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***Rugosothynnus* gen. nov. (Hymenoptera: Tiphidae: Thynninae: Rhagigasterini), a newly recognised Australian genus**

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Abstract

Rugosothynnus gen. nov. (type species *Rhagigaster corrugatus* Turner, 1910) is erected for 12 *Rhagigaster*-like species. Nine species are described and illustrated from Australia: *R. brunneus* sp. nov., *R. clypeatus* sp. nov., *R. confusus* sp. nov., *R. depressus* sp. nov., *R. fulvescens* sp. nov., *R. houstoni* sp. nov., *R. monteithae* sp. nov., *R. neocorrugatus* sp. nov. and *R. schichai* sp. nov. New combinations are proposed for *R. burnsi* (Given, 1959), comb. nov., *R. corrugatus* (Turner, 1910), comb. nov. and *R. tristis* (Smith, 1859), comb. nov. (all previously from genus *Rhagigaster* Guérin-Ménéville, 1838). A key to both sexes of all species is provided except for the females of *R. clypeatus* sp. nov., *R. depressus* sp. nov., *R. neocorrugatus* sp. nov. and *R. schichai* sp. nov. which are unknown.

Key words: Rhagigasterini, Thynninae, *Rugosothynnus*, wasps, new genus, new species, Australia

Introduction

The Thynninae is a large and predominantly Australian subfamily of Tiphidae (Hymenoptera). There are many undescribed taxa, and the subfamily has not been treated in toto for over a century, when the genera were revised by Turner (1910a) and the species by Turner (1907, 1908). A key to the genera of the tribe Rhagigasterini was given by Kimsey (1996) and the subfamily Thynninae by Kimsey (2004).

One of the larger genera included by Turner (1910a) was *Rhagigaster* Guérin-Ménéville, 1838. This genus, as well as *Dimorphothynnus* Turner, 1910, is distinguished by the shape of the metasoma in the male, which is long, narrow and parallel sided with the segments strongly constricted and the apical sternite (the hypopygium) with a strongly upturned apical spine. This genus is in need of revision, and has not been revised since Turner (1910a).

More recently Brown (2008) speculated on the division of *Rhagigaster* into several genera and also erected *Umbothynnus* Brown, 2008 for one species previously included in *Rhagigaster* as well as seven new species. He also revived the status of *Rhytidogaster* Turner, 1907, nom. praeocc., nec *Rhytidogaster* Agassiz, 1846, and proposed the replacement name *Rhytidothynnus* Brown, 2008

Subsequently the genus *Curvothynnus* Brown, 2010 was described by Brown (2010) for two species previously placed in *Rhagigaster*, and a third new genus, *Rugosothynnus* gen. nov., is described here for 12 similar-looking species. *Rhagigaster*, *Rhytidothynnus* and another new genus are currently being reviewed and will complete the revision of the *Rhagigaster* group of genera sensu Turner. Brown (2010) gave a key to the genera of the tribe Rhagigasterini and included *Rugosothynnus* gen. nov. as "genus R".

Materials and methods

The sexes are associated by coincident collecting including pairs collected *in copula*. Traditionally the male sex is selected for the holotype as these are better represented in collections. Where more than one specimen of a single female morphotype is collected with the same male, it is assumed the major association is the correct pairing of the sexes.

- 5(4). Frontal maculae large, occupying almost entire frons [SWA] *R. tristis* (Smith)
 - Frontal maculae small [SWA] *R. houstoni* **sp. nov.**
 6(1). Legs ferruginous, remainder of mesosoma black; pygidium weakly anterolaterally raised (Fig. 4) [SEQ, NNSW]
 *R. burnsi* (Given)
 - Legs brown to black and concolorous with remainder of mesosoma; pygidium strongly anterolaterally raised (Figs 13, 31). 7
 7(6). T3–6 densely covered with fulvous setae especially medially (Fig. 45); T1–5 longitudinally rugosely punctate; body black
 [SWA] *R. fulvescens*, **sp. nov.**
 - T3–6 sparsely covered with white setae; T1–5 deeply punctate; body brown [SWA] *R. brunneus* **sp. nov.**

Discussion

One of the biggest problems with *Rhagigaster*-like genera in particular, and Thynninae in general, is that the sexes will miscouple so that there is no certainty that pairs found *in copula* are conspecific (Given 1954, 1959; Brown 1993, 2001b). The reason for this is unknown, although the dependence on the wingless female to be flown to a food source (whilst *in copula*) may be more important for the survival of a species than copulation resulting in egg fertilisation. Preliminary work on thynnine pheromones (Schiestl *et al.* 2003) suggest that females use a mixture of analogues (Griffiths *et al.* 2011) and this may possibly be a mechanism that allows for miscoupling (and speciation) to occur. This is untested, and currently the pheromones of *Rhagigaster* and related genera have not been isolated or examined.

Within *Rugosothynnus* miscoupling of pairs were found in three instances: a male of *R. depressus* **sp. nov.** mounted with a female of *R. fulvescens* **sp. nov.** (from Tammin); a male of *R. depressus* **sp. nov.** mounted with a female of an unknown species of *Rhagigaster* (from Perenjori); and a male of *R. houstoni* **sp. nov.** mounted with a female of *R. tristis* (from McDermid Rock).

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