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Boucekelimini trib. nov., with genera *Boucekelimus* gen. nov. and *Tatiana* gen. nov. (Hymenoptera: Eulophidae) from Western Australia

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Abstract. A new tribe, Boucekelimini trib. nov., and two new genera, *Boucekelimus* gen. nov. and *Tatiana* gen. nov., are described from Western Australia: Both genera display morphological adaptations associated with extremely long ovipositors which are housed internally rather than being exerted.

Taxonomy, descriptions, new tribus, new genus, new species, Hymenoptera, Chalcidoidea, Eulophidae, Australia

INTRODUCTION

The single most important contribution to the study of Australian Eulophidae was made by Zdeněk Bouček in his classic study on the Chalcidoidea of Australasia (Bouček 1988). This work culminated a research career spanning several decades, and brought a sense of order to the descriptive work of A. A. Girault (for more insight into Girault, see Dahms 1978). In the present paper, two new genera of Australian Eulophidae, *Boucekelimus* gen. nov. and *Tatiana* gen. nov., are described to commemorate Dr. Bouček and his wife, Tania, who supported him through his years of research.

The new genera, *Boucekelimus* gen. nov. and *Tatiana* gen. nov., are placed in the tribe Boucekelimini, trib. nov., which is left as unplaced but is considered to be near other unplaced tribes such as Ophelimini, Anselmellini and Platytetracampini (Gauthier et al. 2000). Further studies will be necessary to clarify the relationships of the new genera. *Boucekelimus* gen. nov. was reared from galls on *Melaleuca* (Myrtaceae), but host relationships for *Tatiana* gen. nov. are unknown. Both genera show unusual morphological adaptations associated with extremely long ovipositors which are stored internally.

MATERIALS AND METHODS

Format. A single diagnosis and description for each new genus and species combination. This is done to avoid repetition because until other species are known it is not clear what are generic level or species level characters.

Terminology used in this paper is taken from Gibson (1997) and Graham (1987); OOL, ocell–ocular distance; POL, post-ocellar distance; MPS, multiporous plate sensilla; SMV, submarginal vein; MV, marginal vein.

Acronyms used in the text are as follows. ANIC – Australian National Insect Collection, CSIRO Entomology, Canberra, Australia; BMNH – The Natural History Museum, London, United Kingdom; CNC – Canadian National Insect Collection, Ottawa, Ontario, Canada; PPRI – Biosystematics Division, Plant Protection Research Institute, Pretoria, South Africa; QMB – Queensland Museum, Brisbane, Australia; SAMA – South Australian Museum, Adelaide, SA, Australia; USNM – United States National Museum of Natural History, Washington, D.C., USA; WAM – Western Australian Museum, Perth, WA, Australia.

TAXONOMY

Boucekelimini trib. nov.

TYPE GENUS. *Boucekelimus* gen. nov.

DIAGNOSIS. Antenna placed very low on face, near clypeal margin; with long club, and 4 or 5 small segments between pedicel and club (the segments sometimes difficult to differentiate between anelli and funicular segments). Submarginal vein with a single dorsal seta; postmarginal vein about the same length as stigmal vein. Gaster elongate, ovipositor not exserted, but apparently quite long and either coiled within the gaster (*Boucekelimus* gen. nov.) or with gaster modified to contain ovipositor which extends anteriorly under mesosoma to level of head (*Tatiana* gen. nov.); base of gaster with membranous area. Axillae moderately (*Tatiana* gen. nov.) to strongly (*Boucekelimus* gen. nov.) advanced. Scutellum without submedian or sublateral lines. Propodeum smooth, without median carina or plicae.

DISCUSSION. The new tribe described here is distinguished by the characters given in the diagnosis. It does not readily fit into any of the defined subfamilies or tribes of Eulophidae. The main characters that differentiate it are:

– antennae situated quite low on the face; this character is not common in the Eulophidae, and is restricted to a few unrelated genera, such as *Trichospilus* Ferrière, 1930 (Eulophini) and *Pronotalia* Gradwell, 1957 (Tetrastichinae);

– forewing with a single setae on the submarginal vein; this character is found only in several genera of Tetrastichinae (e.g., *Tetrastichus* Haliday, 1844; *Quadrastichus* Girault, 1913), a few genera of Euderomphalini (e.g., *Pomphale* Husain, Rauf et Kudeshia, 1983; *Baeoentedon* Girault, 1915), and some aberrant Entedonini (e.g., *Myrmokata* Bouček, 1972; *Encyrtomphale* Girault, 1915);

– gaster displaying modifications to accommodate a long internal ovipositor, similar modifications are not seen in other eulophids.

Additionally, Boucekelimini trib. nov. lacks the defining characteristics of the major groups of Eulophidae as follows:

– Eulophini has the propleura meeting posteriorly and concealing the prosternum (divergent posteriorly to reveal the prosternum in Boucekelimini trib. nov.).

– Cirrospilini has a transverse sulcus on the face between the frontofacial sutures and the toruli, and a clearly defined 2 or 3 segmented.

– Tetrastichinae generally lacks a postmarginal vein, and has paired submedian and sublateral lines on the scutellum.

– Entedoninae has a single pair of setae on the scutellum, two dorsal setae on the submarginal vein, and the frontofacial suture well separated from the anterior ocellus.

– Euderomphalini has the pronotum and dorsellum hidden in dorsal view by the mesoscutum and scutellum respectively, the antenna with only 1 or 2 funicular segments, and the clypeus delimited dorsally by a distinct and curved sulcus.

– Anselmellini has a swollen marginal vein, deep and straight notauli, no frontofacial sutures, the antenna inserted high on the head, and a long radicle.

– Ophelimini has a swollen marginal vein, deep and straight notauli, and no frontofacial sutures.

– Platytetracampini is not very clearly defined by synapomorphies, but differs from Boucekelimini trib. nov. in having more than three setae on the submarginal vein, and a short, ovate gaster.

– Euderinae has eight gastral segments rather than the normal seven for Eulophidae, and 4 or 5 clearly defined funicle segments.

Boucekelimus gen. nov.

Type species. *Boucekelimus elongatus* sp. nov..

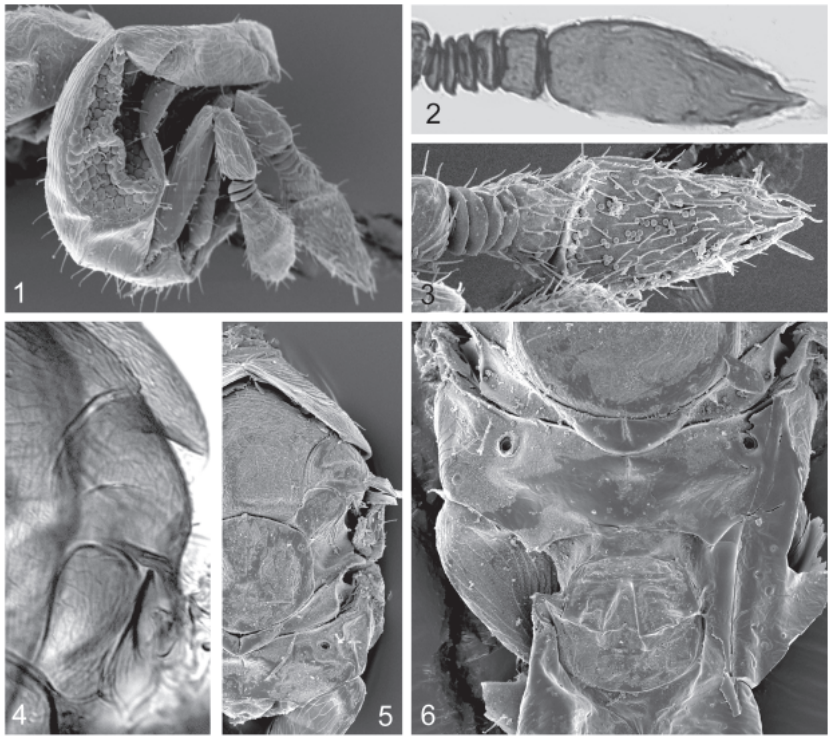
Etymology. *Boucekelimus* is a combination of Bouček, who we are honoring with this generic description, and *Ophelimus* Haliday, 1844, which is another Australian gall forming eulophid that may be related to this genus. Gender masculine.

Boucekelimus elongatus sp. nov.

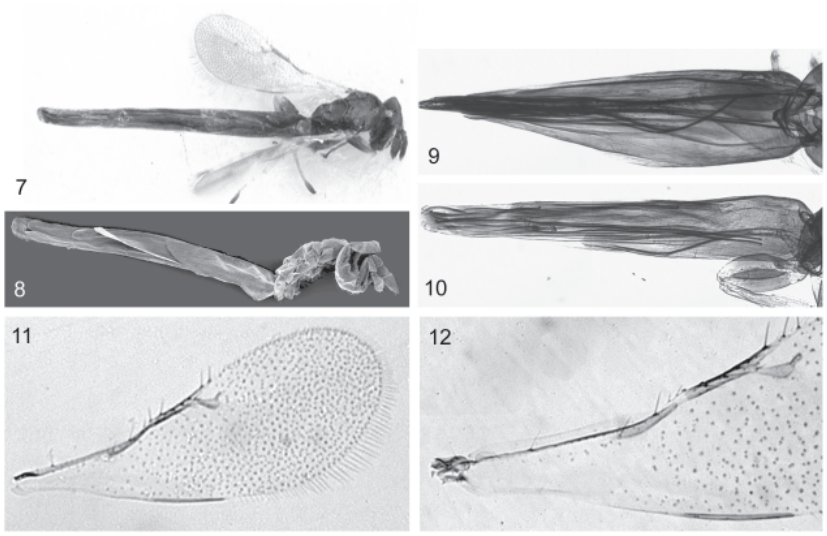
(Figs 1–12)

Type material. Holotype, female, labelled: Near Swan Lagoon, near Grass patch, Western Australia, Australia, 33°14.18'S 121°38.97'E, 07.xi.2000, KAD 2000, WA site 76, KA Davies, reared from 'Moss' galls on *Melaleuca* sp. (ANIC). Paratypes: 46♀, 12♂ same data as holotype (22♀, 9♂ ANIC; 4♀, 1♂ each: BMNH, CNC, USNM; 3♀ each: PPRI, QMB, SAMA, WAM).

Diagnosis. Mesosoma flat; notaulus incomplete, present only anteriorly. Gaster lanceolate, 1.8–2.8 times as long as head plus mesosoma. Antenna with 5 segments between pedicel and clava, the segments not clearly differentiated into anelli and funicular segments. Axilla strongly advanced, placed almost entirely anterior to scuto-scutellar suture. Malar sulcus present.



Figs 1–6. *Boucekelimus elongatus* sp. nov. 1 – head and antennae, antero-lateral view; 2, 3 – clava and antennal segments, ♀; 4 – notaulus and axilla, dorsal view; 5 – mesosoma, dorsal view; 6 – propodeum and basal area of gaster.



Figs 7–12. *Boucekelimus elongatus* sp. nov. 7 – habitus, ♀; 8 – body, lateral view, ♀; 9 – gaster and ovipositor, dorsal view; 10 – gaster and ovipositor, lateral view; 11 – forewing; 12 – base of forewing and venation.

Description. Female [described from shrunken specimens] Length 1.15–1.45 mm. Head and mesosoma mainly dark green metallic with brownish tint. Dorsellum brownish-yellow. Gaster brown.

Head (Fig. 1). Malar space short, with straight and weak malar sulcus. Torulus low on head very close to clypeal margin, separated from clypeal margin by about 2/3 length of its own diameter. Scrobal depression appearing membranous, at least dorsally. Frontofacial suture present as a transverse suture just ventral to anterior ocellus. POL approximately 2.5–3.0 times as long as OOL. Occipital foramen high on back of head.

Antenna (Figs 2,3) with 5 segments between pedicel and clava that are not clearly differentiated into anelli and funicular segments, the 5th segment the longest and transverse rectangular and the other 4 segments anelliform, and all the segments without multiporous plate sensillae (MPS). Club composed of a single segment (Figs 2–3) and with several MPS; about twice as long as combined length of segments between pedicel and clava. Pedicel approximately equal in length to following 5 segments. Scape not exceeding level of vertex.

Mesosoma (Figs 4, 5, 8) flattened. Pronotum extremely narrowed medially. Propleura diverging posteriorly and revealing prosternum. Mid lobe of mesoscutum with raised reticulation and with 2 setae on each side. Notaulus incomplete. Axilla well advanced and rounded anteriorly. Scutellum without submedian or sublateral lines, with 2 pairs of setae, and smoothly rounded posteriorly. Propodeum (Fig. 6) smooth and shiny, without median carina or plicae, and about twice as long as dorsellum. Propodeal spiracle separated from anterior margin of propodeum by its own diameter; entire rim exposed and in shallow depression. Callus with 2–3 setae.

Gaster (Figs 8–10) sessile, narrow, lanceolate and with membranous area at base (Fig. 6). Length of gaster variable, 1.8–2.8 times as long as head plus mesosoma (variation may be due in part to the shrunken condition of specimens). Ovipositor apparently quite long and coiled inside gaster (Figs 9–10), although not visible externally.

Forewing (Figs 11,12) 2.5–2.7 times as long as broad. Submarginal vein with 1 seta before middle and joining parastigma distally to proximal end of parastigma; marginal vein stout and with hyaline break at base; costal cell more than twice as long as marginal vein; postmarginal vein from as long as to slightly longer than stigmal vein; uncus well developed and about 0.3 length of stigmal vein. Costal cell : marginal vein : stigmal vein : postmarginal vein = 4.8–6.3 : 1.9–2.2 : 1.0 : 0.9–1.6. Pilosity beneath marginal vein, stigmal vein and postmarginal vein more or less sparsely distributed.

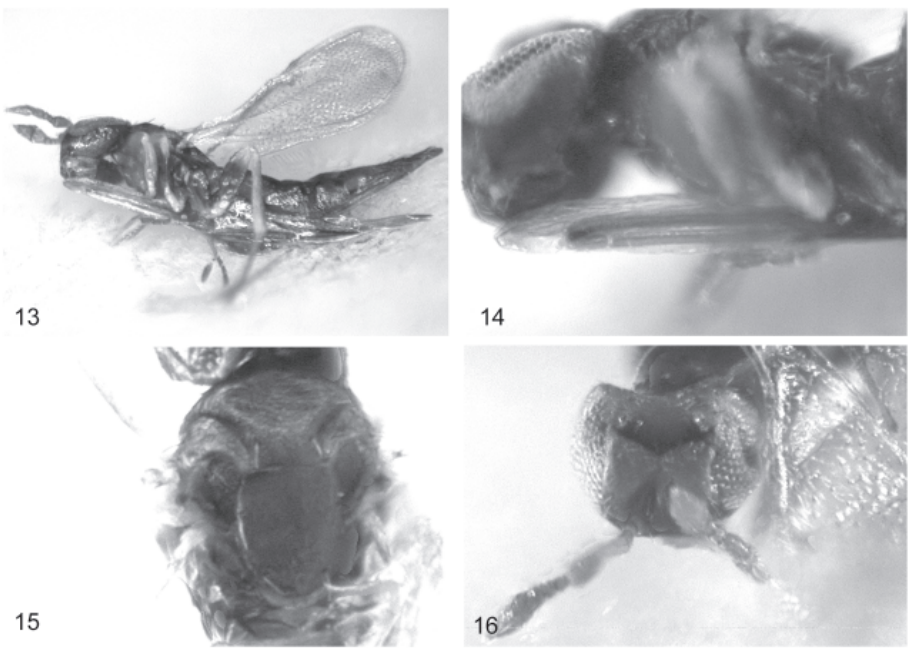
Male. Length 0.64 – 0.9 mm. Similar to female except: club with distinct sutures delimiting 3 claval segments; scape slightly ventrally expanded and flattened; gaster shorter than for female, almost as long as mesosoma or slightly shorter than head plus mesosoma.

Collecting circumstances. Reared from "Moss" galls on *Melaleuca* sp. (Myrtaceae).

Distribution. Western Australia.

Etymology. The species name *elongatus* is used to describe the very long gaster of females of this insect.

Discussion. This species is easily distinguished by the characters given in the diagnosis. *Boucekelimus* gen. nov. is distinguished from *Tatiana* gen. nov. by the provided diagnostic characters, including having the female gaster at least 1.8 times as long as the head plus mesosoma and lacking the sheath made from the basal sternite which projects anteriorly under the head in *Tatiana* gen. nov.



Figs 13–16. *Tatiana mymaroides* sp. nov. 13 – habitus, ♀; 14 – ventral sternite projecting forward and bearing ovipositor, ventro-lateral view; 15 – mesosoma, dorsal view; 16 – face and vertex, frontal view.

Tatiana gen. nov.

TYPE SPECIES. *Tatiana mymaroides* sp. nov.

ETYMOLOGY. Named for Tatiana (Tania) Bouček, who has supported and stood by her husband throughout his career as an entomologist, and has tolerated his passion for small wasps. Gender feminine.

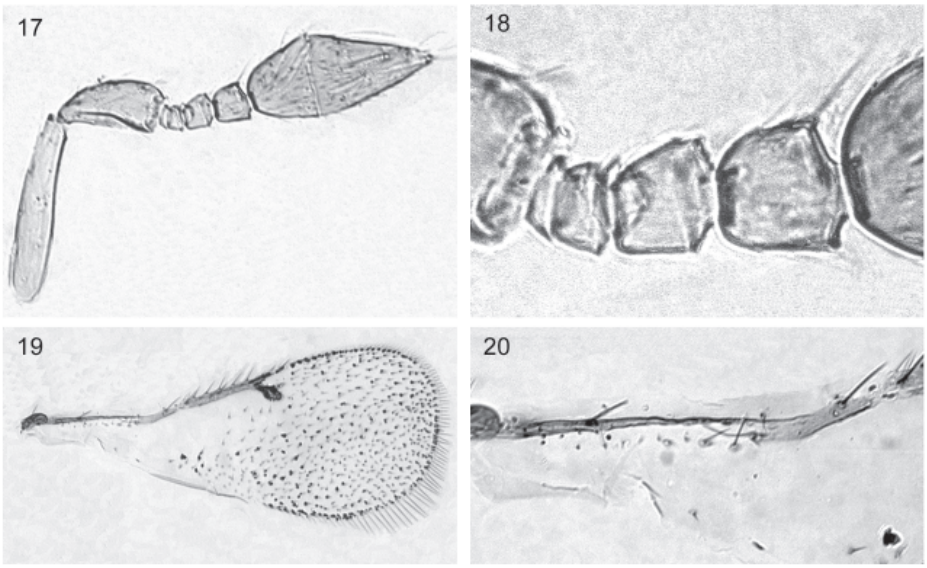
Tatiana mymaroides sp. nov.
(Figs 13–20)

TYPE MATERIAL. Holotype, female, labelled: Australia, Western Australia, Stirling Range NP 600m ~ 2 km, SW, Camel Lake, 34°18.4'S 118°01.1'E, 13. xi. 2002, swp., G.Platner, PEET 02-0386 (ANIC). Paratypes: 2 ♀, same data as holotype (1♀ ANIC); same data as holotype except coll. J.D. Pinto, PEET 02-0385 (1♀ ANIC).

DIAGNOSIS. Basal gastral sternite protruding as sheath and projecting under mesosoma anteriorly to level of head, the sheath accommodating the ovipositor. Notaulus complete and weak. Axilla moderately advanced. Propodeum very short medially and hidden by dorsellum. Antenna with 1 anellus and 3 funicular segments. Malar sulcus absent.

DESCRIPTION. Female**.** Length 0.8 – 1.0 mm. Mesosoma mainly brown with green metallic tint. Head and gaster brown.

Head (Fig. 16) with gena swollen; malar space short, without malar sulcus. Torulus located very low on head, almost touching clypeal margin. Scrobal area rather deep. Frontofacial suture just ventral to anterior ocellus (appearing as a deep groove in shrunken specimen). POL more than 4 times as long as OOL.



Figs 17–20. *Tatiana mymaroides* sp. nov. 17 – antenna, ♀; 18 – funicular segments; 19 – forewing; 20 – submarginal vein.

Antenna (Figs 17,18) with 1 anellus and 3 funicular segments, F1 transverse, F2 and F3 quadrate, and each segment slightly longer and broader than previous one. Club swollen, about 2 times as broad as funicular segments; composed of 3 segments, with suture between second and third segment indistinct. Scape not reaching above vertex.

Mesosoma (Fig. 15) convex in lateral view. Pronotum very short dorsally. Propleura diverging posteriorly and revealing prosternum. Mid lobe of mesoscutum with 2 setae on each side. Notaulus complete and weak, posteriorly shallow. Axilla moderately advanced; scapula angulated posteriorly along the notaulus. Scutellum approximately as long as mid lobe of mesoscutum and with 2 pairs of setae; without submedian or sublateral lines. Propodeum very narrow medially, hidden by dorsellum, and smooth without any carina or plicae. Entire rim of propodeal spiracle exposed. Callus with 2–3 setae.

Gaster (Fig. 13,14) sessile, lanceolate and with membranous area at base. Length of gaster about 1.6 times as long as head plus mesosoma. Basal sternite membranous and projecting forward to level of head as sheath containing ovipositor, which is folded up inside and can be seen through the membrane. Apex of ovipositor sheath not exerted out of gaster.

Forewing (Figs 19,20) 2.3 – 2.5 times as long as broad. Submarginal vein with 1 seta before middle, joining parastigma distally to proximal end of parastigma; costal cell about 1.6 –1.7 times as long as marginal vein; marginal vein slightly swollen basally and with hyaline break at base; postmarginal vein as long as or slightly shorter than stigmal vein. Costal cell : marginal vein : stigmal vein : postmarginal vein = 4.5 – 4.8 : 2.7 – 2.8 : 1.0 : 0.8 – 1.0. Speculum large, extending to stigmal vein.

Male. Unknown.

Distribution. Western Australia.

Etymology. The species name *mymaroides* is used in reference to the unusual shape of the basal sternite, which projects forward and encompasses the ovipositor.

Discussion. The most significant feature of *Tatiana* gen. nov. is the basal sternite which projects anteriorly below the mesosoma as far as the mouth opening, and contains a coil of the ovipositor. This is the first record of such a structure in the Eulophidae. Within the Chalcidoidea, such a structure is only known in some genera of the Mymaridae (e.g., *Idiocentrus* Gahan, 1927; *Cybomymar* Noyes et Valentine, 1989; *Australomymar* Girault, 1929) (Noyes & Valentine 1989).

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