

## Taxonomy and Distribution of the *coracina* Group of *Scaptodrosophila* Duda (Diptera: Drosophilidae) in Australia

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### Abstract

The *coracina* group of *Scaptodrosophila* Duda is largely endemic to Australia. With the four new species (*S. precaria*, *S. garumga*, *S. claytoni* and *S. evanescens*) described in this paper, 14 species are now recognised in the group. Other species included in the *coracina* group are *S. cancellata* (Mather), *S. coracina* (Kikkawa & Peng), *S. ellenae* (Bock), *S. enigma* (Malloch), *S. howensis* (Parsons & Bock), *S. lativittata* (Malloch), *S. nitidithorax* (Malloch), *S. novamaculosa* (Mather), *S. specensis* (Bock) and *S. subnitida* (Malloch). In the past there has been some confusion in the taxonomy of several species; these problems are addressed. Taxonomic changes, and a large amount of additional material, has resulted in a better understanding of the distribution of the group. Most species are widely distributed along the east coast of Australia, with two foci of diversity, one centred on south-eastern Queensland (11 species) and the other in the region around Cairns (8 species).

### Introduction

*Scaptodrosophila* Duda is a large genus of more than 230 described species, 76 of which occur in Australia. The genus is believed to have arisen in south-east Asia (Throckmorton 1975). Bock (1982) suggested that the high degree of endemism evident in the Australian *Scaptodrosophila* fauna is a result of repeated invasions from the north, with subsequent radiations in Australia. The *coracina* group of *Scaptodrosophila*, which currently contains a single species from south-east Asia and nine species endemic to Australia, is a typical example.

The *coracina*-group species are unusual within *Scaptodrosophila*, in being attracted to fermenting baits and being readily cultured on artificial media (Bock and Parsons 1980). They are therefore amenable to intensive field sampling and laboratory studies. The utility of the group has long been recognised, and several studies are already available, including work on their field ecology (Mather 1956a; Parsons 1982), olfactory responses (Hoffman and Parsons 1984), mating behaviour (Grossfield and Rockwell 1979), physiological tolerances (Parsons 1981, 1983), hybridisation and cytology (Mather 1956b, 1956c; Bock 1984).

For four years (1992–1995; van Klinken 1996) I have sampled various drosophilid habitats intensively (banana baiting and host rearing) in several northern and eastern Australian localities. Most *Scaptodrosophila* material was identified with the aid of Bock's descriptions and keys (Bock 1976, 1980, 1982); some species could not be determined satisfactorily. These had to be resolved before ecological and phylogenetic data could be interpreted. The primary aims in this paper on the *coracina* group of *Scaptodrosophila* include description of the new species, resolution of several taxonomic ambiguities in the literature, and delimitation of a few remaining problems that cannot currently be resolved.

As a result of my taxonomic revisions and extensive sampling in areas and habitats not previously investigated to any extent, the biogeographic picture of the *coracina* group in Australia has changed dramatically from that presented in the literature (Bock 1982; Parsons 1982). Therefore, the distribution of each species in the group is described and the biogeography of the group is discussed in some detail.

## Methodology

Most *coracina*-group material was collected during the course of ecological studies I conducted in south-eastern Queensland (c. 30000 specimens), the Cairns region (c. 400 specimens), Iron Range (c. 40 specimens) and the Northern Territory (c. 500 specimens) between 1992 and 1995. Most specimens were collected at traps containing rotting bananas, but a proportion was reared from larval hosts collected in the field.

Additional material was obtained from a survey of all drosophilid material held in institutional collections in Australia. The following institutions, with their abbreviations, had material belonging to the *coracina* group: Australian Museum, Sydney (AM); Australian National Insect Collection, Canberra (ANIC); Queensland Museum, Brisbane (QM); University of Queensland Insect Collection, Brisbane (UQIC); Department of Crop Protection, Waite Campus, University of Adelaide (WARI); and the Biological and Chemical Research Institute, Rydalmere (BCRI).

Material examined are ordered by latitude, and includes only site and lodging. Quantitative data hold little meaning where only voucher specimens are kept from large series, and is therefore limited to the total number of specimens I examined, and the total number lodged in museums. If specimens lodged in the same institution are listed consecutively, that institution is mentioned after the last record only. Holotypes have been lodged in the QM and paratypes in the UQIC. Voucher specimens of species collected during my field work are lodged in the UQIC.

For morphological description I use the terminology and indices defined by Bock (1976), with the exception of the setae on the primary clasper. Claspers of some species have, in addition to medial teeth and setae, large setae on both their inner and outer surfaces, and I refer to these as internal and external setae respectively. Internal setae have not been figured in any earlier descriptions of Australian species, but I found them to be a reliable species-level character in the *coracina* group of *Scaptodrosophila*.

Distributional data were also obtained from the literature. However, the previous taxonomic confusion that I address in this paper means that literature records for only *S. lativittata*, *S. cancellata* and *S. nitidithorax* are reliable.

## Taxonomy

### Genus *Scaptodrosophila* Duda

*Scaptodrosophila* Duda, 1923: 37. Reinstated by Grimaldi (1990: 116).

### *Scaptodrosophila coracina* Species-group (Mather, 1955: 550)

The *coracina* group has been characterised by Bock (1980, 1982) as follows: body length up to c. 3.5 mm; arista with 3–4 rays above and 2 rays below plus terminal fork; carina smoothly rounded, nose-like; prescutellar bristles developed; wings hyaline or with brownish tinge, without patterning; hypandrium of male genitalia with pair of very large spines; adults attracted to fruit baits.

Bock (1980, 1982) recognised ten species in the *coracina* group, nine from Australia [*S. cancellata* (Mather), *S. ellenae* (Bock), *S. enigma* (Malloch), *S. howensis* (Parsons & Bock), *S. lativittata* (Malloch), *S. nitidithorax* (Malloch), *S. novamaculosa* (Mather), *S. specensis* (Bock) and *S. subnitida* (Malloch)] and one from south-east Asia [*S. coracina* (Kikkawa & Peng)]. A further four Australian species are described here. The species group may, however, be much larger. Additional, undescribed, *coracina*-group species have been collected in Australia (UQIC; see later). Undetermined species from the *coracina* group are also present in collections from south-east Asia (Toda *in litt.*, Nov. 1994).

A number of described species also fit the *coracina*-group criteria outlined above, but have never been explicitly included in the group, including six species from New Guinea that were described by Okada and Carson but not placed in any species-group (Okada and Carson 1980, 1982, 1983). Four of these (*S. metatarsalis*, *S. cominsiae*, *S. specensoides* and *S. lagomorpha*) resemble *S. specensis*, and two (*S. phyrniae* and *S. paraphyrniae*) resemble *S. cancellata*. Further species are likely to be discovered in New Guinea, where the greater part of the very diverse *Scaptodrosophila* fauna remains undescribed (Carson and Okada 1982). Several Australian species also appear to match the *coracina* group criteria but have not been included in the group: *S. sydneyensis* (Malloch), *S. bryani* (Malloch) (but see *S. ellenae*) and *S. dichromos* (Bock). Formal inclusion of these species into the *coracina* group should await a proper revision and delimitation of the species-group.

Key to Australian Species of the *S. coracina* Group

1. Anterior scutellar bristles half length of posterior scutellar bristles . . . . . 2  
Anterior and posterior scutellar bristles subequal . . . . . 3
2. Abdominal tergite 4 dark brown to black, with pale patch anteriorly . . . . . *S. ellenae*  
Abdominal tergite 4 black, pale patch absent . . . . . (*S. bryani*)
3. Thorax patterned . . . . . 4  
Thorax unicolorous . . . . . 9
4. Wing with well developed brownish tinge; clouding along cross-veins . . . . . 5  
Wing clear; cross-vein clouding faint or absent . . . . . 8
5. Mesonotum dark brown with pairs of whitish submedial spots anteriorly, plus additional markings . . . . 6  
Mesonotum otherwise, no whitish spots anteriorly . . . . . 7
6. Elongate, whitish patch between the posterior dorsocentrals irregular in shape, extending up to, or past, the anterior dorsocentrals; posterior dorsocentrals arising from velvety black patch when viewed at certain angles (Fig. 12) . . . . . *S. precaria*  
Whitish patch between the posterior dorsocentrals and prescutellars oval shaped, extending approximately midway to the anterior dorsocentrals; velvety black patches absent . . . . . *S. novamaculosa*
7. Mesonotum with median white patch anteriorly, approximately 4 rows of acrostichals broad (Fig. 13) . . . . . *S. garumga*  
Mesonotum without medial white patch or stipe anteriorly . . . . . *S. cancellata*
8. Mesonotum with median white band 4 rows of acrostichals wide . . . . . *S. enigma*  
Mesonotum with median white band 2 rows of acrostichals wide . . . . . *S. lativittata*
9. Thorax tan, abdomen usually patterned . . . . . 10  
Thorax and abdomen dark brown to black . . . . . 13
10. Incurved portions of abdominal tergites 3–5 tan . . . . . 11  
Incurved portions of abdominal tergites 3–5 black, sometimes with pale patches . . . . . 12
11. Abdominal tergites with posterior black bands on tergites 2–5 clearly broken along midline (Fig. 1) . . . . . *S. specensis*  
Abdominal tergites with posterior black bands not broken along midline . . . . . *S. howensis*
12. Abdomen with distinctive, black on tan, pattern (Fig. 3); lateral pale patches present on tergites 3–5 (Fig. 4); cross-veins clouded . . . . . *S. claytoni*  
Abdominal pattern indistinct (Fig. 5); lateral pale patches indistinct or absent on tergites 3 and 4, absent on tergite 5; no clouding along cross-veins . . . . . *S. evanescens*
13. Thorax and abdomen black to velvety-black; wing slightly dusky . . . . . *S. nitidithorax*  
Thorax dark brown with golden sheen; abdomen black; wing clear . . . . . *S. subnitida*

***S. specensis* and Similar Species**

*Scaptodrosophila specensis* was thought to be a common inhabitant of rainforests from north Queensland to central or southern New South Wales (Bock 1982). This distribution, however, reflects the pooled distribution of a complex of species unrecognised to date. Two new species, which make up the bulk of available collections, are described here. Further, undescribed, species are represented in collections from both north and south-eastern Queensland (UQIC, AM).

The above species, together with *S. howensis*, and four New Guinea species that also 'resemble *S. specensis*' (Okada and Carson 1980, 1982, 1983), may be distinguished from each other by abdominal pattern, wing coloration and, where descriptions are sufficiently detailed, male genitalia.

***Scaptodrosophila specensis* (Bock), comb. nov.**

(Figs 1, 2)

*Drosophila* (*Scaptodrosophila*) *specensis* Bock, 1976: 41.**Material Examined***Holotype.* ♂, Mt Spec, Qld, 2900 ft, 22.iv.1955, Norris & Common (ANIC).*Paratype.* 1 'adult', 14 mi SW of Sarina, 8.v.1955, Norris & Common (ANIC).

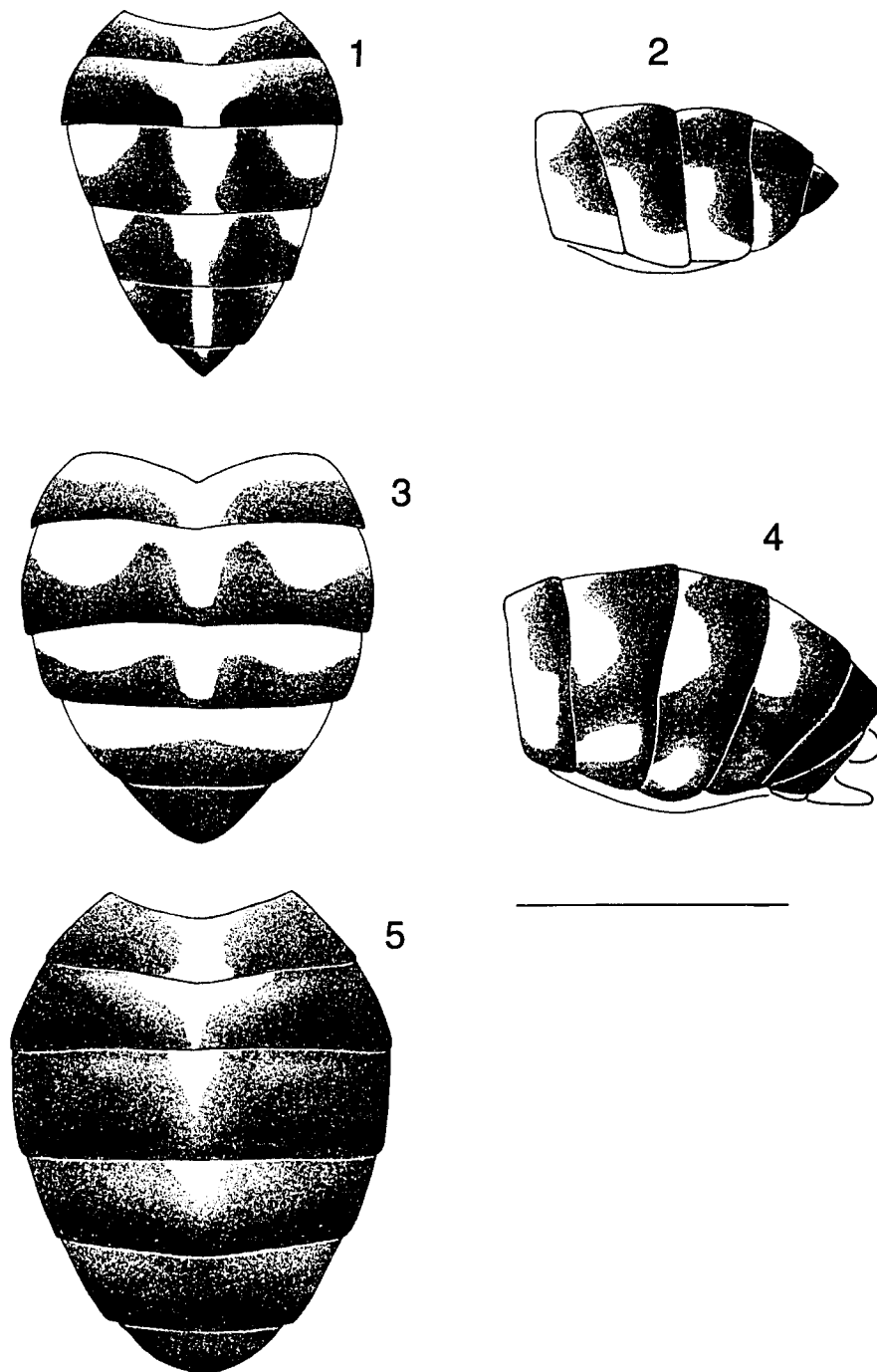
*Other material examined.* 24 specimens, all are lodged in museums. **Queensland:** nr Millaa Millaa; Palmerston NP (AM); The Crater, Hypipamee NP; 4 km SW of The Crater, Hypipamee NP (UQIC); 18 km N of Ravenshoe, nr The Crater; Moses Ck, 4 km NE of Mt Finnigan; 12 km ENE of Ravenshoe; Sluice Ck, 8 km SW of Millaa Millaa; Kirrama Rd, north Qld; Gap Ck, 5 km ESE of Mt Finnigan (ANIC).

*Diagnosis*

Abdomen as in Figs 1, 2. Thorax uniformly mid-brown. Wing with brownish tinge, no clouding at cross-veins.

*Description*

As in Bock (1976: 41) but for the following. Periorbits tan. Eyes with fine pile. Abdominal tergites largely black with yellowish-tan pattern (Figs 1, 2): tergite 2 pale yellowish tan with black band on posterior half, broken at midline; tergites 3–5 pale tan with large black submedial patches on posterior margin, extending towards anterior margin submedially and laterally along posterior margin; tergite 6 black with small pale patch anteriorly on midline; incurved portions of tergites 2–4 pale; incurved portion of tergite 5 pale, black posteriorly.



**Figs 1–5.** *S. specensis* female abdomen: 1, dorsal view, tergites 1–6; 2, lateral view, tergites 2–6. *S. claytoni* male abdomen, tergites 2–6: 3, dorsal view; 4, lateral view. *S. evanescens* male abdomen tergites 1–6: 5, dorsal view; Scale line 1 mm.

*Distribution*

*Scaptodrosophila specensis* appears to be restricted to vineforests in the Cairns region, north Queensland.

*Remarks*

*Scaptodrosophila specensis* is rare in collections. Most specimens have been sweep-netted. Five adults have been collected at the flowers of *Duranta repens* and several at fruit baits.

*Scaptodrosophila claytoni*, sp. nov.

(Figs 3, 4, 6–9)

*Material Examined*

*Holotype.* ♀, 1.5 km SE of Tenison Woods Mtn, south Queensland (27°18'S, 152°45'E), 10.i.1993, banana trap, R. van Klinken (QM).

*Paratypes.* 2♀, as for holotype, 14–17.ii.1994; 1♂, Tenison Woods Mtn, south Queensland (27°18'S, 152°45'E), 7.i.1993, banana trap, R. van Klinken; 1♂, same except 2.viii.1993 (dissected); 1♀, Enoggera Ck at Scrub Rd crossing (27°26'S, 152°50'E), 11.x.1994, banana trap, R. van Klinken (UQIC).

*Other material examined.* 1800 specimens examined, 107 lodged in museums. **Queensland:** Gillies Hwy, 2 km E of Mt Nomico (17°13'S, 145°42'E), (UQIC); Lake Barrine (AM); Atherton; Lake Eacham NP (UQIC); The Crater, Hypipamee NP (UQIC; AM); Birthday Ck, 7 mi W of Paluma (AM); Eungella (UQIC); Mapleton (AM); Tenison Woods Mtn (27°18'S, 152°45'E); Mt Glorious Village (27°20'S, 152°46'E), (UQIC); Mt Glorious (AM); jctn Mt Glorious Rd & Scrub Rd (27°25'S, 152°50'E); Enoggera Ck at Scrub Rd crossing (27°26'S, 152°50'E); Simpson Falls, Mt Coot-tha (27°28'S, 152°53'E); Taringa, Brisbane (UQIC); nr Bilambil; Joalah NP, south Queensland (AM). **New South Wales:** Mt Warning NP; Huonbrook, nr Mullumbimby; Upper Allyn R., nr Eccleston (AM); Forster (UQIC).

*Diagnosis*

Abdomen as in Figs 3, 4. Thorax uniformly mid-brown. Wing dusky, with clouding on posterior cross-vein.

*Description*

*Body length.* 3.1 mm (holotype); paratype range, 2.7–3.2 mm.

*Head.* Arista with 3 branches above and 2 below plus terminal fork. Front as broad as long, golden tan; periorbital bands enclosing orbitals and vertical bristles, and ocellar triangle, indistinct, tan; Ocellar triangle mid-brown. 2nd and 3rd antennal segments mid-brown. Carina weak, low, narrow. Cheek slightly curved, greatest width 0.2 times greatest diameter of eye. Eyes with fine pile. Orbital bristles in ratio 2:1:2; anterior reclinate orbital posterior and slightly lateral to proclinate orbital. Ocellar and vertical bristles large.

*Thorax.* Uniformly mid-brown with a golden tinge. Acrostichals in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Ratio anterior: posterior dorsocentrals 0.6. Prescutellar bristles large, 0.7 length of anterior dorsocentrals. Scutellar bristles subequal; anterior scutellar bristles divergent; posterior scutellars strongly convergent (crossing). Sterno-index 0.7. Legs pale brown; preapical bristles on all tibiae; apicals only on 2nd tibiae.

*Wing.* Dusky with clouding on posterior cross-vein. C-index, c. 0.6; 4V-index, c. 2.0; 5X-index, c. 1.5; M-index, c. 0.6. 3rd costal section with heavy setation on basal 0.6. Length 2.5mm.

*Abdomen* (Figs 3, 4). Tergite 2 yellowish with black band on posterior half, broken at midline and narrowing laterally; tergites 3 and 4 black with large pale patch anteriorly, extending posteriorly along medial line and widening slightly submedially, black laterally with pale patches; tergite 5 pale on anterior half, extending back along midline in some specimens, lateral patch indistinct or absent; tergite 6 black.

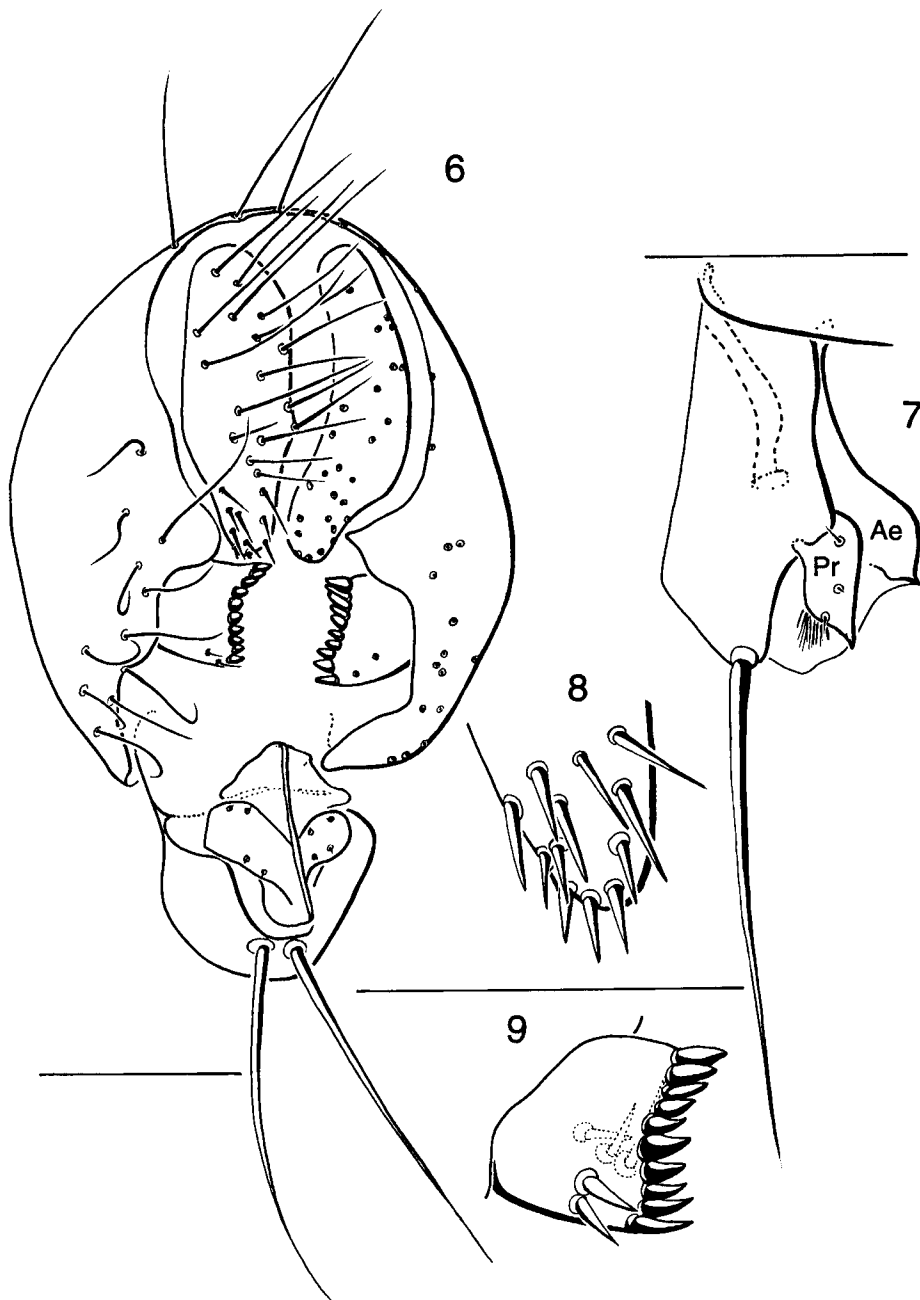
*Male genitalia* (Figs 6–9). Claspers with *c.* 10 medial teeth, *c.* 2 external setae, and *c.* 3 internal setae (Fig. 9). Apical setae on anal plates raised (Fig. 8). Parandrites small, with several sensillae (Fig. 7). Aedeagus weakly developed, with lateral flange (Fig. 7).

#### *Distribution*

*Scaptodrosophila claytoni* is limited to the coastal region between Cairns and central New South Wales. It may be abundant in certain vineforest and wet sclerophyll forest types but rare in most urban areas.

#### *Remarks*

Most *S. claytoni* museum specimens (AM, ANIC) have been misidentified as *S. specensis*. This, together with the relatively high abundance of *S. claytoni* in many rainforest habitats, suggests that most references to *S. specensis* refer, in fact, to *S. claytoni* (e.g. Grossfield and Rockwell 1979; Parsons and Bock 1981; Parsons 1982; Bock 1984; Atkinson 1985; McEvey 1992).



**Figs 6–9.** *S. claytoni* male genitalia: 6, ventral view, whole mount; 7, lateral view of hypandrium; 8, anal plate, apical end; 9, clasper. Ae, aedeagus; Pr, parandrite. Scale lines 0.05 mm.

*Scaptodrosophila evanescens*, sp. nov.

(Figs 5, 10, 11)

*Material Examined*

*Holotype.* ♂, Enoggera Ck at Scrub Rd crossing, south-eastern Queensland, (27°26'S, 152°50'E), 27.ix.1994, banana trap, R. van Klinken (QM).

*Paratypes.* 1♂, as for holotype, 20.x.1994; 2♂, as for holotype, 13.xi.1994 (both dissected); 2♀, as for holotype, 28.xi.1994; 2♀, Scrub Rd, midway between Mt Glorious Rd and Enoggera Ck (27°25'E, 152°50'S), 20.x.1994, banana trap, R. van Klinken (UQIC).

*Other material examined.* 600 specimens examined, 105 lodged in museums. **Queensland:** Gap Ck, 5 km ESE of Mt Finnigan; summit, Bellenden Kerr; Wongabel SF, via Atherton; Paluma (ANIC); Skywindow Lookout, Eungella NP (ANIC); Tenison Woods Mtn (27°18'S, 152°45'E); Mt Glorious Village (27°20'S, 152°46'E); jctn Scrub Rd & Mt Glorious Rd (27°25'S, 152°50'E); Enoggera Ck at Scrub Rd crossing, (27°26'S, 152°50'E); Indooroopilly, Brisbane (27°30'S, 152°53'E) (UQIC); nr Bilambil, south Queensland (AM). **New South Wales:** Huonbrook, nr Mullimbimby; Iluka, Clarence R.; Mt Keira, nr Wollongong (AM).

*Diagnosis*

Abdomen as in Fig. 5. Thorax uniformly mid-brown. Wings translucent with brownish tinge, no clouding at cross-veins.

*Description*

*Body length.* 2.6 mm (holotype); paratype range, 3.0–3.5 mm.

*Head.* Arista with 3 branches above and 2 below plus terminal fork. Front as broad as long, yellowish tan; periorbital bands enclosing orbital and vertical bristles, and ocellar triangle tan, slightly glassy. 2nd antennal segment tan; 3rd antennal segment mid-brown. Carina weak, low, narrow, rounded. Cheek slightly curved, greatest width 0.2 times greatest diameter of eye. Eyes with fine pile. Orbital bristles in ratio 4:2:5; anterior reclinate orbital bristle postero-lateral to proclinate orbital. Ocellar and vertical bristles large.

*Thorax.* Uniformly mid-brown with golden tinge. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Ratio anterior:posterior dorsocentrals 0.5. Prescutellar bristles large, 0.7 length of anterior dorsocentrals. Scutellar bristles subequal; anterior scutellar bristles divergent; posterior scutellars convergent (crossed). Sterno-index 0.7. Legs pale brown; preapical bristles on all tibiae; apicals only on 2nd tibiae.

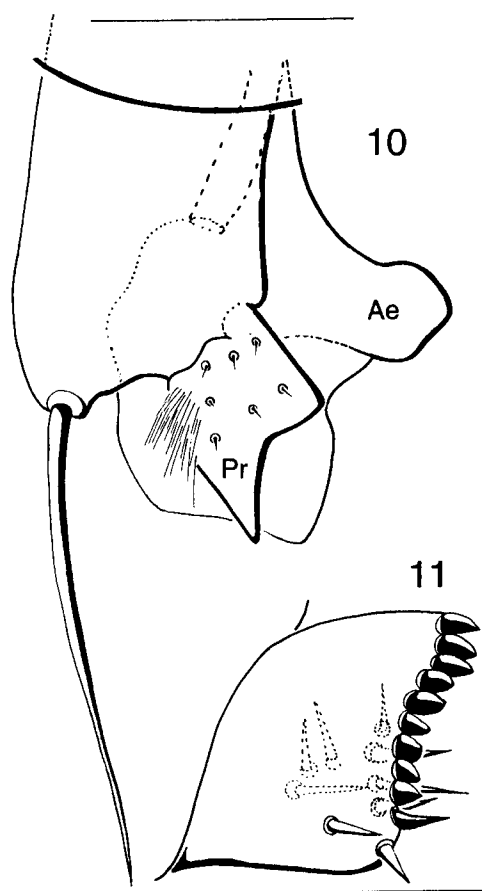
*Wing.* Translucent with brownish tinge; no clouding at cross-veins. *C*-index, *c.* 2.6; 4*V*-index, *c.* 2.0; 5*X*-index, *c.* 1.9; *M*-index, *c.* 0.4. 3rd costal section with heavy setation on basal *c.* 0.6. Length 2.6 mm.

*Abdomen.* Mid to dark brown with indistinct pattern (Fig. 5). Tergites 2–4 dark brown with narrow tan strip anteriorly, extending medially back to the posterior margin, or nearly so; tergite 5 dark brown with narrow tan strip anteriorly; tergite 6 dark brown; incurred portions of tergites dark brown in holotype; slightly paler, lateral patches present on tergites 2–4.

*Male genitalia* (Figs 10, 11). As for *S. claytoni* but for the following features. Claspers with *c.* 11 medial teeth, single external seta, and *c.* 7 internal setae (Fig. 11). Parandrites large, sensillae numerous (Fig. 10). Aedeagus weakly developed, elongated (Fig. 10).

*Distribution*

*Scaptodrosophila evanescens* appears to be largely sympatric with *S. claytoni*. It extends from north Queensland to central New South Wales.



**Figs 10–11.** *S. evanescens* male genitalia: 10, lateral view of hypandrium; 11, clasper. Ae, aedeagus; Pr, parandrite. Scale lines 0.05 mm.

#### Remarks

This species has been collected from several sites in and around Brisbane, where it is usually uncommon, at least at banana traps. Large numbers have, however, been collected on occasion. The abdomen of some specimens is relatively dark with pale markings more restricted dorsally, and lateral patches absent on tergites 2–4. The genitalia of such males appear identical to the lighter individuals assigned to this species. These dark specimens could be confused with *S. subnitida*; see *S. subnitida* description.

#### *Scaptodrosophila howensis* (Parsons & Bock), comb. nov.

*Drosophila (Scaptodrosophila) howensis* Parsons & Bock, 1979: 978.

#### Material Examined

*Holotype.* ♂, Lord Howe I., mushroom baited in forest, 1.xii.1978, P. A. Parsons (ANIC).

*Paratypes.* 3♂, 9♀, same data as holotype (1♂, 3♀, ANIC; 2♂, 3♀, AM).

#### Distribution

*Scaptodrosophila howensis* is known only from type material collected on Lord Howe Island. Lord Howe Island is approximately 555 km east of Port Macquarie on mainland Australia.

#### Remarks

*Scaptodrosophila howensis* is most similar in coloration to *S. claytoni* and *S. evanescens* but differs in abdominal patterning.



***S. novamaculosa* and Similar Species**

The following three species are similar in general *facies*. They can be easily distinguished from each other by thoracic pattern.

***Scaptodrosophila novamaculosa* (Mather), comb. nov.**

*Drosophila maculosa* Mather, 1955: 560 (holotype in AM).

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

**Material Examined**

*Types.* ex. culture, coll. Moggill, Queensland, 19.xi.1952, W. B. Mather (AM).

*Other material examined.* 963 specimens examined, 48 lodged in UQIC. **Queensland:** 1.5 km SE Tenison Woods Mtn (27°18'S, 152°45'E); jctn Scrub Rd & Mt Glorious Rd (27°25'S, 152°50'E); Enoggera Ck at Scrub Rd crossing (27°26'S, 152°50'E); Simpson Falls, Mt Coot-tha (27°28'S, 152°53'E); Indooroopilly, Brisbane (27°30'S, 152°53'E) (UQIC).

**Distribution**

Bock (1982) suggested the species may have gone extinct because of habitat destruction, since it was known then only from the holotype, and attempts to collect further specimens had failed. I have since collected *S. novamaculosa* from a number of sites in and around Brisbane, where it is sometimes relatively abundant.

Bock (1984) reported a new record of *S. novamaculosa* collected as larvae from under the bark of *Eucalyptus perriniana* in Victoria. I could not relocate the specimens to confirm that they are not, in fact, *S. precaria*, with which *S. novamaculosa* can be confused.

***Scaptodrosophila precaria*, sp. nov.**

(Figs 12, 14–17)

**Material Examined**

*Holotype.* ♂, Scrub Rd, midway between Enoggera Ck and Mt Glorious Rd (27°25'S, 152°50'E), 17–20.i.94, banana bait, R. van Klinken (QM).

*Paratypes.* **Queensland:** 1♂, Enoggera Ck at Scrub Rd crossing, nr Mt Nebo (27°26'S, 152°50'E), 27.xi.94, banana bait, R. van Klinken; 2♂, 3♀, same data, 11.xi.1994 (♂ dissected) (UQIC).

*Other material examined.* 308 specimens examined, 42 lodged in UQIC. **Queensland:** Stallion Pocket, Mulgrave R. Forestry Rd (17°12'S, 145°46'E); Tenison Woods Mtn (27°18'S, 152°45'E); Mt Glorious Village (27°20'S, 152°46'E); jctn Scrub Rd & Mt Glorious Rd, (27°25'S, 152°50'E); Enoggera Ck at Scrub Rd crossing (27°26'S, 152°50'E) (UQIC).

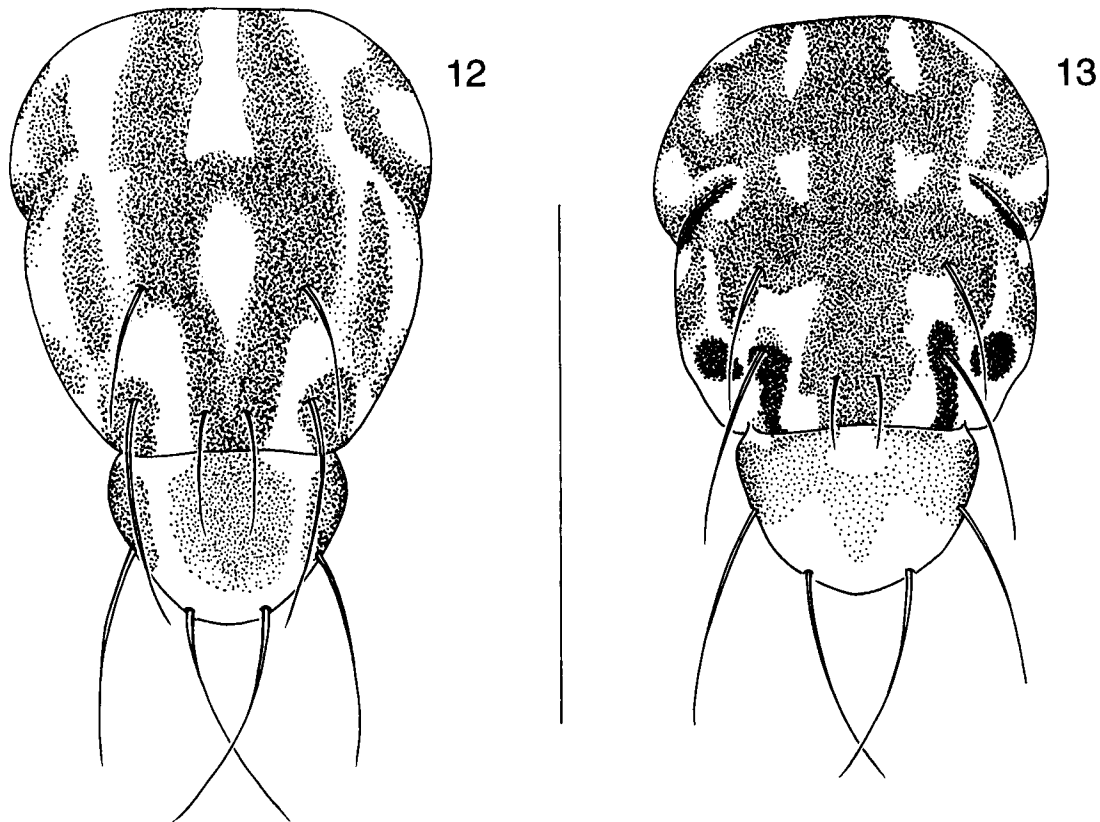
**Diagnosis**

Thorax as in Fig. 12.

**Description**

*Body length.* 2.6 mm (holotype); paratype range 2.2–3.0 mm.

*Head.* Arista with 3 branches above and 2 below plus terminal fork. Front 1.1 times broader than long, dark rufous-brown; periorbital bands enclosing orbital and vertical bristles and ocellar triangle, silvery; brown patches between posterior reclinate bristle and vertical bristles and immediately anterior to periorbital bands; ocellar triangle dark brown to black. 2nd and 3rd antennal segments dusky, almost black. Carina large, dark brown to black, slightly flattened dorsally. Cheek dark brown, almost linear, 0.2 times greatest diameter of eye. Eyes with fine dense pile. Orbital bristles in ratio 8:5:9; anterior reclinate orbital bristle lateral to proclinate bristle.



Figs 12–13. Thorax: 12, *S. precaria*; 13, *S. garumga*. Scale line 1 mm.

*Thorax.* Mesothorax and scutellum dark brown with silvery pattern and additional, characteristic, velvety black markings (Fig. 12). Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Ratio anterior:posterior dorsocentrals 0.6. Scutellar bristles long, subequal. Anterior scutellar bristles diverging, posterior scutellars strongly converging (crossed). Sterno-index 0.8. Femora dark brown to black; tibiae dark brown and tan; tarsi tan; preapical bristles on all tibiae; apicals only on 2nd tibiae.

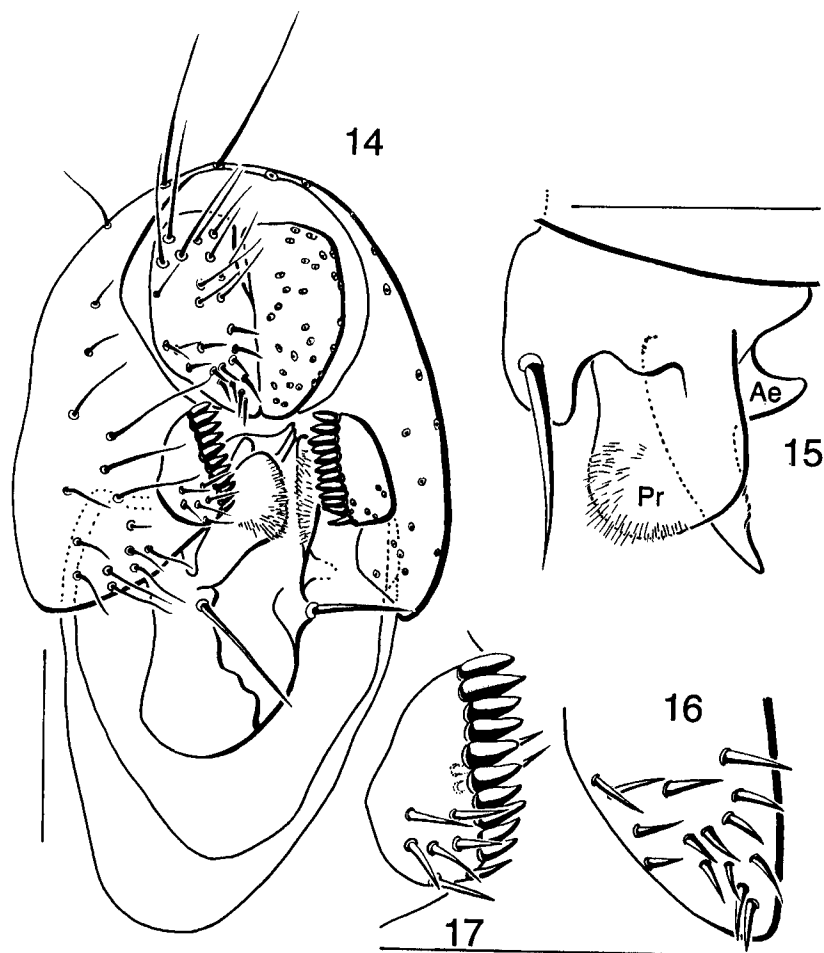
*Wing.* Wing dusky with clouding along cross-veins. *C*-index, *c.* 2.2; 4*V*-index, *c.* 2.3; 5*X*-index, *c.* 1.1; *M*-index, *c.* 0.6. 3rd costal section with heavy setation on basal *c.* 0.7. Length, *c.* 2.5.

*Abdomen.* Tergite 1 dark brown; tergite 2 dark brown to black, pale patch medially, broadening anteriorly; tergite 3 pale anteriorly, broad dark brown to black band posteriorly, narrowing slightly medially; tergites 4 and 5 pale anteriorly, broad dark brown to black band posteriorly, broadening medially; tergite 6 dark brown; incurved portions of all tergites dark brown to black.

*Male genitalia* (Figs 14–17). Claspers with *c.* 10 medial teeth and *c.* 2 medial setae, *c.* 5 external setae and *c.* 2 internal setae (Fig. 17). Apical setae on anal plate not on raised bases (Fig. 16). Parandrites large (Fig. 15). Aedeagus strongly developed, with serrated internal edge subapically (Fig. 15).

#### *Distribution*

*Scaptodrosophila precaria* has been collected on a number of occasions from Brisbane Forest Park, just west of Brisbane. Four specimens have been collected from a single site in the Cairns region.



**Figs 14–17.** *S. precaria* male genitalia: 14, ventral view, whole mount; 15, lateral view of hypandrium; 16, anal plate, apical end; 17, clasper. Ae, aedeagus; Pr, parandrite. Scale lines 0.05 mm.

#### Remarks

*Scaptodrosophila precaria* is most similar to *S. novamaculosa*, from which it may be distinguished by thoracic pattern. This species is unusual among drosophilids in being almost entirely confined to the rainforest canopy (8–20 m above the forest floor) (van Klinken 1996).

#### *Scaptodrosophila garumga*, sp. nov.

(Figs 13, 18, 19)

#### Material Examined

**Holotype.** ♀, Tenison Woods Mtn, Queensland (27°18'S, 152°45'E), 22–25.i.1993, banana bait, R. van Klinken (QM).

**Paratypes.** 1 ♂, same data as holotype; 1 ♀, same data as holotype, 25–28.x.1993; 1 ♂, 1 ♀, Enoggera Ck, at Scrub Rd crossing, (27°26'S, 152°50'E), 10–13.v.1993, banana bait, R. van Klinken (♂ dissected); 1 ♂, same data, 11.x.1994 (♂ dissected); 1 ♂, same data, 25.iii.1995 (♂ dissected).

**Other material examined.** 15 specimens examined, 11 specimens lodged in museums. **Queensland:** Enoggera Ck at Scrub Rd crossing (27°26'S, 152°50'E); Tenison Woods Mtn (27°18'S, 152°45'E) (UQIC). **New South Wales:** Terania Ck, nr Lismore (AM).

*Diagnosis*

Thorax as in Fig. 13.

*Description*

*Body length.* 3.0 mm (holotype); paratype range 2.6–3.2 mm.

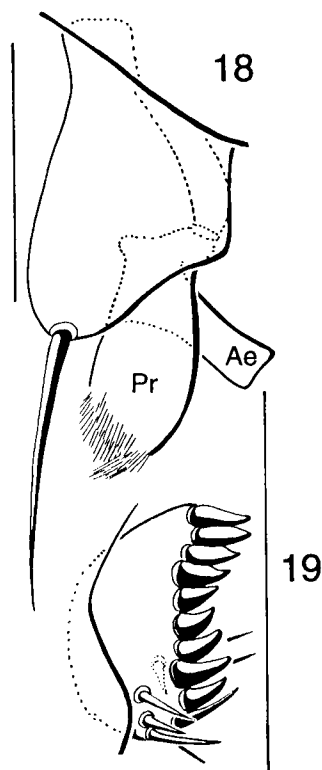
*Head.* Arista with 4 branches above and 3 below plus terminal fork. Front 1.1 times broader than long, rufous brown; periorbital bands enclosing orbital and vertical bristles and ocellar triangle silvery, ocellar triangle black; small dark brown patches immediately anterior to periorbital bands, between posterior reclinate bristle and vertical bristles, and medially on the anterior margin of the front. 2nd antennal segment brown; 3rd antennal segment black. Carina large, dark brown to black, slightly flattened dorsally. Cheek mid-brown, almost linear, greatest width 0.2 times greatest diameter of eye. Eyes with fine dense pile. Orbital bristles in ratio 2:1:2; anterior reclinate orbital bristle lateral and slightly posterior to proclinate orbital.

*Thorax.* Mesothorax and scutellum dark brown with silvery pattern as in Fig. 13. Scutellum black on lateral flanks. Acrostichal hairs in 8 rows in front of dorsocentral bristles, 4–6 rows between dorsocentrals. Ratio anterior:posterior dorsocentrals 0.6. Scutellar bristles long, subequal. Anterior scutellar bristles divergent, posterior scutellar bristles strongly convergent (crossed). Sterno-index 0.9. Femora dark brown to black, remainder of legs tan; preapical bristles on all tibiae; apicals only on 2nd tibiae.

*Wing.* Wing dusky with clouding along cross-veins. *C*-index, *c.* 2.6; 4*V*-index, *c.* 2.1; 5*X*-index, *c.* 1.1; *M*-index, *c.* 0.5. 3rd costal section with heavy setation on basal 0.7. Length, *c.* 2.9 mm.

*Abdomen.* Tergite 2 dark brown to black with pale patch medially, broadening anteriorly; tergites 3–5 dark brown to black with narrow, submedial yellowish patches on anterior margin; tergite 6 dark brown to black; incurved portions of all tergites dark brown to black.

*Male genitalia* (Figs 18, 19). General form as for *S. precaria* (Fig. 14). Clasper with *c.* 9 medial teeth and 2 medial setae, 2 external setae and *c.* 4 internal setae (Fig. 19). Aedeagus well developed, truncate (Fig. 18).



**Figs 18–19.** *S. garumga* male genitalia: 18, lateral view of hypandrium; 19, clasper. Ae, aedeagus; Pr, parandrite. Scale lines 0.05 mm.

*Distribution*

*Scaptodrosophila garumga* has been collected in small numbers at two sites within Brisbane Forest Park, just to the west of Brisbane, the result of extensive collections in the region over a number of years. A single specimen has also been collected in north-eastern New South Wales.

*Remarks*

With the exception of the New South Wales specimen (collected at a 'fly trap') specimens have been collected only at banana baits, at which they appear to be exceedingly rare.

The name *garumga* refers to the aboriginal people who once occupied much of what is now Brisbane Forest Park.

*Scaptodrosophila enigma* (Malloch), comb. nov.

*Drosophila enigma* Malloch, 1923: 618.

*Material Examined.*

*Holotype.* Sydney, New South Wales, 22.vii.1923, collector unknown (AM).

*Other material examined.* 113 specimens examined, 101 lodged in museums. **Queensland:** Stallion Pocket, Mulgrave River Forestry Rd, (17°15'S, 145°46'E); farmhouse, 4.5 km ENE of Yungaburra (17°15'S, 145°37'E) (UQIC); Lake Barrine, nr Yungaburra (AM); Eidsvold (ANIC); Mt Glorious Village (27°20'S, 152°46'E) (UQIC); Samford (27°22'S, 152°53'E) (AM); jctn Scrub Rd & Mt Glorious Rd (27°25'S, 152°50'E); Enoggera Ck at Scrub Rd crossing (27°26'S, 152°50'E); Simpson Falls, Mt Coot-tha (27°28'S, 152°53'E); Indooroopilly, Brisbane (27°30'S, 152°53'E); Moggill, Brisbane (ANIC). **New South Wales:** Bruxner Park, Coffs Harbour (AM); Dorrigo NP (ANIC); Mt Gibraltar NP, 64 mi W of Grafton; Chichester SF, upper Allyn R.; Upper Allyn R. (AM); nr Mt Frome, 6 km SE of Mudgee (ANIC); Gosford (BCRI); Mooney Mooney Ck, nr Gosford; Sassafrass Gully, Springwood; Sydney; Royal NP, 7 km NNE of Otford; Heathcote NP (AM); Wallaga Lake, Bermagui; Ben Boyd; Boyd Tower (ANIC); Bronte; Boyds Ck, N of Mallacoota (AM); nr Nadgee Point (UQ). **Victoria:** Fairfield, Melbourne (AM). **South Australia:** Urrbrae House garden; West Bay, Kangaroo I.; Glenside, Adelaide (WARI). **Western Australia:** Margaret R. (AM). **Norfolk Island:** Filmy Fern Walk, Norfolk Island NP (ANIC).

*Distribution*

*Scaptodrosophila enigma* is the most widely distributed of the *coracina*-group species. It is widespread from south-eastern Queensland, where it is relatively uncommon, to Melbourne, where it is a common urban species during the warmer months (Parsons 1992). It has also been collected in the Cairns region (4 specimens from 3 sites), from Adelaide and Kangaroo Island in South Australia, and from south-west Western Australia (1 specimen). Mather (1955) records it from the inland, semi-arid, site of Carnarvon Gorge (Queensland), although I could not relocate specimens to confirm identifications. See *S. lativittata* for further discussion of the Australian distribution of *S. enigma*.

Parsons (1980) reported *S. enigma* from the north island of New Zealand (latitude 36°60'S.) where it occurs in rainforest. It has also been recorded from Norfolk Island, an isolated island approximately 1400 km east of Brisbane (Bock 1986).

*Remarks*

*Scaptodrosophila enigma* has been previously confused with the three species *S. specensis*, *S. claytoni* and *S. evanescens*, as evidenced by statements about them in Bock's (1976, 1980, 1982) keys, and the past identifications of museum specimens (ANIC; AM). *S. enigma* is distinguished from other *coracina*-group species as follows: thorax tan to midbrown with silvery pattern (Mather 1955, fig. 4a); abdominal pattern similar to that of *S. claytoni* but differing in the pale lateral patches on tergites 3–5 being more extensive, particularly on tergite 5, and tan patches being present on tergite 6; wing with brownish tinge, cross-vein clouding faint but present. Thoracic pattern is superimposed on internal thoracic structures which may be seen through the integument and result in confusion at times.

*Scaptodrosophila lativittata* (Malloch), comb. nov.*Drosophila lativittata* Malloch, 1923: 618.*Paradrosophila interrupta* Duda, 1923: 45 (holotype in Budapest).*Specimens Examined**Holotype.* ♀, Sydney, New South Wales, 28.viii.1921 (AM).

*Other material examined.* Total of c. 26000 examined, 225 lodged in museums. **Queensland:** Lamb Range, Gillies Hwy (17°12'S, 145°42'E); Mulgrave R. Forestry Rd, 12.8 km from Gillies Hwy turnoff (17°13'S, 145°46'E); 4.5 km ENE Yungaburra (17°15'S, 145°37'E); Atherton (17°16'S, 145°29'E); nr Atherton, Malanda, Ravenshoe jctn (17°28'S, 145°28'E); Mt Barney; Tenison Woods Mtn (27°18'S, 152°45'E); Mt Glorious Village (27°20'S, 152°46'E); jctn Scrub Rd & Mt Glorious Rd (27°25'S, 152°50'E); Enoggera Ck at Scrub Rd crossing (27°26'S, 152°50'E); Simpson Falls, Mt Coot-tha (27°28'S, 152°53'E); Indooroopilly, Brisbane (27°30'S, 152°53'E) (UQIC); Moggill, Brisbane; Ipswich (AM). **New South Wales:** Coff's Harbour; Yarrahappini; Moorland; Broulee; Wallaga Lake, Bermagui (ANIC); Bulga SF, 15 km W of Elands; Mooney Mooney Ck, nr Gosford; North Bondi; Royal NP, 7 km NNE of Otford; Kangaroo Valley, on road to Nowra via Budgong; Bronte, nr Sydney (AM); nr Nadgee Point (37°27'S, 149°59'E); Wonboyn turnoff, Princes Hwy (UQIC). **Australian Capital Territory:** Hackett, Canberra (35°15'S, 149°10'E); Black Mtn, Canberra (35°16'S, 149°06'E) (UQIC). **Victoria:** La Trobe University, Melbourne (UQIC); Fairfield, Melbourne (AM).

*Literature Records*

**Queensland:** Carnarvon Gorge; Maroochydore; Landsborough; Toowong, Brisbane (Mather 1955); Greenslopes, Brisbane. **New South Wales:** Grafton; Bulahdelah; Woy Woy (Mather 1960).

*Distribution*

*Scaptodrosophila lativittata* is distributed along the coast between southern Queensland, where in certain habitats it is often the most abundant species at banana traps, and Melbourne, where it is common in urban areas (Parsons 1982). Specimens have also been collected from several sites in the Cairns region, and from a number of more inland localities (Canberra, Carnarvon Gorge).

Parsons and Bock (Parsons 1977; Parsons and Bock 1977, 1981; Bock 1982; Parsons 1982) suggest that the distribution of *S. lativittata* (and *S. enigma*) is governed by the presence of fleshy fruit, and that the species therefore spread into southern New South Wales and Victoria only after the introduction of fruiting trees by Europeans. However, no compelling reason or evidence supports the notion that the distribution of either *S. lativittata* or *S. enigma* is dependent on the availability of fleshy fruits. In fact both species have been collected in numerous sites well away from both rainforests and human habitation (*S. lativittata* in large numbers), and both may well be indigenous to Victoria and southern New South Wales.

*Scaptodrosophila nitidithorax* (Malloch), comb. nov.*Drosophila nitidithorax* Malloch, 1927: 5.*Material Examined**Holotype.* Perth, Western Australia, 15.ii.1924, Nicholson (AM), very badly damaged.

*Other material examined.* 73 specimens examined, 60 lodged in museums. **Queensland:** Mt Barney; jctn Scrub Rd & Mt Glorious Rd (27°25'S, 152°50'E); Simpson Falls, Mt Coot-tha (27°28'S, 152°53'E) (UQIC). **Western Australia:** Burns Beach, Perth (AM); Perth (AM, ANIC); Crowea SF, Pemberton; 24 mi NW of Walpole (ANIC).

*Distribution*

*Scaptodrosophila nitidithorax* has been recorded only from south-west Western Australian and, recently, from south-eastern Queensland. A survey with fermenting baits within a 50-km radius of Perth, Western Australia, revealed *S. nitidithorax* at 8 of the 14 sites sampled.

*S. nitidithorax* was common at Quinn's Rock (on the coast 40 km north of Perth), but uncommon elsewhere (Paterson and Monzu 1972). In southern Queensland it has only ever been collected in small numbers, despite intensive collection in the region with fermenting baits over a number of years.

***Scaptodrosophila subnitida* (Malloch), comb. nov.**

*Drosophila subnitida* Malloch, 1927: 5.

List of synonymies in Bock, 1976: 74.

**Material Examined**

*Holotype.* Sydney, New South Wales, 6.i.1925 (AM).

*Other material examined.* 12 specimens, all lodged in the following museums. **Queensland:** jctn Scrub Rd & Mt Glorious Rd (27°25'S, 152°50'E) (UQ); Noosa (ANIC). **New South Wales:** Little Dandahra Ck; Greenwich; Tamworth (AM).

**Distribution**

Confirmed records of *S. subnitida* are limited to only a few sites in south-eastern Queensland and central New South Wales, where it is represented by few specimens (all collected at banana baits). No specimens were available to support reports of this species from north Queensland (Clump Point, Mather 1955) and Adelaide (Angus 1972), which I therefore consider unreliable.

**Remarks**

*Scaptodrosophila subnitida* can be reliably distinguished from *S. nitidithorax* by coloration. *S. nitidithorax* has a black to velvety-black thorax and abdomen, and slightly dusky wing. *S. subnitida* has a dark brown thorax with a golden sheen, a black abdomen, and clear wings. No consistent morphometric differences were found between these two species.

*Scaptodrosophila subnitida* can be confused with *S. evanescens* if the latter has a poorly developed abdominal pattern. *S. evanescens*, however, has a brownish tinge to the wings.

***Scaptodrosophila ellenae* (Bock), comb. nov.**

*Drosophila (Scaptodrosophila) ellenae* Bock, 1980: 69.

**Material Examined**

*Holotype.* ♂, Jabiru, Northern Territory, 23.viii.1975, swept over compost heap, D. H. Colless (ANIC).

*Paratype.* 4♂, 4♀ pinned ex. ethanol, 12♂, 13♀, in ethanol, label data same as holotype (ANIC: 13♂, 14♀; AM: 3♂, 3♀).

*Other material examined.* 470 specimens examined, 75 lodged in museums. **Northern Territory:** Jabiru (AM; ANIC); UDP Falls; Alligator R.; Darwin (AM); Karama, Darwin (12°21'S, 130°53'E); Berry Springs (12°43'S, 131°00'E) (UQIC). **Queensland:** Mt Adolphus I., Torres Strait (AM); Capt. Billy Ck, Heathlands; Homestead, Heathlands; Bertie Ck pump, Heathlands (AM); Gordan Ck, 1.5 km E of Cooks Hut (AM; UQ); Hartleys Ck, 11 km NW of Ellis Beach (AM); Goldsborough SF, north Queensland; Barrine NP (UQ); Canal Ck, nr Russel R., RNQ; Silkwood, nr Innisfail; Townsville (AM); 27 km N of Mackay; Mackay; Cattle Ck, nr Eungella; Mirani; Sarina (UQ); Glasshouse Mtns (AM); Mt Glorious Village (27°20'S, 152°46'E); jctn Scrub Rd & Mt Glorious Rd (27°25'S, 152°50'E); Enoggera Ck at Scrub Rd crossing (27°26'S, 152°50'E); Simpson Falls, Mt Coot-tha (27°28'S, 152°53'E); Taringa, Brisbane (27°29'S, 152°53'E) (UQIC).

**Distribution**

*Scaptodrosophila ellenae* has been collected from several sites in the humid zone of the Northern Territory, sometimes in high numbers, particularly in urban Darwin. In Queensland it has been recorded in relatively small numbers in all regions where intensive collecting has been conducted: from north to south, the Torres Strait, Heathlands, Iron Range, Cairns region, Townsville, Mackay and south-eastern Queensland.

*Remarks*

*Scaptodrosophila ellenae*, together with *S. bryani* (Malloch), can be easily distinguished from all other Australian *Scaptodrosophila* species by their short anterior scutellar bristles. *Scaptodrosophila ellenae* and *S. bryani* are, however, very similar to each other, despite *S. bryani* not being included in the *coracina* group. With the exception of abdominal patterning, I could find no consistent differences in external morphology between *S. ellenae* and *S. bryani*. Abdominal pattern may however be highly variable, even among flies collected from the same trap. In the absence of more discrete characters and a comparative study of male genitalia, I have distinguished the two species by abdominal pattern as follows.

*S. bryani*: tergites 1–3 at most with narrow anterior, submedian tan patches, otherwise black; remaining tergites entirely black (*sensu* Bock 1976: 68).

*S. ellenae*: abdomen dark brown to black with more extensive patterning than *S. bryani*, including a pale patch anteriorly on tergite 4. Specimens with this pattern match abdominal descriptions of *S. ellenae sensu* Bock (1980) and *S. levis* (Mather 1955, synonymised with *S. bryani* by Mather 1956a), as well as the polymorphisms present in the Northern Territory population [present in *S. ellenae* paratype series (AM) and UQIC material] and in Queensland populations (UQIC).

*Scaptodrosophila bryani* has been reported from south-east Asia, Micronesia, the South Pacific and Australia. In Australia it appears to be largely sympatric with *S. ellenae* (Darwin, Torres Strait, Heathlands, Iron Range, Cairns Region, Townsville and south-eastern Queensland). Examination of *S. bryani* type material (holotype: British Museum of Natural History, London; type locality Samoa) is required to establish whether there are in fact two species present in Australia.

*Scaptodrosophila cancellata* (Mather), comb. nov.

*Drosophila cancellata* Mather, 1955: 550.

*Material Examined*

*Types.* ex. culture, coll. Moggill, Queensland, 19.xi.1952, W. B. Mather (AM).

*Other material examined.* Total of c. 1150 specimens examined, 125 lodged in museums. **Northern Territory:** Karama, Darwin (12°21'S, 130°53'E); Berry Springs (12°43'S, 131°00'E) (UQIC). **Queensland:** nr Mt Lamond, Claudie R. (AM); Whitfield, Cairns (16°54'S, 145°44'E); The Esplanade, Cairns, (16°55'S, 145°46'E); Mulgrave R. Forestry Rd, 12.8 km from Gillies Hwy jctn (17°12'S, 145°46'E); Stallion Pocket, Mulgrave R. Forestry Rd (17°12'S, 145°46'E); NP1353, nr Babinda (17°16'S, 145°58'E); nr Bramston Beach (17°22'S, 146°02'E); Tenison Woods Mtn (27°18'S, 152°45'E); Mt Glorious Village (27°20'S, 152°46'E); jctn Scrub Rd & Mt Glorious Rd (27°25'S, 152°50'E); Enoggera Ck at Scrub Rd crossing (27°26'S, 152°50'E); Simpson Falls, Mt Coot-tha (27°28'S, 152°53'E); Indooroopilly, Brisbane (27°30'S, 152°53'E) (UQIC); Moggill, Brisbane (AM). **New South Wales:** Upper Allyn R. (AM); Forster (UQIC); Royal NP, nr Sydney (AM).

*Literature Records*

**Queensland:** Lake Barrine; Redlynch (Mather 1960).

*Distribution*

*Scaptodrosophila cancellata* has been recorded from the Northern Territory and eastern Australia. In the Northern Territory it was particularly common at Berry Springs (Feb. 1994; van Klinken 1996). On the east coast of Australia it occurs at Iron Range and in the Cairns region, and extends from Brisbane south to central New South Wales.



*Scaptodrosophila coracina* (Kikkawa & Peng), comb. nov.*Drosophila coracina* Kikkawa & Peng, 1938: 523.

Type locality. Shimoda, Japan.

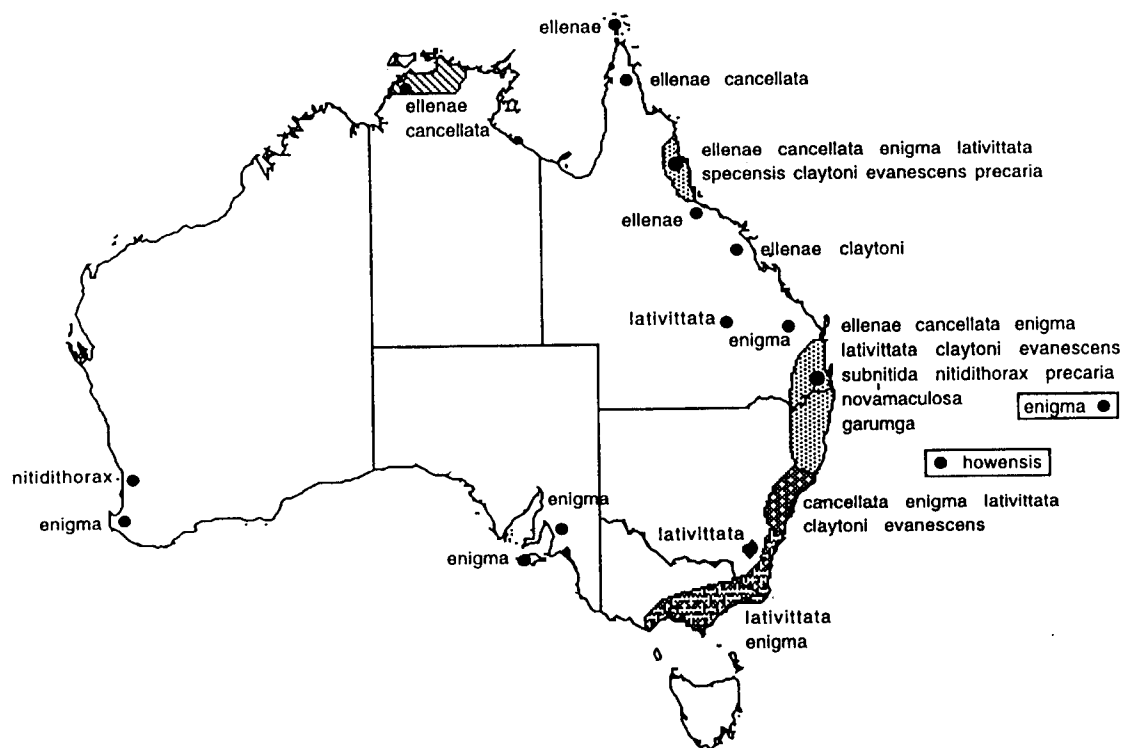
*Distribution*

*Scaptodrosophila coracina* is widely distributed through south-east Asia. It has been recorded from Japan, Quelpart Island, Korea, China, Ryukyu Island, Borneo and India (Toda *et al.* 1990).

**Species Distributions**

The distributional picture, obtained from the literature, of the nine Australian *coracina*-group species previously described is one of relatively high diversity in south-eastern Queensland (6 species), major disjunctions between conspecific populations, and a number of geographically isolated species (*S. ellenae* in the Northern Territory, *S. nitidithorax* in south-west Western Australia, and *S. howensis* on Lord Howe Island). Of the south-eastern Queensland species, only two were thought to extend north to the Cairns region (*S. specensis* and *S. cancellata*) and three south into Victoria (*S. lativittata*, *S. enigma* and *S. novamaculosa*). Two species, *S. subnitida* and *S. novamaculosa*, although considered to be widely distributed, were only represented by a few specimens each.

The picture outlined above has been drastically altered (Fig. 20) as a result of my taxonomic revisions, and the extensive collections I made between 1992 and 1995 (van Klinken 1996). The centre of diversity remains in south-eastern Queensland, or more specifically, the McPherson Region (Barlow 1986), with 11 of the 13 species having been recorded there. Only *S. specensis* from north Queensland, and *S. howensis* from Lord Howe Island, are absent.



**Fig. 20.** Schematic map of the distributions of Australian *coracina*-group species. Boxes indicate Lord Howe Island (*S. howensis*) and Norfolk Island (*S. enigma*). Patterns indicate approximate distributions of species.

A second focus of diversity is present in the Cairns region in north Queensland where eight species have been recorded, including *S. specensis*, which is apparently endemic to the region. Only two species, *S. cancellata* and *S. ellenae*, extend north into Cape York and west into the Northern Territory. *S. ellenae* is the northern-most of the Australian species, extending onto the Torres Strait islands. Records are sparse between the Cairns region and south-eastern Queensland, undoubtedly because of inadequate collecting.

Species diversity falls rapidly south of the McPherson region (Fig. 20). *S. enigma* and *S. lativittata* are the southernmost species, both being common in and around Melbourne, and are likely to be indigenous there. *S. nitidithorax* has perhaps the most unusual distribution, having a transcontinental disjunction between south-west Western Australia, where it appears to be relatively common, and south-eastern Queensland, where it is rare. Of the *coracina*-group species, *S. enigma* is the most widespread, occurring at a number of sites, clock-wise around the coast, from the Cairns region to south-west Western Australia, as well as being found on Norfolk Island and New Zealand. No *coracina*-group species have yet been recorded from Tasmania.

Our distributional picture of the *coracina* group remains, however, far from complete. Baiting with fermenting fruits and fungi (Parsons 1982) is still the only effective means of collecting *coracina*-group species. Systematic baiting has been limited to relatively few localities in Australia [Darwin region (van Klinken 1996), Torres Strait (McEvey 1981), Cairns region (Bock and Parsons 1977, 1978; van Klinken 1996), Townsville (Bock 1977), south-eastern Queensland (Mather 1956a; van Klinken 1996), New South Wales (McEvey 1992), Melbourne (Parsons 1982) and Adelaide (Angus 1972)].

Within these localities [with the exception of Mather's (1956a), Angus's (1972) and van Klinken's (1996) work], collecting with fermenting baits has been limited to rainforest and urban habitats. However, several *coracina*-group species, although rare or absent in rainforests, are frequently abundant in more open, drier habitats, well away from human habitation (e.g. *S. lativittata*). This habitat bias by collectors may, in part, be the reason why inland Australia and the semi-arid zones of coastal Australia have been largely ignored by drosophilid collectors, despite *coracina*-group species, and many other drosophilid species, having been recorded from semi-arid sites such as Para Wirra National Park, 25 miles north-east of Adelaide (Angus 1972), and Carnarvon Gorge, central Queensland.

Collection effort also varies greatly among regions, with repeated trapping at a single site only having been conducted in south-eastern Queensland (Mather 1956a; van Klinken 1996). Repeated trapping in south-eastern Queensland has been largely responsible for the detection of several species that are generally rare there (*S. precaria*, *S. garumga*, *S. novamaculosa*, *S. nitidithorax* and *S. subnitida*).

Despite the above limitations, I am confident of a number of points. Most species are widely distributed, but usually with large distributional disjunctions. Disjunctions are likely to reflect both real breaks in distributions (e.g. *S. nitidithorax*) and inadequate sampling. The focus of diversity for the *coracina* group is along the east coast of Australia, particularly in the McPherson region and the Cairns region. The Cairns region marks the northern limit of several typically rainforest species (e.g. *S. claytoni*, *S. evanescens* and *S. specensis*) that are absent from the monsoonal vineforests of Iron Range (Cape York) and the Northern Territory, but this needs to be supported by further collections in New Guinea and south-east Asia.

### Acknowledgments

I thank Peter Cranston (ANIC), Paul Dangerfield (WARI), Peter Gillespie (BCRI) and Shane McEvey (AM) for access to their drosophilid collections; Michael Ross and Mark Blows for drosophilid material from the Northern Territory and central Queensland respectively; Chris Lambkin for illustrations; Gimme Walter and Dave Yeates for detailed comments on the manuscript; and Shane McEvey for encouragement and various assistance during the course of my work, including ready access to his collections and collection data. Work was supported by the Department of Entomology, University of Queensland, and a Commonwealth Postgraduate Scholarship.

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