Australian Journal of Zoology

A medium for the publication of the results of original scientific research in all branches of zoology. A Supplementary Series, comprising chiefly taxonomic revisions, is published in the form of separates as material becomes available.

Australian Journal of Zoology
Published by the Commonwealth Scientific and Industrial Research Organization. Issued four times a year.

All enquiries and manuscripts should be forwarded to:
The Editor-in-Chief
Editorial and Publications Service
CSIRO, 372 Albert Street
East Melbourne, Victoria 3002

Printed by CSIRO, Melbourne

Australian Journal of Zoology

Supplementary Series No. 40

Drosophilidae of Australia
I. *Drosophila* (Insecta : Diptera)

Ian R. Bock

30 July 1976

AJZSA6 40 1–105 (1976)

Aust. J. Zool., Suppl. Ser., 1976, No. 40, 1–105

Drosophilidae of Australia.
I. *Drosophila* (Insecta : Diptera)

Ian R. Bock

Zoology Department, James Cook University, Townsville, Qld 4811.

Abstract

The Australian members of the genus *Drosophila* are reviewed, with redescriptions of many species; 40 new species are also described, bringing the known total to 81. A key to species is provided. The Australian *Drosophila* fauna is dominated by members of the subgenus *Scaptodrosophila*, most of which appear to be endemic. The bulk of the Australian *Drosophila* fauna is substantially different from that of neighbouring New Guinea–south-east Asia, but the latter fauna overlaps into northern Queensland. The Australian fauna includes eight cosmopolitan species.

Introduction

Knowledge of the Australian species of *Drosophila*, which is by far the largest genus in the family Drosophilidae, has hitherto been restricted to the information contained in several papers dealing with the faunas of particular regions of the country, or describing isolated specimens in museum collections.

The first papers to mention Australian *Drosophila* species appeared in 1923, when the dipterist J. R. Malloch included descriptions of several drosophilids (including several *Drosophila*) from museum collections in his series of papers on Australian Diptera (Malloch 1923). In the same year the German physician O. Duda published a paper on south-east Asian Drosophilidae in the collection of the Hungarian National Museum; Duda's work included descriptions of three Australian species, two of which were described in the genus '*Drosophila*' ('*Drosophila*' *biradiata* is, however, a *Scaptomyza*), the third in the genus '*Paradrosophila*' (now regarded as a subgenus of *Drosophila* and a synonym of *Scaptodrosophila*, *q.v.*). Duda's *Drosophila* species are synonymized in this paper with two of the species described by Malloch (*obsoleta* and *lativittata*) in the same year (Malloch's descriptions were published on 12 December 1923, Duda's on 24 December 1923).

Malloch's isolated descriptions of Australian *Drosophila* species continued to appear until 1927 (Malloch 1924, 1925, 1927), the total number of new species described on the basis of specimens collected in Australia being 18 (see Index); two of these species (*serrata* and *setifemur* = *sulfurigaster* Duda) are now known to occur outside Australia, a third (*nigrovittata*) is a *Dettopsomyia*, and a fourth (*poecilithorax*) has proved on examination to be clearly not a *Drosophila* as the genus is presently delimited, although it does not obviously fall into any of the other known drosophilid genera: it is not considered further in this paper. The remaining 14 of Malloch's species are apparently all endemic. Malloch's keys to Australian species also mentioned five additional cosmopolitans: *busckii*, *hydei*, *immigrans*, *melanogaster* and *repleta*.

Several further Australian, or Australian-New Guinean, *Drosophila* species were described in papers by Mather (1955, 1960) and Angus (1967) (see also Index) which were also concerned with the faunas of limited areas; the species described are discussed further below.

The substantial drosophilid collections of the Division of Entomology, CSIRO, Canberra (Australian National Insect Collection), and the Australian Museum, Sydney, were available for the present study and provided specimens collected from all parts of Australia. This paper attempts a review of existing knowledge of species of the genus *Drosophila* in Australia in addition to providing descriptions of 40 new species; a key to species is provided and the Australian fauna is discussed in relation to that of other regions.

Family **DROSOPHILIDAE**

Several diagnoses of the family Drosophilidae have been given by various authors. One of the most extensive is that of Duda (1924), after which the following is modified.

Head with 2 or (usually) 3 (fronto-)orbital bristles of which 1 is proclinate and remaining 1 or 2 reclinate; postvertical bristles large to minute (parallel to convergent), or absent; outer and inner vertical bristles usually present; antennae decumbent, 3rd segment more or less elliptical; arista micropubescent or plumose, if plumose usually with several short medial hairs in addition to larger dorsal and ventral rays; vibrissae usually present. Mesonotum rarely bare, acrostichal hairs usually in 2–10 more or less well defined longitudinal rows; 1, (usually) 2, 3 or 4 pairs of dorsocentral bristles present; prescutellar acrostichals developed or undeveloped; thorax usually with 1 pair of humeral bristles, 2 notopleurals, 1 presutural, 2 supralars and 2 postalars; mesopleuron bare; sternopleuron usually with 2 or 3 large bristles ('sternopleurals') above and several small bristles below; disc of scutellum usually bare; scutellar margin with 4 bristles (anterior and posterior scutellars), anterior pair reduced in some genera; preapical bristles usually present on tibiae. Costa of wing with proximal and distal breaks, costa reaching end of 3rd or 4th longitudinal vein; 1st longitudinal vein terminating at distal costal incision; auxiliary vein obsolete apically or fused with 1st longitudinal vein; anterior and posterior crossveins present; discal and second basal cells separated by 3rd crossvein in some genera.

With very little loss of accuracy, the diagnosis of the family may be considerably condensed to the following essential features:

Head with 1 pair of proclinate and 1 or 2 pairs of reclinate orbital bristles; postvertical bristles, when present, parallel or convergent; mesopleuron bare; costa twice broken; auxiliary vein not reaching costal margin.

In addition to species of *Drosophila*, the following Drosophilid genera have been noted in the course of this work (several hitherto unrecorded from Australia): *Amiota*; *Dettopsomyia*; *Gitonides* (? = *Cacoxenus*); *Leucophenga*; *Liodrosophila*; *Lissocephala*; *Microdrosophila*; *Mycodrosophila*; *Paramycodrosophila*; *Scaptomyza*; *Stegana*; *Styloptera* (s. s. Duda 1924, p. 192) and *Tambourella*. Further specimens in the Australian National Insect and Australian Museum collections probably represent new genera.

Genus **Drosophila** Fallen

The following diagnosis of the genus *Drosophila* is modified after Wheeler and Takada (1964):

Drosophila Fallen, 1823, p. 4.

Type-species: *Musca funebris* Fabricius, 1787.

Arista plumose, almost invariably with 1 or more ventral branches and terminal fork; 1 proclinate and 2 reclinate orbital bristles, anterior reclinate smaller than other 2 orbitals, posterior reclinate closer to proclinate than to inner vertical; postvertical bristles well developed; mesonotum usually with 6 or more rows of acrostichals and 2 pairs of dorsocentral bristles; prescutellar acrostichals developed or undeveloped; discal and 2nd basal cells of wing confluent; costa reaching apex of 4th vein.

Within the genus, which contains over 1250 described species [about 25% of this total restricted to the Hawaiian Is (Wheeler and Hamilton 1972)], about a dozen subgenera have been recognized of which four may be regarded as 'major' in the sense that each is of cosmopolitan distribution and contains over 100 (in *Drosophila* and *Sophophora* substantially more than 100) species. These subgenera are *Drosophila*, *Sophophora*, *Scaptodrosophila* and *Hirtodrosophila*. Members of all four of them occur in Australia (*Hirtodrosophila* hitherto unrecorded as such). Each subgenus is considered separately below.

Characters of Taxonomic Importance

The form of species descriptions has for some time been relatively standard amongst *Drosophila* taxonomists. The following explanations are given to assist workers whose primary interests in the genus *Drosophila* have not encompassed specialized study of the morphological characters used in classification. Figs 1–5 provide diagrammatic illustrations of some features of taxonomic importance.

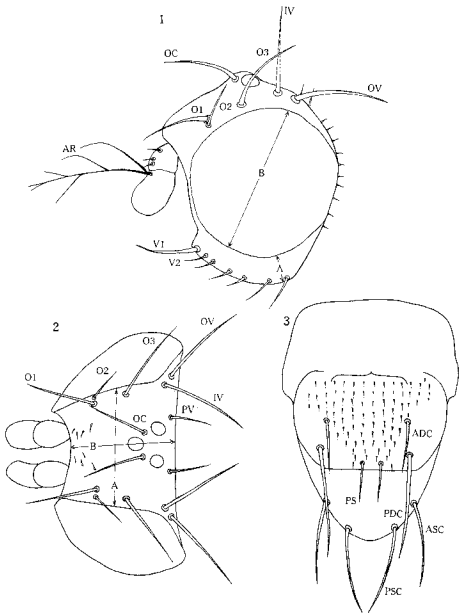
Head

The arista and the orbital, oral and vertical bristles are shown in Fig. 1; the ratio of length *A* to length *B* is the ratio 'greatest width of cheek : greatest diameter of eye'. Fig. 2 depicts orbital, vertical, ocellar and postvertical bristles; positions of measurement of breadth and length of front are shown by lines *A* and *B* respectively.

The carina is a protuberance on the face between the antennae, most satisfactorily observed in pinned (rather than etherized or alcohol-preserved) specimens, which may be arranged at a suitable orientation under a stereomicroscope. The shape and degree of development of the carina (varying from absent to extremely prominent) are useful features in separating many of the Australian species from one another.

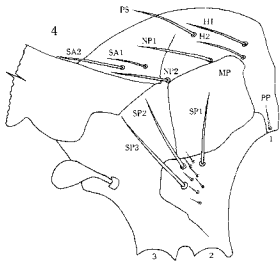
Thorax

The acrostichal hairs and the dorsocentral, prescutellar and scutellar bristles are shown in Fig. 3. The number of rows of acrostichals in front of dorsocentral bristles is indicated within a brace bracket. Fig. 4 depicts propleural and sternopleural bristles; the sterno-index is the ratio of length of bristle SP1 to length of bristle SP3. Humeral, presutural, notopleural and supraalar bristles are also shown; note that the mesopleural sclerite bears no bristles.



Figs 1 and 2. *D. obsoleta*, head: *1*, lateral aspect; *2*, dorsal aspect. *AR*, arista. *IV*, inner vertical bristle. *O1*, proclinate orbital bristle. *O2*, anterior reclinate orbital bristle. *O3*, posterior reclinate orbital bristle. *OC*, ocellar bristle. *OV*, outer vertical bristle. *PV*, postvertical bristle. *V1*, first oral bristle (vibrissa). *V2*, second oral bristle.

Fig. 3. *D. enigma*, thorax, dorsal aspect. *ADC*, anterior dorsocentral bristle. *ASC*, anterior scutellar bristle. *PDC*, posterior dorsocentral bristle. *PS*, prescutellar bristle. *PSC*, posterior scutellar bristle.



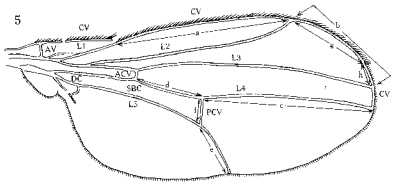


Fig. 4. *D. brunneipennis*, thorax, lateral aspect. *H1, H2*, humeral bristles. *MP*, mesopleuron. *NP1, NP2*, notopleural bristles. *PP*, propleural bristle. *PS*, presutural bristle. *SA1, SA2*, supra-alar bristles. *SP1, SP2, SP3*, anterior, middle and posterior sternopleural bristles. *1, 2, 3*, positions of fore, mid and hind legs.

Fig. 5. *D. sydneyensis*, wing. *ACV*, anterior crossvein. *AV*, auxiliary vein. *CV*, costal vein. *DC*, discal cell. *L1- L5*, first to fifth longitudinal veins. *PCV*, posterior crossvein. *SBC*, second basal cell. *a–h*, measurements for determining ratios (see p. 6).

Wing

Fig. 5 depicts a wing. The ratios of taxonomic importance are: costal index (*C*-index), *a/b*; fourth vein index (4*V*-index), *c/d*; 5*X*-index, *e/f*; *M*-index, *e/d*. The last index has not hitherto been used in *Drosophila* classification, but Malloch (1924) mentioned it in his description of *D. fuscithorax*, and it has been found useful in the course of this work in separating several species; it has therefore been included in the species descriptions. The costal vein in all species bears heavier spines on a basal portion which extends for some (species-specific) distance to a point between the apices of the second and third longitudinal veins. The ratio $g/(g + h)$ is the ratio referred to in 'third costal section with heavy setation on basal .....'

Body length in each species has been measured as the sum of length of head from anterior margin of second antennal segment to occipital margin, plus length of thorax from anterior margin to posterior scutellar margin, plus length of abdomen from anterior margin to apex. Since the abdomen in pinned specimens is almost invariably somewhat shrivelled, the body lengths of live flies would be slightly greater than the measurements given in the descriptions below.

Subgenera and Species Descriptions

Descriptions of new species are based in each case on a single holotype except in some cases where the holotype is a female, when male genitalia from a paratype, if available, have been figured. In several cases, undescribed species were represented, amongst the material examined, by single specimens, and the question arose whether new species should be described and named on the basis of single individuals. Several of the descriptions of new species below are so based; where such a specimen was well preserved and intact regarding all important descriptive characteristics, it is believed that the interests of taxonomy have been better served, and the job of subsequent workers simplified, by describing and naming the species rather than by fully describing the specimen and merely designating it (e.g.) 'sp. A'.

Locations of holotypes of previously described Australian endemics, and where known of more widespread species, are given in the species descriptions; type localities of introduced or cosmopolitan species are also given where known. The following abbreviations are used:

ANIC	Australian National Insect Collection, Division of Entomology, CSIRO, Canberra
AM	Australian Museum, Sydney
SPHTM	School of Public Health and Tropical Medicine, University of Sydney
UT	Type and Reference Collection, Genetics Foundation, University of Texas, Austin, Texas
USNM	United States National Museum, Washington, D.C.
BM	British Museum (Natural History), London
HNM	Hungarian National Museum, Budapest

Holotypes of all species described in this paper are located in either ANIC or AM (as indicated).

Subgenus **Drosophila** Fallen

Drosophila Fallen, 1823, p. 4.

Chaetodrosophilella Duda, 1923, p. 40.

Chaetodrosophilella: Sturtevant, 1927, p. 367 (as subgenus of *Drosophila*).

Type-species: *Drosophila funebris* (Fabricius).

Diagnosis

Apical bands on anterior abdominal tergites, when present, usually interrupted in midline; 2nd oral bristle relatively large; cheek often broad; prescutellar acrostichal bristles not, or barely, enlarged; propleural bristle absent; eggs usually with 4 filaments; genital arch and anal plate of male external genitalia with or without micropubescence; generally larger species than members of other subgenera except some *Scaptodrosophila*.

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

Musca funebris Fabricius, 1787, p. 345. (Type locality Europe.) For synonymies and discussion thereof see Wheeler (1959, p. 181) and Okada (1956, p. 143).

Distinguishing Features

Body brown; male abdomen black; female abdomen with broad posterior dark bands on each tergite narrowly interrupted in midline. Carina prominent; cheek broad. No row of short stout teeth on fore femur (femoral comb). Male external genitalia with large black bristles (figured in Hsu 1949, p. 135).

Detailed Description

In Patterson (1943, p. 110) and Okada (1956, p. 143).

Distribution

Cosmopolitan; known from eastern, but not western, Australia (collected in Sydney by J. S. F. Barker).

repleta Species-group

repleta sp. gp. Sturtevant, 1942, p. 5.

Diagnosis

Carina prominent, more or less sulcate. Mesonotum pale, each hair or bristle arising from dark spot. Prescutellar acrostichals sometimes slightly enlarged.

The following four species belong to the *repleta* species-group, most of the members of which are endemic to the Nearctic and Neotropical biogeographic zones. The group evidently originated in this region; a few of the species have become more widespread, and *hydei, repleta, buzzatii* and *aldrichi* occur in Australia (the last two presumably introduced with the prickly pear cactus on which they feed).

2. *Drosophila* (*Drosophila*) *repleta* Wollaston

Drosophila repleta Wollaston, 1858, p. 117. (Holotype in BM: type locality Spain.)

Distinguishing Features

Abdominal tergites with lateral yellow spots. Similar to following three species; for separation see key (p. 95).

Detailed Description

In Patterson (1943, p. 117) and Okada (1956, p. 160).

Distribution

Cosmopolitan; see notes on *hydei* below.

3. ***Drosophila* (*Drosophila*) *hydei*** Sturtevant

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

Distinguishing Features

Abdominal tergites without lateral yellow spots; see key (p. 95).

Detailed Description

In Patterson (1943, p. 126) and Okada (1956, p. 161).

Distribution

Cosmopolitan. According to Wheeler (personal communication), '*hydei* is found everywhere (ecologically) where it occurs at all *repleta* is scarce, often in and around urinals, etc.'

4. ***Drosophila* (*Drosophila*) *buzzatii*** Patterson & Wheeler

Drosophila buzzatii Patterson and Wheeler, 1942, p. 97. (Holotype location not stated; type locality Sicily.)

Drosophila versicolor Mather, 1955, p. 573. (Holotype in AM; type locality Moggill, Brisbane. Synonymized Mather, 1957, p. 224.)

Distinguishing Features

Smaller than *repleta* and *hydei*; see key (p. 95).

Detailed Description

In Patterson and Wheeler (1942) and Mather (1955).

Distribution

Widespread in eastern Australia in association with *Opuntia* spp., the prickly pear (collections by J. S. F. Barker); also known from Palaearctic and Neotropical biogeographic zones (Patterson and Stone 1952).

5. ***Drosophila* (*Drosophila*) *aldrichi*** Patterson & Crow

Drosophila aldrichi Patterson and Crow, 1940, p. 251. (Type locality Texas, U.S.A.)

Distinguishing Features

Similar to *buzzatii*; carinal sulcus very shallow; abdominal tergites with lateral yellow spots; see key (p. 95).

Detailed Description

In Patterson and Crow (1940) and Patterson (1943, p. 156).

Distribution

Collected with *D. buzzatii* in prickly pear stands in New South Wales by J. S. F. Barker; otherwise known from Nearctic and Neotropical biogeographic zones.

immigrans Species-group

immigrans sp. gp. Sturtevant, 1942, p. 32.

Diagnosis

Fore femur with more or less well developed row of short stout comb-like teeth (femoral comb); see Wilson *et al.* (1969, p. 211).

The remaining Australian species of the subgenus *Drosophila* are all members of the *immigrans* group, a complex of several dozen species centred primarily in the south-east Asian and New Guinean regions. Only four species have been recorded from Australia, three apparently restricted to northern Queensland (but see distribution notes on *D. sulfurigaster*, p. 10).

6. *Drosophila* (*Drosophila*) *immigrans* Sturtevant

Drosophila immigrans Sturtevant, 1921, p. 83. (Holotype in USNM; type locality New York, U.S.A.) For synonymies see Wheeler and Takada (1964, p. 180) and Okada (1956, p. 147).

Distinguishing Features

Large. Femoral comb strong. Carina very large; cheek very broad. 3rd costal section of wing with heavy setation on basal quarter. Bands on abdominal tergites prominent. Male abdomen not darkened apically.

Detailed Description

In Patterson (1943, p. 180).

Distribution

Cosmopolitan. Collected in Australia by various workers from north Queensland to Victoria, South Australia and south-western Western Australia; a common species about households and garbage cans in capital cities, somewhat rarer in undisturbed native habitats; collected by author at Mt Spec, north Queensland, in rain forest (single female only in large collection).

7. *Drosophila* (*Drosophila*) *sulfurigaster* (Duda)

Spinulophila sulfurigaster Duda, 1923, p. 48. (Holotype in HNM; type locality New Guinea.)

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

Drosophila spinofemora Patterson and Wheeler, 1942, p. 104. (Holotype location not stated; type locality Hawaii.)

For further discussion of synonymies see Wilson *et al.* (1969, pp. 211 ff.).

Distinguishing Features

Rather similar to *immigrans* but body size smaller, carina and cheek narrower, and bands on abdominal tergites less prominent. 3rd costal section of wing with heavy setation on basal half. Male abdomen not darkened apically.

Detailed Description

In Clark (1957, p. 221) and Wilson *et al.* (1969, p. 215).

Distribution

Northern Queensland (common in rain forests, Paluma and Cairns areas, collected by author in these localities: easily cultured). Although Mailoch gave the type locality of his specimens as Sydney, collecting in more recent years for *Drosophila* species has failed to find this species in southern Queensland (Mather 1955) or New South Wales (personal communications from various workers). Other subspecies occur in south-east Asia and Pacific islands from Fiji to Hawaii (see below).

Special Comments

Opinion on the status of this species has changed in recent years. Wheeler and Takada (1964, p. 180) and Okada (1964, p. 463) included the above synonyms under the species *Drosophila nasuta* Lamb, 1914 (type locality Seychelles Is). More recently, Wheeler (in Wilson *et al.* 1969) recognized *D. nasuta* as a separate species and *D. sulfurigaster* as a valid species comprising three subspecies; the Australian specimens belong to the nominate subspecies *D. s. sulfurigaster*.

8. *Drosophila* (*Drosophila*) *rubida* Mather

Drosophila rubida Mather, 1960, p. 234. (Holotype location unknown; type locality Crystal Cascades, north Queensland.)

Distinguishing Features

Femoral comb weak. Carina very prominent; cheek relatively narrow. Body coloration darker than that of *immigrans* or *sulfurigaster*; abdomen of male entirely black apically. Testes of living male reddish, visible through ventral abdominal wall.

Detailed Description

In Mather (1960, pp. 234–5).

Distribution

North Queensland (collected from Paluma area northwards in rain forests); also New Guinea. The morphologically very similar, and apparently very closely related, *D. hypocausta* Osten-Sacken occurs throughout south-east Asia and is common in New Guinea, but has not been recorded to date from northern Queensland where, given the considerable overlap between the *Drosophila* faunas of this area and New Guinea, it might be expected to occur.

9. *Drosophila* (*Drosophila*) *pseudotetrachaeta* Angus

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

Distinguishing Features

Mesonotum pale velvety brown with 4 dark longitudinal stripes, middle 2 extending across scutellum; 4 pairs of dorsocentral bristles and 2 rows of acrostichals present. Rays of arista long and straight. Teeth of femoral comb sparse but strong.

Detailed Description

In Angus (1967, pp. 37–9).

Distribution

North Queensland (collected from Cairns and Atherton Tableland areas in rain forests; several specimens in ANIC); also New Guinea.

Special Comments

This species is one of a cluster of several siblings, all very similar morphologically but separable by hybridization tests (Angus 1964, 1967). The remaining species of the complex occur in New Guinea and south-east Asia, the first described species being *D. quadrilineata* de Meijere (from Java). At least two of the species in this complex (including *pseudotetrachaeta*) are distinguished from all other members of the *immigrans* group (and indeed from all other *Drosophila* species) in possessing four pairs of dorsocentral bristles. Only two pairs of dorsocentrals, and at least six rows of acrostichals, are indeed considered the norm for the genus *Drosophila*, although other exceptions are known (thus *D. polychaeta* Patterson & Wheeler, which is also included in the subgenus *Drosophila*, has three pairs of dorsocentral bristles). Interestingly, however, at least one (New Guinean) species in the complex (*D. nigrilineata* Angus) has only two pairs of dorsocentral bristles, although it shows the same striking colour pattern as other members of the complex and its male genitalia are quite similar to those of the other species. *D. quadrilineata* de Meijere, 1911, was placed in the separate genus *Chaetodrosophilella* by Duda because of its aberrant chaetotaxy. Sturtevant (1927) argued that '*Chaetodrosophilella*' was better regarded as a subgenus of *Drosophila*. Angus (1967), while noting that the species included in this subgenus are similar in many respects to members of the *immigrans* group, retained the subgenus. Wheeler (in Wilson *et al.* 1969, p. 212) included the species formerly placed in '*Chaetodrosophilella*' in the *immigrans* group of the subgenus *Drosophila*. The aberrant chaetotaxy certainly poses a dilemma in classification since the older concept of the genus *Drosophila* must be modified to accommodate those species formerly placed in *Chaetodrosophilella*; yet, as indicated in Wilson *et al.* (1969), these species are 'good' *immigrans*-group species in other respects, and are almost certainly part of the same phylogenetic line. The arrangement in Wilson *et al.* has therefore been followed in this work.

Subgenus **Dorsilopha** Sturtevant

Dorsilopha Sturtevant, 1942, p. 28.

Type-species: *Drosophila buscki* Coquillett.

Diagnosis

Monotypic.

10. *Drosophila* (*Dorsilopha*) *buscki* Coquillett

Drosophila buscki Coquillett, 1901, p. 18. (Holotype location and type locality not determined by author.) For synonymies see Okada (1956, p. 89).

Distinguishing Features

Cheek broad. Anterior reclinate orbital bristle lateral to proclinate orbital. Thorax pale brown with narrow darker stripes dorsally and laterally, median dorsal

stripe bifid on posterior part of mesonotum. Middle sternopleural bristle small. 3rd costal section of wing with heavy setation on basal 0.2. Preapical bristles absent on 1st and 2nd tibiae. Abdominal tergites yellowish with broad dark posterior bands interrupted in midline.

Detailed Description

In Patterson (1943, pp. 63–5).

Distribution

Cosmopolitan. The species is usually only found in association with human habitations and numerous records exist for its collection from rotting vegetables (potato, cabbage, cauliflower, etc.) in most parts of the world. Within Australia the species has been collected by various workers from both eastern cities and from Perth.

Special Comments

Separation of *D. busckii* into a monotypic subgenus does not, on close scrutiny, appear justified. The species conforms to the definition of the subgenus *Drosophila*, as this is at present understood, with respect to all major diagnostic characters; it differs from members of this subgenus (and from most if not all members of other subgenera) in lacking preapical bristles on both the first and the second tibiae. Separation of *busckii* from the subgenus *Drosophila* on grounds of its being striped is hardly tenable (the subgenus contains variously patterned species), and separation on grounds of what might be judged a minor difference of chaetotaxy (preapical bristle number is not necessarily an invariable feature within a subgenus) appears excessively arbitrary in the light of modern concepts of *Drosophila* classification. It nevertheless appears that synonymizing *Dorsilopha* with subgenus *Drosophila* would be premature, because Throckmorton (personal communication) possesses data for a number of species apparently closely related to *busckii*, and subsequent full consideration of these is likely to result in a more informed concept of subgeneric classification of the genus than is possible in the present circumstances.

Subgenus **Sophophora** Sturtevant

Sophophora Sturtevant, 1939, p. 137.

Type-species: *Drosophila melanogaster* Meigen.

Diagnosis

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; eggs usually with 2 filaments; male external genitalia usually without micropubescence.

The subgenus contains a number of species-groups including the large *melanogaster* group which is centred primarily in south-east Asia.

melanogaster **Species-group**

melanogaster sp. gp. Sturtevant, 1942, p. 121.

Diagnosis

Yellowish or dull dusky species, usually with sexual dimorphism, male possessing sex-comb; male abdomen often much darker than female abdomen; see also Bock and Wheeler (1972, p. 8).

The following 10 members of this species-group (Nos 11-20 inclusive) are known from Australia, several (as indicated below) restricted in distribution to north Queensland. Subgroup classifications of these species are discussed in Bock and Wheeler (1972). *D. flavohirta* Malloch (species No. 21, p. 20) is of questionable affinity to the *melanogaster* group.

11. *Drosophila* (*Sophophora*) *melanogaster* Meigen

Drosophila melanogaster Meigen, 1830, p. 85. (Type locality Europe.)
Drosophila ampelophila Loew, 1862, p. 231. (Type locality Europe.)
For further synonymies see Bock and Wheeler (1972, p. 9).

Distinguishing Features

Carina prominent. Thorax pale brown. Abdominal tergites of female pale yellowish with black posterior bands; male abdomen entirely shiny black posteriorly. Sex-comb on male fore metatarsus consisting of oblique row of *c.* 10 black teeth. See comments under *D. simulans* (p. 14).

Detailed Description

In Patterson (1943, p. 71); see also Bock and Wheeler (1972, p. 12).

Distribution

Cosmopolitan. The species has been collected in both eastern Australia from far north to far south and from south-western Australia, and is common in and around human habitations but rare or absent in natural habitats. *D. melanogaster* usually occurs together with *D. simulans*.

12. *Drosophila* (*Sophophora*) *simulans* Sturtevant

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

Distinguishing Features

Sibling species of *melanogaster*; see special comments below.

Detailed Description

In Sturtevant (1919) and Patterson (1943, p. 73); see also Bock and Wheeler (1972, p. 12).

Distribution

Cosmopolitan. Collected in both eastern and south-western Australia, *D. simulans* is the commonest household species of *Drosophila* in most parts of the country. Its distribution and ecological preferences appear to be largely coextensive with those of *melanogaster* (but cf. McKenzie and Parsons 1974), with which it is usually collected in urban, but not natural, habitats.

Special Comments

D. melanogaster and *D. simulans* are very similar in general morphology, but may be separated by one or more of three features.

Firstly, separation of males is possible by reference to the external genitalia. A process arises from the posterior margin of the genital arch in each species; this process is large and prominent in *simulans* (resembling in shape, with its partner on the opposite side of the body, a miniature bivalve shell). The corresponding process in *melanogaster* is much smaller and only clearly discernible under the higher magnifications of a stereomicroscope [cf. figures in Bock and Wheeler (1972), p. 12]. Separation of males on this feature is unequivocal.

The second feature applies to both males and females and appears to be about 98% reliable (Gallo 1973). Patterson (1943) noted that cheek width is greater in *melanogaster* than in *simulans*. Basden (1954), in a key to Scottish Drosophilidae, quantified the distinction as follows: 'Width of cheek from lowest point of eye to mouth border broader, at least as broad as widest part of first tibia ..... *melanogaster*; cheek narrower, barely as broad as widest part of first tibia ..... *simulans*.' (see key, p. 96). With some practice it is possible to separate the two species quickly by cheek width without measuring ratios.

The third feature is applicable to females only, since it concerns the extent of the black posterior band on the sixth abdominal tergite. In *melanogaster* females this band is broad laterally as well as dorsally; in *simulans* females it is considerably narrowed laterally. Separation of females by this method appears to be about 99% reliable (Gallo 1973).

The second and third of these characters are more useful in the Australian context for the southern fauna where fewer *melanogaster*-group species occur (cf. distributions of species below); *melanogaster* and *simulans* females may be separated relatively easily from other *melanogaster*-group females and thence from each other. For the north Queensland fauna, where more *melanogaster*-group species occur, separation of females becomes somewhat equivocal and precise determinations are best restricted to males; *melanogaster* and *simulans* themselves are, however, apparently rather rare in north Queensland.

13. *Drosophila* (*Sophophora*) *pseudotakahashii* Mather

Drosophila takahashii Sturtevant; Mather, 1955, p. 568. (Holotype in USNM; type locality Taiwan.)

Drosophila pseudotakahashii Mather, 1957, p. 222. (Holotype apparently never deposited, presumably due to confusion in original identification; type locality of Mather's original material Samford, Queensland.)

Distinguishing Features

Male and female body colorations similar to those of *melanogaster* and *simulans*; slightly smaller than either of these species. Face whitish and carina narrow (distinguishing *pseudotakahashii* from both *melanogaster* and *simulans* in which face is brown and carina nose-like). Sex-comb of male (Fig. 6) clearly distinct from *melanogaster-simulans* sex-comb, consisting of short transverse rows of bristles on fore metatarsus and next tarsal segment.

Detailed Description

In Mather (1955, 1957).

Distribution

Eastern Australia, from north Queensland to Victoria. Common in rain forest, Paluma and Cairns areas, north Queensland; collected in Sydney area by J. S. F. Barker and J. Moth; collected in Victoria by J. Grossfield (specimens deposited in AM). Apparently somewhat rarer in southern localities.

14. *Drosophila* (*Sophophora*) *serrata* Malloch

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

Distinguishing Features

Carina narrow. Abdominal tergites shiny mid-brown with dark posterior bands in both sexes. Posterior margins of abdominal tergites with sparse rows of large bristles (distinguishing *serrata* from above 3 species). Sex-comb of male consisting of longitudinal row of densely packed bristles on fore metatarsus with similar (shorter) row on next tarsal segment. See comments under *D. birchii* below.

Detailed Description

In Mather (1955, p. 557) and Bock and Wheeler (1972, p. 49).

Distribution

Previously recorded from eastern and northern Australia (Bock and Wheeler 1972); common in rain forests, Paluma and Cairns areas, north Queensland (collections by author); also known from New Guinea (Ayala 1965); collected on Christmas I. in 1972 by H. L. Carson, and in far north-western Western Australia by S. J. Miles in 1974.

15. *Drosophila* (*Sophophora*) *birchii* Dobzhansky & Mather

Drosophila serrata birchii Dobzhansky and Mather, 1961, p. 462. (Holotype in AM; type locality Crystal Cascades, north Queensland.)

Drosophila birchii: Ayala, 1965, p. 538.

Distinguishing Features

Carina narrow. Abdominal coloration similar to that of *serrata* but paler [but this feature not completely reliable for separation from *serrata* according to Ayala (1965)]. Sex-comb similar to that of *serrata*. See key (p. 96).

Detailed Description

In Dobzhansky and Mather (1961, p. 462) and Ayala (1965, p. 538).

Distribution

Rain forests of north Queensland and New Guinea (cf. Bock and Wheeler 1972).

Special Comments

Males of *serrata* and *birchii* may be separated unequivocally by reference to the external genitalia: the secondary clasper of *serrata* possesses two very prominent black bristles while that of *birchii* has three.

16. *Drosophila* (*Sophophora*) *ananassae* Doleschall

Drosophila ananassae Doleschall, 1858, p. 128. (Type locality Ambon Island, Indonesia.) For synonymies see Bock and Wheeler (1972, p. 37).

Distinguishing Features

Female resembling those of *melanogaster* and *simulans* but abdominal bands less conspicuous; male similar to female in coloration, abdomen not darkened. Sex-comb of male consisting of short transverse rows of bristles on fore metatarsus and next tarsal segment (5 and 3-4 rows respectively).

Detailed Description

In Patterson (1943, p. 74); see also Bock and Wheeler (1972, pp. 37-40).

Distribution

Cosmopolitan. Collected in Australia in Rockhampton, Qld, by J. S. F. Barker, and in Cairns by author, otherwise apparently unknown from Australian mainland. Several specimens in ANIC from Norfolk I. In other parts of the world this species is associated with human habitations and evidently occupies a similar niche to that of *melanogaster* and *simulans*.

17. *Drosophila* (*Sophophora*) *pseudoananassae* Bock

Drosophila (*Sophophora*) *pseudoananassae* Bock, 1971, p. 274. (Holotype in UT; type locality Cairns, north Queensland.)

Drosophila ananassae Doleschall: Mather, 1955, p. 569.

Distinguishing Features

Small, pale in both sexes. Sex-comb of male consisting of 3 short transverse rows of bristles, 2 rows distally on fore metatarsus and 1 row on 2nd tarsal segment.

Detailed Description

In Bock (1971); see also Bock and Wheeler (1972, p. 48).

Distribution

North Queensland (collected from rain forests in Cairns and Atherton Tableland areas). Also New Guinea (one of the commonest species) and south-east Asia.

18. *Drosophila* (*Sophophora*) *eugracilis* Bock & Wheeler

Tanygastrella gracilis Duda, 1924, p. 253. (Holotype in Amsterdam Museum; type locality Java.) For discussion of subsequent synonymies (*'gracilis'* was preoccupied in *Drosophila*) see Bock and Wheeler (1972, p. 31).

Distinguishing Features

Female very similar to *melanogaster* female; male abdomen shiny black posteriorly, apically involuted, appearing truncated. Male fore metatarsus with 2 large distal bristles.

Detailed Description

In Okada (1964, p. 447) and Bock and Wheeler (1972, p. 31).

Distribution

Collected in rain forests, Cairns area, north Queensland (Bock and Wheeler 1972). Widespread in New Guinea and south-east Asia.

19. *Drosophila* (*Sophophora*) *denticulata* Bock & Wheeler

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

Distinguishing Features

Pale brown; abdominal tergites with dark posterior bands. Face white; carina high, very narrow. Male fore femora plump; sex-comb consisting only of 2–3 large black teeth on apical margin of metatarsus.

Detailed Description

In Bock and Wheeler (1972).

Distribution

North Queensland, rain forests, Cairns area (Bock and Wheeler 1972). Also New Guinea and south-east Asia.

20. *Drosophila* (*Sophophora*) *smithersi*, sp. nov.

Undescribed species from Australia, Bock and Wheeler, 1972, p. 34.

Type

Holotype ♂ in AM: Mulgrave River 4 miles W. of Gordonvale, Queensland, 2.i.1967, fruit bait, D. McAlpine and G. Holloway.

Distinguishing Features

Sex-comb of male in 2 longitudinal rows on first 2 tarsal segments of foreleg, consisting of superficial set of shorter strong black contiguous teeth and deeper set of longer strong black sparse teeth (cf. Bock and Wheeler 1972, p. 32, fig. 50).

Description

Body length. 2.2 mm.

Head. Arista with 3 branches above and 2 below plus terminal fork. Front slightly longer than broad, tapered anteriorly, yellowish tan, silvery about bases of orbital and vertical bristles and ocellar triangle. 2nd and 3rd antennal segments tan. Carina whitish, narrow, ridged, slightly broadened below, gradually falling away towards lateral parts of clypeal margin. Second oral bristle 0.6 length of 1st. Cheek linear, whitish, greatest width 0.1 greatest diameter of eye. Eyes with fine pale pile. Orbital bristles in ratio 5 : 2 : 5; anterior reclinate orbital posterolateral and close to proclinate orbital. All bristles of head, and arista, slightly yellowish.

Thorax. Uniformly mid-brown. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Prescutellar pair of acrostichals slightly enlarged. Ratio anterior : posterior dorsocentrals 0.5. Sterno-index 0.7. Legs pale brown; preapical bristles on all tibiae; apicals on 1st and 2nd tibiae. Thoracic bristles slightly yellowish. Sex-comb as indicated above.

Wings. Hyaline. *C*-index, 2.0; 4*V*-index, 2.0; 5*X*-index, 1.8; *M*-index, 0.7. 3rd costal section with heavy setation on basal 0.5. Length, 2.1 mm.

Abdomen. Tergites 2–6 pale brown with apical black bands.

Male genitalia. Figured by Bock and Wheeler (1972, p. 32). Anal plate relatively large, with long slender upper bristles and shorter, thicker lower bristles; clasper small, with few teeth.

Distribution

Only records from Mulgrave River in north Queensland (holotype); Deeral in north Queensland (Bock and Wheeler 1972); and Hemmant in south-eastern Queensland (collected by J. S. F. Barker, 1974).

21. *Drosophila* (*Sophophora*) *flavohirta* Malloch

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

Distinguishing Features

Carina broad but very low. Cheek linear, squared. Body yellowish; all hairs and bristles, and arista, translucent yellowish.

Description

Body length. c. 2.2 mm.

Head. Arista with 3 relatively short branches above and 1 below plus terminal fork. Front 1.3 times broader than long, tan; periorbital bands enclosing orbital and vertical bristles, and ocellar triangle, silvery. Face, carina and cheeks paler than front, whitish. Carina low, broad, broader below, flat. Cheek linear, wider posteriorly, squared anteriorly and posteriorly, greatest width 0.3 greatest diameter of eye. 2nd oral bristle 0.5 length of 1st. Eyes with dense fine pile and distinct greenish tinge, varying with orientation of specimen to light. Orbital bristles in ratio 7 : 5 : 7; anterior reclinate orbital lateral to proclinate orbital.

Thorax. Entirely tan; all bristles and hairs yellowish. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Sterno-index 0.8; middle sternopleural bristle very small. Legs tan; preapical bristles on all tibiae; apicals on 1st and 2nd tibiae. Male forelegs without sex-combs.

Wings. Hyaline; all veins tan but major costal bristles black. *C*-index, *c.* 2.2; 4*V*-index, *c.* 2.9; 5*X*-index, *c.* 2.0; *M*-index, *c.* 0.9. 3rd costal section with heavy setation on basal 0.7. Length, *c.* 1.8 mm.

Abdomen. Entirely translucent yellowish; abdomen of USNM paratype examined blackened with 2 oval yellowish patches on tergite 4, just extending into tergites 3 and 5.

Male genitalia (Figs 7, 8). Anal plate small; primary clasper only present, large, with strong black teeth.

Distribution and Specimens Examined

Recorded by Malloch from Como, N.S.W., collected on flowers. Specimens in ANIC from Nelligen, N.S.W.; Alpine Creek, N.S.W.; Black Mountain, A.C.T.; Ingham, Qld; and Cooper Creek, near Borradaile, N.T. (ex *Eucalyptus* blossom).

Special Comments

On structure of male genitalia this species is clearly closely allied to the *melanogaster* species-group. It differs from other species of the group in its highly unusual coloration and in the absence of a sex-comb in the male. The former is evidently an adaptation to its specialized ecological niche – the body is almost the same colour as the flowers of *Eucalyptus* species on which it apparently feeds. The latter feature is exceptional in members of the *melanogaster* species-group – only two known species lack sex-combs. *D. flavohirta* perhaps represents a specialized offshoot of the main *melanogaster* group phylogenetic line.

Other *Sophophora* Species

Several other species of the subgenus *Sophophora* of questionable affinity occur in Australia, in addition to those of the *melanogaster* group discussed above. The only other species described to date is *Drosophila dispar* Mather, which is not obviously closely related to any other known *Sophophora* species and was placed in a monotypic species-group by Mather (1955). A further three new species unplaced in species-groups are described in this paper and are discussed further below.

22. ***Drosophila* (*Sophophora*) *dispar*** Mather

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

Distinguishing Features

Carina prominent but relatively narrow, ridged. Thorax uniformly mid to dark brown. Fore femora of male plump. Abdomen dark.

Description

Body length. *c.* 2.5 mm.

Head. Arista with 4–5 branches above and 3 below plus terminal fork. Front very slightly broader than long, tan; periorbital bands enclosing orbital and vertical bristles darker. 2nd antennal segments tan; 3rd slightly dusky. Carina very narrow above, broader below but not greatly widened, with median ridge. Cheek pale; greatest width 0.1 greatest diameter of eye. 2nd oral bristle somewhat weaker than 1st. Eyes with fine pile. Orbital bristles in ratio 3 : 1 : 3; anterior reclinate orbital fine, posterior and slightly lateral to proclinate orbital.

Thorax. Uniformly mid to dark brown. Acrostichal hairs in 8 irregular rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Sterno-index 0.5–0.6. Legs pale brown; fore femora of male plump, bearing numerous fine bristles; those of female somewhat more slender. Sex-comb of male consisting only of 2 weak slightly curved teeth, 1 apically on metatarsus, 2nd apically on 2nd tarsal segment; fore femur with medial row of strong spines. Preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Hyaline. *C*-index, *c.* 2.4; 4*V*-index, *c.* 2.2; 5*X*-index, *c.* 2.0; *M*-index, *c.* 0.7. 3rd costal section with heavy setation on basal 0.6. Length *c.* 2.4 mm.

Male genitalia (Figs 9, 10). Clasper with long finger-like process; anal plate very small; aedeagus with prominent subapical ornamentation.

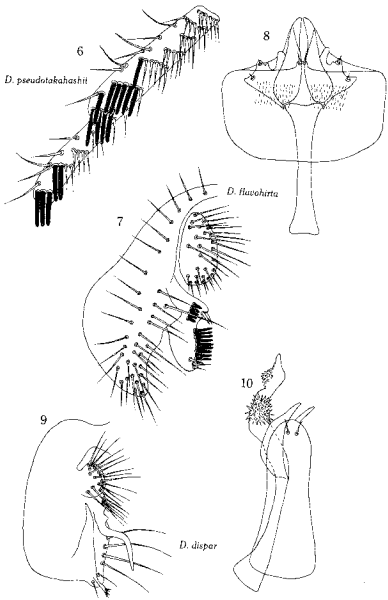


Fig. 6. *D. pseudotakahashii*, tarsus of male foreleg showing sex-comb.
Figs 7–10. Male external and internal genitalia. *7, 8, D. flavohirta. 9, 10, D. dispar.*

Distribution

Widespread in eastern Australia from north Queensland to Victoria: collected from north Queensland forests in Paluma and Cairns areas by I. R. Bock, P. A. Parsons and J. Grossfield; recorded from south-eastern Queensland and New South Wales (Mather 1955, 1960); collected at various localities in Victoria by P. A. Parsons. The species occurs in a range of habitats, from rain forest in north Queensland to open forest in the southern parts of its range.

Each of the remaining three *Sophophora* species is distinguished by a highly unusual sex-comb, consisting of bushy patches of fine hairs rather than the usual rows of stout bristles. Superficially the species are all rather similar and would appear to form a natural (monophyletic) group. Detailed examination of the male genitalia, however, reveals some considerable interspecific differences. No attempt is therefore made at this time to establish a new group for these three species; it is likely that future more intensive collecting will provide live specimens of each; their relationship might then be investigated in more detail.

23. *Drosophila* (*Sophophora*) *pinnitarsus*, sp. nov.

Types

Holotype ♂ in AM: Huonbrook, near Mullumbimby, New South Wales, 4.xii.1961, McAlpine and Lossin. Paratype ♂ and ♀, in AM: same collection data as holotype.

Distinguishing Features

Arista large. Carina narrow above, broad below. Sex-comb of male consisting of bushy patches of fine bristles on first 3 tarsal segments of foreleg (Fig. 11).

Description

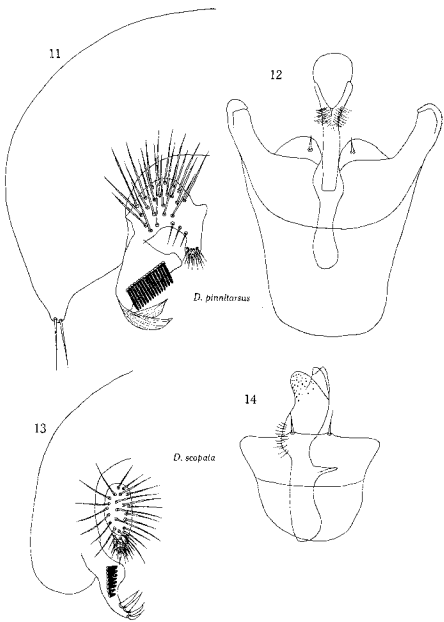
Body length. 2.4 mm.

Head. Arista with 5 branches above and 3 below plus terminal fork. Front flat, tapered anteriorly, breadth anteriorly equals length, breadth posteriorly equals 1.6 times length; front tan, slightly shiny about bases of orbital and vertical bristles and ocellar triangle. 2nd and 3rd antennal segments tan. Carina well developed but narrow above, widened below, paler than front. Cheek almost linear, greatest width 0.15 times greatest diameter of eye. 1st and 2nd oral bristles equal in length. Eyes bare. Orbital bristles in ratio 4 : 1 : 4; all 3 orbitals almost in line, anterior reclinate orbital slightly lateral to other 2 orbitals.

Thorax. Uniformly tan, *melanogaster*-like. Acrosticbal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.5. Sterno-index 0.7. Legs tan; preapical bristles on all tibiae; apicals on 1st and 2nd tibiae. Fore femur somewhat broadened; tibia slender; first 3 tarsal segments of male foreleg subequal in length, short, plump; tarsal segments 4 and 5 short and narrow. Sex-comb (Fig. 21) consisting of bushy patch of hairs on each of first 3 tarsal segments of male foreleg.

Wings. Hyaline. *C*-index, 3.3; 4*V*-index, 2.0; 5*X*-index, 1.3; *M*-index, 0.5. 3rd costal section with heavy setation on basal 0.7. Length, 2.2 mm.

Abdomen. Somewhat shrivelled on type specimens, evidently *melanogaster*-like in male, pale anteriorly, black posteriorly; not completely blackened posteriorly in



Figs 11–14. Male external and internal genitalia. *11, 12, D. pinnitarsus. 13, 14, D. scopata.*

female, tergites tan with darker posterior bands expanded in midline to posterior margin of preceding tergite.

Male genitalia (Figs 11, 12; from paratype). Genital arch unusually broad; genital arch with some micropubescence but only 2 large bristles, both on toe; clasper with 2 broad ventral projections.

Distribution

Known from type locality only. (Types and few additional specimens in AM.)

24. *Drosophila* (*Sophophora*) *scopata*, sp. nov.

Types

Holotype ♂ in ANIC: Gillies Highway 2 miles W. of Little Mulgrave, Queensland, 18.iv.1967, D. H. Colless. Paratype ♂ in ANIC: same collection data as holotype.

Distinguishing Features

Arista large. Carina narrow above, broad below. Sex-comb of male on first 2 tarsal segments of foreleg only (cf. *pinnitarsus*).

Description

Body length. 2.5 mm.

Head. Arista with 5 branches above and 3 below plus terminal fork. Front broader than long but somewhat tapered anteriorly, tan, slightly silvery about bases of orbital and vertical bristles and ocellar triangle. 2nd and 3rd antennal segments tan. Carina prominent, nose-like, convex, broader below. Cheek almost linear, greatest width 0.1 times greatest diameter of eye. 1st and 2nd oral bristles equal in length. Eyes bare. Orbital bristles in ratio 3 : 1 : 4; all 3 orbitals almost in line, anterior reclinate slightly lateral to other 2, very fine.

Thorax. Uniformly tan; pleura with hint of 2 darker longitudinal stripes. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.7. Sterno-index 0.6. Legs tan; preapical bristles on all tibiae; apicals on 1st and 2nd tibiae. Metatarsus of foreleg somewhat longer and broader than each of remaining tarsal segments; sex-comb consisting of 2 dense tufts of hairs, 1 apically on metatarsus, other on 2nd tarsal segment.

Wings. Hyaline. *C*-index, 2.1; 4*V*-index, 2.0; 5*X*-index, 1.6; *M*-index, 0.6. 3rd costal section with heavy setation on basal 0.7. Length, 1.8 mm.

Abdomen. Tergites 2–5 yellowish with broad dark posterior bands, progressively darker and broader on more posterior tergites. 6th tergite black.

Male genitalia (Figs 13, 14; from paratype). Anal plate small, micropubescent; clasper elongate, with large apical bristles.

Distribution and Specimens Examined

Several specimens in ANIC from Little Mulgrave and Kuranda in north Queensland; one specimen in AM from Mulgrave River, Qld.

25. *Drosophila* (*Sophophora*) *progastor*, sp. nov.

Types

Holotype ♂ in AM: Birthday Creek, 7 miles W. of Paluma, Queensland, 14.i.1970, G. A. Holloway coll. Paratype ♂ in ANIC: Yungaburra (State Forest 452), Queensland, 29.iv.1967, D. H. Colless.

Distinguishing Features

Arista large. Male abdomen posteriorly black, broad, truncated. Fore metatarsus longer than next 2 tarsal segments; sex-comb of male consisting of rows of fine bristles on first 3 tarsal segments.

Description

Body length. 2.1 mm.

Head. Arista with 7 long straight branches above and 3 long straight branches below plus terminal fork. Front 1.3 times broader than long, tan; ocellar triangle darkened within and with slight surrounding silveriness. 2nd antennal segments tan; 3rd slightly darker. Carina nose-like, narrow above, broadened and rounded below. Cheek narrow, curved, barely wider in posterior corner, greatest width 0.1 times greatest diameter of eye. 2nd oral bristle *c.* ¾ length of first. Eyes with dense fine pale pile. Orbital bristles in ratio 3 : 2 : 5; anterior reclinate orbital posterior and slightly lateral to proclinate orbital.

Thorax. Mesonotum tan; pleura slightly darker. Acrostichal hairs in 8 rows in front of dorsocentral bristles, *c.* 6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Sterno-index 0.5; anterior sternopleural bristle fine; middle intermediate in size between anterior and posterior. Legs pale tan; preapical bristles on all tibiae; apicals on 1st and 2nd tibiae. Sex-comb consisting of patches of fine pale bristles on first 3 tarsal segments; metatarsus longer than next 2 tarsal segments together, bearing about ⅔ of all sex-comb bristles; 3rd tarsal segment with few bristles.

Wings. Translucent with faint brownish tinge, stronger along posterior crossvein. *C*-index, 3.3; 4*V*-index, 1.5; 5*X*-index, 1.6; *M*-index, 0.4. 3rd costal section with heavy setation on basal 0.6. Length, 1.9 mm.

Abdomen. Broad. All tergites blackish; tergites 2-4 with pale yellow anterolateral patches.

Male genitalia (Figs 15, 16; from paratype). Anal plate indented medially, with long bristles above and considerably shorter bristles below; hypandrium with prominent submedian bristles on conical elevations.

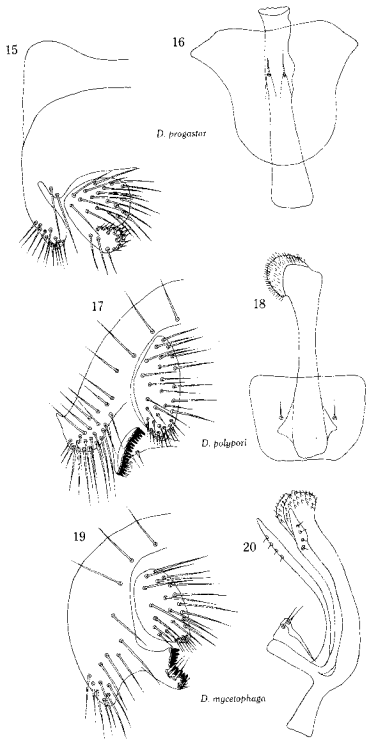
Distribution and Specimens Examined

Queensland: type specimens and 1♂, same data as holotype; 1♂, Summit, Walter Hill Range, Cardstone-Ravenshoe Rd, 16.i.1967, D. K. McAlpine and G. Holloway. (All specimens in AM.)

Subgenus **Hirtodrosophila** Duda

Hirtodrosophila Duda, 1923, p. 41.

Dasydrosophila Duda, 1925, p. 193 (improperly substituted name).



Figs 15–20. Male external and internal genitalia. *15, 16, D. progastor. 17, 18, D. polypori. 19, 20, D. mycetophaga.*

Type-species: *Drosophila latifrontata* Frota-Pessoa (replacement name for *Hirtodrosophila carinata* Duda, 1923; *carinata* preoccupied in genus *Drosophila*). Type locality Taiwan.

Diagnosis

Second oral bristle relatively small; carina, if present, not broadened below; prescutellar bristles absent; propleural bristle absent; anterior and middle sternopleural bristles usually very fine, anterior bristle usually less than half length of posterior; anterior reclinate orbital bristle usually very fine; 3rd antennal segment often relatively large, with long hairs (extreme condition in *D. macalpinei*, sp. nov., p. 30); arista sometimes with only 1 ventral ray. Genital arch and anal plate of male external genitalia micropubescent (not shown in drawings below).

This subgenus has hitherto not been recognized as such in the Australian *Drosophila* fauna. Two of Malloch's species (*D. polypori* and *D. mycetophaga*) are members of the subgenus; both species were recorded by Malloch as fungivorous, which is consistent with the known ecological patterns of *Hirtodrosophila* species in other parts of the world. A further nine species are described in this paper; with the exception of *D. mixtura*, ecological information about them is unfortunately unavailable.

Okada (1967) provided species groupings of the then-known Old World species of *Hirtodrosophila*; these groupings rely, however, largely on structures of male genitalia for their definitions and since males were not available for all of the following species, no infrasubgeneric classification is attempted.

26. *Drosophila* (*Hirtodrosophila*) *polypori* Malloch

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

Distinguishing Features

Wings patterned (Fig. 22). Carina long, narrow. Anterior reclinate orbital bristle exceedingly fine. Thorax brown; abdomen dark brown, 4th and 5th tergites with pairs of large anterior submedian yellow spots.

Description

Body length. *c.* 3.1 mm.

Head. Arista with 3 branches above and 2 below plus terminal fork. Front 1.3 times broader than long, tan, slightly darker and shining about bases of orbital bristles and ocellar triangle. 2nd antennal segments tan; 3rd darkened. Carina very narrow, long. Cheek almost linear, greatest width 0.2 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 3 : 1 : 5; anterior reclinate orbital posterior and slightly lateral to proclinate orbital. Lateral margins of occiput with relatively strong bristles.

Thorax. Entirely mid-brown with darker patches diffusely demarcated from lighter areas; scutellum with broad central darker area; mesonotum with slightly darker areas in middle and laterally; pleura with darker areas. Acrostichal hairs in *c.* 8 rows, somewhat irregular, in front of dorsocentral bristles, *c.* 6 irregular rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Anterior scutellars diver-

gent. Sterno-index 0.25; anterior sternopleural bristle very fine; middle intermediate in length and thickness between anterior and posterior bristles. Halteres tan. Legs pale tan; preapical bristles on 2nd (small) and 3rd tibiae; apicals on 2nd tibiae only.

Wings (Fig. 22). Pale brown (anteriorly) to hyaline (posteriorly) with dark brown patches. *C*-index, *c.* 2.3; 4*V*-index, *c.* 1.4; 5*X*-index, *c.* 1.1; *M*-index, *c.* 0.4. 3rd costal section with heavy setation on basal 0.45. Length *c.* 3.1 *mm*.

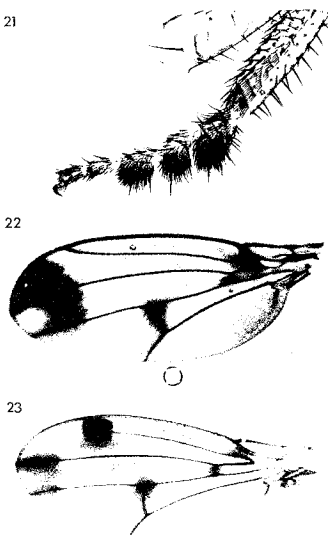


Fig. 21. *D. pinnitarsus*, tarsus of male foreleg.
Figs 22 and 23. *22, D. polypori. 23, D. inycetophaga.*

Abdomen. All tergites uniformly dark brown except 4th and 5th which possess large submedian yellow spots extending on each side of centre line from anterior borders of tergites almost to posterior borders.

Male genitalia (Figs 17, 18). Hypandrium unusually small; aedeagus large, apically rounded and pubescent.

Distribution

Southern Queensland and New South Wales.

Specimens Examined

Queensland: 1, Cunningham's Gap, 2484 ft, 1–2.vi.1966, Z. Liepa (ANIC). New South Wales: 3, Rutherford Creek, Brown Mountain, 10.iii.1961, 9.viii.1962, 17.vii.1963, D. H. Colless (ANIC); 31, Minnamurra Falls, 31.i.1962, 28.v.1963, D. H. Colless (ANIC); 3, Clyde Mountain, 5.v.1955, D. H. Colless (ANIC); Clyde Mountain, 2300 ft, rain forest strip near summit, 15.viii.1967, Z. Liepa (ANIC); 2, Mt Wilson, 3.vii.1961, D. H. Colless (ANIC); 6, Upper Allyn River, 22.iv.1970, D. H. Colless (ANIC); 2, Dorrigo National Park, 12.x.1962, 12.ii.1968, D. H. Colless (ANIC); 20, Dorrigo National Park, 26.i.1970, G. A. Holloway (AM); 1, The Dome, near Dorrigo, 31.iii.1960, D. K. McAlpine (AM); 1, Bruxner Park, Coffs Harbour, 11.x.1962, D. H. Colless (ANIC); 4, Mt Gibraltar National Park, 64 miles W. of Grafton, 24.ii.1965, D. K. McAlpine (AM); 1, Otford, 3.iii.1962, D. K. McAlpine (AM); 3, Mt Wilson, Blue Mountains, 14.iv.1959, D. K. McAlpine (AM); 1, Mt Wilson, Blue Mountains, 16.iv.1971, D. K. McAlpine (AM).

27. *Drosophila* (*Hirtodrosophila*) *mycetophaga* Malloch

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

Distinguishing Features

Wings patterned (Fig. 23). Carina long, narrow. Anterior reclinate orbital bristle exceedingly fine. Mesonotum brown; pleura very pale, sharply contrasting with mesonotum. 5th abdominal tergite with lateral yellow spots.

Description

Body length. c. 2.9 mm.

Head. Arista with 5–6 branches above and 2 below plus terminal fork. Front 1.4 times broader than long, pale to mid-brown; ocellar triangle slightly darker. 2nd antennal segments pale brown; 3rd long, dusky. Carina prominent, very narrow above, slightly widened below, lateral edges almost squared. Clypeal margin dark brown. Cheek linear, dark brown anteriorly, widened posteriorly by narrowing of eye, very pale posteriorly, greatest width 0.25 times greatest diameter of eye. Eyes with fine sparse pile. Orbital bristles in ratio 6 : 1 : 6; all 3 orbitals in line. Lateral margins of occiput with relatively strong bristles.

Thorax. Mesonotum mid-brown, with 3 pale diffusely bordered longitudinal stripes, 1 between and including median 2 rows of acrostichals, lateral 2 in lines of dorsocentral bristles. Scutellum mid-brown. Pleura very pale, sharply contrasting with remainder of thorax. Halteres pale yellow. Acrostichal hairs in *c.* 8 rows, somewhat irregular, in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.7; anterior dorsocentrals close to posteriors. Anterior scutellars divergent. Sterno-index 0.25; anterior and middle sternopleural bristles extremely fine. Legs entirely pale yellow; preapical bristles evident on 3rd tibiae only; apicals on 2nd tibiae only.

Wings (Fig. 23). Hyaline, with darker brown patches. *C*-index, *c.* 1.9; 4*V*-index, *c.* 1.5; 5*X*-index, *c.* 0.9; *M*-index, *c.* 0.4. 3rd costal section with heavy setation on basal 0.5. Length *c.* 3.1 mm.

Abdomen. All tergites uniformly dark brown dorsally except 5th which bears pair of lateral pale yellow spots extending from anterior margin of tergite to posterior three-quarters; lateral margins of tergites pale yellow. 2nd tergite in some specimens with additional small central anterior pale area, variable.

Male genitalia (Figs 19, 20). Clasper with medial row of strong black marginal teeth; aedeagus with apical ornamentation.

Distribution

Queensland and New South Wales.

Specimens Examined

Queensland: 1, Birthday Creek, near Paluma, 18.i.1967, D. K. McAlpine and G. Holloway (AM); 1, Summer Creek, Little Yabba forestry road, near Kenilworth, 5.ii.1961, D. K. McAlpine (AM); 3, Cunningham's Gap, 2484 ft, 1–2.vi.1966, Z. Liepa (ANIC). **New South Wales:** 8, Upper Allyn near Eccleston, 27.ii.1970, D. K. McAlpine (AM); 1, Whian Whian State Forest, near Lismore, 25.ii.1965, D. K. McAlpine (AM); 1, Otford, Illawarra District, 3.iii.1962, D. K. McAlpine (AM); 10, Minnamurra Falls, 31.i.1962, 28.v.1963, D. H. Colless (ANIC); 7, Upper Allyn River, 14.ii.1968, 22.iv.1970, D. H. Colless (ANIC); Palm Creek, Royal National Park, 22.vii.1963, D. H. Colless (ANIC); 1, Clyde Mountain, 5.v.1965, D. H. Colless (ANIC).

28. *Drosophila* (*Hirtodrosophila*) *allynensis*, sp. nov.

Types

Holotype ♀ in ANIC: Upper Allyn River, New South Wales, 14.ii.1968, D. H. Colless. Paratype ♀ in AM: Dorrigo National Park, 2200 ft, New South Wales, 26.i.1970, MV lamp, G. A. Holloway.

Distinguishing Features

Large; body pale brown. Wings slightly dusky. Arista large, with single ventral ray.

Description

Body length. Holotype 3.5 mm; paratype 4.3 mm.

Head. Arista with 4–5 branches above and 1 below plus terminal fork. Front as broad as long, flat, yellowish (greasy in types). 2nd and 3rd antennal segments yellowish; 2nd small; 3rd large, dusky along anterior and ventral margins. Carina very low between bases of antennae, obsolete below. Cheek curved, yellowish, greatest width 0.15 times greatest diameter of eye. Vibrissa very large. Orbital bristles in ratio 3 : 1 : 2; anterior reclinate orbital exceedingly fine; all 3 orbitals in line.

Thorax. Greasy in types; tan; mesonotum with hint of 3 paler longitudinal stripes: 1 between middle 2 rows of acrostichals, others slightly medial to levels of dorsocentral bristles. Acrostichal hairs in *c.* 8 somewhat irregular rows in front of and between dorsocentral bristles. Ratio anterior : posterior dorsocentrals 0.6. Sterno-index 0.4. Legs pale tan; preapical bristles on 3rd tibiae only; no tibiae with apicals.

Wings. Translucent, slightly dusky; slightly greater infuscation about posterior crossvein. *C*-index, 3.2; 4*V*-index, 1.4; 5*X*-index, 1.3; *M*-index, 0.4. 3rd costal section with heavy setation on basal 0.4. Length, 3.2 mm (holotype); 4.0 mm (paratype).

Abdomen. Tergites 2–5 pale tan with darker areas posteriorly, expanded in midline. Tergite 6 pale tan.

Distribution

Type specimens only, both from New South Wales.

29. ***Drosophila* (*Hirtodrosophila*) *whianensis***, sp. nov.

Type

Holotype ♀ in AM: Whian Whian State Forest, near Lismore, New South Wales, 25.ii.1965, MV lamp, McAlpine and Lossin.

Distinguishing Features

Carina prominent but narrow. Thorax uniformly mid-brown; abdomen brown. Wings slightly dusky with pale clouding along crossveins.

Description

Body length. 2.4 mm.

Head. Arista with 4 long anteriorly curved branches above and 2 long straight branches below plus terminal fork. Front 1.5 times broader than long, mid-brown; periorbital bands enclosing orbital and vertical bristles silvery. 2nd and 3rd antennal segments mid-brown. Carina prominent, developed along full length of face but uniformly very narrow. Cheek almost linear, greatest width 0.2 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 4 : 1 : 6; anterior reclinate orbital equidistant from others, slightly lateral to proclinate orbital. Ocellar and vertical bristles large.

Thorax. Mid-brown, pleura slightly paler than mesonotum. Acrostichal hairs in 6 rows in front of dorsocentral bristles, 4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Anterior scutellar bristles longer than posteriors, slightly divergent. Sterno-index 0.4. Halteres pale tan. Legs pale brown; preapical bristles on 2nd and 3rd tibiae; apicals on 2nd tibiae only.

Wings. Hyaline, slightly dusky with pale clouding along crossveins. *C*-index, 2.1; 4*V*-index, 1.7; 5*X*-index, 1.1; *M*-index, 0.4. 3rd costal section with heavy setation on basal 0.5. Length, 2.4 mm.

Abdomen. Shrivelled but apparently uniformly mid-brown.

Distribution

Known from holotype only.

30. ***Drosophila* (*Hirtodrosophila*) *macalpinei***, sp. nov.

Types

Holotype ♀ in AM: Whian Whian State Forest, near Lismore, New South Wales, 25.ii.1965, D. K. McAlpine. Paratype ♂ in AM: Upper Allyn near Eccleston, New South Wales, 27.iii.1970, D. K. McAlpine.

Distinguishing Features

Body tan. 3rd antennal segment large, with *c.* 8 extremely long hairs.

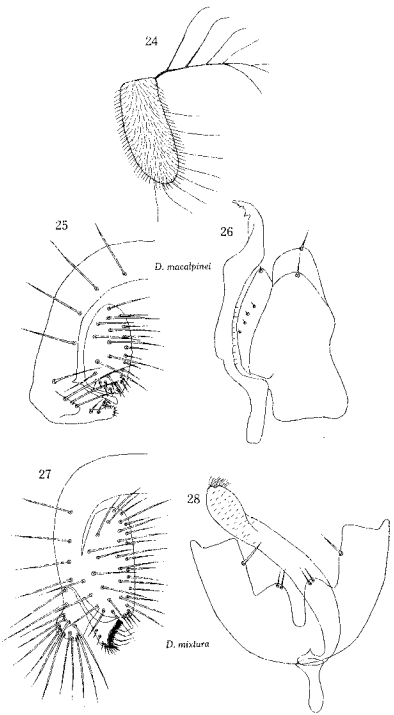


Fig. 24. *D. macalpinei*, third antennal segment and arista.
Figs 25–28. Male external and internal genitalia. *25, 26, D. macalpinei. 27, 28, D. mixtura.*

Description

Body length. 2.0 mm.

Head. Arista with 3–4 branches above and 1 below plus terminal fork. Front 1.3 times broader than long, pale yellowish tan, pruinose about bases of orbital and vertical bristles. Carina prominent but narrow on upper part of face, obsolete below. Cheek unusually broad, slightly curved, greatest width almost ⅓ greatest diameter of eye. Eyes with very fine pile. 3rd antennal segment large, covered in long hairs and with 7–8 additional very large curved hairs about anterior and ventral borders (Fig. 24); 2nd segment with few large bristles; both segments pale yellowish brown. Orbital bristles in ratio 4 : 1 : 4; anterior reclinate orbital extremely fine, lateral to proclinate orbital. All bristles on head, and arista, slightly yellowish.

Thorax. Pale yellowish brown. Acrostichal hairs in 6 rows in front of dorsocentral bristles, 4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.7. Anterior scutellar bristles divergent; anterior and posterior scutellars subequal. Sterno-index 0.5. Legs pale yellowish brown; preapical bristles evident on 3rd tibiae only; apicals on 2nd tibiae only. All bristles on thorax and legs with yellowish tinge.

Wings. Slightly brownish; veins pale brown. *C*-index, 1.8; 4*V*-index, 2.4; 5*X*-index, 1.7; *M*-index, 0.75. 3rd costal section with heavy setation on basal 0.6. Length, 2.0 mm.

Abdomen. Yellowish brown. Tergites 2–5 with darker apical bands of uniform width. All bristles on abdomen yellowish. Egg guides pointed and blackened apically.

Male genitalia (Figs 25, 26). Clasper small, with few teeth; aedeagus long, apically curved and finely serrated.

Distribution and Specimens Examined

Types and two additional specimens from Whian Whian State Forest and Upper Allyn, N.S.W.; 1 specimen, Dorrigo National Park, N.S.W. (All specimens in AM.)

31. *Drosophila* (*Hirtodrosophila*) *mixtura*, sp. nov.

Types

Holotype ♂ in AM: Lake Barrine, Atherton Tableland, Queensland, 15.xii.1961, D. McAlpine and R. Lossin. Paratype ♂ in AM: same collection data as holotype.

Distinguishing Features

Front flat; occipital margin rounded. Eyes broad above, narrowed below. Thorax dark above, pale laterally. Abdomen dark.

Description

Body length. 3.5 mm.

Head. Arista with 5–6 branches above and 2 below plus terminal fork. Front flat, tapered anteriorly, breadth in mid-region equal to length, occipital margin smoothly and gradually rounded. Front anteriorly rich brown, laterally about orbits broadly pale cream, paler brown anterior to level of proclinate orbitals; ocellar triangle shiny blackish. 2nd antennal segments blackish; 3rd brown. Carina rudimentary.

Cheek pale cream, extremely narrow anteriorly, widened and squared at posterior corner, linear, greatest width 0.15 times greatest diameter of eye. Vibrissa small. Posterior corner of cheek with 1–2 large and several smaller yellow bristles. Orbital bristles in ratio 5 : 2 : 6; anterior reclinate orbital slightly lateral to proclinate. Eyes narrowed below, bare, with row of large bristles along posterior border.

Thorax. Mesonotum mid-brownish, with 2 paler narrow diffusely demarcated longitudinal stripes at levels of dorsocentral bristles, and hint of 2 darker stripes anteriorly within latter. Scutellum unevenly brown, paler about bases of bristles. Dorsal brown coloration extending to upper portions of pleura, changing abruptly to unicolorous pale cream after straight line of demarcation extending from front of thorax at level of cheek across upper fifth of mesopleuron to abdomen. Acrostichal hairs in 4 slightly irregular rows in front of and between dorsocentral bristles. Ratio anterior : posterior dorsocentrals 0.6. Anterior scutellar bristles somewhat weaker than posteriors. Sterno-index 0.5. Legs unicolorous pale cream; preapical bristles on 3rd tibiae only; apicals absent.

Wings. Translucent, tinged brownish, more strongly brownish towards costal margin. *C*-index, 2.7; 4*V*-index, 1.3; 5*X*-index, 1.2; *M*-index, 0.3. 3rd costal section with heavy setation on basal 0.4. Length, 2.9 mm.

Abdomen. 2nd tergite black with small median pale triangular patch anteriorly. 3rd–5th tergites black. 6th tergite pale with 2 large diffusely demarcated brownish patches.

Male genitalia (Figs 27, 28; from paratype). Clasper small, with medial row of thick marginal teeth; hypandrium with 3 pairs of submedian bristles; aedeagus with apical pubescence.

Distribution

Northern Queensland.

Specimens Examined

Queensland: Lake Barrine, Atherton Tableland, AM (types); 8, Lake Barrine National Park, Dec. 1974, on bracket fungus, I. R. Bock; 3, Upper Mulgrave River, 10 miles Goldsborough Rd, 9.v.1967, D. H. Colless; 5, Mt Edith Forest Rd, 1½ miles off Danbulla Rd, 6.v.1967, D. H. Colless; 1, Whitfield Range Forest Reserve, Cairns, 19.iv.1967, D. H. Colless; 1, 5–8 miles Mt Lewis Rd off Mossman–Mt Molloy Rd, 22.iv.1967, D. H. Colless. (All latter specimens in ANIC.)

Special Comments

Members of this species may be observed in large numbers on the undersides of fleshy bracket fungi in north Queensland rain forests, a habitat shared with one or more species of *Leucophenga* and *Mycodrosophila*. The larvae apparently live within the fungus.

32. *Drosophila* (*Hirtodrosophila*) *borboros*, sp. nov.

Type

Holotype ♀ in ANIC: Mt Edith, 4–7 miles off Danbulla Rd, Queensland, 27.iv.1967, D. H. Colless.

Distinguishing Features

Body entirely mid to dark brown; wings with deep brownish tinge. Mesonotum humped.

Description

Body length. 2.8 mm.

Head. Arista with 3 branches above and 1 below plus large terminal fork; ventral ray arising close to terminal bifurcation of main axis. Front 1.15 times broader than long, mid-brown, darker centrally and within ocellar triangle. 2nd antennal segments mid-brown; 3rd darker, dusky. Carina consisting only of very narrow ridge, almost knife-like, on upper part of face only, entirely obsolete below. Cheek almost linear, greatest width 0.15 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 3 : 1 : 4; anterior reclinate orbital posterolateral to proclinate orbital.

Thorax. Mesonotum mid-brown, strongly humped; pleura darker. Acrostichal hairs in 6 rows in front of dorsocentral bristles, 2 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.65. Anterior scutellar bristles long. Sterno-index 0.7. Legs straw-coloured; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Translucent with deep brownish tinge, more intense towards costal margin. *C*-index, 3.1; 4*V*-index, 2.4; *SX*-index, 3.1; *M*-index, 1.0. 3rd costal section with heavy setation on basal 0.45. Length, 2.6 mm.

Abdomen. All tergites mid to dark brown, entire abdomen becoming slightly darker posteriorly. Egg guides protuberant in type specimen, strongly sclerotized and pointed apically.

Distribution

Known from holotype only.

33. ***Drosophila* (*Hirtodrosophila*) *bicolora***, sp. nov.

Type

Holotype ♀ in ANIC: 10 miles S. of Daintree, Queensland, 25.iv.1967, D. H. Colless.

Distinguishing Features

Small. 3rd antennal segment large, black. Thorax brown with white stripe at each anterolateral edge. *C*-index very low. Abdomen brown-black.

Description

Body length. 1.9 mm.

Head. Arista with 4 long anteriorly curved dorsal rays and 2 long straight ventral rays plus large terminal fork. Front slightly broader than long, rufous tan; areas about bases of orbital and vertical bristles, and ocellar triangle, darker with superimposed silveriness. 2nd antennal segments pale tan; 3rd contrasting shiny black with white hairs. Face white; carina vestigial. Cheek linear, extremely narrow in middle region, wider anteriorly and at posterior corner, greatest width 0.08 times

greatest diameter of eye. Proboscis brown; palps black. Eyes bare. Orbital bristles in ratio 6 : 3 : 7; anterior reclinate orbital very fine, lateral and slightly anterior to proclinate orbital. Postverticals small.

Thorax. Mesonotum brown; humeral angles of mesonotum white; scutellum and pleura brown. Acrostichal hairs in 6 rows in front of dorsocentral bristles, 2 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.45. Sterno-index 0.6. Basal scutellar bristles 0.75 times length of apicals. Legs pale tan; preapical bristles on all tibiae; apicals on 1st and 2nd tibiae.

Wings. Hyaline. *C*-index, 0.9; 4*V*-index, 3.4; 5*X*-index, 4.5; *M*-index, 1.3. 3rd costal section with heavy setation on basal 0.7. Length, 1.5 mm.

Abdomen. All tergites brownish black (darker at posterior edges where each tergite overlaps its successor).

Distribution and Specimens Examined

Holotype from near Daintree, Qld; 1♀, Iron Range, Qld, 16.viii.1971, R. Jenkins (ANIC).

34. *Drosophila* (*Hirtodrosophila*) *zentae*, sp. nov.

Types

Holotype ♀ in ANIC: Mt Edith Forest Rd, 1 mile off Danbulla Rd, Queensland, 6.v.1967, D. H. Colless. Paratype ♂ in ANIC: Upper Mulgrave River, 10 miles Goldsborough Rd, Qneensland, 9.v.1967, D. H. Colless.

Distinguishing Features

Rays of arista long and straight. Thorax brown above, pleura pale with broad dark stripe. Abdomen brown, shiny. *C*-index low; 4*V*- and 5*X*-indices high.

Description

Body length. 2.5 mm.

Head. Arista with 4 long rays above and 3 long rays below plus terminal fork. Front 1.4 times broader than long, brownish, paler anteriorly. Periorbital bands enclosing orbital and vertical bristles, and ocellar triangle, slightly silvery. 2nd antennal segments brown; 3rd dusky. Carina broad but very low on upper part of face only, entirely obsolete below. Cheek narrow; greatest width 0.1 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 2 : 1 : 2; anterior reclinate orbital fine, lateral and close to proclinate orbital. Vertical bristles large; postverticals small, strongly convergent.

Thorax. Mesonotum uniformly mid-brown; pleura pale tan with broad longitudinal very dark stripe just above sternopleural bristles. Acrostichal hairs in *c.* 8 rows in front of dorsocentral bristles, *c.* 4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.5. Anterior scutellar bristles shorter than posteriors, convergent. Sterno-index 0.5. Legs pale tan; preapical bristles on all tibiae; apicals on 1st and 2nd tibiae.

Wings. Slender; hyaline, faintly brownish. *C*-index, 1.0; 4*V*-index, 3.5; 5*X*-index, 3.4; *M*-index, 1.0. 3rd costal section with heavy setation on basal 0.75. Length, 2.4 mm.

Abdomen. All tergites shiny brown without posterior bands, entire abdomen progressively darkening posteriorly.

Male genitalia (Figs 29, 30). Micropubescence on genital arch and anal plate sparse; anal plate very small, weakly sclerotized; clasper absent; aedeagus bare, apically bifurcate.

Distribution

Northern Queensland in rain forests; one female from New South Wales (see below), apparently same species.

Specimens Examined

Queensland: 1, same data as holotype; 3, same data as paratype; 3, Mt Edith Forest Rd, 1½ miles off Danbulla Rd, 6.v.1967, D. H. Colless; 1, Mt Edith, 4–7 miles off Danbulla Rd, 27.iv.1967, D. H. Colless; 1, 5 miles Tinaroo Falls–Danbulla Rd, 26.iv.1967, D. H. Colless; 4, Kuranda Range State Forest, 20.iv.1967, D. H. Colless; 2, 5–8 miles Mt Lewis Rd off Mossman–Mulloy Rd, 22.iv.1967, D. H. Colless; 4, Mossman Gorge, 23.iv.1967, D. H. Colless; 3, Crystal Cascades, 19.iv.1967, D. H. Colless; 1, Earl Hill, N. of Cairns, 8.v.1967, D. H. Colless; 1, Yungaburra (State Forest 452), 29.iv.1967, D. H. Colless; 5, The Boulders, Babinda, 10.v.1967, D. H. Colless; 2, The Boulders, 6.4 km NW. of Babinda, 8.vii.1971, Z. Liepa; 17, Lake Eacham National Park, Dec. 1974, swept from foliage, I. R. Bock. **New South Wales:** 1, Bruxner Park, 19.iv.1970, D. H. Colless. (All specimens in ANIC.)

Special Comments

The following two species are very similar to *D. zentae*; further comments follow their descriptions.

35. *Drosophila* (*Hirtodrosophila*) *junae*, sp. nov. J. Grossfield

Types

Holotype ♀ in ANIC; 3 miles W. of Kuranda, Mareeba Rd, Queensland, 3.v.1967, D. H. Colless. Paratype ♂ in ANIC: Black Mountain Rd, Kuranda, Queensland (1400 ft, 20°C), 16.viii.1974, bait, J. and J. Grossfield.

Distinguishing Features

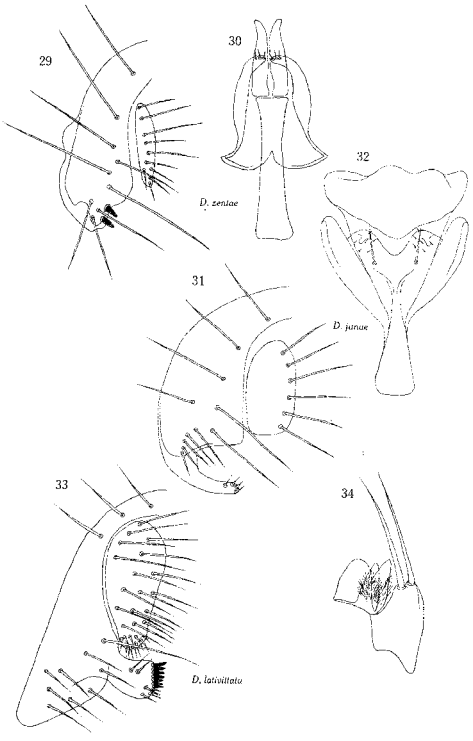
Body entirely pale yellowish. Carina absent. Arista large. *C*-index low; *SX*- and *M*-indices high.

Description

Body length. 2.3 mm.

Head. Arista with 4 long straight rays above and 3 long straight rays below plus terminal fork. Front very slightly broader than long, tan; periorbital bands enclosing orbital and vertical bristles, and ocellar triangle, silvery. 2nd antennal segments tan, slightly dusky anteriorly; 3rd segments tan posteriorly, dusky anteriorly and ventrally. Carina absent. Cheek very narrow, curved, greatest width less than 0.1 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 2 : 1 : 2; anterior reclinate orbital lateral to proclinate orbital.

Thorax. Tan, pleura slightly paler than mesonotum. Acrostichal hairs in 6 rows in front of dorsocentral bristles, 2 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.7. Anterior scutellar bristles long, convergent. Sterno-index 0.5. Legs pale tan; preapical bristles on all tibiae; apicals on 1st and 2nd tibiae.



Figs 29–34. Male external and internal genitalia. *29, 30, D. zentae. 31, 32, D. junae. 33, 34, D. lativittata.*

Wings. Hyaline, slightly dusky. *C*-index, 1.1; 4*V*-index, 3.3; 5*X*-index, 4.6; *M*-index, 1.5. 3rd costal section with heavy setation on basal 0.7. Length, 2.1 mm.

Abdomen. All tergites tan.

Male genitalia (Figs 31, 32). Clasper absent; aedeagus very large, greatly expanded apically.

Distribution and Specimens Examined

Types and additional female from type localities (ANIC).

36. *Drosophila* (*Hirtodrosophila*) *palumae*, sp. nov.

Type

Holotype ♀ in AM: 2 miles SW. Paluma, Queensland, 3050 ft, 17.i.1970, G. A. Holloway.

Distinguishing Features

Carina vestigial. Thorax pale brown; abdomen blackish brown (body coloration similar to that of *zentae* but dark lateral thoracic stripes lacking). *C*-index low; 4*V*-, 5*X*- and *M*-indices high.

Description

Body length. 2.4 mm.

Head. Arista with 3 long straight branches above and 1-2 long straight rays below (cf. *zentae*) plus large terminal fork. Front as broad as long, tan; periorbital bands enclosing orbital and vertical bristles, and ocellar triangle, silvery. 2nd antennal segments tan; third dusky anteriorly. Carina vestigial on upper part of face only, entirely absent below. Cheek curved, very narrow, greatest width less than 0.1 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 3 : 1 : 3; anterior reclinate orbital very fine, lateral to proclinate orbital. Ocellar and vertical bristles large.

Thorax. Pale brown dorsally and laterally. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 2-4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.5. Anterior scutellar bristles same length as posteriors, slightly convergent. Sterno-index 0.6. Legs concolorous with thorax; preapical bristles on all tibiae; apicals on 1st and 2nd tibiae.

Wings. Hyaline, slightly dusky. *C*-index, 1.0; 4*V*-index, 4.0; 5*X*-index, 5.0; *M*-index, 1.6. 3rd costal section with heavy setation on basal 0.8. Length, 2.3 mm.

Abdomen. All tergites blackish brown, slightly darker posteriorly, shiny.

Distribution and Specimens Examined

Holotype from northern Queensland (AM); 1♀, 2 km W. of Gillies Way Crest, Qld (0900 ft, 15°C), sweeping leaf litter, 14.viii.1974, J. and J. Grossfield (ANIC).

Special Comments

The above and the preceding two species are very similar in external morphology but may be separated by reference to aspects of wing venation or arista structure and, to the extent of its consistent reliability, body coloration; these differences

are summarized in the key. Similarities of external morphology notwithstanding, the differences between the male genitalia of *ventae* and those of *junae* are striking; a male of *pahunae* was unfortunately not available for comparison. The egg guides of all three species are similar in being very small and weakly sclerotized. There can be little doubt that these three species share (in phylogenetic terms) very recent common ancestry. Future, more detailed comparative studies of genitalia, internal morphology, ecology, polytene chromosomes, etc. might prove illuminating in determining interspecific relationships.

Subgenus **Scaptodrosophila** Duda

Scaptodrosophila Duda, 1923, p. 37.
Paradrosophila Duda, 1923, p. 43.
Pugiodrosophila Duda, 1924, p. 203.
Xiphidiochaeta Duda, 1925, p. 200 (name improperly substituted for *Pugiodrosophila*).
Pholadoris Sturtevant, 1942, p. 28.

Type-species: *Drosophila scaptomyzoidea* (Duda).

Diagnosis

Second oral bristle relatively small; prescutellar pair of acrostichal bristles usually enlarged, sometimes as large as anterior dorsocentrals; propleural bristle usually present; sternopleural bristles usually subequal; genital arch and anal plate of male external genitalia micropubescent (not shown in drawings below); eggs with *c.* 6-10 filaments.

Largest of the subgenera occurring in Australia, *Scaptodrosophila* contains more of the Australian species than all other subgenera combined.

Most species of *Scaptodrosophila* occur in tropical Asia, New Guinea, Australia and Pacific islands, and Africa. A few species occur in the Palaearctic, Nearctic and Neotropical biogeographic zones. The group evidently arose in or close to southeast Asia and has speciated most widely in this and neighbouring areas. Few of the species appear to be very widespread; none is cosmopolitan. Many of the species of this subgenus are still poorly known; several of the new species described below are known from only one locality. Most *Scaptodrosophila* species are not attracted to banana bait and have thus not been collected by geneticists baiting for *Drosophila*. Members of the subgenus vary considerably in size, and to some extent in the morphological characteristics used in the diagnoses of the other subgenera; this heterogeneity is discussed further following the species descriptions.

Several lines of descent (species-groups) are discernible within Australian members of the subgenus; infrasubgeneric classifications are nevertheless not considered in the following treatment because (as with *Hirtodrosophila*) such classifications would at this time necessarily be based on incomplete information: males of some species are still unknown or inadequately known; it is likely that more new species may be added to the subgenus following future collections; the comparable fauna of neighbouring areas (particularly New Guinea) is poorly known; and, although some clusters of evidently closely related species are apparent, several species are not on currently available information obviously close to any others and the consequent proliferation of monotypic species-groups would seem excessively arbitrary. However, in the following systematic treatment, apparently very closely related species are considered in sequence, with appropriate comments where necessary.

Drosophila lativittata and Similar Species

37. *Drosophila* (*Scaptodrosophila*) *lativittata* Malloch

Drosophila lativittata Malloch, 1923, p. 618. (Holotype in SPHTM: type locality Sydney.)
Peradrosophila interrupta Duda, 1923, p. 45. Syn. nov. (Holotype in HNM: type locality Sydney.)

Distinguishing Features

Carina nose-like, small. Thorax dark brown with paler longitudinal streaks between middle 2 rows of acrostichals and in lines of dorsocentral bristles. Abdominal tergites 2-5 yellow with dark posterior bands, narrowly interrupted in midline and extended forward laterally to enclose lateral yellow spots.

Detailed Description

In Malloch (1923, p. 618), Duda (1923, p. 45) and Mather (1955, pp. 556-8).

Male genitalia (Figs 33, 34). Hypandrium with a pair of extremely prominent submedian spines.

Distribution

Recorded from south-eastern Queensland (Mather 1955), New South Wales (Malloch 1923; Duda 1923) and Victoria (collected by G. Prince). The species is attracted to fruit baits.

38. *Drosophila* (*Scaptodrosophila*) *enigma* Malloch

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

Distinguishing Features

Carina nose-like. Thorax pale to mid-brown, with silvery longitudinal streak enclosing middle 4 rows of acrostichals in some specimens. Abdominal tergites pale with dark brown posterior bands, narrowly interrupted in midline on tergites 2-4 and extended forwards dorsolaterally and laterally.

Description

Body length. c. 3.2 mm.

Head. Arista with 3-4 branches above and 2-3 below plus terminal fork. Front 0.9 times as long as broad, tan; periorbital bands enclosing orbital and vertical bristles, and ocellar triangle, silvery. 2nd and 3rd antennal segments tan; 3rd slightly dusky anteriorly. Carina nose-like, smoothly rounded, small. Cheek almost linear, greatest width 0.15 times greatest diameter of eye. Eyes with fine pile. Orbital bristles in ratio 5 : 2 : 5; anterior reclinate orbital posterolateral to proclinate orbital.

Thorax. In young living specimens uniformly pale brown; in some older living specimens, and in pinned specimens, brown with more or less well developed longitudinal greyish or silvery streaks on mesonotum enclosing middle 4 rows of acrostichals and laterally in extended lines of dorsocentral bristles. Acrostichal hairs in 8 rows in front of dorsocentral bristles, *c.* 6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Sterno-index 0.7. Legs tan; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Translucent, slightly brownish with narrow cloud along posterior crossvein. *C*-index, *c.* 3.1; 4*V*-index, *c.* 2.2; 5*X*-index, *c.* 1.5; *M*-index, *c.* 0.6. 3rd costal section with heavy setation on basal 0.4–0.5. Length *c.* 2.9 mm.

Abdomen. Tergites 2–4 yellow with dark posterior bands, narrowly interrupted in midline, expanded forwards dorsolaterally, then narrowed and finally expanded forwards again at lateral margins of tergites. Tergite 5 with similar band not interrupted in midline.

Male genitalia. Very similar to those of *lativittata*; submedian spines on *enigma* hypandrium relatively shorter than those of *lativittata*, periphallic and phallic organs otherwise very similar.

Distribution

South-eastern Queensland (Mather 1955); New South Wales (Malloch 1927; Mather 1960; collected about Sydney by J. S. F. Barker); Victoria (collected in Melbourne area by G. Prince); South Australia (Angus 1972).

Special Comments

The above two species are very similar in morphology and, since both are attracted to fruit baits, presumably to some extent in ecological requirements. Whether or not this apparent close relationship is confirmed by sexual isolation, chromosomal, behavioural and biochemical studies remains to be determined. Both species may be cultured in standard bottles of corn meal or similar medium, but the yield of flies obtained is small; it is considerably greater if the bottle with larvae is placed without stopper into a larger bottle covered with cloth and containing about an inch of moist coarse sand in which the larvae pupate.

39. *Drosophila* (*Scaptodrosophila*) *specensis*, sp. nov.

Type

Holotype ♂ in ANIC: Mt Spec, Queensland, 2900 ft, 22.iv.1955, Norris and Common.

Distinguishing Features

Carina weak, low. Thorax brown; wings with brownish tinge. Abdominal tergites with interrupted bands.

Description

Body length. 2.5 mm.

Head. Arista with 3 branches above and 2 below plus terminal fork. Front 0.9 times as broad as long, deep tan; periorbital bands enclosing orbital and vertical bristles, and ocellar triangle, silvery. 2nd and 3rd antennal segments mid-brown. Carina weak, low, narrow, rounded, almost obsolete below. Cheek slightly curved, greatest width 0.1 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 2 : 1 : 2; anterior reclinate orbital posterior and slightly lateral to proclinate orbital. Ocellar and vertical bristles large.

Thorax. Uniformly mid-brown. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Prescutellar bristles large. Ratio

anterior : posterior dorsocentrals 0.7. Anterior scutellar bristles strongly divergent. Sterno-index 0.6. Legs pale brown; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Translucent with brownish tinge. *C*-index, 2.9; *4V*-index, 1.9; *5X*-index, 1.5; *M*-index, 0.5. 3rd costal section with heavy setation on basal 0.6. Length, 2.4 mm.

Abdomen. Tergite 2 yellowish with broad posterolateral black patches. Tergites 3 and 4 yellowish with broad black posterolateral patches reaching posterior margins of 2nd and 3rd tergites respectively on either side of midline. Tergite 5 black with median yellow patch. Tergite 6 black with very narrow median yellow patch. Median yellow areas on successively posterior tergites becoming progressively narrower.

Male genitalia (Figs 35, 36). Hypandrium with a pair of large submedian spines; aedeagus short, without ornamentation.

Distribution

Northern Queensland, in rain forests.

Specimens Examined

Queensland: 1, 14 miles SW. of Sarina, 8.v.1955, Norris and Common (ANIC); 9, The Crater, near Herberton, 5.i.1967, D. K. McAlpine and G. Holloway (AM); 2, The Crater, 16.xii.1961, D. K. McAlpine and R. Lossin (AM); 5, Birthday Creek, near Paluma, 15.i.1970, G. A. Holloway (AM); 1, Kenilworth State Forest, 5.ii.1961, D. K. McAlpine (AM); 1, Lake Barrine, near Yungaburra, 3.i.1967, D. K. McAlpine and G. Holloway (AM); 1, Broken River, Eungella, 9.xii.1961, D. K. McAlpine and R. Lossin (AM).

40. *Drosophila* (*Scaptodrosophila*) *nitidithorax* Malloch

Drosophila nitidithorax Malloch, 1927, p. 5. (Holotype, very badly damaged, in SPHTM; type locality Perth.)

Distinguishing Features

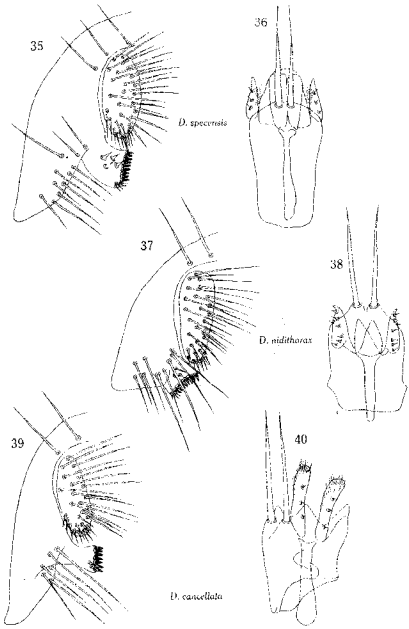
Body shiny black. Carina nose-like. Rays of arista short and straight.

Description

Body length. c. 2.9 mm.

Head. Arista with 3–4 rays above and 2 below plus small terminal fork. Front 1.2 times broader than long, dull velvety blackish brown; periorbital bands enclosing orbital and vertical bristles, and ocellar triangle, shiny. 2nd and 3rd antennal segments dusky. Carina dusky, nose-like but relatively low. Margins of cheeks and clypeus black, central portion of cheek brown; greatest width of cheek 0.2 times greatest diameter of eye. Proboscis yellow. Eyes with dense fine pile. Orbital bristles in ratio 2 : 1 : 2; anterior reclinate orbital posterolateral to prodinate; orbital margin with additional row of fine bristles.

Thorax. Mesonotum and scutellum shiny black with superimposed minute brown flecks; pleura dusky, subshining. Acrostichal hairs in 8 rows in front of dorsocentral bristles, *c.* 6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Anterior scutellar bristles long, divergent. Sterno-index 0.7. Propleural bristle long. Halteres yellow. Legs dusky yellow; preapical bristles on all tibiae; apicals on 1st and 2nd tibiae.



Figs 35–40. Male external and internal genitalia. *35, 36, D. specensis. 37, 38, D. nidithorax. 39, 40, D. cancellata.*

Wings. Hyaline. *C*-index, *c.* 3.0; 4*V*-index, *c.* 2.1; 5*X*-index, *c.* 1.5; *M*-index, *c.* 0.7. 3rd costal section with heavy setation on basal 0.65. Length, *c.* 2.5 mm.

Abdomen. Tergites uniformly brownish black, shiny. Testes of living male orange, conspicuous through ventral abdominal wall.

Male genitalia (Figs 37, 38). Hypandrium with pair of very large submedian spines; aedeagus very small.

Distribution

South-western Western Australia; collected at Yanchep by N. Monzu (unpublished) and about Perth by several workers.

Special Comments

Although differing conspicuously in coloration from *lativittata* and *enigma*, *nitidithorax* is otherwise close to these species morphologically, is also attracted to fruit baits, and also cultures well if the larvae are given moist sand in which to pupate.

41. *Drosophila* (*Scaptodrosophila*) *cancellata* Mather

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

Distinguishing Features

Carina nose-like but not prominently developed. Front rufous brown; silvery bands running along orbital margins anteriorly from just in front of proclinate orbital bristle posteriorly to occipital margin. Anterior reclinate orbital bristle posterolateral to proclinate orbital. Mesonotum mid-brown with slightly paler longitudinal streaks. Abdominal tergites yellowish anteriorly with dark brown medianly interrupted posterior bands.

Detailed Description

In Mather (1955).

Male genitalia. See Figs 39, 40; hypandrium with pair of large submedian spines.

Distribution and Specimens Examined

Recorded by Mather (1955, 1960) from south-eastern and northern Queensland; *c.* 24 specimens in AM, all from Claudie River in northern Queensland.

Drosophila obsoleta and Similar Species

The following seven species are similar in each lacking a carina, or having at most a vestigial carina; propleural bristles, ordinarily one of the diagnostic features of members of the subgenus *Scaptodrosophila*, are also lacking. Several of the species are very close morphologically, but there is a degree of heterogeneity in the structure of the male genitalia suggesting that this group might contain several lines of descent.

42. *Drosophila* (*Scaptodrosophila*) *obsoleta* Malloch

Drosophila obsoleta Malloch, 1923, p. 616. (Holotype in AM; type locality Sydney.)

Drosophila australica Duda, 1923, p. 59. Syn. nov. (Type series in HNM; type locality Springwood, N.S.W.)

Distinguishing Features

Carina absent. Arista with few rays, shortening anteriorly (Fig. 1). Mesonotum pale, sometimes tinged greenish, with bristles arising from dark spots (cf. members of *repleta* species-group, subgenus *Drosophila*). Abdominal tergites dark brown.

Description

Body length. c. 2.4 mm.

Head. Arista dorsally with relatively long curved basal ray, shorter straight middle ray, and very short subapical ray; ventrally with single short straight ray anterior to middle dorsal ray; terminal fork very small. Front 1.2 times broader than long, anteriorly brown; areas about bases of orbital and vertical bristles silvery, bristles arising from small dark brown spots; ocellar triangle and immediately surrounding triangular area blackish with superimposed silveriness. 2nd antennal segments pale brown; 3rd dusky. Carina absent or represented by very weak dorsal rudiment. Cheek curved, broadening posteriorly, greatest width 0.2 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 5 : 3 : 6; anterior reclinate orbital rather slender, lateral to proclinate orbital.

Thorax. Mesonotum whitish to greenish, all hairs and bristles arising from dark brown spots. Scutellum pale to mid brown. Pleura dark brown with greenish tinges. Acrostichal hairs denser centrally, in 6–8 rows, somewhat irregular, in front of dorsocentral bristles, 2–4 rows between dorsocentrals. Prescutellar bristles slender. Ratio anterior : posterior dorsocentrals 0.5. Anterior scutellar bristles long. Sterno-index 0.8. Halteres pale yellow. Legs straw-coloured; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Translucent, with faint brownish tinge; slightly darker tinge along posterior crossvein. *C*-index, *c.* 3.2; 4*V*-index, *c.* 2.0; 5*X*-index, *c.* 1.8; *M*-index, *c.* 0.7. 3rd costal section with heavy setation on basal 0.2. Length, *c.* 2.5 mm.

Abdomen. Tergites 2-4 dark brown with narrow paler posterior bands; remainder of abdomen dark brown.

Male genitalia (Figs 41, 42). Clasper with large black teeth, and with slight micropubescence in addition to that on anal plate and genital arch.

Distribution

Eastern and southern Australia, from central Queensland to South Australia; a species of open forests.

Specimens Examined

Queensland: 1, Eungella, 7.v.1955, Norris and Common. **Australian Capital Territory:** 5, Canberra. 5.x.1950, S. J. Paramonov; 1, Canberra, 14.xi.1958, K. L. Taylor; 48, Black Mountain, light trap, various dates, I. F. B. Common; 1, Mt Stromlo, on pines, 19.iii.1936, A. L. Tonnoir; 1, pine plantation near Mt Stromlo, 18.ix.1934, A. L. Tonnoir; 1, Cotter–Murrumbidgee River junction, 8.x.1960, D. H. Colless; 2, Bull's Head, 19.xi.1968, D. H. Colless. **New South Wales:** 1, Alpine Creek, Snowy Mountains, 9.xii.1964, D. H. Colless; 1, 4 miles E. of Nimmitabel. 8.iii.1963, D. H. Colless; 2, Yass, 26.ix.1931, K. English; 3, Brown Mountain, Bega district, 8.iii.1963, D. H. Colless; 2, Mt Dromedary, 1000 ft, 24.xi.1965, I. F. B. Common and M. S. Upton; 3, Brockelos Creek, 16.5 km S. of Bermagui, 22.vii.1973, 24–27.ii.1974, Z. Liepa; 2,

Mt Tomah, 3000 ft, 18.xii.1967, M. S. Upton; 2, Leura, 3.i.1973, D. H. Colless; 1, Broadwater, Sept. 1926, D. S. North; 1, Manly Reservoir, 21.viii.1963, D. H. Colless; 1, Forbes, 12.xi.1964, D. H. Colless; 1, Korora Bay, near Coffs Harbour, 22.v.1966, Z. Liepa; 1, New England National Park, rain forest, 11.ii.1968, D. H. Colless; 1, Darlington Point, Murrumbidgee River, 25.x.1973, L. P. Kelsey. **Victoria:** 1, Lake Albacutya, near Rainbow, 6.iv.1974, Z. Liepa. **South Australia:** 1, Hahndorf, 6.viii.1968, Colless and Liepa. (All specimens in ANIC.)

43. *Drosophila* (*Scaptodrosophila*) *fuscithorax* Malloch

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

Distinguishing Features

Carina absent. Arista with few short straight rays. Thorax dusky with superimposed greenish to whitish pollinosity. Legs straw-coloured. Abdomen pale tan anteriorly, darkening posteriorly. *M*-index >1.

Description

Body length. c. 2.7 mm.

Head. Arista with 2 rays above and 1 below plus terminal fork; all rays short and straight. Front 1.2 times broader than long, tan at anterior margin, darkening posteriorly, dark brown in middle region, blackish with superimposed pollinosity posteriorly. Broad areas about bases of orbital and vertical bristles with silvery pollinosity. Ocellar triangle and immediately surrounding area with greenish to silvery pollinosity. 2nd antennal segments tan; 3rd dusky anteriorly, tan posteriorly. Face and cheeks pale tan. Carina absent. Cheek almost linear, greatest width 0.2 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 10 : 5 : 12, anterior reclinate orbital lateral and very slightly posterior to proclinate. Few additional small bristles present along orbital margin anterior to orbitals.

Thorax. Entirely dusky, darkest anteriorly, paler on scutellum, with superimposed pollinosity strongly greenish anteriorly and on pleura, becoming whitish posteriorly. Halteres tan. Acrostichal hairs in 8 rows, somewhat irregular, in front of dorsocentral bristles, 2 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.75. Sterno-index 0.7. Legs straw-coloured; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Hyaline, faintly brownish. *C*-index, *c.* 3.0; 4*V*-index, *c.* 3.1; 5*X*-index, *c.* 4.0; *M*-index, *c.* 1.3. 3rd costal section with heavy setation on basal 0.3. Length, *c.* 2.6 mm.

Abdomen. Entirely brown, pale anteriorly, becoming darker posterolaterally and, more posteriorly, on entire tergites.

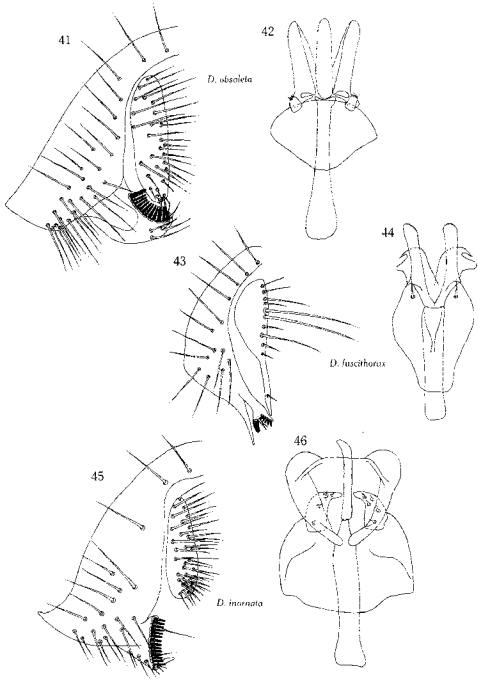
Male genitalia (Figs 43, 44). Anal plate with long slender ventral process; clasper small, with prominent strongly sclerotized ventral process; aedeagus bifid.

Distribution

Eastern, southern and south-western Australia.

Specimens Examined

Queensland: 2, Wombye, near Nambour, 14–16.x.1965, D. H. Colless (ANIC). **New South Wales:** 7, Mt Gibraltar National Park, 72 miles W. of Grafton, 13.xi.1964, D. K. McAlpine (AM); 1, Kurrajong, near Richmond, 26.x.1966, D. K. McAlpine and G. Holloway (AM); 4,



Figs 41–46. Male external and internal genitalia. *41, 42, D. obsoleta. 43, 44, D. fuscithorax. 45, 46, D. inornata.*

Creek-Sawpit Creek, Snowy Mountains, 15.ii.1963, D. K. McAlpine (AM); 2, Wilson's Valley, Snowy Mountains, 16.ii.1963, D. K. McAlpine (AM); 1, Mt Boyce, Blue Mountains, 14.iv.1964, D. K. McAlpine (AM); 5, Clyde Mountain, near Braidwood, 25.ii.1961, D. K. McAlpine (AM); 9, Mt Wilson, Blue Mountains, 15.iv.1971, D. K. McAlpine (AM); 4, Royal National Park, 6.vii.1966, D. K. McAlpine (AM); 1, Korora Bay, near Coff's Harbour, 22.v.1966, Z. Liepa (ANIC); 2, New England National Park, 13.x.1962, D. H. Colless (ANIC); 1, Pond's Creek, E. of Armidale, 13.x.1962, D. H. Colless (ANIC); 2, National Park, 2.viii.1925, Mackerras (ANIC); 1, Manly Reservoir, Sydney, 21.vii.1963, D. H. Colless (ANIC); 1, Ku-ring-gai Chase, Sydney, 28.viii.1960, D. H. Colless (ANIC); 1, McGarr's Creek, Sydney, 18.ix.1960, D. H. Colless (ANIC); 1, Tahmoor, 1.ix.1960, D. H. Colless (ANIC); 1, Leura, 3.i.1973, D. H. Colless (ANIC); 1, Clyde Mountain, west slope, 9.xi.1960, Z. Liepa (ANIC); 2, Mongarlowe River, Clyde Mountain, 5.v.1965, D. H. Colless (ANIC); 1, 5 miles S. of Monga, 8.v.1968, Colless and Liepa (ANIC); 1, Sheepstation Creek, near Araluen, 9.iv.1967, Z. Liepa (ANIC); 4, Shoalhaven River, Braidwood Rd, 4.x.1973, Z. Liepa (ANIC); 1, 16 km E. of Bungendore, 10.xi.1973, Z. Liepa (ANIC); 1, Captain's Flat, 13.iv.1966, Z. Liepa (ANIC); 1, Ooma Creek, Nag's Head Bridge, NW. of Grenfell, 23.iv.1972, Z. Liepa (ANIC); 1, Brockelos Creek, 16.5 km S. of Bermagui, 22.vii.1973, Z. Liepa (ANIC); 1, 3.5 km S. of Bermagui, 21.vii.1973, Z. Liepa (ANIC); 1, 3.3 km E. of Bodalla, swamp, 20.vii.1973, Z. Liepa (ANIC); 1, Lake Mummuga, Dalmeny, 20.vii.1973, Z. Liepa (ANIC); 1, Womboyne Lake, Disaster Bay, 4.viii.1973, Z. Liepa (ANIC); 3, Holbrook, 12.viii.1961, D. H. Colless (ANIC); 2, Brown Mountain, Bega district, 8.iii.1963, D. H. Colless (ANIC); 1, Rutherford Creek, Brown Mountain, 9.viii.1962, D. H. Colless (ANIC); 2, Tumut Plains, Little River, 21.ix.1963, Z. Liepa (ANIC); 1, 4 miles E. of Nimmitabel, 8.iii.1963, D. H. Colless (ANIC); 2, Mt Kosciusko, 4000–5000 ft, 29.i.1933, L. M. Mackerras (ANIC); 1, Alpine Creek, near Kiandra, 2.xii.1965, D. H. Colless (ANIC); 4, Shoalhaven River, Braidwood Rd, 19.xi.1974, Z. Liepa (ANIC); 4, Stoney Creek, 77 km N. of Windsor, 7.x.1974, Z. Liepa (ANIC).

Australian Capital Territory: 1, Canberra, 7.x.1930, A. L. Tonnoir (ANIC); 2, Black Mountain, light trap, 13.vii.1960, 24.ix.1969, I. F. B. Common (ANIC); 1, Black Mountain, 8.iii.1972, Z. Liepa (ANIC); 1, Molonglo River, 8.v.1930, L. F. Graham (ANIC); 1, Mt Majura, 2.iv.1963, D. H. Colless (ANIC); 1, Paddy's River, 29.xi.1962, D. H. Colless (ANIC); 1, near Condor Creek, 6.iii.1970, Z. Liepa (ANIC); 4, Blundell's, various dates, A. L. Tonnoir (ANIC); 1, Uriarra State Forest, 9.x.1960, D. H. Colless (ANIC); 3, Cotter–Murrumbidgee River junction, 8.x.1960, D. H. Colless (ANIC); 1, Lee's Creek, 2500 ft, 31.x.1962, I. F. B. Common and M. S. Upton (ANIC); 3, 2 miles E. of Mt Coree, 19.xi.1968, D. H. Colless (ANIC); 4, Bull's Head, 13.iv. 19.xi.1968, D. H. Colless (ANIC). **Victoria:** 1, Hawkhurst Station, Wonnangatta River, 10.xii.1949, S. J. Paramonov (ANIC); 1, Swan Reach, 22.vii.1964, D. H. Colless (ANIC). **Tasmania:** 2, Arve River, near Geeveston, 20.i.1960, D. K. McAlpine (AM); 2, near Russell Falls, Mt Field National Park, 13.i.1960, D. K. McAlpine (AM); 1, Renison Bell, 15.i.1960, D. K. McAlpine (AM); 2, Lake St Clair, 14.i.1960, D. K. McAlpine (AM); 1, Franklin River crossing, Lyell Highway, 14.i.1960, D. K. McAlpine (AM); 1, Junee Caves, near Maydena, 13.i.1960, D. K. McAlpine (AM); 1, Eaglehawk Neck, 17.i.1960, D. K. McAlpine (AM). **South Australia:** 1, Engelbrook Reserve, near Bridgewater, 12.iv.1967, D. K. McAlpine (AM). **Western Australia:** 5, Margaret River, ex malaise trap, 15.i.1971, G. A. Holloway (AM); 1, Harvey, 28.viii.1969, K. R. Norris (ANIC); 1, Mt Barker, 29.viii.1969, K. R. Norris (ANIC); 1, Cape Naturaliste, 1.x.1970, D. H. Colless (ANIC); 2, 27 miles N. of Bunbury (coast road), 1.x.1970, D. H. Colless (ANIC); 1, 8 miles N. of Bunbury, 1.x.1970, D. H. Colless (ANIC); 1, 1 mile E. of Jewel Cave, Augusta, 3.x.1970, D. H. Colless (ANIC); 1, Boranup, near NW. of Karridale, 3.x.1970, D. H. Colless (ANIC); 1, 2 miles W. of Karridale, 3.x.1970, D. H. Colless (ANIC); 1, 3 miles SW. of Karridale, 3.x.1970, D. H. Colless (ANIC); 1, Pemberton, 20.xi.1936, K. R. Norris (ANIC); 1, 9 miles W. of Pemberton, 4.x.1970, D. H. Colless (ANIC); 3, 3 miles NE. of Pimelia, near Pemberton, 5.x.1970, D. H. Colless (ANIC); 6, 6 miles SW. of Manjimup, 5.x.1970, D. H. Colless (ANIC); 2, 6 miles N. of Walpole, 7.x.1970, D. H. Colless (ANIC); 1, 24 miles NW. of Walpole, 7.x.1970, D. H. Colless (ANIC); 1, Nornalup, 8.x.1970, D. H. Colless (ANIC); 1, 5 miles E. of Nornalup, 8.x.1970, D. H. Colless (ANIC); 1, Valley of Giants, Nornalup, 8.x.1970, D. H. Colless (ANIC); 2, Rest Point, Walpole, 9.x.1970, D. H. Colless (ANIC); 3, Porongurup National Park, 11.x.1970, D. H. Colless (ANIC).

Special Comments

The male genitalia of the Western Australian specimens are identical to those of the eastern specimens.

44. *Drosophila* (*Scaptodrosophila*) *inornata* Malloch

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

Distinguishing Features

Carina absent or represented by rudimentary ridge. Arista with 3 rays above and 1 below, rays curved and progressively shortening towards small terminal fork. Thorax pale brown (occasionally darker or slightly mottled).

Description

Body length. c. 2.9 mm.

Head. Arista as above. Front 1.2 times broader than long, tawny yellow; periorbital bands enclosing orbital and vertical bristles, and ocellar triangle, silvery. 2nd antennal segments concolorous with front; 3rd dusky. Carina absent (hint of vestigial ridge present in some specimens). Cheek slightly curved, greatest width 0.2 times greatest diameter of eye. Eyes with hint of very fine sparse pile. Orbital bristles in ratio 2 : 1 : 3; anterior reclinate orbital lateral and very slightly anterior to proclinate orbital.

Thorax. Pale brown; pleura and patches of mesonotum with hint of darker, slightly greenish tinge. Mesonotum darker, sometimes with slight mottling, in a few (? older) specimens. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 2–4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.7. Sternoindex 0.8. Anterior scutellar bristles longer than posteriors, slightly divergent. Legs tan; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Translucent, with faint brownish tinge. *C*-index, *c.* 3.9; 4*V*-index, *c.* 1.9; 5*X*-index, *c.* 1.7; *M*-index, *c.* 0.6. 3rd costal section with heavy setation on basal 0.3–0.4. Length, *c.* 2.9 mm.

Abdomen. Entirely dark posteriorly, anterior tergites paler centrally.

Male genitalia (Figs 45, 46). Aedeagus small, non-bifid, without ornamentation.

Distribution

South-eastern Australia.

Specimens Examined

Queensland: 1, Wombye, near Nambour, 11–16.x.1965, D. H. Colless (ANIC). New South Wales: 3, Kurrajong, 26.x.1966, D. K. McAlpine and G. Holloway (AM); 1, Mt Kaputar, near Narrabri, 3000 ft, 10.xi.1964, D. K. McAlpine (AM); 2, Govett's Leap, Blue Mountains, 23.x.1964, D. K. McAlpine (AM); 1, Dorrigo National Park, MV lamp, 26.i.1970, G. A. Holloway (AM); 1, Mt Wilson, Blue Mountains, 15.iv.1971, D. K. McAlpine (AM); 1, Upper Allyn, near Eccleston, 12.x.1969, D. K. McAlpine (AM); 1, Burke's Creek near The Rock, 6.iv.1963, D. K. McAlpine (AM); 1, Mt Gibraltar National Park, 64 miles W. of Grafton, 24.ii.1965, D. K. McAlpine (AM); 1, Yass, 19.ix.1931, K. English, emerged from yellow toadstool (AM); 3, Yass, 11.ix.1931, K. English (AM); 1, Wentworth Falls, Blue Mountains, 12.x.1965, D. K. McAlpine (AM); 1, Royal National Park, near Sydney, 30.x.1965, D. K. McAlpine (AM); 2, Clyde Mountain, near Braidwood, 25.ii.1961, D. K. McAlpine (AM); 5, Mungo Brush, Myall Lakes, 26.vi.1964, D. K. McAlpine (AM); 1, New England National Park, 4000 ft, 12.xi.1961, I. F. B. Common and M. S. Upton (ANIC); 1, New England National Park, 11.ii.1968, D. H. Colless (ANIC); 1, 30 miles S. of Singleton, Putty Rd, 11.ii.1968, D. H. Colless (ANIC); 6, 5 miles S. of Forster, 30.viii.1967, I. F. B. Common (ANIC); 4, Leura Falls, 3.i.1973, D. H. Colless; 1,

Deep Creek, Narrabeen, 25.viii.1962, D. H. Colless (ANIC); 5, Brown Mountain near Bega, 27.ii.1974, Z. Liepa (ANIC); 1, Mongarlowe River, Monga Rd, 24.xi.1973, Kelsey and Liepa (ANIC); 1, Shoalhaven River, near Braidwood, 14.iii.1955, S. J. Paramonov (ANIC); 1, Belmore Falls, 2.x.1938, A. L. Tonnoir (ANIC); 1, Fitzroy Falls, 3.x.1938, A. L. Tonnoir (ANIC); 2, Minnamurra Falls, 31.i.1962, 5.vii.1961, D. H. Colless (ANIC); 2, Kangaroo Valley, 23.iii.1961, 3.ix.1960, D. H. Colless (ANIC); 1, Narooma, 25.xi.1930, A. L. Tonnoir (ANIC); 1, Wallaga Lake, Bermagui, 24–27.ii.1974, Z. Liepa (ANIC); 2, Brockelos Creek, 16.5 km S. of Bermagui, 22.vii.1973, 24–27.ii.1974, Z. Liepa (ANIC); 1, Gerogery, 14.vi.1961, D. H. Colless (ANIC); 1, Mt Tomah, 18.xii.1967, M. S. Upton (ANIC). **Australian Capital Territory:** 1, Canberra, 1.x.1930, A. L. Tonnoir (ANIC); 8, Black Mountain, light trap, various dates, I. F. B. Common (ANIC); 9, Mt Majura, various dates, D. H. Colless (ANIC); 1, Paddy's River, 29.xi.1962, D. H. Colless (ANIC); 2, Bull's Head, 13.iv.1968, 19.xi.1968, D. H. Colless (ANIC). **Victoria:** 2, Warburton, 8.iv.1963, D. K. McAlpine (AM); 4, Fernshaw, near Healesville, 12.iv.1963, D. K. McAlpine (AM); 1, Sherbrooke Forest, near Ferntree Gully, 20.i.1966, D. K. McAlpine (AM); 1, Tunnel Bend, near Jamieson, 6.iv.1963, D. K. McAlpine (AM); 1, Cement Creek, 27.x.1961, D. H. Colless (ANIC); 2, Toorloo Arms, Lakes Entrance, 22.vii.1964, D. H. Colless (ANIC); 3, Swan Reach, 22.vii.1964, D. H. Colless (ANIC); 1, 10 miles E. of Beech Forest, 1.i.1967, Z. Liepa (ANIC). **Tasmania:** 3, Pieman River, near Rosebery, 15.i.1960, D. K. McAlpine (AM); 1, Marakoopa Caves, near Mole Creek, 10.i.1960, D. K. McAlpine (AM). **South Australia:** 1, Moorlands, 8.viii.1968, Colless and Liepa (ANIC).

45. *Drosophila* (*Scaptodrosophila*) *grossfieldi*, sp. nov.

Types

Holotype ♀ in ANIC: Nornalup National Park, Western Australia, 9.x.1970, D. H. Colless. Paratype ♂ in ANIC: Porongurup National Park, Western Australia, 11.x.1970, D. H. Colless.

Distinguishing Features

In external morphology and coloration practically identical to *inornata*, slightly darker, wings slightly more brownish; male genitalia considerably different from those of *inornata*; cf. Special Comments below.

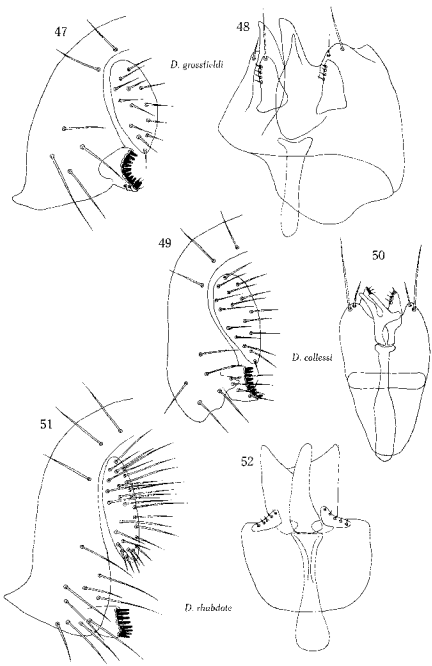
Description

Body length. 2.8 mm.

Head. Arista with 3 branches above and 1 below plus small terminal fork; basal dorsal ray long and curved; apical rays successively shorter. Frontal breadth equal to length; front tan, silvery about bases of orbital and vertical bristles, black within and silvery about ocellar triangle. 2nd antennal segments tan; 3rd dusky anteriorly, tan posteriorly. Carina absent. Cheek slightly curved, widening posteriorly, greatest width 0.25 times greatest diameter of eye. Eyes with trace of very fine, very sparse pile. Orbital bristles in ratio 5 : 2 : 7; anterior reclinate orbital lateral to proclinate orbital.

Thorax. Mesonotum and scutellum tan; pleura darker, with greenish tinge. Acrostichal hairs in 8 rows, somewhat irregular, in front of dorsocentral bristles, 4 narrowing to 2 rows between dorsocentrals. Prescutellar bristles small. Ratio anterior : posterior dorsocentrals 0.65. Sterno-index 0.9. Anterior scutellar bristles long, divergent. Legs tan; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Translucent, slightly brownish. *C*-index, 3.6; 4*V*-index, 2.2; 5*X*-index, 1.8; *M*-index, 0.7. 3rd costal section with heavy setation on basal 0.4. Length, 2.7 mm.



Figs 47–52. Male external and internal genitalia. *47, 48, D. grossfieldi. 49, 50, D. collessi. 51, 52, D. rhabdote.*

Abdomen. Brown, darker posteriorly; anterior tergites paler centrally.

Male genitalia (Figs 47, 48). Clasper small; aedeagus not bifid, without ornamentation; hypandrium with 2 pairs of submedian spines.

Distribution

South-western Western Australia.

Specimens Examined

Western Australia: 2, same data as paratype; 1, Nornalup, 8.x.1970, D. H. Colless; 1, Channybearup, near Pemberton, 5.x.1970, D. H. Colless; 1, 7 miles N. by E. of Pemberton, 5.x.1970, D. H. Colless; 1, Pimelia, near Pemberton, 5.x.1970, D. H. Colless; 2, 9 miles W. of Pemberton, 4.x.1970, D. H. Colless; 1, 6 miles N. of Walpole, 7.x.1970, D. H. Colless. All specimens in ANIC.

Special Comments

The genitalia of this species distinguish it from *inornata*; the two species differ to a small extent in wing indices, but are otherwise virtually inseparable on external morphology. The male genitalia of *grossfieldi* in fact resemble those of the following species, *D. collessi*, sp. nov., much more closely than those of *inornata*, even though *grossfieldi* and *collessi* are clearly separable by reference to several external morphological features. There can be little doubt that the three species are very closely related.

46. *Drosophila* (*Scaptodrosophila*) *collessi*, sp. nov.

Types

Holotype ♂ in ANIC: Bola Creek, Royal National Park, New South Wales, 25.ix.1961, D. H. Colless. Paratype ♂ in ANIC: Rutherford Creek, Brown Mountain, New South Wales, 9.viii.1962, D. H. Colless.

Distinguishing Features

Carina vestigial. Body brown. Wings with strong greyish to brownish tinge. Rather similar to *inornata* but distinguished by coloration and by additional rays of arista.

Description

Body length. 2.7 mm.

Head. Arista with 4 branches above and 2 below plus terminal fork. Front 1.3 times broader than long, mid-brown, darker centrally; silveriness within ocellar triangle, slightly about bases of orbital bristles. 2nd and 3rd antennal segments concolorous with front. Carina consisting only of rudimentary ridge between antennal bases. Cheek linear, widened and almost squared posteriorly, greatest width 0.2 times greatest diameter of eye. Orbital bristles in ratio 3 : 1 : 4; anterior reclinate orbital fine, posterolateral to proclinate orbital. Eyes bare.

Thorax. Mesonotum and scutellum mid-brown, slightly darker in patches, with weak whitish pollinosity at certain angles of illumination. Pleura dark brown with faint greenish tinge. Acrostichal hairs in 6 rows in front of dorsocentral bristles, 2 rows between dorsocentrals. Prescutellar bristles weak. Ratio anterior : posterior dorsocentrals 0.6. Sterno-index 0.8. Legs pale brown; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Translucent, with strong tinge, greyish in living flies, brownish in pinned specimens. *C*-index, 2.5; 4*V*-index, 2.6; 5*X*-index, 3.2; *M*-index, 1.0. 3rd costal section with heavy setation on basal 0.4. Length, 2.8 mm.

Abdomen. Unicolorous mid-brown, subshining, with greenish tinge on 1st and 2nd tergites.

Male genitalia (Figs 49, 50; from paratype). Hypandrium with 2 pairs of submedian spines, outer bristles considerably longer than inner bristles.

Distribution

South-eastern Australia.

Specimens Examined

Queensland: 1, Cunningham's Gap, 2484 ft, 1–2.vi.1966, Z. Liepa. **New South Wales:** 1, Rutherford Creek, Brown Mountain, 11.xi.1961, D. H. Colless; 3, Monga, 19.vii.1962, D. H. Colless; 1, Bola Creek, Royal National Park, 25.ix.1961, D. H. Colless; 1, Mt Wilson, 3.vii.1961, D. H. Colless; 2, Palm Creek, Royal National Park, 3.i.1962, 22.vii.1963, D. H. Colless; 1, Clyde Mountain, 22.ii.1965, D. H. Colless; 1, 4 miles N. of Bateman's Bay, 14.x.1965, Z. Liepa; 1, Upper Allyn River, 14.ii.1968, D. H. Colless; 1, 5 miles S. of Monga, 8.v.1968, Colless and Liepa; 3, Brockelos Creek, 16.5 km S. of Bermagui, 22.v.1973, 24–27.ii.1974, Z. Liepa; 3, Wallaga Lake, Bermagui, 21.vii.1973, 24–27.ii.1974, Z. Liepa; 1, Rotart Lookout, 23 km NW. of Milton, 9.ii.1974, Z. Liepa. **Victoria:** 1, Mt Dom Dom, 22.x.1961, D. H. Colless; 1, 8.5 km SE. of Genoa, 4.viii.1973, Z. Liepa. **Tasmania:** 1, Birralee, 27.x.1961, N. Dobrotworsky. All above specimens in ANIC. Several live flies sighted from Victorian collections made by P. A. Parsons.

47. *Drosophila* (*Scaptodrosophila*) *rhabdote*, sp. nov.

Types

Holotype ♀ in AM: Marakoopa Caves near Mole Creek, Tasmania, 10.i.1960, D. K. McAlpine. Paratype ♂ in AM: Templestowe, Victoria, 22.x.1973, G. Prince (specimen pinned ex alcohol).

Distinguishing Features

Carina absent. Arista similar to that of *inornata*. Anterior reclinate orbital bristle anterior to proclinate orbital. Mesonotum pale with broad dark median longitudinal stripe.

Description

Body length. 3.3 mm.

Head. Arista with 3 rays above and 1 below plus very small terminal fork; 1st (basal) dorsal ray long, curved; 2nd and 3rd dorsal rays progressively shorter towards apex of arista. Front 1.4 times broader than long, pale tan about bases of orbital and vertical bristles, dark with superimposed silveriness within and immediately about ocellar triangle, otherwise mid-brown. 2nd antennal segments pale to mid-brown; 3rd blackish. Carina absent. Cheek curved, rather broad along entire length, greatest width 0.2 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 2 : 1 : 3; anterior reclinate orbital anterolateral to proclinate orbital.

Thorax. Area within median 4 rows of acrostichals a dark brown stripe extending on to scutellum and continuing to its apical margin, posterior scutellar bristles lying at lateral extremities of stripe; thoracic dorsum including scutellum lateral to

median stripe pale tan, with further narrow dark stripes anteriorly at levels of dorsocentral bristles. Pleura brown, diffusely darker in patches. Acrostichal hairs in 8 rows, somewhat irregular, in front of dorsocentral bristles, 2–4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Sterno-index 0.8. Legs pale tan; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Hyaline, with slight darkenings along crossveins. *C*-index, 3.5; 4*V*-index, 2.4; 5*X*-index, 1.6; *M*-index, 0.75. 3rd costal section with heavy setation on basal 0.3. Length, 2.9 mm.

Abdomen. Tergites pale (faint posterior dark bands evident on specimen preserved in alcohol).

Male genitalia (Figs 51, 52). Clasper small; aedeagus not bifid, without ornamentation.

Distribution

South-eastern Australia.

Specimens Examined

Victoria: 1, Pirron Yallock, 8 miles W. of Colac, 1.i.1967, Z. Liepa (ANIC); 1, Fernshaw, near Healesville, 19.i.1966, D. K. McAlpine (AM). **Tasmania:** 2, near Russell Falls, Mount Field National Park, 13.i.1960, D. K. McAlpine (AM). **South Australia:** 2, 12 miles NW. of Millicent, 30.xii.1966, Z. Liepa (ANIC); 1, Moorlands, 8.viii.1968, Colless and Liepa (ANIC).

48. *Drosophila* (*Scaptodrosophila*) *nicholsoni* Malloch

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

Distinguishing Features

Carina absent. Arista with only 1 dorsal ray. Mesonotum mid-brown with pale longitudinal stripes.

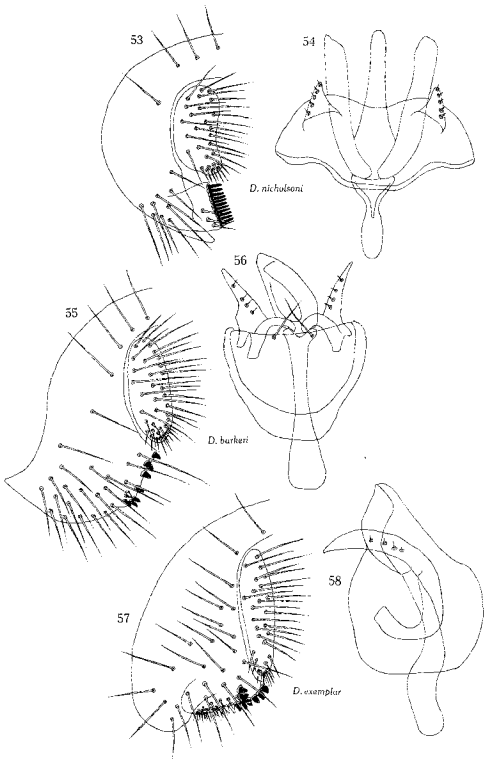
Description

Body length. c. 2.9 mm.

Head. Arista consisting only of axis with few minute hairs along its length, plus 1 long basal dorsal ray strongly curved anteriorly. Front 1.1 times broader than long, tan anteriorly to dark brown posteriorly, broad areas about bases of orbital and vertical bristles, and ocellar triangle, pale whitish. 2nd antennal segments tan; 3rd dusky. Carina absent. Cheek linear, greatest width 0.2 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 2 : 1 : 3; anterior reclinate orbital anterolateral to proclinate orbital.

Thorax. Mesonotum mid-brown with pale longitudinal stripes not clearly demarcated from darker areas: narrow 'stripe' between middle 2 rows of acrostichals, and 2 broader 'stripes' laterally on each side becoming fainter posteriorly. Scutellum entirely mid-brown, slightly paler at margins in some specimens. Pleura mid-brown. Acrostichal hairs in *c.* 8 rows, irregular, in front of dorsocentral bristles, 4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Sterno-index 0.8. Legs tan; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Hyaline. *C*-index, *c.* 3.4; 4*V*-index, *c.* 2.2; 5*X*-index, *c.* 1.8; *M*-index, *c.* 0.7. 3rd costal section with heavy setation on basal 0.35. Length, *c.* 3.2 mm.



Figs 53–58. Male external and internal genitalia. *53, 54, D. nicholsoni. 55, 56, D. barkeri. 57, 58, D. exemplar.*

Abdomen. Uniformly mid-brown.

Male genitalia (Figs 53, 54). Aedeagus slender, not bifid, without ornamentation.

Distribution

South-western Western Australia.

Specimens Examined

Western Australia: 1, Crawley, 3.v.1934, K. R. Norris; 1, Fremantle, 29.vii.1934, K. R. Norris; 4, Nedlands, light trap, 5.viii.1960, 26.viii–2.ix.1960, E. Holm; 1, Toodyay, 14.x.1970, D. H. Colless; 1, Bridgetown, 29.viii.1926, Nicholson; 6, Pemberton, 28.viii.1926, Nicholson; 1, Pemberton, at light, 28.viii.1969, K. R. Norris; 2, 3 miles NE. of Pimelia, near Pemberton, 5.x.1970, D. H. Colless; 1, Pimelia, near Pemberton, 5.x.1970, D. H. Colless; 1, Channybearup, near Pemberton, 5.x.1970, D. H. Colless; 1, Kojonup, 18.viii.1960, E. Holm; 2, Porongurup National Park, 11.x.1970, D. H. Colless; 1, Stirling Range, 26.iii.1968, I. F. B. Common and M. S. Upton; 2, 10 miles N. of Albany, 27.iii.1968, I. F. B. Common and M. S. Upton. All specimens in ANIC.

Species the Male Genitalia of which Lack True Claspers

The following seven species are distinguished in each case by the structure of the male external genitalia. The large teeth which in other species of this subgenus occur on a separate clasper are in these species situated along the posterior margin of the genital arch; a separate clasper is entirely absent, or in a few cases represented by a poorly differentiated extension from the genital arch bearing few teeth. All species are of brownish coloration.

49. *Drosophila* (*Scaptodrosophila*) *barkeri*, sp. nov.

Types

Holotype ♀ in AM: Otford, New South Wales, 18.i.1964, D. K. McAlpine. Paratype ♂ in AM: Upper Allyn near Eccleston, New South Wales, 9.iii.1970, D. K. McAlpine and G. A. Holloway.

Distinguishing Features

Body entirely tan; abdomen slender. Arista large. Carina prominent. *C*-index high.

Description

Body length. 3.9 mm.

Head. Arista with 4–5 branches above and 3 below plus terminal fork. Front tan; slight silveriness about bases of orbital and vertical bristles and ocellar triangle. 2nd and 3rd antennal segments tan. Carina large, broad above, only slightly widened below, rather flat anteriorly, lateral faces meeting anterior face at right angles, abruptly terminating below, thus appearing squared laterally and ventrally. Cheek almost linear, greatest width 0.2 times greatest diameter of eye. Eyes with very sparse fine pile. Orbital bristles in ratio 5 : 2 : 6; anterior reclinate orbital posterolateral to proclinate orbital.

Thorax. Uniformly pale brown. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 6 rows between dorsocentrals. Prescutellar bristles almost as long as anterior dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Sterno-index 0.7. Legs pale brown; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Translucent, with slight brownish tinge especially towards costal margin. *C*-index, 3.6; 4*V*-index, 1.7; 5*X*-index, 1.2; *M*-index, 0.5. 3rd costal section with heavy setation on basal 0.6. Length, 3.5 mm.

Abdomen. Uniformly pale brown, slender.

Male genitalia (Figs 55, 56). Clasper absent; posterior margin of genital arch with few short thick rounded teeth; anterior parameres large; hypandrium with pair of small submedian spines.

Distribution

New South Wales and Victoria.

Specimens Examined

New South Wales: 1, Mt Gibraltar National Park (eastern scarp, 3000 ft), 24.ii.1965, D. K. McAlpine; 1, Mt Boyce, Blue Mountains, 16.iv.1971, D. K. McAlpine; 1, Otford, 18.i.1964, D. K. McAlpine; 1, Bruxner Park near Coffs Harbour, 21.ii.1965, D. K. McAlpine. Victoria: 2, Fernshaw near Healesville, 12.iv.1963, 19.i.1966, D. K. McAlpine. All specimens in AM.

50. *Drosophila* (*Scaptodrosophila*) *exemplar*, sp. nov.

Types

Holotype ♀ in AM: Rain forest, Iluka, Clarence River, New South Wales, 25.xi.1970, D. K. McAlpine. Paratype ♂ in ANIC: Deep Creek, Narrabeen, New South Wales, 28.xii.1961, D. H. Colless.

Distinguishing Features

Very similar to *barkeri*, distinguished from latter by slightly smaller carina, fewer rays of arista, different relative lengths of orbital bristles, and substantial differences in male genitalia.

Description

Body length. 3.3 mm.

Head. Arista with 3 rays above and 1 below plus terminal fork; dorsal rays curved forward apically. Front yellowish tan, silvery about bases of orbital and vertical bristles and ocellar triangle. 2nd and 3rd antennal segments tan. Carina prominent, nose-like, broadened below. Cheek linear, greatest width 0.2 times greatest diameter of eye. Eyes with extremely sparse, very fine pile. Orbital bristles in ratio 2 : 1 : 2; anterior reclinate orbital posterolateral to proclinate orbital. All bristles on head, and arista, slightly luteous.

Thorax. Mesonotum, scutellum and pleura tan; mesonotum with hint of slightly darker longitudinal stripe anteriorly between 2 median rows of acrostichals, and 2 further slightly wider stripes, 3 rows of acrostichals lateral to these on each side. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Prescutellar bristles 0.6 times length of anterior dorsocentrals. Sterno-index 0.7. All bristles on thorax slightly luteous. Legs tan; small preapical bristles on all tibiae; large apicals on 2nd tibiae only.

Wings. Translucent with brownish tinge. *C*-index, 3.1; 4*V*-index, 1.5; 5*X*-index, 1.2; *M*-index, 0.4. 3rd costal section with heavy setation on basal 0.5. Length, 3.1 mm.

Abdomen. Unicolorous yellowish brown.

Male genitalia (Figs 57, 58). Rudimentary clasper present, barely differentiated from posterior margin of genital arch, bearing several contiguous short broad teeth above and finer bristles below; anterior parameres very large.

Distribution

New South Wales.

Specimens Examined

New South Wales: 1, Ku-ring-gai Chase, Sydney, 28.viii.1960, D. H. Colless (ANIC); 1, 4 miles E. of Nimmitabel, 8.iii.1963, D. H. Colless (ANIC); 1, 20 miles Glen Innes to Grafton Highway, 20.iv.1970, D. H. Colless (ANIC); 1, 3.5 km S. of Bermagui, 25.ii.1974, Z. Liepa (ANIC); 2, Royal National Park, near Sydney, 13.viii.1971, D. K. McAlpine (AM); 2, Myall Lakes, 27.vi.1964, D. K. McAlpine (AM).

51. *Drosophila* (*Scaptodrosophila*) *minnamurrae*, sp. nov.

Types

Holotype ♀ in ANIC: Minnamurra Falls, New South Wales, 31.i.1962, D. H. Colless. Paratype ♂ in ANIC: same data as holotype.

Distinguishing Features

Head and thorax brown; abdomen black posteriorly, slender, tapered. Wings distinctly brownish. Carina smoothly rounded.

Description

Body length. 3.6 mm.

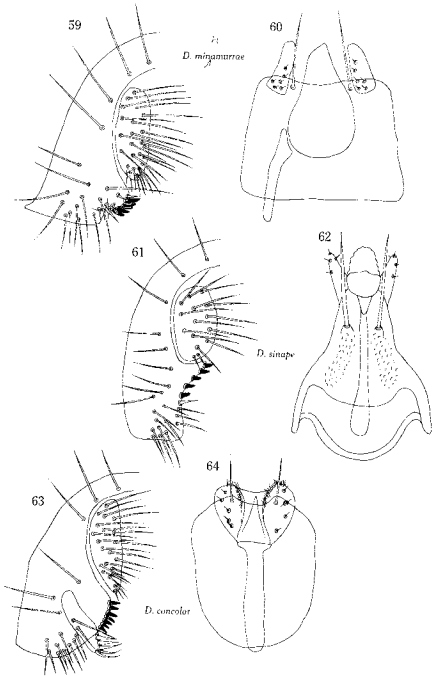
Head. Arista with 3 branches above and 2 below plus terminal fork. Front as broad as long, tan. 2nd antennal segments tan; 3rd slightly darkened. Carina prominent, nose-like, smoothly rounded. Cheek almost linear, widened and almost squared at posterior corner, greatest width 0.15 greatest diameter of eye. Eyes bare. Orbital bristles in ratio 5 : 2 : 6; anterior reclinate orbital posterolateral to proclinate orbital.

Thorax. Mesonotum, scutellum and pleura tan. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 6 rows between dorsocentrals. Basal scutellar bristles divergent. Ratio anterior : posterior dorsocentrals 0.6. Sterno-index 0.7. Legs pale tan; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Translucent, with uniform brownish tinge. *C*-index, 3.1; 4*V*-index, 1.7; 5*X*-index, 1.5; *M*-index, 0.5. 3rd costal section with heavy setation on basal 0.55. Length, 3.0 mm.

Abdomen. Tergite 2 tan anteriorly with narrow dusky band posteriorly; tergite 3 tan on anterior third darkening to dusky posteriorly; tergites 4–6 dusky black, abdomen generally darker posteriorly.

Male genitalia (Figs 59, 60). Unusually small; posterior margin of genital arch with convexity bearing several prominent contiguous teeth; hypandrium with pair of thin elongate submedian bristles; anterior parameres not unusually large (cf. preceding two species).



Figs 59–64. Male external and internal genitalia. *59, 60, D. minnamurrae. 61, 62, D. sinape. 63, 64, D. concolor.*

Distribution and Specimens Examined

Types from Minnamurra Falls, N.S.W.; two additional specimens only in ANIC, from Clyde Mountain and from Sheepstation Creek near Araluen, both in New South Wales.

52. *Drosophila* (*Scaptodrosophila*) *sinape*, sp. nov.

Types

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

Distinguishing Features

Body small, yellowish brown. Wings clear. Arista large. Carina prominent.

Description

Body length. 2.3 mm.

Head. Arista with 3 branches above and 2 below plus terminal fork. Front as broad as long, yellowish tan; slight silveriness about bases of orbital bristles, and infuscation posteriorly on either side of midline. 2nd and 3rd antennal segments tan. Carina prominent, bulbous. Cheek narrow, rounded, not widened posteriorly, greatest width less than 0.1 times greatest diameter of eye. Orbital bristles in ratio 2 : 1 : 2; anterior reclinate orbital posterolateral to proclinate orbital. Eyes bare. All bristles on head slightly luteous.

Thorax. Uniformly mustard yellowish. Acrostichal hairs in 8 rows in front of dorsocentral bristles, *c.* 4 irregular rows between dorsocentrals. Prescutellar bristles almost as large as anterior dorsocentrals. Ratio anterior : posterior dorsocentrals 0.5. Sterno-index 0.7. Legs pale tan; preapical bristles on all tibiae; apicals on 2nd tibiae only. All thoracic bristles slightly luteous.

Wings. Hyaline. *C*-index, 3.0; 4*V*-index, 2.0; 5*X*-index, 2.2; *M*-index, 0.7. 3rd costal section with heavy setation on basal 0.6. Length, 1.6 mm.

Abdomen. Entirely yellowish tan, gradually tapering posteriorly. All bristles slightly luteous.

Male genitalia (Figs 61, 62; from paratype). Posterior margin of genital arch with few short thick teeth, not contiguous; hypandrium narrowed dorsally, with pair of large submedian bristles; apical margin of aedeagus slightly serrate.

Distribution and Specimens Examined

Types from Earl Hill, north Queensland; 1 additional specimen only in ANIC from Bramston Beach, near Innisfail in north Queensland (rain-forest fringe).

53. *Drosophila* (*Scaptodrosophila*) *concolor*, sp. nov.

Type

Holotype ♂ in AM: Claudie River near Mt Lamond, Queensland, 29.v.1966, D. K. McAlpine.

Distinguishing Features

Body pale tan. All bristles and hairs, and aristae, yellowish. Eyes large, oval, with strong pile.

Description

Body length. 2.3 mm.

Head. Arista with 3 branches above and 2 below plus terminal fork. Front 0.8 as broad as long, pale tan; slight silveriness within ocellar triangle. 2nd and 3rd antennal segments pale tan. Carina well developed, rather nose-like, broadened and more protuberant below, flat. Cheek linear anteriorly, curved posteriorly, greatest width 0.1 times greatest diameter of eye. Eyes with dense pile. Orbital bristles in ratio 2 : 1 : 2; anterior reclinate orbital midway between proclinate and posterior reclinate, very slightly lateral to line joining latter.

Thorax. Uniformly pale tan. Acrostichal hairs in 8 rows in front of dorsocentral bristles, *c.* 6 rows between dorsocentrals. Prescutellar bristles as large as anterior dorsocentrals; acrostichal hair on each side lateral to prescutellar somewhat enlarged. Ratio anterior : posterior dorsocentrals 0.5. Sterno-index 0.9. Legs pale tan; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Hyaline. *C*-index, 2.3; 4*V*-index, 2.0; 5*X*-index, 1.3; *M*-index, 0.5. 3rd costal section with heavy setation on basal 0.65. Length, 2.1 mm.

Abdomen. Uniformly pale tan.

Male genitalia (Figs 63, 64). Posterior margin of genital arch with row of stout contiguous teeth; small clasper-like process present on genital arch but main clasping teeth as above; aedeagus small, apically flat; submedian bristles present on hypandrium.

Distribution and Specimens Examined

Holotype from Claudie River, north Queensland; 19 from Speewah Rd, 5 miles S. of Kuranda, Qld, 12.i.1967, D. K. McAlpine and G. Holloway; 19 from Mulgrave River 4 miles W. of Gordonvale, Qld, 31.xii.1966, D. McAlpine and G. Holloway. All in AM.

Special Comments

This species is rather similar to *D. scaptomyzoidea* (p. 92) but the latter species possesses a true clasper in the male external genitalia.

54. ***Drosophila* (*Scaptodrosophila*) *mulgravei*,** sp. nov.

Types

Holotype ♂ in AM: Mulgrave River, 4 miles W. of Gordonvale, Queensland, 31.xii.1966, D. McAlpine and G. Holloway. Paratype ♂ in AM: same data as holotype except date 1.i.1967.

Distinguishing Features

Body pale brown; abdominal tergites with hint of posterior bands. Carina prominent. Arista large. Wings clear.

Description

Body length. 2.3 mm.

Head. Arista with 3 branches above and 2 below plus large terminal fork. Front slightly longer than broad, tan, slightly silvery about bases of orbital and vertical bristles and ocellar triangle. 2nd antennal segments tan; 3rd slightly dusky. Carina prominent, nose-like, rounded, broadened below. Cheek almost linear, not widened at posterior corner, greatest width 0.1 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 2 : 1 : 2; anterior reclinate orbital posterolateral to proclinate orbital.

Thorax. Uniformly tan. Acrostichal hairs in *c.* 8 somewhat irregular rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.45. Sterno-index 0.7. Legs tan; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Hyaline. *C*-index, 2.3; 4*V*-index, 2.2; 5*X*-index, 1.9; *M*-index, 0.7. 3rd costal section with heavy setation on basal 0.5. Length, 2.1 mm.

Abdomen. Rather plump; tergites tan with hint of thin posterior brown bands.

Male genitalia (Figs 65, 66; from paratype). Posterior margin of genital arch with few thick teeth; aedeagus apically enlarged, rounded; hypandrium with prominent submedian spines; anterior parameres large, with medial tufts of hairs.

Distribution

Known only from types and additional female in AM, all from Mulgrave River in north Queensland.

55. *Drosophila* (*Scaptodrosophila*) *nimia*, sp. nov.

Type

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

Distinguishing Features

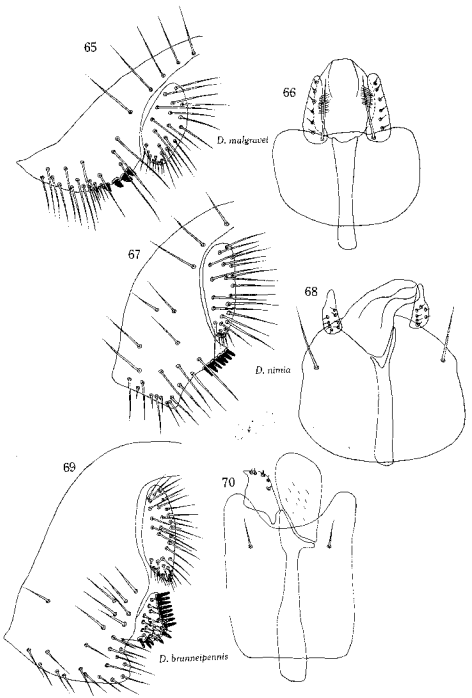
Body entirely pale to mid-brown; wings with brownish tinge. Arista large. Carina nose-like. Cheek narrow. 3rd costal section of wing with heavy setation on basal 0.8.

Description

Body length. 3.0 mm.

Head. Arista with 4 apically curved branches above and 3 straight branches below plus terminal fork. Front as broad as long, tan; slight silveriness about bases of orbital and vertical bristles and within ocellar triangle. 2nd antennal segments tan; 3rd slightly dusky. Carina nose-like, rather flat. Cheek narrow, slightly curved, greatest width less than 0.1 times greatest diameter of eye. Eyes large, oval, bare. Orbital bristles in ratio 4 : 2 : 5; anterior reclinate orbital posterolateral to proclinate orbital.

Thorax. Uniformly mid-brown. Acrostichal hairs in 8 rows in front of dorsocentral bristles, *c.* 6 rows between dorsocentrals. Prescutellar bristles large. Ratio



Figs 65–70. Male external and internal genitalia. *65, 66, D. malgravei. 67, 68, D. nimia. 69, 70, D. brunnelpennis.*

anterior : posterior dorsocentrals 0.65. Sterno-index 0.7. Legs concolorous with thorax; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Translucent with brownish tinge. *C*-index, 3.1; 4*V*-index, 1.6; 5*X*-index, 1.6; *M*-index, 0.5. 3rd costal section with heavy setation on basal 0.8. Length, 2.4 mm.

Abdomen. Tapered posteriorly; all tergites tan with narrow slightly darker apical bands of uniform width.

Male genitalia (Figs 67, 68). Upper part of posterior margin of genital arch with row of contiguous teeth; hypandrium with widely separated bristles.

Distribution and Specimens Examined

Holotype from near Little Mulgrave in north Queensland; one additional ♂ only from 10 miles S. of Daintree, Queensland, 25.iv.1967, D. H. Colless, in ANIC.

Drosophila brunneipennis and Similar Species

The following three large brown species possess prominent carinas and wings with distinct brownish tinges. Certain similarities are also present in the structure of the male genitalia.

56. *Drosophila* (*Scaptodrosophila*) *brunneipennis* Malloch

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

Distinguishing Features

Body large, brown. Wings strongly brownish. Carina large, broad, flattened, almost squared laterally and ventrally.

Description

Body length. c. 4.5 mm.

Head. Arista with 4–5 branches above and 2–3 below plus terminal fork; rays long, apically curved. Front as broad as long, deep tan; slight silveriness about bases of orbital and vertical bristles, ocellar triangle distinctly silvery. 2nd and 3rd antennal segments tan, 3rd slightly dusky anteriorly. Carina very large, broad above, broader below, flat, almost squared laterally and ventrally. Cheek slightly curved, broader towards posterior corner; greatest width 0.2 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 3 : 1 : 3; anterior reclinate orbital posterolateral to proclinate orbital.

Thorax. Uniformly brown. Acrostichal hairs in 8 rows in front of dorsocentral bristles, *c.* 4 rows between dorsocentrals. Prescutellar bristles large. Ratio anterior : posterior dorsocentrals 0.5. Sterno-index 0.7. Propleural bristle large. Legs tan; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Translucent with strong brownish tinge, darker towards costal margin and along posterior crossvein. *C*-index, *c.* 3.0; 4*V*-index, *c.* 1.5; 5*X*-index, *c.* 1.0; *M*-index, *c.* 0.3. 3rd costal section with heavy setation on basal 0.5–0.6. Length, *c.* 3.8 mm.

Abdomen. Tergites tan; dark posterior bands evident in some specimens, colour evidently not preserving well in pinned flies.

Male genitalia (Figs 69, 70). Genital arch broad ventrally; anal plate small; clasper with many teeth; hypandrium with pair of small widely separated bristles.

Female genitalia. Egg guides apically pointed, with long hairs.

Distribution

South-eastern Australia.

Specimens Examined

New South Wales: 1, Narooma, 25.xi.1930, A. L. Tonnoir (ANIC); 1, Rutherford Creek, Brown Mountain, 15.iii.1961, D. H. Colless (ANIC); 2, 4–5 miles S. of Monga, 8.v.1968, Colless and Liepa (ANIC); 1, New England National Park, 500 ft, 11.ii.1968, K. R. Norris (ANIC); 1, Otford, 18.i.1964, D. K. McAlpine (AM); 1, Mt Wilson, Blue Mountains, 10.i.1963, D. K. McAlpine (AM). **Australian Capital Territory:** 3, Blundell's, 21.i.1931, A. L. Tonnoir (ANIC). **Victoria:** 3, Mt Beauty, 21.x.1961, D. H. Colles (ANIC); 1, Kinglake, 18.vii.1964, D. H. Colless (ANIC).

57. *Drosophila* (*Scaptodrosophila*) *notha*, sp. nov.

Types

Holotype ♂ in ANIC: Ku-ring-gai Chase, near Sydney, New South Wales, swept from grass, 28.viii.1960, D. H. Colless. Paratype ♀ in ANIC: Geehi River, New South Wales, 9.xi.1961, D. H. Colless.

Distinguishing Features

Body large, brown. Wings brownish. Carina large. Very similar to *brunneipennis*, distinguished from latter by slightly smaller and less squared carina and considerably different genitalia.

Description

Body length. 4.3 mm.

Head. Arista with 3 apically curved branches above and 2 straight branches below plus terminal fork. Front as broad as long, tan. 2nd and 3rd antennal segments tan, 3rd slightly dusky apically. Carina large, broad above, slightly broader below, rather flat, almost squared at lateral margins but narrowed and tapering more gradually to clypeal margin below broadest ventral part. Cheek almost linear, broad, greatest width 0.2 times greatest diameter of eye. Eyes with very sparse, very fine pile. Orbital bristles in ratio 7 : 3 : 8; anterior reclinate orbital posterolateral to proclinate orbital.

Thorax. Uniformly brown. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Prescutellar bristles large. Ratio anterior : posterior dorsocentrals 0.7. Anterior scutellar bristles long, straight, divergent. Sterno-index 0.8. Legs pale tan; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Translucent, with strong brownish tinge slightly stronger along posterior crossvein. *C*-index, 3.3; 4*V*-index, 1.5; 5*X*-index, 1.1; *M*-index, 0.4. 3rd costal section with heavy setation on basal 0.6. Length, 3.6 mm.

Abdomen. Pale brown with hint of posterior dark bands.

Male genitalia (Figs 71, 72). Clasper indented in middle region, with small teeth above and below; hypandrium with submedian spines; aedeagus bare; anterior parameres small.

Female genitalia. Egg guides apically rounded with marginal rows of closely packed strong teeth.

Distribution

South-eastern Australia.

Specimens Examined

New South Wales: 1, same data as holotype (ANIC); 1, same data as paratype (ANIC); 1, Manly Reservoir, Sydney, 16.x.1960, D. H. Colless (ANIC); 1, 15 miles N. of Putty, 15.x.1962, D. H. Colless (ANIC); 1, Mt Elliot, NE. Gosford, 30.xii.1968, Z. Liepa (ANIC); 1, Leather Barrel Creek, Kosciusko, 9.xi.1961, D. H. Colless (ANIC); 1, Spencer's Creek, Kosciusko, 9.xi.1961, D. H. Colless (ANIC); 2, National Park, 6.vii.1966, D. K. McAlpine (AM); 1, Mt Kaputar near Narrabri, 4000 ft, 11.xi.1964, D. K. McAlpine (AM). **Australian Capital Territory:** 1, Blundell's, 18.ii.1931, A. L. Tonnoir (ANIC). **Victoria:** 1, Mayer's Creek near Healesville, 18.vii.1964, D. H. Colless (ANIC); 1, Fernshaw, near Healesville, 12.iv.1963, D. K. McAlpine (AM).

58. *Drosophila* (*Scaptodrosophila*) *adelphe*, sp. nov.

Types

Holotype ♂ in ANIC: Wootton, north coast of New South Wales, 10.x.1962, D. H. Colless. Paratype ♀ in ANIC: Palm Creek, Royal National Park, New South Wales, 2.i.1962, D. H. Colless.

Distinguishing Features

Body large, mid-brown; abdominal tergites banded. Wings brownish. Carina large. Similar to preceding 2 species, distinguished from both by much narrower cheek and more numerous rays of arista.

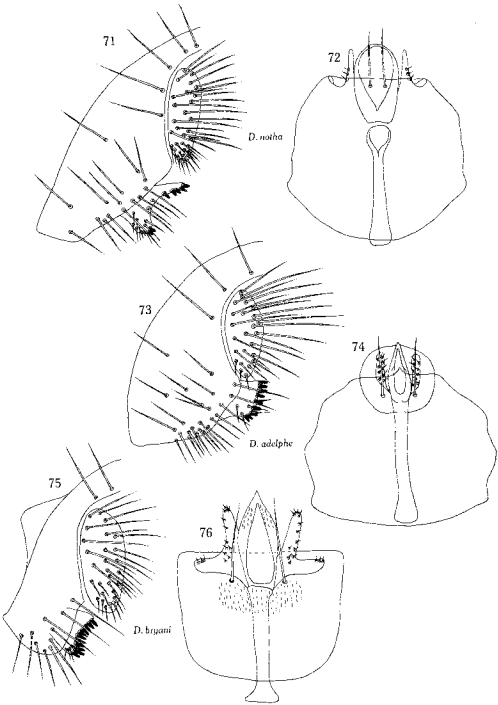
Description

Body length. 3.5 mm.

Head. Arista with 5 rays above and 4 below (3 in paratype) plus terminal fork. Frontal breadth slightly less than length; front deep tan with slight silveriness about bases of orbital and vertical bristles and borders of ocellar triangle, latter darkened within. 2nd and 3rd antennal segments brown, 3rd slightly dusky apically. Carina prominent, narrow above, gradually broadening below, flat, almost squared laterally and ventrally (rather similar to carina of *brunneipennis* but latter considerably broader above). Cheek curved, narrow, greatest width less than 0.1 times greatest diameter of eye. Eyes with fine sparse pile. Orbital bristles in ratio 3 : 1 : 3; anterior reclinate orbital posterolateral to proclinate orbital.

Thorax. Uniformly mid-brown. Acrostichal hairs in 8 rows in front of dorsocentral bristles, *c.* 6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Sterno-index 0.7. Legs pale brown; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Translucent with brownish tinge. *C*-index, 3.4; 4*V*-index, 1.8; 5*X*-index, 1.7; *M*-index, 0.6. 3rd costal section with heavy setation on basal 0.75. Length, 3.0 mm.



Figs 71–76. Male external and internal genitalia. *71, 72, D. notha. 73, 74, D. adelphe. 75, 76, D. bryani.*

Abdomen. Tergites mid-brown with darker posterior bands of uniform width, not interrupted in midline.

Male genitalia (Figs 73, 74). Anal plate with unusually long bristles; clasper small, with marginal teeth; aedeagus greatly expanded apically; anterior parameres small; hypandrium with prominent submedian spines.

Female genitalia. Egg guides apically pointed, with long hairs.

Distribution

Known only from type specimens.

Drosophila bryani and Sibling Species

The following two species are very similar. *D. bryani* is one of the better known species of the subgenus *Scaptodrosophila*, having a relatively wide distribution; the sibling species is, in contrast, new and known from only two specimens.

59. *Drosophila* (*Scaptodrosophila*) *bryani* Malloch

Drosophila bryani Malloch, 1934, p. 310. (Holotype in BM; type locality Samoa.)
Drosophila levis Mather, 1955, p. 561. (Holotype in AM; type locality Maroochydore, Qld.)

Distinguishing Features

Body small, brown. Carina well developed. Basal scutellar bristles short. *C*-index low.

Description

Body length. c. 2.0 mm.

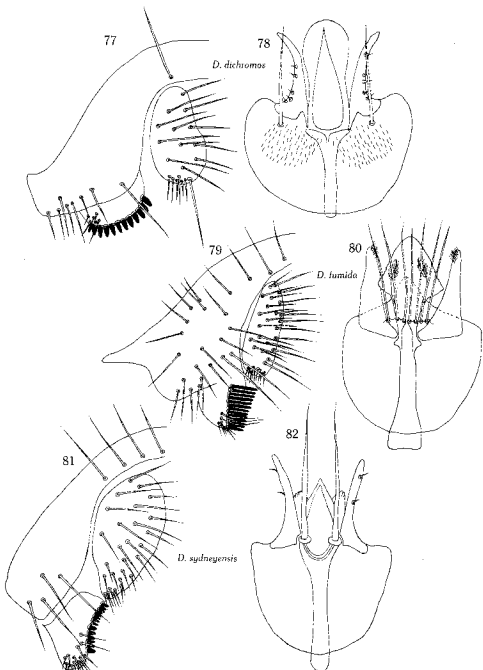
Head. Arista with 4 branches above and 2 below plus terminal fork. Front about as broad as long, tan, periorbits and ocellar triangle silvery. 2nd antennal segments tan; 3rd dusky anteriorly. Carina prominent but narrow, flat. Cheek curved, not greatly widened at posterior corner, greatest width just over 0.1 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 3 : 1 : 3; anterior reclinate orbital lateral and slightly posterior to proclinate orbital.

Thorax. Mesonotum and scutellum mid-brown; pleura darker. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 6 rows between dorsocentrals. Prescutellar bristles relatively long but thin. Ratio anterior : posterior dorsocentrals 0.7. Basal scutellar bristles 0.6 length of apicals. Sterno-index 0.8. All bristles on thorax with slight luteous tinge. Legs pale brown; preapical bristles on all tibiae; apicals on 1st and 2nd tibiae.

Wings. Hyaline. *C*-index, *c.* 1.7; 4*V*-index, *c.* 2.1; 5*X*-index, *c.* 2.5; *M*-index, *c.* 0.8. 3rd costal section with heavy setation on basal 0.75. Length, *c.* 2.1 mm.

Abdomen. Tergites 1–3 with narrow anterior submedian tan patches, otherwise black; remaining tergites entirely black.

Male genitalia (Figs 75, 76). Clasper large; aedeagus apically pointed; anterior parameres bifid; hypandrium with prominent submedian spines.



Figs 77–82. Male external and internal genitalia. *77, 78, D. dichromos. 79, 80, D. fumida. 81, 82, D. sydneyensis.*

Distribution

Wheeler and Takada (1964) give the distribution of *bryani* as 'Samoa, Australia, Philippines, Micronesia (Guam)'. Within Australia the species appears to be restricted to northern and southern Queensland (Mather 1955) and the Northern Territory (two specimens in ANIC: 8 km SW. by S. of Oenpelli Mission; and Koongarra, 15 km E. of Mt Cahill). The species is attracted to fruit baits.

60. ***Drosophila* (*Scaptodrosophila*) *dichromos***, sp. nov.

Type

Holotype ♂ in ANIC: Upper Mulgrave River, 10 miles Goldsborough Rd, Queensland, 9.v.1967, D. H. Colless.

Distinguishing Features

Very similar to *bryani*, distinguished from latter by longer anterior scutellar bristles.

Description

Body length. 1.7 mm.

Head. Arista with 4 branches above and 2 below plus terminal fork. Front about as broad as long, greyish brown, areas about bases of orbital and vertical bristles, and ocellar triangle, blackish with superimposed silveriness. 2nd antennal segments tan; 3rd brown, darkened anteriorly. Carina very similar to that of *bryani*, prominent but narrow and flattened. Cheek curved, not widened posteriorly, greatest width 0.1 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 5 : 2 : 5; anterior reclinate orbital posterolateral to proclinate orbital.

Thorax. Mesonotum, scutellum and pleura mid to dark brown. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 6 rows between dorsocentrals. Sterno-index 0.5; anterior sternopleural bristle thin. Ratio anterior : posterior dorsocentrals 0.4. Anterior scutellar bristles about as long as posteriors. Legs mid-brown; preapical bristles on all tibiae; apicals evident on 2nd tibiae only.

Wings. Hyaline. *C*-index, 1.7; 4*V*-index, 2.4; 5*X*-index, 2.8; *M*-index, 0.85. 3rd costal section with heavy setation on basal 0.7. Length, 1.5 mm.

Abdomen. Uniformly black.

Male genitalia (Figs 77, 78). Clasper with very prominent large teeth; aedeagus apically rounded; hypandrium with pair of long widely separated bristles; clasper (in addition to genital arch and anal plate) micropubescent.

Distribution and Specimens Examined

Holotype from Upper Mulgrave River in northern Queensland; another ♂, Bamboo Creek, near Miallo, N. of Mossman, Qld, 25.iv.1967, D. H. Colless (ANIC).

Special Comments

The following differences in structures of male genitalia distinguish this species from *bryani*: the clasper is micropubescent in *dichromos* but not in *bryani*; the aedeagus of *bryani* possesses subapical adornment which is lacking in that of *dichromos*; the micropubescence surrounding the large submedian spines on the

hypandrium of *dichromos* is more extensive than that of bryani; the aedeagus of *dichromos* is apically rounded while that of *bryani* is pointed; the anterior parameres of *bryani* are bifid while those of *dichromos* are not; and the entire genitalia are black in *dichromos* but mainly brown in *bryani*.

Remaining Species

The following remaining species of the subgenus *Scaptodrosophila* are described without comment or speculation on their possible relationships within the subgenus.

61. ***Drosophila (Scaptodrosophila) fumida*** Mather

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

Distinguishing Features

Wings patterned (Fig. 83). Thorax dark brown with pale anterior patches. Abdomen dark brown to black.

Fig. 83. *D. fumida*, wing.

Description

Body length. *c.* 2.6 mm.

Head. Arista with 3 branches above and 2 below plus terminal fork. Front 1.4 times broader than long, mid-brown with irregular paler patches about bases of orbital and vertical bristles. Ocellar triangle blackish with superimposed white pollinosity. 2nd antennal segments mid-brown; 3rd brown posteriorly, dusky anteriorly. Carina brown, nose-like, smoothly rounded. Cheek curved, greatest width 0.15 times greatest diameter of eye. Eyes with fine pile. Orbital bristles in ratio 5 : 2 : 6; anterior reclinate orbital lateral and slightly posterior to proclinate orbital. Postvertical bristles large, crossed.

Thorax. Mesonotum basically dark brown with paler markings: 2 submedian streaks extending back almost to level of anterior dorsocentral bristles, and few additional streaks lateral to these, with greenish tinge in pinned specimens; pale spot between members of each pair of dorsocentral bristles; and small pale spot on each side at medial limits of transverse suture. Scutellum dark brown, lateral edges

paler. Pleura dark brown. Halteres pale tan. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 2-4 rows between dorsocentrals. Prescutellar acrostichals only slightly enlarged. Ratio anterior : posterior dorsocentrals 0.65. Sterno-index 0.8. Middle sternopleural bristle small. Anterior scutellar bristles divergent. Legs pale to mid-brown; fore and hind femora rather plump, mid femora slender; pre-apical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Hyaline with brown markings (Fig. 83). *C*-index, *c.* 2.6; 4*V*-index, *c.* 2.4; *SX*-index, *c.* 1.3; *M*-index, *c.* 0.8. 3rd costal section with heavy setation on basal 0.3. Length, *c.* 3.0 mm.

Abdomen. Uniformly dark brown.

Male genitalia (Figs 79, 80). Genital arch micropubescent, anal plate without micropubescence; clasper with long contiguous teeth; hypandrium with *c.* 7 long bristles; anterior parameres large, with apical pubescence.

Distribution

Widespread in southern Australia; recorded by Mather (1960) from south-western Western Australia, Tasmania and several localities in New South Wales; recorded from South Australia by Angus (1972); collected about Melbourne by G. Prince. The species is attracted to fruit baits; the Melbourne flies were found to be relatively abundant and were breeding in decaying apples in an orchard. Specimens pinned ex culture deposited in ANIC.

Special Comments

In lacking strong prescutellar bristles and a large middle sternopleural bristle, *D. fumida* is not immediately obviously a *Scaptodrosophila*; however, it possesses the characteristic single vibrissa, propleural bristle and micropubescent genital arch.

G. *Phortica*

62. ***Drosophila* (*Scaptodrosophila*) *albostriata*** Malloch

Drosophila albostriata Malloch, 1924, p. 352. (Holotype in AM; type locality Eidsvold, Qld.)

Distinguishing Features

Mesonotum dark brown with 2 longitudinal shiny white stripes. Head with 2 white stripes; much of occiput silvery. Carina prominent, black.

Description

Body length. c. 2.9 mm.

Head. Arista with 3 branches above and 2 below plus terminal fork. Front very slightly narrower than long, rich rufous brown (slightly darker posteriorly in some specimens) with shiny white periorbital stripes slightly narrowing posteriorly. Small patches about bases of vertical bristles dark brown; ocellar triangle shiny black. 2nd and 3rd antennal segments pale brown. Carina and clypeal margin black; carina well developed, narrow above, considerably broadened below, slightly convex, gradually falling away to clypeal margin. Cheek tan, curved, greatest width 0.2 times greatest diameter of eye. Eyes elongate, with short pile. Posterolateral margins of head with well developed bristles. Orbital bristles in ratio 8 : 2 : 7; anterior reclinate orbital fine, posterior and slightly lateral to proclinate orbital. Postvertical bristles small. Occiput with large silvery areas.

Thorax. Dark brown with shiny white areas: 2 submedian dorsal stripes extending from anterior margin on to lateral margins of scutellum and reaching halfway between bases of scutellar bristles; acrostichals absent within stripes; scutellum with apical white spot; humeral areas of thorax with pale patches. Halteres tan. Acrostichal hairs relatively long, in 6 rows in front of dorsocentral bristles, 2-4 rows between dorsocentrals. Prescutellar bristles fine. Ratio anterior : posterior dorsocentrals 0.6. Anterior scutellars 0.55 length of posteriors. Sterno-index 0.8; middle sternopleural bristle minute. Legs brownish to straw-coloured; preapical bristles on 2nd and 3rd tibiae; apicals on 2nd tibiae only.

Wings. Hyaline, faintly brownish. *C*-index, *c.* 1.9; 4*V*-index, *c.* 3.0; 5*X*-index, *c.* 1.7; *M*-index, *c.* 0.8. 3rd costal section with heavy setation on basal 0.55. Length, *c.* 2.8 mm.

Abdomen. 2nd tergite pale tan centrally, dark brown laterally. Tergites 3–5 dark brown with small pale anterolateral patches. Tergite 6 dark brown.

Distribution

Eidsvold, Qld (Malloch 1924); two flies aspirated off tree-pear (*Opuntia tomentosa*) at Glen Elgin, Qld, by J. S. F. Barker, 1973; several specimens on one pin in ANIC, no locality label. All above flies females, males unknown to date.

Special Comments

Malloch (1924) doubted the position of this species in the genus *Drosophila*: the antennae of his specimens were all missing. The antennae on specimens available at present are typical of *Drosophila* – the species is, however, atypical in several other respects, possessing small postvertical bristles, short basal scutellars and minute middle sternopleurals. It is, however, a typical *Scaptodrosophila* in possession of prescutellar and propleural bristles and single vibrissae. Further clarification of the most appropriate systematic position of the species might be obtained when male genitalia are available for study.

63. *Drosophila* (*Scaptodrosophila*) *sydneyensis* Malloch

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

Distinguishing Features

Frons brown; thorax shiny black, halteres yellow; abdominal tergites mainly black, with strong posterior bristles. Carina well developed but narrow dorsally.

Description

Body length. c. 2.1 mm.

Head. Arista with 3 curved branches above and 2 straight branches below plus terminal fork. Front as broad as long, rufous brown anteriorly and between periorbits and ocellar triangle; areas about bases or orbital and vertical bristles, and ocellar triangle, black with superimposed silveriness. 2nd and 3rd antennal segments brown, blackened anteriorly. Carina nose-like, narrow above, broadened and rounded below. Clypeal margin blackened. Cheek curved, of almost uniform width, posterior corner nearly squared, greatest width 0.15 times greatest diameter of eye. Eyes with dense fine pile. Orbital bristles in ratio 4 : 3 : 6; anterior reclinate orbital lateral and very slightly posterior to proclinate orbital.

Thorax. Shiny black. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows (not extending posteriorly much past level of anterior dorsocentrals) between dorsocentrals. Prescutellar bristles well developed, clear of acrostichals. Ratio anterior : posterior dorsocentrals 0.7. Anterior scutellar bristles long, divergent. Sterno-index 0.7. Halteres pale yellow. Femora blackish; tibiae and tarsi stramineous; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Translucent with faint brownish tinge. *C*-index, *c.* 1.5; 4*V*-index, *c.* 2.6; 5*X*-index, *c.* 2.8; *M*-index, *c.* 0.8. 3rd costal section with heavy setation on basal 0.8. Length, *c.* 1.9 mm.

Abdomen. Tergite 2 shiny black with central pale area and thin posterior pale band. Tergites 3 and 4 shiny black with thin pale anterior and posterior bands; remainder of abdomen shiny black. All tergites with strong posterior bristles.

Male genitalia (Figs 81, 82). Aedeagus small, apically pointed; anterior parameres large; hypandrium with very large submedian bristles.

Distribution and Specimens Examined

Sydney (Malloch 1927; Barker, personal communication); 13 specimens in ANIC, Wallaga Lake, Bermagui, N.S.W., Feb. 1974, Z. Liepa.

64. *Drosophila* (*Scaptodrosophila*) *subnitida* Malloch

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

Drosophila opaca Mather, 1955, p. 558. Syn. nov. (Holotype in AM; type locality Noosa, Qld.)

Drosophila novopaca Mather, 1956, p. 65 (replacement name for *opaca*, preoccupied in genus *Drosophila*). Syn. nov.

Distinguishing Features

Carina nose-like but relatively low. Frons rufous brown. Thorax uniformly dusky, slightly shiny; bristles slightly translucent brownish. Abdomen uniformly dusky brown, shiny.

Description

Body length. c. 2.7 mm.

Head. Arista with 3–4 branches above and 2–3 branches below plus terminal fork. Front as broad as long, rufous brown; areas about bases of orbital and vertical bristles with slight silveriness; ocellar triangle black with superimposed silveriness. 2nd and 3rd antennal segments mid-brown, dusky anteriorly. Carina nose-like, very narrow above, greatly broadened below, but relatively low. Cheek almost linear, greatest width 0.2 times greatest diameter of eye. Eyes with dense fine pile. Orbital bristles in ratio 2 : 1 : 2; anterior reclinate orbital posterolateral to proclinate orbital.

Thorax. Uniformly dusky brown, slightly shiny. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.7. Anterior scutellar bristles long, divergent, arising from middle of lateral scutellar margins. Sterno-index *c.* 0.8. All bristles of thorax slightly translucent brownish. Legs mid-brown; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Hyaline, faintly brownish. *C*-index, *c.* 2.8; 4*V*-index, *c.* 2.1; 5*X*-index, *c.* 1.3; *M*-index, *c.* 0.6. 3rd costal section with heavy setation on basal 0.6. Length, *c.* 2.4 mm.

Abdomen. Tergites uniformly mid to dark brown, shiny.

Further details. Male external genitalia figured by Mather (1955, p. 559).

Distribution

Sydney (Malloch 1927); Woy Woy, N.S.W. (Mather 1960); southern and northern Queensland (Mather 1955); South Australia (Angus 1972).

Specimens Examined

Malloch holotype; Mather holotype and paratypes in AM and ANIC.

65. *Drosophila* (*Scaptodrosophila*) *novamaculosa* Mather

Drosophila maculosa Mather, 1955, p. 560. (Holotype in AM; type locality Moggill, Qld.)

Drosophila novamaculosa Mather, 1956, p. 65 (replacement name for *maculosa*, preoccupied in genus *Drosophila*).

Distinguishing Features

Carina prominent, very broad at base. Front rufous brown; periorbits and ocellar triangle silvery. Mesonotum brown with pale spots. Abdomen banded.

Description

Body length. c. 2.9 mm.

Head. Arista with 3 branches above and 2 below plus terminal fork. Front 1.1 times broader than long, rufous brown; periorbital bands enclosing orbital and vertical bristles, and ocellar triangle, silvery; small patches immediately anterior to periorbital bands dark brown. 2nd antennal segments brown; 3rd dusky, almost black. Carina dark brown, large, very wide below, flattened anteriorly. Cheek dark brown, almost linear, greatest width 0.2 times greatest diameter of eye. Eyes with fine dense pile. Orbital bristles in ratio 5 : 3 : 6; anterior reclinate orbital lateral and slightly posterior to proclinate orbital, much closer to proclinate than to posterior reclinate.

Thorax. Mesonotum dusky brown with pale spots, most distinct 4 anteriorly in 2 pairs, anterior and posterior, in extended lines of dorsocentral bristles; 2 further somewhat smaller spots on each side lateral to these, and 1 larger spot on each side in humeral region; 1 posterior spot present on each side between posterior dorsocentral bristle and prescutellar; faint larger spots present on each side of scutellum. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.7. Anterior scutellar bristles long, divergent. Sterno-index 0.8. All bristles on thorax slightly translucent brownish. Legs mid-brownish; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Hyaline, slightly brownish, with clouding along crossveins. *C*-index, *c.* 2.7; 4*V*-index, *c.* 2.0; 5*X*-index, *c.* 1.2; *M*-index, *c.* 0.6. 3rd costal section with heavy setation on basal 0.7. Length, *c.* 2.4 mm.

Abdomen. Tergite 2 dark brown with central pale patch anteriorly; tergites 3–5 yellowish anteriorly with dark brown posterior bands slightly wider in middle of each tergite; tergite 6 dark brown.

Further details. Male external genitalia figured by Mather (1955, p. 560).

Distribution

Recorded only from Moggill (near Brisbane), Qld.

Specimens Examined

Holotype and paratypes in AM and ANIC.

66. *Drosophila* (*Scaptodrosophila*) *insolita*, sp. nov.

Types

Holotype ♂ in ANIC: Brockelos Creek, 16.5 km S. of Bermagui, New South Wales, 24–27.ii.1974, Z. Liepa. Paratype ?♂ in ANIC: Rotary Lookout, 23 km NW. of Milton, New South Wales, 9.ii.1974, Z. Liepa.

Distinguishing Features

Body brown; bristles slightly yellowish. Wings unusually slender. Carina nose-like. Arista large. Anterior reclinate orbital bristle short, fine.

Description

Body length. 2.7 mm.

Head. Arista with 4 branches above (3 in paratype), basal 2 apically curved, and 2 straight branches below, plus terminal fork. Front as broad as long, mid-brown; periorbital bands enclosing orbital and vertical bristles, and ocellar triangle, slightly silvery. 2nd antennal segments tan; 3rd slightly dusky. Carina nose-like but relatively narrow. Cheek curved, greatest width slightly less than 0.1 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 5 : 2 : 7; anterior reclinate orbital lateral and slightly posterior to proclinate orbital.

Thorax. Uniformly pale brown. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4 rows between dorsocentrals. Prescutellar bristles strong. Ratio anterior : posterior dorsocentrals 0.6. Sterno-index 0.6. Legs pale tan; preapical bristles on all tibiae; apicals on 2nd tibiae only.

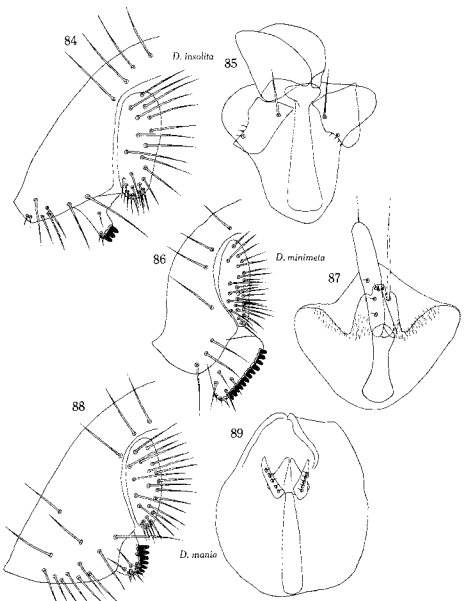
Wings. Hyaline; slender. *C*-index, 3.6; 4*V*-index, 1.9; 5*X*-index, 1.7; *M*-index, 0.45. 3rd costal section with heavy setation on basal 0.45. Length, 2.6 mm.

Abdomen. All tergites brown with darker posterior bands of uniform width, not interrupted in midline.

Male genitalia (Figs 84, 85; from holotype). Clasper small, with pointed dorsal process and 3 large contiguous teeth ventrally; aedeagus large, bifid, flattened; anterior parameres large.

Distribution

Known only from type specimens.



Figs 84–89. Male external and internal genitalia. *84, 85, D. insolita. 86, 87, D. minimeta. 88, 89, D. manio.*

67. *Drosophila* (*Scaptodrosophila*) *minimeta*, sp. nov.

Types

Holotype ♀ in ANIC: Wallaga Lake, Bermagui, New South Wales, 24-27.ii.1974, Z. Liepa. Paratype ♂ in ANIC: New England National Park, at 4000 ft, New South Wales, 12.xi.1961, I. F. B. Common and M. S. Upton.

Distinguishing Features

Body small, brown. Abdomen strongly tapered apically. Carina large. *C*-index low.

Description

Body length. 1.8 mm.

Head. Arista with 3 branches above and 2 below plus terminal fork. Front 1.1 times broader than long, tan; periorbital bands enclosing orbital and vertical bristles, and ocellar triangle, silvery. 2nd and 3rd antennal segments concolorous with front. Carina large, nose-like. Cheek curved, greatest width 0.1 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 7 : 3 : 10; anterior reclinate orbital lateral and slightly posterior to proclinate. Vertical bristles large; postverticals small, parallel.

Thorax. Uniformly brown, rather shiny. Acrostichal hairs in 8 rows in front of dorsocentral bristles, *c.* 6 rows between dorsocentrals. Prescutellar bristles large. Ratio anterior : posterior dorsocentrals 0.6. Anterior scutellar bristles as long apicals, divergent. Sterno-index 0.6. Legs pale tan; preapical bristles evident on 2nd and 3rd tibiae only; apicals on 2nd tibiae only.

Wings. Hyaline. *C*-index, 1.3; 4*V*-index, 2.4; 5*X*-index, 2.2; *M*-index, 0.8. 3rd costal section with heavy setation on basal 0.8. Length, 1.7 mm.

Abdomen. Strongly tapered; all tergites tan.

Male genitalia (Figs 86, 87; from paratype; specimen damaged, mounted on slide). Clasper large, with long row of strong contiguous teeth along medial border; hypandrium with median dorsal projection bearing pair of very large bristles.

Distribution

Known only from type specimens.

68. *Drosophila* (*Scaptodrosophila*) *mania*, sp. nov.

Type

Holotype ♂ in ANIC: Palm Creek, Royal National Park, New South Wales, 2.i.1962, D. H. Colless.

Distinguishing Features

Body entirely tan. Carina strong, flat. Anterior reclinate orbital bristle lateral to proclinate orbital.

Description

Body length. 2.6 mm.

Head. Arista with 4 branches above and 2 below plus terminal fork. Front as broad as long, tan, periorbits and ocellar triangle paler. 2nd antennal segments tan; 3rd slightly dusky. Carina prominent, as broad above as below, rather flat. Cheek almost linear, greatest width 0.1 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 2 : 1 : 2; anterior reclinate orbital lateral to proclinate orbital.

Thorax. Entirely tan. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Sterno-index 0.8. Legs tan; preapical bristles on all tibiae; apicals on 1st and 2nd tibiae.

Wings. Hyaline, slightly brownish. *C*-index, 2.8; 4*V*-index, 2.0; 5*X*-index, 2.0; *M*-index, 0.7. 3rd costal section with heavy setation on basal 0.55. Length, 2.2 mm.

Abdomen. Slightly discoloured but all tergites apparently tan.

Male genitalia (Figs 88, 89). Clasper small but with prominent teeth; aedeagus very small; anterior parameres small.

Distribution

Known only from holotype.

69. ***Drosophila*** (***Scaptodrosophila***) ***megagenys***, sp. nov.

Type

Holotype ♀ in AM: Brown Mountain near Nimmitabel, New South Wales, 13.ii.1963, D. K. McAlpine.

Distinguishing Features

Body tan. Carina tapered below. Cheek considerably wider posteriorly.

Description

Body length. 3.3 mm.

Head. Arista with 3 curved branches above and 1 straight branch below plus large terminal fork. Front 0.9 as broad as long, tan; periorbits and ocellar triangle slightly silvery. 2nd and 3rd antennal segments tan. Carina large, broadest just below middle portion, tapering and smoothly rounded below, rather flat. Cheek almost linear but angled downwards posteriorly, thus greatly widened at posterior corner; greatest width 0.25 times greatest diameter of eye. Eyes large, bare. Orbital bristles in ratio 2 : 1 : 2; anterior reclinate orbital posterior and slightly lateral to proclinate orbital. All bristles on head brownish.

Thorax. Uniformly pale brown. Acrostichal hairs in 8 rows in front of dorsocentral bristles, sparse and irregular between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.65. Sterno-index 0.8. Legs pale brown; small preapical bristles on all tibiae; apicals on 2nd tibiae only. All bristles on thorax brownish.

Wings. Hyaline; veins pale brown. *C*-index, 2.9; 4*V*-index, 1.7; 5*X*-index, 1.4; *M*-index, 0.5. 3rd costal section with heavy setation on basal 0.5. Length, 2.9 mm.

Abdomen. Slender; tergites pale tan with hint of slightly darker posterior bands.

Distribution and Specimens Examined

Holotype from New South Wales; another ♀, swept from bracken ferns, Wilsons Promontory, Vic., Nov. 1974, D. Hay (author's collection).

70. *Drosophila* (*Scaptodrosophila*) *parsonsi*, sp. nov. J. Grossfield

Types

Holotype ♀ in AM: Wilsons Promontory, Victoria, 7.ix.1974, J. Grossfield. Sweeping under bracken fern, dry sclerophyll forest. Paratype ♂ in AM: Fernshaw, near Healesville, Victoria, 12.iv.1963, D. K. McAlpine.

Distinguishing Features

Body dark, large. Cheek extremely narrow. Carina narrow, rounded. Eyes large. *C*-index high.

Description

Body length. 4.2 mm.

Head. Arista with 3 rays above and 2 below plus terminal fork; dorsal rays slightly curved apically. Front dusky tan, darkest within ocellar triangle, breadth and length equal. 2nd antennal segments brown; 3rd dusky. Carina prominent, nose-like, slightly wider below than above, more protuberant below. Clypeal margin dusky. Cheek extremely narrow, linear. Eyes dark red, bare. Orbital bristles in ratio 2 : 1 : 2; anterior reclinate orbital posterior and slightly lateral to proclinate orbital.

Thorax. Mesonotum strongly humped, almost *Mycodrosophila*-like, mid-brown with darker coloration longitudinally in midline enclosing middle 4 rows of acrostichals. Pleura darker than mesonotum, with greenish tinge. Acrostichal hairs in 8 rows in front of dorsocentral bristles, *c.* 6 rows between dorsocentrals. Prescutellar bristles as large as anterior dorsocentrals. Anterior dorsocentral bristles 0.5 times length of posteriors, close to base of latter. Anterior scutellar bristles same length as posterior scutellars, strongly divergent. Sterno-index 0.8. Legs mid-brown; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Hyaline. *C*-index, 4.5; 4*V*-index, 2.0; 5*X*-index, 1.3; *M*-index, 0.4. 3rd costal section with heavy setation on basal 0.6. Length, 3.7 mm.

Abdomen. Tergites 2–5 mid-brown with dark brown posterior bands of uniform width, not interrupted in midline. Egg guides brown, heavily sclerotized, long, slender, almost pointed, with strong marginal teeth and 2 subterminal hairs.

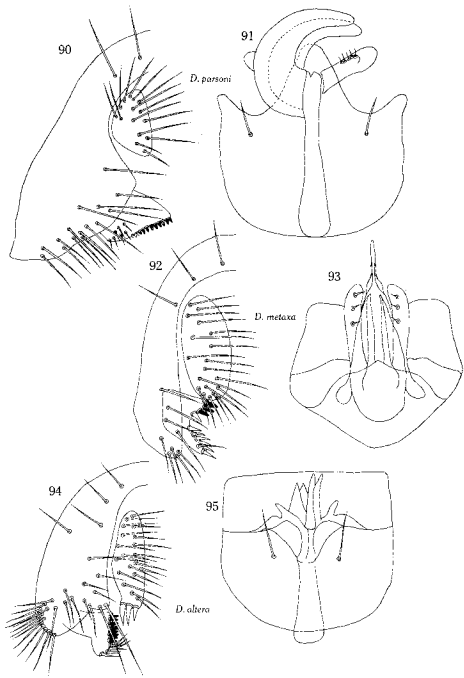
Male genitalia (Figs 90, 91). Anal plate small; clasper with small teeth on upper part of medial margin; aedeagus large, bifid, recurved; hypandrium with pair of widely separated bristles.

Distribution

Eastern Australia.

Specimens Examined

Queensland: 1, 5–8 miles Mt Lewis Rd, off Mossman–Mt Mulloy Rd, 22.iv.1967, D. H. Colless (ANIC); 1, Birthday Creek, near Paluma, 18.i.1967, D. K. McAlpine and G. Holloway (AM); 1, Upper Broken River, near Eungella, 12.xii.1961, D. K. McAlpine and R. Lossin (AM); 1, Broken River, Eungella, 9.xii.1961, D. K. McAlpine and R. Lossin (AM); 1, Binna Burra, Lamington National Park, 31.i.1961, D. K. McAlpine (AM). **New South Wales:** 1, 33 miles Dorrigo–Coramba Rd, 31.iv.1970, D. H. Colless (ANIC); 2, Otford, 3.iii.1962, 30.x.1965, D. K. McAlpine (AM); 1, Royal National Park, 30.x.1965, D. K. McAlpine (AM). **Victoria:** 1, Warburton, 7.iv.1963, D. K. McAlpine (AM). **Tasmania:** 1, Hellyer Gorge, 2.ii.1967,



Figs 90–95. Male external and internal genitalia. *90, 91, D. parsoni. 92, 93, D. metaxa. 94, 95, D. altera.*

E. F. Riek (ANIC); 2, Renison Bell, 15.i.1960, D. K. McAlpine (AM); 8, Pieman River, near Rosebery, 15.i.1960, D. K. McAlpine (AM).

71. *Drosophila* (*Scaptodrosophila*) *metaxa*, sp. nov.

Types

Holotype ♂ in ANIC: Big Mitchell Creek, Mareeba–Mulloy Rd, Queensland, 4.v.1967, D. H. Colless. Paratype ♂ in ANIC: Junction of Goldmine and Davies Creeks, Kuranda–Mareeba Rd, Queensland, 3.v.1967, D. H. Colless.

Distinguishing Features

Body small, dark brown with silky sheen. Prescutellar bristles prominent. *C*-index low.

Description

Body length. 1.7 mm.

Head. Arista with 4 branches above and 2 below plus terminal fork; basal rays apically curved. Front 1.7 times broader than long, dull black with tiny spots of greenish pollinosity. Periorbits and ocellar triangle with stronger whitish pollinosity. 2nd antennal segments brown; 3rd slightly dusky. Carina nose-like, brown. Cheek curved, extremely narrow. Eyes narrower ventrally, bare. Orbital bristles in ratio 4 : 3 : 10; anterior reclinate orbital lateral to proclinate orbital. Inner vertical bristles exceptionally long.

Thorax. Mesonotum dark chocolate-brown, with silky sheen; all bristles with sheen. Scutellum dull chocolate-brown. Pleura chocolate-brown, subshining. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 6 rows between dorsocentrals 0.4. Sterno-index 0.9. Legs stramineous, femora darker than tibiae and tarsi; preapical bristles on all tibiae; large apicals on 2nd tibiae.

Wings. Hyaline. *C*-index, 1.1; 4*V*-index, 2.6; 5*X*-index, 3.0; *M*-index, 1.0. Anterior crossvein unusually close to base of wing. 3rd costal section with heavy setation on basal 0.9. Length, 1.5 mm.

Abdomen. Uniformly dark brown, subshining.

Male genitalia (Figs 92, 93; from paratype). Clasper indented medially, with few prominent black teeth above and smaller bristles below; hypandrium shallow; aedeagus greatly narrowed apically; anterior parameres large.

Distribution

Principally north Queensland, also recorded from New South Wales and the Northern Territory.

Specimens Examined

Queensland: 9, same data as holotype; 5, Iron Range, 14.vi.1971, J. Feehan; 6, Mossman Gorge, 23.iv.1967, D. H. Colless; 1, 5–8 miles Mt Lewis Rd, off Mossman–Mt Mulloy Rd, 22.iv.1967, D. H. Colless; 2, Crystal Cascades, Cairns, 19.iv.1967, D. H. Colless; 5, Kuranda Range State Forest, 20.iv.1967, D. H. Colless; 1, 3 miles W. of Kuranda, Mareeba Rd, 3.v.1967, D. H. Colless; 4, Tinaroo Falls Dam, 27.iv.1967, D. H. Colless; 1, 7–14 miles W. of Herberton, via Watsonville, 1.v.1967, D. H. Colless; 6, Mt Edith Forest Rd, 1 mile off Danbulla Rd, 6.v.1967, D. H. Colless; 2, Bramston Beach, near Innisfail, in open savannah, 30.iv.1967, D. H. Colless; 1, Wallacha Falls, Palmerston Highway, 30.iv..1967, D. H. Colless; 1, Mt Garnet

Rd, 13 miles W. of Ravenshoe, 2.v.1967, D. H. Colless; 1, Gillies Highway, 2 miles W. of Little Mulgrave, 18.iv.1967, D. H. Colless; 6, Wongabel State Forest, 7.v.1967, D. H. Colless; 1, Ingham, light trap, 14.iii.1961, R. Straatman; 2, Crystal Creek, 43.4 km SWS. of Ingham, 8.iv.1971, Z. Liepa; 3, Upper Mulgrave River, 10 miles Goldsborough Rd, 9.v.1967, D. H. Colless; 6, The Boulders, Babinda, 8.vi.1971, Z. Liepa; 1, 2 miles N. of Cooroy, NE. of Nambour, 15.v.1970, Z. Liepa; 1, 3.3 km W. of Childers, 4.vi.1971, Z. Liepa; 2, Beerburrum Creek, Beerburrum, 23.v.1966, Z. Liepa; 2, Mt Beerwah, 5.v.1970, Z. Liepa. **Northern Territory:** 4, Lee Point, June 1964, K. R. Norris; 1, Berry Springs, 15.vi.1964, K. R. Norris; 3, Howard Springs, June 1964, K. R. Norris; 2, Cooper Creek, 11 km S. by W. of Nimbuwah Rock, 3.vi.1973, D. H. Colless; 2, 8 km SW. by S. of Oenpelli Mission, 7.vi.1973, D. H. Colless; 2, 16 km E. by N. of Mt Cahill, 13.vi.1973, D. H. Colless; 6, Baroalba Creek Springs, 19 km NE. by E. of Mt Cahill, 13.vi.1973, D. H. Colless. **New South Wales:** 2, Bruxner Park, 19.iv.1970, D. H. Colless; 5, 2·5 miles NW. of Bruxner Park, 16.iv.1970, D. H. Colless. All specimens in ANIC.

72. *Drosophila* (*Scaptodrosophila*) *altera*, sp. nov.

Types

Holotype ♂ in ANIC: Upper Mulgrave River, 10 miles Goldsborough Rd, Queensland, 9.v.1967, D. H. Colless. Paratype ♂ in ANIC: Mossman Gorge, Queensland, 23.iv.1967, D. H. Colless.

Distinguishing Features

Body dark brown. Prescutellar bristles weak. All bristles brownish. *C*-index low.

Description

Body length. 2.3 mm.

Head. Arista large, with 4 branches above and 2 below plus terminal fork. Front as broad as long, blackish brown posteriorly, with slight silveriness about bases of orbital bristles and ocellar triangle, tan anteriorly. Carina prominent, nose-like, flattened. 2nd antennal segments tan with anterodorsal blackish patches; 3rd segments brown. Cheek curved, very narrow, not widened posteriorly. Eyes with very fine pile, somewhat narrowed ventrally. Orbital bristles in ratio 5 : 3 : 5; anterior reclinate orbital lateral to proclinate orbital.

Thorax. Entirely dark brownish black, shiny, with violet tinge at certain angles of illumination on posterior part of mesonotum and scutellum. Acrostichal hairs in *c.* 8 rows in front of dorsocentral bristles, irregular between dorsocentrals. Prescutellars very weak, barely longer than acrostichals. Ratio anterior : posterior dorsocentrals 0.6. Sterno-index 0.7. Legs dark brown, tarsi paler; preapical bristles on all tibiae; apicals on 2nd tibiae only. Halteres very pale yellow, strongly contrasting with thorax and abdomen. Thoracic bristles brownish.

Wings. Hyaline. *C*-index, 1.8; 4*V*-index, 2.7; 5*X*-index, 2.1; *M*-index, 0.8. 3rd costal section with heavy setation on basal 0.75. Length, 1.9 mm.

Abdomen. Entirely brownish black; all bristles brownish.

Male genitalia (Figs 94, 95; from paratype). Anal plate with 3 large ventral teeth; aedeagus branched; hypandrium with pair of somewhat separated bristles.

Distribution

Northern Queensland.

Specimens Examined

Queensland: 3, The Boulders, Babinda, 10.v.1967, D. H. Colless; 2, Whitfield Range Forest Reserve, Cairns, 19.iv.1967, D. H. Colless; 1, 10 miles S. of Daintree, 25.iv.1967, D. H. Colless; 1, Mossman Gorge, 24.iv.1967, D. H. Colless. All specimens in ANIC.

Special Comments

This species is atypical of its subgenus in lacking strong prescutellar bristles; however, it possesses the typical propleurals and subequal sternopleural bristles.

73. *Drosophila* (*Scaptodrosophila*) *anthemon*, sp. nov.

Type

Holotype ♀ in ANIC: Magela Creek, 9 km SSE. of Mudginbarry Homestead, Northern Territory, 7.xi.1972, D. H. Colless.

Distinguishing Features

Eyes dark, with slight greenish tinge. Body and bristles entirely yellowish. Carina well developed.

Description

Body length. 1.7 mm.

Head. Arista with 3 short straight branches above and 1 similar branch below plus tiny terminal fork; dorsal rays progressively shortening anteriorly. Front 1.2 times broader than long, yellowish; periorbits and ocellar triangle silvery. 2nd and 3rd antennal segments yellowish brown. Carina prominent, nose-like, rounded laterally, somewhat flattened anteriorly. Vibrissa large, luteous. Cheek slightly curved, of uniform width, 0.15 times greatest diameter of eye. Eyes with fine short pile. Orbital bristles in ratio 5 : 3 : 6; anterior reclinate orbital lateral to proclinate orbital. Ocellar and vertical bristles relatively short. Postvertical bristles well developed, parallel.

Thorax. Uniform pale brown; all bristles yellowish. Acrostichal hairs in 8 rows in front of dorsocentral bristles, *c.* 4 rows between dorsocentrals. Prescutellar bristles *c.* 3 times length of acrostichals, slender. Ratio anterior : posterior dorsocentrals 0.9. Sterno-index 0.8. Legs entirely pale yellowish brown; preapical and apical bristles evident on 2nd tibiae only.

Wings. Hyaline. *C*-index, 1.2; 4*V*-index, 2.6; 5*X*-index, 2.0; *M*-index, 0.85. 3rd costal section with heavy setation on basal 0.85. Length, 1.3 mm.

Abdomen. Entirely pale yellowish brown; all bristles yellowish.

Distribution

Known only from holotype.

Special Comments

Superficially this species resembles *D. flavohirta* Malloch but the latter is a member of another subgenus. Both species have been collected in flowers and are apparently coloured procryptically. This appears to be an instance of convergent evolution within the genus.

74. *Drosophila* (*Scaptodrosophila*) *novoguinensis* (Duda)

Paradrosophila novo-guineensis Duda, 1923, p. 46. (Holotype in HNM; type locality New Guinea.) Specific name corrected in accordance with Article 32(c) of the International Code of Zoological Nomenclature (improper use of hyphen; incorrect original spelling; see Wheeler 1959; Duda subsequently dropped the second *e* and evidently considered the original form a printer's error).

Distinguishing Features

Carina prominent, flat. Eyes with dense pile. Body dark brown; abdomen banded. Scutellum with additional hairs as well as usual 4 bristles.

Description

Body length. c. 2.8 mm.

Head. Arista with 4 branches above and 2 below plus terminal fork; dorsal rays apically curved; ventral rays straight. Front as broad as long, shiny black posteriorly, brown anteriorly; areas about bases of orbital bristles, and ocellar triangle, silvery. 2nd and 3rd antennal segments brown; 3rd dusky anteriorly. Carina prominent, nose-like, flattened, with trace of median sulcus dorsally. Cheek almost linear, with large bristles in posterior corner; greatest width 0.15 times greatest diameter of eye. Eyes with dense short pile. Orbital bristles in ratio 12 : 5 : 12; anterior reclinate orbital lateral and slightly posterior to proclinate orbital.

Thorax. Mesonotum, scutellum and pleura dark brown. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Acrostichal hairs lateral to prescutellars enlarged. Ratio anterior : posterior dorsocentrals 0.6. Margin of scutellum with few fine hairs in addition to scutellar bristles. Sterno-index 0.8. Halteres yellow. Legs dark brown; tarsi paler than femora and tibiae; pre-apical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Hyaline. *C*-index, 1.7; 4*V*-index, 1.9; 5*X*-index, 1.2; *M*-index, 0.5. 3rd costal section with heavy setation on basal 0.7. Length, *c.* 2.1 mm.

Abdomen. Yellowish; tergites 2–5 with broad medianly interrupted dark posterior bands.

Male genitalia (Figs 96, 97). Aedeagus short, flattened apically except for small median pointed process; hypandrium with pair of large submedian spines.

Distribution and Specimens Examined

New Guinea; several specimens in ANIC and AM, Claudie and Mulgrave Rivers of north Queensland.

Special Comments

This species is very unusual within the genus *Drosophila* (and the family Drosophilidae) in possessing additional scutellar hairs.

75. *Drosophila* (*Scaptodrosophila*) *fimbriata*, sp. nov.

Types

Holotype ♂ in AM: St Helen's Creek, Mackay District, Queensland, 13.xii.1961, D. K. McAlpine. Paratype ♂ in ANIC: Crystal Cascades, Cairns, Queensland, 19.iv.1967, D. H. Colless.

Distinguishing Features

Face whitish; carina nose-like. Arista very large. Thorax pale brown. 3rd costal section of wing with heavy setation almost along entire length.

Description

Body length. 3.3 mm.

Head. Arista with 6 long apically curved branches above and 4 long straight branches below plus terminal fork. Front 1.3 times broader than long, tan, slightly silvery about bases of orbital and vertical bristles. 2nd and 3rd antennal segments tan, 3rd slightly dusky anterolaterally. Face whitish; carina well developed, nose-like. Cheek curved, greatest width less than 0.1 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 3 : 1 : 5; anterior reclinate orbital fine, lateral and very slightly posterior to proclinate orbital. Ocellar and vertical bristles large.

Thorax. Uniformly pale brown dorsally, pleura slightly paler. Acrostichal hairs in 8 rows in front of dorsocentral bristles, *c.* 6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Prescutellar bristles large. Sterno-index 0.7. Legs tan; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Hyaline, slightly dusky. *C*-index, 2.4; 4*V*-index, 1.7; 5*X*-index, 1.7; *M*-index, 0.6. 3rd costal section with heavy setation on basal 0.95. Length, 2.5 mm.

Abdomen. Tergites tan, darker posteriorly. Posterior margins of tergites with sparse long bristles.

Male genitalia (Figs 98, 99; from paratype). Anal plate with unusually long bristles; aedeagus small; hypandrium with pair of large submedian bristles.

Distribution

Northern Queensland.

Specimens Examined

Queensland: 1, same data as paratype (ANIC); 1, Bamboo Creek, near Miallo, N. of Mossman, 25.iv.1967, D. H. Colless (ANIC).

76. ***Drosophila* (*Scaptodrosophila*) *eluta*** Wheeler & Takada

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

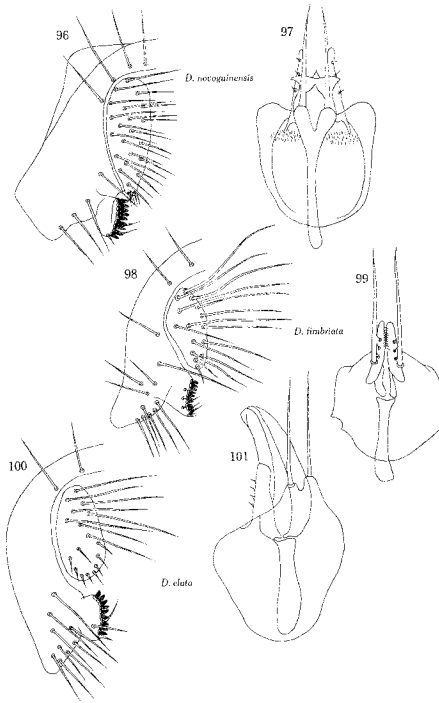
Distinguishing Features

Mesonotum pale brown with dark brown longitudinal stripes (cf. *busckii*). Anterior and middle sternopleural bristles small.

Description

Body length. c. 2.7 mm.

Head. Arista with 4 branches above and 2 below plus terminal fork. Front as broad as long, tan with hint of 2 darker stripes from middle of anterior border diverging between orbital bristles and ocellar triangle, and slight silveriness about bases of orbital bristles and ocellar triangle. 2nd antennal segments tan; 3rd slightly dusky. Carina prominent, nose-like, slightly flattened, whitish. Cheek slightly curved,



Figs 96–101. Male external and internal genitalia. *96, 97, D. novoguinensis. 98, 99, D. fimbriata. 100, 101, D. eluta.*

very narrow, not widened posteriorly, whitish. Orbital bristles in ratio 5 : 2 : 6; anterior reclinate orbital lateral and slightly posterior to proclinate orbital.

Thorax. Mesonotum tan, with 4 dark brown longitudinal stripes at levels of prescutellar and dorsocentral bristles, and 2 incomplete, less well defined similar stripes lateral to these on each side. Scutellum brown, with pale median stripe constricted in middle, and thin lateral pale areas. Pleura brown. Acrostichal hairs in 6-8 rows in front of dorsocentral bristles, *c.* 4 irregular rows between dorsocentrals. Prescutellar bristles somewhat larger than acrostichals but not very strong. Ratio anterior : posterior dorsocentrals 0.6. Sterno-index 0.5. Middle sternopleural bristle smaller than anterior sternopleural; posterior sternopleural extremely large and thick. Legs tan; preapical bristles on all tibiae; small apicals on 1st and large apicals on 2nd tibiae.

Wings. Hyaline, slightly brownish. *C*-index, *c.* 2.0; 4*V*-index, *c.* 1.8; 5*X*-index, *c.* 1.7; *M*-index, *c.* 0.6. 3rd costal section with heavy setation on basal 0.7. Length, *c.* 2.4 mm.

Abdomen. Tergites brown with darker uninterrupted posterior bands on apical segments; bands on basal segments narrowly interrupted.

Male genitalia (Figs 100, 101). Anal plate with large bristles above and small bristles below; hypandrium with pair of large submedian spines borne on small conical projections.

Distribution

Micronesia; northern Queensland.

Specimens Examined

Queensland: 4, Gillies Highway, 2 miles W. of Little Mulgrave, 18.iv.1967, D. H. Colless; 2, Wongabel State Forest, 5.v.1967, D. H. Colless; 1, Mossman Gorge, 23.iv.1967, D. H. Colless. All specimens in ANIC.

77. *Drosophila* (*Scaptodrosophila*) *glauca*, sp. nov.

Types

Holotype ♀ in ANIC: Earl Hill, N. of Cairns, Queensland, 11.v.1967, D. H. Colless. Paratype ♂ in ANIC: same locality and collector, 8.v.1967.

Distinguishing Features

Mesonotum with dark brown longitudinal stripes alternating with areas of silvery to greenish pollinosity.

Description

Body length. 2.2 mm.

Head. Arista with 3 branches above and 2 below plus terminal fork; basal rays strongly curved apically. Front as broad as long, patterned: orbits, and triangular area about ocelli reaching anterior margin of front, with silvery to greenish pollinosity; area within ocellar triangle, and areas about bases of orbital and vertical bristles, black; remainder of front dark brown (between orbits and ocellar area) to pale tan (anterior to orbital bristles). 2nd antennal segments pale tan; 3rd darker. Carina prominent but narrow. Cheek extremely narrow, almost linear. Eyes with very fine sparse pile. Orbital bristles in ratio 8 : 7 : 10; anterior reclinate orbital lateral to

proclinate orbital. Inner and outer vertical bristles large; postverticals relatively small.

Thorax. Mesonotum rather convex, with irregularly defined, occasionally coalescing longitudinal dark brown stripes (4 between dorsocentral bristles, more-irregular patches lateral to these) alternating with areas of pale pollinosity with greenish tinge, latter (not evident in all specimens examined) more distinct anteriorly. Scutellum brown, with paler spots at apex and near bases of scutellar bristles. Anterior dorsocentral bristles slightly medial to posterior dorsocentrals, half length of latter. All thoracic bristles slightly yellowish. Acrostichal hairs in 8 rows in front of dorsocentral bristles; few acrostichals between dorsocentrals. Pleura with longitudinal dark brown areas separated by paler areas with greenish tinge. Sterno-index 0.9. Legs paler brown; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Hyaline; veins (especially costa) darkened basally. *C*-index, 1.8; 4*V*-index, 2.8; 5*X*-index, 2.0; *M*-index, 0.8. 3rd costal section with heavy setation on basal 0.7. Length, 1.7 mm.

Abdomen. Tergites 1–2 yellowish brown; tergite 3 dusky with pair of widely separated lateral spots showing whitish to greenish pollinosity, and further pair of similar spots further laterally to these; tergites 4–5 similar with additional pairs of submedian spots; small 6th tergite with 2 pairs of similar spots evident (in several specimens examined abdominal spots coalescing and without pollinosity).

Male genitalia (Figs 102, 103). Anal plate with ventral tuft of small bristles; aedeagus bifid; hypandrium without spines.

Distribution

Northern Queensland.

Specimens Examined

Queensland: 7, same data as paratype; 2, Crystal Cascades, Cairns, 19.iv.1967, D. H. Colless. All specimens in ANIC.

78. ***Drosophila* (*Scaptodrosophila*) *rhipister***, sp. nov.

Types

Holotype ♀ in ANIC: The Boulders, Babinda, Queensland, 10.v.1967, D. H. Colless. Paratype ♂ in ANIC: The Boulders, 6.4 km NW. of Babinda, Queensland, 8.vii.1971, Z. Liepa.

Distinguishing Features

Body large, dark. Arista very large, fan-like. Carina large. Cheek narrow.

Description

Body length. 3.8 mm.

Head. Arista very large, fan-shaped, with 4 long curved dorsal and 3 long straight ventral rays, plus terminal fork. Front slightly broader than long; areas about bases of orbital and vertical bristles darkened, shining; ocellar triangle blackish; remainder of front tan. 2nd antennal segments tan, blackish anteriorly; 3rd segments tan, slightly dusky. Carina large, narrow above, greatly broadened below. Cheek almost

linear, narrow, greatest width less than 0.1 greatest diameter of eye. Vibrissa long. Eyes bare. Orbital bristles in ratio 2 : 1 : 4; anterior reclinate orbital lateral and slightly posterior to proclinate orbital. Vertical and postvertical bristles large.

Thorax. Dark brown with somewhat diffuse longitudinal tan stripes at levels of dorsocentral bristles, and lateral tan areas about bases of humeral and postalar bristles. Scutellum tan, lightest apically, with diffuse dark patches basally and about bases of bristles. Pleura dark brown with few small pale patches. Halteres pale yellow. Acrostichal hairs in *c.* 12 rows in front of dorsocentral bristles, *c.* 8 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Prescutellar bristles very fine, not wider than acrostichals but over twice as long, rather widely separated. Sterno-index 0.85. Propleural bristle large. Legs brown; coxae and femora dark; tibiae and tarsi paler; all tibiae with middle pale ring in some specimens examined. Preapical bristles on all tibiae; apicals on 2nd tibiae only

Wings. Hyaline. *C*-index, 2.0; 4*V*-index, 2.0; 5*X*-index, 1.6; *M*-index, 0.5. 3rd costal section with heavy setation on basal 0.8. Length, 3.0 mm.

Abdomen. Tergites 2–6 with broad black posterior bands, indented on 2nd tergite to posterior margin of tergite and slightly broadened in midline on remaining tergites. Tergites pale tan anteriorly. (In some specimens examined all tergites posterior to second entirely dark.)

Male genitalia (Figs 104, 105). Clasper with black teeth above, pale teeth below; aedeagus bifid; anterior parameres large; hypandrium with pair of large widely separated spines.

Distribution

Northern Queensland.

Specimens Examined

Queensland: 2, same data as holotype; 2, same data as paratype; 1, 4 miles S. of Atherton, 2.v.1955, Norris and Common; 1, 10 miles S. of Daintree, 25.iv.1967, D. H. Colless; 1, Kuranda Range State Forest, 7–8 miles Black Mountain Rd, 20.iv.1967, D. H. Colless; 1, 2 miles W. of Kuranda, 7.v.1967, D. H. Colless; 1, Gillies Highway, 2 miles W. of Little Mulgrave, 18.iv.1967, D. H. Colless; 3, Crystal Cascades, Cairns, 19.iv.1967, D. H. Colless; 3, Whitfield Range Forest Reserve, Cairns, 19.iv.1967, D. H. Colless; 2, Yungaburra (State Forest 452), 29.iv.1967, D. H. Colless; 1, Fisher Creek, Palmerston Highway, 30.iv.1967, D. H. Colless; 7, Upper Mulgrave River, 10 miles Goldsborough Rd, 9.v.1967, D. H. Colless. All specimens in ANIC.

79. *Drosophila* (*Scaptodrosophila*) *oncera*, sp. nov.

Type

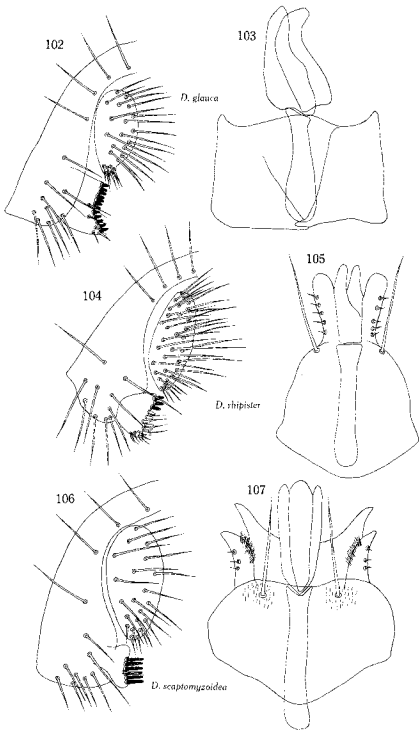
Holotype ♀ in ANIC: Whitfield Range Forest Reserve, Cairns, Queensland, 19.iv.1967, D. H. Colless.

Distinguishing Features

Large, plump, dark; abdominal tergites 3–5 dark anteriorly, pale posteriorly; cheek narrow, linear. Fore and hind femora dark; mid-femora paler.

Description

Body length. 3.8 mm.



Figs 102–107. Male external and internal genitalia. *102, 103, D. glauca. 104, 105, D. rhipister. 106, 107, D. scaptomyzoidea.*

Head. Arista with 5 apically recurved branches above and 2 straight branches below plus large terminal fork. Front slightly broader than long, centrally dark brown, paler about orbits and ocellar triangle, area within ocellar triangle black. 2nd antennal segments pale brown; 3rd large, black. Carina low, nose-like, smoothly rounded, terminating ventrally well above clypeal margin. Cheek narrow, linear, greatest width 0.15 times greatest diameter of eye. Eyes bare. Vibrissa very prominent. Palps blackened. Orbital bristles in ratio 2 : 1 : 3; anterior reclinate orbital lateral and slightly anterior to proclinate orbital. Ocellar and vertical bristles large; postverticals small.

Thorax. Mesonotum generally dark brown, with irregular diffuse paler silvery patches. Scutellum with broad dark brown transverse band, slightly paler anterior band, and pale patches about bases of scutellar bristles, those about posterior scutellars continuous. Pleura dark brown with small irregular paler areas. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Prescutellar bristles large, almost as long as anterior dorsocentrals. Ratio anterior : posterior dorsocentrals 0.6. Sterno-index 0.6. Fore and hind femora dark brown; mid-femora pale brown with hint of darker subapical rings. Fore femur with 3–4 very large spines on posteromedial border. Fore tibiae pale; mid-tibiae mid-dark brown; hind tibiae pale with dark rings in upper and lower thirds. All tarsi very long and slender, metatarsus in each leg longer than all succeeding tarsal segments together. Preapical bristles on all tibiae; large apicals on 2nd tibiae.

Wings. Translucent, with uniform brownish tinge. *C*-index, 3.2; 4*V*-index, 2.0; 5*X*-index, 3.0; *M*-index, 0.9. 3rd costal section with heavy setation on basal 0.8. Length, 3.1 mm.

Abdomen. Tergite 2 pale; tergites 3–5 dark brown anteriorly, pale posteriorly; tergite 6 dark brown with slightly paler lateral areas extending from anterior to posterior borders of tergite.

Distribution

Known from holotype only.

80. *Drosophila* (*Scaptodrosophila*) *scaptomyzoidea* (Duda)

Scaptodrosophila scaptomyzoidea Duda, 1923, p. 37. (Holotype in HNM; type locality New Guinea.)

Distinguishing Features

Body tan; all bristles yellowish. Carina large. Anterior reclinate orbital bristle anterior to level of proclinate orbital. *C*-index high.

Description

Body length. ♂, 2.1 mm.

Head. Arista large, with 4–5 rays above and 2 below plus terminal fork. Front 1.1 times broader than long, tan; slight silveriness within ocellar triangle. 2nd and 3rd antennal segments concolorous with front. Carina nose-like, broader below, smoothly rounded. Cheek narrow, slightly curved, greatest width 0.1 times greatest diameter of eye. Eyes narrowed below, bare. Orbital bristles in ratio 7 : 4 : 10; anterior reclinate orbital anterolateral to proclinate orbital.

Thorax. Uniformly tan. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4 rows between dorsocentrals. Prescutellar bristles large. Ratio anterior : posterior dorsocentrals 0.7. Sterno-index 0.7. Legs pale tan; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Hyaline. *C*-index, 4.1; 4*V*-index, 2.2; 5*X*-index, 1.8; *M*-index, 0.65. 3rd costal section with heavy setation on basal 0.4. Length, *c.* 1.8 mm.

Abdomen. Uniformly tan.

Male genitalia (Figs 106, 107). Clasper small; anterior parameres with medial tufts of fine hairs; hypandrium with pair of large spines.

Distribution and Specimens Examined

New Guinea (Duda 1923); Micronesia (Wheeler and Takada 1964); 1 specimen, Bramston Beach near Innisfail, Qld, in open savannah (ANIC); another, Mary's Creek near Gympie, Qld (AM).

81. *Drosophila* (*Scaptodrosophila*) *crocata*, sp. nov.

Type

Holotype ♂ in AM: Mulgrave River, 4 miles W. of Gordonvale, Queensland, 1.i.1967, D. K. McAlpine and G. Holloway.

Distinguishing Features

Body yellowish brown; bristles slightly yellowish. Carina large. Arista with large terminal fork.

Description

Body length. 2.2 mm.

Head. Arista with 2 branches above and 1 below plus terminal fork; ventral ray between anterior dorsal ray and terminal fork. Front as broad as long, tan. 2nd and 3rd antennal segments tan. Carina prominent, nose-like. Cheek slightly curved, greatest width 0.1 times greatest diameter of eye. Eyes bare. Orbital bristles in ratio 3 : 1 : 3; anterior reclinate orbital lateral and slightly posterior to proclinate orbital.

Thorax. Uniformly yellowish brown. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Prescutellar bristles large. Ratio anterior : posterior dorsocentrals 0.5. Sterno-index 0.5. Propleural bristle large. Legs concolorous with thorax; preapical bristles on all tibiae; apicals on 2nd tibiae only.

Wings. Hyaline, faintly brownish. *C*-index, 2.2; 4*V*-index, 2.5; 5*X*-index, 1.6; *M*-index, 0.7. 3rd costal section with heavy setation on basal 0.7. Length, 2.0 mm.

Abdomen. Uniformly yellowish brown.

Male genitalia (Figs 108, 109; phallic organs not shown completely). Clasper small, with medial row of prominent teeth; anterior parameres very large.

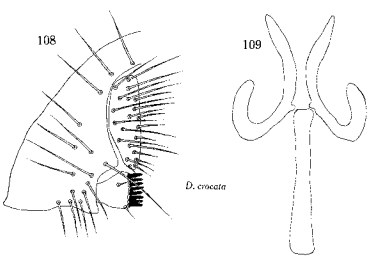
Distribution

Known from holotype only.

Key

The following key has been constructed as an aid to the identification of the Australian *Drosophila* species.

It is emphasized that many of the species in the subgenus *Scaptodrosophila* are extremely similar in external morphology and coloration. Although most species in this subgenus here treated, where males are known, have been found to be separable unequivocally by reference to the detailed structure of the (usually internal) male genitalia, this key has been based as far as possible on external characteristics for the two reasons that males may not be available amongst specimens recovered in a given collection, and that dissection and mounting of genitalia for high-power microscopic examination is a delicate and time-consuming job not always practicable where field or rapid identifications are desired. The situation amongst members of the



Figs 108 and 109. *D. crocata*, male external and internal genitalia (latter incomplete).

subgenus *Sophophora* is different because there is frequently a sexual dimorphism, and because females of some species are virtually indistinguishable; males are thus necessary for separation of some *Sophophora* species. Species identification in this subgenus, however, is usually accomplished where inseminated females are caught in the wild by culturing them in individual tubes and basing specific determinations on F_1 progeny; this technique has not been found to be useful for members of the subgenus *Scaptodrosophila*, most of which are very difficult or impossible to culture by currently known methods.

Although coloration has been used several times in the key for separation of species, it is recognized that several species may show some variability in this feature, or that different observers may differ in their interpretations of a given species' status; for this reason two species (*enigma* and *oncera*) are included twice.

A suggested method of species identification is to work through the key with an unknown specimen. When the specimen has been keyed to a specific name, it should be checked against the more extensive or full description given in the body of the

text; to facilitate this process the number of each species in the sequence of descriptions is given in brackets after the specific name in the key.

Finally, it is also emphasized that further new species are likely to be discovered. A new species may not fit the key in the sense that in endeavouring to key it one will ultimately come to a dead end where neither of the two alternatives in a couplet will be applicable; or (perhaps more likely in view of the considerable similarities amongst so many of the Australian species) a specimen may key to a specific name but the full description may not completely agree with the specimen. In such cases study of the male genitalia, if available, would be likely to help resolve the question.

Key to Australian Species of *Drosophila*

1. Vibrissa single (2nd oral bristle much smaller than 1st) 2
   2nd oral bristle over half length of, often almost as large as, 1st 3

2(1). With 1, 2 or (usually) all 3 of the following characters: presutellar acrostichal bristles considerably enlarged; sternopleural bristles subequal; propleural bristle present (subgenus *Scaptodrosophila*) 37
   Presutellar acrostichals not enlarged; anterior and middle sternopleural bristles, and anterior reclinate orbital bristle, usually very fine; propleural bristle absent (subgenus *Hirtodrosophila*) 27

3(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) (subgenera *Drosophila* and *Dorsilopha*) 4
   Apical bands on abdominal tergites continuous; cheek usually narrow; femoral comb never present (subgenus *Sophophora*) 13

4(3). Mesonotum with longitudinal stripes 5
   Mesonotum without longitudinal stripes 6

5(4). Mesonotum pale brown with dark median posteriorly bifid longitudinal stripe, and additional stripes lateral to this ..... *buscki* (10)
   Mesonotum velvety brown with dark stripes of uniform width; 4 pairs of dorsocentral bristles present ..... *pseudotetrachaeta* (9)

6(4). Carina more or less sulcate; thoracic bristles arising from dark spots 7
   Carina not sulcate; thoracic bristles not arising from dark spots 10

7(6). Third costal section with heavy setation on basal 0.3; *M*-index *c.* 0.5–0.6 8
   Third costal section with heavy setation on basal 0.4; *M*-index *c.* 0.4 9

8(7). 4*V*-index *c.* 1.7; costa not greatly darkened at distal costal break; testes orange ..... *buzzatii* (4)
   4*V*-index *c.* 2.0; costa distinctly darkened at distal costal break; testes yellow ..... *aldrichi* (5)

9(7). Abdomen with lateral yellow spots; *C*-index *c.* 3.0; greatest width of cheek *c.* 0.25 of greatest diameter of eye ..... *repleta* (2)
   Abdomen without lateral yellow spots; *C*-index *c.* 3.3; greatest width of cheek *c.* 0.35 of greatest diameter of eye ..... *hydei* (3)

10(6). Femoral comb absent; anterior reclinate orbital bristle posterolateral to proclinate ..... *funebris* (1)
   Femoral comb present (weak in *rubida*); anterior reclinate orbital posterior and slightly lateral to proclinate (all 3 orbitals almost in line) 11

11(10). Femoral comb weak, setulae sparse; testes red; male abdomen completely black apically ..... *rubida* (8)
   Femoral comb strongly developed; testes yellow; male abdomen not black apically... 12

12(11). Third costal section with heavy setation on basal 0.2–0.3; greatest width of cheek *c.* 0.3 of greatest diameter of eye; abdominal bands strong ..... *immigrans* (6)
   Third costal section with heavy setation on basal 0.5; greatest width of cheek *c.* 0.15 of greatest diameter of eye; abdominal bands weak ..... *sulfurigaster* (7)

13(3). Entire body, and all bristles, hairs and arista, translucent yellowish; male without sex-comb ..... *flavohirta* (21)
Body not entirely as above; bristles and arista black 14

14(13). Male with distinct sex-comb consisting of either longitudinal, transverse or oblique row or rows of strong black bristles on fore tarsus 20
Male without sex-comb, or with tarsal modification not as above 15

15(14). Male fore tarsi with medial bushy aggregations of hairs 16
Male fore tarsi without medial bushy aggregations of hairs 18

16(15). First 2 tarsal segments of male foreleg with bushy hairs ..... *scopata* (24)
First 3 tarsal segments of male foreleg with bushy hairs 17

17(16). First 3 tarsal segments subequal in length, with dense brushes of hairs ..... *pinnitarsus* (23)
Metatarsus longer than next 2 tarsal segments, with narrow brushes of hairs ..... *progastor* (25)

18(15). Male fore femur plump, considerably broader than tibia, with numerous fine bristles; male abdomen apically rounded or pointed, not black 19
Male fore femur not considerably broader than tibia; male fore metatarsus with 2 long apical bristles and numerous recurved hairs along entire length of tarsus; male abdomen apically truncated, black ..... *eugracilis* (18)

19(18). Male fore metatarsus with 2–3 large claw-like apical teeth; body yellowish, apical bands on abdominal tergites distinct ..... *denticulata* (19)
Male fore metatarsus without teeth; body dark brown, abdominal tergites without distinct bands ..... *dispar* (22)

20(14). Sex-comb longitudinal along entire lengths of metatarsus and 2nd tarsal segment 25
Sex-comb in oblique or transverse row or rows 21

21(20). Sex-comb oblique row of teeth on lower part of metatarsus 22
Sex-comb in transverse rows of bristles on first 2 tarsal segments 23

22(21). Posterior margin of male genital arch with large protuberant discoid process; greatest width of cheek *c.* 0.18 of greatest diameter of eye ..... *simulans* (12)
Posterior margin of male genital arch with small process; greatest width of cheek *c.* 0.25 of greatest diameter of eye ..... *melanogaster* (11)

23(21). Male abdomen apically black ..... *pseudotakahashii* (13)
Male abdomen pale, all tergites with slightly darker posterior bands 24

24(23). Sex-comb consisting of 2 rows of bristles on metatarsus and 1 row on 2nd tarsal segment ..... *pseudoananassae* (17)
Sex-comb consisting of 5 rows of bristles on metatarsus and 3–4 rows on 2nd tarsal segment ..... *ananassae* (16)

25(20). Teeth of sex-comb in 2 sets: shorter contiguous teeth and more sparse, considerably longer bristles ..... *smithersi* (20)
Sex-comb consisting of short contiguous teeth only 26

26(25). Secondary clasper of male external genitalia with 2 large black bristles ..... *serrata* (14)
Secondary clasper of male external genitalia with 3 large black bristles ..... *birchii* (15)

27(2). Wings with pattern of darker markings 28
Wings not patterned 29

28(27). Mesonotum and pleura of near uniform brownish coloration ..... *polypori* (26)
Mesonotum mid-brownish, pleura pale yellowish tan sharply contrasting with dorsal colour ..... *mycetophaga* (27)

29(27). Third antennal segment with *c.* 8 extremely long hairs on lower part ..... *macalpinei* (30)
Third antennal segment without additional extremely long hairs on lower part 30

30(29). Wings with deep brownish tinge ..... *borborus* (32)
Wings not strongly brownish 31

31(30). Carina developed along entire length of face ..... *whitenensis*
Carina, if present, confined to upper part of face only 32

32(31). *C*-index > 2.5 33
C-index *c.* 1.0 34

33(32). Thoracic pleura uniformly tan ..... *allynensis* (28)
Thoracic pleura brown above, abruptly becoming pale cream below ..... *mixtura* (31)

34(32). Thorax with white stripe at each anterolateral edge ..... *tricolora* (33)
Thorax without white stripe at each anterolateral edge 35

35(34). Arista with 1–2 rays below in addition to terminal fork ..... *junae* (35)
Arista with 3 rays below in addition to terminal fork 36

36(35). Thorax brown with broad lateral black stripe; *5X*-index *c.* 3.4; *M*-index *c.* 1.0 ..... *zentae* (34)
Thorax entirely brown, occasionally with hint of darker pleural stripes; *5X*-index *c.* 5.0; *M*-index *c.* 1.6 ..... *palumae* (36)

37(2). Wings patterned ..... *fumida* (61)
Wings not patterned 38

38(37). Carina vestigial or absent 39
Carina developed 45

39(38). Mesonotum unicolorous, or with more or less uniform pollinosity 40
Mesonotum patterned 43

40(39). Mesonotum dull black with superimposed pollinosity; pleura dusky with trace of greenish tinge ..... *fuscithorax* (43)
Mesonotum and pleura brown 41

41(40). Wings with deep greyish (living flies) to brownish (dead or pinned flies) tinge ..... *collessi* (46)
Wings hyaline or with faint grey-brown tinge 42

42(41). Male genitalia as in Figs 45, 46; eastern species ..... *inornata* (44)
Male genitalia as in Figs 47, 48; south-western species ..... *grossfieldi* (45)

43(39). Mesonotum pale; each bristle arising from dark spot ..... *obsoleta* (42)
Mesonotum with stripe(s), not spotted 44

44(43). Mesonotum brownish with paler longitudinal stripes; arista consisting only of axis plus long dorsal ray ..... *nicholsoni* (48)
Mesonotum pale with median longitudinal dark stripe; arista multibranched ..... *rhabdote* (47)

45(38). Mesonotum patterned, with stripes, spots, or diffusely demarcated patches differing from background coloration 46
Mesonotum unicolorous or with only slight variations in coloration 54

46(45). Mesonotum with dark brown longitudinal stripes 47
Mesonotum otherwise patterned 48

47(46). Mesonotum pale tan with clearly defined longitudinal dark brown stripes ..... *eluta* (76)
Mesonotum with irregular dark brown stripes alternating with areas of whitish to greenish pollinosity, bristles within latter arising from dark spots ..... *glauca* (77)

48(46). Mesonotum dark with 2 distinct longitudinal white stripes ..... *albostriata* (62)
Mesonotum otherwise patterned 49

49(48). Mesonotum with pale or whitish spots or streaks 50
Mesonotum otherwise patterned 52

50(49). Mesonotum dark with narrow median longitudinal whitish streak and additional whitish streaks in lines of dorsocentral bristles and further laterally ..... *lativittata* (37)
Mesonotum without narrow median longitudinal whitish streak 51

51(50). Mesonotum dark with small submedian whitish spots ..... *novamaculosa* (65)
Mesonotum mid-brown with paler longitudinal streaks, none running entire length of thorax ..... *cancellata* (41)

52(49). Mesonotum pale to mid-brown with silvery or greyish median stripe enclosing middle 4 rows of acrostichals ..... *enigma* (38)
Mesonotum not as above 53

53(52). Mesonotum dark with pair of diffusely demarcated paler submedian longitudinal stripes ..... *rhipister* (78)
Mesonotum dark with slightly paler irregular silvery patches ..... *oncera* (79)

54(45). Mesonotum shiny black 55
Mesonotum pale tan to dark brown, dull or subshining 56

55(54). *C*-index *c.* 1.5; abdomen black with small central pale patch basally; eastern species ..... *sydneyensis* (63)
C-index *c.* 3.0; abdomen uniformly brownish black; south-western species ..... *nitidithorax* (40)

56(54). Scutellum with several marginal hairs additional to usual 4 scutellar bristles ..... *novoguinensis* (74)
Scutellum bare apart from anterior and posterior scutellar bristles 57

57(56). Abdominal tergites with broad clearly differentiated apical bands interrupted in midline 58
Abdominal tergites unbanded, or with uninterrupted apical bands 59

58(57). Carina nose-like; wings with slight brownish tinge, 3rd costal section with heavy setation on basal 0.4–0.5 ..... *enigma* (38)
Carina weak, low, poorly developed; wings with distinct brownish tinge, 3rd costal section with heavy setation on basal 0.6 ..... *speconsis* (39)

59(57). Body large, over 4 mm; cheek broad, greatest width *c.* 0.2 of greatest diameter of eye; carina very large, flat; wings with strong brownish tinge 60
Body large or small, if large without broad cheek, large flat carina and strongly brownish wings 61

60(59). Arista 4–5/2–3 plus terminal fork; carina broadest at lowermost part, almost squared below; egg guides pointed apically ..... *brunneipennis* (56)
Arista 3/2 plus terminal fork; carina slightly broader above lowermost part, tapering below towards clypeal margin; egg guides broadly rounded apically ..... *notha* (57)

61(59). Body entirely pale yellowish tan, all bristles strongly yellowish; eyes with slight greenish tinge ..... *anthemon* (73)
Body and bristles not as above, if body entirely pale brown, bristles not or only slightly yellowish; eyes without greenish tinge 62

62(61). Third costal section with heavy setation along almost entire length ..... *fimbriata* (75)
Third costal section with heavy setation on basal portion only (up to 0.9) 63

63(62). Basal scutellar bristles about half length of apicals, convergent ..... *bryani* (59)
Basal scutellar bristles about as long as apicals, usually divergent 64

64(63). *C*-index low, barely greater than 1.0; small species 65
C-index close to 2.0 or greater; small or large species 66

65(64). Body dark brown; 3rd costal section with heavy setation on basal 0.9; cheek extremely narrow ..... *metaxa* (71)
Body pale to mid-brown; 3rd costal section with heavy setation on basal 0.8; cheek *c.* 0.1 of eye diameter ..... *minimeta* (67)

66(64). Cheek almost linear and slanted, descending posteriorly to increase cheek width considerably in posterior corner ..... *megagenys* (69)
Cheek not as above, linear or curved, more or less parallel to anteroposterior axis of body 67

67(66). Body entirely yellowish or pale tan (mesonotum occasionally with slight colour variation); abdominal tergites unbanded 68
Body darker, mid to dark brown; abdominal tergites with or without apical bands ... 74

68(67). *C*-index greater than 4.0 ..... *scaptomyzoidea* (80)
C-index *c.* 3.0 or less 69

69(68). Arista with single ventral ray in addition to terminal fork 70
Arista with 2 or more ventral rays in addition to terminal fork 71

70(69). Arista 2/1 plus terminal fork; 4*V*-index *c.* 2.5 ..... *crocata* (81)
Arista 3/1 plus terminal fork; 4*V*-index *c.* 1.5 ..... *exemplar* (50)

71(69). Cheek broad, greatest width *c.* 0.2 of greatest diameter of eye ..... *barkeri* (49)
Cheek narrow, greatest width *c.* 0.1 or less of greatest diameter of eye 72

72(71). 5*X*-index low, *c.* 1.3 ..... *concolor* (53)
5*X*-index *c.* 2.0 or more 73

73(72). Anterior reclinate orbital bristle lateral to proclinate orbital ..... *munia* (68)
Anterior reclinate orbital bristle posterolateral to proclinate orbital ..... *sinape* (52)

74(67). *C*-index close to 2.0 75
C-index close to 3.0 or greater 77

75(74). Body pale; *C*-index *c.* 2.3 ..... *mulgravei* (54)
Body dark; *C*-index *c.* 1.8 76

76(75). Body entirely brownish black; prescutellar bristles very weak ..... *altera* (72)
Thorax dark brown, abdomen black; prescutellars well developed ..... *dichromos* (60)

77(74). Abdominal tergites banded, or progressively darkening posteriorly; mesonotum pale to dark brown 78
Abdominal tergites uniformly mid to dark brown, unbanded; mesonotum mid to dark brown 82

78(77). Abdomen tan anteriorly darkening to dusky posteriorly, second tergite banded ..... *minnamurrae* (51)
Abdominal tergites tan anteriorly with darker uninterrupted bands posteriorly 79

79(78). Carina nose-like, or obviously broader below 80
Carina well developed but barely broader below ..... *parsonsi* (70)

80(79). Third costal section with heavy setation on basal *c.* 0.5 ..... *insolita* (66)
Third costal section with heavy setation on basal *c.* 0.8 81

81(80). Arista 5/3–4; carina almost squared laterally and ventrally; orbital bristles in ratio 3 : 1 : 3 ..... *adelphe* (58)
Arista 4/3; carina rounded laterally and ventrally; orbital bristles in ratio 4 : 2 : 5 ..... *nimia* (55)

82(77). 5*X*-index *c.* 1.3; *M*-index *c.* 0.6; 3rd costal section with heavy setation on basal 0.6 ..... *subnitida* (64)
5*X*-index *c.* 3.0; *M*-index *c.* 0.9; 3rd costal section with heavy setation on basal 0.8 ..... *oncera* (79)

Discussion

The composition of the Australian *Drosophila* fauna has now been clearly established: it consists of a large number of species of the subgenus *Scaptodrosophila*, with considerably smaller representations from each of the three remaining major subgenera.

The subgenus *Drosophila* contains hundreds of species, several quite widespread; *immigrans, hydei, repleta* and *funebris*, and the dorsilophan *busckii*, are cosmopolitan. Although all of these species occur in Australia, however, there is no evidence to suggest that any of them originally evolved here. On the contrary, most of the members of the *repleta* group (which includes *hydei, repleta, buzzatii* and *aldrichi*) are endemic to the Americas (*buzzatii* and *aldrichi* apparently having been introduced into Australia with the prickly pear cactus); other members of the *funebris* group are also endemic to the Neotropical biogeographic zone. The majority of the members of the *immigrans* group occur in south-east Asia, but where *immigrans* itself originated is a matter of conjecture since, at least on present indications, it is absent from south-east Asia itself. Three species of the *immigrans* group, *sulfurigaster, rubida* and *pseudotetrachaeta*, are of more restricted distribution, occurring in New Guinea as well as northern Queensland, with *sulfurigaster* also in other areas. Given the proliferation of *immigrans*-group species in south-east Asia, it appears reasonable to conjecture that these three species originated in this area and subsequently spread to northern Queensland. No known species of the subgenus *Drosophila*, then, is endemic to Australia; the only representatives of this subgenus and the monotypic

Dorsilopha are cosmopolitan species (or those apparently accidently introduced on cactus), and those species of more restricted distribution occurring in northern Queensland and, at least, in New Guinea as well.

The situation concerning members of the subgenus *Sophophora* is rather similar to the above, although a few endemic species do occur. The cosmopolitan *melanogaster* and *simulans* are widespread in Australia, while the cosmopolitan *ananassae* occurs in Queensland. Other members of the predominantly south-east Asian *melanogaster* group also occur in northern, or northern and eastern, Australia, and two *melanogaster*-group species – *pseudotakahashii* and *smithersi* – are apparently endemic; the evidently related *flavohirta* is also endemic. In addition to *melanogaster*-group species, Australia possesses four apparently endemic *Sophophora* species, *dispar, pinnitarsus, scopata* and *progastor*. These have no known close relatives elsewhere and may represent lines which have evolved within Australia for a long period.

In the subgenus *Hirtodrosophila* the situation is different. All of the species known from Australia appear to be endemic. To some extent, of course, this phenomenon may simply reflect inadequate sampling: very few *Hirtodrosophila* species, for example, are known from New Guinea (cf. Okada 1967), but little work has been done on the New Guinea fauna and later intensive collecting may well reveal that several of the species hitherto known only from Australia may also occur in New Guinea. Members of this subgenus do not appear to be attracted to known baits; they must thus be collected by the non-specific method of sweeping, or occasionally by aspirating directly from the fungi on which at least some species feed. The subgenus has been held to be rather heterogeneous and in need of revision (Throckmorton 1962); it is world-wide but most species are restricted to rather small areas of distribution. *Hirtodrosophila* must still be regarded as poorly known in Australia and more species may well be discovered by future collecting.

The bulk of the Australian *Drosophila* fauna comprises members of the subgenus *Scaptodrosophila* and in this respect it is unique; in no other part of the world have members of this subgenus speciated so widely and so dominated the *Drosophila* fauna of a region. (The prolific Hawaiian speciation has occurred in the subgenus *Drosophila*.)

Scaptodrosophila species have been recorded from all parts of Australia except the north-west (see below). In most cases the species involved are known only from Australia, although it is quite possible that with future collecting several of them may also be discovered in New Guinea. A few species (*novoguinensis, scaptomyzoidea, eluta*) are already known from New Guinea or Micronesia as well as from Australia, while *bryani* is even more widespread. Three species (*nicholsoni, grossfieldi* and *nitidithorax*) are endemic to the south-west; *fuscithorax* and *fumida* occur in both east and west, while the remaining species have northern or southern distributions in the eastern part of the continent only.

Very little indeed is known of the ecology of the Australian *Scaptodrosophila* species. Most are not attracted to fruit baits and are difficult to maintain in laboratory cultures. Of those species successfully cultured, all culture much better if the larvae are given moist sand in which to pupate, which suggests that they might be leaf miners in nature, normally pupating in the soil. There is manifestly scope for considerable research in this area.

The subgenus *Scaptodrosophila* appears to be considerably more heterogeneous than either *Drosophila* or *Sophophora*. *Scaptodrosophila* is defined principally by: (1) presence of prescutellar bristles; (2) presence of a propleural bristle; (3) possession of three large subequal sternopleural bristles. Not all species included in the subgenus, however, possess all three characters. In a few the prescutellars are very weakly developed; in a few the sternopleural bristles are not subequal; and in several the propleural bristle is absent. In addition to this variation, a few species have interrupted bands on the abdominal tergites; others have continuous bands; still others lack bands altogether. There is considerable variation within the subgenus in cheek width and arista structure, while the extent of development of the carina varies from absent to extremely large. These conditions inevitably raise the question of whether the present inclusion of all of the above species within a single subgenus may not be an excessively arbitrary grouping; but the matter cannot be simply resolved at the present time because of inadequate information on so many of the species both in Australia and in neighbouring areas (Duda, in various papers, listed about two dozen *Scaptodrosophila-Paradrosophila* species from New Guinea, south-east Asia and Taiwan; most of them are very poorly known). It should be noted that the rationale for including all of the subgeneric synonyms listed above under *Scaptodrosophila* is that the original distinctions on which they were based are trivial by present standards of classification; but, equally, a complete revision of the subgeneric classification of the genus *Drosophila* is ultimately inevitable.

Members of the genus *Drosophila* are distributed about the Australian continent from central northern Australia (Northern Territory) through north-eastern, eastern and southern Australia, to the south-west of Western Australia. There appears to be a conspicuous gap in the fauna in central and northern Western Australia – only one species (*serrata*) has been recovered from these large areas, from the far north. This apparent gap is probably not entirely an artefact of lack of collecting; various collections have been made in these areas without detecting any *Drosophila* species, although *Scaptomyza, Leucophenga* and *Mycodrosophila* have been taken along with numerous other Diptera. The environment in this part of the continent, with summers considerably hotter than in the east and lack of the denser humid forests occurring in patches along the length of the eastern coast, have seemingly produced a bar to the invasion of the area by *Drosophila* species.

The *Drosophila* fauna of the remainder of Australia may be broadly considered to comprise two components. The northern-central Queensland fauna consists largely of species unknown from the rest of Australia, but a number of which also occur at least in New Guinea and in several cases in other parts of south-east Asia. The fauna of the southern parts of Australia consists mainly of species unknown either from northern Queensland or anywhere else; the proportion of *Scaptodrosophila* species in the latter group is higher than in the north Queensland fauna. Superimposed on this distribution of endemic species and those occurring in neighbouring areas only, all eight of the world's cosmopolitan *Drosophila* species (*ananassae, busckii, funebris, hydei, immigrans, melanogaster, repleta* and *simulans*) also occur in Australia (although not in all other parts of the Australian biogeographic zone).

The final picture to emerge, then, of the Australian *Drosophila* fauna is one of a large number of endemic species dominated by members of the subgenus *Scaptodrosophila* in an as yet undetermined number of phylogenetic lineages. This fauna is

substantially different from that of the neighbouring New Guinea and south-east Asian areas, where *melanogaster*- and *immigrans*-group species (in the subgenera *Sophophora* and *Drosophila* respectively) predominate; but in northern Queensland this latter fauna overlaps into Australia. The field of ecological studies on Australian *Drosophila* species is an open one.

Acknowledgments

Grateful acknowledgment is made to Professor J. S. F. Barker, University of Sydney, whose original suggestion prompted commencement of this project, to Professor Barker and Mr J. Moth, University of Sydney, for providing numerous specimens of Sydney and other *Drosophila* species; to Dr D. H. Colless of the Division of Entomology, CSIRO, Canberra, for his stimulating and catalytic correspondence in furthering this project, and to Dr Colless and Miss Z. Liepa, Division of Entomology, CSIRO, for expediting loans of ANIC specimens; to Dr C. N. Smithers, Dr D. K. McAlpine and Mr G. Holloway of the Australian Museum, Sydney, for their friendly assistance in arranging loans of holotypes and other specimens; to the staff of the School of Public Health and Tropical Medicine, University of Sydney, for permission to examine type material in the School; to Dr L. Papp of the Hungarian National Museum for arranging the loan of all the Australian specimens in Duda's type series; to Dr W. Wirth of the U.S. National Museum for arranging the loan of a paratype of *D. flavohirta* Malloch; to Mr G. Prince of La Trobe University for provision of numerous Victorian specimens; to Professor P. A. Parsons of La Trobe University for providing further Victorian specimens and the opportunity for the author to join a field trip to Wilsons Promontory; to Dr J. Grossfield of the City University of New York for the descriptions of *D. junae* and *D. parsonsi* and for providing specimens of several species; to Professor Marshall Wheeler of the University of Texas for the identification of *D. aldrichi* and for his sustained interest; to Dr Lynn Throckmorton of the University of Chicago for helpful comments in correspondence; to Mr A. Pont of the British Museum of Natural History for determining the date of publication of Volume 20 of Annals of the Hungarian National Museum to resolve a question of synonymy; to Dr D. S. Angus of Newcastle University, N.S.W., for providing South Australian specimens; To Mr P. Liehne of the University of Western Australia for collections of flies from northern Western Australia; to Professor H. E. Paterson of Witwatersrand University for his stimulating interest in the project; and to all unnamed associated who have assisted this revision in one way or another. Funds were provided by the University of Western Australia for a trip to Sydney and Canberra to visit institutions in those cities, and incidental laboratory expenses were met from research grant funds from the University of Western Australia, where this work was performed.

References

Angus, D. S. (1964). *D. tetrachaeta*: a new species of *Drosophila* from New Guinea. *Univ. Queensl. Pap. Dep. Zool.* 2(8), 155–9.

Angus, D. S. (1967). Additions to the *Drosophila* fauna of New Guinea. *Univ. Queensl. Pap. Dep. Zool.* 3(3), 31–42.

Angus, D. S. (1972). *Drosophila* fauna of Humbug Scrub and Adelaide, South Australia. *Drosoph. Inf. Serv.* 49, 80.

Ayala, F. J. (1965). Sibling species of the *Drosophila serrata* group. *Evolution* 19, 538–45.

Basden, E. B. (1954). The distribution and biology of Drosophilidae (Diptera) in Scotland, including a new species of *Drosophila*. *Trans. R. Soc. Edinb.* **62**, 603–54.
Bock, I. R. (1971). Taxonomy of the *Drosophila bipectinata* species complex. *Tex. Univ. Publ.* No. 7103, pp. 273–80.
Bock, I. R., and Wheeler, M. R. (1972). The *Drosophila melanogaster* species group. *Tex. Univ. Publ.* No. 7213, pp. 1–102.
Clark, A. M. (1957). Hybridization between *Drosophila wetifemur* and *D. spinofemora*. *Aust. J. Zool.* **5**, 216–22.
Coquillet, D. W. (1901). Three new species of Diptera. *Entomol. News* **12**, 16–18.
Dobzhansky, Th., and Mather, W. B. (1961). The evolutionary status of *Drosophila serrata*. *Evolution* **15**, 461–7.
Doleschall, C. L. (1858). *Natl Tijdschr. Ned. Ind.* **17**, 73–128.
Duda, O. (1923). Die orientalischen und australischen Drosophiliden-Arten (Dipteren) des ungarischen National-Museums zu Budapest. *Ann. Hist.-Nat. Mus. Natl Hung.* **20**, 24–59.
Duda, O. (1924). Beitrag zur Systematik der Drosophiliden unter besonderer Berücksichtigung der palärktischen u. orientalischen Arten (Dipteren). *Arch. Naturgesch.* **90**(A3), 172–234.
Duda, O. (1925). Die costaricanischen Drosophiliden des ungarischen National Museums zu Budapest. *Ann. Hist.-Nat. Mus. Natl Hung.* **22**, 149–229.
Fabricius, J. C. (1787). 'Mantissa Insectorum.' Vol. 2, pp. 1–382.
Fallén, C. F. (1823). 'Geomyzides Sveciae.' 8 pp.
Gallo, A. J. (1973). Morphological distinction between female *Drosophila melanogaster* and female *D. simulans*. *Ciênc. Cult. (Sao Paulo)* **25**, 341–5.
Hsu, T. C. (1949). The external genital apparatus of the male Drosophilidae in relation to systematics. *Tex. Univ. Publ.* No. 4920, pp. 80–142.
Loew, H. (1862). *Berl. Entomol. Z.* **7**, 185–232.
McKenzie, J. A., and Parsons, P. A. (1974). Numerical changes and environmental utilization in natural populations of *Drosophila*. *Aust. J. Zool.* **22**, 175–87.
Malloch, J. R. (1923). Notes on Australian Diptera with descriptions. *Proc. Linn. Soc. N.S.W.* **48**, 601–22.
Malloch, J. R. (1924). Notes on Australian Diptera. IV. *Proc. Linn. Soc. N.S.W.* **49**, 348–59.
Malloch, J. R. (1925). Notes on Australian Diptera. VI. *Proc. Linn. Soc. N.S.W.* **50**, 80–97.
Malloch, J. R. (1927). Notes on Australian Diptera. X. *Proc. Linn. Soc. N.S.W.* **52**, 1–16.
Malloch, J. R. (1934). 'Insects of Samoa.' Vol. 6, pt 8, pp. 267–328.
Mather, W. B. (1955). The genus *Drosophila* (Diptera) in eastern Queensland. I. Taxonomy. *Aust. J. Zool.* **3**, 545–82.
Mather, W. B. (1956). The genus *Drosophila* (Diptera) in eastern Queensland. II. Seasonal changes in a natural population 1952–1953. *Aust. J. Zool.* **4**, 65–75.
Mather, W. B. (1957). Genetic relationships of four *Drosophila* species from Australia (Diptera: Drosophilidae). *Tex. Univ. Publ.* No. 5721, pp. 221–5.
Mather, W. B. (1960). Additions to the *Drosophila* fauna of Australia. *Univ. Queensl. Pap. Dep. Zool.* **1**(9), 229–39.
Meigen, J. W. (1830). 'Systematische Beschreibung der bekannten europäischen zweiflügeligen Insekten.' Vol. 6.
Okada, T. (1956). 'Systematic Study of Drosophilidae and Allied Families of Japan.' (Gihodo: Tokyo.)
Okada, T. (1964). Drosophilidae (Diptera) of Southeast Asia collected by the Thai-Japanese Biological Expedition 1961–62. In 'Nature and Life in Southeast Asia'. Vol. 3, pp. 439–66.
Okada, T. (1967). A revision of the subgenus *Hirtodrosophila* of the Old World, with descriptions of some new species and subspecies (Diptera, Drosophilidae, *Drosophila*). *Mushi* **41**, 1–36.
Patterson, J. T. (1943). The Drosophilidae of the Southwest. *Tex. Univ. Publ.* No. 4313, pp. 7–216.
Patterson, J. T., and Crow, J. F. (1940). Hybridization in the *mulleri* group of *Drosophila*. *Tex. Univ. Publ.* No. 4023, pp. 251–6.
Patterson, J. T., and Wheeler, M. R. (1942). Description of new species of the subgenera *Hirtodrosophila* and *Drosophila*. *Tex. Univ. Publ.* No. 4213, pp. 67–109.
Sturtevant, A. H. (1919). A new species closely resembling *Drosophila melanogaster*. *Psyche J. Entomol.* **26**, 153–5.
Sturtevant, A. H. (1921). The North American species of *Drosophila*. Carnegie Inst. Washington Publ. No. 301.

Sturtevant, A. H. (1927). Philippine and other oriental Drosophilidae. *Philipp. J. Sci.* **32**, 361–74.
Sturtevant, A. H. (1939). On the subdivision of the genus *Drosophila*. *Proc. Natl Acad. Sci. U.S.A.* **25**, 137–41.
Sturtevant, A. H. (1942). The classification of the genus *Drosophila*, with descriptions of nine new species. *Tex. Univ. Publ.* No. 4213, pp. 5–51.
Throckmorton, L. H. (1962). The problem of phylogeny in the genus *Drosophila*. *Tex. Univ. Publ.* No. 6205, pp. 207–343.
Wheeler, M. R. (1959). A nomenclatural study of the genus *Drosophila*. *Tex. Univ. Publ.* No. 5914, pp. 181–205.
Wheeler, M. R., and **Hamilton, N.** (1972). Catalog of *Drosophila* species names, 1959–1971. *Tex. Publ.* No. 7213, pp. 257–68.
Wheeler, M. R., and **Takada, H.** (1964). Diptera : Drosophilidae. *Insects Micronesia* **14**(6), 163–242.
Wilson, F. D., Wheeler, M. R., Harget, M., and **Kambysellis, M.** (1969). Cytogenetic relations in the *Drosophila nasuta* subgroup of the *immigrans* group of species. *Tex. Univ. Publ.* No. 6918, pp. 207–53.
Wollaston, T. V. (1858). Brief diagnostic characters of undescribed Madeiran insects. *Ann. Mag. Nat. Hist.* **1**, 13–25.

Manuscript received 12 November 1975

Species Index

The following table lists species included, or originally described, in the genus *Drosophila*, with species-number and page-number. Names removed in this or earlier papers by synonymy, homonymy or transfer to another genus are indicated in roman type. (With the exception of *D. ampelophila* Loew sensu Malloch, synonyms of the cosmopolitan species, which have no relevance to the Australian literature, are not included.)