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Drosophilidae of Australia V. Remaining Genera and Synopsis (Insecta: Diptera)

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Drosophilidae of Australia V.* Remaining Genera and Synopsis (Insecta : Diptera)

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Abstract

The Australian drosophilid fauna is reviewed; a synopsis of the 221 species (51 described as new in this paper) in provided. The species are referable to 31 genera (including four newly established) as follows: *Acletoxenus* von Frauenfeld (two species); *Amiota* Loew (three); *Baeodrosophila* Wheeler & Takada (two); *Balara*, gen. nov. (one); *Cacoxenus* Loew (one); *Chymomyza* Czerny (two); *Collessia*, gen. nov. (one); *Crincosia*, gen. nov. (two), *Dettopsomyia* Lamb (one); *Drosophila* Fallen (122), *Fostegana* Hendel (one), *Gitona* Meigen (one), *Hypselothyrea* de Meijere (two); *Leucophenga* Mik (21); *Liodrosophila* Duda (five); *Lissocephala* Malloch (one), *Luzonimyia* Malloch (one), *Microdrosophila* Malloch (seven); *Mulgravea*, gen. nov. (one), *Mycodrosophila* Oldenberg (21), *Neotanygastrella* Duda (one); *Nesiodrosophila* Wheeler & Takada (four); *Paramycodrosophila* Duda (four); *Phorticella* Duda (one); *Scaptomyza* Hardy (three), *Sphaerogastrella* Duda (one); *Stegana* Meigen (four), *Styloptera* Duda (two); *Tambourella* Wheeler (one); *Zaprionus* Coquillett (one); and *Zygothrica* Wiedemann (one). Keys to genera and species are provided. The following new synonymies are proposed: *Gitonides convergens* Malloch = *Amiota fasciata* (Kertesz), *Liodrosophila australis* Malloch = *Lissocephala metallescens* (de Meijere), and *Drosophila rhipister* Bock = *Drosophila brunnea* de Meijere. The drosophilid fauna of Australia is most closely related to that of south-east Asia and New Guinea and, with the probable exception of the few species in the genera *Scaptomyza* and *Zygothrica*, appears to have reached Australia via migrations from the north. The richest faunas in terms of both numbers of genera and numbers of species occur in the rainforests of north Queensland. The *Drosophila* subgenus *Scaptodrosophila* was probably the earliest Australian invader and is the largest single Australian group; it has undergone adaptive radiation in southern as well as northern Australia. Few other drosophilid groups are represented in southernmost Australia and relationships with other Gondwanaland drosophilid faunas are absent.

Introduction

The Drosophilidae are a large family of acalyptrate Diptera of world-wide distribution. The first complete catalogue of the family (Wheeler 1981) lists about 2500 species in 55 genera, although there can be little doubt that many more species remain to be discovered or described. Previous papers in this series devoted to the Australian fauna have discussed the genera *Drosophila* (81 species), *Scaptomyza* (two species), *Leucophenga* (21 described species) and *Mycodrosophila* (20 described species) (Bock 1976, 1977*a*, 1979, 1980*a*). The number of described species of *Drosophila*, however, now numbers 101 (Bock 1977*b*, 1980*b*; Bock and Parsons 1978*a*, 1978*b*, 1979; Cook *et al.* 1977; McEvey 1981; Parsons and Bock 1977*a*, 1979), while a third species of *Scaptomyza* has been recorded in Tasmania (Hardy *et al.* 1979). Several other drosophilid genera represented in Australian museum

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collections have previously been noted (Bock 1976), although there are fewer genera in which Australian species have been formally recorded or described. The latter genera [with number of species and appropriate reference(s) in each case] are *Acletoxenus* (one; Duda 1936), *Amiota* (one; Malloch 1923), *Cacoxenus* (two, as *Gitonides*; Malloch 1924, 1927; but see *Amiota fasciata* below), *Dettopsomyia* (one; Wheeler and Takada 1964), *Lissocephala* (one, as *Liodrosophila*; Malloch 1928), *Sphaerogastrella* (one; Bock 1977*b*), *Tambourella* (one; Wheeler 1957) and *Zaprionus* (one; Bock 1977*b*).

This paper reviews all Australian genera of the family Drosophilidae. Although concerned primarily with those genera (including new genera) and portions of museum collections not yet considered in this series, summaries of *Drosophila*, *Scaptomyza*, *Leucophenga* and *Mycodrosophila* are provided for completeness with inclusion of some new material.

The Family Drosophilidae and its Subdivision

The diagnosis of the family Drosophilidae has been discussed in greater or lesser detail by various workers (e.g. Duda 1924*a*, 1934; Hennig 1958; Wheeler 1952). Bock (1976) summarized the 'essential' characteristics as: presence of one pair of proclinate and one or two pairs of reclinate (fronto-) orbital bristles; postvertical bristles (if present) parallel or convergent; mesopleuron bare; costa twice broken; and auxiliary vein (*Sc*) not reaching costal margin. [A few species, e.g. *Zaprionus obscuricornis* (de Meijere), otherwise having the essential features of a drosophilid and no doubt correctly included in the Drosophilidae, possess hairy mesopleura; no such species has been detected in Australia.]

Although up to four subfamilies have been established in the past (including, however, the genus *Camilla* which is now placed in its own family), only two subfamilies of Drosophilidae, Drosophilinae and Steganinae, are now recognized (Wheeler 1952, 1981) (cf. also comments under *Acletoxenus quadristriatus* below). There has, however, been very little recent discussion of the diagnosis and status of these subfamilies, and the present arrangement is clearly not entirely satisfactory [five of the genera listed in Wheeler's (1981) catalogue, for example, are appendixed as 'genera of uncertain affinity']. There are certain characteristics which are frequently found in those genera traditionally assigned to the Steganinae, and others of frequent occurrence in the genera conventionally assigned to the Drosophilinae, but no universally applicable diagnostic difference (that is to say, a characteristic possessed by all members of one subfamily and confined exclusively to that subfamily) can yet be claimed. When combinations of characteristics are considered some strong consistencies are evident, but again the classification is complicated by exceptions. (Similar problems are encountered in the characterizations of various genera, as discussed below and as is evident from the structure of the generic key; of course this type of problem is hardly confined to the Drosophilidae.)

The steganine genera have been characterized by: possession of (usually large) prescutellar bristles; the anterior reclinate orbital bristle is often as large as, or almost as large as, the proclinate and posterior reclinate orbitals (all three orbital bristles are usually large); the posterior reclinate orbital bristle is usually closer to the inner vertical bristle than to the proclinate orbital; the third costal section of the wing in some genera possesses small ventral thorn-like spines; the discal and second basal wing cells in many genera are separate; the costa typically terminates

at (or just beyond) the end of the third longitudinal vein; and the sternopleuron usually possesses two large subequal bristles. The drosophiline genera are characterized as: usually lacking prescutellar bristles; the anterior reclinate orbital bristle is usually small or absent; the posterior reclinate orbital bristle is usually close to the proclinate orbital; the third costal section never possesses ventral spines; the discal and second basal wing cells are confluent; and the costa typically reaches the apex of the fourth longitudinal vein.

Most species included in the Steganinae possess prescutellar bristles, which are usually large. Possession of prescutellar bristles is not, however, an exclusively steganine prerogative; almost all of the (well over 100) species of the *Drosophila* subgenus *Scaptodrosophila* possess well developed prescutellars, and a significantly differentiated (if not large) pair of prescutellar acrostichals is present in some of the minor drosophiline genera (cf. *Baeodrosophila* below).

All three orbital bristles are typically large in the steganine genera, but the characteristic is not universal. Thus in *Amiota annulata* the anterior reclinate orbital is appreciably smaller than the proclinate and posterior reclinate orbitals, and in *Acletoxenus formosus* the three bristles occur in increasing size posteriorly. The anterior reclinate orbital is typically small in the drosophiline genera, but again there are exceptions; thus in *Chymomyza* species the anterior reclinate orbital is large, although placed well anterior to the proclinate orbital (an arrangement not found in the Steganinae). Whether or not the posterior reclinate orbital is closer to the inner vertical bristle than to the anterior reclinate orbital is often rather equivocal; in some species of both subfamilies it appears to be more or less equidistant between them, although it is probably true to say that in the majority of cases the posterior reclinate orbital bristle is placed higher on the front in the Steganinae than in the Drosophilinae.

Some genera (see below) of Steganinae possess small ventral thorn-like spines on the third costal section. This character is never found in the Drosophilinae, but it is not of universal occurrence amongst the steganines and cannot, therefore, by itself serve as a reliable diagnostic feature. The possession of a small crossvein separating the discal and second basal wing cells falls into the same category; the crossvein is absent in all Drosophilinae but present in some Steganinae only. In Steganinae the costa typically reaches only to the apex of the third longitudinal vein or just beyond, but the character is, again, not universal; thus in *Acletoxenus formosus* the costa reaches the apex of the fourth vein. In all Drosophilinae examined during the course of this study the costa reaches the apex of the fourth vein.

The character 'sternopleuron with two large subequal bristles' seems to be of general occurrence amongst the Steganinae. In the Drosophilinae, however, the sternopleural setation is very variable, ranging from absent (*Sphaerogastrella*) to possession of three large macrochaetae (most *Scaptodrosophila*); one, two or three macrochaetae may be present, and where more than one occur the relative sizes also vary from genus to genus, and are often variable within a genus.

Okada (1956) compared a number of Japanese species of both subfamilies and found some constant differences in the genitalia. Thus in the Steganinae the lobes of the egg guide were found to be 'fused . . . without forming a basal isthmus', while in the Drosophilinae the lobes are not so fused. The female ninth abdominal tergite was also found to be bifid laterally in the Steganinae but not in the

Drosophilinae. (The two other genital characters examined by Okada were not found to exist in alternate states exclusive to the respective subfamilies.) Okada also listed the character 'middle tibia with minute cuneiform bristles' present in all Steganinae and absent in all Drosophilinae examined. The universality of this and the two genital characters discussed above has not been determined.

Some comments should perhaps be offered on those species possessing other than the typical plumose arista. A modified arista is to be found in a number of genera; two forms of modification occur. The arista may be entirely bare or possess very few rays; or it may be micropubescent. Only one paper (McAlpine 1968) devoted to a consideration of the drosophilid species with bare or micropubescent aristae has been published; 15 such genera were keyed [but McAlpine's classification is now superseded (Wheeler 1981)]. An entirely bare arista is very rare; within the Australian fauna this character is limited to the species *Amiota* (*Erima*) *fasciata* (Kertész). One species of *Drosophila* (*D. nicholsoni* Malloch) possesses an arista bare except for a single large basal dorsal ray, while in another species (*D. moana* McEvey) the arista has a single short dorsal ray but a large terminal fork. An unusual type of reduction has occurred in *Amiota* (*Phortica*) *annulata* Malloch, in which the arista is apically bare but possesses a few basal dorsal rays. A micropubescent arista is more common, although still limited to genera with rather few species; within the Australian fauna five of the steganine genera (*Acletoxenus*, *Cacoxenus*, *Crincosia*, *Gitona* and *Luzonimyia*) are characterized *inter alia* by possession of micropubescent aristae, and in one of the drosophiline genera (*Baeodrosophila*) the arista is apically micropubescent in one species; further comments are given under the relevant generic headings below. It appears that the micropubescent arista is polyphyletic within the Drosophilidae, since it occurs in both steganine and drosophiline genera, although more common in the Steganinae.

It is less than satisfying to a taxonomist to be able to do no better than diagnose any taxon by a series of 'usuallies', but if the subfamilies are not to be ignored altogether there is no present alternative. The classification of the Drosophilidae clearly merits revision, a major undertaking which could hardly be attempted on the basis of one regional fauna (i.e. in this paper). With the characterizations of the subfamilies and the reservations discussed above in mind, the Australian genera are assigned to one or the other of the subfamilies as indicated below.

Key to Genera of Australian Drosophilidae

The 31 genera comprising the Australian drosophilid fauna are separated in the key below. Keys to the species of each genus are provided under the relevant generic headings in all cases where two or more species are known.

1.	Arista entirely bare	*Amiota* (part: *A. fasciata*)
	Arista with 1 or more rays, plumose or finely micropubescent	2
2(1).	Arista entirely finely micropubescent	3
	Arista not entirely micropubescent	7
3(2).	Thorax with dense greyish pollinosity	*Luzonimyia*
	Thorax without dense greyish pollinosity	4
4(3).	Ocellar bristles absent	*Acletoxenus*
	Ocellar bristles large	5
5(4).	Carina rudimentary	*Cacoxenus*
	Carina very prominent	6

6(5). Orbital bristles confined to posterior half of front ..... *Crincosia*
Orbital bristles not confined to posterior half of front ..... *Gitona*

7(2). Prescutellar pair of acrostichal chaetae differentiated 8
Differentiated prescutellars absent 16

8(7). Discal and 2nd basal cells of wing confluent 9
Discal and 2nd basal cells of wing separate 13

9(8). Sternopleuron with 2 large bristles 10
Sternopleuron with 3 large bristles ..... *Drosophila* (part)

10(9). Carina absent ..... *Leucophenga*
Carina present 11

11(10). Ocellar bristles in line with anterior ocellus, outside ocellar triangle ... *Baeodrosophila* (part)
Ocellar bristles behind anterior ocellus, within triangle 12

12(11). Presutural pair of dorsocentral bristles present in addition to 2 postsutural pairs ..... *Balara*
Presutural pair of dorsocentral bristles absent ..... *Drosophila* (part)

13(8). Arista apically bare, with basal rays only ..... *Amiota* (part: *A. annulata*)
Arista large, plumose 14

14(13). Thorax dark, with milky white spots on humeral calli and below wing base .....
..... *Amiota* (part: *A. albomaculata*)
Thorax without milky white spots 15

15(14). Wing with very dark coloration and complex pattern of pale spots and markings .. *Fostegana*
Wing without pattern as above ..... *Stegana*

16(7). Costa extended at distal incision to form blackened lappet 17
Wing without blackened lappet at distal incision 20

17(16). Mesonotum with 3 pairs of large subequal dorsocentral bristles ..... *Styloptera*
Mesonotum with 1–2 pairs of dorsocentral bristles 18

18(17). Mesonotum black or dark brown; anterior dorsocentral bristles, if present, greatly reduced
..... *Mycodrosophila* (part)
Mesonotum patterned, with 2 pairs of dorsocentral bristles 19

19(18). Carina high, knife-like ..... *Paramycodrosophila*
Carina large, bulbous ..... *Dettopsomyia*

20(16). Scutellum apically elongate, pointed and upturned ..... *Hypselothyrea*
Scutellum rounded, not apically upturned 21

21(20). Front polished, with metallic sheen evident at certain angles of illumination 22
Front not polished, without metallic sheen 25

22(21). Front clearly incised by dull line or band on each side 23
Front without dull lines or bands ..... *Lissocephala*

23(22). Scutellum black, velvety 24
Scutellum not black and velvety ..... *Mulgravea*

24(23). Abdomen highly rotund, broader than thorax ..... *Sphaerogastrella*
Abdomen slender, not broader than thorax ..... *Liodrosophila*

25(21). Mesonotum with longitudinal white-silvery stripes 26
Mesonotum without longitudinal white-silvery stripes 27

26(25). Mesonotum dark with 2 complete stripes ..... *Phorticella*
Mesonotum pale with 4 or more complete stripes ..... *Zaprionus*

27(25). Carina very narrow (knife-like); wing strongly patterned 28
Carina, if present, usually not very narrow (if knife-like, wing clear) 29

28(27). Acrostichal hairs in 2 rows; pleura dark above, pale below ..... *Collessia*
Acrostichals absent; pleura entirely dark, glassy ..... *Tambourella*

29(27). Anterior reclinate orbital bristle large, well anterior to proclinate orbital ..... *Chymomyza*
Anterior reclinate orbital bristle usually small, at most slightly anterior to proclinate orbital 30

30(29). Mesonotum with 1 pair of dorsocentral bristles ..... *Mycodrosophila* (part)
Mesonotum with 2 or more pairs of dorsocentral bristles 31
31(30). Mesonotum with 2 pairs of dorsocentral bristles 32
Mesonotum with 4 pairs of dorsocentral bristles ... *Drosophila* (part: *D. pseudotetrachaeta*)
32(31). Carina low above, enlarged and rounded below ..... *Neotanygastrella*
Carina, if present, not as above 33
33(32). Proboscis exceptionally long, heavily chitinized ..... *Zygothrica*
Proboscis not exceptionally long and heavily chitinized 34
34(33). Ocellar bristles beside anterior ocellus, outside triangle ..... *Nesiodrosophila*
Ocellar bristles behind anterior ocellus, within triangle 35
35(34). Anterior dorsocentral bristles close to transverse suture ..... *Microdrosophila*
Anterior dorsocentral bristles close to posterior dorsocentrals 36
36(35). Acrostichal hairs in 2–4 rows ..... *Scaptomyza*
Acrostichal hairs in 6 or more rows ..... *Drosophila* (part)

Genera and Species Descriptions

Species descriptions are given below in the form used previously for drosophilids (Bock 1976, 1979, 1980*a*). The following abbreviations for specimen locations are used:

AM	Australian Museum, Sydney
ANIC	Australian National Insect Collection, Division of Entomology, CSIRO, Canberra
LT	Department of Genetics, La Trobe University, Melbourne
SPHTM	Commonwealth Institute of Health (formerly School of Public Health and Tropical Medicine), University of Sydney
UQ	Department of Entomology, University of Queensland, Brisbane
VM	National Museum of Victoria, Melbourne
Amsterdam	Zoologisch Museum, Universiteit van Amsterdam, Holland
Berlin	Museum für Naturkunde, East Berlin, Germany
Budapest	Természettudományi Múseum Állattára, Budapest, Hungary
London	British Museum (Natural History), London, England
Washington	U.S. National Museum, Washington D.C., U.S.A.

In several cases it is clear that certain genera are rather closely related, while in other cases generic relationships are obscure. For simplicity of presentation the genera of each subfamily are presented below in alphabetical order; obvious or postulated relationships are discussed under appropriate generic headings.

Subfamily **STEGANINAE**

1. Genus *Acletoxenus* von Frauenfeld

Acletoxenus von Frauenfeld, 1868, p. 152. Type-species *A. syrphoides* von Frauenfeld, 1868, by monotypy (see synonymy under *A. formosus* below), type locality Europe.

Arista micropubescent; carina absent; front narrow; eye very large, bare; cheek very narrow; ocellar bristles absent; vibrissa single; postvertical bristles minute; wing clear; costa reaching apex of 4th longitudinal vein; discal and 2nd basal cells confluent; legs without preapical or apical bristles.

Only three species of this genus have been described in addition to the type-species, i.e. *indicus* Malloch from India, *meijerei* Duda from Java and *quadristriatus* Duda (q.v.) from Thursday Island. The larvae of all species appear to be predaceous on Aleyrodidae (Hemiptera), but the phenomenon has been little studied; indeed all

of the above species are poorly or very poorly known. The genus is probably most closely related to *Gitona* and the other steganine genera possessing micropubescent aristae. The lack of ocellar bristles is especially distinguishing of *Acletoxenus*; in one other of the 'micropubescent arista' steganine genera (*Luzonimyia*, q.v.) the ocellar bristles are highly reduced but they are otherwise large.

1. *Acletoxenus formosus* (Loew)

Gitona formosa Loew, 1864, p. 366. (Syntypes in Berlin; type locality Europe.)
Acletoxenus syrphoides von Frauenfeld, 1868, p. 152. (Holotype location unknown; type locality Europe.) (Collin 1902*a*.)

Distinguishing features. As given in generic diagnosis above; mesonotum largely black.

Body length. *C.* 2.3 mm.

Head. Breadth of front 0.4 times length; front pale tan; ocellar triangle black. Face pale tan. Palp dusky. Cheek exceedingly narrow, linear. Orbital bristles in ratio 3 : 4 : 6, about equally spaced and in line, close to eye. Outer vertical bristle less than $^1/_2$ length of inner vertical, very fine.

Thorax. Mesonotum largely shiny black, yellowish tan posteriorly on each side in area of variable extent between prescutellar and posterior dorsocentral bristles to scutellar margin. Acrostichal hairs in numerous (at least 16) rather irregular rows. Anterior dorsocentral bristles very short and fine, considerably smaller than prescutellars, close to posterior dorsocentrals. Thorax with 1 small humeral and 1 small presutural bristle, 2 larger notopleurals, 1 large supraalar and 1 large postalar bristle. Scutellum yellowish tan posteriorly, whitish anteriorly. Notopleuron and immediately adjacent areas white; remainder of pleura whitish to yellowish except for large darkened area covering much of mesopleuron, lower anterior portion of pteropleuron and most of sternopleuron. Haltere pale tan. Legs entirely pale tan.

Wing. Hyaline. *C*-index, *c.* 4.9; 4*V*-index, *c.* 1.5; 5*X*-index, *c.* 0.9; *M*-index, *c.* 0.3. 3rd costal section with heavy setation on basal 0.4. Length, *c.* 2.5 mm.

Abdomen. State of colour preservation in Australian specimens uncertain (see 'Special Comments' below); tergites 1–3 apparently tan (dark in VM specimen, ? discoloured); tergite 4 tan, black posterolaterally; tergite 5 tan with central and lateral black spots; tergite 6 tan with small central black spot.

Distribution. Previously recorded from Europe and Israel (Wheeler 1981); the two Australian specimens are both from Victoria.

Specimens Examined

Types (Berlin). **Victoria**: Hyperparasite on coccynellid?, Aug. 1951, C.J.R. Johnston, 1 ♂ [probably collected in Mildura area in orchards (C.J.R. Johnston, personnal communication)] (ANIC); Ferntree Gully, 6.x.1928, F.E. Wilson, 1 ♂ (poor condition) (VM).

Special Comments

The specimens described above do not agree entirely with the European ones [types and previously published descriptions (Collin 1902*b*; Duda 1934)], in which there is more extensive blackening on the abdomen and less extensive pleural darkening. A different abdominal pattern (but the same pleural coloration) was

described by Duda. The types possess the abdominal pattern described by Duda (tergite 2 with lateral black spots; tergites 3–5 with small median black spots; tergites 4–5 with additional lateral black spots), and the sternopleuron only is dark. The Australian specimens otherwise agree well with the European ones. The reliability of abdominal coloration may be questioned, however, in view of the difference between the Australian specimens (which are otherwise identical). It furthermore seems unlikely that the more extensive pleural darkening in the Australian specimens reflects a genuine specific difference between the Australian and European specimens; the remaining three species of *Acletoxenus* are striped. Convergent evolution in southern Australia of a fifth species, very similar to *formosus* but so unlike those of India, Java and Thursday Island, seems highly unlikely, and Australia also possesses four introduced or cosmopolitan species of Aleyrodidae (Woodward *et al.* 1970). *A. formosus* could well have been introduced with the latter.

2. *Acletoxenus quadristriatus* Duda

Acletoxenus quadristriatus Duda, 1936, p. 347. (Syntypes ? in London; type locality Thursday Island.)

Duda (1936) described the above species in a paper titled 'Weitere neue afrikanische und orientalische akalyptrate Musciden des British Museum'. ['Further new African and Oriental acalyptrate Muscidae in the British Museum'; the Drosophilidae (as well as related groups now accorded family status) were formerly regarded as a subfamily (Drosophilinae) of Muscidae; Duda, however, despite the title of his paper, listed Carnidae, Chloropidae and Drosophilidae as families.] There is no record of *A. quadristriatus* having been rediscovered since Duda's publication, and no specimens are available in the Australian collections on which this work is based. A translation of Duda's description is given below to facilitate identification if the species is rediscovered.

'Head short and high, broader than thorax. Face and front small (typical of the genus), white or pale yellow, blackened between reddish ocelli; orbital bristles about equally spaced behind one another; proclinate orbital fine, slightly in front of middle of front, anterior reclinate orbital stronger, slightly behind middle of front; posterior reclinate orbital stronger again; ocellars absent; inner vertical bristle shorter than posterior reclinate orbital, outer vertical still shorter, postverticals minute. Occiput black, yellowish brown above in middle. Eyes bare. Cheek linear. Proboscis yellowish brown. Palp small, black. Antenna small, white or yellow; 3rd segment oval, slightly longer than 2nd segment, with somewhat longer pubescence than the extremely short-pubescent, fine-haired black arista, the latter over twice as long as 2nd and 3rd antennal segments. Mesonotum shining, not pollinose, with thick dark brown hairs, pale yellowish brown, with 4 broad dark brown to black longitudinal stripes coalescing or only slightly separated, medial ones reaching to rear third of mesonotum, lateral ones almost to posterior dorsocentrals (*meijerei* possesses only 2 medial stripes). Lateral stripes broaden anteriorly over humeral calli and are always spotted quite black in region of broadening. Shoulders and sides of mesonotum lateral to black spots white to transverse suture. Mesonotum behind transverse suture above notopleural border with diffuse brown stripes or spots; anterior and lateral margins of scutellum with more or less obvious black bordering. Pleura yellowish white, but mesopleuron with more or less extensive black spotting and sternopleuron

with small blackish stripes at upper edge. Scutellum whitish yellow, bare dorsally, arched, with the usual 4 strong black marginal bristles equally spaced. Macrochaetae of mesonotum black; 1 weak humeral present; presuturals absent; anterior and posterior notopleurals strong; a very long and strong bristle present behind several short macrochaetae between transverse suture and root of wing [supraalar?]; anterior postalar weaker than these macrochaetae; prescutellars stronger than anterior dorsocentrals, latter very fine and short, close to posterior dorsocentrals; posterior dorsocentrals strong; postalar rudimentary. Abdomen shining, with dense yellow pubescence, unlike *meijerei* Duda completely yellowish brown and without lateral black spots, but sometimes with small round black spot mid-dorsally on 5th segment. Anal segments very small; 2nd anal segment in ♂ yellowish brown, smooth, strongly shining and with very thick, fine, short yellow hairs. Genital appendages concealed. Legs whitish yellow, without special features. Wing colourless. Veins yellow. Venation typical of genus. Halteres yellow. Body length 1.5–2 mm. From several carded ♂♀. Queensland: Thursday I., vii.1934,"ex colonies of *Aleurodicus destructor*" (H.J. Hockings). The accompanying pupal cases are pure white with exception of the pale brown, thick and short, 2-segmented conical posterior spiracles.'

Specimens Examined

None.

Key to Australian Species of *Acletoxenus*

Mesonotum with 4 broad dark longitudinal stripes ..... *quadristriatus*
Mesonotum unbanded, almost entirely black ..... *formosus*

II. Genus **Amiota** Loew

Amiota Loew, 1861, p. 230. Type-species *A. leucostoma* Loew, 1861, by subsequent designation (Coquillett 1910); type locality Pennsylvania, U.S.A.

Phortica Schiner, 1862, p. 433. Type-species *Drosophila variegata* Fallén, by original designation; type locality Europe.

Erima Kertész, 1899, p. 193. Type-species *E. fasciata* Kertész, 1899, by monotypy; type locality New Guinea.

Sinophthalmus Coquillett, 1904, p. 190. Type-species *S. pictus* Coquillett, 1904, by original designation; type locality U.S.A.

Paraphortica Duda, 1934, p. 36. Type-species *Drosophila lata* Becker, 1907, by original designation; type locality China.

Arista plumose, with basal dorsal rays only, or bare; carina not strongly developed; prescutellar bristles large; acrostichal hairs in 8 or more rows; discal and 2nd basal cells of wing separate; costa reaching only to apex of 3rd longitudinal vein. With additional subgeneric characters as indicated below.

The taxonomic history of the genus *Amiota* is extraordinarily convoluted. *Amiota* and *Phortica* were originally established as separate genera. In his paper on Palaearctic and Oriental Drosophilidae, Duda (1924*a*) included *Phortica* as a genus while *Amiota* was not mentioned; in Duda's later (1934) paper on the Drosophilidae of the Palaearctic Region, *Amiota* was included as a genus and *Phortica* as a subgenus of the former. Various other groups have been recognized as subgenera of *Amiota*; Okada (1971) provided the following summary: 'Besides two major subgenera (*Amiota* Loew and *Phortica* Schiner), *Erima* Kertész, *Sinophthalmus*

Coquillett, *Paraphortica* Duda and even *Eostegana* Hendel have been included in the genus *Amiota* Loew. *Sinophthalmus* is thought synonymous with *Erima* by Duda (1924*a*: 178), or with *Phortica* by Wheeler (1952: 166). Wheeler (1965: 761) actually treats *Sinophthalmus* as a subgenus of *Amiota*. Again, *Erima* is treated by Duda (1926*a*: 246) as a subgenus of *Phortica*, *s. lat.* (= *Amiota*, *s. lat.*). On the contrary, McAlpine (1968: 516-7) ranks *Sinophthalmus* and *Erima* as distinct genera. *Paraphortica* was established by Duda (1934: 36) as a genus and at the same time (1934: 30) as a subgenus of *Amiota*. Duda places *Eostegana* in his *Phortica* group, and later (1927) in the genus *Orthostegana* as a subgenus. In the present study the genus *Amiota* is divided into five subgenera, *Amiota*, *Phortica*, *Erima* (= *Sinophthalmus*), *Paraphortica*, and a new subgenus, while *Eostegana* (= *Stegophortica*) is excluded from this genus . . . ' Apart from the foregoing considerations, Sturtevant (1921) synonymized *Phortica* with *Stegana* Meigen, but it is clear that these two groups are not congeneric (Malloch 1923). The minor subgenera recognized by Okada (1971) were *Erima*, *Paraphortica* and the newly established *Apsiphortica*; each subgenus was monotypic, the species occurring in New Guinea, China and Taiwan respectively. However, in his catalogue of the Oriental species of Drosophilidae, Okada (1977) listed only *Amiota*, *Phortica* and *Apsiphortica* as subgenera of *Amiota*; *Erima* was listed as a separate genus and, following McAlpine (1968), the Micronesian species *Cacoxenus lepidothrix* Wheeler & Takada, 1964 included therein. Wheeler (1981), on the contrary, lists *Amiota*, *Apsiphortica*, *Erima*, *Paraphortica* and *Sinophthalmus* as separate subgenera of *Amiota*. Wheeler's system is followed in the list of generic synonyms given above, although it appears that a case could be made for according full generic status to *Amiota* and *Phortica* (*Erima* would be retained as a subgenus of *Phortica*, species of the former differing from those of the latter only in possession of bare aristae); the differences between *Amiota* and *Phortica* are about as significant as those between many other pairs of related genera.

Each of the two major subgenera of *Amiota* contains a moderate number of species. Wheeler (1981) lists 48 species in *Amiota* and 35 in *Phortica*. A disproportionately large number of species of the subgenus *Amiota* is known only from Japan, perhaps representing more intensive work in that country; other species are known from Europe, Asia, north and central America, Africa and south-east Asia. Species of *Phortica* are known from Europe, Asia, Japan, north and central America, Africa, south-east Asia and New Guinea as well as the single species described by Malloch (1923) from Australia. The subgenera *Apsiphortica* and *Paraphortica* have remained monotypic, while Wheeler (1981) lists five species in *Erima*, three from Africa, *E. fasciata* (q.v.), and *E. lepidothrix* from Micronesia.

Three subgenera, *Amiota*, *Phortica* and *Erima*, are represented in the Australian material, each by a single species.

Subgenus **Amiota**

Arista plumose; anterior reclinate orbital bristle large; clypeus with milky white marginal band; an additional milky white spot present on humeral callus and again below wing base, body otherwise brownish or blackish.

1. *Amiota albomaculata* (Duda)

Phortica albomaculata Duda, 1926*a*, p. 248. (Syntypes stated as in Budapest but apparently now lost; type locality New Guinea.)

Distinguishing features. Arista large. Body dark brown, with typical white spots on humeral calli and below wing bases.

Body length. 2.3–2.6 mm.

Head. Arista with 3–5 rays above and 1–2 rays below plus large bifurcate or trifurcate terminal fork; all rays straight. Breadth of front 0.75 times length; front pale tan in anterior $^1/_3$, dark brown in posterior $^2/_3$; ocellar triangle black; periorbits silvery. 2nd antennal segment tan; 3rd segment dusky tan. Carina nose-like but small, low and confined to upper part of face. Face brown above, with typical milky white band on lower $^1/_3$. Palp tan. Cheek almost linear, narrow, barely widened in posterior corner. Eye large, red, bare. Orbital bristles in ratio 4 : 3 : 4; all 3 orbitals in line, anterior reclinate *c.* $^1/_3$ of way from proclinate to posterior reclinate. Very small additional bristles present between proclinate and anterior reclinate orbitals and between anterior and posterior reclinate orbitals. Ocellar and vertical bristles large; postverticals absent.

Thorax. Mesonotum shiny dark brown; humeral callus with typical white spot. Acrostichal hairs in numerous irregular rows. Ratio anterior : posterior dorsocentrals 0.5. Prescutellar bristles as large as anterior dorsocentrals. Scutellum broadly rounded, concolorous with mesonotum. Anterior and posterior scutellar bristles large, anterior bristles divergent, posterior bristles crossed. Pleura shiny dark brown with milky white spot on parts of mesopleuron and pteropleuron immediately below wing base. Haltere pale tan. Legs tan; 2nd and 3rd tibiae with small preapical bristles.

Wing. Entirely hyaline. *C*-index, *c.* 1.4; 4*V*-index, *c.* 2.5; 5*X*-index, *c.* 1.7; *M*-index, *c.* 0.8. 3rd costal section with heavy setation on basal 0.8. Length, *c.* 2.0 mm.

Abdomen. Entirely dark brown.

Distribution. Previously recorded from the Huon Gulf area of New Guinea (Duda 1926*a*). The Australian specimens were all collected in the Mulgrave River area of north Queensland.

Specimens Examined

Queensland (all AM): Mulgrave River 4 miles W. of Gordonvale, 4.i.1959, D.K. McAlpine, 2♂, 31.xii.1966, D.K. McAlpine and G. Holloway, 1♂.

Subgenus **Phortica** Schiner

Basal dorsal rays only of arista usually well developed; anterior reclinate orbital bristle not more than $^1/_2$ length of posterior reclinate orbital; orbital bristles confined to posterior half of front; thorax often with mottled coloration but without white spots on humeral calli and below wing bases.

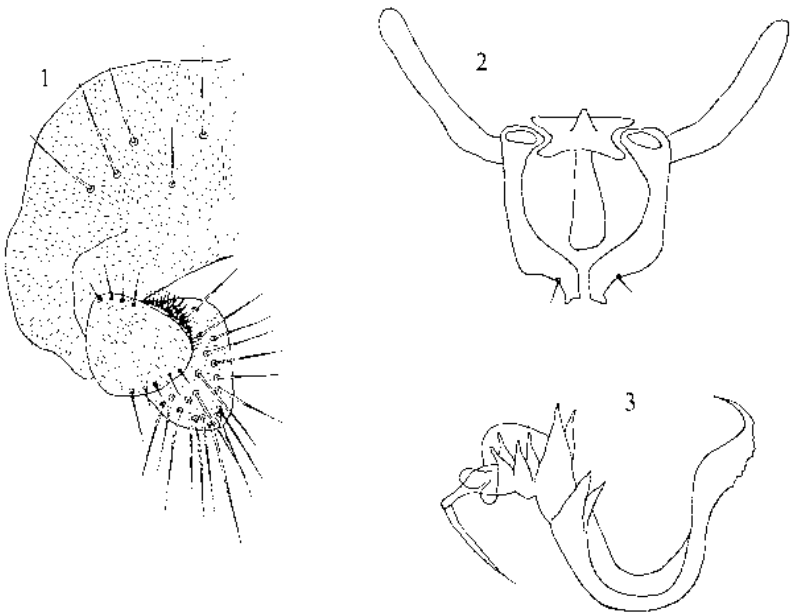
1. *Amiota annulata* Malloch

Amiota annulata Malloch, 1923, p. 612. (Holotype in AM; type locality Eidsvold, Queensland.)

Distinguishing features. Eye with whitish shimmer along posterior margin. Arista without terminal fork, with few rays only. Thorax greyish mottled dark brown. Abdomen short; tergites tan with dark brown markings. Tibiae banded.

Body length. *C.* 3.2 mm.

Head. Arista consisting only of axis with 3–5 basal dorsal rays shortening anteriorly and 2–3 very short ventral rays in middle region. Front rufous tan, darkest centrally, paler laterally, appreciably narrowed anteriorly; width anteriorly equal to length in midline; width posteriorly 1.4 times length. Periorbits pale tan, silvery in thin line adjoining eye. Ocellar triangle black. Face pale tan to whitish, 2nd and 3rd antennal segments tan. Carina broad but very low, smoothly rounded, obsolete below. Clypeal margin protuberant. Cheek of nearly uniform width, slightly over 0.1 times greatest diameter of eye in posterior corner, tan anteriorly, pale tan to whitish posteriorly; narrow band extending along posterior margin of eye silvery white. Palp tan. All 3 orbital bristles in line, rather close together, on posterior half of front; anterior reclinate orbital fine, *c.* ½ length of other orbitals. Tiny additional bristle present between proclinate and anterior reclinate orbitals. Row of minute hairs present along periorbit; additional minute hairs present across front.



Figs 1–3. *Amiota annulata*: *1*, male external genitalia; *2*, hypandrium; *3*, aedeagus.

Eye large, bare, in living flies much darker than usual among Drosophilidae. Ocellar and vertical bristles large; postverticals small.

Thorax. Mesonotum greyish mottled with dark brown. Scutellum pale to dark tan with anterolateral greyish areas. Pleura dark greyish with few brown spots. Acrostichal hairs in 8–10 irregular rows in front of dorsocentral bristles, *c.* 6 rows between dorsocentrals. Prescutellar bristles large. Anterior and posterior dorsocentral bristles close; anterior dorsocentrals *c.* ½ length of posterior dorsocentrals. Anterior and posterior scutellar bristles subequal; anterior scutellars widely divergent; posterior scutellars crossed. Haltere pale tan. Legs tan, each tibia with 3 darker annuli, faint proximally, stronger in middle region, strongest apically. Preapical bristles on 2nd and 3rd tibiae; apical bristle on 2nd tibia only.

Wing. Entirely hyaline. *C*-index, *c.* 2.1; 4*V*-index, *c.* 2.9; 5*X*-index, *c.* 1.0; *M*-index, *c.* 0.7. 3rd costal section with heavy setation on basal 0.7. Length, *c.* 3.0 mm.

Abdomen. Tergite 1 tan. Tergite 2 tan with large lateral dark brown spots; incurved portion tan laterally, dark brown medially. Tergites 3–5 each tan with extensive dark brown areas laterally and narrow dark brown longitudinal band in midline; incurved portion of each tergite dark brown in posteromedial corner. Tergite 6 tan.

Male genitalia (Figs 1–3). Genital arch and anal plates small; hypandrium short but broad, with 2 long slender toothed clasper-like parandrites; aedeagus complex, with curved and branched heavily sclerotized apodemes.

Distribution. Known only from Queensland. The species is common in north Queensland and recent records are restricted to the north, although the type locality is southern.

Specimens Examined

Queensland: Iron Range, 14.vi.1971, J. Feehan, 1♂ (ANIC); Kuranda, 21.v.1958, D.K. McAlpine, 1♂ (AM); Lake Placid near Cairns, 26.v.1958, D.K. McAlpine, 1♂ (AM); Head of Clohesy R., Atherton Tableland, 20.v.1958, D.K. McAlpine, 3♂ (AM); Flying into eyes, Jacky Jacky, Cape York Peninsula, May 1943, D.C. Swan, 3♂, 1 ♀ [abdomen missing but presumably ♂; see 'Special Comments' below] (AM); Rocky Creek, 7 miles N. of Atherton, 3.v.1967, D.H. Colless, 2♂ (ANIC); Big Mitchell Creek, Mareeba–Molloy Rd, 4.v.1967, D.H. Colless, 1♂ (ANIC); Townsville, attracted to eyes, Feb. 1976, I.R. Bock, numerous ♂ (LT).

Special Comments

Amiota annulata is one of a group of very similar species termed the '*variegata* complex' by Máca (1977) [after the European species *A. variegata* (Fallén)]. Other members of the complex occur in the Palaearctic and Oriental Regions. Males of species of the *variegata* complex exhibit the bizarre behaviour of flying into human (and presumably other mammalian) eyes, to which they appear to be quite strongly attracted. Males of *A. annulata* can be collected in considerable numbers in north Queensland merely by standing still under a tree and sweeping about the head or cupping a vial directly over the eye. Malloch (1923) commented that adults of *A. annulata* are attracted to perspiration, but the phenomenon is considerably more specific than this in that only males are attracted and then quite specifically to eyes, ignoring perspiring arms and legs and even other parts of the face. Máca (1977) cited records of the transfer of parasitic nematodes (family Thelaziidae) by this phenomenon. Females of species of the *variegata* complex are not attracted to eyes and, indeed, the female of *A. annulata* is unknown; females of other species have been baited in beer traps hung in tree canopies (Máca 1977). *A. annulata* is a species of hot dry open forests and is found during summer only.

Subgenus **Erima**

Diagnosis as for *Phortica* but arista bare.

1. *Amiota fasciata* (Kertész)

Erima fasciata Kertész, 1899, p. 193. (Holotype location unknown; type locality New Guinea.)
Gitonides convergens Malloch, 1927, p. 7. (Holotype in SPHTM; type locality Eidsvold, Queensland.) Syn. nov.

Distinguishing features. Eye with whitish shimmer along posterior margin; arista bare; mesonotum brown with weak greyish areas; abdominal tergites 3–5 with broad dark blackish bands.

Body length. Range of specimens examined, 3.2–4.0 mm.

Head. Arista bare, with very weak trace of micropubescence medially at base only. Front 1.2 times broader than long, mid-brown; ocellar triangle black, 2nd and 3rd antennal segments tan, slightly dusky. Carina barely evident between antennal bases only. Face and palp concolorous with front. Cheek narrow, almost linear. Eye large, oval, bare. Orbital bristles on posterior half of front, in ratio *c*. 8 : 3 : 5 and about equally spaced in line, with additional small bristle between proclinate and anterior reclinate orbitals in most specimens. Ocellar and vertical bristles large.

Thorax. Mesonotum and scutellum mid-brownish with weak irregular greyish areas especially between prescutellar and dorsocentral bristles, and trace of dark brown vittae in lines of dorsocentrals. Acrostichal hairs in *c*. 10–12 irregular rows. Ratio anterior : posterior dorsocentrals 0.5. Prescutellar bristles as large as anterior dorsocentrals. Pleura with same basic coloration and greyish tones as mesonotum. Haltere pale tan. Legs tan; tibiae with apical blackish annuli (weak on 1st tibia); 2nd and 3rd tibiae with weak preapical bristles; 2nd tibia only with apical bristle.

Wing. Hyaline. *C*-index, *c*. 2.5; 4*V*-index, *c*. 2.6; 5*X*-index, *c*. 0.8; *M*-index, *c*. 0.5. 3rd costal section with heavy setation on basal 0.5. Length, 2.5–3.3 mm.

Abdomen. Tergite 1 pale tan. Tergite 2 pale tan, black laterally; incurved portion pale tan. Tergites 3–5 narrowly pale tan anteriorly and posteriorly, otherwise dark brownish black. Tergite 6 pale tan anteriorly, blackish posteriorly.

Distribution. Previously recorded from New Guinea; the Australian specimens were collected in the vicinity of Iron Range, Qld, except for the holotype and only specimen of '*Gitonides convergens*' which was collected in Eidsvold. The species appears to be rare, as it has not been taken in numerous collections between these widely separated localities.

Specimens Examined

Holotype, *Gitonides convergens*. **Queensland** (alt AM): Claudie R. near Mt Lamond, 28.v.1966, D.K. McAlpine, 2♂, 2♀; Claudie R. 5 miles W. of Mt Lamond, 26.xii.1971, m.v. light, D.K. McAlpine, G.A. Holloway and D.P. Sands, 1♀.

Special Comments

The mesonotum of the Australian specimens is paler than that suggested by Kertész's description of the type, but the Australian specimens otherwise agree well with Kertész's description and wing figure except in body length. Although not specifically stated by Kertész, his description appears to have been based on a single specimen; the body length was given as 2.2 mm. It is probable that this length was taken as one measurement from the front of the head to the tip of the abdomen, but body lengths in this paper are given as the sum of head, thoracic and abdominal lengths. The former method of measurement obviously underestimates the length of a specimen in which the head and abdomen (as is usually the case) are deflected from the thorax.

III. Genus Cacoxenus Loew

Cacoxenus Loew, 1858, p. 217. Type-species *C. indagator* Loew, 1858, by monotypy; type locality Schlesien (Silesia), Germany.

Paragitona Kröber, 1912*a*, p. 235. Type-species *P. obscura* Kröber, 1912 [= *C. indagator* Loew (Kröber 1912*b*)] by monotypy; type locality Germany.

Gitonides Knab, 1914, p. 165. Type-species *G. perspicax* Knab, 1914, by original designation; type locality Hawaii. (Tsacas and de Chenon 1976.)

Paracacoxenus Hardy, 1960, p. 358, in Hardy and Wheeler 1960. Type-species *P. guttatus* Hardy and Wheeler, 1960, by original designation; type locality Washington, U.S.A. (Tsacas and de Chenon 1976.)

Arista micropubescent; carina barely developed; orbital, ocellar, vertical and prescutellar bristles large; discal and 2nd basal wing cells separate; costa reaching only to apex of 3rd longitudinal vein or slightly beyond.

Cacoxenus, *Gitonides* and *Paracacoxenus* were formerly considered as distinct genera. The groups were reviewed by Tsacas and de Chenon (1976), who argued for their inclusion as subgenera in a single genus, as arrangement followed by Wheeler (1981). The subgenus *Cacoxenus* is represented by the single (type) species *C. indagator* which is confined in distribution to Europe; the species is distinguished taxonomically by a black coloration with a uniform pruinosity as well as by several additional features of the male legs and genitalia (Tsacas and de Chenon 1976). The subgenus *Gitonides* (q.v.) includes four species, two from Africa and one from Asia as well as the species discussed below. The subgenus *Paracacoxenus* includes five species from parts of Europe, Asia and North America; the characterization of the group is discussed by Hardy and Wheeler (1960) and Tsacas and de Chenon (1976).

Cacoxenus is clearly similar in many respects to *Amiota* (q.v.), differing principally in possession of a micropubescent arista, and to *Gitona* (q.v.), differing principally from the latter in lacking a well developed carina.

Subgenus Gitonides

Mesonotum with dark spot or ring at base of each bristle or hair.

1. *Cacoxenus perspicax* (Knab)

Gitonides perspicax Knab, 1914, p. 166. (Holotype in Washington; type locality Hawaii.)

Gitona paolii Séguy, 1933, p. 187. (Holotype location unknown; type locality Africa.) (Tsacas and de Chenon 1976.)

Cacoxenus punctatus Duda, 1924*a*, p. 225 (*nom. nud.* in Duda 1923, p. 25; holotype stated as in Budapest but apparently now lost; type locality Taiwan.) (Wheeler 1981.)

Distinguishing features. Mesonotum pale with dark spotting or mottling. Eye with horizontal dark line in middle region. Pleura banded.

Body length. *C*. 3.0 mm.

Head. Breadth of front *c*. 0.85 times length; front mid to dark brownish, paler along anterior border and periorbits but dark again about bases of reclinate orbital and vertical bristles. Ocellar triangle somewhat elevated. Front with strong hairs anteriorly and within ocellar triangle. 2nd antennal segment tan; 3rd segment dark tan. Carina low between antennal bases only. Face pale tan. Palp tan, with marginal bristles. Cheek slightly curved, slightly widened in posterior corner. Eye bare, with dark horizontal line or narrow band in middle region, quite obvious in most dried specimens. Orbital bristles in ratio *c*. 3 : 1 : 3 and in line; anterior reclinate orbital a little closer to prochinate than to posterior reclinate orbital. Ocellar and vertical bristles large.

Thorax. Mesonotum pollinose tan with dark brown spots at bases of bristles and hairs, sometimes coalescing into irregular patches. Acrostichal hairs in 10 or more

irregular rows. Ratio anterior : posterior dorsocentral bristles 0.4–0.5. Prescutellar bristles as large as anterior dorsocentrals. Scutellum weakly pollinose tan with irregular darker areas. Anterior and posterior scutellar bristles subequal, anterior bristles divergent, posterior bristles crossed. Pleura pollinose tan with dark band across middle of pteropleuron and mesopleuron (interrupted on mesopleuron); additional darkening present at upper anterior corner of mesopleuron and about bases of sternopleural bristles. Haltere pale tan. Legs pale tan: 2nd and 3rd tibiae with weak proximal dark annuli; weak preapical bristles present on 2nd and 3rd tibiae; strong apical bristle present on 2nd tibia only.

Wing. Hyaline. *C*-index, *c*. 2.6; 4*V*-index, *c*. 1.9; 5*X*-index, *c*. 1.0; *M*-index, *c*. 0.6. 3rd costal section with heavy setation on basal 0.7–0.8. Length, *c*. 2.4 mm.

Abdomen. Tergite 1 pale tan; incurved portion dark brown. Tergite 2 pale tan with darkening at lateral extremity; incurved portion tan. Tergites 3–6 each dark on anterior ½–⅔ except in midline, pale posteriorly and in midline, darkened on almost entire length at lateral extremity; incurved portions tan.

Distribution. Widespread, from Hawaii to south-east Asia, India, Australia and Africa (Wheeler 1981). Australian records are largely from the north (Western Australia and Northern Territory), but the species has been collected in central New South Wales.

Specimens Examined

Western Australia (all ANIC): Wyndham, 28.ii.1930, T.G.C., 1♀; 15°02′S. 126°55′E., Drysdale River, 3–8.viii.1975, I.F.B. Common and M.S. Upton, 2♀; 6 km W. of Martin's Well, W. Kimberley, 27.iv.1977, D.H. Colless, 1♀; 8 km S. of Cape Bertholet, West Kimberley, 18.iv.1977, D.H. Colless, 1♀; 14°49′S. 126°49′E., Carson Escarpment, 9–15.viii.1975, I.F.B. Common and M.S. Upton, 4♀; 18°27′S. 123°03′E., 101 km SE. by E. Broome, 20.viii.1976, I.F.B. Common, 1♀. **Northern Territory** (all ANIC): 22 km WSW. of Borroloola, 17.iv.1976, D.H. Colless (malaise trap), 1♀; Bukalara Plateau, 46 km SSW. of Borroloola, 23.iv.1976, D.H. Colless, 2♀; Caranbirini WH, 16°16′S. 136°05′E., 33 km SW. of Borroloola, 3.xi.1975, M.S. Upton, 1♀, 22.iv.1976, D.H. Colless, 1♀, 27.iv.1976, D.H. Colless, 1♀; 16°08′S. 136°06′E., 22 km WSW. of Borroloola, 2.xi.1975, M.S. Upton, 2♀; Cattle Creek, 16°32′S. 136°10′E., 54 km S. by S. of Borroloola, 27.x.1975, M.S. Upton, 2♀; McArthur River, 2 km SSE. of Borroloola, 20.iv.1976, D.H. Colless (malaise trap), 1♀; W. of Bukalara Plateau, 46 km SSW. of Borroloola, 23.iv.1976, D.H. Colless (malaise trap), 1♀; 6.4 km SSW. of Victoria River Downs (along Wickham River), 18.vi.1973, L.P. Kelsey, 1♂; Bessie Spring 16°40′S. 135°51′E., 8 km ESE. of Cape Crawford, 26.x.1975, M.S. Upton, 2♀; 16°34′S. 135°41′E., Leila Creek, 14 km NW. Cape Crawford, 6.xi.1975, M.S. Upton, 1♀; Mudginbarry, Mar.–Apr. 1971, manitoba trap, A.L.D., H.A.S., 1♀; 8 km WSW. of Victoria River Downs, 14.viii.1973, L.P. Kelsey, 1♂; Baroalba Creek Springs, 19 km NE. by E. of Mt Cahill, 28.x.1972, D.H. Colless (at light), 2♂. **Queensland**: Ingham, light trap, 15.iii.1961, K.L. Harley, 1♀ (ANIC); Bundaberg, 4.xi.1931, R.W. Mungomery, 2♂, 1♀ (UQ); Point Cartwright, via Mooloolaba, 12.vi.1965, B. Cantrell, 1♂ (UQ). **New South Wales**: Hunter Valley, Jan. 1980, J.S.F. Barker, 1♀ (LT).

Special Comments

The larvae of *C. perspicax* are known to be predaceous on mealy bugs of the genus *Pseudococcus* (Knab 1914). It appears, however, that none of the Australian specimens has been collected in association with Pseudococcidae, although several genera of the family including *Pseudococcus* occur in Australia (Woodward *et al.* 1970). The larval habits of *C. perspicax* are clearly related to those of *Acletoxenus formosus* (q.v.).

IV. Genus **Crincosia**, gen. nov.

Arista micropubescent; eye oval, greatest diameter vertical; cheek unusually broad; carina large; orbital bristles small, on posterior half of front; front hirsute; postvertical bristles absent; anterior dorsocentral bristles small, close to posterior dorsocentrals; propleural bristle absent; discal and 2nd basal cells of wing separate; costa reaching only to apex of 3rd longitudinal vein.

Type-species: *Crincosia setifera*, sp. nov.

The generic name is an anagram of the letters 'CSIRO ANIC' and is considered feminine.

The genus *Crincosia* is established for the two species described below. *Crincosia* appears closest to *Gitona* (q.v.), sharing with species of that genus a micropubescent arista, broad cheek, large broad carina, hirsute front and similar size and arrangement of dorsocentral bristles. Differences between *Crincosia* and *Gitona* include the presence of postvertical bristles in *Gitona* (postverticals absent in *Crincosia*), different arrangement of orbital bristles, presence of a propleural bristle in *Gitona* (and in most Steganinae; propleural absent in *Crincosia*), and especially possession by both species of *Crincosia* of the crossvein (as in some other steganine genera) separating the discal and 2nd basal cells of the wing (discal and 2nd basal cells confluent in *Gitona*); collectively these differences are such that the species involved are most conveniently placed in separate genera. The two species sharing the generic characteristics listed above do, however, differ in one respect: one species possesses (as is typical of Steganinae) large prescutellar bristles, while the other has no trace of prescutellars, but in other respects the species are so similar that there seems little doubt that they should be included in the same genus.

1. *Crincosia setifera*, sp. nov.

Type

Holotype ♀: 25 km NW. by N. of Boulia, Queensland, 8.iv.1976 (at light), D.H. Colless (ANIC).

Distinguishing features. Body large. Cheek exceedingly broad. Abdominal tergites 3–5 dark with narrow pale posterior bands. Prescutellars large.

Body length. 4.7 mm.

Head. Arista very finely micropubescent. Breadth of front equal to length; front tan, periorbits slightly paler; ocellar triangle black. Front with numerous small bristles extending posteriorly to level of ocellar triangle, also in triangle, dense along orbital margins and among orbital bristles. 2nd antennal segment tan, with numerous small bristles as on front; 3rd segment tan, with extremely small, fine pale hairs only. Carina prominent, greatly widened below, rather flat. Face pale tan. Palp slender, tan, with very small bristles. Cheek exceptionally broad, over 0.4 times greatest eye diameter, curved, with row of small fine bristles, without differentiated vibrissa(e) but 3rd or 4th bristle somewhat enlarged. Eye oval, bare. Orbital bristles unusually small, in line and about equidistant, anterior reclinate a little smaller than other 2. Ocellar and vertical bristles larger than orbitals.

Thorax. Mesonotum dark tan, colour slightly irregular. Acrostichal hairs somewhat irregular but in at least 16 rows. Posterior dorsocentral bristles very large; anterior

dorsocentrals fine, half length of posterior dorsocentrals and very close to latter. Scutellar bristles subequal; anterior scutellars divergent. Posterior margin of scutellum with few additional very fine hairs. Sternopleuron with numerous fine hairs in addition to 2 large bristles. Haltere pale tan. Legs tan; preapical bristles absent; 2nd tibia only with small apical bristle.

Wing. Hyaline, slightly brownish anteriorly to 3rd longitudinal vein. Anal vein present as short basal rudiment only. Distal costal incision weak. *C*-index, 1.4; 4*V*-index, 2.0; 5*X*-index, 1.3; *M*-index, 0.8. 3rd costal section with heavy setation on entire length, without ventral thorn-like spines. Length, 3.4 mm.

Abdomen. Tergite 1 tan. Tergite 2 tan centrally, black laterally, posterior margin pale tan. Tergites 3–6 blackish, posterior margins pale tan.

Distribution. Known only from holotype. The type locality lies in an area of temperature extremes and low annual rainfall in inland Australia. Very few drosophilids are known from such inland areas, most species apparently being sensitive to stresses of high temperature and desiccation, although a few species of *Leucophenga* and *Scaptomyza* have been recorded in the inland (Bock 1979; Bock and Parsons 1977*a*).

2. *Crincosia lawgana*, sp. nov.

Type

Holotype ♀: 1 mile N. of Lawgi, Queensland, 11.v.1955, Norris and Common (ANIC).

Distinguishing features. Mesonotum tan with slight pollinosity; abdomen shiny black; wing with basal black patch. Prescutellars absent.

Body length. 3.7 mm.

Head. Breadth of front 0.75 times length; front dark tan; periorbits slightly paler; ocellar triangle weakly blackened. 2nd and 3rd antennal segments tan. Carina very prominent, rather broad, slightly rounded. Face pale tan. Palp tan, with fine setation. Cheek slightly curved, with large vibrissa, *c*. 0.3 times greatest eye diameter. Eye with fine very sparse pile. Orbital bristles subequal, equally spaced and in line. Ocellar and vertical bristles large.

Thorax. Mesonotum tan with weak silvery pollinosity (? greater in ♂). Acrostichal hairs in numerous somewhat irregular rows, in at least 10 rows between dorsocentral bristles anteriorly to scutellum but without prescutellars (or sockets of missing prescutellars). Scutellum concolorous with mesonotum. Scutellar bristles subequal, anterior bristles divergent, posterior bristles crossed. Pleura pale tan. Legs tan; 2nd tibia with large apical bristle.

Wing. Clear with black patch from humeral crossvein to distal costal incision, posteriorly to 3rd longitudinal vein. *C*-index, 2.5; 4*V*-index, 1.8; 5*X*-index, 0.8; *M*-index, 0.4. 3rd costal section with heavy setation on entire length. Length, 2.9 mm.

Abdomen. Entirely glossy black.

Distribution. Known only from holotype. The type locality is close to Eidsvold in southern Queensland, the type locality of four of the species described by

Malloch (1923, 1924, 1927) [*Drosophila albostriata*, *D. serrata*, *Amiota annulata* and *Gitonides convergens* = *A. fasciata* (Kertész)]. There are no published records of results of collections in this area since the last of Malloch's above papers; the area clearly merits closer examination.

V. Genus Eostegana Hendel

Eostegana Hendel, 1913*a*, p. 390. Type-species *E. biroi* Hendel, 1913, by original designation: type locality New Guinea.

Stegophortica Duda, 1923, p. 33. Type-species *S. striatipennis* Duda, 1923, by monotypy: type locality New Guinea. (Duda 1926*a*.)

Body large, dark; wing dark with areas of pale spotting, banding or marking; arista with numerous dorsal and ventral rays; anterior reclinate orbital bristle large; posterior reclinate orbital closer to inner vertical than to proclinate orbital; vibrissa large; prescutellar bristles large; acrostichals in numerous rows; discal and 2nd basal cells of wing separate; costa reaching apex of 3rd longitudinal vein; 3rd costal section with small ventral thorn-like spines.

Eostegana is one of the least well known drosophilid genera; only the type-species has been described in the genus. Duda (1926*a*) considered his *Stegophortica striatipennis* to be a synonym of *E. biroi*. Curiously, Duda made no mention of *Eostegana* in his extensive (1923, 1924*a*, 1924*b*, 1926*b*) works on the Oriental and New Guinean Drosophilidae, and neither *Eostegana* nor *Stegophortica* was included in his (1924*a*) key to drosophilid genera. Duda did not subsequently (1926*a*) examine specimens of *E. biroi*, but compared his specimens of *S. striatipennis* with Hendel's description and, although noting considerable differences between the two, regarded *E. biroi* merely as a species possessing substantial intraspecific variability. The wing photograph given by Duda (1926*a*) for '*Eostegana biroi*' clearly does not match either that described by Hendel (1913*a*) or those of determined specimens of *E. biroi* in Berlin, and there can be no doubt that the two species are separate. In addition to *biroi* and *striatipennis*, two Oriental species have been considered to be members of the genus *Eostegana*, viz. *Stegana bakeri* Sturtevant from the Philippines, and *Notiphila ortalidoides* Walker from India (Okada 1977). Wheeler (1981) lists four species in *Eostegana*: *biroi* Hendel, *Notiphila ortalidoides* Walker, *Trypeta roripennis* Walker (synonym *Helomyza stelliplena* Walker) and *striatipennis* (Duda). Specimens of two undetermined species in addition to *biroi* are also present in the Berlin collection, one species (with *biroi*) from New Guinea, the other from Taiwan. The species represented by the Australian specimens is not referable to any of the above and is accordingly described as new.

1. *Eostegana australis*, sp. nov.

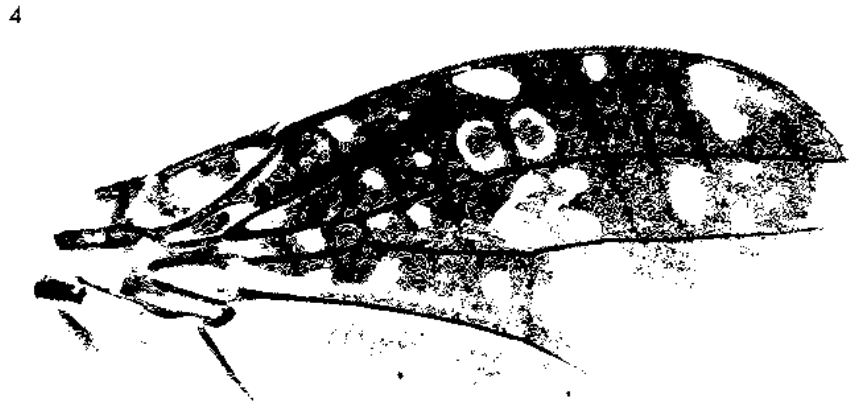
Types

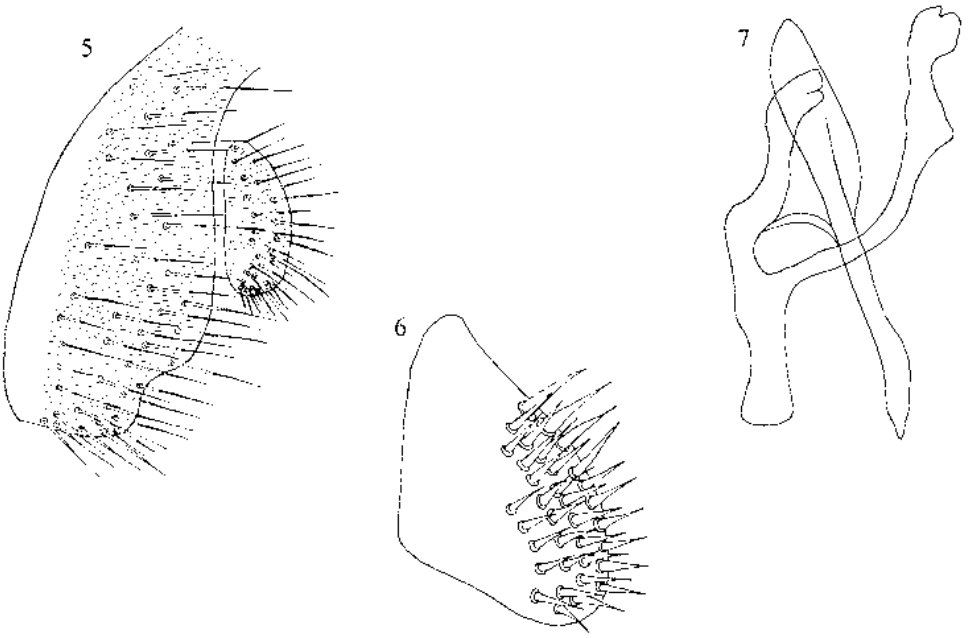
Holotype ♂: Kuranda, north Queensland, 27.xii.1958, D.K. McAlpine (AM). Paratypes (all Queensland): same data as holotype, 2♂, 2♀, 1 ? (AM), 1♂, 1♀ (ANIC); The Intake via Redlynch, 30.xii.1966, D. McAlpine and G. Holloway, 1♂ (AM).

Distinguishing features. An exceptionally large, dark drosophilid; wing dark with small white areas.

Body length. 5.8 mm (holotype); 4.2–5.9 mm (paratype range).

Head. Arista with 12 rays above and 6–7 rays below plus small terminal fork; all rays straight. Breadth of front 1.3 times length; front velvety dark brown posterolaterally, with pale sheen anteriorly, centrally, about anterior 2 orbital bristles and about vertical bristles. Ocellar triangle elevated, with some darkening immediately adjacent to ocelli. 2nd and 3rd antennal segments mid-dark brown. Carina small, high, almost hemispherical. Face largely dark brown. Palp large, flat, blackish in





Figs 4–7. *Eostegana australis*: *4*, wing; *5*, male external genitalia; *6*, clasper (concealed beneath genital arch); *7*, male internal genitalia.

basal ¾, pale in apical ¼. Cheek linear, rather narrow, extending forwards anteriorly, largely blackish brown, pale in posterior corner. Eye large, bare, greatest diameter vertical. Orbital bristles in ratio 3 : 4 : 5; all 3 orbitals almost in line; proclinate and anterior reclinate orbitals close. Ocellar, vertical and postvertical bristles large. Ocellar bristles situated on border of ocellar triangle.

Thorax. Mesonotum dark brown with paler markings: submedian longitudinal bands in anterior ⅔, and less well defined areas lateral and posterior to these. Scutellum dark basally, darkest laterally, pale at apex. Scutellar bristles subequal; anterior scutellars divergent; posterior scutellars crossed. Pleura dark brown. Sternopleuron with large anterior and posterior bristles and numerous fine hairs. Stalk of haltere pale; knob darkened. Legs except tarsi dark brown; tarsi pale; metatarsus of each leg longer than remaining tarsal segments together.

Wing (Fig. 4). Dark brown with small white spots and other markings. Anal vein well developed. *C*-index, 2.2; 4*V*-index, 1.7; 5*X*-index, 0.9; *M*-index, 0.4. 3rd costal section with heavy setation on basal 0.7. Length (holotype), 5.2 mm.

Abdomen. All tergites dirty yellowish brown, darker on incurved portions. Tergites 1 and 2 fused dorsally. Tergite 6 very short.

Male genitalia (Figs 5–7). Anal plate small, weakly sclerotized; clasper small, with numerous stout chaetae; hypandrium strongly sclerotized and blackened in border, otherwise membranous; aedeagus narrow, cylindrical, without ornamentation.

Distribution. Known only from north Queensland.

Specimens Examined

Types as above. **Queensland:** Maple Creek, W. of Innisfail, swept (rainforest), 23.iv.1980, S.F. McEvey, 1♂ (LT).

VI. Genus Gitona Meigen

Gitona Meigen, 1830, p. 129. Type-species *G. distigma* Meigen, 1830, by monotypy; type locality Europe.

Arista micropubescent; eye oval, greatest diameter vertical; cheek rather broad; carina large; orbital bristles smaller than ocellar and vertical bristles; front hirsute; prescutellar bristles large; anterior dorsocentral bristles small, close to posterior dorsocentrals; propleural bristle large; discal and 2nd basal cells of wing confluent or separated by shadow only of crossvein; costa weak or absent between apices of 3rd and 4th longitudinal veins.

The genus *Gitona* contains 16 described species (Wheeler 1981), 10 from Europe–Asia–Africa and six from north and south America. The American species have sometimes been regarded as 'different' from the others, perhaps because of an error in McAlpine's (1968) key in which the European species key out following the alternative 'first [*sic*] basal and discal cells separated'. (*G. distigma* possesses no trace of a crossvein separating the second basal and discal cells.) Comments on the taxonomic affinities of *Gitona* are given above under *Cacoxenus* and *Crincosia*.

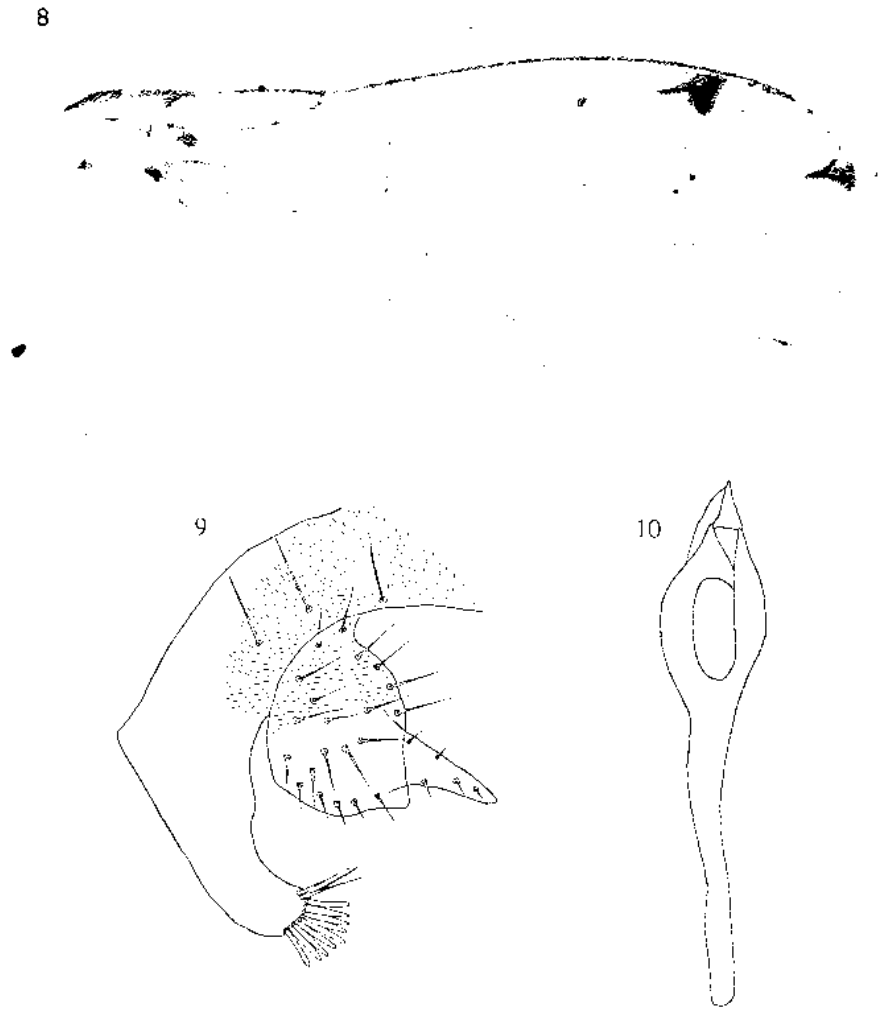
According to Tsacas and de Chenon (1976), *Gitona* larvae may be predators of insect larvae, aphidophagous, or leaf miners. Nothing is known of the ecology of the single Australian species described below.

1. *Gitona incohata*, sp. nov.

Types

Holotype ♂: Cooper Creek, 19 km E. by S. of Mt Borradaile, Northern Territory, 2.xi.1972, D.H. Colless (ANIC). Paratypes: same data as holotype, 1♀ (ANIC); Cooper Creek, Northern Territory, 11 km S. by W. of Nimbuwah Rock, 1.xi.1971,

D.H. Colless, 1♂ (ANIC); 7 km NW. by N. of Cahills Crossing, Northern Territory (E. Alligator River), 4.xi.1972, D.H. Colless, 2♀ (ANIC); Nourlangie Creek, 8 km N. of Mt Cahill, Northern Territory, 26.x.1972, D.H. Colless, 1♂ (ANIC); Jabaluka Lagoon, Northern Territory, 14 km N. of Mudginbarry HS, 13.xi.1972, D.H. Colless, 1♂ (ANIC); 18°55′S, 123°27′E., 145 km SE. by E. of Broome, Western Australia, 6.viii.1976, I.F.B. Common, 1♂ (ANIC); Olive Downs HS, 124 km NE. of Clermont, Queensland, 19.xi.1977, J.S.F. Barker, 2♀ (AM).



Figs 8–10. *Gitona incohata*: *8*, wing; *9*, male external genitalia; *10*, aedeagus.

Distinguishing features. As given in generic diagnosis above; wing with dark spot at end of 2nd longitudinal vein enclosing rudiment of extra crossvein.

Body length. 3.8 mm (holotype); 2.9–3.9 mm (paratype range).

Head. Arista very finely micropubescent. Breadth of front 0.8 times length; front tan to rufous tan, paler anteriorly but with dark line at anterior border, dusky posteriorly in some specimens; ocellar triangle blackened; periorbits slightly silvery,

with darkening about base of each bristle. 2nd antennal segment dusky tan; 3rd segment tan in upper ¼, dusky tan in lower ¾. Carina large, broad, rather flat. Face dusky tan. Palp tan. Cheek curved, quite broad, greatest width *c.* 0.3 times greatest diameter of eye. Eye bare. Proclinate orbital bristle a little longer than reclinate orbitals; orbital bristles about equidistant. Ocellar and vertical bristles large; postverticals well developed.

Thorax. Mesonotum dark brown with ill-defined irregular paler areas, especially on either side of midline anteriorly. Acrostichal hairs in at least 12 rows, rather irregular. Ratio anterior : posterior dorsocentral bristles 0.5; anterior and posterior dorsocentrals close together and close to scutellum. Scutellum arched, dark brown with a few paler spots. Anterior and posterior scutellar bristles subequal; anterior bristles divergent; posterior bristles crossed. Pleura pollinose mid-brownish with broken brown stripe across mesopleuron and pteropleuron. Haltere pale tan. Legs tan to dark tan; mid-femur with medial dark spot apically; mid- and hind-tibiae with apical darkening; weak preapical bristles present on 2nd and 3rd tibiae; strong apical present on 2nd tibia only.

Wing (Fig. 8). Hyaline with small dark spot at apex of 3rd longitudinal vein and larger dark spot at apex of 2nd longitudinal vein enclosing rudiment of extra crossvein originating just before apex of longitudinal vein and extending *c.* third of way back to 3rd vein. *C*-index, 2.7; 4*V*-index, 1.7; 5*X*-index, 1.0; *M*-index, 0.4. 3rd costal section with heavy setation on basal 0.4. Length (holotype), 2.8 mm.

Abdomen. Tergite 1 tan. Tergites 2–3 tan with posterolateral dark bands extending on to incurved portions; tergite 3 in some specimens with additional central dark spot. Tergites 4–5 similar to tergites 2–3 with additional central dark spots. Tergite 6 tan, with weak lateral darkening in some specimens.

Male genitalia (Figs 9, 10). Anal plate with medial beak-like process; clasper formed as extension of genital arch; aedeagus strongly sclerotized, apically pointed, with long basal apodeme.

Distribution. Known only from type specimens, but apparently widespread across arid areas of northern Australia.

Special Comments

G. incolata appears to be similar in some respects to the Asian species *G. beckeri* described by Duda (1924*a*) but differs in various aspects of coloration and wing venation. No species of *Gitona* has been recorded from south-east Asia or New Guinea.

VII. Genus Leucophenga Mik

Leucophenga Mik, 1886, p. 317. Type-species *Drosophila maculata* Dufour, 1939, by original designation; type locality Europe.

Oxyleucophenga Hendel, 1913*a*, p. 386. Type-species *O. undulata* Hendel, 1913, by original designation; type locality Peru. (Wheeler 1981.)

Drosomyiella Hendel, 1914, p. 113. Type-species *Drosophila abbreviata* de Meijere, 1911, by original designation; type locality Java. (Wheeler 1981.)

Ptyelusimyia Séguy, 1932, p. 93. Type-species *P. decaryi* Séguy, 1932, by original designation; type locality Madagascar. (Wheeler 1981.)

Drosophilopsis Séguy, 1951, p. 310. Type-species *D. scaevolaevora* Séguy, by original designation; type locality Madagascar. (Wheeler 1981.)

Arista plumose; front narrow; carina rudimentary or absent; cheek usually very narrow, with single vibrissa: eye very large, bright red, bare; all 3 orbital bristles large, posterior reclinate typically closer to inner vertical than to proclinate orbital; mesonotum with numerous rows of acrostichal hairs and pair of large prescutellar bristles; anterior scutellar bristles large, divergent; propleural bristle present; discal and 2nd basal cells of wing confluent; costa reaching only to apex of 3rd longitudinal vein or slightly beyond; 3rd costal section with minute ventral thorn-like spines.

The Australian species of *Leucophenga*, with species descriptions, synonymies and key to species were reviewed by Bock (1979); 21 named species were considered as well as five species represented only by material inadequate for formal description. No new material is available for the latter species. A summary of the described fauna is given below; species are listed in alphabetical order.

1. *Leucophenga albofasciata* (Macquart)

A strongly dimorphic species widespread across arid non-rainforest areas of northern Australia.

2. *Leucophenga angusta* Okada

A member of the 'dimorphic palp' complex, previously reported from Queensland and New South Wales; three further males from Mooney Mooney Creek, near Gosford, N.S.W. [25.xi.1975, D.K. McAlpine (AM)] have been examined. The species occurs from Japan to Micronesia and is known to be highly dimorphic for abdominal pattern, but the female is still unknown from Australia except for one specimen (evidently *angusta*) reported by Bock (1979).

3. *Leucophenga argentata* (de Meijere)

A highly dimorphic species recorded from Asia to New Guinea; rare in Australia (Northern Territory and Queensland).

4. *Leucophenga bellula* (Bergroth)

The commonest species of the dimorphic palp complex in Australia.

5. *Leucophenga cooperensis* Bock

Described from the Northern Territory; an additional two females from New South Wales were assigned to the same species although they possessed slightly different abdominal patterns. Two further females from New South Wales [Mooney Mooney Creek near Gosford, 3.xi.1976, D.K. McAlpine (AM)] have been examined; the abdominal patterning in both specimens is considerably more extensive than that described for the types. In one specimen tergite 2 possesses blackening posteriorly and laterally; tergite 3 is black posteriorly and centrally; tergite 4 is entirely black; tergite 5 is black centrally and also possesses a small black spot at each lateral extremity; and tergite 6 is black. In the other specimen tergites 3 and 5 are even more extensively blackened. The rather substantial differences in female abdominal patterning between the latter New South Wales specimens and the

Northern Territory types makes the conspecificity of the two forms more questionable, but until males corresponding to the New South Wales females are available for study the question seems best left in abeyance.

6. ***Leucophenga cyanorosa*** Bock

A little-known patterned-wing species from New South Wales.

7. ***Leucophenga flavohalterata*** Malloch

A dimorphic palp species recorded from north Queensland (apparently very rare) to New South Wales (somewhat more common).

8. ***Leucophenga gibbosa*** (de Meijere)

A large, dark species occurring in rainforests of Queensland and New South Wales; also in New Guinea and south-east Asia.

9. ***Leucophenga janicae*** Bock

Known from north Queensland and the Northern Territory. Recent specimens have been collected at Tully River [22.iv.1980, S.F. McEvey, 2♂, 2♀ (ANIC), 2♂, 1♀ (LT)], Mulgrave River Forestry Road [18 km S. of Gordonvale, 26.iv.1980, S.F. McEvey, 4♂, 2♀ (AM)] and Uhr Creek-Mulgrave River junction [13 km SW. of Gordonvale, 26.iv.1980, S.F. McEvey, 1♂ (LT)].

10. ***Leucophenga lubrica*** Bock

Known only from the two type specimens. An additional male [Mooney Mooney Creek near Gosford, N.S.W., 20.v.1975, D.K. McAlpine (AM)] has been examined.

11. ***Leucophenga ornata*** Wheeler

A widespread species (Asia, south-east Asia) but known in Australia (north Queensland) from only two specimens.

12. ***Leucophenga paternella*** Bock

Known only from the two type specimens, New South Wales.

13. ***Leucophenga poeciliventris*** Malloch

A species of south-eastern Australia resembling the widespread *L. maculata*.

14. ***Leucophenga quadripunctata*** (de Meijere)

A south-east Asian species known in Australia from three specimens collected in north Queensland rainforests.

15. ***Leucophenga regina*** Malloch

A large patterned-wing species known from northern and southern Queensland.

16. *Leucophenga scutellata* Malloch

A widespread dimorphic species of northern and eastern Australia. More recent specimens include six males and three females bred from fungus, Palmerston National Park, Qld [Nov. 1978, P.A. Parsons (LT)]; the blackening on the abdominal tergites of the females is more extensive than that usual for the species. *L. scutellata* is still the only Australian species of *Leucophenga* for which direct evidence of a fungal diet or fungal breeding is available.

17. *Leucophenga stigma* Bock

A north Queensland species known only from the holotype.

18. *Leucophenga subpollinosa* (de Meijere)

A small dimorphic species widespread in Australia from the Northern Territory through Queensland to New South Wales; also in south-east Asia and some other areas.

19. *Leucophenga tritaeniata* Duda

A patterned-wing species known from New Guinea and northern Australia.

20. *Leucophenga violae* Bock

A dimorphic patterned-wing species of south-eastern Australia, now known to occur in the vicinity of Melbourne.

21. *Leucophenga zebra* Bock

A north Queensland species possessing pleural banding (cf. *Stegana* below).

VIII. Genus Luzonimyia Malloch

Luzonimyia Malloch, 1926, p. 491. Type-species *L. nigropuncta* Malloch, 1926, by original designation; type locality Mount Maquiling, Luzon, Philippines.

Head and thorax with dense greyish pollinosity; arista micropubescent; orbital and vertical bristles large; ocellar bristles very weak, in line with anterior ocellus; postvertical bristles developed; carina absent; prescutellar bristles large; discal and 2nd basal cells of wing confluent; costa reaching apex of 4th longitudinal vein.

Luzonimyia was established by Malloch for the single species *L. nigropuncta*, apparently (although not explicitly stated) described on the basis of a single female; the species has not been mentioned in any subsequent publication on the Oriental fauna with the exception of catalogues referring back to Malloch's original description, so that the genus *Luzonimyia* has to date been known only on the basis of Malloch's description of the holotype female.

The Australian specimens described below as a new species agree very well with Malloch's generic diagnosis, except that the (single) vibrissa in the Australian species is well developed ('vibrissae very small' according to Malloch), and the Australian species possesses a large humeral bristle [humeral bristle absent in Malloch's diagnosis; but it is questionable if this was an accurate description (Wheeler,

personnal communication)]. These characters are presumably of specific rather than generic importance. There are further differences between Malloch's species and the Australian one in abdominal patterning.

As noted by Malloch, *Luzonimyia* is similar in many respects to *Acletoxenus*. In particular the two genera share the micropubescent arista, narrow cheek, absence of a carina, large prescutellar bristles, and clear wing with confluent discal and second basal cells and costa reaching the fourth vein. Differences include the presence of (small) ocellar bristles in *Luzonimyia* (ocellars absent in *Acletoxenus*), larger orbital bristles in *Luzonimyia*, presence of two pairs of dorsocentral bristles in *Luzonimyia* (one pair in *Acletoxenus*), and general greyish pollinosity in *Luzonimyia*. As discussed above, larvae of *Acletoxenus* species are predaceous on Aleyrodidae (Hemiptera). No information is available on the larval habits of either species of *Luzonimyia*.

1. *Luzonimyia cineracea*, sp. nov.

Types

Holotype ♂: 16 km E. by N. of Mt Cahill, Northern Territory, at light, 16.xi.1972, D.H. Colless (ANIC). Paratypes: **Northern Territory** (all ANIC): Goose Lagoon, 16°10′S. 136°15′E., 11 km SW. by S. of Borroloola, 31.x.1975, M.S. Upton, 1♂, 1♀; Jim Jim Creek, 19 km WSW. of Mt Cahill, at light, 24.x.1972, D.H. Colless, 1♀; Magela Creek, 19 km SSE. of Mudginbarry HS, on blossom, 7.xi.1972, D.H. Colless, 1♂; Baroalba Creek Springs, 19 km NE. by E. of Mt Cahill, at light, 28.x.1972, D.H. Colless, 1♂; 2 miles ENE. of Victoria River Downs HS, 16°24′S. 131°02′E., 26.vi.1969, M. Mendum, 1♀. **Queensland**: 7–14 miles W. of Herberton via Watsonville, 1.v.1967, D.H. Colless, 1♀ (ANIC); Blencoe Creek (Kirrama Ranges), 10.viii.1976, Bock and Parsons, 1♀ (LT); Bundaberg, July 1972, H. Frauca, 1♂ (ANIC); Nogoa River, Emerald, 9.v.1970, Z. Liepa, 1♂ (ANIC). **New South Wales**: (all AM): Bronte, near Sydney, D.K. McAlpine, 5.x.1958, 1♂, 28.x.1971, 1♂, 1♀; Mooney Mooney Creek near Gosford, D.K. McAlpine, 20.xi.1975, 1♂, 1.i.1977, 1♂; Careel Bay, Avalon, mangroves, 15.xii.1964, D.K. McAlpine, 1♂; dunes, North Beach, Bellinger River, 30.xi.1966, D.K. McAlpine, 1♀.

Distinguishing features. As given in generic diagnosis above; abdominal tergites 4–5 each with large median and lateral black spots.

Body length. 3.8 mm (holotype); 2.5–4.1 mm (paratype range).

Head. Arista with relatively long micropubescence. Front flat, breadth 0.7 times length, with dense grey pollinosity (including ocellar triangle), paler anteriorly. Ocellar bristles about size of acrostichal hairs. 2nd antennal segment tan; 3rd tan, slightly dusky especially about anterior border. Face whitish pollinose. Palp black. Cheek curved, very narrow. Eye bare, greatest diameter vertical. Orbital bristles in line, proclinate a little shorter than other 2, anterior reclinate closer to proclinate than to posterior reclinate.

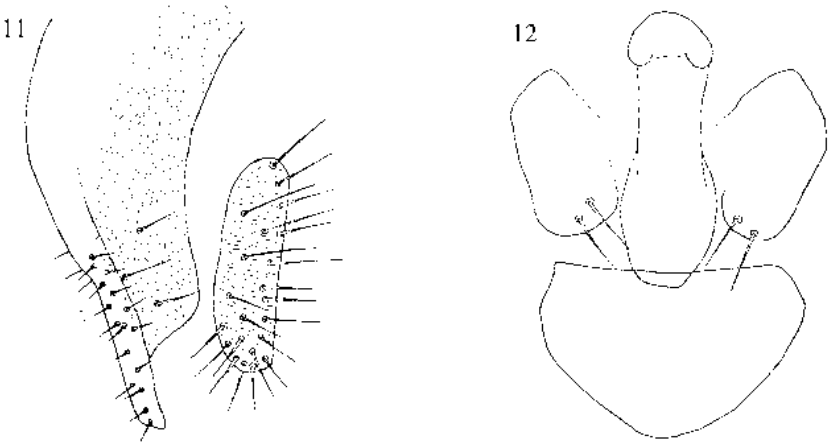
Thorax. Mesonotum with dense steely grey pollinosity (black below pollinosity, but underlying coloration evident only in damaged specimens); some specimens with weak longitudinal brownish bands laterally, others with similar submedian bands. (Mesonotum black in greasy specimens.) Acrostichal hairs in 10 rows in front

of dorsocentral bristles, 6 rows between dorsocentrals, fairly regular. Prescutellar and anterior dorsocentral bristles subequal. Scutellum with greyish pollinosity, a little paler towards apex. Anterior scutellar bristles divergent but somewhat recurved, longer than posterior scutellars; latter crossed. Pleura with greyish pollinosity. Propleural bristle absent. Haltere pale tan. Legs tan; preapical bristles on 2nd and 3rd tibiae; apical bristle on 2nd tibia only.

Wing. Hyaline; vein R_1 darkened apically. *C*-index, 6.5; 4*V*-index, 1.0; 5*X*-index, 0.9; *M*-index, 0.3. 3rd costal section with heavy setation on basal 0.15. 3rd costal section without ventral spines. Length (holotype), 3.6 mm.

Abdomen. Tergite 1 tan. Tergite 2 tan with whitish pollinosity and large lateral black spots. Tergite 3 similar to tergite 2, in some female specimens with additional large median black spot. Tergites 4–5 each tan with whitish pollinosity and large median and lateral black spots. Tergite 6 short, largely concealed beneath tergite 5, tan with black spots.

Male genitalia (Figs 11, 12). Very small. Periphallic organs without clasper; aedeagus basally expanded, apically narrowed, without ornamentation.



Figs 11, 12. *Luzonimyia cineracea*: *11*, male external genitalia; *12*, male internal genitalia.

Distribution. Widespread in northern and eastern Australia from the Northern Territory to central New South Wales, not in rainforests.

Specimens Examined

Types as above. **Queensland** (all UQ): Kingaroy, 3.vi.1959, E.M. Exley, 1♂; Caloundra, 25.viii.1932, 1♂; Caloundra, 17.viii.1934, F.A. Perkins, 1♂; Deception Bay, 17.ix.1961, R.G. Winks, 1♀; Cleveland, 15.ix.1977, W. Yarrow, 1♂; Dunwich, North Stradbroke I., 22.viii.1958, C.D. Michener, 1♂; Brisbane, 23.x.1960, M. Russell, 1♂. **New South Wales** (both AM): Bronte, near Sydney, 28.x.1971, D.K. McAlpine, 1♂; Gordon, ex fly trap, 5.xi.1940, A. Musgrave, 1♀.

IX. Genus **Stegana** Meigen

Stegana Meigen, 1830, p. 79. Type-species *S. nigra* Meigen, 1830, by subsequent designation (Zetterstedt 1847), synonym of *Musca furta* Linnaeus, 1766 (Basden 1961); type locality Europe.

Orthostegana Hendel, 1913*b*, p. 631. Type-species *O. acutangula* Hendel, 1913, by original designation; type locality Bolivia.

Protostegana Hendel, 1920, p. 53. Type-species *Drosophila curvipennis* Fallén, 1823, by original designation, synonym of *Musca furta* Linnaeus, 1766 (Wheeler 1981): type locality Europe.

Oxyphortica Duda, 1923, p. 34 (as subgenus of *Phortica*; cf. *Amiota* above). Type-species *Drosophila convergens* de Meijere, 1911, by monotypy; type locality Java. (Wheeler 1981.)

Chaetocnema Duda, 1926*a*, p. 243 (preoccupied in Coleoptera). Type-species *C. poeciloptera* Duda, 1926, by monotypy; type locality Taiwan. (Wheeler 1981.)

Arista plumose, usually with numerous rays; carina usually narrow and confined to upper part of face; acrostichal hairs usually in numerous rows; prescutellars typically large (but absent in several species); wing typically darkened or patterned; 3rd and 4th longitudinal veins convergent apically; wing typically with crease adjacent to last section of 5th longitudinal vein; discal and 2nd basal cells separate; costa extending beyond apex of 3rd vein; 3rd costal section with small ventral thorn-like spines.

Stegana is a cosmopolitan genus of over 60 species. Up to six subgenera have been recognized, but some of the differences held to be of subgeneric significance do not seem very great; a summary is provided by Okada (1978). The 'typical' *Stegana* species possess darkened wings which are folded over the abdomen, thus imparting a beetle-like appearance to the flies. Many species also possess a broad dark longitudinal pleural band. Ecological information on members of the genus is largely or entirely lacking; adult flies are not attracted to baits and are collected by sweeping foliage. The genus is evidently very rare in Australia and restricted to north Queensland; only eight specimens are available from the combined collections of the Division of Entomology, CSIRO (three specimens), the Australian Museum (five) and the Department of Genetics, La Trobe University (none), but four species are represented.

1. ***Stegana scarabeo***, sp. nov.

Types

Holotype ♀: Summit Walter Hill Range, Cardstone–Ravenshoe Rd, north Queensland, 16.i.1967, D.K. McAlpine and G. Holloway (AM). Paratypes (all Queensland): 2 miles N. Tully River Bridge, Cardstone–Ravenshoe Rd, 16.i.1967, D.K. McAlpine, 1♀ (AM); Mt Edith Forest Rd, 1½ miles off Danbulla Rd, 6.v.1967, D.H. Colless, 1♀ (ANIC); The Boulders, Babinda, 10.v.1967, D.H. Colless, 1♂ (ANIC).

Distinguishing features. Pleura with black band; front largely weakly blackened; palp tan.

Body length. 4.3 mm (holotype); 3.4–4.3 mm (paratype range).

Head. Arista with 8 rays above and 5–6 rays below plus small terminal fork; axis thicker and tan basally, black apically. Breadth of front 0.6 times length; front tan anteriorly in central part and about vertical bristles, otherwise (i.e. in anterior band, and hemispherical patch on each side beside orbit) weakly blackish. Ocellar triangle shiny black. 2nd antennal segment dark tan; 3rd segment large, oval, mostly black, dark tan at base. Carina knife-like, confined to upper half of face. Face with blackish band across carina, pale tan below. Palp entirely pale tan, with a few weak bristles. Cheek shortened below, almost linear, rather wide, pale tan, vibrissa very strong. Eye bare, greater diameter horizontal. Orbital bristles in ratio 7 : 3 : 4, in

line; anterior reclinate orbital closer to proclinate than to posterior reclinate orbital. Ocellar, vertical and postvertical bristles well developed.

Thorax. Mesonotum dark reddish brown (slightly paler centrally in 2 specimens), with pale tan patches anterolaterally which include most of each humeral callus. Dorsocentral bristles small, close together and placed far back on mesonotum, posterior bristle almost at scutellar border; anterior dorsocentrals less than ½ length of posterior dorsocentrals. Prescutellar bristles large. Last transverse row of acrostichal hairs (adjacent to scutellum) enlarged. Scutellum broadly rounded apically, dark brown with pale border, paler centrally. Anterior scutellar bristles considerably larger than posterior scutellars. Pleura with broad blackish longitudinal band above, pale tan below. Stalk of haltere tan; knob weakly darkened. Fore-femur pale tan with apical dark annulus; fore-tibia tan with weak proximal and subapical dark annuli; fore-tarsus pale. Mid-femur pale tan in upper 0.4, dark in lower 0.6; mid-tibia pale with broad subbasal and narrow incomplete subapical annuli; mid-metatarsus dark basally, tarsus otherwise pale tan. Hind-femur pale tan in upper half, weakly darkened in lower half; hind-tibia pale with weak subbasal and strong incomplete subapical annuli; hind-tarsus pale. Short apical bristle present on mid-tibia only.

Wing. Infuscated, coloration weaker towards posterior border. *C*-index, *c*. 2.4; *4V*-index, *c*. 1.6; *5X*-index, *c*. 1.0; *M*-index, *c*. 0.5. 3rd costal section with heavy setation on basal 0.7. Length (holotype), *c*. 3.0 mm.

Abdomen. Tergites 2–6 each mid-brownish, darker along posterior border.

Distribution. Known only from type specimens, rainforests of north Queensland.

Special Comments

De Meijere (1911) described five species of *Stegana* from Java, *brunnescens*, *nigrifrons*, *undulata*, *scutellata* and *lineata*. The first four of these species possess dark pleural bands, as do the European–Asian species *coleoptrata* (Scopoli) and several others. *S. scarabeo*, and the following two species also described as new. All of these species are superficially quite similar, but the features of the Australian species are not coincident in all details with those described for the above exotics, differing especially in the banding patterns on the legs but also in some details of wing venation, arista structure, frontal coloration and a few other characteristics.

2. *Stegana claudana*, sp. nov.

Type

Holotype ♀: Claudie River, 5 miles W. Mt Lamond, north Queensland, 24.xii.1971, D.K. McAlpine, G.A. Holloway and D.P. Sands (AM).

Distinguishing features. Very similar to preceding species, distinguished by its entirely pale front, apically darkened palp and different banding pattern on the legs.

Body length. 3.0 mm.

Head. Arista with 8 rays above and 6 rays below plus terminal fork; axis broader and pale at base. Breadth of front 0.6 times length; front shiny tan; ocellar triangle black. 2nd antennal segment tan; 3rd segment large, rounded, black except at base. Carina knife-like, confined to upper part of face. Face with black band enclosing carina, pale tan below. Palp tan, apically brownish, with very weak bristles. Cheek

shortened below, linear, rather broad, pale tan; vibrissa very long. Eye large, bare, greatest diameter horizontal. Orbital bristles in ratio 8 : 5 : 6, in line, anterior reclinate orbital a little closer to proclinate than to posterior reclinate orbital. Ocellar and vertical bristles well developed; postverticals moderately strong.

Thorax. Mesonotum shiny dark brownish, paler centrally and anteriorly, palest on humeral calli. Posterior dorsocentral bristles almost at scutellar border; anterior dorsocentrals less than ½ length of, and close to, posterior dorsocentrals. Prescutellar bristles large. Last transverse row of acrostichals (at scutellar border) enlarged. Scutellum broadly rounded apically, dark brownish with paler border. Pleura with broad longitudinal blackish band above, pale tan below. Stalk of haltere pale tan; knob a little darker. Fore-femur pale tan, weakly darkened apically; fore-tibia and tarsus tan. Mid-femur pale tan above and below, dark in broad middle area; mid-tibia with weak dark incomplete subbasal band, otherwise tan; mid-metatarsus very weakly darkened at base, tarsus otherwise tan. Hind-femur in upper half pale tan, in lower half pale tan below, with weak darkening above; hind-tibia weakly darkened basally, tan below; hind-tarsus tan. Stubby apical bristle present on mid-tibia only.

Wing. Infuscated, coloration weaker posteriorly. *C*-index, *c*. 1.8; 4*V*-index, *c*. 1.9; 5*X*-index, *c*. 1.4; *M*-index, *c*. 0.7. 3rd costal section with heavy setation on basal 0.75. Length, *c*. 2.0 mm.

Abdomen. Entirely dark blackish brown.

Distribution. Known only from holotype, Claudie River, far north Queensland.

3. ***Stegana earli***, sp. nov.

Types

Holotype ♂: Earl Hill, N. of Cairns, north Queensland, 8.v.1967, D.H. Colless (ANIC). Paratype ♂: same data as holotype (ANIC).

Distinguishing features. Similar to preceding 2 species but scutellum narrowly (rather than broadly) rounded at apex and 3rd and 4th longitudinal wing veins almost touching at apices.

Body length. 3.5 mm (both types).

Head. Arista long, rather feather-like, with short straight rays, *c*. 8 above and 5 below plus small terminal fork. Breadth of front 0.75 times length; front dark brownish, paler anteriorly and along orbital margins; ocellar triangle black. 2nd antennal segment dark tan; 3rd segment large, acutely rounded anteriorly below, black, pale only at base of arista. Carina knife-like, confined to upper part of face. Face with black band across carina, pale tan below. Palp pale tan with moderately strong apical and subapical bristles. Cheek slightly curved, rather broad, pale tan; vibrissa very large. Eye large, bare, greatest diameter vertical. Orbital bristles in ratio 5 : 3 : 4, in line and about equally spaced; proclinate orbitals convergent. Ocellar and vertical bristles strong; postverticals moderately strong.

Thorax. Mesonotum dark reddish brown, pale on humeral calli and adjacent to occiput. Posterior dorsocentral bristles rather weak, almost at scutellar margin; anterior dorsocentrals weak, close to posterior dorsocentrals. Prescutellar bristles large. Last transverse row of acrostichals (at scutellar border) enlarged. Scutellum narrowly rounded apically, largely dark brown, pale in small area at apex. Apical

scutellar bristles much weaker than basal scutellars. Pleura with broad blackish longitudinal band above, pale tan below. Haltere tan. Fore-femur tan, weakly darkened apically on outer side; fore-tibia and tarsus tan. Mid-femur tan on upper 0.4, darkened on lower 0.6; mid-tibia weakly darkened on upper 0.4, tan in lower 0.6; mid-tarsus tan. Hind-femur tan in upper half, darkened in lower half; hind-tibia tan, barely darkened above; hind-tarsus tan. Hind-tibia with weak preapical bristle; mid-tibia with stubby apical bristle.

Wing. Infuscated, coloration weaker posteriorly. 3rd and 4th longitudinal veins very strongly convergent apically. *C*-index, *c*. 2.1; 4*V*-index, *c*. 1.9; 5*X*-index, *c*. 1.5; *M*-index, *c*. 0.6. 3rd costal section with heavy setation on basal 0.8. Length, 2.3 mm.

Abdomen. Entirely dark blackish brown.

Distribution. Known only from type locality.

4. ***Stegana lamondi***, sp. nov.

Type

Holotype ♂: Claudie River near Mt Lamond, north Queensland, ex malaise trap, 18.xii.1971, D.K. McAlpine and G.A. Holloway (AM).

Distinguishing features. Wing coloration weak except along crossveins; pleura without dark band.

Body length. 3.0 mm.

Head. Arista with 7 rays above and 4 rays below plus small terminal fork. Breadth of front 0.7 times length; front narrowed anteriorly, mid-brownish, paler in anterolateral corners; ocellar triangle partly blackish, with some greenish pollinosity. 2nd antennal segment mid-brownish; 3rd segment narrowed and slightly produced forwards anteriorly below, largely blackish, tan at base. Carina knife-like, on upper ⅔ of face. Face with broad weakly blackened band across carina, pale tan below. Palp pale tan, with weak bristles. Cheek linear, broad, pale tan. Eye large, bare, elongate-oval, greatest diameter horizontal. Proclinate orbital bristles missing in type; anterior reclinate orbital a little weaker than posterior reclinate orbital. Postvertical bristles rather weak.

Thorax. Mesonotum mid-dark brown with weak white-greenish pollinosity, laterally with narrow pale band beginning in spot just medial to humeral callus and weakening posteriorly, and further pale areas on humeral callus and just above wing. Posterior dorsocentral bristles weak and close to scutellum; anterior dorsocentrals very weak, close to posterior dorsocentrals. Prescutellar bristles weak. Acrostichal hairs large, rather widely separated and irregularly rowed. Scutellum mid-dark brownish with pollinosity, pale in small spot in each anterior corner. Posterior scutellar bristles much weaker than anterior scutellars. Pleura entirely pale tan. Stalk of haltere tan; knob darkened. Legs entirely pale tan; 2nd and 3rd tibiae with weak preapical bristles; 2nd tibia with stubby apical bristle.

Wing. Darkening weak anteriorly, very weak posteriorly, strong only along crossveins. *C*-index, *c*. 2.0; 4*V*-index, *c*. 2.5; 5*X*-index, *c*. 1.0; *M*-index, *c*. 0.7. 3rd costal section with heavy setation on basal 0.75. Length, 2.2 mm.

Abdomen. Slender, entirely blackish brown.

Distribution. Known only from holotype.

Key to Australian Species of *Stegana*

1. Pleura with broad dark longitudinal band 2
   Pleura unbanded ..... *lanondi*
2(1). 3rd and 4th longitudinal wing veins almost meeting apically; arista feather-like ..... *earli*
   3rd and 4th longitudinal veins not almost meeting apically; arista not feather-like 3
3(2). Front darkened posteriorly; palp entirely tan ..... *scarabeo*
   Front tan; palp darkened apically ..... *claudana*

Subfamily DROSOPHILINAE

X. Genus Baeodrosophila Wheeler & Takada

Baeodrosophila Wheeler and Takada, 1964, p. 238. Type-species *B. pubescens* Wheeler and Takada, 1964, by original designation; type locality Palau Is, Micronesia.

Small species (<2 mm); bristles luteous; vibrissa single; carina large, flat; ocellar bristles strong, in line or almost in line with anterior ocellus; arista with few minute hairs or micropubescent at apex; anterior reclinate orbital bristle appreciably smaller than proclinate and posterior reclinate orbitals; acrostichal hairs in at least 8 rows; weak prescutellar bristles present; middle sternopleural bristle absent; *C*-index low; anal vein absent.

The genus *Baeodrosophila* was established to include four Micronesian species: no further species have subsequently been described and the genus has remained unknown apart from Wheeler and Takada's original work. The relationships of *Baeodrosophila* are unclear. Bearing small prescutellar bristles, the species are reminiscent of members of the *Drosophila* subgenus *Scaptodrosophila* and could be descended from a specialized *Scaptodrosophila* line. One of the more distinguishing characteristics of *Baeodrosophila* is the arista. In three of the species described by Wheeler and Takada and in the new species described below, the arista is micropubescent apically only, bearing a few long basal rays; in Wheeler and Takada's fourth species the arista is wholly micropubescent. Some specimens of three of the species described by Wheeler and Takada (1964) were recorded as collected on *Pandanus*; no further ecological information is available on any of the five species now known.

1. *Baeodrosophila pallens* Wheeler & Takada

Baeodrosophila pallens Wheeler and Takada, 1964, p. 239. (Holotype in Washington; type locality Guam.)

Distinguishing features. Body tan; arista with 2 dorsal rays; carina very broad.

Body length. 1.9 mm.

Head. Arista with 2 straight rays above and 1 straight ray below, apical to upper rays; axis apically micropubescent. Front 1.15 times broader than long, tan; periorbits and ocellar triangle silvery. 2nd and 3rd antennal segments tan. Carina very strong, rather broad above, broader below, flat, lateral and ventral margins almost squared. Face tan. Palp tan, with 2 large apical bristles. Cheek almost linear, rather broad. Eye with short pile. Orbital bristles in ratio 5 : 2 : 5; anterior reclinate orbital posterolateral to proclinate orbital. Postvertical bristles rather widely separated, slightly convergent.

Thorax. Mesonotum, scutellum, pleura and haltere tan. Acrostichal hairs in 8–10 rows in front of dorsocentral bristles, *c*. 4 rows between dorsocentrals. Anterior dorsocentral bristles very small, close to posterior dorsocentrals. Posterior dorsocentrals large. Anterior sternopleural bristle fine, 0.7 times length of posterior sternopleural. Legs tan; 2nd tibia with large apical bristle.

Wing. Hyaline. *C*-index, 1.2; 4*V*-index, 2.5; 5*X*-index, 2.1; *M*-index, 1.0. 3rd costal section with heavy setation on basal 0.75. Length, 1.5 mm.

Abdomen. Entirely tan.

Distribution. Micronesia; Northern Territory.

Specimen Examined

Northern Territory: 11°09'S, 132°09'E., Black Point, Cobourg Peninsula. 29.ii.1977, E.D. Edwards. 1♂ (ANIC).

Special Comments

The Australian specimen differs from those described by Wheeler and Takada in lacking a 'broad light-brownish longitudinal band [on mesonotum] which reaches back on to scutellar disc', but agrees with Wheeler and Takada's description of external morphology in all other respects. Since thoracic darkening polymorphisms are not uncommon in drosophilids (appearing, for example, in several urban species of *Drosophila* on a cyclic basis, disappearing in summer and reappearing in winter), there seems little doubt that the Australian specimen is conspecific with those described from Micronesia.

2. ***Baeodrosophila weiri***, sp. nov.

Type

Holotype ♀: 11°09'S, 132°09'E., Black Point, Cobourg Peninsula, Northern Territory, ex malaise trap, 15-23.ii.1977, T.A. Weir (ANIC).

Distinguishing features. Body tan; arista with 3 dorsal rays; carina not greatly broadened.

Body length. 1.7 mm.

Head. Arista with 3 straight rays above, 1 straight ray below and a few minute apical rays. Front 1.1 times broader than long, shiny tan; ocellar triangle somewhat darkened. 2nd and 3rd antennal segments tan. Carina moderately broad, only slightly widened below, flat, lateral margins slightly rounded, smoothly rounded below. Palp tan. Cheek curved, rather broad. Eye with short pile. Orbital bristles in ratio 2 : 1 : 2; anterior reclinate orbital lateral and slightly posterior to proclinate orbital. Postvertical bristles slightly convergent.

Thorax. Mesonotum, scutellum, pleura and haltere tan. Acrostichal hairs in 8 rows in front of dorsocentral bristles, *c*. 4 rows between dorsocentrals. Ratio anterior : posterior dorsocentral bristles *c*. 0.35. Anterior sternopleural bristle 0.7 times length of posterior sternopleural. Legs tan; 2nd tibia with large apical bristle.

Wing. Hyaline. *C*-index, 1.2; 4*V*-index, 2.9; 5*X*-index, 2.7; *M*-index, 1.1. 3rd costal section with heavy setation on basal 0.7. Length, 1.3 mm.

Abdomen. Entirely tan. Egg guide slender, with small marginal teeth.

Distribution. Known only from holotype.

Special Comments

This species is rather similar to *B. discolor* Wheeler & Takada but differs in coloration and in the relative sizes of the orbital and dorsocentral bristles.

Key to Australian Species of *Baeodrosophila*

Arista with 2 dorsal rays; carina considerably broadened below ..... *pallens*
Arista with 3 dorsal rays; carina barely broadened below ..... *weiri*

XI. Genus Balara, gen. nov.

Small species; cheek exceptionally broad; eye small, round; 2nd oral bristle 0.5–0.6 length of 1st; carina small, low; arista with short rays; anterior reclinate orbital bristle well developed, close to proclinate orbital; ocellar, vertical and postvertical bristles large, ocellars within triangle; acrostichal hairs large; prescutellars present; 3rd pair of dorsocentral bristles present, anterior to transverse suture; sternopleuron with 2 large bristles; anal crossvein and anal vein absent.

Type-species: *Drosophila poecilithorax* Malloch.

'Balar' = 'fly' in Yolngu aboriginal language (Northern Territory); thus *Balara*, feminine.

It has previously been noted (Bock 1976) that '*Drosophila*' *poecilithorax* Malloch is not a member of the genus *Drosophila* as that group is now understood; the species cannot be placed in an existing genus and a new genus is accordingly established. The most distinguishing features of the only included species are the very broad cheek and small round eye, and the presence of an extra pair of dorsocentral bristles, somewhat removed from the other two pairs, which are placed well back on the mesonotum. The presence of prescutellar bristles and two large sternopleurals superficially suggests that the genus might be included in the Steganinae, but other features such as the extra crossvein, ventral spines on the third costal section, termination of the costa at the apex of the third longitudinal vein and wide spacing of three large orbital bristles, which are present in many or most Steganinae, do not occur in this species, which thus seems better assigned to the Drosophilinae. Its closest relatives are a matter of conjecture; it may be a specialized offshoot from *Scaptodrosophila*.

1. *Balara poecilithorax* (Malloch)

Drosophila poecilithorax Malloch, 1925, p. 87. (Holotype in SPHTM; type locality Sydney.)

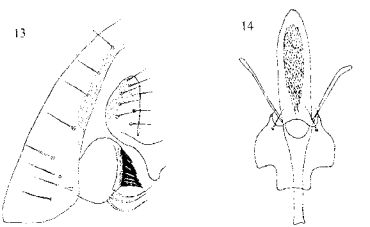
Distinguishing features. As given in generic diagnosis above; mesonotum with bluish grey pollinosity, acrostichal hairs arising from dark spots.

Body length. *C*. 2.1 mm.

Head. Arista with 3 short rays above and 1–2 short rays below plus very small terminal fork. Front 1.2 times broader than long, largely rufous tan; periorbits and ocellar triangle with strong silvery greyish pollinosity. Anterior margin of front with row of strong bristles; additional bristles present centrally and in front of orbitals. 2nd antennal segment tan; 3rd segment short, dusky. Carina narrow above, a little

broader below, low, most protuberant in middle region (at level of join between 2nd and 3rd antennal segments). Face with silvery pollinosity. Clypeal margin with small median notch. Palp tan, slightly dusky. Cheek exceptionally broad, *c.* 0.4 times eye diameter, largely pale tan, dark anteriorly. Eye small, round, with very fine, extremely sparse pile. Orbital bristles in ratio 4 : 3 : 6; anterior reclinate orbital anterolateral to proclinate orbital; orbital bristles arising from very small brown spots; posterior reclinate orbital directed somewhat outwards. Ocellar, vertical and postvertical bristles large. Occiput pollinose.

Thorax. Mesonotum with dense pollinosity, largely bluish grey, dark brown about base of each hair or bristle especially on either side of midline to form weak brownish vittae. Acrostichal hairs unusually large, in 4 complete rows plus a few extra irregularly spaced hairs in front of dorsocentral bristles, 2 rows between dorsocentrals. Scutellum with similar pollinosity to mesonotum, with 4 ill-defined brownish spots. Anterior scutellar bristles weak, 0.5-0.6 length of posterior scutellars. Pleura mid-dark brown with superimposed bluish grey pollinosity except in lower anterior portion of mesopleuron. Anterior and posterior scutellar bristles equal. Haltere pale tan. Legs pale tan; tibiae with weak basal annuli; mid- and/or hind-femora of a few specimens with weak subbasal annuli.



Figs 13, 14. *Balara poecilithorax*: *13*, male external genitalia, *14*, male internal genitalia.

Wing. Hyaline. *C*-index, *c.* 1.1; 4*V*-index, *c.* 2.9; 5*X*-index, *c.* 2.9; *M*-index, *c.* 1.1. 3rd costal section with heavy setation on basal 0.85. Length, *c.* 1.8 mm.

Abdomen. Entirely shiny rufous brown with weak pollinosity.

Male genitalia (Figs 13, 14). Clasper with closely packed marginal teeth increasing in length below, and large curved bristles below latter; decasternum densely sclerotized; aedeagus large, cylindrical; hypandrium shallow, with pair of large widely separated spines.

Female genitalia. Egg guide well developed but apically slender, without teeth but with long apical hairs.

Distribution. Widespread across northern Australia from Western Australia to Queensland, primarily in arid areas but one specimen from a rainforest area of north Queensland. The type locality of the single specimen described by Malloch was

given as Sydney (collected in 1924); no further specimens have been found in New South Wales [cf. also comments by Bock (1976) on the distribution of *Drosophila sulfurigaster*].

Specimens Examined

Holotype. **Western Australia** (all ANIC): 8 km S. of Cape Bertholet, West Kimberley, at light, 19.iv.1977, D.H. Colless, 7♀; 5 km SSW. of Cape Bertholet, West Kimberley, at light, 21.iv.1977, D.H. Colless, 20♀; Martin's Well, West Kimberley, light trap, 24.iv.1977, D.H. Colless, 3♂, 4♀; 1 km S. of Martin's Well, West Kimberley, at light, 26.iv.1977, D.H. Colless, 1♂; 14°49'S. 126°49'E., Carson Escarpment, 9–15.viii.1975, I.F.B. Common and M.S. Upton, 1♂, 10♀; 15°02'S. 126°40'E., Morgan Falls, 16–17.viii.1975, I.F.B. Common and M.S. Upton, 1♀; 15°02'S. 126°55'E., Drysdale River, 3–8.viii.1975, I.F.B. Common and M.S. Upton, 3♀. **Northern Territory** (all ANIC): Cooper Creek, 19 km E. by S. of Mt Borradaile, 2.xi.1972, D.H. Colless, 1♀; Cooper Creek 11 km S. by W. of Nimbuwah Rock, 1.xi.1977, D.H. Colless, 4♀; Birraduk Creek 17 km WSW. of Nimbuwah Rock, at light, 4.vi.1973, D.H. Colless, 1♀ [abdomen densely covered with mites]; 1 km N. of Cahills Crossing (E. Alligator R.), 8.xi.1972, D.H. Colless, 1♀; Koongarra, 15 km E. of Mt Cahill, at light, 6–9.iii.1973, D.H. Colless, 3♀, 12.vi.1973, D.H. Colless, 1♀; 15 km S. by E. of Mudginbarry HS (scarp foot), at light, 11.vi.1973, D.H. Colless, 1♀; Batten Creek 31 km WSW. of Borroloola, malaise trap, 16.iv.1976, D.H. Colless, 1♀; 22 km SSW. of Borroloola, at light, 16.iv.1976, D.H. Colless, 1♀; Cattle Creek, 16°32'S. 136°10'E., 54 km S. by W. of Borroloola, 27.x.1975, M.S. Upton, 1♀; Bessie Spring, 8 km ESE. of Cape Crawford, truck trap, 12.iv.1976, D.H. Colless, 2♀. **Queensland:** Claudie River near Mt Lamond, malaise trap, 14.xii.1971, D.K. McAlpine, G.A. Holloway and D.P. Sands, 1♀ (AM); 15 km S. of Charleville, 6.iv.1976, D.H. Colless, 1♀ (ANIC); Lamington National Park, 22–27.xi.1978, Lawrence and Weir, 1♂ (alcohol) (ANIC).

XII. Genus Chymomyza Czerny

Chymomyza Czerny, 1903, p. 199. Type-species *Drosophila fuscimana* Zetterstedt, 1838, by subsequent designation (Sturtevant 1921); type locality Europe.

Amphoroneura de Meijere, 1911, p. 423. Type-species *A. rufithorax* de Meijere, 1911, by subsequent designation (Wheeler 1981); type locality Java. (Okada 1956.)

Zygodrosophila Hendel, 1917, p. 43. Type-species *Z. albitarsis* Hendel, 1917, by original designation; type locality Paraguay. (Wheeler 1981.)

Arista plumose; anterior reclinate orbital bristle large, well anterior to proclinate orbital; postverticals minute; carina at most small, confined to upper part of face; acrostichal hairs in 6–8 rows.

About 30 species of *Chymomyza* have been described from North and South America, Asia, south-east Asia, Europe and Africa; with the discovery of the genus in Australia it may now be termed cosmopolitan. The most distinguishing feature of *Chymomyza* species is the size and position of the anterior reclinate orbital bristle, i.e. large (usually small in Drosophilinae) and well anterior to the proclinate orbital (typically posterior, lateral or slightly anterior to the proclinate orbital in other Drosophilidae). In many species the fore-tarsi are bicoloured (metatarsus dark, remaining tarsal segments pale), and the male fore-femora in some species are 'swollen and shaggy, being used for mating and fighting . . . .' (Okada 1976).

Only five specimens of *Chymomyza* are present in the Australian collections, but they represent two species, neither referable to those previously described.

1. *Chymomyza eungellae*, sp. nov.

Types

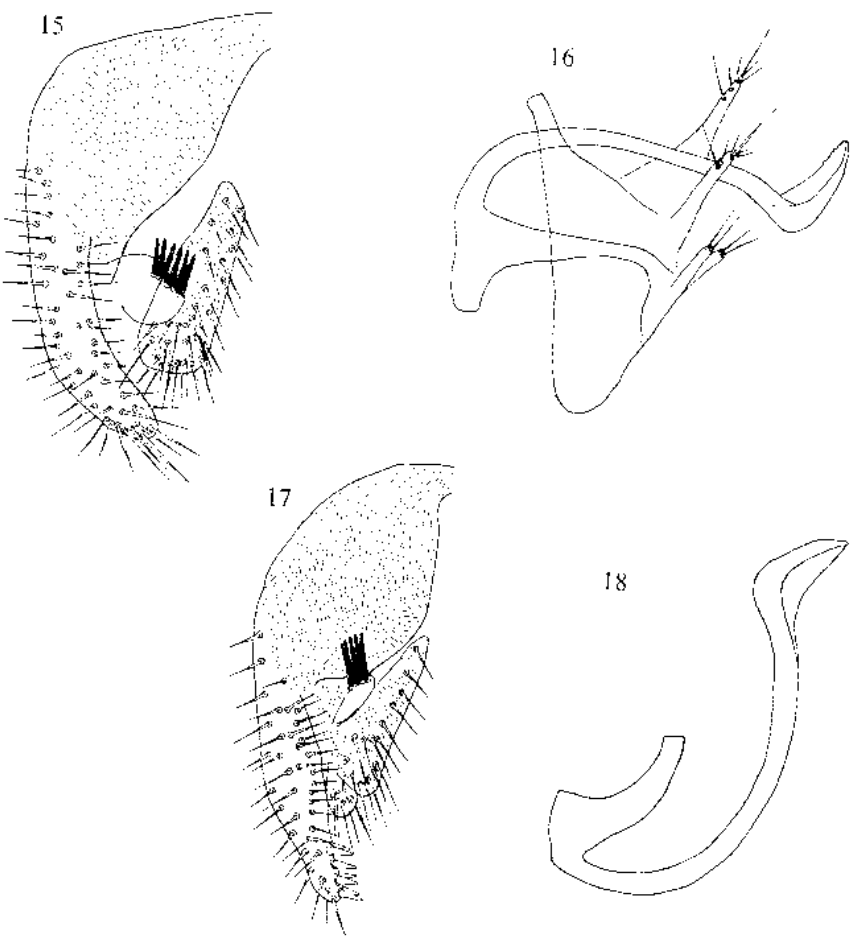
Holotype ♀: Mt Dalrymple Rd, Eungella, Queensland, 11.xi.1961, McAlpine and

Lossin (AM). Paratypes: Wilson River Reserve via Bellangry, New South Wales, 27.xi.1966, D.K. McAlpine, 2♂ (AM).

Distinguishing features. As given in generic diagnosis above; wing tip not apically whitened.

Body length. 2.7 mm (holotype); 2.3 mm (paratypes).

Head. Arista with 3–4 straight rays above and 2 straight rays below plus terminal fork. Breadth of front 1.3 times length; front dark reddish tan in anterior ¼, dusky dark brown in posterior ¾; periorbits rather shiny. 2nd antennal segment reddish tan; 3rd segment small, round, dusky tan. Rudiment only of carina present on upper part of face. Face reddish brown. Palp tan, with a few weak bristles. Cheek narrow, slightly curved, brown. Vibrissa weak; succeeding oral bristles about ½ length of vibrissa. Eye bare. Proclinate and anterior reclinate orbital bristles subequal; posterior reclinate orbital a little longer. Ocellar and vertical bristles large.



Figs 15, 16. *Chymomyza cungellae*: *15*, male external genitalia; *16*, male internal genitalia.
Figs 17, 18. *Chymomyza poena*: *17*, male external genitalia; *18*, aedeagus.

Thorax. Mesonotum dark brownish to blackish, a little paler on humeral calli. Acrostichal hairs in 6–8 rows, rather irregular, in front of dorsocentral bristles, sparse and finishing well anterior to scutellar margin between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Scutellum concolorous with mesonotum; anterior scutellar bristles about ½ length of posterior scutellars. Pleura concolorous with mesonotum, rather shiny. Haltere tan. Fore-femur swollen especially in male, in male with row of large bristles on inner surface. Fore-femur, tibia and metatarsus mid-dark brownish; apical 4 segments of fore-tarsus paler. Mid- and hindlegs tan to dark tan. Small apical bristles present on 2nd tibia.

Wing. Hyaline with infuscation of costal cell. 2nd and 3rd longitudinal veins close together and parallel basally, 2nd vein slightly bent towards costa apically, 3rd vein gently curved posteriorly at about ⅓ of length from origin. *C*-index, 1.1; 4*V*-index, 2.3; 5*X*-index, 2.7; *M*-index, 0.65. 3rd costal section with heavy setation on basal 0.9. Length (holotype), 2.4 mm.

Abdomen. Entirely shiny dark brownish black.

Male genitalia (Figs 15, 16). Anal plate long, slender; clasper with *c*. 7 large marginal teeth; aedeagus long, slender, curved, without ornamentation; hypandrium with apical processes bearing long bristles; parandrites finger-like, with very fine hairs and 2 longer apical bristles.

Female genitalia. Egg guide well developed, with apical bristles but without teeth.

Distribution. Known only from types, but latter collected in rather widely separated localities.

Special Comments

C. eungellae is very similar to several other species of the genus [termed the *costata* group by Okada (1976)] possessing darkened bodies and without apical whitening of the wing, viz. *costata* (Zetterstedt) (Europe to Japan), *caudatula* Oldenberg (Holarctic), *japonica* Okada (Japan), *atrimana* Okada (Japan), *mexicana* Wheeler (Central America) and *leucopoda* Wheeler (Mexico), but differs in details, especially of the male genitalia.

2. *Chymomyza poena*, sp. nov.

Types

Holotype ♀: Lake Barrine, north Queensland, at light, 14.ix.1965. R.B. Angus (ANIC). Paratype ♂: The Crater near Herberton, north Queensland, ex trap, 5.i.1967, D.K. McAlpine and G. Holloway (AM).

Distinguishing features. Very similar to preceding species but wing tip whitened.

Body length. 2.9 mm (holotype); 2.3 mm (paratype).

Head. Arista with 3 straight rays above and 2 straight rays below plus terminal fork. Breadth of front equal to length; front tan in anterior ⅘, dark brownish in posterior ⅘; ocellar triangle shiny black; periorbits shiny. 2nd antennal segment tan; 3rd segment short, round, tan, slightly dusky. Rudiment only of carina present between antennal bases. Face pale brown. Palp tan, with weak setation. Cheek curved, narrow, tan. Vibrissa rather weak; succeeding oral bristles about ½ length of vibrissa. Eye bare. Proclinate and anterior reclinate orbital bristles subequal; posterior reclinate orbital larger. Ocellar and vertical bristles large.

Thorax. Mesonotum dark brownish, a little paler on humeral calli. Acrostichal hairs regular. Scutellum and pleura concolorous with mesonotum; sternopleuron with 2 bristles, anterior bristle weaker than posterior bristle. Haltere tan. Fore-femur, tibia and metatarsus dark, uppermost part of 2nd tarsal segment of foreleg also darkened, remainder of fore-tarsus pale. 2nd and 3rd legs tan to dark tan. Preapical bristle present on 3rd tibia; apical bristle present on 2nd tibia.

Wing. Hyaline with infuscation of costal cell and apical whitening. *C*-index, 1.5; 4*V*-index, 2.3; 5*X*-index, 2.3; *M*-index, 0.6. 3rd costal section with heavy setation on basal 0.8. Length (holotype), 2.2 mm.

Abdomen. Entirely shiny dark reddish brown.

Male genitalia (Figs 17, 18). Very similar to those of preceding species, distinguished mainly by possession of cluster of thick bristles on ventral extension of genital arch on each side.

Female genitalia. Egg guide well developed, with apical bristles but without teeth.

Distribution. Known only from type specimens, Atherton Tableland, north Queensland.

Special Comments

This species resembles *C. obscura* (de Meijere) (south-east Asia), *C. formosana* Okada (Taiwan) and *C. obscuroides* Okada (Japan) in body and wing coloration, differing in details of the male genitalia. The latter species were termed the *obscura* group by Okada (1976), members of this group differing from those of the *costata* group mentioned above in possessing apical whitening on the wing.

Key to Australian Species of *Chymomyza*

Wing with apical whitening ..... *poena*
Wing without apical whitening ..... *cungellae*

XIII. Genus **Collessia**, gen. nov.

Arista plumose; anterior reclinate orbital bristle absent; carina knife-like; vibrissa single; mesonotum patterned; acrostichal hairs in 2 rows; prescutellar bristles absent; sternopleuron with single large bristle and few fine hairs; wing patterned; anal crossvein and anal vein absent.

Type-species: *Collessia superba*, sp. nov.

The genus is named after Dr D.H. Colless, Division of Entomology, CSIRO, Canberra.

Collessia is reminiscent of many species of the subgenus *Hirtodrosophila* in possession of a narrow carina, a single vibrissa and, in the type- and only species, a plumose arista with a single ventral ray, and long hairs on the third antennal segment. The single species for which the genus *Collessia* is established is, however, excluded from *Drosophila* by its possession of only two weak rows of acrostichal hairs (and, to a lesser extent, by the single sternopleural bristle). In possession of only two rows of acrostichals *Collessia* resembles *Scaptomyza*, but the two genera are in most other respects quite dissimilar. The wing venation and patterning and the knife-like carina of *Collessia* are reminiscent of *Tambourella* (q.v.), but the latter genus is otherwise also quite distinct.

1. ***Collessia superba***, sp. nov.

Types

Holotype ♀: The Boulders, Babinda, north Queensland, 10.v.1967, D.H. Colless (ANIC). Paratype ♀: Kuranda, north Queensland, 21.v.1958, D.K. McAlpine (AM).

Distinguishing features. As given in generic diagnosis above; pleura dark brown above abruptly changing to pale tan below.

Body length. 2.3 mm (holotype); 1.7 mm (paratype).

Head. Arista with 5–6 rays above and 1 below plus terminal fork; basal dorsal rays apically curved. Front 1.2 times broader than long, tan with chocolatey brown markings anterolaterally, posterolaterally, about bases of orbital bristles and in narrow crescentic submedian bands from ocellar triangle to just past level of proclinate orbitals. Area within latter bands silvery. Ocellar triangle black. 2nd antennal segment tan; 3rd blackish, with numerous long hairs. Carina prominent. Face tan above, with transverse dark brown band at level of lower part of carina, silvery tan below centrally, with dark brown coloration below laterally extending on to cheek. Palp slender, dark brown, with long apical bristle. Cheek narrow, slightly

Fig. 19. *Collessia superba*, wing.

curved, dark brown in anterior half, pale tan posteriorly. Eye slightly pear-shaped, broader above, with very short, very sparse pile. Orbital bristles subequal. Ocellar and vertical bristles large; postverticals small and fine, crossed.

Thorax. Mesonotum pale tan centrally with darker (weakly mid-brown) markings, especially longitudinal submedian bands in central region; mesonotum mainly dark chocolatey brown lateral to levels of dorsocentral bristles. Acrostichal hairs weak, absent between dorsocentrals. Ratio anterior : posterior dorsocentrals *c*. 0.7. Scutellum weakly brown in longitudinal central band, dark brown at lateral margins, otherwise tan. Anterior scutellar bristles short, slightly convergent. Pleura dark chocolatey brown above line from base of haltere across middle of pteropleuron and mesopleuron, pale tan below. Haltere entirely dark chocolatey brown. Legs pale tan; preapical bristle on 3rd tibia only; apical bristle on 2nd tibia only.

Wing (Fig. 19). Brownish with clear spots and markings, especially spot at costa just basal to termination of 2nd longitudinal vein, and 2 further spots at costa in next costal section. 2nd longitudinal vein strongly curved apically to costa. Posterior

crossvein somewhat inclined. *C*-index, 2.2; 4*V*-index, 1.5; 5*X*-index, 1.5; *M*-index, 0.5. 3rd costal section with weak heavy setation on basal *c*. 0.4–0.5.

Abdomen. All tergites dark brown, paler centrally.

Female genitalia. Egg guide large, with strong apical teeth.

Distribution. Known only from type specimens collected at two rainforest localities in north Queensland.

XIV. Genus **Dettopsomyia** Lamb

Dettopsomyia Lamb, 1914, p. 349. Type-species *D. formosa* Lamb, 1914, by original designation; type locality Seychelles.

Pictostyloptera Duda, 1924*a*, p. 192. Type-species *Drosophila preciosa* de Meijere, 1911, by subsequent designation (Wheeler and Takada 1964); type locality Java. (Wheeler and Takada 1964.)

Small species, with complex thoracic pattern; arista plumose; carina large, bulbous; distal costal incision deep, costa protruding as blackened lappet; acrostichal hairs in 2–4 rows; dorsocentral bristles in 2 or 3 pairs.

Dettopsomyia is a small genus, consisting only of about 10 species mostly distributed in south-east Asia, but with two widespread species (*formosa* and *nigrovittata*) apparently introduced in association with fruits to other parts of the world (Wheeler and Takada 1964). In addition to the features described above, several species possess patterned wings. It appears that *Dettopsomyia* is closely related to another small Oriental genus, *Styloptera* Duda (q.v.); further comments are offered below under *Styloptera*.

One species of *Dettopsomyia*, *D. nigrovittata*, is known from Australia. The species is evidently rare as it is not represented in the ANIC or Australian Museum collections.

1. ***Dettopsomyia nigrovittata*** (Malloch)

Drosophila nigrovittata Malloch, 1924, p. 352. (Holotype in SPHTM; type locality Sydney.)

Distinguishing features. Wing clear; mesonotum dark with pollinose longitudinal bands.

Body length. *C*. 2.0 mm.

Head. Arista with 3–4 straight rays above and 2–3 straight rays below plus terminal fork. Breadth of front 1.7 times length; front whitish pollinose in large triangular area centrally to anterior margin, enclosing ocellar triangle but latter not pollinose; periorbits whitish; front dark brown between periorbits and central triangular area. 2nd and 3rd antennal segments dusky tan. Carina broad, flat. Face tan. Palp dusky tan, with a few large apical bristles. Cheek slightly curved, very broad. Vibrissa single, large; succeeding oral bristles small. Eye rather small, round. Orbital bristles in ratio *c*. 2 : 1 : 3; anterior reclinate orbital lateral to proclinate orbital. Ocellar, vertical and postvertical bristles large.

Thorax. Mesonotum dark brown with whitish to slightly greenish pollinose longitudinal bands: 2 centrally just within dorsocentral bristles, and 2 less complete lateral to these. Anterior dorsocentral bristles large, close to suture; dorsocentrals in 2 pairs. Acrostichal hairs confined to dark brown areas between pollinose bands, in

about 4 rows. Scutellum dark brown with some weak dusting. Scutellar bristles large, subequal. Pleura dark brown; sternopleuron with 1 weak anterior and 1 large posterior bristle. Haltere tan. Femora dark brown. Tibiae pale, with basal and apical dark annuli. Tarsi pale. 2nd tibia with large apical bristle.

Wing. Hyaline. *C*-index, *c*. 1.0; 4*V*-index, *c*. 3.0; 5*X*-index, *c*. 3.0; *M*-index, *c*. 1.1. 3rd costal section with heavy setation on basal 0.6–0.7. Length, *c*. 1.6 mm.

Abdomen. Entirely dark brown.

Female genitalia. Egg guide strong, gradually narrowing apically, with weak marginal teeth and a few subapical bristles.

Distribution. Widespread in tropical and subtropical regions of the world; known in Australia from New South Wales only.

Specimens Examined

Holotype. **New South Wales:** Sydney, 25.vi.1924, 1♀, 29.vi.1924, 1 ? (SPHTM).

XV. Genus **Drosophila** Fallén

Drosophila Fallén, 1823, p. 4. Type-species *Musca funebris* Fabricius, 1787, by subsequent designation (Zetterstedt 1847); type locality Europe.

Chaetodrosophilella Duda, 1923, p. 40. Type-species *Drosophila quadrilineata* de Meijere, 1911, by monotypy; type locality Java. (Wilson *et al*. 1969.) [*Chaetodrosophila* Duda, 1924*a*, p. 180, is apparently an error for *Chaetodrosophilella*.]

Hirtodrosophila Duda, 1923, p. 41. Type-species *Drosophila latifrontata* Frota-Pessoa, 1945 (replacement name for *carinata* Duda, 1923, preoccupied in *Drosophila* by *carinata* Grimshaw, 1901), by subsequent designation (Frota-Pessoa 1945); type locality Taiwan. (Duda 1924*a*: *Hirtodrosophila* as subgenus of *Drosophila*.)

Paradrosophila Duda, 1923, p. 43. Type-species *Drosophila pictipennis* Kertész, 1901, by subsequent designation (Sturtevant 1927); type locality New Guinea. (Duda 1924*a*: *Paradrosophila* as subgenus of *Drosophila*.)

Scaptodrosophila Duda, 1923, p. 37. Type-species *S. scaptomyzoidea* Duda, 1923, by monotypy; type locality New Guinea. (Wheeler and Takada 1964.)

Spinulophila Duda, 1923, p. 47. Type-species *S. signata* Duda, 1923, by subsequent designation (Sturtevant 1927); type locality Taiwan. (Duda 1924*a*: *Spinulophila* as subgenus of *Drosophila*.)

Spuriostyloptera Duda, 1923, p. 38. Type-species *S. multipunctata* Duda, 1923, by subsequent designation (Bock and Parsons 1978*c*); type locality Taiwan. (Bock and Parsons 1978*c*.)

Tanygastrella Duda, 1924*b*, p. 254. Type-species *T. hypopygialis* Duda, 1924, by subsequent designation (Bock and Parsons 1978*c*); type locality Sumatra. (Bock and Parsons 1978*c*.)

Acanthophila Duda, 1925, p. 200 (impermissible substitution for *Spinulophila* Duda; preoccupied in Lepidoptera).

Dasydrosophila Duda, 1925, p. 152 (impermissible substitution for *Hirtodrosophila* Duda).

Adrosophila Séguy, 1938, p. 344. Type-species *A. minuta* Séguy, 1938, by original designation; type locality Africa.

Several groups endemic to the Hawaiian islands and previously described as 'genera' may now also be regarded as synonyms of *Drosophila*; see Kaneshiro 1976.

Arista usually plumose (exceptionally with reduced rays; never micropubescent); anterior reclinate orbital bristle small; postvertical bristles well developed; mesonotum typically with 6 or more rows of acrostichal hairs and 2 pairs of dorsocentral bristles; prescutellar acrostichals enlarged or not; sternopleuron with up to 3 macrochaetae and several microchaetae.

With well over 1000 species, *Drosophila* is by far the largest genus in the family Drosophilidae, and species of the genus occur almost world-wide. Several species are

cosmopolitan in distribution and well established urban dwellers. Greatest species numbers occur, not surprisingly, in tropical rainforests.

The large number of species assigned to *Drosophila* has led to various attempts in the past to subdivide the genus. Currently, over 12 subgenera are recognized but many accommodate few species and designate only small aberrant regional faunas. (The more aberrant evolutionary offshoots from the mainstream of *Drosophila* evolution have, of course, been accorded generic status; compare, for example, Genus XXXI. *Zygothrica* below.) There are only four subgenera of *Drosophila* with species in all continents: *Drosophila*, *Sophophora*, *Hirtodrosophila* and *Scaptodrosophila*. Each of these subgenera contains over 100 species and each subgenus has been further subdivided, at least partially, into species-groups, further comments on the latter are given below under the respective subgeneric headings.

The Australian *Drosophila* fauna has been studied extensively over the past decade, 60 new species or species records being added to the 41 previously known. Material representing further new species is nevertheless available, and descriptions of the new species are given below together with summaries of the other species. A new key to species is also provided, the most recent one (Bock 1976) having been outdated by the large number of new species described since its publication.

Subgenus **Drosophila**

Cheek often broad; 2nd oral bristle large; prescutellar acrostichals not, or barely, enlarged; propleural bristle absent; apical bands on anterior abdominal tergites, when present, usually interrupted in midline; usually rather large species.

Although very large on a world basis (but greatly enlarged by the inclusion of several hundred Hawaiian species), the subgenus *Drosophila* is poorly represented in Australia. Apart from the cosmopolitan or introduced species (such as the largely urban *D. immigrans* which is widespread in the continent), species of the subgenus are restricted to the rainforests of north Queensland; most are members of the *immigrans* species-group and appear to be recent 'overflows' from New Guinea and south-east Asia, which region is the epicentre of speciation in the *immigrans* group.

1. ***Drosophila funebris*** (Fabricius)

Musca funebris Fabricius, 1787, p. 345. (Syntypes in Berlin; type locality Europe.)

A cosmopolitan species and member of the small *funebris* species-group, other members of which occur in North America. The species is rare in Australia, having been collected only in Sydney and recently (two specimens) at a winery in western Victoria. The species has not been detected in Melbourne in spite of regular and frequent urban collections over the past several years.

2. ***Drosophila repleta*** Wollaston

Drosophila repleta Wollaston, 1858, p. 117. (Holotype in London; type locality Spain.)

This and the following three species are members of the *repleta* species-group, other species of which are native to North and South America; all four species occurring in Australia are introduced. *D. repleta* itself is cosmopolitan but rather rare; within Australia it is restricted to southern localities.

3. *Drosophila hydei* Sturtevant

Drosophila hydei Sturtevant, 1921, p. 101. (Holotype in Washington; type locality Florida, U.S.A.)

A cosmopolitan species very similar to *repleta* but considerably more common. The species is abundant in urban parts of southern Australia in summer; one male was collected incidentally by the author in August 1979 in Dubbo, N.S.W. (the urban *Drosophila* faunas of inland Australia are otherwise unknown and clearly merit further attention).

4. *Drosophila buzzatii* Patterson & Wheeler

Drosophila buzzatii Patterson and Wheeler, 1942, p. 97. (Holotype location unknown; type locality Sicily.)

Widespread in eastern Australia in association with prickly pear cactus (*Opuntia* spp.) in which the larvae live in rot pockets; evidently introduced with prickly pear.

5. *Drosophila aldrichi* Patterson & Crow

Drosophila aldrichi Patterson and Crow, 1940, p. 251. (Holotype location unknown; type locality Texas, U.S.A.)

A sibling species of *buzzatii*, also found in association with prickly pear and presumably introduced with it.

6. *Drosophila immigrans* Sturtevant

Drosophila brouni Hutton, 1901, p. 91. (Holotype in Canterbury Museum, New Zealand; type locality Auckland, New Zealand.) (Name suppressed by International Commission on Zoological Nomenclature.)

Drosophila immigrans Sturtevant, 1921, p. 83. (Holotype in Washington; type locality New York, U.S.A.)

D. immigrans is a cosmopolitan species very common in urban collections in southern Australia. The species clearly does not tolerate hot or dry environments; no specimens were found, for example, amongst hundreds of *Drosophila* collected in Townsville (Bock 1977*b*). A few specimens have, however, been recovered from rainforest localities in both north Queensland and south-eastern Australia, although the species is clearly rare in such habitats.

D. immigrans and several dozen of its relatives comprise the *immigrans* species-group which is centred in south-east Asia and New Guinea, but *immigrans* itself appears to be extremely rare in this region; a few specimens were, however, collected by H.L. Carson in 1977 at a high altitude on Mt Kaindi, New Guinea (a cool rainforest habitat).

7. *Drosophila sulfurigaster* (Duda)

Spinulolophila sulfurigaster Duda, 1923, p. 48. (Holotype stated as in Budapest but apparently now lost; type locality New Guinea.)

Drosophila setifemur Malloch, 1924, p. 351. (Holotype in AM; type locality Sydney.)

See also Wilson *et al.* (1969) and Wheeler (1981).

D. sulfurigaster is a member of the *immigrans* group and of a complex of sibling species, and is itself divided into three subspecies, the Australian populations having

been considered to be all members of the nominate subspecies (Bock 1976). Recent work (McEvey 1981) has indicated that the Australian populations comprise two forms separable by differing extents of frontal pollinosity, but the status of these forms cannot be further evaluated until cultures are available for genetic tests; the two forms are otherwise identical (including in structure of male genitalia). Both forms are restricted in distribution to north Queensland.

8. *Drosophila rubida* Mather

Drosophila rubida Mather, 1960, p. 234. (Holotype location unknown; type locality Crystal Cascades, near Cairns, Qld.)

A member of the *immigrans* group showing strong sexual dimorphism in coloration; occurs in rainforests of north Queensland; also occurs in New Guinea but apparently not in south-east Asia.

9. *Drosophila pseudotetrachaeta* Angus

Drosophila pseudotetrachaeta Angus, 1967, p. 37. (Holotype in AM; type locality Brown River, New Guinea.)

Also assigned to the *immigrans* group, but atypical in possessing four pairs of dorsocentral bristles and only two rows of acrostichals. Occurs in rainforests of north Queensland; also in New Guinea. *D. pseudotetrachaeta* is one of several sibling species (including the south-east Asian *D. quadrilineata* de Meijere) of extremely similar morphology but separable by hybridization tests (Angus 1964, 1967); indeed more than one genetical species might be present in the Australian populations, but an extensive testing program would be necessary to investigate the possibility.

10. *Drosophila persicae* Bock & Parsons

Drosophila persicae Bock and Parsons, 1978*b*, p. 99. (Holotype in ANIC; type locality Iron Range, Qld.)

Not placed in a species-group, *D. persicae* has been collected at fruit baits in a number of north Queensland rainforest localities; a single male was collected at Kakadu National Park, N.T., in September 1979.

11. *Drosophila* (*Drosophila*) *sinuata*, sp. nov.

Types

Holotype ♂: Lacey's Creek, north Queensland, rainforest, fruit bait, Aug. 1978, P.A. Parsons (ANIC). Paratypes: same data as holotype, 2♀ (ANIC).

Distinguishing features. Body dark brown; wing with brownish tinge; carina broad, sulcate; cheek broad; postvertical bristles very large.

Body length. 3.4 mm (holotype); 3.3 mm (male paratype); 3.6 mm (female paratype).

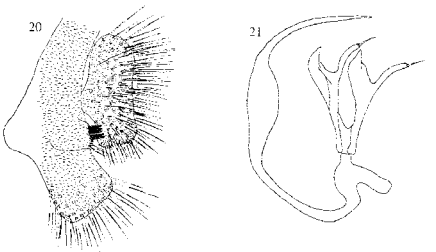
Head. Arista large, with 5–6 straight rays above and 2 straight rays below plus large terminal fork. Breadth of front 1.5 times length; front dark rufous brown; periorbits shiny; ocellar triangle shiny blackish. 2nd and 3rd antennal segments dusky brown. Carina very prominent, broad, broadened below, flat with median

sulcus, face mid-brown. Palp slender, mid-brown, slightly dusky, with numerous small bristles and longer apical bristle. Cheek curved, broad; vibrissa single; cheek widened in posterior corner, with 3 long and numerous small bristles. Eye with dense pile. Orbital bristles in ratio 6 : 3 : 10; anterior reclinate orbital bristle fine, lateral to proclinate orbital. Ocellar, vertical and postvertical bristles very large.

Thorax. Mesonotum shiny dark brown. Acrostichal hairs in *c*. 6 slightly irregular rows in front of dorsocentral bristles, 4 rows between dorsocentrals. Ratio anterior posterior dorsocentral bristles 0.7–0.8. Scutellum dark brown, subshining. Scutellar bristles subequal. Pleura mid-brown. Sternopleuron with 2 large macrochaetae and numerous microchaetae. Haltere mid-brown. Legs mid-brown: preapical bristles on all tibiae; 2nd tibia only with apical bristle.

Wing. Translucent with brownish tinge. *C*-index, 2.0; 4*C*-index, 1.8; 5*X*-index, 1.1; *M*-index, 0.5. 3rd costal section with heavy setation on basal 0.9. Length (holotype), 3.0 mm.

Abdomen. Entirely shiny dark blackish brown.



Figs 20, 21. *Drosophila sinuata*: *20*, male external genitalia; *21*, male internal genitalia.

Male genitalia (Figs 20, 21). Periphallic organs unusually hirsute, with numerous bristles and micropubescence; clasper small, with few marginal teeth; aedeagus with unusually long recurved apodeme (hence specific name).

Female genitalia. Egg guide slender, with few very small apical teeth only.

Distribution. Known only from type locality.

Special Comments

This species cannot be placed in an existing species-group, but is similar in external morphology to *D. persicae* and possibly closely related to the latter. The two species differ greatly, however, in the structure of the male genitalia. *D. sinuata* is aberrant within the subgenus *Drosophila* in possessing only a single vibrissa, but otherwise seems best assigned to this subgenus. In basic morphology the species is

actually quite reminiscent of some of the Hawaiian endemics, although the body size of the latter is several times that of the Australian species described above.

12. *Drosophila buscki* Coquillett

Drosophila huskii Coquillett, 1901, p. 18 (printing error for *buscki*). (Holotype in Washington; type locality U.S.A.)

A cosmopolitan species, widespread in southern Australian cities. *D. buscki* is not usually classified as an insect of economic significance, but several dozen adults were recently bred out from lettuce in Victoria, the eggs having been laid into the leaf tissues which were mined by the larvae (J. Osmelak, personal communication).

D. buscki is (perhaps largely for historical reasons) generally placed in the monotypic subgenus *Dorsilopha* Sturtevant, an arrangement that does not seem tenable to the present author in view of the fundamental similarities between *buscki* and other species of the subgenus *Drosophila*.

Subgenus **Sophophora** Sturtevant

Sophophora Sturtevant, 1939, p. 137. Type-species *Drosophila melanogaster* Meigen, 1830, by original designation; type locality Austria and Germany.

Apical bands on anterior abdominal tergites, when present, not interrupted in midline; 2nd oral bristle relatively large; cheek usually relatively narrow; prescutellar bristles absent; propleural bristle absent.

Of the 20 species of the subgenus *Sophophora* occurring in Australia, 15 are members of the *melanogaster* species-group. The latter group is now known to contain over 100 species, the majority centred in south-east Asia and New Guinea, but with smaller numbers of species or radiations in Africa, Japan with Korea, Micronesia, Australia and some islands of the South Pacific (Bock 1980*c*); three species are cosmopolitan. In the case of the Australian fauna only three of the *melanogaster*-group species appear to be endemic, so that the radiation of this large group within Australia must be regarded as very small, and many of the species are additionally restricted in distribution to north Queensland, as though recent invaders.

1. *Drosophila melanogaster* Meigen

Dros. melanogaster Meigen, 1830, p. 85. (Holotype lost; type locality Austria and Germany.) See also Bock (1980*c*).

This cosmopolitan species is widespread in urban areas of both northern and southern Australia.

2. *Drosophila simulans* Sturtevant

Drosophila simulans Sturtevant, 1919, p. 153. (Holotype in Washington; type locality Florida, U.S.A.)

A cosmopolitan species and a sibling species of *melanogaster*, *D. simulans* is widespread in urban areas of Australia but rare in the far north, where *melanogaster* and *ananassae* dominate urban collections. (In southern cities, *melanogaster* is rare and *simulans* predominates.)

3. *Drosophila pseudotakahashii* Mather

Drosophila takahashii Sturtevant: Mather, 1955, p. 568. (Holotype in Washington; type locality Taiwan.)
Drosophila pseudotakahashii Mather, 1957, p. 222. [Holotype location unknown; type locality Samford, Queensland; see Bock (1976).]

A member of the *takahashii* subgroup of the *melanogaster* group. The 10 other species of the subgroup occur from India to Japan and Borneo. Most of the 11 species are very similar morphologically and a few interspecific crosses have been achieved; there is potential for further work along these lines, particularly involving the Australian species. *D. pseudotakahashii* occurs from north Queensland to south-eastern Australia and, with *D. dispar* (q.v., sp. 16 below), is a very common species in those rainforests of north Queensland growing on the poorer (granitic) soils (Bock and Parsons 1977*b*). Neither of these species has been recorded outside Australia, but the New Guinea fauna is little known.

4. *Drosophila serrata* Malloch

Drosophila serrata Malloch, 1927, p. 6. (Holotype in SPHTM; type locality Eidsvold, Queensland.)

D. serrata is a member of the very large (58 described species) *montium* subgroup of the *melanogaster* group, although only it and the following three other species of this subgroup are known from Australia. *D. serrata* is widespread across northern Australia (Western Australia, Northern Territory and Queensland); also occurs in New Guinea and Christmas I.

5. *Drosophila birchii* Dobzhansky & Mather

Drosophila serrata birchii Dobzhansky and Mather, 1961, p. 462. (Holotype in AM; type locality Crystal Cascades, north Queensland.)
Drosophila birchii (as species): Ayala, 1965, p. 538.

A sibling species of *serrata*, *D. birchii* occurs in north Queensland; also in New Guinea. Females of the two species are indistinguishable, but males are separable by reference to the structure of the external genitalia.

6. *Drosophila kikkawai* Burla

Drosophila kikkawai Burla, 1954*a*, p. 47. (Holotype evidently never selected; see below.)

D. kikkawai is the most widespread species of the *montium* subgroup, now known from the Ethiopian, Oriental, Neotropical and eastern Palaearctic zones; the species was recorded in Townsville by Bock (1977*b*) but is otherwise unknown from Australia. Great confusion has surrounded the identity of this species in the past; it was formerly identified as '*D. montium* de Meijere' but Burla (1954*a*) established the separate identities of *D. montium* (Java) and the widespread species which he renamed *D. kikkawai*, without, however, giving any indication of the selection of a holotype for the latter. More recent work (Baimai 1979) has also demonstrated the existence of several Asian sibling species practically indistinguishable morphologically from *kikkawai*.

7. *Drosophila ?jambulina* Parshad & Paika

Drosophila jambulina Parshad and Paika, 1964, p. 240. (Holotype location unknown: type locality India.)

Drosophila sp. cf. *jambulina* Parshad and Paika: Bock, 1977*b*, p. 269.

Bock (1977*b*) reported the collection in Townsville, Qld, of two males of a *montium* subgroup species closely resembling *D. jambulina*. No further specimens have been collected.

8. *Drosophila ananassae* Doleschall

Drosophila ananassae Doleschall, 1858, p. 128. (Holotype location unknown; type locality Ambon Island, Indonesia.)

This and the following three species are members of the *ananassae* subgroup of the *melanogaster* group, the subgroup comprising a total of 16 species ranging from Africa through India and south-east Asia to Japan and islands of the south Pacific; *ananassae* itself is cosmopolitan and another species of the subgroup not represented in Australia (*D. malerkotliana* Parshad & Paika) is also established in South America (where it appears to be a recent introduction).

Within Australia, *D. ananassae* is restricted to north Queensland and the Northern Territory, where it is a common urban species. It is also established in Queensland rainforests, although more common in urban environments.

9. *Drosophila pseudoananassae* Bock

Drosophila (*Sophophora*) *pseudoananassae* Bock, 1971, p. 274. (Holotype in University of Texas; type locality Cairns, Queensland.)

D. pseudoananassae occurs in south-east Asia and New Guinea as well as in north Queensland, where it is established in both rainforest and urban environments.

10. *Drosophila bipectinata* Duda

Drosophila bipectinata Duda, 1923, p. 52. (Holotype stated as in Budapest but apparently now lost; type locality India.)

A close relative of *pseudoananassae* (Bock 1978*a*), *bipectinata* ranges from south-east Asia to Fiji and Samoa. The species was found to be common in urban collections in Townsville (Bock 1977*b*) but, curiously, appears to be absent from north Queensland rainforests although common in New Guinea.

11. *Drosophila ironensis* Bock & Parsons

Drosophila (*Sophophora*) *ironensis* Bock and Parsons, 1978*a*, p. 102. (Holotype in ANIC; type locality Iron Range, north Queensland.)

This small species is aberrant within the *melanogaster* group in lacking a sex-comb in the male. The species is known from far north Queensland and has also been collected in New Guinea (Bock and Parsons, unpublished).

12. *Drosophila eugracilis* Bock & Wheeler

Drosophila (*Sophophora*) *eugracilis* Bock and Wheeler, 1972, p. 31. (Replacement name for *Tanygastrella gracilis* Duda; *gracilis* preoccupied in *Drosophila*: holotype location unknown; type locality Java.)

This species, widespread and common in south-east Asia and New Guinea and assigned to the monotypic *eugracilis* subgroup of the *melanogaster* group, has been reported previously from north Queensland rainforest collections (Bock and Wheeler 1972), but has not been found in recent years despite some intensive collecting in the areas concerned.

13. *Drosophila denticulata* Bock & Wheeler

Drosophila (*Sophophora*) *denticulata* Bock and Wheeler, 1972, p. 29. (Holotype in University of Texas; type locality Popondetta, New Guinea.)

D. denticulata is a *melanogaster* group species occurring in south-east Asia, New Guinea and north Queensland. The species is attracted to fruit baits in small numbers but is difficult to culture.

14. *Drosophila smithersi* Bock

Drosophila (*Sophophora*) *smithersi* Bock, 1976, p. 17. (Holotype in AM; type locality Mulgrave River, north Queensland.)

This species is a member of the *ficusphila* subgroup of the *melanogaster* group, only one other member of which (*ficusphila* Kikkawa & Peng) has been described, although other species are known to exist in New Guinea (Carson, personal communication).

15. *Drosophila flavohirta* Malloch

Drosophila flavohirta Malloch, 1924, p. 354. (Holotype in SPHTM; type locality Como, N.S.W.)

An endemic and apparently rare, although widespread, Australian species possibly living in association with *Eucalyptus* flowers. *D. flavohirta* was included in the *melanogaster* group by Bock (1980*c*).

16. *Drosophila dispar* Mather

Drosophila dispar Mather, 1955, p. 570. (Holotype in AM; type locality Samford, Queensland.)

Widespread in eastern Australia from north Queensland (cf. *D. pseudotakahashii* above) to Victoria. Taxonomically, *D. dispar* has been regarded as isolated within the subgenus *Sophophora*, no close relatives being known, but reexamination of specimens collected over the past five years has revealed a small number of specimens of a sibling species from southern Victoria, distinguishable from *dispar* by reference to the structure of the genitalia. The new species is described below.

17. *Drosophila* (*Sophophora*) *prodispar*, sp. nov. Parsons & Bock

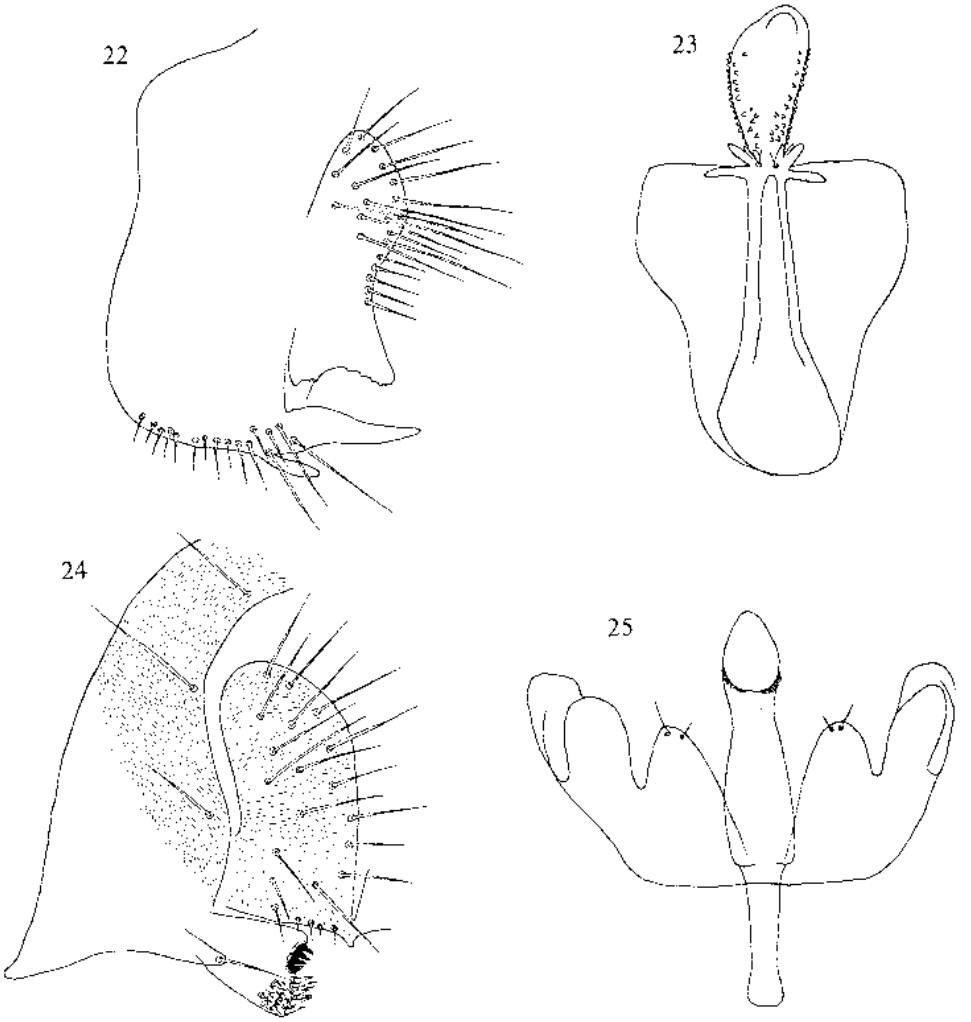
Types

Holotype ♂: Off Ocean Road, opp. Johanna River Road, Victoria, ex fern fronds, 22.v.1975, P.A. Parsons (ANIC). Paratypes (all Victoria): River on Horden Vale Road, Otway Road, ex sedges, 12.ix.1975, P.A. Parsons, 1♂, 1♀ (AM); Mait's Rest, Otway Road, ex ferns, 20.v.1975, P.A. Parsons, 1♀ (ANIC); Paradise, Otway Road, ex tree ferns, P.A. Parsons, 20.v.1975, 1♀ (ANIC), 21.v.1975, 1♂, 1♀ (LT).

Distinguishing features. Very similar to *dispar* but distinguishable from latter in both sexes by high-power (stereo) examination of genitalia.

Body length. 2.9 mm (holotype); 2.8–3.4 mm (paratype range).

Head. Arista with 4 rays above and 3 below plus terminal fork. Breadth of front 1.2 times length; front slightly narrower anteriorly. rufous tan; periorbits slightly silvery; ocellar triangle elevated, blackened within, with surrounding silveriness. 2nd antennal segment tan; 3rd segment dusky tan. Carina prominent but narrow, very narrow in male, a little broader in female. Face dark tan. Palp tan, with moderately strong apical bristle and few other small bristles. Cheek linear, narrow; 2nd oral



Figs 22, 23. *Drosophila prodispar*: *22*, male external genitalia; *23*, male internal genitalia.
Figs 24, 25. *Drosophila hirtominuta*: *24*, male external genitalia; *25*, male internal genitalia.

bristle 0.5–0.6 length of 1st. Eye with very dense short black pile. Proclinate and posterior reclinate orbital bristles strong, subequal; anterior reclinate orbital fine and short, posterior and slightly lateral to proclinate orbital. Ocellar, vertical and postvertical bristles large.

Thorax. Mesonotum reddish brown, paler anteriorly. Acrostichal hairs regular, in 8 rows in front of dorsocentral bristles, 6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.7. Scutellum concolorous with mesonotum; scutellar bristles subequal, anterior bristles slightly divergent, posterior bristles crossed. Pleura dark brownish. Posterior sternopleural bristle strong; anterior and middle bristles finer and shorter, middle bristle *c*. 0.7 length of anterior bristle. Haltere tan. Legs tan; preapical bristles on all tibiae; apical bristle on 2nd tibia only. Fore-femur in male greatly swollen and very bristly; fore-femur in female slightly swollen, with medial row of strong setulae. Male foreleg without sex-comb.

Wing. Faintly brownish. *C*-index, 2.8; 4*V*-index, 2.5; 5*X*-index, 1.8; *M*-index, 0.8. 3rd costal section with heavy setation on basal 0.6. Length (holotype), 3.0 mm.

Abdomen. Tergites shiny dark brownish, paler anteriorly.

Male genitalia (Figs 22, 23). Anal plate with differentiated lower portion; genital arch with finger-like process; hypandrium very weakly sclerotized, with very small submedian spines; aedeagus apically broadened and dorsoventrally flattened, with subapical ornamentation.

Female genitalia. Egg guide rather broadly rounded apically, without marginal teeth but with relatively large apical hair and other very fine hairs.

Distribution. Known only from above localities in southern Victoria.

Special Comments

As indicated above, *D. dispar* and *D. prodispar* are barely distinguishable in external morphology. Setation and wing indices are similar in the two species, as is body coloration, although the abdominal tergites in *dispar* are more uniformly darkened. Both species show the same dimorphism in carina width and hypertrophy of the fore-femur. However, examination of the genitalia under the higher powers of a stereo microscope reveals diagnostic differences in both sexes. In the male, the aedeagus is cylindrical in *dispar* but broadly flattened in *prodispar*; a long slender curved finger-like process extending from the genital arch is visible on each side in *dispar*, while the corresponding process in *prodispar* is shorter, wider and barely curved. In the female, the egg guide in *dispar* possesses a slender apical extension bearing fine teeth; in *prodispar* the egg guide possesses no apical extension and fine teeth are absent. These differences are evident in pinned specimens and should also be obvious in live flies.

18. *Drosophila pinnitarsus* Bock

Drosophila (*Sophophora*) *pinnitarsus* Bock, 1976, p. 21. (Holotype in AM; type locality Huonbrook, near Mullumbimby, N.S.W.)

This and the following two species are distinguished by possession by the male of a sex-comb consisting of a mass of bushy bristles on the fore-tarsus. The species concerned are evidently closely related; the same or similar (undetermined) species are also known to occur in New Guinea (Bock and Parsons, unpublished). The species are not attracted to baits. A few attempts have been made to obtain cultures by placing wild-caught (swept), wild-inseminated females into culture tubes, but although eggs are laid and larvae emerge, most die during the larval or pupal stages; a few pupae eclose but the adults die quickly.

In *D. pinnitarsus* the male possesses bushy bristles on the first three tarsal segments. The species is now known to be considerably more widespread than indicated in the original description: several dozen specimens have now been collected at various rainforest localities in north Queensland.

19. *Drosophila scopata* Bock

Drosophila (*Sophophora*) *scopata* Bock, 1976, p. 23. (Holotype in ANIC; type locality 2 miles W. of Little Mulgrave, north Queensland.)

Similar to the preceding species but male sex-comb restricted to first two tarsal segments of foreleg. The species has been collected in various north Queensland rainforests but appears to be rarer than *pinnitarsus*.

20. *Drosophila progastor* Bock

Drosophila (*Sophophora*) *progastor* Bock, 1976, p. 24. (Holotype in AM; type locality Birthday Creek, near Paluma, Qld.)

Rarest of the three 'bushy tarsus' species, *D. progastor* is known from a small number of specimens collected in north Queensland rainforests. The male sex-comb consists of bristles on the first three tarsal segments but (unlike *pinnitarsus*) the metatarsus is long and narrow.

Subgenus **Hirtodrosophila** Duda

Hirtodrosophila Duda, 1923, p. 41 (as genus; see above under *Drosophila*).
Dasydrosophila Duda, 1925, p. 152 (impermissible substitution for *Hirtodrosophila*).

2nd oral bristle small; carina, if present, not broadened below; prescutellar bristles absent; propleural bristle absent; anterior and middle sternopleural bristles usually very fine and small; anterior reclinate orbital bristle usually very fine.

Over 100 species have been described in this cosmopolitan subgenus, and several species-groups have been established. The number of described *Hirtodrosophila* species previously recorded from Australia is 15. Two species-groups are represented, the *hirticornis* and *zentae* groups, but several poorly known species have not been assigned to any group.

The 'typical' *Hirtodrosophila* species or members of the *hirticornis* species-group (Burla 1956) are distinguished, in addition to the criteria given above, by possession of an enlarged third antennal segment which often possesses unusually long hairs in addition to the usual pubescence. The female egg guide is also usually apically blunt with a few strong teeth, but with a narrow ventral projection bearing a further large and a small tooth. A few dozen species of the *hirticornis* group are known, ranging from Japan to Samoa; a few species also occur in South America; many species are known only from Java or Sumatra. Eleven of the Australian *Hirtodrosophila* species (including five newly described below) can now be assigned to the *hirticornis* group. The south-east Asian species of the group were reviewed recently by Bächli (1973); two of the Australian species also occur in south-east Asia but, given that the fauna of the latter area is still largely unknown, many more species of the *hirticornis* group may be discovered there.

The following previously described Australian species are members of the *hirticornis* group: *D. macalpinei* Bock; *D. allynensis* Bock; *D. donaldi* Wheeler; and

D. hirudo Bock & Parsons. In addition to five further new species described below (*baechlii, lamingtoni, laurelae, reilliana* and *trifurca*), the south-east Asian species *D. hirtominuta* Bächli and *D. jacobsoni* Duda are here also recorded from Australia for the first time.

The *hirticornis* species-group has been divided into *hirticornis* and *latifrontata* subgroups (Okada 1967; Bächli 1973). The Australian species may be assigned to these subgroups as follows: *hirticornis* subgroup (front not much broader than long; anterior reclinate orbital bristle between proclinate and posterior reclinate orbitals; eye with weak pile; *C*-index usually > 1.3): *allynensis, donaldi, hirudo, hirtominuta, baechlii, laurelae, trifurca*; *latifrontata* subgroup (front appreciably broader than long; anterior reclinate orbital bristle close to proclinate orbital; eye with dense pile; *C*-index usually < 1.3): *macalpinei, jacobsoni, lamingtoni, reilliana*.

The *zentae* species-group (Bock and Parsons 1979) includes four species, *D. zentae* Bock, *D. palumae* Bock, *D. junae* Grossfield and *D. durantae* Bock & Parsons. These four species are very similar in basic morphology although there are clear differences in coloration and male genitalia. No species of this group is known to occur outside Australia although *D. zentae*, at least, is very common in north Queensland. Little is known of the ecology of the species, which are collected by sweeping foliage.

The remainder of the Australian *Hirtodrosophila* species (*borboros* Bock, *hannae* Bock & Parsons, *mixtura* Bock, *mycetophaga* Malloch, *polypori* Malloch, *tricolora* Bock and *whianensis* Bock) have not been grouped, although three of the species (*hannae, mycetophaga* and *polypori*) share patterned wings and similar ecological preferences, the species congregating under fleshy white bracket fungi in rain or other dense forests. A fourth species (*mixtura*) without patterned wings exhibits the same behaviour. It is probable that these four species are fairly closely related. The remaining three species are too imperfectly known to permit any speculations on their relationships.

1. *Drosophila macalpinei* Bock

Drosophila (*Hirtodrosophila*) *macalpinei* Bock, 1976, p. 30. (Holotype in AM; type locality Whian Whian State Forest, N.S.W.)

A small pale tan species apparently restricted in distribution to New South Wales. Previous records for the occurrence of this species in Queensland (Bock and Parsons 1978*b*, 1979) were based on misidentifications (see *hirtominuta, lamingtoni* and *reilliana* below).

2. *Drosophila allynensis* Bock

Drosophila (*Hirtodrosophila*) *allynensis* Bock, 1976, p. 29. (Holotype in ANIC; type locality Upper Allyn River, N.S.W.)

A large pale species known only from several specimens collected in southern New South Wales.

3. *Drosophila donaldi* Wheeler

Drosophila (*Hirtodrosophila*) *angusi* Bock and Parsons, 1978*b*, p. 338, *nec* Okada, 1977, p. 369. (Holotype in ANIC; type locality Gheerulla Creek, near Kenilworth, Qld.)
Drosophila donaldi Wheeler, 1981, p. 52 (replacement name for *angusi*).

Known from southern Queensland, *donaldi* is similar in external morphology to *allynensis* but is distinguished from the latter by its strongly brownish wing (wing weakly darkened in *allynensis*) and strong banding on the abdominal tergites (weak darkening only present on the abdominal tergites of *allynensis*).

4. *Drosophila hirudo* Bock & Parsons

Drosophila (*Hirtodrosophila*) *hirudo* Bock and Parsons, 1978*b*, p. 338. (Holotype in ANIC; type locality Mossman Gorge, Qld.)

A rather distinctive species now known from several rainforest localities in north Queensland; collected about fleshy fungi, especially under wet conditions. (The specific name is in recognition of the leeches which hinder collecting under the same conditions.)

5. *Drosophila hirtominuta* Bächli

Drosophila (*Dasydrosophila*) *dentata* var. *minuta* Duda, 1926*b*, p. 66, *nec Drosophila minuta* Walker, 1852, p. 412. (Holotype in Leiden Museum, Netherlands; type locality Sumatra.)
Drosophila (*Hirtodrosophila*) *hirtominuta* Bächli, 1973, p. 288 (replacement name for *minuta*).

Distinguishing features. Body entirely tan; 3rd antennal segment with few long hairs; ocellar bristles longer in female than in male.

Body length. *C*. 2.5 mm.

Head. Arista with 3 almost straight rays above and 1 straight ray below plus large terminal fork. Front 1.1 times broader than long, tan; periorbits shiny; ocellar triangle with darkening just adjacent to ocelli. 2nd antennal segment tan; 3rd segment long, tan, slightly dusky, with few long hairs slightly shorter than breadth of segment. Carina small, low, smoothly rounded, confined to upper part of face. Face pale tan. Palp dusky tan with moderately long apical bristle. Cheek linear; width *c*. 0.15 times greatest eye diameter; vibrissa large. Eye with traces of fine pile. Orbital bristles in ratio *c*. 3 : 1 : 3; anterior reclinate orbital bristle posterior and slightly lateral to proclinate orbital. Vertical and postvertical bristles well developed. Ocellar bristles smaller and more divergent in male.

Thorax. Mesonotum and scutellum tan. Acrostichal hairs in *c*. 6 rows, somewhat irregular. Ratio anterior : posterior dorsocentral bristles 0.6. Anterior scutellar bristles a little shorter than posterior scutellars, convergent. Pleura pale tan. Anterior sternopleural bristle weak; middle sternopleural barely distinguishable from microchaetae. Haltere tan. Legs tan; preapical bristle present on 3rd tibia only; apical bristle on 2nd tibia only.

Wing. *C*-index, *c*. 1.7; 4*V*-index, *c*. 1.8; 5*X*-index, *c*. 1.8; *M*-index, *c*. 0.6. 3rd costal section with heavy setation on basal 0.6. Length, *c*. 2.6 mm.

Abdomen. Tan. Anterior tergites with traces of posterior darkening.

Male genitalia (Figs 24, 25). Clasper with row of strong teeth and additional ventral setation; aedeagus apically rounded, without ornamentation; hypandrium more or less quadrate.

Female genitalia. Typical of the *hirticornis* group species, with slender ventral toothed projection.

Distribution. Previously recorded from Java and Sumatra; Australian specimens from both north and south Queensland.

Specimens Examined

Queensland: Mossman Gorge, on soft fungi, 17.iv.1977, P.A. Parsons, 1♂, 1♀ (LT); Palmerston National Park, on fungi, P.A. Parsons, 28.x.1978, 7♂, 8♀ (LT), 10.i.1979, 2♂, 2♀ (ANIC), 24.ii.1979, 1♂, 4♀ (AM); Gheerulla Creek, on or near fungi, 21.iv.1977, P.A. Parsons, 4♂, 1♀ (LT); Mapleton Falls National Park, on fungi, 21.v.1977, P.A. Parsons, 1♂ (AM).

Special Comments

The species is similar to *D. macalpinei* but differs from the latter in its smaller carina, narrower cheek and front, different arrangement of orbital bristles and different male genitalia.

6. *Drosophila jacobsoni* Duda

Drosophila (*Dasydrosophila*) *latifrons* var. *jacobsoni* Duda, 1926*b*, p. 66. (Holotype in Leiden Museum, Netherlands; type locality Sumatra.)

Distinguishing features. Body small; mesonotum tan with large anterior black patch; abdomen tan.

Body length. *C.* 1.7 mm.

Head. Arista with 3 straight rays above and 1 straight ray below plus large terminal fork (Bächli 1973; see 'Special Comments' below). Front 1.3 times broader than long, shiny blackish; periorbits pale. 2nd and 3rd antennal segments dark. Carina small, narrow, low, confined to upper part of face. Face shiny dark brown. Palp blackish with strong apical bristle. Cheek slightly curved, rather broad. Eye with thick pile. Proclinate and posterior reclinate orbital bristles subequal; anterior reclinate orbital short, very fine, lateral to proclinate orbital.

Thorax. Mesonotum tan with large black patch anteriorly, latter with wavy outline giving appearance of 6 short fingers about periphery of patch. Acrostichal hairs in 6 rows in front of dorsocentral bristles, 2–4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6–0.7. Scutellum tan; basal scutellar bristles weaker than apical scutellars. Pleura pale tan. Middle sternopleural bristle absent. Haltere tan. Legs tan; weak preapical bristle present on 3rd tibia only; apical bristle on 2nd tibia only.

Wing. Hyaline. *C*-index, *c.* 1.0; 4*V*-index, *c.* 2.7; 5*X*-index, *c.* 2.2; *M*-index, *c.* 1.0. 3rd costal section with heavy bristles on basal 0.6. Length, *c.* 1.6 mm.

Abdomen. Tan. Tergites 2–4 slightly darker centrally.

Distribution. Previously recorded from Sumatra; single Australian specimen as indicated below.

Specimen Examined

Queensland: Gillies Highway 2 miles W. of Little Mulgrave, 18.iv.1967, D.H. Colless, 1♂ (ANIC).

Special Comments

Each antenna of the above specimen exhibits a peculiar and highly unusual pathological development; each third antennal segment has four large 'aristae' arising

from it, each 'arista' with a thickened axis bearing numerous short rays. The very long hairs which should be present on the third antennal segment of this species (Bächli 1973) are also absent. In other respects the specimen appears normal.

7. *Drosophila (Hirtodrosophila) baechlii*, sp. nov.

Types

Holotype ♂: Palmerston National Park, Queensland, ex fungi, 28.x.1978, P.A. Parsons (ANIC). Paratypes: same data as holotype, 1♂, 2♀ (ANIC), 1♂, 2♀ (AM). 1♂ (LT).

Distinguishing features. Cheek broad anteriorly, narrowed in posterior corner; mesonotum and scutellum dark; abdominal tergites 2–4 largely dark, tergites 5–6 tan.

Body length. 2.6 mm (holotype); all paratypes very close to holotype length.

Head. Arista not unusually large (Bächli 1973), with 3 straight rays above and 1 straight ray below plus relatively large terminal fork. Breadth of front equal to length; front tan, darker posterolaterally and within ocellar triangle. 2nd antennal segment tan; 3rd segment very large, tan, with long hairs at least equal to breadth of segment. Carina small and narrow between antennal bases, obsolete below. Face tan. Palp dusky, with moderately long apical bristle. Cheek broad (0.25 times greatest eye diameter) anteriorly but narrowed in posterior corner; vibrissa large; following oral bristles weak. Eye with sparse pile. Orbital bristles in ratio *c*. 3 : 1 : 3, about equally spaced and in line. Postvertical bristles strong.

Thorax. Mesonotum dark brown to blackish, paler laterally. Acrostichal hairs in 6–8 rows in front of dorsocentral bristles, *c*. 4 rows between dorsocentrals. Ratio anterior : posterior dorsocentral bristles *c*. 0.6. Scutellum dark; anterior scutellar bristles somewhat shorter than posterior scutellars. Pleura pale tan. Anterior sternopleural bristle ½ length of posterior sternopleural; middle sternopleural absent. Haltere tan. Legs tan; preapical bristle on 3rd tibia only; apical bristle on 2nd tibia only.

Wing. Weakly brownish. *C*-index, 1.6; 4*V*-index, 2.0; 5*X*-index, 2.4; *M*-index, 0.6. 3rd costal section with heavy setation on basal 0.5 or slightly less. Length (holotype), 2.2 mm.

Abdomen. Tergite 1 dark tan. Tergite 2 dark tan with black band on posterior half and anterolateral black spots. Tergites 3–4 with black apical bands, less infuscated anteriorly. Tergites 5–6 tan. Incurved portions of all tergites tan.

Male genitalia (Figs 26, 27). Clasper with medial row of black teeth; hypandrium and aedeagus weakly sclerotized; aedeagus without ornamentation.

Female genitalia. Egg guide strongly sclerotized, with typical toothed ventral projection.

Distribution. Known only from type locality in north Queensland.

8. *Drosophila (Hirtodrosophila) trifurca*, sp. nov.

Types

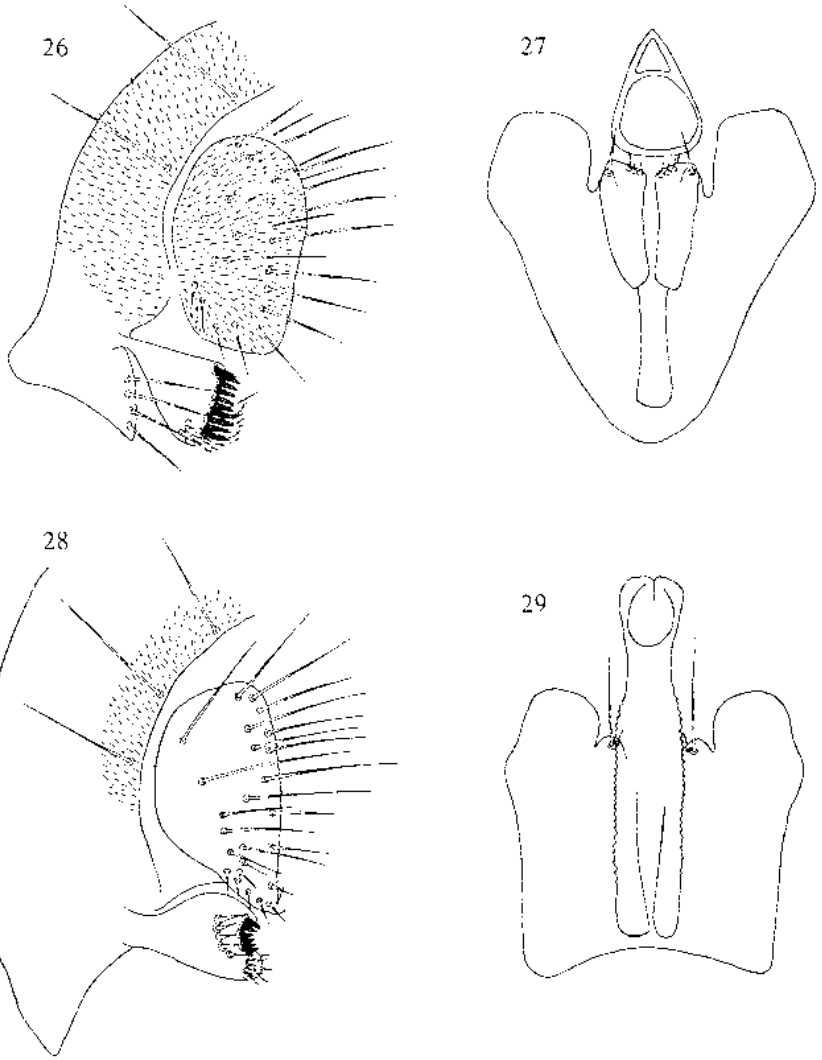
Holotype ♂: Palmerston National Park, Queensland, 2215 ft, about fungi, 24.ii.1979, P.A. Parsons (ANIC). Paratypes (all Queensland): same data as holotype,

1♂, 2♀ (ANIC), 1♀ (LT), Palmerston National Park, ex fungi, 28.x.1978, P.A. Parsons, 3♂ (AM).

Distinguishing features. Arista very large; body largely mid-brownish; wing with brownish tinge; carina developed: cheek narrow.

Body length. 3.1 mm (holotype); 3.0–3.4 mm (paratype range).

Head. Arista very large, with 3 apically curved rays above and 1 almost straight ray below plus very large terminal fork. Breadth of front 1.2 times length; front tan, darker posteriorly; ocellar triangle black. 2nd antennal segment tan; 3rd segment tan,



Figs 26, 27. *Drosophila bacchii*: *26*, male external genitalia; *27*, male internal genitalia.
Figs 28, 29. *Drosophila trifurca*: *28*, male external genitalia; *29*, male internal genitalia.

faintly dusky, very long, with several hairs appreciably longer than breadth of segment. Carina well developed but rather narrow, obsolete below. Face tan. Palp dark tan, with weak setation. Cheek slightly curved, narrow. Eye large, with short very sparse pile. Orbital bristles in ratio 4 : 3 : 6, in line; anterior reclinate orbital bristle closer to proclinate than to posterior reclinate orbital. Ocellar, vertical and postvertical bristles large.

Thorax. Mesonotum dark tan to mid-brownish. Acrostichal hairs in 10–12 rows in front of dorsocentral bristles, 6–8 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Scutellum concolorous with mesonotum. Scutellar bristles subequal; anterior scutellars strongly divergent; posterior scutellars crossed. Pleura tan. Anterior sternopleural bristle ½ length of posterior bristle; middle sternopleural bristle very fine, *c.* ⅔ length of anterior bristle. Stalk of haltere pale tan; knob dusky. Legs tan; preapical bristle on 3rd tibia only; apical bristle on 2nd tibia only.

Wing. Brownish tinge present. *C*-index, 1.6; 4*V*-index, 2.0; 5*X*-index, 1.7; *M*-index, 0.6. 3rd costal section with heavy setation on basal 0.9. Length (holotype), 2.4 mm.

Abdomen. All tergites dusky mid-dark brownish, tergites 2–5 with darker apical bands. Incurved portions of all tergites paler.

Male genitalia (Figs 28, 29). Clasper small, with few black teeth; micropubescence on external genitalia limited to narrow band on genital arch; aedeagus laterally serrated.

Female genitalia. Atypical of the *hirticornis* group in narrowing gradually apically to end in a very strong black tooth; upper teeth absent.

Distribution. Known from Palmerston National Park and Mossman Gorge rainforests, north Queensland.

Specimens Examined

Types as above. **Queensland:** Mossman Gorge, on soft fungi, 17.iv.1977, P.A. Parsons, 1♂ (LT).

Special Comments

The species resembles *D. manonoensis* Harrison (known from Samoa, Sumatra and possibly Micronesia) in general morphology but the male genitalia of the latter species [figured by Bächli (1973)] are quite different from those of *trifurca*.

9. *Drosophila* (*Hirtodrosophila*) *laurelae*, sp. nov.

Types

Holotype ♂: Palmerston National Park, Queensland, ex fungi, 28.x.1978, P.A. Parsons (ANIC). Paratypes (all Queensland): same data as holotype, 3♂, 4♀ (ANIC), 3♂, 4♀ (AM), 2♀ (LT); Palmerston National Park, 2215 ft, near fungi, 24.ii.1979, P.A. Parsons, 1♂ (ANIC).

Distinguishing features. Mesonotum, scutellum and abdomen (except tergite 6) blackish; pleura pale; carina rudimentary.

Body length. 2.4 mm (holotype); paratypes all of similar length.

Head. Arista not unusually large (Bächli 1973), with 3 straight rays above and 1 straight ray below plus large terminal fork. Front 1.1 times broader than long, pale tan anteriorly, darker posteriorly, blackish within ocellar triangle and from posterior reclinate orbital to vertical bristles. 2nd antennal segment tan; 3rd segment long, dusky tan, with long hairs slightly shorter than breadth of segment. Carina rudimentary between antennal bases only. Face tan. Palp dusky, with thin apical bristle. Cheek slightly curved, of nearly uniform width, *c.* 0.1 times greatest eye diameter. Eye with sparse pile. Orbital bristles in ratio 5 : 2 : 5, almost in line; anterior reclinate slightly closer to proclinate than to posterior reclinate orbital.

Ocellar bristles rather weak in both sexes and widely divergent, about same size as postverticals.

Thorax. Mesonotum and scutellum dull blackish. Acrostichal hairs in 6 rows in front of dorsocentral bristles, 4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.7. Anterior scutellar bristles weaker than posterior scutellars, convergent. Pleura pale tan. Middle sternopleural bristle barely distinguishable from microchaetae. Stalk of haltere tan; knob slightly dusky. Legs tan; preapical bristle on 3rd tibia only; apical bristle on 2nd tibia only.

Wing. Almost hyaline. *C*-index, 1.3; 4*V*-index, 2.1; 5*X*-index, 2.0; *M*-index, 0.7. 3rd costal section with heavy setation on basal 0.6. Length (holotype), 2.1 mm.

Abdomen. Tergite 1 dark brownish. Tergites 2–4 each blackish, slightly paler anteriorly. Tergite 5 dark brownish, paler laterally. Tergite 6 tan. Incurved portions of all tergites tan.

Male genitalia (Figs 30, 31). Clasper with medial teeth in upper and lower rows with additional setation; aedeagus apically narrowed; hypandrium very weakly sclerotized.

Female genitalia. Egg guide very broad; ventral projection short; teeth very long.

Distribution. Known from Palmerston National Park and Mossman Gorge, north Queensland.

Specimens Examined

Types as above. **Queensland:** Mossman Gorge, on soft fungi, 17.iv.1977, P.A. Parsons, 1♂ (LT).

Special Comments

In general appearance (especially coloration) this species resembles *D. baechlii*, but is distinguished from the latter by its smaller cheek and dark pigmentation on abdominal tergite 5 and especially by differences in the male genitalia. *D. laurelae* is easily distinguished from *D. hirudo* and *D. trifurca* by the much larger aristae of the latter two species.

10. *Drosophila* (*Hirtodrosophila*) *lamingtoni*, sp. nov.

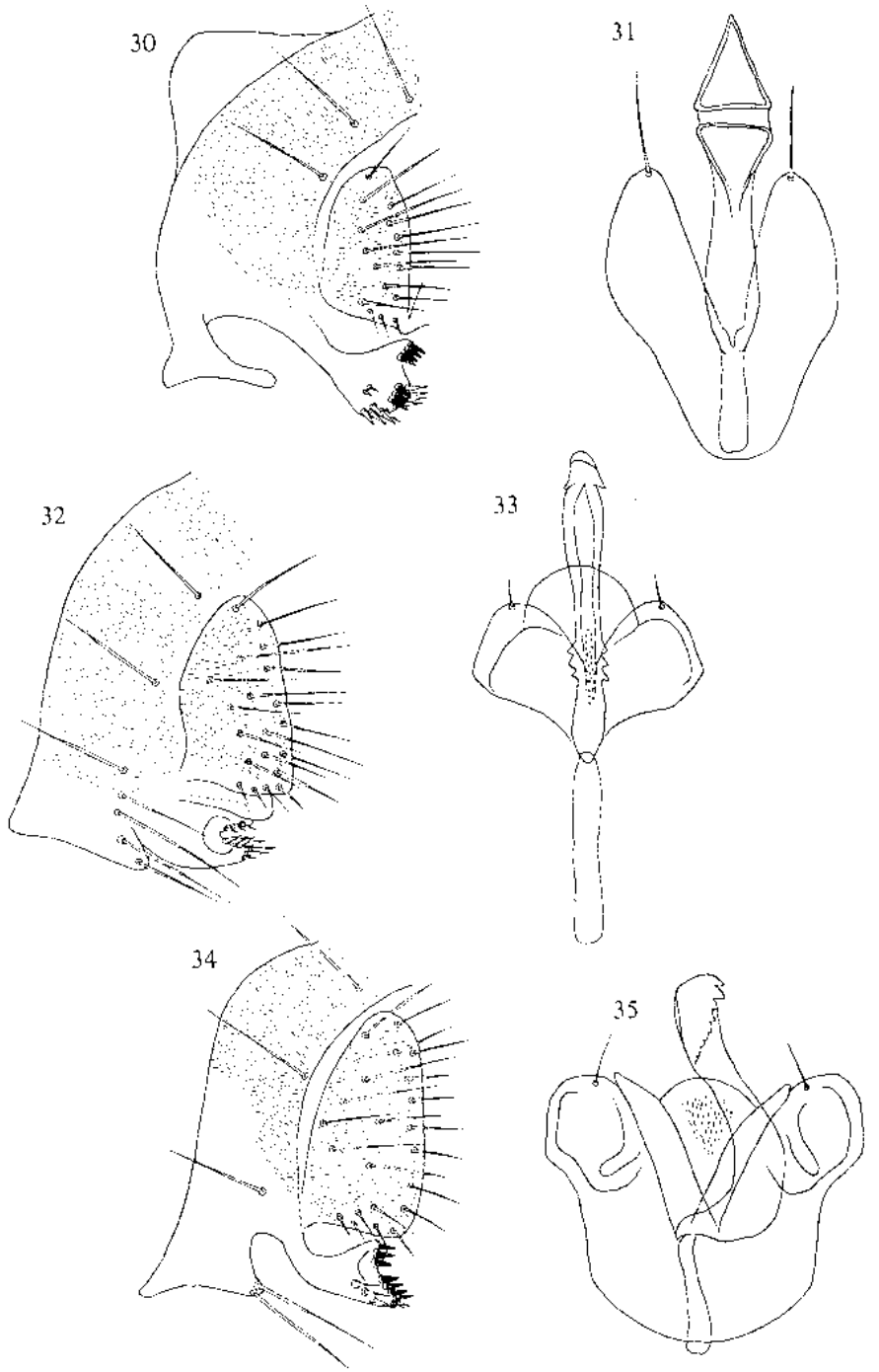
Types

Holotype ♂: O'Reilley's, Lamington National Park, Queensland, off soft fungus, 8.x.1977, P.A. Parsons (ANIC). Paratypes (all Queensland): same data as holotype, 4♂, 2♀ (ANIC); data as for holotype but swept, 1♂, 1♀ (LT); Mapleton Falls National Park, on fungi, 22.iv.1977, P.A. Parsons, 2♂, 2♀ (AM).

Distinguishing features. Body tan; carina low; cheek broad; 3rd antennal segment with very long hairs; very similar to *D. macalpinei*.

Body length. 2.1 mm (holotype); 2.0–2.3 mm (paratype range).

Head. Arista with 3 relatively short straight rays above and 1 straight ray below plus terminal fork. Breadth of front 1.4 times length; front tan; ocellar triangle small, elevated, barely darkened. 2nd antennal segment tan; 3rd segment tan, with *c*. 6 very long hairs (appreciably longer than breadth of segment). Carina low, narrow. Face tan. Palp tan, with several apical bristles, 1 longer than others. Cheek



Figs 30. 31. *Drosophila laurelae*: *30*, male external genitalia; *31*, male internal genitalia.
Figs 32. 33. *Drosophila lamingtoni*: *32*, male external genitalia; *33*, male internal genitalia.
Figs 34, 35. *Drosophila reilliana*: *34*, male external genitalia; *35*, male internal genitalia.

linear, broad, *c.* 0.3 times greatest eye diameter; vibrissa large; following orals very weak. Eye with dense pile. Orbital bristles in ratio 5 : 2 : 5; anterior reclinate orbital lateral to proclinate orbital. Ocellar, vertical and postvertical bristles large.

Thorax. Mesonotum, scutellum and pleura tan. Acrostichal hairs in 6 rows in front of dorsocentral bristles, 4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.7. Scutellar bristles subequal; anterior scutellars convergent. Middle sternopleural bristle absent. Haltere tan. Legs tan; preapical bristle present on 3rd tibia only; apical bristle on 2nd tibia only.

Wing. Almost hyaline. *C*-index, 1.7; 4*V*-index, 2.4; 5*X*-index, 2.5; *M*-index, 0.85. 3rd costal section with heavy setation on basal 0.6. Length (holotype), 2.0 mm.

Abdomen. Shiny dark tan, faintly dusky; tergites 2–5 weakly darkened posteriorly.

Male genitalia (Figs 32, 33). Clasper rather strongly sclerotized, with medial indentation; aedeagus long, slender; hypandrium broadly rounded above.

Female genitalia. Egg guide strongly sclerotized, slender, typical of the *hirticornis* group.

Distribution. Known only from the type localities in southern Queensland.

Special Comments

This species closely resembles *D. macalpinei*. Apart from differences in the male genitalia, the two species are barely distinguishable, but the 3rd antennal segment of *lamingtoni* possesses slightly fewer long hairs (*c.* 6 *v. c.* 8 in *macalpinei*) and the anterior reclinate orbital bristle is significantly smaller in *macalpinei*.

11. *Drosophila* (*Hirtodrosophila*) *reilliana*, sp. nov.

Types

Holotype ♂: O'Reilley's, Lamington National Park, Queensland, off soft fungus, 8.x.1977, P.A. Parsons (ANIC). Paratypes: same data as holotype, 1♂, 1♀ (ANIC), 2♂ (AM), 1♂, 1♀ (LT).

Distinguishing features. Head and thorax tan, abdomen darker; carina small; 3rd antennal segment with several extremely long hairs; cheek broad; similar to *macalpinei* and *lamingtoni*.

Body length. 2.0 mm (holotype); 1.8–2.1 mm (paratype range).

Head. Arista with 3 straight rays above and 1 straight ray below plus terminal fork. Breadth of front 1.5 times length; front tan; ocellar triangle slightly elevated, barely darkened. 2nd antennal segment tan; 3rd segment tan, with *c.* 6 exceptionally long hairs (considerably longer than breadth of segment). Face tan. Carina low, narrow and high, entirely obsolete below. Palp tan, with strong apical bristle. Cheek slightly curved, broad (greatest width *c.* ⅓ eye diameter). Vibrissa very large; following orals small. Eye with rather sparse pile. Orbital bristles in ratio 3 : 2 : 5; anterior reclinate orbital lateral and slightly anterior to proclinate orbital. Ocellar, vertical and postvertical bristles well developed.

Thorax. Mesonotum, scutellum and pleura shiny dark tan. Acrostichal hairs in 6 rows in front of dorsocentral bristles, 2–4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.7. Middle sternopleural bristle absent. Haltere tan. Legs tan; prepaical bristle present on 3rd tibia only; apical bristle on 2nd tibia only.

Wing. Almost hyaline. *C*-index, 1.2; 4*V*-index, 2.4; 5*X*-index, 2.3; *M*-index, 0.8. 3rd costal section with heavy setation on basal 0.75. Length (holotype), 2.0 mm.

Abdomen. Dirty blackish tan, shiny; tergites 2–5 with darker posterior bands (not strongly differentiated from anterior coloration).

Male genitalia (Figs 34, 35). Clasper small but with numerous medial teeth; aedeagus long, slender, with fine serrations about apical head, blackened about apex.

Female genitalia. Egg guide typical of the *hirticornis* group.

Distribution. Known only from type locality in southern Queensland.

Special Comments

This species is rather similar to *macalpinei* and *lamingtoni*, but is distinguishable from both by its smaller carina and stronger abdominal pigmentation; the male genitalia are also quite distinctive.

12. *Drosophila zentae* Bock

Drosophila (*Hirtodrosophila*) *zentae* Bock, 1976, p. 35. (Holotype in ANIC; type locality Mt Edith Forest Road, north Queensland.)

A widespread species in north Queensland rainforests but not attracted to baits of any description. Individuals may often be swept from foliage in large numbers but the species appears to be particularly susceptible to desiccation; during dry periods large numbers of flies are found on foliage overhanging and close to water, while few if any individuals are found even a few metres away. Attempts to culture the species have proved unsuccessful, and indeed it is impossible to keep individuals alive on laboratory food for more than about a day. Although *D. zentae* is widespread and common in northern rainforests, nothing is known of the larval habits.

13. *Drosophila palumae* Bock

Drosophila (*Hirtodrosophila*) *palumae* Bock, 1976, p. 38. (Holotype in AM; type locality Paluma, Qld.)

A species similar in coloration to *zentae* but lacking the distinctive dark pleural band of the latter, *D. palumae* is also considerably rarer than *D. zentae*. A moderate number of specimens was collected by sweeping in rainforest on the summit of Mt Bellenden Ker (> 5000 ft), north Queensland, suggesting that *palumae* may favour a colder environment than does *zentae*.

14. *Drosophila junae* Grossfield

Drosophila (*Hirtodrosophila*) *junae* Grossfield, 1976, p. 36. (Holotype in ANIC; type locality Kuranda, north Queensland.)

Similar in morphology to the preceding two species but of entirely pale coloration, *D. junae* is a rare species of north Queensland rainforests.

15. *Drosophila durantae* Bock & Parsons

Drosophila (*Hirtodrosophila*) *durantae* Bock and Parsons, 1979, p. 296. (Holotype in ANIC; type locality Millaa Millaa, north Queensland.)

D. durantae is similar in coloration to *D. zentae* and *D. palumae* but possesses quite distinctive male genitalia. The species was described on the basis of the holotype only, but further specimens in the collection of the Australian Museum have been identified, extending the range of the species from north Queensland to central New South Wales. Examination of female specimens amongst the latter indicates, further, that the egg guides of *durantae* are strongly developed, in sharp contrast to those of its near-sibling species *zentae*, which are vestigial.

16. *Drosophila mycetophaga* Malloch

Drosophila mycetophaga Malloch, 1924, p. 351. (Holotype in AM; type locality Ourimbah, N.S.W., ex *Polyporus* fungus.)

A patterned-wing species recorded from central Queensland to Melbourne; usually found underneath bracket fungi.

17. *Drosophila polypori* Malloch

Drosophila polypori Malloch, 1924, p. 351. (Holotype in AM; type locality Ourimbah, N.S.W., ex *Polyporus* fungus.)

A patterned-wing species evidently closely related to *mycetophaga* and often found together with the latter, but of more restricted distribution (southern Queensland to central or southern New South Wales).

18. *Drosophila hannae* Bock & Parsons

Drosophila (*Hirtodrosophila*) *hannae* Bock and Parsons, 1978*b*, p. 340. (Holotype in ANIC; type locality Lake Eacham National Park, Qld.)

Known only from the holotype (collected under bracket fungus), this species possesses a wing pattern similar to that of *mycetophaga* but is about twice the size of the latter, and also differs in thoracic pattern.

19. *Drosophila mixtura* Bock

Drosophila (*Hirtodrosophila*) *mixtura* Bock, 1976, p. 32. (Holotype in AM; type locality Lake Barrine, Qld.)

D. mixtura is a common species in rainforests of north Queensland, where large numbers of individuals may be found congregating under bracket fungi. The species is thus found in the same habitat as the preceding three species, but the wings of *mixtura* are not patterned. Further comments on the behaviour of the 'bracket fungi species' are given in Parsons and Bock (1977*b*).

20. *Drosophila borboros* Bock

Drosophila (*Hirtodrosophila*) *borboros* Bock, 1976, p. 33. (Holotype in ANIC; type locality Mt Edith, north Queensland.)

D. borboros was described on the basis of the holotype only; no further specimens have been discovered and no ecological information about the species is available.

21. *Drosophila tricolora* Bock

Drosophila (Hirtodrosophila) tricolora Bock, 1976, p. 34. (Holotype in ANIC; type locality near Daintree, north Queensland.)

This small but distinctive species was described on the basis of two specimens only; no further specimens have been discovered.

22. *Drosophila whianensis* Bock

Drosophila (Hirtodrosophila) whianensis Bock, 1976, p. 30. (Holotype in AM; type locality near Lismore, N.S.W.)

D. whianensis is known only from the holotype collected in Whian Whian State Forest, N.S.W.

Subgenus **Scaptodrosophila** Duda

Scaptodrosophila Duda, 1923, p. 37 (as genus; see above under *Drosophila*).
Paradrosophila Duda, 1923, p. 43 (see above under *Drosophila*).
Spuriostyloptera Duda, 1923, p. 38 (see above under *Drosophila*).
Pugiodrosophila Duda, 1924*a*, p. 203. Type-species *D. pugionata* de Meijere, 1915, by monotypy; type locality Java. (Wheeler and Takada 1964.)
Tanygastrella Duda, 1924*b*, p. 254 (see above under *Drosophila*).
Xiphidiochaeta Duda, 1925, p. 200 (impermissible substitution for *Pugiodrosophila*).
Adrosophila Séguy, 1938, p. 344 (see above under *Drosophila*).
Pholadoris Sturtevant, 1942, p. 28. Type-species *Drosophila victoria* Sturtevant, 1942, by original designation; type locality California, U.S.A.) (Wheeler and Takada 1964.)

Vibrissa single; prescutellar pair of acrostichal bristles usually enlarged, sometimes as large as anterior dorsocentrals; propleural bristle usually present; sternopleural bristles usually subequal.

World-wide, the subgenus *Scaptodrosophila* contains about 150 species, the majority confined to Australia, New Guinea, south-east Asia and neighbouring areas; the bulk of the Australian *Drosophila* fauna belongs to this subgenus. It seems likely that *Scaptodrosophila* arose in the tropical rainforests of south-east Asia and that the initial components of the Australian *Scaptodrosophila* fauna were derived from invasions from the north; subsequent radiations within Australia have given rise to a substantial native fauna.

Although it has been fashionable for some considerable time to subdivide the subgenera of *Drosophila* into species-groups, few of the species of *Scaptodrosophila* have been so grouped because many are still very poorly known; it is also clear that a substantial undescribed *Scaptodrosophila* fauna exists in New Guinea and south-east Asia. Six groups have nevertheless been discerned, primarily among the better-known faunas of Australia and the northern hemisphere (Bock and Parsons 1978*c*). The *inornata* and *barkeri* groups are (as far as is presently known) entirely Australian, the *coracina* and *brunneipennis* groups are predominantly Australian, and the *brunnea* group possesses one described Australian species as well as Asian and African species.

Taxonomic study of the Australian *Scaptodrosophila* fauna is hindered by the very close degrees of similarity among many species; the latter are only separable with a high degree of confidence on male (and to a lesser extent female) genitalia. (Further comments are given below under individual species headings and preceding

the key to species.) A common phenotype is a pale to mid brown body coloration with clear to brownish wings, a large, usually squared facial carina, and large prescutellar bristles. Other aspects of chaetotaxy, and wing venation, are also similar for many of these species, but the differences in male genitalia, and sometimes in female genitalia, are often striking.

To simplify consideration of the large number of Australian *Scaptodrosophila* species now known or described in this paper, grouped species are considered separately below, followed by ungrouped species.

A. *inornata* **Species-group** (Parsons and Bock 1978, p. 83)

Arista usually reduced; carina vestigial; propleural bristle absent; prescutellar bristles small.

Seven species are included in this morphologically rather distinctive group. (Absence of a carina and a propleural bristle is atypical of the subgenus.) The species are predominantly southern in distribution, with range extensions, in the case of two species, into upland areas of north Queensland.

1. *Drosophila inornata* Malloch

Drosophila inornata Malloch, 1923, p. 617. (Holotype in AM; type locality Blue Mountains, N.S.W.)

D. inornata is now known to be a common species in south-eastern Australia, but has also been collected in southern Queensland and on the Atherton Tableland. It is by no means certain that all individuals spanning this rather wide range are members of the same species, that is to say, that two or more sibling species are not involved; indeed the fact that individuals in the more northerly part of the range seem to show different ecological preferences from those in Victoria suggests that the latter may be the case. There are, however, no clear morphological differences between the southern and northern populations which would permit an unequivocal taxonomic discrimination, and the fact that the species is not at all amenable to culture excludes the traditional laboratory studies on reproductive isolation, which might otherwise be quite revealing.

2. *Drosophila rhabdote* Bock

Drosophila (*Scaptodrosophila*) *rhabdote* Bock, 1976, p. 53. (Holotype in AM; type locality near Mole Creek, Tasmania.)

Very similar morphologically to *inornata* but possessing a distinctive median dorsal dark stripe, *rhabdote* is a rather rare species of south-eastern Australia, often collected about sedges in semi-aquatic habitats.

3. *Drosophila grossfieldi* Bock

Drosophila (*Scaptodrosophila*) *grossfieldi* Bock, 1976, p. 50. (Holotype in ANIC; type locality Nornalup National Park, W.A.)

Similar to *inornata* but restricted in distribution to south-western Western Australia.

4. *Drosophila obsoleta* Malloch

Drosophila obsoleta Malloch, 1923, p. 616. (Holotype in AM; type locality Sydney.)
Drosophila australica Duda, 1923, p. 59. (Syntypes in Budapest; type locality Springwood, N.S.W.) (Bock 1976.)

D. obsoleta is a species of open forests of south-eastern Australia; in basic morphology the species is similar to *inornata* but differs strikingly in coloration, each bristle arising from a dark spot (cf. *hydei, repleta, buzzatii* and *aldrichi,* subgenus *Drosophila*).

5. *Drosophila collessi* Bock

Drosophila (*Scaptodrosophila*) *collessi* Bock, 1976, p. 52. (Holotype in ANIC; type locality Royal National Park, N.S.W.)

D. collessi is the only species in the *inornata* group possessing a well developed plumose arista; it is also distinguished by brownish wings (wings clear in remaining species). The species appears to be rather rare; it is usually collected along with much larger numbers of *inornata* by sweeping tree fern fronds in south-eastern Australia. A single specimen is also known from south-western Western Australia.

6. *Drosophila fuscithorax* Malloch

Drosophila fuscithorax Malloch, 1924, p. 353. (Holotype in SPHTM; type locality Sydney.)

D. fuscithorax is distinguished by its dusky coloration. The species is sometimes swept in large numbers from open forest habitats of south-eastern and south-western Australia, and is one of the small number of native species common in Tasmania.

7. *Drosophila nicholsoni* Malloch

Drosophila nicholsoni Malloch, 1927, p. 4. (Holotype in SPHTM; type locality Perth.)

Restricted to the south-west of Western Australia, the most distinguishing feature of this species is the highly aberrant arista, consisting only of the axis with a large dorsal ray.

B. *barkeri* Species-group (Bock and Parsons 1978*c*, p. 100).

Plain coloured species in which the male genitalia lack fully developed claspers. Eight species are now known in this group. All species are restricted to eastern Australia, from Torres Strait to southern Victoria.

1. *Drosophila barkeri* Bock

Drosophila (*Scaptodrosophila*) *barkeri* Bock, 1976, p. 56. (Holotype in AM; type locality Otford, N.S.W.)

A rather large plain brown species, *barkeri* occurs in south-eastern Australia (New South Wales, Victoria and southern Queensland). Large numbers of individuals may be swept in Victorian tree-fern gullies (in summer), but the breeding site of the larvae is unknown.

2. *Drosophila louisae* Parsons & Bock

Drosophila (*Scaptodrosophila*) *louisae* Parsons and Bock, 1977*a*, p. 265. (Holotype in ANIC; type locality Mallacoota National Park, Victoria.)

This species is very similar in external morphology to *barkeri*; indeed the two species are only satisfactorily separable on genitalia. Despite the similarities of gross morphology, the male genitalia of the two species are very different; more subtle differences distinguish the female genitalia. The distributions of *barkeri* and *louisae* are rather similar, but *louisae* has not been collected in Queensland and is also the rarer of the two species.

3. *Drosophila exemplar* Bock

Drosophila (*Scaptodrosophila*) *exemplar* Bock, 1976, p. 57. (Holotype in AM; type locality Iluka, N.S.W.)

D. exemplar is similar to the above two species but distinguishable on details of gross morphology as well as male genitalia. The species has been recorded from New South Wales and southern Queensland.

4. *Drosophila minnamurrae* Bock

Drosophila (*Scaptodrosophila*) *minnamurrae* Bock, 1976, p. 58. (Holotype in ANIC; type locality Minnamurra Falls, N.S.W.)

D. minnamurrae is distinguished by a blackened abdomen. The species appears to be rare, and confined to New South Wales.

5. *Drosophila concolor* Bock

Drosophila (*Scaptodrosophila*) *concolor* Bock, 1976, p. 60. (Holotype in AM; type locality Claudie River, north Queensland.)

At the time of description, this species was known on the basis of three specimens (Mulgrave River and Kuranda in addition to the type locality). Two further specimens were subsequently recorded, one from Townsville (Bock 1977*b*) and one from northern New South Wales (Bock and Parsons 1979). More recently, 19 further specimens were collected on two islands of Torres Strait (McEvey 1981). The known range of *concolor* is thus from northern New South Wales to Torres Strait, and it is conceivable that the species will ultimately be discovered in New Guinea.

6. *Drosophila sinape* Bock

Drosophila (*Scaptodrosophila*) *sinape* Bock, 1976, p. 60. (Holotype in ANIC; type locality Earl Hill, north Queensland.)

This small yellowish species is known only from two localities in north Queensland.

7. *Drosophila mulgravei* Bock

Drosophila (*Scaptodrosophila*) *mulgravei* Bock, 1976, p. 61. (Holotype in AM; type locality Mulgrave River, north Queensland.)

Known only from the type locality in north Queensland.

8. *Drosophila nimia* Bock

Drosophila (*Scaptodrosophila*) *nimia* Bock, 1976, p. 62. (Holotype in ANIC: type locality 2 miles W. of Little Mulgrave, north Queensland.)

Known only from two localities in north Queensland.

C. *coracina* Species-group (Mather 1955, p. 550).

Carina usually small; hypandrium of male genitalia with pair of very large spines; species attracted to fruit baits.

Ten species have been included in the *coracina* group (Bock 1980*b*); one species (*D. coracina* Kikkawa & Peng) is Japanese while the remaining nine occur in Australia and, in the case of one species (*enigma*), also in New Zealand. The species are attracted to fruit baits and in this respect are atypical of the subgenus, most of the remaining *Scaptodrosophila* species being collectable only by sweeping foliage. As might be expected for baitable species, the members of the *coracina* group are culturable on laboratory media, albeit with some difficulty; the technique is described in Bock and Parsons (1980).

1. *Drosophila lativittata* Malloch

Drosophila lativittata Malloch, 1923, p. 618. (Holotype in SPHTM; type locality Sydney.)
Paradrosophila interrupta Duda, 1923, p. 45. (Holotype in Budapest; type locality Sydney.) (Bock 1976.)

D. lativittata is known from south-eastern Australia (Queensland, New South Wales and Victoria). It is a common urban species, although rare in natural habitats; it seems likely that it has expanded its range with, and is one of the few species to benefit from, human activities and settlements.

2. *Drosophila enigma* Malloch

Drosophila enigma Malloch, 1927, p. 6. (Holotype in SPHTM; type locality Sydney.)

Also an urban species, *D. enigma* is coextensive in distribution with *lativittata*, although the latter species is usually the more common of the two. *D. enigma* was also recently discovered in New Zealand (Parsons, personal communication).

3. *Drosophila howensis* Parsons & Bock

Drosophila (*Scaptodrosophila*) *howensis* Parsons and Bock, 1979, p. 978. (Holotype in ANIC; type locality Lord Howe Island.)

Known only from Lord Howe Island, this species is similar in coloration to *enigma*. Hybridization and chromosomal studies, details of which will be published separately, indicate that the two species are very closely related.

4. *Drosophila nitidithorax* Malloch

Drosophila nitidithorax Malloch, 1927, p. 5. (Holotype lost; type locality Perth.)

D. nitidithorax is an entirely black species restricted in distribution to the south-west of Western Australia.

5. *Drosophila specensis* Bock

Drosophila (*Scaptodrosophila*) *specensis* Bock, 1976, p. 41. (Holotype in ANIC: type locality Mt Spec, Qld.)

D. specensis is an inhabitant of rainforests from north Queensland to central or southern New South Wales; the species has not become 'urbanized' as have *lativittata* and *enigma* in the south-east and, to some extent, *nitidithorax* in the south-west. *D. specensis* is collectable at both fruit and mushroom baits. In coloration the species is very similar to *enigma*.

6. *Drosophila subnitida* Malloch

Drosophila subnitida Malloch, 1927, p. 5. (Holotype in SPHTM; type locality Sydney.)
Drosophila opaca Mather, 1955, p. 558, *nec* Williston, 1896, p. 411. (Holotype in AM; type locality Noosa, Qld.) (Bock 1976.)
Drosophila noropaca Mather, 1956, p. 65 (replacement name for *opaca*).

This species appears to be very rare and restricted to southern Queensland and New South Wales. In coloration it is similar to *nitidithorax* but there are differences between the two species in details of morphology, especially in the shape of the carina.

7. *Drosophila cancellata* Mather

Drosophila cancellata Mather, 1955, p. 550. (Holotype in AM; type locality Moggill, Qld.)

D. cancellata appears to be very rare, but is nevertheless known from an extensive range. A number of specimens is present in the AM collection from Claudie River, far north Queensland; the type locality is an outer suburb of Brisbane; and a few specimens have been collected in rainforests in the Mulgrave River area of north Queensland and in southern New South Wales.

8. *Drosophila novamaculosa* Mather

Drosophila maculosa Mather, 1955, p. 560, *nec* Coquillett, 1895, p. 317. (Holotype in AM; type locality Moggill, Qld.)
Drosophila novamaculosa Mather, 1956, p. 65 (replacement name for *maculosa*).

This species is rather distinctive in possessing whitish spots on the mesonotum. It is, however, known only from the original collection at the type locality. Several later attempts to collect the species at the same locality have been unsuccessful; given the destruction of habitat associated with increasing urbanization about the type locality, it is even possible that the species is now extinct.

9. *Drosophila ellenae* Bock

Drosophila (*Scaptodrosophila*) *ellenae* Bock, 1980*b*, p. 69. (Holotype in ANIC; type locality Jabiru, N.T.)

This species is known from several localities in the Northern Territory only.

D. *brunneipennis* Species-group (Bock and Parsons 1978c, p. 100)

Body large; coloration brown; wing brownish; carina very large.

The largest of the Australian *Drosophila* species (body length > 4 mm) are the four which have been described in this group.

1. *Drosophila brunneipennis* Malloch

Drosophila brunneipennis Malloch, 1923, p. 617. (Holotype in AM; type locality Sydney.)

D. brunneipennis has been recorded from New South Wales and Victoria.

2. *Drosophila notha* Bock

Drosophila (*Scaptodrosophila*) *notha* Bock, 1976, p. 65. (Holotype in ANIC; type locality Ku-ring-gai Chase, N.S.W.)

This species is very similar to *brunneipennis* but is distinguished by a few small details of gross morphology as well as substantial differences in both male and female genitalia. The female genitalia are very unusual in being broadly rounded apically; the margin of the egg guide is lined with strong teeth. *D. notha* is known from New South Wales and Victoria, and also from New Guinea where Kirk (1977) reported the discovery that larvae of this species are gall-forming in the stems of bracken. More recently, the same phenomenon has been observed in Australian populations (Thomson *et al.* 1982).

3. *Drosophila adelphe* Bock

Drosophila (*Scaptodrosophila*) *adelphe* Bock, 1976, p. 66. (Holotype in ANIC; type locality Wootton, N.S.W.)

This species was described on the basis of two types only, but several further specimens have been collected in central New South Wales (coastal areas).

4. *Drosophila ehrmanae* Parsons & Bock

Drosophila (*Scaptodrosophila*) *ehrmanae* Parsons and Bock, 1977*a*, p. 267. (Holotype in ANIC; type locality Noojee State Forest, Vic.)

Individuals of this species have been collected at several localities in Victoria only.

E. *brunnea* Species-group (Tsacas & Chassagnard 1976, p. 97).

Arista exceptionally large, fan-like, with long curved rays; carina large; rather large species; prescutellars bristles weak.

This group was established for five Oriental species (*brunnea* subgroup) and two African species (*coundo* subgroup: apex of scutellum pale). Bock and Parsons (1978c) included the Australian species *rhipister* in the group; this species is, however, synonymized below with *brunnea*, and three new species are described.

1. *Drosophila brunnea* de Meijere

Drosophila brunnea de Meijere, 1911, p. 401. (Holotype in Amsterdam; type locality Java.)
Drosophila (*Scaptodrosophila*) *rhipister* Bock, 1976, p. 89. Syn. nov. (Holotype in ANIC; type locality The Boulders, Babinda, Qld.)

The species occurs in south-east Asia and north Queensland. It is highly likely that it will ultimately be discovered in New Guinea.

Tsacas and Chassagnard (1976) described two sibling species of *brunnea*, *parabrunnea* and *pressobrunnea*; both species also occur in south-east Asia. The following three species, while very similar to *brunnea*, are, however, easily distinguishable by their colour patterns, and the female genitalia of two of the species are highly distinctive and quite unlike those of the species already described in this group.

2. *Drosophila* (*Scaptodrosophila*) *cultello*, sp. nov.

Types

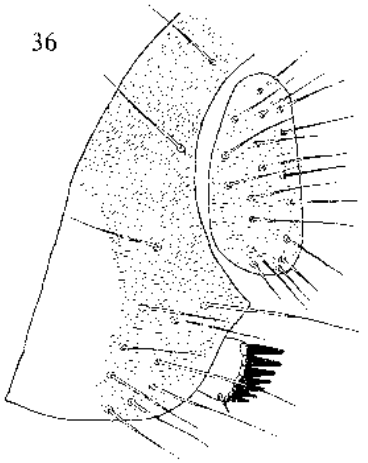
Holotype ♀: Claudie River, 5 miles W. of Mt Lamond, Queensland, 31.xii.1971, D.K. McAlpine and G.A. Holloway (AM). Paratypes (both AM): Mulgrave River, 4 miles W. of Gordonvale, Queensland, 4.i.1959. D.K. McAlpine, 1♂; Kuranda, Queensland, 19.v.1958, D.K. McAlpine, 1♀.

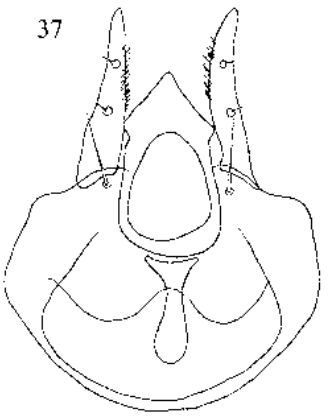
Distinguishing features. Mesonotum with broad dark median longitudinal stripe and narrower lateral stripes; front largely pale; wing brownish.

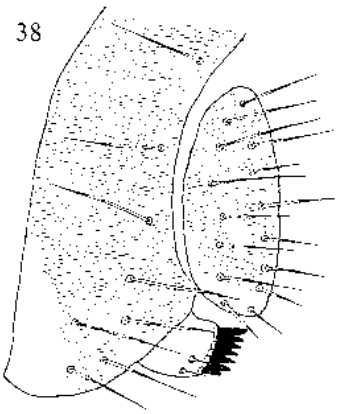
Body length. 3.1 mm (holotype); 2.6, 2.8 mm (paratypes).

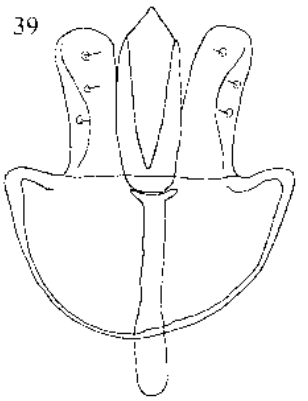
Head. Arista extremely large, with 4 long curved rays above and 3 very long straight rays below plus terminal fork. Breadth of front 1.3 times length; front largely pale tan, with whitish shimmer when viewed from very acute angles; periorbits silvery; ocellar triangle black; additional brownish coloration extending anteriorly from triangle almost to anterior margin of front. 2nd antennal segment tan, darkened anteriorly; 3rd segment pale tan, darker anteriorly in central region. Carina large but lateral and ventral margins smoothly rounded. Carina pale tan, coloration extending to clypeal margin; face otherwise dark brownish. Palp blackish, with a few large apical and subapical bristles. Cheek almost linear, rather narrow, dark brown on lower portion, pale tan adjacent to eye. Eye with very sparse pile, rather elongate. Anterior reclinate orbital bristle lateral to and a little smaller than proclinate orbital; posterior reclinate orbital bristle somewhat larger than proclinate orbital. Postvertical bristles strong.

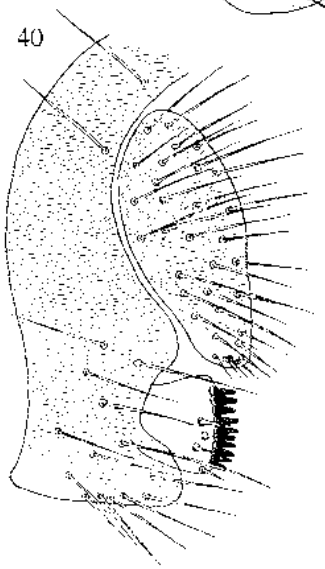
Thorax. Mesonotum pale brown with median longitudinal dark brown band encompassing middle 4 rows of acrostichals, narrower similar band on each side lateral to dorsocentral bristles commencing at transverse suture, large dark brown spot on each side anterior to suture and above humeral callus, and further darkening about bases of notopleural and supraalar bristles. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 2–4 rows between dorsocentrals. Prescutellars very weak. Dorsocentral bristles large; ratio anterior : posterior dorsocentrals 0.7. Scutellum dark brown about bases of anterior bristles and in anterior band, otherwise pale especially apically. Scutellar bristles subequal; anterior bristles barely divergent. Pleura almost entirely dark blackish brown. Anterior and posterior sternopleural bristles subequal; middle sternopleural a little smaller. Haltere tan with small dark apical spot. Femora entirely dark blackish brown; tibiae dark blackish brown with small basal and larger central pale annuli; tarsi pale; preapical bristles on all tibiae; apical bristle on 2nd tibia only.

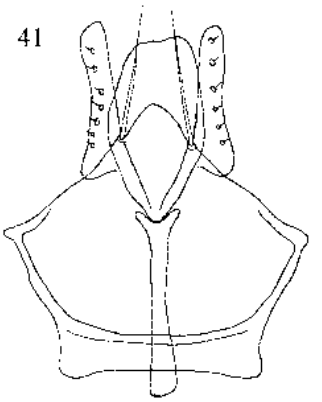












Figs 36, 37. *Drosophila cultello*: *36*, male external genitalia; *37*, male internal genitalia.
Figs 38, 39. *Drosophila paracultello*: *38*, male external genitalia; *39*, male internal genitalia.
Figs 40, 41. *Drosophila variata*: *40*, male external genitalia; *41*, male internal genitalia.

Wing. Brownish tinge present, more intense towards costal margin. *C*-index, 2.1; 4*V*-index, 1.8; 5*X*-index, 2.0; *M*-index, 0.7. 3rd costal section with heavy setation on basal 0.7. Length (holotype), 2.7 mm.

Abdomen. Tergite 1 pale brown. Tergite 2 pale brown centrally, otherwise black. Tergite 3 black with small weakly paler central area anteriorly. Tergites 4–5 black with narrow tan anterolateral bands. Tergite 6 black. Incurved portions of each tergite black.

Male genitalia (Figs 36, 37). Clasper with marginal row of black teeth, largest above; hypandrium strongly sclerotized, shallow, with weak submedian spines; aedeagus small; parandrites large.

Female genitalia. Egg guide broadly rounded apically, with large (but not contiguous) peg-like (hence specific name) marginal teeth.

Distribution. Known from several rainforest localities in north Queensland.

Specimens Examined

Types as above. **Queensland:** Jarra Creek near Tully, swept rainforest, 27.viii.1976, Bock and Parsons, 1♂ (ANIC); near Millaa Millaa, ex flowers of *Duranta repens*, 29.x.1977, P.A. Parsons, 1♀ (I.T).

3. *Drosophila* (*Scaptodrosophila*) *paracultello*, sp. nov.

Types

Holotype ♂: Claudie River, 5 miles W. of Mt Lamond, Queensland, 31.xii.1971, D.K. McAlpine and G.A. Holloway (AM). Paratypes: same data as holotype, 1♂, 1♀ (AM).

Distinguishing features. Similar to preceding species, distinguishable by less extensive thoracic coloration and dark band across middle of carina.

Body length, 2.8 mm (holotype); 2.5, 2.9 mm (paratypes).

Head. Arista extremely broad, with 4–5 long curved rays above and 3 exceedingly long straight rays below plus terminal fork. Breadth of front 1.4 times length; front largely pale tan, with whitish shimmer at very acute angles of illumination; periorbits silvery; ocellar triangle elevated, black; small dark band present in front of triangle extending towards, but not reaching, anterior margin of front. 2nd antennal segment weakly dark brownish; 3rd segment tan with trace of anterior dark spot. Carina prominent, wide below, with rounded margins. Face pale tan; carina with dark transverse band in middle region extending into point below. Palp blackish, with several large bristles. Cheek almost linear, moderately broad, dark below, pale tan above. Eye elongate, with trace of pile. Proclinate and anterior reclinate orbital bristles subequal, both *c*. 0.7 length of posterior reclinate orbital. Proclinate orbital anterolateral to anterior reclinate orbital. Postverticals strong.

Thorax. Mesonotum pale brown, with dark brown median longitudinal band just within middle 4 rows of acrostichals, and lateral posterior bands and anterior spots similar to those of preceding species. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 2–4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals *c*. 0.6. Scutellum dark about bases of anterior bristles, otherwise paler especially apically. Mesopleuron broadly darkened centrally; sternopleuron with

broad dark band; meropleuron and metapleuron dark; pleura otherwise pale. Haltere tan. 1st and 2nd femora dark; 3rd femur largely dark, pale basally; 1st tibia dark with subbasal and subapical pale annuli; 2nd and 3rd tibiae dark with basal and subapical pale annuli; tarsi pale; preapical bristles on all tibiae; apical bristle on 2nd tibia only.

Wing. Brownish tinge present, more intense towards costal margin. *C*-index, 2.0; 4*V*-index, 2.1; 5*X*-index, 1.9; *M*-index, 0.7. 3rd costal section with heavy setation on basal 0.7. Length (holotype), 2.2 mm.

Abdomen. Tergite 1 pale brown. Tergite 2 pale brown centrally and anterolaterally, otherwise black. Tergite 3 black. Tergites 4–5 black with anterolateral pale bands. Incurved portions of tergites tan anteriorly, black posteriorly.

Male genitalia (Figs 38, 39). Clasper with row of strong medial black teeth; hypandrium shallow, rounded; aedeagus simple, parandrites large.

Female genitalia. Egg guide broadly rounded apically, with very strong peg-like apical bristles.

Distribution. Known only from the type locality, far northern Queensland.

Specimens Examined

Types as above plus 1♀ (headless, same data) (AM).

Special Comments

This and the preceding species are similar in colour pattern and undoubtedly closely related. The egg guide of each species is highly distinctive as described above; the egg guides of other species in this species group are slender and bear much smaller teeth (figures in Tsacas and Chassagnard 1976 for *brunnea*, *scutellimargo*, *parabrunnea*, *pressobrunnea* and one of the African species).

4. ***Drosophila* (*Scaptodrosophila*) *variata***, sp. nov.

Types

Holotype ♀: Claudie River, 5 miles W. of Mt Lamond, Queensland, 27.xii.1971, m.v. light, D.K. McAlpine, G.A. Holloway and D.P. Sands (AM). Paratypes: same data as holotype, 1♀ (AM); Mulgrave River, 4 miles W. of Gordonvale, Queensland, 4.i.1959, D.K. McAlpine, 2♂ (AM).

Distinguishing features. Mesonotum with dark submedian bands; pleura with dark bands; abdominal tergites with broad dark posterior bands.

Body length. 3.1 mm (holotype); 2.5–2.7 mm (paratype range).

Head. Arista with 4 curved rays above and 3 straight rays below plus large terminal fork. Breadth of front 1.1 times length; front tan; periorbits silvery; ocellar triangle black. 2nd and 3rd antennal segments tan to dark tan, slightly dusky. Carina prominent, broader below, rather flat, margins rounded. Face pale tan. Palp tan, with several bristles. Cheek tan, linear, moderately broad. Eye with trace only of very fine pile. Orbital bristles large; proclinate and anterior reclinate orbitals subequal, latter lateral to former; posterior reclinate orbital a little larger than other 2 orbitals. Ocellar, vertical and postvertical bristles strong.

Thorax. Mesonotum pale brown with dark longitudinal bands: 2 complete submedian bands between prescutellar and dorsocentral bristles; band on each side behind transverse suture lateral to dorsocentrals; and further band on each side just above humeral calli to wing base. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 2–4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.5. Scutellum largely dark, pale laterally and in small central oval area. Scutellar bristles subequal. Pleura with broad dark upper longitudinal band and narrower dark band across upper part of sternopleuron, otherwise pale. Haltere pale. 1st femur pale, weakly darkened below; 2nd and 3rd femora pale with broad dark subapical annuli; tibiae pale with dark subbasal and apical annuli; tarsi pale; preapical bristles on all tibiae; apical bristle on 2nd tibia only.

Wing. Slightly brownish. 2nd vein almost straight. *C*-index, 1.9; 4*V*-index, 2.0; 5*X*-index, 2.0; *M*-index, 0.7. 3rd costal section with heavy setation on basal 0.8. Length (holotype), 2.3 mm.

Abdomen. Tergite 1 tan. Tergite 2 tan anteriorly and centrally, black posterolaterally. Tergites 3–6 each tan anteriorly, broadly blackened posteriorly. Incurved portions of all tergites black medially.

Male genitalia (Figs 40, 41). Clasper with marginal row of densely packed black teeth; hypandrium with well developed submedian spines; aedeagus simple; parandrites large.

Female genitalia. Egg guide moderately slender, rounded apically, with a few weak marginal teeth and subapical hairs.

Distribution. Known only from the two rainforest localities of the type specimens in north Queensland.

F. Ungrouped Species

As indicated above, many of the Australian *Scaptodrosophila* species are still poorly known and their relationships unclear. Described species are summarized below in alphabetical order; descriptions of several new species follow. The species *Drosophila albostriata* Malloch is here transferred to the genus *Phorticella* (q.v.) and is discussed in greater detail below under that heading.

1. *Drosophila altera* Bock

Drosophila (*Scaptodrosophila*) *altera* Bock, 1976, p. 83. (Holotype in ANIC; type locality Upper Mulgrave River, Qld.)

A small black rainforest species attracted to mushroom baits, *altera* is now known to range from northern to southern Queensland. Several other *Scaptodrosophila* species (*fungi*, *fuscithorax*, *hibisci*, *moana*, *nitidithorax*, *subnitida*, *sydneyensis*) are also black or largely black in coloration, but these species do not appear to be closely related to *altera* or, with the exception of *nitidithorax* and *subnitida* in the *coracina* species-group, to one another; *fuscithorax* is a member of the *inornata* group and possesses clear affinities to species which are otherwise coloured or patterned. Black coloration thus appears to be polyphyletic within the subgenus.

2. *Drosophila anthemon* Bock

Drosophila (*Scaptodrosophila*) *anthemon* Bock, 1976, p. 84. (Holotype in ANIC; type locality Magela Creek, N.T.)

This rare yellowish species is known from the Northern Territory and Queensland, and may be a flower-breeder.

3. *Drosophila bodmeri* Bock & Parsons

Drosophila (*Scaptodrosophila*) *bodmeri* Bock and Parsons, 1979, p. 300. (Holotype in ANIC; type locality Lamington National Park, Qld.)

Known only from southern Queensland, this is one of a large number of plain brown species of questionable or uncertain relationships.

4. *Drosophila bryani* Malloch

Drosophila bryani Malloch, 1934, p. 310. (Holotype in London; type locality Samoa.)
Drosophila levis Mather, 1955, p. 561. (Holotype in AM; type locality Maroochydore, Qld.) (Wheeler and Takada 1964.)

A rather widespread species, reported from south-east Asia, Micronesia and the South Pacific as well as northern Australia. Although collectable in rainforests in small numbers, the species has become urbanized in north Queensland and is abundant in, for example, Townsville (Bock 1977*b*).

5. *Drosophila bushi* Bock & Parsons

Drosophila (*Scaptodrosophila*) *bushi* Bock and Parsons, 1979, p. 298. (Holotype in ANIC; type locality Oakey Creek, Qld.)

This small brown species is known only from a number of specimens collected in flowers in southern Queensland. Further studies are required to determine whether the larvae feed in the flowers.

6. *Drosophila crocata* Bock

Drosophila (*Scaptodrosophila*) *crocata* Bock, 1976, p. 93. (Holotype in AM; type locality Mulgrave River, Qld.)

A small yellowish species described on the basis of the holotype only; no further specimens have been collected.

7. *Drosophila dichromos* Bock

Drosophila (*Scaptodrosophila*) *dichromos* Bock, 1976, p. 70. (Holotype in ANIC; type locality Upper Mulgrave River, Qld.)

A species of north Queensland rainforests, very similar to *bryani* and possibly related to it.

8. *Drosophila eluta* Wheeler & Takada

Drosophila eluta Wheeler and Takada, 1964, p. 190. (Holotype in University of Texas; type locality Caroline Is, Micronesia.)

D. elutta has been reported from Micronesia and north Queensland; there can be little doubt that the species also exists in New Guinea. It is now known to be a common inhabitant of north Queensland rainforests and large numbers may be collected by baiting with rotting mushrooms. The species is rather distinctive in possessing dark longitudinal stripes on the (tan) mesonotum, but in some specimens the stripes are poorly developed (i.e. pale) while in others they are almost black.

9. *Drosophila fimbriata* Bock

Drosophila (*Scaptodrosophila*) *fimbriata* Bock, 1976, p. 85. (Holotype in AM; type locality St Helen's Creek, Qld.)

A pale brown rainforest species collected from a number of localities in northern and central Queensland.

10. *Drosophila fumida* Mather

Drosophila fumida Mather, 1960, p. 230. (Holotype location unknown; type locality Pemberton, W.A.)

D. fumida is one of only two known Australian patterned-wing species in the subgenus *Scaptodrosophila* (see also *picripennis* below). The species is widespread in southern Australia and is attracted to fruit baits but is never common; it can be cultured with some difficulty on standard laboratory media.

11. *Drosophila fungi* Bock & Parsons

Drosophila (*Scaptodrosophila*) *fungi* Bock and Parsons, 1978*b*, p. 343. (Holotype in ANIC; type locality Bruxner Park, N.S.W.)

D. fungi is a very small black species collected in rainforests from central New South Wales to north Queensland. The species is attracted to rotting mushroom baits, sometimes in very considerable numbers, along with ephydrids, if the baits are placed near stagnant water containing putrefying material. *D. fungi* also occurs in New Guinea (Bock and Parsons, unpublished data).

12. *Drosophila glauca* Bock

Drosophila (*Scaptodrosophila*) *glauca* Bock, 1976, p. 88. (Holotype in ANIC; type locality Earl Hill, Qld.)

This rather distinctive small species is now known to occur in rainforest localities from northern to southern Queensland. A single specimen was collected near Darwin by P.A. Parsons in 1978, and a further specimen reported from Mt Adolphus Island in Torres Strait by McEvey (1981).

13. *Drosophila hibisci* Bock

Drosophila (*Scaptodrosophila*) *hibisci* Bock, 1977*c*, p. 761. (Holotype in ANIC; type locality Peachester, Qld.)

A small dark species found in flowers of native *Hibiscus*. Larvae live in rotting flower tissues (Cook *et al.* 1977) and the species is thus quite intimately associated with the *Hibiscus* flowers. It is not known whether *D. hibisci* exploits any other resource when flowers of *Hibiscus* are not available. The species has been collected

from north Queensland to central New South Wales, and is also known to occur in New Guinea (H.L. Carson, personal communication).

14. *Drosophila insolita* Bock

Drosophila (*Scaptodrosophila*) *insolita* Bock, 1976, p. 76. (Holotype in ANIC; type locality Brockelos Creek, N.S.W.)

A small brown species known only from New South Wales.

15. *Drosophila mania* Bock

Drosophila (*Scaptodrosophila*) *mania* Bock, 1976, p. 78. (Holotype in ANIC; type locality Palm Creek, N.S.W.)

A small brown species now known to be rather widespread in southern New South Wales.

16. *Drosophila megagenys* Bock

Drosophila (*Scaptodrosophila*) *megagenys* Bock, 1976, p. 79. (Holotype in AM; type locality Brown Mountain, N.S.W.)

D. megagenys was described on the basis of only two specimens, and was considered for some time to be a very rare species, until the breeding site of the larvae was discovered (Thomson *et al.* 1982). Following the discovery that larvae feed in the tissues of common bracken, it has been possible to collect substantial numbers of adults by sweeping bracken in affected areas. *D. megagenys* occurs in New South Wales and Victoria. As indicated above under *D. notha*, larvae of this species also feed in bracken but form stem galls; the two species have been collected together in New South Wales.

17. *Drosophila metaxa* Bock

Drosophila (*Scaptodrosophila*) *metaxa* Bock, 1976, p. 82. (Holotype in ANIC; type locality Big Mitchell Creek, Qld.)

This small dark brown species is widespread from the Northern Territory through Queensland to central New South Wales. The species is common in north Queensland and occurs in both rainforest and open forest localities.

18. *Drosophila minimeta* Bock

Drosophila (*Scaptodrosophila*) *minimeta* Bock, 1976, p. 78. (Holotype in ANIC; type locality Wallaga Lake, N.S.W.)

A small brown species known from several localities in New South Wales.

19. *Drosophila moana* McEvey

Drosophila (*Scaptodrosophila*) *moana* McEvey, 1981, p. 914. (Holotype in ANIC; type locality Moa I., Torres Strait.)

This small dark species possessing a highly distinctive arista was described on the basis of the holotype only. A second specimen from Claudie River, near Iron Range in far north Queensland, exists in the collection of the Australian Museum.

20. *Drosophila mossmana* Bock & Parsons

Drosophila (*Scaptodrosophila*) *mossmana* Bock and Parsons, 1978*b*, p. 345. (Holotype in ANIC; type locality Mossman Gorge, Qld.)

A small brownish species known only from the type locality. A sexual dimorphism in abdominal coloration is present. The species was collected at mushroom baits.

21. *Drosophila novoguinensis* (Duda)

Paradrosophila novo-guinecnsis (printing error) Duda, 1923, p. 46. (Holotype stated as in Budapest but apparently now lost; type locality New Guinea.)

Known from New Guinea and north Queensland; attracted to mushroom baits; distinguished by possession of several scutellar hairs in addition to bristles.

22. *Drosophila oncera* Bock

Drosophila (*Scaptodrosophila*) *oncera* Bock, 1976, p. 90. (Holotype in ANIC; type locality Whitfield Range Forest Reserve, Qld.)

A large dark species known only from the type locality.

23. *Drosophila oweni* Bock & Parsons

Drosophila (*Scaptodrosophila*) *oweni* Bock and Parsons, 1978*b*, p. 346. (Holotype in ANIC; type locality Paluma, Qld.)

A rather distinctive species known from several rainforest localities in north Queensland. The type specimens were collected at mushroom baits.

24. *Drosophila parsonsi* Grossfield

Drosophila (*Scaptodrosophila*) *parsonsi* Grossfield, 1976, p. 80. (Holotype in AM; type locality Wilson's Promontory, Vic.)

A large dark fly ranging from Queensland (rare) to Tasmania.

25. *Drosophila pictipennis* Kertész

Drosophila pictipennis Kertész, 1901, p. 421. (Holotype location unknown; type locality New Guinea.)

Known only from far northern Queensland and New Guinea; attracted to mushroom baits, one of only two patterned-wing Australian species in this subgenus.

26. *Drosophila rhinos* Bock & Parsons

Drosophila (*Scaptodrosophila*) *rhinos* Bock and Parsons, 1979, p. 300. (Holotype in ANIC; type locality East Cedar Creek, Qld.)

A plain brown species known only from southern Queensland.

27. *Drosophila scaptomyzoidea* (Duda)

Scaptodrosophila scaptomyzoidea Duda, 1923, p. 37. (Holotype stated as in Budapest but apparently now lost; type locality New Guinea.)

A small species known from south-east Asia, New Guinea, Queensland and New South Wales.

28. *Drosophila sydneyensis* Malloch

Drosophila sydneyensis Malloch, 1927, p. 5. (Holotype in SPHTM; type locality Sydney.)

A small black species attracted to fruit baits, *D. sydneyensis* has been collected recently in Sydney and several other parts of New South Wales; several specimens have also been collected in central (coastal) Queensland (J.S.F. Barker, personnal communication). In and about Sydney the species is not common and comprises only a small portion of all flies caught at baits.

29. *Drosophila* (*Scaptodrosophila*) *thodayi*, sp. nov. Parsons & Bock

Types

Holotype ♀: Upper Allyn River, New South Wales, swept ex foliage, 7.iii.1978, P.A. Parsons (ANIC). Paratypes: same data as holotype, 3♂, 3♀ (ANIC), 3♂, 3♀ (AM).

Distinguishing features. Body plain brown; wing with brownish tinge; egg guide of female with numerous large teeth over entire surface.

Body length. 3.4 mm (holotype); 2.8–3.5 mm (paratype range).

Head. Arista with 4 rays above and 2 rays below plus terminal fork. Breadth of front 1.1 times length; front dark tan with silveriness within ocellar triangle and about bases of orbital and vertical bristles. 2nd antennal segment tan; 3rd segment tan, slightly dusky. Carina prominent, nose-like. Face tan. Palp tan, with prominent apical bristle. Cheek slightly curved, narrow. Eye with fine sparse pile. Orbital bristles in ratio 5 : 2 : 6; anterior reclinate orbital posterolateral to proclinate orbital. Ocellar, vertical and postvertical bristles large.

Thorax. Mesonotum, scutellum and pleura entirely pale to mid brown. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 6 rows between dorsocentrals. Prescutellar bristles large. Ratio anterior : posterior dorsocentrals 0.5. Sterno-index 0.8. Haltere tan. Legs tan; preapical bristles on all tibiae (small on 1st); apical bristle present on 2nd tibia only.

Wing. Translucent with brownish tinge. *C*-index, 2.9; 4*V*-index, 2.0; 5*X*-index, 1.6; *M*-index, 0.5. 3rd costal section with heavy setation on basal 0.6. Length (holotype), 2.7 mm.

Abdomen. Mid-brownish, slightly darkening posteriorly.

Male genitalia (Figs 42, 43). Clasper small, with row of *c.* 6 marginal teeth; hypandrium with pair of submedian spines; aedeagus large, apically rounded, bare; parandrites narrow, curved, apically pointed.

Female genitalia. Egg guide large, broadly rounded apically, with numerous large teeth along margin and over entire outer surface.

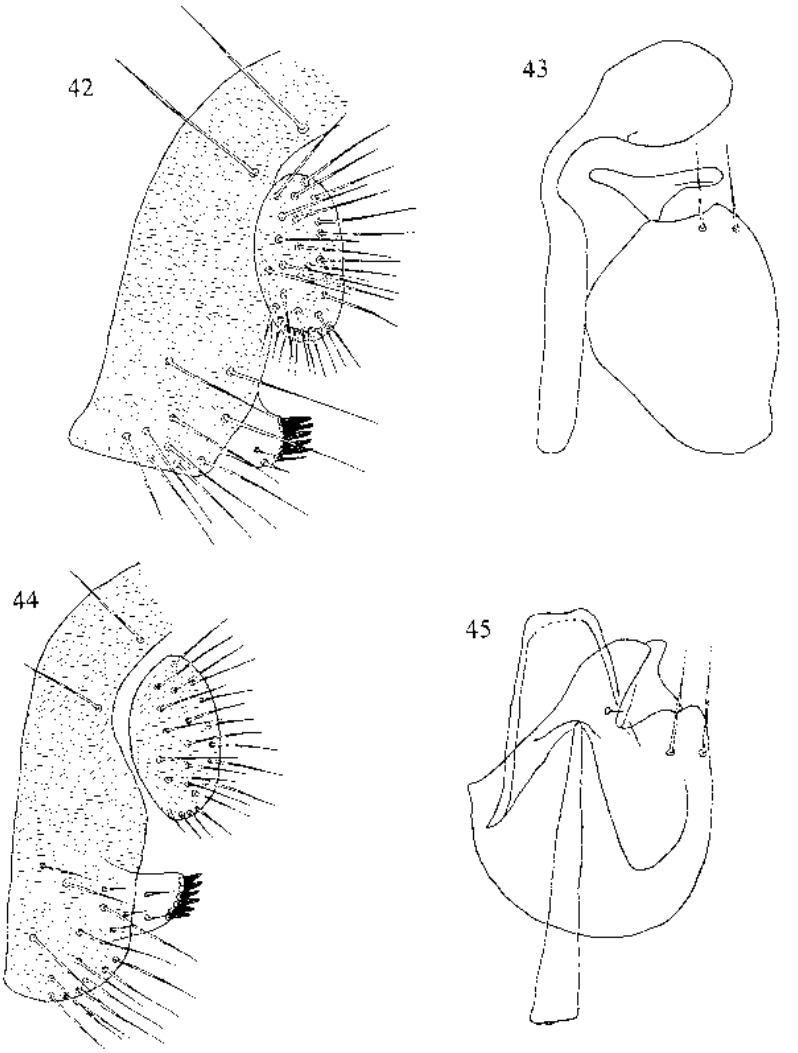
Distribution. Collected in southern and central New South Wales, and at one locality in central Queensland.

Specimens Examined

Types as above. **New South Wales:** Same data, 2♂, 1♀, same data except swept ex ferns, 2♂, 2♀, same data except fruit baited, 1♂ (LT); Nadgee Nature Reserve, rainforest, 3♀ (LT); Springwood, Blue Mountains, 10.i.1956, D.K. McAlpine, 2♀ (AM). **Queensland:** Broken River, Eungella, 9.xii.1961, McAlpine and Lossin, 1♀ (AM).

Special Comments

In general morphology and coloration *D. thodayi* is very like many other (plain brown) Australian *Scaptodrosophila* species, but the egg guide is highly distinctive and serves to identify the female with relative ease. The unusual egg guide suggests oviposition in a tough tissue, although nothing is yet known concerning the larval habitat.



Figs 42, 43. *Drosophila thodayi*: *42*, male external genitalia; *43*, male internal genitalia.
Figs 44, 45. *Drosophila vindicta*: *44*, male external genitalia; *45*, male internal genitalia.

30. ***Drosophila (Scaptodrosophila) vindicta***, sp. nov. Parsons & Bock

Types

Holotype ♂: Upper Allyn River, New South Wales, swept ex foliage, 7.iii.1978, P.A. Parsons (ANIC). Paratypes (all New South Wales): same data as holotype, 3♂,

1♀ (ANIC); Barrington Tops National Park, swept ferns, 6.iii.1978, P.A. Parsons, 2♂, 2♀ (AM), 1♀ (LT).

Distinguishing features. A plain brown species separable from others on genitalia; cf. 'Special Comments' below.

Body length. 2.5 mm (holotype); 2.5–3.0 mm (paratype range).

Head. Arista with 3 rays above and 2 rays below plus terminal fork. Breadth of front 1.15 times length; front tan, periorbits slightly paler; ocellar triangle with trace of darkening. 2nd and 3rd antennal segments tan. Carina prominent, nose-like, slightly flattened. Face and palp tan. Cheek slightly curved, rather narrow. Eye with sparse very fine pile. Orbital bristles in ratio 6 : 3 : 8; anterior reclinate orbital lateral and slightly posterior to proclinate orbital. Ocellar, vertical and postvertical bristles large.

Thorax. Mesonotum, scutellum, pleura and haltere tan. Acrostichal hairs in 8 rows in front of dorsocentral bristles, *c*. 4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Sterno-index 0.7. Legs tan; preapical bristles on all tibiae; apical bristle on 2nd tibia only.

Wing. Translucent with weak brownish tinge. *C*-index, 2.8; 4*V*-index, 2.1; 5*X*-index, 1.7; *M*-index, 0.6. 3rd costal section with heavy setation on basal 0.6. Length (holotype), 2.3 mm.

Abdomen. Tan, a little darker posteriorly.

Male genitalia (Figs 44, 45). Clasper rather small, with row of black marginal teeth; hypandrium with prominent submedian spines; aedeagus large, without ornamentation; parandrites large.

Female genitalia. Egg guide with row of strong (but not contiguous) marginal teeth, several teeth above latter apically, and several apical hairs.

Distribution. Known from the two New South Wales localities given above.

Special Comments

This species is one of a number of plain brown *Scaptodrosophila* species which are very difficult to distinguish from one another without reference to (and in some cases dissection of) genitalia. *D. vindicta* is close to *D. mania* but distinguishable from the latter by its smaller carina, *vindicta* is also similar to the following species and indeed to all plain brown species in its size range.

31. *Drosophila* (*Scaptodrosophila*) *horrifica*, sp. nov.

Types

Holotype ♂: Springwood, Blue Mountains, New South Wales, 10.i.1956, D.K. McAlpine (AM). Paratypes: same data as holotype, 2♂, 5♀ (AM).

Distinguishing features. Very similar to preceding species but distinguishable from latter on male genitalia.

Body length. 2.9 mm (holotype); 2.3–2.9 mm (paratype range).

Head. Arista with 4 rays above and 2-3 rays below plus terminal fork. Breadth of front equal to length; front dark tan; periorbits and ocellar triangle slightly silvery. 2nd and 3rd antennal segments tan. Carina very prominent, nose-like but flattened anteriorly. Face and palp tan. Cheek moderately broad, slightly curved. Eye with trace of very fine pile. Orbital bristles in ratio 5 : 2 : 7; anterior reclinate orbital posterolateral to proclinate orbital. Ocellar and vertical bristles large; postverticals moderately large.

Thorax. Mesonotum, scutellum, pleura and haltere tan. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4 rows between dorsocentrals. Prescutellar bristles large. Ratio anterior : posterior dorsocentrals 0.5. Sterno-index 0.7. Legs tan; preapical bristles on all tibiae (weak on 1st); apical bristle on 2nd tibia only.

Wing. Almost hyaline. *C*-index, 3.1; 4*V*-index, 1.7; 5*X*-index, 1.4; *M*-index, 0.45. 3rd costal section with heavy setation on basal 0.7. Length (holotype), 2.7 mm.

Abdomen. Dark tan.

Male genitalia (Figs 46, 47). Clasper rather large, with row of marginal teeth becoming smaller below; hypandrium with pair of close, small submedian spines; aedeagus and parandrites small.

Female genitalia. Egg guide large, with row of large (but not contiguous) marginal teeth, a few teeth above latter, and a few apical hairs.

Distribution. Known from two localities in New South Wales.

Specimens Examined

Types as above. New South Wales: Mooney Mooney Creek, near Gosford, 25.xi.1975, D.K. McAlpine, 2♂, 2♀ (AM).

Special Comments

There are minor differences between this species and *D. vindicta* in details such as number of rays in the arista, ratio of breadth of front to length, etc., but the species is very similar to *vindicta* in size, general morphology and female genitalia although the male genitalia are quite distinctive.

32. *Drosophila* (*Scaptodrosophila*) *nausea*, sp. nov.

Types

Holotype ♀: Springwood, Blue Mountains, New South Wales, 30.i.1956, D.K. McAlpine (AM). Paratypes (all New South Wales; all AM): same data as holotype, 3♀; Wentworth Falls, Blue Mountains, D.K. McAlpine, 2.ii.1957, 2♂, 3♀; Bowen's Creek, Blue Mountains, 14.xii.1956, D.K. McAlpine, 1♂.

Distinguishing features. A large plain brown fly, distinguishable from other similar species on genitalia.

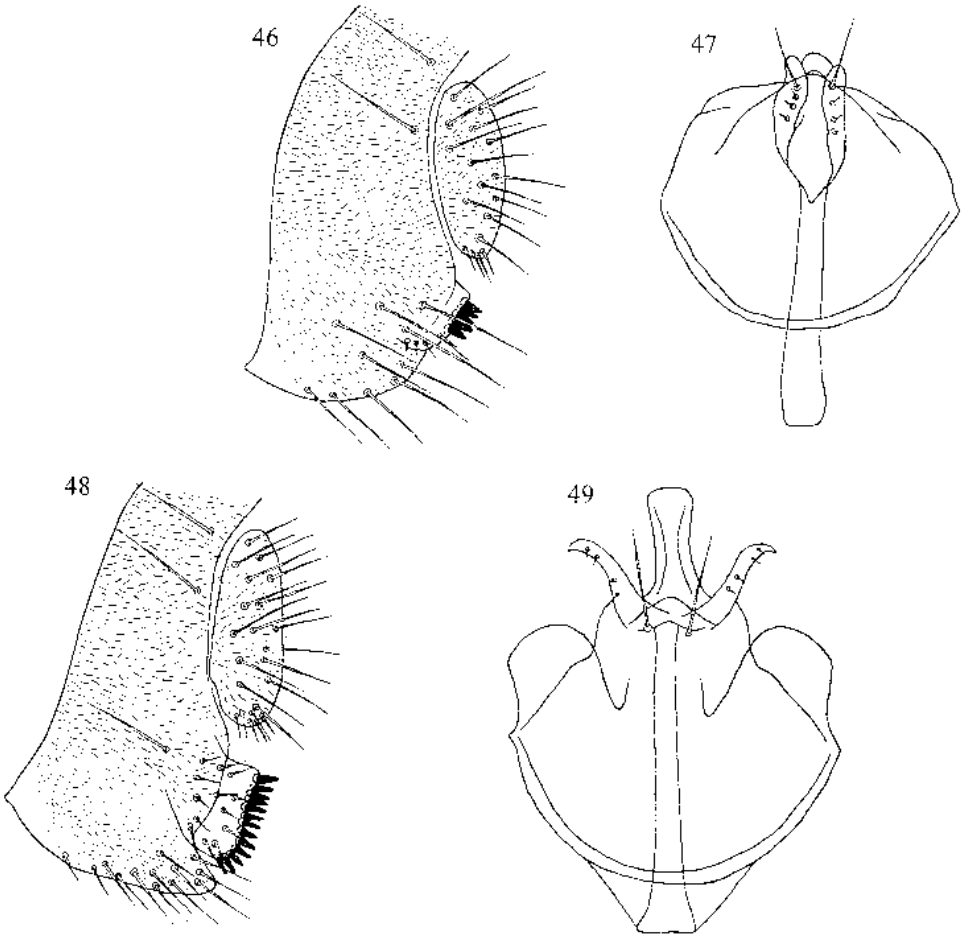
Body length. 4.1 mm (holotype); 3.6–4.6 mm (paratype range).

Head. Arista with 5 rays above and 3 below plus terminal fork. Breadth of front 0.9 times length; front dark tan; periorbits paler; ocellar triangle slightly darkened. 2nd antennal segment tan; 3rd segment dark tan, faintly dusky. Carina very strong, rather broad, flat. Face and palp tan. Cheek slightly curved, rather narrow. Eye with sparse very fine pile. Posterior reclinate orbital bristle slightly longer than proclinate

orbital; anterior reclinate orbital *c.* ⅓ length of proclinate orbital, posterolateral to latter. Ocellar, vertical and postvertical bristles large.

Thorax. Mesonotum, scutellum, pleura and haltere dark tan. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Prescutellar bristles large. Ratio anterior : posterior dorsocentrals 0.5–0.6. Sterno-index 0.7. Legs tan; preapical bristles on all tibiae (weak on 1st); apical bristle on 2nd tibia only.

Wing. Weakly dusky. *C*-index, 3.2; 4*V*-index, 1.8; 5*X*-index, 1.5; *M*-index, 0.5. 3rd costal section with heavy setation on basal 0.6. Length (holotype), 3.9 mm.



Figs 46, 47. *Drosophila horrifica*: *46*, male external genitalia; *47*, male internal genitalia.
Figs 48, 49. *Drosophila nausea*: *48*, male external genitalia; *49*, male internal genitalia.

Abdomen. Tergites tan, dusky posteriorly.

Male genitalia (Figs 48, 49). Clasper with row of very strong black teeth along margin; hypandrium with small, close submedian spines; aedeagus cylindrical, bare; parandrites large, apically curved and pointed.

Female genitalia. Egg guide large and broad but without teeth, with a few short hairs only.

Distribution. Recorded from the Blue Mountains and from near Gosford, N.S.W.

Specimens Examined

Types as above. New South Wales: Mooney Mooney Creek near Gosford, 20.xi.1975–3.xii.1976, D.K. McAlpine, 6♀ (AM).

Special Comments

In male genitalia this species is reminiscent of *D. ehrmanae*, and the two may be related, but *nausea* lacks the wing infuscation of *ehrmanae* and the female genitalia of the two species are also quite different.

33. *Drosophila* (*Scaptodrosophila*) *kennedyi*, sp. nov.

Types

Holotype ♀: Claudie River near Mt Lamond, Queensland, ex malaise trap, 14.xii.1971, D.K. McAlpine, G.A. Holloway and D.P. Sands (AM). Paratype ♀: same data as holotype but 18.xii.1971 (AM).

Distinguishing features. Body small, pale tan; carina strong, *C*-index low.

Body length. 2.0 mm (both types).

Head. Arista large, with 4 rays above and 2 rays below plus terminal fork. Breadth of front equal to length; front pale tan; periorbits and ocellar triangle slightly silvery. 2nd and 3rd antennal segments tan. Carina prominent, nose-like. Face pale tan. Palp tan, with a few strong bristles on outer edge. Cheek linear, rather narrow. Eye with thick fine black pile. Orbital bristles in ratio 5 : 2 : 5; anterior reclinate orbital lateral and slightly anterior to proclinate orbital. Ocellar, vertical and postvertical bristles well developed.

Thorax. Mesonotum and scutellum pale tan with faintly silvery appearance. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4 rows between dorsocentrals. Prescutellar bristles appreciably weaker than anterior dorsocentrals. Ratio anterior : posterior dorsocentrals 0.7. Pleura and haltere tan. Sterno-index 0.7. Propleural bristle prominent. Legs tan; preapical bristles on 2nd and 3rd tibiae; apical bristle on 2nd tibia only.

Wing. Hyaline. *C*-index, 1.2; 4*V*-index, 2.1; 5*X*-index, 2.0; *M*-index, 0.7. 3rd costal section with heavy setation on basal 0.65. Length, 1.8 mm.

Abdomen. Discoloured in both types but apparently tan.

Female genitalia. Egg guide large, broadly rounded apically, with a few weak apical marginal teeth.

Distribution. Known only from type locality.

Special Comments

This species is easily distinguishable from the southern Australian plain brown *Scaptodrosophila* species by its paler coloration and hyaline wing, as are the following two species, which are rather similar to *kennedyi* but lack well developed carinas.

34. *Drosophila* (*Scaptodrosophila*) *jackeyi*, sp. nov.

Types

Holotype ♀: Claudie River near Mt Lamond, Queensland, 20.xii.1971, D.K. McAlpine, G.A. Holloway and D.P. Sands (AM). Paratype ♀: same data as holotype except 18.xii.1971 (AM).

Distinguishing features. Body small, tan; carina rudimentary; *C*-index high (cf. following species).

Body length. 2.5 mm (holotype); 2.4 mm (paratype).

Head. Arista rather small, with 3 rays above (basal 2 apically curved) and 1 straight ray below plus terminal fork. Breadth of front equal to length; front tan; periorbits and ocellar triangle silvery. 2nd and 3rd antennal segments tan. Carina barely evident as low hump above, entirely obsolete below. Face pale tan. Palp tan, with several apical and subapical bristles. Cheek almost linear, rather narrow. Eye with dense short black pile. Orbital bristles in ratio 2 : 1 : 2; anterior reclinate orbital posterior and slightly lateral to proclinate orbital. Ocellar, vertical and postvertical bristles well developed.

Thorax. Mesonotum, scutellum, pleura and haltere tan. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4 rows between dorsocentrals. Prescutellar bristles as large as anterior dorsocentrals, latter close to posterior dorsocentrals and 0.6 length of latter. Sterno-index 0.6. Legs tan; preapical bristles on all tibiae; apical bristle on 2nd tibia only.

Wing. Hyaline. *C*-index, 3.4; 4*V*-index, 1.7; 5*X*-index, 1.5; *M*-index, 0.5. 3rd costal section with heavy setation on basal 0.5. Length (holotype), 2.0 mm.

Abdomen. Somewhat discoloured in both types but apparently entirely pale tan.

Female genitalia. Egg guide large, very strongly sclerotized, broadly rounded apically, with very strong (but not contiguous) ventral teeth.

Distribution. Known only from type locality.

Special Comments

Superficially this species resembles the members of the *inornata* group in lacking a carina, but the latter species lack the propleural bristle otherwise characteristic of *Scaptodrosophila* species including *jackeyi*. The following species is rather similar to *jackeyi* and possibly closely related.

35. *Drosophila* (*Scaptodrosophila*) *brunnotata*, sp. nov. S.F. McEvey

Type

Holotype ♀: Uhr Creek-Mulgrave River junction, 13 km SW. of Gordonvale, north Queensland, swept in rainforest, 26.iv.1980, S.F. McEvey (AM).

Distinguishing features. Body small, pale tan; mesonotum with darker submedian bands; carina very weakly developed.

Body length. 1.7 mm.

Head. Arista small, with 3 rays above and 3 rays below plus terminal fork. Breadth of front 1.2 times length; front pale yellowish tan; periorbits slightly silvery; ocellar

triangle weakly darkened. 2nd and 3rd antennal segments pale tan. Carina weakly developed, low, rounded. Cheek curved, narrow. Eye with very sparse, very fine pile. Orbital bristles in ratio 3 : 1 : 3; anterior reclinate orbital lateral and slightly posterior to proclinate orbital. Ocellar, vertical and postvertical bristles well developed.

Thorax. Mesonotum pale tan with dark diffusely bordered submedian band on each side, band thickened anterolaterally and diminishing posteriorly, not extending beyond level of anterior dorsocentral bristle, both bands separated by 6 rows of acrostichal hairs, latter in 6 rows in front of dorsocentral bristles, sparse and irregular between dorsocentrals. Prescutellar bristles weaker than anterior dorsocentrals. Ratio anterior : posterior dorsocentrals 0.5. Pleura pale tan. Sterno-index 0.6. Haltere tan. Legs tan; preapical bristles on all tibiae; apical bristle on 2nd tibia only. Propleural bristle present.

Wing. Hyaline. *C*-index, 1.7; 4*V*-index, 2.5; 5*X*-index, 2.1; *M*-index, 0.8. 3rd costal section with heavy setation on basal 0.65. Length, 1.7 mm.

Abdomen. Entirely pale tan.

Female genitalia. Egg guide strong, elongate and narrowly rounded apically, with small marginal teeth.

Distribution. Known only from holotype.

Special Comments

This species shows a superficial resemblance to members of the *inornata* species-group, but the carina is at least weakly developed and a propleural bristle is present, which suggests that the resemblance is due to convergence (cf. also preceding species).

Species not Assigned to Subgenus

Drosophila teratos, sp. nov.

Type

Holotype ♂: National Park, New South Wales, 3.xi.1956, D.K. McAlpine (AM).

Distinguishing features. Body rather large, pale brown; wing brownish; carina low, high; arista with single ventral ray; fore-femur with row of strong shaggy bristles.

Body length. 3.6 mm.

Head. Arista with 5 rays above and 1 ray below; all rays almost straight; ventral ray arising from axis apical to all dorsal rays; terminal fork large. Breadth of front 0.95 times length; front large, flat, tan, with microchaetae anteriorly; ocellar triangle small, weakly blackened. 2nd and 3rd antennal segments dark tan. Carina low, smoothly rounded, obsolete below. Face pale tan. Palp tan, with rather weak apical bristle. Cheek almost linear, moderately broad (width in posterior corner *c*. 0.2 times greatest eye diameter). Vibrissa single, very strong; following oral bristles very small. Eye oval, greatest diameter oblique (at acute angle to vertical); eye with sparse pile. Orbital bristles in ratio *c*. 3 : 1 : 3, well spaced and in line; anterior reclinate orbital closer to posterior reclinate than to proclinate orbital. Ocellar, vertical and postvertical bristles large.

Thorax. Mesonotum, scutellum, pleura and haltere tan. Acrostichal hairs in 8–10 rather irregular rows in front of dorsocentral bristles, 6–8 rows between dorsocentrals. Prescutellar bristles absent. Ratio anterior : posterior dorsocentrals 0.6. Anterior and posterior scutellar bristles subequal; anterior scutellars convergent; posterior scutellars crossed. Propleural bristle absent. Anterior sternopleural bristle short, rather weak; posterior sternopleural strong; middle sternopleural absent; sternopleuron with a few fine hairs in addition to macrochaetae. Legs tan; fore-coxa large, with prominent bristle on outer side; fore-femur swollen, with ventromedial row of very strong shaggy bristles; preapical bristle on 3rd tibia only; apical bristle on 2nd tibia only.

Wing. Brownish, more intensely apically. *C*-index, 3.0; 4*V*-index, 1.4; 5*X*-index, 1.5; *M*-index, 0.4. 3rd costal section with heavy setation on basal 0.45. Length, 3.8 mm.

Abdomen. Tergite 1 tan. Tergites 2–5 each tan anteriorly, with weakly darkened apical band of uniform width. Tergite 6 tan, slightly darker posteriorly.

Distribution. Known only from holotype.

Special Comments

This species is not unequivocally assignable to any of the major *Drosophila* subgenera, although it appears closest to *Hirtodrosophila* in possessing a single vibrissa, a low, weak carina, and weak anterior reclinate orbital and anterior sternopleural bristles, and in lacking prescutellar and propleural bristles. The species is very unusual in possessing a row of shaggy bristles on the fore-femur (cf. *Chymomyza* above) in a position occupied by the 'femoral comb' of members of the *immigrans* group of the subgenus *Drosophila*, but the species is not otherwise assignable to the latter subgenus. The brown coloration of body and wing is strongly reminiscent of many species of *Scaptodrosophila*, but the present species is excluded from this subgenus by its lack of prescutellar, propleural and middle sternopleural bristles. The arrangement of orbital bristles is unusual for the genus *Drosophila*; the anterior reclinate orbital is typically closer to the proclinate than to the posterior reclinate orbital.

Key to Australian Species of *Drosophila*

The following key attempts to separate the 122 species of *Drosophila* discussed above.

There are clear problems in constructing a key to separate species which can only be reliably distinguished by reference to features of male morphology, or to male genitalia, and two groups of species are included in these categories. Many species of the *melanogaster* group (subgenus *Sophophora*) are not reliably separable without reference to males, but the structure of the sex-comb and the abdominal coloration are sufficiently distinctive in some cases to permit specific recognition, while in others reference must also be made to the male genitalia. A different problem exists with the 'plain brown' species of the subgenus *Scaptodrosophila* in which there are no sexual dimorphisms. Specific determination is only reliably effected in many of these species by reference to genitalia, but in some instances the female genitalia are also distinctive. In several couplets in the following key references are therefore made to genitalia for separation of species.

1. Vibrissa single; carina, if present, not sulcate 2
   2nd oral bristle > ½ length of 1st, often almost as large as 1st; if vibrissa single, carina large, with shallow median sulcus 4

2(1). With 1, 2 or (usually) all 3 of the following characters: prescutellar acrostichal bristles considerably enlarged; sternopleural bristles (anterior, middle and posterior) all large; propleural bristle present (subgenus *Scaptodrosophila*) 56
Prescutellar acrostichals not enlarged; anterior and middle sternopleural bristles, and anterior reclinate orbital bristle, usually small and fine; propleural bristle absent 3

3(2). Fore-femur with ventromedial row of strong shaggy bristles ..... *teratos*
Fore-femur without ventromedial row of shaggy bristles (subgenus *Hirtodrosophila*) 35

4(1). Apical bands on anterior abdominal tergites usually interrupted in midline; cheek often broad; fore-femur in some species with ventromedial row of short stout black setulae (femoral comb) (subgenus *Drosophila*) 5
Apical bands on abdominal tergites continuous; cheek usually narrow; femoral comb absent (subgenus *Sophophora*) 16

5(4). Mesonotum with longitudinal stripes 6
Mesonotum without longitudinal stripes 7

6(5). Mesonotum tan with dark median posteriorly bifid stripe, and additional lateral stripes ..... *busckii*
Mesonotum velvety brown with dark stripes of uniform width; 4 pairs of dorsocentral bristles present ..... *pseudotetrachaeta*

7(5). Thoracic bristles arising from dark spots; carina more or less sulcate 8
Thoracic bristles not arising from dark spots; carina not, or barely sulcate 11

8(7). 3rd costal section with heavy setation on basal 0.3; *M*-index *c.* 0.5–0.6; smaller species (body length $<$ 3.0 mm) 9
3rd costal section with heavy setation on basal 0.4; *M*-index *c.* 0.4; larger species (body length *c.* 3.5 mm or more) 10

9(8). 4*V*-index *c.* 1.7; costa not greatly darkened at distal incision; testes orange ..... *buzzatii*
4*V*-index *c.* 2.0; costa distinctly darkened at distal incision; testes yellow ..... *aldrichi*

10(8). Abdomen with lateral yellow spots; *C*-index *c.* 3.0; greatest width of cheek *c.* 0.25 times greatest eye diameter ..... *repleta*
Abdomen without lateral yellow spots; *C*-index *c.* 3.3; greatest width of cheek *c.* 0.35 times greatest eye diameter ..... *hydei*

11(7). Femoral comb absent; anterior reclinate orbital bristle lateral or posterolateral to proclinate orbital 12
Femoral comb present (weak in *rubida*); anterior reclinate orbital posterior and slightly lateral to proclinate orbital (all 3 bristles almost in line) 14

12(11). 3rd costal section with heavy setation on basal *c.* 0.5 ..... *funebris*
3rd costal section with heavy setation on basal 0.8 or more 13

13(12). 3rd costal section with heavy setation on basal 0.8; body mid-brownish; wing with weak infuscation ..... *persicae*
3rd costal section with heavy setation on basal 0.9; body dark brown; wing with moderate to strong infuscation ..... *sinuata*

14(11). Femoral comb weak, setulae sparse; testes red; male abdomen entirely black apically ..... *rubida*
Femoral comb strongly developed; testes yellow; male abdomen not entirely black apically 15

15(14). 3rd costal section with heavy setation on basal 0.2–0.3; greatest width of cheek *c.* 0.3 times greatest eye diameter; abdominal bands strong ..... *immigrans*
3rd costal section with heavy setation on basal 0.5; greatest width of cheek *c.* 0.15 times greatest eye diameter; abdominal bands weak ..... *sulfurigaster*

16(4). Entire body, and all bristles, hairs and arista, translucent yellowish; male without sex-comb ..... *flavohirta*
Coloration not as above; bristles and arista black 17

17(16). Male with distinct sex-comb consisting of either longitudinal, transverse or oblique row(s) of strong black bristles on fore-tarsus 25
Male without sex-comb, or with tarsal modification not as above 18

18(17). Male fore-tarsus with medial bushy clusters of hairs 19
Male fore-tarsus without medial bushy clusters of hairs 21

19(18). First 2 tarsal segments of male foreleg with bushy hairs ..... *scopata*
First 3 tarsal segments of male foreleg with bushy hairs 20

20(19). First 3 tarsal segments subequal in length, with dense mops of hairs ..... *pinnitarsus*
Metatarsus longer than next 2 tarsal segments together, with narrow brushes of hairs ..... *progastor*

21(18). Male fore-femur plump, considerably broader than tibia, with numerous fine bristles ... 22
Male fore-femur not as above 24

22(21). Male fore-metatarsus with 2–3 large claw-like apical teeth; body yellowish, apical bands on abdominal tergites distinct ..... *denticulata*
Male fore-metatarsus without large teeth as above; body dark brown 23

23(22). Male external genitalia with long slender curved finger-like process arising from genital arch; female egg guide with slender apical finely toothed extension ..... *dispar*
Male external genitalia without long slender curved finger-like process, with short almost straight process; female egg guide broadly rounded apically, without marginal teeth ..... *prodispar*

24(21). Male fore-metatarsus with 2 long apical bristles and numerous recurved hairs along entire length of tarsus; male abdomen apically truncated, black ..... *eugracilis*
Male fore-metatarsus without sex-comb or special bristles; male abdomen apically rounded, yellowish ..... *ironensis*

25(17). Sex-comb longitudinal along entire lengths of metatarsus and 2nd tarsal segment 26
Sex-comb in oblique or transverse row(s) 30

26(25). Teeth of sex-comb in 2 sets; shorter contiguous teeth and sparse, considerably longer bristles below former ..... *smithersi*
Sex-comb consisting of short contiguous teeth only 27

27(26). 6th abdominal tergite of male abdomen black ..... sp. cf. *jambulina*
6th abdominal tergite of male abdomen tan 28

28(27). Secondary clasper of male external genitalia with 3 medial black bristles ..... *birchii*
Secondary clasper of male external genitalia with 2 medial black bristles 29

29(28). Medial bristles on secondary clasper subequal ..... *serrata*
Upper medial bristle on secondary clasper appreciably smaller than lower bristle ..... *kikkawai*

30(25). Sex-comb of male consisting of oblique row(s) of teeth on lower part of metatarsus 31
Sex-comb of male consisting of transverse rows of bristles on first 2 tarsal segments 33

31(30). Sex-comb with additional 1–2 bristles apically on 2nd tarsal segment; male abdomen pale apically ..... *bipectinata*
Sex-comb without additional bristle(s) on 2nd tarsal segment; male abdomen black apically 32

32(31). Posterior margin of genital arch with large protuberant discoid process; greatest width of cheek *c.* 0.18 times greatest eye diameter ..... *simulans*
Posterior margin of genital arch with small process; greatest width of cheek *c.* 0.25 times greatest eye diameter ..... *melanogaster*

33(30). Abdomen of male apically black ..... *pseudotakahashii*
Male abdomen pale, all tergites with slightly darker apical bands 34

34(33). Sex-comb consisting of 2 rows of bristles on metatarsus and 1 row on 2nd tarsal segment ..... *pseudoananassae*
Sex-comb consisting of 5 rows of bristles on metatarsus and 3–4 rows on 2nd tarsal segment ..... *ananassae*

35(3). Wing patterned 36
Wing clear or infuscated but without distinct pattern 38

36(35). Wing with large apical dark patch bordering small clear circular area between 3rd and 4th longitudinal veins; 2nd longitudinal vein terminating in clear area ..... *polypori*
Wing with weak coloration about terminal portions of 3rd and 4th veins; 2nd vein terminating in large black spot 37

37(36). Pleura entirely pale tan below level of wing articulation ..... *mycetophaga*
Pleura with dark longitudinal band in middle region and dark spot on sternopleuron ..... *hannae*

38(35). Mesonotum tan with large anterior oak-leaf-shaped dark area ..... *jacobsoni*
Mesonotum without above pattern 39

39(38). 3rd antennal segment with several exceptionally long hairs in addition to usual pubescence 40
3rd antennal segment without exceptionally long hairs 47

40(39). Mesonotum largely very dark blackish brown (paler laterally) 41
Mesonotum tan to mid-brownish or reddish brown 42

41(40). Cheek exceptionally broad (greatest width *c.* 0.25 times greatest eye diameter) but tapered below ..... *baechlii*
Cheek not unusually broad (greatest width *c.* 0.15 times greatest eye diameter), not appreciably tapered below ..... *laureiae*

42(40). Cheek broad (greatest width *c.* 0.25 or more times greatest eye diameter) 43
Cheek narrow (greatest width *c.* 0.15 or less times greatest eye diameter) 45

43(42). *C*-index *c.* 1.2 ..... *reilliana*
C-index *c.* 1.7–1.8 44

44(43). 3rd antennal segment with *c.* 6 very long hairs; anterior reclinate orbital bristle *c.* 0.4 length of posterior reclinate orbital ..... *lamingtoni*
3rd antennal segment with *c.* 8 very long hairs; anterior reclinate orbital bristle *c.* 0.25 length of posterior reclinate orbital ..... *macalpinei*

45(42). Mesonotum tan ..... *hirtominuta*
Mesonotum mid-brownish 46

46(45). 3rd costal section with heavy setation on basal 0.9 ..... *trifurca*
3rd costal section with heavy setation on basal 0.65 ..... *hirudo*

47(39). Carina developed along entire length of face ..... *whianensis*
Carina, if present, confined to upper part of face 48

48(47). Pleura dark brown above abruptly changing to pale tan below ..... *mixtura*
Pleura not uniformly pale tan below 49

49(48). Mesonotum brown with whitening on humeral calli ..... *tricolora*
Humeral calli not white 50

50(49). Wing with well developed brownish tinge 51
Wing hyaline or faintly brownish only 52

51(50). Carina developed but very narrow on upper part of face ..... *borboros*
Carina very low between antennal bases, entirely obsolete below ..... *donaldi*

52(50). Wing slightly dusky; *C*-index *c.* 3.2 ..... *allynensis*
Wing hyaline or slightly dusky; *C*-index *c.* 1.0 53

53(52). Pleura with distinct broad black longitudinal band ..... *zentae*
Pleura with or without darkening but without distinct longitudinal band 54

54(53). Arista with 2–3 rays above and 1–2 rays below ..... *palumae*
Arista with 4 rays above and 2–3 rays below 55

55(54). Body entirely pale tan ..... *junae*
Mesonotum dark tan; pleura dark tan with diffuse infuscation ..... *durantae*

56(2). Wing patterned 57
Wing hyaline or infuscated but without pattern 58

57(56). Wing with black coloration anteriorly and about posterior crossvein; mesonotum tan ..... *pictipennis*
Wing with extensive pattern of coalescing or almost coalescing dark patches and spots; mesonotum patterned ..... *fumida*

58(56). Carina at most rudimentary between antennal bases 59
Carina developed: low, prominent or very prominent 66

59(58). Mesonotum unicolorous, or with more or less uniform pollinosity 60
Mesonotum patterned 64

60(59). Mesonotum dull black with superimposed pollinosity; pleura dusky with trace of greenish tinge ..... *fuscithorax*
Mesonotum and pleura brown 61

61(60). Wing with deep brownish tinge ..... *collessi*
Wing hyaline or with faint brownish tinge 62

62(61). Propleural bristle present ..... *jackeyi*
Propleural bristle absent 63

63(62). Medial margin of clasper of male external genitalia almost straight; aedeagus narrow ..... *inornata*
Medial margin of clasper appreciably curved; aedeagus swollen basally ..... *grossfieldi*

64(59). Mesonotum pale, each bristle arising from dark spot ..... *obsoleta*
Mesonotum striped or patterned but without spots as above 65

65(64). Mesonotum brownish with paler longitudinal stripes; arista consisting only of axis plus long dorsal ray ..... *nicholsoni*
Mesonotum pale with median longitudinal dark stripe; arista with several rays ..... *rhabdote*

66(58). Mesonotum more or less patterned, with stripes, spots or diffusely demarcated patches differing from background coloration 67
Mesonotum unicolorous, pale to dark 79

67(66). Mesonotum predominantly pale, with dark longitudinal stripe(s) or band(s) extending entire length 68
Mesonotum otherwise patterned 72

68(67). Mesonotum with median longitudinal stripe or band 69
Mesonotum with submedian stripes or bands 71

69(68). Median longitudinal band *c.* breadth of middle 4 rows of acrostichal bristles; carina unicolorous 70
Median longitudinal band 2–4 rows of acrostichals broad; carina pale tan with dark transverse stripe ..... *paracultello*

70(69). Arista exceedingly large, fan-like, with very long rays ..... *cultello*
Arista normal ..... *enigma*

71(68). Mesonotum with 2 complete longitudinal bands and 2 shorter bands lateral to these ..... *variata*
Mesonotum with 4 complete longitudinal stripes and 2 short stripes lateral to these ..... *eluta*

72(67). Mesonotum tan with dark submedian bands anteriorly ..... *brunnotata*
Mesonotum otherwise patterned 73

73(72). Mesonotum with median longitudinal stripe or band extending entire length 74
Mesonotum otherwise patterned 76

74(73). Mesonotum with broad dark median band narrowly separated from lateral dark areas by paler stripes, latter not clearly demarcated ..... *brunnea*
Mesonotum not as above, with narrower median band 75

75(74). Mesonotum with whitish median stripe between middle 2 rows of acrostichals and additional lateral whitish markings ..... *lativittata*
Mesonotum with greyish median stripe enclosing middle 4 rows of acrostichals and additional lateral greyish markings ..... *enigma*

76(73). Mesonotum silvery pollinose, most bristles arising from small dark spots ..... *glauca*
Bristles on mesonotum not arising from dark spots 77

77(76). Mesonotum dusky brown with 2 pairs of pale spots anteriorly in extended lines of dorsocentral bristles and additional lateral pale spots ..... *novamaculosa*
Mesonotum without pale spots as above 78

78(77). Mesonotum dark brown with irregular diffuse paler silvery patches ..... *oncera*
Mesonotum mid-brown with pattern of paler longitudinal streaks ..... *cancellata*

79(66). Arista consisting only of axis with large terminal fork plus single short straight dorsal ray ..... *moana*
Arista with several rays 80

80(79). Front densely hirsute; frontal macrochaetae strongly reduced, anterior reclinate orbital bristle barely distinguishable from other bristles in row along orbital margin; small dark species ..... *hibisci*
Frontal macrochaetae not greatly reduced 81

81(80). Anterior scutellar bristles weak, *c.* 0.5 length of posterior scutellars 82
Anterior and posterior scutellar bristles subequal 83

82(81). Abdomen almost entirely black, tergites 2–3 only narrowly paler anteriorly ..... *bryani*
Abdominal tergites 2–4 pale anteriorly and centrally, blackish posterolaterally ..... *ellenae*

83(81). Mesonotum glossy, black or very dark blackish brown 84
Mesonotum pale tan to dark brown, latter dull to subshining 88

84(83). *C*-index *c.* 3.0 ..... *nitidithorax*
C-index < 2.0 85

85(84). *C*-index *c.* 1.0 86
C-index 1.5–1.8 87

86(85). Prescutellar bristles very much weaker than anterior dorsocentrals ..... *fungi*
Prescutellar bristles larger than anterior dorsocentrals ..... *metaxa*

87(85). Front tan in anterior ¼, black in posterior ¾; abdomen entirely black ..... *altera*
Front tan anteriorly and in bands extending posteriorly between ocellar triangle and periorbits; abdomen black with small central basal tan patch ..... *sydneyensis*

88(83). Body entirely pale yellowish tan, all bristles strongly yellowish; eye with slight greenish tinge ..... *anthemon*
Body and bristles not as above, if body entirely pale brown, bristles not or only slightly yellowish; eye without greenish tinge 89

89(88). Scutellum with several marginal microchaetae in addition to usual 4 bristles ... *novoguineensis*
Scutellum without additional microchaetae 90

90(89). Anterior abdominal tergites with broad dark apical bands narrowly interrupted in midline 91
Anterior abdominal tergites unicolorous or with continuous apical bands 92

91(90). Apical bands on tergites 3 and 4 not greater than ½ length of tergites ..... *specensis*
Apical bands on tergites 3 and 4, ¾ or more times length of tergites ..... *howensis*

92(90). Middle sternopleural bristle much smaller than anterior sternopleural 93
Middle sternopleural bristle large 94

93(92). Mesonotum tan; prescutellar bristles well developed ..... *kennedyi*
Mesonotum with dense greenish brown bloom; prescutellar bristles very weak ..... *oweni*

94(92). Mesonotum dark brown or blackish brown 95
Mesonotum paler, tan to mid-brownish 96

95(94). Cheek very narrow, only thin line separating oral bristles from eye ..... *parsonsi*
Cheek rather broad ..... *subnitida*

96(94). Mesonotum mid-brownish anteriorly, darker posteriorly and on scutellum; abdomen black; *C*-index *c.* 1.7 ..... *dichromos*
Mesonotum and abdomen without above coloration 97

97(96). *C*-index < 1.5 98
C-index > 2.0 100

98(97). Abdominal tergites with black markings ..... *mossmana*
Abdomen entirely tan 99

99(98). Dorsal margin of hypandrium deeply scalloped on either side of midline, median portion projecting, bearing 2 large bristles ..... *minimeta*
Dorsal margin of hypandrium not scalloped, median portion somewhat projecting, with 2 moderately large bristles ..... *bushi*

100(97). *C*-index > 4.0; small yellowish tan species ..... *scaptomyzoidea*
C-index *c.* 3.6 or less 101

101(100). Fringe of heavy bristles on 3rd costal section almost entire ..... *fimbriata*
3rd costal section with heavy bristles on basal 0.8 or (usually) less 102

102(101). Wing with infuscation, clearly more intense along costal margin, apically, and about posterior crossvein; large species ..... *ehrmanae*
Wing infuscation, if present, uniform or almost uniform 103

103(102). Body large (length > 4.0 mm); cheek broad; carina very large, flat; wing with strong brownish tinge 104
Without above combination of characters 105

104(103). Arista with 4–5 rays above and 2–3 rays below plus terminal fork; carina broadest at lowermost portion, almost squared below; egg guide pointed apically ..... *brunneipennis*
Arista with 3 rays above and 2 rays below; carina slightly broader above lowermost postion, tapering below towards clypeal margin; egg guide broadly rounded apically ..... *notha*

105(103). Arista with single ventral ray in addition to terminal fork 106
Arista with 2 or more ventral rays 109

106(105). Carina very low, smoothly rounded ..... *jackeyi*
Carina very prominent 107

107(106). Body yellowish; *C*-index *c.* 2.2 ..... *crocata*
Body tan; *C*-index *c.* 3.0 108

108(107). Cheek appreciably widened in posterior corner; aedeagus very strongly sclerotized, strongly recurved apically, subapically with arrow-like head ..... *megagenys*
Cheek not greatly widened in posterior corner; aedeagus simple, without narrow recurved apex ..... *exemplar*

109(105). Male external genitalia with strong black teeth, either on separate articulated clasper or on margin of genital arch 110
Male external genitalia entirely without strong black teeth; small clasper present bearing weak bristles only ..... *louisae*

110(109). Strong black teeth on male external genitalia situated along apical margin of genital arch, not on clearly differentiated clasper 111
Strong teeth on male external genitalia present on separate protruding clasper 116

111(110). Male genitalia with additional clasper-like process bearing several prominent bristles in addition to row of strong black teeth above on apical margin of genital arch ..... *concolor*
Male genitalia without additional clasper-like process 112

112(111). Genital arch protuberant at origin of large black teeth; abdomen dusky black posteriorly ..... *minnamurrae*
Genital arch not protuberant at origin of large black teeth; abdomen not dusky black posteriorly 113

113(112). Body entirely yellowish tan; bristles slightly luteous ..... *sinape*
Body not yellowish; bristles not luteous 114

114(113). 3rd costal section of wing with heavy bristles on basal 0.8 ..... *nimia*
3rd costal section with heavy bristles on basal 0.5–0.6 115

115(114). *C*-index *c.* 2.3 ..... *mulgravei*
C-index *c.* 3.6 ..... *barkeri*

116(110). Large medial black teeth on clasper long above, becoming much shorter below ..... *rhinos*
Large medial black teeth on clasper of uniform length or only slightly shorter below 117

117(116). Clasper with large pointed dorsal process and only 3 medial black teeth ..... *insolita*
Clasper without pointed dorsal process, with more than 3 medial black teeth 118

118(117). Clasper with long row of *c.* 15 medial black teeth extending around ventral edge of clasper; large species ..... *nausea*
Clasper with much shorter row of teeth 119

119(118). *C*-index *c*. 3.4; 3rd costal section with heavy bristles on basal 0.75: wing infuscated ..... *adelphe*
C-index *c*. 3.1 or less; 3rd costal section with heavy bristles on basal 0.5–0.6 120

120(119). Medial black teeth on clasper very short ..... *horrifica*
Medial black teeth on clasper not very short 121

121(120). Aedeagus very small; parandrite with sensilla along almost entire length ..... *mania*
Aedeagus large; parandrite with basal sensilla 122

122(121). Aedeagus apically narrowed, subapically expanded; parandrite apically pointed .....*bodmeri*
Aedeagus apically broad; parandrite apically rounded 123

123(122). Aedeagus narrowed at point of articulation with basal apodeme; egg guide covered with strong teeth ..... *thodayi*
Aedeagus becoming broader towards point of articulation with basal apodeme; egg guide with marginal and few other teeth only ..... *vindicta*

XVI. Genus **Hypselothyrea** de Meijere

Hypselothyrea de Meijere, 1906, p. 193. Type-species *H. dimidiata* de Meijere, 1906, by subsequent designation (Okada 1956); type locality New Guinea.

Head broader than thorax; arista plumose; anterior reclinate orbital bristle small or absent; postvertical bristles small or absent; front shining, separated into central and lateral portions by dull lines; carina large; thorax with reduced setation: acrostichals in few rows or absent, 1 or 2 pairs of dorsocentral bristles present, sternopleuron with 1 large bristle only; scutellum typically pointed and strongly upturned apically; anterior scutellar bristles small or absent; abdomen elliptical or globose; wing slender; anal vein absent.

The genus *Hypselothyrea* consists of a small number of little-studied Oriental and Australian species. The most recent comprehensive treatment of the group is Duda's (1928) survey of the genus, which included a key to and descriptions of the six species then known. Two further species have since been described (Takada and Momma 1975). The most distinguishing features of the 'typical' species is the aberrant, strongly upturned scutellum; the slender wing (in some species patterned) is also characteristic. In many other respects the genus converges on *Liodrosophila*, particularly in possession of a shiny front divided by dull lines, although the front in the latter typically also possesses a metallic coloration. Duda (1928) remarked that the two genera are very close, and indeed described one *Hypselothyrea* species (*breviscutellata*) without the typically upturned scutellum, the latter possessing however only one pair of dorsocentral bristles and a very slender wing, and thus seemingly better placed in *Hypselothyrea*. There can be no doubt that *Hypselothyrea* and *Liodrosophila* are very close and, were it not for the aberrant *Hypselothyrea* scutellum, the two genera would be merged [As emphasized by Throckmorton (1975), species possessing a bizarre morphological attribute have regularly been grouped into separate genera. This point is well illustrated by the two genera here discussed; de Meijere described several species of what was subsequently separated as *Liodrosophila* in the genus *Drosophila*, but established the genus *Hypselothyrea* for three species with the upturned scutellum.]

Two species of *Hypselothyrea* are represented in the Australian collections, one of which is new.

1. *Hypselothyrea lanigera* Duda

Hypselothyrea lanigera Duda, 1928, p. 88. (Holotype in Budapest; type locality New Guinea.)

Distinguishing features. Mesonotum with greenish pollinosity; front with broad dull bands; thorax with 2 pairs of dorsocentral bristles.

Body length. *C*. 2.3 mm.

Head. Arista large, fan-like, with 5–6 apically curved rays above and 2–3 slightly curved rays below plus terminal fork. Front 1.3 times broader than long, shiny dark brown with broad dull band on each side. Central part of front (between bands) with fine dot-like sculpturing which extends on to anterior face of carina. 2nd and 3rd antennal segments mid to dark brown, 3rd slightly dusky. Carina very prominent, broad, only slightly broader below, flat, lateral and ventral margins abruptly squared. Face shiny dark brown. Palp dark brown. Cheek curved, narrow, with 2 small subequal vibrissae. Eye with trace of pile only, greatest diameter almost vertical. Orbital bristles in ratio 3 : 1 : 5; anterior reclinate orbital extremely fine. Ocellar and vertical bristles large, latter on raised prominence. Postvertical bristles rather long but very fine, crossed.

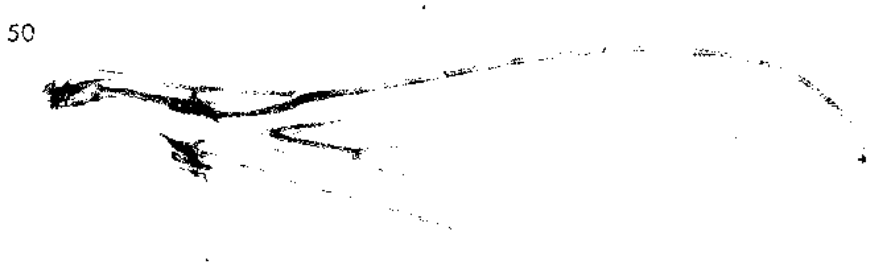


Fig. 50. *Hypselothyrea lanigera*, wing.

Thorax. Mesonotum with fine dot-like sculpturing, greenish especially posteriorly; humeral calli prominent, shiny dark brown. Acrostichal hairs absent. Anterior dorsocentral bristles close to transverse suture; ratio anterior : posterior dorsocentrals 0.5. Scutellum dark brown, subshining. Anterior scutellar bristles short and extremely fine; posterior scutellars large. Pleura glassy mid to dark brown anteriorly, with dull pollinosity posteriorly. Stalk of haltere dark tan; knob black basally, pale tan apically. Fore-coxa shiny dark brown medially, pale tan laterally; fore-femur dark brown; remainder of foreleg pale tan; mid- and hind-femora pale tan above, dark brown below; remainder of mid- and hind-legs pale tan.

Wing (Fig. 50). Hyaline, very slightly brownish. *C*-index, *c*. 1.9; 4*V*-index, *c*. 2.0; 5*X*-index, *c*. 1.3; *M*-index, *c*. 0.4. 3rd costal section with heavy setation on basal 0.6. Length, *c*. 1.8 mm.

Abdomen. Globose, glossy black.

Female genitalia. Egg guide narrowly rounded apically, with marginal teeth.

Distribution. Previously reported from New Guinea (Duda 1928); within Australia restricted to north Queensland rainforest habitats.

Specimens Examined

Holotype. **Queensland:** Mossman Gorge, 24.iv.1967, D.H. Colless, 1♂ (ANIC); Mossman Gorge, swept rainforest, 24–25.viii.1976, P.A. Parsons, 1♂, 3♀ (LT); 10 miles S. of Daintree, 25.iv.1967, D.H. Colless, 1♀ (ANIC); 2 miles N. Tully River bridge, Cardstone–Ravenshoe Road, 16.i.1967, D.K. McAlpine and G. Holloway, 1♀ (AM); Crystal Cascades, 19.iv.1967, D.H. Colless, 1♂, 2♀ (ANIC); Upper Mulgrave River, Goldsborough Road, swept, 29.viii.1976, P.A. Parsons, 1♂ (LT); The Boulders, Babinda, 10.v.1967, D.H. Colless, 3♂, 1♀ (ANIC); Bramston Beach near Innisfail (rainforest fringe), 30.iv.1967, D.H. Colless, 4♂, 1♀ (ANIC); North Maria near Silkwood, 14.xii.1961, D.K. McAlpine, 2♂ (AM); Lacey's Creek, 13.v.1980, I. Naumann, 1♂, 2♀ (ANIC).

2. *Hypselothyrea claudensis*, sp. nov.

Types

Holotype ♀: Claudie River, 1 mile W. of Mt Lamond, Queensland, 13.xii.1971, D.K. McAlpine, G.A. Holloway and D.P. Sands (AM). Paratypes (all Claudie River, AM unless otherwise noted): same data exactly as holotype, 5♂, 2♀; 18.xii.1971, ex malaise trap, D.K. McAlpine and G.A. Holloway, 1♀; 23.xii.1971, m.v. light, D.K. McAlpine, G.A. Holloway and D.P. Sands, 3♂, 2♀ (ANIC); 14.i.1972, D.K. McAlpine and G. Holloway, 1♂, 1♀; 29.v.1966, D.K. McAlpine, 1♀; 31.v.1966, D.K. McAlpine, 1♂.

Distinguishing features. Front shining with narrow dull lines; mesonotum mid-brown, with only 1 pair of dorsocentral bristles.

Body length. 2.5 mm (holotype); 2.4–2.6 mm (paratype range).

Head. Arista large, with 4 curved rays above and 3 slightly curved rays below plus large curved terminal fork. Front 1.3 times broader than long, dark brown with greenish to violet metallic sheen except in dull line on each side just medial to orbital bristles. 2nd antennal segment mid-brown; 3rd segment dusky brown. Carina very prominent, broad above, only slightly broader below, flat, lateral and ventral margins strongly squared. Face glassy mid to dark brown. Palp dark brown. Cheek curved, with 2 weak subequal vibrissae. Eye bare, broad above, considerably narrower below. Anterior reclinate orbital bristle absent; proclinate and posterior reclinate orbitals in ratio 2 : 3. Ocellar and inner vertical bristles large; outer verticals and postverticals absent.

Thorax. Mesonotum mid to dark brown, shiny, with minute whitish flecks centrally. Humeral calli very prominent, shiny dark brown. Acrostichal hairs absent. Single pair of dorsocentral bristles large. Scutellum concolorous with mesonotum; anterior scutellar bristles very fine and short; posterior scutellars large. Pleura glassy dark brown anteriorly, with whitish pollinosity posteriorly. Stalk and base of knob of haltere dark tan; knob apically whitish. Fore-coxa pale tan; fore-femur dark brown; fore-tibia pale tan above, dark brown below; fore-tarsus pale tan; mid-femur pale tan in upper ⅔, dark brown in lower ⅓; mid-tibia and tarsus pale tan; hind-femur pale tan in upper ½, dark brown in lower ½; hind-tibia similarly patterned; hind-tarsus pale tan.

Wing. Hyaline, faintly brownish. *C*-index, 2.3; 4*V*-index, 2.2; 5*X*-index, 1.6; *M*-index, 0.5. 3rd costal section with heavy setation on basal 0.5. Length (holotype), 1.8 mm.

Abdomen. Globose, glossy black.

Female genitalia. Egg guide strong, apically pointed, with few teeth.

Distribution. Known only from the Claudie River area, far north Queensland.

Key to Australian Species of *Hypselothyrea*

Mesonotum with 2 pairs of dorsocentral bristles ..... *lanigera*
Mesonotum with 1 pair of dorsocentral bristles ..... *claudensis*

XVII. Genus **Liodrosophila** Duda

Liodrosophila Duda, 1922, p. 153. Type-species *Camilla coeruleifrons* de Meijere, 1911, by subsequent designation (Okada 1956); type locality Java.

Front highly polished, with metallic sheen, separated by (usually) dull lines or bands into central and lateral (periorbital) areas; lunular microchaetae absent, arista plumose; anterior reclinate orbital bristle small; mesonotum with metallic sheen; acrostichal hairs absent or in 2 or more rows; 2 pairs of dorsocentral bristles present; scutellum velvety, typically black; abdomen with metallic sheen.

In addition to the above features, some species of *Liodrosophila* possess a comb of short stout setulae on the inner side of the fore-femur (cf. species of the *immigrans* group, genus *Drosophila*). Where present in the Australian species this comb is noted.

Wheeler (1981) lists a total of 44 species of *Liodrosophila* ranging from Africa through Madagascar, Asia, Japan, Taiwan, south-east Asia and Micronesia to Samoa. No species have been identified from New Guinea or Australia, although the genus has previously been noted in both areas (Okada 1970; Bock 1976). No species of *Liodrosophila* are known from Europe or from North or South America. (The Neotropical genus *Paraliodrosophila* Duda was regarded by Duda as intermediate between *Liodrosophila* and *Drosophila*.)

Five species of *Liodrosophila*, four new, have now been distinguished among the Australian material. Ecologically, little is known about *Liodrosophila*. Most specimens have been collected by sweeping, although in a few cases Australian species have been taken at fruit or mushroom baits.

1. *Liodrosophila nitida* Duda

Liodrosophila nitida Duda, 1922, p. 157. (Syntypes in Naturhistorisches Museum, Vienna; type locality Vietnam.)

Distinguishing features. Front brown; thorax and abdomen black; acrostichal hairs in 6 rows.

Body length. *C*. 2.1–2.6 mm.

Head. Arista large, with 5–6 (usually 5) apically curved rays above and 2 straight rays below plus large terminal fork. Front 1.4 times broader than long, dark brown, a little paler at anterolateral extremities, smooth, highly polished, with greenish violet tinge; bands separating central from lateral areas narrow, a little widened only near anterior extremities. 2nd and 3rd antennal segments dusky dark tan. Carina high but prominent, rather broad, flat, squared laterally, almost squared ventrally. Face shiny mid-brown. Palp dark brown, with long slender apical bristle. Cheek

slightly curved, narrow. Vibrissa single, succeeding orals much smaller and finer; a few larger bristles present in posterior corner. Eye large, with sparse very short pile. Proclinate orbital bristle 0.7 length of posterior reclinate orbital, the 2 bristles close to each other and to orbital margin; anterior reclinate orbital short and very fine, almost at orbital margin. Ocellar, vertical and postvertical bristles well developed.

Thorax. Mesonotum glossy black (brown in teneral specimens) with strong violet tinge except near anterior extremity where finely punctate and subshining; remainder of mesonotum smooth but with hint of punctation evident at high magnification (X 100). Acrostichal hairs in 6 even rows in front of dorsocentral bristles reducing to 2–4 rows between dorsocentrals and finishing well before scutellar margin. Ratio anterior : posterior dorsocentrals 0.7. Anterior scutellar bristles 0.5 length of posterior scutellars. Pleura dark brownish black, shiny above level of upper margin of sternopleuron, subshining below. Sternopleuron with 3 bristles in ratio *c*. 2 : 1 : 3, anterior 2 bristles fine, posterior bristle large. Haltere tan; knob with weak basal darkening. Legs shiny; femora blackened (2nd and 3rd femora paler apically in some specimens); tibiae and tarsi dark tan; fore-femur with inner row of short setulae; preapical bristles on 2nd and 3rd tibiae; apical bristle on 2nd tibia only.

Wing. Faint brownish tinge present. Anal cell closed; shadow-like rudiment of anal vein present. *C*-index, *c*. 1.6; 4*V*-index, *c*. 2.2; 5*X*-index, *c*. 1.7; *M*-index, *c*. 0.6. 3rd costal section with heavy setation on basal 0.6. Length, *c*. 1.8 mm.

Abdomen. Largely glossy black with violet tinge. Small basal patch of dull-subshining bloom present on tergites 1–3 (in central parts only of tergites 2–3). Tergites 1 and 2 fused.

Male genitalia (Figs 51, 52). Clasper narrow, with long medial row of contiguous teeth; aedeagus expanded apically, rounded, without ornamentation, parandrites small, triangular.

Female genitalia. Egg guide strong, black, with marginal teeth.

Distribution. Widespread in south-east Asia, Japan and Taiwan (Okada 1974). Australian specimens from north Queensland rainforest localities.

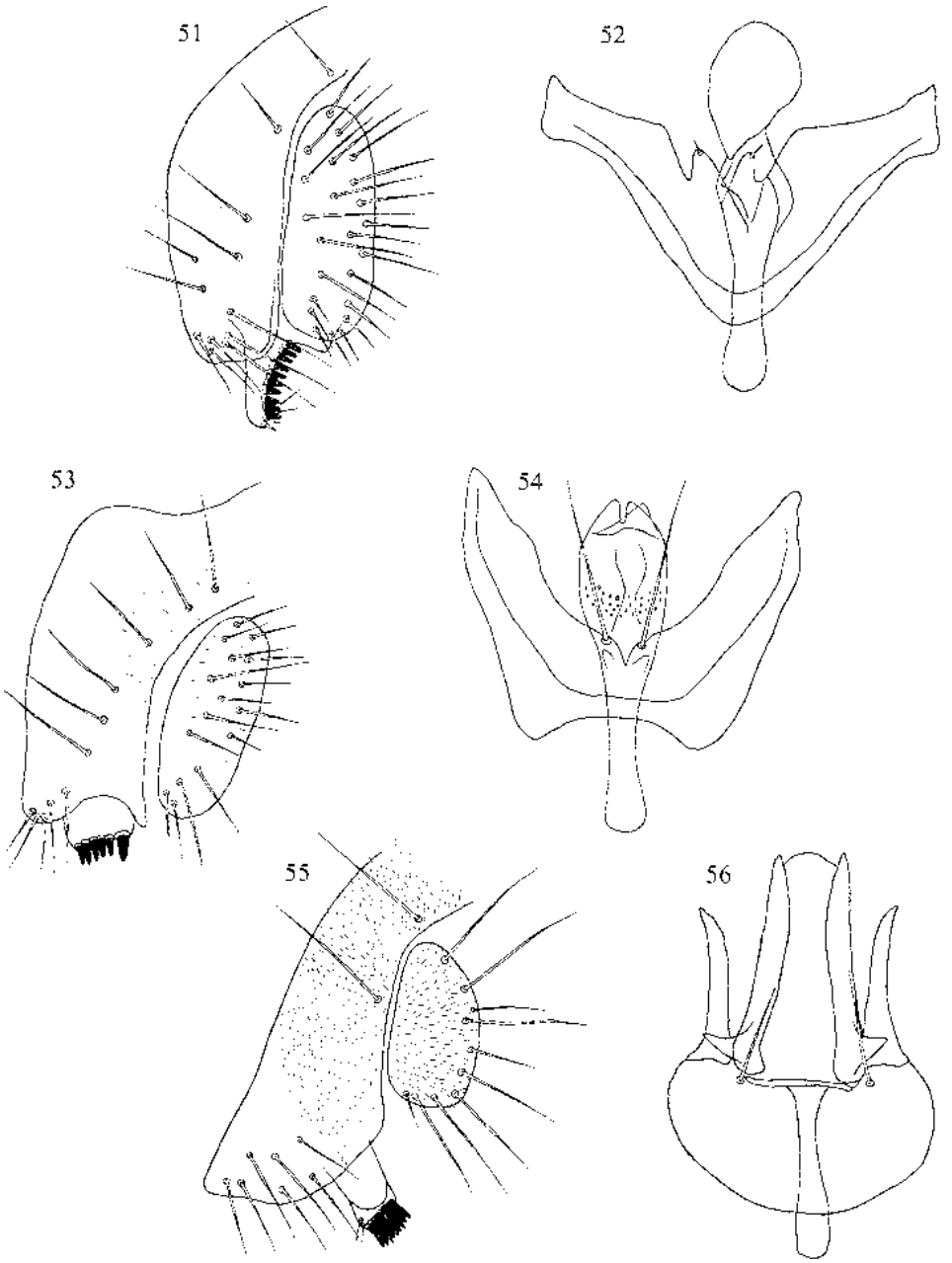
Specimens Examined

Queensland: Bamboo Creek near Miallo, N. of Mossman, 25.iv.1967, D.H. Colless, 1♀ (ANIC); Earl Hill, N. of Cairns, 8.v.1967, D.H. Colless, 1♀ (ANIC); Palmerston National Park, swept, 28.x.1978, P.A. Parsons, 2♂, 3♀ (LT); Wongabel State Forest, 7.v.1967, D.H. Colless, 1♂ (ANIC); Yungaburra (State Forest 452), 29.iv.1967, D.H. Colless, 1♂ (ANIC); Lake Eacham National Park, Wright's Bridge, 7.xi.1975, P.A. Parsons, 1♂ (LT); Kuranda, 20.v.1958, D.K. McAlpine, 1♀ (AM); The Intake via Redlynch, 30.xii.1966, D. McAlpine and G. Holloway, 1♀ (AM); Summit, Walter Hill Road, Cardstone–Ravenshoe Road, 16.i.1967, D. McAlpine and G. Holloway, 1♀ (AM); 2 miles N. Tully River bridge, Cardstone–Ravenshoe Road, 16.i.1967, D. McAlpine and G. Holloway, 1♀ (AM); The Crater near Herberton, 16.xii.1961, McAlpine and Lossin, 1♀ (AM); Mt Edith Forest Road, 1½ miles off Danbulla Road, 6.v.1967, D.H. Colless, 1♀ (ANIC); Palmerston National Park, Crawford Lookout, 15.vii.1971, Z. Liepa, 1♂ (ANIC); Palmerston National Park, 1600 ft, light trap, 18.iv.1971, D.A. Duckhouse, 1♀ (ANIC); Lacey's Creek, 13.v.1980, I. Naumann, 1♀ (ANIC); Gillies Highway, 2 miles W. of Little Mulgrave, 18.iv.1967, D.H. Colless, 4♂, 2♀ (ANIC); Upper Mulgrave River, 10 miles Goldsborough Road, 9.v.1967, D.H. Colless, 1♀ (ANIC); Upper Mulgrave River, Goldsborough Road, swept, 29.vii.1976, P.A. Parsons, 1♂, 1♀ (LT); Goldsborough–Mulgrave Forest Road, *c*. 20 km Goldsborough Highway, swept rainforest, Aug. 1976, I.R. Bock, 1♂ (LT); Bramston Beach near Innisfail, rainforest fringe, 30.iv.1967, D.H. Colless, 2♀, 1 ♀ (ANIC); Birthday Creek near Paluma, 18.i.1967, D.K. McAlpine, 1♀ (AM); Birthday Creek 7 miles W. Paluma, 14.i.1970, G.A. Holloway, 1♂ (AM).

2. ***Liodrosophila moyae***, sp. nov.

Types

Holotype ♂: Upper Mulgrave River, north Queensland, fruit-baited, 19.viii.1976,



Figs 51, 52. *Liodrosophila nitida*: *51*, male external genitalia; *52*, male internal genitalia.
Figs 53, 54. *Liodrosophila moyae*: *53*, male external genitalia; *54*, male internal genitalia.
Figs 55, 56. *Liodrosophila lutea*: *55*, male external genitalia; *56*, male internal genitalia.

Bock and Parsons (AM). Paratypes (all Queensland): same data as holotype, 1♀ (AM); Claudie River near Mt Lamond, I.i.1966, D.K. McAlpine, 2♀, 1 ? (AM); Mossman Gorge, 23.iv.1967, D.H. Colless, 1♀ (ANIC); Crystal Cascades, Cairns, 19.iv.1967, D.H. Colless, 2♂, 1♀ (ANIC); Yungaburra (State Forest 452), 29.iv.1967, D.H. Colless, 1♂ (ANIC); 2 miles N. Tully River Bridge, Cardstone-Ravenshoe Road, 16-17.i.1967, D. McAlpine and G. Holloway, 2♀, 1 ? (AM); Upper Mulgrave River 10 miles Goldsborough Road, 9.v.1967, D.H. Colless, 3♂, 2♀ (ANIC); Mulgrave River 4 miles W. of Gordonvale, 21.v.1966, D.K. McAlpine, 1♂ (AM); The Boulders, Babinda, 10.v.1967, D.H. Colless, 1♂ (ANIC).

Distinguishing features. Body except legs largely black; head broader than thorax; mesonotum with 2 rows of acrostichal hairs plus micropubescence.

Body length. 2.0 mm (holotype); 1.9-2.2 mm (paratype range).

Head. Arista large, with 4–5 rays above (basal rays apically curved) and 2 straight rays below plus terminal fork. Front 1.4 times broader than long, dark blackish brown (paler in anterolateral corners) with greenish violet sheen. Bands separating central from lateral shiny areas rather narrow, widened anteriorly, black posteriorly, tan anteriorly. 2nd antennal segment dark tan; 3rd segment dusky tan. Carina high but well developed, rather narrow, rounded. Face blackish brown. Palp dark brown, with long apical bristle. Cheek slightly curved, narrow, dark brown; 2 equal vibrissae present followed by fine oral bristles. Eye large, with trace of fine pile. Proclinate orbital bristle 0.75 length of posterior reclinate orbital, the 2 bristles close together and close to orbital margin; anterior reclinate orbital short and very fine, closer to orbital margin. Ocellar and vertical bristles large. Postverticals weak, close together, crossed.

Thorax. Mesonotum dark blackish brown with violet tinge. Acrostichal hairs in 2 rows only with additional microchaetae in extended lines of dorsocentral bristles and in small patch on each side lateral to dorsocentrals; very fine micropubescence otherwise present over most of mesonotum but bare patch present between dorsocentral bristles back to posterior margin of mesonotum. Ratio anterior posterior dorsocentrals 0.6. Anterior scutellar bristles 0.5 length of posterior scutellars. Pleura concolorous with mesonotum, with dense micropubescence or bloom. Sternopleuron with 2 bristles, anterior bristle fine, 0.7 length of posterior bristle. Legs shining; fore-coxa and femur blackish; mid-femur weakly blackened; legs otherwise dark tan. Fore-femur with distal row of short setulae on inner side. Preapical bristle on 3rd tibia only; apical bristle on 2nd tibia only.

Wing. Slightly brownish. Anal cell closed; basal rudiment of anal vein present. *C*-index, 1.4; 4*V*-index, 2.1; 5*X*-index, 1.8; *M*-index, 0.55, 3rd costal section with heavy setation on basal 0.5. Length (holotype), 2.0 mm.

Abdomen. Largely shiny black with violet tinge but dull to subshining bloom present on rounded basal area covering tergite 1, most of tergite 2 and central part of tergite 3. Tergites 1 and 2 fused.

Male genitalia (Figs 53, 54). Clasper small, with medial row of strong black teeth; aedeagus narrowed apically, with small notched posterior process and fine basal ornamentation; parandrite absent.

Female genitalia. Egg guide strong, pointed, with marginal teeth.

Distribution. Known only from type specimens as listed above, rainforests of north Queensland.

Special Comments

This species resembles *L. pusilla* (de Meijere), known from Java, Malaya and Singapore, differing most notably from the latter species in wing structure, the crossveins of *pusilla* having been described as very close together while the crossveins of *moyae* are widely separated.

3. *Liodrosophila vitrea*, sp. nov.

Types

Holotype ♀: near Noosa Heads, Queensland, mushroom bait, 22.iv.1977, P.A. Parsons, (AM). Paratype ♂: Mapleton Falls National Park, Queensland, mushroom bait, 22.iv.1977, P.A. Parsons (AM).

Distinguishing features. Front and thorax (except scutellum) glassy brown; mesonotum without acrostichal hairs; scutellum broad posteriorly; anterior scutellar bristles small; postvertical bristles absent.

Body length. 2.3 mm (holotype); 2.2 mm (paratype).

Head. Arista large, with 5 apically curved rays above and 2 slightly curved rays below plus large terminal fork. Front 1.7 times broader than long, glassy mid to dark brown with greenish violet tinge; bands separating central from lateral portions narrow, only slightly widened anteriorly. 2nd antennal segment rufous brown; 3rd segment dusky tan. Carina high on face, broad, almost as broad above as below, more protuberant below, flat, squared laterally and ventrally. Face glassy brown with greenish violet tinge. Palp slender, dusky, with long apical bristle. Cheek linear, broad, shiny brown, devoid of bristles except for 2 slender vibrissae situated close to eye, and additional bristle in posterior corner. Eye with trace only of very short pile. Proclinate orbital bristle 0.6 length of posterior reclinate orbital, former a little closer to orbital margin, the 2 bristles rather widely separated. No anterior reclinate orbital bristle evident on either specimen but minute (vestigial?) socket present between other 2 orbitals. Vertical bristles large. Ocellar bristles very large. Postverticals absent, without trace of sockets.

Thorax. Mesonotum glassy mid to dark brown with greenish violet tinge. Acrostichal hairs absent. Ratio anterior : posterior dorsocentral bristles 0.6; anterior and posterior dorsocentrals rather widely separated. Humeral callus with a few rudimentary chaetae only. Presutural and notopleural bristles absent. Posterior supraalar and posterior postalar bristles very small; anterior supraalar and anterior postalar large. Scutellum truncated and broad posteriorly. Anterior scutellar bristles fine and very short; posterior scutellars large. Pleura concolorous with mesonotum. Sternopleuron with single very weak bristle. Stalk of haltere tan; knob blackish. Legs glassy brownish; fore-femur with apical row of short stout setulae on inner side; preapical bristles on 2nd and 3rd tibiae; apical bristle on 2nd tibia only.

Wing. Hyaline, with trace only of brownish tinge. Anal cell open; anal vein absent. *C*-index, 2.2; 4*V*-index, 1.8; 5*X*-index, 1.3; *M*-index, 0.4. 3rd costal section with heavy setation on basal 0.45. Length (holotype), 2.7 mm.

Abdomen. Entirely glassy dark brown with greenish violet tinge.

Female genitalia. Egg guide strong, with a few marginal teeth.

Distribution. Known only from type specimens, southern Queensland.

Special Comments

This species is atypical of *Liodrosophila* in the extent of its bristle reductions as noted above, and in this respect converges on *Sphaerogastrella* (q.v.), but *L. vitrea* lacks the typical broadened abdomen of *Sphaerogastrella* species. The collection of both type specimens at mushroom baits suggests that *L. vitrea* may feed on fungi.

4. ***Liodrosophila lutea***, sp. nov.

Types

Holotype ♀: Upper Mulgrave River, north Queensland, swept ex rainforest, 19.viii.1976, P.A. Parsons (AM). Paratypes (all Queensland, ANIC unless otherwise noted): same data as holotype, 1♂, 1♀ (AM), 1♂ (LT); Iron Range, 16.viii.1971, R. Jenkins, 1♂; Mossman Gorge, 24.iv.1967, D.H. Colless, 2♂; Bamboo Creek near Miallo, N. of Mossman, 25.iv.1967, D.H. Colless, 4♀; Upper Mulgrave River 10 miles Goldsborough Road, 9.v.1967, D.H. Colless, 7♂, 6♀; The Boulders, Babinda, 10.v.1967, D.H. Colless, 1♂, 3♀; Bramston Beach near Innisfail (rainforest fringe), 30.iv.1967, D.H. Colless, 1♀.

Distinguishing features. Abdomen yellowish, tergites 3–4 with dark apical bands; pleura dark above, pale below.

Body length. 2.1 mm (holotype); 1.8–2.4 mm (paratype range).

Head. Arista large, with 5 apically curved rays above and 3–4 almost straight rays below plus terminal fork. Front 1.4 times broader than long, smooth and highly polished blackish brown in central area and between orbital and vertical bristles; central and lateral areas separated by shiny darker bands with very finely striated appearance, bands narrow posteriorly, greatly widened anteriorly. Front with purplish sheen, less evident on bands. 2nd antennal segment dark tan; 3rd segment dark tan, slightly dusky. Carina narrow and low between antennal bases only. Face shiny dark tan. Palp dusky, with several long bristles. Cheek linear, narrow, dark brown; vibrissa single. Eye large, with short pile. Orbital bristles in ratio 5 : 2 : 6; anterior reclinate orbital fine, posterolateral to proclinate orbital. Ocellar and vertical bristles large. Postverticals rather small, strongly convergent.

Thorax. Mesonotum shiny black (brown in teneral specimens) with strong violet tinge. Acrostichal hairs in 6–8 rows in front of dorsocentral bristles (more irregular laterally), 4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6; anterior and posterior dorsocentrals close. Anterior scutellar bristles longer than posterior scutellars, divergent. Pleura black above level of upper margin of sternopleuron, pale tan below. All 3 sternopleural bristles developed, somewhat *Scaptodrosophila*-like, 1st bristle smallest, 3rd largest. Stalk of haltere tan, darkened on outer side; knob black. Legs tan, fore-femur weakly darkened apically on outer side. Preapical bristles present on 2nd and 3rd tibiae; apical bristle on 2nd tibia only.

Wing. Brownish tinge present. Anal cell open; anal vein absent. *C*-index, 1.2; 4*V*-index, 1.7; 5*X*-index, 1.8; *M*-index, 0.6. 3rd costal section with heavy setation on basal 0.65. Length (holotype), 2.0 mm.

Abdomen. Tergite 1 weakly blackish. Tergite 2 weakly blackish dorsally, yellow on incurved portion, latter with narrow black band at medial extremity. Tergites 3–4 each yellow with apical black band (weak centrally on tergite 3) extended forwards laterally: incurved portion of each tergite yellow with narrow black band at medial extremity. Tergites 5–6 entirely yellow.

Male genitalia (Figs 55, 56). Clasper small, with long medial bristles: aedeagus bifid, each portion slender, apically pointed; parandrite large, slender, apically pointed.

Female genitalia. Egg guide strong, with marginal teeth.

Distribution. Known only from type specimens, rainforests of north Queensland.

Special Comments

To some extent this species resembles *L. fasciata* Duda (known from Java, Sumatra and Malaya) in general coloration, but the latter species possesses only four rows of acrostichal hairs, and there are other differences given in the description of Okada (1974), most notably in the male genitalia.

5. *Liodrosophila formicifórmes*, sp. nov.

Types

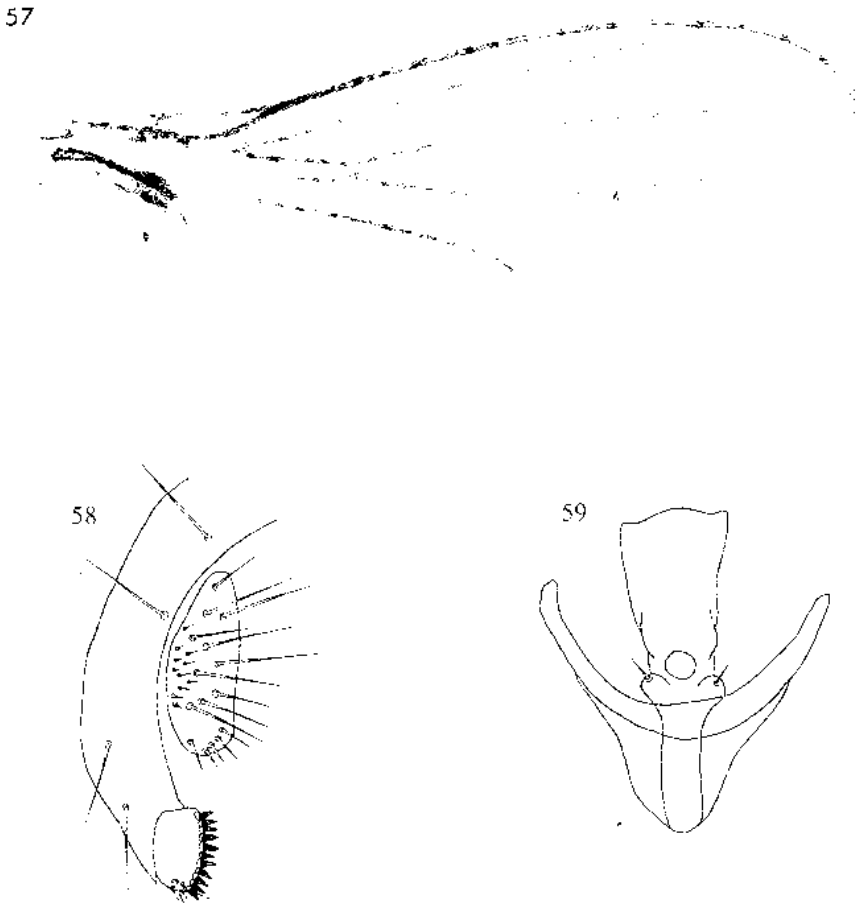
Holotype ♂: Lake Eacham National Park, Queensland, Dec. 1974, I.R. Bock (ANIC). Paratypes (all Queensland): same data as holotype, 2♂, 2♀ (ANIC); Bamboo Creek near Miallo, N. of Mossman, 25.iv.1967, D.H. Colless, 1♂ (ANIC); Lake Barrine, 29.xii.1958, D.K. McAlpine, 1♀ (AM); Crystal Cascades, Cairns, 19.iv.1967, D.H. Colless, 1♀ (ANIC); Kuranda Range State Forest, 20.iv.1967, D.H. Colless, 2♂, 1♀ (ANIC); Kuranda, D.K. McAlpine, 17.v.1958, 1♂, 28.xii.1958, 1♂ (AM); The Crater National Park, swept leaf litter, July 1975, I.R. Bock, 1♂ (LT); The Crater near Herberton, 29.i.1972, D.K. McAlpine and G.A. Holloway, 1♂ (AM); Barron River near Crater, 3.i.1959, D.K. McAlpine, 1♀ (AM); Wallacha Falls, Palmerston Highway, 30.iv.1967, D.H. Colless, 1♂ (ANIC); Mulgrave River 4 miles W. of Gordonvale, 4.i.1959, D.K. McAlpine, 1♀ (AM); Bramston Beach near Innisfail (open savannah), 30.iv.1967, D.H. Colless, 1♂ (ANIC); Mt Bartle Frere (base), rainforest, fruit bait, 18.viii.1976, I.R. Bock, 2♂ (LT); North Maria Creek near Silkwood, 14.xii.1961, D.K. McAlpine, 2♂ (AM); river band rainforest, Silkwood, Innisfail District, 25.v.1958, D.K. McAlpine, 1♀ (AM); Kirrama rainforest, swept ex foliage, Bock and Parsons, 11.viii.1976, 1♂ (LT).

Distinguishing features. Body black, legs largely pale; acrostichal hairs absent; mesonotum finely punctate; wing slender; abdomen long, slender, narrowed basally.

Body length. 2.6 mm (holotype); 2.4–2.7 mm (paratype range).

Head. Arista fan-like, with 6–7 apically curved rays above and 3 almost straight rays below plus terminal fork. Front 1.6 times broader than long, shiny blackish; central area (within dull lines) finely punctate; periorbits smooth, highly polished, with weak greenish to violet tinge. 2nd antennal segment brown to blackish, shiny; 3rd segment dusky, dull. Carina prominent, only slightly narrowed above, flat, finely

punctate, squared laterally and ventrally. Face shiny black with violet tinge about carina, especially below. Palp long, slender, brownish black, with long fine apical bristle. Cheek slightly curved, rather broad, widened in posterior corner; 2 long slender vibrissae present. Eye with trace only of fine pile. Proclinate orbital bristle 0.6 length of posterior reclinate orbital and close to latter, both bristles about same distance from orbital margin; anterior reclinate orbital very short and exceedingly fine, distinguishable only at high magnification. Vertical bristles large: ocellar and postvertical bristles minute, distinguishable only at high magnification.



Figs 57–59. *Liodrosophila formiciformes*: *57*, wing; *58*, male external genitalia; *59*, male internal genitalia.

Thorax. Mesonotum shiny dark brownish to black, finely punctate, with whitish to brownish bloom except anterolaterally. Acrostichal hairs absent. Ratio anterior : posterior dorsocentral bristles 0.7; anterior dorsocentrals close to transverse suture. Scutellum velvety black. Anterior scutellar bristles minute, close to posterior scutellars; posterior scutellars large. Pleura brownish black; sternopleuron with 1 large bristle. Haltere tan; knob with weak basal darkening. Legs tan to brown, darkest on fore-femora and apically on mid- and hind-femora (fore-coxae concolorous with pleura); fore-femur with comb of very small rather widely spaced setulae on apical half; preapical bristles absent; apical bristle on 2nd tibia only.

Wing (Fig. 57). Slender, with slight brownish tinge. Anal vein absent. *C*-index, 2.6; 4*V*-index, 1.8; 5*X*-index, 1.3; *M*-index, 0.4. 3rd costal section with heavy setation on basal 0.5. Length (holotype), 2.1 mm.

Abdomen. Long, slender, narrowed basally. Tergites 2–6 very heavily sclerotized, shiny black with greenish to violet tinge.

Male genitalia (Figs 58, 59). Small; anal plate relatively large; medial margin of clasper concave, with row of closely packed small teeth; hypandrium very small; aedeagus cylindrical, without ornamentation.

Female genitalia. Egg guide long, slender, strongly sclerotized, with a few sparse marginal teeth.

Distribution. Collected only at above north Queensland localities in or close to rainforests.

Special Comments

In several respects (wing and abdominal structure, absence of acrostichal hairs, punctate mesonotum) this species is more reminiscent of *Hypselothyrea* than *Liodrosophila;* it lacks, however, the uniquely pointed and upturned scutellum so characteristic of the former and in fact its rounded, black, velvety scutellum is typical of *Liodrosophila*.

Key to Australian Species of *Liodrosophila*

1. Acrostichal hairs absent 2
   Acrostichal hairs present 3
2(1). Mesonotum finely punctate ..... *formiciformes*
   Mesonotum glassy ..... *vitrea*
3(1). Acrostichal hairs in 2 rows ..... *novae*
   Acrostichal hairs in 6 or more rows 4
4(3). Abdomen black ..... *nitida*
   Abdominal tergites 3–6 yellow, tergites 3–4 with apical black bands ..... *lutea*

XVIII. Genus Lissocephala Malloch

Lissocephala Malloch, 1929, p. 250. Type-species *L. unipuncta* Malloch, 1929, by original designation; type locality Salisbury, Rhodesia.

Entire front highly polished, with metallic sheen; mesonotum and abdomen glossy, usually with metallic sheen; scutellum dull or subshining; wing without anal vein; *C*-index low.

About 20 species of *Lissocephala* have been described from Africa, Japan, southeast Asia, Micronesia and Samoa (Wheeler 1981); only one species occurs in Australia. Carson and Wheeler (1973) described an unusual species, the larvae of which live under the maxillipeds or in the gills of several species of terrestrial crabs, on Christmas I., Indian Ocean.

1. *Lissocephala metallescens* (de Meijere)

Drosophila metallescens de Meijere, 1914, p. 265. (Holotype in Amsterdam; type locality Java.)

Liodrosophila australis Malloch, 1928, p. 354. (Holotype in AM; type locality Mossman, Qld.) Syn. nov.

Distinguishing features. Front and mesonotum pale to mid brown, with purplish sheen; abdomen almost entirely glossy black, with similar sheen; wing with basal dark band.

Body length. *C*. 2.3 mm.

Head. Arista with 3 apically curved rays above and 2 straight rays below plus terminal fork. Front 1.1 times broader than long, entirely glassy pale to mid brown with weak purplish sheen. 2nd and 3rd antennal segments, face and palp tan. Carina prominent but narrow, lateral margins squared, curved towards clypeus below. Cheek curved, narrow; vibrissa single. Orbital bristles in ratio 5 : 2 : 6; anterior reclinate orbital lateral to proclinate orbital. Eye with very fine sparse pile. Ocellar and vertical bristles large; postverticals fine, strongly convergent.

Thorax. Mesonotum pale to mid glassy brown with strong purplish sheen at certain angles of illumination. Scutellum pale brown, slightly shiny. Pleura glassy brown. Haltere mid-brown. Acrostichal hairs in 8 rows in front of dorsocentral bristles, irregular and sparse between dorsocentrals. Sterno-index 1.0. Legs tan; preapical bristles present on 2nd and 3rd tibiae; apical bristle on 2nd tibia only.

Wing. Slender, hyaline with oblique dark basal band from distal costal incision to alula. *C*-index, *c*. 0.9; 4*V*-index, *c*. 1.7; 5*X*-index, *c*. 2.0; *M*-index, *c*. 0.5. 3rd costal section with heavy setation on basal 0.4. Length, *c*. 2.0 mm.

Abdomen. Tergite 1 tan, darker laterally. Tergite 2 tan in anterior half, brownish black in posterior half, coloration in each case continued on to incurved portion. Remainder of abdomen entirely black. Entire abdomen glossy with metallic sheen.

Male genitalia. Figured by Wheeler and Takada (1964).

Female genitalia. Egg guide strong, apically pointed, with weak marginal teeth.

Distribution. Widespread in south-east Asia, Micronesia and New Guinea (Okada 1977); within Australia restricted to north Queensland, usually in rainforests.

Specimens Examined

Holotypes (*metallescens* headless). Queensland: (ANIC unless otherwise noted): Iron Range, rainforest, mushroom bait, 4.xi.1975, Bock and Parsons, 30.iv.1976, I.R. Bock, numerous ♂♀ (LT); Mossman Gorge, 23.iv.1967, D.H. Colless, 2♀; Bamboo Creek, near Miallo, N. of Mossman, 25.iv.1967, D.H. Colless, 2♂, 1♀; Earl Hill, N. of Cairns, 8.v.1967, D.H. Colless, 1♂; Lake Placid nr. Cairns, 26.v.1958, D.K. McAlpine, 1♂ (AM); 3 miles W. of Kuranda, Mareeba Road, 3.v.1967, D.H. Colless, 1♂, 1♀; 2 miles W. of Kuranda, 7.v.1967, D.H. Colless, 1♂; Kuranda Range State Forest, 7–8 miles on Black Mountain Road, 20.iv.1967, D.H. Colless, 1♂, 2♀; Whitfield Range Forest Reserve, Cairns, 19.iv.1967, D.H. Colless, 1♀; Tinaroo Falls Dam (open savannah), 27.iv.1967, D.H. Colless, 2♂, 2♀; Gillies Highway, 2 miles W. of Little Mulgrave, 18.iv.1967, D.H. Colless, 3♂; Upper Mulgrave River, 10 miles Goldsborough Road, 9.v.1967, D.H. Colless, 1♂, 1♀; Big Mitchell Creek, Mareeba–Molloy Road, 4.v.1967, D.H. Colless, 1♂; Bramston Beach near Innisfail (open savannah), 30.iv.1967, D.H. Colless, 2♂, 3♀; river bank rainforest, Silkwood, Innisfail District, 25.v.1958, D.K. McAlpine, 1♂, 2♀ (AM).

Special Comments

McEvey (1981) found this species to be very common on Mt Adolphus and Moa Islands, Torres Strait; many specimens were collected at decaying fungi. It is probable that the larvae are fungivorous.

XIX. Genus **Microdrosophila** Malloch

Microdrosophila Malloch, 1921, p. 312. Type-species *Drosophila quadrata* Sturtevant, 1916, by original designation; type locality Alabama, U.S.A.

Oxystyloptera Duda, 1924*a*, p. 192. Type-species *Drosophila tectifrons* de Meijere, 1914, by subsequent designation (Burla 1954*b*); type locality Java. (Wheeler & Takada 1964.)

Incisurifrons Duda, 1924*c*, p. 248 (as subgenus of *Drosophila*). Type-species *Drosophila congesta* Zetterstedt, 1847, by monotypy; type locality Scandinavia. (Sturtevant 1927.)

Hopkinsomyia Malloch, 1934, p. 289. Type-species *H. convergens* Malloch, 1934, by original designation; type locality Samoa. (Harrison 1954.)

Breadth of front considerably greater than length; front with more or less distinct oblique line or band on each side from between ocellar triangle and periorbit to anterior margin; anterior reclinate orbital bristle small, minute or indistinguishable from adjacent microchaetae, other cephalic bristles typically large; vibrissa single, typically very large; mesonotum typically with 2 pairs of large dorsocentral bristles, anterior pair situated close to transverse suture; prescutellar bristles absent; anterior sternopleural bristle fine; middle sternopleural very small; costal index typically low; 3rd costal section with extensive fringe of heavy bristles; egg guide of female typically weakly developed.

Microdrosophila is a genus of 35 described species from the Oriental, Ethiopian, Palaearctic and Nearctic biogeographic zones (Wheeler 1981), the majority of these species occurring in the Oriental and eastern Palaearctic regions. Undescribed species are also known from South America (Wheeler 1970). The genus has previously been noted in Australia (Bock 1976), although no species have hitherto been identified. The material currently at hand comprises seven species, two of which can be determined to described Micronesian species; another one (*takadai*, q.v.) is close to one of the species known from Micronesia.

As is evident from the synonymies listed above, the genus *Microdrosophila* has been the subject of some past confusion. The genus has also been subdivided into subgenera; the most recent arrangement (Wheeler 1981) admits only two subgenera, *Microdrosophila* (= *Hopkinsomyia*) and *Oxystyloptera* (= *Incisurifrons*), although *Oxystyloptera* and *Incisurifrons* were formerly proposed as separate subgenera after an analysis based on the methods of numerical taxonomy (Okada 1968). There is no recent comprehensive discussion of the genus which attempts to place the subgeneric classification on a rational basis, and, indeed, subgenera have sometimes been ignored in considerations of regional faunas (cf. Wheeler and Takada 1964; Okada 1966). The criteria cited previously in considerations of subgeneric diagnoses include the size of the anterior reclinate orbital bristle (distinguishable or not), the presence or absence of darkening on the upper pleura, and whether or not the fringe of heavy bristles on the third costal section is entire or nearly so (Okada 1956, 1968). To these might be added the degree of acuteness of the wing and the depth of the distal costal incision (cf. Figs 60–62, 69–71), but none of the above characters exhibits an unequivocal '+ or –' condition across the whole genus. The anterior reclinate orbital bristle may be just distinguishable, the darkening on the upper pleura varies from intense to weak, the heavy fringe on the third costal section may extend from anywhere between the basal 0.7 and the entire length, and varying degrees of acuteness of the wing and depth of the distal costal incision are discernible among the various species. In view of these considerations subgenera are not considered further in this paper.

Sexual dimorphisms are known in some species of *Microdrosophila*. Wheeler and Takada (1964) described several species in which the male possesses appreciably more rays in the arista than the female, or in which the postvertical bristles are larger in the female, or where both conditions occur. These differences are mentioned where relevant in the descriptions below; an additonal dimorphism is present in several species, the carina being considerably larger in the female than in the male.

1. *Microdrosophila takadai*, sp. nov.

Types

Holotype ♂: Jarra Creek near Tully, Queensland, swept rainforest, 12.viii.1976, P.A. Parsons (ANIC). Paratypes (all Queensland): same data as holotype, 2♂, 1♀ (ANIC), 3♂ (AM), 1♂ (LT); Iron Range, rainforest sweeping, 4.xi.1975, Bock and Parsons, 1♂, 1♀ (ANIC), 1♂, 1♀ (AM), 1♂ (LT); Upper Mulgrave River 10 miles Goldsborough Road, 9.v.1967, D.H. Colless, 1♂ (ANIC).

Distinguishing features. Mesonotum pale to mid brown; abdomen darker; distal costal incision very deep; 3rd costal section with complete fringe of heavy bristles; male genitalia with 2 long hirsute finger-like processes, clearly visible in pinned specimens.

Body length. 1.7 mm (holotype); 1.7–2.2 mm (paratype range).

Head. Arista with 5–7 rays above and 2 rays below plus terminal fork (both sexes). Front 1.7 times broader than long, shiny tan; trace of blackening only present beside each ocellus. 2nd antennal segment tan; 3rd segment tan, with long hairs at least equal to breadth of segment. Carina prominent, as broad above as below (broader in females), smoothly rounded. Face tan. Palp tan, with 2 large apical and several smaller bristles. Cheek moderately narrow, slightly curved, pale tan, with prominent bristle in posterior corner. Eye with dense fine pile. Proclinate orbital bristle 0.7 length of posterior reclinate orbital, the 2 bristles about equal distances from orbital margin. Anterior reclinate orbital bristle distinguishable from microchaetae but short and very fine. Ocellar and vertical bristles large. Postverticals unusually large, rather widely separated, convergent.

Thorax. Mesonotum shiny tan anteriorly, a little darker posteriorly. Acrostichal hairs in *c*. 8 rows in front of dorsocentral bristles, 6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Scutellum dark tan, subshining. Anterior scutellar bristles 0.5–0.6 length of posterior scutellars. Pleura weakly darkened above upper border of sternopleuron, pale below. Anterior sternopleural bristle 0.6–0.7 length of posterior sternopleural. Haltere mid to dark brownish. Legs tan; preapical bristles present on all tibiae; strong apical bristle on 2nd tibia only.

Wing (Fig. 60). Hyaline, not strongly acute. Distal costal incision very deep, costa protruding as slender (but not blackened) lappet. *C*-index, 0.9; 4*V*-index, 4.1; 5*X*-index, 4.9; *M*-index, 1.7. 3rd costal section with heavy setation on entire length. Length (holotype), 1.4 mm.

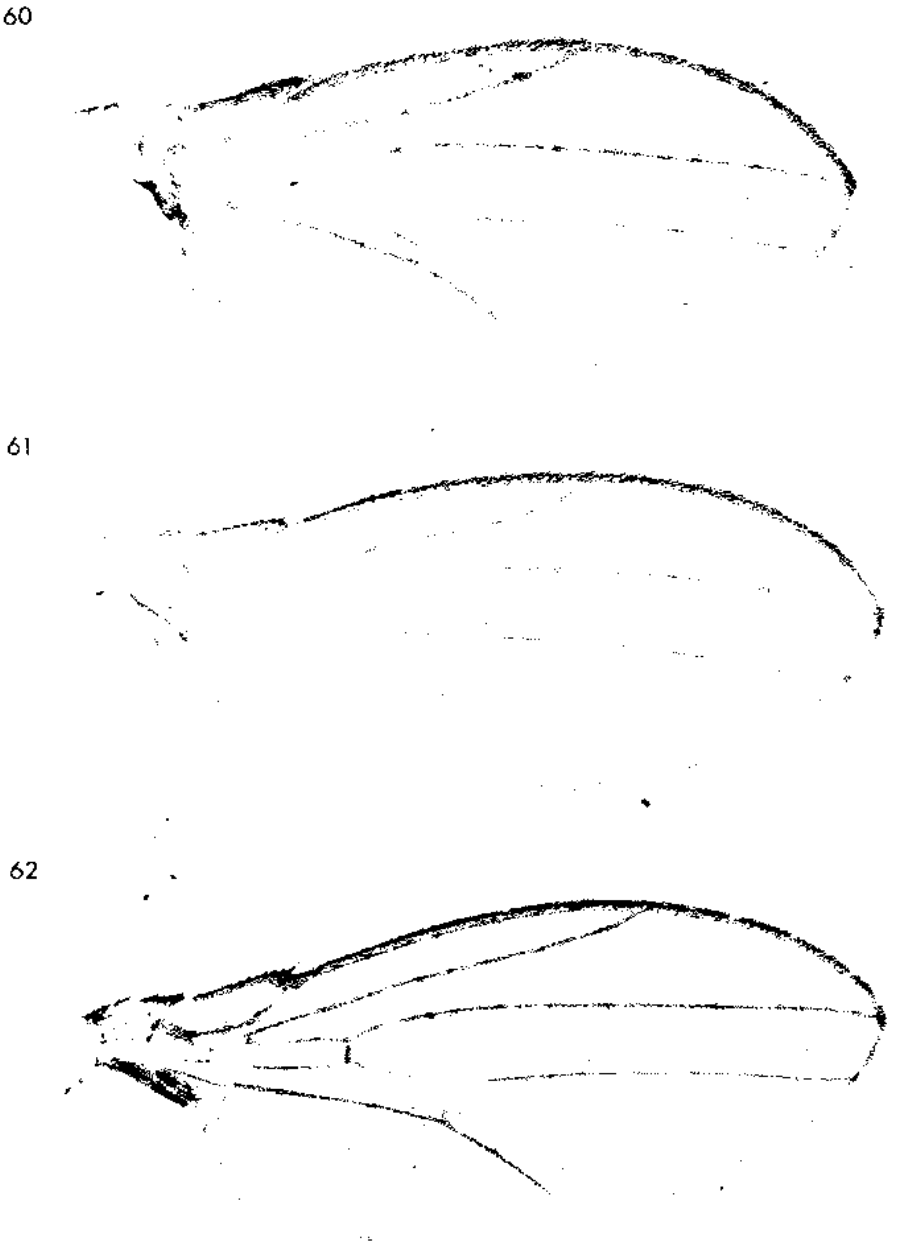
Abdomen. Entirely blackish brown, weakly shining.

Male genitalia (Figs 63, 64). External genitalia simple, without articulated clasper bearing large teeth; aedeagus swollen subapically, with fine ornamentation; lateral portions of hypandrium produced dorsally into long finger-like processes with dense pubescence above and stubby bristles below.

Distribution. Rainforest localities of north Queensland as above.

Special Comments

This species resembles *M. distincta* Wheeler & Takada (described from Micronesia) in general morphology, especially with respect to the finger-like processes of the hypandrium; the male genitalia are, however, quite distinct in other respects from those figured by Wheeler and Takada (1964).



Figs 60–62. Wings of: *60*, *Microdrosophila takadai*: *61*, *M. diserepantia*; *62*, *M. pleurolineata*.

In possessing long hairs on the third antennal segment, *M. takadai* resembles the 'typical' species of the *Drosophila* subgenus *Hirtodrosophila* (Wheeler and Takada's description does not mention such hairs in *M. distincta*). The following species also possesses long hairs on the third antennal segment.

2. *Microdrosophila discrepantia*, sp. nov.

Types

Holotype ♂: Baroalba Creek Springs, 19 km NE. by E. of Mt Cahill, Northern Territory, 13.vi.1973, D.H. Colless (ANIC). Paratypes: Northern Territory: same data as holotype, 8♂, 6♀ (ANIC); Howard Springs, June 1964, K.R. Norris, 2♂, 2♀ (ANIC); Lee Point, June 1964, K.R. Norris, 1♀ (ANIC). Queensland: Mossman Gorge, 24.iv.1967, D.H. Colless, 1♂ (ANIC); Lake Placid near Cairns, 2.i.1959, D.K. McAlpine, 1♂ (AM); Big Mitchell Creek, Mareeba-Molloy Road, 4.v.1967, D.H. Colless, 1♂ (ANIC); The Crater near Herberton, 30.i.1972, D.K. McAlpine and G. Holloway, 1♂ (AM); Beatrice River, Palmerston National Park, 17.xii.1961, D.K. McAlpine, 1♀ (AM); Kuranda Range State Forest, 20.iv.1967, D.H. Colless, 2♀ (ANIC); The Boulders, Babinda, 10.v.1967, D.H. Colless, 1♂ (ANIC); Bilyana, 25.7 km SW. of Tully, 15.vii.1971, Z. Liepa, 1♂, 4♀ (ANIC); Broken River, Eungella, 9.xii.1961, McAlpine and Lossin, 5♂, 3♀ (AM); Upper Broken River, 12.xii.1961, McAlpine and Lossin, 1♂ (AM); Woombye, near Nambour, 11–16.x.1965, D.H. Colless, 3♂ (ANIC); Kenilworth State Forest, 5.ii.1961, D.K. McAlpine, 1♂, 1♀ (AM); Mapleton, 5.ii.1961, D.K. McAlpine, 1♂, 4♀ (AM); Mt Tamborine, 2.ii.1961, D.K. McAlpine, 1♂ (AM). New South Wales (all AM): rainforest, Iluka, Clarence River, 25.xi.1970, D.K. McAlpine, 1♂; Huonbrook near Mullumbimby, 4.xii.1961, McAlpine and Lossin, 2♂; The Island, Bellingen, 29.iii.1960, D.K. McAlpine, 2♂.

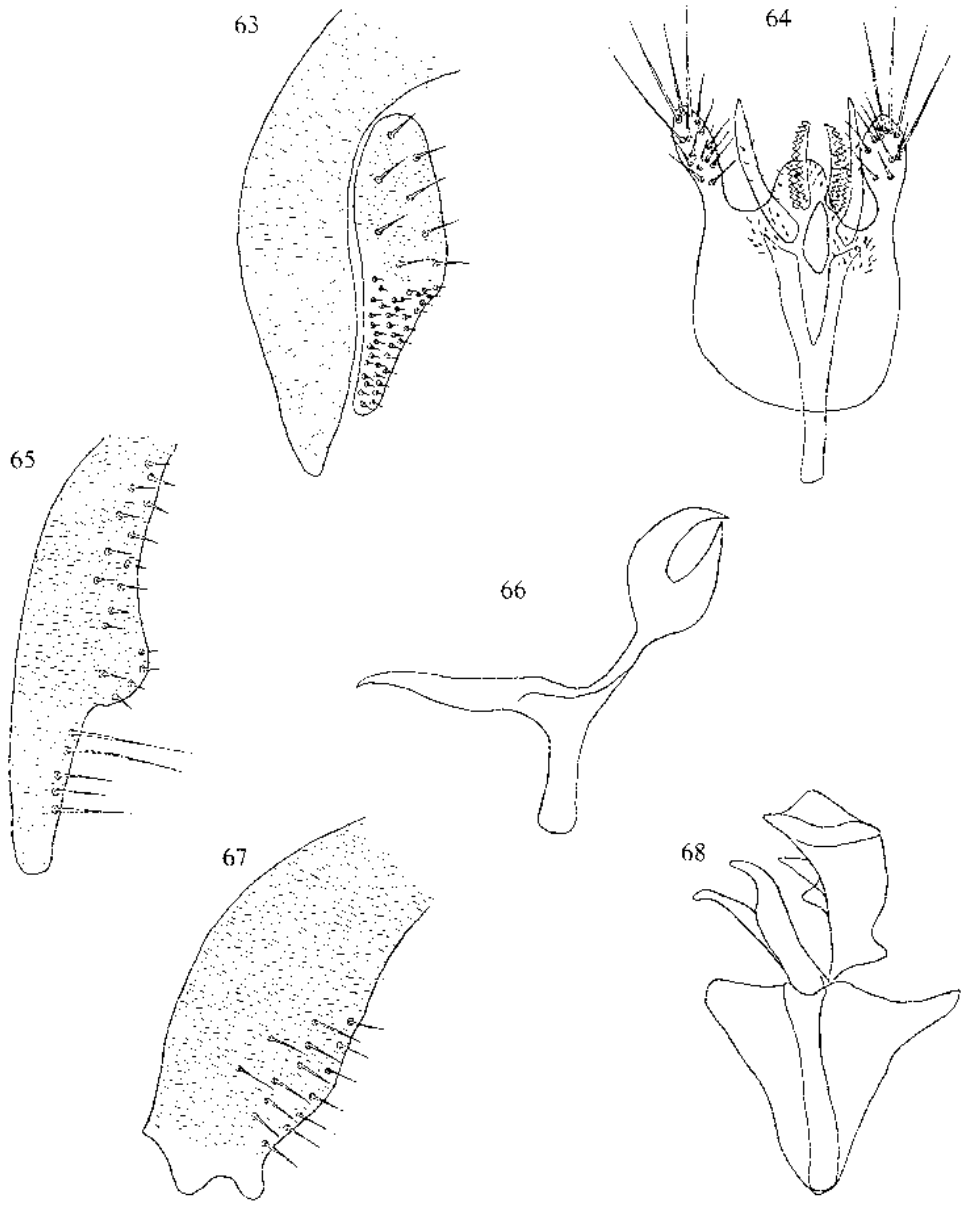
Distinguishing features. Body tan to brown; pleura pale below; 6th abdominal tergite with large lateral black spots (less obvious in darker specimens); 4*V*, 5*X* and *M*-indices unusually high; carina strongly sexually dimorphic; all bristles on head and thorax luteous.

Body length. 1.5 mm (holotype); 1.5–1.9 mm (paratype range).

Head. Arista with 6–8 rays above and 2 below plus terminal fork (both sexes). Front 2.2 times broader than long, shiny tan, paler laterally (almost glassy in some specimens), incised by oblique line on each side extending from inner vertical bristle to middle of anterior margin; ocellar triangle with slight blackening only immediately adjacent to each ocellus. 2nd antennal segment tan; 3rd segment small, tan, with long hairs. Carina in males very narrow above, almost knife-like, a little wider below, gradually falling away towards clypeal margin; carina in females rather broad above, a little broader below, smoothly rounded, gradually falling away towards clypeal margin. Face whitish to pale tan. Palp dusky, with several large apical and subapical bristles. Cheek narrow, linear, pale, with large bristle in posterior corner. Eye with dense fine pile. Proclinate orbital bristle 0.6 length of posterior reclinate orbital, latter closer than former to orbital margin. Anterior reclinate orbital bristle distinguishable but short and very fine, lateral to proclinate orbital. Ocellar, vertical and postvertical bristles large, latter rather widely spaced.

Thorax. Mesonotum tan to dark tan. Acrostichal hairs rather irregular, in *c*. 8 rows in front of dorsocentral bristles, 2 rows between dorsocentrals. Ratio anterior :

posterior dorsocentrals 0.7. Scutellum tan. Anterior scutellar bristles fine, 0.3 length of posterior scutellars; posterior scutellar bristles large. Pleura weakly dark brown above line separating upper ¾ of mesopleuron from lower ¼, pale tan below. Anterior sternopleural bristle very fine, 0.4 length of posterior sternopleural, latter large. Haltere tan. Legs tan; weak preapical bristle present on each tibia; strong apical on 2nd tibia.



Figs 63, 64. *Microdrosophila takadai*: *63*, male external genitalia; *64*, male internal genitalia.
Figs 65, 66. *Microdrosophila discrepantia*: *65*, male external genitalia; *66*, aedeagus.
Figs 67, 68. *Microdrosophila pleurolineata*: *67*, male external genitalia; *68*, male internal genitalia.

Wing (Fig. 61). Hyaline, barely acute. *C*-index, 1.0; 4*V*-index, 5.9; 5*X*-index, 9.1; *M*-index, 2.8. 3rd costal section with heavy setation on basal 0.85. Length (holotype), 1.4 mm.

Abdomen. Shiny tan to blackish brown. Tergite 6 in most specimens with large black spot on each side, usually occupying full length of tergite, leaving only narrow median pale band; spots less obvious in specimens with darker abdomens.

Male genitalia (Figs 65, 66). Anal plate not separated from genital arch; clasper absent; aedeagus strongly sclerotized, apically pointed, with bifid posterior process.

Distribution. Widespread in Australia from New South Wales to the Northern Territory.

Specimens Examined

Types as above. **Queensland:** Mapleton, 5.ii.1961, D.K. McAlpine, 1♀ (damaged) (AM).

3. *Microdrosophila pleurolineata* Wheeler & Takada

Microdrosophila pleurolineata Wheeler and Takada, 1964, p. 217. (Holotype in Washington; type locality Palau Is, Micronesia.)

Distinguishing features. Body tan; abdomen darker; arista with numerous rays in male, fewer in female; pleura weakly darkened above, pale below; carina dimorphic.

Body length. *C.* 2.1–2.4 mm.

Head. Arista with 10–13 rays above and 4 rays below plus terminal fork in males, with 8–9 rays above and 3–4 rays below plus terminal fork in females. Front 2.1 times broader than long, shiny tan, paler laterally, with narrow darker oblique band on each side from inner vertical bristle to middle of anterior margin, latter produced forwards a little between antennal bases; ocellar triangle blackened within. 2nd antennal segment tan, dusky laterally; 3rd segment dusky, with somewhat elongated hairs. Carina in males low, very narrow, slightly widened below; carina in females prominent, smoothly rounded. Face tan above, pale tan to whitish below. Palp dusky, with several long bristles. Cheek pale, linear, narrow. Eye with dense fine pile. Proclinate orbital bristle 0.85 length of posterior reclinate orbital, former a little closer than latter to orbital margin. Anterior reclinate orbital just distinguishable from microchaetae, posterolateral to proclinate orbital. Ocellar and vertical bristles large; postverticals just displaced on to occiput, smaller in males.

Thorax. Mesonotum shiny tan. Acrostichal hairs in *c.* 8 rows in front of dorsocentral bristles, 6–8 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.7. Scutellum tan. Anterior scutellar bristles fine, 0.4 length of posterior scutellars. Pleura weakly darkened above upper margin of sternopleuron, pale below. Anterior sternopleural bristle ½ length of posterior sternopleural. Haltere tan, weakly infuscated. Legs tan; weak preapical bristle present on 3rd tibia only; strong apical on 2nd tibia only.

Wing (Fig. 62). Hyaline, barely acute. *C*-index, *c.* 1.2; 4*V*-index, *c.* 4.7; 5*X*-index, *c.* 4.9; *M*-index, *c.* 2.0. 3rd costal section with heavy setation on basal 0.9. Length, *c.* 2.1 mm.

Abdomen. Entirely blackish tan.

Male genitalia (Figs 67, 68). Genital arch with small bare clasper-like process; anal plate continuous with genital arch; aedeagus strongly sclerotized, complex, with long slender process bearing fine subapical micropubescence.

Distribution. Previously reported from Micronesia, Japan and south-east Asia: Australian specimens from far northern Queensland to New South Wales.

Specimens Examined

Queensland: Iron Range, 14.vi.1971, J. Feehan, 1♂ (ANIC); The Crater near Herberton, 30.i.1972, D.K. McAlpine and G.A. Holloway, 2♂ (AM); Mt Edith Forest Road 1½ miles off Danbulla Road, 6.v.1967, D.H. Colless, 1♂ (ANIC); Mulgrave River, 4 miles W. of Gordonvale, 21.v.1966, D.K. McAlpine, 1♀ (AM); 13.2 miles from Gillies Highway turnoff, Goldsborough–Mulgrave Forest Road, swept, 29.viii.1976, P.A. Parsons, 1♀ (LT); Jarra Creek near Tully, swept rainforest, 12.viii.1976, P.A. Parsons, 2♂ (LT); Beerburrum Creek, Beerburrum, 23.v.1966, Z. Liepa, 1♂ (ANIC); Kenilworth State Forest, 5.ii.1961, D.K. McAlpine, 1♂ (AM). **New South Wales:** Huonbrook near Mullumbimby, 4.xii.1961, McAlpine and Lossin, 1♂ (AM).

Special Comments

Many of the Micronesian specimens described by Wheeler and Takada (1964) are darker than the Australian specimens, but the male genitalia of the latter match those figured by Wheeler and Takada.

4. *Microdrosophila hasta*, sp. nov.

Types

Holotype ♂: The Boulders, Babinda, Queensland, 10.v.1967, D.H. Colless (ANIC). Paratypes (all Queensland): same data as holotype, 5♂, 3♀ (ANIC); Mossman Gorge, 24.iv.1967, D.H. Colless, 3♂ (ANIC); Fisher Creek, Palmerston Highway, 30.iv.1967, D.H. Colless, 1♂ (ANIC); Lacey's Creek, 13.v.1980, I. Naumann, 1♂, 1♀ (ANIC); Bramston Beach near Innisfail, rainforest fringe, 30.iv.1967, D.H. Colless, 2♂; as preceding but open savannah, 1♀ (ANIC); Jarra Creek near Tully, swept rainforest, 27.viii.1976, Bock and Parsons, 2♂, 12.viii.1976, P.A. Parsons, 1♂ (AM); Mt Bartle Frere (base), swept rainforest, 19.iv.1977, P.A. Parsons, 1♂ (LT).

Distinguishing features. Body dark above, pleura pale below; carina well developed; face white below; fringe of heavy bristles on 3rd costal section almost entire.

Body length. 1.9 mm (holotype); 1.9–2.2 mm (paratype range).

Head. Arista with 8 rays above (males) or 5–7 rays above (females) and 3 rays below plus terminal fork. Front 1.9 times broader than long, tan, paler about orbits, darkened within ocellar triangle. 2nd antennal segment dusky tan; 3rd segment short, round, dusky. Carina well developed, stronger in female, narrow above, considerably broader below, rounded, gradually tapering to clypeal margin. Face tan above, white below. Palp black, with 2 large and several smaller bristles. Cheek slightly curved, narrow. Eye with dense fine pile. Proclinate orbital bristle 0.75 length of posterior reclinate orbital and closer than latter to orbital margin; anterior reclinate orbital exceedingly fine, short, barely distinguishable from other frontal microchaetae. Ocellar and vertical bristles large; postverticals larger in females, displaced on to occiput.

Thorax. Mesonotum dark brown, a little paler anteriorly, subshining. Acrostichal hairs in *c*. 8 rows in front of dorsocentral bristles, 4 rows between dorsocentrals.

Ratio anterior : posterior dorsocentrals 0.7. Scutellum dark brown. Anterior scutellar bristles short, weak; posterior scutellars large. Pleura dark brown above level of upper margin of sternopleuron, pale tan below. Anterior sternopleural bristle fine, 0.5

Figs 69–71. Wings of: *69, Microdrosophila hasta*. *70, M. ochracella*; *71. M. residua.*

length of posterior sternopleural. Stalk of haltere brown; knob almost black. Legs pale tan; weak preapical bristles present on 2nd and 3rd tibiae; strong apical bristle on 2nd tibia.

Wing (Fig. 69). Acute, with faint brownish tinge. *C*-index, 1.2; 4*V*-index, 3.7; 5*X*-index, 4.3; *M*-index, 1.3. 3rd costal section with heavy setation on basal 0.95. Length (holotype), 1.8 mm.

Abdomen. Entirely dark blackish brown, shining.

Male genitalia (Figs 72, 73). Anal plate partly separated from genital arch; aedeagus very strongly sclerotized and dark, spear-like, protruding from and clearly visible in most pinned specimens, without ornamentation, with large curved dorsal process.

Distribution. Known only from above north Queensland localities.

5. *Microdrosophila ochracella* Wheeler & Takada

Microdrosophila ochracella Wheeler and Takada, 1964, p. 218. (Holotype in Washington; type locality Palau Is, Micronesia.)

Distinguishing features. Body mid to dark brown above, pleura paler below; carina well developed; scutellum with additional hair on (usually) each side anterior to basal scutellar bristle.

Body length. *C*. 1.9–2.4 mm.

Head. Arista with 10–11 rays above and 3–4 rays below plus terminal fork in males, with 7–8 rays above and 3 rays below plus terminal fork in females. Front 1.9 times broader than long, shiny tan, darkened centrally; ocellar triangle blackened within. 2nd and 3rd antennal segments dusky. Carina large, broad (narrower in males), as broad above as below. Face pale tan. Palp tan, only slightly dusky, with 2 large and several smaller bristles. Cheek slightly curved, narrow, pale. Eye with dense fine pile. Proclinate orbital bristle 0.8 length of posterior reclinate orbital and closer to orbital margin than latter; anterior reclinate orbital indistinguishable from microchaetae. Ocellar and vertical bristles large; postverticals large, a little smaller in males, displaced on to occiput.

Thorax. Mesonotum shiny mid-brownish, paler anteriorly. Acrostichal hairs in *c*. 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.7. Scutellum mid-brown. Anterior scutellar bristles fine, *c*. 0.4 length of posterior scutellars; small additional hair present on each side in most specimens anterior to basal scutellar bristle. Pleura mid to dark brown above level of upper margin of sternopleuron, pale tan below. Anterior sternopleural bristle rather fine, 0.6 length of posterior sternopleural. Haltere mid-brown. Legs pale tan; weak preapical bristles present on 2nd and 3rd tibiae; apical bristle on 2nd tibia only.

Wing (Fig. 70). Slightly acute, with faint brownish tinge. *C*-index, *c*. 1.1; 4*V*-index, *c*. 4.0; 5*X*-index, *c*. 4.7; *M*-index, *c*. 1.6. 3rd costal section with heavy setation on basal 0.85. Length, *c*. 2.1 mm.

Abdomen. Entirely blackish brown.

Male genitalia (Figs 74, 75). Genital arch produced into long finger-like process below; anal plate not separated from genital arch; aedeagus slender, simple, narrowed and bare apically, with subapical pubescence.

Distribution. Previously recorded only from Micronesia; Australian specimens from rainforests of north Queensland.

Specimens Examined

Queensland: Lake Eacham National Park, 19.iv.1977, P.A. Parsons, 1♀ (LT); Wongabel State Forest, 5.v.1967, D.H. Colless, 1♂ (ANIC); Upper Mulgrave River, 10 miles Goldsborough Road, 9.v.1967, D.H. Colless, 1♂ (ANIC); Gillies Highway 2 miles W. of Little Mulgrave, 16.iv.1967, D.H. Colless, 1♀ (ANIC); 13.2 miles from Gillies Highway turnoff, Goldsborough–Mulgrave Forest Road, 29.viii.1976, P.A. Parsons, 1♂ (LT); The Boulders, Babinda, 10.v.1967, D.H. Colless, 1♀ (ANIC); Jarra Creek near Tully, swept rainforest, 12.viii.1976, P.A. Parsons, 1♂, 2♀ (LT), 1♂, 2♀ (AM); as in preceding but 27.viii.1976, Bock and Parsons, 1♂ (LT).

6. *Microdrosophila jarrae*, sp. nov.

Types

Holotype ♂: Jarra Creek near Tully, Queensland, swept rainforest, 12.viii.1976, P.A. Parsons (ANIC). Paratype ♂: same data as holotype (ANIC).

Distinguishing features. Body tan, pleura weakly darkened; 3rd costal section with heavy setation on basal 0.75 only; hypandrium of male genitalia with very strongly sclerotized, slender, pointed black lateral processes obvious in pinned specimen without dissection.

Body length. 2.1 mm.

Head. Arista with 6–7 rays above and 2 rays below plus terminal fork. Front 2.3 times broader than long, shiny tan with narrow dull oblique bands from inner vertical bristle to middle of anterior margin; ocellar triangle with some blackening adjacent to ocelli. 2nd antennal segment tan, dusky laterally; 3rd segment dusky tan with moderately long hairs. Carina prominent, narrow, rounded. Face tan above, whitish below. Palp tan above, dusky below, with several long bristles. Cheek slightly curved, narrow, whitish, with long bristle in posterior corner. Eye with short dense pile. Proclinate orbital bristle *c*. 0.6 length of posterior reclinate orbital, former closer than latter to orbital margin; anterior reclinate orbital bristle indistinguishable from adjacent microchaetae. Ocellar, vertical and postvertical bristles large, latter displaced on to occiput and rather widely separated.

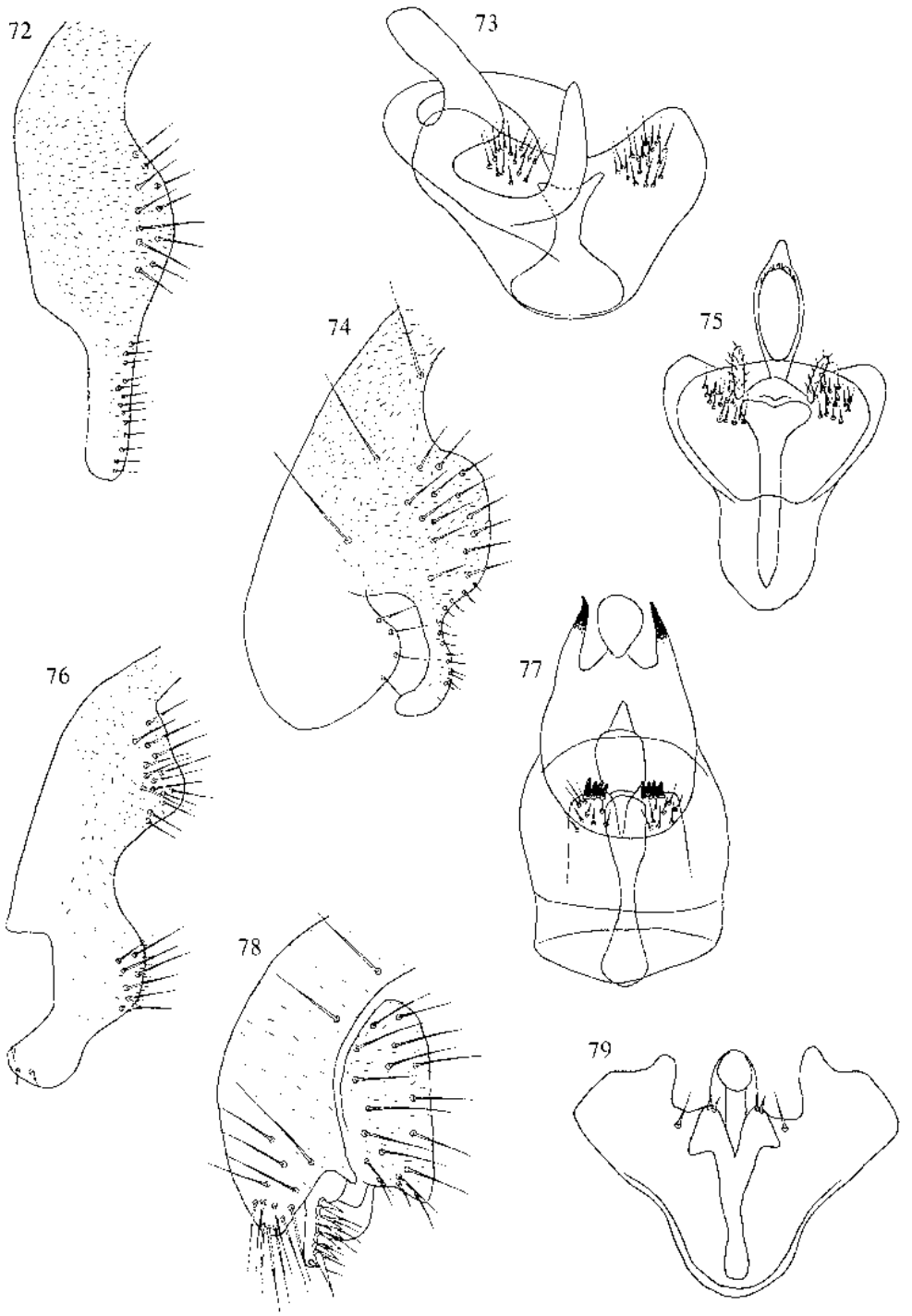
Thorax. Mesonotum shiny tan. Acrostichal hairs in 6–8 rows in front of dorsocentral bristles, 2–4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.7. Scutellum shiny tan. Anterior scutellar bristles 0.5 length of posterior scutellars. Pleura weakly darkened above level of upper margin of sternopleuron, pale tan below. Anterior sternopleural bristle rather fine, 0.5 length of posterior sternopleural. Haltere tan, knob weakly darkened basally. Legs tan; preapical and apical bristles on 2nd tibia only.

Wing. Hyaline, not acute. *C*-index, 1.3; 4*V*-index, 4.1; 5*X*-index, 4.4; *M*-index, 1.7, 3rd costal section with heavy setation on basal 0.75. Length, 2.2 mm.

Abdomen. Entirely dark tan.

Male genitalia (Figs 76, 77). Clasper not separated from genital arch, latter broadly produced below; aedeagus very weakly sclerotized, without ornamentation; hypandrium with very prominent lateral horn-like processes; decasternum toothed.

Distribution. Known only from type locality.



Figs 72, 73. *Microdrosophila hasta*: *72*, male external genitalia; *73*, male internal genitalia.
Figs 74, 75. *Microdrosophila ochracella*: *74*, male external genitalia; *75*, male internal genitalia.
Figs 76, 77. *Microdrosophila jarrae*: *76*, male external genitalia; *77*, male internal genitalia.
Figs 78, 79. *Microdrosophila residua*: *78*, male external genitalia; *79*, male internal genitalia.

7. *Microdrosophila residua*, sp. nov.

Types

Holotype ♂: Jarra Creek near Tully, Queensland, swept rainforest, P.A. Parsons, 12.viii.1976 (ANIC). Paratypes (all Queensland): 5–8 miles Mt Lewis Road off Mossman–Mt Molloy Road, 22.iv.1967, D.H. Colless, 1♀ (ANIC); Mossman Gorge, 23.iv.1967, D.H. Colless, 1♀ (ANIC); Wright's Bridge, Lake Eacham, swept over mushroom bait, 8.xi.1975, P.A. Parsons, 1♀ (LT); Lacey's Creek, 13.v.1980, I. Naumann, 2♂ (ANIC); Upper Mulgrave River, swept ex rainforest, 19.viii.1976, P.A. Parsons, 2♂, 2♀ (AM), 1♂, 1♀ (LT).

Distinguishing features. Thorax and abdomen entirely dark; carina small, high.

Body length. 2.1 mm (holotype); 2.1–2.6 mm (paratype range).

Head. Arista with 7 rays above and 2 rays below plus terminal fork in both sexes. Front 1.6 times broader than long, shiny dark brownish, paler anteriorly and in dull band on each side between periorbit and central triangle. 2nd antennal segment tan, dusky basally; 3rd segment black. Carina small between antennal bases only, a little larger in female than in male. Face white to tan. Palp dusky, with large apical bristle and smaller subapical bristles. Cheek rather broad, tan above, darker on lower margin. Eye with dense fine pile, ovoid, horizontal and vertical diameters about equal. Proclinate orbital bristle a little shorter than posterior reclinate orbital; anterior reclinate orbital *c*. 0.4 length of proclinate orbital but very fine, lateral and slightly posterior to latter. Ocellar, vertical and postvertical bristles well developed.

Thorax. Mesonotum, scutellum and pleura entirely shiny dark chocolatey brown. Acrostichal hairs in *c*. 8 rows in front of dorsocentral bristles, *c*. 4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6–0.7. Anterior scutellar bristles 0.7–0.8 length of posterior scutellars. Anterior sternopleural bristle fine, *c*. 0.5 length of posterior sternopleural. Haltere pale tan. Legs dark brown, paler at joints; long preapical bristles present on 2nd and 3rd tibiae; apical bristle on 2nd tibia only.

Wing (Fig. 71). Rounded apically, with weak brownish tinge. *C*-index, 1.5; 4*V*-index, 3.0; 5*X*-index, 2.5; *M*-index, 1.0. 3rd costal section with heavy setation on basal 0.7 only. Length (holotype), 2.1 mm.

Abdomen. Entirely shiny dark brownish black.

Male genitalia (Figs 78, 79). Anal plate separated from genital arch; clasper developed, with strong medial teeth; aedeagus strongly sclerotized but small, apically rounded, without ornamentation.

Female genitalia. Egg guide strongly developed, with very large apical and several smaller marginal teeth.

Distribution. Known only from above localities, rainforests of north Queensland.

Special Comments

This species is somewhat peripheral within the genus *Microdrosophila*. In relation to the 'typical' species the body is larger, the head a little longer in relation to breadth, the anterior dorsocentral bristles a little further from the transverse suture, the posterior reclinate orbital bristle better developed, and the anterior scutellar

bristles a little larger; the egg guides are also developed, and the male genitalia are atypical in possessing separated anal plates and well developed claspers. The species nevertheless fits most readily into *Microdrosophila*, the closest alternative being to force it into the *Drosophila* subgenus *Hirtodrosophila* as a more atypical species.

Key to Australian Species of *Microdrosophila*

1. Body entirely dark; male genitalia with strong toothed clasper; egg guide strongly developed ..... *residua*
   Body not entirely dark; male genitalia without toothed clasper; egg guide undeveloped 2
2(1). Fringe of heavy bristles on 3rd costal section entire ..... *takadai*
   Fringe of heavy bristles on 3rd costal section not entire (up to basal 0.95) 3
3(2). Mesonotum dark brown; pleura similarly dark brown above abruptly changing to pale tan below ..... *hasta*
   Mesonotum tan or dusky tan; upper pleura more or less darker than mesonotum, lower pleura pale 4
4(3). Abdomen more or less blackened, darker than mesonotum 5
   Abdomen largely or entirely pale, not noticeably darker than mesonotum except on last tergite 6
5(4). Upper pleura weakly and unevenly darkened; scutellum without additional basal hair(s) ..... *pleurolineata*
   Upper pleura uniformly dark brownish; scutellum with additional basal hair(s) ..... *ochracella*
6(4). 6th abdominal tergite with large lateral black spots ..... *discrepantia*
   6th abdominal tergite without lateral black spots ..... *jarrae*

XX. Genus **Mulgravea**, gen. nov.

Head broader than thorax; front highly polished, divided by narrow dull band on each side; postvertical and anterior reclinate orbital bristles vestigial; ocellar bristles outside ocellar triangle; arista large, with numerous straight rays; carina vestigial; mesonotum and scutellum subshining; anterior dorsocentral bristles large, placed almost at transverse suture; mesonotum with trace only of acrostichal hairs in front of dorsocentral bristles; 1 humeral bristle present; presutural bristle absent; wing slender; anal vein absent; abdomen elongate, slender.

Type-species: *Mulgravea minima*, sp. nov.

The generic name is derived from the locality at which all but one of the type specimens were collected, and is considered feminine.

This genus shares with *Liodrosophila*, *Sphaerogastrella* and *Hypselothyrea* a glossy front divided by dull lines or bands; in all other respects it is distinct from each of these genera. The pattern of bristle reduction in the type and only included species of *Mulgravea* is of particular interest: while the postvertical and anterior reclinate orbital bristles are rudimentary, the other cephalic bristles are large, and while traces only of acrostichal hairs are present on the thorax, the dorsocentral and scutellar bristles are very large.

1. ***Mulgravea minima***, sp. nov.

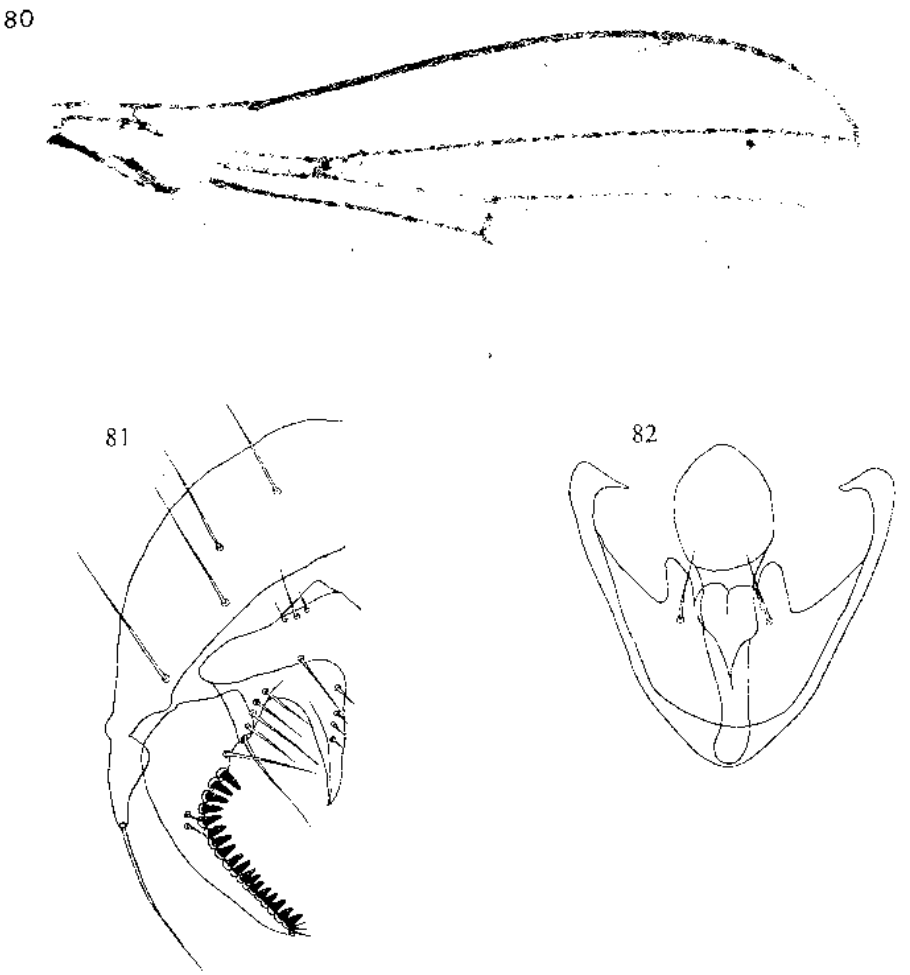
Types

Holotype ♀: Upper Mulgrave River 10 miles Goldsborough Road, north Queensland, 9.v.1967, D.H. Colless (ANIC). Paratypes: same data as holotype, 3♂, 7♀ (ANIC), 1♂, 3♀ (AM); Mossman Gorge, north Queensland, 23.iv.1967, D.H. Colless, 1♂ (ANIC).

Distinguishing features. As given in generic diagnosis above; mesonotum and scutellum each yellow with large lateral dark spots.

Body length. 2.2 mm (all specimens of similar length).

Head. Arista with 9–11 rays above and 4 rays below plus terminal fork, all rays straight and close together. Front 1.4 times broader than long, largely dark brown, darker within ocellar triangle, yellow anteriorly between dull bands, with general violet tinge. Bands separating central and lateral areas dull black, widened anteriorly.



Figs 80–82. *Mulgravea minima*: *80*, wing; *81*, male external genitalia; *82*, male internal genitalia.

Periorbits produced downwards below level of central triangle anteriorly. 2nd antennal segment yellow; 3rd segment black in upper half, pale tan in lower half. Face yellowish. Palp tan, with apical bristle. Cheek curved, very narrow. Slender vibrissa present; 2nd oral bristle 0.75 length of 1st; remaining orals fine and short; larger bristle present in posterior corner of cheek. Eye with moderately dense pile. Proclinate and posterior reclinate orbital bristles subequal, rather close, latter a little closer to orbital margin. Ocellar and vertical (especially inner vertical) bristles very large. Posterior margin of front rounded on to occiput.

Thorax. Mesonotum with very fine sparse bloom, yellow anteriorly and between dorsocentral bristles, with large blackish brown spot on each side, spot shiny with violet tinge posteromedially, otherwise dull. Trace of 2 rows of acrostichal hairs present anteriorly with additional microchaetae in extended lines of dorsocentral bristles. Anterior dorsocentral bristles longer than posterior dorsocentrals. Scutellum yellow with lateral black spots. Anterior scutellar bristles a little shorter than posterior scutellars. Pleura with weak bloom (strong on upper posterior part of sternopleuron), largely dark brown, mesopleuron with paler area. Sternopleuron with 1 large bristle. Haltere yellowish. Legs dark tan, femora paler in upper half. Preapical bristles present on all tibiae; apical bristle on 2nd tibia only.

Wing (Fig. 80). Brownish tinge present (weak near posterior border). Anal cell open. *C*-index, 2.4; 4*V*-index, 2.3; 5*X*-index, 3.5; *M*-index, 0.7. 3rd costal section with heavy setation on basal 0.5. Length (holotype), 1.8 mm.

Abdomen. Subshining blackish brown. Tergites 1–2 fused.

Male genitalia (Figs 81, 82). Anal plate small but strongly sclerotized; clasper elongate, with concave medial margin bearing numerous peg-like black bristles; aedeagus apically expanded and rounded.

Female genitalia. Egg guide large, strong, pointed, with strong apical and several ventral marginal teeth.

Distribution. Known only from type specimens collected at two north Queensland rainforest localities.

XXI. Genus **Mycodrosophila** Oldenberg

Mycodrosophila Oldenberg, 1914, p. 4. Type-species *Amiota poecilogastra* Loew, 1874, by monotypy; type locality southern Russia.

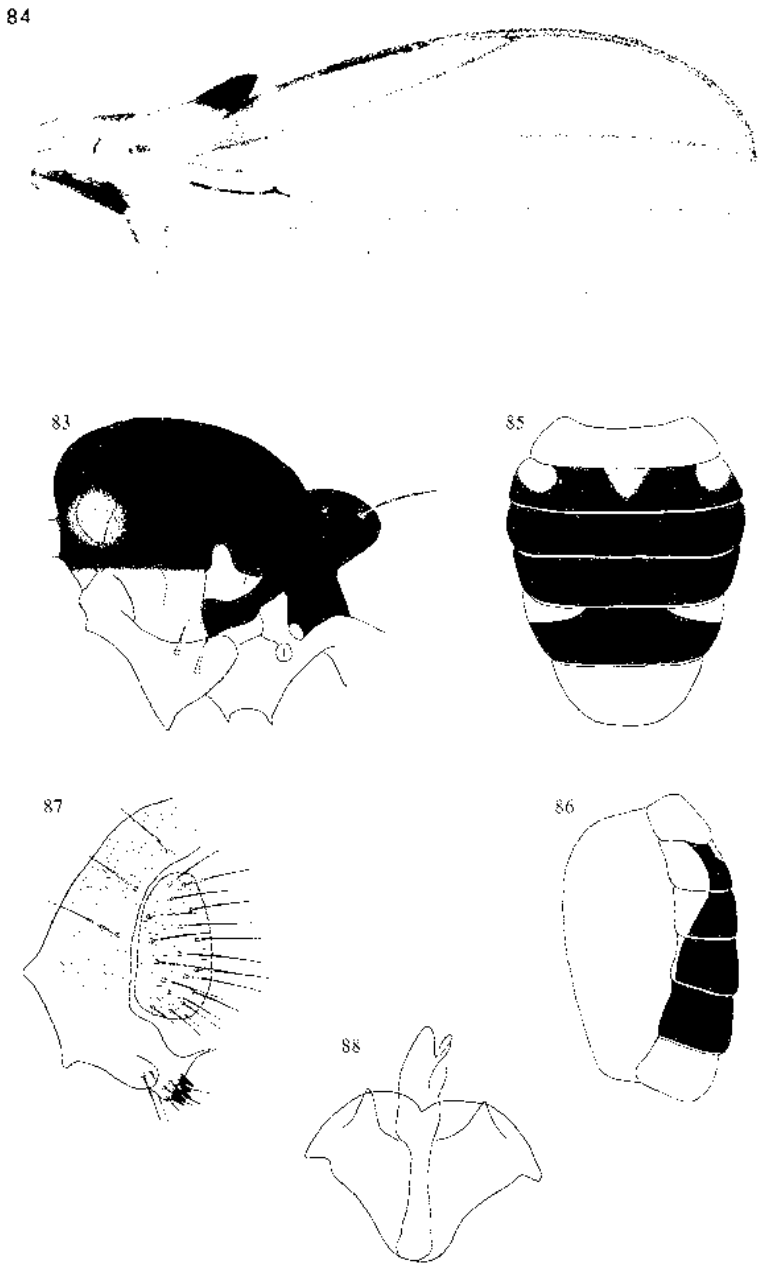
Arista large, plumose, usually with single ventral ray; carina usually well developed; vibrissa single; greatest diameter of eye vertical; eye bare; middle orbital bristle small, fine; ocellar, vertical and postvertical bristles large; mesonotum strongly rounded, arched, usually darkly coloured, shiny; scutellum broadly rounded, dark, velvety or subshining; anterior dorsocentral bristles very small or absent; acrostichal hairs in numerous rows; prescutellar bristles absent; basal scutellar bristles short, fine; apical scutellars large, convergent; apex of costa (at distal costal incision) usually darkened and protruding as a blackened lappet; front usually strongly silvery, especially centrally, when viewed at acute angles.

The Australian species of *Mycodrosophila* were reviewed recently by Bock (1980*a*); *M. argentifrons* Malloch, the only species of the genus previously recorded from Australia, and *M. separata* (de Meijere), previously known from south-east Asia, were discussed, and 18 new species were described; a further new species represented by a single specimen in poor condition was also noted. Several further specimens of the latter species are now available and the species is described below as *M. joalahae*. No significant new information is available for any of the other species and reference may therefore be made to Bock (1980*a*) for full descriptions and discussion. The key to species is reproduced below with the inclusion of *joalahae*.

Mycodrosophila joalahae, sp. nov.

Types

Holotype ♂: Joalah National Park, Queensland, under bracket fungus, 2.xii.1976, P.A. Parsons (ANIC). Paratypes (both Queensland): Mt Spec, on bracket fungus, 14.viii.1976, P.A. Parsons, 1♂ (ANIC); Eungella National Park, swept, 8.viii.1978, P.A. Parsons, 1♂ (LT).



Figs 83–88. *Mycodrosophila joalahae*: *83*, thorax; *84*, wing; *85*, abdomen (dorsal); *86*, abdomen (lateral); *87*, male external genitalia; *88*, male internal genitalia.

Distinguishing features. Rather small; pleura with band; wing without band; *C*-index low.

Body length. 1.9 mm (holotype); 1.9–2.0 mm (paratype range).

Head. Arista with 4 rays above and 1 ray below plus terminal fork. Front 1.3 times broader than long, tan anteriorly and centrally, otherwise blackish, with strong silvery sheen. 2nd antennal segment tan; 3rd segment dusky tan. Carina prominent but very narrow above, broader below, lateral margins almost squared, smoothly rounded ventrally. Face dark tan. Palp dusky, with prominent apical bristle. Cheek rather broad, linear, pale in posterior corner, otherwise dark. Proclinate orbital bristle slightly shorter than posterior reclinate orbital; anterior reclinate orbital very small, *c*. midway between other 2 bristles.

Thorax (Fig. 83). Mesonotum dark blackish brown with violet tinge. Acrostichal hairs in at least 10 rows. Scutellum subshining blackish. Pleura pale tan below level of wing articulation, with broad dark band on pleurotergite and power part of pteropleuron. Stalk and knob of haltere blackish. Legs pale tan; apical bristle on 2nd tibia only.

Wing (Fig. 84). Faintly brownish, with large lappet and trace of darkening behind lappet. *C*-index, 1.0; 4*V*-index, 2.8; 5*X*-index, 3.0; *M*-index, 1.1. 3rd costal section with heavy setation on basal 0.45. Length (holotype), 2.0 mm.

Abdomen (Figs 85, 86). Tergite 1 tan. Tergite 2 largely black, tan in central and lateral spots; incurved portion black laterally, tan medially. Tergites 3–4 black; incurved portions black, tergite 3 only tan at medial border. Tergite 5 black with anterolateral tan areas extending on to incurved portion, latter otherwise blackish. Tergite 6 tan.

Male genitalia (Figs 87, 88). Weakly sclerotized; clasper small, with only *c*. 5 medial teeth; aedeagus simple, apically bifid, slightly expanded and more strongly sclerotized subapically.

Female genitalia. Egg guide well developed, apically rounded, with toothed margin and a few long hairs.

Distribution. Collected at several localities in southern and northern Queensland.

Specimens Examined

Types as above. **Queensland:** Lamington National Park, 21.v.1959, E.N. Marks, 1♀ (UQ).

Key to Australian Species of *Mycodrosophila*

1.	Pleura with some darkening below level of wing articulation, at least on pleurotergite and lower part of pteropleuron	2
	Pleura uniform pale tan below level of wing articulation	10
2(1).	Pleura and legs entirely dark	*scotos*
	Pleura and legs not entirely dark	3
3(2).	Pleura with 2 broad longitudinal bands	*marksae*
	Pleura with single band or darkening	4
4(3).	Pleural darkening confined to pleurotergite and pteropleuron, or just extending on to lower posterior part of mesopleuron	5
	Pleural band more extensive, clearly extending across lower part of mesopleuron	8
5(4).	Wing with distinct dark band behind lappet	*variata*
	Wing with at most slight darkening behind lappet	6

6(5). Abdominal tergites 3 and 4 entirely black dorsally 7
Tergites 3 and 4 tan anteriorly, with posterior and central blackening ..... *aqua*

7(6). C-index *c.* 2.1 ..... *diversa*
C-index *c.* 1.0 ..... *joalahae*

8(4). Legs banded 9
Legs entirely tan ..... *minor*

9(8). Pleura band not reaching 1st coxa; cheek pale in posterior corner ..... *margoae*
Pleural band extending on to 1st coxa; cheek barely paler in posterior corner ..... *annulata*

10(1). Costa protruding as distinct enlarged black lappet at distal incision 12
Costa not protruding as enlarged lappet at distal incision 11

11(10). Apex of scutellum pale; costa barely darkened at distal incision ..... *separata*
Apex of scutellum not pale; costa appreciably darkened at distal incision ..... *compacta*

12(10). Wing darkened apically ..... *stigma*
Wing not darkened apically 13

13(12). Abdominal tergites 3 and 4 entirely black dorsally or with traces only of paler coloration 16
Tergites 3 and 4 black dorsally with distinct pale tan spots or markings 14

14(13). Tergites 3 and 5 with small pale tan submedian spots; tergite 4 with much larger pale markings ..... *rosemaryae*
Tergites 3–5 with markings not as above 15

15(14). Tergites 3–5 with large pale tan submedian spots ..... *argentifrons*
Tergites 3–5 with transversely elongate pale tan markings ..... *mulgravensis*

16(13). Wing with distinct dark band behind lappet 17
Wing with at most trace of darkening behind lappet 18

17(16). 6th abdominal tergite largely black; apical segment of stalk of haltere, and knob, blackened ..... *dianae*
6th tergite pale tan; apical segment of stalk of haltere tan, knob blackened basally only ..... *claudensis*

18(16). Facial carina broad, flat with bulbous protuberance below ..... *carinata*
Carina narrow or broad, without bulbous protuberance below 19

19(18). Carina greatly broadened below, flat; 2nd abdominal tergite pale tan anteriorly 20
Carina not greatly broadened below; 2nd tergite pale tan anteriorly in central and lateral spots only ..... *rayi*

20(19). Knob of haltere black; incurved portion of 5th abdominal tergite almost entirely black ..... *helenae*
Knob of haltere with weak blackening basally only; incurved portion of 5th tergite largely tan ..... *simplex*

XXII. Genus **Neotanygastrella** Duda

Neotanygastrella Duda, 1925, p. 206. Type-species *N. tricoloripes* Duda, 1925, by monotypy; type locality Costa Rica.

Arista plumose; postvertical bristles usually large; anterior reclinate orbital bristle anterior or lateral to proclinate orbital; carina low between antennal bases, bulbous below; front broad; acrostichal hairs in 6–8 rows; 2 pairs of dorsocentral bristles present; fore-femora and tibiae usually dark.

Neotanygastrella was established by Duda for a single central American species. Wheeler (1981) listed a total of 16 species in the genus, seven Neotropical species, five from West Africa (Ivory Coast), one from the Seychelles, one from Samoa, one from Borneo and one from Micronesia [although a further two Micronesian species were represented in the material examined by Wheeler and Takada (1964)]. This little-known genus therefore appears to be widespread in tropical and subtropical

regions, although not extensively speciated. One species, represented by only two specimens, is present in the Australian collections; the species closely resembles species A of Wheeler and Takada (1964), briefly described on the basis of one male specimen from Micronesia.

1. *Neotanygastrella janeae*, sp. nov.

Types

Holotype ♂: 5–8 miles Mt Lewis Road, off Mossman–Mt Molloy Road, north Queensland, 22.iv.1967, D.H. Colless (ANIC). Paratype ♀: Huonbrook near Mullumbimby, New South Wales, 2.iii.1965, D.K. McAlpine and R. Lossin (AM).

Distinguishing features. As given in generic diagnosis above; carina sulcate.

Body length. 2.4 mm (holotype); 2.6 mm (paratype).

Head. Arista large, fan-like, with 4 apically curved rays above and 2 straight rays below plus large terminal fork. Ratio frontal breadth : length 1.9; front tan anteriorly, darkening posteriorly; ocellar area and periorbits infuscated. 2nd antennal segment dark tan, dusky anteriorly; 3rd segment tan, dusky anteriorly. Carina with pronounced median sulcus. Face dusky. Palp dusky tan. Cheek curved, narrow, a little widened in posterior corner, dusky. Eye with sparse weak pile; greatest diameter vertical. Orbital bristles in ratio 2 : 1 : 3; anterior reclinate orbital situated well anterior and slightly lateral to proclinate orbital. Ocellar and vertical bristles large; postverticals as large as proclinate orbitals. Occiput with weak pruinosity.

Thorax. Mesonotum and scutellum mid to dark brownish. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4 rows narrowing to 2 between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.7. Scutellar bristles subequal; anterior scutellars divergent; posterior scutellars crossed. Pleura dusky dark brownish with paler sutures. Middle sternopleural bristle very weak. Haltere tan. Fore-coxa tan with darkening anteriorly above; fore-femur and tibia dark brownish; mid- and hind-femur and tibia weakly darkened. Tarsi long, slender, tan. Preapical bristles present on all tibiae; apical bristle on mid-tibia only.

Wing. Brownish tinge present. Anal vein absent. Subcosta very weak, present only as basal shadow. *C*-index, 1.7; 4*V*-index, 2.7; 5*X*-index, 2.3; *M*-index, 1.0. 3rd costal section with heavy setation on basal 0.75. Length (holotype), 2.4 mm.

Abdomen. Uniformly dark brown.

Female genitalia. Egg guide narrow, with marginal teeth.

Distribution. Known only from type specimens; evidently of widespread distribution (north Queensland and New South Wales) but rare.

XXIII. Genus **Nesiodrosophila** Wheeler & Takada

Nesiodrosophila Wheeler and Takada, 1964, p. 238. Type-species *N. lindae* Wheeler and Takada, 1964, by original designation; type locality Caroline Is, Micronesia.

Small species; anterior reclinate orbital bristle usually large; front more or less flat; ocellar bristles beside anterior ocellus, at periphery of or outside ocellar triangle; carina, if present, narrow; acrostichal hairs in up to 6 irregular rows; fore-femur with several very large bristles on outer side; egg guide very strongly developed.

Nesiodrosophila was established for the type-species. Five species are now included in the genus (Wheeler 1981) in addition to the type, one subsequently described from Taiwan, one from Japan, and three species previously described in *Drosophila*, two from Japan and one from Nepal. Several undescribed species from New Guinea are present in the collection of the Bishop Museum, Honolulu. Four species, three of them undescribed, are represented amongst the Australian collections.

1. *Nesiodrosophila lindae* Wheeler & Takada

Nesiodrosophila lindae Wheeler and Takada, 1964, p. 238. (Holotype in Washington; type locality Palau Is, Micronesia.)

Distinguishing features. Small; carina absent; pleura with broad dark brown longitudinal bands.

Body length. *C.* 1.5 mm.

Head. Arista with 4–5 apically curved rays above and 2 straight rays below plus terminal fork. Front 1.3 times broader than long, dark tan; periorbits pale; ocellar triangle infuscated. 2nd antennal segment dark tan, slightly dusky laterally; 3rd segment dusky. Face tan, with barest rudiment of carina between antennal bases. Palp tan, apically darkened, with large bristle. Cheek curved, narrow. 2nd oral bristle *c.* ½ length of 1st. Eye with short pile. Anterior reclinate orbital bristle only slightly smaller than proclinate and posterior reclinate orbitals, anterolateral to proclinate orbital. Postvertical bristles rather widely separated, parallel.

Thorax. Mesonotum mid-brown with darker median longitudinal band in middle 2 rows of acrostichals, and lateral darkening. Scutellum mid-brown, a little darker centrally. Acrostichal hairs in 6 irregular rows in front of dorsocentral bristles reducing to 2 rows near scutellum. Ratio anterior : posterior dorsocentrals *c.* 0.6. Pleura tan with 2 broad dark brown longitudinal bands, upper band across upper half of mesopleuron and pteropleuron and lower band across upper half of sternopleuron. Anterior sternopleural bristle short, fine; posterior sternopleural bristle very large. Haltere dark brown, knob paler posteriorly. Legs tan; preapical bristles present on all tibiae; apical bristle on 2nd tibia only.

Wing. Hyaline. *C*-index, *c.* 1.6; 4*V*-index, *c.* 2.9; 5*X*-index, *c.* 3.8; *M*-index, *c.* 1.2. 3rd costal section with heavy setation on basal 0.6. Length, *c.* 1.6 mm.

Abdomen. Dark brown. Tergites 4–6 with narrow pale anterolateral crescents, extending on to and widened on incurved portions of tergites.

Male genitalia. Figured by Wheeler and Takada (1964).

Female genitalia. Egg guide large, strongly sclerotized, with rounded dark brown ventral teeth largest apically.

Distribution. Previously recorded from Micronesia; Australian specimens from rainforest areas of north Queensland. Given the present known distribution, it is highly likely that the species also occurs in New Guinea.

Specimens Examined

Queensland: Bamboo Creek nr Miallo, N. of Mossman, 25.iv.1967, D.H. Colless, 1♂ (ANIC); Kuranda Range State Forest, 7–8 miles Black Mountain Road, 20.iv.1967, D.H. Colless, 1♀ (ANIC); Lake Placid, near Cairns, 26.v.1958, D.K. McAlpine, 1♀ (AM); Upper Mulgrave River, 10 miles Goldsborough Road, 9.v.1967, D.H. Colless, 1♀ (ANIC); The Boulders, Babinda,

10.v.1967, D.H. Colless, 2♀ (ANIC); River-bank rainforest, Silkwood, Innisfail District, 25.v.1958, D.K. McAlpine, 1♀ (AM).

Special Comments

According to the description given by Wheeler and Takada (1964), the Micronesian specimens of this species lack the mesonotal darkening described above, but the two forms otherwise match and thus seem conspecific.

2. ***Nesiodrosophila carinata***, sp. nov.

Types

Holotype ♂: The Boulders, Babinda, north Queensland, 10.v.1967, D.H. Colless (ANIC). Paratype ♂: Gillies Highway, 2 miles W. of Little Mulgrave, north Queensland, 18.iv.1967, D.H. Colless (ANIC).

Distinguishing features. Body small; carina developed but narrow; arista with numerous rays.

Body length. 1.4 mm (holotype); 1.6 mm (paratype).

Head. Arista with 7–8 rays above and 2–3 below plus terminal fork: basal rays straight: apical rays curved. Front 1.1 times broader than long, tan; periorbits silvery; ocellar triangle slightly blackened within, largely silvery. 2nd antennal segment tan: 3rd segment tan, slightly dusky. Carina well developed but high, narrow. Face tan. Clypeal margin with median indentation. Palp tan with large apical bristle. Cheek slightly curved, narrow. Eye with rather dense pile; greatest diameter of eye almost vertical. Proclinate and posterior reclinate orbital bristles subequal; anterior reclinate orbital a little smaller, lateral and slightly anterior to proclinate orbital. Postvertical bristles almost as large as ocellars.

Thorax. Mesonotum tan, slightly whitish especially anteriorly. Acrostichal hairs irregular but approximating 6 rows anteriorly reducing to 2 rows at scutellum. Ratio anterior : posterior dorsocentral bristles 0.7; anterior dorsocentrals close to suture. Scutellum tan; anterior and posterior scutellar bristles subequal. Pleura dark brownish on most of mesopleuron and pteropleuron and upper part of sternopleuron, gradually becoming paler on other areas. Anterior sternopleural bristle weak; posterior sternopleural strong. Haltere tan. Legs tan; preapical bristles present on 2nd and 3rd tibiae; apical bristle on 2nd tibia only.

Wing. Hyaline. *C*-index, 1.8; 4*V*-index, 2.6; 5*X*-index, 3.7; *M*-index, 1.1. 3rd costal section with heavy setation on basal 0.6. Length (holotype), 1.6 mm.

Abdomen. Tergites largely dark brown, paler anteriorly.

Distribution. Known only from type specimens, north Queensland.

Special Comments

This species is quite similar to *N. lindae*, but the latter lacks a carina and possesses more intense coloration.

3. *Nesiodrosophila plana*, sp. nov.

Types

Holotype ♀: Barrington House, 92 km NE. of Singleton, New South Wales (swamp), 28.vi.1976, Z. Liepa (ANIC). Paratypes: Queensland: Finch Hatton Gorge, 8.xii.1961, McAlpine and Lossin, 1♀ (AM); The Crater near Herberton, 16.xii.1961, McAlpine and Lossin, 1♂, 1♀ (AM); Summit, Walter Hill Range, Cardstone-Ravenshoe Road, 16.i.1967, McAlpine and Holloway, 1♂ (AM); 2 miles N. Tully River Bridge, Cardstone-Ravenshoe Road, 16.i.1967, McAlpine and Holloway, 1♀ (AM); Lake Eacham National Park, swept from foliage, Dec. 1974, I.R. Bock, 2♂ (ANIC); Millaa Millaa Falls, Atherton Tableland, 15.vii.1971, Z. Liepa, 1♀ (ANIC); Lake Placid near Cairns, 26.v.1958, D.K. McAlpine, 1♂, 1♀ (AM); Crediton Creek, near Eungella, 12.xii.1961, McAlpine and Lossin, 1♂ (AM); Upper Broken River, Eungella, 12.xii.1961, McAlpine and Lossin, 1♂, 1 ♀ (AM); Byfield, 10.v.1955, Common and Norris, 1♂ (ANIC); Woombye near Nambour, 11–16.x.1965, D.H. Colless, 1♂, 1♀ (ANIC); Kenilworth State Forest, 5.ii.1961, D.K. McAlpine, 1♀ (AM); Summer Creek, Little Yabba Forestry Road, near Kenilworth, 5.ii.1961, D.K. McAlpine, 1♂ (AM); Coomera River, Lamington National Park, 1200 ft, 28.v.1966, Z. Liepa, 3♂ (ANIC). New South Wales: Moonpar State Forest, nr Dorrigo, 4.iv.1960, D.K. McAlpine, 1♂ (AM); 33 miles Dorrigo-Coramba Road, 18.iv.1970, D.H. Colless, 1♂, 2♀ (ANIC); C. 2 miles NW. of Bruxner Park, 16.iv.1970, D.H. Colless, 1♂ (ANIC); Bruxner Park, near Coffs Harbour, 21.ii.1965, D.K. McAlpine, 1♂ (AM); Kurrajong, 26.x.1966, McAlpine and Holloway, 1♂ (AM); Mooney Mooney Creek nr Gosford, 20–29.xi.1975, D.K. McAlpine, 5♂, 2♀ (AM); Colo River, 25 km N. of Windsor, 9.x.1974, Z. Liepa, 2♂ (ANIC); Sassafras Gully, Springwood, Blue Mountains, 17.xi.1956, D.K. McAlpine, 2♂, 1♀ (AM); Mt Wilson, Blue Mountains, D.K. McAlpine, 28.xi.1959, 1♀, 20.v.1967, 1♀ (AM); Wentworth Falls, Blue Mountains, D.K. McAlpine, 4.xii.1956, 1♀, 29.xi.1958, 1♂, 1♀, 16.xi.1957, 1♀, 22.xi.1960, 1♀ (AM); 94 km NE. of Singleton, nr Barrington House, 28.vi.1976, Z. Liepa, 1♂ (ANIC).

Distinguishing features. Front large, flat; carina knife-like; clypeal margin milky white.

Body length. 2.9 mm (holotype); 2.1–2.9 mm (paratype range).

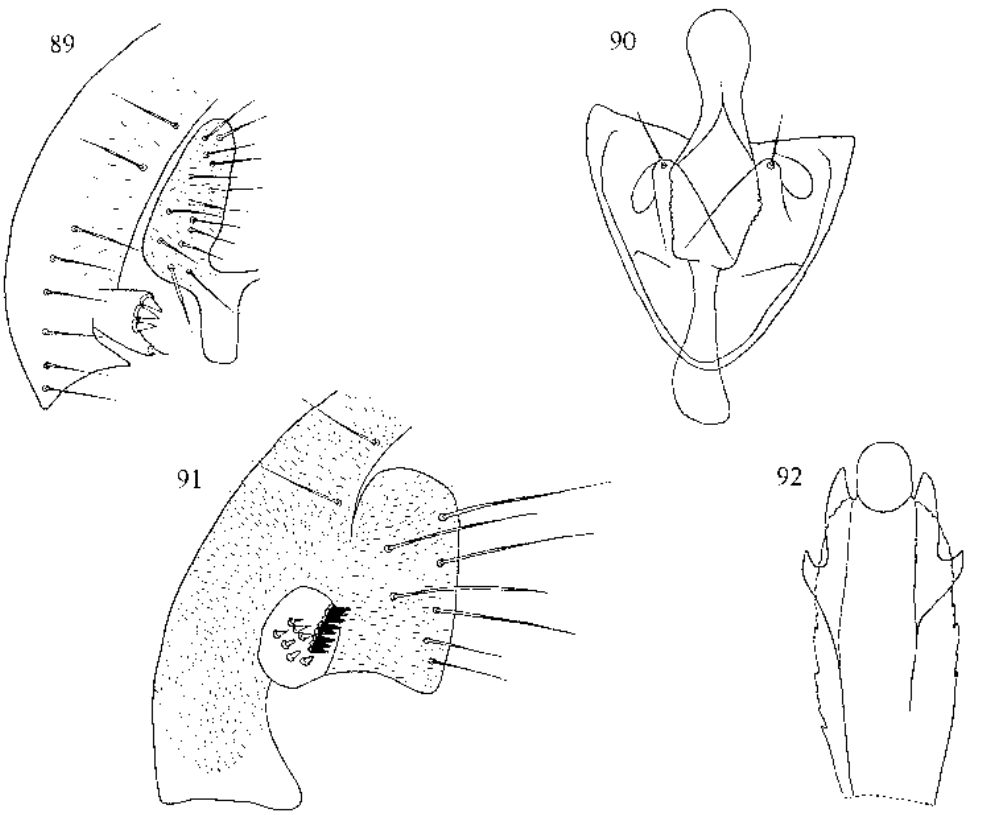
Head. Arista long, almost feather-like, with 6–7 rays above and 3 rays below plus terminal fork. Front square, large and flat, shiny dark tan; ocellar triangle blackened within. 2nd antennal segment dusky tan; 3rd segment short, round, dusky tan. Carina low, knife-like. Face tan; clypeal margin with milky white band; dark brown line present above latter. Palp tan, with large subapical and several smaller bristles. Cheek linear, whitish; vibrissa very large. Eye with dense pile; greatest diameter oblique. Orbital bristles large; proclinate and posterior reclinate orbitals subequal; anterior reclinate orbital a little smaller, lateral and slightly anterior to proclinate orbital. Ocellar, vertical and postvertical bristles large; ocellars well outside ocellar triangle.

Thorax. Mesonotum and scutellum tan to dark tan. Acrostichal hairs in 4 rows in front of dorsocentral bristles, 2 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.8; anterior dorsocentrals close to suture. Scutellar bristles large, subequal. Pleura tan with darkening on uppermost part of mesopleuron and on pteropleuron (latter just extending on to middle of mesopleuron). Anterior

sternopleural bristle fine, *c*. 0.6 length of posterior sternopleural. Stalk of haltere dark tan; knob pale tan. Legs pale tan; preapical bristles present on all tibiae; apical bristle on 2nd tibia only.

Wing. Brownish. *C*-index, 2.0; 4*V*-index, 2.7; 5*X*-index, 3.3; *M*-index, 1.0. 3rd costal section with heavy setation on basal 0.6–0.7. Length (holotype), 2.6 mm.

Abdomen. Tergite 1 tan. Tergite 2 tan with posterior dark band, interrupted in midline, just extending on to incurved portion of tergite. Tergites 3–6 each tan with unbroken posterior dark band just extending on to incurved portion.



Figs 89, 90. *Nesiodrosophila plana*: *89*, male external genitalia; *90*, male internal genitalia.
Figs 91, 92. *Nesiodrosophila macalpinei*: *91*, male external genitalia; *92*, aedeagus.

Male genitalia (Figs 89, 90). Clasper small, barely differentiated from genital arch, with *c*. 3 pointed medial black teeth; aedeagus large, apically expanded and rounded, bare; parandrites large, each with apical bristle.

Female genitalia. Egg guide large, strongly sclerotized, with very large apical teeth.

Distribution. Widespread in rainforest habitats from north Queensland to central New South Wales.

Specimens Examined

Types as above. **Queensland** (all LT): near Tully, swept rainforest, 12.viii.1976, P.A. Parsons, 1♂; Wallaman Falls, rainforest, 8.viii.1976, I.R. Bock, 1♀; Paluma, swept, 26.vi.1975, Bock and

Grossfield, 1♂; near Peachester, swept, 21.iv.1977, P.A. Parsons, 1♂. New South Wales: Pacific Highway 1 mile S. of Hawkesbury River, 29.ix.1956, D.K. McAlpine, 1♀ (AM).

4. *Nesiodrosophila macalpinei*, sp. nov.

Types

Holotype ♀: Katoomba, New South Wales, 16.xii.1958, G.H. Hardy (AM). Paratypes (all AM): Narrabeen, Middle Creek, New South Wales, 4.xi.1956, W.W. Wirth, 1♂; Otford, New South Wales, 24.xi.1962, D.K. McAlpine, 1♂; 2 miles E. of Tonganah, NE. Tasmania, 23.i.1960, D.K. McAlpine, 1♀.

Distinguishing features. Carina prominent, knife-like; greatest diameter of eye horizontal; wing with brownish tinges.

Body length. 2.8 mm (holotype); 2.8-3.2 mm (paratype range).

Head. Arista with straight rays, 3 above and 2 below in females, 7 above and 6 below in males. Breadth of front 0.9 times length; front tan, darkest anterolaterally and between ocellar triangle and periorbits. Ocellar triangle somewhat darkened. Anterior ¼ of front hirsute. 2nd antennal segment pale tan; 3rd segment oval, dark tan. Carina strongly developed, knife-like. Face dark tan above, sharply contrasting very pale tan below carina. Palp very pale tan, with large apical and several smaller bristles. Cheek very broad, very pale tan. Vibrissa slender; following orals very fine. Eye with sparse pile, elongate-oval with long axis horizontal. Orbital bristles in ratio *c*. 2 : 1 : 2, in line, anterior reclinate orbital weaker in males, closer to proclinate than to posterior reclinate orbital. Ocellar, vertical and postvertical bristles strong.

Thorax. Mesonotum mid-brownish with narrow pale median longitudinal band and weak paler areas laterally. Acrostichal hairs in 4 very weak irregular rows in front of dorsocentral bristles only. Ratio anterior : posterior dorsocentrals 0.5. Scutellum mid-brownish; anterior scutellar bristles weaker than apical scutellars. Pleura with narrow dark brown band across mesothoracic spiracle and intervening sclerites to stalk of haltere; pleura brownish above band, very pale tan below. Anterior sternopleural bristle fine, 0.5-0.6 length of posterior sternopleural. Stalk of haltere dark brown; knob mid-brownish. Legs pale tan; knees slightly darker. Preapical bristle on 3rd tibia only; apical bristle on 2nd tibia only.

Wing. Distinctly brownish especially close to veins, entirely brownish anteriorly. *C*-index, 2.0; 4*V*-index, 1.8; 5*X*-index, 1.7; *M*-index, 0.6. 3rd costal section with heavy setation on basal 0.4-0.5. Length (holotype), 2.6 mm.

Abdomen. Mid-brownish, posterior tergites darker apically. Genital arch pale.

Male genitalia (Figs 91, 92). Anal plate with numerous short black teeth; aedeagus cylindrical, with 2 pairs of strongly sclerotized small subapical processes.

Female genitalia. Egg guide with prominent apical teeth.

Distribution. Collected from central New South Wales and northern Tasmania (no Victorian records); evidently rare.

Specimens Examined

Types as above. New South Wales: Wentworth Falls, Blue Mountains, 22.ii.1960, D.K. McAlpine, 1♀ (AM).

Special Comments

The sexual dimorphism in the arista noted above is absent in other species of *Nesiodrosophila* and is an unusual phenomenon within the Drosophilidae (but see *Microdrosophila* above).

Key to Australian Species of *Nesiodrosophila*

1. Carina developed 2
   Carina not, or barely, developed 3
2(1). Greatest diameter of eye horizontal ..... *macalpinei*
   Greatest diameter of eye almost vertical ..... *carinata*
3(1). Clypeal margin with broad milky white band ..... *plana*
   Clypeal margin without milky white band ..... *lindae*

XXIV. Genus Paramycodrosophila Duda

Paramycodrosophila Duda, 1924*a*, p. 191. Type-species *Drosophila pictula* de Meijere, 1911, by monotypy; type locality Java.

Upolumyia Malloch 1934, p. 280. Type-species *U. pictifrons* Malloch, 1934, by original designation; type locality Samoa. (Wheeler and Takada 1964.)

Distal costal incision deep, costa protruding as blackened lappet; arista plumose, with single ventral ray; carina knife-like, confined to upper part of face; orbital bristles subequal, anterior reclinate orbital lateral or anterior to proclinate orbital; ocellar, vertical and postvertical bristles well developed; vibrissa single; mesonotum with complex colour pattern of pale and dark areas; 2 pairs of dorsocentral bristles present; hind-tibia with large subbasal bristle on outer side in addition to prominent preapical bristle. Acrostichal hairs in all Australian species in 6 rows in front of dorsocentral bristles, *c.* 4 rows (irregular) between dorsocentrals.

Paramycodrosophila is a small genus of apparently fungivorous flies. Species have been described from south-east Asia (*pictula*). Micronesia (*parapictula* Wheeler & Takada, *neopictula* Wheeler & Takada), Japan (*nakamurai* Okada), Samoa [*pictifrons*, *bimaculata* (Malloch)], Central America (*costaricana* Duda, *nephelea* Wheeler) and North America (*anomala* Wheeler, *centralis* Wheeler). Five species, three of them undescribed, are represented in the Australian collections. Species of *Paramycodrosophila* are superficially very similar, but are separable on details of colour and pattern.

1. *Paramycodrosophila pictula* (de Meijere)

Drosophila pictula de Meijere, 1911, p. 412. (Holotype in Amsterdam; type locality Java.)

Distinguishing features. Abdominal tergites 2–3 largely blackish; tergites 4–5 blackish with pale lateral spots and median lines.

Body length. *C.* 2.1 mm.

Head. Arista with 6 apically curved rays above, long basally, progressively shortening apically; terminal fork large. Front *c.* 1.4 times broader than long, dark in posterior ¾ especially centrally, pale in anterior ¼; proclinate and anterior reclinate orbital bristles in black protuberance; ocellar triangle black. 2nd antennal segment tan; 3rd segment black, tan immediately at base. Carina prominent, largely dusky; lowermost part of face and carina pale tan. Palp black. Cheek almost linear,

rather wide, entirely pale tan. Anterior reclinate orbital bristle anterior to proclinate orbital. Eye with fine sparse pile.

Thorax (Figs 93, 94). Mesonotum pale tan with darker markings, most conspicuously comprising transverse band in middle region, submedian longitudinal bands anterior to latter, and round area in front of scutellum bisected anteriorly by pale line. Scutellum largely dark, pale in small apical spot and weakly paler in lateral spots. Pleura pale with upper longitudinal dark band across middle of pteropleuron, widened to cover upper ⅔ of mesopleuron and bifurcating anteriorly to extend on to propleuron, and lower dark band covering metapleuron, meropleuron and sternopleuron. Sterno-index *c.* 0.6; middle sternopleural bristle small. Haltere pale tan. Fore-femur tan with broad dark basal annulus and narrow dark subapical annulus; mid- and hind-femora tan with broad dark annuli in middle regions; each tibia tan with dark basal annulus; all tarsi tan.

Wing. Slightly brownish with trace of darker band behind lappet. *C*-index, *c.* 1.2; 4*V*-index, *c.* 2.1; 5*X*-index, *c.* 1.8; *M*-index, *c.* 0.7. 3rd costal section with heavy setation on basal 0.6. Length, *c.* 2.2 mm.

Abdomen (Figs 95, 96). Tergite 1 weakly infuscated, paler centrally. Tergite 2 blackish, paler centrally especially anteriorly; incurved portion black with central pale spot. Tergite 3 blackish with trace of small pale central area anteriorly; incurved portion black with large pale spot. Tergite 4 black with large anterolateral pale spots and median pale line; incurved portion as in tergite 3. Tergite 5 similar to tergite 4, median line wider anteriorly; incurved portion black. Tergite 6 entirely pale tan.

Male genitalia. Figured by Wheeler and Takada (1964).

Female genitalia. Egg guide with *c.* 4 strong apical teeth above and a few smaller teeth below on slender projection (cf. species of the *hirtocornis* group, genus *Drosophila*, subgenus *Hirtodrosophila*).

Distribution. Previously recorded from Java, Sumatra, Taiwan, Nepal and Micronesia; also present in New Guinea (Bock and Parsons, unpublished data), Australian specimens from north Queensland.

Specimens Examined

Holotype, **Queensland** (all ANIC): Whitfield Range Forest Reserve, Cairns, 19.iv.1967, D.H. Colless, 1♂; 2 miles W. of Kuranda, 7.v.1967, D.H. Colless, 1♀; Wongabel State Forest, 7.v.1967, D.H. Colless, 1♀.

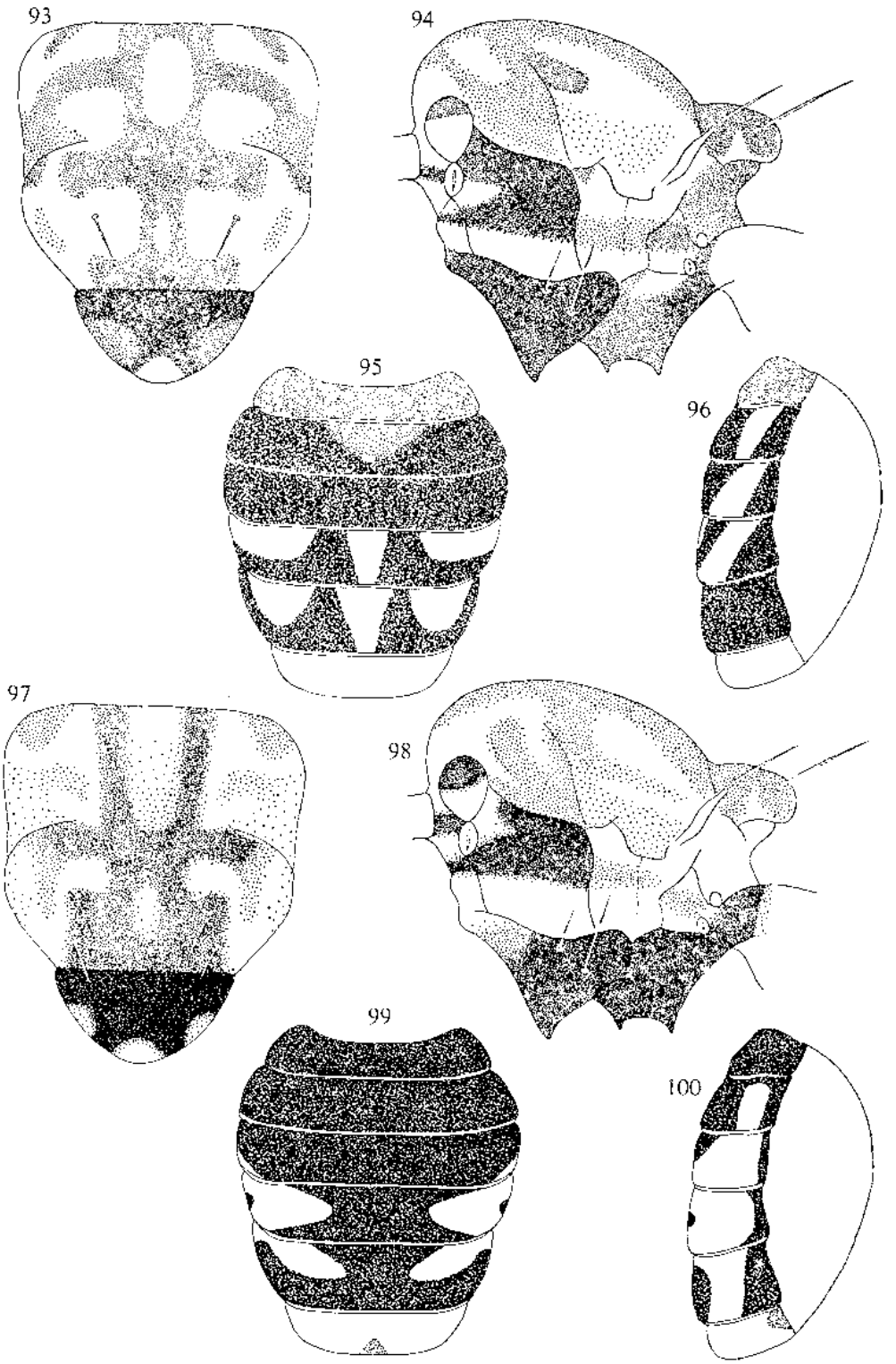
2. *Paramycodrosophila parapictula* Wheeler & Takada

Paramycodrosophila parapictula Wheeler and Takada, 1964, p. 208. (Holotype in University of Texas; type locality Caroline Is, Micronesia.)

Distinguishing features. Abdominal tergites 2–3 blackish; tergites 4–5 blackish with pale lateral spots.

Body length. *C.* 2.4 mm.

Head. Arista with 4 long apically curved rays above; terminal fork large. Front 1.2 times broader than long, pale tan in anterior corners, along periorbits and in front of ocellar triangle, otherwise rufous tan; proclinate and anterior reclinate orbital bristles in black elevation; ocellar triangle protuberant, black. 2nd antennal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segment dark tan; 3rd segment black, tan immediately at base. Palp blackened apically. Carina rather small. Face tan, slightly dusky about carina, pale below; clypeal margin with black coloration extending laterally on to anterior ⅓ of cheek. Cheek slightly curved, very narrow, pale posteriorly. Anterior reclinate orbital bristle anterior to proclinate orbital. Eye with fine sparse pile.

Thorax (Figs 97, 98). Mesonotum pale with darker markings, most conspicuously 2 submedian longitudinal bands converging posteriorly and extending to scutellum, and lateral spots or crescents including areas merging with submedian bands, latter coalescing just behind transverse suture. Scutellum largely dark, paler at apex, slightly paler laterally. Pleura pale with upper longitudinal dark band, weak and narrow across middle of pteropleuron, strong across upper ½ of mesopleuron, bifurcating anteriorly and extending on to propleuron, and lower dark band covering metapleuron, meropleuron and sternopleuron. Sterno-index *c.* 0.5; middle sternopleural bristle small. Haltere pale tan. Fore-femur tan with broad dark basal annulus and incomplete subapical annulus; mid- and hind-femora tan with broad dark annuli in middle regions. Each tibia tan with weak basal dark annulus; all tarsi tan.

Wing. Slightly brownish. *C*-index, *c.* 1.7; 4*V*-index, *c.* 1.8; 5*X*-index, *c.* 1.5; *M*-index, *c.* 0.5. 3rd costal section with heavy setation on basal 0.5. Length, *c.* 2.1 mm.

Abdomen (Figs 99, 100). Tergite 1 blackish. Tergite 2 blackish; incurved portion blackish with pale spot. Tergite 3 blackish; incurved portion largely pale tan, black at medial extremity and anterolaterally. Tergite 4 blackish with large pale tan lateral spots extending on to incurved portion, latter black at medial extremity and in very small spot at lateral extremity. Tergite 5 blackish with large pale tan lateral spots; incurved portion black with pale spot partly coalescing with dorsal spot. Tergite 6 pale tan, blackish only in small median spot posteriorly and at medial margin of incurved portion.

Male genitalia. Figured by Wheeler and Takada (1964).

Female genitalia. Egg guide broadly rounded apically, with row of strong marginal teeth.

Distribution. Micronesia; north Queensland. (It seems highly likely that the species will also be found to exist in New Guinea.)

Specimens Examined

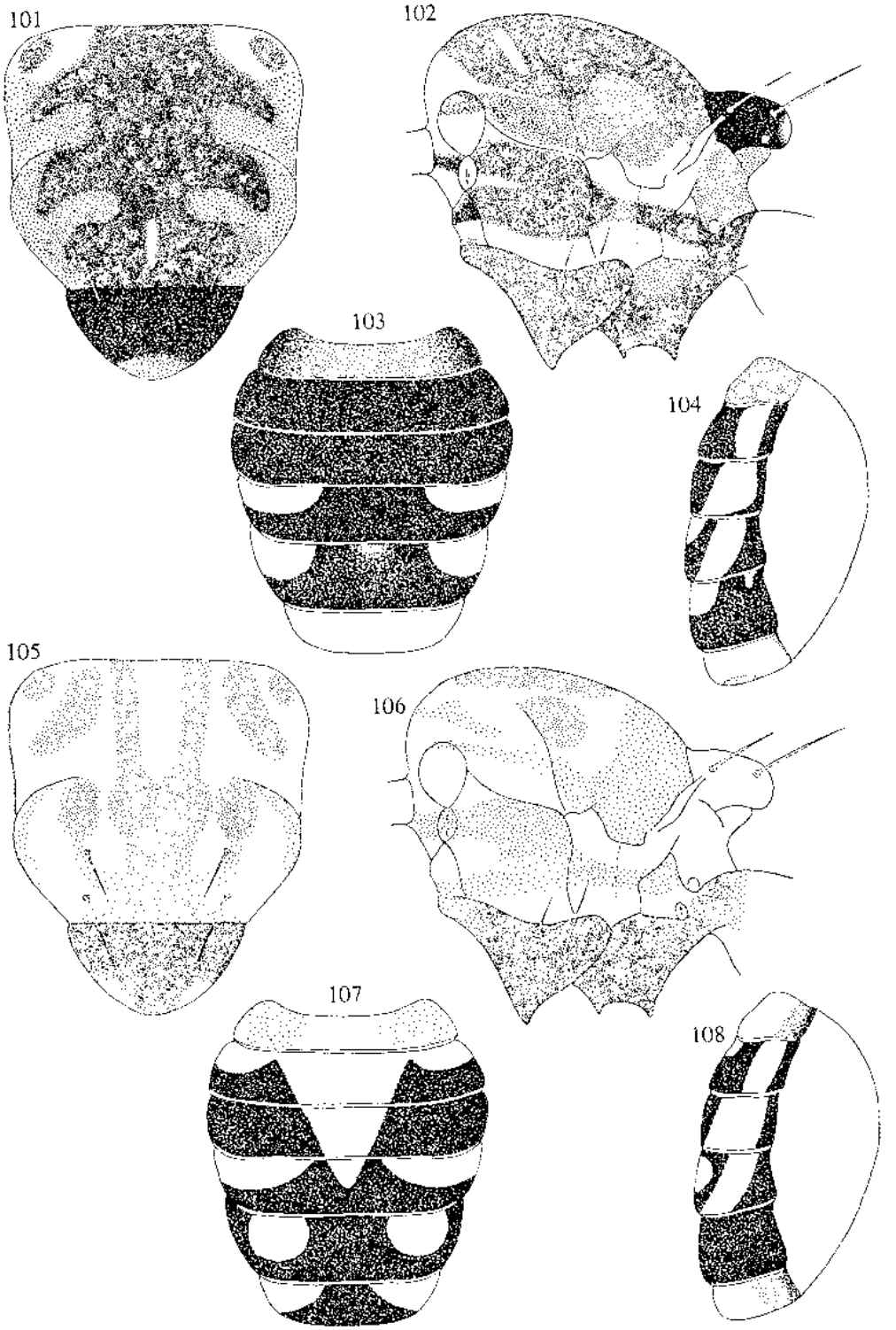
Queensland: Palmerston National Park, 1600 ft, 18.iv.1971, D.A. Duckhouse (light trap), 1♀ (ANIC); Palmerston National Park, bred from fungus, Nov. 1978, P.A. Parsons, 2♂, 4♀ (LT).

3. *Paramycodrosophila acumina*, sp. nov.

Types

Holotype ♀: Mossman Gorge, north Queensland, 23.iv.1967, D.H. Colless (ANIC). Paratype ♂: Mt Edith Forest Road, 1 mile off Danbulla Road, north Queensland, 6.v.1967, D.H. Colless (ANIC).

Figs 93–96. *Paramycodrosophila pictula*: *93*, thorax (dorsal); *94*, thorax (lateral); *95*, abdomen (dorsal); *96*, abdomen (lateral).
Figs 97–100. *Paramycodrosophila parapictula*: *97*, thorax (dorsal); *98*, thorax (lateral); *99*, abdomen (dorsal); *100*, abdomen (lateral).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Distinguishing features. Abdominal tergites 2–5 blackish, 4–5 with pale anterolateral spots; hind-femur with incomplete basal annulus in addition to broad annulus in middle region.

Body length. 2.3 mm (holotype); 2.1 mm (paratype).

Head. Arista with 7 large apically curved rays above shortening anteriorly; terminal fork large. (Arista on one side of holotype with 8 dorsal rays and no ventral ray plus very large terminal fork; developmental abnormality?). Front 1.2 times broader than long, pale tan in anterior $\frac{1}{5}$, largely blackish in posterior $\frac{4}{5}$, paler centrally and in thin lines lateral to posterior reclinate orbital bristles. Proclinate and anterior reclinate orbitals on strong protuberance; ocellar triangle less strongly elevated. 2nd antennal segment tan; 3rd segment slightly dusky, tan immediately at base. Carina prominent, dusky, pale at lowermost extremity. Face dusky in upper $\frac{1}{4}$, pale tan in lower $\frac{3}{4}$. Palp dusky. Cheek slightly curved, rather wide, pale tan, darkened in thin short line behind vibrissa. Anterior reclinate orbital bristle anterior to proclinate orbital. Eye with fine, moderately dense pile.

Thorax (Figs 101, 102). Mesonotum tan with extensive dark brown markings, especially median longitudinal band with lateral extensions; small pale elongate spot present just anterior to scutellum. Scutellum dark, pale only at apex. Pleura tan with upper dark longitudinal band weakly across middle of pteropleuron, strong across upper $\frac{3}{4}$ of mesopleuron, bifurcating anteriorly and extending on to propleuron, and lower dark band covering metapleuron, meropleuron and sternopleuron. Sterno-index 0.6. Haltere pale tan. Fore-femur pale with dark basal annulus and almost complete subapical annulus; mid-femur pale with broad dark annulus in middle region; hind-femur pale with broad dark annulus in middle region and narrow incomplete basal annulus. Tibiae pale with dark basal annuli; tarsi pale.

Wing. Slightly brownish. *C*-index, 1.4; 4*V*-index, 2.5; 5*X*-index, 2.2; *M*-index, 0.8. 3rd costal section with heavy setation on basal 0.6. Length (holotype), 2.0 mm.

Abdomen (Figs 103, 104). Tergite 1 dark brown. Tergites 2–3 dark brownish black; incurved portion of each tergite blackish with large pale spot. Tergites 4–5 brownish black with anterolateral pale spots extending on to incurved portions; incurved portion of tergite 4 with additional large pale spot. Tergite 6 pale.

Female genitalia. Egg guide strongly sclerotized, apically slender with single tooth (hence specific name).

Distribution. Known only from type specimens, north Queensland.

4. *Paramycodrosophila parsonsi*, sp. nov.

Types

Holotype ♂: Gheerulla Creek, Queensland, on fungi, 21.iv.1977, P.A. Parsons (ANIC). Paratypes: same data as holotype, 1♂, 1♀ (ANIC); Koongarra, Airfield Road, 16 km E. by N. of Mt Cahill, Northern Territory, 10.iii.1973, D.H. Colless (ANIC).

Distinguishing features. Abdominal tergites 2–4 dark with large pale median triangular area from anterior margin of tergite 2 (base) to middle of tergite 4 (apex);

Figs 101–104. *Paramycodrosophila acumina*: *101*, thorax (dorsal); *102*, thorax (lateral); *103*, abdomen (dorsal); *104*, abdomen (lateral).
Figs 105–108. *Paramycodrosophila parsonsi*: *105*, thorax (dorsal); *106*, thorax (lateral); *107*, abdomen (dorsal); *108*, abdomen (lateral).

tergites 2, 4, 5 and 6 with pale anterolateral spots, those on tergite 2 coalescing with base of triangular area.

Body length. 2.5 mm (holotype); 2.3 mm (♂ paratype); 2.6 mm (♀ paratype).

Head. Arista with 7 long apically curved rays above shortening anteriorly; terminal fork large. Front 1.3 times broader than long, tan in anterior ¼; posterior ¾ of front pale tan in narrow median band anterior to ocellar triangle and posteriorly on each side between ocellar triangle and vertical bristles; oval bands enclosing orbital bristles silvery, blackish anteriorly; area within and about ocellar triangle, and about vertical bristles, dusky; remainder of front slightly dusky. Proclinate and anterior reclinate orbital bristles on slight protuberance; ocellar triangle slightly elevated. 2nd antennal segment pale tan; 3rd segment black, tan immediately at base. Carina prominent, dusky. Face dusky in upper ¾, extremely pale in lower ¼. Palp black. Cheek linear, rather broad, concolorous with lower ¼ of face. Anterior reclinate orbital bristle anterior to proclinate orbital. Eye with fine sparse pile.

Thorax (Figs 105, 106). Mesonotum pale with dark markings, especially large central spot extended forwards in narrow bands on either side of middle 4 rows of acrostichals, large spot in front of scutellum slightly weaker in midline, and lateral spots on either side of suture; anterior pale areas with greyish pollinosity. Scutellum mid-brown, darker about bases of bristles. Pleura pale tan with longitudinal bands: across upper ¼ of mesopleuron extending on to propleuron; across middle of pteropleuron weakly extended forward across middle of mesopleuron and on to propleuron; and covering metapleuron, meropleuron and sternopleuron. Sterno-index 0.5. Haltere pale tan. Fore-femur pale with dark basal and incomplete subapical annuli; mid- and hind-femora pale with broad dark annuli in middle regions. Tibiae pale with dark basal annuli; tarsi pale, hind-metatarsus dark basally.

Wing. Faintly brownish. *C*-index, 1.1; 4*V*-index, 2.2; 5*X*-index, 1.7; *M*-index, 0.7. 3rd costal section with heavy setation on basal 0.6. Length (holotype), 2.3 mm.

Abdomen (Figs 107, 108). Tergite 1 tan, a little darker laterally. Tergite 2 tan anteriorly and centrally in band narrowing posteriorly, blackish posterolaterally; incurved portion black with large tan spot. Tergite 3 blackish, tan centrally in band narrowing posteriorly; incurved portion largely tan, black laterally and medially. Tergite 4 blackish with large tan anterolateral areas extending on to incurved portions and central tan triangular area anteriorly; incurved portion black with lateral tan area and additional oblique tan band. Tergite 5 blackish with anterolateral tan spots; incurved portion black. Tergite 6 black posteriorly and centrally, tan anterolaterally; incurved portion tan, blackish medially.

Female genitalia. Egg guide similar to that of *pictula*, with apical teeth only, lowermost on small projection.

Distribution. Collected at several widely separated localities in the Northern Territory, southern Queensland and New South Wales.

Specimens Examined

Types as above. **New South Wales** (all AM): Whian Whian State Forest near Lismore, m.v. lamp, 25.ii.1965, McAlpine and Lossin, 2♂; The Island, Bellingen, 29.iii.1960, D.K. McAlpine, 1♂.

5. *Paramycodrosophila* sp. A

The following description is provided for a single male collected 7–14 miles west of Herberton, via Watsonville, north Queensland, 1.v.1967, D.H. Colless (ANIC). The specimen is not in good enough condition for designation as a type.

Distinguishing features. Abdominal tergite 2 largely pale, black posterolaterally; tergites 3–5 blackish with large lateral pale spots; tergites 3–4 with median pale spots.

Body length. 2.4 mm.

Head. Arista with 7 long apically curved rays above becoming shorter and less curved anteriorly. Front 1.1 times broader than long, pale tan in anterior ⅓, darker in posterior ⅔, black about proclinate and anterior reclinate orbital bristles, vertical bristles and ocellar triangle. Proclinate and anterior reclinate orbitals on slight protuberance; ocellar triangle elevated. 2nd antennal segment tan; 3rd segment black. Carina prominent, black. Face dark tan above, pale below level of carina. Palp black. Cheek broad, linear, pale tan with wisp of darkening behind vibrissa. Eye with fine sparse pile.

Thorax. Mesonotum tan with darker markings, especially broad longitudinal submedian bands and large ovals lateral to these. Scutellum dark. Pleura pale with broad dark upper and lower bands. Haltere pale tan. Fore-femur pale with broad basal dark annulus and narrow incomplete subapical annulus; mid- and hind-femora pale with broad dark annuli in middle regions; tibiae pale with basal annuli; tarsi pale.

Wing. Faintly brownish. *C*-index, 1.4; 4*V*-index, 2.1; 5*X*-index, 1.5; *M*-index, 0.7. 3rd costal section with heavy setation on basal 0.7. Length, 2.4 mm.

Abdomen (Figs 109, 110). Tergite 1 pale tan centrally, darkened laterally. Tergite 2 largely pale tan, black posterolaterally; incurved portion pale tan in large band across middle region, otherwise black. Tergite 3 pale tan in anterolateral ovals and median band, latter wider anteriorly, otherwise black; incurved portion pale tan, black laterally and medially. Tergite 4 with large oval pale tan areas on either side of midline and median pale tan band, otherwise black; incurved portion largely black, with oblique pale tan band. Tergite 5 black with large submedian pale tan spots coalescing anteriorly; incurved portion black. Tergite 6 pale tan with median black spot; incurved portion pale tan.

Key to Australian Species of *Paramycodrosophila*

1. 2nd abdominal tergite pale tan anterolaterally 2
   2nd tergite entirely blackish laterally 3
2(1). 3rd abdominal tergite pale tan anterolaterally ..... sp. A
   3rd tergite entirely black laterally ..... *parsonsi*
3(1). Hind-femur with incomplete basal annulus in addition to broad annulus in middle region ..... *acumina*
   Hind-femur with broad annulus in middle region only 4
4(3). Abdominal tergites 4–5 with pale median line in addition to pale lateral spots ..... *pictula*
   Tergites 4–5 with pale lateral spots only ..... *parapictula*

XXV. Genus Phorticella Duda

Phorticella Duda, 1923, p. 36. Type-species *Drosophila bistriata* de Meijere, 1911, by subsequent designation (Sturtevant 1927); type locality Java.

Mesonotum dark, with 2 silvery white longitudinal stripes; periorbits silvery white; arista plumose; vibrissa single; acrostichal hairs in *c*. 6 rows; weak prescutellar bristles present; anterior and posterior sternopleural bristles well developed, middle sternopleural bristle small.

This small and little-known genus includes eight species known from India, Taiwan and south-east Asia. The most striking feature of all species is the pair of silvery mesonotal stripes, a feature reminiscent of species of the genus *Zaprionus* which, however, possess a paler mesonotum and a greater number of stripes. According to Wheeler (1981) the distinction between these two genera has not been satisfactorily established (see also below under *Zaprionus*).

Drosophila albostriata Malloch has previously been considered to be a somewhat aberrant member of the *Drosophila* subgenus *Scaptodrosophila*, and it clearly shows some affinities with that group (Bock 1976, 1978*b*); it seems, however, better now included in *Phorticella* along with the Oriental species of similar colour pattern. The species is close to *P. bistriata* but differs in details, especially of the abdominal banding pattern.

1. *Phorticella albostriata* (Malloch)

Distinguishing features. As given in generic diagnosis above; mesonotum black apart from silvery white stripes. Full description in Bock (1976) with details of male genitalia in Bock (1978*b*).

XXVI. Genus Scaptomyza Hardy

Scaptomyza Hardy, 1849, p. 361. Type-species *Drosophila graminum* Fallén, 1823, by subsequent designation (Coquillett 1910); type locality Europe.

Arista plumose, with 1–2 ventral rays; acrostichal hairs in 2–4 rows; prescutellar bristles absent; small, slender species resembling *Drosophila*: larvae often leaf-mining.

Scaptomyza is the second largest genus in the family Drosophilidae, although poorly represented in Australia. The genus is cosmopolitan, although most extensively speciated in Hawaii, where the finding that *Scaptomyza* and *Drosophila* species intergrade with respect to various features has led to the suggestion that the genus *Scaptomyza* originated in Hawaii (Throckmorton 1975). Two species only were recorded from Australia when the genus was reviewed previously (Bock 1977*a*); a third species has more recently been detected in Tasmania.

1. *Scaptomyza australis* Malloch

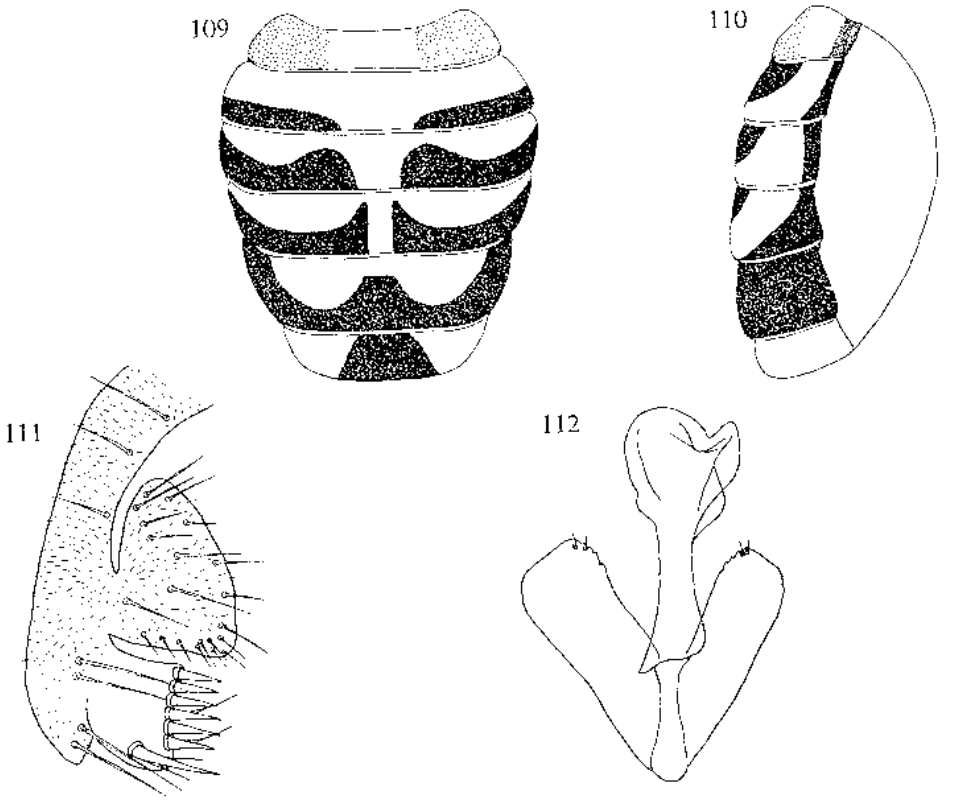
Scaptomyza australis Malloch, 1923, p. 618. (Holotype in Washington; type locality Sydney.)
Drosophila biradiata Duda, 1923, p. 50. (Syntypes in Budapest; type locality New South Wales). (Bock 1977*a*.)

A widespread species in continental Australia, occurring in coastal, inland and suburban habitats although absent in rainforests.

2. *Scaptomyza elmoi* Takada

Scaptomyza (*Parascaptomyza*) *elmoi* Takada, 1970, p. 144. (Holotype location not stated in description; type locality Taiwan.)
Scaptomyza pallida (Zetterstedt): Bock 1977*a*, p. 341.

This species, also widespread in Australia, was reported by Bock (1977*a*). Takada (1970) has shown that specimens previously identified as '*S. pallida*' in fact comprise a complex of three species separable on details of male genitalia: the Australian specimens belong to the species *S. elmoi* which also occurs in Japan, Taiwan and Hawaii (Takada 1970) and New Zealand (Takada, personal communication). *S. pallida* is of Holarctic distribution, and the third species of the complex, *S. himalayana* Takada, is known from Nepal.



Figs 109, 110. *Paramycodrosophila* species A: *109*, abdomen (dorsal); *110*, abdomen (lateral).
Figs 111, 112. *Styloptera wheeleri*: *111*, male external genitalia; *112*, male internal genitalia.

3. *Scaptomyza flava* (Fallén)

Drosophila flava Fallén, 1823, p. 10. (Holotype location unknown; type locality Europe.)
Notiphila flaveola Meigen, 1830, p. 66. (Holotype location unknown; type locality Europe.) (Wheeler 1981.)

Distinguishing features. Body entirely yellowish tan; mesonotum with weak whitish pollinosity; arista with 3 rays above and 1 ray below plus terminal fork; carina absent; anterior reclinate orbital bristle lateral and slightly anterior to

proclinate orbital; additional small bristle present behind posterior reclinate orbital; acrostichal hairs in 4 irregular rows; egg guide very strongly developed, with close marginal teeth.

S. flava is widespread in Europe, Asia and North America; in the latter area it appears to be an introduction which has spread in association with cultivated members of the cabbage group (Hackman 1959). The species was reported recently (Hardy *et al.* 1979) in Tasmania, where larvae were detected mining the leaves of cultivated brassicas.

S. flava appears to be a recent introduction to Tasmania and the species is unknown from the mainland.

Key to Australian Species of *Scaptomyza*

1. Arista with 2 ventral rays in addition to terminal fork ..... *australis*
   Arista with single ventral ray in addition to terminal fork 2
2. Acrostichal hairs in 2 rows; mesonotum with extensive greyish areas ..... *elmoi*
   Acrostichal hairs in 4 rows, mesonotum yellowish tan ..... *flava*

XXVII. Genus **Sphaerogastrella** Duda

Sphaerogastrella Duda, 1922, p. 158. Type-species *Camilla javana* de Meijere, 1911, by monotypy; type locality Java. [*Camilla flavipes*, *nom. nud.* in de Meijere, 1915, p. 95, is a synonym of *C. javana* (Duda 1922; see comments below).]

Entire body glossy except scutellum and narrow dull lines on either side of front; front, mesonotum and abdomen with metallic sheen; setation greatly reduced: presuturals, sternopleurals and postverticals absent; almost all acrostichals absent; 1 supraalar and 1 postalar only present; humerals vestigial; notopleurals small; anterior scutellars very small; anterior reclinate orbitals minute; dorsocentrals, posterior scutellars, proclinate and posterior reclinate orbitals, and verticals, normal; arista plumose; wing slender, with reduced anal vein; abdomen very rotund, appreciably wider than thorax.

Only two species of *Sphaerogastrella* in addition to the type are known, *S. rostralis* Okada, 1974 (Thailand) and *S. novoguinensis* Duda, 1926*a* (New Guinea). Duda (1922) drew attention to de Meijere's (1915) mention of a '*Camilla flavipes*', which Duda found to be synonymous with *C. javana* on examination of a specimen of each forwarded by de Meijere. Specimens in the Amsterdam collection labelled '*Camilla flavipes*' are certainly the same species as those labelled '*Camilla javana*'. It appears that a description of *C. flavipes* was never published.

Species of *Sphaerogastrella* share with those of *Liodrosophila* and *Lissocephala* the metallic gloss on the front, mesonotum and abdomen; there seems little doubt that the three genera are closely related, although Duda (1922, p. 152) regarded the position of *Sphaerogastrella* as peripheral and even questionable within the Drosophilidae, because of the aberrant setation of *S. javana*. The latter species shares with those of *Liodrosophila* the glossy front separated into central and lateral portions by dull lines; it differs from the *Liodrosophila* species, which otherwise seem to be the closest relatives of *Sphaerogastrella*, in possessing reduced setation and the peculiar globose abdomen.

Only one species of *Sphaerogastrella* has been found in Australia.

1. ***Sphaerogastrella javana*** (de Meijere)

Camilla javana de Meijere, 1911, p. 422. (Holotype in Amsterdam; type locality Java.)
Camilla flavipes de Meijere, 1915, p. 95 (*nomen nudum*, although specimen in Amsterdam from Simalur labelled 'Type'.)

Distinguishing features. Front, mesonotum and abdomen glossy, with metallic sheen; abdomen globose, appreciably wider than thorax; setation reduced.

Body length. *C*. 3.2 mm.

Head. Arista large, fan-like, with 5 curved rays above and 2 straight rays below plus large terminal fork. Front 1.5 times broader than long, glassy mid-brown with bluish green metallic sheen except in narrow lines (widening anteriorly) on either side just medial to orbital bristles. 2nd and 3rd antennal segments mid-brown. Carina situated well above clypeal margin, prominent, more protuberant below, broad, only slightly narrower above, flat, lateral and ventral margins squared. Face glassy mid-brown. Palp dusky brown. Cheek broad, linear, with 2 weak vibrissae. Orbital bristles in line; proclinate orbital 0.5 length of posterior reclinate orbital. Eye bare, narrowed below.

Thorax. Mesonotum glossy black (brown in teneral specimens) with greenish to purplish metallic sheen. Scutellum velvety black. Pleura glossy black. Basal segments of haltere pale tan; knob black, subshining. Legs glassy brown, a little paler apically; preapical bristles present on 2nd and 3rd tibiae; apical bristle on 2nd tibia.

Wing. Rather slender, with weak brownish tinge. *C*-index, *c*. 2.1; 4*V*-index, *c*. 2.0; 5*X*-index, *c*. 1.2; *M*-index, *c*. 0.4. 3rd costal section with heavy setation on basal 0.45. Length, *c*. 2.7 mm.

Abdomen. Very broad, globose, glossy black with greenish to purplish metallic sheen.

Male genitalia. Figured by Okada (1974).

Female genitalia. Egg guide strong, apically pointed, with sparse marginal teeth.

Distribution. Widespread in south-east Asia (Thailand, Vietnam, Malaysia, Java, Sumatra, Singapore, Lombok, Ceylon: Okada 1974); New Guinea (Bock and Parsons, unpublished data); rainforests of eastern Australia from north Queensland to central New South Wales, also recorded as an urban species in Townsville (Bock 1977*b*), and several localities in the Northern Territory.

Specimens Examined

Holotype. **Northern Territory** (all ANIC): Howard Springs, June 1964, K.R. Norris, 3♂, 1♀; Lee Point, June 1964, K.R. Norris, 1♂; Melville I., ex *Opilio amantacea*, G. Fitt, 1977, 1♀. **Queensland**: Iron Range, 12.vi.1971, J. Feehan, 1♂ (ANIC); Iron Range, mushroom bait, 30.iv.1976, I.R. Bock, 1♂, 1♀ (I.T); Middle Claudie River, Iron Range, m.v. lamp, 29.ix.1974, G. Daniels, 1 ? (AM); Claudie River near Mt Lamond, 31.v.1966, D.K. McAlpine, 5♂, 4♀, 1 mile W. of Mt Lamond, 23.xii.1971, McAlpine and Holloway, 2♂, 3 miles W. of Mt Lamond, 13.xii.1971, McAlpine and Holloway, 2♀, 5 miles W. of Mt Lamond, 9.i.1972, McAlpine and Holloway, 1♂ (AM); Lake Eacham National Park, 7.xi.1975, P.A. Parsons, 1♀ (LT); Palmerston National Park, 1600 ft, 18.iv.1971, D.A. Duckhouse, 1♀ (ANIC); Wallacha Falls, Palmerston Highway, 30.iv.1967, D.H. Colless, 1♀ (ANIC); Mossman Gorge, 24.iv.1967, D.H. Colless, 2♂ (ANIC); Crystal Cascades, 19.iv.1967, D.H. Colless, 2♂, 2♀ (ANIC); Kuranda, 20.v.1958, D.K. McAlpine, 1♂, 1♀ (AM); The Intake via Redlynch, 30.xii.1966, D.K. McAlpine and G. Holloway, 1♀ (AM); Canal Creek near Russel River, 25.v.1958, D.K. McAlpine, 1♂ (AM); Lake Placid near

Cairns, D.K. McAlpine, 24.v.1958, 1♀, 26.v.1958, 7♂, 9♀, 2.i.1959, 1♂, 1♀ (AM); Upper Mulgrave River, Goldsborough Road, fruit baited, Bock and Parsons, 19.viii.1976, numerous ♂♀ (LT); Upper Mulgrave River 10 miles Goldsborough Road, 9.v.1967, D.H. Colless, 3♂, 1 ♀ (ANIC); Gillies Highway 2 miles W. of Little Mulgrave, 18.iv.1967, D.H. Colless, 5♂, 4♀ (ANIC); 9.6 km SW. of Gordonvale, Gillies Highway, 11.vii.1971, Z. Liepa, 7♀ (ANIC); Mulgrave River 4 miles W. of Gordonvale, D.K. McAlpine, R. Lossin, G. Holloway and D.P. Sands, 29.xii.1958 (D.K.McA.), 3♂, 11♀, 1 ♀, 15.xii.1961 (McA. and L.), 10♀, 21.v.1966 (D.K. McA.), 3♂, 6♀, 31.xii.1966 (McA. and H.), 1♂, 6♀, 1-2.i.1967 (McA. and H.), 2♂, 6♀, 1 ♀, 10.xii.1971 (McA, H. and S.), 5♀ (AM); Earl Hill N. of Cairns, 8.v.1967, D.H. Colless, 1♀ (ANIC); The Boulders, Babinda, 10.v.1967, D.H. Colless, 2♂, 1♀ (ANIC); Mt Bartle Frere, rainforest, base, fruit baited, 6.v.1976, I.R. Bock, 1♂, 1♀, mushroom baited, 19.iv.1977, P.A. Parsons, 2♂, 1♀ (LT); Bramston Beach near Innisfail (rainforest fringe), 30.iv.1967, D.H. Colless, 3♂ (ANIC); Dunk I., Sept. 1968, R. Pullen, 2♂, 1♀ (ANIC); Kirrama Ranges, fruit baited, 10.viii.1976, P.A. Parsons, 1♂, 1♀ (LT); Townsville, Jan.-Feb. 1976, I.R. Bock, banana baited, 2♂, at compost heap, 1♂ (LT); 14 miles SW. of Sarina, 8.v.1955, Norris and Common, 1♂ (ANIC); St Helen's Creek, Mackay District, D.K. McAlpine, 13.xii.1961, 1♂, 18.xii.1961, 5♂, 2♀ (AM); Woombye, near Nambour, 11-16.x.1955, D.H. Colless, 1♂ (ANIC); Mary's Creek near Gympie, 6.ii.1961, D.K. McAlpine, 3♂, 2♀ (AM); Mapleton Falls National Park, mushroom baited, 22.iv.1977, P.A. Parsons, 3♂, 2♀ (LT); near Noosa Heads, mushroom baited, 22.iv.1977, P.A. Parsons, 1♂ (LT); Kenilworth State Forest, 5.ii.1961, D.K. McAlpine, 2♂, 1♀ (AM). **New South Wales** (AM unless otherwise noted): Bruxner Park (site 3), 19.iv.1970, D.H. Colless, 2♂, 1♀ 1 ♀ (ANIC); Whian Whian State Forest near Lismore, 25.ii.1965, D.K. McAlpine, 1♂, 1♀; Victoria Park near Alstonville, 22.i.1971, D.K. McAlpine and A. Hughes, 1♂, 1♀; The Island, Bellingen, D.K. McAlpine, 29.iii.1960, 2♂, 1♀, 1.iv.1960, 3♂, 19.vii.1964, 2♂; Huonbrook near Mullumbimby, D.K. McAlpine and R. Lossin, 4.xii.1961, 3♂, 3♀, 2 ♀, 28.ii.1965, 2♂, 4♀, 2.iii.1965, 8♂, 11♀, 2.iii.1965, emerged from fruit of *Castanospermum australe* 20.iii.1965, 2♂, 1 ♀.

Special Comments

Despite their decidedly unaerodynamic appearance (small wings, large fat abdomen), individuals of *S. javana* are fast and agile fliers, much more difficult than most *Drosophila* species, for example, to aspirate directly from baits. The integument is exceptionally thick and hard; specimens are thus very difficult to pin. Wild-caught females have been kept in the laboratory on standard *Drosophila* culture media in which they lay eggs; larvae and pupae have been obtained but the pupae fail to eclose.

XXVIII. Genus **Styloptera** Duda

Styloptera Duda, 1924*a*, p. 192. Type-species *S. formosae* Duda, 1924, by subsequent designation (Wheeler and Takada 1964); type locality Taiwan.

Small species; arista plumose; carina developed; vibrissa single; anterior reclinate orbital bristle lateral to proclinate orbital; costa protruding at distal incision as blackened lappet; mesonotum with 3 pairs of large dorsocentral bristles, anteriormost in front of transverse suture; acrostichal hairs in *c.* 4 rows.

Duda (1924*a*) included three species in *Styloptera*, *Drosophila pictipes* de Meijere and the two newly described species *S. formosae* and *S. fruhstorferi*. Wheeler and Takada (1964) argued for the transfer of *pictipes* and *fruhstorferi* to *Dettopsomyia* (see above), retaining only *formosae* in *Styloptera*. There can be little doubt that the two genera are very close, the species retained in *Styloptera* being distinguished principally by possession of three pairs of dorsocentral bristles, while those species retained in *Dettopsomyia* are distinguished principally by a complex mesonotal pattern but may possess two or three pairs of dorsocentral bristles. A complete

revision of the two genera is clearly desirable; most of the species concerned are very poorly known. Wheeler (1981) lists two species in *Styloptera*, *formosae* as discussed above, and *repletoides* Carson & Okada, 1980; two new species are present in the Australian collections.

1. *Styloptera striata*, sp. nov.

Type

Holotype ♂: The Boulders, Babinda, north Queensland, 10.v.1967, D.H. Colless (ANIC).

Distinguishing features. As given in generic diagnosis above; mesonotum silvery tan with longitudinal brown stripes.

Body length. 1.7 mm.

Head. Arista with 3 straight rays above and 2 straight rays below plus large terminal fork. Front 1.3 times broader than long, largely silvery; ocellar triangle dark brown; curved brown band present on each side of front, becoming darker posteriorly; narrow submedian band present on each side joining former band anteriorly. 2nd antennal segment tan with dark brown spot anteriorly; 3rd segment dusky tan. Carina very prominent, nose-like. Face tan, dark brown at bottom of carina and about vibrissae. Vibrissa very prominent. Palp dusky, with long bristles. Cheek slightly curved, broad, widened in posterior corner. Eye small, almost round, with dense short pile. Orbital bristles in ratio 2 : 1 : 3. Ocellar, vertical and postvertical bristles large.

Thorax. Mesonotum silvery tan with 4 longitudinal dark brown stripes dorsally, inner 2 each with row of acrostichal hairs at borders, outer 2 each with 3 large dorsocentral bristles. Additional incomplete brown longitudinal stripes present laterally. Scutellum silvery tan with 2 large submedian dark brown crescentic bands from anterior margin (as continuation of mesonotal bands enclosing dorsocentral bristles) to posterior scutellar bristles. Anterior scutellar bristles arising from dark spots. Pleura tan with 3 longitudinal dark brown bands. Anterior sternopleural bristle rather weak; middle sternopleural very small; posterior sternopleural very strong. Haltere tan with small dark brown lateral spot. Legs tan; femora with apical dark annuli; tibiae with proximal and apical dark annuli; preapical bristle on 3rd tibia only; apical bristle on 2nd tibia only.

Wing. Slight brownish tinge present. Costal lappet bearing 2 very large bristles. *C*-index, 1.0; 4*V*-index, 2.6; 5*X*-index, 3.0; *M*-index, 1.1. 3rd costal section with heavy setation on basal 0.6. Length, 1.8 mm.

Abdomen. Tergite 1 tan, darkened posterolaterally. Tergites 2–6 somewhat discolored but evidently each tan with posterior dark band interrupted in mid-line.

Distribution. Known only from holotype.

2. *Styloptera wheeleri*, sp. nov.

Types

Holotype ♂: Jarra Creek near Tully, Queensland, swept rainforest, 27.viii.1976, Bock and Parsons (ANIC). Paratypes: same locality as holotype, 12.viii.1976, P.A. Parsons, 2♂ (ANIC).

Distinguishing features. As in generic diagnosis above; body tan.

Body length. 2.0 mm (all specimens of similar length).

Head. Arista with 3 straight rays above and 2 straight rays below plus terminal fork. Front 1.4 times broader than long, shiny tan, pollinose about periorbits and ocellar triangle, latter weakly darkened within. 2nd and 3rd antennal segments tan. Carina forming a ridged mound on upper part of face, obsolete below. Face tan. Palp tan, with a few apical-subapical bristles. Cheek slightly curved, broad; vibrissa very large. Eye with strong pile. Orbital bristles in ratio 4 : 3 : 7. Ocellar and vertical bristles large. Postvertical bristles unusually large, larger than proclinate orbitals but smaller than ocellars.

Thorax. Mesonotum, scutellum, pleura and haltere tan. Acrostichal hairs rather irregular, in 4–6 rows. Anterior and posterior scutellar bristles subequal. Sternopleuron with 2 bristles, anterior bristle 0.6 length of posterior bristle. Legs tan; preapical bristles present on all tibiae; apical bristle on 2nd tibia only.

Wing. Slight brownish tinge present. Lappet moderately strong, with 2 large bristles. Anal vein rudimentary. *C*-index, 1.9; 4*V*-index, 2.5; 5*X*-index, 3.4; *M*-index, 1.0. 3rd costal section with heavy setation on basal 0.5–0.6. Length (holotype), 2.0 mm.

Abdomen. Largely tan. Tergites 2–5 darker apically.

Male genitalia (Figs 111, 112). Clasper with *c*. 7 prominent medial bristles and single very large bristle below; aedeagus apically expanded and heart-shaped, without ornamentation.

Distribution. Known only from type locality (but see below).

Special Comments

This species is very close to, and may be the same as, an unnamed specimen described by Wheeler and Takada (1964) (as ? *Styloptera* species) from Micronesia.

Key to Australian Species of *Styloptera*

Mesonotum striped ..... *striata*
Mesonotum entirely tan ..... *wheeleri*

XXIX. Genus Tambourella Wheeler

Tambourella Wheeler, 1957, p. 226. Type-species *T. endiandrae* Wheeler, 1957, by original designation; type locality Mt Tamborine, Qld.

Arista large, fan-like; carina narrow; clypeal margin with median notch; 2 vibrissae present; anterior reclinate orbital bristle absent; ocellar and vertical bristles large, ocellars close together behind anterior ocellus; postvertical bristles very weak; acrostichals absent; anterior dorsocentral bristle large, close to transverse suture; pleura and posterior portion of abdomen glassy; wing with complex pattern; distal costal incision weak; 2nd longitudinal vein curved apically towards costa; anal vein absent; abdominal tergites 1 and 2 fused dorsally.

Only one species, known only from Australia, has been described in this genus of uncertain affinities; a second species exists in New Guinea (Bock and Parsons, unpublished; the generic diagnosis above is given on the basis of both species).

1. *Tambourella endiandrae* Wheeler

Tambourella endiandrae Wheeler, 1957, p. 226. (Holotype in London; type locality Mt Tamborine, Qld.)

Distinguishing features. As given in generic diagnosis above; wing with complex pattern and aberrant venation (Fig. 113).

Body length. ♂, 2.6 mm.

Head. Arista with 5 long apically curved rays above and 3 slightly curved rays below plus terminal fork, rays of latter curved downwards. Front 1.5 times broader than long, tan, pollinose except in elevated ocellar triangle (black) and in narrow triangular area anteriorly on each side medial to orbital bristles. 2nd antennal segment tan; 3rd segment slightly dusky. Carina almost knife-like, high. Face glassy pale to mid brown. Clypeus with small bulbous protuberance on either side of midline; clypeal margin black. Palp dusky brown. Cheek almost linear, black. Proclinate orbital bristle *c.* 0.5 length of reclinate orbital. Eye bare; greatest diameter almost horizontal.

Thorax. Mesonotum and scutellum irregular pale brown, darker near midline, pollinose. Anterior scutellar bristles weak. Anterior dorsocentral bristles at level of suture. Pleura glassy dark blackish brown. 2 bristles only present on sternopleuron, anterior bristle very fine and short, posterior bristle large. Basal segments of haltere pale tan; knob blackish. Fore- and hind-femora glassy blackish basally, tan apically; mid-femur weakly blackish basally, tan apically. Tibiae and tarsi tan. Preapical and apical bristles on 2nd tibia only.

Wing (Fig. 113). Complex pattern of pale dark areas present. 2nd longitudinal vein strongly curved apically towards costa. 5th longitudinal vein irregular, obsolete apically. *C*-index, *c.* 1.0; 4*V*-index, *c.* 0.9. 3rd costal section with heavy setation on basal 0.3. Length *c.* 2.3 mm.

Abdomen. Tergites 1–2 pollinose brown; incurved portions shiny black. Tergites 3–6 entirely shiny dark brownish black.

Male genitalia (Figs 114, 115). Small, black, strongly chitinized. Clasper with medial row of strong teeth; aedeagus cylindrical.

Female genitalia. Egg guide strong, narrowly rounded apically, with marginal teeth.

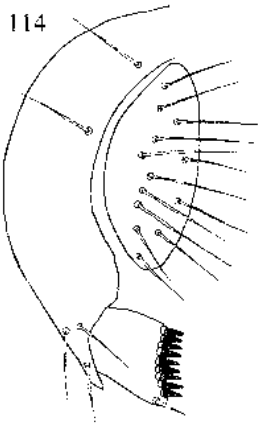
Distribution. Rainforests of eastern Australia, from north Queensland to southern New South Wales.

Specimens Examined

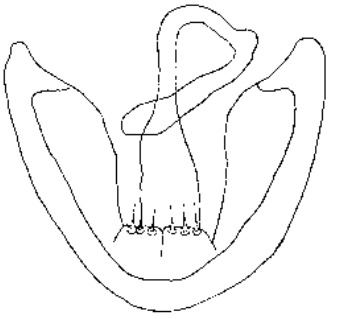
Queensland: Lake Eacham National Park, banana bait, Dec. 1974, I.R. Bock, numerous ♂ ♀ (ANIC); Lake Eacham National Park, 7.xi.1975, P.A. Parsons, 1♂ (I.T). Millaa Millaa Falls, Atherton Tableland, 15.vii.1971, Z. Liepa, 1♀ (ANIC); The Crater near Herberton, 4.i.1967, D.K. McAlpine and G.A. Holloway, 1♀ (AM); Summit Walter Hill Range, Cardstone–Ravenshoe Road, 16.i.1967, D.K. McAlpine and G.A. Holloway, 1♀ (AM); Mt Edith Forest Road, 1–1½ miles off Dambulla Road, 6.v.1967, D.H. Colless, 3♂, 3♀ (ANIC); 9 miles SSE. of Ravenshoe, 21.iv.1969, I.F.B. Common and M. Upton, 2750 ft, 1♂ (ANIC); Yungaburra (State Forest 452), 7.v.1967, D.H. Colless, 3♂, 2♀ (ANIC); Wongabel State Forest, 7.v.1967, D.H. Colless, 3♂, 2♀ (ANIC); Birthday Creek, 7 miles W. of Paluma, 14–15.i.1970, G.A. Holloway, 7♂, 9♀, 1 ? (AM); Maleny, rainforest 2000 ft, 6.iv.1967, N. Dobrotworsky, 1♀ (AM); Kenilworth State Forest, 5.ii.1961, D.K. McAlpine, 1♀ (AM); Mt Tamborine, D.K. McAlpine, 3.ii.1960, 1♂, 2.ii.1961, 1♂.

113

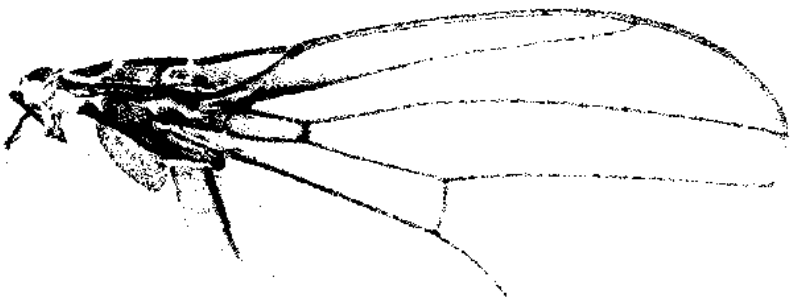
114



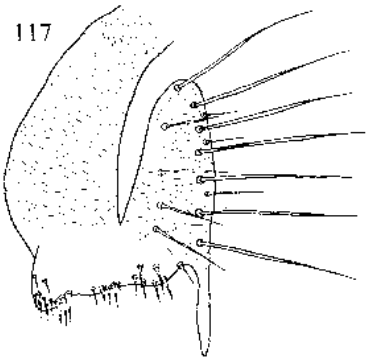
115



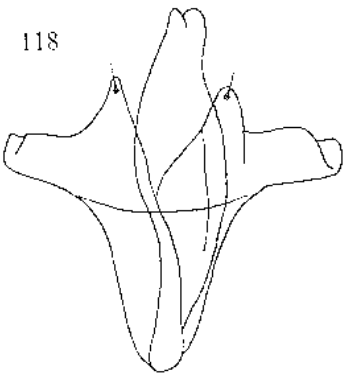
116



117



118



2♀ (AM). **New South Wales:** Bruxner Park (site 3), 19.iv.1970, D.H. Colless, 2♂, 2♀ (ANIC); Bruxner Park, fruit bait, 21.ii.1978, P.A. Parsons, 4♂, 3♀ (LT); The Island, Bellingen, D.K. McAlpine, 1.iv.1960, 1♂, 19.vii.1964, 1♂ (AM); Wilson's Creek near Mullumbimby, 29.i.1961, D.K. McAlpine, 3♂, 1♀ (AM); Huonbrook near Mullumbimby, D.K. McAlpine, 30.i.1961, 2♀, 28.ii–3.iii.1965, 4♂, 6♀, McAlpine and Lossin, 4.xii.1961, 2♂, 1♀, 1 ? (AM); Upper Allyn River, 22.iv.1970, D.H. Colless, 1♂ (ANIC).

Special Comments

T. endiandrae can be cultured on standard *Drosophila* media. The wing venation in the undescribed species from New Guinea is normal apart from the absence of the anal vein.

XXX. Genus **Zaprionus** Coquillett

Zaprionus Coquillett, 1902, p. 31. Type-species *Z. vittiger*, Coquillett, 1902, by original designation; type locality Cape Province, South Africa.

Arista plumose; periorbits silvery white; carina very large; vibrissa single; orbital bristles all developed and in line, posterior reclinate orbital closer to inner vertical than to proclinate orbital; ocellar, vertical and postvertical bristles all developed; mesonotum pale with silvery white longitudinal stripes, at least 2 dorsal and 2 lateral; prescutellar bristles absent, or prescutellar acrostichals only slightly enlarged; posterior sternopleural bristle only large; male fore-femur in typical species with row of tubercles on lower side, each tubercle with large basal bristle.

The genus *Zaprionus* contains about two dozen species, mostly restricted to Africa but with a few species in India, south-east Asia and Australia. Only one species is known from Australia (but see species A below). As indicated above, the distinction between *Zaprionus* and *Phortica* has not been satisfactorily resolved.

1. *Zaprionus argentostriatus* (Bock)

Drosophila argentostriata Bock, 1966, p. 273. (Holotype in AM; type locality Bisianumu, Papua New Guinea.)
Zaprionus argentostriatus (Bock): Bock, 1977*b*, p. 270.

Distinguishing features. Body length *c*. 4 mm; mesonotum tan with 5 complete longitudinal silvery stripes; front tan with 3 (median + periorbital) silvery stripes; abdomen tan. Full description (including genitalia and chromosomes) in Bock (1966).

2. ? *Zaprionus* species A

A single male specimen in poor condition in the AM collection (2 miles N. of Tully River Bridge, Cardstone–Ravenshoe Road, north Queensland, 17.i.1967, D. McAlpine and G. Holloway), possibly a member of this genus, is distinguished by a narrow carina, an unusually narrow cheek, and a mesonotum possessing two broad submedian longitudinal stripes each narrowly divided posteriorly, the inner half of each stripe obsolete. The frontal setation is typical of species of *Zaprionus*.

Figs 113–115. *Tambourella endiandrae*: *113*, wing; *114*, male external genitalia; *115*, male internal genitalia.
Figs 116–118. *Zygothrica samoaensis*: *116*, wing; *117*, male external genitalia; *118*, male internal genitalia.

XXXI. Genus Zygothrica Wiedemann

Zygothrica Wiedemann, 1830, p. 12. Type-species *Achias dispar* Wiedemann, 1830, by monotypy; type locality Brazil.

Anterior reclinate orbital bristle large; carina prominent; proboscis unusually long, strongly sclerotized; arista plumose; anal plate of male external genitalia typically with ventral finger-like process.

The genus *Zygothrica* is predominantly Neotropical, with over 50 species described from Central and South America (Wheeler 1981) and many more species undescribed (Kaneshiro, personnal communication). Malloch (1934) described a single species from Samoa. Takada (1976) described a further species from Fiji and two species from West Malaysia.

The most characteristic feature of *Zygothrica* species is the elongate and highly sclerotized proboscis; indeed, were it not for this distinctive feature the species now assigned to the genus would be included in *Drosophila* (see below). The Neotropical species *Z. dispar* Wiedemann, *Z. prodispar* Duda and *Z. laticeps* Burla also exhibit an allometric widening of the head in males, a phenomenon studied in some detail by Burla (1954*c*).

Zygothrica appears most closely related to the *Drosophila* subgenus *Hirtodrosophila*, and it is fairly certain that *Zygothrica* originated in South America as an offshoot of *Hirtodrosophila* (Burla 1956). All species of *Zygothrica* appear to be fungivorous (Burla 1956; Takada 1976), as are many (but probably not all) species of *Hirtodrosophila*. A comprehensive account of the relationships between the two groups is given by Burla (1956).

Zygothrica is represented in Australia by the single species discussed below.

1. *Zygothrica samoaensis* Malloch

Zygothrica samoaensis Malloch, 1934, p. 278. (Holotype in London; type locality Samoa.)

Distinguishing features. As given in generic diagnosis above; mesonotum blackish; pleura pale tan; abdomen blackish.

Body length. Range 2.3–3.0 mm. in specimens examined.

Head. Arista with 4–5 rays above and 2 rays below plus terminal fork; dorsal rays apically curved. Ratio frontal breadth : length 0.95; front dull blackish, a little paler anteriorly, with pale oval area anteriorly in midline; periorbits silvery. 2nd antennal segment dusky; 3rd segment long, dusky. Carina strongly protuberant, nose-like. Face dusky, darker at clypeal margin. Proboscis black. Palp blackish, with long apical bristles. Cheek slightly curved, black, pale in posterior corner. Eye large, bare, narrowed below. Orbital bristles in ratio *c*. 8 : 6 : 7, in line; anterior reclinate orbital slightly closer to proclinate than to posterior reclinate orbital. Ocellar, vertical and postvertical bristles large.

Thorax. Mesonotum and scutellum subshining dark brownish black. Acrostichal hairs in *c*. 8 irregular rows in front of dorsocentral bristles decreasing to *c*. 6 rows between dorsocentrals. Last acrostichals in each row (at scutellar margin) appreciably enlarged. Ratio anterior : posterior dorsocentral bristles *c*. 0.3; anterior dorsocentrals very close to posterior dorsocentrals. Pleura pale tan, upper anterior corner of mesopleuron only slightly darkened. Anterior sternopleural bristle fine, *c*. ½ length

of posterior sternopleural. Stalk of haltere tan; knob black. Legs pale tan; preapical bristles on 2nd and 3rd tibiae; large apical bristle on 2nd tibia.

Wing (Fig. 116). Smoky, more intensely at base. *C*-index, *c.* 1.9; 4*V*-index, *c.* 2.1; 5*X*-index, *c.* 1.9; *M*-index, *c.* 0.7. 3rd costal section with heavy setation on basal 0.5. Length, *c.* 2.5 mm.

Abdomen. Tergites 1–5 shiny black dorsally and laterally, tan on incurved portions. Tergite 6 pale tan.

Male genitalia (Figs 117, 118). Unusually small, weakly sclerotized; anal plate with typical finger-like ventral extension ['Analplattenschnabel' (Burla 1956)]: aedeagus bare, apically narrowed and rounded.

Female genitalia. Egg guide well developed, with strong marginal and a few lateral teeth.

Distribution. Previously reported from Samoa (Malloch 1934; Wheeler and Kambysellis 1966; Takada 1976); Australian specimens from rainforests of north Queensland.

Specimens Examined

Queensland: Mossman Gorge, swept rainforest, 28.iv.1980, S.F. McEvey, 2♂, 1♀ (LT); Whitfield Range Forest Reserve, Cairns, 19.iv.1967, D.H. Colless, 1♂, 1♀ (ANIC); Kuranda, 19.v.1958, D.K. McAlpine, 1♂ (AM); The Boulders, Babinda, 10.v.1967, D.H. Colless, 1♂ (ANIC); Tully River, west of Mt Cullumbullum, fungus, 22.iv.1980, S.F. McEvey, numerous ♂♀ (AM; ANIC).

Special Comments

The Australian specimens differ slightly from those described previously for this species in the length of the anterior reclinate orbital bristle (as long as the posterior reclinate orbital bristle in the Samoan specimens, shorter in the Australian specimens), but the Australian specimens match the descriptions of the Samoan ones in other respects, and the male genitalia of the Australian specimens are in good agreement with those figured by Wheeler and Kambysellis (1966). There seems no doubt that the Australian and Samoan specimens are conspecific.

Discussion

Fifty-five genera of Drosophilidae have been recognized on a world basis (Wheeler 1981); if one adds the four new genera established in this paper that total reaches 59 genera, 31 of which occur in Australia. Similarly, about 2500 species are listed in Wheeler's catalogue; the 221 species now described from Australia thus constitute just under 9% of the world total. These figures may, however, give an overestimate of Australia's share of the world total since many more species undoubtedly remain to be described from south-east Asia, New Guinea, South America, Hawaii and Africa, and Australia's relative share of the world total will certainly fall as the unknown parts of these faunas are worked. Of course it is also possible that further new species will be described from Australia (see below), but it seems probable that the bulk of Australia's drosophilid fauna is now known.

By far the largest drosophilid genus in Australia is *Drosophila*, as it also is on a world basis; *Leucophenga* and *Mycodrosophila* are also well represented, but with considerably smaller numbers of species. The largest number of species in any of

the remaining genera is seven (*Microdrosophila*), and several genera are represented by a single species each.

One of the most interesting features of the *Drosophila* fauna is the number of species of the subgenus *Scaptodrosophila* of externally very similar morphology, i.e. plain brown coloration with similar setation and wing indices; with a few exceptions these species are unequivocally determinable only by reference to (usually male) genitalia and they comprise an appreciable component of the fauna of south-eastern Australia. It is this component of the Australian drosophilid fauna which is unquestionably most deserving of further attention, and perhaps also the most likely to reveal further new species on closer examination. Nothing at all is known of the larval habits of almost all of the species concerned, several are known only from single localities and most of the remainder are very poorly known.

Clearly, Australia's drosophilid fauna shows strong affinities with that of south-east Asia and New Guinea. Most of the Australian genera and species-groups also occur in these areas, and in many cases (such as the *melanogaster* and *immigrans* groups of the genus *Drosophila*) the Australian components are merely impoverished 'spill-overs' restricted in distribution to the rainforests of north Queensland; in a few cases (*Sphaerogastrella javana*, *Lissocephala metallescens*) single widespread Oriental species also extend into northern Australia. Several groups have, however, successfully moved southwards in rainforest habitats so that typically Oriental-northern species such as *S. javana* also extend into New South Wales; central New South Wales seems to be about the southernmost limit of extension of these typically northern forms, the floral composition of the more southerly rainforests perhaps being unsuitable and the climate too cold. Generic and specific diversity thus decrease from northern Queensland towards southern Australia, and the fauna of southern Western Australia is especially depauperate, only a few species of the two genera *Drosophila* and *Scaptomyza* having been collected there. The single group (the subgenus *Scaptodrosophila*) that is well established in southern Australia was presumably the earliest drosophilid invader into Australia.

It appears, then, that at least the great bulk of Australia's drosophilid fauna originated by way of migrations into the north of the continent, especially into north Queensland, from the Oriental Region and New Guinea, the earlier immigrants having had time to undergo subsequent adaptive radiation in Australia. Two genera, however, may be exceptions to this proposition. The genus *Scaptomyza* is very poorly represented in the Oriental Region (Okada 1977) but possesses hundreds of species in Hawaii and may have originated there; and the genus *Zygothrica* is similarly very poorly represented in the Oriental Region and, as discussed above, probably originated in South America. The genus *Scaptomyza* is represented in Australia by one widespread (in Australia) endemic species, one rather widespread species also known from several other regions, and an apparently recent introduction into Tasmania. *Zygothrica* is represented in Australia by a single species also known from Samoa and within Australia restricted to north Queensland. These species (with the exception of *Scaptomyza flava* introduced into Tasmania) may have reached Australia from the Pacific, although it is admittedly not easy, given the absence of connecting land masses or island chains, to envisage such a migration.

How much of the Australian drosophilid fauna is unique to Australia? Five of the genera considered above have been recorded only from Australia, viz. *Tambourella* and the four newly established genera *Balara*, *Collessia*, *Crincosia* and

Mulgravea. It would, however, certainly be premature to conclude that these groups represent truly autochthonous and endemic Australian genera. As already indicated, an undescribed species of *Tambourella* is known to occur in New Guinea, and as far as the other genera are concerned much of the fauna of New Guinea and south-east Asia is simply too poorly known for a very meaningful comparison. At the level of species-groups, however, the *inornata* and *barkeri* groups of the *Drosophila* subgenus *Scaptodrosophila* and the *zentae* group of the subgenus *Hirtodrosophila* may be truly native and endemic, although one member of the *barkeri* group extends as far northwards as Torres Strait (McEvey 1981). At the level of individual species it appears that a large proportion of the (ungrouped) *Scaptodrosophila* species as well as various species of other groups may be restricted to Australia and, as already noted, some *Scaptodrosophila* species occur only in southern Australia.

It is certain that Australia's drosophilid fauna bears very little, if any, relationship to other Gondwanaland faunas. The dominant group in southern Australia is *Scaptodrosophila*; indeed in southernmost Australia other groups are barely represented at all. In both South America and southern Africa, however, *Scaptodrosophila* is barely represented while other groups clearly dominate (such as the subgenera *Drosophila* and *Hirtodrosophila* and the genus *Zygothrica* in South America, and the subgenus *Sophophora* and the genera *Leucophenga* and *Zaprionus* in Africa). Although species of these latter groups are present in Australia, they are also present in greater numbers in south-east Asia and New Guinea, and the Australian species are largely or entirely confined to north Queensland. Noteworthy also in this context is the highly depauperate fauna of New Zealand (Harrison 1959), consisting of only two native species of *Drosophila* (*Scaptodrosophila*) and two of *Scaptomyza*, with several introduced or cosmopolitan species of *Drosophila*.

How much of Australia's fauna remains to be discovered? Although this review will certainly not be the last word on Australian Drosophilidae, most of the favourable collecting areas in Australia have now been visited several times, and it seems likely that the bulk of the fauna is now known. Nevertheless, there are still species known only from single specimens, a situation suggesting that some further species may have been overlooked altogether, a few undetermined specimens in poor condition but probably representing new species (especially of *Drosophila*) are also present in the museum collections. A substantial amount of field work may thus well reveal a few new species; the northern part of Western Australia in particular is largely unexplored, although indications to date are that the number of species in this area is small.

In summary, Australia's fauna of the family Drosophilidae is now known to comprise 221 described species in 31 genera. The genus *Drosophila* contains over half of the total number of drosophilid species described; several genera are represented in Australia by a single species each. It is clear that almost all of Australia's drosophilid fauna originated by way of immigrations from the north; the earliest invaders have undergone adaptive radiation within the continent. Many groups are restricted to the rainforests of north Queensland where generic and specific diversities are greatest.

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Index of Genera and Species of Australian Drosophilidae

All described genera and species of Australian Drosophilidae are listed below, together with a page reference except for most species of *Mycodrosophila* which are fully discussed in Bock (1980a). Synonyms and homynyms are printed in Roman type.