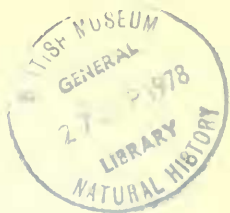


# Nine genera of fungus-feeding Phlaeothripidae (Thysanoptera) from the Oriental Region

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## Synopsis

Revisions are given of nine genera with 65 species mainly from the Oriental Region. One of these, *Ecacanthothrips* (6 species), belongs in the Phlaeothripinae; the rest are all Idolothripinae, *Aesthesiothrips* (1 species), *Diaphorothrips* (3 species), *Dinothrips* (5 species), *Elaphrothrips* (17 Oriental species), *Machatothrips* (14 species including 3 from Africa), *Mecynothrips* (13 species), *Meiothrips* (3 species), *Malesiathrips* (3 species). A check-list is provided summarizing the nomenclatorial changes, which include one new genus, six new species, 41 new specific synonyms and 10 new generic synonyms.

## Introduction

The thrips species which feed on fungi associated with freshly dead twigs and branches are amongst the largest and most spectacular insects in the order Thysanoptera. Many are large in size, up to 15 mm long, and many exhibit extraordinary patterns of allometric growth and of sexual dimorphism. However, much of the early taxonomic work on these species was carried out before the significance of structural variation and its relationship to body size was fully appreciated.

Recent collections by one of the authors (L. A. Mound) in Malaya and Java have facilitated a reassessment of the species criteria which are current in such complex genera as *Elaphrothrips* and *Ecacanthothrips*. In these two genera in particular, species are variable in structure, widespread in distribution and relatively abundant. In contrast the species of *Machatothrips* are less variable, more localized and relatively infrequent, and these species are peculiarly difficult to define. It seems likely that the different patterns of speciation in these genera are related to different patterns of activity of the individuals, but how a taxonomist should interpret such differences in terms of names is at present very much a matter of opinion.

The revisions given here concern one genus of Phlaeothripinae and eight genera of Idolothripinae; these include all the common species of large Thysanoptera which are found in this habitat in the Oriental region. It is intended to re-examine the generic classification of the Idolothripinae elsewhere, but such a study must be built on a sound knowledge of the variation within and between species. For example, *Mecynothrips* is used here to include a group of 12 species which have been divided previously between five genera and two subgenera. A study of the variation within and between these species has indicated that large and small males of certain species would be placed in separate genera using traditional criteria, but that it is almost impossible to distinguish between the females at species level. This process of reassessment of taxonomic criteria must needs involve not only recently collected specimens but also the type-material of earlier described species. In this paper all the material which has been studied is detailed, and in the few instances where type-specimens were not available the species concerned are not dealt with in the keys but are merely listed in the text. This approach probably explains the difference in interpretation of certain names, particularly in *Elaphrothrips*, between the present work and that of other recent authors.

### Acknowledgements and depository abbreviations

This revisionary study has been carried out with the cooperation of numerous colleagues who are responsible for collections in other institutes and museums. The authors are very grateful to the following for loans of material; depository abbreviations used in the text are given in parentheses. Professor T. N. Ananthakrishnan, Director, Zoological Survey of India, Calcutta (TNA); Paul H. Arnaud, California Academy of Sciences, San Francisco (CAS); E. Dahms, Queensland Museum, Brisbane (QM); C. F. Jacot-Guillarmod, Albany Museum, Grahamstown (JG); A. Kaltenbach, Naturhistorisches Museum, Wien (NM); I. Kudo, Shizuoka Seikogakuin, Oshika, Japan; Madame D. Mathilde-Ferrero, Muséum National d'Histoire Naturelle, Paris (MNHN); Shuji Okajima, Tokyo University of Agriculture (SO, Tokyo); Kellie O'Neill, U.S.D.A., Beltsville, Maryland (USNM); M. Suwa, Faculty of Agriculture, Hokkaido University, Sapporo (HUS); R. zur Strassen, Senckenberg Museum, Frankfurt (SMF).

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### Check-list of the species discussed in this paper

#### Subfamily PHLAEOTHIRIPINAE Uzel

##### *ECACANTHOTHRIPS* Bagnall, 1909

- Ormothrips* Buffa, 1909
- andrei* sp. n.
- coniger* Priesner, 1930
- inarmatus* Kurosawa, 1932
- piceae* Ishida, 1936 syn. n.
- leai* Moulton, 1947
- spinipes* (Bagnall, 1908)
- bagnalli* Priesner, 1930
- guineaensis* Moulton, 1947
- inermis* (Buffa, 1909)
- tibialis* (Ashmead, 1905) comb. n.
- bryanti* Bagnall, 1915
- coxalis* Bagnall, 1915
- coxalis consanguineus* Priesner, 1930
- coxalis formosensis* Takahashi, 1936 syn. n.
- coxalis philippinensis* Priesner, 1930 syn. n.
- crassiceps* Karny, 1913 syn. n.

- erythrinus* Ananthakrishnan, 1956
- flavipes* Bagnall, 1915
- fletcheri* Ramakrishna, 1934
- io* Girault, 1930 syn. n.
- matsumurai* Ishida, 1934 syn. n.
- priesneri* Hood, 1935
- ramakrishnai* Ananthakrishnan, 1952
- sanguineus* (Bagnall, 1908) syn. n.
- steinskyi* (Schmütz, 1913)

#### Subfamily IDOLOTHRIPINAE Bagnall

- AESTHESIOTHRIPS* Ananthakrishnan, 1961
- jatrophae* Ananthakrishnan, 1961
- DIAPHOROTHRIPS* Karny, 1920
- D.* (*Cnemidothrips*) Priesner, 1940
- clavipes* Priesner, 1940
- hamipes* Karny, 1923
- unguipes* Karny, 1920
- spinosus* Ananthakrishnan, 1959
- thetvetii* Ananthakrishnan, 1957 syn. n.

**DINOTHRIPS** Bagnall, 1908

- Paxillothrips* Ananthakrishnan, 1961 syn. n.  
*juglandis* Moulton, 1933  
*longicauda* (Ananthakrishnan, 1961) comb. n.  
*monodon* Karny, 1920  
*spinosus* (Schmutz, 1913) comb. n.  
*affinis* Bagnall, 1915 syn. n.  
*anodon* Karny, 1923 syn. n.  
*celebensis* Bagnall, 1934 syn. n.  
*crassiceps* (Bagnall, 1921) syn. n.  
*gardneri* Moulton, 1928 syn. n.  
*jacobsoni* Karny, 1921 syn. n.  
*kemneri* Karny, 1923 syn. n.  
*malloti* Moulton, 1933 syn. n.  
*sumatrensis* Bagnall, 1908  
*fulmeki* Priesner, 1959 syn. n.  
*furcifer* Schmutz, 1913

**ELAPHROTHRIPS** Buffa, 1909

- Dicaiothrips* Buffa, 1909  
*E. (Elaphoxothrips)* Bagnall, 1932  
*E. (Cradothrips)* Ananthakrishnan, 1973  
*amoenus* Priesner, 1935  
*athletes* (Karny, 1923)  
*bakeri* (Karny, 1920)  
*bakeri depokensis* Priesner, 1935 syn. n.  
*imitator* Priesner, 1935 syn. n.  
*mentaweensis* Priesner, 1929 syn. n.  
*coreanus* Woo, 1974  
*curvipes* Priesner, 1929  
*karnyi* Priesner, 1935 syn. n.  
*secus* Ananthakrishnan, 1973 syn. n.  
*denticollis* (Bagnall, 1909)  
*beesoni* Ramakrishna Ayyar, 1934 syn. n.  
*mucronatus* Priesner, 1935  
*productus* Priesner, 1935 syn. n.  
*productus obscuricornis* Priesner, 1935 syn. n.  
*sumbanus* Priesner, 1935 syn. n.  
*fulmeki* Priesner, 1935  
*greeni* (Bagnall, 1914)  
*bowieri* (Vuillet, 1914)  
*micidus* Ananthakrishnan, 1973 syn. n.  
*insignis* Ananthakrishnan, 1973  
*insularis* Priesner, 1928  
*jacobsoni* Priesner, 1935  
*mahensis* (Bagnall, 1921)  
*hystrix* (Bagnall, 1921)  
*rex* (Bagnall, 1921)  
*malayensis* (Bagnall, 1909)  
*bruneitarsis* (Schmutz, 1913) syn. n.  
*bruneitarsis levis* (Schmutz, 1913) syn. n.  
*coronatus* Bagnall, 1934 syn. n.  
*notabilis* Ananthakrishnan, 1973  
*procer* (Schmutz, 1913)  
*achaetus* Bagnall, 1904  
*approximatus* Bagnall, 1934  
*chandana* Ramakrishna Ayyar, 1934  
*dallatorensis* (Schmutz, 1913)  
*eranthemi* Seshadri & Ananthakrishnan, 1954  
*novus* (Schmutz, 1913)

*proximus* (Bagnall, 1914)

*sensitivus* Priesner, 1929

*seychellensis* (Bagnall, 1921)

*spiniceps* Bagnall, 1932

*clarispinis* Priesner, 1935 syn. n.

*graveleyi* Bagnall, 1934 syn. n.

**MACHATOTHRIPS** Bagnall, 1908

- Adiaphorothrips* Bagnall, 1909  
*Cnestrothrips* Priesner, 1939 syn. n.  
*antennatus* (Bagnall, 1915)  
*dammermani* (Priesner, 1939) syn. n.  
*artocarp* Moulton, 1928  
*biuncinatus* Bagnall, 1908  
*montanus* Priesner, 1932 syn. n.  
*simplex* (Bagnall, 1909)  
*braueri* Karny, 1912  
*multidens* Bagnall, 1934  
*paucidens* Bagnall, 1934  
*paucidens bicolorisetosus* Bagnall, 1934  
*braueri karnyi* Priesner, 1932  
*celosia* Moulton, 1928  
*corticosis* Ananthakrishnan, 1972  
*decorus* sp. n.  
*diabolus* Priesner, 1928  
*haplodon* Karny, 1925  
*braueri buffai* Karny, 1925  
*braueri spatata* Priesner, 1932 syn. n.  
*simplicidens* Bagnall, 1934  
*heveae* Karny, 1921  
*indicus* Ananthakrishnan & Jagadish, 1970  
*lentus* sp. n.  
*quadrudentatus* Moulton, 1947  
*silvaticus* Ananthakrishnan, 1972

**MALESIATHRIPS** gen. n.

*guamensis* sp. n.

*malayensis* sp. n.

*solomoni* (Mound, 1970) comb. n.

**MECYNOTHRIPS** Bagnall, 1908

- Acrothrips* Karny, 1921 syn. n.  
*Dracothrips* Bagnall, 1914 syn. n.  
*Kleothrips* Schmutz, 1913 syn. n.  
*K. (Akleothrips)* Priesner, 1935 syn. n.  
*K. (Synkleothrips)* Priesner, 1935 syn. n.  
*Phoxothrips* Karny, 1913 syn. n.  
*acanthus* (Hood, 1918) comb. n.  
*gargantua* (Girault, 1926)  
*giganteus* (Girault, 1926)  
*sorex* (Karny, 1921)  
*atratus* (Hood, 1919) comb. n.  
*zuluensis* (Jacot-Guillarmod, 1939) syn. n.  
*goliath* (Priesner, 1935) comb. n.  
*hardyi* (Priesner, 1928) comb. n.  
*kanoi* (Takahashi, 1937) comb. n.  
*karimonensis* (Priesner, 1935) comb. n.  
*karimonensis parvidens* (Priesner, 1935)  
 syn. n.  
*kraussi* sp. n.  
*lacerta* (Priesner, 1935) comb. n.  
*innocens* (Priesner, 1935) syn. n.

*priesneri* Mound, 1971  
*minor* Mound, 1971 *syn. n.*  
*pugilator* (Karny, 1913) *comb. n.*  
*takahashi* (Priesner, 1935)  
*simplex* Bagnall, 1912 *comb. rev.*  
*agana* (Priesner, 1935)  
*ceylonicus* (Bagnall, 1914)  
*gigans* (Schmutz, 1913)  
*snodgrassi* Hood, 1952  
*wallacei* Bagnall, 1908  
*bagnalli* Priesner, 1935

*bagnalli imbecilla* Priesner, 1935 *syn. n.*  
*magnus* Girault, 1929  
**MEIOTHIRIPS** Priesner, 1929  
*M. (Telothrips)* Kudo & Ananthakrishnan,  
 1974 (preocc.) *syn. n.*  
*M. (Aculeathrips)* Kudo, 1975 *syn. n.*  
*annulipes* (Bagnall, 1914)  
*annulatus* Priesner, 1929 *syn. n.*  
*menoni* Ananthakrishnan, 1964  
*nepalensis* Kudo & Ananthakrishnan, 1974

### **ECACANTHOTHIRIPS** Bagnall

*Ecacanthothrips* Bagnall, 1909a: 348. Type-species: *Acanthothrips sanguineus* Bagnall, by monotypy (here regarded as a synonym of *Idolothrips tibialis* Ashmead).

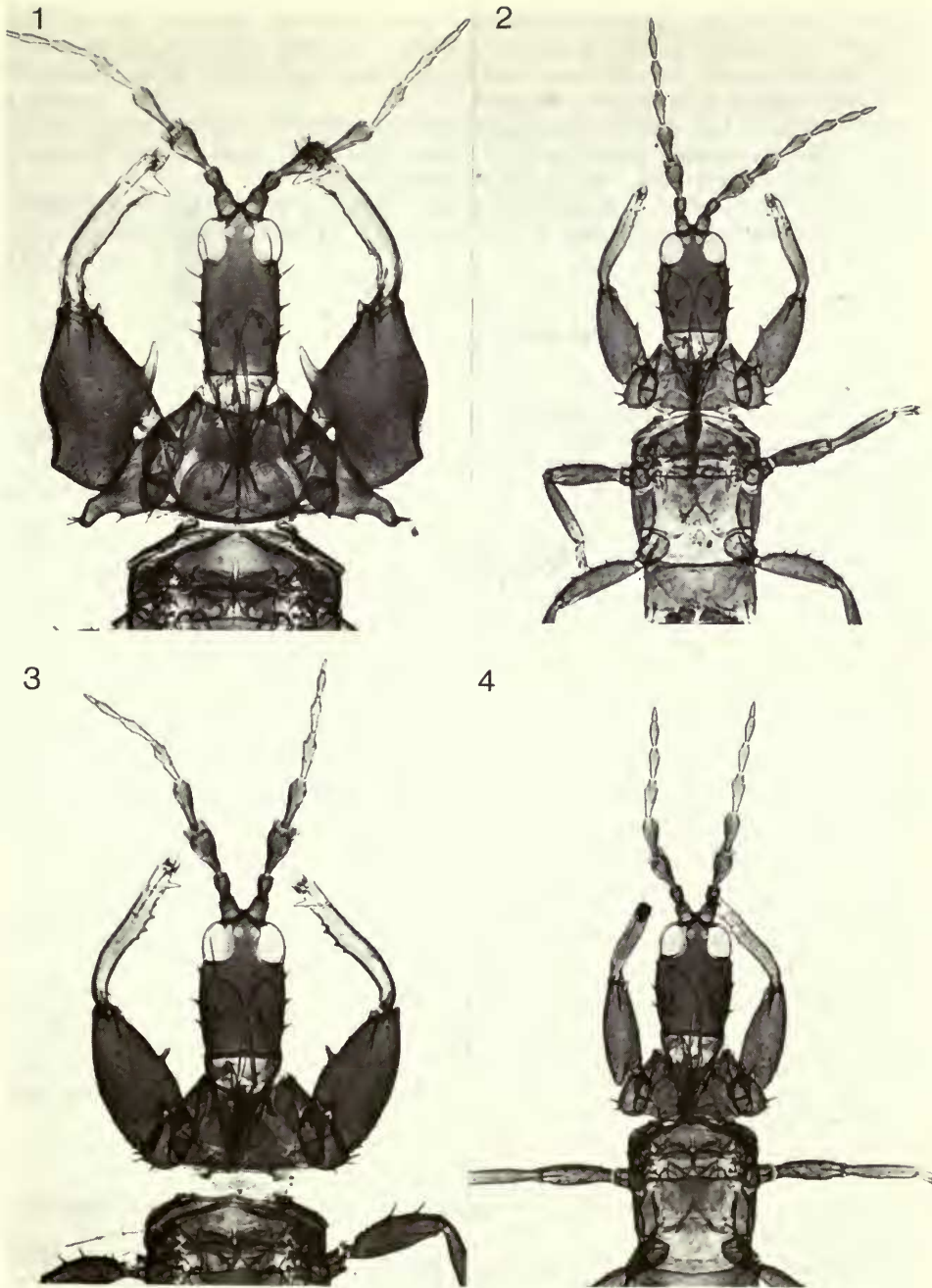
*Ormothrips* Buffa, 1909: 166. Type-species: *Ormothrips inermis* Buffa, by monotypy (here regarded as a synonym of *Phloeothrips spinipes* Bagnall). [Synonymized by Bagnall, 1911: 464.]

Macropterous, sexually dimorphic Phlaeothripinae. Antennae 8-segmented; segment IV with 4 sense cones, III with enlarged and usually supernumerary sense cones. Head with large eyes, cheeks with at least one pair of setae on small tubercles; stylets retracted almost to eyes, close together in middle of head; mouth cone pointed. Pronotum transverse, epimeral sutures complete; all major setae developed, anteroangulars frequently elongate in ♂; praepectus absent. Fore tarsus usually with a tooth; fore femur of ♂ with a pair of apical tubercles; both sexes sometimes with a median fore femoral tubercle. Mesonotal lateral setae elongate; metanotum reticulate. Fore wing constricted medially, duplicated cilia present. Pelta bell-shaped, rarely almost triangular; tergites II–VII with supernumerary wing retaining setae laterally in addition to the two main pairs; sternite VIII of ♂ without a glandular area.

Although 23 species-group names have been placed in this genus only six species are here accepted as valid. The concept of the genus is usually based on the polymorphic species *tibialis* Ashmead (= *sanguineus* Bagnall), and involves two obvious characters – the large number of enlarged sense cones on the third antennal segment, and the well-developed tubercle on the inner margin of the fore femur. However, only five of the six species here recognized in the genus have the first of these two characters, and only two of the species have the second character. One species, described below as *andrei*, has a well-developed fore femoral tubercle but has only four enlarged sense cones on the third antennal segment (Figs 5–8). This species is thus intermediate between the genera *Ecacanthothrips* and *Hoplandrothrips*. The alternative combination of characters involving four enlarged sense cones and unarmed fore femora is found in *Hoplandrothrips flavipes* Bagnall, and this species could well be treated in *Ecacanthothrips* as a close relative of *andrei*. However, the characteristic of enlarged sense cones on the third antennal segment is not in itself clear-cut in other undescribed species from Malaya and Japan. As a result, *Ecacanthothrips* could well be regarded as an Oriental species-group derived from the world-wide genus *Hoplandrothrips*.

#### **Key to species**

- 1 Fore femur of ♀ and ♂ with a stout median tubercle on inner margin, in very small ♀ this tubercle is scarcely visible; ♂ with a pair of tubercles at apex of fore femur (Figs 6–8). . . . . 2
- Fore femur of ♀ and ♂ with inner margin smooth or bearing a series of small tuberculate setae; ♂ with a pair of tubercles at apex of fore femur . . . . . 3
- 2 Antennal segment III with at least 10 sense cones; pelta triangular; mid and hind femur with 3 stout capitate setae on anterior margin [Widespread] . . . . . *tibialis* (p. 161)
- Antennal segment III with 4 sense cones (rarely 5, 3 or 2) (Fig. 5); pelta broadly bell-shaped; anterior margin of mid and hind femur with one stout capitate seta [Malaya] . . . . . *andrei* (p. 158)
- 3 Anterior margin of mid and hind femur with a row of 5 or more stout setae with blunt or capitate apices; pelta broadly triangular; inner margin of fore femur with a row of short stout setae on small tubercles [New Guinea, Solomon Is] . . . . . *spinipes* (p. 161)



Figs 1-4 *Ecacanthothrips tibialis*, (1, 2) ♂; (3, 4) ♀.

- Anterior margin of mid and hind femur with a row of 10 or more fine setae with acute apices; pelta bell-shaped; inner margin of fore femur smooth . . . . . 4
- 4 Setae  $B_1$  on tergite IX 1.1 times as long as tube; pronotum with well-developed closely spaced transverse lines of sculpture; sculptured reticles of metanotum and pelta with internal linear markings; posterolateral areas of tergites II-VII with numerous very stout dentate microtrichia; antennal segment III with more than 20 black sense cones which occupy about half of the ventral surface of the segment [Borneo] . . . . . *coniger* (p. 160)
- Setae  $B_1$  on tergite IX less than 0.9 times as long as tube; pronotal sculpture weak, without transverse lines; sculptured reticles without internal markings; tergal microtrichia weak, ciliate or absent; antennal segment III with 15 sense cones or less . . . . . 5
- 5 Fore wing pale or weakly shaded, but dark brown around sub-basal setae [Japan] *inarmatus* (p. 160)
- Fore wing pale or shaded, but not dark at base except on wing scale [Japan to Solomon Is] *leai* (p. 160)

*Ecacanthothrips andrei* sp. n.

(Figs 5-8)

♀ macroptera. Colour brown with some red hypodermal pigment; mid and hind tibiae and apices of femora clear yellow, fore tibiae yellow with faint brown markings; antennal segment III brownish yellow, succeeding segments increasingly dark, IV-VI light brown with yellowish pedicels; major setae of head and thorax dark, of wings and abdomen pale; wings light brown, paler at base, at median constriction and a little paler at apex.

Head reticulate dorsally but reticulation weak medially; cheeks slightly swollen, with one pair of major setae in posterior third. Antennal segment III with 4 sense cones ventrally, less commonly with 5, or 3, or only 2, segment IV with 4 sense cones (Fig. 5). Pronotum sculptured medially; fore femur with hooked median tubercle (Fig. 8); fore tibia with 4 to 5 small tubercles on inner margin; fore tarsal tooth variable in size. Mid and hind femora with 1 stout seta on anterior margin. Pelta broadly bell-shaped; tergites III-VII with a transverse row of 4 setae lateral to wing retaining setae; lateral areas with microtrichia on the lines of sculpture.

Measurements (holotype ♀ in  $\mu\text{m}$ ). Body, length 3100. Head, length 330; maximum width 230; post-ocular setae 120; basal cheek setae 26. Pronotum, length 195; median width 370; major setae, antero-marginal 75, anteroangular 90, mid-lateral 80, epimeral 90, posteroangular 130. Width of prothorax across coxae 550. Mesonotal lateral setae 50. Fore wing, length 1150; distal width 80; sub-basal setae 70, 80, 80; number of duplicated cilia 15. Tergite IX setae  $B_1$  130. Tube, length 175. Antennal segments III-VIII length, 90, 115, 100, 68, 55, 40.

♂ macroptera. Colour similar to ♀. Body size variable, large ♂ with elongate head bearing 3 pairs of stout cheek setae, elongate femoral tubercle (Fig. 7), long pointed coxae and large fore tarsal tooth; small ♂ with short head bearing weak cheek setae, very small fore femoral tubercle and fore tarsal tooth (Fig. 6), coxae normal and rounded.

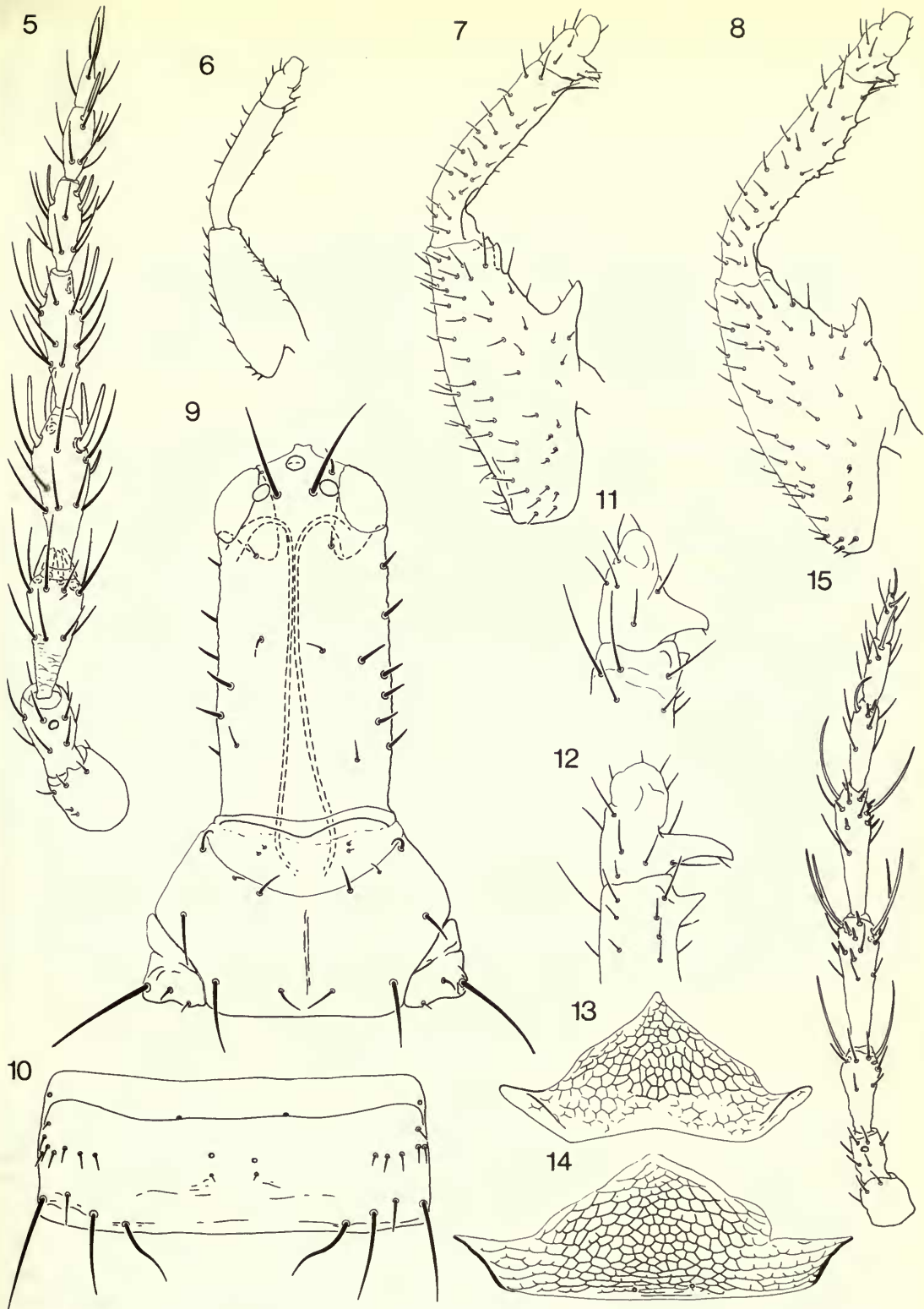
Measurements (largest and smallest ♂ paratypes). Body, length 2800 (1650). Head, length 350 (225); maximum width 190 (165); postocular setae 165 (70); basal cheek setae 35 (16). Pronotum, length 200 (97); median width 320 (210); major setae, anteromarginal 210 (42), anteroangular 115 (50), mid-lateral 115 (38), epimeral 100 (50), posteroangular 130 (65). Width of prothorax across coxae 550 (275). Fore wing, length 1000 (700); number of duplicated cilia 14 (7). Tube, length 160 (115). Antennal segments, III 90 (75); IV 100 (70).

SPECIMENS STUDIED.

Holotype ♀, **Malaya**: Gombak Field Station, 30 km east of Kuala Lumpur, on dead branches, 5.x.1973 (*L. A. Mound*) (BMNH).

Paratypes. **Malaya**: 7 ♀, 7 ♂ with same locality and collector as holotype, 29.ix.1973-7.x.1973; Kuala Lumpur, 3 ♀, 6 ♂ on partly dead branch, 27.xii.1969 (*R. & F. Andre*) (BMNH). **Singapore**: Bukit Timah Reserve, 1 ♀ on dead branch, 3.xi.1973 (*L. A. Mound*) (BMNH).

The head, pronotum and fore legs of the male of *andrei* are very similar to those of *tibialis*, moreover they show the same range of structural variation (Figs 6-8). However, large males have the pronotal anteromarginal setae much longer than the anteroangular setae instead of reduced as in *tibialis*, and the second pair of postocular setae are short and pointed, not elongate and expanded. The females are much less variable than the males. Most of the specimens studied have



Figs 5-15 5-8, *Eacanthothrips andrii*, (5) ♀ right antenna; (6, 7) ♂ fore leg; (8) ♀ fore leg. 9-11, *Aesthesiothrips jatrophae*, (9) head and pronotum; (10) tergite III; (11) ♀ fore tibia and tarsus. 12 *Diaphorothrips clavipes* ♀, fore tibia and tarsus. 13, 14, peltas, (13) *A. jatrophae*; (14) *D. clavipes*. 15, *A. jatrophae*, right antenna.

4 sense cones on the third antennal segment, but several individuals have one or both antennae with only 3 or 2 sense cones on this segment, and one specimen has 5 sense cones on this segment on one of its antennae. This variation is not related to body size, but when the number of sense cones on a segment is reduced then their own individual size is increased. As discussed in the introduction, *andrei* is intermediate in structure between *Ecacanthothrips* and *Hoplandrothrips*.

### *Ecacanthothrips coniger* Priesner

*Ecacanthothrips coniger* Priesner, 1930 : 363–364. Syntypes 2 ♀, BORNEO (SMF) [1 ♀ examined].

The only specimen of this species which has been studied is a large female. This specimen is easily recognized from the characters given in the key, but at least some of these characters are probably related to the large body size. If a small female of *coniger* is ever collected it will probably be rather similar to the other members of the *inarmatus*-group.

SPECIMEN STUDIED.

**Borneo:** Midden, 1 ♀ 'paratype', 16.viii.1925 (*H. C. Siebers* 33) (SMF).

### *Ecacanthothrips inarmatus* Kurosawa

*Ecacanthothrips inarmatus* Kurosawa, 1932 : 238–242. Holotype ♀, JAPAN (Nat. Inst. Agric. Sci. Tokyo) [examined].

*Ecacanthothrips piceae* Ishida, 1936 : 154–156. Holotype ♂, JAPAN (? lost) [not examined]. **Syn. n.**

This species appears to be confined to the Japanese mainland. It is similar to, but considerably larger than, *leai* from Malaya and Java. The pattern of intraspecific variation in the *inarmatus* species-group requires further study based on new collections. Haga (1972) states that *piceae* may be the male form of *inarmatus*. The unique holotype of *piceae* is not in the Ishida collection at Sapporo and there is nothing in the description to distinguish it from *inarmatus*.

The smallest specimen listed below has a head rather similar to *leai*, but the other specimens are larger with a relatively long head. The pronotal anteromarginal setae of the males are elongate, about two-thirds as long as the anteroangulars, and the males have 2 pairs of long stout setae laterally on the posterior half of the head. The colour of the legs and antennal segments appears to be variable from yellow to brown, but even in the palest specimen the tibiae are dark.

SPECIMENS STUDIED.

**Japan:** Sizuoka, Iida-mura, holotype ♀ of *inarmatus* in hole of citrus tree, 24.xi.1930 (*T. Noguti*) (SO, Tokyo); Kanagawa Prefecture, Atsugi, 1 ♂, 1 ♀ on dead leaves, 18.iii.1975; Kawada, Mikura-jima I., 2 ♀ (1 ♀ BMNH) on dead leaves, 9.vi.1973 (SO, Tokyo), 1 ♀, 11.vi.1973 (BMNH); Ohdaru spa, 1 ♂ on dead leaves, 27.vi.1972 (SO, Tokyo).

### *Ecacanthothrips leai* Moulton

*Ecacanthothrips leai* Moulton, 1947 : 176. Holotype ♀, MALAYA (CAS) [examined].

This species was described from a single damaged female, but further specimens of both sexes have now been collected in both Malaya and Java. Moreover two females from New Guinea, referred to as *spinipes* by Mound (1970), are here regarded as *leai* as well as two specimens from the Ryuku Islands and four specimens from the Solomon Is. In Malaya *leai* was collected with both *tibialis* and *andrei*, and *tibialis* is also known from the Ryuku Is.

The differences between *leai* and *spinipes* are referred to under the latter species. Unfortunately all of the differences could be a function of size, that is *leai* may represent a small form of *spinipes*. Similarly the differences between *leai* and *inarmatus* are of the same order as the geographical variation in colour noted in *tibialis*. The male and female listed below from Amami-ohshima (Ryuku Is) are larger than the *leai* specimens from Malaya and Java with the head relatively long and slender and the pronotal anteromarginal setae of the male as long as the anteroangular



setae. Major males of *leai* from Malaya have the anteromarginal setae reduced. One of the females listed below from New Guinea has brown hind tibiae, whereas all the other specimens of *leai* have yellow tibiae. Delimitation of species in the *inarmatus*-group is still far from clear, and the description of further species needs to be avoided until more material is collected.

SPECIMENS STUDIED.

**Malaya:** Kuala Lumpur, ♀ holotype (*A. M. Lea*) (CAS); Kuala Lumpur, 11 ♀, 2 ♂ on dead branches xii.1969 (*R. & F. Andre*) (BMNH); Gombak, 30 km east of Kuala Lumpur, 5 ♀, 2 ♂ on dead wood, ix-x.1973 (*L. A. Mound*) (BMNH). **Java:** Tjibodas Botanic Garden, 5 ♀, 2 ♂ on dead leafy twigs, x.1973 (*L. A. Mound*) (BMNH). **New Guinea:** Wau, Bulolo Gorge, 900 m, 1 ♀ from bark of fallen log, 4.vi.1968 (*R. Rice*); Aiyura, 5400 ft [1800 m], 1 ♀ on grasses, 22.ii.1962 (*J. H. Barrett*) (BMNH). **Solomon Is:** Rendova, 2 ♂, 2 ♀ on dead leaves, xi.1972 (*Krauss*) (BMNH). **Japan:** Amami-ohshima Is, Nishinakama, 1 ♀, 1 ♂, 30.vi.1972 (*M. Kuboki*) (SO, Tokyo).

*Ecacanthothrips spinipes* (Bagnall)

*Phloeothrips spinipes* Bagnall, 1908b : 195-196. Holotype ♀, NEW GUINEA (BMNH) [examined].

*Ecacanthothrips spinipes* (Bagnall) Mound, 1968 : 90.

*Ormothrips inermis* Buffa, 1909 : 168. Holotype ?, NEW GUINEA (? lost) [not examined]. [Synonymized by Mound, 1970 : 96.]

*Ecacanthothrips bagnalli* Priesner, 1930 : 364-365. Holotype ♂, KEI Is (SMF) [examined]. [Synonymized by Mound, 1970 : 96.]

*Ecacanthothrips guineaensis* Moulton, 1947 : 176-177. Holotype ♀, NEW GUINEA (CAS) [examined]. [Synonymized by Mound, 1970 : 96.]

Mound (1970) listed material of this species from the Solomon Islands and New Guinea and discussed variation in the shape of the pelta which appeared to be dependent on body size. However, the two small females from New Guinea (1 ♀ Aiyura, 1 ♀ Wau) which have a bell-shaped pelta also lack capitate setae on the mid and hind femora. These specimens are here regarded as *leai* despite the fact that one of them was collected with 11 ♀, 1 ♂ of *spinipes*. Unfortunately all of the known *spinipes* specimens are considerably larger than any of the known *leai* specimens. Therefore it is impossible to be certain that the obvious differences in head shape, pelta and femoral setae are not a function of size rather than real species differences. In contrast to *leai* the inner margin of the fore femur bears a series of small tuberculate setae, the mid and hind femora bear a row of stout capitate setae, the head is relatively short and narrowed to the base with three or more pairs of stout tuberculate setae in the female and four or more pairs of long stout setae in the male. The colour of the tibiae and third antennal segment appears to be variable. No further material has been studied apart from that listed by Mound (1970 : 97) from New Guinea and the Solomon Is.

*Ecacanthothrips tibialis* (Ashmead) comb. n.

(Figs 1-4)

*Idolothrips tibialis* Ashmead, 1905 : 20. Holotype ♀, PHILIPPINES (USNM) [examined].

*Acanthothrips sanguineus* Bagnall, 1908a : 362. Holotype ♀, NEW GUINEA (BMNH) [examined]. **Syn. n.**

*Ecacanthothrips sanguineus* (Bagnall) Bagnall, 1909a : 348.

*Ormothrips sanguineus* (Bagnall) Buffa, 1909 : 166.

*Ecacanthothrips crassiceps* Karny, 1913 : 134-136. Holotype ? ♀, NEW GUINEA (? lost) [not examined].

**Syn. n.**

*Ormothrips Steinskyi* Schmutz, 1913 : 1028-1030. Syntypes ♂, ♀, SRI LANKA (Ceylon) (NM) [2 ♀ examined].

[Synonymized with *sanguineus* by Ananthkrishnan, 1961b : 275.]

*Ecacanthothrips bryanti* Bagnall, 1915a : 320-321. Lectotype ♂, SARAWAK (BMNH) [examined]. [Synonymized with *sanguineus* by Ananthkrishnan, 1961b : 275.]

*Ecacanthothrips coxalis* Bagnall, 1915b : 597. Lectotype ♂, SARAWAK (BMNH) [examined]. [Synonymized with *sanguineus* by Ananthkrishnan, 1961b : 275.]

*Ecacanthothrips flavipes* Bagnall, 1915b : 597. Lectotype ♂, SARAWAK (BMNH) [examined]. [Synonymized with *sanguineus* by Ananthkrishnan, 1961b : 275.]

- Ecacanthothrips coxalis* var. *consanguineus* Priesner, 1930 : 367–368. Syntypes ♂, ♀, MALAYA & BORNEO (SMF & BMNH) [examined]. [Synonymized with *sanguineus* by Mound, 1968 : 89.]
- Ecacanthothrips coxalis* var. *philippinensis* Priesner, 1930 : 368. Syntypes ?, PHILIPPINES (? SMF) [not examined]. **Syn. n.**
- Ecacanthothrips io* Girault, 1930 : 1. Holotype ♂, AUSTRALIA (QM) [examined]. **Syn. n.**
- Ecacanthothrips matsumurai* Ishida, 1934 : 149–151. Holotype ♂, TAIWAN (? lost) [not examined]. **Syn. n.**
- Ecacanthothrips fletcheri* Ramakrishna, 1934 : 495–496. Holotype ♀, INDIA (? TNA) [not examined]. [Synonymized with *sanguineus* by Ananthakrishnan, 1961*b* : 275.]
- Ecacanthothrips priesneri* Hood, 1935 : 196–199. Holotype ♀, TANZANIA (USNM) [examined]. [Synonymized with *sanguineus* by Ananthakrishnan, 1961*b* : 275.]
- Ecacanthothrips coxalis* var. *formosensis* Takahashi, 1936 : 454–456. Holotype ♂, TAIWAN (? Dept. Agric. Res. Taiwan) [not examined]. **Syn. n.**
- Ecacanthothrips ramakrishnai* Ananthakrishnan, 1952 : 38–41. Holotype ♂, INDIA (TNA) [not examined]. [Synonymized with *sanguineus* by Ananthakrishnan, 1961*b* : 275.]
- Ecacanthothrips erythrinus* Ananthakrishnan, 1956 : 134–136. Holotype ♂, INDIA (TNA) [not examined]. [Synonymized with *sanguineus* by Ananthakrishnan, 1961*b* : 275.]

Ashmead described *tibialis* from a single specimen which at that time was mounted dry on a card point. This female was subsequently placed in balsam on a slide and is a typical member of the species usually known as *sanguineus*. Karny described *crassiceps* from a single specimen from New Guinea. This specimen is not available but the description defines satisfactorily an extreme gynaecoid male of *tibialis*, particularly when it is remembered that both Karny and Priesner measured 'head length' from the anterior margin of the eyes instead of the extreme anterior margin of the head. The specimen described as *io* by Girault is a typical male of *tibialis*. Moreover, although type-specimens have not been studied there is nothing in the descriptions of *philippinensis*, *matsumurai* nor *formosensis* to distinguish these from the species *tibialis* which is known to be common in both the Philippines and also Formosa.

This species is exceptionally variable. Structural variation associated with allometric growth is found throughout the geographical range of the species and has been discussed and illustrated by Hood (1935) and Ananthakrishnan (1961). Variation in colour of the tibiae and also the median antennal segments does not seem to be associated with body size, but there is a tendency for specimens from the western end of the range to have darker appendages than specimens from the eastern end. Thus the specimens from the Philippines and many of those from Borneo have the pedicels of antennal segments V and VI yellow, and the hind tibiae vary from yellow washed with brown medially to dark brown with paler ends. Most of the specimens studied from Malaya, Sri Lanka, India, Mauritius and Tanzania have the antennal pedicels brown and the hind tibiae frequently black. However, the specimens listed below from Japan and Taiwan are also dark. These colour variations, together with the structural variation associated with allometric growth patterns (Figs 1–4), account for the large number of names by which this species has been known.

#### SPECIMENS STUDIED.

**Japan:** Okinawa-jima Is, 3 ♂, 1 ♀ (SO, Tokyo; 1 ♀ BMNH); Amami-ohshima Is, 1 ♀, vii.1972 (SO, Tokyo; 1 ♂ BMNH). **Taiwan:** Nansanchi, 2 ♀, 2 ♂, vi.1972 (SO, Tokyo); Heito, 1 ♀ from bark of *Artocarpus*, 25.iii.1933 (*M. Ishida* 1685) (HUS) [det. *sanguineus* by Haga, 1972, and labelled 'M. Ishida's *E. matsumurai*']. **China:** Chengtu, 1 ♀, viii.1930 (BMNH). **Vietnam:** Tonkin, 4 ♀, 3 ♂ (BMNH). **Philippines:** Manila; holotype ♀ of *tibialis* (*Robt Brown*) (USNM); 17 ♀, 8 ♂, vii.1931 (BMNH). **Borneo:** Midden, 1 ♂, 1 ♀ syntypes of *consanguineus*, viii.1925; Sarawak, Mt Matang, ♂ lectotypes of *bryanti*, *coxalis* and *flavipes*, xii.1913–ii.1914; Hii Siew, 3 ♀, 2 ♂ on Cacao (BMNH). **New Guinea:** Dorey, holotype ♀ of *sanguineus*; Wau, 2 ♀, 2 ♂, vi.1968 (BMNH). **Australia:** Queensland, holotype ♂ of *io* (QM). **Indonesia:** Isle of Nias, 1 ♀, 7 ♂; Java, Bogor, 31 ♀, 21 ♂ 10 instar II, x.1973 (*Mound*) (BMNH). **Singapore:** Bukit Timor, 7 ♀, 12 ♂, xi.1973–i.1974 (BMNH). **Malaya:** near Kuala Lumpur, 48 ♀, 41 ♂, x.1973; Ringlet, Cameron Highlands, 4 ♀, 5 ♂, x.1973 (*Mound*); Trengganu, 9 ♀, 2 ♂, iii.1974 (BMNH). **India:** Madras, 4 ♀, 5 ♂ (*Ananthakrishnan*) (BMNH). **Sri Lanka:** Peradeniya, 7 ♀, 6 ♂ (*Green & Rutherford*) (BMNH); 2 ♀ syntypes of *Steinskyi* on bark, 24–25.v.1902 (*Uzel* 193, 194) (NM). **Mauritius:** 1 ♀, v.1970; 1 ♂, xii.1971; 1 ♂, vi.1971 (BMNH). **Rodrigues:** 1 ♂ (BMNH). **Tanzania:** Amani, holotype ♀ of *priesneri*, i.1928 (USNM).

## *AESTHESIOTHRIPS* Ananthakrishnan

*Aesthesiothrips* Ananthakrishnan, 1961a : 253. Type-species: *Aesthesiothrips jatrophae* Ananthakrishnan, by monotypy.

Large, dark, macropterous species of Cryptothripini. Head elongate, eyes relatively small but slightly prolonged ventrally; stylets retracted to eyes, close together in middle of head; postocellar setae reaching to apex of antennal segment I; mouth cone broadly rounded. Antennae 8-segmented, III about two-thirds as long as IV; sense cones on III and IV longer than their segment, 2 on III, 4 on IV. Pronotum transverse, epimeral sutures complete, setae in normal position; posteroangular setae scarcely two-thirds as long as epimerals; praepectus present. Both sexes with stout fore tarsal tooth, apex of fore tibia flattened and bearing a small tubercle. Metanotum weakly reticulate, median setae less than 50  $\mu\text{m}$  long. Fore wing relatively slender, sub-basal setae not elongate. Pelta irregularly triangular (Fig. 13); tergites II–VII with 1 pair of wing-retaining setae, and laterally with a transverse row of 2 to 5 short setae; tergite IX setae almost as long as tube; ♀ with tube slightly longer than head, margins weakly convex; ♂ with tube shorter than head.

This genus was erected for a single species described from two damaged females. The original description referred to the elongate sense cones on the third and fourth antennal segments, but did not mention the remarkable maxillary stylets and long postocellar setae (Fig. 9). The form of the head is similar to *Phaulothrips* Hood from Australia (Mound, 1974), but the structure of the antennae and sense cones is quite different (Fig. 15). *Celidothrips* Priesner is also related but has long postocular setae and short sense cones, and one ommatidium is isolated behind each eye on the cheeks.

### *Aesthesiothrips jatrophae* Ananthakrishnan

(Figs 9–11, 13, 15)

*Aesthesiothrips jatrophae* Ananthakrishnan, 1961a : 253–254. Holotype ♀, INDIA (TNA) [examined].

This species was based on two damaged females collected in northern India. The specimens listed below from Malaya cannot be distinguished at present from *jatrophae*, although the holotype has fewer setae laterally on each tergite. The males are very similar to the females although a little smaller with a shorter tube. However, the length of the tube is apparently subject to allometric growth in this species. The short third antennal segment is mainly yellow in contrast to the dark brown of the rest of the body.

#### SPECIMENS STUDIED.

**India:** Dehra Dun, Nakronda, holotype ♀ on *Jatropha curcus* fruits, 23.iii.1934 (*Bahadur*) (TNA). **Malaya:** Kuala Lumpur, 13 ♀, 4 ♂ on dead branch, 26.xii.1969 (*R. G. & F. Andre*) (BMNH).

## *DIAPHOROTHRIPS* Karny

*Diaphorothrips* Karny, 1920a : 186. Type-species: *Diaphorothrips unguipes* Karny, by monotypy.

*Diaphorothrips* (*Cnemidothrips*) Priesner, 1940 : 403. Type-species: *Diaphorothrips hamipes* Karny, by original designation.

Medium sized, dark brown members of Cryptothripini. Head rectangular, longer than broad; cheeks with at least 8 pairs of setae; 1 pair of ocellar setae frequently elongate; maxillary stylets retracted almost to postocular setae, not close together in midline; mouth cone appears pointed. Antennae 8-segmented, VIII lanceolate in shape; 2 sense cones on III, 5 on IV. Pronotum with anterior margin thickened, at least in large specimens, anteromarginal setae reduced; both sexes with fore tarsal tooth well developed and fore tibia with subapical projection (Fig. 12); praepectus well developed, mesopraesternum boat-shaped. Fore wings broad with numerous duplicated cilia. Pelta hat-shaped with lateral margins curving forwards away from tergite II (Fig. 14). Tergites with 1 pair of wing-retaining setae; setae on IX shorter than tube; tube heavy, margins slightly convex.

The three species now recognized in *Diaphorothrips* are *unguipes* from Sri Lanka and southern India, *hamipes* from Java, Sumatra and Malaya, and *clavipes* from both Singapore and the adjoining Riau Is. However, none of these species appears to occur in large numbers, each having been

collected infrequently from dead twigs or under bark. The genus is a typical member of the Cryptothripini and is intermediate in structure between certain species of *Scotothrips* or *Dichaetothrips* and the Oriental genus *Uredothrips*. The subgenus *Cnemidothrips* does not seem to be a useful category in view of the many similarities between the three species indicated below.

**Key to species**

- 1 Antennal segment III yellow to yellowish brown in basal half, relatively short and conical, less than 2.2 times as long as maximum width; relatively small species with tube 1.2 times as long as head [Malaya to Sumatra] . . . . . *hamipes* (p. 164)
- Antennal segment III dark brown with extreme base pale, more than 2.5 times as long as wide; relatively large species with tube 1.4 times as long as head . . . . . 2
- 2 Postocellar setae more than 3.0 times as long as anteoecellar setae; cheeks with 10–12 pairs of relatively weak setae, longest cheek seta less than 26  $\mu\text{m}$ ; fore wing clear or weakly shaded in distal half [India, Sri Lanka] . . . . . *unguipes* (p. 164)
- Postocellar setae less than 0.8 times as long as anteoecellar setae; cheeks with 8 pairs of stout dark setae, longest cheek seta more than 30  $\mu\text{m}$ ; fore wing deeply shaded in distal half [Riau Is, Singapore] . . . . . *clavipes* (p. 164)

***Diaphorothrips clavipes* Priesner**

(Figs 12–14)

*Diaphorothrips* (*Cnemidothrips*) *clavipes* Priesner, 1940 : 403–405. Holotype ♀, RIAU IS (SMF) [examined].

The cheek setae of this species are larger and darker than in the other two species. The antennae are similar to *unguipes* but the ocellar setae are similar to *hamipes*.

**SPECIMENS STUDIED.**

**Riau (Riouw) Is:** Doerian, ♀ holotype, xi.1923 (*Dammerman*) (SMF). **Singapore:** 3 ♀ on dead twigs, 4.xi.1973 (*L. A. Mound*) (BMNH).

***Diaphorothrips hamipes* Karny**

*Diaphorothrips hamipes* Karny, 1923 : 296–299. Syntypes 1 ♀, 2 ♂ (sic) JAVA: (SMF) [2 ♀ examined].

The original description refers to one female and two males. However, the only specimens bearing the original data which have been found are both females although one was labelled as male by Karny. The species is smaller than both *clavipes* and *unguipes*, although the head length varies from 280 to 350  $\mu\text{m}$  in the available specimens. Even in the largest specimen the cheek setae are pale and slender. The external sense cone on the sixth antennal segment is exceptionally large, whereas it is small in *clavipes* and only moderately large in *unguipes*.

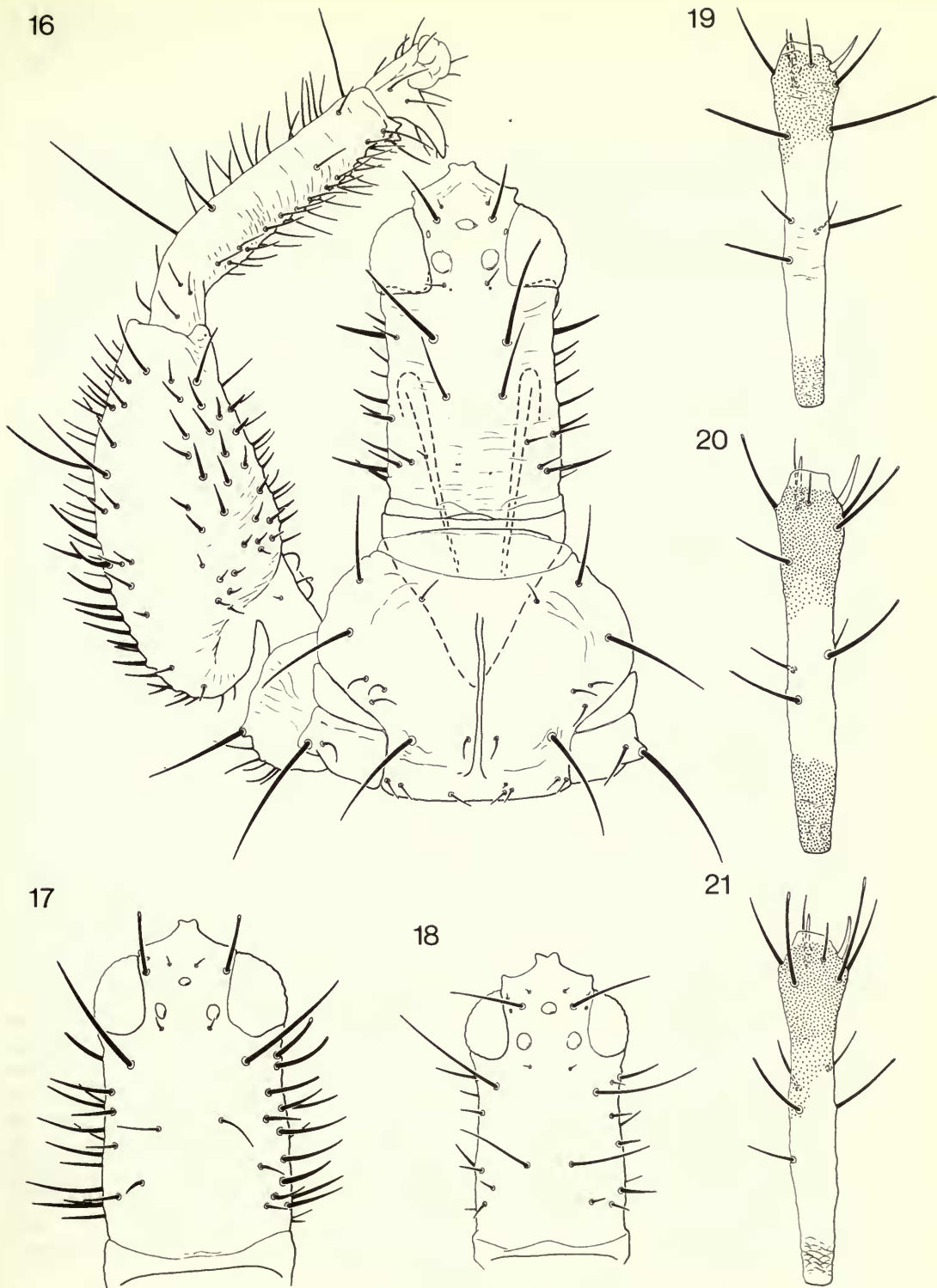
**SPECIMENS STUDIED.**

**Java:** Buitenzorg [Bogor]; 2 ♀ syntypes under citrus bark, 11.ii.1921 (*Kemner*) (SMF); 1 ♀ on dead twigs, 18.x.1973 (*L. A. Mound*) (BMNH). **Sumatra:** Medan, 1 ♀ in dry *Caesalpinia* pods, 15.v.1922 (*Fulmek*) (SMF). **Malaya:** Kuala Lumpur, 3 ♀, 3 ♂ on dead branches, 26–29.xii.1969 (*R. G. & F. Andre*) (BMNH).

***Diaphorothrips unguipes* Karny**

*Diaphorothrips unguipes* Karny, 1920a : 186–189. Syntypes 2 ♀, SRI LANKA (Ceylon) (SMF) [1 ♀ examined]. *Diaphorothrips thevetii* Ananthakrishnan, 1957 : 101–102. Holotype ♀, INDIA (TNA) [examined]. **Syn. n.** *Diaphorothrips spinosus* Ananthakrishnan, 1959 : 321–322. Holotype ♀, INDIA (TNA) [examined]. [Synonymized by Ananthakrishnan & Jagadish, 1970 : 275.]

The original description of *unguipes* refers to one winged and one wingless specimen from Sri Lanka, but only the winged individual has been studied. *D. thevetii* was based on a rather small, damaged female and the original description did not compare this specimen with other members of the genus. The differences quoted by Ananthakrishnan (1973b : 87) are interpreted here as being related to body size. *D. spinosus* was based on a male and female with a longer head and



Figs 16–21 Males of *Dinothrips* species. 16, *D. spinosus*. 17, *D. juglandis*. 18, *D. longicauda*. 19–21, antennal segment III, (19) *D. spinosus*; (20) *D. sumatrensis*; (21) *D. juglandis*.

with longer setae than the *thevetii* holotype. However, none of these specimens differs significantly from the syntype listed below. The date of collection and the collector's number on the holotype slide of *spinus* differ from those given in the original description.

**SPECIMENS STUDIED.**

**Sri Lanka** (Ceylon): Bentotta, 1 ♀ syntype of *unguipes* (*W. Horn* 99) (SMF). **India**: Madras; ♀ holotype of *thevetii*, on *Thevetia*, 19.xi.1955 (*Ananthkrishnan*); ♀ holotype of *spinus* from inside dry twigs of *Thevetia*, iii.1957 (*Ananthkrishnan*); 1 ♀ on *Sesbania* twigs, 2.iv.1963 (BMNH); 3 ♀ on *Erythrina* twig, 20.ix.1965 (1 ♀ SMF, 2 ♀ BMNH).

**DINOTHRIPS** Bagnall

*Dinotrips* Bagnall, 1908b : 190. Type-species: *Dinotrips sumatrensis* Bagnall, by monotypy.

*Dinotrips* Bagnall; Priesner, 1959 : 52.

*Paxillothrips* Ananthkrishnan, 1961a : 250. Type-species: *Paxillothrips longicauda* Ananthkrishnan, by monotypy. **Syn. n.**

*Dinotrips* Bagnall; Ananthkrishnan, 1964 : 88; 1973b : 91.

Large, dark, macropterous species of Idolothropini. Head rectangular, about twice as long as broad, projecting slightly in front of eyes; eyes large and equally developed on dorsal and ventral surfaces; head with 1 pair of antecellar setae, 1 pair of postocular setae and 1 pair of long setae on the vertex (post-ocular setae pair II); cheeks set with stout spine-like setae. Antennae 8-segmented; segment III about 5.0 to 5.5 times as long as broad, with 2 sense cones, IV with 4 sense cones. Pronotum shorter than head, almost twice as broad as long, usually with 5 pairs of major setae but sometimes with an additional pair of posteroangulars (Fig. 24). Fore tarsal tooth present in ♂ and ♀, but much larger in ♂; fore femora of ♂ enlarged with numerous spine-like setae at base (Fig. 16). Mesothoracic anterior angles of ♂ with spiracles produced into a laterally projecting, usually bifurcate, process; this process not developed in ♀ and some small ♂. Pelta triangular, lateral lobes separated (Fig. 30). Tergites II–VII with 2 pairs of sigmoid wing-retaining setae, those on VII much reduced, tergal accessory setae straight (Fig. 31); sternite IX of ♂ with a pair of large spines (Fig. 33). Tube with straight sides evenly narrowing to apex, about 4 times as long as broad and about as long as head.

Although *Dinotrips* is a small genus, only five species now being recognized, the individuals are frequently large. They are found on dead branches in the area between northern India, Sri Lanka, New Guinea and the Philippines, and they frequently constitute the dominant element in the thrips fauna of this habitat. In both Malaya and Java *D. sumatrensis* and *D. spinus* have been found together on recently fallen tree trunks where they were coexisting in large numbers with *Ecacanthothrips* species. Each *Dinotrips* species is sexually dimorphic, the males having a pair of enlarged mesothoracic spiracular processes (Figs 22, 26–29) which are not developed in females. However, the males are subject to allometric growth patterns such that these processes are large in large individuals but small or absent in small individuals. This sexual dimorphism and allometry is the cause of the large number of names which have been applied to the two common species.

The monobasic genus *Paxillothrips* was distinguished from *Dinotrips* by the small peg-like mesothoracic processes, and by the form of the pelta. However, the pelta of the two male and one female paratypes of *longicauda* which have been studied is similar to that of *Dinotrips* species and not like that given in the illustration which accompanied the original description. Moreover, the mesothoracic process is so variable in *Dinotrips*, even being absent in some males, that it is of little practical value as a generic characteristic. *Dinotrips* is related to both *Elaphrothrips* and the monobasic African genus *Lamillothrips*. In the latter genus the anterior angles of the pronotum are produced into tubercles in the male, and the lateral lobes of the pelta are not separated. In Oriental *Elaphrothrips* species the tergites bear accessory sigmoid setae anterolateral to the major wing-retaining setae, and the first ocellus is situated anterior to the ocellar setae, on the head prolongation.

**Key to species**

- 1 Antennal segment III with base pale (Fig. 21); mesothoracic spiracular process of ♂ small (Figs 27, 28) . . . . . 2

- Antennal segment III with base dark (Figs 19, 20); mesothoracic spiracular process of ♂ frequently large (Figs 22, 29) . . . . . 3
- 2 Pronotal anteromarginal setae longer than the distance between their bases (Fig. 25); median pair of setae on vertex small, no longer than cheek setae and about 0·3 times as long as postocular setae (Fig. 17); cheek setae long and pale (♂ 160–170 μm; ♀ 95–100 μm) [India, Burma] . . . . . *juglandis* (p. 167)
- Pronotal anteromarginal setae shorter than distance between their bases; median pair of setae on vertex about 0·75 times as long as postoculars (Fig. 18); cheek setae short and pale (50–90 μm) [India] . . . . . *longicauda* (p. 167)
- 3 Mesothoracic spiracular process of ♂ not bifurcate but with dentate margin (Fig. 29); cheek setae less than 100 μm long [Philippines] . . . . . *monodon* (p. 167)
- Mesothoracic process of ♂ bifurcate or reduced (Figs 22, 26) . . . . . 4
- 4 Antennal segment III usually less than 3·5 times as long as the apical dark band on this segment (♂ 2·2–3·2; ♀ 2·8–3·9) (Fig. 20); cheek setae long and pale in ♂ (110–180 μm) but shorter and sometimes dark in ♀ (60–100 μm); antecellar setae long (♂ 140–180 μm; ♀ 120–160 μm); ♂ usually, ♀ sometimes with more than one pair of major posteroangular pronotal setae (Fig. 24); epimeral tubercles often well developed; antecostal ridge of sternite II in ♀ often interrupted medially [Malaya to Borneo] . . . . . *sumatrensis* (p. 170)
- Antennal segment III usually more than 3·5 times as long as apical dark band on this segment (♂ 3·5–4·9; ♀ 3·4–5·3) (Fig. 19); cheek setae shorter and darker (♂ 70–140 μm; ♀ 50–90 μm); antecellar setae shorter (90–150 μm); only one pair of posteroangular pronotal setae (Fig. 16); epimeral tubercles weak even in large ♂; antecostal ridge of sternite II in ♀ not interrupted medially [India to Solomon Is] . . . . . *spinus* (p. 169)

*Dinothrips juglandis* Moulton

(Figs 17, 21, 25, 28)

*Dinothrips juglandis* Moulton, 1933 : 6. Holotype ♂, INDIA (BMNH) [examined].

This species is readily distinguishable from the others in this genus by having the pronotal anteromarginal setae longer than the distance between their bases. In the specimens listed below the cheek setae are long and pale and the mesothoracic spiracular processes are not well developed (Fig. 28).

SPECIMENS STUDIED.

**India:** Bengal, Lopchu, holotype ♂, paratype ♀ (also 3 ♂ 1 ♀ with identical data) under bark of *Juglans regia*, 26.ix.1929 (*J. C. M. Gardner*) (BMNH). **Burma:** Mishmi Hills, 2 ♂, iii.1935 (*M. Steel*) (BMNH).

*Dinothrips longicauda* (Ananthakrishnan) **comb. n.**

(Figs 18, 27, 32)

*Paxillothrips longicauda* Ananthakrishnan, 1961a : 250. Holotype ♀, INDIA (TNA) [not examined].

Two male and one female paratypes of this species have been studied out of an original series of 4 ♀, 2 ♂. These specimens resemble the other species in *Dinothrips* in most characters, but have rather paler wings and small peg-like mesothoracic spiracular processes. The available specimens are small, the head appears to be slightly more concave behind the eyes, and the metanotal sculpture of the male is developed into a U-shaped ridge (Fig. 32).

SPECIMENS STUDIED.

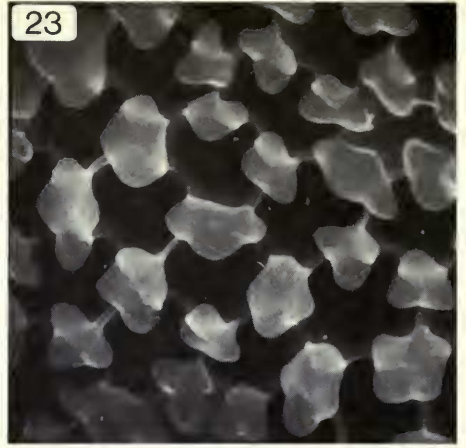
**India:** Bombay, Ramangulli, 2 ♂, 1 ♀ paratypes in hollow of bamboo, 28.i.1949 (TNA).

*Dinothrips monodon* Karny

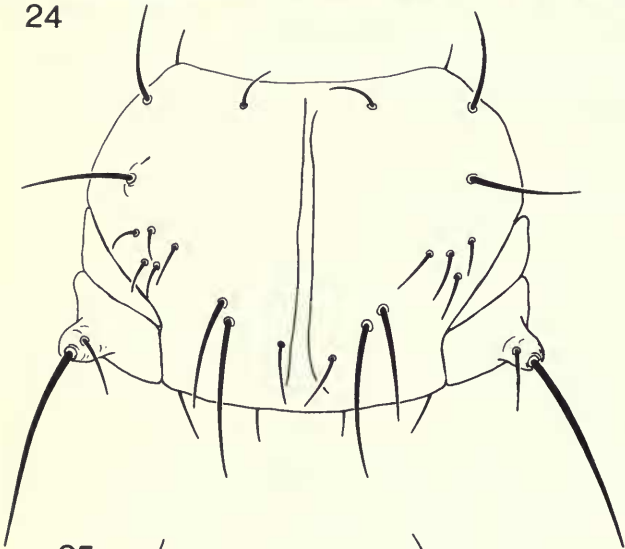
(Fig. 29)

*Dinothrips monodon* Karny, 1920b : 204. Holotype ♂, PHILIPPINES (SMF) [examined].

The male of this species is recognized easily by the unforked, toothed spiracular process (Fig. 29).



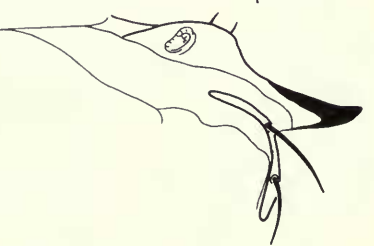
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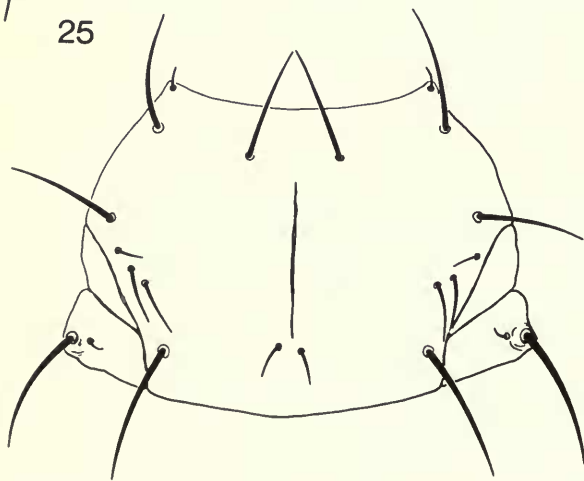
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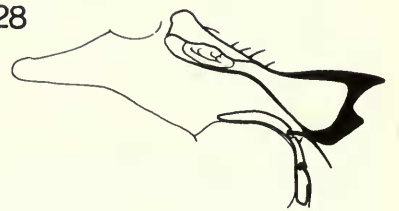
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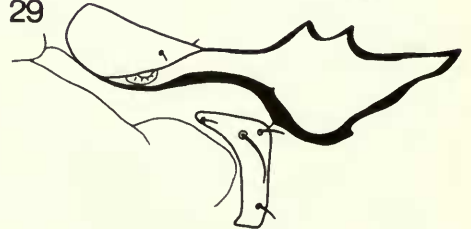
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29



Figs 22–29 Males of *Dinothrips* species. 22–24, *D. sumatrensis*, (22, 23) mesothoracic spiracular process. 25, *D. juglandis*. 26–29, mesothoracic spiracular processes, (26) small *D. spinosus*; (27) *D. longicauda*; (28) *D. juglandis*; (29) *D. monodon*.



Moulton (1943) records 6 ♂, 1 ♀ of *monodon* from the Philippines, but the original description was based on a single male.

SPECIMEN STUDIED.

**Philippines:** Mindanao, Butuan, holotype ♂ (*Baker*) (SMF).

*Dinothrips spinosus* (Schmutz) **comb. n.**

(Figs 16, 19, 26, 33)

*Ischyrothrips spinosus* Schmutz, 1913 : 88. Holotype ♀, SRI LANKA (Ceylon) (NM) [examined].

*Dinothrips affinis* Bagnall, 1915c : 270. LECTOTYPE ♂, BORNEO (BMNH), here designated [examined].

**Syn. n.**

*Dicaiothrips crassiceps* Bagnall, 1921b : 399. Holotype ♀, BURMA (BMNH) [examined]. **Syn. n.**

*Dinothrips jacobsoni* Karny, 1921a : 283. Holotype ♂, JAVA (SMF) [examined]. **Syn. n.**

*Dinothrips kemneri* Karny, 1923 : 294. LECTOTYPE ♂, JAVA (SMF), here designated [examined].

**Syn. n.**

*Dinothrips anodon* Karny, 1923 : 295. Syntypes 1 ♂, 1 ♀, JAVA (depository unknown) [not examined].

**Syn. n.**

*Dinothrips gardneri* Moulton, 1928b : 290. Holotype ♂, INDIA (CAS) [examined]. **Syn. n.**

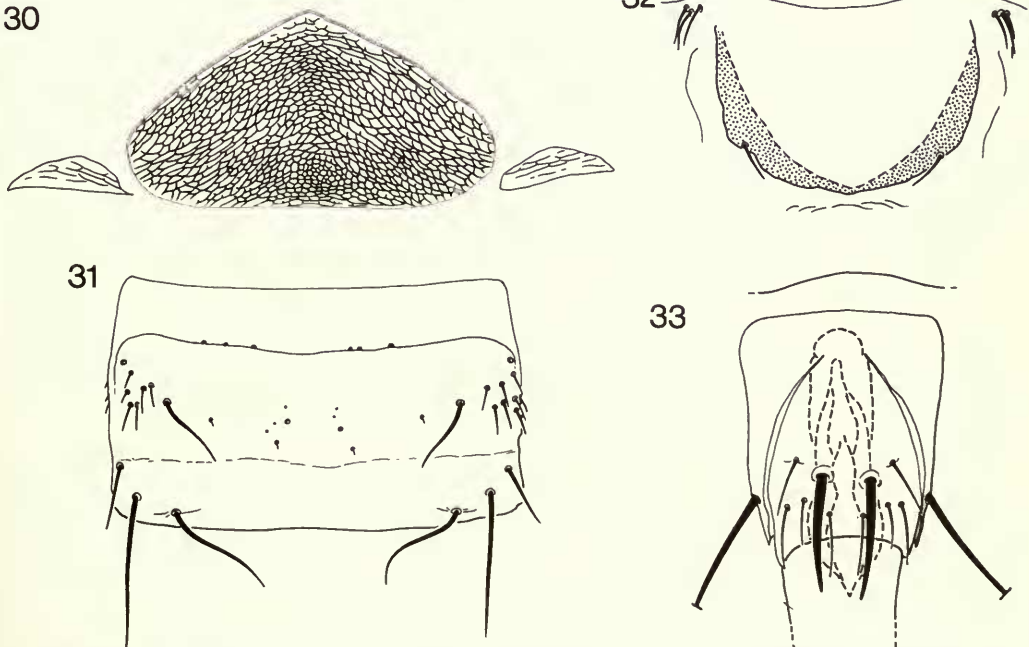
*Dinothrips malloti* Moulton, 1933 : 6. Holotype ♂, INDIA (BMNH) [examined]. **Syn. n.**

*Dinothrips celebensis* Bagnall, 1934a : 485. Holotype ♂, SULAWESI (Celebes) (MNHN) [examined].

**Syn. n.**

[*Dinothrips sumatrensis* Bagnall; Priesner, 1959 : 52. Misidentification.]

*D. spinosus* is the most commonly collected species in the genus, with an extensive distribution in tropical rain forest between northern India, Sri Lanka, Sulawesi and New Guinea. However, throughout much of this range it is often found in company with a second closely related species, *sumatrensis*, with which it has previously been confused.



Figs 30-33 Males of *Dinothrips* species. 30, 31, *D. sumatrensis*, (30) pelta; (31) tergite IV. 32, *D. longicauda*, metathorax. 33, *D. spinosus*, sternite IX.

The unique holotype female of *spinosus* was labelled subsequently by Dr H. Priesner '*Dinothrips sumatrensis* Bagn'. This specimen is evidently a member of the genus *Dinothrips*, but it is indistinguishable from the female paralectotypes of *affinis* and, like them, differs from *sumatrensis* in having the third antennal segment longer, more slender and paler, in having shorter darker cheek setae and shorter anteocellar setae, and in having only one pair of posteroangular pronotal setae. The synonymy of *affinis* with *sumatrensis* by Mound (1968) is therefore here refuted.

Bagnall (1915c) states that the *Dinothrips* collected by G. E. Bryant from dead bark and trees on Mt Matang in December 1913 comprised both *sumatrensis* and *affinis*. He distinguished the second species by having the third antennal segment 'more slender' and 'distinctly longer than in *sumatrensis* . . . rarely darker basally and only narrowly blackish-brown at apex'. The series of specimens remaining in Bagnall's collection and bearing the above data comprises 2 ♀, 5 ♂ which agree with the description of *sumatrensis*, and 8 ♀, 8 ♂ which agree with the description of *affinis*. One of these male syntypes is here designated lectotype of *affinis*.

Bagnall (1921b) described *crassiceps* from a unique female, but this specimen cannot be distinguished from females of *spinosus*. The remaining six nominal species listed above in the synonymy of *spinosus* were all established for different variants of the male mesothoracic spiracular processes. The holotypes of *gardneri* and *jacobsoni*, as well as the lectotype of *kemneri* designated here, are merely small individuals with small processes, and the 'heavy, blunt tips' of these processes in *malloti* described by Moulton are due to the tips being broken. Moreover, *celebensis* lies within the range of variation of *spinosus* (not of *sumatrensis*, cf. Mound, 1968), and judging from the description, this is also true of *anodon*.

#### SPECIMENS STUDIED.

**Sri Lanka** (Ceylon): holotype ♀ of *spinosus*, No. 54, stuck to sap of fallen tree, between wood and bark, 2.i.1902 (Uzel) (NM). **India**: Malabar, 8 ♀ (BMNH); Taliparamba, 1 ♀ (BMNH), 1 ♀ (SMF); Kumaon, 1 ♀; Kiruvatti, 4 ♂, 2 ♀; Aryankaru, 1 ♀; Dehra Dun, 1 ♂, 1 ♀ (BMNH); holotype ♂ of *gardneri*, Gola-tappar, 14.xi.1922 (N. C. Chatterjee) (CAS); holotype ♂ of *malloti*, Lachiwala, on log of *Mallotus philippensis*, 6.i.1929 (BMNH). **Burma**: holotype ♀ of *crassiceps*, Myawadi, 900 ft [270 m], 24–26.xi.1911 (F. H. Gravely) (BMNH). **Vietnam**: North, 1 ♂, 1 ♀ (BMNH). **Malaya**: Kuala Lumpur, 13 ♂, 12 ♀; Perak, 1 ♂, 1 ♀; Ringlet, 2 ♂; Kuala Trengganu, 1 ♀ (BMNH); Bentong, 1 ♂; Serdang 1 ♂, 1 ♀ (SMF). **Singapore**: 4 ♂, 1 ♀ (BMNH). **Riau (Riouw) Is**: 1 ♀ (SMF). **Sumatra**: 18 ♂, 23 ♀ (BMNH), 17 ♂, 19 ♀ (SMF). **Mentawai Is**: 3 ♂, 1 ♀ (SMF). **Java**: holotype ♂ of *jacobsoni*, Semerang, under bark, 1905 (E. Jacobson) (SMF); lectotype ♂ of *kemneri*, Bogor (Buitenzorg), under *Albizia* bark, 10.xii.1920 (N. A. Kemner) (SMF); Bogor, 24 ♂, 6 ♀ (BMNH), 2 ♂, 3 ♀ (SMF); Jasinga, 1 ♂, 2 ♀ (BMNH); Sindanglaja, 2 ♂, 1 ♀ (SMF). **Borneo**: 1 ♀ (SMF); Sarawak, 4 ♂, 5 ♀; lectotype ♂, paralectotypes 7 ♂, 7 ♀ of *affinis*, Mt Matang 1000 ft [300 m], on dead tree, 16.xii.1913 (G. E. Bryant) (BMNH). **Sulawesi (Celebes)**: 7 ♂, 1 ♀ (BMNH); holotype ♂ of *celebensis* (*de la Savinière*) (MNHN). **Philippines**: 1 ♂, 5 ♀ (SMF). **New Guinea**: 2 ♀ (BMNH), 1 ♂ (SMF). **Solomon Is**: 1 ♀ (BMNH).

#### *Dinothrips sumatrensis* Bagnall

(Figs 20, 22–24, 30, 31)

*Dinothrips sumatrensis* Bagnall, 1908b: 191. LECTOTYPE ♂, SUMATRA (BMNH) [examined].

*Dinothrips furcifer* Schmutz, 1913: 36. Holotype ♂, SRI LANKA (Ceylon) (lost) [not examined]. [Synonymized by Karny 1920b: 203.]

*Dinothrips fulmeki* Priesner, 1959: 55. Holotype ♂, SUMATRA (SMF) [examined]. **Syn. n.**

The published data for the original material of *sumatrensis* were 'Several examples of both sexes and in all stages, SUMATRA, Amsterdam Museum', also 'Three carded males in the Paris Museum, Benghalis, Sumatra (*Maindron* 1885)'. The specimens from Amsterdam were stated to have been sent by J. C. H. Meyere, but recent correspondence with the Zoological Museum, University of Amsterdam, has established that there are no specimens preserved there from the type-series. It would have been out of character for Bagnall, in 1908, to return material to a correspondent. However, Karny (1920b) states that Bagnall sent to him some specimens of *sumatrensis* from the type locality 'Nias' – an island off the western coast of Sumatra. This is interesting because the introduction to Bagnall's paper (1908b: 183) suggests that the type-series was in alcohol,

and an old tube has recently been found in Bagnall's collection labelled by him 'Nias/K. Jordan'. Despite the lack of connection between K. Jordan and J. C. H. Meyere this tube may contain the type-series of *sumatrensis*. The specimens have now been mounted onto slides and represent two species, *sumatrensis* and *spinus*. This mixture is probably the cause of subsequent confusion over the identity of these species. The description of *fulmeki* by Priesner (1959), for example, involves a comparison with specimens of '*sumatrensis*' which were evidently misidentified *spinus*. The lectotype of *sumatrensis* designated here is one of the 'three carded males', now mounted onto a slide, from Sumatra, Benghalis. The antennae are lost but the cheek setae are long and pale and there are 2 pairs of posteroangular pronotal setae.

#### SPECIMENS STUDIED.

**Malaya:** 3 ♂, 10 ♀ Kuala Lumpur (BMNH); 1 ♂, 9 ♀ Pahang (SMF); 1 ♀ Ringlet; 1 ♂, 1 ♀ Perak; 1 ♀, Kuala Trengganu (BMNH). **Riau (Riouw) Is:** 2 ♀ (SMF). **Sumatra:** lectotype ♂ of *sumatrensis* Benghalis, 1885 (*Maindron*) 7004 85; 14 ♂, 14 ♀ (BMNH); holotype ♂ of *fulmeki* Medan, Rimboen, under bark of a cut-down tree, v.1925 (*L. Fulmek*), 2 ♂ paratypes of *fulmeki*, 2 ♂, 3 ♀ with type-data (SMF). **Java:** 1 ♂, 1 ♀ (BMNH). **Borneo:** Sarawak, 6 ♂, 3 ♀ (BMNH), 6 ♂, 2 ♀ (SMF).

### *ELAPHROTHRIPS* Buffa

*Elaphrothrips* Buffa, 1909: 162–163. Type-species: *Idolothrips coniferarum* Pergande, 1896, designated by Andre, 1940.

*Dicaiothrips* Buffa, 1909: 169–170. Type-species: *Thrips schotti* Heeger, 1852, designated by Bagnall, 1910. [Synonymized by Hood, 1927: 238–9.]

*Elaphrothrips* (*Elaphoxothrips*) Bagnall, 1932: 516–517. Type-species: *Kleothrips athletes* Karny, by monotypy.

*Elaphrothrips* (*Cradothrips*) Ananthakrishnan, 1973a: 273. Type-species: *Elaphrothrips* (*Cradothrips*) *insignis* Ananthakrishnan, by monotypy.

Macropterous species of Idolothripini; very variable in size, longest individual 4 or 5 times as long as smallest individual. Head usually elongate, 2.0 to 4.0 times as long as broad, usually with a long projection in front of eyes; eyes large and equally developed on dorsal and ventral surfaces; head with 1 pair of long ocellar setae, often as long as the postoculars, situated posterolateral to the first ocellus, 1 pair of small postocellar setae, 1 pair of postocular setae and 1 pair of long setae on the vertex; some species have a second smaller pair of setae on the vertex behind the first pair of postocular setae; cheeks set with stout spine-like setae, particularly in males. Antennae 8-segmented; segment III about 4 to 7 times as long as broad, with 2 sense cones, IV with 4 sense cones. Pronotum about half as long as head, about 1.5 times as broad as long, with 5 pairs of major setae. Fore femora of ♂ enlarged, usually with a stout sickle-shaped seta at apex; fore tarsal tooth well developed in ♂, very reduced or absent in ♀. Fore wings pale or shaded, slightly broadened in the apical half with 25 to 60 duplicated cilia. Pelta broadly triangular or with lateral lobes which are sometimes separate. Tergites II–VII with 2 pairs of sigmoid wing-retaining setae and several pairs of usually sigmoid accessory setae, but posteromarginal setae of VII straight; sternites II–VIII with several small accessory setae, sometimes arranged in a row; sternite IX of males with a pair of large spines (cf. *Dinothrips*). Tube with straight sides evenly narrowing to apex, shorter than total head length and not bearing any obvious lateral setae.

*Elaphrothrips* is a large pantropical genus in which many species show confusing patterns of structural variation, both between sexes and also between different-sized individuals of the same sex. At present it is not possible to distinguish between differences due to allometric growth and differences due to geographical isolation with any great certainty. In the present account only 17 species from the Oriental Region are recognized and 15 new synonyms are established. Several of these species are widespread, e.g. *denticollis*, *malayensis* and *spiniceps* (Map 1), and detailed studies may eventually demonstrate that these are actually species-groups. However, in view of the intraspecific variation found in some populations, and in view of the few populations which have ever been sampled and studied satisfactorily, the species concepts adopted here are considered to be of greater practical value than those adopted in previous studies. Even with the present analysis it is remarkable how several species have been found to coexist at some sites, e.g. *bakeri*, *curvipes*, *denticollis* and *sensitivus* in Malaya and Java (Table 1).

**Table 1** *Elaphrothrips* species from (a) Malaya and (b) Java

(a)	Malaya											
L. A. Mound												
Collection	9	39	42	51	81	83	90	104	106	110	111	
Nos.												
<i>bakeri</i>	-	-	-	1 ♀	3 ♂, 1 ♀	3 ♂, 2 ♀	-	-	1 ♀	1 ♀	-	
<i>curvipes</i>	-	2 ♂	-	-	-	1 ♂	1 ♀	-	1 ♀	1 ♂	1 ♂	
<i>denticollis</i>	1	-	-	-	2 ♂, 2 ♀	11 ♂, 8 ♀	-	-	-	1 ♂, 2 ♀	-	
<i>jacobsoni</i>	-	-	-	-	-	-	-	1 ♂	1 ♀	1 ♂	-	
<i>malayensis</i>	1 ♂, 1 ♀	-	1 ♀	-	2 ♂, 1 ♀	-	-	-	-	-	-	
<i>sensitivus</i>	-	-	-	-	-	-	-	-	-	-	-	

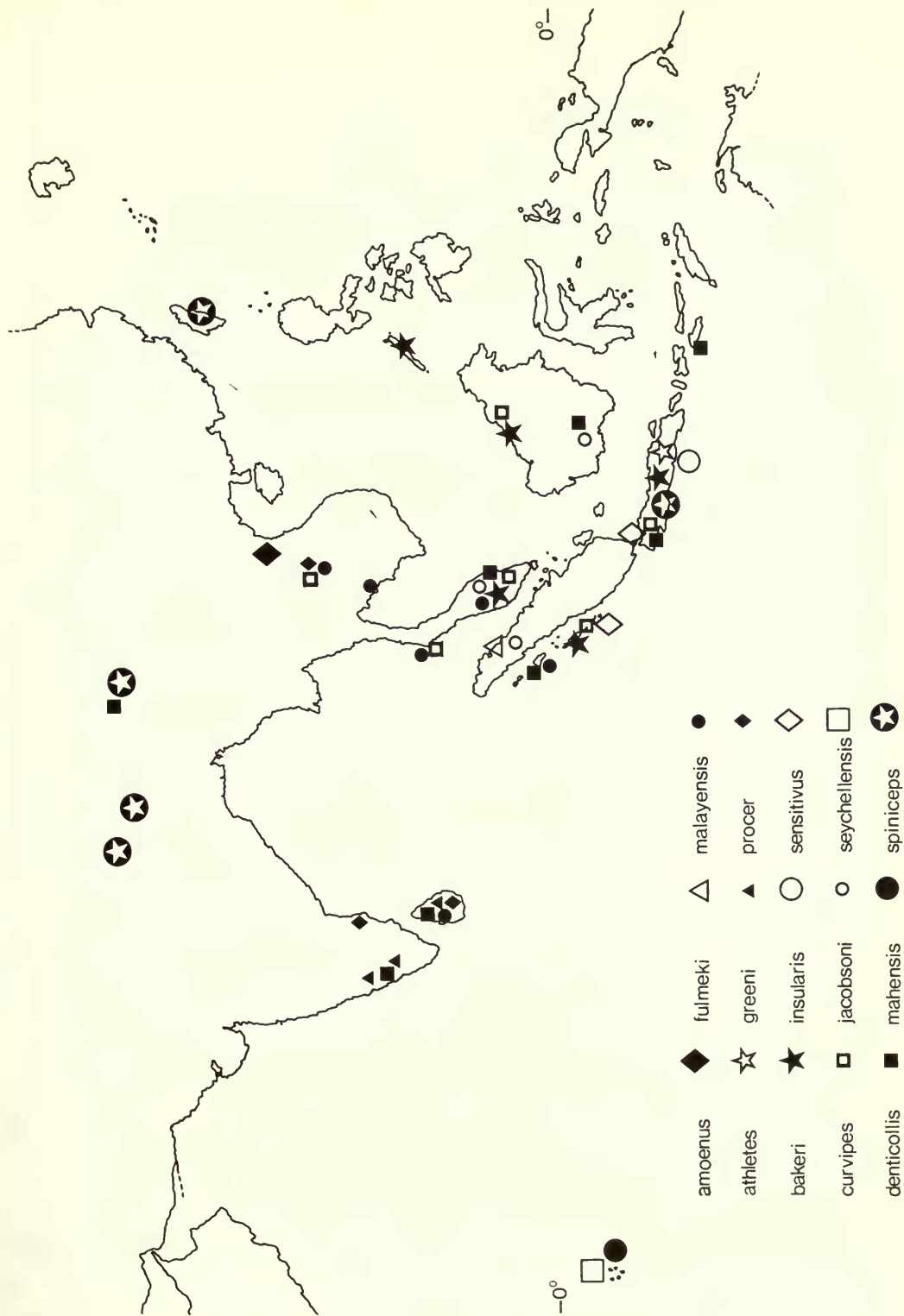
  

(b)	Java								
L. A. Mound									
Collection	119	126	162	166	177	185	192	193	
Nos.									
<i>bakeri</i>	-	-	-	-	-	-	-	1 ♂, 3 ♀	
<i>curvipes</i>	-	-	-	1 ♂	-	1 ♂	-	-	
<i>denticollis</i>	-	-	-	1 ♂	1 ♀	-	-	3 ♂, 5 ♀	
<i>jacobsoni</i>	-	-	-	-	-	-	-	-	
<i>malayensis</i>	-	-	-	-	-	-	-	-	
<i>sensitivus</i>	1 ♂	7 ♂, 6 ♀	1 ♀	4 ♂	17 ♂, 11 ♀	-	3 ♂, 6 ♀	4 ♂, 1 ♀	

Buffa distinguished *Elaphrothrips* from *Idolothrips* by the head being slightly produced in front of the eyes. He removed *coniferarum* Pergande and *flavipes* Hood from *Idolothrips* and included them in his new genus. He also erected the genus *Dicaiothrips* for *schotti* Heeger and the African species *bottegii* which have a long head production and a large sickle-shaped seta on the male femur.

In the Austro-Oriental region *Elaphrothrips* is related to the genus *Mecynothrips* which has three pairs of sigmoid wing-retaining setae on tergites III to V; *Dinothrips* which has straight tergal accessory setae; *Pyrgothrips* in which the eyes are prolonged ventrally, and the monotypic *Tiarothrips* which has a distinctive head shape with a very long production in front of the eyes. The first ocellus and antecellar setae of this latter genus, however, are situated between the anterior margin of the eyes and not on the prolongation as they are in the other related genera. The African genus *Derothrips* is also similar to *Elaphrothrips* but, as in *Pyrgothrips*, it has the eyes prolonged ventrally. At the eastern end of its range (Map 1) *Elaphrothrips* appears to be replaced by the closely related genus *Mecynothrips*.

*Elaphrothrips apertus* Girault from Queensland, Australia, was transferred to *Bolothrips* and synonymized with *badius* (Hood) by Mound (1974). *Elaphrothrips crassiceps* Bagnall from Burma is transferred above to *Dinothrips* (p. 169) and synonymized with *spinus* (Schmutz). Ananthakrishnan (1973a: 282) synonymized *Elaphridia agasthya* (Ramakrishna) with *crassiceps* which he then designated as the type-species of his genus *Elaphridia*. However, the unique holotype female of *crassiceps* differs from a syntype female of *agasthya* which has been studied in the shape of the pelta and the number of pairs of sigmoid wing-retaining setae on the tergites. *E. crassiceps* has a pelta with small, separate lateral lobes and tergites with 2 pairs of sigmoid wing-retaining setae. *E. agasthya* has an entire pelta without separate lateral lobes and tergites with only 1 pair of sigmoid wing-retaining setae which are situated on the posterior margin. *E. agasthya*, the type-species of *Elaphridia*, is therefore regarded as a different species from *Elaphrothrips crassiceps*, indeed it should be placed in a different tribe. *Elaphrothrips thoreauini* Girault (1929a) was described from an unspecified number of syntypes of unspecified sex from Queensland, Australia.



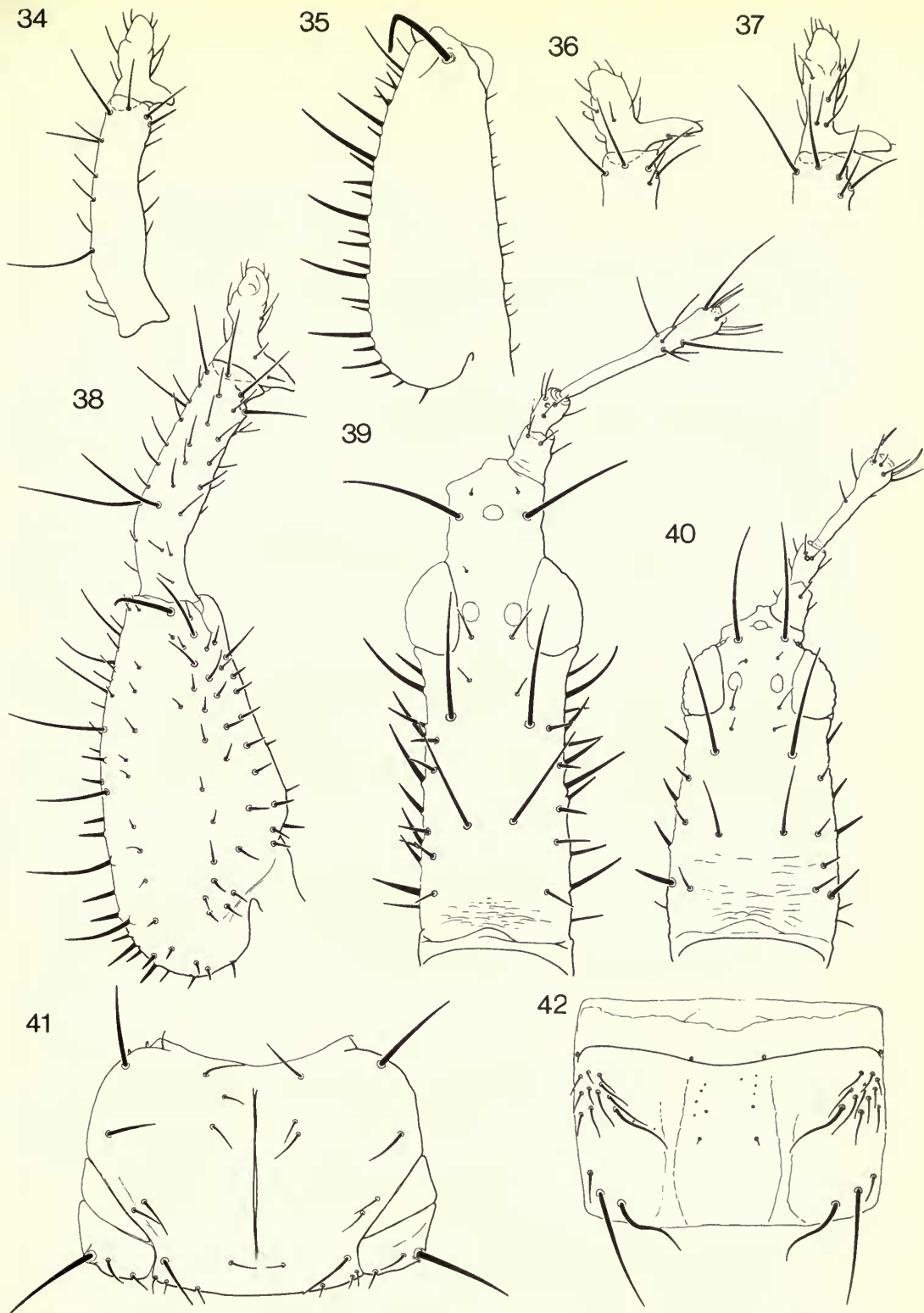
Map 1 Distribution of *Elaphrothrips* species in the Oriental Region.

There is a slide in the Queensland Museum labelled by Girault '*Elaphrothrips thoreau- | ini* Girault Type ♀ / (outer) Taringa, 26th. Jany. 1929 / under bark living gum / trees / *Horistothrips / corticis* Girault / Types'. This slide bears 3 ♀, 1 ♂ under one cover slip and 1 ♀ under another. The 2 ♀, 1 ♂ grouped together have dark legs with pale knees and tarsi which correspond to the description of *H. corticis*. The smallest ♀ with these and the ♀ under the separate cover slip have completely pale legs and represent the second species *thoreauini*. The ♀ under the separate cover slip is here designated as LECTOTYPE and the species should now be referred to as *Horistothrips thoreauini* (Girault) **comb. n.**

The length of the head prolongation is measured laterally from the base of the antenna to the anterior margin of the eye, and the breadth is measured across the base anterior to the eyes.

#### Key to the Oriental species

- |    |   |                           |
|----|---|---------------------------|
| 1  | Cheek setae shaded, pale to dark . . . . .  | 2                         |
| -  | Cheek setae colourless, with no trace of pigment . . . . .  | 8                         |
| 2  | Head prolongation very short, 8 times as broad as long; antennal segment III less than 5 times as long as broad; all tibiae dark; basal stem of antennal segments IV and V pale; ♀ fore femur with a dark tubercle on inner margin . . . . .  | <i>insignis</i> (p. 181)  |
| -  | Head prolongation 4 or less times as broad as long; ♀ fore femur without a tubercle . . . . .   | 3                         |
| 3  | Antennal segment III 6 times as long as broad; head prolongation 4 times as broad as long; all tibiae dark; antennal segment III pale with a narrow dark apical ring, basal stem of IV and V pale . . . . .   | <i>mahensis</i> (p. 182)  |
| -  | Antennal segment III less than 5.2 times as long as broad; head prolongation less than 3.5 times as broad as long . . . . .   | 4                         |
| 4  | Head prolongation 1.8 times as broad as long; antennal segment III with small area of apical dark shading, basal stem of IV-VI pale, length of III and IV subequal; apices of tibiae and tarsi pale, ♂ foretarsal tooth slim; pelta (Fig. 49) . . . . .   | <i>amoenus</i> (p. 176)   |
| -  | Head prolongation more than 2 times as broad as long; antennal segment IV-VI with darker basal stems . . . . .  | 5                         |
| 5  | Hind tibiae with apical half, other tibiae with apices and tarsi pale; antennal segment III pale with a slightly shaded apex, segments IV and V with patchy shading in basal stem; major and minor ♂ with concave inner margin of fore tibiae (Fig. 34) . . . . .   | 6                         |
| -  | All tibiae completely dark; basal stem of antennal segments IV and V evenly dark . . . . .  | 7                         |
| 6  | Antennal segment III equal to or shorter than IV; distance between base of left ocellar seta and left postocular seta greater than the length of either of these setae; pelta (Fig. 47) . . . . .   | <i>curvipes</i> (p. 178)  |
| -  | Antennal segment III longer than IV; distance between base of left ocellar seta and left postocular seta less than the length of either of these setae . . . . .  | <i>notabilis</i> (p. 182) |
| 7  | Dark apex of antennal segment III extending beyond apical bulge, about one-third length of segment; head prolongation 2.1 times as broad as long; pelta with lateral lobes separate or only narrowly joined to centre (Fig. 43); anteroangulars of ♂ longer and stouter than small mid-lateral setae, ♀ with posteroangular setae short, little more than 0.5 times total median length of pronotum (Fig. 41) . . . . . | <i>jacobsoni</i> (p. 181) |
| -  | Dark apex of antennal segment III not extending beyond apical bulge, about one-quarter length of segment; head prolongation 2.4-3.4 times as broad as long; pelta with lateral lobes more broadly joined to centre (Fig. 52); anteroangulars of ♂ shorter than well-developed mid-laterals, ♀ with posteroangular setae long, more than 0.75 times total median length of pronotum . . . . .                            | <i>bakeri</i> (p. 176)    |
| 8  | Head prolongation 3.0 to 5.0 times as broad as long; antennal segment III 5.1 or less times as long as broad; all tibiae completely dark . . . . .  | 9                         |
| -  | Head prolongation 1.0 to 3.0 times as broad as long; antennal segment III often longer; tibiae sometimes partly pale . . . . .  | 11                        |
| 9  | Head prolongation 4.0 to 5.0 times as broad as long (Fig. 40); dark apex of antennal segment III broad, more than one-third length of segment, IV and V sometimes with paler basal stem; lateral lobes of pelta narrowly joined to centre (Fig. 44) . . . . .   | <i>spiniceps</i> (p. 184) |
| -  | Head prolongation 3.0 to 4.0 times as broad as long; dark apex of antennal segment III not as extensive . . . . .   | 10                        |
| 10 | Antennal segments IV and V usually with paler base; lateral lobes of pelta narrowly joined to centre (Fig. cf. <i>bakeri</i> ) . . . . .  | <i>procer</i> (p. 183)    |



Figs 34-42 *Elaphrothrips* species. 34, *E. curvipes*, ♂ fore tibia and tarsus. 35, *E. denticollis* (*mucronatus* holotype), ♂ fore femur. 36, 37, ♂ fore tibiae and tarsi, (36) *E. sensitivus* holotype ♂; (37) *E. denticollis* (*sumbanus* holotype ♂). 38, *E. denticollis* (*productus* holotype ♂). 39, *E. greeni* (*bowieri* holotype ♂). 40, *E. spiniceps* ♀. 41, *E. jacobsoni* ♂. 42, *E. bakeri* ♂, tergite III.

- Antennal segments IV and V completely dark; pelta entire (Fig. 48), small species from Seychelles . . . . . *seychellensis* (p. 184)
- 11 All tibiae with apical half pale; antennal segment III more than 6 times as long as broad, basal stem of antennal segments IV and V usually slightly paler; head prolongation 1.0 to 1.5 times as broad as long (Fig. 39) . . . . . *greeni* (p. 180)
- At least mid tibiae completely dark; antennal segment III usually less than 6 times as long as broad, if more than 6 times as long as broad, then antennal segments IV and V with dark basal stem . . . . . 12
- 12 Basal stem of antennal segments IV and V pale, yellowish, distinctly paler than apex of segment . . . . . 13
- Basal stem of antennal segments IV and V as dark as apex of segment, or light brown, only slightly paler than apex of segment . . . . . 14
- 13 Basal one-fifth of antennal segment VI clear yellow, distinctly paler than distal part of segment, antennal segment III distinctly longer than IV; pelta (Fig. 45) . . . . . *fulmeki* (p. 180)
- Antennal segment VI completely dark, antennal segments III and IV subequal in length . . . . . *malayensis* (p. 182)
- 14 Antennal segment III uniformly brown . . . . . *athletes* (p. 176)
- Basal stem of antennal segment III distinctly paler than apex . . . . . 15
- 15 Hind tibiae long, equal to or longer than median head length including the head production; antennal segment III longer than IV and 4.7 to 6.2 times as long as broad; major pair of median head setae usually long and stout, four-fifths or more times length of postocular setae; basal wing setae  $B_2$  long,  $B_1$  1.0 to 1.3 times as long as  $B_2$ ; ♂ fore tarsi almost 3 times as long as broad (Figs 37, 38); pelta (Fig. 46) . . . . . *denticollis* (p. 179)
- Hind tibiae short, equal to or shorter than median head length; antennal segment III equal to or shorter than IV and 4.0 to 5.5 times as long as broad; major pair median head setae usually short, two-thirds or less times length of postocular setae; basal wing setae  $B_2$  short,  $B_1$  1.3 to 2.0 times as long as  $B_2$ ; ♂ fore tarsi less than 2 times as long as broad (Fig. 36); pelta (Fig. 50) . . . . . *sensitivus* (p. 183)

*Elaphrothrips amoenus* Priesner

(Fig. 49)

*Elaphrothrips amoenus* Priesner, 1935a : 174. Holotype ♂, VIETNAM (NORTH) (SMF) [examined].

This species is known only from the holotype. It has a long head production, dark cheek setae and pale yellow basal stems of antennal segments III–VI. It is similar only to the stouter *fulmeki* which differs in having pale cheek setae.

SPECIMEN STUDIED.

Vietnam (North): Langson, holotype ♂, 6.ii.1925 (SMF).

*Elaphrothrips athletes* (Karny)

*Kleothrips athletes* Karny, 1923 : 355. Holotype ♂, JAVA (SMF) [examined].

*Elaphrothrips (Elaphoxothrips) athletes* Karny; Bagnall, 1932 : 516–517.

This species is known only from the holotype. It is a major male with a stout fore tarsal claw, pale cheek setae and a long head production. It is most similar to *denticollis* but may be distinguished by the colour of the third antennal segment. The antennae of the *athletes* holotype are poorly preserved but segment III appears to be uniformly pale brown.

SPECIMEN STUDIED.

Java: Semarang, holotype ♂, ix.1909 (*E. Jacobson*) (SMF).

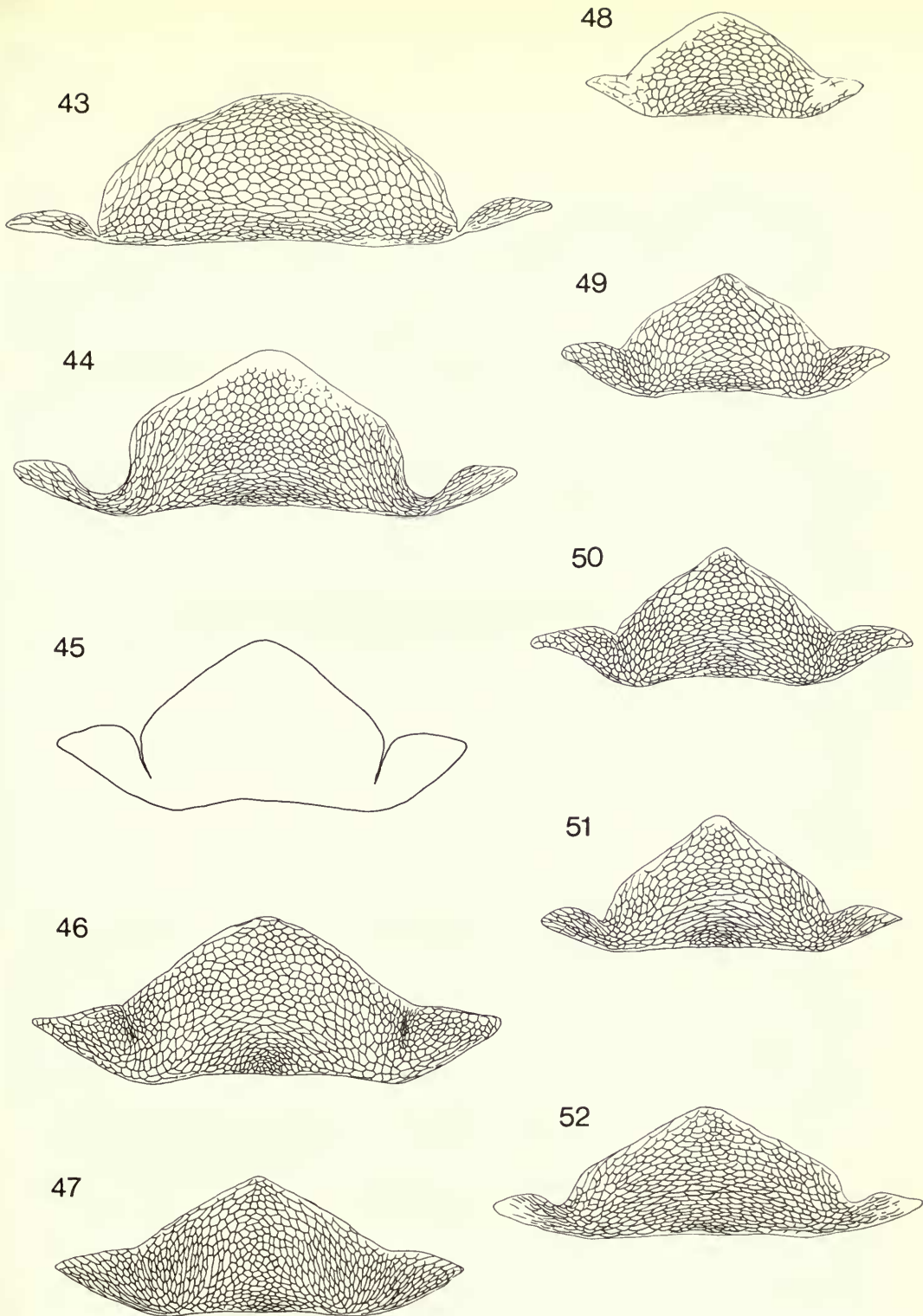
*Elaphrothrips bakeri* (Karny)

(Figs 42, 51, 52)

*Dicaiothrips bakeri* Karny, 1920b : 206. Holotype ♂, PHILIPPINES (SMF) [examined].

*Elaphrothrips mentaweiensis* Priesner, 1929b : 201. Holotype ♂, MENTAWAI IS (SMF) [examined]. **Syn. n.**





Figs 43–52 Male peltas of *Elaphrothrips* species. 43, *E. jacobsoni*; 44, *E. spiniceps*; 45, *E. fulmeki*; 46, *E. denticollis*; 47, *E. curvipes*; 48, *E. seychellensis*; 49, *E. amoenus*; 50, *E. sensitivus*; 51, *E. bakeri*; 52, *E. bakeri* (v. *depokensis* syntype).

*Elaphrothrips bakeri* var. *depokensis* Priesner, 1935a : 159. 10 syntype ♂, ♀, JAVA (SMF) [1 ♂, 1 ♀ examined].

**Syn. n.**

*Elaphrothrips imitator* Priesner, 1935b : 249. Holotype ♂, JAVA (SMF) [examined]. **Syn. n.**

This species is dark brown except for antennal segment III which is pale yellow with a small brown patch at the extreme apex. The head has a relatively short prolongation in front of the eyes, and the cheek setae are dark.

The holotype of *bakeri* is a major male with an enlarged fore femur and a stout fore tarsal tooth. The holotype of *mentaweiensis* is a minor male with a slim fore tarsal tooth but is otherwise inseparable from *bakeri*.

*E. bakeri* var. *depokensis* was described from 10 male and female syntypes differing from *bakeri* in the relative lengths of antennal segments IV and V. One major male and one female with type-data and labelled 'type' by Priesner have been examined and are indistinguishable from *bakeri*.

The holotype major male and female paratype of *imitator* which were apparently collected together have also been examined. They are rather poorly preserved specimens which differ from *bakeri* in the diffuse colour of antennal segment III, and in the slightly shorter segment IV and head prolongation. These characters, however, are not regarded as sufficient to distinguish the specimens as a separate species.

*E. bakeri* is most similar to *procer*. The latter species, from Sri Lanka and India, differs in having pale cheek setae and pale basal stems of antennal segments IV and V. It may also be distinguished from the dark brown species *jacobsoni* by the extent of the apical dark patch on antennal segment III, the shape of the pelta and the lengths of the pronotal posteroangular setae.

#### SPECIMENS STUDIED.

**Malaya:** Negeri, 2 ♂ on *Dryobalanops aromatica*, 24.vii.1970; Damansara Forest Reserve, 1 ♀ on dead branches and leaves, 3.x.1973 (*L. A. Mound*); Gombak, 2 ♀ 3 ♂ on dead leaves on branches, 7.x.1973, 1 ♀ on dead branch, 13.x.1973 (*L. A. Mound*); Genting Highlands 3000 ft [1000 m], 2 ♀, 1 ♂ on dead leaves 14.x.1963, Tea Estate, 3500 ft [1150 m], 1 ♀, 3 ♂ on dead leaves on branch, 6.x.1973 (*L. A. Mound*) (BMNH). **Mentawai Is:** Siberoet, holotype ♂ of *mentaweiensis* from dried leaves, 24.ix.1924 (*H. H. Karny* 101) (SMF); Sipora, 2 ♀, 2 ♂ paratypes of *mentaweiensis* (*H. H. Karny* 221) (BMNH), 1 ♀ paratype of *mentaweiensis* 9.x.1924 (*H. H. Karny*) (SMF). **Java:** Jasinga Forest Reserve, 3 ♀, 1 ♂ on dead leafy branch, 30.x.1973 (*L. A. Mound*) (BMNH); Depok, 1 ♀, 1 ♂ syntypes of *depokensis* on bushes of fresh and dried leaves, 14.v.1929 (*H. H. Karny*); Halte Dawoan, holotype ♂ with 1 ♀ paratype of *imitator* on *Hevea*, xi.1906 (*De Vos van Nic.*) (SMF). **Borneo:** Sarawak, 1 ♂ (*C. R. Wallace*) (BMNH); 6 ♂, 5 ♀ on dead leaves, viii.1972 (*Kizasawa & Sohma*) (SO, Tokyo). **Philippines:** Palawan, Puerto Princesa, holotype ♂ of *bakeri* (*Baker*) (SMF).

#### *Elaphrothrips coreanus* Woo

*Elaphrothrips coreanus* Woo, 1974 : 69. Holotype ♀, KOREA (Dept. Agric. Biol., Seoul Nat. Univ., Suweon) [not examined].

The holotype of this species and the specimen referred to as *Elaphrothrips antennalis* Bagnall by Woo (1974) have not been available for study. The descriptions and illustrations, however, would indicate that neither specimen belongs in this genus.

#### *Elaphrothrips curvipes* Priesner

(Figs 34, 47)

*Elaphrothrips curvipes* Priesner, 1929b : 206. 2 syntype ♂, MENTAWEI IS (SMF) [1 ♂ examined].

*Elaphrothrips karnyi* Priesner, 1935b : 246. Holotype ♀, SUMATRA (SMF) [examined]. **Syn. n.**

*Elaphrothrips secus* Ananthakrishnan, 1973a : 278. Holotype ♀, INDIA (TNA) [examined]. **Syn. n.**

This species has lightly shaded cheek setae, characteristically patchy shading in the basal stems of antennal segments IV and V and both major and minor males have a concave inner margin to the fore tibiae. It is most similar to *notabilis* which differs in having much longer major head and pronotal setae.

## SPECIMENS STUDIED.

**India:** West Bengal, Kalimpong, holotype ♀, paratype ♂ of *secus*, on dry twigs, 20.iv.1969 (*T. N. Ananthakrishnan*) (TNA). **Laos:** Vang-Viong, 1 ♂, 1 ♀ on dead leaves, 21.iii.1975 (*S. Yamaguchi*) (SO, Tokyo). **Thailand:** Ban lung tong, Phuket Is, 2 ♂ on dead leaves, 11.i.1975 (*S. Yamaguchi*) (SO, Tokyo). **Malaya:** Negri Sembilan, 2 ♀, 1 ♂ on oil palms (*Chemara Research Station*); Gombak, on dead branches, 3 ♂, 2 ♀, 30.ix.–13.x.1973 (*L. A. Mound*); Genting Highlands 3000 ft [1000 m], 1 ♂ on dead leaves, 14.x.1973 (*L. A. Mound*); Kuala Lumpur Agricultural University, 1 ♂ on rolled leaves of *Pittosporum ferrugineum*, 15.x.1973 (*L. A. Mound*) (BMNH). **Sumatra:** Fort de Kock, 920 m, ♀ holotype of *karnyi* from a deserted larval borehole in a plant stem, xi.1920 (*E. Jacobson*) (SMF). **Mentawai Is:** Sipora, Sioban, 1 ♂ syntype of *curvipes* from dried leaves, 29.x.1924 (*H. H. Karny* 221) (SMF). **Java:** Bogor Gardens, 1 ♂ on dead leaves, 25.x.1973, 1 ♂ on dead creepers, 28.x.1973 (*L. A. Mound*) (BMNH).

*Elaphrothrips denticollis* (Bagnall)

(Figs 35, 37, 38, 46)

- Dicaiothrips denticollis* Bagnall, 1909b : 527. Holotype ♀, NIAS (BMNH) [examined].  
*Elaphrothrips beesoni* Ramakrishna, 1934 : 7. Syntypes ♂, ♀, INDIA (TNA) [2 ♂ examined]. **Syn. n.**  
*Elaphrothrips mucronatus* Priesner, 1935a : 167. Holotype ♂, JAVA (SMF) [examined]. [Synonymized with *beesoni* by Ananthakrishnan, 1973 : 278.]  
*Elaphrothrips sumbanus* Priesner, 1935a : 169. Holotype ♂, SUMBA (SMF) [examined]. **Syn. n.**  
*Elaphrothrips productus* Priesner, 1935a : 170. Holotype ♂, SUMBA (SMF) [examined]. **Syn. n.**  
*Elaphrothrips productus* f. *obscuricornis* Priesner, 1935a : 171. Syntypes ♂, ♀, SUMBA (SMF) [1 ♂ ? syntype examined]. **Syn. n.**

From recent material collected in Malaya and Java it appears that the males of this species are very variable. The large males from this material have a slim fore tarsal tooth, a slim fore femur with a large, pale sickle-shaped seta at the apex and a pair of well-developed median setae on the vertex. This form corresponds with the holotype male of *mucronatus*.

A male labelled by Priesner *E. productus* f. *obscuricornis* has been examined. It is not labelled 'type', but it has the same data as the *productus* holotype. Since the type-data for f. *obscuricornis* was not indicated by Priesner, this specimen is assumed to be a syntype. It has a slim fore tarsal claw, a slim fore femur with a smaller, darker, sickle-shaped seta at the apex, and a pair of well-developed median setae on the vertex. This specimen is indistinguishable from the smaller males in the recently collected series of this species.

The holotype male of *sumbanus* differs from the previous form in having finer median setae on the vertex and a longer third antennal segment. This segment is 6.2 times as long as broad in the holotype, whereas in the other specimens it is only 4.7 to 5.7 times as long as broad.

The holotype male of *productus* is a large major male with a stout fore tarsal claw, a greatly enlarged fore femur with a small dark sickle-shaped seta at the apex and fine median setae on the vertex as in *sumbanus*. Ananthakrishnan (1973a) regarded *productus* as a distinct species, differing mainly in its colouring. The long series of specimens in the British Museum (Natural History), however, shows this variation in antennal and fore tibial colour.

The holotype of *denticollis* is a unique female. It is in poor condition with most of the head setae missing but it has one complete antenna and six legs. It is indistinguishable from the females associated with the male holotypes of *mucronatus*, *productus* and *sumbanus*, and also from recently collected females from Malaya and Java.

*E. beesoni* was described from numerous specimens collected by the Sandal Insect Survey at Fraserpet, Coorg, 1930. Ramakrishna compares his species with *greeni* which differs in colour and the relative lengths of antennal segments III and IV. In *greeni* they are subequal in length and in *beesoni* segment III is longer than IV. The tibiae of *beesoni* are also dark and differ from those of *greeni*, which are distinctly bicoloured. The two male syntypes of *beesoni* which have been examined lack antennae but in the shape of the head and fore legs and the colour of the tibiae they are inseparable from the *mucronatus*-type males. Ananthakrishnan (1973a) synonymized *greeni* with *beesoni* but for the above reasons *greeni* is kept here as a distinct species.

However, it is possible that *beesoni* was based on a mixed series, especially as it was collected with *chandana* (see *procer*).

The characters distinguishing the two males of *sumbanus* and *productus* are not regarded as sufficient to separate these from the remaining material listed below. This is here interpreted as representing one variable species which is widespread between Sri Lanka and Borneo.

#### SPECIMENS STUDIED.

**Sri Lanka** (Ceylon): Peradeniya, 1 ♂, 25.vii.1913 (*A. Rutherford*) (BMNH). **India**: Coorg, 2 ♂ syntypes of *beesoni* on Sandal, 24.x.1930 (TNA). **Burma**: Mishmi Hills, Delei River 1700 ft [570 m], 1 ♂, iii.1935 (*M. Steele*) (BMNH). **Malaya**: Selangor, 1 ♀, iii.1898 (*Biro*); 1 ♂, on *Flindersia brayliana* leaves, 3.xii.1956 (Forest Research Institute); Kuala Lumpur, 1 ♀ on *Citrus medica* v. *acida*, 7.ix.1928 (*G. H. Corbett*); Gombak, 8 ♀, 11 ♂ on dead leaves on branches, 7.x.1973 (*L. A. Mound*); Genting Highlands 3000 ft [1000 m], 2 ♀, 1 ♂ on dead leaves, 14.x.1973 (*L. A. Mound*); Genting Tea Estate 3500 ft [1150 m], 2 ♀, 2 ♂ on dead leaves on branch, 6.x.1973 (*L. A. Mound*) (BMNH). **Java**: Bogor Gardens, 1 ♂ on dead leaves, 25.x.1973, 1 ♀ on large dead leaves on tree, 26.x.1973 (*L. A. Mound*); Jasinga Forest Reserve, 5 ♀, 3 ♂ on dead leafy branch, 30.x.1973 (*L. A. Mound*) (BMNH); Depok, holotype ♂ and paratype ♀ of *mucronatus* on bushes of fresh and dried leaves, 14.v.1929 (*H. H. Karny*) (SMF). **Nias**: holotype ♀ of *denticollis* (*K. Jordan*) (BMNH). **Sumba**: Kambera, holotype ♂ and paratype ♀ of *productus*, 1 ♂ ? syntype of *productus* f. *obscuricornis* (SMF), 3 ♀, iii.1925, 1 ♀, 2 ♂, 6.iii.1925, 1 ♂, 12.iii.1925 (*Dammerman*); Kananggar, 700 m, 1 ♂, v.1925 (*Dammerman*) (BMNH); Laora 100 m, holotype ♂ and paratype ♀ of *sumbanus*, v.1925 (*Dammerman* 89) (SMF). **Borneo**: 3 ♂ on dead leaves, viii.1972 (*Mizusawa & Soma*) (SO, Tokyo).

### *Elaphrothrips fulmeki* Priesner

(Fig. 45)

*Elaphrothrips fulmeki* Priesner, 1935b : 242. Holotype ♂, SUMATRA (SMF) [examined].

This species is known only from the holotype which is a major male. It has a broad fore tarsal claw, pale cheek setae and pale basal stems to antennal segments III–VI. It is distinguished from *amoenus* by the pale cheek setae and segment III being longer than IV. It is most similar to *malayensis* and differs only by having a pale base to antennal segment VI which in *malayensis* is completely dark. All the males of *malayensis* that have been examined, however, are small and it is possible that *fulmeki* represents the major form of this species. It is also possible that *sensitivus* is a larger darker form of *malayensis*, but these major males differ from *fulmeki* in having dark antennal segments IV–VI, a longer more slender fore tarsal claw and a differently shaped pelta. If *malayensis* and *sensitivus* are one species then *fulmeki* must represent a second species.

#### SPECIMEN STUDIED.

Holotype ♂, **Sumatra**: Medan (*L. Fulmek* 24) (SMF).

### *Elaphrothrips greeni* (Bagnall)

(Fig. 39)

*Dicaiothrips greeni* Bagnall, 1914 : 289. Holotype ♂, SRI LANKA (Ceylon) (BMNH) [examined].

*Dicaiothrips bowieri* Vuillet, 1914 : 276. Holotype ♂, INDIA (BMNH) [examined]. [Synonymized by Mound, 1968 : 96.]

*Elaphrothrips micidus* Ananthakrishnan, 1973a : 275. Holotype ♀, INDIA (TNA) [not examined]. **Syn. n.**

The holotype of *greeni* lacks antennae and has only one fore leg which is without tarsi. Abdominal segment VII is missing and the detached segments VIII–X are from a female. The fore femur, however, is enlarged as in males and it would appear that the detached abdominal segments are from another specimen. One unidentified male in the British Museum (Natural History), mounted and labelled by Bagnall 'CEYLON / E. E. Green 2821' appears to be the same species. This, also, is without antennae but does have two complete fore and hind legs and one complete mid leg. The tarsi and apical half of all tibiae are pale. The original description would suggest that antennal segments IV and V have a slightly paler stem. Three other specimens in the British Museum (Natural History), two males and one female from India, have all tibiae and antennal

segments III–VI distinctly bicoloured. The holotype of *bowieri* has bicoloured tibiae but the basal stems of antennal segments IV–VI are dark. The ♂ paratype of *bowieri* has darker fore tibiae and tarsi but antennal segments IV and V have patchy, somewhat paler shading on the basal stem. Mound (1968), recognizing this variability in colour, synonymized *bowieri* with *greeni*. The male and female paratypes of *micidus* which have been examined have all tibiae bicoloured and pale basal stems to antennal segments III–V. They are therefore here synonymized with *greeni*. The relationship of this species to *beesoni* (cf. Ananthakrishnan, 1973a) is discussed under *denticollis*.

**SPECIMENS STUDIED.**

**Sri Lanka** (Ceylon): Peradeniya, holotype ♂ of *greeni* on decayed *Phaseolus* pods (E. E. Green 3023); 1 ♂, 'CEYLON' (E. E. Green 2821), no further data (BMNH). **India**: Nilgiri Hills, holotype and paratype ♂ of *bowieri*, Coonoor 2000 m, 14–31.vii.1901 (*M. Maindron*), 1 ♂, Mysore (*Campbell*); Kiruvatti, 1 ♀ on dry leaves and twigs, 17.ix.1969 (*T. N. Ananthakrishnan*); Trichur, 1 ♂ on *Areca* sheath, 17.viii.1966 (*T. N. Ananthakrishnan*) (BMNH); Yelagiri, 1 ♂, 1 ♀ paratypes of *micidus* on dry leaves, 8.x.1970 (*T. N. Ananthakrishnan*) (TNA).

*Elaphrothrips insignis* Ananthakrishnan

*Elaphrothrips* (*Cradothrips*) *insignis* Ananthakrishnan, 1973a : 273. Holotype ♀, INDIA (TNA) [not examined].

Ananthakrishnan erected a subgenus for this new species described for two females and two males. It is characterized by the presence of a tooth on the inner margin of the female fore femur. The head prolongation is very short, about 8 times as broad as long, antennal segment III is less than 5 times as long as broad and longer than IV, antennal segments III–V have pale basal stems and all tibiae are dark brown. The two specimens examined are assumed to be paratypes although the published date of collection was 19.xi.1970.

**SPECIMENS STUDIED.**

**India**: Almora, U.P., 1 ♂, 1 ♀ paratypes on dry twigs, 19.x.1970 (TNA).

*Elaphrothrips insularis* Priesner

*Elaphrothrips insularis* Priesner, 1928a : 57. Holotype ♂, JAVA (Hamburg Museum, destroyed).

This species was described from a unique male which was destroyed in the Hamburg Museum. It was not illustrated and the original description is insufficient to distinguish it from, or synonymize it with, other species in the genus from the Oriental Region. However, it would appear to resemble most closely *fulmeki* with the head prolongation 1.9 times as broad as long, antennal segments III–VI with pale basal stems, segment III longer than IV, and a stout fore tarsal claw. The name *insularis* is best regarded as a nomen dubium at present.

*Elaphrothrips jacobsoni* Priesner

(Figs 41, 43)

*Elaphrothrips jacobsoni* Priesner, 1935b : 243. Holotype ♂, SUMATRA (SMF) [examined].

This is a very large black species, similar to *bakeri*, with dark cheek setae. It may be distinguished mainly by the more extensive dark apex of antennal segment III, the slightly shorter head prolongation and the lateral lobes of the pelta being separate or only narrowly joined to the centre.

**SPECIMENS STUDIED.**

**Malaya**: Ringlet, 1 ♂ on dead branch, 12.x.1973; Gombak, 1 ♀ on dead branch, 13.x.1973; Genting Highlands, 3000 ft [1000 m], 1 ♂ on dead leaves, 14.x.1973 (*L. A. Mound*) (BMNH). **Sumatra**: Fort de Kock, 920 m, holotype ♂ and 1 ♀ paratype on plant detritus, vii.1922 (*E. Jacobson*) (SMF). **Borneo**: 1 ♂ under bark, 1973 (*T. Kubayashi*) (SO, Tokyo).

### *Elaphrothrips mahensis* (Bagnall)

*Dicaiothrips mahensis* Bagnall, 1921a : 283. Holotype ♂, SEYCHELLES (BMNH) [examined].

*Dicaiothrips rex* Bagnall, 1921a : 281. Holotype ♂, SEYCHELLES (BMNH) [examined]. [Synonymized by Mound, 1968 : 97.]

*Dicaiothrips hystrix* Bagnall, 1921a : 284. Holotype ♀, SEYCHELLES (BMNH) [examined]. [Synonymized by Mound, 1968 : 97.]

This species has a short head prolongation, a long antennal segment III and a distinctive antennal colour. Segment III is very pale with a thin dark apical ring and segments IV and V have pale basal stems with a thin dark basal ring. The holotypes of *mahensis* and *rex* represent the major male form and *hystrix* represents the female form of this species. It is most similar to *procer* which differs in having pale cheek setae and not so distinctly bicoloured antennal segments IV and V.

#### SPECIMENS STUDIED.

**Seychelles:** Mahé, nr Morne Blanc, holotype ♂, 1 ♂ paratype of *mahensis*, ix-x.1908 (*H. Scott*); Cascade Estate, 1000 ft [300 m], 1 ♀, 1 ♂, ii-iii.1909 (*H. Scott*); Silhouette [Mare-aux-Cochons], holotype ♀ of *hystrix*, holotype ♂ of *rex* [6.ix.1908 (*H. Scott*)], 1 ♂ paratype of *hystrix*, 1908 (*Seychelles Expedition*), Mare-aux-Cochons, 1 ♀, ix.1908 (*H. Scott*) (BMNH).

### *Elaphrothrips malayensis* (Bagnall)

*Dicaiothrips malayensis* Bagnall, 1909b : 525. Holotype ♂, NIAS (BMNH) [examined].

*Dicaiothrips bruneitarsis* Schmutz, 1913 : 80. Holotype ♂, SRI LANKA (Ceylon) (NM) [examined]. **Syn. n.**

*Dicaiothrips bruneitarsis* var. *levis* Schmutz, 1913 : 82. ? Holotype ♀, SRI LANKA (Ceylon) (NM) [examined]. **Syn. n.**

*Elaphrothrips coronatus* Bagnall, 1934b : 631. Holotype ♀, SRI LANKA (Ceylon) (BMNH) [examined]. **Syn. n.**

The ♀ holotypes of *bruneitarsis* var. *levis* and *coronatus* from Sri Lanka are indistinguishable from a series of females collected in Malaya. These females were collected with males indistinguishable from the holotype ♂ of *malayensis* from the Isle of Nias, Java, and the holotype ♂ of *bruneitarsis* from Sri Lanka. Both sexes have antennal segment III and the basal stems of IV and V pale yellow, and the legs are dark except for the tarsi. The females have a small fore tarsal tooth and a slightly enlarged fore femur with a rugose inner margin. These three species are, therefore, here synonymized.

*E. malayensis* is most similar to the larger darker species *sensitivus* in which the basal stems of antennal segments IV and V are as dark as, or only slightly paler than, the apex of those segments.

#### SPECIMENS STUDIED.

**Sri Lanka** (Ceylon): Peradeniya, holotype ♂ of *bruneitarsis*, Nr 64 from the upper side of a banana leaf in the Botanic Gardens of Peradeniya, 4.i.1902 (*Uzel*); ? holotype ♀ of *bruneitarsis* var. *levis*, Nr 83, 10.i.1902 (*Uzel*) (NM); holotype ♀ of *coronatus*, on banana 2.vi.1913 (*A. Rutherford*); 2 ♀, 1 ♂ on dead *Hevea* leaves, 6.v.1914 (*A. Rutherford*) (BMNH); Deniyaya, 1 ♂, 1 ♀ on dead leaves, 7.xi.1974 (*S. Yamaguchi*) (SO, Tokyo). **Laos:** Van-Viong, 2 ♂, 1 ♀ on dead leaves, 21.iii.1975 (*S. Yamaguchi*) (SO, Tokyo). **Thailand:** East, Chanta buri, 1 ♂, 1 ♀ on dead leaves, 30.iii.1975; South, Ban lung tong, Phuket Is, 1 ♂ on dead leaves, 11.i.1975 (*S. Yamaguchi*) (SO, Tokyo). **Malaya:** Negri Sembilan, 1 ♀ on oil palms (*Chamara Research Station*); 11 miles (17 km) Genting Highlands, 1 ♀, 1 ♂ on dead leaves, 27.ix.1973 (*L. A. Mound*); 5000 ft [1700 m] Genting Highlands, 1 ♀ on dead branch, 1.x.1973 (*L. A. Mound*); 3500 ft [1200 m] Genting Tea Estate, 1 ♀, 2 ♂ on dead leaves on branch, 6.x.1973 (*L. A. Mound*). **Nias:** holotype and 2 paratype ♂ of *malayensis* (*K. Jordan*) (BMNH).

### *Elaphrothrips notabilis* Ananthakrishnan

*Elaphrothrips notabilis* Ananthakrishnan, 1973a : 276. Holotype ♀, INDIA (TNA) [examined].

This species has pale shaded cheek setae and the fore tibiae of the males have a concave inner margin. It is very similar to *curvipes* but can be distinguished from the latter species by its unusually long major head and pronotal setae.

SPECIMENS STUDIED.

**India:** Mysore, Kiruvatti Forest, holotype ♀, paratype ♂ on decaying bark, 6.ix.1967 (*T. N. Ananthakrishnan*) (TNA).

*Elaphrothrips procer* (Schmutz)

- Dicaiothrips procer* Schmutz, 1913 : 73. Holotype ♂, SRI LANKA (Ceylon) (NM) [examined].  
*Dicaiothrips novus* Schmutz, 1913 : 76. Holotype ♀, SRI LANKA (Ceylon) (NM) [examined]. [Synonymized by Ananthakrishnan, 1973a : 281.]  
*Dicaiothrips dallatorensis* Schmutz, 1913 : 77. Holotype ♂, SRI LANKA (Ceylon) (NM) [examined]. [Synonymized by Ananthakrishnan, 1973a : 281.]  
*Dicaiothrips proximus* Bagnall, 1914 : 289. Holotype ♂, SRI LANKA (Ceylon) (BMNH) [examined]. [Synonymized by Mound, 1968 : 98.]  
*Elaphrothrips achaetus* Bagnall, 1934b : 633. Holotype ♀, SRI LANKA (Ceylon) (BMNH) [examined]. [Synonymized by Mound, 1968 : 98.]  
*Elaphrothrips approximatus* Bagnall, 1934b : 635. Holotype ♂, SRI LANKA (Ceylon) (BMNH) [examined]. [Synonymized by Mound, 1968 : 98.]  
*Elaphrothrips chandana* Ramakrishna, 1934 : 9. Holotype ♂, INDIA (unknown) [not examined]. [Synonymized by Ananthakrishnan, 1973a : 28.]  
*Elaphrothrips eranthemi* Seshadri & Ananthakrishnan, 1954 : 224. Holotype ♂, INDIA (TNA) [1 ♂ paratype examined]. [Synonymized by Ananthakrishnan, 1973a : 281.]

This species has a relatively short head prolongation in front of the eyes, paler basal stems to antennal segments IV and V and distinct lateral lobes to the pelta.

The major males of this species have an enlarged fore femur and a stout fore tarsal tooth. The minor males have a slim fore femur and a slender fore tarsal tooth. Mound (1968) synonymized the major male *proximus*, the minor male *approximatus* and the female *achaetus* with *procer* which was based on a major male. The holotype female of *novus*, the holotype minor male of *dallatorensis* and a paratype major male of *eranthemi* are indistinguishable from *achaetus*, *approximatus* and *proximus* respectively. They are here, therefore, all regarded as synonyms of *procer*. *E. chandana* was described from a few males and females collected with *beesoni*. They are smaller and darker and, according to Ananthakrishnan, are synonymous with the '*dallatorensis*' form.

This species from Sri Lanka and India is similar to *bakeri* from Malaya apart from the pale cheek setae and paler basal stems to antennal segments IV and V. The female and minor male from Laos, however, have almost uniformly dark basal stems to segments IV and V.

SPECIMENS STUDIED.

**Sri Lanka** (Ceylon): holotype ♂ of *procer*, holotype ♀ of *novus*, Nr. 34, on a bush 19.xii.1901 (*Uzel*) (NM); Peradeniya, holotype ♂ of *dallatorensis*, Nr. 83, 10.i.1902 (*Uzel*) (NM), holotype ♂ of *proximus*, holotype ♀ of *achaetus*, 1 ♀, 1 ♂, on pods of *Crotalaria*, xi.1912 (*E. E. Green* 3180), holotype ♂ of *approximatus* on dead *Hevea* leaves, 6.v.1914 (*A. Rutherford* 321), 1 ♂, 21.vii.1913 (*A. Rutherford*), 1 ♀ without data (BMNH). **India:** Madras, 1 paratype ♂ of *eranthemi*, Teynampet Botanical Gardens, on *Eranthemum*, 17.i.1953 (*T. N. Ananthakrishnan* 150) (TNA), 1 ♀ on *Cassia* twig, 23.x.1966, 1 ♀, 1 ♂ on dry twigs, 4.iii.1967, 3 ♀, 3 ♂ on *Sesbania* twigs 3.iv.1963; Adichanallur, 1 ♀ on *Areca* sheath, 29.viii.1966 (*T. N. Ananthakrishnan*) (BMNH). **Laos:** Vang-Viong, 1 ♂, 1 ♀ on dead leaves, 21.iii.1975 (*S. Yamaguchi*) (SO, Tokyo).

*Elaphrothrips sensitivus* Priesner

(Figs 36, 50)

*Elaphrothrips sensitivus* Priesner, 1929b : 204. Holotype ♂, MENTAWAI Is (SMF) [examined].

The holotype of *sensitivus* is a major male. This species has pale cheek setae and a long head production, and the males have a well-developed but slim fore tarsal tooth. It is very similar to *malayensis* which may be distinguished by the pale basal stems of antennal segments IV and V.

SPECIMENS STUDIED.

**Mentawai Is:** Sipora, Sioban, holotype ♂, from dead leaves, 9.x.1924 (*H. H. Karny* 164) (SMF). **Java:** Bogor, 1 ♀ (labelled by Priesner, allotype of *sensitivus*, but not referred to in the original description) on dried leaves, 22.ix.1922 (*Soerijat*) (SMF); Bogor Gardens, 1 ♂ on dead leaves of *Brownea* sp. tree, 18.x.1973, 6 ♀, 7 ♂ on dead leaves on tree 19.x.1973, 1 ♀, 24.x.1973, 4 ♂ on dead leaves, 25.x.1973, 12 ♀, 18 ♂ on large dead leaves on tree, 26.x.1973, 6 ♀, 3 ♂ on dead leafy branch, 29.x.1973 (*L. A. Mound*); Jasinga Forest Reserve, 1 ♀, 4 ♂ on dead leafy branch, 30.x.1973 (*L. A. Mound*) (BMNH).

*Elaphrothrips seychellensis* (Bagnall)

(Fig. 48)

*Dicaiothrips seychellensis* Bagnall, 1921a: 280. Holotype ♀, SEYCHELLES (BMNH) [examined].

This is a small dark species from the Seychelles with pale cheek setae. The males have a well-developed fore femur with a large sickle-shaped seta and a well-developed fore tarsal tooth.

SPECIMENS STUDIED.

**Seychelles:** holotype ♀, Mahé [above Port Glaud, 500–1000 ft [200–300 m], 5.xi.1908 (*H. Scott*)], 1 ♂ paratype (*Seychelles Expedition* 1908–1909), above Port Glaud 500–1000 ft [200–300 m], 1 ♀ paratype, 5.xi.1908 (*H. Scott*), Cascade Estate, 800–1000 ft [270–300 m], 1 ♀, i.1909 (*H. Scott*); Silhouette nr Mont Pot-a-Eau, 1500 ft [500 m], 1 ♂, viii.1908 (*H. Scott*) (BMNH).

*Elaphrothrips spiniceps* Bagnall

(Figs 40, 44)

*Elaphrothrips spiniceps* Bagnall, 1932: 514. Holotype ♀, INDIA (BMNH) [examined].

*Elaphrothrips graveleyi* Bagnall, 1934b: 628. Holotype ♀, INDIA (BMNH) [examined]. **Syn. n.**

*Elaphrothrips clarispinis* Priesner, 1935b: 247. Holotype ♂, JAVA (SMF) [examined]. **Syn. n.**

This is a large, stout, black species with a broad head, only about twice as long as broad, pale cheek setae and a short prolongation in front of the eyes. The small lateral lobes of the pelta are narrowly joined to the centre. The holotype of *spiniceps*, although described and labelled as a female, is, in fact, a male with enlarged fore femora and a well-developed fore tarsal tooth. Both antennae are unfortunately missing distal to the second segment.

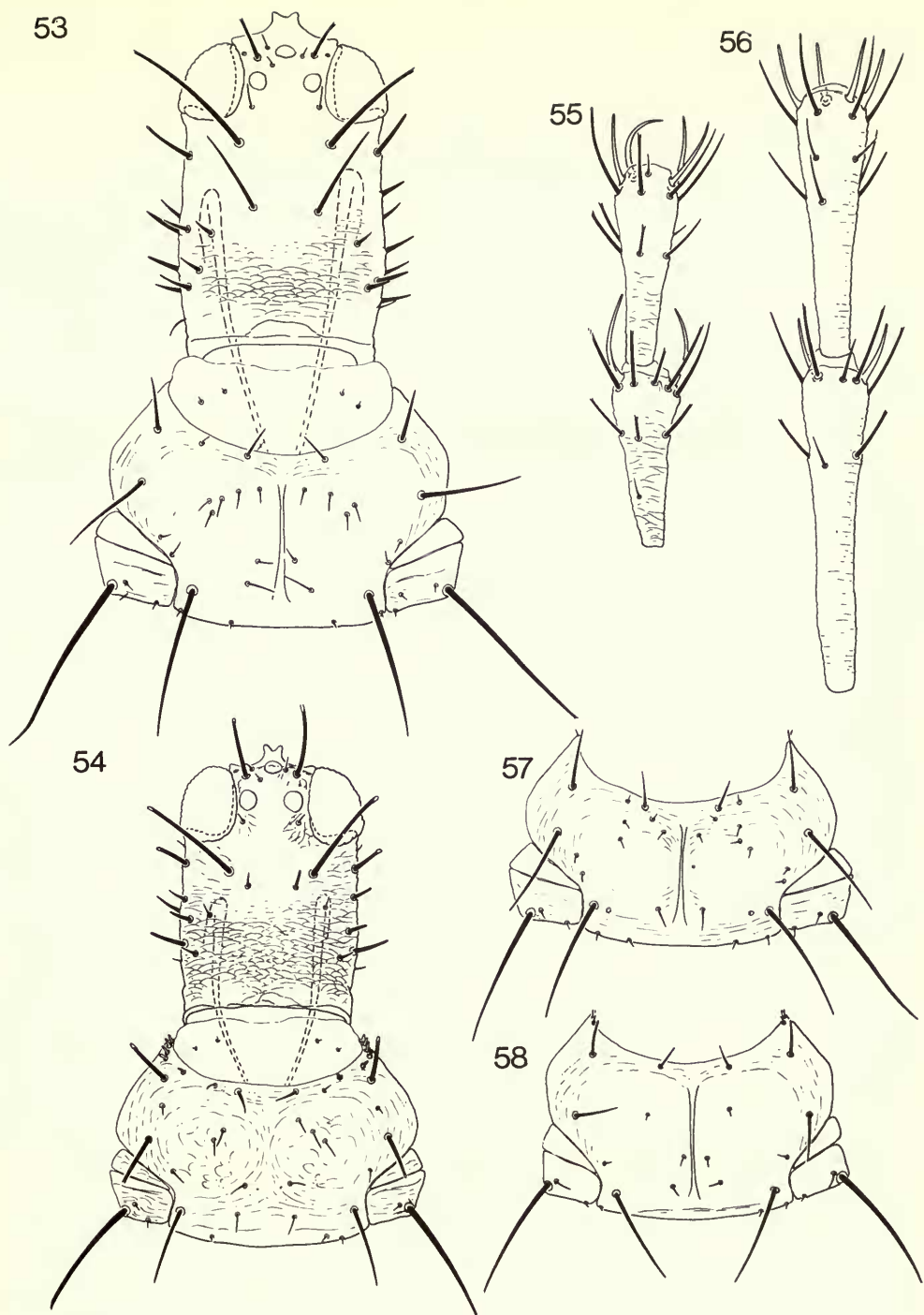
The holotype of *graveleyi* is a female with the head and pelta shape as in *spiniceps*. The basal stem of antennal segment III is clear pale yellow and segments IV and V have a slightly paler basal stem. An additional male and female in the British Museum (Natural History) collection from Burma and two males and two females from Nepal (SO, Tokyo) all have pale basal stems to segments III–V. The sickle-shaped seta on the fore femur of even the largest of these males is small.

The male holotype of *clarispinis* is indistinguishable from the holotype of *spiniceps* in the shape of the head and pelta. Both antennae of *clarispinis* are complete, however, and the basal stem of segment III has patchy dark shading and the basal stem of IV is hardly paler than the apex. The fore femur also bears a well-developed sickle-shaped seta. Four males and one female from Taiwan also have this antennal colouration, and a large sickle-shaped seta in the males, but this is considered to be no more than regional variation and all these specimens are here regarded as *spiniceps*. Ananthakrishnan (1973a) records two males and two females of *clarispinis* from India. However, from the redescription and illustrations it is apparent that these specimens have been misidentified and most closely resemble *denticollis* which is found in India.

SPECIMENS STUDIED.

**India:** Sikkim, Gangtok, holotype ♀ of *spiniceps* (*Lt. Col. F. M. Bailey*), holotype ♀ of *graveleyi*, Kurs[e]ong 4700 ft [1800 m] with *Neoheegeria fumipennis* Bagnall, 26.iii.1910 (*F. H. Graveley*) (BMNH). **Nepal:** Ghasa, 2 ♂, 2 ♀ on dead leaves, 4.vi.1974 (*S. Yamaguchi*) (SO, Tokyo). **Burma:** Mishmi Hills, 1 ♂, Delei River, 4700 ft [1800 m] iii.1935; 1 ♂, Monodon (*M. Steele*) (BMNH). **Taiwan:** Nanshanchi, 4 ♂, 1 ♀ on dead leaves, 1.vi.1972 (*S. Okajima*) (SO, Tokyo). **Java:** Kamodjan, above Garoet, 1200 m, holotype ♂ of *clarispinis*, 30.v.1923 (*Siebers*) (SMF).





Figs 53–58 *Machatothrips* species. (53) *M. biuncinatus*; (54) *M. antennatus*. 55, 56, antennal segments III and IV, (55) *M. quadrudentatus*; (56) *M. biuncinatus*. (57) *M. braueri*; (58) *M. heveae*.

## MACHATOTHRIPS Bagnall

*Machatothrips* Bagnall, 1908b : 189. Type-species: *Machatothrips biuncinatus* Bagnall, by monotypy.  
*Adiaphorothrips* Bagnall, 1909b : 536. Type-species: *Adiaphorothrips simplex* Bagnall, by original designation. [Synonymized by Priesner 1939 : 75.]  
*Cnestrothrips* Priesner, 1932 : 344 (1939 : 75). Type-species: *Cnestrothrips dammermani* Priesner, by original designation. **Syn. n.**

Large, dark, macropterous species of Cryptothripini. Head rectangular, about 1.5 times as long as broad, projecting only slightly in front of eyes; eyes equally developed on dorsal and ventral surfaces; head with 1 pair of elongate ocellar setae situated posterolaterally to anterior ocellus and outside ocellar triangle, also 1 pair of postocular setae and 1 median pair of setae on vertex (postocular pair II); cheeks with stout spine-like setae. Antennae 8-segmented, segment III 2.5 to 5.0 times as long as broad with 2 sense cones, IV with 4 sense cones. Pronotum shorter than head, twice as broad as long with 5 pairs of major setae. Fore femora of males and females enlarged, females always and males rarely with a row of teeth on inner margin; fore tarsal tooth present in ♂ and ♀, larger in ♂. Wings broad, slightly broader in apical half, pale or dusky, with numerous duplicated cilia. Pelta broadly triangular. Tergites II–VII with 1 pair of wing-retaining setae; sternites II–VIII with a row of small accessory setae; sternite IX of males with a pair of long stout setae. Tube with straight sides evenly narrowing to apex, 3.0 to 3.5 times as long as broad, about as long as head.

Twelve species are here recognized in this genus and a further two nominal species were not available for study, but the patterns of inter- and intraspecific variation are difficult to interpret (Table 2). The species are distinguished on the lengths of the setae on the head and pronotum, the length and colour of the third antennal segment, and the form and number of tubercles on the fore femora of the females. Unfortunately none of these characters appears to be stable, and since it is not unusual for two or more species to be collected together the possibility of hybridization must be considered in future studies in the field. The species are not infrequently collected but apparently do not usually exist in large populations. This widespread dispersion in low numbers suggests a high vagility, and this biological characteristic would contribute to taxonomic problems. Certainly the taxonomic conclusions which have been reached in this genus, for example only two new synonyms are established, are in marked contrast to the conclusions reached in *Elaphrothrips* and *Dinothrips*. In both of these genera it is not unusual for each species to form large populations and, despite the problems associated with allometric growth, there is less overlap in the ranges of structural variation between species.

*Machatothrips* species are widespread between West Africa and Guam throughout the Old World tropics. The genus is unusual in that it is the females, not males, which bear the obvious sexually dimorphic characters on which species are defined. However, in both of the new species described below, *decorus* and *lentus*, one or more males are known which have female-like fore legs.

*Adiaphorothrips pallicornis* Karny (1924) from Queensland is not a member of *Machatothrips*. The holotype has slender maxillary stylets and is a member of the Phlaeothripinae. This species is here transferred to the genus *Akainothrips* Mound (1971a) and should be referred to as *Akainothrips pallicornis* (Karny) **comb. n.** The holotype female of *Machatothrips ishshikii* Ishida (1932 : 7–9) (HUS) has been examined. The specimen has been remounted and relabelled by Dr Haga as *Acanthothrips nodicornis* (Reuter) although this synonymy does not appear to have been published.

The monotypic genus *Cnestrothrips* was erected by Priesner for his species *dammermani* which is here shown to be a synonym of *Machatothrips antennatus*. It differs from the other species of *Machatothrips* in the presence of a group of spines on the fore angles of the pronotum, and also in having a series of small tubercles, without any large teeth, on the inner margin of the female fore femora. The arrangement of these teeth in *M. decorus* is intermediate between that of *antennatus* and the other species in the genus in having one larger basal tooth and a row of 12 to 14 almost uniform small teeth.

*Machatothrips* is closely related to *Macrothrips* from New Guinea although the females of the latter do not have a row of teeth on the fore femora. Both males and females of *Macrothrips* have a hook on the ventral surface of the fore angles of the pronotum. Larger specimens of this

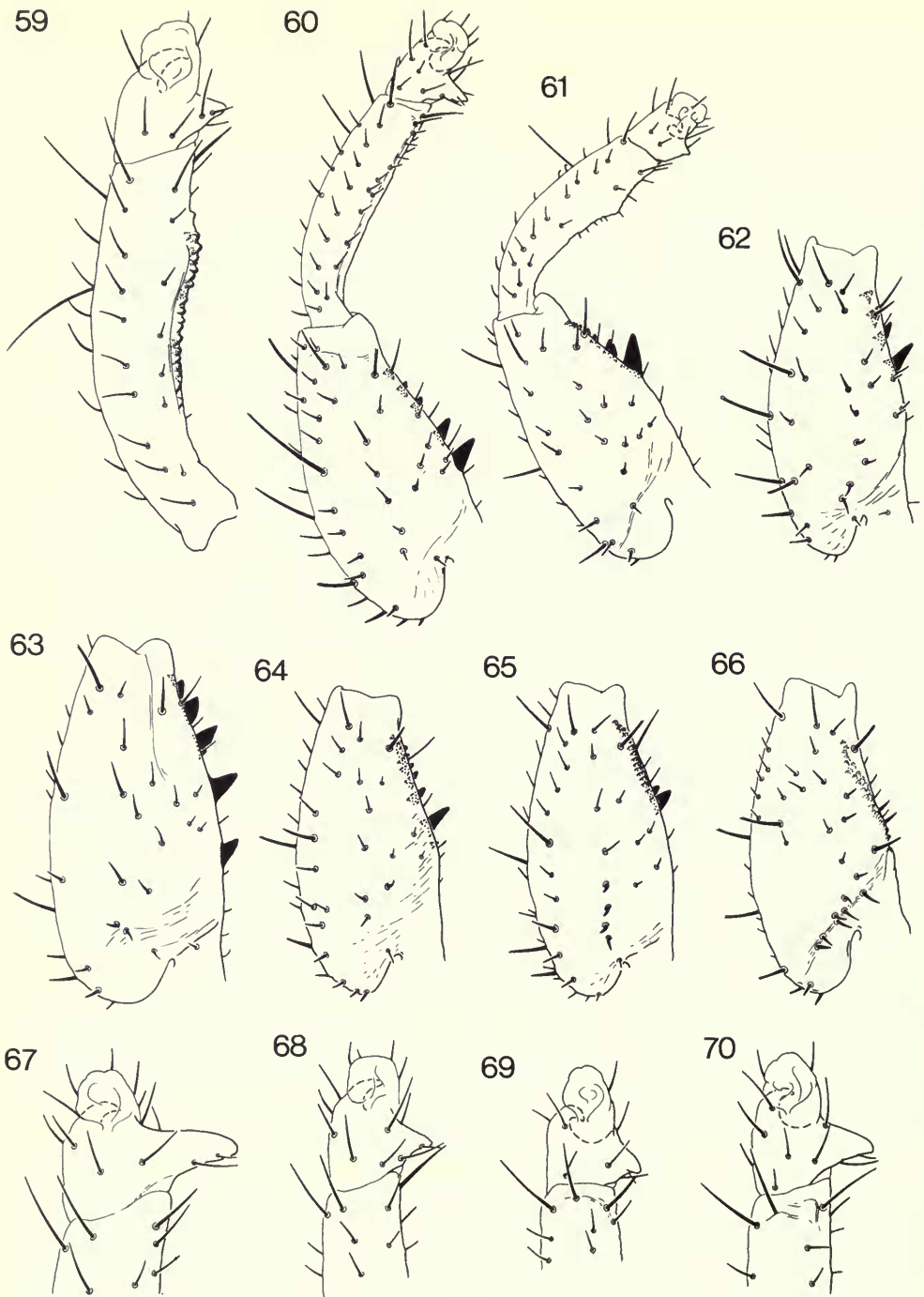
**Table 2** Variation in the length of antennal segment III and the postocular setae of *Machatothrips* species

Species	Antennal segment III length/breadth	Postocular setae pair I length/pair II length	Distribution
<i>sylvaticus</i>	2.4 to 2.7	3.4 to 5.0	India
<i>quadrudentatus</i>	2.5	10.0	New Guinea
<i>antennatus</i>	2.8 to 3.6	7.0 to 9.3	Malaya
<i>indicus</i>	3.0	4.8	India
<i>haplodon</i>	3.2 to 3.6	5.0 to 10.0	Africa
<i>lentus</i>	3.2 to 3.8	3.0 to 6.5	Malaya
<i>decorus</i>	3.2 to 3.8	2.8 to 3.3	Malaya
<i>heveae</i>	3.5 to 4.0	2.0 to 2.2	Malaya
<i>artocarpi</i>	3.5 to 4.4	1.9 to 3.7	Japan to Solomon Is
<i>braueri</i>	3.0 to 4.5	1.9 to 3.2	Africa
<i>celosiae</i>	4.7	2.4	Taiwan
<i>biuncinatus</i>	4.1 to 5.0	1.4 to 2.8	Malaya to New Guinea

genus have a nodular swelling on the inner margin of the fore femora near the base, they also have large coxal and epimeral tubercles, and the fore tibiae have from one to three teeth on the inner margin near the apex. The pronotum of *Machatothrips* lacks the hook and tubercles, and only in males of *antennatus* is a small tooth visible at the apex of the fore tibiae. The tube of *Macrothrips* is longer than in *Machatothrips* being more than four times as long as broad and the pores on the pelta are situated further forward (Figs 71–78). Partial revisions of *Machatothrips* have been published by Mound (1968; 1970).

#### Key to species

- 1 Postocular setae pair I 5 to 10 times as long as postocular setae pair II . . . . . 2
- Postocular setae pair I 1 to 5 times as long as postocular setae pair II . . . . . 5
- 2 Antennal segment III yellow, 2.5 times as long as broad (Fig. 55); anteromarginal setae equal in length to anteroangulans [New Guinea] . . . . . *quadrudentatus* (p. 195)
- Antennal segment III as dark as IV, 2.8 to 3.8 times as long as broad . . . . . 3
- 3 Fore angles of pronotum with a group of spine-like setae (Fig. 54); fore femora of ♀ with a complete row of small tubercles (Fig. 66); anteromarginal setae 0.4 to 0.7 times as long as anteroangulans [Malaya, Borneo] . . . . . *antennatus* (p. 189)
- Fore angles of pronotum without spine-like setae; fore femora of ♀ with a row of 4 to 8 stout teeth; anteromarginal setae 0.6 to 1.1 times as long as anteroangulans . . . . . 4
- 4 Fore tibiae of ♀ with a distinct hump, fore tarsal claw small, fore femora with teeth restricted to distal half (Fig. 61) [Malaya] . . . . . *lentus* (part) (p. 194)
- Fore tibiae of ♀ without a hump, fore tarsal claw well developed and sharply pointed, fore femora with row of teeth extending into basal half (Fig. 60) [Africa] . . . . . *haplodon* (p. 193)
- 5 Antennal segment III 2.4 to 3.0 times as long as broad at apex . . . . . 6
- Antennal segment III more than 3.0 times as long as broad . . . . . 7
- 6 Antennal segment III slightly paler than IV; fore tibiae of ♀ without hump [India] . . . . . *sylvaticus* (p. 195)
- Basal stem of antennal segments III–VI slightly paler than apical half; fore tibiae of ♀ with a distinct hump bearing spinules (Fig. 59) [India] . . . . . *indicus* (p. 194)
- 7 Pronotal anteromarginal setae short, less than 0.5 times as long as anteroangulans; postocular setae pair II long, pair I 1.4 to 2.8 times as long as pair II (Fig. 53); antennal segment III long, 4.1 to 5.0 times as long as broad (Fig. 56); distal teeth on fore femora of ♀ usually fused into a ridge (2+3 to 4+5) (cf. Fig. 61) [Malaya to New Guinea] . . . . . *biuncinatus* (p. 190)
- Pronotal anteromarginal setae longer, more than 0.5 times as long as anteroangulans; antennal segment III shorter, usually less than 4.5 times as long as broad; teeth on ♀ fore femora usually separate . . . . . 8
- 8 Pronotal anteromarginal setae longer than anteroangulans; antennal segment III 4.7 times as long as broad [Taiwan] . . . . . *celosiae* (p. 192)



Figs 59-70 *Machatothrips* species. 59, *M. indicus* ♀, fore tibia and tarsus. 60, *M. haplodon* ♀. 61, *M. lentus* ♀. 62-66, ♀ fore femora, (62) *M. artocarpus*; (63) *M. heveae*; (64) *M. braueri*; (65) *M. decorus*; (66) *M. antennatus*. 67-70, ♂ fore tarsi, (67) *M. artocarpus*; (68) *M. decorus*; (69,70) *M. lentus* (69 gynaeoid ♂).

- Pronotal anteromarginal setae 0.5 to 1.0 times as long as anteroangulars; antennal segment III 4.5 or less times as long as broad . . . . . 9
- 9 Postocular setae pair I 3.0 to 6.5 times as long as pair II; antennal segment III 3.2 to 3.8 times as long as broad; fore tibiae of ♀ with a distinct hump, arrangement of teeth on fore femora similar to *biuncinatus* (2+3 to 4+6) (Fig. 61) [Malaya] . . . . . *lentus* (part) (p. 194)
- Postocular setae pair I usually less than 3.2 times as long as pair II, if more than 3.2 times as long as pair II then antennal segment III 3.5 or more times as long as broad; fore tibiae of ♀ without a distinct hump. . . . . 10
- 10 Pronotal posteroangular setae short, median pronotal length 1.8 to 3.0 times as long as these setae (Fig. 58); antennal segment III 3.5 to 4.0 times as long as broad; fore femora of ♀ with 5 to 10 teeth throughout its length, first tooth in basal half smaller than second (Fig. 63) [Malaya, Java] . . . . . *heveae* (p. 194)
- Pronotal posteroangular setae longer (Fig. 57), median pronotal length usually 1.1 to 2.0 times as long as these setae, if more than 2.0 then antennal segment III only 3.2 times as long as broad . . . . . 11
- 11 Tube short, 2.8 to 3.3 times as long as basal breadth; fore femora of ♀ with 5 to 10 closely set teeth evenly decreasing in size, rarely with a smaller tooth or tubercle in basal half (Fig. 64) [Africa] . . . . . *braueri* (p. 190)
- Tube longer, 3.3 or more times as long as basal breadth . . . . . 12
- 12 Fore femora of ♀ with a distinctive row of 12 to 14 teeth in distal half (Fig. 65); pronotal anteromarginal setae 0.5 times as long as anteroangulars; antennal segment III 3.2 to 3.8 times as long as broad [Malaya] . . . . . *decorus* (p. 193)
- Fore femora of ♀ with 3 to 5 separate teeth in distal half (Fig. 62); pronotal anteromarginal setae 0.6 to 0.9 times as long as anteroangulars; antennal segment III 3.5 to 4.4 times as long as broad [Japan to Solomon Is] . . . . . *artocarpi* (p. 189)

*Machatothrips antennatus* (Bagnall)

(Figs 54, 66, 74)

*Adiaphorothrips antennatus* Bagnall, 1915b : 594. Lectotype ♀, BORNEO (BMNH) [examined].

*Cnestrothrips dammermani* Priesner, 1932: 344 (1939: 76). Holotype ♀, RIAU (Riouw) Is (SMF) [examined]. **Syn. n.**

This is a distinctive species, both males and females having a group of spine-like setae on the fore angles of the pronotum and short postocular setae pair II. The females have a complete row of 12 to 20 small tubercles on the fore femora, and the tergal accessory setae of both ♂ and ♀ are rather robust. The holotype of *dammermani* has these characteristics and is indistinguishable from *antennatus* with which it is here synonymized. This species is most similar to *decorus* which may be distinguished by having much longer postocular setae pair II.

**SPECIMENS STUDIED.**

**Malaya:** Gombak, dead branch, 2 ♀, 1 ♂, 30.ix.1973; 1 ♂, 7.x.1973; Damansara Forest Reserve, 8 miles [13 km] north of Kuala Lumpur, 1 ♀, 3.x.1973 (*L. A. Mound*) (BMNH). **Singapore:** Bukit Timah, 2 ♀, 1 ♂ on dead branches, 3.xi.1973 (*L. A. Mound*); 2 ♂ on *Dialium wallichii* fallen tree, 16.xi.1973 (*D. H. Murphy*) (BMNH). **Riau (Riouw) Is:** Doerian, holotype ♀ of *dammermani*, caught in low herbage, vi.1923 (*Dammerman* 33) (SMF). **Borneo:** West Sarawak, lectotype ♀ of *antennatus*, Mt Matang, 1000 ft [300 m], under bark of dead tree, 7.xii.1913; Quop, 1 ♂, 28.iii.1914 (*G. E. Bryant*) (BMNH).

*Machatothrips artocarpi* Moulton

(Figs 62, 67, 71)

*Machatothrips artocarpi* Moulton, 1928a : 322. Holotype ♀, TAIWAN (CAS) [examined].

This dark but otherwise unremarkable species is recorded from Japan, Formosa, Guam, Philippines, New Guinea and the Solomon Is, but not, as yet, from further west.

**SPECIMENS STUDIED.**

**Japan:** Ishigaki-jima I., Mt Banna, 2 ♀, 2 ♂ on dead twigs, 16.vi.1972 (*S. Okajima*) (SO, Tokyo). **Taiwan (Formosa):** Kagi, holotype ♀, paratype ♂, on *Artocarpus*, 10.viii.1927 (*R. Takahashi*) (CAS). **Guam:** 1 ♂

under dead bark (Swezey); Upi, 4 ♀, 1 ♂ (2 ♀, 4 ♂ CAS) under bark of *Pariti tiliaceum*, 5.v.1936 (Swezey); Apra, 9 ♀, 2 ♂ under dead bark, 15.vi.1936; Machaneo, 2 ♀ (3 ♀, 2 ♂ CAS) on *Elaeocarpus joga* bark, 30.vi.1936 (Swezey); Piti, 1 ♀, 3 ♂ (4 ♀, 3 ♂ CAS) under *Heritiera littoralis* bark, 7.x.1936 (Swezey); Yigo, 1 ♀ (1 ♂ CAS) under dead bark, 1 ♀ (1 ♀ CAS) under *Elaeocarpus joga* bark, 18.x.1936 (Swezey); 1 ♀, 2 ♂ ? Guam [unlabelled from Floyd Andre Collection] (BMNH). [? Philippines]: Occ. Negros, 1 ♀ on *Papaya*, 1.9.1929 (*W. D. Pierce*) (CAS). New Guinea: Maffin Bay, 1 ♀, vii.1944; 7 ♀, 1 ♂, viii.1944; 1 ♀, 1 ♂, ix.1944; 1 ♀, 2 ♂, 3.x.1944; 12 ♀, 7 ♂ on bark, ix.1944 (*E. S. Ross*) (CAS). Solomon Is: 5 ♀, 4 ♂, 1965 (*J. A. Grant*); Guadalcanal, Umasani River, 2 ♀, 1 ♂ on *Areca macrocalyx*, 1-9.vii.1965 (*P. N. Lawrence*); Kakum, 1 ♀, 3 ♂ in arable soil, 1962 (*P. Greenslade*); Oreke, 1 ♂, 14.xii.1934 (*R. A. Lever*); North Guadalcanal, 2 ♀, 2 ♂ on dried calyx of shrivelled coconut, x.1931 (*R. A. Lever*); Rendova, 1 ♀ on *Cocos* trunk, 28.iii.1935 (*R. A. Lever*) (BMNH).

### *Machatothrips biuncinatus* Bagnall

(Figs 53, 56, 72)

*Machatothrips biuncinata* Bagnall, 1908b: 189. Holotype ♀ (fore leg only), NEW GUINEA (BMNH) [examined].

*Adiaphorothrips simplex* Bagnall, 1909b: 537. Lectotype ♂, BORNEO (BMNH) [examined]. [Synonymized by Mound, 1968: 134.]

*Machatothrips montanus* Priesner, 1932: 344. Holotype ♀, SARAWAK (SMF) [examined]. **Syn. n.**

Bagnall described *Adiaphorothrips simplex* from two males collected together, and Mound (1968) designated one of these as lectotype. The holotype of *montanus* has the anteromarginal setae missing, but the small setal bases indicate that they were probably short as in typical *biuncinatus*. The original description states that the fore femora have only three teeth, but three extra small humps are visible in the position of the typical fused comb of *biuncinatus*. This is a variable species with very short anteromarginal setae, long postocular setae pair II, long anteroangulars, long antennal segment III and a rounded pelta. It is similar to *artocarpi*, but that species has longer anteromarginals, shorter anteroangulars and postocular setae pair II, and a pointed pelta (Fig. 71).

#### SPECIMENS STUDIED.

**Malaya:** Lenggong, 1 ♀ (*A. M. Lea*) (CAS); Damansara Forest Reserve, 8 miles [13 km] north of Kuala Lumpur, 1 ♂ on dead branches and leaves, 3.x.1973; Gombak Field Station, 16 miles [26 km] east of Kuala Lumpur, 1 ♀, 2 ♂ on dead wood, 25.ix.1973; Gombak, on dead branches, 1 ♀, 30.ix.1973, 1 ♀, 4 ♂, 5.x.1973, 1 ♂, 8.x.1973; Ringlet, 2 ♀ on a dead branch, 12.x.1973 (*L. A. Mound*) (BMNH). **Singapore:** Bukit Timah Forest, 1 ♀, 3 ♂ on fallen *Dialium wallichii* tree, 16.xi.1973 (*D. H. Murphy*) (BMNH). **Mentawai Is:** Siberut, 1 ♂, 13.ix.1927 (BMNH). **Java:** Jasinga Forest Reserve, 1 ♀, 4 ♂ on a dead leafy branch, 30.x.1973 (*L. A. Mound*) (BMNH); Marywattie near ? Lindanglaja Menzel, 2 ♀ under bark, vii.1924 (SMF). **Borneo:** Sambas, lectotype ♂ and paralectotype ♂ of *simplex*, v.1890 (*Th. F. Lucassen*); Sarawak, Lawas, 1 ♀ (*C. R. Wallace*); West Sarawak, Quop, 1 ♂, iii.1914 (*G. E. Bryant*); Sarawak, Matang, 1 ♂ on dead bark, 8.xii.1913; 1 ♀, 1 ♂ on dead tree, 17.xii.1913 (*G. E. Bryant*) (BMNH); Sarawak, Mt Dulit, 3000 ft [1000 m], holotype ♀ of *montanus* (*Mjoberg*) (SMF). **Sulawesi** (Celebes): 1 ♀ (*de la Savinière*) (BMNH); 1 ♀ without data from the Bagnall Collection (BMNH). **New Guinea:** holotype ♀ of *biuncinatus* (Netherlands' New Guinea Expedition, 1904-5); Bululo Gorge, north of Wau, 2 ♂ on bark of fallen log, 4.vi.1968 (*R. Rice*) (BMNH); Finschhafen, 5 ♀, 1 ♂ on bark, 16.iv.1944; Maffin Bay, 1 ♀ on bark, ix.1944 (*E. S. Ross*) (CAS).

### *Machatothrips braueri* Karny

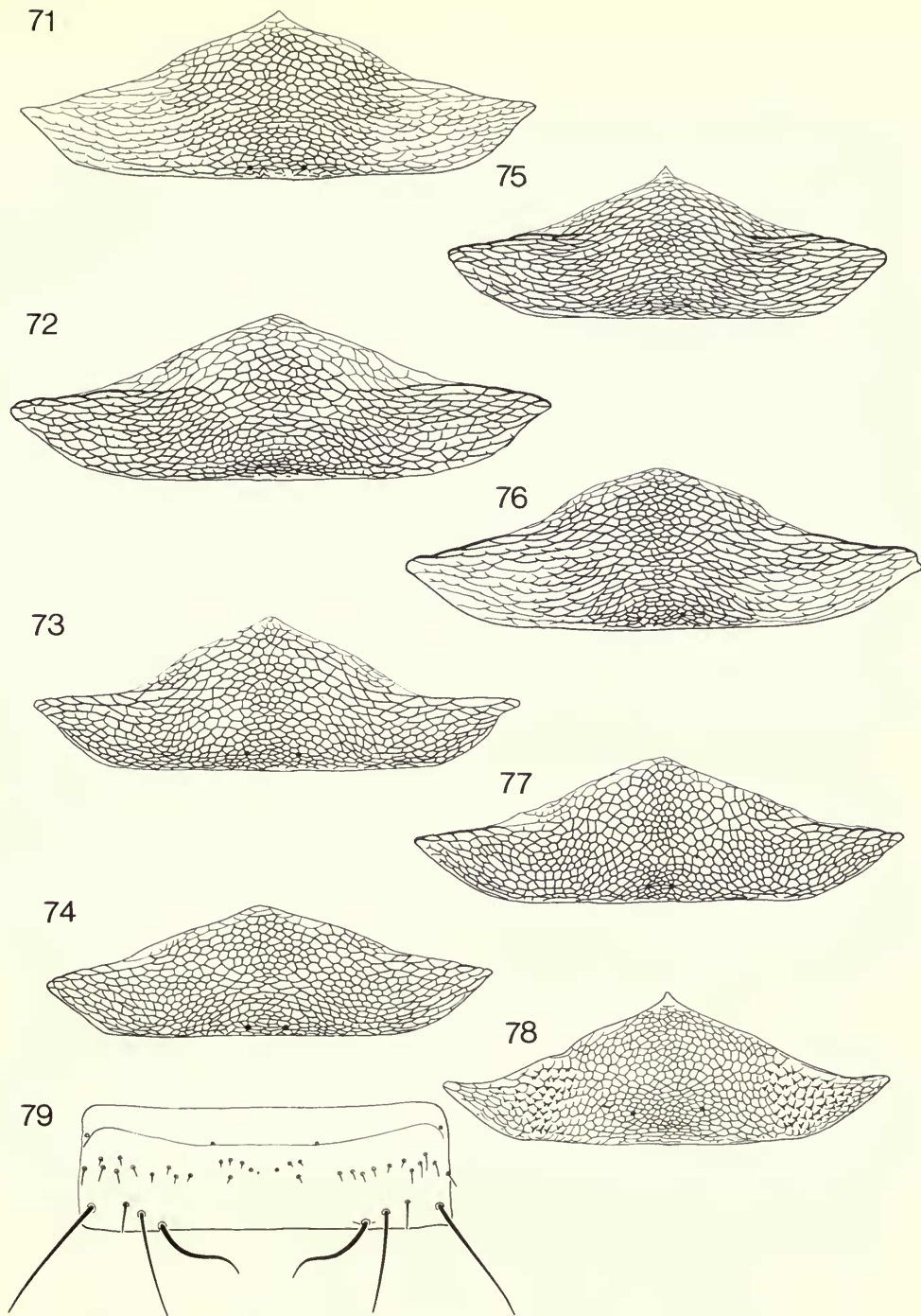
(Figs 57, 64, 73)

*Machatothrips braueri* Karny, 1912: 23. Holotype ♀, CAMEROUN (MNHU) [examined].

*Machatothrips multidentis* Bagnall, 1934a: 487. Lectotype ♀, GHANA (BMNH) [examined]. [Synonymized by Mound, 1968: 134.]

*Machatothrips paucidens* Bagnall, 1934a: 489. Lectotype ♀, GHANA (BMNH) [examined]. [Synonymized by Mound, 1968: 134.]

*Machatothrips paucidens* var. *bicolorisetosus* Bagnall, 1934a: 489. Lectotype ♀, SIERRA LEONE (BMNH) [examined]. [Synonymized by Mound, 1968: 134.]



**Figs 71–79** *Machatothrips* and *Macrothrips* species. 71–78 peltas, (71) *Machatothrips artocarpi*; (72) *M. biuncinatus*; (73) *M. braueri*; (74) *M. antennatus*; (75) *M. lentus*; (76) *M. heveae*; (77) *M. haplodon*; (78) *Macrothrips* species. 79, *Machatothrips lentus*, tergite III.

*Machatothrips braueri* is very similar to *heveae* from Malaya. Both species have well-developed postocular setae pair II, these setae being more than one-third as long as pair I, and the measurements of antennal segment III as well as the anteromarginal setae lie within the same ranges. The row of teeth on the fore femora of the females is also variable. Usually *braueri* has a row of 5 to 9 separate teeth, the most basal being the largest, whereas *heveae* has 4 to 7 separate teeth, the most basal being smaller than the second (Fig. 63). There are, however, some *braueri* with a small basal tubercle or tooth, but usually the two species may be separated on the length of the posteroangular setae. These setae in *braueri* are long, more than half as long as the pronotum, whereas those of *heveae* are short, seldom more than half and usually only one-half to one-third as long as the pronotum. There are some specimens of *braueri* in the BMNH labelled *paucidens* or *bicolorisetosus* which are smaller and have shorter, darker setae. The third antennal segment of some of these is also very short, being only 3.0 to 3.5 times as long as broad.

*Machatothrips braueri* may be distinguished from *haplodon*, the only other species from Africa, by its much longer postocular setae pair II, those of *haplodon* being less than 0.2 times as long as pair I, and those of *braueri* being more than 0.3 times as long as pair I.

#### SPECIMENS STUDIED.

**Sierra Leone:** 1 ♀ on coconut (*E. Hargreaves*); Njala, lectotype ♀, paralectotype ♀ of *bicolorisetosus*, also 1 ♀ with identical data, in tunnels of coffee twig borer, 7.i.1927 (*E. Hargreaves*); 1 ♀, 1 ♂ in twigs of *Bauhinia tomentosa*, 1933 (*E. Hargreaves*); 2 ♀ in cassava stem (*E. Hargreaves*); 1 ♀, 1 ♂ on coffee, 16.x.1963 (CIE 19548); Petema, 1 ♂ under bark of *Kola*, 19.ii.1925 (*E. Hargreaves*) (BMNH). **Ghana:** on cocoa, 2 ♂, vi.1972, 22 ♀, 7 ♂, 1972 (*J. D. Majer*); Kade, on cocoa, 1 ♀, 27.i.1971, 25 ♀, 13 ♂, i-ii.1972 (*J. D. Majer*); Aburi, in tunnels of cocoa stem moth borer, lectotype ♀ of *paucidens*, lectotype ♀ and paralectotype ♂ of *multidens*, 29.x.1915; 5 ♀ paralectotypes, 15.xi.1915; 3 ♀, 1 ♂ in tunnels of *Cacao* shot hole borer, 20.xi.1915 (*W. H. Patterson*); on *Tapinanthus bangwensis* on cocoa 1 ♀, 1 ♂, 1969, 8 ♀, 1 ♂, 1970 (*P. M. Room*) (BMNH). **Nigeria:** Ibadan, 2 ♀ on dead wood, 16.ix.1964; Ibadan, Moor Plantation, 3 ♀, 3 ♂ on yam leaves, 7.vii.1964 (*B. A. Okwakpam*) (BMNH). **Zaire:** 1 ♂ on *Cacao* (*R. Mayne*) (BMNH); Kasai, Ngombe, 1 ♀, 8.xi.1921 (*H. Schouteden*) (SMF). **Cameroun:** Bascho, holotype ♀ of *braueri*, iv.1909 (*Oberlt. Bartsch. S.V.*) (MNHU).

#### *Machatothrips braueri* f. *karnyi* Priesner

*Machatothrips braueri* f. *karnyi* Priesner, 1932: 340. Holotype ♀, CONGO (BRAZZAVILLE) (unknown) [not examined].

This form was described from a unique female with three large and three small spines on the fore femur. Unfortunately the type has not been traced and the original description is insufficient to assign it to any one species.

#### *Machatothrips celosia* Moulton

*Machatothrips celosia* Moulton, 1928a: 325. Holotype ♀, TAIWAN (Formosa) (CAS) [examined].

This species is known only from the holotype which is very similar to *artocarpi*. It may be distinguished by the anteromarginal setae being longer than the anteroangulars and by the longer third antennal segment. The second specimen mentioned in the original description is indistinguishable from typical *artocarpi*.

#### SPECIMEN STUDIED.

**Taiwan:** Kagi, holotype ♀ on *Celosia argenta*, i.1928 (*K. Toyota*) (CAS).

#### *Machatothrips corticosus* Ananthakrishnan

*Machatothrips corticosus* Ananthakrishnan, 1972b: 443. Holotype ♀, INDIA (TNA) [not examined].

Type-material of this species was not available for study but from the original description it would appear to be most similar to *indicus* Ananthakrishnan. Both species were collected from Kerala, India.



*Machatothrips decorus* sp. n.

(Figs 65, 68)

♀ macroptera. Colour uniformly brown, basal three-fifths of tube dark brown to black; wings pale with dark median longitudinal line in basal half; abdominal setae pale, yellowish, wing-retaining setae slightly darker.

Head 1.5 times as long as broad, postocular setae pair I 2.8 times as long as postocular setae pair II; antennal segment III 3.6 times as long as broad. Pronotum twice as broad as long, anterior angles with a row of three small spine-like setae; anteroangular setae twice as long as anteromarginals; median length of pronotum 1.2 times as long as posteroangular setae. Fore femora enlarged with a row of 12 to 14 small teeth in apical half of inner margin; inner margin of fore tibiae weakly convex, fore tarsal claw small. Tube evenly narrowing to apex, 3.3 times as long as basal breadth.

Measurements (holotype ♀ in µm). Body, length 5420. Head, length 500; maximum breadth across cheeks 355. Postocular setae pair I 220; pair II 76. Antennal segments, III length 220, breadth 62; length, IV 210; V 176; VI 134; VII 80; VIII 76. Pronotum, median length 270; maximum breadth 548; antero-marginal setae 58; anteroangular setae 119; mid-lateral setae 128; posteroangular setae 214; epimeral setae 286. Fore wing, length 2208; maximum breadth 240; number of duplicated cilia 63; length basal setae, 1, 142; 2, 190; 3, 334. Dorsal setae tergite IX 600. Tube, length 670; maximum breadth 200.

♂ macroptera. Colour and structure similar to ♀. Posteroangular setae shorter than in ♀, pronotum 2.4 times as long as these setae. Fore femora aberrant, with two well-developed and two small teeth on inner margin; fore tarsal tooth sharply pointed, as long as its basal breadth (Fig. 68).

Measurements (paratype ♂ in µm). Body, length 4675. Head, length 470; maximum breadth across cheeks 316. Postocular setae pair I 190; pair II 58. Antennal segments, III length 180, breadth 58; length, IV 176; V 162; VI 120; VII 70; VIII 70. Pronotum, median length 270; maximum breadth 524; antero-marginal setae 48; anteroangulars 95; mid-laterals 100; posteroangulars 114; epimerals 200. Fore wing, length 2016; maximum breadth 190; duplicated cilia 54; basal setae, 1, 90; 2, 124; 3, 152. Dorsal setae tergite IX 476. Tube, length 546; maximum breadth 152.

SPECIMENS STUDIED.

Holotype ♀, **Malaya**: Gombak, 16 miles [26 km] west of Kuala Lumpur, on dead branches, 8.x.1973 (*L. A. Mound*) (BMNH).

Paratype. 1 ♂, same data as holotype.

This species is most similar to *antennatus* in the shape of the third antennal segment, the small spine-like setae on the fore angles of the pronotum and the long row of small tubercles on the female fore femora. It may be distinguished mainly by the much longer postocular setae pair II. It is also not easily distinguishable from the African species *braueri*, apart from the arrangement of the fore femoral teeth of the female and slightly shorter anteromarginal setae. The male is unusual in having teeth on the fore femora.

The two specimens on which this species is based were collected with a male of *biuncinatus*.

*Machatothrips diabolus* (Priesner)

*Adiaphorothrips diabolus* Priesner, 1928a : 56. Holotype ♀, EAST AFRICA (Hamburg Museum, destroyed). This species was described from a unique female which was destroyed in the Hamburg Museum. It was not illustrated and the original description is insufficient even to assign it to the genus *Machatothrips*. Priesner (1928a) states that it most closely resembles *elephas* Karny which he subsequently transferred to the genus *Scotothrips*. The name *diabolus* is best regarded as a nomen dubium at present.

*Machatothrips haplodon* Karny

(Figs 60, 77)

*Machatothrips braueri* var. *haplodon* Karny, 1925 : 141. Holotype ♀, UGANDA (BMNH) [examined].

*Machatothrips braueri* var. *buffai* Karny, 1925 : 142. Holotype ♂, UGANDA (BMNH) [examined]. [Synonymized by Mound, 1968 : 135.]

*Machatothrips simplicidens* Bagnall, 1934a : 490. Holotype ♀, CONGO (BRAZZAVILLE) (MNHN) [not examined]. [Synonymized by Mound, 1968 : 135.]

*Machatothrips braueri* f. *spatiata* Priesner, 1932: 341. LECTOTYPE ♀, ZAIRE (SMF), here designated [examined]. **Syn. n.**

*Machatothrips haplodon* Karny; Mound, 1968: 135.

*Machatothrips braueri* f. *spatiata* was described for an unspecified number of female syntypes from various localities in the Belgian Congo. Three females labelled 'paratype' have been studied. One, from Kasai, Ngombe, 8.xi.1921 (*Dr H. Schouteden*), has postocular setae pair II 0.3 times as long as pair I, antennal segment III 4.0 times as long as broad, and a short blunt fore tarsal claw. The fore femoral teeth are variable in form and the presence of a small tooth at the base is not sufficient to separate this specimen from typical *braueri*. The two other 'paratypes', one from Haut Uelé, Moto, 1920 (*L. Burgeon*), and the other from Barumbu here designated as lectotype, have postocular setae pair II 0.1 times as long as pair I, antennal segment III 3.2 to 3.5 times as long as broad and a long and sharply pointed fore tarsal claw. The presence of the small spine at the base of the femora of these two specimens is not sufficient to separate them from typical *haplodon*. *Machatothrips braueri* var. *buffai* was described from specimens without fore femoral teeth. The holotype is a male which, in common with most males of this genus, has no fore femoral teeth. It has short postocular setae pair II and is indistinguishable from typical *haplodon*.

**SPECIMENS STUDIED.**

**Ghana:** 1 ♀ on *Tapinanthus banguensis* on cocoa, 1970 (*P. M. Room*) (BMNH). **Zaire:** lectotype ♀ of *spatiata*, Barumbu, viii.1925 (*J. Ghesquière*), paralectotype ♀ of *spatiata*, Haut Uelé, Moto, 1920 (*L. Burgeon*) (SMF). **Uganda:** Kampala, holotype ♀ of *haplodon*, holotype ♂ of *buffai* and 2 ♀ in Scolytid galleries in bark of *Ficus ovata*, 8.viii.1921 (*H. Hargreaves*) (BMNH).

***Machatothrips heveae* Karny**

(Figs 58, 63, 76)

*Machatothrips heveae* Karny, 1921*b*: 61. Holotype ♀, JAVA (SMF) [examined].

This species is very similar to the African species *braueri* but may usually be distinguished by its shorter posteroangular setae.

**SPECIMENS STUDIED.**

**Malaya:** Kuala Lumpur, 2 ♀ (*A. M. Lea*) (CAS), 2 ♀, 3 ♂ on dead branches, 29.xii.1969 (*R. G. & F. Andre*); Gombak, 2 ♂ on dead branches 29.ix.1973, 1 ♀ on *Cassia* leaves, 2.x.1973 (*L. A. Mound*) (BMNH). **Java:** Halte Dawoan, holotype ♀ on *Hevea* xi.1906 (*De Vos V.N.C.*) (SMF).

***Machatothrips indicus* Ananthakrishnan & Jagadish**

(Fig. 59)

*Machatothrips indicus* Ananthakrishnan & Jagadish, 1970: 279. Holotype ♀, INDIA (TNA) [examined].

This species, described from two females and two males, may be distinguished easily from the others in the genus by the inner margin of the fore tibiae being set with small spinules in both sexes and the fore tibiae of the females having a distinct hump.

**SPECIMENS STUDIED.**

**India:** Aryankavu, holotype ♀ and paratype ♂ on dry twigs, 18.vii.1969 (TNA).

***Machatothrips lentus* sp. n.**

(Figs 61, 69, 70, 75, 79)

♀ macroptera. Colour dark brown to black, basal stem of antennal segment III, tarsi and extreme apex of tube slightly paler. Wings dusky with a dark median longitudinal line in basal half. Wing-retaining setae dark brown, the two pairs of tergal posteroangular setae pale, colourless to yellow.

Head about 1.5 times as long as broad, postocular setae pair I 3.0 to 6.5 times as long as pair II. Antennal segment III 3.2 to 3.8 times as long as broad. Pronotum twice as broad as long, anteroangular

setae 1.5 to twice as long as anteromarginals, median length of pronotum 1.7 to 2.5 times as long as the short posteroangulals. Fore femora enlarged with 2 to 4 separate teeth plus a ridge of 3 to 6 in the distal half of the inner margin; inner margin of fore tibiae with a distinct hump opposing the basal, largest, femoral tooth; fore tarsal claw small. Tube evenly narrowing to apex, about 3.5 times as long as broad.

Measurements (holotype ♀, also largest and smallest ♀ paratypes, in µm). Body, length 5328 (5874, 5106). Head, length 520 (546, 500); maximum breadth across cheeks 326 (344, 316). Postocular setae, pair I 200 (209, 186), pair II 66 (62, 52). Antennal segments, III length 200 (214, 190), breadth 62 (62, 58); length, IV 186 (204, 180); V 156 (170, 158); VI 120 (128, 120); VII 76 (76, 76); VIII 76 (80, 76). Pronotum, median length 266 (314, 268); maximum breadth 530 (540, 510); anteromarginal setae 42 (62, 42); anteroangulals 66 (80, 62); mid-laterals 90 (95, 86); posteroangulals 120 (132, 110); epimerals 228 (248, 214). Fore wing, length 2160 (2400, 2062); maximum breadth 220 (240, 200); duplicated cilia 57 (67, 60); basal setae, 1, 90 (120, 90); 2, 148 (200, 148); 3, 248 (286, 238). Dorsal setae tergite IX 575 (592, 564). Tube, length 632 (710, 632); maximum breadth 180 (190, 180).

♂ macroptera. Colour and structure similar to ♀. Inner margin of fore femora normally without teeth; inner margin of fore tibiae without hump; fore tarsi with well-developed, rounded claw. Some males have a tendency to produce fore femoral spines; these specimens have shorter, more sharply pointed, fore tarsal claws.

Measurements (largest and smallest ♂ paratypes in µm). Body, length 4942, 4800. Head, length 490, 480; maximum breadth across cheeks 306, 306. Postocular setae, pair I 190, 186; pair II 28, 42. Antennal segments, III length 200, 194, breadth 58, 58; length, IV 186, 180; V 162, 156; VI 122, 120; VII 70, 70; VIII 70, 70. Pronotum, median length 366, 304; maximum breadth 592, 528; anteromarginal setae 52, 40; anteroangulals 80, 80; mid-laterals 114, 104; posteroangulals 134, 114; epimerals 238, 224. Fore wing, length 2160, 2015; maximum breadth 214, 200; duplicated cilia 74, 63; basal setae, 1, 90, 86; 2, 142, 138; 3, 228, 214. Dorsal setae tergite IX 466, 472. Tube, length 584, 536; maximum breadth 162, 162.

#### SPECIMENS STUDIED.

Holotype ♀, **Malaya**: Genting Highlands, 4500 ft [1500 km], 30 miles [48 km] east of Kuala Lumpur, dead wood and leaves, 28.ix.1973 (*L. A. Mound*) (BMNH).

Paratypes. **Malaya**: Damansara Forest Reserve, 8 miles [13 km] north of Kuala Lumpur, 1 ♀, 3 ♂ on dead branches and leaves, 3.x.1973; Tanah Rata, 3 ♀, 1 ♂ on dead branch, 12.x.1973; Ringlet, 1 ♀, 1 ♂ on dead branch, 12.x.1973; Gombak, on dead branch, 1 ♀, 5.x.1973, 1 ♂, 13.x.1973 (*L. A. Mound*); Cameron Highlands, 1 ♀ under bark of *Citrus*, 8.xi.1974 (*J. A. Whellan*) (BMNH); Kuala Lumpur 1 ♂; Fraser's Hill, Gap, 2 ♀ (*A. M. Lea*) (CAS). **Singapore**: 1 ♀ (*A. M. Lea & C. T. McN.*) (CAS).

This species is most similar in colour and form to *artocarpi* but it may usually be distinguished by the shorter third antennal segment, posteroangular setae and postocular setae pair II. The females, however, are distinctive in having a hump on the inner margin of the fore tibiae. The teeth on the fore femora are arranged similarly to *biuncinatus* with the smaller apical teeth sometimes fused at the bases to form a ridge. This species appears twice in the key due to the variation in length of the postocular setae pair II, pair I being 3.0 to 6.5 times as long as these setae.

### *Machatothrips quadridentatus* Moulton

(Fig. 55)

*Machatothrips quadridentatus* Moulton, 1947: 179. Holotype ♀, NEW GUINEA (CAS) [examined].

This species is known only from the holotype which, although described as a male, is, in fact, a female. It is distinct in having a short pale, third antennal segment 2.5 times as long as broad, very short postocular setae pair II, which are only 0.1 times as long as pair I, and long anteromarginal setae equal in length to the anteroangulals. The fore femora bear four simple separate teeth in the distal half.

#### SPECIMEN STUDIED.

**New Guinea**: Finschhafen, holotype ♀, v.1944 (*E. Ross*) (CAS).

### *Machatothrips silvaticus* Ananthkrishnan

*Machatothrips silvaticus* Ananthkrishnan, 1972a: 436. Holotype ♀, INDIA (TNA) [paratypes examined].

This species is known from 21 male and 35 female paratypes, in addition to the holotype, from

India. It has a short, third antennal segment, slightly paler than the fourth and may be distinguished from *indicus* mainly by the lack of tubercles on the fore tibiae.

SPECIMENS STUDIED.

**India:** Madhya Pradesh, Kanha forest, 2 ♂, 1 ♀ paratypes on dry twigs, 21.i.1970 (TNA).

**MALESIATHRIPS gen. n.**

Type-species: *Malesiathrips malayensis* sp. n.

Small, dark or bicoloured species of Idolothripinae. Head longer than wide, dorsal surface sculptured, bearing several pairs of broadly blunt, pale setae which arise from tubercles, maxillary stylets V-shaped. Antennae 8-segmented, III-IV less than twice as long as wide; 2 sense cones on III, 4 sense cones on IV. Pronotum with epimeral sutures complete; 5 pairs of major setae present, anteroangular and midlateral setae relatively close together on a slight ridge, epimeral setae elongate on a small tubercle; praepectal plate broad, parallel to probasisternum. Fore tarsus with or without a tooth; all femora with one or more stout pale setae. Mesonotal lateral setae small; metanotum reticulate, median setae stout. Fore wings slightly angled before middle, parallel-sided distally, without duplicated cilia; sub-basal setae  $B_3$  stout. Pelta broad; abdominal tergites with anterior pair of wing-retaining setae small or absent; posterior margin of tergites with 4 pairs of setae; tergite IX setae  $B_1$  and  $B_2$  stout,  $B_3$  finely acute; tube less than 4 times as long as tergite IX, terminal setae short.

This new genus is erected for three species from the Malesian phytogeographic region. One of these species, *solomoni* Mound, was described in the genus *Atractothrips* but the type-species of that genus, from Florida, has the following characteristics: antennal segment III more than 4 times as long as wide, sense cones less than 0.25 times as long as segment; praepectus absent; pronotal midlateral setae reduced; sub-basal wing setae not developed; tergites with 2 pairs of sigmoid wing-retaining setae; posterior margin of tergites with 3 pairs of setae; tergites sculptured in front of antecostal ridge; tube more than 5 times as long as tergite IX.

*Malesiathrips* appears to be similar to the monobasic Hawaiian genus *Dermothrips* which has very reduced setae and the terminal antennal segments condensed. However, the tribal relationships of these genera, together with *Emprosthiothrips* from Australia, are at present uncertain.

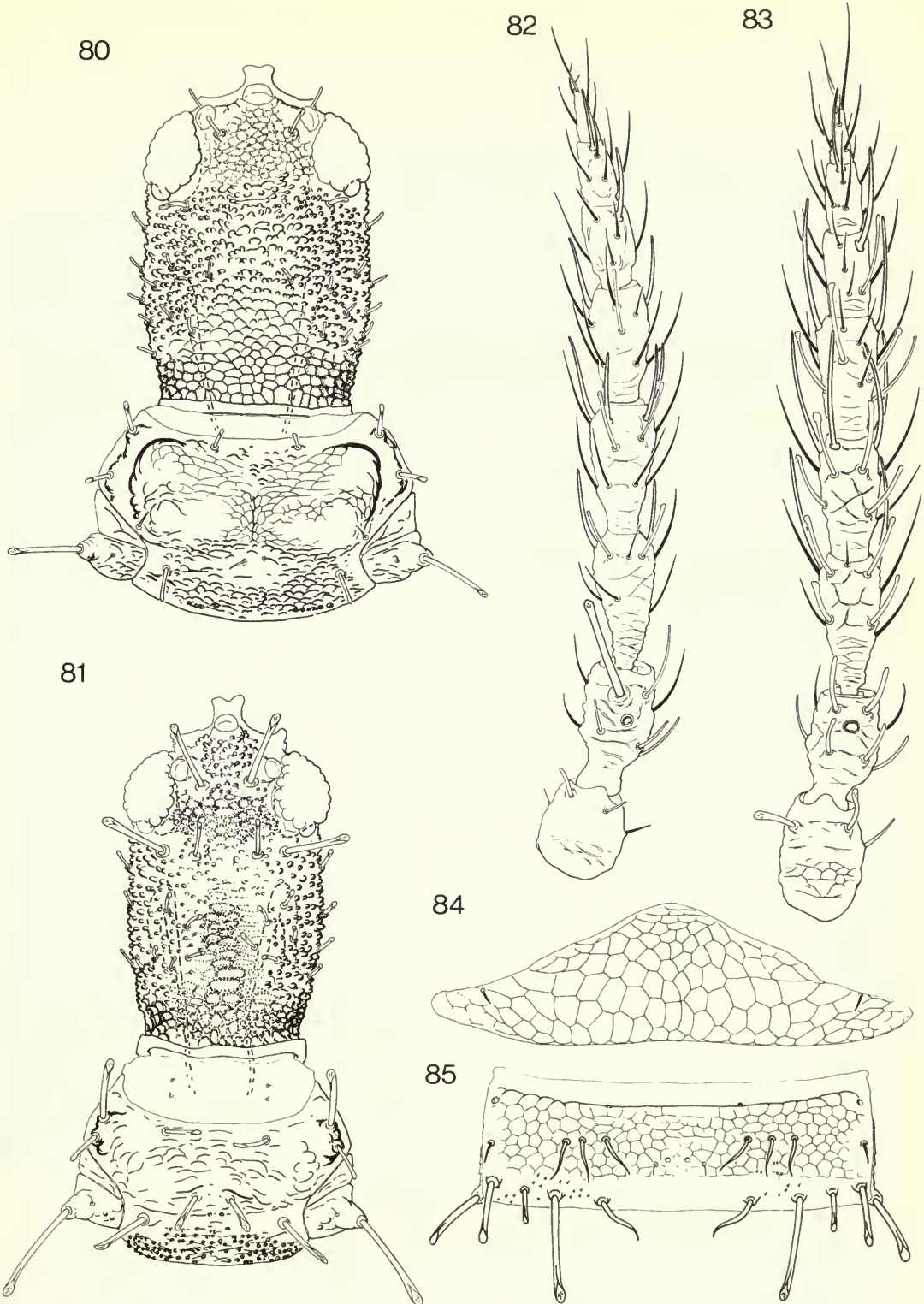
**Key to species**

- 1 Antennal segment II bearing 1 large seta, with expanded apex, which extends beyond mid-point of III (Fig. 82); head prolongation in front of eyes shorter than diameter of one ocellus; head with 1 pair of postocular setae (Fig. 80); sub-basal setae shorter than half basal width of fore wing; median metanotal setae short, about as long as one sculptured reticle [Guam] *guamensis* (p. 196)
- Antennal segment II with 2 short broad setae at apex (Fig. 83); head prolongation as long as diameter of one ocellus; head with 2 pairs of postocular setae (Fig. 81); sub-basal setae longer than half basal width of fore wing; median metanotal setae longer than the diameter of 2 reticles . . . . . 2
- 2 Head with 1 pair of setae on vertex behind and equal in length to postocular setae; median area of vertex tuberculate; pronotal posteromedian discal setae short and acute; fore wing with 2 long sub-basal setae; ♀ with small fore tarsal tooth; head dark laterally, antennal segments III-IV light brown, legs bicoloured, tube as dark as abdomen [Solomon Is] *solomoni* (p. 199)
- Head with 2 or 3 pairs of short broad setae behind postoculars (Fig. 81); median area of vertex with large, transverse reticles; pronotal posteromedian discal setae as long as antero-marginals; fore wing with 1 long sub-basal seta; ♀ without a fore tarsal tooth; head with 2 longitudinal pale stripes, antennae blackish brown except pedicel of III, legs uniformly dark, tube much paler than abdomen [Malaya, Java] . . . . . *malayensis* (p. 198)

***Malesiathrips guamensis* sp. n.**

(Figs 80, 82)

Macropterous ♀. Colour brown; abdomen and tube, pronotum and sides of pterothorax dark brown; head, median area of pterothorax and pelta light brown, legs dark, tarsi yellow; antennal segments,



Figs 80–85 *Malesiathrips* species. (80) *M. guamensis*; (81) *M. malayensis*; (82) *M. guamensis*; (83) *M. malayensis*; (84) *M. malayensis*, pelta; (85) *M. malayensis*, tergite IV.

I-II, VI-VIII dark, III-IV mainly yellow, V yellow to brown; fore wing weakly shaded medially; major setae pale, but large dorsal seta on antennal segment II dark.

Head with irregular tubercles medially, reticulate between eyes and at posterior margin; eyes rather small; postocular and postocellar setae little larger than cheek setae. Antennal segment II with median dorsal seta long and spatulate; III-IV with dorsal setae expanded at apex; pedicel of VI broad. Pronotum sculptured; major setae almost tubular. Metanotum strongly reticulate, median setae small. Pelta reticulate, broad, close to anterior margin of tergite II; tergites similar to *malayensis* (Fig. 85); tergite IX with setae  $B_1$  and  $B_2$  broadly rounded at apex,  $B_3$  finely acute; tube margins weakly convex, with longitudinal ridges basally.

Measurements (holotype ♀ in  $\mu\text{m}$ ). Body, length (contracted) 2000. Head, length 325; median width 220; postocellar and postocular setae 25. Pronotum, length 180; median width 300; major setae, antero-marginal 15, anteroangular 30, mid-lateral 17, epimeral 70, posteroangular ? 30. Metanotal median setae 15. Fore wing, length 1000; distal width 80; sub-basal setae 12, 15, 30. Tergite IX setae,  $B_1$ , 75;  $B_2$ , 75;  $B_3$ , 90. Tube, length 300; terminal setae 150. Antennal segments, length, 45, 70, 75, 72, 60, 45, 40, 30.

#### SPECIMEN STUDIED.

Holotype ♀, **Guam**: Upi, under bark of *Pariti tiliaceum*, 5.v.1936 (*Swezey*) (BMNH).

The eyes of *guamensis* appear to be more reduced than in the other two species of the genus. The pedicillate antennal segments are similar to *solomoni*, but there is a large seta on segment II. The tergites appear to be similar to *malayensis*, but the abdomen of the unique holotype is contracted and difficult to study.

### *Malesiathrips malayensis* sp. n.

(Figs 81, 83-85)

Macropterous ♀. Colour yellow to blackish brown; head pale between the eyes and with two submedian pale stripes, rest of head dark; antennal segments II-VIII dark except base of III; thorax and legs brown, tarsi paler; abdominal segments II-VIII blackish brown, slightly paler submedially, IX pale, tube reddish brown; fore wings shaded, particularly at base, with a longitudinal dark stripe.

Head projecting in front of large eyes; dorsal surface reticulate medially, tuberculate laterally (Fig. 81); postocellar and lateral postocular setae sometimes longer than median postocular setae. Antennal segments IV-VI with broad pedicels; dorsal setae on I-V flattened or apically blunt. Pronotum with posteromedian discal setae similar in structure to the 5 pairs of major setae. Tergites with median pores close together, III-VIII with anterior pair of wing-retaining setae weakly sigmoidal, II-VII with posterior pair of wing-retaining setae sigmoid and flattened (Fig. 85); sternal marginal setae very small; tube parallel-sided, ridged near base, constricted at apex.

Measurements (holotype ♀ in  $\mu\text{m}$ ). Body, length (extended) 2400. Head, length 345; median width 185; postocellar setae 65; postocular setae 30, 65. Pronotum, length 135; median width 255; major setae, anteromarginal 35, anteroangular 54, mid-lateral 30, epimeral 105, posteroangular 54. Metanotal median setae 54. Fore wing, length 1000; distal width 75; sub-basal setae 2, 10, 65. Tergite IX setae,  $B_1$ , 110;  $B_2$ , 95;  $B_3$ , 80. Tube, length 330; terminal setae 90. Antennal segments, length 50, 60, 75, 68, 68, 50, 40, 30.

Apterous ♂. Similar in colour and structure to ♀; head without ocelli; fore tarsus with a small, broad-based tooth; tergites with 2 pairs of large posteromarginal setae and 2 pairs of minute setae; tergal posteromarginal setae small but thorn-like.

Measurements (paratype ♂ from Java, in  $\mu\text{m}$ ). Body, length 1800. Head, length 270; median width 165; postocellar setae 50; postocular setae 30, 48. Pronotum, length 125; median width 225; epimeral setae 60. Tube, length 210. Antennal segments, length, 50, 50, 65, 50, 50, 40, 35, 25.

#### SPECIMENS STUDIED.

Holotype ♀, **Malaya**: 16 ml [26 km] east of Kuala Lumpur, Gombak Field Station, on dead wood, 26.ix.1973 (*L. A. Mound*) (BMNH).

Paratypes. **Malaya**: Kuala Lumpur, 3 ♀ on dead leaves and branches, 23-27.xii.1969 (*R. G. & F. Andre*) (BMNH). **Java**: Bogor Botanic Gardens; 30 ♀, 8 ♂ from dead palm fronds, 24.x.1973 (*L. A. Mound*); 4 ♀ from dead leaves, 25.x.1973 (*L. A. Mound*) (BMNH).

The head of *malayensis* is similar in shape to that of *solomoni*, but the antennal segments are more condensed, and the fore tarsal tooth is smaller. Moreover, *malayensis* has 2 pairs of wing-retaining setae whereas the anterior pair is not developed in *solomoni*. The paratypes from Java and Malaya have shorter setae on the head than the holotype.

*Malesiathrips solomoni* (Mound) **comb. n.**

*Atractothrips solomoni* Mound, 1970 : 116–118. Holotype ♀, SOLOMON IS (BMNH) [examined].

This species is discussed under *guamensis* and *malayensis*. The male has the tergal posteroangular setae short but stout and thorn-like.

**SPECIMENS STUDIED.**

**Solomon Is:** Choiseul I., Vasu River, holotype ♀ with 2 ♀, 1 ♂ paratypes from forest litter, 16.xi.1965 (*Greenslade*) (BMNH).

**MECYNOTHRIPS** Bagnall

*Mecynothrips* Bagnall, 1908a : 356. Type-species: *Mecynothrips wallacei* Bagnall, by original designation and monotypy.

*Phoxothrips* Karny, 1913 : 132. Type-species: *Phoxothrips pugilator* Karny, by monotypy. **Syn. n.**

*Kleothrips* Schmutz, 1913 : 1057. Type-species: *Kleothrips gigans* Schmutz, by monotypy, here regarded as a synonym of *Mecynothrips simplex* Bagnall, 1912. **Syn. n.**

*Dracothrips* Bagnall, 1914 : 290. Type-species: *Dracothrips ceylonicus* Bagnall, by monotypy, here regarded as a synonym of *Mecynothrips simplex* Bagnall, 1912. **Syn. n.**

*Acrothrips* Karny, 1921b : 43. Type-species: *Acrothrips sorex* Karny, by monotypy, emended from *sorex* by Karny, 1924 : 37, here regarded as a synonym of *Kleothrips acanthus* Hood, 1918. **Syn. n.**

*Kleothrips* (*Synkleothrips*) Priesner, 1935c : 330. Type-species: *Kleothrips* (*Synkleothrips*) *innocens* Priesner, by monotypy, here regarded as a synonym of *Kleothrips lacerta* Priesner, 1935c. **Syn. n.**

*Kleothrips* (*Akleothrips*) Priesner, 1935c : 332. Type-species: *Kleothrips* (*Akleothrips*) *karimonensis* Priesner, by original designation. **Syn. n.**

*Mecynothrips* Bagnall; Mound, 1971b : 279–283.

*Phoxothrips* Karny; Haga & Okajima, 1974 : 375–384.

Large, macropterous species of Idolothripini. Head elongate, 2 to 3 times as long as greatest breadth, prolongation in front of eyes also elongate, 2 to 3 times as long as broad; eyes sometimes slightly longer on the dorsal surface; head with 2 pairs of elongate ocellar setae, pair I near first ocellus, pair II posterior to ocellar triangle; 1 pair of postocular setae and 1 pair of median setae on vertex; cheeks with at least 3 (usually more than 6) pairs of pale, stout spine-like setae arising from tubercles. Antennae 8-segmented, segment III 6.0 to 11.5 times as long as broad with 2 sense cones, IV with 4 sense cones. Pronotum about one-third as long as total head length, 1.5 times as broad as long to slightly longer than broad, usually with 5 pairs of major setae; anteromarginals, anteroangulars and mid-laterals sometimes reduced to minor setae, and the second pair of epimerals sometimes well developed; fore angles of some males bearing large recurved horns; epimeral sutures sometimes not developed in larger males. Fore femora of males and females enlarged, rectangular or bulbous in males, usually with an apical tooth and with or without a median or basal tubercle. Fore tibiae of males sometimes with a seta-bearing tubercle at apex; fore tarsal claw well developed in most males, absent in females and some gynaecoid males. Wings broad, slightly broader in apical half, pale or dusky with numerous duplicated cilia. Pelta broad with lateral lobes. Tergite II with at least 2 pairs of wing-retaining setae, tergites III–V with 3 pairs of sigmoid wing-retaining setae and numerous sigmoid accessory setae. Sternite IX of males with a pair of stout setae. Median pair of setae on tergite IX 0.40 to 1.25 times as long as tube. Tube with straight sides evenly narrowing to apex, 4 to 5 times as long as broad, 1.10 to 3.75 times as long as head prolongation, with a few small setae laterally.

The length of the head prolongation is measured laterally from the base of the antenna to the anterior margin of the eye, and the breadth is measured across the base anterior to the eyes. The 'head length from behind eyes' is also measured laterally between the posterior margin of the eyes and the posterior margin of the vertex.

The monotypic genus *Dracothrips* was erected by Bagnall for *ceylonicus*, but he later synonymized this with *Kleothrips gigans*. The monotypic genus *Acrothrips* was erected by Karny for *sorex*, but Bagnall later synonymized this with *Kleothrips acanthus*. Priesner erected two subgenera of *Kleothrips*; *Synkleothrips* for his species *innocens* which has unarmed fore femora and *Akleothrips* for his species *karimonensis* which has an apical tooth and a basal tubercle on the fore femora. Haga & Okajima (1974) indicated that the two genera *Phoxothrips* and *Kleothrips* could not be separated and that *Phoxothrips* was the oldest name. Moreover, they illustrated clearly the range in form of the male fore femur of the type-species *pugillator* which varies from being slender, unarmed and female-like to being enlarged, with a median hump and apical tubercle. Despite this variation within one species, they retained the subgeneric names *Synkleothrips* and *Akleothrips* with the resulting anomaly that large and small males of *pugillator* would be placed in separate subgenera. Similar variation in the fore femora occurs in *hardyi* Priesner (Mound, 1974) and it appears that only one generic name is useful for this group of species.

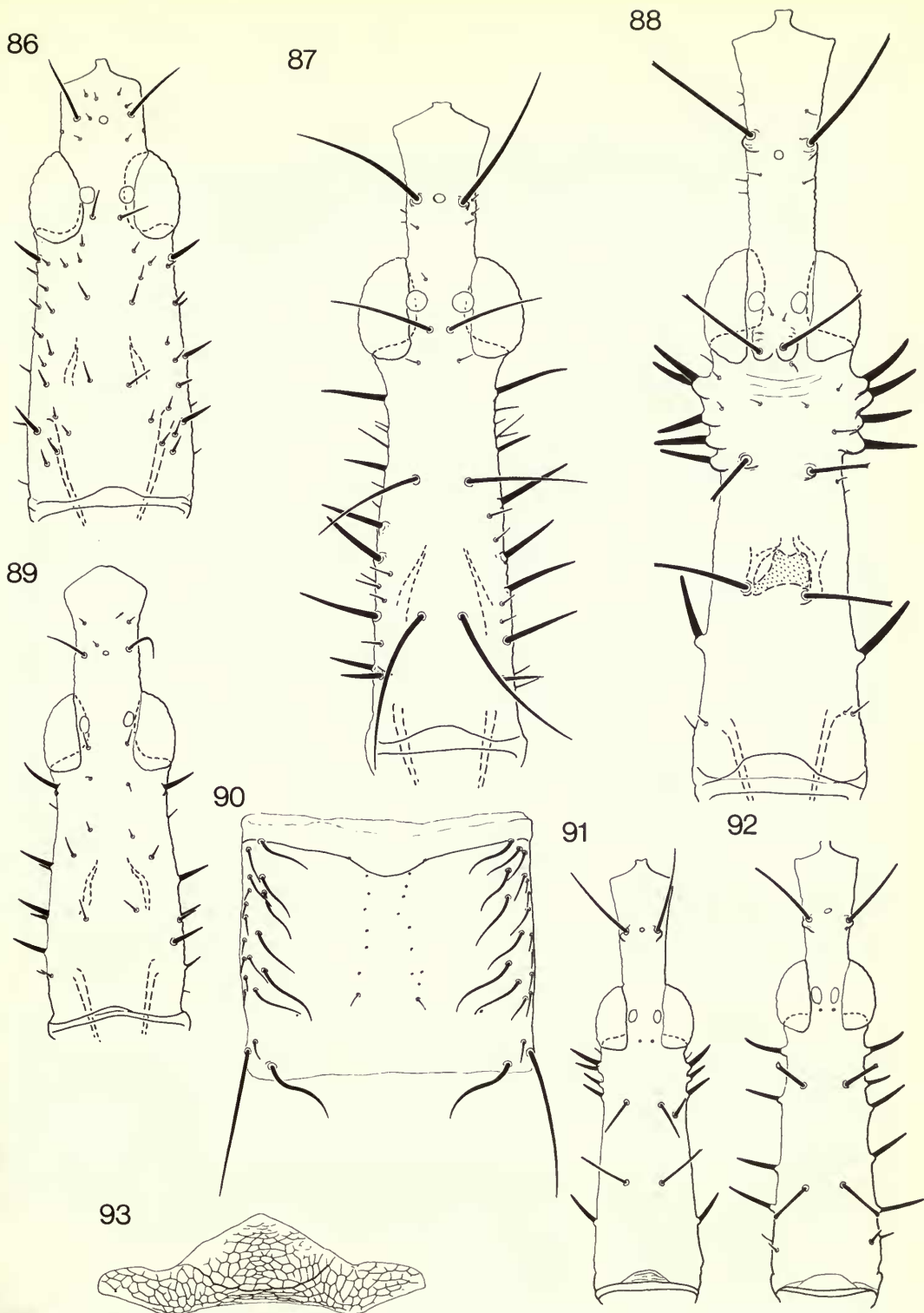
The genus *Mecynothrips* was erected by Bagnall for *wallacei* which was based on one large male. The distinguishing characteristics of this genus appear to be the long head prolongation, the horns on the fore angles of the pronotum and the relatively short tube. The fore femora of the males have an apical tooth and a median tubercle. The pronotal horns, even in small males, are well developed and all the male specimens examined have at least a small median tubercle on the fore femora. However, *acanthus* is intermediate between *Phoxothrips* and *Mecynothrips* in the form of the fore angles of the pronotum, and the species assigned to *Mecynothrips* appear to represent the more extreme oedymorous forms of *Phoxothrips*. The present authors do not regard these differences as sufficient to segregate two genera in which, moreover, the females are not easily distinguishable even at species level. Therefore *Phoxothrips* and *Mecynothrips* are here synonymized.

Within *Mecynothrips* three species-groups can be distinguished on characters which are available in both sexes. In the *simplex*-group, which includes *atratus*, *goliath* and *pugillator*, the median setae on tergite IX are shorter than the tube. In the *acanthus*-group, which includes *hardyi*, *karimonensis* and *lacerta*, the median setae on tergite IX are longer than the tube and the pronotal anteromarginal setae are well developed. In the *wallacei*-group, which includes *kraussi*, *priesneri* and *snodgrassi*, the median setae on tergite IX are longer than the tube but the pronotal anteromarginals are small, minor setae. These species-groups appear to be correlated with the geographical distribution of the species each includes. The *simplex*-group is the most northern: East Africa, Sri Lanka, Java, Sarawak, Philippines, Taiwan, Japan. The *wallacei*-group is the most eastern: New Guinea, Australia, Solomon Is. The *acanthus*-group is the most southern: Java, Sumba, Australia. The genus *Mecynothrips* appears to be the Austro-Oriental equivalent of the otherwise pantropical genus *Elaphrothrips* (Mound, 1974). In both sexes it may be distinguished by the presence of 3 pairs of wing-retaining setae on tergites III–V whereas species of *Elaphrothrips* have only 2 pairs.

#### Key to species

- |   |   |                         |
|---|---|-------------------------|
| 1 | Median pair of setae on tergite IX ( $B_1$ ) shorter than tube, 0.4 to 0.8 times as long . . . . .  | 2                       |
| – | Median pair of setae on tergite IX ( $B_1$ ) longer than tube, 1.05 to 1.25 times as long . . . . .   | 5                       |
| 2 | Median length of pronotum of ♀ 1.7 to 2.5, of ♂ 2.4 to 2.7 times as long as anteroangular setae; legs bicoloured; fore femur of large ♂ without any development of the inner margin, apart from a black apical spine . . . . .  | 3                       |
| – | Median length of pronotum of ♀ 3.0 to 3.3, of ♂ 3.9 to 7.7 times as long as anteroangular setae; legs usually dark; fore femur of large ♂ with a black apical spine and a basal bulge or median tubercle . . . . .  | 4                       |
| 3 | Antennal segment III with a dusky basal stem, IV and V with a darker stem and pale median band, VI dark; fore wings with a dark median longitudinal bar at the base; ♂ with a slim, curved fore tarsal tooth and simple fore tibia (Fig. 103) [Sumba] . . . . .   | <i>goliath</i> (p. 203) |
| – | Antennal segments III–IV with a pale or slightly dusky basal stem; fore wings with a pale basal half and dark margins in the apical half; ♂ with long, slim, straight fore tarsal tooth; small ♂ with simple fore tibia, larger ♂ with two protruding points at the base (Fig. 99) [India to Philippines] . . . . . | <i>simplex</i> (p. 207) |





Figs 86–93 *Mecynothrips* species. 86, *M. pugilator*; 87, *M. acanthus*; 88, *M. kraussi*; 89, *M. atratus* (zuluensis paratype); 90, *M. simplex*, tergite IV. 91, 92, smallest males; (91) *M. kraussi*; (92) *M. snodgrassi*. 93, *M. atratus*, pelta.

- 4 Setae  $B_1$  on tergite IX short, no longer than 0.5 times as long as tube; all legs and tarsi dark; antennal segments III–V with a pale basal stem, segment VI completely dark; ♂ with a slim fore tarsal tooth, fore femur with a black apical spine and median tubercle (Fig. 102). Head length from behind eyes 2.4 to 2.7 times as long as the prolongation (Fig. 89) [East and South Africa] . . . . . *atratus* (p. 203)
- Setae  $B_1$  on tergite IX longer, 0.5 to 0.7 times as long as tube, all legs dark, tarsi paler, antennal segment III–VI with a pale basal stem. Large ♂ with a slim fore tarsal tooth, fore femur with a black apical spine and basal bulge, small ♂ with only a small fore tarsal tooth and fore femur without a basal bulge. Head length from behind eyes 3.5 to 4.4 (5.5 in *takahashii*) times as long as the prolongation (Fig. 86) [Japan, Taiwan] . . . . . *pugilator* (p. 207)
- 5 Anteromarginal setae well developed, 0.75 to 1.0 of anteroangular setae (Fig. 113); tendency to relatively longer tube and shorter head prolongation; ♂ with tube more than 2.5 times length of head prolongation; ♂ without process over tentorial pits on ventral surface of head . . . . . 6
- Anteromarginal setae small, hardly more developed than other minor pronotal setae; tendency to relatively shorter tube and longer head prolongation; ♂ with tube less than 2.5 times length of head prolongation; ♂ with process over tentorial pits on ventral surface of head (Figs 88, 106, 107) . . . . . 9
- 6 Antennal segment III dark, only slightly paler at extreme base, segments IV and V with a pale basal stem and dark basal ring; head prolongation about 0.25 times length of head from behind eyes. Major ♂ with a small fore tarsal tooth, also fore femur with a black apical spine and a basal tubercle, small ♂ with unarmed fore legs [Australia] . . . . . *hardyi* (p. 203)
- At least antennal segments III–V with a pale yellow basal stem; head prolongation about 0.33 times length of head from behind eyes. . . . . 7
- 7 Mid and hind tibiae not distinctly bicoloured; basal stem of antennal segment III paler than IV–VI; ♂ with a small, slim fore tarsal tooth and unarmed fore femur (Fig. 101) [Sumba] . . . . . *lacerta* (p. 206)
- Mid and hind tibiae distinctly bicoloured; basal stem of antennal segment III concolourous with IV and V. . . . . 8
- 8 Basal stem of antennal segments III–VI pale yellow; ♂ with a well-developed, slim fore tarsal tooth, fore femur with an apical spine and basal tubercle (Fig. 100) [Java] *karimonensis* (p. 205)
- Antennal segments III–V with a dusky basal stem and a paler median band; male with a stout fore tarsal tooth, fore femur with two apical spines but without any basal tubercle (Fig. 98) [Australia] . . . . . *acanthus* (p. 202)
- 9 Cheeks with only 1 pair of spine-like setae in basal two-thirds (Figs 88, 91); median sub-basal wing seta usually longer than the most basal; ♂ with cluster of 3 to 5 pairs of spine-like setae on cheeks just posterior to eyes, fore tarsus with a long retroussé claw 3 to 4 times as long as its basal breadth (Fig. 94); process over tentorial pits bilobed (Fig. 106) [Solomon Is] . . . . . *kraussi* (p. 205)
- Cheeks set with numerous spine-like setae throughout entire length (Fig. 92); sub-basal wing setae 1 and 2 subequal, or 2 shorter than 1; fore tibia of ♂ with straight fore tarsal claw, usually only 2 to 3 times as long as basal breadth (Figs 95, 96) . . . . . 10
- 10 Male fore tarsus with a stout claw about 2.5 times as long as basal breadth; fore ocellus situated anterior to ocellar setae (Fig. 92); process over tentorial pits bilobed [Solomon Is] . . . . . *snodgrassi* (p. 208)
- Male fore ocellus situated lateral or posterior to ocellar setae; process over tentorial pits with 1 lobe . . . . . 11
- 11 Male fore tarsal claw stout, only about twice as long as basal breadth; seta bearing tubercle at apex of fore tibia not so distinct (Fig. 96) [New Guinea, New Britain] . . . . . *priesneri* (p. 207)
- Male fore tarsal claw more slender, more than 3 times as long as basal breadth; seta-bearing tubercle at apex of fore tibia distinct (Fig. 95) [New Guinea, Australia] . . . . . *wallacei* (p. 208)

*Mecynothrips acanthus* (Hood) comb. n.

(Figs 87, 98)

*Kleothrips acanthus* Hood, 1918 : 77. Holotype ♂, AUSTRALIA (USNM) [not examined].

*Acrothrips serex* Karny, 1920c : 43. Lectotype ♂, AUSTRALIA (SMF) [examined]. [Synonymized by Bagnall, 1932 : 520.]

*Acrothrips gargantua* Girault, 1926 : 1. Lectotype ♂, AUSTRALIA (QM) [not examined]. [Synonymized by Mound, 1974 : 65.]

*Phoxothrips giganteus* Girault, 1926: 4. Holotype ♂, AUSTRALIA (QM) [not examined]. [Synonymized by Mound, 1974: 65.]

This species belongs to the group with the median setae on tergite IX longer than the tube, well-developed anteromarginal setae and males with bulbous fore femur with a spine only at the apex. The males may be distinguished by the presence of small horns on the fore angles of the pronotum and a second tooth on the ventral surface of the fore femora at the apex. The females are difficult to distinguish from *karimonensis* but tend to have shorter anteroangular setae and a longer head production.

SPECIMENS STUDIED.

**Australia:** [Queensland] Atherton, ♂ lectotype, 2 ♀ paralectotypes of *sorex*, v.1913 (*Mjöberg* 2) (SMF); Kuranda 1100 ft [330 m], 2 ♂, 2 ♀, v.vi.1913, 1 ♂, 21.vi.–24.vii.1913 (*R. E. Turner*); Kuranda–Mareeba, Clohesy River, 1 ♀, 17.i.1962 (*E. Britten*) (BMNH).

***Mecynothrips atratus* (Hood) comb. n.**

(Figs 89, 93, 102, 114)

*Kleothrips atratus* Hood, 1919: 69. Holotype ♀, EAST AFRICA (USNM) [examined].

*Kleothrips* (*Akleothrips*) *zuluensis* Jacot-Guillarmod, 1939: 70. Holotype ♂, SOUTH AFRICA (JG) [examined]. **Syn. n.**

This species is the only representative of *Mecynothrips* in Africa and belongs to the group with the median setae on tergite IX shorter than the tube. It has a distinctively shaped head and pelta (Figs 89, 93), rather short antennal segments, incomplete epimeral sutures, pale wings and completely dark legs. The anterior pair of wing-retaining setae on tergites III–V are sometimes weakly developed, particularly in the female. The males have an enlarged fore femur with an apical tooth and a well-developed median tubercle, and a slim fore tarsal claw. *Kleothrips atratus* was described from one female only and *zuluensis* from two males. Jacot-Guillarmod distinguished them on the shape of the head and its prolongation, also the relative lengths of antennal segments VII and VIII and abdominal segments VIII and XI. These differences are so small that they are here regarded as sexual variation and the two species synonymized.

SPECIMENS STUDIED.

**East Africa [Tanzania]:** Rufigi River, ♀ holotype of *atratus*, 1.vi.1917 (*A. W. Robbins-Pomeroy*) (USNM).

**South Africa (Zululand):** ♂ holotype of *zuluensis*, Hluhluwe, Hhabisa, 24.i.1937 (*Jacot-Guillarmod*), ♂ paratype of *zuluensis*, White Umfolosi, 1922 (*R. H. T. P. Harris*) (JG).

***Mecynothrips goliath* (Priesner) comb. n.**

(Fig. 103)

*Kleothrips goliath* Priesner, 1935c: 327. Holotype ♂, SUMBA (SMF) [examined].

This species is very similar to *simplex* in having short setae on tergite IX and unarmed, bulbous fore femora. It may be distinguished by the darker basal stem of antennal segments III–VI, the dark median bar at the base of the fore wings, the dark postocular setae, also the slim curved fore tarsal claw and the unarmed fore tibiae of the males.

SPECIMENS STUDIED.

**Sumba:** Kananggar, 700 m, holotype ♂, paratype ♀, v.1925 (*Dammerman* 224) (SMF).

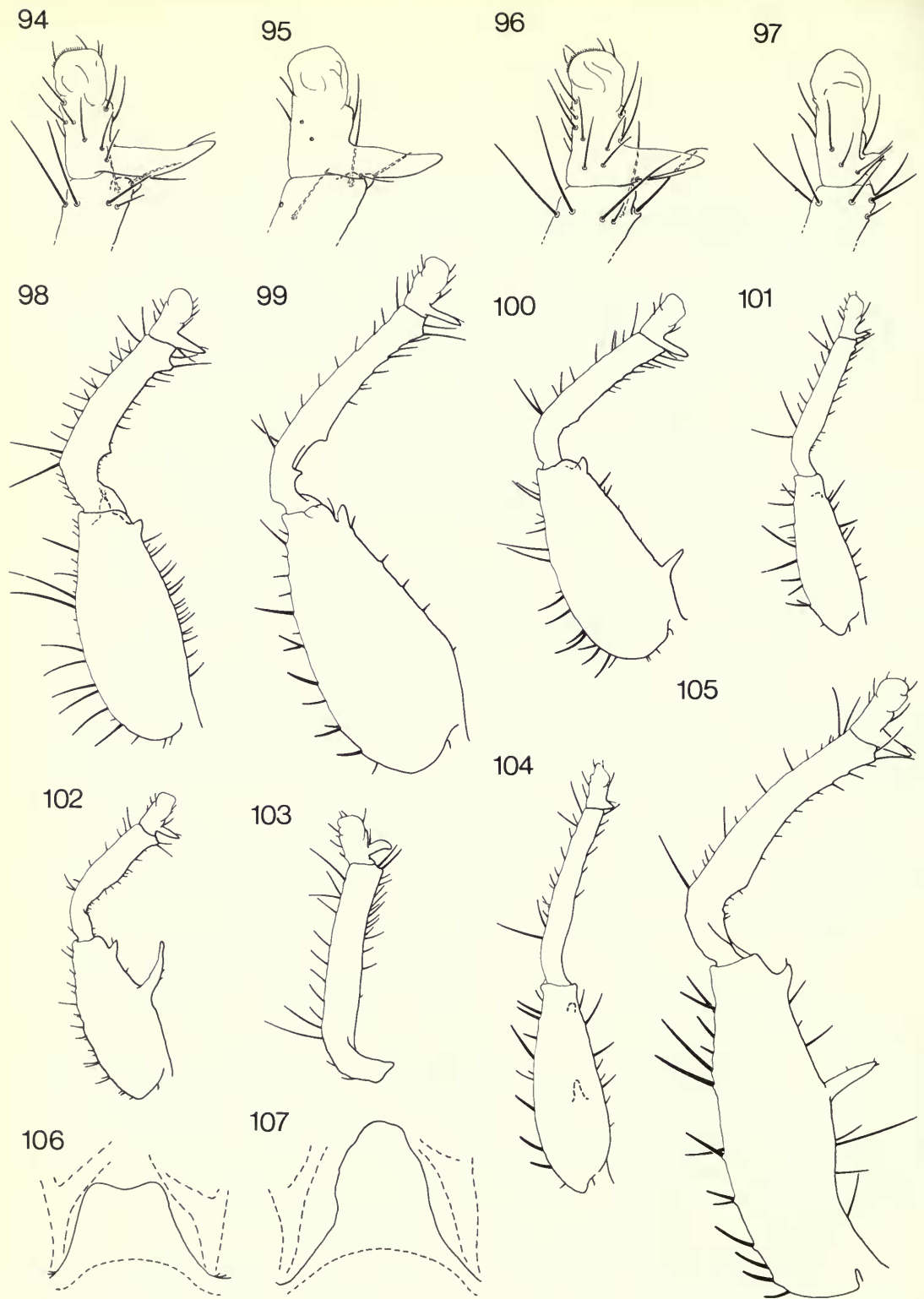
***Mecynothrips hardyi* (Priesner) comb. n.**

(Figs 97, 113)

*Kleothrips hardyi* Priesner, 1928b: 657. Holotype ♀, AUSTRALIA (SMF) [examined].

*Kleothrips hardyi* Priesner; Mound, 1974: 65–66.

This is a dark species belonging to the group which has the median setae on tergite IX longer



**Figs 94-107** Males of *Mecynothrips* species. 94-97, fore tibiae and tarsi, (94) *M. kraussi*; (95) *M. wallacei*; (96) *M. priesneri*; (97) *M. hardyi*. 98-105, fore legs, (98) *M. acanthus*; (99) *M. simplex*; (100) *M. karimonensis*; (101) *M. lacerta* (innocens holotype); (102) *M. atratus* (zuluensis paratype); (103) *M. goliath*; (104, 105) *M. priesneri* (104, minor paratype). 106, 107, tentorial pit covers, (106) *M. kraussi*; (107) *M. priesneri*.

than the tube and well-developed pronotal anteromarginal setae. Large males have bulbous fore femora with an apical tooth as well as a basal tubercle and a small fore tarsal claw. Small males, however, have completely unarmed fore legs. This species is distinct in having a dark antennal segment III, dark legs and dark wings in both sexes.

**SPECIMENS STUDIED.**

**Australia:** [Queensland] Brisbane Bot[anical] Gardens, holotype ♀ (*Hardy*) (SMF); 30 ml [48 km], N. Biloela, 4 ♂, 2 ♀ on dead *Eucalyptus* leaves, 18.vii.1968 (*L. A. Mound*) (BMNH).

***Mecynothrips kanoi* Takahashi comb. n.**

*Kleothrips kanoi* Takahashi, 1937: 343. Syntypes 2 ♀, TAIWAN (depository unknown) [not examined].

This species was described from two female syntypes but has not been recognized since. From the original description it can be established that *kanoi* belongs to the group which has the median setae on tergite IX shorter than the tube. It has a shorter head prolongation than *simplex*, dark legs and antennal segments III–VI with a pale base. Takahashi states that it differs from *takahashii* in the leg colour, the head prolongation and the shorter anteroangulars. It is likely, however, that these characteristics fall within the variation of *pugillator* of which it is probably a synonym.

***Mecynothrips karimonensis* (Priesner) comb. n.**

(Fig. 100)

*Kleothrips (Akleothrips) karimonensis* Priesner, 1935c: 332. Holotype ♂, JAVA (SMF) [examined].

*Kleothrips (Akleothrips) karimonensis* f. *parvidens* Priesner, 1935c: 334. LECTOTYPE ♂, JAVA (SMF), here designated [examined]. **Syn. n.**

This is the type-species of Priesner's subgenus *Akleothrips* to which he also assigned *hardyi* and *lacerta*. These three and also *acanthus* comprise the group of species with the median setae on tergite IX longer than the tube and well-developed anteromarginal setae. The larger males have bulbous fore femora with an apical tooth and a basal tubercle, also a slim fore tarsal claw. The smaller males have a smaller basal tubercle on the fore femur, and a longer tube as do the females. An unspecified number of these small males were named f. *parvidens* by Priesner. The lectotype designated here is the specimen labelled as holotype by Priesner.

**SPECIMENS STUDIED.**

**Java:** Karimon, holotype ♂, paratype ♀ of *karimonensis*, lectotype ♂ of f. *parvidens*, v.1926 (*Dammerman* 10) (SMF).

***Mecynothrips kraussi* sp. n.**

(Figs 88, 91, 94, 106, 115)

♂ macroptera. Colour dark brown to black, basal stems of antennal segments III–V, apices of mid and hind tibiae, tarsi and cheek spines pale yellow, wings dusky at the base with a dark, median longitudinal line in the basal half.

Head from behind eyes about 3 times as long as broad, and head prolongation also about 3 times as long as broad; ocellar setae situated anterior to first ocellus, postocellar setae situated on a pair of tubercles between the eyes near their posterior margin; 3 to 5 pairs of cheek setae arranged on a cluster of tubercles immediately behind eyes, 1 pair of cheek setae situated on tubercles in the basal half of head; tentorial pits on ventral surface of head covered by a bilobed tubercle. Antennal segment III 9.7 to 11.4 times as long as broad and 1.4 times as long as IV. Pronotum slightly longer than broad, anterior angles produced into upwardly curved horns, anteromarginal and anteroangular setae reduced to minor setae, mid-laterals small, posteroangular and one pair of epimeral setae well developed. Fore femora enlarged, rectangular with a dark seta-bearing spine on inner margin at apex, also a tubercle medially and a small rugose hump at the base; fore tibiae L-shaped with 2 major setae on outer angle, apex slightly produced inwards under the well-developed, retroussé fore tarsal claw. Median pair of setae on tergite IX about 1.2 times as long as tube. Tube evenly narrowing to apex, about 4.5 times as long as broad, set with a few small setae.

Measurements (holotype ♂, with largest and smallest ♂ paratypes, in  $\mu\text{m}$ ). Body, length 10100 (10945, 9985). Head, length from behind eyes 865 (890, 710); basal breadth 335 (385, 315). Head prolongation, lateral length 400 (450, 315); basal breadth 125 (135, 125). Anteo-cellular setae 230/250 (268, 220), post-ocular setae 180 (-, -). Postocular setae, pair I 115 (115, 115/135), pair II 180 (169/190, 155). Antennal segments, III, length 655 (780, 545); breadth 65 (65, 55); length, IV 480 (545, 415); V 395 (430, -); VI 240 (270, -); VII 115 (125, -); VIII 95 (115, -). Pronotum, median length 565 (650, 422); maximum breadth 545 (605, 490); posteroangular setae 120 (160, 110); epimeral setae 142 (170, 135). Fore wing, length 2975 (3455, 2685); maximum breadth 250 (325, 240); duplicated cilia 59 (67, 52); basal setae, 1, 126 (125, 105); 2, 142 (160, 110); 3, 225 (240, 185). Dorsal setae tergite IX 660 (-, -). Tube, length 545 (615, 545); maximum breadth 125 (135, 125).

♀ macroptera. Colour similar to the males.

Head and prolongation not as elongate as the male, only twice as long as broad; ocellar setae situated lateral or posterior to first ocellus; cheeks set with at most 3 pairs of stout setae in apical half, not in a cluster, and 1 pair in basal half. Pronotum about 1.4 times as broad as long without horns at anterior angles; anteromarginal setae small but anteroangulars, mid-laterals, posteroangulars and 2 pairs of epimerals well developed. Fore femora not enlarged, unarmed, fore tarsi without a tooth. Tube about 4 times as long as broad.

Measurements (largest and smallest ♀ paratypes in  $\mu\text{m}$ ). Body, length 8065, 7485. Head, length from behind eyes 620, 530; basal breadth 315, 325. Head prolongation, lateral length 240, 190; basal breadth 125, 115. Anteo-cellular setae 260, -; postocellar setae 190/210, -. Postocular setae, pair I 95/105, 95/115, pair II 230, -. Antennal segments, III, length 480, -, breadth 45, -; length, IV 375, -; V 305, -; VI 200, -; VII 95, -; VIII 85, -. Pronotum, median length 385, 325; maximum breadth 500, 480, -; anteroangular setae 85/95, 40/65; mid-laterals 135, -; posteroangulars -, -; epimerals, outer 115/145, 105; inner -, 85/95. Fore wing, length 2880, 2305; maximum breadth 250, 190; duplicated cilia 54, 45; basal setae, 1, -, 220; 2, -, -; 3, -, 385. Dorsal setae tergite IX -, -. Tube, length 700, 605; maximum breadth 150, 135.

#### SPECIMENS STUDIED.

Holotype ♂, **Solomon Is:** Gizo, Titania, 0-20 m, 10.xi.1970 (*N. L. H. Krauss*) (BMNH).

Paratypes. **Solomon Is:** 2 ♂, 2 ♀, same data as holotype; 3 ♂, 1 ♀, same data but 9.xi.1970 (BMNH).

This species is most similar to *snodgrassi* from which the males may be distinguished by the arrangement of the cheek setae and the position of the first ocellus. Of this group of species with median setae on tergite IX longer than the tube and small pronotal anteromarginal setae, the only females known are 1 of *priesneri*, 3 of *wallacei* and 3 of *kraussi*. The females of *wallacei* have not been examined but those of *kraussi* may be distinguished from *priesneri* on the lengths of the postocular setae and pronotal mid-lateral setae. The median head setae of *kraussi* are 2.5 times as long as the postoculars, whereas those of *priesneri* are subequal, and the mid-laterals of *kraussi* are less than 1.5 times as long as the anteroangulars, whereas those of *priesneri* are more than twice as long.

### *Mecynothrips lacerta* (Priesner) **comb. n.**

(Fig. 101)

*Kleothrips lacerta* Priesner, 1935c : 329. LECTOTYPE ♀, SUMBA (SMF), here designated [examined].

*Kleothrips* (*Synkleothrips*) *innocens* Priesner, 1935c : 331. Holotype ♂, SUMBA (SMF) [examined]. **Syn. n.**

*Kleothrips lacerta* was described from a series of female syntypes. The lectotype designated here is the specimen labelled as holotype by Priesner.

This species belongs to the group with the median setae on tergite IX longer than the tube and well-developed pronotal anteromarginal setae. *K. innocens* was described as the type-species of the subgenus *Synkleothrips* because of the unarmed fore femora. The holotype is a small male with a slim fore tarsal claw.

This species is most similar to *karimonensis* from Java but it may be distinguished mainly by the more uniform colour of the mid and hind tibiae.

#### SPECIMENS STUDIED.

**Sumba:** Kampera, lectotype ♀ of *lacerta*, iii.1925 (*Dammerman* 6); Laora, 100 m, holotype ♂ of *innocens*, iv.1925 (*Dammerman* 89) (SMF).

*Mecynothrips priesneri* Mound

(Figs 96, 104, 105, 107)

*Mecynothrips priesneri* Mound, 1971b : 281. Holotype ♂, NEW GUINEA (BPBM) [1 ♂ paratype examined].

*Mecynothrips minor* Mound, 1971b : 282. Holotype ♂, NEW GUINEA (BPBM) [1 ♂ paratype examined].

Syn. n.

This species belongs to the group with the median pair of setae on tergite IX longer than the tube and small pronotal anteromarginal setae. Males have large horns on the fore angles of the pronotum, rectangular fore femora with an apical tooth and a median tubercle, and a stout fore tarsal claw. The cover over the tentorial pits on the ventral surface of the head is of one lobe as in *wallacei*.

Mound (1971) distinguished the small male, *minor*, from *priesneri* by the position of the first ocellus which is variable, and the major setae on antennal segments III and IV not being at right angles to the segment. However, these characters are typical of females and small males throughout the genus.

SPECIMENS STUDIED.

**New Guinea:** Manus I., Rossur, 150 m, 1 ♂ paratype of *priesneri*, 30.vi.1959 (*J. L. Gressitt*); Wau, 1200 m, 1 ♂, 1 ♀, 9.xii.1961 (*J. H. Sedlacek*) (BMNH). **New Britain:** Gazelle Peninsula, Bainings, St Paul's, 350 m, 1 ♂, 7.ix.1955; Kerawat, 60 m, 1 ♂ paratype of *minor*, 2.xi.1955 (*J. L. Gressitt*) (BMNH).

*Mecynothrips pugilator* (Karny) comb. n.

(Fig. 86)

*Phoxothrips pugilator* Karny, 1913 : 132. Holotype ♂, TAIWAN (depository unknown) [not examined].

*Elaphrothrips takahashii* Priesner, 1935d : 372. Holotype ♀, JAPAN (SMF) [examined]. [Synonymized by Haga & Okajima 1974 : 379.]

*Phoxothrips pugilator* Karny; Haga & Okajima, 1974 : 376.

This species belongs to the group with the median setae on tergite IX shorter than the tube. The large males are distinct in having the inner margin of the fore femur developed into a distinct bulge. This, however, varies with size and in small males it is indiscernible. Both males and females of the species may be distinguished from the others in this group, *atratus*, *goliath* and *simplex*, by the distinctly bicoloured antennae and dark legs. The head is also not so constricted behind the eyes.

This is the type-species of the monotypic genus *Phoxothrips*. It was probably described from a unique male which, according to Haga & Okajima (1974), is not with Karny's specimens at Eberswalde. They redescribed the species from a large series of males and females from the Ryuku Is.

The unique female holotype of *takahashii* is similar to *pugilator* although it has a shorter head prolongation.

SPECIMENS STUDIED.

**Japan:** Amami Oosima, Gusuku, Loochoo, holotype ♀ of *takahashii*, 27.vii.1932 (*S. Minoua*) (SMF); Arakawa, Ishigaki-jima, Ryūkyūs, 2 ♂, 1 ♀ on dead *Phoenix* (*S. Okajima*) (BMNH).

*Mecynothrips simplex* Bagnall comb. rev.

(Figs 90, 99)

*Mecynothrips simplex* Bagnall, 1912 : 216. Holotype ♂, PHILIPPINES (BMNH) [examined].

*Kleothrips gigans* Schmutz, 1913 : 1058. Syntypes ♂♀, SRI LANKA (Ceylon) [1 ♂ examined]. [Synonymized by Ananthakrishnan, 1969 : 130.]

*Dracothrips ceylonicus* Bagnall, 1914 : 290. Syntypes 2 ♂, SRI LANKA (Ceylon) (lost). [Synonymized with *gigans* by Bagnall, 1918 : 219.]

*Kleothrips agama* Priesner, 1935c : 323. Holotype ♂, JAVA (SMF) [examined]. [Synonymized by Ananthakrishnan, 1969 : 130.]

*Kleothrips simplex* Bagnall; Mound, 1968 : 130.

This species belongs to the group in which the median setae on tergite IX are shorter than the tube. It is most similar to *goliath* from Sumba except for the slightly paler bases of the antennal segments.

The unique holotype of *simplex* is a large male with square fore angles to the pronotum but without horns, and with an enlarged, bulbous fore femur which bears only an apical spine. The fore tibia has two small teeth at the base and the fore tarsus has a well-developed but slim claw. The mid and hind tibiae are distinctly bicoloured.

Schmutz (1913) described *gigans* as the type-species of his genus *Kleothrips*, differing from *Mecynothrips* in lacking horns on the fore angles of the pronotum. The syntype male examined corresponds to the original illustration in having a large bulbous fore femur with only an apical tooth, a tooth at the base of the fore tibia and a well-developed slim fore tarsal claw. It is in these characteristics inseparable from *simplex*.

The specific synonymy of *ceylonicus* with *gigans* was not stated but implied. In March 1918 Bagnall synonymized his monotypic genus *Dracothrips* with the, at that time, monotypic *Kleothrips*. There were no other species in *Kleothrips* until Hood described *acanthus* in October 1918.

Priesner (1935) described *agama* from a large series of males and females from Java. They differ from *simplex* only in the lack of any small teeth at the base of the fore tibia. From the material examined this character would appear to vary according to the stoutness of the specimen.

Ananthakrishnan (1969) discussed and illustrated the structural variation in the head and fore legs of this species, but unfortunately used the name *gigans* rather than the older name *simplex*.

#### SPECIMENS STUDIED.

**Sri Lanka** (Ceylon): 1 ♂ (*E. E. Green*); 1 ♂, 8.iv.1907 (*B. Fletcher*); 1 ♂ (*Thwaites*); Peradeniya, 1 ♀ (*E. E. Green*), 1 ♂ on dead *Hevea* leaves, 10.v.1914; ? Ceylon: 1 ♂ (BMNH). **India**: Adichanallur, 1 ♂, 1 ♀ on *Areca* sheath, 25.vi.1967 (*TNA*); Uythiri, 2 ♂, 4 ♀ on dry twig, 15.viii.1969 (*TNA*) (BMNH). **Malaya**: Penang, 1 ♀, 20.xi.1945 (*H. T. Pagden*) (BMNH). **Java**: Karimon, holotype ♂, paratype ♀ (+ 2 ♂ paratypes, 2 ♀ BMNH) v.1926 (*Dammerman* 10) (SMF); Bogor, 2 ♂, 2 ♀ on dead leaves, 25.x.1973 (*L. A. Mound*); Jasinga Forest Reserve, 2 ♂ on dead leafy branch, 30.x.1973 (*L. A. Mound*) (BMNH). **Borneo**: W. Sarawak, Quop, 1 ♂, iii.1914 (*G. E. Bryant*) (BMNH). **Philippines**: holotype ♂ of *simplex* (*E. Simon*) (BMNH).

### *Mecynothrips snodgrassi* Hood

(Fig. 92)

*Mecynothrips snodgrassi* Hood, 1952: 294. Holotype ♂, SOLOMON IS (USNM) [not examined].

This species belongs to the group which has the median setae on tergite IX longer than the tube, and small pronotal anteromarginal setae. The males have large horns at the fore angles of the pronotum, and rectangular rather than bulbous fore femora with an apical tooth and a median tubercle on the inner margin. The fore tarsal claw is well developed and there is a bilobed cover over the tentorial pits on the ventral surface of the head. The original illustration of the large holotype male shows the irregular arrangement of cheek spines and the bilobed process on the head. In these characteristics this species closely resembles the new species *kraussi*, also from the Solomon Is, but it may be distinguished by the more numerous cheek setae in the basal half, *kraussi* having only 1 pair, and the stouter fore tarsal claw. The position of the first ocellus, although variable, is apparently anterior to the ocellar setae in *snodgrassi* and usually posterior in *kraussi*.

#### SPECIMEN STUDIED.

**Solomon Is**: Florida Group, Tulagi, 1 ♂, 2.ix.1960 (*C. W. O'Brien*) (BMNH).

### *Mecynothrips wallacei* Bagnall

(Fig. 95)

*Mecynothrips wallacei* Bagnall, 1908a: 357. Holotype ♂, NEW GUINEA (BMNH) [examined].

*Mecynothrips magnus* Girault, 1929b: 1. Syntypes ♂, AUSTRALIA (QM) [not examined]. [Synonymized by Mound, 1971: 283.]



*Mecynothrips bagnalli* Priesner, 1935c : 335. Holotype ♀, KEI Is (? SMF) [not examined]. [Synonymized by Mound, 1971 : 283.]

*Mecynothrips bagnalli* f. *imbecilla* Priesner, 1935c : 338. Syntypes ♂♀, KEI Is (? SMF) [not examined].  
**Syn. n.**

This is the type-species of the genus *Mecynothrips*. It belongs to the group of species with small anteromarginal prothoracic setae and the median setae on tergite IX longer than the tube.

The holotype of *wallacei* is a large male with well-developed pronotal horns, rectangular fore femora with an apical spine and a tubercle on the inner margin just in the apical half. The fore tibiae have a slight bulge at the base and are drawn out into a tubercle at the apex. The fore tarsal claw is stout and well developed. The fore wings are pale apart from a dark horizontal median band in the basal half. There is a cover over the tentorial pits on the ventral surface of the head which is of one lobe, as in *priesneri*.

Priesner described the form *imbecilla* from small males which have shorter pronotal horns as well as smaller fore femoral spines and a smaller fore tibial apical tubercle. There is a small male possibly of *wallacei* in the BMNH from New Guinea which has a small slim fore tarsal claw and only an apical spine on the fore femur. The female which was apparently collected with this male, however, has well-developed anteromarginal prothoracic setae.

**SPECIMENS STUDIED.**

**West Malaysia** ('Malayischen Archipel.'): 1 ♂ (? *Karny*) (BMNH). **New Guinea**: Dorey, holotype ♂ of *wallacei* (*Wallace*); Port Moresby, Waigani, 1 ♂, 1 ♀, leaf litter, 28.ix.1969 (BMNH).

**MEIOTHRIPS** Priesner

*Idolothrips* (*Meiothrips*) Priesner, 1929b : 197. Type-species: *Idolothrips* (*Meiothrips*) *annulatus* Priesner (here regarded as a synonym of *Acanthinothrips annulipes* Bagnall), by monotypy.

*Meiothrips* Priesner & Bagnall, 1934a : 494.

*Meiothrips* (*Telothis*) Kudo & Ananthakrishnan, 1974 : 385. Type-species: *Meiothrips* (*Telothis*) *nepalensis* Kudo & Ananthakrishnan, by monotypy. [Junior homonym of *Telothis* Priesner, 1929a.]

**Syn. n.**

*Meiothrips* (*Aculeathrips*) Kudo, 1975 : 421. Replacement name for *Telothis* Kudo & Ananthakrishnan.

**Syn. n.**

Large, elongate species of *Idolothripini*. Head long, projecting in front of eyes; first ocellus between bases of antennae; inter- and postocellar setae well developed; vertex with 1 pair of postocular setae close together, well behind eyes; cheeks with at least 2 pairs of short stout setae. Antennae 8-segmented, exceptionally elongate, III as long as fore tibia; III with 2 sense cones, IV with 4 sense cones. Pronotum with epimeral sutures not complete; praepectal plates weakly developed, lateral to mouth cone. Fore tarsi unarmed; femora slender but irregularly swollen distally, bearing 4 pairs of stout capitate setae. Mesonotal lateral setae, metanotal median setae and metepimeral setae stout and elongate. Fore wing with or without duplicated cilia; sub-basal setae relatively small, II shortest, III longest. Pelta pointed medially, with broad lateral wings. Tergites III–VI with antecostal ridge recurved medially; tergites with 2 pairs of sigmoid wing-retaining setae and several accessory setae laterally, one or more pairs of these setae sometimes on or anterior to antecostal ridge; setae on IX short; tube with numerous erect setae, with or without tubercles or denticles in ♂.

This genus is closely related to *Bactridothrips* and *Idolothrips*. In all three genera the species have numerous erect setae on the tube, and the metanotum and metepimera bear a pair of stout setae. The females of *Meiothrips* species can be distinguished from females of species in the other two genera mainly by the longer antennae and more slender head. The males of *M. annulipes*, like the males of *Idolothrips* species, have the posteroangular setae of the abdominal tergites stout and thorn-like. Moreover, in both *M. nepalensis* and *I. dissimilis* the dorsal surface of the tube bears two rows of stout tubercles, whereas in *M. annulipes* the dorsal surface of the tube bears numerous small denticles. The subgenus *Aculeathrips* is thus intermediate between *Meiothrips* and *Idolothrips*, and it is possible that only one genus is needed for this whole group of species. The species of *Meiothrips* have been collected infrequently, but the genus is widespread between Nepal, southern India and Borneo. In contrast *Idolothrips* is still known only from Australia.

### Key to species

- 1 Fore wing without duplicated cilia; pelta with numerous dentate microtrichia on lines of sculpture in posterior half (Fig. 111); mid-femora uniformly dark brown; ♂ with 1 pair of posteroangular setae short and thorn-like on tergites VII–VIII; tube of ♂ with numerous small denticles on dorsal surface [Malaya, Sumatra, Borneo] . . . . . *annulipes* (p. 210)
- Fore wing with at least 12 duplicated cilia; sculpture on pelta not bearing microtrichia; mid-femora yellow in part; ♂ without thorn-like tergal posteroangular setae . . . . . 2
- 2 Tube of ♂ with 2 longitudinal rows of pointed tubercles dorsally; setae  $B_1$  on tergite IX of ♂ shorter than width of tergite; antennal segments VI–VII with a short apical, ventral prolongation (Fig. 110); femoral major setae yellow [Nepal, Thailand]. . . . . *nepalensis* (p. 212)
- Tube of ♂ without dorsal tubercles or denticles; setae  $B_1$  on tergite IX of ♂ longer than width of tergite; antennal segments VI–VII not prolonged ventrally (Fig. 109); femoral major setae brown to dark brown [India, Thailand, Malaya] . . . . . *menoni* (p. 210)

### *Meiothrips annulipes* (Bagnall)

(Figs 108, 111–112)

*Acanthinothrips annulipes* Bagnall, 1914 : 378–379. Lectotype ♂, SARAWAK (BMNH) [examined].

*Idolothrips (Meiothrips) annulatus* Priesner, 1929b : 197–201. Syntypes ♀♂, SUMATRA (SMF) [1 ♂ BMNH examined]. **Syn. n.**

*Meiothrips annulipes* (Bagnall) Bagnall, 1934a : 494.

The specimens in the type-series of *annulipes* are larger and more brightly coloured than the small teneral male syntype of *annulatus* which has been studied. The degree of development of the thorn-like setae on the posterior angles of the tergites is variable as in *Idolothrips* (Mound, 1974). Priesner pointed out in the original description of *annulatus* that on tergite V it is not unusual for the seta on one side to be long and 'female-like', but on the other side to be short and stout. This, however, is not true of larger males and it can be inferred that on smaller males both setae on tergite V will be slender.

#### SPECIMENS STUDIED.

**Borneo:** Sarawak, Mt Matang, lectotype ♂ of *annulipes* on dead wood at 1000 ft (30 m), 13.xii.1913 (*G. E. Bryant*) (BMNH); 6 ♂, 1 ♀ paralectotypes with similar data, xii.1913–i.1914 (BMNH). **Sumatra:** Mentawai, Siberat, syntype ♂ of *annulatus*, 10.ix.1924 (*Karny*, 25) (BMNH). **Malaya:** Tapah, 1 ♂, 1 ♀ on dead leaves, 30.vii.1976 (*Okajima*) (SO, Tokyo).

### *Meiothrips menoni* Ananthkrishnan

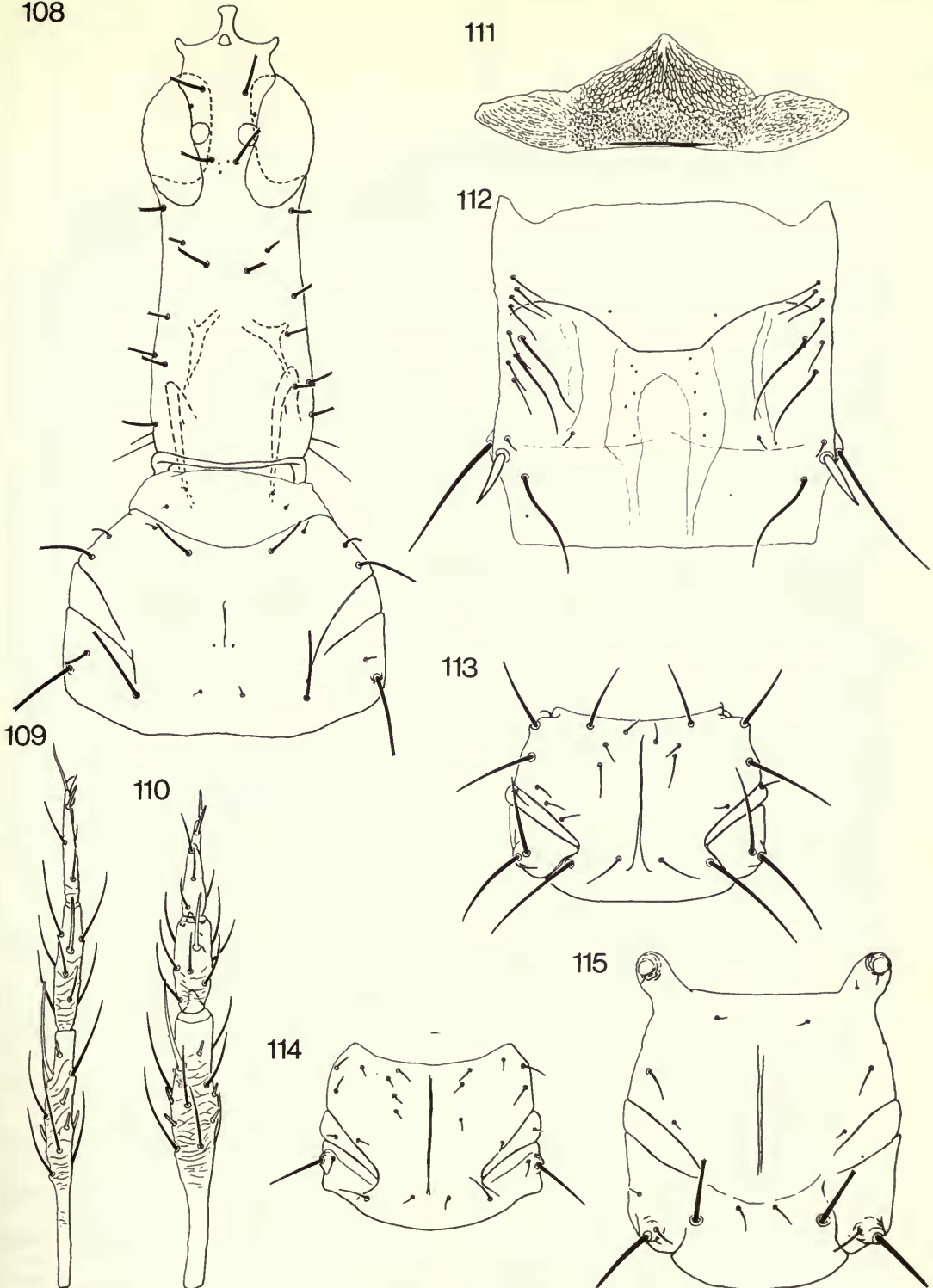
(Fig. 109)

*Meiothrips menoni* Ananthkrishnan, 1964 : 99–101. Holotype ♀, INDIA (TNA) [not examined].

This species was described from a single female collected at Trichur in southern India. That specimen and the three specimens from India listed below have the tibiae largely yellow except for a pale brown mark near the base and an even fainter mark near the apex. In contrast, the specimens listed below from Malaya have an extensive dark brown sub-basal area on the tibiae, and a narrow dark brown area subapically. Moreover, these specimens have short, dark pronotal posteroangular and anteromarginal setae, and the setae on the vertex and ocellar region are also short and dark, whereas the Indian specimens have longer and paler setae. If only these two samples were available then the Malayan specimens would undoubtedly be regarded as a distinct species. However, the two specimens listed below from Thailand have the tibiae intermediate in colour between the Indian and Malayan specimens, and moreover the pronotal setae are long and pale whereas the head setae are short and dark. These specimens suggest that *menoni* exists as a cline between southern India and Malaya; therefore no attempt is made here to distinguish between these populations by the use of formal names.

#### SPECIMENS STUDIED.

**India:** Trichur [Kerala], 1 ♂, beating logs, 7.xi.1963; Kallar [? Mysore], 1 ♂, 1 ♀ on *Areca* leaf, 9.ix.1967



**Figs 108–115** 108–112, *Meiothrips* species. (108) *M. annulipes*. 109, 110, antennal segments VI–VIII, (109) *M. menoni*; (110) *M. nepalensis*. 111–112, *M. annulipes*, (111) pelta; (112) tergite V. 113–115, *Mecynothrips* species pronota, (113) *M. hardyi*; (114) *M. atratus* (zuluensis holotype); (115) *M. kraussi*.

(TNA). **Thailand:** Doi Suthep, 1 ♂, 1 ♀ from dead leaves, 1100 m, 11.viii.1976 (*Okajima*) (SO, Tokyo). **Malaya:** Tapah, 1 ♂ from dead leaves, 28.vii.1976 (*Okajima*) (SO, Tokyo); Kuala Lumpur, 13 ♀, 7 ♂ from dead branches, 23–26.xii.1969 (*Andre*) (BMNH).

*Meiothrips nepalensis* Kudo & Ananthkrishnan

(Fig. 110)

*Meiothrips (Telothrips) nepalensis* Kudo & Ananthkrishnan, 1974 : 385–387. Syntypes ♂♀, NEPAL (2 ♂ syntypes BMNH) [examined].

*Meiothrips (Aculeathrips) nepalensis* Kudo & Ananthkrishnan; Kudo, 1975 : 421.

As discussed above, the remarkable dentate structure of the tube in this species is not unique but also occurs in *Idolothrips dissimilis* Girault from Australia. One of the males listed below from Thailand is exceptionally small. This specimen differs from the other *nepalensis* males in having no long metanotal setae, and in having few small denticles near the base of the tube although the dorsal tubercles are well developed. It is not possible to know if this is normal variation, aberration or another new species. The pronotal anteromarginal setae are shorter than the mid-lateral setae in one of the four syntypes which have been studied, but this is not so in the other three syntypes.

SPECIMENS STUDIED.

**Nepal:** Dhunche, 4 ♂ syntypes on dry leaf, 19.x.1973 (*Kudo*) (2, BMNH). **Thailand:** Doi Suthep, Chiang-mai, 4 ♀, 2 ♂ on dead leaves, 22.iv.1976 (*Suzuki*) (BMNH); Doi Suthep, 1100 m, 1 ♂, 11.viii.1976 (*Okajima*) (SO, Tokyo).

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