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**THE GENUS DROSOPHILA (DIPTERA) IN EASTERN
QUEENSLAND**

I. TAXONOMY

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(Manuscript received November 29, 1954)

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Summary

Ten species of which six are new, of the genus *Drosophila* are described and figured: *D. cancellata*, sp. nov., *D. enigma* Mall., *D. lativittata* Mall., *D. opaca*, sp. nov., *D. maculosa*, sp. nov., *D. levis*, sp. nov., *D. serrata* Mall., *D. takahashii* Sturt., *D. dispar*, sp. nov., and *D. versicolor*, sp. nov. Laboratory cultures of these have been set up from single females fertilized in the wild, allowing descriptions of eggs, larvae, pupae, and certain internal structures and external anatomy of the adults. These species have been assigned to subgenera and species group and their geographical distribution is recorded, together with the known Queensland distribution of *D. busckii* Coq., *D. melanogaster* Meig., *D. simulans* Sturt., *D. ananassae* Dol., *D. hydei* Sturt., *D. repleta* Woll., *D. inmigrans* Sturt., and *D. spinofemora* Patt. & Wheel. These 18 species are keyed. The taxonomy of the subgenus *Pholadoris* is discussed, and three new species groups established, namely, *coracina*, *maculosa*, and *levis*. A new species group within the subgenus *Sophophora*, namely, *dispar*, is established.

I. INTRODUCTION

The only published work on the genus *Drosophila* in Australia has been by Duda (1923) and by Malloch (1923, 1924, 1925, 1927). Duda described three indigenous species, and Malloch 18. Malloch also recorded

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five cosmopolitan species: *D. busckii* Coq., *D. hydei* Sturt., *D. immigrans* Sturt.,* *D. melanogaster* Meig., and *D. repleta* Woll.

Prior to this study only two species, *D. serrata* Mall. and *D. albostrata* Mall., had been recorded from Queensland. The present study is the result of collections made in Queensland, particularly in the south-east corner of the State over the past 3 years (Table 8 and Fig. 1).

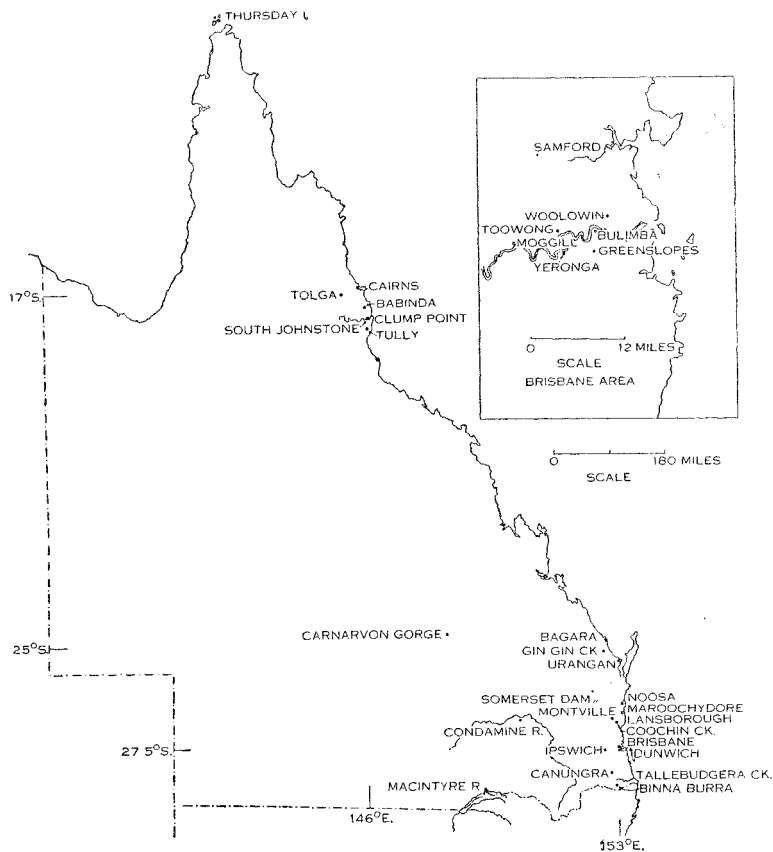


Fig. 1.—Distribution of *Drosophila* in Queensland.

II. TYPE MATERIAL

Malloch's types, which have been examined by the author are located as follows: (i) Australian Museum, Sydney: *D. albostrata*, *D. brunneipennis*, *D. inornata*, *D. lativittata*, *D. mycetophaga*, *D. obsoleta*, *D. polypori*, and *D. setifemur*; (ii) School of Public Health and Tropical Medicine, University of Sydney: *D. enigma*, *D. fuscithorax*, *D. nicholsoni*, *D.*

* The specific name *D. immigrans* has been retained for this species pending a ruling from The International Commission on Zoological Nomenclature on the application put forward by Mayr, E., Patterson, J. T., Wheeler, M. P., and Spencer, W. P. (1954).—*Bull. Zool. Nomencl.* 9: 161.

nigrovittata, *D. poecilithorax*, *D. serrata*, *D. subnitida*, and *D. sydneyensis*. The location of Malloch's type *D. flavohirta* is unknown, but Lee (personal communication) states that "the U.S. National Museum possesses six paratypes". Duda's types of *D. australica*, *D. biradiata*, and *D. interrupta* are in the Budapest Museum.

Two paratypes of each sex of species, here described as new, and two plesiotypes of redescribed species have been deposited as pinned material at the Australian Museum, Sydney; British Museum; U.S. National Museum; Division of Entomology, C.S.I.R.O., Canberra, A.C.T.; Queensland Museum; and the School of Public Health and Tropical Medicine, University of Sydney. The ♂ holotype and allotype of each new species have been deposited at the Australian Museum. In addition, slides of the hypopygium of all species described have been deposited at the above institutions. This procedure has been adopted, due to the confusion caused in the past by type material consisting only of pinned specimens. These types and the above deposited material have been taken from type cultures, which are maintained at the Zoology Department, University of Queensland, Brisbane, and are descended from single females fertilized in the wild.

III. TECHNIQUES

The material studied was collected by Patterson's (1943) method and type cultures maintained by Spencer's (1950) standard method.

In general, descriptions are based on single adult specimens taken from the type culture. For the following characters, 10 specimens of each sex were measured: arista branches, cheek-eye ratios, sterno-indices, body lengths, wing lengths, and wing indices. In the case of pupae the number of branches of the anterior spiracles, the stalk length in relation to pupal length, and the relationship of the posterior spiracles to one another have also been determined from 10 individuals. For species within the subgenus *Pholadoris*, egg filament number has been determined from 50 eggs, taken from a mass culture.

Wings, external genitalia, and legs have been mounted in Womersley's (1939) medium. Drawings were made on graph paper using a squared eyepiece. Dissections were made in 0.7 per cent. saline, and colours expressed by the Maertz and Paul (1950) standard scale.

Measurements were made by a micrometer eyepiece. Body length is here taken as the distance from the posterior extremity of the fly to the most anterior point of the abdomen, plus the distance from here to the antennal base, both measurements being made laterally (Fig. 2B). Body length is split into two components because of the variable flexure at the abdominal-thoracic junction. Measurements have been made on freshly killed flies to obviate inaccuracies due to shrinkage.

Wing length is here taken as the distance from the more basal division of the common trunk of the 1st, 2nd, and 3rd longitudinal veins to the

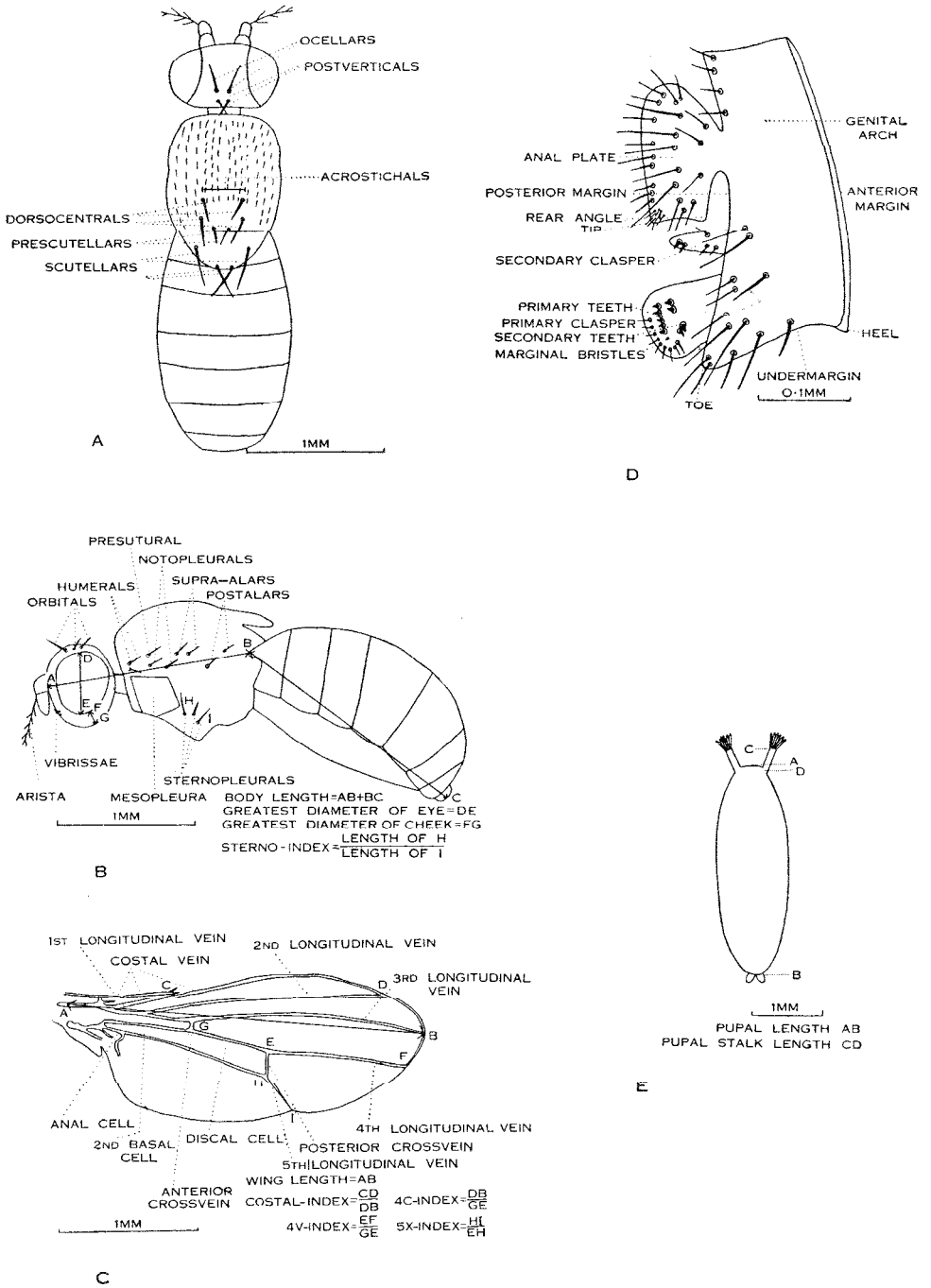


Fig. 2 A-F.—Hypothetical *Drosophila* showing features of taxonomic importance: A, dorsal view — wings and legs removed; B, lateral view — wings and legs removed; C, wing; D, hypopygium (after Hsu 1949); E, pupa.

intersection of the costal and 3rd longitudinal veins (Fig. 2C). These reference points were chosen as being the most practicable identifiable points approximating to the actual length of the wing.

Pupal stalk length is here defined as the length of the stalk of the anterior spiracles, and pupal body length as the length of the pupa excluding both the anterior spiracles together with their stalks and the posterior spiracles (Fig. 2E). These measurements have been chosen, because with them a high degree of accuracy is possible, whereas this is not the case with the "horn index".

The abundance of each species in a catch is expressed as two fractions (the female being listed first), except for the massive catches from the University Farm, Moggill, Brisbane, which will be detailed in a later paper. The females of certain species are most difficult to distinguish externally and this is indicated by a query (?).

Standard technical terminology (Sturtevant 1921, 1942) and the special terminology developed for the ♂ external genitalia (Hsu 1949) are followed (Fig. 2).

KEY TO THE QUEENSLAND SPECIES OF THE GENUS DROSOPHILA

1.	Prescutellar bristles present	2
	Prescutellar bristles absent	5
2 (1).	Thorax of uniform colour	3
	Thorax not of uniform colour	4
3 (2).	Thorax brown	<i>levis</i> , sp. nov.
	Thorax black	<i>opaca</i> , sp. nov.
4 (2).	Thorax with white streak between the 2 median rows of acrostichals (Fig. 5A)	<i>lativittata</i> Mall.
	Thorax with white streak between the 2 submedian rows of acrostichals (Fig. 4A)	<i>enigma</i> Mall.
	Thorax with 2 submedian rows of 3 white spots (Fig. 7A)	<i>maculosa</i> , sp. nov.
	Thorax with 2 submedian white stripes on anterior part (Fig. 3A)	<i>cancellata</i> , sp. nov.
5 (1).	Thorax striped	<i>busckii</i> Coq.
	Thorax not striped	6
6 (5).	Thorax with bristles arising from black spots	7
	Thorax not spotted	9
7 (6).	Lateral abdominal yellow spots (Fig. 12A)	8
	No lateral abdominal yellow spots	<i>hydei</i> Sturt.
8 (7).	Testes white*	<i>repleta</i> Woll.
	Testes orange*	<i>versicolor</i> , sp. nov.
9 (6).	A comb-like series of stout bristles on femur of 1st leg	10
	No comb-like series of stout bristles on femur of 1st leg	11
10 (9).	Eyes red and 3rd costal section with heavy bristles on its basal quarter	<i>immigrans</i> Sturt.
	Eyes orange and 3rd costal section with heavy bristles on its basal half	<i>spinofemora</i> Patt. & Wheel.

* Testes colour may be determined in the intact fly as the ventral abdominal wall is translucent.

Males Only

- 11 (9). Sex comb absent *dispar*, sp. nov.
 Sex comb present 12
- 12(11). Longitudinal sex comb 13
 Transverse sex comb 15
- 13(12). Longitudinal sex comb on 1st and 2nd tarsal segments of 1st leg (Fig. 9A)
 *serrata* Mall.
 Longitudinal sex comb on distal half of 1st tarsal segment of 1st leg 14
- 14(13). Posterior margin of genital arch very conspicuous and clam-shaped
 *simulans* Sturt.
 Posterior margin of genital arch inconspicuous *melanogaster* Meig.
- 15(12). Transverse sex comb on 1st leg; 6 rows on 1st tarsal segment, distal 2
 prominent; 2 rows on 2nd tarsal segment, prominent (Fig. 10C)
 *takahashii* Sturt.
 Transverse sex combs on 1st leg; 2 rows on 1st tarsal segment and 1 on 2nd
 tarsal segment *ananassae* Dol.

IV. SPECIES DESCRIPTIONS

Genus DROSOPHILA Fallén

Drosophila Fallén, 1823, Diptera Sueciae Geomyzides. Part 2: p. 4.

V Subgenus PHOLADORIS Sturtevant

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

Species group CORACINA, sp. gr. nov.

Black or brown species, anterior scutellar bristles divergent, acrostichal hairs in 8 rows, cheeks 0.2 width of eyes. Male genitalia with squarish heel to genital arch, the latter lightly bristled below; anal plate with not especially dense bristles at lower tip; clasper without numerous fine hairs, and not extended outward beyond primary teeth. Posterior malpighian tubules with common trunk 0.1-0.3 their total length. Larvae white in colour, ventral hooklets yellow, larval salivary glands of equal size. Egg filaments showing both intraspecific and interspecific variability and lying in the range of 4-10.

DROSOPHILA CANCELLATA, sp. nov.

Fig. 3A-D

General: Black thorax with 2 submedian white streaks anteriorly (Fig. 3A).

Description

Type Culture Source.—Moggill, 19.xi.1952 (Fig. 1).

Body Length.—♂ 2.8 mm, ♀ 3.0 mm.

Head ♂ and ♀.—Arista with 6-8 branches. Orbital bristles in the ratio of about 2:1:2. Second oral bristle about 0.3 of 1st. Greatest width of cheeks 0.2 greatest diameter of eyes. Eye colour red (6L9). Carina flat.

Thorax ♂ and ♀.—Black, with 2 submedian white streaks anteriorly (Fig. 3A). Acrostichal hairs in 8 rows. Prescutellars present. Anterior scutellars divergent. Sterno-index 0.8. Apical bristles on 1st and 2nd tibia, preapicals on all 3. No sex combs.

Wings ♂ and ♀.—Clouding over crossveins. Costal index 2.4, 4th vein index 2.2, 5x index 1.3, 4c index 1.2. Third costal section with heavy spines on its basal 0.6. Length: ♂ 2.5 mm, ♀ 2.6 mm.

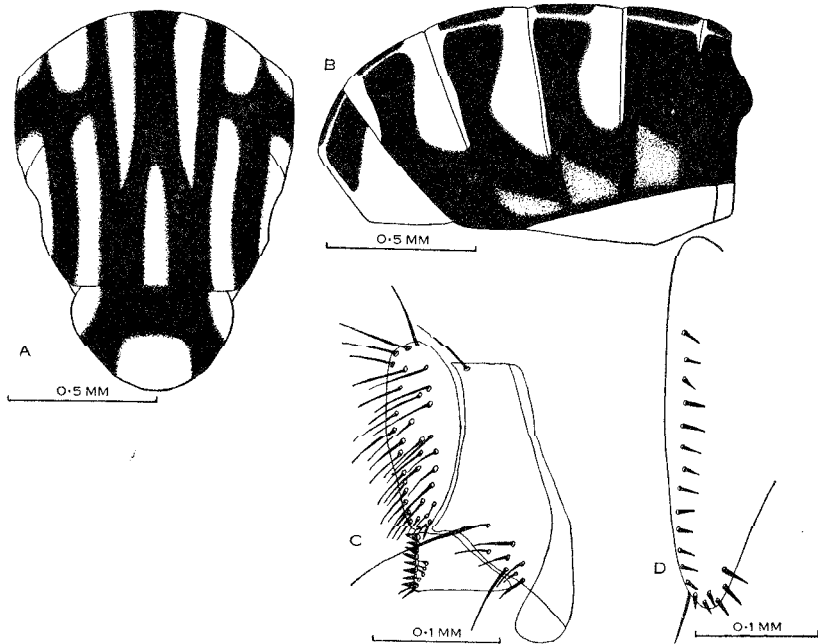


Fig. 3 A-D.—*D. cancellata*: A, ♂ thorax, dorsal view; B, ♂ abdomen, dorsolateral view; C, hypopygium; D, ovipositor plate.

Abdomen ♂.—First segment black, interrupted dorsally with yellow. Second segment similar, but with ventrolateral yellow patch. Third and 4th segments with black band posteriorly, interrupted dorsally with yellow and with ventrolateral yellow patches. Fifth segment with black band posteriorly, interrupted dorsally with yellow. Sixth segment black dorsally, interrupted with yellow (Fig. 3B).

♀.—Similar to ♂ but with 6th segment similar to 5th, and 7th segment all black.

External Genitalia.—♂. Genital arch broad in centre, about 1 bristle on upper margin, about 8 bristles below, heel round, undermargin straight, toe pointed and above level of heel. Anal plate oval, free, about 35 bristles evenly distributed, rear angle absent. Primary clasper free, about 2 marginal bristles posteriorly, about 8 primary teeth in straight row, about 5 bristles posteriorly. Secondary clasper absent (Fig. 3C).

SUBGENUS PHOLADOREIS: EXTERNALS
TABLE 1
D, divergent; *C*, convergent; *T*, transparent; *C/C*, clouded over crossveins

Species Group and Spp.	Orbital Bristles Ratio	Arista Branches	Oral Bristles Ratio	Cheek-Eye Ratio	Rows of Acrostichals	Anterior Scutellars	Sterno-index	Wing Colour	Costal Index	4th Vein Index	5x Index	4c Index	3rd Costal Section Ratio	Wing Length ♂ (mm)	Wing Length ♀ (mm)	Body Length ♂ (mm)	Body Length ♀ (mm)
<i>victoria</i>																	
<i>lebanonensis</i> *	4:1:4	7	0.3	0.2	6	<i>D</i>	0.7	—	—	2.8	—	—	—	2.5	2.8	2.7	3.0
<i>nitens</i> *	—	8	—	0.2	—	—	—	—	2.2	—	—	—	—	—	—	—	—
<i>victoria</i> †	5:1:5	7	0.5	0.2	6	<i>D</i>	0.7	<i>T</i>	1.9	2.4	1.4	1.3	0.6	1.8	1.8	2.0	2.0
<i>coracina</i>																	
<i>cancellata</i> ‡	2:1:2	6-8	0.3	0.2	8	<i>D</i>	0.8	<i>C/C</i>	2.4	2.2	1.3	1.2	0.6	2.5	2.6	2.8	3.0
<i>coracina</i>	2:1:2	7	0.3	0.2	8	—	—	<i>T</i>	1.5	2.2	2.0	1.5	—	2.1	2.1	2.1	2.1
<i>enigma</i> ‡	5:2:5	7-8	0.4	0.2	8	<i>D</i>	0.7	<i>C/C</i>	2.7	1.9	1.5	0.9	0.5	2.6	2.7	2.5	2.8
<i>lativittata</i> ‡	3:1:3	6-8	0.3	0.2	8	<i>D</i>	0.7	<i>T</i>	2.9	2.0	1.4	0.9	0.6	2.5	2.7	2.8	2.9
<i>opaca</i> ‡	2:1:2	6-7	0.4	0.2	8	<i>D</i>	0.7	<i>T</i>	3.3	2.0	1.3	0.9	0.6	2.5	2.9	2.6	2.8
<i>maculosa</i> ‡	2:1:2	6-7	0.4	0.3	8	<i>D</i>	0.8	<i>C/C</i>	2.6	2.0	1.0	1.0	0.6	2.2	2.3	2.7	3.0
<i>mirim</i>																	
<i>bacomyia</i> *	3:1:3	8	—	0.1	8	<i>C</i>	—	<i>T</i>	1.6	2.2	2.0	—	0.6	1.5	1.7	1.7	2.0
<i>mirim</i> §	2:1:2	8-9	—	0.1	8	<i>C</i>	0.7	<i>T</i>	1.3	2.3	2.2	—	0.8	1.8	1.8	2.1	2.1
<i>tevis</i> ‡	3:1:3	8	0.4	0.1	6	<i>C</i>	0.7	<i>T</i>	1.5	2.3	2.6	1.5	0.7	1.5	1.7	2.0	2.1

* Constructed from the data of Wheeler (1949). † Sturtevant (1942). ‡ The author. § Dobzhansky and Pavan (1943).
|| Kikkawa and Peng (1938).

♀. Ovipositor plate with about 20 bristles (Fig. 3D).

Malpighian Tubules ♂ and ♀.—Two anterior, free, common trunk 0.1 total length; 2 posterior, apposed, common trunk 0.3 total length; anterior twice length of posterior.

Internal Genitalia.—♂. Testes orange (10F12), not coiled.

♀. Ventral receptacle very small. Spermatheca spheroidal, heavily chitinized.

Egg Filaments.—7-10, pointed.

Larvae.—Skip, white, hooklets yellow, salivary glands equal.

Pupae.—Anterior spiracles with 6-7 branches. No anterior spiracle stalks. Posterior spiracles divergent. Site of pupation mainly on stopper.

Relationships.—Tables 1-3.

Distribution.—Moggill (Table 8 and Fig. 1).

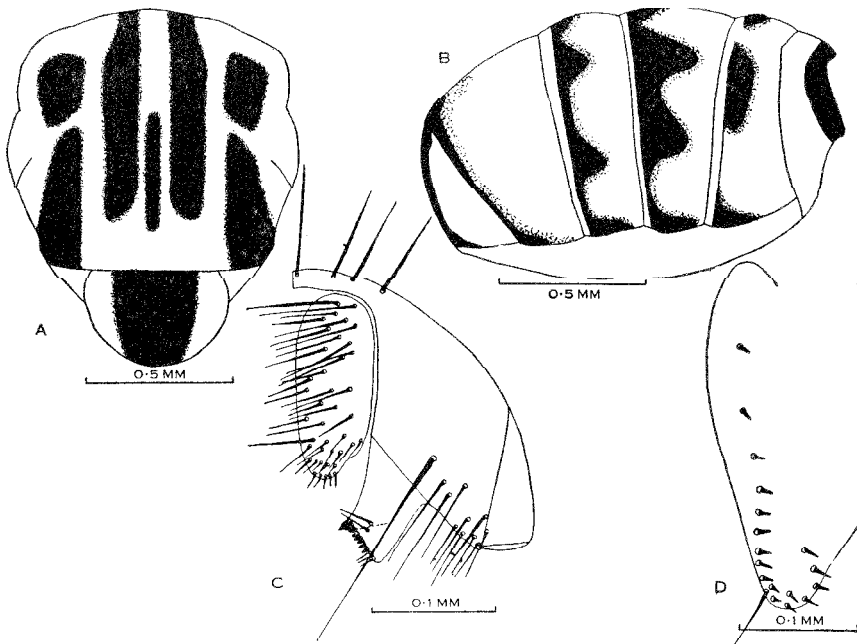


Fig. 4 A-D.—*D. enigma*: A, ♂ thorax, dorsal view; B, ♂ abdomen, dorso-lateral view; C, hypopygium; D, ovipositor plate.

DROSOPHILA ENIGMA Malloch

Fig. 4A-D

Drosophila enigma Malloch, 1927, Proc. Linn. Soc. N.S.W. 50: 6.

General: Brown thorax with white streaks between the 2 submedian rows of acrostichals (Fig. 4A).

TABLE 2
SUBGENUS PHOLADORIS: INTERNALS, LIFE HISTORY, AND DISTRIBUTION

Malpighian tubules: *F*, free; *A*, apposed; *Fu*, fused; chitinization: *P*, present; *H*, heavy; relationship pupal post. spir.: *A*, apposed; *D*, divergent; pupation pattern: *N*, rot on stopper; *S*, on stopper; larval colour: *L*, lavender; *W*, white, hooklet colour: *Y*, yellow; *B*, blackish

Species Group	Malpighian Tubules		Testes Colour	Testes Collings	Spermatheca	Ventral Receptacle	Egg Number	Egg Filament Shape	Pupal Ant. Spir.	Rel. of Pupal Post. Spir.	Pupation Pattern	Larval Colour	Larval Hooklet	Larval Salivary Glands	Distribution**
	Ant.	Post.													
<i>victoria</i>								Curly ends							
<i>lebanonensis</i> *	2 <i>F</i> 0.1 > 2 <i>A</i>	0.1	Dull yellow	None	<i>P</i>	Short	6-10		6-10	<i>A</i>	<i>S</i>	<i>W</i>	<i>Y</i>	Unequal	Palae.
<i>nitens</i> *	—	—	—	—	—	—	4-8	—	—	—	—	<i>W</i>	<i>Y</i>	—	Palae.
<i>victoria</i> †	2 <i>F</i> 0.1 > 2 <i>A</i>	0.1	"Dark"	None	<i>P</i>	Short	4-8	Pointed	4	—	—	<i>W</i>	<i>Y</i>	Unequal	Near.
<i>coracina</i>															
<i>cancellata</i> ‡	0.5 (2 <i>F</i> 0.1)														
<i>coracina</i>	—	0.3	Orange	None	<i>PH</i>	Short	7-10	Pointed	6-7	<i>D</i>	<i>S</i>	<i>W</i>	<i>Y</i>	Equal	Aust. Palae. & Ori.
<i>enigma</i> ‡	2 <i>F</i> 0.1 = 2 <i>A</i>	0.1	Yellow	None	<i>PH</i>	Short	5-8	Pointed	5-7	<i>A</i>	<i>S</i>	<i>W</i>	<i>Y</i>	Equal	Aust.
<i>lativittata</i> ‡	0.5 (2 <i>F</i> 0.1)														
<i>opaca</i> ‡	—	0.2	Orange	None	<i>PH</i>	Short	4-6	Pointed	7-8	<i>D</i>	<i>S</i>	<i>W</i>	<i>Y</i>	Equal	Aust.
<i>maculosa</i> ‡	2 <i>F</i> 0.1 = 2 <i>A</i>	0.1	Orange	None	<i>PH</i>	Short	4-6	Pointed	6-9	<i>D</i>	<i>S</i>	<i>W</i>	<i>Y</i>	Equal	Aust.
	0.5 (2 <i>F</i> 0.1)														
	—	0.2	White	None	<i>PH</i>	Short	3	Split	8-10	<i>A</i>	<i>S</i>	<i>W</i>	<i>Y</i>	Equal	Aust.
<i>mirin</i>															
<i>baeomyia</i> *	2 <i>F</i> 0.3 > 2 <i>A</i>	0.5	Pale yellow	None	<i>P</i>	Short	2-8	—	4	<i>A</i>	<i>N</i>	<i>L</i>	<i>B</i>	Equal	Near.
<i>mirin</i> §	2 <i>F</i> 0.5 > 2 <i>A</i>	0.5	Amber yellow	None	—	Short	6	Pointed	5	—	—	—	—	—	Neotr.
<i>levis</i> ‡	2 <i>F</i> 0.5 = 2 <i>Fu</i>	0.5	Pale yellow	1 <i>I</i> , 10	<i>PH</i>	4 Coils	4-7	Pointed	6-7	<i>A</i>	<i>N</i>	<i>L</i>	<i>Y</i>	Equal	Aust.

* Constructed from the data of Wheeler (1949). † Sturtevant (1942). ‡ The author. § Dobzhansky and Pavan (1943). || Kikkawa and Peng (1938). ** Patterson and Wheeler (1949).

Description

Culture Source.—Moggill, 28.v.1953 (Fig. 1).

Body Length.—♂ 2.5 mm, ♀ 2.8 mm.

Head ♂ and ♀.—Arista with 7-8 branches. Orbital bristles in the ratio of about 5:2:5. Second oral bristle about 0.4 of 1st. Greatest width of cheeks 0.2 greatest diameter of eyes. Eye colour red (6L8). Carina flat.

Thorax ♂ and ♀.—Brown with a white streak between the 2 sub-median rows of acrostichals (Fig. 4A). Acrostichal hairs in 8 rows.

TABLE 3*

RANGE OF NUMBER OF EGG FILAMENTS OF SPECIES OF PHOLADORIS, RECORDED AS PERCENTAGE OF TOTAL LAID BY FEMALES IN MASS CULTURES
Percentages for Australian species calculated from 50 eggs

Species Group, Spp., and Strain	2	3	4	5	6	7	8	9	10
<i>victoria</i>									
<i>lebunonensis</i>					5	44	44	5	1
<i>nitens</i>			2	37	41	16	3		
<i>victoria</i> 1				32	58	10			
<i>victoria</i> 2				16	55	26	3		
<i>victoria</i> 3			4	7	57	35			
<i>victoria</i> 4			5	22	56	15	2		
<i>victoria</i> 5				12	34	47	7		
<i>victoria</i> 6			6	30	43	21			
<i>victoria</i> 7			4	36	44	16			
<i>victoria</i> 8				25	42	28	5		
<i>victoria</i> 9			1	25	52	21	1		
<i>coracina</i>									
<i>cancellata</i> †						10	32	48	10
<i>enigma</i> †				16	48	32	4		
<i>lativittata</i> †			22	70	18				
<i>opaca</i> †			10	60	30				
<i>maculosa</i> †		100							
<i>mirim</i>									
<i>baeomyia</i> 1	1	2	10	25	42	17	3		
<i>baeomyia</i> 2			13	47	37	3			
<i>baeomyia</i> 3			2	26	59	12	1		
<i>baeomyia</i> 4		1	15	62	19	3			
<i>levis</i> †			10	34	38	18			

* Constructed from the data of Wheeler (1949). † The author.

Prescutellars present. Anterior scutellars divergent. Sterno-index 0.7. Apical bristles on 1st and 2nd tibia; preapicals on all 3. No sex combs.

Wings ♂ and ♀.—Clouding over crossveins. Costal index 2.7, 4th vein index 1.9, 5x index 1.5, 4c index 0.9. Third costal section with heavy spines on its basal 0.5. Length: ♂ 2.6 mm, ♀ 2.7 mm.

Abdomen ♂.—First segment with a black band anteriorly. Second segment with a black band posteriorly, interrupted dorsally and laterally.

Third and 4th segments with a black band posteriorly indented dorsally, dorsolaterally, and ventrolaterally. Fifth and 6th segments with a black band posteriorly (Fig. 4B).

♀. Similar to ♂ but with 5th segment similar to 4th, and 6th and 7th segments similar to 5th.

External Genitalia.—♂. Genital arch broad below, about 4 bristles on upper part, about 11 below, heel squarish, undermargin straight, toe squarish. Anal plate oval, free, about 41 bristles evenly distributed, slight rear angle. Primary clasper free, about 3 marginal bristles posteriorly, about 8 primary teeth in a straight line, about 2 bristles anteriorly. Secondary clasper fused onto under side of primary and with 1 tooth (Fig. 4C).

♀. Ovipositor plate with about 18 bristles (Fig. 3D).

Malpighian Tubules ♂ and ♀.—Two anterior free, common trunk 0.1 total length; 2 posterior apposed, common trunk 0.1 total length; anterior and posterior of equal length.

Internal Genitalia.—♂. Testes yellow (9H1), not coiled.

♀. Ventral receptacle very small. Spermatheca spheroidal, heavily chitinized.

Egg Filaments.—5-8, pointed.

Larvae.—Skip, white, hooklets yellow, salivary glands equal.

Pupae.—Anterior spiracles with 5-7 branches. No anterior spiracle stalks. Posterior spiracles apposed. Site of pupation mainly on stopper.

Relationships.—Tables 1-3.

Distribution.—Landsborough, 7-9.vi.1952, W. Mather 9/138 8/94, open eucalypt forest. Samford, 22.vi.1952, W. Mather 1/12 2/9, open eucalypt forest. Toowong, 3.viii.1952, W. Mather 0/1 1/4, garden. Montville, 17-20.viii.1952, P. Watkins 0/52 2/46, open eucalypt forest. Carnarvon Gorge, 27-29.v.1954, T. Woodward 2/67 0/64, open eucalypt forest. Moggill (Table 8 and Fig. 1). Probably does not extend into northern Queensland but recorded by Malloch from New South Wales.

DROSOPHILA LATIVITTATA Malloch

Fig. 5A-D

Drosophila lativittata Malloch, 1923, Proc. Linn. Soc. N.S.W. 48: 618.

General: Brown thorax with white streaks between the 2 median rows of acrostichals (Fig. 5A).

Description

Culture Source.—Moggill, 25.v.1952 (Fig. 1).

Body Length.—♂ 2.8 mm, ♀ 2.9 mm.

Head ♂ and ♀.—Arista with 6-8 branches. Orbital bristles in the ratio of about 3:1:3. Second oral bristle about 0.3 of 1st. Greatest width of cheek 0.2 greatest diameter of eyes. Eye colour red (5L7). Carina flat.

Thorax ♂ and ♀.—Brown with a white streak between the 2 median rows of acrostichals (Fig. 5A). Acrostichal hairs in 8 rows. Prescutellars present. Anterior scutellars divergent. Sterno-index 0.7. Apical bristles on 1st and 2nd tibia, preapicals on all 3. No sex combs.

Wing ♂ and ♀.—Clear, costal index 2.9, 4th vein index 2.0, 5x index 1.4, 4c index 0.9. Third costal section with heavy spines on its basal 0.6. Length: ♂ 2.5 mm, ♀ 2.7 mm.

Abdomen ♂.—First segment brown. Second, 3rd, and 4th segments with a black band interrupted dorsally, indented dorsolaterally, and with yellow patches ventrolaterally. Fifth segment with black band, interrupted dorsally and laterally. Sixth segment yellow (Fig. 5B).

♀. Similar to ♂ but with 5th segment similar to 4th; 6th similar to 5th; and 7th brown, anteriorly, posteriorly, and dorsally.

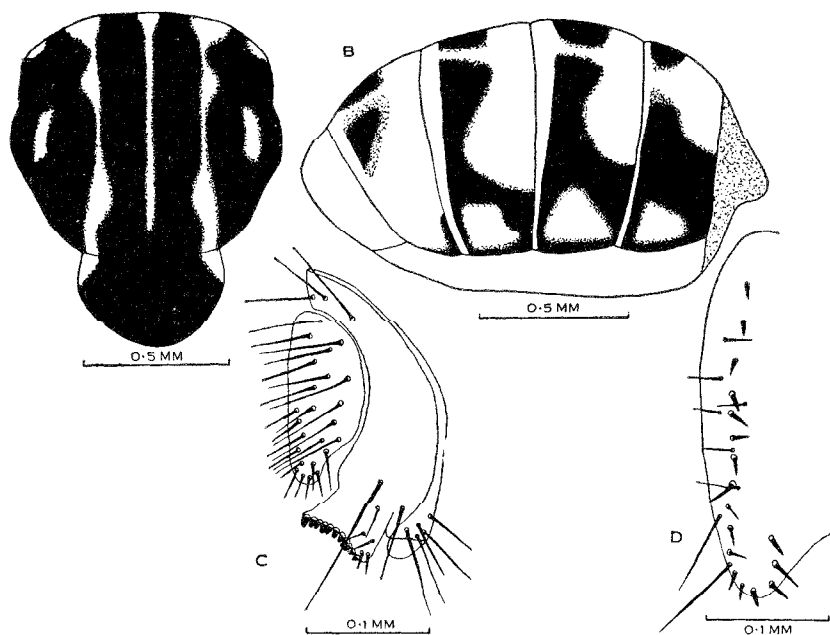


Fig. 5 A-D.—*D. lativittata*: A, ♂ thorax, dorsal view; B, ♂ abdomen, dorsolateral view; C, hypopygium; D, ovipositor plate.

External Genitalia.—♂. Genital arch broad below, about 3 bristles on upper part, about 8 below, heel squarish, undermargin straight, toe squarish. Anal plate oval, free, about 24 bristles, evenly distributed, slight rear angle. Primary clasper fused to genital arch, no marginal bristles, about 11 primary teeth in concave row, about 4 bristles posteriorly. Secondary clasper absent (Fig. 5C).

♀. Ovipositor plate with about 25 bristles (Fig. 5D).

Malpighian Tubules ♂ and ♀.—Two anterior, free, common trunk 0.1 total length; 2 posterior, apposed, common trunk 0.2 total length; anterior twice length of posterior.

Internal Genitalia.—♂. Testes orange (11A12), not coiled.

♀. Ventral receptacle very small. Spermatheca spheroidal, heavily chitinized.

Egg Filaments.—4-6, pointed.

Larvae.—Skip, white, hooklets yellow, salivary glands equal.

Pupae.—Anterior spiracles with 7-8 branches. No anterior spiracle stalks. Posterior spiracles divergent. Site of pupation mainly on stopper.

Relationships.—Tables 1-3.

Distribution.—Toowong, 25.v.1952, 1/2 0/0, 5.vi.1952, 2/143 0/58, 3.viii.1952, W. Mather 0/1 1/4, garden. Greenslopes, 4.vi.1952, N. Lavis 1/12 0/2, garden. Landsborough, 7-9.vi.1952, 3/138 4/94, 27-28.ix.1952, W. Mather 6/15 1/12, open eucalypt forest. Condamine River, 11-12.vi.1952, R. Kenny 4/4 6/6, open eucalypt forest. Ipswich, 22-25.viii.1952, 1/31 1/81, 3.viii.1952, J. Davis 1/7 5/50, garden. Maroochydore, 7-8.ii.1953, 1/104 0/90, 8.iii.1953, M. Bleakly 1/74 0/180, open eucalypt forest. Carnarvon Gorge, 27-29.v.1954, T. Woodward 2/67 9/64, open eucalypt forest. Moggill (Table 8 and Fig. 1). Probably does not extend into northern Queensland, but recorded by Malloch from N.S.W. and by A. Clark (personal communication) from Victoria.

✓ *DROSOPHILA OPACA*, sp. nov.

Fig. 6A, B

General: Black thorax and abdomen.

Description

Type Culture Source.—Noosa, 9.i.1953 (Fig. 1).

Body Length.—♂ 2.6 mm, ♀ 2.8 mm.

Head ♂ and ♀.—Arista with 6-7 branches. Orbital bristles in the ratio of about 2:1:2. Second oral bristle 0.4 of 1st. Greatest width of cheek 0.2 greatest diameter of eyes. Eye colour red (4L7). Carina flat.

Thorax ♂ and ♀.—Black. Acrostichal hairs in 8 rows. Prescutellars present. Anterior scutellars divergent. Sterno-index 0.7. Apical bristles on 1st and 2nd tibia, preapicals on all 3. No sex combs.

Wings ♂ and ♀.—Transparent. Costal index 3.3, 4th vein index 2.0, 5x index 1.3, 4c index 0.9. Third costal section with heavy spines on its basal 0.6. Length: ♂ 2.5 mm, ♀ 2.9 mm.

Abdomen ♂ and ♀.—All segments black.

External Genitalia.—♂. Genital arch broad below, about 2 bristles on upper posterior margin, about 7 bristles below, heel pointed, undermargin slightly convex, toe absent. Anal plate oval, free, about 30 bristles evenly distributed, rear angle absent. Primary clasper partially fused to

genital arch, about 4 marginal bristles posteriorly, about 11 primary teeth in straight row, about 5 scattered bristles posteriorly. Secondary clasper absent (Fig. 6A).

♀. Ovipositor plate with about 20 bristles (Fig. 6B).

Malpighian Tubules ♂ and ♀.—Two anterior, free, common trunk 0.1 total length; 2 posterior, apposed, common trunk 0.1 total length; anterior and posterior of equal length.

Internal Genitalia.—♂. Testes orange (10F12), not coiled.

♀. Ventral receptacle very small. Spermatheca spheroidal, heavily chitinized.

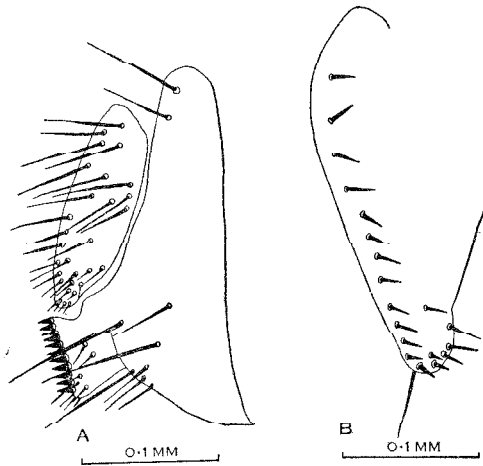


Fig. 6 A-B.—*D. opaca*: A, hypopygium; B, ovipositor plate.

Egg Filaments.—4-6, pointed.

Larvae.—Skip, white, hooklets yellow, salivary glands equal.

Pupae.—Anterior spiracles with 6-9 branches. No anterior spiracle stalks. Posterior spiracles divergent. Site of pupation mainly on stopper.

Relationships.—Tables 1-3.

Distribution.—Noosa, 9-12.i.1953, W. Dall and E. Grant 0/3 1/11, open eucalypt forest. Clump Point, 3.vi.1953, T. Woodward 1/21 2/8, rain-forest. Moggill (Table 8 and Fig. 1). Collected from both southern and northern Queensland.

Species group *MACULOSA*, sp. gr. nov.

Black species, anterior scutellar bristles divergent, acrostichal hairs in 8 rows, cheeks 0.3 width of eyes. Male genitalia with squarish heel to genital arch, the latter lightly bristled below; anal plate with not especially dense bristle at lower tip; clasper without numerous fine hairs, and not

extended outwards beyond primary teeth which are in a diagonal row across clasper. Posterior malpighian tubules with common trunk 0.2 their total length. Larvae white in colour, ventral hooklets yellow, larval salivary glands of equal size. Egg filaments showing no intraspecific variability and consisting of 3 split filaments.

DROSOPHILA MACULOSA, sp. nov.

Fig. 7A-D

General: Thorax with 2 submedian rows of 3 white spots (Fig. 7A).

Description

Type Culture Source.—Moggill, 19.xi.1952 (Fig. 1).

Body Length.—♂ 2.7 mm, ♀ 3.0 mm.

Head ♂ and ♀.—Arista with 6-7 branches. Orbital bristles in the ratio of about 2:1:2. Second oral bristle about 0.4 of 1st. Greatest width of cheeks 0.3 greatest diameter of eyes. Eye colour red (4L7). Carina flat.

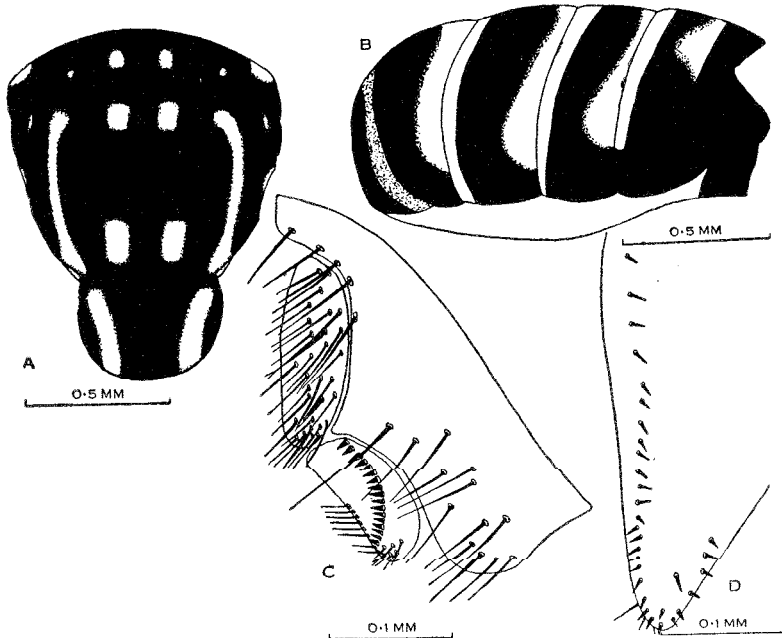


Fig. 7 A-D.—*D. maculosa*: A, ♂ thorax, dorsal view; B, ♂ abdomen, dorsolateral view; C, hypopygium; D, ovipositor plate.

Thorax ♂ and ♀.—Black with 2 submedian rows of white spots (Fig. 7A). Acrostichal hairs in 8 rows. Prescutellars present. Anterior scutellars divergent. Sterno-index 0.8. Apical bristles on 1st and 2nd tibia, preapicals on all 3. No sex combs.

Wings ♂ and ♀.—Clouding over crossveins. Costal index 2.6, 4th vein index 2.0, 5x index 1.0, 4c index 1.0. Third costal section with heavy spines on its basal 0.6. Length: ♂ 2.2 mm, ♀ 2.3 mm.

Abdomen.—♂. First segment black, 2nd to 5th segments with posterior black band which covers entire segment ventrolaterally. Sixth segment with black band posteriorly (Fig. 7B).

♀. Similar to ♂ but 6th and 7th segments black.

External Genitalia.—♂. Genital arch broad below, about 5 bristles along upper posterior margin, about 13 bristles below, heel squarish, undermargin slightly concave, toe roundish and below level of heel. Anal plate oval, free, about 30 bristles evenly distributed, rear angle absent. Primary clasper free, about 8 marginal bristles on posterior half, about 17 primary teeth in concave row diagonally across clasper, about 6 bristles posteriorly. Secondary clasper absent (Fig. 7B).

♀. Ovipositor plate with about 34 bristles (Fig. 7C).

Malpighian Tubules ♂ and ♀.—Two anterior, free, common trunk 0.1 total length; 2 posterior, apposed, common trunk 0.2 total length; anterior twice length of posterior.

Internal Genitalia.—♂. Testes white, not coiled.

♀. Ventral receptacle very small. Spermatheca spheroidal, heavily chitinized.

Egg Filaments.—3, split.

Larvae.—Skip, white, hooklets yellow, salivary glands equal.

Pupae.—Anterior spiracles with 8-10 branches. No anterior spiracle stalks. Posterior spiracles apposed. Site of pupation mainly on stopper.

Relationships.—Tables 1-3.

Distribution.—Moggill (Table 8 and Fig. 1).

Species group LEVIS, sp. gr. nov.

Brown species, anterior scutellar bristles convergent, acrostichal hairs in 6 rows, cheeks 0.1 width of eyes. Male genitalia with squarish heel to genital arch, the latter lightly bristled below; anal plate with not especially dense bristles at lower tip; clasper without numerous fine hairs and not extended outwards beyond primary teeth. Posterior malpighian tubules fused and with common trunk 0.5 their total length. Larvae lavender in colour, ventral hooklets black, larval salivary glands of equal size. Egg filaments showing intraspecific variability between 4 and 7.

♂ DROSOPHILA LEVIS, sp. nov.

Fig. 8A-C

General: A small brown species.

Description

Type Culture Source.—Maroochydore, 8.iii.1953 (Fig. 1).

Body Length.—♂ 2.0 mm, ♀ 2.1 mm.

Head ♂ and ♀.—Arista with 8 branches. Orbital bristles in the ratio of about 3:1:3. Second oral bristle about 0.4 of 1st. Greatest width of cheeks 0.1 greatest diameter of eyes. Eye colour red (5L6). Carina flat.

Thorax ♂ and ♀.—Acrostichal hairs in 6 rows. Prescutellars present. Anterior scutellars convergent. Sterno-index 0.7. Apical bristles on 1st and 2nd tibia. Preapicals on all 3. No sex combs.

Wings ♂ and ♀.—Transparent. Costal index 1.5, 4th vein index 2.3, 5x index 2.6, 4c index 1.5. Third costal section with heavy spines on its basal 0.7. Length: ♂ 1.5 mm, ♀ 1.7 mm.

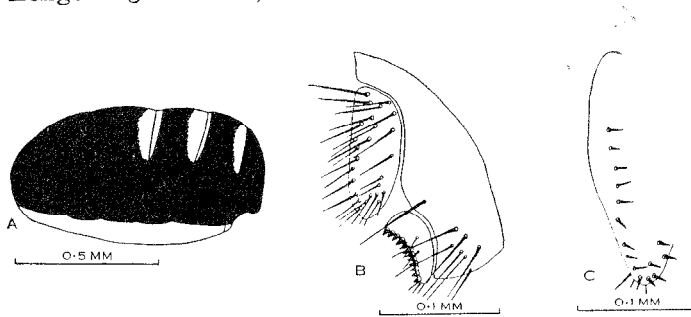


Fig. 8 A-C.—*D. levis*: A, ♂ abdomen, dorsolateral view; B, ♂ hypopygium; C, ovipositor plate.

Abdomen.—♂. First segment black. Second to 4th segments with black bands indented with yellow dorsally and laterally. Fifth and 6th segments black (Fig. 8A).

♀. Similar to ♂ but with 7th segment also black.

External Genitalia.—♂. Genital arch broad below, about 8 bristles on lower half, heel squarish, undermargin convex, toe squarish and below level of heel. Anal plate oval, free, about 26 bristles, evenly distributed, rear angle absent. Primary clasper free, about 2 marginal bristles posteriorly, about 12 primary teeth in a concave row, and about 2 bristles centrally. Secondary clasper absent (Fig. 8B).

♀. Ovipositor plate with about 18 bristles (Fig. 8C).

Mulpighian Tubules ♂ and ♀.—Two anterior, free, common trunk 0.5 total length; 2 posterior, fused, common trunk 0.5 total length; anterior and posterior of equal length.

Internal Genitalia.—♂. Testes pale yellow (10G1) with 1 inner and 1 outer coil.

♀. Ventral receptacle with about 4 coils. Spermatheca spheroidal, heavily chitinized.

Egg Filaments.—4-7, pointed.

Larvae.—Skip, pale lavender, hooklets black, salivary glands equal.

Pupae.—Anterior spiracles with 6-7 branches. No anterior spiracle stalks. Posterior spiracles apposed. Site of pupation mainly not on stopper except for shrivelled larvae.

Relationships.—Tables 1-3.

Distribution.—Noosa, 9-12.i.1953, E. Grant and W. Dall 0/3 1/11, open eucalypt forest. Maroochydore, 7-8.ii.1953, 2/104 4/90, 8.iii.1953, M. Bleakly 12/74 16/180 open eucalypt forest. Clump Point, 3.vi.1953, T. Woodward 3/21 5/8, rain-forest. Moggill (Table 8 and Fig. 1). Collected from southern and northern Queensland.

Subgenus DORSILOPHA Sturtevant

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

DROSOPHILA BUSCKII Coquillett

D. busckii Coquillett, 1901, Ent. News. 12: 18; Patterson, 1943, Univ. Tex. Publ. 4313: 63, Fig. 12, Plate II.

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

D. plurilineata Villeneuve, 1911, Wien. Ent. Z. 30: 38.

General: Yellow thorax with 3 longitudinal stripes.

Distribution.—Toowong, 6.vii.1952, 1/3 0/26, 10.viii.1952, W. Mather 2/22 5/36, garden. Moggill (Table 5 and Fig. 1). Collected only from southern Queensland but recorded from Western Australia and New South Wales by Malloch and from Victoria by A. Clark (personal communication).

Subgenus SOPHOPHORA Sturtevant

Sophophora Sturtevant, 1939, Proc. Nat. Acad. Sci. Wash. 25: 137.

Species group MELANOGASTER Sturtevant

Melanogaster Sturtevant, 1942, Univ. Tex. Publ. 4213: 28.

Species subgroup MELANOGASTER Hsu

Melanogaster Hsu, 1949, Univ. Tex. Publ. 4920: 121.

DROSOPHILA MELANOGASTER Meigen

D. melanogaster Meigen, 1830, Syst. Besch. 6: 85; Patterson 1943, Univ. Tex. Publ. 4313: 63, Fig. 14, Plate V.

D. nigriventris Zetterstedt, 1847, Dipt. Scand. 6: 2557 (not Macquart, 1843 Dipt. Exot. 2: 259).

D. ampelophila Loew, 1862, Berl. Ent. Z. 6: 231.

D. uvarum Rondani, 1875, Bull. Com. Agric. Parm.

General: Longitudinal sex comb on distal half of metatarsus of 1st leg and posterior margin of genital arch inconspicuous.

Distribution.—Toowong, 30.v.1952, ?/15 1/18, 5.vi.1952, ?/143 6/58, 21.vi.1952, ?/1 1/3, 6.vii.1952, ?/3 1/16, 13.vii.1952, ?/6 1/22, 8.ii.1952, W. Mather ?/7 4/7, garden. Woolloowin, 29.vi.1952, R. Domorov ?/12

2/20, indoors. Ipswich, 22-25.vii.1952, ?/55 4/57, 3.viii.1952, J. Davis ?/7 2/30, garden. South Johnstone, 23-24.viii.1952, N. Darveniza ?/37 15/52, garden. Tallebudgera Creek, 16.ii.1953, H. Reye ?/8 1/71, open eucalypt forest. Maroochydore, 8.iii.1953, M. Bleakly ?/74 14/180, open eucalypt forest. Tully, 30.iv.1953, L. Webb ?/1 1/4, indoors. Carnarvon Gorge, 27-29.v.1954, T. Woodward ?/67 2/64, rain-forest. Moggill (Table 8 and Fig. 1). Collected from northern and southern Queensland and recorded from New South Wales and South Australia by Malloch, and Victoria by A. Clark (personal communication). Not nearly as prevalent as the closely related *D. simulans*.

DROSOPHILA SIMULANS Sturtevant

D. simulans Sturtevant, 1919, Psyche Camb. Mass. 26: 153; Patterson, 1943, Univ. Tex. Publ. 4313: 63, Fig. 15.

General: Longitudinal sex comb on distal half of metatarsus of 1st leg and posterior margin of genital arch very conspicuous and clam-shaped.

Distribution.—Dunwich, 26.v.1952, P. Watkins and N. Darveniza ?/19 4/35, 19.vii.1952, W. Dall ?/1 2/2, garden. Toowong, 30.v.1952, ?/15 17/18, 5.vi.1952, ?/143 52/58, 21.vi.1952, ?/1 2/3, 13.vii.1952, ?/6 17/22, 27.viii.1952, ?/12 11/16, 3.viii.1952, ?/1 2/4, 10.viii.1952, ?/22 31/36, 8.ii.1953, W. Mather ?/7 3/7, garden. Yeronga, 1.vi.1952, H. Reye ?/6 9/9, garden. Bagara, 2.vi.1952, R. Kenny ?/10 14/15, open eucalypt forest. Urangan, 3.vi.1952, R. Kenny 0/0 1/1, open eucalypt forest. Tolga, 26.v.1952, D. Tranter ?/35 33/33, 28.iv.1953, R. McIntyre ?/78 20/70, garden. Landsborough, 7-9.vi.1952, ?/138 47/94, 27-28.ix.1952, ?/25 5/12, 15.xi.1953, W. Mather ?/18 1/8, open eucalypt forest. Samford, 22.vi.1952, W. Mather ?/12 1/9, open eucalypt forest. Ipswich, 22-25.vii.1952, ?/31 73/81, 3.viii.1952, J. Davis ?/7 23/30, garden. South Johnstone, 23-24.viii.1952, N. Darveniza ?/37 36/52, garden. Gin-Gin Creek, 14-16.viii.1952, H. Reye ?/38 24/25, open eucalypt forest. Montville, 17-20.viii.1952, P. Watkins ?/50 30/39, open eucalypt forest. Bulimba, 7.ix.1952, W. Stephenson ?/15 8/5, garden. Somerset Dam, 14.ix.1952, W. Stephenson ?/1 2/2, open eucalypt forest. Coochin Creek, 28.ix.1952, W. Mather ?/1 2/2, open eucalypt forest. Noosa, 9-12.i.1953, W. Dall and E. Grant ?/3 2/11, open eucalypt forest. Maroochydore, 7-8.ii.1953 ?/104 72/90, 8.iii.1953, M. Bleakly ?/74 115/180, open eucalypt forest. Tallebudgera Creek, 19.ii.1953, H. Reye ?/8 4/7, open eucalypt forest. Wooloowin, 10.iii.1953, R. Domorov ?/7 1/9, indoors. Carnarvon Gorge, 27-29.v.1954, T. Woodward ?/67 53/64, rain-forest. Moggill (Table 8 and Fig. 1). Recorded from northern and southern Queensland and from Victoria by A. Clark (personal communication). By far the most ubiquitous species in Queensland.

Species subgroup MONTIUM HSU

Montium Hsu, 1949, Univ. Tex. Publ. 4920: 121.

DROSOPHILA SERRATA Malloch

Fig. 9A-D

D. serrata Malloch, 1927, Proc. Linn. Soc. N.S.W. 52: Pt. II, 6, Fig. 1.

General: Longitudinal sex comb on 1st and 2nd tarsal segments of 1st leg with about 34 and 18 teeth respectively (Fig. 9A).

Description

Culture Source.—Greenslopes, 4.vi.1952 (Fig. 1).

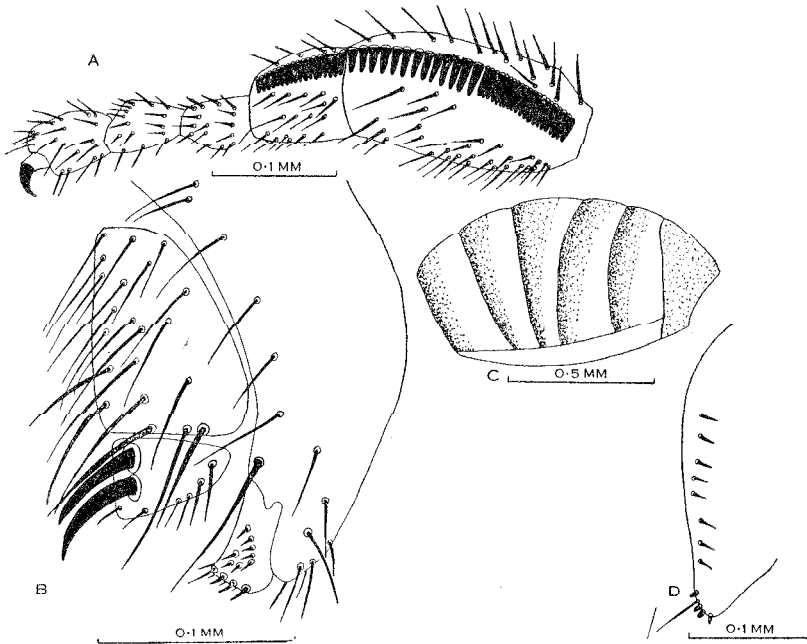


Fig. 9 A-D.—*D. serrata*: A, tarsus of ♂ fore leg; B, hypopygium; C, ♂ abdomen, dorsolateral view; D, ovipositor plate.

Body Length.—♂ 2.2 mm, ♀ 2.3 mm.

Head ♂ and ♀.—Arista with 8-9 branches. Orbital bristles in the ratio of about 2:1:2. Second oral bristle about 0.5 of 1st. Greatest width of cheeks 0.2 greatest diameter of eyes. Eye colour red (2L11). Carina ridged.

Thorax ♂ and ♀.—Brown. Acrostichal hairs in 6 rows. Prescutellars absent. Anterior scutellars divergent. Sterno-index 0.6. Apical bristles on 1st and 2nd tibia; preapicals on all 3. Sex comb in the male extending over the 1st and 2nd tarsal segments with about 34 and 18 teeth respectively (Fig. 9A).

TABLE 4*
SUBGROUPS MONTIUM AND TAKAHASHII

Carina: *F*, flat; *R*, ridged; wing colour: *T*, transparent; *FC*, faint clouding

Subgroup and Spp.	Orbital Bristles Ratio	Arista	Branches	Oral Bristles Ratio	Cheek-Eye Ratio	Carina	Rows of Acrostichals	Sterno-index	Sex Comb	Teeth	Wing Colour	Costal Index	4th Vein Index	5x Index	4c Index	Wing Length	Body Length	Distribution†	
<i>montium auraria</i>	3:1:3	9	9	1.0	0.2	<i>F</i>	6	0.5	26 + 18	<i>T</i>	<i>T</i>	2.0	2.7	2.0	1.5	2.0	2.0	Palae. & Ori.	
<i>fusciphila montium</i>	3:1:3	7	7	0.8	0.1	<i>F</i>	8	0.8	25 + 18	<i>T</i>	<i>T</i>	1.8	2.0	1.5	1.2	2.0	2.2	Palae.	
	3:1:3	9	9	1.0	0.1	<i>F</i>	6	0.6	25 + 18	<i>T</i>	<i>T</i>	2.1	2.5	2.5	1.5	2.0	2.0	Neotr. Palae., Ori. & Aust.	
<i>nipponica</i>	5:1:5	8	8	0.5	0.3	<i>F</i>	6	0.3	15 + 13	<i>T</i>	<i>T</i>	2.0	2.2	1.6	1.1	1.8	1.8	Palae.	
<i>rufa</i>	4:1:4	9	9	0.7	0.1	<i>F</i>	6-8	0.6	25 + 18	<i>T</i>	<i>T</i>	2.3	2.5	3.0	1.3	2.1	2.1	Palae.	
<i>serrata</i>	2:1:2	8-9	8-9	0.5	0.2	<i>R</i>	6	0.6	34 + 18	<i>T</i>	<i>T</i>	2.2	2.7	2.5	1.5	1.9	2.2	Aust.	
<i>takahashii</i>																			
<i>lutea</i>	3:1:3	9	9	0.7	0.1	<i>F</i>	8	0.7			<i>FC</i>	2.0	2.2	2.0	1.7	2.1	2.2	Palae.	
<i>takahashii‡</i>	2:1:2	8-9	8-9	0.5	0.1	<i>R</i>	8	0.6			<i>FC</i>	2.6	2.1	1.8	1.0	2.0	2.2	Palae., Ori. & Aust.	

* Constructed from the data of Kikkawa and Peng (1938). † Patterson and Wheeler (1949). ‡ The author.

Wings ♂ and ♀.—Transparent. Costal index 2.2, 4th vein index 2.7, 5x index 2.5, 4c index 1.5. Third costal section with heavy spines on its basal 0.5. Length ♂ 1.9 mm, ♀ 2.0 mm.

Abdomen.—♂. First segment brown. Second to 6th with posterior brown band (Fig. 9C).

♀. Similar to ♂ but with 7th segment black.

External Genitalia.—♂. Genital arch broad above, about 7 bristles along posterior margin, about 8 bristles below, heel absent, undermargin concave, toe rounded. Anal plate triangular, free, about 21 bristles evenly distributed, squarish rear angle. Primary clasper free, about 4 marginal bristles, about 4 primary teeth in a straight line, 2 rows of secondary teeth, about 3 in inner, 4 in outer. Secondary clasper triangular, free, 2 very large bristles on inner margin, about 6 smaller bristles on under margin (Fig. 9B).

♀. Ovipositor plate with about 13 bristles (Fig. 9D).

Malpighian Tubules ♂ and ♀.—Two anterior, free, common trunk 0.2 total length; 2 posterior, free, common trunk 0.1 total length; anterior and posterior of equal length.

Internal Genitalia.—♂. Testes yellow (9J1) with 3 inner and 3 outer coils.

♀. Ventral receptacle with about 7 coils. Spermatheca spheroidal, not chitinized.

Egg Filaments.—2, pointed.

Larvae.—Do not skip, white, hooklets black, salivary glands equal.

Pupae.—Anterior spiracles with 9-11 branches. Posterior spiracles divergent. Ratio (pupal stalk length/pupal body length) = 0.05. Site of pupation not on stopper.

Relationships.—Table 4.

Distribution.—Dunwich, 26.v.1952, P. Watkins and N. Darveniza ?/19 30/35, garden. Bagara 2.vi.1952, R. Kenny ?/10 1/15, open eucalypt forest. Greenslopes, 4.vi.1952, N. Lavis ?/12 2/2, garden. Landsborough, 7-9.vi.1952, ?/138 27/94, 27-28.ix.1952, ?/25 5/12, 15.xi.1953, W. Mather ?/18 7/8, open eucalypt forest. Samford, 22.vi.1952, W. Mather ?/12 1/9, open eucalypt forest. Toowong, 27.vi.1952, W. Mather ?/12 5/16, garden. Gin-Gin Creek, 14-16.viii.1952, H. Reye ?/38 1/25, open eucalypt forest. Montville, 17-20.viii.1952, P. Watkins ?/52 7/46, open eucalypt forest. South Johnstone, 23-24.viii.1952, N. Darveniza ?/23 1/32 Noosa, 9-12.i.1953, W. Dall and E. Grant ?/3 7/11, open eucalypt forest. Maroochydore, 7-8.ii.1953, ?/104 14/90, 8.iii.1953, M. Bleakly ?/24 34/180, open eucalypt forest. Canungra, 8.iii.1953, W. Mather ?/18 12/12, open eucalypt forest. Clump Point, 3.vi.1953, T. Woodward ?/11 1/8, rain-forest. Moggill (Table 8 and Fig. 1). Collected from northern and southern Queensland and also recorded by Malloch from Queensland. After *D. simulans* the most ubiquitous species in Queensland.

Species subgroup TAKAHASHII Hsu

Takahashii Hsu, 1949, Univ. Tex. Publ. 4920: 122.

DROSOPHILA TAKAHASHII Sturtevant

Fig. 10A-D

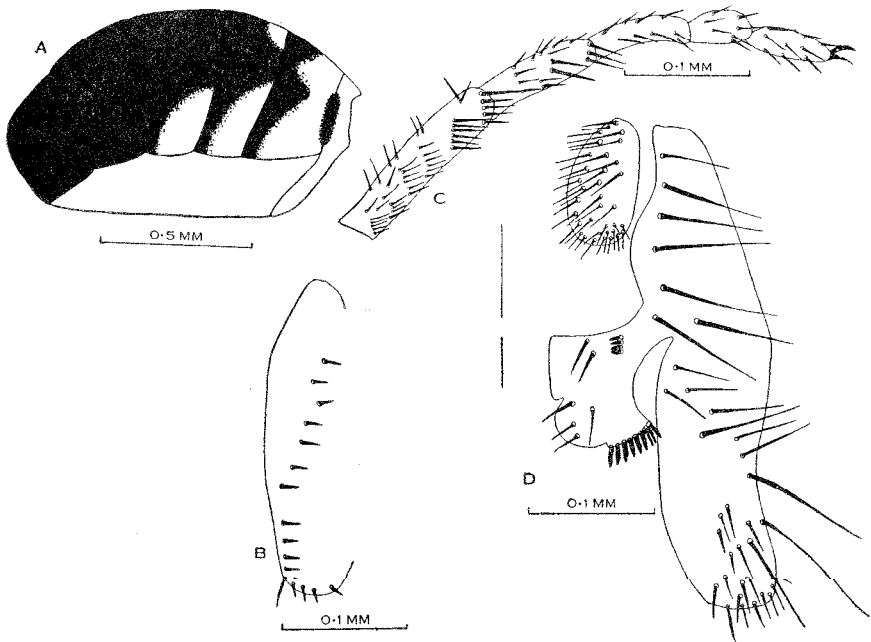
D. takahashii Sturtevant, 1927, Phil. J. Sci. 32: 371; Kikkawa and Peng, 1938, Jap. J. Zool. 7: 538, Fig. 19.*General*: Sex comb in transverse rows, 6 on metatarsus, distal 2 prominent; 2 on 1st tarsal segment, prominent (Fig. 10A).*Description**Culture Source*.—Samford 22.vi.1952 (Fig. 1).

Fig. 10 A-D.—*D. takahashii*. A, ♂ abdomen, dorsolateral view; B, ovipositor plate; C, tarsus of ♂ fore leg; D, hypopygium.

Body Length.—♂ 2.2 mm, ♀ 2.5 mm.*Head* ♂ and ♀.—Arista with 8-9 branches. Orbital bristles in the ratio of about 2:1:2. Second oral bristle about 0.5 of 1st. Greatest width of cheeks 0.1 greatest diameter of eyes. Eye colour red (2K11). Carina ridged.*Thorax* ♂ and ♀.—Brown. Acrostichal hairs in 8 rows. Prescutellars absent. Anterior scutellars convergent. Sterno-index 0.6. Apical bristles on 1st and 2nd tibia, preapicals on all 3. Sex comb in the ♂ in transverse rows, 6 on 1st tarsal segment, distal 2 prominent, 2 on 2nd tarsal segment, prominent (Fig. 10A).

Wings ♂ and ♀.—Faintly clouded. Costal index 2.6, 4th vein index 2.1, 5x index 1.8, 4c index 1.0. Third costal section with heavy spines on its basal 0.4. Length: ♂ 2.0 mm, ♀ 2.3 mm.

Abdomen.—♂. First segment yellow. Patch of black laterally on junction of 1st and 2nd segments. Second segment with a black band posteriorly, indented anteriorly, dorsally, and ventrolaterally. Third and 4th segments with black band indented ventrolaterally. Fifth and 6th segments black (Fig. 10A).

♀. Similar to ♂ but with 7th segment black.

External Genitalia.—♂. Genital arch of uniform width, about 34 bristles evenly distributed, heel rounded, undermargin convex, toe rounded, and at same level as heel. Anal plate oval, free, about 34 bristles evenly distributed, rear angle absent. Primary clasper attached by stalk to genital arch, no marginal bristles, about 9 primary teeth in straight row on undermargin, about 4 secondary teeth in a row near base of clasper and about 6 scattered bristles. Secondary clasper absent (Fig. 10D).

♀. Ovipositor plate with about 17 bristles (Fig. 10B).

Malpighian Tubules ♂ and ♀.—Two anterior, free, common trunk 0.2 total length; 2 posterior, free common trunk 0.1 total length; anterior and posterior of equal length.

Internal Genitalia.—♂. Testes pale yellow (10G1), with 2 inner and 4 outer coils.

♀. Ventral receptacle with about 10 coils. Spermatheca spheroidal and chitinized.

Egg Filaments.—2, pointed.

Larvae.—Do not skip, white, hooklets black, salivary glands equal.

Pupae.—Anterior spiracles with 4-5 branches. Posterior spiracles divergent. Ratio (pupal stalk length/pupal body length) = 0.06. Site of pupation not on stopper.

Relationships.—Table 4.

Distribution.—Montville, 17-20.viii.1952, P. Watkins ?/51 7/46, open eucalypt forest. Binna Burra, 9-10.xii.1952 ?/35 15/43, 13-14.i.1953, W. Mather ?/40 28/51, rain-forest. Moggill (Table 8 and Fig. 1). Previously recorded by Kikkawa and Peng (1938) from Formosa and China.

Species subgroup ANANASSAE Hsu

Ananassae Hsu, 1949, Univ. Tex. Publ. 4920: 122.

DROSOPHILA ANANASSAE Doleschall

- D. ananassae* Doleschall, 1858, Nat. Tijd. 17: 128, 129; Patterson, 1943, Univ. Tex. Publ. 4313: Fig. 16, Plate II.
- D. imparata* Walker, 1859, Proc. Linn. Soc. 3: 126, 164.
- D. similis* Lamb, 1914, Trans. Linn. Soc. 3: 347.
- D. caribbea* Sturtevant, 1916, Ann. Ent. Soc. Amer. 9: 335.
- D. errans* Malloch, 1934, Brit. Mus. (Nat. Hist.) 6: 301.

General: Transverse sex combs on 1st leg; 2 on 1st tarsal segment and 1 on 2nd tarsal segment.

Distribution.—Tolga, 28.iv.1953, R. McIntyre ?/78 50/70, garden. Tully, 30.iv.1953, L. Webb ?/1 3/4, indoors. Babinda, 4.v.1953, L. Webb ?/13 4/5, rain-forest. Thursday I., 26.vii.1953, D. Tranter ?/7 12/12, garden. Moggill (Table 8 and Fig. 1). Only collected from northern Queensland.

Species group DISPAR, sp. gr. nov.

Dark species, mid-orbital bristle small, 9-10 arista branches, medium size 2nd oral bristle, 8 rows of acrostichals, prescutellars absent, anterior scutellars convergent, sterno-index about 0.5, preapicals of 1st leg of normal length, sex combs absent, no sclerotized areas on 5th abdominal tergite, wings transparent, wing behaviour normal. External male

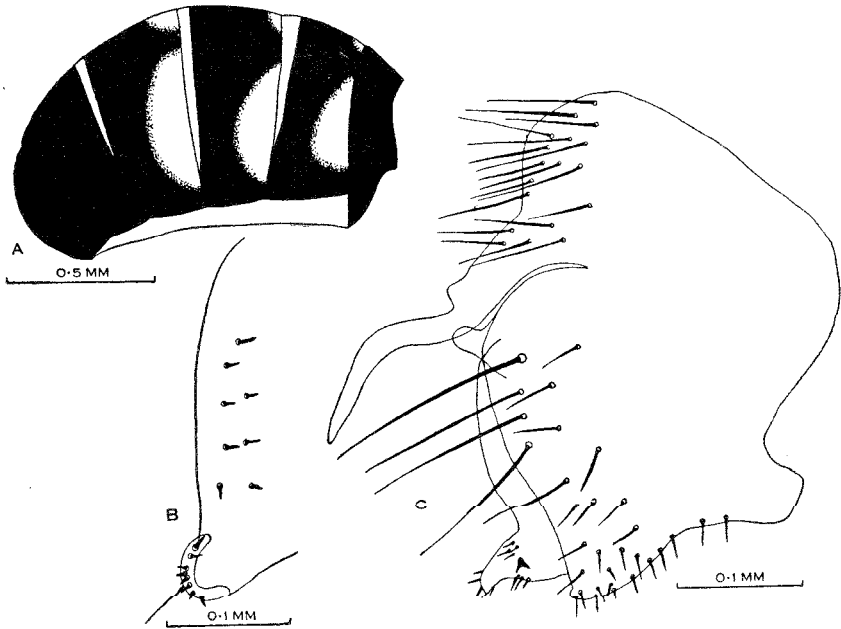


Fig. 11 A-C.—*D. dispar*: A, ♂ abdomen, dorsolateral view; B, ovipositor plate, C, hypopygium.

genitalia having anal plate extended into a very prominent finger-like projection. Testes yellow and short, ventral receptacle with about 8 coils. Eggs with 2 filaments expanded apically, larvae do not skip.

DROSOPHILA DISPAR, sp. nov.

Fig. 11A-C

General: Tip of anal plate extended into a very prominent finger-like projection (Fig. 11C).

Description

Type Culture Source.—Samford, 22.vi.1953 (Fig. 1).

Body Length.—♂ 2.3 mm, ♀ 2.5 mm.

Head ♂ and ♀.—Arista with 9-10 branches. Orbital bristles in the ratio of about 4:1:4. Second oral bristle about 0.9 of 1st. Greatest width of cheeks 0.1 greatest diameter of eyes. Eye colour red (3L10). Carina ridged.

Thorax ♂ and ♀.—Brown. Acrostichal hairs in 8 rows. Prescutellars absent. Anterior scutellars convergent. Sterno-index 0.5. Apical bristles on 2nd tibia, preapicals on all 3. No sex combs.

Wings ♂ and ♀.—Transparent. Costal index 2.7, 4th vein index 2.0, 5x index 2.0, 4c index 1.0. Third costal section with heavy spines on the basal 0.6. Length ♂ and ♀ 2.4 mm.

Abdomen.—♂. First segment black. Second, 3rd, and 4th segments with black bands indented dorsally and laterally. Fifth and 6th segments black (Fig. 11A).

♀. Similar to ♂ but with 7th segment also black.

External Genitalia.—♂. Genital arch with anterior margin strongly convex, about 31 bristles on lower posterior margin and undermargin, heel prominent, undermargin concave, toe prominent and below level of heel. Anal plate, fused to genital arch and with tip extended into a very prominent finger-like projection, about 18 bristles evenly distributed. Primary clasper fused to genital arch, about 8 marginal bristles, about 1 primary tooth and about 4 bristles. Secondary clasper fused to genital arch and free of bristles (Fig. 11C).

♀. Ovipositor plate with about 17 bristles (Fig. 11B).

Malpighian Tubules ♂ and ♀.—Two anterior, free, common trunk 0.1 total length; 2 posterior, free, common trunk 0.05 total length; anterior and posterior of equal length.

Internal Genitalia.—♂. Testes yellow (9I5) with 3 inner, and 2½ outer coils.

♀. Ventral receptacle with about 8 coils. Spermatheca spheroidal, chitinized.

Egg Filaments.—2, pointed.

Larvae.—Do not skip, white, hooklets black, salivary glands equal.

Pupae.—Anterior spiracles with 9-12 branches. Posterior spiracles divergent. Ratio (pupal stalk length/pupal body length) = 0.05. Site of pupation not on stopper.

Relationships.—Table 5.

Distribution.—Landsborough, 7-9.vi.1952, W. Mather ?/138 2/94, open eucalypt forest. Samford, 22.vi.1952, W. Mather ?/12 2/9, open eucalypt forest. Binna Burra, 19.vii.1952, 0/0 1/1, 9-10.xii.1952, ?/35 28/43, 13-14.i.1953, W. Mather ?/40 23/51, rain-forest. Moggill (Table 8 and Fig. 1).

TABLE 5*
SUBGENUS SOPHOPHORA

Character	<i>D. dispar</i> †	Groups				
		<i>saltans</i>	<i>willistoni</i>	<i>melanogaster</i>	<i>obscura</i>	<i>aligitans</i> <i>nannoptera</i> <i>bromeliac</i>
Mid-orb. bristle	Small				Large	7-9
Arista branches	9-10				Small	8
2nd Oral bristle	Medium					Absent
Rows of acrost.	8					Enlar. hairs
Prescutellars	Absent					Convergent
Ant. scutellars	Convergent	Divergent	Divergent	Convergent	Convergent	Divergent
Sterno-index	0.4-0.7	0.3-0.4	0.3	0.5-0.6	0.6	
Preap. 1st leg	Normal				Usu. long	
Sex combs	Absent	Absent	Absent	Present	Present	
5th Abdom. tergite	No sclerotized areas	1 or 2 sclerotized areas	No sclerotized areas	No sclerotized areas	No sclerotized areas	
Wing colour	Transparent					Clouded Crossveins Constantly waving
Wing behaviour	Normal					Orange and spiral
Testes	Yellow and short	Long spiral	Med. long spiral	Med. long spiral		Long and loosely coiled
Ventral receptacle	8 Coils	Long fine	Long fine	Rather long		2 Long
Egg filaments†	2	2	2			
Larvae	Do not skip	Do not skip	Do not skip	Do not skip	Do not skip	
Colour	Dark	Dark	Yellowish	Yellowish	Dark	Dull black
Habitat	Queensland	Tropical America	Tropical America	Trop. and Subtrop. Old World	N. Temp. Zone	Mexico
Chief distribution						Mexico Central S. America

* Constructed from the data of Pattersor and Stone (1952). † The author. ‡ Expanded apically. || Usually on flowers.

Subgenus DROSOPHILA Fallén

Drosophila Fallén, 1823, Diptera Sueciae Geomyzides. Part 2: p. 4.

Species group REPLETA Sturtevant

Repleta Sturtevant, 1942, Univ. Tex. Publ. 4213: 5.

Species subgroup HYDEI Wharton

Hudei Wharton, 1944, Univ. Tex. Publ. 4445: 178; Wheeler, 1949, Univ. Tex. Publ. 4920: 182.

DROSOPHILA HYDEI Sturtevant

D. hydei Sturtevant, 1921, Carneg. Instn. Publ. 301: 101; Patterson, 1943, Univ. Tex. Publ. 4313: 126, Fig. 37, Plate VIII.

General: Thorax with bristles arising from black spots but no lateral abdominal yellow spots.

Distribution.—Tallebudgera Creek, 16.ii.1953, H. Reye 5/8 1/7, open eucalypt forest. Maroochydore, 8.iii.1953, M. Bleakly 0/74 1/180, open eucalypt forest. Moggill (Table 8 and Fig. 1). Only collected from southern Queensland and from Victoria by A. Clark (personal communication from Victoria, and Malloch from New South Wales and South Australia.

Species subgroup REPLETA Wharton

D. repleta Wharton, 1944, Univ. Tex. Publ. 4445: 178; Wheeler, 1949, 4920: 182.

DROSOPHILA REPLETA Wollaston

D. repleta Wollaston, 1858, Ann. Mag. Nat. Hist. 41: 117; Patterson, 1943, Univ. Tex. Publ. 4313: 117; Fig. 32, Plate VII.

D. punctulata Loew, 1862, Berlin Ent. Z. 6: 232.

D. adspersa Mik, 1886, Wien Ent. Z. 5: 328.

General: Thorax with bristles arising from black spots, lateral abdominal yellow spots and white testes.

Distribution.—Wooloowin, 29.vi.1952, ?/12 18/20, 10.iii.1953, R. Domorov ?/7 8/9, indoors. Tallebudgera Creek, 16.ii.1953, H. Reye ?/8 1/7, open eucalypt forest. Moggill (Table 8 and Fig. 1). Only collected from southern Queensland, but Malloch has recorded it from New South Wales.

Species subgroup MULLERI Wharton

Mulleri Wharton, 1944, Univ. Tex. Publ. 4445: 178.

DROSOPHILA VERSICOLOR, sp. nov.

Fig. 12A-C

General: Thorax with bristles arising from black spots, with lateral abdominal yellow spots (Fig. 12A) and orange testes.

Description

Type Culture Source.—Moggill, 23.xi.1952 (Fig. 1).

TABLE 6
SUBGROUP MULLERI: EXTERNALS

S, sulcate; F, flat; C, convergent; T, transparent; R, ridged; D, divergent; C/C, clouding over crossveins

Species	Orbital Bristles Ratio	Arista Branches	Oral Bristles Ratio	Cheek-Eye Ratio	Carina	Rows of Acrostichals	Anterior Scutellars	Sterno-index	Wing Colour	Costal Index	4th Vein Index	3x-Index	4c-Index	3rd Costal Section Ratio	Wing Length ♂ (mm)	Wing Length ♀ (mm)	Body Length ♂ (mm)	Body Length ♀ (mm)
<i>aldrichi</i> *	2:1:2	7	0.3	0.3	S	8	C	0.8	T	2.6	2.2	1.3	1.1	0.3	22	—	2.5	—
<i>anceps</i> †	2:1:2	8	0.4	0.2	R	8	C	0.7	C/C	3.0	1.7	1.2	0.9	0.5	29	3.2	3.0	3.2
<i>arizonensis</i> ‡	3:2:4	7	0.3	0.3	S	8	C	0.8	T	2.4	1.7	1.4	1.0	0.3	20	2.1	2.3	2.6
<i>buzzatii</i> ‡	3:1:3	7	0.3	0.3	S	8	C	0.8	T	2.7	1.6	1.1	0.9	0.3	20	2.1	2.4	2.6
<i>hamatoflata</i> ‡	4:1:4	7	0.5	0.3	S	8	C	0.8	T	3.1	1.6	1.3	0.9	0.3	23	2.5	2.5	2.9
<i>herastigma</i> ‡	3:1:3	7	—	0.2	—	8	C	—	T	3.6	1.5	1.0	0.7	0.4	3.5	3.5	3.2	3.5
<i>longicornis</i> ‡	3:1:3	7	0.5	0.3	S	8	C	0.8	C/C	3.2	1.9	1.3	0.9	0.3	22	2.5	2.6	2.9
<i>mairlandi</i> *	2:1:3	7	0.5	0.3	S	8	C	0.8	C/C	3.4	1.6	1.1	0.8	0.3	27	—	2.8	—
<i>meridiana</i> ‡	—	8	—	0.3	S	8	C	0.8	C/C	2.6	1.9	1.7	1.1	0.4	22	2.2	2.3	2.3
<i>mojavensis</i> *	2:1:2	7	0.5	0.3	S	8	C	0.8	T	2.9	1.8	1.3	0.9	0.3	20	2.3	2.4	2.6
<i>mulleri</i> *	2:1:2	7	0.3	0.3	S	8	C	0.7	T	2.8	2.0	1.3	1.0	0.3	22	2.4	2.6	2.8
<i>peninsularis</i> ‡	3:1:3	8	0.3	0.3	S	8	C	0.8	T	2.5	1.6	1.3	1.0	0.5	22	—	2.7	3.4
<i>racemosa</i> ‡	4:1:3	7	0.5	0.4	F	8	C	0.6	T	3.0	1.8	1.3	0.9	0.5	22	3.9	3.5	4.7
<i>vilae</i> ‡	2:1:2	7	1.0	0.3	S	8	D	0.8	T	2.8	1.5	1.1	1.1	0.3	22	2.6	2.5	3.3
<i>spenceri</i> *	2:1:—	8	0.5	0.3	S	3	C	0.7	T	3.0	1.7	1.4	1.2	0.4	40	—	4.2	—
<i>subviridis</i> †	2:1:—	8	1.0	0.3	S	8	C	0.8	C/C	3.8	1.5	1.1	0.9	0.5	28	—	3.1	—
<i>versicolor</i>	2:1:2	7-8	0.3	0.3	S	6	C	0.6	T	2.9	1.7	1.2	0.9	0.3	21	2.3	2.5	2.7

* Constructed from the data of Patterson (1943). † Patterson and Mainland (1944). ‡ Patterson and Wheeler (1942). || The author.

Body Length.—♂ 2.5 mm, ♀ 2.7 mm.

Head ♂ and ♀.—Arista with 7-8 branches. Orbital bristles in the ratio of about 2:1:2. Second oral bristle about 0.3 of 1st. Greatest width of cheeks 0.3 greatest diameter of eyes. Eye colour red (2L11). Carina sulcate.

Thorax ♂ and ♀.—Grey with bristles arising from black spots. Acrostichal hairs in 6 rows. Prescutellars absent. Anterior scutellars convergent. Sterno-index 0.6. Apical bristles on 1st and 2nd tibia, preapicals on all 3. No sex combs.

Wings ♂ and ♀.—Transparent. Costal index 2.9, 4th vein index 1.7, 5x index 1.2, 4e index 0.9. Third costal section with heavy spines on its basal 0.3. Length ♂ 2.1 mm, ♀ 2.3 mm.

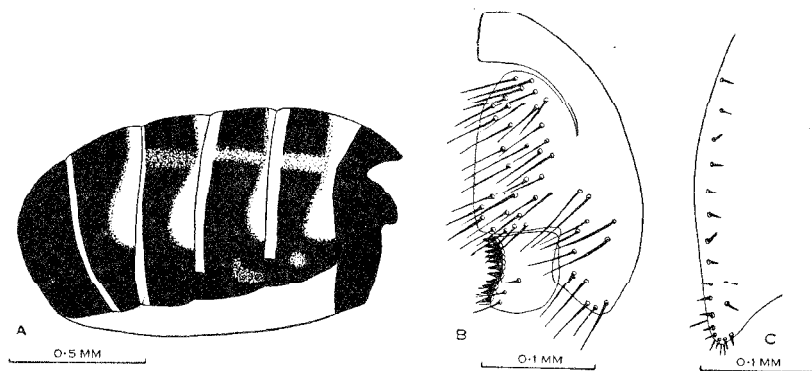


Fig. 12 A-C.—*D. versicolor*: A, ♂ abdomen, dorsolateral view; B, hypopygium; C, ovipositor plate.

Abdomen.—♂. First segment black. Second and 3rd segments with a black band posteriorly interrupted dorsally with brown, indented dorsolaterally from the front and with a yellow patch ventrolaterally. Fourth segment similar to 3rd but with no yellow patch. Fifth segment with black band posteriorly indented dorsolaterally from the front. Sixth segment black (Fig. 12A).

♀. Similar to ♂ but in addition 7th segment black.

External Genitalia.—♂. Genital arch slightly broader below, about 12 bristles on lower half, heel slightly rounded, undermargin straight, toe rounded and above level of heel. Anal plate oval and fused to genital arch, about 33 bristles evenly distributed. Primary clasper free, about 3 marginal bristles, about 11 primary teeth in a concave row, about 3 bristles posteriorly. Secondary clasper absent (Fig. 12B).

♀. Ovipositor plate with about 22 bristles (Fig. 12C).

Malpighian Tubules ♂ and ♀.—Two anterior, free, common trunk 0.1 total length; 2 posterior, fused, common trunk 0.1 total length; anterior and posterior of equal length.

TABLE 7
 SUBGROUP MULLERI: INTERNALS, LIFE HISTORY, AND DISTRIBUTION
 Testes: *I*, inner; *O*, outer; spermatheca: *A*, absent; *P*, present; *L*, light

Species	Testes		Spermatheca Chitinization	Ventral Recept. Coils	Egg Fil. Shape	Branches on Pupal Ant. Spir.	Distribution
	Colour	Coiling					
<i>aldrichi</i> *	Orange	2I + 2O	A	0	Pointed	9	Near. and Neotr.
<i>anceps</i> †	Yellow	2I + 2O	A	28	—	12	Near.
<i>arizonensis</i> †	Orange	3I + 3O	PL	17	Pointed	11	Near.
<i>buzzatii</i> †	Orange	3I + 3O	A	14	Pointed	14	Neotr. & Palae.
<i>hamatofila</i> †	Yellow	4I + 5O	P	15	Hooked	11	Near. & Neotr.
<i>hexastigma</i> †	Orange	—	A	28	Wavy	18	Near.
<i>longicornis</i> †	Yellow	2I + 3O	P	15	Pointed	12	Near. & Neotr.
<i>mainlandi</i> *	Yellow	3I + 3O	A	15	—	12	Near.
<i>meridiana</i> †	Cream	2I + 3O	P	17	Pointed	19	Near.
<i>mojavensis</i> *	Yellow	2½I + 2O	A	15	Pointed	11	Near.
<i>mulleri</i> *	Apricot yellow	2I + 3O	A	20	Pointed	10	Near. & Neotr.
<i>peninsularis</i> †	Yellow	2½I + 3O	PL	24	Wavy	15	Near.
<i>racemosa</i> †	Yellow	4I + 4O	A	28	—	10	Near. & Neotr.
<i>ritae</i> †	Yellow	2I + 3O	A	18	Pointed	17	Near. & Neotr.
<i>spenceri</i> *	Yellow	13	A	35	—	—	Near.
<i>subviridis</i> †	Yellow	9I + 9O	A	70	Pointed	—	Near.
<i>versicolor</i> §	Orange	1I + 2O	PL	12	Pointed	9-14	Aust.

* Constructed from the data of Patterson (1943). † Patterson and Mainland (1944). ‡ Patterson and Wheeler (1942). || Patterson and Wheeler (1949). § The author.

Internal Genitalia.—♂. Testes orange (11F12), 1 inner and 2 outer coils.

♀. Ventral receptacle with about 12 coils. Spermatheca spheroidal and lightly chitinized.

Egg Filaments.—4, pointed.

Larvae.—Do not skip, white, hooklets yellow, salivary glands equal.

Pupae.—Anterior spiracles with 9-14 branches. Posterior spiracles apposed. Ratio (pupal stalk length/pupal body length) = 0.2. Site of pupation not on stopper.

Relationships.—Tables 6 and 7.

Distribution.—McIntyre River, 18-19.ix.1953, E. Grant ?/27 13/13, open eucalypt forest. Moggill (Table 8 and Fig. 1). Only collected from southern Queensland.

Species group IMMIGRANS Sturtevant

Immigrans Sturtevant, 1942, Univ. Tex. Publ. 4213: 32.

DROSOPHILA IMMIGRANS Sturtevant

D. immigrans Sturtevant, 1921, Publ. Carneg. Instn. 301: 101; Patterson, 1943, Univ. Tex. Publ. 4313: 180, Fig. 61, Plate X.

General: A comb-like series of stout bristles on femur of 1st leg, eyes red and 3rd costal section with heavy bristles on its basal quarter.

Distribution.—Dunwich, 26.v.1952, P. Watkins and N. Darveniza 2/19 1/35, garden. Cairns, 4.vi.1952, D. Tranter 4/7 0/0, 24.vi.1953, R. McIntyre 2/4 0/0, garden. Landsborough, 7-9.vi.1952, 6/138 6/94, 27-28.ix.1952, W. Mather 4/75 1/12, open eucalypt forest. Montville, 17-20.viii.1952, P. Watkins 1/52 0/46, open eucalypt forest. Bulimba, 7.ix.1952, W. Stephenson 2/5 0/8, garden. Moggill (Table 8 and Fig. 1). Collected from both northern and southern Queensland, A. Clark (personal communication) has recorded it from Victoria, and Malloch from New South Wales and Western Australia.

DROSOPHILA SPINOFEMORA Patterson & Wheeler

D. spinofemora Patterson & Wheeler, 1942, Univ. Tex. Publ. 4213: 104.

General.—A comb-like series of stout bristles on femur of 1st leg, eyes orange, 3rd costal section with heavy bristles on its basal half.

Distribution.—Babinda, 4.v.1953, L. Webb 5/13 1/5, rain-forest. Clump Point, 3.vi.1953, T. Woodward 2/21 0/8, rain-forest (Table 8 and Fig. 1). Only recorded from northern Queensland but previously recorded from Hawaii by Patterson and Wheeler and northern Queensland by A. Clark (personal communication).

V. DISCUSSION

(a) *Descriptive Technique*

In this study certain descriptive techniques have been used which have not hitherto been used in *Drosophila* systematic work, for example,

colour description by reference to a standard colour scale, thorax and abdomen illustrated by simple line drawings, species relationships treated by tabulation, slide material deposited with the type material, and the number of specimens of each species taken at each station expressed as a fraction of the total catch.

Further, an attempt has been made to give exact definitions of the measurements made, and to state the number of specimens examined for each character; mean for quantitative characters and the range for meristic characters.

(b) *The Subgenus Pholadoris*

The subgenus *Pholadoris* established by Sturtevant (1942) was re-defined by Wheeler (1949). The morphology of the Australian species *D. cancellata*, *D. enigma*, *D. lativittata*, *D. maculosa*, *D. opaca*, and *D. levis* (Tables 1 and 2) allows their classification in this subgenus but it should be noted that *D. maculosa* has 3 split egg filaments and *D. levis* has fused posterior malpighian tubules thus calling for a widening of the definition of the subgenus in respect of these points.

Wheeler divided the subgenus into the *victoria*, and *mirim* species group. He provisionally placed *D. coracina* in the *victoria* group but pointed out that it may belong to a third species group which had, at that time, no other known members. It is now proposed to erect such a third group—the *coracina* group and to include in it *D. coracina* and the Australian species: *D. cancellata*, *D. enigma*, *D. lativittata*, and *D. opaca*.

It is considered justified in establishing a fourth species group for the Australian species *D. maculosa* differing from the *coracina* species group in that there are 3 split egg filaments showing no intraspecific variability and the primary teeth on the clasper are in a diagonal row.

Finally, *D. levis* shows closer relationship to the *mirim* group than to the other groups, but the establishment of a new group, *levis* species group for the species is considered justified because the posterior malpighian tubules are fused and there are 6 rows of acrostichals.

Wheeler (1949) pointed out that *D. bryani* Malloch probably belongs to the *victoria* species group. Harrison (1954) has supported this view by a fuller description of the species, but until such time as the life history, and internal structure of the species are examined, due to the fact that the clasper is not extended outward beyond the primary teeth, it seems more likely that the species belongs to the *coracina* group.

Harrison (1954) has assigned *D. samoensis* Harrison tentatively to the *mirim* group but, although the matter cannot be settled until the malpighian tubules are examined, it seems likely that, because there are 6 rows of acrostichals, and the external male genitalia are similar to *levis*, this species should be provisionally placed in the *levis* group.

Harrison (1954) has also assigned *D. marjoryae* to the subgenus, but, until the male external genitalia, certain internal structures, and the

life history are studied, it is not possible to assign this species to a species group. Harrison remarks on the wing indices falling outside the range of known members of the subgenus, but, when the Australian species are considered, the wing indices are no longer anomalous.

TABLE 8
GEOGRAPHICAL DISTRIBUTION

From south to north: OEF, open eucalypt forest; RF, rain-forest; G, garden; I, indoors

Station	<i>D. cancellata</i>	<i>D. enigma</i>	<i>D. lativittata</i>	<i>D. opaca</i>	<i>D. maculosa</i>	<i>D. levis</i>	<i>D. busckii</i>	<i>D. melanogaster</i>	<i>D. simulans</i>	<i>D. serrata</i>	<i>D. takahashii</i>	<i>D. ananassae</i>	<i>D. dispar</i>	<i>D. hydei</i>	<i>D. replata</i>	<i>D. versicolor</i>	<i>D. immigrans</i>	<i>D. spinifemora</i>	Habitat
Southern Queensland																			
McIntyre R.																			OEF
Binna Burra											+		+					+	RF
Tallebudgera Ck.								+	+						+	+			OEF
Canungra										+									OEF
Ipswich																			OEF
Dunwich		+						+	+										G
Greenslopes			+															+	G
Yeronga																			G
Moggill																			G
Toowong	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	OEF
Bulimba		+	+				+	+	+	+									G
Woollowin								+										+	G
Samford		+								+	+				+				I
Coochin Ck.													+						OEF
Landsborough		+	+								+	+							OEF
Montville		+																+	OEF
Condamine R.											+	+	+					+	OEF
Somerset Dam																			OEF
Maroochydore		+			+			+	+	+			+						OEF
Noosa				+		+													OEF
Urangan																			OEF
Gin Gin Ck.																			OEF
Bagara																			OEF
Carnarvon Gorge	+	+						+	+										OEF
Northern Queensland																			
Tully																			I
South Johnstone								+											G
Clump Pt.								+	+	+									RF
Babinda				+		+												+	RF
Tolga												+						+	G
Cairns																			G
Thursday I.																		+	G

Likewise, until more is known about the morphology of *D. excepta* Malloch, and *D. anuda* Curran, Wheeler's tentative assigning of these species to the *victoria* group must remain in doubt.

(c) *Geographical Distribution*

Despite the fact that southern Queensland has been far more adequately sampled than northern Queensland, it is possible to make certain comparisons between the *Drosophila* fauna of the two regions (Table 8 and Fig. 1). Of the species collected only two: *D. ananassae* and *D. spinofemora* have not been collected in southern Queensland. *D. ananassae* is a cosmopolitan species belonging to the *melanogaster* species group and Sturtevant (1942) has suggested that the distributional records indicate that the group was originally restricted to tropical and subtropical regions of the Old World. The collection of *D. ananassae* from rain-forest at Babinda and rain-forest at Cairns (Dobzhansky 1951, personal communication) may indicate that it forms part of the natural population of northern Queensland.

All species collected in southern Queensland have also been collected at Moggill but this is not surprising as Moggill is a representative area of southern Queensland and very intensive collecting has been done there. But, it should be noted that, on any one day at Moggill, usually only about six species were taken. When intensive collecting is done in northern Queensland, it is considered likely that, many more species will be found.

A particularly interesting feature of the collections from rain-forest at Binna Burra was the presence of only two species: *D. takahashii*, and *D. dispar*. Three collecting trips have been made to Binna Burra in July and December 1953 and January 1954. In July, cold weather prevailed and only one fly, a male *D. dispar* was caught. But, in December and January good collections were made from several different stations, and it was found that only *D. takahashii* and *D. dispar* were present, and in approximately equal numbers, as established from the males. The reasons why there should be only two species in an environment with, presumably, many kinds of ecological niches remain unexplained.

In southern Queensland, the cosmopolitan species *D. simulans* is dominant, and, the Australian species *D. serrata* is subdominant. *D. melanogaster*, which is closely related to *D. simulans*, is not prevalent.

Finally, as has been pointed out previously (Mather 1953), the most interesting feature of the Queensland *Drosophila* fauna is the prevalence of species assignable to the subgenus *Pholadoris*, and Harrison (1954) has also pointed out this feature of the Samoan and Fijian faunas. Thus, additional evidence is to hand, supporting Harrison's suggestion that "in the South Pacific a sizeable proportion of the *Drosophila* fauna has developed from the *Pholadoris* division of the genus".

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