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ACALYPTERATE  
DIPTERA  
OF  
NEW ZEALAND

by

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# ACALYPTERATE DIPTERA OF NEW ZEALAND

## *Introduction*

Knowledge of New Zealand flies is far from complete, and will be so for many years. Species already known number about two thousand, and many more await discovery. Of the described species, many are known from one or few specimens, adequate information on distribution is lacking, and, as in other groups, the older descriptions are often so brief that the species cannot be recognised. However, enough is now known of the New Zealand Diptera fauna to give some indication of its peculiarities and affinities, and of its important gaps. New Zealand Diptera lacks any major text and the literature is scattered in New Zealand and overseas journals. Thus collection of literature is one of the major hurdles at the early stages of any research work on New Zealand flies. It now seems desirable to consolidate this information so that we may the better assess the extent of our knowledge and the most profitable avenues of future research.

This study is an attempt at such consolidation for one section of the New Zealand Diptera, the Acalypterae. These flies have received less attention than any other section of the New Zealand Diptera, for without doubt the tendency with many collectors has been to ignore specimens of this group. This is for two reasons: first, the majority of these flies are small and are often regarded as being difficult to handle and preserve; hence, most are discarded if captured, and many undoubtedly escape through normal net material. Secondly, identification of these flies has always been regarded as relatively difficult, especially at the family level.

All previously known species are re-described. For some of the more recently described species, original descriptions are adequate, but, for the sake of uniformity, these species are again described in this text. The majority of original descriptions, however, are basically descriptions of the colouration of the species, and, as such, have proved inadequate for recognition of the species.

Holotypes have been available for all but a few indigenous species. However, in three species, a search through all likely collections has failed to locate either holotypes or paratypes, and these must be regarded as lost. For twenty species, holotypes exist but have not been seen by the writer. Specimens have, however, been compared with holotypes by competent authorities in the institutions which house the types.

If this work serves no other purpose than to quicken interest in New Zealand Diptera, and in acalypterates in particular, its preparation will have been worthwhile. The major need is a many-fold increase in the number of specimens in collections, for it is only when collections from each major population within the range of each species are avail-

able that the taxonomist can hope to arrive at a final understanding of the group he is studying.

An examination of the locality records for most species in this text will make it apparent that the distribution of the majority of species is insufficiently known to determine the course of evolution of the group in New Zealand.

## HISTORICAL

The first two endemic New Zealand acalypterate Diptera were described by Walker (1849) from material lodged in the British Museum.

Schiner (1868) described material collected during the voyage of the *Novara* and recorded two Sapromyzidae from New Zealand. Because of the generally recognised doubt concerning the validity of the localities of the *Novara* material (e.g. Miller, 1950 p. 138), and because the two species concerned have not been captured in New Zealand since the voyage, the records must be considered doubtful and are omitted from this work.

Hutton (1881) described two acalypterates together with many other Diptera. One of his species was the well-known large sciomyzid previously described by Walker (1849) and now known as *Neolimnia sigma* (Walker). Later Hutton published a series of papers (Hutton, 1901, 1902a, b, 1904a) which are the foundation works for New Zealand acalypterates. Hutton (1904b) lists the total species known. By the end of 1904, 41 species had been described.

Mik (1881) added one species to the known fauna.

Lamb (1909) described an important collection of Diptera from the several subantarctic islands of New Zealand and added six species to the known acalypterate fauna.

Miller (1921) added one species.

Watt (1923, 1924) described many agromyzids and gave very full notes on immature stages, mines, host plants and habits of the species.

Malloch (1922) described two species and revised two genera.

Tonnoir and Malloch (1926a) began the most important series of papers yet published on New Zealand acalypterates. Together they, or Malloch by himself, described many species and added 115 species as endemic or introduced forms in the following series of papers: Tonnoir and Malloch (1926a, b, 1927, 1928); Malloch (1925, 1930a, b, c, d, 1931 a, b, 1933a, b, c, 1935).

During the period when Tonnoir and Malloch were publishing, only minor additions were made by other authors; Womersley (1937) made the most important contribution when he recorded seven species, three of them new, from Macquarie Island, an island normally regarded as belonging to the New Zealand subregion; Enderlein (1930) added one species; Hendel (1937) added another in an important paper discussing Diptera of the subantarctic islands; Cresson (1935) described a new ephydrid; Salmon (1937, 1939) described one ephydrid and one chloropid; Kelsey (1937) and Morrison (1938) gave notes on the biology of some agromyzids.

Records of the occurrence of introduced species have been made by Broun (1905), Cottier (1933), Harrison (1952, 1953a), and Mugeridge (1933).

Apart from nomenclatural changes noted by Miller (1945) and Salmon (1950) no work was published on acalypterates, from 1940 to 1951.

Dumbleton (1953) gave notes on asteiid species.

Harrison (1952, 1953a, b, 1955) described and recorded several species from the mainland and the subantarctic islands.

Sabrosky (1955) described one further chloropid.

Miller (1950) published a complete catalogue of New Zealand Diptera which, at the same time as consolidating the records of New Zealand species, has been and will continue to be of invaluable assistance to dipterists. That catalogue lists 174 species of acalypterate Diptera. In this study, 233 species are considered, including 37 new species and 17 immigrant species, which are recorded from New Zealand for the first time.

### COLLECTION AND PRESERVATION

*Collection:* The majority of acalypterates are too small or inconspicuous to be specially hunted for and collections are best obtained by general sweeping with a net. With experience, the various families or genera or even species may be recognised in the net by their shape and particularly by their behaviour within the net, but it is usually advisable to retain all specimens until a preliminary sorting can take place.

The most satisfactory net for collecting acalypterates is of jappara, nylon, or some soft very finely meshed material. It should be pointed at its apex so that the small insects can be concentrated readily to a small space and transferred to a killing bottle with ease and without fear of damaging them.

Some families of acalypterates are only rarely taken in nets and can be more satisfactorily collected by means other than sweeping.

The Drosophilidae are rarely taken in the sweep net unless collecting is carried out in specialised habitats such as rubbish dumps, fruit stores, or similar localities. Traps are the most profitable means of obtaining these flies. Many traps and baits have been used, and the most successful types are those described by Demerec (1950). A type used successfully in Auckland for several years is a half-pint milk bottle with a plastic-gauze funnel. The trap is baited with yeasted banana, prepared by mincing ripe or over-ripe bananas, adding live yeast and allowing fermentation to take place. Such bait is best for use when about two to five days old.

It is often desirable to culture drosophilid flies in order to obtain immature stages and to have fresh material for dissection of those internal organs that are used as diagnostic characters.

Half-pint milk bottles or vials, 1 in. x 3 in., are convenient culture vessels and a suitable medium is:

Rolled oats	110 g.
Molasses	30 g.
Yeast (baker's)	15 g.
Agar agar	13.5 g.
Water	750 cc.
Moldex (a mould preventive)	0.5 g.

These ingredients are boiled for about five minutes and the medium poured while hot into the culture bottles. Gravid females are placed in cultures, which have a paper strip on which adults can rest. Satisfactory cultures can be obtained at room temperature, but, for experimental work, accurate temperature control is essential. Methods of breeding are described fully by Demerec (1950).

Adult flies of the Agromyzidae are frequently taken in the sweep net. However, valuable information concerning immature stages and host plants can be obtained by collecting mined plants and breeding adults from the mines.

*Preservation.* All acalypterate Diptera should be pinned, and all but the larger specimens should be double mounted either gummed on card points or impaled on stainless steel micro-pins. Single-mounted flies should be pinned through the lateral region of the mesonotum or dorsal pleura and never at the mid dorsal line, as this destroys the important acrostichal and dorsocentral bristles. Flies mounted on card should be stuck on the apex of the triangle in such a manner that the whole dorsal surface and at least one complete lateral surface are untouched and readily visible. Those mounted on micro-pins in double mounts should be pierced with the micro-pin from the ventral-lateral region of the thorax. With freshly killed specimens the micro-pin need not pass right through the body but with old specimens that have been relaxed for mounting it is advisable to do so in order to secure the specimen more firmly.

For taxonomic work, flies need not be set, but it is often an advantage to have legs unfolded and spread away from the body, for then examination of structures is easier.

Male genitalia can rarely be examined *in situ* and need to be dissected from the abdomen. For preparation of genitalia, the terminal abdominal segments are detached, boiled in 10 per cent caustic soda or caustic potash solution for five to ten minutes according to size and then washed thoroughly in water. Genital structures are then dissected out and mounted. Permanent mounts are best made in balsam, but semi-permanent mounts can be quickly prepared by mounting in glycerine jelly. It is essential that prepared genitalia be referable to the specimens from which they were obtained. This can be done by cataloguing specimens and microscope slides on which genitalia are mounted, or by mounting genitalia on celluloid squares and attaching them to the pin holding the specimen.

#### LOCATION OF TYPES AND SPECIMENS

Locations are given in abbreviated form in brackets as the last entry to the data given for the holotype or specimens examined and given as new records.

Two locations are given in some cases because many of Malloch and Tonnoir's and Malloch's types are at the time of writing in the United States National Museum prior to being distributed to the institution where the authors intended them to be finally deposited. The second abbreviation given indicates the final repository.

The abbreviations used are as follows:

Ak. Mus.	Auckland Museum, Auckland
B.M.	British Museum (Natural History), London
Cant. Mus.	Canterbury Museum, Christchurch
Cawt. Inst.	Cawthron Institute, Nelson
D.E.I.	Deutsches Entomologisches Museum, Berlin
Dom. Mus.	Dominion Museum, Wellington
O.U.	Otago University, Dunedin
P.D.D.	Plant Diseases Division, Auckland
S.A.M.	South Australian Museum, Adelaide, Australia
S.P.H.T.M.	School of Public Health and Tropical Medicine, University of Sydney, Sydney, Australia
U.S.N.M.	United States National Museum, Washington, D.C., U.S.A.

## Systematics

### KEY TO SUBORDERS, SERIES, AND SECTIONS OF THE ORDER DIPTERA

- 1 Antennae usually of 6 or more segments. Palpi long, of 4 to 6 segments. Anal cell open and rarely narrowed towards wing margin ..... Suborder **NEMATOCERA**
  - Antennae with less than 6 segments and bearing a terminal or basal arista. Palpi never of more than 2 segments, usually 1, and sometimes absent. Anal cell closed or distinctly narrowed towards wing margin ..... 2
  - 2 Frontal lunule and ptilinal suture absent  
Suborder **BRACHYCERA-ORTHORRHAPHA**  
and Suborder **BRACHYCERA-CYCLORRHAPHA**, Series **ASCHIZA\***  
Frontal lunule and ptilinal suture present  
Suborder **BRACHYCERA-CYCLORRHAPHA**,  
Series **SCHIZOPHORA** 3
  - 3 Leathery or horny flies. Parasitic on warm-blooded animals. Wings often reduced or absent. Legs and claws modified for clinging to hair and skin of hosts. Head closely joined to thorax and falling into an excavation in dorsal thorax ..... Section **PUPIPARA**
  - Normal flies ..... 4
  - 4 Second antennal segment with a longitudinal seam or cleft on outer dorsal surface and extending whole length of segment. Transverse suture of mesonotum complete or evident almost to centre of mesonotum. Squamae usually large and concealing halteres. Posterior calli of mesonotum present and distinguished by a depression extending from posterior of wing base to base of scutellum ..... Section **CALYPTERAE**
  - Second antennal segment without well developed dorsal seam or cleft. Transverse suture of mesonotum not evident centrally. Squamae usually vestigial and not concealing halteres. Posterior calli of mesonotum not differentiated ..... Section **ACALYPTERAE**
- \*The method of emergence from larval and pupal skins separates Brachycera-Orthorrhapha from Brachycera-Cyclorrhapha, but the grouping indicated here is used because of its great convenience for separating adults.

### Section **ACALYPTERAE**

Usually small flies, 2–5 mm. long but ranging from 1.5 to about 16 mm. Wing length usually the same as body length. Arista arising near base of dorsal surface of 3rd segment of antenna, occasionally from a preapical position or absent; composed of 2 small basal segments and a long 3rd apical; bare, faintly or strongly pubescent, plumose or pectinate. Antenna of 3 segments; usually decumbent, sometimes porrect: 3rd segment shorter, equal or several times length of 2nd segment, reniform, circular, spherical, or elongate rod shaped, usually covered with dense short pile; 2nd segment usually with 1 or more strong dorsal hairs or bristles, distinct row of hairs about apical margin, those at ventral region stronger than lateral ones and other hairs on rest of dorsal and lateral surfaces; basal segment usually minute and less than length of 2nd segment, bare or with dorsal apical hairs, only occasionally stronger than hairs on 2nd segment. Ptilinal suture

usually distinct, extending down face and separating the parafacial plates; frontal lunule small but distinct and in some families large and extending nearly half distance from antennae to vertex. Frontal orbits distinct, particularly so when strong fronto-orbital bristles are present; ocellar triangle usually differentiated, large and distinct in some families; ocellar area often distinctly raised above level of front; 3 ocelli present, only occasionally absent; front at vertex, wide, usually half or more of width of head; vertex sharply ridged or gently curved onto occiput; front usually same width in both sexes, sides parallel or converging anteriorly. Ocellars present or absent, erect or proclinate, cruciate or divergent; postverticals either present, or absent, and cruciate, convergent, parallel, or divergent; 2 pairs of verticals usually present, inner pair convergent, outer pair divergent and posterior to inner pair; fronto-orbitals present or absent, proclinate, reclinate, directed mesad or outwardly over eyes; frontals present in some families and usually convergent; hairs usually present between and posterior to ocelli, on frontal orbits and on front anterior to ocellar triangle; occasionally strong hairs or bristles posterior to vertex in addition to the normal postvertical pair. Face narrow or wide with parallel or divergent sides, vertical in profile or strongly produced and convex or deeply concave; usually evenly chitinised but occasionally with membranous area in centre; usually bare but sometimes thickly covered with hairs and bristles. Cheeks ranging from linear to about equal to vertical diameter of eye; composed of the extension ventrally and posteriorly of the parafacials which form the gena or plate bordering the eye and the bucca or ventral portion of the cheek; the occiput may be produced anteriorly between these two plates and so reduce the bucca; the central region of the face extends posteriorly beneath the bucca forming the oral margin and may be visible laterally, ventral to the bucca; vibrissal angle present or absent and sometimes distinctly prominent. Vibrissa present or absent; 2nd oral sometimes differentiated from other cheek hairs and bristles; hairs strong or weak or absent on all cheek except dorsal gena; bristles at lower posterior angle of cheek present or absent. Occiput convex to deeply concave. Postocular hairs in distinct rows on dorsal and lateral margin of occiput. Eyes bare or haired. Proboscis usually not specially modified; sometimes elongate and geniculate; palpi present, rarely absent or modified. Clypeus hidden or strongly produced anterior to epistoma.

Mesonotum usually strongly convex; transverse suture incomplete; humerus normally prominent; posterior callus not differentiated. Scutellum normally semicircular but occasionally very short, much wider than long or produced and large and about half length of mesonotum; dorsal surface flat or convex; postscutellum rarely prominent. Propleuron normally separated from prosternum by a weakly chitinised membrane. Acrostichal hairs present or absent and arranged in longitudinal rows from 2 to about 20 rows between the dorsocentrals posterior to transverse suture; acrostichal bristles present or absent, if present, the prescutellar pair usually present, anterior bristles occur less frequently; 0 to 4 postsutural and 0 to 3 presutural dorsocentrals; apical scutellars cruciate, convergent, parallel, or divergent; lateral scutellars usually present and near base of scutellum; scutellum haired or bare on dorsal surface and occasionally some hairs ventral to apex;



0 to 3 humerals; 0 to 1 presutural; 1 to 3 notopleurals; 1 to 2 supraalar; 0 to 1 interalar; 0 to 2 postalar; 0 to 1 mesopleural with occasionally extra short bristles; 0 to 3 sternopleurals; 0 to 1 propleural bristle, or hairs on propleuron present or absent; pteropleuron usually bare; hypopleuron usually bare; mesopleuron, sternopleuron and prosternum haired or bare.

Legs rarely extensively modified. Tibiae with or without preapical and apical spines. Empodia always linear.

Wings normal, reduced, or absent; with normal 5 longitudinal veins and an anal vein. Costa ending at apex of 3rd or 4th veins; costa broken or weakened or not weakened near humeral cross vein and at apex of subcostal vein; spines of costa several times diameter or less than diameter of costa, small black costal spines usually extending to between apices of 2nd and 3rd veins; subcosta entire, and free from 1st vein and ending in costa distinctly separate from apex of 1st vein, or fused with 1st vein at apex, or vestigial, or only traceable to costa as a faint fold in membrane, or strong basally and right angled near apex and almost unpigmented on this apical portion; 1st vein always short and ending in costa in basal half of wing; 2nd vein short in Asteiidae but long in other families; 3rd and 4th veins ending near wing apex; 5th vein either reaching wing margin or fading out before wing margin; anal vein absent, reduced to small stump vein, reaching wing margin or fading out before wing margin; axillary vein usually absent or represented by fold in membrane; anterior and posterior cross veins present or absent; cross vein separating discal and 2nd basal cell present or absent or partly present; additional cross veins sometimes between longitudinal veins; stump veins sometimes arising from longitudinal veins. Membrane clear, cloudy, or pigmented on small or large areas.

Halteres present, rarely modified.

Abdomen of 6 large visible tergites and 5 sternites in males and 6 to 8 visible segments in females. External male genitalia consisting of a genital arch formed of the 9th tergite, a pair of anal plates formed from the 10th tergite, and claspers associated with the genital arch and formed from the 9th segment. Penis short or very long and coiled; parameres minute or large. Female ovipositor simple, bordered by 2 ovipositor plates or modified into a telescopic structure enclosed in a sheath.

Acalypterate flies can be readily recognised and separated from other Diptera by the three-segmented antenna bearing an arista and having the 2nd segment without a dorsal seam; the presence of lunule and distinct ptilinal suture; the reduced squamae; the absence of the transverse suture in the middle of the mesonotum; and the usually sparse bristling of head and thorax. The antennal structure, suture, and squamae are the best characters to use for separation from the calypterates, and the presence of a lunule and ptilinal suture is the surest way of separating from the Aschiza and Brachycera-Orthorrhapha.

#### KEY TO FAMILIES OF ACALYPTERAE IN NEW ZEALAND

- 1 Subcosta curved forward at nearly a right angle and weakened beyond bend  
Subcosta not sharply angled and weakened

2  
3

2	Postverticals convergent	TRYPETIDAE (p. 179)
	Postverticals divergent or absent	PSILIDAE (p. 174)
3	Basal segment of hind tarsus short and incrassate	SPHAEROCERIDAE (p. 252)
	Basal segment of hind tarsus normal	4
4	Arista absent	CRYPTOCHAETIDAE (p. 328)
	Arista present	5
5	Wings with anal lobe and alula reduced or absent, cross veins very close together and close to base of wing	OPOMYZIDAE (p. 213)
	Wings normal, anal lobe and alula usually well developed; if lobe and alula reduced, cross veins well separated	6
6	Subcosta complete and ending in costa and widely separated from apex of 1st vein	7
	Subcosta vestigial or complete but fused to 1st vein for most of its length or fused with 1st vein at apex	13
7	Palpi vestigial	SEPSIDAE (p. 169)
	Palpi normal	8
8	Postverticals convergent	9
	Postverticals parallel or divergent	11
9	Mesonotum and scutellum flattened, legs and abdomen conspicuously bristly; anal vein reaching wing margin faintly; apical tarsal segments triangular and enlarged	COELOPIDAE (p. 93)
	Mesonotum and scutellum not flattened; legs and abdomen not bristly; anal vein incomplete and never reaching wing margin; apical tarsal segments not enlarged	10
10	Vibrissa absent	SAPROMYZIDAE (p. 10)
	Vibrissa present	HELOMYZIDAE (part) (p. 110)
11	Prosternum and propleuron fused as one continuous heavily chitinised plate	HELCOMYZIDAE (p. 90)
	Prosternum and propleuron distinctly separated by membrane	12
12	Tibiae without preapical dorsal bristles	OTITIDAE (p. 175)
	All or some tibiae with preapical dorsal bristles	SCIOMYZIDAE (p. 36)
13	Vibrissa absent or very weak	14
	Strong vibrissa present	16
14	Postverticals divergent	15
	Postverticals convergent	CHLOROPIDAE (p. 336)
15	Glossy flies; 2nd basal and discal cells separated by a cross vein	PALLOPTERIDAE (p. 198)
	Not glossy flies; 2nd basal and discal cells united	EPHYDRIDAE (p. 215)
16	Anterior fronto-orbitals convergent	17
	No convergent fronto-orbitals	18
17	Postverticals divergent	AGROMYZIDAE (p. 305)
	Postverticals convergent or parallel	MILICHIIDAE (p. 329)
18	Second vein very short and ending very close to 1st vein	ASTEIIDAE (p. 279)
	Second vein not short and ending close to 1st vein	19
19	Subcosta very short and vestigial, not continued to costa	DROSOPHILIDAE (p. 283)
	Subcosta not vestigial, fused with 1st vein at apex or on most of its length	20
20	Postverticals divergent and weak; shining black species	PIOPHILIDAE (p. 171)
	Postverticals convergent or absent; not shining black species	21
21	Dull grey species; face often strongly concave; clypeus prominent	CANACEIDAE (p. 249)
	Not dull grey species; face vertical or retreating, not concave; clypeus never distinctly prominent	HELOMYZIDAE (part) (p. 110)

antero-posteriorly, almost reniform; bare. Vertical diameter of eye about twice width of cheek in same axis. Proboscis brown.

**THORAX:** Brown or dark brown dusted; humerus brown; mesopleuron and pteropleuron light brown ventrally. Prescutellars not as strong as dorsocentrals; 2 strong and 1 weak postsuturals, 2 small incurved presutural dorsocentrals; divergent basal scutellars about three-quarters length divergent apicals, 1 small presutural hair; prosternum bare.

Legs light brown to brown; fore and hind femora distinctly brown. Fore femur with small bristles on postero-dorsal and apical half of postero-ventral surfaces; fore tibia without preapical and apical; mid femur not as enlarged as other femora and with few but distinct black hairs, no basal ventral bristles in male; basal segment of hind tarsus about three-quarters length of 2nd segment and produced to small keel-like structure posteriorly.

Wings (Fig. 320) opaque; veins brown. Short hairs on costa beyond 1st vein. Costal index about 1.0-1.1.

Halteres brown with light brown stalk.

**ABDOMEN:** Brown or dark brown.

*Holotype:* Europe.

*Material Examined:* 3 ♂ and 18 ♀.

*New Records:* AUCKLAND: Owairaka, bred ex seaweed compost, 16.vi.1946, 3 ♂, 18 ♀, (C. Little), (P.D.D.).

*Distribution in New Zealand:* Auckland. (June).

*Remarks:* Specimens identified by Dr O. W. Richards. A widespread species occurring in Europe, Seychelles, North and South America. Recognised by its small size, clouded wings with long basal costal bristles, and by the chaetotaxy, particularly of the thorax. Separated from the other member of the subgenus occurring in New Zealand by the absence of hairs and bristles on basal ventral region of mid femur of male.

## Family ASTEIIDAE

Arista pubescent or plumose. Third antennal segment short. Post-ventricals divergent. Humeral and mesopleural bristles absent. Wings long. Costa weakened but not broken at humeral cross vein and apex of subcosta; costa extending to fourth vein; second vein ends close to first vein or near wing apex; cross veins on basal third of wing; third and fourth veins convergent apically; anal cell and often second basal cell absent.

*Genera Occurring in New Zealand:* *Asteia* Meigen

Readily recognised by the wing venation, particularly the cross vein being near base of wing.

## Genus ASTEIA Meigen

*Asteia* Meigen, 1830. "Syst. Besch. Zweifl. Insekt." 6 : 88.

Arista pubescent or plumose with rays on both dorsal and ventral surfaces of main axis. One reclinate fronto-orbital. Two dorsocentrals. Tibia without pre-apical dorsal bristles. Second vein ends close to 1st vein. Cross vein closing 2nd basal cell and the posterior cross vein absent.

Type Species: *Asteia amoena* Meigen

Recognised by the short second vein, which ends very close to first vein on costa, and the absence of cross veins between fourth and fifth veins.

*Distribution:* World wide.

*Species Occuring in New Zealand:*

*Asteia crassinervis* Malloch

*A. levis* Hutton

*A. tonnoiri* Malloch

KEY TO SPECIES OF ASTEIA IN NEW ZEALAND

- |   |   |                     |
|---|---|---------------------|
| 1 | Arista minutely pubescent .....                         | <b>levis</b>        |
|   | Arista plumose .....                                    | <b>2</b>            |
| 2 | Fifth vein noticeably thickened beyond cross vein ..... | <b>crassinervis</b> |
|   | Fifth vein not thickened .....                          | <b>tonnoiri</b>     |

*Asteia tonnoiri* Malloch. Figs. 326, 329

*Asteia tonnoiri* Malloch, 1930. Rec. Cant. [N.Z.] Mus. 3 : 233.

A shining brown and dark brown species with dull blackish-brown and light yellow abdomen. Body length about 2.75 mm., wing length about 3.0 mm.

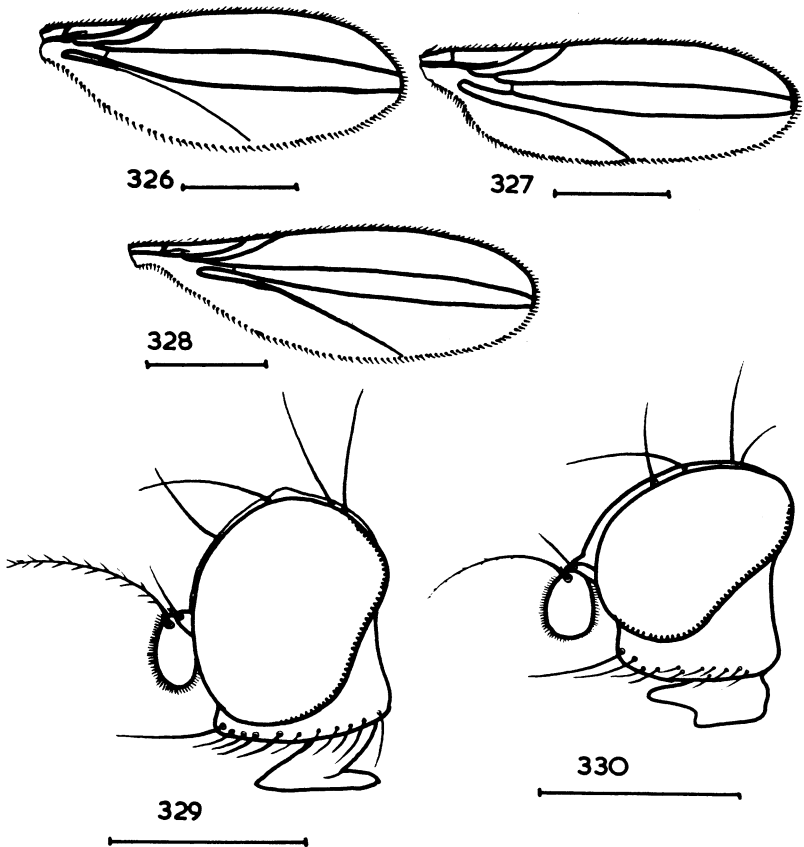


Fig. 326. Wing of *Asteia tonnoiri*

„ 327. „ „ *A. levis*

„ 328. „ „ *A. crassinervis*

„ 329. Head of *A. tonnoiri*

„ 330. „ „ *A. levis*

Scale: Figs. 326-328, 1.0 mm.; Figs. 329, 330, 0.5 mm.

#### MALE AND FEMALE

**HEAD** (Fig. 329): Arista brown; plumose, equal rays on dorsal and ventral sides of axis about 4 times width of basal segments. Antenna brown; 3rd segment blackish-brown with transverse light yellow band on inner surface from basal half of ventral surface to antero-dorsal corner, outer surface light brown ventrally, covered with thick white pile; 2nd segment with 1 strong dorsal apical bristle and small apical hairs; basal segment bare. Front brown not shining; orbits as far as bristle and ocellar area, blackish-brown and shining. Pair of strong hairs at middle of anterior margin or front; verticals and ocellars strong. Face with transverse light brown stripe dorsally, and in succession ventrally a whitish-brown stripe, a broad blackish-brown stripe, a white stripe and a narrow blackish-brown stripe on ventral margin. Cheeks light brown. Row of strong hairs posterior to vibrissa extending to posterior region of cheek. Occiput brown and dark brown, strongly concave. Eyes with a few minute hairs. Vertical diameter of eye about 8 times width of cheek in same axis. Proboscis shining brown; palpi brown.

**THORAX:** Dark reddish-brown dorsally, reddish-brown laterally, not shining dorsally but glossy laterally. No prescutellars; 3 strong dorsocentrals, anterior one presutural; 1 pair divergent scutellars; a bristle about half length of scutellars arising from about middle of lateral margin of scutellum; scutellum bare; humeral absent; 1 interalar just posterior to transverse suture; 2 notopleurals; 1 supraalar; 1 postalar; 2 sternopleurals; no propleural.

Legs brown; apices of femora, hind trochanter, bases of tibiae, basal half of hind tibia, and apical segments of tarsi light brown. Mid tibia with weak apical.

**Wings** (Fig. 326) clear; veins light brown. Fifth vein not thickened. Costal index about 0.09.

Halteres light yellow.

**ABDOMEN:** Basal tergites blackish-brown; apical tergites and sternites light yellow. Genital arch brown.

**Holotype:** NELSON: Aniseed Valley, 1-4.xii.1923, ♂, (*A. Tonnoir*), (Cawt. Inst.).

**Material Examined:** Holotype and 3 ♀.

**New Records:** HEN ISLAND: 18-24.x.1923, 2 ♀, (*H. Hamilton*), (Dom. Mus.). WAITAKERE RANGES: 10.ii.1950, 1 ♀, (*M. Knight*), (P.D.D.).

**Distribution:** Hen Island, Waitakere Ranges, Nelson. (October, December, February).

**Remarks:** Separated from *A. crassinervis* by the absence of thickening of the fifth vein and from *A. levis* by the strong pubescence of the arista.

#### *Asteia levis* Hutton. Figs. 327, 330

*Asteia levis* Hutton, 1902. Trans. N.Z. Inst. 34 : 175. Malloch, 1930. Rec. Cant. [N.Z.] Mus. 3 : 231. Dumbleton, 1953. Trans. roy. Soc. N.Z. 81 : 239.

A brown or dark brown species. Body length about 2.5 mm., wing length about 3.0 mm.

#### MALE AND FEMALE

**HEAD** (Fig. 330): Arista brown; sparsely pubescent with rays well separated and less than diameter of basal segment. Antenna light brown; 3rd segment brown dorsally; 2nd segment with one dorsal bristle and row of short hairs on apical margin; basal segment small. Front brown, light brown anteriorly and dark brown at vertex; light brown band posteriorly from fronto-orbital to vertex. Convergent pair of small bristles at middle of anterior margin of front, ocellars, verticals, and the single fronto-orbital strong; postverticals represented by minute hairs. Face brown on dorsal third merging to dark brown ventrally, this area separated distinctly from the more ventral white band, and the ventral margin of face shining dark brown. Cheeks light brown. Row of strong hairs posterior to vibrissa and

small fine hairs on posterior region of cheek. Occiput dark brown. Eyes with a few hairs. Vertical diameter of eye about 5.5 times width of cheek in same axis. Proboscis light brown; palpi light brown with fine hairs.

**THORAX:** Shining brown; mesonotum dark brown with brown border and a light dusting of brownish-grey; all pleura with a light dusting. No prescutellars; 3 dorsocentrals, anterior just posterior to transverse suture; strong cruciate apical scutellars, no basal scutellars; scutellum bare, no humeral; no presutural; 2 notopleurals; 2 interalar and a small third anterior bristle; other pleura bare.

Legs shining light brown. Fore femur with long fine median bristle on postero-dorsal surface; mid tibia with small ventral apical.

Wings (Fig. 327) clear; veins light brown. Costal index about 0.14.

Halteres brown and light brown.

**ABDOMEN:** Dark brown basal tergites in both sexes, whitish-yellow and lightly chitinised apical tergites in both sexes, except, in males, the genital arch dark brown and heavily chitinised.

*Holotype:* STEWART ISLAND: no date, ♂, (Cawt. Inst.).

*Material Examined:* Holotype, 7 ♂, 16 ♀.

*New Records:* S.W. STEWART ISLAND: Solomons Island, Cave on south coast, 28.i.1955, 7 ♂, 16 ♀. (R. K. Dell and B. A. Holloway), (Dom. Mus.).

*Distribution:* Stewart Island, Paringa River area, Karitane. (September, November, January).

*Remarks:* Dumbleton (1953) gave notes on this species and stated that it is found at coastal localities. Separated from other species in New Zealand by the almost bare arista.

### **Asteia crassinervis** Malloch. Fig. 328

*Asteia crassinervis* Malloch, 1930. Rec. Cant. [N.Z.] Mus. 3: 232.

A species with shining brown head and thorax, and dull blackish-brown and yellowish-white abdomen. Body length about 2.0 mm.

#### FEMALE

**HEAD:** Arista brown; plumose, equal rays on dorsal and ventral surfaces of main axis about 3 times diameter of basal segment. Antenna brown; 3rd segment dark brown on apical and dorsal sector, circular; 2nd segment dark brown dorsally with a long dorsal bristle, minute black hairs along inner apical margin and long light brown hairs at ventral apex; basal segment with fine light brown hairs. Front parallel sided, shining brown, light brown anteriorly; ocellar area dark brown. One strong fronto-orbital: a pair of convergent strong hairs at middle of anterior margin of front; few fine light brown hairs on front; other frontal bristles absent or represented by minute hairs. Face brown on dorsal half; ventral half with broad white band bordered dorsally and ventrally by blackish-brown bands, the ventral band shining; dorso-ventral median line depressed; no carina. Cheeks shining brown. Short hairs over most of cheek; 1 small bristle at posterior corner of cheek about half length of vibrissa. Occiput shining brown, strongly concave. Eyes with a few very minute hairs. Vertical diameter of eye about 7 times width of cheek in same axis. Proboscis shining brown; palpi light brown with long hairs particularly on basal half.

**THORAX:** Shining brown; mesonotum with a light dusting. No prescutellars; 3 dorsocentrals, anterior one presutural; 1 pair of scutellars; scutellum bare; no humeral; no presutural; 2 notopleurals; 1 postalar; 2 sternopleurals; no prepleural.

Legs shining yellowish-brown; fore femur light brown, fore femur with bristles on postero-dorsal surface.

Wings (Fig. 328) clear; veins light brown. Fifth vein thickened from level of cross vein to mid way to apex. Costal index about 0.08.

Halteres light brown.

**ABDOMEN:** Tergites 1 to 4 blackish-brown; apical tergites and all sternites yellowish-white.

*Holotype*: MT. ARTHUR: 4,000 ft., 28.xii.1921, ♀, (*A. Tonnoir*), (Cawt. Inst.).

*Material Examined*: Holotype.

*Distribution*: Mt. Arthur. (December).

*Remarks*: The holotype is now in poor condition, one wing and most of the other wing has been destroyed, and characters not now discernible have been taken from Malloch's original description. Separated from the other two New Zealand species by the marked thickening of the fifth vein.

## Family DROSOPHILIDAE

Arista plumose, pectinate, or pubescent. Third antennal segment rounded or oval. Front with conspicuous bristles. Postverticals convergent. Face with distinct antennal fossae and a carina. Vibrissa present. Costa twice broken; subcosta vestigial; first vein short; discal and second basal cells united; anal cell present.

Distinguished and separated from other families by having two costal breaks, discal and second basal cell united, subcosta vestigial, anal cell present, arista usually plumose with rays dorsally and ventrally on main axis, and convergent postverticals.

*Genera Occurring in New Zealand*:

*Drosophila* Fallén

*Scaptomyza* Hardy

Hutton (1901) first recorded and described New Zealand representatives of the family and Harrison (1952) described the domestic species of the genus *Drosophila* in New Zealand. None of the species considered up to 1952, with the possible exception of *D. marmorata* Hutton, is endemic. Endemic species are recorded here for the first time.

A species of *Leucophenga* was recorded by Miller (1921). This is shown below to be a *Drosophila* and as yet no true member of *Leucophenga* has been found in New Zealand. *Scaptomyza* has not previously been recorded from New Zealand.

Species additional to those recorded below are present in New Zealand but as they are represented in collections by few specimens and have not been examined in the live state, their description is postponed until further material is available. The subgenus *Pholadoris* and the *obscura* group of species appears to be represented in the undescribed material. In most New Zealand collections *Drosophilidae* are poorly represented. Compared with other families these flies are rarely taken in the sweep net and it is only when special collecting procedures are practised, such as the use of banana-baited traps, that large numbers are obtained. Such collecting has been confined, so far, to the Auckland district. When trapping can be extended in other areas of New Zealand a more complete picture of the fauna will be obtained.

### KEY TO GENERA OF DROSOPHILIDAE OCCURRING IN NEW ZEALAND

Two or 4 rows of acrostichal hairs ..... SCAPTOMYZA (p. 284)  
At least 6 rows of acrostichal hairs ..... DROSOPHILA (p. 289)

## Genus SCAPTOMYZA Hardy

*Scaptomyza* Hardy, 1849. Hist. Berwicksh. Nat. Cl. p. 361.

Occiput distinctly convex. Two or 4 rows of acrostichal hairs in front of transverse suture, 2 between dorsocentral bristles; prescutellars always absent. Thorax, abdomen, and wings slender.

Type Species: *Scaptomyza graminum* (Fallén)

Closely allied to *Drosophila* Fallén and separated by the characters given above, chief of which is the number of rows of acrostichal hairs.

*Distribution:* World wide.

*Species Occurring in New Zealand:*

*Scaptomyza flavella* sp.n.

*S. fuscitarsis* sp.n.

*S. graminum* (Fallén)

Not previously recorded from New Zealand. *S. graminum* is the most widespread species in the genus and has probably been introduced to New Zealand through commerce. The other two species are possibly endemic.

These species are most frequently collected by sweeping over foliage, and are regarded as leaf miners in grasses. *S. graminum* can be bred in the laboratory on unyeasted cultures, but *S. fuscitarsis*, the only other species which has been available as live material, has failed to culture.

### KEY TO SPECIES OF SCAPTOMYZA IN NEW ZEALAND

- |   |                    |
|---|--------------------|
| 1 Entirely yellow species .....                     | <b>flavella</b>    |
| Brown to black species .....                        | 2                  |
| 2 Dorsal surface of scutellum almost flat .....     | <b>graminum</b>    |
| Dorsal surface of scutellum distinctly convex ..... | <b>fuscitarsis</b> |

### *Scaptomyza flavella* sp.n. Figs. 333, 336, 338

A yellow species. Body length 2.75–3.0 mm., wing length 2.75–3.0 mm.

#### MALE AND FEMALE

HEAD (Fig. 338): Arista with 7 branches, two below in addition to the terminal fork; axis dark brown with basal segment light yellow. Antenna yellow; 3rd segment longer than 2nd segment, covered with fine white pile; 2nd segment with 2 strong black bristles and small black hairs. Front yellow, over half width of head at vertex; ocellar triangle small, enclosing ocelli and ocellar bristles and hairs, whitish-grey dusted; area between ocelli distinctly raised above level of front; ocelli clear; orbits light greyish-brown, pollinose. Postverticals cruciate; ratio of length of fronto-orbitals, anterior to posterior, 3 : 2 : 4; anterior reclinate bristle much closer to proclinate than to posterior reclinate and lateral to it; 1 small hair on frontal orbit anterior to orbitals; about 8 small black hairs near anterior median margin of front. Face yellowish-white. Carina wedge shaped, broad and prominent below; not sulcate. Cheeks yellowish-white. Vibrissa strong; 2nd oral bristle equal to vibrissa; 3 prominent bristles at lower posterior angle of cheek. Occiput yellow, bunch of black hairs immediately above foramen. Eyes dark red in pinned specimens; covered with short, whitish pile. Vertical diameter of eye about 5 times width of cheek in same axis. Proboscis yellow; palpi light yellow with 2 apical fine bristles, 1 longer than the other, and a few fine bristles on anterior margin.

THORAX: Yellowish-brown; scutellum yellowish-brown, flat disc. Acrostichal hairs in 2 rows; 2 enlarged hairs anterior to anterior dorsocentrals; basal scutellars divergent, equal in length to apical scutellars, both pairs strong; 1 strong humeral and 1 strong hair close to it; 2 enlarged hairs medial to presutural, 2 prominent sternopleurals, 1 enlarged hair dorsal to posterior bristle; sterno-index about 0.63.



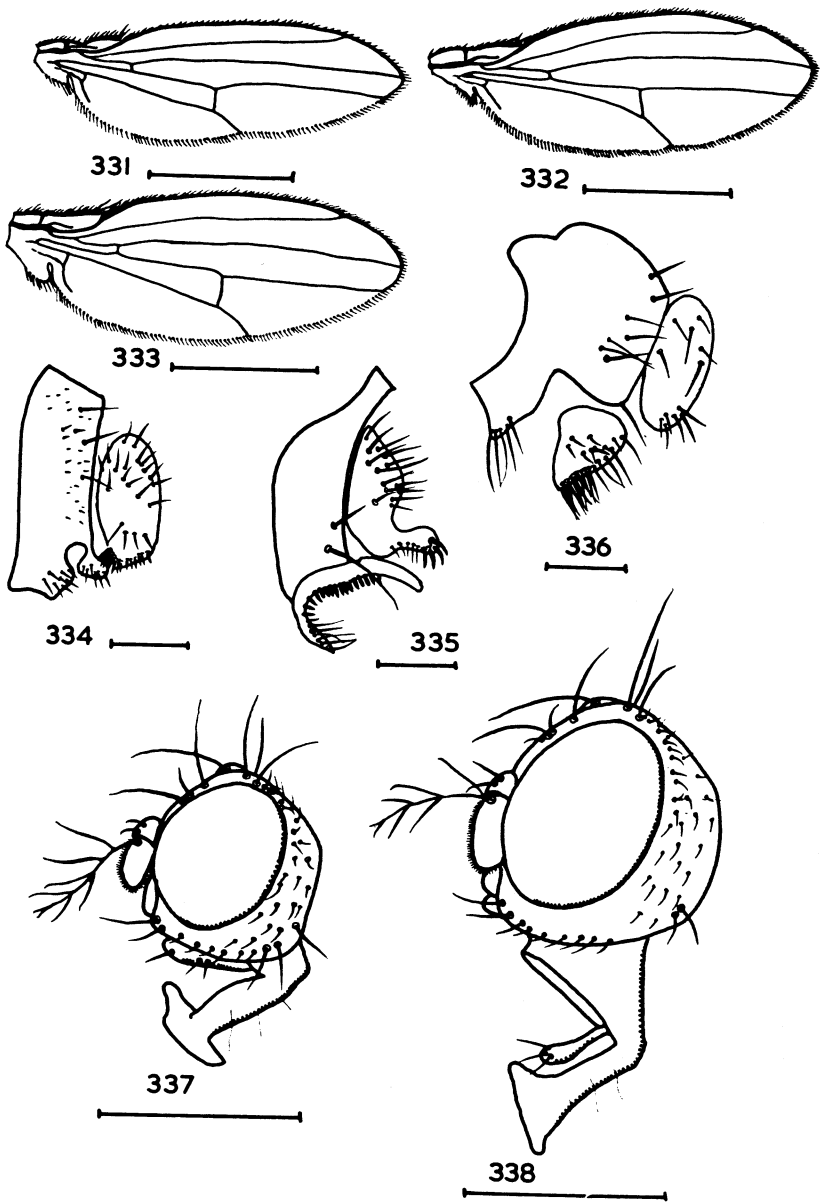


Fig. 331. Wing of *Scaptomyza fuscitarsis*  
 .. 332. " " *S. graminum*  
 .. 333. " " *S. flavella*  
 .. 334. External male genitalia of *S. fuscitarsis*  
 .. 335. " " " *S. graminum*  
 .. 336. " " " *S. flavella*  
 .. 337. Head of *S. fuscitarsis*  
 .. 338. " " *S. flavella*

Scale: Figs. 331-333, 1.0 mm.; Figs. 334-336, 0.1 mm.; Figs. 337-338, 0.5 mm.

Legs yellowish-brown; apical segments of tarsi light brown. Apical bristle on 1st and 2nd tibiae; preapicals on all three tibiae.

Wings (Fig. 333) clear; veins light brown. Costa ending at apex of 4th vein but weakened between 3rd and 4th veins; third costal section with heavy bristles on basal three-fifths; pair of strong bristles at distal costal break. Wing indices: costal about 3.5-3.7; 4th vein about 1.6; 4c about 0.6; 5x about 1.8.

Halteres yellowish-brown.

**ABDOMEN:** Yellowish-white. Strong bristles on posterior margin of tergites, small black hairs elsewhere on tergites.

External male genitalia (Fig. 336): Genital arch lightly chitinised, parallel sided, with about 6 bristles near middle on either side; anal plate brown posteriorly, about 20 strong bristles and a cluster of fine short bristles at ventral margin; clasper with row of about 8 very strong black teeth and a subapical row of about 8 shorter stout black teeth with fine bristles between these teeth and between the rows of teeth.

*Holotype:* MOKO HINAU ISLANDS: Lizard Island, swept, 23.viii.1955, ♂, (R. A. Harrison), (P.D.D.).

*Paratypes:* MOKO HINAU ISLANDS: Lizard Island, swept, 23.viii.1955, 1♂; Burgess Island, 24.viii.1955, 1♂, (R. A. Harrison), (P.D.D.). BANKS PENINSULA: Charteris Bay, 21.ix.1955, 1♀, (A. Tonnoir), (Cant. Mus.).

*Material Examined:* Holotype, 2♂ and 1♀ paratypes.

*Distribution:* Moko Hinau Islands, Banks Peninsula. (August, September).

*Remarks:* Separated from *S. graminum* and *S. fuscitarsis* by the yellow colour, higher costal index, greater size, and, in males, by distinctive characters of the external genitalia.

### **Scaptomyza graminum** (Fallén). Figs. 332, 335

*Drosophila graminum* Fallén, 1823. "Dipt. Suec. Geomyz." 8: 11.

*Scaptomyza graminum* (Fallén): Hardy, 1849. Hist. Berwicksh. Nat. Cl. p. 349.

A small light brown to greyish species. Body length 2.0-2.25 mm., wing length 2.0-2.75 mm.

#### MALE AND FEMALE

**HEAD:** Arista with about 7 branches, usually only 1 below in addition to the terminal fork; axis dark brown, basal segment light brown. Antenna light brown; 3rd segment dark on outer margin; 2nd segment darker on outer margin, with 2 bristles and smaller black hairs. Front brown posteriorly and medianly, yellowish-brown anteriorly; about half width of head at vertex; area between ocelli almost black in some specimens and raised above level of front; ocelli clear; frontal orbits greyish-brown about bristles, yellowish-brown anteriorly. Ratio of lengths of orbitals, anterior to posterior, about 7:3:9; anterior reclinate lateral to and just anterior to or level with proclinate; 1 or 2 small hairs on frontal orbit anterior to orbitals; a few minute hairs on median anterior region of front. Face yellowish-brown. Carina brown, narrow, ridge shaped, but slightly broader and nose-like below. Cheeks light yellow. Vibrissa strong; 2nd oral bristle about half length of vibrissa; 3 or 4 prominent bristles at lower angle of cheek. Occiput grey to dark purplish-grey. Eyes dark red in pinned specimens; covered with dense light-coloured pile. Vertical diameter of eye about 6 times width of cheek in same axis. Proboscis yellowish-brown; palpi with 1 strong apical bristle and some smaller black hairs.

**THORAX:** Light brownish-grey to purplish-grey, dusted dorsally, sometimes lighter laterally, and yellowish-brown ventrally; broad light-coloured stripes on mesonotum extending from acrostichal rows through dorsocentral row to 1st row of hairs outside of the dorsocentral row; scutellum greyish-brown, almost flat disc.

Acrostichal hairs in 2 rows; 2 enlarged hairs anterior to anterior dorsocentrals; basal scutellars divergent, equal in length to apicals, both pairs strong; 1 strong humeral; 2 prominent sternopleurals, 1 enlarged hair dorsal to posterior bristle; sterno-index about 0.5.

Legs yellowish-brown; tarsi faintly but not distinctly darkened towards tip; preapical bristles on all tibiae; apicals on 1st and 2nd only.

Wings (Fig. 332) clear; veins light brown; costal ending at apex of 4th vein; third costal section with heavy bristles on its basal third; pair of strong bristles at distal costal break; 3rd vein with a slight bend posteriorly near apex, thus narrowing the 1st posterior cell somewhat. Wing indices: costal about 3.2; 4th vein about 1.7; 4c about 0.75; 5x about 1.3.

Halteres yellowish-greyish-brown.

**ABDOMEN:** Varies from light brown to blackish-brown, shining. Lightest areas occur about median region of anterior tergites, apical tergites the darkest and often almost completely black. Sternites light yellow.

External male genitalia (Fig. 335): Genital arch narrow dorsally, heavily chitinised anteriorly and posteriorly on dorsal half, ventral margin concave and produced posteriorly and anteriorly, 2 strong bristles at postero-ventral and antero-ventral regions; anal plate normal and oval on dorsal half and with bristles over most of this surface, ventral half modified to a posteriorly directed auxiliary clasper with 4 very strong apical teeth and a cluster of small bristles about them; clasper crescent shaped and fitting into ventral margin of arch, apical margin with strong teeth and bristles.

*Holotype:* Europe.

*Material Examined:* 5 ♂, 8 ♀, and 3 ex.

*New Records:* WAITAKERE RANGES: Swanson, ex stream, 11.xii.1949, 1 ♂, (*R. A. Harrison*). AUCKLAND: Owairaka, 26.vi.1940, 1 ex.; 3.vii.1940, 1 ex. (*D. Spiller*); 28.iii.1951, 1 ♀, (*R. A. Harrison*): Mt. Albert, 14.xii.1948, 1 ♀, (*D. Hard*): Green Lane, 18.i.1949, 1 ♀; 11.vi.1949, 1 ♂; on nasturtium, 15.viii.1948, 2 ♀, (*K. P. Lamb*): Avondale, 20.viii.1950, 1 ♂, 1 ♀, (*R. A. Harrison*): Browns Bay, 14.viii.1949, 1 ♂; (*R. A. Harrison*), (P.D.D.). PUKEKOHE: Swept off carrots, 11.viii.1952, 1 ♂, (*R. A. Harrison*) (P.D.D.). THE BROTHERS ISLANDS: 7.x.1954, 1 ♀, (*R. Ornduff*), (Cawt. Inst.). CHRISTCHURCH: 12.vii.1924, 1 ex. (*A. Tonnoir*), (Cant. Mus.). NO DATA: 15.v.1922, 1 ♀, (*D. Miller*), (Cawt. Inst.).

*Distribution in New Zealand:* Waitakere Ranges, Auckland, Pukekohe, Christchurch, The Brothers Islands. (July, August, October, December, January, March, May, June).

*Remarks:* Separated from *S. fuscitarsis* by having the scutellum almost flat dorsally and from *S. flavella* by its smaller size, darker colour, and lower costal index.

### *Scaptomyza fuscitarsis* sp.n. Figs. 331, 334, 337

A slender shining fly, usually black but varies from brown to black. Body length 1.75–2.25 mm., wing length 1.75–2.5 mm.

#### MALE AND FEMALE

**HEAD** (Fig. 337): Arista with 7 branches, 2 below in addition to the terminal fork; axis black, basal segment light brown. Antenna yellowish-brown, occasionally reddish-brown; 3rd segment somewhat pointed apically and about equal in length to 2nd segment; 2nd segment with 2 bristles and some minute black hairs. Front light yellowish-brown to dark brown occasionally tinged with red; dark and, in some lights, grey dusted at vertex; anterior region frequently light brown; orbits grey to dark brown, lighter anteriorly; area between ocelli dark brown to black and raised above level of front; ocelli clear. Ratio of lengths of orbitals, anterior to posterior, 2 : 1 : 3; anterior reclinate lateral to and level with or just

posterior to proclinate; usually 1 small hair on frontal orbit anterior to orbitals; a few minute black hairs on median anterior region of front. Face yellowish-brown, occasionally light yellow. Carina ridged, not sulcate, sometimes with a brown stripe on ridge. Cheeks yellowish-brown, black posteriorly. Vibrissa strong; 2nd oral bristle usually distinct from other hairs and third to half length of vibrissa; 3 prominent bristles at lower angle of cheek. Occiput brown or greyish-black with lightly dusted bands extending from vertex, at either side of ocelli to foramen. Eyes dull red in pinned specimens; covered with dense whitish pile. Vertical diameter of eye about 6 times width of cheek in same axis. Proboscis light yellowish-brown; palpi with 1 strong apical and 2 or 3 small bristles on anterior margin of apical third.

**THORAX:** Brown to purplish-black with much grey dusting dorsally and laterally, light ventrally; no pattern of stripes except lighter specimens have indications of yellowish-brown areas between the acrostichal and dorsocentral rows anteriorly; scutellum same colour as mesonotum, with distinctly convex disc. Acrostichal hairs in 2 rows; 2 enlarged hairs anterior to dorsocentrals; basal scutellars divergent and equal to or longer than apical scutellars, both pairs strong; 1 humeral and often 1 enlarged hair; 2 sternopleurals; sterno-index about 0.5.

Legs light yellowish-brown; anterior tarsus with apical three segments dark brown or black; other tarsi darkening gradually towards apices. Preapicals on all tibiae; apicals on 1st and 2nd tibiae only.

Wings (Fig. 331) clear; veins light brown. Costa ending at apex of 4th vein but weakened between 3rd and 4th vein; 3rd costal section with heavy bristles on its basal two-thirds; pair of strong bristles at distal costal break. Wing indices: costal about 2.5-3.1; 4th vein about 1.9; 4c about 0.9; 5x about 1.6.

Halteres light yellow, darkened basally.

**ABDOMEN:** Shining blackish-brown with lighter area anteriorly. In the light-coloured specimens the anterior tergites may be brown, or even yellowish-brown dorsally, but apical segments and lateral regions of anterior segments are always dark brown.

External male genitalia (Fig. 334): Genital arch broad and parallel sided, about 3 bristles near middle of posterior margin, cluster of short bristles along ventral margin, narrow posteriorly directed arm arising near postero-ventral corner; anal plate ovoid, bristles over most of surface except at middle; shorter and thicker bristles clustered about ventral margin; clasper small with very short almost tooth-like bristles on ventral margin.

**Holotype:** AUCKLAND: Browns Bay; swept off *Leptospermum* foliage 14.viii.1949, ♀, (R. A. Harrison), (P.D.D.).

**Paratypes:** AUCKLAND: Browns Bay, swept off *Leptospermum* foliage, 14.vii.1949, 1 ♂, 2 ♀; Browns Bay, 1.v.1949, 1 ♂; 17.vii.1949, 1 ♂, 2 ♀; swept off foliage, 28.v.1950, 1 ♂; Browns Bay, 15.ix.1951, 1 ♂, 1 ♀, (R. A. Harrison), (P.D.D.); Owairaka, 28.i.1940, 1 ♀; 20.vi.1940, 1 ♀, (D. Spiller), (P.D.D.); Mangere, 28.xii.1949, 1 ♀; Green Lane, 28.xii.1948, 1 ♀; -viii.1949, 1 ♀; 23.x.1949, 3 ♀; 27.x.1949, 1 ♀, 1 ♂, (K. P. Lamb), (P.D.D.); Avondale, 2.vi.1949, 1 ♂; Ellerslie, swept off chrysanthemums, 17.xii.1953, 2 ♀, (K. A. J. Wise), (P.D.D.). PUKEKOHE: swept off carrots, 11.vii.1952, 1 ♂, (R. A. Harrison), (P.D.D.). PALMERSTON NORTH: flying around rotting swedes, 16.x.1930, 1 ♂, (W. Cottier), (P.D.D.). BANKS PENINSULA: Charteris Bay, 21.ix.1925, 1 ♀, (A. L. Tonnoir), (Cant. Mus.). CHRISTCHURCH: 10.xi.1924, 1 ♀, (A. L. Tonnoir), (Cant. Mus.). OKARAHIA: 5.ii.1925, 1 ♂, (A. L. Tonnoir), (Cant. Mus.).

**Additional Specimens:** AUCKLAND: Owairaka, 26.vi.1940, 2 ex., (D. Spiller); carrot cage in insectary, 25.ix.1942, 1 ex., (T. R. Rabone); Avondale, 2.vii.1949, 3 ex., (R. A. Harrison); Green Lane, 27.x.1949, 1 ex., (K. P. Lamb), (P.D.D.). PALMERSTON NORTH: flying around rotting swede, 16.x.1950, 1 ex.; on new swede area, 5.vi.-

1931, 1 ex., (*W. Cottier*), (P.D.D.). ROXBURGH: swept off grass, 6.ix.1953, 1 ♂, 1 ♀, (*R. A. Harrison*), (P.D.D.).

*Material Examined*: Holotype, 10 ♂ and 18 ♀ paratypes, 1 ♂, 1 ♀, and 9 ex.

*Distribution*: Auckland, Pukekohe, Palmerston North, Christchurch, Banks Peninsula, Okarahia, Roxburgh. (All the year).

*Remarks*: Readily separated from *S. graminum* and *S. flavella* by the distinctly convex scutellum.

## Genus DROSOPHILA Fallén

*Drosophila* Fallén, 1823. "Dipt. Suec. Geomyz." 2 : 4.

Arista plumose. Postverticals large; ocellars present; 3 fronto-orbitals, anterior proclinate, dorsal two reclinate, middle one smallest of the three. Prescutellars present or absent; 2 dorsocentrals; 2 pairs of scutellars; scutellum bare; 1 presutural; 2 notopleurals; 2 supraalars; 2 postalars, mesopleuron bare; 6 or 8 rows of acrostichal hairs anterior to anterior dorsocentral. Preapical bristles usually on hind tibia. Costa extending to 4th vein; 2 bristles on costa just basal to distal costal break.

Type Species: *Drosophila funebris* (Fabricius)

Readily recognised by the plumose arista, three fronto-orbitals including both proclinate and reclinate bristles. Separated from *Scaptomyza* by the presence of at least six rows of acrostichal hairs anterior to the anterior dorsocentral bristles.

*Distribution*: World wide.

*Subgenera Occurring in New Zealand*:

*Dorsilopha* Sturtevant

*Drosophila* Fallén

*Pholadoris* Sturtevant

*Sophophora* Sturtevant

Intensive taxonomic studies on the genus in recent years has resulted in subgenera diagnoses being based on larval, pupal, and internal adult characters as well as normal external adult characters.

### KEY TO SPECIES OF DROSOPHILA IN NEW ZEALAND

- |   |  |                     |
|---|--|---------------------|
| 1 | Prescutellars present  | <b>neozelandica</b> |
|   | Prescutellars absent   | 2                   |
| 2 | Mesonotum distinctly marked with spots or stripes  | 3                   |
|   | Mesonotum not distinctly marked  | 5                   |
| 3 | Mesonotum grey with dark brown spots at base of hairs and bristles   | 4                   |
|   | Mesonotum yellowish-brown with dark brown longitudinal vittae  | <b>busckii</b>      |
| 4 | Costa darkened at distal break   | <b>repleta</b>      |
|   | Costa not darkened at distal break   | <b>hydei</b>        |
| 5 | Yellowish-brown species  | 6                   |
|   | Dark brown or brown species  | <b>kirki</b>        |
| 6 | Costal index less than 3.0   | 7                   |
|   | Costal index greater than 3.0  | 8                   |
| 7 | Vertical diameter of eye about 7 or 8 times width of cheek in same axis. Genital arch of male with large posterior process | <b>simulans</b>     |
|   | Vertical diameter of eye about 5 times width of cheek in same axis. Genital arch of male with small posterior process      | <b>melanogaster</b> |

- 8 Fore femur with row of short stout spines on apical half of antero-ventral surface ..... **immigrans**  
 Fore femur without short stout spines ..... **funebis**

### Subgenus PHOLADORIS Sturtevant

*Pholadoris* Sturtevant, 1942. Univ. Tex. Publ. 4213 : 28.

Wheeler, 1949. Univ. Tex. Publ. 4920 : 143-56.

Shining dark brown or yellow species; egg filaments 4 to 10, usually 6 to 8; skipping larvae; anterior spiracle of puparium borne on extremely short stalk or none at all; branches of anterior spiracle 4 to 8; posterior spiracles tightly parallel or closed; pupation in or near cotton stoppers in laboratory vials; acrostichal hairs in 6 or 8 rows; prescutellars present; upper series of frontal hairs with their bases arranged in a rough V; arista with 7 to 8 branches, 2 below in addition to the terminal fork; 2nd oral short, usually less than half 1st; sterno-index 0.7-0.9; middle sternopleural usually well developed; costal index usually less than 2.0; 4th vein index 2.2-2.4; cheeks narrow, one-sixth to one-tenth greatest diameter of eyes; anterior Malpighian tubes much longer than posterior; posterior tubes apposed at their ends forming a ring around the gut but without a continuous lumen; testes elliptical; ventral receptacle short, finger-like; male genitalia with bristled genital arch, bristled anal plate which is not attached to the arch, and clasper with a single row of primary teeth; male hypopygium recessed in abdomen.

Type Species: *Drosophila (Pholadoris) victoriae* Sturtevant.

The subgeneric diagnosis above is after Wheeler (1949). Most readily separated from other subgenera by the presence of prescutellar bristles.

*Species Occurring in New Zealand: Drosophila (Pholadoris) neozelandica* sp.n.

### *Drosophila neozelandica* sp.n. Figs. 339 to 345

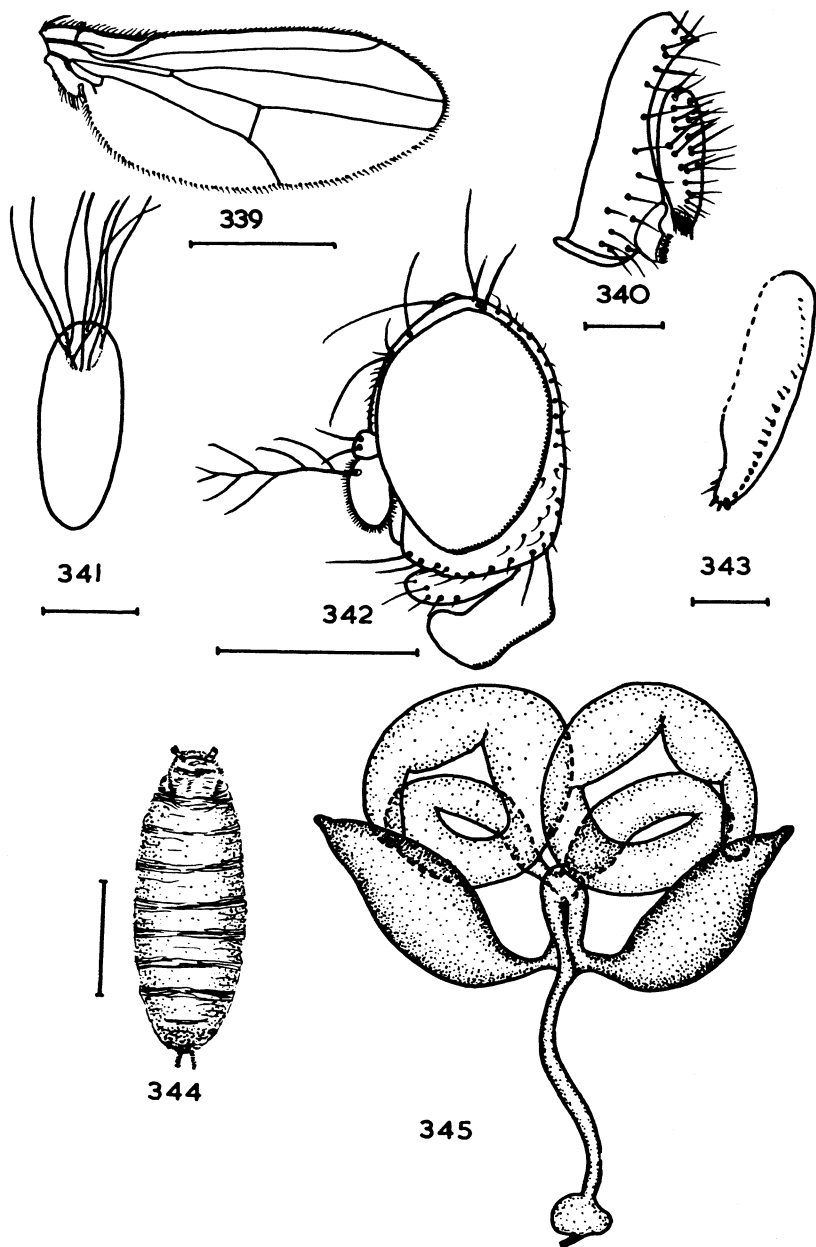
A brown species with dark brown abdomen. Body length about 2.5 mm., wing length about 2.75 mm.

#### MALE AND FEMALE

HEAD (Fig. 342): Arista shining blackish-brown, basal segments light brown; 7 branches, 2 below in addition to the terminal fork. Antenna yellowish-brown; 3rd segment brown with fine brown pile; 2nd segment with 2 dorsal bristles and small black hairs; basal segment with few apical dorsal hairs. Front light brown posteriorly; yellowish-brown anteriorly; orbits about verticals and fronto-orbital bristles distinctly dusted; ocellar area dusted; brown spot between and just posterior to the two posterior ocelli. Ratio of length of fronto-orbitals, anterior to posterior, 2 : 1 : 2; anterior bristle reclinate, lateral and just posterior to proclinate; ocellars and verticals strong; postverticals weaker. Face dusted with light yellowish-brown; carina prominent and sulcate dorsally. Cheeks light brown. Second oral bristle about half length of vibrissa; 2 bristles at lower posterior corner of cheek. Occiput greyish-brown. Eyes haired. Vertical diameter of eye about 8 times width of cheek in same axis. Proboscis light brown; palpi yellowish-brown.

THORAX: Brown; mesonotum dusted. Prescutellars about half length of posterior dorsocentrals; enlarged hairs anterior to prescutellars; acrostichal hairs in 8 rows immediately anterior to anterior dorsocentral; anterior dorsocentral about three-fifths posterior, hairs in dorsocentral rows slightly enlarged; cruciate apical scutellars about three-quarters length of divergent basals, basals about half way from scutellar suture to insertion of apicals; 2 strong and 1 weak ventral humerals; presutural with 1 or 2 enlarged hairs median to it; 2 supraalar, ventral of pair weak; 2 postalar, ventral of pair the stronger; 3 sternopleurals, the two dorsal ones about equal, the ventral one directly below posterior dorsal bristle, sterno-index about 0.8.

Legs light brown. Fore femur with strong bristles on postero-dorsal and postero-ventral surfaces; fore tibia with preapical and apical.



Figs. 339-345, *Drosophila neozelandica*:

- |                              |                              |
|------------------------------|------------------------------|
| 339. Wing                    | 343. Female genital plate    |
| 340. External male genitalia | 344. Puparium                |
| 341. Egg                     | 345. Internal male genitalia |
| 342. Head                    |                              |

Scale: Figs. 339, 344, 1.0 mm.; Figs. 340, 343, 0.1 mm.;  
 Fig. 341, 0.25 mm.; Fig. 342, 0.5 mm.

Wings (Fig. 339) clear; veins brown. One strong and 1 weak bristle at distal costal break; stout costal spines extending half distance between apices of 2nd and 3rd veins. Wing indices: costal about 2.9; 4th vein about 2.0; 4c about 0.9; 5x about 1.7.

Halteres light yellow.

ABDOMEN: Tergites yellowish-brown anteriorly, blackish-brown posteriorly; the posterior band produced to anterior margin narrowly at centre and at lateral margins. Variations of width of the blackish-brown band occur within the same population: in dark specimens this band extends over most of tergites especially the basal ones.

External male genitalia (Fig. 340) lightly chitinised. Genital arch relatively narrow, somewhat broader ventrally, about 20 bristles on either side, only few of these on middle region, ventral margin more heavily chitinised than rest of plate and produced anteriorly into a small anterior projection; anal plate about two-thirds height of arch, about 35 to 40 normal bristles on dorsal four-fifths and a cluster of shorter thicker bristles on ventral fifth; clasper more heavily chitinised than arch or anal plate, triangular in shape, base facing posteriorly with a series of about 10 thick short teeth on ventral two-thirds of this margin and with about 4 short bristles arising between or near teeth.

Female genital plates (Fig. 343): Long spines near apex and short stout spines elsewhere.

INTERNAL CHARACTERS: Malpighian tubes about equal in length, common stalk of both anterior and posterior pair about one-sixth total length, tips of posterior pair opposed. Testes (Fig. 345) elliptical, reddish-orange. Spermathecae large, with small, heavily chitinised centres. Ventral receptacle small, angled greater than 90°.

EGG (Fig. 341): Filaments two-thirds to three-quarters length of egg. Seven to 10 filaments, usually 8.

LARVA: White. Skip.

PUPA (Fig. 344): Anterior spiracles minute. Pupation takes place in cotton plug of culture vessel.

*Holotype*: WAITAKERE RANGES: Nihotupu, 2.i.1950, ♂, (*R. A. Harrison*), (P.D.D.).

*Paratypes*: LITTLE BARRIER ISLAND: —.xi.1954, 2 ♀. WAITAKERE RANGES: Nihotupu, ex banana trap, 5.ii.1953, 3 ♀; swept, 17.ii.1954, 3 ♀; swept, 9.iii.1955, 3 ♀; ex banana trap, 5.ii.1953, parent ♀ and 2 F1 ♀; Oratia, ex banana trap, 14.xii.1952, 2 ♀, (*R. A. Harrison*), (P.D.D.).

*Other Records*: LITTLE BARRIER ISLAND: Waipawa Stream, ex banana trap, 27.xi.1954, 1 ♂, 2 ♀, (*R. A. Harrison*). WAITAKERE RANGES: Nihotupu, banana-baited trap, 5.ii.1953, 6 ♀; 16.iii.53, 67 ♀; 23.iii.1955, 5 ♂, 57 ♀; 30.iii.1955, 5 ♂, 440 ♀; 6.iv.1955, 7 ♂, 292 ♀; 14.iv.1955, 2 ♂, 28 ♀; 27.iv.1955, 2 ♂, 18 ♀; 4.v.1955, 5 ♀; 8.vi.1955, 1 ♂, 3 ♀; 15.vi.1955, 4 ♀; 29.vi.1944, 1 ♂; 7.vii.1955, 1 ♀; 13.vii.1955, 1 ♀; 10.viii.1955, 3 ♀; 31.viii.1955, 4 ♀; 7.ix.1955, 1 ♀; 14.ix.1955, 4 ♀; 21.ix.1955, 2 ♂, 32 ♀; 29.ix.1955, 13 ♀; 4.x.1955, 16 ♀; 10.x.1955, 4 ♂, 74 ♀; 17.x.1955, 1 ♂, 10 ♀; Nihotupu, swept off foliage, 9.iii.1953, 4 ♂, 3 ♀; 12.ii.1954, 2 ♂, 3 ♀; Oratia, 14.xii.1952, 1 ♀; Titirangi, banana-baited trap, 14.xii.1953, 1 ♀, (*R. A. Harrison*); Titirangi, ex light trap, 7.vii.1953, 2 ♀, (*C. R. Thomas*). AUCKLAND: Henderson, banana-baited trap, 14.i.1955, 1 ♀, (*K. A. J. Wise*), (P.D.D.).

*Material Examined*: Holotype, 16 ♀ paratypes, and 37 ♂, and 1092 ♀.

*Distribution*: Little Barrier Island, Waitakere Ranges, Auckland. (All the year).



*Remarks:* Agrees with the definition of the *victoria* group of species as given by Wheeler (1949) in having divergent basal scutellars, a projection on the antero-ventral corner of the genital arch and the anal plate with dense mass of bristles at the ventral margin. However it differs from that group by having eight rows of acrostichals, the common trunk of the posterior Malpighian tubules about one-sixth total length of tubules, and by the absence of a ventrally directed extension beyond the teeth of the clasper. Mather (1955) defined the *coracina* group of species with which *D. neozelandica* agrees in having eight acrostichals, divergent basal scutellars, and the absence of a projection beyond the clasper teeth. The costal index of *D. neozelandica* conforms with that of the Australian members of the *coracina* group in being greater than 2.0, but not with *D. coracina* itself, which has a costal index of 1.5. It differs from this species group by having a dense cluster of bristles at the ventral margin of the anal plate and by the presence of bristles on the whole length of the genital arch. The affinities of *D. neozelandica* with the *mirim*, *maculosa*, and *levis* groups is not close and it thus cannot be placed definitely in any of the groups as yet proposed. Breeds in laboratory cultures but not easily bred through several generations. Oviposition by wild females is usually prompt and plentiful but a large mortality occurs at pupation time.

#### Subgenus DORSILOPHA Sturtevant

*Dorsilopha* Sturtevant, 1942. Univ. Tex. Publ. 4213 : 28.

Yellowish species, mesonotum longitudinally striped; preapicals not evident on 2nd and 3rd tibiae; larvae with dorsal processes; 4 egg-filaments; posterior Malpighian tubes fused; ventral receptacle not kinky; sterno-index about 0.3.

Type Species: *Drosophila (Dorsilopha) busckii* Coquillet

The subgeneric diagnosis given above is after Sturtevant (1942).

Separated from other subgenera most readily by the presence of distinct brown longitudinal vittae on thorax.

*Species Occurring in New Zealand:* *Drosophila (Dorsilopha) busckii* Coquillet

#### ***Drosophila busckii* Coquillet. Figs. 346, 352, 363**

*Drosophila busckii* Coquillet, 1901. Ent. News 12 : 18. Harrison, 1952. Trans. roy. Soc. N.Z. 79 : 507.

*Drosophila rubrostriata* Becker, 1908. Mitt. zool. Mus. Berl. 4 : 155.

*Drosophila plurilineata* Villeneuve, 1911. Wien. Ent. Ztg. 30 : 38.

A yellowish-brown species with distinctive dark brown bands on thorax. Body length about 2.0–2.5 mm., wing length about 2.0–2.5 mm.

#### MALE AND FEMALE

**HEAD:** Arista blackish-brown, basal segment yellowish-brown with 9 branches, 2 below in addition to the terminal fork. Third segment of antenna dark brown; 2nd segment yellowish-brown with about 2 dorsal bristles. Front yellowish-brown with a silvery-grey ocellar triangle, yellowish-white or grey orbits and anterior margin of front, ocellar area dark brown. Ratio of fronto-orbitals, anterior to posterior, 3 : 2 : 4; anterior reclinate bristle lateral to and level with, just posterior to or anterior to proclinate bristle; 1 or 2 small hairs posterior to 2 anterior orbitals and row of hairs extending anteriorly from these bristles along orbits;

hairs on anterior region of front. Face light yellow; carina narrow, not sulcate. Cheeks light yellow. Second oral bristle about seven-eighths length of vibrissa; about 3 strong bristles at lower posterior corner of cheek about half length of vibrissa. Occiput brown. Eyes thickly haired. Vertical diameter of eye about 4 times width of cheek in same axis. Proboscis yellow; palpi with 1 subapical bristle.

**THORAX:** Light yellowish-brown; mesonotum with dark brown vittae; 1 on mid longitudinal line bifurcating near anterior dorsocentral, continuing to scutellar suture and uniting with other vittae; vitta on dorsocentral line not reaching anterior or posterior margins of mesonotum; 1 vitta arising near humerus and extending to wing base and occasionally a shorter lighter vitta between this and the dorsocentral vitta; a wide vitta from propleuron extending to just below wing base or to haltere; a short stripe across sternopleuron and a dark area at postero-ventral corner of hypopleuron. Acrostichal hairs in 8 rows; prescutellars absent but several hairs in this region often slightly enlarged; no enlarged hairs in dorsocentral lines; basal scutellars parallel or slightly convergent and shorter than cruciate apicals; 2 strong humerals and occasionally a weak third bristle dorsally; 2 sternopleurals, sterno-index about 0.3.

Legs uniformly yellowish-brown. Fore femur with 1 dorsal bristle at apical quarter, 2 or 3 postero-dorsals on middle area and 3 postero-ventrals on apical two-thirds.

Wings (Fig. 346) clear; veins brown. Short costal spines extending one-fifth distance between apices of 2nd and 3rd veins. Pair long bristles at distal costal break. Wing indices: costal about 3.1; 4th vein about 2.0; 4c about 0.9; 5x about 2.0.

Halteres yellowish-brown with basal segments partly dark brown.

**ABDOMEN:** Yellow; each tergite with posterior blackish-brown band, wider on posterior segments, interrupted mid dorsally, narrowed to almost interrupted near mid lateral region, and interrupted just before lateral margin.

External male genitalia (Fig. 363): Genital arch slightly narrower dorsally, most bristles on ventral posterior half with a few similar bristles on dorsal half; anal plate with bristles over most of surface; clasper with about 12 teeth on posterior margin.

Female ovipositor plates with minute spine. (Fig. 352).

**INTERNAL CHARACTERS:** Testis with about 2 outer coils yellowish-orange. Ventral receptacle small and composed of about 5 coils. Spermathecae small.

**Egg:** Four filaments about two-thirds length of egg.

*Holotype:* Europe.

*Material Examined:* 222 ex.

*New Records in New Zealand:* LITTLE BARRIER ISLAND: ex banana trap, 25.xi.1954, 2 ♂, (R. A. Harrison). (P.D.D.).

*Distribution in New Zealand:* Little Barrier Island, Auckland, Waitakerere Ranges, Palmerston North, Wallaceville, Nelson. (All the year).

*Remarks:* A cosmopolitan species frequently found in association with man.

### Subgenus SOPHOPHORA Sturtevant

*Sophophora* Sturtevant, 1939. Proc. nat. Acad. Sci. 25 : 139.

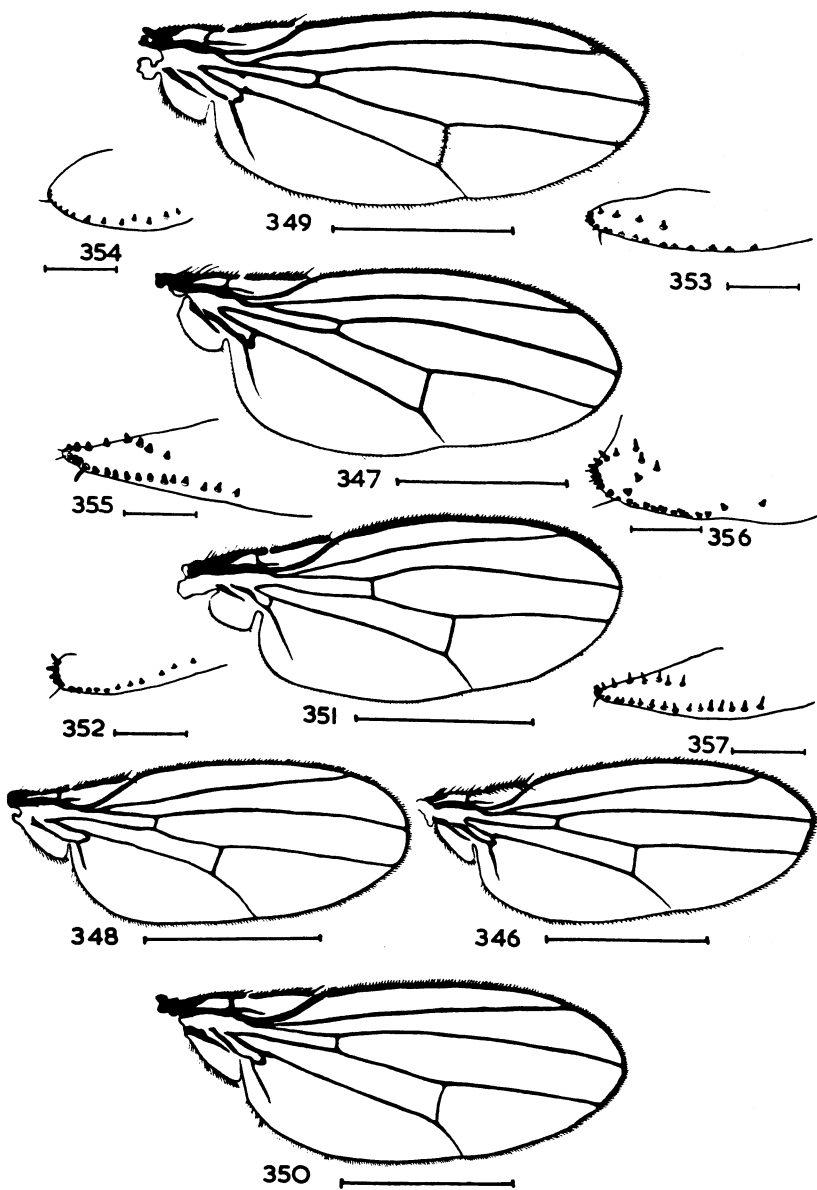
Sturtevant, 1942. Univ. Tex. Publ. 4213 : 38. Wheeler, 1949,

Univ. Tex. Publ. 4920 : 174.

Eggs with 2 blunt filaments; ventral receptacle not kinky; posterior Malpighian tubes free at their distal ends; sterno-index 0.6 or less; anterior spiracle and its stalk not over one-fifth length of puparium; 2nd to 5th abdominal tergites with posterior dark bands that are never broken or narrowed in mid dorsal line; cheeks always relatively narrow.

Type Species: *Drosophila (Sophophora) melanogaster* Meigen

The subgeneric diagnosis given above is after Sturtevant (1942).



Wings:

- Fig. 346. *Drosophila busckii*  
 .. 347. *D. hydei*  
 .. 348. *D. simulans*  
 .. 349. *D. immigrans*  
 .. 350. *D. funebris*  
 .. 351. *D. repleta*

Female genital plates:

- Fig. 352. *D. busckii*  
 .. 353. *D. hydei*  
 .. 354. *D. simulans*  
 .. 355. *D. immigrans*  
 .. 356. *D. funebris*  
 .. 357. *D. repleta*

Scale: Figs. 346-351, 1.0 mm.; Figs. 352-357, 0.1 mm.

Separated from other subgenera mainly by the two blunt filaments on the egg, the colouration of abdomen, and width of cheeks.

*Species Occurring in New Zealand:*

*Drosophila (Sophophora) melanogaster* Meigen

*D. (Sophophora) simulans* Sturtevant

A large subgenus containing several widespread and cosmopolitan species.

***Drosophila simulans* Sturtevant. Figs. 348, 354, 358**

*Drosophila simulans* Sturtevant, 1919. Psyche. 26 : 153.

Harrison, 1952. Trans. roy. Soc. N.Z. 79 : 512.

A yellowish-brown species. Body length about 2.0 mm., wing length about 2.0 mm.

#### MALE AND FEMALE

**HEAD:** Arista blackish-brown, yellowish-brown basally; about 10 branches, 2 below in addition to terminal fork. Third segment of antenna light brown; 2nd segment yellowish-brown with 2 dorsal bristles. Front yellowish-brown; ocellar triangle brown; orbits brown about fronto-orbital bristles. Ratio of lengths of fronto-orbitals, anterior to posterior, 2 : 1 : 2.1; anterior reclinate bristles lateral to and level with or just posterior to proclinate; row of about 5 hairs from orbitals anteriorly along orbit; about 4 hairs on either side of anterior region of front. Face light yellowish-brown; carina prominent, narrow dorsally, not sulcate. Cheeks yellowish-brown. Second oral bristle equal to vibrissa; 3 or 4 bristles at lower posterior angle of cheek. Occiput brown or light brown. Eyes haired. Vertical diameter of eye about 7 or 8 times width of cheek in same axis. Proboscis predominantly yellowish-brown; palpi yellow with several bristles apically.

**THORAX:** Light reddish-brown dorsally, light yellowish-brown ventrally, no pattern. Acrostichal hairs in 8 rows; prescutellars absent, no enlarged hairs at this region, no enlarged hairs in dorsocentral line; basal scutellars convergent or almost parallel and shorter than cruciate apicals; 2 humerals with occasionally 1 small extra dorsal bristle; 2 sternopleurals, sterno-index about 0.5.

Legs shining yellowish-brown. Fore femur with 1 dorsal bristle at apical quarter, bristles on postero-dorsal and postero-ventral surfaces; fore tibia with small preapical and apical; sex comb of male consisting of row of about 10 shining black bristles; mid tibia with preapical and apical.

Wings (Fig. 348) clear; veins brown. Short stout costal spines extending one-third distance between apices of 2nd and 3rd veins; pair strong bristles at distal costal break. Wing indices: costal about 2.25; 4th vein about 2.5; 4c about 1.3; 5x about 2.0.

Halteres yellowish-brown.

**ABDOMEN:** Black or dark brown posteriorly, yellowish-brown anteriorly. Male darker than female. Each tergite with dark brown posterior band, wide mid dorsally and narrow laterally, often fading out before reaching lateral margin.

External male genitalia (Fig. 358): Genital arch broad, narrowing ventrally to a rounded apex, bristles on most of posterior surface, longest ones at or near ventral apex; large process on posterior margin ventral to anal plate; anal plate oval with small bristles, denser ventrally; clasper long and narrow with about 10 to 13 teeth in an irregular row.

Female ovipositor plate broad and with minute spines. (Fig. 354).

**INTERNAL CHARACTERS:** Testis yellow with about 3 coils. Spermathecae small. Ventral receptacle small and composed of 4 to 6 whorls.

**EGG:** Two filaments with enlarged apical portions.

**PUPA:** Anterior spiracles with about 7 branches.

*Holotype:* America.

*Material Examined:* 217 ex.

*Distribution in New Zealand:* Auckland, Waitakere Ranges. (August, October, January, February, April).

*Remarks:* Of the two species *D. simulans* and *D. melanogaster*, the former is the predominant species in the Auckland district. The latter occurs farther south. Recognised by its small size, yellowish-brown colouration, sex comb in male, and costal index of less than 3.0. Separated from *D. melanogaster* by the narrow cheek and shape of posterior process on the genital arch of male.

### ***Drosophila melanogaster* Meigen. Fig. 359**

*Drosophila melanogaster* Meigen, 1830. "Syst. Besch. Zweifl. Insekt." 6 : 85. Harrison, 1952. Trans. roy. Soc. N.Z. 79 : 513.

*Drosophila nigriventris* Zedderstedt, 1847. "Dipt. Scand." 6 : 2557.

*Drosophila ampelophila* Loew, 1862. Berl. ent. Z. 6 : 231.

*Drosophila uvarum* Rondani, 1875. Boll. Com. agr. Parm.

A yellowish-brown species. Body length about 2.0 mm., wing length about 2.0 mm.

#### MALE AND FEMALE

**HEAD:** Similar to *D. simulans* except vertical diameter of eye about 5 times width of cheek in same axis.

**THORAX:** Similar to *D. simulans*.

**ABDOMEN:** Black or dark brown posteriorly, yellowish-brown anteriorly. Male darker than female. Tergites with dark brown posterior band, wide mid dorsally, narrow laterally, and often fading out before reaching lateral margin.

External male genitalia (Fig. 359) similar to *D. simulans* except posterior process of genital arch small; clasper larger than posterior process, teeth in irregular sinuate row, about 5 dorsally and 13 to 17 ventrally.

*Holotype:* Europe.

*Material Examined:* 14 ex.

*Distribution in New Zealand:* Auckland, Nelson. (October to March).

*Remarks:* Recognised by small size, yellowish-brown colouration, and costal index under 3.0. Separated from *D. simulans* by the comparatively wide cheek and small posterior process on genital arch of male.

### Subgenus **DROSOPHILA** Fallén

*Drosophila* Fallén, 1823. "Dipt. Suec. Geomyz." 2 : 6.  
Sturtevant, 1942. Univ. Tex. Publ. 4213 : 30.

Three or 4 egg filaments, at least anterior ones tapering; ventral receptacle long, fine, usually kinky; testes long, spiral; posterior Malpighian tubes forming a closed loop around the gut, their distal ends sometimes merely opposed but usually fused and with a continuous lumen; dark posterior bands on abdomen usually narrowed or broken in mid-dorsal line; sterno-index usually 0.5 or more; cheeks often wide; puparial "horns" often more than one-fifth length of puparium.

*Type Species:* *Drosophila (Drosophila) funebris* Fallén

The subgeneric diagnosis given above is after Sturtevant (1942).

The largest subgenus and separated from other subgenera by the number of egg filaments and the colouration of the abdomen.

*Species Occurring in New Zealand:*

- Drosophila (Drosophila) funebris* (Fallén)
- D. (Drosophila) hydei* Sturtevant
- D. (Drosophila) immigrans* Sturtevant
- D. (Drosophila) repleta* Wollaston
- D. (Drosophila) marmorata* Hutton

***Drosophila funebris*** (Fabricius). Figs. 350, 356, 364

*Musca funebris* Fabricius, 1787. "Mant. Ins." 2 : 345.

*Drosophila clarkii* Hutton, 1901. Trans. N.Z. Inst. 33 : 91.

*Drosophila funebris* (Fabricius): Sturtevant, 1921. Publ. Carnegie Instn. 301 : 84; Harrison, 1952. Trans. roy. Soc. N.Z. 79 : 515.

*Leucophenga atkinsoni* Miller, 1921. N.Z. J. Sci. Tech. 3 : 302. (New synonymy).

A yellowish or reddish-brown species. Body length about 3.0 mm., wing length about 3.0 mm.

MALE AND FEMALE

**HEAD:** Arista black, basally yellowish-brown; about 12 branches with 4 below in addition to the terminal fork. Third antennal segment dark brown; 2nd segment dark brown dorsally and with about 3 dorsal bristles. Front light reddish-brown; ocellar triangle dark brown. Ratio of lengths of fronto-orbitals, anterior to posterior, 2 : 1 : 4; anterior reclinate bristle almost level with and lateral to proclinate; small hairs on anterior half of front and from orbitals anteriorly along orbits. Face yellowish-brown; carina prominent, not sulcate. Cheeks yellowish-brown. Second oral bristle about three-quarters length of vibrissa; 2 or 3 bristles at lower posterior corner of cheek. Occiput light brown. Eyes haired. Vertical diameter of eye about 5 times width of cheek in same axis. Proboscis yellowish-brown; palpi with about 4 bristles, apical ones stronger.

**THORAX:** Reddish-brown on yellowish-brown. Acrostichal hairs in 8 rows; no enlarged hairs in prescutellar region; several enlarged hairs in dorsocentral row; parallel or convergent basal scutellars about equal to cruciate apicals; 2 humerals and often a small third dorsal bristle; 2 sternopleurals and usually 1 or 2 smaller bristles between them, sterno-index about 0.6.

Legs shining yellowish-brown. Fore femur with 1 dorsal bristle at apical quarter and few postero-dorsal and postero-ventrals; fore and mid tibiae with preapical and apical.

Wings (Fig. 350) clear; veins brown. Short stout costal spines extending half distance between apices of 2nd and 3rd veins; pair short bristles at distal costal break. Wing indices: costal about 3.5; 4th vein about 1.3; 4c about 0.6; 5x about 1.0.

Halteres yellowish-brown.

**ABDOMEN:** Yellowish-brown. Tergites with posterior brown or dark brown band. Band in male very dark and wide and appears to cover whole tergite; in female this band interrupted mid dorsally on anterior tergites.

External male genitalia (Fig. 364): Genital arch narrower ventrally, bare of bristles but with about 5 or 6 strong stout teeth near ventral margin; anal plate large with strong bristles over most of surface, about 10 to 20 strong curved spines, most on ventral surface and few at posterior curved apex; clasper fused with arch, large, round, with about 12 primary teeth and few interspersed hairs, and about 4 to 6 secondary teeth.

Female ovipositor plates broad, spines small. (Fig. 356).

**INTERNAL CHARACTERS:** Testis with large white inner coils and about 9 light yellow outer coils. Spermathecae large. Ventral receptacle long and coiled.

**EGG:** Four filaments almost as long as egg.

**PUPA:** Anterior spiracle with about 16 branches.

*Holotype:* Europe.

*Material Examined:* 63 ex.

*Distribution in New Zealand:* Auckland, Wellington (?), Rangiora, Dunedin. (January to April).

*Remarks:* Miller (1950) states that the type of *Leucophenga atkinsoni* Miller is lost. Apparently no holotype was created but rather a series of syntypes which are recorded as syntypes No. 1240, (Miller, 1921). Three of these syntypes are in the Miller collection and have been examined and found to be *D. funebris*. The description of *L. atkinsoni* Miller, 1921 gives sufficient data in both text and diagrams to show that the species was not a *Leucophenga* and has many characters of *D. funebris*. Separated from other species by the large number of arisal rays, absence of spines on fore femur and lack of shading on cross veins.

***Drosophila immigrans* Sturtevant. Figs. 349, 355, 362**

*Drosophila brouni* Hutton, 1901. Trans. N.Z. Inst. 33 : 91.  
Harrison, 1952. Trans. roy. Soc. N.Z. 79 : 514. (Suppressed name, Opin. int. Comm. zool. Nom. 396.)

*Drosophila immigrans* Sturtevant, 1921. Publ. Carnegie Inst. 301 : 83.

A yellowish-brown species. Body length about 3.0 mm., wing length about 3.0 mm.

MALE AND FEMALE

**HEAD:** Arista black, yellowish-brown basally; about 11 branches, 3 or 4 below in addition to the terminal fork. Third antennal segment brown, light brown ventrally; 2nd segment yellowish-brown with 2 to 4 bristles dorsally. Front reddish or yellowish-brown; ocellar triangle dark brown. Ratio of length of fronto-orbital bristles, anterior to posterior, 2 : 1 : 2; anterior reclinate orbital mid way between other two bristles or just closer to anterior and in line with them or just lateral to them; few hairs between anterior orbital and mid point of anterior frontal margin; hairs from orbitals anteriorly along orbits. Face yellowish-brown; carina prominent not sulcate. Cheeks yellowish-brown. Second oral bristle about three-quarters length of vibrissa; 2 strong bristles at lower posterior corner of cheek. Occiput light brown. Eyes haired. Vertical diameter of eye about 4.5 times width of cheek in same axis. Proboscis yellowish-brown; palpi light yellow and with 3 bristles apically.

**THORAX:** Yellowish-brown. Acrostichal hairs in 8 rows; no enlarged hairs in prescutellar region; no enlarged hairs in dorsocentral row; basal scutellars parallel or convergent and equal to cruciate apicals; 2 humerals; 3 sternopleurals, dorsal posterior bristle the weakest, sterno-index about 0.6.

Legs yellowish-brown, tarsi light brown or brown. Fore femur with 1 dorsal bristle at apical quarter, 3 or 4 postero-dorsals on basal three-quarters, about 6 postero-ventrals, row of about 9 to 10 short, stout bristles on apical half of antero-ventral surface; fore and mid tibia with preapical and apical; fore tarsus in male with long recurved hairs on basal segment.

Wings (Fig. 349) clear except for slight darkening about posterior cross vein and at apices of 2nd, 3rd, and 4th veins. Short stout costal spines extending one-third distance between apices of 2nd and 3rd veins; 1 strong bristle at distal costal break. Wing indices: costal about 4.2; 4th vein about 1.2; 4c about 0.5; 5x about 1.0.

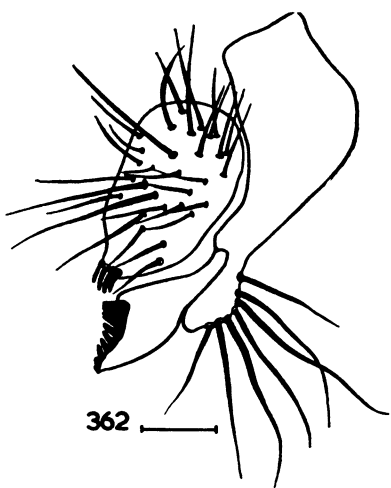
Halteres light yellowish-brown.

**ABDOMEN:** Yellowish-brown with a blackish-brown band on posterior margin of each tergite, wider on posterior tergites.

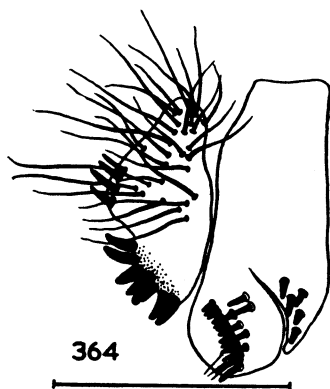
External male genitalia (Fig. 362): Genital arch broad dorsally with about 8 long and strong ventral bristles; anal plate with bristles over all surface and about 5 short stout bristles at ventral apex; clasper triangular, large, about 15 teeth on posterior margin.

Female ovipositor plate narrow and pointed, spines short (Fig. 355).

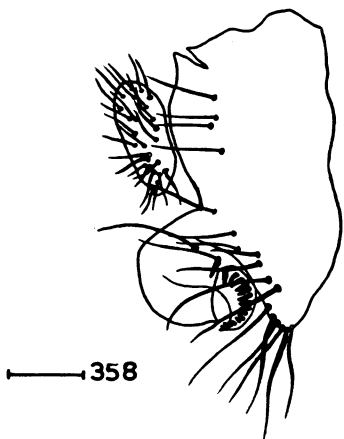
**INTERNAL CHARACTERS:** Testis light yellow with about 5 coils. Spermathecae small. Ventral receptacle elongate and coiled.



362



364



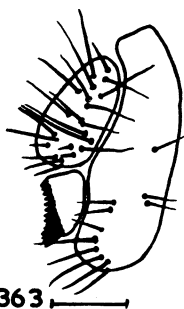
358



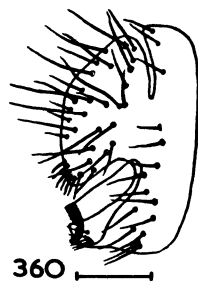
359



361



363



360

Figs. 358-364, External male genitalia:

358. *Drosophila simulans*

362. *D. immigrans*

359. *D. melanogaster*

363. *D. busckii*

360. *D. repleta*

364. *D. lunebrii*

361. *D. hydei*

Scale: 0.1 mm.



EGG: Four filaments about two-thirds length of egg.

PUPA: Anterior spiracles elongate and with about 18 branches.

*Holotype*: AUCKLAND: ♀, (*H. Suter*), (Cant. Mus.).

*Material Examined*: Holotype, 5 ♀, and 771 ex.

*New Records in New Zealand*: LITTLE BARRIER ISLAND: banana-baited trap, 25-29.xi.1954, 75 ex., (*R. A. Harrison*). WAITAKERE RANGES: Titirangi, ex light trap, 14.vi.1953, 1 ♀; 13.xii.1953, 1 ♀, (*C. R. Thomas*), (P.D.D.). NELSON: 8.v.1944, 1 ♀, (*Anon.*); Cawthron Park, swept off bracken fern, 17.x.1951, 2 ♀, (*A. W. Parrot*), (Cawt. Inst.).

*Distribution in New Zealand*: Little Barrier Island, Waitakereranges, Auckland, Palmerston North, Nelson. (All the year).

*Remarks*: Separated from other species in the subgenus *Drosophila* by the presence of a row of short black spines on the fore femur.

### ***Drosophila hydei* Sturtevant. Figs. 347, 353, 361**

*Drosophila hydei* Sturtevant, 1921. Publ. Carnegie Inst. 301: 101. Harrison, 1952. Trans. roy. Soc. N.Z. 79: 510.

A dark brown species with light grey mesonotum and dark brown spots at base of each hair and bristle. Body length about 2.5 mm., wing length about 2.5 mm.

#### MALE AND FEMALE

**HEAD**: Arista black, basally yellowish-brown; 7 branches, 2 below in addition to the terminal fork. Antenna dark brown but yellowish-brown ventrally; 2nd segment with 3 dorsal bristles, 1 strong. Front dark reddish-brown; ocellar triangle blackish-brown; orbits grey posteriorly and about orbital bristles, dark brown or brown anteriorly; dark brown spot at base of each orbital, those about posterior orbital and verticals often merged. Ratio of length of fronto-orbital bristles, anterior to posterior, 2:1:2; anterior reclinate bristle closer to proclinate than posterior reclinate and lateral to them; hairs on anterior region of front from mid lunule to anterior orbital bristle. Face brown; carina prominent, sulcate. Cheeks yellowish-brown. Second oral bristle about half length of vibrissa. Eyes haired. Vertical diameter of eye about 4.5 times width of cheek in same axis. Proboscis yellowish-brown, rostrum brown; palpi with 1 strong apical bristle.

**THORAX**: Reddish-brown; mesonotum light grey with dark brown spots at base of hairs and bristles, spots often fusing to form large dark areas. Acrostichal hairs in 8 rows; no enlarged hairs in prescutellar region; some enlarged hairs in dorsocentral line; basal scutellars convergent and shorter than cruciate apicals; 3 humerals, dorsal one weak; 2 sternopleurals, sterno-index about 0.7.

Legs all yellowish-brown. Fore femur with a dorsal bristle at apical quarter, about 4 postero-dorsals and 6 postero-ventrals; fore tibia with preapical and apical fore tarsus in male with many short and some long slender recurved hairs; mid tibia with preapical and apical.

Wings (Fig. 347) clear, veins brown. Short stout costal spines extending half distance between apices of 2nd and 3rd veins; pair of bristles at distal costal break and costa not darkened at this region. Wing indices: costal about 3.5; 4th vein about 1.75; 4c about 0.75; 5x about 1.1.

Halteres yellowish-brown with basal segments brown anteriorly.

**ABDOMEN**: Yellowish-brown with dark brown bands posteriorly on each tergite, interrupted mid dorsally, narrowed before reaching lateral margin of tergite and extending whole width of tergite at lateral margin.

External male genitalia (Fig. 361): Genital arch broader basally, bristles over most of surface, few dorsally, cluster on ventral apex; anal plate oval, fused to arch; clasper with about 10 teeth and several small posterior marginal bristles.

Female ovipositor plates narrow with broadly rounded apex and small spines. (Fig. 353).

INTERNAL CHARACTERS: Testis orange with about 40 coils. Spermathecae small and on long thick stalks. Ventral receptacle exceedingly long and coiled.

EGG: Four filaments tapering to apex and about as long as egg length.

PUPA: Anterior spiracles moderately long with about 16 branches.

*Holotype*: America.

*Material Examined*: 1 ♂ and 46 ex.

*New Records in New Zealand*: LITTLE BARRIER ISLAND: 26.xi.1954, 1 ♂, (R. A. Harrison), (P.D.D.).

*Distribution in New Zealand*: Little Barrier Island, Paihia, Auckland (All year).

*Remarks*: The commonest member of the *repleta* group of the subgenus *Drosophila* found in New Zealand. Recognised by the grey mesonotum with dark brown spots at base of hairs and bristles, the absence of dark spot at distal costal break, and, in males, by the slender recurved hairs of fore tarsus.

### ***Drosophila repleta* Wollaston. Figs. 351, 357, 360**

*Drosophila repleta* Wollaston, 1858. Ann. Mag. nat. Hist.

41 : 117. Harrison, 1952. Trans. roy. Soc. N.Z. 79 : 508.

*Drosophila punctulata* Loew, 1862. Berl. ent. Z. 6 : 232.

*Drosophila adspersa* Mik, 1886. Wein. ent. Ztg. 5 : 328.

A dark brown species with light grey mesonotum with dark brown spots at base of hairs and bristles. Body length about 2.5 mm., wing length about 2.5 mm.

#### MALE AND FEMALE

HEAD: Arista black, basally light brown; 7 branches, 2 below in addition to terminal fork. Third antennal segment dark brown, light brown ventrally; 2nd segment yellowish- or light reddish-brown with dark brown patch dorsally and 3 dorsal bristles. Front predominantly dark reddish-brown and silvery-grey; ocellar triangle almost black; areas lateral to ocelli dark reddish-brown; a narrow median longitudinal light brown vitta from ocelli to anterior margin of front; orbits silvery-grey posteriorly and about the bristles, reddish-brown anteriorly; each fronto-orbital arising from a dark brown spot. Ratio of lengths of fronto-orbitals, anterior to posterior, 2 : 1 : 2; anterior reclinate orbital closer to proclinate than posterior reclinate and lateral to them; row of hairs from anterior orbital along orbit; an irregular row of hairs from orbitals to mid point of anterior frontal margin. Face brown or dark brown with blackish-brown areas; carina broad ventrally, slightly sulcate ventrally. Cheeks brown to dark brown. Second oral bristle about half length of vibrissa; 3 bristles at lower posterior angle of cheek. Occiput dark brown with greyish dusting. Eyes with thick matt of hairs. Vertical diameter of eye about 5 times width of cheek in same axis. Proboscis brown; rostrum dark brown; palpi yellowish-brown with about 4 or 5 bristles evenly spaced on lateral margin, the apical one the longest.

THORAX: Dark brown; mesonotum light grey with dark brown spot at each hair and bristle, these spots often fusing; scutellum with narrow yellowish-brown margin merging to dark brown ventral area. Acrostichal hairs in 8 rows; several enlarged hairs in dorsocentral line; prescutellars absent; basal scutellars convergent and shorter than cruciate apicals; 3 humerals, dorsal bristle the weakest; 2 sternopleurals, sterno-index about 0.8.

Legs reddish-brown, fore coxa dark brown. Fore femur with 1 dorsal bristle at apical quarter, about 4 postero-ventrals; fore and mid tibiae with preapical and apicals; fore tarsus without recurved hairs.

Wings (Fig. 351) clear, veins brown. Short stout costal spines extending half distance between apices of 2nd and 3rd veins; pair small bristles at distal costal break and costa dark brown about this region. Wing indices: costal about 3.0; 4th vein about 1.7; 4c about 0.8; 5x about 1.3.

Halteres light reddish-brown.

**ABDOMEN:** Tergites yellowish-brown with wide dark brown band posteriorly, interrupted mid-dorsally; a yellowish-brown area near anterior corner of lateral margins of tergites.

External male genitalia (Fig. 360): Genital arch broad, bristles on surface, majority near ventral margin; anal plate fused with arch, cluster of short bristles at ventral apex; clasper with about 10 teeth and some bristles on posterior margin.

Female ovipositor plates tapering to pointed apex; spines distinct. (Fig. 357).

**INTERNAL CHARACTERS:** Testis long and extensively coiled. Spermathecae large on short stalks. Ventral receptacle long and coiled.

**EGG:** Four tapering filaments.

**PUPA:** Anterior spiracles moderately long.

*Holotype:* Madeira.

*Material Examined:* 13 ex.

*Distribution in New Zealand:* Auckland, Paihia. (December, March, April).

*Remarks:* Not common in New Zealand but of cosmopolitan distribution. Recognised by the brown spots at base of hairs and bristles on mesonotum and the brown spot at distal costal break.

### ***Drosophila marmorata* Hutton**

*Drosophila marmorata* Hutton, 1901. Trans. N.Z. Inst. 33 : 91.

The holotype is in poor condition and cannot be fully described. No other specimens are known. Similar in many respects to *D. hydei* and may possibly be this species.

*Holotype:* AUCKLAND: ♀, (*H. Suter*), (Cant. Mus.).

### SPECIES UNCLASSIFIED AS TO SUBGENUS

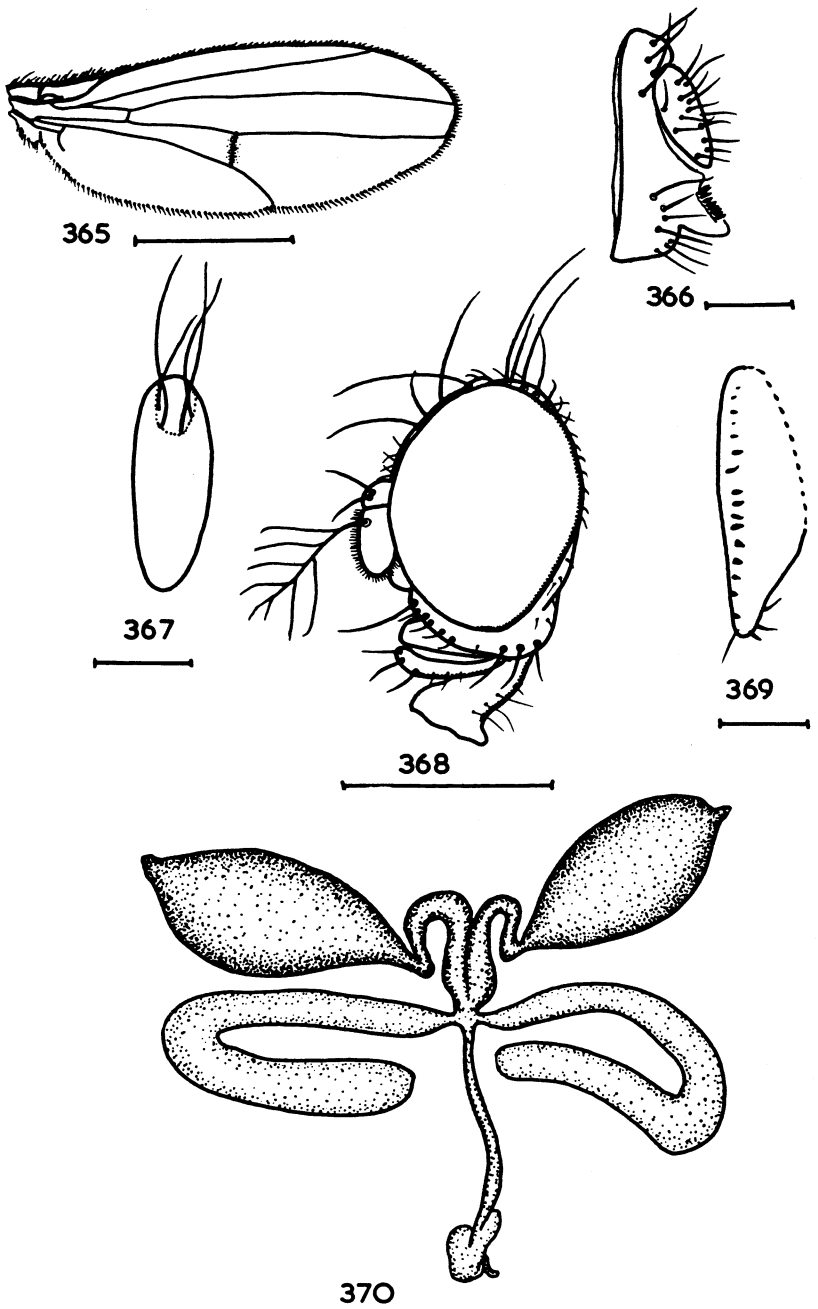
#### ***Drosophila kirki* sp.n. Figs. 365 to 370**

A dark brown species with brown mesonotum. Body length about 2.75 mm., wing length about 3.0 mm.

#### MALE AND FEMALE

**HEAD** (Fig. 368): Arista blackish-brown, brown basally; 8 branches, 2 below in addition to the terminal fork. Antenna greyish-brown; 2nd segment brown with 1 strong median dorsal bristle and several strong apical hairs. Front golden brown; ocellar area blackish-brown, ocellar triangle grey dusted; orbits as far anterior as proclinate orbital bristle, dark brown with grey dusting. Ratio of fronto-orbitals, anterior to posterior, 3 : 2 : 4; anterior reclinate fronto-orbital lateral to and just posterior to proclinate orbital; inner vertical strongest of all frontal bristles; distinct row of black hairs from middle fronto-orbital anteriorly along orbit; an irregular row of inwardly directed hairs on either side of middle line of front anterior to ocelli. Face light brown, antennal fossae and anterior margin of face dark brown; carina not sulcate. Cheeks light brown with dark brown ventral margin. Second oral bristle less than half length of vibrissa and scarcely differentiated from hairs along cheek margin; 2 or 3 bristles at lower posterior corner of cheek. Occiput chocolate brown. Eyes with thick matt of hairs. Vertical diameter of eye about 12 times width of cheek in same axis. Proboscis brown; palpi brown with strong bristles.

**THORAX:** Dark brown, mesonotum brown with light dusting. Prescutellars absent; anterior dorsocentral about two-thirds length of posterior, no enlarged hairs in dorsocentral row; divergent basal scutellars longer than apicals and about one-third distance from scutellar suture to apical bristles; acrostichal hairs in 8 rows, immediately anterior to anterior dorsocentral; 2 humerals; 2 supraalars, anterior of pair very weak; 2 postalars, posterior of pair weaker; 3 strong sternopleurals, anterior of the two dorsal bristles the weaker, ventral bristle just posterior to



Figs. 365-370, *Drosophila kirki*:

- |                              |                              |
|------------------------------|------------------------------|
| 365. Wing                    | 368. Head                    |
| 366. External male genitalia | 369. Female genital plate    |
| 367. Egg                     | 370. Internal male genitalia |

Scale: Fig. 365, 1.0 mm.; Figs. 366, 369, 0.1 mm.; Fig. 367, 0.25 mm.;  
Fig. 368, 0.5 mm.

posterior dorsal, row of hairs down sternopleuron, the dorsal one very strong and about half length anterior sternopleural, sterno-index about 0.6.

Legs brown; all trochanters, extreme base and apex of fore femur and tibia, all fore tarsus, base and apical third of mid femur and tibia, all mid tarsus, base and apex of hind femur, and tibia and all hind tarsus yellowish-brown. Fore femur with long fine bristles on postero-dorsal and postero-ventral surfaces; fore and hind tibia with weak bristles, mid tibia with strong preapical and apical.

Wings (Fig. 365) clear, veins brown. Pair of bristles at distal costal break, dorsal of pair the stronger; short costal spines extending two-thirds distance between apices of 2nd and 3rd veins. Wing indices: costal about 2.9; 4th vein about 2.1; 4c about 0.9; 5x about 1.7.

Halteres light yellow.

**ABDOMEN:** Basal tergite yellowish-brown, other tergites blackish-brown, apical ones darker with median longitudinal yellow band and yellow anterior margins; sternites yellowish-brown.

External male genitalia (Fig. 366): Genital arch narrow dorsally, broad ventrally, about 4 bristles on either side dorsally, and 7 on postero-ventral corner; anal plate about half length of arch with about 20 bristles on surface and a cluster of small bristles at ventral angle; clasper with 11 or 12 strong teeth on posterior margin.

Female ovipositor plates with short spines; apical one the strongest and with 1 strong and a few weak apical hairs. (Fig. 369).

**INTERNAL CHARACTERS:** Testes elliptical, light lemon-yellow. (Fig. 370).

**EGG** (Fig. 367): Four filaments about equal to length of egg.

**Holotype:** LITTLE BARRIER ISLAND: Waipawa stream bed, 25.xi.1954, ♂, (R. A. Harrison), (P.D.D.).

**Paratypes:** LITTLE BARRIER ISLAND: Waipawa Stream, banana-baited trap, 29.xi.1954, 42 ♂, 16 ♀; Kauri Gully, 24.xi.1954, 6 ♂, (R. A. Harrison). WAITAKERE RANGES: Oratia, ex house, 21.i.1952, 1 ♀, (R. A. Harrison); Titirangi, ex light trap, 15.vi.1953, 1 ♀, (C. R. Thomas), (P.D.D.). PAPA KURA: Kirks Bush, banana-baited trap, 9.i.1953, 27 ♂, 13 ♀, (R. A. Harrison). PUKEKOHE: banana-baited trap, 9.i.1953, 1 ♂, (R. A. Harrison). AUCKLAND: Browns Bay, banana-baited trap, 15.vii.1951, 1 ♂; 2.ix.1951, 1 ♂; 12.xii.1951, 1 ♀, (R. A. Harrison), (P.D.D.).

**Material Examined:** Holotype, 78 ♂ and 32 ♀ paratypes.

**Distribution:** Little Barrier Island, Auckland, Waitakere Ranges, Papakura, Pukekohe. (June, July, November to January).

**Remarks:** The testes show similarities with the subgenus *Pholadoris* and to some members the *obscura* group of the subgenus *Sophophora*. However, the four egg filaments, the absence of prescutellars, and the divergent basal scutellars are important characters which separate this species from one or both of those subgenera. This species does not agree with the diagnosis of any of the eight subgenera so far proposed for the genus *Drosophila*. Although eggs have been laid occasionally on laboratory culture medium, no success has been achieved in breeding this species.

#### Family AGROMYZIDAE

Arista bare or with short pubescence. Postverticals strongly divergent; ocellars present; hairs on frontal-orbits; centre of front usually bare; anterior fronto-orbitals convergent; posterior fronto-orbitals erect or slightly reclinate; ocellars present. Vibrissa present. Carina present.

*New Records*: WAIMAUKU: bred ex silver beet, 13.xii.1955, 5 ♂, 5 ♀, (Gilbertson), (P.D.D.). WHAKATANE: bred ex silver beet, -xii.1955, 24 ♂, 24 ♀, (Dep. Agric.), (P.D.D.).

*Distribution*: Waimauku, Auckland, Whakatane, Napier, Wanganui, Christchurch. (December).

*Host Plants*: *Cerastium glomeratum* Thuill., *C. vulgatum* L., *Chenopodium album* L., *Beta vulgaris* L., *Stellaria media* (L.) Vill., *Spinacia oleracea* L.

## Family CRYPTOCHAETIDAE

Arista absent. Third antennal segment large. Postverticals divergent and small; fronto-orbitals small. Scutellum large. Wings short and broad. Sternopleurals absent; mesopleuron haired. Costa broken at apex of subcosta and near humeral cross vein. Abdomen short.

The family contains only one genus. Its relationships are not very clear and the genus has been placed at times in such families as the Agromyzidae, Drosophilidae and Chamaemyiidae. Its most common placing seems to have been the Agromyzidae but Frick (1952) pointed out that, with two costal breaks, the genus could not be associated with the Agromyzidae. Full family ranking appears to be the most satisfactory way of dealing with the genus.

The family can be recognised at once by the absence of aristae, the large antennae, short abdomen, large scutellum, and the short but wide wings.

*Genera*: *Cryptochaetum* Rondani

### Genus CRYPTOCHAETUM Rondani

*Cryptochaetum* Rondani, 1875. Boll. Soc. ent. ital. 7 : 167.

Generic characters as for family.

Type Species: *Cryptochaetum grandicorne* Rondani

*Distribution*: World wide.

*Species Occurring in New Zealand*: *Cryptochaetum iceryae* (Williston)

The only New Zealand representative is an introduction from Australia, and parasitises *Icerya purchasi* Maskell.

### *Cryptochaetum iceryae* (Williston). Figs. 401, 402

*Leptophonus iceryae* Williston, 1888. Insect Life 1 : 21.

*Cryptochaetum iceryae* (Williston): Mik, 1889. Wien. ent. Ztg. 8 : 281.

A stout blackish-brown species with clear wings. Body length about 1.5-2.0 mm., wing length about 1.5-1.75 mm.

#### MALE AND FEMALE

HEAD (Fig. 401): Arista absent but a very short spine at apex of antenna. Antenna blackish-brown; 3rd segment about half height of head; 2nd segment small, without distinct bristles; basal segment small. Front shining blackish-brown; ocellar triangle very large. Bristles not developed but a row of stronger hairs along vertex and hairs over most of front. Face shining blackish-brown. Cheeks

linear, eye almost reaching oral margin in middle of cheek. Row of short black hairs along cheek margin; no vibrissa nor bristles at lower posterior angle of cheek. Occiput black or blackish-brown. Eyes distinctly haired; widest part of eye at level of insertion of antennae. Proboscis small, dark brown; palpi dark brown.

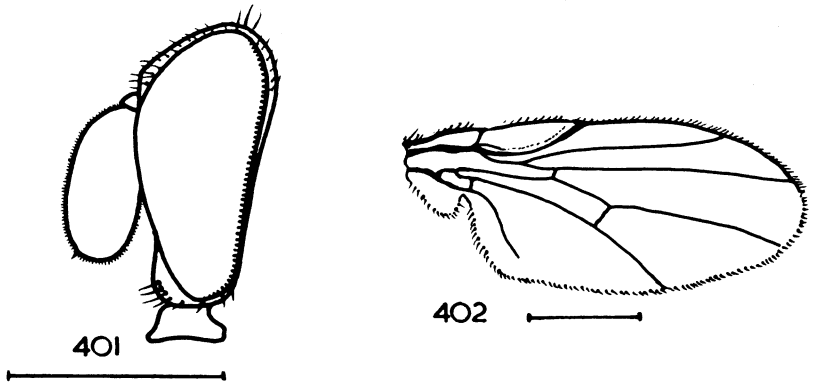


Fig. 401. Head of *Cryptochaetum iceryae*

„ 402. Wing of „ „

Scale: 0.5 mm.

**THORAX:** Mesonotum and scutellum shining blackish-brown; pleura generally lighter brown. Distinct matt of thick hairs on mesonotum and scutellum and bristles not developed. Scutellum about half length of mesonotum. Mesopleuron with black hairs along posterior margin; other pleura bare.

Legs brown; tarsi light brown. Apical and preapical tibial bristles scarcely developed.

Wings (Fig. 402) wide, clear membrane; veins brown. Subcosta short but traceable to wing margin by a narrow fold in membrane; costa extending to apex of 3rd vein; 5th vein and anal veins reaching wing margins; no cross vein separating 2nd basal and discal cells; pair of short bristles at costal break at 1st vein apex. Wing indices: costal about 2.2; 4th vein about 2.8; 4c about 1.2; 5x about 0.3.

Halteres dark brown, brown basally.

**ABDOMEN:** Shining blackish-brown covered with thick brown hairs.

*Holotype:* Australia.

*Material Examined:* 7 ♂, 7 ♀.

*New Records:* MOKO HINAU ISLANDS: Fanal Island, swept from stream bed, 23.viii.1955, 1 ♂, (*R. A. Harrison*), (P.D.D.). WAITAKERE RANGES: Titirangi, bred ex *Icerya purchasi* on citrus, emerged 28.vii.1942–10.viii.1942, 4 ♂, 6 ♀, (*M. W. Carter*), (P.D.D.). AUCKLAND: Devonport 25.iv.1942, 1 ♂, (*N. Crump*), (P.D.D.); Sunnyvale, in house, 18.iv.1954, 1 ♀, (*K. A. J. Wise*), (P.D.D.). WANGANUI: Bred ex *Icerya purchasi*, emerged 2.iv.1943, 1 ♂, (*Dep. Agric.*), (P.D.D.).

*Distribution in New Zealand:* North Island. (April, July, August).

### Family MILICHIIDAE

Third antennal segment rounded. Ocellar triangle often strongly developed. Postverticals convergent or parallel; anterior fronto-orbitals convergent; frontals often present. Vibrissa present. Proboscis long

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