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BRIEF COMMUNICATION

Notes on the classification of *Ctenocolletes* (Hymenoptera: Stenotritidae)

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Abstract. Three new subgenera are established within the Australian bee genus *Ctenocolletes* Cockerell (Stenotritidae). Three species are placed in ***Ctenocolletopsis*** Engel, new subgenus, distinguished most notably by the absence of both female arolia and prominent metasomal setal bands, and the non-convergent male compound eyes. The species *Ctenocolletes fulvescens* Houston is assigned to the monotypic ***Houstonapis*** Engel, new subgenus, owing to the unique absence of a male pygidial plate (similar in this respect to *Stenotritus* Smith) and the orange brown integument of the metasoma, while *C. tigris* Houston is placed in ***Tigriocolletes*** Engel, new subgenus.

INTRODUCTION

The bee genus *Ctenocolletes* Cockerell encompasses 10 moderately robust species distributed largely in Western Australia (Michener, 2007) (Figs. 1–5). Although species have been recorded visiting a wide variety of flowers, they are apparently most often found on Proteaceae, Myrtaceae, and Fabaceae (Houston, 2018). Where known, species nest in sandy ground and form comparatively deep burrows but without an external tumulus (Houston, 1984, 1987a). The genus encompasses remarkable disparity, perhaps reflective of considerable time since they diverged. Indeed, the characters and differences among subsets of species of *Ctenocolletes* are as great as those used to diagnose subgenera in other groups of bees (*e.g.*, Michener, 1965, 2007), or, as it is in the case of *Ctenocolletes fulvescens* Houston, the distinctions are what might in other lineages constitute separate genera. In fact, it is possible that *C. fulvescens* is allied

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Table 1. Hierarchical classification of *Ctenocolletes* Cockerell (Stenotritidae).

Genus *Ctenocolletes* Cockerell, 1929
Subgenus *Ctenocolletes* Cockerell, 1929
C. (*C.*) *albomarginatus* Michener, 1965
C. (*C.*) *centralis* Houston, 1983a
C. (*C.*) *nicholsoni* (Cockerell, 1929)
C. (*C.*) *nigricans* Houston, 1985
C. (*C.*) *rufescens* Houston, 1983a
C. (*C.*) *tricolor* Houston, 1983a
Subgenus *Ctenocolletopsis*, n. subgen.
C. (*C.*) *ordensis* Michener, 1965
C. (*C.*) *smaragdinus* (Smith, 1868)
Subgenus *Houstonapis*, n. subgen.
C. (*H.*) *fulvescens* Houston, 1983a
Subgenus *Tigriocolletes*, n. subgen.
C. (*T.*) *tigris* Houston, 1983b

to *Stenotritus* Smith, its combination of some characters seemingly osculant between this genus and *Ctenocolletes*, but I have retained the species within the latter pending a comprehensive phylogenetic analysis for Stenotritidae. The various species can be differentiated on the basis of the keys and descriptions provided by Houston (1983a, 1983b, 1985). The species as arranged here are outlined in Table 1.

SYSTEMATICS

Genus *Ctenocolletes* Cockerell

Ctenocolletopsis Engel, new subgenus

ZooBank: urn:lsid:zoobank.org:act:FB2A38B4-2AA7-42EB-B88F-EFEC48662666

TYPE SPECIES: *Stenotritus smaragdinus* Smith, 1868.

DIAGNOSIS: The subgenus can be most readily distinguished in females by the absence of arolia, although this is shared, likely synapomorphically, with *Tigriocolletes* (*vide infra*) from which it can be distinguished by the absence of yellow, enamel-like integumental bands (such bands are present in *Tigriocolletes*). Arolia are present in females of both *Ctenocolletes s.str*. and *Houstonapis*. In males, the compound eyes do not converge dorsally (also shared with *Tigriocolletes*), while in *Ctenocolletes s.str*. and *Houstonapis* the compound eyes slightly converge dorsally. Additional comparative features include the absence of white metasomal setal bands (absent in *Houstonapis*, present in *Ctenocolletes s.str*.), black or metallic green metasomal integument [black in *C. ordensis* Michener, metallic green in *C. smaragdinus* (Smith)], presence of a pygidial plate in males (absent in *Houstonapis*), metasoma lacking acarinaria (present in some *Ctenocolletes s.str*.), and the presence of a narrow to narrowly triangular, medioapical process on the male eighth sternum.

ETYMOLOGY: The new subgeneric name is a combination of *Ctenocolletes* [itself composed of *ktenós* (κτενός), the genitive singular of, "comb", and *kollitís* (κολλητής, meaning, "gluer" or "one who glues" – derived from *kólla* (κόλλα), "glue"] and *ópsis* (ὄψις, meaning "view" or "appearance"). The gender of the name is feminine.

INCLUDED SPECIES: Aside from the type species, the subgenus includes *C. ordensis* Michener.

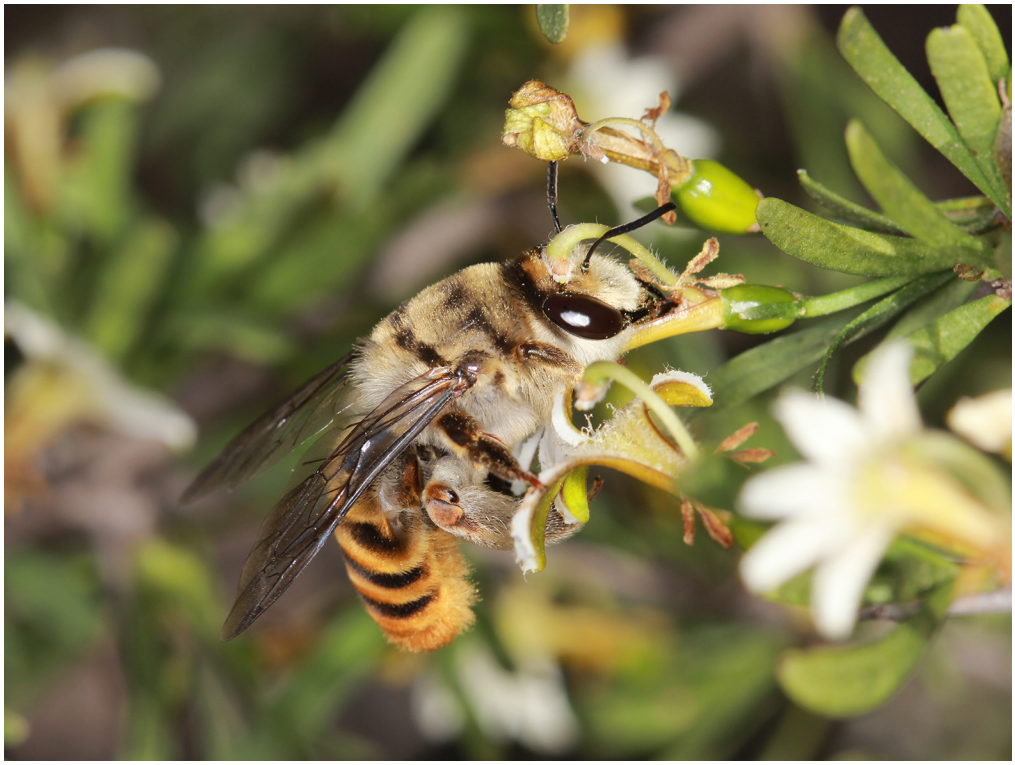

Figure 1. Female of *Ctenocolletes* (*Ctenocolletes*) *nicholsoni* (Cockerell) at a flower of *Scaevola* Linnaeus (Goodeniaceae) in Western Australia (photograph by Linda Rogan, reproduced with permission).

Tigriocolletes Engel, new subgenus
ZooBank: urn:lsid:zoobank.org:act:92CC8EE3-23C2-4215-9692-46746EC1BFAB

Type species: *Ctenocolletes tigris* Houston, 1983b.

Diagnosis: This subgenus may be immediately recognized by the presence of wide, yellow, enamel-like bands on an otherwise black metasoma and a whitish to pale yellow clypeus, such areas of maculation absent in all other *Ctenocolletes*. As in *Ctenocolletopsis*, females lack arolia, the compound eyes of the male do not converge dorsally, and the male possesses a pygidial plate. The medioapical process of the male eighth sternum is broadly triangular, closest in form to the condition in *Ctenocolletopsis* where the process is either narrow or narrowly triangular.

Etymology: The new subgeneric name is a combination of *tígris* (τίγρις; genitive, *tígreōs*, τίγρεως, meaning, "tiger") and *kollitís* (κολλητής, meaning, "gluer" or "one who glues"), and is a reference to the distinctive wide, yellow bands of the metasoma that contrast against the otherwise black integument. The gender of the name is masculine.

Included species: The subgenus presently includes only the type species, known from only a few localities in the western portion of the Great Victoria Desert, in Western Australia.

Figure 2. Lateral habitus of female of *Ctenocolletes* (*Ctenocolletes*) *nigricans* Houston.

Houstonapis Engel, new subgenus
ZooBank: urn:lsid:zoobank.org:act:B3E1BD8D-46ED-40F3-9FF6-1A79D6EC03FC

TYPE SPECIES: *Ctenocolletes fulvescens* Houston, 1983a.

DIAGNOSIS: This is subgenus is one of the more distinctive owing to the unique absence of a pygidial plate in males, a feature shared with *Stenotritus*. Indeed, it may be warranted to eventually recognize the subgenus at generic rank alongside other stenotritids. Like *Ctenocolletes* proper, females possess arolia and the male compound eyes converge slightly above. The metasomal integument is a generally orange color, lacking the yellow bands of *Tigriocolletes*, as well as white setal bands (present in *Ctenocolletes s.str*.) and acarinaria (present only in some *Ctenocolletes s.str*.). The male eighth sternum uniquely possesses a broad, deep medioapical concavity, bordered laterally by short processes (in *Ctenocolletes s.str*. the sternum has an exceedingly short, broadly transverse medial process with its apical margin either bluntly truncate, indented, or weakly trilobed).

ETYMOLOGY: The new subgeneric name honors Terry F. Houston, one of the great statesmen of Australian melittology and who provided modern revisions of *Ctenocolletes* (Houston, 1983a, 1983b, 1985) and our most detailed accounts of stenotritid biology (Houston, 1975, 1984, 1987a, 1987b; Houston & Thorp, 1984). His recent guide to the bees of Australia is an indispensable resource for the continent (Houston, 2018). The name is a combination of his surname with *apis* (Latin, meaning, "bee"). The gender of the name is feminine.

INCLUDED SPECIES: The subgenus presently includes only the type species, known from a few localities in southern Western Australia and extreme southwestern South Australia right along the border with Western Australia.

Figures 3–5. Select species of *Ctenocolletes* Cockerell. **3.** Dorsal habitus of female of *Ctenocolletes* (*Ctenocolletes*) *rufescens* Houston. **4.** Facial view of female of *C.* (*C.*) *nicholsoni* (Cockerell). **5.** Dorsal habitus of male of *C.* (*Ctenocolletopsis*) *ordensis* Michener.

Key to Subgenera of *Ctenocolletes*

1. Metasoma without yellow integumental bands 2
—. Metasoma with wide yellow integumental bands ..... *Tigriocolletes*, n. subgen.

2. Female with arolia; metasoma with or without prominent setal bands; male compound eyes converging dorsally 3
—. Female without arolia; metasoma without white setal bands; male compound eyes not converging dorsally ..... *Ctenocolletopsis*, n. subgen.
3. Male with well-developed pygidial plate; metasomal integument black, sometimes with weak metallic highlights; metasoma with prominent setal bands ..... *Ctenocolletes* Cockerell, *s.str*.
—. Male without pygidial plate; metasomal integument orange brown; metasoma without prominent white setal bands ..... *Houstonapis*, n. subgen.

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REFERENCES

Cockerell, T.D.A. 1929. Descriptions and records of bees – CXV. *Annals and Magazine of Natural History, Series 10* 3(15): 354–360.

Houston, T.F. 1975. Nests, behaviour and larvae of the bee *Stenotritus pubescens* (Smith) and behaviour of some related species (Hymenoptera: Apoidea: Stenotritinae). *Journal of the Australian Entomological Society* 14(2): 145–154.

Houston, T.F. 1983a. A revision of the bee genus *Ctenocolletes* (Hymenoptera: Stenotritidae). *Records of the Western Australian Museum* 10(3): 269–306.

Houston, T.F. 1983b. A new species of *Ctenocolletes* (Hymenoptera: Stenotritidae). *Records of the Western Australian Museum* 10(4): 307–313.

Houston, T.F. 1984. Biological observations of bees in the genus *Ctenocolletes* (Hymenoptera: Stenotritidae). *Records of the Western Australian Museum* 11(2): 153–172.

Houston, T.F. 1985. Supplement to a revision of the bee genus *Ctenocolletes* (Hymenoptera: Stenotritidae). *Records of the Western Australian Museum* 12(3): 293–305.

Houston, T.F. 1987a. A second contribution to the biology of *Ctenocolletes* bees (Hymenoptera: Apoidea: Stenotritidae). *Records of the Western Australian Museum* 13(2): 198–201.

Houston, T.F. 1987b. The symbiosis of acarid mites, genus *Ctenocolletacarus* (Acarina: Acariformes), and stenotritid bees, genus *Ctenocolletes* (Insecta: Hymenoptera). *Australian Journal of Zoology* 35(5): 459–468.

Houston, T.F. 2018. *A Guide to Native Bees of Australia*. CSIRO Publishing; Clayton South, Australia; vii+272 pp.

Houston, T.F., & R.W. Thorp. 1984. Bionomics of the bee *Stenotritus greavesi* and ethological characteristics of Stenotritidae (Hymenoptera). *Records of the Western Australian Museum* 11(4): 375–385.

Michener, C.D. 1965. A classification of the bees of the Australian and South Pacific regions. *Bulletin of the American Museum of Natural History* 130: 1–362, +15 pls.

Michener, C.D. 2007. *The Bees of the World* [2nd Edition]. Johns Hopkins University Press; Baltimore, MD; xvi+[i]+953 pp., +20 pls.

Smith, F. 1868. Descriptions of aculeate Hymenoptera from Australia. *Transactions of the Entomological Society of London* 1868(2): 231–258.

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