

# Key to the Australasian and Oceanian genera of Muscidae (Diptera)

Márcia Souto Couri<sup>1,2</sup>

<sup>1</sup>Departamento de Entomologia, Museu Nacional, 20940-040 Rio de Janeiro-RJ, Brazil.

<sup>2</sup>Fellowship CNPq; mcouri@terra.com.br

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**ABSTRACT.** Key to the Australasian and Oceanian genera of Muscidae (Diptera). A key to 51 Australasian and Oceanian genera of Muscidae is given. The Catalogue of Australasian and Oceanian Diptera and its on line version last reviewed in May 2007 were used as taxonomic guides. Some more recently synonyms and taxonomic changes were updated. For each genus, a brief diagnosis, number of valid species in these regions and comments, when pertinent, are also included. Some morphological diagnostic characteres are illustrated in order to help the use of the key.

**KEYWORDS.** Australasian and Oceanian regions; identification; taxonomy.

**RESUMO.** Chave para os gêneros de Muscidae da Australásia e da Oceania (Diptera). Uma chave para 51 gêneros de Muscidae (Diptera) da Australásia e Oceania é apresentada. O catálogo de Diptera da Australásia e da Oceania e sua versão online com última revisão em maio de 2007 foram utilizados como guias taxonômicos. Alguns sinônimos e mudanças taxonômicas mais recentes foram acrescentados. Para cada gênero são incluídos uma breve diagnose, o número de espécies válidas para estas regiões e comentários, quando pertinentes. Alguns caracteres morfológicos diagnósticos são ilustrados para facilitar a utilização da chave.

**PALAVRAS-CHAVE.** Australasia e Oceania; identificação; taxonomia.

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The taxonomic knowledge of the Australasian and Oceanian muscids can be found both in individual revisions as in synoptic contributions. Pont (1989) summarized these contributions, which are herein updated: keys to genera (Malloch 1925 and Emden 1965); key to Coenosiini genera and revision of *Pygophora* Schiner (Crosskey 1962); key and revision of Mydaeinae genera (Vockeroth 1972), revision of the tribe Dichaetomyiini (Pont 1969a), key and revision of the genera with a facial carina (Pont 1969b), revision of *Pectinseta* Stein (Pont 1972) and revision of *Passeromyia* Rodhain & Villeneuve (Pont 1974a). Other contributions for restricted areas are: Australia (many contributions by Malloch and Pont; see Pont 1989); Fiji (Bezzi 1928); Hawaii (Hardy 1981); Lord Howe and Norfolk Islans (Pont 1973b); Maluku (Malloch 1929a), Marquesas (Malloch 1932); Micronesia (Snyder 1965); Papua New Guinea (Shinonaga & Kano 1984; Shinonaga & Pont 1988), Samoa (Malloch 1929b) and New Caledonia (list of species by Shinonaga *et al.* 1991). More recently, Shinonaga (2005) studied the *Limnophora* Robineau-Desvoidy of New Guinea; Couri *et al.* (2010) revised the muscids from New Caledonia; and revisions of the muscids from Vanuatu and Fiji are in final preparation by Pont & Couri and by Couri, Pont & Daugeron, respectively.

The printed version of the Australasian catalogue (Pont 1989) listed 640 species in 51 genera, totalizing almost 910 names. The on line version of the catalogue last reviewed in May 2007 (Pont 2007) listed 728 (plus nine unplaced species) species in 52 genera, totalizing almost the same number of names. One of the genus listed, *Mesembrina* Meigen was unsuccessfully introduced to Fiji and no longer occurs in the region (Pont 1989: 677) and the genus *Pectinseta* Stein was synonymized with *Lispocephala* Pokorny by Couri &

Pont (2000), so the total number of genera recorded from the regions is 50. Certainly much still remains to be known on the muscid fauna of these regions, especially because of their known richness and endemism. Presently, about 65% of the recorded genera are represented for less than 10 species, while *Limnophora* and *Lispocephala* Pokorny are represented for more than 100 species, because of the recent revisions, respectively of Hardy (1981) and Shinonaga (2005) where many new species were described.

For the present key, the Catalogue of Australasian and Oceanian Diptera (Evenhuis 1989) and its on-line version last reviewed in May 2007 (to family Muscidae) were used as taxonomic guides, to which, the more recently synonyms and taxonomic changes were updated. Table I summarizes the valid muscid genera recorded from the Australasian and Oceanian regions by subfamily and the number of valid species. Carvalho *et al.* (2005) was used for general classification. As a result, the 50 recorded genera are keyed. For each genus, a brief diagnosis, number of valid species in these regions and comments, when pertinent, are also included. Some morphological diagnostic characters are illustrated in order to help the use of the key. The key is based (parts modified) on previous keys, descriptions and diagnosis as Vockeroth (1972), Pont (1969b, 1973a, 1974b,), Couri & Pont (1999); Carvalho & Couri (2002); Couri & Carvalho (2002), Couri *et al.* (2006), Nihei & Carvalho (2009) and Couri *et al.* (2010).

The morphological terminology follows McAlpine (1981); special characters of *Atherigona*, such as the trifoliate process, follows Pont (1986) and Pont & Magpayo (1995). "Postpedicel" is used for "antennal flagellomere", following Stuckenberg (1999).

## Key to the Australasian and Oceanian genera of Muscidae

1. Proboscis usually elongated, strongly sclerotized; labela reduced; mouth-parts modified into a piercing organ; prosternum and anepimeron setulose; arista with long hairs on the dorsal surface and bare on ventral or, at most with 3-4 ventral cilia (except in *Haematobosca*, with hairs in both surfaces) ..... 2  
 Proboscis retractile, not modified into a piercing organ, faintly or moderately sclerotized; prosternum and anepimeron setulose or bare; arista bare, with short hairs or plumose ..... 4
2. Palpus about as long as proboscis (Fig. 1) ..... 3  
 Palpus shorter than half the length of proboscis; 2 species ..... *Stomoxys* Geoffroy
3. Arista with dorsal and ventral hairs; notopleuron with covering setulae; proepisternal depression setulose or bare; general body color from yellow to black; body length between 3.5-9.0 mm; 1 species .....  
 ..... *Haematobosca* Bezzi  
 Arista with dorsal hairs only; notopleuron without covering setulae (but setae present); proepisternal depression bare; general body color with dense grey and olive pollinosity; body length between 2.0-5.0 mm; 2 species .....  
 ..... *Haematobia* Le Peletier and Serville
4. Head angular in profile; antenna long; antennal insertion above mid-level of eye (Fig. 2); presutural dorsocentral setae very short and fine, almost indistinct from the covering setulae; 55 species ..... *Atherigona* Rondani  
 Head shape not as above; antennal insertion below mid level of eye; presutural dorsocentral setae developed or not differentiated from the covering setulae ..... 5
5. Inferior calypter enlarged, subtruncate posteriorly and with the anteromedian angle extending below base of scutellum (Fig. 3) ..... 6  
 Inferior calypter glossiform, at most a little enlarged, not extending below base of scutellum ..... 11
6. Body black or bluish-black, not metallic shining green or blue; stem vein on lower surface bare after humeral vein; mid tibia without a ventral seta ..... 7  
 Body shining metallic green or blue; stem vein on lower surface with 1-4 setulae after humeral vein; mid tibia with a strong ventral seta ..... 10
7. Stem vein on upper surface with 1-3 setulae in basal part (Fig. 4); vein M with an angular forward bend towards vein  $R_{4+5}$  (Fig. 5); 10 species ..... *Musca* Linnaeus  
 Stem vein bare on upper surface in basal part, vein M with a smoothly rounded forward curve towards vein  $R_{4+5}$  (Fig. 6) ..... 8
8. Pair of strong postocellar setae present; scutellum with 3 strong pairs of marginal setae; 1 species .....
- ..... *Phaonina* Emden  
 Pair of strong postocellar setae absent; scutellum differently bristling ..... 9
9. Prosternum setulose; subcostal sclerite bare (Fig. 7); stem vein on lower surface with only 1-4 setulae in basal part (Fig. 7); 1 species ..... *Morellia* Robineau-Desvoidy  
 Prosternum bare, subcostal sclerite setulose (Fig. 8), stem vein on lower surface with a row of about 8 setulae in basal part (Fig. 8); 1 species ..... *Myiophaea* Enderlein
10. Suprasquamal ridge setulose; infra-alar bulla setulose; 11 species ..... *Neomyia* Robineau-Desvoidy  
 Suprasquamal ridge and infra-alar bulla bare; 2 species .....  
 ..... *Pyrellia* Robineau-Desvoidy
11. Face carinate (Figs 9 and 10) ..... 12  
 Face not carinate ..... 14
12. Anepimeron bare; postpedicel mainly to entirely black; 5 species ..... *Prohardyia* Pont  
 Anepimeron setulose, postpedicel yellow ..... 13
13. Postalar wall with a tuft of black setulae; posterior spiracle bare on posterior margin; prosternum with setulae on the surrounding membrana; vein M curved forwards in apical portion (Fig. 11); 1 species ..... *Hennigiola* Pont  
 Postalar wall bare; posterior spiracle with setulae on posterior margin; prosternum with a few setulae in the pit behind prosternal plate only; vein M not curved forwards in apical portion (Fig. 12); 1 species .....  
 ..... *Beccimyia* Pont
14. Anepimeron setulose ..... 15  
 Anepimeron bare ..... 19
15. Fine and sparse cilia below scutellum (as in Anthomyiidae); 1 species ..... *Metopomyia* Malloch  
 Scutellum without cilia below ..... 16
16. Parafacial with one or more series of setae; palpus enlarged in apical part; male dichoptic, width of frons about one third of head width; 32 species ..... *Lispe* Latreille  
 Parafacial bare; palpus not enlarged; male holoptic or dichoptic ..... 17
17. Prosternum setulose; posterior spiracle with black setulae along lower margin; 73 species .....  
 ..... *Dichaetomyia* Malloch  
 Prosternum bare, posterior spiracle without black setulae along lower margin ..... 18
18. Postsutural dorsocentral setae 3; ocellar triangle not very short and no cruciate setae in female; 1 species .....  
 ..... *Papuaiella* Vockeroth  
 Postsutural dorsocentral setae 4; ocellar triangle very short, with cruciate setae well in front of its extremity in female; 1 species ..... *Australophyra* Malloch

19. Costal vein discontinued a little beyond the apex of the vein  $R_{4+5}$ ; 2 species ..... *Neohelina* Malloch  
 Costal vein not discontinued beyond the apex of the vein  $R_{4+5}$  ..... 20
20. Marginal cell of uniform width almost to its apex, with its apical half narrowly wedge shaped; 3 species .....  
 ..... *Idiohelina* Malloch  
 Marginal cell gradually narrowed from apex of vein  $R_1$  to its apex ..... 21
21. Wing with the subcostal vein running in a smooth even curve from humeral cross-vein to Costal; body color metallic black, blue or green; gena with or without a strong differentiated upcurved seta; female ocellar triangle shining, short or long, in this case, almost reaching lunula, frons with a pair of proclinate orbital setae and inclinate interfrontal setae; 7 species .....  
 ..... *Hydrotaea* Robineau-Desvoidy  
 Wing with the subcostal vein with a slightly sinuous course from humeral cross-vein to Costal, not smoothly bowed; body color usually not metallic black, blue or green; gena without a differentiated upcurved seta; female ocellar triangle shining or not shining, usually short; frons without proclinate orbital or inclinate interfrontal setae ..... 22
22. Wing very broad, about as wide as long, very different in general body appearance from all other muscids; 2 species ..... *Exsul* Hutton  
 Wing not broadened ..... 23
23. Arista short, long plumose, the dorsal plumes longer and sparser than the ventrals; postalar wall setulose or bare; 4 species .. *Passeromyia* Rodhain and Villeneuve  
 Arista not shortened; plumes of arista, if present, not as described above; postalar wall bare ..... 24
24. Wing with at least one setula on ventral surface of  $R_s$  node or base of  $R_{4+5}$  ..... 25  
 Wing without setulae on ventral surface of  $R_s$  node or base of vein  $R_{4+5}$  ..... 37
25. Prosternum setulose ..... 26  
 Prosternum bare ..... 31
26. Vein  $R_1$  with setulae on the apical part of the dorsal surface; 18 species ..... *Heliographa* Malloch  
 Vein  $R_1$  without setula on the apical part of the dorsal surface ..... 27
27. Katepimeron haired ..... 28  
 Katepimeron bare ..... 29
28. Hairs on katepimeron and in front of posterior spiracle pale; hairs on prosternum fine; front of male not wider than ocellus, bare or nearly on upper half (Fig. 13); 5 species ..... *Papuaia* Malloch
- Hairs on katepimeron and in front of posterior spiracle black; hairs on prosternum short and setose; front of male as wide as ocellar triangle, with strong setae throughout its length (Fig. 14); 1 species .....  
 ..... *Chaetopapuaia* Vockeroth
29. With one pair of postocellar seta strong and diverging; 1 species ..... *Buccophaonia* Emden  
 Without postocellar seta ..... 30
30. Gena high, about half of eye height; 3 species .....  
 ..... *Paralimnophora* Lamb  
 Gena not high; 118 species .....  
 ..... *Limnophora* Robineau-Desvoidy
31. Frons very wide in both sexes, with margins slightly emarginated close to the middle; gena high, about half of eye height; 10 species ..... *Limnohelina* Malloch  
 Frons not as described above; gena not high as above . 32
32. Katepisternals 1+2, never arranged in a triangle, either the anterior or the lower lacking; hind tibia without anterodorsal apical seta ..... 33  
 Katepisternals 1+2, arranged in a triangle, either the anterior or the lower present; hind tibia with or without anterodorsal apical seta ..... 34
33. Anterior katepisternal seta absent; katepimeron haired and in front of spiracle; 11 species .....  
 ..... *Graphomya* Robineau-Desvoidy  
 Anterior katepisternal seta present; katepimeron bare; 1 species ..... *Balioglutum* Aldrich
34. Thorax with a pair of strong presutural acrostichal setae at least half as long as first pair of dorsocentrals; hind tibia with dorsal apical seta very weak or absent, much shorter than anterodorsal apical; 4 species .....  
 ..... *Helinomydaea* Vockeroth  
 Thorax without presutural acrostichal seta, hind tibia with dorsal apical seta strong, at least as long as anterodorsal apical ..... 35
35. Vein  $R_1$  before humeral crossvein, with one or more weak to moderate strong, sometimes pale setae below; katepimeron with at least a few hairs; 26 species .....  
 ..... *Gymnopapuaia* Vockeroth  
 Vein  $R_1$  before humeral crossvein bare; katepimeron bare or with few setulae ..... 36
36. Katepisternal setae different from 2+2; dorsal surface of vein  $R_{4+5}$  bare; 4 species ..... *Hebecnema* Schnabl  
 Katepisternal setae 2+2 or 1+2; dorsal surface of vein  $R_{4+5}$  setulose; 20 species ..... *Myospila* Rondani
37. Proboscis with the labella not reduced and the prestomal teeth hardly developed, and prementum dusted ..... 38  
 Proboscis with labella usually reduced and/or prestomal teeth strongly developed, and prementum shining, undusted ..... 44

38. Male dichoptic, frons longer than wider in both sexes; ocellar triangle slender and continued to beyond middle; hind tibia with 2 anterodorsals and 2 posterodorsals; 2 species ..... *Paracoenosia* Malloch  
Another combination of caracteres ..... 39
39. Apical section of vein M strongly curved forward ..... 40  
Apical section of vein M straight or only slightly curved forward ..... 41
40. Arista bare; 1 species .....  
..... *Synthesiomyia* Brauer & Bergenstamm  
Arista with short hairs; 1 species .....  
..... *Calliphoroides* Malloch
41. Hind tibia with one strong posterodorsal seta on its apical third (calcar) ..... 42  
Hind tibia with no calcar ..... 43
42. Anterior intra-alar seta placed posteriorly to level of supra-alar seta; 3 species ..... *Muscina* Robineau-Desvoidy  
Anterior intra-alar seta not placed posteriorly to level of supra-alar seta; 2 species .....  
..... *Phaonia* Robineau-Desvoidy
43. Arista plumose, with the longest cilia longer than the width of the flagellomere; sternite 1 setulose or bare; 60 species ..... *Helina* Robineau-Desvoidy  
Arista bare; sternite 1 strongly setulose near the posterior margin; 6 species ..... *Brontaea* Kowarz
44. Katepisternal setae 1+1-3; ovipositor of the *Mydaea*-type, short, with a spinose hypoproct; 33 species .....  
..... *Spilogona* Schnabl  
Katepisternal setae usually 1:1:1, placed at the angles of a equilateral triangle; ovipositor long, with a setulose hypoproct ..... 45
45. One pair of reclinate orbital setae (Fig. 15) ..... 46  
Two pairs of reclinate orbital setae (Fig. 16) ..... 47
46. One pair of long presutural dorsocentral setae, sometimes preceded by a very short second pair; 14 species .....  
..... *Coenosia* Meigen  
Two pairs of subequal presutural dorsocentral setae; 1 species ..... *Macrorchis* Rondani
47. Two pairs of subequal presutural dorsocentral setae .... 48  
One pair of long presutural dorsocentral setae, sometimes preceded by a very short second pair ..... 49
48. Ocellar setae short, hair-like; outer margin of eye emarginated on basal half; mid tibia with 2 posterodorsals; hind tibia without a posteroventral apical seta; 4 species ..... *Cephalispa* Malloch  
Ocellar setae long; outer margin of eye not emarginated on basal half; mid tibia with 1 posterodorsal; hind tibia with a posteroventral apical seta; 110 species .....  
..... *Lispocephala* Pokorny
49. Inferior calypter linear, much shorter than the upper one (Fig. 17); 8 species ..... *Parvisquama* Malloch  
Inferior calypter elongate, 1.5 times as long as upper one, or, at least, as long as the upper one, and glossiform, never linear (Fig. 18) ..... 50
50. Arista with long hairs on basal half (Fig. 19); scutellum with both basal and apical pairs of setae strong; fore tibia with one median seta on posterior surface; 41 species ..... *Pygophora* Schiner  
Arista with hairs along its entire length; scutellum with only the apical pair of setae strong, fore tibia without one median seta on posterior surface; 1 species .....  
..... *Orchisia* Rondani

### Genera and Diagnosis

#### Atherigoninae

[Ref. Pont (1986) and Pont & Magpayo (1995)]

#### *Atherigona* Rondani

*Atherigona* Rondani, 1856: 97. Type species: *Anthomyia varia* Meigen, 1826, orig. des.

Diagnosis. Head angular, with long face and antennal postpedicel; arista bare; one pair of reclinate orbital setae; palpus strongly differentiated between the two sexes and between the two subgenera *Atherigona* s.str. and *Acritochaeta* Grimshaw; mesonotum with very short setae; dorsocentral setae reduced; katepisternals 1+2; hind tibia without calcar; wing veins bare; males of sg. *Atherigona* with a trifoliate process and a hypopygial prominence; female with (sg. *Atherigona*) or without (sg. *Acritochaeta*) a pair of small anterior plates on tergite 8 of ovipositor.

Comments. The genus is well represented in the regions, with 55 recorded species. They are known as shoot flies, together with many genera of Chloropidae and are significant pests of cereal crops. For biology and economic importance see Pont & Magpayo (1995).

#### Muscinae

[Ref. Pont (1973a) for Australian species]

#### Muscini

#### *Mesembrina* Meigen

*Mesembrina* Meigen, 1826: 10. Type species: *Musca meridiana* Linnaeus, 1758, des. Westwood 1840: 141.

Comments. The genus is listed in the catalogue as not occurring in the regions as the only species *M. meridiana* Linnaeus was unsuccessfully introduced to Fiji. The genus was not included in the key.



**Morellia Robineau-Desvoidy**

*Morellia* Robineau-Desvoidy, 1830: 405. Type species: *Morellia agilis* Robineau-Desvoidy, 1830 [= *Musca hortorum* Fallén, 1817], des. Townsend 1916: 8.

Diagnosis. Male holoptic, anterointernal ommatidia enlarged; eye bare or with few cilia, arista plumose on basal two-thirds or three-quarters and bare apically; acrostichal setae 0+1; katapisternals 1+2; anepimeron setulose; meron bare; metepimeron haired above hind coxa; subcostal sclerite bare; M strongly curved forward apically; sternite 1 setulose; ovipositor long with tergites very thin and with strong spines.

Comments. Only *M. hortensia* Wiedemann, 1824 has been recorded to the regions from Australia and Papua New Guinea.

**Musca Linnaeus**

*Musca* Linnaeus, 1758: 589. Type species: *Musca domestica* Linnaeus, 1758, des. I.C.Z.N. 1925: 1.

Diagnosis. General coloration non-metallic; males holoptic; eye bare; arista enlarged on basal fourth, long-plumose; presutural acrostichals not developed; dorsocentrals 2+4; katapisternals 1+2; anepimeron setulose; prosternum setulose; inferior calypter broad, truncate posteriorly, extending under base of scutellum; mid tibia without ventral seta; vein M with an angular forward bend towards vein  $R_{4+5}$  in apical part.

Comments. Known from 10 species in the regions. Key to the Australian species, redescription and illustrations in Pont (1973a).

**Myiophaea Enderlein**

*Myiophaea* Enderlein, 1935: 240. Type species: *Myiophaea ralumensis* Enderlein, 1935 [= *Bengalia spissa* Walker, 1858], orig. des.

Diagnosis. General coloration non-metallic; scutum and abdomen mostly pale; male holoptic; arista long plumose; prosternum bare; acrostichal setae 0+1; dorsocentrals 2+4-5; katapisternals 1+2; anepimeron setulose; meron bare; metepimeron haired above hind coxa; subcostal sclerite setulose; vein M setulose on both surfaces from the node to beyond r-m cross-vein; sternite 1 setulose.

Comments. The genus is known in the regions from one species – *M. spissa* Walker, 1858, recorded from Australia and Papua New Guinea. For redescription and illustrations of the species see Pont (1973a).

**Neomyia Walker**

*Neomyia* Walker, 1859: 138 (Musca subg.). Type species: *Musca gavis*, Walker, 1859, mon.

Diagnosis. General coloration metallic green; male holoptic; eye bare; arista plumose; presutural acrostichals not developed; dorsocentrals 2+3; katapisternals 1+2;

anepimeron setulose; prosternum setulose; inferior calypter broad, subtruncate posteriorly and, at least, extending slightly under base of scutellum, mid tibia with a strong posteroventral seta at middle or apical third; vein M strongly curved forward; suprasquamal ridge setulose; sternite 1 setulose; aedeagus with strong spinules.

Comments. Eleven species are recorded to the regions, *N. greenwoodi* Bezzi and *N. simondsi* Bezzi endemic to Fiji and *N. gressitti* Shinonaga & Kano; *N. kaidiensis* Shinonaga & Kano and *N. montana* Shinonaga & Kano endemic to Papua New Guinea.

**Pyrellia Robineau-Desvoidy**

*Pyrellia* Robineau-Desvoidy, 1830: 462. Type species: *Pyrellia vivida* Robineau-Desvoidy, 1830, des. Townsend 1916: 8.

Diagnosis. General coloration metallic green; male holoptic; eye bare, arista very long plumose; acrostichals 0+1; dorsocentrals 2+4, katapisternals 1+3; prosternum and anepimeron setulose; proepimeral seta present; mid tibia with a strong posteroventral seta at apical third; vein  $R_{4+5}$  with several setulae on both surfaces; M strongly curved forward; suprasquamal ridge bare; sternite 1 setulose.

Comments. Two species, both recorded only from Australia, redescribed and illustrated by Pont (1973a).

## Stomoxyni

**Haematobia Le Peletier & Serville**

*Haematobia* Lepeletier & Serville in Latreille *et al.* 1828: 499 (*Stomoxys* subg.). Type species: *Conops irritans* Linnaeus, 1758, des. Westwood 1840: 140. [Validated by I.C.Z.N. 1974: 157].

Diagnosis. General coloration dark greyish, with yellowish tinge and often yellow setae; head 1.25 times as wide as high; arista plumose only on dorsal surface; palpus long, spatulate, a little narrowed on basal quarter to half, grooved inside; prosternum setulose; proepisternal depression and postalar wall bare; prealar seta barely differentiated or vestigial; inferior calypter about twice as long as upper one; vein  $A_1$  long.

Comments. Two species occurring in the regions, one doubtfully recorded from Fiji (*H. irritans* (Linnaeus) and the other (*H. exigua* de Meijere) more widespread in the regions. Both species are serious pests of cattle, *H. exigua* known as buffalo fly and *H. irritans* known as horn fly.

**Haematobosca Bezzi**

*Haematobosca* Bezzi, 1907: 414. Type species: *Haematobia atripalpis* Bezzi, 1895, orig. des.

Diagnosis. Proboscis elongated and strong sclerotized with labela reduced; prosternum and anepimeron setulose; arista with dorsal and ventral hairs; palpus about as long as proboscis; notopleuron with covering setulae; proepisternal depression setulose or bare; general body color from yellow to black; body length between 3.5-9.0 m.

Comments. One species, *H. sanguinolenta* Austen, widespread in the Oceanian region, but not recorded from Australia.

### ***Stomoxys* Geoffroy**

*Stomoxys* Geoffroy, 1762: 449, 538. Type species: *Conops calcitrans* Linnaeus, 1758, des. I.C.Z.N. 1957: 83.

Diagnosis. General color brownish-grey to yellowish-brown; head slightly wider than high, at vertex about one-fourth of head width in male and well over one-third in female; arista plumose; palpus slender and short, subcylindrical, and less than half as long as the elongated and non-retractile piercing proboscis; postpedicel about 2.5 times as long as pedicel; prosternum and proepisternal depression setulose; prealar seta absent; anterior katapisternal absent; vein M conspicuously curved forward towards vein  $R_{4+5}$  in its apical section.

Comments. Two species have been recorded to the regions; the cosmopolitan *S. calcitrans* (Linnaeus) was introduced and is the only species of *Stomoxys* occurring in Australia.

### Azeliinae

#### Azeliini

[Ref. Pont (1973a) for Australian species]

### ***Australophyra* Malloch**

*Australophyra* Malloch, 1923: 667. Type-species: *Ophyra analis* Macquart, 1846 [= *Peronia rostrata* Robineau-Desvoidy, 1830], orig. des.

Diagnosis. Ocellar triangle very short; female with cruciate setae inserted well in front of the anterior extremity of the ocellar triangle; beret with moderately long black hairs; ptilinum never silvery pruinose as in some *Hydrotaea* species.

Comments. The genus has been recently re-instated by Savage & Wheeler (2004), with *Australophyra rostrata* transferred from *Hydrotaea*.

### ***Hydrotaea* Robineau-Desvoidy**

*Hydrotaea* Robineau-Desvoidy, 1830: 509. Type species: *Musca meteorica* Linnaeus, 1758, des. Curtis 1839: pl. 768.

Diagnosis. Male holoptic; eye bare; general color usually black or bluish-black, rarely metallic; arista very short pubescent; gena with a strong upcurved seta; female with crossed interfrontal seta; dorsocentrals 2+4; notopleuron covered with setulae, the two setae similar in size; anepimeron bare; katapisternals 1+1; some males with fore femur on ventral surface with a preapical excavation with 2 toothed processes and fore tibia flattened along basal half or two-thirds of ventral surface; vein M straight; distiphallus with apical part of juxta spinulose; ovipositor long, with narrow tergites.

Comments. Seven species known to occur in the regions, *H. chalcogaster* Wiedemann, 1824 the most widespread one.

### Reinwardtiini

### ***Balioglutum* Aldrich**

*Balioglutum* Aldrich, 1925: 9. Type species: *Balioglutum illingworthi* Aldrich, 1925, mon.

Diagnosis. Eye bare; postpedicel 3-4 times longer than pedicel; arista with few hairs of moderate length above near base and one or two below; proboscis very short; proepisternum bare; suprasquamal ridge without setulose hairs; prosternum, anepimeron and meron bare; katapisternals 1+1; 1 postsutural intra-alar (anterior one absent); abdomen entirely without setae; sternite 1 setulose; vein  $R_{4+5}$  with a few distinct hairs below, bare above; vein M curved forward; calcar absent.

Comments. The genus is recorded only from one species, *B. illingworthi* (Aldrich), endemic to Australia (Queensland).

### ***Calliphoroides* Malloch**

*Calliphoroides* Malloch, 1930: 305. Type species: *Calliphora antennatis* Hutton, 1881, orig. des.

Diagnosis. Vein M with a very broad round bend towards  $R_{4+5}$  at apex; stem vein bare; vein  $R_{4+5}$  bare on both sides; arista with short hairs; proepisternum and anepimeron bare, hind tibia with no distinct posterodorsal seta.

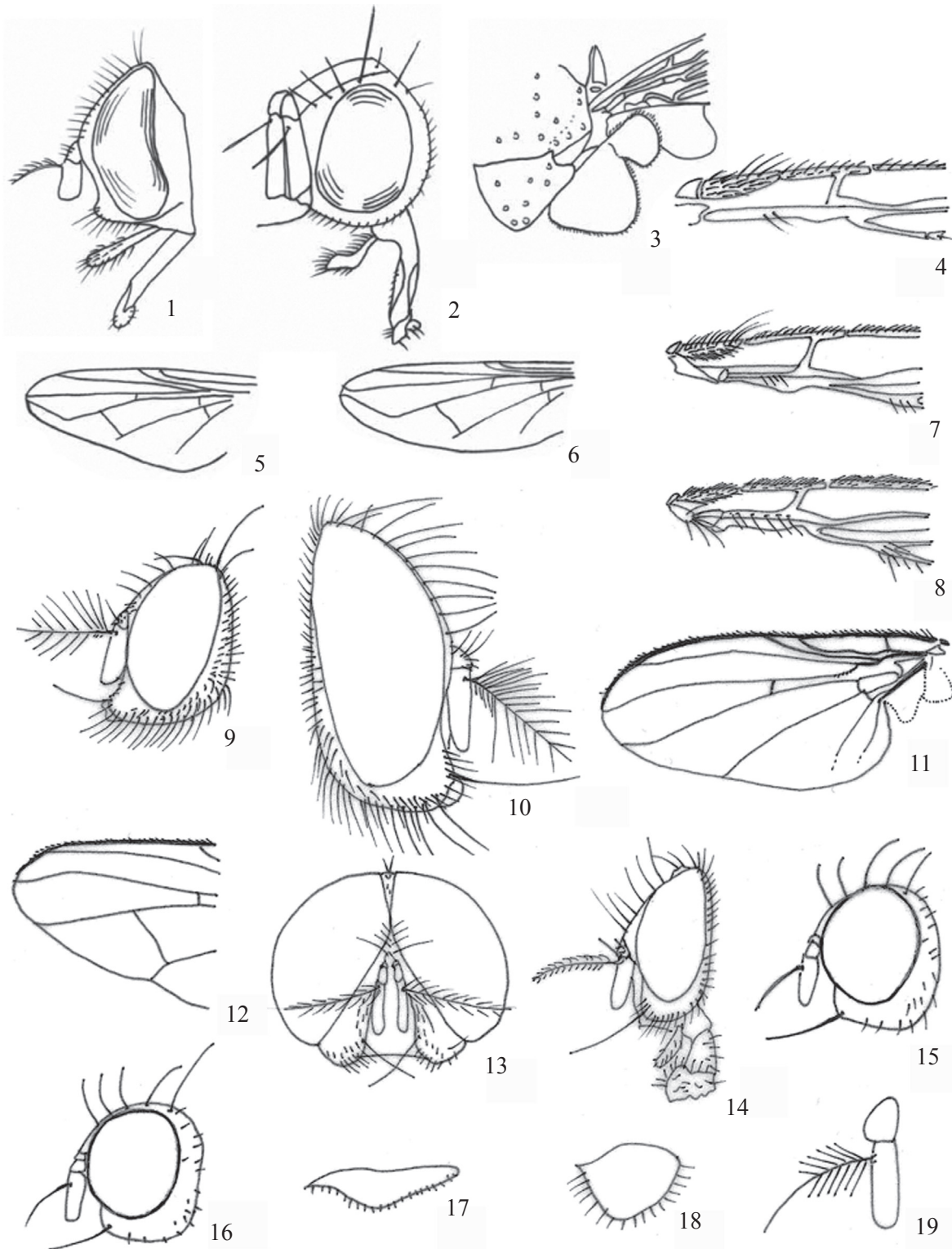
Comments. The genus is known only from one species, *C. antennatis* (Hutton), endemic to New Zealand. Malloch (1930: 305–306) distinguished the genus from *Musca* by the “broadly rounded bend of the fourth wing vein, the lack of hairs on the stem vein and third vein of the wings, and the much shorter haired aristae”. He had seen the type specimen and mentioned that “the bright orange-red third antennal segment and the similarly colored mark on the parafacials opposite the bases of the antennae” could “readily” identify the species (Malloch 1930: 306).

### ***Muscina* Robineau-Desvoidy**

*Muscina* Robineau-Desvoidy, 1830: 406. Type species: *Musca stabulans* Fallén, 1817, des. Coquillett 1910: 571.

Diagnosis. Male holoptic; eye bare; arista plumose, with cilia on basal three-fourths and bare on apical fourths; female with interfrontal setae; anterior postsutural intra-alar seta placed posteriorly to level of supra-alar seta; presutural acrostichals developed; prealar seta short, but distinct; anepimeron bare; meron setulose; vein M slightly curved forward at apex; veins bare; calcar strong, submedian; sternite 1 setulose.

Comments. The genus is known from three species, *M. arcuata* Shinonaga, 1989 endemic to Papua New Guinea, *M. levida* (Harris, 1780) recorded in the regions from Hawaiian islands and the widespread *M. stabulans* (Fallén, 1817).



Figs. 1–19. 1, *Haematobosca Bezzi*, head, lateral view (from Couri 2007). 2, *Atherigona Rondani*, head, dorsolateral view (from Couri 2007, modified from Pont & Magpayo 1995). 3, *Musca domestica* Linnaeus, superior and inferior calypters (from Couri 2007, modified from McAlpine 1981). 4, *Musca fergusonii* Johnston & Bancroft, anterior veins at base of wing, dorsal view (modified from Pont 1973a). 5, *Musca (Byomyia) afra* Paterson, wing (from Couri 2007). 6, *Morellia cerciformis* Ziehlke, wing (from Couri 2007). 7, *Morellia hortensia* (Wiedemann), anterior veins at base of wing, ventral view (modified from Pont 1973a). 8, *Myiophaea spissa* (Walker), anterior veins at base of wing, ventral view (modified from Pont 1973a). 9, *Hennigiola setulifera* (Stein), female head, lateral view (modified from Pont 1969). 10, *Beccimyia papuana* Pont, male head, lateral view (modified from Pont 1969). 11, *Hennigiola setulifera* (Stein), wing, ventral view (modified from Pont 1969b). 12, *Beccimyia papuana* Pont, wing, apical part (modified from Pont 1969b). 13, *Papuaia curvinervis* (Stein), head of male, anterior view (modified from Vockeroth 1972). 14, *Chaetopapuaia setifrons* Vockeroth, head of male, lateral view (modified from Vockeroth 1972). 15, Coenosiini, head with 2 pairs of reclinate orbital seta (modified from Couri & Pont 1999). 16, Coenosiini, head with 1 pair of reclinate orbital seta (modified from Couri & Pont 1999). 17, *Parvisquama* Malloch, inferior calypter (modified from Couri & Pont 1999). 18, inferior calypter glossiform (modified from Couri & Pont 1999). 19, *Pygophora* Schiner, antenna (modified from Couri & Pont 1999).



### ***Passeromyia* Rodhain & Villeneuve**

*Passeromyia* Rodhain & Villeneuve, 1915: 592. Type species: *Muscina heterochaeta* Villeneuve, 1915, mon.

Diagnosis. Frons dichoptic in both sexes, broader in female; arista short, with the dorsal plumes longer and sparser than the ventral ones; dorsocentral setae 2+4; prealar seta present; post-alar wall setulose or bare; katapisternals 1+2; metathoracic spiracle large, with no setae on margins; hind tibia with a short calcar.

Comments. This is a small genus with five species, four of them occurring in the Australasian and Oceanian regions, recorded from Australia, Fiji and Vanuatu (*P. veitchi* Bezzi, 1928, endemic to Fiji). The larvae live in bird nests as scavengers or subdermical in the nestlings. The genus was revised by Pont (1974a).

### ***Synthesiomyia* Brauer & Bergenstamm**

*Synthesiomyia* Brauer & Bergenstamm, 1893: 96, 110, 178. Type species: *Synthesiomyia brasiliana* Brauer & Bergenstamm, 1893 [= *Cyrtoneura nudiseta* Wulp, 1883], orig. des.

Diagnosis. Eye bare; arista with very short hairs; presutural acrostichal setae not differentiated; prealar seta strong; anepimeron bare; dorsocentrals 2+4; katapisternals 1+2; wing veins bare; vein M strongly curved forward apically; inferior calypter very enlarged; sternite 1 setulose.

Comments. One species, *S. nudiseta* (Wulp), widespread in the regions.

#### Phaoniinae

#### Metopomyiini

### ***Metopomyia* Malloch**

*Metopomyia* Malloch, 1922: 272. Type species: *Metopomyia atropunctipes* Malloch, 1922, orig. des.

Diagnosis. Eye bare; anepimeron setulose; ventral surface of scutellum with fine sparse hairs (as in Anthomyiidae); prosternum bare; prealar seta long; presutural acrostichals not developed; calcar absent, but with one or two short setae on the posterodorsal surface; vein M not curved forward at apex.

Comments. Genus and the only species – *M. atropunctipes* Malloch, endemic to Australia.

#### Eginiini

### ***Neohelina* Malloch**

*Neohelina* Malloch, 1924: 414. Type species: *Neohelina semivittata* Malloch, 1924, orig. des.

Diagnosis. Prosternum with a short setula on each side; anepimeron bare; prealar seta absent, Costal vein discontinued a little beyond the apex of vein  $R_{4+5}$ , the remainder of the cell

between that vein and M having no more distinct marginal vein than does the second posterior cell (as in original description).

Comments. The genus and the two recorded species are endemic to Australia.

#### Dichaetomyiini

### ***Dichaetomyia* Malloch**

*Dichaetomyia* Malloch, 1921a: 163. Type species: *Dichaetomyia polita* Malloch, 1921 [preocc., = *Dichaetomyia emdeni* Pont 1969a], orig. des.

Diagnosis. Eye of male narrowly separated by the diameter of anterior ocellus or more; eye, in female widely separated; proclinate orbital and crossed interfrontal setae absent; arista long-plumose; dorsocentrals 2+2, 3 or 4; prealar seta present; postalar wall with sparse hairs or bare; lower margin of the posterior thoracic spiracle with a row of dark setulae, prosternum and anepimeron setulose, vein M only slightly curved forwards before apex; hind tibia with a well developed anterodorsal preapical in addition to dorsal one; calcar absent.

Comments. One of the most speciose genera in the regions, with 73 recorded species. The Australian species were revised by Pont (1969a).

#### Phaoniini

### ***Beccimyia* Pont**

*Beccimyia* Pont, 1969b: 935. Type species: *Beccimyia papuana* Pont, 1969, orig. des.

Diagnosis. Male holoptic; face carinate; arista with very long and sparse irregular plumes; prosternum bare; anepimeron setulose; postalar wall setulose; acrostichals 0+1; dorsocentrals 2+4; katapisternals 1+2; posterior spiracle with several setulae on posterior and part of lower margins; calcar absent; vein  $R_{4+5}$  with several setae on both surfaces.

Comments. The genus and its single species, *B. papuana* Pont are endemic to Papua New Guinea.

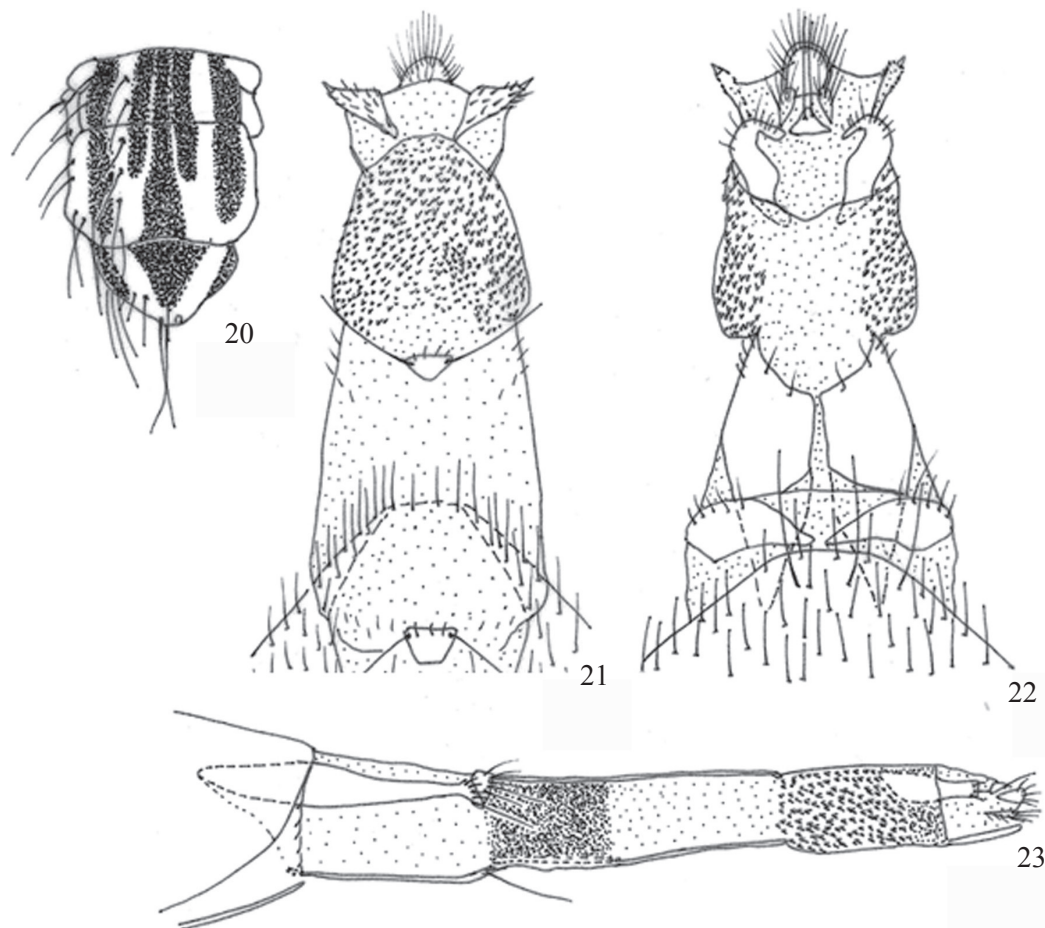
### ***Buccophaonia* Emden**

*Buccophaonia* Emden, 1965: 212. Type species: *Buccophaonia subcostalis* Emden, 1965, orig. des.

Diagnosis. Head with the vibrissal angle and oral margin somewhat proclined; eye of male more or less contiguous; male without inner and outer vertical setae and with a pair of strong and divergent postocellar setae; arista plumose; dorsocentrals 2+4; prealar present; prosternum setulose at margins; anepimeron bare; katapisternals 1+2; katapimeron haired; posterior spiracle with few black setulae on posterior part of lower margin; hairs of scutellum extending to lower edge; stem vein with about 5 setulae on inferior surface; node and base of  $R_{4+5}$  with some setulae on both surfaces.

Comments. Recorded from the regions for an unidentified species from Australia.





Figs. 20–23. 20, *Graphomya* sp., thorax, dorsal view (from Couri & Carvalho 2002, modified from Arntfield 1975). 21, *Gymnopapuaia albicornis* (Walker), ovipositor, dorsal view (modified from Vockeroth 1972). 22, *Gymnopapuaia albicornis* (Walker), ovipositor, ventral view (modified from Vockeroth 1972). 23. *Heliomydaea punctiventris* Vockeroth, ovipositor, lateral view (modified from Vockeroth 1972).

### *Helina* Robineau-Desvoidy

*Helina* Robineau-Desvoidy, 1830: 493. Type species: *Helina euphemioidea* Robineau-Desvoidy, 1830 [= *Anthomyia pertusa* Meigen, 1826], des. Coquillett 1901: 137.

**Diagnosis.** Male head holoptic or dichoptic, eye with few hairs, arista plumose; mesonotum with 4 dark vittae, dorsocentrals 2+3, veins  $R_{4+5}$  and M conspicuously divergent at apex, prosternum and anepimeron bare, wing veins bare, prealar present in male, hind tibia without calcar.

**Comments.** Sixty species are recorded to the regions, mostly distributed in Australia and Papua New Guinea. The genus was recently firstly recorded to New Caledonia (Couri *et al.* 2010).

### *Hennigiola* Pont

*Hennigiola* Pont, 1969b: 930. Type species: *Spilogaster setulifera* Stein, 1906, orig. des.

**Diagnosis.** Male holoptic; arista with long, sparse and irregular plumosity; face carinate, acrostichals 0+1; dorsocentrals 2+4; postalar wall and suprasquamal ridge bare;

membrana surrounding prosternum with several setulae, but prosternum bare; anepimeron setulose; katepisternals 1+2; calcar absent; wing with subcostal sclerite setulose; vein  $R_{4+5}$  with several setulae on both surfaces; sternite 1 bare.

**Comments.** The genus and the single species *H. setulifera* Pont are endemic to Australia.

### *Idiohelina* Malloch

*Idiohelina* Malloch, 1921b: 238. Type species: *Idiohelina nubeculosa* Malloch, 1921, orig. des.

**Diagnosis.** Delicate yellow species; prementum of proboscis undusted; acrostichal presutural setae not differentiated; prosternum bare; prealar seta absent; postsutural dorsocentrals 3; katepisternals 0-1+2; anepimeron bare; meron bare; wing with marginal cell of uniform width almost to its apex, the apical half of the cell being narrowly wedge shaped; all wing veins bare; scutellum with some fine hairs below at apex (as in *Anthomyiidae*); sternite 1 bare.

**Comments.** The genus is recorded to the regions on the basis of three species, all endemic to New Zealand.

### ***Phaonia* Robineau-Desvoidy**

*Phaonia* Robineau-Desvoidy, 1830: 482. Type species: *Phaonia viarum* Robineau-Desvoidy, 1830 [= *Musca valida* Harris, 1780], des. Coquillett 1901: 140.

Diagnosis. Eye ciliated; female frons without proclinate orbital setae; arista plumose; prosternum bare; dorsocentrals 1–2+3–4; notopleuron with covering setulae; posterior notopleural seta weaker than anterior seta; anepimeron bare; inferior calypter glossiform; base of  $R_{4+5}$  with ventral setulae or bare; hind tibia with a strong posterodorsal seta (calcar) inserted at apical fourth.

Comments. Two species, both recorded only from Australia.

### ***Phaonina* Emden**

*Phaonina* Emden, 1965: 201. Type species: *Phaonina corbeti* Malloch, 1931, orig. des.

Diagnosis. Male dichoptic; male and female with a pair of strong postocellar, stronger than ocellar in male; lower third of facial ridge with several rows of setulae; arista with long hairs; acrostichals 3+2-3; dorsocentrals 2-3+4-5; katapisternals 1+2; prosternum bare; katepimeron setulose; scutellum with 3 strong marginals, and a moderate basal one; inferior calypter Musca-type; veins bare on upper side; ventral side with small setulae on Sc beyond h and on base of  $R_{4+5}$ ; vein M slightly bent forwards at tip; hind tibia with a short calcar.

Comments. The genus has only one species, described as *Phaonia corbeti* by Malloch (1931), who, in the original description of this species mentioned the bare wing veins, corrected by Emden (1965) in the genus description. Malloch (1931) also referred to the close appearance of this species with others Muscinae.

### ***Prohardyia* Pont**

*Hardyia* Malloch, 1926: 554. Type species: *Mydaea carinata* Stein, 1910, orig. des. [Preocc.]

*Prohardyia* Pont, 1969b: 939 (nom. nov. for *Hardyia*).

Diagnosis. Male holoptic; arista with long and sparse plumosity, bare on basal third ventrally; face carinate; acrostichals 0+1; dorsocentrals 2+4; postalar wall and suprasquamal ridge bare; prosternum and membrane surrounding prosternum bare; anepimeron setulose; katapisternals 1+2; calcar absent; wing with subcostal sclerite bare; vein  $R_{4+5}$  with several setulae on both surfaces; sternite 1 setulose.

Comments. Five species all occurring in Australia; four endemic and *P. carinata* Stein also recorded from Lord Howe I.

Mydaeinae  
[Ref. Vockeroth (1972)]

### ***Brontaea* Kowarz**

*Brontaea* Kowarz, 1873: 461. Type species: *Anthomyia polystigma* Meigen, 1826, des. Coquillett 1910: 516.

Diagnosis. Male holoptic; arista with very short hairs, shorter than its basal diameter; dorsocentrals 2+4; prealar absent; prosternum bare; anepimeron bare; katapisternals 1+2; lower calypter glossiform (“*Phaonia*-type”) or enlarged posteriorly (“*Musca*-type”); hind tibia without calcar; veins bare; vein M slightly curved towards  $R_{4+5}$  on apical portion; inferior calypter “*Phaonia*-type”; sternite 1 setulose.

Comments. Six species occurring in the regions; the ones recorded from Australia – *B. obliterata* (Malloch), *B. ruficornis* (Malloch) and *B. subtilis* (Stein) were revised by Pont (1977) (as *Gymnodia* Robineau-Desvoidy).

### ***Chaetopapuaia* Vockeroth**

*Chaetopapuaia* Vockeroth, 1972: 56. Type species: *Chaetopapuaia setifrons* Vockeroth, 1972, orig. des.

Diagnosis. Male holoptic; prosternum with a few dark hairs, restricted on lateral margins on posterior half; dorsocentrals 2+3; pre-alar weak but distinct in both sexes; anepimeron bare; katepimeron with many long and strong black hairs and in front of the spiracle; katapisternals 1+2; calcar absent; wing with subcostal sclerite bare; vein  $R_{4+5}$  with 3-4 short setae above and 4-5 below at base; apex of vein M curved slightly forward, sternite 1 with a pair of setae.

Comments. The genus is known from only one species, *C. setifrons* Vockeroth, endemic to Papua New Guinea.

### ***Graphomya* Robineau-Desvoidy**

*Graphomya* Robineau-Desvoidy, 1830: 403. Type species: *Musca maculata* Scopoli, 1763 (Duponchel in d’Orbigny 1845: 305).

Diagnosis. Male holoptic; eye with cilia; female without interfrontal setae; arista enlarged on basal third, plumose; characteristic marks on scutum (Fig. 20) dorsocentrals 2+4; prealar seta present; prosternum, postalar wall, suprasquamal ridge and anepimeron bare; katapisternals 0+2, meron setulose below spiracle and on katepimeron; calcar absent; sternite 1 setulose.

Comments. Eleven species recorded to the regions, eight of them keyed by Vockeroth (1972).

### ***Gymnopapuaia* Vockeroth**

*Gymnopapuaia* Vockeroth, 1972: 26. Type species: *Aricia albicornis* Walker, 1864, orig. des.

Diagnosis. Male holoptic; dorsocentrals 2+3-4; prealar seta short, present or absent in male and usually present in female; prosternum, postalar wall, suprasquamal ridge and anepimeron bare; katapisternals 1+2; katepimeron with abundant hairs on in front of spiracle; calcar absent; base of vein  $R_{4+5}$  with several fine setae on ventral surface, sometimes extending to r-m crossvein, sternite 1 setulose, ovipositor characteristic (Figs. 21 and 22).

Comments. Twenty six species recorded from the regions, mainly occurring in Papua New Guinea. Vockeroth (1972) keyed 25 of them.

Table I. Valid Muscidae genera and subgenera of the Australasian and Oceanian regions and number of species (based on Pont (1989) and the updated online version last of the catalogue (Pont 2007) last reviewed in May 2007 for all regions, Couri *et al.* (2010) for New Caledonia and Carvalho *et al.* (2005) for classification).

SUBFAMILY, GENERA AND SUBGENERA	NR. OF SPECIES
<b>ATHERIGONINAE</b>	
<i>Atherigona</i> Rondani	55
<b>MUSCINAE</b>	
<b>MUSCINI</b>	
<i>Morellia</i> Robineau-Desvoidy	01
<i>Musca</i> Linnaeus	10
<i>Myiophaea</i> Enderlein	01
<i>Neomyia</i> Walker	11
<i>Pyrellia</i> Robineau-Desvoidy	02
<b>STOMOXYINI</b>	
<i>Haematobia</i> Le Peletier & Serville	02
<i>Haematobosca</i> Bezzi	01
<i>Stomoxys</i> Geoffroy	02
<b>AZELIINAE</b>	
<b>AZELIINI</b>	
<i>Australophyra</i> Malloch	01
<i>Hydrotaea</i> Robineau-Desvoidy	07
<b>REINWARDTIINI</b>	
<i>Balioglutum</i> Aldrich	01
<i>Calliphoroides</i> Malloch	01
<i>Muscina</i> Robineau-Desvoidy	03
<i>Passeromyia</i> Rodhain & Villeneuve	04
<i>Synthesiomyia</i> Brauer & Bergenstamm	01
<b>PHAONINAE</b>	
<b>METOPOMYIINI</b>	
<i>Metopomyia</i> Malloch	01
<b>EGINIINI</b>	
06	
<i>Neohelina</i> Malloch	02
<b>DICHAETOMYIINI</b>	
<i>Dichaetomyia</i> Malloch	73
<b>PHAONIINI</b>	
<i>Beccimyia</i> Pont	01
<i>Buccophaonia</i> Emden	01
<i>Helina</i> Robineau-Desvoidy	60
<i>Hennigiola</i> Pont	01
<i>Idiohelina</i> Malloch	03
<i>Phaonia</i> Robineau-Desvoidy	02
<i>Phaonina</i> Emden	01
<i>Prohardya</i> Pont	05
<b>MYDAEINAE</b>	
<i>Brontaea</i> Kowarz	06
<i>Chaetopapuaia</i> Vockeroth	02
<i>Graphomya</i> Robineau-Desvoidy	11
<i>Gymnopapuaia</i> Vockeroth	26
<i>Hebecnema</i> Schnabl	04
<i>Helinomydaea</i> Vockeroth	04
<i>Myospila</i> Rondani	20
<i>Papuaia</i> Malloch	05
<i>Papuaiella</i> Vockeroth	01
<b>COENOSIINAE</b>	
<b>LIMNOPHORINI</b>	
<i>Exsul</i> Hutton	02
<i>Heliographa</i> Malloch	18
<i>Limnohelina</i> Malloch	10
<i>Limnophora</i> Robineau-Desvoidy	118
<i>Lispe</i> Latreille	32
<i>Paracoenosia</i> Malloch	02

Table I. Cont.

SUBFAMILY, GENERA AND SUBGENERA	NR. OF SPECIES
<i>Paralimnophora</i> Lamb	03
<i>Spilogona</i> Schnabl	33
<b>COENOSIINI</b>	
<i>Cephalispa</i> Malloch	04
<i>Coenosia</i> Meigen	14
<i>Lispocephala</i> Pokorny (+Pectinisetia Stein)	110
<i>Macrorchis</i> Rondani	01
<i>Orchisia</i> Rondani	01
<i>Parvisquama</i> Malloch	08
<i>Pygophora</i> Schiner	41
Unplaced species of Phaoniinae and Mydaeinae	07
Unplaced species of Muscidae	02
<b>TOTAL</b>	<b>737</b>

### *Hebecnema* Schnabl

*Hebecnema* Schnabl, 1889: 331 (*Aricia* subg.). Type species: *Anthomyia umbratica* Meigen, 1826, des. Coquillett 1901: 137.

Diagnosis. Male holoptic; upper anterior eye facets of male distinctly enlarged; dorsocentrals 2+4; prealar present; prosternum, anepimeron; sternite 1 bare; posterior spiracle very small in both sexes; vein M slightly curved forward at apex, hind tibia with one strong anterodorsal and one weaker anteroventral seta.

Comments. Four species recorded from New Guinea, Solomon Is, New Caledonia and Australia, all of them keyed in Vockeroth (1972).

### *Helinomydaea* Vockeroth

*Helinomydaea* Vockeroth, 1972: 58. Type species: *Helinomydaea acrostichalis* Vockeroth, 1972, orig. des.

Diagnosis. Male holoptic; one pair of strong presutural acrostichals; dorsocentrals 2+3; prealar weak; anepimeron and meron bare; prosternum and sternite 1 bare; posterior spiracle large in male and small in female, with a row of about seven setae on posterior margin; vein  $R_{4+5}$  bare above and with some setae below, from base to a little forward; hind tibia with two strong anterodorsals, 3-4 weak anteroventrals and a very short posterodorsal; dorsal apical absent or extremely short and one anterodorsal apical strong, ovipositor elongate (Fig. 23).

Comments. Four species, two occurring in Papua New Guinea and two in Australia. Vockeroth (1972) justified the position of the genus among the Mydaeinae "because of the presence of setae below the base of vein  $R_{4+5}$ ", because of the very short female cerci with only a trace of sclerotization on the lower (inner) surface, and because of the very long filaments of the egg" (Vockeroth, 1972: 60).

### *Myospila* Rondani

*Myospila* Rondani, 1856: 91. Type species: *Musca meditabunda* Fabricius, 1782, orig. des.

Diagnosis. Male holoptic; female with a pair of interfrontal setae; arista enlarged on basal third, plumose; dorsocentrals 2+4; prealar present; postalar wall, suprasquamal ridge, prosternum setulose in most species; anepimeron and meron bare; katepisternals 2+2; posterior spiracle with bare margins; vein M slightly curved forward apically; vein  $R_{4+5}$  with setulae at base on both surfaces of wing; hind tibia without calcar; sternite 1 bare; ovipositor and egg *Mydaea* type.

Comments. Twenty species recorded to the regions, most of them keyed in Vockeroth (1972).

### **Papuaia Malloch**

*Papuaia* Malloch, 1921c: 422. Type species: *Spilogaster rufescens* Stein, 1900 [misid., = *Spilogaster curvinervis* Stein, 1900], orig. des.

Diagnosis. Male holoptic, dorsocentrals 2+3-4, prealar absent in male, present in female; meron setulose, prosternum with many fine and pale hairs, anepimeron bare, sternite 1 each with a few short pale hairs, vein M slightly curved forwards at apex, Rs with 4-5 short setae above and below.

Comments. Five species recorded, all of them keyed by Vockeroth (1972). According to him, except for *P. asternata* Vockeroth, the other four species may be conspecific, as they differ mainly in color or in number of posterior dorsocentral setae.

### **Papuaiella Vockeroth**

*Papuaiella* Vockeroth, 1972: 54. Type species: *Papuaiella ponti* Vockeroth, 1972, orig. des.

Diagnosis. Male holoptic with anterior eye facets slightly enlarged; palpi slender, very slightly broadened towards apex; dorsocentrals 2+3; prealar seta weak but distinct in male and stronger in female; anepimeron with black setulae dorsally on subalar ridge; prosternum, sternite 1 bare; vein  $R_{4+5}$  with few fine setae below near the humeral cross vein; vein M slightly curved forward at apex.

Comments. Genus and the unique species *P. ponti* Vockeroth endemic to Papua New Guinea. Vockeroth (1972) mentioned the similar general aspect of this genus and *Gymnopapuaia*, from which it can be segregated by the setulose anepimeron and by the greatly reduced halves of sternite 8 in female ovipositor.

Coenosiinae

Limnophorini

### **Exsul Hutton**

*Exsul* Hutton, 1901: 75. Type species: *Exsul singularis* Hutton, 1901, mon.

Diagnosis. Eye slightly haired; arista bare; parafacial haired; prealar seta absent; dorsocentrals 2+4; meron and prosternum bare; wing very broad; veins  $R_{4+5}$  and M parallel; "fifth vein diverging widely, making the posterior cross vein longer than the distance between it and the chief cross-vein"

[as in original description]; anepimeron bare; sternite 1 bare.

Comments. The general appearance is very different from all other muscids, especially because of the very broad wing. Two known species are endemic to New Zealand.

### **Heliographa Malloch**

*Heliographa* Malloch, 1921a: 169. Type species: *Limnophora tonsa* Stein, 1909 (as *intonsa*) [= *Hydrotaea javana* Macquart, 1851], orig. des.

Diagnosis. Male holoptic or eye intermediate; eye bare; arista bare a plumose; prosternum frequently setulose; dorsocentrals 2+4-6; anepimeron bare; scutellum with numerous hairs on sides of lower surface anteriorly; hind tibia without calcar; vein  $R_1$  with strong setulae on the dorsal surface; vein  $R_{4+5}$  setulose at base on both surfaces and slightly curved forward at apex and with some setulae at base; sternite 1 bare or setulose.

Comments. From the 18 species occurring in the regions, 12 were more recently described by Shinonaga & Pont (1988), who revised the melanesian (Papua New Guinea, Solomon Islands and Bismarck Archipleago) *Heliographa*. Sixteen species were keyed.

### **Limnohelina Malloch**

*Limnohelina* Malloch, 1930: 294. Type species: *Cordylura debilis* Hutton,

Diagnosis. Frons very wide in both sexes, never less than one third of the width of the head, with margins slightly emarginate close to the middle; ocellar setae strong; two orbitals reclinate; arista bare; parafacial bare; gena about half as high as eye; prosternum and meron bare; anterior presutural dorsocentral pair of seta much shorter than the second; prealar absent; Katepisternals 1+2; males with two or more strong and long fasciculate setae near apex of the mesosternum among other finer and long setae; hind tibia with no posterodorsal seta; sternite 1 setulose.

Comments. All 10 recorded species are endemic to New Zealand.

### **Limnophora Robineau-Desvoidy**

*Limnophora* Robineau-Desvoidy, 1830: 517. Type species: *Limnophora palustris* Robineau-Desvoidy, 1830 [= *Anthomyia maculosa* Meigen, 1826], des. Coquillett 1910: 561.

Diagnosis. Males eyes separated by no more than one-fifth of the head width or male head dichoptic; eye almost invariably bare; arista bare to plumose; prestomal teeth developed; postsutural dorsocentrals 3+3-4; prosternum setulose; vein M slightly bent forwards at apex; wing with setulae at base of  $R_{4+5}$  on both surfaces; sternite 1 bare; ovipositor with segment 8 directed upwards and with spicules; hypoproct elongated and with spines.

Comments. Shinonaga (2005) reviewed the *Limnophora* from New Guinea and Solomon Islands and described 87 new species to science; all were keyed. With this contribution, this is the most speciose genus in the regions, the total number of 118 recorded species.



***Lispe* Latreille**

*Lispe* Latreille, 1796: 169. Type species: *Musca tentaculata* De Geer, 1776, subs. mon. Latreille, 1802: 462.

Diagnosis. Male dichoptic; palpus enlarged apically, spatula-like; prestomal teeth developed; without interfrontal setae and proclinate orbital; parafacial setulose; dorsocentrals 0-2+0-4; prealar seta absent; anepimeron setulose; katepisternals 0-1+2; sternite 1 setulose; male gonopod absent; ovipositor with segment 8 directed upwards and with spicules; hypoproct elongated and with spines.

***Paracoenosia* Malloch**

*Paracoenosia* Malloch, 1938: 254. Type species: *Paracoenosia tonnoiri* Malloch, 1938, orig. des.

Diagnosis. Frons at vertex in male less than and in female more than one-fourth of the head width and much longer than wider; eye bare; ocellar triangle slender and continued to beyond middle frons; ocellar seta well developed; parafacial and arista bare; prealar absent; dorsocentrals 2+3; katepisternum haired; katepisternals 3, not in an equilateral triangle, or 4; anepimeron bare; all wing veins bare; hind tibia with two anterodorsal and two posterodorsal setae; vein M not curved forwards at tip; vein  $A_1+CuA_2$  extending over two-thirds of the distance to the wing margin; sternite 1 bare.

Comments. Two species recorded from New Zealand. Malloch (1938) placed the genus among the Phaoninae, mainly based on the arrangement of the katepisternals (not in an equilateral triangle) and in the length of vein  $A_1+CuA_2$ , longer than usually found among the Coenosiinae.

***Paralimnophora* Lamb**

*Paralimnophora* Lamb, 1909: 136. Type species: *Paralimnophora depressa* Lamb, 1909, des. Séguy 1937: 272.

Diagnosis. Male dichoptic; eye bare or sparsely haired; male with 2 pairs of orbitals; arista minutely pubescent; gena high; ocellar seta strong; parafacial bare; prosternum bare; prealar absent; acrostichals 0+1; dorsocentrals 2+3; meron bare; all wing veins bare; scutellum with both pairs of setae strong; hind tibia without posterodorsal seta; abdomen depressed; sternite 1 bare.

Comments. The original description basically compared the new genus with *Limnophora*. Harrison (1955) gave a key to segregate the species based on general ground color and abdominal marks. Genus and the three recorded species are endemic to New Zealand.

***Spilogona* Schnabl**

*Spilogona* Schnabl, 1911: 92 (*Limnophora* subg.). Type species: *Aricia carbonella* Zetterstedt, 1845, mon.

Diagnosis. Male head holoptic or dichoptic; some females with a holoptic head (only in the Australasian region); prestomal teeth developed; labella reduced; parafacial bare

or setulose; prealar absent; prosternum bare; dorsocentrals 2+3-4; katepisternals 1+1-3; meron bare or setulose; hind tibia without calcar; wing veins bare; ovipositor moderately long, tergites 6 and 7 large; sternite 1 bare or setulose.

Comments. From the 33 species recorded to the regions, 31 are endemic to New Zealand, one to Australia and one to Norfolk Island.

**Coenosiini*****Cephalispa* Malloch**

*Cephalispa* Malloch, 1935: 658 (*Lispocephala* subg.). Type species: *Lispocephala scutellata* Malloch, 1935, orig. des.

Diagnosis. Male dichoptic; posterior eye-margin emarginated in basal half; frons parallel-sided, longer than wide; prestomal teeth well-developed; prealar seta absent; two pairs of reclinate orbital setae; ocellar setae short, hair-like; 2 pairs of presutural dorsocentrals, long or short; anepimeron bare; katepisternals 1+1+1, arranged in an equilateral triangle; both pairs of scutellar setae well developed or apical pair reduced; wing veins bare; vein M straight at apex; hind tibia with a supramedian posterodorsal and anterodorsal seta, a strong median anterodorsal and a submedian anteroventral; abdomen of male lanceolate.

Comments. Only four species recorded to the regions.

***Coenosia* Meigen**

*Coenosia* Meigen, 1826: 210. Type species: *Musca tigrina* Fabricius, 1775, des. Westwood 1840: 143.

Diagnosis. Male dichoptic; one pair of reclinate orbital setae; frons parallel-sided, longer than wider; labella reduced, prestomal teeth well developed; prealar seta absent; lower proepimeral seta directed downwards; dorsocentrals 1+3 (rarely 2+3); anepimeron bare; katepisternals 1+1+1, arranged in an equilateral triangle; scutellum with both pairs of setae developed; inferior calypter about 1.8 times as long as the upper one; hind femur with two preapical setae; hind tibia with one submedian anterodorsal seta and usually one anteroventral; sternite 1 bare; male hypandrium tubular; female ovipositor long and with many microtrichia.

Comments. Fourteen species are recorded to the regions.

***Lispocephala* Pokorny**

*Lispocephala* Pokorny, 1893: 532. Type species: *Anthomyia alma* Meigen, 1826, orig. des.

*Pectiniseta* Stein, 1919: 96, 145. Type species: *Caricea prominens* Stein, 1910 [= *Coenosia pectinata* Stein, 1900], mon. [syn. by Couri & Pont 2000].

Diagnosis. Head long; two pairs of reclinate orbital setae; antenna inserted on upper half of the head; pair of ocellar setae strong; arista long plumose in all its extension in both surfaces in female, and only in dorsal surface in some males, where the ventral side is bare or with a few hairs; ocellar triangle long, reaching lunula; dorsocentral setae 1+3; hind tibia with

at least one seta on posterodorsal surface, two anterodorsals and one anteroventral, the last one short; sternite 1 bare.

Comments. *Lispocephala*, together with *Limnophora* are, by far, the two most speciose genera in the Australasian and Oceanian regions, with more a hundred species each. Hardy (1981) described many species endemic to Hawaiian Island. Considering the synonymy with *Pectiniseta* (see Couri & Pont 2000), 110 species are recorded. Pont (1972) revised the Australian species described under *Pectiniseta*.

### ***Macrorchis Rondani***

*Macrorchis* Rondani, 1877: 280. Type species: *Musca meditata* Fallén, 1825, orig. des.

Diagnosis. Male dichoptic; one pair of reclinate orbital seta; dorsocentrals 2+3; scutellum with both basal and apical pairs of setae long; fore tibia with a posterior median seta; mid tibia with one anterodorsal and one posterodorsal setae; hind tibia with one anterodorsal, one anteroventral and without a posterodorsal seta.

Comments. One species recorded to New Zealand probably imported (Pont 1989).

### ***Orchisia Rondani***

*Orchisia* Rondani, 1877: 16. Type species: *Sapromyza costata* Meigen, 1826, orig. des.

Diagnosis. Head with two pairs of reclinate frontal setae; arista with hairs along its entire length; prestomal teeth developed; frontal triangle reaching lunula; dorsocentrals 1+3; prealar absent; katapisternals 1+1+1; scutellum with only the apical pair of setae strong; fore tibia without a median posterior seta; hind tibia with a very small submedian posterodorsal seta.

Comments. *O. costata* Meigen is the only recorded species, widespread also in the Palearctic, Oriental and Afrotropical regions.

### ***Parvisquama Malloch***

*Parvisquama* Malloch, 1935: 662 (*Lispocephala* subg.). Type species: *Lispocephala pahangensis* Malloch, 1935, orig. des.

Diagnosis. Small species, about 3.5 mm long; ocellar triangle long and narrow, reaching lunule; inferior calypter reduced, linear; basal scutellar seta half as long as apical one; fore tibia without setae on middle; mid tibia with only one posterior seta; hind tibia with 2 anterodorsals, 2 posterodorsals and one anteroventral.

### ***Pygophora Schiner***

[Ref. Crosskey (1962)]

*Pygophora* Schiner, 1868: 295. Type species: *Pygophora apicalis* Schiner, 1868, orig. des.

Diagnosis. Frons high, much wider at anterior margin than at vertex; two pairs of reclinate orbital setae; each

fronto-orbit usually with 4 setae; frontal triangle short; arista with long hairs on basal half; prestomal teeth developed; dorsocentrals 1+3; presutural seta sometimes preceded by a short one; prealar seta absent; anepimeron bare; fore tibia with one median seta on posterior surface; mid tibia with 2 posterodorsal setae; hind tibia with one anteroventral, 2 anterodorsal and 2 posterodorsal setae.

Comments. Crosskey (1962) presented a full revision of the species with descriptions and illustrations and a key to identification (nine species posteriorly described by Snyder (1965) were not included in his revision).

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