



Systematics, distribution and biology of the Australian 'micro-flea' wasps, *Baeus* spp. (Hymenoptera: Scelionidae): parasitoids of spider eggs

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Abstract

Baeus represents one of the most unusual genera of parasitic wasps in that females are apparently wingless, highly compact and flea-like in appearance. They are endoparasitoids of spider eggs of host families associated with above-ground vegetation and crytobiotic niches such as leaf-litter. The genus has remained poorly studied, with only 25 species described world-wide, with three from Australia; *B. dux* Girault, *B. leai* Dodd and *B. saliens* (Hickman). This study revises the Australian fauna, and describes 17 new species: *Baeus arthuri* Stevens **sp. nov.**, *B. glenysae* Stevens **sp. nov.**, *B. hallarakeri* Stevens **sp. nov.**, *B. iqbal* Stevens **sp. nov.**, *B. jenningsi* Stevens **sp. nov.**, *B. maryae* Stevens **sp. nov.**, *B. matthewi* Stevens **sp. nov.**, *B. moorei* Stevens **sp. nov.**, *B. murphyi* Stevens **sp. nov.**, *B. mymyae* Stevens **sp. nov.**, *B. ocellatus* Stevens **sp. nov.**, *B. prolatuspissus* Stevens **sp. nov.**, *B. scrobiculus* Stevens **sp. nov.**, *B. spirolimbus* Stevens **sp. nov.**, *B. tropaeumusbrevis* Stevens **sp. nov.**, *B. tropaeumusdensus* Stevens **sp. nov.** and *B. vulcanus* Stevens **sp. nov.** In addition, information is presented on the distribution of species which generally show the greatest diversity along the eastern seaboard of the Australian continent, including Tasmania. The biology of *Baeus*, its monophyly and relationships within the Baeini are also discussed. The African genera *Angolobaeus* Kozlov **syn. nov.** (type species *Parabaeus machadoi* Risbec, from Angola) and *Paraneurobaeus* Risbec **syn. nov.** (type species *Paraneurobaeus arachnevora* Risbec, from Cameroon) are placed in synonymy with *Baeus*, and a lectotype is designated for *P. arachnevora* Risbec.

Key words: Baeini, *Ceratobaeus*, *Idris*, egg parasitoid, spider host

Introduction

The Scelionidae are small wasps, 0.5–12 mm in length, that are endoparasitic on the eggs of insects and spiders. They have a hypodermic-like ovipositor that is used to pierce the chorion of a host egg, in which they lay their own egg. The scelionid larva then consumes the contents of the host egg, pupates within it, and emerges as a fully developed adult (Austin 1983, 1985; Austin *et al.* 2005). Although the tribal classification of the family is somewhat problematic in that numerous groups are probably not monophyletic (see Murphy *et al.* in press) they, none-the-less, are mostly easy to recognise morphologically and appear to have relatively fixed host relationships. For example, members of the Scelionini *sensu str.* parasitize the eggs of acridid grasshoppers, the Gryononi parasitise heteropteran eggs, the Embidobiini attack embiid eggs, and the Teleasini and Xenomerini (Teleasinae) parasitise eggs of carabid beetles (e.g. Masner 1976; Austin *et al.* 2005).

The Baeini (*sensu* Austin and Field 1997) is the only scelionid tribe that utilises the eggs of spiders as a host food source for their larvae. As a group they have radiated into numerous araneid families (Austin 1985; Iqbal & Austin 2000b) and, because of their relatively high degree of host specificity, have speciated along with the diverse fauna of spiders that are found in three key habitats; soil and leaf-litter, under the bark of trees, and the foliage of shrubs and bushes. Even though members of the tribe are often the most diverse scelionid groups in some habitats, the vast majority of species remain undescribed for all regions of the world. In Australia, where at least some taxonomic work has been undertaken on the group (e.g. Austin 1986, 1988; Iqbal & Austin 2000b), at least 80% of species have not yet been described, with the fauna probably exceeding 1,000 species.

Members of the Baeini can be recognized by three synapomorphies other than their host biology, however none are unequivocal for the group. These are the female antenna comprised of four compact clavomeres that are usually completely fused to each other; the antennal scape not reaching above the level of the anterior ocellus; and tridentate mandibles with a convex outer surface (Austin & Field 1997). A recent molecular study has shown that most Baeini (*Idris* Foerster, *Ceratobaeus* Ashmead, *Baeus* Haliday and *Odontacolus* Priesner) form a monophyletic group, but that the Australasian genera *Mirobaeiodes* Dodd and *Neobaesus* Austin are more closely related to other genera of scelionids associated with non-spiders hosts (Carey *et al.* 2006; Murphy *et al.* in press).

Without doubt, members of the nominal baeine genus *Baeus* are among the most highly modified and unusual parasitic wasps. Like some other scelionid genera, they are extremely sexually dimorphic in that females are tiny 'wingless' wasps with a highly fusiform body, while males are fully winged and, although morphologically reduced in some ways, have a 'normal' scelionid appearance. It is not unusual for female *Baeus* to be misidentified as small beetles and, because of their highly modified morphology, we have coined the common name 'micro-flea wasps' to describe them.

Even though the highly unusual nature of *Baeus* has been known for over 170 years (e.g. Haliday 1833; Kieffer 1926), only 25 species have been described to date, three from Australia, seven from the Nearctic, six each from the Neotropics and the Palearctic, one each from the Oriental and Afrotropical (Seychelles) regions, and one from Hawaii. However, significant numbers of species occur in many regions, particularly in the wet tropics, subtropics and southern hemisphere temperate forests. The aims of the current study were to revise the taxonomy of Australian species and to document available information on their distribution and biology. Because of the extreme sexual dimorphism of the genus, it is very difficult to associate male and female conspecifics when there is more than one species present at a specific location. For two species treated here, the sexes have been reliably associated as they have been reared from host egg sacs. However, for all other species, their taxonomy is based only on females. In total 20 species are recognized, three of which are redescribed and 17 described as new. However, an additional eight species, have been identified from the continent but have not been formally described because they are represented by few specimens, most in poor condition, and are not readily distinguishable.

Materials and methods

Approximately 900 specimens from Australian and international collections were examined for this study. Because of their small size, a Phillips XL30 field emission scanning electron microscope (FESEM) (Adelaide Microscopy, The University of Adelaide) was used to elucidate micro-characters such as sculpturing, measure pilosity length, and to distinguish if the hind femoral spines are absent or reduced. For most *Baeus* these characters cannot be accurately discerned under a stereomicroscope, therefore SEM is required. Prior to examination, specimens were cleaned while mounted on card-points using absolute alcohol (so not to dissolve the water based seccotine glue) applied with a fine brush to remove obvious dirt and debris. Card-mounted specimens were then secured to SEM stubs with carbon-based plasticine (Leitz-C-Plast). Most specimens were examined uncoated at 1.0 kV and a spot size of two or three. Several specimens were sputter coated with gold-carbon using a CSC (Commonwealth Scientific Corporation) Mini Coater Model 2000, to a thickness of 300–400 Å with a current of 10–15 mA set for 3 min. Specimens were then examined at 5.0 kV and a spot size of three or four.

Terminology and abbreviations

Terminology used for general morphology and measurements principally follow Masner (1976, 1980), Galloway and Austin (1984) and Iqbal and Austin (2000b). For the terminology associated with the carinae on the dorsal and posterior surfaces of the head we use the terms proposed by Masner (1983). Importantly, the carina running along the dorsal-posterior margin of the head is referred to as the hyperoccipital (not occipital) carina (see Fig. 4B).

Abbreviations used for morphological terminology are given in Figures 2–6. Nomenclature of male wing veins follows Dangerfield *et al.* (2001) which combines the nomenclature used for reduced forewing venation (e.g. Galloway and Austin 1984; Masner 1980) with the homologous terms derived from the modified Comstock-Needham system adopted by Sharkey and Wharton (1997). Measurements presented in the species' descriptions are mean values, followed by the range in parentheses and the number of species measured (n).

Terminology for surface sculpturing follows Eady (1968) and Harris (1979), while that for Australian biogeographic subregions (Fig. 1) is adopted from Heatwole (1987). Length and density of pilosity is extensively used as distinguishing characters and specific terminology was devised to denote grades of pilosity (Table 1).

TABLE 1. Terminology used for length and density of pilosity as measured using scanning electron microscopy.

| Pilosity of dorsal sclerites | | Pilosity of eyes | |
|---|---|------------------|--|
| Length | | Length | |
| Short | < 10 μm | Short | < 5 μm |
| Medium | = 10 μm and < 30 μm | Medium | = 5 μm and < 10 μm |
| Long | = 30 μm | Long | = 10 μm |
| Density (distance between hairs in the same row) | | | |
| Sparse | = 20 μm | | |
| Moderate | < 20 μm and > 10 μm | | |
| Dense | = 10 μm | | |

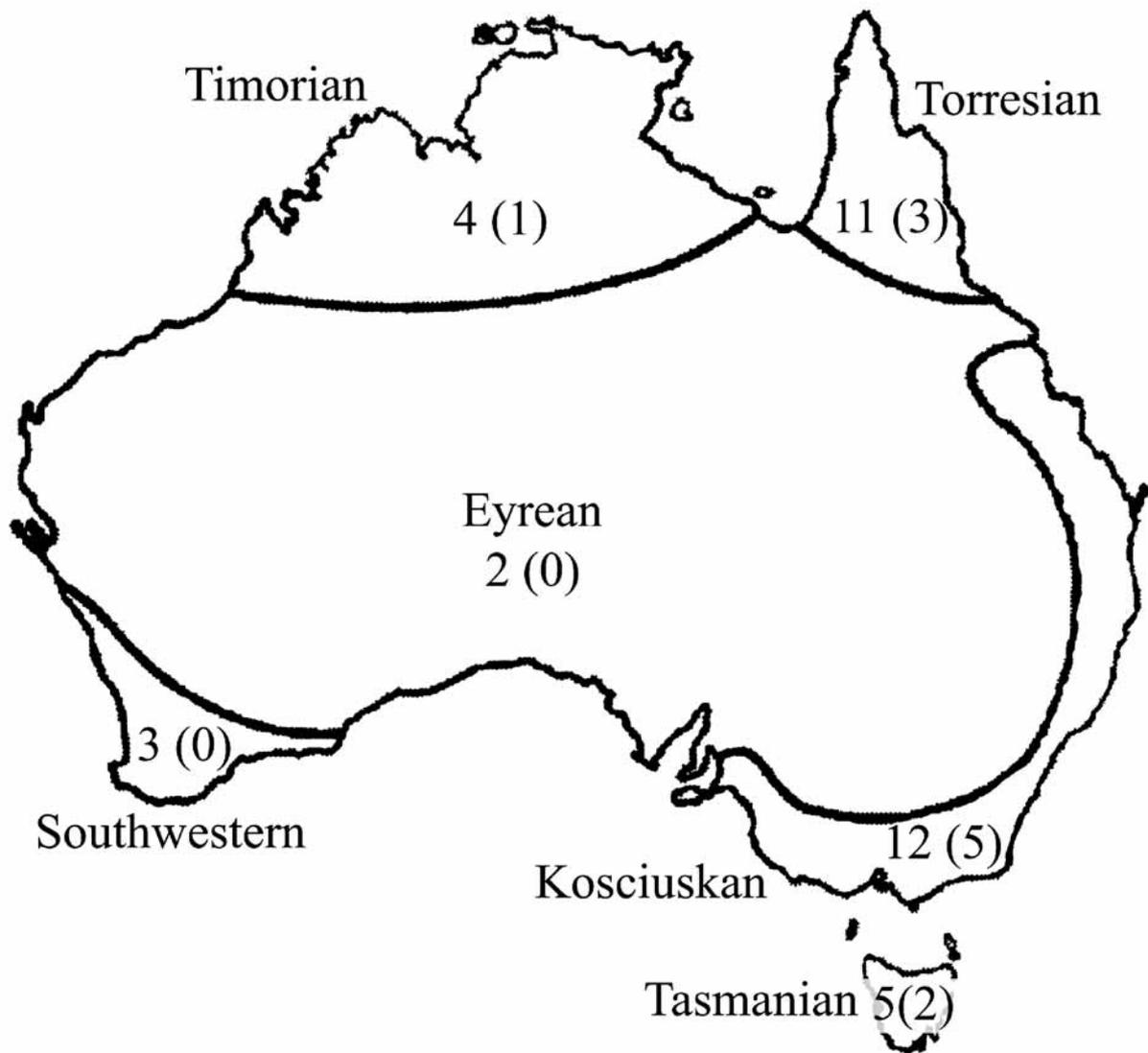


FIGURE 1. Distribution patterns of *Baeus* species: Number of *Baeus* species found in particular biogeographic regions with number of endemic species in parenthesis. Biogeographic subregion nomenclature adopted from Heatwole (1987). See Table 3 also.

TABLE 3. Number of *Baeus* species shared among regions. Biogeographic subregion nomenclature adopted from Heatwole (1987). See also Fig. 1.

| | Eyr | Kos | SW | Tas | Tim | Tor |
|--------------|-----|-----|----|-----|-----|-----|
| Eyrean | - | | | | | |
| Kosciuskan | 2 | - | | | | |
| Southwestern | 1 | 3 | - | | | |
| Tasmanian | 0 | 2 | 1 | - | | |
| Timorian | 0 | 1 | 0 | 1 | - | |
| Torresian | 2 | 7 | 3 | 2 | 2 | - |

Abbreviations used in the text for institutions follow Evenhuis and Samuelson (2004) as follows:

| | |
|------|---|
| ANIC | Australian National Insect Collection, CSIRO, Canberra |
| BMNH | The Natural History Museum, London |
| CNC | Canadian National Collection, Ottawa |
| QDPC | Queensland Department of Primary Industries Collection, Indooroopilly, Brisbane |
| QM | Queensland Museum, Brisbane |
| MNHN | Muséum National d'Histoire Naturelle, Paris |
| NZAC | New Zealand Arthropod Collection, Auckland |
| SAM | South Australian Museum, Adelaide |
| MRAC | Musee Royal de l'Afrique Centrale, Teruren |
| WAMP | Western Australian Museum, Perth |
| WINC | Waite Insect and Nematode Collection, The University of Adelaide, Adelaide |

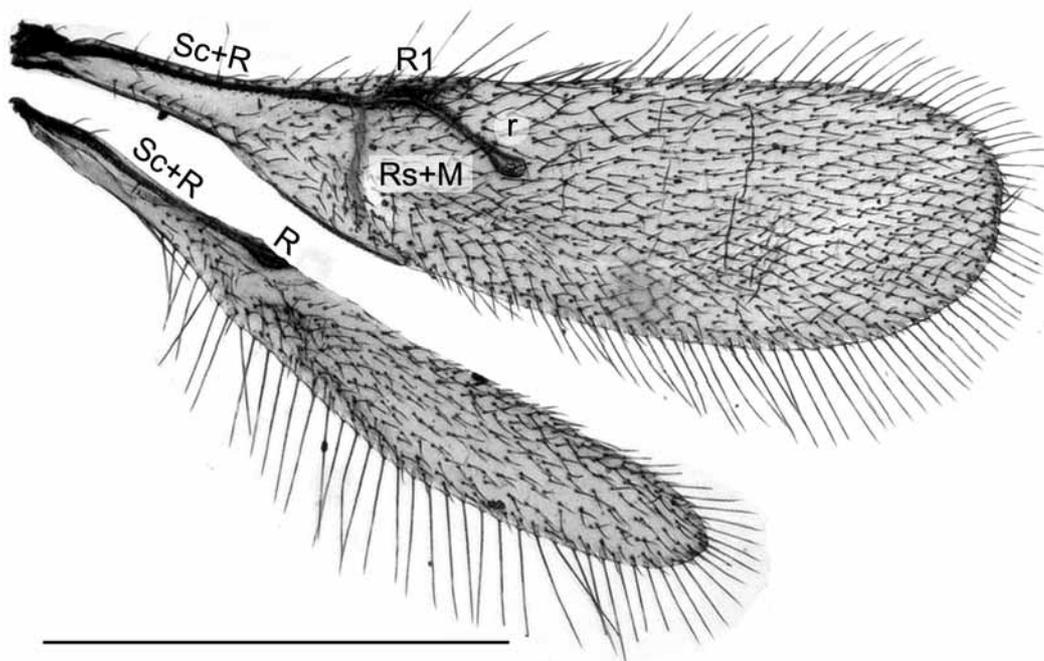


FIGURE 2. Forewing and hindwing of *Baeus* male. Venation terminology follows Dangerfield *et al.* (2001): **Sc+R**, submarginal = subcosta + radius ; **R1**, marginal = radius anterior branch; **r**, stigmal = radial cross vein; **RS+M**, basal = radial sector + media. Scale line = 0.5 mm.

Genus *Baeus* Halliday

Baeus Halliday, 1833: 270. —Ashmead, 1893: 167; Kieffer, 1926: 146; Galloway & Austin, 1984: 86; Austin, 1988: 88; see Johnson, 2004, for complete bibliography [Type species, by monotypy, *Baeus seminulum* Haliday, 1833].

Anabaesus Ogloblin, 1957: 440 —[Type species, by designation, *Baeus (Anabaesus) ventricosus* Ogloblin, 1957]. Proposed as a subgenus of *Baeus* Haliday.

Angolobaeus Kozlov, 1970: 218. —Masner, 1976: 67; Johnson, 1992: 336 [Type species, by designation, *Parabaeus machadoi* Risbec, 1957]. **Syn nov.**

Hyperbaeus Foerster, 1856: 144. —Masner, 1976: 67; Johnson, 1992: 457 [Type species, *Baeus seminulum* Haliday] Unnecessary replacement name for *Baeus* Haliday.

Paraneurobaeus Risbec, 1956: 821 — Masner, 1976: 67; Johnson, 1992: 457 [Type species, by designation, *Paraneurobaeus arachnevora* Risbec, 1956]. **Syn nov.**

Psilobaeus Kieffer, 1926: 151 — [Type species, by monotypy, *Baeus curvatus* Kieffer, 1910] Synonymy by Masner (1965).

Diagnosis. Female. Head much wider than mesosoma, closely abutted to pronotum, marginally wider than metasoma (Fig. 11D); lateral ocellus much closer to posterior margin of eye than to median ocellus (Fig. 4B); hyperoccipital carina distinct along dorsal-posterior margin of vertex; occiput vertical and concave, not normally visible dorsally unless head flexed forward, always forming acute angle with vertex; posterior margin of vertex concave medially; in dorsal and lateral views, frons rounded; in anterior view, head ovoid in shape; antenna 7-segmented (Fig. 6A), with 4 funicle segments, F1 about twice as long as each of F2–4 which are transverse, clava unsegmented (fine suture lines present on dorsal surface only), densely pilose (Fig. 6A), scape not reaching to median ocellus; frontal carina incomplete, not reaching to median ocellus (Fig. 13D); antennal insertion positioned below ventral margin of eyes, between ventral margin of frons and dorsal margin of clypeus; clypeus with transverse furrow just dorsal to its ventral margin, furrow with 6 bristles along dorsal margin; mandibles tridentate; maxillary and labial palps 1-segmented, labial palps wart-like, bearing one bristle, maxillary palps clavate, having three bristles apically; dorsally frons coriarius; malar region with cristulations seemingly emanating from anterior tentorial pits (Fig. 13D); gena broad and distinct (Fig. 4A and 9E).

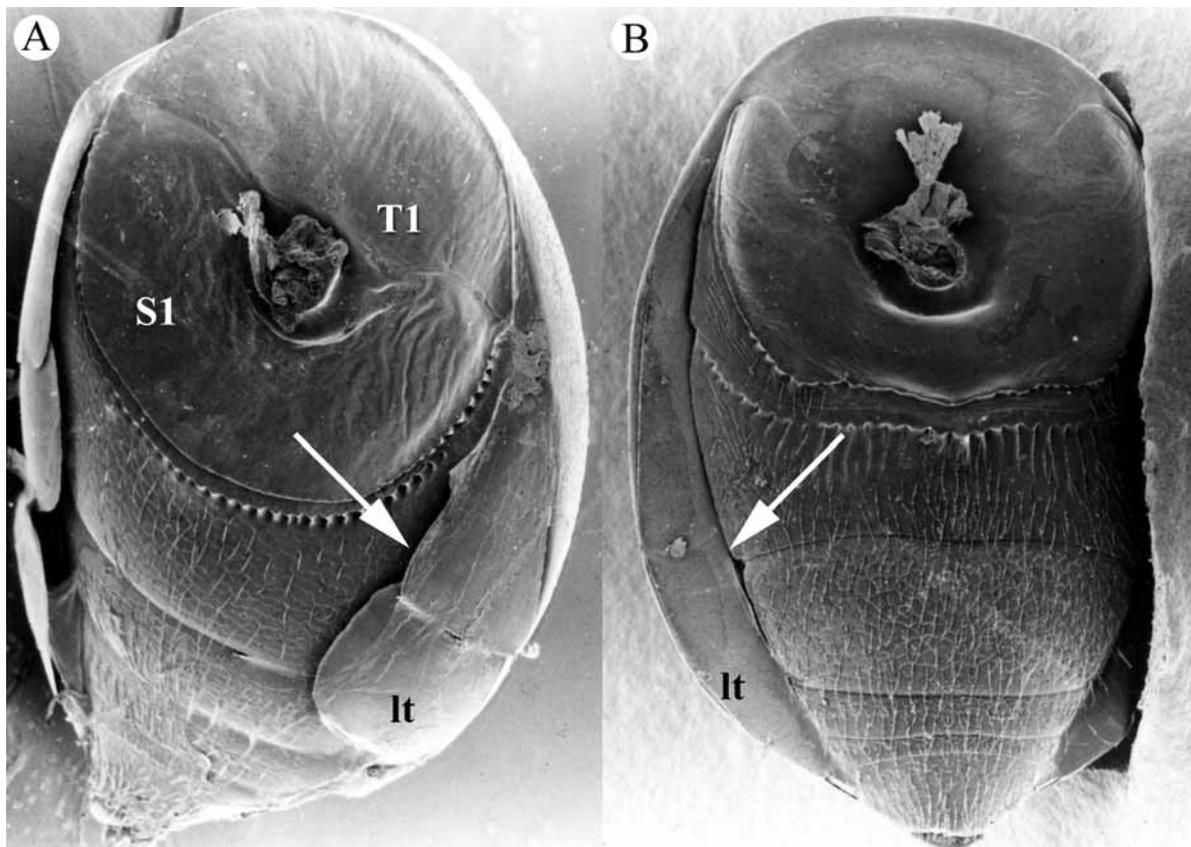


FIGURE 3. Ventral view of female metasoma showing laterotergites and the condition of the ventral margins (arrowed): **A**, excised (free) (*Baeus leai*). **B**, incised (sutured) (*Mirobaeoides* sp.). **lt** = laterotergite; **S1** = sternite 1; **T1** = tergite 1.

Mesosoma. Compact, higher and wider than long (Fig. 10A and 11D); both fore- and hindwings reduced to minute sclerotized plates that are often overlooked because they neatly fit into recesses beneath lateral margins of mesoscutum and mesoscutellum respectively, only marginally larger than tegula (Fig. 4A and 7B–F); pronotum visible latero-dorsally, but not medio-dorsally, dorso-posterior corner of pronotum bearing protuberance (Fig. 7E); mesoscutum much wider than long; mesoscutellum transverse, approximately one-third length of mesoscutum (Fig. 4B); metanotum greatly reduced, hidden beneath mesoscutellum so not visible (cf. Figs 4A and B to Figs 5A and B); posterior surface of propodeum vertical, dorsal surface forming thin transverse band, posterior margin extending over anterior margin of T2 (Figs 4A and B); dorsal metapleuron fused with propodeum to varying degrees (Figs 7A–F); coxae large, anterior surface densely covered with stout bristles; legs longer than mesosoma and metasoma combined, hind leg longest; hind leg femoral spine present or absent (sometimes difficult to see even at high magnification) (Figs 6C and D).

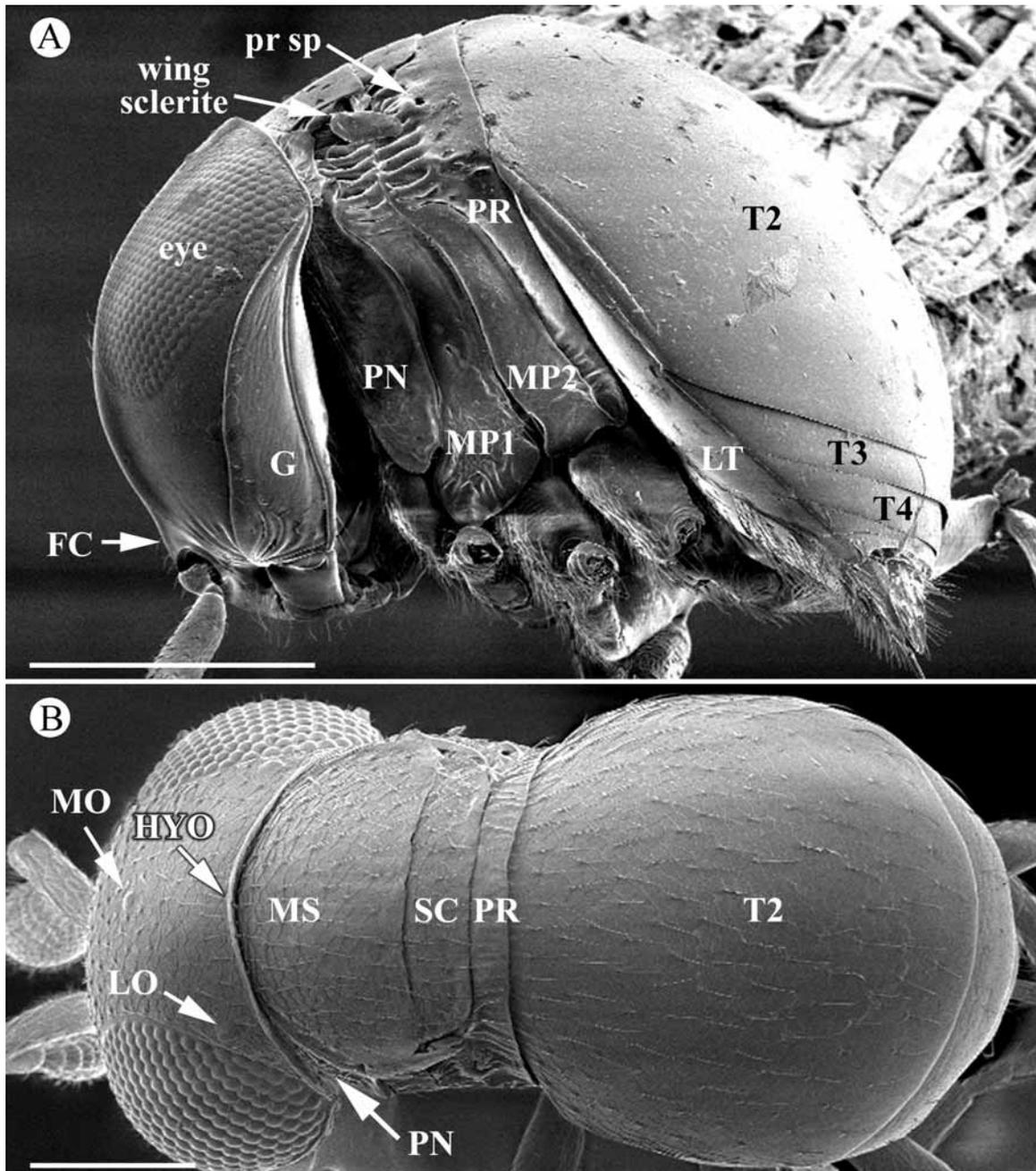


FIGURE 4. Female *Baeus* spp.: **A**, lateral habitus of *B. arthuri*; **B**, dorsal habitus of *B. murphyi*. Scale lines, **A** & **B** = 100 μ m. **fc** = frontal carina; **fw** = forewing remains; **ge** = gena; **hw** = hindwing remains; **hyo** = hyperoccipital carina; **lo** = lateral ocelli; **lt** = laterotergite; **mo** = medial ocellus; **mp 1 & 2** = mesopleuron & metapleuron respectively; **ms** = mesoscutum; **pn** = pronotum; **pr** = propodeum; **pr sp** = propodeal spiracle; **sc** = mesoscutellum; **tg 1 & 2** = forewing & hindwing tegula, respectively; **T2, 3 & 4** = tergite 2, 3 & 4 respectively.

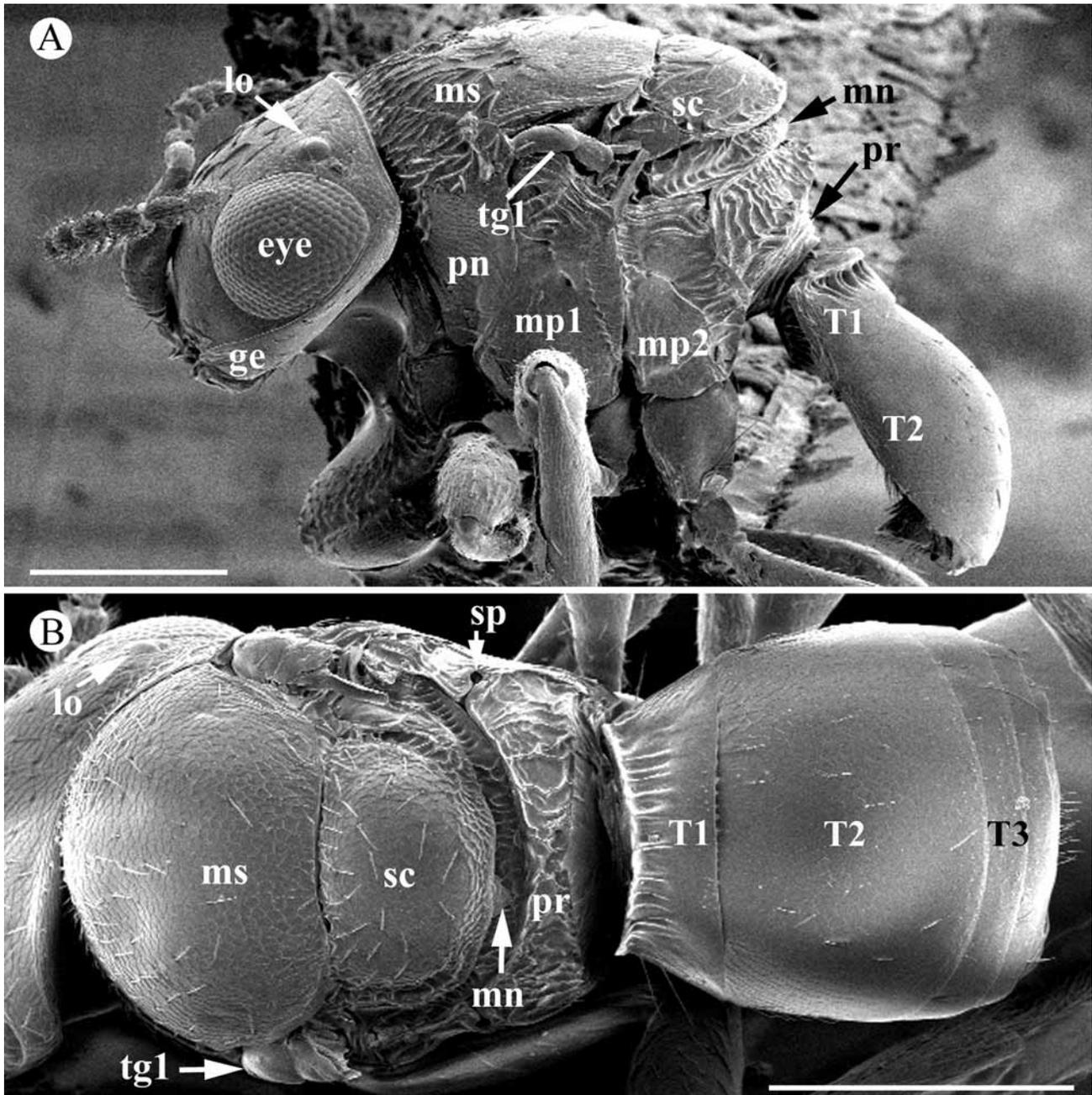


FIGURE 5. Male *Baeus* spp. (wings removed): **A**, lateral habitus of *B. arthuri*. **B**, dorsal habitus of *B. leai*. Scale lines, A & B = 200 μ m. **ge** = gena; **lo** = lateral ocelli; **mn** = metanotum; **mp 1 & 2** = mesopleuron & metapleuron respectively; **ms** = mesoscutum; **pn** = pronotum; **pr** = propodeum; **pr sp** = propodeal spiracle; **sc** = mesoscutellum; **tg1** = forewing tegula; **T1, 2 & 3** = tergite 1, 2 & 3 respectively.

Metasoma. Short, broadly abutted against vertical posterior surface of propodeum so body appears fused (Figs 4A and B); T1 and S1 forming vertical anterior surface of metasoma, T1 not visible dorsally (Fig. 3A); T2 largest tergite, occupying >0.6 of dorsal surface of metasoma (Figs 4A and B), glabrous band present along posterior margin; laterotergites wide, ventral margins free, not incised into a submarginal groove (cf. Fig. 3A to 3B).

Male. Body not rounded and fused, division between mesosoma and metasoma obvious (Fig. 5); dorsal surface of mesosoma well above that of metasoma; metasoma petiolate; sculpturing of all dorsal sclerites similar to female, usually more pronounced, except for propodeum and anterior margin of T1 which are visible

and generally confused-rugulose and crenulate-costate, respectively; pilosity generally longer than female conspecifics but not as dense; colour similar to female conspecifics.

Head. Wider than mesosoma, but not as wide in relation to mesosoma as in female, closely abutted to pronotum; hyperoccipital carina distinct along dorsal-posterior margin of vertex; occiput vertical and concave, often forming acute angle with vertex (as in female); eyes not as large as in female, but more distinctly bulging from face; ocelli more prominent; antenna 11 or 12-segmented, F9 and F10 sometimes fused or separated (Fig. 6B).

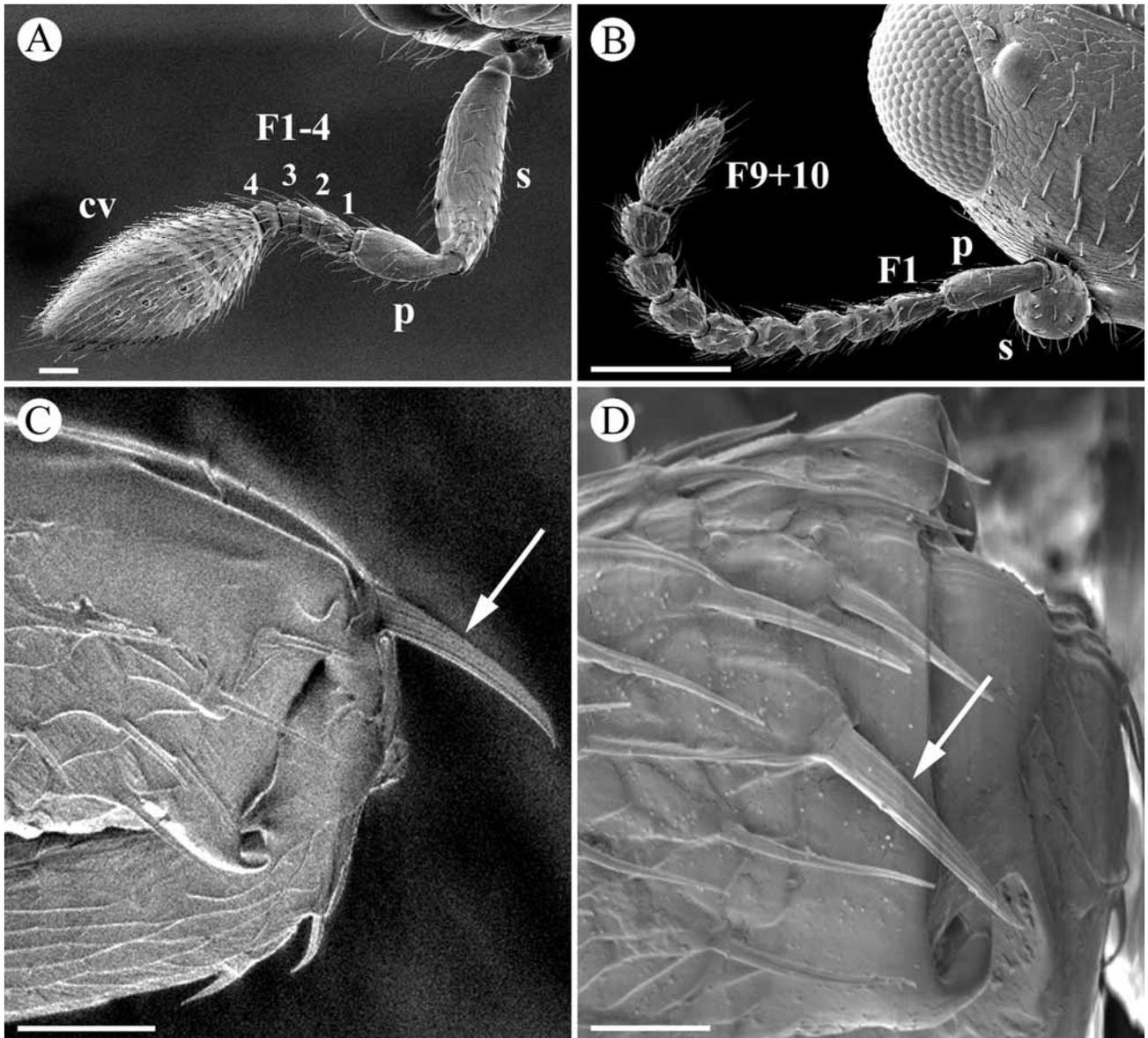


FIGURE 6. *Baeus* spp.: **A & B**, *B. arthuri*: **A**, female antenna; **B**, male antenna. **C**, female *B. vulcanus* hind femoral spine (arrowed). **D**, female *B. leai* reduced hind femoral spine (arrowed). Scale lines, A = 20 μ m; B = 100 μ m; C = 20 μ m; D = 10 μ m. cv = clava; F1 - 4, 9 & 10 = funicle segments 1–4, 9 & 10 respectively; p = pedicel; s = scape.

Mesosoma. More quadrate than transverse, length greater than width and height, though only marginally (Fig. 5A and B); mesoscutum wider than long; mesoscutellum often semi-ovoid in dorsal view, approximately half length of scutum, projecting posteriorly above metanotum; metanotum transverse, visible posteriorly; propodeum with exposed oblique sculptured surface in anterior dorsal part, posteriorly surface more vertical and abutted against T1; sculpturing of dorso-lateral regions of meso- and metapleuron confused;

wings present and macropterous (Fig. 2); forewing narrow so that anterior and posterior margins almost parallel; submarginal (Sc+R) + marginal (R1) veins only reaching about 0.4 times along wing length, marginal vein short, stigmal vein (r) much longer than marginal vein, basal vein (Rs+M) present as thickened infuscate band; setal fringe present and long except for proximal posterior margin; hindwing extremely narrow, setal fringe on posterior margin much longer than maximum wing width.

Metasoma. Petiolate, short, usually shorter than mesosoma; T1 clearly visible dorsally; T2 the largest tergite but not as dominant as in female; ventral surface often collapsed inwards so concave; laterotergites free and wide as in female, but difficult to see when metasoma has collapsed ventrally.

Monophyly and relationships of *Baeus*

The monophyly of *Baeus* is supported by eight critical characters associated with the female sex: 1) the female metasoma is short, convex, wide anteriorly and broadly abutted against the vertical surface of the mesosoma so the body appears to be rounded and fused (Figs 4A & B), 2) T1 and S1 are wafer thin and form the semi-vertical anterior surface of the metasoma (Fig. 3A); because of this arrangement, T1 is not visible dorsally (Fig. 4B), 3) T2 is the largest tergite, comprising at least 0.6 times the length of the metasoma (Fig. 4A & B), 4) the laterotergites of the metasoma wide and free, not incised into a submarginal groove as in *Mirobaeoides* (Fig. 3A cf. 3B), 5) the propodeum is vertical and forms the whole of the posterior surface of the mesosoma, 6) the metanotum is reduced and hidden below the mesoscutellum, 7) the maxillary and mandibular palps are reduced to a single segment, and 8) the wings are micropterous, i.e. both fore- and hindwings reduced to minute sclerotized plates, the forewing only slightly larger than the tegula, therefore, often referred to as 'wingless' (Fig. 4A, 7B–F). In addition, the male is characterized by having the forewing narrow so that the anterior and posterior margins are almost parallel, the submarginal + marginal veins only about 0.4 times the length of the wing, and a basal vein is usually present (Fig. 2).

Of the female characters above, a rounded, apparently fused body (character 1) is found in the genera *Mirobaeoides*, *Neobaeus* and two undescribed baeine genera from southern Africa (in CNC); the laterotergites being wide and free (character 4) is found independently in *Neobaeus*, *Tiphodytes* Bradley (Thoronini) and all members of the Telenominae (Masner 1976), while the forewings being reduced to a tiny sclerotized flaps (character 8) is found in numerous taxa across the Scelionidae and Platygasteridae, particularly those associated with soil and litter habitats (Austin *et al.* 2005). The other characters listed above are all apparently unique to *Baeus*.

The phylogeny of the Baeini was first examined by Iqbal and Austin (2000a) using a morphological dataset for exemplar species representing virtually all described genera as well as five putatively undescribed generic level taxa. Parsimony analysis resolved *Baeus* as monophyletic but only with the inclusion of *Apobaeus* Ogloblin, a potential synonym of *Baeus* from the Neotropics. To date we have been unable to examine the type species of *Apobaeus* (*Tetrabaesus insularis* Ogloblin), and the generic status of this taxon remains unclear. In this analysis, virtually all 'wingless' taxa formed a monophyletic group, with *Baeus* + *Apobaeus* being placed apically and sister to *Neobaeus* and then *Mirobaeoides*. However, removal of wing size character states from the dataset resulted in a largely comb-like tree, and pointed to the fact that in the absence this character, which is notoriously homoplastic, there were few informative characters to infer relationships among genera. However, as partly outlined in the Introduction, a recent molecular study (Carey *et al.* 2006), including 23 baeine species representing seven genera and eight non-baeine scelionids, resolved *Baeus* as monophyletic but placed it in a more basal position as sister to *Odontacolus* + *Hickmanella* + *Idris* + *Ceratobaeus*, with the latter two genera being polyphyletic. Further, in this analysis the Baeini was not monophyletic as *Mirobaeoides* + *Neobaeus* were resolved with other scelionid genera. These results have been confirmed within a broader sampling of taxa, and point to the fact that the Baeini is not monophyletic and that scelionids have probably exploited spider eggs independently at least twice (Murphy *et al.* in press).

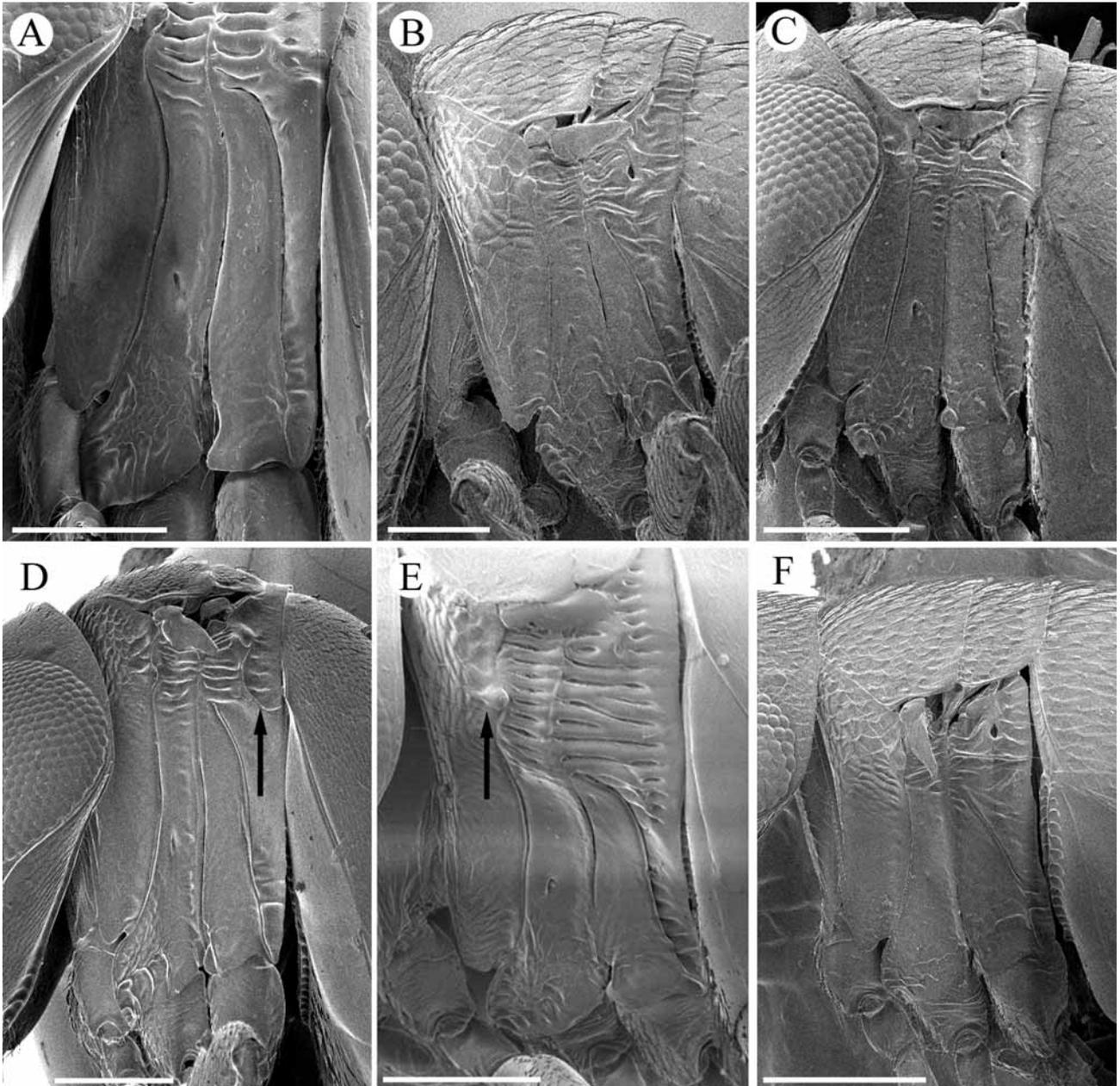


FIGURE 7. Female *Baeus* spp.: lateral mesosoma. **A**, *B. arthuri*; **B**, *B. hallarakeri*; **C**, *B. iqbali*; **D**, *B. leai*, cresent shaped carina arrowed; **E**, *B. scrobiculus*, pronotal protuberance arrowed; **F**, *B. tropaeumdensus*. Scale lines, A, C – F = 100 μ m; B = 50 μ m.

Comments on non-Australian genera

Prior to the commencement of the current study, one of us (ADA) was able to examine the types of two monotypic baeine genera, *Angolobaeus* Kozlov and *Paraneurobaeus* Risbec. Both of these genera are here proposed as junior synonyms of *Baeus*.

Kozlov (1970) erected *Angolobaeus* for *Parabaeus machadoi* Risbec from Angola (Risbec 1957) (holotype in MRAC) on the basis that the type species has the vertex and frons with two “mound-like projects” on each. *Parabaeus* Kieffer is morphologically highly convergent with *Baeus*-like scelionids, but the genus belongs to the Platygasteridae as recognized by Masner (1976) (see also Austin 1988; Manser & Huggert 1989). Kozlov (1970) correctly placed *P. machadoi* as a scelionid and a member of the Baeini. However, there is no justification for the generic status of this species; it is congeneric with *Baeus* in every respect except for

the cephalic projections, which we propose are simply autapomorphic and of importance only at the species level. A range of cephalic processes also occur on the head of some *Telenomus* (Telenominae) (Mineo 1979; Johnson 1980; Huggert 1983) and the vertex and eyes of some Platygasteridae (Austin 1984), where they are also only of species level importance.

Risbec (1956) described *Paraneurobaeus* for a species reared from spider eggs collected at Garoua (Cameroon) that appeared to have a 6-segmented, rather than a 7-segmented, antenna. The type species, *Paraneurobaeus arachnevora* Risbec, is represented by a syntypic series (MNHN) mounted on two microscope slides. Unfortunately, Risbec's description is inaccurate and his drawings look nothing like the slide mounted specimens that are in reasonable condition. Examination of the type series shows in fact that the antenna is 7-segmented and that three (not two) tiny funicle segments are present in addition to the larger basal funicle segment, as is the case in *Baeus* and most other members of the tribe. In every respect, this species is congeneric with *Baeus*. The specimen on one slide with the head attached we here designate as the lectotype of *P. arachnevora*, and the remaining specimens that are slightly broken as paralectotypes.

Biology

Although there are numerous series of *Baeus* reared from spider eggs in world collections, in most cases the host spider has not been identified. Austin (1985) summarised all available host information for parasitoids associated with spider eggs and, worldwide, 22 species of *Baeus* have host data recorded to at least family level. Although the data are limited, it does point to this genus parasitising a narrower spectrum of spider host families compared with the largest genus of baeines, *Idris*. Where *Baeus* has been reared from six spider families, more than 70% of which come from just two families (Araneidae – 9 records and Theridiidae – 7 records), *Idris* has been reared from 11 host families (22 records). Interestingly, the spider hosts for *Baeus* have uniformly more complex structured eggsacs compared with the hosts of *Idris*, in that they have either dense flocculent silk walls or have multiple layers of dense and flocculent silk (types 2 and 3, viz. the eggsac classification proposed by Austin 1985). Further, it has been postulated that the highly modified body shape of *Baeus* may also function as an adaptation for the female wasp to burrow through the silk wall of the eggsac to reach and oviposit into the eggs within (Austin 1988; Austin *et al.* 2005). However, some caution should be exercised in not over-interpreting the above apparent difference as there is likely to be some bias in the host data for *Baeus* in that most records come from spider hosts collected from above-ground vegetation (where eggsacs are easy to locate and collect), rather than from soil and leaf-litter where *Baeus* appear to be more abundant.

For Australia, *Baeus* have been reared from three spider families (Table 2); Araneidae, Linyphiidae and Theridiidae with four of the six records being from the araneid genera *Araneus*, *Argiope*, *Celaenia* and *Cyrtophora*, all of which produce eggsacs attached to vegetation. Individual host data are given below for two *Baeus* species, however for the other four host records the material was not available to examine and the species had not been identified.

TABLE 2. List of known hosts of Australian *Baeus* species from data labels and Austin (1985).

| <i>Baeus</i> species | Host species | Spider family |
|-----------------------------|--|---------------|
| <i>B. leai</i> Dodd | <i>Araneus</i> sp. | Araneidae |
| | <i>Celaenia</i> sp. | Araneidae |
| <i>B. saliens</i> (Hickman) | <i>Microtenonyx subianeus</i> (Pick.-Camb) | Linyphiidae |
| <i>Baeus</i> sp. | <i>Argiope aethera</i> (Walck.) | Araneidae |
| | <i>Cyrtophora moluccensis</i> (Doleschall) | Araneidae |
| | <i>Steatoda livens</i> (Simon) | Theridiidae |

Distribution. The greatest diversity of Australian *Baeus* species exists within the peripheral mesic environments of the continent, a common pattern exhibited by their hosts (Raven 1988). Of the 20 species treated here, 55% are endemic to a single biogeographic subregion, with the highest level of endemism found in the Kosciuskan subregion (25%) (Fig. 1). The eastern seaboard of the continent, from northern Queensland to southern New South Wales, exhibit the greatest species richness (Fig. 1) and share the most number of species (Table 3). The lowest number of species occurs in the South-Western and Eyrean subregions which have no endemic taxa, although these areas are also the poorest surveyed. In addition, we have recognized a further eight likely new species, but have refrained from describing them because of the limited material available and/or their poor condition. Five of these species are from the Kosciuskan subregion, two of which also occur in other subregions, one in the South-West, the other extending into the Torresian subregion. The Tasmanian, Timorian, and Torresian subregions each have a single undescribed species. It is likely that numerous additional species will be discovered in the future as more long-term collecting using a range of techniques is undertaken in specific habitats.

Although beyond the scope of the current study, available material of *Baeus* from New Zealand and islands surrounding Australia were also examined. Apparent from this is a close affinity of the neighbouring Pacific fauna with the Australian fauna. For instance, New Zealand has a relatively small fauna comprising five species, two of which also occur in Australia (*B. leai* and *B. saliens*). Of the remaining three species, two are similar to *B. murphyi* and *B. saliens*, and may be indicative of allopatric speciation events. The *Baeus* species found to occur on several neighbouring Pacific islands from which material was available (Norfolk Island, Lord Howe Island, New Caledonia, and Fiji) all belong to species also present in Australia. This close affinity is in stark contrast to the *Baeus* fauna of Christmas Island in the Indian Ocean, some 2000 km to the north-west of Australia. Of the five species found to occur on Christmas Island, only one, *B. tropaeumusbrevis* is also present in Australia. Interestingly, *B. tropaeumusbrevis* in Australia has only been collected from the north-west of Australia, the closest region of the Australian mainland to Christmas Island. This difference between the Christmas Island and Australian fauna's is hardly surprising given that the islands of the Sunda Arc to the north, particularly Java and Sumatra, are the closest landmasses to Christmas Island, and the direction of the prevailing winds may facilitate colonisation from Indonesia. Study of the *Baeus* fauna of the neighbouring Indonesian islands may reveal a close affinity with the Christmas Island fauna, as Smithers (1995) has documented for the Psocoptera. The distribution of *B. tropaeumusbrevis* appears to be an example of colonisation of Australia from the north-west.

Key to females of Australian *Baeus* spp.

Please note, because of the small size of the specimens to be identified, the minimum magnification required to view the characters used in this key is 80x's. In addition, an eyepiece graticule is required because measurements of various characters and their states are relied upon in this key.

1. Hind femoral spine large, > 15 µm in length, clearly visible under stereo-light microscope (Fig. 6C) 2
- Hind femoral spine absent or reduced (< 15 µm), not readily visible under stereo-light-microscope (Fig. 6D)..... 3
- 2(1). Propodeal spiracle opening large, = 20 µm in diameter, forming a volcanic-like cone (Figs 14E & F); frontal carina reaching < 0.5 distance to medial ocellus (e.g. Fig. 13B)..... *B. vulcanus* sp. nov.
- Propodeal spiracle not as large as above, < 15 µm in diameter, not forming a volcanic-like cone (Figs 11A & B); frontal carina reaching = 0.5 distance to medial ocellus (e.g. Fig. 13D) *B. matthewi* sp. nov.

- 3(1). Posterior margin of mesoscutellum extending to, or beyond anterior margin of T2, so propodeum not visible medio-dorsally (Figs 14A–D); mesoscutellum bearing three complete transverse rows of setae 4
- Posterior margin of mesoscutellum not extending over propodeum to anterior margin of T2, so propodeum visible medio-dorsally (e.g. Figs 12A–D); mesoscutellum bearing either one or two complete transverse rows of setae 5
- 4(3). Posterior eye margin contacting hyperoccipital carina (Figs 14A & B); lateral ocelli < 0.5 medial ocellus diameter from eye margin; pilosity of mesoscutum and mesoscutellum of medium length (= 10 µm, < 30 µm); eye pilosity of medium length (= 5 µm, < 10 µm) *B. tropaeumusbrevis* sp. nov.
- Posterior eye margin = 0.5 medial ocellus diameter from hyperoccipital carina (Fig. 14C); lateral ocelli = 0.5 medial ocellus diameter from eye margin; pilosity of mesoscutum and mesoscutellum long (= 30 µm); eye pilosity long (= 10 µm) *B. tropaeumusdensus* sp. nov.
- 5(3). Entire dorso-lateral propodeum scrobiculate, except for thin glabrous band along posterior margin (Figs 7E & 13A) *B. scrobiculus* sp. nov.
- Dorso-lateral propodeum sculptured otherwise (e.g. Figs 12A–E) 6
- 6(5). Posterior eye margin = 0.5 medial ocellus diameter from hyperoccipital carina (e.g. Fig. 8 B) 7
- Posterior eye margin touching, or < 0.5 medial ocellus diameter from hyperoccipital carina (e.g. Fig. 8C) 9
- 7(6). Dorso-lateral propodeum bearing semi-circular ridge that begins near posterior margin of propodeum and extends through ventral region of propodeal spiracle before curving back to end near posterior margin of lateral propodeum (Figs 8A & B, arrowed); *B. dux* Girault
- Dorso-lateral propodeum not bearing a semi-circular ridge (e.g. Figs 8C & E); 8
- 8(7). Pilosity of T2 long, = 30 µm; antennal process and ventral frontal carina broadly projecting > 20 µm from ventral surface of frons (Fig. 12D); frontal carina extending < 0.3 distance to medial ocellus
- *B. prolatusspissus* sp. nov.
- Pilosity of T2 shorter, < 30 µm in length; antennal process and ventral frontal carina less obvious, projecting < 20 µm from ventral surface of frons (Fig. 12C); frontal carina extending > 0.3 distance to medial ocellus *B. ocellatus* sp. nov.
- 9(6). Dorso-lateral propodeum bearing distinct crescent-shaped ridge running from ventral margin of propodeal spiracle to posterior margin of lateral propodeum (Figs 7D & 9E, arrowed) *B. leai* Dodd
- Dorso-lateral propodeum not bearing crescent-shaped ridge 10
- 10(9). Lateral ocelli, viewed dorso-laterally, touching eye margin or = 0.5 medial ocellus diameter from eye margin 11
- Lateral ocelli, viewed dorso-laterally, much greater than 0.5, often nearly 1.0 x's medial ocellus diameter from eye margin 18
- 11(10). Posterior ocellar line > inter-ocular distance (Fig. 9F) 12
- Posterior ocellar line = inter-ocular distance 15
- 12(11). Propodeal spiracle situated close to the edge of the latero-dorsal margin of propodeum (Fig. 13C, arrowed) that is clearly defined by a broad laterally projecting carina that delineates the dorsal propodeum from the lateral propodeum (Figs 12C & D); T2 pilosity mostly long (= 30 µm) but can be of medium length (= 10 µm, < 30 µm) in parts; T3 glabrous except a few setae present laterally *B. spirolimbus* sp. nov.
- Propodeal spiracle not situated close to the edge of the latero-dorsal margin of the propodeum as described above either because latero-dorsal region of propodeum is rounded or, if dorsal propodeum is delineated from the lateral propodeum by a laterally projecting carina (e.g. Fig. 10C), then the propodeal spiracle is distant from the latero-dorsal margin of the propodeum (Fig. 10D); T2 pilosity never long, either medium or short (< 30 µm); T3 with transverse coriarius band medially, bearing one row of setae 13

- 13(12). Anterior and posterior genal margins convergent medially when viewed postero-laterally *B. maryae* **sp. nov.**
 - Anterior and posterior genal margins mostly parallel or divergent medially when viewed postero-laterally 14
- 14(13). Mesoscutum bearing 5 rows of setae in medial region; body generally not appearing pilose; density of pilosity of T2 being mostly sparse (= 20 µm between setae of same row), some areas of moderate density (< 20 & > 10 µm) may be present; dorsal region of the propodeum delineated from the lateral propodeum by a longitudinal carinae..... *B. jenningsi* **sp. nov.**
 - Mesoscutum bearing 6 or more rows of setae in medial region; body generally quite pilose in appearance; pilosity of T2 dense (= 10 µm between setae of same row) about the anterior region, but generally rest of T2 of moderate density (< 20 & > 10 µm); latero-dorsal region of propodeum rounded, not delineated from the lateral propodeum by a longitudinal carinae (e.g. Fig. 13B)....*B. murphyi* **sp. nov.**
- 15(11). Eye height < 0.5 head height (Fig. 12B)*B. mymyae* **sp. nov.**
 - Eye height = 0.5 head height (Fig. 10A) 16
- 16(15). Body not pilose in appearance; pilosity of vertex, mesoscutum and scutellum mostly sparse (= 20 µm between setae of same row), small areas of moderate density (< 20 & > 10 µm) can be present; length of setae on vertex, mesoscutum and scutellum a mixture of short (< 10) and medium length, (medium length pilosity within 10–15 µm range, not exceeding 20 µm); T2 pilosity of similar density but length mostly short, occasionally setae of medium length do occur, randomly dispersed amongst short setae *B. moorei* **sp. nov.**
 - Body pilose in appearance; pilosity of vertex, mesoscutum and scutellum mostly of moderate density (< 20 & > 10 µm), with regions of dense pilosity (= 10 µm) occurring; setae of medium length overall, including T2, commonly exceeding 20 µm in length, (range being 15–25 µm) 17
- 17(16). Lateral margins of mesosoma, when viewed dorsally, diverging posteriorly from one another (Fig. 9B); dorsal region of propodeum delineated from the lateral propodeum by a large longitudinal carina (Figs 7C, 9A & B) *B. iqbalii* **sp. nov.**
 - Lateral margins of mesosoma, when viewed dorsally, largely parallel, or converging marginally posteriorly (Fig. 8F); latero-dorsal region of propodeum rounded, not delineated from lateral propodeum by a large longitudinal carina (Figs 7B, 8E & F)..... *B. hallarakeri* **sp. nov.**
- 18(10). Anterior and posterior genal margins strongly convergent medially when viewed postero-laterally (Fig. 4A); anterior genal margin in contact with = 0.3 of ventral eye margin length (Fig. 4A)..... *B. arthuri* **sp. nov.**
 - Anterior and posterior genal margins parallel or divergent when viewed postero-laterally, (e.g. 14A); anterior genal margin in contact with > 0.4 of ventral eye margin length (e.g. 12B) 19
- 19(18). Pilosity of vertex, mesoscutum and scutellum mostly dense (= 10 µm), small patches of moderate density (< 20 & > 10 µm) can occur; pilosity of T2 dense in anterior region, gradating to moderate density posteriorly; T3 bearing two complete transverse rows of setae *B. saliens* (Hickman)
 - Pilosity of vertex, mesoscutum and scutellum mostly of moderate density (< 20 & > 10 µm), small dense (= 10 µm) patches can occur; pilosity of T2 mostly sparse (> 20 µm) apart from moderate density in anterior region; T3 glabrous except for several setae laterally *B. glenysae* **sp. nov.**

Treatment of species

1. *Baeus arthuri*, Stevens, sp. nov.

(Figs 4A, 5A, 6A & B, 7A, 15A)

Holotype, ♀, Queensland, 'N. Qld: East Palmerston, 15.v.1991, R. Piper' (ANIC).

Paratypes: **Queensland:** 28♀, 4♂, same data as holotype (ANIC, WINC); 6 ♀, 11.45S 142.35E, Heath-

lands, 23.v–18.vi.1993, P. Zborowski & I.D. Naumann, F.I.T. (ANIC); 15 ♀, 11.45S 142.35E, Heathlands, 25.vii–18.viii.1992, P. Zborowski & J. Cardale, M.T. (ANIC, WINC); 1 ♀, 11.45S 142.35E, Heathlands, 21.x–22.xi.1992, P. Zborowski & A. Calder, F.I.T. (ANIC); 2 ♀, 11.45S 142.35E, Heathlands, 5.iv–23.v.1993, P. Zborowski & A. Roach, F.I.T. (ANIC); 2 ♀, 11.45S 142.35E, Heathlands, 18.ix–21.x.1992, P. Zborowski & T. Weir, F.I.T. (ANIC); 1 ♀, 11.45S 142.35E, Heathlands, 25.iv–7.vii.1992, T. McLeod, M.T. (ANIC); 7 ♀, 12.41S 142.41E, 5km S Batavia Downs, 23.viii–16.ix.1992, P. Zborowski & L. Miller, F.I.T. (ANIC); 6 ♀, 13.43S 143.19E, 15km WNW Bald Hill, McIlwraith Range, 420m, 27.vi–12.vii.1989, I. D. Naumann, pan trap (ANIC); 1 ♀, 16.52S 145.40E, Lake Placid, Barron River, 7.vi.1996, C.J. Burwell (ANIC); 1 ♀, Conway Range, 2.xii.76, Bouček (ANIC); 1 ♀, 15.16S 144.59E, 14km WbyN of Hope Vale Mission, 7–10.v.1981, I.D. Naumann (ANIC); **Northern Territory:** 1 ♀, Wangi Falls, Litchfield National Park, xi.1992, A.D. Austin & P.C. Dangerfield (WINC); **Papua New Guinea:** 1 ♀, Awar Bush Street, 21.vi.1982, 24.vii.1982, 31.vii.1982, 12.x.1982, P. Grootaert (CNC); 1 ♀, Morobe Pr. Wau Ecology Institute, viii.1983, S. & P. Miller (CNC); **Fiji:** 1 ♀, Vanua Leevu, Mt Delaikara, 700m, 21.vii.1987, Monteith and Cook, pyrethrum/logs and trees (QM).

Description. Female. Mean length 1.04 mm (0.93–1.12 mm; n = 10); body dark brown, almost black, head dark brown, legs and antennae yellow with darker colouration dorsally.

Head. 2.2 (2.08–2.33) x as wide as inter-ocular distance, and 2.19 (1.73–2.58) x as wide as length; medial ocellus level with surface of vertex; medial ocellus 10 µm in diameter, 120 (110–130) µm from posterior head margin; lateral ocelli 10 µm from eye margin, and 24 (2.0–3.0) µm from posterior head margin; posterior ocellar line 1.3 (1.24–1.3) x inter-ocular distance; vertex coriarius, pilosity sparse with mixture of short and medium length setae (medium length mostly within 10–15 µm range, not exceeding 20 µm); eyes circular, eye height 0.5 (0.45–0.49) x head height, eye width 0.7 (0.61–0.74) x eye length, pilosity minute, appearing absent under stereo-light microscope; frontal carina not prominent, fine and short, reaching 0.45 (0.42–0.48) distance to medial ocellus; cristulations of malar region not reaching to within 10 µm of eye margin; gena sinuate with anterior and posterior genal margins strongly convergent medially in postero-lateral view; anterior genal margin in contact with 0.3 (0.2–0.3) of ventral eye margin length; posterior eye margin contacting hyperoccipital carina.

Mesosoma. Length 0.43 (0.41–0.46) x width; mesoscutum finely coriarius, pilosity sparse and mostly of medium length, but can be short in patches; mesoscutellum smooth, with one row of setae present medio-dorsally, sparsely spaced and of medium length; propodeum glabrous medio-dorsally; mesoscutum length 0.32 (0.29–0.36) x width, 0.56 (0.53–0.58) x mesosoma length and 2.28 (2.20–2.50) x mesoscutellum length; mesoscutellum length 1.32 (1.0–1.67) x propodeum length; dorso-lateral mesopleuron and propodeum anterior to propodeal spiracle scrobiculate; dorso-lateral propodeum posterior of spiracle smooth and bearing fine short setae; dorsal and lateral propodeum clearly delineated by broad laterally projecting carina (e.g. Fig. 10C); posterior margin of metapleuron mostly straight, except curving sharply towards mesopleuron dorsally, dorsal extent of suture is above level of antero-lateral margin of T2, posterior margin elevated above anterior margin of lateral propodeum; hind femoral spine absent.

Metasoma. T2 length 0.93 (0.9–0.96) x width, faintly coriarius to smooth, pilosity sparsely scattered and mostly short, but can be of medium length in patches, posterior margin extending ventrally past ventral margin of pronotum; T3 smooth with one row of setae, sparsely spaced and short, may appear devoid of setae; T4 glabrous.

Description. Male. Mean length 1.11 mm (1.06–1.16; n = 2);

Head. 1.5 (1.3–1.6) x as wide as inter-ocular distance and 2.5 (2.3–2.8) x as wide as long; medial ocellus 22 µm in diameter, 110 (99–121) µm from posterior head margin; lateral ocelli 22 µm from eye margin, 35.8 (33–38.5) µm from posterior head margin; posterior ocellar line equal to inter-ocular distance; eyes ovoid, eye height 0.51 x head height; frontal carina reaching > 0.5 distance to medial ocellus; in postero-lateral view, anterior and posterior genal margins slightly convergent medially; anterior genal margin contacting the entire length of ventral eye margin; posterior eye margin > 45 µm from hyperoccipital carina.

Mesosoma. Length 1.13 x width; mesoscutum length 0.9 x width, 0.68 x mesosoma length; propodeal spiracle small and round; hind femoral spine absent.

Metasoma. T1 transverse, length 0.18 (0.17–0.19) x width; T2 length 0.5 (0.4–0.6) x width.

Comments. This is a large species, characterised by sparse and short pilosity, with mostly smooth, shiny dorsal surfaces, and gena being sinuate with strongly convergent margins medially. *Baeus arthuri* is most similar to *B. scrobiculus* except the dorsal surfaces are smoother, and the scrobiculate sculpturing of the dorso-lateral propodeum is not as extensive. The holotype, along with 28 female and four male paratypes, were all reared from a single, unidentified host egg-sac. Therefore, *B. arthuri* is one of only a few Australian *Baeus* species that has reliably associated males. *Baeus arthuri* is confined to the more tropical areas of northern Australia (Fig 15A) and extends to Papua New Guinea and Fiji. This species is named after the father of the senior author, Mr Arthur Stevens.

2. *Baeus dux* Girault (Figs 8A & B, 15A)

Baeus dux Girault, 1933: 2; in Gordth *et al.* 1979: 300; Austin, 1981: 89; Johnson, 2004.

Holotype, ♀, 'Brisbane, garden on grass, Sep. 8, 1932, A. R. Brimblecomb' (QM).

Other material examined: **Queensland:** 2 ♀, Gatton, Qld, 27.iv–5.v.1981, yellow pan trap in potato crop, no collector (ANIC); 2 ♀, same data, 5–11.v.1981 (ANIC); 1 ♀, same data, 25.v–3.vi.1981 (ANIC); **Norfolk Island:** 1 ♀, 29.07S 167.57E, Phillip Island, Lower Long Valley, 20–24.ii.1984, T. A. Weir, pitfall trap (ANIC).

Description. Female. Mean length 0.64 mm (0.63–0.65; n = 3); body and head dark brown, nearly black, leg and antennae segments yellow with light brown markings on dorsal surfaces.

Head. 1.71 (1.65–1.82) x as wide as inter-ocular distance and 1.89 (1.75–2.07) x as wide as long; medial ocellus 10 µm in diameter, 80 µm from posterior head margin; lateral ocelli 5 µm from eye margin, 20 µm from posterior head margin; posterior ocellar line = inter-ocular distance; vertex imbricate, pilosity density gradates, anterior to posterior, from moderate to dense, and is medium length; eyes sub-triangular, eye height 0.44 (0.43–0.46) x head height, eye width 0.55 (0.5–0.64) x eye length, pilosity short; frontal carina prominent, reaching 0.55 (0.53–0.59) distance to medial ocellus; cristulations of malar region reaching to within 10 µm of eye margin; in postero-lateral view, anterior and posterior genal margins parallel medially; anterior genal margin in contact with 0.43 (0.4–0.5) of ventral eye margin length; posterior eye margin 20 µm from posterior head margin, not contacting hyperoccipital carina.

Mesosoma. Length 0.72 (0.71–0.73) x width; both mesoscutum and mesoscutellum imbricate, pilosity mostly dense, patches of moderate density can be present, and of medium length; propodeum glabrous medio-dorsally; mesoscutum length 0.60 (0.57–0.63) x width, 0.73 (0.71–0.75) x mesosoma length and 3.71 (3.43–4.00) x mesoscutellum length; mesoscutellum length 2.56 (2.33–3.0) x propodeum length; dorso-lateral region of mesopleuron scrobiculate, sculpturing ending dorsally to dorsal metapleuron margin; dorso-lateral propodeum bearing a semi-circular ridge beginning near posterior margin of the propodeum and extending through ventral region of propodeal spiracle cone, before curving back to end near posterior margin of lateral propodeum (Figs 8A&B); propodeal spiracle small and ovoid; posterior suture of metapleuron straight and short, dorsal extent of suture ending below the level of antero-lateral margin of T2; hind femoral spine absent.

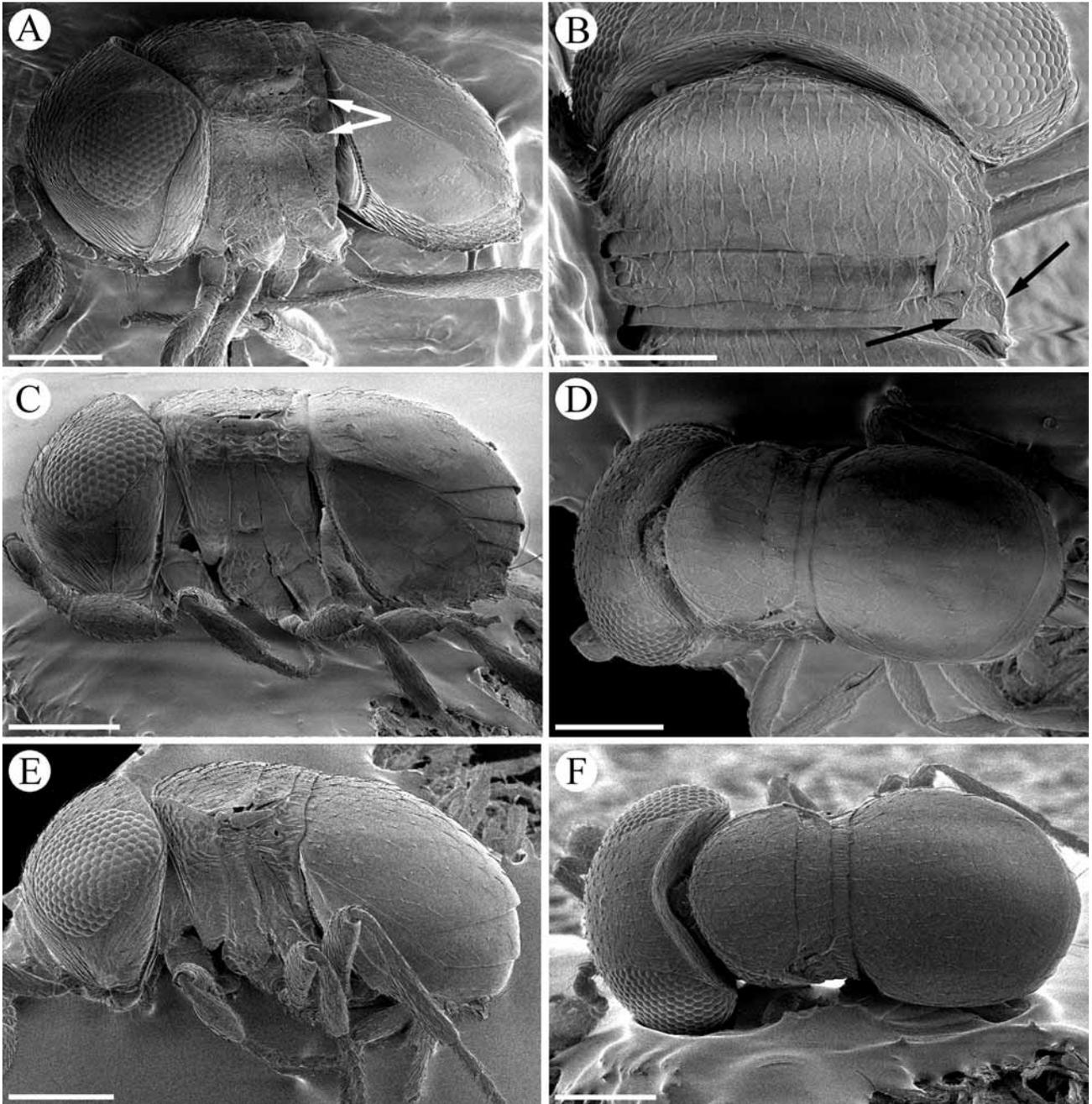


FIGURE 8. Female *Baeus* spp.: **A & B**, *B. dux*, crescent shaped carina arrowed: **A**, lateral habitus; **B**, dorsal mesosoma. **C & D**, *B. glenysae*: **C**, lateral habitus; **D**, dorsal habitus. **E & F**, *B. hallarakeri*: **E**, lateral habitus; **F**, dorsal habitus. Scale lines, A – F = 100 μ m.

Metasoma. T2 length 0.9 x width, anterior region imbricate to finely coriaceous, to smooth posteriorly, pilosity dense anteriorly to moderately dense posteriorly, of medium length overall; T3 smooth, bearing one row of setae of medium length; T4 glabrous.

Comments. The distinguishing feature for *B. dux* is its distinct semi-circular ridge on the dorso-lateral propodeum. *Baeus leai* is the only other species to possess a similar structure. However, the two species are very different in many other characters, namely, the shape of the gena, sculpturing of the dorsal mesosomal, and smaller body and eye size. *Baeus dux* has been collected from south-eastern Queensland (Fig. 15A) and Philip Island near Norfolk Island. The habitats from which some specimens were collected include a suburban garden and a potato crop, indicating that the host(s) are tolerant of, or may prefer, heavily disturbed sites.

3. *Baeus glenysae*, Stevens, sp. nov.

(Figs 8C & D, 15A)

Holotype, ♀, Tasmania, '42.12S 146.30E, 9 km S Bronte Park, Tas, 15 Jan–3 Feb, 1983, I.D. Naumann and J.C. Cardale, ex pantrap' (ANIC).

Paratypes: **Tasmania**: 1 ♀, 42.10S 146.10E, 7 km SW by W, Tas, Derwent bridge, 16.i–2.ii.1983, I.D. Naumann and J.C. Cardale, ex pantrap (ANIC); **Western Australia**: 3 ♀, 14.49S 125.50E, Mining camp, Mitchell Plateau, 9–19.v.1983, I.D. Naumann & J.C. Cardale, ex pantrap (ANIC).

Description. Female. Mean length 0.49 mm (0.47–0.51; n = 5); dorsal mesosomal sclerites, and T2 brown, lateral mesosoma and rest of metasoma light brown, antennae brown, legs similar to lateral mesosoma; head 1.79 (1.73–1.86) x as wide as inter-ocular distance and 2.2 (2.09–2.36) x as wide as long; medial ocellus 10 µm in diameter, 50 µm from posterior head margin; lateral ocelli 7 (5–10) µm from eye margin, 17 (15–20) µm from posterior head margin; posterior ocellar line = inter-ocular distance; vertex coriarius, pilosity generally moderately dense, but dense patches can occur posteriorly, of medium length overall; eyes ovoid, eye height 0.45 (0.45–0.46) x head height, eye width 0.42 (0.38–0.46) x length, pilosity of medium length; frontal carina reaching 0.50 distance to medial ocellus; cristulations of malar region not extending to within 10 µm of eye margin; in postero-lateral view, anterior and posterior genal margins are marginally to strongly divergent medially; anterior genal margin in contact with 0.53 (0.50–0.60) of ventral eye margin length; posterior eye margin contacting hyperoccipital carina.

Mesosoma. Length 0.65 (0.65–0.67) x width; both mesoscutum and mesoscutellum imbricate, pilosity generally moderately dense, anterior region of mesoscutum can have dense patches, of medium length overall; propodeum glabrous medio-dorsally; mesoscutum length 0.51 (0.47–0.56) x width, 0.70 (0.68–0.71) x mesosoma length and 3.11 (3.00–3.33) x mesoscutellum length; mesoscutellum length 2.83 (2.50–3.00) x propodeum length; dorsal mesopleuron scrobiculate, sculpturing ending adjacent to dorsal margin of metapleuron; sculpturing of dorso-lateral propodeum anterior to propodeal spiracle confused; propodeal spiracle small and ovoid; posterior suture of metapleuron straight, dorsal extent of suture equal to or above level of the antero-lateral margin of T2; hind femoral spine reduced.

Metasoma. T2 length 0.81 (0.78–0.84) x width, coriarius, pilosity moderately dense along anterior margin, rest sparse, of medium length overall; T3 and T4 glabrous.

Comments. This species is similar to *B. murphyi* and *B. mymyae*. The main features that distinguish *B. glenysae* from *B. murphyi* are the posterior ocellar line being equal to the inter-ocular distance, and the pilosity of T2 being mostly sparse. From *B. mymyae* it differs in the frontal carina being shorter and less distinct, the hind femoral spine present although reduced, and the posterior suture of the metapleuron being longer indicating that the amount of fusion that has occurred with the propodeum is less relative to *B. mymyae*. The sculpturing of the dorsal surface is also less pronounced for this species than for both *B. murphyi* and *B. mymyae*. *Baeus glenysae* is recorded from Tasmania and north-western Australia, indicating that it is widely adapted to varying climates (Fig. 15A). It is named after Ms Glenys Wood.

4. *Baeus hallarakeri*, Stevens, sp. nov.

(Figs 7B, 8E & F, 15B)

Holotype: ♀, Tasmania, '41.19S 147.56E, Intake Bridge, 13–29. Jan. 1983, Tas., I. D. Naumann & J. C. Cardale, ex pantrap' (ANIC).

Paratypes: **Tasmania**: 2 ♀, same data as holotype (ANIC) 3 ♀, 42.12S 146.30E, 9 km S Bronte Park, 15.i–3.ii.1983, I. D. Naumann & J. C. Cardale, ex pantrap (ANIC); 1 ♀, 41.22S 147.24E, 10 km ENE of Nunamara, 12.i–6.ii.1983, I. D. Naumann & J. C. Cardale, ex pantrap (ANIC); 1 ♀, 42.10S 146.10E, 7 km SW by W Derwent Bridge, 16.i–2.ii.1983, I. D. Naumann & J. C. Cardale, ex pantrap (ANIC).

Description. Female. Mean length 0.60 MM (0.58–0.62; n = 5); body and head brown, legs and antennae generally same as body and head but with lighter markings on ventral surfaces and apical areas of each segment.

Head. 1.83 (1.80–1.87) x as wide as inter-ocular distance, 1.85 (1.80–1.93) x as wide as long; medial ocellus 10 µm in diameter, 59 (50–65) µm from posterior head margin; lateral ocelli 3 (0–5) µm from eye margin, 20 µm from posterior head margin; posterior ocellar line equal to inter-ocular distance; vertex coriarius, pilosity mostly dense along posterior margin, moderately dense elsewhere, of medium length overall; eyes ovoid, eye height 0.53 (0.52–0.57) head height, eye width 0.46 (0.43–0.50) x eye length, pilosity of medium length; frontal carina usually not reaching 0.5 or more distance to medial ocellus (0.37–0.52); cristulations on malar region not extending to within 10 µm of eye margin; in postero-lateral view, anterior and posterior genal margins varying from parallel to divergent medially; anterior genal margin in contact with 0.70 of ventral eye margin length; posterior eye margin touching hyperoccipital carina.

Mesosoma. Length 0.75 (0.73–0.79) x width; both mesoscutum and mesoscutellum coriarius, pilosity moderately dense except anterior region of mesoscutum which is dense, of medium length overall; medio-dorsally, propodeum may be glabrous, plicate, or intermediate between the two; mesoscutum length 0.56 (0.56–0.58) x width, 0.68 (0.67–0.69) x mesosoma length and 3.27 (2.86–3.67) x mesoscutellum length; mesoscutellum length 1.82 (1.50–2.00) x propodeum length; sculpturing dorsal mesopleuron and dorso-lateral propodeum confused; propodeal spiracle small and ovoid; posterior suture of metapleuron curved slightly medially, extending dorsally above level of antero-lateral margin of T2; posterior margin metapleuron elevated from anterior region of propodeum; hind femoral spine absent.

Metasoma. T2 length 1.0 (0.93–1.00) x width, faintly coriarius, pilosity dense in patches along anterior margin, but mostly moderately dense except towards posterior region which is sparse, setae of medium length overall; T3 smooth and nitid, bearing one row of setae; T4 glabrous.

Comments. *Baeus hallarakeri* is similar to *B. glenysae*, *B. murphyi* and *B. mymyae*, the most obvious difference being its larger eyes. This species is known only from Tasmania (Fig 15B). *Baeus hallarakeri* is named in honour of Torstein Hallaraker, Senior, of Norway.

5. *Baeus iqbali*, Stevens, sp. nov.

(Figs 7C, 9A & B, 15B)

Holotype: ♀, Queensland, '17.27S 145.29E, 1150 m, GS3 Hugh Nelson Rd, QLD, 4. Feb–6. Mar. 1995, P. Zborowski, F. I. trap JCU (East)' (ANIC).

Paratypes: **Queensland:** 2 ♀, same data as holotype (WINC); 2 ♀, Windsor Tableland via Mt Carbine, 26.xii.1983–24.i.1984, Storey & Halfpapp (QDPC); 1 ♀, Julatten, 10.vii–10.ix.1987, A. Walford-Huggins (ANIC); 1 ♀, 17.37S 145.39E, 1000 m, Lake Eacham, 15.ii–2.iii.1988, P. Zborowski (ANIC); **New South Wales:** 1 ♀, Lansdowne/Taree, 3 km N, 7.ix.–25.x.1987, G. Williams (ANIC); **Australian Capital Territory:** 1 ♀, 35.19S 148.51E, Wombat Ck, 6 km NE of Piccadilly Circus, 750 m, ii.1984, Weir, Lawrence & Johnson (ANIC); 1 ♀, 35.22S 148.50E, Blundells Ck, ii.1987, D. H. Colless (ANIC)

Description. Female. Mean length 0.68 mm (0.67–0.71; n = 5); body and vertex dark brown, almost black, frons and gena slightly lighter, legs and antennae generally light brown with darker markings on dorsal surfaces of large segments, femur, tibia, scape, pedicel and clava.

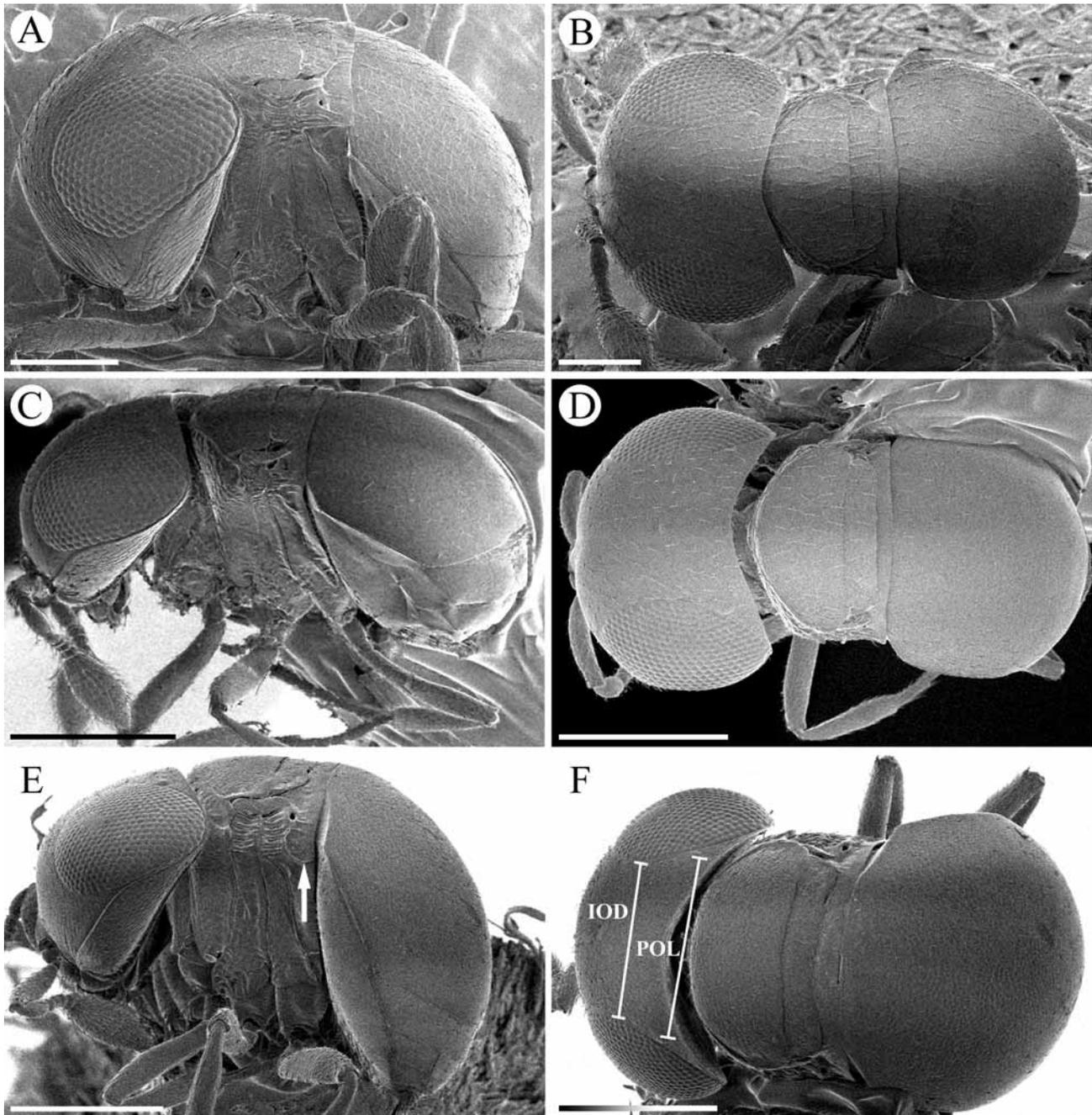


FIGURE 9. Female *Baeus* spp.: **A & B**, *B. iqbali*: **A**, lateral habitus; **B**, dorsal habitus. **C & D**, *B. jenningsi*: **C**, lateral habitus; **D**, dorsal habitus. **E & F**, *B. leai*: **E**, lateral habitus, crescent shaped carina arrowed; **F**, dorsal habitus; **IOD** = inter-ocular distance, the minimum distance between the eyes; **POL** = posterior ocelli line, minimum distance between inner margins of lateral ocelli. Scale lines, **A & B** = 100 μ m; **C – F** = 200 μ m.

Head. 2.0 x as wide as inter-ocular distance, and 2.05 (1.95–2.13) x as wide as long; medial ocellus 10 μ m in diameter, 70 μ m from posterior head margin; lateral ocelli touching eye margin, 20 μ m from posterior head margin; posterior ocellar line equal to inter-ocular distance; vertex coriarius, pilosity generally of moderate density, but can be dense in patches towards posterior margin, is of medium length overall; eyes large and ovoid, eye height 0.6 x head height, eye width 0.56 (0.53–0.59) x eye length, pilosity of medium length; frontal carina prominent, reaching 0.58 (0.53–0.61) distance to medial ocellus; cristulations of malar region are faint laterally, extending to within 10 μ m of eye margin; in postero-lateral view, anterior and posterior genal margins diverge medially; anterior genal margin in contact with 0.74 (0.70–0.80) of ventral eye margin

length; posterior eye margin touching hyperoccipital carina.

Mesosoma. Length 0.61 (0.58–0.67) x width; both mesoscutum and mesoscutellum coriarius, pilosity mostly of moderate density, but can be dense in anterior parts of the mesoscutum, of medium length for both sclerites; medio-dorsally, propodeum glabrous, however, may have a few small carinae present in region posterior to latero-posterior mesoscutellum; mesoscutum length 0.49 (0.45–0.55) x width, 0.68 (0.67–0.69) x mesosoma length and 3.47 (3.33–3.67) x mesoscutellum length; mesoscutellum length 1.50 x propodeum length; sculpturing of dorsal mesopleuron scrobiculate; sculpturing of propodeum directly anterior to spiracle confused, region posterior to spiracle generally smooth, but may have two carinae emanating from dorsal and ventral margins of propodeal spiracle; propodeal spiracle small and ovoid; dorso-lateral propodeum bearing two ridges running from posterior margin of mesopleuron, between spiracle and dorsal extremity of metapleuron, towards posterior margin of propodeum, ventral ridge reaching posterior margin, delineating dorsal propodeum from lateral propodeum, making posterior dorso-lateral propodeal margin pointed, dorsal ridge may, or may not extend to posterior margin; posterior suture of metapleuron curving slightly medially, extending dorsally above level of antero-lateral margin of T2, metapleuron surface having consistent shallow furrows, except for ventral region, posterior margin elevated from anterior region of lateral propodeum; ventral area of mesopleuron bearing similar sculpturing to metapleuron; hind femoral spine absent.

Metasoma. T2 length 0.80 (0.75–0.83) x width, faintly coriarius, pilosity in medial anterior region generally mixture of dense to moderately dense, remainder of T2, setae sparsely scattered, length medium overall; T3 smooth, bearing one row of setae; T4 glabrous.

Comments. *Baeus iqbal* is found in north Queensland, the Australian Capital Territory and New South Wales (Taree) (Fig. 15B). This species is named after Mohammed Iqbal.

6. *Baeus jenningsi*, Stevens, sp. nov.

(Figs 9C & D, 15A)

Holotype, ♀, New South Wales, 'Sheepstation Cr. NSW 16 km NE of Wiangaree, 600 m 13 Jun–24 Aug. 1982 S. & J. Peck SBP 36', 'Flight intercept trap rainforest flight intercept' (ANIC).

Paratype: **New South Wales:** 1 ♀, 30.22S 152.45E, Dorringo NP, NSW, 13.ii.1984, I. D. Naumann, ex ethanol (ANIC).

Description. Female. Mean length 0.73 mm (0.71–0.74; n = 2); body and head dark brown to black, legs and antennae yellow, both with darker markings dorsally.

Head. 2.06 (1.95–2.17) x as wide as inter-ocular distance and 2.17 (2.06–2.29) x as wide as long; medial ocellus 10 µm in diameter, 75 (70–80) µm from posterior head margin; lateral ocelli contacting eye margin, 20 µm from posterior head margin; posterior ocellar line 1.08 (1.05–1.11) x inter-ocular distance; vertex finely coriarius, pilosity of medium length and mostly sparse, but can be of medium density in areas, particularly posteriorly; eyes large and ovoid, eye height 0.53 x head height, eye width 0.72 (0.67–0.78) x eye length, pilosity short; frontal carina prominent, reaching 0.56 (0.55–0.58) distance to medial ocellus; cristulations on malar region not extending to within 10 µm of eye margin; in postero-lateral view, anterior and posterior margins of gena divergent medially; anterior genal margin in contact with 0.8 of ventral eye margin length; posterior eye margin in contact with hyperoccipital carina.

Mesosoma. Length 0.59 (0.58–0.61) x width; mesoscutum and mesoscutellum coriarius, pilosity generally of moderate density, but can be sparse in areas and of medium length; propodeum glabrous medio-dorsally; mesoscutum length 0.44 (0.41–0.46) x width, 0.65 x mesosoma length and 2.93 (3.14–2.71) x mesoscutellum length; mesoscutellum length 2.04 (1.75–2.33) x propodeum length; dorso-lateral region of mesopleuron scrobiculate, sculpturing extending ventrally of dorsal margin of metapleuron; dorso-lateral propodeum bearing 2 parallel carinae ventral of propodeal spiracle, both extending from near posterior margin of

mesopleuron to near posterior margin of propodeum, ventral carina longest and most prominent; propodeal spiracle small and ovoid; posterior suture of metapleuron extending dorsally above level of antero-lateral margin of T2, ventro-posterior half of metapleuron elevated above anterior margin of lateral propodeum; hind femoral spine absent.

Metasoma. T2 length 0.83 (0.81–0.84) x width, coriarius, pilosity generally sparse although areas of moderate density may occur towards posterior margin, setae mostly of medium length overall but can be short in patches; T3 medially coriarius, bearing one row of setae, ranging from medium to short in length, anterior and posterior margins glabrous; T4 glabrous.

Comments. This species is similar to *B. moorei* except it is more slender, the posterior ocellar line is equal to the inter-ocular distance, the anterior and posterior genal margins are divergent medially and the pilosity of the vertex is sparse. *Baeus jennings* is named after John Jennings and is known from only two specimens collected from northern New South Wales (Fig. 15A).

7. *Baeus leai* Dodd

(Figs 3A, 5B, 6D, 7D, 9E & F, 15C)

Baeus leai Dodd, 1914: 73; Kieffer, 1926: 147, 150; Austin, 1981: 89; Johnson 2004.

Holotype, ♀, 'Sydney, [A. M.] Lea' (SAM). [Head and forelegs mounted on slide]

Other material examined. **Queensland:** 2 ♀, Bunya Mountains, 15.iv.1927, A.P. Dodd (ANIC); 5 ♀, Mt Tamborine, xi.1978–iii.1979, 6–17.iii.1981, 16–30.I.1982, 21.ii–29.iii.1984 (QDPC); 1 ♀, Rex Range lookout via Julatten, 9.xi–2.xii.1981, Storey (QDPC); 2 ♀, 16 km up Davies Creek Rd, via Mareeba, 4–13.iii.1983, Storey & Titmarsh (QDPC); 4 ♀, Windsor Tablelands via Mt Carbine, 12.xi–26.xii.1983, Storey, Walford & Huggins (ANIC); 7 ♀, Windsor Tablelands via Mt Carbine, 26.xii.1983–24.i.1984, Storey & Halfpapp (QDPC); 1 ♀, Hugh Nelson Range, 31 km S of Atherton, 31.xii.1983, R.I. Storey (QDPC); 7 ♀, Hugh Nelson Range, 21 km S of Atherton, 1.xii.1983–9.i.1984, 9.i–10.ii.1984, 12.x–5.xi.1989, Storey & Brown (QDPC); 11 ♀, Mt Glorious N.P., 28.ii–9.iii.1984, L. Masner (CNC), 1 ♀, Mt Glorious N.P., 3.i–4.ii.1989, H. Howden (CNC); 1 ♀, Indooroopilly, 28.ii–9.iii.1984, L. Masner (CNC); 12 ♀, Lake Eacham, 17.17S 145.39E, 15.ii–16.iii.1988, 29.iii–31.v.1988, D.C.F. Rentz (ANIC); 1 ♀, 27.57S 153.11E, Guanaba Shelf, Tamborine Mountain, xii.1992–i.1993, K.J. Lambkin (ANIC); 10 ♀, Hugh Nelson Range, 17.27S 145.29E, 3.i–4.ii.1995, 6.iii–4.iv.1995, P. Zborowski (ANIC); 3 ♀, Massey Creek, 17.37S 145.34E, 3.i–4.ii.1995, 4.ii–6.iii.1995, P. Zborowski (ANIC); 8 ♀, Longlands Gap, 17.28S 145.29E, 3.i–4.iii.1995, 4.iv–2.v.1995, P. Zborowski (ANIC); 1 ♀, Hugh Nelson Road, 17.27S 145.29E, 6.iii–4.iv.1995, P. Zborowski (ANIC); 2 ♀, Brisbane Forest Park, 27.25.04S 152.49.48E, 4–11.iii.1998, & 11–17.iv.1998, N. Power, malaise trap (CNC); 1 ♀, Main Range National Park, 28.03.01S 152.23.59E, 9.xii.2002, Owen, George, Munro, sweeping (CNC); 1 ♀, Great Sandy National Park, 26.00.95S 153.01.32E, 15–16.xii.2002, J. Munro, yellow pan trap (CNC); 1 ♀, Great Sandy National Park, 25.00.62S 153.02.80E, 16–17.xii.2002, J. Munro, A. Owen, yellow pan trap (CNC); **New South Wales:** 2 ♀, Fitzroy Falls, 31.i.1968 (ANIC); 1 ♀, Victoria Park via Alstonville, 25.xii.1974–22.iii.1975, G.B. & S.R. Monteith (QDPC); 6 ♀, Pearl Beach, 7.i.1979, A.D. Austin, reared series (WINC); 1 ♀, Beaury State Forest, 28.29S 152.23E, 15–17.ii.1983, T. Weir & A. Calder (ANIC); 7 ♀, Macquarie Pass, 34.34S 150.40E, 8.II.1984, I.D. Naumann (ANIC); 1 ♀, Ben Boyd N.P., Bittangabee nr Green Cape, 16–19.ii.1984, J. Lawrence (ANIC); 12 ♀, Mt Wog Wog, 37.04S 149.28E, ii.1987, C.R. Margules (ANIC); 1 ♀, Kosciuszko National Park, 35.54.9S 148.37.3E, 26–28.xi.2002, George et al. yellow pan trap (CNC); **Australian Capital Territory:** 34 ♀, 1 ♂, Canberra, 1.vi.1946, ex. eggs *Caelaenia* sp. (bird dung spider; Araneae) (ANIC, WINC); 28 ♀, 1 ♂, 15.iii.1950, E.F. Riek (ANIC, WINC); 6 ♀, Mt Majura, 14.xii.1969, 6.i.1970, C.G. Brooks (ANIC); 2 ♀, Black Mountain, 2.vi.1970, J. Simmons (ANIC); 1 ♀, Mt Ainslie, 11.viii.1970, C. Taplin

(ANIC); 3 ♀, Wombat Creek, 35.19S, 148.51E, IV.1985, J. Lawrence, T. Weir & M.L. Johnson (ANIC); 4 ♀, Piccadilly Circus, 35.22S, 148.48E, V.1986, J. Lawrence, T. Weir, & M.L. Johnson (ANIC); **Victoria:** 1 ♀, Greensborough, 29.ii.1961 (ANIC); **Tasmania:** 13 ♀, Hobart, 4.i.1951, E.F. Riek (ANIC); 1 ♀, Bird River, Launceston, 41.14S 147.28E, 3.ii.1973, E. Britton (ANIC); 2 ♀, Barrow Creek, 41.21S 147.22E, 12.i–6.ii.1983, I.D. Naumann & J.C. Cardale (ANIC); **South Australia:** 1 ♀, Port Davenport, York Peninsula, 26.iii.1979, D. Morgan (WINC); 4 ♀, Wistow, iv–v.1988, A.D. Austin (WINC); 3 ♀, Mt Barker Summit, 18.i–4.ii.1996, M. Iqbal & A.D. Austin (WINC); **Western Australia:** 3 ♀, Perth, 30km E, 24–28.xii.1986, J.S. Noyes (WINC); 1 ♀, Fitzgerald River N.P., Quaalup area, 5–9.i.1987, J.S. Noyes (BMNH); 2 ♀, Stirling Range N.P., 11–15.i.1987, J.S. Noyes (WINC); 3 ♀, Narnahop N.P., Walpole, 17–21.i.1987, J.S. Noyes (BMNH); 7 ♀, Bold Park, 31.57S 115.46E, 20.v–20.vii.1993, 24.ix–18.xi.1993, 19.xi.1993–6.i.1994, J.M. Waldock, K. Goodsell & J. Webb (WINC), 9 ♀, Bold Park, 31.57S 115.46E 6.i–18.iii.1994, 18.iii–19.v.1994, M.S. Harvey & J.M. Waldock (WAMP, WINC); 1 ♀, Perth Airport, 31.59S 115.58E, 10.v–24.vi.1993, 6.i–18.iii.1994, 18.iii–19.v.1994, M.S. Harvey & J.M. Waldock (WAMP, WINC); 3 ♀, Perth Airport, 31.59S 115.58E, 10.v–24.vi.1993, 18.xi.1993–6.i.1994, J. Waldock, K. Goodsell, J. Webb (WAMP); 1 ♀, Tuart Hill, 31.53S 115.52E, 18.xii.1993–7.i.1994, J.M. Waldock (WAMP); 3 ♀, Stirling Range National Park, Salt River & Redgum Pass roads, 34.18.79S 117.17.59E, 21–22.xi.2002, yellow pan traps, J. George, J. Munro, A. Owen (CNC); 1 ♀, Carter's Rd nr. Margaret River, 33.56.12S 115.03.94E, 15–16.xi.2002, yellow pan trap, George, Hawks, (CNC); **Lord Howe Island:** 2 ♀ S. & J. Peck, 17–31.v.1980. (CNC); **Norfolk Island:** Sp 3. 8 ♀ 29.01 S 167.57 E, Filmy Fern Walk, NINP, 14.xi–2.xii.1984, T.A. Weir. 2nd Flight intercept window/trough trap. (ANIC); 1 ♀ 29.01 S 167.57 E, Red Rd, Tr. NINP, 14.xi–2.xii.1984, T.A. Weir. 2nd Flight intercept window/trough trap. (ANIC); 1 ♀ 29.01 S 167.56 E, South Spur Track (bottom) NINP, 14.xi–2.xii.1984, T.A. Weir. 2nd Flight intercept window/trough trap. (ANIC); 4 ♀ Palm Glen 1.xii.1979, G.B. Monteith, pyrethum knock-down. (QDPI); **New Zealand:** 1 ♀ Lynfield, 18.iv.1981, G. Kuschel. Malaise trap (NZAC); 1 ♀ Mt Albert Research Centre, 13.ii.1977, A.K. Walker. (NZAC); 1 ♀ Rotorua, Forest Research Institute, ii.1981, J. Bain, Malaise trap. (NZAC); 4 ♀ North Island, Coromandel Peninsula, 10 km E. Thames, 22–29.i.1999, yellow pan trap, S.A. Marshall (NZAC).

Description. Female. Mean length 1.09 mm (1.00–1.24; n = 10); body and head dark red brown, sometimes almost black, both legs and antennae brown with darker markings on dorsal surfaces.

Head. 2.03 (1.88–2.21) x as wide as inter-ocular distance and 1.99 (1.80–2.27) x as wide as long; medial ocellus 15 µm in diameter, 96 (80–120) µm from posterior head margin; lateral ocelli 5 µm from eye margin, 18 (10–20) µm from posterior head margin; posterior ocellar line 1.21 (1.14–1.37) x inter-ocular distance; vertex coriarius, pilosity generally of sparse density, but can be of moderate density in areas, mostly short in length, but if setae do qualify as medium length then usually only just; i.e. mostly within 10–15 µm range, not exceeding 20 µm, except for some Norfolk Island specimens whose pilosity is mostly of medium length often exceeding 20 µm; eyes large and ovoid, eye height 0.53 (0.47–0.56) x head height, eye width 0.53 (0.44–0.62) x eye length, pilosity short; frontal carina often reaching 0.5 distance to medial ocellus; cristulations of malar region often extending to within 10 µm of eye margin; in postero-lateral view, anterior and posterior genal margins usually parallel medially, but may be marginally divergent; anterior genal margin in contact with 0.60 (0.50–0.77) of ventral eye margin length; posterior eye margin touching hyperoccipital carina.

Mesosoma. Length 0.62 (0.55–0.67) x width; mesoscutum and mesoscutellum coriarius, pilosity varies from sparse to moderately dense, for most specimens, the setae are mixture of short and medium length, but if medium in length then usually only just; i.e. within 10–15 µm range, not exceeding 20 µm, except some Norfolk Island specimens that exhibit a mixture of medium to long setae; medio-dorsally, propodeum glabrous; mesoscutum length 0.42 (0.38–0.47) x width, 0.65 (0.58–0.68) x mesosoma length and 3.23 (2.33–4.25) x mesoscutellum length; mesoscutellum length 1.5 (1.0–2.5) x propodeum length; sculpturing dorsal mesopleuron distinctly scrobiculate, ending adjacent to or slightly ventral of dorsal margin of metapleuron; sculpturing of propodeum anterior to spiracle scrobiculate, region posterior to spiracle generally smooth, but may be

faintly carinulate; ventral to spiracle is distinct crescent shaped ridge running from ventral margin of spiracle to lateral posterior margin of propodeum, enclosed by ridge are varying number of faint carina bearing hairs posteriorly; propodeal spiracle small and tear-drop shaped; posterior margin of metapleuron curving dorso-medially, dorsal extent of suture equal to level of antero-lateral margin of T2; hind femoral spine reduced.

Metasoma. T2 length equal to width, posterior margin extending ventrally to below level of ventral margin of pronotum, sculpturing coriarius, pilosity sparse and mixture of short and medium length, if setae medium in length then only just; i.e. mostly within 10–15 μm range, not exceeding 20 μm , except for some Norfolk Island specimens whose pilosity is mostly of medium length, often exceeding 20 μm and even long in patches; T3 and T4 coriarius anteriorly with wide, smooth bands along posterior margins, T3 bearing one row of setae.

Description. Male. Mean length 1.05 mm (0.94–1.16; $n = 2$).

Head. 1.55 (1.50–1.61) x as wide as inter-ocular distance and 2.4 (2.25–2.5) x as wide as long; medial ocellus 17 μm in diameter, 104.5 (99–110) μm from posterior head margin; lateral ocelli 17 μm from eye margin, 44 (33–55) μm from posterior head margin; posterior ocellar line 1.0 (0.97–1.1) x inter-ocular distance; eyes ovoid, eye height 0.59 (0.56–0.61) x head height; frontal carina reaching greater than 0.5 of distance to medial ocellus; in postero-lateral view, anterior and posterior genal margins convergent medially; anterior genal margin in contact with the entire length of the ventral eye margin; posterior eye margin more than 40 μm from hyperoccipital carina.

Mesosoma. Length 1.03 x width; mesoscutum length 0.73 x width, 0.63 x mesosoma length; propodeal spiracle small and round; hind femoral spine reduced.

Metasoma. T1 transverse, length 0.24 x width; T2 length 0.6 x width.

Biology. This species has been reared from the eggs of a *Celaenia* sp. (Araneidae), commonly referred to as the 'bird dung' spider, in the Canberra area, ACT, and *Araneus* sp. (Austin 1985; Table 2).

Comments. *Baeus leai* is a large species with a very compact mesosoma and long metasoma. The distinctive feature of this species is the crescent-shaped ridge on the dorso-lateral propodeum beginning from the ventral margin of the spiracle (Fig. 7D, 9E). *Baeus leai* is the most widespread and commonly collected member of the genus (Fig 15C).

8. *Baeus maryae*, Stevens, sp. nov.

(Figs 10A–D, 15D)

Holotype, ♀, Queensland, '40 km W Ingham QLD. nr Wallaman Falls, 22.vi–7.viii.1982, S. & J. Peck coll. S8P45, 600m', 'Flight intercept trap, rainforest', (ANIC).

Paratypes: **Queensland:** 1 ♀, Mt Glorious, 26.xi–10.xii.1979 (QDPC); 4 ♀, O'Reillys Guest House, 2.ii–22.iii.1980 (QDPC); 2 ♀, Mt Webb N.P., 28–30.ix.1980, T. Weir (ANIC); 3 ♀, Mt Webb N.P., 27–30.iv.1981, I.D. Naumann (ANIC); 1 ♀, Davies Creek Rd, 16 km up via Mareeba, 4–13.iii.1983, Storey & Titmarsh (QDPC); 2 ♀, Windsor Tableland via Mt Carbine, 10.xi.–26.xii.1983, 12.xi.–26.xii.1983, Storey & Walford-Huggins (QDPC); 2 ♀, Mossman Gorge, 23.ii.1984, L. Masner (CNC); 13 ♀, Wongabel State Forest, 6 km S Atherton, 10.xi.1983–9.i.1984, 13.iii–1.v.1984, 26.vii–3.ix.1984, 3.ix.–1.xii.1984, Storey & Brown (QDPC); 1 ♀, Mt Glorious N.P., 28.ii–9.iii.1984, L. Masner (CNC); 13 ♀, Kuranda, 6 km NW, 2.x.–6.xi.1984, Storey & Halfpapp (QDPC); 1 ♀, Mareeba, 22 km WSW, 7.i–12.ii.1985, Storey & Halfpapp (QDPC); 13 ♀, Kuranda, 6 km SW, 10.xii.1984–15.i.1985, Storey & Halfpapp (QDPC); 4 ♀, Kuranda, 4 km NNW, 10.xii.1984–15.i.1985, Storey & Halfpapp (QDPC); 6 ♀, Mt Tozer, 3 km ENE, 12.44S 143.14E, 1–4.vii.1986, T. Weir, 28.vi–4.vii.1986, J.C. Cardale (ANIC); 2 ♀, Mt Tozer, 9 km ENE, 12.43S 143.17E, 5–10.vii.1986, J.C. Cardale (ANIC); 3 ♀, Mt Lewis, 8 km NW of Julatten, 8.i–2.ii.1987, A. Walford-Huggins (ANIC); 3 ♀, Julatten, 18.viii–5.ix.1987, 29.ix–5.x.1987, A. Walford-Huggins (ANIC); 8 ♀, Lake Eacham, 17.17S 145.39E,

15.ii–2.iii.1988, 16–19.ii.1988, D.C.F. Rentz (ANIC); 7 ♀, Lake Eacham, 17.17S 145.39E, 15.ii–2.iii.1988, 2–16.iii.1988, 29.iii–31.v.1988, D.C.F. Rentz (ANIC); 6 ♀, Bald Hill, McIlwraith Range, 11 km WbyN, 13.44S 143.20E, 26.vi–13.vii.1989, I.D. Naumann (ANIC); 4 ♀, Bald Hill, McIlwraith Range, 15 km WNW, 13.43S 143.19E, 27.vi–12.vii.1989, I.D. Naumann (ANIC); 6 ♀, Mt Cleveland summit, 19.16S 147.03E, 23.iii–13.v.1991, D. Cook, (QM); 2 ♀, Heathlands, 12 km SSE, 11.51S 142.38E, 22.iii–25.iv.1992, T. Mcleod, 21.viii–17.ix.1992, P. Zboroskii & L. Miller (ANIC); 1 ♀, Guanaba Shelf, Tamborine Mountains, xii.1992–i.1993, K.J. Lambkin (ANIC); 1 ♀, Mt Glorious, 27.19.54S 152.45.29E, 21–27.iii.1997, N. Power, canopy malaise trap (CNC); **Northern Territory:** 4 ♀, 53 km SSW Darwin, 12.52.11S 130.35.04E, 17–23.vi.1998, M. Hoskins, malaise trap (CNC); 1 ♀, 53 km SSW Darwin, 12.52.10S 130.35.04E, 1–9.vi.1998, mango patch, M. Hoskins, malaise trap (CNC); **Norfolk Island:** 4 ♀, 29.03 S 167.55 E, Rocky Point Reserve, 14.xi–2.xii.1984, T.A. Weir. 2nd Flight intercept window/trough trap (ANIC); 2 ♀ as above but 15–22.xi.1984. 2nd litter under *Araucaria heterophylla* (ANIC); 2 ♀ 29.01 S 167.56 E NP nr Mt Pitt 8.iv.1984, St. 4, J.E. Feehan 2nd Flight intercept window/trough trap (ANIC); 3 ♀ 29.01 S 167.57 E, Filmy Fern Walk, NINP, 14.xi–2.xii.1984, T.A. Weir. 2nd Flight intercept window/trough trap (ANIC); 1 ♀ Anson Bay Reserve, 9.iv.1984, St. 6, J.E. Feelan. 2nd Flight intercept window/trough trap. (ANIC); 1 ♀ 29.01 S 167.57 E, Red Rd, Tr. NINP, 14.xi–2.xii.1984, T.A. Weir. 2nd Flight intercept window/trough trap. (ANIC); 2 ♀ Palm Glen 1.xii.1979, G.B. Monteith, pyrethrum knockdown. (QDPI); **New Caledonia:** 2 ♀ Noumea, Mt. Koghis, edge of rainforest, 27.iii–4.iv.1985, yellow pan traps, A.D. Austin (WINC); 1 ♀ Noumea, Anse Vata, 1–4.iv.1985, disturbed low scrub, yellow pan traps, A.D. Austin (WINC)

Description. Female. Mean length 0.82 mm (0.70–1.01; n = 10); body and head vary from dark brown, almost black, to brown, anterior vertex, frons and gena may be lighter than body and posterior vertex, legs and antennae generally yellow with darker markings on dorsal surfaces.

Head. 2.5 (2.1–2.6) x as wide as inter-ocular distance, and 2.1 (1.9–2.4) x as wide as long; medial ocellus 15 µm in diameter, 101 (80–110) µm from posterior head margin; lateral ocelli contacting eye margin, 21 (20–30) µm from posterior head margin; posterior ocellar line 1.3 (1.2–1.3) x inter-ocular distance; vertex coriari-ous, pilosity mostly sparse and of medium length, but can be of moderate density and short in length; eyes large and ovoid, eye height 0.56 (0.51–0.59) x head height, eye width 0.58 (0.45–0.75) x eye length, pilosity short; frontal carina prominent, reaching 0.53 (0.50–0.57) distance to medial ocellus; cristulations of malar region extending to within 10 µm of eye margin, may be very faint in instances; in postero-lateral view, anterior and posterior genal margins convergent medially; anterior genal margin in contact with 0.64 (0.57–0.68) of ventral eye margin length; posterior eye margin touching hyperoccipital carina.

Mesosoma. Length 0.50 (0.42–0.59) x width; sculpturing mesoscutum coriari-ous, mesoscutellum varies from smooth to faintly coriari-ous, to distinctly coriari-ous, pilosity of both sclerites mostly sparse but can be moderately dense in parts, and is generally of medium length, though can be short and occasionally long in parts; propodeum glabrous medio-dorsally; mesoscutum length 0.37 (0.31–0.43) x width, 0.61 (0.56–0.65) x mesosoma length and 2.67 (2.20–3.00) x mesoscutellum length; mesoscutellum length 1.54 (1.00–2.50) x propodeum length; sculpturing dorsal mesopleuron distinctly scrobiculate, may or may not extend ventral of dorsal margin of metapleuron; sculpturing of propodeum anterior to spiracle scrobiculate, region posterior to spiracle generally smooth, but may be faintly carinate; propodeal spiracle small and tear-drop shaped; dorsal and lateral propodeum clearly delineated by a broad laterally projecting carina (Fig. 10C); posterior margin of metapleuron parallel to anterior margin medially, curving gently dorsally, ending ventral to level of antero-lateral margin of T2, ventro-posterior margin elevated above ventro-anterior margin of lateral propodeum; hind femoral spine absent.

Metasoma. T2 length 0.85 (0.80–0.89), sculpturing varies from smooth to faintly coriari-ous, to distinctly coriari-ous, pilosity is sparse throughout and mostly short in length but can be of medium length in parts; T3 often glabrous but can be smooth with a very sparsely spaced row (> 100 µm between setae) of short setae; T4 glabrous.

Comments. The degree of dorsal sculpturing varies for this species, however, the size and shape of several characters remain relatively consistent. *Baeus maryae* is most commonly collected from north-eastern Queensland (Fig. 15D), but is also found in the Pacific on New Caledonia and Norfolk Island. This species is named after the mother of the senior author, Mrs Mary Stevens.

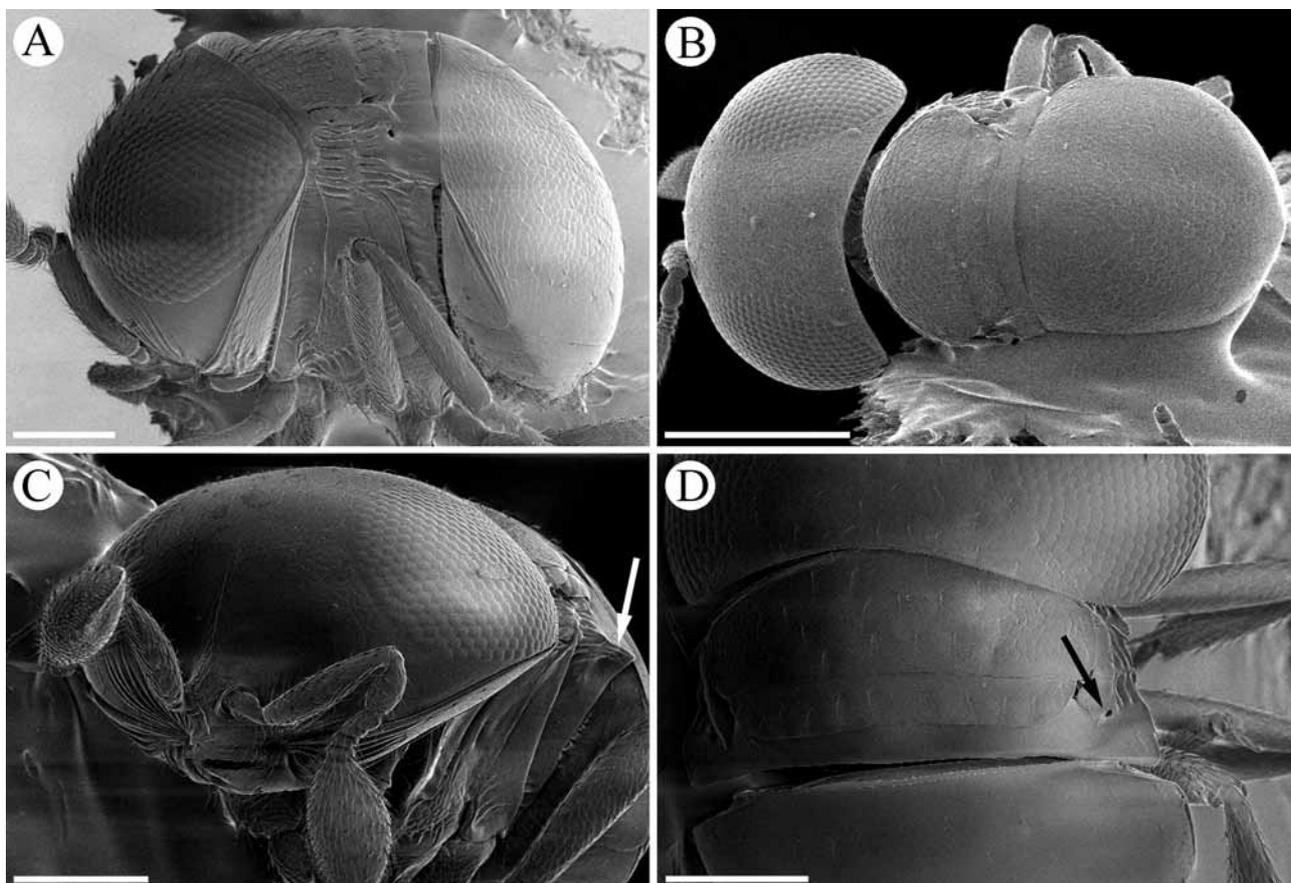


FIGURE 10. Female *Baeus* spp.: A – C, *B. maryae*: A, lateral habitus; B, dorsal habitus; C latero-anterior head and mesosoma, laterally projecting carina on latero-dorsal margin of propodeum (arrowed) clearly delineates the lateral part of the propodeum from the dorsal part; D, dorsal mesosoma, propodeal spiracle (arrowed) distal from the lateral margin. Scale lines, A, C & D = 100 μ m; B = 200 μ m.

9. *Baeus matthewi*, Stevens, sp. nov.

(Figs 11A & B, 16A)

Holotype, ♀, Queensland, '12.41S 142.41E, QLD, 5 km S Batavia Downs. 23 Aug–16 Sep 1992. Flight Intercept trap P. Zborowski & L. Miller' (ANIC).

Paratypes: **Queensland:** 2 ♀, Eungella N.P., 29.xi.1976, Bouček, 8–9.v.1980, I.D. Naumann & J.C. Cardale (ANIC); 1 ♀, Tinaroo Creek Rd, 26 km up via Mareeba, 12–28.i.1983, Storey & Brown (ANIC); 2 ♀, same data as holotype (ANIC); 1 ♀, Heathlands, 11.45S 142.35E, 25.vii–18.viii.1992, P. Zborowski & J. Cardale (ANIC); 1 ♀, Mt Haig, 17.06S 145.36E, 4.ii–17.iii.1995, P. Zborowski (ANIC); 1 ♀, Mt Edith, 17.06S 145.37E, 30.vi–31.vii.1995, P. Zborowski (ANIC); **Australian Capital Territory:** 1 ♀, Canberra, Black Mountain, 36.16S 149.06E, 22–28.ii.1998, yellow pan trap, G.Gibson; **South Australia:** 3♀, Brachina Gorge, 31.30S 138.34E, 4–10.xi.1987, I. Naumann & J. Cardale (ANIC).

Description. Female. Mean length 0.82 mm (0.74–0.86; n = 5); body and head range from black to dark brown, legs and antennae yellow with darker markings on dorsal surfaces.

Head. 2.25 (2.17–2.38) x as wide as inter-ocular distance, and 1.86 (1.59–2.00) x as wide as long; medial ocellus 15 μm in diameter, 82 (80–90) μm from posterior head margin; lateral ocelli touching eye margin, 20 μm from posterior head margin; lateral ocelli very close to (<5 μm) or touching eye margin; posterior ocellar line 1.24 (1.20–1.31) x inter-ocular distance; vertex coriarius, pilosity generally sparse but may be moderately dense posteriorly, generally of medium length but bordering on short which it can be in areas; eyes large and ovoid, eye height 0.53 (0.48–0.55) head height, eye width 0.59 (0.56–0.61) x length, pilosity short; frontal carina prominent, reaching 0.57 (0.54–0.68) distance to medial ocellus; lateral cristulations of malar region extending to within 10 μm of eye margin; in postero-lateral view, anterior and posterior genal margins convergent medially; anterior genal margin in contact with 0.5 of ventral eye margin length; posterior eye margin touching hyperoccipital carina.

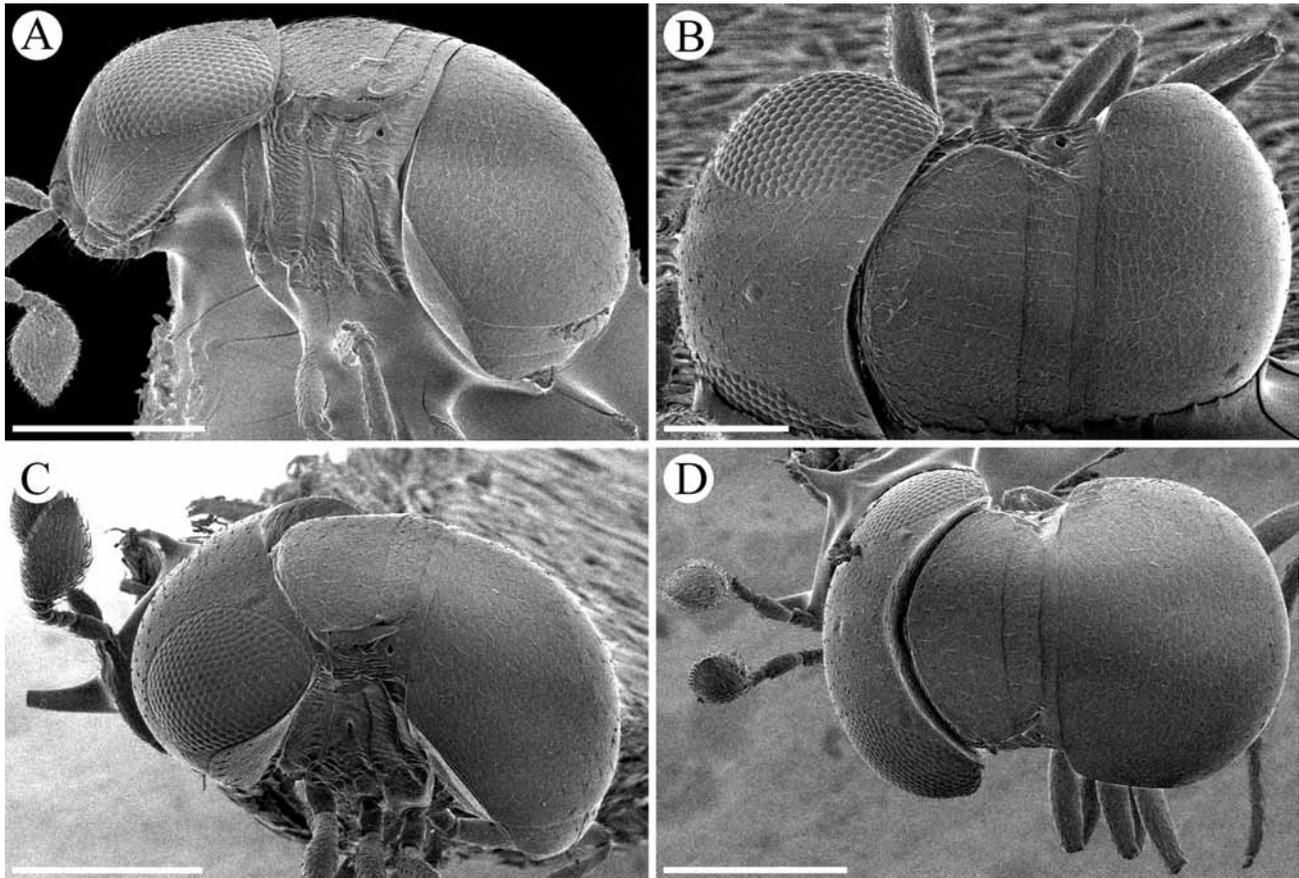


FIGURE 11. Female *Baeus* spp.: **A & B**, *B. matthewi*: **A**, lateral habitus; **B**, dorsal habitus. **C & D**, *B. moorei*: **C**, lateral habitus; **D**, dorsal habitus. Scale lines, A – D = 200 μm .

Mesosoma. Length 0.55 (0.47–0.60) x width; mesoscutum and mesoscutellum coriarius, pilosity mostly of moderate density, though can be dense in the anterior row of mesoscutellum, and sparse in posterior parts of both sclerites, is of medium length overall though often bordering on being short; propodeum glabrous medio-dorsally; mesoscutum length 0.42 (0.36–0.47) x width, 0.66 (0.63–0.67) x mesosoma length, and 2.86 (2.50–3.00) x mesoscutellum length; length mesoscutellum 2.1 (2.0–2.5) x propodeum length; sculpturing dorsal mesopleuron scrobiculate, may end adjacent to or ventral to dorsal margin of metapleuron; sculpturing of propodeum anterior to spiracle confused, region posterior to spiracle carinulate; propodeal spiracle opening round and distinct, with margins prominently raised; dorsal and lateral propodeum delineated by a broad laterally projecting carina (e.g. Fig. 10C); posterior margin of metapleuron relatively parallel to anterior margin medially, but dorsally curving sharply, nearly at right angles, towards mesopleuron, ending adjacent to level of antero-lateral margin of T2; ventro-posterior metapleuron elevated from anterior margin of lateral propo-

deum; hind femoral spine > 15 µm in length.

Metasoma. T2 length 0.90 (0.89–0.91) x width, sculpturing coriarius, pilosity mostly sparse, but can be of moderate density in medial anterior areas, is mostly of medium length, often bordering on short, which it can be in areas; T3 coriarius anteriorly with wide smooth, nitid band along posterior margin, one row of setae present along posterior extremity of sculpturing; T4 glabrous.

Comments. *Baeus matthewi* is clearly recognisable from other species because of its large hind femoral spine that is very distinct under stereo-light microscopy. The only other species to possess such large spines is *B. vulcanus*, which also has large propodeal spiracles (opening ? 20 µm in diameter) that are clearly distinguishable from the smaller spiracles of *B. matthewi*. This species has mainly been collected along Cape York Peninsula as far south as Mareeba, except for several specimens collected from the Flinders Ranges in South Australia, and from Canberra (Fig. 16A). The contrasting climatic conditions among the regions possibly indicates that the distribution of *Baeus* spp. is largely determined by host distribution rather than environmental conditions. This species is named after the brother of the senior author, Mr Matthew Stevens.

10. *Baeus moorei*, Stevens, sp. nov.

(Figs 11C & D, 16A)

Holotype: ♀, Queensland, 'Beerwah, S. E. Qld, 26.51S 152.57E, 28.ix.–29.x.1986, B. K. Cantrell, Malaise trap' (ANIC)(left antenna glued to card point).

Paratypes: **Queensland:** 1 ♀, Bold Mtn, 29.xii.1974–30.iii.1975, G.B. & S.R. Monteith (ANIC); 2 ♀, same data as holotype (ANIC).

Description. Female. Mean length 0.73 mm (0.70–0.77; n = 4); body brown, head lighter brown, legs and antennae lighter than head with darker markings on dorsal surfaces.

Head. 1.88 (1.57–2.06) x as wide as inter-ocular distance, and 1.62 (1.57–1.74) x as wide as long; medial ocellus 15 µm in diameter, 65 (60–80) µm from posterior head margin; lateral ocelli 5 µm from eye margin, 13 (10–20) µm from posterior head margin; posterior ocellar line = inter-ocular distance; vertex coriarius, pilosity generally sparse but may be moderately dense posteriorly, and mixture of short and medium length setae (medium length mostly within 10–15 µm range, not exceeding 20 µm); eyes large and ovoid, eye height 0.55 (0.54–0.56) x head height, eye width 0.47 (0.33–0.53) x length, pilosity short; Frontal carina reaching 0.54 (0.52–0.57) distance to medial ocellus; cristulations of malar region faint but extending to within 10 µm of eye margin; in postero-lateral view, anterior and posterior genal margins generally parallel, but may be marginally divergent medially; anterior genal margin in contact with 0.68 (0.63–0.76) of ventral eye margin length; posterior eye margin touching hyperoccipital carina.

Mesosoma. Length 0.61 (0.57–0.71) x width; mesoscutum and mesoscutellum coriarius, pilosity mostly sparse, but can be moderately dense in areas; generally of medium length overall, but short setae can be present; propodeum glabrous medio-dorsally; mesoscutum length 0.47 (0.41–0.52) x width, 0.66 (0.60–0.69) x mesosoma length and 3.12 (2.40–3.67) x mesoscutellum length; mesoscutellum length 1.67 (1.50–2.00) x propodeum length; sculpturing dorsal mesopleuron scrobiculate, extending ventrally of level of dorsal margin of metapleuron; sculpturing of propodeum anterior to spiracle confused, region posterior to spiracle generally smooth but with a few faint, short carinae present; propodeal spiracle opening tear-drop shape; dorsal and lateral propodeum delineated by a broad laterally projecting carina (e.g. Fig. 10C); posterior margin of metapleuron straight, ending adjacent to level of antero-lateral margin of T2; ventro-posterior metapleuron elevated from ventro-anterior margin of lateral propodeum; hind femoral spine absent.

Metasoma. T2 length 0.8 x width, sculpturing coriarius, pilosity mostly sparse, but can have small patches of moderate density in the medial anterior region, length mostly short though in instances setae of medium length may occur randomly dispersed amongst short setae; T3 coriarius anteriorly with wide

smooth, nitid band along posterior margin, one row of setae present along posterior extremity of sculpturing; T4 glabrous.

Comments. *Baeus moorei* is a small, but broad squat species, with the head and metasoma much wider than the mesosoma. This species is known from only four specimens collected from southeast Queensland (Fig. 16A) and is named after Mr Sam Moore.

11. *Baeus murphyi*, Stevens, sp. nov.

(Figs 4B, 12A, 16B)

Holotype, ♀, Queensland, '17.28S 145.29E, QLD, BS 1 Longlands Gap, 4 Apr–2 May 1995, P. Zborowski. 1150 m F.I. trap JCU (East)' (ANIC).

Paratypes: **Queensland:** 1 ♀, Cold Creek, G.B. & S.R. Monteith (ANIC); 1 ♀, Kuranda, Black Mountain Rd, 16.45S 145.35E, 27.vi.1971, Taylor & Feehan (ANIC); 1 ♀, Mt Tenison Woods, 13.iii.1977, A. Slater (WINC); 1 ♀, Mt Webb N.P., 15.04S 145.07E, 27–30.iv.1981, A. Calder & J. Feehan (ANIC); 1 ♀, Mt Glorious, ii.1982, Hiller (ANIC); 1 ♀, Mt Tamborine, 21.ii.–29.iii.1984 (ANIC); 2 ♀, Tinaroo Creek Rd, 26 km via Mareeba, 29.ix–11.xi.1983, Storey & Brown (ANIC); 1 ♀, Mt Haig, 17.06S 145.36E, 3.I–4.ii.1995, P. Zborowski (ANIC); **New South Wales:** 1 ♀, Lismore, G.B. & S.R. Monteith (ANIC); 1 ♀, Bells Creek, 9.iv.1967, Z. Liepa (ANIC); 1 ♀, Cabbage Tree Creek, 11 km NW of Nelligen, 21.ii.1969, S. Miske (ANIC); 1 ♀, Cambewarra Mountain, 10 km N by W of Nowra, 5.v.1969, Britton & Upton (ANIC); 2 ♀, Tooloom Plateau, 15.vii–5.viii.1973, 14.ii.1984, I.D. Naumann (ANIC); 1 ♀, Toonumbar S.F., 26.xii.1974–31.iii.1975, G.B. & S.R. Monteith (ANIC); 1 ♀, Jerrabornberra Hill, 35.23S 149.13E, 30.ix.1976, R.W. Taylor & T.A. Weir (ANIC); 1 ♀, Clyde Mountain, 27.ix.1979, I.D. Naumann & J.C. Cardale (ANIC); 7 ♀, Bundanoon, 2 km SSE, 3.iv.1982, L. Hill (ANIC); 1 ♀, Barwick Creek Bog, 30.29S 152.19E, 27.vi.1982, L. Hill (ANIC); 11 ♀, Macquarie Pass, 34.34S 150.40E, 8.ii.1984, I.D. Naumann (9 ANIC; 2 WINC); 3 ♀, Dorrigo N.P., 30.22S 152.45E, 13.ii.1984, I.D. Naumann, 2 ♀, L. Masner, 1 ♀, 2–15.x.1984, I.D. Naumann & J.C. Cardale (ANIC); 1 ♀, Mt Wog Wog, 37.05S 149.28E, vi.1989, C.R. Margules (ANIC); **Australian Capital Territory:** 1 ♀, Blundells Creek, 3 km E of Piccadilly Circus, 35.22S 148.50E, ii.1984, Weir, Lawrence & Johnson (ANIC); 19 ♀, Wombat Creek, 6 km NE of Piccadilly Circus, 35.19S 148.51E, ii–v.1984, ix.1984, i.1985, Lawrence, Weir & Johnson (ANIC); 1 ♀, Piccadilly Circus, 35.22S 148.48E, 1.x–15.xi.1984, Lawrence, Weir & Johnson (ANIC); **Tasmania:** 1 ♀, Mt Barrow Rd, 15–17.ii.1980, A. Newton & M. Thayer (ANIC); **Western Australia:** 2 ♀, Mitchell Plateau, 14.49S 125.50E, 9–19.v.1983, I.D. Naumann & J.C. Cardale (ANIC); 1 ♀, Warren N.P., 25.x.1984, J. & N. Lawrence (WINC); 2 ♀, Perth Airport, 31.59S 115.58E, 10.v–24.vi.1993, 6.i–18.iii.1994, M.S. Harvey & J.M. Waldock (WAMP); 2 ♀, Tuart Hill, 31.53S 115.52E, 10.v–23.ix.1993, J.M. Waldock, K. Goodsell, & J. Webb (WAMP); 1 ♀, Wexcombe, western side of Talbot Rd Reserve, 10.v–24.vi.1993, M.S. Harvey & J.M. Waldock (WINC); 4 ♀, Bold Park, 31.57S 115.46E, 20.v–20.vii.1993, 24.ix–19.xi.1993, J.M. Waldock, K. Goodsell & J. Webb (WAMP); 6 ♀, Talbot Rd Reserve, 31.52S 116.03E, 24.vi–18.xi.1993, J.M. Waldock, K. Goodsell, & J. Webb (WAMP); **Lord Howe Island:** 1 ♀ Malabar Hill, 25.xi.1979, G.B. Monteith, Rainforest, pyrethrum knockdown. (QDPI); **Norfolk Island:** 7 ♀ 29.01 S 167.57 E, Red Rd, Tr. NINP, 14.xi–2.xii.1984, T.A. Weir. 2nd Flight intercept window/trough trap. (ANIC); 1 ♀ 29.01 S 167.57 E, Red Rd, Tr. NINP, 14.xi–2.xii.1984, I.D. Naumann. ex pantraps. (ANIC); 5 ♀ 29.01 S 167.57 E, Filmy Fern Walk, NINP, 14.xi–2.xii.1984, T.A. Weir. 2nd Flight intercept window/trough trap. (ANIC); 2 ♀ Palm Glen 1.xii.1979, G.B. Monteith, pyrethrum knockdown (QDPI); 3 ♀, 29.03 S 167.55 E, Rocky Point Reserve, 14.xi.–2.xii.1984, T.A. Weir. 2nd Flight intercept window/trough trap (ANIC); 1 ♀ 29.01 S 167.56 E NP nr Mt Pitt 8.iv.1984, St. 4, J.E. Feehan 2nd Flight intercept window/trough trap (ANIC); 1 ♀ as above but 240m, 20–26.iii.1984 (ANIC); 1 ♀ Anson Bay Reserve, 9.iv.1984, St. 6, J.E. Feehan. 2nd Flight intercept window/trough trap (ANIC); 1 ♀ 29.02 S 167.57 E nr Highlands Guesthouse, 9.iv.1984, St. 1, J.E. Feehan 2nd

Flight intercept trap with trough. (ANIC); 2 ♀ 29.07 S 167.57 E Philip Island , Lower Long Valley, 20–24.xi.1984, T.A. Weir, pitfall trap (WINC).

Description. Female. Mean length 0.69 mm (0.61–0.72; n= 10); body and head dark brown, legs and antennae lighter with darker markings on dorsal surfaces.

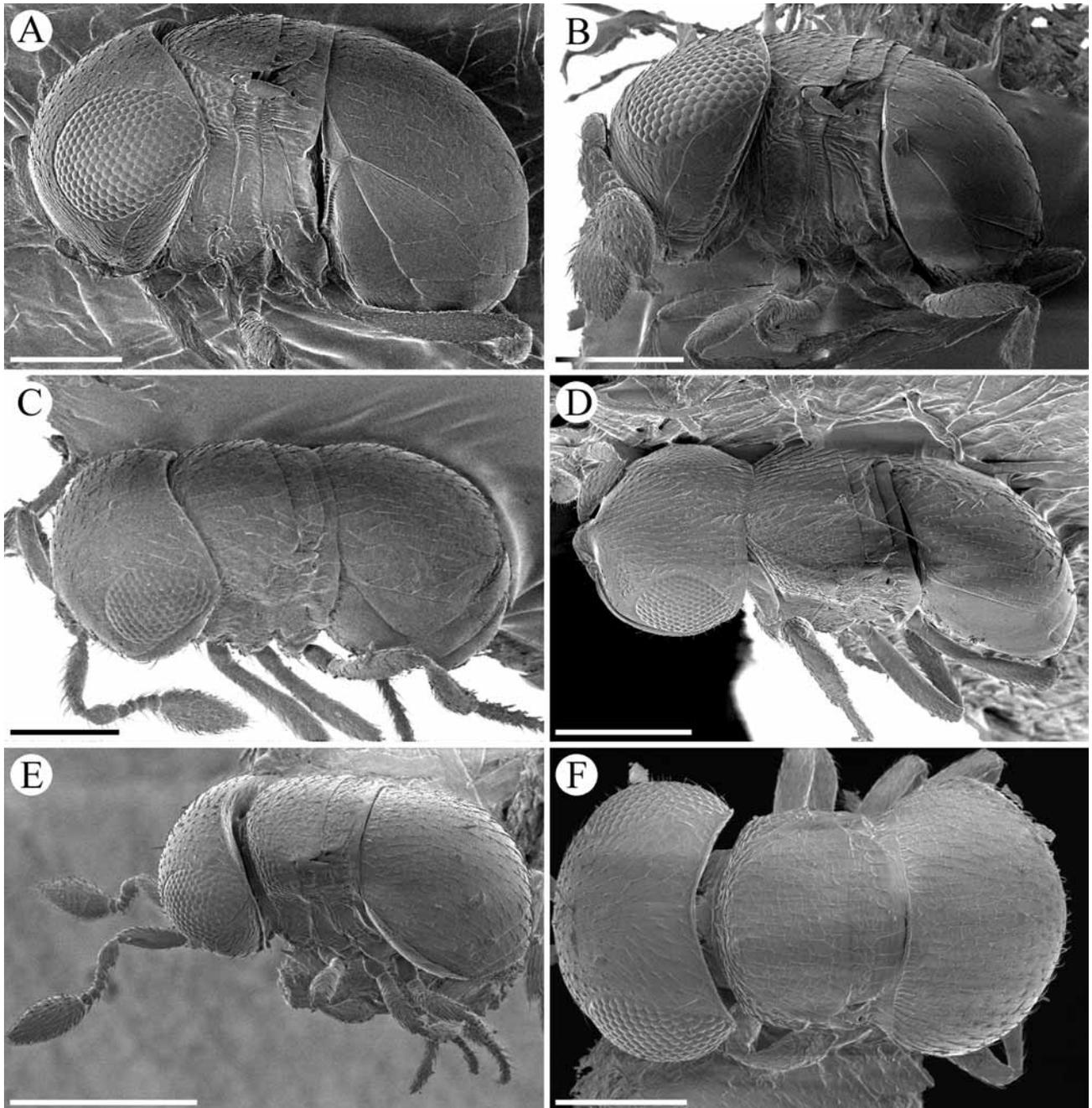


FIGURE 12. Female *Baeus* spp.: **A**, *B. murphyi* lateral habitus. **B**, *B. mymyae* lateral habitus. **C**, *B. ocellatus* latero-dorsal habitus. **D**, *B. prolatusspissus* latero-dorsal habitus. **E** & **F**, *B. saliens*: **E**, postero-lateral habitus; **F**, dorsal habitus. Scale lines, A – C, & F = 100 μ m; D & E = 200 μ m.

Head. 1.88 (1.80–2.00) x as wide as inter-ocular distance and 1.36 (1.29–1.43) x as wide as long; medial ocellus 10 μ m in diameter, 62 (60–70) μ m from posterior head margin; lateral ocelli contacting eye margin, 12 (10–15) μ m from posterior head margin; posterior ocellar line 1.16 (1.13–1.21) x inter-ocular distance; vertex coriarius, pilosity dense and of medium length; eyes circular, eye height 0.51 (0.48–0.59) x head height, eye width 0.49 (0.43–0.54) x length, pilosity of medium length; frontal carina prominent, reaching 0.54 (0.53–

0.56) distance to medial ocellus; lateral cristulations of malar region faint, reaching to within 10 µm of eye margin; in postero-lateral view, anterior and posterior genal margins generally marginally divergent medially, but may be parallel; anterior genal margin in contact with 0.59 (0.57–0.62) of ventral eye margin length; posterior eye margin touching hyperoccipital carina.

Mesosoma. Length 0.64 (0.50–0.70) x width; mesoscutum and mesoscutellum imbricate, pilosity varies from dense to moderately dense, of medium length overall; sculpturing of propodeum ranges from glabrous to plicate medio-dorsally; mesoscutum length 0.51 (0.42–0.56) x width, 0.67 (0.63–0.73) x mesosoma length and 3.37 (2.50–4.00) x mesoscutellum length; mesoscutellum length 1.7 (1.5–2.0) x propodeum length; sculpturing of dorsal mesopleuron scrobiculate, extending ventrally of level of dorsal margin of metapleuron; sculpturing of propodeum anterior to spiracle confused, region posterior to spiracle carinate, often with one, more distinct carina running posteriorly from medial or ventral margin of propodeal spiracle, or with two, more distinct carinae beginning from dorsal and ventral margins of spiracle; propodeal spiracle opening teardrop shaped; dorsal propodeum not delineated from lateral propodeum by distinct, laterally projecting carina, instead dorso-lateral propodeum rounded; metapleuron thin and tapered, posterior margin curving slightly medially, ending adjacent to level of antero-lateral margin of T2, medio-posterior margin elevated from anterior margin of lateral propodeum; hind femoral spine reduced.

Metasoma. T2 length 0.85 (0.74–0.92) x width, sculpturing gradating from coriarius anteriorly to smooth posteriorly; pilosity gradating, anterior to posterior, from dense to moderately dense, of medium length overall; T3 and T4 glabrous except for two bristles on lateral regions of each.

Comments. *Baeus murphyi* is a slender species and is similar to *B. hallarakeri*, *B. glenysae* and *B. mymyae* (see *Comments* under *B. hallarakeri* and *B. glenysae*). *Baeus mymyae* is distinguishable from *B. murphyi* by having a longer frontal carina, shorter metapleuron, and hind femoral spines absent. *Baeus murphyi* occurs in a wide range of habitats from northern Queensland, down the eastern seaboard to Tasmania and extends into South Australia and the southwestern part of the continent (Fig. 16B). Specimens have also been collected from Norfolk and Lord Howe Islands. This species is named after Mr Kevin Murphy.

12. *Baeus mymyae*, Stevens, sp. nov. (Figs 12B, 16B)

Holotype, ♀, Queensland, '11.45S 142.35E, Heathlands, 23 May–18 June 1993, Flight Intercept Trap, P. Zborowski & I. Naumann' (ANIC).

Paratypes: **Queensland:** 1 ♀, Bald Hill, McIlwraith Range, 13.43S 143.19E, 27.vi–12.vii.1989, I. Naumann, (ANIC); 6 ♀, Heathlands Research Reserve, 11.51S 142.38E, 22.iii–25.iv.1992, T. McLeod, 22.x–22.xi.1992, P. Zborowski & A. Calder (ANIC); **Western Australia:** 2 ♀, Mitchell Plateau, 14.49S 125.50E, 9–19.v.1983, I. Naumann & J. Cardale (ANIC).

Description. Female. Mean length 0.49 mm (0.47–0.52; n = 5); body and head brown, legs and antennae lighter.

Head. 1.97 (1.92–2.00) x as wide as inter-ocular distance and 1.63 (1.53–1.92) x as wide as long; medial ocellus 10 µm in diameter, 52 (50–60) µm from posterior head margin; lateral ocelli very close to eye margin (< 5 µm) but not touching, 10 µm from posterior head margin; posterior ocellar line = inter-ocular distance; vertex imbricate, pilosity dense and mostly of medium length, can be short in patches; eyes sub-triangular in shape, eye height 0.43 (0.41–0.45) x head height, eye width 0.51 (0.50–0.60) x length, pilosity medium length; frontal carina reaching 0.59 (0.53–0.69) distance to medial ocellus; cristulations of malar region distinct and reaching to within 10 µm of eye margin; in postero-lateral view, anterior and posterior genal margins parallel medially; anterior genal margin in contact with 0.67 (0.60–0.73) of ventral eye margin length; posterior eye margin touching hyperoccipital carina.

Mesosoma. Length 0.71 (0.61–0.81) x width; mesoscutum and mesoscutellum imbricate, pilosity generally dense, but can be of moderate density in areas, and of medium length overall; medio-dorsally, propodeum glabrate; mesoscutum length 0.52 (0.44–0.57) x width, 0.65 (0.62–0.67) x mesosoma length and 2.60 (2.33–2.67) x mesoscutellum length; mesoscutellum length 2.7 (1.5–3.0) x propodeum length; sculpturing of dorsal mesopleuron scrobiculate, sculpturing ending dorsal or ventral to level of dorsal margin of metapleuron; sculpturing of propodeum anterior to spiracle confused, region posterior to spiracle carinate, more often with two distinct carinae running posteriorly from dorsal and ventral margins of propodeal spiracle, or less often, with only one carinae beginning from dorsal margin of spiracle; propodeal spiracle opening tear-drop shape; dorsal propodeum not delineated from lateral propodeum by distinct, laterally projecting carina, instead dorso-lateral propodeum rounded; metapleuron relatively broad, posterior margin straight and short, ending ventral to level of antero-lateral margin of T2, medio-posterior margin level with anterior margin of lateral propodeum; hind femoral spine absent.

Metasoma. T2 length 0.93 (0.89–0.95) x width, sculpturing gradating from coriarius anteriorly to smooth posteriorly; pilosity gradating anterior to posterior, from dense to sparse, medium in length; T3 and T4 glabrous.

Comments. This species appears similar to *B. hallarakeri*, *B. glenysae* and *B. murphyi* (see *Comments* under these species). It is recorded from Cape York Peninsula and the Kimberlys (Fig. 16B). However, only a few specimens from the top end of the Northern Territory have been examined in this study. Further collecting from this region is required to reveal if the distribution of *B. mymyae* is disjunct or continuous throughout the northern monsoonal regions of Australia. This species is named after Ms My-my Huynh.

13. *Baeus ocellatus* Stevens, sp. nov. (Figs 12C, 16C)

Holotype, ♀, Australian Capital Territory, '35.19S 148.51E, Wombat Ck., 6 km NE of Piccadilly Circus, 750 m, ACT, May 1984, Weir, Lawrence, Johnson'; 'Flight intercept window/trough trap' (ANIC).

Paratypes: **Queensland:** 2 ♀, Gatton, 9–16.ix.1981 (QDPC); **Australian Capital Territory:** 4 ♀, Piccadilly Circus, 35.22S 148.48E, ii.1984, 1.x–15.xi.1984, T. Weir, J. Lawrence & M. Johnson (ANIC); 14 ♀, Wombat Ck, 35.19S 148.51E, i–iv.1984, T. Weir, J. Lawrence & M. Johnson (ANIC);

Description. Female. Mean length 0.64 mm (0.55–0.69; n = 5); body and head dark brown, legs and antennae lighter, both with darker markings on dorsal surfaces.

Head 1.64 (1.62–1.67) x as wide as inter-ocular distance, and 1.19 (1.05–1.35) x as wide as long; medial ocellus 5 µm in diameter, 50 µm from posterior head margin; lateral ocelli 5 µm from eye margin, 22 (20–30) µm from posterior head margin; posterior ocellar line 1.06 (1.08–1.00) x inter-ocular distance; vertex coriarius, pilosity mostly of moderate density but can have dense patches, length medium; eyes small and sub-triangular in shape, eye height 0.37 (0.35–0.40) x head height, eye width 0.5 x length, pilosity long; frontal carina broad and prominent reaching 0.55 (0.53–0.56) distance to medial ocellus; cristulations of malar region not reaching to within 10 µm of eye margin; in postero-lateral view, anterior and posterior genal margins slightly divergent medially; anterior genal margin in contact with 0.79 (0.67–0.89) of ventral eye margin length; posterior eye margin 18 (10–20) µm from hyperoccipital carina.

Mesosoma. Length 0.76 (0.70–0.79) x width; mesoscutum and mesoscutellum faintly coriarius, pilosity of medium density though can be dense in some patches, and is mostly medium in length though occasional setae can be long; propodeum glabrous medio-dorsally; mesoscutum length 0.55 (0.50–0.59) x width, 0.66 (0.64–0.69) x mesosoma length and 3.13 (3.00–3.33) x mesoscutellum length; mesoscutellum 1.8 (1.5–3.0) x as long as propodeum; sculpturing dorsal mesopleuron and propodeum anterior to spiracle confused, region of lateral propodeum posterior of spiracle bearing two or three short carinae, each with one long bristle posteri-

orly, region posterior of carinae glabrous; propodeal spiracle opening small and ovoid; dorsal propodeum not delineated from lateral propodeum by distinct, laterally projecting carina, instead dorso-lateral propodeum rounded; posterior margin of metapleuron faint, straight and short, ending well ventral to level of antero-lateral margin of T2, entire posterior margin level with anterior margin of lateral propodeum, depression present medially of posterior metapleuron and lateral anterior propodeal region; hind femoral spine absent.

Metasoma. T2 length 0.95 (0.87–1.05) x length, sculpturing coriarius anteriorly, rest smooth; pilosity long and mostly dense except for irregular patches of moderate density; both T3 and T4 smooth, each bearing one row of setae posteriorly.

Comments. *Baeus ocellatus* is a readily recognisable species having small distinctively shaped eyes and a relatively pilose appearance. It is recorded from the ACT and south-east Queensland (Fig 16C). This species is named after the Latin word *ocellatus*, meaning little eyes.

14. *Baeus prolatusspissus*, Stevens, sp. nov.

(Figs 12D, 16C)

Holotype, ♀, Queensland, '15.04S 145.07E, Mt Webb National Park, 27–30 Apr. 1981, Q, I. D. Naumann'; 'caught in yellow tray: ex alcohol collection' (ANIC).

Description. Female. Length 0.82 mm; body brown, head, legs and antennae lighter, legs and antennae with darker markings dorsally.

Head. 1.88 x as wide as inter-ocular distance, and 2.0 x as wide as long; medial ocellus 10 µm in diameter, 70 µm from posterior head margin; lateral ocelli 10 µm from eye margin, 20 µm from posterior head margin; posterior ocellar line 1.12 x inter-ocular distance; vertex surface smooth with prominent hair processes, pilosity dense and of medium length; eyes small and sub-triangular in shape, eye height 0.4 x head height, eye width 0.63 x length, pilosity long; antennal process and ventral frontal carina project ? 20 µm from frons surface; frontal carina broad, prominent but short, reaching 0.42 distance to medial ocellus; malar region faintly sculptured, cristulations not reaching to within 10 µm of eye margin; in postero-lateral view, anterior and posterior genal margins parallel medially; anterior genal margin in contact with 0.67 length of ventral eye margin; posterior eye margin 10 µm from hyperoccipital carina.

Mesosoma. Length 0.7 x width; mesoscutum deeply coriarius, pilosity mostly dense and long but patches of moderate density and of medium length do occur; mesoscutellum smooth, pilosity long and of moderate density; propodeum glabrous medio-dorsally; mesoscutum length 0.54 x width, 0.67 x mesosoma length and 2.8 x mesoscutellum length; mesoscutellum 2.5 x as long as propodeum; dorsal mesopleuron bearing long setae, sculpturing dorsal mesopleuron and propodeal region anterior to spiracle confused, lateral propodeal region posterior of spiracle but anterior of posterior margin of mesoscutellum bearing several distinct carinae, each with a long bristle projecting posteriorly, lateral propodeal region posterior of carinae glabrous; propodeal spiracle opening small and tear-drop shaped; dorso-lateral propodeum rounded, distinct, laterally projecting carina absent; posterior margin of metapleuron distinct, straight and short, ending well ventral to level of antero-lateral margin of T2, ventro-posterior margin elevated from anterior margin of lateral propodeum; hind femoral spine reduced.

Metasoma. T2 length 0.88 x width, smooth with prominent hair processes, pilosity dense along anterior margin, rest moderately dense and long (> 30 µm); both T3 and T4 glabrous medially with long setae laterally, setae processes not prominent.

Comments. This species is very distinctive because of its very long pilosity, smooth nitid dorsal surfaces (except the mesoscutum) and the prominent forward projection of the antennal process and frontal carina. This species is named after the Latin words *prolatus*, meaning elongated, and *spissus* meaning dense, because of its distinctive pilosity. *Baeus prolatusspissus* is only known from the holotype collected from northern Queensland (Fig. 16C).

15. *Baeus saliens* (Hickman)

(Figs 12E & F, 16D)

Aneurobaeus saliens Hickman, 1967: 16.

Baeus saliens: Austin, 1981: 89; Johnson, 2004.

Holotype, ♀, 'Tasmania, New Town, xi.1966–i.1967, V. V. Hickman'; 'Ex: eggs *Microctenonyx subitaneus* (Camb.)' (ANIC).

Paratypes: **New South Wales**: 1 ♀, Taree, 3 km N, 7.ix.–25.x.1987, G. Williams (WINC); **Tasmania**: 4 ♀, on same slide, same data as holotype (ANIC).

Other material examined: **Tasmania**: 1 ♀, same data as holotype (WINC); **New Zealand**: 1 ♀ AK Huia, iv.1981, B.M. May, malaise traps (NZAC).

Description. Female. Length 0.56 mm; body and head brown, legs and antennae lighter, both with darker markings on dorsal surfaces.

Head. 1.71 x as wide as inter-ocular distance, and 1.6 x as wide as long; medial ocellus 10 µm in diameter, 70 µm from posterior head margin; lateral ocelli 20 µm from eye margin and posterior head margin; posterior ocellar line 0.93 x inter-ocular distance; vertex coriarius anteriorly to imbricate posteriorly, pilosity dense and of medium length; eyes small and sub-triangular in shape, eye height 0.39 x head height, eye width 0.45 x length, pilosity long; frontal carina reaching 0.67 distance to medial ocellus; malar region mostly cristulate, cristulations reaching to within 10 µm of eye margin; in postero-lateral view, anterior and posterior genal margins parallel medially; anterior genal margin in contact with 0.73 of ventral eye margin length; posterior eye margin touching hyperoccipital carina.

Mesosoma. Length 0.68 x width; mesoscutum and mesoscutellum imbricate, pilosity mostly dense, can be of moderate density in patches, and of medium length; propodeum glabrate medio-dorsally; mesoscutum length 0.5 x width, 0.62 x mesosoma length and 2.67 x mesoscutellum length; mesoscutellum 1.5 x length of propodeum; sculpturing of dorsal mesopleuron and propodeum anterior to spiracle confused, region of lateral propodeum posterior of spiracle bearing short carinae, each with a bristle posteriorly, lateral region posterior of carinae glabrate; propodeal spiracle opening small and round; dorso-lateral propodeum without distinct, laterally projecting carina, instead is rounded; posterior margin of metapleuron obscure, appears to end well ventral to level of antero-lateral margin of T2, posterior margin level with anterior margin of lateral propodeum; depression present on medio-posterior region of metapleuron; hind femoral spine absent.

Metasoma. T2 length 0.71 x width, sculpturing gradating from imbricate anteriorly, to coriarius then smooth posteriorly; pilosity is dense anteriorly, but gradating to moderate density posteriorly, and of medium length overall; posterior margin ending dorsal to level of ventral margin of pronotum; both T3 and T4 mostly smooth, T3 bearing two rows of setae of moderate density and medium length, T4 bearing only one row.

Biology. The type series was reared from the eggs of *Microctenonyx subitaneus* (Cambridge) (Linyphiidae) at Hobart, Tasmania (Hickman 1967).

Comments. The notable features of *B. saliens* are its densely pilose dorsal surfaces, the posterior margin of the metapleuron being obscure, and the deep depression present in the medio-posterior area of the metapleuron. This species has a disjunct distribution, being found in Tasmania, along the central east coast of Australia (Fig. 16D), and in the North Island of New Zealand. Further collecting in south-eastern Australia, particularly Victoria may uncover a wider distribution for *B. saliens* in that region.

16. *Baeus scrobiculus*, Stevens, sp. nov.

(Figs 7E, 13A & B, 16D)

Holotype, ♀, Queensland, '11.51S 142.38E, 12 km SSE Heathlands, 22.Mar–25.Apr.1992, T. McLeod, FIT #2'; 'F.I.T., ANIC 1245, closed forest' (ANIC).

Paratypes: **Queensland:** 1 ♀, same data as holotype (ANIC); 2 ♀, Bellenden Ker Range, Cableway Base Station, 17.x.–9.xi.1981 (QDPC); 1 ♀, Julatten, Clacherty Rd, 4–25.ii.1983, A. Walford-Huggins (QDPC); 1 ♀, Heathlands Research Reserve, 11.51S 142.38E, 22.iii–25.iv.1992, T. Mcleod (ANIC).

Description. Female. Mean length 0.94 mm (0.87–0.98; n = 5); body and posterior vertex dark, red brown, anterior vertex and frons brown, legs and antennae lighter than frons, both with darker markings dorsally.

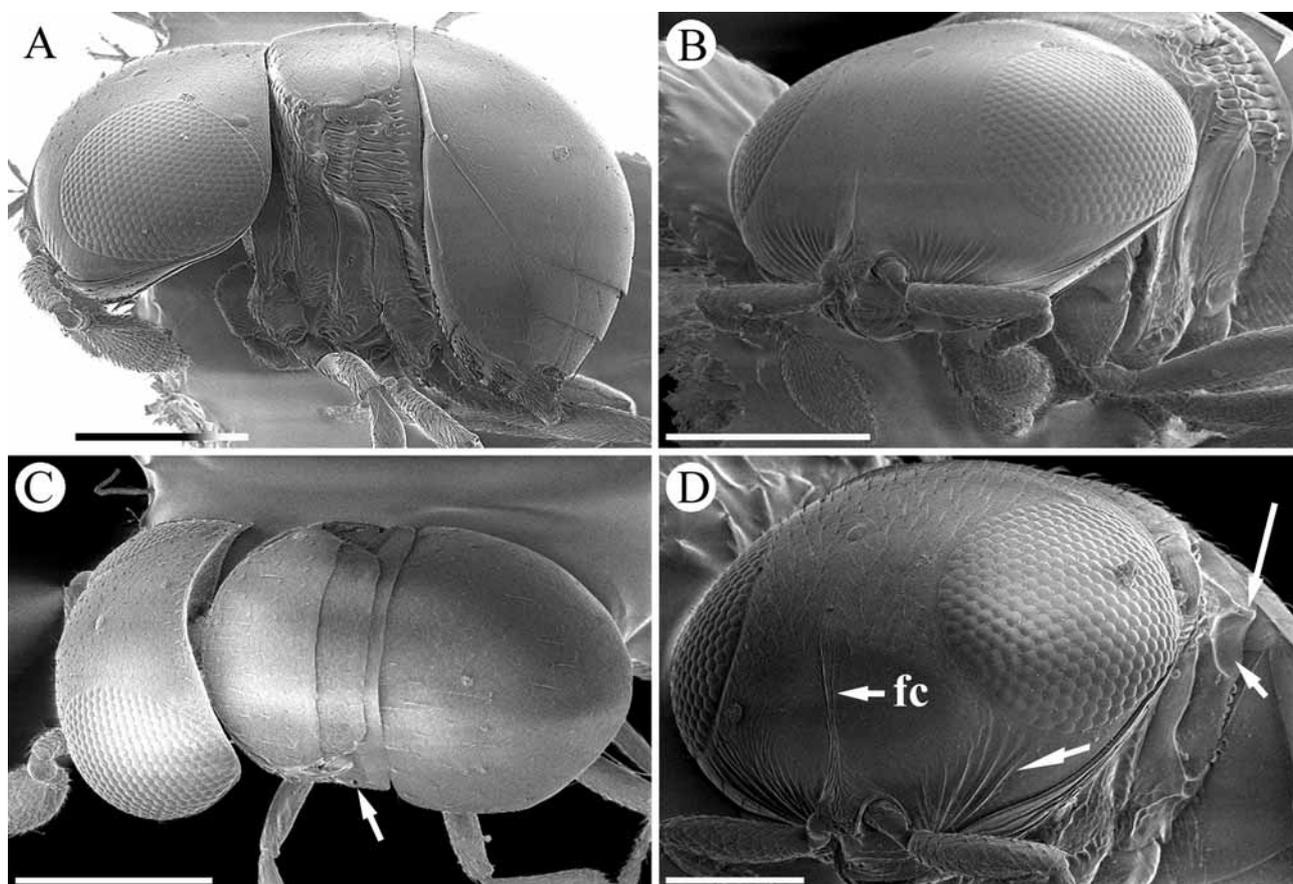


FIGURE 13. Female *Baeus* spp.: **A & B**, *B. scrobiculus*: **A**, lateral habitus; **B**, latero-anterior head and mesosoma, latero-dorsal margin of propodeum (arrow) rounded. **C & D**, *B. spirolimbus*: **C**, dorsal habitus, propodeal spiracle (arrowed) on the lateral margin; **D**, latero-anterior head and mesosoma, **fc** = frontal carina; laterally projecting carina on latero-dorsal margin of propodeum (long arrow) clearly delineates the lateral part of the propodeum from the dorsal part, distinctive quarter-circle shaped recess present below lateral ridge (short arrow); cristulations of malar region (distorted arrow). Scale lines, A – C = 200 μ m; D = 100 μ m.

Head 2.65 (2.50–2.88) x as wide as inter-ocular distance and head length; medial ocellus 20 μ m in diameter, 122 (120–130) μ m from posterior head margin; lateral ocelli touching eye margin, 20 μ m from posterior head margin; posterior ocellar line 1.54 (1.50–1.56) x inter-ocular distance; vertex finely coriarius, pilosity sparse and mostly short, if setae of medium length do occur then only just exceeding 10 μ m; eyes are large and ovoid, eye height 0.56 (0.53–0.59) x head height, eye width 0.62 x length, pilosity minute, not visible under a stereo-light microscope; frontal carina broad, prominent but short, reaching 0.42 (0.36–0.48) distance to medial ocellus; lateral cristulations of malar region faint, reaching to within 10 μ m of eye margin; in postero-lateral view, anterior and posterior genal margins highly convergent medially; anterior genal margin in contact with 0.40 (0.38–0.42) of ventral eye margin length; posterior eye margin broadly touching hyperocipital carina.

Mesosoma. Very compact, length 0.31 (0.27–0.33) x width; mesoscutum and mesoscutellum transverse in appearance; mesoscutum finely coriarius, pilosity very sparse, although small patches of medium density

can occur, mixture of short and medium length, medium length setae in range of 10–15 μm , not exceeding 20 μm ; anterior half mesoscutellum faintly coriarius, posterior half smooth, only one row setae present, short, dense medially, moderately dense laterally; propodeum glabrous medio-dorsally; mesoscutum length 0.23 (0.20–0.26) x width, 0.54 (0.50–0.60) x mesosoma length and 1.73 (1.50–2.25) x mesoscutellum length; mesoscutellum 2.2 (2.0–2.5) x as long as propodeum; sculpturing of entire dorso-lateral mesosoma scrobiculate, except for pronotum and thin glabrous band along posterior margin of propodeum; propodeal spiracle difficult to see within sculpturing laterally, more visible postero-laterally, opening small and ovoid; prominent laterally projecting carina not present on dorso-lateral propodeum (Fig. 13B); posterior margin of metapleuron distinct, curved dorsally and ending ventral to level of antero-lateral margin of T2, ventro-posterior margin elevated from ventro-anterior margin of lateral propodeum; hind femoral spine absent.

Metasoma. T2 length 0.88 (0.77–0.96), faintly coriarius, pilosity sparse and mostly short, if setae of medium length do occur then only just exceeding 10 μm ; T3 smooth, bearing one row of short setae; T4 glabrous.

Comments. This species is similar in size, shape, and pilosity to *B. arthuri*. The genal shape of both species are similar, with the posterior and anterior margins being strongly convergent medially. However, *B. scrobiculus* is easily identifiable by the extensive scrobiculate sculpturing of the dorso-lateral propodeum. It is this distinctive feature that the species name is derived from the Latin word *scrobiculus*, meaning extensive scrobiculation. *Baeus scrobiculus* is recorded from northern Queensland, a region that has been extensively sampled (Fig. 16D). However, it has not been commonly collected and is described here from five specimens only.

17. *Baeus spirolimbus*, Stevens, sp. nov. (Figs 13C & D, 17A)

Holotype, ♀, Queensland, 'Maroochy Hort Res Stn, Nambour, S.E. QLD, 22.iii–3.iv.1985. Malaise Trap' (ANIC).

Paratypes: **Queensland:** 2 ♀, Casey Ck via Imbil, 30.xii.1974–27.iii.1975, 16.vi–23.viii.1975, G.B. & S.R. Monteith (QDPC); 1 ♀, Black Butt Range, Benarkin, 10.i–28.iii.1975, G.B. & S.R. Monteith (QDPC); 2 ♀, Lacey's Ck, Mission Beach, 17.54S 146.06E, 13–14.v.1980, I.D. Naumann & J.C. Cardale (ANIC); 1 ♀, Windsor Tableland via Mt Carbine, 22.ix–16.x.1983, Storey & Titmarsh (WINC); 2 ♀, Davies Ck Rd, 16 km up via Mareeba, 4–13.iii.1983, 18 km up, 18.i–2.ii.1985, Storey & Titmarsh (QDPC); 2 ♀, State Forest nr Caloundra turn-off, 8.iii.1984, I.D. Galloway (QDPC); 2 ♀, Kuranda, 6 km NW, 2.x–6.xi.1984 (QDPC); 7 ♀, Kuranda, 6 km SW, 10.xii.1984–15.i.1985, Storey & Halfpapp (QDPC); 1 ♀, same data as holotype (ANIC); 1 ♀, 'Maroochy Hort Res Stn, Nambour, 22.iii–3.iv.1985. Malaise Trap (ANIC); 1 ♀, Julatten, 20–29.x.1987, A. Walford-Huggins (WINC); 5 ♀, Lake Eacham, 17.17S 145.39E, 15.ii–2.iii.1988, 2–16.iii.1988, 16–29.iii.1988, D. Rentz (ANIC); 19 ♀, Bald Hill, McIlwraith Ra., 13.43S 143.19E, 27.vi–12.vii.1989, I. Naumann (ANIC); 17 ♀, Batavia Downs, 12.41S 142.41E, 23.viii–16 ix.1992, P. Zborowski & L. Miller (ANIC); 14 ♀, Heathlands Research Reserve, 11.45S 142.35E, 25.vii–18.viii.1992, P. Zborowski & J. Cardale, 18.ix–21.x.1992, P. Zborowski & T. Weir, 5.iv–23.v.1993, P. Zborowski & A. Roach, 23.v–18.vi.1993, P. Zborowski & I. Naumann (ANIC).

Description. Female. Mean length 0.82 mm (0.76–0.88; n = 5); body and head brown, legs and antennae yellow, both with darker markings on dorsal surfaces.

Head 2.63 (2.33–2.80) x as wide as inter-ocular distance, and 1.71 (1.52–1.83) x as wide as long; medial ocellus 15 μm in diameter, 106 (90–120) μm from posterior head margin; lateral ocelli touching eye margin, 24 (20–30) μm from posterior head margin; posterior ocellar line 1.38 (1.27–1.47) x inter-ocular distance; vertex coriarius, pilosity mostly dense, may have patches of moderate density, length generally of medium

length, although some rows can exhibit short setae towards the anterior regions of the vertex; eyes large and ovoid, eye height 0.58 (0.56–0.61), eye width 0.58 (0.50–0.61) x length, pilosity short; frontal carina prominent, reaching 0.56 (0.50–0.67) distance to medial ocellus; lateral cristulations of malar region reaching to within 10 μ m of eye margin; in postero-lateral view, anterior and posterior genal margins parallel medially; anterior genal margin in contact with 0.51 of ventral eye margin length; posterior eye margin touching hyper-occipital carina.

Mesosoma. Length 0.63 (0.61–0.64) x width; mesoscutum and mesoscutellum coriarius, pilosity mostly of moderate density, and of medium length but can be long in parts; propodeum glabrous medio-dorsally; mesoscutum length 0.43 (0.42–0.44) x width, 0.63 (0.61–0.65) x mesosoma length and 2.44 (2.20–2.80) x mesoscutellum length; mesoscutellum 2.33 (1.67–2.50) x as long as propodeum; sculpturing of dorsal mesopleuron scrobiculate, sculpturing extending ventral to level of dorsal metapleuron; sculpturing of latero-dorsal propodeum around spiracle mostly smooth with few fine setae present; propodeal spiracle opening small and ovoid, situated on lateral margin of dorsal propodeum (Fig. 13C), which is delineated from lateral propodeum by distinct, laterally projecting carina (Fig. 13D; large arrow); distinctive quarter-circle shaped recess present below lateral carina (Fig. 13D; small arrow); posterior margin of metapleuron curving dorsally, ending ventral to level of antero-lateral margin of T2, posterior region level with anterior region of lateral propodeum, depression present in medial region of posterior metapleuron and anterior propodeum; hind femoral spine reduced.

Metasoma. T2 length 0.87 (0.83–0.89), sculpturing coriarius; pilosity generally of moderate density medio-anteriorly, but sparse elsewhere, and mostly long in length, but can be of medium length in parts; both T3 and T4 smooth, non-pilose medially.

Comments. Notable features of this species are the propodeal spiracle being situated close to the lateral margin of the laterally projecting carina, and the distinctive quarter-circle shape of the recess below this lateral carina. It is confined to north eastern Australia (Fig 17A). The name '*spirolimbus*' is from the Latin words that relate to the closeness of the propodeal spiracle to the lateral margin of the lateral carina; *spiro*, meaning breathe, and *limbus*, meaning fringe.

18. *Baeus tropaeumusbrevis*, Stevens, sp. nov.

(Figs 14A & B, 17A)

Holotype, ♀, Western Australia, '15.38S 125.15E, CALM Site 28/3, 4 km W of King Cascade, W.A., 12–16. June.1988, T. A. Weir'; 'Malaise trap with trough, closed forest' (ANIC).

Paratype: **Western Australia:** 1 ♀, Marun, Prince Frederick Harbour, 15.00S 125.21E, 6–11.xi.1988, I. D. Naumann (ANIC); **Christmas Island:** 1 ♀, 10.29S 105.37–38E, nr Central Area Workshop, 13–28.iv.1989, J. Lawrence, flight intercept trap, closed forest, plateau (ANIC); 1 ♀, 10.28S 105.42E, Lily Beach Road, 13–28.iv.1989, J.C. Cardale, malaise trap (ANIC); 1 ♀, 10.27S 105.33E, nr North-West Point, 13–28.iv.1989, J.F. Lawrence, flight intercept trap, closed forest, terrace (ANIC); 1 ♀, 10.30S 105.35–36E, East-West Park Track, 13–28.iv.iv.1989, J.F. Lawrence, flight intercept trap, closed forest, plateau (ANIC).

Description. Female. Mean length 0.72 mm (0.69–0.74; n = 2); body and head dark brown, legs and antennae light brown, both slightly darker dorsally; a yellow medial band exists across the head of the Australian type specimens but this is believed to be an artefact of the trap preservative.

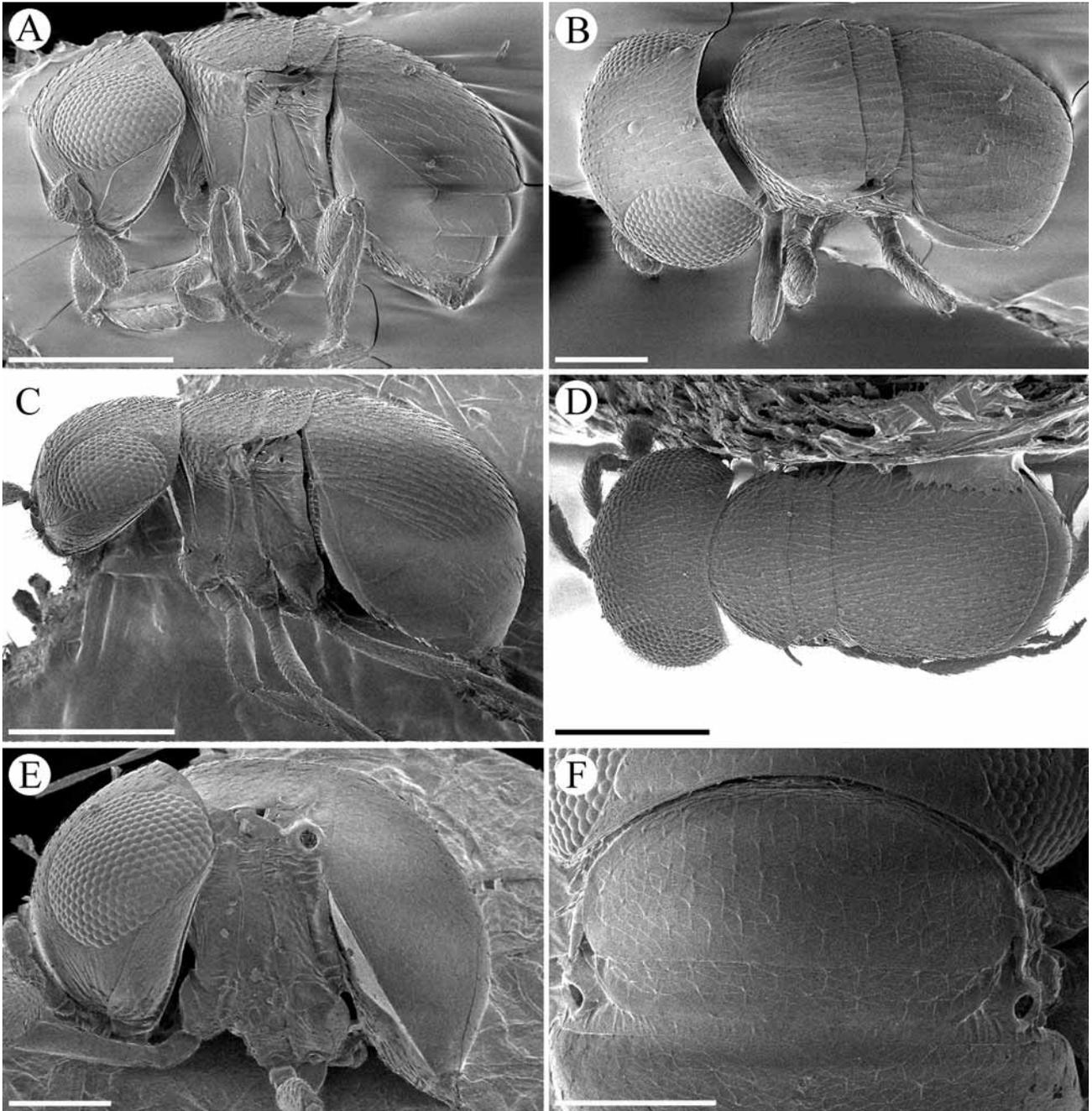


FIGURE 14. Female *Baeus* spp.: **A & B**, *B. tropaeumusbrevis*: **A**, lateral habitus; **B**, latero-dorsal habitus. **C & D**, *B. tropaeumusbrevis*: **C**, lateral habitus; **D**, dorsal habitus. **E & F**, *B. vulcanus*: **E**, lateral habitus; **F**, dorsal mesosoma. Scale lines, **A**, **C**, & **D** = 200 μm ; **B**, **E**, & **F** = 100 μm .

Head. 2.27 x as wide as inter-ocular distance and 1.79 x head length; medial ocellus 10 μm in diameter, 70 μm from posterior head margin; lateral ocelli touching or within 5 μm of eye margin, 20 μm from posterior head margin; posterior ocellar line = inter-ocular distance; vertex faintly coriarius, hair processes prominent, pilosity mostly moderately dense, but can be dense posteriorly, of medium length overall; eyes circular, height 0.46 x head height, eye width 0.66 (0.63–0.68) x length, pilosity of medium length; frontal carina reaching 0.53 distance to medial ocellus; lateral cristulations of malar region not reaching to within 10 μm of eye margin; in postero-lateral view, anterior and posterior genal margins parallel medially; anterior genal margin in contact with 0.72 of ventral eye margin length; posterior eye margin not touching hyperoccipital carina, is 10 μm from posterior head margin.

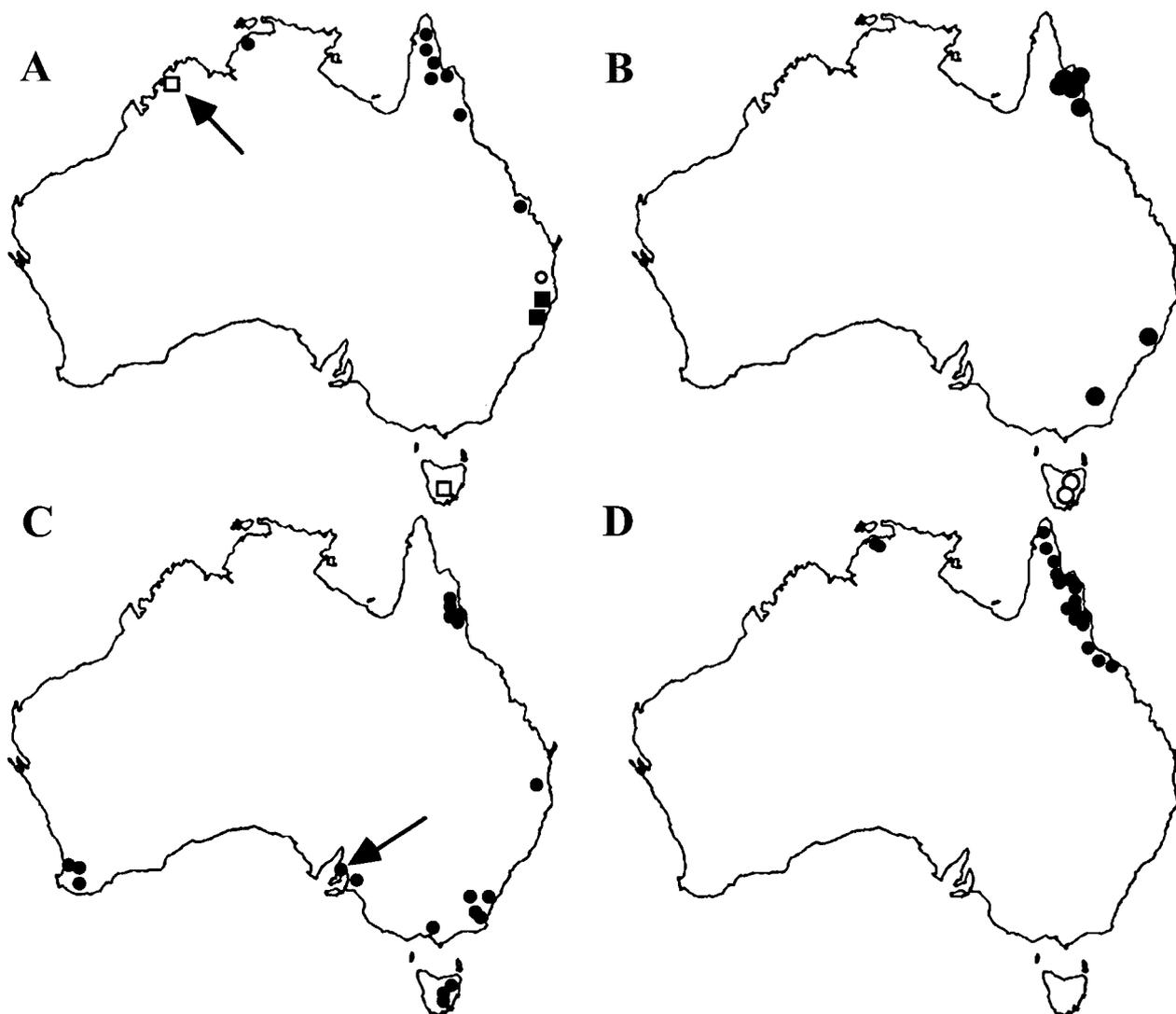


FIGURE 15. Distribution maps: **A** *B. arthuri* ●, *B. jenningsi* ■, *B. dux* ○, *B. glenysae* □; **B** *B. hallarakeri* ○, *B. iqbali* ●; **C** *B. leai* ●; **D** *B. maryae* ●.

Mesosoma. Length 0.63 (0.59–0.68) x width; mesoscutum and mesoscutellum faintly coriarius, pilosity mostly moderate in density but can be dense in parts, and of medium length overall; posterior margin of mesoscutellum broadly extending to anterior margin of T2, so propodeum not visible medio-dorsally; mesoscutum length 0.50 (0.48–0.52) x width, 0.70 (0.68–0.71) x mesosoma length and 2.28 (2.17–2.40) x mesoscutellum length; sculpturing latero-dorsal mesopleuron and propodeum anterior to spiracle confused, region of latero-dorsal propodeum, posterior of spiracle, bearing short carinae dorsally, each with a long bristle posteriorly, and longer, more distinct carinae ventral of spiracle that are not prominent enough to obviously delineate lateral propodeum from dorsal propodeum; propodeal spiracle opening small and ovoid; posterior margin of metapleuron distinct, straight, and long, ending dorsal to level of antero-lateral margin of T2, posterior region of metapleuron level with anterior region of lateral propodeum; hind femoral spine absent.

Metasoma. T2 length 0.80 (0.77–0.83), sculpturing faintly coriarius anteriorly to smooth posteriorly; pilosity mostly moderately dense, but sparse areas do occur posteriorly, of medium length overall; both T3 and T4 glabrous.

Comments. *Baeus tropaeumusbrevis* is readily distinguished from most other species by the posterior margin of the mesoscutellum extending over the propodeum dorsally to reach the anterior margin of T2. Only

B. tropaeumsdensus and an undescribed *Baeus* species also possess this distinctive character. However, *B. tropaeumsbrevis* is distinguished from these by having shorter pilosity, and the lateral ocelli being closer to the eye margin. It is suspected that the trap preservative used to collect this species has caused bleaching to occur, resulting in a yellow band across the head of the Australian type specimens. However, the head is believed to be uniform in colour, similar to the body. This species is known from two specimens from north western Australia (Fig. 17A) and four specimens from Christmas Island. It is named after the Latin words *tropaeum*, meaning a shield or trophy taken from a battlefield by the victor as a token of a foe's defeat, relating to the extended mesoscutellum, and *brevis*, meaning short, relating to both its shorter pilosity and the shorter posterior extension of the mesoscutellum over the anterior margin of T2, relative to *B. tropaeumsdensus*.

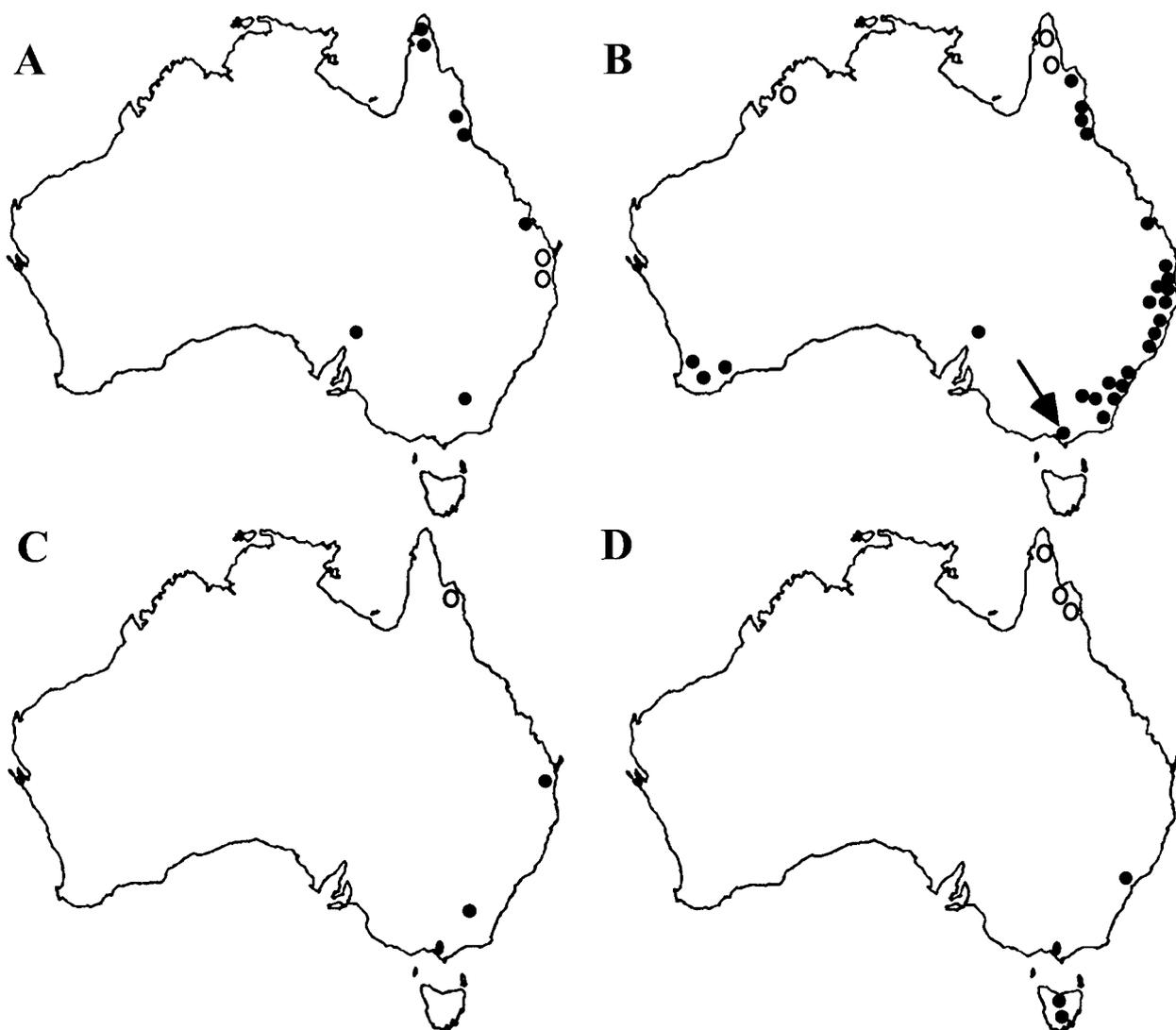


FIGURE 16. Distribution maps: **A** *B. matthewi* ●, *B. moorei* ○; **B** *B. murphyi* ●, *B. mymyae* ○; **C** *B. ocellatus* ●, *B. prolatuspissus* ○; **D** *B. saliens* ●, *B. scrobiculus* ○.

19. *Baeus tropaeumsdensus*, Stevens, sp. nov.
(Figs 7F, 14C & D, 17B)

Holotype, ♀, Tasmania, 'Eugenana, TAS, 8.Apr.1988, L. Hill, *Euc. viminallis* forest' (ANIC).

Paratypes: **Queensland:** 1 ♀, Mareeba, 22km WSW of, 7.i–12.ii.1985, Storey & Halfpapp (QDPC); **New**

South Wales: 1 ♀, Bundanoon, 2 km SSE of, 3.iv.1982, L. Hill (ANIC); **Australian Capital Territory:** 3 ♀, Wombat Ck, 6 km NE of Piccadilly Circus, 35.19S 148.51E, 15.xi.1984, i.1985, Lawrence, Weir & Johnson (ANIC); **Western Australia:** 1 ♀, Stirling Range N.P., 11–15.i.1987, J.S. Noyes (BMNH).

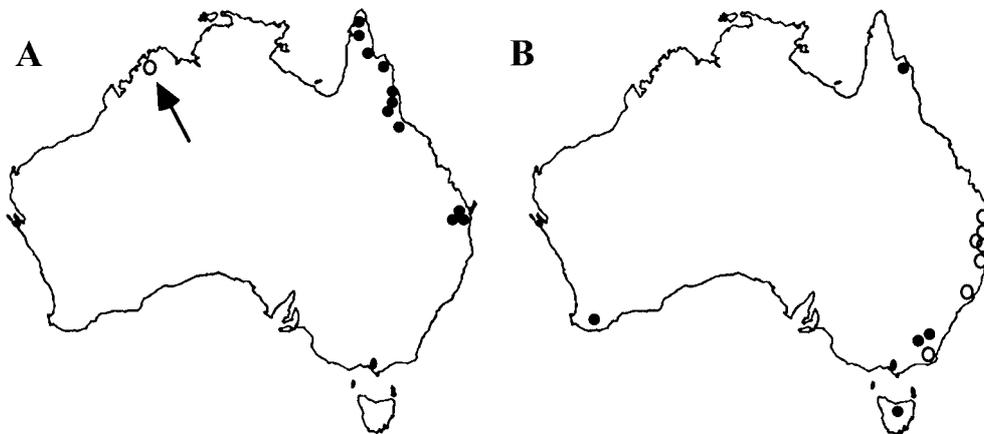


FIGURE 17. Distribution maps: **A** *B. spirolimbus* ●, *B. tropaeumusbrevis* ○; **B** *B. tropaeumusdensus* ●, *B. vulcanus* ○.

Description. Female. Mean length 0.73 mm (0.71–0.75; n = 5); body and head dark brown, almost black, legs and antennae brown.

Head. 1.78 (1.75–1.81) x as wide as inter-ocular distance and 1.72 (1.65–1.76) x as wide as long; medial ocellus 10 µm in diameter, 68 (60–70) µm from posterior head margin; lateral ocelli not touching eye margin but within 10 µm, and are 20 µm from posterior head margin; posterior ocellar line = inter-ocular distance; vertex coriarius along anterior region to imbricate posteriorly, pilosity dense and medium in length throughout; eyes circular, height 0.47 (0.44–0.48) x head height, eye width 0.50 (0.46–0.54) x length, pilosity of medium length; frontal carina broad, and prominent, reaching 0.50 distance to medial ocellus; lateral cristulations of malar region reaching to within 10 µm of eye margin; in postero-lateral view, anterior and posterior genal margins parallel medially; anterior genal margin in contact with 0.72 (0.67–0.75) of ventral eye margin length; posterior eye margin not touching hyperoccipital carina, is 20 µm from posterior head margin.

Mesosoma. Length 0.66 (0.64–0.68) x width; mesoscutum and mesoscutellum imbricate, pilosity dense and medium in length throughout; posterior margin of mesoscutellum broadly extending over dorsal propodeum to beyond anterior margin of T2; mesoscutum length 0.49 (0.45–0.52) x width, 0.65 (0.63–0.69) x mesosoma length and 1.87 (1.67–2.20) x mesoscutellum length; sculpturing of dorso-lateral mesopleuron and propodeum anterior to spiracle confused, region of latero-dorsal propodeum, posterior of spiracle, bearing short carinae, each with a long bristle posteriorly, and a longer, more distinct carina ventral to spiracle that is not prominent enough to delineate lateral propodeum from dorsal propodeum; propodeal spiracle opening small and ovoid; posterior margin of metapleuron distinct, straight, and short, ending dorsal to level of antero-lateral margin of T2, posterior region of metapleuron level with anterior region of lateral propodeum; hind femoral spine absent.

Metasoma. T2 length 0.97 (0.86–1.11) x width, imbricate anteriorly to coriarius posteriorly; pilosity dense, and medium in length throughout, glabrous band along posterior margin short; T3, transverse coriarius band present medially, bearing two rows of setae; T4 similar, but only one row of setae present.

Comments. As the names suggests, *B. tropaeumusdensus* is similar to *B. tropaeumusbrevis* in that the mesoscutellum extends over the propodeum reaching the anterior margin of T2. Therefore, the first part of the name is similarly derived (see *Comments* above) and the second part, *densus*, means dense and thick in Latin, which relates to the species' pilosity. Although not commonly collected, *B. tropaeumusdensus* has a widespread distribution (Fig. 17B).

20. *Baeus vulcanus*, Stevens, sp. nov.

(Figs 14E & F, 17B)

Holotype, ♀, Queensland, 'Samford, Q., 18 Sept.1968, G. Monteith'; 'ANIC Berlesate No. 115, Dry Sclerophyll' (ANIC).

Paratypes: **Queensland:** 4 ♀, Black Butt Ridge, Benarkin, G.B. & S.R. Monteith (QDPC); 1 ♀, Cooloola, 25.xii.1974–27.iii.1975, G.B. & S.R. Monteith (QDPC); 2?, Mt Tamborine, xi.1978–i.1979, 6–17.iii.1981, Agard (QDPC); 5 ♀, Mt Glorious, 10–31.i.1982, ii.1982, 14.xi.1986–30.i.1987, T. Hiller (ANIC, QDPC); 1 ♀, Maroochy Horticultural Research Stn, Nambour, 22–29.iii.1985 (QDPC); **New South Wales:** 1 ♀, Tooloom Plateau, via Urbenville, 11.xi–24.xii.1973 (QDPC); 2 ♀, New Brighton Beach, 25.xii.1974–21.iii.1975, G.B. & S.R. Monteith (ANIC); 1 ♀, O'Sullivan's Gap Res., 11 km NE Buladelah, 11.vi–27.viii.1982, S. & J. Peck (ANIC); 1 ♀, Mt Wog Wog, 4 km NE of, 37.04S 149.28E, ii.1987, C.R. Margules (ANIC).

Description. Female. Mean length 0.80 mm (0.77–0.85; n = 5); body and head brown, legs and antennae lighter, both with darker markings dorsally.

Head. 2.16 (2.12–2.24) x as wide as inter-ocular distance and 1.67 (1.57–1.73) x as wide as long; medial ocellus 20 µm in diameter, 80 µm from posterior head margin; lateral ocelli touching eye margin, and are 20 µm from posterior head margin; posterior ocellar line 1.19 (1.18–1.24) x inter-ocular distance; vertex coriari-ous, pilosity generally sparse in density, but patches of moderate density can occur, and mostly short in length, but can be of medium length in patches; eyes large and ovoid, eye height 0.57 (0.56–0.58) x head height, eye width 0.56 (0.53–0.58) x length, pilosity short; frontal carina broad, prominent, but short, reaching 0.40 (0.30–0.46) distance to medial ocellus; lateral cristulations of malar region reaching to within 10 µm of eye margin; in postero-lateral view, anterior and posterior genal margins parallel medially; anterior genal margin in contact with 0.57 (0.56–0.59) of ventral eye margin length; posterior eye margin touching hyperoccipital carina.

Mesosoma. Length 0.56 (0.52–0.64) x width; mesoscutum and mesoscutellum faintly coriari-ous, pilosity mostly of moderate density along anterior regions of both sclerites but gradates to sparse posteriorly, mostly of medium length but can be short in patches; propodeum plicate medio-dorsally; mesoscutum length 0.43 (0.42–0.44) x width, 0.66 (0.61–0.69) x mesosoma length and 3.17 (2.75–3.67) x mesoscutellum length; mesoscutellum length 1.67 x propodeum length; dorso-lateral propodeum dominated by large, round propodeal spiracle (opening ? 20 µm diameter), margins form large, distinct cone resembling a volcano; posterior margin of metapleuron mostly straight, curving marginally dorsally, reaching dorsal to level of antero-lateral margin of T2, posterior margin not elevated above anterior margin of lateral propodeum; hind femoral spine large (? 20 µm in length).

Metasoma. T2 length 0.92 (0.91–0.94) x width, sculpturing coriari-ous; pilosity mostly sparse and short, glabrous band along posterior margin short; both T3 and T4 smooth and bearing one row of setae posteriorly.

Comments. *Baeus vulcanus* is easily distinguished from all other *Baeus* spp. by its large prominent propodeal spiracles and large hind femoral spines. The namesake of this species relates to the propodeal spiracle resembling a volcano, and is therefore named after Vulcan, the Roman god of fire, who established his forge within the volcanically active Mount Etna. *Baeus vulcanus* is found along the eastern seaboard from northern Queensland to northern New South Wales (Fig. 16B).

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