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A conspectus of New Zealand flower flies (Diptera: Syrphidae) with the description of a new genus and species

F. CHRISTIAN THOMPSON

Systematic Entomology Laboratory, ARS, USDA, c/o Smithsonian Institution, NHB-0169, Washington, D. C. 20560-0169 USA.
E-mail: cthompso@sel.barc.usda.gov

Abstract

A key to the New Zealand flower fly genera is presented; one new genus (*Anu* Thompson, type *una* Thompson) and one new species (*Anu una* Thompson)) are described. A checklist of the flower flies of New Zealand is also included.

Key words: Diptera; Syrphidae; generic key, checklist

Introduction

A new genus and species of flower flies from New Zealand (*Anu una*) are described to make the names available for a forthcoming book on the biodiversity of New Zealand flies (Macfarlane, et alia). To put *Anu* into proper perspective, the New Zealand flower flies are reviewed. A key to the genera of New Zealand Syrphidae is presented. A number of new combinations, synonyms, and other taxonomic actions are made to bring the New Zealand fauna into congruence with the fauna of the rest of the World. These changes are here documented in the form of a checklist, although most have already appeared in the recent *Catalog of the Diptera of Australasian and Oceanian Regions* (Thompson & Vockeroth 1989). All extant types of names associated with New Zealand flower flies have been studied. Details on the specimens and associated label data with lectotype designations will be published in a monographic treatment planned for the *Fauna of New Zealand* series.

The New Zealand biota is one of the most critical for understanding the history of life on earth. Regardless of one's biogeographic paradigm, the New Zealand biota is a privotal test of it. Hence, description of the New Zealand biota is the first vital step to solving many essential questions. For example, if one adheres to in a dispersal paradigm, then the flower flies native to New Zealand should be related to species found in adjacent (the most proximal) areas (Australia, Chile, New Caledonia, etc.). And given that insect dispersal is largely passive and related to wind patterns, then one would assume that the New Zealand flower flies should be most closely related to those of Australia or perhaps New Caledonia. But if one accepts a vicariance paradigm, which assumes that organisms are rather immobile (as species) and disperse with the land, then one might assume the relationship of the flower flies reflects the break-up of ancient landmasses, such as Gondwana, and the New Zealand flower flies should therefore be most closely related to those of Chile. Surprisingly, what we know of the New Zealand flower flies suggests that most are not related to those of Australia, Chile nor New Caledonia.

The New Zealand flower fly fauna can be split into 4 groups: 1) radiation after disperal /vicariance events from unknown sources (*Platycheirus* (*Eocheilosia*)—30+ species; *Allograpta*—32+ species; *Helophilus* (*Pilinasica*)—19+ species); 2) singleton vicariance / disperal events [that is, the sister taxon is in the other area]

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(*Melangyna novaezelandiae* & *Psilota decessum* from Australia; *Paratropidia bilineata* from New Caledonia; *Anu una* from New Guinea (*Giluwea*); *Melanostoma fasciatum* from either Australia or New Caledonia); 3) species possibly introduced with Polynesian colonization (*Simosyrphus grandicornis*); and 4) Alien and Invasive species introduced with European colonization (*Merodon equestris*, *Eumerus strigatus* & *funeralis*, *Eristalis tenax*, *Eristalinus aeneus*). In summary, there are 5 alien species, 1 native but widespread Oceanian species, 37 described endemic species and more known but not yet described endemic species (48) for a total of 91 known flower fly species for the New Zealand subregion. More collecting will undoubtedly reveal species belonging to the three radiations and more alien species may become established, such as *Syritta* species (from Polynesia, Australia or southern South America), *Palpada vinetorum* (from Polynesia or South America), *Eristalinus taeniops* (from Europe, Africa or Chile), and *Eumerus* species (from the Orient or Polynesia).

Materials and methods

The characters and terminology used follow those of my recent glossary (Thompson 1999b) and are largely consistent with those used in the Nearctic and Palaearctic Diptera manuals (Vockeroth & Thompson 1987, Thompson & Rotheray 1998). The style of the key follows the standard set in the *Manual of Nearctic Diptera* and subsequently used in the *Manual of Palaearctic Diptera*. The checklist follows the standard of the Bio-Systematic Database of World Diptera (Thompson 1999a) except no type data are provided for species-group names and extra-limital distribution is given only for species which range outside of the New Zealand subregion.

The following abbreviations are used for the repositories of the material studied and are those of the Bio-Systematic Database of World Diptera (Thompson 1999): BMNH = The Natural History Museum, London; CNC = Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa; DEBUG = Department of Environmental Biology, University of Guelph, Guelph; MCSNM = Museo Civico di Storia Naturale, Milan; NZAC = New Zealand Arthropod Collection, Landcare Research, Auckland; USNM = National Museum of Natural History, Smithsonian Institution, Washington.

General information on New Zealand Diptera can be found in Macfarlane and Andrew (2001) and bibliographies of New Zealand entomology are provided by Miller (1956) and Ramsay and Crosby (1992).

Key to the genera of New Zealand Syrphidae

1. Postpronotum bare; head posteriorly strongly concave and closely appressed to thorax so that postpronotum is partly or entirely hidden (Fig. 18); male abdomen with tergum 5 visible dorsally (SYRPHINAE)9
- Postpronotum pilose; head posteriorly less strongly concave so that postpronotum is clearly exposed (Fig. 19); male abdomen with tergum 5 not visible dorsally (ERISTALINAE) 2
2. Anterior anepisternum pilose.....6
- Anterior anepisternum bare 3
3. Cell R_{2+3} closed (Fig. 10) 8
- Cell R_{2+3} open (Figs. 11–16) 4
4. Face with a tubercle; vein R_{4+5} strongly to moderately sinuate; metafemur with basolateral patch of black setulae, without a ventroapical tubercle or carina .....*Helophilus* 12 (7) spp.
- Face without a tubercle (Fig. 24); vein R_{4+5} straight or only slightly sinuate (Fig. 11); metafemur without patch of setulae, with ventroapical carina or tubercle 5
5. Wing completely microtrichose; metafemur with a ventroapical tubercle; metepisternum bare .... *Paratropidia* 1 sp.; *bilineata (Walker)*

- Wing almost bare on basal 2/3 or more, very sparsely microtrichose on apical 1/3; metafemur with an anteroventral spinose carina on apical 1/3; metepisternum with a patch of fine pile ..... [*Syritta*] potential alien species

6. Vein R_{4+5} sinuate (Fig. 12)..... *Merodon* 1 invasive sp., *equestris* (Fabricius)
- Vein R_{4+5} straight (Figs. 15–16) 7
7. Vein M_1 (apical crossvein) recurrent; cell R_{4+5} obtuse (Fig. 15)..... *Eumerus* 2 invasive spp.
- Vein M_1 (apical crossvein) progressive; cell R_{4+5} acute (Fig. 16) ..... *Psilota* 1 sp., *decessa* (Hutton)
8. Eye punctate (Fig. 25); anepimeron with dorsomedial portion pilose; postalar ridge with tuft of strong black pile (Fig. 20); arista bare ..... *Eristalinus* 1 alien sp., *aeneus* (Scopoli)
- Eye unicolorous (Fig. 23); anepimeron bare dorsomedially; postalar ridge bare, without tuft; arista pubescent, with pile about as long as aristal width ..... *Eristalis* 1 alien sp., *tenax* (Linnaeus)
9. Face and scutellum entirely black 13
- Face and/or scutellum partly yellow 10
10. Metasternum pilose. Scutum frequently with a sharply defined clear yellow lateral vitta extending at least from postpronotum to transverse suture; pleuron frequently with yellow maculae; abdomen without marginal sulcus, narrow or petiolate, never broadly oval ..... *Allograpta* 8 (24) spp.
- Metasternum bare 11
11. Abdomen with marginal sulcus; katepisternum with a distinct pile patch anteromedially, between dorsal and ventral patches. Scutum with sharply defined clear yellow lateral vitta extending from postpronotum to scutellum; abdomen oval ..... *Simosyrphus* 1 sp., *grandicornis* (Macquart)
- Abdomen without marginal sulcus; katepisternum without anteromedial pile patch, with dorsal and ventral pile widely separated 12
12. Scutum with a sharply defined clear yellow lateral vitta extending at least from postpronotum to transverse suture; pleuron frequently with yellow maculae; scutellum with ventral fringe absent or at most with a few hairs laterally; male abdomen with terga reduced posteromedially, with segments arched posterodorsally; small flies, less than 6.5 mm in length..... *Anu* 1 sp., *una* Thompson
- Scutum with at most a poorly defined dull whitish pollinose lateral vitta; pleuron without yellow maculae; scutellum with ventral fringe complete, well-developed, dense; male abdomen normal, held flat, not arched; large flies, more than 7.0 mm in length ..... *Melangyna* (*Austrosyrphus*) 1 sp., *novaezelandiae* (Macquart)
12. Metasternum greatly reduced, with deep posterior incision on each side so that medial portion is narrowly joined to lateral arms (Fig. 21); face not produced, straight with small tubercle ..... *Melanostoma* 1 sp., *fasciatum* (Macquart)
- Metasternum normal, with medial portion broadly joined to lateral arms (Fig. 22); face variable, almost straight with weak tubercle or moderately or strongly produced anteriorly on ventral portion ..... *Platycheirus* (*Eocheilosia*) 13 (17) spp.

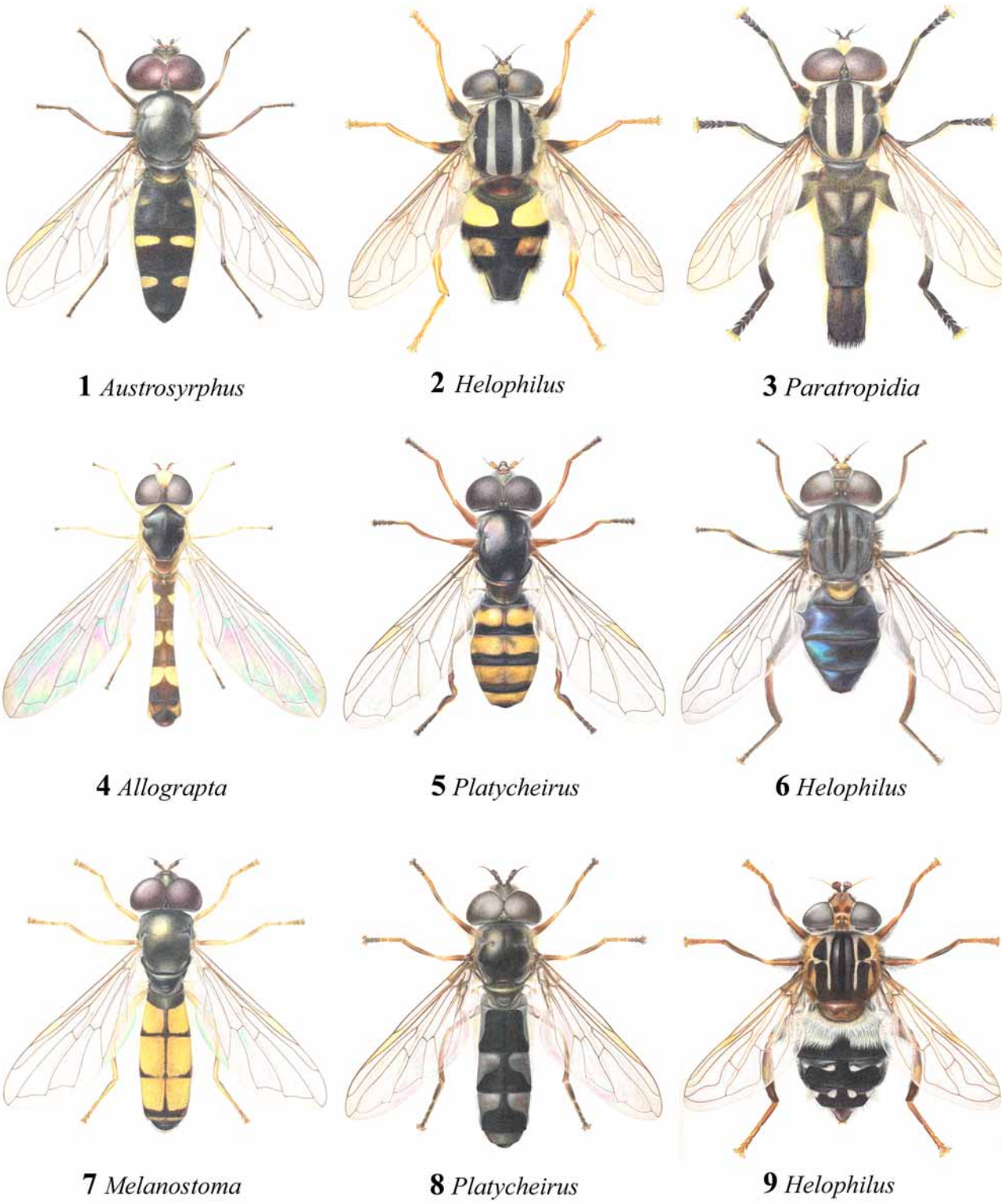
Checklist of New Zealand flower flies

Subfamily Syrphinae

Tribe Bacchini

GENUS *MELANOSTOMA* Schiner

Plesia Macquart 1850: 460. Type-species: *Plesia fasciata* Macquart, 1850, original designation [Preoccupied by Jurine, 1807]



FIGURES 1–9. Habitus, dorsal view. 1. *Melangyna* (*Austrosyrphus*) *novaezelandiae* (Macquart); 2. *Helophilus seelandicus* (Gmelin); 3. *Orthoprosopa* (*Paratropidia*) *bilineata* (Walker); 4. *Allograpta dorsalis* (Miller); 5. *Platycheirus* sp. NZ-3; 6. *Helophilus hochstetteri* Nowicki; 7. *Melanostoma fasciatum* (Macquart); 8. *Platycheirus ronanus* (Miller); 9. *Helophilus cingulatus* (Fabricius).

MELANOSTOMA Schiner 1860: 213. Type-species: *Musca mellina* Linnaeus, 1758, original designation.

Most authors (cf. Hull 1949a: 332) have overlooked Macquart's designation of *fasciata* as the type of his genus, and have used the name *Plesia* as if based on the other included species, *anale* Macquart. *Plesia anale* is related to *Chrysogaster* (subfamily Eristalinae, tribe Brachyopini) and will be designated the type of a new genus. Fortunately, the name *Plesia* is preoccupied and, therefore, will not supplant the well-known name *Melanostoma*.

fasciatum Macquart, 1850: 461 (*Plesia fasciata*).
apertum Hutton, 1901: 42.
?*scalare*, Miller, 1950, not Fabricius, misidentitication.

Melanostoma apertum Hutton was described from a unique female from Christchurch, which Hutton stated to have "unfortunately, lost the antennae." Miller (1921: 308) examined the holotype, noting that part of the antennae remained, and wrote "owing to the length of the existing 2nd joint [of the antenna], it is doubtful if this species belongs to *Melanostoma*." Of the second antennal segment, Miller wrote the "2nd joint elongate, reaching toward the facial prominence." The holotype is now without a head, so it is impossible to verify Miller's statements. However, the holotype otherwise is in fair condition and is a melanistic specimen of the common *fasciatum*.

Miller (1950: 96, 144) listed a species, *scalare*, as separate from *fasciatum* and as introduced from Europe. I can not confirm this as I have seen no specimens of *scalare* and suspect Miller may have confused the female of *fasciatum* with *scalare*. True *scalare* from Europe is a much larger species, but the females of the two have almost identical color patterns.

GENUS *PLATYCHEIRUS* Lepeletier & Serville

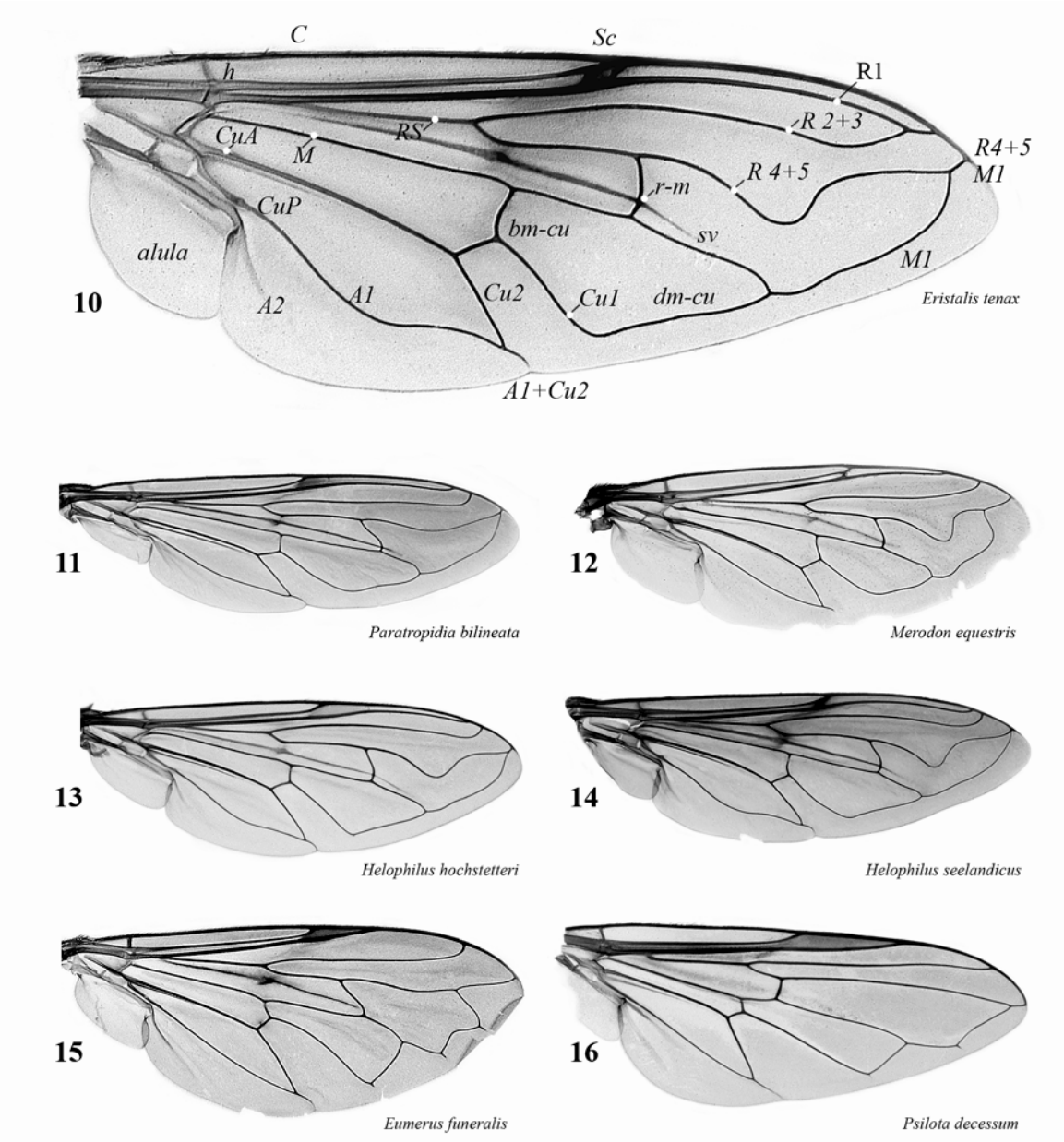
PLATYCHEIRUS Lepeletier & Serville 1828: 513. Type-species: *Syrphus scutatus* Meigen, 1822, by designation of Westwood, 1840: 137.

SUBGENUS *EOCHEILOSIA* Hull

EOCHEILOSIA Hull 1949a: 327 (as *Cheilosia* subg.). Type-species: *Cheilosia ronana* Miller, 1921, original designation.

When describing *huttoni* (as *milleri*) I noted that this species had all the essential characters of *Platycheirus, sensu lato,* except that male prolegs were not modified. Many other species are similarly characterized and the genus group name *Eocheilosia* Hull is associated with one of these species. Hence, I use this name for those species of *Platycheirus* with unmodified male prolegs. The determination of whether modified male prolegs is a primitive or derived trait must await a world revision of the genus *Platycheirus* and the identification of its sister-group. However, despite the phylogenetic status of *Eocheilosia*, the group is distinctive morphologically and zoogeographically. About a dozen more species are known and await description.

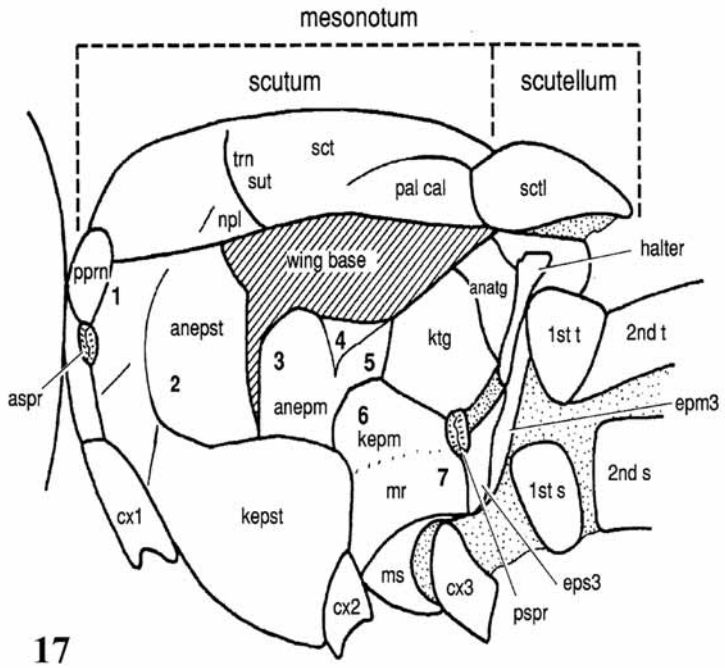
antipodus Hull, 1949b: 740 (*Cheilosia antipoda*).
captalis Miller, 1924: 282 (*Cheilosia*).
clarkei Miller, 1921: 310.
cunninghami Miller, 1921: 299 (*Cheilosia*).
fulvipes Miller, 1924: 282 (*Cheilosia*).
milleri Hull, 1949b: 742 (*Cheilosia*).



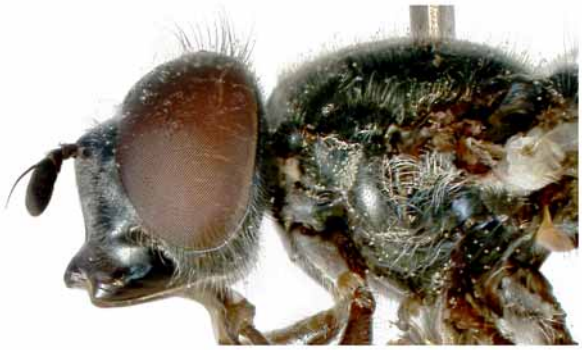
FIGURES 10–16. Wings, dorsal view. 10. *Eristalis tenax* (Linnaeus); 11. *Paratropidia bilineata* (Walker); 12. *Merodon equestris* (Fabricius); 13. *Helophilus hochstetteri* Schiner; 14. *Helophilus seelandica* (Gmelin); 15. *Eumerus funeralis* (Meigen); 16. *Psilota decessum* (Hutton).

The female holotypes of *fulvipes* Miller and *milleri* Hull were examined and found to represent the same species.

harrisi Miller, 1921: 301 (*Syrphus*).
howesii Miller, 1921: 298 (*Cheilosia*).
huttoni Thompson in Thompson & Vockeroth, 1989: 439. New name for *milleri* Thompson.
milleri Thompson, 1972a: 77 [Preoccupied by Hull, 1949]
leptospermi Miller, 1921: 297 (*Cheilosia*).
lignudus Miller, 1921: 309.
myersii Miller, 1924: 281 (*Paragus*).
notatus Bigot, 1884: 554 (*Chrysogaster notata*).
ronanus Miller, 1921: 300 (*Cheilosia ronana*).



18 *Simosyrphus grandicornis*



19 *Psilota decessum*

FIGURES 17–19. 17. Generalized syrphid thorax, lateral view; 18–19. Head and thorax, lateral view. 18. *Simosyrphus grandicornis* (Macquart); 19. *Psilota decessum* (Hutton).

Tribe Syrphini

GENUS *ALLOGRAPTA* Osten Sacken

ALLOGRAPTA Osten Sacken 1875: 49. Type-species: *Scaeva obliqua* Say, 1823, monotypic.

Allograpta is "beyond doubt the most varied in the tribe Syrphini," but "despite the great variation in many characters, the male terminalia are very distinctive and separate the genus sharply from all others (with one exception discussed below)"(Vockeroth 1969: 127-128). The one exception was *Rhinoprosopa* Hull, which later was included in *Allograpta* (Vockeroth 1973; Thompson, et al., 1976: 33). The essential characters of *Allograpta* are (as given by Vockeroth (1969: 128)) "the flattened expanded apicolateral processes of sternite 9, the distinctive mode of attachment, position, shape, and direction of the superior lobes, and particularly

the simple, rounded, heavily sclerotized and spiculate aedeagal base". The New Zealand species have these essential genitalic characters, but are rather diverse in their color patterns and body form. About two dozen new species are known and await description. Bowie (2001) provides information on the biology of *Allograpta ventralis*.

atkinsoni Miller, 1921: 311 (*Platycheirus*).
dorsalis Miller, 1924: 284 (*Ocyptamus*).
doralis Miller, 1924: 284 (incorrect original spelling).

The original spelling of the epithet was *doralis*, without the "s." However, as Miller (1950: 96) used *dorsalis*, I have continued to use his corrected spelling following the wisdom of Art. 33.3.1 of the International Code of Zoological Nomenclature (1999).

flavofaciens Miller, 1921: 302 (*Syrphus*).
hirsutifera Hull, 1949b: 727 (*Epistrophe*).
hudsoni Miller, 1921: 302 (*Syrphus*).
pseudoropala Miller, 1921: 293 (*Paragus pseudoropalus*).
ropala Walker, 1849: 593 (*Syrphus ropala*).
ventralis Miller, 1921: 296 (*Sphaerophoria*).

Anu Thompson, gen. nov.

Type-species: *Anu una* Thompson, **sp. nov.**

Small slender flies. Length: 5–6 mm.

Head: Face straight, with distinct medial tubercle, yellow, with or without black medial vitta; oral opening about 1.5 times as long as broad; gena narrow; front not swollen, with slightly divergent side dorsally in female; antennal sockets confluent; eye bare, holoptic in male, with eye contiguity as long as ocellar triangle; antenna short, with basoflagellomere oval; arista long, about as long as antenna.

Thorax: Mesonotum yellow laterally from postpronotum (humerus) to transverse suture; scutellum slightly concave apicomedially so that subscutellum is visible dorsally; subscutellar fringe absent; anterior anepisternum bare; katepisternal pile patches broadly separated throughout; metasternum bare; metathoracic pile patch absent; postmetacoxal bridge absent; legs simple; plumula simple, short. WING: hyaline, extensively microtrichose; vein R_{4+5} straight; vein M_1 (apical crossvein) oblique, slightly sinuous; alula narrow, about as wide as cell CuP.

Abdomen: 1st tergum divided into lateral plates by membranous medial area; without marginal sulcus; male with terga 2-4 broadly membranous apicomedially, so abdomen is bent apicodorsally. Male genitalia: surstyles asymmemtric; lingula absent; paramere free; aedeagus two-segmented.

Etymology: *Anu* is an arbitrary combination of letters and is to be treated as masculine.

Comparative diagnosis: *Anu* is distinguished from all other Syrphidae by the male terga reduced apicomedially so that the abdomen may be bent into an apicodorsal curve (almost always in dead specimens); the 1st tergum is divided into lateral plates as the medial area is entirely membranous; and the scutellum is concave apicomedially with the subscutellum greatly produced so as to be visible dorsally. In the last key to the genera of Syrphini (Vockeroth 1969), *Anu* runs to couplet #24. The statement about the scutellum in couplet #21 should be ignored; otherwise *Anu* agrees well with the rest of the first alternative. *Anu* is distinguished from both *Exallandra* and *Sphaerophoria* by the unique apotypic characters listed above. In appearance and

behavior *Anu una* is related to *Sphaerophoria*. *Anu una* looks like and acts like a small *Sphaerophoria* species. *Anu*, along with *Exallandra*, *Giluwea* and *Sphaerophoria* (including *Loveridgeana*) probably form a monophyletic group characterized by yellow mesonotal vitta, loss or reduced subscutellar fringe, loss or reduced lingula, bare or reduced metasternal pile, and *Anu* is probably the sister to *Giluwea* as their genitalia are most similar (both have asymmetric surstyli).

***Anu una* Thompson, sp. nov.**

MALE. **Head**: Face yellow, except tubercle brown, white pilose; gena yellow, white pilose; frontal triangle yellow, black pilose; vertical triangle shiny, black, black pilose; occiput black, white pollinose and pilose on ventral 2/3, black pollinose dorsally except along eye margin, black pilose dorsally; antenna orange except basoflagellomere brownish orange on apical 3/4, black pilose; arista brown.

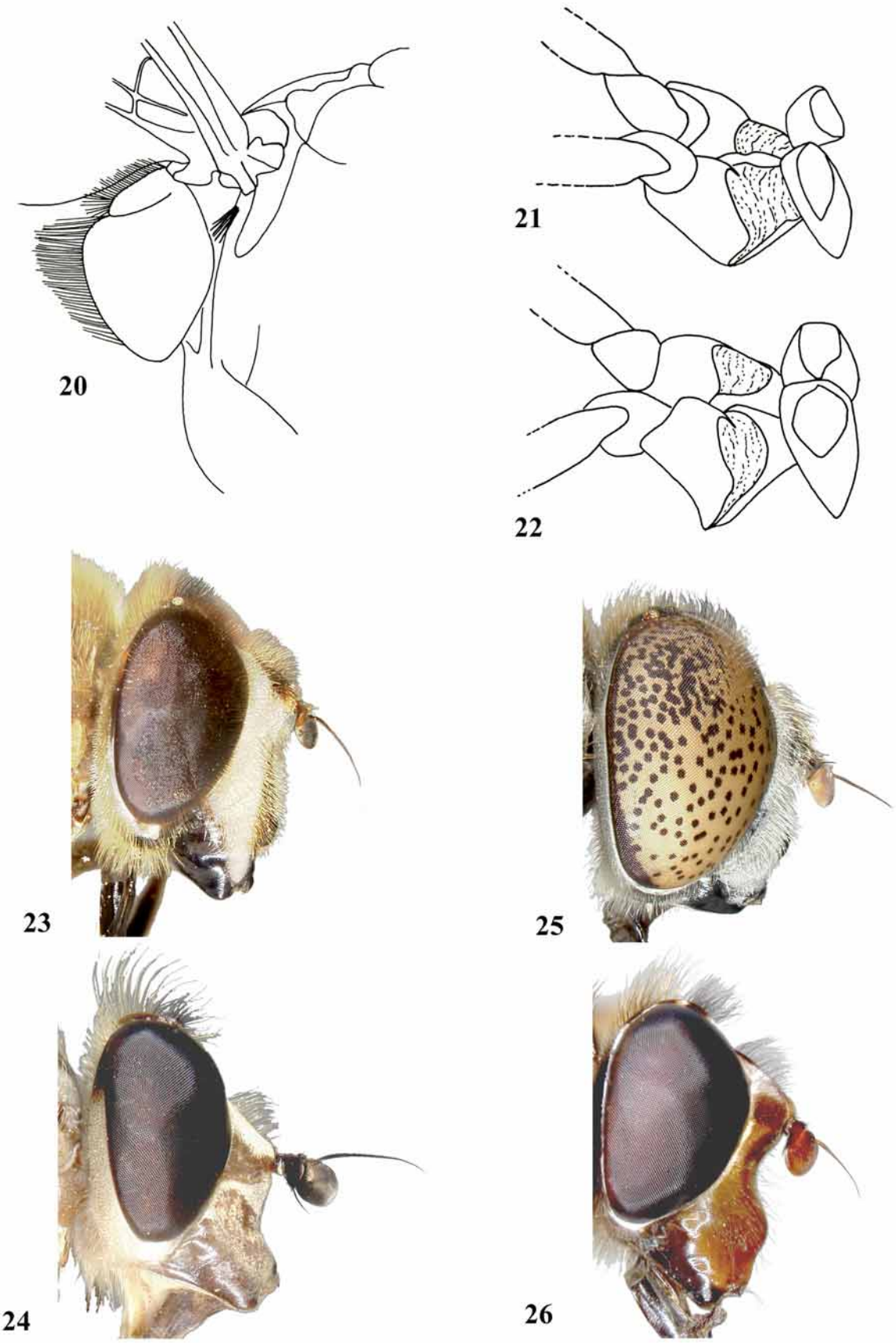
Thorax: Postpronotum yellow; mesonotum shiny, black except with yellow lateral vitta from postpronotum to transverse suture, black pilose; scutellum yellow except black basolateral side, black pilose; pleuron shiny, extensively black, yellow dorsad of procoxa, yellow dorsally on katepisternum, yellow posteriorly on anepisternum, yellow narrowly and dorsally on anepimeron, and yellow on katatergite; calypter, plumula and halter yellow. Wing: Hyaline, microtrichose except bare basal 7/8 of cell C, basal 1/8 of cell BM and CuP. Legs: Coxae and trochanters yellow, pale pilose; femora brownish yellow, black pilose; tibiae brownish yellow on basal 3/4. brown apically, black pilose; tarsi black, black pilose.

Abdomen: Terga brownish yellow on lateral 1/4, blackish brown medially, long white pilose on 1st and 2nd terga, short, sparse black pilose elsewhere; sterna brownish yellow; male genitalia as figured (Figs 30–31).

Female: Similar to male; front yellow on ventral 1/4, black dorsally, black pilose; 1st tergum black, shiny, white pilose; 2nd tergum shiny, black except yellow small macula on lateral 1/4 medially, white pilose except black pilose medially; 3rd & 4th terga shiny, black except larger yellow triangular macula on lateral 1/3 medially and yellow apical margins; 5th tergum black, black pilose.

Variation: The above description is of the holotype male and allotype female and will match most specimens precisely. However, a few individuals tend to be darker, with the darkest individuals having broad black facial vitta and an almost entirely dark pleuron.

Types: **Holotype** male, allotype female and 6 male, 4 female paratypes: NEW ZEALAND, South Island, Rahu Saddle Peak, 672 m, Rt 7, 8 km west Springs Junction, 18 December 1986, F. C. & B. J. Thompson. Holotype and allotype deposited in NZAC; rest of topotypic series deposited in USNM. **Paratypes**: NEW ZEALAND. **North Island**: Taupo, Tauhara, 27 December 1931, J. S. Armstrong (2 females, NZAC); Ohakune, Mt. Ruapehu, 12–1300 m, 19 January 1999, S. A. Marshall (6 males, 4 females, CNC, DEBUG, USNM); Taranaki National Park, Pembroke Road, 1200 m, 9 January 1999, S. A. Marshall (1 male, DEBU); Wellington Harbour [as "York B."], J. G. Myers (1 male, NZAC); Tararua Ranges, Dundas Hut, 1250 m, sweeping, 5 February 1985, C. F. Butcher (1 male, NZAC); Tararua Ranges, Dundas Hut Ridge, sweeping before Malaise trap, 11 February 1985, C. F. Butcher (1 male, NZAC). **South Island**: Nelson, "Dun Mt." 23 January 1923, J. G. Myers (1 female, NZAC); Borland Saddle (FD), 22 km west of Monowai, 167?23.2'E 45?44.8'S, 945–988 m, 17–18 January 2004, W. N. Mathis (3 males, USNM); Rahu Saddle, 4 km west Springs Junction, 18 December 1986, F. C. & B. J. Thompson (9 males, 8 females; USNM); Lewis Pass National Park, Lewis Pass Summit, 911 m, 31 December 1986, FC & BJ Thompson (1 female, USNM); Lewis Pass National Park, Wee Creek, Rt 7, 31 December 1986, F. C & B. J. Thompson (4 males, 6 females; USNM); Arthur's Pass National Park, Arthur's Pass Summit, 920 m, 27-28 December 1986, FC & BJ Thompson (21 males, 5 females; USNM); Arthur's Pass National Park, Warden's Creek, Rt 73, 27-28 December 1986, FC & BJ Thompson (1 female; USNM); Arthur's Pass National Park, Greyney's Shelter, Rt 73, 27



FIGURES 20–26. Adult structures. 20. *Eristalinus aeneus* (Scopoli), posterior lateral thorax and wing base, dorsal view; 21–22. Metasternum and metalegs, ventral view. 21. *Melanostoma mellinum* (Linnaeus); 22. *Platycheirus* sp. 23–26. Heads, lateral view. 23. *Eristalis tenax* (Linnaeus); 24. *Paratropidida bilineata* (Walker); 25. *Eristalinus aeneus* (Scopoli); 26. *Helophilus cingulatus* (Fabricius)

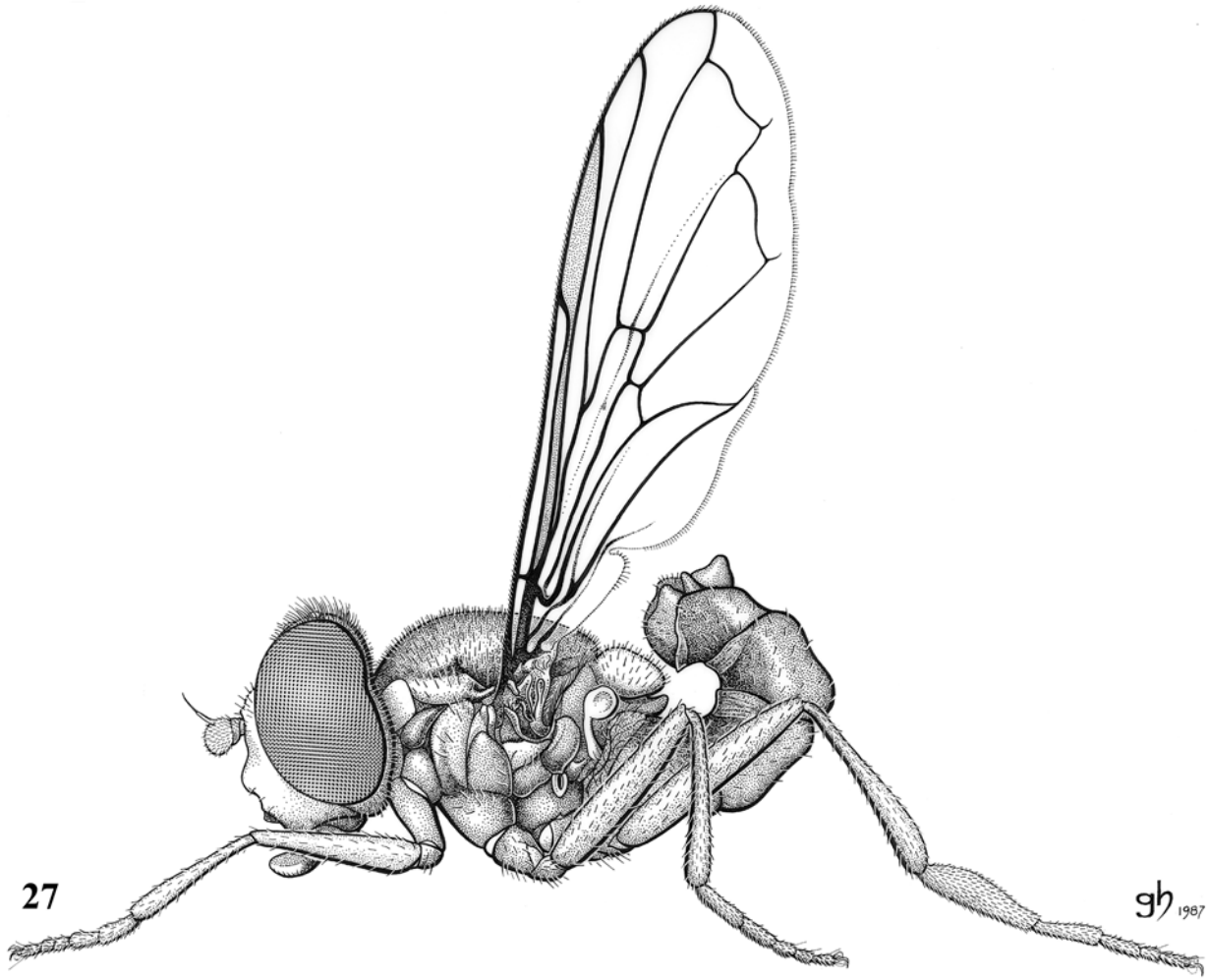
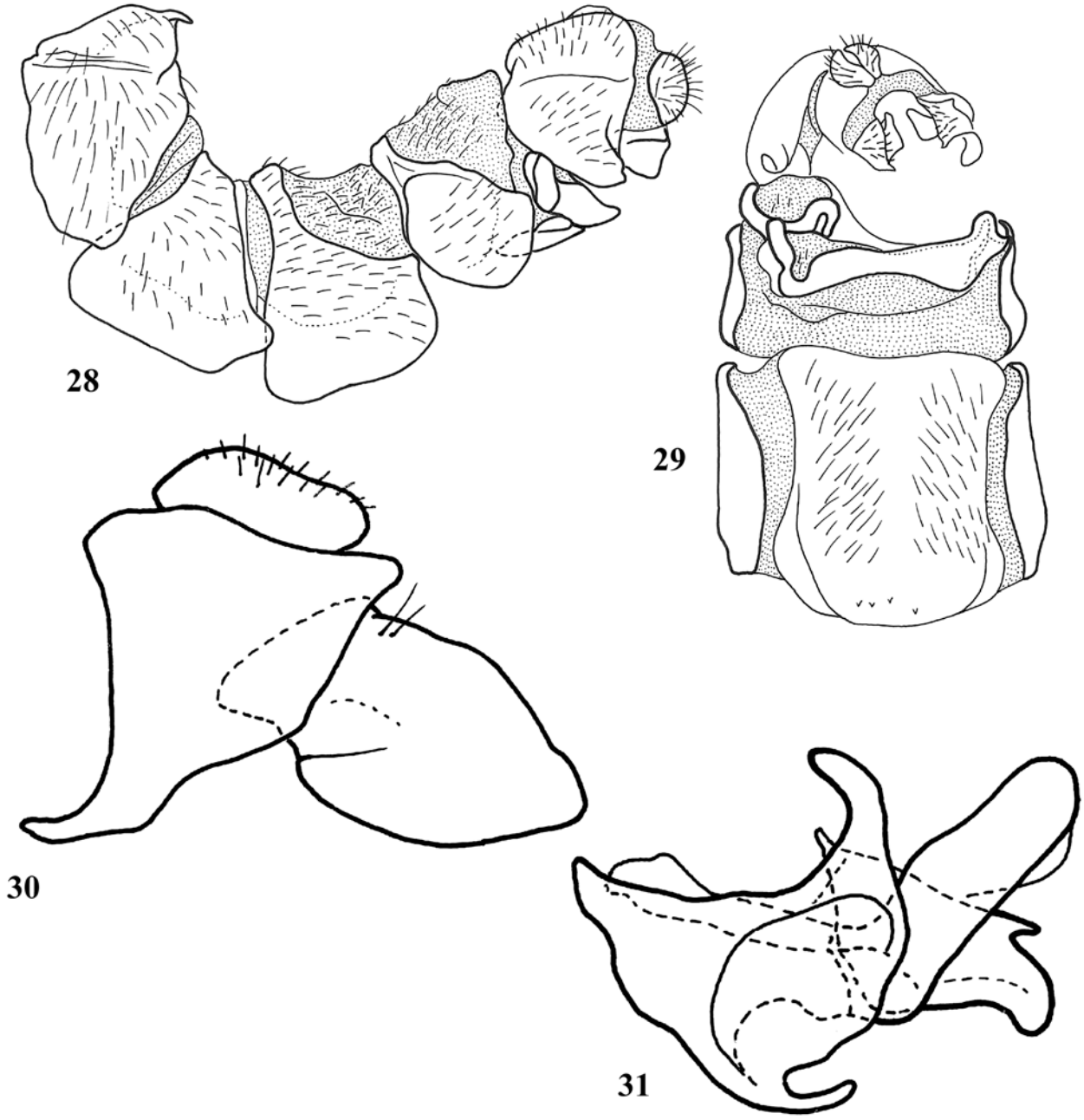


FIGURE 27. Adult male habitus, lateral view. *Anu una* Thompson, **sp. nov.**

December 1986, F. C. & B. J. Thompson (2 females; USNM); Arthur's Pass, 8–11 January 1957, E. S. Gourlay (1 male, NZAC); Arthur's Pass, 2800 ft., 22 December 1922, J. Myers (1 male, NZAC); Arthur's Pass, 3500 ft., 26 December 1922, J. Myers (1 male, NZAC); Arthur's Pass, 3000 ft., 4 January 1923, Myers (1 male, NZAC); Arthur's Pass, 3000 ft., 16–19 December 1959, J. I. Townsend and J. S. Dugdale (1 male, NZAC); Mt. Arthur, 4500 ft., 27 Dec 1921, A. Tonnoir (1 male, Bezzi Collection, Milan); Mt. Arthur, 4500 ft., 12 December 1922, A. Philpott (1 male, NZAC); Kelly's Creek Campgrounds, near Otira, 20–23 Jan 1974, G. E. Shewell (1 female, CNC); Otira Gorge Peak, Rt 73, 28 December 1986, F. C. & B. J. Thompson (1 male; USNM); Governors Bay, 3 December 1921, J. W. Campbell, BM 1922-175, (1 female, BMNH); Dunedin, Flagstaff, 10 December 1921, T. R. Harris, BM 1923-125 (1 female, BMNH); Lake Wakatipu, January 1921, G. V. Hudson, BM 1923-323 (2 females; BMNH); Nevis Saddle, 3250 ft., 25 January 1959, J. I. Townsend (1 female, NZAC); Blackbirch Range, 4400 ft., around seepage at light, 17 February 1970, J. S. Dugdale (1 female, NZAC); W of Staveley, SH 72, *Nothofagus* forest, 2 December 1977, E. Schlinger (2 females, NZAC); Paparoa Range, Lochnagar Ridge, 3500–4300 ft., J. S. Dugdale and J. C. Watt (2 females, NZAC); Routeburn, 2–5 January 1945, E. S. Gourlay (1 female, NZAC); Darran Mts, Tutoko Bench, South Gully, 945–1158m, 9 January 1977, J. S. Dugdale (1 female, 1 male, NZAC); Lake Rotoiti, 1–12 January 1976, malaise trap, A. K. Walker (1 male, NZAC), Lake Luna, 22 December 1919 (1 male, NZAC); Bold Peak, 27 December–1 January 1945, E. S. Gourlay (1 male, NZAC); Old Woman Range, 1524 m, sweeping, 13 February 1983, J. C. Watt (1 male, NZAC).

Etymology: The specific epithet, *una*, is an arbitrary combination of letters and is to be treated as a noun in apposition.



FIGURES 28–31. Abdomen and male genitalia. *Anu una* Thompson, Adult male. 28. Abdomen, lateral view; 29. Abdomen, dorsal view; 30. Male genitalia, 9th tergum and associated structures, lateral view; 31. Male genitalia, 9th sternum and associated structures, lateral view.

GENUS *MELANGYNA* Verrall

MELANGYNA Verrall 1901: 313. Type-species: *Melanostoma quadrimaculatum* Verrall, 1901, monotypic.

SUBGENUS *AUSTROSYRPHUS* Vockeroth

Melangyna, subgenus *AUSTROSYRPHUS* Vockeroth 1969: 85. Type-species: *Syrphus novaezelandiae* Macquart, 1855, original designation.

novaezelandiae Macquart, 1855: 115 (*Syrphus*).

novaezealandiae, Hutton 1881: 44, 1901: 40; Miller 1921: 302, 1950: 97; Thompson & Vockeroth 1989: 444 (subsequent misspelling).

novaeselaniae, Kertész 1910: 123 (subsequent misspelling).

ortas Walker, 1849: 585 (*Syrphus*).

rectus Nowicki, 1875: 24 (*Syrphus*).

The types of *novaezelandiae* Macquart and *ortas* Walker were examined and found to represent the same species. The description of *rectus* Nowicki also clearly applies to this species. Under the principle of priority, the name for this species should be *ortas* Walker. However, as *novaezelandiae* has far more widespread use, being the only name of the three that has been used as valid (with the exception of catalogs and checklists) in the last 80 or more years (exactly since Miller 1921), the name is eligible to be preserved under the plenary powers of the International Code of Zoological Nomenclature (Art. 81; ICZN (1999)). Normally, I am against preserving junior synonyms, but as the name *novaezelandiae* is most appropriate for this species, the second most common New Zealand flower fly, and has become the basis of the common name, the New Zealand flower fly, I feel that an exception for its preservation should be made.

The original spelling of the epithet was "*novae zelandiae"* based on material collected from "Nouvelle-Zelande." Subsequent authors have misspelt the epithet, but there is no basis for an emendation or is there sufficient usage to adopt the spelling *novaezealandiae*.

GENUS *SIMOSYRPHUS* Bigot

SIMOSYRPHUS Bigot 1882: 79. Type-species: *Syrphus grandicornis* Macquart, 1842, by designation of Hull, 1949a: 291.

grandicornis Macquart, 1842: 96 (*Syrphus*). Australia, widespread Oceania.

obesus Hutton, 1901: 41 (*Syrphus*) [Preoccupied by Fabricius, 1775.]

huttoni Goot, 1964: 220 (*Syrphus*, new name for *obesus* Hutton).

viridiceps (misidentification) of Miller 1921: 307, pl. 48, fig. 4.

Two female syntypes of *obesus* Hutton were examined and are specimens of *grandicornis* Macquart.

There has been much confusion about "*Syrphus viridiceps*" of various authors, but not Macquart. *Syrphus viridiceps* Macquart is a species of *Austrosyrphus* that is endemic to Australia. The species called "*viridiceps*" by many authors is *grandicornis* Macquart.

Subfamily Eristalinae

Tribe Eristalini

Subtribe Helophilina

GENUS *HELOPHILUS* Meigen

HELOPHILUS Meigen, 1822: 368. Type-species: *Musca pendula* Linnaeus, 1758, by designation of Curtis, 1832: pl. 429.

SUBGENUS *PILINASICA* Malloch

PILINASICA Malloch 1922: 227. Type-species: *Syrphus cingulatus* Fabricius, 1775, monotypic

Prohelophilus Curran & Fluke, 1926: 210. Type-species: *Syrphus trilineatus* Fabricius, original designation = *seelandicus* Gmelin

Xylota, subgenus *Palaeoxylota* Hull, 1949a: 361. *Nomen nudum*.

Xylota, subgenus *Palaeoxylota* Hull 1950a: 614. Type-species: *Xylota probosca* Hull, 1950, original designation = *montanus* Miller

The status of the family-group taxon based on *Helophilus* (subtribe Helophilina in my classification, but variously ranked as a family, subfamily, tribe or genus in other classifications) is uncertain. While in recent years many diverse elements have been removed to make it a more "natural" taxon, the taxon remains the pleisomorphic sister of the Eristalina, that is, a taxon with no defining synapomorphy. The diagnostic character of an open marginal cell (R_{2+3}) is clearly primitive. The relationship (Helophilina + Eristalina) is well defined by the presence of a strong spinose basolateral patch on the metafemur and sinuate R_{4+5} vein. The presumed sister taxon to the Eristalini is the Sericomyiini, as both of these groups have rat-tailed larval stages. However, for Helophilina, the next question is the relationship of the groups included within this taxon. Here the New Zealand fauna is pivotal. While my study is incomplete, I believe that all native New Zealand eristaline species are derived from a single introduction and represent a monophyletic assemblage. There are already numerous names for this assemblage, the oldest of which is *Pilinasica*. The question that remains to be answered is: How are the New Zealand species related to the north temperate species (*Helophilus*, *sensu stricto*)? These are the only two groups within the subtribe without stigmatic crossveins. Again, given the outgroup, the sericomyiines, the lack of the stigmatic crossvein is a primitive trait! So, until a revision of the tribe can be done, I retain all the New Zealand species together under the oldest genus-group name (*Pilinascia*), but as a subgenus of *Helophilus*. Christian Kassebeer (in preparation) currently is revising tribe Eristalini worldwide. The species have been grouped into various named groups (*cingulatus* group = *Pilinascia* (*cingulatus* only), *seelandicus* group = *Prohelophilus* (*seelandicus* only), *campbelli* group = *Myiatropa* of Miller (misidentification) (*campbelli* only), *montanus* group = *Palaeoxylota* (*montanus* only) and the rest in *antipodus* group) and a key to those groups is given below. Nine new species are known and await description.

The ruling by the International Commission of Zoological Nomenclature on *Helophilus* (ICZN 1993) is ignored as it is incorrect and does not relate to the facts. The use of *Helophilus* in the synonymy of six species of *Eristalis* by Fabricius was as an error for *Elophilus* Meigen [=*Eristalis* Latreille], not a new name in synonymy as suggested by Tubbs (ICZN 1993). The first and proper use of *Helophilus* for the species related to *Musca pendula* Linnaeus was by Meigen (1822).

Key to the species groups of *Helophilus* (*Pilinascia*)

1. Scutellum with two medial tuberculate swellings ..... *cingulatus* group
- Scutellum normal, without such tuberculate swellings 2
2. Metafemur with a large distinct basoventral process; wing with a stigmatic crossvein.. *seelandicus* group
- Metafemur simple, without a process; wing without a stigmatic crossvein 3
3. Eye pilose..... *campbelli* group
- Eye bare 4
4. Lateral ocelli closer to each other than to eyes; oral margin strongly produced anteriorly or ventrally; smaller, more slender and elongate flies..... *montanus* group
- Lateral ocelli closer to eyes than to each other; oral margin not strongly produced; larger and more robust flies ..... *antipodus* group

antipodus Schiner, 1868: 359.
vincinus Hutton, 1901: 38.
interruptus Lamb, 1909: 133.
campbelli Miller, 1921: 332 (*Myiatropa*).
campbellicus Hutton, 1902: 170.
cargilli Miller, 1911: 126.
chathamensis Hutton, 1901: 39.
cingulatus Fabricius, 1775: 767 (*Syrphus*).
pacifica Gmelin, 1790: 2872 (*Musca*, unjustified new name for *cingulatus* Fabricius).
agerinus Walker, 1849: 608 (*Helophilus*).
hectori Miller, 1924: 283.
hochstetteri Nowicki, 1875: 23.
latifrons Schiner, 1868: 359 [Preoccupied by Loew, 1863]
schineri Goot, 1964: 214 (new name for *latifrons* Schiner, 1868).
ineptus Walker, 1849: 608.
purehuensis Miller, 1911: 125.
montanus Miller, 1921: 312 (*Xylota montana*).
probosca Hull, 1950: 614 (*Xylota*).

Xylota montana Miller was described from an unspecified number of syntypes (males and females) collected from Arthur's Pass by J. W. Campbell and G. V. Hudson. I have examined syntypes of *montana* Miller and the holotype of *probosca* Hull and find them to be the same species. I suspect that the holotype of *probosca* Hull, which was collected by G. V. Hudson at Arthur's Pass, is, in fact, an unlabelled syntype of *montana* Miller.

seelandicus Gmelin, 1790: 2870 (*Musca seelandica*, new name for *trilineatus* Fabricius)
trilineatus Fabricius, 1775: 766 (*Syrphus*, secondary homonym of *Musca trilineata* Linnaeus 1767).

Under Article 59.3 (ICZN (1999)), We (Thompson & Vockeroth 1989: 448; Thompson & Pont 1994: 118) re-instated *seelandica* Gmelin as it was the valid epithet under the rules of nomenclature then in effect (Art. 59b (ICZN (1985)). This action establishes usage so even under the current rules, *seelandica* remains the valid name, and clearly it is a more appropriate name for this endemic species.

taruensis Miller, 1924: 283.

Subtribe Eristalina

GENUS *ERISTALINUS* Rondani

ERISTALINUS Rondani 1845: 453. Type-species: *Musca sepulchralis* Linnaeus, 1758, by subsequent monotypy in Rondani 1857: 38.
Lathyrophthalmus Mik 1897: 114. Type-species: *Conops aeneus* Scopoli, 1763, original designation.
Lathyrophthalmus, subgenus *Metalloeristalis* Kanervo 1938: 43. Type-species: *Conops aeneus* Scopoli, 1763, original designation.

aeneus Scopoli 1763: 356 (*Conops*). Widespread in Palaearctic Region, introduced into Nearctic Region, Chile and & Australia.

GENUS *ERISTALIS* Latreille

Tubifera Meigen 1800: 34. Type-species: *Musca tenax* Linnaeus, 1758, by designation of Coquillett, 1910: 618. Suppressed by I.C.Z.N. 1963: 339.

ERISTALIS Latreille 1804: 194. Type-species: *Musca tenax* Linnaeus, 1758, by designation of Curtis, 1832: pl. 432. Genus-group name conserved by I.C.Z.N (1993, Opinion 1747).

tenax Linnaeus, 1758: 591 (*Musca*). Widespread in Palaearctic Region, temperate areas of Afrotropical and Oriental Regions, introduced into temperate areas of Nearctic, Neotropical and Australian Regions.

Tribe Merodontini

GENUS *EUMERUS* Meigen

EUMERUS Meigen 1822: 202. Type-species: *Syrphus tricolor* Fabricius, by designation of Curtis, 1839: pl. 749. Genus-group name conserved by I.C.Z.N. (1993, Opinion 1747).

strigatus (Fallén), 1817: 61 (*Pipiza strigata*). Europe, introduced in Australia and North America.

funeralis Meigen, 1822: 208. Europe, introduced in Australia, North America and Colombia.
tuberculatus Rondani, 1857: 93.

Rather than preserve a widely used name (*tuberculatus* Rondani), Speight and others (1998) opted to use the senior synonym for this common pest species.

GENUS *MERODON* Meigen

SUBGENUS *MERODON* Meigen

Lampetia Meigen 1800: 34. Type-species: *Syrphus clavipes* Fabricius, by designation of Coquillett, 1910: 557. Suppressed by I.C.Z.N. 1963: 339.

MERODON Meigen 1803: 274. Type-species: *Syrphus clavipes* Fabricius, by designation of Westwood, 1840: 137.

equestris Fabricius, 1794: 292 (*Syrphus*). Europe, introduced into North America and New Zealand.

GENUS *PSILOTA* Meigen

PSILOTA Meigen 1822: 256. Type-species: *anthracina* Meigen, 1822, monotypic.

PSISOLOTA Meigen 1822: 413. Incorrect original spelling of *Psilota*, by present revision.

decessa Hutton, 1901: 43 (*Melanostoma decessum*).

Tribe Milesiini

Subtribe Tropidiina

GENUS *ORTHOPROSOPA* Macquart

ORTHOPROSOPA Macquart 1850: 447. Type-species: *nigra* Macquart, 1850, [= *griseus* Walker, 1835], original designation.

SUBGENUS *PARATROPIDIA* Hull

PARATROPIDIA Hull 1949a: 363. Type-species: *Milesia bilineata* Walker, 1849, original designation. Revision Thompson (1972b).

bilineata (Walker), 1849: 566 (*Milesia*).

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