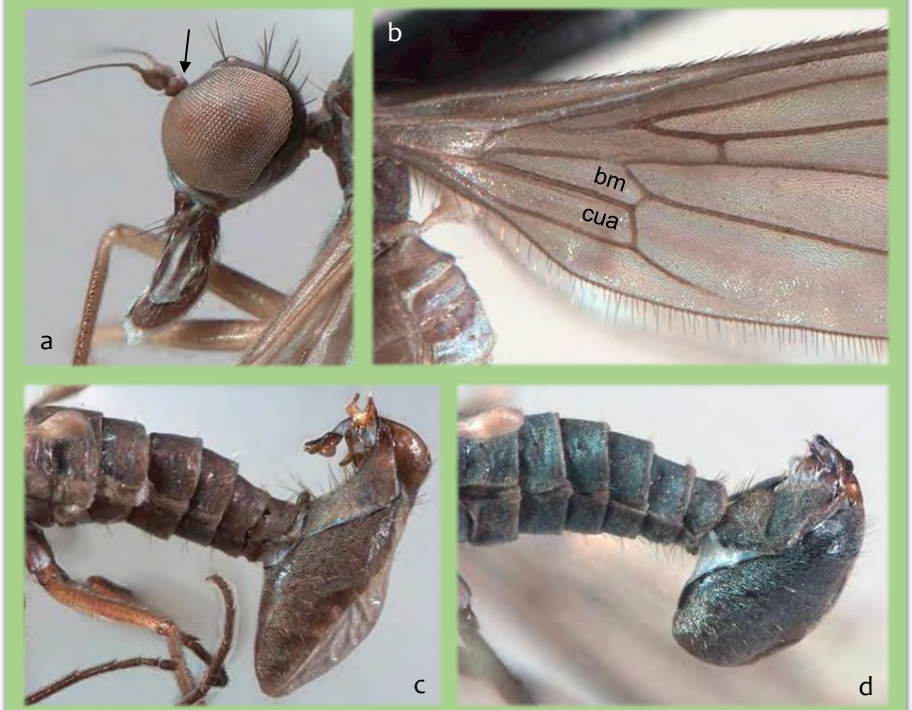
FIGURES: (**a**) Wing of *Sabroskyella rancheria* Wilder. (**b**) Wing of *Saigusamyia harkrideri* Sinclair.

36 Antenna with scape and pedicel yellow (Fig. A); wing with cell cua shorter than cell bm (Fig. B); male terminalia projecting dorsally (Fig. C), not capsule-like or projecting below abdomen; male cerci elongate, upright (Fig. D): ***BOREODROMIA*** Coquillett



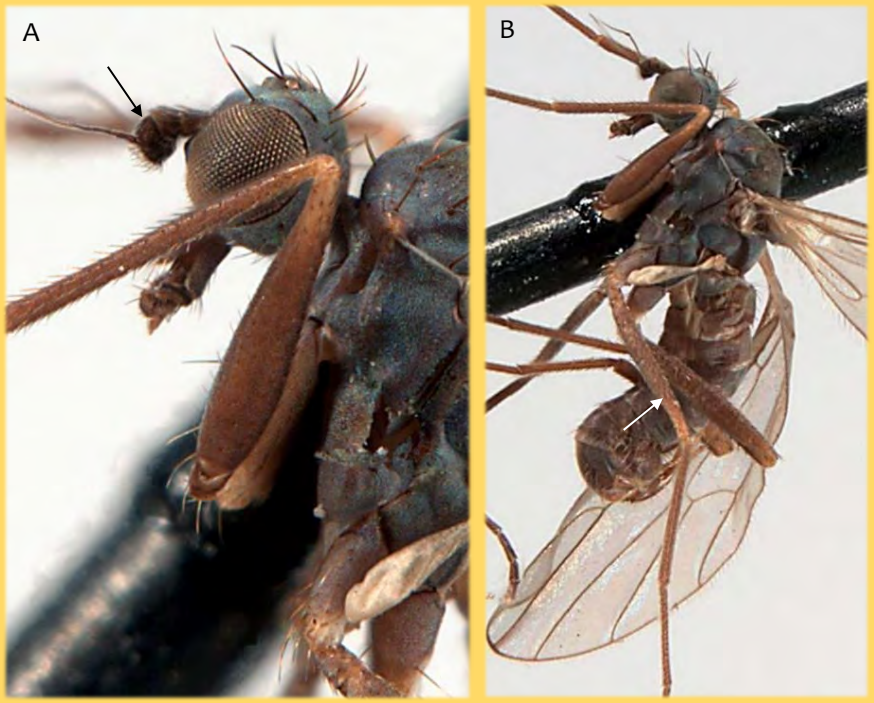
FIGURES: (**A**) Head of *Boreodromia bicolor* (Loew). (**B**) Wing of *B. bicolor*. (**C**) Abdomen of male *B. bicolor*. (**D**) Male terminalia of *B. bicolor*. Abbreviations: bm – basal medial cell; cua – anterior cubital cell.

36' Antenna with scape and pedicel brown (Fig. a); wing with cell cua as long as cell bm (Fig. b); male terminalia in form of enlarged capsule, usually projecting below abdomen (Figs c, d); male cerci reduced, hidden within capsule: ***HELEODROMIA*** Haliday



FIGURES: (**a**) Head of *Heleodromia cranehollowensis* Cumming & Coovert. (**b**) Wing of *H. pullata* (Melander). (**c**) Abdomen of male *H. cranehollowensis*. (**d**) Abdomen of male *H. chillcotti* Sinclair. Abbreviations: bm – basal medial cell; cua – anterior cubital cell.

37 Antenna with postpedicel short, ovate (Fig. A); mid femur slender, without rows of strong ventral setae (Fig. B, white arrow): ***SAIGUSAMYIA*** Sinclair



FIGURES: (**A**) Head of *Saigusamyia harkrideri* Sinclair. (**B**) Body and legs of *S. harkrideri*.

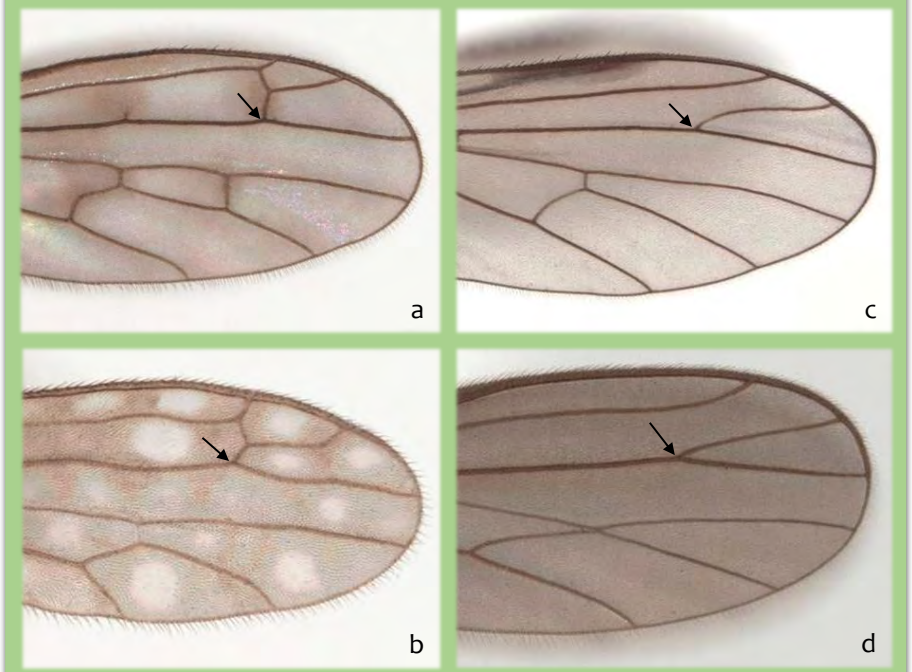
37' Antenna with postpedicel long and tapered (Fig. a); mid femur broader than hind femur, with rows of strong ventral setae (Fig. a): ***SABROSKYELLA*** Wilder

FIGURE: (**a**) Body and legs of *Sabroskyella rancheria* Wilder.

38 Wing vein R4+5 unbranched (Figs A, B): **GO TO COUPLET 39**

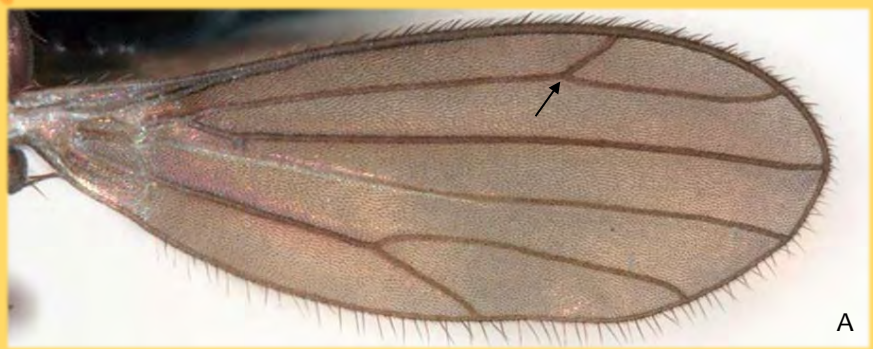
FIGURES: (**A**) Wing of *Asymphyloptera* sp. (Australia). (**B**) Wing of *Oreothalia sierrensis* Wilder.

38' Wing vein R4+5 branched (Figs a–d): **GO TO COUPLET 40**



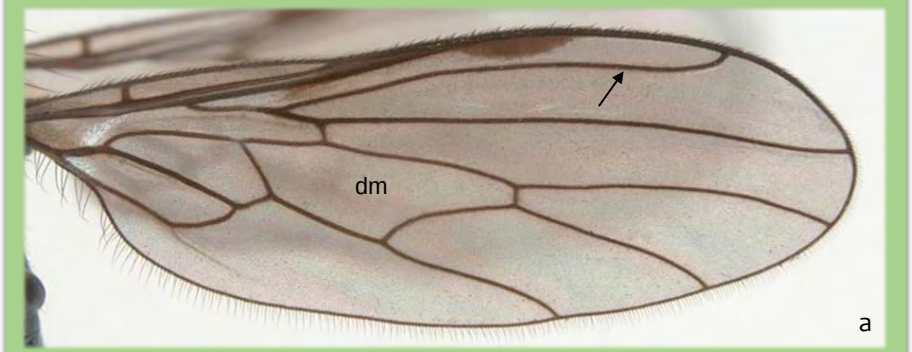
FIGURES: (**a**) Wing of *Clinocera conjuncta* Loew. (**b**) Wing of *Dolichocephala argus* Melander. (**c**) Wing of *Proclinopyga* sp. (**d**) Wing of *Roederiodes recurvatus* Chillcott.

39 Wing with cell dm absent (Fig. A); vein R2+3 branched (Fig. A); fore femur without spine-like ventral setae (Fig. B): ***ASYMPHYLOPTERA*** Collin



FIGURES: (**A**) Wing of *Asymphyloptera* sp. (Australia). (**B**) Foreleg of *Asymphyloptera* sp. (Australia).

39' Wing with cell dm present (Fig. a); vein R2+3 unbranched (Fig. a); fore femur with spine-like ventral setae (Fig. b): ***OREOTHALIA*** Melander



FIGURES: (**a**) Wing of *Oreothalia sierrensis* Wilder. (**b**) Foreleg of *O. spinitarsis* Wilder. Abbreviations: dm – discal medial cell.

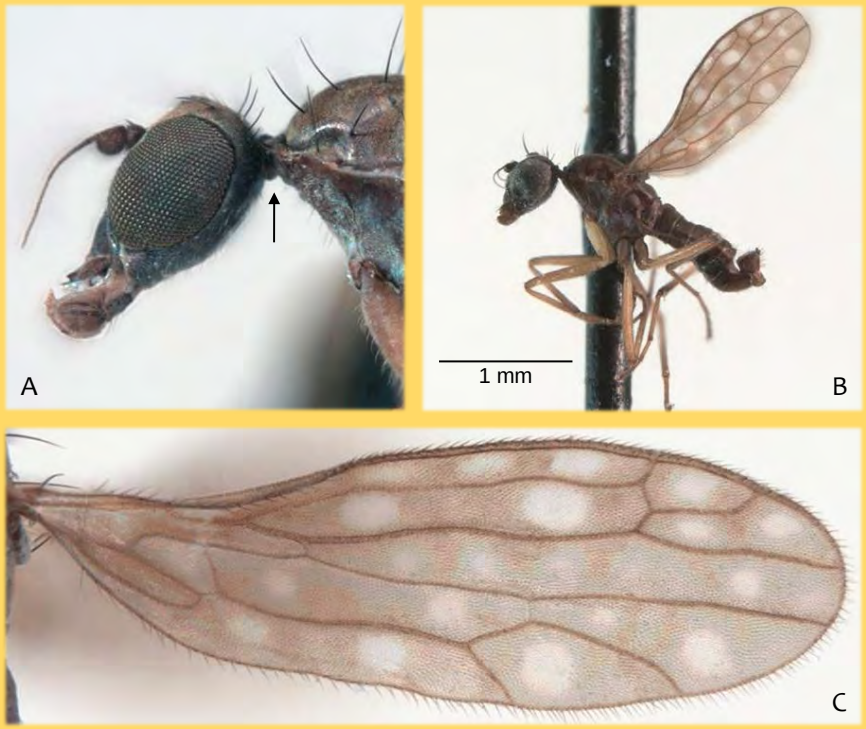
40 Proboscis long and slender, about as long as head (Fig. A): ***ROEDERIODES*** Coquillett

FIGURE: (**A**) Head and thorax of *Roederiodes recurvatus* Chillcott.

40' Proboscis short and broad, one-third or less as long as head (Figs a–d): GO TO COUPLET 41

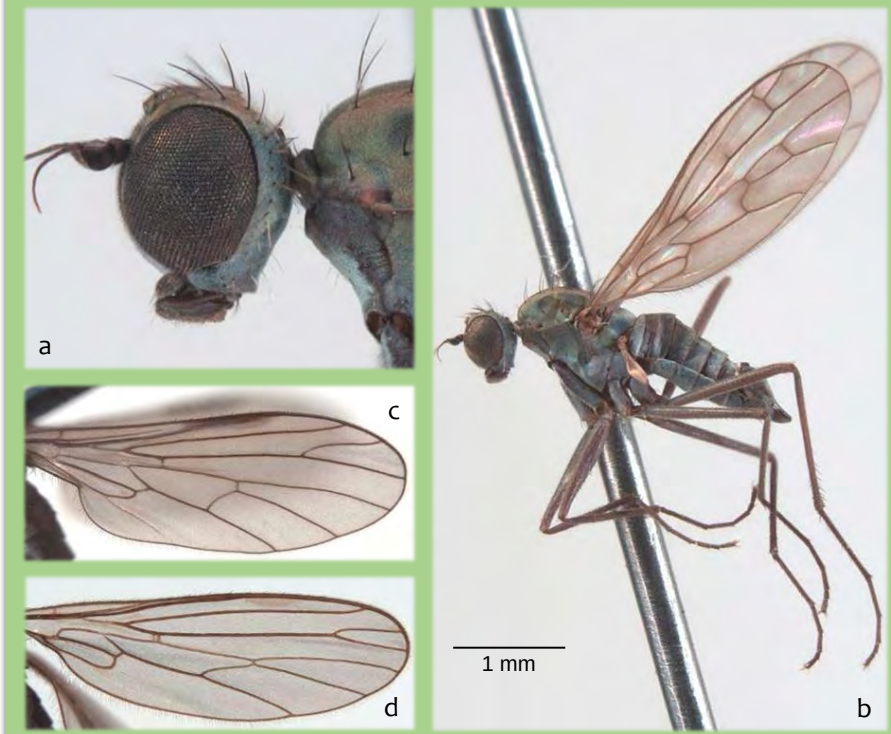
FIGURES: (**a**) Head of *Dolichocephala argus* Melander. (**b**) Head of *Proclinopyga* sp. (**c**) Head of *Trichoclinocera hamifera* (Melander). (**d**) Head of *Wiedemannia simplex* (Loew).

41 Neck arising from near top of head (Fig. A); wing with light spots on dark background (Figs B, C) ; small flies, body less than 2.5 mm long (Fig. B): ***DOLICHOCEPHALA*** Macquart [in part]



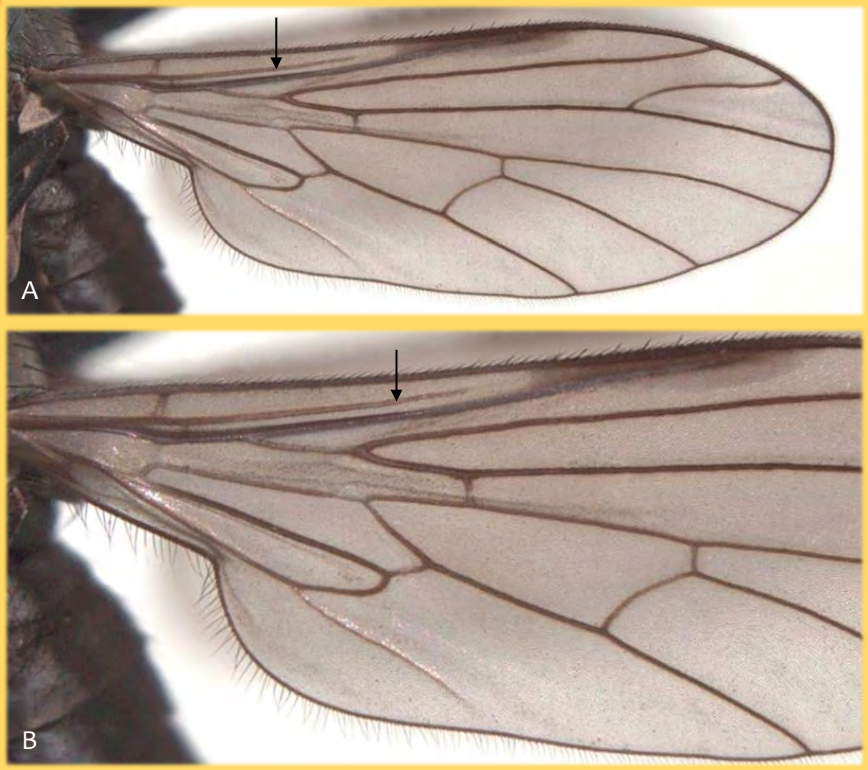
FIGURES: (**A**) Head of *Dolichocephala argus* Melander. (**B**) Male of *D. argus*, *habitus*. (**C**) Wing of *D. argus*.

41' Neck usually arising well below top of head (Fig. a); wing hyaline (Figs c, d) or with dark spots on light background (Fig. b); most species much larger, body usually 3–5 mm long (Fig. b): **GO TO COUPLET 42**



FIGURES: (**a**) Head of *Clinocera conjuncta* Loew. (**b**) Male of *C. conjuncta*, *habitus*. (**c**) Wing of *Proclinopyga* sp. (**d**) Wing of *Wiedemannia simplex* (Loew).

42 Wing vein Sc ending prior to reaching costa (Figs A, B): ***PROCLINOPYGA*** Melander



FIGURES: (**A**) Wing of *Proclinopyga* sp. (**B**) Wing of *Proclinopyga* sp., close-up.

42' Wing vein Sc reaching costa (Figs a, b): GO TO COUPLET 43

FIGURES: (**a**) Wing of *Trichoclinocera longipes* (Walker). (**b**) Wing of *T. longipes*, close-up.

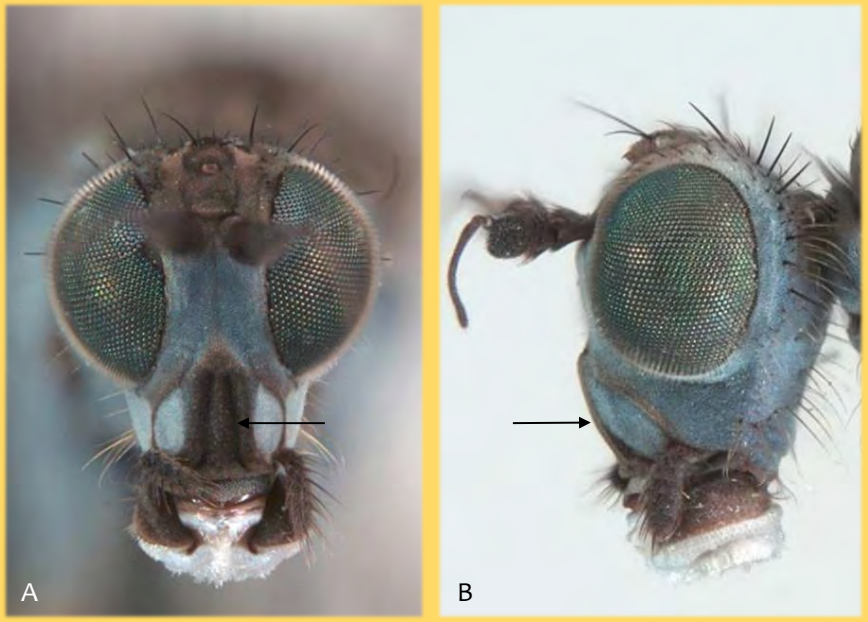
43 Wing vein R1 with setae along dorsal surface (Fig. A):
TRICHOCLINOCERA Collin

FIGURE: (**A**) Wing of *Trichoclinocera hamifera* (Melander), dorsal surface of basal part.

43' Wing vein R1 without setae along dorsal surface (Fig. a):
GO TO COUPLET 44

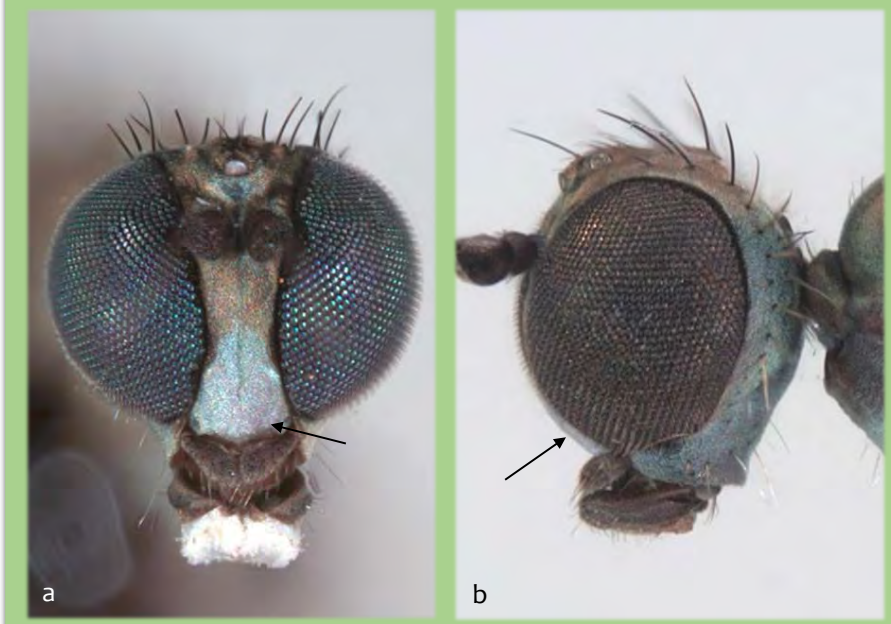
FIGURE: (**a**) Wing of *Wiedemannia simplex* (Loew), dorsal surface of basal part.

44 Lower margin of face with concave notch above mouthparts (Figs A, B): ***WIEDEMANNIA*** Zetterstedt



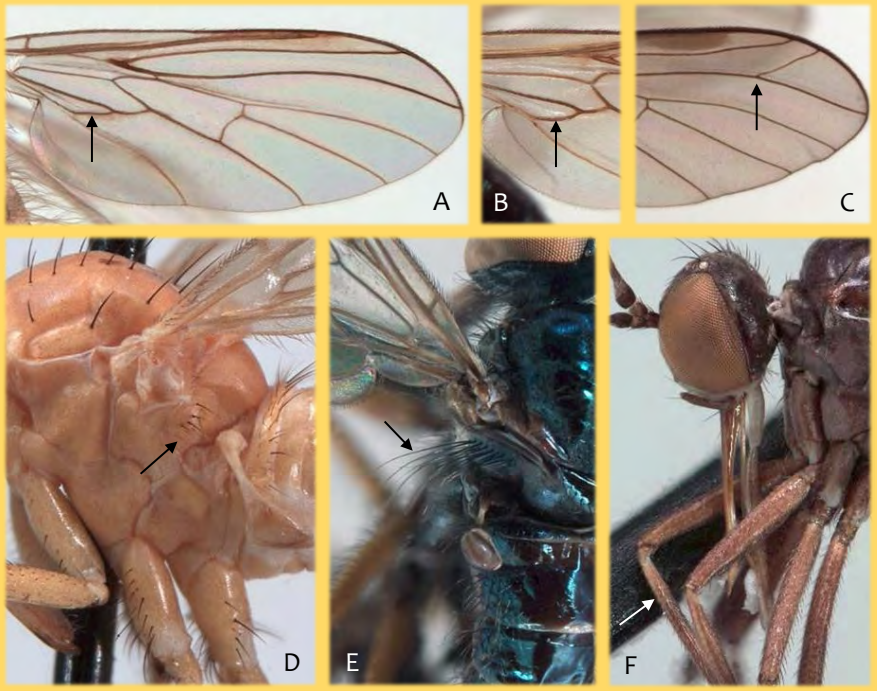
FIGURES: (**A**) Head of *Wiedemannia simplex* (Loew), anterior view. (**B**) Head of *W. simplex*, lateral view.

44' Lower margin of face lacking concave notch above mouthparts (Figs a, b): ***CLINOCERA*** Meigen



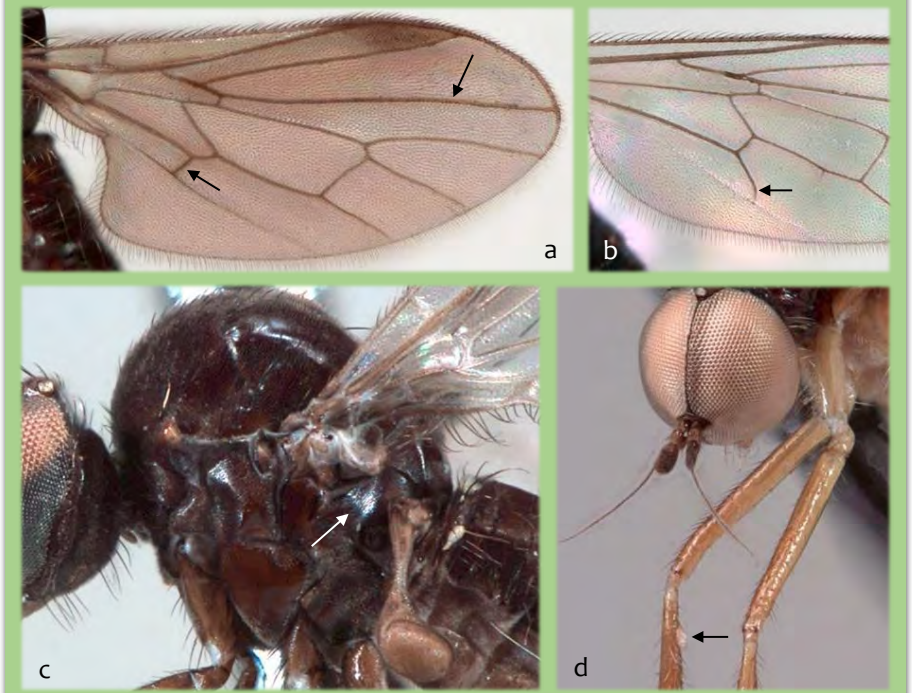
FIGURES: (**a**) Head of *Clinocera conjuncta* Loew, anterior view. (**b**) Head of *C. conjuncta*, lateral view.

45 Wing vein CuA usually recurved and confluent with vein CuP on underside of cell cua (Figs A, B); if CuA weakly recurved, then vein R4+5 branched (Fig. C), or thorax with laterotergite setose (Figs D, E); fore tibia without gland (Fig. F): GO TO COUPLET 46



FIGURES: (**A**) Wing of *Rhamphomyia* sp. (**B**) Wing of *Empis lucida* Zetterstedt. (**C**) Wing of *Oreogeton scopifer* (Coquillett). (**D**) Thorax of *Empis poeciloptera* Loew. (**E**) Body and wing base of *Lamprempis* sp. (**F**) Head and forelegs of *Porphyrochroa* sp.

45' Wing vein CuA forming distinct angle with vein CuP (Figs a, b); vein R4+5 unbranched (Fig. a); thorax with laterotergite bare (Fig. c); fore tibia usually with gland on inner basal margin (Fig. d), gland sometimes indistinct: GO TO COUPLET 59



FIGURES: (**a**) Wing of *Trichina* sp. (**b**) Wing of *Hybos reversus* Walker. (**c**) Thorax of *Anthalia* sp. (**d**) Head and forelegs of *Ocydromia glabricula* (Fallén).

46 Thorax with laterotergite setose (Figs A, B), setae dark, pale, or sometimes indistinct: GO TO COUPLET 47

FIGURES: (**A**) Thorax of *Oreogeton scopifer* (Coquillett). (**B**) Thorax of *Lamprempis* sp.

46' Thorax with laterotergite bare (Fig. a): GO TO COUPLET 51

FIGURE: (**a**) Head and thorax of *Hilara* sp.

doi:10.3752/cjai.2023.48

47 Wing vein R4+5 branched (Figs A, B): **GO TO COUPLET 48**

FIGURES: (**A**) Wing of *Oreogeton scopifer* (Coquillett). (**B**) Wing of *Empis lucida* Zetterstedt.

47' Wing vein R4+5 unbranched (Figs a, b); EMPIDINAE (EMPIDIDAE) [in part]: **GO TO COUPLET 50**

FIGURES: (**a**) Wing of *Rhamphomyia* sp. (**b**) Wing of *Porphyrochroa* sp.

48 Wing vein R1 with setae dorsally (Figs A, B); OREOGETONINAE (EMPIDIDAE): ***OREOGETON*** Schiner

FIGURES: (**A**) *Oreogeton rufus* (Loew), body and dorsal surface of wing. (**B**) *Oreogeton scopifer* (Coquillett), dorsal surface of wing.

48' Wing vein R1 without setae dorsally (Fig. a); EMPIDINAE (EMPIDIDAE) [in part]: GO TO COUPLET 49

FIGURE: (**a**) *Lamprempis* sp., dorsal view of wing and body.

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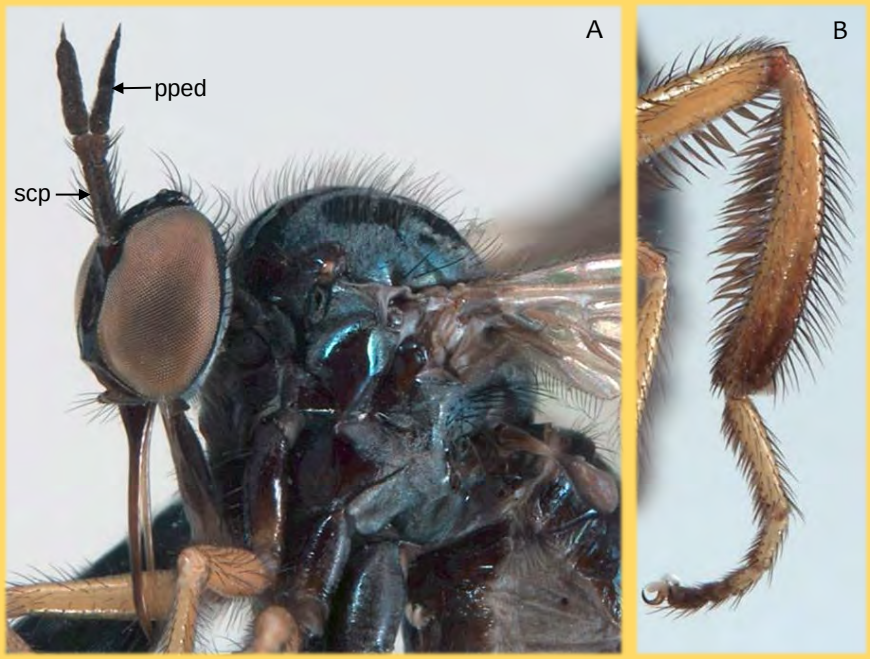
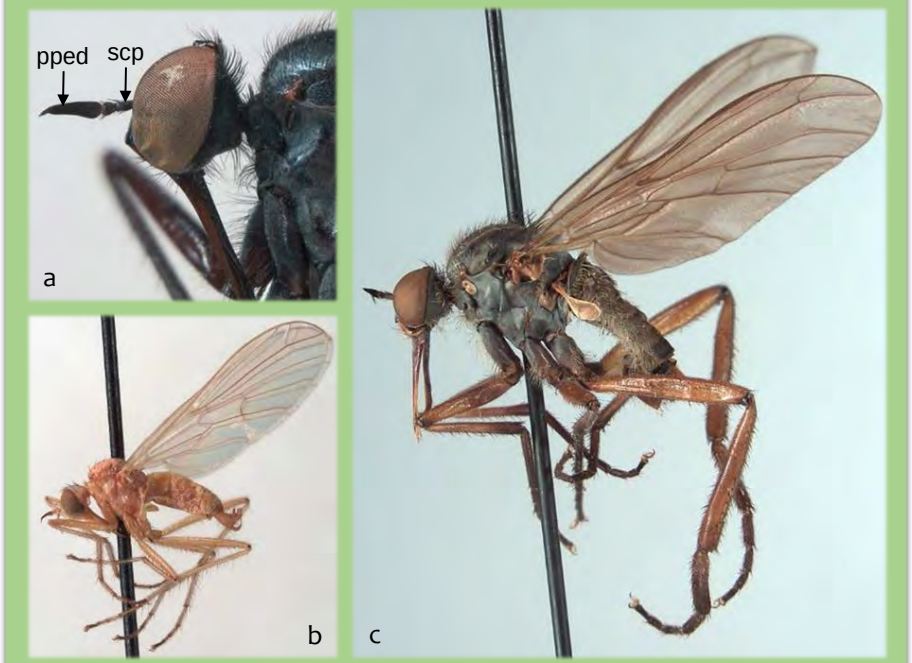
49 Antenna generally inserted high up on head (Fig. A); scape nearly as long as postpedicel (Fig. A); female and male often with pinnate setae on legs (Fig. B); body commonly shiny metallic blue or blue-green (Fig. A): ***LAMPREMPIS*** Wheeler & Melander



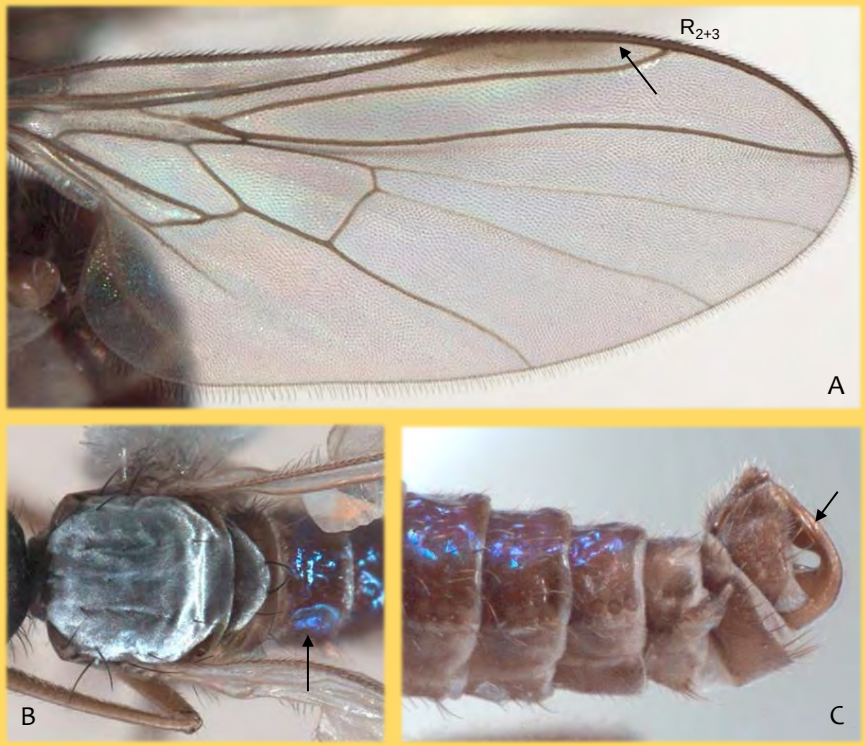
FIGURES: (**A**) Head and thorax of female *Lamprempis* sp. (**B**) Hind leg of female *Lamprempis* sp. Abbreviations: pped – postpedicel; scp – scape.

49' Antenna inserted near middle of head (Figs a, c); scape shorter than postpedicel (Fig. a); at least male without pinnate setae on legs (Figs b, c); body rarely shiny metallic (Figs b, c): ***EMPIS*** Linnaeus



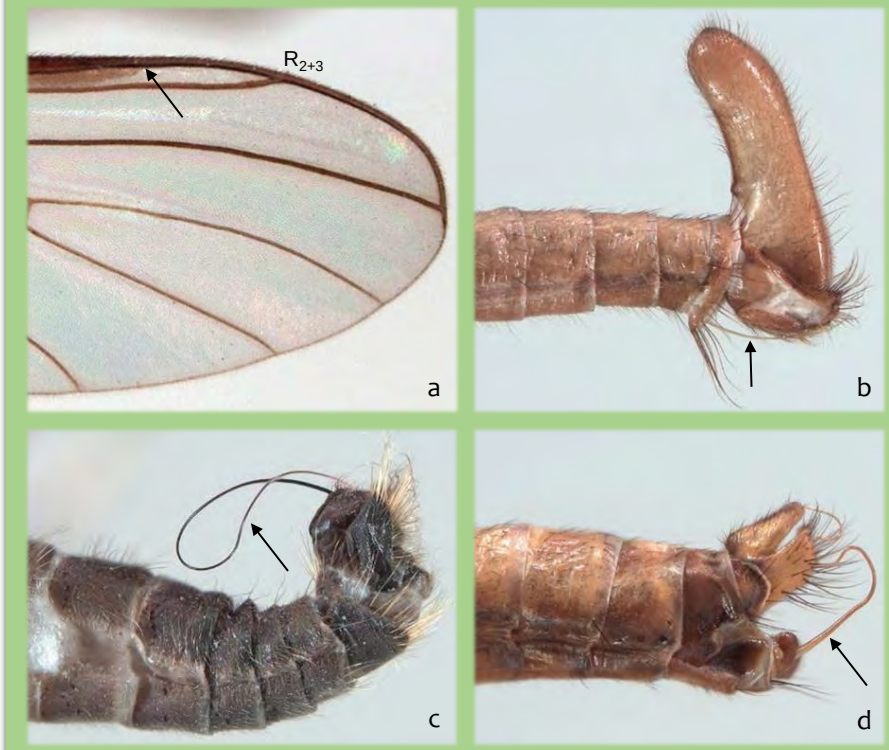
FIGURES: (**a**) Head of *Empis lucida* Zetterstedt. (**b**) *Empis pallida* (Loew), male. (**c**) *Empis* sp., male habitus. Abbreviations: pped – postpedicel; scp – scape.

50 Wing with pterostigma extending to near apex of vein R2+3 (Fig. A); abdomen metallic blue or blue-green (Figs B, C); male terminalia with phallus short and usually concealed within elongate hypandrium (Fig. C): ***PORPHYROCHROA*** Melander



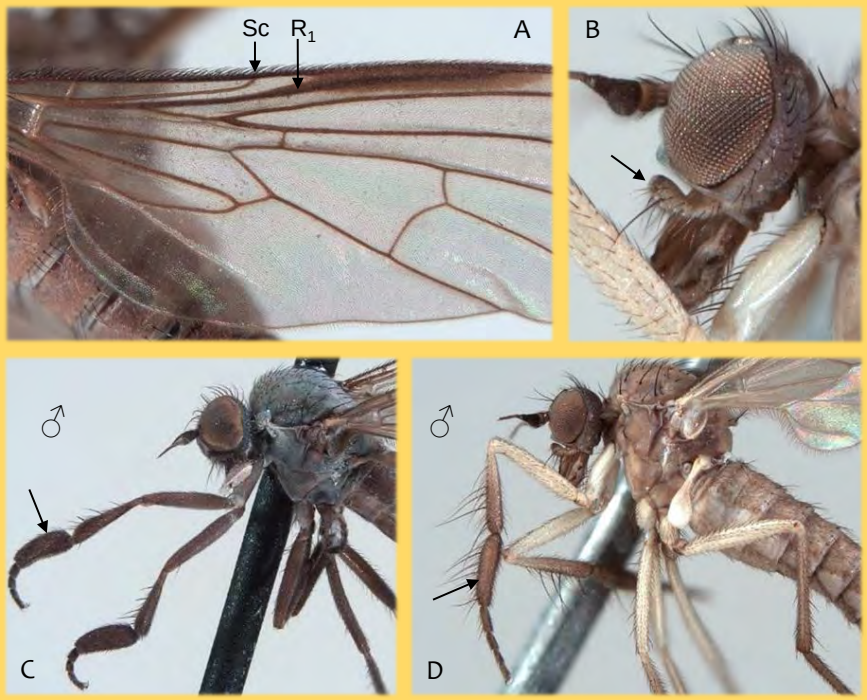
FIGURES: (**A**) Wing of *Porphyrochroa* sp. (**B**) Thorax and basal abdominal tergites of *Porphyrochroa* sp. (dorsal). (**C**) Abdomen of male *Porphyrochroa* sp. Abbreviation: R2+3 – radial vein.

50' Wing with pterostigma well short of apex of vein R2+3 (Fig. a); abdomen not metallic blue or blue-green (Figs b–d); male terminalia with phallus often long and usually not concealed within hypandrium (Figs b–d): ***RHAMPHOMYIA*** Meigen



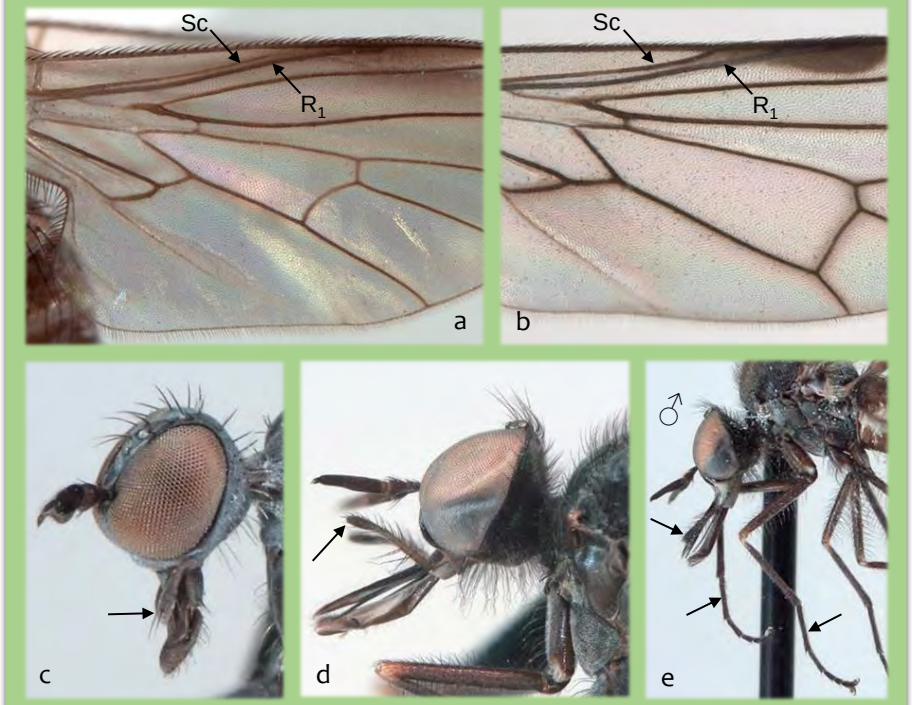
FIGURES: (**a**) Wing of *Rhamphomyia vockerothi* Barták. (**b**) Abdomen of male *R. longicauda* Loew. (**c**) Abdomen of male *R. rhytmica* Barták. (**d**) Abdomen of male *R. amplipedis* Coquillett. Abbreviation: R2+3 – radial vein.

51 Wing vein R1 distinctly dilated before joining costa (Fig. A); vein Sc bent forward to meet costa (Fig. A); mouthparts with palpus usually arched and curved beneath head (Fig. B); male foreleg with first tarsomere often enlarged and swollen (Figs C, D); EMPIDINAE (EMPIDIDAE) [in part]: ***HILARA*** Meigen



FIGURES: (**A**) Wing of *Hilara* sp. (**B**) Head of *Hilara* sp. (**C**) Male *Hilara* sp. showing forelegs. (**D**) Male *Hilara* sp. showing foreleg. Abbreviations: R1 – radial vein; Sc – subcostal vein.

51' Wing vein R1 not dilated before joining costa (Figs a, b); vein Sc evanescent apically (Fig. a), or meeting costa acutely (Fig. b); mouthparts with palpus usually straight, projecting obliquely or parallel to proboscis (Figs c, d); male foreleg with first tarsomere not enlarged (Fig. e): **GO TO COUPLET 52**



FIGURES: (**a**) Wing of *Gloma fuscipes* Melander. (**b**) Wing of *Iteaphila macquarti* Zetterstedt. (**c**) Head of *Philetus schizophorus* Melander. (**d**) Head of *I. macquarti*. (**e**) Male *I. macquarti* showing forelegs. Abbreviations: R1 – radial vein; Sc – subcostal vein.

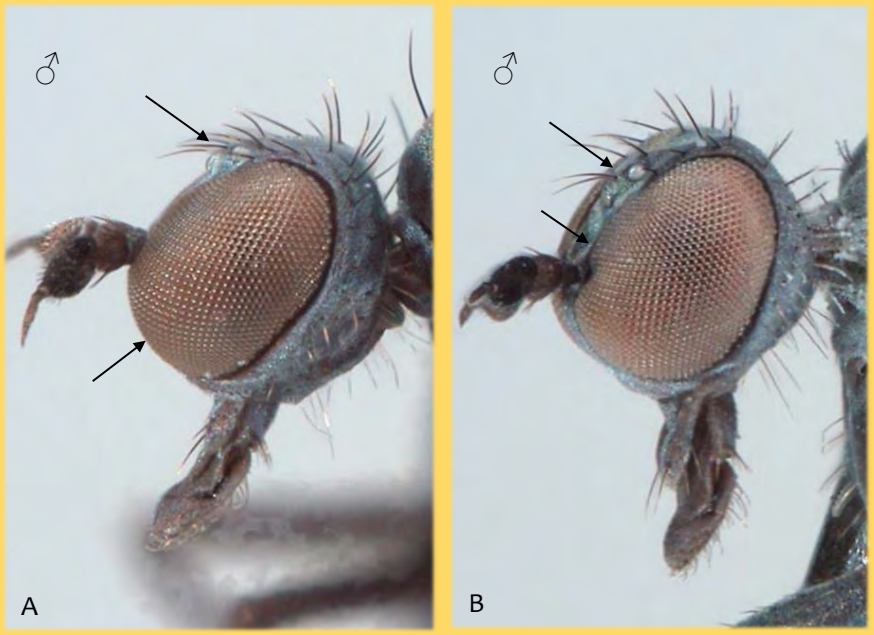
52 Wing vein R4+5 unbranched (Fig. A); ITEAPHILIDAE: ***ITEAPHILA*** Zetterstedt [in part]

FIGURE: (**A**) Wing of *Iteaphila longipalpis* (Melander).

52' Wing vein R4+5 branched (Figs a, b): **GO TO COUPLET 53**

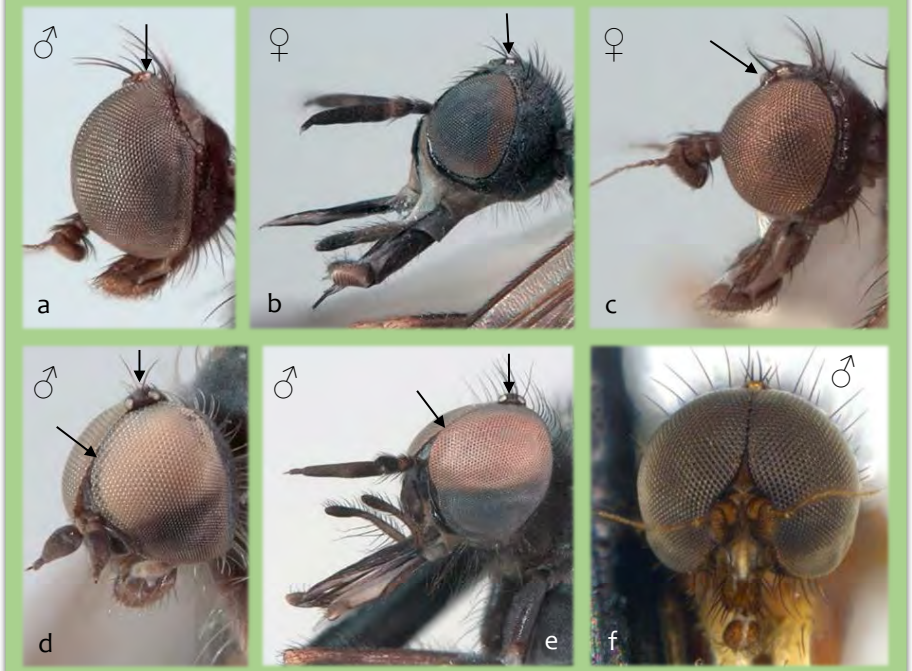
FIGURES: (**a**) Wing of *Hormopeza copulifera* Melander. (**b**) Wing of *Iteaphila macquarti* Zetterstedt.

53 Eyes narrow, obliquely oriented and ovoid in lateral view (Fig. A); ocelli anterior to vertex (Figs A, B); male eyes separated above antennae (dichoptic, Fig. B); EMPIDINAE (EMPIDIDAE) [in part]: ***PHILETUS*** Melander



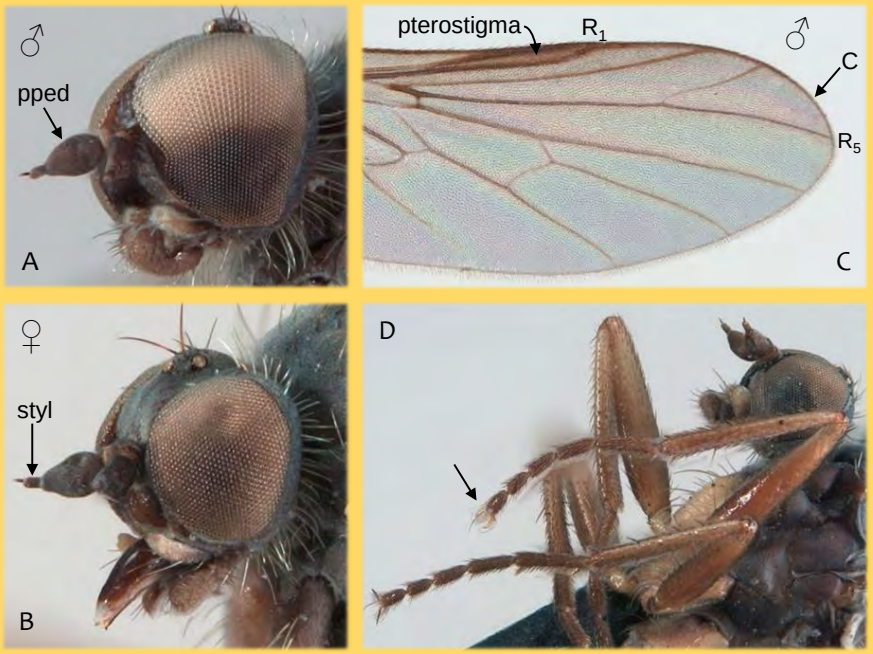
FIGURES: (**A**) Head of male *Philetus schizophorus* Melander, lateral view. (**B**) Head of male *P. schizophorus*, oblique view.

53' Eyes broad, not obliquely oriented, but rounded or hemispherical in lateral view (Figs a–c); ocelli at vertex (Figs a, b, d–f), or anterior to vertex (Fig. c); male eyes meeting above antennae (holoptic, Figs d–f): **GO TO COUPLET 54**



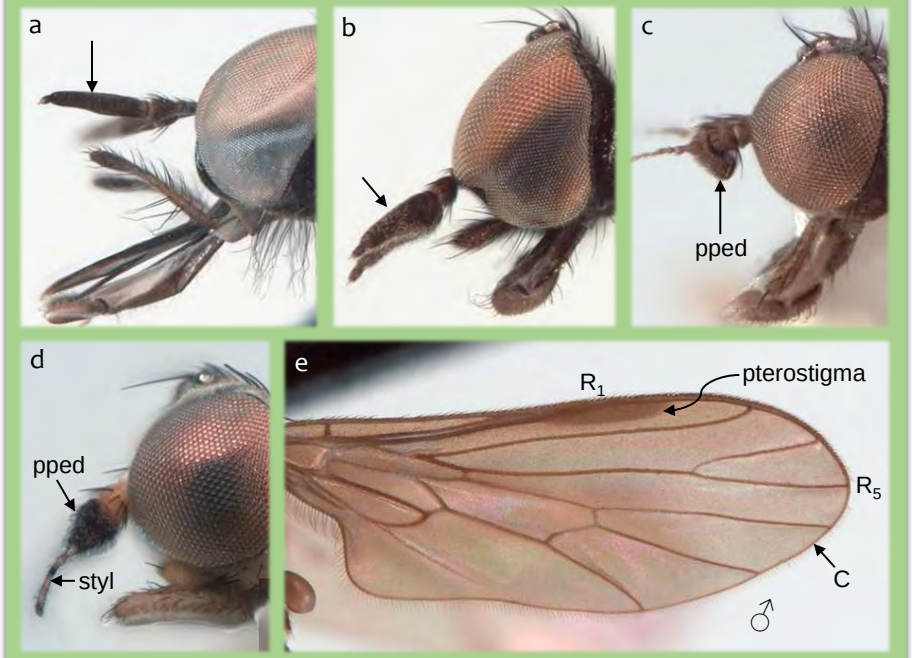
FIGURES: (**a**) Head of male *Gloma fuscipes* Melander, lateral view. (**b**) Head of female *Iteaphila macquarti* Zetterstedt, lateral view. (**c**) Head of female *G. fuscipes*, lateral view. (**d**) Head of male *Hormopeza copulifera* Melander, oblique view. (**e**) Head of male *I. macquarti*, oblique view. (**f**) Head of male *G. fuscipes*, anterior view.

54 Antenna with postpedicel broadly ovate and stylus short (Figs A, B); wing with pterostigma not overlapping apex of vein R1 (Fig. C); male wing with costa indistinct beyond vein R5 (Fig. C); male without tarsal claws at least on foreleg (Fig. D); RAGADINAE (EMPIDIDAE) [in part]: ***HORMOPEZA*** Zetterstedt



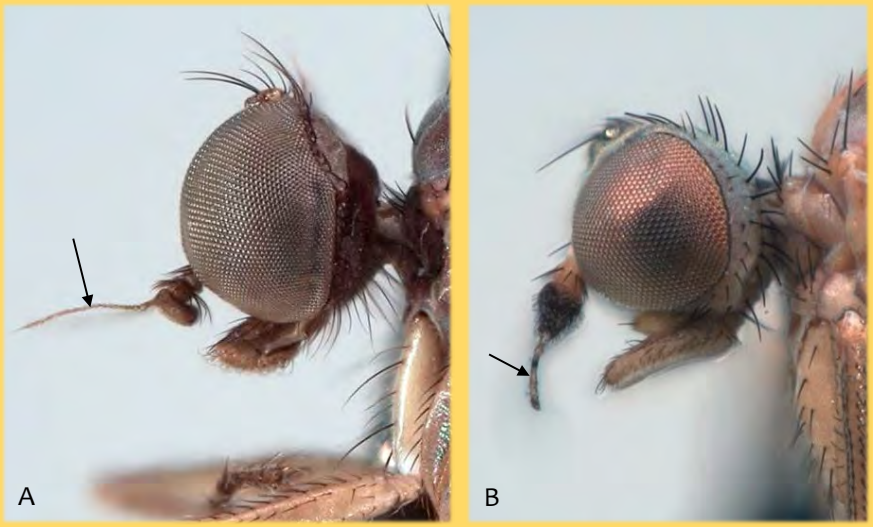
FIGURES: (**A**) Head of male *Hormopeza copulifera* Melander, oblique view. (**B**) Head of female *H. copulifera*, oblique view. (**C**) Wing of male *H. copulifera*. (**D**) Foreleg and midleg of *H. senator* Melander. Abbreviations: C – costa; pped – postpedicel; R1, R5 – radial veins; styl - stylus.

54' Antenna with postpedicel elongate (Figs a, b), reniform (Fig. c), or pointed ovate (Fig. d), if broadly pointed ovate, then stylus longer than postpedicel (Fig. d); wing with pterostigma overlapping apex of vein R1 (Fig. e); male wing with costa distinct beyond vein R5 (Fig. e); male with tarsal claws on all legs: **GO TO COUPLET 55**



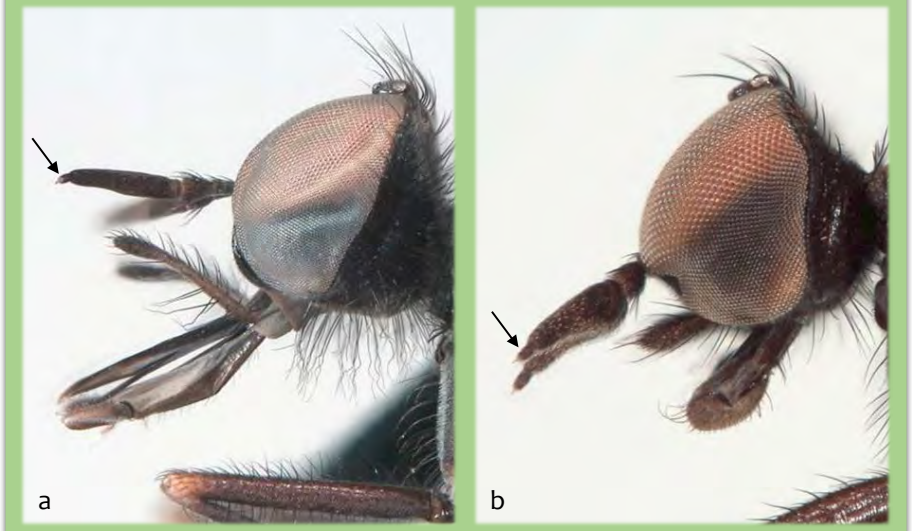
FIGURES: (**a**) Head of *Iteaphila macquarti* Zetterstedt. (**b**) Head of Undescribed genus B sp. (**c**) Head of *Gloma fuscipes* Melander. (**d**) Head of *Apalocnemis* sp. (**e**) Wing of male *Apalocnemis* sp. (Costa Rica). Abbreviations: C – costa; pped – postpedicel; R1, R5 – radial veins; styl - stylus.

55 Antennal stylus arista-like and longer than postpedicel (Figs A, B); TRICHOPEZINAE (BRACHYSTOMATIDAE) [in part]:
GO TO COUPLET 56



FIGURES: (**A**) Head of *Gloma fuscipes* Melander. (**B**) Head of *Apalocnemis* sp.

55' Antennal stylus much shorter than postpedicel (Figs a, b):
GO TO COUPLET 58

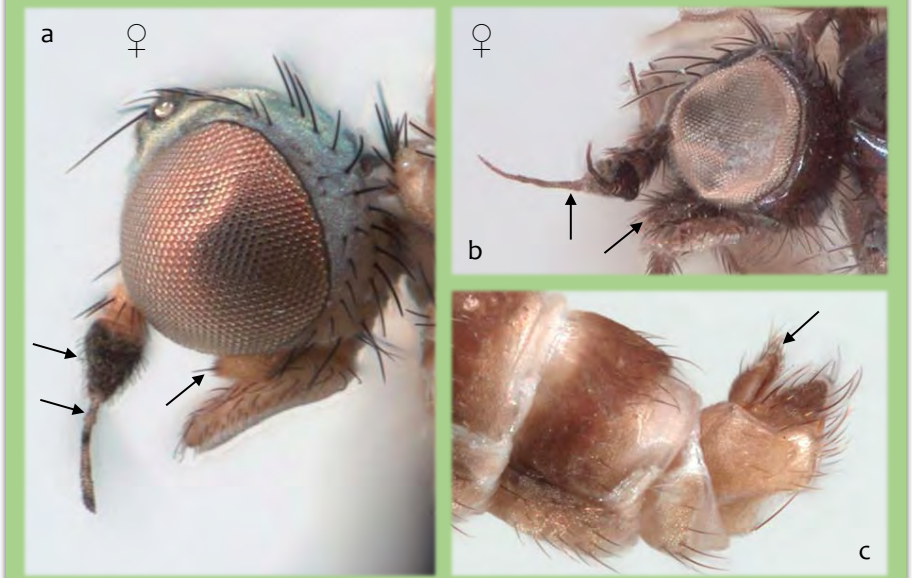


FIGURES: (**a**) Head of *Iteaphila macquarti* Zetterstedt. (**b**) Head of Undescribed genus B sp.

56 Antennal postpedicel reniform with narrow dorsal extension bearing arista-like stylus (Figs A, B); male terminalia with cercus with apical prolongation (Fig. C); female mouthparts with palpus narrow and setose (Fig. B): ***GLOMA*** Meigen

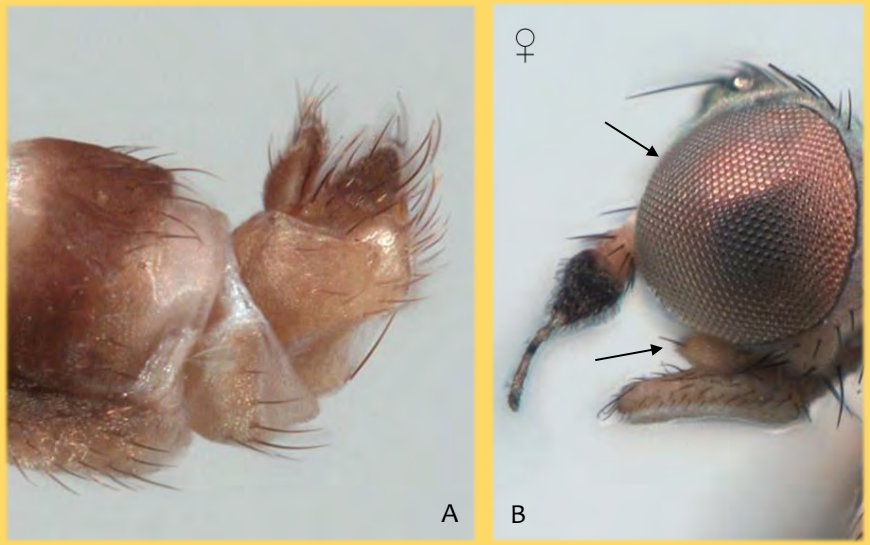
FIGURES: (**A**) Antenna of *Gloma fuscipes* Melander. (**B**) Head of female *G. fuscipes*. (**C**) Male terminalia of *G. fuscipes*.

56' Antennal postpedicel pointed ovate, lacking narrow dorsal extension, arista-like stylus apical (Figs a, b); male terminalia with cercus without apical prolongation (Fig. c); female mouthparts with palpus narrow and setose (Fig. b), or broad with only dark apical setae (Fig. a): GO TO COUPLET 57



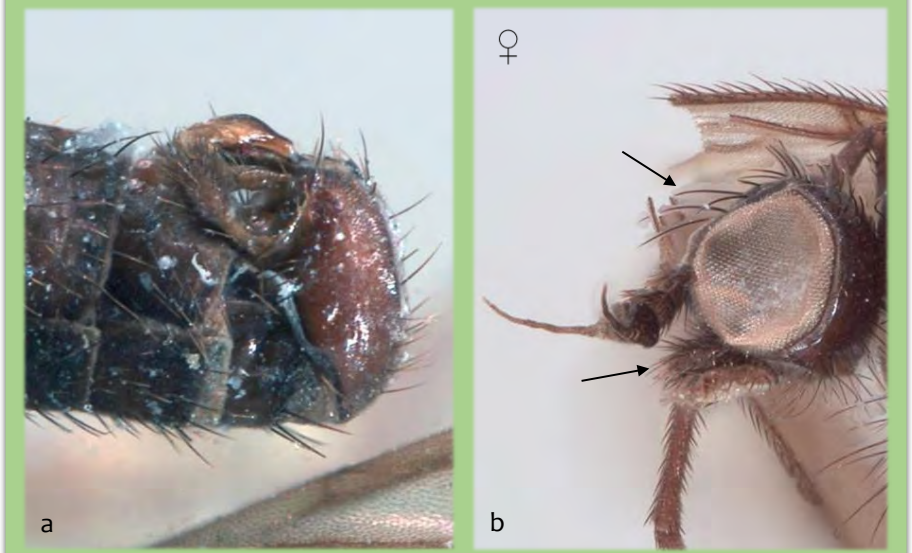
FIGURES: (**a**) Head of female *Apalocnemis* sp. (**b**) Head of female Undescribed genus A sp. (**c**) Male terminalia of *Apalocnemis* sp. (Costa Rica).

57 Male terminalia projecting posteriorly, not arched dorsally (Fig. A); female mouthparts with palpus broad bearing only dark apical setae (Fig. B); female frons without setae (Fig. B): ***APALOCNEMIS*** Philippi



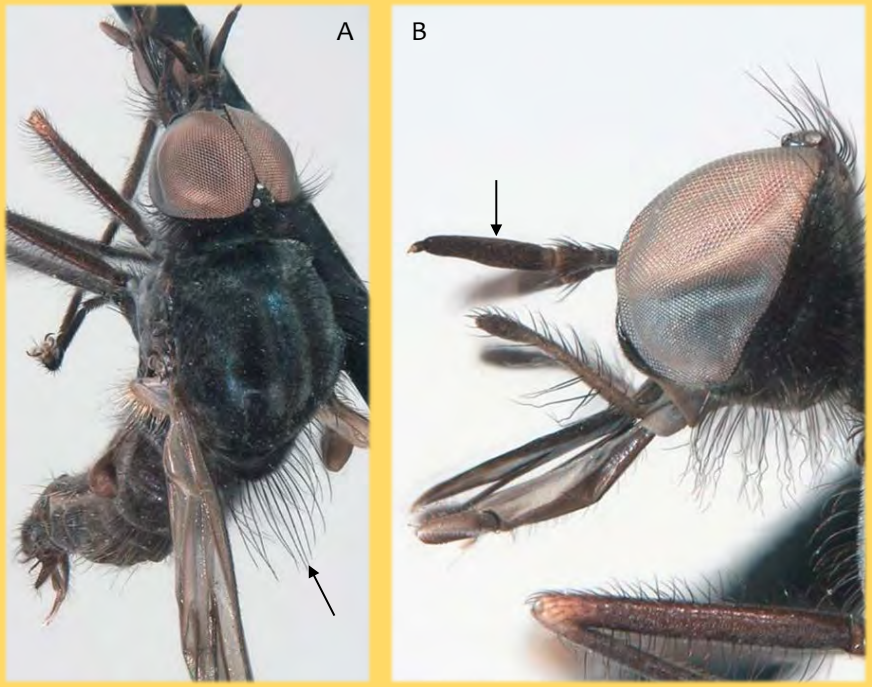
FIGURES: (**A**) Male terminalia of *Apalocnemis* sp. (Costa Rica). (**B**) Head of female *Apalocnemis* sp.

57' Male terminalia arched dorsally over abdomen (Fig. a); female mouthparts with palpus narrow and setose (Fig. b); female frons with pair of strong setae (Fig. b): **Undescribed genus A**



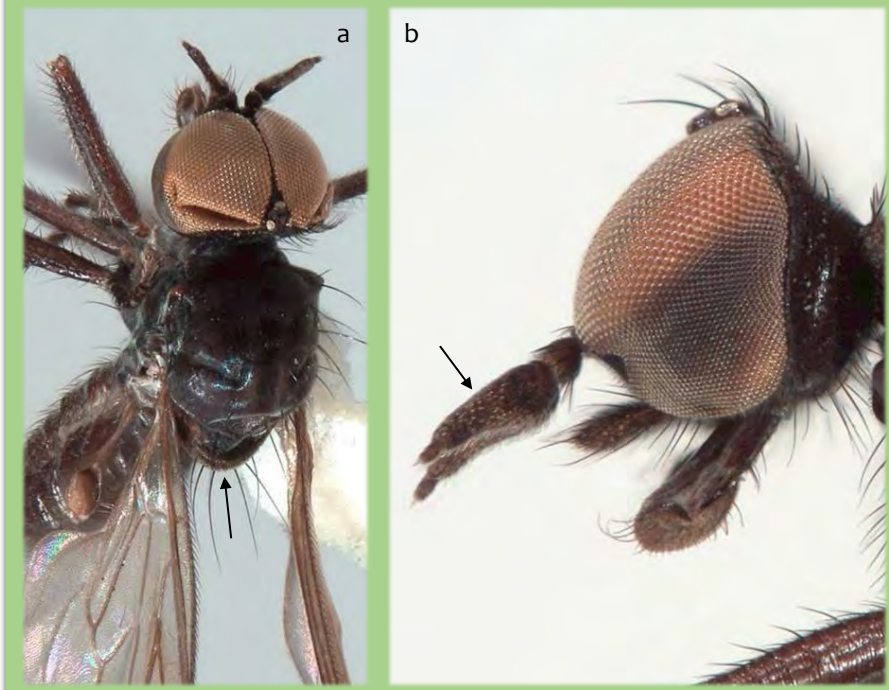
FIGURES: (**a**) Male terminalia of Undescribed genus A sp. (**b**) Head of female Undescribed genus A sp.

58 Thorax with more than 3 pairs of scutellar setae (Fig. A); antenna with postpedicel nearly parallel-sided, base only slightly broader than apex (Fig. B); ITEAPHILIDAE: ***ITEAPHILA*** Zetterstedt [in part]



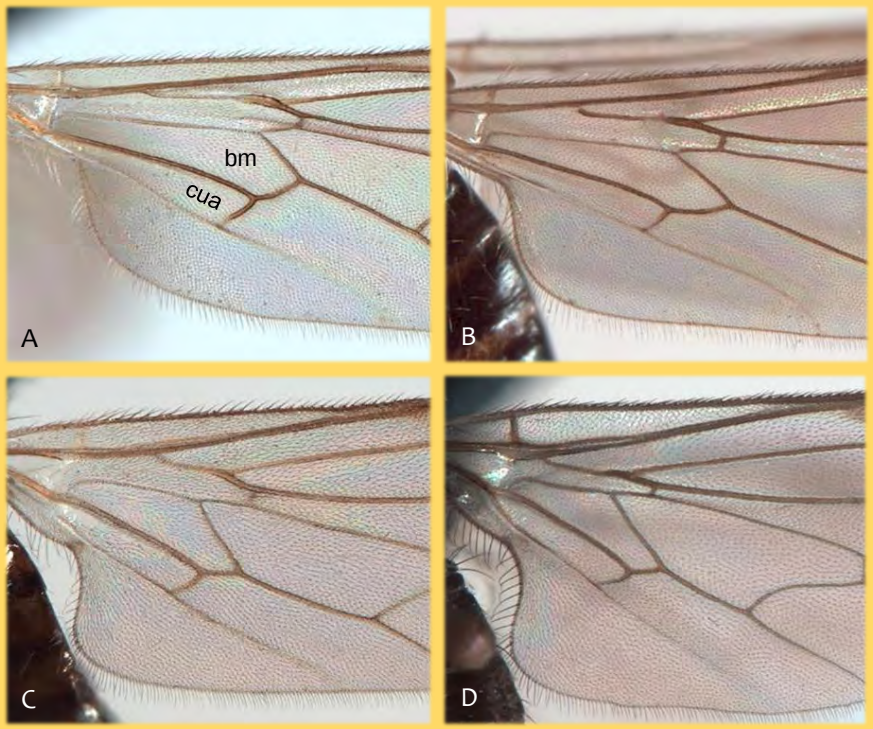
FIGURES: (**A**) Thorax of *Iteaphila macquarti* Zetterstedt (dorsal). (**B**) Head of *I. macquarti*.

58' Thorax with 3 or fewer pairs of scutellar setae (Fig. a); antenna with postpedicel tapered, base much broader than apex (Fig. b); TRICHOPEZINAE (BRACHYSTOMATIDAE) [in part]: **Undescribed genus B**



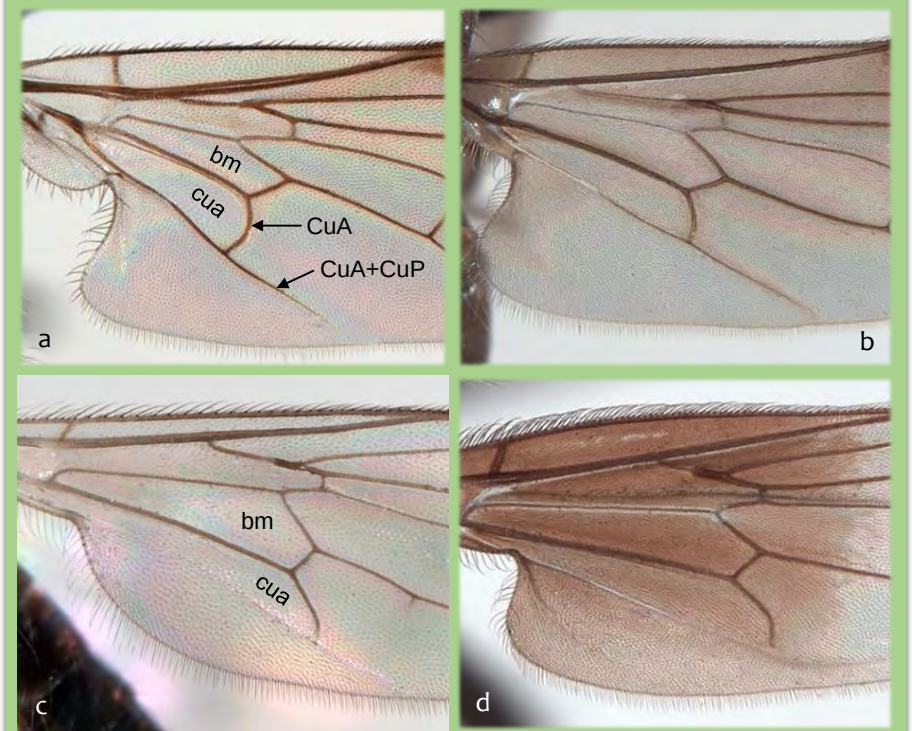
FIGURES: (**a**) Thorax of Undescribed genus B sp. (dorsal). (**b**) Head of Undescribed genus B sp.

59 Wing with cell cua usually truncate, either ending short of apex of cell bm or apically aligned (Figs A–D); HYBOTIDAE [in part]: GO TO COUPLET 60



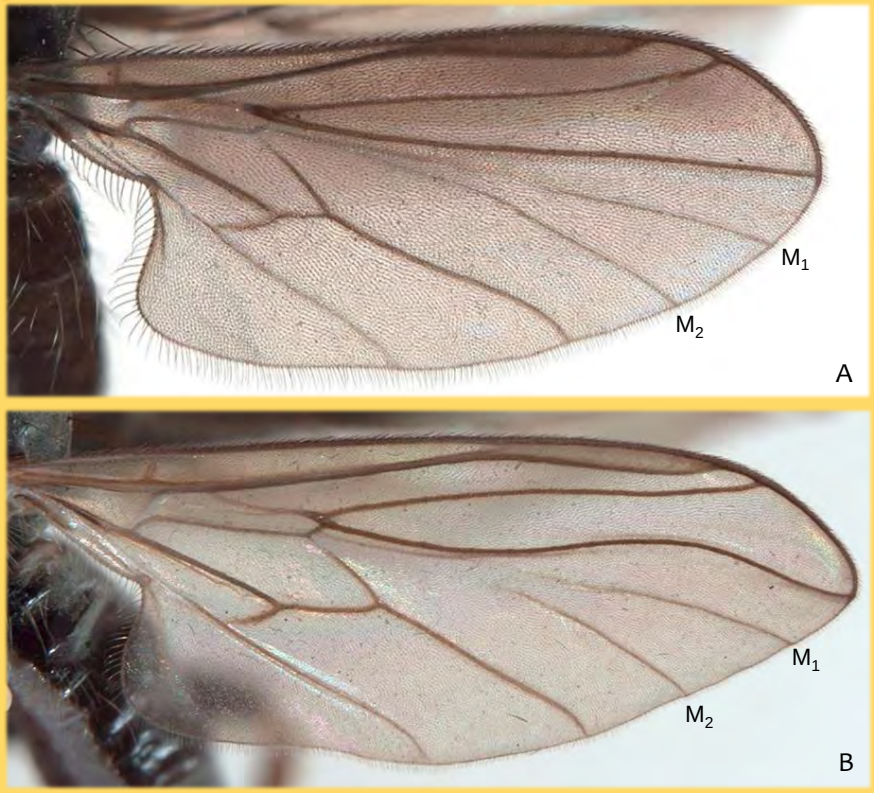
FIGURES: (**A**) Wing of *Leptopeza flavipes* (Meigen). (**B**) Wing of *Ocydromia glabricula* (Fallén). (**C**) Wing of *Trichina* sp. (**D**) Wing of *Anthalia* sp. Abbreviations: bm – basal medial cell; cua – anterior cubital cell.

59' Wing with cell cua as long as or longer than cell bm, with apex (vein CuA) arched distally to meet vein CuA+CuP (Figs a–d); HYBOTIDAE [in part] and ATELESTIDAE: GO TO COUPLET 69



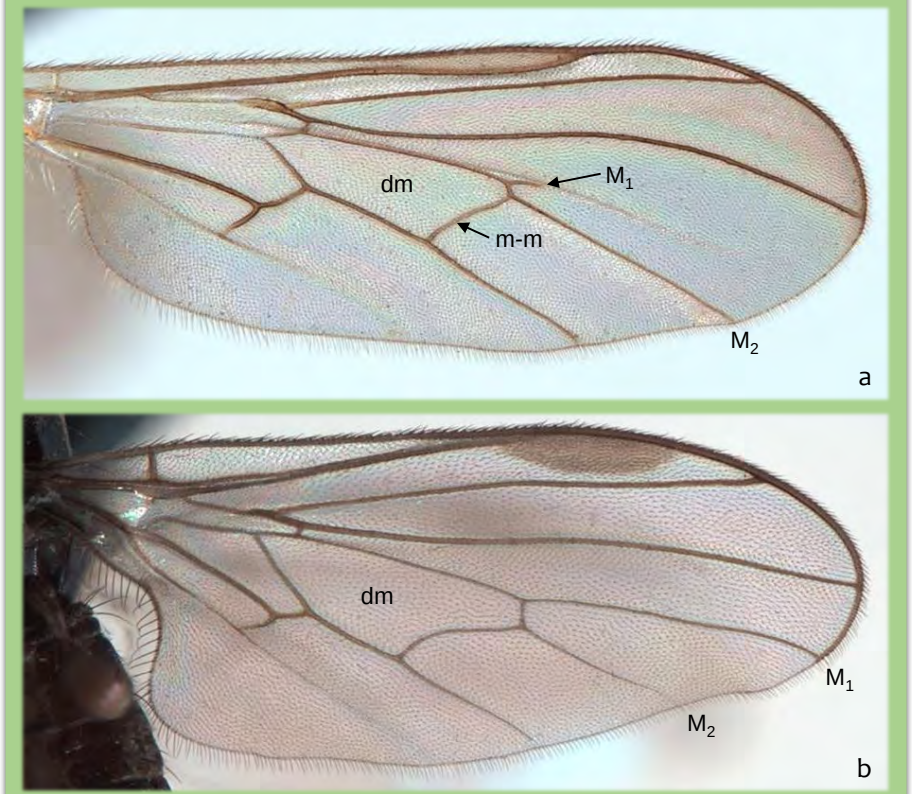
FIGURES: (**a**) Wing of *Meghyperus occidens* Coquillett. (**b**) Wing of *Syneches thoracicus* (Say). (**c**) Wing of *Hybos reversus* Walker. (**d**) Wing of *Euhybus triplex* (Walker). Abbreviations: bm – basal medial cell; cua – anterior cubital cell; CuA – anterior branch of cubital vein; CuA+CuP – anterior branch of cubital vein + posterior branch of cubital vein.

60 Wing with cell dm absent; veins M1 and M2 very weakened, only distinct toward wing margin (Figs A, B); BICELLARIINAE: GO TO COUPLET 61



FIGURES: (**A**) Wing of *Bicellaria* sp. (**B**) Wing of *Hoplocyrtoma femorata* (Loew). Abbreviations: M1, M2 – medial veins.

60' Wing with cell dm usually present (crossvein m-m rarely absent in *Allanthalia* and *Euthyneura*), veins M1 and M2 usually distinct (Figs a, b), M1 occasionally stub-like (Fig. a) or absent: GO TO COUPLET 62



FIGURES: (**a**) Wing of *Leptopeza flavipes* (Meigen). (**b**) Wing of *Anthalia* sp. Abbreviations: dm – discal medial cell; M1, M2 – medial veins; m-m – medial crossvein.

61 Hindleg raptorial (Fig. A); hind femur thickened; hind tibia geniculate at base: ***HOPLOCYRTOMA*** Melander

FIGURE: (**A**) Hindleg of *Hoplocyrtoma femorata* (Loew).

61' Hindleg slender (Fig. a); hind femur not greatly thickened; hind tibia simple at base: ***BICELLARIA*** Macquart

FIGURE: (**a**) Hindleg of *Bicellaria* sp.

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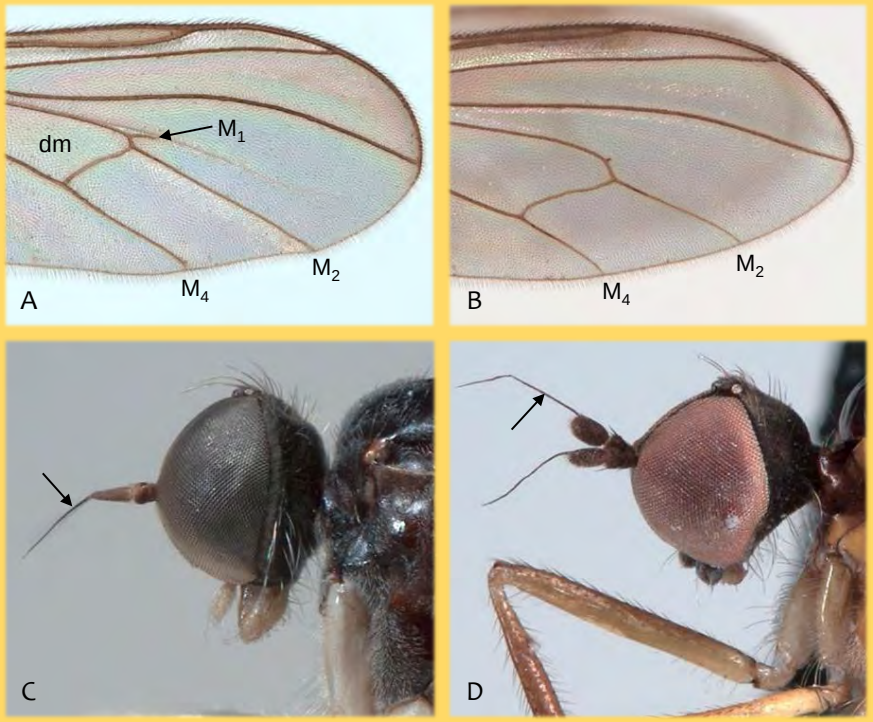
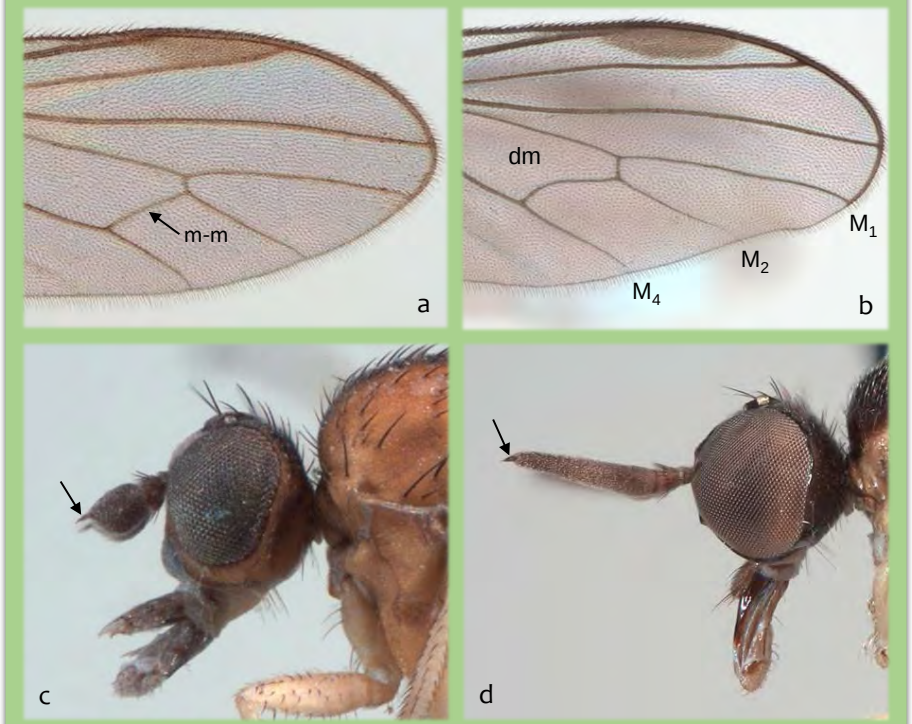
62 Wing with cell dm emitting two veins (M2, M4) reaching wing margin (Figs A, B), sometimes a third stump vein also present (M1, Fig. A); antenna with long arista-like stylus, longer than postpedicel (Figs C, D); OCYDROMIINAE: GO TO COUPLET 63



FIGURES: (**A**) Wing of *Leptopeza flavipes* (Meigen). (**B**) Wing of *Ocydromia glabricula* (Fallén). (**C**) Head of *Leptopeza* sp. (**D**) Head of *O. glabricula*. Abbreviations: dm – discal medial cell; M1, M2, M4 – medial veins.

62' Wing with cell dm (crossvein m-m rarely absent) emitting three veins (M1, M2, M4) reaching or nearly reaching wing margin (Figs a, b); antenna with short stylus, not longer than postpedicel (Figs c, d): GO TO COUPLET 64

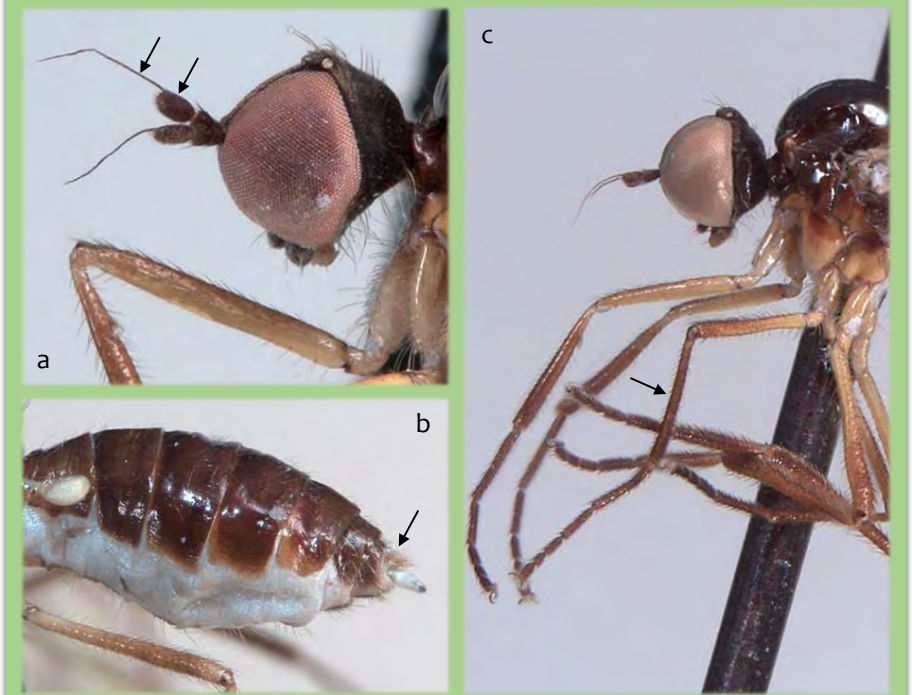


FIGURES: (**a**) Wing of *Trichina* sp. (**b**) Wing of *Anthalia* sp. (**c**) Head of *Anthalia* sp. (**d**) Head of *Oedalea lanceolata* Melander. Abbreviations: dm – discal medial cell; M1, M2, M4 – medial veins; m-m – medial crossvein.

63 Antenna (Fig. A) with postpedicel conical; arista-like stylus terminal; female ovipositor often narrowed and extended (Fig. B); mid tibia with distinct, erect dorsal setae (Fig. C): ***LEPTOPEZA*** Macquart

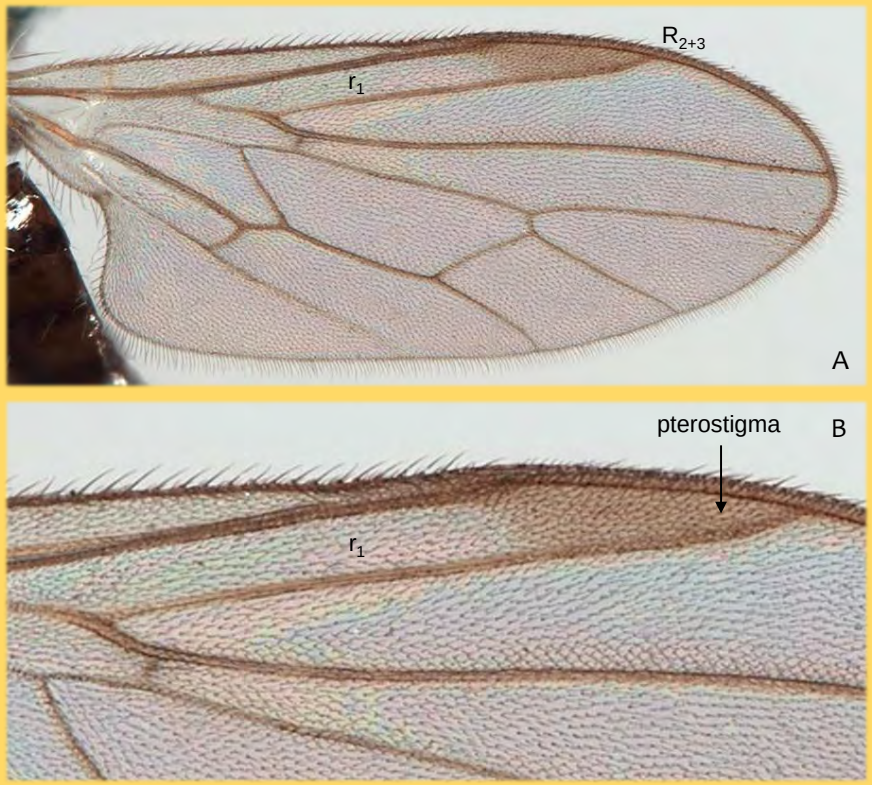
FIGURES: (**A**) Head of *Leptopeza* sp. (**B**) Abdomen of female *Leptopeza flavipes* (Meigen). (**C**) Body and legs of *Leptopeza* sp.

63' Antenna (Fig. a) with postpedicel oval; arista-like stylus dorsoapical; female ovipositor not narrowed and extended (Fig. b); mid tibia without distinct dorsal setae (Fig. c): ***OCYDROMIA*** Meigen



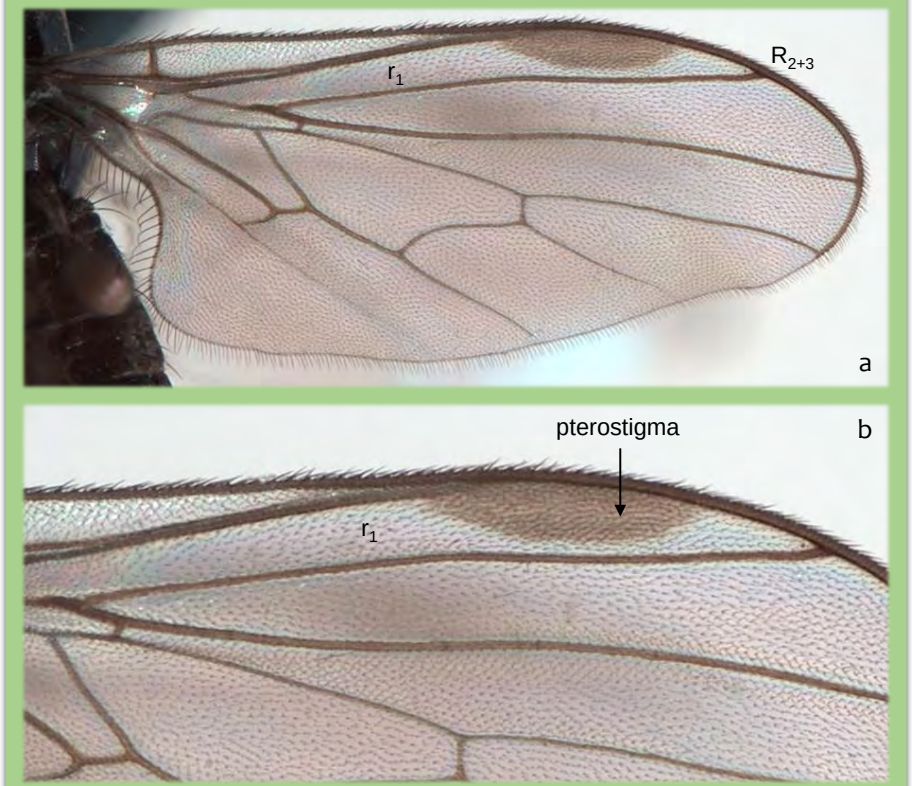
FIGURES: (**a**) Head of *Ocydromia glabricula* (Fallén). (**b**) Abdomen of female *O. glabricula*. (**c**) Body and legs of *O. glabricula.*

64 Wing with pterostigma extended to apex of vein R2+3, filling apex of cell r1 (Figs A, B); TRICHININAE [in part]: ***TRICHINA*** Meigen



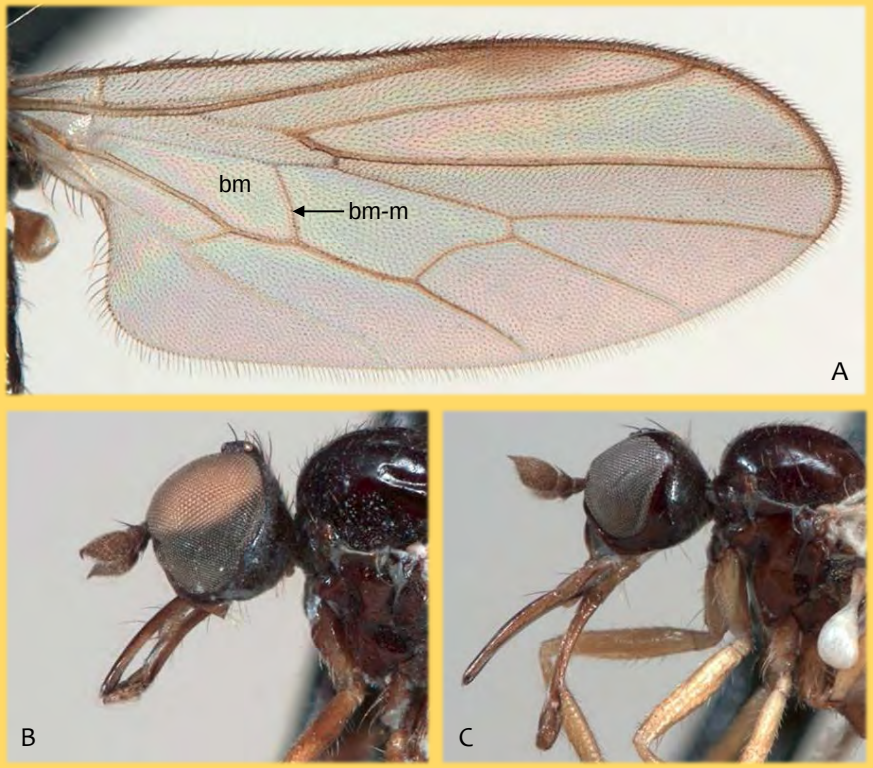
FIGURES: (**A**) Wing of *Trichina* sp. (**B**) Wing of *Trichina* sp. (close up). Abbreviations: r1 – radial cell 1; R2+3 – radial vein.

64' Wing with pterostigma not extended to apex of vein R2+3, not filling apex of cell r1 (Figs a, b): **GO TO COUPLET 65**



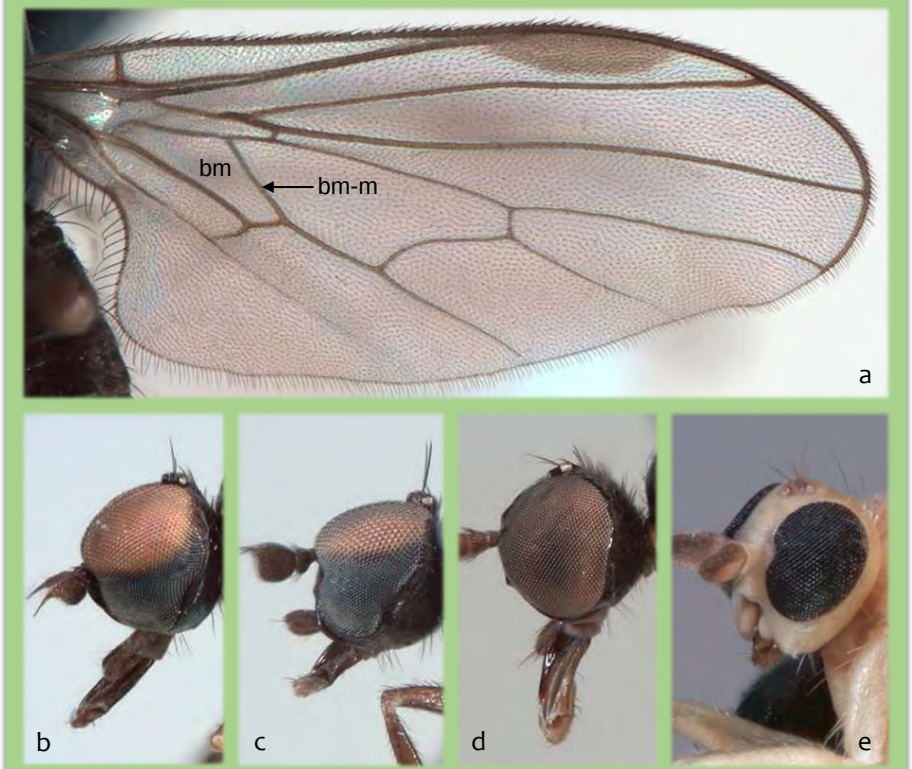
FIGURES: (**a**) Wing of *Anthalia* sp. (**b**) Wing of *Anthalia* sp. (close up). Abbreviations: r1 – radial cell 1; R2+3 – radial vein.

65 Wing with cell bm twice as broad distally as proximal end, with crossvein bm-m nearly perpendicular (Fig. A); proboscis long, projecting obliquely forwards (Figs B, C); OEDALEINAE [in part]: ***EUTHYNEURA*** Macquart



FIGURES: (**A**) Wing of *Euthyneura bucinator* Melander. (**B**) Head of male *E. bucinator*. (**C**) Head of female *E. bucinator*. Abbreviations: bm – basal medial cell; bm-m – basal medial crossvein.

65' Wing with cell bm as narrow distally as proximal end, crossvein bm-m oblique (Fig. a); proboscis length variable (Figs b–e): GO TO COUPLET 66



FIGURES: (**a**) Wing of *Anthalia* sp. (**b**) Head of *Anthalia* sp. (**c**) Head of *Anthalia* sp. (**d**) Head of *Oedalea lanceolata* Melander. (**e**) Head of *Allanthalia* sp. Abbreviations: bm – basal medial cell; bm-m – basal medial crossvein.

66 Antenna without obvious stylus (Fig. A); proboscis usually retracted into wide subcranial cavity (Fig. A); eyes of both sexes widely separated above antennae (dichoptic), upper facets not enlarged (Fig. A); OEDALEINAE [in part]: ***ALLANTHALIA*** Melander

FIGURE: (**A**) Head and thorax of female *Allanthalia* sp.

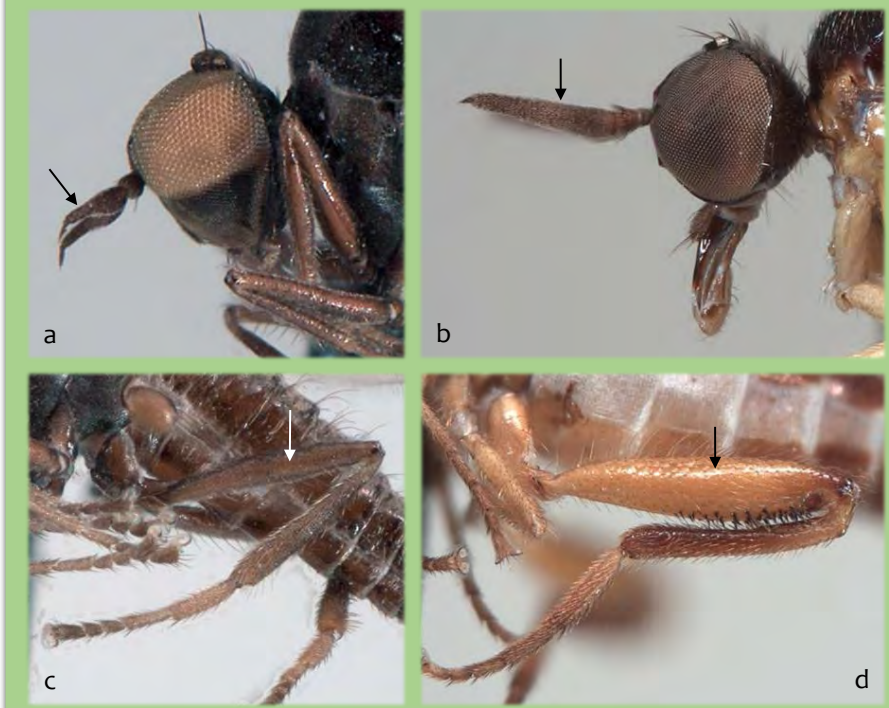
66' Antenna with stylus (Fig. a); proboscis not retracted into subcranial cavity (Fig. a); male eyes meeting above antennae (holoptic), with upper facets enlarged (Fig. a): GO TO COUPLET 67

FIGURE: (**a**) Head and thorax of male *Anthalia* sp.

67 Antenna with postpedicel usually short and broad, width subequal to length (Figs A, B); hind femur usually slender (Fig. C), if inflated, antenna with stylus longer than basal width of postpedicel and wing vein M2 complete; OEDALEINAE [in part]: ***ANTHALIA*** Zetterstedt

FIGURES: (**A**) Head of *Anthalia* sp. (**B**) Head of *Anthalia* sp. (**C**) Body and legs of *Anthalia* sp.

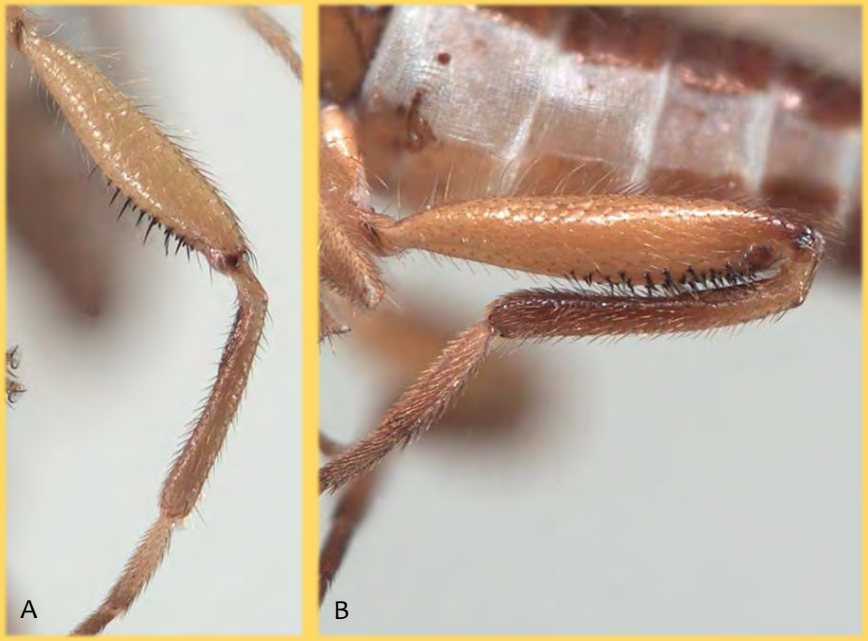
67' Antenna (Figs a, b) with postpedicel elongated, often more or less strap-shaped; stylus shorter than basal width of postpedicel; hind femur slender (Fig. c) or thickened with strong ventral setae (Fig. d); if rarely postpedicel long and broad, then wing vein M2 incomplete, not reaching wing margin: **GO TO COUPLET 68**



FIGURES: (**a**) Head of *Trichinomyia* sp. (**b**) Head of *Oedalea lanceolata* Melander. (**c**) Hindleg of *Trichinomyia* sp. (**d**) Hindleg of *O. lanceolata*.

doi:10.3752/cjai.2023.48

68 Hind femur thickened with strong ventral setae (Figs A, B); OEDALEINAE [in part]: ***OEDALEA*** Meigen



FIGURES: (**A**) Hindleg of *Oedalea lanceolata* Melander. (**B**) Hindleg of *O. lanceolata*.

68' Hind femur slender without strong ventral setae (Fig. a); TRICHININAE [in part]: ***TRICHINOMYIA*** Tuomikoski

FIGURE: (**a**) Hindleg of *Trichinomyia* sp.

69 Wing (Fig. A) with vein M1+2 branched beyond apex of cell dm; alula developed; fore tibial gland absent (Fig. B); only male eyes meeting above antennae (holoptic, Fig. C) with upper facets enlarged; female eyes separated above antennae (dichoptic, Fig. B), without upper facets enlarged; ATELESTINAE (ATELESTIDAE): ***MEGHYPERUS*** Loew

FIGURES: (**A**) Wing of *Meghyperus occidens* Coquillett. (**B**) Head and foreleg of female *Meghyperus nitidus* Melander. (**C**) Head of male *Meghyperus* sp.

69' Wing (Fig. a) with vein M1+2 unbranched; alula greatly reduced or lacking; fore tibial gland present (Fig. b); eyes of both sexes meeting above antennae (holoptic, Fig. b) with upper facets enlarged; HYBOTINAE: **GO TO COUPLET 70**

FIGURES: (**a**) Wing of *Syndyas merbleuensis* Teskey & Chillcott. (**b**) Head, thorax and foreleg of female *Syneches thoracicus* (Say).

70 Wing (Fig. A) with vein Rs long, arising basal to middle of cell bm; apex of cell cua usually aligned with apex of cell bm: ***SYNECHES*** Walker

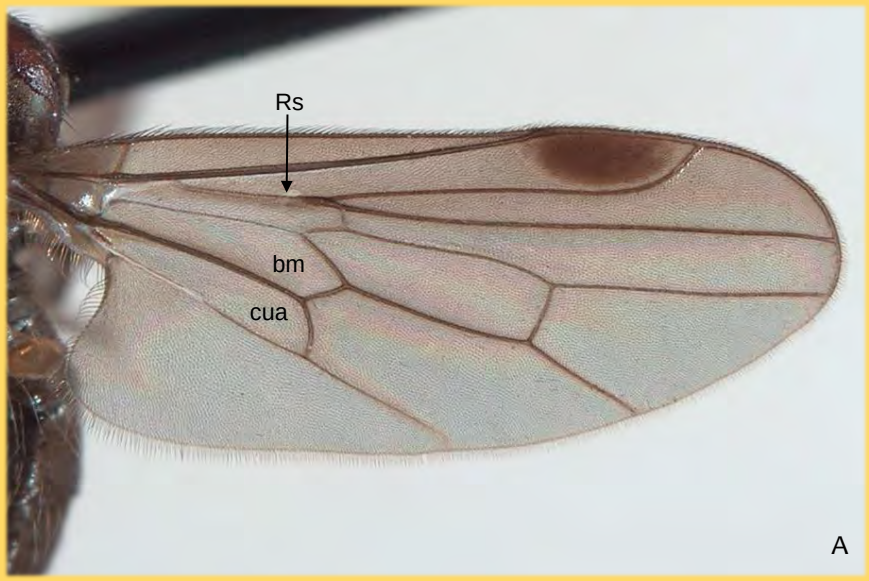


FIGURE: (**A**) Wing of *Syneches thoracicus* (Say). Abbreviations: bm – basal medial cell; cua – anterior cubital cell; Rs – radial sector.

70' Wing (Fig. a) with vein Rs short, arising distal to middle of cell bm; apex of cell cua extending beyond apex of cell bm:
GO TO COUPLET 71

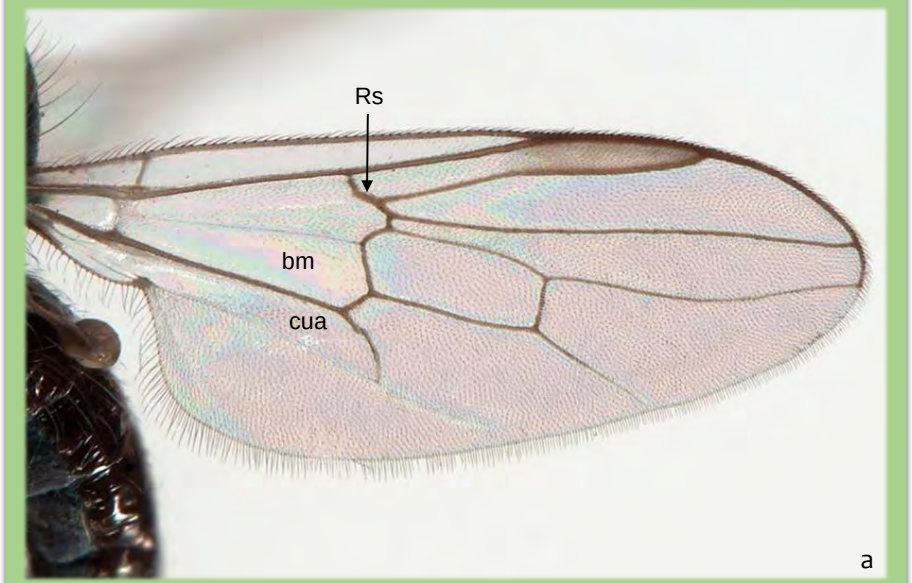
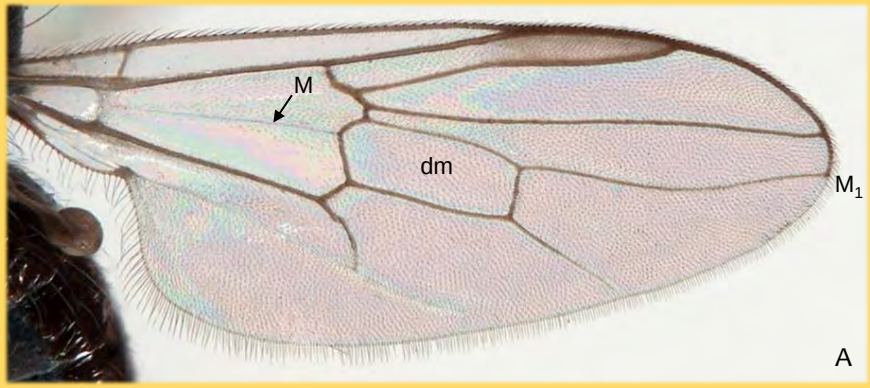
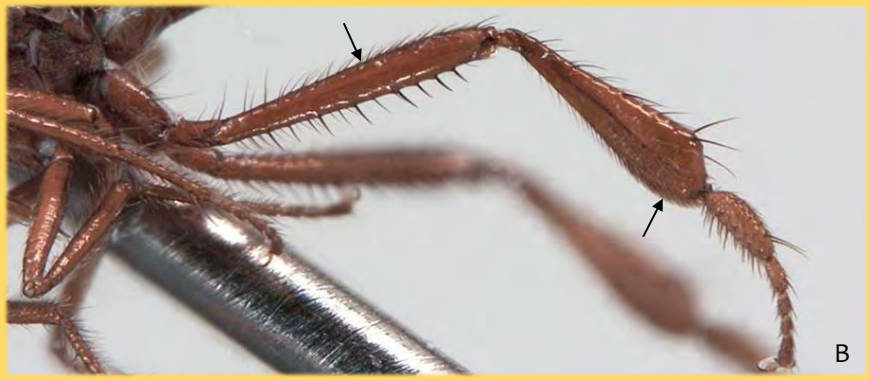


FIGURE: (**a**) Wing of *Syndyas merbleuensis* Teskey & Chillcott. Abbreviations: bm – basal medial cell; cua – anterior cubital cell; Rs – radial sector.

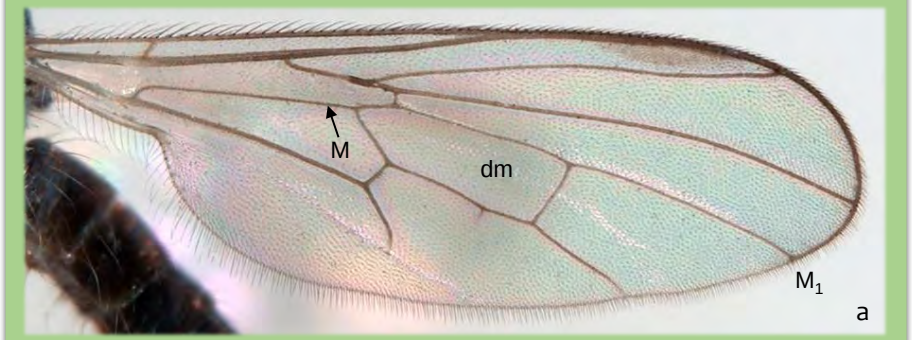
71 Wing (Fig. A) with basal section of vein M markedly weakened; cell dm much shorter than vein M1; hind femur slender (Fig. B); hind tibia usually clavate (Fig. B): ***SYNDYAS*** Loew





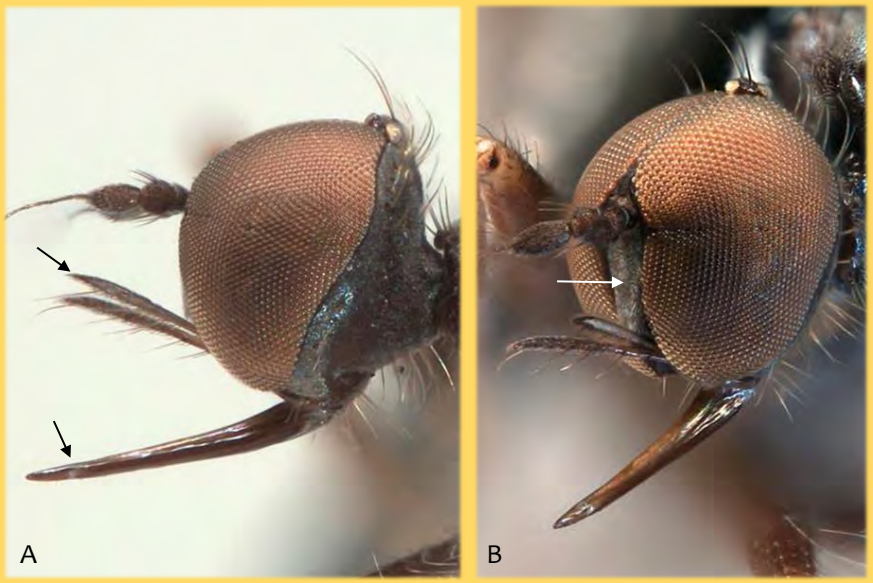
FIGURES: (**A**) Wing of *Syndyas merbleuensis* Teskey & Chillcott. (**B**) Hindleg of *S. merbleuensis*. Abbreviations: dm – discal medial cell; M, M1 – medial veins.

71' Wing (Fig. a) with vein M strong basally or only slightly weakened; cell dm not much shorter than vein M1; hind femur more or less thickened (Fig. b); hind tibia not clavate (Fig. b): **GO TO COUPLET 72**



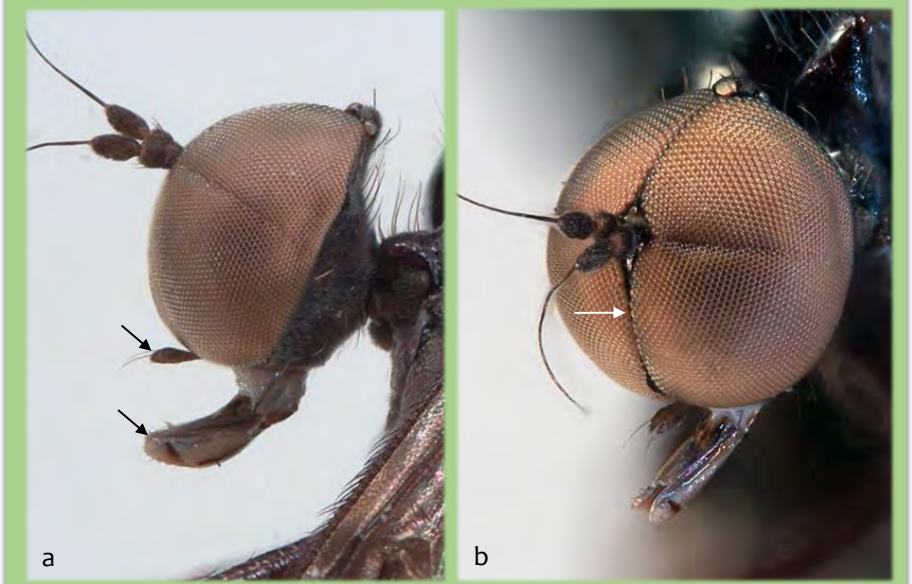
FIGURES: (**a**) Wing of *Hybos reversus* Walker. (**b**) Hindleg of *H. reversus*. Abbreviations: dm – discal medial cell; M, M1 – medial veins.

72 Proboscis elongate and projecting, about as long as head (Fig. A); palpus prominent (Fig. A); labellum constricted for piercing (Fig. A), without pseudotracheae; eyes widely separated on face (Fig. B): ***HYBOS*** Meigen



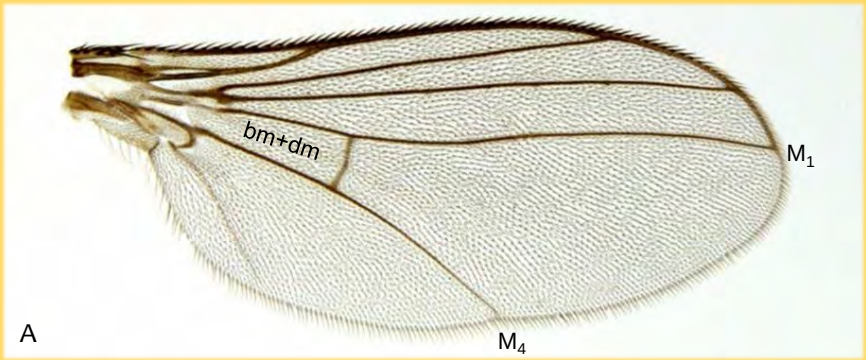
FIGURES: (**A**) Head of *Hybos reversus* Walker, lateral view. (**B**) Head of *H. reversus*, oblique view.

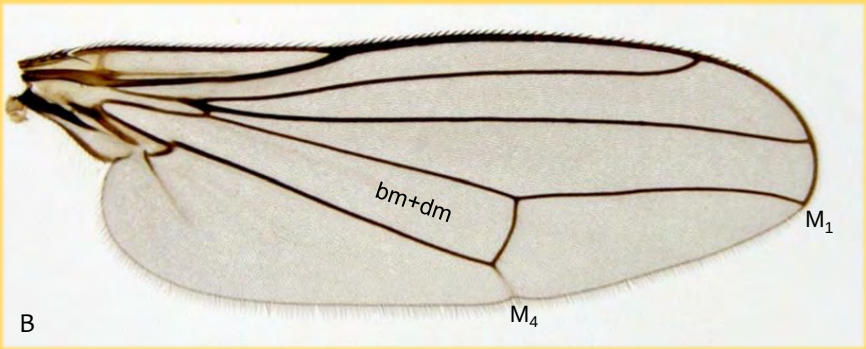
72' Proboscis and palpus short to moderately projecting (Fig. a); labellum not constricted for piercing (Fig. a), with pseudotracheae; eyes meeting on face (Fig. b): ***EUHYBUS*** Coquillett



FIGURES: (**a**) Head of *Euhybus* sp., lateral view. (**b**) Head of *Euhybus* sp., oblique view.

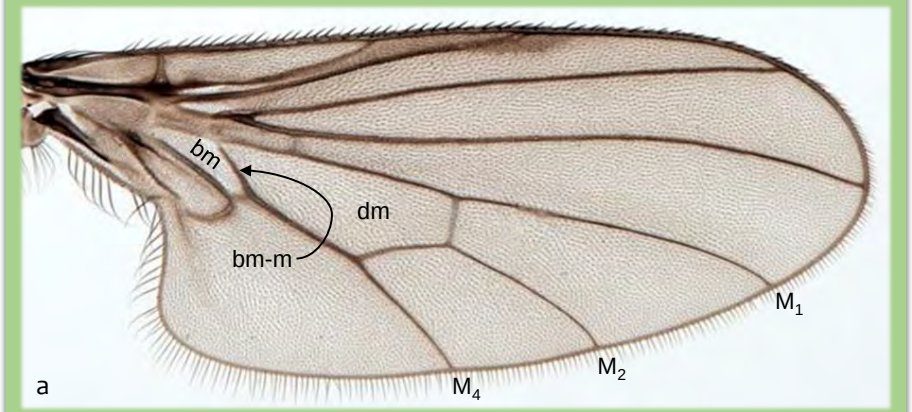
73 Wing cell bm+dm emitting two branches (M1, M4, Figs A, B); crossvein bm-m absent (cell bm confluent with cell dm, Figs A, B): **DOLICHOPODIDAE** sensu stricto

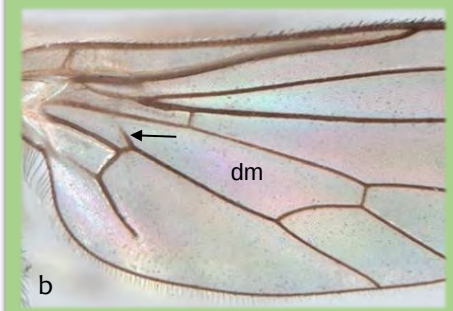


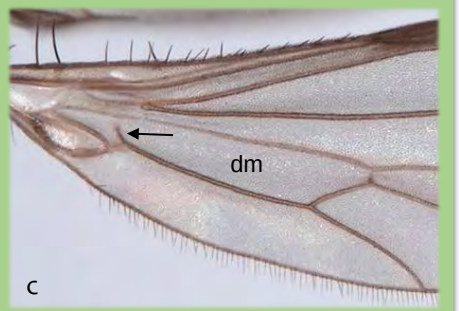


FIGURES: (**A**) Wing of *Chrysotus* sp. (**B**) Wing of *Hydrophorus* sp. Abbreviations: bm+dm – basal medial cell + discal medial cell; M1, M4 – medial veins.

73' Wing cell dm emitting three branches (M1, M2, M4, Figs a–c); crossvein bm-m present (cells bm and dm separate, Figs a–c), but sometimes incomplete anteriorly (Figs b, c): **GO TO COUPLET 74**

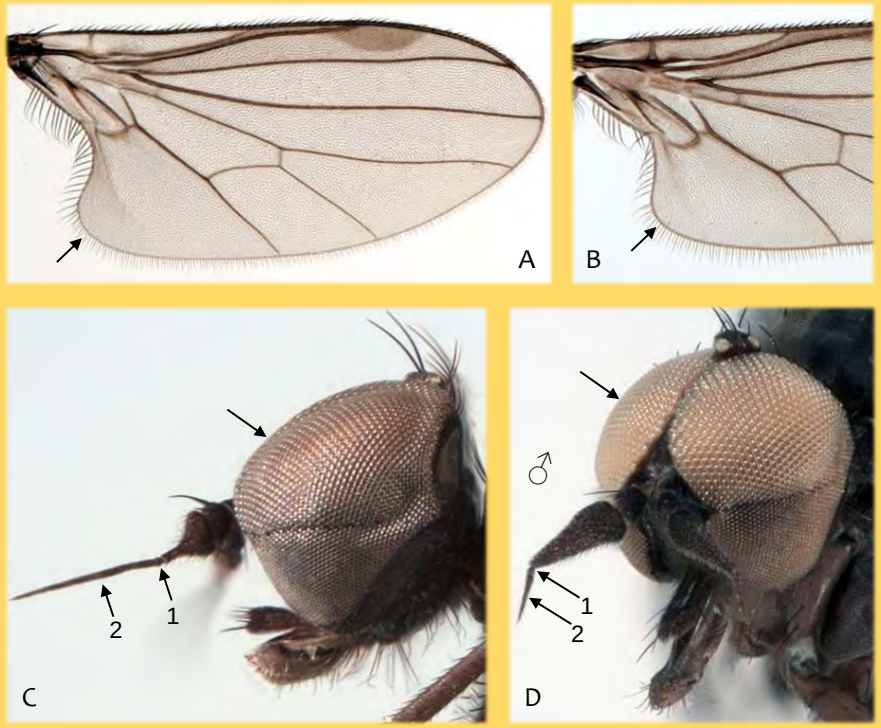






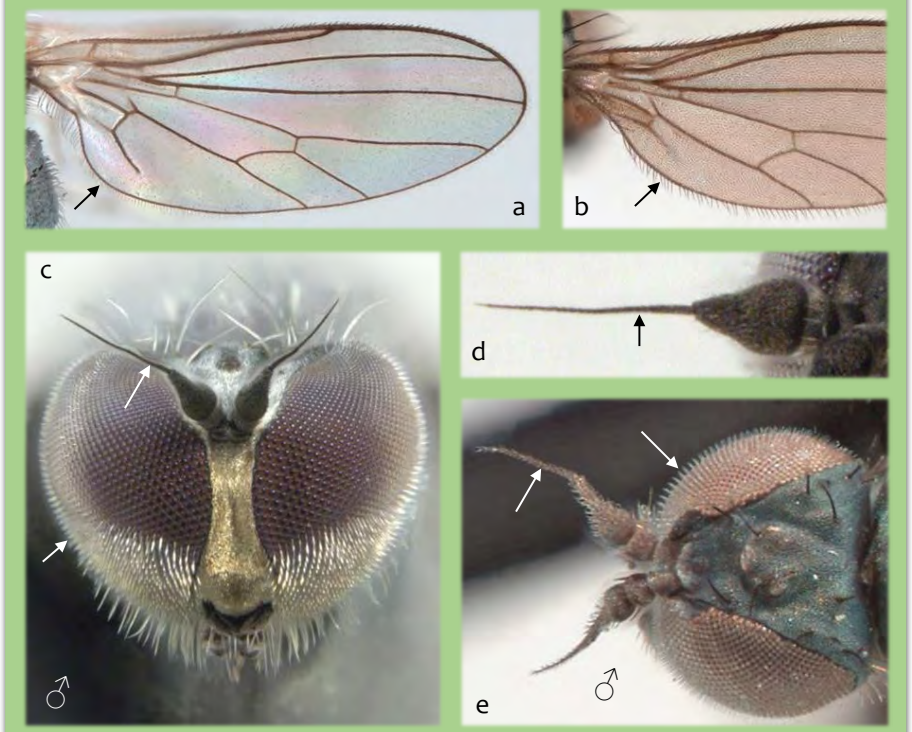
FIGURES: (**a**) Wing of *Schistostoma sycophantor* (Melander). (**b**) Wing of *Parathalassius candidatus* Melander. (**c**) Wing of *Thalassophorus arnaudi* Brooks & Cumming. Abbreviations: bm – basal medial cell; bm-m – basal medial crossvein; dm – discal medial cell; M1, M2, M4 – medial veins.

74 Wing with anal lobe well developed (Figs A, B); antennal stylus two-segmented (Figs C, D), with short basal segment (1) and long apical segment (2); eyes bare (Figs C, D), meeting above antennae (holoptic) in male (Fig. D); MICROPHORINAE: GO TO COUPLET 75



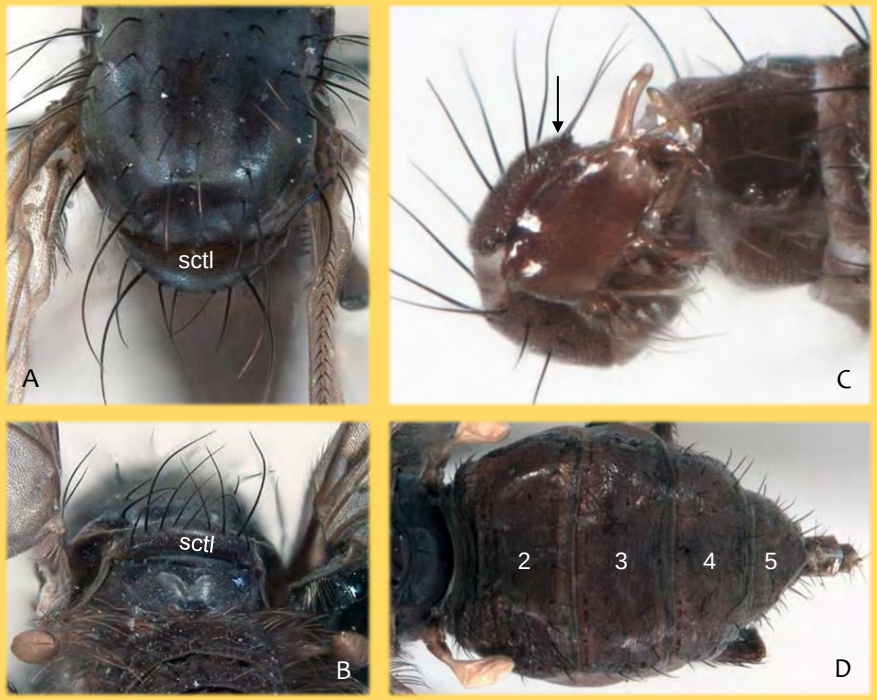
FIGURES: (**A**) Wing of *Microphor obscurus* Coquillett. (**B**) Wing of *Schistostoma sycophantor* (Melander). (**C**) Head of male *S. armipes* (Melander). (**D**) Head of male *M. obscurus*.

74' Wing with anal lobe reduced (Figs a, b); antennal stylus one-segmented (Figs c–e); eyes pubescent (with ommatrichia, Figs c, e), broadly separated above antennae (dichoptic) in male (Figs c, e); PARATHALASSIINAE: GO TO COUPLET 76



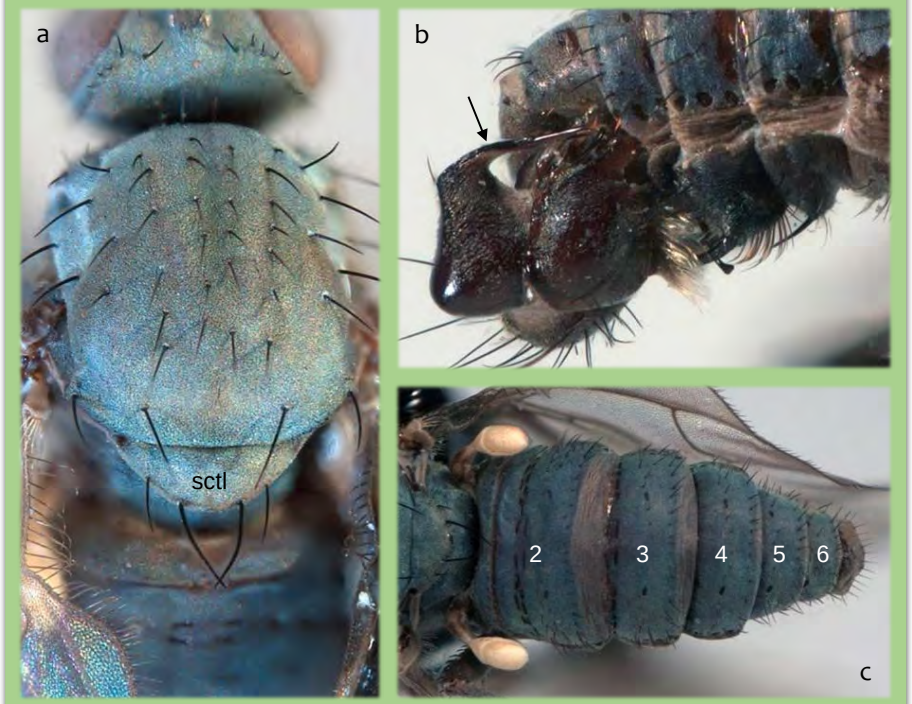
FIGURES: (**a**) Wing of *Parathalassius candidatus* Melander. (**b**) Wing of *Microphorella breviradia* Cumming & Brooks. (**c**) Head of male *P. abela* Brooks & Cumming. (**d**) Antenna of *P. abela*. (**e**) Head of male *Thalassophorus arnaudi* Brooks & Cumming (dorsal).

75 Thorax with 6–10 scutellar setae (Figs A, B); male terminalia without medial hypandrial prolongation (Fig. C); female abdomen with five exposed segments (terminalia retractable into segment five, Fig. D): ***MICROPHOR*** Macquart



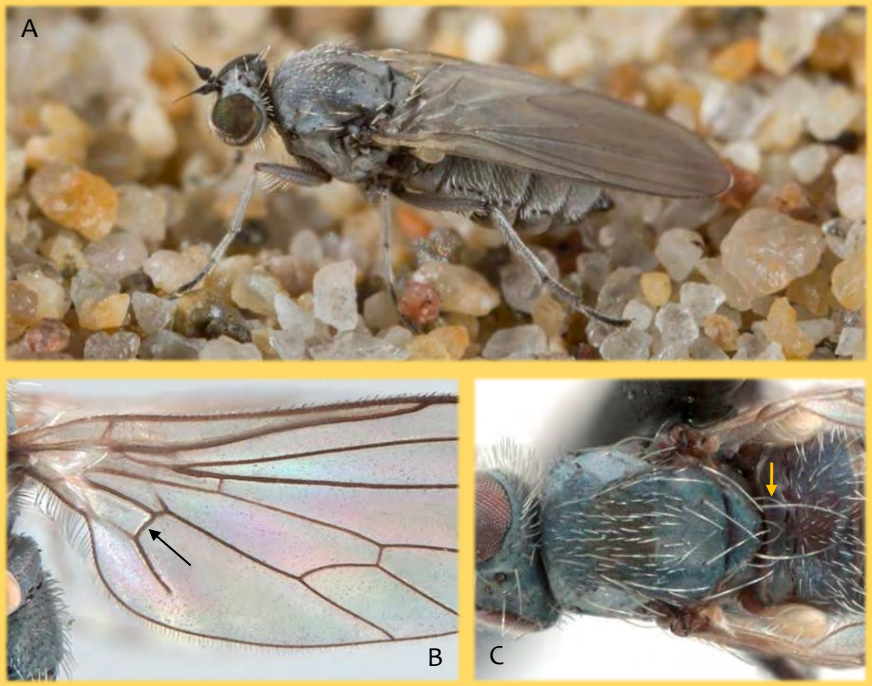
FIGURES: (**A**) Thorax of *Microphor skevingtoni* Brooks & Cumming. (**B**) Scutellum of *M. discalis* Melander (posterior). (**C**) Abdomen and male terminalia of *M. discalis* (lateral). (**D**) Female abdomen of *M. discalis* (dorsal). Abbreviation: sctl – scutellum.

75' Thorax of most species with 2–4 scutellar setae (Fig. a), but occasionally with 6–8 setae; male terminalia with medial hypandrial prolongation (Fig. b); female abdomen with six or seven exposed segments (terminalia retractable into segments six or seven, Fig. c): ***SCHISTOSTOMA*** Becker



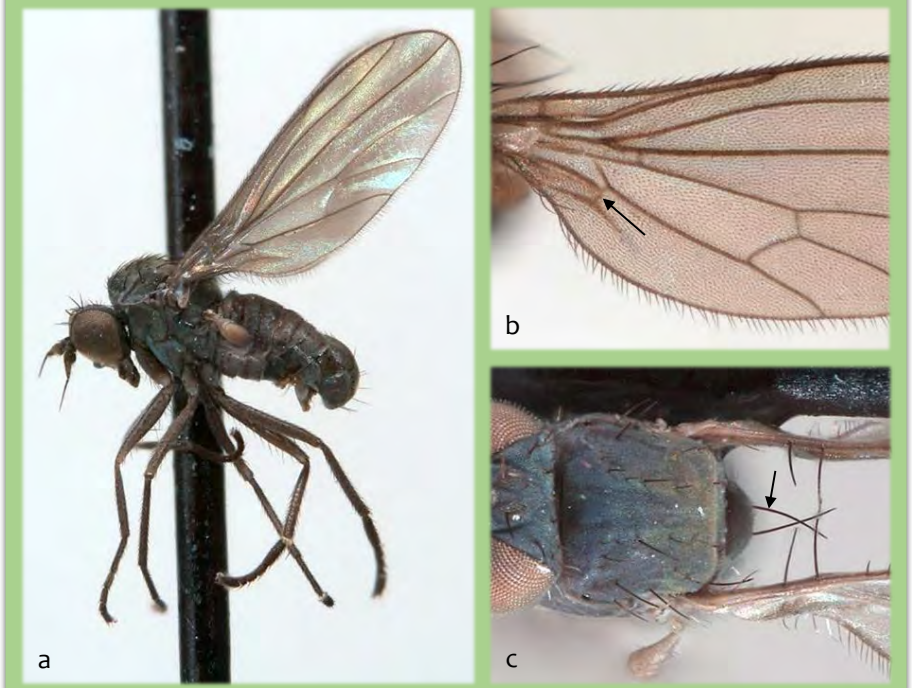
FIGURES: (**a**) Thorax of *Schistostoma evisceratum* (Melander) (dorsal). (**b**) Abdomen and male terminalia of *S. evisceratum* (lateral). (**c**) Female abdomen of *S. evisceratum* (dorsal). Abbreviation: sctl – scutellum.

76 Body and legs silvery-grey with pale setae (Figs A, C); wing cell cua truncate apically (Fig. B); thorax with 2–3 pairs of scutellar setae (Fig. C); found on sandy seacoast habitats: ***PARATHALASSIUS*** Mik



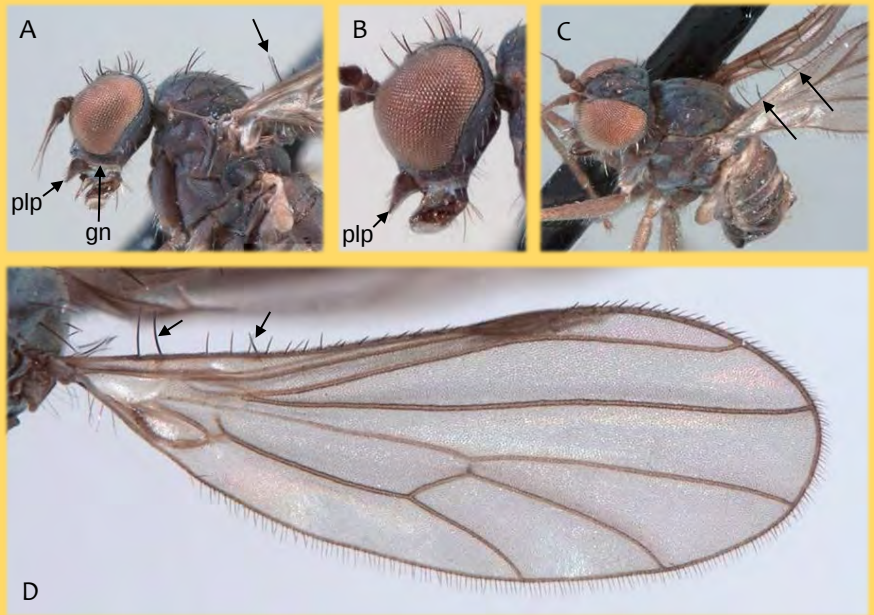
FIGURES: (**A**) *Parathalassius abela* Brooks & Cumming resting on sand, Oso Flaco Dunes, California; photo by A. Abela. (**B**) Wing of *P. candidatus* Melander. (**C**) Thorax of *P. sinclairi* Brooks & Cumming (dorsal).

76' Body and legs dull grey or brownish, with mostly dark setae (Figs a, c), setae of legs dark or pale; wing cell cua convex apically (Fig. b); thorax with 1 pair of scutellar setae (Fig. c); found on rocky or stony seacoast habitats, or in riparian habitats: GO TO COUPLET 77



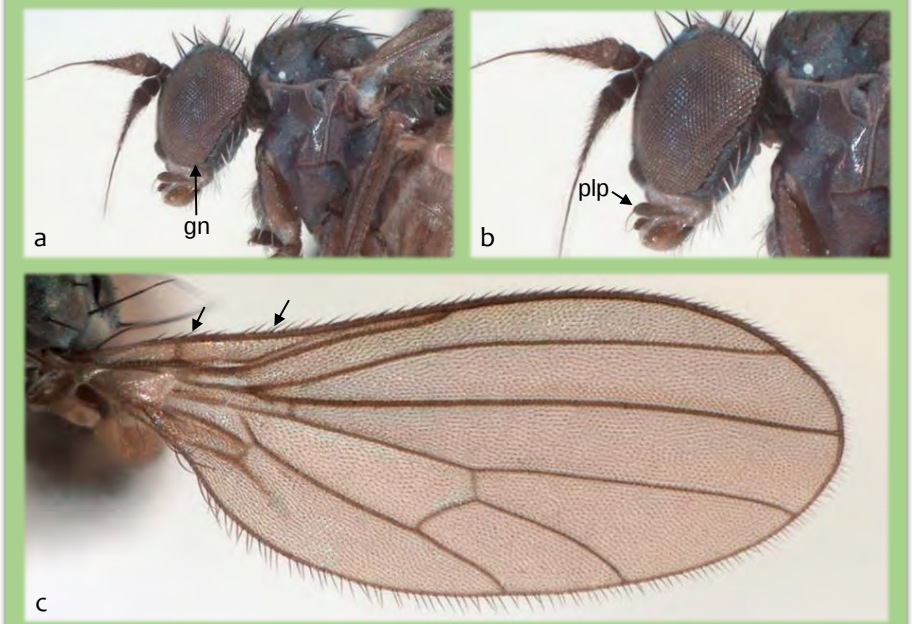
FIGURES: (**a**) Male of *Microphorella* sp., habitus. (**b**) Wing of *M. breviradia* Cumming & Brooks. (**c**) Thorax of *Thalassophorus arnaudi* Brooks & Cumming (dorsal).

77 Head with gena distinctly projecting below eye (Figs A, B); mouthparts with palpus triangular, tapered to pointed tip (Figs A, B); wing with spine-like anterior costal setae along basal third (Figs A, C, D); found on rocky or stony seacoast habitats: ***THALASSOPHORUS*** Saigusa



FIGURES: (**A**) Head, thorax and wing base of *Thalassophorus arnaudi* Brooks & Cumming. (**B**) Head of *T. arnaudi*. (**C**) Body of *T. arnaudi* (dorsolateral view). (**D**) Wing of *T. arnaudi*. Abbreviations: gn – gena; plp – palpus.

77' Head with gena weakly developed, scarcely projected below eye (Fig. a); mouthparts with palpus broadly or narrowly rounded apically, not triangular (Fig. b); wing without spine-like anterior costal setae along basal third (Fig. c); found in riparian habitats: ***MICROPHORELLA*** Becker



FIGURES: (**a**) Head, thorax and wing base of *Microphorella breviradia* Cumming & Brooks. (**b**) Head of *M. breviradia*. (**c**) Wing of *M. breviradia*. Abbreviations: gn – gena; plp – palpus.

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Allanthalia Melander

This genus of Oedaleinae (Hybotidae) has long been thought to be represented in North America by the Palaearctic species, *Allanthalia pallida* (Zetterstedt). Re-examination of Nearctic specimens indicates that they represent an undescribed species, which is not conspecific with Palaearctic specimens of that species (Shamshev et al. 2017). Adults are nectar feeders and are often found on flowers (Chvála 1983). The genus (wing length: 1.5–2.4 mm) is characterized by its yellow colour (Fig. B), widely separated eyes in both sexes (Fig. A), antennal postpedicel large, elongate oval, without an obvious terminal stylus (Fig. A), wing vein R4+5 unbranched and cell dm emitting three veins (Fig. B). In North America, *Allanthalia* is recorded from eastern North America, Missouri, Mississippi, Idaho and British Columbia.

FIGURES: (**A**) Head and thorax of female *Allanthalia* sp. (**B**) *Allanthalia* sp., female habitus. Abbreviation: dm – discal medial cell.

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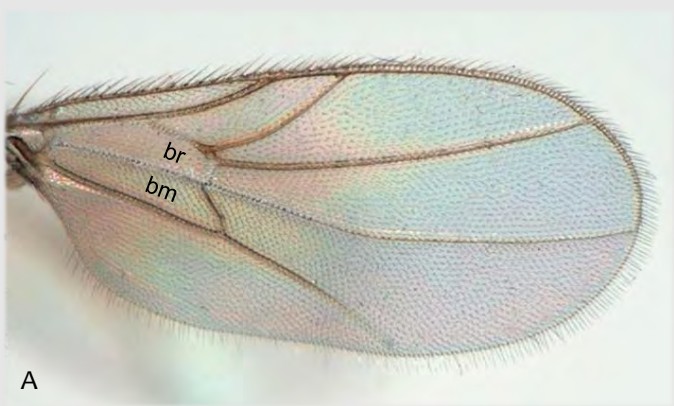
Allodromia Smith

This genus of Tachydromiinae (Hybotidae) includes one described Nearctic species north of Mexico. Chillcott & Teskey (1983) revised the New World species and provided a key to species. The genus (wing length: 1.3–1.5 mm) is characterized by wing (Fig. A) with cell cua absent, cells br and bm apically aligned, and veins R2+3 and R4+5 strongly curved anteriorly, head with narrow gena (Fig. D), thorax with 1–2 pairs of scutellar setae (Fig. B), antenna with dorsal arista-like stylus (Fig. C), and male terminalia with long filamentous phallus. *Allodromia testacea* (Melander) occurs in eastern North America with adults having been bred from decaying wood (Cumming et al. 2018).



FIGURES: (**A**) Wing of *Allodromia wirthi* Chillcott (Dominica). (**B**) Thorax of *A. wirthi*. (**C**) Head of *Allodromia* sp., dorsal view. (**D**) *A. wirthi*, male habitus. Abbreviations: bm – basal medial cell; br – basal radial cell.

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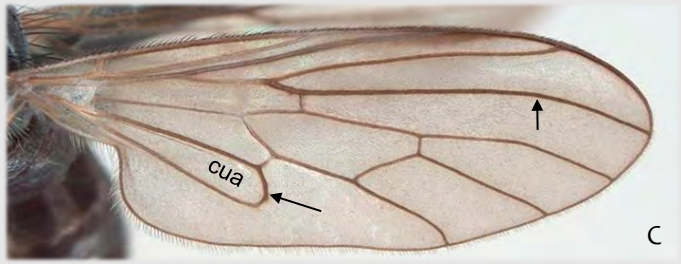
Anomalempis Melander

This genus of Brachystomatinae (Brachystomatidae) includes two described Nearctic species, and one or two undescribed Nearctic species (W.J. Turner unpubl. data). There is also one species described from Russia (Shamshev 2022). Melander (1945) provided features distinguishing the two described Nearctic species. The genus (wing length: 3.5–4.0 mm; Figs A, D) is characterized by the elongate wing cell cua with rounded vein CuA, vein R4+5 unbranched (Fig. C), mouthparts with long recurved labrum (Fig. B) and female abdomen with truncate apex (Fig. D). In North America, *Anomalempis* is recorded from Alaska, Colorado, Washington and Yukon.



FIGURES: (**A**) *Anomalempis archon* Melander, male habitus. (**B**) *A. archon*, close-up of mouthparts. (**C**) Wing of *A. archon*. (**D**) *A. archon*, female habitus. Abbreviation: cua – anterior cubital cell.

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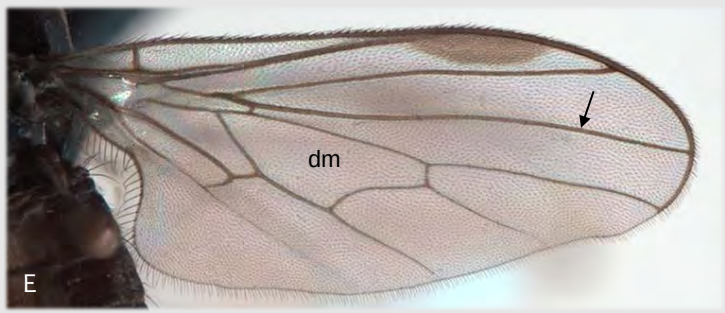
Anthalia Zetterstedt

This genus of Oedaleinae (Hybotidae) includes 12 described Nearctic species. Adults are common on flowers (Fig. D), feeding on nectar and pollen (Downes & Smith 1969). Large numbers of specimens are readily collected, with adults attracted to coloured surfaces, including vehicles and pan traps. Melander (1928) provided an identification key to species. The genus (wing length: 1.5–2.3 mm) is characterized by the antennal postpedicel usually short and broad (Figs A, B), width subequal to length, with distinct stylus, males holoptic (Fig. A), wing vein R4+5 unbranched and cell dm emitting three veins reaching wing margin (Fig. E). Females of some species are yellow (Figs C, D), in contrast to darkly coloured males (Fig. D). *Anthalia* is recorded from across North America. Females of the genus can sometimes be mistaken for those of *Microphor* or *Schistostoma* (often found together on flowers, Fig. D) but can usually be distinguished by their broad postpedicel (Fig. B).



FIGURES: (**A**) Head of male *Anthalia* sp. (**B**) Head of female *Anthalia* sp. (**C**) *Anthalia* sp., female habitus. (**D**) Several individuals of *Anthalia* sp. (including yellow females, arrows) on flowers of *Physocarpus* sp., with larger female *Microphor obscurus* Coquillett at center; photo by S.A. Marshall. (**E**) Wing of *Anthalia* sp. Abbreviation: dm – discal medial cell.

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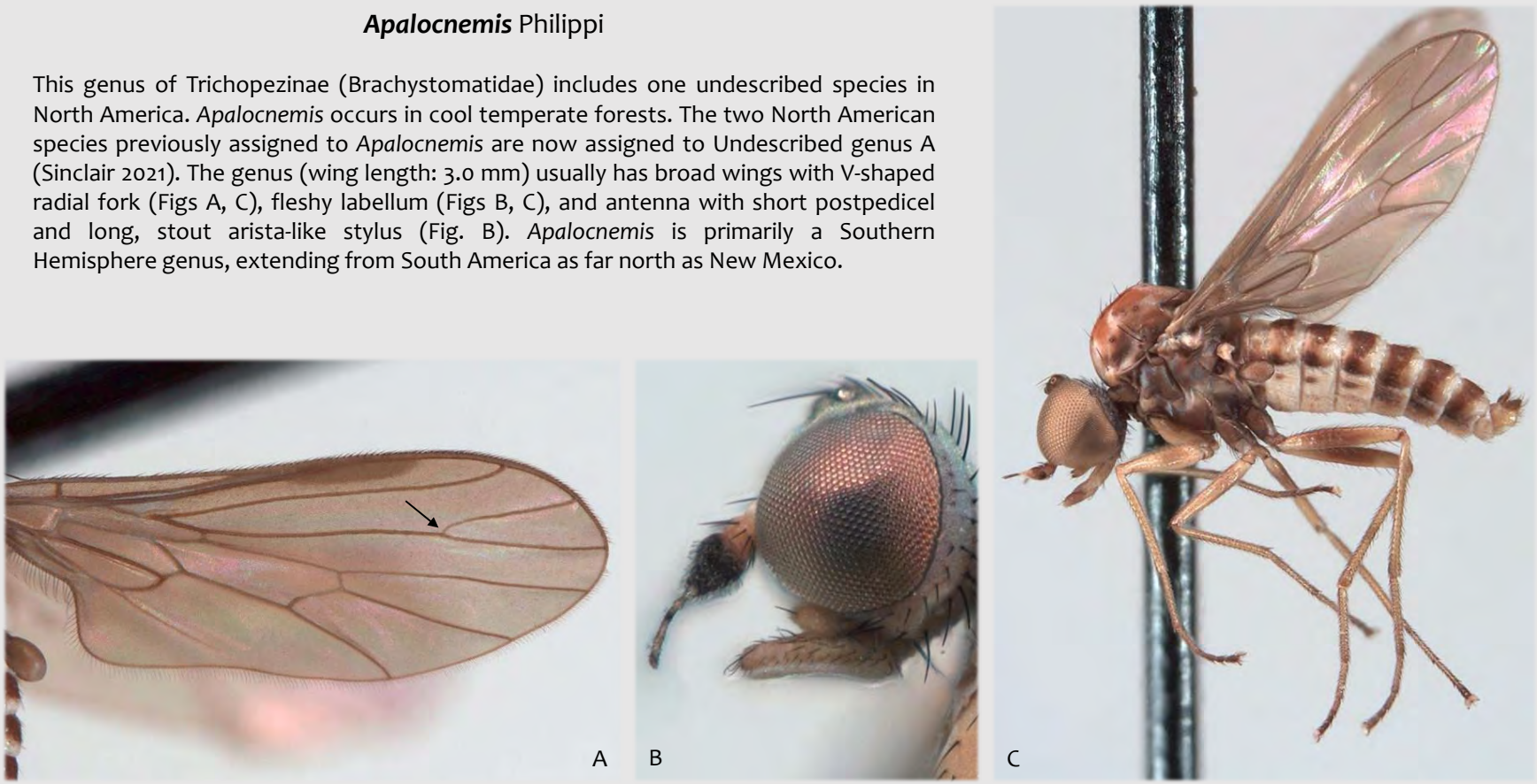
Apalocnemis Philippi

This genus of Trichopezinae (Brachystomatidae) includes one undescribed species in North America. *Apalocnemis* occurs in cool temperate forests. The two North American species previously assigned to *Apalocnemis* are now assigned to Undescribed genus A (Sinclair 2021). The genus (wing length: 3.0 mm) usually has broad wings with V-shaped radial fork (Figs A, C), fleshy labellum (Figs B, C), and antenna with short postpedicel and long, stout arista-like stylus (Fig. B). *Apalocnemis* is primarily a Southern Hemisphere genus, extending from South America as far north as New Mexico.



FIGURES: (**A**) Wing of *Apalocnemis* sp. (Costa Rica). (**B**) Head of *Apalocnemis* sp. (**C**) *Apalocnemis* sp. (Costa Rica), male habitus.

doi:10.3752/cjai.2023.48

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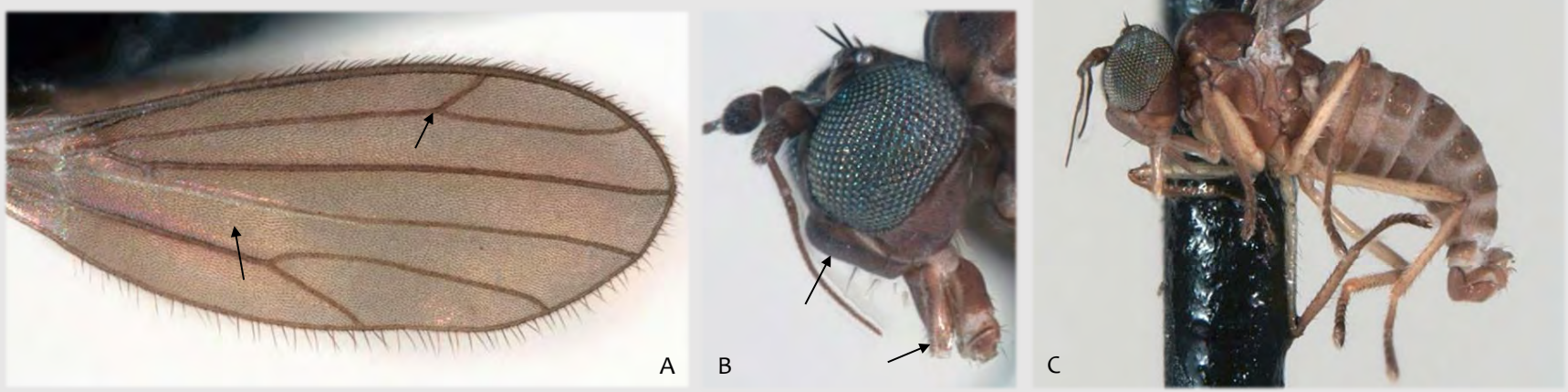
Asymphyloptera Collin

This genus of Clinocerinae (Empididae) includes two described Nearctic species of very small flies north of Mexico. *Asymphyloptera* (Fig. C) is an aquatic genus, occurring on wet rocks and seepages in small streams and cascades. Sinclair (2015) revised the New World species and provided a key to species. The immature stages remain unknown. The genus (wing length: 1.0–2.5 mm) is easily recognized by narrow wings with vein R2+3 forked and absence of cell dm (Figs A, C), face with distinct clypeus and mouthparts with narrow, elongate palpus (Fig. B). *Asymphyloptera* is primarily a Southern Hemisphere genus, extending from South America as far north as southwestern United States.



FIGURES: (**A**) Wing of *Asymphyloptera* sp. (Australia). (**B**) Head of *Asymphyloptera* sp. (Australia). (**C**) *Asymphyloptera* sp. (Australia), male habitus.

doi:10.3752/cjai.2023.48

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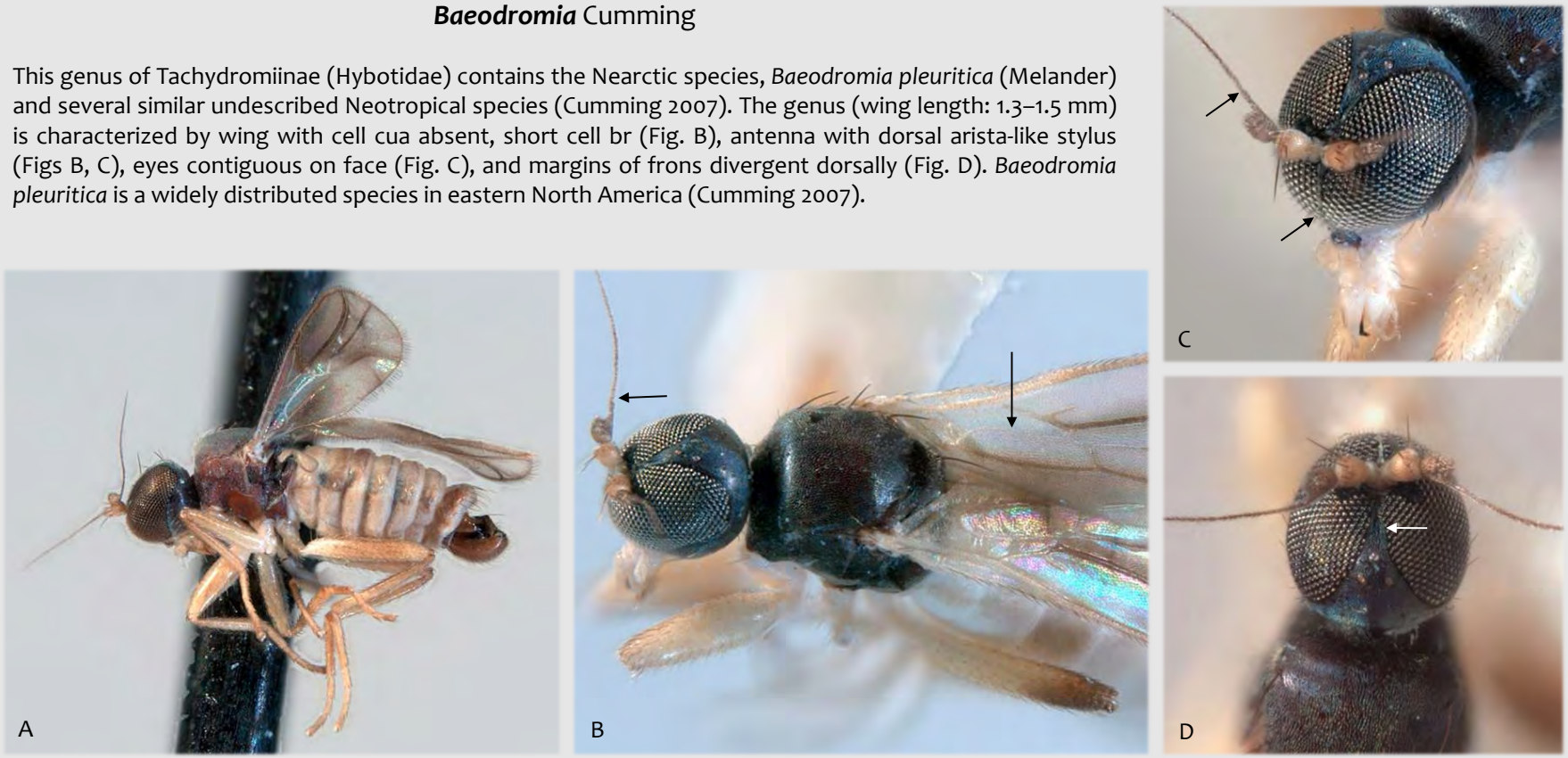
Baeodromia Cumming

This genus of Tachydromiinae (Hybotidae) contains the Nearctic species, *Baeodromia pleuritica* (Melander) and several similar undescribed Neotropical species (Cumming 2007). The genus (wing length: 1.3–1.5 mm) is characterized by wing with cell cua absent, short cell br (Fig. B), antenna with dorsal arista-like stylus (Figs B, C), eyes contiguous on face (Fig. C), and margins of frons divergent dorsally (Fig. D). *Baeodromia pleuritica* is a widely distributed species in eastern North America (Cumming 2007).



FIGURES: (**A**) *Baeodromia* sp. (Costa Rica), male. (**B**) Head, thorax and wing of *B. pleuritica* (Melander). (**C**) Head of *B. pleuritica*, oblique view. (**D**) Head of *B. pleuritica*, dorsal view.

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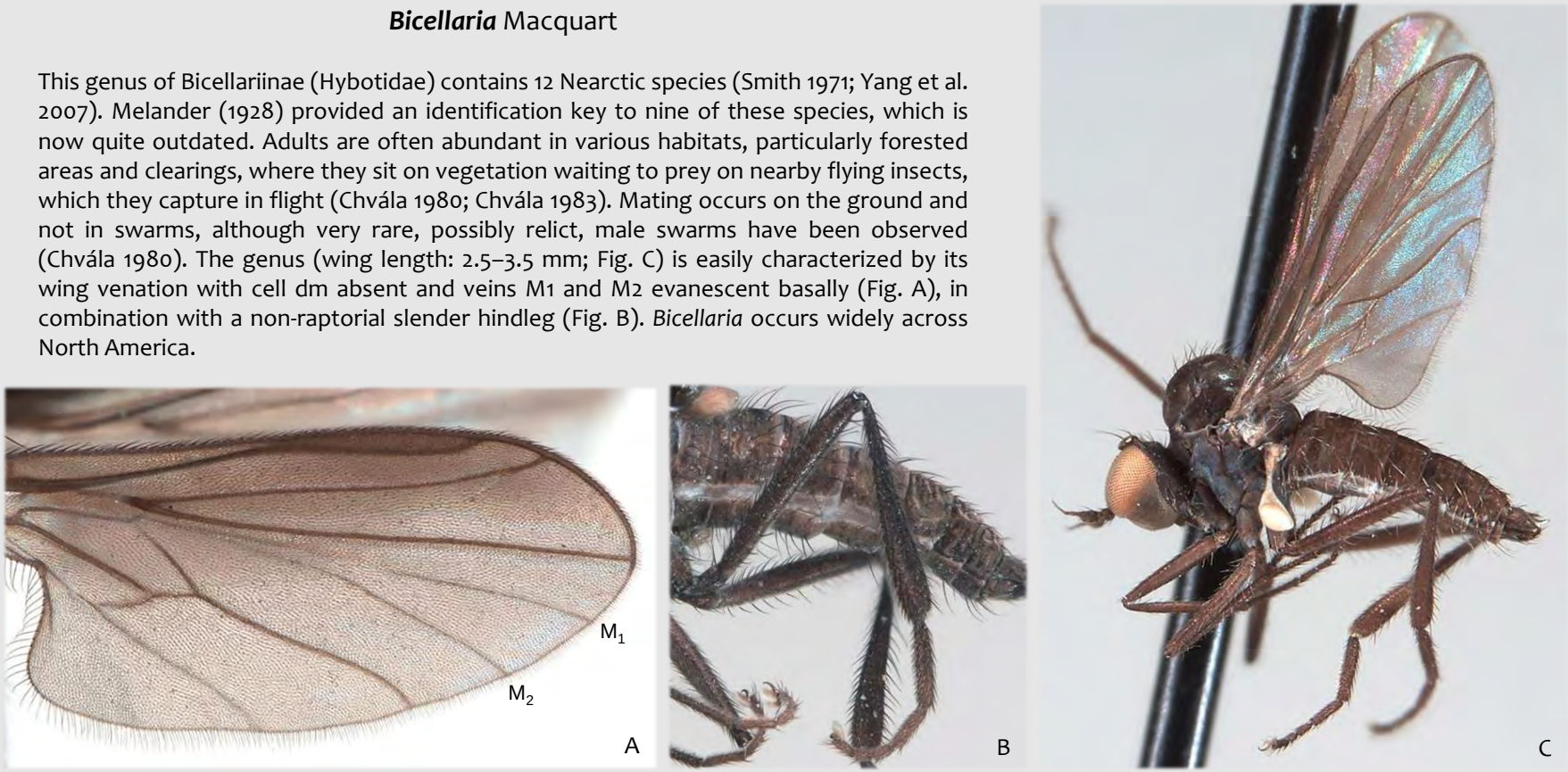
Bicellaria Macquart

This genus of Bicellariinae (Hybotidae) contains 12 Nearctic species (Smith 1971; Yang et al. 2007). Melander (1928) provided an identification key to nine of these species, which is now quite outdated. Adults are often abundant in various habitats, particularly forested areas and clearings, where they sit on vegetation waiting to prey on nearby flying insects, which they capture in flight (Chvála 1980; Chvála 1983). Mating occurs on the ground and not in swarms, although very rare, possibly relict, male swarms have been observed (Chvála 1980). The genus (wing length: 2.5–3.5 mm; Fig. C) is easily characterized by its wing venation with cell dm absent and veins M1 and M2 evanescent basally (Fig. A), in combination with a non-raptorial slender hindleg (Fig. B). *Bicellaria* occurs widely across North America.



FIGURES: (**A**) Wing of *Bicellaria* sp. (**B**) Hindleg of *Bicellaria* sp. (**C**) Male of *Bicellaria* sp., habitus. Abbreviations: M1, M2 – medial veins.

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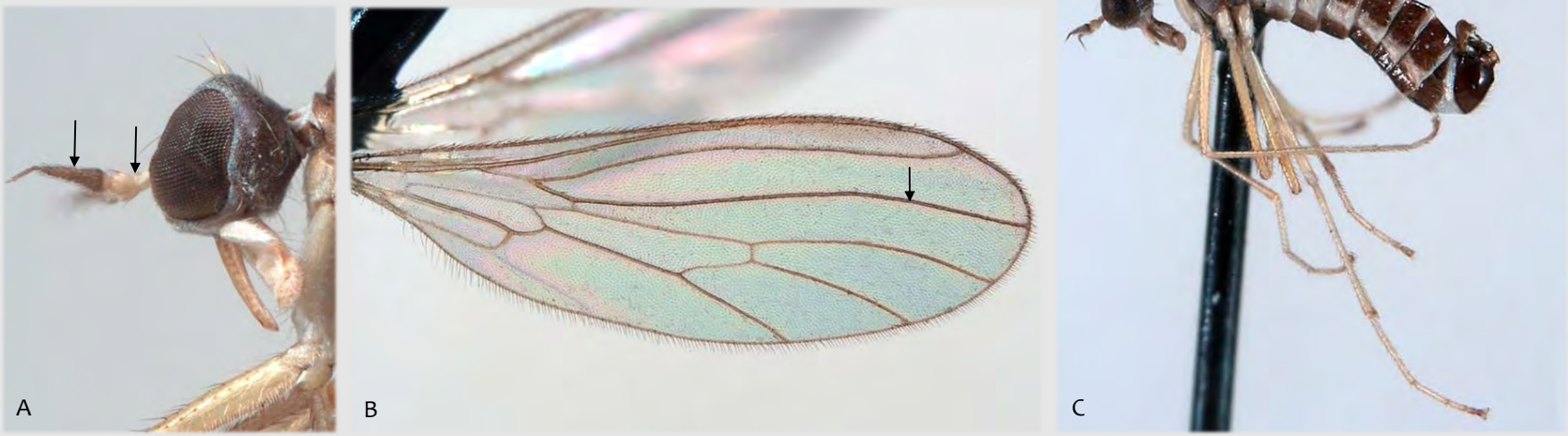
Boreodromia Coquillett

This monotypic Nearctic genus of Trichopezinae (Brachystomatidae) is based on the species, *Boreodromia bicolor* (Loew). This species has been collected along streams and riparian regions in coastal rainforests, as well as coastal tundra habitats (Sinclair 2008a). The genus (wing length: 3.9–4.2 mm; Fig. C) is readily recognized by the narrow wings with vein R4+5 unbranched (Fig. B) and antenna (Fig. A) with yellowish scape and pedicel, and brownish postpedicel and stylus. *Boreodromia bicolor* is confined along the Pacific coast of North America from Alaska (including Aleutian islands), south to San Francisco Bay region of California.



FIGURES: (**A**) Head of *Boreodromia bicolor* (Loew). (**B**) Wing of *B. bicolor*. (**C**) *B. bicolor*, male habitus.

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Brachystoma Meigen

This genus of Brachystomatinae (Brachystomatidae) includes four described Nearctic species. An identification key to species was provided by Melander (1902). The genus (wing length: 3.5–5.0 mm) is characterized by the wing with elongate cell cua extending beyond cell bm, with convex vein CuA, vein R4+5 branched (Fig. A), mouthparts with long recurved labrum (Fig. B) and female abdomen with an enlarged balloon-like sclerite encircling the apex in *Brachystoma occidentale* Melander (Fig. C). In North America, there is a single widespread western species (*B. occidentale*, Figs C, D) recorded from British Columbia to southern California. In the east, there are three widespread species in the USA, with only *B. serrulatum* Loew extending north into southern Ontario.

FIGURES: (**A**) Wing of *Brachystoma robertsonii* Coquillett. (**B**) Head of *B. robertsoni*. (**C**) *B. occidentale* Melander, female habitus. (**D**) *B. occidentale* Melander, male habitus.

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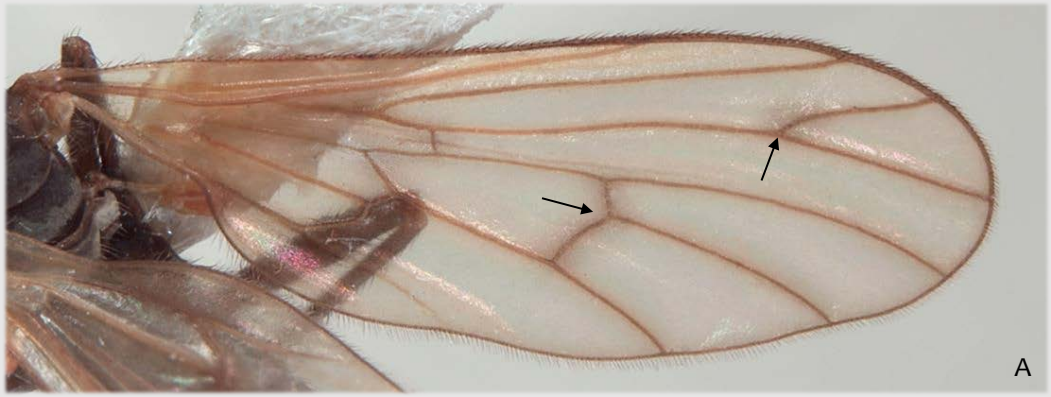
Brochella Melander

This monotypic Nearctic genus of Brochellinae (Empididae) is based on the species, *Brochella monticola* Melander (Figs A, B). This is a rarely encountered species, and currently only collected in the month of August. Adults are likely flower visitors, based on mouthpart morphology (Sinclair & Cumming 2006). This genus was assigned to its own subfamily, Brochellinae, by Yang et al. (2007). The genus (wing length: 4.8 mm) is readily recognized by anteriorly positioned proboscis, with prolonged clypeus (Fig. B), antenna without an apical stylus (Fig. B), and broad wings with vein R4+5 branched, with clouding at base of branch and at apex of cell dm (Fig. A). *Brochella monitcola* is currently known from the state of Washington (i.e., Mt. Rainier) and British Columbia (i.e., Mt. Doom, Vancouver Is).



FIGURES: (**A**) Wing of *Brochella monticola* Melander. (**B**) Head and thorax of *B. monticola*.

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Ceratempis Melander

This monotypic Nearctic genus of Trichopezinae (Brachystomatidae) is based on the species, *Ceratempis longicornis* Melander (Figs A, B) and has been collected in coastal forests (Sinclair 2008a). The genus (wing length: 3.8–4.0 mm) is readily recognized by the yellow body colour (Fig. B), antenna with postpedicel greatly elongated, clothed in grey pubescence without apical stylus (Fig. A), acrostichal setulae greatly reduced and vein R4+5 branched. *Ceratempis longicornis* is confined to the extreme southwestern region of Washington State (Sinclair 2008a), with a recent record from Lincoln County, Oregon (Gerth 2016).

FIGURES: (**A**) Head of *Ceratempis longicornis* Melander. (**B**) *C. longicornis*, male habitus.

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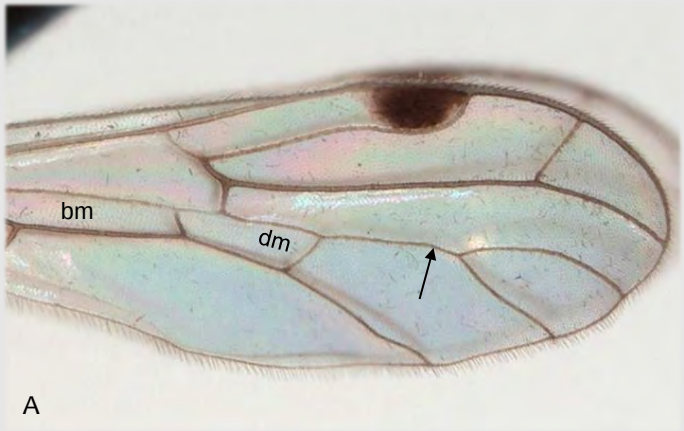
Chelifera Macquart

This genus of Hemerodromiinae (Empididae) includes 22 described Nearctic species north of Mexico (MacDonald 1994). *Chelifera* is an aquatic genus, collected from riparian vegetation along streams. MacDonald (1994) revised the Nearctic species and provided keys to species. The larvae and pupae have been described and illustrated (Brammer et al. 2009). The genus (wing length: 3.0–5.0 mm; Fig. B) is readily distinguished from other Hemerodromiinae genera by the wing venation where cells dm and bm are separated, not fused, two veins are emitted from cell dm, and vein M1+2 is petiolate and forked distal of cell dm (Figs A, C). *Chelifera* occurs across North America, ranging from Alaska to the USA southern border.



FIGURES: (**A**) Wing of *Chelifera subnotata* MacDonald. (**D**) *Chelifera* sp., male; photo by S.A. Marshall. (**C**) *C. valida* (Loew), male habitus. Abbreviations: bm – basal medial cell; dm – discal medial cell.

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Chelipoda Macquart

This genus of Hemerodromiinae (Empididae) includes seven described Nearctic species north of Mexico (MacDonald 1993). *Chelipoda* is generally observed in damp forest undergrowth and the genus is not associated with streams, unlike the other genera of this subfamily. The immature stages are unknown in North America, but are probably not aquatic as Cumming et al. (2018) indicated that two species were bred from decaying wood. MacDonald (1993) revised the Nearctic species and provided a key to species. The loss of crossvein dm-m and the resulting open cell dm has been used to assign some species to the genus *Phyllodromia* Zetterstedt (e.g., *C. americana* (Melander) and *C. limitaria* MacDonald). In North America, this wing vein modification is not considered of generic importance, although *Phyllodromia* is recognized in other regions of the world. *Chelipoda* (wing length: 2.0–3.0 mm) is readily distinguished from other Hemerodromiinae by the elongate arista-like stylus of the antenna, at least twice as long the postpedicel (Figs A, C, D), and wing vein R4+5 is unbranched (Fig. B). *Chelipoda* occurs primarily in eastern North America, ranging from Newfoundland to Texas and Florida, and west to Manitoba and the Dakotas. A single species (*C. contracta* Melander) extends west to British Columbia and Washington.

FIGURES: (**A**) Head of *Chelipoda elongata* (Melander). (**B**) Wing of *C. praestans* Melander. (**C**) *Chelipoda* sp., female with prey; photo by S.A. Marshall. (**D**) *C. praestans*, male habitus.

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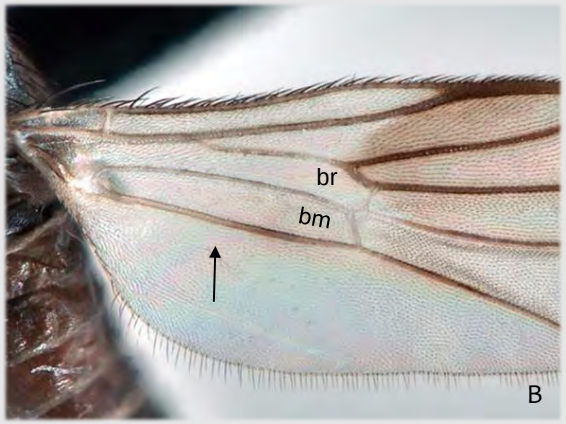
Chersodromia Walker

This genus of Tachydromiinae (Hybotidae) includes eight described North American species (Yang et al. 2007). Melander (1945) provided a key to five of the North American species. The genus (wing length: 1.2–3.5 mm; Figs A, D, E) is characterized by wing with cell cua absent, cells br and bm aligned apically (Fig. B), head with broad gena (Fig. C), and bristly legs. A few species have greatly reduced wings, reduced to triangular "flaps", barely longer than the thorax (Fig. E). Species of *Chersodromia* occur on marine shorelines and beaches along both the Atlantic and Pacific coasts of North America (Cumming & Sinclair 2009).



FIGURES: (**A**) *Chersodromia* sp., male habitus. (**B**) Wing of *Chersodromia* sp. (**C**) Head of *Chersodromia* sp. (**D**) *C. insignita* Melander with prey; photo by A. Abela. (**E**) *C. inchoata* (Melander); photo by A. Abela. Abbreviations: bm – basal medial cell; br – basal redial cell.

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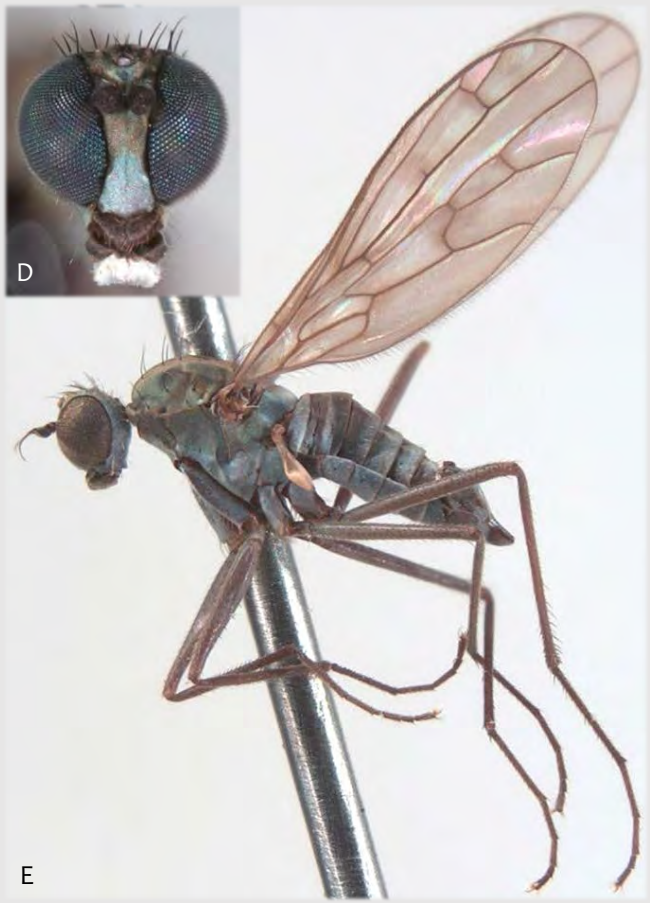
Clinocera Meigen

This genus of Clinocerinae (Empididae) includes 42 described Nearctic species north of Mexico. *Clinocera* is an aquatic genus, common in springs, small shaded streams, creeks and waterfalls. Sinclair (2008b) revised the New World species and provided keys to species. The immature stages for Nearctic species of *Clinocera* were described and illustrated by Sinclair (2008b). The genus (wing length: 2.0–6.0 mm; Figs B, C) is easily recognized by the narrow wing (Figs A, E), rounded head and narrow face without a medial notch (Fig. D). *Clinocera* occurs across North America, primarily in the western and eastern mountain ranges, ranging as far north as Baffin Island and Alaska, and south beyond Mexico.



FIGURES: (**A**) *Clinocera fuscipennis* Loew; photo by S.A. Marshall. (**B**) *C. lineata* Loew; photo by J. van der Linden. (**C**) Mating pair of *C. binotata* Loew; photo by S.A. Marshall. (**D**) Head of *C. conjuncta* Loew, anterior view. (**E**) *C. conjuncta*, male habitus.

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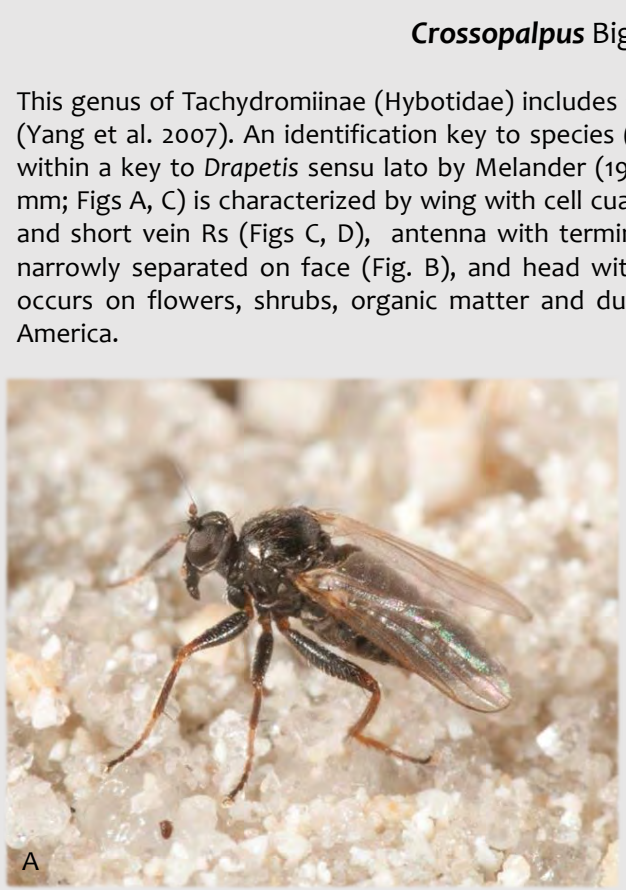
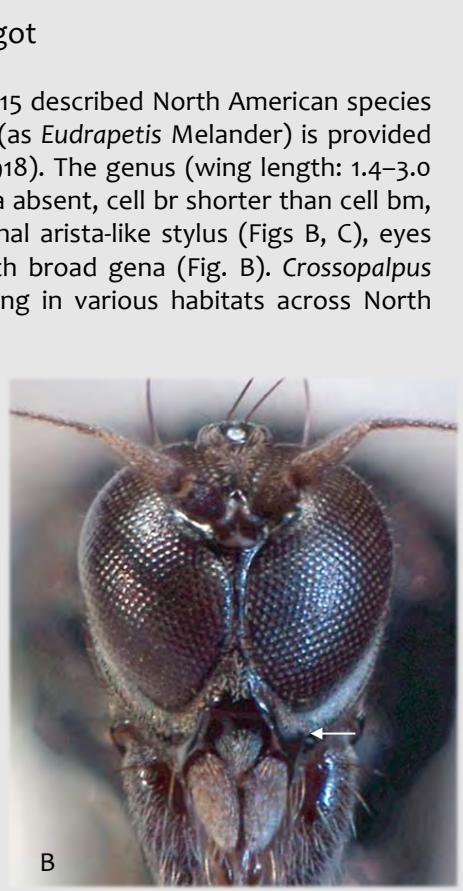
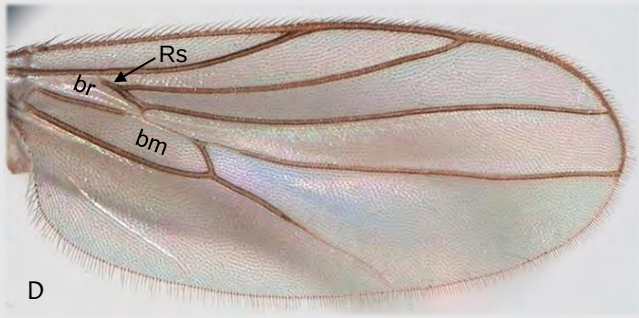
Crossopalpus Bigot

This genus of Tachydromiinae (Hybotidae) includes 15 described North American species (Yang et al. 2007). An identification key to species (as *Eudrapetis* Melander) is provided within a key to *Drapetis* sensu lato by Melander (1918). The genus (wing length: 1.4–3.0 mm; Figs A, C) is characterized by wing with cell cua absent, cell br shorter than cell bm, and short vein Rs (Figs C, D), antenna with terminal arista-like stylus (Figs B, C), eyes narrowly separated on face (Fig. B), and head with broad gena (Fig. B). *Crossopalpus* occurs on flowers, shrubs, organic matter and dung in various habitats across North America.







FIGURES: (**A**) *Crossopalpus aenescens* (Wiedemann), female (Tanzania); photo by S.A. Marshall. (**B**) Head of *C. setiger* (Loew). (**C**) *C. setiger*, female habitus. (**D**) Wing of *C. setiger*. Abbreviations: bm – basal medial cell; br – basal radial cell; Rs – radial sector.

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Dolichocephala Macquart

This genus of Clinocerinae (Empididae) includes seven described North America species (Sinclair & MacDonald 2012). *Dolichocephala* is an aquatic genus, occurring in seepages and springs, often associated with moss, sphagnum and sedges. Sinclair & MacDonald (2012) revised the New World species and provided an identification key to species. The genus (wing length: 1.8–2.8 mm) is easily recognized by narrow wings with white spots (Figs A, D), narrow head attached high on occiput (Figs C, D) and male terminalia with the subepandrial sclerite extending beyond the base of the clasping cercus. *Dolichocephala borkenti* Sinclair & MacDonald has miniaturized wings (Fig. B) that are greatly narrowed and slightly longer than the thorax. *Dolichocephala* occurs across North America, with several species confined to the western mountain ranges, extending from Alaska to California.

FIGURES: (**A**) Wing of *Dolichocephala argus* Melander. (**B**) Wing of *D. borkenti* Sinclair & MacDonald. (**C**) Head and neck of *D. argus*. (**D**) *D. argus*, male habitus.

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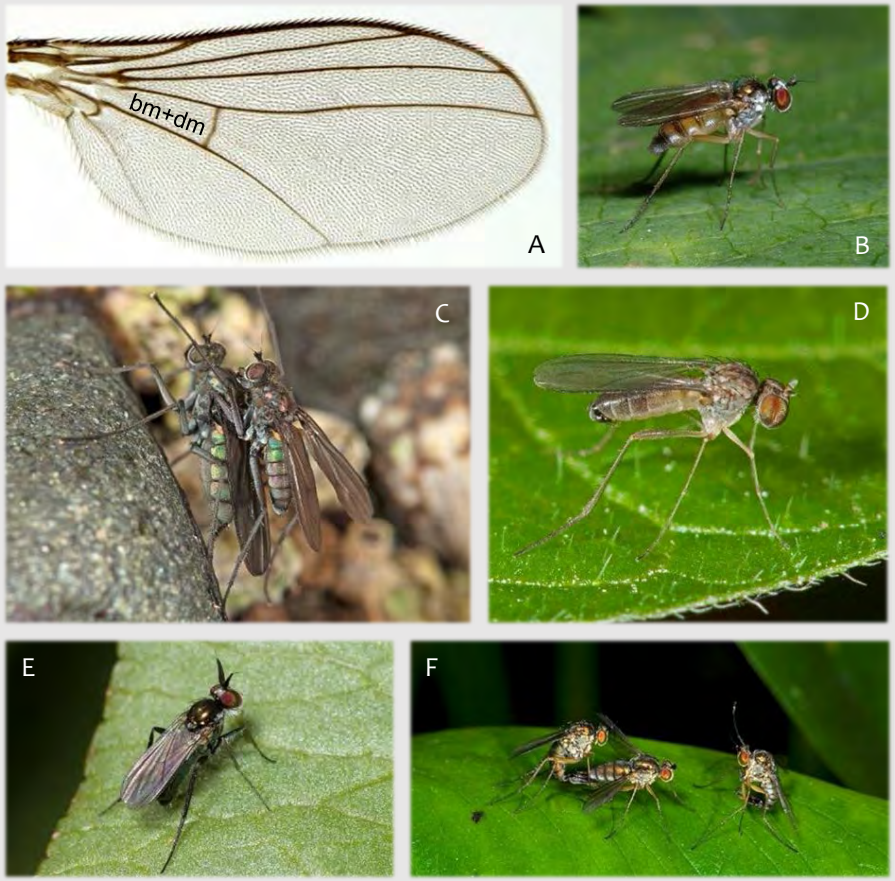
DOLICHOPODIDAE sensu stricto

This group of Empidoidea includes the traditional Dolichopodidae, exclusive of the Microphorinae and Parathalassiinae genera (i.e., *Microphor* Macquart, *Schistostoma* Becker, *Microphorella* Becker, *Parathalassius* Mik and *Thalassophorus* Saigusa in the Nearctic Region). Worldwide the group includes about 7500 described species, of which over 1300 are described from the Nearctic Region. These flies can be diagnosed by the following features: small to medium-sized flies (body length: 0.8–9 mm), with slender build; wing (Fig. A) with vein Rs originating at, or near level of humeral crossvein, shortened basal cells (less than ½ length of cell dm), crossvein r-m in the basal ¼ of wing, costal vein ending at, or before vein M1, subcostal vein short and ending in vein R1, cell bm+dm emitting 2 veins (M1 and M4), and crossvein bm-m absent (cells bm and dm confluent); male terminalia rotated and lateroflexed forward below the preceding abdominal segments (Sinclair & Cumming 2006). Adults often have metallic colouration, typically blue-green with bronze reflections, sometimes brown to black, greyish, or yellow (Figs B–F). Males are often adorned with male secondary sexual characters on the antennae, mouthparts, legs, wings and abdomen. Adults are predaceous on small soft-bodied arthropods and annelids (Ulrich 2005) in a variety of warm, moist habitats. Larvae occur in mud, damp soil, leaf litter, moss, algae, on trees (sap wounds, under bark, in tree holes), within plant tissues, and on intertidal rocks (Dyte 1959; Poulding 1998, 2011). Bickel (2009) provided a key to the New World genera of Dolichopodidae sensu stricto.



FIGURES: (**A**) Wing of *Chrysotus* sp. (**B**) *Argyra* sp., female. (**C**) *Melanderia mandibulata* Aldrich, pair with male on top. (**D**) *Sympycnus* sp., male. (**E**) *Rhaphium* sp., male. (**F**) *Dolichopus* sp., mating pair with adjacent male engaged in mating display. All in situ photos by S.A. Marshall. Abbreviation: bm+dm – basal medial cell + discal medial cell.

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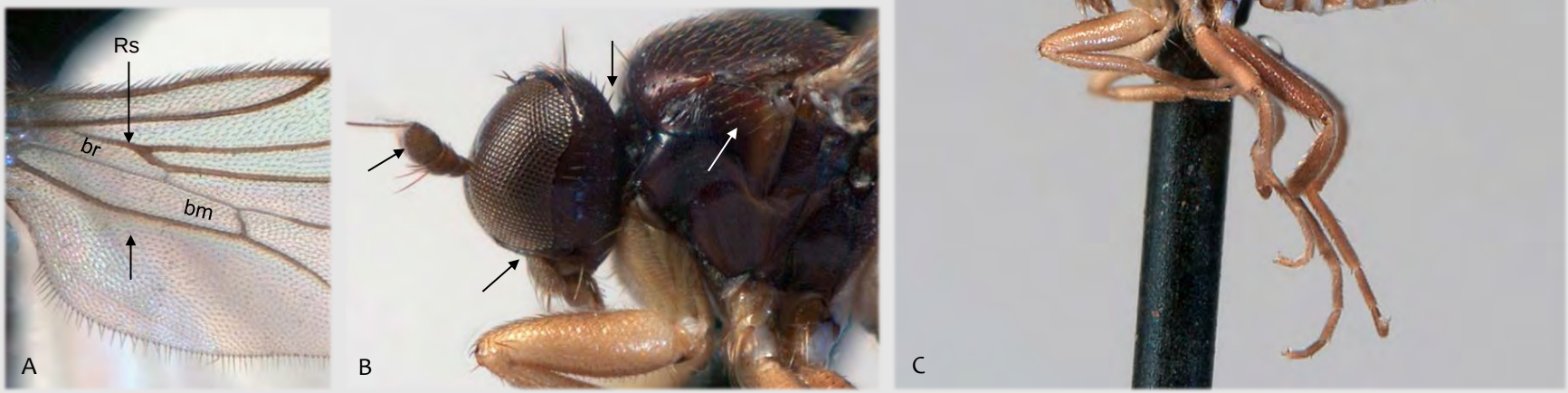
Drapetis Meigen

This genus of Tachydromiinae (Hybotidae) includes 18 described North American species (Yang et al. 2007). An identification key to Nearctic species can be found within a key to *Drapetis* sensu lato by Melander (1918) and Rogers (1989) provided a key to the *Drapetis assimilis* species group. The genus (wing length: 1.3–2.0 mm; Fig. C) is characterized by wing with cell cua absent, cell br shorter than cell bm, and long vein Rs (Fig. A), antenna with terminal or subterminal arista-like stylus (Fig. B), eyes usually narrowly separated on face, narrow gena, somewhat flattened occiput, oval to conical postpedicel, and anepisternum with scattered setulae (Fig. B). *Drapetis* occurs on flowers, shrubs, organic matter and dung in various habitats across North America.



FIGURES: (**A**) Wing of *Drapetis* sp. (**B**) Head and thorax of *Drapetis* sp. (**C**) *Drapetis* sp., male habitus. Abbreviations: bm – basal medial cell; br – basal radial cell; Rs – radial sector.

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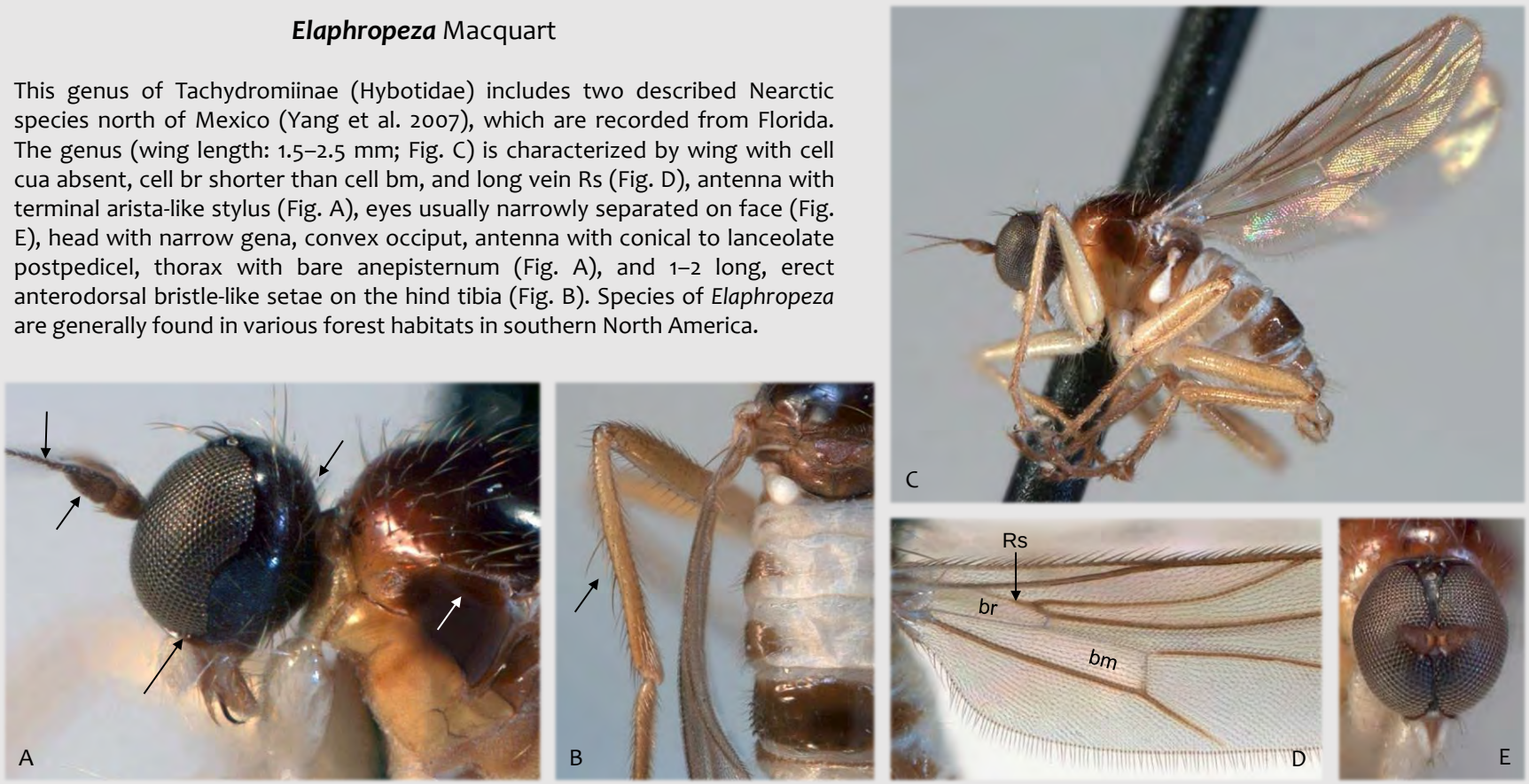
Elaphropeza Macquart

This genus of Tachydromiinae (Hybotidae) includes two described Nearctic species north of Mexico (Yang et al. 2007), which are recorded from Florida. The genus (wing length: 1.5–2.5 mm; Fig. C) is characterized by wing with cell cua absent, cell br shorter than cell bm, and long vein Rs (Fig. D), antenna with terminal arista-like stylus (Fig. A), eyes usually narrowly separated on face (Fig. E), head with narrow gena, convex occiput, antenna with conical to lanceolate postpedicel, thorax with bare anepisternum (Fig. A), and 1–2 long, erect anterodorsal bristle-like setae on the hind tibia (Fig. B). Species of *Elaphropeza* are generally found in various forest habitats in southern North America.



FIGURES: (**A**) Head and thorax of *Elaphropeza* sp. (**B**) Hind leg and abdomen of *Elaphropeza* sp. (**C**) *Elaphropeza* sp., male habitus. (**D**) Wing of *Elaphropeza* sp. (**E**) Head of *Elaphropeza* sp., anterior view. Abbreviations: bm – basal medial cell; br – basal radial cell; Rs – radial sector.

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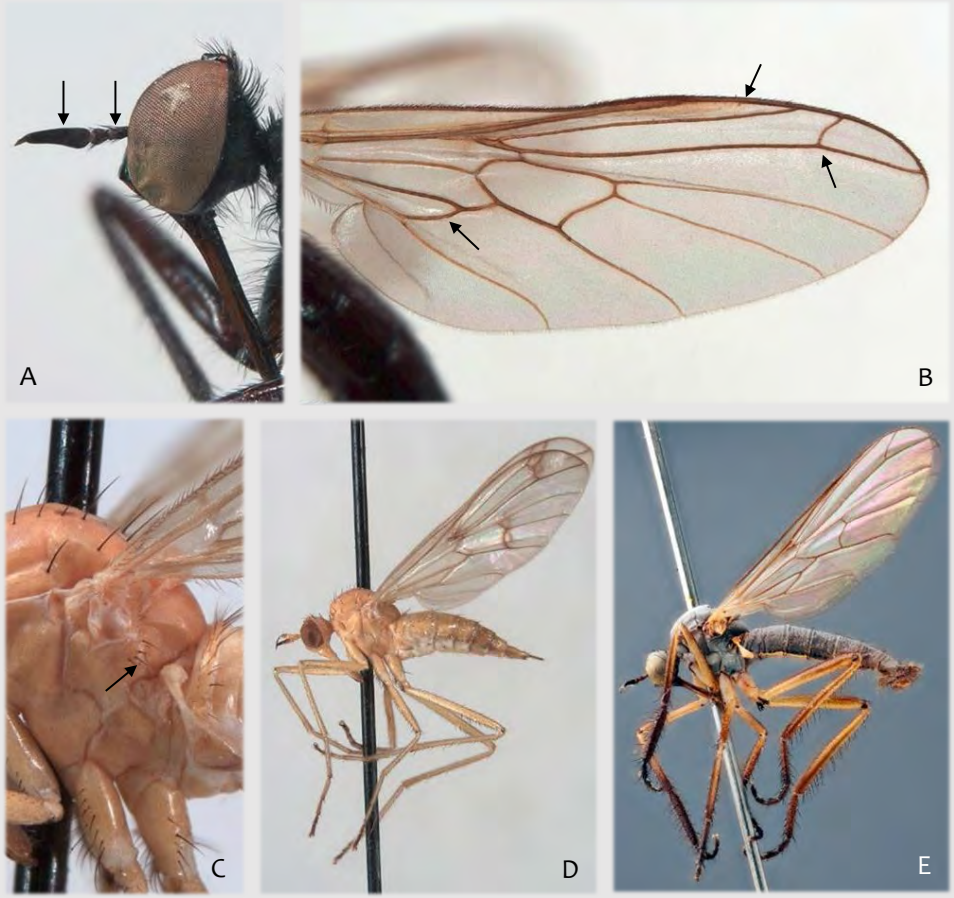
Empis Linnaeus

This genus of Empidinae (Empididae) includes 91 described species in North America, with at least as many species remaining undescribed, but appears to be less diverse than Nearctic *Rhamphomyia*. The genus has been divided into 15 subgenera (Yang et al. 2007; not including *Enoplempis* Bigot), but the subgeneric classification for the Nearctic fauna has not been thoroughly applied or investigated. *Empis* is most common in forests and mountainous regions, often collected from flowers. The genus displays an interesting array of mating behaviours (Cumming 1994), especially concerning the transfer of nuptial gifts (Figs F, J). Melander (1902) provided identification keys to species (incl. *Empis*, *Empimorpha* Coquillett, *Pachymeria* Stephens). More recently, the eastern North American species of *E.* (*Enoplempis*) and the *E.* (*Enoplempis*) *mira* group have been revised and identification keys to species provided (Sinclair et al. 2013, 2021, Figs E, G, J). Adults of the genus (wing length: 2.2–12.0 mm; Figs D–F, H–J) are readily distinguished from other Empidinae genera by antennae inserted near middle of head, scape shorter than postpedicel (Fig. A), laterotergite setose (Fig. C), and the wing venation where vein R4+5 is branched, vein CuA strongly recurved into vein CuP, pterostigma removed from apex of vein R2+3, and costa extending only as far as apex of wing (Figs B, D, E). *Empis* is widespread across the Nearctic Region from Alaska, south to the Mexican border.

Additional images of *Empis* (Figs F–J) on next slide…



FIGURES: (**A**) Head of *Empis lucida* Zetterstedt. (**B**) Wing of *E. lucida*. (**C**) Thorax of *E. poeciloptera* Loew (**D**) *E. poeciloptera*, female habitus. (**E**) *E. appalachicola* Sinclair, male habitus.

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Empis Linnaeus (continued)

FIGURES: (**F**) *Empis gulosa* Coquillett, mating pair with syrphid prey; photo by J. Alcock. (**G**) *E. mira* Bigot, left hind leg, anterior view of femur and tibia. (**H**) *Empis* sp., male habitus. (**I**) *E. lucida* Zetterstedt, male habitus. (**J**) *E. vockerothi* Cumming, male with balloon; photo by A. Coovert.

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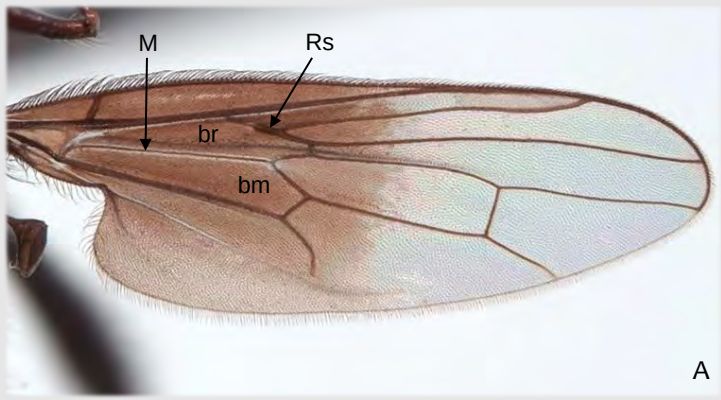
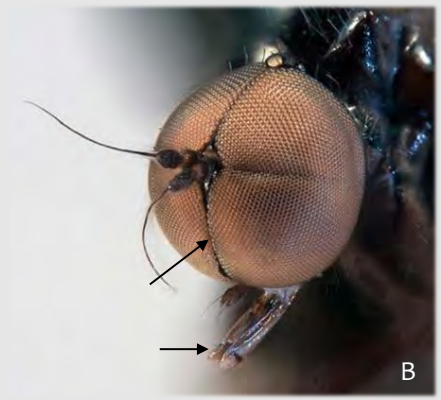
Euhybus Coquillett

This genus of Hybotinae (Hybotidae) includes 13 described species in North America (Melander 1928). *Euhybus* species prey on flying insects and like other Hybotinae do not visit flowers or form mating swarms. Melander (1928) revised the New World species and provided an identification key to species. The genus (wing length: 3.5–5.5 mm) is readily distinguished from other Hybotinae species by the wing venation (Fig. A) where vein Rs is short, arising in the distal half of cell br, vein M separating cells br and bm well developed, hind leg (Fig. C) with femur thickened and tibia slender, not clavate, eyes meeting on face (Fig. B) and mouthparts (Figs B, D) not elongate, palps short, with labellum not constricted and sclerotized for piercing, and with pseudotracheae present. *Euhybus* usually occurs in forested regions and is found throughout North America, extending as far north as Churchill, Manitoba, with greatest species diversity in the east.





FIGURES: (**A**) Wing of *Euhybus triplex* (Walker). (**B**) Head of *Euhybus* sp., oblique view. (**C**) *Euhybus* sp., male habitus. (**D**) Head of *Euhybus* sp., lateral view. Abbreviations: bm – basal medial cell; br – basal radial cell; M – medial vein; Rs – radial sector.

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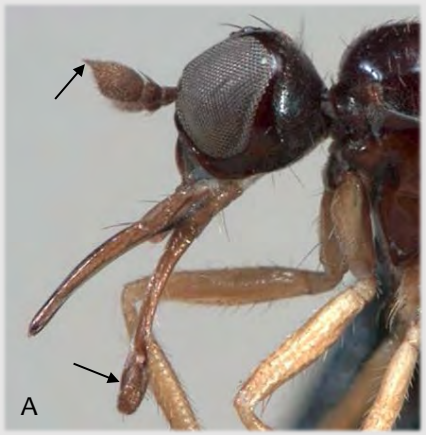
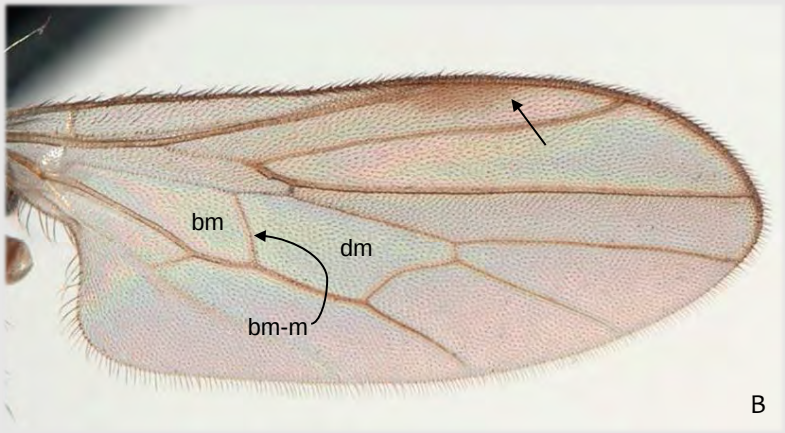
Euthyneura Macquart

This Holarctic genus of Oedaleinae (Hybotidae) includes six described Nearctic species. Adults are nectar and/or pollen feeders and are frequently found on flowers (Chvála 1983). Larvae are probably predators in decaying wood as adults have been repeatedly bred from rotten wood (Chvála 1983; Cumming et al. 2018). Melander (1928) provided an identification key to Nearctic species. *Euthyneura* (wing length: 2.1–3.3 mm) is characterized by a head with long proboscis (Figs A, C, D), antenna with short stylus (Fig. A), wing with pterostigma not filling apex of cell r1, cell dm emitting three veins that reach wing margin, and cell bm broad apically with crossvein bm-m nearly perpendicular (Fig. B). The genus occurs across North America, ranging from Alaska and Yukon in the north to the southern United States.





FIGURES: (**A**) Head of female *Euthyneura bucinator* Melander. (**B**) Wing of *E. bucinator*. (**C**) *E. buccinator*, male habitus. (**D**) *E. buccinator*, female habitus. Abbreviations: bm – basal medial cell; dm – discal medial cell.

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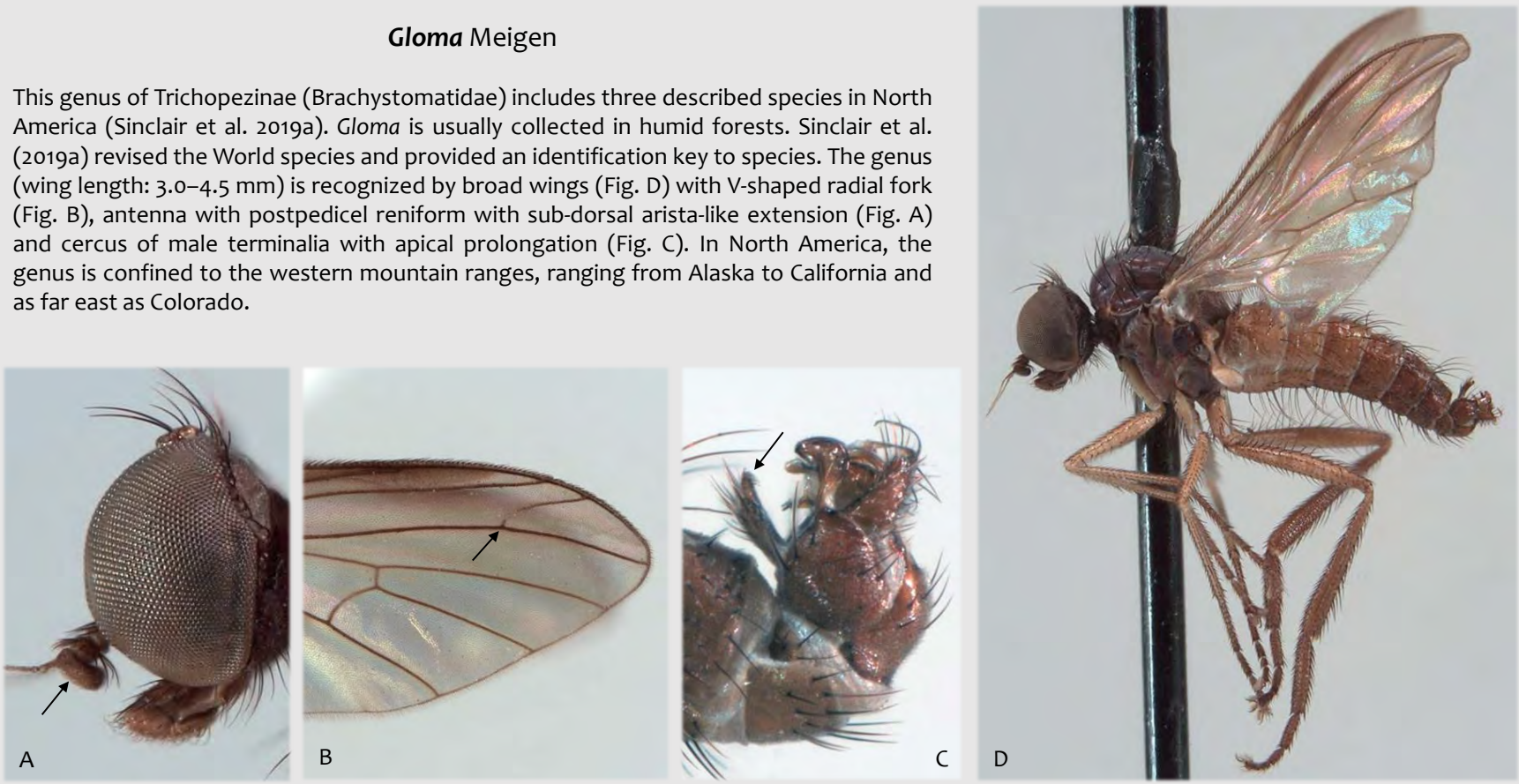
Gloma Meigen

This genus of Trichopezinae (Brachystomatidae) includes three described species in North America (Sinclair et al. 2019a). *Gloma* is usually collected in humid forests. Sinclair et al. (2019a) revised the World species and provided an identification key to species. The genus (wing length: 3.0–4.5 mm) is recognized by broad wings (Fig. D) with V-shaped radial fork (Fig. B), antenna with postpedicel reniform with sub-dorsal arista-like extension (Fig. A) and cercus of male terminalia with apical prolongation (Fig. C). In North America, the genus is confined to the western mountain ranges, ranging from Alaska to California and as far east as Colorado.



FIGURES: (**A**) Head of *Gloma fuscipes* Melander, lateral view. (**B**) Wing of *G. fuscipes*. (**C**) Male terminalia of *G. fuscipes*. (**D**) *G. fuscipes*, male habitus.

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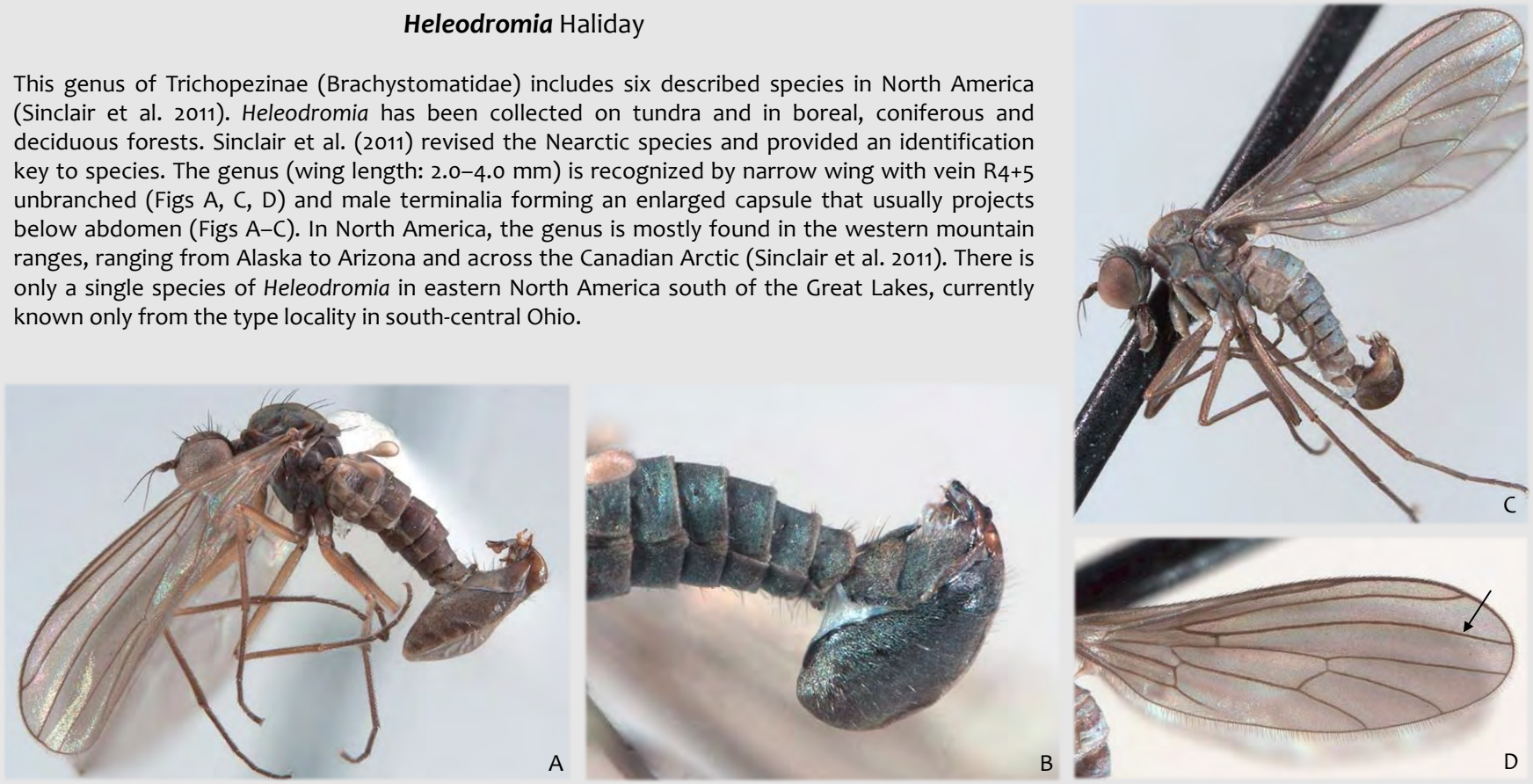
Heleodromia Haliday

This genus of Trichopezinae (Brachystomatidae) includes six described species in North America (Sinclair et al. 2011). *Heleodromia* has been collected on tundra and in boreal, coniferous and deciduous forests. Sinclair et al. (2011) revised the Nearctic species and provided an identification key to species. The genus (wing length: 2.0–4.0 mm) is recognized by narrow wing with vein R4+5 unbranched (Figs A, C, D) and male terminalia forming an enlarged capsule that usually projects below abdomen (Figs A–C). In North America, the genus is mostly found in the western mountain ranges, ranging from Alaska to Arizona and across the Canadian Arctic (Sinclair et al. 2011). There is only a single species of *Heleodromia* in eastern North America south of the Great Lakes, currently known only from the type locality in south-central Ohio.



FIGURES: (**A**) *Heleodromia cranehollowensis* Cumming & Coovert, male habitus. (**B**) Abdomen and male terminalia of *H. chillcotti* Sinclair. (**C**) *H. pullata* Melander, male habitus. (**D**) Wing of *H. pullata*.

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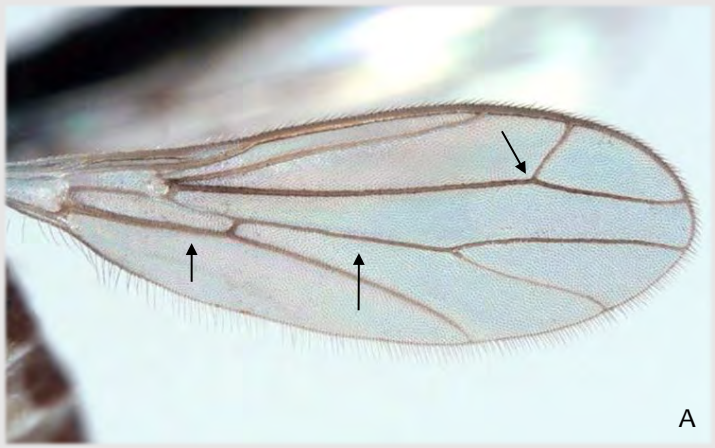
Hemerodromia Meigen

This genus of Hemerodromiinae (Empididae) includes 22 described Nearctic species north of Mexico (MacDonald 1998). *Hemerodromia* is an aquatic genus (Fig. D), collected from riparian vegetation and rocks along streams and rivers. MacDonald (1998) revised the Nearctic species and provided keys to species. In North America, the larvae and pupae have been illustrated by Brammer et al. (2009), with a key to Hemerodromiinae genera. The genus (wing length: 2.0–3.5 mm; Figs A–D) is readily distinguished from other Hemerodromiinae by the wing venation where vein R4+5 is branched, cell cua is absent, without vein CuA, and cell dm is absent (Fig. A). *Hemerodromia* occurs across North America, ranging from Alaska to the USA southern border.



FIGURES: (**A**) Wing of *Hemerodromia oratoria* Fallén. (**B**) Head and foreleg of *H. glabella* MacDonald. (**C**) *Hemerodromia* sp., male. (**D**) Congregation of *Hemerodromia* sp. on wet rock; photo by S.A. Marshall.

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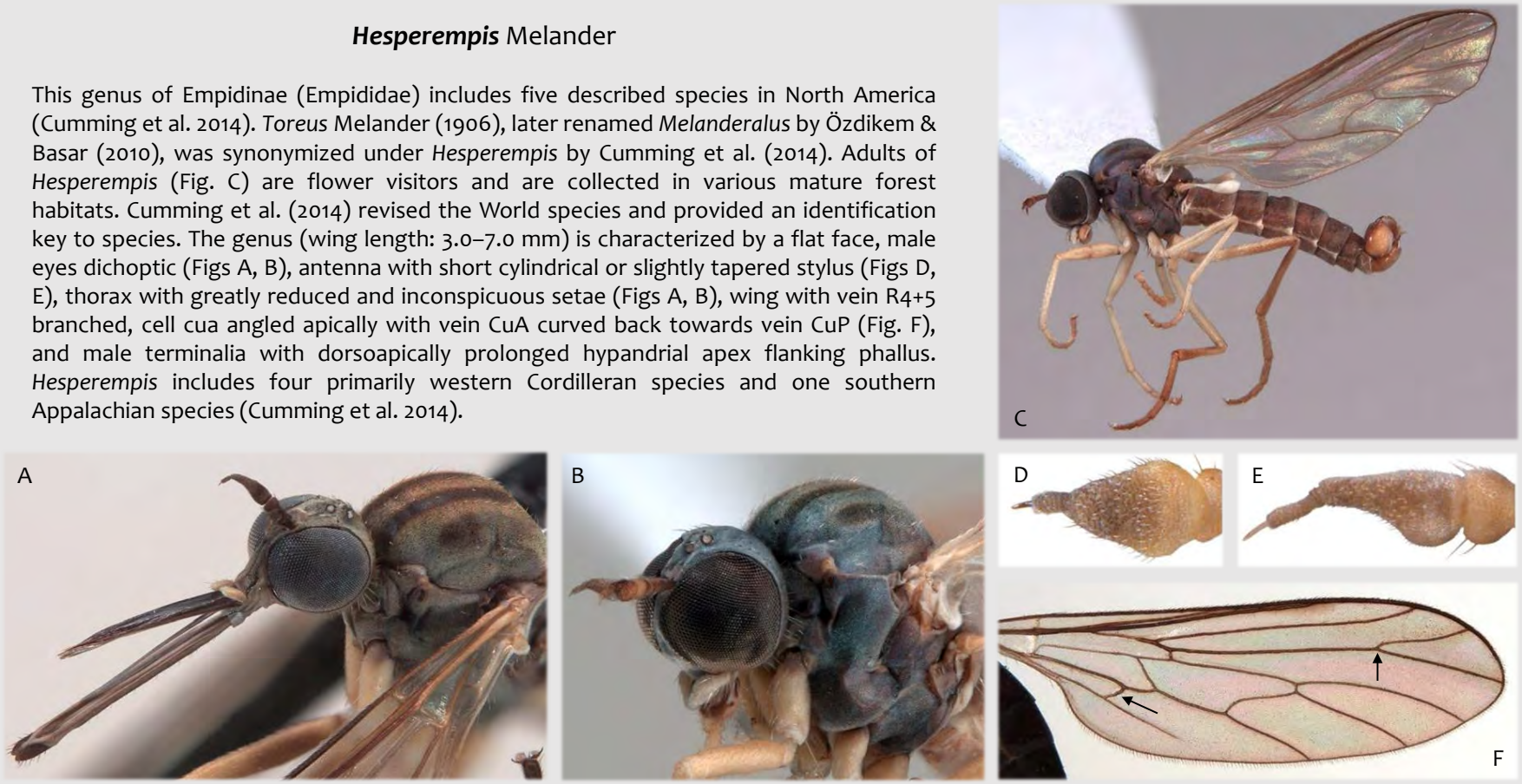
Hesperempis Melander

This genus of Empidinae (Empididae) includes five described species in North America (Cumming et al. 2014). *Toreus* Melander (1906), later renamed *Melanderalus* by Özdikem & Basar (2010), was synonymized under *Hesperempis* by Cumming et al. (2014). Adults of *Hesperempis* (Fig. C) are flower visitors and are collected in various mature forest habitats. Cumming et al. (2014) revised the World species and provided an identification key to species. The genus (wing length: 3.0–7.0 mm) is characterized by a flat face, male eyes dichoptic (Figs A, B), antenna with short cylindrical or slightly tapered stylus (Figs D, E), thorax with greatly reduced and inconspicuous setae (Figs A, B), wing with vein R4+5 branched, cell cua angled apically with vein CuA curved back towards vein CuP (Fig. F), and male terminalia with dorsoapically prolonged hypandrial apex flanking phallus. *Hesperempis* includes four primarily western Cordilleran species and one southern Appalachian species (Cumming et al. 2014).



FIGURES: (**A**) Head and thorax of *Hesperempis neomexicana* (Melander). (**B**) Head and thorax of *H. mabelae* (Melander). (**C**) *H. mabelae*, male habitus. (**D**) Antenna of *H. sanduca* Melander. (**E**) Antenna of *H. mabelae*. (**F**) Wing of *H. mabelae*.

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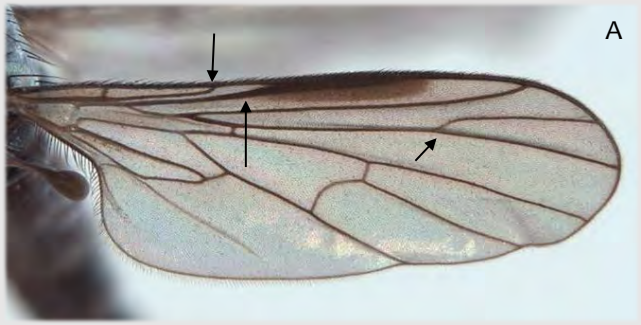
Hilara Meigen

This genus of Empidinae (Empididae) includes 43 described species in North America, with at least twice as many species remaining undescribed. The genus has been divided into numerous species groups (e.g., Chvála 2005), but this classification for the Nearctic fauna has not been investigated. *Hilara* is most common in forests, often swept from swarms along trails and streams or scooped up from specimens skimming water surfaces. The genus displays an interesting array of mating behaviours (Cumming 1994), especially concerning the transfer of nuptial gifts. Melander (1902) provided an identification key to 29 species and Coquillett (1895) provided an identification key to 22 species, but neither are useful. In an unpublished thesis, Roach (1971) provided a key to 72 eastern North American species, of which 48 new invalid species were included. In a second unpublished thesis, Rogers (1982) recognized and illustrated 17 species from the Sierra Nevada Mountains of California. The genus (wing length: 2.5–8.0 mm) is readily distinguished from other Empidinae genera by the bare laterotergite (Fig. B), wing with vein R4+5 branched, vein Sc bent forward to meet costa, vein R1 distinctly dilated before joining costa (Fig. A), and male foreleg with first tarsomere often enlarged and swollen (Figs B, D). *Hilara* is widespread across the Nearctic Region from Alaska, south to the Mexican border.



FIGURES: (**A**) Wing of *Hilara* sp. (**B**) Foreleg and body of *Hilara* sp. (**C**) Forelegs and body of *Hilara* sp., male. (**D**) *Hilara* sp., male habitus.

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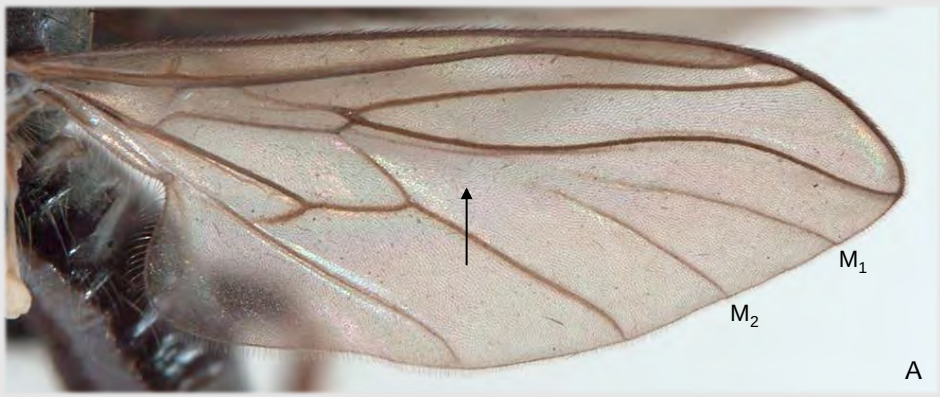
Hoplocyrtoma Melander

This genus of Bicellariinae (Hybotidae) includes two described Nearctic species and two described Japanese species (Melander 1928; Saigusa & Kato 2002). In Japan, adults are found in forested areas and on grassy alpine slopes, where they sit on vegetation waiting to pursue flying insects that they capture in flight with their raptorial hindlegs (Saigusa & Kato 2002). An identification key to the four described species was provided by Saigusa & Kato (2002). The genus (wing length: 2.5–3.5 mm) is readily distinguished by the raptorial hindleg (Fig. B) and characteristic wing venation with cell dm absent and veins M1 and M2 evanescent basally (Fig. A). In North America one described species occurs in the east, whereas the other is found in the northwest from Alaska to Oregon (Melander 1965).



FIGURES: (**A**) Wing of *Hoplocyrtoma femorata* (Loew). (**B**) *H. femorata*, female habitus. Abbreviations: M1, M2 – medial veins.

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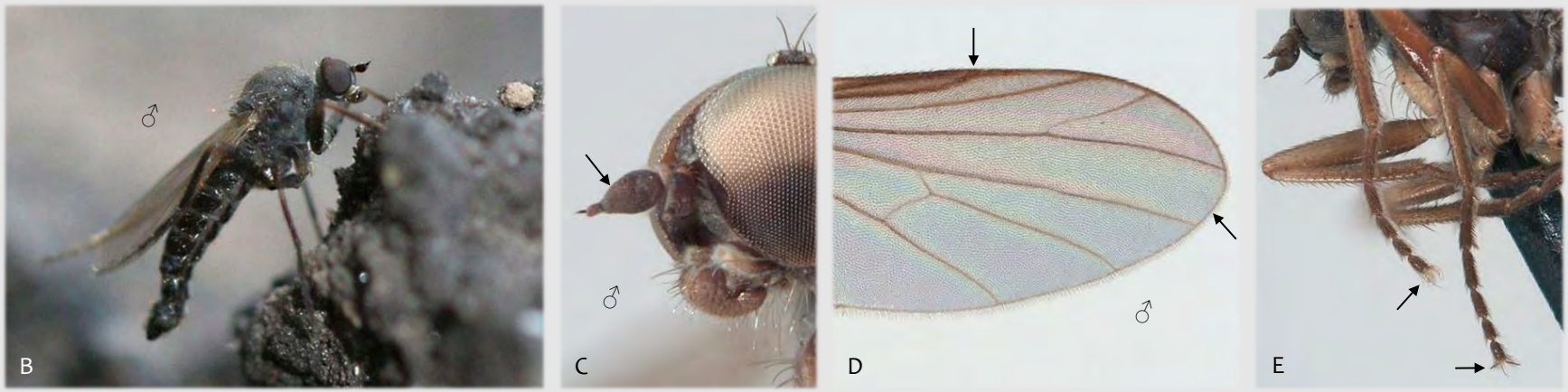
Hormopeza Zetterstedt

This genus of Ragadinae (Empididae) includes seven described North American species (Steyskal 1969). The antennal postpedicel possesses a pair of sensory pits, which are presumably used in the detection of smoke (Sinclair & Cumming 2006). Large swarms of these flies have been observed in smoke from wood fires in forested regions, as well as being attracted to smoke-scented clothing (Kessel 1958, 1960). Steyskal (1969) provided an identification key to five of seven Nearctic species. The genus (wing length: 2.3–3.7 mm; Figs A, B) is distinguished by the antenna with a broad postpedicel and stout stylus (Fig. C), wing with pterostigma not overlapping the apex of vein R1 (Fig. D), male wing with costa indistinct beyond vein R5 (Fig. D) and male without tarsal claws on at least the foreleg (Fig. E). The genus is widespread across western and eastern North America, ranging from Alaska to California and Ontario to the southern Appalachian Mountains.



FIGURES: (**A**) *Hormopeza virgator* Melander, female habitus. (**B**) *Hormopeza* sp. (Russia), male; photo by N. Vikhrev. (**C**) Head of male *H. copulifera* Melander, oblique view. (**D**) Wing of male *H. copulifera*. (**E**) Foreleg and midleg of *H. senator* Melander.

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Hybos Meigen

This genus of Hybotinae (Hybotidae) includes a single described species in North America, *Hybos reversus* Walker (Melander 1928). *Hybos* preys on flying insects in shady areas and species do not visit flowers or form mating swarms (Chvála 1983). Ale-Rocha (2001) revised the New World species and provided an identification key to species. The male wings of *H. reversus* are variable in colouration, and previously some variants were recognized as different species or varieties. The genus (wing length: 3.0–5.5 mm) is readily distinguished from other Hybotinae genera by the wing venation where vein Rs is short, arising in the distal half of cell br, and vein M separating cells br and bm is well developed (Fig. A), hind femur thickened, hind tibia slender, not clavate (Figs A, B), eyes widely separated on face (Fig. C), and mouthparts narrow, elongate, palps elongate, with labellum constricted and sclerotized for piercing, and without pseudotracheae (Figs C, D). *Hybos reversus* is usually found in forested regions and is restricted to eastern North America (Melander 1965).

FIGURES: (**A**) *Hybos reversus* Walker, male habitus. (**B**) Hindleg of *H. reversus*. (**C**) Head of *H. reversus*, oblique view. (**D**) Head of *H. reversus*, lateral view.

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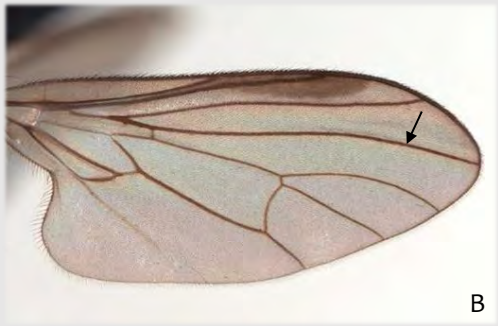
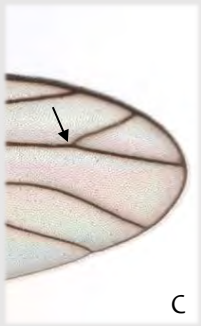
Iteaphila Zetterstedt

This genus (Iteaphilidae) includes 35 described species in North America (Sinclair & Shamshev 2012, 2021). Adults of *Iteaphila* are flower visitors primarily collected on flowers of willow, but also known from a variety of other early spring flowering plants (Sinclair & Shamshev 2012, 2021). The adults (Fig. A) feed on both nectar and pollen. Sinclair & Shamshev (2012, 2021) revised the World species and provided identification keys to species. In addition, Sinclair & Shamshev (2021) included a key to species groups and genera of Iteaphilidae. The genus (wing length: 2.0–4.5 mm) includes specimens with wing vein R4+5 either branched (Fig. C) or unbranched (= *Anthepiscopus* Becker, Fig. B). The genus is recognized by broad wings (Fig. B), bare laterotergite, more than 3 pairs of scutellar setae (Fig. D), antenna with postpedicel nearly parallel-sided, and palpus that is usually long and slender (Fig. E). *Iteaphila* is widespread in North America, including several transcontinental and Holarctic species. In the west, the genus ranges from Alaska and Yukon, south to Baja California and in the east ranges from northern Quebec to the southern Appalachian Mountains.





FIGURES: (**A**) Mating pair of *Iteaphila* sp.; photo by S.A. Marshall. (**B**) Wing of *I. longipalpus* (Melander). (**C**) Wing of *I. macquarti* Zetterstedt. (**D**) Thorax of *I. macquarti*. (**E**) Head of *I. macquarti*.

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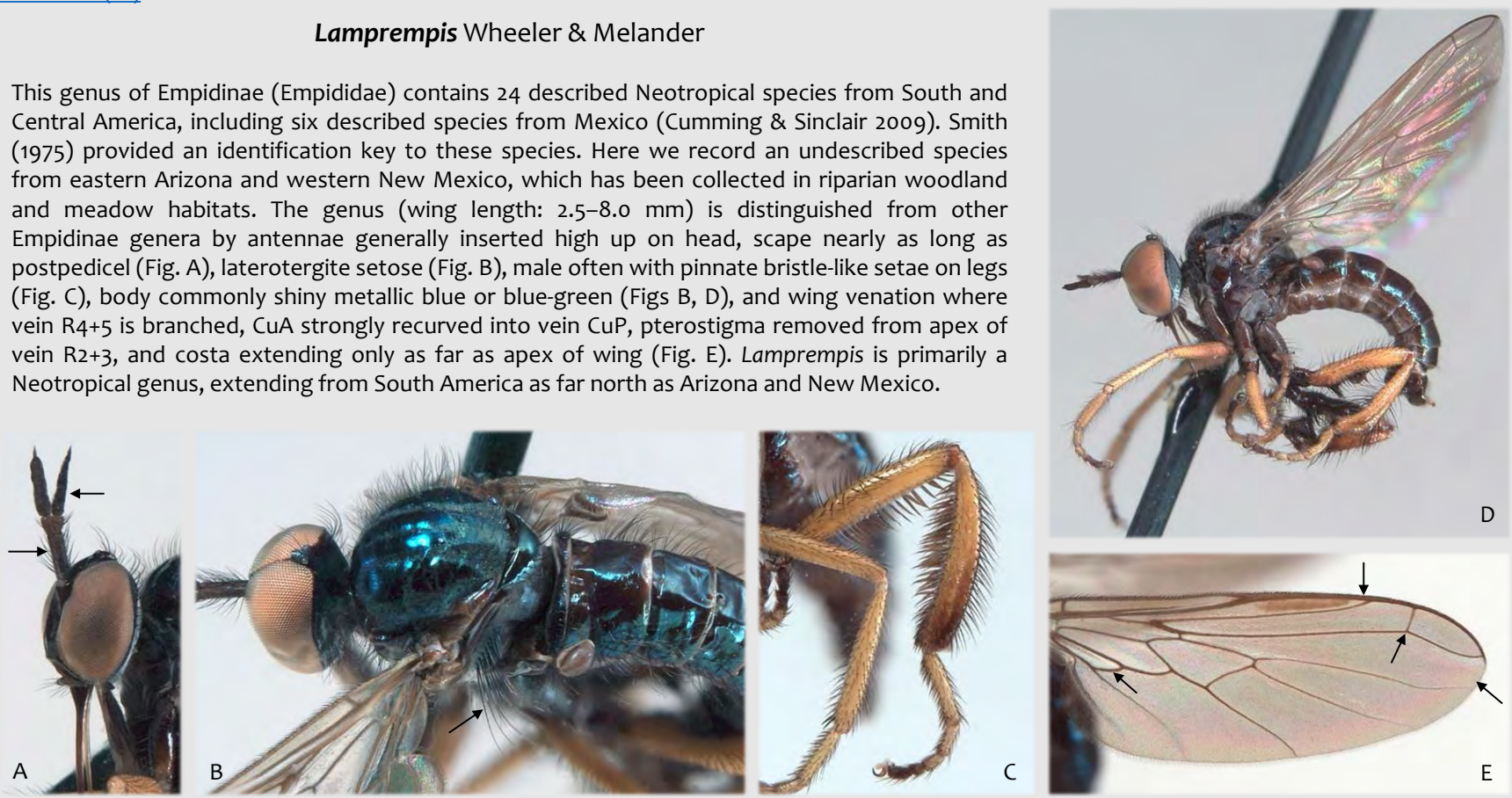
Lamprempis Wheeler & Melander

This genus of Empidinae (Empididae) contains 24 described Neotropical species from South and Central America, including six described species from Mexico (Cumming & Sinclair 2009). Smith (1975) provided an identification key to these species. Here we record an undescribed species from eastern Arizona and western New Mexico, which has been collected in riparian woodland and meadow habitats. The genus (wing length: 2.5–8.0 mm) is distinguished from other Empidinae genera by antennae generally inserted high up on head, scape nearly as long as postpedicel (Fig. A), laterotergite setose (Fig. B), male often with pinnate bristle-like setae on legs (Fig. C), body commonly shiny metallic blue or blue-green (Figs B, D), and wing venation where vein R4+5 is branched, CuA strongly recurved into vein CuP, pterostigma removed from apex of vein R2+3, and costa extending only as far as apex of wing (Fig. E). *Lamprempis* is primarily a Neotropical genus, extending from South America as far north as Arizona and New Mexico.



FIGURES: (**A**) Head of female *Lamprempis* sp. (**B**) Thorax of *Lamprempis* sp. (**C**) Hindleg of male *Lamprempis* sp. (**D**) *Lamprempis* sp., male habitus. (**E**) Wing of *Lamprempis* sp.

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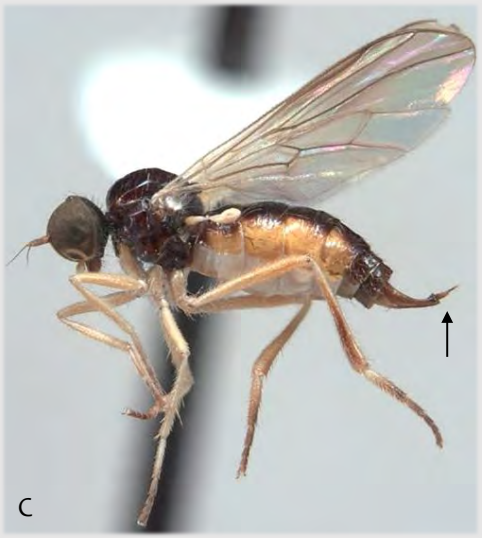
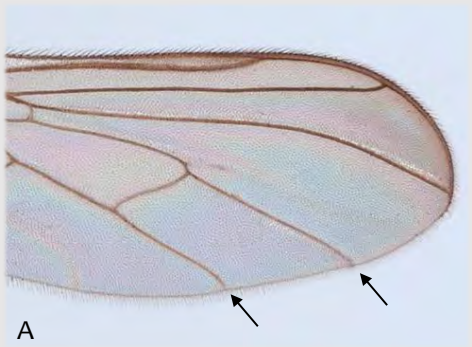
Leptopeza Macquart

This primarily Holarctic genus of Ocydromiinae (Hybotidae) includes five described species in North America, of which two are considered to be Holarctic. Adults (Figs C, E) are generally found in forested habitats and don't appear to visit flowers (Chvála 1983). Larvae are probably predators in decaying wood as adults have been reared from rotten wood (Chvála 1983; Cumming et al. 2018). Melander (1928) provided an identification key to species that occur in North America. The genus (wing length: 2.8–4.9 mm) is characterized by an antenna with conical postpedicel and terminal arista-like stylus (Fig. B), wing with cell dm emitting two veins that reach wing margin (Fig. A), mid tibia with erect dorsal setae (Fig. E), and a usually narrowed and prolonged female ovipositor (Figs C, D). In North America, *Leptopeza* occurs widely throughout Canada and USA south into Mexico.





FIGURES: (**A**) Wing of *Leptopeza flavipes* (Meigen). (**B**) Head of *Leptopeza* sp. (**C**) *L. flavipes*, female habitus. (**D**) Abdomen of female *L. flavipes*. (**E**) Leptopeza sp., male; photo by S.A. Marshall.

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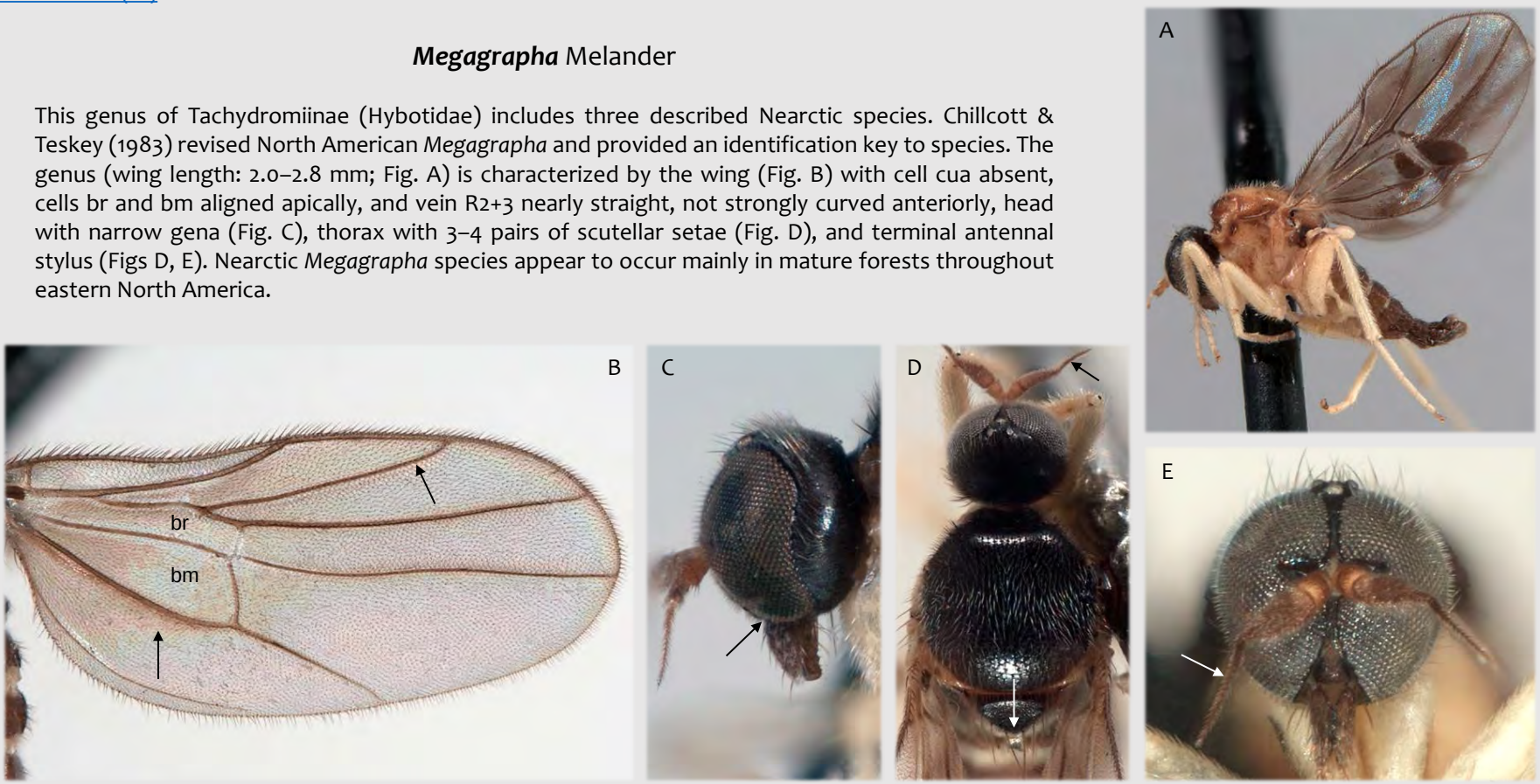
Megagrapha Melander

This genus of Tachydromiinae (Hybotidae) includes three described Nearctic species. Chillcott & Teskey (1983) revised North American *Megagrapha* and provided an identification key to species. The genus (wing length: 2.0–2.8 mm; Fig. A) is characterized by the wing (Fig. B) with cell cua absent, cells br and bm aligned apically, and vein R2+3 nearly straight, not strongly curved anteriorly, head with narrow gena (Fig. C), thorax with 3–4 pairs of scutellar setae (Fig. D), and terminal antennal stylus (Figs D, E). Nearctic *Megagrapha* species appear to occur mainly in mature forests throughout eastern North America.



FIGURES: (**A**) *Megagrapha exquiseta* Malloch, male habitus. (**B**) Wing of female *M. exquiseta*. (**C**) Head of *M. exquiseta*, lateral view. (**D**) Head and thorax of *M. exquiseta*, dorsal view. (**E**) Head of *M. exquiseta*, anterior view. Abbreviations: bm – basal medial cell; br – basal radial cell.

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Meghyperus Loew

This genus of Atelestinae (Atelestidae) includes two described species in North America, although three additional undescribed Nearctic species have been identified (Wiegmann 1989). Adults of *Meghyperus* have been swept from flowers and the immature stages are unknown. *Meghyperus* (wing length: 2.5–3.0 mm; Figs B, C) is characterized by the wing with a narrow cell dm, cell cua longer than cell bm, vein CuA arched, and vein M1+2 forked distal to cell dm with vein M2 fading out before reaching the wing margin (Fig. A). In North America, this genus is known from the western United States, unknown from Canada, but likely will be discovered in southern Alberta and British Columbia.

FIGURES: (**A**) Wing of *Meghyperus occidens* Coquillett. (**B**) *M. nitidus* Melander, female habitus. (**C**) *Meghyperus* sp., male habitus. Abbreviations: bm – basal medial cell; dm – discal medial cell; cua – anterior cubital cell.

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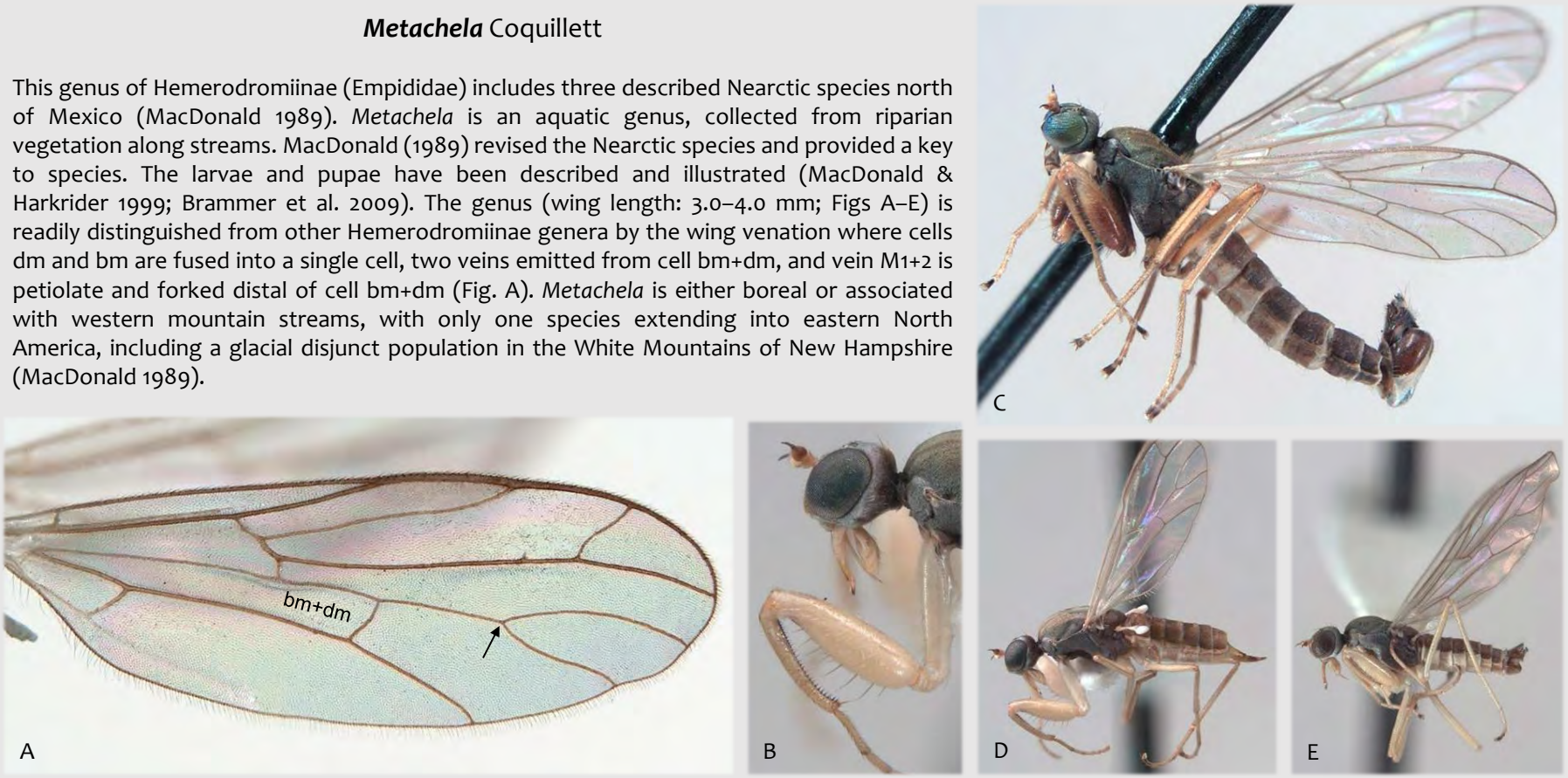
Metachela Coquillett

This genus of Hemerodromiinae (Empididae) includes three described Nearctic species north of Mexico (MacDonald 1989). *Metachela* is an aquatic genus, collected from riparian vegetation along streams. MacDonald (1989) revised the Nearctic species and provided a key to species. The larvae and pupae have been described and illustrated (MacDonald & Harkrider 1999; Brammer et al. 2009). The genus (wing length: 3.0–4.0 mm; Figs A–E) is readily distinguished from other Hemerodromiinae genera by the wing venation where cells dm and bm are fused into a single cell, two veins emitted from cell bm+dm, and vein M1+2 is petiolate and forked distal of cell bm+dm (Fig. A). *Metachela* is either boreal or associated with western mountain streams, with only one species extending into eastern North America, including a glacial disjunct population in the White Mountains of New Hampshire (MacDonald 1989).



FIGURES: (**A**) Wing of *Metachela collusor* (Melander). (**B**) Head and foreleg of *M. collusor*. (**C**) *Metachela* sp., male habitus. (**D**) *M. collusor*, female. (**E**) *M. collusor*, male. Abbreviations: bm+dm – basal medial cell + discal medial cell.

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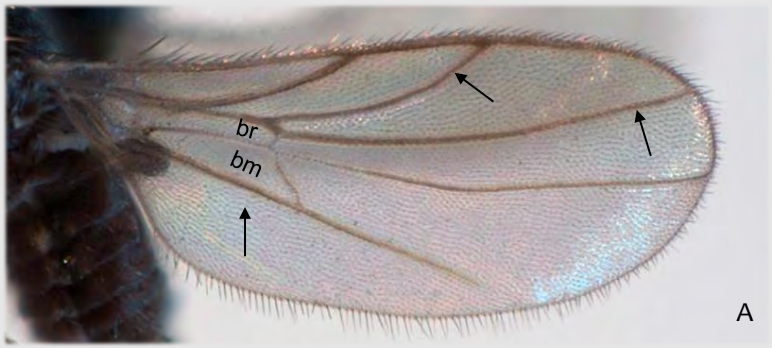
Micrempis Melander

This genus of Tachydromiinae (Hybotidae) includes 10 described Nearctic species north of Mexico (Chillcott & Teskey 1983; Cumming & Cooper 1989). Chillcott & Teskey (1983) revised the New World species and provided an identification key to species. The genus (wing length: 1.0–1.5 mm) is characterized by wing cell cua absent, cells br and bm aligned apically, and vein R2+3 strongly curved anteriorly with vein R4+5 more gradually curved (Fig. A), head with narrow gena (Fig. B), thorax with 1–2 pairs of scutellar setae, terminal arista-like antennal stylus (Fig. C), and male terminalia with short non-filamentous phallus. *Micrempis* occurs throughout North America in a variety of open habitats.



FIGURES: (**A**) Wing of *Micrempis bomboxynon* Chillcott. (**B**) *M. bomboxynon*, male habitus. (**C**) Head of *M. bomboxynon*, dorsal view. Abbreviations: bm – basal medial cell; br – basal radial cell.

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Microphor Macquart

This genus of the Microphorinae (Dolichopodidae sensu lato) includes five described species in North America. Brooks & Cumming (2022) revised the Nearctic species and provided an identification key to species. Adults (Figs C, D, F, G) are found in various habitats such as forest margins, meadows, and gardens. They are mostly predaceous, but are often found on flowers (Fig. C). Some species are known to feed on insects trapped in spider webs, or on spider prey not found in webs (Fig. D). The genus (wing length: 1.9–3.5 mm) is characterized by wing with vein Rs originating near level of crossvein h (Figs A, B), cell dm long (Fig. A), or if cell dm short (Fig. B) then antennal stylus shorter than postpedicel (Fig. E), thorax with 3–4 pairs of scutellar setae, male genitalia without medial hypandrial prolongation, and female abdomen with five exposed segments. Species of *Microphor* are distributed across North America.

FIGURES: (**A**) Wing of *Microphor discalis* Melander. (**B**) Wing of *M. obscurus* Coquillett. (**C**) *M. obscurus*, male on flower of *Maiantheum racemosum* (L.) Link; photo by S.A. Marshall. (**D**) Females of *Microphor* sp. feeding on noctuine caterpillar prey of crab spider (*Xysticus* sp.) in Germany; photo Gerrit Öhm. (**E**) Head of *M. obscurus*, oblique view. (**F**) *M. obscurus*, male habitus. (**G**) *M. discalis*, male habitus. Abbreviations: dm – discal medial cell; Rs – radial sector.

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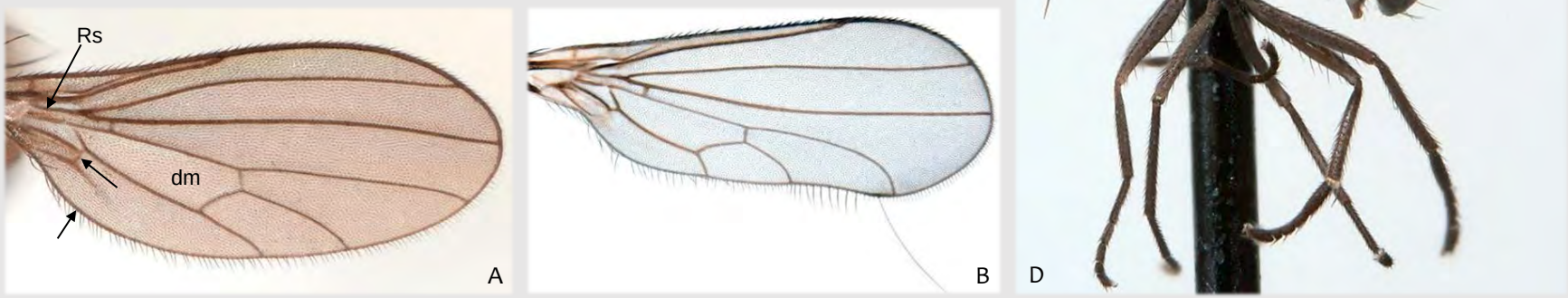
Microphorella Becker

This genus of Parathalassiinae (Dolichopodidae sensu lato) includes 10 described Nearctic species and at least 20 North American species awaiting description (Cumming & Brooks 2019). These species are classified into four species groups by Cumming & Brooks (2019) with an identification key to the groups provided by Cumming & Brooks (2022). Identification keys to the described Nearctic species in two of these species groups are available in Brooks & Cumming (2012) and Cumming & Brooks (2022). Adults (Fig. D) of North American *Microphorella* (wing length: 1.3–2.0 mm) can be recognized by the wing with vein Rs originating near level of crossvein h, a reduced anal lobe, apically convex cell cua, short to absent vein CuA+CuP and cell dm present (Figs A, B), in combination with a head with weakly developed gena, small short rounded or narrow palpus, and a non-lengthened arista-like stylus (Fig. C). In North America, *Microphorella* has a western distribution with species found primarily in a variety of riparian habitats.



FIGURES: (**A**) Wing of *Microphorella breviradia* Cumming & Brooks. (**B**) Wing of *M. chillcotti* Brooks & Cumming. (**C**) Head of *M. breviradia*, lateral view. (**D**) *Microphorella* sp., male habitus. Abbreviations: dm – discal medial cell; Rs – radial sector.

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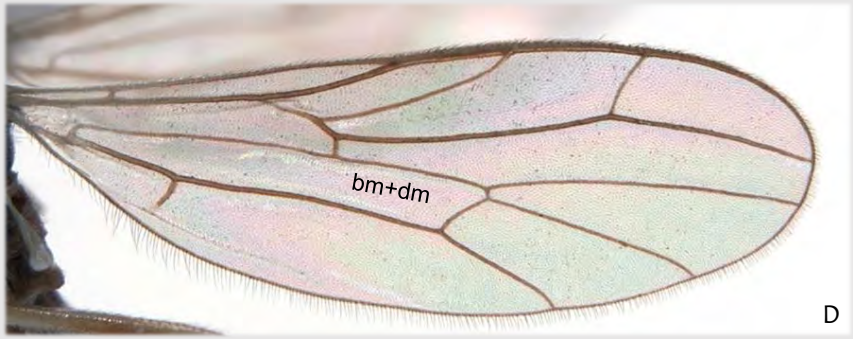
Neoplasta Coquillett

This genus of Hemerodromiinae (Empididae) includes 12 described Nearctic species north of Mexico (MacDonald & Turner 1993). *Neoplasta* is an aquatic genus, collected from riparian vegetation along streams. MacDonald & Turner (1993) revised the Nearctic species and provided an identification keys to species. The larvae and pupae have been described and illustrated (MacDonald & Harkrider 1999; Brammer et al. 2009). Adults of the genus (wing length: 2.5–4.0 mm; Figs A–C) are readily distinguished from other Hemerodromiinae genera by the less enlarged fore femur, and the wing venation where cells bm and dm are fused, and three veins are emitted from cell bm+dm (Fig. D). *Neoplasta* occurs across North America, ranging from south of the Arctic circle to the USA southern border.



FIGURES: (**A**) *Neoplasta* sp., male. (**B**) *Neoplasta* sp. (Costa Rica), male with prey (probably Ceratopogonidae). (**C**) *Neoplasta* sp., female. (**D**) Wing of *Neoplasta paramegorchis* MacDonald & Turner. All in situ photos by S.A. Marshall. Abbreviation: bm+dm – basal medial cell + discal medial cell.

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Niphogenia Melander

This endemic Nearctic genus of Trichopezinae (Brachystomatidae) includes two described species (Wilder 1981b). Adults of *Niphogenia* are found in montane forest habitats in low-growing vegetation, often in high numbers, feeding on insect larvae unearthed from soil. An identification key to species was provided by Wilder (1981b). The genus (wing length: 3.0–4.0 mm) is characterized by dark body colouration (Figs A–C), antenna with an elongate postpedicel and very short stylus (Fig. A), bare rounded dichoptic eyes in both sexes, and wing with anal lobe not developed and vein R4+5 forked (Figs B, C). *Niphogenia* occurs in the mountain ranges of northern California, Idaho, Montana, Oregon and Washington (Wilder 1981b).

FIGURES: (**A**) *Niphogenia* sp., male head and thorax. (**B**) *Niphogenia* sp., male habitus. (**C**) *Niphogenia* sp., female habitus.

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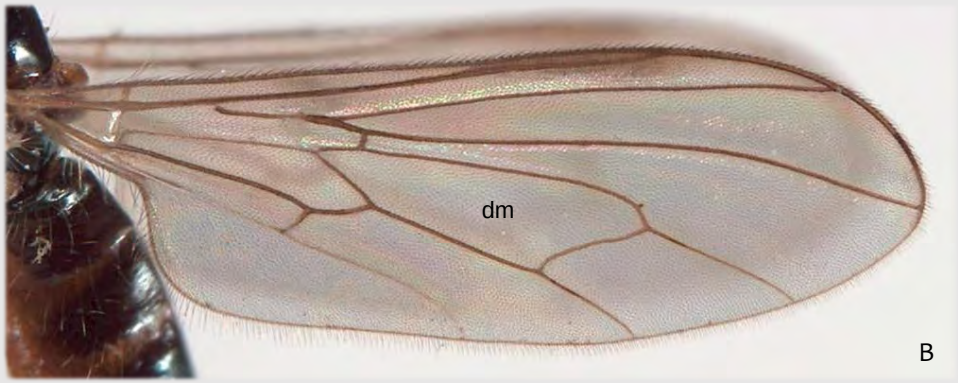
Ocydromia Meigen

This genus of Ocydromiinae (Hybotidae) is known from the Nearctic, Palaearctic, Oriental and Afrotropical Regions and includes nine described species (Yang et al. 2007). The single species found in the Nearctic Region is thought to be a Holarctic species, *Ocydromia glabricula* (Fallén), but this requires further verification. A possible second eastern species has also been tentatively identified (B.J. Sinclair unpubl. data). Adults of this species (Fig. A) fly low over the ground in open areas. Larvae have been reared from dung and decaying organic matter, and females are viviparous (Chvála 1983). The genus (wing length: 2.8–4.5 mm) is characterized by an antenna with oval postpedicel and long dorsoapical arista-like stylus (Fig. C), wing with cell dm emitting two veins that reach the wing margin (Fig. B), and legs without distinct setae. In North America, *Ocydromia* occurs widely throughout Canada and the USA.



FIGURES: (**A**) *Ocydromia glabricula* (Fallén), female; photo by N. Vladimirov. (**B**) Wing of *O. glabricula*. (**C**) Head, thorax and foreleg of *O. glabricula*. Abbreviation: dm – discal medial cell.

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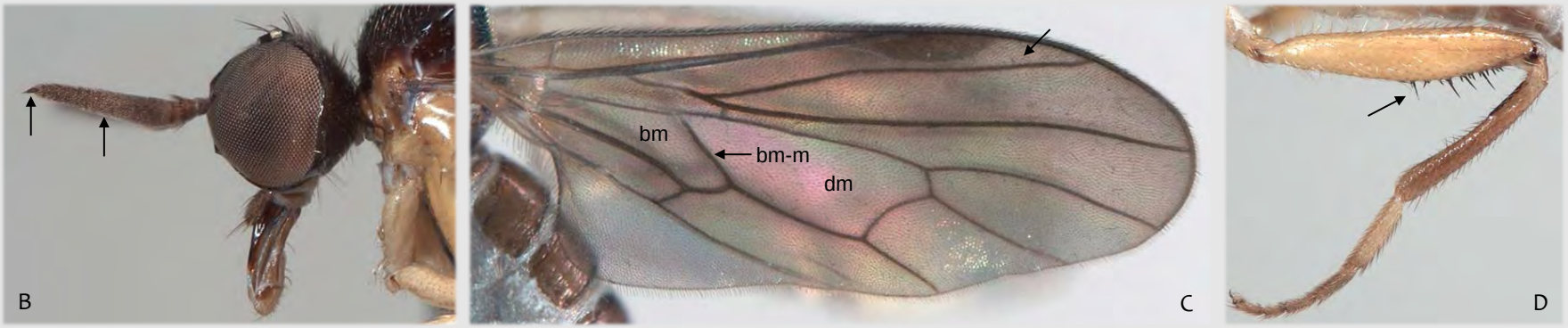
Oedalea Meigen

This primarily Holarctic genus of Oedaleinae (Hybotidae) includes four described Nearctic species and at least one undescribed species. Adults (Fig. A) are generally found in forested habitats and are not known to visit flowers (Chvála 1983). Larvae are probably predators in decaying wood as adults have been repeatedly bred from rotten wood (Chvála 1983; Cumming et al. 2018). Melander (1928) provided an identification key to Nearctic species. *Oedalea* (wing length: 3.0–4.8 mm) is characterized by an antenna with elongated postpedicel and short stylus (Fig. B), wing with pterostigma not filling apex of cell r1, cell dm emitting three veins that reach wing margin, cell bm narrow apically with crossvein bm-m oblique (Fig. C), and hind femur thickened with strong ventral setae (Fig. D). The genus occurs across North America from Alaska, Yukon, Alberta, central and eastern Canada in the north to California, Texas, Georgia and Durango Mexico in the south.



FIGURES: (**A**) *Oedalea lanceolata* Melander, male habitus. (**B**) Head of *O. lanceolata*, lateral view. (**C**) Wing of *O. lanceolata*. (D) Hing leg of *O. lanceolata*. Abbreviations: bm – basal medial cell; bm-m – basal medial crossvein; dm – discal medial cell.

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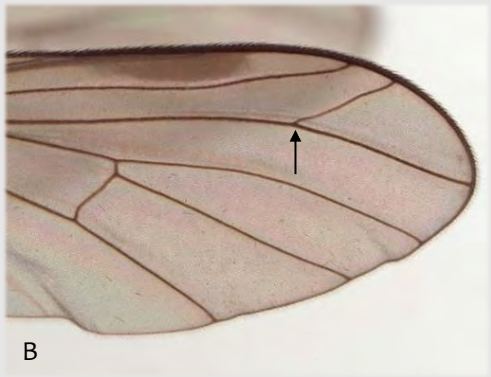
Oreogeton Schiner

This Holarctic genus includes eight described Nearctic species and seven undescribed species (B.J. Sinclair unpubl. data). *Oreogeton* is often classified in the monotypic subfamily Oreogetoninae (Empididae), but recent morphological studies suggest that the genus is closely related to the genus *Gloma* of the subfamily Trichopezinae (Sinclair et al. 2019a). *Oreogeton* is an aquatic genus, found in small streams mostly in mountainous regions, with adults (Figs C, D) swept from overhanging riparian vegetation. Melander (1928) provided an identification key to species, but it is now outdated. Immature stages were described by Sommerman (1962). The genus (wing length: 4.5–8.0 mm) is easily recognized by wing vein R1 with setae dorsally (Fig. A), vein R4+5 branched (Fig. B) and laterotergite setose (Fig. A). *Oreogeton* is primarily found in the western and eastern mountain ranges, from Alaska to California and Ontario to the southern Appalachian Mountains.



FIGURES: (**A**) *Oreogeton scopifer* (Coquillett). (**B**) Wing of *O. scopifer*. (**C**) *Oreogeton* sp., female; photo by S.A. Marshall. (**D**) *Oreogeton* sp., female; photo by S.A. Marshall.

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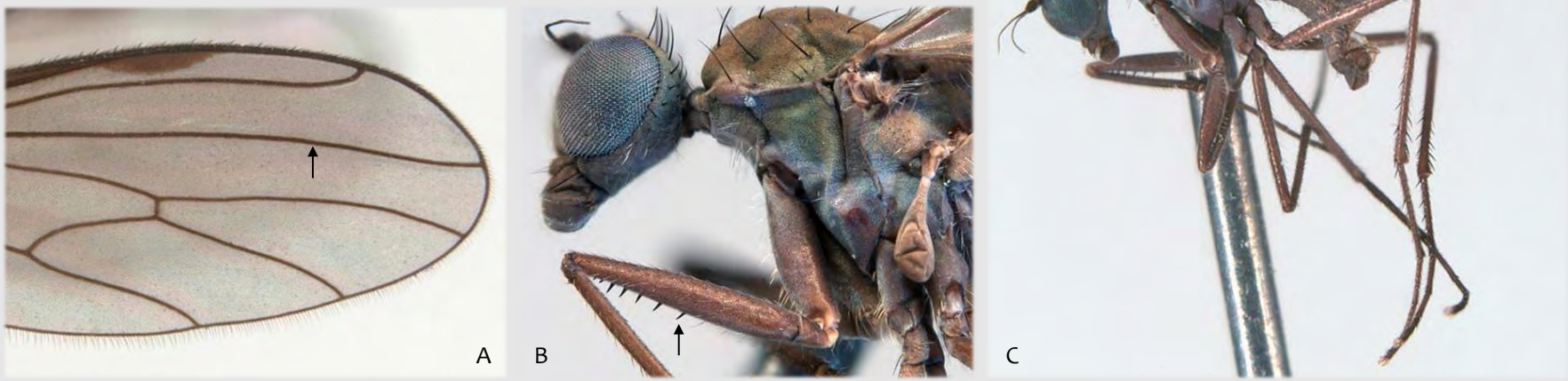
Oreothalia Melander

This endemic Nearctic genus of Clinocerinae (Empididae) includes five described species and one undescribed species (Sinclair 1995). *Oreothalia* is an aquatic genus, found in headwater streams and madicolous habitats, although some species are found in boggy areas, tundra, wet soil and puddles along forest trails (Wilder 1981a; Sinclair 1995). Wilder (1981a) revised the genus and provided an identification key to species. The immature stages remain unknown. The genus (wing length: 2.0–4.0 mm) is easily recognized by the narrow wing (Fig. C) with unbranched vein R4+5 (Fig. A) and spine-like ventral setae on the fore femur (Fig. B). *Oreothalia* includes one southern Appalachian species and four western Cordilleran species (Wilder 1981a). An undescribed species is known from Florida (Sinclair 1995; Sinclair et al. 2020).



FIGURES: (**A**) Wing of *Oreothalia sierrensis* Wilder. (**B**) Fore femur of *O. spinitarsis* Wilder, lateral view. (**C**) *O. spinitarsis*, male habitus.

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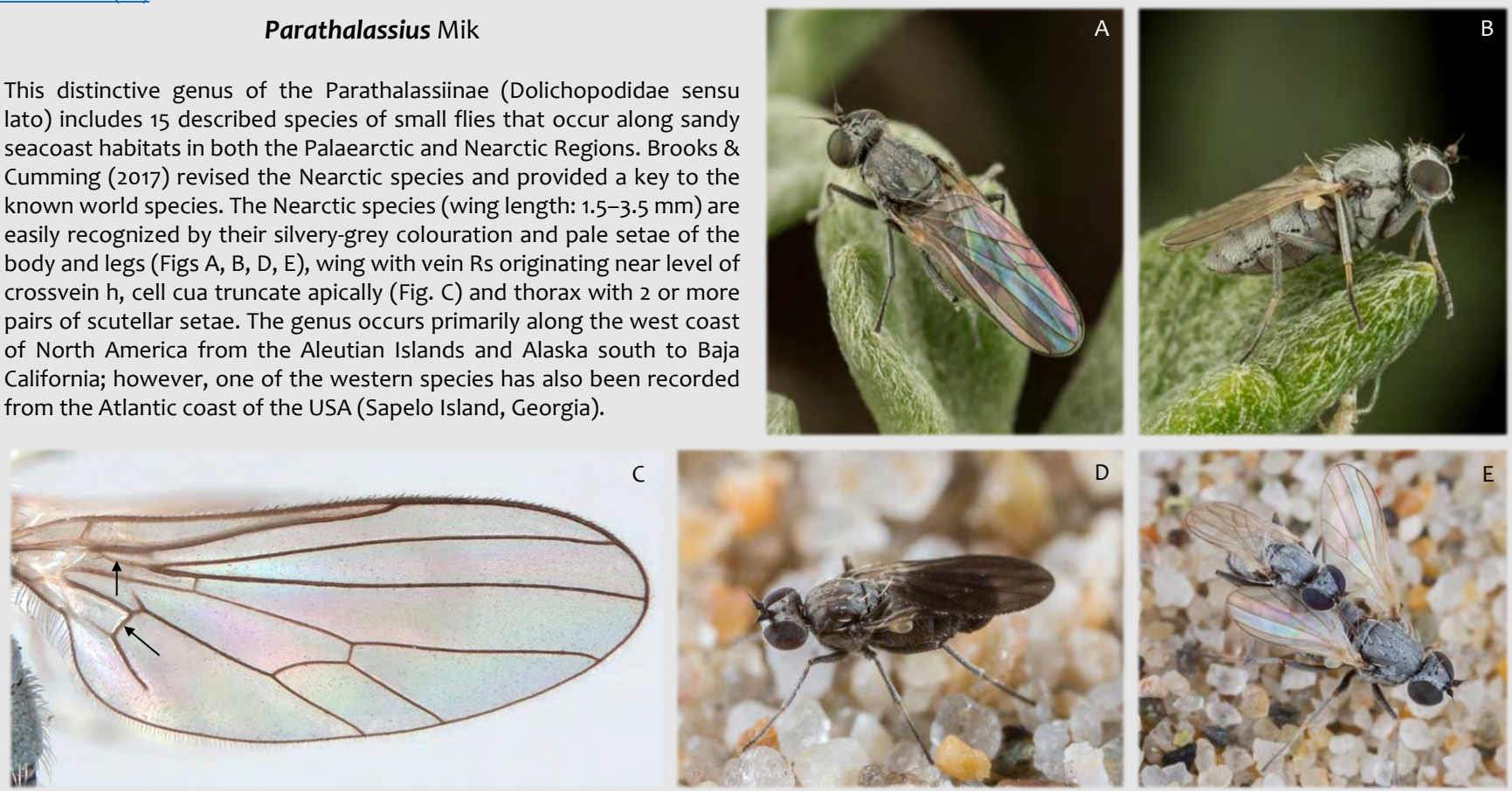
Parathalassius Mik

This distinctive genus of the Parathalassiinae (Dolichopodidae sensu lato) includes 15 described species of small flies that occur along sandy seacoast habitats in both the Palaearctic and Nearctic Regions. Brooks & Cumming (2017) revised the Nearctic species and provided a key to the known world species. The Nearctic species (wing length: 1.5–3.5 mm) are easily recognized by their silvery-grey colouration and pale setae of the body and legs (Figs A, B, D, E), wing with vein Rs originating near level of crossvein h, cell cua truncate apically (Fig. C) and thorax with 2 or more pairs of scutellar setae. The genus occurs primarily along the west coast of North America from the Aleutian Islands and Alaska south to Baja California; however, one of the western species has also been recorded from the Atlantic coast of the USA (Sapelo Island, Georgia).



FIGURES: (**A**) *Parathalassius abela* Brooks & Cumming, male. (**B**) *P. uniformus* Brooks & Cumming, female. (**C**) Wing of *P. candidatus* Melander. (**D**) *P. infuscatus* Brooks & Cumming, male. (**E**) Mating pair of *P. uniformus*. All in situ photos by A. Abela.

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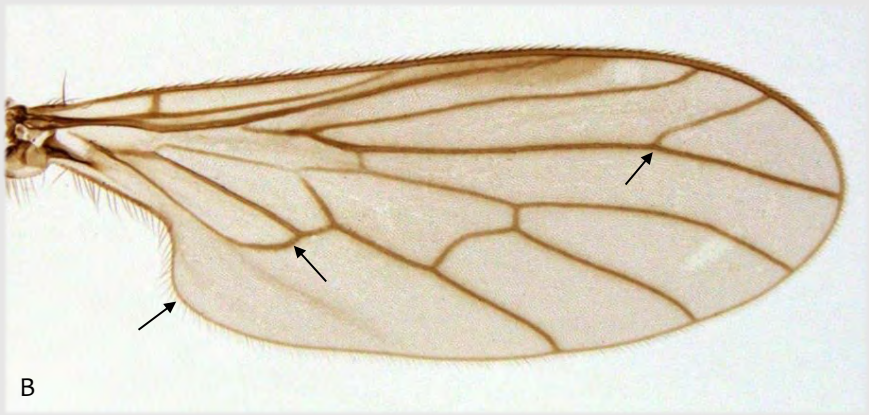
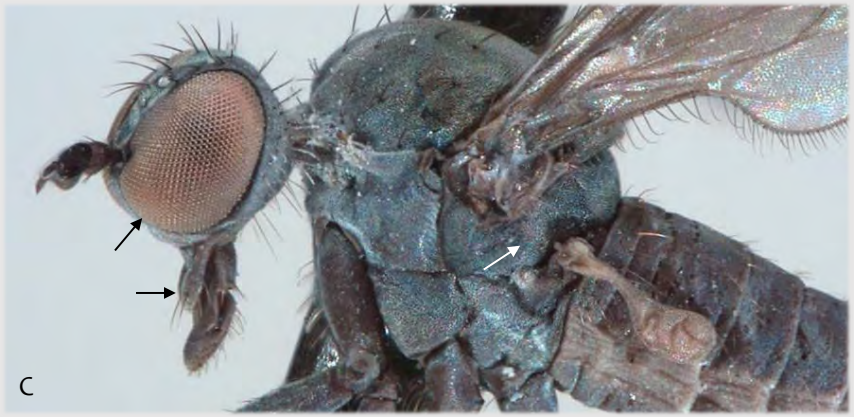
Philetus Melander

This endemic Nearctic genus of Empidinae (Empididae) includes three described species (Cumming et al. 2016; Cumming & Brooks 2020). Adults of *Philetus* (Fig. A) are found in montane and coastal forest habitats, with one species recorded from shrub tundra. An identification key to males of the species was provided by Cumming & Brooks (2020). The genus (wing length: 3.0–4.5 mm) is characterized by a head with ocelli positioned anterior to the vertex, eyes dichoptic and narrow and obliquely oriented, palpus straight (Fig. C), thorax with laterotergite bare (Fig. C), and wing with vein R4+5 branched, cell cua angled apically with vein CuA curved back towards vein CuP, and anal lobe developed (Fig. B). The genus occurs primarily in the western mountain ranges, from Alaska and Yukon in the north, to California, Nevada and Arizona in the south, including records from British Columbia, Washington, Oregon, Montana, Wyoming and Colorado (Cumming et al. 2016; Cumming & Brooks 2020). Females of an unidentified species are also known from the southern Appalachian Mountains.





FIGURES: (**A**) *Philetus* sp., female; photo by S.A. Marshall. (**B**) Wing of *P. memorandus* Melander. (**C**) Head and thorax of *P. schizophorus* Melander.

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Platypalpus Macquart

This is the most speciose genus of Tachydromiinae (Hybotidae) in the world and currently includes 117 described North American species (Yang et al. 2007; Shamshev & Grootaert 2012). An identification key to most Nearctic species was provided by Melander (1928) with Chillcott (1962) subsequently revising the *Platypalpus juvenis* species group. In addition, species that were formerly classified as the separate genus *Charadrodromia* Melander, were synonymized under *Platypalpus* and keyed by Shamshev & Grootaert (2012). Several species of *Platypalpus* appear to be parthenogenic allowing them to reproduce without males (Chvála 1975; Sinclair & Cumming 2017). *Platypalpus* (wing length: 1.3–5.5 mm) is characterized by a wing with cell cua present (Fig. A), bare eyes, and raptorial midlegs (Figs B, C) with mid femur usually thickened and mid tibia usually ending in an apical spur (Fig. B). The genus is found in various habitats throughout North America.

FIGURES: (**A**) Wing of *Platypalpus glacialis* Melander. (**B**) Midleg of *Platypalus* sp. (**C**) *Platypalpus* sp., female; photo by S.A. Marshall.

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Porphyrochroa Melander

This genus of Empidinae (Empididae) contains 53 described Neotropical species (Rafael & Cumming 2004; Mendonça 2010), including four described species from Central America (Cumming & Sinclair 2009). Here we record two undescribed species from Texas, New Mexico and Arizona, which have been collected in riparian woodland and meadow habitats. Adults of the genus (wing length: 2.5–3.5 mm; Figs C, D) are distinguished from other Empidinae genera by the thorax with laterotergite setose, abdomen metallic blue or blue-green (Fig. D), wing venation where vein R4+5 is unbranched, vein CuA strongly recurved into vein CuP, pterostigma extending to near apex of vein R2+3 (Fig. A), and male terminalia with phallus short and usually concealed within elongate hypandrium (Fig. B). *Porphyrochroa* is primarily a Neotropical genus, extending from South America into the southern USA.

FIGURES: (**A**) Wing of *Porphyrochroa* sp. (**B**) Male terminalia of *Porphyrochroa* sp. (**C**) *Porphyrochroa* sp. (Ecuador) on flower; photo by S.A. Marshall. (**D**) *Porphyrochroa* sp. (Ecuador), male in flight; photo by S.A. Marshall.

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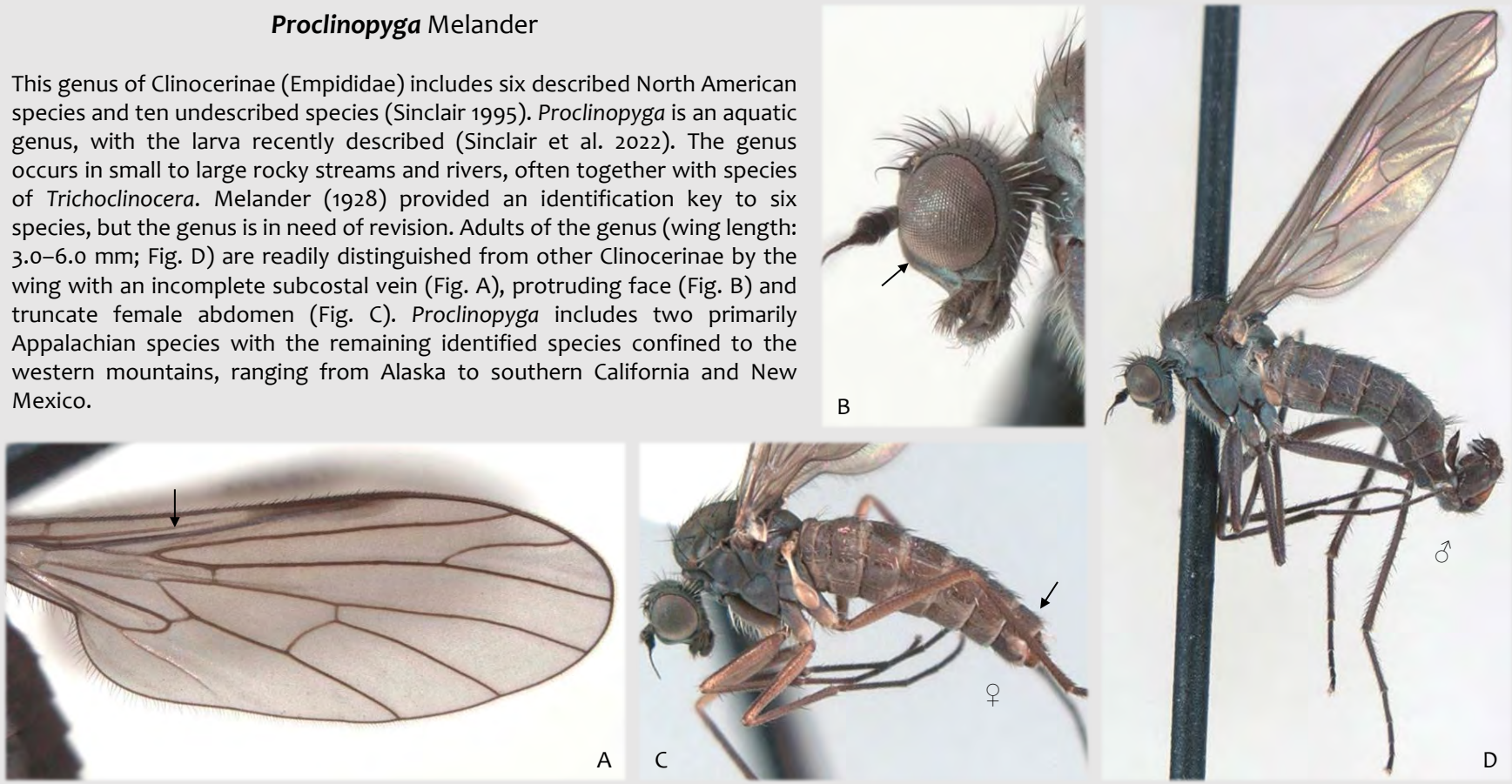
Proclinopyga Melander

This genus of Clinocerinae (Empididae) includes six described North American species and ten undescribed species (Sinclair 1995). *Proclinopyga* is an aquatic genus, with the larva recently described (Sinclair et al. 2022). The genus occurs in small to large rocky streams and rivers, often together with species of *Trichoclinocera*. Melander (1928) provided an identification key to six species, but the genus is in need of revision. Adults of the genus (wing length: 3.0–6.0 mm; Fig. D) are readily distinguished from other Clinocerinae by the wing with an incomplete subcostal vein (Fig. A), protruding face (Fig. B) and truncate female abdomen (Fig. C). *Proclinopyga* includes two primarily Appalachian species with the remaining identified species confined to the western mountains, ranging from Alaska to southern California and New Mexico.



FIGURES: (**A**) Wing of *Proclinopyga* sp. (**B**) Head of *Proclinopyga* sp., lateral view. (**C**) *P. exporrecta* Melander, female habitus. (**D**) *Proclinopyga* sp., male habitus.

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Ragas Walker

This genus of Ragadinae (Empididae) includes four described North American species (Sinclair & Saigusa 2001). In North America, *Ragas* is relatively rarely collected with adults appearing in winter months (Sinclair & Saigusa 2001). In Europe, adults have been observed clustered on tree trunks where they prey on small insects, such as Collembola. Sinclair & Saigusa (2001) provided an identification key to species. Adults of the genus (wing length: 2.0–2.5 mm; Figs A, B) are readily distinguished by stout setae on the postgena behind the proboscis, on the anterior surface of the fore coxa (Fig. C) and on the anteroventral surface of the fore trochanter, and by a wing with a narrow or indistinct pterostigma (Fig. D). In North America, species of this genus are known from Arizona and California (Sinclair & Saigusa 2001).

FIGURES: (**A**) *Ragas alpina* Sinclair & Saigusa, male habitus. (**B**) *R. alpina*, female habitus. (**C**) Head of *R. alpine*, lateral view. (**D**) Wing of *R. alpina*.

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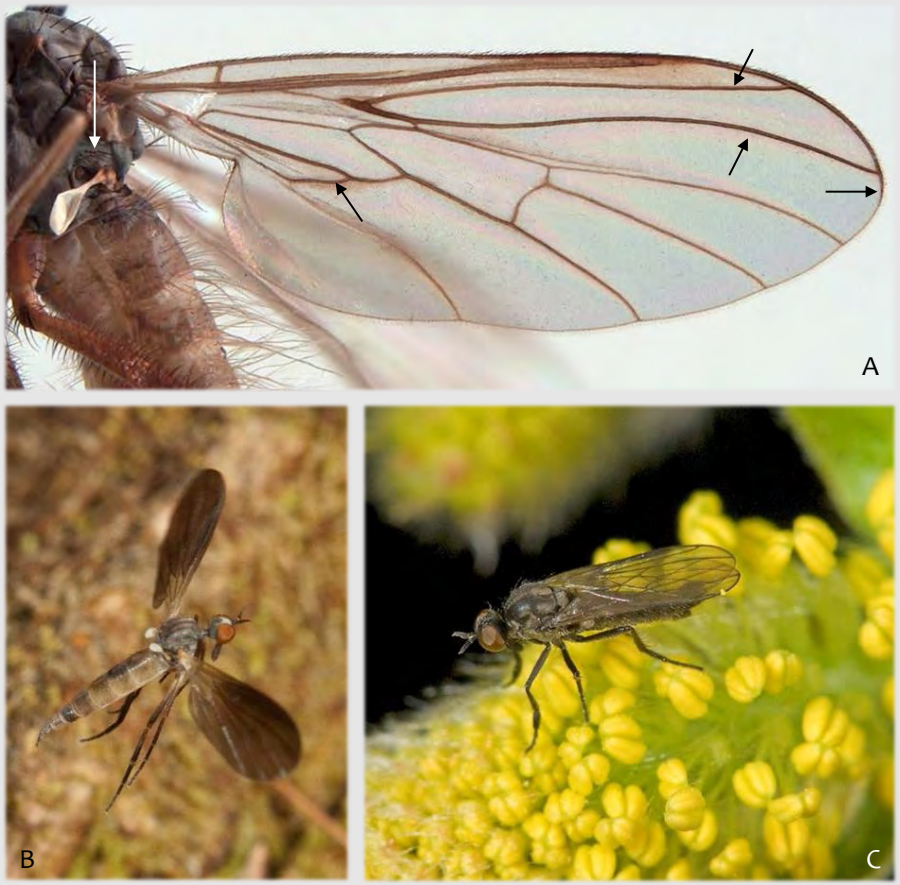
Rhamphomyia Meigen

This genus of Empidinae (Empididae) includes 205 described species in North America, with at least as many species remaining undescribed (Sinclair et al. 2019b) and represents one of the most diverse and common groups of Empididae. With such diversity, the genus has been divided into more than 10 subgenera and several remain to be formally described (Saigusa 2012). Adults of *Rhamphomyia* (Figs B–L) are most common in forests, along streams, on tundra and in mountainous regions, and are often observed resting on flowers (Fig. C). The genus displays an interesting array of mating behaviours (Cumming 1994), especially concerning the transfer of nuptial gifts (Fig. E). Coquillett (1895) provided the first identification key to species, which is now outdated. More recently, various groups of Nearctic *Rhamphomyia* have been revised and authors have usually provided keys to species, including: *R.* (*Pararhamphomyia*) *basalis* group (Chillcott 1959), species described by Walker (Smith 1971; Sinclair & Saigusa 2018), *R.* (*Megacyttarus*) (Barták 2002), *R.* (*Vockerothempis*) (Saigusa 2012) and species of the Canadian arctic islands (Sinclair et al. 2019b). The genus (wing length: 2.2–10.0 mm) is readily distinguished from other Empidinae genera by wing venation (Fig. A) where vein R4+5 is unbranched, vein CuA is strongly recurved into vein CuP, pterostigma does not extend to apex of vein R2+3, costa extends only as far as apex of wing, and by laterotergite setose (Fig. A). *Rhamphomyia* is widespread across the Nearctic Region from Ellesmere Island and Greenland in the north, south to the Mexican border.

Additional images of *Rhamphomyia* (Figs D–L) on next slide…



FIGURES: (**A**) Thorax and wing of *Rhamphomyia* sp. (**B**) *Rhamphomyia* sp., female in flight; photo by S. A. Marshall. (**C**) *Rhamphomyia* sp., male on flower; photo by S.A. Marshall.

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Rhamphomyia Meigen (continued)

FIGURES: (**D**) *Rhamphomyia* sp., female. (**E**) *Rhamphomyia sudigeronis* Coquillett, mating pair, female with tephritid fly as nuptial gift. (**F**) *R. longicauda*, male with prey. (**G–H**) *R. longicauda*, female with inflated abdomen. (**I**) *Rhamphomyia* sp., male. (**J–L**) *Rhamphomyia* spp., females. All in situ photos by S.A. Marshall, except Fig. G by J. Alcock.

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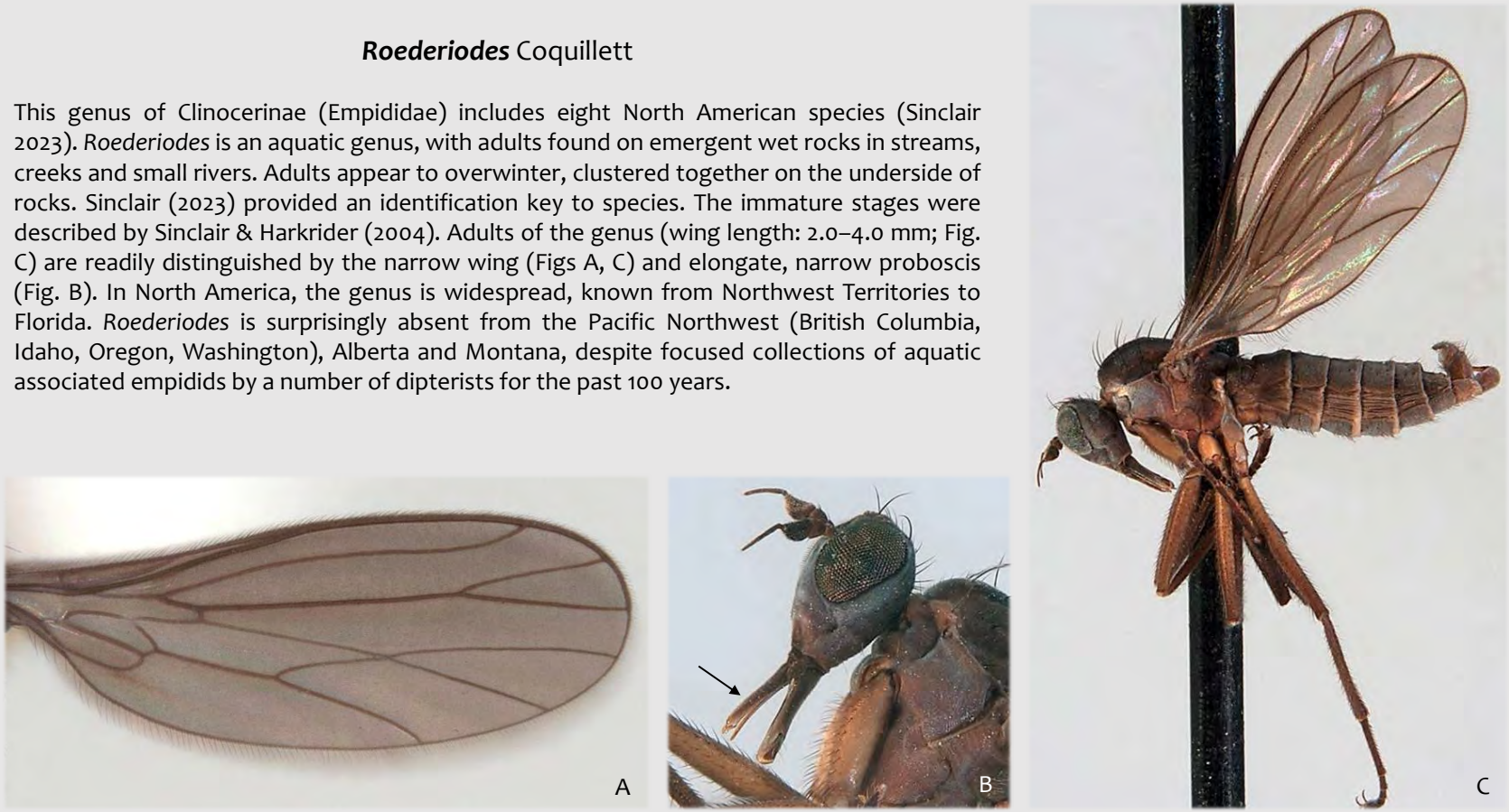
Roederiodes Coquillett

This genus of Clinocerinae (Empididae) includes eight North American species (Sinclair 2023). *Roederiodes* is an aquatic genus, with adults found on emergent wet rocks in streams, creeks and small rivers. Adults appear to overwinter, clustered together on the underside of rocks. Sinclair (2023) provided an identification key to species. The immature stages were described by Sinclair & Harkrider (2004). Adults of the genus (wing length: 2.0–4.0 mm; Fig. C) are readily distinguished by the narrow wing (Figs A, C) and elongate, narrow proboscis (Fig. B). In North America, the genus is widespread, known from Northwest Territories to Florida. *Roederiodes* is surprisingly absent from the Pacific Northwest (British Columbia, Idaho, Oregon, Washington), Alberta and Montana, despite focused collections of aquatic associated empidids by a number of dipterists for the past 100 years.



FIGURES: (**A**) Wing of *Roederiodes recurvatus* Chillcott. (**B**) Head of *R. recurvatus*, lateral view. (**C**) *R. recurvatus*, male habitus.

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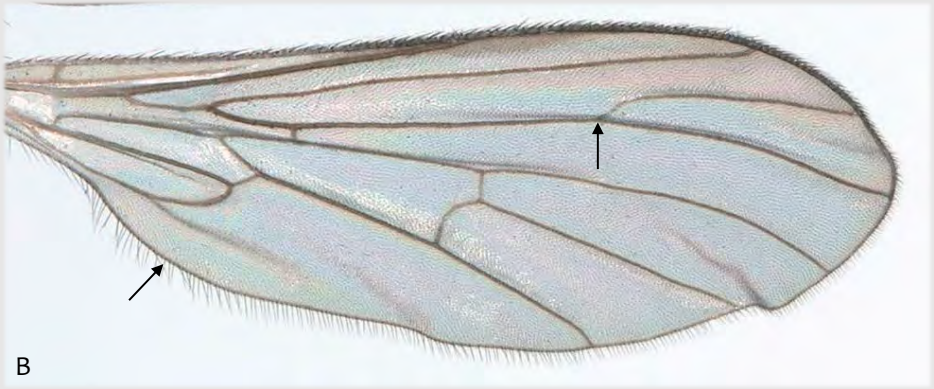
Sabroskyella Wilder

This monotypic Nearctic genus of Trichopezinae (Brachystomatidae) is based on the species, *Sabroskyella rancheria* Wilder (Wilder 1982; Figs A–C). Adults of the genus have been collected from riparian vegetation of mountain streams at high elevation, usually active in early morning and late evening (Wilder 1982). The genus (wing length: 3.0–4.0 mm) is easily recognized by the antenna with long, gradually tapered postpedicel, without a terminal stylus (Fig. C), wing with weakly developed anal lobe, vein R4+5 branched (Fig. B), mid femur with spine-like anteroventral and posteroventral setae (Fig. C), and male terminalia asymmetrical with long thread-like phallus. *Sabroskyella* is known only from the Sierra Nevada mountains of California (Wilder 1982).



FIGURES: (**A**) *Sabroskyella rancheria* Wilder, female habitus. (**B**) *Wing of S. rancheria.* (**C**) *S. rancheria*, male showing antenna and midleg.

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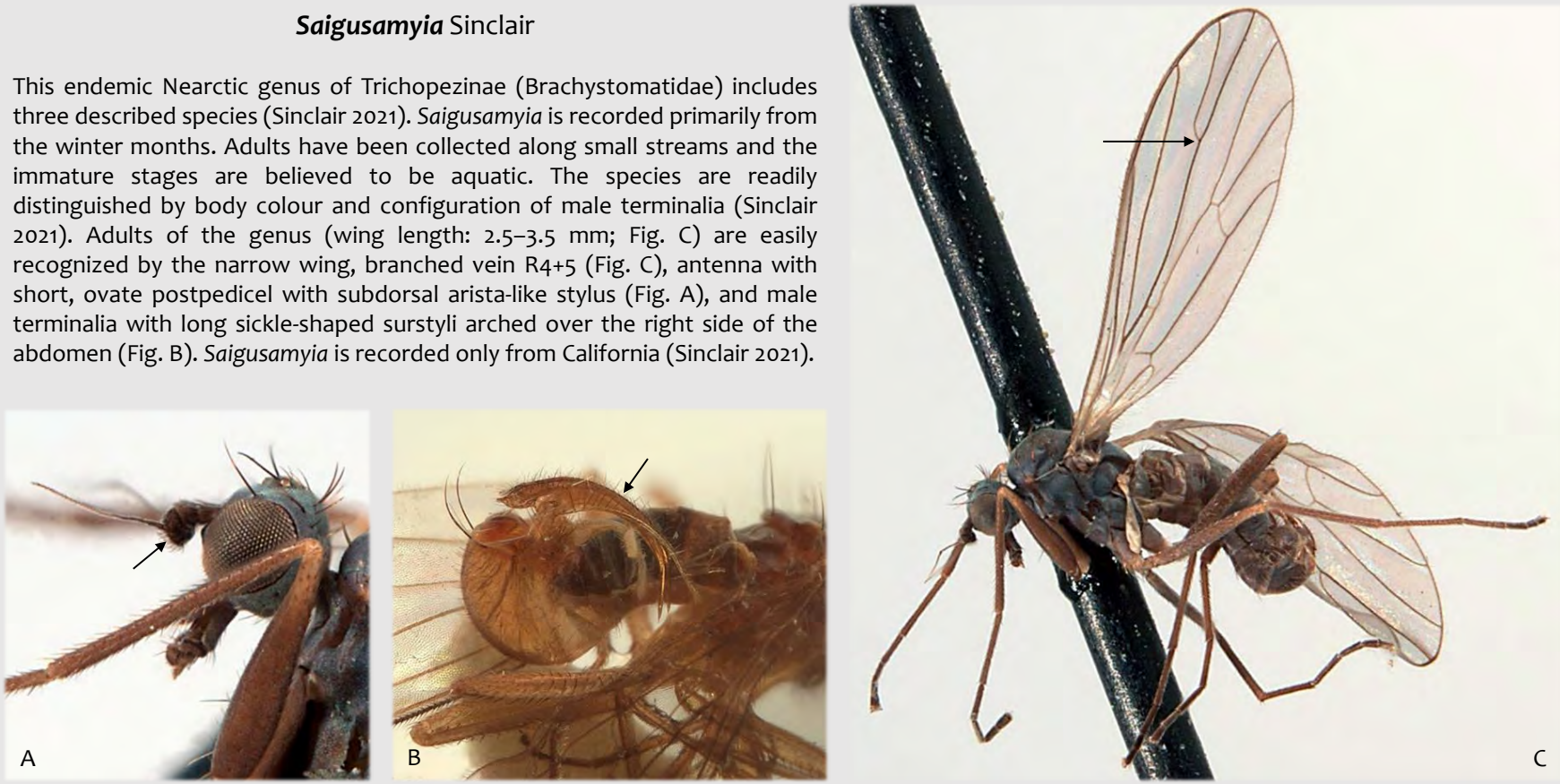
Saigusamyia Sinclair

This endemic Nearctic genus of Trichopezinae (Brachystomatidae) includes three described species (Sinclair 2021). *Saigusamyia* is recorded primarily from the winter months. Adults have been collected along small streams and the immature stages are believed to be aquatic. The species are readily distinguished by body colour and configuration of male terminalia (Sinclair 2021). Adults of the genus (wing length: 2.5–3.5 mm; Fig. C) are easily recognized by the narrow wing, branched vein R4+5 (Fig. C), antenna with short, ovate postpedicel with subdorsal arista-like stylus (Fig. A), and male terminalia with long sickle-shaped surstyli arched over the right side of the abdomen (Fig. B). *Saigusamyia* is recorded only from California (Sinclair 2021).



FIGURES: (**A**) Head of *Saigusamyia harkrideri* Sinclair. (**B**) Male terminalia of *S. uvasensis* Sinclair. (**C**) *S. harkrideri*, male habitus.

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Schistostoma Becker

This genus of Microphorinae (Dolichopodidae sensu lato) includes 28 described species in North America. Brooks & Cumming (2022) revised the Nearctic species and provided an identification key. North American *Schistostoma* are generally found in riparian habitats, but some species occur in drier areas. Adults of several species are flower visitors and some feed on pollen (Brooks & Cumming 2022, Fig. A). Adults of the genus (wing length: 1.7–3.1 mm; Figs A, B) are characterized by wing vein Rs originating near level of crossvein h, cell dm short (Fig. C), antennal stylus at least subequal to postpedicel (Fig. D), thorax with setae widely spaced (Figs B, D), usually with 2 pairs of scutellar setae (occasionally one, three or four), male terminalia with medial hypandrial prolongation (Fig. E), and female abdomen with six or seven exposed segments. *Schistostoma* is distributed throughout North America with most species occurring in the west.

FIGURES: (**A**) *Schistostoma armipes* (Melander) female eating pollen from dehisced thimbleberry anther. (**B**) *S. evisceratum* (Melander), male; photo by S.A. Marshall. (**C**) Wing of *S. sycophantor* (Melander). (**D**) Head and thorax of male *S. borkenti* Brooks & Cumming. (**E**) Abdomen and male terminalia of *S. armipes*. Abbreviations: dm – discal medial cell; Rs – radial sector.

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Stilpon Loew

This genus of Tachydromiinae (Hybotidae) includes 13 described Nearctic species. Cumming & Cooper (1992) revised the North American species and provided an identification key to species. Adults of the genus (wing length: 1.3–2.0 mm; Figs B, D) are characterized by wing with cell cua absent, cell br shorter than cell bm, antenna with dorsal arista-like stylus (Fig. A), eyes contiguous on face, and margin of frons nearly parallel (Fig. A), male terminalia large (Fig. D) with one slender internal apodeme, and female terminalia with tergite and sternite 8 separated laterally (Fig. C). Species of *Stilpon* are widely distributed in eastern North America and are primarily found in various open habitats such as grasslands, sandy coastal areas, sedge and moss zones, and open riparian woodlands.

FIGURES: (**A**) Head of *Stilpon chillcotti* Cumming, dorsal view. (**B**) *Stilpon* sp.; photo by T. Murray. (**C**) Female abdomen of *S. chillcotti*. (**D**) *S. chillcotti*, male habitus.

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Symballophthalmus Becker

This Holarctic genus of Tachydromiinae (Hybotidae) includes one described Nearctic species (Chillcott 1958). *Symballophthalmus* (wing length: 2.5–3.0 mm; Figs A, B) is characterized by a wing with cell cua present and anal lobe absent, bare eyes, slender legs with mid femur not thickened, and mid tibia without an apical spur. *Symballophthalmus masoni* Chillcott occurs in forested habitats throughout northeastern North America.

FIGURES: (**A**) Wing of *Symballophthalmus* sp. (**B**) *Symballophthalmus* sp., female habitus.

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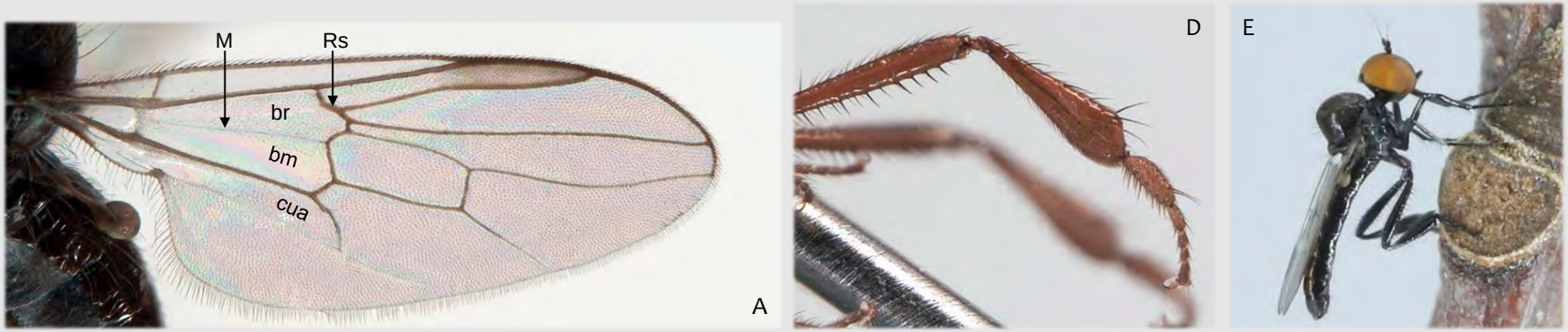
Syndyas Walker

This genus of Hybotinae (Hybotidae) includes six described species in North America (Teskey & Chillcott 1977). *Syndyas* preys on flying insects, with habits similar to *Hybos* (Chvála 1983). Although Teskey & Chillcott (1977) revised the North American species and provided an identification key to species, the species definitions require reassessment. Adults of the genus (wing length: 2.4–3.4 mm; Figs B, C, E) are readily distinguished from other Hybotinae species by the wing venation where vein Rs is very short, arising in the apex of cell br, M vein separating cells br and bm weak and unpigmented, and cell cua longer than cell bm (Fig. A), hind femur slender to thickened, hind tibia clavate (Fig. D), and mouthparts narrow, elongate and sclerotized for piercing. *Syndyas* is widespread in North America from Nova Scotia to Florida, extending west to British Columbia and Texas (Teskey & Chillcott 1977).



FIGURES: (**A**) Wing of *Syndyas merbleuensis* Teskey & Chillcott. (**B**) *S. merbleuensis*, male habitus. (**C**) *S. merbleuensis*, female habitus. (**D**) Hindleg of *S. merbleuensis*. (**E**) *Syndyas* sp, male; photo by D. Patton. Abbreviations: bm – basal medial cell; br – basal radial cell; cua – anterior cubital cell; M – medial vein; Rs – radial sector.

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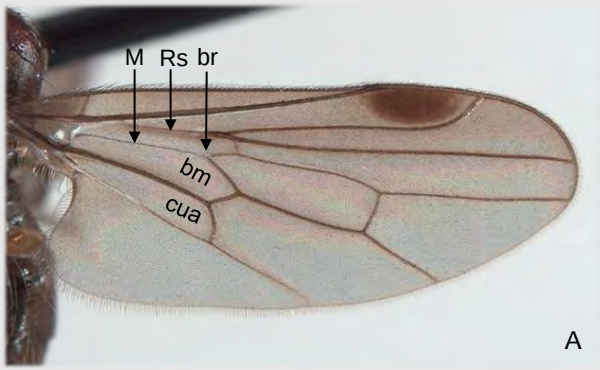
Syneches Walker

This genus of Hybotinae (Hybotidae) includes 11 described species in North America (Wilder 1974) and an undescribed species from Texas. *Syneches* preys on flying insects in the undergrowth of forests and grasslands, with at least some species becoming active towards dusk (Wilder 1974). Wilder (1974) revised the North American and Antilles species and provided an identification key to species. Adults of the genus (wing length: 4.5–5.5 mm; Figs C, D) are readily distinguished from other Hybotinae genera by the wing venation where vein Rs is long, arising in the basal half of cell br, M vein separating cells br and bm well developed, and cell cua usually as long as cell bm (Fig. A), hind femur narrow to thickened, hind tibia slender and not clavate (Figs C, D), head hemispherical, often with eyes flattened dorsally with prominent ocellar triangle and mouthparts narrow, elongate and sclerotized for piercing (Fig. B). *Syneches* is widespread in eastern North America from Nova Scotia to Florida, extending west to South Dakota and south through Texas and Arizona (Wilder 1974).



FIGURES: (**A**) Wing of *Syneches thoracicus* (Say). (**B**) Head of *S. debilis* Coquillett, lateral view. (**C**) *S. thoracicus*; photo by C. Butler. (**D**) *S. thoracicus*, female habitus. Abbreviations: bm – basal medial cell; br – basal radial cell; cua – anterior cubital cell; M – medial vein; Rs – radial sector.

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Tachydromia Meigen

This genus of Tachydromiinae (Hybotidae) includes 15 described Nearctic species (Shamshev & Grootaert 2018). An identification key to the Nearctic species was provided by Melander (1928). *Tachydromia* (wing length: 1.6–3.0 mm; Figs B, C) is characterized by the postpronotal lobe being large, elongate and distinctly differentiated (Fig. A), wing cell cua and vein CuA absent (Fig. D), frons narrow with sides nearly parallel (Fig. A), and eyes bare and with upper margins nearly on level with ocellar tubercle (Fig. A). The genus occurs throughout North America in a variety of forested habitats.

FIGURES: (**A**) Head and thorax of *Tachydromia* sp., dorsal view. (**B**) *Tachydromia* sp., male habitus. (**C**) *Tachydromia* sp.; photo by S.A. Marshall. (**D**) Wing of *Tachydromia* sp.

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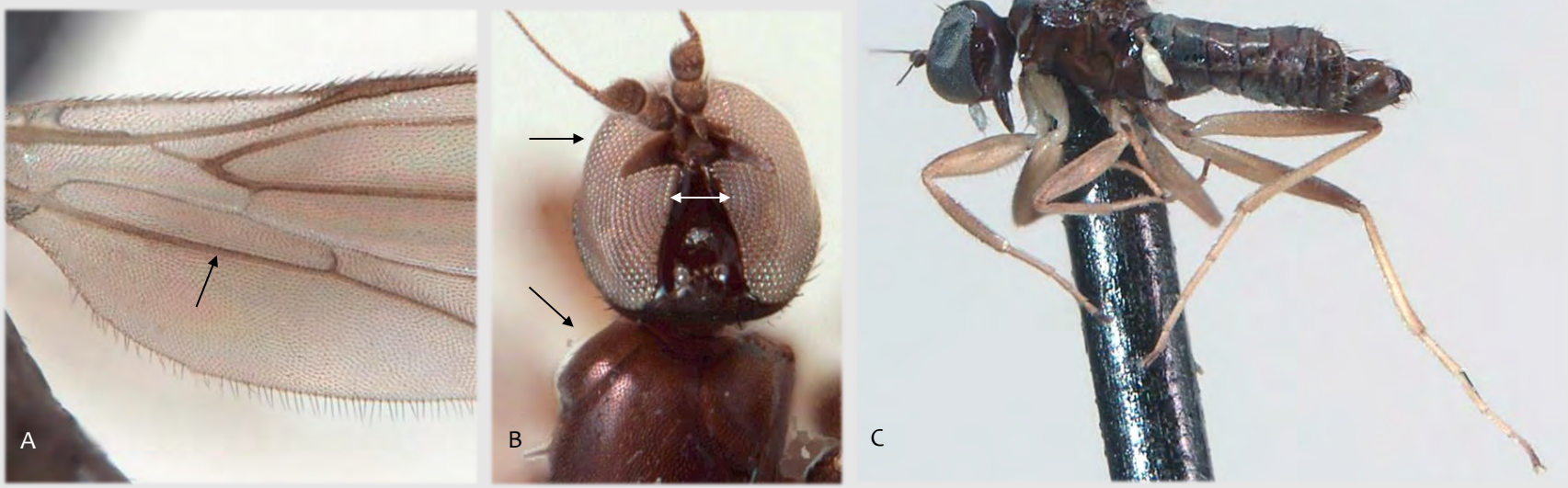
Tachyempis Melander

This genus of Tachydromiinae (Hybotidae) includes six described Nearctic species (Yang et al. 2007). An identification key to the New World species was provided by Melander (1928). Adults of *Tachyempis* (wing length: 1.3–2.0 mm; Fig. C) are characterized by the postpronotal lobe being of moderate size and distinctly differentiated (Fig. B), wing cell cua and vein CuA absent (Fig. A), eyes bare, and frons fairly broad with sides divergent above (Fig. B). Females of one undescribed species from Montana have short wings that are about the length of the thorax. The genus occurs throughout North America in a variety of habitats.



FIGURES: (**A**) Wing of *Tachyempis* sp. (**B**) Head and thorax of *Tachyempis* sp., dorsal view. (**C**) *Tachyempis* sp., male habitus.

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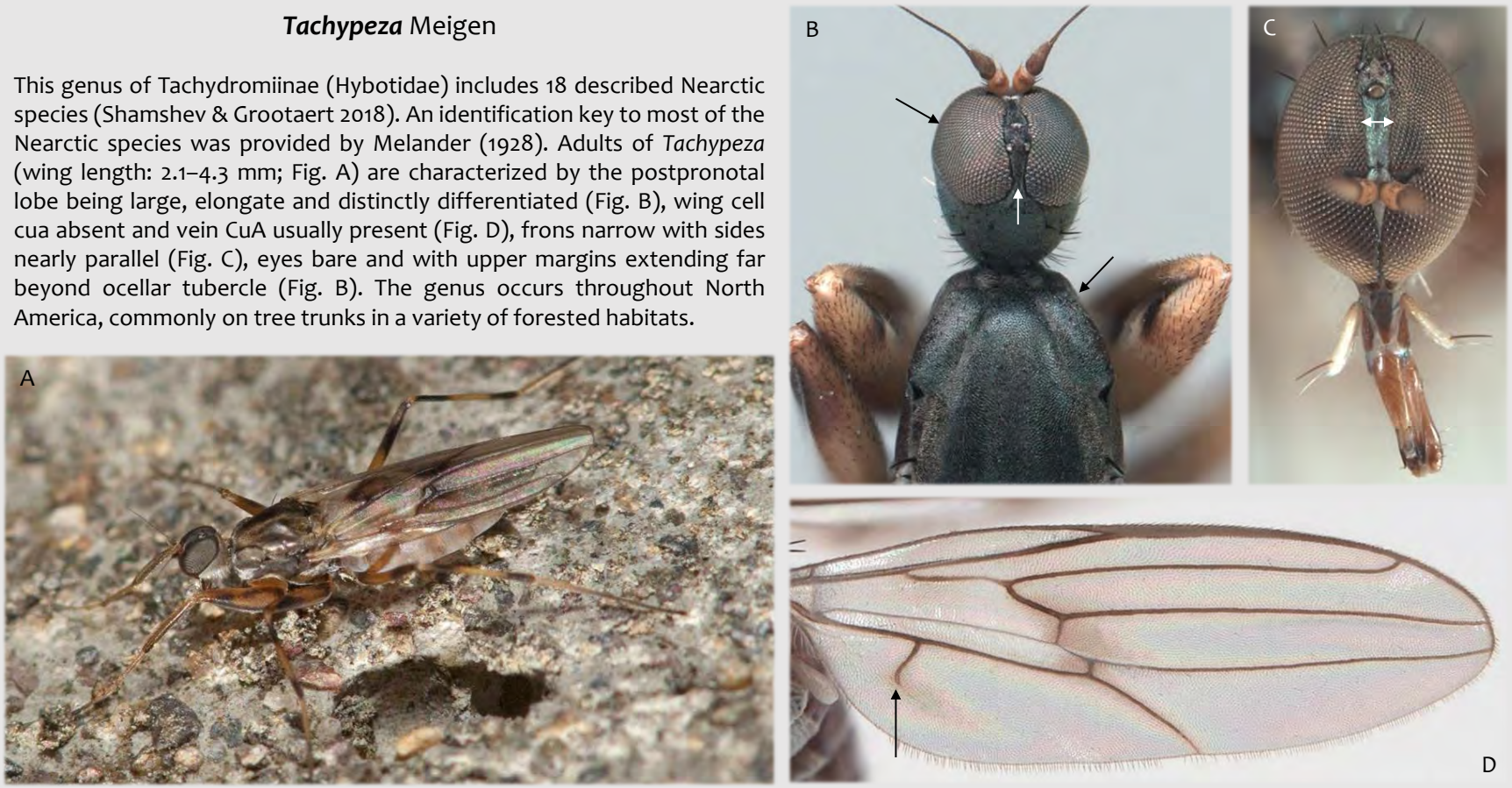
Tachypeza Meigen

This genus of Tachydromiinae (Hybotidae) includes 18 described Nearctic species (Shamshev & Grootaert 2018). An identification key to most of the Nearctic species was provided by Melander (1928). Adults of *Tachypeza* (wing length: 2.1–4.3 mm; Fig. A) are characterized by the postpronotal lobe being large, elongate and distinctly differentiated (Fig. B), wing cell cua absent and vein CuA usually present (Fig. D), frons narrow with sides nearly parallel (Fig. C), eyes bare and with upper margins extending far beyond ocellar tubercle (Fig. B). The genus occurs throughout North America, commonly on tree trunks in a variety of forested habitats.



FIGURES: (**A**) *Tachypeza* sp.; photo by S.A. Marshall. (**B**) Head and thorax of *T. corticalis* (Melander), dorsal view. (**C**) Head of *T. corticalis*, anterior view. (D) Wing of *Tachypeza* sp.

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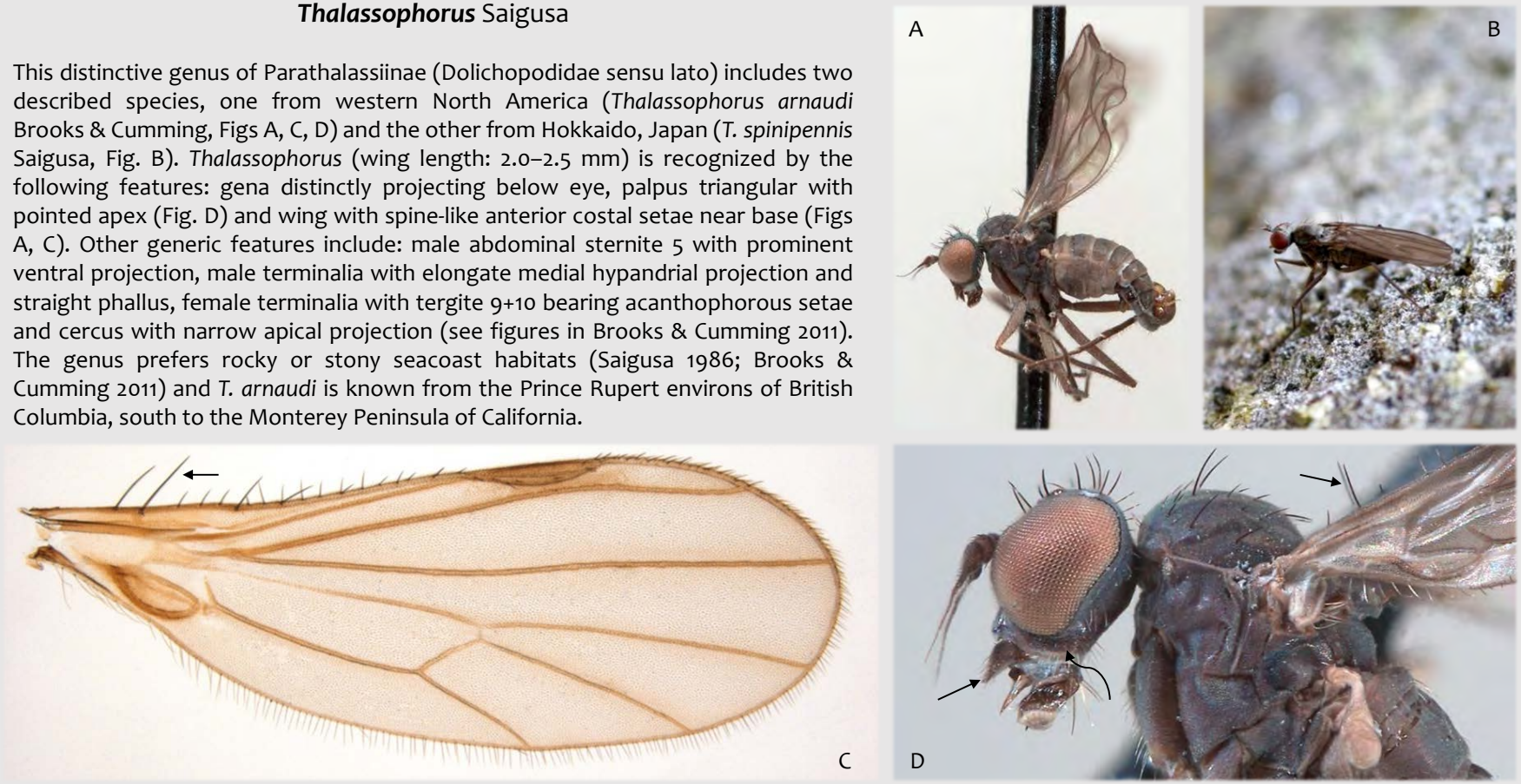
Thalassophorus Saigusa

This distinctive genus of Parathalassiinae (Dolichopodidae sensu lato) includes two described species, one from western North America (*Thalassophorus arnaudi* Brooks & Cumming, Figs A, C, D) and the other from Hokkaido, Japan (*T. spinipennis* Saigusa, Fig. B). *Thalassophorus* (wing length: 2.0–2.5 mm) is recognized by the following features: gena distinctly projecting below eye, palpus triangular with pointed apex (Fig. D) and wing with spine-like anterior costal setae near base (Figs A, C). Other generic features include: male abdominal sternite 5 with prominent ventral projection, male terminalia with elongate medial hypandrial projection and straight phallus, female terminalia with tergite 9+10 bearing acanthophorous setae and cercus with narrow apical projection (see figures in Brooks & Cumming 2011). The genus prefers rocky or stony seacoast habitats (Saigusa 1986; Brooks & Cumming 2011) and *T. arnaudi* is known from the Prince Rupert environs of British Columbia, south to the Monterey Peninsula of California.



FIGURES: (**A**) *Thalassophorus arnaudi* Brooks & Cumming, male. (**B**) *T. spinipennis*, male; photo by M. Satô. (**C**) Wing of male *T. arnaudi*. (**D**) Head, thorax and wing base of *T. arnaudi*.

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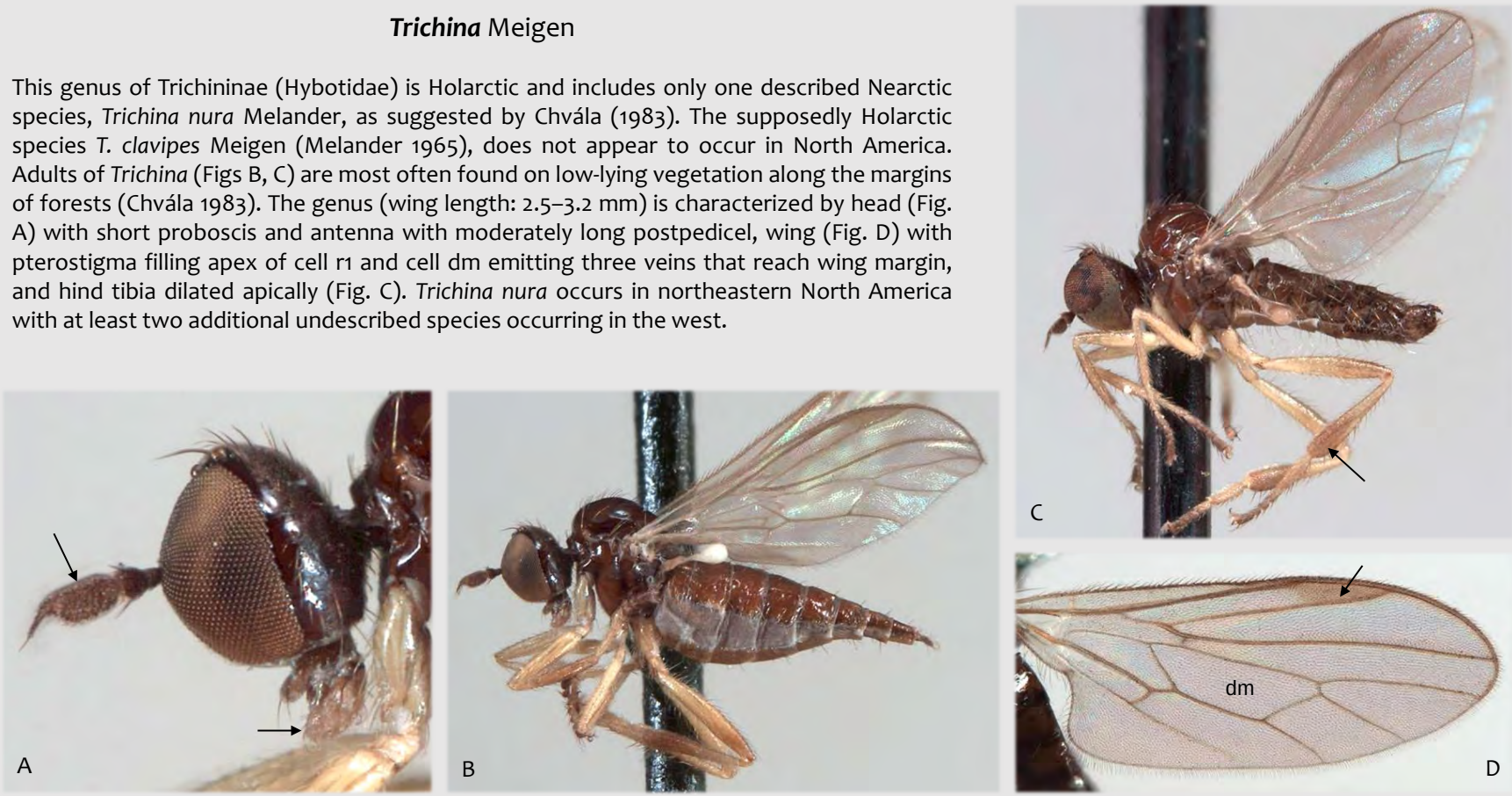
Trichina Meigen

This genus of Trichininae (Hybotidae) is Holarctic and includes only one described Nearctic species, *Trichina nura* Melander, as suggested by Chvála (1983). The supposedly Holarctic species *T. clavipes* Meigen (Melander 1965), does not appear to occur in North America. Adults of *Trichina* (Figs B, C) are most often found on low-lying vegetation along the margins of forests (Chvála 1983). The genus (wing length: 2.5–3.2 mm) is characterized by head (Fig. A) with short proboscis and antenna with moderately long postpedicel, wing (Fig. D) with pterostigma filling apex of cell r1 and cell dm emitting three veins that reach wing margin, and hind tibia dilated apically (Fig. C). *Trichina nura* occurs in northeastern North America with at least two additional undescribed species occurring in the west.



FIGURES: (**A**) Head of *Trichina* sp., lateral view. (**B**) *Trichina* sp., female habitus. (**C**) *Trichina* sp., male habitus. (**D**) Wing of *Trichina* sp. Abbreviation: dm – discal medial cell.

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Trichinomyia Tuomikoski

This genus of Trichininae (Hybotidae) was reported from North America by Chvála (1983) and Cumming et al. (2018). Five described Nearctic species were listed by Melander (1928) under the genus *Trichina*, but one species, the supposedly Holarctic species *Trichinomyia flavipes* (Meigen), probably does not occur in North America and its identification requires confirmation. Adults of *Trichinomyia* are found on shaded low-lying vegetation often at the margins of forests (Chvála 1983) and have been bred from decaying wood (Cumming et al. 2018). An identification key to the described Nearctic species was provided by Melander (1928) under the genus *Trichina*. The genus (wing length: 2.0–3.3 mm; Fig. A) is characterized by head with short proboscis, antenna with moderately long postpedicel, wing with pterostigma not filling apex of cell r1 and cell dm emitting three veins that reach wing margin, and hind tibia slender apically. *Trichinomyia* occurs in both eastern and western North America.

FIGURE: (**A**) *Trichinomyia* sp., male habitus. Abbreviation: dm – discal medial cell.

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Trichoclinocera Collin

This genus of Clinocerinae (Empididae) includes 16 described North American species (Sinclair 1994). *Trichoclinocera* is an aquatic genus, with adults found on emergent wet rocks and margins of streams, creeks and small rivers (Figs A–C). Sinclair (1994) provided an identification key to Nearctic species and described the immature stages. *Trichoclinocera cummingi* Sinclair was described only on the basis of female specimens and males remain unknown. The genus (wing length: 3.0–6.5 mm) is readily distinguished by the narrow wing with setulae along the upper surface of vein R1 (Fig. D), distinct cleft on the lower margin of the face (Fig. E), and truncate female abdomen (Fig. A). *Trichoclinocera* occurs in both eastern and western North America (Sinclair 1994).

FIGURES: (**A**) *Trichoclinocera pectinifemur* Sinclair with prey (Chironomidae). (**B**) Congregation of *Trichoclinocera* sp. on emergent rock. (**C**) Two individuals of *T. hamifera* (Melander). (**D**) Wing base of *T. hamifera*, dorsal view. (**E**) Head of *T. hamifera*, lateral view. All in situ photos by S.A. Marshall.

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Wiedemannia Zetterstedt

This genus of Clinocerinae (Empididae) includes seven described North American species (Sinclair 1998; 2007). *Wiedemannia* is an aquatic genus, with adults readily swept from emergent rocks in open canopy creeks and rivers (Fig. C). Sinclair (2007) provided an identification key to species. Adults of the genus (wing length: 3.5–4.5 mm; Figs C, D) are readily distinguished by the narrow wing (Fig. D), broad gena (Fig. B), distinct cleft on the lower margin of the face (Fig. A) and tapered female abdomen. The North American species are known from the western Cordillera and northern Canada, with a glacial relict population on Isle Royale in Lake Superior (Sinclair 1998).

FIGURES: (**A**) Head of *Wiedemannia simplex* (Loew), anterior view. (**B**) Head of *W. simplex*, lateral view. (**C**) Congregation of *Wiedemannia* sp. (Spain) resting on a rock; photo by C. Pradera. (**D**) *W. simplex*, male habitus.

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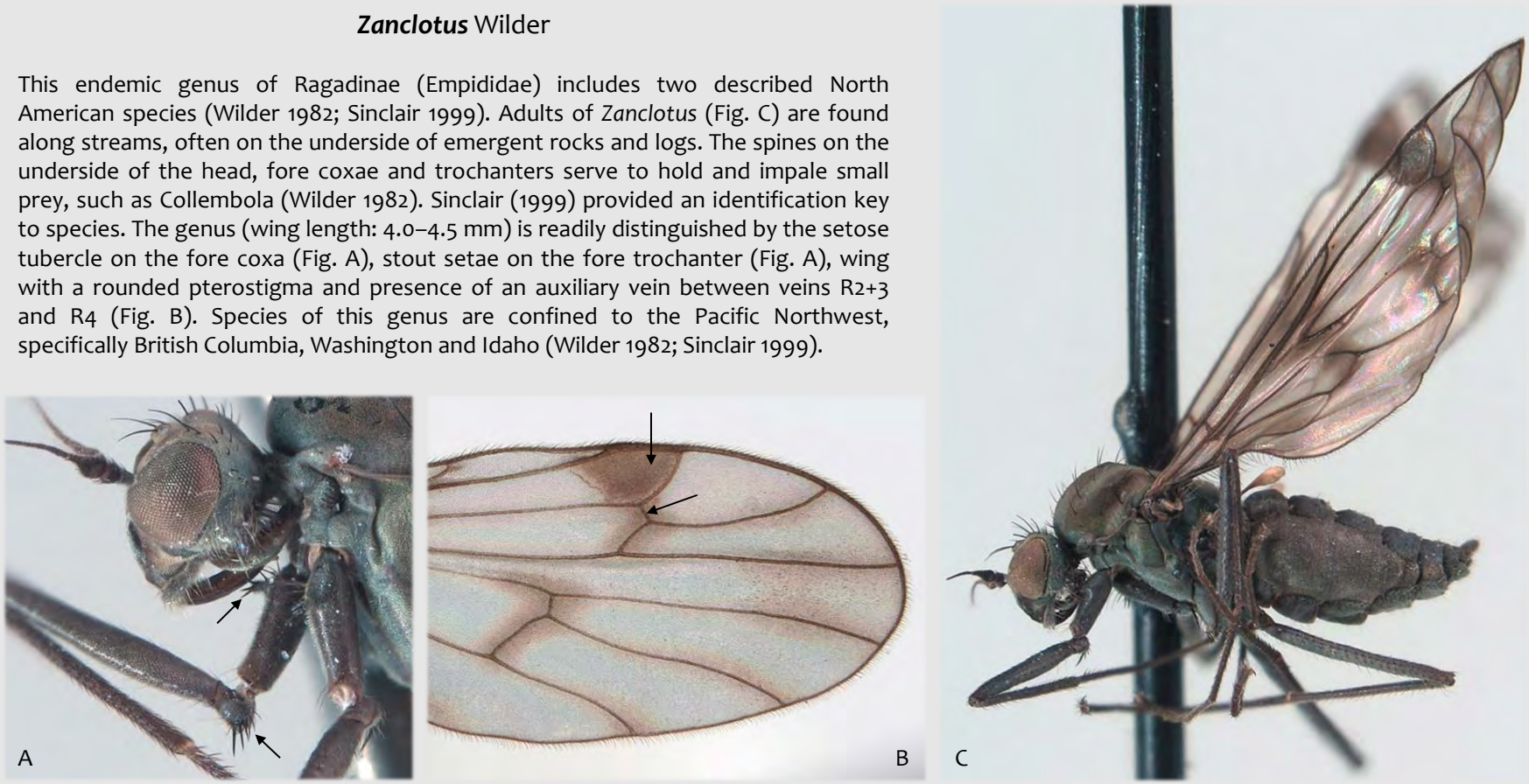
Zanclotus Wilder

This endemic genus of Ragadinae (Empididae) includes two described North American species (Wilder 1982; Sinclair 1999). Adults of *Zanclotus* (Fig. C) are found along streams, often on the underside of emergent rocks and logs. The spines on the underside of the head, fore coxae and trochanters serve to hold and impale small prey, such as Collembola (Wilder 1982). Sinclair (1999) provided an identification key to species. The genus (wing length: 4.0–4.5 mm) is readily distinguished by the setose tubercle on the fore coxa (Fig. A), stout setae on the fore trochanter (Fig. A), wing with a rounded pterostigma and presence of an auxiliary vein between veins R2+3 and R4 (Fig. B). Species of this genus are confined to the Pacific Northwest, specifically British Columbia, Washington and Idaho (Wilder 1982; Sinclair 1999).



FIGURES: (**A**) Head and forelegs of *Zanclotus dioktes* Wilder, lateral view. (**B**) Wing of *Z. dioktes*. (**C**) *Z. dioktes*, female habitus.

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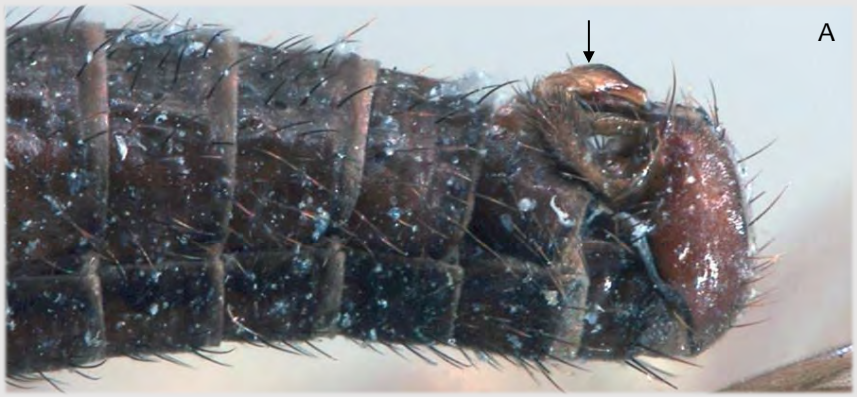
Undescribed genus A

This genus, assigned to the Trichopezinae (Brachystomatidae), includes two Nearctic species formerly assigned to *Apalocnemis* (*A. hirsuta* Melander, *A. oreas* Melander) and an undescribed species from Baltic amber (Sinclair 2021). This genus is related to *Boreodromia* and *Saigusamyia*. Specimens have been collected on flowers at the edges of alpine meadows (Melander 1946). Melander (1946) provided an identification key to species (as *Apalocnemis*). Adults (wing length: 3.5–4.5 mm; Fig. B) are distinguished by postpedicel short ovate, wing with broad anal region and costa well developed around margin, mouthparts with setose palpus, male holoptic, and male terminalia upright, arched dorsally over abdomen (Fig. A). Species of the genus have been collected in Arizona, California and Oregon.



FIGURES: (**A**) Abdomen of male Undescribed genus A sp. (**B**) Undescribed genus A sp., male habitus.

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Undescribed genus B

This genus, assigned to the Trichopezinae (Brachystomatidae), includes one undescribed Nearctic species and appears to be related to *Gloma* and *Oreogeton* (Sinclair et al. 2019a). Specimens have often been collected along creeks. Adults of the genus (wing length: 3.3–3.5 mm; Figs D, E) are distinguished by the long tapered postpedicel and short, stout stylus (Figs A, B), wing with broad anal region (Figs D, E) and costa well developed around margin, male holoptic (Fig. A), and male terminalia (Fig. C) with three-lobed surstylus and presence of a hypandrial bridge plate. The genus has been collected in northern California and Oregon.

FIGURES: (**A**) Head and thorax of male Undescribed genus B sp., dorsal view. (**B**) Head of female Undescribed genus B sp., lateral view. (**C**) Male terminalia of Undescribed genus B sp. (**D**) Undescribed genus B sp., male habitus. (**E**) Undescribed genus B sp., female habitus.

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