

**Australian Endemic *Drosophila*
V.* Queensland Rain-Forest Species associated
with Fungi, with Descriptions of Six New Species
and a Redescription of *D. pictipennis* Kertész**

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Abstract

Direct aspiration from the undersides of bracket fungi, or collections from the vicinity of soft fungi, usually on decaying logs, yielded nine *Hirtodrosophila* species of which three are new. Of these, five species including two new ones use the undersides of bracket fungi as courting territories. Baiting with rotted commercial mushrooms yielded 10 *Scaptodrosophila* species of which three are new and a fourth, *D. pictipennis* Kertész, is a new record for Australia. The uniqueness of the north Queensland fauna is emphasized, since few of the species here discussed also occur in the south. By far the highest species diversities occur in the complex mesophyll vine forests of north Queensland, in agreement with previously reported collections for the subgenera *Drosophila* and *Sophophora*. Descriptions of the six new species are provided, together with a redescription of *D. pictipennis*.

Introduction

This paper considers those Queensland rain-forest *Drosophila* species baited with rotting mushrooms, aspirated off soft fungi, or collected by direct aspiration from the white undersides of bracket fungi which act as courting territories (Parsons and Bock 1977a; Parsons 1977a).

The previous paper in this series (Bock and Parsons 1978) considered Queensland fruit-baited species; this led to a detailed consideration of the small Australian radiation in the subgenus *Sophophora* and the few species, including only one endemic, in the subgenus *Drosophila*. Species of the subgenera *Scaptodrosophila* and *Hirtodrosophila*, however, are frequently collected in association with fungi or by baiting with rotted mushrooms.

There are now 48 described Australian *Scaptodrosophila* species (Bock 1976; Parsons and Bock 1977b; Cook *et al.* 1977), many of which are caught by sweeping foliage, leaf litter or flowers, but several of which come to mushroom baits, especially in north Queensland. Those *Scaptodrosophila* species attracted to fermented fruit baits (*D. bryani*) and to both fermented fruit and mushroom baits (*D. specensis*) in Queensland are discussed in Bock and Parsons (1978).

Bock (1976) described 11 endemic Australian species in *Hirtodrosophila*, a subgenus known to have fungivorous members elsewhere in the world (Throckmorton 1975). Three of these species, *D. polypori*, *D. mycetophaga* and *D. mixtura*, have since been shown to use the undersides of bracket fungi as courting territories (Parsons and Bock 1977a). Three species very similar to one another morphologically, *D. zentae*, *D. junae* and *D. palumae*, can be swept from leaf litter

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and foliage close to permanent water; they are not attracted to fermented fruit or mushroom baits. The remaining five species listed by Bock (1976) are apparently very rare, two known from holotypes only.

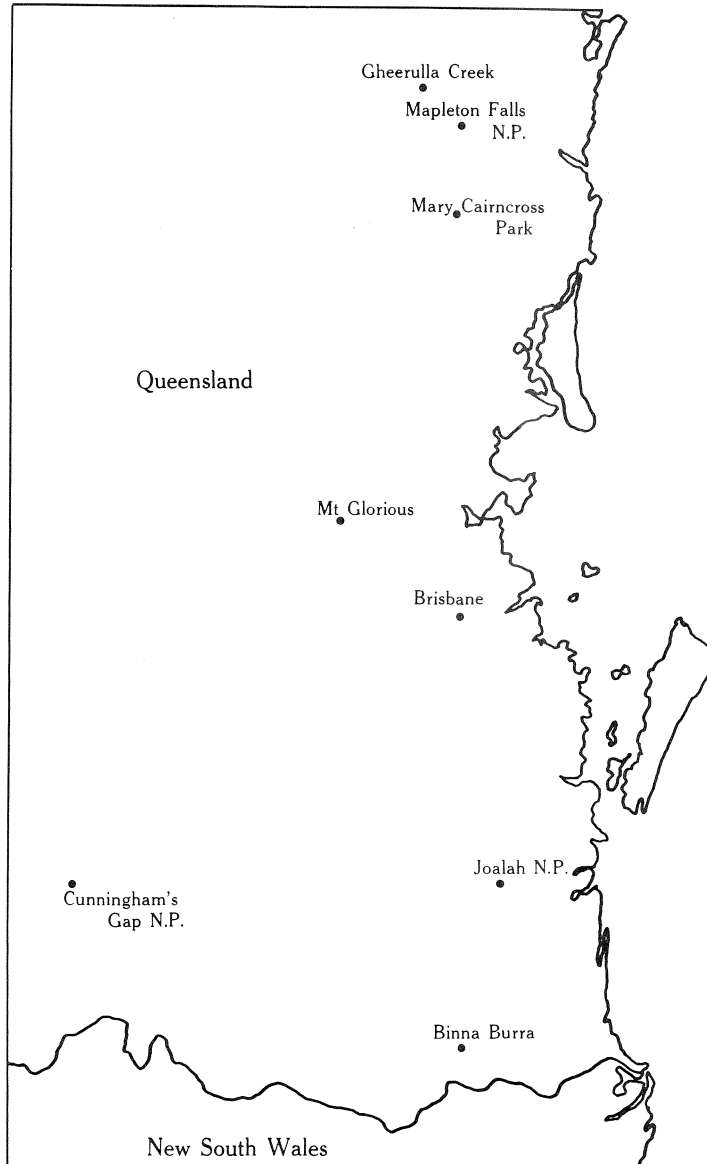


Fig. 1. Collection sites in southern Queensland.

Collection Methods and Site Ecologies

The three collection methods are: (1) direct aspiration from the undersides of bracket fungi, where flies have established courting territories; (2) direct aspiration from or sweeping in the vicinity of soft fungi, usually on decaying timber in the forest — a technique especially successful when the humidity is high; (3) baiting with well-rotted commercial mushrooms at sites close to permanent water or moisture, fly yields being low away from moisture.

Rain-forest types are described in detail in Bock and Parsons (1978). The following types are relevant here:

- (1a), (1b) Complex mesophyll vine forests of lowlands and foothills (<400 m altitude) and uplands (400–800 m) respectively.
- (5a) Complex notophyll vine forests;
- (8) Simple notophyll vine forests;
- (9) Simple microphyll vine-fern forest.

A map of north Queensland site locations is given in Bock and Parsons (1978). Of these, the following are discussed in Tables 1–3: **A**, Iron Range; **B**, Mossman Gorge; **C**, Palmerston National Park; **D**, Mt Bartle Frere (Josephine Falls); **E**, Mulgrave Forestry Road; **F**, Lake Eacham; **G**, The Crater; **I**, Cardwell Ranges; **J**, Mt Spec; **L**, Mt Bellenden Ker. Fig. 1 is a map of collection sites in southern Queensland.

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Results

Results for the three collection methods above are given in Tables 1–3 respectively. Collection method 1, direct aspiration under bracket fungi, yielded *Hirtodrosophila* species only (Table 1). In north Queensland the only common species is *D. mixtura*.

Table 1. *Drosophila* species aspirated from under bracket fungi

All species are in subgenus *Hirtodrosophila*. The double entries refer to numbers of males and females respectively. For key to localities, see Bock and Parsons (1978, fig. 1)

Locality	Forest type	<i>mixtura</i>	<i>hirudo</i>	<i>hannae</i>	<i>polypori</i>	<i>mycetophaga</i>
North Queensland						
B	1a	2, 1	—	—	—	—
F	1b	39, 7	1, 0	0, 1	—	—
G	5a	1, 0	—	—	—	—
J	8	2, 0	—	—	—	—
South Queensland						
Joalah Natl Pk		—	—	—	2, 2	0, 1
Binna Burra		—	—	—	4, 2	0, 1

This species has wings tinged brownish especially towards the costal margin; it is conspicuous in appearance, being very dark above changing abruptly to unicolorous pale cream below. It therefore stands out strikingly when displaying on the undersides of bracket fungi (Parsons and Bock 1977a). The excess of males is to be expected for a territorial species where males are displaying to females in the surrounding foliage. Two other rare species were found in the 1b forest, an upland complex mesophyll vine forest; it is normally cooler, more cloudy and more humid than 1a lowland complex mesophyll vine forests. It was argued by Bock and Parsons (1977) that this is an environmental situation favourable for the development of territorial species. One of the rare species, *D. hirudo* (also collected on soft fungi, see below), is similar in appearance to *D. mixtura*, while the other, *D. hannae*, has patterned wings (Fig. 5) (see Appendix). *D. hannae*, is the third endemic Australian *Hirtodrosophila* species with patterned wings known. The other two, *D. polypori* and *D. mycetophaga*, have been recorded from eastern Victoria to southern Queensland (Parsons and Bock 1977b); south Queensland records of both species are in Table 1. *D. mycetophaga* is in addition known from north Queensland (Bock 1976), although it was not detected during the present investigation.

The bracket fungi which act as courting territories for the above species do not serve as a larval food source; repeated visits to the same fungi over a period of two years have revealed no evidence of oviposition or larval activity within them. The fungi appear to be relatively long-lived, and several of them at the end of the 2-year observation period were still completely intact and harboured populations of courting flies.

Collection method 2, direct aspiration from and sweeping in the vicinity of soft fleshy fungi (Table 2), yielded a few *D. mixtura* in north Queensland, and *D. polypori* and *D. mycetophaga* in southern Queensland (Table 2); some of these fungi could perhaps act as territories (of a more temporary nature than bracket fungi), but it is also highly likely that the soft fungi are oviposition sites for some or all of these species. *D. polypori* adults were recently bred out in the laboratory from soft fungus collected at Mary Cairncross Park; thus for this species at least, separation of

Table 2. *Drosophila* species collected by direct aspiration and sweeping from the vicinity of soft fungi

All species are in subgenus *Hirtodrosophila*, except *D. (Scaptodrosophila) fungi*. The double entries refer to numbers of males and females respectively. For key to localities, see Bock and Parsons (1978, fig. 1)

Locality	Forest type	<i>mixtura</i>	<i>hirudo</i>	<i>macal-pinei</i> ^A	<i>polypori</i>	<i>myceto-phaga</i>	<i>angusi</i>	<i>fungi</i>
North Queensland								
B	1a	2, 0	3, 5	1, 1	—	—	—	—
C	1a	1, 0	4, 2	—	—	—	—	—
South Queensland								
Mapleton Falls								
	Natl Pk	—	—	3, 2	—	8, 4	1, 0	—
Gheerulla								
	Creek	—	—	19, 8	—	0, 1	2, 1	0, 1
Mary Cairncross								
	Natl Pk	—	—	—	2, 3	2, 1	—	—

^AAlso collected in Bruxner Park, N.S.W.

courting sites (bracket fungi) and breeding-feeding sites (soft fungi) is clearly defined. In addition, three other *Hirtodrosophila* species were collected, including two new ones, *D. hirudo* (a north Queensland species) and *D. angusi* (a south Queensland species) (see Appendix); *D. macalpinei*, previously recorded from northern New South Wales only (Bock 1976), is now known to extend to north Queensland. The final species collected by method 2 was also new, *D. (Scaptodrosophila) fungi* (see Appendix). This species is mainly collected at mushroom baits (Table 3); since it is represented by one fly in Table 2, its presence at soft fungi may well be fortuitous. The fauna of fleshy fungi therefore appears to be substantially or entirely *Hirtodrosophila*. Indeed, since fleshy fungi were only common in a minority of collection sites (presumably because of seasonal-climatic factors), more species may well remain to be discovered.

The spectrum of species attracted to rotted mushrooms (collection method 3; Table 3) is quite different; all are *Scaptodrosophila*. In north Queensland most species, including two new ones, *D. mossmana* and *D. fungi*, were collected in the 1a, 1b and 5a forests on basaltic soils [as is also true for species of the other three main *Drosophila* subgenera; see Tables 1 and 2 and Bock and Parsons (1978)]. The third

new species, *D. oweni*, was found at Mt Spec (see Appendix). Of those species found in north Queensland, only *D. fungi* extends to the south; indeed its distribution is from Iron Range to Bruxner Park in northern New South Wales. *D. eluta* is also widespread, being known from Mt Spec to Micronesia. The richest *Scaptodrosophila* fauna was detected at Iron Range, suggesting the possibility of high species diversity in rain forests to the north of Australia (New Guinea).

D. pictipennis, previously known from New Guinea only (Kertész 1901), was found in some numbers at Iron Range; it is redescribed in the Appendix. Only females were obtained. Before collection they were observed waving their wings on the mushroom bait in a manner similar to that often seen in some *Leucophenga* (Drosophilidae) species, both after capturing and on mushroom baits (unpublished observations). *D. pictipennis* is one of two known patterned-wing *Scaptodrosophila* species in Australia.

Table 3. *Drosophila* species collected by mushroom baiting

All species are in subgenus *Scaptodrosophila*. The double entries refer to numbers of males and females respectively. For key to localities, see Bock and Parsons (1978, fig. 1)

Locality	Forest type	<i>altera</i>	<i>fungi</i> ^A	<i>eluta</i>	<i>hipister</i>	<i>novoguineensis</i>	Other species
North Queensland							
A	1a	2, 0	3, 4	0, 1	19, 7	6, 2	<i>pictipennis</i> 0, 38
B	1a	0, 1	—	24, 7	—	—	<i>mossmans</i> 6, 7
C	1a	2, 1	—	0, 2	—	0, 1	
D	1a	3, 5	—	1, 1	—	—	
E	1a	—	1, 2	—	10, 2	—	
F	1b	—	0, 1	12, 16	—	—	
G	5a	—	3, 0	8, 8	—	—	
I	8	—	0, 1	0, 2	—	—	
J	8	—	2, 2	0, 9	—	—	<i>oweni</i> 1, 3
L	9	—	—	—	—	—	<i>obsoleta</i> 0, 1
South Queensland							
Mt Glorious, Cunninghams Gap		—	—	—	—	—	<i>inornata</i> 1, 6

^AAlso collected in Bruxner Park, N.S.W.

Males of the other species, the southern *D. fumida*, also show a characteristic behaviour, a 'bobbing' up and down of the body, which could be a visual signal to female flies. Males of *D. fumida* are obtained in excess in aspirator catches as is to be expected if they are in fact territorial (Parsons 1977b). Males of *D. pictipennis* are, by contrast, unknown.

Two other species merit comment. The *inornata*-group species *D. obsoleta* was collected from the summit of Mt Bellenden Ker, and *D. inornata* itself was collected in southern Queensland. In both cases the upland rain forests where the flies were collected possess floristic similarities to forests of southern Australia (Parsons and Bock 1978). These two species are normally swept from foliage in southern Australia,

where they are not attracted to mushroom bait. Some differences in resource utilization within the species may thus be implied, a result which is not surprising in view of their extremely wide distributions.

Discussion

The greatest species diversities obtained by the present collection methods were found, as already established by fruit baiting (Bock and Parsons 1978), in the complex mesophyll vine forests of north Queensland. The uniqueness of the north Queensland fauna as noted in previously cited publications is thus further emphasized, although *D. macalpinei* and *D. fungi* do extend to southern Queensland and northern New South Wales. Indeed, in southern Queensland there are species such as *D. polypori*, *D. mycetophaga* and *D. inornata* which also occur in southern Australia; southern Queensland therefore possesses a mixture of southern and northern species in agreement with its similar mixture of floras. *D. angusi* has only been found in southern Queensland; this may, however, merely reflect the relatively few collections made involving fleshy fungi.

The three fungal collection methods yield different spectra of species, which are themselves quite different to the species collected at fermented fruit baits, discussed in Bock and Parsons (1978). In particular the faunas collected at rotting commercial mushrooms (Table 3) and about forest fungi (Tables 1 and 2) are almost totally non-overlapping. It may be suggested at this stage that most of the *Scaptodrosophila* species are associated with forest-floor fungi and are thus attracted to rotted mushrooms placed there. Some *Hirtodrosophila* species exploit fleshy fungi on rotting logs; others breed in such fungi but utilize bracket fungi for courting purposes. The feeding sites utilized by rain-forest *Drosophila* are therefore diverse, but each site possesses its own unique spectrum of species. Few of the species discussed in this paper are found south of north Queensland. Apart from stressing the richness of the north Queensland fauna, this suggests that investigation of the relationship of the fungus species with those which may occur in New Guinea is an open problem, especially given the high number of species found at Iron Range.

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Appendix: Species Descriptions

The new species and *D. pictipennis* are described below in the form used previously for the Australian *Drosophila* species (Bock 1976). All type specimens have been deposited in the Australian National Insect Collection.

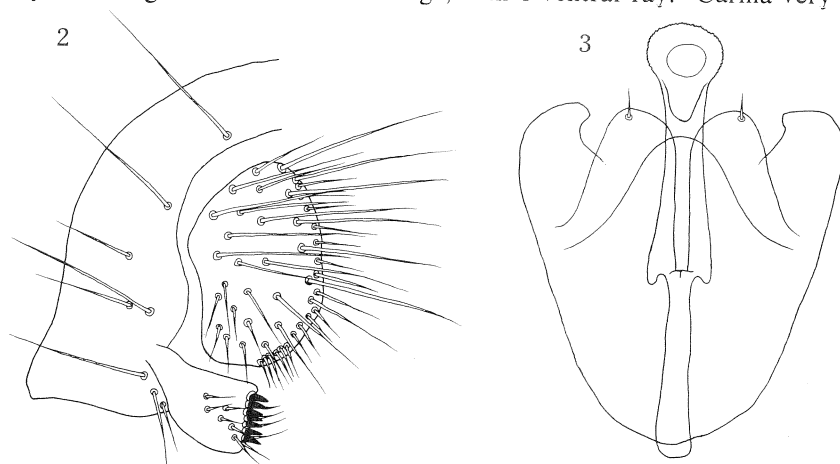
Drosophila (Hirtodrosophila) angusi, sp. nov. 198/

Types

Holotype ♂: Gheerulla Creek, near Kenilworth, Queensland, swept near fungi, 21.iv.1977, P. A. Parsons. Paratypes: same data as holotype, 1♀; Mapleton Falls National Park, Queensland, swept near fungi, 22.iv.1977, P. A. Parsons, 1♂.

Distinguishing Features

Body and wings brownish. Arista large, with 1 ventral ray. Carina very small.



Figs 2 and 3. *D. angusi*, male genitalia: 2, external; 3, internal.

Description

Body length. 3.6 mm (holotype); 3.4 – 4.5 mm (paratype range).

Head. Arista large, with 5–6 rays above and 1 ray below plus large terminal fork; ventral ray originating from axis close to terminal fork. Frontal breadth equal to length. Front tan; ocellar triangle infuscated. 2nd and 3rd antennal segments tan. Face whitish; carina very low between bases of antennae, obsolete below. Cheek slightly curved, greatest width 0.1 greatest diameter of eye. Eyes with fine, very sparse pile. Orbital bristles in ratio 3 : 1 : 3; anterior reclinate orbital in line with proclinate and posterior reclinate orbitals, slightly closer to latter. Postvertical bristles large.

Thorax. Mesonotum and scutellum pale to mid-brownish; pleura paler. Acrostichal hairs in 6 rows in front of dorsocentral bristles, 4 irregular rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.75. Sterno-index 0.45. Middle sternopleural bristle minute. Legs pale; preapical bristles on 2nd and 3rd tibiae; apicals on 2nd tibiae only.

Wings. Translucent, with uniform brownish tinge. C-index, 2.9; 4V-index, 1.5; 5X-index, 1.5; M-index, 0.4. 3rd costal section with heavy setation on basal 0.4. Length (holotype) 3.0 mm.

Abdomen. All tergites pale to mid-brownish with thin uninterrupted apical black bands.

Male genitalia (Figs 2, 3). Genital arch and anal plate micropubescent (not shown in Fig. 2). Anal plate large; clasper with apical row of strong teeth. Hypandrium with pair of very small submedian spines; aedeagus rounded apically with very finely serrated margin.

Distribution

See Table 2; Fig. 1.

Relationships

The species is a typical *Hirtodrosophila* in possession of a small carina and a large arista with only a single ventral ray, and is a member of the *hirticornis* species-group. The latter was reviewed by Bächli (1973), who discussed 20 species occurring in south-east Asia and New Guinea. *D. angusi* keys to *trapezina* in Bächli's (1973) key, but differs from that species in various details. In particular, the number of dorsal rays on the arista in *angusi* is five or six while *trapezina* possesses only three. Indeed, Bächli characterized members of the *hirticornis* group as possessing only three (rarely four) dorsal rays on the arista, but *angusi* agrees closely with the diagnostic features of members of the *hirticornis* group in other respects, and there can be little doubt of its affinities with the group. *D. angusi* keys to *borboros* in Bock's (1976) key to Australian species of *Drosophila*, but differs quite obviously from that species in various details.

✓ *Drosophila (Hirtodrosophila) hirudo*, sp. nov.

Types

Holotype ♂: Mossman Gorge, North Queensland, fleshy fungi, 16.iv.1977, P. A. Parsons. Paratypes: same data as holotype, 3♂, 3♀.

Distinguishing Features

Arista large, fan-like, with few rays. 3rd antennal segment with very long hairs. Thorax dark above, pale laterally. Wings brownish.

Description

Body length. 2.7 mm (holotype); 2.7 – 3.5 mm (paratype range).

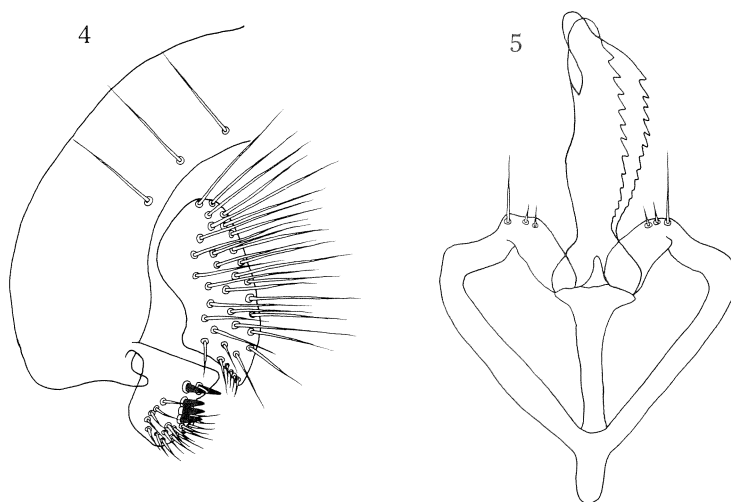
Head. Arista large, with 3 rays above and 1 ray below plus large terminal fork; ventral ray arising from axis distal to dorsal rays. Frontal breadth = length. Front tan, darker posteriorly; ocellar triangle blackened. 2nd and 3rd antennal segments tan; 3rd with *c.*8 very long hairs arising from anterior margin. Carina very small, narrow and low, confined to uppermost part of face between antennal bases. Cheek linear, not widened posteriorly, greatest width less than 0.1 greatest diameter of eye. Eyes with fine very sparse pile. Orbital bristles in ratio 5 : 2 : 6; anterior reclinate orbital posterior and slightly lateral to proclinate orbital.

Thorax. Mesonotum and scutellum mid-brown. Pleura pale tan. Acrostichal hairs in *c.*10–12 rows, somewhat irregular, in front of dorsocentral bristles, *c.*6–8 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0.5. Sterno-index 0.45. Legs pale tan; preapical bristles on 3rd tibiae only; apicals on 2nd tibiae only.

Wings. Translucent with brownish tinge. *C*-index, 1.7; 4*V*-index, 1.7; 5*X*-index, 1.6; *M*-index, 0.5. 3rd costal section with heavy setation on basal 0.65. Length (holotype) 2.3 mm.

Abdomen. All tergites brownish with some darkening along posterior borders.

Male genitalia (Figs 4, 5). Micropubescence present on anal plate and small portion of genital arch about large bristles only (not shown in Fig. 4). Clasper with few large black teeth and more numerous bristles. Hypandrium with pair of large spines and 2 pairs of small bristles. Aedeagus apically bifid, laterally serrate.



Figs 4 and 5. *D. hirudo*, male genitalia: 4, external; 5, internal.

Distribution

See Tables 1 and 2.

Relationships

The species is related to *D. angusi* in the *hirticornis* species-group. *D. hirudo* resembles *D. hirticornis* de Meijere and *D. manonoensis* Harrison in the structure of the arista, but differs from both species in various details. *D. hirudo* resembles *D. macalpinei* Bock in possessing several extremely long hairs on the third antennal segment; several other south-east Asian species also possess similar long hairs (Bächli 1973). *D. hirudo* keys to *macalpinei* in Bock's (1976) key to Australian species, but is easily distinguished from the latter in coloration and several other features.

Drosophila (Hirtodrosophila) hanna, sp. nov.

Type

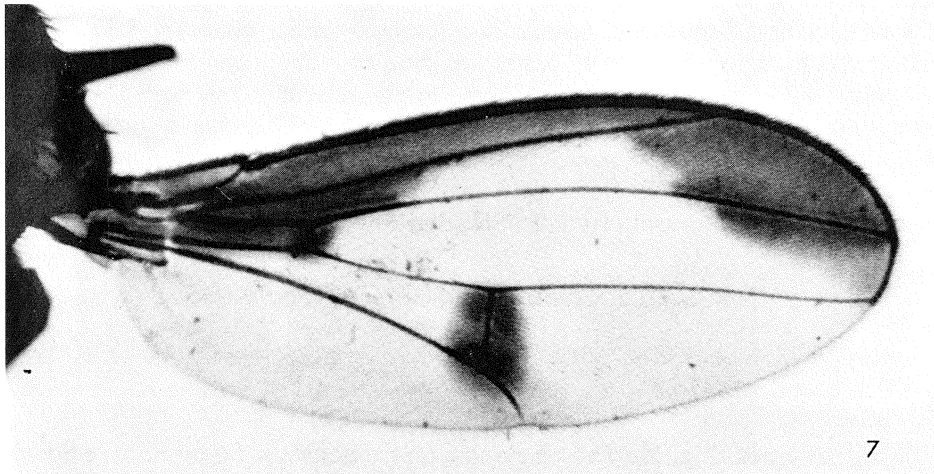
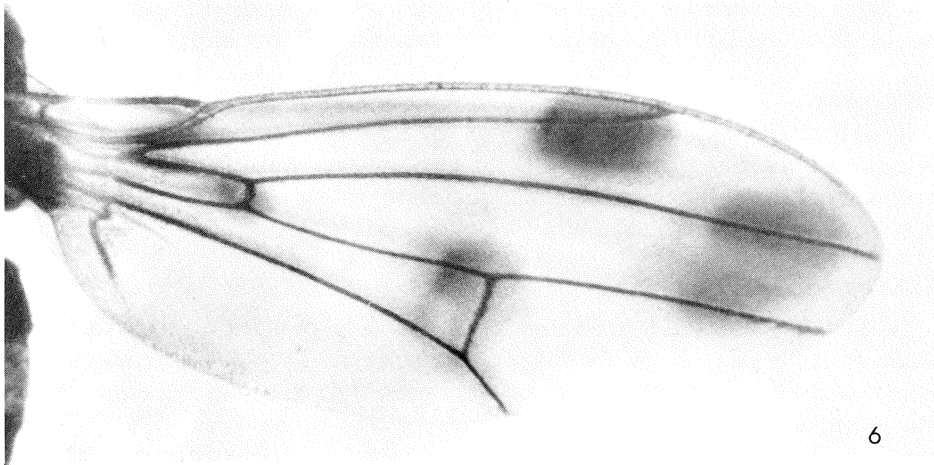
Holotype ♀: Lake Eacham National Park, Queensland, under bracket fungus, 20.viii.1976, P. A. Parsons.

Distinguishing Features

A large very distinctive fly with patterned wings (Fig. 6). Mesonotum patterned. Abdomen dark with lateral pale patches on 5th tergite.

Description

Head. Arista with 5-6 rays above and 2 below plus terminal fork; dorsal and ventral rays straight. From 1.4 times broader than long, tan; ocellar triangle and immediately surrounding area blackened. 2nd antennal segments tan; 3rd slightly dusky. Carina narrow, tapering away below. Cheek almost linear, considerably widened in posterior corner, greatest width 0.2 greatest diameter of eye. Eyes with fine sparse pile. Orbital bristles in ratio 3 : 1 : 4; anterior reclinate orbital extremely fine, midway between other 2 orbitals and slightly lateral to line joining them.



Figs 6 and 7. Wings: 6, *D. hannaë*; 7, *D. pictipennis*.

Thorax. Mesonotum tan with darker markings. Submedian longitudinal bands present between dorsocentral bristles, extending full length of mesonotum. Similar lateral bands present outside dorsocentral bristles and with enlarged spherical areas just above presutural bristles. Further dark areas present enclosing humeral, notopleural and supraalar bristles. Pleura tan, with dark longitudinal band in middle region and dark spot just below sternopleural bristles. Acrostichal hairs in *c.* 8 rows,

somewhat irregular, in front of dorsocentral bristles, *c.* 6 rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0·6. Sterno-index 0·35. Halteres pale tan. Legs tan; preapical bristles on 3rd tibiae only; apicals on 2nd tibiae only.

Wings (Fig. 6). Pale brownish, slightly darker towards costal margin, with darker markings at end of 2nd longitudinal vein, close to ends of 2nd and 3rd longitudinal veins, about anterior and posterior crossveins, and just behind distal costal incision. *C*-index, 1·8; *4V*-index, 1·3; *5X*-index, 0·9; *M*-index, 0·3. 3rd costal section with heavy setation on basal 0·55. Length 3·9 mm.

Abdomen. Tergites 1–4 black. Tergite 5 black with pale tan patch on each side extending from anterior margin to $\frac{3}{4}$ of way back to posterior margin. Tergite 6 black. Genitalia tan. Egg-guides apically rounded, without strong marginal teeth.

Distribution

Known only from holotype. Given that the other bracket fungus species can often be collected in substantial numbers, the single finding of this very distinctive species in a remnant of forest (Lake Eacham National Park) rather isolated from other areas of rain forest seems remarkable.

Relationships

D. hanna is the third Australian patterned-wing *Hirtodrosophila* species to be found under bracket fungi; the other two species are *D. polypori* Malloch and *D. mycetophaga* Malloch, both of which have been shown to utilize the undersides of bracket fungi as courting territories or leks (Parsons and Bock 1976). The wing pattern of *hanna* is very similar to that of *mycetophaga* (Bock 1976, fig. 23) and the wing indices of the two species are also very similar. The thoracic patterns are, however, quite different, and *hanna* is appreciably larger than *mycetophaga*. The abdominal patterns of the two species are similar. There can be little doubt that *polypori*, *mycetophaga* and *hanna* are closely related. Interestingly, although numerous *Hirtodrosophila* species are known from New Guinea and south-east Asia, the patterned-wing species appear to be endemic to Australia. *D. polypori* and *D. mycetophaga* occur principally in south-eastern Australia, although there are isolated records for the occurrence of *mycetophaga* in north Queensland (Bock 1976).

Drosophila (*Scaptodrosophila*) *pictipennis* Kertész

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

Distinguishing Features

Wing patterned (Fig. 7). Thorax shining tan; abdomen tan anteriorly, shiny black posteriorly.

Description

Body length. *c.* 2·8 mm.

Head. Arista with 4–5 rays above and 2–3 below plus terminal fork. Front tan, 1·1 times broader than long. 2nd and 3rd antennal segments tan, 3rd slightly whitish anteriorly. Carina large, nose-like. Cheek curved, greatest width 0·1 greatest diameter of eye. Eyes with fine sparse pile. Orbital bristles in ratio 3 : 2 : 3; anterior reclinate orbital lateral to proclinate orbital.

Thorax. Mesonotum and scutellum tan, shining. Pleura paler. Acrostichal hairs in 8 slightly irregular rows in front of dorsocentral bristles, *c.* 4 irregular rows between dorsocentrals. Prescutellar bristles small. Ratio anterior : posterior dorsocentrals 0·8. Sterno-index 0·8. Middle sternopleural bristle minute. Legs pale; preapical bristles on 2nd and 3rd tibiae; apicals on 2nd tibiae only.

Wings (Fig. 7). Hyaline, with pronounced infuscation along costa and posterior crossvein. Costal infuscation expanded basally to include anterior crossvein, and expanded again apically. *C*-index, 2·4; 4*V*-index, 2·0; 5*X*-index, 0·9; *M*-index, 0·4. 3rd costal section with heavy setation on basal 0·6. Length *c.* 2·3 mm.

Abdomen. Tergites 1 and 2 concolorous with thorax; remainder of abdomen shiny black, contrasting strongly with thorax.

Collect: no data on 2.3.5 (with out date)

Distribution

New Guinea; far northern Queensland (Table 3).

Relationships

D. pictipennis is not obviously closely related to any other species within the subgenus. Only one other *Scaptodrosophila* species, *D. fumida* from southern Australia, possesses patterned wings (Bock 1976, fig. 83); the wing patterns of the two species are, however, quite different, as are the body colorations. The two species are alike in possessing small prescutellars and minute middle sternopleurals. Whether or not a closer relationship can be demonstrated may be resolved when male genitalia become available for study. *D. pictipennis* keys to *fumida* in Bock (1976) but is easily separated from the latter by reference to the wing pattern.

Special Comments

D. pictipennis is apparently known from a total of ^{0 1}41 specimens; the holotype, two specimens in the Amsterdam Museum (Zoölogisch Museum, Universiteit van Amsterdam), and the 38 specimens recorded in this paper. All specimens are females. Given, however, that sexual dimorphism in the subgenus *Scaptodrosophila* is very rare, there is no reason to suppose that the males will be found to differ from the females in external morphology (except, of course, in the genitalia).

Drosophila (*Scaptodrosophila*) *fungi*, sp. nov.

Types

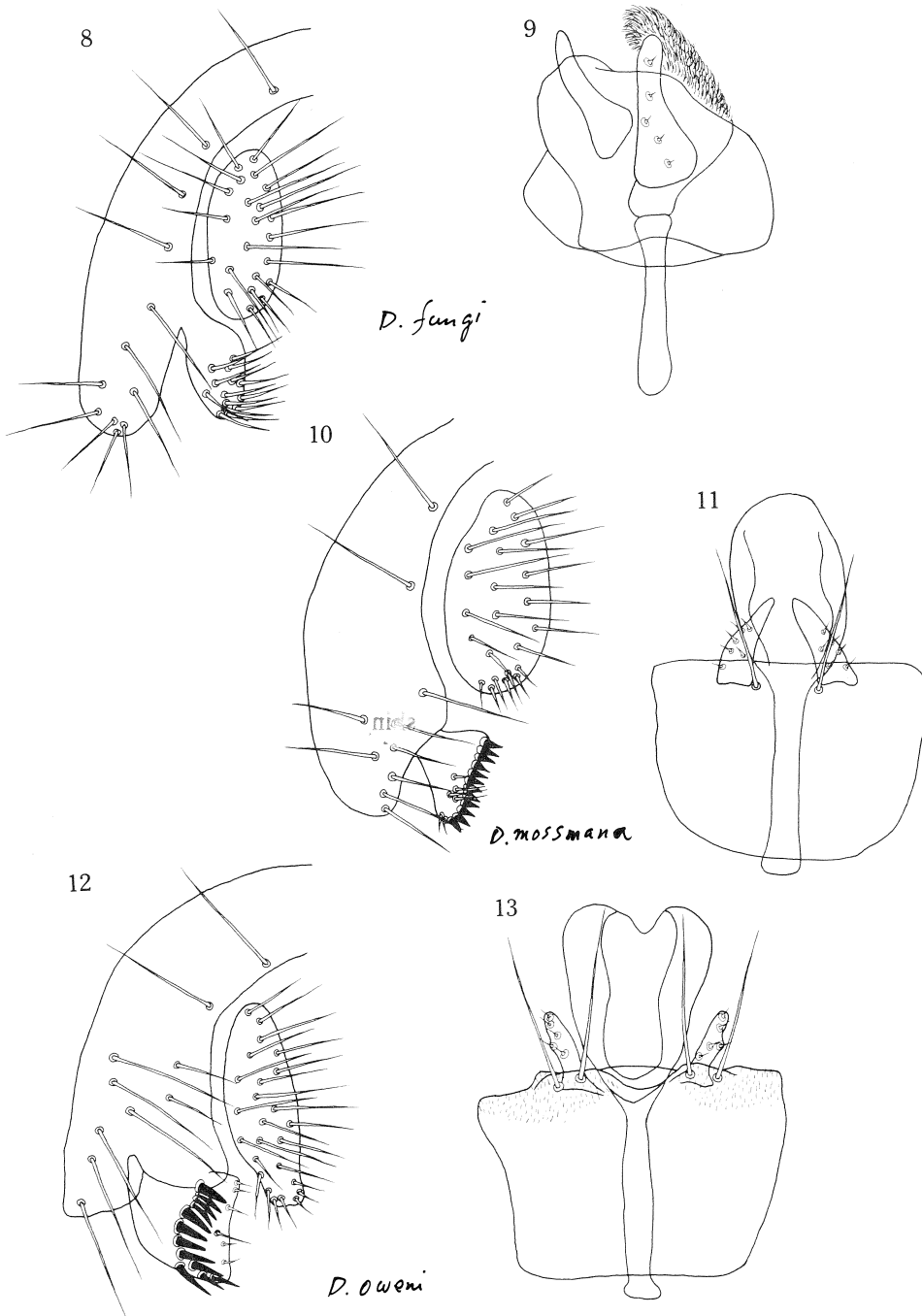
Holotype ♂: Bruxner Park, near Coffs Harbour, New South Wales, on mushroom bait, 3.ii.1976, P. A. Parsons. Paratypes: same data as holotype, 1♂; Bruxner Park, New South Wales, on top of bracket fungus, 3.ii.1976, P. A. Parsons, 2♀; Paluma, north Queensland, rain forest, sweeping, 12.xi.1975, P. A. Parsons, 1♀; Goldsborough-Mulgrave Forest Rd, *c.* 20 km Gillies Highway, mushroom bait, Aug. 1976, P. A. Parsons, 2♂.

Distinguishing Features

A very small fly, body dark brownish black. *C*-index low.

Description

Body length. 1·9 mm (holotype); 1·7 – 2·1 mm (paratype range).



Figs 8 and 9. *D. fungi*, male genitalia: 8, external; 9, internal.

Figs 10 and 11. *D. mossmani*, male genitalia: 10, external; 11, internal.

Figs 12 and 13. *D. oweni*, male genitalia: 12, external; 13, internal.

Head. Arista with 3 branches above and 2 below plus terminal fork; branches short, almost straight. Front 1·2 times broader than long. Ocellar triangle, large surrounding triangular area, and periorbits brownish black; bands between periorbits and central triangular area shining black. 2nd and 3rd antennal segments dark brown.

Carina strong, only slightly widened below, flat, lateral edges almost squared. Cheek almost linear, greatest width 0·2 greatest diameter of eye. Eyes bare. Orbital bristles in ratio 4 : 2 : 5; anterior reclinate orbital lateral to proclinate orbital. Ocellar and vertical bristles large.

Thorax. Mesonotum and pleura shining dark brownish black; scutellum concolorous with mesonotum, subshining. Acrostichal hairs in 8 regular rows in front of dorsocentral bristles, 6 rows between dorsocentrals. Prescutellar bristles small. Ratio anterior : posterior dorsocentrals 0·7. Sterno-index 0·7. Femora dark brown; tibiae paler; tarsi pale tan. Preapical bristles on 2nd and 3rd tibiae; apicals on 2nd tibiae only.

Wings. Hyaline. *C*-index, 1·0; *4V*-index, 2·8; *5X*-index, 1·9; *M*-index, 1·0. 3rd costal section with heavy setation on basal 0·7. Length (holotype) 1·7 mm.

Abdomen. All tergites concolorous with thorax, subshining.

Male genitalia (Figs 8, 9). Genital arch and anal plate strongly micropubescent (not shown in Fig. 8); clasper with long bristles but without short stout teeth. Aedeagus densely micropubescent.

Distribution

See Tables 2 and 3.

Relationships

D. fungi is one of a small number of shiny black species in the subgenus *Scaptodrosophila*; however, the species concerned show no close relationships and the coloration may be the result of convergent evolution within the subgenus. One other black *Scaptodrosophila*, *D. altera* Bock, is found in the same habitats as *fungi*; the two species are easily separated on costal index (*c.* 1·0 in *fungi*, *c.* 1·5 in *altera*) and size (*altera* is about twice as large as *fungi*). Other shiny black *Scaptodrosophila* species occurring in other parts of Australia are *D. sydneyensis* Malloch (south-eastern Australia) and *D. nitidithorax* Malloch (south-western Australia). *D. metaxa* Bock is superficially similar to *D. fungi* and also occurs in north Queensland but *metaxa* is never collected about fungi or at fungal baits; also, it is dark brownish in colour.

Drosophila (Scaptodrosophila) mossmana, sp. nov.

Types

Holotype ♂: Mossman Gorge, north Queensland, mushroom bait, 24–25.viii.1976, I. R. Bock. Paratypes: 1♂, 4♀, same data as holotype.

Distinguishing Features

Head and thorax tan; abdomen with black markings. Middle sternopleural bristle minute. *C*-index low.

Description

Body length. 2·2 mm (holotype); 2·0 – 2·3 mm (paratype range).

Head. Arista with 4 branches above and 2 below plus terminal fork. Front 1·1 times broader than long, dark tan; areas about bases of orbital and vertical bristles slightly silvery. 2nd and 3rd antennal segments tan. Carina small, narrow, rounded. Cheek curved, greatest width 0·1 greatest diameter of eye. Eyes with fine pile. Orbital bristles in ratio 2 : 1 : 2; anterior reclinate orbital lateral to proclinate orbital and close to it.

Thorax. Uniformly tan. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 6 irregular rows between dorsocentrals. Ratio anterior : posterior dorsocentrals 0·5. Sterno-index 0·6. Middle sternopleural bristle minute. Legs concolorous with thorax; preapical bristles on 2nd and 3rd tibiae; apicals on 2nd tibiae only.

Wings. Hyaline, *C*-index, 1·2; *4V*-index, 2·2; *5X*-index, 1·8; *M*-index, 0·7. 3rd costal section with heavy setation on basal 0·6. Length (holotype) 2·2 mm.

Abdomen. Sexual dimorphism present in abdominal coloration. Tergites 2–4 of male anteriorly tan, posteriorly black with weakening of black coloration in midline; tergite 5 with 3 large black spots on tan background; tergite 6 with 1 large spot. All tergites of female abdomen with weak posterior dark bands.

Male genitalia (Figs 10, 11). Clasper with marginal row of strong black teeth; anal plate and genital arch with strong micropubescence (not shown in Fig. 10). Hypandrium with pair of prominent submedian spines.

Distribution

Recorded only from Mossman Gorge (Table 3).

Relationships

The sexual dimorphism in abdominal banding pattern makes *D. mossmana* highly unusual within the subgenus *Scaptodrosophila*; no other Australian species possesses such a dimorphism. *D. mossmana* is further unusual in possessing a minute middle sternopleural bristle; in *Scaptodrosophila* species the middle sternopleural is characteristically large, although a few species are known in which this bristle is very small (cf. the following species).

✓ *Drosophila (Scaptodrosophila) oweni*, sp. nov.

Types

Holotypes ♂: Paluma, north Queensland, mushroom bait, 20.vii.1975, Bock and Parsons. Paratypes: same data as holotype: 3♀.

Distinguishing Features

Front broad. Carina low, ridged. Thorax with dense mid-brown dusting dorsally. Prescutellars weak. Femora and tibiae of fore- and mid-legs dark, remainder of legs pale.

Description

Body length. 2·3 mm (holotype); 2·4 – 2·6 mm (paratype range).

Head. Arista large, fan-like, with 4 rays above and 2 below plus large terminal fork. Front 1·7 times broader than long, deep rufous tan anteriorly, greenish black

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