



## Leaf-litter thrips of the genus *Psalidothrips* (Thysanoptera, Phlaeothripidae) from Australia, with fifteen new species

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### Abstract

A key is given to 16 *Psalidothrips* species known from Australia. In contrast to members of this genus from other parts of the world, most of these species show a strong tendency toward wing loss, with associated character states, also remarkable reduction in sclerotisation of the thoracic sclerites. Character state variation is discussed, and 15 new species are described and illustrated: *P. bipictus* sp.n., *P. brittoni* sp.n., *P. cecryphalus* sp.n., *P. daguilari* sp.n., *P. driesseni* sp.n., *P. gloriousi* sp.n., *P. greensladeae* sp.n., *P. howei* sp.n., *P. minantennus* sp.n., *P. platetus* sp.n., *P. postlei* sp.n., *P. tritus* sp.n., *P. trivius* sp.n., *P. verus* sp.n. and *P. wellsae* sp.n.

**Key words:** Fungus-feeding, structural variation, identification key

### Introduction

The litter of dead leaves under trees across Australia is the habitat of a wide range of fungus-feeding Thysanoptera (Mound *et al.* 2013; Tree & Walter 2012). Some of these thrips feed on fungal spores (Mound 1974; Eow *et al.* 2014) whereas others feed on hyphae or the breakdown products associated with fungal decay (Mound 1972, 2002). The genus considered here, *Psalidothrips*, comprises species that are presumably hyphal-feeders, and they seem to be associated almost entirely with dead leaves on the ground, in contrast to the species of the related genus *Hoplothrips* that usually occur on dead twigs and branches as well as on bunches of dead leaves hanging from dead branches. Previously, only one species of *Psalidothrips* has been reported from Australia, but for many years a range of undescribed related species have been known to be common and widespread across the Australian continent (see Acknowledgements below). They have been found, sometimes in abundance, in the litter of both tropical and temperate rain forest trees, in wet and dry sclerophyll forests, and even in the litter of mallee scrub in semi-arid areas. These thrips seem to be particularly associated with the litter of *Eucalyptus* trees, although some samples of *Psalidothrips* species have been taken from *Banksia* litter. However, given the ubiquity of *Eucalyptus* across Australia, it is rarely possible to take any litter sample that does not include dead leaves of species in this genus. In contrast, samples of leaf litter that were taken beneath pure stands of *Brachychiton* and also of *Eucryphia* trees did not contain any Phlaeothripidae, and although the litter of *Casuarina* species supports populations of several species of this family no *Psalidothrips* have been found in such litter.

There is no evidence of *Psalidothrips* species being associated with the litter of any particular species of *Eucalyptus*, although there is indication of a negative correlation with the litter of *Eucalyptus cinerea*. Litter beneath trees of this species has been sampled several times but without any *Psalidothrips* being found. It may be significant that trees of this species usually retain their juvenile foliage. In contrast, there is some indication of habitat specificity amongst some *Psalidothrips* species. Thus one new species described below is recorded from wet forest litter in Tasmania and eastern New South Wales, whereas another species is known from across Australia south of the Tropic of Capricorn in dry sclerophyll litter.

Okajima (1983) discussed the relationships of *Psalidothrips* and gave a key to the 17 species worldwide then known. More recently, Wang *et al.* (2007) described three new species from China, and Zhao *et al.* (2018) a further five new species from that country. Prior to the present study, 33 *Psalidothrips* species were listed worldwide (ThripsWiki 2019), of which 20 are from Asia, eight are from the Neotropics, two from the Solomon Islands, two from New Zealand, and one found both in New Zealand and in Australia (Mound & Walker 1986). A further 15 new species are described below in this genus, but species taxonomy in this group involves many problems. These are due partly to intraspecific variation in body size, also dimorphisms associated with sex and wing development. Apterous individuals in several species have some thoracic sclerites severely eroded or even absent, and in some species this erosion also includes the first abdominal tergite, the pelta. There is remarkable structural variation within some populations, including bilateral asymmetry of antennal sense cone number. Some of the species described below are represented by sufficiently large samples to recognise such structural diversity. Other species are represented by single samples, and the significance of these must remain questionable.

This publication is thus no more than an initial introduction to the structural diversity found within this genus of fungus-feeding species. These thrips constitute a major element in the leaf-litter insect fauna of Australia, and the ecological and evolutionary significance of their remarkable variation within and between populations would be an interesting study.

**Abbreviations.** Pronotal setae are referred to as follows: am—anteromarginals; aa—anteroangulars; ml—mid-laterals; epim—epimerals; pa—posteroangulars. The term S1 setae is used to refer to any setal pair that is closest to the body mid-line; S2 is then used for the next major setal pair lateral to S1 setae. ANIC—Australian National Insect Collection, CSIRO, Canberra. QDPC—Queensland Primary Industries Insect Collection, Brisbane.

## *Psalidothrips* Priesner

*Psalidothrips* Priesner, 1932: 61. Type-species: *P. amens* Priesner, by monotypy.

Although extensive morphological diagnoses of this genus are available (Okajima 1983, 2006; Mound & Walker 1986; Dang *et al.* 2014), each of these indicates many exceptions to various character states. As a result, these diagnoses are not entirely effective for distinguishing membership of the genus. The only character states shared by all the species listed in *Psalidothrips* are plesiomorphies, and no single autapomorphy occurs in all of the species allocated to the genus. The genus comprises small and often weakly sclerotised and rather pale species that tend to be flattened dorso-ventrally, and on the head the genae are usually incut just behind the eyes and never bear stout setae. The species from Australia differ in several respects from their congeners in other parts of the world: they appear to be rather less dorso-ventrally compressed, and most available specimens of both sexes are apterae; antennal segment III bears only one or two, instead of three sense cones; the major pair of setae ventrally on the head do not always arise between the tentorial pits; the pronotal anteromarginal and anteroangular setae are not always reduced; the mesopresternum is reduced and commonly absent, and the anterior border of the mesoepisternum sometimes eroded; the fore wings are usually only weakly constricted medially or are parallel sided; the abdominal tergites usually have only one pair of wing-retaining setae, and in macropterae of a few species these setae are small and straight; the sternal discal setae are not always minute; males commonly have tergite IX S2 setae long, instead of short and stout as in typical Phlaeothripinae. The variation in some characters is as follows:

*Antennal segments:* Species of this genus have 8-segmented antennae and segment VIII varies between species from broadly connected to VII, or scarcely narrower than the apex of VII, through weakly narrowed to the base and shorter than VII, to slender and even with a distinct pedicel. The length of the antennae varies among species, and although segment III is usually longer than wide and longer than segment IV, it is short and wider than long in one species described below.

*Antennal sense cones:* Species of this genus in the northern hemisphere have 3 sense cones on segment III, and 3 or 4 on segment IV. In contrast, species in Australia generally have 1 or 2 sense cones on III (rarely 0), and usually 2 on IV (sometimes 3 or even 4). In some species, the number is variable among individuals, and even differs between the left and right antennae in some individuals. In one Australian species, antennal segment III bears 0, 0+1, 0<sup>l</sup>+1, or 1+1 sense cones. In one of the species with 3 sense cones on segment III, *bipictus* described below, one of the paratypes has a fourth small sense cone on this segment.

*Sculpture of head and thorax:* The dorsal surface of the head is usually smooth, or with weak sculpture only near the posterior margin, but one species has weak to strong net-like reticulation anteromedially on the vertex. The meso and metanota are usually without any sculpture.

*Maxillary stylets:* Maxillary stylets are usually short, reaching approximately half way to the postocular setae and placed far apart, often V-shaped or U-shaped. But the position of these stylets is commonly disrupted in slide-mounted specimens and is thus not a reliable character state for taxonomic decisions.

*Pronotal setae:* All the species considered here have three pairs of setae elongate (ml, epim, pa), with their apices varying from acute, through bluntly pointed, to weakly capitate. Most species of this genus in other parts of the world have the am and aa setae short, and although this is true of most species of this genus from Australia the am setae are long in three species. In contrast, the aa setae are well-developed in 10 species from Australia, but they are sometimes variable in length such that this character state is difficult to use for species recognition.

*Mesopresternum:* In the species from Australia considered here the mesopresternum is rarely complete and boat-shaped. Even macropterae of some species have this sclerite partially eroded on the posterior margin, and in apterae it is commonly more extensively or even completely eroded and thus absent. The mesoeusternum anterior margin is similarly variably eroded and incomplete medially, and in some species does not extend laterally.

*Pelta:* This sclerite, representing abdominal tergite I, is variable in shape amongst the species considered here. It ranges from almost D-shaped with short posterolateral lobes, or widely transverse along the anterior margin of tergite II, to weakly eroded posteromedially, to completely eroded and absent.

*Tergite IX setae:* In females the major setae S1 and S2 have sharply pointed apices. Males of *Psalidothrips* are unusual amongst Phlaeothripinae in commonly having setae S2 almost as long as S1 rather than short and stout.

*Tube:* The tenth abdominal segment is usually shorter than the head. It is short and broad in some species, but more elongate in others. The anal setae are commonly longer than the tube.

*Male sternite VIII:* One of the species considered here lacks a pore plate on this sternite. Among the other species the pore plate varies from small and almost oval medially, to broadly or narrowly transverse fully across the sternite, or divided into two lateral transverse areas.

**Relationships.** Within the Phlaeothripinae, *Psalidothrips* is a member of the *Phlaeothrips*-lineage (Mound & Marullo 1996) of fungus-feeding species. It shares with typical members of that lineage the production of species that exhibit dimorphism associated both with sex and also with the presence/absence of wings. Moreover, some species are structurally variable in association with body size. The genus is most closely related to the worldwide genus *Hoplothrips* in which some species, such as *H. pergandei* (Hood) from North America, are particularly similar in structure to some species of *Psalidothrips*. Not all the species of *Hoplothrips* are closely related to the type species of that genus, *H. corticis* (de Geer), but we here restrict the genus to those species which resemble *H. corticis* in having the maxillary stylets long and close together in the middle of the head. In contrast, the species of *Psalidothrips* have the maxillary stylets wide apart and low in the head, or else about one third of the head width apart and parallel medially, and with the maxillary palps exceptionally small.

**Acknowledgements.** A manuscript concerning the Australian members of this genus was first drafted by LAM in 1970, subsequent to visiting Australia in 1967–68 from the British Museum (Natural History) on a research visit sponsored by D.F. Waterhouse, the Chief of CSIRO Entomology. Over subsequent years, further specimens of the genus were collected and slide-mounted. In 2014 Dang Lihong from Beijing, China, whilst working on her PhD, sorted the slides of this genus in ANIC, and drafted a new key to species. Desley Tree, as part of her MSc degree at the University of Queensland, developed and sorted an extensive collection of litter-living thrips. We are grateful to Mark Schutze of Queensland Primary Industries Insect Collection, Brisbane, for arranging the loan to Canberra of all the *Psalidothrips* slides held at QDPC. The authors are particularly grateful to Alice Wells who collected and processed many litter samples through CSIRO Berlese funnels at Canberra. We also acknowledge research facilities provided by CSIRO, as well as the support to LAM by many CSIRO staff over the past 40 years.

## Key to Australian *Psalidothrips*

1. Pronotal aa well-developed, often twice as long as pronotal discal setae (Fig. 11) . . . . . 2
- . Pronotal aa minute, about as long as pronotal discal setae, or shorter (Fig. 7) . . . . . 11
2. Pronotal am well-developed, longer than pronotal discal setae (Fig. 10) . . . . . 3
- . Pronotal am minute or as long as pronotal discal setae (Fig. 7) . . . . . 5

3. Vertex anteromedially with weakly or strongly net-like reticulation (Fig. 4); fore tarsal tooth present in male, absent in female  
 -. Vertex with sculpture only near posterior margin (Fig. 10); fore tarsal tooth absent in both sexes. . . . . *cecryphalus* sp.n. 4
4. Antennal segment III without sense cones (or with one very small sense cone), tergites II–V each with one pair of well-developed median setae (Fig. 41); male sternite VIII with complete pore plate (Fig. 27); both sexes apterous . . . . . *minantennus* sp.n.  
 -. Antennal segment III usually with 0+1 or 0<sup>1</sup>+1 sense cones, tergites II–V median setae undeveloped, male pore plate on sternite VIII usually divided into two parts (Fig. 29), rarely complete. . . . . *taylori* Mound & Walker 6
5. Pelta eroded to small discrete sclerite separate from anterior margin of tergite II (Figs 41, 45, 46); male without fore tarsal tooth . . . . . 6  
 -. Pelta well developed and confluent with anterior margin of tergite II (Figs 38–40); male with or without fore tarsal tooth . . . . . 7
6. Antennal segment VIII broadly joined to VII; male sternite VIII with slender transverse pore plate (Fig. 28) . . . . . *postlei* sp.n.  
 -. Antennal segment VIII weakly constricted to base; male sternal pore plate comprising two small transverse lateral areas (cf. Fig. 29) . . . . . *greensladeae* sp.n.
7. Antennal segment III wider than long, base of VIII not clearly narrower than apex of VII (Fig. 34) [tergite IX setae S1 longer than tube] . . . . . *platetus* sp.n.  
 -. Antennal segment III clearly longer than wide (Figs 35, 37), VIII weakly or strongly narrower at base than VII at apex. . . . . 8
8. Antennal segment III with 2 slender sense cones, VIII weakly narrowed to base. . . . . 9  
 -. Antennal segment III with 1 sense cone, VIII sharply constricted at base . . . . . 10
9. Head and pronotum equally light brown to yellow; male without fore tarsal tooth, and no pore plate on sternite VIII . . . . . *wellsae* sp.n.  
 -. Head paler than pronotum; male with stout fore tarsal tooth, pore plate broadly transverse across sternite VIII (cf. Fig. 24) . . . . . *daguilari* sp.n.
10. Antennal segment IV sub-globose (Fig. 31) particularly in apterae; compound eyes of apterae with 4–10 (usually 6) facets (Fig. 3). . . . . *brittoni* sp.n. [in part]  
 -. Antennal segment IV more slender (Fig. 35) [macropterae not known]; compound eyes of apterae with 2 large and 1–2 small facets. . . . . *trivius* sp.n.
11. Antennal segment III with 3 sense cones . . . . . 12  
 -. Antennal segment III with 1 or 2 sense cones . . . . . 13
12. Antennal segments III–V yellow, VII–VIII brown; legs and abdomen yellow; mesopresternum with posterior margin entire . . . . . *bipictus* sp.n.  
 -. Antennal segments III–VIII almost uniformly brownish yellow; femora and abdomen brown; mesopresternum posterior margin weakly eroded and not confluent with anterior margin of mesoeusternum . . . . . *gloriosi* sp.n. [in part]
13. Head dark brown contrasting with yellowish pronotum and pale abdomen (Figs 2, 3, 15). . . . . 14  
 -. Head and pronotum not strongly differing in colour (Fig. 7). . . . . 15
14. Mesopresternum complete, both sexes macropterous; tergites each with 2 pairs of wing-retaining setae (Fig. 39) . . . . . *verus* sp.n.  
 -. Mesopresternum almost absent, including in macropterae; females macropterous and apterous, males apterous; tergites with one only pair of wing-retaining setae (cf. Fig. 40) . . . . . *brittoni* sp.n. [in part]
15. Mid and hind tibiae yellow in contrast to dark brown femora; fore wing with 4–5 duplicated cilia . . . . . *gloriosi* sp.n. [in part]  
 -. Mid and hind tibiae and femora similar in colour, usually yellowish; fore wing either with no more than 4 duplicated cilia or with none at all [macropterae or apterae]. . . . . 16
16. Apterous with compound eyes multifaceted with about 25 facets (Fig. 5), macropterae not known [male with transverse pore plate]. . . . . *howei* sp.n.  
 -. Apterous with compound eyes reduced to 10 facets or less (Fig. 13) . . . . . 17
17. Sternite VIII of male with small oval pore plate medially (Fig. 25); macropterae with 2–4 duplicated cilia on fore wing . . . . . *driesseni* sp.n.  
 -. Male with pore plate transverse fully across sternite VIII (Fig. 30); macropterae with no duplicated cilia on fore wing. . . . . *tritius* sp.n.

***Psalidothrips bipictus* sp.n.**

(Figs 1, 47)

*Female macroptera.* Body strongly bicoloured, head and thorax brown, abdomen brownish yellow, legs yellow; antennal segments brown on I and base of II also VII–VIII and apex of VI, but yellow on III–V; fore wing shaded distally. Head without sculpture, genae constricted behind eyes; compound eyes multifaceted; postocular setae shorter than dorsal eye length, apices bluntly pointed; ocelli present, postocellar setae minute; maxillary stylets two-thirds of head width apart, retracted half way to postocular setae (Fig. 1). Antennal segments III and IV each with three sense cones, segments III–VII each with pedicel, VIII slender with base narrowed; segment III longer than IV, VIII as long as VII. Pronotum without sculpture, with median longitudinal apodeme; setae aa and am minute, ml, epim and pa well-developed, pa acute, epim weakly capitate. Mesonotum with transverse reticulation; metanotum without sculpture medially, median setae small. Mesopresternum fully transverse and complete, mesoeusternum not

eroded. Fore tarsal tooth absent. Fore wings each with 2 small sub-basal setae and without duplicated cilia. Pelta faintly sculptured at anterior part, usually with pair of campaniform sensilla; tergites II–VII each with 2 pairs sigmoid wing-retaining setae; tergite VIII setae S1 weakly capitate; tergite IX setae S1 as long as tube (Fig. 47); anal setae a little longer than tube.

**Measurements** (holotype female in microns). Body length 2183. Head, length 187; width 196; postocular setae 51, distance between their bases 162; postocellar setae 12, distance between their bases 61. Pronotum, length 158; median width 198; major setae am 5, aa 10, ml 36, epim 56, pa 77. Fore wing sub-basal setae, S1 17, S2 12. Tergite VI median marginal setae 104; tergite VIII median setae 46, tergite IX setae S1 131, S2 131. Tube length 138; anal setae 150. Antennal segments III–VIII length 68, 53, 56, 56, 49, 49.

*Male macroptera*. Similar to female but pronotum with median longitudinal apodeme stronger; small fore tarsal tooth present; sternite VIII with large, arched pore plate extending to lateral margins.

**Measurements** (in microns). Body length 1741. Head, length 179; width 167; postocular setae 63, postocellar setae 12. Pronotum, length 138; median width 219; major setae am 5, aa 10, ml 31, epim 41, pa 56. Tergite VIII median setae 44, tergite IX setae S1 102, S2 73. Tube length 104; anal setae 121. Antennal segments III–VIII length 58, 51, 52, 51, 44, 41.

**Specimens studied**. Holotype female macroptera, **Queensland**, Cairns, Redlynch, Crystal Creek, *Piper hederaea* leaf roll, 5.xi.2008 (LAM5195), in ANIC.

Paratypes: 1 female collected with holotype; Cairns, Behana Gorge, 9 females, 3 males from dead branches and leaves, 3.xi.2008; Cape Tribulation, 1 female, 6 males from beating dead leaves and vine, 7.x.2012; Lync Haven, 1 female from leaf litter, 6.x.2012.

Non-paratypes: **Queensland**, Kuranda, 2 females, 2 males from dead hanging leaves, 7.xi.2008 (in QDPC).

**Comments**. This species shares with *verus* the presence of a complete mesopresternum as well as 2 pairs of sigmoid wing-retaining setae on the tergites but is distinguished by having 3 slender sense cones on antennal segments III and IV. The four specimens listed above from Kuranda have antennal segments III–V light brown, and segment IV slightly shorter and broader and bearing four sense cones.

### ***Psalidothrips brittoni* sp.n.**

(Figs 2, 3, 23, 31, 44)

*Female macroptera*. Body bicoloured, head brown, pterothorax and tergite II brown laterally, pronotum and abdomen largely yellow, tube pale brown; legs and antennal segments III–VII yellow, I and VIII weakly shaded brown. Head without sculpture, postocellar setae as long as posterior ocelli, compound eyes multifaceted; postocular setae long, weakly capitate; maxillary stylets wide apart, V-shaped in position, retracted about half way to postocular setae (Fig. 2). Antennal segment III with one sense cone, IV with two sense cones, III–VIII each with pedicel; segment III longer than IV, VIII longer than VII. Pronotum without sculpture, with weak median longitudinal line; setae ml, epim and pa well-developed, weakly capitate; aa variable, minute to longer than postocellar setae; am minute. Meso and metanota without sculpture medially. Mesopresternum reduced to pair of lateral irregular sclerites, meso- and metanotal anterior margin weakly concave. Fore tarsal tooth absent. Fore wing narrowed medially, with two pairs of minute sub-basal setae, no duplicated cilia. Pelta faintly sculptured at anterior, with small lobes (Fig. 44); tergites almost unsculptured; tergites III–VII with one pair of large sigmoid wing-retaining setae, these setae on II weaker; median setae on II–VIII small; VIII with major setae S1 capitate; tergite IX setae S1 longer than tube and acute; anal setae as long as tube. Sternites with 3 to 5 pairs of small discal setae.

**Measurements** (holotype female in microns). Body length 2040. Head, length 173; width 162; postocular setae 60, distance between their bases 136; postocellar setae 16, distance between their bases 43; post ocelli diameter 15. Pronotum, length 133; median width 213; major setae am 5, aa 18, ml 53, epim 68, pa 85. Fore wing sub-basal setae, S1 17, S2 10, S3 9, S4 9. Tergite IV median marginal setae 102, tergite VIII median setae 68, tergite IX setae S1 182, S2 171. Tube length 162; anal setae 162. Antennal segments III–VIII length 53, 44, 46, 51, 43, 51.

*Female aptera*. Similar to macroptera but extensively yellow apart from brown head; compound eyes usually with 6 facets, ocelli absent; postocular setae long; pronotal aa setae usually very small; tergal wing-retaining setae straight to weakly sigmoid.

**Measurements** (in microns). Body length 1979. Head, length 171; width 162; postocular setae 97, postocellar

setae 16. Pronotum, length 153; median width 238; major setae am 6, aa 43, ml 75, epim 75, pa 95. Tergite IX setae S1 195, S2 179. Tube length 163. Antennal segments III–VIII length 53, 46, 48, 49, 48, 49.

*Male aptera*. Similar to female aptera but head slightly paler (Fig. 3); mesopresternum absent; wing-retaining setae straight; fore tarsus with prominent tooth; sternite VIII pore plate transverse, about half of sternite width (Fig. 23).

**Measurements** (in microns). Body length 1632. Head, length 158; width 139; postocular setae 68, postocellar setae 9. Pronotum, length 122; median width 199; major setae am 6, aa 26, ml 51, epim 54, pa 77. Tergite IX setae S1 143, S2 78. Tube length 128. Antennal segments III–VIII length 41, 34, 39, 39, 34, 42.

**Specimens studied**. Holotype female macroptera, **Tasmania**, Southwest National Park, Olga, moss in rain forest, 18.ii.1977 (C. Howard), in ANIC.

Paratypes: 8 female macropterae, 6 males collected with holotype; 1 female aptera, 1 male from same site and collector, 4.ii.1976. **Tasmania**, Trenah Bridge 3 female apterae, 1 male from litter of *Eucalyptus delegarensis*, 2.vii.1974; Salmon River, 2 female apterae from litter of *Eucalyptus obliqua*, 29.xi.1974; Huon Valley, 1 female aptera, 29.v.2001, 1 female macroptera, 17.i.2002. **New South Wales**, Clyde Mt., 1 female aptera, 1 male, from leaf mould, 4.xii.1967.

Non-paratypes: **New South Wales**, Dorrigo National Park, 1 female aptera in rainforest litter, 5.ix.1967. **Queensland**, Cooloola, 1 male in litter, 23.vi.1977.

**Comments**. The pronotal anteroangular setae vary in length among the available specimens, as is indicated in the key above. The female from Dorrigo listed here is very similar in structure to the type specimens but has a distinct fore tarsal tooth. In colour and chaetotaxy *brittoni* is particularly similar to *verus*, but macropterae of that species have a complete mesopresternum, and the male pore plate is more extensive.

### *Psalidothrips cecryphalus* sp.n.

(Figs 4, 24, 32)

*Female aptera*. Body brownish yellow, head and abdomen darkest, thorax brown laterally; legs and antennae yellow. Head with weak but distinct polygonal reticulation between eyes, posterior third of head with transverse reticulation; genae constricted behind eyes, compound eyes with about three facets; ocelli absent; postocular setae acute, much longer than half the distance between their bases; postocellar setae pointed, as long as distance between their bases (Fig. 4). Antennal segment III with 0, 1 or 2 sense cones, IV with 2 sense cones, III–VII each with pedicel, VIII narrowed to base; segment III longer than IV, VIII longer than VII (Fig. 32). Maxillary stylets wide apart, retracted almost to postocular setae. Pronotum without sculpture or median longitudinal line; setae ml, epim and pa long and pointed, aa and am longer than discal setae. Mesonotum with weak reticulation. Metanotum not sculptured. Fore tarsal tooth absent. Mesopresternum almost absent, mesoeusternal anterior margin entire. Pelta weakly sculptured, broadly D-shaped extending across half of tergite II; tergites II–VII with one pair of short straight wing-retaining setae; median setae on II–V shorter than median length of their tergite, but much longer on VI–VIII; tergite IX setae S1 longer tube, anal setae as long as tube. Sternal discal setae small, only two pairs present.

**Measurements** (holotype female aptera in microns). Body length 1856. Head, length 153; width 158; postocular setae 104, distance between their bases 122; postocellar setae 70, distance between their bases 68. Pronotum, length 139; median width 250; major setae am 37, aa 51, ml 102, epim 116, pa 168. Mesonotum posteromarginal setae 37. Metanotum median setae 68. Tergite IV median marginal setae 140; tergite VIII median setae 80, tergite IX setae S1 184, S2 170. Tube length 150; anal setae 151. Antennal segments III–VIII length 44, 37, 36, 44, 39, 43.

*Female macroptera*. Head and thorax brown, abdomen yellowish brown with tergites VIII–IX and base of tube darker; legs yellowish brown; antennae light brown III pale at base. Mesoeusternum anterior margin concave but not eroded. Fore wing with two long sub-basal setae. Tergites II–VII with one pair of short straight wing-retaining setae; median tergal setae on II–VI not as long as their tergites, much longer on VII–VIII.

**Measurements** (in microns). Body length 1938. Head, length 162; width 150; postocular setae 92, postocellar setae 51. Pronotum, length 121; median width 235; major setae am 34, aa 36, ml 94, epim 133, pa 133. Fore wing sub-basal setae, outer 94, inner 53. Tergite VIII median setae 85. Tergite IX setae S1 187, S2 187. Tube length 153; anal setae 155. Antennal segments III–VIII length 43, 36, 43, 44, 36, 47.

*Male aptera*. Similar to female; pelta slightly eroded; fore tarsal tooth varies with body size; sternite VIII with transverse pore plate, extending to lateral margins of sternite (Fig. 24).

**Measurements** (in microns). Body length 1306. Head, length 124; width 119; postocular setae 131, postocellar setae 26. Pronotum, length 102; median width 182; major setae am 22, aa 25, ml 78, epim 85, pa 84. Tergite VIII median setae 63, tergite IX setae S1 128, S2 80. Tube length 104; anal setae 192. Antennal segments III–VIII length 34, 26, 31, 31, 29, 36.

**Specimens studied.** Holotype female aptera, **New South Wales**, Hawksbury Sandstone, Ettalong Lookout, from *Eucalyptus* leaf litter, 28.vi.1968 (LAM 705), in ANIC.

Paratypes (apterae except where noted): collected with holotype 17 females, 7 males, 2 female macropterae. **New South Wales**, Trangie, 1 male from leaf litter, 8.iii.1968 (LAM). **Australian Capital Territory**, Woods Reserve, 6 females, 6 males from *Acacia melanoxylon* litter, 20–21.iv.2016; Oakey Hill, 4 females, 5 males, 1 female macroptera from *Eucalyptus* litter, 18–19.iv.2016; Mt. Ainslie, 1 female in litter, 27.xi.1969. **Victoria**, Grampians, Lake Belfield, 4 females, 1 male from leaf litter, 6.ii.1978. **South Australia**, Aldinga Reserve, 1 female from leaf litter, 13.vi.1977. **Tasmania**, Trenah and Kamona, 10 females, 7 males, 1 female macroptera from *Eucalyptus* and *Pinus* litter, 2.vii.1974. **Western Australia**, Dwellingup, 4 females, 6 males from litter, 15.iv.1981.

**Comments.** This species is unusual in having weak, net-like polygonal reticulation anteriorly on the head, between the eyes, although in some individuals this is scarcely visible. In general appearance it is similar to *taylori*, but the males have a fore tarsal tooth and sternite VIII has a complete transverse pore plate. These two species have been taken together in ACT, and the females can be difficult to distinguish from each other.

### ***Psalidothrips daguilari* sp.n.**

(Figs 8, 48)

*Female aptera.* Body brown, head paler than pronotum, abdominal segment IX and tube lighter than rest of abdomen; legs mainly yellow; antennae brownish yellow, but segment II shaded with brown. Head without sculpture; genae not clearly constricted behind eyes; ocelli absent, compound eyes with 2 large and 1 small facets; postocular setae long and bluntly pointed, longer than half the distance between their bases; postocellar setae minute; maxillary stylets about two-thirds of head width apart (Fig. 8), retracted half way to postocular setae (displaced in most specimens). Antennal segments III–IV each with 2 slender sense cones, III–VII each with pedicel; VIII weakly narrowed at base; segment III longer than IV, VIII longer than VII. Pronotum without sculpture; setae aa, ml, epim and pa well-developed, am as long as median discal setae. Mesonotum and metanotum without sculpture. Mesopresternum absent, mesoeusternal anterior margin weakly eroded. Fore tarsal tooth absent. Pelta eroded, posterior margin weakly separated from tergite II, campaniform sensilla present or absent; tergites II–VII each with one pair of minute straight wing-retaining setae; median setae minute on II–VII but long on VIII; tergite IX setae S1 shorter than tube (Fig. 48), anal setae as long as tube.

**Measurements** (holotype female in microns). Body length 1770. Head, length 143; basal width 168; postocular setae 76, distance between their bases 120; postocellar setae 6, distance between their bases 41. Pronotum, length 130; median width 250; major setae am 12, aa 40, ml 68, epim 68, pa 75. Mesonotum posteromarginal setae 23. Metanotum median setae 25. Tergite IV median marginal setae 102; tergite VIII median setae 85, tergite IX setae S1 97, S2 93. Tube length 117; anal setae 113. Antennal segments III–VIII length 47, 40, 43, 43, 32, 37.

*Male aptera.* Similar to female but colour lighter; fore tarsal tooth present; sternite VIII pore plate transverse, wide and reaching lateral margins of sternite.

**Measurements** (in microns). Body length 1550. Head, length 133; width 135; postocular setae 60, postocellar setae 8. Pronotum, length 120; median width 220; major setae am 15, aa 40, ml 62, epim 65, pa 65. Tergite VIII median setae 65, tergite IX setae S1 70, S2 62. Tube length 100; anal setae 105. Antennal segments III–VIII length 44, 38, 40, 38, 30, 36.

**Specimens studied.** Holotype female aptera. **Queensland**, Brisbane Forest Park, Centre Rd., from litter, 5.x.2008 (DJT 731), in ANIC.

Paratypes: 1 female, 1 male, same locality as holotype; **Queensland**, Mt. Coot-tha, 3 males from dry sclerophyll litter, 12.vii.2008.

Non-paratypes: **Queensland**, Brisbane Forest Park, Boombana, 1 male from wet sclerophyll litter, 2.viii.2008; Carnarvon Station, 1 female in pitfall trap, 15.x.2014.

**Comments.** The body structure and sclerites of this species are similar to *postlei* and *greenladeae*, and these

three differ in the character states given in the key. The pore plate of the male extends across the full width of sternite VIII. The male from Boombana differs in having the pore plate interrupted medially, and also in lacking a fore tarsal tooth.

***Psalidothrips driesseni* sp.n.**

(Figs 6, 20, 21, 25)

*Female macroptera.* Body light brown, head darkest, tube yellow; femora light brown, tibiae and tarsi yellow; antennal segments I–II shaded with brown, III yellow on basal half but III–VIII gradually darkened; fore wing weakly shaded. Head without sculpture, genae constricted behind eyes and narrowed to base; compound eyes multifaceted; postocular setae shorter than dorsal eye length; ocelli present, postocellar setae minute; maxillary stylets two-thirds of head width apart, retracted about half way to postocular setae (Fig. 6). Antennal segment III with 2 sense cones, IV with 2 or 3 sense cones; III–VII each with pedicel, VIII slender and narrowed to base; segment III longer than IV, VIII longer than VII. Pronotum without sculpture; setae ml, epim and pa long and acute, aa and am minute. Mesonotum with weak transverse reticulation; metanotum not sculptured. Mesopresternum transverse with posterior margin eroded (Fig. 20). Fore tarsal tooth absent. Fore wing with sub-basal setae minute, 2–4 duplicated cilia present. Pelta with small lobes, recessed into anterior margin of tergite II; tergites II–VII with two pairs of wing-retaining setae but anterior pair on each tergite straight; tergites II–VII median setae minute; tergite IX setae S1 shorter than tube, anal setae shorter than tube.

**Measurements** (holotype female in microns). Body length 1734. Head, length 211; width 192; postocular setae 63, distance between their bases 158; postocellar setae 22, distance between their bases 77. Pronotum, length 153; median width 247; major setae am 9, aa 6, ml 34, epim 49, pa 65. Fore wing sub-basal setae S1 9, S2 9, S3 14. Tergite IV median marginal setae 71; tergite VIII median setae 60, tergite IX setae S1 119, S2 128. Tube length 146; anal setae 153. Antennal segments III–VIII length 66, 53, 56, 57, 46, 51.

*Male aptera.* Compound eyes each with 8–10 facets; ocelli almost absent; sense cones on segment III small and thin; pronotum with a median longitudinal line; mesopresternum absent (Fig. 21), mesoeusternal anterior margin eroded; fore tarsal tooth longer than half tarsal width; sternite VIII with small oval pore plate about 35 microns wide (Fig. 25); tergite IX setae S2 shorter and slightly stouter than S1.

**Measurements** (in microns). Body length 1734. Head, length 163; width 162; postocular setae 37, postocellar setae 17. Pronotum, length 138; median width 221; major setae am 6, aa 7, ml 17, epim 44, pa 45. Metanotum median setae 19. Tergite VIII median setae 37. Tergite IX setae S1 90, S2 56. Tube length 105; anal setae 136. Antennal segments III–VIII length 56, 44, 46, 48, 37, 43.

**Specimens studied.** Holotype female macroptera, **Tasmania**, Lake Pedder, Condominium Creek, in pitfall trap, ii–iii.2004 (M. Driessen), in ANIC.

Paratypes: from pitfall traps on same dates at same locality, White Spur, 1 male; McPartlan Pass, 2 female macropterae, 1 male, 1 female apterae; Huon Valley, 1 male, 1 female aptera from dead wood, 29.v.2001.

**Comments.** Although probably related to *tritus*, the size and number of sense cones on antennal segments III–IV are remarkably variable in this species. Two macropterae have three sense cones on segment IV of one antenna, but only two on the other antenna. Similarly, in apterae the sense cones on segment III are very small, and sometimes only the one on the external margin is developed. The fore wing of macropterae bears a few duplicated cilia, but the anterior pair of wing-retaining on each tergite is small and straight. These specimens probably faded in colour before being removed from the pitfall traps with which they were collected.

***Psalidothrips gloriousi* sp.n.**

(Figs 7, 19, 38)

*Female macroptera.* Body almost uniformly brown, head darkest and tube paler; femora brown, but mid and hind tibiae and tarsi yellow; antennal segments I–II brown, III–VIII yellow weakly shaded with brown; fore wing shaded. Head without sculpture, narrowed to base, genae constricted behind eyes with stout postocular internal apodeme; compound eyes multifaceted; postocular setae slightly shorter than dorsal eye length; ocelli present, postocellar se-



tae minute; maxillary stylets about two-thirds of head width apart, retracted about half way to postocular setae (Fig. 7). Antennal segment III with 3 sense cones (rarely 2), IV with 4 sense cones, III–VII each with pedicel, VIII slender and narrowed to base; segment III as long as IV, VIII as long as VII. Pronotum without sculpture; setae ml, epim and pa long and bluntly pointed to weakly capitate, aa and am minute. Mesonotum with weak reticulation; metanotum not sculptured, median setae minute; mesopresternum usually with posterior margin slightly eroded and separate from mesoeusternal border (Fig. 19). Fore tarsal tooth absent. Fore wing with sub-basal setae small; 4–5 duplicated cilia present. Abdominal tergites with weak sculpture on anterior thirds; pelta recessed into anterior margin of tergite segment II, with lateral lobes; II–VII with two pairs sigmoid wing-retaining setae, but median setae minute (Fig. 38); tergite IX setae S1 shorter than tube, anal setae as long as tube.

**Measurements** (holotype female in microns). Body length 2170. Head, length 208; width 188; postocular setae 68, distance between their bases 140; postocellar setae 9, distance between their bases 57. Pronotum, length 145; median width 252; major setae am 6, aa 6, ml 65, epim 68, pa 87. Metanotum median setae 10. Fore wing sub-basal setae S1 10, S2 20. Tergite IV median marginal setae 100; tergite VIII median setae 52, tergite IX setae S1 110, S2 90. Tube length 143; anal setae 150. Antennal segments III–VIII length 70, 71, 65, 65, 45, 52.

*Female aptera*. Paler than macroptera, legs almost uniformly yellow; compound eyes angulate, multifaceted, with at least 25 facets of which one is unusually large; antennal segment III with 3 sense cones, IV with 4.

*Male aptera*. Similar to female but compound eyes smaller with only about 12 facets; antennal segments III and IV each with 2 sense cones; sternite VIII with broadly transverse pore plate.

**Specimens studied.** Holotype female macroptera, **Queensland**, Mt. Glorious, dead *Eucalyptus* leaves in rainforest, 18.i.2006 (DJT 198), in ANIC.

Paratypes (macropterae unless stated), all from **Queensland**: same site, 1 female from dead branch, 19.i.2006; same site, 3 females from dead leaves and branches, 10.v.2007, 1 female aptera, from rainforest litter, 12.vii.2008; Mt. Glorious, Piccabeen forest, 1 female from dead wood, 11.xi.2009; Lamington, O'Reilly's, 8 females from dead leaves and twigs, 9.x.2006; same locality, 5 females, 2 male apterae, iii.2007; same locality, 1 female, viii.2013; Kondalilla Falls N.P., 2 male apterae from dead leaves, 17.v.2007; Mt. Cordeaux, Cunningham's Gap, 4 females, 6.iv.2008; Cape Tribulation, Mt. Sorrow Track, 3 females, 1 male aptera, 8.x.2012.

**Comments.** The number of sense cones on antennal segment III of this species is usually three but occasionally only two are present. The presence of an almost complete mesopresternum and also two well-developed pairs of sigmoid wing-retaining setae in macropterae are characters states shared with *bipictus* and *verus*. The head has a stout internal apodeme behind each eye, and in macropterae the compound eyes are slightly angulate with one larger facet, much as in *tritius*. This species is also similar to *driesseni* in having fore wing duplicated cilia, although in macropterae of *driesseni* the anterior pair of wing-retaining setae is weakly developed on each tergite.

### ***Psalidothrips greensladeae* sp.n.**

(Figs 9, 45, 49)

*Female aptera*. Body mainly yellow with tube darkest, legs and antennal segments yellow. Head without sculpture, genae scarcely constricted behind eyes; compound eyes with three facets, the smallest of which is displaced posteriorly; postocular setae longer than half of distance between their bases; postocellar setae minute; ocelli absent (Fig. 9). Antennal segments III and IV each with 2 slender sense cones, III–VII each with pedicel, VIII weakly narrowed to base; III longer than IV, VIII as long as VII. Maxillary stylets wide apart, probably retracted to postocular setae (displaced in available specimens). Pronotum with no sculpture; setae aa, ml, epim and pa long and bluntly pointed, am minute. Mesonotum and metanotum without reticulation. Mesopresternum absent, anterior margin of mesoeusternum weakly concave. Fore tarsal tooth absent. Pelta eroded strongly, even absent, posterior margin distinct from tergite II (Fig. 45); tergites II–VI each with one pair of minute straight wing-retaining setae, median setae also minute; VII–IX median setae longer than their tergites (Fig. 49); tergite IX setae S1 shorter than tube, anal setae longer than tube.

**Measurements** (holotype female in microns). Body length 1632. Head, length 136; width 129; postocular setae 65, distance between their bases 109; postocellar setae 9, distance between their bases 27. Pronotum, length 112; median width 204; major setae am 5, aa 34, ml 54, epim 63, pa 64. Mesonotum posteromarginal setae 10. Metanotum median setae 19. Tergite IV median marginal setae 73; tergite VII, VIII median setae 70, 66, respectively, tergite

IX setae S1 85, S2 82. Tube length 107; anal setae 107. Antennal segments III–VIII length 44, 33, 37, 34, 32, 34.

*Male aptera*. Similar to female, fore tarsus without a tooth, sternite VIII pore plate divided in two slender transverse areas.

**Measurements** (in microns). Body length 1374. Head, length 134; width 119; postocular setae 54, postocellar setae 6. Pronotum, length 117; median width 198; major setae am 5, aa 41, ml 51, epim 68, pa 62. Tergite VIII median setae 60. Tergite IX setae S1 68, S2 63. Tube length 80; anal setae 111. Antennal segments III–VIII length 42, 32, 34, 33, 27, 34.

**Specimens studied**. Holotype female aptera, **South Australia**, Cambrai, Red Meat Ant Dune, from litter, 15.x.1972 (P. Greenslade), in ANIC.

Paratypes: 1 female same data as holotype, 2 females from same site on 18 and 21.ix.1972. **South Australia**, Koonamore, 5 females and 2 males from Mallee litter, iv–vi.1971. **Victoria**, Wyperfield, 1 male, 11.ix.1969.

**Comments**. Seven of the paratype females have lost their antennae. Two of the male paratypes have the pore plates in the form of transverse ovals, but the male paratype from Victoria has the pore plates prolonged laterally. The species is unusually small, and exceptionally weakly sclerotised, with the pelta and prosternites strongly eroded. The available specimens seem to be extremely reduced apterae, with the posterior facet of the compound eyes small and displaced posteriorly.

### ***Psalidothrips howei* sp.n.**

(Figs 5, 22, 26, 42)

*Female aptera*. Body bicoloured, head, thorax, abdominal segment IX and tube brownish yellow, abdominal segments I–VIII dark brown; legs brown; antennal segments increasingly brown from base to apex. Head without sculpture, narrowed to base, and genae constricted behind eyes with strong postocular apodeme; compound eyes multifaceted, with two enlarged facets posterolaterally; postocular setae acute, longer than dorsal eye length; ocelli absent; postocellar setae minute; maxillary stylets more than one-third of head width apart, retracted about half way to postocular setae (Fig. 5). Antennal segments III–IV each with two sense cones, III relatively slender, IV–VI each with pedicel, VII–VIII with base slightly narrowed; segment III longer than IV, VIII as long as VII. Pronotum without sculpture and without median longitudinal line; ml, epl and pa well-developed, aa and am minute; Mesonotum broad, eroded at anterior margin, a pair concave at posterior margin; Metanotum not sculptured, median setae small; mesopresternum transverse but variably eroded (Fig. 22). Fore tarsal tooth absent. Pelta faintly sculptured at anterior margin, without lobes, without campaniform sensilla, posteromarginal almost straight; tergites almost unsculptured; tergites II–VII with wing-retaining setae undeveloped, median marginal setae apex blunt; tergite VIII median setae apex blunt; tergite IX setae S1 clearly shorter than tube and apex blunt. Anal setae as long as tube.

**Measurements** (holotype female in microns). Body length 1856. Head, length 199; width 170; postocular setae 68, distance between their bases 139; postocellar setae 4, distance between their bases 68. Pronotum, length 143; median width 213; major setae am 0, aa 5, ml 48, epim 49, pa 68. Tergite IV median marginal setae 94; tergite VIII median setae 53, tergite IX setae S1 99, S2 82. Tube length 138; anal setae 135. Antennal segments III–VIII length 68, 58, 56, 56, 43, 44.

*Male aptera*. Antennal segment I and II yellowish, pronotum with a weak median longitudinal line, fore tarsus with tooth, sternite VIII with transverse and arched pore plate, extending almost to lateral margins of sternite but sometimes discontinuous medially (Fig. 26).

**Measurements** (in microns). Body length 1510. Head, length 162; width 150; postocular setae 56, postocellar setae 5. Pronotum, length 128; median width 197; major setae am 0, aa 5, ml 24, epim 41, pa 53. Tergite VIII median setae 46, tergite IX setae S1 82, S2 70. Tube length 104. Antennal segments III–VIII length 51, 41, 41, 39, 32, 39.

**Specimens studied**. Holotype female aptera, **Lord Howe Island**, Soldiers Creek, 23.xi.1996 (LAM 3055), in ANIC.

Paratypes: 13 females, 1 male collected with holotype at base of native grass and on dead branches; Smoking Tree Ridge, 6 females, 3 males from base of native grass, 23.xi.1996, same site and plants, 7 females, 7 males, 27.xii.2007 and 24.xii.2011. Intermediate Hill, 3 females, 3 males from dead *Howea*, 28.xii.2001, 2 females, 2 males from litter, 3.xii.2000; Rocky Run, 6 females, 1 male from base of grasses, 22.xii.2001; Erskine Valley, 5 females 2 males, xii.2000 and xii.2007; Mt. Lidgberg, 4 females, 3 males, xi–xii. 2001.

**Comments**. This species has been taken widely across Lord Howe Island, often at the base of grasses. It is pre-

sumably endemic to this island, and is probably derived from a mainland species such as *tritus* with which it shares the strong postocular apodeme and enlarged posterolateral eye facets. It is unusual in its bicoloured body and broad pelta shape.

***Psalidothrips minantennus* sp.n.**

(Figs 10, 27, 33, 41)

*Female aptera.* Body yellowish brown with head darkest, but some specimens almost uniformly yellow; legs and antennal segments III–VIII yellow, but I–II shaded brown. Head without sculpture, genae scarcely constricted behind eyes, compound eyes with three facets; postocular setae acute, longer than half the distance between their bases; ocelli absent; postocellar setae acute, as long as distance between their bases. Maxillary stylets wide apart, retracted almost to postocular setae (Fig. 10). Antennal segment III without sense cones, IV with 2 sense cones, segments III–VII each with pedicel, VIII with base narrowed, III longer than IV, VIII a little longer than VII (Fig. 33). Pronotum without sculpture or median apodeme; all setae acute and long. Mesonotum weakly reticulate; metanotum without sculpture (Fig. 10). Fore tarsal tooth absent. Pelta faintly sculptured, strongly eroded and separate from anterior margin of tergite II (Fig. 41); tergites II–VII with wing-retaining setae small and straight, median setae acute and longer than median length of their tergite; tergite IX setae S1 much longer tube, anal setae as long as tube.

**Measurements** (holotype female in microns). Body length 1822. Head, length 153; width 138; postocular setae 82, distance between their bases 104; postocellar setae 26, distance between their bases 49. Pronotum, length 128; median width 226; major setae am 39, aa 26, ml 77, epim 100, pa 94. Mesonotum posteromarginal setae 24; Metanotum median setae 63. Tergite IV median marginal setae 90; tergite VIII median setae 71, tergite IX setae S1 146, S2 153. Tube length 121; anal setae 141. Antennal segments III–VIII length 36, 33, 37, 36, 34, 37.

*Male aptera.* Pronotum without median apodeme; fore tarsus without tooth; sternite VIII with slender, transverse pore plate, extending to lateral margins of sternite (Fig. 27).

**Measurements** (in microns). Body length 1360. Head, length 121; width 138; postocular setae 68, postocellar setae 36. Pronotum, length 105; median width 223; major setae am 34, aa 32, ml 63, epim 77, pa 68. Tergite VIII median setae 56. Tergite IX setae S1 111, S2 71. Tube length 97; anal setae 107. Antennal segments III–VIII length 34, 31, 34, 34, 34, 39.

**Specimens studied.** Holotype female aptera, **Victoria**, Lake Hattah, leaf litter in Mallee, 27.x.1967 (E.B. Britton), in ANIC.

Paratypes: 6 females collected with holotype; **South Australia**, Cambrai, Meat Ant Dune, 5 females from leaf litter, 15–18.x.1972. **Queensland**, 7 miles northeast of Bell, 2 females, 2 males from *Acacia* leaf litter, 17.viii.1968.

Non-paratypes: **New South Wales**, 2 ml east of Putty, 3 females, 1 male from *Eucalyptus* leaf litter, 29.vi.1968.

**Comments.** The non-paratypic specimens have one small sense on antennal segment III, and segment VIII is slightly less slender than in the type series. However, segment VIII is variable in the type series, being slightly less slender in males than in females. This species is generally similar to apterae of *taylori*, but has unusually short antennae, segment III without a sense cone, a conspicuous pair of long median setae on tergites II–VII, and sternite VIII of males with a complete transverse pore plate.

***Psalidothrips platetus* sp.n.**

(Fig. 34)

*Female macroptera.* Bicoloured, head brown, darkest around ocelli; pronotum brown, pterothorax darker; abdomen yellowish with segments VIII–IX darker; legs yellow; antennae light brown, III darkest; fore wings weakly shaded. Head almost without sculpture, genae sharply constricted behind large eyes; postocular setae bluntly pointed, longer than half of distance between their bases; postocellar setae small. Antennal segments short, III unusually broad, with one sense cone on external margin and sometimes with one minute sense cone on inner margin; IV–VI each with 2 stout sense cones; VIII broadly joined to VII (Fig. 34). Maxillary stylets two-thirds of head width apart, retracted half way to postocular setae. Pronotum without sculpture, setae am small, remaining setae long. Mesopresternum

absent; anterior border of mesoeosternum eroded and concave. Fore tarsal tooth absent. Fore wing with two long sub-basal setae. Pelta with lateral lobes but posterior margin eroded; tergites II–VII each with one pair of wing-retaining setae less than 15 microns long, median setae 30 microns long; VIII with median setal pair longer than the tergite; tergite IX setae S1 acute, longer than tube. Sternites with up to 4 pairs of discal setae.

**Measurements** (holotype female in microns). Body length 1986. Head, length 153; width 151; postocular setae 90, distance between their bases 121; postocellar setae 17, distance between their bases 32. Pronotum, length 120; median width 210; major setae am 18, aa 42, ml 78, ml 78, epim 115, pa 95. Fore wing, length 750; distal width 66; sub-basal setae inner 42, outer 62. Tergite III median marginal setae 112; tergite VIII median setae 90, tergite IX setae S1 170; S2 135. Tube length 135; anal setae 145. Antennal segments III–VIII length 33, 42, 45, 45, 42, 40.

*Female aptera*. Similar to macroptera in chaetotaxy, but body, legs and antennae yellow. Head without ocelli, genae weakly constricted behind eyes; compound eyes reduced to three facets. Meso and metanota without sculpture. Pelta similar to macroptera but even more eroded.

**Measurements** (paratype female in microns). Body length 1600. head, length 150; width 155; postocular setae 90. Pronotum, length 120; median width 240; major setae am 15, aa 42, ml 80, epim 92, pa 88. Tergite IX setae S1 165. Tube length 120. Antennal segments III–VIII length 30, 40, 42, 42, 36, 36.

*Male aptera*. Colour light brown including femora, but tibiae and antennae paler. Structure similar to female, antennae even more compact, fore tarsal tooth absent; pore plate on sternite VIII transverse but incomplete medially.

**Measurements** (paratype male in microns). Body length 1350. head length 130. Tergite IX setae S1 105; B2 95. Antennal segments III–VIII length 24, 33, 33, 35, 33, 33.

**Specimens studied**. Holotype female macroptera, **New South Wales**, 5 miles north of Maroota, 4.iv.1968 (LAM 634), in ANIC.

Paratypes: 1 female macroptera, 2 female, 2 male apterae collected with holotype, in ANIC.

**Comments**. The antennae of this species are remarkable for their foreshortened structure with segment III slightly wider than long.

### ***Psalidothrips postlei* sp.n.**

(Figs 11, 28, 46)

*Female aptera*. Head, prothorax and abdomen segments II–VIII light brown, posterior part of metathorax and abdominal segment I paler, segment IX and tube yellowish; tibiae and tarsi mainly yellow but femora darker; antennae brownish yellow. Head without sculpture medially but with weak transverse lines laterally; genae not clearly constricted behind eyes; ocelli absent, compound eyes with three facets; postocular setae bluntly pointed, longer than half the distance between their bases, postocellar setae minute; maxillary stylets retracted almost to postocular setae, about one-third of head width apart (Fig. 11). Antennal segments III and IV each with 2 slender sense cones, III–VII each with pedicel; VIII broadly joined to VII with suture sometimes weakly developed; segment III longer than IV, VIII as long as VII. Pronotum without sculpture; setae ml, epim and pa well-developed, aa much longer than median setae, am minute; mesonotum and metanotum without sculpture. Mesopresternum absent, mesoeosternal anterior margin eroded. Fore tarsal tooth absent. Pelta strongly eroded, even absent (Fig. 46); tergites II–VII each with one pair of minute straight wing-retaining setae; median setae minute on II–VII but long on VIII; tergite IX setae S1 shorter than tube, anal setae shorter than tube. Sternites with one pair of minute discal setae.

**Measurements** (holotype female in microns). Body length 2088. Head, length 148; width 156; postocular setae 68, distance between their bases 119; postocellar setae 10, distance between their bases 27. Pronotum, length 144; median width 246; major setae am 7, aa 44, ml 68, epim 80, pa 79. Mesonotum posteromarginal setae 9. Metanotum median setae 27. Tergite IV median marginal setae 102; tergite VIII median setae 94, tergite IX setae S1 122, S2 122. Tube length 131; anal setae 116. Antennal segments III–VIII length 51, 42, 42, 42, 34, 33.

*Male aptera*. Similar to female but antennal segments III–VIII brown, tergite IX yellow; fore tarsal tooth absent; sternite VIII pore plate transverse but very slender and not reaching lateral margins of sternite (Fig. 28).

**Measurements** (in microns). Body length 1435. Head, length 143; width 122; postocular setae 60, postocellar setae 6. Pronotum, length 111; median width 187; major setae am 5, aa 41, ml 60, epim 69, pa 65. Tergite VIII median setae 66. Tergite IX setae S1 75, S2 68. Tube length 114; anal setae 94. Antennal segments III–VIII length 37, 29, 32, 32, 30, 25.

**Specimens studied.** Holotype female aptera. **Western Australia**, Dwellingup, from litter, 24.x.1980 (A. Postle), in ANIC.

Paratypes: 1 female and 1 male, same locality as holotype, 24.ii.1981 and 20.vii.1981.

**Comments.** The body structure and sclerites of this species are similarly pale and eroded to *greensladeae*, and these two differ in the character states given in the key. The pore plate on sternite VIII of the male is unusually slender.

***Psalidothrips taylori* Mound & Walker**  
(Fig. 29)

*Psalidothrips taylori* Mound & Walker, 1986: 76

In structure, this species is closely similar to *cecryphalus* described above, and shares with that species the presence of long median setae on several tergites, particularly VI–VIII. However, it lacks polygonal reticulation on the head between the eyes, the male has no fore tarsal tooth and the pore plate on sternite VIII of males is incomplete medially (Fig. 29). The two species are equally widespread across Australia, and at a few localities they have been taken together. The holotype of *taylori* was collected from litter on Black Mountain, Canberra, but specimens have been seen from leaf litter at various localities in eastern New South Wales, including Norfolk Island, also southeastern Queensland, South Australia including Kangaroo Island, Tasmania and southwestern Western Australia. This species has also been taken in both North and South Islands of New Zealand.

***Psalidothrips tritus* sp.n.**  
(Figs 13, 14, 30, 40)

*Female aptera.* Body, legs and antennae brownish yellow, abdomen darkest, pronotum usually paler than head. Head without sculpture; postocular setae long and almost acute; ocelli absent; compound eyes with 2 large and 1–4 small facets; internal postocular apodeme unusually strong; maxillary stylets about two-thirds of head width apart, retracted about half way to postocular setae (Fig. 13). Antennal segments III–IV each with two sense cones, IV–VIII each with distinct pedicel. Pronotum without sculpture, setae aa and am usually minute but occasionally one or both aa longer; ml, epim and pa bluntly pointed to weakly capitate. Mesopresternum eroded to small irregular sclerites; anterior border of mesoeusternum not eroded. Mesonotum with weak sculpture, metanotum without sculpture. Fore tarsal tooth absent. Pelta broad across tergite II with weak sculpture at anterior (Fig. 40); tergites II–VII each with minute, straight wing-retaining setae, median setae scarcely 10 microns long; tergite IX setae S1 acute, S2 bluntly pointed; sternites with about 4 pairs of discal setae.

**Measurements** (holotype female in microns). Body length 1900. Head, length 180; width 175; postocular setae 75, distance between their bases 141; postocellar setae 7, distance between their bases 68. Pronotum, length 150; median width 240; major setae am 6, aa 15 (6 to 25 in paratypes), ml 50, epim 45, pa 75. Tergite IV median marginal setae 73; tergite VIII median setae 44, tergite IX setae S1 105; S2 105. Tube length 120; anal setae 116. Antennal segments III–VIII length 54, 42, 48, 48, 40, 40.

*Female macroptera.* Bicoloured; head and pterothorax brown, pronotum and antennae brownish yellow, abdomen slightly paler; legs yellow; fore wing shaded. Head with stout postocular apodeme; genae sharply incut behind angulate compound eyes, 2 posterolateral facets unusually large (Fig. 14). Mesonotum weakly sculptured, metanotum without sculpture medially. Mesopresternum almost complete. Fore wing with about four small sub-basal setae. Pelta broad, with lateral lobes; tergites III–VII with one pair of sigmoid wing-retaining setae.

**Measurements** (paratype female from Mt Cambewarra in microns). Body length 1800. Head, length 190; width 145; postocular setae 90. Pronotum, length 150; median width 240; major setae am 6, aa ?, ml 55, epim 45, pa 75. Fore wing, length 800; distal width 60; longest sub-basal seta 25. Tergite IX setae S1 105; S2 105. Antennal segments III–VIII length 54, 48, 48, 50, 38, 45.

*Male aptera.* Colour and structure similar to female aptera; large male with fore femora enlarged, fore tarsal tooth about 0.8 of tarsal width; small male with slender fore femora, fore tarsal tooth less than 0.3 of tarsal width or inner margin of tarsus flattened with a small forwardly directed tooth; sternite VIII with pore plate transverse

(interrupted medially in one male), usually not extending fully to sternite margins (Fig. 30); tergite IX setae S2 as long as but stouter than S1.

**Measurements** (largest and smallest male paratypes collected with holotype). Body length 1500 (1300). Head length 155 (125). Fore tarsal width including tooth 55 (35). Tergite IX setae S1 75 (70); S2 75 (70); S3 90 (90). Tube length 105 (90). Antennal segment III length 48 (45).

**Specimens studied.** Holotype female aptera, **Queensland**, 30 mls south east of Gayndah, in *Eucalyptus* leaf litter, 17.viii.1968 (LAM 798), in ANIC.

Paratypes, apterae except where noted: **Queensland**; 9 females, 7 males collected with holotype; Kuranda, Black Mt Road, 3 females 1 male in rain forest litter, 30.x.1969; Sunnybank, 1 female macroptera in water trap, 28.i.1966; Ormiston, 1 female macroptera in water trap, 20.iv.1966; Indooroopilly, 8 females, 5 males in leaf litter, 13–15.x.1985; Mt Cootha, 2 females in leaf litter, 14.x.1985, 1 female from dead branch, 29.x.2007, 2 females in dry sclerophyll litter, 12.vii.2008; Cooloola, 1 female macroptera, 1 male in litter, 29.iii.1977; Brisbane Forest Park, 2 female macropterae, 8 females, 6 males in *Eucalyptus* litter, various dates viii.2008–iii.2009; Mt. Glorious, 2 females, 2 males, in litter, vii.2008–ix.2009; Mt Nebo, 3 females, 1 male in wet sclerophyll litter, 12.vii.2008; Brisbane, Gap Creek, 2 female macropterae, 3 females, 2 males in dry sclerophyll litter, vii.2008–xii.2008; Lamington N.P., 2 female macropterae, 2 females, 3 males, x.2006–iii.2007. **New South Wales**: Coffs Harbour, 1 female, 1 male in rain forest, 14.v.1969; Clyde Mt., 5 females, 1 male in leaf litter, 4.xii.1967; Cambewarra Mt, 1 female macroptera, 1 female in rain forest litter, 13.iv.1968; Monga State Forest, 1 female macroptera in rain forest litter, 27.ii.1968. **Australian Capital Territory**, Black Mt., 6 female macropterae, 8 females, 7 males from leaf litter, on various dates, xi.1967, iv.2001, xi.2002, x–xi.2011, iv.2016. **Victoria**, Mt Dandenong, 1 male from log, 11.i.1981. **Tasmania**, Peters Link Road, 2 female macropterae, 5 females, 1 male in dry sclerophyll litter, ii–viii.1993; Salmon River Forestry Area, 1 female macroptera, 4 females, iii–xi.1974; Trenah, 1 female macroptera, 2.vii.1974.

**Comments.** This species is widespread in eastern Australia, although in contrast to *taylori* it has been collected mainly in areas of higher rainfall. The most obvious structural characteristic of *tritius* is the stout postocular apodeme, also the male pore plate that usually does not quite extend to the sternite lateral margins. However, as in *taylori*, the species is by no means constant in appearance. For example, the apterous paratypes from near Kuranda are large, with tergal sculpture typical of macropterae, whereas the apterae collected with the holotype are all small and unsculptured. The two female paratypes from Mt. Cootha have one or both pronotal aa setae longer than normal.

### ***Psalidothrips trivius* sp.n.**

(Figs 12, 16, 35)

*Female aptera.* Body light brown, head darker, darkest at apex of head, thorax lighter but shaded with brown laterally, abdominal segment IX and tube a little lighter than rest of abdomen; legs mainly yellow; antennae yellow, but segment I brown, II and VIII weakly shaded. Head without sculpture medially but with few lines laterally; genae weakly constricted behind eyes, without strong internal apodeme behind compound eyes; ocelli absent; compound eyes with 2 large and 1 small facets; postocular setae long and bluntly pointed, longer than half the distance between their bases; postocellar setae minute; maxillary stylets about two-thirds of head width apart, retracted half way to postocular setae (Fig. 12). Antennal segment III with 1 sense cone that is often minute, IV with 2 slender sense cones, III–VIII each with pedicel; segment III longer than IV, VIII longer than VII (Fig. 35). Pronotum without sculpture; setae aa, ml, epim and pa well-developed, am as long as median discal setae. Mesonotum with transverse sculpture near anterior margin; metanotum without sculpture. Mesopresternum absent, mesoepisternal anterior margin weakly eroded. Fore tarsal tooth absent. Pelta broad across tergite II with sculpture at anterior, campaniform sensilla absent; tergites II–VII each with one pair of minute straight wing-retaining setae; median setae minute on II–VII but long on VIII; tergite IX setae S1 as long as tube, anal setae as long as tube. Sternites with 3–5 pairs of minute discal setae.

**Measurements** (holotype female in microns). Body length 1890. Head, length 168; basal width 176; postocular setae 76, distance between their bases 130; postocellar setae 28, distance between their bases 58. Pronotum, length 153; median width 258; major setae am 10, aa 37, ml 67, epim 70, pa 75. Mesonotum posteromarginal setae 15. Metanotum median setae 21. Tergite IV median marginal setae 103; tergite VIII median setae 58, tergite IX setae S1 118, S2 100. Tube length 117; anal setae 122. Antennal segments III–VIII length 50, 46, 48, 51, 45, 52.

*Male aptera*. Similar to female but smaller; fore femora larger and tarsal tooth present (Fig. 16); sternite VIII pore plate transverse and slender, almost reaching lateral margins of sternite.

**Measurements** (in microns). Body length 1590. Head, length 150; width 151; postocular setae 53, postocellar setae 15. Pronotum, length 150; median width 225; major setae am 8, aa 25, ml 61, epim 53, pa 55. Tergite VIII median setae 40. Tergite IX setae S1 95, S2 75. Tube length 107; anal setae 108. Antennal segments III–VIII length 45, 38, 43, 47, 37, 48.

**Specimens studied**. Holotype female aptera. **Queensland**, Brisbane Forest Park, Centre Rd., from litter, 26.iii.2008 (DJT 930), in ANIC.

Paratypes: 10 females, 7 males, same data as holotype.

**Comments**. The body structure and sclerites of this species are similarly to *tritius*. However, it has the pronotal aa setae longer, only one sense cone on antennal segment III and lacks the strong internal apodeme behind the compound eyes that is typical of *tritius* and related species.

### ***Psalidothrips verus* sp.n.**

(Figs 15, 36, 39)

*Female macroptera*. Body strongly bicoloured, head dark brown, pronotum almost yellow, lateral parts of pterothorax and abdomen brown and III–VII with brown area antero-medially; legs yellow; antennal segments I–II brown, III–VIII increasingly brown; fore wing grey. Head without sculpture, genae constricted behind eyes and narrowed to base; compound eyes multifaceted; postocular setae acute, shorter than dorsal eye length; ocelli present, postocellar setae minute; maxillary stylets more than two-thirds of head width apart, retracted about half way to postocular setae (Fig. 15). Antennal segments III and IV each with two sense cones, III–VII each with pedicel, VIII narrowed to base; segment III longer than IV, VIII as long as VII (Fig. 36). Pronotum without sculpture but with median longitudinal apodeme; setae ml, epim and pa well-developed and acute, aa and am minute. Mesonotum with transverse sculpture lines; metanotum not sculptured medially, median setae small. Mesopresternum complete. Fore tarsal tooth absent. Fore wings each with 2 minute sub-basal setae. Pelta recessed into anterior margin of segment II, with small lobes and pair of campaniform sensilla; tergites II–VII with 2 pairs sigmoid wing-retaining setae but weak on II (Fig. 39); tergite VIII major setae weakly capitate; tergite IX setae S1 bluntly pointed, shorter than tube; anal setae slightly longer than tube.

**Measurements** (holotype female in microns). Body length 2074. Head, length 192; width 179; postocular setae 65, distance between their bases 134; postocellar setae 18, distance between their bases 60. Pronotum, length 153; median width 238; major setae am 5, aa 5, ml 41, epim 51, pa 78. Fore wing sub-basal setae, S1 9, S2 14. Tergite III median marginal setae 92; tergite VIII median setae 46, tergite IX setae S1 112, S2 126. Tube length 122; anal setae 123. Antennal segments III–VIII length 60, 53, 53, 54, 46, 44.

*Male macroptera*. Pronotum with median longitudinal apodeme, fore tarsus with tooth; sternite VIII with large, arched pore plate, extending to lateral margins.

**Measurements** (in microns). Body length 1618. Head, length 172; width 150; postocular setae 43, postocellar setae 14. Pronotum, length 129; median width 196; major setae am 5, aa 5, ml 41, epim 44, pa 75. Tergite VIII median setae 39, tergite IX setae S1 97, S2 77. Tube length 97; anal setae 111. Antennal segments III–VIII length 58, 44, 46, 43, 37, 36.

**Specimens studied**. Holotype female macroptera, **Queensland**, Cape Tribulation, dead *Ficus* leaves, 9.vii.1995 (LAM 2746), in ANIC.

Paratypes: 6 females, 2 males collected with holotype; **Queensland**, Daintree N.P., 1 female from dead palm leaves, 8.x.2012; South Emmagen Creek, 1 female from palm flowers, 8.x.2012.

Non-paratypes: **Queensland**, Lamington N.P., 1 female, vii.2007; Brisbane Forest Park, 1 female from *Eucalyptus* litter, 26.iii.2009; Mt. Glorious, 1 female aptera in rainforest litter, 2.viii.2008.

**Comments**. In general appearance this species resembles *brittoni* with the dark head and pronotum with a median longitudinal apodeme in both sexes. However, it is particularly unusual in having the mesopresternum complete, and tergites II–VII each with 2 pairs of sigmoid wing-retaining setae. Also, the major body setae are pointed, and antennal segment III has two well-developed sense cones. The female from Lamington listed above is very

similar to the type series but has only one sense cone on antennal segment III. The two females from Brisbane Forest Park and Mt. Glorious are also very similar to the types but have the antennal segments more robust and angular.

***Psalidothrips wellsae* sp.n.**

(Figs 17, 18, 37, 43)

*Female macroptera.* Body brown including femora and antennae, tibiae paler; fore wing shaded. Head without sculpture, genae weakly constricted behind eyes; compound eyes multifaceted; postocular setae longer than dorsal length of eyes, bluntly pointed; ocelli present, postocellar setae minute; maxillary stylets about two-thirds of head width apart, retracted about half way to postocular setae (Fig. 17). Antennal segments III and IV each with two sense cones, segments III–VII each with pedicel, VIII broad at base; segment III as long as IV, VIII longer than VII (Fig. 37). Pronotum without sculpture; setae aa, ml, epim and pa well-developed and weakly capitate, am minute. Mesonotum and metanotum without sculpture. Mesopresternum reduced to weak lateral triangles, mesoeusternum anterior margin eroded. Fore tarsal tooth absent. Fore wing with 2 moderately long sub-basal setae. Pelta broad, with lateral lobes and pair of campaniform sensilla (Fig. 43); tergites II–VII with 1 pair of wing-retaining setae that are minute on II, VI and VII; tergite VIII major setae bluntly pointed; tergite IX setae S1 a little shorter than tube; anal setae as long as tube. Sternites with about 3 pairs of small discal setae.

**Measurements** (holotype female in microns). Body length 2310. Head, length 190; width 205; postocular setae 80, distance between their bases 150; postocellar setae 10, distance between their bases 38. Pronotum, length 143; median width 288; major setae am 12, aa 63, ml 75, epim 85, pa 85. Fore wing sub-basal setae S1 33, S2 58. Metanotum median setae 22. Tergite IV median marginal setae 98; tergite VIII median setae 80, tergite IX setae S1 133, S2 125. Tube length 153; anal setae 132. Antennal segments III–VIII length 53, 50, 45, 43, 43, 42.

*Female aptera.* Similar to macroptera, but compound eyes with 3 facets, ocelli absent (Fig. 18); wing-retaining setae straight and minute.

**Measurements** (apterous female in microns). Body length 1820. Head, length 153; width 193; postocular setae 65, distance between their bases 137; postocellar setae 9, distance between their bases 53. Pronotum, length 143; median width 265; major setae am 8, aa 53, ml 68, epim 75, pa 76. Metanotum median setae 15. Tergite IV median marginal setae 97; tergite VIII median setae 75, tergite IX setae S1 125, S2 105. Tube length 145; anal setae 138. Antennal segments III–VIII length 50, 45, 45, 48, 40, 40.

*Male aptera.* Pronotum without a median longitudinal line, fore tarsus without tooth, sternite VIII without pore plate.

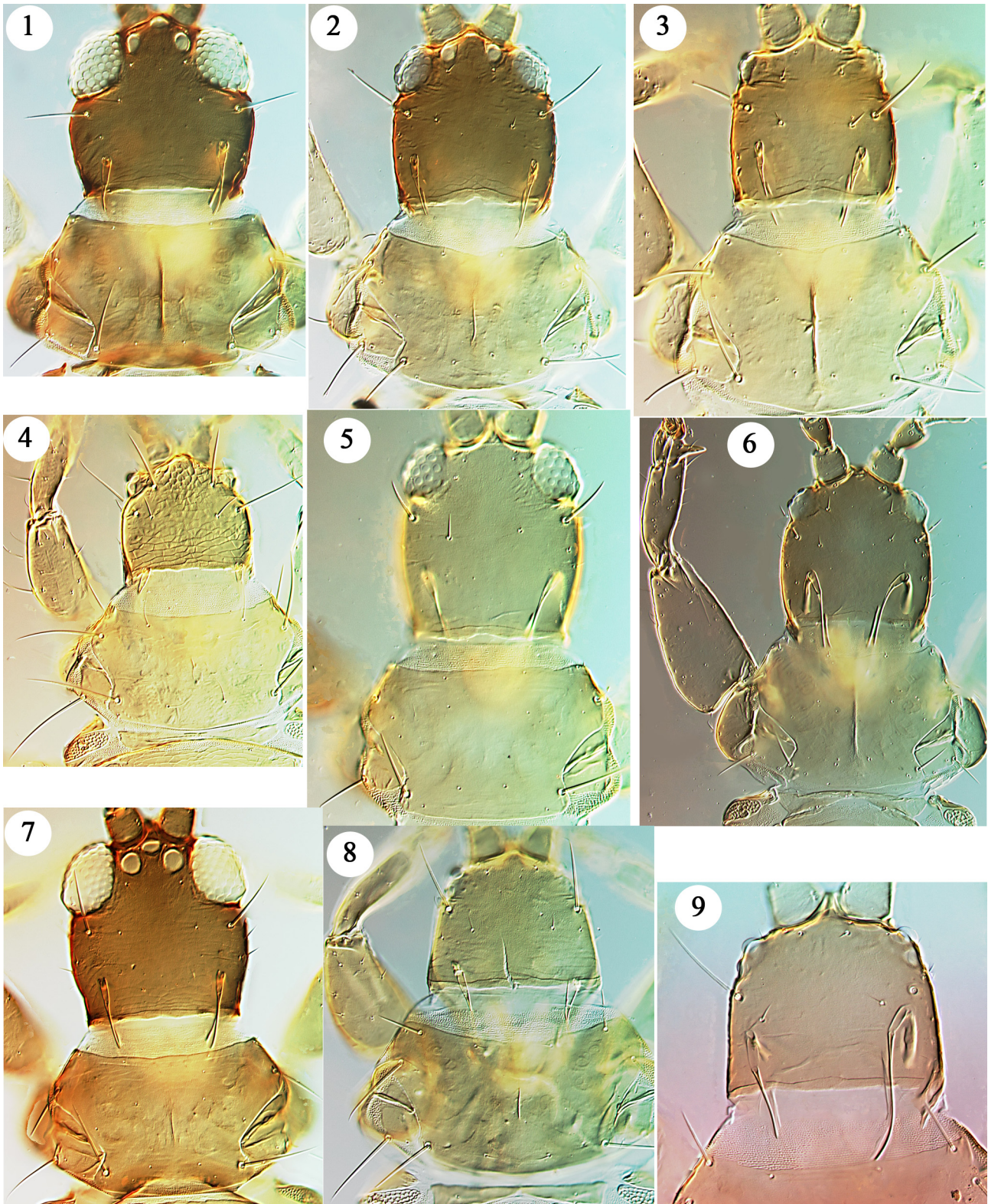
**Measurements** (apterous male in microns). Body length 1510. Head, length 145; width 153; postocular setae 58, distance between their bases 120; postocellar setae 8, distance between their bases 47. Pronotum, length 113; median width 220; major setae am 8, aa 38, ml 65, epim 65, pa 65. Metanotum median setae 23. Tergite IV median marginal setae 78; tergite VIII median setae 58, tergite IX setae S1 90, S2 70. Tube length 113; anal setae 118. Antennal segments III–VIII length 45, 37, 38, 43, 33, 33.

**Specimens studied.** Holotype female macroptera, **New South Wales**, Monga Forest, *Eucalyptus* litter, 10.iv.2019 (Alice Wells), in ANIC.

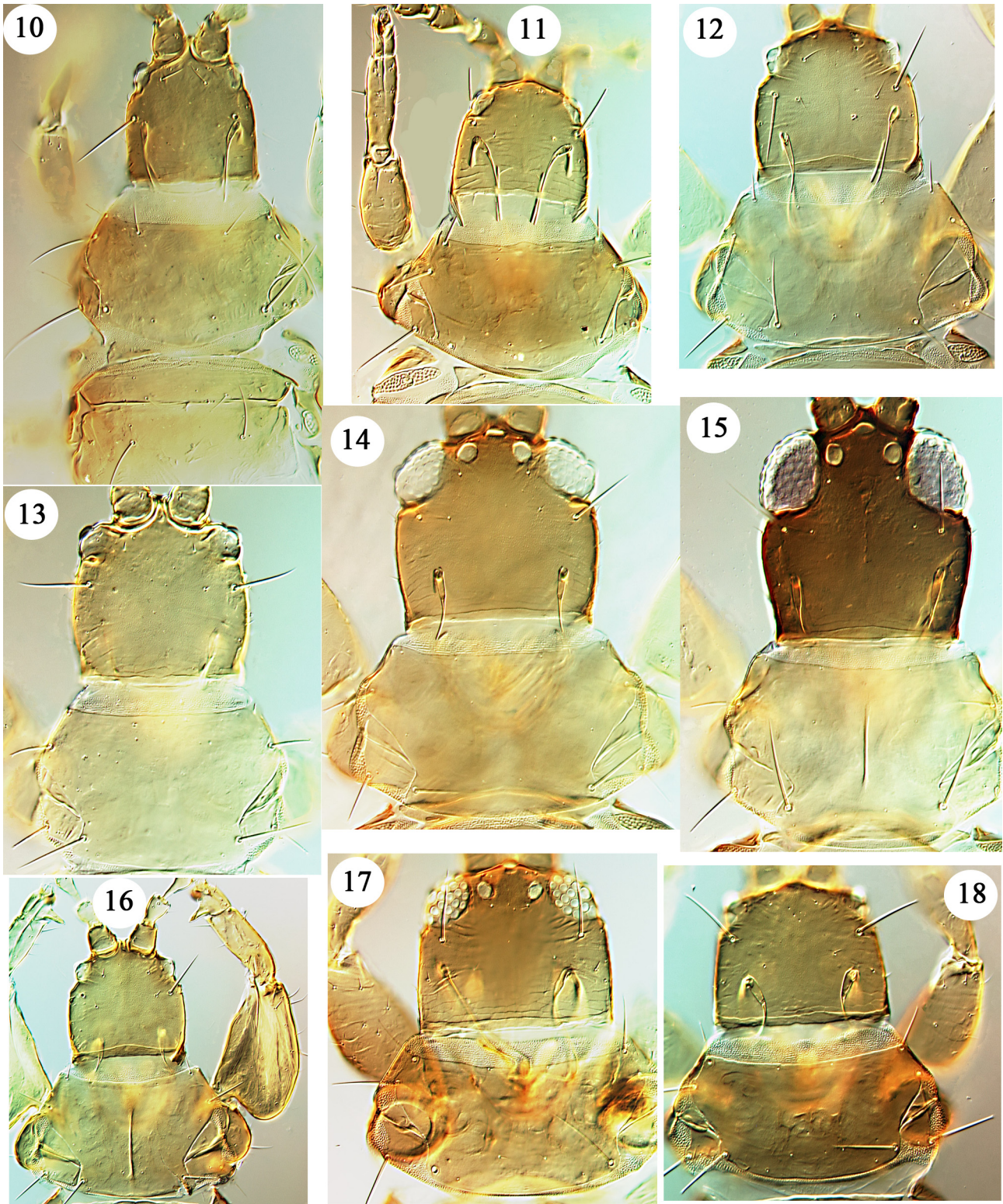
Paratype apterae, 6 females, 6 males, collected with holotype. **Australian Capital Territory**, Stromlo Forest, 5 females, 1 male from leaf litter, 18.iv.1968. **New South Wales**, Kanangra Walls, 1 female macroptera from *Eucalyptus* leaf litter, 3.iv.1968. **Queensland**, Carnarvon Station, 1 female in *Callitris* litter, 8.x.2014.

**Comments.** This species is unusual in having pronotal aa setae long but am minute, and antennal segment III with 2 well-developed sense cones. It is particularly unusual in that the male has no pore plate on sternite VIII. The paratypes from Stromlo Forest appear to have been stored in ethanol and are particularly pale, whereas the macropterous female from Kanangra Walls is particularly dark.

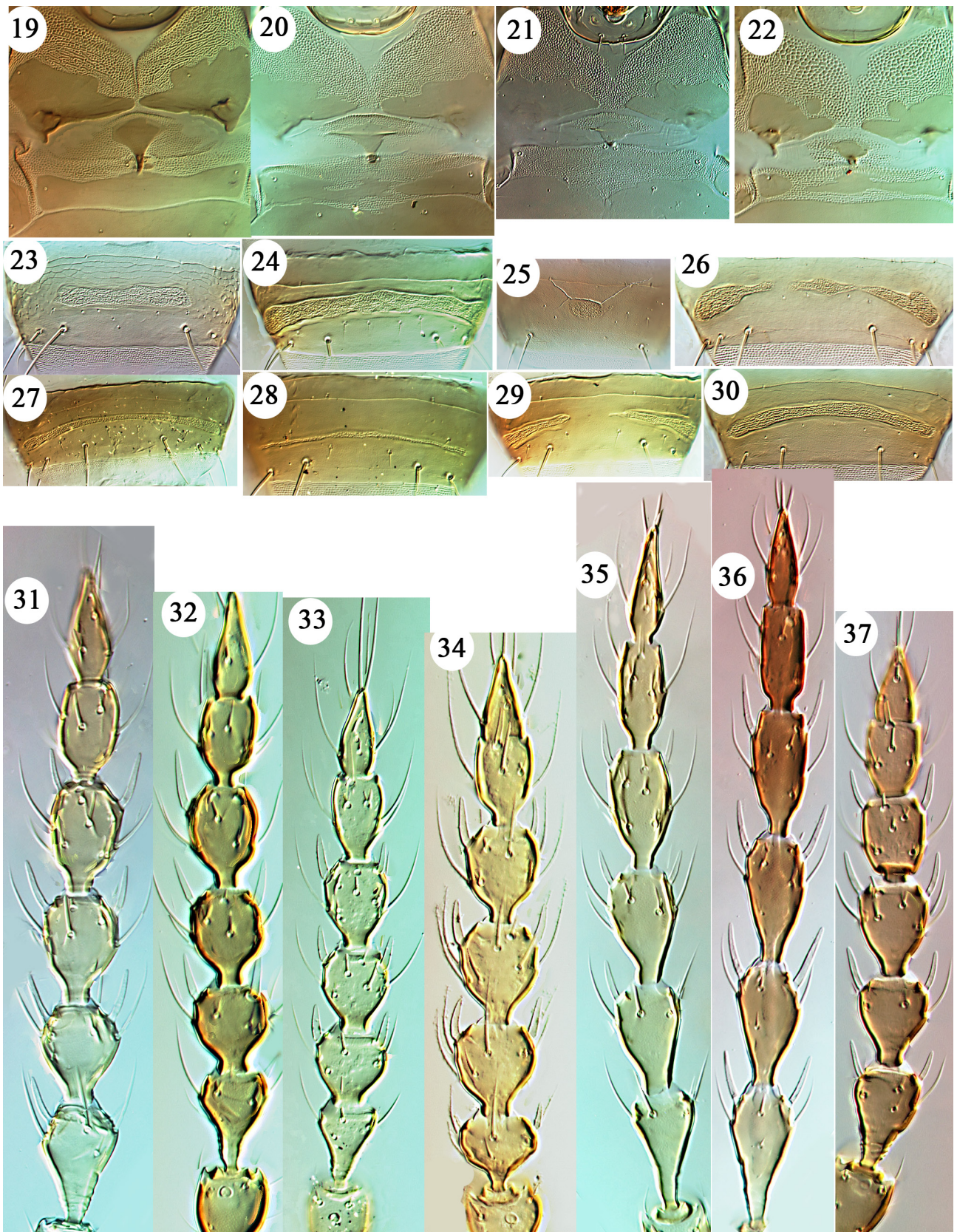




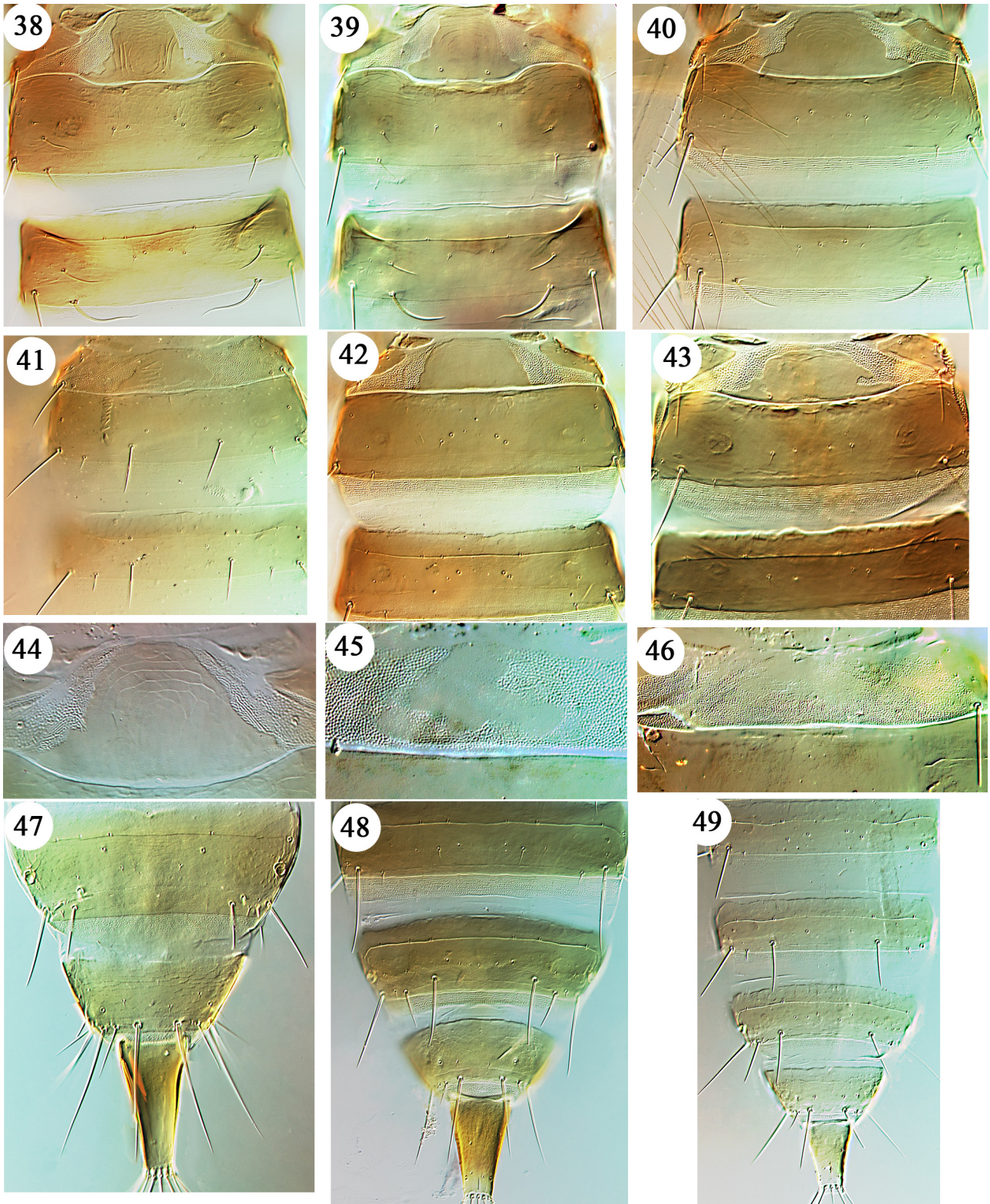
**FIGURES 1–9.** *Psalidothrips* species, head & pronotum. (1) *bipictus*; (2) *brittoni* macropterous female; (3) *brittoni* apterous male; (4) *cecryphalus* holotype; (5) *howei*; (6) *driesseni* male; (7) *gloriousi*; (8) *daguilari*; (9) *greensladeae*.



**FIGURES 10–18.** *Psalidothrips* species, head & pronotum. (10) *minantennus*; (11) *postlei*; (12) *trivius*; (13) *tritus* holotype; (14) *tritus* macropterous female ; (15) *verus*; (16) *trivius* male; (17) *wellsae* holotype; (18) *wellsae* apterous female.



**FIGURES 19–37.** *Psalidothrips* species. Mesopresternum 19–22 (19) *gloriosi*; (20) *driesseni* macroptera; (21) *driesseni* aptera; (22) *howei*. Male pore plate 23–30 (23) *brittoni*; (24) *cecryphalus*; (25) *driesseni*; (26) *howei*; (27) *minantennus*; (28) *postlei*; (29) *taylori*; (30) *tritius*. Antennae 31–37 (31) *brittoni*; (32) *cecryphalus*; (33) *minantennus*; (34) *platetus*; (35) *trivius*; (36) *verus*; (37) *wellsae*.



**FIGURES 38–49.** *Psalidothrips* species tergites. Pelta & tergites II–III 38–43 (38) *gloriosi* macroptera; (39) *verus* macroptera; (40) *tritus* macroptera; (41) *minantennus* aptera; (42) *howei* aptera; (43) *wellsae* aptera. Pelta 44–46 (44) *brittoni*; (45) *greensladeae*; (46) *postlei*. Tergites & tube 47–49 (47) *bipictus*; (48) *daguilari*; (49) *greensladeae*.

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