



Fungus-feeding thrips of the genus *Stephanothrips* in Australia (Thysanoptera, Phlaeothripinae)

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Abstract

Five species of *Stephanothrips* are now recorded from Australia, of which one is found worldwide, four are endemic, and two are described here as new species. *S. broomei* is remarkable for its colour pattern, and *S. howei* is only the fourth member of the genus to have a prominent hamus on the external margin of the fore tarsus. An illustrated key is provided to distinguish these five species.

Key words: new species, Phlaeothripidae, leaf-litter, fore tarsal hamus

Introduction

Opinions have fluctuated considerably over the past 50 years concerning systematic relationships among the long-tailed species of Phlaeothripinae that comprise a genus-group currently known as urothripines. This group has been considered a distinct family (Urothripidae), or super-family (Urothripoidea), or even sub-order (Polystigmata). However, more frequently the group has been referred to as Tribe Urothripini, although even this has limited phylogenetic support (Ullitzka & Mound 2014). Stannard (1957) reduced the group to a single genus, *Amphibolothrips*, but subsequently (Stannard 1970) recognised and provided a key to 17 genera, although Mound (1972) reduced this to 13 genera. Subsequently, Ullitzka and Mound (2014) placed three more genera into synonymy with *Urothrips*, so that currently 10 genera are recognised. However, this seems unlikely to be a satisfactory reflection of phylogenetic relationships, and more synonymies are likely to be established in the future, because some genera are distinguished on relatively trivial character-state differences. The objective here is to provide an illustrated account of the species found in Australia of one of these genera, *Stephanothrips*. These are fungus-feeding thrips in which most adults are wingless, and they live on dead branches, twigs and leaves, but also in leaf litter and at the base of tussocks of grasses (Okajima 1994).

Holotypes of the new species described here are housed in ANIC—the Australian National Insect Collection, CSIRO, Canberra. Specimens are also deposited in the Queensland Primary Industries Insect Collection (QDPC), Brisbane.

Stephanothrips Trybom

Stephanothrips Trybom, 1912: 42. Type species *S. buffai* Trybom by monotypy.

With the two new species described below, 32 are now listed in this genus (ThripsWiki 2018). Of these species, five are from North America, two from southern Africa, four from Australia, and the others from Asia. Females of *S. occidentalis* are found widely in tropical and sub-tropical countries, but since males have been found only in southern Thailand (Okajima & Urushihara 1995) this species probably originated in tropical Asia. Until the

description below of *howei* sp.n., only three species in this genus, *occidentalis*, *thai* and *zonatus*, have been known as bearing a prominent hamus on the external margin of the fore tarsi, although this structure occurs in species of some other urothripine genera. Currently *Stephanothrips* is identified using the generic key provided by Mound (1972). However, the increasing number of species described in the genus since that date, also the increased number of species in both *Baenothrips* and *Bradythrips*, will necessitate a re-evaluation of this generic classification. Currently these genera are distinguished only on the degree of fusion of antennal segments three, four and five, and the number of setae on the anterior margin of the head, and both characters seem susceptible to variation.

Key to species from Australia

1. Fore tarsus with laterally projecting hamus (Fig. 3) 2
- Fore tarsus without a laterally projecting hamus 3
2. Head with compound eye of 3 large facets (Fig. 1); median tubercles on vertex larger and more transverse than lateral tubercles; abdominal tergite I with “hour-glass” sculpture lines medially (Fig. 15); tergites I and II fused without a suture; fore femora brown, mesonotum yellow *occidentalis*
- Head with compound eye of 3 large and 6 or 7 small facets (Fig. 3); tubercles on vertex all equal in size; abdominal tergite I weakly sculptured medially, separated from tergite II by slender suture (Fig. 14); fore femora white, mesonotum dark brown (Fig. 3) *howei* sp.n.
3. Metanotum and abdominal tergite I closely joined with no clear suture (Fig. 12); tergite I sculptured with many small tubercles medially (Fig. 12); anterior margin of head with 2 pairs of major setae; meso and metathorax white but tergite I dark brown *broomei* sp.n.
- Metanotum and abdominal tergite I clearly separated by complete suture (Figs 11, 13); tergite I with weak sculpture; anterior margin of head with 2 or 3 pairs of major setae (Fig. 2); metathorax and abdominal segment I not sharply different in colour 4
4. Body, legs and antennae largely brown to dark brown (Fig. 5); pronotal epimeral setae prominent, about 20 microns long; anterior margin of head with 3 pairs of major setae; *barretti*
- Head and pronotum brown, body, legs and antennae mainly yellow (Fig. 4); pronotal epimeral setae obscure, scarcely 10 microns long; anterior margin of head with 2 pairs of major setae. *ferrari*

Stephanothrips barretti Mound

(Figs 5, 6, 11)

Described from a single female (Mound 1972: 100), this wingless species has been found widely in eastern Australia, although only four males have been seen. The collecting localities range from various sites in Tasmania including Flinders Island, southern Victoria, eastern New South Wales including the Canberra area, and southeastern Queensland, also Lord Howe Island and Norfolk Island. The species has generally been collected only one specimen at a time, and particularly on dead branches, and most individuals bear a large number of fungal spores and fragments of mycelia on their surface. The brown to dark brown body and rectangular head, are distinctive amongst the Australian thrips fauna (Fig. 5), although antennal segment III is variably paler in the basal third (Fig. 6). The anterior margins of the prosternal ferna are weakly sclerotized, but the meso and metasternal furcae are well developed (Fig. 9). In appearance, *barretti* is similar to *formosanus* from Taiwan and Japan, but has tergite I clearly distinct from the metanotum (Fig. 11).

Stephanothrips broomei sp. n.

(Figs 2, 7, 12)

Female aptera. Strikingly bicoloured (Fig. 2); dark brown on pronotum anterior margin, tergite I and lateral thirds of II; meso and metathorax, and posterior half of pronotum white; head light brown laterally posterior to eyes but paler on anterior third; tergites III–VIII pale medially but with brown areas laterally; tube yellow; fore and mid legs almost white, hind legs including coxae dark brown; antennae pale, terminal two segments shaded brown. Head slightly longer than wide, constricted at base (Fig. 2); vertex with many small tubercles; compound eyes with only 3 facets, all large and on the dorsal surface; anterior margin with 2 pairs of prominent setae with bluntly capitate

apices; maxillary stylets retracted to eyes, parallel medially and about one third of head width apart. Antennal segments III–V fused with only faint sutures (Fig. 7), VII–VIII completely fused. Pronotum weakly sculptured, epimeral setae prominent with broadly expanded apices. Meso- and metanota apparently fused, weakly sculptured, and fused to strongly sculptured tergite I (Fig. 12); tergites I–II separated by weak incomplete suture, II–III with transverse row of about 20 small setae; tergite X with 3 pairs of long terminal setae, dorsal pair two-thirds as long as lateral pairs.

Measurements (holotype female in microns). Body length 1450. Head, length 160; width 140; anteromarginal setae, inner 40, outer 25. Pronotum, length 95; width 175; epimeral setae 25. Tergites VIII, IX & X lengths 45, 150, 310; lateral anal setae 800. Antennal segments length 100 [III+IV+V]; 30 [VI]; 50 [VII+VIII].

Male aptera. Smaller and paler than female, but otherwise very similar.

Material studied. Holotype female, **WESTERN AUSTRALIA**, Broome, Willie Creek, from *Acacia* stems, 2.iii.2005 (LAM 4670), in ANIC.

Paratypes: 1 female, 1 male taken with holotype.

Comments. The holotype and paratypes are mounted on a single slide, and the holotype is the female specimen that has the anal setae fully extended. The extensive fusion of the meso- and metanota with the first abdominal tergite is a condition shared with several other species in this genus (Okajima 2006). However, *broomei* is distinguished by its remarkable colour pattern, the long slender fused antennal segments III–V, and the presence of two pairs of major setae on the anterior margin of the head.

***Stephanothrips ferrari* Mound**

(Figs 4, 13)

Described originally from six females and four males taken near Townsville in northern Queensland (Mound 1972: 100), this species was collected in 1995 further north at Cape Tribulation and in 2009 on the Torres Strait Islands (Horn, Badu and Gabba Islands). The collection records indicate that the species lives amongst tussocks of grass, not on dead branches. It is one of the species in this genus in which tergites I and II are fully fused together, as in *occidentalis*, but tergite I is distinct from the posterior margin of the metanotum (Fig. 13). In contrast to other species in this group the head is elongate, prolonged in front of the eyes and with only two pairs of major setae on the anterior margin (Fig. 4). It is another strongly bicoloured species, with the head and pronotum dark brown but the rest of the body, legs and antennae yellow.

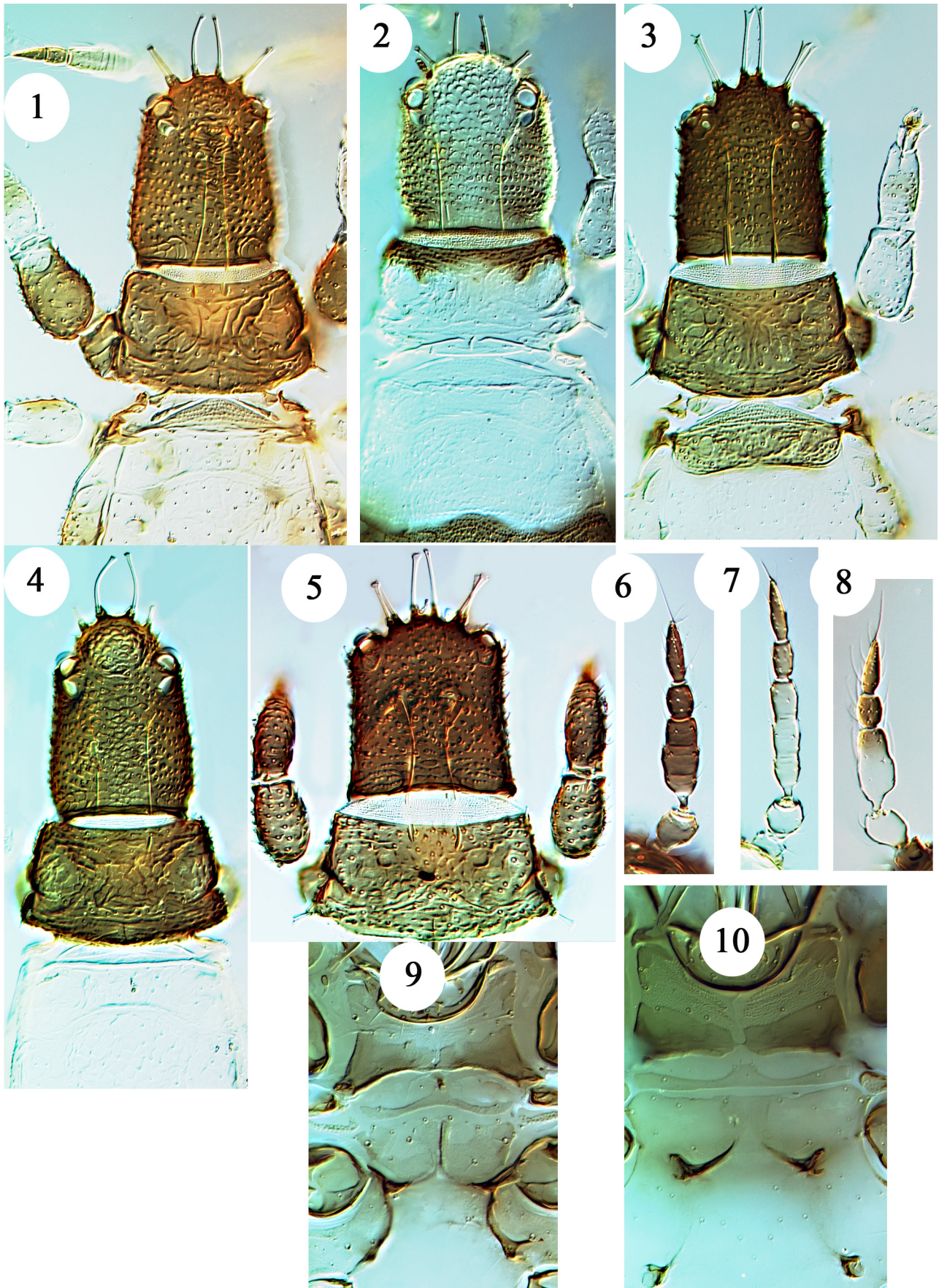
***Stephanothrips howei* sp.n.**

(Figs 3, 8, 14)

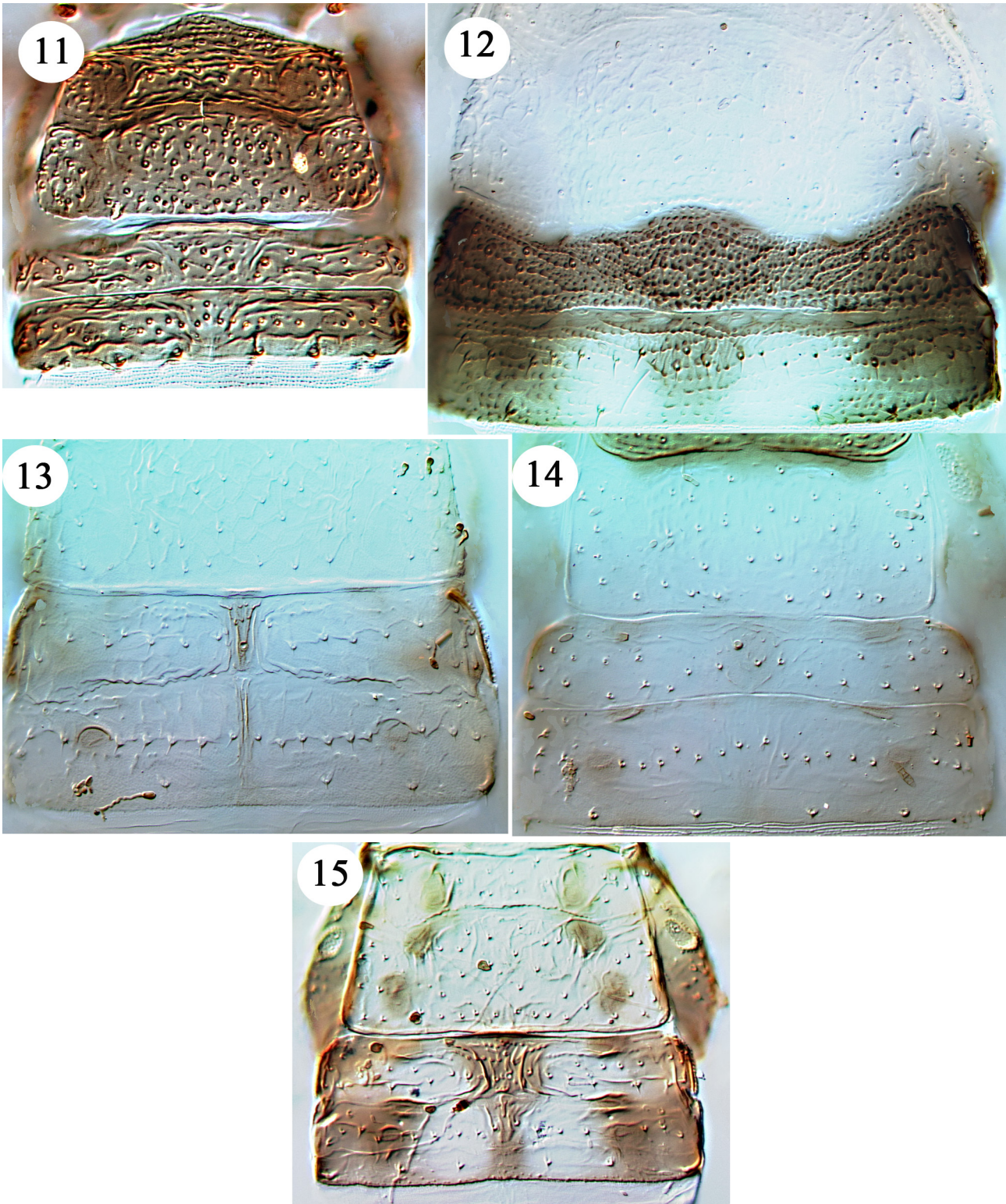
Female aptera. Bicoloured (Fig. 3); dark brown head, pronotum, mesonotum, fore and mid coxae; white fore femora and antennal segments II–V, but VI–VIII brown; all tibiae with light brown band medially; mid and hind femora variable from almost white to light brown; abdominal tergites with light brown areas laterally but pale medially, tube yellow. Head slightly longer than wide, cheeks weakly concave behind eyes (Fig. 3); vertex with many equally small tubercles; compound eyes with 3 large facets and mesad of these a row of about 7 smaller facets; anterior margin with 3 pairs of prominent setae with broadly capitate apices, arising from prominent tubercles; maxillary stylets retracted to eyes, parallel medially and about one third of head width apart. Antennal segments III–V fused without sutures (Fig. 8), VII–VIII fused but with partial suture ventrally. Pronotum with many small tubercles posterolaterally, epimeral setae short with broadly expanded apices. Fore tarsi with prominent hamus on external margin. Metanotum weakly joined to tergite I medially; suture between tergites I and II slender (Fig. 14); tergites II and III each with transverse row of about 20 small setae; tergite X dorsal setal pair about two-thirds as long as the other 4 anal setae.

Measurements (holotype female in microns). Body length 1450. Head, length 170; width 145; anteromarginal setae, inner 60, outer 50. Pronotum, length 100; width 175; epimeral setae 20. Tergites VIII, IX & X lengths 60, 135, 275; lateral anal setae 650. Antennal segments length 65 [III+IV+V]; 25 [VI]; 45 [VII+VIII].

Male not known.



FIGURES 1–10. *Stephanothrips* from Australia. Head & pronotum 1–5: (1) *occidentalis*; (2) *broomei*; (3) *howei*; (4) *ferrari*; (5) *barretti*. Antenna 6–8: (6) *barretti*; (7) *broomei*; (8) *howei*. Prosternites 9–10: (9) *barretti*; (10) *howei*.



FIGURES 11–15. *Stephanothrips* from Australia, metanotum & tergites I–II. (11) *barretti*; (12) *broomei*; (13) *ferrari*; (14) *howei*; (15) *occidentalis*.

Material studied. Holotype female, **Australia, Lord Howe Island**, Stevens Trail, from dead branches, 26.xii.2001 (LAM 4086), in ANIC.

Paratypes: 1 female taken with the holotype; **Queensland**, Lamington, O'Reilly's, dead branches, 1 female 11.x.2006, 1 female 4.viii.2013; Mt Glorious, 1 female from *Cyathea* fronds, 18.i.2006. **New South Wales**, Harrington, 1 female from *Podocarpus*, 10.xii.2001.

Comments. Among the 32 species now placed in *Stephanothrips*, this is only the fourth to be described as having a prominent hamus on the external margin of the fore tarsi. *Stephanothrips occidentalis* is generally recognised because of the possession of this structure, but a rather similar structure is described for *S. thai* from northern Thailand, and *S. zonatus* from Bali, Indonesia. In contrast to the common worldwide species, *occidentalis*, this new species has each compound eye with an extra row of small facets medially, and tergites I and II are not fused together. Moreover, antennal segments III+IV+V are more closely fused in *howei* than in *occidentalis*. Species of *Stephanothrips* usually have each compound eye with a single row of facets, but the extra row of smaller facets described here in *howei* is a character state that is shared with some species in the related urothripine genus *Bradythrips*.

***Stephanothrips occidentalis* Hood & Williams**

(Figs 1, 15)

Described originally from the Caribbean island of St Croix (Hood & Williams 1925: 69), this species is widespread in tropical and subtropical countries around the world, although males have been reported only from southern Thailand (Okajima & Urushihara 1995). In Australia it has been taken no further south than the border between New South Wales and Queensland, but is common in northern Queensland rainforest areas, as well as in the Torres Strait Islands. It has been taken around Darwin and the Coburg Peninsula, but although it is common on Norfolk Island it has not been found on Lord Howe Island. In contrast to other members of the genus, it shares with *howei* described above, and also with *thai* Okajima & Urushihara from northern Thailand, and *zonatus* Okajima from Bali, the presence of a prominent hamus on the external margin of the fore tarsi. However, the fore femora are brown, each compound eye consists of just three large facets, and tergites I and II are fully fused together (Fig. 15).

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