Zootaxa 3807 (1): 001–082
www.mapress.com/zootaxa/

Monograph

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

http://dx.doi.org/10.11646/zootaxa.3807.1.1
http://zoobank.org/urn:lsid:zoobank.org:pub:2D4B429C-A8E3-4B02-9C15-286FCF7D04F1

ZOOTAXA

3807

Conspectus of the Phlaeothripinae genera from China and Southeast Asia (Thysanoptera, Phlaeothripidae)

LI-HONG DANG[1, 2], LAURENCE A. MOUND[3] & GE-XIA QIAO[1, 4]

[1]*Key Laboratory of Zoological Systematics and Evolution, Institute of Zoology, Chinese Academy of Sciences, No. 1 Beichen West Road, Chaoyang District, Beijing 100101, P.R.China*

[2]*University of Chinese Academy of Sciences, No. 19, Yuquan Road, Shijingshan District, Beijing 100049, P.R.China*

[3]*CSIRO Ecosystem Sciences, PO Box 1700, ACT 2601, Australia* [*laurence.mound@csiro.au*]

[4]*Corresponding author. Email: qiaogx@ioz.ac.cn*

Magnolia Press
Auckland, New Zealand

Accepted by A. Cavalleri: 6 Mar. 2014; published: 29 May 2014

LI-HONG DANG, LAURENCE A. MOUND & GE-XIA QIAO
Conspectus of the Phlaeothripinae genera from China and Southeast Asia (Thysanoptera, Phlaeothripidae)
(*Zootaxa* 3807)

82 pp.; 30 cm.

29 May 2014

ISBN 978-1-77557-401-9 (paperback)

ISBN 978-1-77557-402-6 (Online edition)

FIRST PUBLISHED IN 2014 BY

Magnolia Press

P.O. Box 41-383

Auckland 1346

New Zealand

e-mail: zootaxa@mapress.com

http://www.mapress.com/zootaxa/

ISSN 1175-5326 (Print edition)

ISSN 1175-5334 (Online edition)

Table of contents

Abstract

An illustrated identification key is provided to 100 genera of Phlaeothripinae from China and Southeast Asia, together with a diagnosis for each genus, and comments on the species diversity. One new genus with a new species, *Akarethrips iotus* **gen.n.** & **sp.n.,** and two new species, *Heliothripoides boltoni* **sp.n.** and *Terthrothrips strasseni* **sp.n.**, are described from specimens collected in Peninsular Malaysia and Java respectively. Three Phlaeothripinae genera are synonymised, *Mychiothrips* Haga & Okajima **syn.n.** of *Veerabahuthrips* Ramakrishna*, Syringothrips* Priesner **syn.n.** of *Gigantothrips* Zimmermann, and *Sauridothrips* Priesner **syn.n.** of *Gynaikothrips* Zimmermann. In addition, four nomenclatural changes are included, *Adelphothrips ignotus* (Reyes) **comb.n.** transferred from *Mesothrips*, *Karnyothrips palmerae* (Chen) **comb.n** from *Xylaplothrips*, *Xylaplothrips bogoriensis* (Karny) **comb.n** from *Brachythrips,* and *Oidanothrips notabilis* Feng, Guo & Duan considered as a **new synonym** of *Oidanothrips frontalis* (Bagnall).

Key words: Phlaeothripinae, genera, illustrated key, new genus, new species, China, Southeast Asia

Introduction

The Phlaeothripinae, with 2845 species and 376 genera, is the largest subfamily in the insect Order Thysanoptera, with species exhibiting a wide range of biologies (Mound & Marullo 1996). A large proportion of the species feed on fungal hyphae or their break-down products, and another large group feed on green tissues mainly of angiosperms on which some species induce galls; a relatively small group of species live and feed in flowers; a few species feed on mosses or ferns, and a few others are predatory on small arthropods. This paper is the first attempted overview of the diversity of the Phlaeothripinae in Southeast Asia, one of the most biologically diverse areas in the world. It is not an analysis of the systematics of the group, however comments on systematic relationships are included as a basis for future work. This paper provides an illustrated identification key to 100 genera from China and SE Asia, including one new genus, together with a diagnosis for each genus, also comments on the species diversity and distribution within each genus. Full species lists and nomenclatural information is available at ThripsWiki (2014).

The target area

The region considered here includes China and the Southeast Asian countries, but excluding India to the west and Japan to the east. This is an arbitrary choice, based on the limitations of time and available specimens. However, for the areas east and west of our target area major taxonomic treatments of this group of insects are available: Okajima (2006) for Japan; and Ananthakrishnan and Sen (1980) for India. Our selected area is ecologically highly diverse, from the Palaearctic of northern China and its extensive arid areas, to the montane areas of southwestern China, and the fragmented rainforests of the Indonesian islands. There have been various recent studies on elements of the thrips fauna of some countries in this area, including the Philippines (Okajima 1984; Reyes 1994), Malaysia (Okajima 1978b; Palmer & Mound 1978; Kudo 1995, 1997; Mound & Azidah 2009; Mound & Ng 2009; Ng *et al*. 2010; Eow *et al*. 2011), Indonesia (Okajima 1987b, 1987c, 1988b, 1989a; zur Strassen 1994; Sartiami & Mound 2013), and Thailand (Okajima 1978a, 1978b, 1983, 1989b). In contrast, the thrips fauna of several countries is still largely unexplored, including Cambodia, Vietnam, Laos, Burma, Brunei, East Timor and the island of New Guinea. Moreover, despite extensive work by several authors, particularly Zhang and Tong (1994) and Han (1997), the latest check-list of the thrips of China (Mirab-Balou *et al*. 2011) is probably not a good indication of the richness of the fauna of that country. Few samples have been taken in the highly dissected southwest of China bordering Burma and Laos, where the fauna probably shares taxa with India across the Himalayas. There has been even less collecting in the semi-desert areas of western China, and this area is likely to share faunal elements with countries as far west as Iran where there is a similar xeric flora. In contrast, the southern fauna of Hainan and Guangdong is tropical and shares many thrips taxa with Indonesia and southern Japan. Between mainland Asia and Australia there is a complex of about 17,000 islands that are referred to by biogeographers as the Greater Sunda Islands, and studies on the bird fauna of the area suggest that there are three major faunal sub-regions (MacKinnon & Phillipps 1993). To the north and west is the Sundaic subregion of the Malay Peninsula, Sumatra, Borneo and Java. To the south and east is the Australo-Papuan subregion, comprising Australia and New Guinea. And between these two continental shelves is the Wallacean subregion, comprising the many islands of the Phillipines, Sulawesi and the Lesser Sundas. Because thrips are readily distributed by winds, it is not likely that the distribution of fungal feeding thrips will reflect similar faunal distributions to vertebrates, and the thrips fauna associated with leaves has been so little explored that it is impossible to detect any distribution patterns. Most of the taxa recorded from Indonesia are known only from studies on plant galls in the first quarter of the 20th century (zur Strassen 1994). These thrips taxa have not previously been illustrated nor assessed within a modern systematic framework, but the diversity in their structure emphasises the probable richness of the Indonesian thrips fauna.

The target group

The Tubulifera is the larger of the two Thysanoptera suborders, but includes only a single family, the Phlaeothripidae, with about 3500 species in 460 genera (ThripsWiki 2014). Two subfamilies are recognised, and the smaller of these, the spore-feeding Idolothripinae, has been the focus of considerable taxonomic study (Mound & Palmer 1983a; Eow *et al*. 2011; Dang & Qiao 2013b), and the generic classification is currently reasonably effective. However, there have been only limited attempts at overviews of the larger subfamily, the Phlaeothripinae.

Almost 50% of the genera in this group are monobasic, and the various suprageneric classifications proposed seem to have little phylogenetic structure (Buckman *et al*. 2013). Species in this subfamily are often polymorphic, thus making relationships difficult to detect, and many species have been described on few or poorly prepared, slide-mounted specimens (Mound *et al*. 2013). For these reasons, it is difficult for any student to begin studies on any taxa within the Phlaeothripinae, and the present work has the objective of providing an entry point for future studies.

Review of Phlaeothripidae classification systems

The names for the Order Thysanoptera and its two suborders date from Haliday (1836). Subsequently, Uzel (1895) produced the major work that provided the basis for future studies on these insects, and recognised Phlaeothripidae as the single family of Tubulifera, to which Bagnall (1908) later added the Idolothripidae as a second family. The subfamily sense in which these two names are now used derives from Stannard (1957), although he used Megathripinae, a junior synonym of Idolothripinae that was erected by Karny (1913). The classification within the Phlaeothripidae proposed by Stannard attempted to recognise phylogenetic relationships. In contrast, the classification proposed by Priesner (1961) was essentially typological, with many group names provided for taxa exhibiting some unusual character state. A particularly unfortunate decision in that classification was to place *Hoplothrips*, a major genus of fungus-feeding species, in the same group as the many genera of leaf-feeding species related to *Liothrips*. This is particularly relevant here, because Han (1997), in the only review of the Thysanoptera of China, adopted the Priesner typological classification. One major objective of the work presented here is to draw to the attention of thrips students in China and Southeast Asia a more modern approach to thrips phylogenetic relationships, and to emphasise that most of the suprageneric names in Han and Priesner are no longer used.

The various names proposed for supra-generic taxa now placed in the Idolothripinae have been discussed by Mound and Palmer (1983a). The following comments refer to the names available within the Phlaeothripinae. Stannard (1957) recognized the following as representing nine major lineages within the Phlaeothripinae: *Haplothrips*; *Gigantothrips*; *Amphibolothrips*; *Hyidiothrips*; *Plectrothrips*; *Docessissophothrips*; *Williamsiella*; *Neurothrips*; and *Glyptothrips*. Mound and Marullo (1996) built on the ideas of Stannard, but recognized only three major lineages. The first was Stannard's *Haplothrips*-lineage and this was subsequently treated by Mound and Minaei (2007) as the Tribe Haplothripini (Table 1), a group of flower-feeders that also includes genera of predatory species. The second major group recognised by Mound and Marullo (1996) is the *Liothrips*-lineage that includes most of the leaf-feeding Phlaeothripinae (Table 1), and this corresponds to the group discussed by Stannard as the *Gigantothrips* line. The third major group is the *Phlaeothrips*-lineage of species most of which feed on fungal hyphae, and this comprises the remaining seven groups recognized by Stannard (Table 1). Amongst this large assemblage, the *Amphibolothrips* genus-group is sometimes referred to as the urothripines (Mound 1972; Ulitzka & Mound 2014); these are small species that commonly live in leaf-litter, and have the tube and ninth abdominal tergite particularly elongate. Members of the *Hyidiothrips* genus-group are minute, pale and laterally flattened species. Although generally found in leaf-litter where they are presumed to be fungus-feeders (Okajima 2006), in Australia one species has been found on the leaves of *Lantana* where it appears to be predatory on mites. Species of the *Plectrothrips* genus-group are fungus-feeders on dead branches, and have the sensorium on the second antennal segment placed on the basal half of that segment (Okajima 1981). The *Docessissophothrips* genus-group includes fungus-feeding species with unusually broad maxillary stylets that are often greatly elongate, and most of these species are placed in the genus *Holothrips*. In contrast, the *Williamsiella* genus-group involves species in which the stylets are sometimes very short, and these thrips are associated with mosses (Mound 1989). The final two groups recognized by Stannard, the *Neurothrips* and *Glyptothrips* lines, include most of the genera of fungus-feeding species found on dead branches and in leaf litter, including *Phlaeothrips*, *Hoplothrips*, *Adraneothrips*, and *Hoplandrothrips*. The *Glyptothrips* genus-group has been used for taxa with prominent reticulation on the head, but that condition is now recognised as highly variable within some genera (Mound 2002). The suprageneric classification of Phlaeothripinae remains less than satisfactory. Two reasonably well-defined major groups can be distinguished, the Haplothripini and the *Liothrips*-lineage. But the *Phlaeothrips*-lineage of fungus-feeding species is clearly a complex, polyphyletic assemblage (Buckman *et al*. 2013).

TABLE 1. List of Phlaeothripinae genera discussed in this paper
[Number of described species in parentheses—see ThripsWiki 2014]
[*Austrothrips*—see main text; *Chalepothrips* Priesner 1968: 191—name invalid]

Haplothripini genera		***Phlaeothrips*-lineage genera**	
Akarethrips Dang, Mound & Qiao	(1)	*Ablemothrips* Ananthakrishnan	(3)
Ananthakrishnana Bhatti	(1)	*Acanthothrips* Uzel	(13)
Androthrips Karny	(12)	*Adraneothrips* Hood	(77)
Apterygothrips Priesner	(40)	*Aleurodothrips* Franklin	(1)
Bagnalliella Karny	(9)	*Andrethrips* Mound	(2)
Dolichothrips Karny	(20)	*Apelaunothrips* Karny	(38)
Dyothrips Kudô	(1)	*Asianthrips* Okajima	(1)
Glenothrips Priesner	(1)	*Azaleothrips* Ananthakrishnan	(10)
Haplothrips Amyot & Serville	(243)	*Bamboosiella* Ananthakrishnan	(28)
Karnyothrips Watson	(48)	*Cephalothrips* Uzel	(8)
Logadothrips Priesner	(1)	*Deplorothrips* Mound & Walker	(9)
Mesothrips Zimmermann	(42)	*Ecacanthothrips* Bagnall	(11)
Okajimathrips Bhatti	(1)	*Heliothripoides* Okajima	(2)
Plicothrips Bhatti	(2)	*Hoplandrothrips* Hood	(117)
Podothrips Hood	(30)	*Hoplothrips* Amyot & Serville	(128)
Praepodothrips Priesner & Seshadri	(7)	*Lizalothrips* Okajima	(2)
Sinuothrips Collins	(1)	*Macrophthalmothrips* Karny	(16)
Sumatrothrips Priesner	(1)	*Margaritothrips* Priesner	(3)
Xylaplothrips Priesner	(27)	*Murphythrips* Mound & Palmer	(1)
		Mystrothrips Priesner	(7)
***Liothrips*-lineage genera**		*Phylladothrips* Priesner	(9)
		Propesolomonthrips Reyes	(1)
Adelphothrips Priesner	(4)	*Prosantothrips* Priesner	(1)
Agynaikothrips Okajima	(2)	*Psalidothrips* Priesner	(28)
Athlibothrips Priesner	(4)	*Pygmaeothrips* Karny	(1)
Chaetokarnyia Priesner	(4)	*Sagenothrips* Priesner	(1)
Chelaeothrips Karny	(2)	*Solomonthrips* Mound	(8)
Coryphothrips Karny	(2)	*Strepterothrips* Hood	(9)
Crotonothrips Ananthakrishnan	(16)	*Terthrothrips* Karny	(26)
Eothrips Hood	(13)	*Trichinothrips* Bagnall	(8)
Eugynothrips Priesner	(16)	*Veerabahuthrips* Ramakrishna	(8)
Eurhynchothrips Bagnall	(5)		
Gemmathrips Reyes	(1)	***Amphibolothrips* genus-group**	
Gigantothrips Zimmermann	(19)	*Alerothrips* Bhatti	(3)
Gynaikothrips Zimmermann	(40)	*Baenothrips* Crawford	(11)
Horistothrips Morgan	(5)	*Bradythrips* Hood & Williams	(6)
Isotrichothrips Priesner	(2)	*Habrothrips* Ananthakrishnan	(1)
Jennythrips Bhatti	(1)	*Stephanothrips* Trybom	(29)
Leeuwenia Karny	(27)	*Urothrips* Bagnall	(9)
Liophloeothrips Priesner	(16)		
Liothrips Uzel	(285)	***Hyidiothrips* genus-group**	
Litotetothrips Priesner	(11)	*Crinitothrips* Okajima	(5)
Manothrips Priesner	(1)	*Hyidiothrips* Hood	(10)
Medogothrips Han	(1)	*Preeriella* Hood	(20)
Myopothrips Priesner	(1)		
Phasmothrips Priesner	(1)	***Plectrothrips* genus-group**	
Phenicothrips Bhatti	(8)	*Chirothripoides* Bagnall	(5)
Pnigmothrips Priesner	(1)	*Mastigothrips* Priesner	(1)
Ponticulothrips Haga & Okajima	(1)	*Menothrips* Hood	(1)
Praeciputhrips Reyes	(1)	*Plectrothrips* Hood	(2)
Propealiothrips Reyes	(1)	*Streptothrips* Priesner	(32)
Psephenothrips Reyes	(5)		
Rosingothrips Reyes	(1)	***Docessissophothrips* genus-group**	
Sphingothrips Ananthakrishnan	(1)	*Holothrips* Karny	(127)
Thlibothrips Priesner	(7)	*Oidanothrips* Moulton	(12)
Zelotothrips Priesner	(1)		
		***Williamsiella* genus-group**	
		Sophiothrips Hood	(25)

Feeding associations of Phlaeothripinae

The range of substances on which Phlaeothripinae species feed is extensive, and includes fungi, plant leaves, flowers and other small insects. Flower-feeding in this subfamily is largely restricted to members of the Tribe Haplothripini, and is typical of species in the genera *Haplothrips*, *Neoheegeria* and *Dolichothrips*, and possibly a few others. However, other genera of Haplothripini include predatory species, such as *Podothrips*, at least some *Karnyothrips*, and also a few *Haplothrips*. Leaf-feeding is largely restricted to the members of the *Liothrips*-lineage (Table 1), and these occur in the key below mainly between couplets 35 and 60. *Liothrips* is the most species-rich genus of Phlaeothripidae with species all over the world. Several well-known genera are closely related to *Liothrips*, including *Gynaikothrips*, *Gigantothrips* and *Leeuwenia*. Many of these leaf-feeding thrips induce galls, and various similar-looking species are known to invade these galls. Unfortunately, in Southeast Asia there have been few studies on the interactions amongst the thrips that can be found in galls, in contrast to biological studies in Australia (Mound *et al*. 1998; Crespi *et al*. 2004; Tree & Mound 2009; Tree & Walter 2009). A particularly large suite of thrips are fungus-feeders, living and breeding on dead leaves and dead branches. These species comprise the *Phlaeothrips*-lineage, and this is the most species rich group of Phlaeothripinae (Table 1). This group includes some of the most polymorphic species, and the remarkable variation in male size and structure in many species is presumably related to male/male competitive mating behaviour (Crespi 1988), but no behavioural studies have been carried out on such thrips in Asia.

Some leaf-feeding and flower-living thrips are known to have specific host plant associations. However, the recognition and definition of 'host plant' for a thrips is sometimes not easy. Adults may disperse widely from their breeding sites, and may alight on many different plants on which they cannot breed, and possibly do not feed. Many authors list several plant names under a specific heading 'Hosts', but rarely produce any evidence that a thrips was breeding on such plants. Often it is clear that such "hosts" were merely the "finding-places" from which adults had been swept or beaten, and such records are of little significance in furthering our understanding of how and where a thrips species lives. A practical definition of host plant for a thrips species is a plant on which the insect is able to maintain a population (Mound 2013a), although it must be remembered that a thrips species may breed more successfully on some plants than on others. Moreover, the flowers of some plant species may provide important mating or feeding sites without being true hosts, in the sense that a species does not breed on them.

Genus identification systems for Phlaeothripinae

Priesner (1949) provided a world-wide key to all of the named genera of the entire Thysanoptera. However, not only is it clear that he did not study many of the genera included in his key, but the nomenclature and taxonomy has changed radically in the following half-century, and the key is now misleading and of limited use. Priesner (1964a) published a key to European genera, and also a key (1964b) to genera recorded from Egypt, but although these remain the only available identification tools for those areas, their effectiveness as identification tools is limited by subsequent changes in taxonomy and nomenclature. Stannard (1957) provided a revised classification and key to the genera of North America, and later a key to the genera from Illinois (1968). The only recent identification system in North America is the electronic system by Hoddle *et al*. (2012) for California, but Mound and Marullo (1996) provided a key to 100 genera from the Neotropics. For the Asian fauna, Han (1997) provided a key to 26 genera of Phlaeothripinae from China, and this remains the only reference work available for this country, although the systematic arrangement used is long out of date. More recently, Reyes (1994) provided a key to 34 genera from the Philippines, and Okajima (2006) a key to 58 genera from Japan. Because the fauna of Japan includes the subtropical Ryukyu Islands, this key from Japan is broadly useful in Southeast Asia. Finally, Mound *et al*. (2013) published an illustrated key to 39 genera of Australian fungivorous Phlaeothripinae from leaf-litter and dead branches, and this also includes some taxa that are found in Asia.

Classification problems among Phlaeothripinae

As indicated above, the classification of this group is not satisfactory, with many genera remaining poorly defined. For example, although the species of *Leeuwenia* appear to be distinctive with their elongate tube bearing numerous lateral setae, this condition is shared by some species in *Gigantothrips* and *Gynaikothrips*, and a few species of *Leeuwenia* have the tube relatively short (Mound 2004). Moreover, there are species in each of *Gigantothrips*, *Gynaikothrips* and *Liothrips* that might equally well be placed in one of the other two genera.

Eugynothrips is a particularly poorly defined genus, used for a group of species that have the head rather short, the antennal sensoria long and slender, and the males with a fore tarsal tooth. The two subgenera listed within *Eugynothrips* are distinguished only on the length of the tube; both subgenera include species in which the postocular setae on the head are very short, and other species in which these setae are long. *Phenicothrips* was erected as a subgenus for a few species of *Liothrips* in which the antennae and their sensoria are particularly elongate, but the type species, *daetymon*, has the pronotum with reticulation that is very similar to some common *Gynaikothrips* species, and some other species of *Liothrips* also have elongate antennae. *Adelphothrips* is used for some species that bear two pairs of postocular setae, but some *Gynaikothrips* species from Fiji and Australia also have such setae. Within this *Liothrips* complex there are many genera that have been distinguished each for single species that exhibits some unusual character state; examples are *Ponticulothrips* for a *Liothrips*-like species in which the head bears a pair of cheek setae; *Sphingothrips* for a species with the head sharply constricted at the base and with stout cheek setae; *Propealiothrips* for a species with the fore femora enlarged in the male; *Myopothrips* for a species in which the fore tibia bears a prominent apical claw; *Phasmothrips* for a species with numerous short, stout pronotal setae; *Zelotothrips* for a species with prominent cheek setae.

Genera that are based on single specimens, such as *Propesolomonthrips* and *Manothrips*, are difficult to assess in the absence of any knowledge of structural variation. At couplet 37 of the key below, four genera are indicated as having one or more postero-lateral ommatidia enlarged on the compound eyes. Each of these genera is known only from a single individual or small sample; the possibility that this unusual eye structure represents a synapomorphy of the four species involved requires more extensive field sampling. *Medogothrips* is included in the key below, but is difficult to recognize because of the poor quality of the original slide mounts. Similarly difficult to evaluate are many genera based on specimens prepared onto slides by Karny about 100 years ago. These are usually not cleared, and are commonly mounted ventral side uppermost. Some genera, including *Azaleothrips* and *Mystrothrips*, are defined as comprising species with the body surface strongly reticulate, but species that are otherwise similar in structure have weaker reticulation and are thus more difficult to place. The last four genera in the key below are particularly difficult. *Apelaunothrips* species can be recognized by their relatively wide maxillary stylets, but on other character states this genus seems allied to *Adraneothrips* (Dang *et al*. 2013; Mound 2013b). And although *Hoplandrothrips* and *Hoplothrips* were placed in widely separate subtribes by Priesner (1961), more recent studies in Australia (Mound & Tree 2013) suggest that these two, together with *Adraneothrips*, are closely related.

In addition to the relationship complexities outlined above, the classification and identification of taxa in the Phlaeothripinae are subject to two major problems – the technical difficulties involved in specimens poorly mounted onto microscope slides, and the extent of structural polymorphism and colour variation within many species. The first of these is discussed further below, but the second is an essential part of the biology of many thrips species. For example, *Ecacanthothrips tibialis* has been described under 17 different species names in four different genera, because large and small males look very different from each other and also different from females. This variation is associated with mating systems that presumably involve male/male competition, and also depends on the quantity and quality of the fungi on which this thrips feeds that are likely to vary with rainfall and temperature. Such problems are not restricted to fungus-feeding species, because *Mesothrips jordani* that breeds on the leaves of *Ficus* trees varies greatly in size, and has been described under different names in different countries (Mound & Minaei 2007). Interpreting differences in colour is a common taxonomic problem, but for thrips it is important to consider the length of time some species take to achieve their mature colour. For example, species in the genus *Adraneothrips* are considered to differ in body colour. However, recent collections of large populations of *A. russatus* included many uniformly yellow adults of this strikingly bicoloured species. These pale individuals would not have been recognised as the same species if taken in isolation.

Methods and depositories

Good taxonomy starts with the acquisition of specimens in sufficient numbers to illustrate variation and to provide some information about the biology and habitat of species. A sweep net is one common tool for collecting thrips, but this provides little or no biological information and frequently causes damage to specimens. A more effective method is to beat individual flowers or branches over a plastic tray, because the thrips tarsal structure causes individuals to adhere to such a surface, from which they are easily collected with a small brush into ethanol (ThripsWiki 2014). Thrips galls are best collected individually into suitable bags, and the thrips removed later into

vials of ethanol in the laboratory. A very effective method of collecting fungus-feeding thrips from the bark of living or dead tree trunks and branches is to spray these surfaces with a domestic insecticide, having first laid down suitable sheeting below the area to be sprayed, from which thrips can then be collected as they fall (Tree & Walter 2012). Many fungus-feeding thrips can also be collected from leaf-litter using suitable extraction funnels. This diversity of collecting methods is important, given the diversity of thrips biology and the objective of collecting population samples of species.

Reliable thrips taxonomy is also based on slide-mounted specimens that are undistorted, exhibiting as near as possible their natural colours, but with the body contents fully cleared to make it possible to see surface details clearly. Some workers have recommended heating thrips in 10% KOH solution, and then mounting in a water-soluble mountant such as Hoyers (Mirab-balou & Chen 2010). However, heating in such a solution causes considerable damage, and specimens in a water-soluble mountant do not remain satisfactory for long-term taxonomic work. Hoyer's mountant is useful for urgent identifications of pest species (Zhang *et al*. 2006), but for research collections Canada Balsam is the most appropriate mountant. The highest quality slide preparations of thrips are those made by Okajima and his students (Okajima 2006), and an account of their method has been republished in China (Zhang *et al*. 2006). An alternative method that is practised satisfactorily in several major museums is available in ThripsWiki (2014).

Original specimens have been studied of 90% of the genera included in the key below. However, many taxa are known only from old slide mounted specimens, such as those prepared by H. Karny in the 1920's, and these are usually uncleared and mounted ventral side uppermost. As a result many characters are not available for study. The descriptions and drawings provided here were produced from slide-mounted specimens using a Nikon Eclipse 80i and drawing tube. The photomicrograph images were prepared with a Leica DM2500 using DIC illumination, and processed with Automontage and Photoshop software.

Abbreviations for names of setae are as follows: pronotal setae – am (anteromarginal), aa (anteroangular), ml (midlateral), epim (epimeral), pa (posteroangular); tergite IX posteromarginal setae S1–S3, with S1 the dorso-median pair, S3 the ventro-lateral pair, and iS the intermediate pair between S1 and S2. The unit of measurements in this paper is micrometre. Full nomenclatural details and references for all Thysanoptera taxa are available in ThripsWiki (2014).

Species that have not been studied here, and for which the information is from original descriptions, are indicated by an asterisk *. Slide-mounted specimens of many of the genera are available in the National Zoological Museum of China (NZMC), Institute of Zoology, Chinese Academy of Sciences, Beijing, China, and the Australian National Insect Collection (ANIC), Canberra, Australia. However, many slides have been borrowed from the Natural History Museum, London (BMNH), the Senckenberg Museum, Frankfurt (SMF), the Tokyo University of Agriculture, Japan, Taiwan Agriculture Research Institute and Baotou Landscape Research Institute of Inner Mongolia, China.

Key to Phlaeothripinae genera from China and SE Asia

[excluding *Austrothrips* and *Eothrips* q.v.;*indicates no species studied]

1. Compound eyes holoptic, surrounding the ocelli (Fig. 72); mouth cone extending across prosternum; body black with yellow, red and white markings when alive. . . . . *Macrophthalmothrips*
-. Compound eyes smaller, never fully surrounding ocellar region (Figs 71, 73, 74); mouth cone various; body colour various, but never with yellow, red and white markings. 2
2. Tube parallel-sided, long and slender with elongate anal setae, usually 2–4 times as long as tube (Fig. 25); abdominal segment IX usually much longer than wide (Fig. 25) [body with reticulate and tubercles on dorsal surface (Figs 28, 29, 33); basantra absent; usually aptera]. 3
-. Tube various, but anal setae usually as long as tube, if long, basantra well-developed; body surface various; abdominal segment IX wider than length (Fig. 45) 8
3. Antenna 5- or 6-segmented, morphological segments III–V united, VII–VIII sometimes fused without sutures (Fig. 90) [head with 1–3 pairs of setae on anterior margin]. . . . . *Stephanothrips*
-. Antenna 7- or 8-segmented, segments III–V completely separated, VII–VIII sometimes fused without sutures 4
4. Anterior margin of head with 1–3 pairs of prominent setae (Figs 28, 29) 5
-. Anterior margin of head with no prominent setae (Fig. 33) 6
5. Anterior margin of head with one pair of prominent setae (Fig. 29) . . . . . *Bradythrips*
-. Anterior margin of head with three pairs of prominent setae (Fig. 28). . . . . *Baenothrips*

6. Head projecting in front of eyes (Fig. 43) . . . . . *Habrothrips*
-. Head not projecting in front of eyes, but sometimes produced as a hump 7
7. Postocular setae well-developed with apex expanded, close together; anal setae 4 times as long as tube or more . . *Alerothrips**
-. Head without distinct long postocular setae (Fig. 33); anal setae about twice as long as tube. . . . . *Urothrips*
8. Antennal segment III much smaller than IV (Figs 31, 65, 91), these segments either broadly joined or fused 9
-. Antennal segments III and IV normal, distinctly separated from each other 11
9. Pronotal setae blunt to expanded at apex (Fig. 91); antenna 8-segmented, segment III about 0.5 as long as IV, and widely joined to IV. . . . . *Preeriella*
-. At least pronotal posteroangular setae sickle-shaped at apex (Figs 31, 65); antenna usually 7-segmented, morphological segments III–IV fused with or without sutures 10
10. Pronotal notopleural sutures absent; pm setae similar in size to pa setae. . . . . *Crinitothrips*
-. Pronotal notopleural sutures present, but incomplete; pm setae much smaller than pa setae. . . . . *Hyidiothrips*
11. Antennal segment II with campaniform sensorium on median or basal half of segment (Fig. 96) 12
-. Antennal segment II with campaniform sensorium on apical half of segment (Figs 12, 13, 16) 17
12. Body with long barbed setae on elongate dorsal tubercles; tarsal tooth and hamus equally developed in all legs [tergite VIII with 2 pairs of wing-retaining setae]. . . . . *Andrethrips**
-. Body with major setae simple; tarsal tooth and hamus not equally developed in any legs 13
13. Antennal segment IV broad apically, with more than 4 prominent sensoria (Fig. 96); female abdominal sternite VIII with row of stout posteromarginal setae. . . . . *Streptothrips*
-. Antennal segment IV narrowed at apex, with 3 (or 2) prominent sensoria; female abdominal sternite VIII without stout setae . . 14
14. Sternite VIII posterior margin with series of long teeth . . . . . *Chirothripoides**
-. Sternite VIII simple, without posteromarginal teeth 15
15. Head produced in front of eyes; prosternal ferna large, fused medially . . . . . *Mastigothrips**
-. Head not produced in front of eyes (Fig. 74); prosternal ferna of two distinct plates 16
16. Antennal segment IV with 2 sensoria; fore femora inner margin with tooth . . . . . *Menothrips**
-. Antennal segment IV with 3 sensoria; fore femora inner margin without tooth. . . . . *Plectrothrips*
17. Maxillary stylets short and V-shaped, usually scarcely retracted into head capsule (Figs 8, 84, 95) 18
-. Maxillary stylets various, at least clearly visible in head anterior to postoccipital ridge 21
18. Antennal segment III with 3 sensoria, IV with 4 sensoria, segments VII–VIII broadly joined or fused (Fig. 11); prosternal basantra present (Fig. 8); fore wing constricted medially . . . . . *Akarethrips* **gen n.**
-. Antennal segment III with 1–2 sensoria, IV with 2–3 sensoria, segments VII–VIII distinct from each other; prosternal basantra absent or weakly developed; fore wing without median constriction. 19
19. Fore femora expanded, with at least one large tooth on inner margin (Figs 92, 93). . . . . *Veerabahuthrips*
-. Fore femora without tooth on inner margin 20
20. Metathoracic sternopleural sutures present; abdominal tergites III–VI each with one pair of wing-retaining setae in macropterae (Fig. 94); living on dead branches . . . . . *Sophiothrips*
-. Metathoracic sternopleural sutures absent; abdominal tergites III–VI each with 2 pairs of wing-retaining setae in macropterae; living on Poaceae . . . . . *Bamboosiella*
21. Abdominal tergite VIII with 1 or 2 pairs of curved wing-retaining setae (Figs 68, 86) 22
-. Abdominal tergite VIII with no wing-retaining setae 25
22. Pronotal aa absent; antennal segments III-IV each with 2 sensoria . . . . . *Solomonthrips*
-. Pronotal aa developed; antennal segment III with 2 or 3 sensoria, IV with 3 or 4 23
23. Eyes prolonged on ventral surface of head; tergite VIII with only one pair of curved wing-retaining setae . . . . . *Lizalothrips**
-. Eyes not longer ventrally than dorsally; tergite VIII with 2 pairs of curved wing-retaining setae 24
24. Pronotal am setae minute (Fig. 131); antennal segment III with 3 sensoria, IV with 4; fore wing parallel-sided . . . *Phylladothrips*
-. Pronotal am well developed, as long as aa (Fig. 84); antennal segment III with 2 sensoria, IV with 3; fore wing slightly constricted medially . . . . . *Propesolomonthrips*
25. Antenna 5-segmented, morphological segments III–VI joined (Fig. 77) [body surface bearing numerous tubercles, most setae broadly expanded; meso- and metanotum fused; abdominal tergite I transverse, broadly fused to tergite II; tube encircled by a transverse furrow medially] . . . . . *Murphythrips*
-. Antenna 7- or 8-segmented 26
26. Fore wing with 3 brown bands, without duplicated cilia, sub-basal setae weak (Fig. 21); abdominal tergites III–VI each with one pair of wing-retaining setae . . . . . *Aleurodothrips*
-. Fore wing rarely banded, duplicated cilia and sub-basal setae various; abdominal tergites III–VI usually with 2 pairs of wing-retaining setae 27
27. Antennae 7-segmented [body surface strongly reticulated] . . . . . *Strepterothrips*
-. Antennae 8-segmented, but sometimes VII–VIII closely joined, with complete or incomplete suture 28
28. Antennal segment III usually with more than 6 stout sensoria (Fig. 12), if with 4, fore femur with a median tubercle in both sexes (Fig. 130) . . . . . *Ecacanthothrips*
-. Antennal segment III with no more than 4 sensoria 29
29. Tube elongate, usually more than 10 times as long as basal width, with numerous lateral setae (Fig. 70); abdominal tergites II–V with 2 pairs of wing-retaining setae, usually fan-shaped; antennal segment IV with two sensoria. . . . . *Leeuwenia*

-. Tube less than 5 times as long as basal width; if tube elongate, then abdominal tergites II–V with numerous wing-retaining setae, or antennal segment IV with three sensoria 30
30. Head with 2 pairs of prominent postocular setae (Fig. 105); antennal segment IV with 2 sensoria; head of female with ocellar triangle prolonged conically over base of antennae (Fig. 105) . . . . . *Coryphothrips*
-. Head usually with one pair of postocular setae; if with 2 pairs then antennal segment IV with 3 sensoria; head not prolonged into cone over base of antennae 31
31. Antennal segment VIII elongate (Fig. 17); head constricted basally; maxillary stylets far apart from each other; pronotal am (and usually aa) setae minute, notopleural sutures incomplete; fore tarsal tooth absent in both sexes; fore wing parallel-sided 32
-. Not above combination of characters 34
32. Maxillary stylets parallel medially in head, about one third of head width apart; mouth cone pointed . . . . . *Athlibothrips*
-. Maxillary stylets wide apart and V-shaped in head; mouth cone broadly rounded. 33
33. Head about as long as wide (Fig. 71); fore wing sub-basal setae reduced; leaf-feeding species . . . . . *Litotetothrips*
-. Head longer than wide; fore wing sub-basal setae well-developed; gall-inducing species . . . . . *Thlibothrips**
34. Antennal segment II asymmetric, inner margin sharply angulate (Fig. 104); head projecting over bases of antennae, first ocellus directed forwards (Fig. 104); mesopresternum completely absent [antennal segment III with one sensorium, IV with two sensoria; pronotal epimera laterally strongly eroded] . . . . . *Chelaeothrips*
-. Antennal segment II not sharply asymmetric; anterior margin of head different; mesopresternum various, transverse, or reduced to two lateral triangles, or rarely fused to anterior margin of mesoeusternum 35
35. Antennal segment III with one sensorium, IV with 3 (Fig. 89) [basantra usually absent] 36
-. Sensorium number on antennal segments III and IV different from above 62
36. Basantra present; postocular setae minute . . . . . *Jennythrips**
-. Basantra absent; postocular setae usually developed 37
37. Eyes with posterior ommatidia enlarged (Figs 81, 82, 119, 120) 38
-. Eyes without enlarged posterior ommatidia 41
38. Mesonotum, metanotum and tergites II–VI yellow, head and abdominal segments VII–X dark brown [maxillary stylets retracted almost to compound eyes, close together medially in head] . . . . . *Praeciputhrips*
-. Body uniformly brown 39
39. Posteromarginal setae on abdominal segment IX 0.6 as long as tube. . . . . *Manothrips**
-. Posteromarginal setae on abdominal segment IX as long as tube, or a little shorter 40
40. Pronotum with notopleural sutures incomplete (Fig. 119) . . . . . *Gemmathrips*
-. Pronotum with notopleural sutures complete (Fig. 120). . . . . *Rosingothrips*
41. Body strongly reticulate dorsally, usually with fine internal wrinkles; tube usually elongate, at least 5 times as long as basal width, and with fine lateral setae; head about twice as long as width across eyes, cheeks parallel (Fig. 3); antennal segments III–V usually slender; pelta triangular 42
-. Not above combination of characters 44
42. Maxillary stylets elongate, retracted to just behind eyes, close together medially (Fig. 3) . . . . . *Agynaikothrips*
-. Maxillary stylets short and wide apart, retracted to basal third of head length. 43
43. Abdominal tergites II–V with more than 4 pairs of sigmoid or straight wing-retaining setae (Figs 39, 41, 42) . . . *Gigantothrips*
-. Abdominal tergites II–V with 2 pairs of sigmoid wing-retaining setae, usually also with several pairs of accessory smaller wing-retaining setae . . . . . *Gynaikothrips*
44. Postocellar setae elongate, much longer than diameter of posterior ocelli . . . . . *Chaetokarnyia**
-. Postocellar setae not elongate 45
45. Maxillary stylets retracted to compound eyes and close together medially in head (Figs 66, 124) 46
-. Maxillary stylets not reaching compound eyes, about one third of head width apart medially 47
46. Metanotum strongly reticulate; pronotum clearly narrower than prothorax width; female with a large fore tarsal tooth . . . . . *Horistothrips*
-. Metanotum weakly reticulate; pronotum occupying full width of prothorax; female without a fore tarsal tooth . . . . . *Psephenothrips*
47. Female with sharply recurved, pointed tooth on inner apex of fore tibia (Fig. 142), and fore femora swollen but without tooth on inner margin . . . . . *Myopothrips*
-. Fore tibia of both sexes without a large recurved tooth at inner apex. 48
48. Head strongly constricted basally, forming a neck with one or more stout setae just anterior to the constriction (Fig. 83); fore tibia of male with small triangular tooth at inner apex (Fig. 83) . . . . . *Sphingothrips*
-. Head not constricted to a basal neck with stout setae; fore tibiae of male with no tooth or tubercle at inner apex 49
49. Head with two pairs of equally developed postocular setae (Fig. 118). . . . . *Adelphothrips*
-. Head with no more than one pair of well-developed postocular setae 50
50. Pronotum with no long major setae, epim no longer than width of fore tibia (Fig. 129); pronotum anterior angles with numerous stout setae (Fig. 129); head much longer than wide, cheeks with numerous stout setae, postocular setae minute (Fig. 129) [both sexes with large fore tarsal tooth] . . . . . *Phasmothrips*
-. Pronotum anterior angles without numerous stout setae, major setae usually elongate, head usually with postocular setae and cheeks without numerous stout setae 51
51. Postocular setae behind inner margin of compound eyes, and cheeks with numerous short stout setae (Fig. 121) [antennal seg-

ments III–IV sensoria 0.75 as long as their segments] . . . . . *Zelotothrips*
-. Postocular setae arising further apart; cheeks without numerous setae 52
52. Head with one pair of stout setae on basal third of cheeks (Fig. 80) . . . . . *Ponticulothrips*
-. Head without such stout cheek setae 53
53. Antennal sensoria on III and IV long and slender, at least 2/3 as long as segment 54
- Antennal sensoria scarcely half as long as segment 55
54. Male with fore tarsal tooth; head scarcely long than wide (Fig. 126). . . . . *Eugynothrips*
-. Male without fore tarsal tooth; head much longer than width (Fig. 127) . . . . . *Phenicothrips*
55. Postocular setae minute, not extending to posterior margin of eye (Fig. 109) 56
-. Postocular setae well-developed 57
56. Body surface strongly reticulate; fore tarsal tooth present in female; tergite IX setae much shorter than tube . . . *Medogothrips*
-. Body surface not reticulate, pronotum with transverse sculpture lines; fore tarsal tooth absent in both sexes; tergite IX setae longer than tube (Fig. 109) . . . . . *Pnigmothrips*
57. Fore tarsal tooth present in both sexes 58
-. Fore tarsal tooth absent in females, rarely present in males 59
58. Pronotal epimeral setae well developed, usually much longer than other major setae (Fig. 32); metathoracic sternopleural sutures well developed . . . . . *Crotonothrips*
-. Pronotal 5 pairs of major setae well developed, epimerals slightly longer (Fig. 122); metathoracic sternopleural sutures present, but short. . . . . *Liophloeothrips*
59. Male with fore femora enlarged and large fore tarsal tooth; fore tarsus of female without tooth. . . . . *Propealiothrips*
-. Fore femora of male not enlarged; fore tarsal tooth absent in both sexes. 60
60. Antennal segment VIII long and slender, constricted basally, as long as VII, or a little longer (Fig. 13) . . . . . *Eurhynchothrips*
-. Antennal segment VIII short and slightly constricted basally, distinctly shorter than VII 61
61. Male tergite IX with setae S2 as long as setae S1 . . . . . *Isotrichothrips*
-. Male tergite IX with setae S2 much shorter than setae S1 . . . . . *Liothrips*
62. Body surface strongly reticulate, many short sculpture lines inside each reticle (Fig. 87); maxillary stylets long, retracted to eyes, close together medially (Fig. 87); pronotal major setae and postocular setae short, broadly expanded at apex (Fig. 87); postocular setae close together (Fig. 87); metathoracic sternopleural sutures present; fore wing, if developed, weakly constricted medially, with duplicated cilia . . . . . *Azaleothrips*
-. Not above combination of characters 63
63. Mesopresternum fused to mesoeusternum medially (Figs 24, 116) 64
-. Mesopresternum transverse, or reduced to two lateral triangles, never fused to mesoeusternum (Figs 50, 52, 54). 65
64. Antennal segment VIII clearly separate from VII, III with 3 sensoria; pronotal am, aa and ml setae not arising close together (Fig. 19); fore wing constricted medially . . . . . *Asianthrips*
-. Antennal segment VIII fused to VII, III with 2 sensoria (Fig. 114); pronotal am, aa and ml setae arising close together (Fig. 113); fore wing parallel sided . . . . . *Trichinothrips*
65. Head strongly reticulate and with cheeks distinctly in-cut just behind eyes (Fig. 78) 66
-. Head not strongly reticulate and with cheeks not in-cut behind eyes 68
66. Pronotum with 5 pairs of major setae with broadly expanded apices (Fig. 78); postocular setae long and capitate . *Mystrothrips*
-. Pronotum with only epimeral setae developed; postocular setae minute 67
67. Head with cheeks almost parallel-sided; antennal segment III with 3 sensoria; pronotal epimeral setae less than 20 microns long . . . . . *Sagenothrips**
-. Head with cheeks swollen behind eyes (Fig. 46); antennal segment III with 2 sensoria; pronotal epimeral setae more than 30 microns long (Fig. 46). . . . . *Heliothripoides*
68. Basantra present, usually well developed 69
-. Basantra absent or weak 86
69. Anterior margin of head produced into a prominent ensiform process overhanging base of antennae (Fig. 57). . . . . *Sinuothrips*
-. Anterior margin of the head without such a process 70
70. Postocular setae minute; only epimerals developed and expanded on pronotum; forewing without duplicated cilia [antennal segments III–IV with 2 and 4 sensoria respectively] . . . . . *Ananthakrishnana**
-. Postocular setae usually well developed, at least reaching posterior margin of eyes; all five pairs of pronotal setae developed, sometimes am, ml reduced; forewing with or without duplicated cilia 71
71. Metathoracic sternopleural sutures present 72
-. Metathoracic sternopleural sutures absent 75
72. Basantra well developed, longer than wide (Fig. 59) 73
-. Basantra usually broader 74
73. Pronotal notopleural sutures complete (Fig. 58); anal setae usually about twice as long as tube (Fig. 141); fore wing constricted medially. . . . . *Podothrips*
-. Pronotal notopleural sutures incomplete (Fig. 133); anal setae slightly longer than tube; fore wing parallel-sided *Okajimathrips*
74. Anal setae long, about 1.5 times as long as tube (Fig. 140); pronotal am setae minute, ml setae as long as aa setae (Fig. 125). . . . . *Praepodothrips*
-. Anal setae as long as tube; pronotal am and ml setae minute (Fig. 26) . . . . . *Bagnalliella*

75. Pronotal notopleural sutures incomplete (Fig. 60); antennal segment III with one sensorium, IV with 4 . . . . . *Dyothrips*
-. Pronotal notopleural sutures complete; antennal segments III–IV with different sensoria formula than above 76
76. Fore femur inner margin with small blunt tubercle either at base or medially (Figs 5, 110) 77
-. Fore femur without tubercle on inner margin 78
77. Fore femur inner margin with small blunt tubercle at base (Fig. 5) . . . . . *Androthrips*
-. Fore femur inner margin with small blunt tubercle medially (Fig. 110). . . . . *Sumatrothrips*
78. Head sharply constricted basally, with several stout setae on cheeks (Fig. 56); maxillary stylets short and V-shaped, not reaching postocular setae; stout fore tarsal tooth present in both sexes; antennal segment III with 3 sensoria, IV with 4. . *Mesothrips*
-. Not this combination of characters 79
79. Mouth cone straight, pointed, usually extending to mesothorax (Fig. 35) . . . . . *Dolichothrips*
-. Mouth cone usually short and rounded 80
80. Wings and tergal wing-retaining setae usually absent; antennal III with 1 sensorium, segment IV with 2 or 3; pronotum with 5 well developed setae . . . . . *Apterygothrips*
-. Not above combination of characters 81
81. Abdominal segments II–VI with 1 pair of wing-retaining setae (Fig. 69) . . . . . *Plicothrips*
-. Abdominal segments II–VI with 2 pairs of wing-retaining setae 82
82. Anal setae elongate, usually twice as long as tube or more, if shorter then pronotum notopleural sutures incomplete; basantra sometimes as long as wide; pronotal am setae usually minute (Fig. 55) . . . . . *Karnyothrips*
-. Anal setae shorter, no more than 1.5 times as long as tube; pronotal am setae usually developed 83
83. Fore tibia with small tooth at inner apex in both sexes (Fig. 112) . . . . . *Glenothrips*
-. Fore tibia with no small tooth at inner apex 84
84. Antennal segment III with 1 or 2 prominent sensoria. . . . . *Haplothrips*
-. Antennal segment III with 3 sensoria 85
85. Pronotum with 3 pairs of major setae, am and aa minute (Fig. 108) . . . . . *Logadothrips*
-. Pronotum usually with 5 pairs of major setae (am rarely small) . . . . . *Xylaplothrips*
86. Maxillary stylets long, retracted to eyes, close together medially for full length of head (Figs 61, 66). 87
-. Maxillary stylets never close together medially for full length of head 90
87. Antennal segments III and IV each with 3 sensoria (Fig. 88). . . . . *Pygmaeothrips*
-. Antennal segment IV with 4 sensoria 88
88. Antennal segment III with 4 sensoria . . . . . *Oidanothrips*
-. Antennal segment III with 2 or 3 sensoria 89
89. Fore tarsal tooth present in both sexes . . . . . *Holothrips*
-. Fore tarsal tooth absent in both sexes (Fig. 1). . . . . *Ablemothrips*
90. Female sternite VIII with pair of stout or leaf-like posteromarginal setae (Fig. 102); major setae strongly expanded at apex (Figs 97, 98) . . . . . *Terthrothrips*
-. Female sternite VIII without pair of stout posteromarginal setae 91
91. Wingless; pronotal am, aa and ml setae no larger than discal setae, pa setae often also small or scarcely 0.5 as long as epimeral setae; postocular setae not reaching posterior margin of eyes (Fig. 123) . . . . . *Cephalothrips*
-. Usually macropterous; at least pronotal ml, pa and epimeral setae long, also postocular setae extending to posterior margin of eyes 92
92. Apex of fore femora at inner margin with tooth in both sexes (Fig. 2); head without pair of stout setae on cheeks (Fig. 2) . . . . . *Acanthothrips*
-. Fore femora of female without tooth, male sometimes with tooth; head with pair of stout setae on basal third of cheeks 93
93. Maxillary stylets short, wide apart, usually V- or U-shaped 94
-. Maxillary stylets long, close together medially 97
94. Pronotum with 3 pairs of major setae, am and aa minute (Fig. 73) . . . . . *Psalidothrips*
-. Pronotum with 4 or 5 pairs of major setae, sometimes am minute 95
95. Antennal segment III with 2 sensoria . . . . . *Prosantothrips*
-. Antennal segment III with 3 sensoria 96
96. Abdominal tergites with one pair of wing-retaining setae; pronotum with 5 pairs of major setae; antennal segment IV with 3 sensoria . . . . . *Margaritothrips**
-. Abdominal tergites with two pairs of wing-retaining setae; pronotum usually with 4 pairs of major setae, am usually minute; antennal segment IV usually with 4 sensoria . . . . . *Deplorothrips*
97. Maxillary stylets relatively broad, usually 4–6 microns wide (Fig. 20); pronotal aa and ml setae relatively close together (Fig. 20) . . . . . *Apelaunothrips*
-. Maxillary stylets slender, usually 2–3 microns in diameter; pronotal aa and ml setae well separated 98
98. Postocular setae behind inner margin of eyes (Fig. 4); metathoracic sternopleural sutures absent . . . . . *Adraneothrips*
-. Postocular setae wider apart; metathoracic sternopleural sutures usually present 99
99. Major setae usually expanded at apex (Figs 63, 64); fore wings usually weakly constricted medially . . . . . *Hoplandrothrips*
-. Major setae usually acute at apex (Fig. 62); fore wings, if developed, parallel-sided . . . . . *Hoplothrips*

Ablemothrips Ananthakrishnan
(Fig. 1)

Ablemothrips Ananthakrishnan, 1969: 289. Type species: *Ablemothrips maxillatus* Ananthakrishnan, by monotypy.

Of the three species listed in this genus, two are from Thailand, but the type species was described from India and later recorded from southern Japan, Taiwan and the Philippines (Okajima 2006). This genus is probably related to *Holothrips*, although the dorsal surface of the head is strongly reticulate (Fig. 1), and in females the postocular setae arise behind the inner margin of the eyes. Three specimens of *maxillatus* have been studied, one from India identified by Ananthakrishnan, and two from Taiwan identified by Okajima. Each of these has three sensoria on antennal segment III, although the redescription by Okajima (2006) states that there are only two on this segment. Similarly, Okajima (1999a) indicates that two of the three species in this genus have four sensoria on segment IV, but *breviceps* has only two sensoria.

Diagnosis: Head much longer than wide (Fig. 1); postocular setae arise between inner margin of eyes in female, wide apart in male; stylets retracted to eyes, close together along full length of head; antennae 8-segmented, VIII closely fused to VII, III with 2 or 3 sensoria, IV with 4 (or 2); pronotum usually with 5 pairs of capitate setae, notopleural sutures almost complete; basantra absent; mesopresternum eroded medially; sternopleural sutures absent; fore tarsal tooth absent in both sexes; fore wings weakly constricted medially, without duplicated cilia; pelta hat-shaped with narrow lateral wings; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, much shorter than head; male sternite VIII without pore plate.

Acanthothrips Uzel
(Fig. 2)

Acanthothrips Uzel, 1895: 259. Type species: *Phloeothrips nodicornis* Reuter, by monotypy.

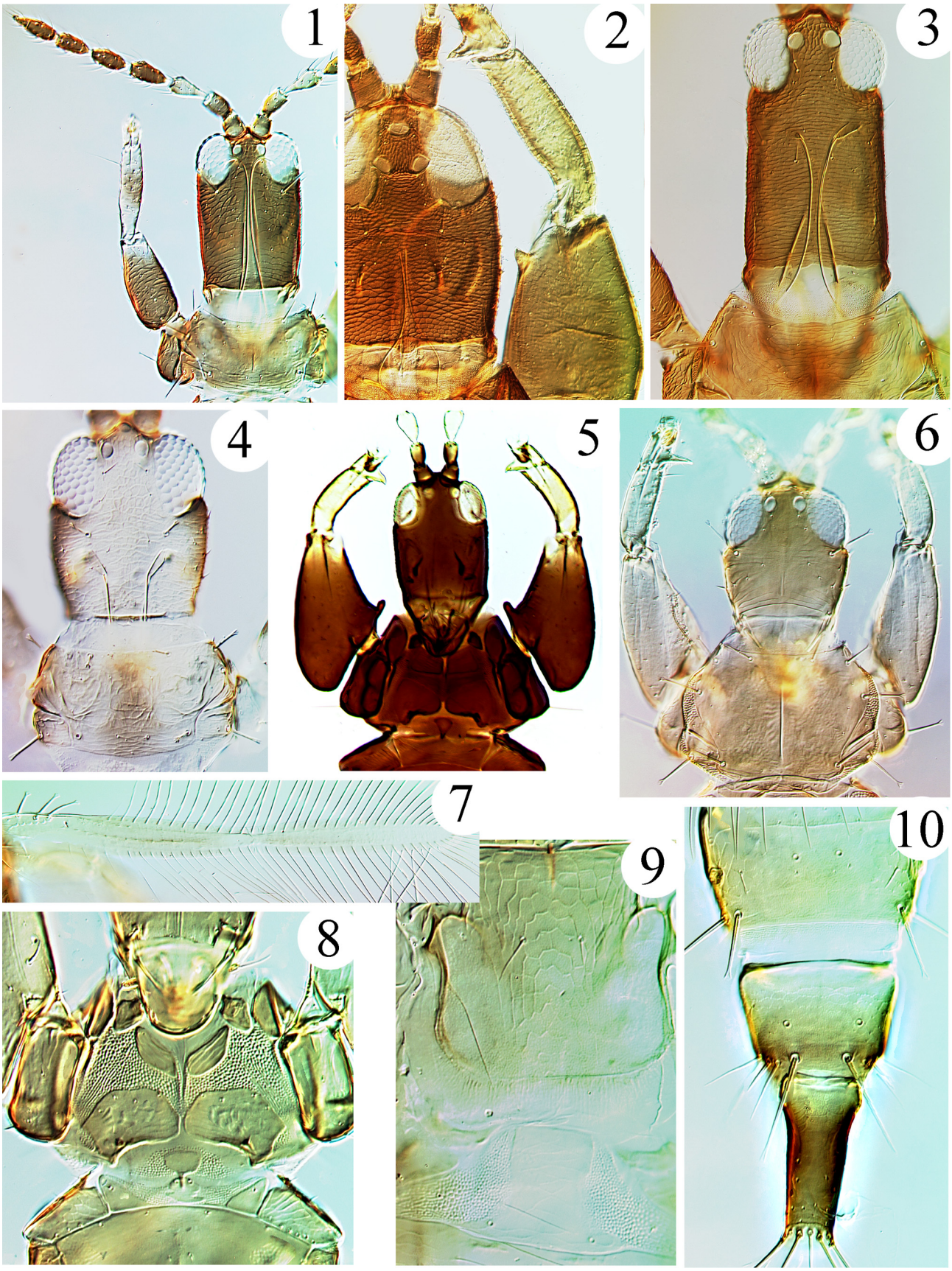
There are 13 species included in this genus, of which six are from the Neotropics, and five are from North America. One species is known only from northern Europe, but *nodicornis* is recorded widely across the Holarctic, including northern China. The fore femora of both sexes in this genus have a tooth apically on the inner margin (Fig. 2).

Diagnosis: Body reticulated dorsally; head longer than wide, cheeks with several small tubercles (Fig. 2); eyes normal; postocular setae usually well-developed; stylets retracted to eyes, close together medially; antennae 8-segmented, III usually with 3 sensoria, IV with 4; pronotum usually with 5 pairs of well-developed setae, notopleural sutures complete; basantra absent; mesopresternum transverse or reduced medially; sternopleural sutures present; fore tarsal tooth present in both sexes, fore femur with a tubercle on apical inner margin; fore wings usually parallel-sided, with duplicated cilia; pelta slightly triangular; tergites II–VII with 2 or 3 pairs of wing-retaining setae; tube shorter than head; male sternite VIII with or without pore plate.

Adelphothrips Priesner
(Fig. 118)

Adelphothrips Priesner, 1953: 374. Type species: *Gynaikothrips tristis* Karny, by original designation.

No species of this genus is recorded from China, but two are described from Java, one from the Philippines, and one from Fiji. The holotype and paratype females of *longisetosus* Reyes have been studied (in ANIC), and antennal segment IV has three sensoria not two as given in the original description (Reyes 1994). This genus belongs to the *Liothrips*-lineage, in which antennal segments III–IV have one and three sensoria respectively, and the prosternum lacks basantra, but in contrast to most species in that group the species of *Adelphothrips* have two pairs of equally well developed postocular setae (Fig. 118). Another species from the Philippines, *Adelphothrips ignotus* (Reyes) **comb.n.,** is here transferred from *Mesothrips* because it has the character states typical of *Liothrips*-lineage. The only known specimen of *ignotus* (in ANIC), a male with expanded fore femora but no fore tarsal tooth, has the notopleural suture slightly incomplete on the right side, but complete on the left, and the metathoracic sternopleural sutures are well-developed.



FIGURES 1–10. Phlaeothripinae genera. **(1)** *Ablemothrips maxillatus*, antenna, head, pronotum & fore leg; **(2)** *Acanthothrips nodicornis*, head & fore leg; **(3)** *Agynaikothrips* sp., head; **(4)** *Adraneothrips coloratus*, head & pronotum; **(5)** *Androthrips ramachandrai*, head, pronotum & for legs. *Akarethrips iotus* 6–10: **(6)** Head, pronotum & fore legs; **(7)** Forewing; **(8)** Basantra & mesopresternum; **(9)** Metanotum & Pelta; **(10)** Tergites VIII–IX.

Diagnosis: Head with cheeks slightly or distinctly narrowed at base; 2 pairs of postocular setae well-developed, one pair well posterior to the other (Fig. 118); stylets usually about 1/3 of head width apart, retracted to postocular setae; antennae 8-segmented, III with 1 sensorium, IV with 3; pronotum with 5 pairs of well-developed setae, notopleural sutures incomplete or complete; basantra absent; mesopresternum transverse, sometimes narrow medially; sternopleural sutures absent or present; fore tarsal tooth absent in both sexes; fore wings parallel-sided, with duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, slightly shorter than head.

Adraneothrips Hood
(Fig. 4)

Adraneothrips Hood, 1925: 54. Type species: *Haplothrips tibialis* Hood, by original designation.
Stigmothrips Ananthakrishnan, 1964: 231. Type species: *Stigmothrips limpidus* Ananthakrishnan, by original designation.

There are now 77 species listed in this genus, of which four are known from China, and one from the Philippines. Dang *et al*. (2013), in synonymising *Stigmothrips* with *Adraneothrips*, provided a key to the 23 species known from Asia and Australia. Most species in the genus are known from the New World, and in these the prothoracic notopleural sutures are complete, whereas these sutures are incomplete in most of the Asian *Adraneothrips* species.

Diagnosis: Head with cheeks slightly constricted behind large eyes; postocular setae usually arise behind inner margin of eyes (Fig. 4); stylets usually about 1/3 of head width apart, retracted to postocular setae; antennae 8-segmented, III with 2 or 3 sensoria, IV with 3 or 4; pronotum with 5 pairs of capitate setae, notopleural sutures incomplete or weakly complete; basantra absent, mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth usually not developed; fore wings weakly constricted medially, with or without duplicated cilia; pelta slightly longer than wide and usually bell-shaped; tergites II–VII with 2 pairs of wing-retaining setae, each posterior pair usually thicker than anterior pair; tergite IX with setae iS between S1 and S2 almost as long as S1; tube with straight sides, slightly shorter than head; male sternite VIII with or without pore plate.

Agynaikothrips Okajima
(Fig. 3)

Agynaikothrips Okajima, 2006: 157. Type species: *Agynaikothrips okinawaensis* Okajima.

Only two species are included in this genus, one from southern Japan and the other from Taiwan. The genus is related to *Gynaikothrips* and *Gigantothrips* in the *Liothrips*-lineage, but is distinguished by the long maxillary stylets that are close together medially (Fig. 3).

Diagnosis: Body sculptured dorsally; head much longer than wide (Fig. 3); eyes normal, postocular setae usually reduced, mid-dorsal setae slightly developed; stylets retracted to just behind eyes, close together medially; antennae 8-segmented, III with 1 sensorium, IV usually with 3 (or 2); pronotum usually with ml and epim setae developed, weakly expanded apically, notopleural sutures complete; basantra absent; mesopresternum boat-shaped; sternopleural sutures absent; fore tarsal tooth present in both sexes; fore wings parallel-sided, with duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tergite IX with S1 and S2 short and expanded, shorter than one third of tube; tube much longer than head, straight sides with fine setae on the surface, anal setae short; male sternite VIII with pore plate.

Akarethrips gen.n.
(Figs 6–11)

Small-sized Phlaeothripinae with unusually short maxillary stylets; body surface weakly sculptured; head longer than wide, cheeks incut just behind eyes (Fig. 6); eyes equally developed on dorsal and ventral surfaces, all ommatidia of equal size; postocular setae well-developed; stylets wide apart, V-shaped, not retracted anterior to

postoccipital ridge (Figs 6, 8); antennae 8-segmented, VIII fused to VII but with weakly complete suture (Fig. 11), III with 3 slender sensoria, IV with 4, V and VI each with 2 similar sensoria; pronotum with 5 pairs of capitate setae, notopleural sutures complete; basantra present in male, weak in female; mesopresternum divided into three sclerites, median sclerite with pair of setae (Fig. 8); sternopleural sutures absent; fore tarsal tooth present in both sexes; fore wings constricted medially, with duplicated cilia (Fig. 7); pelta slightly hat-shaped (Fig. 9); tergites II–VII with 2 pairs of wing-retaining setae; tergite IX with setae S1 and S2 of female expanded at apex; tube with straight sides, shorter than head; male tergite IX setae S2 short and stout (Fig. 10), sternite VIII without pore plate. Type species: *Akarethrips iotus* sp.n.

Comments. This new genus shares character states of the fore wing and prosternum with genera of the Haplothripini. Amongst the genera of that tribe in which species have three sensoria on the third segment (Mound & Minaei 2007; Minaei *et al*. 2007) it is distinguished by the exceptionally short maxillary stylets that are scarcely retracted into the head.

Akarethrips iotus sp.n.

Female macroptera. Body largely yellow, anterior part of head light brown, mesothorax shaded brown, tube brown on distal four-fifths; antennal segments I–III yellow, IV–VIII dark brown; all legs yellow; major setae pale; fore wing weakly shaded.

With the character states indicated above; head with pair of setae on basal third (Fig. 6), weak lines of sculpture present near posterior margin; postocular capitate; mouth-cone short and round.

Pronotum relatively large, with sculpture only near posterior margin; mesonotal lateral setae capitate; metanotum weakly reticulate, median setae pointed; fore femur slightly enlarged; fore tarsal tooth pointed, as long as tarsal width; fore sub-basal setae capitate, S2 and S3 closer to each other than to S1 (Fig. 7).

Pelta weakly sculptured, campaniform sensilla present (Fig. 9); tube with anal setae a little shorter than tube.

Measurements (holotype female in microns). Body length 1525. Head, length 160; width 135; postocular setae 50. Pronotum, length 150; width 210; major setae – am 35, aa 35, ml 50, epim 45, pa 55. Mesonotum lateral seta 25. Fore wing, length 625; sub-basal setae 35, 45, 40. Tergite IX, setae S1 60; S2 65; S3 70. Tube length 95; anal setae 90. Antennal segments III–VIII length, 50, 50, 45, 40, 35, 25.

Male macroptera. Very similar to female but darker and smaller; head and thorax brown, abdomen yellow, segment IX brown on posterior half; antennal segment III shaded brown in apical half; tergite IX setae S2 short and pointed; sternites IV–VI with median transverse band of reticulation, VII with similar band laterally, VIII without pore plate.

Measurements (paratype male in microns). Body length 1310. Head, length155; width 120; postocular setae 45. Pronotum, length 125; width 195; major setae – am 30, aa 30, ml 40, epimeral 40, pa 45. Tergite IX setae, S1 60; S2 20. Tube length 85; anal setae 85. Antennal segments III–VIII length, 40, 45, 40, 40, 30, 25.

Specimens studied. Holotype female, **Peninsular Malaysia**, Gombak, near Kuala Lumpur, beaten from *Mikania scandens* dead twigs, 7.x.1973 (LAM 1085), in The Natural History Museum, London.

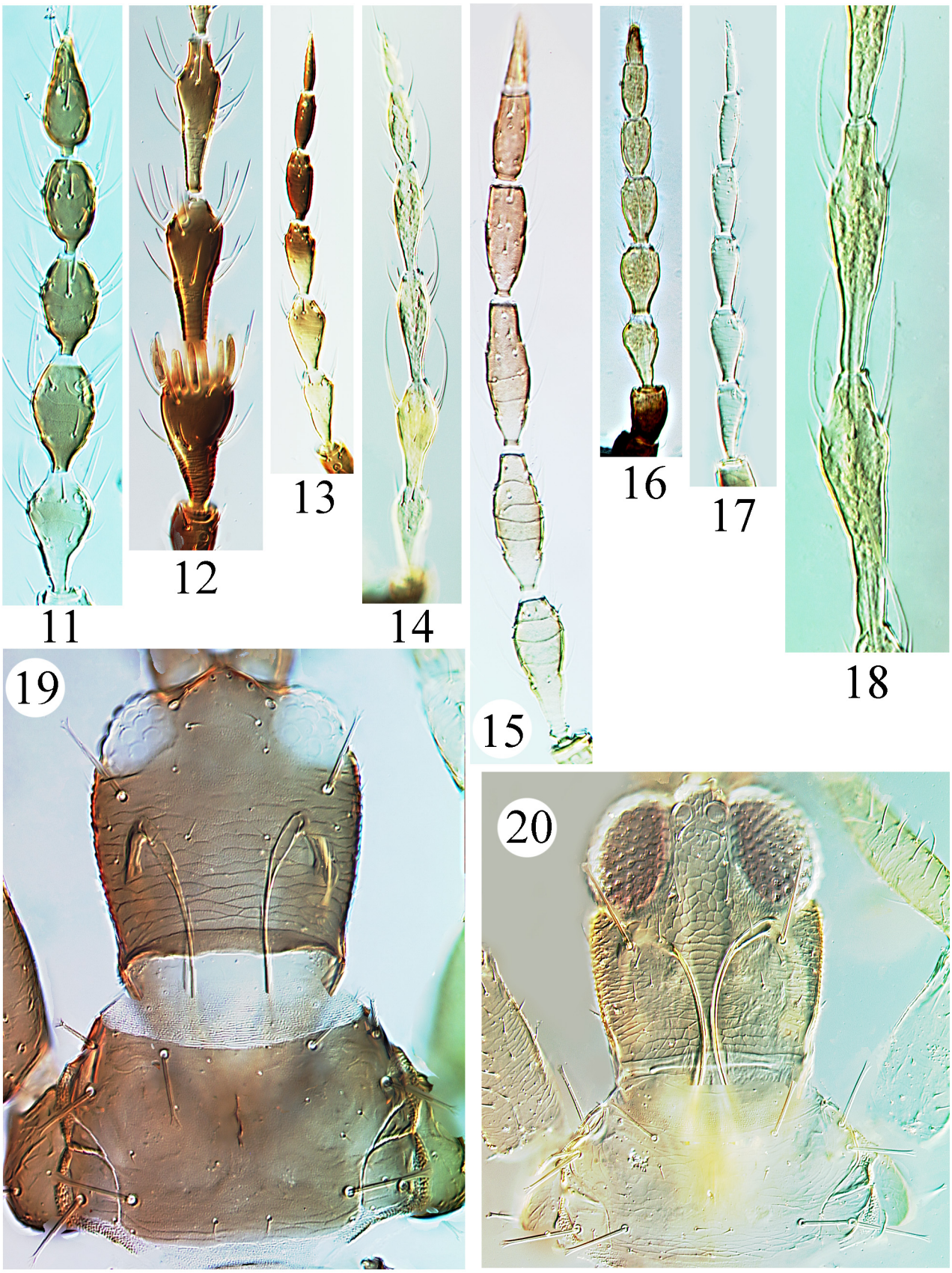
Paratype: 1 male from same site as holotype, beaten from herbs and climbers, 29.ix.1973.

Comments. Nothing is known of the biology of this new species, based on two individuals that were collected separately although at the same site.

Alerothrips Bhatti*

Alerothrips Bhatti, 1995: 98. Type species: *Neurothrips indicus* Ananthakrishnan, by monotypy.

Three species are included in this genus, two from Thailand, and one from India. The genus is similar to *Neurothrips* in having a slender tube and remarkably long anal setae, and these character states are also shared with urothripine taxa. *Alerothrips* is distinguished from *Neurothrips* by the presence of only two, instead of three, pairs of slightly flattened, simple to broad tergal wing-retaining setae (Okajima 1997). The genus is listed here in the *Amphibolothrips* genus-group with the urothripines (Table 1), although it is also similar to *Azaleothrips* in head shape, the shape and position of postocular setae, and the presence of a pore plate on male sternite VIII.



FIGURES 11–20. Phlaeothripinae genera. Antennae 11–18: **(11)** *Akarethrips iotus*; **(12)** *Ecacanthothrips tibialis*; **(13)** *Eurhynchothrips messuicola*; **(14)** *Eugynothrips sumatranus*; **(15)** *Heliothripoides boltoni*; **(16)** *Isotrichothrips longirostris*; **(17)** *Litotetothrips* sp.; **(18)** *Phenicothrips daetymon*. Head & pronotum 19–20: **(19)** *Asianthrips orientalis*; **(20)** *Apelaunothrips aokii*.

Diagnosis: Head as long as wide or a little longer, dorsal surface reticulate or with tubercles; cheeks strongly constricted basally; postocular setae short but expanded at apex, arising behind inner margin of eyes; stylets retracted to eyes, close together medially; antennae 8-segmented, segments VI–VIII widely fused, III with 2 or 3 sensoria, IV with 2, 3 or 4; pronotum with major setae short and expanded at apex, notopleural sutures reduced; basantra absent; sternopleural sutures present; fore tarsal tooth present in both sexes; fore wings with or without duplicated cilia; pelta hat-shaped; tergites II–VII with 2 pairs of simple to broad wing-retaining setae; tergite IX with S1 and S2 short; tube parallel-sided, slender, shorter than head, anal setae about 4 times as long as tube; male sternite VIII with pore plate.

Aleurodothrips Franklin

(Figs 21, 22)

Aleurodothrips Franklin, 1909: 228. Type species: *Cryptothrips fasciapennis* Franklin, by monotypy.

The only species in this genus is widespread around the tropics and sub-tropics, including Southern China, and is a predator of whitefly and scale insects (Palmer & Mound 1991). The head is unusual (Bhatti 1998) in that ventrally the labro-maxillary complex is fused with the cranium.

Diagnosis: Head slightly produced in front of eyes (Fig. 21); eyes normal, postocular setae minute; stylets long and wide apart; antennae 8-segmented, III with 1 sensorium, IV with 2; pronotum with aa and epim setae developed, notopleural sutures vestigial; basantra present; mesopresternum transverse; sternopleural sutures absent; male with fore tarsal tooth and a tooth on inner margin of fore femur, female fore legs unarmed; fore wings with three brown bands, without duplicated cilia; pelta weak; tergites II–VII with 1 pair of wing-retaining setae; male tergite IX with S2 long (Fig. 22); tube with straight sides, shorter than head.

Ananthakrishnana Bhatti*

Ananthakrishnana Bhatti, 1967: 22. Type species: *Ananthakrishnana indica* Bhatti, by monotypy; a synonym of *Haplothrips euphorbiae* Priesner.

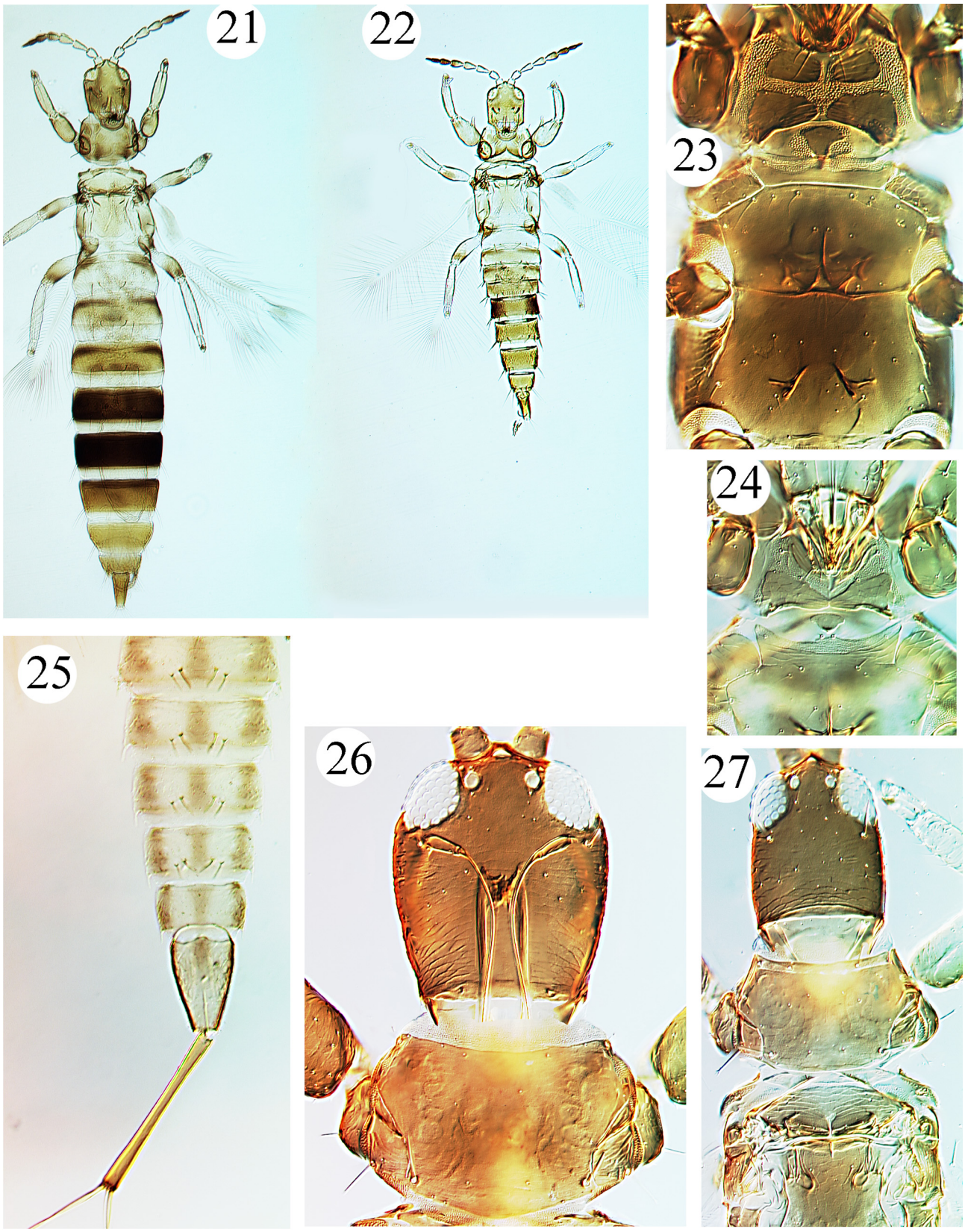
The only species included in this genus was described from Indonesia and subsequently from India. The original description was very simple, with most characters not available. However, Bhatti (1967) indicated that the species shares many character states with those of *Haplothrips* species, and the genus is placed in the Haplothripini.

Diagnosis: Head a little longer than wide; eyes normal, postocular setae minute; stylets ?; antennae 8-segmented, III with 2 sensoria, IV with 4; pronotum with epimeral setae developed; notopleural sutures complete ?; basantra present; mesopresternum transverse; sternopleural sutures absent ?; fore tarsal tooth present in both sexes ?; fore wings constricted medially, without duplicated cilia; pelta ?; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides.

Andrethrips Mound

Andrethrips Mound, 1974:110. Type species: *Andrethrips floydi* Mound, by monotypy.

This remarkable genus from SE Asia is easily recognized by the presence of long barbed setae on elongate dorsal tubercles on the body, and each leg with a tarsal tooth and hamus equally developed. Of the two fungus-feeding species in the genus, *floydi* was described from Malaysia on two females, and Okajima (1998a) described *insularis* from Thailand based on three females and one male. *Andrethrips* is related to the genera with two pairs of wing-retaining setae on tergite VIII, such as *Solomonthrips*, *Phylladothrips* and *Propesolomonthrips*. However, the sensorium on antennal segment II is placed near the base of that segment, as in members of the *Plectrothrips* genus-group.



FIGURES 21–27. Phlaeothripinae genera. *Aleurodothrips* sp. 21–22: **(21)** female; **(22)** male. Ventral view of thorax 23–24: **(23)** *Apterygothrips viretum*; **(24)** *Asianthrips orientalis*. **(25)** *Baenothrips moundi*, tergites III–X. Head & pronotum 26–27: **(26)** *Bagnalliella* sp.; **(27)** *Bamboosiella cingulata*.

Diagnosis: Body with many long and barbed setae arising from elongate tubercles; head with well-developed projection in front of eyes; cheeks notched behind eyes; stylets retracted into head capsule, V-shaped; antennae 8-segmented, campaniform sensorium situated near base on segment II, III with 2 sensoria, IV with 4; pronotum with 6 pairs of barbed setae, notopleural sutures reduced; basantra absent; mesopresternum eroded medially, divided into two lateral plates; sternopleural sutures absent; each leg with tarsal tooth and hamus equally developed in both sexes; fore wings narrow, without duplicated cilia; pelta broad; tergites II–VIII with 2 pairs of wing-retaining setae; tergite IX with S1 flattened and fringed, S2 and S3 slender; tube parallel-sided, slender, much longer than head, anal setae much shorter than tube; male sternite VIII without pore plate.

Androthrips Karny
(Fig. 5)

Androthrips Karny, 1911b: 560. Type species: *Mesothrips melastomae* Zimmermann, by monotypy

There are 12 species in this typically oriental genus. Three of these species are recorded from China, of which one is known also from Indonesia and is introduced to North America (Hoddle *et al*. 2012) living in the leaf galls of *Gynaikothrips* on *Ficus* species, presumably as a predator of the galling thrips. The original description of *A. crus* Chen from Taiwan indicated that the mid- and hind tibiae are brown with base and apex yellow. However, the type-specimens have been studied on loan, and these have all the tibiae yellow in contrast to the brown femora. Moreover, the description of *A*. *guiyangensis* Sha *et al*. from China, does not distinguish this species from *crus*. A series of both sexes from northern Australia, identified as *monsterae* (Moulton) from Papua New Guinea, has also been studied and these cannot be distinguished from *crus*. At present it seems likely that these three names, together with two others described from India and the Philippines (Mound & Minaei 2007), represent a single widespread species that lives as a predator in leaf galls induced by several thrips species.

Diagnosis: Head longer than wide (Fig. 5); eyes normal, postocular setae well-developed; stylets retracted to postocular setae, about half the head width apart medially; antennae 8-segmented, sensoria on III and IV variable; pronotum usually with 4 pairs of capitate setae, sometimes am reduced; notopleural sutures complete; basantra present; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth present in both sexes, fore tibiae usually with an apical flat scale on inner margin, fore femur enlarged with a basal tooth or hump on inner margin (Fig. 5); fore wings constricted medially, with duplicated cilia; pelta triangular or trapeziodal; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head, anal setae a little longer than tube.

Apelaunothrips Karny
(Fig. 20)

Apelaunothrips Karny, 1925: 82. Type species: *Ophidothrips medioflavus* Karny, by monotypy.

Mound (2013b) provided an identification key to the 38 species listed in this genus, all from the Old World tropics. Of these species, 26 are recorded from SE Asia, with nine from China. Species of this genus are particularly unusual amongst Phlaeothripinae in having the maxillary stylets relatively broad (Fig. 20), but not as broad as in species of Idolothripinae, although it seems that they feed on fungal spores.

Diagnosis: Head often longer than wide, cheeks weakly rounded, without stout setae, slightly incut behind large eyes (Fig. 20); postocular setae usually long, capitate; maxillary stylets long, close together medially, broader than typical Phlaeothripinae; antennae 8-segmented, III with 3 (or 2) sensoria, IV with 4 (or 3) sensoria; pronotum usually with 5 pairs of capitate setae, notopleural sutures complete; basantra absent; mesopresternum transverse; no sternopleural sutures; fore tarsi usually without tooth in both sexes; fore wings, if present, weakly constricted medially, with duplicated cilia; pelta triangular or bell-shaped; tergites II–VII each with 2 pairs of wing-retaining setae in macropterae; tube shorter than head, anal setae usually shorter than tube; male sternite VIII without pore plate.

Apterygothrips Priesner
(Fig. 23)

Apterygothrips Priesner, 1933a: 1. Type species: *Apterygothrips haloxyli* Priesner, by monotypy.

There are 40 species included in this genus, of which three are recorded from China, one from the northern Palaearctic area, and two from the South or Southwest. This genus, a member of the Haplothripini, is possibly polyphyletic because it is defined from *Haplothrips* only on the basis of lack of wings and tergal wing-retaining setae.

Diagnosis: Head longer than wide; eyes normal, or slightly prolonged ventrally, postocular setae well-developed; stylets retracted to just behind eyes, about one third of head width apart, maxillary bridge present; antennae 8-segmented, III with 1 or 2 sensoria, IV with 2 or 3; pronotum usually with 5 pairs of developed setae, notopleural sutures complete; basantra present; mesopresternum transverse or eroded medially; sternopleural sutures usually absent, sometimes present (Fig. 23); fore tarsal tooth present or absent; commonly micropterous, macropterae with fore wings weakly constricted medially, without duplicated cilia; pelta trapezoidal or hemicircular; tergites II–VII with 2 pairs of wing-retaining setae in macroptera; tube shorter than head.

Asianthrips Okajima
(Figs 19, 24)

Asianthrips Okajima, 2006: 187. Type species: *Asianthrips orientalis* Okajima, by monotypy.

The only species in this genus was described from southern Japan and Taiwan, and is almost unique among Phlaeothripinae in having the mesopresternum fused to the mesoeusternum medially with a reduced suture present laterally (Fig. 24). According to Okajima (2006) this genus is probably related to *Adraneothrips*, although unlike the Asian members of that genus the notopleural sutures are complete.

Diagnosis: Head slightly longer than wide (Fig. 19); eyes normal, postocular setae well-developed and wide apart; stylets retracted to postocular setae, usually wide apart; antennae 8-segmented, III with 3 sensoria, IV with 4; pronotum with 5 pairs of well-developed setae, notopleural sutures complete; basantra weakly present; mesopresternum fused to mesoeusternum medially (Fig. 24); sternopleural sutures absent; fore tarsal tooth absent in both sexes; fore wings weakly constricted medially, with duplicated cilia; pelta nearly triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head; male sternite VIII without pore plate.

Athlibothrips Priesner

Thlibothrips (*Athlibothrips*) Priesner, 1952: 199. Type species: *Gynaikothrips fuscipes* Karny, by monotypy.

Erected for a single species, from Vietnam, this genus currently includes three further species, two from India and one from New Caledonia. Judging from field studies on the latter species, members of this genus probably induce galls on leaves.

Diagnosis: Head slightly wider than long; eyes normal, postocular setae well-developed, wide apart (sometimes duplicated in *caledonensis*); stylets retracted to postocular setae, about one third of head width apart; antennae 8-segmented, III with 1 sensorium, IV with 3; pronotum with 4 pairs of capitate setae, am setae small, notopleural sutures slightly incomplete; basantra absent; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth absent in both sexes; fore wings parallel-sided, with duplicated cilia; pelta irregular triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head; male sternite VIII without pore plate, setae S2 on IX unusually short.

Austrothrips Brethes

Austrothrips Brethes, 1915: 89. Type species: *Austrothrips verae* Brethes, by monotypy.

This genus was erected for a single species from Argentina. This species appears never to have been studied by any other worker, and the genus remains inadequately defined and effectively unknown. Despite this, three further species have been described in the genus, one from Fiji, one from New Guinea, and one from Thailand. One male syntype of the latter species, *cochinchinensis* Karny (1922b), has been studied, together with two females that appear to be the same species from *Calycopteris floribunda* galls in southern India. None of these specimens is in a satisfactory condition for detailed study, but there appear to be two sensoria on antennal segments III and IV, and the mesopresternum is transverse but slender. The maxillary stylets are deeply retracted and less than one third of the head width apart, but antennal segment VIII is long and slender. This species is possibly related to *Prosantothrips* and to some of the species placed in *Eothrips*.

Azaleothrips Ananthakrishnan
(Fig. 87)

Azaleothrips Ananthakrishnan, 1964: 220. Type species: *Azaleothrips amabilis* Ananthakrishnan, by monotypy.

Ten species are listed in this genus, all from the Old World tropics, between India and southern Japan, with three species recorded from Southern China (Guizhou and Taiwan). These thrips live on dead branches, and have delicate, complex sculpture, and broadly capitate major setae (Fig. 87).

Diagnosis: Body with complex reticulation (Fig. 87); head about as long as wide; postocular setae short, capitate, behind inner margins of eyes or absent; stylets long, retracted to eyes, close together medially; antennae 8-segmented, VIII more or less fused to VII; segment III with 3 sensoria, IV with 4; pronotum with 5 pairs of capitate setae, notopleural sutures complete; basantra absent; mesopresternum transverse, slender; sternopleural sutures long; female with small fore tarsal tooth; fore wings weakly constricted medially, with duplicated cilia; pelta broadly bell-shaped; tergites II–VII each with 2 pairs of wing-retaining setae, each posterior pair larger than anterior pair, tergal major setae broadly capitate; tube shorter than head, anal setae as long as tube; male sternite VIII with large pore plate.

Baenothrips Crawford
(Fig. 25)

Baenothrips Crawford, 1948: 39. Type species: *Baenothrips guatemalensis* Crawford, by monotypy.

This urothripine genus is widespread around the world, with fungus-feeding species often living at ground level amongst the base of grasses or on dead branches. It includes 11 species, of which three are recorded from Southern China, and one from west Malaysia.

Diagnosis: Body tuberculate-reticulate; head anterior margin with 3 pairs of prominent setae, compound eyes reduced to 10–15 facets; stylets retracted to eyes, 1/3 of head width apart; antennae 8-segmented, III with no sensorium, IV with 2 sensoria; pronotum with only epim setae well-developed, notopleural sutures reduced; basantra reduced to 2 small lateral triangles; mesopresternum slender, transverse; metathoracic epimera enlarged and tuberculate, no sternopleural sutures; fore tarsi without tooth; fore wings, if present, narrow, no duplicated cilia; pelta transverse; tergites II–VII each with 2 pairs of broad wing-retaining setae in macropterae; tergite IX three times as long as VIII (Fig. 25); tube long and slender with apex slightly widened; anal setae more than twice as long as tube; male sternite VIII without pore plate.

Bagnalliella Karny
(Fig. 26)

Bagnalliella Karny, 1920: 41. Type species: *Cephalothrips yuccae* Hinds, by monotypy.

Seven of the nine species listed in this genus are from the arid areas of southwestern USA, in association with plants of the genus *Yucca* (Agavaceae). The generic relationships of the other two species (from Africa and New Guinea) remain doubtful. One species, *yuccae* Hinds, has been distributed widely around the world with its cultivated host-plant, and is known from China. The head of *Bagnalliella* species associated with *Yucca* has distinctive small grooves on the cheeks, but the number of antennal sensoria is known to be variable (Tree 2010).
Diagnosis: Head a little longer than wide (Fig. 26); eyes normal, postocular setae usually short and acute apically; stylets retracted to postocular setae, close together medially, maxillary bridge present; antennae 8-segmented, III usually with 2 sensoria, IV usually with 3; pronotum with 3 pairs of developed setae, am and ml minute, notopleural sutures complete; basantra present; mesopresternum transverse; sternopleural sutures present; fore tarsal tooth present in both sexes; fore wings weakly constricted medially, with duplicated cilia; pelta triangular or semicircular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head, anal setae slightly longer than tube; male sternite VIII without pore plate.

Bamboosiella Ananthakrishnan
(Fig. 27)

Bamboosiella Ananthakrishnan, 1957: 65. Type species: *Bamboosiella bicoloripes* Ananthakrishnan, by monotypy.

Most of the 28 species listed in this genus are probably phytophagous, and they all seem to be associated with grasses. Five of these species are recorded from China, 13 from Thailand, four from Peninsular Malaysia, three from Indonesia, and one each from Borneo and Singapore, but *cingulata* Hood is known from several countries around the tropics.

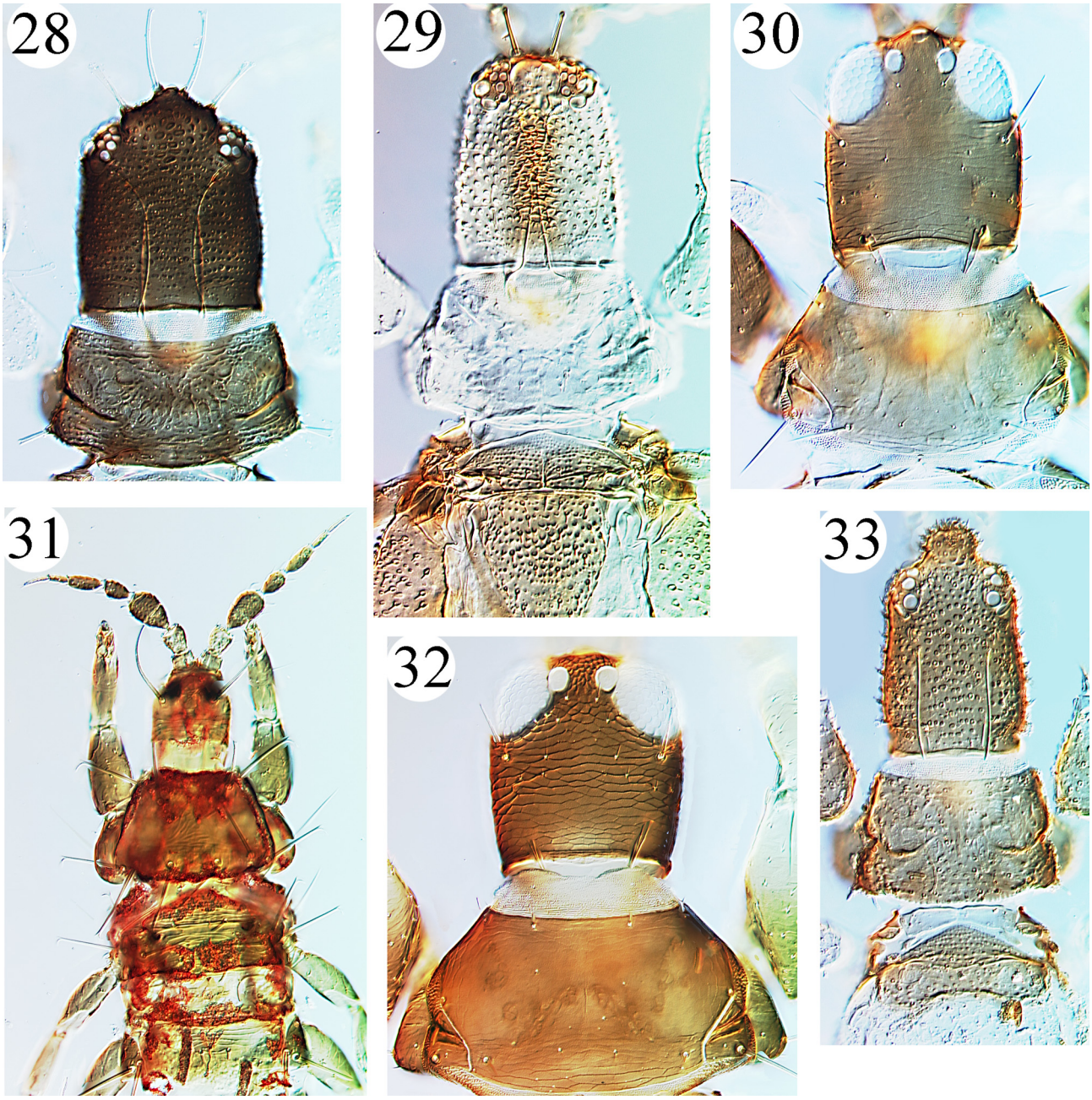
Diagnosis: Head shape variable; eyes normal, postocular setae well-developed; stylets usually very short, restricted to mouth-cone, V-shaped (Fig. 27); antennae 8-segmented, III with 1 or 2 sensoria, IV usually with 3, sometimes with 2 or 4; pronotum usually with 5 pairs of well-developed setae, sometimes am reduced, notopleural sutures complete, rarely incomplete; basantra absent, or weakly present; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth usually absent in both sexes, sometimes present; fore wings weakly constricted medially, usually with duplicated cilia; pelta bell-shaped; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head; male sternite VIII without pore plate.

Bradythrips Hood & Williams
(Fig. 29)

Bradythrips Hood & Williams, 1925: 68. Type species: *Bradythrips hesperus* Hood & Williams, by monotypy.

This is a small genus of six species, all of which are reported from SE Asia, despite the type species having been described originally from Guyana in South America. As with the related urothripine genera, *Baenothrips* and *Stephanothrips*, the species are fungus-feeding and are usually found on dead branches or in leaf-litter.

Diagnosis: Head longer than wide, tuberculate dorsally and laterally, produced in front of eyes, with 1 pair of prominent knobbed setae (Fig. 29); eyes developed in macroptera, with facets separated; all head setae short and expanded, usually arising from tubercles; stylets retracted to eyes, close together medially; antenna 7-segmented, segment VII with or without distinct suture, III with 1 sensorium, IV with 2; pronotum with irregular sculpture and numerous tubercles, most setae short but epim elongate, notopleural suture reduced; basantra reduced or small; mesopresternum developed; fore tarsal tooth absent; usually apterous; pelta distinctly separated from tergite II or not; tergites reticulate strongly or weakly; tergites II–VII with a pair of fin-shaped wing-retaining setae in macroptera; segments IX–X elongate, tube longer than head, with 1 or 2 pairs of anal setae elongate, about 3 times as long as tube, other anal setae reduced.



FIGURES 28–33. Phlaeothripinae genera. Head & pronotum 28–33: **(28)** *Baenothrips moundi*; **(29)** *Bradythrips hesperus*; **(30)** *Asianthrips orientalis*; **(31)** *Crinitothrips setosus*; **(32)** *Crotonothrips dentifer*; **(33)** *Urothrips junctus*.

Cephalothrips **Uzel**
(Fig. 123)

Cephalothrips Uzel, 1895: 244. Type species: *Phloeothrips monilicornis* Reuter, by monotypy.

Although eight species are listed in this genus, it remains uncertain if they are all closely related. No species is known from SE Asia, but the common European species, *monilicornis* (Reuter), is recorded from Inner Mongolia, and one species has been described from southern China, Sichuan (Han *et al*. 1991; Cao & Feng 2011).

Diagnosis: Usually apterous; head longer than wide (Fig. 123); eyes prolonged ventrally, postocular setae scarcely reaching posterior margin of eyes; stylets retracted nearly to eyes, about one fifth of head width apart; antennae 8-segmented, VII and VIII broad at base, III with 1 sensorium, IV with 2; pronotum with epim and

sometimes pa setae about as long as width of antennal II, am, aa and ml minute, notopleural sutures complete (Fig. 123); basantra absent; mesopresternum reduced to lateral triangles; sternopleural sutures present; fore tarsi with small tooth; macroptera with fore wings lacking duplicated cilia; pelta broad; tergites II–VII without sigmoid wing-retaining setae; tergite IX setae S1 and S2 shorter than basal width of tube; tube shorter than head, anal setae shorter than tube.

Chaetokarnyia Priesner*

Chaetokarnyia Priesner, 1952: 200. Type species: *Cryptothrips tenuicornis* Karny, by monotypy.

All four species listed in this genus were described from Java, Indonesia, and remain known only from their descriptions. No member of the genus is recorded from China, and no species has been examined during the studies reported here. The genus was described for species similar to *Liothrips* species but having the head a little longer than wide, with a pair of unusually long postocellar setae, and the fore tarsus of males with a tooth.

Chelaeothrips Karny
(Fig. 104)

Chelaeothrips Karny, 1923: 374. Type species: *Chelaeothrips annamensis* Karny, by monotypy.

Described originally for a single species represented by both sexes taken from a gall in Vietnam, a second species was described subsequently based on a single female from Sumatra. The genus shares with *Sumatrothrips* a curious condition of the pronotal epimera being fully eroded lateral to the insertion of the major epimeral seta. Despite the presence of only two sensoria on the fourth antennal segment, this genus is presumably a member of the *Liothrips*-lineage.

Diagnosis: Head longer than wide, prolonged in front of eyes over bases of antennae, ocellar triangle located in front of eyes (Fig. 104); base of head sharply constricted; eyes without enlarged ommatidia, postocular setae elongate, distant from posterior margin of eyes; maxillary stylets wide apart with distinct bridge; antennae 8-segmented, II asymmetric with inner magin angulate (Fig. 104), III with 1 sensorium, IV with 2; pronotum with 3 pairs of long major setae, am minute, ml small but longer than discal setae, notopleural sutures incomplete, epimera eroded lateral to base of major seta; basantra absent; mesopresternum absent; sternopleural sutures absent; fore tarsal tooth present in both sexes; fore wings parallel-sided, with duplicated cilia; pelta eroded irregularly; tergites II–VII with 2 pairs of wing-retaining setae; tube narrowed to apex, slightly shorter than head; male sternite VIII without pore plate.

Chirothripoides Bagnall*

Chirothripoides Bagnall, 1915: 505. Type species: *Chirothripoides typicus* Bagnall, by monotypy.

In reviewing the nine genera of the *Plectrothrips* genus-group, Okajima (1981) provided a key to the five species of the widely distributed genus *Chirothripoides*, of which two species are from Malaysia.

Diagnosis: Head longer than wide, distinctly produced in front of eyes; eyes large, postocular setae minute; stylets short, wide apart, U-shaped; antenna 8-segmented, campaniform sensorium situated on basal half of segment II, III–IV with sensoria stout; pronotum weakly sclerotized, major setae reduced, sometimes epimerals developed, notopleural suture complete; basantra reduced or absent, ferna separated from each other; mesopresternum ?; fore tarsus usually with a small tooth, mid tibiae with a spur-like seta, hind tibiae with 2 spur-like setae; fore wing long and slender, with duplicated cilia; pelta ?; posterior margin of sternite VIII with a series of long teeth; tergites without sigmoid wing-retaining setae ?; tube shorter than head, anal setae shorter than tube.

Coryphothrips Karny
(Figs 105, 107)

Coryphothrips Karny, 1923: 340. Type species: *Coryphothrips trochiceps* Karny, by original designation.

This genus remains known only from the original specimens of two species, taken from galls on *Dipterocarpus* species, one from Thailand but the other from Malaysia. Judging from the body sculpture, and the finely hairy tube, *Coryphothrips* is probably related to *Gynaikothrips* and *Gigantothrips*, despite having only two sensoria on the fourth antennal segment. However, the ocellar region of the head is prolonged into a conical projection over the bases of the antennae (Fig. 105), with the fore ocellus on the ventral surface of this projection.

Diagnosis: Body suface with prominent sculpture lines (Figs 105, 107); head longer than wide, anterior margin cone-shaped, projecting over antennal bases (Fig. 105); eyes without enlarged ommatidia, two pairs of postocular setae, one behind inner margin of eyes, one posterolaterally; maxillary stylets wide apart, retracted half-way to postocular setae; antennae 8-segmented, III with 1 sensorium, IV with 2; pronotal epimeral setae long, other major setae short and stout, notopleural sutures complete or nearly complete (Fig. 107); basantra absent; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth absent in both sexes; fore wings parallel-sided, without duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae, III–V with one pair of anterior accessory wing-retaining setae; tube with straight sides, with fine lateral setae, longer than head; male sternite VIII without pore plate.

Crinitothrips Okajima
(Fig. 31)

Crinitothrips Okajima, 1988: 465. Type species: *Crinitothrips setosus* Okajima, by monotypy.

There are five species listed in this genus, one from West Africa, two from Indonesia, one from Singapore, and one from Malaysia, but no species is yet recorded from China. The genus is a member of the *Hyidiothrips*-group (Okajima 1988), with species living on dead branches.

Diagnosis: Head a little longer than wide, weakly produced in front of eyes; postocular setae usually well-developed (Fig. 31); stylets short, retracted into head capsule, V-shaped; antennae 8-segmented, III and IV completely fused with or without suture (Fig. 31), III with 1 sensorium, IV with 2; pronotum with 5 pairs of well-developed setae, pm but not ml setae developed, notopleural sutures reduced (Fig. 31); basantra present but weak; mesopresternum absent; sternopleural sutures absent; fore tarsal tooth absent in both sexes; fore wings weak, without duplicated cilia; pelta irregular; tergites II–VII with 1 pair of wing-retaining; tube shorter than head.

Crotonothrips Ananthakrishnan
(Fig. 32)

Crotonothrips Ananthakrishnan, 1968: 119. Type species: *Crotonothrips gallarum* Ananthakrishnan, by monotypy.

This genus comprises 16 species, all of which feed on the leaves of trees, and most of which are from India. One species is recorded from Taiwan, *dentifer* Priesner (Okajima 2006), but none from mainland China. One species was described from Sulawesi, Indonesia, and is also known from Java as well as Malaysia, and this galls the leaves and stunts the growth of the widely planted decorative tree *Polyalthia longifolia* (Nasruddin & Mound 2012).

Diagnosis: Head usually as long as wide; eyes normal, postocular setae well-developed (Fig. 32); stylets variable, wide apart or close together; antennae 8-segmented, VIII widely fused to VII, III with 1 sensorium, IV with 3; pronotum with epim setae well-developed, other major setae usually short, notopleural sutures complete; basantra absent; mesopresternum reduced; sternopleural sutures present; fore tarsal tooth present in both sexes; fore wings parallel-sided, with duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tergite IX setae S2 shorter than S1 in both sexes; tube longer than head, anal setae shorter than tube.

Deplorothrips Mound & Walker

Deplorothrips Mound & Walker, 1986: 49. Type species: *Deplorothrips bassus* Mound & Walker, by monotypy.

The type species of this genus of nine species is from New Zealand, and undescribed species are known from eastern Australia, but the other eight named species are recorded from the following parts of Asia: three from southern Japan of which one is also known from Taiwan; a second species was described from Taiwan, two from Peninsular Malaysia, one from Thailand and one from the Philippines.

Diagnosis: Head as long as wide or longer, cheeks usually with at least one pair of small stout setae; postocular setae usually developed; stylets V-shaped, retracted scarcely or not at all anterior to occipital ridge; antennae 8-segmented, VIII broad at base, often fused with VII, III with 3 sensoria, IV with 4 (rarely 3); pronotum usually with 4 pairs of major setae, am usually reduced, notopleural sutures complete; basantra absent; mesopresternum transverse; sternopleural sutures present; fore tarsal tooth present in both sexes; fore tibia usually with subapical tubercle in male; fore wings, if present, weakly constricted medially, duplicated cilia present; pelta bell-shaped, or broader; tergites II–VII each with 2 pairs of wing-retaining setae in macroptera; tube shorter than head, anal setae about as long as tube; male sternites II–VII usually with reticulate areas, VIII with pair of pore plates, or one slender one.

Dolichothrips Karny
(Figs 34, 35)

Dolichothrips Karny, 1912c: 299. Type species: *Dolichothrips longicollis* Karny, by monotypy.

There are 20 species listed in this genus, and these appear to be phytophagous in association with the leaves or flowers of trees and shrubs. Most of the species are described from India, with one from Africa and another from Australia. Four species are recorded from southern China and Taiwan, and one each from Java, the Philippines and New Guinea. *D. pumilus* Priesner and *D. flavipes* (Moulton), described from Taiwan, probably represent the same species. Photographs of the holotype of *flavipes* (in CAS San Francisco) clearly show that the tibiae are yellow; the statement by Okajima (2006) that the mid- and hind tibiae are dark brown is therefore not correct.

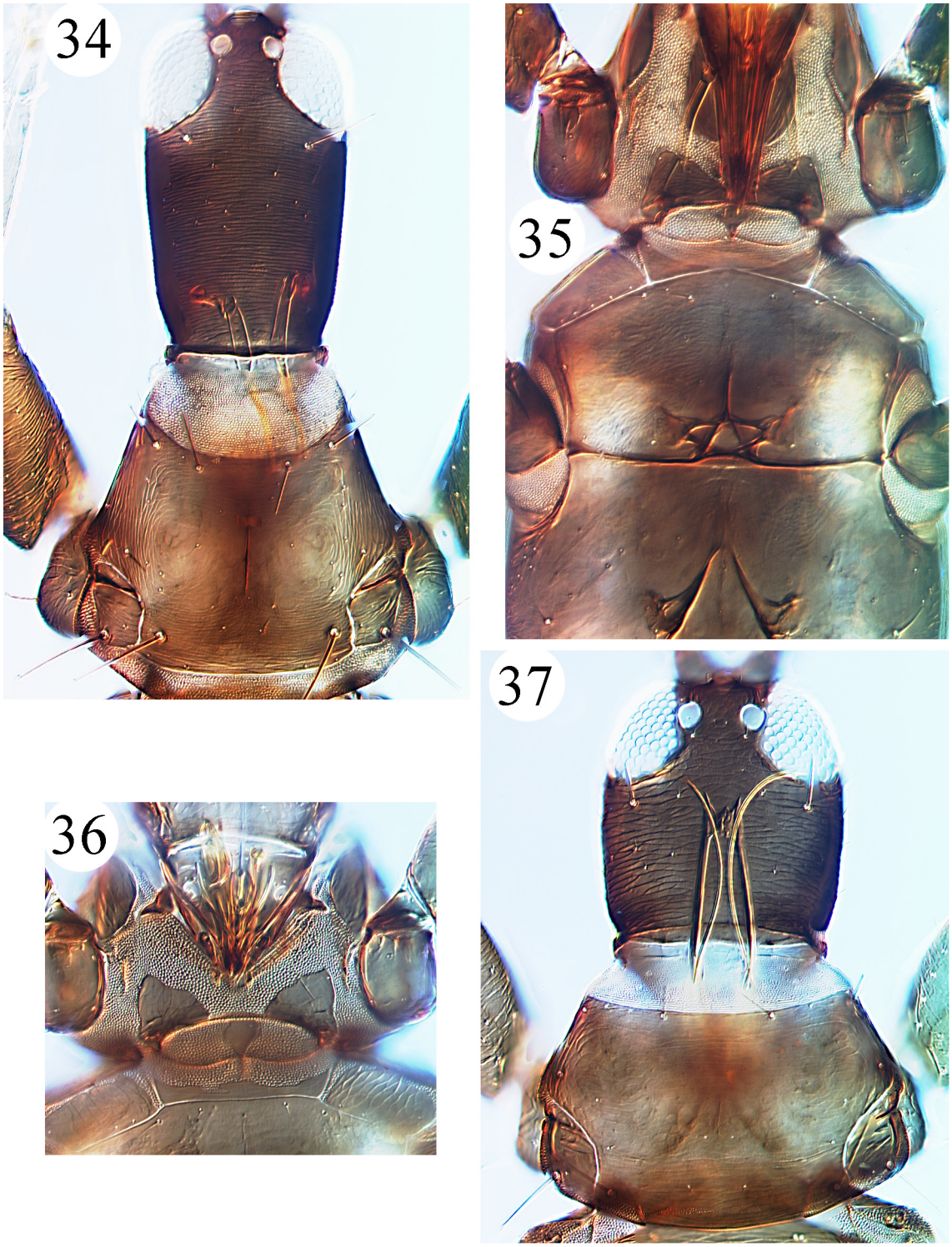
Diagnosis: Head longer than wide (Fig. 34); eyes normal, postocular setae well-developed; mouth-cone long and pointed (Fig. 35), stylets retracted to postocular setae, wide apart, maxillary bridge present; antennae 8-segmented, III with 3 sensoria, IV with 4; pronotum usually with 5 pairs of capitate setae, notopleural sutures complete; basantra present (Fig. 35); mesopresternum eroded medially; sternopleural sutures absent; fore tarsal tooth usually present in both sexes; fore wings weakly constricted medially, with duplicated cilia; pelta triangular or trapezoidal; tergites II–VII with 2 pairs of wing-retaining setae, sometimes with accessory wing-retaining setae; tube with straight sides, shorter than head; male sternite VIII without pore plate.

Dyothrips Kudô
(Fig. 60)

Dyothrips Kudo, 1974: 114. Type species: *Haplothrips cingulatus* Pelikan, by monotypy.

The only species in this genus is very similar to species of *Haplothrips*. It was described from Taiwan, but is widespread across the Old World tropics from India to Fiji, including Japan and northern Australia (Mound & Minaei 2007), as well as the Chinese mainland.

Diagnosis: Head longer than wide (Fig. 60); eyes normal, postocular setae well-developed; stylets retracted to median part of head, wide apart, maxillary bridge present; antennae 8-segmented, III with 1 sensorium, IV with 4; pronotum usually with 5 pairs of well-developed setae, notopleural sutures incomplete; basantra present; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth absent in both sexes; fore wings weakly constricted medially, without duplicated cilia; pelta trapezoidal; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head; male sternite VIII without pore plate.



FIGURES 34–37. Phlaeothripinae genera. *Dolichothrips longicollis* 34–35: **(34)** Head & pronotum; **(35)** Ventral view of thorax. *Eurhynchothrips messuicola* 36–37: **(36)** Ventral view of thorax; **(37)** Head & pronotum.

Ecacanthothrips Bagnall
(Figs 12, 130)

Ecacanthothrips Bagnall, 1909: 348. Type species: *Acanthothrips sanguineus* Bagnall, by monotypy, synonym of *Idolothrips tibialis* Ashmead, 1905: 20.

There are 11 species included in this genus, all from Asia but with one species introduced to Africa (Palmer & Mound 1978). Three are recorded from China, two from Malaysia, two from the Philippines, and one each from Borneo, Thailand, the Philippines, and New Guinea. These fungus-feeding species share many character states with *Hoplandrothrips* species, but have very large, and usually multiple, sensoria on the third antennal segment (Fig. 12).

Diagnosis: Head as long as wide or much longer (Fig. 130), cheeks usually with stout setae; postocular setae long; stylets long and retracted to eyes, close together medially; antennae 8-segmented, III usually with at least 6 stout sensoria (Fig. 12), IV with 4; pronotum usually with 5 pairs of major setae; notopleural sutures complete; basantra absent; mesopresternum usually eroded medially and divided into three; sternopleural sutures present; fore tarsi present in both sexes, fore femur usually with pair of apical tubercles in male (Fig. 130); fore femur sometimes with median tooth at inner margin in both sexes (Fig. 130); fore wings weakly constricted medially, with duplicated cilia; pelta triangular or bell-shaped; tergites II–VII each with 2 pairs of wing-retaining setae, often with several accessory wing-retaining setae; tube shorter than head, anal setae a little shorter than tube; male sternite VIII without pore plates.

Eothrips Hood
(Fig. 117)

Eothrips Hood, 1915: 106. Type species: *Dolerothrips crassicornis* Karny, by original designation.

Hood erected this genus without any definition or comment, but designated the type species and listed a further seven species from Java that had been described by Karny. Three of these seven have subsequently been transferred to other genera, and 13 species are now listed in *Eothrips* from India, Indonesia and Papua New Guinea. Two syntype females of *crassicornis* have been studied, together with one female (labelled male) from Vietnam that appears to be the same species. This species has the character states of a member of the *Liothrips*-lineage. It tracks to *Liothrips* in the key below, but has the head about as wide as long with widely spaced maxillary stylets (Fig. 117), and the major setae pale and elongate with capitate apices. The 13 species currently listed under this genus require further study in order to produce a clear definition of this genus, and to determine its validity.

Eugynothrips Priesner
(Figs 14, 126)

Eugynothrips Priesner, 1926: 157. Type species: *Cryptothrips conocephali* Karny, by subsequent designation.

This South East Asian genus is a member of the *Liothrips*-lineage. It comprises 16 leaf-feeding species, of which four are placed in the subgenus *Loepothrips*. One species was described from India, but all the others from Indonesia, either Java or Sumatra, with a single species, *intorquens* (Karny), recorded from southern Japan and Taiwan (Okajima 2006). One un-named species has been seen from mainland China (NZMC, Beijing). Species in this genus usually have the head relatively short (Fig. 126) and the antennal sensoria unusually long (Fig. 14). However, most of these species were described 100 years ago from poorly mounted specimens, and the group requires extensive study.

Diagnosis: Head a little longer than wide (Fig. 126); eyes normal, without enlarged ommatidia, postocular setae either small or well-developed; stylets retracted to postocular setae, wide apart; antennae 8-segmented, III with 1 sensorium, IV with 3, sensoria long and slender (Fig. 14); pronotum with major setae developed, sometimes am reduced, notopleural sutures usually complete; basantra absent; mesopresternum reduced medially;

sternopleural sutures present, but short; fore tarsal tooth absent in female, present in male; fore wings parallel-sided, with duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, slightly shorter than head; male sternite VIII without pore plate.

Eurhynchothrips Bagnall
(Figs 13, 36, 37)

Eurhynchothrips Bagnall, 1918: 213. Type species: *Eurhynchothrips convergens* Bagnall, by monotypy.

Of the five species listed in this genus, three are known only from West Africa. One species, *ordinarius* (Hood) from India, is recorded from China (Han 1997), and *messuicola* (Bagnall) described from Malaysia has been seen from Singapore. This is yet another poorly defined genus in the *Liothrips*-lineage.

Diagnosis: Head slightly longer than wide; eyes normal, postocular setae well-developed; stylets retracted to compound eyes, less than fifth of head width apart with stout maxillary bridge (Fig. 37); antennae 8-segmented (Fig. 13), III with 1 sensorium, IV with 3; pronotum with 5 pairs of developed setae, notopleural sutures complete; basantra absent; mesopresternum transverse but slender; sternopleural sutures present (Fig. 36); fore tarsal tooth absent in both sexes; fore wings parallel-sided, with duplicated cilia; pelta broadly triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head; male sternite VIII without pore plate.

Gemmathrips Reyes
(Fig. 119)

Gemmathrips Reyes, 1994: 389. Type species: *Gemmathrips brevis* Reyes, by monotypy.

The holotype female and paratype male of the type species of this monotypic genus have been studied (in ANIC). These specimens have three sensoria on antennal segment IV, not two as stated in the original description, and the genus is therefore a member of the *Liothrips*-lineage. However, the compound eyes have the posterior ommatidia enlarged (Fig. 119), and this condition also occurs in three related genera: *Manothrips*, *Praeciputhrips* and *Rosingothrips*. Antennal segment VIII is long and slender, and *G. brevis* is similar in structure to some species placed in *Thlibothrips*.

Diagnosis: Head much longer than wide; eyes normal, with enlarged posterior ommatidia, postocular setae well-developed (Fig. 119); stylets retracted to behind postocular setae, V-shaped; antennae 8-segmented, III with 1 sensorium, IV with 3; pronotum with 4 pairs of developed setae, am minute, notopleural sutures incomplete; basantra absent; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth absent in both sexes; fore wings parallel-sided, with duplicated cilia; pelta broadly triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head; male sternite VIII without pore plate.

Gigantothrips Zimmermann
(Figs 39–42)

Gigantothrips Zimmermann, 1900: 18. Type species: *Gigantothrips elegans* Zimmermann, by monotypy.
Syringothrips Priesner, 1933b: 77. Type species: *Syringothrips gallicola* Priesner, by monotypy. **Syn.n.**

The type species of this genus differs from the other included species in that the anterior margin of the pronotum bears a row of about eight pairs of short, stout setae but not the usual two pairs of major setae, and abdominal tergites III–V bear laterally a pair of longitudinal rows of four sigmoid wing-retaining setae (Fig. 42). Other members of the genus have the number of pairs of major pronotal setae varying from zero to the typical five of Phlaeothripidae, and laterally on the tergites there are multiple pairs of straight to semi-sigmoid wing-retaining setae. Type specimens of two of the *Gynaikothrips* species described from the Philippines have been studied (in ANIC), and these are here transferred to *Gigantothrips* because of the presence of numerous pairs of tergal wing

retaining setae (Figs 39, 41): *Gigantothrips pontis* (Reyes) **comb.n.** and *Gigantothrips xynos* (Reyes) **comb.n**. Moreover, the original female of *Syringothrips gallicola* Priesner has been examined, and is here considered to be related to *nigrodentatus* Karny in *Gigantothrips*. As a result, there are now 22 species listed in this genus, of which 10 are from Africa, one from Mexico, and five from India. One species is widespread from India to the Philippines, including China, on the leaves of *Ficus*. A second species, described from Sri Lanka, is recorded from southern China, and one species is known only from Java. There are two un-named species in NZMC, Beijing. This genus is closely related to *Gynaikothrips*, also to *Leeuwenia*, but is distinguished because of the presence on tergites III–V of multiple wing-retaining setae, many of which are straight not sigmoid.

Diagnosis: Head much longer than wide, cheeks parallel-sided with a few stout setae; eyes normal, postocular setae minute; stylets retracted to one third of head, close together; antennae slender, 8-segmented, III with 1 sensorium, IV with 3; pronotum with major setae often short, notopleural sutures incomplete (or complete) (Fig. 40); basantra absent; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth usually present in both sexes; fore wings parallel-sided, with numerous duplicated cilia; pelta triangular; tergites II–VII with at least 4 pairs of wing-retaining setae, usually with several accessory wing-retaining setae (Figs 39, 41, 42); tube long and slender with fine setae on the surface, usually longer than head, anal setae short; male sternite VIII without pore plate.

Glenothrips Priesner
(Figs 112, 132)

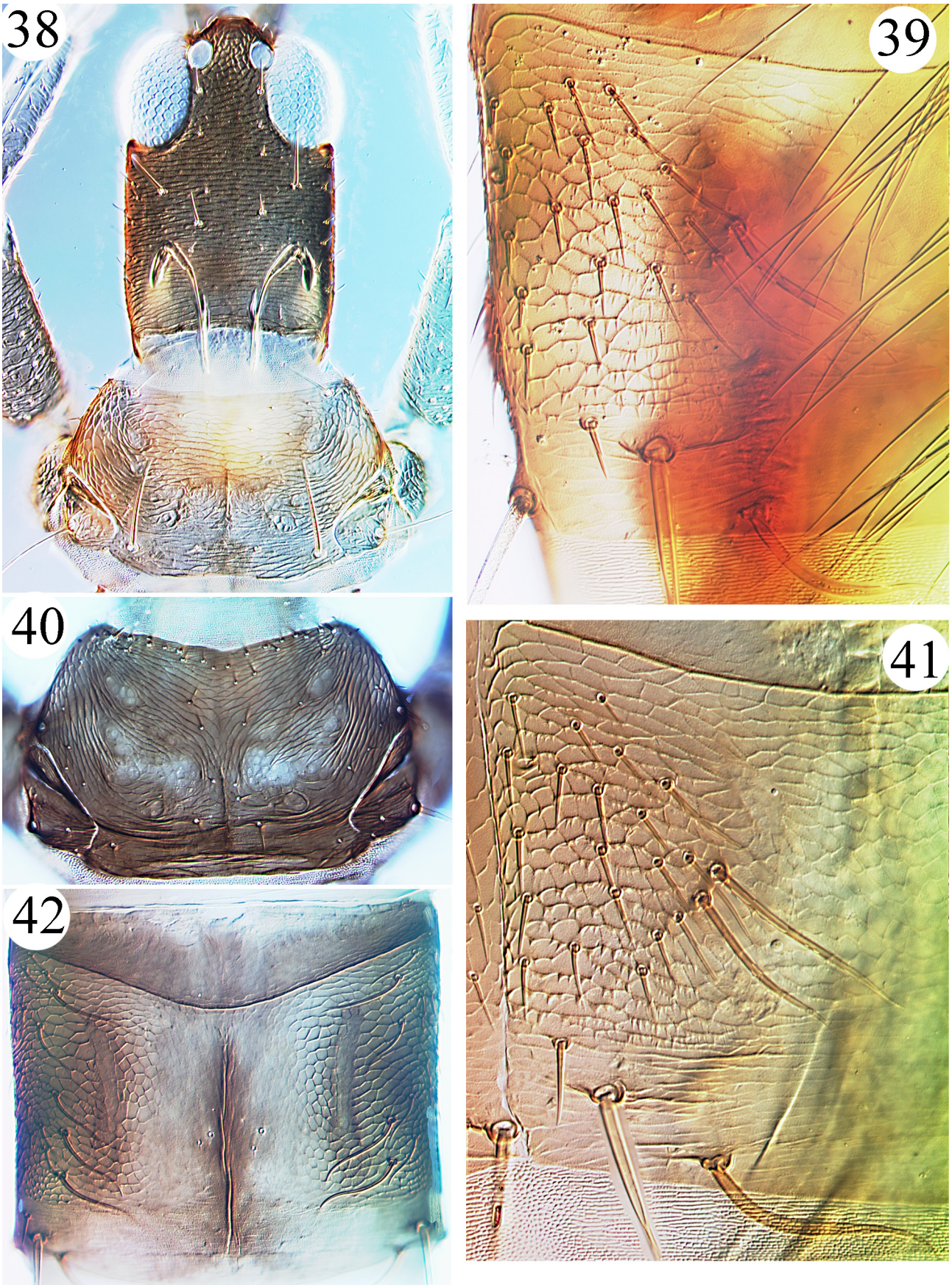
Glenothrips Priesner, 1921: 19. Type species: *Cryptothrips biuncinatus* Karny, by monotypy.

Currently this genus includes a single species that has been collected near Bogor in Java, Indonesia, in leaf galls on *Conocephalus* and *Schefflera*. However, it is possible that some of the species currently placed in *Xylaplothrips* that are known from leaf galls should instead be referred to this Haplothripini genus.

Diagnosis: Head longer than wide (Fig. 132); eyes normal, without enlarged ommatidia, postocular setae almost as long as eye; stylets retracted to postocular setae, more than 0.3 of head width apart, maxillary bridge well-developed; antennae 8-segmented, III with 3 sensoria, IV with 4; pronotum with 4 pairs of major setae developed, am reduced, notopleural sutures complete; basantra present; mesopresternum reduced medially; sternopleural sutures absent; fore tarsal tooth present in both sexes; fore tibia with small tooth at inner apex in both sexes (Fig. 112); fore wings constricted medially, with duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head, anal setae longer than tube; male sternite VIII without pore plate.

Gynaikothrips Zimmermann
(Fig. 38)

Gynaikothrips Zimmermann, 1900: 13. Type species: *Mesothrips uzeli* Zimmermann, by monotypy.
Sauridothrips Priesner, 1953: 371. Type species: *Sauridothrips phlaeothripinus* Priesner, by monotypy. **Syn.n.**
The species of this Old World tropical genus are commonly found inducing galls on the leaves of *Ficus* trees. However, the genus is not well defined, and not all the 40 listed species are closely related. The genus is a member of the *Liothrips*-lineage, and the species have one sensorium on antennal segment III and three on IV, although one of the sensoria on IV is sometimes small. The genus *Sauridothrips* was erected for a single species taken in Vietnam. This has rather long antennae, and very short post ocular setae, but is here considered a species of *Gynaikothrips* with stout abdominal setae that have pale blunt apices. *Gynaikothrips* is closely related to *Gigantothrips*, but species in that genus have more than four pairs of wing-retaining setae on abdominal tergites II–V. Despite this, some large *Gynaikothrips* species have several accessory sigmoid wing-retaining setae in addition to the two main pairs, and these are then difficult to distinguish from *Gigantothrips*. Of the 39 species in *Gynaikothrips*, two are known from Africa, 12 only from India, seven from Pacific islands particularly Fiji, seven from Indonesia, one from Vietnam, and two from the Philippines. Four species are recorded from mainland China, including *oblongus* Okajima. Two species described by Reyes (1996) from the Philippines are here transferred to *Gigantothrips*.



FIGURES 38–42. Phlaeothripinae genera. **(38)** *Gynaikothrips uzeli*, head & pronotum. *Gigantothrips* spp. 39–42: **(39)** *pontis*, tergite III; **(40)** *elegans*, pronotum; **(41)** *xynos*; **(42)** *elegans*, tergites III–IV.

Diagnosis: Body commonly finely reticulate, head longer than wide (Fig. 38); eyes normal, postocular setae developed or reduced, but sometimes with 2 pairs of postoculars; stylets usually short, retracted into one third of head length, close together; antennae 8-segmented, III with 1 sensorium, IV with 3; pronotum with major setae variable, but epimerals always developed, notopleural sutures complete or incomplete; basantra absent; mesopresternum transverse, sometimes eroded medially; sternopleural sutures absent; fore tarsal tooth present in both sexes, sometimes small; fore wings parallel-sided, with duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae, usually with accessory wing-retaining setae; tube variable, anal setae shorter than tube; male sternite VIII with pore plate.

Habrothrips Ananthakrishnan
(Figs 43, 44)

Habrothrips Ananthakrishnan, 1968: 137. Type species: *Habrothrips curiosus* Ananthakrishnan, by monotypy.

The single species in this genus was described from India, but subsequently recorded from Taiwan, Malaysia, and Australia, living in leaf-litter and on dead twigs. *Habrothrips* is similar to other genera in the Urothripini in having abdominal segment IX more than twice as long as segment VIII, and the tube long and slender with elongate anal setae. However the form of the head is distinctive.

Diagnosis: Body tuberculate (Figs 43, 44); head strongly produced in front of eyes (Fig. 43), with a pair of well-developed setae, cheeks swollen just behind eyes, constricted to base; postocular setae minute; stylets retracted to postocular setae, close together medially; antennae 8-segmented, III with 3 sensoria, IV with 4; pronotum with epim setae developed, other major setae reduced, notopleural sutures reduced (Fig. 43); basantra and mesopresternum reduced; sternopleural sutures absent; fore tarsal tooth absent in both sexes; fore wings slender, without duplicated cilia; pelta complete; tergites II–VII with 2 pairs of fan-shaped wing-retaining setae (Fig. 44); tergite IX and tube elongate, tube much longer head, anal setae about twice as long as tube.

Haplothrips Amyot & Serville
(Figs 49, 51)

Haplothrips Amyot & Serville, 1843: 640. Type species: *Phloeothrips albipennis* Burmeister, by monotypy.

Species of the genus *Haplothrips* are found worldwide. This is the second largest genus in the Phlaeothripinae, with over 240 species. Two subgenera are generally recognized based on the presence or absence of duplicated wing cilia (Figs 49, 51). The smaller of the two, *Trybomiella*, includes less than 20 species and these are probably not all closely related. From China, two species of *Trybomiella* and 18 species of *Haplothrips* sensu stricto are recorded, and 16 species are listed from Indonesia (zur Strassen 1994). Wang (1996) provided characters to distinguish the four most common species of *Haplothrips* in Taiwan, and Okajima (2006) provided a key to nine species from Japan, but there is no identification key to the extensive *Haplothrips* fauna of the Southeast Asian region, and undescribed species have been studied from northern China. The presence in the head of a maxillary bridge is shared by almost all *Haplothrips*, but species have been studied both from Central America and from India in which this structure is not visible.

Diagnosis: Head variable in shape, usually a little longer than wide; eyes normal, postocular setae usually developed, rarely reduced; stylets usually retracted to postocular setae, distinct maxillary bridge rarely absent; antennae 8-segmented, III with 1 or 2 sensoria, IV with 4; pronotum with major setae variable in length, notopleural sutures usually complete; basantra present; mesopresternum transverse, or eroded medially; sternopleural sutures absent; fore tarsal tooth usually absent in female, absent or present in male; fore wings constricted medially, usually with duplicated cilia (Fig. 49); pelta triangular or bell-shaped; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head; male sternite VIII without pore plate.

Heliothripoides Okajima
(Figs 15, 45–48)

Heliothripoides Okajima, 1987c: 294. Type species: *Heliothripoides reticulatus* Okajima, by monotypy.

This genus is presumably a member of the *Phlaeothrips*-lineage of fungus-feeding species. The type species was described from Borneo, but a second species of the genus from that island is described below.

Diagnosis: Body polygonally sculptured (Figs 46, 47); head about as long as wide, swollen just behind eyes (Fig. 46); eyes sometimes prolonged ventrally, postocular setae minute; stylets retracted to one third of head length, close together medially; antennae 8-segmented (Fig. 15), III with 2 sensoria, IV with 2 or 3; pronotum with epim setae developed, other major setae usually small, notopleural sutures complete; basantra absent; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth absent in both sexes; fore wings weakly constricted medially, without duplicated cilia; pelta trapezoidal; tergites II–VII with 2 pairs of flattened wing-retaining setae; tergite IX with setae S1 and S2 short (Fig. 45); tube with straight sides, shorter than head; male sternite VIII without pore plate.

Heliothripoides boltoni sp.n.

Female macroptera. Body largely brownish yellow with lateral margins brown; head mainly yellow with lateral margins brown, pronotum largely yellow but brown laterally and median triangular area pale brown; meso and metathorax yellow but brown laterally; pelta with reticulate area brown; tergite II largely yellow with anterior margin darker; tergites III–VII brownish yellow with brown lateral margins, VIII yellow with anterior lateral darker, IX yellow, tube brown with extreme base yellow and apex pale; antennal segments I–II slightly darker brown than head, III–VIII light brown with base of III–IV yellow; fore femora brown with yellow apex and inner margin, fore tibiae yellow; middle femora and tibiae brown with apex yellow, hind femora brown with yellow base and apex, hind tibiae yellow; all tarsi yellow; fore wing weakly shaded with darker median line.

Head about 1.3 times as long as wide, cheeks round, strongly constricted just behind eyes, and gradually narrowed basally (Fig. 46) with many warts; vertex with polygonal sculpture; eyes equally developed dorsally and ventrally (Fig. 48); postocular setae minute; stylets retracted to postocular setae, close together medially (Fig. 46); antennae 8-segmented, III with 2 sensoria, IV with 3.

Pronotum with polygonal sculpture, notopleural sutures complete, only epimeral setae well-developed, blunt or expanded, other major setae minute but blunt; basantra absent, ferna developed; mesopresternum complete. Mesonotum with lateral setae small. Metanotum reticulate (Fig. 47), median setae pointed, about 12 small setae arised on anterior half; sternopleural suture absent. Fore tarsal tooth absent. Fore wing slender, weakly constricted medially, without duplicated cilia; sub-basal setae small but blunt.

Pelta trapezoidal with median area reticulate (Fig. 47), campaniform sensilla present; tergites II–VII sculptured laterally, with two pairs of wing-retaining setae that are usually slightly flattened (Fig. 47); tergite IX setae S1 very short and weakly capitate (Fig. 45), about 0.5 as long as basal width of tube, S2 longer than S1, blunt but not expanded, S3 pointed and longest, but shorter than tube; sterna discal setae minute; tube straight, shorter than head, anal setae a little longer than tube.

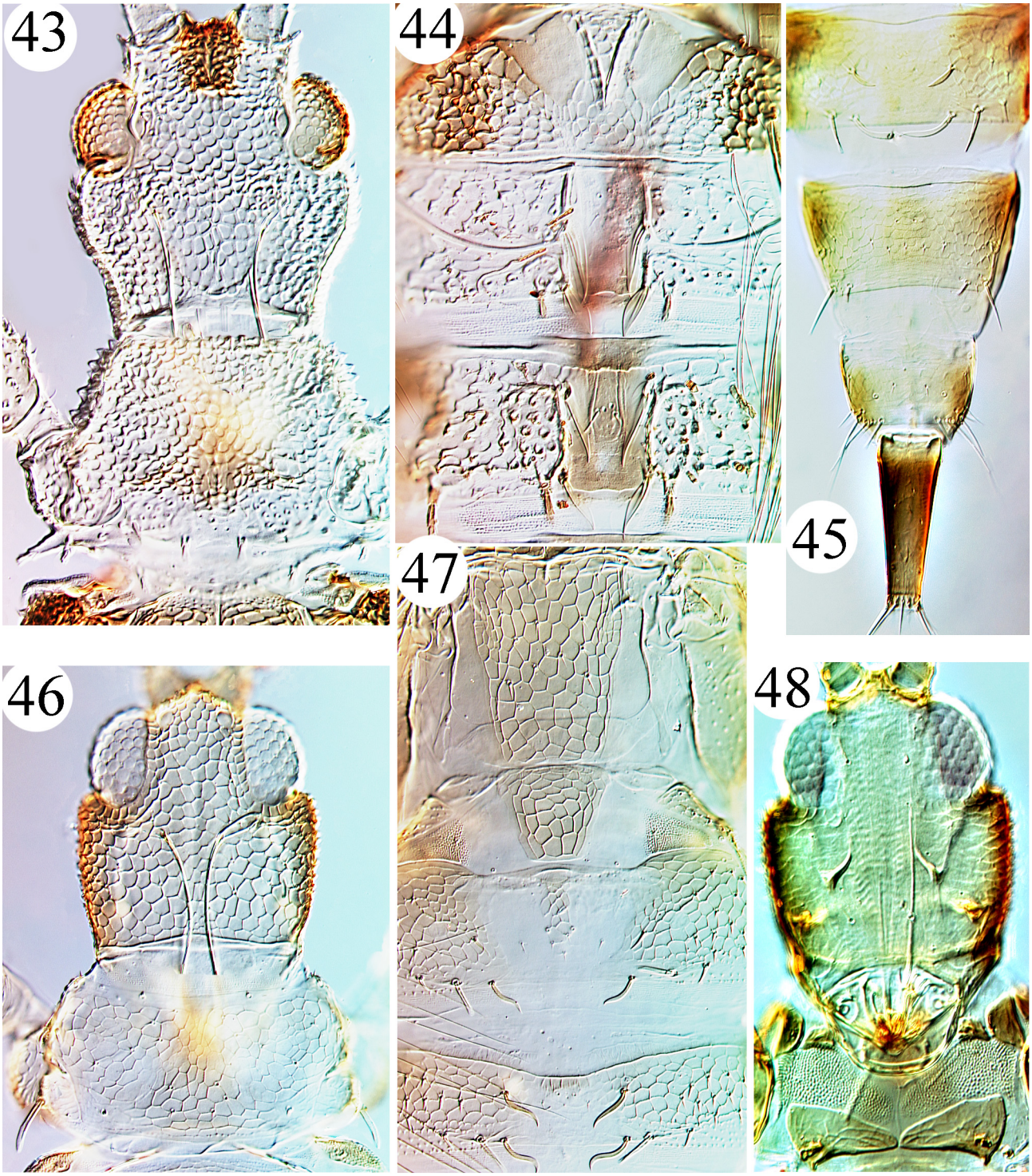
Measurements (holotype female in microns). Body length 1910. Head, length 240; width 175. Pronotum, length 120; width 260; epimeral setae 45. Fore wing, length 700; sub-basal setae 10. Tergite IX, setae S1 27; S2 55; S3 100. Tube length 135, basal width 55; anal setae 150. Antennal segments III–VIII length, 65, 65, 65, 50, 35, 35.

Male macroptera. Very similar to female but smaller; tergite IX setae S2 short and pointed; sternites with minute discal setae, without reticulate areas, VIII without pore plate.

Measurements (paratype male in microns). Body length 1585. Head, length 205; width 155. Pronotum, length100; width 225, epimeral 35. Fore wing, length 600. Tergite IX setae, S1 25; S2 15. Tube length 120, basal width 50; anal setae 125. Antennal segments III–VIII length, 60, 60, 60, 50, 35, 30.

Specimens studied. Holotype female, **Malaysia, Sarawak,** Mulu National Park, Long Pala, from litter in lowland rainforest, 3.x.1977 (Barry Bolton), in The Natural History Museum, London.

Paratypes: 7 females, 9 males collected with holotype; 4 females, 9 males with same data but different dates (18, 20, 24, 26, 29.ix.1977).



FIGURES 43–48. Phlaeothripinae genera. *Habrothrips curiosus* 43–44: **(43)** Head & pronotum; **(44)** Tergites I–III. *Heliothripoides boltoni* 45–48: **(45)** Tergites VII–X; **(46)** Head & pronotum; **(47)** Metanotum & tergites I–III; **(48)** Ventral view of head & prototum.

Comments. This species is very similar to *reticulatus*, but is distinguished because the compound eyes are equally developed dorsally and ventrally (Fig. 48), and antennal segment IV has three sensoria, whereas in *reticulatus* the eyes are prolonged ventrally and curved toward the midline, and antennal segment IV has only two sensoria. The species also differ in colour, in that the head (and probably also the pronotum) of *reticulatus* is uniformly brown, whereas the head of *boltoni* is brown only laterally, and the pronotum is also bicoloured.

Holothrips Karny
(Fig. 61)

Holothrips Karny, 1911a: 502. Type species: *Holothrips ingens* Karny, by monotypy.

This is a large genus with 127 species listed from around the world, but mainly in the tropics. These thrips all live on dead leaves and dead branches, where they feed on fungal hyphae and spores (Okajima 1987a). The maxillary stylets of these species are wider than in most other Phlaeothripinae, and range from 4–8 microns (Fig. 61), but are more slender than in species of Idolothripinae. Okajima (1987a) provided a key to 40 species from the Old World, and species are found widely across Southeast Asia. From Indonesia, zur Strassen (1994) listed nine species, and 11 species are now known from China.

Diagnosis: Head usually longer than wide; postocular setae usually developed (Fig. 61); stylet width unusually broad 4–8 microns, usually retracted to eyes, close together medially (Fig. 61); antennae 7-segmented, segments VII and VIII more or less fused, III with 3 sensoria, IV with 4; pronotum usually with 5 pairs of major setae, notopleural sutures usually complete; basantra absent; mesopresternum transverse; sternopleural sutures present; fore tarsal tooth present in both sexes; fore wings parallel-sided, with duplicated cilia; pelta bell-shaped or triangular; tergites II–VII with wing-retaining setae variable; tube variable in shape, anal setae usually shorter than tube; male sternites IV–VII usually with transverse reticulated areas.

Hoplandrothrips Hood
(Figs 63, 64)

Phloeothrips (*Hoplandrothrips*) Hood, 1912: 145. Type species: *Phloeothrips* (*Hoplandrothrips*) *xanthopus* Hood, by original designation.

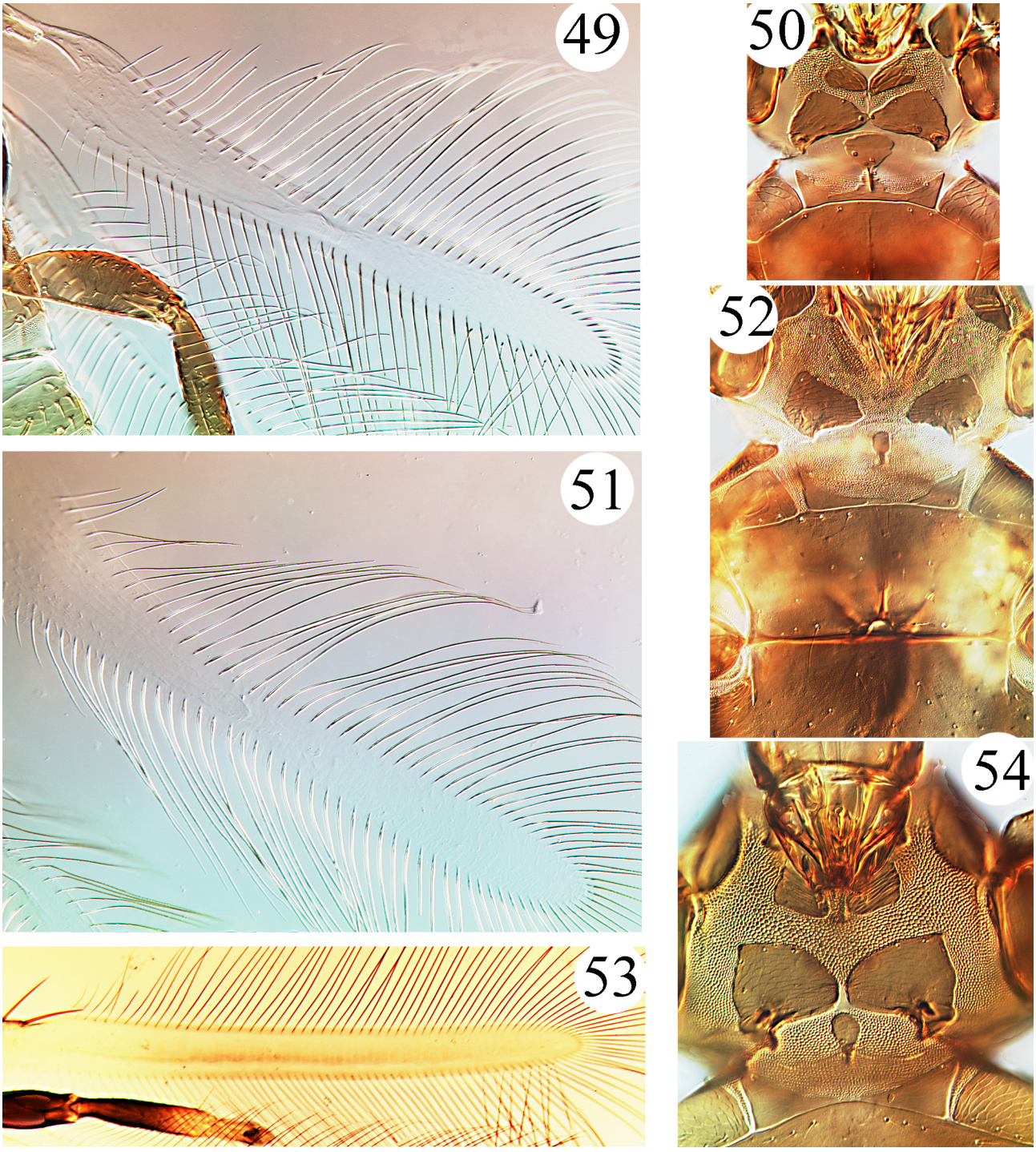
This genus of polymorphic, fungus-feeding species is recorded world-wide. It includes 117 species, and although eight are listed from China, there are few known from other parts of Southeast Asia, although Mound and Tree (2013) recorded 16 species from Australia. These thrips live mainly on dead branches, sometimes forming large colonies that exhibit sexual dimorphism as well as male polymorphism.

Diagnosis: Often sexually dimorphic, with males varying in body size (Figs 63, 64); head shape variable, usually longer than wide, constricted behind eyes, reticulate dorsally (Fig. 64); postocular setae usually well developed, wide apart; stylets usually retracted to eyes and close together medially, rarely short and wider apart; mouth cone variable; antennae 8-segmented, III with 3 (or 2–4) sensoria, IV with 4; pronotum usually with 5 pairs of major setae, major males with aa setae unusually long, notopleural sutures complete; basantra absent; mesopresternum transverse, or divided into three plates; sternopleural sutures present; fore tarsal tooth present in both sexes, male fore femur often with pair of apical tubercles; fore wings usually weakly constricted medially, with duplicated cilia; pelta bell-shaped; tergites II–VII each with 2 pairs of wing-retaining setae; tube shorter than head, anal setae usually as long as tube or longer; male sternite VIII with or without pore plate.

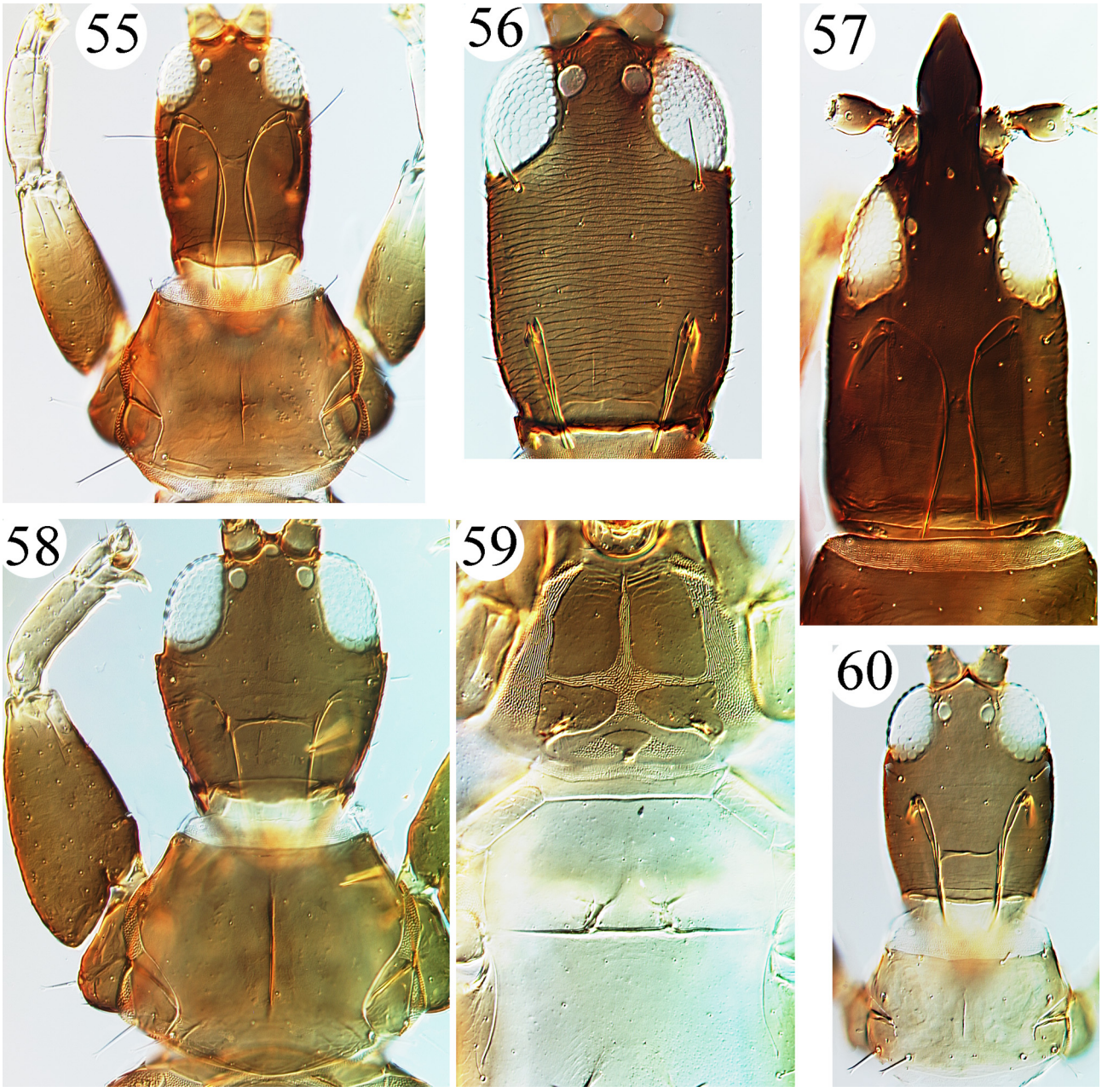
Hoplothrips Amyot & Serville
(Fig. 62)

Hoplothrips Amyot & Serville, 1843: 640. Type species: *Thrips corticis* De Geer, by subsequent designation of Karny, 1912a.

This is a large genus of 128 fungus-feeding species. As in *Hoplandrothrips*, many of these are known to exhibit sexual dimorphism as well as male allometry, leading to problems both in defining the genus and in distinguishing the species. These two genera are probably more closely related to each other than previous authors have considered (Mound *et al*. 2013). In the north temperate part of the world, *Hoplothrips* species are often common on dead branches, with six species recorded from China, but only a single one listed from Indonesia.

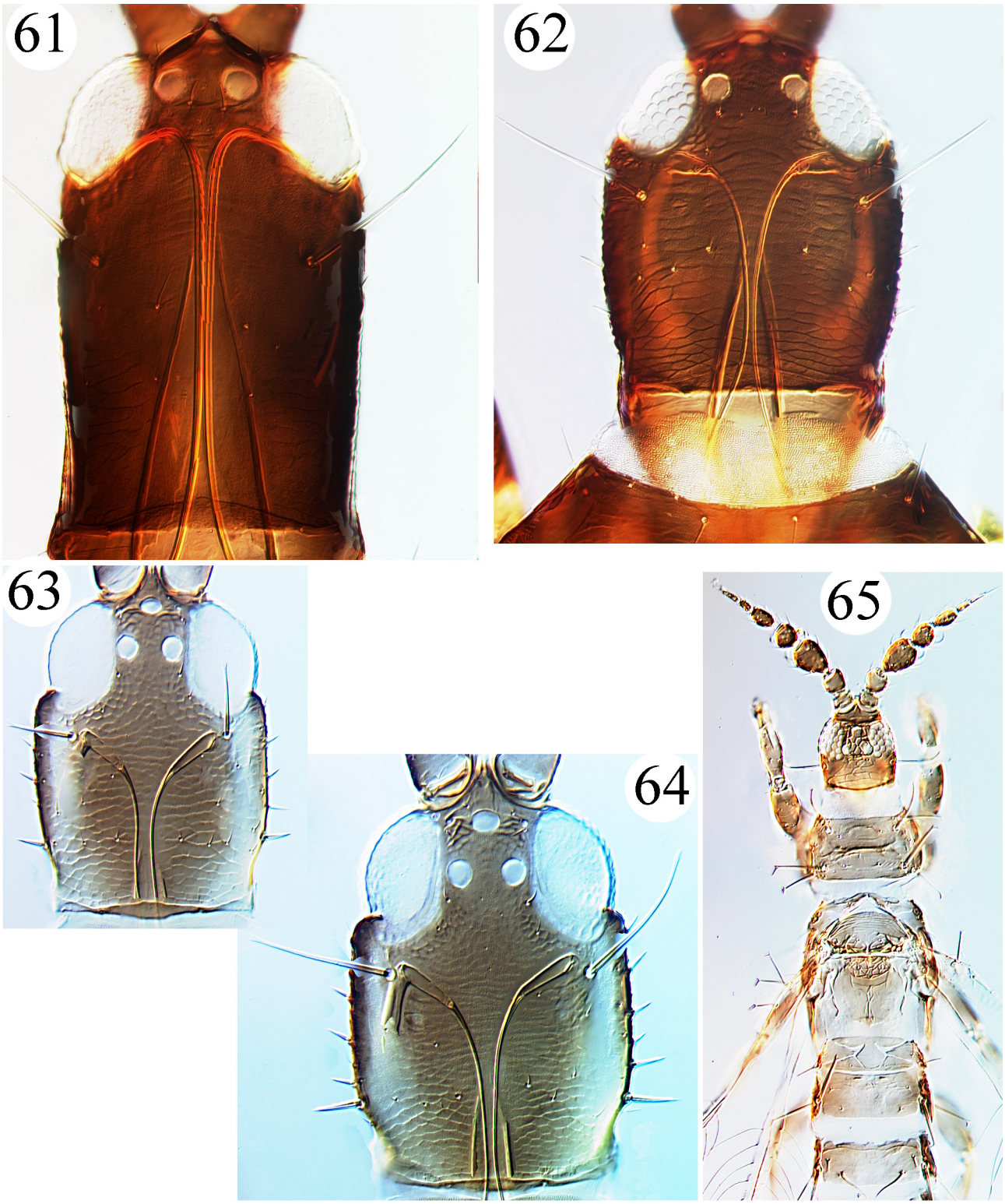


FIGURES 49–54. Phlaeothripinae genera. *Haplothrips* 49–51: **(49)** subgenus *Haplothrips*, forewing; **(50)** Ventral view of thorax; **(51)** subgenus *Trybomiella*, forewing. *Liothrips vaneeckei* 52–53: **(52)** Ventral view of thorax; **(53)** Forewing. **(54)** *Mesothrips jordani*, ventral view of thorax.



FIGURES 55–60. *Haplothripini*. **(55)** *Karnyothrips melaleucus*, head, pronotum & foreleg; **(56)** *Mesothrips jordani*, head; **(57)** *Sinuothrips hasta*, head; **(58)** *Podothrips ferrugineus*, head, pronotum & foreleg; **(59)** *Podothrips sasacola*, ventral view of thorax; **(60)** *Dyothrips pallescens*, head & pronotum.

Diagnosis: Often sexually dimorphic, also wing-length polymorphic; head usually slightly longer than wide; postocular setae usually well developed (Fig. 62), pointed or capitate; stylets usually long and close together medially; antennae 8-segmented, VIII usually constricted basally, III with 3 sensoria, IV with 4; pronotum with major setae variable, notopleural sutures usually complete, sometimes incomplete or nearly complete; basantra absent, rarely present; mesopresternum variable, often divided into three plates; sternopleural sutures present; fore tarsal tooth usually present in both sexes; fore wings if present parallel-sided, with duplicated cilia; pelta usually bell-shaped; tergites II–VII usually each with 2 pairs of wing retaining setae; tube variable in shape, anal setae usually shorter than tube, often longer; male sternites often with paired reticulated areas, sternite VIII with pore plate.

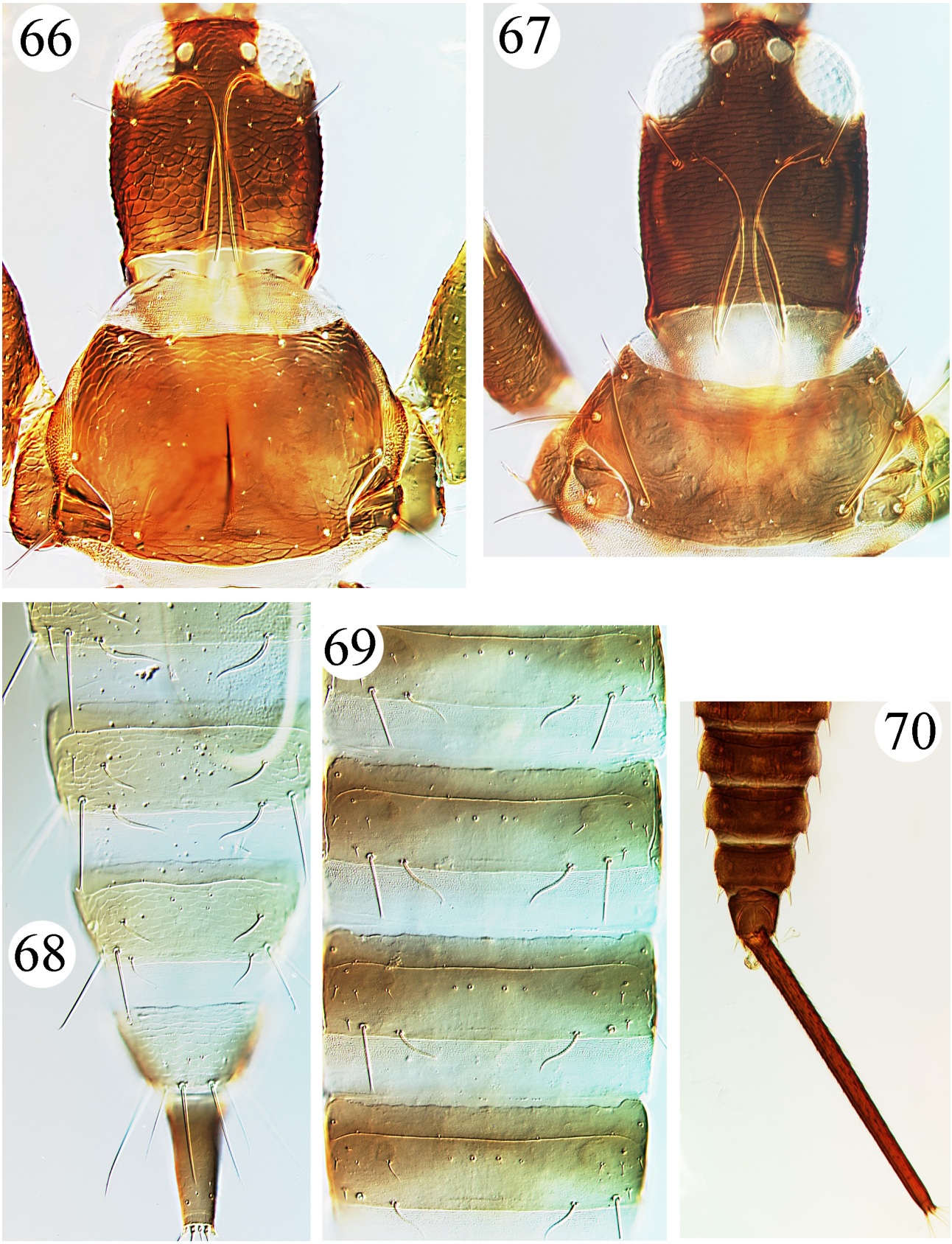


FIGURES 61–65. *Phlaeothrips*-lineage. Heads 61–64: **(61)** *Holothrips*; **(62)** *Hoplothrips*; **(63)** *Hoplandrothrips hylaius*, small male; **(64)** *Hoplandrothrips hylaius*, large male. **(65)** *Hyidiothrips brunneus*, female.

Horistothrips **Morgan**

(Fig. 66)

Horistothrips Morgan, 1913: 36. Type species: *Horistothrips australiae* Morgan, by monotypy.



FIGURES 66–70. Phlaeothripinae genera. Head & pronotum 66–67: **(66)** *Horistothrips australiae*; **(67)** *Liothrips vaneeckei*. **(68)** *Phylladothrips pictus*, tergites VII–X; **(69)** *Plicothrips apicalis*, tergites III–VI; **(70)** *Leeuwenia karnyiana*, male tegites VI–X.

Three of the five species listed in this genus, two from Fiji and one from Zhejiang, China, are possibly not congeneric with the two species from Australia, including the type species (Mound 2008). The antennal sensorium formula of *H. australiae* (1 on segment III and 3 on IV) places this species in association with the leaf-feeding species of the *Liothrips*-lineage (following couplet 35). However, it is known to be a fungus-feeder on the bark of trees (Tree & Walter 2012). Therefore it seems that either this Australian thrips has undergone a reduction in the number of sensoria, or else that it has reverted from leaf-feeding to fungus-feeding.

Diagnosis: Usually micropterous; head longer than wide, posterior half reticulate; postocular setae capitate; stylets retracted to eyes, close together medially (Fig. 66); antennae 8-segmented, VIII broad at base, III with 1 sensorium, IV with 3 (or 2) sensoria; pronotum with 5 pairs of capitate setae, notopleural sutures complete; basantra absent; mesopresternum reduced to two lateral triangles; sternopleural sutures long; both sexes with fore tarsal tooth; pelta triangular; tergites II–VII each with 2 pairs of wing-retaining setae; tube shorter than head, anal setae much longer than tube; male sternite VIII with large pore plate.

Hyidiothrips Hood
(Fig. 65)

Hyidiothrips Hood, 1938: 414. Type species: *Hyidiothrips atomarius* Hood, by monotypy.

This genus of 10 minute species is known from various sites around the tropics, with the species usually taken from leaf-litter. Okajima (1995a) described one species from west Malaysia and another from southern Sulawesi, Indonesia, and three species are recorded from Southern China.

Diagnosis: Body minute, laterally flattened (Fig. 65); head a little longer than wide, distinctly produced in front of eyes; eyes normal, micropterae with number of ommatidia greatly reduced; postocular setae well-developed; stylets usually short, retracted into mouth-cone; antennae 7-segmented, III and IV fused to one enlarged segment bearing 2 slender apical sensoria; pronotum with 4 pairs of well-developed setae, am displaced posterolaterally, ml reduced, aa, epim and pa usually with apices expanded and asymmetric, notopleural sutures incomplete; basantra present; mesopresternum absent; sternopleural sutures absent; fore tarsal tooth absent in both sexes; fore wings weak, without duplicated cilia; pelta usually divided into several plates; tergites II–VII with 1 pair of wing-retaining setae; tube shorter than head, anal setae longer than tube.

Isotrichothrips Priesner
(Figs 16, 76)

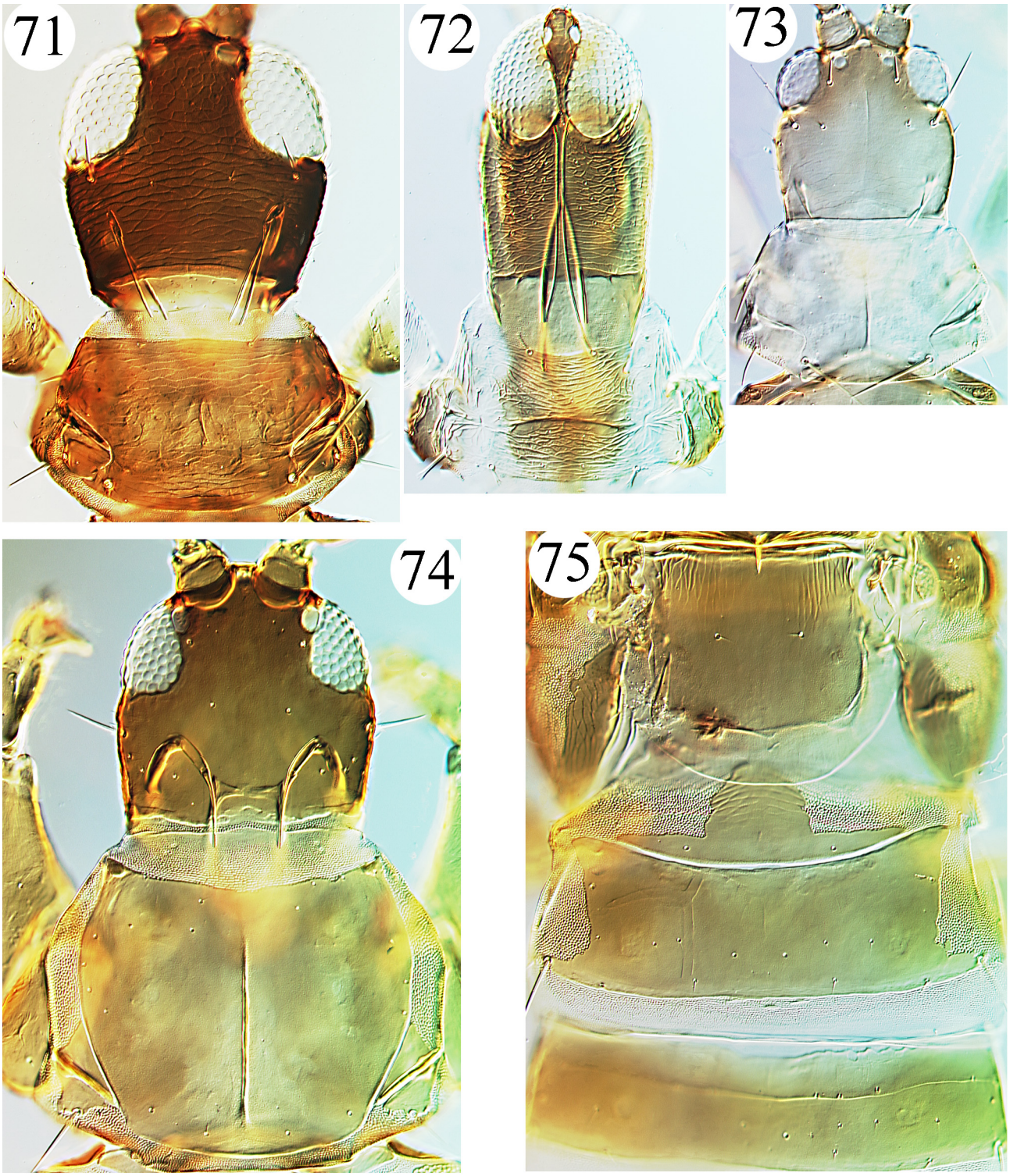
Isotrichothrips Priesner, 1968: 282. Type species: *Liothrips longirostris* Karny, by original designation.

The two species included in this genus are from Java, Indonesia, and type specimens of *longirostris* have been examined. The genus belongs to the *Liothrips*-lineage, but is distinguished from the worldwide *Liothrips* because in males setae S1 and S2 on tergite IX are equally long. This condition also occurs in the New World genus *Pseudophilothrips* (Mound *et al*. 2010), from which *Isotrichothrips* is distinguished by the much shorter antennae (Fig. 16).

Diagnosis: Head longer than wide (Fig. 76); postocular setae well-developed; stylets retracted into head; antennae 8-segmented (Fig. 16), segment VIII shorter than VII, III with 1 sensorium, IV with 3; pronotum with 5 pairs of well-developed setae, notopleural sutures incomplete; basantra absent; mesopresternum transverse ?; sternopleural sutures ?; fore tarsal tooth absent in both sexes; fore wings parallel-sided, with duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides; male tergite IX with setae S2 as long as S1.

Jennythrips Bhatti*

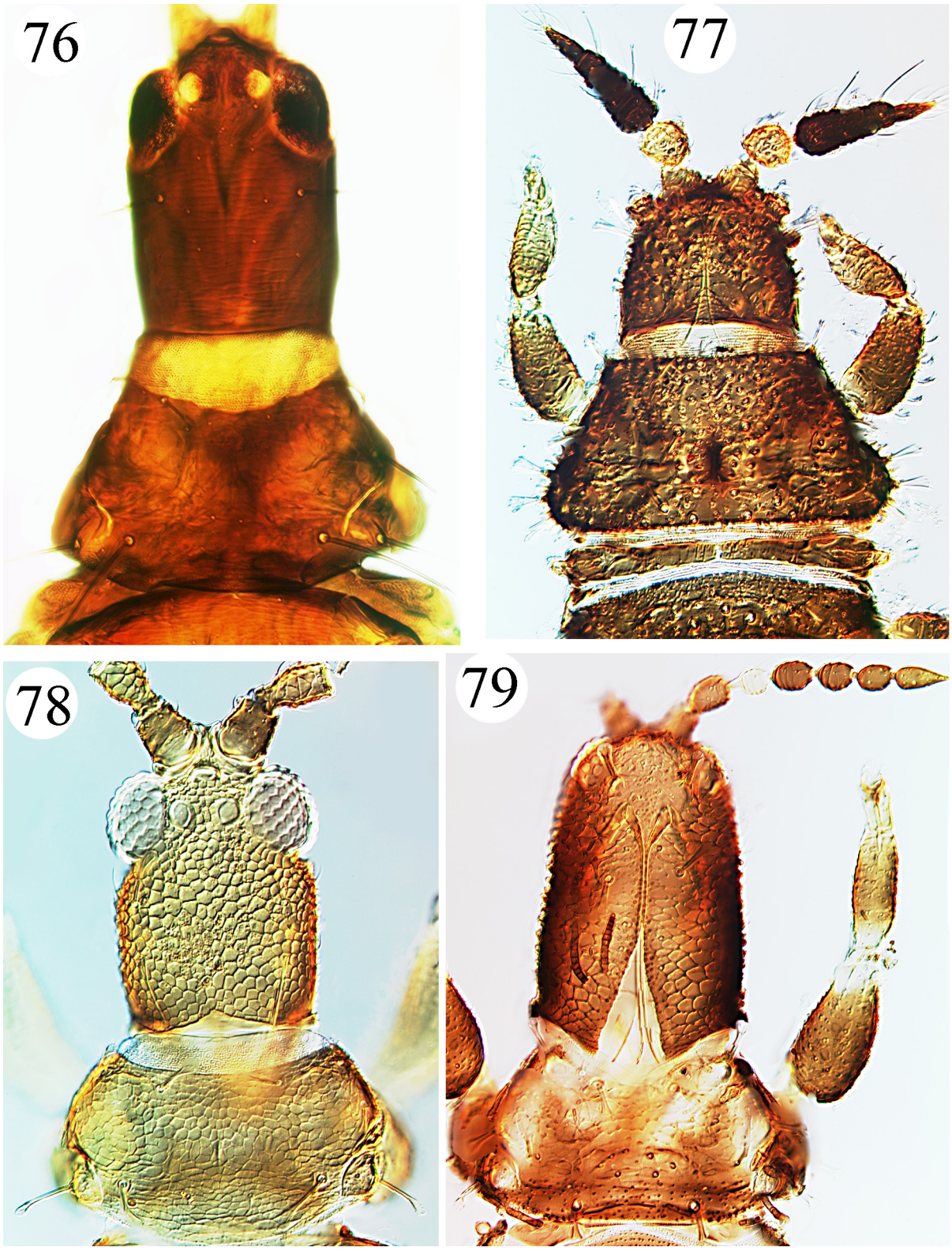
Jennythrips Bhatti, 1993: 252. Type species: *Liothrips* (*Zopyrothrips*) *jasmini* Priesner, by monotypy



FIGURES 71–75. Phlaeothripinae genera. Heads 71–73: **(71)** *Litotetothrips* sp.; **(72)** *Macrophthalmothrips flavafemora*; **(73)** *Psalidothrips* sp. *Plectrothrips australis* 74–75: **(74)** Head & pronotum; **(75)** Metanotum & tergites I–III.

The only species included in this *Liothrips*-lineage genus was described from Indonesia based on a single female taken in association with a gall.

Diagnosis: Head not distinctly constricted basally; postocular setae minute; stylets retracted into 1/3 of head, wide apart; antennae 8-segmented, III with 1 sensorium, IV with 3; pronotum with 4 pairs of well-developed setae, aa short, notopleural sutures complete; basantra present; mesopresternum transverse; fore tarsal tooth absent in female; fore wings parallel-sided, with duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, about as long as head.



FIGURES 76–79. Phlaeothripinae genera. Head & pronotum 76–79: **(76)** *Isotrichothrips longirostris*; **(77)** *Murphythrips legalis*; **(78)** *Mystrothrips dammermani*; **(79)** *Strepterothrips uenoi*.

Karnyothrips Watson
(Fig. 55)

Karnyothrips Watson, 1923: 23. Type species: *Karynia weigeli* Watson, by monotypy, a synonym of *Anthothrips flavipes* Jones.

This worldwide genus of 47 species is probably polyphyletic. The holotypes of two species described from the Philippines, *ateuchis* and *expandosus*, have been studied, and these are probably not congeneric with the type species. Two well-known and widespread species, *flavipes* and *melaleucus*, are predatory on other small arthropods (Palmer & Mound 1991), but little is known of the biology of most of the others, some of which are possibly fungus-feeders. Four species are now known from China, including *palmerae* discussed below, but more species are likely to be found considering that Okajima (2006) described six species from the southern tropical islands of Japan. The holotype of *Xylaplothrips palmerae* Chen (1980) from Taiwan has been studied, and this has the following character states: antennal segment III with 2 sensoria, IV with 4; pronotal am setae reduced, but other major setae capitate; metathoracic sternopleural sutures absent; fore wing weakly constricted medially; anal setae more than twice the length of tube. Because of these states, this species is here transferred to this genus as *Karnyothrips palmerae* (Chen) **comb.n.**

Diagnosis: Head longer than wide (Fig. 55); eyes normal, postocular setae well-developed; stylets usually retracted to postocular setae, wide apart; antennae 8-segmented, III with 1, 2 or 3 sensoria (varing within some species), IV with 4 (5); pronotum with 4 pairs of well-developed setae, am usually reduced, notopleural sutures complete or rarely incomplete; basantra present; mesopresternum usually transverse; sternopleural sutures absent; fore tarsi with forwardly directed tooth in both sexes; fore wings weakly constricted medially, with or without duplicated cilia; pelta usually trapezoidal; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head, anal setae usually about twice as long as tube; male sternite VIII without pore plate.

Leeuwenia Karny
(Figs 70, 128)

Leeuwenia Karny, 1912b: 161. Type species: *Leeuwenia gladiatrix* Karny, by monotypy.

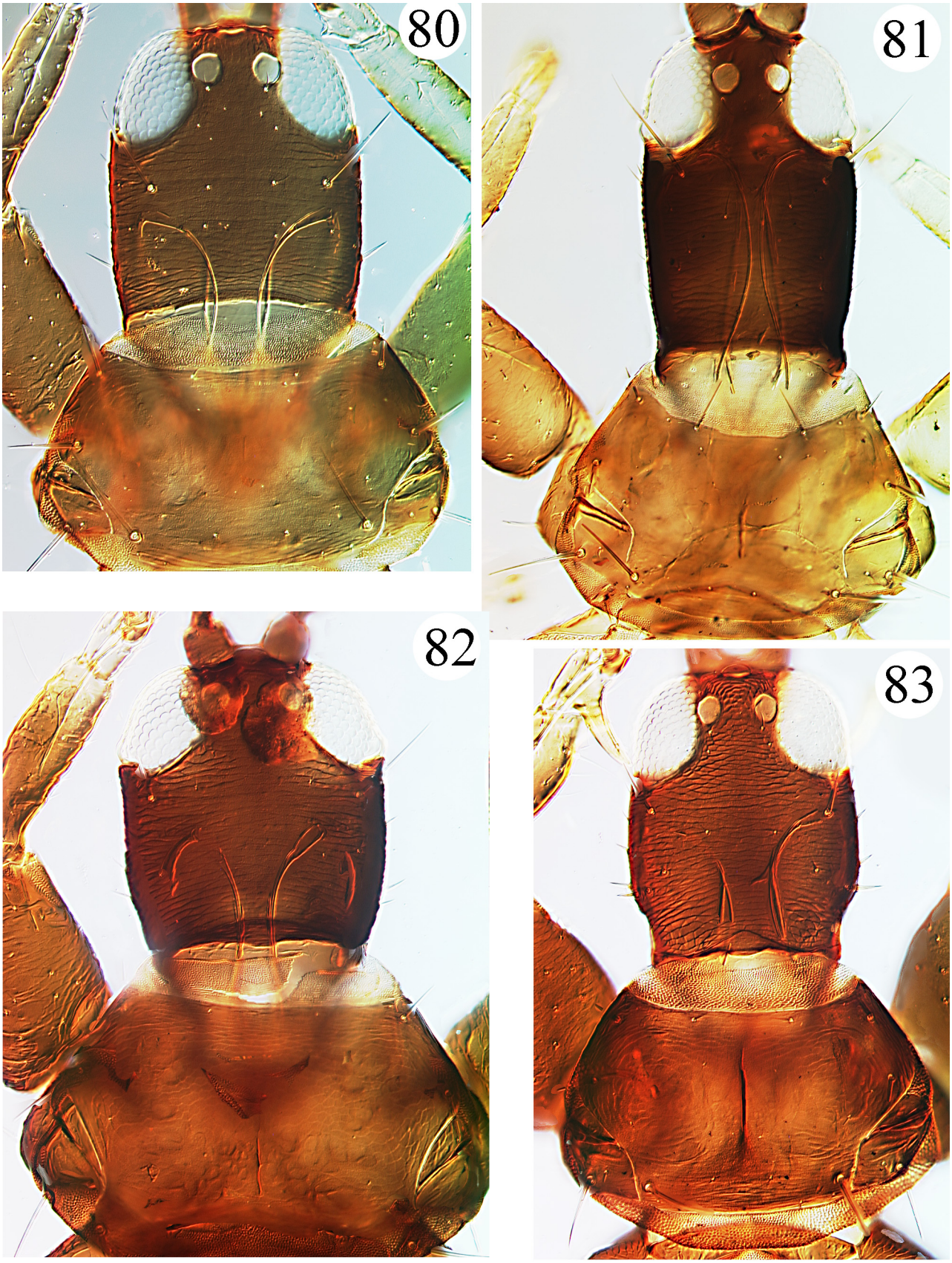
This is an Old World genus with most species in tropical Asia. These are leaf-feeding, sometimes gall-inducing, thrips and 27 species are listed in the area between Mauritius, Japan and northern Australia (Mound 2004). Seven species are recorded from China, four from Indonesia and two from the Philippines. Despite the elongate tube, this genus is probably related to *Gynaikothrips* in the *Liothrips*-lineage.

Diagnosis: Head longer than wide (Fig. 128); eyes normal, postocular setae developed or reduced; stylets usually retracted to one third of head length, wide apart; antennae 8-segmented, III with 1 sensorium, IV with 2; pronotum usually with 4 pairs of developed setae, am reduced, notopleural sutures incomplete or complete; basantra absent; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth absent in both sexes; fore wings parallel-sided, without duplicated cilia; pelta trapezoidal or hat-shaped; tergites II–VII with 2 pairs of fan-shaped wing-retaining setae; tube very long (Fig. 70), usually more than twice as long as head, with fine or robust setae on surface, anal setae short; male sternite VIII with or without pore plate.

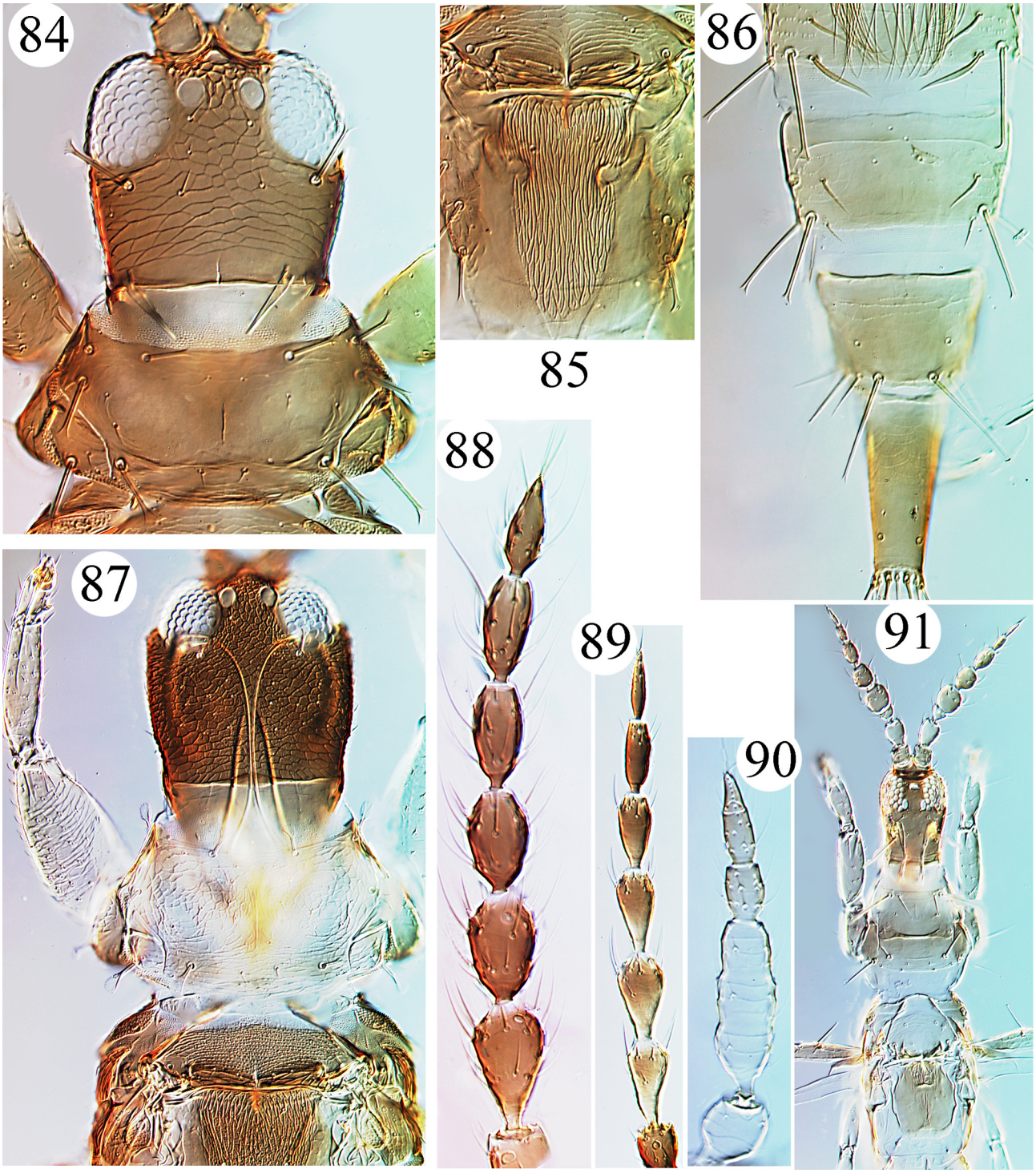
Liophloeothrips Priesner
(Fig. 122)

Liophloeothrips Priesner, 1919: 138. Type species: *Liophloeothrips glaber* Priesner, by monotypy.

The name for this genus is frequently mis-spelled as '*Liophlaeothrips'* in literature from India, despite the spelling given originally by Priesner. Most of the 16 listed species are from India, but one of these has been recorded from Guangdong and Hainan provinces (Zhang 1984). Seven of the species are reported to be leaf-feeders that induce galls (Tyagi & Kumar 2011), but the other species have been taken from grasses, dead branches and from bark. Although interpreted here as a member of the *Liothrips*-lineage, some species of *Liophloeothrips* have only two sensoria on the fourth antennal segment.



FIGURES 80–83. Phlaeothripinae genera. Head & pronotum 80–83: **(80)** *Ponticulothrips diospyrosi*; **(81)** *Praeciputhrips balli*; **(82)** *Rosingothrips ommatus*; **(83)** *Sphingothrips trachypogon*.



FIGURES 84–91. *Phlaeothrips*-lineage. *Propesolomonthrips mindorensis* 84–86: **(84)** Head & pronotum; **(85)** meso- & metanotum; **(86)** tergites VII–X. **(87)** *Azaleothrips lepidus*, head, pronotum & foreleg; **(88)** *Pygmaeothrips angusticeps*, antenna; **(89)** *Rosingothrips ommatus*, antenna; **(90)** *Stephanothrips yaeyamensis*, antenna; **(91)** *Preeriella armigera*, female.

Diagnosis: Head longer than wide (Fig. 122); eyes normal, postocular setae well-developed; stylets retracted to postocular setae, close together medially; antennae 8-segmented, III with 1 sensorium, IV with 3 (or 2); pronotum with 5 pairs of capitate setae, notopleural sutures complete; basantra absent; mesopresternum eroded medially; sternopleural sutures present; fore tarsal tooth present in both sexes; fore wings parallel-sided, with duplicated cilia; pelta bell-shaped or triangular; tergites II–VII with 2 pairs of wing-retaining setae; tergite IX with setae S1 and S2 well-developed and expanded at apex in both sexes; tube shorter than head; male sternite VIII with pore plate.

Liothrips Uzel
(Figs 52, 53, 67)

Liothrips Uzel, 1895: 261. Type species: *Phloeothrips setinodis* Reuter, by subsequent designation.

The largest genus in the subfamily Phlaeothripinae, this genus comprises 283 named species from around the world. Three subgenera have been proposed, of which *Epiliothrips* includes just two species from Africa, and *Zopyrothrips* 25 species from Southeast Asia. Mirab-Balou *et al*. (2011) list 25 species of *Liothrips* from China, and zur Strassen (1994) lists 74 species from Indonesia. However, species identification in this genus is very difficult. The only available identification key (Priesner 1953) is unreliable and misleading, having been based largely on slides prepared by H. Karny who mounted each specimen ventral-side uppermost. According to that key, some plant genera such as *Piper* and *Schlefflera* share a surprisingly large number of *Liothrips* species. In order to to establish a reliable basis for species recognition in this genus, studies are needed on variation in body size, structure and setal lengths within and between populations on single plant species.

Diagnosis: Head longer than wide (Fig. 67); postocular setae well-developed; stylets retracted into head, variable in length; antennae 8-segmented, III with 1 sensorium, IV with 3; pronotum with 5 pairs of well-developed setae (am sometimes small), notopleural sutures complete; basantra absent; mesopresternum transverse or eroded medially; sternopleural sutures present (Fig. 52); fore tarsal tooth absent in both sexes; fore wings parallel-sided, with duplicated cilia (Fig. 53); pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, usually shorter than head; male sternite VIII usually with an entire pore plate.

Litotetothrips Priesner
(Fig. 71)

Litotetothrips Priesner, 1929a: 449. Type species: *Litotetothrips cinnamomi* Priesner (junior synonym of *Gynaikothrips rotundus* Moulton), by monotypy.

This genus is a member of the *Liothrips*-lineage, and the 11 listed species are all leaf-feeders in the tropics and subtropics of eastern Asia, with one species from New Guinea. Kudo (1994) described five species from Peninsular Malaysia, and three species are reported from China, although none are listed from Indonesia.

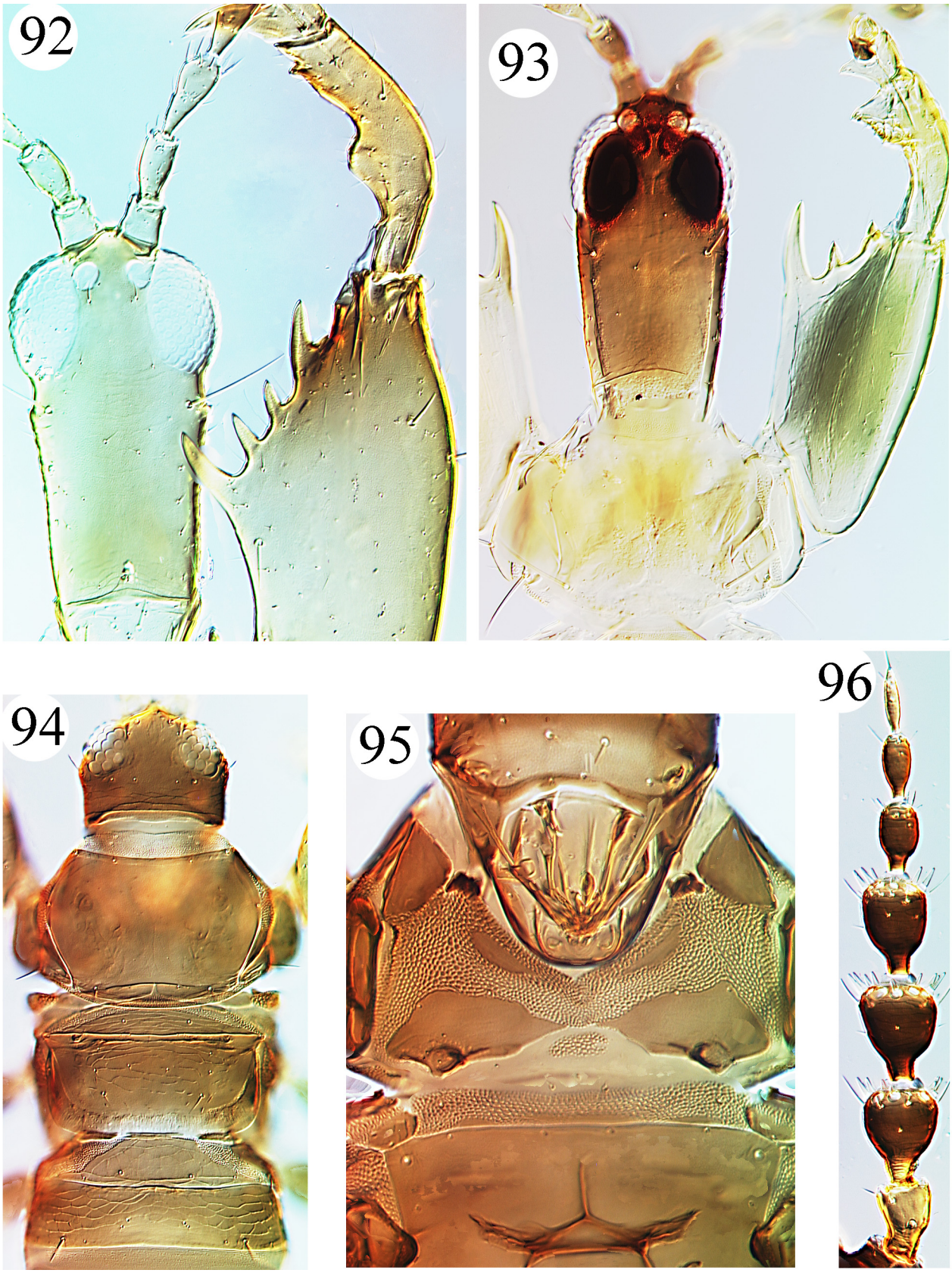
Diagnosis: Head about as long as wide, constricted at base (Fig. 71); eyes normal, postocular setae well-developed; stylets retracted to postocular setae, wide apart, V-shaped; antennae 8-segmented, VIII as long as or a little longer than VII, III with 1 sensorium, IV with 2 or 3; pronotum with 3 pairs of developed setae, am and aa reduced, notopleural sutures incomplete; basantra absent; mesopresternum transverse, sometimes reduced; sternopleural sutures usually absent, sometimes present; fore tarsal tooth absent in both sexes; fore wings parallel-sided, with or without duplicated cilia; pelta usually hat-shaped; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head; male sternite VIII without pore plate.

Lizalothrips Okajima*

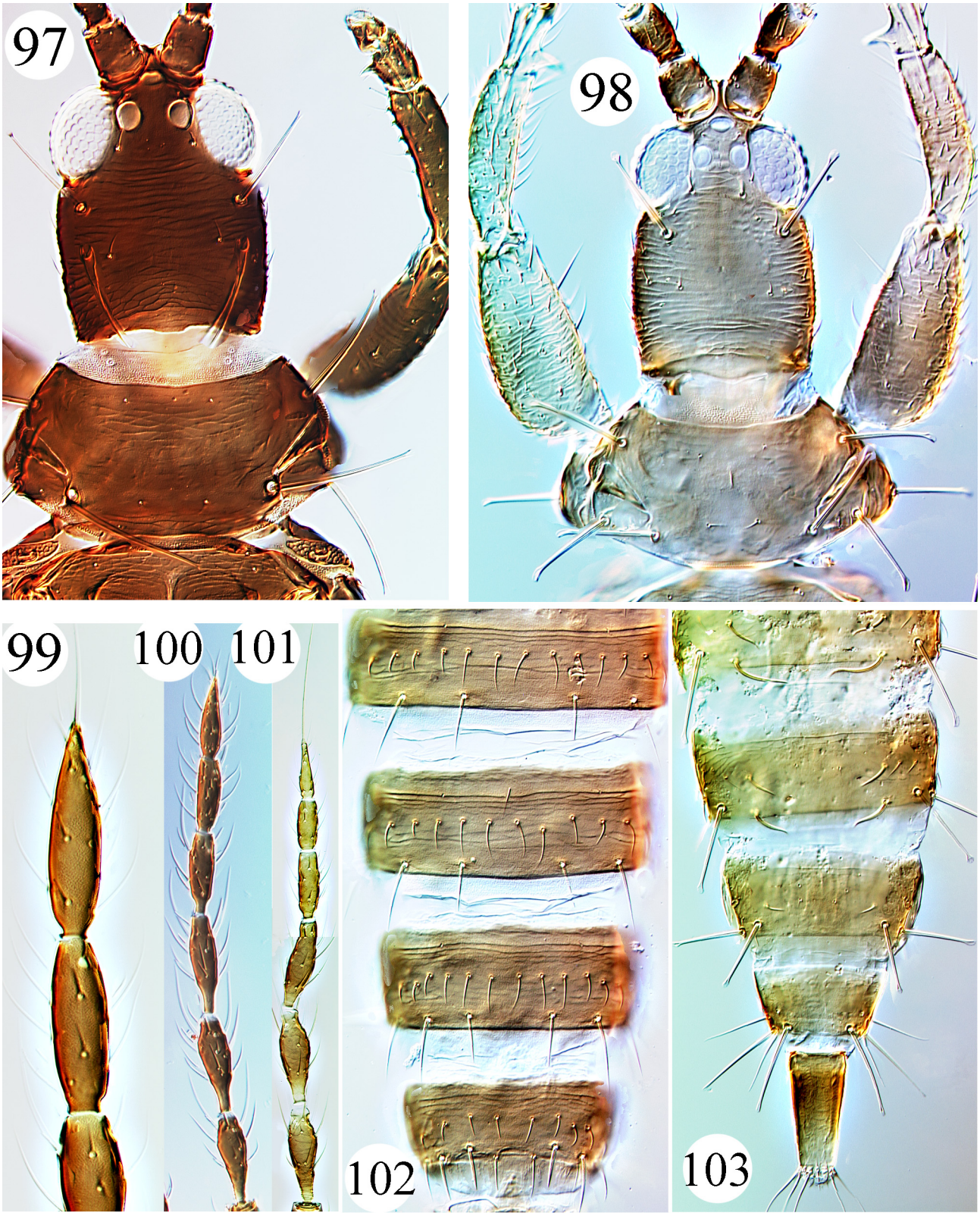
Lizalothrips Okajima, 1984: 729. Type species: *Lizalothrips luzonensis* Okajima, by monotypy.

Two species are currently placed in this genus, one from Luzon and the second from Sabah. The genus is considered to be related to *Apelaunothrips*, although the maxillary stylets are slender, and the eyes are much longer ventrally than dorsally.

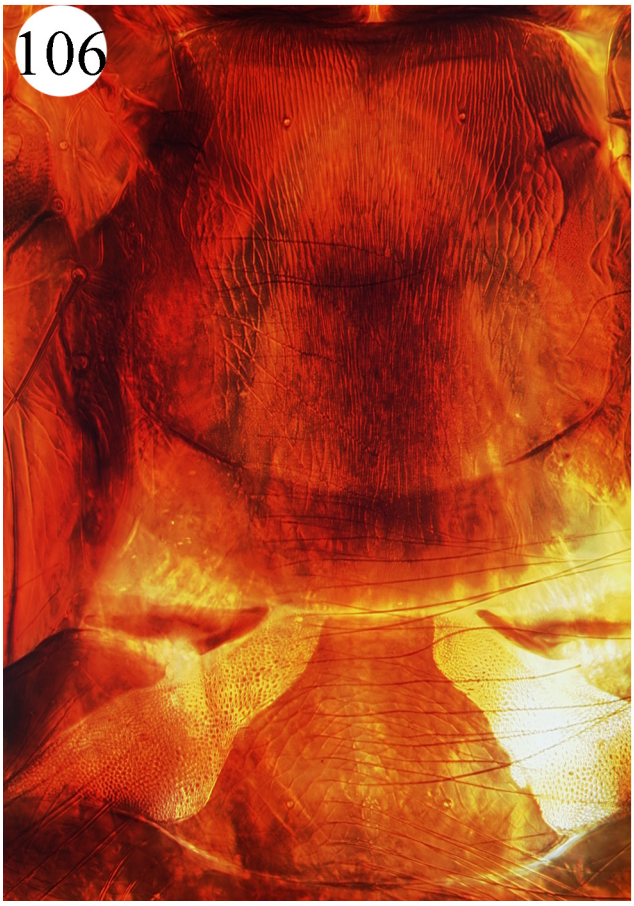
Diagnosis: Head slightly longer than wide, projecting slightly in front of eyes; eyes large and rounded, longer ventrally than dorsally, cheeks sharply incut behind eyes; postocular setae wide apart, shorter than eye; stylets less than one third of head width apart, retracted to postocular setae; antennae 8-segmented, III with 2 sensoria, IV with 3; pronotum with 5 pairs of capitate setae, ml rather close to aa; notopleural sutures incomplete; basantra absent; sternopleural sutures weak; fore tarsal tooth absent; fore wings parallel-sided, with duplicated cilia; pelta slightly hat-shaped; tergites II–VII with 2 pairs of wing-retaining setae, unciform on II–III, VIII with 1 weakly curved pair; tergite IX setae almost as long as tube; tube about half as long as head.

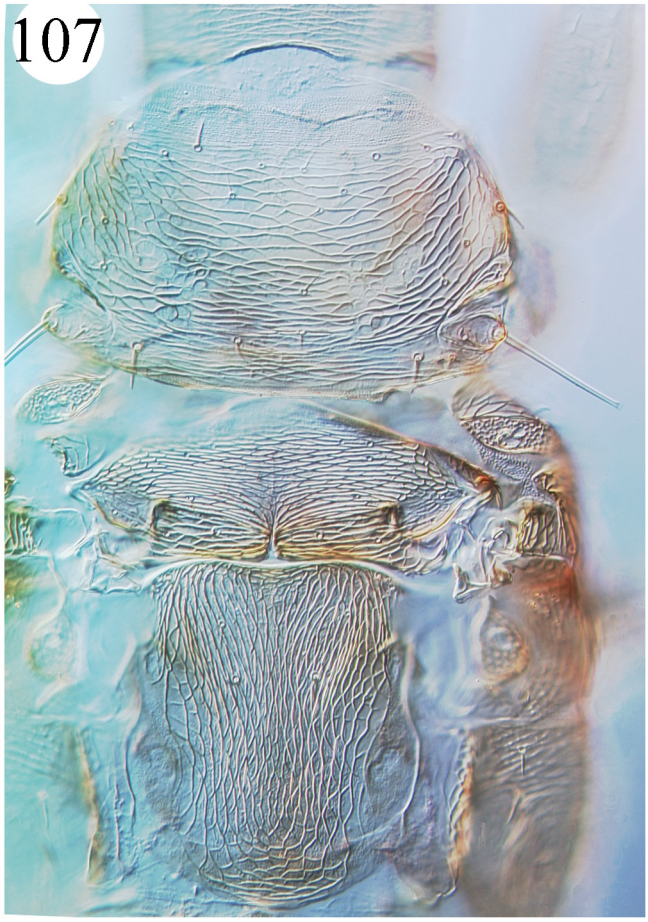


FIGURES 92–96. *Phlaeothrips*-lineage. *Veerabahuthrips* spp. 92–93 head, pronotum & foreleg: **(92)** *crassipes*; **(93)** *simplex*. *Sophiothrips annulatus* 94–95: **(94)** head, thorax & tergites I–II; **(95)** ventral view of thorax. **(96)** *Streptothrips tribulatius*, antenna.

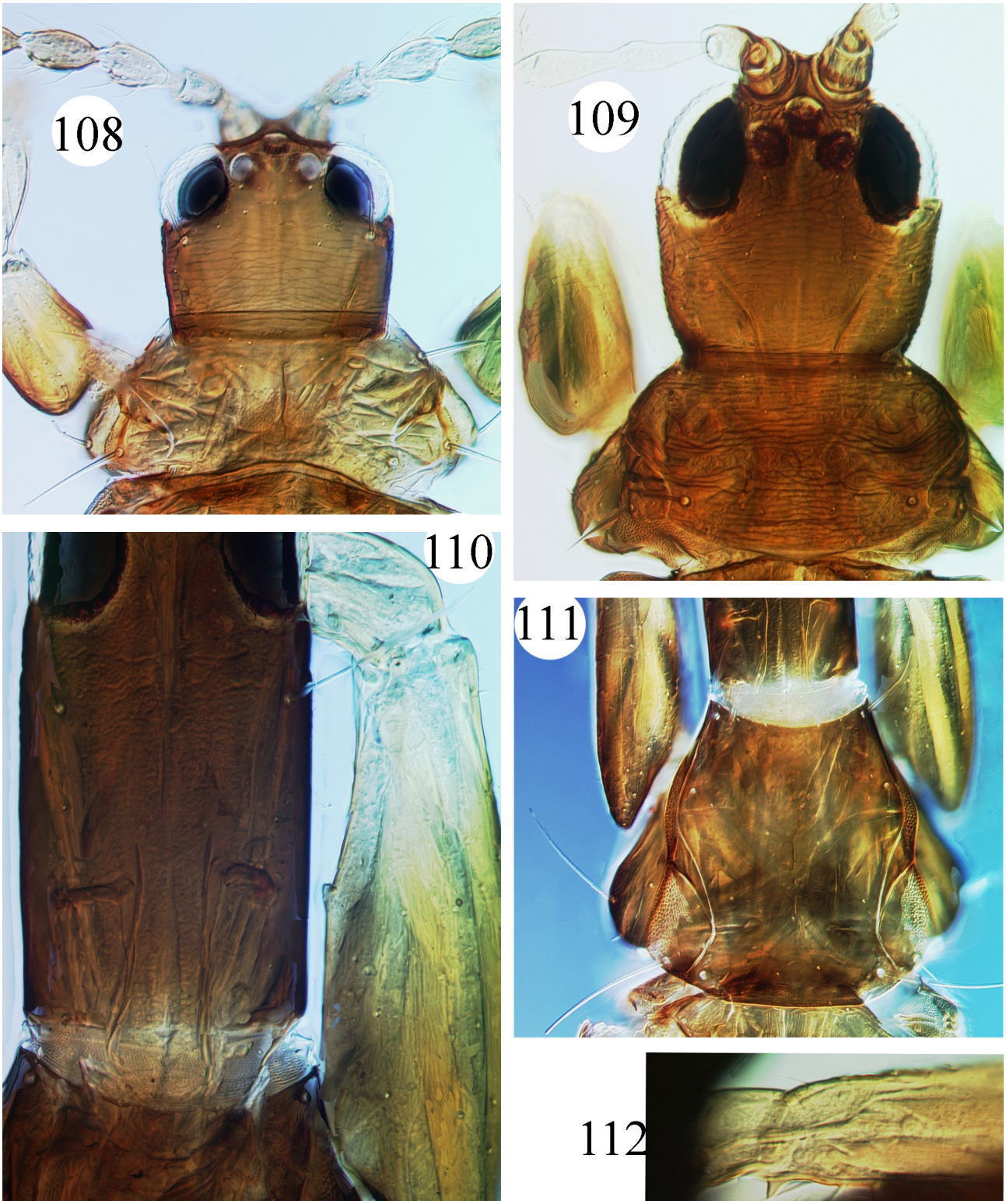


FIGURES 97–103. *Terthrothrips* spp. Head, pronotum & fore leg 97–98: **(97)** *ananthakrishnani*; **(98)** *strasseni*. Antennal segments 99–101: **(99)** *ananthakrishnani*, VII–VIII; **(100)** *ananthakrishnani*, III–VIII; **(101)** *strasseni*, III–VIII. Abdominal segments 102–103: **(102)** *strasseni*, sternites V–VIII; **(103)** *strasseni*, tergites VI–VIII.





FIGURES 104–107. *Liothrips*-lineage. **(104)** *Chelaeothrips annamensis*, antenna, head & pronotum; **(105)** *Coryphothrips trochiceps*, head & foreleg; **(106)** *Zelotothrips fuscipennis*, metanotum & pelta; **(107)** *Coryphothrips trochiceps*, thorax.



FIGURES 108–112. Phlaeothripinae genera. Head & pronotum 108–109: **(108)** *Logadothrips karnyellus*; **(109)** *Pnigmothrips medanensis*. *Sumatrothrips filiceps* 110–111: **(110)** head; **(111)** pronotum. **(112)** *Glenothrips biuncinatus*, fore tibiae.

Logadothrips **Priesner**
(Fig. 108)

Logadothrips Priesner, 1929b: 190. Type species: *Logadothrips karnyellus* Priesner, by monotypy.

This genus is based on a single species that is known only from one female, taken in Sumatra, Indonesia. It is interpreted here as a member of the Haplothripini, in view of the character states listed below. However, the available individual appears to be depressed dorso-ventrally as in *Psalidothrips* species, and the pronotal am and aa setae are very small, but unlike species of that genus the maxillary palps are not short and stout (Fig. 108).

Diagnosis: Head a little wider than long (Fig. 108); eyes normal, postocular setae wide apart and as long as eye; stylets 0.75 of head width apart, retracted almost to postocular setae; antennae 8-segmented, III with 3 sensoria, IV with 4; pronotum with 3 pairs of major setae developed, am and aa minute, notopleural sutures complete; basantra present; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth absent in female; fore wings constricted medially, with duplicated cilia; pelta slightly hat-shaped; tergites II–VII with 2 pairs of wing-retaining setae, tergite IX setae longer than tube; tube with straight sides, slightly shorter than head.

Macrophthalmothrips Karny

(Fig. 72)

Ophthalmothrips Karny, 1920: 38. Type species: *Ophthalmothrips argus* Karny, by monotypy.
Macrophthalmothrips Karny, 1922a: 34. Replacement name for *Ophthalmothrips* Karny nec *Ophthalmothrips* Hood, 1919.

There are 16 species listed in this distinctive, pantropical genus of fungus-feeding thrips on dead branches. Two species are described from Southeast Asia, one from Laos and the other from Java, Indonesia, but no species is recorded from China.

Diagnosis: Body black with yellow and white markings, eyes bright red; head longer than wide; eyes holoptic, surrounding ocellar region (Fig. 72); postocular setae usually minute; mouth-cone extending to mesosternum, stylets retracted to eyes, close together medially; antennae 8-segmented, III with 2 sensoria, IV with 4; pronotum with 5 pairs of major setae, notopleural sutures incomplete; basantra absent; mesopresternum divided into two plates; sternopleural sutures present, but short; fore tarsi without tooth; fore wings parallel-sided, with duplicated cilia; pelta bell-shaped; tergites II–VII each with 2 pairs of wing retaining setae; tube shorter than head, anal setae shorter than tube; male sternite VIII without pore plate.

Manothrips Priesner*

Manothrips Priesner, 1953: 373. Type species: *Manothrips fortis* Priesner, by monotypy.

Known only from its description, the only species placed in this genus was described from a single female taken on Sumatra, Indonesia. The record of this genus from Fujian, China, by Zhang *et al*. (1999) requires further confirmation, particularly as there was no indication either of the sex or number of specimens found.

Diagnosis: Head longer than wide, cheeks strongly narrowed to base, with 2 pairs of sub-basal spine-like setae; eyes normal, but with enlarged posterior ommatidium; postocular setae well-developed; antennae 8-segmented, III with 1 sensorium, IV with 3; pronotum with major setae developed, epim long; basantra absent; fore tarsal tooth absent in female; fore wings parallel-sided, with duplicated cilia; tergites II–VII with 2 pairs of wing-retaining setae; tube slightly longer than head.

Margaritothrips Priesner*

Margaritothrips Priesner, 1932: 49. Type species: *Margaritothrips sumatrensis* Priesner, by monotypy.

Three species are listed in this genus, the type species from Indonesia and the other two from India. These species are unusual in being described as macropterous but having only one pair of tergal wing-retaining setae.

Diagnosis: Head longer than wide, slightly produced in front of eyes; eyes short ventrally, postocular setae well-developed; stylets short, wide apart, U-shaped; antennae 8-segmented, III–IV each with 3 sensoria; pronotum with 5 pairs of developed setae, notopleural sutures complete; basantra absent; mesopresternum reduced;

sternopleural sutures absent; fore tarsal tooth present in female; fore wings parallel-sided, without duplicated cilia; pelta triangular with sides rounded; tergites II–VII with 1 posterior pair of wing-retaining setae; tube shorter than head, anal setae much shorter than tube.

Mastigothrips Priesner*

Mastigothrips Priesner, 1932: 53. Type species: *Mastigothrips karnyianus* Priesner, by monotypy.

Only two species are recognised in this genus that is a member of the *Plectrothrips* genus-group. One species was described from Fiji, and the other from Indonesia, but these are possibly different forms of a single species, as indicated by Okajima (1981).

Diagnosis: Head longer than wide, slightly produced in front of eyes; eyes large, postocular well-developed; stylets short, reaching one third of head, close together; antenna 8-segmented, campaniform sensorium on basal half of segment II, VIII elongate, III–IV with sensoria stout; pronotum stout, major setae reduced, notopleural suture complete; basantra reduced or absent, ferna large, fused together medially; mesopresternum reduced; fore tarsus with a stout tooth, fore femora with a basal hump on inner margin, mid and hind tibiae with 2 spur-like setae; fore wing with duplicated cilia; pelta irregular, with pair of lateral wings and slender median lobe; posterior margin of sternite VIII without teeth; tergites without sigmoid wing-retaining setae; tube shorter than head, anal setae much shorter than tube.

Medogothrips Han

Medogothrips Han, 1988: 188. Type species: *Medogothrips reticulatus* Han, by monotypy.

The only species in this genus was described from Tibet, China, with the dorsal surface of the body strongly reticulate and the head unusually short. The type specimens are not in good condition, and the relationships of the genus remain in doubt. The character states listed below suggest that the species is a member of the *Liothrips*-lineage, although the original author suggested a relationship to *Hoplothrips*.

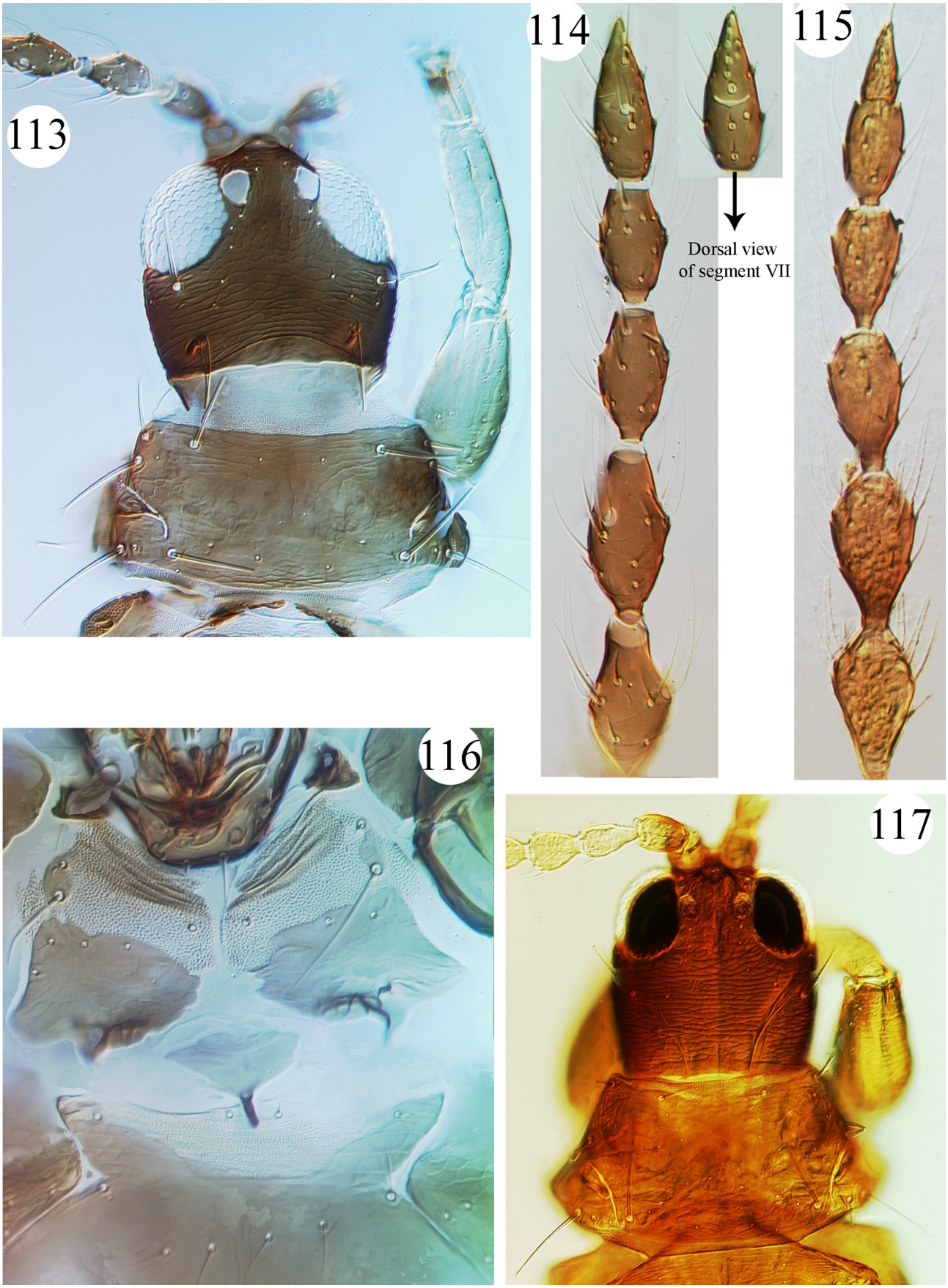
Diagnosis: Body reticulate; head broad; eyes normal, postocular setae minute; stylets retracted to postocular setae, far apart medially; antennae 8-segmented, segments short, III with 1 sensorium, IV with 3; pronotum with epimerals developed, other major setae small, notopleural sutures complete; basantra absent; mesopresternum transverse; sternopleural sutures present; fore tarsal tooth present in female; fore wings parallel-sided, with duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, slightly shorter than head, anal setae shorter than tube.

Menothrips Hood*

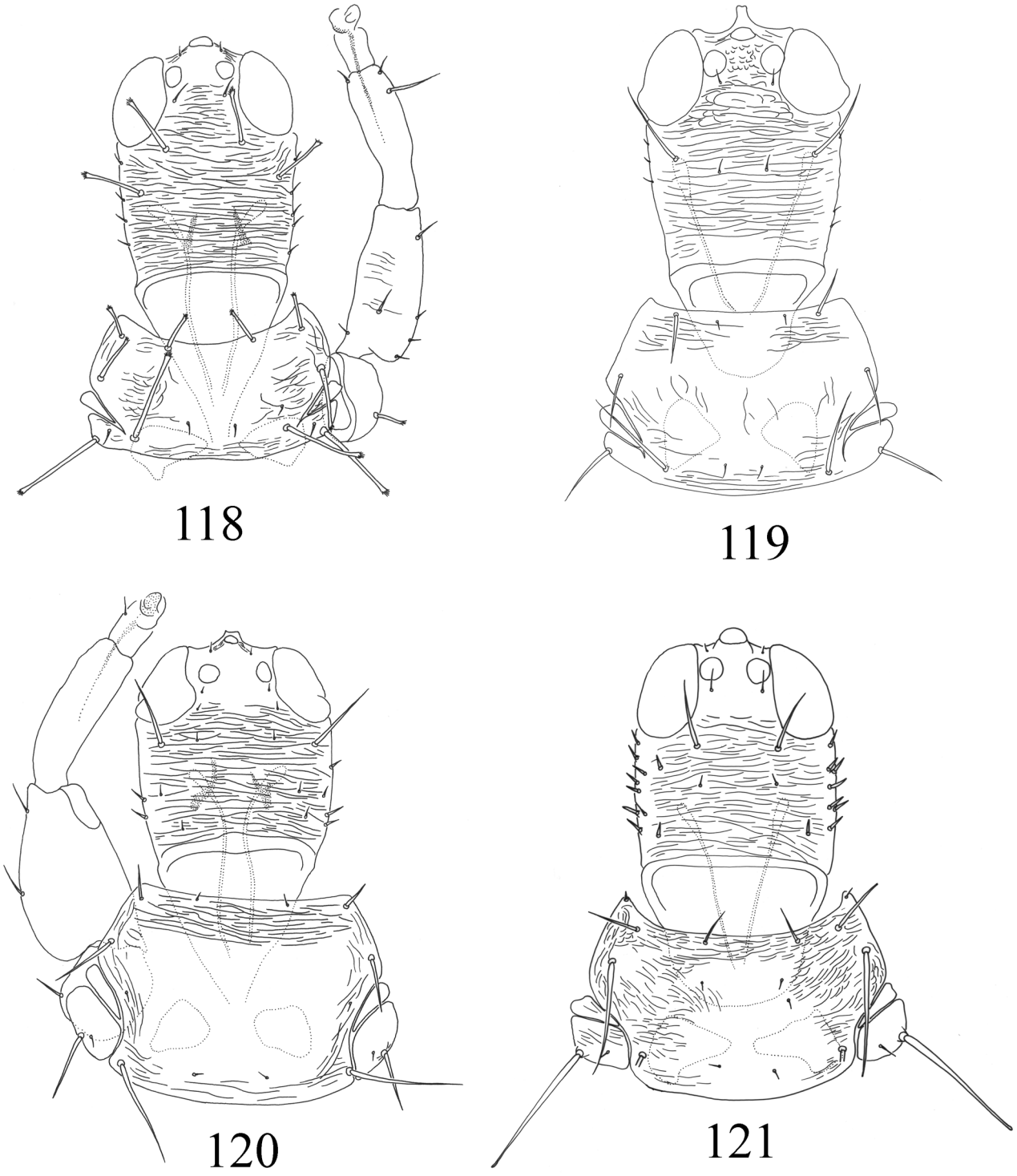
Menothrips Hood, 1957: 175. Type species: *Menothrips ebriosus* Hood, by monotypy.

Based on a single species from southern Brazil that was subsequently recorded from Martinique, this genus also includes a second very similar species known only from Sabah. Related to the *Plectrothrips* genus-group, *Menothrips* species are distinguished by the presence of a tooth on the distal half of the inner margin of the fore femora.

Diagnosis: Head long; eyes normal, postocular setae long; stylets wide apart, low in head; antennae 8-segmented, II with sensorium on basal half of segment, III and IV each with 2 sensoria; pronotum with epimeral setae long, other major setae well-developed, notopleural sutures complete; basantra present; mesopresternum ?; sternopleural sutures ?; fore tarsal tooth large; fore wings parallel-sided, with duplicated cilia, only one sub-basal seta; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube shorter than head, with straight sides.



FIGURES 113–117. Phlaeothripinae genera. *Trichinothrips breviceps* 113, 114, 116: **(113)** head, pronotum & foreleg; **(114)** antenna; **(116)** ventral view of thorax. **(115)** *Xylaplothrips bogoriensis*, antenna; **(117)** *Eothrips crassicornis*, head & pronotum.



FIGURES 118–121. *Liothrips*-lineage. Head & pronotum: **(118)** *Adelphothrips longisetosus*; **(119)** *Gemmathrips brevis*; **(120)** *Rosingothrips ommatus*; **(121)** *Zelotothrips fuscipennis*.

Mesothrips Zimmermann

(Figs 54, 56)

Mesothrips Zimmermann, 1900: 12. Type species: *Mesothrips jordani* Zimmermann, by subsequent designation.

Apart from one species described from Madagascar, the remaining 41 species listed in this genus are from Asia

between India, southern Japan and northern Australia. Ananthakrishnan (1976) reviewed the genus and produced a key to 31 species, but that the key is not reliable judging from subsequent observations on variation in *jordani*. This widespread species is highly variable, not only in the body-size but also in the length of the major pronotal setae (Mound & Minaei 2007), and it is likely that further synonyms remain to be recognised. Han (1997) described *Mesothrips* as having the fore wings broad basally and parallel-sided but tapering toward the apex, whereas this genus is a member of the Haplothripini with the fore wings clearly constricted medially. Most of the named species in this genus are from the Indonesian islands, with six recorded from China. These thrips are usually found within galls, but they are possibly kleptoparasites as there is no evidence that they are gall-inducers. *Mesothrips ignotus* Reyes is here transferred to *Adelphothrips*, because it lacks prosternal basantra, and has the antennal sensoria formula that is typical of the *Liothrips*-lineage.

Diagnosis: Head longer than wide, cheeks sharply constricted at base (Fig. 56); eyes normal, postocular setae well-developed; stylets usually retracted to one third of head length, wide apart, V-shaped; antennae 8-segmented, III with 3 sensoria, IV with 4; pronotum usually with 5 pairs of developed setae, sometimes am and aa reduced, notopleural sutures complete; basantra present; mesopresternum eroded medially, usually divided into two lateral plates (Fig. 54); sternopleural sutures absent; fore tarsal tooth present in both sexes; fore wings weakly constricted medially, with duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube shorter than head; male sternite VIII without pore plate.

Murphythrips Mound & Palmer
(Fig. 77)

Murphythrips Mound & Palmer, 1983b: 431. Type species: *Murphythrips legalis* Mound & Palmer, by monotypy.

Only one species, described from Singapore, is included in this genus. It is presumably a fungus-feeding species, and like some Urothripini species it is rather depressed dorsoventrally.

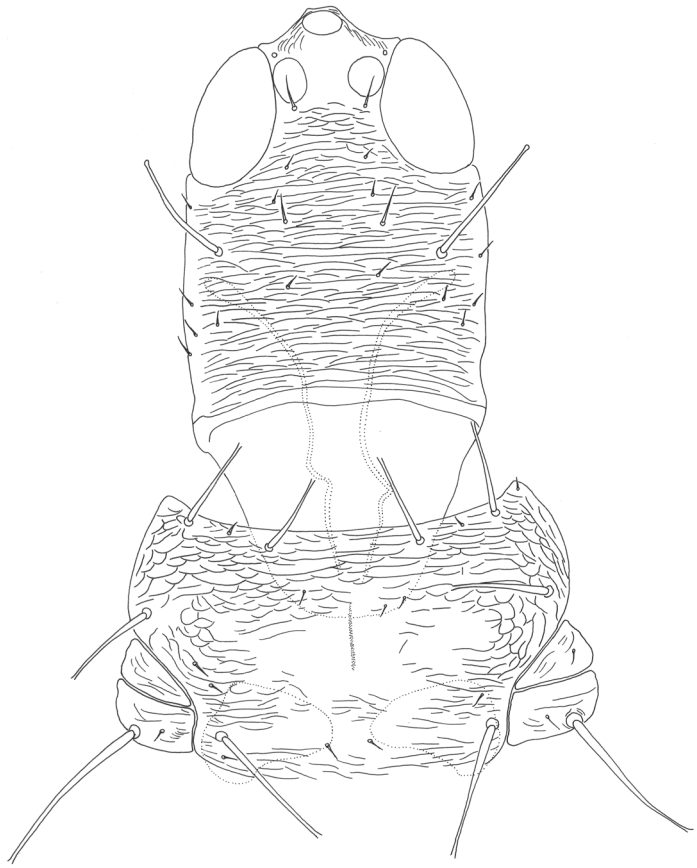
Diagnosis: Body tuberculate, with broadly expanded setae; head about as long as wide (Fig. 77); eyes reduced to 3 ommatidia, 2 pairs of postocular setae broadly expanded; stylets retracted to eyes, close together medially, nearly touching; antennae 5-segmented, morphological segments III–V completely fused; pronotum with many setae broadly expanded, notopleural sutures reduced; basantra absent; mesopresternum small; fore tarsal tooth absent in female, present in male; usually apterous; tergite I transvers, broadly fused to II; tergites II–VII without wing-retaining setae; tube encircled by a transverse furrow medially, anal setae shorter than tube; male sternite VIII without pore plate.

Myopothrips Priesner
(Fig. 142)

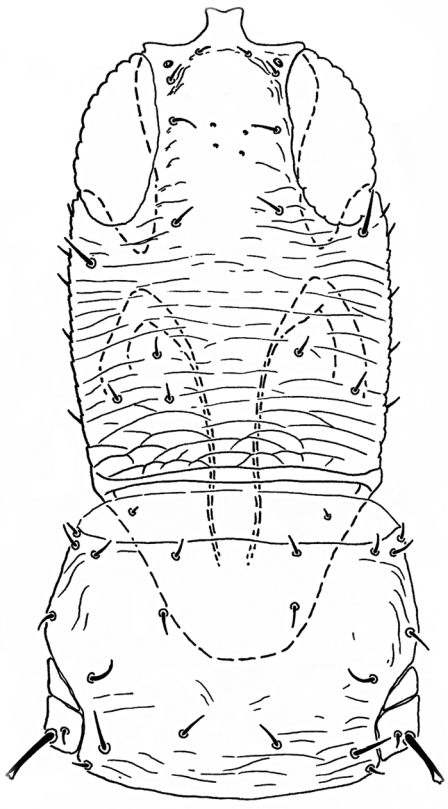
Myopothrips Priesner, 1940: 405. Type species: *Myopothrips symplocobius* Priesner, by monotypy.

The only species in the genus was described from Java, Indonesia, from a single female. It is considered to belong to the *Liothrips*-lineage, because antennal segment III has one sensorium and segment IV has three sensoria, also the basantra are absent on the prosternum.

Diagnosis: Head a little longer than wide, with convex cheeks; postocular setae short and stout; maxillary stylets one-third of head width apart, retracted to postocular setae; antennae 8-segmented, VIII weakly constricted at base, III with 1 sensorium, IV with 3; pronotum with setae epim and pa long and pointed, am setae minute, aa and ml short and stout, notopleural sutures complete; fore tarsal tooth absent in female, fore tibia with sharply curved, pointedtooth on inner apex (Fig. 142), fore femora swollen; fore wings with duplicated cilia; pelta broadly triangular; tergites with 2 pairs of long, curved (not sigmoid) wing-retaining setae; tergite IX setae about 0.8 as long as tube; tube about as long as head, anal setae shorter than tube.

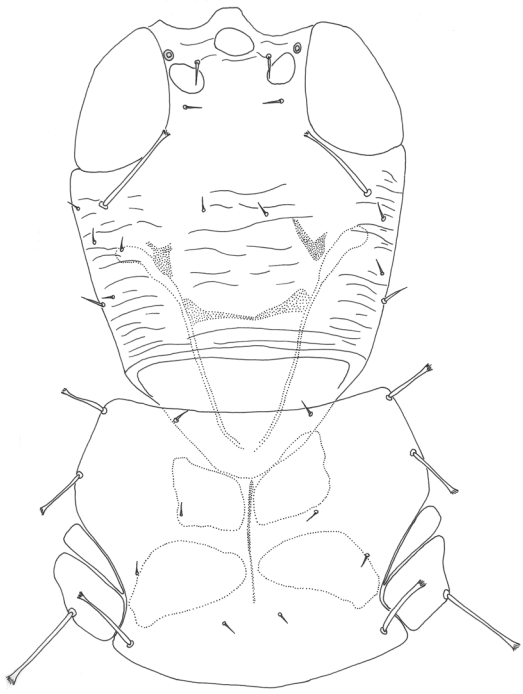


122



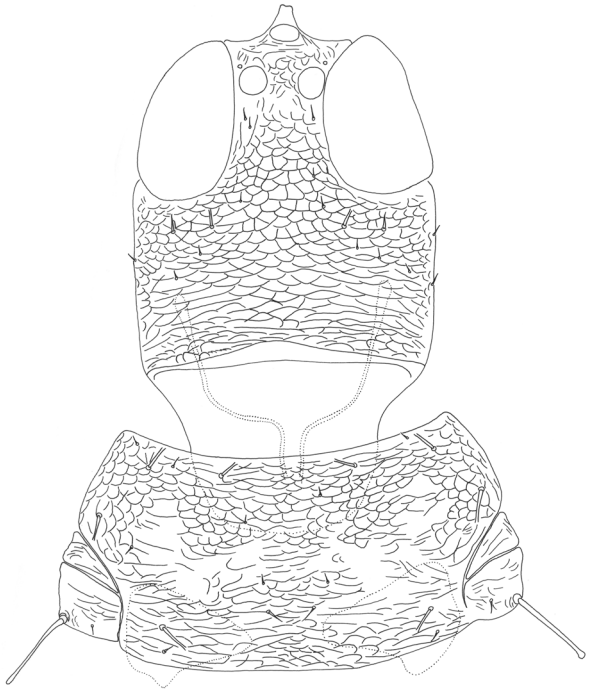
123

124

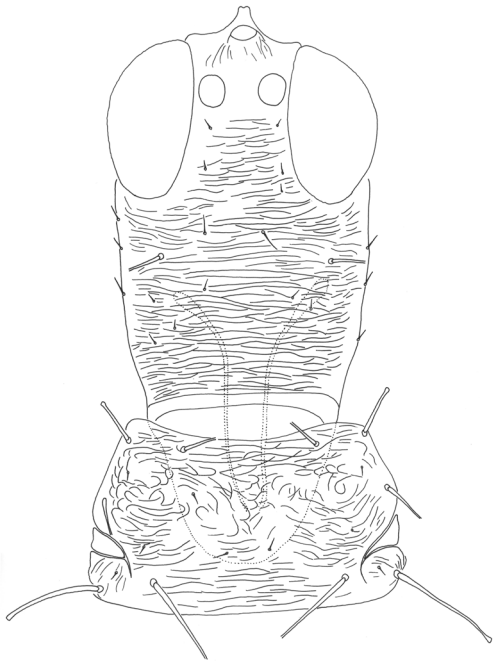


125

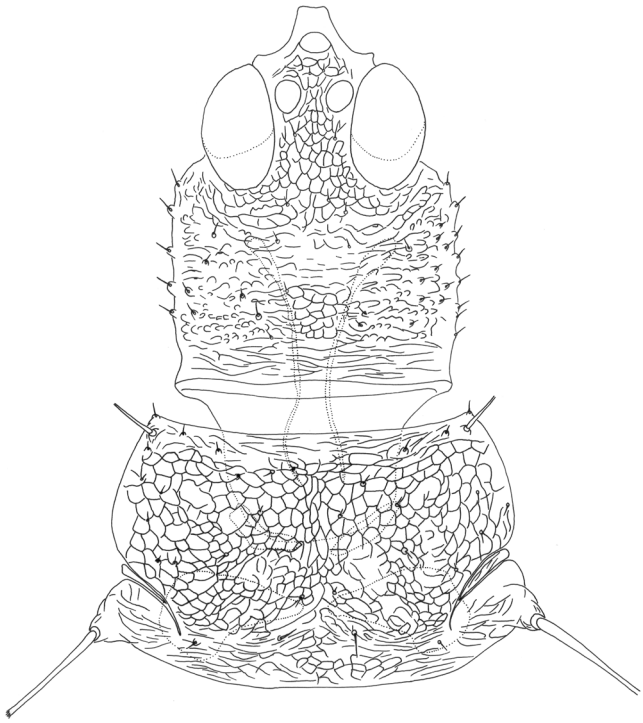
FIGURES 122–125. Phlaeothripinae genera. Head & pronotum: **(122)** *Liophlaeothrips ablusus*; **(123)** *Cephalothrips monilicornis*; **(124)** *Psephenothrips leptoceras*; **(125)** *Praepodothrips causiapeltus*.



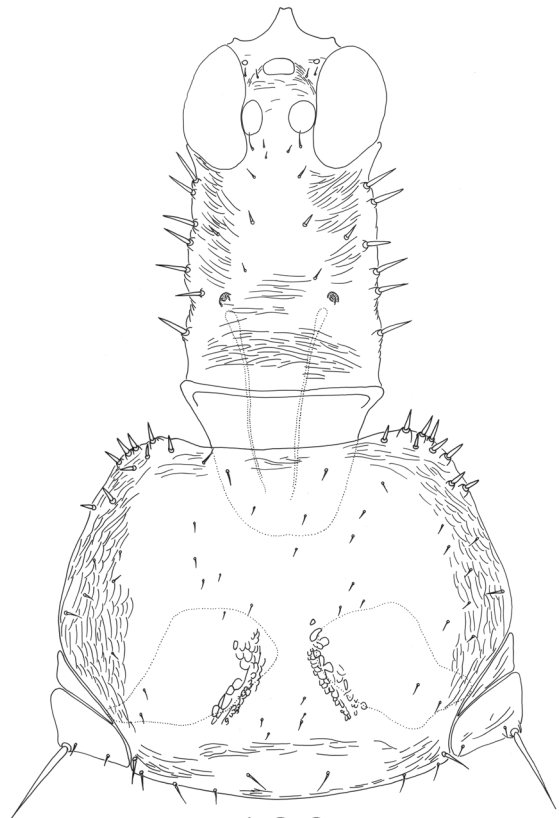
126



127

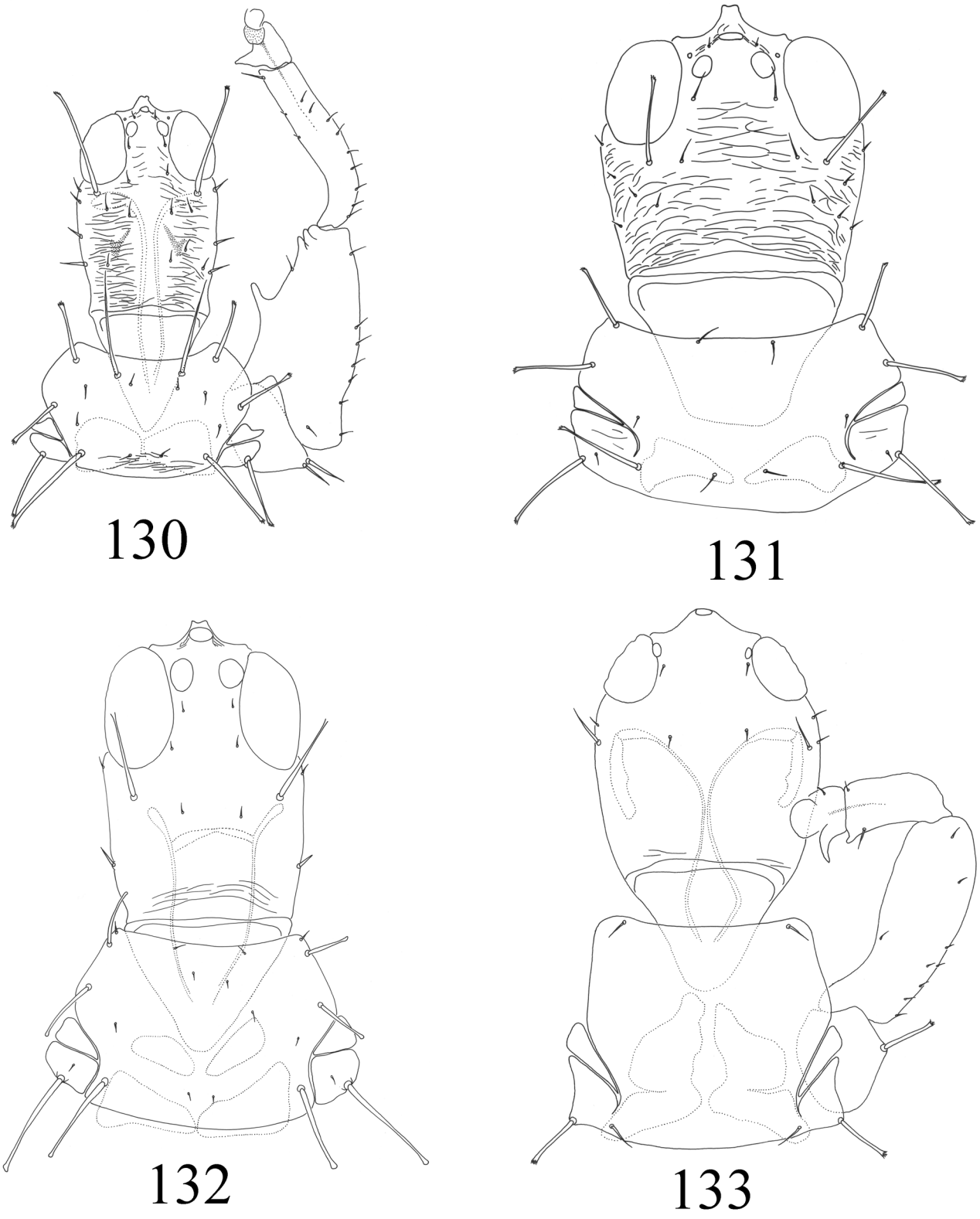


128



129

FIGURES 126–129. *Liothrips*-lineage. Head & pronotum: **(126)** *Eugynothrips brevisetis*; **(127)** *Phenicothrips siamensis*; **(128)** *Leeuwenia caelatrix*; **(129)** *Phasmothrips asperatus*.



FIGURES 130–133. Phlaeothripinae genera. Head & pronotum: **(130)** *Ecacanthothrips claricornis*, male; **(131)** *Phylladothrips pictus*; **(132)** *Glenothrips biuncinatus*; **(133)** *Okajimathrips kentingensis*.

Mystrothrips Priesner
(Fig. 78)

Mystrothrips Priesner, 1949: 117. Type species: *Sagenothrips dammermani* Priesner, by monotypy.

Seven species are included in this genus, of which two are recorded from Southern China, two from southern Japan, and one each from Java, Korea, the Solomon Islands, and southern Brazil. Specimens have also been studied in ANIC from Nepal, India, Peninsular Malaysia, Sarawak and Australia (Mound *et al*. 2013).

Diagnosis: Head usually as long as wide, weakly to strongly prolonged in front of eyes, strongly reticulate dorsally (Fig. 78); cheeks incut behind eyes; postocular setae usually well developed; stylets usually wide apart, V-shaped; antennae 8-segmented, VIII constricted basally, III with 2 or 3 sensoria, IV usually with 3; pronotum usually with 5 pairs of capitate setae, notopleural sutures complete or nearly complete; basantra usually present; mesopresternum strongly eroded; sternopleural sutures present or absent; fore tarsal tooth usually present, sometimes absent in female; fore wings, if developed, without duplicated cilia; pelta variable; tergites without wing retaining setae; tube shorter than head, anal setae shorter than tube or a little longer; male sternite VIII without pore plate.

Oidanothrips Moulton

Oidanothrips Moulton, 1944: 267. Type species: *Oidanothrips magnus* Moulton, by monotypy.

This genus of fungus-feeding species with remarkably elongate stylets is closely related to *Holothrips*, but has four sensoria on the third antennal segment. Most of the 12 species included are from various countries in Southeast Asia (Okajima 1999b), of which three are recorded from southern China. A further species, *notabilis* Feng, Guo & Duan, was described from Henan province in China, based on four females and one male (Feng *et al*. 2006). The original description indicated that the postocular setae and fore wing sub-basal setae S3 are blunt apically. However, the types have been checked in this study, and these setae were found to be sharply pointed. The other characters given for *notabilis* do not differ from the redescription of *frontalis* by Okajima (2006), and one female of *frontalis* has been studied in ANIC with pointed setae. For these reasons, *Oidanothrips notabilis* Feng, Guo & Duan (2006) is here considered a **new synonym** of *frontalis* (Bagnall).

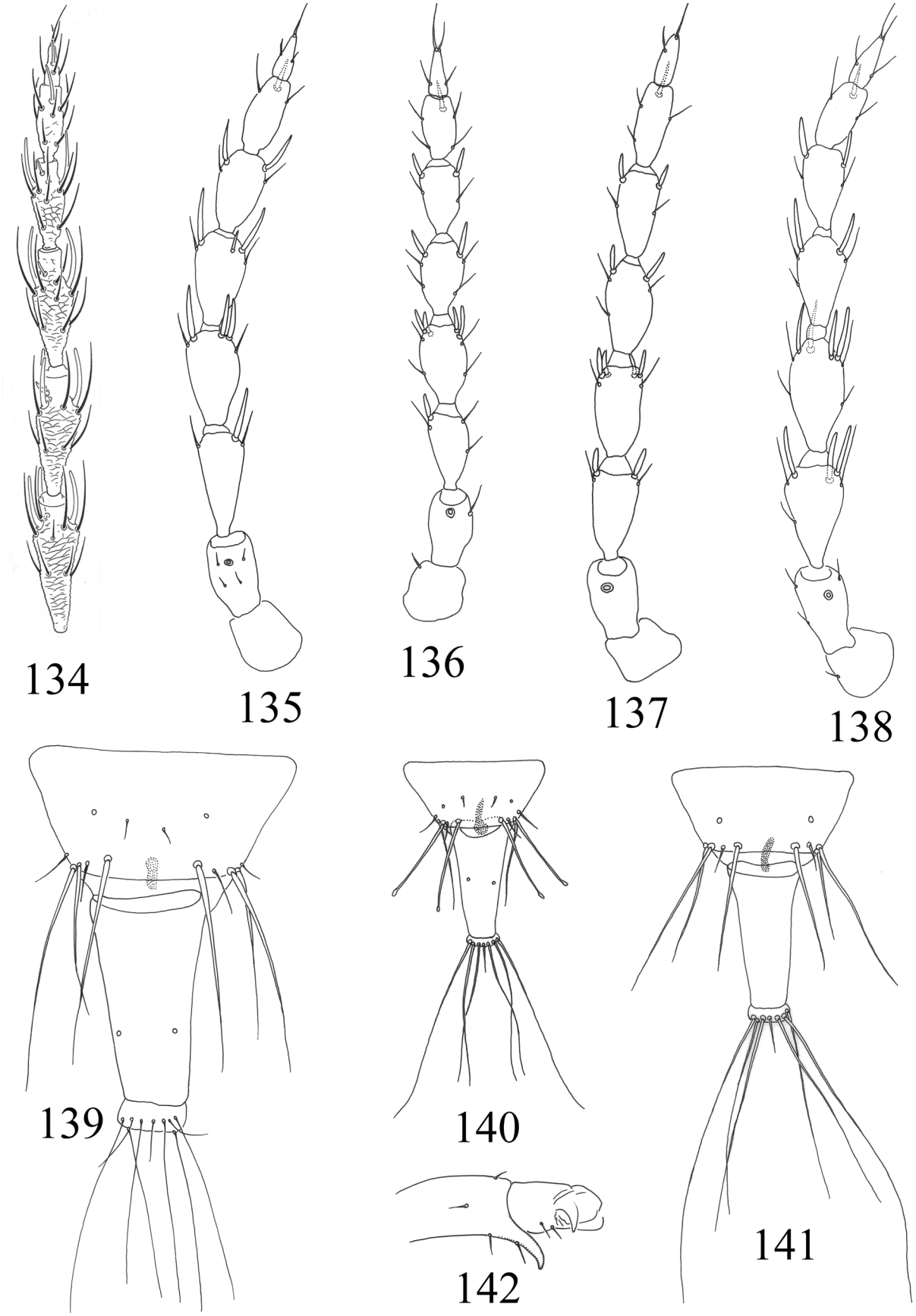
Diagnosis: Head much longer than wide; eyes normal, 1 or 2 pairs of postocular setae well-developed; stylets very long, retracted to eyes, close together for full length of head; antennae 7-segmented, VII with complete or incomplete suture, III with 4 sensoria, IV with 4; pronotum with 5 pairs of developed setae, sometimes am reduced, notopleural sutures complete; basantra absent; mesopresternum transverse; sternopleural sutures present; fore tarsal tooth present in both sexes; fore wings parallel-sided, with numerous duplicated cilia; pelta bell-shaped; tergites II–VII with 2 pairs of wing-retaining setae; tube shorter than head; male sternite VIII without pore plate.

Okajimathrips Bhatti
(Fig. 133)

Okajimathrips Bhatti, 1992: 130. Type species: *Podothrips kentingensis* Okajima, by monotypy.

This genus includes a single species, described from Taiwan. It presumably has a similar biology to *Podothrips* species—predatory on Coccoidea on Poaceae (Mound & Minaei 2007), and is a member of the Haplothripini although not mentioned by Mound and Minaei (2007).

Diagnosis: Head a little longer than wide (Fig. 133); eyes normal, postocular setae developed, wide apart; stylets retracted to postocular setae, far apart medially; antennae 8-segmented, III and IV each with 2 sensoria; pronotum with 3 pairs of capitate setae (Fig. 133), am, ml reduced, but aa and pa much smaller than epimerals, notopleural sutures incomplete; basantra present; mesopresternum eroded medially, divided into two lateral plates; fore tarsal tooth present in both sexes, fore tibia with a subapical tubercle; fore wings weakly constricted medially, without duplicated cilia; pelta irregular; tergites II–VII with 2 pairs of wing-retaining setae; tergite IX with S1 short and expanded; tube with straight sides, about as long as head, anal setae longer than tube; male sternite VIII with a pair of pore plates.



FIGURES 134–142. Phlaeothripinae genera. Antennae 134–138: **(134)** *Acanthothrips nodicornis*; **(135)** *Propealiothrips moundi*; **(136)** *Haplothrips ganlbaueri*; **(137)** *Haplothrips clarisetis*; **(138)** *Xylaplothrips inquilinus*; Tergites IX–X 139–141: **(139)** *Xylaplothrips inquilinus*; **(140)** *Praepodothrips causiapeltus*; **(141)** *Podothrips ferruginenus*. **(142)** *Myopothrips symplocobius*, fore tibiae.

***Phasmothrips* Priesner**
(Fig. 129)

Phasmothrips Priesner, 1933b: 82. Type species: *Phasmothrips asperatus* Priesner, by monotypy.

Based on a single species, that is known only from the original series of both sexes, taken from a leaf gall on *Sloanea* in Java, this genus is considered to be a member of the *Liothrips*-lineage. However, it is remarkable for the numerous short-stout setae on the pronotum (Fig. 129) and fore femora, as well as on the head. In the absence of long pronotal setae it is unlike any species of *Liothrips* or related genera.

Diagnosis: Head longer than wide, cheeks with about 8 pairs of short, stout setae (Fig. 129); head dorsally with one pair of small tubercles on posterior quarter; eyes without enlarged ommatidia, postocular setae small, not reaching posterior margins of eyes; maxillary stylets one-third of head width apart, retracted into basal third of head; antennae 8-segmented, III with 1 sensorium, IV with 3; pronotum well-developed and rounded, only epimeral setae well-developed, other major setae small, about 8 pairs of stout spur-like setae on anterior angles, notopleural sutures complete; basantra absent; mesopresternum reduced medially; sternopleural sutures absent; fore tarsal tooth present in both sexes; fore wings parallel-sided, with about 90 duplicated cilia; pelta rounded triangular; tergites II–VII with 2 pairs of wing-retaining setae; lateral abdominal setae very long, tergite IX setae slightly longer than tube; tube with straight sides, slightly shorter than head; male sternite VIII with an entire pore plate.

***Phenicothrips* Bhatti**
(Figs 18, 127)

Liothrips (*Phaenothrips*) Priesner, 1968: 176. Type species: *Gynaikothrips daetymon* Karny, by original designation.
Phenicothrips Bhatti, 1995: 107. Replacement name for *Phaenothrips* Priesner, nec *Phenothrips* Ananthakrishnan, 1968: 128.

There are eight species listed in this Asian genus. Four are described from Indonesia, with one each from Vietnam, Malaysia, Thailand, and the Philippines, with three species recorded from China. This genus is a typical member of the *Liothrips*-lineage, and all species of *Phenicothrips* were described originally in either *Liothrips* or *Gynaikothrips*. However, *Phenicothrips* species have long and slender antennal sensoria, almost as long as the segment (Fig. 18). These species are particularly similar to some of the species placed in *Eugynothrips*.

Diagnosis: Head longer than wide (Fig. 127); eyes normal, postocular setae usually small, sometimes developed; stylets usually retracted into head capsule, far apart; antennae 8-segmented, median segments elongate, III with 1 sensorium, IV with 3, sensoria elongate (Fig. 18); pronotum with major setae developed, epim longest, notopleural sutures complete; basantra absent; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth absent in both sexes; fore wings parallel-sided, with duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head; male sternite VIII without pore plate.

***Phylladothrips* Priesner**
(Figs 68, 131)

Phylladothrips Priesner, 1933b: 79. Type species: *Phylladothrips karnyi* Priesner, by monotypy.

All nine species listed in this genus are from Southeast Asia, with two from Taiwan, two from the Philippines, one from Malaysia, and four from Indonesia (Okajima 1988b). These species are collected from dead leaves and branches where, presumably, they are fungus feeders. They are particularly unusual in having sigmoid wing-retaining setae on the eighth tergite (Fig. 68).

Diagnosis: Head a little longer than wide (Fig. 131); eyes normal, postocular setae well-developed; stylets usually retracted to postocular setae, about one third of head width apart medially; antennae 8-segmented, III with 3 sensoria, IV with 4; pronotum with 4 pairs of developed setae, am reduced, notopleural sutures incomplete; basantra present but weak; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth absent on

both sexes; fore wings weakly constricted medially, without duplicated cilia; pelta hat-shaped; tergites II–VIII with 2 pairs of wing-retaining setae (Fig. 68); tube shorter than head; male sternite VIII without pore plate.

Plectrothrips Hood
(Figs 74, 75)

Plectrothrips Hood, 1908: 370. Type species: *Plectrothrips antennatus* Hood, by monotypy.

There are 32 species listed in this genus, of which four are recorded from China, Three of these are from Taiwan, and *crassiceps* (Priesner) that was described from Indonesia is here newly recorded from mainland China, at Beijing. Three further species are recorded from Indonesia, and another three from Singapore (Okajima 1981). These thrips are usually found living on dead branches, where they presumably feed on fungal hyphae.

Diagnosis: Head usually a little longer than wide (Fig. 74); postocular setae usually developed, wide apart; stylets variable, usually retracted into head; antennae 8-segmented, II with campaniform sensilla in basal half of segment, VIII long, III with 2 or 3 sensoria, IV with 3; pronotum clearly smaller than prothorax, without major setae, notopleural sutures complete; basantra absent; mesopresternum reduced; sternopleural sutures present or absent; fore tarsal tooth present in both sexes; fore wings, if developed, parallel-sided, with duplicated cilia; pelta broad with slender lateral lobes (Fig. 75); tergite II eroded laterally; tergites II–VII each with one pair of wing-retaining setae; tube and anal setae variable; male sternite VIII without pore plate.

Plicothrips Bhatti
(Fig. 69)

Plicothrips Bhatti, 1979: 306. Type species: *Hindsiana apicalis* Bagnall, by original designation.

Only two species are included in this genus, one from Sudan and the other described from India. However, the latter species, *apicalis* Bagnall, is known from Thailand and Taiwan, and is here newly recorded from mainland China, in Yunnan. *Plicothrips* is close related to the worldwide genus *Haplothrips*, and is distinguished by the presence of only one pair of well-developed wing-retaining setae on abdominal tergites III–VI (Fig. 69), and the fore wings with the basal third constricted. More than 100 specimens of *apicalis* have been examined from Yunnan, and the wing-retaining setae are highly variable among these specimens. Most have only the second pair of wing-retaining setae well-developed, but some have the anterior pair well-developed on one or all of tergites III–VI. Specimens from Thailand in ANIC also have the anterior pair of wing-retaining setae present but small. The genus *Plicothrips* probably represents two slightly unusual, grass-living species of *Haplothrips*.

Diagnosis: Head longer than wide; eyes normal, postocular setae well-developed; stylets usually retracted to postocular setae, V-shaped with long maxillary bridge; antennae 8-segmented, III with 1 sensorium, IV with 4; pronotum with 5 pairs of developed setae, sometimes am reduced, notopleural sutures complete; basantra present; mesopresternum eroded medially; sternopleural sutures absent; fore tarsal tooth present in both sexes; fore wings weakly constricted medially, without duplicated cilia; pelta slightly triangular; tergites II–VII usually with 1 pair of wing-retaining setae (Fig. 69), sometimes with 2; tube with straight sides, slightly shorter than head, anal setae longer than tube; male sternite VIII without pore plate.

Pnigmothrips Priesner
(Fig. 109)

Pnigmothrips Priesner, 1953: 369. Type species: *Pnigmothrips medanensis* Priesner, by monotypy.

The only species in this genus was described from both sexes taken in a leaf gall in Sumatra. It is here considered to be a member of the *Liothrips*-lineage, but has unusually short postocular setae (Fig. 109).

Diagnosis: Head almost as long as wide; eyes normal, without enlarged ommatidia, postocular setae minute

(Fig. 109); stylets more than 0.3 of head width apart, retracted almost to postocular setae; antennae 8-segmented, sensoria not elongate, III with 1 sensorium, IV with 3; pronotum with 2 pairs of major setae developed, am minute, aa and ml short and stout, notopleural sutures complete; basantra absent; mesopresternum transverse but slender; sternopleural sutures possibly present; fore tarsal tooth absent in both sexes; fore wings parallel-sided, with duplicated cilia; pelta hat-shaped; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, almost as long as head; male sternite VIII with entire pore plate.

Podothrips **Hood**
(Figs 58, 59, 141)

Podothrips Hood, 1913: 67. Type species: *Podothrips semiflavus* Hood, by monotypy.

There are 30 species listed in *Podothrips*, of which one was described from Thailand, one from Peninsular Malaysia, and three are recorded from China including Taiwan. The species in this genus appear to be predators of scale insects that live on Poaceae in the tropics and subtropics across the word (Ritchie 1974).

Diagnosis: Head longer than wide (Fig. 58); eyes normal, postocular setae developed; stylets usually about 1/3 of head width apart, retracted to postocular setae; antennae 8-segmented, III with 1 or 2 sensoria, IV with 2 or 3; pronotum usually with 4 pairs of developed setae, am reduced, sometimes ml small, notopleural sutures complete; basantra developed, longer than wide (Fig. 59); mesopresternum transverse; sternopleural sutures present (Fig. 59); fore tarsal tooth present in both sexes, fore tibia usually with an inner subapical tubercle; fore wings constricted medially, with or without duplicated cilia; pelta usually bell-shaped; tergites II–VII with 2 pairs of wing-retaining setae; tube shorter than head, anal setae longer than tube (Fig. 141); male sternite VIII without pore plate.

Ponticulothrips **Haga & Okajima**
(Fig. 80)

Ponticulothrips Haga & Okajima, 1983: 241. Type species: *Ponticulothrips diospyrosi* Haga & Okajima, by monotypy.

The only species in this genus, *diospyrosi*, is at present known only from Honshu and Kyushu in Japan. However, the host plant, *Diospyros kaki*, is widely cultivated in China, and this thrips that causes damage to the leaves and fruits is likely to have a wider distribution than currently recorded.

Diagnosis. Head a little longer than wide, cheeks with a pair of stout setae (Fig. 80); eyes normal, postocular setae developed; stylets retracted to postocular setae, wide apart; antennae 8-segmented, III with 1 sensorium, IV with 3; pronotum with 5 pairs of developed setae, notopleural sutures complete; basantra absent; mesopresternum transverse; sternopleural sutures present; fore tarsal tooth present in both sexes; fore wings parallel-sided, with duplicated cilia; pelta bell-shaped; tergites II–VII with 2 pairs of wing-retaining setae; tube shorter than head, anal setae shorter than tube; male sternite VIII without pore plate.

Praeciputhrips **Reyes**
(Fig. 81)

Praeciputhrips Reyes, 1994: 465. Type species: *Praeciputhrips balli* Reyes, by monotypy.

The only species in this genus, *balli* Reyes (Fig. 81), was described from the Philippines based on three females and three males. A member of the *Liothrips*-lineage, it is similar to *Manothrips*, *Gemmathrips*, and *Rosingothrips* in having the eyes with a few posterior ommatidia enlarged, but has longer maxillary stylets. The species is presumably leaf-feeding.

Diagnosis: Head longer than wide (Fig. 81); eyes normal, with enlarged posterior ommatidia, postocular setae well-developed; stylets retracted to postocular setae, close together medially; antennae 8-segmented, III with 1 sensorium, IV with 3; pronotum with 5 pairs of developed setae, notopleural sutures incomplete; basantra absent;

mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth absent in both sexes; fore wings parallel-sided, with duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head, anal setae slightly longer than tube; male sternite VIII without pore plate.

Praepodothrips Priesner & Seshadri
(Figs 125, 140)

Praepodothrips Priesner & Seshadri, 1952: 407. Type species: *Praepodothrips indicus* Priesner & Seshadri, by monotypy.

This genus of Haplothripini comprises seven species from tropical Asia that live on Poaceae. Two were described from China, one from the Philippines, and the others from India. Little is known about their biology, and the genus as currently used is not satisfactorily defined. Reyes (1994) stated that *P. causiapeltus* from the Phillipines has only two sensoria on antennal segment IV, but the holotype female and one paratype male (in ANIC) both have three sensoria on antennal segment III and four on IV. The type species, *P. indicus*, has two sensoria on each of these segments.

Diagnosis: Head slightly longer than wide (Fig. 125); eyes normal, postocular setae well-developed; stylets retracted to one third of head length, wide apart, with maxillary bridge; antennae 8-segmented, III with 2 or 3 sensoria, IV with 2 or 3 or 4; pronotum with 4 pairs of capitate setae, am reduced, notopleural sutures complete; basantra present; mesopresternum transverse; sternopleural sutures present; fore tarsal tooth present in both sexes; fore wings constricted medially, with duplicated cilia; pelta hat-shaped; tergites II–VII with 2 pairs of wing-retaining setae; tube shorter than head, anal setae much longer than tube (Fig. 140); male sternite VIII without pore plate.

Preeriella Hood
(Fig. 91)

Preeriella Hood, 1939: 612. Type species: *Chirothripoides minutus* Watson, by original designation.

This genus is a member of the *Hyidiothrips* group, and includes 20 species, mostly from Africa and South America. However, five species are listed from Southeast Asia, two from Taiwan, one from Thailand and another from Malaysia (Okajima 1998b). A further species was described from Malaysia but is recorded from Thailand and southern China. These are minute thrips that are usually found in leaf litter.

Diagnosis: Minute, usually apterous species; head longer than wide, elevated in mid-line, prolonged in front of eyes (Fig. 91); postocular setae usually well developed and expanded at apex; stylets usually subparallel; antennae 8-segmented, II with campaniform sensilla at the middle, III short and broad, closely joined to IV, with no sensoria, IV large, with 2 sensoria; pronotum usually with 4 major setae, midlaterals sometimes reduced, notopleural sutures incomplete; basantra weakly present; mesopresternum reduced; no sternopleural sutures; fore tarsal tooth absent; fore wings, if developed, without duplicated cilia; pelta divided into several plates; tergites III–VII each with 1 pair of wing-retaining setae in macroptera; tube shorter than head, anal setae usually much longer than tube; male sternite VIII without pore plate.

Propealiothrips Reyes
(Fig. 135)

Propealiothrips Reyes, 1994: 471. Type species: *Propealiothrips moundi* Reyes, by monotypy.

The only species in this genus was described from one female and four males collected in the Philippines. The holotype male and a paratype female have been studied in ANIC and, contrary to the original description, antennal (Fig. 135) segment IV has three sensoria not two, and sternite VIII of the male is occupied by an entire pore plate. Moreover, the original illustration and measurements of this male holotype are incorrect, in that the pronotal am

setae are acute and scarcely 15 microns long, whereas the aa setae are weakly capitate and about 50 microns. The genus is a member of the *Liothrips*-lineage, and is distinguished from *Liothrips* only because the fore femora of the male are enlarged and the fore tarsal tooth is also large.

Diagnosis: Head longer than wide; eyes normal, postocular setae well-developed; stylets retracted to postocular setae, close together medially; antennae 8-segmented (Fig. 135), III with 1 sensorium, IV with 3; pronotum with 5 pairs of well-developed weakly capitate setae in female but am setae small and acute in male, notopleural sutures complete; basantra absent; mesopresternum transverse; sternopleural sutures present in female; fore tarsal tooth absent in female, present in male; fore wings parallel-sided, with duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, slightly shorter than head, anal setae shorter than tube; male sternite VIII occupied by large pore plate.

Propesolomonthrips **Reyes**
(Figs 84–86)

Propesolomonthrips Reyes, 1994: 473. Type species: *Propesolomonthrips mindorensis* Reyes, by monotypy.

This genus is known only from a single male collected in the Philippines. This exhibits the unusual character state of tergite VIII bearing two pairs of wing-retaining setae (Fig. 86), a condition that is found otherwise only in species of *Solomonthrips* and *Phylladothrips*. The species in all three genera are presumably fungus-feeding in leaf-litter or on dead leaves and branches.

Diagnosis: Head about as long as wide (Fig. 84); eyes normal, postocular setae well-developed, capitate; stylets short, not retracted into head capsule, V-shaped; antennae 8-segmented, III with 2 sensoria, IV with 3; pronotum with 5 pairs of capitate setae, notopleural sutures complete; basantra present; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth absent in male; fore wings weakly constricted medially, with duplicated cilia; pelta hat-shaped; tergites II–VIII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head, anal setae shorter than tube; male sternite VIII without pore plate.

Prosantothrips **Priesner**

Prosantothrips Priesner, 1952: 199. Type species: *Eothrips hyalopterus* Karny, by monotypy.

This genus was erected for a single species from Vietnam. Two females and one male from the type series have been studied, although some characters are not easily seen on these specimens. The presence of two sensoria on the third antennal segment suggests that this species is not a member of the *Liothrips*-lineage, in contrast to the type species of *Eothrips*. Priesner mentioned the "strongly sclerotised tube" as indicating a relationship to *Acallurothrips* in the Idolothripinae. However, as is clear from the diagnosis given below, most of the character states suggest that this species is related to *Liothrips*.

Diagnosis: Head slightly longer than wide; eyes normal, postocular setae well-developed and wide apart; stylets retracted to postocular setae, V-shaped; antennae 8-segmented, III with 2 sensoria, IV with 3; pronotum with 4 pairs of well-developed setae, am minute, notopleural sutures complete; basantra absent; mesopresternum transverse; sternopleural sutures well-developed; fore tarsal tooth absent in both sexes; fore wings broad, parallel-sided, with duplicated cilia; pelta nearly triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, slightly shorter than head; male sternite VIII without pore plate.

Psalidothrips **Priesner**
(Fig. 73)

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

There are 28 species listed in this genus, from various parts of the tropics across the world. Wang *et al*. (2007)

recorded nine species from southern China together with an identification key, and another species was described from Indonesia. Members of this genus typically live in leaf-litter as fungus-feeders.

Diagnosis: Body commonly dorso-ventrally flattened; head usually a little longer than wide (Fig. 73); postocular setae developed, wide apart, situated near cheeks, cheeks usually incut just behind eyes; stylets usually short, V- or U-shaped; antennae 8-segmented, VIII usually constricted basally, III with 2 or 3 sensoria, IV with 2, 3 or 4; pronotum usually with 3 major setae, am and aa setae reduced, notopleural sutures complete; basantra absent; mesopresternum transverse; sternopleural sutures present; fore tarsal tooth present in male, usually absent in female; fore wings, if developed, weakly constricted medially, without duplicated cilia, sub-basal setae minute; pelta hat- or bell-shaped; tergites II–VII each with 2 pairs of wing-retaining setae in macroptera; tube shorter than head, anal setae about as long as tube; male sternite VIII with pore plate.

Psephenothrips **Reyes**
(Fig. 124)

Psephenothrips Reyes, 1994: 478. Type species: *Psephenothrips strasseni* Reyes, by monotypy.

Five species are listed in this Asian genus. One was described from Taiwan and one from the Philippines, but two come from central Japan and the fifth from southern India. These are leaf-feeding species, and the genus is distinguished from *Liothrips* by the longer maxillary stylets that are close together medially in the head (Fig. 124), and the absence of a pore plate on the eighth sternite of males.

Diagnosis: Head longer than width (Fig. 124); eyes normal, postocular setae well developed; stylets retracted to postocular setae, close together medially; antennae 8-segmented, III with 1 sensorium, IV with 3; pronotum with 5 pairs of developed setae, notopleural sutures complete; basantra absent; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth absent in both sexes; fore wings parallel-sided, with duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head; male sternite VIII without pore plate.

Pygmaeothrips **Karny**
(Fig. 88)

Pygmaeothrips Karny, 1920: 40. Type species: *Pygmaeothrips columniceps* Karny, by monotypy; a synonym of *Trichothrips angusticeps* Hood.

The only species placed in this genus is a fungus-feeder, living on dead branches. It is widespread across the world in tropical and subtropical areas, and is recorded from Taiwan.

Diagnosis: Head longer than wide, postocular setae long, capitate; mouth-cone extending to ferna; stylets retracted to eyes, close together medially; antennae 8-segmented, III and IV each with 3 stout sensoria, VIII constricted to base (Fig. 88); pronotum with 5 slender capitate setae; notopleural sutures complete; basantra absent; mesopresternum eroded medially, or separated into 2 lateral triangles; sternopleural sutures absent; fore tarsal tooth absent in female, present in male; fore wings, if present, weakly constricted medially, with duplicated cilia; pelta D-shaped; tergites II–VI each with 2 pairs of wing-retaining setae in macroptera, tergite IX postermaginal setae usually longer than tube; tube shorter than head, anal setae about as long as tube; male sternite VIII without pore plate.

Rosingothrips **Reyes**

Rosingothrips Reyes, 1994: 481. Type species: *Rosingothrips ommatus* Reyes, by monotypy.

The only species in this genus is another member of the *Liothrips*-lineage with the posterior ommatidia of the compound eyes enlarged as in *Praeciputhrips*. It was described from five females and two males collected on the

leaves of an unkown vine in the Philippines. The original description stated incorrectly that there are four sensoria on antennal segment IV, whereas there are actually only three sensoria on this segment on both the holotype female and paratype male (in ANIC).

Diagnosis: Head longer than wide; eyes normal, but with enlarged postero-lateral ommatidia, postocular setae well-developed; stylets retracted almost to postocular setae, about one fifth of head width apart medially; antennae 8-segmented, III with 1 sensorium, IV with 3, segment VIII long and slender; pronotum with 4 pairs of developed setae, am small, notopleural sutures complete; basantra absent; mesopresternum transverse; sternopleural sutures present; fore tarsal tooth absent in both sexes; fore wings parallel-sided, with duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head, anal setae shorter than tube; male sternite VIII without pore plate.

Sagenothrips Priesner*

Sagenothrips Priesner, 1933b: 72. Type species: *Sagenothrips gracilicornis* Priesner, by monotypy.

The only species placed in this genus was described from a single female taken in southern Sumatra, Indonesia. The very short major setae on head and pronotum are unusual amongst the reticulate-headed glyptothripine taxa.

Diagnosis. Head longer than wide, strongly reticulate dorsally; eyes normal, cheeks almost parallel-sided, sharply in-cut behind eyes; postocular setae very small but capitate; stylets ?; antennae 8-segmented, III and IV each with 3 sensoria, segment VIII long, slender and constricted to base; pronotum reticulate, 4 pairs of setae very small but epimeral setae almost 20 microns long, notopleural sutures ?; basantra ?; mesopresternum ?; sternopleural sutures ?; fore tarsal tooth small, but hamus hooked and pointed; fore wings parallel-sided, without duplicated cilia; pelta ?; tergal wing-retaining setae ?; tube narrowed distally, shorter than head; male not known.

Sinuothrips Collins
(Fig. 57)

Sinuothrips Collins, 2000: 286. Type species: *Sinuothrips hasta* Collins, by monotypy.

Described from England where it was taken on dried sedges imported from Eastern Europe, the only species in this genus was recorded from Inner Mongolia, China by Dang and Qiao (2013a). The remarkable ensiform process in front of eyes (Fig. 57) distinguishes this genus from any other member of Haplothripini.

Diagnosis: Head a little longer than wide, strongly prolonged in front of eyes (Fig. 57); eyes normal, postocular setae developed; stylets long and far apart, with maxillary bridge; antennae 8-segmented, III with 1 or 2 sensoria, IV with 3 or 4; pronotum with major setae variable in length, notopleural sutures complete; basantra present; mesopresternum developed; sternopleural sutures absent; fore tarsal tooth present in female; forewings distinctly constricted medially, with duplicated cilia; pelta triangular; terga II–VII each with 2 pairs of wing-retaining setae; tube usually shorter than head.

Solomonthrips Mound

Solomonthrips Mound, 1970: 104. Type species: *Solomonthrips greensladei* Mound, by original designation.

Of the eight species in this genus, five are recorded from the Solomon Islands, two from northern Australia, and one from Indonesia. The genus shares with *Propesolomonthrips* and *Phylladothrips* the character state of having wing-retaining setae on tergite VIII, but although *Andrethrips* also shares this, the latter genus is probably more distantly related. However, the shape of the head and antenna suggest that the genus might be related to *Mystrothrips*.

Diagnosis: Head a little longer than wide, cheeks in-cut just behind eyes; eyes large, postocular setae well-developed; stylets deeply or barely retracted into head capsule; antennae 8-segmented, III with 2 sensoria, IV with

2; pronotum with 4 pairs of capitate setae, aa reduced, notopleural sutures complete; basantra weak; ferna large and strongly sclerotised; mesopresternum weak or absent; sternopleural sutures absent; fore tarsal tooth present in both sexes; fore wings without duplicated cilia; pelta bell-shaped; tergites II–VIII with 2 pairs of wing-retaining setae; tube with straight sides, shorter than head, anal setae shorter than tube; male sternite VIII without pore plate.

Sophiothrips Hood
(Figs 94, 95)

Sophiothrips Hood, 1934: 425. Type species: *Sophiothrips squamosus* Hood, by original designation.

The 25 species included in this genus, from various parts of the tropics and subtropics around the world, involve some of the smallest Phlaeothripinae. Despite their small size, several species are polymorphic, with major males differing in structure from minor males, and winged individuals differing considerably from wingless adults (Mound & Walker 1982). Two species are recorded from Taiwan, two from Indonesia, and one from Malaysia. These thrips are commonly found living on dead twigs, in association with fungi.

Diagnosis: Head broader than long (Fig. 94); interocellar and postocular setae present but small, postoculars near cheeks; mouth-cone rounded, stylets short, V-shaped, restricted to mouth-cone; antennae 8-segmented, VIII not constricted basally, III with 1 or 2 sensoria, IV with 2; pronotum usually with 3 pairs of major setae; notopleural sutures usually complete; basantra small or absent; mesopresternum narrow or reduced (Fig. 95); sternopleural sutures present; fore tarsal tooth present in male, present or absent in female; fore wings, if present, parallel-sided without duplicated cilia; pelta broad; tergites II–VII with 1 pair of wing-retaining setae; tube longer than head, anal setae much shorter than tube; male sternite VIII usually without pore plate.

Sphingothrips Ananthakrishnan
(Fig. 83)

Sphingothrips Ananthakrishnan, 1972: 115. Type species: *Dolerothrips trachypogon* Karny, by monotypy.
Amphidoxothrips Reyes, 1994: 351. Type species: *Amphidoxothrips armatus* Reyes, by monotypy. Synonymised by Bhatti, 2004: 132.

Only one species is recognized in this genus, based on a single male, as is the synonym indicated above. The shape of the head, strongly constricted to a basal neck, is similar to that of species of *Mesothrips*, but the cheeks bear stout setae on the basal third (Fig. 83). However, the structure of the female remains unknown. *Sphingothrips* is a member of the *Liothrips*-lineage, with antennal segments III–IV bearing 1 and 3 sensoria respectively, and the prosternal basantra not developed.

Diagnosis: Head longer than wide, male with cheeks sharply constricted to basal neck (Fig. 83), with several stout setae; eyes normal, postocular setae well-developed; stylets retracted to postocular setae, about one fifth of head width apart medially with maxillary bridge; antennae 8-segmented, III with 1 sensorium, IV with 3; pronotum with major setae developed, am small, notopleural sutures complete; basantra absent; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth present in male; fore wings parallel-sided, with duplicated cilia; pelta triangular; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, slightly shorter than head; male sternite VIII without pore plate.

Stephanothrips Trybom
(Fig. 90)

Stephanothrips Trybom, 1913: 42. Type species: *Stephanothrips buffai* Trybom, by monotypy.

Based originally on a species from South Africa, the 29 species included in this urothripine genus are found in many parts of the tropics and subtropics around the world. They are fungus-feeders, usually living in leaf-litter or

on dead branches. Six species are known from Malaysia, four from Southern China, three species from Thailand, three from Indonesia, and one each from the Phillipines and Nepal.

Diagnosis: Body tuberculate-reticulate, usually wingless; head longer than wide, with 1–3 pairs of prominent setae on anterior margin; postocular setae reduced; mouth-cone short and rounded, stylets retracted to eyes, close together medially; antennae 5- or 6-segmented (Fig. 90), morphological segments III–V fused, sometimes also VII and VIII; pronotum with only epim setae developed; notopleural sutures reduced; basantra present; mesopresternum reduced; sternopleural sutures absent; fore tarsal tooth absent in both sexes; abdominal tergite I transverse and closely joined to II; tergites without wing-retaining setae; tergite IX longer than broad; tube long and slender, longer than head, anal setae long, about twice as long as tube; male sternite VIII without pore plate.

Strepterothrips **Hood**
(Fig. 79)

Strepterothrips Hood, 1934: 431. Type species: *Strepterothrips conradi* Hood, by monotypy.

The nine species listed in this genus are recorded from many different parts of the world, including Florida, Africa and New Zealand. One species was described from India but is recorded from Taiwan as well as northern Australia, and one species described from Thailand is recorded from Malaysia and Singapore. The adults are usually wingless, but are sometimes common on small dead branches.

Diagnosis: Body strongly reticulate (Fig. 79); head with eyes large dorsally, but with few ommatidia ventrally; postocular setae short, capitate; maxillary stylets retracted to eyes, close together medially; antennae 7-segmented, IV–VII with narrow pedicels; III with 1 sensorium, IV with 2 sensoria; pronotal major setae short, broadly expanded; basantra reduced or absent; mesopresternum reduced to 2 small triangular sclerites; sternopleural sutures short; fore tarsi without tooth in both sexes but fore tarsal hamus large in males; fore tibia in males with small apical tubercle; fore wings, when present, constricted medially, without duplicated cilia; pelta broad in apterae, hat-shaped in macropterae; tergites II–VII each with 2 pairs of broad wing-retaining setae in macropterae; S1 setae on tergite IX broadly expanded, S2 pointed; male without sternal pore plates.

Streptothrips **Priesner**
(Fig. 96)

Streptothrips Priesner, 1932: 58. Type species: *Streptothrips mirabilis* Priesner, by monotypy.

There are 10 species listed in this genus, and these have been found in various parts of the tropics and subtropics living on dead branches (Okajima 1981). Two species are described from Indonesia, and one of these, *tibialis* Priesner, is here recorded from Guangxi, China.

Diagnosis: Head much longer than wide; postocellar and postocular setae long and bluntly pointed; mouth-cone short and rounded, stylets deeply retracted into head, close together medially; antennae 8-segmented (Fig. 96), VIII long, slightly constricted basally, III and IV broad, each with 4–12 short stout sensoria; pronotum reduced to a shield, with 2 pairs of epimeral setae, notopleural sutures complete; basantra weak; mesopresternum reduced or absent; sternopleural sutures absent; fore tarsal tooth stout in both sexes, mid- and hind tibiae with apical spur-like stout setae; fore wings, if present, with duplicated cilia; pelta broad, posterior margin eroded, sometimes into three plates; tergites without wing-retaining setae; tube shorter than head, anal setae about 1.5 times as long as apical width of tube; sternite VIII with a series of long, stout posteromarginal setae; male sternite VIII without pore plate.

Sumatrothrips **Priesner**
(Figs 110, 111)

Sumatrothrips Priesner, 1952: 196. Type species: *Sumatrothrips filiceps* Priesner, by monotypy.

The only species in this genus is based on a single female taken from *Mallotus* in Sumatra. As indicated in the original description, this is considered to be a member of the Haplothripini, but with the head and pronotum unusually elongate.

Diagnosis: Head much longer than wide (Fig. 110); eyes normal, postocular setae finely pointed and longer than length of eyes; stylets damaged in holotype; antennae 8-segmented, III with 3 sensoria, IV with 4; pronotum with 4 pairs of very long, finely pointed, major setae, am minute, epimera eroded lateral to major seta, notopleural sutures complete (Fig. 111); basantra present but weakly sclerotised; mesopresternum reduced to pair of lateral triangles; sternopleural sutures absent; fore tarsal tooth absent in female, fore femur inner margin with small blunt tubercle medially (Fig. 110); fore wings slighly constricted medially, with duplicated cilia; pelta triangular, recessed into anterior margin of tergite II; tergites II–VII with 2 pairs of sigmoid wing-retaining setae, tergite IX setae long and finely acute; tube with straight sides, shorter than head.

Terthrothrips **Karny**

(Figs 97–103)

Terthrothrips Karny, 1925: 78. Type species: *Phloeothrips sanguinolentus* Bergroth, by monotypy.

There are 26 species included in this genus, almost all described from leaf-litter in the Neotropics. However, three species are recorded from China, of which two were described from Japan, and a new species is described here from Java.

Diagnosis: Head usually longer than wide, slightly prolonged in front of eyes, cheeks incut behind eyes (Figs 97, 98); postocular setae long, capitate; mouth-cone short and rounded, stylets short, V-shaped; antennae 8-segmented (Figs 99–101), VIII constricted basally, III and IV each with 2 or 3 sensoria; pronotum with 3 or 4 slender, capitate setae, am reduced, notopleural sutures complete or nearly complete; basantra usually present; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth present in both sexes, fore tibia inner margin often with row of tubercles (Fig. 97); fore wings, if present, parallel-sided without duplicated cilia; pelta variable; tergites II–VII each with 2 pairs of wing-retaining setae (Fig. 103); tube shorter than head, anal setae much shorter than tube, about twice as long as apical width of tube; male sternite VIII without pore plate.

Terthrothrips strasseni **sp.n.**

Female hemimacroptera (holotype). Body colour light brown to brown; antenna brown with median segments slightly pale; legs largely light brown with extreme apices of mid- and hind tibiae pale; wings shaded with gray brown; major setae brownish.

Head about 1.5 times as long as wide (Fig. 98); dorsal surface weakly sculptured laterally and posteriorly; eyes equally developed dorsally and ventrally, postocular setae about as long as eyes, expanded at apex; cheeks rounded, incut just behind eyes; mouth-cone short and rounded, stylets just retracted into head, wide apart; antenna 8-segmented, segment VIII about as long as VII (Fig. 101), but shorter than VI, segments III–IV each with 1+2 sensoria, V–VI each with 1+1, VII with 1 ventrally.

Pronotum almost smooth (Fig. 98), with three pairs of major well-developed capitate setae, am and aa reduced, notopleural sutures complete; basantra present, but weak, paired ferna well-developed. Mesonotum with pair of minute lateral setae; mesopresternum slightly boat-shaped, with prospinasternum developed. Metanotum smooth with polygonal reticulation laterally, pair of median setae acute; sternopleural sutures absent. Fore tarsal tooth large, fore tibiae without tubercles on inner margin; fore wing parallel-sided, three pairs of sub-basal capitate setae almost equally developed, without duplicated cilia.

Pelta irregularly hat-shaped, indistinctly sculptured, campaniform sensilla present; tergites II–VII each with two pairs of wing-retaining setae (Fig. 103), posterior pair larger than anterior pair; tergite VIII with anterior pair of wing-retaining setae present (Fig. 103); tergite IX with posteromarginal setae S1 slightly longer than S2, expanded or blunt at apex, slightly shorter than tube, setae iS longer than half of S1, S3 shorter and acute (Fig. 103); tube shorter than head, anal setae much shorter than tube; sternites II–VIII with tramsverse row of 10–18 long discal setae (Fig. 102), VIII with pair of stout median posteromarginal setae.

Measurements (holotype female in microns). Body length 1765; head length 215, width across eyes 135, across cheeks just behind eyes 115; eye length 70, postocular setae 75; antenna length 510, segments I–VIII length (width): 45(35), 45(30), 85(25), 85(25), 82(20), 55(15), 40(15), 42(10), sensorium on segment III length 55. Pronotum median length (width) 105(200), major setae length: ml 75, epim 70, pa 75. Wing length 700, sub-basal setae: 55, 65, 65. Pelta length 75; tergite IX posteromarginal setae S1–S3 length: 90, 85, 80, iS length 65; tube length 105, basal width 55, apical width 30, anal setae length 50.

Male hemimacroptera. Very similar in color and structure to female, but smaller; tergite IX with only two pairs of long capitate or blunt posteromaginal setae [the homology of these setae is not clear, but S2 appears to be minute with S1 and S3 elongate]; sternites without pore plate.

Measurements (paratype male in microns). Body length 1460. Head length 200, width across eyes 125, across cheeks just behind eyes 110; eye length 60, postocular setae 55; antenna length 440, segments I–VIII length (width): 35(35), 40(25), 75(20), 75(25), 75(20), 45(15), 35(15), 40(10), sensorium on segment III length 40. Pronotum median length (width) 95(180), major setae length: ml 60, epim 50, pa 60. Wing length 605, sub-basal setae: 45, 50, 50. Pelta length 65; tergite IX posteromarginal setae S1–S3 length: 70, 10, 70, iS length 45; tube length 85, basal width 45, apical width 30, anal setae length 45.

Specimens studied. Holotype female, **Indonesia**, **Java**, Bogor Gardens, from leaf litter, 19.x.1973 (LAM 1124), in The Natural History Museum, London.

Paratypes: 2 females, 1 male collected with holotype; 17 females, 5 males with same data but different dates (20, 29, 31.x.1973).

Comments. This new species is very similar to *ananthakrishnani*, but it can be distinguished because the dorsal surface is almost smooth, and antennal segment VIII is shorter than VI and terminates with a very long seta (Fig. 101).The fore tibiae have no tubercles on the inner margin (Fig. 98), and setae iS between S1 and S2 on tergite IX are well-developed (Fig. 103). In contrast, in *ananthakrishnani* the dorsal surface is sculptured and reticulate, antennal segment VIII is large and longer than VI (Figs 99, 100), the fore tibiae have a series small tubercles on the inner margin, and setae iS on tergite IX are small. Furthermore, the body size of *ananthakrishnani* is much larger than that of *strasseni*. This species is named in recognition of the many years of support provided by the late Richard zur Strassen to thrips workers around the world.

Thlibothrips Priesner*

Thlibothrips Priesner, 1952: 199. Type species: *Dolerothrips atavus* Karny, by monotypy.

The seven Asian species placed in this genus are similar in structure to species of *Litotetothrips*, but are considered to be gall-inducers. Antennal segment VIII is long and slender, and some species have the posterior eye facets enlarged as in *Gemmathrips*.

Diagnosis: Head longer than wide; eyes normal, sometimes with posterior facets enlarged, postocular setae well-developed; stylets short, usually retracted to one third of head, V-shaped; antennae 8-segmented, III with 1 sensorium, IV with 2 or 3; pronotum with 4 pairs of developed setae, am reduced, sometimes aa reduced, notopleural sutures incomplete; basantra absent; mesopresternum eroded; sternopleural sutures absent; fore tarsal tooth absent in both sexes; fore wings parallel-sided, with duplicated cilia; pelta usually triangular; tergites II–VII with 2 pairs of wing-retaining setae, each posterior pair usually thicker than anterior pair; tube with straight sides, slightly shorter than head; male sternite VIII without pore plate.

Trichinothrips Bagnall
(Figs 113, 114, 116)

Trichinothrips Bagnall, 1929: 604. Type species: *Trichinothrips branderi* Bagnall, by monotypy; a synonym of *Trichaplothrips breviceps* Bagnall.

Of the eight species in this genus, five are from the Neotropics, but two are described from Malaysia and Indonesia. Female specimens from India identified as *breviceps* have been studied in ANIC.

Diagnosis: Head about as wide as long (Fig. 113); postocular setae capitate, longer than eyes; stylets wide apart; antennae 7-segmented (Fig. 114), VII sometimes with a suture ventrally, III with 2 sensoria, IV with 3; pronotum with 5 pairs of developed setae, am, aa and ml unusually close together, notopleural sutures incomplete; basantra absent; mesopresternum almost fused to mesoeusternum (Fig. 116); metanotal median setae wide apart and long, usually expanded at apex; sternopleural sutures not developed; fore tarsal tooth absent in female; fore wings parallel-sided, with few duplicated cilia; pelta recessed into anterior margin of tergite II; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides; sternite VIII without pore plate.

Urothrips Bagnall

(Fig. 33)

Urothrips Bagnall, 1909: 126. Type species: *Urothrips paradoxus* Bagnall, by monotypy.

In describing a new species from the Seychelles, Ulitzka and Mound (2014) placed as new synonyms of *Urothrips* the two generic names *Coxothrips* Bournier from Africa and Asia, and *Biconothrips* Stannard from Australia. There are now nine species listed in this genus, of which two are recorded from China by Dang and Qiao (2012) under the name *Coxothrips*, and a third species is known only from Thailand (Okajima & Urushihara 1995).

Diagnosis: Head longer than wide, slightly to strongly produced anteriorly, sometimes produced as a hump (Fig. 33); without prominent setae on vertex; eyes reduced to few distinct facets; all head setae small, usually arising from tubercles; stylets retracted to eyes, wide apart; antenna 5–8-segmented, segments III–V sometimes fused, VII–VIII sometimes fused with or without a distinct suture, sensoria on III–IV various; pronotum with irregular sculpture and numerous tubercles, most setae small and pointed, epim enlarged or blunt, notopleural suture reduced; basantra reduced or small; mesopresternum developed; fore tarsus usually with a hook-like hamus; usually apterous; pelta distinctly separated from tergite II or not; tergites reticulate strongly or weakly; setae usually small, posterolateral setae on III–VIII enlarged or blunt at tip; tergites without sigmoid wing-retaining setae; segments IX–X elongate, with 3 pairs of anal setae subequal in length.

Veerabahuthrips Ramakrishna

(Figs 92, 93)

Veerabahuthrips Ramakrishna, 1932: 277. Type species: *Veerabahuthrips bambusae* Ramakrishna, by monotypy.
Mychiothrips Haga & Okajima, 1979: 266. Type species: *Mychiothrips fruticola* Haga & Okajima, by monotypy. **Syn.n.**

Until now, this genus has comprised six Asian species that live on bamboo. One was described from India, four from Thailand of which one is recorded from Fujian, China, and the sixth from Malaysia (Okajima 1993). *Mychiothrips* was described from Japan for a single species that also was taken from bamboo and, despite sharing a wide range of character states with *Veerabahuthrips*, it was distinguished by the longer antennae, fore tibiae and postocular setae. Subsequently Okajima (1993) described a second species in *Mychiothrips*, but provided no further differences between the genera, concluding that they are "closely related". In this study, specimens of both species of *Mychiothrips* have been examined and compared with specimens of *Veerabahuthrips exilis* and *simplex* (Fig. 93), together with the descriptions of the other members of this genus. We suggest that the recorded differences between the two genera are essentially related to body size, the two species described in *Mychiothrips* being distinctly larger (body length 2.5mm or more) than the six species described in *Veerabahuthrips* (body length 2.0mm or less). Since all eight species live on bamboo plants, we consider that these thrips comprise a single radiation and thus place *Mychiothrips* as a synonym. A further species of this genus has been seen from Yunnan, China.

Diagnosis: Head much longer than wide (Figs 92, 93), slightly or strongly produced in front of eyes, cheeks usually incut just behind eyes; eyes normal, postocular setae well-developed or short; stylets short, restricted to mouth-cone, V-shaped; antennae 8-segmented, III with 2 sensoria, IV usually with 3, sometimes 2; pronotum with 3 pairs of major setae, am and aa minute, ml sometimes reduced, notopleural sutures complete; basantra absent; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth present in both sexes, fore tibiae

sometimes with some irregular tubercles on inner margin, fore femur with one or more teeth on apical half of inner margin (Figs 92, 93); fore wings weakly constricted medially, with duplicated cilia; pelta triangular or hat-shaped; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides, much shorter than head, anal setae a little longer than tube; male sternite VIII without pore plate.

Xylaplothrips Priesner
(Figs 115, 138, 139)

Haplothrips (*Xylaplothrips*) Priesner, 1928: 572. Type species: *Cryptothrips fuliginosa* Schille, by monotypy.

This genus of Haplothripini remains a taxonomic problem, although currently it includes 26 named species. Four of these are recorded from China, of which one was described from Java, Indonesia. The species placed in *Xylaplothrips* usually have three sensoria on antennal segment III and four on segment IV (Fig. 138), although the type species has only two sensoria on the third segment. Almost nothing in known of the biology of any species placed in this genus. Most are known only from a few specimens beaten from dead branches, but others have been found within galls. *Brachythrips bogoriensis* was described by Karny (1923) from a single female collected in Java. This specimen has three sensoria on antennal segment III and four on IV, the fore wings are weakly constricted medially, and the stylets are wide apart with a long slender maxillary bridge. On the basis of these three character states the species is here transferred to this genus as *Xylaplothrips bogoriensis* (Karny) **comb.n.** The specimen is severely contracted and opaque, and few details are visible, but the abdominal setae are elongate, and the fore wings lack duplicated cilia. The genus *Brachythrips* is based on a single female taken in Finland that is closely related to *Liothrips*, according to Priesner (1964a).

Diagnosis: Head a little longer than wide; eyes normal, postocular setae developed; stylets usually retracted to postocular setae, far apart, maxillary bridge present; antennae 8-segmented (Fig. 138), III usually with 3 sensoria, IV with 4; pronotum usually with 5 pairs of developed setae, sometimes am reduced, notopleural sutures complete; basantra present; mesopresternum transverse; sternopleural sutures absent; fore tarsal tooth usually present in both sexes; fore wings constricted medially, with duplicated cilia (rarely without); pelta usually trapezoidal; tergites II–VII with 2 pairs of wing-retaining setae; tube with straight sides (Fig. 139), shorter than head; male sternite VIII without pore plate.

Zelotothrips Priesner
(Fig. 121)

Zelotothrips Priesner, 1952: 200. Type species: *Cryptothrips fuscipennis* Karny, by monotypy.

The only species placed in this genus was described on both sexes from Java, Indonesia, taken in a gall on *Spatholobus*. It is a member of the *Liothrips*-lineage, but has long antennal sensoria, cheeks with stout setae and striate metanotal sculpture.

Diagnosis: Head longer than wide, cheeks with numerous stout setae (Fig. 121); eyes normal, without enlarged ommatidia, postocular setae shorter than width of an eye, arising behind inner margin of eyes; stylets about one-third of head width apart, retracted half-way to postocular setae; antennae 8-segmented, III with 1 sensorium, IV with 3, sensoria long and slender; pronotum with 5 pairs of major setae developed, aa and am smaller, notopleural sutures complete; basantra absent; mesopresternum reduced to pair of lateral triangles; sternopleural sutures present; fore tarsal tooth absent in female, present in male; fore femora of male swollen; metanotum closely striate medially; fore wings parallel-sided, with duplicated cilia; pelta triangular, slightly recessed into anterior margin of tergite II; tergites II–VII with 2 pairs of sigmoid wing-retaining setae, tergite IX setae longer than tube; tube with straight sides, slightly shorter than head.

Acknowledgements

We are particularly grateful to the following who have arranged the loan of many specimens used in this study: Andrea Hastenpflug-Vesmanis of the Senckenberg Museum, Frankfurt; Paul Brown of the Natural History Museum, London; Shuji Okajima and Masami Masumoto of Tokyo, Japan; FengChyi Lin of the Taiwan Agricultural Research Institute, Taichung; Ban-Suo Duan of Inner Mongolia Autonomous Region, China. Many thanks also are due to C.P. Liu and F.D. Yang for making microscope slides. This work was supported by National Science Funds for Distinguished Young Scientists (No. 31025024), National Science Fund for Fostering Talents in Basic Research (No. J1210002), and a grant from the Ministry of Science and Technology of the People's Republic of China (No. SQ2012FY4910058). The first author has been supported by a grant from the China Scholarship. The authors take responsibility for the accuracy of the information provided here, but are deeply grateful to the editor and three referees who provided us with detailed criticisms and corrections to an earlier draft.

References

Amyot, C.J.B. & Audinet-Serville, J.G. (1843) *Histoire Naturelle des Insectes*. *Hémiptères*. Librairie Encyclopédique de Roret, Paris, 20 pp.

Ananthakrishnan, T.N. (1957) *Bamboosiella* nov.gen. (Phlaeothripidae, Tubulifera) from India. *Entomological News*, 68, 65–68.

Ananthakrishnan, T.N. (1972) Further studies on Indian Gall Thrips. *Marcellia*, [1971], 37 (3), 111–127.

Ananthakrishnan, T.N. (1976) Studies on *Mesothrips* (Thysanoptera: Tubulifera). *Oriental Insects*, 10, 185–214. http://dx.doi.org/10.1080/00305316.1976.10434905

Ananthakrishnan, T.N. (1964) Thysanopterologica Indica II. *Entomologisk Tidskrift*, 85, 218–235.

Ananthakrishnan, T.N. (1968) Studies on new and little known Indian Thysanoptera. *Oriental Insects*, 1, 113–138. http://dx.doi.org/10.1080/00305316.1967.10433856

Ananthakrishnan, T.N. (1969) Mycophagous Thysanoptera - II. *Oriental Insects*, 3, 289–299. http://dx.doi.org/10.1080/00305316.1969.10433918

Ananthakrishnan, T.N. & Sen, S. (1980) Taxonomy of Indian Thysanoptera. *Zoological Survey of India (Handbook Series)*, 1, 1–234.

Ashmead, W.H. (1905) A new thrips from the Philippine Islands. *Entomological News*, 16, 20.

Bagnall, R.S. (1908) On some new genera and species of Thysanoptera. *Transactions of the Natural History Society of Northumberland*, 3, 183–217.

Bagnall, R.S. (1909) Synonymical notes; with a description of a new genus of Thysanoptera. *Annals de la Societe entomologique de Belge*, 52, 348–352.

Bagnall, R.S. (1915) On a collection of Thysanoptera from the West Indies, with descriptions of new genera and species. *Journal of the Linnean Society Zoology*, 32, 495–507. http://dx.doi.org/10.1111/j.1096-3642.1915.tb01871.x

Bagnall, R.S. (1918) Brief descriptions of new Thysanoptera IX. *Annals and Magazine of Natural History*, Series 9, 1, 201–221.

Bagnall, R.S. (1929) A new thrips-gall on Ironwood (Messua ferrea) and its inhabitants. *Annals and Magazine of Natural History*, Series 10, 3, 601–606. http://dx.doi.org/10.1080/00222932908673016

Bhatti, J.S. (1967) Thysanoptera nova Indica. Published by the author, Delhi, 24 pp.

Bhatti, J.S. (1979) Studies in some haplothripine forms. *Nouvelle Revue d'Entomologie*, 9, 305–311.

Bhatti, J.S. (1992) The Order Tubulifera (Insecta): Its characters and classification into families. *Zoology (Journal of Pure and Applied Zoology)*, 3, 127–162.

Bhatti, J.S. (1993) List of world genera of the order Tubulifera (Insecta). *Zoology (Journal of Pure and Applied Zoology)*, 3, 241–271.

Bhatti, J.S. (1995) Studies on some Phlaeothripidae (Insecta: Tubulifera). *Zoology (Journal of Pure and Applied Zoology)*, 5, 97–110.

Bhatti, J.S. (1998) New structural features in the Order Tubulifera (Insecta). 1. Amalgamation of labro-maxillary complex with cranium and other cephalic structures. *Zoology (Journal of Pure and Applied Zoology)*, 5, 147–176.

Bhatti, J.S. (2004) T.N.Ananthakrishnan's taxa of Thysanoptera 1950 to 1980. *Thysanoptera*, 2, 85–181.

Brethes (1915) Descripcion un de genera nuevo y una nueva especie de "Tisanoptero" de la republica Argentina. *Anales del Museo Nacional de Historia Natural de Buenos Aires*, 27, 89–92.

Buckman, R.S., Mound, L.A. & Whiting, M.F. (2013) Phylogeny of thrips (Insecta: Thysanoptera) based on five molecular loci. *Systematic Entomology*, 38, 123–133. http://dx.doi.org/10.1111/j.1365-3113.2012.00650.x

Cao, S.J. & Feng, J.N. (2011) A newly recorded species of the Genus *Cephalothrips* Uzel (Thysanoptera: Phlaeothripidae) from China. *Entomotaxonomia*, 33 (3), 192–194.
Chen, L.S. (1980) Thrips associated with Mulberry plant (*Morus* sp.) in Taiwan. *Proceedings of the National Science Council (Taiwan)*, 4, 169–182.
Collins, D.W. (2000) A new genus and species of haplothripine thrips (Thysanoptera: Phlaeothripidae) with a prominent dorsal projection from the head. *Insect Systematics and Evolution*, 31, 285–289. http://dx.doi.org/10.1163/187631200x00048
Crawford, J.C. (1948) A new genus of Urothripidae from Guatemala. *Proceedings of the Entomological Society of Washington*, 50, 39–40.
Crespi, B.J. (1988) Adaptation, compromise and constraint: the development, morphometrics and behavioral basis of a fighter-flier polymorphism in male *Hoplothrips karnyi*. *Behavioral Ecology and Sociobiology*, 23, 93–104. http://dx.doi.org/10.1007/bf00299892
Crespi, B.J., Morris, D.C. & Mound, L.A. (2004) *Evolution of ecological and behavioural diversity: Australian Acacia thrips as model organisms*. Australian Biological Resources Study, Canberra & Australian National Insect Collection, Canberra, 328 pp.
Dang, L.H. & Qiao, G.X. (2012) First record of the genus *Coxothrips* Bournier from China with two new record species (Thysanoptera, Phlaeothripidae, Phlaeothripinae). *Acta Zootaxonomica Sinica*, 37 (4), 889–893.
Dang, L.H. & Qiao, G.X. (2013a) First record of the genus *Sinuothrips* Collins in Phlaeothripinae (Thysanoptera: Phlaeothripidae) from China. *Acta Zootaxonomica Sinica*, 38 (2), 427–431.
Dang, L.H. & Qiao, G.X. (2013b) Review of the spore-feeding Idolothripinae from China (Thysanoptera, Phlaeothripidae). *Zookeys*, 345, 1–28. http://dx.doi.org/10.3897/zookeys.345.6167
Dang, L.H., Mound, L.A. & Qiao, G.X. (2013) Leaf-litter thrips of the genus *Adraneothrips* from Asia and Australia (Thysanoptera, Phlaeothripinae). *Zootaxa*, 3716 (1), 1–21. http://dx.doi.org/10.11646/zootaxa.3716.1.1
Eow, L.X., Mound, L.A. & Ng, Y.F. (2011) Genera of Spore-Feeding Thysanoptera from Southeast Asia (Phlaeothripidae, Idolothripinae), with a species checklist from Peninsular Malaysia. *Zootaxa*, 2928, 1–19.
Feng, J.N., Guo, F.Z. & Duan, B.S. (2006) A new species of the genus *Oidanothrips* Moulton from China (Thysanoptera, Phlaeothripidae). *Acta Zootaxonomica Sinica*, 31 (1), 165–167.
Franklin, H.J. (1909) On Thysanoptera. *Entomological News*, 20, 228–231.
Haga, K. & Okajima, S. (1979) A new phlaeothripine genus and species (Thysanoptera, Phlaeothripidae) from Japan. *Annotationes zoologicae Japonensis*, 52, 266–271.
Haga, K. & Okajima, S. (1983) A new genus and species of Phlaeothripidae (Thysanoptera) harmful to Persimmon from Japan. *Annotationes zoologicae Japan*, 56, 241–245.
Haliday, A.H. (1836) An epitome of the British genera in the Order Thysanoptera with indications of a few of the species. *Entomological Magazine*, 3, 439–451.
Han, Y.F. (1988) Thysanoptera: Aeolothripidae, Thripidae, Phlaeothripidae. *In*: Huang, F.-S. (Eds.) *Insects of Mt. Namjagbarwa Region of Xizang*. Science Press, Beijing, pp. 177–191.
Han, Y.F. (1997) *Economic Insect Fauna of China. 55 Thysanoptera*. Editorial Committee of Fauna Sinica, Science Press, Beijing, 514 pp.
Han, Y.F., Cui, Y.Q., Hu, X.G. & Cui, W.Q. (1991) Two new species of Phlaeothripids from Hengduan Mountains, China. *Acta Entomologica Sinica*, 34, 337–340.
Hoddle, M.S., Mound, L.A. & Paris, D.L. (2012) *Thrips of California 2012*. Available from: http://www.lucidcentral.org/keys/v3/thrips_of_california/Thrips_of_California.html (accessed 25 March 2014)
Hood, J.D. (1908) New genera and species of Illinois Thysanoptera. *Bulletin of the Illinois State Laboratory of Natural History*, 8, 361–379.
Hood, J.D. (1912) Descriptions of new North American Thysanoptera. *Proceedings of the Entomological Society of Washington*, 14, 129–160.
Hood, J.D. (1913) Two new Thysanoptera from Porto Rico. *Insecutor inscitiae menstruus*, 1, 65–70.
Hood, J.D. (1915) *Hoplothrips corticis*: a problem in nomenclature. *The Entomologist*, 1915, 102–107.
Hood, J.D. (1919) On some new Idolothripidae (Thysanoptera). *Insecutor inscitiae menstruus*, 7, 66–74.
Hood, J.D. (1925) New neotropical Thysanoptera collected by C.B. Williams. *Psyche*, 32, 48–69. http://dx.doi.org/10.1155/1925/38498
Hood, J.D. (1934) New Thysanoptera from Panama. *Journal of the New York Entomological Society*, 41, 407–434.
Hood, J.D. (1938) Studies in Neotropical Thysanoptera VIII. *Revista de Entomologia*, 9, 404–426.
Hood, J.D. (1939) New north American Thysanoptera, principally from Texas. *Revista de Entomologia*, 10, 550–619.
Hood, J.D. (1957) New Brazilian Thysanoptera. *Proceedings of the Biological Society of Washington*, 70, 129–180.
Hood, J.D. & Williams, C.B. (1925) New neotropical Thysanoptera collected by C.B. Williams. *Psyche*, 32, 48–69. http://dx.doi.org/10.1155/1925/38498
Karny, H. (1911a) Neue Phloeothripiden-Genera. *Zoologische Anzieger*, 38, 501–504.
Karny, H. (1911b) Über Thrips-Gallen und Gallen-Thripse. *Zentralblatt fur Bakteriologie, Parasitenkunde,*

Infektionskrankheiten und Hygiene. Abteilung II, 30, 556–572.
Karny, H. (1912a) Revision der von Serville aufgestellten Thysanopteren-Genera. *Zoologische Annalen*, 4, 322–344.
Karny, H. (1912b) Gallenbewohnende Thysanopteren aus Java. *Marcellia*, 1, 115–169.
Karny, H. (1912c) Zwei Neue javanische Physapoden-Genera. *Zoologischer Anzieger*, 40, 297–301.
Karny, H. (1913) Beiträge zur Kenntnis der Gallen von Java 5. Über die javanischen Thysanopteren-cecidien und deren Bewohner. *Bulletin du Jardin Botanique de Buitenzorg*, 10, 1–126.
Karny, H. (1920) Nova Australska Thysanoptera, jez nashbiral Mjöberg. *Casopis Ceskoslovenské spolecnosti entomologiscké*, 17, 35–44.
Karny, H. (1922a) Zorapteren aus Süd-Sumatra. *Treubia*, 3, 14–37.
Karny, H. (1922b) Thysanoptera from Siam and Indo-China. *Journal of the Siam Society*, 16, 91–153.
Karny, H. (1923) Beitrage zur Malayischen Thysanopterenfauna VI. Malayische Rindenthripse, gessammelt von Dr. N.A. Kemner. VII. Gallenbewohnende Thysanopteren von Celebes und den Inseln südlich davon, gesammelt von Herrn W. Doctors v. Leeuwen. VIII. Ueber die tiergeographischen Beziehungen der malayischen Thysanopteren. *Treubia*, 3, 277–380.
Karny, H. (1925) Über *Phlaeothrips sanguinolentus* Bergroth nebst einer Revision der Diceratothripinen-Genera. *Notulae entomologicae*, 5, 77–84.
Kudo, I. (1974) Some graminivorous and gall forming Thysanoptera of Taiwan. *Kontyu*, 42, 110–116.
Kudo, I. (1994) Further notes on the genus *Litotetothrips* (Thysanoptera: Phlaeothripidae). *Insecta matsumurana*, 50, 53–78.
Kudo, I. (1995) Some Panchaetothripinae from Nepal, Malaysia and the Philippines (Thysanoptera: Terebrantia: Thripidae). *Insecta Matsumurana*, New series 52, 81–103.
Kudo, I. (1997) Malaysian Hydatothrips with some species from neighboring areas (Thysanoptera, Terebrantia, Thripidae). *Japanese Journal of Systematic Entomology*, 3, 325–365.
MacKinnon, K. & Phillipps, K. (1993) *A Field Guide to the Birds of Borneo, Sumatra, Java and Bali*. Oxford University Press, 491 pp.
Minaei, K. (2013) The *Phlaeothrips*-lineage of fungus feeding thrips (Thysanoptera: Phlaeothripidae) in Iran with a new species of *Hindsiothrips*. *Zootaxa*, 3599 (3), 279–290.
http://dx.doi.org/10.11646/zootaxa.3599.3.5
Minaei, K., Azemayeshfard, P. & Mound, L.A. (2007) The southern Palaearctic genus *Neoheegeria* (Thysanoptera: Phlaeothripidae): redefinition and key to species. *Tijdschrift voor Entomologie*, 150, 55–64.
http://dx.doi.org/10.1163/22119434-900000212
Mirab-balou, M., Tong, X.L., Feng, J.N. & Chen, X.X. (2011) Thrips (Insecta: Thysanoptera) of China. *Checklist*, 7 (6), 720–744.
Mirab-balou, M. & Chen, X.X. (2010) A new method for preparing and mounting thrips for microscopic examination. *Journal of Environmental Entomology*, 32 (1), 115–121.
Morgan, A.C. (1913) New genera and species of Thysanoptera with notes on distribution and food plants. *Proceedings of the United States National Museum*, 46, 1–55.
http://dx.doi.org/10.5479/si.00963801.46-2008.1
Moulton, D. (1944) Thysanoptera of Fiji. *Occasional Papers of the Bishop Museum*, 17, 267–311.
Mound, L.A. (1970) Thysanoptera from the Solomon Islands. *Bulletin of the British Museum (Natural History) Entomology*, 24, 83–126.
Mound, L.A. (1972) Species complexes and the generic classification of leaf-litter thrips of the Tribe Urothripini (Phlaeothripidae). *Australian Journal of Zoology*, 20, 83–103.
http://dx.doi.org/10.1071/zo9720083
Mound, L.A. (1974) *Andrethrips floydi* - a remarkable new Thysanopteron. *Journal of Entomology*, 43, 109–113.
http://dx.doi.org/10.1111/j.1365-3113.1974.tb00095.x
Mound, L.A. (1989) Systematics of thrips (Insecta: Thysanoptera) associated with mosses. *Zoological Journal of the Linnean Society*, 96, 1–17.
http://dx.doi.org/10.1111/j.1096-3642.1989.tb01818.x
Mound, L.A. (2002) *Zemiathrips*; a new genus of fungus-feeding phlaeothripine Thysanoptera in Australian leaf-litter. *Australian Journal of Entomology*, 41, 209–215.
http://dx.doi.org/10.1046/j.1440-6055.2002.00296.x
Mound, L.A. (2004) Australian long-tailed gall thrips (Thysanoptera, Phlaeothripinae, Leeuweniini), with comments on related Old World taxa. *Australian Journal of Entomology*, 43, 36–45.
http://dx.doi.org/10.1111/j.1440-6055.2004.00406.x
Mound, L.A. (2008) Identification and host associations of some Thysanoptera Phlaeothripinae described from Australia pre-1930. *Zootaxa*, 1714, 41–60.
Mound, L.A. (2013a) Homologies and host-plant specificity: recurrent problems in the study of thrips. *Florida Entomologist*, 96 (2), 318–322.
http://dx.doi.org/10.1653/024.096.0250
Mound, L.A. (2013b) Species diversity in the Palaeotropical leaf-litter genus *Apelaunothrips* (Thysanoptera, Phlaeothripinae). *Zootaxa*, 3741 (1), 181–193.

http://dx.doi.org/10.11646/zootaxa.3741.1.7
Mound, L.A. & Azidah, A.A. (2009) Species of the genus *Thrips* (Thysanoptera) from Peninsular Malaysia, with a checklist of recorded Thripidae. *Zootaxa*, 2023, 55–68.
http://dx.doi.org/10.1111/j.1440-6055.1998.tb01535.x
Mound, L.A., Crespi, B.J. & Tucker, A. (1998) Polymorphism and kleptoparasitism in thrips (Thysanoptera: Phlaeothripidae) from woody galls on *Casuarina* trees. *Australian Journal of Entomology*, 37, 8–16.
Mound, L.A., Dang, L.H. & Tree, D.J. (2013) Genera of fungivorous Phlaeothripinae (Thysanoptera) from dead branches and leaf-litter in Australia. *Zootaxa*, 3681 (3), 201–224.
http://dx.doi.org/10.11646/zootaxa.3681.3.1
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 insects of the *Haplothrips* lineage (Thysanoptera - Phlaeothripinae). *Journal of Natural History*, 41 (45–48), 2919–2978.
http://dx.doi.org/10.1080/00222930701783219
Mound, L.A. & Ng, Y.F. (2009) An illustrated key to the genera of Thripinae (Thysanoptera) from South East Asia. *Zootaxa*, 2265, 27–47.
Mound, L.A. & Palmer, J.M. (1983a) The generic and tribal classification of spore-feeding Thysanoptera (Phlaeothripidae: Idolothripinae). *Bulletin of the British Museum (Natural History)*, *Entomology*, 46, 1–174.
Mound, L.A. & Palmer, J.M. (1983b) An enigmatic fungus-feeding Thysanopteran from Singapore. *Systematic Entomology*, 8 (4), 421–424.
http://dx.doi.org/10.1111/j.1365-3113.1983.tb00492.x
Mound, L.A. & Tree, D.J. (2013) Fungus-feeding thrips from Australia in the worldwide genus *Hoplandrothrips* (Thysanoptera, Phlaeothripinae). *Zootaxa*, 3700 (3), 476–494.
http://dx.doi.org/10.11646/zootaxa.3700.3.8
Mound, L.A. & Walker, A.K. (1982) Evolutionary significance and generic classification of the Williamsiellina (Thysanoptera: Phlaeothripidae). *Systematic Entomology*, 7, 347–355.
http://dx.doi.org/10.1111/j.1365-3113.1982.tb00451.x
Mound, L.A. & Walker, A.K. (1986) Tubulifera (Insecta: Thysanoptera). *Fauna of New Zealand*, 10, 1–140.
Mound, L.A., Wheeler, G. & Williams, D.A. (2010) Resolving cryptic species with morphology and DNA; thrips as a potential biocontrol agent of Brazilian peppertree, with a new species and overview of *Pseudophilothrips* (Thysanoptera). *Zootaxa*, 2432, 59–68.
Nasruddin, A. & Mound, L.A. (2012) Seasonal abundance and biology of *Crotonothrips polyalthiae* (Thysanoptera: Phlaeothripidae), and its damage to a shade tree, *Polyalthia longifolia*. *Florida Entomologist*, 95, 610–616.
http://dx.doi.org/10.1653/024.095.0311
Ng, Y.F., Eow, L.X. & Mound, L.A. (2010) A new species of genus *Thrips* (Thysanoptera, Thripinae) from flowers in Peninsular Malaysia. *Zootaxa*, 2638, 65–68.
Okajima, S. (1978a) Notes on the Thysanoptera from Southeast Asia II. A new species of the genus *Veerabahuthrips* (Phlaeothripidae). *Kontyu*, 46, 165–168.
Okajima, S. (1978b) Notes on the Thysanoptera from Southeast Asia IV. A new genus and two new species of the tribe Hyidiothripini (Phlaeothripidae). *Kontyu*, 46, 539–548.
Okajima, S. (1981) A revision of the tribe Plectrothripini of fungus-feeding Thysanoptera (Phlaeothripidae: Phlaeothripinae). *Systematic Entomology*, 6, 291–336.
http://dx.doi.org/10.1111/j.1365-3113.1981.tb00441.x
Okajima, S. (1983) Four new species of *Ecacanthothrips* from the Oriental region (Thysanoptera, Phlaeothripidae). *Kontyu*, 51, 56–65.
Okajima, S. (1984) Apelaunothripini from the Philippines (Thysanoptera: Phlaeothripidae). *Journal of Natural History*, 18, 717–738.
http://dx.doi.org/10.1080/00222938400770611
Okajima, S. (1987a) Studies on the old world species of *Holothrips* (Thysanoptera, Phlaeothripidae). *Bulletin of the British Museum (Natural History), Entomology*, 54, 1–74.
Okajima, S. (1987b) The genus *Sophiothrips* (Thysanoptera, Phlaeothripidae) from eastern Asia, with descriptions of two new species. *Kontyu*, 55, 549–558.
Okajima, S. (1987c) Some Thysanoptera from the East Kalimantan, Borneo, with descriptions of a new genus and five new species. *Transactions of the Shikoku Entomological Society*, 18, 289–299.
Okajima, S. (1988a) Studies on the genus *Crinitothrips* (Thysanoptera, Phlaeothripidae), with descriptions of two new species. *Kontyu*, 56, 465–473.
Okajima, S. (1988b) The genus *Phylladothrips* (Thysanoptera, Phlaeothripinae) from east Asia. *Kontyu*, 54, 706–722.
Okajima, S. (1989a) Five new species of the genus *Stephanothrips* (Thysanoptera, Phlaeothripidae) from Southeast Asia, with a key to the East Asian species. *Japanese Journal of Entomology*, 57, 25–36.
Okajima, S. (1989b) The genus *Deplorothrips* Mound & Walker (Thysanoptera, Phlaeothripidae) from eastern Asia, with descriptions of six new species. *Japanese Journal of Entomology*, 57, 241–256.

Okajima, S. (1993) Bamboo inhabiting genera *Mychiothrips* and *Veerabahuthrips* (Thysanoptera, Phlaeothripidae) from Asia. *Japanese Journal of Entomology*, 61, 723–736.
Okajima, S. (1995a) The genus *Hyidiothrips* Hood (Thysanoptera, Phlaeothripidae) from east Asia. *Japanese Journal of Entomology*, 63, 167–180.
Okajima, S. (1995b) A revision of the bamboo- and grass-inhabiting genus *Bamboosiella* Ananthakrishnan (Thysanoptera, Phlaeothripidae) I & II. *Japanese Journal of Entomology*, 63, 303–321, 469–484.
Okajima, S. (1997) The genus *Alerothrips* (Thysanoptera, Phlaeothripidae), with descriptions of two new species from Thailand. *Japanese Journal of Entomology*, 65, 773–783.
Okajima, S. (1998a) The genus *Andrethrips* (Thysanoptera: Phlaeothripidae), with description of a new species. *Entomological Science*, 1, 71–76.
Okajima, S. (1998b) Minute leaf-litter thrips of the genus *Preeriella* (Thysanoptera, Phlaeothripidae) from Asia. *Species Diversity*, 3, 301–316.
Okajima, S. (1999a) The Oriental genus *Ablemothrips* (Thysanoptera: Phlaeothripidae), and sexual dimorphism in the postocular setae. *Entomological Science*, 2, 257–263.
Okajima, S. (1999b) The significance of stylets length in Thysanoptera, with a revision of *Oidanothrips* (Phlaeothripidae), an Old World genus of large fungus-feeding species. *Entomological Science*, 2, 265–279.
Okajima, S. (2006) *The Insects of Japan. Vol. 2. The suborder Tubulifera (Thysanoptera)*. Touka Shobo Co Ltd., Fukuoka, 720 pp.
Okajima, S. & Urushihara, H. (1995) Descriptions of four new urothripine species (Thysanoptera, Phlaeothripidae) from south east Asia. *Japanese Journal of Systematic Entomology*, 1, 27–34.
Okajima, S. & Urushihara, H. (1995) Studies on some *Stephanothrips* species (Thysanoptera: Phlaeothripidae) from Southeast Asia. *Japanese Journal of Systematic Entomology*, 1, 227–233.
Palmer, J.M. & Mound, L.A. (1978) Nine genera of fungus-feeding Phlaeothripidae (Thysanoptera) from the Oriental Region. *Bulletin of the British Museum (Natural History) Entomology*, 37, 153–215.
Palmer, J.M. & Mound, L.A. (1991) Thysanoptera. Chapter 2.2.5 *In*: Rosen, D. (Ed.), *The Armoured Scale Insects, Their Biology, Natural Enemies and Control. Vol. B*. Amsterdam, pp. 67–76.
Priesner, H. (1919) Zur Thysanopteren-Fauna Albaniens. *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften*, 128, 115–144.
Priesner, H. (1921) *Haplothrips*-Studien. *Treubia*, 2, 1–20.
Priesner, H. (1926) Die Jugendstadien der malayischen Thysanopteren. *Treubia*, 8 (suppl), 1–264.
Priesner, H. (1928) *Die Thysanopteren Europas. Abteilung IV*. Wien: F. Wagner Verlag. pp. 569–755.
Priesner, H. (1929a) Indomalayische Thysanopteren I. *Treubia*, 10, 447–462.
Priesner, H. (1929b) Spolia Metawiensia: Thysanoptera. *Treubia*, 11, 187–210.
Priesner, H. (1932) Indomalayische Thysanopteren IV [Teil 1]. *Konowia*, 11, 49–64.
Priesner, H. (1933a) Contributions towards a knowledge of the Thysanoptera of Egypt, VIII. *Bulletin de la Societe Royale entomologique d'Egypte*, 17, 1–7.
Priesner, H. (1933b) Indomalayische Thysanopteren IV [Teil 2]. *Konowia*, 12 (1–2), 69–85.
Priesner, H. (1940) Thysanopterologica IX. *Philippine Journal of Science*, 71, 403–409.
Priesner, H. (1949) Genera Thysanopterorum. Keys for the identification of the genera of the order Thysanoptera. *Bulletin de la Societe Royale entomologique d'Egypte*, 33, 31–157.
Priesner, H. (1952) On some new genera and species of Thysanoptera from the Oriental region. *Indian Journal of Entomology*, 13, 183–200.
Priesner, H. (1953) On the genera allied to *Liothrips* of the Oriental fauna, I. (Thysanoptera). *Treubia*, 22, 357–380.
Priesner, H. (1961) Das System der Tubulifera (Thysanoptera). *Anzeiger mathematisch-naturwissenschaftliche Klasse, Österreichische Akademie der Wissenschaften*, [1960] 13, 283–296.
Priesner, H. (1964a) Ordnung Thysanoptera (Fransenflügler, Thripse). in Franz H, *Bestimmungsbücher zur Bodenfauna Europas*, 2, 1–242.
Priesner, H. (1964b) A monograph of the Thysanoptera of the Egyptian deserts. *Publications de l'Institut Desert d'Egypte*, 13, 1–549.
Priesner, H. (1968) On the genera allied to *Liothrips* of the Oriental fauna II (Insecta-Thysanoptera). *Treubia*, 27, 175–285.
Priesner, H. & Seshadri, A.R. (1952) Some new Thysanoptera from South India. *Indian Journal of agricultural Sciences*, 22, 405–411.
Ramakrishna, T.V. (1932) A new genus and species of Thysanoptera from South India. *Records of the Indian Museum*, 34, 277–279.
Reyes, C.P. (1994) Thysanoptera (Hexapoda) of the Philippine Islands. *The Raffles Bulletin of Zoology*, 42, 107–507.
Reyes, C.P. (1996) Three new species of *Gynaikothrips* Zimmermann (Thysanoptera: Tubulifera) from the Philippines. *Aguinaldo College Journal*, 1 (1), 109–123.
Ritchie, J.M. (1974) A revision of the grass-living genus *Podothrips* (Thysanoptera: Phlaeothripidae. *Journal of Entomology* (B), 43, 261–282.
http://dx.doi.org/10.1111/j.1365-3113.1975.tb00135.x
Sartiami, D. & Mound, L.A. (2013) Identification of the terebrantian thrips (Insecta, Thysanoptera) associated with cultivated

plants in Java, Indonesia. *Zookeys*, 306, 1–21.
http://dx.doi.org/10.3897/zookeys.306.5455
Stannard, L.J. (1957) The phylogeny and classification of the North American genera of the sub-order Tubulifera (Thysanoptera). *Illinois Biological Monographs*, 25, 1–200.
Stannard, L.J. (1968) The Thrips, or Thysanoptera, of Illinois. *Bulletin of the Illinois Natural History Survey*, 29, 213–552.
ThripsWiki (2014) *ThripsWiki - providing information on the World's thrips*. Available from: http://thrips.info/wiki/Main_Page (accessed 23 January 2014)
Tree, D.J. (2010) Intrapopulation Variation in an Australian Population of the North American Thrips, *Bagnalliella yuccae* (Thysanoptera: Phlaeothripidae), A New Record from Australia. *Florida Entomologist*, 93, 346–351.
http://dx.doi.org/10.1653/024.093.0304
Tree, D.J. & Mound, L.A. (2009) Gall-induction by an Australian insect of the family Thripidae (Thysanoptera: Terebrantia). *Journal of Natural History*, 43, 1147–1158.
http://dx.doi.org/10.1080/00222930902807767
Tree, D.J. & Walter, G.H. (2009) Diversity of host plant relationships and leaf galling behaviours within a small genus of thrips – *Gynaikothrips* and *Ficus* in south east Queensland. *Australian Journal of Entomology*, 48, 269–275.
http://dx.doi.org/10.1111/j.1440-6055.2009.00706.x
Tree, D.J. & Walter, G.H. (2012) Diversity and abundance of fungivorous thrips (Thysanoptera) associated with leaf-litter and bark across forest types and two tree genera in subtropical Australia. *Journal of Natural History*, 46, 2897–2918.
http://dx.doi.org/10.1080/00222933.2012.737037
Trybom, F. (1913) Physapoden aus natal und dem Zululande. *Arkiv för Zoologi*, 7 (33), 1–52.
Tyagi, K. & Kumar, V. (2011) The Indian species of *Liophloeothrips* Priesner (Thysanoptera, Phlaeothripidae) with one new species. *Zootaxa*, 2803, 21–31.
Ulitzka, M.R. & Mound, L.A. (2014) New generic synonyms in the Palaeotropical genus *Urothrips* (Thysanoptera: Phlaeothripinae) with one new species from Seychelles. *Zootaxa*, 3755 (6), 595–600.
http://dx.doi.org/10.11646/zootaxa.3755.6.6
Uzel, H. (1895) *Monographie der Ordnung Thysanoptera*. Königratz, Bohemia. Pp 1–472.
Wang, C.L. (1996) Morphological characteristics, development and fecundity of *Haplothrips chinensis* Priesner (Thysanoptera: Phlaeothripidae). *Plant Protection Bulletin Taiwan*, 38, 191–202.
Wang, J., Tong, X.L. & Zhang, W.Q. (2007) The genus *Psalidothrips* Priesner in China (Thysanoptera: Phlaeothripidae) with three new species. *Zootaxa*, 1642, 23–31.
Watson, J.R. (1923) Synopsis and catalog of the Thysanoptera of North America. *Bulletin of the Agricultural Experiment Station, University of Florida*, 168, 1–100.
Zhang, H.R., Okajima, S. & Mound, L.A. (2006) Collecting and slide preparation methods of thrips. *Chinese Bulletin of Entomology*, 43 (5), 725–728.
Zhang, W.Q. (1984) Preliminary note on Thysanoptera collected from Hainan Island, Guangdong, China. III. Subfamily: Phlaeothripinae (Thysanoptera: Phlaeothripidae). *Journal of South China Agricultural University*, 5 (3), 15–27.
Zhang, W.Q. & Tong, X.L. (1994) Checklist of thrips (Insecta: Thysanoptera) from China. *Zoology (Journal of Pure and Applied Biology)*, 4, 409–443.
Zhang, W.Q., Tong, X.L., Luo, X.N. & Zhuo, W.X. (1999) Thysanoptera. *In*: Huang, B.K. (Ed.), *Fauna of Insects in Fujian Province of China*. *Vol. I*. Science & Technology Publisher of Fujian, Fuzhou, pp. 347–395.
Zimmermann, A. (1900) Ueber einige javanische Thysanoptera. *Bulletin de l'Institut botanique de Buitenzorg*, 7, 6–19.
Zur Strassen, R. (1994) Some reflections on the composition of the thrips fauna (Insecta: Thysanoptera) of Bali (Indonesia) along the biogeographical Bali-Lombok line. *Courier Forschungsinstitut Senckenberg*, 178, 33–48.