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(The pages of the publication follow this cover sheet)

THE *NESOTHRIPS* COMPLEX OF SPORE-FEEDING THYSANOPTERA (PHLAEOTHRIPIDAE : IDOLOTHRIPINAE)

By L. A. MOUND

CONTENTS

SYNOPSIS

Difficulties in the definition of genera among the Cryptothripini are correlated with the biology of these spore-feeding thrips which live in leaf litter and on freshly dead wood. *Nesothrips* is divided into five genera, each with a restricted geographical distribution, but the structural characteristics on which these genera are based are weak and overlapping. Keys are provided to twelve genera and one hundred and one species, and three species are transferred to the subfamily Phlaeothripinae. Two new genera and seven new species are described and sixteen new synonymies are established. These synonymies suggest that some species have been transported between various tropical countries by human commerce.

INTRODUCTION

THE GENUS *Nesothrips* has been interpreted by recent authors in different ways. Stannard (1957) used the name for a large group of species with a wide range of morphological characteristics and placed eight generic names in synonymy. Priesner (1961), however, retained a large element of the traditional classification and recognised five genera in the group when proposing a classification of the suborder Tubulifera. Unfortunately neither of these authors was able to examine the full range of forms in the *Nesothrips*-complex because the collections of J. D. Hood and R. S.

Bagnall were not readily available at the time. In the present study one hundred species are recognized in the complex and through the courtesy of many colleagues the author has been able to study type-material or authentic specimens in all except two instances. As a result a more traditional view has been adopted using relatively small genera. The generic classification of the whole tribe Cryptothripini is in need of revision, but the present study is concerned solely with those species which have been associated with *Nesothrips* or the closely related genus *Rhaebothrips*.

RECOGNITION OF GENERA

In the Cryptothripini the individual genera intergrade in a confusing pattern and it was for this reason that Stannard (1957) used *Nesothrips* in a broad sense. However, this has several disadvantages; it obscures the fact that certain species of *Nesothrips* are morphologically more similar to species in other genera than they are to other species of *Nesothrips*; it conceals the fact that closely related groups of species tend to occur nearer to each other geographically than do less related species; it conceals the structural diversity of the *Nesothrips* group. If the genus is used in Stannard's sense then *Rhaebothrips* and *Acallurothrips* must be included. Moreover some species of *Dichaetothrips* and *Scotothrips* then become difficult to distinguish from the enlarged genus. In this way the concept of a genus approaches Priesner's (1961) concept of a tribe or subtribe, and the name *Nesothrips* no longer calls to mind any concise set of structural, biological or geographical attributes. In order that genera reflect evolutionary relationships between groups of species it is sometimes necessary to admit that there are intermediate species. The use of subgenera may be helpful at times in these circumstances, but this would not be practical in the Cryptothripini in view of the complexity of the relationships between the various forms. The origin of these complex relationships probably lies in the lack of host or habitat specificity in many of these fungal-spore-feeding thrips (Mound & O'Neill, 1974 and also below).

DISTRIBUTION OF GENERA

The generic analysis in this paper has been facilitated partly by establishing the synonymy of several tropical tramp species, and partly by transferring to *Neosmerinthothrips* several South American species described in *Gastrothrips*. The result is not completely satisfactory, but in that it establishes a correlation between structural similarity and geographical distribution this system probably reflects evolutionary relationships. The genus *Nesothrips* sensu stricto is based on a species from Hawaii and is used here for a group of species from the Pacific, Australia and New Zealand. This is itself a difficult group of species which are not all closely related, and some of which are very closely related to *Rhaebothrips* species from the Pacific and New Zealand. *Carientothrips* is another related genus but this has its centre of diversity in Australia rather than the Pacific Islands. In contrast *Bolothrips* is a holarctic genus usually associated with grass tussocks, but with several species in South Africa. *Gastrothrips* is a Neotropical genus with a few species entering North

America and one species-group widespread (?introduced) in the old world. The remaining large genus, *Neosmerinthothrips*, is more confusing with species apparently native to various parts of the tropics. The characters on which these genera are separated are summarised in the key below, although few of the genera can be distinguished on single characters.

SPECIATION IN LITTER THRIPS

The species of the subfamily Idolothripinae (= Megathripinae), to which the *Nesothrips* complex belongs, all feed on fungal spores, judging from the gut contents of the specimens which have been studied. They usually live in leaf litter or on freshly dead wood and they are found mainly in the tropics. This habitat is widespread and readily available across large parts of the earth's surface, and there is no evidence that the fungi on which the thrips feed are restricted in their distribution. This has important effects on the biology of the thrips, their dispersive activity and resultant speciation, as well as the ease with which they are transported by man. Although the habitat is widespread the nutritional status of the fungi at any one site varies with the state of decay of the substratum. This fluctuation in suitability of the habitat has probably stimulated the evolution of winged and wingless morphs in many species, as well as the production of major and minor (oedymerous and gynaecoid) individuals. It is assumed that this structural diversity within individual species is controlled largely by the environment and that the flexibility of the morphogenetic process is itself inherited. The evolution of such a group, within which each species is structurally diverse, can be expected to produce a complicated series of forms difficult to classify into genera. Moreover the lack of host specificity and the irregular production of winged individuals is likely to facilitate gene flow between populations of incipient species. This could have caused the complicated patterns of variation between populations that are found apparently irregularly in *Carientothrips mjobergi* (Mound, 1974) and *Biconothrips* species (Mound, 1972*b*) or in clines as in *Bolothrips* species (q.v.) and *Allothrips megacephalus* (Mound, 1972*a*).

THRIPS DISPERSION BY MAN

Several species of fungus-feeding thrips from leaf litter and dead wood appear to have been distributed around the world by human commerce. Some of these have been referred to elsewhere (Mound, 1970 : 87, *Nesothrips propinquus* and *Hoplandrothrips flavipes*), and the establishment of new synonymy in the present study has revealed further examples e.g. *Scotothrips claripennis*, *Neosmerinthothrips collaris* and *Rhaebothrips lativentris*. Such species have probably been transported in sailing ships: in dry grasses used as fodder and bedding; in seed pods and coconut husks; in baskets or tubs of plants; on dead wood, or in ballast. Different species seem to be associated with different shipping routes. Thus *N. propinquus* is found along the route from Europe to New Zealand via South Africa. *N. collaris* is found in West Africa and the West Indies, the two ends of one of the major slave

trading routes, and this lends support to the suggestion made in this paper that *Neosmerinthothrips hilaris* from West Africa and *N. diversicolor* from Brazil may be variants of one species. A similar situation is found in the Phlaeothripine genus *Rhinoceps*. The first species in this genus, *R. jansei* Faure, 1949, was described from south-east Africa, the second species, *R. cornutus* zur Strassen, 1972, from Colombia, and there is a third (?) species in the BMNH collection from Ghana. However, in view of the very small differences between these 'species' it seems more likely that they are merely local variants which have been distributed by man. A distribution involving south-east Africa and the West Indies is also found in *Scotothrips claripennis* and *Neosmerinthothrips collaris*, and again this relationship calls to mind the slave trading pattern of the seventeenth and eighteenth centuries. It would not have been possible to transport more than a million men and women in conditions of appalling squalor without transporting fungus-feeding and detritus-living insects. The fact that *S. claripennis* is also found in India may reflect even earlier patterns of human trading. Ships have crossed the Indian ocean for several thousand years between such distant points as China and East Africa, and this could well explain much of the present-day distribution of such species as *Nesothrips brevicollis*.

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This study would not have been possible without the active support of many colleagues. Dr Jacot-Guillarmod of Grahamstown, South Africa and the late Professor Priesner of Linz, Austria not only loaned many valuable specimens from their collections, but also gave the author the benefit of their experience with the Cryptothripini in the initial stages of the project. Kellie O'Neill of Washington, Professor Ananthakrishnan of Madras and Dr zur Strassen of Frankfurt also loaned numerous specimens. To all of these the author is deeply grateful. Figures 1–58 in this paper were all drawn to the same magnification by my colleague Mrs Jenny Palmer, and figures 59–74 were all drawn by the author to a different magnification.

ABBREVIATIONS

The following abbreviations are used for depositories.

AMG	Albany Museum, Grahamstown, South Africa
ANIC	Australian National Insect Collection, C.S.I.R.O., Canberra
BMNH	British Museum (Natural History)
BPBM	Bernice P. Bishop Museum, Hawaii
CAS	California Academy of Sciences, San Francisco
DSIR	Department of Scientific & Industrial Research, Auckland, New Zealand
FDA	Florida Department of Agriculture, Gainsville, U.S.A.
HP	Dr H. Priesner collection, Linz, Austria
INHS	Illinois Natural History Survey, Urbana, U.S.A.
NR	Naturhistoriska Riksmuseum, Stockholm
Pretoria	Plant Protection Research Institute, Pretoria, South Africa

NZFI	New Zealand Forest Research Institute, Rotorua
QM	Queensland Museum, Brisbane, Australia
SMF	Senckenberg Museum, Frankfurt
TM	Természettudományi Múzeum, Budapest
TNA	Professor Ananthakrishnan collection, Loyola College, Madras, India
USNM	United States National Museum (National Museum of Natural History), Washington D.C.

The following abbreviations are used in the descriptions of species for the major setae of the pronotum.

am	anteromarginal setae	epim	epimeral setae
aa	anteroangular setae	pa	posteroangular setae
ml	midlateral setae		

CHECK-LIST OF THE SPECIES DISCUSSED IN THIS PAPER

Family **PHLAEOTHRIPIDAE** Uzel

Phloeothripidae Uzel, 1895

Subfamily **IDOLOTHRIPINAE** Bagnall

Idolothripidae Bagnall, 1908
Megathripidae Bagnall, 1914
Megathripinae Bagnall; Karny, 1919

BOLOTHRIPS Priesner, 1926 **gen. rev.**
Bolothrips (*Botanothrips*) Hood, 1939
bicolor (Heeger, 1852)
bicolor brevicornis Priesner, 1928
andrei Watson, 1933
cinctus Faure, 1943
cingulatus (Karny, 1916)
dentipes (Reuter, 1880)
bagnalli (Karny, 1916)
dentis Faure, 1954
embotyi Faure, 1943
gilvipes Hood, 1914
litoreus Hood, 1939 **syn. n.**
icarus (Uzel, 1895)
icarus pallipes (Uzel, 1895)
insularis (Bagnall, 1914)
icarus tuberculatus (Priesner, 1922)
brachyurus (Bagnall, 1927)
arenarius Priesner, 1950 **syn. n.**
italicus **sp. n.**
pratensis Hood, 1939
rachiphilus Cott, 1956
schafferi (Thomasson & Post, 1966) **comb. n.**
varius Hartwig, 1948

CARIENTOTHRIPS Moulton, 1944 **stat. n.**
acti Mound, 1974
badius (Hood, 1918) **comb. n.**
apterus (Girault, 1928)
biformis (Moulton, 1939) **comb. n.**
capricornis (Mound, 1974) **comb. n.**
casuarinae Mound, 1974
denticulatus (De Santis, 1963) **comb. n.**
fijiensis Moulton, 1944
grayi **sp. n.**
japonicus (Bagnall, 1921) **comb. n.**
loisthus Mound, 1974
magnetis Mound, 1974
miskoi Mound, 1974
mjobergi (Karny, 1920)
australicus (Priesner, 1928)
incisus (Girault, 1927)
flavitibia (Moulton, 1968)
pedicillus Mound, 1974
pictilis Mound, 1974
reedi Mound, 1974
semirufus (Girault, 1928)
vesper Mound, 1974
DICERATOTHRIPS Bagnall, 1908
validipennis (Hood, 1938) **comb. n.**

DICHAETOTHRIPS Hood, 1914
gloveri (Ramakrishna Ayyar & Margabandhu, 1939) **comb. rev.**
GASTROTHRIPS Hood, 1912 **gen. rev.**
Probolothrips Moulton, 1941
abditus Hood, 1935
brasiliensis (Moulton, 1938)
hambletoni (Moulton, 1941)
acuticornis (Hood, 1925)
cybele (Girault, 1927)
noumeae Bianchi, 1945
alticola Hood, 1942
anolis Morgan, 1925
proteus Hood, 1933
callipus Hood, 1935
corvus Priesner, 1933
capitalis Hood, 1935 **syn. n.**
falcatus Ananthakrishnan, 1968 **comb. n.**
fulvicauda Hood, 1937
fulviceps Hood, 1937
fumipennis Hood, 1952
intonsus Hood, 1941
mandiocae (Moulton, 1941)
oeceticola De Santis, 1943
mongolicus Pelikan, 1965 **comb. n.**
monticola Hood, 1942
procerus Hood, 1956
ruficauda Hood, 1912
stygicus Hood, 1935
subulatus (Hartwig, 1948) **comb. n.**
texanus Hood, 1912
NEOSMERINTHOTHRIPS Schmutz, 1913 **gen. rev.**
Coenurothrips Bagnall, 1921
Galactothrips Moulton, 1933 **syn. n.**
affinis (Bagnall, 1921) **comb. n.**
annulipes (Hood, 1950) **comb. n.**
milleforme (De Santis, 1963) **syn. n.**
brevicollis (Bagnall, 1921) **comb. n., stat. rev.**
collaris (Bagnall, 1917) **comb. n.**
fuscicauda (Morgan, 1925) **syn. n.**
marshalli (Priesner, 1934) **syn. n.**
dominicanus (Hood, 1925) **syn. n.**
diversicolor (Moulton, 1933) **comb. n.**
fijiensis (Moulton, 1944) **comb. n.**
fructuum Schmutz, 1913
ceylonicus (Karny, 1925) **syn. n.**
hilaris (Priesner, 1937) **comb. n.**
hoodi (Faure, 1954) **comb. n.**
inquilinus Ananthakrishnan, 1960
nigrisetis (Hood, 1935) **comb. n.**
parvidens (Hood, 1935) **comb. n.**
paulistarum (Hood, 1950) **comb. n.**
picticornis (Hood, 1936) **comb. n.**
plaumanni (Hood, 1950) **comb. n.**
robustus (Ananthakrishnan, 1964) **comb. n.**
variipes (Hood, 1950) **comb. n.**
xylebori Priesner, 1935
NESIDIOTHRIPS **gen. n.**
alius (Ananthakrishnan, 1970) **comb. n.**
validus (Bagnall, 1921) **comb. n.**
NESOTHRIPS Kirkaldy, 1907
Oedemothrips Bagnall, 1910
aoristus Mound, 1974
artocarpi (Moulton, 1942)
brevicollis (Bagnall, 1914)
minor (Bagnall, 1921) **syn. n.**
formosensis (Priesner, 1935) **syn. n.**
formosensis karnyi (Priesner, 1935) **syn. n.**
carverae Mound, 1974
fodinae **sp. n.**
hemidiscus Mound, 1974
malaccae **sp. n.**
melinus Mound, 1974
niger (Moulton & Steinweden, 1932)
oahuensis Kirkaldy, 1907
laticeps (Bagnall, 1910)
propinquus (Bagnall, 1916)
dimidiatus (Hood, 1918)
propinquus breviceps (Bagnall, 1924)
propinquus obscuricornis (Bagnall, 1924)
cestosa (Karny, 1920)
oleriae (Moulton, 1949)
similis (Hartwig, 1948) **syn. n.**
rhizophorae (Girault, 1927)
semiflavus (Moulton, 1939)
yanchepi Mound, 1974
PHACOTHRIPS **gen. n.**
ocelloides (Hood, 1950) **comb. n.**
RHAEBOTHRIPS Karny, 1913
doulli **sp. n.**
eastopi **sp. n.**
lativentris Karny, 1913
claripennis (Hood, 1919)
seychellensis (Bagnall, 1921) **syn. n.**
difficilis (Bagnall, 1921) **syn. n.**
ipomoeae (Ishida, 1932)
magnus (Moulton, 1928)
yuasai (Moulton, 1928)
fuscus Moulton, 1942
australiensis (Moulton, 1968)
leveri **sp. n.**
major Bagnall, 1928
nigrisetis Sakimura, 1972
zondagi **sp. n.**

SCOTOTHRIPS Priesner, 1939
claripennis (Moulton, 1934) **comb. n.**
trinidadensis (Hood, 1935) **syn. n.**
indicus (Ananthakrishnan, 1968) **syn. n.**
diversus (Ananthakrishnan, 1972) **syn. n.**
firmus (Hood, 1952) **comb. n.**
SYNCEROTHRIPS Hood, 1935 **gen. rev.**
harti Hood, 1935

Species removed from *Nesothrips* complex

Subfamily **PHLAEOTHRIPINAE** Uzel, 1895

Adelothrips lativerticis (Post, 1961) **comb. n.**
Adelothrips speciosissimus (Karny, 1920)
Liothrips debilis (Hood, 1936) **comb. n.**

KEY TO THE GENERA OF THE *NESOTHRIPS* COMPLEX

1 Antennal segment IV with two sense cones (Text-fig. 59) 2
– Antennal segment IV with three or more sense cones (Text-figs 61–74) . . 4
2 Antennal segment VIII less than twice as long as wide, broadly joined to VII; head not projecting in front of eyes; interocellar setae twice as long as distance between two ocelli; female with a fore tarsal tooth [South Africa] ***Bolothrips dentis*** (p. 120)
– Antennal segment VIII slender, twice as long as wide; head strongly projecting in front of eyes; no elongate setae near the ocelli (Text-fig.1); female without a fore tarsal tooth 3
3 Antennal segment III with two sense cones; prothorax and all legs yellow in both sexes, rest of body brown [Europe and eastern North America] ***Bolothrips bicolor*** (p. 118)
– Antennal segment III with one sense cone; prothorax brown in ♀, legs brown with yellow markings on the femora, ♂ with pronotum and pterothorax yellow with brown shadings laterally [Italy] . . . . . ***Bolothrips italicus*** (p. 122)
4 Antennal segment IV with three sense cones (Text-figs 64, 65) 5
– Antennal segment IV with four or rarely five sense cones (Text-figs 66–74) . . 7
5 Eyes usually longer ventrally than dorsally, if eyes not prolonged ventrally then metanotal setae weak and pelta broadly rounded; tube always black with straight sides (Text-fig. 13); ♂ and ♀ usually apterous, ♀ rarely macropterous [mainly Holarctic] . . . . . ***BOLOTHRIPS*** (p. 117)
– Eyes rarely prolonged on ventral surface of head; one pair of metanotal setae frequently stout; pelta usually triangular and never broadly rounded; tube variable, frequently yellow, or with apex sharply constricted (Text-figs 14–19); ♀ usually macropterous, rarely micropterous or apterous; ♂ macropterous or apterous [mainly Neotropical] 6
6 Antennal segment VIII distinct from VII, usually long and slender, rarely less than 0·75 times as long as VII . . . . . ***GASTROTHRIPS*** (p. 134)
– Antennal segment VIII broadly fused to VII, the suture incomplete dorsally ***SYNCEROTHRIPS*** (p. 181)
7 Head with an ommatidia-like papilla on cheek, situated midway between posterior margin of eye and posterior margin of head (Text-fig. 47); tube margins strongly convex, maximum diameter about five times apical diameter (Text-fig. 51); fore wing without duplicated cilia [Brazil] . . . . . ***PHACOTHRIPS*** (p. 170)
– Head with normal cheeks, rarely with one isolated ommatidium close behind compound eye; tube frequently with straight sides, if convex then maximum diameter

less than three times apical diameter; fore wing when present rarely lacking duplicated cilia 8

8 Head with a pair of stout setae anterolateral to the fore ocellus but with no other long setae near the ocelli (rarely with these setae shorter than one side of ocellar triangle) (Text-fig. 9); antennal segment III more than 1·3 times as long as IV, segments VII and VIII with a complete suture but forming a single unit with an almost smooth outline (Text-fig. 66); pronotum broad and weakly reticulate, with anterior and median ridge scarcely thickened even in major males, and mid-lateral setae usually small; fore femora of males frequently with a series of stout spines on inner margin [Neotropics] . . . ***DICERATOTHRIPS*** (p. 133)

– Head with a pair of stout setae between or behind the ocelli, or with no long setae near the ocelli; antennal segment III less than 1·2 times as long as IV, segment VIII usually smaller at base than VII at apex; pronotum frequently with a stout median thickening, anterior margin often thickened in males, and midlateral setae rarely small; fore femur of ♂ without spine-like setae 9

9 Head with a pair of long setae arising within the ocellar triangle, midway between anterior and posterior ocelli (Text-fig. 46); fore tarsus of ♀ with a stout tooth ***NESIDIOTHRIPS*** (p. 156)

– Head with a pair of long setae arising between or behind the posterior ocelli, or ocellar setae all short; fore tarsus of ♀ frequently without a tooth . . . 10

10 Fore tarsal tooth well developed in ♀; head always longer than wide, eyes never prolonged on ventral surface of head; ocellar setae arising behind posterior ocelli; cheeks frequently with several stout setae; tube slender with straight sides, evenly narrowing from base to apex 11

– Fore tarsal tooth usually absent in ♀; if present then eyes prolonged on ventral surface of head, or ocellar setae arising between posterior ocelli, or head as wide as long and constricted to base without cheek setae, or tube heavy with stout setal tubercles or even with convex sides 12

11 Postocellar setae longer than one side of ocellar triangle; cheeks with fine setae (Text-fig. 8) . . . . . ***DICHAETOTHRIPS*** (p. 134)

– Postocellar setae shorter than one side of ocellar triangle; cheeks frequently with stout setae . . . . . ***SCOTOTHRIPS*** (p. 177)

12 Maxillary stylets retracted into head as far as postocular setae, parallel in middle of head and about one third of head width apart (Text-fig. 2); pelta of macropterae usually with very slender lateral wings [Pacific, Australia, Falkland Is] ***CARIENTOTHRIPS*** (p. 125)

– Maxillary stylets wide apart, arranged in a V-shape and usually low in head (Text-figs 40–42); pelta of macropterae without slender lateral wings . . . 13

13 Tube heavy with sides convex (Text-figs 35–37) and head with no elongate ocellar setae; or fore tarsal tooth present in ♀, and tube heavy with one or more pairs of lateral setal bases, ocellar setae rarely elongate [Oriental, Ethiopian and Neotropical regions] . . . . . ***NEOSMERINTHOTHRIPS*** (p. 148)

– Tube with straight sides, sometimes slightly constricted at apex (Text-figs 44, 56); fore tarsal tooth rarely present in ♀; postocellar setae usually longer than diameter of one ocellus, frequently arising between the posterior ocelli [Pacific and Australian regions, introduced elsewhere] 14

14 Postocellar setae close together arising between the posterior ocelli (Text-figs 52–54); tube rarely less than three times as long as maximum width; ♀ rarely with a fore tarsal tooth . . . . . ***RHAEBOTHRIPS*** (p. 171)

– Postocellar setae frequently arising behind posterior ocelli, if arising between the ocelli than the tube is shorter, less than 2·5 times as long as maximum width; ♀ never with a fore tarsal tooth 15

15 Head more than 1·3 times as long as wide . ***CARIENTOTHRIPS*** (part) (p. 125)

– Head less than 1·2 times as long as wide . . . . ***NESOTHRIPS*** (p. 158)

GENERA AND SPECIES DISCUSSED ALPHABETICALLY

BOLOTHRIPS Priesner **gen. rev.**

Bolothrips Priesner, 1926 : 90. Type-species: *Phloeothrips bicolor* Heeger, by original designation

Bolothrips (*Botanothrips*) Hood, 1939 : 605–606. Type-species: *Bolothrips pratensis* Hood, by original designation.

The genus *Bolothrips* is used here for a group of fourteen Holarctic and Ethiopian species which live at the base of grass tussocks and only rarely produce macropterae. The more common species appear to exist as irregular clines, for example the *gilvipes*, *litoreus*, *rhachiphilus* complex in North America, and the *insularis*, *icarus*, *varius* complex in Europe and Africa. The interpretation of these clines nomenclatorially must be rather arbitrary.

Most species of *Bolothrips* have three sense cones on the fourth antennal segment, although the ventral sense cone is missing in the type-species *bicolor* as well as in *dentis* Faure. *Gastrothrips* species also have three sense cones on the fourth antennal segment although these are usually rather stouter than in *Bolothrips* species. Moreover most species of *Gastrothrips* have a pair of stout metanotal setae, a triangular pelta, and well developed wings. *Botanothrips* has been used for a group of species in which the eyes are not prolonged ventrally, but this is not accepted here in view of the variation in *insularis* and *varius*. One species, *dentis* Faure, is retained in *Bolothrips* for the present although it combines the characters of several genera.

GENERIC DEFINITION. Medium sized, black or bicoloured, rarely pale species of Cryptothripini. Head usually longer than wide, projecting in front of eyes, with eyes prolonged or at least narrowed ventrally; maxillary stylets V-shaped and wide apart. Antennae eight segmented, VIII more than 0·5 times as long as VII; segment III with two (rarely one) sense cone, IV with three (rarely two) sense cones. Pronotum with epimeral sutures complete; ♂ with fore tarsal tooth and frequently with fore tibial apical tubercle; ♀ without tooth or tubercle. Usually apterous, fore wing with duplicated cilia in *bicolor* and *icarus*. Metanotal median setae small and slender. Pelta usually broadly rounded; tube with straight sides.

KEY TO THE SPECIES OF *BOLOTHRIPS*

1 Body colour light yellowish brown, abdominal segments VIII–X lightest [South Africa] . . . . . .****embyoti*** (p. 120)

– Body colour dark brown, thorax sometimes yellow, abdominal segments VIII–IX darker than rest of body 2

2 Antennal segment IV with two sense cones, the ventral one missing . . . 3

– Antennal segment IV with three sense cones 5

3 Fore tarsal tooth present in ♀; interocellar setae longer than distance between ocelli; tube paler than abdomen, constricted at apex [South Africa] . . ***dentis*** (p. 120)

– Fore tarsal tooth not present in ♀; interocellar setae not elongate; tube with sides straight 4

4 Prothorax and all legs yellow in both sexes, rest of body brown; antennal segment III with two sense cones [Europe, eastern North America] . . ***bicolor*** (p. 118)

– Prothorax brown in ♀, legs brown with yellow markings; ♂ with prothorax and pterothorax yellow but shaded brown laterally; antennal segment III with one sense cone; Italy . . . . . ***italicus*** (p. 122)

5 Ventral length of eyes more than 1·6 times the dorsal length 6
– Ventral length of eyes less than 1·3 times the dorsal length 11
6 Pronotum, pterothorax and abdominal segment I yellow 7
– Pronotum sometimes reddish yellow, but pterothorax brown 8
7 Abdominal segment II yellow; antennal segments II and IV largely brown [Europe] ***cingulatus*** (p. 119)
– Abdominal segment II brown; antennal segment II brownish yellow, IV and V largely yellow [South Africa] . . . . . ***cinctus*** (p. 119)
8 Tube relatively long, at least 2·3 times as long as maximum width; antennal segment III largely yellow 9
– Tube relatively short, not more than 2·1 times as long as maximum width; antennal segment III brown with pedicel light 10
9 Legs uniform dark yellow; antennal segments III, IV and basal two-thirds of V yellow [western North America] . . . . . ***schafferi*** (p. 123)
– Legs largely brown; antennal segments IV and V brown, III yellow with brown shading at apex [Europe and North America] . . . . ***dentipes*** (p. 119)
10 Head of apterae with reduced ocelli; pronotum reddish yellow [south-eastern North America] . . . . . ***gilvipes*** (p. 120)
– Head of apterae without ocelli; pronotum black [California] . ****rhachiphilus*** (p. 123)
11 Body bicoloured, head and thorax much paler than abdomen [Florida, Texas] ***pratensis*** (p. 122)
– Head and thorax as brown as abdomen 12
12 Dorsal setae on tergite IX less than 0·8 times as long as tube [South Africa] ***varius*** (p. 123)
– Dorsal setae on tergite IX more than 0·9 times as long as tube [Mediterranean to Latvia] 13
13 Antennal segment IV yellow at base; dorsal setae on tergite IX generally shorter than tube . . . . . ***icarus*** (p. 121)
– Antennal segment IV brown; dorsal setae on tergite IX generally a little longer than tube . . . . . ***insularis*** (p. 121)

* Not studied

Bolothrips bicolor (Heeger)

Phloeothrips bicolor Heeger, 1852 : 477–478. Syntypes ?sex, AUSTRIA (? lost).
Bolothrips bicolor (Heeger) Priesner, 1926 : 90.
Bolothrips bicolor f. *brevicornis* Priesner, 1928*a* : 687. Holotype ♀, HUNGARY (HP) [not examined].
Oedaleothrips andrei Watson, 1933 : 49–50. Syntypes 4 ♀, 4 ♂, U.S.A.: Iowa (FDA) [not examined]. [Synonymized by Stannard, 1957 : 106.]

This species is widespread in central and south-eastern Europe, and according to Stannard (1957) it is distributed through the northern part of North America. The present author has not studied specimens from west of North Dakota or Utah. One macroptera is listed below from Minnesota, and Priesner (1928 : 687) refers to macropterae from Austria found in July and August. The most closely related species are *dentipes* and *italicus*, whereas *cingulatus* has much shorter antennal segments with three sense cones on the fourth segment.

SPECIMENS STUDIED.

HUNGARY: Simontornia, 1 ♀, 1 ♂, 5.v.1924 (*F. Pillich*). CZECHOSLOVAKIA: 1 ♀

ex Uzel Collection. FRANCE: Villefranche sur Saone, 3 ♂, 2 ♀, ix–x.1927 (*O. John*); Hyères Plage, 1 ♂, ix.1927 (*R. S. Bagnall*) (BMNH).

U.S.A.: Illinois, Grundy County, 1 ♂, x.1970 (*L. A. Mound*); Minnesota, MacGregor, 7 ♀, 3 ♂ apterae, 1 ♀ macroptera, iv.1936 (*F. Andre*); M., Hay Creek, 2 ♀, 1 ♂, xi.1936 (*G. Decker*); Iowa, Ottumwa, 27 ♂, 22 ♀, in Moss, i.1933; I., Boone, 7 ♀, 7 ♂, from *Poa*, vii–viii.1934 (*F. Andre*); North Dakota, Northwood, 1 ♀, iv.1961 (*R. I. Post*); Utah, Blacksmith Fork Canyon, 1 ♀, iv.1971 (*G. F. Knowlton*) (BMNH).

Bolothrips cinctus Faure

Bolothrips (*Bolothrips*) *cinctus* Faure, 1943 : 86–87. Syntypes 2 ♀, SOUTH AFRICA: Transvaal (Pretoria) [not examined].

This species has a shorter tube than any other species of *Bolothrips*, and it can be distinguished moreover by its colour pattern. The two syntype apterae were collected from *Themeda triandra* near Lydenburg, Transvaal.

SPECIMEN STUDIED.

SOUTH AFRICA: Transvaal, Ermelo, 1 ♀ aptera on *Hyparrhenia*, 21.v.1949 (*J. C. Faure*) (HP).

Bolothrips cingulatus (Karny)

Cryptothrips cingulatus Karny, 1916 : 92. Syntypes ? sex, AUSTRIA (HP) [not examined].
Bolothrips cingulatus (Karny) Priesner, 1926 : 90.

Priesner (1964 : 143) refers to this as a south-eastern European species and states that the macropterae have only the first and second abdominal segments light. The antennae of *cingulatus* are shorter than those of *bicolor* and *dentipes*.

SPECIMENS STUDIED.

HUNGARY: Simontornyia, 1 ♂, 3 ♀ apterae, vi & ix. 1924 (*F. Pillich*). FRANCE: Rhône, Curis, 3 ♂, 1 ♀ apterae, viii. 1927 (*O. John*); Hyères Plage, 1 ♀ aptera, ix. 1927 (*R. S. Bagnall*) (BMNH).

Bolothrips dentipes (Reuter)

Phloeothrips dentipes Reuter, 1880 : 12–14. 2 Syntypes, ? sex, FINLAND (? lost).
Bolothrips dentipes (Reuter) Priesner, 1928*a* : 689–692.
Cryptothrips bagnalli Karny, 1916 : 94. Syntypes, ? sex, SARDINIA (? lost).
Cryptothrips dentipes var. *bagnalli* Karny; Priesner, 1925 : 154.

This species is widespread in Europe between Ireland, Poland and Hungary. There are numerous specimens in the BMNH collections from southern England, and also one female without data but bearing a determination label 'Reuter det. 3.84'. Stannard (1968) records the species from Illinois, and one specimen has been studied from Massachusetts.

Bolothrips dentis Faure

Bolothrips dentis Faure, 1954*b* : 155–159. Holotype ♂, TRANSVAAL (Pretoria) [not examined].

This species was described from 14 males and 26 females, all apterae, collected at Mariepskop in Transvaal, mainly on dead branches covered in lichen. The combination of morphological characters is most unusual. The head is truncate at the anterior and bears a pair of stout interocellar setae, but the eyes are prolonged ventrally. The fore tarsus of the female bears a tooth but the fourth antennal segment has two sense cones. The tube is pale in colour and constricted at the apex. This one species thus shows characteristics from each of the genera of the *Nesothrips* complex. It is not a true *Bolothrips* species but is retained in this genus until the South African fauna is better known.

SPECIMENS STUDIED.

TRANSVAAL: Mariepskop, 2 ♀ paratypes on dead branches of *Syzygium cordatum*, iv. 1951 (*J. C. Faure*) (HP, AMG).

Bolothrips embotyi Faure

Bolothrips (*Bolothrips*) *embotyi* Faure, 1943 : 87–89. Syntypes 5 ♀, 7 ♂, SOUTH AFRICA: Pondoland (Pretoria) [not examined].

No specimens of this species have been studied. Judging from the description it is a true *Bolothrips* with the eyes prolonged ventrally, the head projecting in front of the eyes, the fourth antennal segment with three sense cones, and the female without a fore tarsal tooth.

Bolothrips gilvipes (Hood)

Cryptothrips gilvipes Hood, 1914 : 169–170. Holotype ♀, U.S.A.: Maryland (USNM) [not examined].

Bolothrips (*Bolothrips*) *litoreus* Hood, 1939 : 609–612. Holotype ♀, U.S.A.: Texas (USNM) [not examined]. **Syn. n.**

This species appears to show a gradient in size and colour with the darkest specimens in the southern and western part of its range. The specimens from Florida listed below have the thorax varying in colour from yellow to light brown even at one site. In view of this variation there seems to be little point in distinguishing the larger and darker specimens as *litoreus*. The Californian species *rhachiphilus* is possibly another element in this cline.

SPECIMENS STUDIED.

U.S.A.: Alabama, Mobile, 1 ♂ on dead grass (det. *gilvipes* by J. D. Hood), 17.xii.1938 (*J. D. Hood*); Florida: Cedar Keys, 17 ♀, 1 ♂, on salt marsh grass, 12.vii.1939 (*P. Oman*); F., Lake Wauberg, 1 ♀, iv. 1938; F., Hudson, 1 ♂ on grass, vii. 1939; F., Deland, 1 ♀, 1 ♂ on grass, vii. 1939 (BMNH, USNM).

Bolothrips icarus (Uzel)

Cryptothrips Icarus Uzel, 1895 : 232–233. Syntypes ♂ ♀, CZECHOSLOVAKIA: Bohemia (? lost).
Cryptothrips icarus var. *pallipes* Uzel, 1895 : 233.
Bolothrips icarus (Uzel) Priesner, 1928*a* : 692–695.

All of the specimens listed below have the legs more or less yellow with a variable amount of brown shading. The species is widespread from southern Europe to Latvia and is very closely related to the Mediterranean *insularis* and the African *varius*, but has paler legs and the eyes usually less prolonged ventrally. Three macropterous females have been studied from France.

SPECIMENS STUDIED.

FRANCE: Villefranche sur Saone, 3 ♂, 1 ♀, 1 ♀ macroptera, vii. 1927; Rhône, Curis, 1 ♂, 2 ♀ macropterae, viii. 1927 (*O. John*); La Trinite sur Mer, 1 ♂, viii. 1968 (*V. F. Eastop*). AUSTRIA: Innsbruck, 1 ♂, ix. 1929 (*R. S. Bagnall*). YUGOSLAVIA: Subotica, 1 ♂, vi. 1963. CZECHOSLOVAKIA: Ceje, 1 ♀, vi. 1950 (*J. Pelikan*); Bzendei, 3 ♂, v. 1964 (*V. F. Eastop*). HUNGARY: Simontornia, 3 ♀, 1 ♂, vi. 1924 (*Pillich*). U.S.S.R.: Latvia, 4 ♂, 1 ♀, vi. 1928; 2 ♂, 3 ♀, viii. 1929 (*O. John*) (BMNH).

Bolothrips insularis (Bagnall)

Cryptothrips insularis Bagnall, 1914 : 295. Holotype ♀, CANARY ISLANDS (BMNH) [examined].
Cryptothrips icarus var. *tuberculatus* Priesner, 1922 : 105. Holotype ♀, YUGOSLAVIA (HP) [examined]. [Synonymized by Mound, 1968 : 141.]
Cryptothrips brachyurus Bagnall, 1927 : 573–574. Lectotype ♂, FRANCE (BMNH) [examined]. [Synonymized by Mound, 1968 : 141.]
Bolothrips arenarius Priesner, 1950 : 36–37. Syntypes ♂ ♀, EGYPT & SYRIA (HP) [examined]. **Syn. n.**

Priesner (1928 : 693) suggested that this species (under the name *tuberculatus*) might be a geographical race of *icarus*. Whereas *icarus* is found in continental Europe, *insularis* appears to be restricted to the Mediterranean area between the Canary Islands and Syria. Both species are variable, but they can apparently be distinguished by the characters given in the key above. Specimens from the eastern part of the range of *insularis*, Cyprus and Egypt, generally have the tube shorter and stouter than specimens from the western part of the range, Spain and the Canary Islands. The specimens from Cyprus appear to be intermediate between *insularis* and typical *arenarius* from Egypt.

SPECIMENS STUDIED.

Holotype ♀ of *insularis*, CANARY ISLANDS (*T. V. Wollaston*) (BMNH). Lectotype ♂ with 1 ♂, 1 ♀ paralectotypes of *brachyurus*, FRANCE: Tamaris, iii. 1927 (*R. S. Bagnall*) (BMNH). Holotype ♀, allotype ♂ [sic] of *tuberculatus*, YUGOSLAVIA: Dalmatia, Ragusa, from grass, 31.x.1918 (HP).

EGYPT: 40 km east of Meadi, 1 ♂, 1 ♀ paratypes of *arenarius*, on *Retama*, 9.iv.1934; Ismailia, 1 ♀, 23.iv.1935; Bingash, ♂ allotype, 17.i.1935 (HP). CANARY ISLANDS: Lancerota, 1 ♀ on grass, iii. 1963, 1 ♂, ii. 1968 (*zur Strassen*). SPAIN: Chiclana,

2 ♀. FRANCE: St Cyr sur Mer, 1 ♀, 2 ♂, ix. 1927 (*R. S. Bagnall*). CYPRUS: Akrotiri Bay, 8 ♂, 4 ♀ on *Juncus*, vii. 1945 (*Mavroumoustakis*) (BMNH).

Bolothrips italicus sp. n.

♀ aptera. Colour brown, head and posterior abdominal segments darker than pterothorax; femora variable in colour, mid and hind tibiae and tarsi dark brown, fore tarsi and inner surface of fore tibiae lighter; antennal segment III yellow, IV light brown, V slightly paler at extreme base; terminal setae of abdomen light brown.

Structure of body and antennae very similar to *dentipes* and *bicolor*, but head more slender, pterothorax distinctly alatiform, metanotum not sculptured; antennal segment III with one sense cone, IV with two sense cones.

MEASUREMENTS (holotype ♀ in μm). Body length 2900. Head, length 330; median width 230; postocular setae 100. Pronotum, length 175; width across fore coxae 320. Metathorax total width 315. Tergite IX setae B_1 170. Tube, length 210; basal width 100. Antennal segments length III–VIII length, 97; 97; 97; 80; 65; 45.

♂ aptera. Thorax paler than ♀, pronotum yellow but shaded brown laterally, pterothorax and abdominal segment I almost clear yellow; head and posterior abdominal segments dark brown; all femora extensively yellow on inner surface, mid and hind tibiae and tarsi brown; antennal segments IV and V paler than in ♀. Similar in structure to ♀ but fore tarsus with a slender tooth and fore tibia with an apical tubercle.

MEASUREMENTS (paratype ♂ in μm). Body length 1900 (body contracted). Head length 290. Tube, length 160; basal width 90.

SPECIMENS STUDIED.

Holotype ♀, ITALY (taken in quarantine at Detroit, U.S.A.): *Stipa tenacissima*, 27.xi.1961 (*J. Fergusson* 4087) (USNM).

Paratypes. 5 ♀, 6 ♂ collected with the holotype (USNM, BMNH).

COMMENTS. Unfortunately this species is known only from rather poorly preserved specimens taken in quarantine. It is described here because of its interesting relationship to *bicolor* and *dentipes*, and because it is the only member of the genus with one sense cone on the third antennal segment. The females are very similar to *dentipes* but have a shorter tube, and some of the specimens have the pterothorax and femora pale in colour.

Bolothrips pratensis Hood

Bolothrips (*Botanothrips*) *pratensis* Hood, 1939 : 606–609. Holotype ♀, U.S.A.: Texas (USNM) [not examined].

Despite the fact that the eyes are not prolonged on the ventral surface of the head, the present author does not agree with Hood that *pratensis* is closely related to the European and African *icarus*-group of species. The tube is particularly stout and the mesothoracic spiracles project as in *gilvipes*, and it is possible that *pratensis* is derived from forms with ventrally prolonged eyes. Most of the specimens listed below were collected on dead wood, in contrast to the type-series which came from grasses as is usual in *Bolothrips*.

SPECIMENS STUDIED.

U.S.A.; Texas, Palacios (type-locality), 1 ♀, 1 ♂ paratypes, 28.iii. & 23.iv.1939 (*J. D. Hood*); Florida, Upper Matecumbe Key, 5 ♂, 10 ♀ from dead branches, xii. 1958 (*Andre*); F., Grassy Key, 1 ♂, 1 ♀ on dead branches, xii. 1958 (*Andre*); F., Cedar Keys, 1 ♂, 1 ♀, vii. 1939 (*P. Oman*) (BMNH).

Bolothrips rhachiphilus Cott

Bolothrips (*Bolothrips*) *rhachiphilus* Cott, 1956 : 181–182. Holotype ♀, U.S.A.: California (not known).

Type-material of this species has not been deposited in the California Academy of Sciences (Arnaud & Lee, 1973) as was stated in the original description. The species appears to be related to the dark forms of *gilvipes*.

Bolothrips schafferi (Thomasson & Post) **comb. n.**

Nesothrips schafferi Thomasson & Post, 1966 : 31–32. Holotype ♀, U.S.A.: North Dakota (INHS) [not examined].

This species is closely related to *dentipes* in the form of the antennae, head and tube, but differs in the colour of the legs and antennae. It is known only from western North America.

SPECIMENS STUDIED.

U.S.A.: North Dakota, Benson County, Wood Lake, 3 ♀ paratypes on *Spartina pectinata*, 27.viii.1964 (*Thomasson & McBride*) (BMNH & USNM); Oregon, 2 ♀, 1 ♂, 15.iv.1937 (?*F. Andre*) (BMNH).

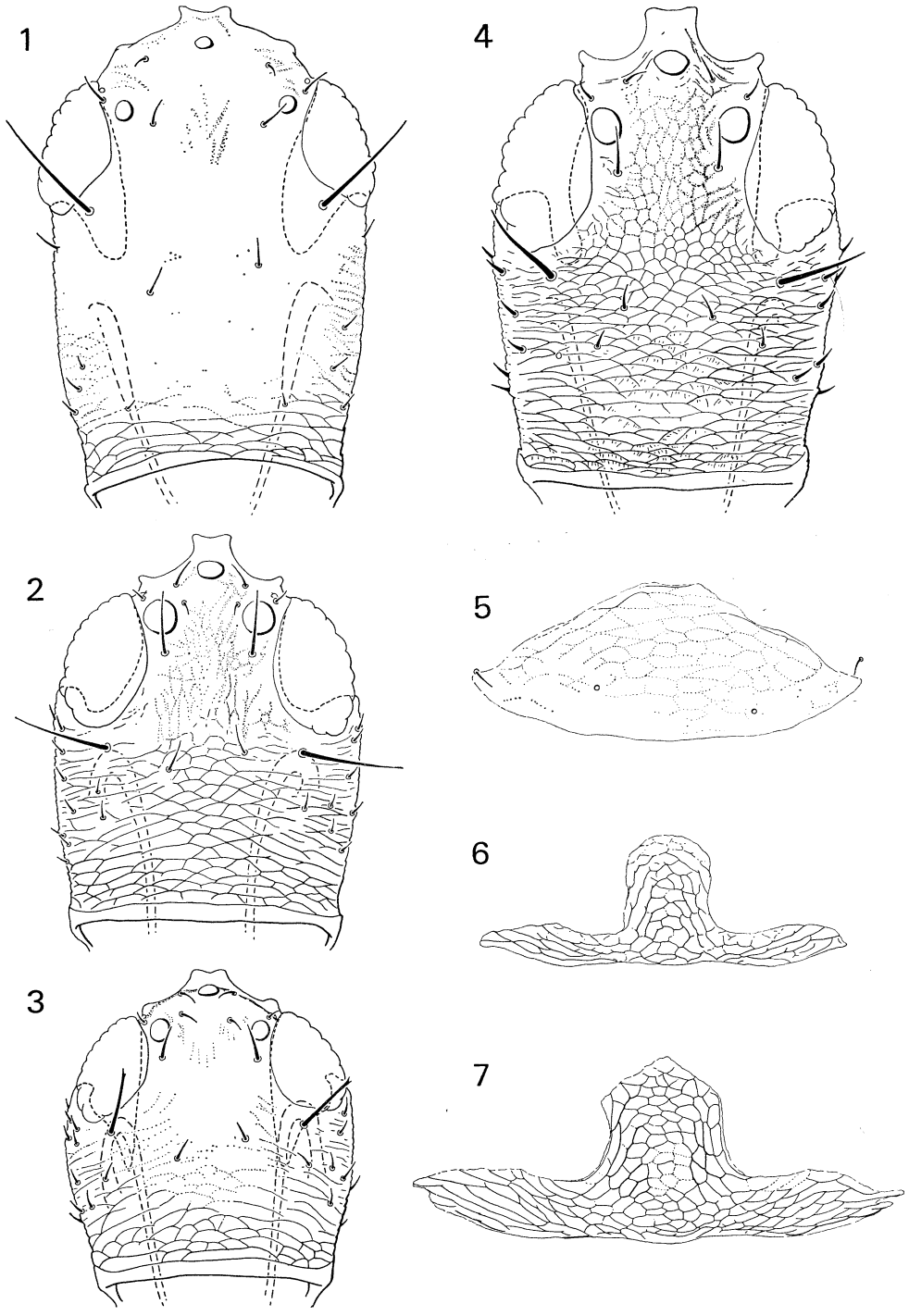
Bolothrips varius Hartwig

Bolothrips varius Hartwig, 1948 : 110–112. Holotype ♀, SOUTH AFRICA: Transvaal (Pretoria) [not examined].

The original description of this species noted that the ventral length of the eyes varied from 'about equal to the dorsal length to about 1·4 times the dorsal length'. The eyes of *insularis* from the Mediterranean region also vary considerably, and these two species are closely related. Hartwig lists material of *varius* from Cape Province, Basutoland, Natal and Transvaal. The specimen listed below from Kenya has a slender head as in *varius* and *insularis*, but the legs and antennal segments are pale as in *icarus*. It is possible that further collecting will produce intermediates between these named forms.

SPECIMENS STUDIED.

SOUTH AFRICA: Transvaal, Pretoria, 1 ♂ paratype on *Panicum maximum*, 13.ii.1946 (*E. K. Hartwig* [data as for holotype]; 3 ♀, 1 ♂ on *P. maximum*, 8.v.1948 (*E. K. Hartwig*) (BMNH). KENYA: 1 ♀ on *Pinus*, vii.1963 (BMNH).



FIGS 1–7. 1, *Bolothrips italicus*. 2, *Carientothrips fijiensis*. 3, *C. mjobergi*. 4, *C. grayi*. 5–7. Pelta (first abdominal tergite): 5, *B. italicus*. 6, *C. fijiensis*. 7, *C. grayi*.

CARIENTOTHRIPS Moulton **stat. n.**

Bolothrips (*Carientothrips*) Moulton, 1944 : 306. Type-species: *Bolothrips* (*Carientothrips*) *fijiensis* Moulton, by monotypy.

This genus was placed as a synonym of *Nesothrips* by Stannard (1957) but is used here for a group of seventeen species from Australia and the Pacific, with one possibly unrelated form from South America. The macropterae of the type-species *fijiensis* are similar to a new species *grayi* described below from New Guinea, and also to the macropterae of the *mjobergi* complex from Australia. The micropterae of *fijiensis* are very similar to the more slender forms *loisthus* and *magnetis* from Australia and New Zealand, but the micropterae of *mjobergi* are much shorter and broader and at first sight look very different. These are related to other species in Australia with short broad heads, *miskoi* and *pedicillus*. Within *mjobergi* there are forms with the eyes prolonged ventrally or with the eyes equal in size on the dorsal and ventral surfaces, moreover the legs also vary from yellow to brown, and there is no clear evidence that these different forms represent distinct species. The pelta of the macropterae is frequently characteristic with very slender lateral wings, but the pelta of micropterae and apterae is reduced and such specimens are very similar to *Nesothrips* species. These two genera intergrade in Australia, but *Carientothrips* is used for a group of species with the stylets relatively close together in the head. Two species with the stylets wide apart are also included from Australia, *capricornis* which seems to be related to *semirufus*, and *badius* which is not closely related to any other species.

GENERIC DEFINITION. Medium sized, dark or pale species of Cryptothripini. Head longer than wide, or wider than long; eyes normal or reduced, sometimes longer on ventral than on dorsal surface; maxillary stylets usually parallel in middle of head and about one third of head width apart; ocellar setae usually well developed. Antennae eight-segmented, two sense cones on segment III, four sense cones on IV; segment VIII usually elongate. Fore tarsal tooth absent in ♀ (except *denticulatus*), present in ♂. Pronotum transverse, oedymerous individuals rare; epimeral sutures usually complete. Wings frequently absent. Pelta frequently with slender lateral wings; tube with straight sides.

KEY TO THE SPECIES OF *CARIENTOTHRIPS*

1 Antennal segment III with a shelf-like ring near the base (Text-fig. 60) . . 2
– Pedicel of antennal segment III simple 3
2 Thorax and legs yellow, rest of body and head brown; antennal segments II–IV largely yellow [Australia] . . . . . ***pictilis*** (p. 132)
– Head light brown, thorax medium brown, abdomen dark, legs yellowish brown; antennal segments II–IV largely brown [Australia] . . . . ***acti*** (p. 126)
3 Metanotum with four to six pairs of setae medially in apterae, two pairs in macropterae; epimeral sutures incomplete 4
– Metanotum with one pair of median setae; epimeral sutures complete . . . 6
4 Antennal segment III 2·5 times as long as wide, pedical stout bearing several transverse ridges (Text-fig 62) [Japan] . . . . ***japonicus*** (p. 130)
– Antennal segment III either longer or shorter, pedicel slender 5
5 Antennal segment III 2·1 times as long as wide [Australia]. . . ***reedi*** (p. 132)
– Antennal segment III 2·8 times as long as long as wide [Australia] . . ***vesper*** (p. 133)
6 Head broad, less than 1·2 times as long as wide 7
– Head slender, more than 1·3 times as long as wide 12

7 Body, legs and antennae dark brown except pedicel of III which is paler; pelta of macropterae and apterae rounded; eyes not extended on ventral surface of head [Australia] . . . . . ***casuarinae*** (p. 128)
– At least antennal segments III–V with yellow pedicels; frequently with legs, several antennal segments and anterior half of body pale 8
8 Female with very small fore tarsal tooth at base of pretarsus; ocellar setae less than 20 μm long; antennal segment III stout but sharply constricted at pedicel [Argentina and Falkland Islands] . . . . . ***denticulatus*** (p. 128)
– Female without a fore tarsal tooth; ocellar setae more than 30 μm; antennal segment III tapering to base 9
9 Setae B_2 on tergite IX about 0·5 times as long as B_1 [Society Islands] ***biformis*** (p. 127)
– Setae B_2 on tergite IX as long as or longer than B_1 [Australia] 10
10 Antennal segments VI and VII broadly rounded with a sharply slender yellow pedicel . . . . . ***pedicillus*** (p. 132)
– Pedicel of antennal segments VI and VII less slender, VI frequently yellow in basal half 11
11 Apical third of tube sharply yellow in contrast to black basal two-thirds; femora largely yellow . . . . . ***miskoi*** (p. 131)
– Apical third of tube paler than base but not sharply yellow; femora brown but tibiae yellow or brown . . . . . ***.mjobergi*** (p. 131)
12 Body and appendages uniformly dark brown except for pale base of antennal segment III; eyes reduced but rounded and protruding [Australia] . . ***badius*** (p. 127)
– Head and pronotum sometimes paler than abdomen, antennae or legs with extensive pale areas; eyes large, if reduced then not round and protruding . . . 13
13 Antennal segment IV shorter than segment III [Australia] . . ***capricornis*** (p. 127)
– Antennal segment IV longer than segment III 14
14 Setae B_1 and B_2 on tergite IX less than 0·5 times as long as the tube, with apices clearly expanded; head and thorax yellow, abdomen brown, antennal segments I and II yellow [Australia] . . . . . ***semirufus*** (p. 132)
– Setae B_1 and B_2 on tergite IX more than 0·5 times as long as tube, apices acute or blunt; head and thorax usually as brown as abdomen, if paler then antennal segment II brown 15
15 Antennal segments III and IV almost clear yellow, also basal half of V; segment IV about 3·5 times as long as wide; body colour brown, legs yellow [Australia] ***magnetis*** (p. 131)
– Antennal segments III and IV variously shaded with brown; if pale then segment IV less than 3·0 times as long as wide; body and femora usually dark . . . 16
16 Eyes prolonged on ventral surface of head with one large isolated facet; dorsal surface of head and pronotum conspicuously reticulate (Text-fig. 4); antennal segments IV and V with elongate slender pedicels [New Guinea] . ***grayi*** (p. 129)
– Eyes not longer ventrally than dorsally (Text-fig. 2); dorsal surface of head weakly sculptured; antennal segments IV and V with short pedicels (Text-fig. 61) . 17
17 Eyes reduced to about five facets ventrally; antennal segment III yellow in basal half, sometimes brown in apical half [Australia & New Zealand] . ***loisthus*** (p. 130)
– Eyes with at least ten facets on ventral surface; antennal segment III pale at base and apex, but with a transverse brown band at basal third [Fiji] . ***fijiensis*** (p. 128)

Carientothrips acti Mound

(Text-fig. 60)

Carientothrips acti Mound, 1974 : 25–26. Holotype ♀, AUSTRALIA (ANIC) [examined].

The *acti* group of species includes *japonicus* (Bagnall), *pictilis* Mound, *reedi*

Mound and *vesper* Mound. Both *acti* and *pictilis* are unusual in having the terminal setae on the tube flattened at the apex instead of acute, and in having the pedicel of antennal segment three flared into a ring. However, *japonicus* has the pedicel of segment three slightly thickened, and this probably represents an intermediate condition. These species, apart from *pictilis*, have the epimeral sutures incomplete, and the metanotum bears more than one pair of median setae.

SPECIMENS STUDIED.

Holotype ♀, AUSTRALIA: Australian Capital Territory, Canberra, Black Mt, on dead leafy *Eucalyptus* branches, 3.i.1961 (*E. M. Reed*) (ANIC). Paratypes from New South Wales, A.C.T. and northern Victoria from leaf litter and grass tussocks are listed in detail in Mound (1974).

Carientothrips badius (Hood) comb. n.

Cryptothrips badius Hood, 1918 : 143–144. Holotype ♀, AUSTRALIA: Queensland (USNM) [examined].

Elaphrothrips apterus Girault, 1928 (42) : 2. Holotype ♂, AUSTRALIA: Queensland (QM) [examined]. [Synonymized by Mound, 1974 : 23].

Bolothrips badius (Hood) Hartwig, 1948 : 117.

This species was treated in the genus *Bolothrips* by Mound (1974), but is now removed from that genus because the fourth antennal segment bears four sense cones. However, it is an unusual species with a relatively long head and small rounded eyes which is not closely related to any other known species. *C. badius* is widespread in Australia in grass tussocks, and a detailed list of specimens from Queensland, New South Wales, and Western Australia is given in Mound (1974).

Carientothrips biformis (Moulton) comb. n.

Bolothrips biformis Moulton, 1939 : 146–147. Holotype ♀, TAHITI (BPBM) [not examined].

This species is removed from *Bolothrips* because it has four sense cones on the fourth antennal segment. It is not closely related to the other species of *Carientothrips* but has the maxillary stylets closer together than the species of *Nesothrips*.

SPECIMEN STUDIED.

SOCIETY ISLANDS: Rapa, Mangaoa Pk, 1000–1200 ft, 25.vii.1934 (*E. C. Zimmermann*), 1 ♀ microptera paratype (BMNH).

Carientothrips capricornis (Mound) comb. n.

Bolothrips capricornis Mound, 1974 : 23–24. Holotype ♀, AUSTRALIA: Queensland (ANIC) [examined].

This species was described in *Bolothrips* because of its resemblance to the American species *B. pratensis*. However, the fourth antennal segment bears four sense

cones unlike any species of *Bolothrips*, and *capricornis* is probably most closely related to *Carientothrips semirufus*.

SPECIMENS STUDIED.

Holotype ♀ microptera, AUSTRALIA: Queensland, Townsville, 2 miles west of Saunders Beach, in leaf litter, 21.vii.1968 (*L. A. Mound*) (ANIC). Paratype ♀ collected with the holotype (BMNH).

Carientothrips casuarinae Mound

Carientothrips casuarinae Mound, 1974 : 26–29. Holotype ♀, AUSTRALIA: New South Wales (ANIC) [examined].

This species, which is known from macropterae as well as apterae, is dark brown but is otherwise similar to *semirufus*. It has been taken on dead *Casuarina* branches at several sites in eastern Australia.

SPECIMENS STUDIED.

Holotype ♀ aptera, AUSTRALIA: New South Wales, Normanhurst (15 miles north of Sydney), on dead *Casuarina* foliage, 1.ii.1959 (*E. M. Reed*) (ANIC). Paratypes ♀ ♂ and ♀ macropterae from New South Wales listed in detail in Mound (1974).

Carientothrips denticulatus (De Santis) **comb. n.**

Nesothrips (*Bolothrips*) *denticulatus* De Santis, 1963*b* : 66. Holotype ♀, ARGENTINA: Tierra del Fuego (Museos de La Plata) [not examined].

This species is removed from *Bolothrips* because it has four sense cones on the fourth antennal segment. It is not close to *Nesothrips* species because the stylets are parallel in the middle of the head, but it seems unlikely to be closely related to the other species of *Carientothrips*. Some of the specimens listed below were identified by Prof. Luis de Santis as *denticulatus*. The fore tarsal tooth of the female is less than 10 μm long, although that of the male is about 30 μm long.

SPECIMENS STUDIED.

EAST FALKLAND ISLANDS: Kidney Is., 55 ♀, 24 ♂ in *Poa flabellatum* tussocks, 29.xi.1967 (*E. Holdgate*) (BMNH).

Carientothrips fijiensis (Moulton) ***comb. n.***

Bolothrips (*Carientothrips*) *fijiensis* Moulton, 1944 : 306–307. Holotype ♀, FIJI (BPBM) [not examined].

The original description refers to an apterous paratype female, although this specimen is actually micropterous with wing lobes 160 μm long. The eyes of the microptera are reduced and flattened externally as in *loisthus*, although the eyes of the macropterae are large and rounded as in *grayi* described below. The Australian species *mjobergi* is similar to the macropterae of *fijiensis* although with a

shorter head, but the apterae and micropterae of *mjobergi* are much shorter and broader. The pelta of *fijiensis* is similar to that of *grayi*, and the male has a small fore tarsal tooth.

SPECIMENS STUDIED.

FIJI: Vitilevu, Nandarivatu, 2 ♀, 1 ♂ macropterae, 1 ♀ micropterae (all paratypes), 9.ix.1938, 1 ♀ macroptera paratype 1.ix.1938; Mt Korobamba, 1 ♀ macroptera paratype 1.viii.1938 (*E. C. Zimmermann*) (CAS).

***Carientothrips grayi* sp. n.**

(Text-figs 4, 7, 63)

♀ macroptera. Colour dark brown with red internal pigment; tarsi light brown; antennal segments IV and V yellow in basal third, III with yellow pedicel and yellowish brown in apical half otherwise dark brown; fore wings deeply shaded in third and fourth fifth, but clear in apical fifth, basal two-fifths clear with dark longitudinal stripe; major setae almost hyaline, bases of setae at apex of tube dark.

Head longer than wide, projecting in front of large compound eyes, cheeks rounded to base with about four small setae; dorsal surface strongly sculptured; postocellar setae well behind ocelli; maxillary stylets retracted to postocular setae; eyes with one large ventral facet displaced posterior to normal hind margin of eye. Antennae with segment III much shorter than IV; segment VII with a distinct pedicel, VIII slender and slightly constricted at base. Pronotum similarly sculptured to head, with weak median thickening; epimeral sutures complete, setae with blunt apices. Metanotum reticulate, median setae slender, 30 μm long. Fore wing slightly constricted medially; subbasal setae short, duplicated cilia variable. Fore tarsus with no tooth. Pelta reticulate with pronounced lateral wings; setae on tergite IX softly rounded at apex; tube slender with straight sides bearing fine setae.

MEASUREMENTS (holotype ♀ in μm). Body length 3250. Head, length 350; median width 260; postocular setae 65; ocellar setae 35. Pronotum, length 195; median width 320; major setae – am 30, aa ?30, ml ?50, epim 100, pa 70. Fore wing, length 1400; distal width 100; subbasal setae 40, 45, 65; number of duplicated cilia 4–7 (3–6 in one paratype). Tergite VII setae, B_1 70; B_2 100. Tergite IX setae, B_1 160; B_2 190; B_3 155. Tube, length 290; basal and apical width 90, 45; terminal setae 175. Antennal segments length, 55; 65; 95; 125; 120; 77; 58; 35; sense cones on III 75.

SPECIMENS STUDIED.

Holotype ♀, NEW GUINEA: Wau, under bark of *Araucaria cunninghamiana*, 22.ix.1970 (*B. Gray*) (BMNH).

Paratypes, NEW GUINEA: Wau; 1 ♀, 9.i.1966 (*J. Sedlacek*); 1 ♀, 6.x.1966 (*G. Samuelson*) (BPBM).

COMMENTS. This species is very similar to the macropterae of *fijiensis*, although larger and with the eyes prolonged ventrally. In the BPBM collection there is a female from north-western New Guinea, Lake Wissel, with almost uniformly brown antennae and no duplicated cilia on the fore wings, but otherwise very similar to *grayi*. This may represent a further species. The micropterae of *fijiensis* are more slender and very similar to *loisthus*, although a direct comparison of *loisthus* and *grayi* would not suggest any close relationship between these two species.

Carientothrips japonicus (Bagnall) comb. n.

(Text-fig. 62)

Cryptothrips japonicus Bagnall, 1921 : 355–356. Holotype ♀, JAPAN (BMNH) [examined].
Mystrothrips japonicus (Bagnall) Mound, 1968 : 138.

The unique holotype of this species is rather damaged but is difficult to distinguish from the eastern Australian species *reedi* Mound. The third antennal segment is thicker at the base, suggesting the origin of the condition found in *acti* Mound. The apices of the terminal setae on the tube are flattened in *acti* and *pictilis* Mound, but are acute as in most other thrips in *japonicus*, *reedi* and *vesper*.

SPECIMEN STUDIED.

Holotype ♀, JAPAN: Kobe, 23.viii.1916 (*Lewis*) (BMNH).

Carientothrips loisthus Mound

Carientothrips loisthus Mound, 1974 : 29–30. Holotype ♀, AUSTRALIA: South Australia (ANIC) [examined].

This species was based on a single female aptera collected in South Australia, and at that time the holotype was regarded as a distinct species from specimens collected in New Zealand. However there is more difference between the specimens listed below from various localities within New Zealand than there is between some of these specimens and the Australian holotype. For this reason they are all regarded as one species. Large specimens from both North and South Island, New Zealand have the femora brown, whereas the females from Waiwera have the femora almost as yellow as the tibiae. Moreover these small specimens have the head and thorax much paler than the abdomen. The large specimens have very long pronotal setae with acute apices, whereas the small specimens have the epimeral and midlateral setae bluntly rounded at the apex. The holotype is completely apterous but has three ocelli, whereas the New Zealand specimens have a small lobe (15 μm) attached to the lateral corners of the mesonotum, and the lateral ocelli are scarcely indicated. The males are smaller than the females with almost clear yellow legs and a large fore tarsal tooth.

MEASUREMENTS (large New Zealand ♀ in μm). Body length 2700. Head, length 310; median width 225; ocellar setae 85; postocular setae 135; mid-dorsal setae 90–120. Pronotum, length 175; median width 290; major setae – am 80, aa 100, ml 120, epim 130, pa 135. Tube length 195.

SPECIMENS STUDIED.

Holotype ♀, AUSTRALIA: South Australia, Adelaide, Waterfall Gulley, grass by stream, 14.i.1968 (*L. A. Mound*) (ANIC).

NEW ZEALAND: South Island, Greymouth, 1 ♀ on *Juncus*, 12.ix.1972 (*V. F. Eastop*); North Island, Levin, 2 ♀, ix. 1966, 1 ♂, v. 1966, 1 ♀, iv. 1967 (*Manson & Pritchard*); N.I., near Rotorua, 2 ♀, ix. 1972 (*V. F. Eastop*); N.I., Waiwera, 4 ♀,

1 ♂ at base of grasses, viii. 1968 (*L. A. Mound*); N.I., Helensville, 1 ♂, viii. 1968 (*L. A. Mound*) (BMNH).

Carientothrips magnetis Mound

Carientothrips magnetis Mound, 1974 : 30–31. Holotype ♀, AUSTRALIA: Queensland (ANIC) [examined].

This species has the eyes well developed ventrally, but is intermediate between *loisthus* and the *acti*-group of species in the form of the head and epimeral sutures.

SPECIMEN STUDIED.

Holotype ♀, AUSTRALIA: Queensland, 10 miles north of Townsville, on grasses, 20.vii.1968 (*L. A. Mound*) (ANIC).

Carientothrips miskoi Mound

Carientothrips miskoi Mound, 1974 : 31. Holotype ♀, AUSTRALIA: New South Wales (ANIC) [examined].

This species is known only from three females which were collected on two separate occasions at the same site. It differs from *mjobergi* mainly in having the tube brightly bicoloured.

SPECIMENS STUDIED.

Holotype ♀ aptera, AUSTRALIA: New South Wales, Cabbage Tree Creek, 7 miles north of Nelligen, near Bateman's Bay, in leaf litter, 2.ii.1969 (*S. Misko*) (ANIC).

Carientothrips mjobergi (Karny)

Cryptothrips mjobergi Karny, 1920 : 42. Holotype ♀, AUSTRALIA: Queensland (NR) [examined].
Cryptothrips (?) *australicus* Priesner, 1928*b* : 649–651. Holotype ♀, AUSTRALIA: Queensland (HP) [examined]. [Synonymized by Mound, 1974 : 31.]
Cryptothrips incisus Girault, 1927 (37) : 1. Syntypes 2 ♀, AUSTRALIA: Queensland (QM) [examined]. [Synonymized by Mound, 1974 : 31.]
Bolothrips (*Bolothrips*) *flavitibia* Moulton, 1968 : 117–118. Holotype ♀, AUSTRALIA: Queensland (CAS) [examined]. [Synonymized by Mound, 1974 : 31.]

This species is widespread in Australia and highly variable. The eyes are frequently prolonged ventrally, although this is not true of all populations. The tibiae are usually brown but sometimes yellow, and similarly the colour of the fore wings and antennae apparently varies. The number of duplicated cilia on the fore wing has been found to vary from two to eight even within a single population. The pelta of the macropterae is very similar to that of macropterae of *fijiensis* and *grayi*, but the distinction between a central body and lateral wings is less evident in the pelta of micropterae and apterae. Numerous specimens of this species, or species complex, have been studied from all the States of Australia except Tasmania and the Northern Territories, mainly from *Eucalyptus* dead leaves and branches.

Carientothrips pedicillus Mound

Carientothrips pedicillus Mound, 1974 : 32–33. Holotype ♀, AUSTRALIA (ANIC) [examined].

This species is known only from the holotype. It is very similar to *mjobergi* but has the antennal segments six and seven sharply constricted to a narrow pedicel.

SPECIMEN STUDIED.

Holotype ♀ aptera, AUSTRALIA: Australian Capital Territory, Mt Gingera, in leaf litter, 13.iv.1967 (*E. B. Britton*) (ANIC).

Carientothrips pictilis Mound

Carientothrips pictilis Mound, 1974 : 33–34. Holotype ♀ AUSTRALIA: New South Wales (ANIC) [examined].

The unique holotype of this species is bicoloured as in some species of *Bolothrips*. However, the fourth antennal segment has four sense cones and the maxillary stylets are parallel in the middle of the head.

SPECIMEN STUDIED.

Holotype ♀, AUSTRALIA: New South Wales, Parkes, from *Eucalyptus blakelyi*, 7.viii.1959 (*E. M. Reed*) (ANIC).

Carientothrips reedi Mound

Carientothrips reedi Mound, 1974 : 34–35. Holotype ♀, AUSTRALIA (ANIC) [examined].

This species was described from apterae and one macroptera collected in New South Wales and Australian Capital Territory, as well as one macroptera from southern Queensland. This may be a widespread species because the unique holotype of *japonicus* Bagnall only differs in the detailed structure of the antennae. These two species are related to *acti* Mound in the form of the head and thorax.

SPECIMENS STUDIED.

Holotype ♀ aptera, AUSTRALIA: Australian Capital Territory, Canberra, Black Mt, in grass tussock, 11.xii.1960 (*E. M. Reed*) (ANIC). Paratypes from New South Wales, A.C.T., and Queensland are listed in Mound (1974).

Carientothrips semirufus (Girault)

Elaphrothrips semirufus Girault, 1928(42) : 4. Holotype ♀, AUSTRALIA: Victoria (QM) [examined].
Carientothrips semirufus (Girault) Mound, 1974 : 35.

This apterous species is very similar to the bicoloured specimens of *loisthus* from New Zealand, but has short expanded major setae and the mesonotum is closely transversely striate.

SPECIMENS STUDIED.

Holotype ♀, AUSTRALIA: Victoria, Melton, in tussocks, v. 1928 (*F. E. Wilson*) (QM).

AUSTRALIA: New South Wales, 13 ♀, 10 ♂ all collected south-east from the Blue Mountains and detailed in Mound (1974) (BMNH, ANIC).

Carientothrips vesper Mound

Carientothrips vesper Mound, 1974 : 35–36. Holotype ♀, AUSTRALIA: Western Australia (ANIC) [examined].

The unique holotype of *vesper* is very similar to the apterae of *reedi* but with longer antennae and shorter expanded setae on tergite nine.

SPECIMEN STUDIED.

Holotype ♀, AUSTRALIA: Western Australia, Manjimup, in grass clump, 28.ix.1967 (*L. A. Mound*) (ANIC).

DICERATOTHRIPS Bagnall

Diceratothrips Bagnall, 1908 : 193. Type-species: *D. bicornis* Bagnall, by monotypy.

This genus has been confused with *Dichaetothrips* (Mound, 1968 : 78), but is best restricted to a group of Neotropical species. Most of these species have a pair of elongate anteocellar setae, although in some of the smaller species such as *harti* Hood, *delicatulus* Hood, and *setigenis* Hood these setae are reduced. It is to this group of species that *Gastrothrips validipennis* Hood is related.

Large species of *Diceratothrips* have a series of stout spines on the inner surface on the fore femora, at least in the males. The antennae are frequently distinctive, segment three is relatively long, the sense cones on segments three and four unusually short, and segments seven and eight frequently form a single elongate unit. The pronotum is also unusual with no thickening at the anterior margin and very little medially even in large individuals, moreover the anterior third is reticulate and the anterior setae short.

Diceratothrips validipennis (Hood) **comb. n**

(Text-figs 9, 66)

Gastrothrips validipennis Hood, 1938 : 403–406. Holotype ♀, U.S.A.: Florida (USNM) [not examined].

This is a small species of *Diceratothrips* with the anteocellar setae exceptionally reduced.

SPECIMEN STUDIED.

U.S.A.: Florida, Homestead, 1 paratype ♂, on dead branches, 28.xii.1937 (*J. C. Bradley*) (AMG).

DICHAETOTHRIPS Hood

Dichaetothrips Hood, 1914 : 164–165. Type-species: *D. brevicollis* Hood, by monotypy.

The synonymy of this genus and its relationship to *Scotothrips* have been discussed recently by Mound (1974). The Indian species referred to below can be distinguished from *Nesothrips* by the presence of a large fore tarsal tooth in the female as well as the more elongate tube. It is returned to the genus *Dichaetothrips* on account of the elongate postocellar setae.

Dichaetothrips gloveri (Ramakrishna & Margabandhu) **comb. rev.**

(Text-fig. 8)

Neosmerinthothrips gloveri Ramakrishna & Margabandhu, 1939 : 31–32. LECTOTYPE ♀ INDIA (TNA), here designated [examined].
Dichaetothrips gloveri (Ramakrishna & Margabandhu) Shumsher, 1947 : 204–205.
Nesothrips gloveri (Ramakrishna & Margabandhu) Ananthakrishnan, 1960 : 32–33.

The original description of this species does not designate a holotype, although Shumsher (1947) refers to a holotype in the Zoological Survey of India. The specimen here designated as lectotype bears the original data and is the only member of the type-series still available for study.

The postocellar setae of the lectotype are 55 μm long, rather longer than the distance between the anterior and posterior ocelli. The fore tarsal tooth is slender and almost as long as the width of the fore tarsus. Unfortunately the specimen is crushed, but in the opinion of the present author further collecting is likely to show that this individual is a small specimen of the species known as *Dichaetothrips usitatus* Ananthakrishnan & Jagadish, 1970 (= *Dichaetothrips indicus* Ananthakrishnan, 1961).

SPECIMEN STUDIED.

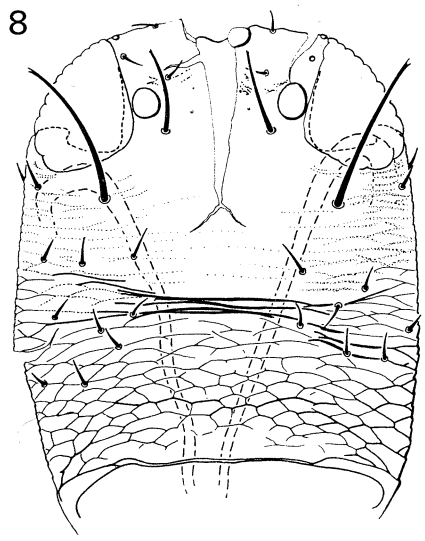
Lectotype ♀, INDIA, Numkum, Ranchi, on *Zizyphus jujuba*, 1933 (*TVR*450) (TNA).

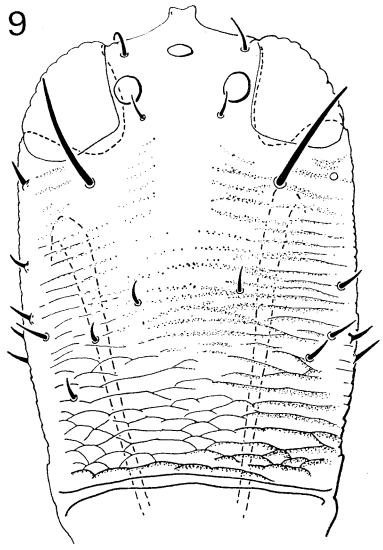
GASTROTHRIPS Hood **gen. rev.**

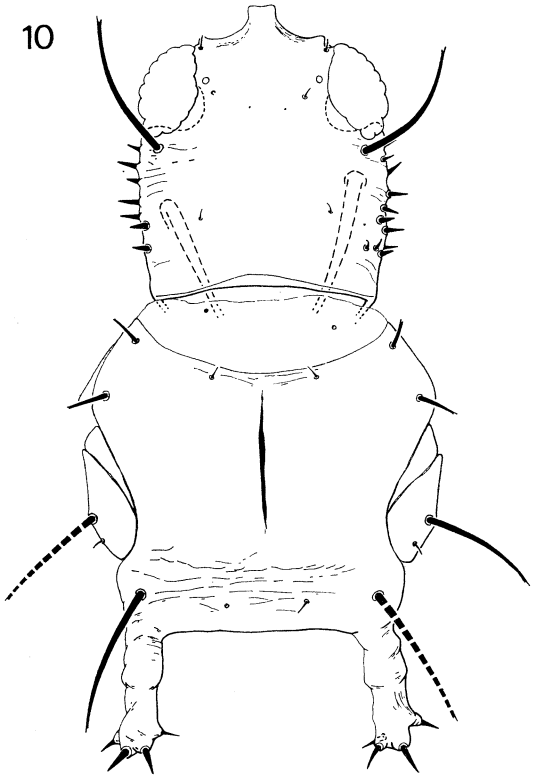
Gastrothrips Hood, 1912 : 156. Type-species: *G. ruficauda* Hood, by original designation.
Probolothrips Moulton, 1941 : 319. Type-species: *P. hambletoni*, by monotypy; treated here as a synonym of *abditus*. [Synonymized by Hood, 1952 : 163.]

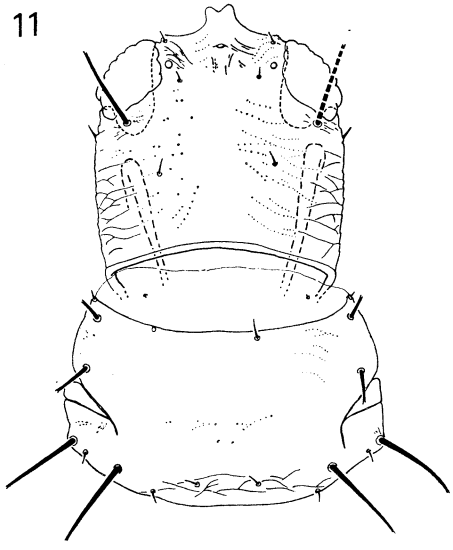
The genus *Gastrothrips* is used here for a group of nineteen species, mainly from the Neotropics, which have only three sense cones on the fourth antennal segment. The tube is variable in shape, either with straight sides or constricted apically, and frequently much paler than the rest of the abdomen. In contrast the Neotropical species related to *nigrisetis* Hood have four sense cones on the fourth antennal segment (with the exception of *paulistarum*), and the tube is black, frequently with convex sides. These species are treated here under *Neosmerinthothrips*.

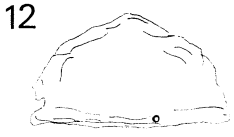
The *Gastrothrips* species which have a straight-sided tube comprise a single











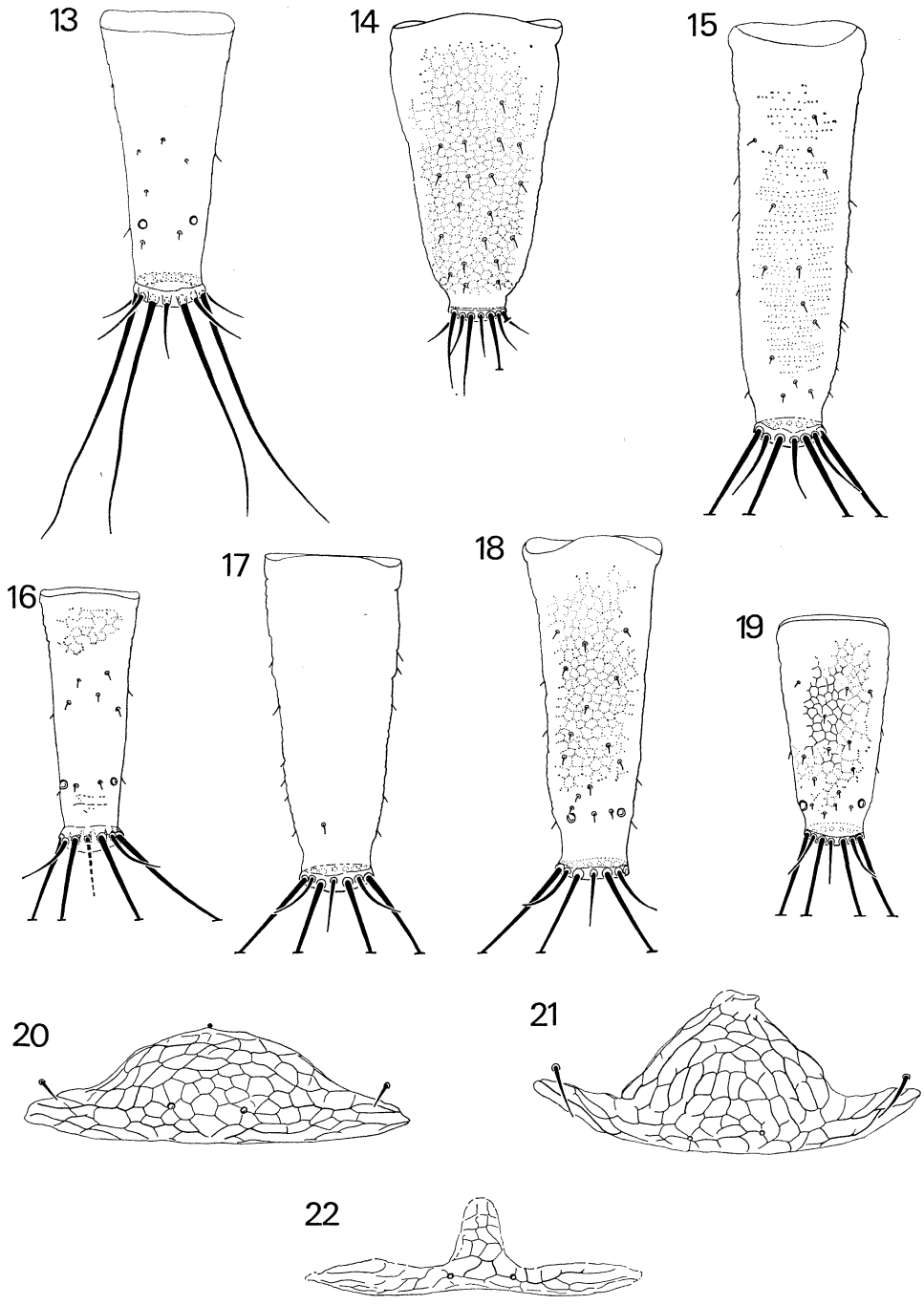
FIGS 8–12. 8, *Dichaetothrips gloveri*. 9, *Diceratothrips validipennis*. 10–12. *Gastrothrips anolis:* 10, large male. 11, female. 12, pelta of female.

species from India, *falcatus* Ananthakrishnan, and a complicated species-group with named forms distributed throughout the tropics, the *acuticornis*-group. All the other *Gastrothrips* species are known only from the Neotropics with a few species extending into temperate latitudes. A major problem with species recognition is the few species that are known from a series of specimens at more than one site. Moreover several species are known from only one morph, aptera, microptera or macroptera, and are therefore difficult to compare with each other. *Cryptothrips citriceps* Priesner, 1921 may also belong in this genus but has not been studied.

GENERIC DEFINITION. Medium sized, usually dark species of Cryptothripini. Head usually rectangular, longer than wide and not projecting in front of eyes; eyes large and usually equally developed on dorsal and ventral surfaces; head rarely wider than long, rarely with cheeks bearing stout setae. Antennae eight-segmented, VIII usually elongate and slender, rarely short and broad; segment IV with three sense cones, III with one or two sense cones. Pronotum transverse, sometimes enlarged in major males, anterior setae usually small, epimeral sutures frequently not complete. Fore tarsal tooth present in ♂, present or absent in ♀. Wings present or absent, duplicated cilia present or absent. Mesonotal anterior angles frequently projecting in major males; metanotal median setae usually well developed. Pelta usually well defined, triangular, with small lateral wings. Tube with straight sides evenly narrowing to apex, or with apex sharply constricted; never with sides strongly convex and not constricted at apex; frequently yellow or paler than rest of abdomen. Males commonly oedymerous.

KEY TO THE SPECIES OF *GASTROTHRIPS*

1 Tube with straight sides, not sculptured nor sharply constricted close to terminal setae (Text-fig. 16); tube dark at least in basal half. 2
– Apex of tube sharply constricted in front of terminal setae, tube often sculptured (Text-figs 17–19); basal half of tube frequently yellow or paler than tergite IX . 3
2 Antennal segment VIII broad at base, scarcely 0·5 times as long as VII (Text-fig. 64); pelta with a small central body and slender lateral wings; fore wings without duplicated cilia . . . . . ***falcatus*** (p. 143)
– Antennal segment VIII slender, more than 0·7 times as long as VII; pelta without slender lateral wings; fore wings with duplicated cilia ***acuticornis*-group** (see *acuticornis* (p. 139), *mongolicus* (p. 145), *procerus* (p. 147), & *subulatus* (p. 148))
3 Basal half of tube yellow or reddish brown, paler than abdominal segment IX . 4
– Tube black or dark brown throughout, not paler than tergite IX . . . 9
4 Antennal segments I–III largely yellow, paler than the head; tube bright yellow . 5
– Antennal segments I–III brown, as dark as head; tube reddish yellow to reddish brown 7
5 Pelta small and semicircular, occupying less than 0·5 of anterior margin of tergite II (Text-fig. 12); oedymerous ♂ with pair of elongate tubercles on posterior margin of pronotum . . . . . ***anolis*** (p. 142)
– Pelta broadly triangular, occupying at least two-thirds of anterior margin of tergite II (Text-fig. 20) 6
6 Antennal segments I and II yellow in sharp contrast to brown segments IV–VIII; head of ♀ with cheeks evenly narrowing to base (Text-fig. 25); ♀ with a fore tarsal tooth . . . . . ***intonsus*** (p. 145)
– Antennal segments grade evenly from yellow I to brown VIII, even VII has a pale pedicel; head of ♀ with cheeks parallel except for slight constriction near base; ♀ without a fore tarsal tooth . . . . . ***fulvicauda*** (p. 143)
7 Head slightly wider than long (210 μm 195 μm); mid and hind femora brown but with a yellow area on distal posterior margin . . . . ***ruficauda*** (p. 147)



FIGS 13–22. 13–19. Tube (last abdominal segment): 13, *Bolothrips italicus*. 14, *Gastrothrips intonsus*. 15, *G. mandiocae*. 16, *G. falcatus*. 17, *G. callipus*. 18, *G. abditus*. 19, *G. ruficauda*. 20–22. Pelta: 20, *G. intonsus*. 21, *G. mandiocae*. 22, *G. ruficauda*.

– Head longer than wide; mid and hind femora uniformly brown 8
8 Head less than 1·15 times as long as wide; tube more than 0·9 times as long as head ***corvus*** (p. 142)
– Head more than 1·25 times as long as wide; tube less than 0·75 times as long as head ***alticola*** (p. 140)
9 Legs and antennal segments I–VI largely yellow; tube 0·7 times as long as head; apterous with metanotal setae fine and less than 15 μm long . ***fulviceps*** (p. 144)
– Legs and antennal segments largely dark; tube 0·8 times as long as head or longer; macropterous or micropterous with metanotal setae more than 30 μm long and usually stout 10
10 Fore wing with duplicated cilia 11
– Fore wing without duplicated cilia, or micropterous 13
11 Female without a fore tarsal tooth; postocellar setae less than the diameter of one ocellus . . . . . ***abditus*** (p. 138)
– Female with a fore tarsal tooth; postocellar setae usually at least 40 μm long, usually twice as long as the diameter of one ocellus 12
12 Antennal segment III brown with yellow pedicel; sides of tube weakly convex, curving from base to apex; pronotal anteromarginal setae less than half as long as anteroangulars; median part of pelta narrowly triangular . . ***stygicus*** (p. 147)
– Antennal segment III largely yellow, shaded brown at apex; sides of tube parallel medially or even weakly constricted in anterior third; pronotal anteromarginal setae as long as anteroangulars; median part of pelta broadly triangular ***mandiocae*** (p. 145)
13 Fore tarsal tooth of ♀ acute, almost as long as width of fore tarsus . ***texanus*** (p. 148)
– Female without a fore tarsal tooth 14
14 Femora brown with yellow area distally on inner margin; sides of tube weakly convex, curving from base to apex . . . . . ***callipus*** (p. 142)
– Femora uniformly brown without a clear yellow area; tube parallel to weakly constricted medially, or evenly tapering with sides not rounded . . . 15
15 Micropterous; tube tapering from base to near apex . . . ***monticola*** (p. 146)
– Macropterous; tube parallel or weakly constricted medially . ***fumipennis*** (p. 144)

Gastrothrips abditus Hood

(Text-fig. 28)

Gastrothrips abditus Hood, 1935 : 177–182. Holotype ♀, PANAMA: Barro Colorado (USNM) [not examined].
Hoplothrips brasiliensis Moulton, 1938 : 378–379. Holotype ♀, BRAZIL (CAS) [not examined]. [Synonymized by Hood, 1952 : 163.]
Probolothrips hambletoni Moulton, 1941 : 320–321. Holotype ♀, BRAZIL (CAS) [not examined]. [Synonymized by Hood, 1952 : 163.]

Hood described this species from six female and one male macropterae collected from burrows in dead branches. None of these have been studied by the present author, but specimens from the type-series of Moulton's two species have been seen. Apparently *abditus* is widespread in eastern South America, and it is closely related to *mandiocae* and *texanus*. There are two undescribed species in the USNM from Mexico which are also related to *abditus*. One of these is macropterous with a heavy tube and dark brown third antennal segment. The other species includes the only hemimacropterous *Gastrothrips* known to the author, and these may

represent *abditus* despite the fact that the wing lobes are shaded. The macropterae of *abditus* have the fore wings pale or only weakly shaded.

SPECIMENS STUDIED.

BRAZIL: Minas Gerais, on dead Manioc stems, 3 ♀, 1 ♂, 21.vii.1933, 2 ♂, 10.iv.1933 (*Hambleton*) (BMNH) [type data of *brasiliensis* and *hambletoni*]. PARAGUAY: Caaguazu, 1 ♂ swept, 1.ii.1964 (*F. Andre*). TRINIDAD: St Augustine, 1 ♂ in empty Psychidae case, 1.xi.1970 (*L. A. Mound*) (BMNH).

Gastrothrips acuticornis (Hood)

Cryptothrips acuticornis Hood, 1925 : 65. Holotype ♀, WEST INDIES: St Croix (USNM) [examined].

Cryptothrips cybele Girault, 1927(38) : 1. Holotype ♂, AUSTRALIA: Queensland (QM) [examined]. [Synonymized by Mound, 1974 : 53.]

Gastrothrips noumeae Bianchi, 1945 : 251–254. Holotype ♀, NEW CALEDONIA (BPBM) [not examined]. [Synonymized by Mound, 1974 : 53.]

Nesothrips acuticornis (Hood); Ananthakrishnan, 1969 : 181–182.

This species has a remarkable distribution and, moreover, it is difficult to distinguish from three other described species: *mongolicus* from Mongolia, *procerus* from Brazil and *subulatus* from Transvaal. Hood described *acuticornis* from several specimens collected on St Croix and Barbados, and in the description refers to small pale males. Ananthakrishnan (1969) recorded both sexes from southern India, and Mound (1974) compared Indian specimens with the West Indian holotype and also specimens from New Caledonia and Australia. The Australian specimens have the eighth antennal segment slightly shorter than the seventh in contrast to the other material studied, and moreover the third antennal segment of most of the Australian specimens is paler than that of either the holotype or the Indian material. However, one female from Kuala Lumpur in Malaya has the third antennal segment dark except for the pedicel as in the holotype, but the eighth segment is short as in the Australian specimens. For these reasons *cybele* and *noumeae* are regarded as the same species as *acuticornis*, despite the fact that the males which have been studied from Australia and New Caledonia are macropterous and brown like the females, whereas the males from India and the West Indies are yellow and micropterous. Large males from India have the posterior margin of the metanotum produced into a dentate fringe which is excavate medially.

The females of *acuticornis* are macropterous with short postocellar setae, and the head of each of the specimens which have been studied is about 1·1 times as long as the tube. However, there are two micropterous females from Basutoland in the Albany Museum, Grahamstown which may represent this species but one has both postocellar setae 30 μm long and the other has these setae 12 μm and 30 μm long. The single male collected with these specimens is also micropterous and slightly oedymerous but has a simple posterior border to the metanotum unlike the small yellow males from India.

Whilst considering the variation in *acuticornis* it is necessary to refer to three other similar species. The South American species *procerus* has a relatively short

tube, the head being 1·5 times as long as the tube in all three of the available specimens. The holotype and one male from southern Brazil have a more slender head than a female from Paraguay, but all three specimens have the third antennal segment light brown with a yellow pedicel, and none of them have elongate postocellar setae. The South African species *subulatus* has the head about 1·4 times as long as the tube and the postocellar setae less than 15 μm long, but the third antennal segment is yellow and the fourth variable yellowish brown. Finally, *mongolicus* has the head 1·2 times as long as the tube, the third antennal segment is yellow in contrast to the dark brown fourth segment, but the postocellar setae are 50 μm long. These three species are known from too few specimens to assess the significance of these differences at present. The form of the pelta differs between them but this may be a function of body size. It is possible that all three are only local populations of *acuticornis*.

SPECIMENS STUDIED.

Holotype ♀ macroptera of *acuticornis*, WEST INDIES: St Croix, swept from grass, 9.iii.1915 (*C. B. Williams* 553) (USNM 71992). Holotype ♂ macroptera of *cybele*, AUSTRALIA: Queensland, Gympie, in forest, 29.vi.1924 (*A. A. Girault*).

AUSTRALIA: Queensland, Laidley, 1 ♂, 1 ♀ in forest, 31.v.1923 (*A. A. Girault*); Q., Grandchester, 1 ♀ (labelled as ♂) in forest, 1.viii.1924 (*A. A. Girault*) (QM); Q., Moura, 2 ♀ on Rhodes grass, 10.x.1967 (*Page & Rigby*); Q., 100 miles north of Rockhampton, 1 ♂ in grass, 18.vii.1968 (*L. A. Mound*) (BMNH).

NEW CALEDONIA: near Noumea, 2 ♀, 1 ♂ paratypes of *noumeae*, beaten from grass, 24.ix.1940 (*F. X. Williams*) (BMNH, BPBM, HP).

WEST MALAYSIA: Kuala Lumpur, 1 ♀ from live tree, 26.xii.1969 (*F. Andre*) (BMNH). INDIA: Madras, 4 ♂ on *Barteria* sp. twigs, 18.vii.1969, 3 ♀ on dry Jasmine twig, 25.vii.1966, 1 ♀ from grass, 23.iii.1968; Palghat, 1 ♀, 1 ♂ on dry twig, 12.v.1970; Kumili, 1 ♀ on dry twig, 22.vii.1969; Ronningtonn, 1 ♀ on dry twig, 8.ii.1969 (*T. N. Ananthakrishnan*) (BMNH).

Gastrothrips alticola Hood

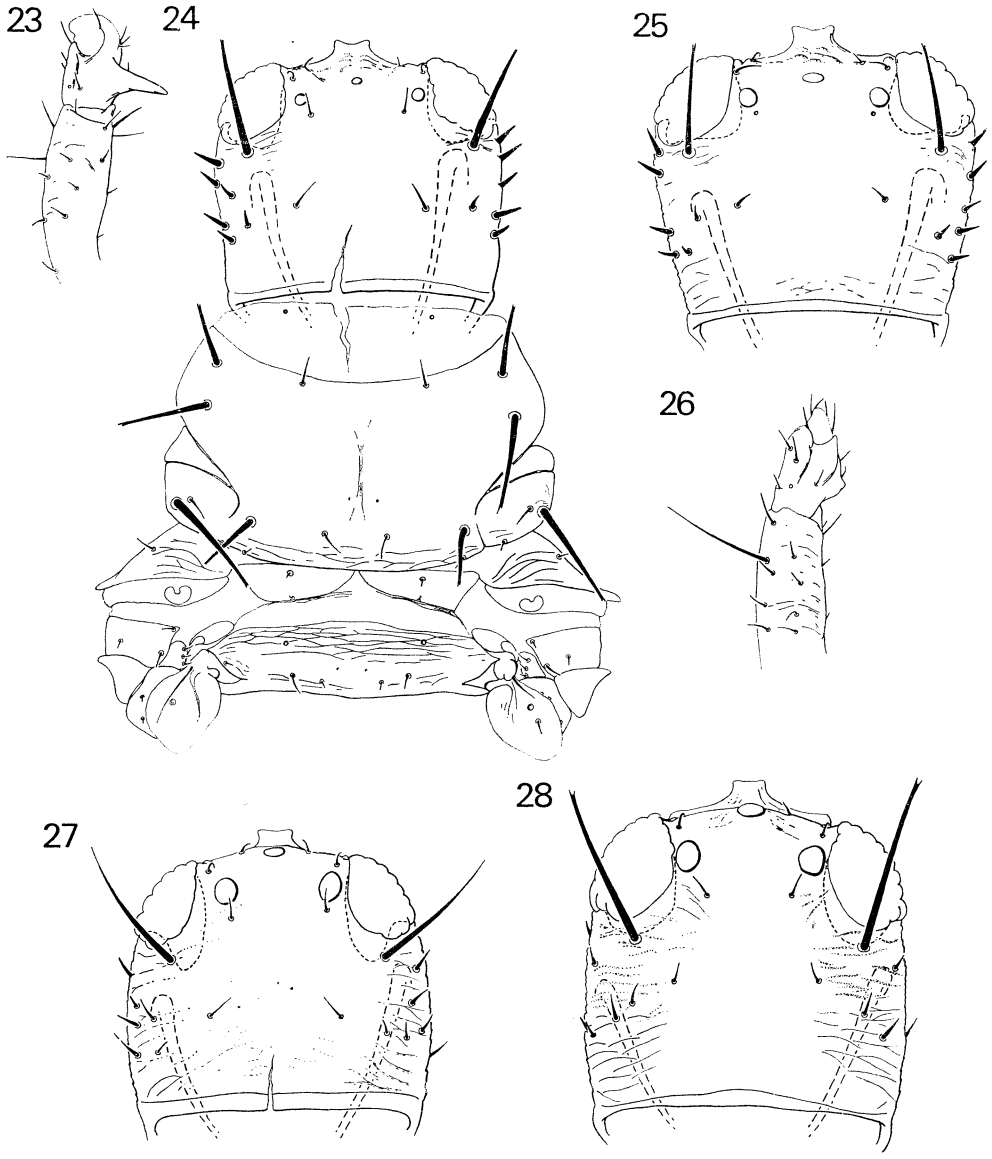
Gastrothrips alticola Hood, 1942 : 570–573. Holotype ♀, PERU (USNM) [not examined].

This species was described from thirty-five apterous females and ten apterous males. Hood states in the description 'basal three fourths of tube blackish brown', whereas the paratypes which have been studied here have the basal three-fourths of the tube paler than tergite nine. This has made comparison with other species particularly difficult. In the key to species above *alticola* will run to *monticola* if the tube is considered to be black. However, *monticola* is known only from micropterae and *alticola* only from apterae. However, both forms were collected in the Department of Huanuco, Peru, at 3000 metres. Moreover, in the BMNH collections there is a single macropterous female which was collected within 100 miles of Huanuco. This female has the basal three fourths of the tube dark reddish brown and paler than tergite nine, the fore wing bears six duplicated cilia, and the

fore tarsus does not bear a tooth. This specimen probably represents *alticola*, and *monticola* may also be the same species.

SPECIMENS STUDIED.

PERU: Dept. Huanuco, Shishmay, 2 ♀ paratypes from shrub with dry branches, at 3000 m, 18.ix.1937 (*F. Woytkowski*); Panao, 1 ♀, 1 ♂ from dead branches and leaves at 3000 m, 10.ix.1937 (*F. Woytkowski*) (AMG).



FIGS 23–28. 23–26. *Gastrothrips intonsus:* 23, fore tarsus of small male. 24, small male. 25, female. 26, fore tarsus of female. 27, *G. ruficauda*. 28, *G. abditus*.

Gastrothrips anolis Morgan

(Text-figs 10–12)

Gastrothrips anolis Morgan, 1925 : 7–8. Holotype ♀, PUERTO RICO (USNM) [not examined].
Gastrothrips proteus Hood, 1933 : 417–419. Holotype ♀, PANAMA: Barro Colorado (USNM) [not examined]. [Synonymized by Hood, 1935 : 186.]

Morgan described this species from one female, and Hood described *proteus* from one macropterous and seventeen apterous females with seven apterous males. The tube is bright yellow as in *fulvicauda*, *intonsus* and *ruficauda*, and the head of the major males has spiny cheeks as in *intonsus*. However, the females and the smallest males have a quadrate head similar to several other species of *Gastrothrips*. The major males bear two elongate tubercles on the posterior margin of the pronotum which overhang the metanotum, and Hood (1935 : 185) has published drawings of the variation of this species.

SPECIMENS STUDIED.

PANAMA: Barro Colorado Is., Gatun Lake, paratypes of *proteus*; 1 ♀, 1 ♂ on dead branches, 27.vii.1933, 1 ♀ on dead grass and leaves, 1.vii.1933, 1 ♂ on grass, 14.viii.1933 (*J. D. Hood*) (AMG). CAYMAN ISLANDS: 2 ♀, 2 ♂ apterae in Nightingale's nest, 16.vii.1962 (*A. Ventura*) (BMNH).

Gastrothrips callipus Hood

(Text-fig. 17)

Gastrothrips callipus Hood, 1935 : 182–186. Holotype ♀, U.S.A., Texas (USNM) [not examined].

Hood described this species from three female and one male macropterae from Texas, but the species is apparently widespread in the south-eastern part of North America. The femora are bicoloured as in the North American species *ruficauda* and the Central American species *anolis*; however, the tube is black with weakly convex sides. The male listed below from Mexico is identified as *callipus* with some doubt because it is micropterous with the basal three antennal segments yellowish brown.

SPECIMENS STUDIED.

U.S.A.: Texas, Victoria, paratype ♀ on *Chenopodium*, iv. 1908 (*J. D. Mitchell*) (USNM); T., Sinton, 1 ♀ on dead branches, 20.xii.1967; T., San Antonio, 1 ♀ on dead branches, 23.xii.1967 (*F. Andre*); Oregon, Ashland, 1 ♀ in berlese funnel, 6.xii.1937 (BMNH); South Carolina, Charleston, 3 ♀ on *Solidago*, 15.vi.1943 (*W. S. Fields*); Florida, Hialiah, 1 ♀ on grass and weeds, 15.iv.1969 (*C. E. Stegmaier*). BAHAMA IS.: West Palm Beach, 1 ♀, 13.v.1966 (*W. E. Browning*. MEXICO: in quarantine at Nogales, 1 ♂ on tomato fruit, 15.iii.1941 (USNM).

Gastrothrips corvus Priesner

Gastrothrips (?) *corvus* Priesner, 1933 : 55–57. Holotype ♀, MEXICO (HP) [examined].

Gastrothrips capitalis Hood, 1935 : 174–177. Holotype ♀, U.S.A.: Texas (USNM) [examined]. **Syn. n.**

The two unique holotypes of *corvus* and *capitalis* have been compared with each other and *capitalis* is here regarded as a small macroptera whereas the *corvus* holotype is a large microptera. The other differences noted by Hood follow from this morph difference, but it should be noted that in both specimens the basal two-thirds of the tube is dark reddish brown in contrast to the black colour of segment nine. The most closely related species appears to be *monticola* from Peru which has a dark tube.

SPECIMENS STUDIED.

Holotype ♀ microptera of *corvus*, MEXICO: Stadt, im Zimmer, 20.ii.1924 (*A. Dampf*) (HP). Holotype ♀ macroptera of *capitalis*, U.S.A.: Texas, Brownsville, Palm Jungle, in beatings, 20.xi.1911 (*C. A. Hart*) (USNM 71986).

Gastrothrips falcatus (Ananthakrishnan) **comb. n.**

(Text-figs 16, 64)

Nesothrips falcatus Ananthakrishnan, 1968 : 969–971. Syntypes 11 ♀, 5 ♂, INDIA (TNA) [not examined].

The males of this species show extreme allometry. Major males bear several very stout recurved setae on the posterior margin of the fore femora and fore coxae, and the metanotum bears a median process projecting backwards over the pelta. These features are not developed in minor males. Allometry is also known in four other species of *Gastrothrips*, *acuticornis*, *alticola*, *anolis* and *monticola*, although different parts of the body are affected in each species. In most species of Thysanoptera which show allometry the major males are much larger than the minor males, but in *anolis* and apparently *falcatus* the differences in body size are not very great. Unfortunately the measurements published by Ananthakrishnan (1970; 1971) are given as ranges for each character and hence cannot be used to establish correlations.

G. falcatus appears to be related to the *acuticornis*-group in the form of the head and tube, but differs from other members of the genus in having antennal segment eight short and broad. There is one specimen in the BMNH collections from Valparai in southern India which is very similar to *falcatus* in colour and the form of the wings and antennae, but has the tube constricted at the apex, the pelta broadly triangular and the postocellar setae close together.

SPECIMENS STUDIED.

INDIA: from dead twigs; Madras, 1 ♀, ii. 1968, 3 ♀, xi. 1968, 2 ♀, vii. 1969, 1 ♀, xii. 1970; Devikula, 1 ♂, ix. 1970; Goa, 2 ♀, x. 1968 (BMNH).

Gastrothrips fulvicauda Hood

Gastrothrips fulvicauda Hood, 1937 : 277–280. Holotype ♀, PERU (USNM) [not examined].

This species was based on three apterous females, and unlike *ruficauda* the head

is rectangular without any ocelli (Hood, 1937: fig. 4b). The tube is yellowish orange and the distal half of the femora considerably paler than the tibiae. The most closely related species seems to be *alticola* which is also based on apterae from Peru, but these have the first two antennal segments brown and the tube more darkly coloured.

SPECIMENS STUDIED.

PERU: Cajamarca Dept., near Celendin, from bush containing dry branches, 1 paratype ♀ aptera, 1.vi.1936 (*F. Woytkowski*) (USNM).

Gastrothrips fulviceps Hood

Gastrothrips fulviceps Hood, 1937 : 274–277. Holotype ♀, PERU (USNM) [not examined].

This species was described from seven apterous females from Celendin, Peru, and the holotype was collected from a bush containing dry branches and moss. No other member of *Gastrothrips* has a similar colour combination of dark tube but yellowish legs, antennal segments and head. In colour and general shape *fulviceps* is very similar to *Nesothrips propinquus* (Bagnall), but that species has a more transverse head, four sense cones on the fourth antennal segment, a shorter and broader eighth antennal segment, and a differently shaped pelta without a strong subbasal line of sculpture. The head of *fulviceps* is as broad as long, intermediate in shape between that of *ruficauda* and the majority of *Gastrothrips* species.

SPECIMENS STUDIED.

PERU: Cajamarca Dept., Celendin, 1 ♀ paratype on *Alansoa acutifolia* flowers, 2.vi.1936 (*F. Woytkowski*) (AMG). GUATEMALA: Guatemala City, 1 ♀ on *Brunella vulgaris*, 7.v.1945 (*E. J. Hambleton*) (USNM). MEXICO: in quarantine at Brownsville, Texas, 1 ♀ on rose, 6.x.1939; in quarantine at San Francisco, California, 1 ♀ on *Sedum*, 20.iv.1938 (USNM).

Gastrothrips fumipennis Hood

Gastrothrips fumipennis Hood, 1952 : 163. Holotype ♀, BRAZIL (USNM) [not examined].

Hood described this species from three female and seven male macropterae. According to the description large males bear a pair of lateral processes on the mesothorax as in *abditus*, *falcatus* and *acuticornis*. Despite the absence of duplicated wing cilia *fumipennis* is very closely related to *abditus*, although it is rather darker with shaded wings and brown tarsi and third antennal segment.

SPECIMENS STUDIED.

BRAZIL: Santa Catarina, 2 ♂ paratypes on dry branches, 16.v.1949 (*F. Plaumann*) (AMG).

Gastrothrips intonsus Hood

(Text-figs 23–26)

Gastrothrips intonsus Hood, 1941*a* : 180–183. Holotype ♀ microptera, PERU (USNM) [not examined].

The unique holotype of this species was related by Hood to *picticornis* on account of the shape of the head. However, *picticornis* is treated here in the genus *Neosmerinthothrips* because of the shape of the tube. Moreover the males of *intonsus*, particularly large specimens, have the head with convex spiny cheeks as in *anolis*. These major males, however, do not have the posterior margin of the pronotum produced into tubercles. The females have the head broadest just behind the eyes and strongly tapering to the base, and the pelta is broader than in the male and similar to *fulvicauda* and *alticola*. The bright yellow tube is similar to *anolis*.

SPECIMENS STUDIED.

PERU: Piedras Grandes, at 3000 m, 1 major ♂ (det J. D. Hood) in flowers, 2.xi.1937 (*F. Woytkowski*) (USNM); Huacapistana, 1 ♀ on dry leaves, 12.ii.1940 (*F. Woytkowski*); San Felix, 1 minor ♂ from bush with dry leaves, 25.iii.1940 (*F. Woytkowski*) (BMNH).

Gastrothrips mandiocae (Moulton)

(Text-fig. 21)

Dichaetothrips mandiocae Moulton, 1941 : 321–322. Holotype ♀, BRAZIL (CAS) [examined].
Gastrothrips oeceticola De Santis, 1943 : 92–96. Holotype ♀, ARGENTINA (Museos de la Plata) [not examined]. [Synonymized by Hood, 1956 : 99.]

Hood (1950 : 22–25) redescribed and figured *oeceticola* from southern Brazil, and later synonymized it with *mandiocae* after a comparison of the type-specimens. The postocellar setae are frequently more than 100 μm long, but the female listed below from Paraguay has one of these setae less than 20 μm long. Because of this variation the female listed below from Ghana is identified provisionally as *mandiocae* despite the fact that the postocellar setae are short. The most closely related species are *abditus* and *texanus*.

SPECIMENS STUDIED.

BRAZIL: Minas Gerais, 1 ♀, 1 ♂ in dead Manioc stems, 15.ix.1933 (*Hambleton*) [type data of *mandiocae*]; Vicosa, 3 ♀, 2 ♂ on dead branches, 8.vii & 20.ix.1964 (*F. Andre*) (BMNH). PARAGUAY: Caaguazu, 1 ♀ swept, 2.ii.1964 (*F. Andre*) (BMNH).

GHANA: Accra, Legon, 1 ♀ from *Tapinanthus* on *Cacao*, 1969 (*P. Room*) (BMNH).

Gastrothrips mongolicus (Pelikan) **comb. n.**

Nesothrips mongolicus Pelikan, 1965 : 231–233. Holotype ♀, MONGOLIA (TM) [not examined].

This species was described from two females and is discussed under *acuticornis*.

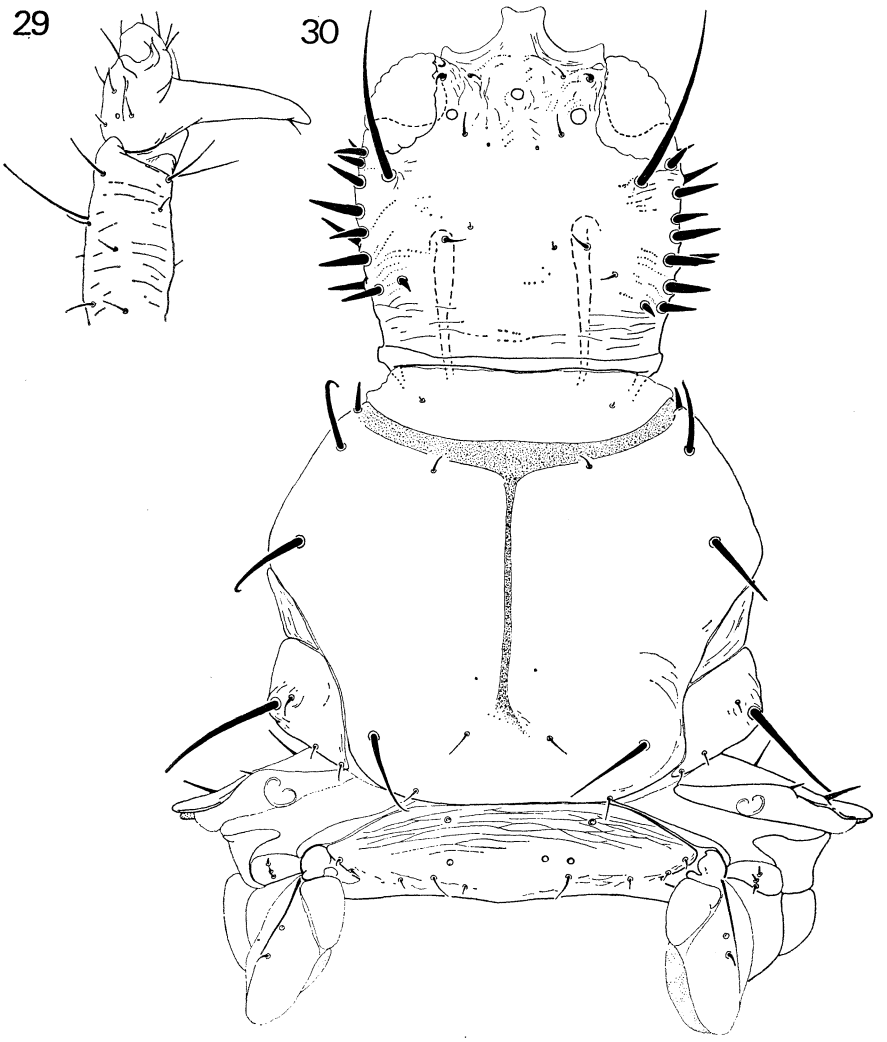
Contrary to the original description the ventral setae on the head are not particularly long in comparison to other members of the *acuticornis* group.

SPECIMEN STUDIED.

MONGOLIA: Koschoo Zaidam, in *Milvus* nest at 1490 m, 1 paratype ♀, 1.vii.1964 (*Kaszab*) (J. Pelikan collection).

Gastrothrips monticola Hood

Gastrothrips monticola Hood, 1942 : 573–576. Holotype ♀, PERU (USNM) [not examined].



FIGS 29–30. *Gastrothrips intonsus*, large male: 29, fore tarsus. 30, head, pronotum and mesonotum with short wings.

This species was described from two female and one male micropterae, and its possible synonymy with *alticola* is discussed under that species.

SPECIMEN STUDIED.

PERU: Huanuco Dept., Piedras Grandes, 1 ♀ paratype from a bush at 3000 m, 13.xi.1937 (*F. Woytkowski*) (AMG).

Gastrothrips procerus Hood

Gastrothrips procerus Hood, 1956 : 99–100. Holotype ♀, BRAZIL (USNM) [examined].

This species was described from one female macroptera, and is discussed under *acuticornis*.

SPECIMENS STUDIED.

Holotype ♀, BRAZIL: Santa Catarina, on dead branches, v. 1949 (*F. Plaumann*) (USNM 71989). BRAZIL: Parana, Ponta Grossa, 1 ♂ in grass tufts, 14.x.1972 (*V. F. Eastop*). PARAGUAY: Caaguazu, 1 ♀ sweeping, 2.ii.1964 (*F. Andre*) (BMNH).

Gastrothrips ruficauda Hood

(Text-figs 19, 22, 65)

Gastrothrips ruficauda Hood, 1912 : 156–157. Syntypes 3 ♀, U.S.A.: Illinois (USNM) [not examined].

Stannard (1957 : 104–106) records this species from eastern North America. The males have a pointed process in front of the mesothoracic spiracle as in several other species of *Gastrothrips*. The legs are bicoloured as in *callipus*, and the tube is bright yellow as in *anolis*, *fulvicauda* and *intonsus*. This is the type-species of *Gastrothrips* but the head of the female is relatively small with more rounded cheeks than other members of the genus. The only specimen studied was an apterous female with reduced wing-retaining setae but with well developed ocelli.

SPECIMEN STUDIED.

U.S.A.: Virginia, Rosslyn, 1 ♀ from dead willow branch, 1.xi.1914 (*C. B. Williams & J. D. Hood*) (BMNH).

Gastrothrips stygicus Hood

Gastrothrips stygicus Hood, 1935 : 186–191. Holotype ♀, PANAMA: Barro Colorado (USNM) [not examined].

Hood described this species from five female and one male macropterae. The tube is stouter than in *abditus* or *mandiocae* with weakly convex margins; however, these three species, together with *texanus*, are closely related. The fore tarsal tooth of *stygicus* is very short and broad, and the postocellar setae are intermediate in length between those of *abditus* and *mandiocae*.

SPECIMEN STUDIED.

PANAMA: Porto Bello, 1 ♀ paratype on dead vegetation, 10.vii.1933 (*J. D. Hood*) (AMG).

Gastrothrips subulatus (Hartwig) **comb. n.**

Bolothrips subulatus Hartwig, 1948 : 113–115. Holotype ♀, SOUTH AFRICA: Transvaal (Pretoria) [not examined].

This species, which was described from 45 ♀ and 5 ♂ collected in Pretoria and one female collected in Lourenco Marques, is discussed under *acuticornis*. The original description refers to macropterous females and 'dealate' females and males. However, the paratypes listed below are micropterae with well developed ocelli and wing retaining setae.

SPECIMENS STUDIED.

SOUTH AFRICA: Transvaal, Pretoria, paratypes; 4 ♀, 1 ♂ on *Bignonia tweediana*, 1.i.1946 (*E. K. Hartwig*) [same data as holotype]; 1 ♀ on *B. tweediana*, 16.ii.1941; 1 ♀ on bean leaves, 6.i.1940 (*E. K. Hartwig*) (BMNH, AMG, HP).

Gastrothrips texanus Hood

Gastrothrips texanus Hood, 1912 : 157–159. Holotype ♀, U.S.A.: Texas (USNM) [examined].

This species is known only from the unique holotype macroptera and one damaged female from the same locality. The pelta is similar to *abditus*, but the fore tarsus bears a tooth and the fore wings do not have any duplicated cilia. Despite this unusual combination of characters the species is closely related to *abditus* and *mandiocae*.

SPECIMENS STUDIED.

Holotype ♀, U.S.A.: Texas, Brownsville, on *Acacia farnesiana*, 29.vi.1908 (*C. A. Hart*) (USNM 71990). 1 ♀, 17.ii.1938 (*Anderson*) (USNM).

NEOSMERINTHOTHRIPS Schmutz **gen. rev.**

Neosmerinthothrips Schmutz 1913 : 1051. Type-species: *N. fructuum* Schmutz, by monotypy.
Coenurothrips Bagnall, 1921*a* : 271. Type-species: *C. brevicollis* Bagnall, by original designation.
Galactothrips Moulton, 1933 : 404. Type-species: *G. diversicolor* Moulton, by monotypy. **Syn. n.**

Stannard (1957) placed this genus in synonymy with *Nesothrips* on the grounds that *fructuum* was closely related to those species of the *Nesothrips* complex 'formerly called *Gastrothrips*'. Unfortunately, Stannard did not indicate in what sense he was using the name *Gastrothrips*, and the present author has removed from *Gastrothrips* to *Neosmerinthothrips* those species which have four sense cones on the fourth antennal segment together with *paulistarum* Hood. The genus *Gastrothrips* is limited in this paper to a group of species of the *Nesothrips* complex with only three

sense cones on the fourth antennal segment. As a result *Neosmerinthothrips* includes eighteen named species which are found in the Oriental, Ethiopian and Neotropical regions. The Oriental and Ethiopian species are more or less closely related, although it is interesting that the fore tarsal tooth is either present or absent. One species from Brazil, *diversicolor*, is probably introduced; it is so similar to the West African *hilaris*. Similarly the West Indian and African species *collaris* is very closely related to the Indian species, *robustus*. However, the *annulipes* group of species, including *picticornis*, *plaumanni*, *paulistarum* and *variipes*, is almost certainly native to Brazil. This is the group of species, together with two species from Panama and one from Fiji, which are here removed from *Gastrothrips*. The genus *Neosmerinthothrips* cannot be defined on any single character, but it includes those members of the *Nesothrips* complex which have a heavy tube with somewhat convex margins and the setae on tergite nine relatively elongate.

GENERIC DEFINITION. Medium-sized black or dark brown species of Cryptothripini. Head variable, longer than wide, or slightly wider than long, stylets V-shaped and wide apart; postocellar setae small (except *nigrisetis*), eyes not prolonged ventrally. Antennae eight-segmented; segment VIII either broad or narrowed at base, but never elongate and sharply constricted; segment III with two sense cones, IV with four sense cones (three in *paulistarum*). Pronotum transverse, epimeral sutures complete; oedymerous forms rare; fore tarsal tooth present in ♂ but large, small or absent in ♀. Metanotal median setae usually small and fine; fore wing with duplicated cilia. Pelta broad with lateral wings, lateral setae of tergites VI, VII and IX usually elongate, tube heavy with convex margins or at least with small setal bearing tubercles laterally, rarely almost straight with longitudal ridges in basal third.

KEY TO THE SPECIES OF *NEOSMERINTHOTHRIPS*

(excluding *inquilinus*, q.v.)

1 Antennal segment I yellow, if shaded with brown then distinctly paler than the head 2
– Antennal segment I dark brown, as dark as the head 8
2 Fore tarsal tooth absent in ♀ 3
– Fore tarsal tooth present in ♀ 6
3 Head at least 1·2 times as long as maximum width (Text-fig. 33); head largely yellow 4
– Head less than 0·95 times as long as maximum width (Text-fig. 32); head dark brown 5
4 Pronotal anteroangular and midlateral setae 15 μm long [West Africa] . ***hilaris*** (p. 153)
– Pronotal anteroangular and midlateral setae more than 35 μm long [Brazil] ***diversicolor*** (p. 152)
5 Antennal segments I–III largely yellow; tube more than 1·8 times as long as maximum width [India and Ceylon] . . . . . ***fructuum*** (p. 152)
– Antennal segment II brown in basal half, III brown with a yellow pedicel; tube about 1·5 times as long as wide [Brazil] . . . . ***picticornis*** (p. 155)
6 Antennal segments IV and V yellow, not darker than III and IV [South Africa] ***hoodi*** (p. 153)
– Antennal segments IV and V dark brown in contrast to yellow-brown of segment III 7
7 Fore tarsal tooth of ♀ less than half as long as width of foretarsus; tube more than 1·7 times as long as maximum width; large species, antennal segment III about 80 μm long [Seychelles] . . . . . ***brevicollis*** (p. 151)
– Fore tarsal tooth of ♀ about as long as width of fore tarsus; tube less than 1·6 times as long as maximum width (Text-fig. 36); small species, antennal segment III less than 60 μm long [Java] . . . . . ***xylebori*** (p. 155)

8 Fore tarsal tooth absent in ♀ 9
– Fore tarsal tooth present in ♀ but sometimes very small 11
9 Antennal segment III brown with pedicel yellow . . . . ***affinis*** (p. 150)
– Antennal segment III yellow, shaded light brown in distal half 10
10 Fore wing shaded only close to bases of subbasal setae; fore femora largely yellowish brown, darkly shaded along external margin near base [India] . . ***robustus*** (p. 155)
– Fore wing shaded completely across base; fore femora largely dark brown, paler near apex [Africa and West Indies] . . . . . ***collaris*** (p. 151)
11 Fore wings uniformly shaded light or dark brown 12
– Fore wings not shaded, or shaded at base with median area much paler . . 13
12 Fore wing dark brown; major setae in tergite IX exceptionally dark and stout with pale slender apices, B_1 longer than tube; pronotal anteromarginal and anteroangular setae scarcely longer than posterior discal setae [Brazil] ***plaumanni*** (p. 155)
– Fore wing light brown; major setae on tergite IX not exceptionally dark and stout, B_1 about half as long as tube; pronotal anteromarginal and anteroangular setae twice as long as posterior discal setae [Fiji] . . . . . ***fijiensis*** (p. 152)
13 Antennal segment IV with three sense cones [Brazil] . . ***paulistarum*** (p. 154)
– Antennal segment IV with four sense cones 14
14 Fore tarsal tooth well developed, length more than 0·5 of fore tarsal width; head broadest across posterior part of eyes [Brazil] 15
– Fore tarsal tooth small, length less than 0·25 of tarsal width; head broadest across cheeks [Panama] 16
15 Second antennal segment brown at base, yellow at apex; femora brown, pale at extreme apices; tube about 2·1 times as long as maximum width ***annulipes*** (p. 150)
– Second antennal segment largely yellow; femora yellow in distal third; tube less than 2·0 times as long as wide (Text-fig. 37) . . . . . ***variipes*** (p. 155)
16 Postocellar setae about 2.0 times as long as diameter of one ocellus; apices of femora yellow; major setae on abdomen black . . . . . ***nigrisetis*** (p. 154)
– Postocellar setae about 0.5 times as long as diameter of one ocellus; femora dark brown; major setae on abdomen pale . . . . . ***parvidens*** (p. 154)

Neosmerinthothrips affinis (Bagnall) **comb. n.**

Coenurothrips affinis Bagnall, 1921*b* : 361–362. Holotype ♀, CEYLON (BMNH) [examined].

This species is known from a single crushed specimen which is similar to *collaris* and *robustus* in structure but with the third antennal segment largely dark brown. The fore femur is dark brown along the external margin and yellow along the internal margin. Unlike *brevicollis* the fore tarsus has no tooth.

SPECIMEN STUDIED.

Holotype ♀, CEYLON: among cotton from Hettipold, Ex. Gd., 20.vi.1913 (*A. Rutherford*) (BMNH).

Neosmerinthothrips annulipes (Hood) **comb. n.**

Gastrothrips annulipes Hood, 1950 : 13–16. Holotype ♀, BRAZIL (USNM) [not examined].
Nesothrips (*Gastrothrips*) *milleforme* De Santis, 1963*a* : 12–14. Holotype ♀, ARGENTINA (Museos de la Plata) [examined]. **Syn. n.**

The head of this species is similar to that of the Brazilian species *variipes* and *picticornis*, but the tube is more slender with nearly straight sides and slightly

constricted near the apex. The other species described from Brazil, *plaumanni*, has the head wider across the cheeks than across the eyes but is otherwise similar, and these four species are all closely related. The holotype of *milleforme* has the distal parts of the major abdominal setae pale not dark, but cannot otherwise be distinguished satisfactorily from the paratype of *annulipes* listed below.

SPECIMENS STUDIED.

Holotype ♀ of *milleforme*, ARGENTINA: Tezanosa Pinto (Prov. Entre Rios), 1957 (*Rosillo*) (Museos de la Plata).

BRAZIL: Rio de Janeiro, Jacarepagua, 1 ♀ paratype of *annulipes*, on dead branches, 21.vi.1948 (*J. D. Hood*) (USNM).

Neosmerinthothrips brevicollis (Bagnall) **comb. nov., stat. rev.**

Coenurothrips brevicollis Bagnall, 1921*a* : 271–272. Syntypes ♂, ♀, SEYCHELLES (BMNH) [examined].

This species was synonymized in error with *Coenurothrips validus* Bagnall in Mound (1968 : 142), and placed in the genus *Nesothrips* sensu lato. However, *validus*, which is known from a single badly damaged specimen, has a pair of stout interocellar setae and is here placed in the genus *Nesidiothrips*. *N. brevicollis* is very similar to *collaris* and *robustus* although rather smaller. However, it differs not only in having paler basal antennal segments but in having a small slender fore tarsal tooth in the female. In contrast to *hoodi* these three species all have yellowish brown setae in tergite nine.

SPECIMENS STUDIED.

Syntypes. SEYCHELLES: Mahe, 1 ♀, Cascade Estate, top of Mt Serbert, x. 1908–i. 1909 (*H. Scott* 104); 1 ♂, 1908–09 (3. No. 71); 2 ♀, 1908–09 (15 No. 71) (BMNH).

Neosmerinthothrips collaris (Bagnall) **comb. n.**

Cryptothrips collaris Bagnall, 1917 : 26–27. Lectotype ♀, ST. VINCENT (BMNH) [examined].

Gastrothrips fuscicauda Morgan, 1925 : 6–7. Holotype ♂, PUERTO RICO (USNM) [examined]. **Syn. n.**

Bolothrips marshalli Priesner, 1934 : 58–60. LECTOTYPE ♀, SIERRA LEONE (BMNH), here designated [examined]. **Syn. n.**

Gastrothrips dominicanus Hood, 1935 : 170–174. Holotype ♂, DOMINICA (USNM) [not examined]. **Syn. n.**

Bagnall described *collaris* from two females and Hood described *dominicanus* from two males but there appear to be no significant differences between the specimens. The damaged unique holotype of *fuscicauda* has been compared with the paratype of *dominicanus* as well as the other material listed below. More surprisingly the African specimens described as *marshalli* apparently represent the same species together with the specimen from Mozambique, and moreover Indian specimens referred to as *robustus* Ananthakrishnan can only be distinguished on very

trivial characters. Thus *collaris* appears to be a tramp species which has been distributed by man, possibly during the slave trade.

SPECIMENS STUDIED.

Lectotype ♀, with 1 ♀ paralectotype of *collaris*, ST VINCENT: ?1895 (*H. H. Smith*) (BMNH). Holotype ♂ of *fuscicauda*, PUERTO RICO: from stomach of lizard (*G. N. Wolcott*) (USNM type No. 71987) (labelled ?♀). Lectotype ♀ of *marshalli*, SIERRA LEONE: Njala, inside *Cassava* seedpod, 4.xi.1932 (*E. Hargreaves*), with 1 ♂ paralectotype bearing identical data (BMNH).

DOMINICA: paratype ♂ of *dominicanus*, swept from grass, 13.iii.1915 (*C. B. Williams* 571) (AMG). MOZAMBIQUE: Lourenco Marques, 2 ♀, 4 ♂ in dry *Cassia* pods, vii. 1936 (*J. C. Faure*) (AMG).

Neosmerinthothrips diversicolor (Moulton) **comb. n.**

Galactothrips diversicolor Moulton, 1933 : 404–406. Holotype ♀, BRAZIL (CAS) [not examined].

This is probably only a local and introduced variety of *hilaris* Priesner from West Africa. The only apparent differences are the slightly longer setae on the pronotum.

SPECIMEN STUDIED.

BRAZIL: Bahia, on *Galactia* sp., 1 paratype ♀ (*Bondar*) (BMNH).

Neosmerinthothrips fijiensis (Moulton) **comb. n.**

Gastrothrips fijiensis Moulton, 1944 : 286–287. Holotype ♀, FIJI (BPBM) [examined].

The single specimen from which this species is known has the head rather similar to the *annulipes* group from Brazil and the tube is also similar to *annulipes*. However, the abdominal setae are rather short, the dorsal setae on tergite nine being 145 μm and the tube 260 μm. At present *fijiensis* cannot be placed satisfactorily in any species group. The median part of the pelta is triangular although the lateral wings are well developed.

SPECIMEN STUDIED.

Holotype ♀, FIJI; Navai Mill, Viti Levu at 2500 ft, 16.ix.1938 (*E. C. Zimmerman*) (BPBM).

Neosmerinthothrips fructuum Schmutz

(Text-figs 32, 34, 35, 70)

Neosmerinthothrips fructuum Schmutz, 1913 : 1052–1053. LECTOTYPE ♂, CEYLON (HP), here designated [examined].

Oedemothrips ceylonicus Karny, 1925 : 137–139. Holotype ♀, CEYLON (BMNH) [examined]. **Syn. n.**

The specimen here designated as lectotype was labelled by Prof. H. Priesner 'Typen material, ex coll. Karny', although the original description does not indicate if more than one specimen existed. This specimen is very faded and partly crushed, but otherwise cannot be distinguished from specimens labelled as '*formosensis* var. *Karni*' by Prof. Ananthakrishnan collected in southern India. The female of the species lacks a fore tarsal tooth. The true *formosensis* is treated here under *Nesothrips*, and has a tube with straight not weakly convex margins.

SPECIMENS STUDIED.

Lectotype ♂ of *fructuum*, CEYLON: Peradenyia, in Schoten (*Uzel* 55) (HP). Holotype ♀ of *ceylonicus*, CEYLON; Peradenyia, in empty galleries in *Cassia multijuga* with 3 immatures, 1.v.1924 (*F. T. Jepson*) (BMNH).

INDIA: Kerala, Kudal, 1 ♀ in dry twigs, 6.x.1969 (*TNA* 158); Vyithri, 3 ♀, 15.viii.1969; Ranni, 2 ♀, 5.x.1969; Kiruatti, 1 ♂, 19.ix.1969 (BMNH); Sagar, 1 ♀ 20.x.1966 (HP).

Neosmerinthothrips hilaris (Priesner) **comb. n.**

(Text-fig. 33)

Bolothrips hilaris Priesner, 1937 : 624–626. Holotype ♂, SIERRA LEONE (BMNH) [examined].

The tube of this species is heavy with slightly convex sides bearing distinct setal bases, as in other species of *Neosmerinthothrips*. There are four sense cones on the fourth antennal segment, and segment eight is broad at the base. The eyes are smaller on the ventral than on the dorsal surface, the head does not project in front of the eyes and the ocellar setae are minute. The epimeral sutures are sometimes not quite complete, and the setae on tergite nine are elongate. Despite the colour difference *hilaris* is related to *collaris* and *fructuum* in structure, and the Brazilian species *diversicolor* is probably only a local variant.

SPECIMENS STUDIED.

Holotype ♂, with allotype ♀, SIERRA LEONE: Njala, in twigs of *Bauhinia tomentosa*, 1936 (*E. Hargreaves*); 1 ♀ paratype at same locality on dead branch of *Ficus* (BMNH).

GHANA: near Legon, 11 ♀, 6 ♂ from *Tapinanthus banguensis* on *Cacao* branches, 1969 and 1970 (*P. Room*) (BMNH).

Neosmerinthothrips hoodi (Faure) **comb. n.**

Gastrothrips hoodi Faure, 1954*a* : 9–13. Holotype ♀ macroptera dealate, SOUTH AFRICA (Pretoria) [not examined].

This species is very similar to *fructuum* in the shape of the head and tube, and differs mainly in colour and the presence of a pretarsal tooth. Although it was described in *Gastrothrips*, Faure specifically compared it to *fructuum* (as *ceylonicus* Karny) and moreover listed those characters which are here regarded as excluding species from *Gastrothrips* sensu stricto.

SPECIMENS STUDIED.

SOUTH AFRICA: Zululand, St Richards Bay, 1 ♀ mac. paratype on dead branches, 17.ii.1946; Kluhluwe, 4 ♀ dealate paratypes on dead branches of *Syzygium cordatum*, 13.v.1949 (*J. C. Faure*) (AMG and BMNH).

Neosmerinthothrips inquilinus Ananthakrishnan

Neosmerinthothrips inquilinus Ananthakrishnan, 1960 : 32–33. Holotype ♀, INDIA (?TNA) [not examined].

The holotype female and two male paratypes of *inquilinus* cannot be found at present in Prof. Ananthakrishnan's collection (teste T.N.A. in litt.). However, judging from the description this is likely to prove to be a senior synonym of *robustus* q.v.

Neosmerinthothrips nigrisetis (Hood) **comb. n.**

Gastrothrips nigrisetis Hood, 1935 : 161–165. Holotype ♀, PANAMA (USNM) [not examined].

The ocellar setae of *nigrisetis* are very well developed, about 40 μm long and arising well behind a line joining the posterior ocelli. As a result the head and pronotum look very like a species of *Dichaetothrips*, but the tube is unusually heavy with small setal tubercles laterally and the abdominal setae are elongate. This species and *parvidens* are closely related and are probably derived from the *annulipes* group. They are only distantly related to the other species of *Neosmerinthothrips*, although Hood compared them to *collaris* (as *dominicanus*) in the original description.

SPECIMENS STUDIED.

PANAMA: Barro Colorado Island, on dead branches, 3 ♀, 1 ♂ paratypes, 30.vii.1933 (*J. D. Hood*) (AMG).

Neosmerinthothrips parvidens (Hood) **comb. n.**

Gastrothrips parvidens Hood, 1935 : 165–168. Holotype ♀, PANAMA (USNM) [not examined].

This species is closely related to *nigrisetis* but has very small ocellar setae, and the tube is more slender than any other species of *Neosmerinthothrips*.

SPECIMENS STUDIED.

PANAMA: Barro Colorado Island, on dead branches, 1 paratype ♀, 10.viii.1933 (*J. D. Hood*) (USNM); Canal Zone, Barro Colorado Is., 1 ♀ on *Swartzia danienensis* fls, 10.v.1939 (*Zetek*) (USNM).

Neosmerinthothrips paulistarum (Hood) **comb. n.**

Gastrothrips paulistarum Hood, 1950 : 25–27. Holotype ♀, BRAZIL (USNM) [examined].

Because of the antennal sense cone formula this species will come out to *Gastro-*

thrips in the key above. However, it is based on a single specimen which may be aberrant, and it is closely related to the *annulipes* group of species. The tube is dark and heavy with slightly convex margins, and the head shape is intermediate between that of *annulipes* and *parvidens*.

SPECIMEN STUDIED.

Holotype ♀, BRAZIL: Estado de São Paulo, São Carlos, from dead branches, 13.vi.1948 (*J. D. Hood & D. P. de Souza Dias*) (USNM).

Neosmerinthothrips picticornis (Hood) comb. n.

Gastrothrips picticornis Hood, 1936 : 272–275. Holotype ♀, BRAZIL (USNM) [not examined].

The tube of this species is very broad, rather similar to that of *xylebori* from Java. However, *picticornis* is probably closely related to *plaumanni* and *variipes* which also come from Brazil, but which have a fore tarsal tooth in the female.

SPECIMENS STUDIED.

BRAZIL: Rio de Janeiro, 1 ♀ paratype on dead twigs of *Annona squamosa*, 10.viii.1934 (*D. Mendes*) [holotype in USNM bears identical data]; State of Sao Paulo, Itanhaen, 1 ♂ on dead branches, 17.vi.1948 (*J. D. Hood & J. Lane*) (AMG).

Neosmerinthothrips plaumanni (Hood) comb. n.

Gastrothrips plaumanni Hood, 1950 : 20–22. Holotype ♀, BRAZIL (USNM) [examined].

This is the only South American member of this genus with dark brown fore wings. The abdominal setae are long and dark as in *picticornis* and *variipes*, and the tube is moderately heavy.

SPECIMENS STUDIED.

Holotype ♀, BRAZIL: Sta Catarina, on dry branches, 5.i.1949 (*F. Plaumann*) (USNM Type No. 71988).

BRAZIL: Vicosa, 2 ♀ on dead braches, 20.xi.1964 (*F. Andre*) (BMNH).

Neosmerinthothrips robustus (Ananthakrishnan) comb. n.

Nesothrips robustus Ananthakrishnan, 1964 : 102–103. Syntypes ♂, ♀, INDIA (TNA) [not examined).

Contrary to the original description the female of this species does not have a fore tarsal tooth (Ananthakrishnan, 1968 : 972). It is placed in the genus *Neosmerinthothrips* on account of the heavy tube with weakly convex margins bearing small setal bases, and the elongate setae on tergite nine. It is very similar to the widespread species *collaris*, being rather smaller and paler, and may eventually prove to be merely a local variety.

SPECIMENS STUDIED.

INDIA: Madras, 2 ♂, 2 ♀; Goa, 1 ♂; Adar, 1 ♂, 1 ♀; Thenmatai, 1 ♀, all determined by T. N. Ananthakrishnan (BMNH).

Neosmerinthothrips variipes (Hood) **comb. n.**

(Text-figs 37, 73)

Gastrothrips variipes Hood, 1950 : 16–20. Holotype ♀, BRAZIL (USNM) [not examined].

This species is very close to *plaumanni* but the fact that it has rather paler wings and more yellowish basal antennal segments and femora may not be significant when more specimens are collected.

SPECIMENS STUDIED.

BRAZIL: Rio de Janeiro, Jacarepagua, 1 ♀ paratype on dead branches, 22.v.1948 (*J. D. Hood & T. Borgmeir*); State of São Paulo, São Carlos, 1 ♂ paratype, 15.vi.1948 (*J. D. Hood & D. P. de Souza Diaz*) (AMG).

Neosmerinthothrips xylebori Priesner

(Text-fig. 36)

Neosmerinthothrips xylebori Priesner, 1935 : 370. LECTOTYPE ♀, JAVA (SMF), here designated [examined].

♀ macroptera. Colour brown, tube blackish; mid and hind femora dark at base and along anterior margin but yellow at apex and posterior margin; fore femora yellow in apical half; antennal segments I and II yellow, III light brown, succeeding segments progressively darker; wings shaded; major setae light brown.

MEASUREMENTS (Lectotype ♀ in μm). Body length 1550. Head, length 175; maximum width 190. Fore wing, length 700; subbasal setae 50, 50, 58; number of duplicated cilia 6–8. Tergite IX setae, B_1 145, B_2 130, B_3 125. Tube, length 190; basal width 115; apical width 35. Antennal segments length 26; 50; 55; 50; 50; 50; 38; 32.

SPECIMENS STUDIED.

Lectotype ♀, JAVA: Tegallega near Tjibadak, 500–600 m, in tunnel of *Xyleborus coffeae* (on *Cacao*?), 30.iii.1925 (*Menzel*), with 1 ♂ paralectotype (SMF); 2 ♀ paralectotypes with identical data (HP).

COMMENTS. This species was described in a key, complete with collection data but without reference to the number of individuals. The lectotype selected here is the female labelled as holotype by Prof. Priesner which is mounted on a slide with one larva. Despite the long slender fore tarsal tooth of the female it is similar to *fructuum*, although the only available male is hemimacropterous and oedymerous.

NESIDIOTHRIPS gen. n.

Type-species: *Nesothrips alius* Ananthakrishnan.

Medium-sized dark brown species of Cryptothripini with males frequently oedymerous.

Head longer than wide or about as wide as long; ocellar setae elongate, arising within the ocellar triangle; postocular setae elongate, major males with two pairs of postocular setae; maxillary stylets wide apart, V-shaped and retracted to postocular setae. Antennae eight-segmented, VIII fairly broad at base; two sense cones on segment III, four sense cones on IV. Pronotum with median thickening, anterior margin thickened in males; fore femora sometimes enlarged, fore tarsal tooth well developed in both sexes. Mesonotal lateral setae small; metanotal median setae frequently stout; fore wing with duplicated cilia; mid and hind femora each with one stout dorsal seta. Pelta with small lateral wings; sigmoid wing retaining setae well developed on tergites III–VI, nearly straight on II and VII; lateral setae on tergites VI and VII elongate, on IX shorter than tube; tube heavy, ridged basally and slightly constricted near apex.

This genus is erected for two species, one from India and the other from the Seychelles and the Solomon Islands. These species are closely related to *Nesothrips* and *Rhaebothrips* species, and the mid and hind femora bear a single stout dorsal seta as in those genera. However, the ocellar setae are elongate and arise within the ocellar triangle, and the fore tarsus bears a large tooth in the female unlike both *Nesothrips* and *Rhaebothrips*.

KEY TO THE SPECIES OF *NESIDIOTHRIPS*

1 Setae on tergite IX yellowish brown; midlateral pronotal setae more than 80 μm long in ♀; head slightly longer than tube [India] . . . . . ***alius*** (p. 157)

– Setae on tergite IX dark brown; midlateral pronotal setae less than 60 μm long in ♀; head slightly shorter than tube [Seychelles] . . . . . ***validus*** (p. 157)

Nesidiothrips alius (Ananthakrishnan) **comb. n.**

(Text-figs 46, 48, 50, 69)

Nesothrips alius Ananthakrishnan, 1970 : 52–55. Holotype ♀, INDIA (TNA) [not examined].

The original description of this species includes illustrations of the dimorphism. The oedymerous males have a second pair of long postocular setae medially on the vertex which are not developed on females or minor males. The median metanotal setae and the pronotal anteroangulars and midlaterals are also elongate in large males. This species is closely related to *validus* and further collecting may indicate that only one widespread species is involved.

SPECIMENS STUDIED.

INDIA: Aryankavu, 1 ♀, 1 ♂ on dry twiner, 7.x.1969 (*T. N. Ananthakrishnan*) (TNA) [these data are similar to those published for the type-series – Kerala, Aryankavu, dry twigs, 8.x.1969].

Nesidiothrips validus (Bagnall) **comb. n.**

Coenurothrips validus Bagnall, 1921*a* : 272–273. Holotype ♀, SEYCHELLES (BMNH) [examined].

The holotype of this species is very badly crushed and the interocellar setae are not readily visible. The species *C. brevicollis* Bagnall is not a synonym of *validus* contrary to Mound (1968 : 142). The specimens listed below from the Solomon

Islands are identified provisionally as *validus*, the males show a similar dimorphism to *alius* but the terminal abdominal setae are dark brown.

SPECIMENS STUDIED.

Holotype ♀, SEYCHELLES: Silhouette [Mare aux Cochons, ix. 1908] (BMNH).

SOLOMON ISLANDS: Guadalcanal, Mt Austen, 2 ♂, 1 ♀ in litter, 19.xi.1963 (*P. Greenslade*) (BMNH).

NESOTHRIPS Kirkaldy

Nesothrips Kirkaldy, 1907 : 103. Type-species: *N. oahuensis* Kirkaldy, by monotypy.
Oedemothrips Bagnall, 1910 : 680. Type-species: *O. laticeps* Bagnall, by monotypy. [Synonymized by Bianchi, 1944.]

FIG. 31. *Nesothrips oahuensis*, large male.

Oedemothrips is a synonym of *Nesothrips* because the names *laticeps* and *oahuensis* have been shown to refer to the same species. However, the other genera which were placed as synonyms of *Nesothrips* by Stannard (1957) are here withdrawn from synonymy for the reasons given in the introduction and key. Unfortunately this still leaves *Nesothrips* as an unsatisfactory group of fourteen more or less related species from the Pacific, Australia and Indonesia, with two species which have become widespread on trade routes. This group of species is closely related to *Rhaebothrips* through *aoristus* and *oahuensis*, and it is also closely related to *Cariento-thrips* through *melinus* and *propinquus*. *Neosmerinthothrips fructuum* is sometimes misidentified as *Nesothrips brevicollis* (or one of its synonyms), but the species of *Neosmerinthothrips* have a stout heavy tube with weakly convex instead of straight margins. Similarly, small species of *Scotothrips* and *Dichaetothrips* have been placed in *Nesothrips* despite the fact that they have a more elongate tube.

In the present interpretation *Nesothrips* includes both short broad species such as *oahuensis* and *propinquus*, as well as more elongate species such as *niger* and *yanchepi*. The eyes are prolonged on the ventral surface of the head in some species and in *propinquus* the extent of this prolongation is variable. Duplicated cilia are present on the fore wings of those species in which macropterae are known with the exception of *propinquus* which does not have duplicated cilia. The systematics of this group is not likely to be stabilized without further collecting in the New Guinea and Pacific areas.

GENERIC DEFINITION. Small to medium sized dark species of Cryptothripini. Head frequently wider than long but sometimes longer than wide, usually only weakly extended in front of eyes; eyes variably prolonged on ventral surface; maxillary stylets wide apart and V-shaped. Antennae eight-segmented, two sense cones on segment III, four sense cones on IV; segment VIII short and broad. Pronotum transverse, sometimes enlarged in major males; epimeral sutures complete. Fore tarsal tooth present in ♂, absent in ♀. Wings, when present, usually with duplicated cilia. Metanotal median setae usually small. Pelta with lateral lobes in most species. Tube relatively short, with straight sides.

KEY TO THE SPECIES OF *NESOTHRIPS*

1 Antennal segment I yellow or brownish yellow, much paler than VII and VIII and usually paler than the head 2
– Antennal segment I brown, as dark as the head and distal antennal segments . 8
2 Setae B_1 on tergite IX more than 0·8 times as long as the tube; major setae unusually slender; dorsal surface of head with two pairs of elongate postocular setae; mid and hind legs dark brown except for the pale hind margin of femora at extreme apex [Rapa Is.] . . . . . ***semiflavus*** (p. 168)
– Setae B_1 on tergite IX less than 0·7 times as long as tube; major setae stout and dark; head with only one pair of postocular setae; mid and hind legs sometimes yellow, or with apex of femora more or less yellow 3
3 Head more than 1·1 times as long as wide (Text-fig. 38) [Guam] . ***artocarpi*** (p. 161)
– Head less than 1·0 times as long as wide, usually distinctly wider than long (Text-figs 40–42) 4
4 Posterior margin of hind femora yellow, anterior margin dark brown, fore femora yellow in distal half; eyes not prolonged on ventral surface of head . . .
Micropterae with anterior margin of head and antennal segments I–V

yellow or brownish yellow; macropterae and hemimacropterae with head and most of antennal segments IV–V brown [Mascarenes, Indonesia, Japan, Hawaii] (see also *rhizophorae*) . . . . . ***brevicollis*** (p. 162)

– Femora coloured differently from above, or with eyes prolonged on ventral surface of head 5

5 Tube as long as or a little longer than the head; hind femora dark brown but yellow in distal third; antennal segments I and II yellow, III yellow-brown, IV scarcely paler than V–VIII which are dark brown [Malaya, Sumatra] . ***malaccae*** (p. 164)

– Tube 0·8 times as long as head or shorter; hind femora largely yellow . . . 6

6 Lateral lobes of pelta separate from the median lobe or with only a slender connection, posterior border of pelta eroded medially and separate from anterior border of tergite II [Australia, New Zealand, South Africa] . . ***propinquus*** (p. 167)

– Lateral lobes of pelta broadly joined to median lobe, posterior border close to anterior border of tergite II (Text-fig. 45) 7

7 Body colour dark brown; postocellar setae finely pointed [Fiji] . . ***fodinae*** (p. 163)

– Body colour largely yellow; ocellar setae blunt at apex [Australia] . ***melinus*** (p. 166)

8 Ventral length of eyes at least 1·5 times as long as dorsal length [Pacific Is.] . 9

– Ventral length of eyes less than 1·2 times dorsal length [Australia] . . . 10

9 Ocellar setae 60–80μm long, 40–60μm apart at base (Text-fig. 31); setae B_1 on tergite IX 90–100μm [Hawaii] . . . . . ***oahuensis*** (p. 167)

– Ocellar setae 35μm long, 80μm apart at base (Text-fig. 39); setae B_1 on tergite IX 200μm [Marquesas Is.] . . . . . ***niger*** (p. 166)

10 Pelta semicircular, lateral lobes not developed; head almost transversely oval, broadest across cheeks; pronotum very short, more than three times as wide as long . . . . . ***hemidiscus*** (p. 164)

– Pelta with lateral lobes well developed; head not transversely oval; pronotum scarcely twice as wide as long 11

11 Setae B_1 on tergite IX 0·6–0·75 times as long as B_2; head less than 0·9 times as long as wide; mid and hind femora yellow at apex and along posterior margin in distal third (see also *brevicollis*) . . . . . ***rhizophorae*** (p. 168)

– Setae B_1 on tergite IX 1·0–1·2 times as long as B_2; head longer than wide; mid and hind femora brown 12

12 Setae B_1 on tergite IX 1·2 times as long as B_2, but less than 0·5 times as long as the tube; major setae including ocellar and metanotal setae exceptionally stout and dark . . . . . ***aoristus*** (p. 160)

– Setae B_1 on tergite IX about as long as B_2, and more than 0·5 times as long as the tube; major setae slender 13

13 Antennal segment III brown with pedicel yellow, IV and V dark brown ***carverae*** (p. 163)

– Antennal segment III largely yellow, shaded near apex, IV and V yellow at base ***yanchepi*** (p. 170)

Nesothrips aoristus Mound

Nesothrips aoristus Mound, 1974 : 68. Holotype ♀, AUSTRALIA: South Australia (ANIC) [examined].

The oedymerous male of this species has enlarged fore femora similar to *oahuensis*, but the eyes are not prolonged ventrally as in that species. Although the head and fore legs are similar to *Rhaebothrips* species the tube and antennae are relatively short.

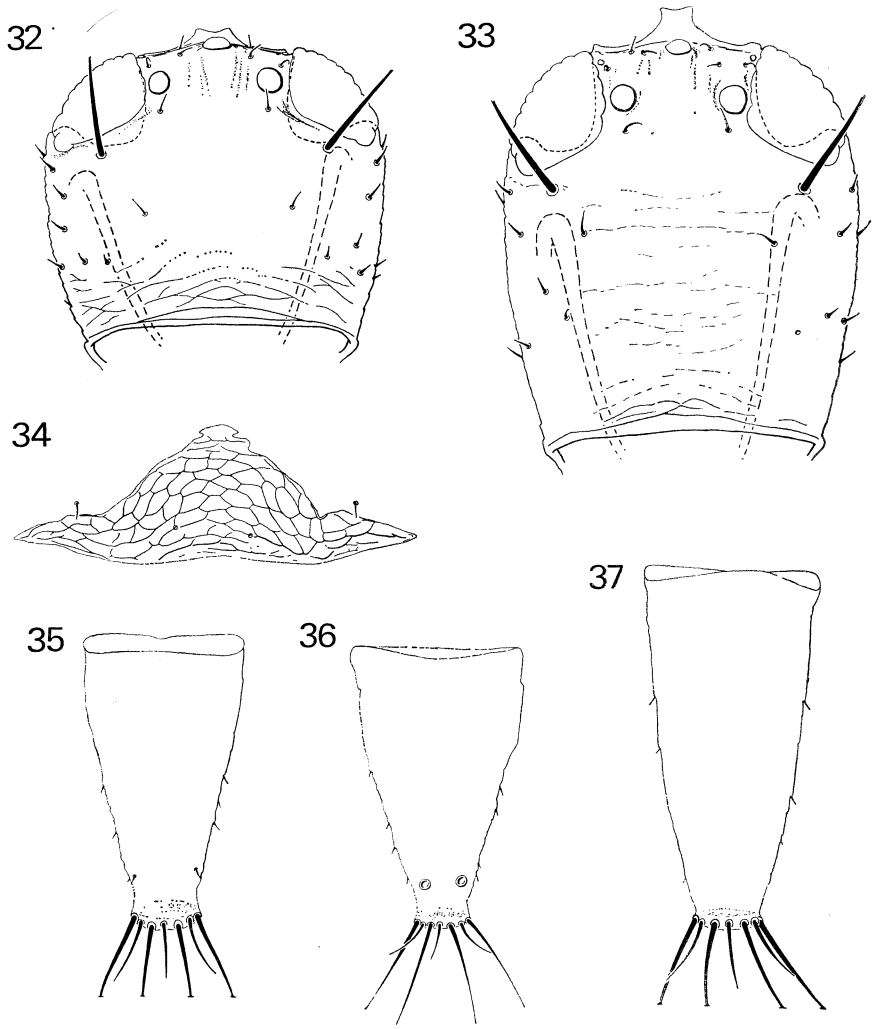
SPECIMENS STUDIED.

Holotype ♀ with 2 ♀, 2 ♂ paratypes, AUSTRALIA: South Australia, south of Adelaide, on *Olearia ramalosa*, 4.xii.1967 (*L. A. Mound*) (ANIC, BMNH).

Nesothrips artocarpi (Moulton)

(Text-fig. 38)

Bolothrips artocarpi Moulton, 1942 : 14–15. Holotype ♀, GUAM (BPBM) [examined].



FIGS 32–37. *Neosmerinthothrips* species: 32, *N. fructuum*. 33, *N. hilaris*. 34, *N. fructuum*, pelta. 35, *N. fructuum*, tube. 36, *N. xylebori*, tube. 37, *N. variipes*, tube.

This species, described from two females, is similar to *semiflavus* in the shape of the head. The maxillary stylets are retracted into the head as far as the postocular setae, and the postocellar setae are 30 μm long. The metanotum is almost unsculptured around the bases of the median setae, and these setae are slender, 40 μm long and about 45 μm apart. The pelta has well developed lateral wings. The tube is relatively long, 195 μm, with straight sides, and the setae on tergite nine are dark brown with pale acute apices.

SPECIMEN STUDIED.

Holotype ♀, GUAM: on *Artocarpus communis*, 21.v.1936 (*Sweezey*) (BPBM).

Nesothrips brevicollis (Bagnall)

(Text-figs 40, 43, 44)

Oedemothrips (?) *brevicollis* Bagnall, 1914 : 29–30. Holotype ♀, JAPAN (BMNH) [examined].
Coenurothrips minor Bagnall, 1921*a* : 287–288. Holotype ♀, RODRIGUES (BMNH) [examined]. **Syn. n.**
Neosmerinthothrips formosensis Priesner, 1935 : 368–370. LECTOTYPE ♀, TAIWAN (HP), here designated [examined]. **Syn. n.**
Neosmerinthothrips formosensis var. *karnyi* Priesner, 1935 : 369–370. LECTOTYPE ♀, JAVA (SMF), here designated [examined]. **Syn. n.**

The name *formosensis* var. *karnyi* has been used by Ananthakrishnan in several publications from Madras (e.g. 1973), but most of the specimens bearing that name from southern India are referred to here as *Neosmerinthothrips fructuum* Schmutz. These specimens have short postocellar setae, the mid and hind femora pale distally, and the tube broad at the base with convex sides. The single specimen listed below from India and bearing Ananthakrishnan's identification as *formosensis karnyi* has a pair of setae between the posterior ocelli 35 μm long, the hind femora yellow along the posterior border, and the tube relatively slender with straight sides.

Bagnall described this species on a single micropterous female from Japan, and Priesner described *formosensis* on two micropterous females from Taiwan (the only whole specimen is here designated lectotype). Bagnall's specimen is slightly larger and crushed but cannot otherwise be distinguished. The variety *karnyi* and the species *minor* were both described from macropterous females, which as is indicated in the key to species have a darker coloured head and median antennal segments. The males listed below from Hawaii are hemimacropterous, wing length 500 μm, and have a similar colour pattern to the macropterae. This also applies to the micropterous female from Mauritius listed below, although this specimen has rather long wing lobes, 125 μm. The Australian species *rhizophorae* is possibly only a local colour variant of *brevicollis*.

In the USNM collections there are three specimens taken in quarentine, apparently from Guam, which have the ocellar setae scarcely 15 μm long and arising just behind a line joining the hind margins of the posterior ocelli. Usually in *brevicollis* the ocellar setae are about 50 μm long and just anterior of a line joining the hind margins

of the posterior ocelli. Mound (1974) refers to similar variation in the position of the ocellar setae in *rhizophorae*.

SPECIMENS STUDIED.

Holotype ♀ of *brevicollis*, JAPAN: Okinawa, Luchu Is., v. 1913 (*J. E. A. Lewis*) (BMNH). Lectotype ♀ of *formosensis*, TAIWAN: Hookotoo, Makoo, 5.vi.1930 (*S. Minowa*) (HP), with a damaged ♀ paralectotype on the same slide. Lectotype ♀ (labelled holotype) of *formosensis* var. *karnyi*, JAVA: Tjibodas, 1400 m, 1923 (*Karny*) (SMF). Holotype ♀ of *minor*, RODRIGUES: vii–xi. 1918 (*H. J. Snell & H. P. Thomasset*) (BMNH).

MAURITIUS: De Pouce Mt, 1 ♀, 1 ♂ micropterae on leaves, 2.xi.1939 (*R. Mamet*) (HP). REUNION: St Louis, 1 ♀ macroptera on tobacco, 14.vii.1951 (*J. R. Williams*) (BMNH).

INDIA: Aryankavu, 1 ♀ macroptera on dry twig, 19.vii.1969 (*Ananthakrishnan*) (BMNH); Pachmarki, 1 ♀, 20.xi.1966 (*Ananthakrishnan*) (HP).

HAWAII: Pupukea, 8 ♀, 2 ♂ on *Leucaena*, 16.xii.1969; Barbers Point, 2 ♀, 6 ♂, sweeping and on *Desmanthus*, 16.xii.1969 (*F. Andre*) (BMNH).

Nesothrips carverae Mound

Nesothrips carveri Mound, 1974 : 71. Holotype ♀, AUSTRALIA: South Australia (ANIC) [examined].

The holotype of this species was collected at Adelaide, but the original description lists specimens from Western Australia, Victoria and the Australian Capital Territory. The nomen nudum 'Oedemothrips nigricans Bagnall' in Kelly & Mayne (1934 : 51) refers to this species. The most closely related species is *yanchepi* with which *carverae* has been collected in Western Australia near Perth.

SPECIMENS STUDIED.

AUSTRALIA: South Australia, Adelaide, holotype ♀ on washing, 15.x.1967 (*M. Carver*) (ANIC). A complete list of specimens is given in Mound (1974).

Nesothrips fodinae sp. n.

♀ macroptera. Head, thorax and abdomen dark brown, legs brownish yellow with the morphological upper surface of all femora deeply shaded at the base, coxae dark brown, tarsi yellow; antennal segments I–VI yellow, VII and VIII light brown; wings strongly shaded, particularly at base; major setae dark brown.

Head broader than long, weakly projecting in front of eyes, postocular setae acute; postocellar setae close to inner margin of each posterior ocellus; eyes prolonged on ventral surface. Antennal sensoria rather slender, two sense cones on III, four sense cones on IV; basal pedicel of segment VII broad. Pronotum with a weak median thickening; anterior setae reduced, posterior setae acute; fore femora moderately expanded. Metanotum apparently not sculptured medially, median setae slender and acute, 20 μm long. Pelta with broad lateral wings; tergal wing retaining setae reduced on II, sigmoid on III–VII; dorsal and lateral setae on tergite IX short; sides of tube almost straight.

MEASUREMENTS (holotype ♀ in μm). Body length 1850. Head, length 175; maximum width 210; basal width 175; postocular setae 50; postocellar setae 23. Pronotum, length 115; median width 230; major setae – aa, am, ml, 16, epim 58, pa 30–35. Fore wing, length 750; distal width 60; subbasal setae 35, 75, 90; number of duplicated cilia 9. Tergite VII setae, B_1 130; B_2 95. Tergite IX setae, B_1 55; B_2 52; B_3 70. Tube, length 135; basal width 70; apical width 32; terminal setae 110. Antennal segments length (paratype ♀), 27; 50; 67; 58; 55; 52; 36; 27.

♂ macroptera. Head and thorax brown, abdomen dark brown; legs yellow with small brown markings particularly at base of femora; otherwise similar to ♀. Fore femora strongly swollen, fore tibiae stout, fore tarsi with a stout tooth. Pronotum enlarged, anterior margin and median line strongly thickened; midlateral setae elongate. Metanotal setae 70 μm long.

MEASUREMENTS (paratype ♂ in μm). Body length 1800. Head, length 170; maximum width 187; postocular setae ?90. Pronotum, length 195; median width 250; major setae – am 20, aa 25, ml 100, epim ?80, pa ?60. Fore wing, length 650; subbasal setae 55, 100, 160; number of duplicated cilia 7. Tergite IX setae, B_1 70; B_2 60; B_3 120. Tube length 135.

SPECIMENS STUDIED.

Holotype ♀, FIJI: Lau, in [?palm leaf] mines of *Promecotheca reichei* (Hispidae), ii. 1932 (*R. W. Paine*) (BMNH).

Paratypes, 2 ♀, 4 ♂ collected with the holotype, also several immatures of first, second and fifth instar.

COMMENTS. This species is readily distinguished by the dark body with pale legs and antennae. *N. propinquus* is similar in head shape and form of the eyes, but has a different pelta and usually has a paler head and thorax. The males of *propinquus* are apterous. The males of *fodinae* are interesting not only because they are macropterous, but also because of the sexual dimorphism in the lengths of the setae on the head, thorax and wings. The postocellar setae vary from 23–30 μm but the series is too short to establish whether these also are subject to sexual dimorphism.

Nesothrips hemidiscus Mound

Nesothrips hemidiscus Mound, 1974 : 71–72. Holotype ♀, AUSTRALIA: Queensland (ANIC) [examined].

The D-shaped pelta of this species is unique in the genus.

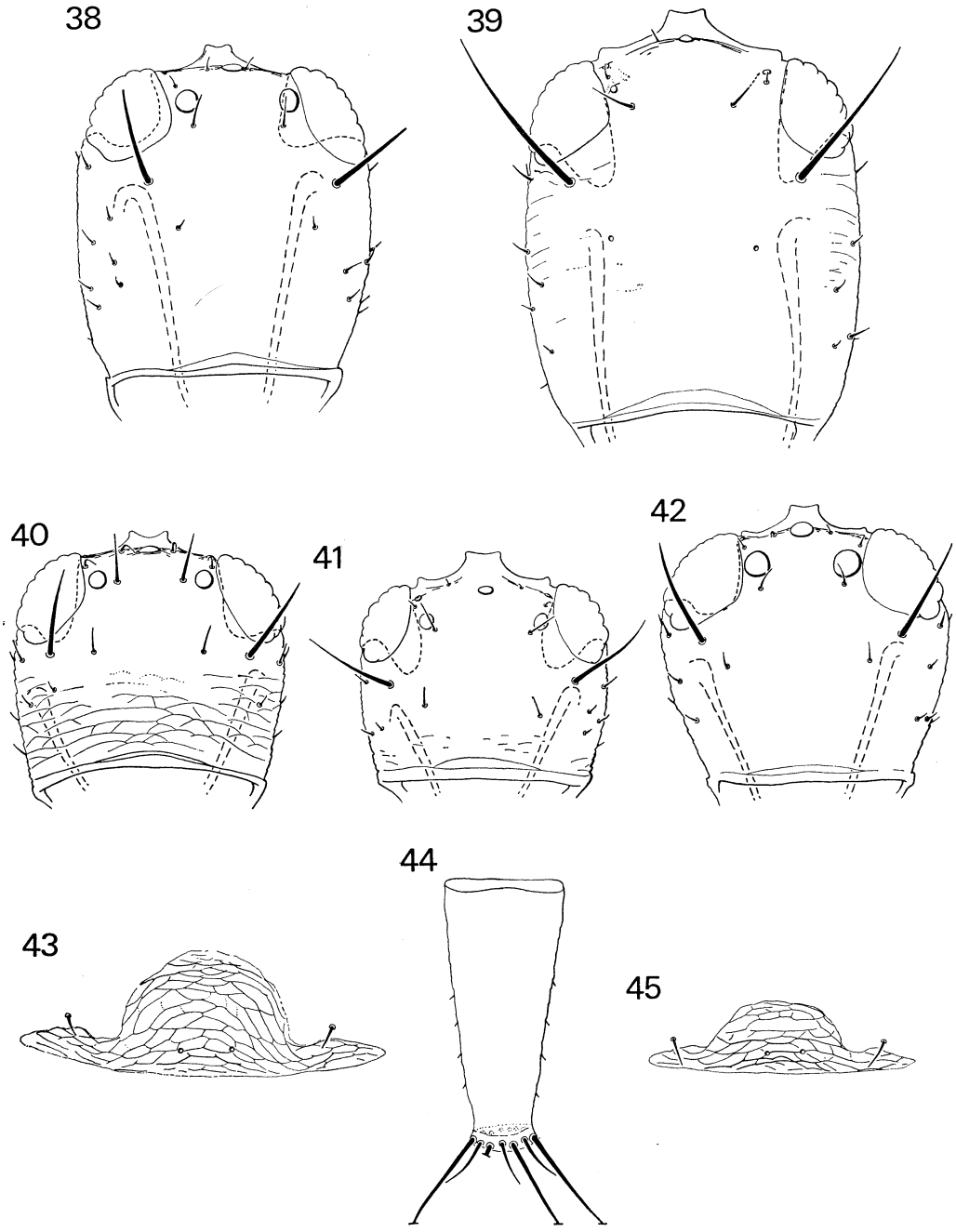
SPECIMENS STUDIED.

Holotype ♀ with 7 ♀, 2 ♂ paratypes, AUSTRALIA: Queensland, near Mareeba, on dead *Casuarina* twigs, 23.vii.1968 (*L. A. Mound*) (ANIC, BMNH).

Nesothrips malaccae sp. n.

(Text-fig. 42)

♀ macroptera. Body and legs dark brown, head and abdomen blackish, all femora yellow in distal third; antennal segments I and II yellow, III light brown with yellow pedicel, IV–VIII dark brown; major setae black; fore wings deeply shaded, particularly at base, with one longitudinal dark stripe.



FIGS 38–45. *Nesothrips* species: 38, *N. artocarpi*. 39, *N. niger*. 40, *N. brevicollis*. 41, *N. fodinae*. 42, *N. malaccae*. 43, *N. brevicollis*, pelta. 44, *N. brevicollis*, tube. 45, *N. fodinae*, pelta.

Head broadest behind eyes, cheeks rounded and narrowed to base with two pairs of fine setae; dorsal surface not sculptured; postocellar setae arise behind the posterior ocelli; postocular setae almost acute; maxillary stylets wide apart, retracted to postocular setae; eyes not prolonged on ventral surface. Antennae typical of genus, two sense cones on segment III, and four sense cones on IV; VIII not constricted at base. Pronotum transverse, epimeral sutures complete; anteromarginal setae slender and acute, remaining setae stout and bluntly acute. Metanotum with a pair of slender setae medially. Pelta with broad lateral wings; tergal wing retaining setae well developed on II–VII; lateral setae exceptionally long on VII; tube with straight sides.

MEASUREMENTS (holotype ♀ in μm). Body length 1900. Head, length 210; maximum width 215; basal width 150; postocellar setae ?20; postocular setae 80. Pronotum, length 105; median width 225; major setae – am 35, aa ?20, ml 35, epim 80, pa 50. Fore wing, length 760; distal width 70; subbasal setae 50, 80, 100; number of duplicated cilia 9. Tergite IV setae, B_1 100; B_2 55. Tergite VII setae B_1 175; B_2 210. Tergite IX setae, B_1 160; B_2 145; B_3 160. Tube, length 210; basal width 95; apical width 42; terminal setae 130. Antennal segments length, 30; 50; 68; 64; 58; 55; 39; 26.

SPECIMENS STUDIED.

Holotype ♀, WEST MALAYSIA: Kuala Lumpur, on dead branch, 29.xi.1969 (*R. G. & F. Andre*) (BMNH).

Paratypes. WEST MALAYSIA: 1 ♀ with data similar to holotype except 24.xii.1969 (BMNH). SUMATRA: Fort de Kock, 920 m, xi. 1920 (*Jacobson*) (SMF) [this paratype bears a manuscript name].

COMMENTS. This species appears to be related to *brevicollis* and *rhizophorae* but has the dorsal setae (B_1) on tergite nine elongate, and all the femora dark brown with a sharply yellow apex. The paratype female from Sumatra is larger than the two specimens from Malaya (body length 2400 μm), and was designated holotype of an unpublished name by Dr H. Priesner.

Nesothrips melinus Mound

Nesothrips melinus Mound, 1974: 72–73. Holotype ♂, AUSTRALIA: Queensland (ANIC) [examined].

This species was described from four males collected in northern Queensland, Australia, although a fifth male from southern New South Wales may represent the same species. These males are largely yellow, and in structure appear to be intermediate between *Nesothrips* and the *Carientothrips* species of the ***mjobergi*** complex.

SPECIMENS STUDIED.

Holotype ♀ with 3 ♂ paratypes, AUSTRALIA: Queensland, near Ingham, on dead twigs, 21.vii.1968 (*L. A. Mound*) (ANIC, BMNH).

Nesothrips niger (Moulton & Steinweden)

(Text-fig 39)

Bolothrips nigra Moulton & Steinweden, 1932 : 167–168. Holotype ♀, MARQUESAS IS. (BPBM) [examined].

This species is known only from the unique holotype which is mounted under a broken cover glass. Because of this its relationships cannot be determined at present. Contrary to the original description the lengths of the tube and B_1 setae on tergite nine are 260 μm and 210 μm.

SPECIMEN STUDIED.

Holotype ♀, MARQUESAS Is.: Hiva Oa, Mt Temetiu, 24.vii.1929 (*Adamson & Mumford*) (BPBM).

Nesothrips oahuensis Kirkaldy

(Text-fig. 31)

Nesothrips oahuensis Kirkaldy, 1907 : 103. Syntype ♀, HAWAIIAN Is.: Oahu (?BPBM) [not examined].

Oedemothrips laticeps Bagnall, 1910 : 680–681. Syntypes ♂, ♀, HAWAIIAN Is.: Oahu, Lanai (BMNH) [examined]. [Synonymized by Bianchi, 1944.]

Nesothrips hawaiiensis, lapsus for *oahuensis* Kirkaldy, Bianchi, 1944 : 31–38.

Bianchi studied a male and female specimen from Kirkaldy's original material and illustrated these. The present author has examined only two female and one oedymerous male syntypes of *laticeps*. The illustration given by Bianchi clearly refers to a rather small male with the fore femora weakly swollen. The male illustrated here has a greatly enlarged fore femur which is L-shaped as in *Rhaebothrips* species. Moreover the head is prolonged in front of the eyes and the ocellar setae are rather close together. The pelta of this specimen is very broad and slender.

SPECIMENS STUDIED.

1 ♂ syntype of *laticeps*, HAWAIIAN ISLANDS: Oahu, near Honolulu, 2000–3000 ft, vii. 1900 (*Perkins* 667); 1 ♀ syntype, HAWAIIAN ISLANDS: Lanai, 2000 ft, i. 1894 (*Perkins* 91); 1 ♀ syntype without data (*Perkins* 489) (BMNH).

Nesothrips propinquus (Bagnall)

Oedemothrips propinquus Bagnall, 1916 : 408–409. Holotype ♀, AUSTRALIA: Victoria (BMNH) [examined].

Cryptothrips dimidiatus Hood, 1918 : 145–146. Holotype ♀, AUSTRALIA: Queensland (USNM) [examined]. [Synonymized by Mound, 1968 : 141.]

Oedemothrips propinquus var. *breviceps* Bagnall, 1924 : 634–635. Syntype ♀, NEW ZEALAND (BMNH) [examined]. [Synonymized by Mound, 1968 : 141.]

Oedemothrips propinquus form *obscuricornis* Bagnall, 1924 : 635.

Bagnalliella cestosa Karny, 1920 : 41. Holotype ♀, AUSTRALIA: Queensland (NR) [examined]. [Synonymized by Mound, 1974 : 73.]

Neosmerinthothrips oleriae Moulton, 1949 : 492–494. Holotype ♀, SOUTH AFRICA (CAS) [not examined]. [Synonymized by Mound, 1968 : 141.]

Bolothrips similis Hartwig, 1948 : 103–108. Holotype ♀, SOUTH AFRICA: Pretoria [not examined]. **Syn. n.**

In addition to the above synonymy the nomen nudum 'Oedemothrips australis Bagnall' in Kelly & Mayne (1934 : 51) also refers to this species. The species is widespread and common in Australia and New Zealand, as well as in South Africa, and has been recorded from St Helena and New Caledonia. Material from all these localities is available in the BMNH collections, together with paratypes of *oleriae* and *similis*. In the USNM collections there are three females taken in quarantine at Boston apparently from the Azores and Portugal. Moreover in the BMNH collections there is one female apparently collected at Curitiba in southern Brazil, but this is the only Neotropical record and needs further confirmation.

Males and most females of *propinquus* are apterous but female macropterae are collected occasionally. The variation in head shape in Australia includes the form shown by *similis*, and the ventral prolongation of the eyes is not constant. In a few gynaecoid males the eyes are not elongate ventrally. The colour of the legs and antennae is also variable, and the form *obscuricornis* has the legs and antennae largely brown. The anterior setae of the pronotum also vary in length from 15 to 60 μm, but there is no evidence from all this variation that more than one species is involved. Populations from New Zealand appear to show the greatest degree of variation.

Nesothrips rhizophorae (Girault)

Cryptothrips rhizophorae Girault, 1927(38) : 2. Syntype ♀ ♂, AUSTRALIA: Queensland (QM) [examined].
Nesothrips rhizophorae (Girault) Mound, 1974 : 74–75.

This species is very similar to *brevicollis* (Bagnall) and may be merely a local colour variant with the basal antennal segments brownish instead of yellow.

SPECIMENS STUDIED.

AUSTRALIA: Queensland, Brisbane, 3 ♀, 1 ♂ syntypes from galls on mangrove, 28.vi.1927 (*L. Franzen*) (QM); Brisbane, Mt Nebo, 1 ♀ from shrubs, 27.vii.1968 (*L. A. Mound*) (BMNH).

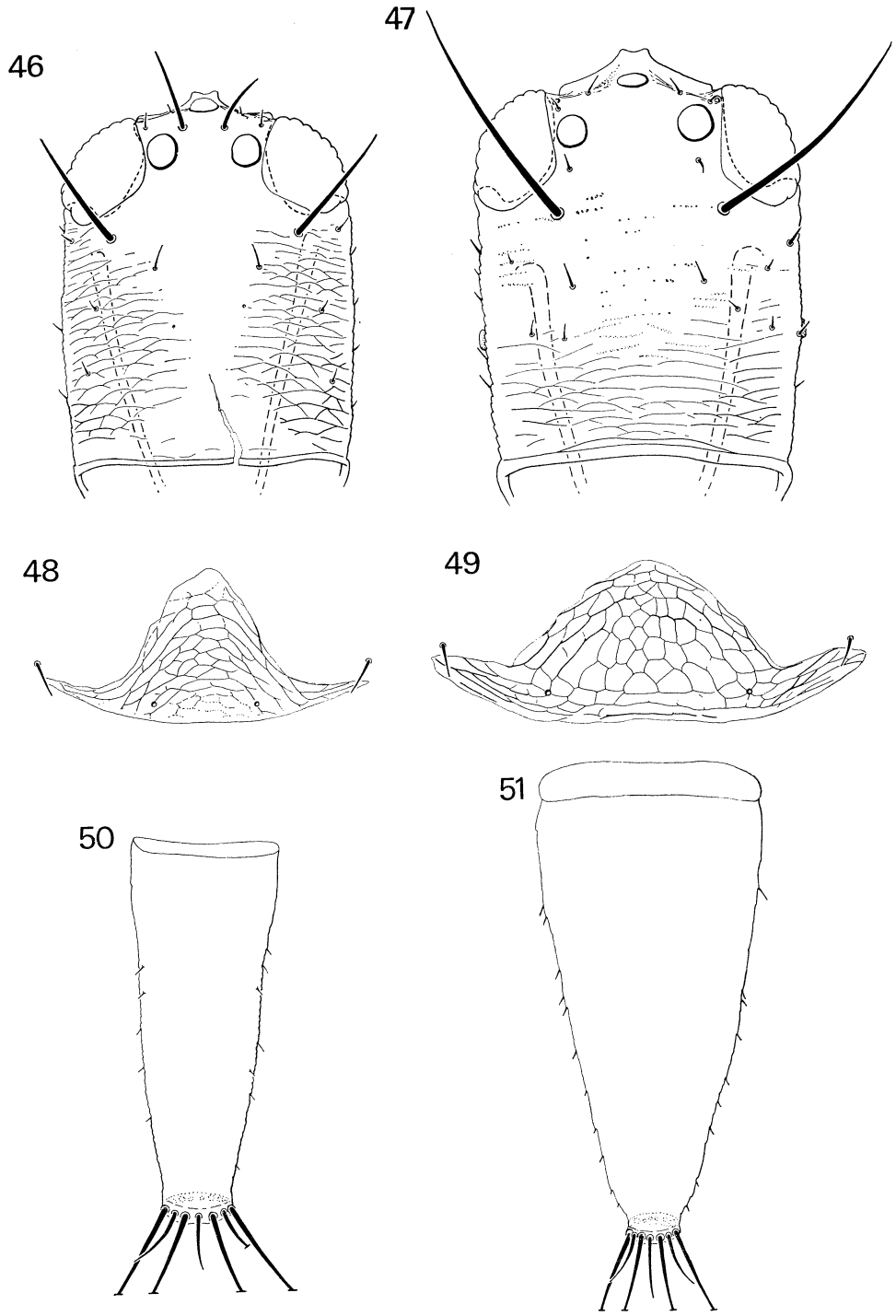
Nesothrips semiflavus (Moulton)

Bolothrips semiflavus Moulton, 1939 : 147–148. Holotype ♀, RAPA Is. (BPBM) [examined].

This species is known only from the unique holotype. It appears to be similar to *artocarpi* in having the head slightly longer than wide, but there are two pairs of long setae behind the eyes, the postoculars 110 μm and the mid-dorsals 70 μm long. The postocellar setae are also 70 μm long. The median setae on tergite nine are 155 μm and the tube 175 μm long. The major setae appear to be paler and more slender than in other species of *Nesothrips*.

SPECIMEN STUDIED.

Holotype ♀, RAPA ISLAND: Mt Tevaitahu at 700 ft, 8.vii.1935 (BPBM).



FIGS 46–51. 46, *Nesidiothrips alius*. 47, *Phacothrips ocelloides*. 48, *N. alius*, pelta. 49, *P. ocelloides*, pelta. 50, *N. alius*, tube. 51, *P. ocelloides*, tube.

Nesothrips yanchepi Mound

Nesothrips yanchepi Mound, 1974 : 75. Holotype ♀, AUSTRALIA: Western Australia (ANIC) [examined].

This species is similar to *niger* (Moulton & Steinweden) but has the eyes less prolonged ventrally and the setae on tergite nine shorter. It is also closely related to *carveri*.

SPECIMENS STUDIED.

Holotype ♀ with 1 ♀, 1 ♂ paratypes, AUSTRALIA: Western Australia, Yanchep near Perth, from sedges at lakeside, 29.ix.1967 (*L. A. Mound*) (ANIC, BMNH).

PHACOTHRIPS gen. n.

Type-species: *Gastrothrips ocelloides* Hood.

Medium sized, dark brown species of Idolothripinae, Cryptothripini. Head as in *Gastrothrips*, not projecting at anterior, eyes large, stylets wide apart, but with one large isolated ommatidium on each cheek midway between posterior margin of head and posterior margin of eye. Antennae with two sense cones on segment III, four sense cones on segment IV; segment VIII more than 0·6 times as long as VII but barely constricted at base. Fore tarsal tooth well developed in both sexes. Median metanotal setae small. Tube very stout, sides strongly convex, maximum width more than 0·5 times the total length, and about 5·0 times the minimum width, terminal setae very weak. Macropterous ♀ with no duplicated cilia; pelta triangular with slender lateral wings. Micropterous ♂ sometimes oedymerous with enlarged pronotum, pelta broadly triangular, metanotum and tergites with supernumerary setae.

This genus is possibly related to the *nigrisetis*-group of species from South America which is treated here under *Neosmerinthothrips*. It is distinguished from other Thysanoptera by the ommatidia on the cheeks and the heavy tube which resembles that of some *Pygothrips* species.

Phacothrips ocelloides (Hood) comb. n.

(Text-figs 47, 49, 51, 68)

Gastrothrips ocelloides Hood, 1950 : 9–12. Holotype ♀, BRAZIL (USNM) [not examined].

This species is here removed from *Gastrothrips* on account of the four sense cones on the fourth antennal segment, as well as the structure of the head and tube.

SPECIMENS STUDIED.

BRAZIL: Distrito Federal, Jacarepagua, 1 ♀, 1 ♂ paratype on dead branches, 14.v.1948 (*J. D. Hood*); São Paulo, Itanhaen, 1 ♀ paratype (sic) on dead branches, 17.vi.1948 (*J. D. Hood & J. Lane*) (AMG); Vicosa, on dead branches, 2 ♀, 1 ♂, vii. 1964, 5 ♀, 1 ♂, xi. 1964 (*F. Andre*) (BMNH).

RHAEBOTHRIPS Karny

Rhaebothrips Karny, 1913 : 128. Type-species: *R. lativentris* Karny, by monotypy.

A revision and diagnosis of this genus was published recently by Sakimura (1971). However, considerably more material is now available and *Rhaebothrips* is used here in a broader sense. Two species are described below which have a small fore tarsal tooth in the female and one of these, *leveri*, is unusually small with a short tube, similar to some *Nesothrips* species. The other species, *doulli*, is interesting because it is closely related to two further new species from New Zealand which do not have a fore tarsal tooth. One of these species is unique in the genus in having the eyes prolonged on the ventral surface of the head as in some *Nesothrips* species. The distinction between these two genera is tenuous and likely to become more so with further collecting in the Pacific area. *Rhaebothrips* species always have a stout pair of setae relatively close together between the posterior ocelli. They are usually larger than *Nesothrips* species with relatively longer antennae and tube.

KEY TO THE SPECIES OF *RHAEBOTHRIPS*

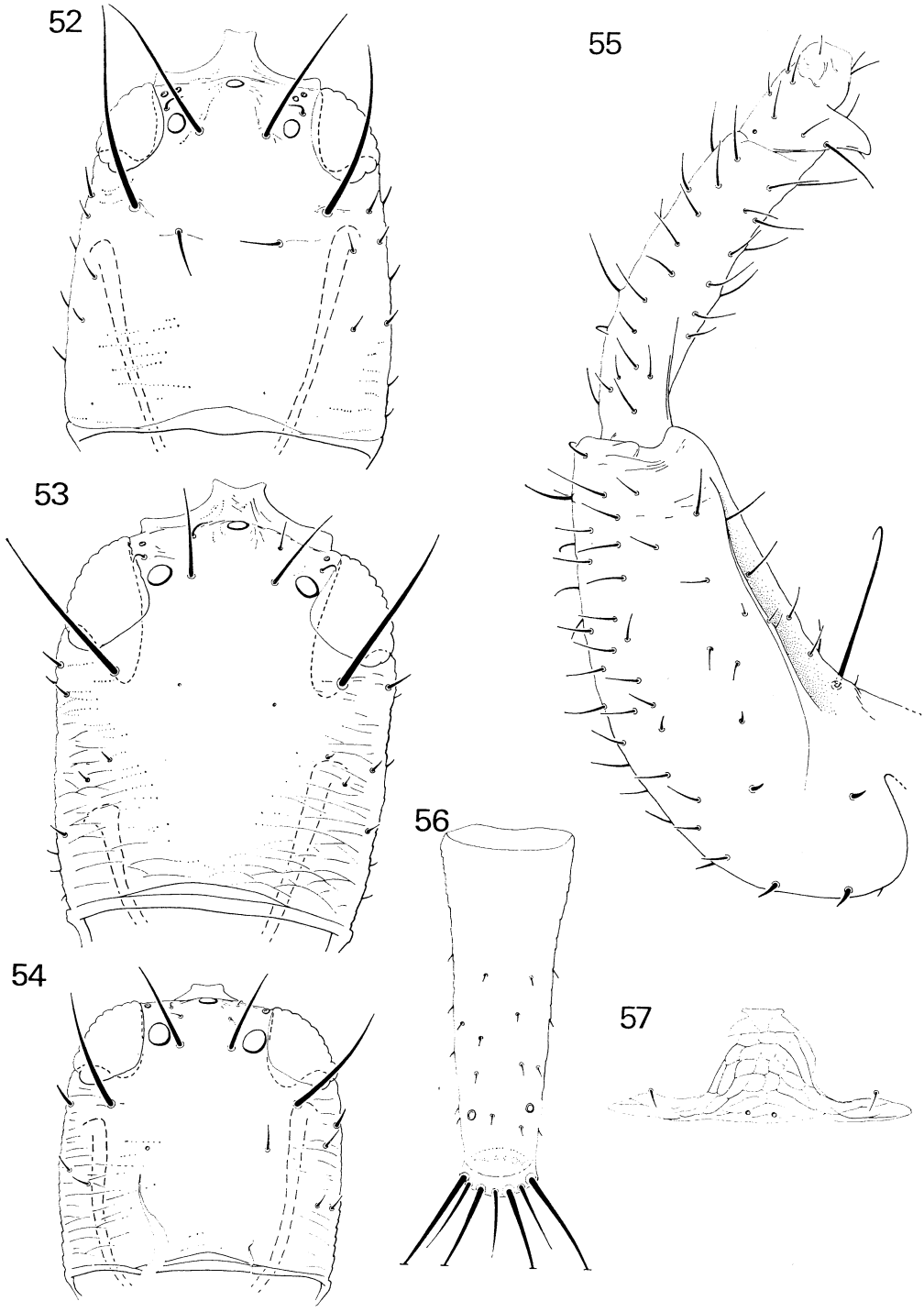
1 Antennal segment III largely yellow or yellowish brown; V paler at base . . 2
– Antennal segment III brown with pedicel pale; V uniformly dark brown . . 4
2 Fore tarsal tooth present in ♀; antennal segment III less than 2·0 times as long as wide (Text-fig. 74) [Fiji] . . . . . ***leveri*** (p. 175)
– Fore tarsal tooth absent in ♀; antennal segment III more than 3·5 times as long as wide 3
3 Lateral setae in abdominal segments III–VIII light brown to yellowish ***lativentris*** (p. 174)
– Lateral setae on abdominal segments III–VIII dark brown to black ***.nigrisetis*** (p. 175)
4 Setae B_1 on tergite IX more than 0·8 times as long as tube, sometimes longer than tube [Pacific Is.] . . . . . ***major*** (p. 175)
– Setae B_1 on tergite IX less than 0·6 times as long as tube [New Zealand] . . 5
5 Head 0·9–1·0 times as long as tube (Text-fig. 58); antennal segment III 2·1–2·2 times as long as wide (Text-fig. 72) . . . . . ***zondagi*** (p. 176)
– Head 1·2 times as long as tube, antennal segment III 2·4–2·5 times as long as wide (Text-figs 67, 71) 6
6 Fore tarsal tooth present in ♀ (only micropterae and hemimacropterae known); eyes not prolonged on ventral surface of head (Text-fig. 52) . . . ***doulli*** (p. 171)
– Fore tarsal tooth not present in ♀ (only macropterae known); eyes 1·4 times as long on ventral surface of head as on dorsal surface (Text-fig. 53) . . ***eastopi*** (p. 173)

***Rhaebothrips doulli* sp. n.**

(Text-figs 52, 55, 67)

♀ microptera. Colour dark brown with red internal pigment; tarsi and fore tibiae a little paler; antennae dark brown except for yellow pedicel of segment III; fore wing rudiment pale; major setae not very dark, with finely acute apices.

Head longer than wide, cheeks rounded, eyes rather small; ocellar setae arising between posterior ocelli, median setae on vertex sometimes elongate; maxillary stylets retracted to postocular setae; antennae similar in structure to *eastopi*. Pronotum with median thickening



FIGS 52–57. *Rhaeobothrips* species: 52, *R. doulli*, male. 53, *R. eastopi*. 54, *R. leveri*. 55, *R. doulli*, fore leg of male. 56, *R. eastopi*, tube. 57, *R. leveri*, pelta.

developed, epimeral sutures complete; metanotum not sculptured, median setae 50 μm long and 120 μm apart. Fore femur simple, fore tarsus with a small pointed tooth at apex of inner margin about one-third as long as tarsal width. Fore wing lobes with a few cilia. Pelta broad with small lateral wings; tube with straight sides but slightly constricted near apex.

MEASUREMENTS (holotype ♀ in μm). Body length 2900. Head length 310; median width 260, ocellar setae 100 long, bases 55 apart; post ocular setae 145; mid dorsal setae 85 (35 in ♀ paratype). Pronotum, length 175; median width 370; major setae – am 50, aa 50, ml 80–85, epim 120, pa 100–120. Fore wing, length 450; subbasal seta 140. Tergite IV setae, B_1 175, B_2 100. Tergite VII setae, B_1 240; B_2 280. Tergite IX setae, B_1 145, B_2 150, B_3 240. Tube, length 260; basal and apical width, 100, 58; terminal setae 195. Antennal segments length, 50, 70, 105; 100; 85; 77; 55; 40.

♂ microptera. Colour similar to ♀ (2 ♂ paratypes teneral). Pronotum strongly thickened medially and along anterior border; fore femur enlarged L-shaped; fore tarsal tooth curved, almost as long as tarsal width; major setae of head and pronotum longer than in ♀.

MEASUREMENTS (paratype ♂ in μm). Body length 2400. Head length 290; ocellar setae 100; postocular setae 160, mid-dorsal seta 50. Pronotum, length 225; median width 350; major setae – am 50, aa 65, ml 145, epim 160, pa 145. Fore wing, length 400; subbasal setae 145, 230. Tube length 225.

SPECIMENS STUDIED.

Holotype ♀, NEW ZEALAND: Christchurch, on dead walnut twig, 1951 (*K. M. Doull*) (BMNH).

Paratypes. NEW ZEALAND: 1 ♀, 4 ♂ collected with holotype (BMNH) (1 ♂ deposited in DSIR); 1 ♀, 1 ♂ on *Cytisus* bark, Cave [100 miles south-west of Christchurch], 9.vii.1969 (*R. Zondag*) (NZFI).

COMMENTS. This species is closely related to *eastopi* described below which unfortunately is known only from a different morph. The third antennal segment of these two species differs from *lativentris* and *major* in being slightly swollen in the basal third. The female paratype from Cave has fore wings 950 μm long and a rather stouter fore tarsal tooth than the micropterae, but the male with which it was collected cannot be distinguished from the other male paratypes.

***Rhaebothrips eastopi* sp. n.**

(Text-figs 53, 56, 71)

♀ macroptera. Colour dark brown, fore tarsi yellowish, fore tibiae light brown; antennae brown to dark brown, III slightly lighter with pedical yellow; fore wings very weakly shaded; major setae light brown and finely acute.

Head longer than wide; ocellar setae arising between posterior ocelli, maxillary stylets not retracted to postocular setae, eyes prolonged and narrowed on ventral surface; antennal segment III slightly swollen in basal third, VII with a distinct pedicel, two sense cones on III, four on IV. Pronotum smooth, median thickening not developed, epimeral sutures complete; metanotum weakly reticulate medially, setae 65 μm long. Fore tarsus angulate on inner surface but without a tooth; fore wing narrow (?partially reduced). Pelta with lateral wings extending almost to lateral margins of tergite II; tube with almost straight margins.

MEASUREMENTS (holotype ♀ in μm). Body length 2800. Head length 320; median width 255; ocellar setae 65 long, bases 62 apart; postocular setae 135. Pronotum, length 195; median width 310; major setae – am 35, aa 25, ml 50, epim 100–110; pa 95–100. Fore wing, length 950; distal width 80; subbasal setae 50, 50; number of duplicated cilia 3–4. Tergite

IV setae, B_1 145; B_2 80. Tergite VII setae, B_1 245; B_2 225. Tergite IX setae, B_1 145; B_2 130; B_3 225. Tube, length 260; basal and apical width 100, 52; terminal setae 195. Antennal segments length, 50, 65, 100, 115, 100, 70, 56, 45.

SPECIMEN STUDIED.

Holotype ♀, NEW ZEALAND: South Island, 15 miles S.E. of Greymouth, Moana Kotula, from *Uncinia* and *Juncus*, 12.ix.1972 (*V. F. Eastop*) (BMNH).

COMMENTS. The unique holotype is possibly not fully macropterous. The antennae, particularly segment three, are similar to *doulli* described above, but that species has a distinct fore tarsal tooth in the female and the eyes are not prolonged ventrally.

Rhaebothrips lativentris Karny

Rhaebothrips lativentris Karny, 1913 : 129–130. Holotype ♂, TAIWAN (? lost) [not examined].
Cryptothrips claripennis Hood, 1919 : 90. Holotype ♀, AUSTRALIA: Queensland (USNM) [examined]. [Synonymized by Mound, 1974 : 91.]
Cryptothrips seychellensis Bagnall, 1921 : 274–276. Lectotype ♂, SEYCHELLES (BMNH) [examined]. **Syn. n.**
Cryptothrips difficilis Bagnall, 1921 : 276. Holotype ♀, SEYCHELLES (BMNH) [examined]. **Syn. n.**
Machatothrips ipomoeae Ishida, 1932 : 12–14. Holotype ♀, PONAPE (Hokkaido Univ.) [not examined]. [Synonymized by Kurosawa, 1968 : 60.]
Cryptothrips magnus Moulton, 1928*a* : 299. Holotype ♀, TAIWAN (CAS) [not examined]. [Synonymized by Sakimura, 1972 : 668.]
Gynaikothrips yuasai Moulton, 1928*b* : 315. Holotype ♀, TAIWAN (CAS) [not examined] [Synonymized by Sakimura, 1972 : 668]
Rhaebothrips fuscus Moulton, 1942 : 15–16. Holotype ♀, GUAM (BPBM) [not examined]. [Synonymized by Sakimura, 1971 : 393.]
Bolothrips australiensis Moulton, 1968 : 118–119. Holotype ♀, LORD HOWE ISLAND (CAS) [examined]. [Synonymized by Mound, 1974 : 91.]

This remarkable synonymy is a reflection partly of the variation in structure of *lativentris*, but more particularly of the low standard of preparation of most of the microscope slides on which these nominal species were based. Sakimura (1971) has given an account of the variation of the species, and moreover distinguished a new species, *nigrisetis* from Fiji and New Guinea. However, in the opinion of the present author, *lativentris* is native to – and has its centre of diversity in – the western Pacific. Individuals with black setae which correspond to the description of *nigrisetis* have been studied from the Solomon Islands and the New Hebrides, and also from Fiji where they were collected together with normal *lativentris*. It seems unlikely that two species are involved in this pattern of variation although the names are retained separate for the present.

There are specimens of *lativentris* in the BMNH collection from Samoa, Hawaii, Guam, Solomon Islands, New Guinea, Queensland, Malaya, Seychelles, Jamaica, Cayman Islands and Trinidad. Sakimura (1971 ; 1972) also lists southern Japan, Taiwan, Philippines, Java, Mauritius, Puerto Rico. Cuba, Dominican Republic, Panama, Bahama and Florida.

***Rhaebothrips leveri* sp. n.**

(Text-figs 54, 57, 74)

♀ macroptera. Colour dark brown, tarsi yellow, fore tibiae with yellow markings; antennal segments I and VI–VIII brown, II yellow at apex, III and IV yellow but light brown distally, V brown with a yellow pedical; fore wing shaded; major setae dark brown.

Head longer than wide; ocellar setae arising on line joining posterior margins of posterior ocelli; postocular setae acute; maxillary stylets retracted to postocular setae; antennal segments VI–VIII compact, two sense cones on III, four on IV. Pronotum transverse, median thickening slender; epimeral sutures just complete; epimeral setae bluntly acute. Metanotum not sculptured medially, setae 30 μm. Fore tarsal tooth acute but less than half as long as tarsal width. Pelta with slender lateral wings; tergal lateral setae not long, blunt at apex; sides of tube straight.

MEASUREMENTS (holotype ♀ in μm). Body length 1850. Head length 220; width 210; postocellar setae 60; postocular setae 90. Pronotum, length 105; median width 260; major setae – am 35, aa 35, ml 58, epim 80–85, pa 50–60. Fore wing, length 750; distal width 65; subbasal setae 40, 58, 58; number of duplicated cilia 5–6. Tergite IV setae B_1 80; B_2 65. Tergite VII setae, B_1 135; B_2 100. Tergite IX setae, B_1 115; B_2 125, B_3 135. Tube, length 145; width at base 80, at apex 42; terminal setae 135. Antennal segments length, 26, 50, 60; 50; 42; 45; 35; 20.

SPECIMEN STUDIED.

Holotype ♀, FIJI: Viti Levu, Vatuwaga, 12.vii.1941 (*R. A. Lever*) (BMNH).

COMMENTS. This species could equally well be placed in *Nesothrips*. It is here described in *Rhaebothrips* partly because it is more closely related to *lativentris* than to *N. oahuensis*, and partly because the only other related species with a fore tarsal tooth is *R. doulli* from New Zealand.

***Rhaebothrips major* Bagnall**

Rhaebothrips major Bagnall 1928 : 75–76. ?Holotype ♂, SAMOA (?lost) [not examined].

The (?unique) holotype male, not female as stated in the original description, should be in Bagnall's collection at the BMNH but cannot be found (Mound, 1968). Sakimura (1972) has given a redescription of *major* from specimens collected in Samoa, and there is one macropterous male in the BMNH collections from the Solomon Islands apparently of this species.

***Rhaebothrips nigrisetis* Sakimura**

Rhaebothrips nigrisetis Sakimura, 1972 : 400–402. Holotype ♂, FIJI (BPBM) [not examined.]

Sakimura described this species from nearly eighty specimens collected in Fiji and one male from New Guinea. As mentioned above there are specimens apparently of *nigrisetis* in the BMNH collection from New Hebrides, the Solomon Islands and New Guinea, as well as some from Fiji which were collected with *lativentris*, and it is doubtful if these two species are really distinct. The *Rhaebothrips* specimens from New Guinea are particularly difficult. Specimens in one series in the

BMNH collected on various dates at Bulolo in S.E. New Guinea are similar to *nigrisetis* but with the antennae darker. Another series in the BPBM from N.W. New Guinea (Irian Barat) near Nabire and Lake Wissel have black setae but are much larger than any other *Rhaebothrips* which have been studied.

***Rhaebothrips zondagi* sp. n.**

(Text-figs 58, 72)

♀ macroptera. Colour brown, head and tube darkest; fore tarsi little paler than femora; antennae dark brown, pedicel of segment III yellow; fore wing uniformly shaded dark brown; major setae brown but not very dark, with finely acute apices.

FIG. 58. *Rhaebothrips zondagi*, male.

Head longer than wide, ocellar setae between posterior ocelli; maxillary stylets not retracted to postocular setae; antennae relatively short but similar to those of *eastopi*. Pronotum with weak median thickening; epimeral sutures complete; median area of metanotum not sculptured, setae 50–60 μm long and 50 μm apart. Fore femur simple, fore tarsus with no tooth; fore wing relatively broad. Lateral wings of pelta not extending fully across anterior margin of tergite II; sigmoid setae well developed on II–VII; tube with straight sides.

MEASUREMENTS (holotype ♀ in μm). Body length 2450. Head, length 260; median width 225; ocellar setae 70, bases 35 apart; postocular setae 100. Pronotum, length 160; median width 275; major setae – am 35, aa 20, md 50, epim 90, pa 100. Fore wing, length 1100; distal width 115; subbasal setae 65, 100, 115, number of duplicated cilia 12. Tergite IV setae, B_1 125, B_2 80. Tergite VII setae, B_1 220, B_2 195. Tergite IX setae, B_1 120; B_2 145; B_3 195. Tube, length 275; basal and apical width 95, 50; terminal setae 160. Antennal segments length, 40, 65, 90, 80, 70, 65, 50, 35.

♂ macroptera. Colour and structure similar to ♀; frequently oedymerous with fore femora enlarged and L-shaped, and fore tarsus with a stout tooth equal in length to tarsal width; major setae of head and pronotum longer than in ♀; fore wing relatively small.

MEASUREMENTS (paratype ♂ in μm). Body length 2300. Head, length 260; median width 210; ocellar setae 90; post ocular setae 135; mid dorsal setae 50–65. Pronotum, length 195; median width 320; major setae – am 55, aa 30, ml 115, epim 100, pa 135. Fore wing, length 900; distal width 85; number of duplicated cilia 8; sub-basal setae 115, 160. Tergite IX setae, B_1 100; B_2 95; B_3 225. Tube length 255.

SPECIMENS STUDIED.

Holotype ♀, NEW ZEALAND: South Island, Hochstetter State Forest 25 miles east of Greymouth, on *Phyllocladus alpinus* branches, 13.iii.1970 (*W. A. Holloway*) (DSIR).

Paratypes. NEW ZEALAND: 13 ♀, 8 ♂ collected with the holotype; 2 ♀ North Island, Mangawiri Basin, Whiriaki (Urewera), 40 miles south-west of Rotorua, on *Podocarpus totara* twigs, 13.iv.1972 (*P. J. Alma*) (DSIR, NZFI, BMNH).

COMMENTS. This species is related to the other two species described above from New Zealand in having short setae on tergite nine. The antennae are shorter than any other species of *Rhaebothrips*, apart from the aberrant *leveri* from Fiji, but the tube is longer than any species of *Nesothrips* with which it might be confused.

SCOTOTHRIPS Priesner

Scotothrips Priesner, 1939 : 75. Type-species: *Adiaphorothrips elephas* Karny, by original designation.

The synonymy of this genus and its relationships to *Dichaetothrips* have been discussed recently by Mound (1974). *Scotothrips* species are found mainly in the Pacific, Indonesian and Australian regions, and the Brazilian species *firmus* listed below is not typical of the group.

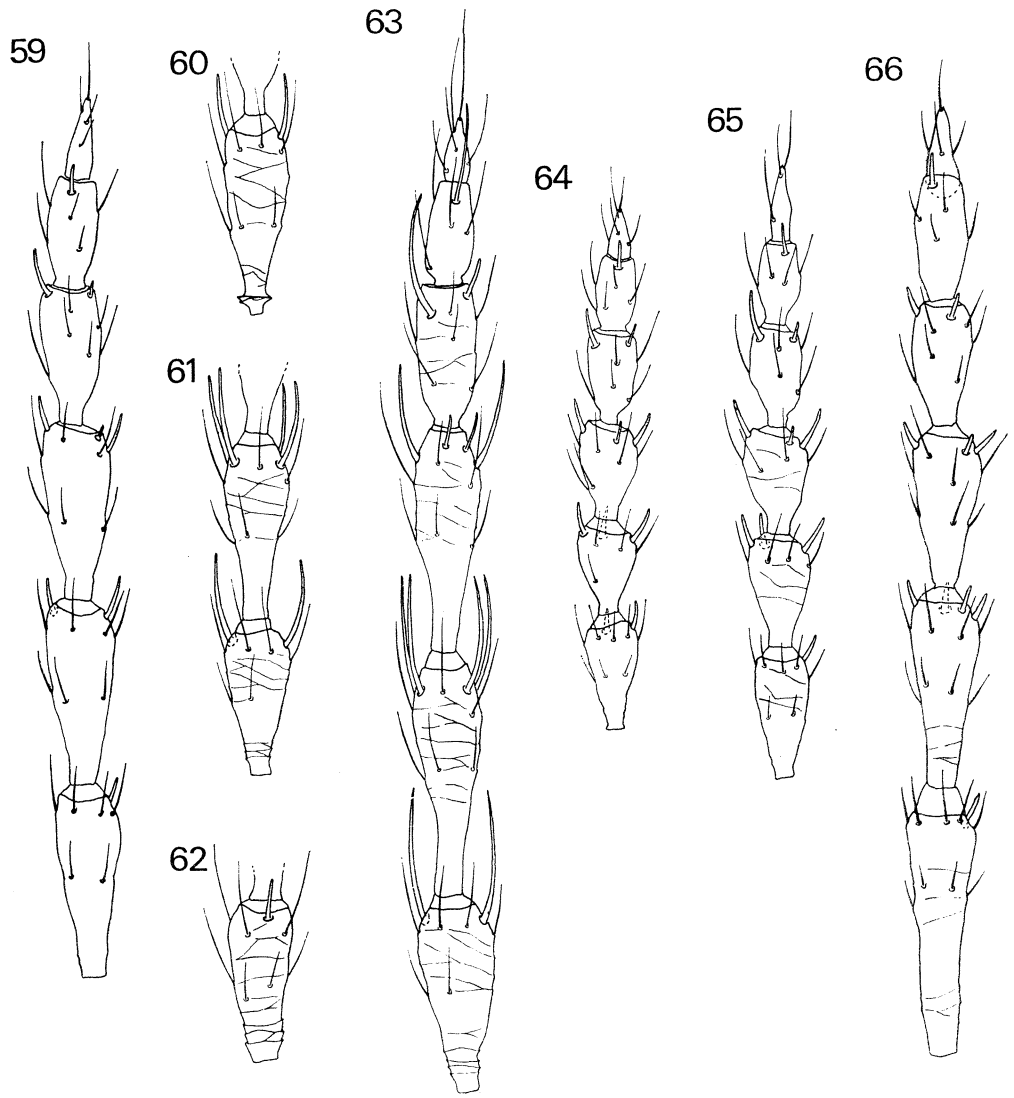
Scotothrips claripennis (Moulton) **comb. n.**

Dichaetothrips claripennis Moulton, 1934 : 503. Holotype ♀, HAWAII (CAS) [not examined].
Gastrothrips trinidadensis Hood, 1935 : 168–170. Holotype ♀, TRINIDAD (USNM) [not examined]. **Syn. n.**

Nesothrips indicus Ananthakrishnan, 1968 : 967–969. Syntypes ♂ ♀, INDIA: Madras (TNA) [not examined]. **Syn. n.**

Nesothrips diversus Ananthakrishnan, 1972 : 434–436. Holotype ♀, INDIA: Madras (TNA) [not examined]. **Syn. n.**

This species was based on a single female collected in Honolulu. This specimen has not been studied, but the above synonymy is based on a female from Honolulu determined as *claripennis* by Bianchi. This species does not belong in *Nesothrips*



FIGS 59–66. Right antennae (III–VIII unless stated otherwise): 59, *Bolothrips italicus*. 60, *Carientothrips acti*, III. 61, *C. fijiensis*, III–IV. 62, *C. japonicus*, III lateral. 63, *C. grayi*. 64, *Gastrothrips falcatus*. 65, *G. ruficauda*. 66, *Diceratothrips validipennis*.

because of the presence of a fore tarsal tooth in the female, nor in *Gastrothrips* because of the four sense cones on the fourth antennal segment. The elongate straight-sided tube is typical of the *Scotothrips*/*Dichaetothrips* complex, and because the postocellar setae are short *claripennis* is here placed in *Scotothrips*.

The vertex of this species is narrowed in dorsal view but is very deep. This shape is very susceptible to distortion in mounting, and the *claripennis* and *indicus* specimens which have been studied have the head apparently rather broad at the base. The specimens described as *diversus* are here regarded as small pale forms of the larger species. The most constant characteristic in all this material is the presence of a pair of pores on the metanotum anterolateral to the metanotal setae. The colour of antennal segments three and four is variable, although three is usually yellow with a shaded apex and four is usually light brown. The mid and hind tarsi are usually yellow but sometimes light brown. In the BMNH collections there are several specimens of *Dichaetothrips usitatus* Ananthakrishnan & Jagadish, 1970 (*Dichaetothrips indicus* Ananthakrishnan, 1961) which had been misidentified as *Nesothrips indicus* Ananthakrishnan, 1968 despite the presence of very long postocellar setae. One of the male paratypes of *diversus* is also a misidentification of *usitatus*. The species *claripennis* has probably been transported around the tropics by man.

SPECIMENS STUDIED.

HAWAIIAN ISLANDS: Oahu, Honolulu, Mckinkey High, 1 ♀ in Monkey Pod, iv. 1946 (*F. A. Bianchi*) (BMNH).

MEXICO: 3 ♀, 2 ♂ on *Cocos nucifera* seed, in quarantine at US (USNM). BAHAMAS: 1 ♀ on *Cocos nucifera* seed, 1 ♀ on *Poinciana regia* pod, in U.S. quarantine (USNM). JAMAICA: Caenwood, 1 ♀, vi. 1970 (*K. Heinze*) (BMNH); 1 ♀, 2 ♂ on *Cocos nucifera* fls, 1 ♀ on *Delonix regia* pod, in U.S. quarantine (USNM); TRINIDAD: St Clair, 1 ♀ paratype of *trinidadensis* in hole in dead bamboo, 13.i.1917 (*C. B. Williams*) (AMG).

MOZAMBIQUE: Lourenço Marques, 1 ♀ in *Cassia* pods, vii. 1936 (*J. C. Faure*) (AMG); SOUTH AFRICA: Natal, Winterskloof, 2 ♀, 1 ♂ in *Cassia* pods, vii. 1942 (*F. Casalis*) (AMG).

INDIA: Madras, 1 ♀, 2 ♂, determined as *indicus*, ii. 1966, 1 ♀ paratype of *diversus*, xii. 1970 (*T. N. Ananthakrishnan*) (BMNH).

Scotothrips firmus (Hood) **comb. n.**

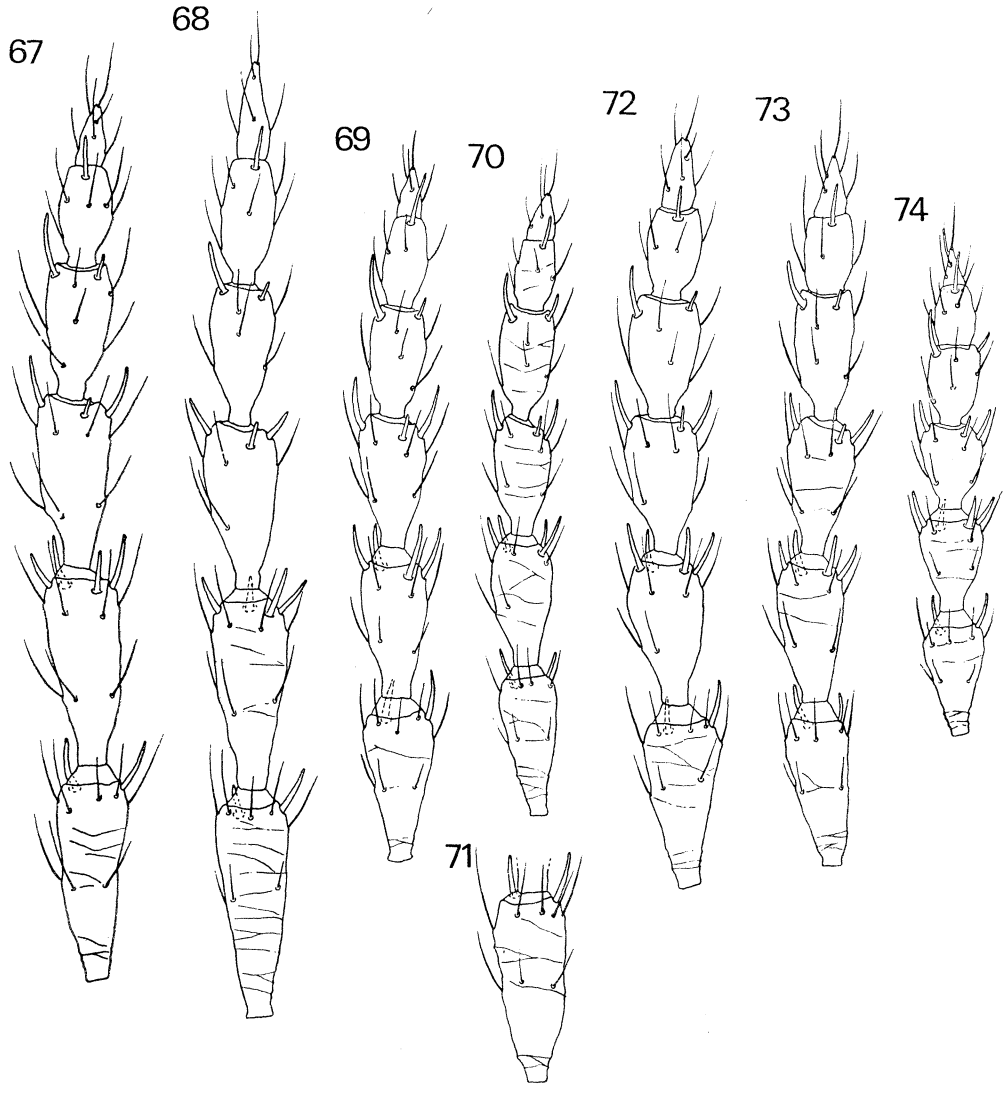
Gastrothrips firmus Hood, 1952 : 162. LECTOTYPE ♀, BRAZIL (USNM), here designated [not examined].

The head of this species is unusual in *Scotothrips* as the cheeks are constricted near, but not at, the base, and the eyes are slightly swollen at their posterior margin. The fore tarsus bears a small tooth in the female, the pronotum is thickened medially and at the anterior margin, the median metanotal setae are small and slender, the pelta broadly triangular with the median pores close together, and the tube is long with straight sides. The specimen here designated as lectotype has not been studied

but is that specimen which was labelled holotype by Hood but not referred to in his text. The lectotype bears identical data to the paratype listed below and has been given the following number: USNM Type Number 71995.

SPECIMEN STUDIED.

BRAZIL: São Paulo, Itanhaen, 1 ♀ paratype on dead branches, 17.vi.1948 (*J. D. Hood & J. Lane*) (AMG).



FIGS 67–74. Right antennae (III–VIII unless stated otherwise): 67, *Rhaebothrips doulli*. 68, *Phacothrips ocelloides*. 69, *Nesidiothrips alius*. 70, *Neosmerinthothrips fructuum*. 71, *Rhaebothrips eastopi*, III. 72, *R. zondagi*. 73, *Neosmerinthothrips variipes*. 74, *Rhaebothrips leveri*.

SYNCEROTHRIPS Hood **gen. rev.**

Syncerothrips Hood, 1935 : 191–192. Type-species: *S. harti* Hood, by monotypy.

Stannard (1957) synonymised this genus with *Nesothrips* on the grounds that the last two antennal segments of the type-species of *Neosmerinthothrips* were more or less closely joined. However, *Syncerothrips* is closely related to the South American species of *Gastrothrips*. There are three sense cones on the fourth antennal segment and two on the third, the median metanotal setae are very stout, and the pelta triangular. The only species in the genus differs from *Gastrothrips* species in having the last two antennal segments fused with only a partial suture on the ventral surface. The fore tarsus does not bear a tooth in the female, and the postocellar setae are long.

Syncerothrips harti Hood

Syncerothrips harti Hood, 1935 : 192–194. Holotype ♀, U.S.A.: Texas (USNM) [not examined].

This species was based on a single female, but the specimen listed below was taken at the type-locality and identified by Hood.

SPECIMEN STUDIED.

U.S.A.: Texas, Brownsville, 1 ♀ microptera on dead branches, 2.iii.1939 (*J. D. Hood*) (USNM).

SPECIES REMOVED FROM THE *NESOTHRIPS* COMPLEX

The following three species were described in genera related to *Nesothrips*, but they are not even members of the subfamily Idolothripinae in its strict sense. Species of the genus *Adelothrips* have moderately broad maxillary stylets and probably feed on fungus spores, but in view of the structure of the male abdomen it is likely that this genus is derived from *Hoplothrips*-like members of the Phlaeothripinae (Mound, 1974).

Adelothrips lativerticis (Post) **comb. n.**

Bolothrips lativerticis Post, 1961 : 140–143. Holotype ♀, U.S.A.: Oregon (CAS) [examined].

The original illustration of this species shows five sense cones on the third antennal segment and six on the fourth, although the description gives the actual number correctly as three and four. There are two pairs of wing retaining setae on each tergite, unlike any member of the Cryptothripini discussed in this paper. Moreover the males of *lativerticis*, like other members of *Adelothrips*, have setae B_2 on tergite nine short and stout, and sternites six and seven have glandular areas. This species is a typical member of *Adelothrips* because of the number of antennal sensoria, the fusion of the last two antennal segments, the position of the maxillary stylets close together in the middle of the head, the bell-shaped pelta, and the abdominal structure detailed above.

SPECIMENS STUDIED.

Holotype ♀, U.S.A.: Oregon, Hood River County, Herman Creek, in hollow twigs, 31.i.1946 (*R. L. Post*) (CAS).

U.S.A.: Oregon, Benton County, Corvallis, paratype ♀, 23.iii.1946 (*Leah & Post*) (R. L. Post coll. North Dakota); Washington, Puyallup, 3 ♀, 2 ♂ in dead willow, 20.iv.1937 (*B. Baker*) (BMNH).

Adelothrips speciosissimus (Karny)

Nesothrips speciosissimus Karny, 1920 : 42. Holotype ♂, AUSTRALIA: Queensland (NR) [examined].
Adelothrips speciosissimus (Karny) Mound, 1974 : 16.

This species may not be native to Australia as the most closely related species appears to be *skwarrae* Priesner from Mexico. The male has setae B_2 on tergite nine short, and sternites six and seven have reticulate glandular areas.

SPECIMENS STUDIED.

Holotype ♂, AUSTRALIA: Queensland, Cedar Creek, March (*Mjoberg*) (NR).

AUSTRALIA: Queensland, Clump Point, Mission Beach, 2 ♀ on dead branches, 21.vii.1968 (*L. A. Mound* 764) (BMNH).

Liothrips debilis (Hood) **comb. n.**

Neosmerinthothrips (?) *debilis* Hood, 1936 : 269–271. Holotype ♂, PANAMA (USNM) [examined].

This species was described from a single male with stout maxillary guides but with slender maxillary stylets. It is a member of the subfamily Phlaeothripinae despite the fact that all three pairs of major setae on tergite nine are elongate, a characteristic shared with several South American species in the genus *Liothrips*. The genus is widespread in the tropics and the species feed on the leaves of green plants.

SPECIMEN STUDIED.

Holotype ♂, PANAMA: Frijoles, on *Panicum maximum*, 23.vii.1933 (*P. C. Standley*) (USNM).

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Synonyms and invalid names are in *italics*.

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