

AUSTRALIAN SEPSIDAE (DIPTERA)

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Abstract

The Australian Sepsidae comprise some 16 species in 7 genera, almost all with distributions extending to adjacent regions. With the exception of *Toxopoda* Macquart, which requires further study, the species are reviewed and a comprehensive key given for their identification.

Introduction

The family Sepsidae is known from all zoogeographic regions and includes 7 genera and some 16 species in Australia. The list of Australian taxa is unsurprising. Most species occur in, and probably came from, other regions—Oriental and Afrotropical (species of *Australosepsis* Malloch, *Dicranosepsis* Duda, *Sepsis* Fallén and *Xenosepsis* Malloch). *Lasionemopoda* Duda occurs in the Australia-New Zealand area, while all Australian species of *Parapalaeosepsis* Duda are also distributed, and mostly more common, in Melanesia. *Toxopoda* Macquart awaits revision; but 1 species may be limited to Australia and thus be the only Australian endemic sepsid.

There has been no recent review of Australian Sepsidae. Scattered papers by Malloch (1925, 1928a, b), Duda (1926), Steyskal (1949) and Zuska (1968, 1970, 1972) dealt with their taxonomy; general morphology and biology were treated by Hennig (1949) and Pont (1979); and the Oriental catalogue by Zuska (1977) included relevant points of nomenclature. Distributions within Australia were described and discussed by Colless (1980).

Substantial collections of Sepsidae have accumulated in Australia—partly because of the species' coprophilous habits, which bring them into association with much-studied pests that breed in dung. A review of the fauna is now possible (except for *Toxopoda* species, which are rare in collections). We include, especially, a consolidated, detailed key to Australian species; but avoid republishing the adequate descriptions available elsewhere, or presenting voluminous lists of specimens examined. For each species the bibliography includes only the original description, locally important synonyms and works on the Australian fauna.

Material studied came from the Australian National Insect Collection, CSIRO, Canberra; the Department of Entomology, University of Queensland, Brisbane; the Australian Museum, Sydney; the Commonwealth Institute of Health, University of Sydney; the National Museum of Victoria, Melbourne; the South Australian Museum, Adelaide; and the Western Australian Department of Agriculture, Perth.

Family SEPSIDAE

Diagnosis

Diptera-Schizophora, relatively small and elongate, rather ant-like, base of abdomen strongly constricted. Vibrissa absent, but vibrissal angle with several strong peristomal hairs; palp vestigial. Posteroventral rim of metathoracic spiracle with an erect bristle and (usually) a few fine setulae (Fig. 1), the bristle usually about as long as the posterior notopleural, but much finer. Australian species lacking presutural dorsocentral bristles and (except in *Xenosepsis*) postsutural acrostichal bristles. Wing with unbroken costa, and often with dark and/or pale areas near apex. In males, fore femur with a characteristic armature of spines and/or tubercles on ventral surface; cerci vestigial, fused; surstylus mostly fused with epandrium; aedeagus conspicuous, sclerotised, pigmented.

Notes

In species of *Sepsis*, *Australosepsis* and (to some extent) *Lasionemopoda*, a sample of males will usually contain a few to many specimens that are conspicuously larger, paler (usually reddish or yellowish), and more strongly bristled than the remainder, which in general resemble the female. A parallel, but very inconspicuous, variability occurs in females (Colless unpublished). The phenomenon is widespread in the family (Pont 1979), but its cause and adaptive significance, if any, remain unknown.

Almost nothing is known of the life history of the Australian species but at least some are coprophilous. By analogy with other species it seems likely that the larvae are largely coprophagous.

Key to Australian species of Sepsidae

1. Thorax and abdomen entirely pruinose. Orbital bristle developed though short or vestigial. Inner vertical bristle lacking. Thoracic bristles (if developed) weak, or strong but short. Humeral bristle lacking or vestigial. One dorsocentral bristle. Fore coxa unusually long; mid femur distinctly and sharply bent at about midpoint. Abdominal pubescence reduced . . . **Toxopoda** spp.
 At least thoracic pleura partially shiny. Orbital bristle often lacking. Both inner and outer vertical bristles developed. Thoracic bristles of normal length. Humeral bristle fully developed. One or 2 dorsocentral bristles. Fore coxa shorter; mid femur straight. Abdomen with normal to very long pubescence and often with macrochaetae . . . 2
2. Basal section of vein M lacking; cells R and M (basal cells) fused (Figs 3-4); alula largely or completely without microtrichia, narrow. Pleura shiny, except on posterodorsal area of sternopleuron . . . 3
 Cells R and M separated by base of vein M; alula fully covered with microtrichia (except in *Xenosepsis*), wide or narrow. Pleura sometimes pruinose on pteropleuron and above fore coxa . . . 4
3. Wing clear, without white apex (Fig. 4). Male: Fore tibia ventrally with short row of stout setulae on *ca* basal third, apical half curved, concave ventrally. Female: Fore femur without posteroventral black spine . . . **Australosepsis frontalis**
 Wing with diffuse dark subapical spot; wing apex milk-white (Fig. 3). Male: Fore tibia ventrally with longer row of setulae on basal half, followed distally by 2 bare tubercles. Female: Fore femur with a posteroventral black spine at two-thirds of length from base . . . **Australosepsis niveipennis**
4. Posteroventral area of thorax (behind and above hind coxae) sclerotised, forming a bridge between the pleura. Wing without apical or preapical dark spot; alula very narrow (Fig. 5). Pleura pruinose across base of fore coxae. Male: Surstylus deeply bifid . . . **Dicranosepsis bicolor**
 Posteroventral area of thorax membranous. Wing often with apical or preapical dark spot; alula wide or narrow. Pleura sometimes shiny across base of fore coxae. Male: Surstylus never deeply bifid . . . 5
5. Postvertical bristle absent, orbital bristle well developed. Several small acrostichal bristles (distinct from the setulae) present behind suture; alula moderately wide, with microtrichia on a marginal strip only. Male: Fore femur with 2 convergent spines ventrally; hind tibia with slit-like osmeterium anterodorsally. Female: Fore femur with 1 ventral spine . . . **Xenosepsis sydneyensis**
 Postvertical bristle developed, orbital bristle absent (except for most *Sepsis dissimilis* Brunetti). Postsutural acrostichal bristles not differentiated; alula fully covered with microtrichia. Male: Fore femur with at least 3 spines ventrally; hind tibia without osmeterium. Female: Fore femur without, or (in *Lasionemopoda*) with numerous, ventral spines . . . 6
6. One pair of dorsocentral bristles. Peristoma with several rows of hairs. Antennal segment 3 bluntly angular apically. Male (Figs 1-2): Whole body, including frons and fore coxae, with dense pile of fine hairs with curved tips (except in dwarf specimens); fore

- femur without any ventral protuberance, but with a ventral row of 5-8 strong spines and a shorter anteroventral row of smaller spines. Female: Fore femur ventrally with 2 rows of spines; abdomen without macrochaetae; fore coxa with short but distinct scattered hairs or setulae **Lasionemopoda hirsuta**
- Two pairs of dorsocentral bristles. Peristoma with a single row of hairs. Antennal segment 3 broadly rounded apically. Fore coxa bare or with sparse, minute setulae. Male: Body with normal pubescence; fore femur ventrally with protuberance(s) and fewer but clustered spines. Female: Fore femur ventrally without spines; abdomen often with macrochaetae 7
7. Anepisternite, propleuron and pteropleuron shiny, non-pruinose, no presutural acrostichal bristles. Wing clear or with diffuse subapical dark spot; wing apex often milk-white; alula wide (except in *Sepsis dissimilis*). Males and many females with anterior bristle(s) on hind tibia. Abdomen with strongly differentiated marginal macrochaetae, at least in male. Male: Hind coxa without a recurved ventral bristle anteriorly 8
- Anepisternite and propleuron pruinose on stripe above base of fore coxa; pteropleuron also pruinose; 1-3 pairs of small acrostichal bristles present near anterior margin of mesonotum. Wing almost always with apical or subapical dark spot; wing apex never milk-white; alula narrow. Hind tibia without anterior bristle. Abdomen without marginal macrochaetae. Male: Hind coxa with long, strong, recurved, ventral bristle anteriorly 10
8. Sternopleuron shining, except for strip of pruinosity along dorsal margin. Wing with diffuse dark preapical spot; wing apex largely milk-white (Fig. 6); alula narrow, its margin rather symmetrically curved. Male: Fore femur ventrally with 2 weakly developed, spine-tipped tubercles. Female: Abdomen with inconspicuous bristles **Sepsis dissimilis**
- Sternopleuron entirely pruinose. Wing without preapical spot; alula wide, with fully developed posterodistal lobe. Male: Fore femur ventrally either with 1 strong spine-tipped tubercle or without tubercles. Female: Abdomen with conspicuous, erect macrochaetae 9
9. Wing apex never whitish. Fore metatarsus ventrally, near base, with 2 strong, black, sinuous bristles, clearly differentiated from other ventral hairs. Male: Fore femur ventrally without tubercle, but with a row of spines; fore tibia with a posteroventral tubercle; surstylus longer, wider, flatter, with long, ventrally directed, basal bristle posteriorly **Sepsis coprophila**
- Wing apex including veins almost always pale (Fig. 7). Fore metatarsus without modified hairs ventrally. Male: Fore femur ventrally with 1 strong spine near centre and, distal to this, a strong, spine-tipped tubercle; fore tibia without posteroventral tubercle, merely swollen; surstylus short and thin, without conspicuous posterior bristle **Sepsis nitens**
10. Wing almost always with small, dark, preapical spot, which is roughly circular, sharply delimited, and not reaching beyond vein R_{4+5} (Fig. 8). Sternopleuron largely pruinose, shiny only on an anterior "island" that is entirely or almost entirely surrounded by pruinosity **Parapalaeseopsis plebeia**
- Wing with larger to very large apical dark patch, which is not so sharply delimited. Sternopleuron with extensive, shiny, anteroventral area, broadly reaching at least ventral margin 11
11. Abdominal tergite 2 with subapical median patch of short appressed hairs (Fig. 9) 12
- Abdominal tergite 2 with subapical median patch of small, erect bristles (Fig. 10) 13

12. Apical wing patch usually conspicuous, reaching vein M_1 , in male filling apical third or more of cell R_{4+5} (Fig. 11). Cell M (hind basal cell) usually completely, or almost completely, filled with microtrichia. Male: Fore tibia deeply notched ventrally a little distal of midway; surstylus conspicuously widened apically **Parapalaeseopsis apicalis**
 Apical wing patch otherwise, less conspicuous, largely confined to apex of cell R_{2+3} . Cell M with very sparse microtrichia or none. Male: Fore tibia at most inconspicuously notched ventrally; surstylus only slightly widened at apex .. **Parapalaeseopsis laffooni** (part)
13. Apical wing patch large and distinct, apex of cell R_1 extensively darkened over a much greater length than pigmented apex of cell R_{2+3} (Fig. 13). Cell M with at least a sparse, longitudinal stripe of microtrichia. Male: Mid metatarsus normal; surstylus longer, distinctly widened apically **Parapalaeseopsis limbata**
 Apical wing patch smaller, without any conspicuous extension in cell R_1 . Cell M with at most a few microtrichia at extreme base. Male: Sometimes with mid metatarsus strongly modified and surstylus not widened apically 14
14. Apical wing spot fairly sharply defined, largely confined to apex of cell R_{2+3} , in female scarcely extending into cells R_1 or R_{4+5} , in male sometimes filling extreme apex of cell R_1 (Fig. 12). Fore femur with small anterior subbasal bristle, shorter than width of femur at point of insertion, often accompanied by 1-2 shorter ones. Bristles in subapical patch on abdominal tergite 2 relatively short, about as long as crossvein r-m. Male: Mid metatarsus normal; surstylus slightly, but distinctly, widened at apex **Parapalaeseopsis laffooni** (part)
 Apical wing patch either: (a) reduced to a narrow darkening of margin between (approximately) apices of R_{2+3} and M_1 , sometimes scarcely perceptible; or (b) a relatively well defined spot across apex of R_{2+3} , extending part way to R_{4+5} and surrounded by a much fainter dark clouding that extends across R_{4+5} , usually to M_1 (Fig. 14). Fore femur with 1, relatively long, anterior subbasal bristle, about as long as width of femur at point of insertion. Subapical patch on abdominal tergite 2 with some longer bristles, usually about twice as long as crossvein r-m. Male: Mid metatarsus conspicuously enlarged and flattened, with ventral fringe of scales; surstylus short and tapering **Parapalaeseopsis compressa**

Australosepsis frontalis (Walker) (Fig. 4)

Sepsis frontalis Walker, 1860: 163.

Sepsis tenella Meijere, 1906: 183.

Saltelliseps tenella (Meijere); Duda, 1926: 31.

Australosepsis frontalis (Walker); Zuska, 1968: 472.

Strongly associated with, and perhaps restricted to, buffalo dung (Colless 1980).

Range.—Oriental Region, Lesser Sunda Islands, northern Australia, New Caledonia.

Distribution in Australia.—Northern parts of Northern Territory and Western Australia (Colless 1980, Fig. 6).

Australosepsis niveipennis (Becker) (Fig. 3)

Sepsis niveipennis Becker, 1903: 143.

Australosepsis fulvescens (including var. *atratula* Malloch) Malloch, 1925: 314; 1928a: 307.

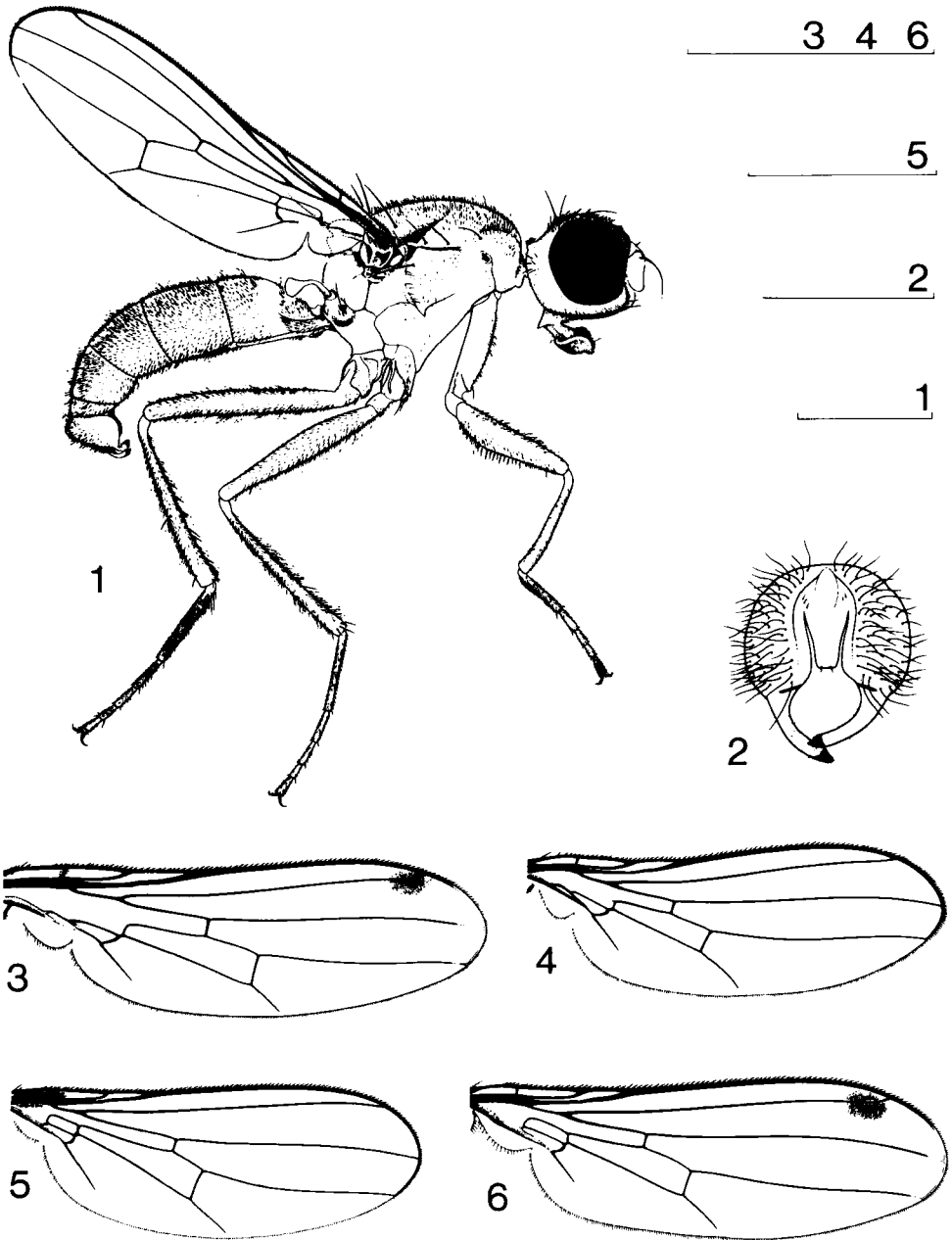
Saltelliseps niveipennis (Becker); Duda, 1926: 70.

Australosepsis niveipennis (Becker); Zuska, 1968: 474.

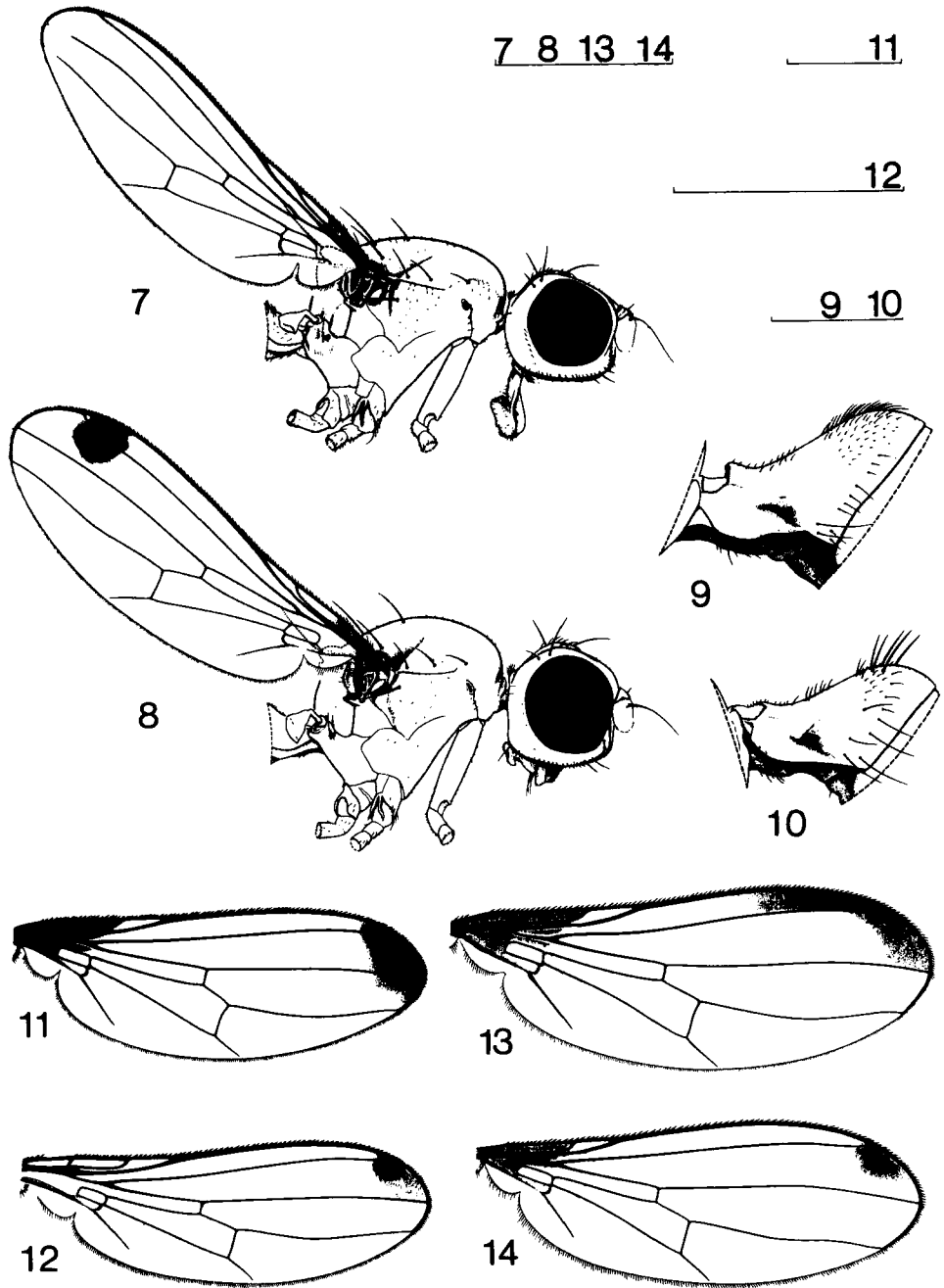
Although probably a recent immigrant, this species now ranks with *P. plebeia* (Meijere) as Australia's commonest species.

Range.—Afrotropical Region, Mediterranean Subregion of Palaearctic Region, Oriental Region, Flores, New Guinea, Australia, Bismarck Archipelago, Solomon Islands, Vanuatu (New Hebrides), New Caledonia, Fiji.

Distribution in Australia.—All parts of continent (including arid areas), except Tasmania (Colless 1980, Fig. 1).



FIGS 1-6—(1) *L. hirsuta*, male, and (2) male genitalia; (3) *A. niveipennis*, wing; (4) *A. frontalis*, wing; (5) *D. bicolor*, wing; (6) *S. dissimilis*, wing. Scale bar 2 represents 0.5 mm; all others represent 1 mm.



FIGS 7-14—(7) *S. nitens*, head, thorax, and wing; (8) *P. plebeia*, head, thorax, and wing; (9) *P. apicalis*, abdominal segments 1 and 2, lateral; (10) *P. limbata*, abdominal segments 1 and 2, lateral; (11) *P. apicalis*, wing; (12) *P. laffooni*, wing; (13) *P. limbata*, wing; (14) *P. compressa*, wing (type b markings). All scale bars represent 1 mm.

***Dicranosepsis bicolor* (Wiedemann) (Fig. 5)**

Sepsis bicolor Wiedemann, 1830: 468.

A locally common species in the northern tropics, but uncommon in collections. It has been taken in both rainforest and dry savannah.

Range.—Oriental Region, Guam, Moluccas, Timor, New Guinea, northern Australia, Bismarck Archipelago, Solomon Islands, Santa Cruz Islands.

Distribution in Australia.—Northern coast of Queensland, northern parts of Northern Territory (Colless 1980, Fig. 6).

***Lasionemopoda hirsuta* (Meijere) (Figs 1-2)**

Sepsis hirsuta Meijere, 1906: 186; Malloch, 1925: 312.

Lasionemopoda hirsuta (Meijere); Duda, 1926: 70; Steyskal, 1949: 167.

Colless (1980) found no records of the breeding place of this species. However, it has recently been reared from cowdung (J. Feehan pers. comm.). The male genitalia are shown in Fig. 2.

Range.—Australia, Lord Howe Island, Norfolk Island, New Zealand.

Distribution in Australia.—Widespread, but commonest in southeastern areas; occurs in Tasmania (Colless 1980, Fig. 2).

***Parapalaeosepsis apicalis* (Meijere) (Figs 9, 11)**

Sepsis apicalis Meijere, 1906: 168.

Parapalaeosepsis apicalis (Meijere); Zuska, 1970: 52.

A rainforest species, rare in collections.

Range.—Moluccas, New Guinea, northern Australia, Bismarck Archipelago, Solomon Islands.

Distribution in Australia.—Northern Queensland (Cooktown, Atherton Tableland, Dunk Island).

***Parapalaeosepsis compressa* Zuska (Fig. 14)**

Parapalaeosepsis compressa Zuska, 1970: 54.

A not uncommon species in rainforest. Females have been taken on dung and in large numbers during winter at carrion bait, but no rearing records are known. The 2 fairly distinct types of wing marking (see key) are of about equal frequency, and uncorrelated with sex or locality.

Range.—New Guinea, Australia, Bismarck Archipelago.

Distribution in Australia.—Coastal forests of northern New South Wales and Queensland (Colless 1980, Fig. 6).

***Parapalaeosepsis laffooni* Steyskal (Fig. 12)**

Parapalaeosepsis laffooni Steyskal, 1949: 168; Zuska, 1970: 56.

A relatively rare species in Australian collections. Our application of the name *P. laffooni* remains somewhat uncertain. Most Australian specimens have rather short, erect bristles on abdominal tergite 2, but some have them distinctly appressed. All have cell M with few microtrichia or none. New Guinea specimens are similar, except that none has been seen with erect bristles on abdominal tergite 2. However, the holotype male from Vanuatu has the bristles appressed, but cell M filled with microtrichia. We cannot evaluate these observations.

Range.—New Guinea, northern Australia, Vanuatu, New Caledonia.

Disiribution in Australia.—Northern Queensland (Cooktown, Julatten, Innisfail) (Zuska 1970).

***Parapalaeosepsis limbata* (Meijere) (Figs 10, 13)**

Sepsis limbata Meijere, 1906: 169.

Parapalaeosepsis limbata (Meijere); Zuska, 1970: 56.

A locally common species, found in rainforest; breeding habits unknown.

Range.—Moluccas, New Guinea, northern Australia, Bismarck Archipelago.

Distribution in Australia.—Northern Queensland (Cooktown, Atherton Tableland and adjacent coast) (Zuska 1970).

Parapalaeseopsis plebeia (Meijere) (Fig. 8)

Sepsis plebeia Meijere, 1906: 171; Malloch, 1925: 313.

Parapalaeseopsis plebeia (Meijere); Duda, 1926: 76; Zuska, 1970: 58.

A very common species, but mainly in cooler areas; the only species common in Tasmania. Adult have been taken on carrion, but we have no reliable rearing records.

Range.—New Guinea, Australia, Lord Howe Island, Bismarck Archipelago, Santa Cruz Islands, Vanuatu.

Distribution in Australia.—Widespread, mainly in southeastern and southwestern quarters of continent, including Tasmania (Colless 1980, Fig. 3).

Sepsis coprophila Meijere

Sepsis coprophila Meijere, 1906: 176; Malloch, 1925: 313.

We have not seen this species among many thousands of specimens and do not believe it occurs in Australia. The specimens (from Eidsvold, Queensland) identified under this name by Malloch (1925) are in the Commonwealth Institute of Health; all belong to *S. nitens* Wiedemann.

Range.—Oriental Region, Timor.

Sepsis dissimilis Brunetti (Fig. 6)

Sepsis dissimilis Brunetti, 1910: 355.

Sepsis albopunctata Lamb, 1914: 323.

Sepsis hirtifemur Malloch, 1925: 314.

Generally referred to under the name *S. albopunctata* in Australian collections and recent publications.

Range.—Afrotropical and Oriental Regions, New Guinea, Australia, Lord Howe Island, Norfolk Island, Vanuatu.

Distribution in Australia.—Eastern and northern areas, mainly tropical and subtropical, near the coast (Colless 1980, Fig. 4, as *S. albopunctata*).

Sepsis nitens Wiedemann (Fig. 7)

Sepsis nitens Wiedemann, 1824: 57.

Sepsis tuberculata Duda, 1926: 64.

Range.—Oriental Region, Timor, New Guinea, Australia.

Distribution in Australia.—Practically identical with that of *S. dissimilis* (Colless 1980, Fig. 5).

Toxopoda species

The taxonomy of this genus is not yet worked out. The limited material available shows that at least 3 species occur in Australia. One of them, *T. atrata* (Malloch) (see Malloch 1928a: 308, as *Podanema* Malloch), is based on type-material from Townsville, Queensland.

Xenosepsis sydneyensis Malloch

Xenosepsis sydneyensis Malloch, 1925: 315; Zuska, 1972: 67.

Pseudomeroplius acrosticalis Duda, 1926: 11.

Despite its apparently wide range (Zuska 1972), the species is extremely rare in collections. It is the only Australian representative of the large group in which the male bears a scent-producing organ (osmeterium) on the hind tibia. Adults have been taken on carrion and blossom.

Range.—Borneo, Australia.

Distribution in Australia.—New South Wales (Sydney) (Malloch 1925); Queensland [Gordonvale (Duda 1926), Iron Range, Mareeba].

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