Zootaxa 4718 (3): 301–323
https://www.mapress.com/j/zt/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

https://doi.org/10.11646/zootaxa.4718.3.1
http://zoobank.org/urn:lsid:zoobank.org:pub:09F9270F-589A-471D-A912-2F2788544399

The genus *Hoplothrips* in Australia (Thysanoptera, Phlaeothripinae), with eleven new species

LAURENCE A. MOUND[1], JUN WANG[1,2] & DESLEY J. TREE[3]
[1]*Australian National Insect Collection, CSIRO, Canberra, Australia. E-mail: laurence.mound@csiro.au*
[2]*College of Plant Science, Jilin University, Changchun 130062, China. E-mail: wang_jun@jlu.edu.cn*
[3]*c/o Queensland Primary Industries Insect Collection (QDPC), Department of Agriculture and Fisheries, Queensland, Ecosciences Precinct, GPO Box 267, Brisbane, Qld, 4001.*

Abstract

A key to 19 species from Australia in the genus *Hoplothrips* is provided, including 11 described as **new species**: *H. bellingeni*, *H. giganteus*, *H. lamingtoni*, *H. lihongae*, *H. lowdeni*, *H. nelsoni*, *H. oakeyi*, *H. reedi*, *H. tarsus*, *H. woodsi*, *H. wrightae*. One species, *H. semicaecus* (Uzel), is recorded in Australia for the first time, and *H. corticis* (De Geer) and *H. orientalis* (Ananthakrishnan) are newly recorded from the Australian mainland. Structural diversity among the species of the genus *Hoplothrips* is discussed. Members of this genus share many character states with species of *Deplorothrips*, *Hoplandrothrips* and *Psalidothrips* that also live as fungal-hyphal feeders on dead branches and in leaf litter.

Key words: Dead branch, fungus-feeding, *Phlaeothrips*-lineage, structural variation

Introduction

The Thysanoptera-Tubulifera subfamily Phlaeothripinae comprises almost 3000 species in 370 genera. However, 50% of these genera are monobasic, and scarcely 100 include more than four species (ThripsWiki 2019). The resultant supra-generic classification is clearly inadequate. Three major lineages have been suggested within this subfamily (Mound & Marullo 1996), and one of these is currently recognized as the tribe Haplothripini (Mound & Minaei 2007). The *Liothrips*-lineage comprises most of the Phlaeothripinae that feed on green leaves (Dang *et al*. 2014; Minaei & Mound 2014), although relationships of the Neotropical species-rich *Holopothrips* group remain obscure (Lindner *et al*. 2018). The third major group, the *Phlaeothrips*-lineage, comprises the species of Phlaeothripinae that are associated with the dead tissues of plants, apparently feeding on fungal hyphae or their liquid breakdown products. This group is particularly weakly diagnosed, and there is very considerable structural variation between genera, from the minute species of *Williamsiella* with very short maxillary stylets (Mound & Tree 2015), to the large species of *Hoplandrothrips* with very long stylets (Mound & Tree 2013). In addition to extensive structural diversity among the genera, there is confusing intraspecific diversity resulting from dimorphisms associated with sex and wing length, as well as remarkable polyphenism that is associated with body size variation.

Despite a large number of species worldwide attributed to the *Phlaeothrips*-lineage, only 23 species are listed under the nominate genus *Phlaeothrips*, with half of those old names of which the significance remains doubtful. Within this lineage four major genera appear to be closely related, *Hoplothrips* (120 species), *Hoplandrothrips* (117 species), *Psalidothrips* (48 species), and *Deplorothrips* (23 species). In contrast, Priesner (1960) placed *Hoplothrips* among the group of genera now considered as the *Liothrips*-lineage, presumably on the basis of the shape of the fore wings. Published accounts are available for Australian species of three of the four genera, with 14 named species in *Deplorothrips* (Mound & Tree 2016), 16 named species in *Hoplandrothrips* (Mound & Tree 2013), and 16 named species in *Psalidothrips* (Wang *et al*. 2019). For the genus *Hoplothrips* only six species have previously been recorded from Australia, but the account presented here recognizes 19 species, including 11 new species.

Distinctions between these four genera remain far from clear, as is evident from the key couplets 53 to 59 in the comprehensive account of Phlaeothripidae from Japan (Okajima 2006). The diagnoses for each of these four

Accepted by A. Cavalleri: 22 Nov. 2019; published: 7 Jan. 2020

genera overlap in many character states, and none of the genera is diagnosed by a clear autapomorphy. In contrast to species of *Deplorothrips* and *Psalidothrips* with which they share many structural character states, the species of *Hoplothrips* and *Hoplandrothrips* all have maxillary stylets deeply retracted into the head and close together in the midline. These two genera have been distinguished by the presence/absence of a slight median constriction on the fore wings, but this condition is variable among Australian species placed in *Hoplandrothrips* (Mound & Tree 2013).

Species in both of these genera commonly exhibit sexual and wing-length dimorphisms, and variation in body size is sometimes associated with allometric growth patterns. Structural variation among males of a species is common, but "major" and "minor" males are not separate morphs, they merely represent extremes of continuous variation within any species. Presumably size variation in males is associated with male/male competition (Crespi 1986, 1988), but it often produces problems in the diagnosis of individual taxa. A further problem amongst the species from Australia that are considered members of *Hoplothrips* is the condition of the prosternal basantra sclerites. These are usually considered to be absent in members of the *Phlaeothrips* lineage, but three species of *Hoplothrips* are discussed below (Figs 24, 30) in which basantra are present (although absent in females of one of them). Some species from Australia of two further genera that are considered members of the *Phlaeothrips* lineage, *Lissothrips* and *Williamsiella*, also have weakly developed prosternal basantra (Mound & Tree 2015).

Abbreviations. Pronotal setae are referred to as follows: am—anteromarginals; aa—anteroangulars; ml—midlaterals; 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.

Hoplothrips Amyot & Serville

Hoplothrips Amyot & Serville, 1843: 640. Type species *Thrips corticis* De Geer 1773.

Most species of *Hoplothrips* collected in Australia have been taken from dead branches, although *oudeus*, *woodsi* **sp. n.** and *wrightae* **sp. n.** are known only from leaf litter samples. The species from Australia discussed here exhibit a number of unusual structural features.

Antennae: all species have eight antennal segments, but one species has unusually prominent ring-like ridges near the base segment III (Fig. 45). However, this condition is found amongst several distantly related Phlaeothripidae (Mound & Tree 2013, 2014; Eow *et al*. 2014). Segment IV of macropterae of *semicaecus*, and of both macropterae and micropterae in *bellingeni* **sp. n.**, bears ventrally many small sense cones (*sensilla basiconica*), although micropterae of *semicaecus* have segment IV with a reduced number of these structures (Figs 42–44).

Prosternal basantra: this pair of sclerites is absent in most species of *Hoplothrips* (Figs 23, 25) and related genera, but they are present in three species considered here (Figs 24, 30).

Fore tarsal tooth: this is present in males of all species considered here, but is absent in females of *bellingeni* **sp. n.**, *tarsus* **sp. n.** and *fungosus*.

Metanotal setae: the median pair of setae is usually small and acute, but in one species these setae are capitate (Fig. 53), and in another species the metanotum bears several pairs of minor setae (Fig. 50).

Fore wing duplicated cilia: macropterae of most species in this genus have these cilia, but they are absent in four species considered here (*fungosus*, *connexus*, *reedi* **sp. n.** and *tarsus* **sp. n.**).

Tergites II–VII sigmoid wing-retaining setae: macropterae usually have two pairs of such setae on tergites II–VII, but these setae are absent on all tergites in *reedi* **sp. n.**; they are absent on tergite VII in *giganteus* **sp. n.**; and only one pair is sigmoid on each tergite in *oakeyi* **sp. n**., *lihongae* **sp. n**., *fungosus* and *connexus*.

Male sternite VIII pore plate: although present in most species (Figs 57–64), this is absent in *bellingeni* **sp. n.**, *lowdeni* **sp. n.**, *giganteus* **sp. n.** and *fungosus*.

As a result of the extensive structural diversity, the generic diagnosis given below involves many exceptions. Considered worldwide, one series of species in the genus has been referred to as the *H. fungi* complex (Mound 2017), and this comprises at least seven species (*corticis*, *dubius*, *fungi*, *japonicus*, *karnyi*, *orientalis* and *ulmi*). This is essentially an Holarctic group, but at least four species from Australia share many character states with the members of the *H. fungi* complex (*lihongae*, *oakeyi*, *poultoni*, *wrightae*) and two others are also rather similar (*giganteus*,

lamingtoni). In three species discussed below the head is similar to that of members of the *fungi*-complex, with elongate maxillary stylets that are close together medially (*melanurus*, *oudeus*, *semicaecus*), but each of these is distinguished by a singular autapomorphy. Similarly, despite being generally similar to *H. fungi*, two species (*reedi*, *tarsus*) have the remarkable condition of the notopleural sutures being incomplete anteriorly (Fig. 17). Finally, three species (*bellingeni*, *convexus*, *nelsoni*) have the maxillary stylets wider apart than is typical of *Hoplothrips* (Figs 1–8). Two of these are thus similar to some members of *Psalidothrips*, although *bellingeni* has antennae very similar in structure to *semicaecus*, a species with a typical *Hoplothrips*-like head. It thus seems likely that there has been considerable structural homoplasy in the evolutionary radiation of these fungus-feeding thrips.

In addition to the many specimens listed as having been studied for this account, a further 25 Australian specimens have been examined but not identified. Each of these specimens could easily be assessed as representing a further undescribed species. The structural diversity within this genus is thus even greater and more complex than reported here, but will require far more extensive field work for a satisfactory analysis.

Diagnosis: Large to medium sized thrips, macropterous, micropterous or apterous. Body surface usually with linear or weakly polygonal sculpture. Head variable, longer or shorter than wide, with reticulate sculpture basally; postocular setae well developed, pointed or capitate, varying between species from much longer to shorter than eye length; maxillary stylets long, at least retracted to postocular setae, usually close together medially but sometimes sub-parallel medially. Antennae 8-segmented, III with 3 or 2 sense cones, IV with 2–4 (usually 4). Pronotum usually with 5 pairs of major setae, pointed or capitate, but am and ml sometimes not developed; notopleural sutures complete, or rarely incomplete anterolaterally. Prosternal basantra usually absent, rarely present; mesopresternum variable, from boat-shaped to three or two plates, or even absent; mesoeusternal anterior margin usually entire but sometimes strongly eroded; metathoracic sternopleural sutures present. Mesonotum usually weakly reticulate, metanotum sometimes reticulate medially; fore tarsal tooth usually present in both sexes, but often absent in female; fore wings usually not constricted medially, duplicated cilia usually present. Pelta usually reticulate, shape variable, campaniform sensilla present; tergites II–VII each with two pairs (rarely one pair) of wing-retaining setae, but these are short and straight in wingless individuals; tube shorter than head, anal setae length variable; male sternite VIII usually with pore plate; males often with areas of specialized reticulation anterolaterally on several sternites.

Key to *Hoplothrips* species from Australia

1. Prosternal basantra present in both sexes (Fig. 24) but sometimes weakly sclerotised and scarcely visible in females (Fig 30) 2
-. Prosternal basantra not developed as distinct sclerites (Fig. 25) 4
2. Antennal segment III with a prominent ring-like ridge near base (Fig. 45); fore tarsal tooth present in both sexes; male sternite VIII with a slender transverse pore plate (Fig. 64). . . . . *woodsi* **sp.n.**
-. Antennal segment III without a prominent ridge near base; fore tarsal tooth absent or minute in female; male sternite VIII without a pore plate 3
3. Ocellar region of head weakly reticulate (Figs 4–6); apterae with about 9 facets in each compound eye; pronotal am setae capitate and as long as aa setae; female fore tarsus without a tooth; female with prosternal basantra present . . . . . *fungosus*
-. Ocellar region of head without reticulate sculpture; apterae with about 14 facets in each compound eye; pronotal am setae pointed and much shorter than aa setae; fore tarsus with small tooth at inner apex; female with prosternal basantra weak or absent . . . . . *lowdeni* **sp.n.**
4. Pronotum with notopleural sutures incomplete anterolaterally (Fig. 17). 5
-. Pronotum with notopleural sutures complete anterolaterally (Fig. 7) 6
5. Prosternal ferna fused into narrow transverse band (Fig. 29); large fore tarsal tooth present in both sexes; antennal segment III with 1 sense cone; male sternite VIII with 3 small pore plates arranged in triangle (Fig. 61). . . . . *reedi* **sp.n.**
-. Prosternal ferna not fused, separated by small median gap (Fig. 27); fore tarsal tooth absent in female; antennal segment III with 2 sense cones; male not known . . . . . *tarsus* **sp.n.**
6. Maxillary stylets parallel in middle of head and more than 1/4 of head width apart (Fig. 1) 7
-. Maxillary stylets close together medially in head and no more than 1/8 of head width apart (Fig. 3) 9
7. Antennal segment IV with numerous small sensory hairs in both sexes (Fig. 31); fore tarsal tooth absent in female . . . . . *bellingeni* **sp.n.**
-. Antennal segment IV without small sensory hairs in both sexes (Fig. 36); fore tarsal tooth present in both sexes 8
8. Macroptera with 2 sense cones on antennal segments III and IV (apterae not known); fore wing without duplicated cilia; male with slender pore plate fully across sternite VIII; tube yellowish, paler or equal in colour to abdominal segment IX. . . . . *connexus*
-. Macroptera with 3 sense cones on antennal segments III and IV, but aptera with on 2 sense cones on III & IV; fore wing with 5–6 duplicated cilia; male sternite VIII with small transverse pore plate medially; tube darker brown than abdominal segment

IX . . . . . *nelsoni* **sp.n**.

9. Metanotum with pair of capitate setae posteromedially (Fig. 53); male sternite VIII almost fully occupied by pore plate . . . . . *oudeus*

-. Metanotum with median setal pair pointed; male pore plate not so extensive. 10

10. Metanotal discal area of micropterae with 5–12 small fine setae (Fig. 50), macropterae with at least 4 such setae, in addition to the major setal pair; pronotal midlateral setae no larger than discal setae (Fig. 18); males with extensive specialized reticulate areas laterally on sternites II–VII (Fig. 66) . . . . . *melanurus*

-. Metanotal discal area with no more than one pair of minor setae medially, in addition to the major setal pair; pronotal midlateral setae well developed; males with specialised reticulate areas absent, smaller or on fewer sternites. 11

11. Pronotal posteroangular setae unusually short, scarcely longer than maximum width of third antennal segment 12

-. Pronotal posteroangular setae long, at least as long as length of third antennal segment 13

12. Large, dark brown species with dark brown antennae; genae with prominent setae (Fig. 7); fore wing with more than 20 duplicated cilia; male sternite VIII without pore plate . . . . . *giganteus* **sp.n**.

-. Small light brown species with light brown antennae; genae without prominent setae (Fig. 14); fore wing with less than 10 duplicated cilia; male sternite VIII with indistinct, irregular pore plate (Fig. 60) . . . . . *oakeyi* **sp.n.**

13. Major setae on head and pronotum capitate; female fore tarsal tooth blunt, shorter than half of tarsal width . *lamingtoni* **sp.n.**

-. Major setae on head and pronotum pointed; female fore tarsal tooth larger and pointed 14

14. Macropterae with antennal segment IV bearing many small sensory hairs ventrally, but micropterae with only a few near apex of segment IV (Figs 42–44) . . . . . *semicaecus*

-. Macropterae and micropterae without sensory hairs ventrally on antennal segment IV 15

15. Pronotal posteroangular setae at least 1.4 times as long as epimeral setae (Fig. 9) [male sternite VIII with transverse pore plate less than half of sternite width (Fig. 58)] . . . . . *lihongae* **sp.n.**

-. Pronotal posteroangular and epimeral setae equal in length 16

16. Tergite IX setae S1 acute, longer than tube 17

-. Tergite IX setae S1 no more than 0.7 as long as tube, apices sometimes not acute. 18

17. Macropterae with antennal segments IV–V fully brown; micropterae with pedicels of antennal segments IV–V no longer than wide, III truncate at apex (Fig. 40); male sternite VIII with transverse pore plate extending across sternite width (Fig. 63). . . . . *poultoni*

-. Macropterae with antennal segments IV–V yellow at base; micropterae with pedicels of antennal segments IV–V slender, longer than wide, III with apex not truncate (Fig. 38); male sternite VIII transverse pore plate no wider than half of sternite width (Fig. 59) . . . . . *wrightae* **sp.n.**

18. Antennal segments III–IV with sense cones long, curved and acute, on III distinctly longer than apex of segment (Fig. 39); pelta with posterolateral angles curving away from anterior margin of tergite II (Fig. 52) . . . . . *orientalis*

-. Antennal segments III–IV with sense cones short, straight and blunt, on III about as long as apex of segment (Fig. 32); pelta with posterolateral angles confluent with anterior margin of tergite II (Fig. 47). . . . . *corticis*

***Hoplothrips bellingeni* sp. n.**

(Figs 1, 2, 23, 31, 46)

Female macroptera. Body, femora and antennae brown, tibiae and tarsi yellow; antennal segment III with base paler. Head with transverse polygonal sculpture near base, without distinct sculpture on anterior half; genae widest behind eyes, narrowing base; ocelli well developed; dorsal length of compound eyes greater than one third of head length; postocular setae capitate, almost as long as dorsal eye length; maxillary stylets retracted to postocular setae and about one third of head width apart medially (Fig. 1). Antennal segment III with 3 sense cones, IV with 4 sense cones also 12–14 small sensory hairs (*sensilla basiconica*) ventrally (Fig. 31); III–VIII each with pedicel. Pronotum with transverse sculpture near posterior margin; with 5 pairs of capitate major setae (Fig. 1). Mesonotum with sculpture, lateral setal pair capitate; metanotum with weak polygonal sculpture on posterior half, and median setae acute (Fig. 46). Prosternal basantra not sclerotised, ferna bluntly acute medially but not meeting; mesopresternum eroded to two triangles; mesoeusternal anterior margin complete (Fig. 23). Fore tarsal tooth absent. Fore wings each with three capitate sub-basal setae and 6 duplicated cilia. Pelta reticulate, with small lateral lobes (Fig. 46); tergites II–VII each with two pairs of sigmoid wing-retaining setae,median marginal setae capitate; tergite VIII median setae capitate; tergite IX setae shorter than tube, S1 blunt but S2 acute; anal setae as long as tube.

Measurements (holotype female in microns). Body length 1820. Head, length 183; width 168; postocular setae 38, distance between their bases 127; postocellar setae 6, distance between their bases 37. Pronotum, length 107; median width 203; major setae am 27, aa 27, ml 25, epim 43, pa 40. Mesonotum lateral setae 37. Metanotum median setae 28. Tergite IV median marginal setae 75, VIII median setae 40, IX setae S1 73, S2 77. Tube length 92. Anal setae 95. Antennal segments III–VIII length (width) 47 (30), 57 (33), 44 (25), 38 (22), 35 (20), 33 (14). Fore wing length 67, sub-basal setae S1 40, S2 48, S3 51.

Female microptera. Similar to macropterous female, but compound eyes smaller, ocelli not developed, wing-retaining setae smaller.

Measurements (in microns). Body length 1860. Head, length 180; width 160; postocular setae 51.

Male macroptera. Similar to macropterous female but smaller; antennal segment IV with about 10 sensory hairs ventrally; fore tarsal tooth length less than half of tarsal width (Fig. 2); tergite IX S2 setae shorter; sternite VIII without pore plates, sternites without specialised reticulate areas laterally.

Measurements (in microns). Body length 1500. Head, length 180; width 145; postocular setae 50, postocellar setae 6. Pronotum, length 98; median width 185; major setae am 31, aa 31, ml 26, epim 47, pa 40. Tergite VIII median setae 43, Tergite IX setae S1 73, S2 45. Tube length 98; anal setae 100. Antennal segments III–VIII length 45, 50, 40, 34, 28, 29.

Male microptera. Similar to macropterous male, but ocelli smaller and wing-retaining setae smaller; antennal segment IV with 8 sensory hairs ventrally.

Measurements (in microns). Body length 1480. Head, length 188; width 143; postocular setae 51.

Specimens studied. Holotype female macroptera. **New South Wales**, Bellingen, 40 km southwest of Coffs Harbour, from dead wood, 12.ii.2010 (A. Wells) in ANIC.

Paratypes: same data as holotype, 1 macropterous female, 1 micropterous female, 1 macropterous male, 1 micropterous male.

Comments. The holotype is mounted onto the same slide as a second female and a male; the holotype is the female with both antennae. This species is unusual within the genus *Hoplothrips* for the relatively wide separation within the head of the maxillary stylets, the unarmed fore tarsi of females, and the presence ventrally on antennal segment IV of numerous small sensory hairs in both sexes (Fig. 31). In contrast to *H. semicaecus*, that also has such sensory hairs on antennal segment IV, the maxillary stylets of *H. bellingeni* are not close together medially in the head, and the males have no pore plate on the eighth sternite.

Hoplothrips connexus (Hood)

Trichothrips connexus Hood, 1919: 84.

Female macroptera. Body, femora and antennae brown, tibiae, tarsi and antennal segment III yellow. Head widest behind eyes and narrowing to base, with little or no sculpture; postocular setae weakly capitate, as long as dorsal eye length; maxillary stylets retracted to postocular setae, parallel and about one third of head width apart. Antennal segments III–VI each with 2 long sense cones, VIII broad at base and shorter than VII. Pronotum with 4 pairs of major weakly capitate setae, am setae minute. Mesonotum without sculpture, lateral setal pair minute. Metanotum without sculpture, median setae small and pointed. Prosternal basantra absent; ferna slender, not meeting medially; mesopresternum not present, mesoeusteral anterior margin heavily eroded. Fore tarsal tooth longer than half of tarsal width. Pelta with slender lateral wings; tergites III–VII each with one pair of curved wing-retaining setae, the anterior pair on each tergite weak or absent; II–VII with median tergal setal pair long, extending beyond posterior margin of each tergite; IX with setae S1 and S2 finely pointed, almost as long as tube.

Male aptera. Compound eyes reduced to 3 facets; prosternal ferna larger; tergite IX S2 setae much shorter than S1; sternite VII with specialised reticulate areas laterally, VIII with transverse, slender pore plate.

Specimens studied. New South Wales, Maroota, 2 females from leaf litter, 4.iv.1968 [compared to holotype at US National Museum in 1972]. **Australian Capital Territory**, Black Mountain, 1 male from twigs, 13.vii.1968. **Queensland**, Ormiston, 1 female in water trap, 20.iv.1966.

Comments. This species was described originally from Brooklyn, New South Wales, very close to the Maroota site listed above, and it is here recorded from the Australian Capital Territory as well as southeastern Queensland. The species is similar to some species of *Psalidothrips* but has the stylets closer together medially in the head.

Hoplothrips corticis (De Geer)
(Figs 3, 32, 47, 57)

Thrips corticis De Geer, 1773: 11.

Female macroptera. Body and femora brown; tibiae yellow shaded brown, tarsi yellow; antennal segment III mainly yellow, IV–VI variably yellow at base but not sharply bicoloured; fore wings weakly shaded toward apex. Head longer than wide, genae with several small, slender setae; postocular setae very long and pointed, wide apart; maxillary stylets retracted to eyes, close together medially (Fig. 3). Antennal segment III with 3 short, straight sense cones, IV with 4 sense cones (Fig. 32); VIII constricted to base. Pronotum without sculpture medially, with 4 pairs of very long, slender pointed major setae, am scarcely larger than discal setae (Fig. 3); prosternal basantra absent. Fore tarsal tooth large. Metanotum without sculpture medially (Fig. 47). Fore wing with about 10 duplicated cilia. Pelta with lateral margins confluent with anterior margin of tergite II (Fig. 47); tergites II–VII with two pairs of sigmoid wing-retaining setae; tergite IX setae S1 pointed, at least 0.8 as long as tube.

Female microptera. Wings shorter than thorax width; antennal segment III sometimes with 2 sense cones; genae swollen behind small forwardly directed eyes. *Male microptera*. Large males with fore femora swollen; tergite IX setae S2 short and stout; sternite VIII with large pore plate that scarcely extends posterior to spiracles (Fig. 57), median longitudinal length of pore plate 50–60 microns.

Specimens studied. Queensland, Bunya Mts, 9.iv.1993, 2 female micropterae from *Araucaria bidwilli* litter; **Norfolk Island**, Selwyn Pine Road, 6 female macropterae, 3 female micropterae, 1 male microptera, from dead branches, 26.xii.2012.

Comments. Described from Europe where it is widespread (Mound *et al*. 2018), this species is known also from eastern North America and New Zealand (Mound & Walker 1986). In Australia, it has been reported from Norfolk Island (Mound & Wells 2015) and is here recorded from southeastern Queensland.

Hoplothrips fungosus **Moulton**
(Figs 4, 5, 6, 24)

Hoplothrips fungosus Moulton, 1928: 305.

Described from Taiwan, this species has been recorded from India and southern Japan and is probably widespread in East Asia (Okajima 2006). It is here recorded from Australia in Northern Territory and also eastern Queensland. Okajima (2006) stated that this species "could well be placed in a different genus" because of the following character states: prosternal basantra present (Fig. 24), female fore tarsal tooth absent, fore wings lacking duplicated cilia, male pore plate absent. However, prosternal basantra are present in the males of two new species described here from Australia, although these sclerites are not developed in females of one of these species, and the male of the other species has a transverse pore plate.

Specimens studied. Australia, Northern Territory, Litchfield NP, 12 males, 11 females, 3 female macropterae from dead *Melaleuca* wood, 3.v.2014; Darwin, East Point, 1 female, 1 male from dead wood, 5.v.2014; Kuranda, 1 female from dead leaves, 5.xi.2008; Brisbane, Brookfield, 2 females, 1 female macroptera from barkspray, 22.i.2011. [All apterae except where stated.]

Hoplothrips giganteus **sp. n.**
(Figs 7, 33, 48, 65)

Female macroptera. Body, legs and antennae dark brown, tarsi paler also base of antennal segments III–V; major setae pale; fore wings pale. Head with weak transverse sculpture lines except between eyes; genae convex; genae appearing serrated with stout setae arising from small tubercles; compound eyes large, more than one third of head length; postocular setae wide apart, pointed, less than half as long as dorsal eye length; maxillary stylets retracted to postocular setae and close together medially (Fig. 7). Antennal segment III slender with 3 sense cones, IV slender with 4 sense cones, VIII weakly narrowed to base (Fig. 33). Pronotum with faint sculpture around margins; major setae pointed, small to minute, pa longest (Fig. 7). Mesonotum with transverse polygonal sculpture, lateral setae small; metanotum reticulate, median setae finely pointed (Fig. 48). Prosternal basantra absent, ferna triangular almost meeting medially; mesopresternum slender boat-shaped; mesoeusternal anterior margin entire. Fore tarsal tooth sharp, longer than half tarsal width. Fore wings with three small sub-basal setae, about 24 duplicated cilia.

Pelta with slender lateral lobes (Fig. 48); tergites II–VI each with two pairs of sigmoid wing-retaining setae, minute and straight on VII; tergite VIII median setae pointed; tergite IX setae S1 much shorter than tube and pointed, S2 blunt; anal setae longer than tube.

Measurements (holotype female in microns). Body length 4440. Head, length 345; most width 275; postocular setae 45, the distance of their base 235, postocellar setae 20, the distance of their base 70. Pronotum, length 270; median width 400; major setae am 10, aa 25, ml 13, epim 15, pa 25. Mesonotum lateral setae 20; Metanotum median setae 40. Tergite IV median marginal setae 85; tergite VIII median setae 71, tergite IX setae S1 88, S2 73. Tube length 202. Anal setae 278. Antennal segments III–VIII length (width) 113 (47), 115 (43), 100 (33), 63 (28), 50 (23), 49 (16). Fore wing length 136, sub-basal setae S1 33, S2 33, S3 33.

Male macroptera. Similar to female but smaller, setae stouter on genae; fore tarsal tooth larger; large male with prominent median ridge on pronotum; tergite IX S2 setae short and stout; sternite VIII without pore plate; sternites III–VII of large male with specialised reticulate areas (Fig. 65) (absent in small male).

Measurements (in microns). Body length 3470. Head, length 308; width 248; postocular setae 50. Pronotum, length 260; median width 313; major setae am 8, aa 23, ml 11, epim 24, pa 47. Tergite IX setae S1 113, S2 52. Tube length 180, anal setae 243. Antennal segments III–VIII length 106, 101, 96, 65, 50, 31. Fore wing length 121.

Specimens studied. Holotype female macroptera. **Queensland**, Carnarvon Gorge, from *Eucalyptus* dead leaves, 11.v.2017 (DJT 2063) in ANIC.

Paratypes: 1 female and 2 males, same data as holotype.

Comments. The structure of this dark brown species is unusual, with a characteristic pelta, tergites II–VI with two pairs of sigmoid wing-retaining setae but none on VII, and the male abdominal sternite VIII without a pore plate.

Hoplothrips lamingtoni **sp. n.**

(Figs 8, 49, 56)

Female macroptera. Body, legs and antennae brown, tube darkest, tarsi paler; antennae brown, segments III–IV paler at base; major setae pale; fore wings weakly shaded. Head longer than wide, with transverse striate sculpture; genae sub-parallel, with a pair of stout setae on basal third; posterior ocelli close to compound eyes; dorsal length of compound eyes greater than one third of head length; postocular setae capitate, shorter than dorsal eye length; maxillary stylets retracted to postocular setae, close together medially (Fig. 8). Antennal segment III with 3 sense cones, IV with 4 sense cones, III–VII each with pedicel, VIII slender but with base almost as broad as apex of VII. Pronotum with sculpture around margins; with 5 pairs of capitate major setae. Mesonotum with transverse polygonal sculpture, lateral setae capitate; metanotum reticulate, median setae long, pointed, on anterior third of sclerite (Fig. 49). Prosternal basantra absent, ferna sharply pointed medially; mesopresternum eroded to three plates, mesoeusternal anterior margin entire. Fore tarsal tooth small, on basal half of tarsus. Fore wing with capitate sub-basal setae, 24–28 duplicated cilia. Pelta triangular (Fig. 49); tergites with extensive sculpture, reticulate and transverse, segments II–VI each with two pairs of strongly sigmoid wing-retaining setae (Fig. 56), VII with these setae weaker and wider apart; VIII median setae weakly capitate; IX setae S1 and S2 weakly capitate, shorter than tube; anal setae as long as tube.

Measurements (holotype female in microns). Body length 3520. Head, length 337; width 258; postocular setae 108, distance between their bases 205; postocellar setae 23, distance between their bases 47. Pronotum, length 187; median width 410; major setae am 43, aa 70, ml 75, epim 106, pa 68. Mesonotum lateral setae 53; Metanotum median setae 65. Tergite IV median marginal setae 175; tergite VIII median setae 115, tergite IX setae S1 178, S2 178. Tube length 220. Anal setae 221. Antennal segments III–VIII length (width) 100 (43), 93 (43), 88 (35), 75 (33), 65 (27), 45 (18). Fore wing length 122, sub-basal setae S1 63, S2 73, S3 108.

Specimens studied. Holotype female macroptera. **Queensland**, Lamington NP, O'Reilly's, from Malaise Trap, i.2007, in ANIC.

Paratypes: 3 females with same data as holotype except x.2006 and xi.2007; 1 female, Bottom Creek, Mudlo NP, from rainforest barkspray, 21.xii.2011.

Comments. This is an unusual species within the genus *Hoplothrips*. The transversely striate sculpture on the head is a character state more commonly associated with species of the *Liothrips* lineage.

***Hoplothrips lihongae* sp. n.**
(Figs 9, 25, 34, 58)

Female macroptera. Body light brown with head and sides of pterothorax darker, tube yellowish, tergites III–VII each with darker area anteromedially; legs and tarsi mainly yellow; antennae light brown, segments II and III mainly yellow and bases of IV–VI pale (Fig. 34). Head with weak sculpture posterolaterally; genae narrowed to base; dorsal length of compound eyes about half of head length; postocular setae pointed, arising laterally and almost as long as dorsal eye length (Fig. 9). Antennal segment III with 3 sense cones, IV with 4 sense cones, IV–VII each with pedicel, VIII slender and narrowed at base (Fig. 34). Pronotum without sculpture; setae pointed, aa small, am minute (Fig. 9). Mesonotum with transverse polygonal sculpture anteriorly, lateral setae minute; metanotum without sculpture medially, median setae small and acute. Prosternal basantra absent, mesopresternum eroded to slender sclerite, mesoeusternal anterior margin entire (Fig. 25). Fore tarsal tooth pointed, longer than half of tarsal width. Fore wing with two small sub-basal setae, 12–14 duplicated cilia. Pelta triangular with small lobes; tergites II–VII each with only one pair of wing-retaining setae; tergite VIII median setae pointed; tergite IX setae S1 and S2 finely pointed; anal setae shorter than tube.

Measurements (holotype female in microns). Body length 3060. Head, length 243; width 222; postocular setae 72, distance between their bases 220; postocellar setae 15, distance between their bases 52. Pronotum, length 205; median width 347; major setae am 15, aa 30, ml 75, epim 68, pa 100. Mesonotum lateral setae 8; metanotum median setae 30. Tergite IV median marginal setae 75, VIII median setae 16, IX setae S1 162, S2 178. Tube length 197. Anal setae 163. Antennal segments III–VIII length (width) 90 (45), 83 (45), 77 (40), 75 (35), 63 (28), 63 (17); longest sense cone on III 25. Fore wing length 128, sub-basal setae S1 48, S2 60.

Female microptera. Similar to macropterous female, compound eyes smaller, ocelli absent, antennal segments III and IV each with 2 small sense cones; wing-retaining setae not developed.

Measurements (in microns). Body length 3220. Head, length 233; width 243; postocular setae 98; fore wing lobe 70; longest sense cone on antennal segment III 12.

Male microptera. Similar to micropterous female but smaller; large male with fore femora swollen, fore tarsal tooth massive; tergite IX S2 setae short and stout; sternite VIII transverse pore plate about one third of sternite width; sternites VI–VIII with specialised reticulate areas laterally (Fig. 58).

Measurements (in microns). Body length 2810. Head, length 213; width 225; postocular setae 75. Pronotum, length 275; median width 375; major setae am 10, aa 37, ml 130, epim 100, pa 113. Tergite VIII median setae 40, IX setae S1 137, S2 42. Tube length 176, anal setae 170. Antennal segments III–VIII length 75, 65, 65, 63, 56, 58.

Specimens studied. Holotype female macroptera. **South Australia**, Desert Camp Park, 50 km South of Keith, from *Eucalyptus* nuts, 14.iii.2011 (LAM 5482) in ANIC.

Paratypes: 1 female macroptera, 2 female micropterae, 3 males, same data as holotype.

Comments. In all of the available specimens the maxillary stylets have been disrupted during slide mounting. However, they are clearly very long, and are probably retracted to the postocular setae in life. The micropterae of *H. lihongae* differ from those of *H. corticis* and *H. orientalis* in having only two small cones on the third and fourth antennal segments. The macropterae have three sense cones on segment III and four on IV, as in the other two species, but have much shorter pronotal setae apart from the posteroangulars.

***Hoplothrips lowdeni* sp. n.**
(Figs 10, 11, 26, 35)

Female aptera. Body light brown with pronotum darkest, but head, abdominal segments VIII, IX and basal half of tube yellow; mid and hind femora light brown, tibiae yellow and light brown, tarsi yellow; antennal segments I –II brownish yellow, III yellow on basal half, IV–VIII brown (Fig. 35). Head with weak transverse polygonal sculpture posterolaterally but ocellar region without sculpture; genae sub-parallel, setae weak; ocelli absent, compound eyes with about 14 facets; postocular setae capitate, shorter than half the distance between their bases; maxillary stylets long, retracted to postocular setae and close together medially (Fig. 11). Antennal segments III and IV each with 2 sense cones, III–VIII each with distinct pedicel (Fig. 35). Pronotum without sculpture; with 4 pairs of capitate major setae, am varying from small and pointed to capitate. Mesonotum transverse, with sculpture lines, lateral setae small

but capitate; metanotum smooth, median setae acute. Prosternal basantra absent or faintly indicated, ferna transverse and meeting medially; mesopresternum absent, mesoeusternal anterior margin eroded. Fore tarsal tooth small, curved, at inner apex of tarsus. Pelta transverse, with weak polygonal sculpture anteriorly; tergites II–VII each with one pair of minute straight wing-retaining setae; tergite IX setae S1 and S2 pointed, shorter than tube; longest anal setae longer than tube.

Measurements (holotype female in microns). Body length 1580. Head, length 175; width 160; postocular setae 38, the distance of their base 135, postocellar setae 5, the distance of their base 45. Pronotum, length 153; median width 247; major setae am 8, aa 25, ml 20, epim 28, pa 23. Mesonotum bilateral setae 10; Metanotum median setae 20. Tergite IV median marginal setae 40; tergite VIII median setae 37, tergite IX setae S1 56, S2 78. Tube length 83. Anal setae 100. Antennal segments III–VIII length (width) 47 (29), 43 (29), 42 (28), 38 (22), 40 (20), 40 (13).

Male aptera. Similar to female but slightly smaller and varying in size; basantra well developed, major male with ferna large and median margins closely parallel (Fig. 26); fore femora swollen, fore tibiae inner margin with distinct tubercle in largest male, fore tarsal tooth longer than tarsal width; tergite IX setae S2 shorter; sternite VIII pore plate absent.

Measurements (of large male, in microns). Body length 1340. Head, length 148; width 158; postocular setae 58, postocellar setae 5. Pronotum, length 235; median width 267; major setae am 5, aa 33, ml 31, epim 28, pa 37. Tergite VIII median setae 47, Tergite IX setae S1 68, S2 32. Tube length 88; anal setae 105. Antennal segments III–VIII length 50, 40, 47, 40, 40, 41.

Specimens studied. Holotype female aptera. **New South Wales**, Lowden F.P., from dead *Eucalyptus*, 9.ii.2013 (LAM 5735) in ANIC.

Paratypes: 7 males, same data as holotype; same locality, 1 male from *Eucalyptus* dead branches, 27.ii.2011 (LAM 5431). **Queensland**, Indooroopilly, 1 female from dead leaves and grasses, 7.iii.2006. **Victoria**, Mallacoota, 1 female from dead *Eucalyptus*, 1.iv.2011.

Comments. This species is generally similar to *H. fungosus*, but has the ocelli region without sculpture, the compound eyes with more facets, the prosternal ferna of major males greatly enlarged, the prosternal basantra absent in females, and the fore tarsus of females with a small tooth.

Hoplothrips melanurus **(Bagnall)**

(Figs 18, 50, 62, 66)

Trichothrips melanurus Bagnall, 1919: 276.

Female microptera. Body and femora brown, with tibiae, tarsi, and base of antennal segments III–V yellow; tube darkest. Head reticulate except in midline; genae convex, sharply constricted in front of posterior margin, with pair of stout setae; postocular setae pointed. Antennal segment III usually with 2 sense cones (sometimes 3), IV with 4 sense cones, VIII weakly constricted at base. Pronotum with am and ml setae very small, epim and pa long (Fig. 18). Metanotum reticulate, major setal pair wide apart, with a scattering of 4–12 small setae (Fig. 50). Fore wing lobe minute, sometimes scarcely 25 microns long. Tergites with wing-retaining setae small and straight; tergite IX major setae blunt and shorter than tube.

Male microptera. Similar to female, smaller but more robust, fore tarsal tooth massive; genae with prominent setae; prosternal ferna median margins parallel; mesopresternum represented by 3 sclerites, mesoeusternal anterior margin narrow. Metanotum reticulate posterior to a transverse concave ridge. Tergite IX setae S2 short and stout. Sternites II–VI with large areas laterally of specialized sculpture (Fig. 66); transverse pore plate extends across three-quarters of sternite VIII (Fig. 62).

Female macroptera. Similar to microptera, eyes large, ocelli present; mesopresternum slender but complete; metanotum with 4–6 minor setae; tergites II–VII each with two pairs of sigmoid wing-retaining setae.

Specimens studied. New South Wales, Royal NP, Werrong Beach, 3 females, 3 males from barkspray, 19.iv.2011; Galston Gorge, near Sydney, 2 female, 1 mal from dead *Eucalyptus*, 23.viii.1959. **Queensland**, Lamington NP, O'Reilly's, 3 female micropterae by bark spraying, 1 female from dead twigs, 13.iii.2007; same locality, in malaise trap, 1 male, iii.2007, 1 female macroptera, xi.2007. Brisbane, Cameron's Scrub, 3 females, 1 male from barkspray, 30.iv.2012; Brisbane, Sawpit Gulley Road, 1 female from barkspray, 8.iii.2015; Brisbane, Mt Mee,

2 female macropterae, 1 male from barkspray, 30.x.2010. Carnarvon Station, 1 female, 1 male from barkspray, 9.x.2014. (Micropterae except where indicated).

Comments. Described from a single female taken at Fern Tree Gulley, Victoria, this species has been found widely in eastern Australia. The males are particularly distinctive amongst *Hoplothrips* species for the many minor setae on the metanotum and the large specialised reticulate areas laterally on the sternites. The only described species known to share these character states is *H. anobii* Mound & Walker from New Zealand, but that has antennal segments IV–V uniformly dark brown not yellow at base, segment VIII strongly narrowed to a basal pedicel, and the pronotal ml setae very long, longer than the pa setae. The female macropterae of *melanurus* are similar to those of other members of the *H. fungi* complex, but have the pronotal ml setae exceptionally small.

***Hoplothrips nelsoni* sp. n.**
(Figs 12, 13, 36)

Female macroptera. Body, femora and antennae light brown with tube darker; tibiae shaded with brown, tarsi almost yellow; antennal segment III with basal third pale (Fig. 36). Head without sculpture apart from a few lines at posterior margin; genae subparallel; ocelli present; dorsal length of compound eyes greater than one third of head length; postocular setae capitate, as longas dorsal eye length; maxillary stylets retracted to postocular setae and about one quarter of head width apart medially, weak maxillary bridge present (Fig. 13). Antennal segments III and IV each with 2 sense cones, IV–VII each with pedicel; VIII broadly connected with VII (Fig. 36). Pronotum without sculpture; 4 pairs of capitate major setae, am setae small and pointed. Mesonotum with with weak transverse sculpture, lateral setal pair capitate; metanotum without sculpture medially, median setal pair long and finely pointed. Prosternal basantra absent, ferna acute medially but not meeting; mesopresternum reduced to 2 triangles; mesoeusternal anterior margin entire. Fore tarsal tooth pointed, length equals half of tarsal width (Fig. 13). Fore wing with three small, weakly capitate, sub-basal setae; about 6 duplicated cilia present. Pelta broadly triangular with small lateral lobes; tergites III–VII each with two pairs of sigmoid wing-retaining setae, these are weak on tergite II; median tergal setae acute but not reaching posterior margins of tergites; tergite VIII median setae capitate, tergite IX setae S1 shorter than tube and capitate, S2 shorter than tube and blunt; anal setae longer than tube.

Measurements (holotype female in microns). Body length 1950. Head, length 193; width 207; postocular setae 57, distance between their bases 163; postocellar setae 10, distance between their bases 53. Pronotum, length 125; median width 250; major setae am 15, aa 45, ml 40, epim 51, pa 33. Mesonotum lateral setae 30; Metanotum median setae 29. Tergite IV median marginal setae 65; tergite VIII median setae 60, tergite IX setae S1 78, S2 78. Tube length 118. Anal setae 175. Antennal segments III–VIII length (width) 60 (30), 60 (30), 55 (26), 45 (23), 43 (21), 30 (13). Fore wing length 75, sub-basal setae S1 28, S2 28, S3 25.

Female aptera. Similar to macropterous female, but compound eyes smaller, ocelli absent; pelta D-shaped; tergal wing-retaining setae short and pointed.

Measurements (in microns). Body length 1680. Head, length 185; width 170; postocular setae 51.

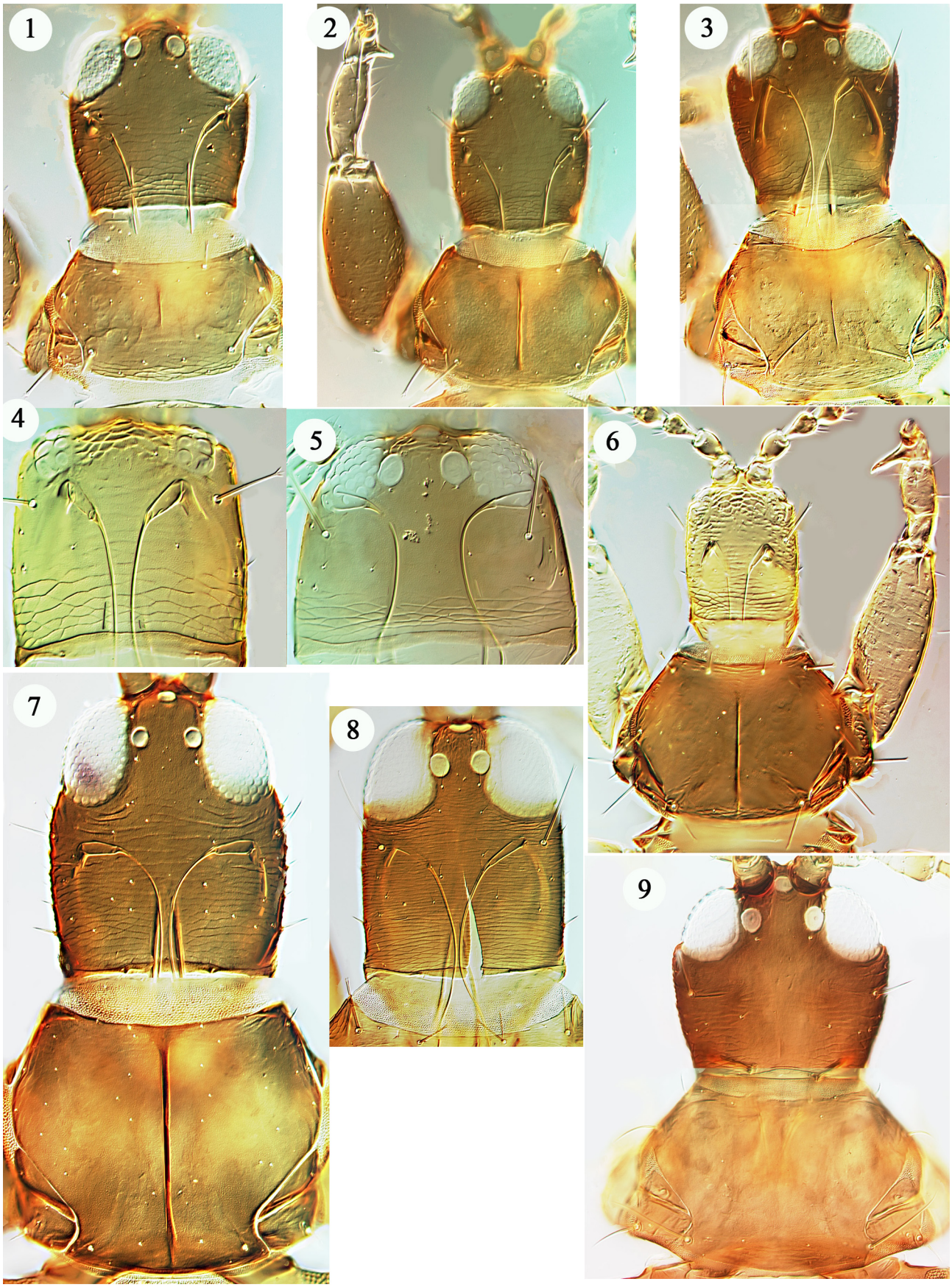
Male aptera. Similar to apterous female but smaller, with fore leg and tarsal tooth larger (Fig. 12); tergite IX S2 setae shorter; sternite VIII pore plate transverse, about a third of sternite width; sternites VI–VII without specialised reticulate areas laterally.

Measurements (in microns). Body length 1390. Head, length 175; width 158; postocular setae 70. Pronotum, length 128; median width 225; major setae am 10, aa 51, ml 25, epim 55, pa 40. Tergite VIII median setae 41, tergite IX setae S1 73, S2 36. Tube length 88. anal setae 133. Antennal segments III–VIII length 53, 50, 50, 49, 42, 23.

Specimens studied. Holotype female macroptera. **Victoria**, Nelson, from bark spray of living tree, 5.x.2013 (DJT 1687) in ANIC.

Paratypes: 1 female aptera and 1 male, same data as holotype.

Comments. Within the genus *Hoplothrips* this species is unusual in having a maxillary bridge. It is generally similar to *H. connexus* but with shorter median setae on tergites II–VII, and the macroptera has two pairs of well-developed sigmoid wing-retaining setae. The pore plate on sternite VIII of the male is transverse but present only on the median third of the sternite, and sternite VII has no specialised reticulate areas laterally.



FIGURES 1–9. *Hoplothrips* species—head and pronotum. **(1)** *bellingeni* female; **(2)** *bellingeni* male; **(3)** *corticis*; **(4)** *fungosus* female aptera; **(5)** *fungosus* female macroptera; **(6)** *fungosus* male aptera; **(7)** *giganteus*; **(8)** *lamingtoni*; **(9)** *lihongae*.

***Hoplothrips oakeyi* sp. n.**
(Figs 14, 15, 37, 51, 60)

Female macroptera. Body, legs and antennae light brown, fore tibia lighter, all tarsi yellow; antennal segment III with base yellow (Fig. 37). Head with genae convex, weakly sculptured posterolaterally; dorsal length of compound eyes about half of head length; postocular setae pointed, shorter than dorsal eye length; maxillary stylets retracted to postocular setae, close together medially (Fig. 14). Antennal segment III with 3 long sense cones, IV with 4 long sense cones, IV–VII with distinct pedicels, VIII broadly connected to VII (Fig. 37). Pronotum without sculpture; major setae minute to small, pa setae often slightly longer than epim, apices varying from pointed to blunt (Fig. 14). Mesonotum with weak transverse sculpture on anterior half, lateral setae minute; metanotum with no sculpture medially, median setae small and pointed (Fig. 51). Prosternal basantra absent, mesopresternum boat-shaped but slender medially, mesoeusternal anterior margin entire. Fore tarsal tooth sharply pointed, length about half of tarsal width. Fore wing sub-basal setae small, 8–11 duplicated cilia. Pelta with small lobes (Fig. 51); tergites II–VII each with a pair of sigmoid wing-retaining setae, weaker on II and VII, anterior pair on each tergite small and curved; tergite VIII median setae pointed; tergite IX setae S1 pointed, shorter than tube; anal setae longer than tube.

Measurements (holotype female in microns). Body length 2220. Head, length 202; width 225; postocular setae 50, distance between their bases 188; postocellar setae 12, distance between their bases 57. Pronotum, length 150; median width 258; major setae am 12, aa 24, ml 15, epim 41, pa 41. Mesonotum lateral setae 10; Metanotum median setae 26. Tergite IV median marginal setae 65; tergite VIII median setae 57, tergite IX setae S1 93, S2 91. Tube length 140. Anal setae 203. Antennal segments III–VIII length (width) 75 (36), 74 (38), 63 (33), 46 (28), 39 (23), 26 (17). Fore wing length 85, sub-basal setae S1 27, S2 27, S3 20.

Female microptera. Similar to macropterous female, compound eyes and ocelli smaller; mesopresternum slender boat-shaped; tergal wing-retaining seta weaker.

Measurements (in microns). Body length 2660. Head, length 200; width 203; postocular setae 38; fore wing lobe 100.

Male microptera. Similar to apterous female but smaller (Fig. 15); fore tarsal tooth stouter; tergite IX S2 setae short; sternite VIII with small indistinct circular pore plate (Fig. 60), sternites IV-VII with small areas of specialised reticulation laterally.

Measurements (in microns). Body length 1970. Head, length 197; width 173; postocular setae 51. Pronotum, length 145; median width 207; major setae am 12, aa 20, ml 16, epim 30, pa 37. Tergite IX setae S1 75, S2 48. Tube length 108, anal setae 187. Antennal segments III–VIII length 65, 63, 53, 43, 38, 28.

Specimens studied. Holotype female macroptera. **Australian Capital Territory**, Oakey Hill, from *Eucalyptus blakeleyi* dead branches, 6.iii.2011 (LAM 5445) in ANIC.

Paratypes: 3 females micropterae, 2 males, same data as holotype; Black Mountain, 1 male from dead wood, 19.ix.2011. **Queensland**, Brisbane F. P., 1 female microptera, 1 male from dead branch with moss, 16.i.2006; Mt. Coot-tha, Fire trial, 1 female microptera from dead wood, 1.xi.2007. Broadwater Lake, 10km west of Dalby, 1 female macroptera from *Casuarina cristata*, 19.x.1985. Carnarvon Station, 1 female macroptera from dead wood, 8.x.2014.

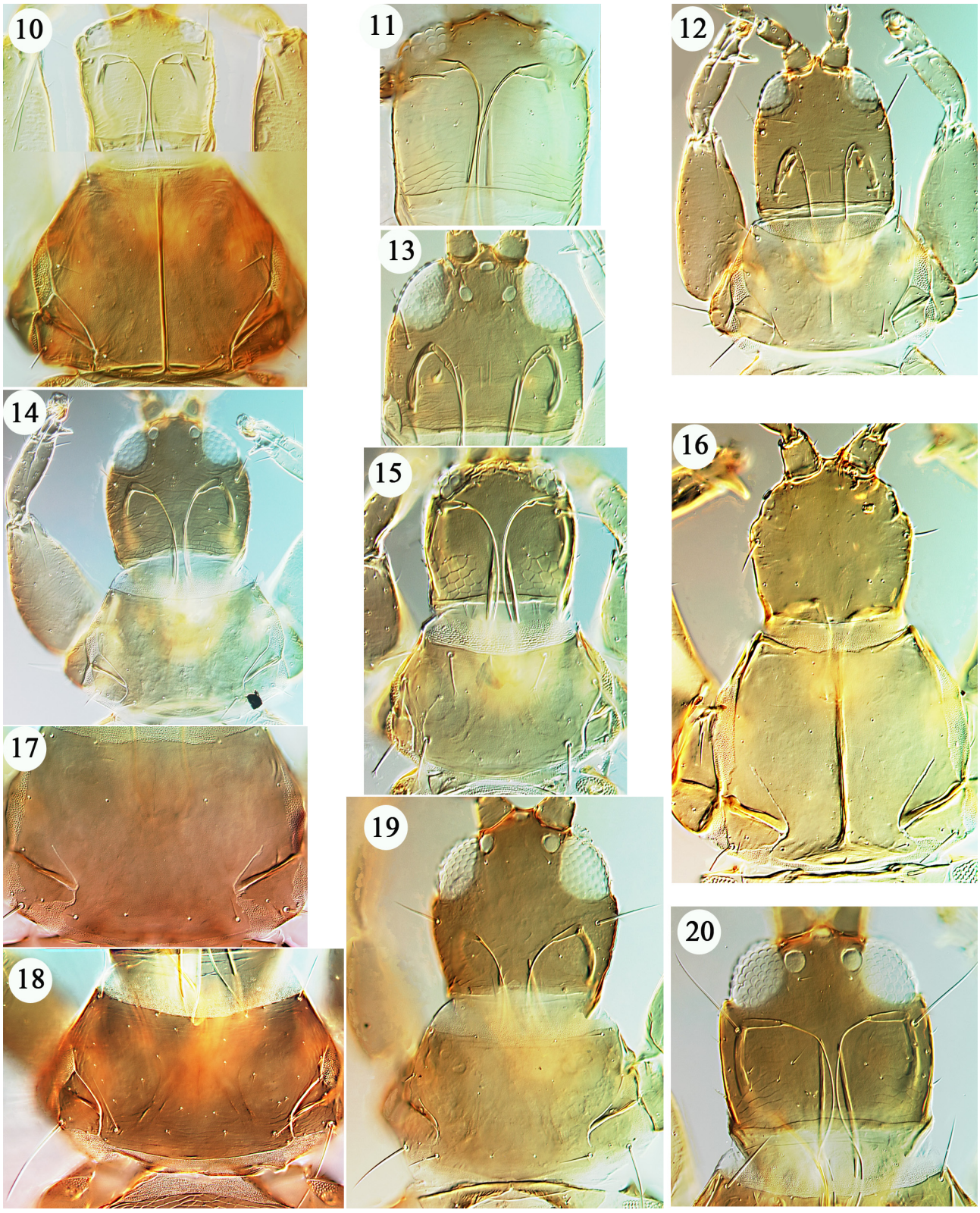
Comments. This species is probably related to the *H. fungi* complex but has antennal segment VII short and broadly joined to VIII, and the pronotal epim setae unusually short. Sternite VIII of the males is unusual in having a pore plate that is only faintly indicated in some individuals (Fig. 60).

***Hoplothrips orientalis* (Ananthakrishnan)**
(Figs 39, 52)

Carathrips orientalis Ananthakrishnan, 1969: 179.

Female macroptera. Body, femora and antennae dark brown with basal half of antennal segment III yellow; mid and hind tibiae yellowish brown at base; tarsi yellow; fore wings shaded, darker toward apex; major setae pale. Head sculptured dorsally; postocular setae long, acute; maxillary stylets retracted to compound eyes and close together medially. Antennal segments III–VII each with a distinct pedicel, sense cones on segment III long, acute, the inner

one curved (Fig. 39), 3 on III, 4 on IV; VIII with pedicel sometimes indistinct. Three pairs of pronotal major setae long, acute, but aa short and am minute. Mesopresternum transverse, often eroded medially; metathoracic sternopleural sutures present. Fore tarsal tooth present. Fore wings with 7–13 duplicated cilia. Pelta usually bell-shaped, recessed into concave anterior margin of tergite II; tergites II–VII each with 2 pairs of wing-retaining setae (Fig. 52); tergite IX posteromarginal setae bluntly acute, more than half as long as tube.



FIGURES 10–20. *Hoplothrips* species—head and pronotum. **(10)** *lowdeni* male; **(11)** *lowdeni* female; **(12)** *nelsoni* male; **(13)** *nelsoni* female; **(14)** *oakeyi* female; **(15)** *oakeyi* male; **(16)** *reedi* male; **(17)** *reedi* pronotum; **(18)** *melanurus* pronotum; **(19)** *tarsus*; **(20)** *semicaecus* female macroptera.

Female microptera. Antennal sense cones smaller, less acute, inner sense cone on III not curved; wing lobe with 1 or 2 pairs of acute setae; tergites II–VII each with 2 pairs of curved wing-retaining setae. *Male microptera*. Similar to female but sternite VIII with a transverse pore plate extending posterolaterally of spiracles; sternites III–VII with areas of complex sculpture laterally; tergite IX posteromarginal setae S2 short, stout. Large males with fore tarsal tooth larger; fore femora swollen; pronotum elongate, major setae longer; a few largest males with head ventrally bearing a horn-like tubercle between interocular setae.

Specimens studied. [micropterae except where stated] **Queensland**, Glasshouse Mts, 1 male from dead wood, 4.ix.2012; Atherton, 1 female from dead branch, 1.viii.2004; Brisbane, Mt Glorious, 1 male from rotting branch, 9.iii.2006. **Australian Capital Territory**, Oakey Hill, 2 females from *Eucalyptus blakeleyi* dead twigs, 21.iv.2011; Black Mountain, 1 female macroptera, 9 females, 10 males from *Acacia* dead branch, 30.iv.2011. **New South Wales**, Windellama, 1 female, 1 male from dead branches, 4.vi.2011. **Lord Howe Island**, 1 male macroptera; 4 females, 5 males with larvae from old dead branches, 24.xi.1996; 2 male macropterae from dead branches, 26.xii.2001; 15 female macropterae, 10 males, 1 female from dead twigs, 25.xii.2011. **Norfolk Island**, 5 female and 5 male macropterae; 7 female mic. from dead twigs, xii.2012; 6 females, 1 male from dead branch, 30.xi.2014. **Tasmania**, Buckland, 1 male from dead branch, 27.xi.2010. **New Zealand**, Coromandel Peninsula, 1 male from rotten branch, 13.ii.1979. **New Caledonia**, La Foa, 3 female macropterae, 3 females, 1 male from dead wood, 1-3.iv.2012.

Comments. This is a typical member the *H. fungi* complex, and is closely related to *H. fungi*, *H. karnyi* and *H. japonicus*. It is distinguished only because antennal segments IV–VI are uniformly brown rather than pale at the base (Mound 2017). Described originally from India in association with twigs of *Rubus* infested by rust fungus, this species was subsequently recorded from New Zealand (Mound & Walker, 1986), Lord Howe Island (Mound 1998), Norfolk Island (Mound & Wells 2015), and Japan, Ryukyu Islands (Okajima, 2006). The records given above indicate that this species is widespread in eastern Australia.

Hoplothrips oudeus **Mound & Walker**
(Fig. 53)

Hoplothrips oudeus Mound & Walker, 1986: 62.

Female microptera. Body light brown, tube dark brown; legs brownish yellow; antennal segments V–VIII brown, I concolourous to head, II–IV variably paler than distal segments. Head sometimes weakly reticulate in ocellar region, more clearly reticulate near posterior margin; genae convex; ocelli absent, compound eyes with about 12 facets; postocular setae capitate, much longer than dorsal eye length; maxillary stylets retracted to eyes and close together medially. Antennal segment III with 2 sense cones, IV with 3 sense cones, IV–VII with pedicel, VII distinct from but closely joined to VIII into a single unit. Pronotum without sculpture; with 5 pairs of long capitate major setae. Mesonotal lateral setae long and capitate; metanotum without sculpture, median setae capitate (Fig. 53). Prosternal basantra absent, mesopresternum eroded and slender, mesoeusternal anterior margin complete. Fore tarsal tooth absent. Fore wing lobes each with two capitate setae. Pelta semicircular; tergites II–VII wing-retaining setae minute and straight (Fig. 53); tergite VIII median setae capitate; tergite IX setae S1 shorter than tube and capitate, S2 similar to S1 or longer than tube and pointed; anal setae longer than tube.

Female macroptera. Similar to microptera, ocelli present, compound eyes with about 24 facets; fore wings without duplicated cilia; tergites III–VII each with one pair of large sigmoid wing-retaining setae.

Male microptera. Similar to female but smaller, fore tarsi with small tooth; sternite VIII almost completely occupied by pore plate; sternite VII without specialised reticulate area; tergite IX S2 setae a little shorter than S1 and capitate.

Specimens studied. Paratype female [collected with holotype]. **New Zealand**, North Island, West Taupo, 3.xi.1953. **Australian Capital Territory**, Black Mountain, 1 female from leaf litter, 29.xi.1967. **New South Wales**, Monga Forest, 2 females, 1 male from *Eucalyptus* litter, 10.iv.2019. **Queensland**, Brisbane, The Gap, 4 females, 3 males from dry sclerophyll litter, 13.viii.2008. Mt Coot-tha, 1 female from dry sclerophyll litter, 12.vii.2008. Brisbane Forest Park, Centre Road, 1 male from litter, 2.viii.2008. Cooloola, 1 female macroptera, 1 female, 1 male from litter, 29.iii.1977. Carnarvon Station, 3 females, 1 male from leaf litter, 15.x.2014; 3 females in pitfall trap, x.2014; 6 females in pitfall trap, xii.2010. (All micropterae except where indicated)

Comments. The original description of this species from New Zealand referred to the three specimens listed above from Cooloola, Queensland, as non-paratypes. Although presumably fungus-feeding as are other members of *Hoplothrips*, this species has been collected only from leaf litter. It is distinguished from most members of *Hoplothrips* by the pair of large metanotal median setae with capitate apices, and the pore plate that occupies most of sternite VIII in males. It is also unusual in having the eighth antennal segment broadly based, and the five pairs of equally long pronotal major setae with capitate apices. The original description of the micropterous female of this species states "major setae expanded at apex except for S2 on VIII and IX", thus indicating that these setae are pointed. However, the female paratype listed above has setae S2 on IX capitate, and this condition is shared by most of the specimens listed here. In contrast, all but one of the females from Carnarvon Station have setae S2 on IX acute and longer than the capitate S1 setae, and the single female listed from ACT shares this condition. There is also considerable difference in the colour of antennal segments II–IV, although V–VIII are consistently brown.

Hoplothrips poultoni (Bagnall & Kelly)

(Figs 40, 63)

Trichothrips poultoni Bagnall & Kelly, 1929: 90.

The identity of this species remains doubtful as it was described from a single macropterous female, taken in Victoria, although three further macropterous females were recorded subsequently from New Zealand. The species is interpreted here on the basis of the uniformly brown colour of antennal segments IV and V of the few available macropterae, but these specimens are closely similar in structure to *wrightae* **sp.n.** described below. A long series of micropterae from Canberra listed below is also considered to represent *poultoni*, despite being collected without macropterae. This species is unusual with the setae on tergite IX longer than the tube and the anterior pair of wing-retaining setae small on each tergite. The species is a typical member of the *H. fungi* complex, with long maxillary stylets, antennal segment VIII long and with a pedicel (Fig. 40), and the pore plate on sternite VIII of males (Fig. 63) similar to that of *corticis* although placed a little further forward on the sternite. The pronotal major setae are long in micropterae, with the ml setae being 190 microns in large males.

Specimens studied. Tasmania, Stewarton, 1 female macroptera in water trap, 4.i.1994. **South Australia**, Adelaide, 1 female macroptera on washing, 15.x.1967. **Australian Capital Territory**, Canberra, Black Mountain, 6 male, 30 female micropterae under *Eucalyptus* bark, 25.v.1961.

Hoplothrips reedi sp. n.

(Figs 16, 17, 29, 41, 61)

Female macroptera. Body, legs and antennae light brown, apices of tibiae, tarsi, and base of antennal segment III paler; major setae pale; fore wing weakly shaded. Head without sculpture lines; genae widest behind eyes and narrowed to base; ocelli close to eyes, dorsal length of compound eyes greater than one third of head length; postocular setae short with apex pointed; maxillary stylets retracted about halfway to postocular setae, one fifth of head width apart medially. Antennal segment III with 1 sense cone, IV with 2 sense cones, IV–VII each with pedicel, VIII slender and narrowed to base (Fig. 41). Pronotum without sculpture; major setae short and pointed, only epimeral setae well-developed (Fig. 17). Mesonotum without sculpture, lateral setal pair minute; metanotum without sculpture, median setae small and acute. Prosternal basantra absent; ferna transverse, band-like, fused medially; mesopresternum absent, mesoeusternal anterior margin extensively eroded (Fig. 29). Fore tarsal tooth sharp, about as long as half of tarsal width. Fore wing sub-basal setae minute, no duplicated cilia. Pelta triangular, no sculpture, campaniform sensilla present or absent; tergites II–VII each with 2 pairs of minute, straight, wing-retaining setae; median marginal setae arise laterally; tergite VIII median setae not elongate; tergite IX setae S1 shorter than tube, S2 longer than tube; anal setae as long as tube.

Measurements (holotype female in microns). Body length 2280. Head, length 198; width 207; postocular setae 43, distance between their bases 193; postocellar setae 5, distance between their bases 75. Pronotum, length 162; median width 228; major setae am 8, aa 8, ml 8, epim 78, pa 25. Mesonotum lateral setae 10; metanotum median

setae 10. Fore wing length 98, sub-basal setae 10. Tergite IV median marginal setae 38; tergite VIII median setae 20, tergite IX setae S1 102, S2 148. Tube length 113. Anal setae 111. Antennal segments III–VIII length (width) 50 (32), 45 (34), 43 (33), 40 (29), 41 (24), 51 (13).

Female aptera. Similar to macropterous female, but ocelli absent, compound eyes reduced to 3 facets, prosternal ferna slender, and mesonotum transverse.

Measurements (in microns). Body length 2750. Head, length 170; width 198; postocular setae 41.

Male aptera. Similar to female aptera but smaller; fore femora and tarsal tooth larger (Fig. 16); tergite IX S2 setae shorter; major males with fore femora and tarsal tooth particularly large, pronotum with prominent median ridge; sternite VIII with three small round pore plates arranged in a triangle (Fig. 61), sternites VI and VII laterally with irregular specialised reticulate areas; small males have the lateral pair of pore plates minute on sternite VIII, and sternite VII with the lateral reticulate areas weak or absent.

Measurements (in microns). Body length 2520. Head, length 187; width 186; postocular setae 40. Pronotum, length 240; median width 270; major setae am 7, aa 7, ml 7, epim 70, pa 20. Tergite VIII median setae 12, Tergite IX setae S1 52, S2 33. Tube length 100, anal setae 110. Antennal segments III–VIII length 57, 45, 48, 43, 42, 52.

Specimens studied. Holotype female macroptera. **New South Wales**, Glenfield, from *Casuarina* under bark, 21.v.1959 (E.M. Reed) in ANIC.

Paratypes: same data as holotype, 5 female macropterae, 5 male apterae. **Australian Capital Territory**, Black Mountain, 7 female dealate macropterae, two female apterae, 1 male from *Acacia* dead branches and lichen, 30.iv.2011; Oakey Hill, 3 female macropterae (1 dealate), 2 female apterae, 4 males from *Eucalyptus* dead branch, 5.iii.2011. **Queensland**, Ormiston, 1 female macroptera from water trap, 12.x.1966. **Victoria**, Nelson, 1 female dealate macroptera from *Acacia* dead twigs, 13.iii.2011.

Comments. This species is remarkable among Phlaeothripidae, and apparently unique among *Hoplothrips* species, in the form of the prosternal ferna that are transverse, band-like and fused medially. It is also unusual in having the prothoracic notopleural sutures incomplete at the anterior end (Figs 16, 17), but complete at the posterior end, in having only a single sense cone on the third antennal segment, and in the three small pore plates on sternite VIII of males (Fig. 61). There is a considerable range in body size between the largest and smallest males.

Hoplothrips semicaecus (Uzel)

(Figs 20, 42, 43, 44)

Trichothrips semicaeca Uzel, 1895: 249.

Macropterous female. Body, femora and antennae light brown, tibiae and tarsi yellow, and antennal segment III partly yellow; fore wings pale. Head with maxillary stylets retracted to postocular setae, less than one fifth of head width apart medially; postocular setae bluntly pointed (Fig. 20). Antennal segment III apex variable in shape with 2 (or 3) sense cones, IV with 2 (or 3–4) sense cones; ventrally IV–VI with variable number of small sensory hairs (up to 25 on IV); VIII only weakly narrowed to base (Fig. 42). Pronotum without sculpture medially; with 4 pairs of pointed major setae, am small; prosternal basantra absent. Fore tarsal tooth small. Metanotum without sculpture medially. Fore wing with 8–10 duplicated cilia. Abdominal tergites II–VII with two pairs of curved wing-retaining setae; tergite IX setae S1 pointed, more than half as long as tube.

Female aptera. Largely yellow with tube brown, tergites shaded medially; antennal segment IV with fewer sensory hairs ventrally (Fig. 43); compound eyes small, postocular setae long and finely pointed; maxillary stylets close together medially; fore tarsal tooth large; tergal wing-retaining setae small and straight. *Male aptera*. Eyes small, no ocelli; large males with fore femora swollen and tarsal tooth large; tergite IX setae S2 about half as long as S1; sternites IV–VII with specialised reticulate areas laterally, VIII with irregular transverse pore plate not extending the full width of sternite.

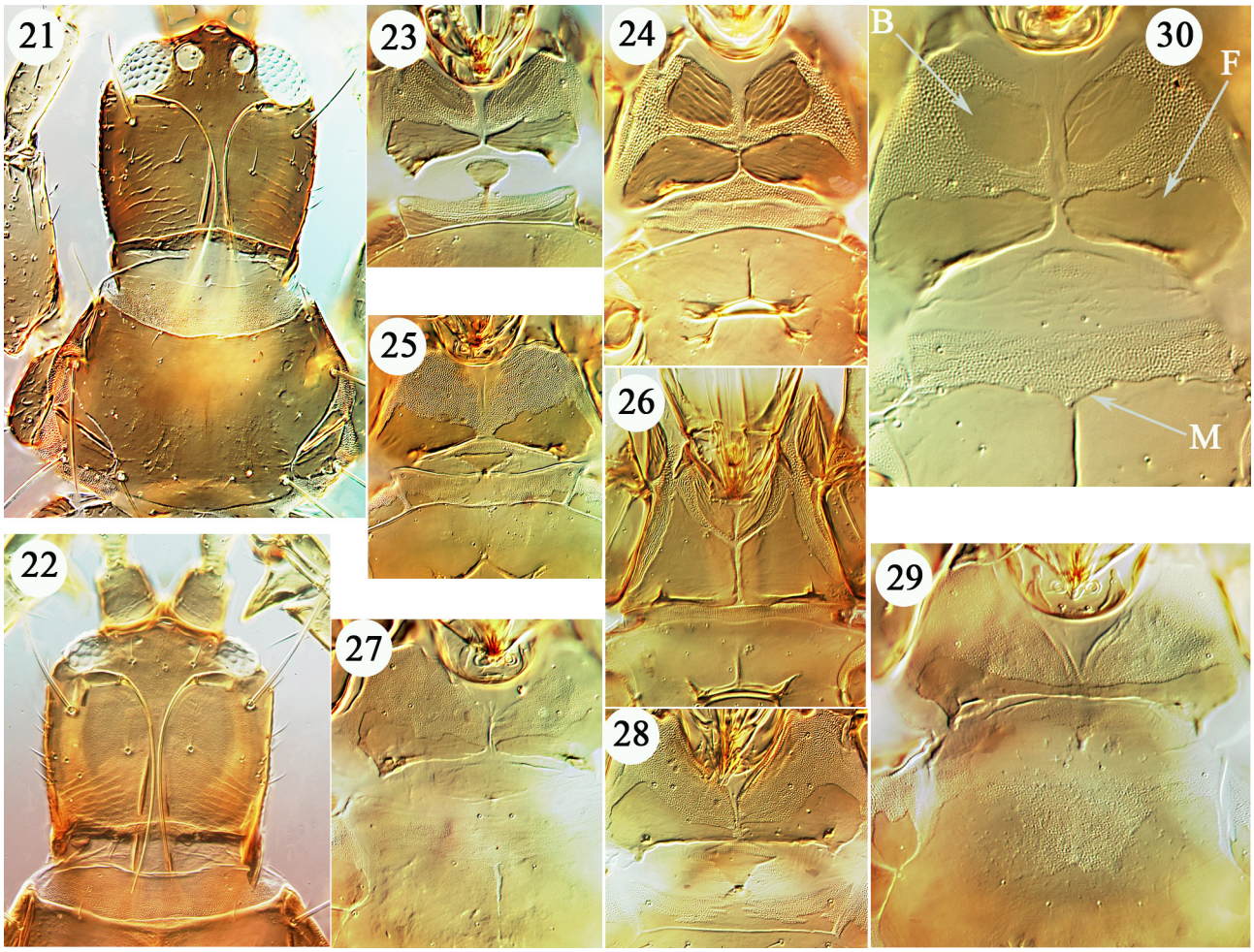
Specimens studied. Australian Capital Territory, Mt Majura, 1 male aptera from leaf litter, 9.i.1968. **Tasmania**, Picton Valley, 1 female macroptera from dead wood, 29.v.2001.

Comments. Described from Europe where it is widespread (Mound *et al*. 2018), and with one synonym from North America, this species is also recorded from Japan and New Zealand. However, the range of variation recorded amongst specimens from New Zealand (Mound & Walker 1986) suggests that this species originated in the southern hemisphere, with subsequent dispersal to Europe and America by human trading. Prior to the description above of

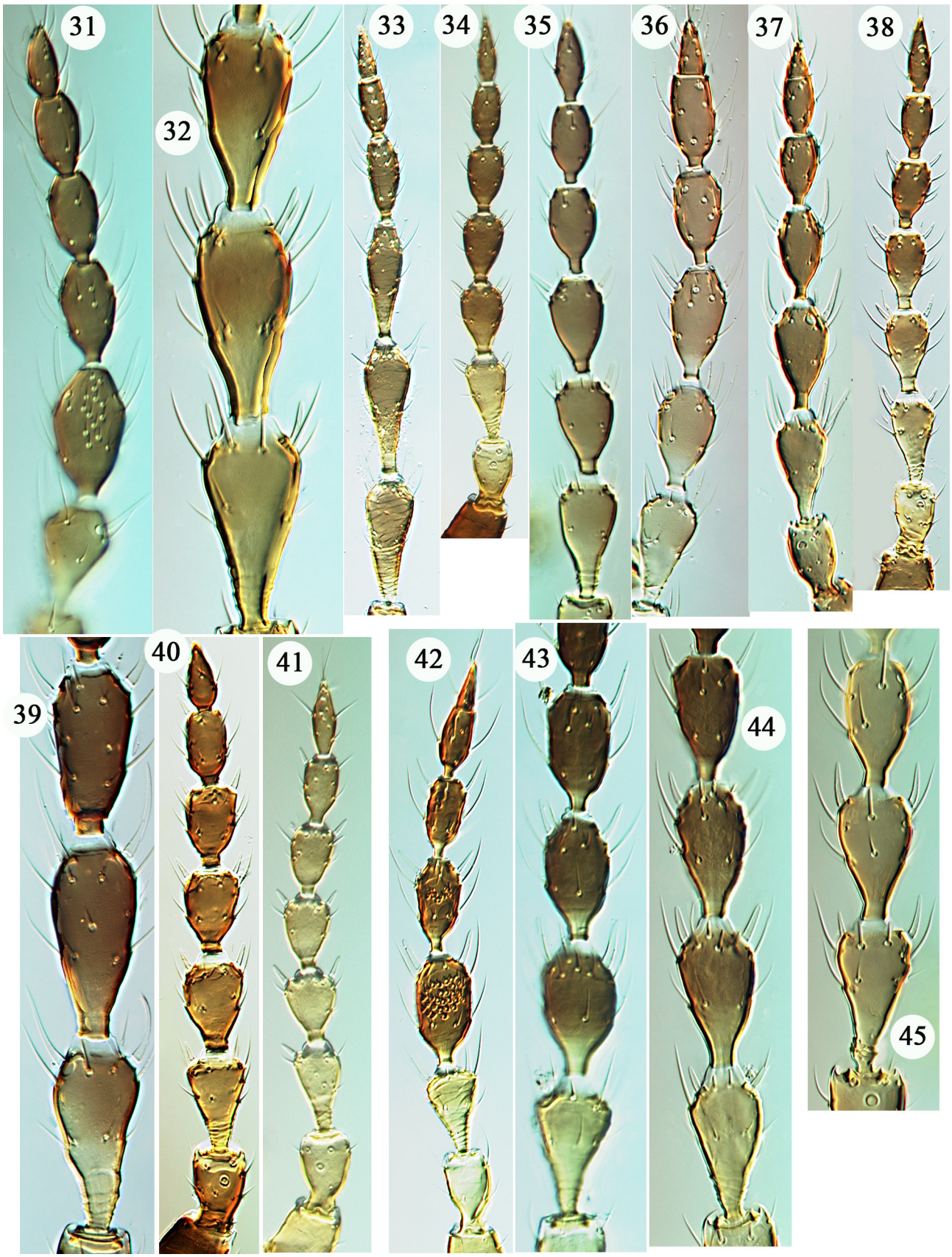
bellingeni, the antennae of *semicaecus* were considered unique amongst *Hoplothrips* species worldwide in bearing ventrally on antennal segment IV a group of small sensory hairs (Fig. 42) (*sensilla basiconica*). The similarity in the antennae of these two species might support the suggestion that *semicaecus* is part of the Australasian diversification within *Hoplothrips*, however *bellingeni* and *semicaecus* do not seem to be particularly closely related, judging from the differences in their maxillary stylets.

***Hoplothrips tarsus* sp. n.**
(Figs 19, 27, 55)

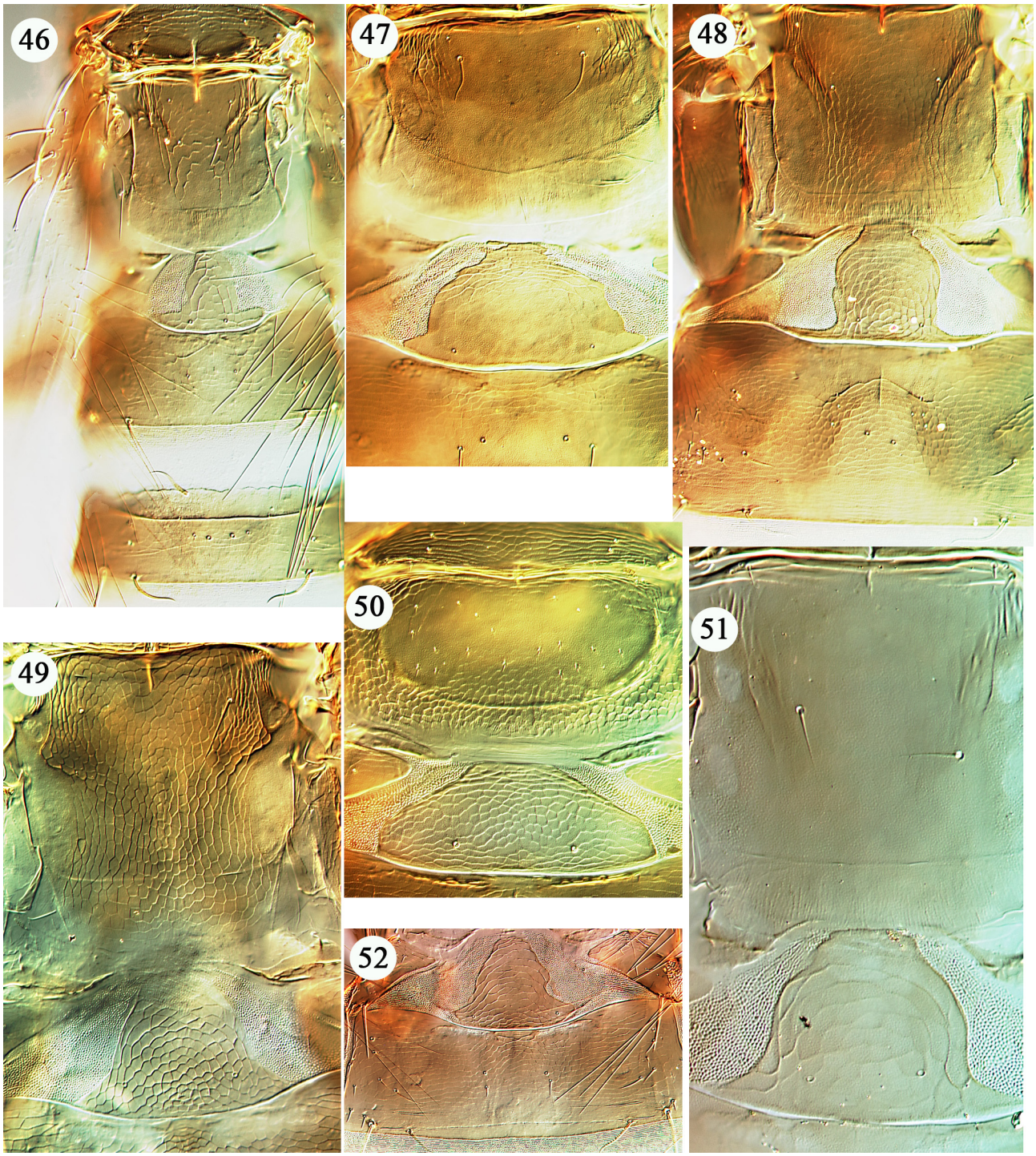
Female macroptera (dealate). Body, legs and antennae light brown; tarsi and tibiae almost yellow, and bases of antennal segments III–VI pale. Head without sculpture except near posterior margin; genae widest behind eyes, narrowed to base; hind ocelli close to eyes; dorsal length of compound eyes greater than one third of head length; postocular setae pointed, as long as dorsal eye length; maxillary stylets retracted to postocular setae and about one fifth of head width apart medially (Fig. 19). Antennal segments III and IV each with 2 sense cones, III–VIII each with pedicel. Pronotum without sculpture; major setae pointed, but only epim setae long; notopleural sutures incomplete anteriorly (Fig. 19). Mesonotum without sculpture, lateral setal pair minute; metanotum without sculpture, median setae small and acute. Prosternal basantra absent, ferna slender, transverse, but not meeting medially; mesopresternum absent, mesoeusternal anterior margin strongly eroded (Fig. 27). Fore tarsal tooth absent. Fore wing with 2 small sub-basal setae. Pelta triangular with weak lateral wings, posterior margin eroded (Fig. 55); tergites III–VII each with pair of weakly curved wing-retaining setae, median marginal setae arising laterally; tergite VIII median setae moderately developed; tergite IX setae S1 and S2 finely pointed, shorter than tube; anal setae much shorter than tube.



FIGURES 21–30. *Hoplothrips* species. Head 21–22 **(21)** *wrightae* female; **(22)** *wrightae* male. Prosternum 23–30 **(23)** *bellingeni*; **(24)** *fungosus*; **(25)** *lihongae*; **(26)** *lowdeni* male; **(27)** *tarsus*; **(28)** *wrightae*; **(29)** *reedi*; **(30)** *woodsi* (B–basantra ; F–ferna ; M–mesoeusternum anterior margin).



FIGURES 31–45. *Hoplothrips* species antennae. **(31)** *bellingeni*; **(32)** *corticis* (III–V); **(33)** *giganteus*; **(34)** *lihongae*; **(35)** *lowdeni*; **(36)** *nelsoni*; **(37)** *oakeyi*; **(38)** *wrightae*; **(39)** *orientalis* (III–V); **(40)** *poultoni*; **(41)** *reedi*; **(42)** *semicaecus* female macroptera; **(43)** *semicaecus* female microptera; **(44)** *semicaecus* male microptera; **(45)** *woodsi*.



FIGURES 46–52. *Hoplothrips* species—metanotum & pelta. **(46)** *bellingeni*; **(47)** *corticis*; **(48)** *giganteus*; **(49)** *lamingtoni*; **(50)** *melanurus*; **(51)** *oakeyi*; **(52)** *orientalis*.

Measurements (holotype female in microns). Body length 2680. Head, length 208; width 212; postocular setae 76, distance between their bases 180; postocellar setae 15, distance between their bases 72. Pronotum, length 150; median width 260; major setae am 8, aa 33, ml 24, epim 83, pa 40. Mesonotum lateral setae 8; metanotum median setae 24. Tergite IV median marginal setae 65; tergite VIII median setae 45, tergite IX setae S1 113, S2 131. Tube length 165. Anal setae 78. Antennal segments III–VIII length (width) 63 (35), 58 (35), 55 (33), 47 (31), 40 (26), 50 (15).

Specimens studied. Holotype female macroptera (dealate). **Australian Capital Territory**, Black Mountain, from *Eucalyptus* dead branches, 30.iv.2011 (LAM 5500).

Non-paratype: **Norfolk Island**, Prince Philip Drive, 1 female macroptera from leaf litter, 26.xi.2014.

Comments. The non-paratype is closely similar to the holotype in structure but has antennal segment IV with four sense cones. Although generally similar to *H. reedi* in structure, particularly in the notopleural sutures being incomplete anteriorly (Fig. 19), the female of *tarsus* has no fore tarsal tooth, the prosternal ferna are not continuous medially (Fig. 27), antennal segment III has two sense cones, and the pronotal setae and the tube are longer.

***Hoplothrips woodsi* sp. n.**
(Figs 30, 45, 54, 64)

Female aptera. Body light brown, abdominal segment IX and tube apex paler; femora light brown, tarsi and at least distal half of tibiae yellow; antennal segments VI–VIII paler than I–V. Head with weak transverse sculpture lines posterolaterally; genae sub-parallel with one or more pairs of small setae; ocelli absent, compound eyes with 3 large and 2 small facets; postocular setae blunt, longer than half the distance between their bases; maxillary stylets long, retracted to eyes, close together medially. Antennal segment III with 2 sense cones and a prominent ring-like ridge near base, IV with 2 sense cones (Fig. 45); III–VII each with pedicel; VIII slender, narrowed to base. Pronotum without sculpture; 4 pairs of major setae long and blunt, am setae no longer than discal setae. Mesonotum transverse, with weak sculpture, lateral setae minute; metanotum with weak sculpture anteriorly, median setae finely pointed (Fig. 54). Prosternal basantra present but weak, ferna transverse, mesopresternum apparently absent, mesoeusternal anterior margin eroded (Fig. 30). Fore tarsal tooth length scarcely half of tarsal width. Pelta transverse, slender, with polygonal sculpture anteriorly; tergites II–VII each with one pair of minute straight wing-retaining setae (Fig. 54); VII–VIII with median setae long, IX with setae S1 bluntly pointed and slightly shorter than tube; anal setae shorter than tube.

Measurements (holotype female in microns). Body length 2370. Head, length 203; width 205; postocular setae 90, distance between their bases 138; postocellar setae 13, distance between their bases 63. Pronotum, length 187; median width 325; major setae am 15, aa 68, ml 88, epim 95, pa 87. Mesonotum lateral setae 12; metanotum median setae 53. Tergite IV median marginal setae 120; tergite VIII median setae 93, tergite IX setae S1 145, S2 133. Tube length 173. Anal setae 153. Antennal segments III–VIII length (width) 68 (38), 58 (35), 62 (35), 51 (28), 45 (23), 43 (17).

Female macroptera. Similar to female aptera in colour and chaetotaxy; compound eyes multifaceted, ocelli present; fore wing without duplicated cilia.

Measurements (in microns). Body length 2260. Head, length 212; width 215; postocular setae 97. Fore wing length 107, sub-basal setae S1 65, S2 80.

Male aptera. Similar to apterous female but smaller, fore leg and tarsal tooth larger; prosternal basantra more robustly sclerotized; tergite IX setae S2 shorter and stout; sternite VIII pore plate transverse, slender and reaching lateral margins of sternite (Fig. 64).

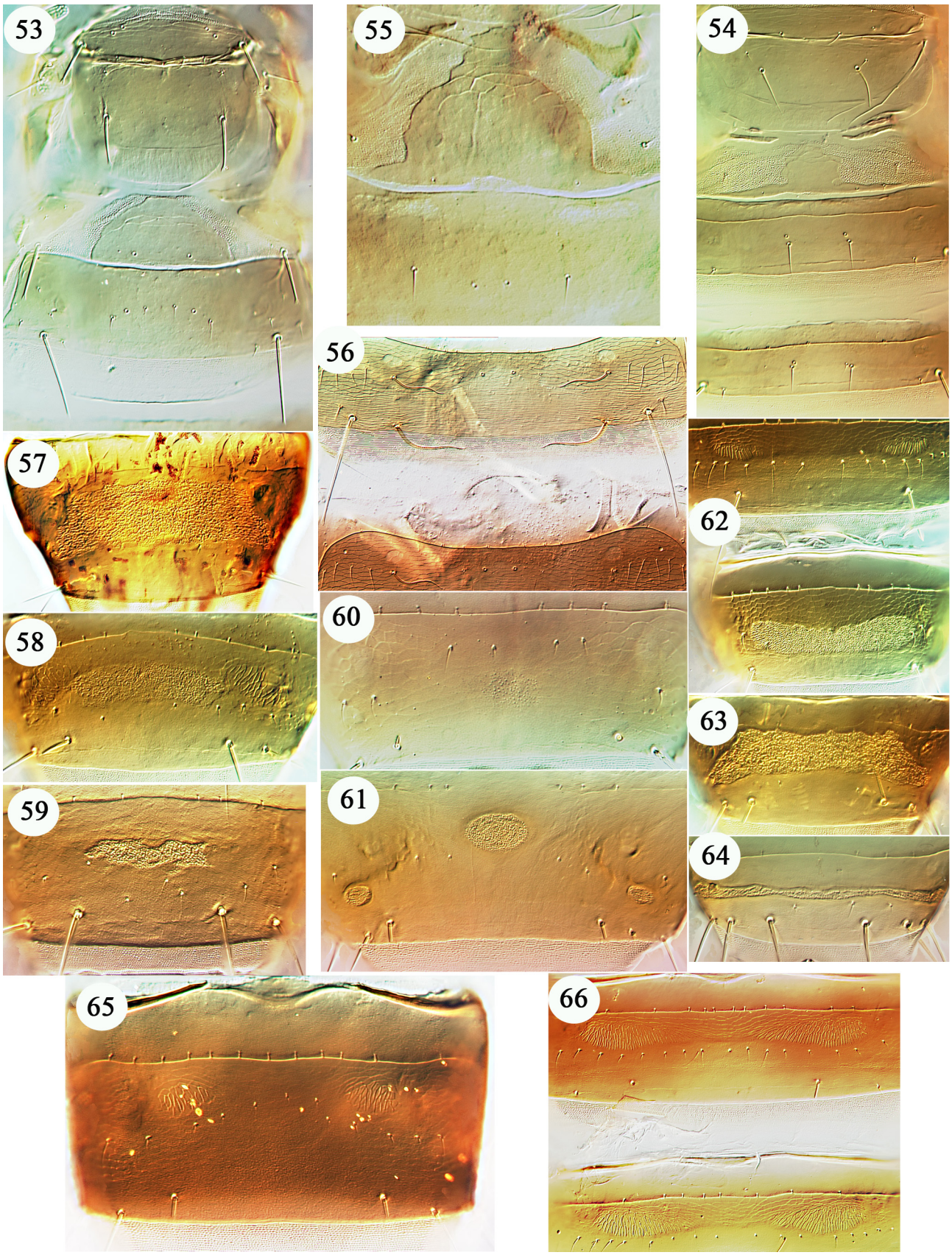
Measurements (in microns). Body length 1960. Head, length 193; width 160; postocular setae 77, postocellar setae 9. Pronotum, length 202; median width 278; major setae am 8, aa 20, ml 82, epim 81, pa 82. Tergite VIII median setae 80, Tergite IX setae S1 123, S2 65. Tube length 147, anal setae 147. Antennal segments III–VIII length 61, 53, 55, 48, 38, 38.

Specimens studied. Holotype female aptera. **Australian Capital Territory**, Black Mountain, from leaf litter, 29.xi.1967 (C.G. Brooks) in ANIC.

Paratypes: ACT, Mt. Ainslie, 1 female from leaf litter, 9.i.1968; ACT, Woods Reserve, 1 female, 3 males from *Eucalyptus* litter, 20-21.iv.2016. **Tasmania**, Lake Pedder, 1 female macroptera, ii-iii.2014. **South Australia**, Monarto Sth, Mallee Site, 1 female, 13.vi.1969; 90 mile Desert, 1 female, 5.x.1977; Tailembend, 1 female, 3.iv.1969.

Non-paratypes: **South Australia**, Koonamore, 1 female from Mallee litter, 18.ii.1974. **Queensland**, Cooloola, 1 female, 23.vi.1977. [All apterae except where indicated].

Comments. The two non-paratype females lack antennae and have the pelta strongly eroded and tergites II–VI with well-developed median setae. The one from South Australia has the pronotal am setae well developed. The one from Queensland has mesonotal lateral setae long, and the prosternal basantra not developed. It seems that *H. woodsi* is widespread but not common in leaf-litter in southeastern Australia.



FIGURES 53–66. *Hoplothrips* species. Metanotum & pelta 53–54 **(53)** *oudeus*; **(54)** *woodsi*. **(55)** *tarsus* pelta. **(56)** *lamingtoni* tergite II. Male sternite VIII pore plate 57–64 **(57)** *corticis*; **(58)** *lihongae*; **(59)** *wrightae*; **(60)** *oakeyi*; **(61)** *reedi*; **(62)** *melanurus* (VII–VIII); **(63)** *poultoni*; **(64)** *woodsi*. Male sternites 65–66 **(65)** *giganteus* (VII); **(66)** *melanurus* (V–VI).

***Hoplothrips wrightae* sp. n.**
(Figs 21, 22, 28, 38, 59)

Male microptera. Body and legs brownish, tube darker medially, tarsi paler, antennae brown, base of antennal segments III–V yellow (Fig. 38); major setae pale. Head with weak transverse sculpture lines basally; genae sub-parallel and a little narrowed basally; compound eyes small, less than one eighth of head length; postocular setae pointed, much longer than half the distance between their bases; maxillary stylets retracted to eyes and close together medially (Fig. 22). Antennal segment III with 3 or 2 sense cones, IV with 4 or 3 sense cones, VIII narrowed to base (Fig. 38). Pronotum without sculptures; major setae pointed, am small, ml longest. Mesonotum with transverse polygonal sculpture, lateral setae small; metanotum reticulate bilaterally, median setae finely pointed. Prosternal basantra absent, ferna almost meeting medially; mesopresternum eroded completely; mesoeusternal anterior margin entire (Fig. 28). Fore tarsal tooth sharp, as long as tarsal width (Fig. 22). Fore wing lobes with two long sub-basal setae. Pelta triangular with slender lateral lobes; tergites II–VII each with one pair of weak sigmoid wing-retaining setae; tergite VIII median setae pointed; tergite IX setae S1 longer than tube and pointed, S2 short; anal setae shorter than tube; sternite VIII pore plate transverse and no wider than half of sternite width (Fig. 59); sternites VI–VII with specialised reticulation laterally.

Measurements (holotype male in microns). Body length 2860. Head, length 218; width 200; postocular setae 125, distance between their bases 158, postocellar setae 25, distance between their bases 55. Pronotum, length 275; median width 363; major setae am 23, aa 100, ml 163, epim 153, pa 155. Metanotum median setae 40. Tergite IV median marginal setae 180; tergite VIII median setae 100, tergite IX setae S1 223, S2 80. Tube length 203. Anal setae 158. Antennal segments III–VIII length (width) 80 (40), 70 (39), 67 (38), 63 (35), 57 (28), 65 (22).

Female microptera. Similar to male microptera but larger; fore femora and tarsal tooth smaller; tergite IX S2 setae much longer.

Measurements (in microns). Body length 3270. Head, length 225; width 223; postocular setae 120, postocellar setae 25. Pronotum, length 218; median width 338; major setae am 23, aa 100, ml 180, epim 160, pa 170. Tergite VIII median setae 108, Tergite IX setae S1 258, S2 213. Tube length 218, anal setae 150. Antennal segments III–VIII length 80, 75, 74, 70, 60, 68.

Female macroptera. Similar to female microptera, but compound eyes multifaceted, ocelli bigger (Fig. 21); fore wing developed with about 10 duplicated cilia, tergites II–VII each with the single pair of sigmoid wing-retaining setae stronger than in microptera.

Measurements (in microns). Body length 3040. Head, length 237; width 225; postocular setae 105. Fore wing length 107, sub-basal setae S1 82, S2 115.

Specimens studied. Holotype male microptera. **Queensland**, Carnarvon Station, White Stallion Springs, from *Leptospermum* leaf litter, 15.x.2014, S.G. Wright, in Queensland Museum, Brisbane.

Paratypes: 3 male, 4 female micropterae, 5 female macropterae, taken with holotype; same locality, 1 female microptera from leaf litter, 8.x.2014.

Comments. This species shares with *H. poultoni* the unusually long setae on tergite IX that are longer than the length of the tube. However, the males have a small, transverse pore plate on sternite VIII that does not extend across the sternite (Fig. 59), and in micropterae the antennal segments are more slender than in *H. poultoni*.

References

Amyot, C.J.B. & Audinet-Serville, J.G. (1843) *Histoire Naturelle des Insectes. Hémiptères*. Librairie encyclopédique de Roret, Paris, 657 pp.

Ananthakrishnan, T.N. (1969) Mycophagous Thysanoptera. 1. *Indian Forester*, 95, 173–185.

Bagnall, R.S. (1919) Brief descriptions of new Thysanoptera X. *Annals and Magazine of Natural History*, Series 9, 4, 253–277.
https://doi.org/10.1080/00222931908673889

Bagnall, R.S. & Kelly, R. (1929) On a new species of *Trichothrips* from Australia. *Entomologist's monthly Magazine*, 65, 90–91.

Crespi, B.J. (1986) Territoriality and fighting in a colonial thrips, *Hoplothrips pedicularius*, and sexual dimorphism in Thysanoptera. *Ecological Entomology*, 11, 119–130.
https://doi.org/10.1111/j.1365-2311.1986.tb00286.x

Crespi, B.J. (1988) Adaptation, compromise and constraint: the development, morphometrics and behavioral basis of a fighter-flier polymorphism in male *Hoplothrips karnyi* (Insecta, Thysanoptera). *Behavioral Ecology and Sociobiology*, 23, 93–104. https://doi.org/10.1007/BF00299892

Dang, L.H., Mound, L.A. & Qiao, G.X. (2014) Conspectus of the Phlaeothripinae genera from China and Southeast Asia (Thysanoptera, Phlaeothripidae). *Zootaxa*, 3807 (1), 1–82. https://doi.org/10.11646/zootaxa.3807.1.1

De Geer, C.F. (1773) *Mémoires pour servir à l'histoire des insectes. Tome Troisième*. L.L. Grefing, Stockholm [Hesselberg], VIII + 696 + 2 pp., 44 pls.

Eow, L.X., Mound, L.A., Tree, D.J. & Cameron, S.L. (2014) Australian species of spore-feeding Thysanoptera in the genera *Carientothrips* and *Nesothrips* (Phlaeothripidae: Idolothripinae). *Zootaxa*, 3821 (2), 193–221. https://doi.org/10.11646/zootaxa.3821.2.2

Hood, J.D. (1919) Two new genera and thirteen new species of Australian Thysanoptera. *Proceedings of the Biological Society of Washington*, 32, 75–92.

Lindner, M.F., Ferrari, A., Mound, L.A. & Cavalleri, A. (2018) *Holopothrips* diversity—a Neotropical genus of gall-inducing insects (Thysanoptera, Phlaeothripidae). *Zootaxa*, 4494 (1), 1–99. https://doi.org/10.11646/zootaxa.4494.1.1

Minaei, K. & Mound, L.A. (2014) The *Liothrips*-lineage of thrips (Thysanoptera: Phlaeothripidae) from Iran with the first record of micropterous morph of a *Liothrips* species. *Zootaxa*, 3889 (1), 107–117. https://doi.org/10.11646/zootaxa.3889.1.6

Moulton, D. (1928) New Thysanoptera from Formosa. *Transactions of the Natural History Society of Formosa*, 18, 287–328.

Mound, L.A. (1998) Thysanoptera from Lord Howe Island. *Australian Entomologist*, 25 (4), 113–120.

Mound, L.A. (2017) Intraspecific structural variation among Hawaiian *Hoplothrips* (Thysanoptera, Phlaeothripidae), with ten new synonymies and one new species. *ZooKeys*, 722, 137–152. https://doi.org/10.3897/zookeys.722.22131

Mound, L.A, Collins, D. & Hastings, A. (2018) Thysanoptera Britannica et Hibernica. A guide to British thrips**.** Lucidcentral.org, Identic Pty Ltd, Queensland, Australia. Available from: https://keys.lucidcentral.org/keys/v3/british_thrips/ (accessed 28 August 2019)

Mound, L.A. & Marullo, R. (1996) The thrips of Central and South America: an introduction. *Memoirs on Entomology*, *International*, 6, 1–488.

Mound, L.A. & Minaei, K. (2007) Australian thrips of the *Haplothrips* lineage (Insecta: Thysanoptera). *Journal of Natural History*, 41, 2919–2978. https://doi.org/10.1080/00222930701783219

Mound, L.A. & Tree, D.J. (2013) Fungus-feeding thrips from Australia in the worldwide genus *Hoplandrothrips* (Thysanoptera, Phlaeothripinae). *Zootaxa*, 3700 (3), 476–494. https://doi.org/10.11646/zootaxa.3700.3.8

Mound, L.A. & Tree, D.J. (2014) The minute, fungus-feeding species of *Sophiothrips* (Thysanoptera, Phlaeothripinae) from Australia and New Zealand. *Zootaxa*, 3860 (2), 184–194. https://doi.org/10.11646/zootaxa.3860.2.5

Mound, L.A. & Tree, D.J. (2015) The genus *Lissothrips* and *Williamsiella* from mosses and lichens in Australia and New Zealand (Thysanoptera, Phlaeothripinae). *Zootaxa*, 3946 (3), 361–373. https://doi.org/10.11646/zootaxa.3946.3.4

Mound, L.A. & Tree, D.J. (2016) Australian mycophagous species of the genus *Deplorothrips* (Thysanoptera, Phlaeothripinae). *Zootaxa*, 4208 (3), 201–220. https://doi.org/10.11646/zootaxa.4208.3.1

Mound, L.A. & Walker, A.K. (1986) Tubulifera (Insecta: Thysanoptera). *Fauna of New Zealand*, 10, 1–140. https://doi.org/10.7931/J2/FNZ.10

Mound, L.A. & Wells, A. (2015) Endemics and adventives: Thysanoptera (Insecta) Biodiversity of Norfolk, a tiny Pacific Island. *Zootaxa*, 3964 (2), 183–210. https://doi.org/10.11646/zootaxa.3964.2.2

Okajima, S. (2006) *The Insects of Japan. Volume 2. The suborder Tubulifera (Thysanoptera)*. Touka Shobo Co. Ltd., Fukuoka, 720 pp.

Priesner, H. (1960) Das System der Tubulifera (Thysanoptera). *Anzeiger mathematisch-naturwissenschaftliche Klasse, Österreichische Akademie der Wissenschaften*, 13, 283–296.

ThripsWiki (2019) Thrips Wiki-providing information on the World's thrips. Available from: http://thrips.info/wiki/Main Page (accessed 28 August 2019)

Uzel, H. (1895) *Monographie der Ordnung Thysanoptera*. Königratz, Bohemia, 472 pp.

Wang, J., Mound, L.A. & Tree, D.J. (2019) Leaf-litter thrips of the genus *Psalidothrips* (Thysanoptera, Phlaeothripidae) from Australia, with fifteen new species. *Zootaxa*, 4686 (1), 053–073. https://doi.org/10.11646/zootaxa.4686.1.2