A Taxonomic Revision of the Genus *Mirobaeoides* Dodd (Hymenoptera : Scelionidae)

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Abstract

The genus *Mirobaeoides* Dodd is revised. Ten species are described as new and *M. tasmanicus* Dodd and *M. ater* (Hickman) are redescribed. A key to separate these species and information on their relationships, distribution and biology is presented. The Tribe Idrini Kozlov is synonymized with Baeini Ashmead.

Introduction

Females of the genus *Mirobaeoides* Dodd are small, stocky, wingless creatures that are not easily recognized as belonging to the Family Scelionidae, nor, indeed, to the Order Hymenoptera. They are parasitoids of the eggs of spiders in confined microhabitats, and are particularly associated with leaf litter. This genus, along with other members of the Tribe Baeini (*sensu* Galloway and Austin 1984), are also notable for their extreme sexual dimorphism, males having fully developed wings and a completely different body form to females (see Galloway and Austin 1984). *Mirobaeoides* is apparently endemic to the Australian continent, having been recorded from the mainland, Tasmania and Lord Howe I. It is rarely collected; the majority of specimens available having been taken in pitfall traps and by sweeping low in vegetation.

The genus was described by A. P. Dodd in 1914 from a single specimen collected in Tasmania. A brief account of the nomenclatorial history of the genus since then is provided in Austin (1981) and Galloway and Austin (1984). The latter work also provides a generic diagnosis and key to separate *Mirobaeoides* from other members of the Subfamily Scelioninae.

The aim of this paper is to revise the genus, describing the species within it; provide a key to their separation; present new information on character states important at the generic level; and discuss the relationships of genera belonging to the Tribe Baeini.

Materials and Methods

Specimens were prepared for the scanning electron microscope (SEM) by mounting them on card-points or rectangles. Most were examined uncoated, but if long series were available one specimen was coated with gold-palladium. All were then examined at 15 keV in an ISI 60A SEM with an environmental chamber fitted.

The abbreviations for morphological terms used in this paper are the same as those defined in Masner (1980) and Galloway and Austin (1984). The nomenclature for cuticular sculpturing follows Eady (1968) and Harris (1979). All ratios given in species descriptions, except those for antennae, were measured under the same stereomicroscope with a 100-division eyepiece micrometer, so all are comparable between species. Ratios for antennal segments were measured in the same way with slide-mounted material under a compound microscope. The following abbreviations are used for institutions:

ANIC	Australian National Insect Collection, Canberra
BMNH	British Museum (Natural History), London
CNC	Canadian Collection of Insects, Arachnids and Nematodes, Ottawa
MV	Museum of Victoria, Melbourne
QDPI	Queensland Department of Primary Industries, Brisbane
QM	Queensland Museum, Brisbane
SAM	South Australian Museum, Adelaide

Genus *Mirobaeoides* Dodd

Mirobaeoides Dodd, 1914, p. 74; Kieffer, 1926, p. 275; Austin, 1981, p. 90; Galloway and Austin, 1984, p. 87.

Notoscelio Hickman, 1967, p. 35. Synonymy Austin, 1981, p. 90.

Type-species *Mirobaeoides tasmanicus* Dodd, 1914.

Generic Description

The genus was redescribed by Galloway and Austin (1984). To that description the following characters can be added.

Female. Ocelli minute, almost invisible among sculpturing in some species; lower gena striate; netrion if present indicated by smooth margin to lower posterior pronotum; mesopleuron very compressed, several times higher than wide, with coarse transverse striae dorsally; mesopleural carina if present near vertical; metapleuron short, not reaching to metanotum; distal hind femur with pair of stout spines; T2 more than $\frac{1}{2}$ length of metasoma, at least twice midline length of T1 or T3; ovipositor as for *Baeus* (Austin 1983).

Male. Notauli developed as short triangular depressions, incompletely bounded by carinae, never slit-like; scutellum smooth and shining; metanotum broadly protruding past posterior margin of scutellum, coarsely striate along anterior margin, the rest rugose.

Distribution and Habitat

Specimens examined for this study extend the distribution of *Mirobaeoides* to include Lord Howe I., South Australia, and Western Australia, though the majority of species are found along the eastern seaboard. All species are associated with habitats close to the ground, i.e. base of shrubs, grass tussocks or leaf litter, and these locations are undoubtedly where their spider hosts reside.

Discussion

Mirobaeoides as defined here is limited to species that possess the following combination of characters: female with T2 at least twice length of T1 and T3; T1 without hump or midline crest; distal hind femur with a pair of stout spines; metapleuron not reaching to metanotum, divided off by propodeum; antenna 11-segmented and clavate; males fully winged; gaster clearly separated; antenna moniliform. This suite of characters clearly unites the species treated here and separates them from all other known taxa, except for an undescribed species from Clyde Mountain, N.S.W. (two females, ANIC, CNC) which shares all the above characters except that T2 and T3 are equal in size.

Psyllobaeus Austin is best considered the sister-group of *Mirobaeoides*. It differs in having T1 with a midline crest; metapleuron reaching to metanotum; male apterous with a sessile gaster and subclavate antenna (Austin 1984). A further three undescribed taxa also appear to belong in this *Mirobaeoides*-*Psyllobaeus* complex, but again they are known from only very limited material. The first species from south-western Western Australia (three females, CNC) has an elongate fusiform body, T1 developed into a broad hump, and T3 slightly longer than T2. The second and third species from eastern Australia (three females, ANIC; two females, QDPI)

and south-western Western Australia (one female, CNC) are superficially similar to *Mirobaeus*, but they have well developed femoral spines, a character absent in all known *Mirobaeus*.

The combination of femoral spines and the retention of more plesiomorphic antennae in which the clava is completely divided into four segments, and in which there is one extra funicle segment (i.e. antenna 11-segmented in total), are characters unique to species of *Mirobaeoides*, *Psyllobaeus* and the above undescribed taxa. These two character states group these taxa into a holophyletic assemblage, which, due to the apterous condition of females and their apparent association with *Eucalyptus* leaf-litter, has probably left them to evolve in isolation on the Australian continent and surrounding islands. *Mirobaeoides* as defined in this study is intended as a functional genus in that it holds a group of readily identifiable species related by the characters given above. However, as the Australian fauna becomes better known the limits of this genus may need to be expanded.

The separation between the Tribes Baeini and Idrini is less clear than previously thought (Masner 1976; Galloway and Austin 1984). Examination of several recently discovered taxa from southern continents (southern Africa, South America and New Zealand) show some of them to be intermediate between these two tribes, especially in regard to the relative sizes of the first three metasomal tergites and the degree to which the metasoma broadly fits against the mesosoma; these being the major characters that previously separated the tribes. Furthermore, the Baeini is probably a polyphyletic assemblage, as it contains the highly apomorphic *Baeus* Haliday, a genus which has excised laterotergites and has lost the metanotum. This tribe, prior to this study, also included *Mirobaeoides* and *Psyllobaeus*, which on mesosomal and metasomal morphology are more closely related to the Idrini genera (e.g. *Idris*, *Ceratobaeus* and *Hickmanella*). I therefore propose that these genera be combined into one tribe, with Idrini Kozlov, 1970 becoming a synonym of Baeini Ashmead, 1893.

A problem still remains with interpreting the importance of male characters in this tribe. Males in the Baeini (*sensu* Austin) are morphologically very similar, even between genera that have very dissimilar females, such as *Idris*, *Mirobaeoides* and *Baeus* (see Galloway and Austin 1984). Unfortunately the males of very few species are known. For *Mirobaeoides* and related Australian taxa males of only two species are recorded, both of which have been reared from hosts along with females. Specimens of another two species are in collections but I have not been able to associate them with any females, due to an apparent total absence of any correlation between male and female characters. Also the existence of one male that is intermediate in the relative sizes of T2 and T3 between *Mirobaeoides* and *Mirobaeus*, further compounds this problem. Assessment of male characters may only be undertaken seriously when males and females can be associated accurately, and this will only be achieved through extensive rearing of material from hosts.

Key to Species of *Mirobaeoides*

1. Metanotum hidden by scutellum; scutellum expanded posteriorly to meet anterior margin of T1 (Figs 20, 21) *scutellaris*, sp. nov.
Metanotum visible dorsally as a narrow thin strip between scutellum and T1; scutellum not reaching over metanotum (Figs 1, 2) 2
- 2(1). Anterior margin of T2 either obviously striate or with a single row of punctate-crenulate depressions (Figs 6, 10, 24), differing from sculpturing on rest of T2 3
Anterior margin of T2 either smooth or with imbricate or coriaceous sculpturing uniformly covering whole tergite (Fig. 2) 5
- 3(2). Dorsal body with only short scattered hairs (Fig. 24); T2 $2 \times$ length of T3 *tamborinensis*, sp. nov.
Dorsal body with long hairs (Figs 5, 6, 10); T2 $> 2.5 \times$ length of T3 (Figs 5, 10) 4
- 4(3). Metanotum and T1 longitudinally striate; eyes close together, separated by $\frac{1}{3}$ width of head (Fig. 10) *elongatus*, sp. nov.
Metanotum and T1 without longitudinal sculpturing, either smooth or finely coriaceous; eyes separated by just $< \frac{1}{2}$ width of head (Figs 5, 6) *setosus*, sp. nov.

- 5(2). Metanotum and/or T1 with fine longitudinal striations (Figs 1, 19) 6
 Metanotum and T1 without longitudinal sculpturing, either smooth or coriaceous (Fig. 17)
 7
- 6(5). Metanotum subpedunculate; lateral margins of T2 not parallel, converging anteriorly (Fig. 1);
 head in anterior view squarish, as wide as high *tasmanicus* Dodd
 Metasoma oval; lateral margins of T2 parallel (Fig. 18); head in anterior view oval, wider than
 high *occidentalis*, sp. nov.
- 7(5). Mesosoma large, as long as metasoma; scutum as long as wide; metanotum as long as scutellum;
 lateral propodeum above metapleuron smooth (Fig. 23) *mirabilis*, sp. nov.
 Mesosoma much shorter than metasoma, usually $< \frac{1}{2}$ length of metasoma; metanotum much
 shorter than scutellum; lateral propodeum above metapleuron longitudinally striate (Fig. 16)
 8
- 8(7). T1 c. $2 \times$ longer than metanotum (Figs 16, 17); mesosoma and metasoma with long scattered
 hairs *lordhowei*, sp. nov.
 T1 very narrow, at most only slightly longer than metanotum; mesosoma and metasoma either
 hairless or with scattered minute hairs (hairs almost invisible in dorsal view) 9
- 9(8). Large species, 1.5 mm in length; scutum wide, only slightly narrower than maximum width of
 metasoma *lycosi*, sp. nov.
 Species 1 mm in length or less; scutum obviously much narrower than metasoma 10
- 10(9). Vertex in anterior view evenly rounded (Fig. 35), T2 c. $\frac{2}{3}$ length of metasoma, with very coarse
 reticulate-imbricate sculpturing (as in Figs 18, 19); body 0.88 mm in length
 reticulatus, sp. nov.
- 11(10). Vertex in anterior view not rising much above dorsal margin of eyes, or straight at least in medial
 part (Fig. 36); T2 c. $\frac{3}{4}$ length of metasoma, with much finer sculpturing (Figs 2, 4) 11
 Carina along vertex in lateral view hardly raised above level of surface in front; striae on gena
 strong; body c. 1 mm in length (Fig. 4) *kerryi*, sp. nov.
 Carina on vertex in lateral view raised above level of surface in front to form a lip (Fig. 34);
 striae on gena less strongly developed; body 0.85 mm in length or less (Fig. 2)
 ater (Hickman)

Species Descriptions

Mirobaeoides tasmanicus Dodd

(Figs 1, 3, 25)

Mirobaeoides tasmanicus Dodd, 1914, p. 74; Kieffer, 1926, p. 275; Austin 1981, p. 90; Galloway and Austin, 1984, p. 88.

Type

Holotype ♀, card-mounted, head and antennae on slide, Huon R., Tasmania, A. M. Lea, 1.1987, SAM.

Female

Length 0.85 mm; body black, antennae and legs dark brown, apical $\frac{1}{2}$ of tibia lighter in colour, tarsal segments 1–4 yellow, segment 5 dark brown.

Head. Very large, broad, much wider than mesosoma, as wide as metasoma; in dorsal view, strongly arched around mesosoma, subrectangular, widest well anterior of imaginary line joining posterior corners of occipital carina; eyes rather bulbous, hairless; in anterior view, head squarish; vertex straight; gena with ventral corners gently angled; ocellar triangle acute, LOL almost equal to POL (1.6:1.9); distance between eyes $< \frac{1}{2}$ width of head (1.5:3.8); height of eyes equal to $\frac{1}{2}$ height of head; area above frons finely granulate, tending to coriaceous sculpturing on upper frons; frontal carina indistinct, reaching c. $\frac{1}{3}$ distance from antennal insertions to median ocellus; lower frons with striae that radiate from clypeus and curve dorsally to frontal carina forming semicircular pattern; in lateral view, temples and upper gena with fine coriaceous

Figs 1, 3. *Mirobaeoides tasmanicus* Dodd, female, north Queensland: 1, dorsal view, 3, sculpturing on T1 and anterior T2.

Fig. 2. *Mirobaeoides ater* (Hickman), female, dorsal view.

Fig. 4. *Mirobaeoides kerryi*, sp. nov., female paratype, lateral view.

Scale lines: 1, 2, 4, 100 μ m; 3, 50 μ m.

sculpturing, lower gena with coarse striae anteriorly and fine coriaceous sculpturing posteriorly; orbital carina open ventrally and extended to enclose area of cheek adjacent to gena which is coarsely striate; antennal scape L : W 20 : 5, pedicel 8 : 4, fl slightly longer than wide, f2-f5 much wider than long, clava as long as scape, twice as long as wide (20 : 10).

Mesosoma. In dorsal view elongate, sides parallel in posterior $\frac{1}{3}$, shining, very sparsely covered with short fine hairs; scutum elongate, L : W (4 : 5), anterior margin sharply rounded, with fine imbricate sculpturing becoming coriaceous along anterior margin; scutellum rectangular, posterior corners rounded, 4 × wider than long, with fine imbricate sculpturing, posterior margin smooth and shining; metanotum very narrow, c. $\frac{1}{3}$ length of scutellum, smooth, shining, sometimes with faint longitudinal striations; in lateral view, metapleuron nearly rectangular, posterodorsal margin slightly rounded.

Metasoma. In dorsal view, subpedunculate, much wider across posterior $\frac{1}{2}$, width compared to mesosoma 3·8 : 2·7; T1 transverse, same length as metanotum, with longitudinal striations; T2, $\frac{4}{5}$ length of metasoma, shining, with polygonal imbricate sculpturing; T3 and T4 narrow, slightly longer than T1, finely imbricate on anterior lateral corners, smooth and shining elsewhere; T7 with fine granulate sculpturing.

Male

Unknown.

Host

Unknown.

Non-type Material Examined

Queensland: 1 ♀, Tinaroo Falls, 30.iii.1976, I. D. Galloway, QDPI.

Comments

This species is easily recognized by the distinctive shape of the head, scutum and metasoma. The specimen from north Queensland is identical to the holotype from Tasmania in every respect. The wide separation of these specimens (3000 km) indicates that this species is distributed along the east coast of Australia, as well as in Tasmania.

Mirobaeoides lycosi, sp. nov.

(Figs 7-9, 13, 14, 27, 28)

Types

Holotype ♀, Melton, Victoria, C. Oke (no date), MV.

Paratypes: **Victoria:** 1 ♂ same label as holotype; 5 ♀, 5 ♂, Macclesfield, 7.xii.1949, R. Dunn (1 ♀, 1 ♂ gold coated, wings and antennae on slide), MV.

Female

Length 1·5 mm; body black, antennae dark brown, legs brown, coxa black.

Head. Large, as wide as metasoma; in dorsal view, head broadly rounded, not particularly transverse and flattened to mesosoma; in anterior view, head almost circular, vertex and gena rounded; ocellar triangle acute, LOL : POL 3 : 4; eyes smallish, distance between them equal to $>\frac{1}{2}$ width of head (4·4 : 7·2), height equal to $\frac{1}{2}$ height of head; sculpturing above mid frons very finely coriaceous becoming granulate above median ocellus; lower frons and cheeks with striae radiating from clypeus and slightly curving dorsally; faint orbital carina opening onto cheek, not distinguishable from rest of striae; frontal carina faint; in lateral view, gena parallel-

sided, not particularly wide, with 5 or 6 coarse striae; lower temples strigose; antennal scape L : W 25 : 7, pedicel 10 : 4, f1 slightly longer than wide, f2–f5 much wider than long, clava as long as scape, L : W 25 : 9.

Mesosoma. In dorsal view, short, broad, only slightly narrower than metasoma (6.0 : 6.5), shining, sparsely covered with minute hairs; scutum almost 3× wider than long, L : W 2.0 : 5.8; scutellum c. 6× wider than long, posterior corners broadly rounded; scutum and scutellum with very fine imbricate sculpturing; metanotum c. $\frac{1}{2}$ width of scutellum, completely smooth; in lateral view, mesosoma strongly compressed anteroposteriorly; metapleuron nearly triangular, pointed dorsally.

Metasoma. Oval, shining, >2× longer than mesosoma; T1 very narrow, about as long as metanotum but often partly hidden by it; T2 $\frac{3}{4}$ length of metasoma, with imbricate sculpturing that fades out posteromedially to form broad smooth area, sparsely covered with minute hairs; T3 and T4 slightly longer than T1, anterior $\frac{1}{2}$ of each tergite imbricate, smooth posteriorly; T7 with granulate sculpturing.

Male

Length 1.5–1.6 mm; body all black, antennae dark brown, legs chestnut brown.

Head. As wide as mesosoma; in anterior view, ovoid in shape; upper frons coriaceous grading into granulate sculpturing on vertex; lower frons with moderately coarse striae, radiating from clypeus to lower orbital margin, and medially from mouth $\frac{1}{2}$ distance to median ocellus; in lateral view, posterior and dorsal parts of gena faintly strigose, anterior $\frac{1}{2}$ with 3 very coarse separate striae; antennal scape L : W 26 : 6, pedicel 10 : 5, f1 8 : 4.5, f2–f9 all slightly longer than wide, as wide as f1, f10 12 : 4.5.

Mesosoma. Scutum wider than long (4.5 : 3.8), with fine short scattered hairs and coriaceous sculpturing in anterior $\frac{2}{3}$, becoming granulate posteriorly; notauli short, about as long as posterior width, represented by 2 indented triangular regions bounded by small carinae; scutellum smooth, with a few short scattered hairs laterally, 2× wider than long, in lateral view sloping posteriorly, not truncate; medial lobe of metanotum coarsely striate anteriorly, rugose posteriorly; forewing evenly infusate, broad, L : W 7.5 : 2.9; marginal fringe short; venation darkly pigmented, radial vein and to lesser extent medial and cubital veins represented by infusate lines.

Metasoma. Slightly $>\frac{2}{3}$ wider than long (4.5 : 6.2), not much wider than mesosoma; T1 and T2 with dense patches of long hairs laterally; T3 finely coriaceous laterally, smooth medially and along posterior margin, with long scattered hairs; T4 and T5 with fine coriaceous sculpturing anteriorly, broad smooth band posteriorly and long scattered hairs.

Host

Lycosa sp. (Araneae : Lycosidae). The holotype and one male were reared from the eggs of *Lycosa* sp. All other specimens are labelled 'parasite of eggs of *Tarantula godeffroyi*', the name *Tarantula* having been dropped as it is preoccupied. *Lycosa godeffroyi* L. Koch is distributed throughout south-eastern Australia.

Comments

M. lycosi is the largest species recorded for the genus, and this is closely correlated with the large size of its host's eggs. Females are characterized by the short broad mesosoma, almost circular head, and minutely haired, finely sculptured dorsal surface. Males of *lycosi* can be separated from those of *ater* (Hickman), the only other species for which the male sex is recorded, by the very coarse genal striae, the deeper notauli bordered by carinae, and the more finely sculptured scutum (cf. Figs 12, 13).

Mirobaeoides setosus, sp. nov.

(Figs 5, 6, 11, 29)

Types

Holotype ♀, Lever's Plateau via Rathdowney, Queensland, 640 m, 1.xi.1975, I. Naumann, QM.

Paratypes: **Queensland:** 1♀, same label as holotype, QDPI; 2♀, Mt Tamborine, Nov.1978–Jan.1979 (no collector), QDPI; 1♀, Rozen's Lookout, Beechmont, 13.xii.1974, G. B. and S. R. Monteith, gold-coated, antennae on slide, QDPI; 4♀, Hugh Nelson Range, 21 km S. Atherton, 12.x.1983, Storey and Brown, QDPI; 1♀, Mt Glorious, 630 m, 28.ii.1984, L. Masner, CNC.

Figs 5, 6. *Mirobaeoides setosus*, sp. nov., female paratypes: 5, south Queensland, dorsal view, surface faintly sculptured; 6, north Queensland, mesosoma, T1 and anterior T2, lacking sculpturing. Scale lines: 5, 100 μ m; 6, 50 μ m.

New South Wales: 5♀, Wiangaree State Forest, Brindle Creek, 1000 m, 15.ii.1984, L. Masner, CNC; 1♀, Wiangaree State Forest, Isaksson Ridge, 1050 m, 29.ii.1980, A. Newton and M. Thayer, ANIC; 1♀, Whian Whian State Forest via Dunoon, 25.xii.1974, G. B. and S. R. Monteith, QDPI; 1♀, Toonumbar State Forest, via Grevillea, 26.xii.1974, G. B. and S. R. Monteith, QDPI.

Female

Length 0.6–0.8 mm; body dark brown to brown, lower legs, distal half of antennae and T7 lighter in colour.

Head. In dorsal view, equal to width of metasoma or very slightly wider, rather long, L : W

1.4 : 3.5; ocellar triangle rather obtuse, LOL : POL 1.25 : 2.0; in anterior view head oval, W : H 3.6 : 3.0; vertex and genae gently curved; eyes and upper face covered with short to longish hairs; distance between eyes $< \frac{1}{2}$ width of head (1.5 : 3.5); dorsal $\frac{1}{2}$ of face (above frontal carina) with fine coriaceous sculpturing and minute punctures; lower frons with strigose sculpturing enclosing a smooth medial patch above antennal insertions, smooth area bisected by frontal carina which extends $\frac{1}{2}$ the distance to median ocellus; cheeks with striae radiating from clypeus that merge with fine coriaceous sculpturing beside smooth area; medial lower frons slightly depressed; in lateral view, gena wide, with striae along anterior margin, smooth behind, becoming strigose and coriaceous dorsally; antennal scape L : W 19 : 4, pedicel 6 : 3.3, f1–f5 very small, f1 about as wide as long, f2–f5 small and transverse, clava 18 : 8.

Mesosoma. In dorsal view, covered with long hairs, shining, usually with very fine coriaceous sculpturing, otherwise smooth; scutum broadly rounded anteriorly, almost 2 × wider than long, L : W 1.4 : 2.6; scutellum $\frac{1}{3}$ length of scutum; metanotum $\frac{1}{2}$ width of scutellum, smooth, sometimes with faint longitudinal striations; in lateral view, metapleuron $< 2 \times$ higher than wide, with short tooth dorsally, posterior margin broadly rounded.

Metasoma. Wider than mesosoma (3.1 : 2.6), dorsal surface covered with long hairs, sculpturing varying from totally smooth to finely granulate, most specimens with fine coriaceous sculpturing and smooth posterior border to each tergite; T2, 4–5 × longer than T1; anterior border of T2 with single row of punctate–crenulate depressions; T3 longer than T1; T4 $< \frac{1}{2}$ length of T3; T7 with fine granulate sculpturing under dense covering of short hairs.

Male

Unknown.

Host

Unknown.

Comments

This is a small species characterized by having a very hairy body, a depressed lower frons, a smooth metanotum and T1, and a crenulate anterior border to T2. *M. setosus* appears to be associated with subtropical and tropical wet forests, and probably is restricted to a host spider found in these habitats. This species shows a moderate degree of latitudinal variation. Specimens from north Queensland are larger, have a completely smooth surface and longer hairs; those from New South Wales are smaller, have a finely sculptured surface and short hairs, while specimens from southern Queensland are intermediate between these two extremes.

Mirobaeoides elongatus, sp. nov.

(Figs 10, 15, 26, 31)

Types

Holotype ♀, Warren National Park, Pemberton, Western Australia, 5.iii.1980, S. and J. Peck, ANIC.

Paratypes: 3♀, same labels as holotype, CNC.

Female

Length 0.9–1.1 mm; body elongate, narrow, covered with long hairs, dark brown, head black, antennae light brown, clava darker.

Head. In dorsal view, much wider than mesosoma, slightly wider than metasoma, broad, not especially flattened against mesosoma, L : W 1.5 : 3.9; carina along vertex with narrow

upturned lip; ocellar triangle acute, LOL : POL 1·8 : 2·2; in anterior view, head oval, W : H 3·9 : 3·2; eyes large, very close together, separated by $\frac{1}{3}$ width of head (1·3 : 3·9), covered with short hairs; dorsal $\frac{1}{2}$ of face (from point just below median ocellus) with dense granular sculpturing and short hairs; lower half of face (ventral $\frac{3}{4}$ of frons) completely smooth and shining

Figs 7-9. *Mirobaeoides lycosi*, sp. nov., paratypes: 7, female, mesosoma; 8, female, sculpturing on anterior T2; 9, male, head.

Fig. 10. *Mirobaeoides elongatus*, sp. nov., female paratype, dorsal view.

Fig. 11. *Mirobaeoides setosus*, sp. nov., female paratype, south Queensland, sculpturing on scutum and scutellum.

Scale lines: 7, 9, 10, 100 μ m; 8, 50 μ m; 11, 25 μ m.

except for faint striae on lateral cheeks which reach to orbital margin; in lateral view, gena broad, with 4 coarse striae along anterior margin, smooth posteriorly, dorsally with faint coriaceous sculpturing; mandible as in Fig. 31; antennal scape L : W 18 : 4·5, pedicel 6·5 : 3·5, f1 slightly longer than wide, f2-f5 not much wider than long, clava 22 : 9·5.

Mesosoma. In dorsal view, not much narrower than metasoma, elongate; scutum and scutellum with dense imbricate sculpturing, covered with longish hairs: scutum L:W 2.0:2.8; scutellum slightly $< \frac{1}{3}$ length of scutum, with smooth posterior border; metanotum slightly shorter than scutellum, with coarse longitudinal sculpturing, without hairs; in lateral view, metapleuron broad, the shape of a trapezium, pointed dorsally, reaching $> \frac{1}{2}$ distance from hind coxa to scutellum.

Metasoma. Elongate; T1 slightly shorter than metanotum, with serrate posterior margin and coarse longitudinal striations; T2 $> 5 \times$ length of T1, anterior $\frac{1}{3}$ with coarse longitudinal striations, rest of T2 and T3 smooth, shining, covered with long hairs; T3 and T4 sometimes telescoped outwards making these tergites and whole metasoma appear longer than normal; T3 c. $\frac{1}{3}$ length of T2; T4 and T5 very short, smooth without hairs; T7 smooth, with short hairs.

Male

Unknown.

Host

Unknown.

Comments

This is a very distinctive species that cannot be confused with any other. In addition to the characters given in the key the following are also helpful in recognizing this species: frons completely smooth and shining; body elongate; vertex with dense granular sculpturing; scutum and scutellum with dense imbricate sculpturing (Fig. 15).

Mirobaeoides kerryi, sp. nov.

(Figs 4, 33)

Types

Holotype ♀, Intermediate Hill, Lord Howe I., 50 ft, 19–31.v.1980, J. and S. Peck, ANIC.

Paratypes: 6♀ (one specimen gold-coated), same labels as holotype, CNC.

Female

Length 1.0 mm; body black, femora brown, rest of legs lighter, antennae brown.

Head. In dorsal view, transverse, though not strongly arched around mesosoma, much wider than mesosoma, same width as metasoma; eyes slightly bulging, not in continuous curve with frons; in anterior view, head oval in shape, W:H 5.0:4.2; vertex gently arched; gena evenly curved; ocellar triangle moderately obtuse, LOL:POL 1.9:3.0; eyes large, rounded, hairless; distance between eyes equal to $\frac{1}{2}$ width of head (2.6:5.0); frontal carina short, prominent basally; dorsal $\frac{1}{2}$ of face very finely coriaceous, with scattered minute hairs; lower $\frac{1}{2}$ of face with fine striae that curve upwards towards midline, becoming finely strigose at level of lower margin of eye; cheeks finely striate, with smooth shining area under eye; in lateral view, angle of vertex and occiput very acute; carina along vertex without an upturned lip; gena wide, coarsely striate on anterior $\frac{2}{3}$, becoming strigose just below dorsal margin, posterior surface curved around behind head, finely strigose; mandible as in Fig. 33; antennal scape L:W 20:4.5, pedicel 8:3.5, f1 longer than wide, f2–f5 wider than long, clava elongate (20:7.5).

Mesosoma. In dorsal view, sparsely covered with short hairs; scutum short, L:W 1.5:4.0, much narrower than metasoma; scutellum $\frac{1}{3}$ length of scutum; scutum and scutellum with very fine coriaceous sculpturing; metanotum $< \frac{1}{2}$ length of scutellum, smooth, shining, hairless; in

lateral view, metapleuron approximately triangular, reaching much $< \frac{1}{2}$ distance from hind coxa to scutellum, with very blunt tooth on posterior margin.

Metasoma. Oval, L : W 7.0 : 4.8; T1 c. 1.5 $\times$ longer than metanotum; T2 c. $\frac{3}{4}$ length of metasoma, 10 $\times$ length of T1, sides almost parallel; T3, 2 $\times$ length of T1; T4, 0.5 $\times$ length of T3; T2–T4 with fine imbricate sculpturing and minute scattered hairs, each tergite with broad smooth posterior border, smooth anterior border to T3 sometimes visible; T7 with very fine coriaceous sculpturing and minute hairs.

Male

Unknown.

Host

Unknown.

Comments

This species is similar to *M. lycosi* and *M. ater* and shares the following characters with them: a very finely sculptured and almost hairless dorsal surface, a short, truncate mesosoma, and a narrow T1. These three species appear to form a closely related group within *Mirobaeoides*; however, they can be reliably separated on the characters given in the key. *M. kerryi* is probably restricted to Lord Howe I., as is the case for several other scelionids found on the island (see comments in Austin 1984).

Mirobaeoides ater (Hickman)

(Figs 2, 12, 32, 34, 36)

Notoscelio atra Hickman, 1967, p. 35.

Mirobaeoides atra (Hickman), Austin, 1981, p. 90; Galloway and Austin, 1984, p. 88.

Types

Holotype ♀, slide-mounted, Hobart, Tasmania, 20.i.1967, V. V. Hickman, ANIC.

Paratypes: 2♀, 2♂, on same slide as holotype, ANIC.

Female

Length 0.7–0.85 mm; body black to dark brown, antennae and legs lighter in colour.

Head. In dorsal view, as wide as metasoma, much wider than mesosoma, rather flattened to pronotum; in anterior view, head oval, W : H 4.4 : 3.6; vertex gently rounded but not rising much above dorsal margins of eyes; eyes smallish, distance between them c. $\frac{1}{2}$ width of head, (2.3 : 4.4); ocellar triangle rather obtuse, LOL : POL 1.7 : 2.5; dorsal face with very fine coriaceous sculpturing and scattered fine hairs; lower face with vertical striae radiating from corners of mouth and bending towards midline, enclosing small shining smooth patch above antennal insertions; frontal carina prominent basally, extending c. $\frac{1}{2}$ distance to median ocellus; striae on lateral cheeks not reaching to lower margin of eye, leaving small smooth area below eye; in lateral view, angle between vertex and occiput very acute; carina along vertex with narrow but obvious upturned lip; gena more coarsely striate than cheek, striae merging with strigose sculpturing posteriorly and below dorsal margin; mandible as in Fig. 32; antennal scape L : W 16 : 4, pedicel 6 : 3, f1 slightly longer than wide, f2–f5 wider than long, f5 slightly wider than f1–f4, clava $> 2 \times$ longer than wide (19 : 7).

Mesosoma. In dorsal view, very short; scutum and scutellum with fine imbricate–coriaceous sculpturing and short scattered hairs; scutum L : W 1.1 : 3.1; scutellum slightly $> \frac{1}{2}$ length of

scutum; metanotum very narrow, slightly $> \frac{1}{2}$ length of scutellum; in lateral view, metapleuron shining, in the shape of a trapezium, posterior margin without a blunt tooth or other protuberance, height $< \frac{1}{2}$ distance from hind coxa to scutellum.

Metasoma. Oval, L:W 5.7:4.2; T1 slightly longer than scutellum; T2 c. 10× longer than T1, c. $\frac{3}{4}$ length of metasoma, sides almost straight and parallel; T3 and T4 slightly longer than T1; T1–T4 with fine imbricate sculpturing and minute scattered hairs, posterior border of each tergite broad, smooth; T7 with short hairs.

Fig. 12. *Mirobaeoides ater* (Hickman), male, posterior mesosoma.

Figs 13, 14. *Mirobaeoides lycosi*, sp. nov., paratypes: 13, male, mesosoma; 14, female, head.

Fig. 15. *Mirobaeoides elongatus*, sp. nov., female paratype, sculpturing on dorsal mesosoma.

Scale lines: 12, 15, 50 μ m; 13, 14, 100 μ m.

Male

Length 1.0–1.1 mm, head and mesosoma black, metasoma very dark brown, antennae and legs lighter in colour.

Head. In dorsal view, slightly wider than mesosoma, ovoid in anterior view, W:H 3.9:3.0; dorsal $\frac{1}{2}$ of face with coriaceous sculpturing and fine scattered hairs; ventral $\frac{1}{2}$ of face with fine striae radiating from corners of mouth and curving dorsally, becoming finely strigose above mid

frons; frons hairless except for few tiny hairs around margins of eye and gena; gena with several distinct striae on anterior $\frac{1}{2}$ which are not much coarser than striae on cheek, genal striae break up dorsally and become strigose, posterior gena finely strigose; antennal scape L : W 15 : 4, pedicel 6 : 3.5, f1 5 : 3, f2–f5 slightly shorter than f1, f6–f9 same as f1, f10 elongate (9 : 3.3).

Mesosoma. Scutum L : W 1.9 : 2.9, with fine imbricate sculpturing and scattered long hairs; carinae bounding notauli faint, sometimes virtually absent; scutellum L : W 1.0 : 1.9, mostly smooth posteriorly, anterior $\frac{1}{3}$ – $\frac{1}{2}$ finely coriaceous, with scattered long hairs; broad medial lobe of metanotum with dense rugose sculpturing that extends to anterior margin; forewing L : W 5.0 : 1.9, radial vein indicated by very faint infuscated line, medial and cubital veins virtually absent.

Metasoma. L : W 3.9 : 3.2, rather rounded; sculpturing the same as *M. lycosi*.

Host

Oxyopes mundulus (Oxyopidae). Hickman (1967) provides some observations on the biology of this species and its egg-parasitoid, *M. ater*.

Non-type Material Examined

Tasmania: 2♀, 6♂, CNC; 7♂, BMNH; 10♂, ANIC, same labels as holotype. **Australian Capital Territory**: 3♀, Black Mtn, 620 m, 23.vi.1970, I. C. Taplin, ANIC.

Comments

This is the smallest species of *Mirobaeoides*. Apart from its size, *M. ater* is distinguished by the distinct upturned lip of the carina along the vertex, and the facial, genal and metasomal sculpturing. This species appears to be closely related to the Lord Howe I. species, *M. kerryi*, and to *M. lycosi*. I have included in *M. ater* three specimens from Black Mountain, Canberra, which are indistinguishable from Tasmanian specimens except for their smaller size. This is then the first record of the species from mainland Australia (see under *M. lycosi* for comments on the male sex).

Mirobaeoides scutellaris, sp. nov.

(Figs 20–22, 33)

Types

Holotype ♀, Nelson Bay, New South Wales, 30.xi.1967, Britton and Misko, ANIC.

Paratypes: **New South Wales**: 3♀, ANIC; 1♀, CNC, same label as holotype; 1♀, Leeton, 10.iii.1970, N. J. Mitchell, ANIC. **Australian Capital Territory**: 2♀, Mt Majura, 680 m, 6.i.1970, C. G. Brooks, ANIC; 2♀, Black Mtn, 8.vii.1970, J. Simmons, 9.i.1968, C. Brooks, ANIC; 1♀, Ainslie, 8.ii.1977, Bouček, BMNH. **South Australia**: 1♀, 27 km W. Manangatang, 12.i.1970, R. W. Taylor, ANIC.

Female

Length 0.85–1.0 mm; head black, rest of body, legs and antennae brown.

Head. In dorsal view, wider than mesosoma and metasoma, c. 3 × wider than long, not closely arched around mesosoma; vertex broad, angle with occiput approximately 90°; in anterior view, rather high, almost circular, W : H 3.4 : 3.0; vertex evenly rounded; ocellar triangle obtuse, LOL : POL 1.3 : 2.0; eyes separated by $\frac{1}{2}$ width of head (1.7 : 3.4); dorsal $\frac{1}{2}$ of face with coriaceous sculpturing, minute punctures and tiny scattered hairs; lower $\frac{1}{2}$ of face with striae radiating from corners of clypeus which curve dorsally towards midline; orbital carina open anteroventrally to enclose small smooth area of cheek; gena very broad, striate in ventral $\frac{1}{2}$, becoming strigose, border with eyes coriaceous; mandible as in Fig. 33; antennal scape L : W

16 : 4, pedicel small (5 : 2·5), f1 longer than wide, f2–f5 much wider than long, all very small, clava 15 : 7.

Mesosoma. In dorsal view, almost as wide as metasoma, moderately elongate, broadly rounded anteriorly; scutum L : W 2·1 : 2·9, with imbricate sculpturing and minute scattered hairs; scutellum rectangular, L : W 0·7 : 2·1, extending posteriorly to completely cover metanotum, with imbricate sculpturing; in lateral view, posterior margin of scutum and scutellum inflected dorsally; dorsal and anteroventral pronotum with reticulate–rugose sculpturing, strigose between; mesopleuron and metapleuron fused, dividing suture indicated by incomplete carina; metapleuron broad, not much higher than wide; lateral propodeum reticulate–rugose; hind femoral spines very long.

Metasoma. In dorsal view, squarish, L : W 3·8 : 3·2; T1 c. $\frac{3}{4}$ length of scutellum, sculpturing intermediate between imbricate and reticulate–rugose; T2 L : W 2·4 : 3·1, $>4\times$ longer than T1, lateral margins parallel, with reticulate–rugose sculpturing and minute scattered hairs; T3 and T4 shorter than T1, finely imbricate; posterior margin of T1–T4 inflected dorsally; T2–T4 with smooth shining posterior border; T7 coriaceous, hairless; ventrally, S2 and S3 with reticulate–rugose sculpturing.

Male

Unknown.

Host

Unknown.

Comments

This is a very distinctive species that is easily recognized by the size and shape of the scutellum, the hidden metanotum, the dorsal sculpturing, the fusion of the mesosomal pleura, and the upturned posterior margin of the dorsal plates. *M. scutellaris* does not appear to have any close relatives among the species so far recorded.

Mirobaeoides mirabilis, sp. nov.

(Figs 23, 30)

Types

Holotype ♀, 5 km SSE. Harford, Tasmania, 19.i.1983, I. D. Naumann and J. C. Cardale, ANIC.

Paratypes: **Tasmania:** 2♀, Fingal, 24.v.1928, V. V. Hickman, MV.

Female

Length 1·0–1·1 mm; body dark brown, dorsal head and metasoma darker than mesosoma, legs brown, antennae brown, clava darker than other segments.

Head. In dorsal view, wider than mesosoma and metasoma, almost oval in shape except for posterior concavity, L : W 1·5 : 4·4; vertex gently rounded; gena prominent; carina along vertex not sharp; occiput visible, convex dorsally so that angle with vertex is very obtuse; in anterior view, head oval, cheeks and gena prominent and rounded; vertex gently rounded, flat medially; eyes small, hairless, $<\frac{1}{2}$ height of head (2·0 : 4·5), separated by $>2\times$ width of head (2·5 : 4·4); ocelli in acute triangle, LOL : POL 2·1 : 2·8; dorsal $\frac{1}{2}$ of face finely rugose and virtually hairless; lower $\frac{1}{2}$ of face with very coarse striae radiating from corners of mouth and curving dorsally; frontal carina extending slightly $>\frac{1}{2}$ distance to median ocellus; cheeks coarsely striate; clypeus large, with acutely pointed corners; in lateral view, gena large, parallel-sided in ventral $\frac{1}{2}$, coarsely striate below eye, becoming strigose then coriaceous dorsally; mandibles very large, robust, with ventral tooth elongate, dorsal and medial teeth small subequal and partly

Figs 16, 17. *Mirobaeoides lordhowei*, sp. nov., female holotype: 16, lateral view of head, mesosoma and anterior metasoma; 17, sculpturing on dorsal surface.

Figs 18, 19. *Mirobaeoides occidentalis*, sp. nov., female holotype: 18, dorsal view; 19, sculpturing on dorsal surface.

Scale lines: 16–18, 100 μ m; 19, 50 μ m.

fused (Fig. 30); antennal scape L : W 23 : 4.5, pedicel 9 : 4, f1 almost 2 × longer than wide, f2–f5 wider than long, clava elongate (21 : 8).

Mesosoma. In dorsal view, scutum very large, as long as T2, broadly rounded anteriorly, almost as long as wide, L : W 3.1 : 3.4; scutellum broadly rounded posteriorly, L : W 0.8 : 2.8; metanotum narrow posteriorly, rounded at posterolateral corners exposing broad dorsolateral parts of propodeum; scutum and scutellum with fine coriaceous sculpturing, slightly coarser on metanotum; in lateral view, pronotum very large, dorsal margin $> \frac{1}{2}$ length of mesosoma, with fine coriaceous sculpturing dorsally, finely longitudinally striate in ventral $\frac{1}{2}$; metapleuron very large, smooth, in the shape of a trapezium; propodeum smooth and shining, without longitudinal striae, continuous with mesopleuron.

Metasoma. L : W 4.5 : 4, as wide as scutum, shorter than mesosoma; T1 forming very narrow strip anteriorly which is completely hidden by metanotum and propodeum when mesosoma and metasoma are closely opposed; T2 $> \frac{1}{2}$ length of metasoma; T3 c. $\frac{1}{3}$ length of T2; T4, $\frac{1}{3}$ length of T3; T7 with short white hairs; T2–T4 with smooth posterior border, rest of tergites with reticulate–imbricate sculpturing and scattered minute hairs; S2–S4 with same sculpturing.

Male

Unknown.

Host

Unknown.

Comments

This is undoubtedly the most unusual species of *Mirobaeoides*. The greatly enlarged scutum, narrowing of the metanotum posteriorly, small size of the metasoma, and sub-bidentate mandible distinguish *mirabilis* from all other species. However, the structure of the antenna and metapleuron, the relative sizes of T1 and T2, and the presence of hind femoral spines clearly places this species within my concept of *Mirobaeoides*. The structure of the mandible is unique within the Baeini. In all other species the mandible is tridentate or subtridentate with the dorsal and ventral teeth of equal size (see Figs 31–33). The mandible in *mirabilis* is asymmetrical, due to the greatly expanded ventral tooth, which must form an effective cutting edge, possibly used for chewing through tough egg sacs or litter debris.

Mirobaeoides lordhowei, sp. nov.

(Figs 16, 17, 31)

Type

Holotype ♀, Eddies Cave on Gower track, Lord Howe I., 550 m, 16.xi.1979, G. B. Monteith, QM.

Female

Length 1.0 mm; body dark brown, legs and antennal clava lighter in colour.

Head. In dorsal view, flattened against mesosoma, much wider than mesosoma, slightly wider than metasoma; carina along vertex very sharp, forming an upturned lip; angle between vertex and occiput very acute; gena not visible; in anterior view, head oval, W : H 5.1 : 4.4, vertex and genae gently rounded; eyes with minute hairs, separated by half width of head (2.5 : 5.1); ocellar triangle moderately obtuse, LOL : POL 1.7 : 2.9; upper $\frac{1}{2}$ of face with very fine coriaceous sculpturing and longish scattered hairs; lower $\frac{1}{2}$ of face with short coarse striae radiating from corners of mouth, striae becoming finely strigose at point level with lower eye

margin; frons hairless except for single row of hairs around lower eye; frontal carina faint, reaching to median ocellus, area beside carina smooth and shining; cheek coarsely striate, striae not reaching to eye margin, leaving broad smooth and shining patch on dorsal cheek below eye, lower cheek with few scattered hairs; in lateral view, genal carina (carina following posterior border of eye) very large, raised above level of eye; gena narrow, with 1 large curved carina anteroventrally,

Figs 20–22. *Mirobaeoides scutellaris*, sp. nov., female paratype: 20, dorsal surface of mesosoma, T1 and anterior T2; 21, dorsal view; 22, lateral view of head and mesosoma. *m*sp, mesopleuron; *m*tp, metapleuron; *pr*, propodeum; *sc*, scutum; *sl*, scutellum.

Fig. 23. *Mirobaeoides mirabilis*, sp. nov., female holotype, lateral view.

Fig. 25. *Mirobaeoides tamborinensis*, sp. nov., female holotype, dorsolateral view of mesosoma and anterior metasoma.

Scale lines: 20, 22, 24, 50 μ m; 21, 23, 100 μ m.

finely striate above carina, rest of gena finely coriaceous; mandible as in Fig. 31; antennal scape as long as clava, with fine longitudinal striae, clava $> 2 \times$ longer than wide (antenna not mounted on slide).

Mesosoma. In dorsal view, broad, L : W 3.2 : 4.3; scutum L : W 1.9 : 4.3; scutellum $\frac{1}{2}$ length of scutum; metanotum c. $\frac{1}{3}$ length of scutellum, smooth, hairless; scutum and scutellum with

fine coriaceous sculpturing and long scattered hairs; in lateral view, mesosoma coarsely longitudinally striate; metapleuron finely granulate, reaching $\frac{1}{2}$ distance to scutellum, $>2\times$ higher than wide, broadly pointed posteriorly.

Metasoma. Broad, L : W 5.7 : 4.8; T1 almost as long as scutellum; T2, $4\times$ longer than T1, anterior margin without crenulate sculpturing, lateral margins carinate, nearly parallel; T3 c. $\frac{1}{3}$ length of T2; T4 slightly $>\frac{1}{2}$ length of T3; T1–T4 finely coriaceous, with long scattered hairs, posterior borders smooth; T7 with short hairs.

Male

Unknown.

Host

Unknown.

Comments

This species is characterized by the long hairs covering the body, the large size of T1, and the sculpturing of the lower face and gena. This is the second species of *Mirobaeoides* recorded from Lord Howe I. (see comments under *M. kerryi*).

Mirobaeoides occidentalis, sp. nov.

(Figs 18, 19, 31)

Type

Holotype ♀, Walpole National Park, Peaceful Bay, Western Australia, 17.vi–11.vii.1980, S. and J. Peck, ANIC.

Female

Length 0.85 mm; body black, legs dark brown becoming lighter distally, scape and pedicel dark brown, rest of antenna brown.

Head. In dorsal view, broad, wider than mesosoma and metasoma, posterior surface not strongly curved around pronotum; carina along vertex sharp, slightly upturned anteriorly; angle between vertex and occiput acute; eyes slightly bulging from curve of face; in anterior view, head oval in shape, W : H 4.0 : 3.3, vertex nearly straight; eyes separated by c. $\frac{1}{2}$ width of head (1.9 : 4.0); ocellar triangle moderately obtuse, LOL : POL 1.4–2.0; upper $\frac{1}{2}$ of face with fine coriaceous sculpturing and short hairs; lower $\frac{1}{2}$ of face with coarse striae radiating from clypeus, reaching to eye margin, striae on frons curving dorsally; frontal carina reaching halfway to median ocellus; in lateral view, gena moderately wide, almost parallel-sided, slightly narrower ventrally, anterior $\frac{2}{3}$ coarsely striate, tending to strigose sculpturing dorsally and posteriorly, posterior $\frac{1}{3}$ of gena smooth, shining; mandible as in Fig. 31; antennal scape longitudinally striate, as long as clava, clava $>2\times$ longer than wide (antenna not mounted on slide).

Mesosoma. In dorsal view, scutum L : W 1.4 : 3.0; scutellum L : W 0.6 : 2.6; scutum and scutellum with fine coriaceous-imbricate sculpturing and longish scattered hairs, anterolateral margin of scutellum foveate, with narrow smooth posterior border; metanotum $<\frac{1}{2}$ length of scutellum, hairless, longitudinally striate anteriorly, becoming striate-foveate anterolaterally, posterior border smooth; in lateral view, pronotum, mesopleuron and propodeum coarsely longitudinally striate; metapleuron broad, much $<2\times$ longer than wide, near rectangular, not acutely pointed dorsally.

Metasoma. Very broad, L : W 4.3 : 3.8; T1 narrow, slightly shorter than metanotum, widest

medially, becoming acutely narrow laterally, anterolateral margin foveate, faintly striate medially, with single transverse row of hairs; T2 c. $\frac{2}{3}$ length of metasoma, L : W 2.9 : 3.8, with coarse reticulate-imbricate sculpturing and scattered hairs; T3 c. $\frac{1}{4}$ length of T2 (estimate as T2 partly telescoped outwards), with fine coriaceous sculpturing anteriorly and narrow transverse band of short hairs; T2 and T3 with broad smooth posterior margin; T4 slightly $> \frac{1}{2}$ length of T3, completely smooth, with a single transverse row of short hairs; T5, $\frac{1}{2}$ length of T4, smooth; T7 with very fine granulate sculpturing; ventrally, S2 and S3 with reticulate-imbricate sculpturing.

Male

Unknown.

Host

Unknown.

Comments

This species and *elongatus* are the first *Mirobaeoides* so far recorded from Western Australia. This species is easily recognized by the striate metanotum and T1, and the sculpturing pattern of the metasoma and lower face.

Mirobaeoides tamborinensis, sp. nov.

(Fig. 24)

Type

Holotype ♀, Mt Tamborine National Park, Queensland, 3.iii.1984, L. Masner, ANIC.

Female

Length 0.7 mm; body dark brown, T7, legs and distal $\frac{1}{2}$ of antennae lighter in colour.

Head. In dorsal view, much wider than mesosoma, as wide as metasoma; frons gently rounded, eyes bulging slightly from curve of frons; gena virtually hidden by dorsal part of eye; posterior surface of head strongly curved around pronotum; in anterior view, head almost circular, W : H 3.2 : 2.9, vertex gently rounded; eyes hairless, separated by exactly $\frac{1}{2}$ width of head; ocellar triangle obtuse, LOL : POL 1.2 : 1.8; dorsal $\frac{1}{2}$ of face with fine coriaceous sculpturing, minute punctures and short scattered hairs; ventral $\frac{1}{2}$ of face with striae radiating from clypeus and curving dorsally, becoming strigose at lower margin of eye; cheek evenly striate, striae on frons and cheek not particularly coarse; frontal depression prominent, reaching $\frac{1}{2}$ distance to median ocellus; in lateral view, angle between vertex and occiput very acute, anterior surface of carina slightly upturned; gena wide, parallel in posterior $\frac{1}{2}$, anterior $\frac{1}{2}$ with moderately fine striae, rest of gena strigose; mandible as in Fig. 31 but more elongate; antennal scape shorter than clava, clava 2 × longer than wide (antenna not mounted on slide).

Mesosoma. In dorsal view, scutum L : W 1.0 : 2.3, with fine scattered short hairs, finely coriaceous anteriorly, becoming imbricate in posterior $\frac{2}{3}$; scutellum 0.4 × length of scutum, with imbricate-coriaceous sculpturing and scattered short hairs, anterolateral border with single row of foveate depressions; metanotum almost as long as scutellum, anterior border striate-crenulate, posterior order smooth; (metapleuron not visible in holotype).

Metasoma. Oval in shape, L : W 4.4 : 3.2; T1 slightly longer than scutellum, anterolateral margin striate-crenulate, narrow smooth posterior border, rest of tergite imbricate; T2 slightly more than 4 × length T1, L : W 2.2 : 3.2, anterior margin with single row of longitudinal crenulate-punctate depressions, posterior margin smooth and shining, rest of tergite coarsely

Figs 25–29. Antennae of *Mirobaeoides* spp.: 25, *M. tasmanicus* Dodd, female holotype; 26, *M. elongatus*, sp. nov., female paratype; 27, 28, *M. lycosi*, sp. nov., female (27) and male (28) paratypes; 29, *M. setosus*, sp. nov., female paratype.

Figs 30–33. Mandibles of *Mirobaeoides* spp.: 30, *M. mirabilis*, sp. nov., female holotype; 31, *M. elongatus*, sp. nov., *M. lordhowei*, sp. nov., and *M. occidentalis*, sp. nov., female holotypes; 32, *M. reticularis*, sp. nov., female holotype, and *M. ater* (Hickman), female; 33, *M. scutellaris*, sp. nov., female holotype, and *M. kerryi*, sp. nov., female paratype.

Figs 34, 36. *Mirobaeoides ater* (Hickman), female: 34, lateral view of head showing upturned lip along vertex; 36, anterior view of vertex.

Fig. 35. *M. reticularis*, sp. nov., female holotype, anterior view of vertex.

Common scale line: 25, 123 μm ; 26, 133 μm ; 27, 28, 185 μm ; 29, 115 μm ; 30, 88 μm ; 31, 75 μm ; 32, 55 μm ; 33, 61.5 μm ; 34, 177 μm ; 35, 174 μm ; 36, 235 μm .

reticulate-imbricate, with scattered short hairs; T3, $\frac{1}{2}$ length T2 (slightly telescoped outwards in holotype) with imbricate sculpturing and smooth posterior border; T4 c. $\frac{1}{4}$ length of T3, with single row of short fine hairs; T7 finely rugulose.

Male

Unknown.

Host

Unknown.

Comments

This species can be recognized by the larger size of T3, the coarse imbricate metasomal sculpturing and the completely striate-strigose gena.

Mirobaeoides reticulatus, sp. nov.

(Figs 32, 35)

Type

Holotype ♀, Wiangaree State Forest, Brindle Creek, New South Wales, 1000 m, 15.ii.1984, L. Masner, ANIC.

Female

Length 0.85 mm; body dark brown, head slightly lighter in colour; legs and antennae brown, clava yellow-brown.

Head. In dorsal view, broad, wider than mesosoma and metasoma; frons gently curved; eyes bulging slightly from curve of face; dorsal part of gena visible behind eye; head not strongly curved around pronotum; in anterior view, head oval, W : H 3.6 : 3.2, vertex rounded; eyes smallish, separated by $\frac{1}{2}$ width of head; ocellar triangle moderately obtuse, LOL : POL 1.4 : 2.1; dorsal $\frac{1}{2}$ of face very finely coriaceous, with scattered minute punctures and scattered longish hairs; ventral $\frac{1}{2}$ of face with striae radiating from corners of clypeus, curving dorsally, parallel to frontal carina, reaching slightly $> \frac{1}{2}$ distance to median ocellus, reaching to eye margin on cheek; frontal carina prominent, reaching $\frac{1}{2}$ distance to median ocellus, narrow areas each side smooth and shining; frons slightly depressed; in lateral view, carina on vertex very acute, without obvious upturned anterior margin; gena wide, striate in anterior $\frac{1}{2}$, strigose in posterior $\frac{1}{2}$; mandible as in Fig. 32; antennal scape slightly shorter than clava; clava slightly more than 2 × longer than wide (antenna not mounted on slide).

Mesosoma. In dorsal view. Scutum slightly $> 2 \times$ wider than long, L : W 1.2 : 2.6, with fine coriaceous-imbricate sculpturing and longish scattered hairs; scutellum c. $\frac{1}{4}$ length of scutum, with fine coriaceous sculpturing and longish scattered hairs; metanotum as long as scutellum, smooth and shining; metapleuron not visible in holotype.

Metasoma. L : W 4.0 : 3.3; T1 narrow, c. same length as metanotum, with fine coriaceous sculpturing and single transverse row of short hairs; T2 c. $\frac{2}{3}$ length of metasoma, L : W 2.7 : 3.3, lateral margins almost parallel, with very coarse reticulate-imbricate sculpturing and scattered longish hairs, broad smooth posterior margin; T3, $\frac{1}{4}$ length of metasoma (slightly telescoped outwards), with imbricate sculpturing and scattered hairs, broad smooth posterior margin; T4 c. $\frac{1}{3}$ length T3, finely coriaceous, with single transverse row of short hairs; T7 finely papillate.

Male

Unknown.

Host

Unknown.

Comments

This species is similar to both *M. kerryi* and *ater* (Hickman), but can be distinguished from them primarily in having a more rounded vertex (viewed anteriorly) and coarser sculpturing covering T2. The holotype was collected in subtropical eucalypt forest at the same locality as *M. setosus*.

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