Records of the Western Australian Museum Supplement No. 52: 253–263 (1995).

New species of baeine parasitoids of spider eggs (Hymenoptera: Scelionidae) from Western Australia

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Abstract – Six species of scelionid wasps from Western Australia belonging to the tribe Baeini, a group known only to be parasitic on spider eggs, are described as new: *Mirobaeoides barbarae, M. manjimupensis, Ceratobaeus mainae, C. clavisegmentus, Hickmanella walpolensis* and *H. noyesi*. These species extend the morphological limits of their respective genera, and in the case of *Mirobaeoides*, enough to warrant its redescription. *Psyllobaeus* Austin (type species *P. pecki* Austin) known only from Lord Howe Island is synonymised with *Mirobaeoides*. Additional diagnostic notes are provided for *Ceratobaeus* Ashmead and *Hickmanella* Austin, along with comments on the relationships of the six new species, and the diversity and make up of the baeine fauna in southwestern Western Australia.

INTRODUCTION

The scelionid tribe Baeini comprises some 200 described species world-wide (Johnson 1992), the members of which are known only to be endoparasitoids of spider eggs (Austin 1985). In this respect they probably constitute the most significant group of insects that limit spider populations (Austin 1984a). Australia has a particularly rich fauna of baeine wasps, of which less than 10% have been treated formally. Until recently, most taxonomic studies have focused on species found in eastern Australia where most field work has been concentrated (e.g. Dodd 1914; Hickman 1967; Austin 1984b, 1986). However, recent collecting in southwestern Western Australia by a number of workers has revealed many new taxa. Six of these species, treated here, extend the limits of their respective genera. At the same time the type species of *Psyllobaeus* Austin, known only from Lord Howe Island, is reinterpreted in a broader context and, consequently, synonymised with *Mirobaeoides* Dodd. The latter genus is redescribed, and additional diagnostic characters are provided for the genera *Ceratobaeus* Ashmead and *Hickmanella* Austin. Notes are provided on the relationships of the six new species, their diagnostic characters, and the diversity and make up of the baeine fauna in southwestern Western Australia. Two of the species described here are named in honour of Barbara Main to celebrate her contribution to the knowledge of Australian spiders.

METHODS, TERMINOLOGY AND ABBREVIATIONS

Specimens used for SEM examination were washed in concentrated detergent, rinsed in distilled water, and examined uncoated under a Cambridge Stereoscan 250 (Mk 3B) scanning electron microscope at low keV or under an Electroscan environmental scanning electron microscope.

Terminology for morphology follows Masner (1979, 1980) and Galloway and Austin (1984). Terminology used for surface sculpturing follows Harris (1979). The following abbreviations are used: L, length; LOL, length between median and lateral ocelli; POL, length between lateral ocelli; W, width.

Abbreviations of institutions are: ANIC, Australian National Insect Collection, Canberra; BMNH, The Natural History Museum, London; CNCI, Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa; QDPI, Queensland Department of Primary Industries, Indooroopilly; WARI, Waite Campus Collection, The University of Adelaide, Adelaide.

SYSTEMATICS

Family Scelionidae

Tribe Baeini

Genus *Mirobaeoides* Dodd

Mirobaeoides Dodd, 1914: 74; Kieffer, 1926: 275; Austin, 1981b: 90; Galloway and Austin, 1984: 87; Austin, 1986: 316; Johnson, 1992: 437.

Notoscelio Hickman, 1967: 35. Synonymised by Austin 1981b: 90.

Psyllobaeus Austin, 1984c: 121. **New synonymy.**

Type species

of *Mirobaeoides*: *Mirobaeoides tasmanicus* Dodd, 1914, by monotypy and original designation.

Description

Female

Body smoothly rounded, usually short and stocky, fusiform, apterous, metasoma sessile against mesosoma; head usually transverse, occiput usually strongly contoured to mesosoma; ocelli minute, sometimes almost invisible among sculpturing; lower gena striate; small frontal carina sometimes present; maxillary palps 2-segmented; labial palps 1-segmented; eyes continuous with surface of face; occipital carina sharp; antenna 11-segmented, with 5 funicle segments and 4-segmented clava; notauli absent; scutellum and metanotum narrow but visible dorsally (scutellum expanded posteriorly and hiding metanotum in one species); propodeum hidden by sessile metasoma, only visible dorso-laterally; 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, often not reaching to metanotum; distal hind femur with pair of stout spines; T1 usually narrow, visible dorsally, sometimes partly hidden by metanotum, rarely with low medial hump or crest; T2 usually the largest tergite and then usually at least 2 x mid-line length of T1 or T3 and at least half length of metasoma, sometimes occupying most of dorsal surface of metasoma, rarely with T3 larger or subequal in size to T2; laterotergites incised into longitudinal sternal groove.

Male

Nearly always with mesosoma and metasoma separated, not fusiform, fully winged; mesosoma much higher than metasoma; eye slightly bulging from face; antenna 12-segmented, last two segments clearly separated; notauli developed as short triangular depressions at posterior margin of scutum; scutellum posteriorly rounded, arched dorsally, smooth and shiny; metanotum broadly protruding past posterior margin of scutellum, coarsely striate along anterior margin, the rest rugose; propodeum expanded and visible in dorsal view, with narrow curved keel; fore wing venation not reaching middle of fore margin; basal vein strong, curving distally; metasoma dorso-ventrally flattened, moderately small, rounded or oval; T2 usually the largest tergum, often T2 and T3 subequal.

In one species, *M. pecki* (Austin) from Lord Howe Island, male the same as female, i.e. body smoothly rounded, short and stocky, fusiform, mesosoma and metasoma fully sessile, apterous, except antenna straight (not clavate) and 11-segmented (cf. males of other species which are 12-segmented).

Comments

When discussing the limits of *Mirobaeoides*, Austin (1986) pointed out the strong similarity between this genus, *Psyllobaeus* and several undescribed species, one of which is described here as *M. barbarae*. It now seems likely that the exclusion of these taxa from *Mirobaeoides* renders this genus paraphyletic. Certainly, when describing the monospecific *Psyllobaeus*, Austin (1984c) over-emphasised the importance of the aberrant male, which has the highly specialised morphology typical of females of this genus and *Mirobaeoides*, viz. wingless, fusiform body and sessile metasoma. The males of previously described *Mirobaeoides* spp. are all fully winged and have the metasoma flattened and clearly separated from the mesosoma This phenomenon of males having the specialised body form of females is now known to be associated with the genetic expression of winglessness in baeine wasps restricted to oceanic and habitat islands (see Austin 1988; pers. comm. L. Masner). The inclusion of *M. pecki* and description of *M. barbarae* and *M. manjimupensis* expand the limits of *Mirobaeoides* to include species that have T3 slightly larger than T2 (*M. barbarae* and *M. manjimupensis* – Figs 1–4), the metanotum shortened transversely so that the propodeum is clearly visible dorsally (*M. manjimupensis* – Fig. 4), T1 with a medial hump or crest (*M. pecki* and *M. barbarae* – Figs 1 and 2), and males which are fusiform and apterous (*M. pecki*). Comparison with other baeine genera indicate that the first two of these characters are plesiomorphic and the last one restricted to only two other known species, *Neobaeus novazealandensis* Austin from New Zealand (Austin 1988) and an undescribed species of *Baeus* from the high Andes (pers. comm. L. Masner). *Mirobaeoides*, as diagnosed here, is then defined by four apomorphic characters; female body fusiform and wingless, metasoma sessile, hind femur with pair of stout apical spines (Fig. 4).

In Galloway and Austin's (1984) key to Australian scelionine genera, *M. barbarae* and *M. manjimupensis* run to *Mirobaeus* Dodd at couplet 2, but they can be readily separated from this genus by the possession of femoral spines. *M. pecki* poses a less serious problem in that both the male and female sex run to female *Mirobaeoides*, males being distinguishable by the shape of the antenna.

Mirobaeoides barbarae sp. nov.
Figures 1–3

Material Examined

Holotype

♀, **Australia: Western Australia:** "W.AUST: Walpole NP Peaceful Bay, S & J Peck 17.VI–11.VII.80 coast sand heath pan traps" (ANIC).

Paratypes

Australia: Western Australia: 2♀, same data as holotype (CNCI, WARI).

Description

Female

Length: 0.75–0.85 mm.

Colour: Brown to dark brown, head slightly darker than rest of body.

Head: Strongly arched around mesosoma, slightly wider than mesosoma; in anterior view subcircular in shape; surface of frons and vertex extremely finely alutaceous, with scattered fine punctures and associated minute hairs; lower frons and lower gena with very fine striae radiating from toruli; frontal carina faint, reaching approximately half distance to median ocellus; upper temples and rest of gena finely striate-alutaceous; minimum distance between eyes equal to half width of head; eyes hairless (x 80); LOL:POL = 1.2:1.4; clava as long as scape, 2 x as long as wide.

Mesosoma: Moderately elongate, fully sessile to metasoma, slightly narrower than metasoma, in dorsal view almost parallel-sided in posterior half; scutum broadly rounded anteriorly, L:W = 1.5:2.2, surface finely imbricate-alutaceous with very fine posteriorly-directed hairs; scutellum rectangular, one-third length of scutum, surface finely imbricate-alutaceous with very fine posteriorly-directed hairs; metanotum very narrow, medially about one-third length of scutellum, broadly emarginate posteriorly, smooth to very faintly alutaceous, virtually glabrous; propodeum visible dorsally as small sclerites either side of metanotum; lateral mesosoma faintly longitudinally striate; metapleuron moderately large, pointed dorsally; femoral spines on hind leg prominent.

Metasoma: Moderately elongate, much longer than head and mesosoma combined (4.5:2.8), tapering posteriorly, convex; T1 with broad low hump medially, sublenticular in dorsal view; midline length of T1:T2:T3 about 1:1:1.5; surface of T1-T4 imbricate-alutaceous with scattered short hairs, posterior margin smooth, anterior margins of T1 and T2 striate-scrobiculate, but anterior margin of T1 usually hidden under posterior margin of metanotum and propodeum; T7 elongate, as long as basally wide.

Male

Unknown.

Comments

M. barbarae is easily distinguished from other species of *Mirobaeoides* by its relatively narrow elongate body, posteriorly emarginate metanotum, hump on T1, and large T3. It keys to *M. tamborinensis* Austin in Austin (1986) because of the striate-scrobiculate anterior margin of T2, but it can be readily separated from this species by the above characters. It is known only from Peaceful Bay, Walpole National Park, and is here named in honour of Dr Barbara Main.

Mirobaeoides manjimupensis sp. nov.
Figure 4

Material Examined

Holotype

♀, **Australia: Western Australia:** "W.AUST: 40 km ESE Manjimup, Cup Rd, 6–28.VII.80, S & J Peck, open Jarrah for. malaise trap & trough" (ANIC).

Description

Female

Length: 0.75 mm.

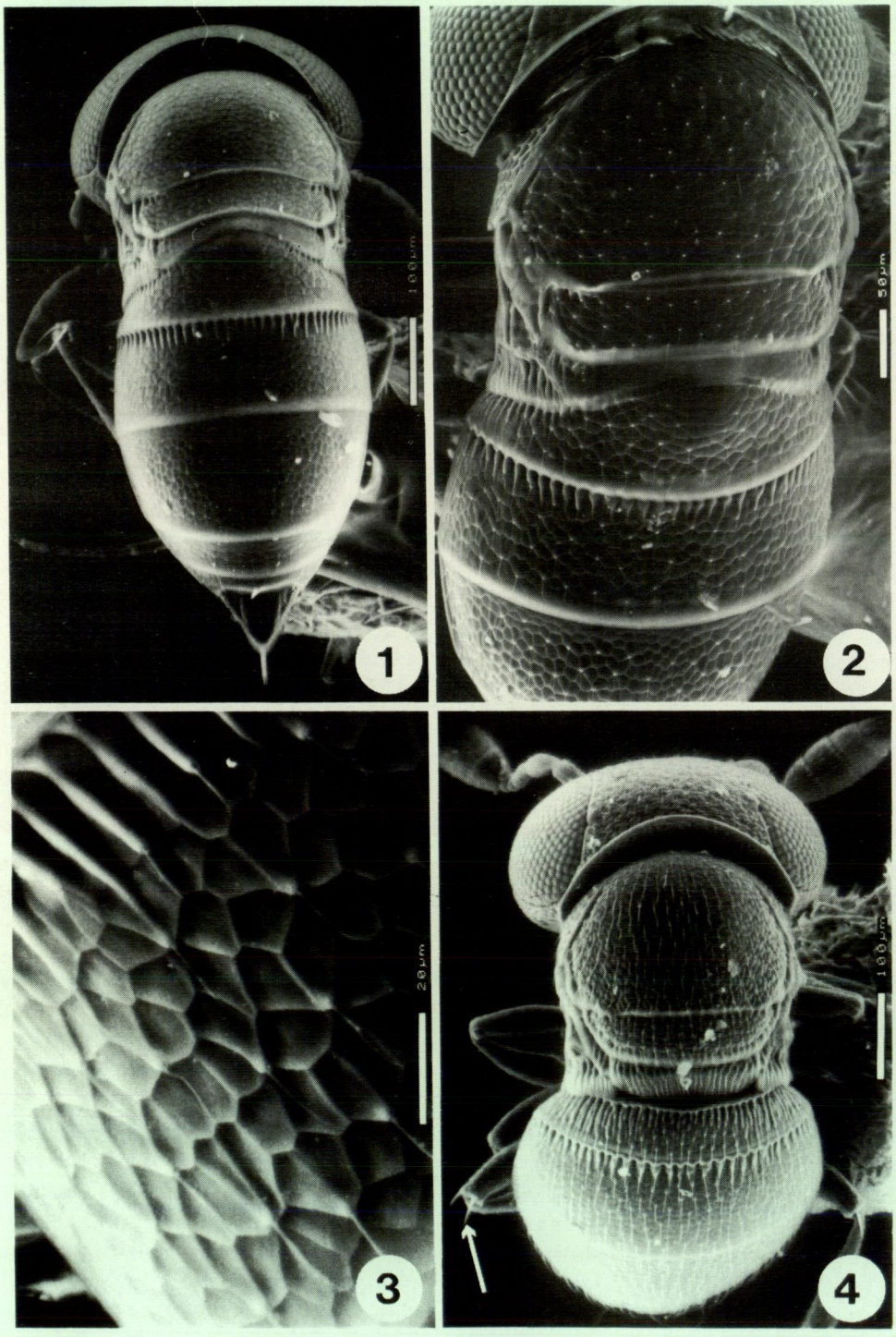
Colour: Body dark brown, head darker than rest of body, almost black, clava brown, rest of antenna yellow-brown.

Head: Strongly arched around mesosoma, much wider than mesosoma; in anterior view subcircular in shape; surface of frons and vertex coarsely granulate with scattered punctures and associated fine short hairs; lower frons with fine striae radiating from toruli which curve upwards to frontal carina; frontal carina prominent ventrally, faint dorsally, reaching approximately two-thirds distance to median ocellus; temples and upper gena finely and densely coriaceous; minimum distance between eyes equal to half width of head; eyes with minute hairs (x 80); ocelli minute, virtually hidden among granulate sculpturing; clava as long as scape, slightly more than 2 x as long as wide.

Mesosoma: Fully sessile to metasoma, substantially narrower than metasoma (2.3:2.8), in dorsal view almost parallel-sided in posterior two-thirds; scutum broadly rounded anteriorly, L:W = 1.7:2.3, surface granulate-coriaceous with scattered punctures, with moderately dense posteriorly-directed hairs; scutellum subrectangular, posterior margin broadly rounded, more noticeable at posterior corners, about one-third length of scutum, surface granulate-coriaceous with

scattered punctures, with moderately dense posteriorly-directed hairs; metanotum slightly shorter than scutellum in mid-line, posterior margin broadly rounded, transverse, width narrow so that propodeum prominently exposed at lateral corners in dorsal view, surface finely striate-coriaceous; lateral mesosoma mostly smooth; metapleuron moderately large, pointed dorsally; propodeum faintly longitudinally striate; femoral spines on hind leg prominent.

Metasoma: Moderately short, as long as head and mesosoma combined, elongate-oval in shape, convex; T1 flat medially, anterior and posterior margins parallel in dorsal view; T2 and T3 subequal in size, mid-line length of T1:T2:T3 = 6:12:14; surface of T1 finely granulate-striate, with moderately dense posteriorly-directed hairs; T2 and T3 minutely alutaceous with tiny punctures, with moderately dense posteriorly-directed hairs; anterior margin of T1 and T2 striate-scrobiculate



Figures 1–4 1–3, *Mirobaeoides barbarae* sp. nov., ♀: 1, dorsal view, holotype; 2, dorsal view, paratype; 3, microsculpture on second metasomal tergum, holotype. 4, *Mirobaeoides manjimupensis* sp. nov., ♀ holotype, dorsal view (arrow showing femoral spines). Scale lines: 100 µm (Figs 1, 4); 50 µm (Fig. 2); 20 µm (Fig. 3).

but anterior margin of T1 normally hidden under posterior margin of metanotum and propodeum; posterior margins of T1–T3 smooth; T4 transverse, smooth; T7 shorter than basal width.

Male
Unknown.

Comments
M. manjimupensis is easily distinguished from other species by the posterior margins of the scutellum and metanotum being broadly rounded, the metanotum being transversely short so that the propodeum is visible dorsally, and T3 being the largest tergum. Like *M. barbarae*, it keys to *M. tamborinensis* in Austin (1986) because of the striate-scrobiculate anterior margin of T2, but it can be readily separated from the latter species by the above characters and from *M. barbarae* by the form of the scutellum, metanotum and propodeum, and having a short body and oval metasoma. It is known only from a single site close to Manjimup in southwestern Western Australia, and is here named after this locality

Mirobaeoides pecki (Austin), comb. nov.

Psyllobaeus pecki Austin, 1984c: 123; Johnson, 1992: 470.

Material Examined

Holotype
♀, "Australia, Lord Howe Island, Intermediate Hill, Big Creek, alt. 50 ft, 17–31.v.1980, S. & J. Peck" (ANIC).

Paratypes
5♀, 5♂, Lord Howe Island, various localities (ANIC, CNCI, QDPI, WARI).

Comments
Since its original description (Austin 1984c) no further material of this species has been recorded. Compared with other species of *Mirobaeoides*, *M. pecki* can be recognised easily by its short robust form, body which is slightly compressed laterally, and longitudinal crest on T1. It keys to *M. scutellaris* Austin in Austin (1986) because the scutellum is expanded over and hides the metanotum, but it can be separated readily from the latter species by the above characters. This species also has a striate-scrobiculate anterior margin to T2, a character state known only in three other species: *M. tamborinensis*, from which it differs in the form of the scutellum and T1, and *M. barbarae* and *M. manjimupensis*, which have T3 larger than T2.

Genus *Ceratobaeus* Ashmead

Ceratobaeus Ashmead, 1893: 167; Kieffer, 1926: 139; Masner, 1976: 65; Huggert, 1979: 7; Austin, 1981b: 83; 1984b: 22; Galloway and Austin, 1984: 90 (see Johnson, 1992: 402 for complete extra-limital bibliography).

Type species
Ceratobaeus cornutus Ashmead, 1893, by original designation.

Description (additional to Masner 1976, Austin 1984b, and Galloway and Austin 1984).

Female
Antenna rarely 11-segmented, with 5 funicle segments and 4-segmented clava.

Comments
Huggert (1979) placed *Ceratobaeus* as a subgenus of *Idris* Foerster and this change has been maintained by Johnson (1992) in his world catalogue of scelionid species. However, Austin (1984b) and Galloway and Austin (1984) have argued that these genera should be kept separate because of apparent differences in the shape of T1 (i.e. *Ceratobaeus* has a metasomal horn – see Figs 5 and 6), form of the propodeum, and length of the ovipositor (Austin 1983). The status of these genera will only be resolved after a detailed phylogenetic analysis on a world-wide basis has been undertaken; such an analysis should examine not only the relationships between *Idris* and *Ceratobaeus*, but also among other genera that may render *Idris* s.s. paraphyletic, such as *Mirobaeus* and *Hickmanella*.

The two species described below fit the description of *Ceratobaeus* perfectly with one exception; females have 11-segmented antennae with a 4-segmented clava. These characters, when compared with potential outgroups, viz. genera of Gryonini, are undoubtedly plesiomorphic. However, this is the first time they have been reported in any species of *Ceratobaeus* or *Idris*, where the antennae normally only have four funicle segments (not five) and the clava is compact and segments fused together. Although there is no key available to Australian *Ceratobaeus* or *Idris*, the obviously segmented clava in *C. mainae* and *C. clavisegmentus* distinguishes them from all other known species. The scrobiculate occiput and margins to the scutum and scutellum further characterise these two species.

In Galloway and Austin's (1984) key to Australian scelionine genera, *Ceratobaeus mainae* and *C. clavisegmentus* run with difficulty to *Probaryconus* Kieffer and *Jarabambius* Galloway at couplet 33, but they can be readily separated from

these genus by having T3 the largest metasomal tergite and having a 4-segmented clava (not 6-segmented).

Ceratobaeus mainae sp. nov.

Figures 5, 7, 9

Material Examined

Holotype

♀, **Australia: Western Australia:** "W. Australia Walpole Nornalup NP 17–21.I.V.1987 J.S. Noyes MT/YPT" (ANIC).

Paratypes

Australia: Western Australia: 2♀, 1♂, same data as holotype (BMNH, CNCI).

Description

Female

Length: 1.3–1.4 mm.

Colour: Body black, except for scape, funicle segments, legs including coxae and posterior T1 (base of horn) which are brown; wings evenly and darkly infuscate.

Head: In anterior view subtriangular in shape; vertex straight; upper frons, vertex and occiput finely granulate with scattered minute punctures and associated minute hairs; cheeks finely striate; minimum distance between eyes to width of head = 2.3:4.2; eyes hairless (x 80); frontal carina faint, reaching about two-thirds to median ocellus; median ocellus partly recessed into small anterior depression; ocelli forming obtuse triangle, LOL:POL = 1.4:2.5, lateral ocelli continuous with margin of eyes; in dorsal view head moderately broad, slightly wider than mesosoma; anterior margin of occipital carina striate-scrobiculate; in lateral view temple granulate; antenna with 5 funicle segments and large 4-segmented clava.

Mesosoma: Scutum L:W = 1.8:3.0, surface finely granulate, with scattered small punctures and associated hairs, these punctures more concentrated in anterior half; notauli present and well developed, reaching three-quarters the distance to anterior margin of scutum; margin of scutum, sulcus between scutum and scutellum and posterior margin of scutellum striate-scrobiculate; scutellum moderately convex, 2 x as long as scutum in mid line, surface finely granulate, posterior margin straight medially, broadly rounded at corners, with smooth marginal lip which is upturned medially; propodeal lamellae converging slightly towards scutellum, upper parts expanded into broad flanges which protrude either side of metasomal horn; propodeal flanges striate; in lateral view pronotum, mesopleuron and metapleuron coarsely striate-scrobiculate; lower mesopleuron with some fine coriaceous sculpturing; fore wing elongate, L:W = 4.0:1.4; stigmal vein long, postmarginal vein very short, about one-fifth length of stigmal vein, basal vein absent.

Metasoma: About 1.5 x as long as head and mesosoma combined, slightly more than 2 x as long as wide (7.5:3.3); in lateral view horn near vertical, straight, reaching above level of scutellum, surface smooth except for few basal longitudinal striations and scrobiculate antero-ventral margins, anterior surface of horn slightly flattened and this area margined with minute carina; rest of T1 (other than horn) and T2 longitudinally striate with fine granulate background sculpturing; mid-line length of T2:T3 = 1.1:2.4; T3–T5 finely granulate-coriaceous with smooth posterior margins; all terga with sparse long hairs.

Male

As for female except as follows:

Antenna 12-segmented, last two segments separated; propodeal lamellae strongly converging dorsally, upper parts expanded into two closely approximated teeth (not flanges); metasoma oval in shape, as long as head and mesosoma combined, 1.6 x as long as wide; T1 virtually flat except for upturned anterior margin, longitudinally striate throughout.

Comments

This species can be readily separated from *C. clavisegmentus* by the length of the notauli, shape of the scutellum, and length, diameter and sculpturing of the metasomal horn. *C. mainae* in known only from Walpole Nornalup National Park in southwestern Western Australia, and I have much pleasure in naming it after Barbara Main.

Ceratobaeus clavisegmentus sp. nov.

Figure 6

Material Examined

Holotype

♀, **Australia: Western Australia:** "W. Australia Walpole Nornalup NP 17–21.I.V.1987 J.S. Noyes MT/YPT" (ANIC).

Description

Female

As for *C. mainae* except as follows:

Legs and antennae dark brown; anterior margin of occipital carina more finely striate-scrobiculate; notauli present, very short, reaching only about

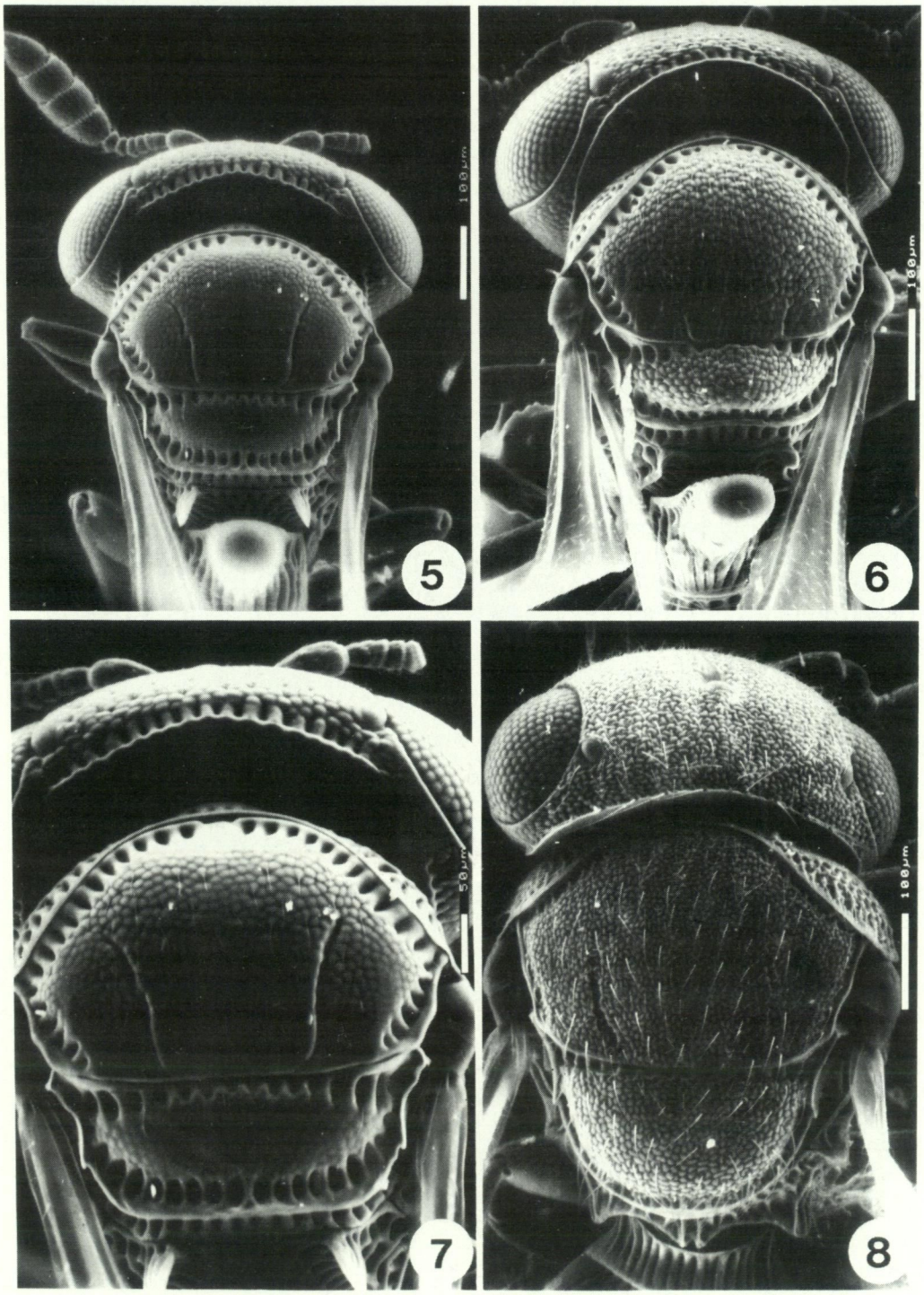
one-fifth distance to anterior margin of scutum; margin of scutum, sulcus between scutum and scutellum and posterior margin of scutellum more finely striate-scrobiculate; scutellum smaller, about one-third as long as scutum in mid line, strongly convex medially, with flattened posterior surface which abuts against metasoma horn; propodeal lamellae expanded dorsally into small broad teeth (not flanges); fore wing with stigmal vein slightly curved, postmarginal vein about half length of stigmal vein; horn on T1 slightly longer and narrower in cross-section.

Male

Unknown.

Comments

This species is also only recorded from Walpole



Figures 5–8 5, 7: *Ceratobaeus mainae* sp. nov., paratype ♀: 5, dorsal view of head, mesosoma and metasomal horn; 7, dorsal view of occiput and mesosoma. 6, *Ceratobaeus clavisegmentus* sp. nov., holotype ♀, dorsal view of head, mesosoma and metasomal horn. 8, *Hickmanella walpolensis* sp. nov., holotype ♀, dorsal view of head and mesosoma. Scale lines: 100 µm (Figs 5, 6, 8); 50 µm (Fig. 7).

Nornalup National Park. It is named after the unusual form of the antennal clava, a character it shares with *C. mainae* (see comments under that species).

Genus *Hickmanella* Austin

Hickmanella Austin, 1981a: 303; Galloway and Austin, 1984: 91; Austin, 1988: 176; Johnson, 1992: 400.

Hickmaniella Austin: Austin, 1981b: 85 (spelling error).

Type species

Baeoneurella intrudens Hickman, 1967, by original designation.

Description (additional to Austin 1981a)

Female

Frontal carina sometimes reduced, not keel-like and not reaching to median ocellus; notauli sometimes narrow; fore wing sometimes with basal and stigmal veins clearly defined (tubular).

Key to Species of *Hickmanella*

1. Fore wing with stigmal vein blurred, represented by infuscate patch; frontal carina keel-like, percurrent to median ocellus; scutum and scutellum coarsely to finely coriaceous; notauli as prominent broad grooves 2

   Forewing with well-defined tubular stigmal vein (Fig. 10); frontal carina reduced, reaching about half to two-thirds distance to median ocellus, faint in dorsal half; scutum and scutellum finely granulate (Fig. 8); notauli represented by narrow grooves (Fig. 8) 3

2. T1 virtually square in shape; posterior T2 slightly more than 2.5 x as wide as T1 .... *H. intrudens* (Hickman)

   T1 transverse, more than 3 x as wide as long; posterior T2 less than 2.0 x as wide as T1 .... *H. holoplatysa* Austin

3. Head and mesosoma black, metasoma brown, antennae golden yellow, legs yellow; longitudinal striations on T2 and T3 fine and dense ..... *H. walpolensis* sp. nov.

   Head and mesosoma golden yellow, antennae and metasoma yellow, legs pale yellow; longitudinal striations on T2 and T3 fainter .. .. *H. noyesi* sp. nov.

Comments

The two species described here from Western Australia expand the total fauna of this endemic Australian genus to four species. The inclusion of *H. walpolensis* and *H. noyesi* require that the diagnosis of *Hickmanella* be modified slightly to include species that have a reduced frontal carina and well-defined distal fore wing venation. The main diagnostic features for the genus are now that the antenna is 11-segmented, including five funicle segments and a distinctly four-segmented clava, the head and dorsal mesosoma are covered with very long posteriorly-directed hairs, the notauli are prominent, and the dorsal head is reniform in shape. The first of these characters is considered plesiomorphic (see discussion under *Mirobaeoides*), the second apomorphic, while the polarity of the last two characters is undetermined. The genus is closely related to *Idris* and may in fact render it paraphyletic. However, *Hickmanella* comprises a distinct and easily recognised assemblage of species and, like *Ceratobaeus*, its generic status will only be resolved after a more detailed analysis of these taxa on a world-wide basis. The four included species comprise two distinct groups: *H. holoplatysa* and *H. intrudens* which have a keel-like frontal carina, blurred distal fore wing venation and are found in eastern Australia (Austin 1981a), and *H. walpolensis* and *H. noyesi* which have a reduced frontal carina, distinct venation (Fig. 10) and are located in the southwest.

In Galloway and Austin's (1984) key to Australian scelionine genera, *H. walpolensis* and *H. noyesi* run to *Idris* at couplet 22, but they can be readily separated from this genus by the form of the antenna (see above).

Hickmanella walpolensis sp. nov.

Figures 8, 10

Material Examined

Holotype

♀, **Australia: Western Australia:** "W.AUST: Walpole NP Peaceful Bay, S & J Peck 17.VI–11.VII.80 coast sand heath pan traps" (ANIC).

Paratype

Australia: Western Australia: 1♂, Stirling Ranges N.P., 11.15.I.1987, J.S. Noyes, MT/YPT (BMNH).

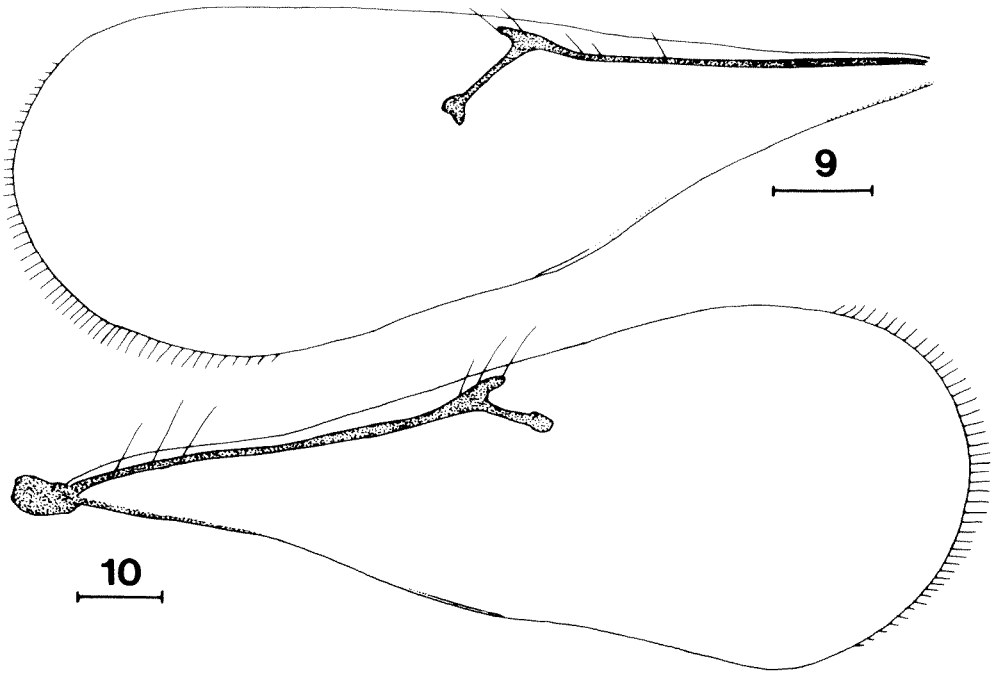
Description

Female

Length: 1.25 mm.

Colour: Head and mesosoma black, metasoma brown, antennae golden yellow, legs yellow; wings evenly and faintly infuscate.

Head: In anterior view subtriangular to oval in shape; vertex straight, broadly rounded at eyes;



Figures 9, 10 Fore wings: 9, *Ceratobaeus mainae* sp. nov., paratype ♀; 10, *Hickmanella walpolensis* sp. nov., paratype ♂. Scale lines: 100 μm.

frons, vertex and occiput densely granulate, with long scattered hairs; cheeks with short striae; minimum distance between eyes to width of head = 2.5:3.8; eyes with long scattered hairs; frontal carina prominent basally, fainter dorsally, reaching about half way to median ocellus; median ocellus partly recessed into small anterior depression; ocelli forming obtuse triangle, LOL:POL = 1.2:2.5, lateral ocelli not quite touching margins of eyes; in dorsal view head moderately elongate, vertex flattened, no wider than mesosoma; occipital carina prominent; in lateral view temple granulate; antennal clava compact, shorter than scape.

Mesosoma: Scutum L:W = 2.3:3.3, surface densely granulate, with scattered long hairs; notauli represented by narrow grooves, reaching about half way to anterior margin of scutum; scutellum moderately flat dorsally, L:W = 1.5:2.5, two-thirds length of scutum, almost semicircular in shape, surface densely granulate, posterior margin with smooth narrow lip; propodeal lamella almost horizontal, with five teeth (small medial tooth, large lateral teeth and small anterior teeth), surface of propodeum longitudinally scrobiculate-carinate; in lateral view pronotum granulate in upper part, with longitudinally scrobiculate-carinate along postero-ventral margin; mesopleuron and metapleuron mostly smooth; fore wing broad, L:W = 8.2:3.4; stigmal vein tubular, well-defined; postmarginal vein short, about one-third length of stigmal vein, basal vein absent.

Metasoma: As long as head and mesosoma combined, 1.25 x as long as wide, suboval in shape, with long fine hairs (denser and shorter than those on scutum and scutellum); T1 longitudinally striate, with upturned anterior margin, one-third as long as posteriorly wide; ratio of mid-line length of T1:T2:T3 = 0.6:1.2:2.3; T2 longitudinally strigulate; T3 finely strigulate; T4 and T5 finely coriaceous; T2–T4 with smooth posterior margin.

Male

As for female except as follows:

Head slightly more oval in anterior view; antenna moderately short, about 2 x as long as scape, funicle segments short, f6–f9 transverse, last two segments separated; metasoma more rounded posteriorly, slightly shorter than head and mesosoma combined.

Comments

H. walpolensis is readily identified by the characters in the above key. It is very similar to *H. noyesi* from which it differs primarily in its striking colour pattern. It has been recorded from Peaceful Bay, Walpole National Park and the Stirling Ranges, and has been named after the former collecting locality.

Hickmanella noyesi sp. nov.

Material Examined

Holotype

♀, **Australia: Western Australia:** "W. Australia

Walpole Nornalup NP 17–21.I.1987 J.S. Noyes MT/YPT" (ANIC).

Description

Female

As for *H. walpolensis* except as follows:

Length 1.3 mm; head and mesosoma golden yellow, antennae and metasoma yellow, legs pale yellow; longitudinal strigulations on T2 and T3 slightly fainter.

Male

Unknown.

Comments

This species is unusual because of its vivid uniform yellow colouring. Only baeine wasps from tropical regions were formerly known to have such pale colouring, and hence the present species is easily distinguished from all others in the southern two-thirds of Australia. It is named after John Noyes, chalcidologist at the Natural History Museum, London, for collecting so many interesting scelionids from southwestern Western Australia.

DISCUSSION

Of the 80 species of baeine scelionids described from Australia, only two, *Mirobaeoides elongatus* Austin and *M. occidentalis* Austin are known from Western Australia. Recent collecting is the southwest by a number of workers, however, has revealed a rich and apparently strongly endemic baeine fauna. All seven baeine genera known from Australia (see Galloway and Austin 1984) are represented and, of the approximately 40 species recognised, 28 belong to *Idris* and *Ceratobaeus*. Apart from the six species treated here, all are undescribed and only four appear to occur outside of the region. Collecting to date, although intensive, has focused on relatively few localities and future surveys in a wider range of habitats in the southwest are therefore likely to reveal a much larger and taxonomically more interesting baeine fauna than so far revealed.

ACKNOWLEDGEMENTS

In 1975 I bought a copy of Barbara Main's Jacaranda book, "Spiders of Australia" to identify spiders collected as part of an undergraduate project. The following year, as an honours student in the Zoology Department at Sydney University I became seriously interested in spiders and undertook a project on the biology of *Nephila clavipes*. During that year Barbara's second book on spiders was published by Collins, the first really definitive work on this group of animals for Australia. I remember reading sections of this book and thinking what great animals these are and what wonderful experiments could be done. Without realising at the time, these two books and Barbara's other publications were instrumental in my undertaking a Ph.D. on spider biology and, subsequently, working on the ecology and systematics of spider parasitoids. For this Barbara, I am eternally grateful.

I wish to thank Lubo Masner (CNCI) for bringing some of the species treated here to my attention, and Paul Dangerfield for technical assistance.

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Manuscript received 10 January 1994; accepted 11 March 1994.