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Rediagnoses of the Asian genera *Xylaplothrips* and *Mesandrothrips* (Thysanoptera, Phlaeothripinae, Haplothripini), with keys to Australian species

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Abstract

The genus *Xylaplothrips* is re-diagnosed, 11 species are listed as appropriately included in this genus of which three are **new combinations** from *Haplothrips* (*X. acaciae*; *X. collyerae*; *X. gahniae*). A further six species are listed as *incertae sedis* within *Xylaplothrips* and a key is provided to the four species of this genus known from Australia including *X. anarsius* **sp.n.** The genus *Mesandrothrips* is recalled from synonymy with *Xylaplothrips*, and a list is provided of 20 appropriately included species of which 14 are **new combinations** from *Xylaplothrips* (*M. caliginosus*; *M. clavipes*; *M. darci*; *M. dubius*; *M. emineus*; *M. flavitibia*; *M. flavus*; *M. inquilinus*; *M. montanus*; *M. pictipes*; *M. pusillus*; *M. reedi*; *M. subterraneus*; *M. tener*), and one is a new combination from *Haplothrips* (*M. inquinatus*). A key is provided to 10 species of this genus known from Australia, including three species transferred from *Haplothrips*, together with *M. austrosteensia* **sp.n.**, *M. googongi* **sp.n.**, *M. kurandae* **sp.n.**, *M. lamingtoni* **sp.n.** and *M. oleariae* **sp.n.** The type species, *M. inquilinus*, is widespread across Southeast Asia as an invader of thrips galls, and *Haplothrips darci* Girault based on a single female from Queensland is considered closely related.

Key words: new species, new combinations, gall invaders

Introduction

Most of the almost 3000 thrips species in the sub-family Phlaeothripinae (ThripsWiki 2019) feed either on fungal hyphae or else on green leaves. In contrast, the habitat most commonly associated with thrips, flower-living, is limited among Phlaeothripinae almost entirely to members of the tribe Haplothripini (Minaei & Mound 2008). A list of the 35 genera that were included in this tribe was provided by Mound and Minaei (2007), but feeding habits are diverse even within this tribe. Flower-inhabiting occurs mainly among members of the single large worldwide genus, *Haplothrips*, although among the 244 species listed in this genus there are a few that are predatory, such as *H. subtilissimus* and its relatives (Minaei & Mound 2008). The general appearance and body form of species in the Haplothripini is remarkably uniform, with several monobasic genera being distinguished on unusual autapomorphies that probably have limited phylogenetic significance.

Within the Haplothripini, three genera, *Apterygothrips, Karnyothrips,* and *Xylaplothrips* are more species-rich, each comprising 40, 48 and 27 species respectively. The first is an assemblage of *Haplothrips*-like species that share the absence of wings, and this group is almost certainly polyphyletic. *Karnyothrips* is even more weakly diagnosed (Okajima 2006), and currently appears to be an almost arbitrary assemblage of *Haplothrips*-like species that sometimes have the fore tarsal tooth small and arising distally, and often have long anal setae. The third genus, *Xylaplothrips*, is the target of the studies presented here, as it clearly comprises more than one group of unrelated species, although these occur mainly in the Southeast Asian region. As pointed out by Okajima (2006), *Xylaplothrips* is "scarcely distinguished from *Haplothrips* and is "undoubtedly polyphyletic". The lack of clear generic diagnoses to ensure that each of these genera represents a single evolutionary lineage renders it impossible to consider evolutionary patterns of host and habitat exploitation. It is probably significant that each of these three genera includes species that live at ground level, on dead branches or on living plants, and are phytophagous, gall-invaders, mycophagous or predatory.

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In a recent web-based account of Thysanoptera from Britain (Mound *et al.* 2018) it was pointed out that probably only four described species are congeneric with the type-species of *Xylaplothrips,* but no attempt was made to consider the relationships of the remaining species listed under that name (ThripsWiki 2019). The objectives of the studies presented here are to re-diagnose the genus *Xylaplothrips* and list the few species that are appropriately included, to recall from synonymy the genus *Mesandrothrips* to include those appropriate species from *Xylaplothrips* for which information is available, and to list a further six species whose identity and generic position remains in doubt. A key is provided to ten species from Australia that are here placed in *Mesandrothrips,* of which five are newly described, also a key to four species of *Xylaplothrips* from Australia of which one is described as new.

The re-diagnoses of the two genera provided here are based on the number of sense cones on antennal segments III and IV. Species of *Xylaplothrips* bear two sense cones on both of these segments, species of *Mesandrothrips* bear three sense cones on III and four on IV, and *Haplothrips* species have one or two on III and usually four on IV. This decision might well be questioned, considering the variation in number of such sense cones that can be observed on these segments in some genera (Cavalleri *et al*. 2016). However, the decisions adopted here are not entirely arbitrary, but show some correlation with geographical distributions and host associations, and are considered to produce suitable patterns for further analysis in the future.

Acknowledgements, depositaries and abbreviations. We are grateful to Andrea Hastenpflug-Vesmanis at Frankfurt, and to Paul Brown at London, for much help with loans from the thrips collections under their care. Holotypes of the new species are in ANIC, the Australian National Insect Collection, CSIRO, Canberra; with many specimens in QDPC, the Queensland Primary Industries Insect Collection, Brisbane; the holotype of *M. darci* (Girault) is in the Queensland Museum (QM). The following abbreviations are used for pronotal setae: am anteromarginals, aa anteroangulars, md midlaterals, epim epimerals, pa posteroangulars. S1, S2 & S3 are used to indicate setae on tergite IX, with S1 setae being the most median pair, and S3 the most lateral pair. Nomenclatural details are available in ThripsWiki (2019).

Xylaplothrips Priesner

Xylaplothrips Priesner, 1928: 572. Type species: *Cryptothrips fuliginosa* Schille, 1910, by monotypy.

This genus is interpreted here as comprising those *Haplothrips*-like species that have just two sense cones on antennal segments III and IV. These species seem to be associated with dead branches, but it remains unclear whether they behave as predators or as fungus-feeders. The type species*, fuliginosus,* has been taken on dead branches, as have *ulmi* and *fungicola,* but *zawirskae* was described from a single female taken in a Malaise trap. Two species described from Japan were taken from bamboo, but with no observations as to whether they fed on the green tissues or on fungi associated with dead tissues on these plants, or even on other organisms that also lived on these plants. Three species are here newly transferred to this genus from *Haplothrips*. Two of these were described by Mound and Minaei (2007) as the only known species of *Haplothrips* that have two sense cones on antennal segments III and IV: *acaciae* is possibly predatory, having been found breeding within leaves tied together by spiders or Lepidoptera larvae, but *gahniae* is probably phytophagous, having been found only in the inflorescences of a species of Poaceae. The third species here transferred, *collyerae*, is known as a predator on the eggs of mites; it is unusual within this genus because antennal segment IV bears an additional very small sense cone, a condition shared by the new species *anarsius* described below. Pitkin (1976) included *debilis* in this genus, but indicated doubts concerning its relationships. A total of 13 species are here transferred from *Xylaplothrips* to *Mesandrothrips,* and a further six species are listed below within *Xylaplothrips* as *incertae sedis*. Okajima (2006) provided an extensive diagnosis of this genus. However, most of the listed character states are shared with other Haplothripini, and many of the distinguishing character states are prefaced by the caveat "usually" thus rendering the diagnosis operationally ineffective. As a result, the genus *Xylaplothrips* now comprises 11 species, almost all described from the Palearctic and Australian regions.

Diagnosis: Macropterous Haplothripini with 8-segmented antennae; two major sense cones on each of antennal segments III and IV; segment VIII usually slender and constricted to the base; pronotum often with only four pairs of major setae, the anteromarginal setae being scarcely longer than discal setae.

Species included

Xylaplothrips acaciae (Mound & Minaei) **comb.n.**
Xylaplothrips anarsius **sp.n.**
Xylaplothrips bamboosae Okajima
Xylaplothrips collyerae (Mound & Walker) **comb.n.**
Xylaplothrips debilis Ananthakrishnan & Jagadish
Xylaplothrips fuliginosus (Schille)
Xylaplothrips fungicola (Priesner)
Xylaplothrips gahniae (Mound & Minaei) **comb.n.**
Xylaplothrips togashii Okajima
Xylaplothrips ulmi Priesner
Xylaplothrips zawirskae Kucharczyk

Species *incertae sedis*

The generic relationships of the following six species will remain in doubt until the original specimens can be traced and re-examined. The sense cone formula on segments III and IV for each of these is indicated, based on the original descriptions; in each pair, the first number refers to the sense cone on the inner surface of a segment. If those descriptions prove to be correct, then each of these species might more appropriately be placed in the genus *Haplothrips.*
Xylaplothrips ananthakrishnani (Bournier) (III - 1+1; IV - 1+2)
Xylaplothrips bogoriensis (Karny) (III - 1+1; IV - 2+2)
Xylaplothrips ligs Ananthakrishnan & Jagadish (III - 0+1; IV - 1+2)
Xylaplothrips micans Ananthakrishnan & Jagadish (III - 1+1; IV - 2+2)
Xylaplothrips mimus Priesner (III - 1+1; IV - 1+2)
Xylaplothrips trinervoidis Hartwig (III - 1+1; IV - 1+2)

Key to *Xylaplothrips* species from Australia

1. Antennal segment VIII slender and constricted to basal pedicel (Fig. 2); pronotal am setae long and capitate (Fig. 1); fore wing sub-basal setae all capitate 2
-. Antennal segment VIII more broadly based without a distinct pedicel; pronotal am setae acute, no longer than discal setae; fore wing sub-basal setae III blunt at apex 3
2. Maxillary stylets retracted to compound eyes and close together medially in head (Fig. 1); fore tarsal tooth about as long as tarsal width; fore tibia inner apex with tooth; metanotum with several small setae on anterior half (Fig. 3) . . . . *anarsius* **sp.n.**
-. Maxillary stylets about 0.3 of head width apart with distinct maxillary bridge; fore tarsal tooth minute, less than 0.3 as long as tarsal width; fore tibia inner apex without tooth; metanotum with one pair of setae medially but no small setae on anterior half . . . . . *acaciae*
3. Antennal segment IV with two major and one minor sense cones; tergite IX setae S1 less than 0.8 as long as tube; usually micropterous . . . . . *collyerae*
-. Antennal segment IV with two major sense cones only; tergite IX setae S1 about 1.2 as long as tube; only macropterae known . . . . . *gahniae*

Xylaplothrips acaciae (Mound & Minaei) comb.n.

Haplothrips acaciae Mound & Minaei, 2007: 2944

This species has been taken widely in semi-arid areas across Australia, usually in pairs of *Acacia* phyllodes that have been tied together either by Lepidoptera larvae or by spiders. Based on the number of sense cones on antennal segments III and IV the species cannot be placed in *Haplothrips*.

Xylaplothrips anarsius sp.n.

(Figs 1–4)

Female macroptera. Head longer than wide (Fig. 1), broadest across cheeks behind eyes and narrowing to base; postocular setae capitate, placed lateral to mid-point of eyes; maxillary stylets retracted to eyes, close together medially; mouth cone pointed but not extending between fore coxae, maxillary palps small (Fig. 4). Antennae 8-segmented (Fig. 2), III and IV each with 2 short stout sense cones, IV also with one small dorsal sense cone; VIII slender and constricted to basal pedicel. Pronotum with 5 pairs of capitate setae, surface weakly sculptured, epimeral sutures complete (Fig. 1). Fore femoral inner margin swollen, fore tibia stout with pointed tubercle at inner apex; fore tarsus stout. Mesonotal lateral setae small. Metanotum with 4 or 5 small setae on anterior half (Fig. 3), median setae finely pointed on posterior half of sclerite. Mesopresternum eroded to pair of lateral triangles (Fig. 4); metathoracic sternopleural sutures not developed. Fore wing weakly constricted medially, without duplicated cilia; sub-basal setae capitate and unusually small. Hind tibiae without stout setae. Pelta broadly D-shaped (Fig. 3); tergites II–VII each with 2 pairs of sigmoid wing-retaining setae, major lateral setae capitate, except S2 on VII finely pointed; tergites II–VII with median setal pair long and finely pointed (Fig. 3); tergite IX S1 setae capitate and shorter than tube, S2 long and finely pointed. Tube shorter than head.

Measurements (holotype in microns). Body length 2000. Head, length 225; width 160; postocular setae 45. Pronotum, length 160; width 240; major setae: am 40, aa 30, ml 30, epim 40, pa 35. Fore wing length, 730; sub-basal setae 20, 18, 15. Tergite II median setae 45; IV posteromarginal setae S1 75, S2 60; VII posteromarginal setae S1 75, S2 110. Tergite IX setae S1 80; S2 125. Tube length 130. Antennal segments III–VIII length 55, 55, 55, 50, 50, 30.

Material studied. Holotype female, **AUSTRALIA, NEW SOUTH WALES**, Narooma, 10 km west, from *Eucalyptus* nuts, 24.xii.2010 (LAM 5407), in ANIC.

Comments. This remarkable Haplothripini species is based on a single specimen. In this Tribe it shares only with members of *Xylaplothrips* the unusual presence of only two major sense cones on each of the third and fourth antennal segments. It differs from all members of the genus in having the maxillary stylets retracted to the eyes and close together medially in the head, in bearing a tooth at the inner apex of the fore tibiae, and in having several small setae on the anterior half of the metanotum. As indicated by the species name, it is not closely related to the other known members of this genus. It resembles species of *Dolichothrips* and *Mesothrips* in having a long mouth cone, and the mesopresternum reduced to a pair of triangles. But as a species of Haplothripini with two sense cones on antennal segments III and IV it is here placed in *Xylaplothrips* until such time as the Phlaeothripinae fauna of Australia is more extensively explored.

Xylaplothrips collyerae (Mound & Walker) comb.n.

Haplothrips collyerae Mound & Walker, 1986: 40

Described from New Zealand, the larvae of this species have been recorded in Tasmania as predatory on the European thrips, *Sericothrips staphylinus*, a species that is useful in the biological control of the weedy shrub, *Ulex europea* (Mound & Minaei 2007). As with *acaciae* discussed above, and *gahniae* below, the presence on antennal segments III and IV of only two major sense cones suggests that these species are probably unrelated to the many species of genus *Haplothrips*.

Xylaplothrips gahniae (Mound & Minaei) comb.n.

Haplothrips gahniae Mound & Minaei, 2007: 2953

This species is known only from samples taken from the flowering heads of *Gahnia brachystylis* [Poaceae] in South Australia and west coast of Tasmania.

Mesandrothrips Priesner stat. rev.

Mesandrothrips Priesner, 1933: 80. Type species: *Haplothrips inquilinus* Priesner, 1921, by monotypy.

This genus is interpreted here as comprising those *Haplothrips*-like species that have three sense cones on antennal segments III and four on IV. Within the Haplothripini there are six genera in which species have the third antennal segment bearing three sense cones, and a key to distinguish the five that have a centre of diversity in the Oriental Region was provided by Mound and Minaei (2007). Species of the first two, *Androthrips* and *Euoplothrips*, are distinguished by the presence of tubercles on the inner margin of the fore femora, and species of the third, *Mesothrips*, all have the head sharply constricted to a basal neck and with several prominent setae on the genae. Species in these three genera are all associated with leaf galls on their host plants. In contrast, *Dolichothrips* species are generally leaf- and flower-living, and are known to be pollinators of *Macaranga* species (Mound & Okajima 2015). Members of this genus have the mouth cone long and pointed, and almost all of them have an additional pair of wing-retaining setae at least on the third abdominal tergite. Species in the final two genera, *Mesandrothrips* and *Neoheegeria*, are structurally very similar, although females of species in the first generally have a well-developed fore tarsal tooth, whereas females of the second have a minute, scarcely visible tooth (Minaei *et al*. 2018). However, the similarity in body form in these two genera is likely to result from convergence to a basic *Haplothrips*-like body form, because *Neoheegeria* species are all flower-living and from the western Palaearctic, whereas species of *Mesandrothrips* are not flower-living and are from Southeast Asia. The form of the mesopresternum, whether complete or reduced to two lateral triangles, has been used in a key to distinguish genera (Mound & Minaei 2007), but this structure is variable between closely related species of *Mesandrothrips*, including *inquilinus* and *darci*.

Mesandrothrips was erected casually by Priesner (1933), with neither details nor diagnosis. It was referred to as a genus intermediate between *Mesothrips* and *Androthrips,* and included the single species *Haplothrips inquilinus*. The genus has been listed as a synonym of *Xylaplothrips,* because *inquilinus* was treated in that genus by Pitkin (1976), although no comment on the significance of the name *Mesandrothrips* has ever been published. The genus is here re established with a formal generic diagnosis and list of Haplothripini species that are reputed to share the character states of that diagnosis. A further species from Java, *inquinatus*, is known from a single small female that is similar to *inquilinus* but has darker antennae. Little is known about the biology of species in this genus, but several have been taken from galls or from other enclosed spaces. They are usually collected in very low numbers, and this might suggest that some of them are predators on other small arthropods. Intra-specific structural variation, in association both with sex and with body size, combined with lack of population samples, produces complications in distinguishing the species. The genus *Senegathrips,* that includes a single species from West Africa living as an invader of galls induced by the phlaeothripine *Vuilletia houardi* (Mound *et al.* 2014), shares most character states with *Mesandrothrips,* but has two pairs of pronotal epimeral setae. The list below includes the 20 species now recognized in the genus *Mesandrothrips*, which is essentially restricted to Australian and Indo-Malaysian regions.

Diagnosis: Macropterous Haplothripini with 8-segmented antennae; three major sense cones on antennal segment III and four major sense cones on segment IV; segment VIII slender and constricted to the base; pronotum often with only four pairs of major setae, anteromarginal setae scarcely longer than discal setae, epimeral sutures complete; metathoracic sternopleural sutures usually not developed; fore wing weakly constricted medially; tergites II–VII each with 2 pairs of sigmoid wing-retaining setae; tube relatively slender.

Species included
(* based on description; see also Pitkin, 1976)

Mesandrothrips austrosteensia **sp.n.**
Mesandrothrips caliginosus* (zur Strassen) **comb.n.
Mesandrothrips clavipes (Karny) **comb.n.**
Mesandrothrips darci (Girault) **comb.n.**
***Mesandrothrips dubius* (Okajima) **comb.n.**
***Mesandrothrips emineus* (Ananthakrishnan & Jagadish) **comb.n.**
Mesandrothrips flavitibia* (Ananthakrishnan & Jagadish) **comb.n.
Mesandrothrips flavus* (Ananthakrishnan) **comb.n.

Mesandrothrips googongi **sp.n.**
Mesandrothrips inquilinus (Priesner) **comb.n.**
Mesandrothrips inquinatus (Karny) **comb.n.**
Mesandrothrips kurandae **sp.n.**
Mesandrothrips lamingtoni **sp.n.**
Mesandrothrips montanus* (Ananthakrishnan & Jagadish) **comb.n.
Mesandrothrips oleariae **sp.n.**
Mesandrothrips pictipes (Bagnall) **comb.n.**
Mesandrothrips pusillus* (Ananthakrishnan & Jagadish) **comb.n.
Mesandrothrips reedi (Pitkin) **comb.n.**
Mesandrothrips subterraneus (Crawford JC) **comb.n.**
Mesandrothrips tener* (Ananthakrishnan & Jagadish) **comb.n.

Key to *Mesandrothrips* species from Australia

1. Pronotum with am setae as long as aa setae (Figs 23–25) 2
-. Pronotal am setae minute, no larger than discal setae (Figs 21, 22) 4
2. Antennal segment III yellow (Fig. 13) in contrast to segments I–II and IV–VIII that are uniformly brown . *kurandae* **sp.n.**
-. Antennal segment III not sharply different in colour from other segments 3
3. Antennal segments IV–VI light brown to brown, III paler at base (Fig. 16) . . . . . *pictipes*
-. Antennal segments III–VI bicoloured, brown with bases sharply paler (Fig. 15) . . . . . *oleariae* **sp.n.**
4. Mesopresternum incomplete or very slender medially (Fig. 6) 5
-. Mesopresternum complete medially and broadly boat-shaped (Figs 7, 8) 7
5. Fore tarsal tooth acute and almost as long as tarsal width (Fig. 22); micropterous; longest sense cone on segment III no more than 0.6 as long as segment width . . . . . *lamingtoni* **sp.n.**
-. Fore tarsal tooth small or minute in both sexes; macropterous; longest sense cone on segment III 0.9 as long as maximum width of segment 6
6. Mesopresternum slender and continuous medially; antennal segment III slender, at least 1.7 times as long as wide, IV–VI yellow at base (Fig. 12) . . . . . *inquilinus*
-. Mesopresternum divided into two separate triangles (Fig. 6); antennal segment III stouter, scarcely 1.5 times as long as wide (Fig. 18), IV–VI scarcely paler at base . . . . . *darci*
7. Postocular setae and fore wing sub-basal setae S3 pointed [tergite IX setae S1 finely pointed and almost as long as tube] . . . . . *reedi*
-. Postocular and fore wing sub-basal setae S3 with apices capitate 8
8. Pronotum slightly longer than wide (Fig. 19); antennal segment III twice as long as wide; fore femora swollen, fore tibiae stout, fore tarsal tooth massive (Fig. 5) . . . . . *austrosteensia* **sp.n.**
- Pronotum wider than long; antennal segment III less than 1.8 times as long as maximum width; fore femora slender (Fig. 21) 9
9. Antennal segment III 1.5 times as long as maximum width (Fig. 10); tergite IX setae S1 with apices pointed . . . . . *clavipes*
-. Antennal segment III 1.3 times as long as maximum width (Fig. 11); tergite IX setae S1 with apices capitate *googongi* **sp.n.**

Mesandrothrips austrosteensia **sp.n.**

(Figs 5, 9, 19, 20)

Female macroptera. Body and femora brown, tarsi and fore tibiae brownish-yellow, mid and hind tibiae light brown; antennal segment I as brown as head, II yellow toward apex, III mainly yellow, IV–V yellow in basal third but light brown distally, VI light brown, VII–VIII dark brown; fore wings pale to very lightly shaded; all major setae pale. Head longer than wide (Fig. 19), projecting very slightly in front of eyes; vertex with weak sculpture lines; eyes longer dorsally than ventrally; postocular setae arising laterally, weakly capitate and not extending far beyond posterior margin of eyes; maxillary stylets short, low in head; mouth cone short and rounded. Antennal segments III–IV with sense cones short and stout, V–VII with distinct pedicels, VIII slender and narrowed to base. Pronotum slightly longer than wide (Fig. 19), without sculpture lines but with median longitudinal apodeme; pronotal am setae minute, remaining major setae weakly capitate. Fore femora swollen, fore tibiae short and stout, fore tarsal tooth massive (Fig. 5). Mesonotum weakly sculptured, lateral setae small (Fig. 20); metanotum without sculpture anteromedially, weakly reticulate posteromedially, median setae small and acute. Mesopresternum

entire; metathoracic sternopleural sutures present but narrow. Fore wing with about 9 duplicated cilia; sub-basal setae rather short, S1 and S2 capitate, S3 acute. Pelta with short wings posterolaterally; tergites II–VII each with two pairs of sigmoid wingretaining setae, of which the most posterior pair on III–VI is much larger than the anterior pair; tergite II with an extra pair of curved setae anterolateral to sigmoid setae; tergites III–VI with posteroangular setae S1 and S2 weakly capitate, VII with S2 pointed; tergite IX setae S1 and S2 pointed, shorter than tube.

Measurements (holotype female in microns). Body length 2550. Head, length 290; width 190; postocular setae 50. Pronotum, length 260; width 250; major setae, aa 25, ml 40, epim 65, pa 45. Fore wing length I 000; sub-basal setae 45, 45, 55. Tergite V posteromarginal setae S1 90, S2 85. Tergite IX setae S1 140, S2 140. Tube, length 190; basal width 70. Antennal segments III–VIII length 70, 68, 60, 55, 50, 45.

Male microptera. Similar to female in colour and structure; tergite IX setae S2 short and stout; sternite VIII without a pore plate; pseudovirga apex similar to that of many species of *Haplothrips*.

Measurements (paratype male in microns). Body length 2450. Head, length 260; width 165; postocular setae 50. Pronotum, length 250; width 250; major setae aa 50, ml 60, epim 70, pa 45. Tergite IX setae S1 130; S2 40. Tube, length 180; basal width 65.

Material studied Female holotype, **Australia, New South Wales**, Brisbane, The Gap, Allamanda Street, from leaf gall on *Austrosteensia blackii* [Fabaceae], 24.xi.2007 (DJT 569), in ANIC.

Paratypes, all from same site and vine: 4 males taken with holotype; 3 females, 1 male, 10.i.2008; 3 females, 18.i.2008; 14 females, 7 males, 18.ii.2008; 2 females, 5 males, 22.vi.2008 (in ANIC & QDPC).

Comments. This species shares many structural character states with species of the Haplothripini, but is remarkable for the short maxillary stylets, the massive nature of the fore legs, and the elongate pronotum. It is not closely related to *M. inquilinus,* but is presumably adapted to invading the unusual leaf galls of its thripid host, *Cyrilthrips cecidis*. Tree and Mound (2009) reported that these leaf-fold galls sometimes have an additional marginal flap that inhibits such invasion. They concluded that this thrips is not a predator, but behaves as a kleptoparasite. The adults and larvae feed on the inner tissues of the galls induced by *C. cecidis*, and pupae occur within the galls.

Mesandrothrips clavipes (Karny) comb.n.

(Figs 8, 10)

Haplothrips clavipes Karny, 1920: 41.
Xylaplothrips clavipes (Karny); Pitkin, 1973: 331.

This species is based on one of the earliest thrips specimens collected in Australia. It was taken in the Kimberley area of Western Australia by the Mjoberg Expedition 1910-1913. The available syntypes are poorly preserved and are difficult to study. Karny deliberately mounted specimens of Phlaeothripidae ventral side uppermost, because he wanted to look at the mouth parts. As a result, for many of his thrips species it is not possible to see most characters on the dorsal surface, including the pronotal setae. This species is interpreted here in the sense of Pitkin (1973). However, there is likely to be a group of similar-looking species associated with dead branches in Australia that share the following character states: body and femora brown, tibiae and tarsi yellow, antennal segments III–V paler than VI–VIII and with basal thirds yellow (Fig. 10); head with vertex weakly sculptured, postocular setae capitate and shorter than dorsal length of eyes, maxillary stylets wide apart, V-shaped, and retracted almost to postocular setae; pronotal am setae minute, aa setae smaller than remaining three pairs; mesopresternum entire (Fig. 8); fore tarsus with tooth; fore wing sub-basal setae S3 weakly capitate; tergite IX setae S1 bluntly pointed and shorter than tube.

Material studied. **Western Australia**, Kimberley, 1 male syntype in the Swedish Museum of Natural History, Stockholm. New South Wales, Lansdowne, 1 female from *Malaisia* [Moraceae], 20.i.2001; Chichester Forest, 1 male from *Nothofagus* branch, 24.xii.2000.

Mesandrothrips darci (Girault) comb.n.

(Figs 6, 18)

Haplothrips darci Girault, 1930: 1.

Described from a single female taken near Brisbane (Pitkin 1973), no further specimens of this species have been found. Antennal segment III of this holotype is unusually short (Fig. 18), segments IV–VI are scarcely paler at the base, and the mesopresternum is fully divided into lateral triangles (Fig. 6). Apart from these states, this specimen is very similar to specimens of *M. inquilinus*.

Material studied. **Australia, Queensland**, Indooroopilly, holotype female of *darci,* in window, iv.1930 (in QM).

***Mesandrothrips googongi* sp.n.**
(Figs 7, 11, 17, 21)

Female macroptera. Body and femora brown, tarsi yellow, mid and hind tibiae brown with base paler and apex yellow, fore tibiae brownish yellow; antennal segments I & II brown, III light brown with basal third yellow, IV–VIII light brown; fore wing pale with weak shading sub-medially; major setae all pale. Antennal segment III sub-globose with short basal third (Fig. 11), sense cones short and stout; IV–VII each with distinct pedicel; VIII slender but not sharply narrowed to base. Head almost as wide as long (Fig. 21); vertex without sculpture except laterally and near posterior margin; postocular setae capitate, shorter than dorsal eye length; maxillary stylets wide apart, retracted almost to postocular setae, maxillary bridge well developed. Pronotum wider than long, without sculpture except for median longitudinal apodeme; four pairs of major capitate setae present but am setae not larger than discal setae (Fig. 21). Mesonotum with weak sculpture, lateral setae capitate; metanotum almost without sculpture anteromedially, weakly reticulate posteromedially, median setae small and acute. Fore tarsus with prominent tooth. Fore wing sub-basal setae all capitate; six duplicated cilia present. Mesoprestemum entire. Pelta triangular but with posterolateral comers prominent; tergites II–VII each with two pairs of sigmoid wing-retaining setae, also two pairs of capitate posteroangular setae, except that S2 on VII are finely acute; tergite IX setae S1 capitate, S2 pointed.

Measurements (holotype female in microns). Body length 1730. Head, length 160; width 145; postocular setae 35. Pronotum, length 110; width 200; major setae, aa 35, ml 35, epim 50, pa 40. Fore wing length 720; sub-basal setae 35, 35, 50. Tergite IV posteromarginal setae S1 70, S2 35. Tergite IX setae S1 80; S2 90. Tube, length 110; basal width 50. Antennal segments III-VIII length, 40, 42, 40, 38, 38, 26.

Male macroptera. Similar to female in colour, sculpture and structure; tergite IX setae S1 capitate, S2 short and stout; pseudovirga similar to that of many *Haplothrips* species (Fig. 17).

Measurements (paratype male in microns). Body length 1450. Head, length 160; width 130; postocular setae 25. Tergite IX setae S1 55; S2 30. Tube, length 100; basal width 45.

Material studied. Holotype female, **Australia, Australian Capital Territory**, Googong Dam, beaten from *Acacia* sp., 28.ii.1998 (LAM 3671), in ANIC.

Paratypes: 1 female, 1 male taken with holotype; same locality and date, 2 females from *Dillwynia sieberi*; same locality, 1 male from *Acacia falciformis*, 28.iii.1999.

Comments. This species is one of the *clavipes* group, but is distinguished by the rather shorter third antennal segment (Fig. 11), and the capitate S1 setae on the ninth tergite.

***Mesandrothrips inquilinus* (Priesner) comb.rev.**
(Fig. 12)

Haplothrips inquilinus Priesner, 1921: 4.

Although Priesner (1933) mentioned this as the only species in his new genus *Mesandrothrips,* it was placed by Pitkin (1976) into *Xylaplothrips* without further comment. Described from Java, three further species described from India were recognised as synonyms of *inquilinus* by Pitkin (1976: 272), and the species is known as an invader of galls of various thrips species that is widespread from southern India to Indonesia. The type specimen of *inquilinus* (and of the closely similar species *inquinatus* from Java) have the mesopresternum complete but slender medially, in contrast to *darci* from Australia. The unique holotype of *inquinatus* is essentially similar to *inquilinus*

but has the antennal segments IV–VI light brown. As indicated in the key above, *inquilinus* is interpreted here as having antennal segment III relatively short and broad, but with sense cones that are unusually long and stout, and the mid and hind tibiae variable in colour from largely yellow to extensively brown.

Female macroptera. Head with maxillary stylets retracted to postocular setae, wide apart with prominent maxillary bridge; postocular setae long and capitate. Antennal segments III–VI usually extensively yellow on basal half (Fig. 12). Pronotum with 4 pairs of capitate setae, am setae minute and acute. Mesonotal lateral setae long and capitate; metanotum weakly reticulate medially, median setae small and acute. Mesopresternum slender medially. Fore tarsus with small forwardly directed tooth near inner apex. Fore wing with 6–8 duplicated cilia; sub-basal setae S3 long and capitate. Pelta broadly and irregularly triangular; tergal lateral setae weakly capitate or bluntly pointed; tergite IX setae S1 pointed.

Measurements (female from Timor Leste in microns). Body length 2300. Head, length 240; postocular setae 80. Pronotum, length 140; epimeral setae 100; posteroangular setae 80. Fore wing sub-basal setae S3 125. Tergite IX setae S1 115. Tube length 125.

Material studied. Paralectotypes, **Indonesia**, Java, Semarang, 1 female, 3 males in gall on *Smilax,* i.1912 (in Senckenberg Frankfurt Museum). **Thailand**, Sechong, 1 female from gall on *Ficus benjiamina,* vi.2018. **Cambodia**, Phnom Penh, 1 female from leaf gall on *Polyalthia longifolia*, 6.iv.2014 (DJT). **Singapore**, Singapore Zoo, 1 female from leaf roll gall on *Ficus microcarpa*, 25.ix.2007 (DJT). **Timor Leste**, Aileu, 2 females from gall on *Piper sarmentosa,* viii.2018 (in ANIC).

Mesandrothrips kurandae sp.n.

(Figs 13, 25)

Female macroptera. Body and femora dark brown, tarsi yellow, tibiae mainly yellow or faintly washed with light brown; antennal segments uniformly brown except III clear yellow; major setae on head and pronotum dark; major setae on abdomen and fore wing pale; fore wing weakly shaded, particularly just basal to median constriction, hind wing with longitudinal dark line. Antennal segments III and IV with sense cones shorter than segment width. Head with cheeks convex, narrowed to base; postocular setae capitate, arising lateral to mid-point of eyes; maxillary stylets retracted to postocular setae, wide apart with distinct maxillary bridge. Pronotum with 5 pairs of capitate major setae (Fig. 25). Mesonotal lateral setae capitate; metanotal median setae finely pointed; mesopresternum broadly transverse. Fore tarsus with tooth. Fore wing with about 7 duplicated cilia; sub-basal setae long and capitate. Pelta broadly triangular; tergites III–VI with major setal pairs S1 and S2 capitate, but S2 on VII–IX finely acute, S1 on IX bluntly pointed.

Measurements (holotype female in microns). Body length 1650. Head, length 170; width across cheeks 145; postocular setae 35. Pronotum, length 110; width 185; major setae, am 25, aa 25, ml 35, epim 40, pa 35. Fore wing length 650; sub-basal setae 40, 40, 55. Tergite IV posteromarginal setae S1 65, S2 45. Tergite IX setae S1 75; S2 90. Tube length, 115; basal width 45. Antennal segments III–VIII length 45, 45, 45, 40, 35, 30.

Material studied. Holotype female, **Australia, Queensland**, Julatten, Mt. Malloy, from dead twigs and leaves, 4.vii.1995 (LAM 2713), in ANIC.

Paratype female, Queensland, Kuranda, from dead leaves, 4.xi.2008 (in ANIC).

Comments. This species is very similar in structure to *pictipes,* but is distinguished by the sharply yellow colour of the third antennal segment (Fig. 13).

Mesandrothrips lamingtoni sp.n.

(Figs 14, 22)

Male microptera. Body and femora light brown, with head and tube darkest; antennal segments IV–VIII dark brown, III yellow in basal third and light brown distally, I and II slightly paler than head; tarsi, tibiae and apices of femora yellow; major setae pale. Antennal segment III slender in basal third (Fig. 14), apex angular, with slender sense cones; IV–VII each with distinct pedicel. Head scarcely longer than wide (Fig. 22), vertex with no sculpture; posterior ocelli faintly indicated; postocular setae weakly capitate, longer than dorsal eye length;

maxillary stylets wide apart, V-shaped, retracted almost to postocular setae. Pronotum without sculpture lines, anteromarginal setae minute; four pairs of long, weakly capitate major setae. Mesonotum weakly sculptured, lateral setae softly pointed; metanotum without sculpture lines, median setae small and acute. Fore tarsal tooth pointed, longer than half tarsal width (Fig. 22). Fore wing lobe small, with two long setae at apex. Mesopresternum reduced to two small triangles. Pelta small and triangular; tergites II–VII each with 2 pairs of minute wingretaining setae, marginal setae S1 weakly capitate and longer than each of their tergites, setae S2 on VII long and finely acute; tergite IX setae S1 bluntly pointed, S2 shorter and stouter. Sternite VIII without a pore plate.

Measurements (holotype male in microns) Body length 1630. Head, length 150; width 140; postocular setae 65. Pronotum, length 125; with 200; major setae, aa 50, ml 60, epim 65, pa 75. Fore wing lobe 60. Tergite IV posteromarginal setae S1 85, S2 50. Tergite IX setae, S1 80; S2 35. Tube, length 100; basal width 55. Antennal segments III–VIII length 50, 50, 45, 40, 35, 30.

Female microptera. Larger than male but similar in colour and structure; head with a few sculpture lines laterally, pronotum with weak median longitudinal thickening, but metanotum with no sculpture; mesopresternum continuous but slender medially.

Measurements (paratype female in microns) Body length 2450. Head, length 190; width 170; postocular setae 80. Pronotum, length 175; width 280; major setae, aa 50, ml 80; epim 80, pa 90. Fore wing lobe 75. Tergite IX setae, S1 105, S2 110. Tube, length 135; basal width 70. Antennal segments III–VIII length 70, 70, 60, 60, 50, 35.

Material studied. Holotype male, **Australia, Queensland**, Lamington, O'Reilly's, in yellow pan trap, vii.2007 (Desley Tree), in ANIC.

Paratypes: 1 female in leaf-litter at same locality as holotype; Queensland, Brisbane Forest Park, Mt Glorious, 2 females in *Macrozamia* leaf-litter, 13.ix.2009 (in ANIC)

Comments. All four of the available specimens are remarkable for the lack of sculpture on the head, pronotum and metanotum. Each of the three female specimens has the maxillary stylets dissociated.

Mesandrothrips oleariae sp.n.

(Figs 15, 23)

Female macroptera. Body and femora dark brown, tarsi yellow, fore tibiae yellow distally, mid and hind tibiae brown; antennal segments I and II dark brown, remaining segments paler, III–VI yellow in basal third to half (Fig. 15); major setae pale to very weakly shaded; fore wing and hind wings weakly shaded particularly medially. Antennal segments III and IV with sense cones short and stout. Head with cheeks convex, narrowed to base (Fig. 23); postocular setae capitate, arising lateral to mid-point of eyes; maxillary stylets retracted to postocular setae, wide apart with distinct maxillary bridge. Pronotum with 5 pairs of capitate major setae. Mesonotal lateral setae capitate; metanotal median setae finely pointed; mesopresternum broadly transverse. Fore tarsal tooth stout. Fore wing with 4–6 duplicated cilia; sub-basal setae long and capitate. Pelta triangular; tergites III–VI with major setal pairs S1 and S2 capitate, but S2 on VII–IX finely acute, S1 on IX bluntly pointed.

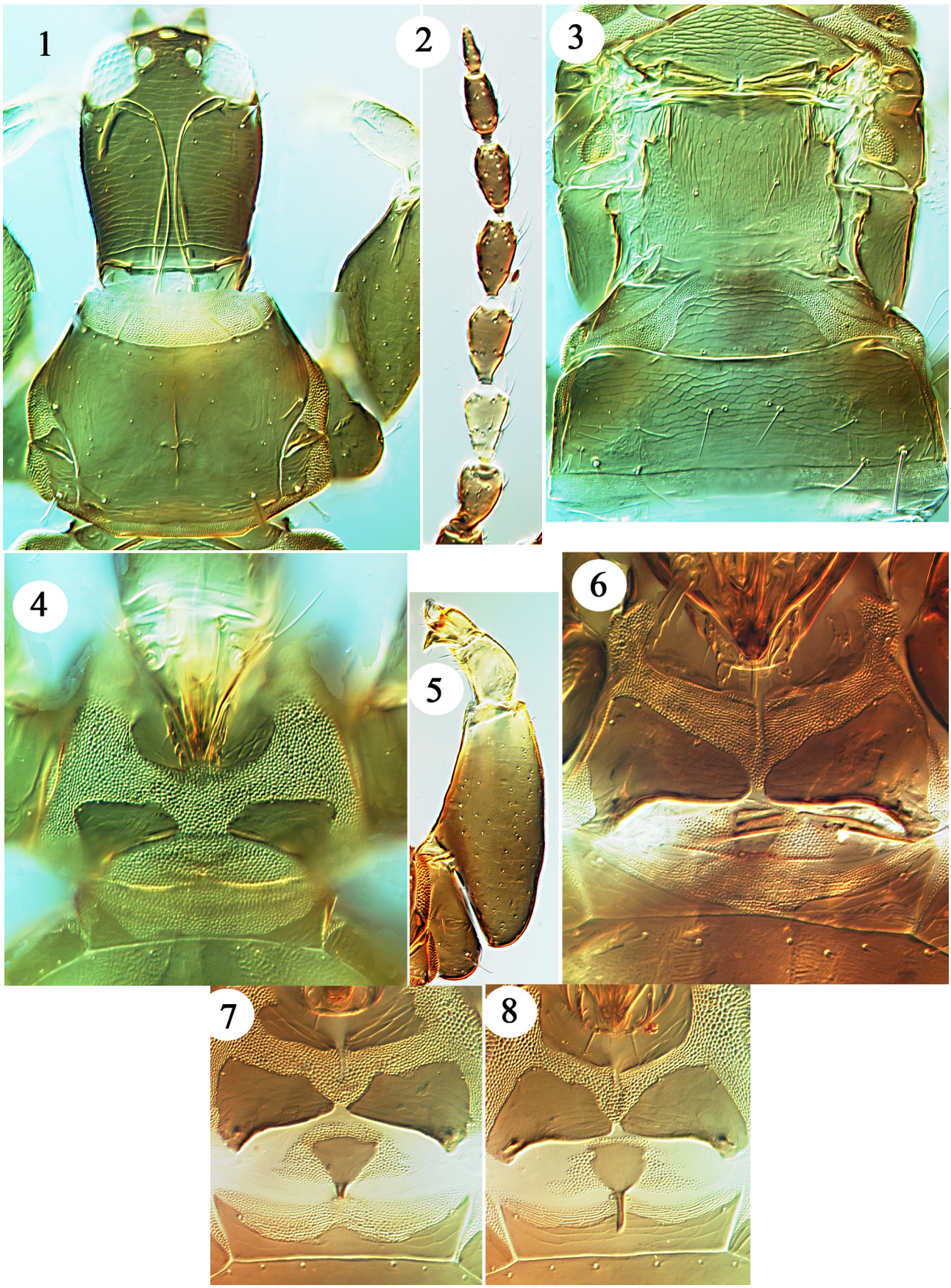
Measurements (holotype female in microns). Body length 2000. Head, length 175; width across cheeks 155; postocular setae 55. Pronotum, length 125; width 225; major setae, am 40, aa 55, ml 50, epim 65, pa 65. Fore wing length 800; sub-basal setae 50, 60, 85. Tergite IV posteromarginal setae S1 90, S2 45. Tergite IX setae S1 105; S2 115. Tube length, 125; basal width 55. Antennal segments III–VIII length 45, 50, 45, 40, 38, 33.

Material studied. Holotype female, **Australia, Australian Capital Territory**, Tidbinbilla, in rolled leaf galls of *Klambothrips oleariae* on *Olearia lirata*, 1.iii.1996 (LAM) (in ANIC & QDPC).

Paratypes: two females taken with the holotype (ANIC).

Non-paratypic specimens: 1 female, 1 male from tied leaves of *Acacia doratoxylon,* New South Wales, Lockhart, Galore Hill, 16.i.2002 (ANIC).

Comments. This species is closely similar in structure to *pictipes* but with the antennal segments brightly bicoloured. The two specimens from Lockhart are smaller than the types but otherwise very similar.

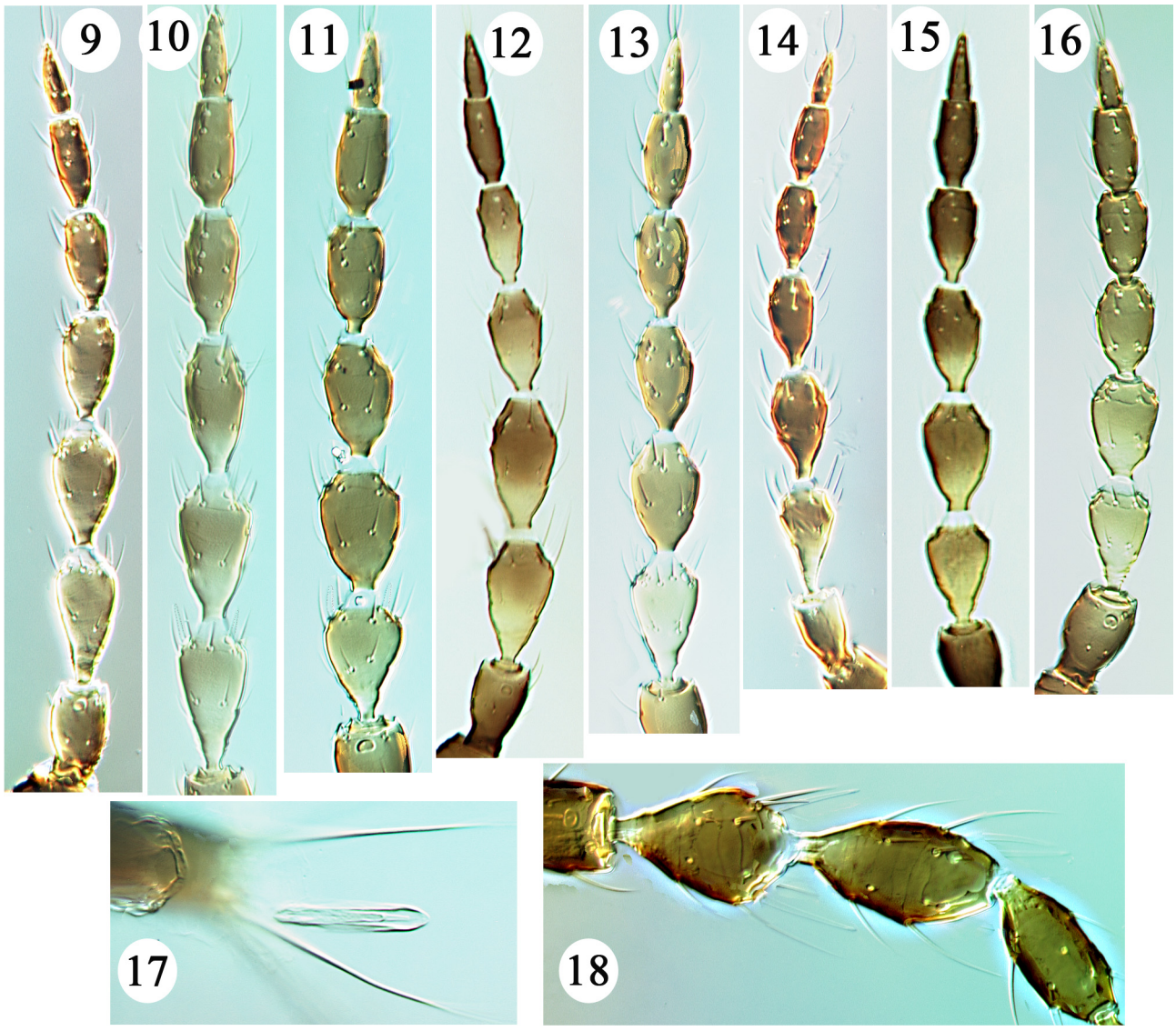


FIGURES 1–8. *Xylaplothrips* and *Mesandrothrips*. *X. anarsius* 1–4: **(1)** head & pronotum; **(2)** antenna; **(3)** meso & metanota, pelta and tergite II; **(4)** prosternum. **(5)** *M. austrosteensia* fore leg. **(6)** *M. darci*, prosternum. **(7)** *M. googongi* prosternum. **(8)** *M. clavipes* prosternum.

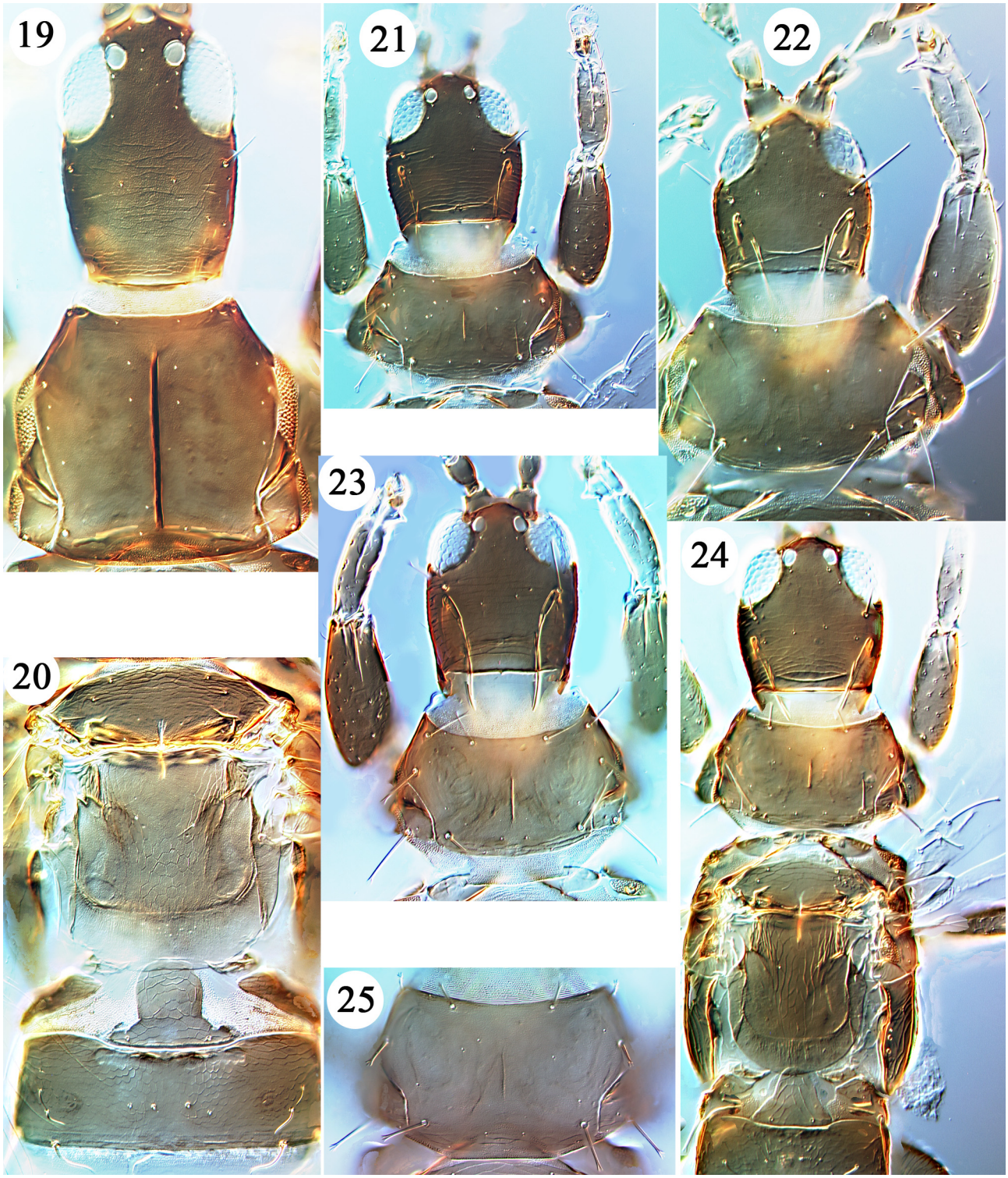
***Mesandrothrips pictipes* (Bagnall) comb.n.**
(Figs 16, 24)

Haplothrips pictipes Bagnall 1919: 273
Xylaplothrips pictipes (Bagnall); Pitkin, 1976: 274.

Described from a few females taken on diseased coffee berries in southern India, this species is here recorded widely but infrequently across Southeast Asia. There is no evidence that it is associated with galls. One series was reared from the dry fruits of *Rhodomyrtus tomentosa* from Hong Kong, and isolated individuals have been beaten from dead branches and various live plants. Males sometimes have enlarged fore legs and fore tarsal teeth, but small males and females usually have the fore tarsal tooth very small. Several specimens of both sexes were taken in rainforest in Sarawak from various plants and dead branches, but amongst these were a few much larger individuals. These large specimens, of both sexes, have variably enlarged fore femora, fore tarsi with a well-developed tooth, and in many the fore tibiae bears a tubercle on the inner margin distal third. This tubercle varies in size, and even in presence, among these specimens, and there is no evidence from any other body structure that these large individuals represent a different species. From various sites in eastern and southern Australia further specimens that are closely similar to *pictipes* in structure have been seen, but these have rather shorter pronotal setae, and tergite IX setae S1 capitate.



FIGURES 9–18. *Mesandrothrips* species. Antennae 9–14: **(9)** *austrosteensia*; **(10)** *clavipes*; **(11)** *googongi*; **(12)** *inquilinus*; **(13)** *kurandae*; **(14)** *lamingtoni*; **(15)** *oleariae*; **(16)** *pictipes*. **(17)** *googongi* male aedeagus. **(18)** *darci* antennal segments II–V.



FIGURES 19–25. *Mesandrothrips* species. *austrosteensia* 19–20: **(19)** head & pronotum; **(20)** meso & metanota, pelta and tergite II. **(21)** *googongi* head & pronotum. **(22)** *lamingtoni* head & pronotum. **(23)** *oleariae* head & pronotum. **(24)** *pictipes* head, thorax & pelta. **(25)** *kurandae* pronotum.

Female macroptera. Head with maxillary stylets wide apart (Fig. 24), retracted to postocular setae. Pronotum with 5 pairs of capitate setae, epimeral setae longest. Fore wing sub-basal setae all capitate, S3 usually longer than S2 and S1; with about 6 duplicated cilia. Mesopresternum entire. Tergite IX setae S1 bluntly pointed. Tube slender, 2.5 times as long as basal width, and about 0.7 as long as head.

Material studied. Lectotype female, **India**, Malabar, ix.2018 (BMNH); India, Kallar, 1 female from dead lvs, x.2005. **Hong Kong**, 3 females, 2 males, reared (in Florida, USA) from dried fruits of *Rhodomyrtus tormen-*

tosa, xi.2015. **Malaysia**, Kuala Lumpur, 1 female from *Shorea* fls, iv.1976; 1 female from *Xanthophyllum* flowers, 8.vii.2006, 1 male from *Polyscias* lvs, iv.2008. **Sarawak**, Tamu Abu, HoB Expedition, 15 females, 9 males from various plants and dead branches, 16-23.viii.2017. **Timor Leste**, 5 females, 6 males from various weeds and dead branches, viii.2018. **Australia, Queensland**, Badu ls., 1 female from *Carica papaya,* xi.2000 (in ANIC).

Mesandrothrips reedi (Pitkin) comb.n.

Xylaplothrips reedi Pitkin, 1973: 330

As indicated in the original description, this species has been found several times living between pairs of tree leaves that have been tied together by larval Lepidoptera. It is one of the members of the genus with minute pronotal anteromarginal setae, but also has the pronotal anteroangular setae scarcely 15 microns long. However, the other three pairs of pronotal major setae are long and weakly capitate. The postocular setae are pointed, and arise lateral to the mid-point of the eyes. The fore wing sub-basal setae S3 are also long and acute, as are tergite IX setae S1 that are longer than the tube. Antennal segments III–VIII are pale with their apical thirds weakly shaded, the mesopresternum is transverse, and the fore tarsal tooth variable but usually very small. In addition to the type series from several sites in New South Wales and the Australian Capital Territory, specimens identified as *reedi* are available in ANIC from Queensland (Moonie, Chinchilla), South Australia (Crafers), and Western Australia (Narrogin).

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