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A new genus for an Australian thrips (Thysanoptera, Phlaeothripinae) presumed predatory on a waxy eriococcid (Hemiptera, Coccoidea)

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Abstract

Callococcithrips gen.n. is erected for the species *Rhynchothrips fuscipennis* Moulton that lives only among the protective waxy secretions of an eriococcid on *Kunzea* in south-eastern Australia. Larvae and adults of this thrips move rapidly amongst the sticky wax strands, and their maxillary stylets are unusually long and convoluted. Circumstantial evidence suggests that the thrips is predatory on immature stages of the eriococcid. Also transferred to this genus is *Liothrips atratus* Moulton, based on a single female from Western Australia.

Key words: Eriococcidae, predation, wax secretion, convoluted stylets, *Teuchothrips*

Introduction

The wingless females of the Australian sap-sucking bug *Callococcus acaciae* (Maskell) appear to be host specific to certain *Kunzea* species (Myrtaceae), particularly to *K. ericoides*, and the specific epithet of the insect presumably results from an early misidentification (Lyn Cook and Penny Gullan in litt.). Listed by Ben Dov (2006) in the family Asterolecaniidae, this coccoid is treated within the Eriococcidae by Cook & Gullan (2004). Each female is covered by a thick protective mass of loosely woven wax filaments (Plate 1). These waxy masses, measuring up to 10mm in diameter, are sometimes abundant in eastern Australia on the stems of the host plant, and the wax is of interest biologically for two reasons. Firstly, a particular species of thrips breeds only beneath these waxy masses, and the larvae and adults of this thrips move quickly and freely between the filaments without adhering to their sticky surfaces. Secondly, unlike many coccoid species in this part of Australia that secrete waxy coverings, ants have never been observed to attend *C. acaciae* despite often walking on the plant stems near them. The objective of these notes is to record field observations made on the thrips, and to erect for it a new monobasic genus, distinguishing the species from other members of the family Phlaeothripidae in Australia.

Despite extensive collecting on many plant species widely across Australia, the thrips species discussed below has never been found other than on *Kunzea ericoides*. All life stages of the thrips have been found amongst the waxy strands of the eriococcid, and only an occasional adult has ever been observed walking on the host plant outside of a wax mass. The thrips species thus seems to be fully dependent on the coccoid. However, although predation by the thrips on the eggs or larvae of the coccid is strongly suspected, we have been unable to demonstrate this convincingly, despite watching the thrips throughout 24-hour periods. Larvae and adults have been observed moving actively among the wax filaments throughout the day and night, but feeding has never been observed. The free movement of the thrips among the sticky wax is particularly remarkable, because any attempt to touch the wax, however lightly, with an implement such as a micropin,

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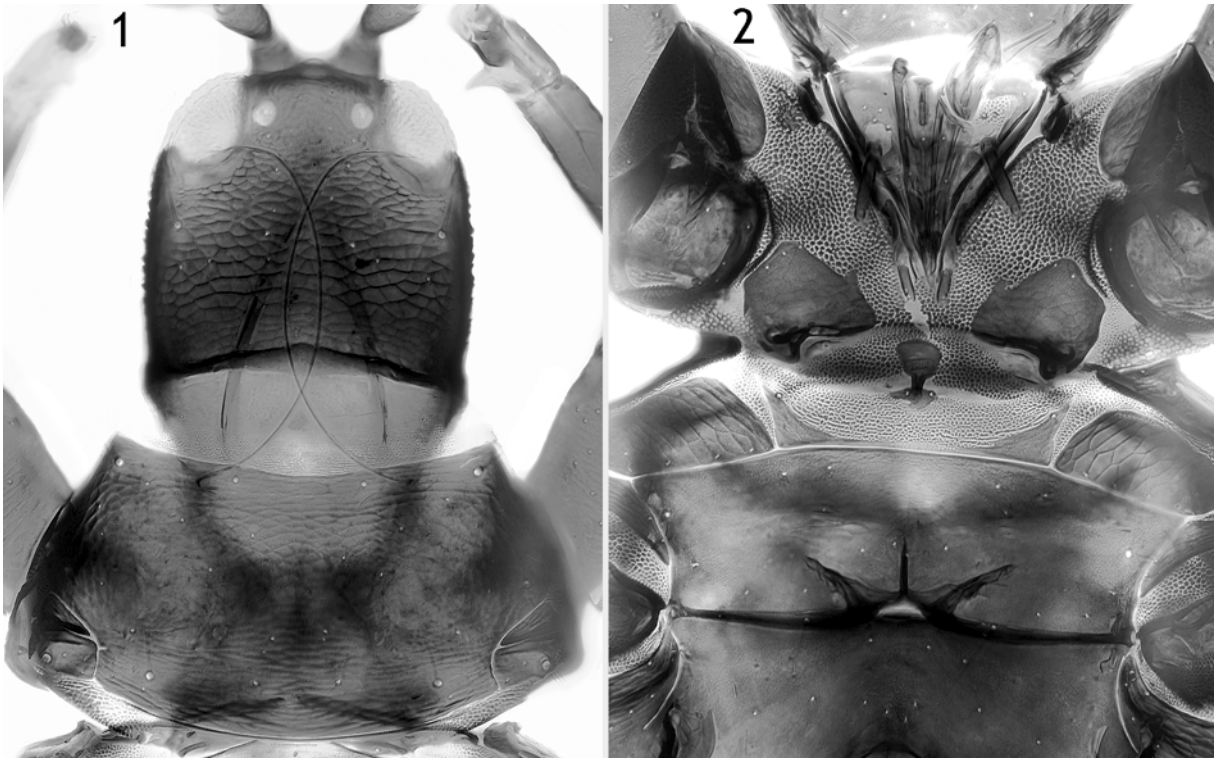
results in inextricable adherence. The remarkably sticky nature of the wax filaments presumably provides excellent protection against attack by ants. The chemical structure of the wax is the subject of ongoing investigations (Tschuch et al., 2006), and for these studies nomenclatural stability of the thrips is required.

PLATE 1. Wax masses covering adult females of *Callococcus acaciae*. (photos by Prof. Penny Gullan, University of California).

***Callococcithrips* gen.n.**

Type-species *Rhynchothrips fuscipennis* Moulton.

Macropterous dark brown Phlaeothripinae. Antennae 8-segmented, III with one sensorium, IV with 3^{+1} sensoria, VIII not constricted at base. Head slightly wider than long, eyes smaller ventrally than dorsally, postocular setae scarcely reaching posterior margin of eyes; maxillary stylets retracted to posterior ocelli, crossing over medially and with a slight loop laterally at base of mouth cone (Fig. 1); maxillary guides stout and curved; mouth cone extending between fore coxae. Pronotum reticulate, with 5 pairs of major setae, am, ml and pa pairs shorter than aa and epim pairs. Metanotum reticulate, medially with one pair of small setae. Prosternal basantra not developed, mesopraesternum reduced to pair of lateral triangles, metathoracic sternopleural sutures well developed (Fig. 2). Both sexes with large fore tarsal tooth; fore femora swollen in large males. Forewing without duplicated cilia; sub-basal setae arranged in straight line. Pelta reticulate, triangular but with apex truncate; tergites reticulate laterally, almost striate medially, II–VII each with two pairs of wing-retaining setae; tergite IX with three pairs of capitate setae, S2 in male 0.5 as long as S1; tube shorter than head. Male sternite VIII with transverse glandular area anterior to discal setae.



FIGURES 1–2. *Callococcithrips fuscipennis*. 1, Head and pronotum; 2, Thoracic sternites. (photomicrograph by Dena Paris).

Relationships. This new genus is a member of the *Liothrips*-lineage of leaf-feeding Phlaeothripinae (Mound & Minaei, 2007), and presumably is derived from within the ill-defined *Teuchothrips*-complex. Currently, there is no satisfactory definition of the genus *Teuchothrips* Hood, and the 29 species listed under this generic name (Mound, 2007) are not all congeneric. In addition to these 29 species, there is in Australia a large suite of species, mostly undescribed, feeding on the leaves of a wide range of unrelated plants and often inducing galls or leaf deformation. Without further studies on this suite of species, the genus *Teuchothrips*, and its relationships to the large and worldwide genus *Liothrips* Uzel, will remain undefined. The type species of the new genus proposed here is referred to as "Teucho Leptospermum" in the phylogram provided by Mound & Morris (2007), based on two genes from several Australian Phlaeothripinae. These molecular data place the species within the clade of the *Teuchothrips*-complex. However, unlike the species currently assigned to *Teuchothrips*, the maxillary stylets of *C. fuscipennis* are unusually elongate, crossing over each other in the head (Fig. 1). A second species, known only from a single female collected in Western Australia, is also transferred to this genus. This condition of exceptionally elongate stylets is otherwise found in Phlaeothripinae only in species of the genus *Heligmothrips* Mound, all of which have duplicated cilia on the forewing, and feed only on *Casuarina* foliage. The two species placed in *Callococcithrips* lack duplicated cilia on the forewings, in contrast to all but two species listed in *Teuchothrips*. However, *T. simplicipennis* Hood and *T. froggatti* (Bagnall) have maxillary stylets of normal length, and are considered to be phytophagous.

***Callococcithrips fuscipennis* (Moulton) comb.n.**

Rhynchothrips fuscipennis Moulton, 1968: 97
Teuchothrips fuscipennis (Moulton); Mound & Houston, 1987: 18

This species was described from a holotype female with one male and two female paratypes, collected by W.W. Froggatt at Canberra, 14.i.1927. The holotype slide (in the California Academy of Sciences, San Francisco) bears the unpublished information "from woolly covering of mealybugs". Periodically, *C. fuscipennis* is common in the Canberra region and has also been seen from Victoria; the host plant, *Kunzea ericoides*, is widespread in south-eastern Australia. Populations of the eriococcid and the thrips were high in the years 2000 to 2002, but both insect species became difficult to find in 2004 and 2005, which years were particularly dry. As with so many insect species in this area, populations seem to be remarkably unstable from year to year.

Unfortunately, this thrips was described in a paper that was prepared for publication 17 years after Moulton's death, and the specific epithet *fuscipennis* was used for three newly described species in three different genera: *Smerinthothrips fuscipennis* Moulton (1968: 93) is now a synonym of *Teuchothrips ater* (Girault), and *Teuchothrips fuscipennis* Moulton (1968: 100) is now a synonym of *Heligmothrips erinaceus* (Karny) (Mound & Houston, 1987). *Rhynchothrips fuscipennis* itself has been listed under *Teuchothrips* for the past 20 years, pending studies on the many unidentifiable species of Phlaeothripinae named by Moulton and particularly by A.A.Girault (Mound 1996; Crespi et al., 2004). Progressively, the identity and host associations of various members of the *Teuchothrips*-complex are being elucidated, based on field and laboratory studies (Mound & Morris, 2007).

Callococcithrips atratus (Moulton) comb.n.

Liothrips atratus Moulton, 1935: 100.

This species remains known only from the female holotype, in the California Academy of Sciences, San Francisco. This is a severely crushed specimen that was remounted into Canada Balsam in 1978 from the original water soluble mountant. The data on the slide are "sweeping, Western Australia, Mundaring, L.J. Newton, 25.ii.1931". *C. atratus* has all of the character states indicated in the generic definition above, but differs from *C. fuscipennis* in that the forewings are exceptionally and uniformly dark.

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