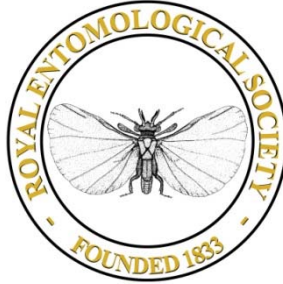


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Handbooks for the Identification of British Insects
Vol. I, Part 11

THYSANOPTERA

L. A. Mound, G. D. Morison,
B. R. Pitkin & J. M. Palmer



ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

THYSANOPTERA

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HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS

World List abbreviation: *Handbk Ident. Br. Insects*

The aim of this series is to provide illustrated keys to the insects of Britain, together with concise morphological, bionomic and distributional information. Each handbook should serve both as an introduction to a particular group of insects and as an identification manual.

Eleven volumes are planned, each of which will be issued in separately paginated parts as manuscripts become available.

The proposed volumes are:

- | | |
|---------------------------------|-----------------------|
| I. Part 1. General introduction | Part 9. Ephemeroptera |
| 2. Thysanura | 10. Odonata |
| 3. Protura | 11. Thysanoptera |
| 4. Collembola | 12. Neuroptera |
| 5. Dermaptera and Orthoptera | 13. Mecoptera |
| 6. Plecoptera | 14. Trichoptera |
| 7. Psocoptera | 15. Strepsiptera |
| 8. Anoplura | 16. Siphonaptera |
- II. Hemiptera
- III. Lepidoptera
- IV. and V. Coleoptera
- VI. Hymenoptera: Symphyta and Aculeata
- VII. Hymenoptera: Ichneumonoidea
- VIII. Hymenoptera: Cynipoidea, Chalcidoidea, Proctotrupoidea and Ceraphronoidea
- IX. Diptera: Nematocera and Brachycera
- X. Diptera: Cyclorrhapha
- XI. Check List of British Insects

A list of published parts appears at the end of this handbook

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THYSANOPTERA

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PREFACE

This handbook is based on a study of the 20,000 slide-mounted specimens from Britain which are deposited in the British Museum (Natural History). Included in this material are the important collections of R. S. Bagnall, G. D. Morison and E. R. Speyer. A few species previously unrecorded from Britain have been found in these collections and relevant data is included in the text. Accounts of the fauna of Britain and Europe have been produced by Morison (1947-1949) and Priesner (1964), and there is further relevant biological information in the faunistic accounts from North America and India by Stannard (1968) and Ananthakrishnan (1969). However, the most important source of information about Thysanoptera is the book by Lewis (1973).

INTRODUCTION

The term 'British species' may be interpreted in different ways. In the Formicidae 'native' species and a few firmly established or regular immigrants are considered under this title; however, in groups such as the Psocoptera all species which have been collected in the British Isles are regarded as 'British species'. The latter interpretation has been adopted in the present handbook. Many Thysanoptera are transported by air currents and it is not always easy to differentiate between these natural immigrant species and those species which have been accidentally introduced by man.

Eleven species of Thysanoptera recorded in Britain have undoubtedly been imported from the tropics. Until the widespread use of modern insecticides some of these species could be found commonly in glasshouses, but 2 of the 11 species have been found only once in Britain. Other species, e.g. *Liothrips vaneeckei*, *Frankliniella schultzei* and *Thrips simplex*, may be imported regularly from Europe on lily bulbs or gladiolus corms, but only *simplex* is likely to survive and subsequently breed in the British climate. In contrast, *Hoplothrips unicolor*, which was probably introduced into Scotland by the timber trade sometime after 1935, maintained populations in the forests around Aberdeen for about 30 years.

The occurrence of several other species in Britain is more difficult to explain. The Mediterranean species *Aeolothrips gloriosus* has been collected twice in the field, the Oriental Rice Thrips, *Baliothrips biformis*, has been found breeding on *Phalaris* at more than one locality, and the central European species *Odontothrips meliloti* is now well established on its introduced host plant. Each of these three species may have been introduced but it is possible they entered south-eastern England on a warm southerly wind.

Ceratothrips frici, a species common in the Mediterranean area, almost certainly reaches England in this way during warm summers, and *Poecilothrips albopictus* and *Abiastothrips schaubergeri* also may be natural immigrants into southern England. However, not all immigrant species invade Britain along its south coast. *Apterothrips secticornis*, a boreoalpine species found also in New Zealand and the Falkland Islands, has been collected twice in Scotland in recent years.

CHECK LIST OF THYSANOPTERA RECORDED IN BRITAIN

This list only includes changes in synonymy made since the publication of the revised Kloet & Hincks *Check List* (1964). Misidentifications in that list are given here in square brackets and discussed in the text, as are the four new synonyms listed below. Full synonymies with dates can be found in the catalogue of world Thysanoptera (Jacot-Guillarmod, 1970-1975).

As a result of these changes 158 species in 48 genera are now known to have been found in Britain. However, 11 of these species and 9 genera have been recorded only under artificial conditions such as in glasshouses (+).

TEREBRANTIA

AEOLOTHRIPIDAE

AEOLOTHRIPS Haliday

albicinctus Haliday

ericae Bagnall

gloriosus Bagnall

intermedius Bagnall

[*fasciatus* auctt.]

melaleucus (Haliday)

propinquus Bagnall

tenuicornis Bagnall

versicolor Uzel

vittatus Haliday

MELANTHRIPS Haliday

ficulbii Buffa

fuscus (Sulzer)

RHIPIDOTHRIPS Uzel

brunneus Williams

gratiosus Uzel

THRIPIDAE

PANCHAETOTHRIPINAE

HELIOTHRIPINAE

HERCINOTHRIPS Bagnall

+ *bicinctus* (Bagnall)

+ *femoralis* (Reuter)

HELIONOTHRIPS Bagnall

+ *errans* (Williams)

HELIOTHRIPS Haliday

+ *haemorrhoidalis* (Bouché)

PARTHENOTHRIPS Uzel

+ *dracaenae* (Heeger)

THRIPINAE

DENDROTHRIPINI

DENDROTHRIPS Uzel

degeeri Uzel

eastopi Pitkin & Palmer

ornatus (Jablonowski)

saltator Uzel

peucedani Bagnall

LEUCOTHRIPS Reuter

+ *nigripennis* Reuter

SERICOTHRIPINI

DREPANOTHRIPS Uzel

reuteri Uzel

SCIROTTHRIPS Shull

+ *longipennis* (Bagnall)

SERICOTHRIPS Haliday

abnormis (Karny)

bicornis (Karny)

gracilicornis Williams

staphylinus Haliday

CHIROTHRIPINI

CHIROTHRIPS Haliday

aculeatus Bagnall

hamatus Trybom

manicatus Haliday

molestus Priesner

ruptipennis Priesner

LIMOTHRIPS Haliday

cerealium Haliday

denticornis Haliday

schmutzi Priesner

THRIPINI
APTINOTHRIPINA
ANAPHOTHRIPINA

ANAPHOTHRIPS Uzel

articulosus Priesner

badius (Williams)

obscurus (Müller)

+ *orchidaceus* Bagnall

silvarum Priesner

tamicola Bagnall

validus Karny

[*atroapterus*: Kloet & Hincks]

APTEROTHRIPS Bagnall

secticornis (Trybom)

APTINOTHRIPS Haliday

elegans Priesner

karnyi John

rufus (Haliday)

nitidulus Haliday

stylifer Trybom

BELOTHRIPS Haliday

acuminatus Haliday

CHAETANAPHOTHRIPS Priesner

+ *orchidii* (Moulton)

DICHROMOTHRIPS Priesner

+ *orchidis* Priesner

OXYTHRIPS Uzel

ajugae Uzel

pernicis Bagnall

bicolor (Reuter)

brevistylis (Trybom)

halidayi Bagnall

quercicola Bagnall

ulmifloriorum (Haliday)

virginalis Priesner **syn.n.**

TMETOTHRIPS Amyot & Serville

subapterus (Haliday)

THRIPINA

BALIOTHRIPS Uzel

STENOTHRIPS Uzel

EUCHAETOTHRIPS Bagnall

biformis (Bagnall)

dispar (Haliday)

exilis (Bagnall)

graminum (Uzel)

kroeli (Schille)

BOLACOTHRIPS Uzel

jordani Uzel

CERATOTHRIPS Reuter

AMBLYTHRIPS Bagnall

ericae (Haliday)

frici (Uzel)

FRANKLINIELLA Karny

IRIDOTHRIPS Priesner **syn.n.**

intonsa (Trybom)

iridis (Watson)

schultzei (Trybom)

anglicana Bagnall

tenuicornis (Uzel)

KAKOTHRIPS Williams

pisivorous (Westwood)

MYCTEROTHRIPS Trybom

PHYSOTHRIPS Karny

RHOPALANDROTHRIPS Priesner

consociatus (Targioni-Tozzetti)

latus (Bagnall)

salicis (Reuter)

ODONTOTHRIPS Amyot & Serville

biuncus John

[*uzeli*: Kloet & Hincks]

cytisi Morison

ignobilis Bagnall

inermis Bagnall

[*meridionalis*: Kloet & Hincks]

mutabilis Bagnall

loti (Haliday)

uzeli Bagnall

meliloti Priesner

phaleratus (Haliday)

ulicis (Haliday)

PLATYTHRIPS Uzel

tunicatus (Haliday)

RHAPHIDOTHRIPS Uzel

longistylous Uzel

SCOLOTHRIPS Hinds

longicornis Priesner

TAENIOTHRIPS Amyot & Serville

inconsequens (Uzel)

picipes (Zetterstedt)

THRIPS Linnaeus

PARAFRANKLINIELLA Priesner

albopilosus Uzel

alni Uzel

[*trybomi*: Kloet & Hincks]

angusticeps Uzel

atratus Haliday

[*annulatus*: Kloet & Hincks]

[*montanus*: Kloet & Hincks]

brevicornis Priesner

calcaratus Uzel

crassicornis Bagnall

difficilis Priesner

dilatatus Uzel

discolor Haliday

euphorbicola Bagnall

flavus Schrank

fulvipes Bagnall
funebri Bagnall
fuscipennis Haliday
menyanthidis Bagnall **syn.n.**
hukkinieni Priesner
inopinatus Zur Strassen
juniperinus Linnaeus
junipericola Morison
klapaleki Uzel
major Uzel
inaequalis Bagnall
minutissimus Linnaeus
nigropilosus Uzel
origani Priesner
paludosus Bagnall
palustris Reuter
physapus Linnaeus
pillichi Priesner
 [praetermissus: Kloet & Hincks]
sambuci Heeger
simplex (Morison)
tabaci Lindeman
adamsoni Bagnall
debilis Bagnall
urticae Fabricius
validus Uzel
verbasci (Priesner)
viminalis Uzel
vulgatissimus Haliday

TUBULIFERA

PHLAEOTHIRIPIDAE

IDOLOTHIRIPINAE

BOLOTHIRIPS Priesner

dentipes (Reuter)

CRYPTOTHIRIPS Uzel

nigripes (Reuter)

MEGALOTHIRIPS Uzel

bonannii Uzel

MEGATHIRIPS Targioni-Tozzetti

lativentris (Heeger)*nobilis* Bagnall

PHLAEOTHIRIPINAE

ABIASTOTHIRIPS Priesner

schaubergeri (Priesner)

ACANTHOTHIRIPS Uzel

nodicornis (Reuter)

CEPHALOTHIRIPS Uzel

monilicornis (Reuter)GYNAIKOTHIRIPS Zimmermann
+ *ficorum* (Marchal)

HAPLOTHIRIPS Amyot & Serville

aculeatus (Fabricius)*distinguendus* (Uzel)*flavilibia* Williams*fuliginosus* (Schille)*hukkinieni* Priesner*jasionis* Priesner*juncorum* Bagnall*leucanthemi* (Schränk)? *niger* Osborn*marrubicola* Bagnall*minutus* (Uzel)*propinquus* Bagnall[*angusticornis*: Kloet & Hincks]*senecionis* Bagnall*setiger* Priesner*statices* (Haliday)*subterraneus* Crawford*subtilissimus* (Haliday)

HOPLANDROTHIRIPS Hood

bidens (Bagnall)

HOPLOTHIRIPS Amyot & Serville

[PHLAEOTHIRIPS: Kloet & Hincks]

corticis (De Geer)*fungi* (Zetterstedt)*longisetis* (Bagnall)*pedicularius* (Haliday)*polysticti* (Morison)*semicaecus* (Uzel)*ulmi* (Fabricius)*unicolor* Vuillet*flumenellus* (Hood) **syn.n.**

LIOTHIRIPS Uzel

setinodis (Reuter)[*austriacus*: Kloet & Hincks]*vaneeckeii* Priesner

PHLAEOTHIRIPS Haliday

EUPHFLAEOTHIRIPS Morison

annulipes Reuter*coriaceus* Haliday*immanis* Bagnall

POECILOTHIRIPS Uzel

albopictus Uzel

BIOLOGY

Host plants. Some species of thrips are monophagous, and even polyphagous species frequently have only two or three host plants on which the majority of larvae are reared (Pitkin, 1976a). However, sunny weather

encourages adult thrips to fly actively, with the result that they may be found on many plants on which they do not normally breed. For this reason the biological notes given after each species in the following keys exclude references to plants which are not true hosts. In the Phlaeothripidae more than half the species live on dead wood or in leaf litter where they appear to feed on fungal hyphae or fungal breakdown products. The species of *Idolothripinae* all feed on fungal spores. Recent studies on the feeding apparatus of thrips, using a scanning-electron microscope, indicate that the maxillary stylets are not the simple needle-like structures shown in textbook illustrations. These stylets fit together by means of a tongue and groove system and so form a tube through which food can be sucked (Mound, 1971b).

Population fluctuations. After a series of relatively cool days in early summer a rise in temperature can produce a mass flight of thrips, especially *Limoithrips*, when a suitable temperature threshold is reached. The name Thunder Flies is derived from this habit. A period of cold wet weather usually causes a high mortality in thrips populations and a series of cool summers appears to produce an overall reduction in the level of populations. No statistics are available, but several species of thrips were apparently more difficult to find in the early 1970s than in the first few years of the preceding decade. Predators and parasites are usually assumed to be of less importance than weather conditions in controlling thrips populations, but nymphal trombiculid mites are commonly found on the adults of flower-living thrips. Changes of habitat, however, have a more drastic effect on populations. Large numbers of trees were felled in the early 1940s, and forestry practices being then less clean than in recent years, the resultant yield of dead wood remaining in forests was instrumental in producing an increase in the numbers of several *Hoplothrips* species. This increase extended over a period of years but many Phlaeothripidae are now relatively uncommon.

Period of Occurrence. The monthly records for each species given in the text are based exclusively on the specimens in the BMNH collection. Some of these records may be exceptional, but from these dates details of the life history of many species can be inferred. Most species are probably univoltine, however the overwintering stage is not always known. Although all Thysanoptera have two larval instars which feed actively, there are two Terebrantian and three Tubuliferan pupal instars which apparently neither feed nor move to any great extent.

Distribution in Britain. The pre-1974 county divisions have been used in recording distribution, because these are readily understood and a more exacting system is probably inappropriate for insects which are readily carried by winds. To conserve space the county records are presented as a series of code numbers after each species (Appendix), and those records for which voucher specimens are not available in the BMNH collections are given in square brackets. The Aberdeen area of Scotland (75-79) and the South-east of England (1-9) have been collected intensively. Presence or absence of a record in these areas almost certainly reflects true distribution of species, but the absence of records from the western counties is more difficult to assess.

COLLECTION AND PRESERVATION

Thysanoptera may be beaten from dead wood, leaves, flowers or grasses. A plastic beating tray is particularly effective because the pretarsal bladder of thrips adheres to the smooth surface. To keep the specimens relaxed they should be collected into 60% alcohol, preferably with the addition of a small quantity of glycerine and acetic acid. Each individual should be mounted on a microscope slide in Canada Balsam. Very pale, as well as black, individuals must be macerated with cold 5% sodium hydroxide solution prior to dehydration through a series of alcohols. Clove oil is one of the best clearing agents. Rapid identifications for ecological surveys may be carried out on specimens mounted in Hoyers or Berlese mountant, but the head and antennae of such specimens are liable to distortion. Sira mountant is not recommended, particularly for pale specimens which are difficult to clear. Full collection data should be preserved with all specimens (Mound & Pitkin, 1972).

MORPHOLOGICAL CHARACTERS

The following notes are intended as a guide to the keys. Detailed accounts of morphology may be found through the references in the Preface.

Surface sculpture. The surface of Thysanoptera adults is variously reticulate as in many other insects, but this reticulation is exaggerated in the Panchaethripinae (figs 72-75). The surface of *Dendrothrips* species is frequently finely sculptured (figs 79-82), and in many Terebrantia the surface bears few to large numbers of fine microtrichia (figs 147-148).

Setae. The position, form and length of setae are important in classification. In Tubulifera, as well as the larvae of Terebrantia, the apices of major setae are frequently not acute (figs 248, 255). However, the appearance of a setal apex may vary depending on the angle of view, and certain mounting media can cause a weakly expanded apex to collapse and thus appear acute.

Antennae. The form and number of antennal segments as well as their sensoria, particularly those on segments III and IV, are important at all levels of classification. These sensoria are linear in Aeolothripidae, but protrude as simple or forked trichomes in the other families (figs 5, 12, 238). In several genera the degree of fusion of the terminal segments is variable, e.g. *Dendrothrips* and *Thrips* (figs 84-87), and the development of one or more sutures may vary within a species, e.g. *Anaphothrips obscurus* (fig. 15).

Head. Thripidae typically have three pairs of setae associated with the ocelli (figs 40, 98-100): pair I anterior to the first ocellus, pair II lateral to the first ocellus near the compound eyes, pair III within the ocellar triangle or lateral to it. Phlaeothripidae typically have one pair of major postocular setae (figs 233-234), and a few species have stout setae or tubercles on the cheeks (figs 315-316).

Maxillary stylets. In Terebrantia the stylets are usually confined to the mouth cone. In Phlaeothripidae the maxillary stylets are usually much longer, deeply retracted into the head, and associated with them are muscle supports, the maxillary guides. *Haplothrips* species have a median anterior extension from each guide, the maxillary bridge (figs 254-256). The stylets of Idolothripinae are exceptionally broad permitting the ingestion of fungal spores (figs 234, 237).

Prothorax. In Terebrantia the pronotal chaetotaxy usually varies between genera (figs 17, 97, 133) and the prosternum is weakly sclerotized. In Phlaeothripidae there are typically five pairs of major pronotal setae, the anteromarginals, anteroangulars, mid laterals, epimerals and posteroangulars (figs 248, 253); and the prosternum frequently bears two pairs of median sclerites, the praepectal plates and the probasisterna (figs 254, 256).

Pterothorax. The metathoracic endoskeletal furca is well developed in some Thripidae which jump actively (figs 77-78). The sculpture of the metanotum, and the position of its median setae, are useful in recognizing some genera and species (figs 102, 153, 186).

Wings. Most species are either macropterous (macr.), micropterous (micr.) or apterous, and each species usually exhibits two only of these three conditions. Hemimacropterae are not common, and continuous variation in wing length is rare. In Terebrantia the colour, chaetotaxy and venation of the forewings are important in classification (figs 1, 70, 171). In Phlaeothripidae the forewings have no veins, but there are usually three or four sub-basal setae near the anterior margin. These wings are sometimes constricted medially, and the number of duplicated cilia on the distal posterior margin is variable (figs 326-327).

Legs. In adults the tarsi may be one or two segmented and always bear a well developed pretarsal apparatus. Normal claws are present in larvae but very reduced in adults. The fore tarsus frequently bears a tooth on the inner margin (figs 288-291), and in a few Thripidae the pretarsal bladder bears a terminal tooth (figs 93, 158). In Phlaeothripidae the apical margin of the tarsus may be prolonged into a hook, the hamus, ventral to the pretarsus.

Abdominal tergites. In Phlaeothripidae tergite I is reduced to a small plate, the *pelta* (figs 235, 246, 313), and tergites II-VII usually bear two pairs of sigmoid wing retaining setae. The paired major setae at the hind margin of tergite IX are usually numbered B₁, B₂ and B₃ (figs 272-274). In Thripidae the posterior margin of tergite VIII frequently bears a *comb* of ciliate or dentate microtrichia (figs 19, 122, 161), but many grass-living species have the posterior margin of the tergites and sternites prolonged into a flange or *craspedum* (figs 23, 66-68). In species of *Thrips* the number of setae near the lateral margins of tergite II is sometimes diagnostic (figs 207-208), and in *Thrips*, *Frankliniella* and *Kakothrips* the surface of tergites V-VIII bears a row of microtrichia laterally, the *ctenidia* (figs 95-96, 210-218).

Abdominal sternites. The marginal setae sometimes arise in front of the margin on the posterior sternites, but Phlaeothripidae and many Terebrantia also have a variable number of accessory setae medially on the sternites (figs 174-177). Male Phlaeothripinae frequently have a porose glandular area on sternite VIII (figs 301-306), but in *Abiastothrips* and related genera there is instead a reticulate glandular area on sternites V-VII. The structure of the male genitalia is used for species recognition in only two genera: in *Haplothrips* the sclerotised apex of the aedeagus (figs 266-271), and in *Odonthrips* the lateral endotheal spines on the inflated intromittant organ (figs 127-132).

KEY TO FAMILIES

Only three families of Thysanoptera are represented in Britain. The other families of the Order are all small in numbers of species and belong in

the suborder Terebrantia. These are the Heterothripidae, Merothripidae and Uzelothripidae, the majority of whose species are found in the New World, particularly the tropical areas.

- 1 Forewing with no longitudinal veins and with no setae except sub-basally on anterior margin; wing surface smooth, without microtrichia (figs 326-327); abdominal segment X tubular in both sexes, ♀ without saw-like ovipositor, ♂ with base of tube excavate ventrally; terminal setae of body arising from small platelets attached to end of tube (figs 272-274); larvae I and II with antennal segments smooth, not bearing microtrichia or sculptured rings

PHLAEOTHRIPIDAE (p. 56)

- Forewing usually with three well developed longitudinal veins (including costa), each bearing a variable number of setae; wing surface bearing numerous small microtrichia, at least along veins (figs 1, 70-71, 171-172); abdominal segment X not tubular in either sex, always divided ventrally and frequently with a dorsal longitudinal split (fig. 107), ♀ with saw-like ovipositor; larvae I and II sometimes with segment X tubular but terminal setae then arising from apical margin of segment, and antennal segments bearing numerous microtrichia or rings of sculpture 2

- 2 Antenna with 9 segments, sensoria on segments III and IV broadly or narrowly linear, never produced as trichomes (figs 5-7); forewings broad with rounded apices, veinal setae small (fig. 1) **AEOLOTHRIPIDAE** (p. 10)

- Antenna usually with 7 or 8 segments (rarely 6 or 9), sensoria on segments III and IV produced as simple or forked trichomes (figs 47, 57, 87, 135); forewings usually pointed at apex, veinal setae frequently large (figs 70-71, 171-172)

THRIPIDAE (p. 14)

Family AEOLOTHRIPIDAE

The family Aeolothripidae comprises 26 genera, four of which are known only from fossil specimens in Baltic amber. Most of the species feed in flowers although some are predatory. Many species occur in the Holarctic and a number in Australia, but the family is poorly represented in the wet tropics. Only three genera comprising 13 species are recorded in Britain, and these tend to be more abundant in the south.

KEY TO GENERA

- 1 Head with at least 2 pairs of long setae behind the eyes (fig. 4); antennal segments VII-IX distinctly separated (fig. 7); labial palps 2-segmented; claw-like tooth not present on tarsal segment II **MELANTHRIPS** (p. 12)
- Head with no long setae behind the eyes (figs 2-3); antennal segments VII-IX closely united (figs 5-6); labial palps 4-segmented; claw-like tooth present on tarsal segment II (fig. 8) 2
- 2 Pronotum with a pair of elongate posteroangular setae; antennal segments VII-IX closely united (fig. 6) **RHIPIDOTHRIPS** (p. 14)
- Pronotum without prominent posteroangular setae; antennal segments V-IX closely united (fig. 5) **AEOLOTHRIPS** (p. 10)

Genus AEOLOTHRIPS Haliday

(figs 1, 2, 5, 8-11)

The genus *Aeolothrips* comprises about 85 species, most of which are found in the holarctic region. Nine species are recorded from Britain, but one of these is probably introduced from the Mediterranean area. The species occupy a variety of habitats; one occurs at the base of grass tussocks, two occur on deciduous trees, one on coniferous trees, and the other species are found on flowering herbs. Adult females are almost 2 mm in length

although the males are rather smaller. All the British species have black and white banded forewings, except the males and most females of *albicinctus* Haliday which are micropterous. At rest, when the wings are folded over the abdomen, the insects have a striking banded, or ant-like appearance which may serve to distract larger predators. In *albicinctus* the anterior part of the abdomen is white thus producing a similar disruptive pattern, and moreover this species runs actively like a small hymenopteron. The larvae are creamy yellow to white, and they are at least partially predaceous in some species. When mature, the larvae spin a silken cocoon in the soil or leaf litter, but the overwintering stage is not known. Adults emerge in May, and the fore tarsal tooth (fig. 8) probably assists in breaking the cocoon.

No consistent differences in the colour, length or sensoria of the antennal segments have been found in British specimens to which the names *Aeolothrips fasciatus* (Linnaeus) and *A. intermedius* Bagnall have been applied, and these are all treated as one species here. *A. fasciatus* is here regarded as a nomen dubium on the grounds that more than one species with fasciate wings occurs in Sweden which could be attributed to the Linnean description. Moreover, males to which the name *fasciatus* has been applied (Priesner, 1964) have not been found in Britain or northern Europe.

KEY TO SPECIES

- 1 Prothorax, lateral parts of head, pterothorax, and at least base of femora yellow; abdominal segments III-VI yellow laterally with variable amounts of brown medially, segments VIII-X dark brown; head and pterothorax variably brown medially; antennal segments I, II and basal half of III yellow in contrast to rest of antenna which is dark brown; wings with 2 dark transverse bands, marginal vein colourless at apex of wing but shaded on hind margin between the 2 dark bands

gloriosus Bagnall

The British record is based on 2 ♀ from water traps at Silwood Park, Berkshire and 1 ♀ from a Tilia europea leaf at Hoddesdon, Hertfordshire. These specimens differ from typical gloriosus in having the tibiae and distal parts of the femora brown not yellow, but this darker colour may be the result of development at lower temperatures than usual.

The species is known from the Mediterranean area between the Azores and Turkey.

- Head and thorax uniformly dark brown, never clear yellow.....2
- 2 Abdominal segments II and III (& anterior of IV in ♂) white in life but colourless in slide mounted specimens, contrasting with dark brown of rest of body; abdominal tergite I of ♀ with numerous transverse striae; abdominal tergite IX of ♂ simple, without claspers or strong curved setae; wings usually reduced to 60 µm in ♀, 15 µm in ♂; ♀ macropteræ uncommon **albicinctus** Haliday

At base of grass tussocks, probably predaceous; ♀ macr. v, vi, viii, ♀ micr. v-ix, ♂ micr. v-viii, larvae viii-ix; widespread in Europe and northern U.S.A., locally abundant in southern Britain; 1-7, 9, 15, 18, 20-22, 24, [26], 28, [29, 30, 34] 35, [37], 42, [50, 51].

- Abdominal segments II and III brown, as dark as head and thorax; both sexes always macropterous.....3
- 3 Posterior margin of forewing dark except at base and apex, forewing with one or two transverse dark bands (fig. 1).....4
- Posterior margin of forewing pale medially between two dark cross bands.....6
- 4 Forewing with single transverse dark band (fig. 1).....**vittatus** Haliday

On Pinus, probably predaceous; ♀ v-viii, larvae vi-ix, ♂ not known; widespread in Europe and northern U.S.A. but not common; 3, 9, 15, 21, 31-33, 75, 76, 81.

- Forewing with 2 transverse dark bands, median pale area sometimes very reduced..5
- 5 Antennal segments III and IV yellow in contrast to V-IX which are brown; tarsi and apices of tibiae yellow **versicolor** Uzel

On Fraxinus and other deciduous trees; predatory on thrips and other small arthropods; ♀ v-viii, xi, larvae viii, ♂ not recorded in Britain; widespread in Europe, northern U.S.A. and southern England but not common; [1], 3, 6, 8, 13, 14, 21, 29.

- Antennal segment III yellow, but at least apical half of IV brown; mid and hind tarsi and tibiae brown, fore tarsi and apices of fore tibiae paler **melaleucus** Bagnall
On Quercus, Sambucus flowers, and other deciduous trees; predatory on thrips, mites and probably other small arthropods; ♀ v-viii, larvae vii, ♂ not recorded in Britain; widespread in Europe, northern U.S.A. and southern England, but not common; 3, 4, 5, 9, 12, 15, 33, 36, 53, 76.
- 6 Ring vein around apex of forewing darker than the membrane it surrounds, usually as dark as the veins in the transverse dark bands. 7
- Ring vein around apex of forewing as pale as the membrane it surrounds, much paler than the veins in the transverse dark bands. 8
- 7 Sensorium on each of antennal segments III and IV 0.3-0.5 times as long as segment (fig. 5); accessory setae on sternite VII of ♀ further from the posterior margin of the sternite than their length (fig. 10); ♂ tergite IX with paired claspers and a pair of stout curved setae (cf. fig. 9) **tenuicornis** Bagnall
Particularly on yellow flowered Cruciferae, Leguminosae and Compositae; ♀ iv-ix, ♂ iv-viii, larvae vii-ix; widespread in Europe, common in southern England; 1-7, 9, 11, 13, 14, [15], 17, [18], 20, 21, [22], 23, 24, 28, [29, 33], 50, 75-79.
- Sensorium on each of antennal segments III and IV more than 0.5 times as long as corresponding segment; accessory setae on sternite VII of ♀ closer to the posterior margin of the sternite than their length (fig. 11); ♂ not known **propinquus** Bagnall
Bagnall described propinquus from an unspecified number of females collected in Surrey at Woldingham, Warmingham and Purley Oaks, in flowers of Verbascum nigrum, July 1924. Only a single female remains in the Bagnall collection, labelled 'Type' and designated lectotype (Mound, 1968), but this bears the date vi. 1924. A second female from herbage, Norman's Bay, Sussex, viii. 1948 (G. D. Morison) has recently been studied. The species has been recorded from Spain, France and Germany. The other British records under this name are now regarded as misidentifications of tenuicornis and intermedius.
- 8 Antennal segments I and II yellow, as pale as base of III; ♀ abdomen variable in colour, segments III-IV and X frequently pale; ♂ tergite IX with paired claspers and a pair of stout curved setae (fig. 9) **ericae** Bagnall
Particularly on Ericaceae and Leguminosae; ♀ v-viii, ♂ vi-viii, larvae vii-x; widespread and fairly common in Europe; 1-3, 6, 7, 9, 11, 12, [13], 14, 15, 21, [33, 39, 50], 52, [53], 54, [58, 60, 74], 75, [76-79, 81, 82, 84, 86].
- Antennal segments I and most of II brown, darker than segment III; ♀ abdomen brown; ♂ tergite IX with paired claspers but without curved setae **intermedius** Bagnall
Particularly on yellow flowered Cruciferae, Leguminosae and Compositae; ♀ v-ix, ♂ v-viii, larvae vi-ix; widespread in Europe and common in southern England; 1-7, 9, 12-18, 20-24, 28, 30, 33, 36, 37, 51, 53, 75, 76, [78], 84.

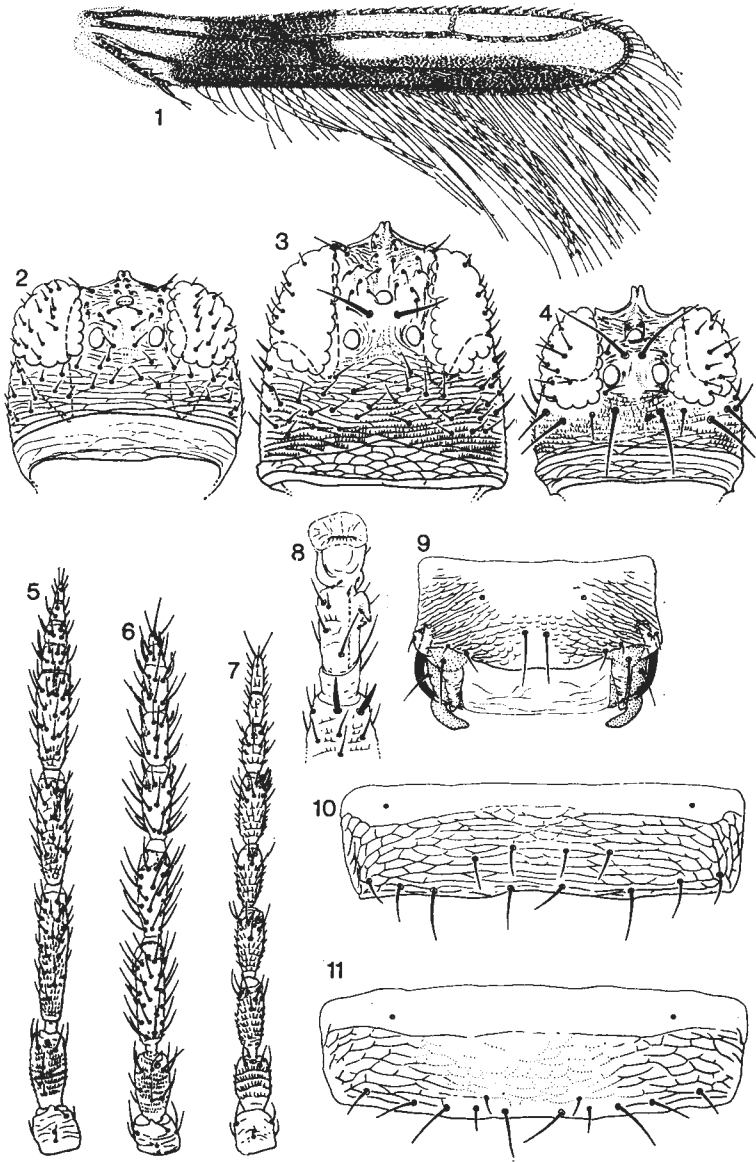
Genus MELANTHRIPS Haliday

(figs 4, 7)

The genus *Melanthrips* comprises about 36 species, and these occur mainly in the Palaearctic region. Only two species are recorded from Britain and little is known of their biology. It is not known if the larvae are predaceous, or whether they spin cocoons as do species of *Aeolothrips*.

KEY TO SPECIES

- 1 Forewing with 2 dark transverse bands **ficallii** Buffa
In flowers, particularly Galium aparine, G. mollugo and Reseda lutea; ♀ v-viii, ♂ v-vi, larvae vi-ix; widespread in Europe south of Holland, locally common in Britain; 1, 3, 4, 8, 9, 12, 14, 20-23, [24], 33, 36, [37], 44, 45, 50, 53, 55.
- Forewing without dark transverse bands, uniformly grey-brown except for a paler area near the base **fuscus** (Sulzer)
In flowers, particularly Sinapsis arvensis, Brassica spp. and Poterium sangui-



FIGS. 1-11. 1, *Aeolothrips vittatus* forewing. 2, *A. tenuicornis* head. 3, *Rhipidothrips gratiosus* head. 4, *Melanthrips fuscus* head. 5, *A. tenuicornis* antenna. 6, *R. gratiosus* antenna. 7, *M. ficalbii* antenna. 8, *A. tenuicornis* left fore tarsus. 9, *A. ericae* ♂ tergite IX. 10, *A. tenuicornis* ♀ sternite VII. 11, *A. propinquus* ♀ sternite VII.

sorba; ♀ *v-ix*, ♂ *v-ix*, larvae *vi-ix*; widespread in Europe and north Africa, sometimes common in southern England; 1-9, [17], 18, [20], 21, 22, 24, 31, [33], 37, 50, 52, [53], 54, [63], 75, 76.

Genus RHIPIDOTHRIPS Uzel

(figs 3, 6)

This genus comprises six species, all of which are Holarctic although *cahirensis* Priesner has been introduced to Australia. Two species are recorded from Britain, but they are scarce and occur on grasses in southern England in mid-summer. Both species have grey-brown forewings, although only short winged females of *brunneus* Williams have so far been recorded in Britain.

KEY TO SPECIES

- 1 Antennal segment II pale, concolorous with segment III; prothorax paler than head and pterothorax and bearing 3-4 pairs of setae on the posterior margin between the elongate posteroangular setae; mid and hind tibiae yellow at base and apex
gratiosus Uzel
On Avena sativa; ♀ *vi-viii*, ♂ *vi-vii*, larvae not recorded; collected infrequently in southern England but widespread in Europe; [3, 4], 7, [8], 9, 15, 17.
- Antennal segment II darker than segment III; prothorax concolorous with head and pterothorax, and bearing 2 pairs of setae between the elongate posteroangular setae; mid and hind tibiae yellow at apex only.
brunneus Williams
On Bromus sterilis; ♀ *micr. vi-vii*, ♂ *unknown*, ♀ *macr. and larvae not recorded in Britain*; collected four times near the coast in Sussex between 1915 and 1930. Also known from the Netherlands, Finland, U.S.S.R. and U.S.A. (Oregon), but *cahirensis* Priesner from the Mediterranean area and Australia may be the same species.

Family THIRIPIDAE

The family Thripidae is found throughout the world and comprises more than 200 genera. The supra-generic classification is indicated in the Check List (p. 4-6). The species included in the Panchaetothripinae, the Dendrothripini and the Sericothripini, as well as many species in the Aptinothripina, feed on the leaves of dicotyledonous plants almost exclusively. The majority of flower-living Thripidae are placed in the Thripina, and the species in the Chirothripini live on Gramineae. Many genera have a restricted distribution, but many species have been distributed around the world by man.

KEY TO GENERA

- 1 Macropterous, head conspicuously reticulate (figs 72-75); first vein of forewing more or less fused to costa (figs 70-71); body colour mainly dark brown, tibiae yellow at least in part; tropical species, in Britain found only in glasshouses. . . . 2
- Head not conspicuously reticulate; doubtful species are apterous, or with first vein and costa clearly separate, or not associated with glasshouses. 5

Panchaetothripinae

- 2 Forewing with 3 complete rows of stout setae, on costa, first and second veins (cf. fig. 88); tarsi 2-segmented; internal furca of metathorax large and Y-shaped (fig. 78)
HERCINOTHRIPS
- Forewing with only a few setae on first vein (fig. 70), or setae very reduced in size (fig. 71); tarsi 1-segmented; internal furca of metathorax small, not extending to meso-metathoracic suture 3
- 3 Forewing unusually broad, median width more than 0.1 of wing length; wing membrane with reticulate pattern; no cilia on costa (fig. 70)
PARTHENOTHRIPS
- Forewing slender, median width less than 0.7 of wing length; costa bearing cilia. . . 4

- 4 Forewing pale, with rounded apex; major setae on veins minute, less than 0.2 as long as median width of wing (fig. 71); all legs yellow **HELIOTHRIPS**
- Forewing shaded, with acute apex; setae on veins about 0.5 as long as median width of wing; mid and hind femora brown **HELIONOTHRIPS**

Thripinae

- 5 Internal furca of metathorax lyre-shaped (fig. 77), extending to mesothoracic furca; abdominal tergites with a pair of major setae close together medially; leaf feeding species mainly on trees and shrubs or in glasshouses..... 6
- Metathoracic furca not lyre-shaped, small, rarely extending to mesothoracic furca and then only as a slender spinula (fig. 142); abdominal tergites rarely with a pair of major setae close together medially..... 7

Dendrothripini

- 6 Forewing with anterior marginal cilia arising sub-marginally; anterior margin of forewing recurved at apex to join posterior margin, terminal setae minute (fig. 69); antennae with 8 or 9 segments; major sense cone on antennal segment VI arising near middle of segment (fig. 84); ♀ brown, pale yellow or white, with brown markings, ♂ small and pale; feeding on leaves of *Ligustrum*, *Fraginus*, *Tilia* etc. **DENDROTHRIPS**
- Forewing with cilia arising at anterior margin, wing apex acute with one long terminal seta; antennae 7-segmented; major sense cone on antennal segment VI arising close to base of segment (fig. 83); minute yellow thrips with dark wings, body length of ♀ less than 0.9mm when fully distended; rare in Britain, in glasshouses **LEUCOTHRIPS**
- 7 Surface of abdominal tergites with numerous minute (5µm) microtrichia, at least lateral two-thirds of tergites covered with about 8 rows of such microtrichia (figs 147-148)..... 8
- Abdominal tergites without numerous microtrichia..... 10

Sericothripini

- 8 Both sexes dark brown, sometimes micropterous; microtrichia present medially as well as laterally on abdominal tergites (fig. 148); on Leguminosae **SERICOTHRIPS**
- Small pale species, always macropterous; microtrichia only on lateral thirds of tergites (fig. 147)..... 9
- 9 Antenna with 6 segments, segment VI not bearing a terminal style of 1 or 2 segments; on *Quercus*, *Vitis* etc. **DREPANOTHRIPS**
- Antenna with 8 segments, segment VI bearing a terminal style of 2 segments (fig. 152); rare in Britain, in glasshouses **SCIRTOTHRIPS**
- 10 *Either* both sexes with pronotum trapezoidal, much wider at posterior than at anterior, with small head (fig. 53); *or* ♀ with a pair of stout thorn-like setae on tergite X (fig. 107), and ♂ with a pair of stout setae medially on quadrate bases on tergite IX (fig. 109); on grasses..... 11
- Pronotum transversely rectangular, and tergites IX and X not with setae as above..... 12

Chirothripini

- 11 Pronotum trapezoidal with 2 pairs of major posteroangular setae (fig. 53); head smaller than pronotum, fore femur enlarged **CHIROTHRIPS**
- Pronotum transversely rectangular with 1 pair of major posteroangular setae (fig. 103); head as large as pronotum; tergite X of ♀ with a pair of stout thorn-like setae (fig. 107); ♂ apterous with a pair of stout setae on large quadrate bases medially on tergite IX (figs 108-110) **LIMOTHRIPS**

Thripini

- 12 Apterous; sense cones on antennal segments III and IV simple, not forked (figs 24-27); pronotum with no elongate projecting setae at posterior angles (figs 22, 29) 13
- Usually macropterous and with forked sense cones on antennal segments III and IV; if apterous then either with forked sense cones or with at least 1 pair of well-developed posteroangular pronotal setae 14
- 13 Dark brown, abdomen wider than thorax, head wider than long; tergites and sternites with a deep craspedum at posterior margin, sternal craspeda deeply lobed between marginal setae (fig. 23); in grass tussocks, rare in Britain
- APTEROTHRIPS
- Golden yellow, but brown when living in saltmarshes; elongate, slender abdomen scarcely wider than thorax, head longer than wide (fig. 29); tergites and sternites without a marginal craspedum (figs 30-31); in grasses, widespread and abundant
- APTINOTHRIPS
- 14 Pronotum without well-developed posteroangular setae (fig. 17); abdominal tergites V-VIII usually with 1 pair of dominant setae medially placed closer together than their length (figs 18-21) 15
- Pronotum with at least 1 pair of well-developed posteroangular setae (figs 33, 111); tergites without a pair of isolated setae close together medially, although some species have 3 pairs of large tergal setae in a transverse row 16
- 15 Antennal segments VII and VIII more than 0.75 times as long as segment VI (fig. 45); always macropterous; on *Galium*
- BELOTHRIPS
- Antennal segments VII and VIII less than 0.5 times as long as segment VI (this segment may be more or less divided by an oblique suture near the apex) (figs 12-16); sometimes apterous; several species quite common on various hosts; 1 species in glasshouses but rare in Britain
- ANAPHOTHRIPS
- 16 Pronotum with 1 pair of well-developed posteroangular setae (figs 42, 111) 17
- Pronotum with at least 2 pairs of well-developed posteroangular setae (figs 124, 143) 19
- 17 Bicoloured, mainly brown with abdominal segments III to VI and all tibiae bright yellow; forewings with 2 transverse dark bands; abdominal tergite VIII with a comb of long fine microtrichia at posterior margin (fig. 52); rare in Britain, on Orchids in glasshouses
- DICHROMOTHRIPS
- Body colour light to dark brown; abdominal tergite VIII without a comb on posterior margin 18
- 18 Ocellar setae pair I present, i.e. 3 pairs of ocellar setae developed (figs 111, 114); body light brown, abdominal setae slender; both sexes macropterous; in buds and flowers of *Ulmus*, *Quercus*, *Fraxinus* and *Pinus* in Spring
- OXYTHRIPS
- Ocellar setae pair I absent, i.e. only 2 pairs of ocellar setae developed (fig. 42); cheeks rounded and swollen; abdomen broad and dark, terminal setae on tergite IX stout; ♂, and frequently ♀, micropterous; on *Galium* and *Stellaria*
- TMETOTHRIPS
- 19 External sense cone on antennal segment VI with enlarged base which is sole-shaped in face view (fig. 120); fore tibiae usually with 1 or 2 distal claws, but if absent then distal fore tarsal segment with small hook or tubercle ventrolaterally (figs 116-119); 3 pairs of ocellar setae present (fig. 123); metanotum with 2 pairs of setae at anterior margin; macropterous, body colour brown; in legume flowers
- ODONTOTHRIPS
- Sense cone on antennal segment VI not enlarged at base (figs 164-170); fore tibiae without claws 20
- 20 Antennal segments VII and VIII very long, equal in length to V+VI (fig. 125); frequently only 1 pair of ocellar setae present, elongate arising within ocellar triangle (fig. 126); tergite VIII with a comb of microtrichia on posterior margin; macropterous, body colour brown; in grasses, but rare in Britain
- RHAPHIDOTHRIPS
- Terminal antennal segments not abnormally long, with only 7 antennal segments or with VII+VIII shorter than VI 21
- 21 Pronotum with 12 long setae, each at least half as long as median length of pronotum (fig. 133); forewing pale with 2 narrow dark cross bands, setae on veins about twice as long as median width of wing; predaceous on red spider mites, but rare in Britain
- SCOLOTHRIPS

- Pronotum with 10 elongate setae or less (fig. 97); setae on veins of forewing about as long as median width of wing or shorter..... 22
- 22 Sense cones on antennal segments III and IV simple (fig. 135); posterior angles of pronotum with 2 pairs of elongate setae; ocellar setae pair I absent, pair III elongate but close to compound eyes outside the ocellar triangle (fig. 134); body colour yellow, apex of abdominal segment X brown; ♂, and usually ♀, microporous; in grasses, but rare in Britain
BOLACOTHRIPS
- Sense cones on antennal segments III and IV forked (figs 164–170)..... 23
- 23 Body colour yellow, wings dark brown with clear area at apex and sub-basally; pronotal posteroangular setae less than one-third as long as median length of pronotum (fig. 49); tergite VIII with distinctive stippled area of sculpture extending medially from spiracles (fig. 43); rare in Britain in glasshouses
CHAETANAPHOTHRIPS
- Without this combination of characters..... 24
- 24 Tergites and sternites with lobed craspedum at posterior margin; tergites with 3 pairs of major setae in a transverse row (fig. 144); maxillary palps 2-segmented; head, thorax and abdominal segments IX–X yellowish brown, rest of abdomen dark brown; ♂ and usually ♀ apterous; on *Galium* and *Stellaria*
PLATYTHRIPS
- Tergites and sternites without a craspedum, tergite VIII frequently with a comb of microtrichia on posterior margin (figs 213–218); maxillary palps usually 3-segmented (2-segmented in some *Baliothrips*); if tergites with 3 pairs of major setae then body colour different..... 25
- 25 Antennae 7-segmented (figs 166–170); abdominal tergites with paired lateral ctenidia (fig. 218); ocellar setae pair I absent (figs 33, 180)..... 26
- Antennae 8-segmented (figs 162–165); abdominal tergites without lateral ctenidia (figs 122, 161) (except in *Thrips*, *Frankliniella* and *Kakothrips*); ocellar setae pair I present or absent..... 27
- 26 Sub-median pair of postocular setae arising behind main row of postocular setae (figs 32–34); sternites without accessory setae; median pair of setae on sternites III–VI usually arising in front of posterior margin; ocellar setae pair II sometimes longer than pair III; on Gramineae
BALIOTHRIPS
- Postocular setae in a continuous row without displaced pair; ocellar setae equal in length (figs 178–182); sternites frequently with accessory setae medially; median setae on sternites III–VI arising at margin (figs 174–177)
THRIPS (part)
- 27 Head with 2 pairs of ocellar setae (figs 156, 178)..... 28
- Head with 3 pairs of ocellar setae (figs 40, 98, 136)..... 29
- 28 Abdominal tergites without paired ctenidia laterally although sometimes with an irregular group of microtrichia near spiracles on VIII (fig. 161); tergite VIII with complete comb of long microtrichia on posterior margin; sternites without accessory setae; ocellar setae pair III much longer than distance between two ocelli (figs 156–157)
TAENIOTHRIPS
- Abdominal tergites V–VIII with paired ctenidia (figs 213–218), on VIII passing mesad of the spiracle; sternites frequently with accessory setae (figs 174–176); ocellar setae, and microtrichia on tergite VIII, not so long (figs 178–182)
THRIPS (part)
- 29 Both veins of forewing with complete row of setae (fig. 88); pronotal anteromarginal and anteroangular setae at least half as long as posteroangulars (fig. 97); ctenidia present on tergites, on VIII lateral to spiracle (fig. 94–96)..... 30
- Anterior vein of forewing with setal row widely incomplete (cf. fig. 171), or apterous; pronotal anteroangular and anteromarginal setae no longer than pronotal discal setae (fig. 40); abdominal tergites without ctenidia (fig. 141)..... 31
- 30 Tergal ctenidia absent on V–VI, developed weakly on VII–VIII (fig. 94); fore tarsus viewed laterally with a small apical tooth (fig. 93); posterior margin of pronotum without a pair of small setae between major posteromarginal setae; ocellar setae pair III arising between posterior ocelli (fig. 98); ♂ with stout tubercles laterally on tergite VIII (fig. 96)
KAKOTHRIPS
- Tergal ctenidia present on V–VIII (fig. 95); fore tarsus without a terminal tooth; posterior margin of pronotum usually with a pair of small setae medially between median posteromarginals (fig. 97); ocellar setae pair III arising in front of a line joining anterior margins of posterior ocelli
FRANKLINIELLA
- 31 Tergite VIII with complete row of microtrichia on posterior margin in both sexes

(fig. 141); tergites III–VII with small comb of microtrichia on posterior margin laterally; pronotum with 2 pairs of setae on posterior margin; metathoracic furca with an elongate spinula (fig. 142), although this is usually faint in *latus*; on leaves of *Salix* and *Betula* **MYCTEROTHRIPS**

- Tergite VIII with comb absent or widely interrupted medially; tergites III–VII without microtrichia on posterior margin laterally; pronotum with more than 2 pairs of posteromarginal setae (fig. 40); metathoracic furca without an elongate spinula medially; on flowers of *Erica* and Compositae **CERATOTHRIPS**

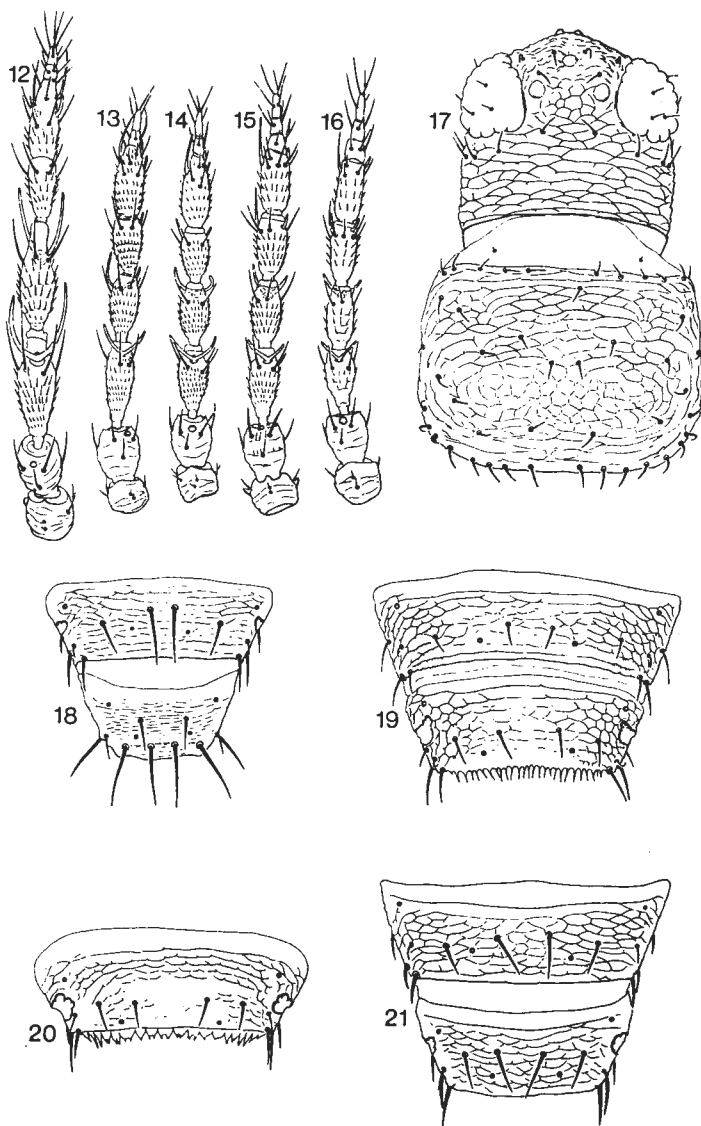
Genus ANAPHOTHRIPS Uzel

(figs 12–21)

This is a large genus with species in many parts of the world, but relationships within the genus are not clear. The species are found on various herbs, grasses, shrubs and trees.

KEY TO SPECIES

- 1 Tergite VIII with a comb of ciliate or dentate microtrichia on posterior margin (figs 19–20); median setae on tergite VII less than 0.4 times as long as distance between their bases (fig. 19)..... 2
- Tergite VIII without a comb of microtrichia on posterior margin; median setae on tergite VII more than 0.7 times as long as distance between their bases (figs 18, 21)..... 6
- 2 Tergite VIII with dentate comb on posterior margin (fig. 20); antennal segment VI divided by partial or complete suture (fig. 16); colour yellow except for light brown terminal antennal segments **articulosus** Priesner
Probably on Glyceria; widespread in Europe, apterous ♀ recorded twice in Britain; Cumberland, Derwentwater, ix. 1947; Middlesex, Staines, vii. 1954.
- Tergite VIII with ciliate comb on posterior margin (fig. 19)..... 3
- 3 Antennal segments III and IV brown medially but yellow at base and apex, both segments with apex elongate (fig. 12); body colour yellow with median area of thorax and abdominal segments II–VIII brown, also a pair of brown longitudinal stripes behind eyes; wings shaded with base pale **orchidaceus** Bagnall
Recorded from cultivated orchids in several parts of the world but rare in greenhouses in Britain.
- Antennal segments III and IV not strongly bicoloured, apices not elongate (fig. 15)..... 4
- 4 Body colour dark brown, tarsi and pedicels of antennal segments III–V paler; both sexes macropterous **badius** (Williams)
On Carex or Phragmites; ♀ iii, vii–ix, ♂ vii–ix, larvae not recorded; widespread in Europe but collected rarely in Britain; 4, 8, 22, 54.
- Body colour mainly yellow, base of head with transverse dark band, distal antennal segments brown, abdominal tergites and thorax with light brown markings; ♀ macr. or micr., ♂ not known **obscurus** (Müller)
On various grasses and cereals; ♀ macr., ♀ micr., also larvae i–xii; widespread in Europe, America and Australia, but usually not in large numbers in Britain; 1–5, [6], 7, 9, [12, 13, 15, 18], 21, 22, [25, 26, 28–31, 33–36], 37, 40, 42, [43, 50–52], 53–55, [57], 58, 60, [63], 68, 71, 73, [74], 75–79, 81, 83, [84, 85, 88], 96, 97, 99.
- 5 Antennal segment III yellow to yellow-brown, segments II and IV yellowish brown at least in part; wings bicoloured, basal fifth pale then dark brown shading to light brown at apex **tamicola** Bagnall
In Tamus communis flowers; ♀ and larvae v–vii, ♂ not known; recorded in France and Spain, widespread in southern England; 1, 3–5, 8, 18, 23, 24, 26, 28, 33, [36], 37, 44.
- Antennal segment III brown, sometimes yellowish at base, segments II and IV as dark brown as rest of antennae; wings pale or weakly shaded, particularly along veins, basal fifth not distinctly paler..... 6
- 6 Antennal segment VI less than 1.3 times as long as segment V, usually with a strongly marked basal ring (fig. 13); setae on tergite IX not stouter than median setae on VIII **validus** Karny



FIGS 12-21. 12, *Anaphothrips orchidaceus* antenna. 13, *A. validus* antenna. 14, *A. sylvarum* antenna. 15, *A. obscurus* antenna. 16, *A. articulosus* antenna. 17, *A. obscurus* head and pronotum. 18, *A. sylvarum* ♀ tergites VIII-IX. 19, *A. obscurus* ♀ tergites VII-VIII. 20, *A. articulosus* ♀ tergite VIII. 21, *A. tamicola* ♀ tergites VII-VIII.

- On *Galium palustre*; ♀ and ♂ *v-viii*, larvae *vii*; recorded from northern Germany to Roumania, in Britain only from Aberdeen and Inverness. (1 ♀ hemimacropter from Inverness has median tergal setae reduced and widely separated.)
- Antennal segment VI more than 1.4 times as long as V, constricted at base but without a basal ring (fig. 14); setae on tergite IX stouter than median setae on VIII (fig. 18)
- On *Galium verum*; ♀ and larvae *v-viii*, ♂ *vii*, widespread in Europe and southern England; 2, 4, [5], 6, 7, 17, 18, 21, 30.

Genus **APTEROTHRIPS** Bagnall

(figs 22-24)

The single species of this genus is found in many cold temperate parts of the world. Its country of origin is not known.

Dark brown wingless thrips, with deeply lobed sternal craspeda (fig. 23)

On grasses; ♀ and larvae recorded twice in Britain; Shetland, Fair Isle, ix. 1954; Ayr, ix. 1971.

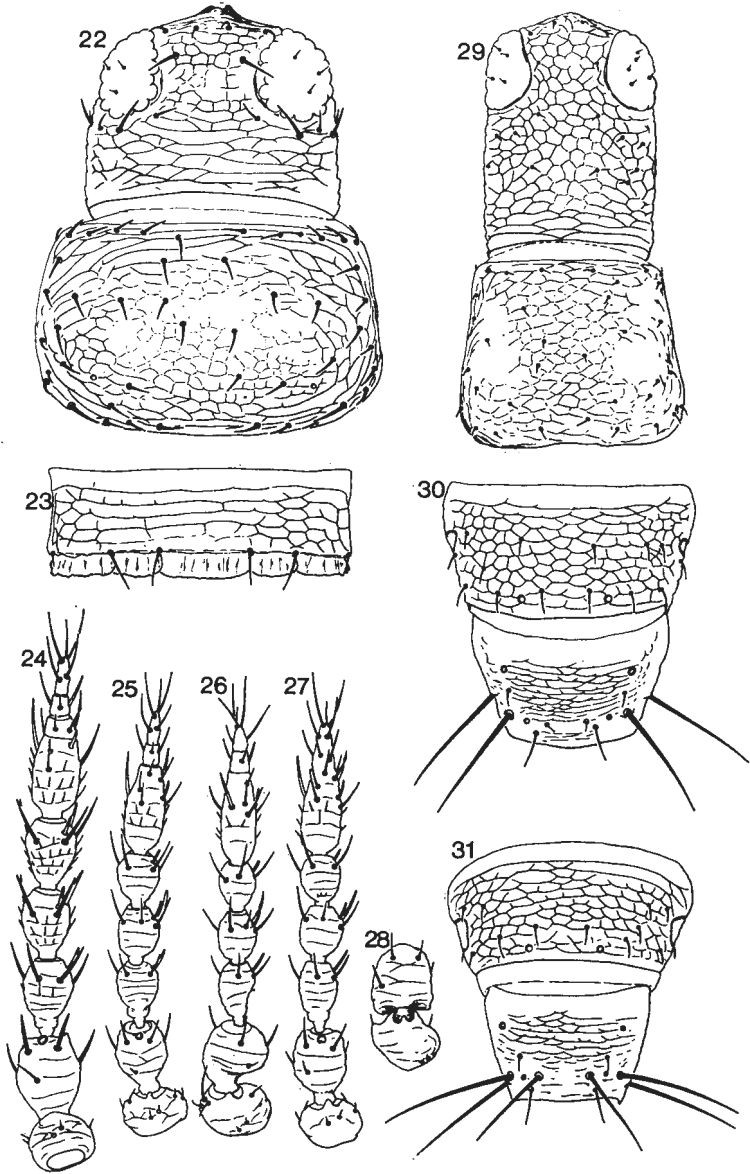
Genus **APTINOTHRIPS** Haliday

(figs 25-31)

All four species of this holarctic genus are apterous, and feed and breed within the leaf sheathes of grasses. They all occur in Britain but *rufus* has been introduced throughout the temperate regions of the world.

KEY TO SPECIES

- 1 Tergite IX of ♀ with posteromedian setae less than 0.2 times as long as lateral setae (fig. 30); tergites II-VIII of both sexes with 0 to 20 discal setae in addition to posterior submarginal setae; antennae 6-segmented, rarely 7- or 8-segmented (fig. 27).....2
- Tergite IX of ♀ with posteromedian setae more than 0.5 times as long as lateral setae (fig. 31); tergites II-VIII of both sexes with no discal setae; antennae 8-segmented, rarely 7-segmented (figs 25-26).....3
- 2 Lateral pair of posteromarginal setae on sternites III-VI of both sexes arising in front of margin; posteromedian setae and pores of tergite IX of ♀ nearer posterior margin than lateral setae; tergites II-VIII with 0-4 discal setae; base of antennal segment II usually broad and flat (fig. 28) **elegans** Priesner
On grasses; widespread in Europe, one ♀ recorded in Devon, Dawlish, vi. 1928.
- Lateral pair of posteromarginal setae on sternites III-IV arising at margin; posteromedian setae and pores of tergite IX of ♀ arise in line with lateral setae (fig. 30); tergites II-VIII of both sexes with 2-20 discal setae; base of antennal segment II not broad (fig. 27) **rufus** (Haliday)
On many grass species (a dark form, nitidulus Haliday, is found on salt marshes); all stages throughout year; very common in temperate regions throughout world; 1-9, 11-15, 17, 18, 20-23, [24-31], 32-38, 40-43, [44-52], 53-57, [58, 60, 63, 64], 68, 71-79, 81-91, 97-99.
- 3 Tarsi 2-segmented; posterior half of tergites II-VIII with 2 pairs of median setae in addition to lateral pair (fig. 31); antennal segment II as in *rufus*, segment VII with narrow base (fig. 25) **stylifer** Trybom
On several grass species, particularly *Deschampsia* and *Dactylis*; ♀ and larvae *i-xii*, ♂ *vi-ix*; widespread in Europe and northern U.S.A., not as common as *rufus* in Britain; 1-4, [5-7, 9, 12, 13], 14, 17, [18, 20], 21, [23, 24, 28-32], 33, [34, 36-39, 43, 47, 50-52], 53-55, [57, 58, 60, 63], 68, [70, 73, 74], 75-79, [80], 81, 82, [83], 84, [85, 86], 87, 88, [99].
- Tarsi 1-segmented; posterior half of tergites II-VIII with 3 pairs of median setae in addition to lateral pair; antennal segment II bulging, segment VII with a broad base (fig. 26) **karnyi** John
On grasses; widespread in Europe, 1 ♀ recorded in Kent, Folkestone, viii. 1949.



FIGS 22-31. 22, *Apterothrips secticornis* head and pronotum. 23, *A. secticornis* ♀ sternite IV. 24, *A. secticornis* antenna. 25, *Aptinothrips stylifer* antenna. 26, *Aptinothrips karnyi* antenna. 27, *Aptinothrips rufus* antenna. 28, *Aptinothrips elegans* antennal segments I-II. 29, *A. rufus* head and pronotum. 30, *A. rufus* ♀ tergites VIII-IX. 31, *A. stylifer* ♀ tergites VIII-IX.

Genus BALIOTHRIPS Uzel

(figs 32-37)

This genus is now used for a group of almost 20 species from Europe and the Old World tropics. However, it is probably a polyphyletic group, derived from the genus *Thrips*, resulting from convergence of species all breeding on Gramineae. Four species are recorded in Britain, of which *kroeli* has been referred to the monotypic genus *Euchaetothrips*, *graminum* to the monotypic genus *Stenothrips*, and *biformis* to the genus *Chloethrips*.

KEY TO SPECIES

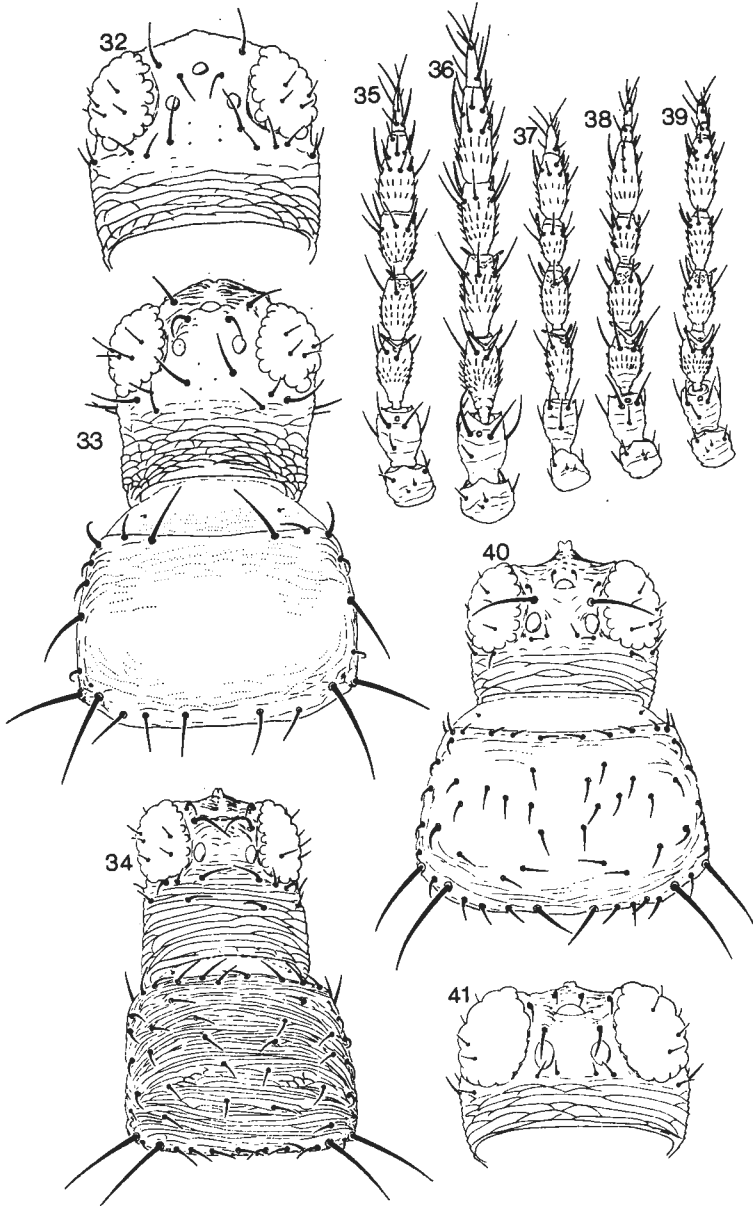
- 1 Head more than 1.1 times as long as wide (fig. 34); pronotum covered with numerous transverse lines of sculpture; both sexes macropterous; ♂ with small oval glandular areas on sternites III-VII **graminum** (Uzel)
On Gramineae, sometimes on Cereals; ♀ v-viii, ♂ v-vii, larvae vii-viii; apparently throughout Europe, but not found in northern Britain; [1, 2-4, 6-9, 12, 15, 17, 18, [20], 21-23, [24, 29, 31, 33, 36, 37], 40, 43, [45], 50.
- Head less than 1.1 times as long as wide, usually wider than long (figs 32-33); pronotum with no sculpture medially. 2
- 2 Sternites III-VI with median pair of setae arising at posterior margin; forewings uniformly shaded, always macropterous; body brown, antennal segment III and tarsi yellow, mid and hind tibiae largely yellow but shaded brown medially; posterior margin of tergite VIII of ♀ with complete comb; ♂ head and thorax yellow-brown; ♂ tergites III-VII with laterally directed triangular teeth on posterior margin; ♂ sternites III-VII with transverse glandular area **biformis** (Bagnall)
On Phalaris and Phragmites; ♀ and ♂ vii-viii; apparently breeding in Middlesex (Wraysbury and Horton), but only recorded at two other sites in Britain, Kent, Appledore, and Oxford, Weston; recorded from Roumania (as dobrogensis Knechtel), but common in Oriental region as pest of seedling rice (as oryzae Williams).
- Sternites III-VI with median pair of setae arising in front of posterior margin; forewings banded, pale at base and submedially, sometimes micropterous; mid and hind tibiae brown with yellow apex; posterior margin of tergite VIII of ♀ with comb interrupted medially. 3
- 3 Head at least 1.0 times as long as width across eyes, projecting in front of eyes (fig. 33); maxillary palps 3-segmented; antennal segment III more than 2.7 times as long as wide (fig. 36); both sexes macropterous; ♂ with oval glandular area on sternites III and IV **kroeli** (Schille)
On Glyceria maxima in wet areas; ♀, ♂ and larvae v-ix; widespread in Europe but not recorded in Scotland; 3-6, [9, 13, 15], 20-22, 24, 29, 33, 50, 51, [54].
- Head 0.9 times as long as wide, not projecting in front of eyes (fig. 32); maxillary palps 2-segmented; antennal segment III less than 2.4 times as long as wide (fig. 35); ♂ micropterous, ♀ macropterous or hemimacropterous; ♂ with slender transverse glandular area on sternites III-VII **dispar** (Haliday)
On Gramineae, particularly Glyceria, Phalaris and Holcus in wet areas; ♀ i-xii, ♂ vi-xii, larvae vi-ix; widespread in Europe and Britain; 1-7, 9, 12, [13], 14, [15, 18, 20], 21, 22, 23, [29], 30, 31, [33], 34, [37-39], 42, [43, 45, 50], 51-55, [57], 58, [60, 63, 68], 74-77, 81, 96-99.

Genus BELOTHRIPS Haliday

(figs 45, 48)

The four species of this genus are European, and are probably all associated with species of *Galium*.

Colour brown, tarsi and base of antennal segment III paler; antennal segments VII-VIII very long; head and pronotum with no long setae; tergites II-VIII with median pair of setae long and close together; abdominal segments IX and X unusually elongate **acuminatus** (Haliday)



FIGS 32-41. 32, *Baliothrips dispar* head. 33, *B. kroeli* head and pronotum. 34, *B. graminum* head and pronotum. 35, *B. dispar* antenna. 36, *B. kroeli* antenna. 37, *B. graminum* antenna. 38, *Ceratothrips ericae* antenna. 39, *C. frici* antenna. 40, *C. ericae* head and pronotum. 41, *C. frici* head.

On Galium verum; ♀ and ♂ *v-vii*, larvae *vii-ix*; widespread in Europe, but not recorded from England or Wales; [73, 74], 75-77, [78, 79], 81, 84, 99.

Genus BOLACOTHRIPS Uzel

(figs 134-135)

This genus includes one European species and three species from the tropics.

Colour yellow, antennal segments VI and VII and abdominal segments IX and X shaded; antennae 7-segmented, sense cones simple (fig. 135); head large (fig. 134); sternites with median row of accessory setae; ♀ macroptera with paired ctenidia on tergite VII at least; ♂ with transverse glandular area on sternites III-VII

jordani Uzel

On grasses (?*Alopecurus*); ♀ *micr. viii-x*, ♀ *macr.*, ♂ and larvae not recorded in Britain; widespread in Europe, but specimens from only three English counties have been studied; 1, 12, 33.

Genus CERATOTHRIPS Reuter

(figs 38-41)

This genus is now used for two species from *Erica* and one or more species from yellow-flowered Compositae in Europe and the Mediterranean area. These species have been referred to previously under the generic names *Amblythrips* or *Taeniothrips*.

KEY TO SPECIES

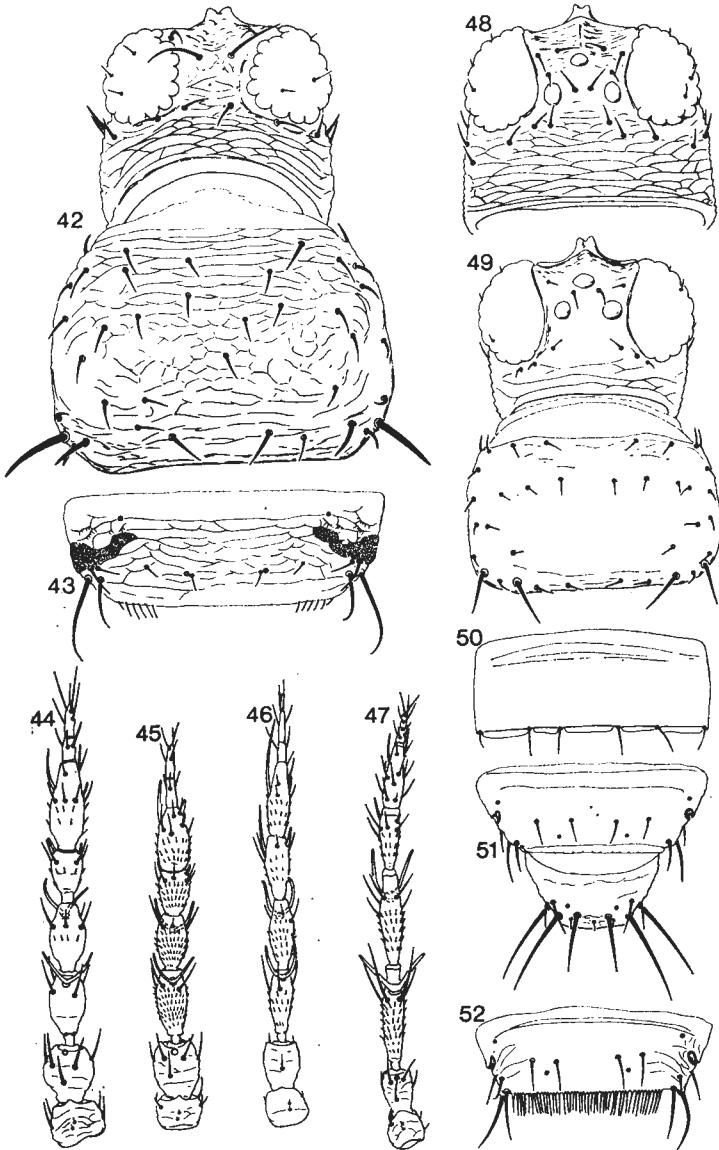
- 1 Ocellar setae pair III longer than distance between 2 ocelli (fig. 40); antennal segments III-VI brown; ♀ tergites VII and VIII with at least 5 lines of sculpture between median pair of setae, VIII without a comb of microtrichia on posterior margin; ♀ pronotum trapezoidal with no sculpture medially (fig. 40); ♂ apterous, yellow and larviform, sternites III-VIII each with 1 long and 2 short transverse glandular areas **ericae** (Haliday)
On Erica species; ♀ and larvae *i-xii*, ♂ *ii-x*; widespread in northern Europe; probably occurs throughout Britain; [1], 2-4, [5, 6], 7, 9, 11, 12, 14, 15, 20, 21, 31, 33, [39, 42, 43, 47], 50, 52, [53], 54, [55-58], 60, [63, 73, 74], 75, 76, [77-80], 81-88, 90, 99.
- Ocellar setae pair III about as long as distance between 2 ocelli (fig. 41) or shorter; antennal segments III-V yellow, VI yellow in basal half; ♀ tergites VII and VIII not sculptured between median pair of setae, VIII with a comb of microtrichia laterally on posterior margin rarely with microtrichia medially; ♀ pronotum transversely rectangular, covered with fine sculpture; ♂ macropterous, sternites III-VII with small oval glandular area **frici** (Uzel)
On yellow flowered Compositae in Mediterranean area and southern Europe, also common in Australia. Recorded only 3 times in Britain; Devon, Ilfracombe, 1♀; Sussex, Eastbourne, 1♀; Kent, Canterbury, 2♀ 5♂.

Genus CHAETANAPHOTHRIPS Priesner

(figs 43, 46, 49)

This is a small genus of five tropical species. *C. signipennis* Bagnall is a pest of cultivated bananas and *orchidii* (Moulton) is sometimes a minor pest in greenhouses in various parts of the world.

Body yellow, forewings narrow and dark with 2 pale areas; antennal segments IV-VI bicoloured **orchidii** (Moulton)
Polyphagous, recorded rarely in glasshouses in Britain; ♂ not known.



FIGS 42-52. 42, *Tmetothrips subapterus* head and pronotum. 43, *Chaetanaphothrips orchidii* ♀ tergite VIII. 44, *T. subapterus* antenna. 45, *Belothrips acuminatus* antenna. 46, *C. orchidii* antenna. 47, *Dichromothrips orchidis* antenna. 48, *B. acuminatus* head. 49, *C. orchidii* head and pronotum. 50, *T. subapterus* ♀ sternite IV. 51, *T. subapterus* ♀ tergites VIII-IX. 52, *D. orchidis* ♀ tergite VIII.

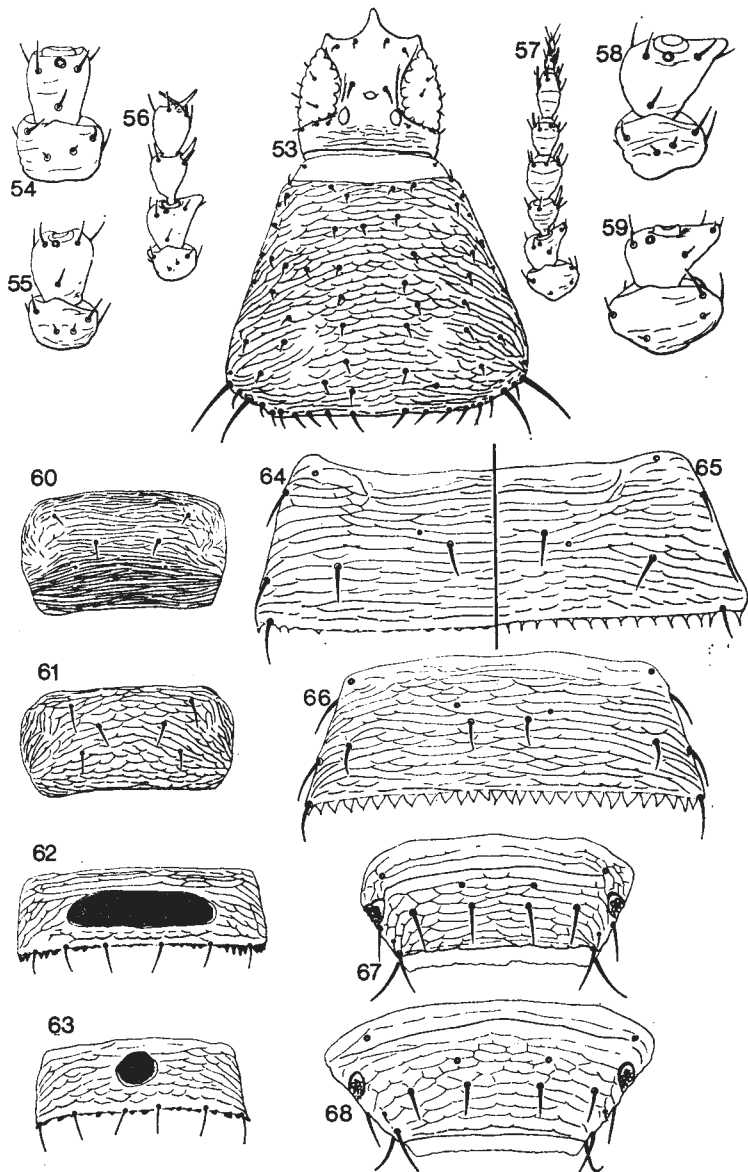
Genus CHIROTHRIPS Haliday

(figs 53-68)

This is a distinctive genus with more than 50 species, all of which breed in grass flowers. Many of these species are found in the Holarctic region, but there are others which are native to the Ethiopian and Neotropical regions. Five species are here recorded from Britain; *molestus* Priesner and *aculeatus* Bagnall being new records. British specimens labelled as *pallidicornis* Priesner in the British Museum (Natural History) collections are here regarded as *manicatus* Haliday.

KEY TO SPECIES

- 1 Both sexes with antennal segment II symmetrical (fig. 54), and sense cone on segment IV not forked; head prolongation in front of eyes less than 5 μ m; ♀ macropterous; ♂ micropterous, with glandular areas on sternites III-VII more than half as wide as sternites (fig. 62) **hamatus** Trybom
On Alopecurus pratensis; ♀ v-vii, ♂ v; widespread in Europe, locally common in Britain; 3, 4, 6, 7, 21, 30, 33, 51, 52, 76, 81.
- Antennal segment II produced outwards or at least asymmetrical (figs 55-59); head prolongation 2-12 μ m; sternal glandular areas of ♂ smaller (fig. 63)..... 2
- 2 Tergites of ♀ with craspeda on posterior margin much reduced or finely pointed (figs 64-65); ♂ with tergal craspeda entire; ♂ and ♀ with antennal segment II produced outwards without a seta at apex (fig. 58), and sense cone on IV not forked; ♀ macr.; ♂ micr. but not recorded in Britain **molestus** Priesner
An uncommon species recorded from Austria, Czechoslovakia and France; 1♀ swept from grass on chalk, Kent, viii. 1960.
- Tergites of both ♂ and ♀ with well-developed craspeda on posterior margins (figs 66-68)..... 3
- 3 Tergal craspeda with long detached lobes in both sexes (fig. 66); pro-, meso-, and metanotal sculpture finely transverse (fig. 60); ♂ apterous with antennal segment II asymmetrical (fig. 55), and sense cone on IV not forked; sternal glandular areas small and circular (cf. fig. 63), always on III-IV, usually also on V, VI or VII; ♀ macropterous with antennal segment II produced outwards without a seta at apex, and sense cone on IV forked (fig. 56); ♀ not recorded in Britain **aculeatus** Bagnall
20 ♂ swept from grass, Gloucester, vii. 1931; widespread in central and southern Europe, also in coastal States of western U.S.A.
- Lobes of tergal craspeda joined (fig. 67-68); sculpture of thoracic nota more or less reticulate (fig. 61); both sexes with antennal segment II produced outwards with a terminal seta, and sense cones on IV not forked (fig. 57)..... 4
- 4 Antennal segment II strongly produced, median seta near outer margin (fig. 59); vertex with 3-5 pairs of anteocellar setae; ♀ with distance between median setae on tergite VIII 2.0-2.6 times the length of these setae (fig. 68); pronotal discal setae exceptionally robust; only ♀ micropterae recorded in Britain **ruptipennis** Priesner
On ?Koeleria cristata; ♀ micr. iv-xi; uncommon in central and southern Europe; 100 ♀ micr. collected in Kincardine and Aberdeen between 1924 and 1973.
- Antennal segment II less produced, median seta usually near centre of segment (fig. 57); vertex with 2-3 pairs of anteocellar setae (fig. 53); ♀ with distance between median setae on tergite VIII 1.1-2.1 times the length of these setae (fig. 67); pronotal discal setae not robust; ♀ macr., ♂ micr. **manicatus** Haliday
On many species of Gramineae; ♀ i-xii, ♂ iii-xi, larvae vii-ix; found in most temperate parts of the world, probably in all British countries; 1-9, 12-15, 17, [18], 20-25, 28-31, 33-37, 39, 40, 42-45, [47], 49-54, [55, 57, 58, 60, 63], 67, 68, [71, 73, 74], 75-79, 81, 84, 87, [90, 96], 97-99.



Figs 53-68. 53, *Chirothrips manicatus* head and pronotum. 54, *C. hamatus* ♂ antennal segments I-II. 55, *C. aculeatus* ♂ antennal segments I-II. 56, *C. aculeatus* ♀ antennal segments I-IV. 57, *C. manicatus* ♀ antenna. 58, *C. molestus* ♀ antennal segments. 59, *C. ruptipennis* ♀ antennal segments. 60, *C. aculeatus* metanotum. 61, *C. manicatus* metanotum. 62, *C. hamatus* ♂ sternite III. 63, *C. manicatus* ♂ sternite III. 64, *C. molestus* ♀ tergite II (British). 65, *C. molestus* ♀ tergite II (Holotype). 66, *C. aculeatus* ♀ tergite II. 67, *C. manicatus* ♀ tergite VIII. 68, *C. ruptipennis* ♀ tergite VIII.

Genus **DENDROTHRIPS** Uzel

(figs 69, 79–82, 84–87)

This is a fairly large genus of small leaf-feeding species found in many parts of the Old World. Two of the four British species are common but the other two have been collected only once. The hind legs are held under the body at rest. All *Dendrothrips* species jump actively.

KEY TO SPECIES

- 1 Body colour brown; forewings banded or darkly shaded (fig. 69); antennae usually with 9 segments; pronotal posteroangular setae less than $10\mu\text{m}$ long 2
- Body colour yellow to white; forewings uniformly pale; antennae with 8 or 9 segments; pronotal posteroangular setae $20\text{--}30\mu\text{m}$ long 3
- 2 Forewing with 3 transverse white bands (fig. 69); antennal segments III–V much paler than II and VI; tergites III–VII with lateral polygonal reticulations not ridged internally (fig. 81) **ornatus** (Jablonowsky)
On leaves of Ligustrum and Syringa, but reported from Tilia and Alnus in Europe; ♀ iv–v, vii–ix, xi, ♂ vii, ix, xi, larvae vii–viii, xi; widespread in Europe and North America, locally abundant in southern England; 1–4, 6, 7, 14.
- Forewing uniformly shaded grey-brown; antennal segments III–V little paler than II and VI; tergites III–VII with lateral reticulations ridged internally (fig. 82) **degeeri** Uzel
On leaves of Fraxinus and Ulmus but reported from Tilia, Alnus and Corylus in Europe; ♀ v–ix, ♂ vii, ix, larvae vii–ix; widespread in Europe, common in southern England; 1–3, 5, 6, 8, 9, 12, [18], 20, 21.
- 3 Antenna with 8 segments (fig. 84); tergites III–VII with polygonal reticulations laterally bearing fine internal lines of sculpture (fig. 79); ocellar setae less than $10\mu\text{m}$ long **saltator** Uzel
Recorded once in Britain, in large numbers on Peucedanum officinale, Tankerton, Kent, vi. 1931; widespread in Europe on Fraxinus, Alnus, Corylus and Eupatorium cannabinum.
- Antenna with 9 segments (fig. 86); tergites III–VII with transversely elongate reticulations bearing short longitudinal ridges on posterior third (fig. 80); ocellar setae $20\mu\text{m}$ long **eastopi** Pitkin & Palmer
Known only from ♀ holotype and 9 ♀ paratypes on Hedera helix, Kew Gardens, Surrey, vi. 1968.

Genus **DICHROMOTHRIPS** Priesner

(figs 47, 52)

This genus occurs on orchids in the Old World. One species has been found once in Britain.

With the characters in the key to genera; antennae elongate (fig. 47)

orchidis Priesner

On Cymbidium flower stalk in greenhouse, Hertfordshire, Turnford, xii. 1938.

Genus **DREPANOTHRIPS** Uzel

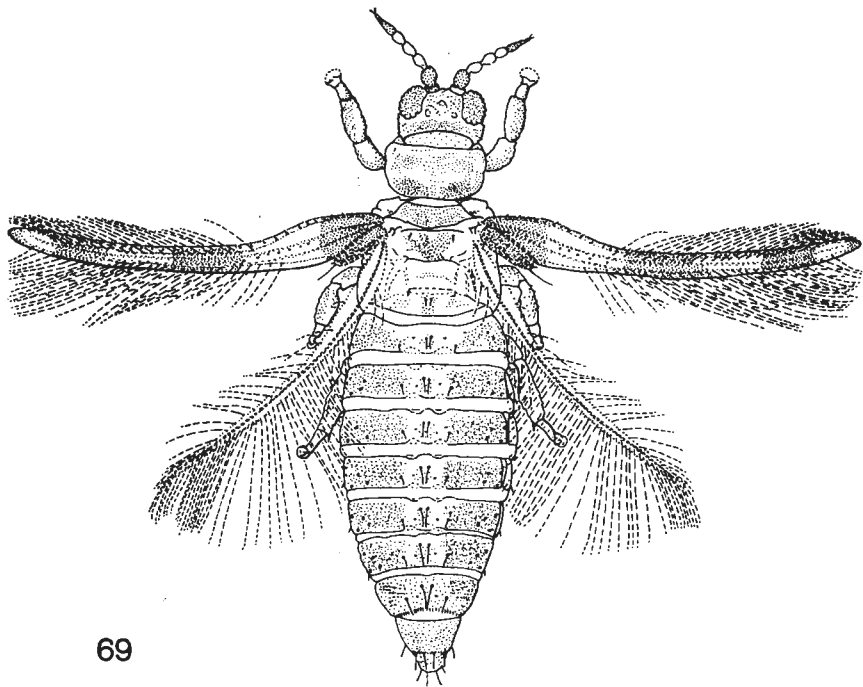
(fig. 147)

The single species in this genus can be distinguished from the species of the world-wide genus *Scirtothrips* only by the fusion of the last three antennal segments.

Colour yellow with brown shadings, distal antennal segments dark, wings shaded;

♂ with two long dark processes laterally on tergite IX **reuteri** Uzel

On leaves of Quercus robur, also on Betula and Corylus, but a pest of Vitis vinifera



69

FIG. 69. *Dendothrips ornatus* ♀.

in warmer climates; ♀ iii-vi, viii-xi, ♂ vi, viii-ix, larvae viii; widespread in Europe and North America, but collected infrequently in Britain; 3, 15, [18], 54, 74-76, 78, 79, 81, 84.

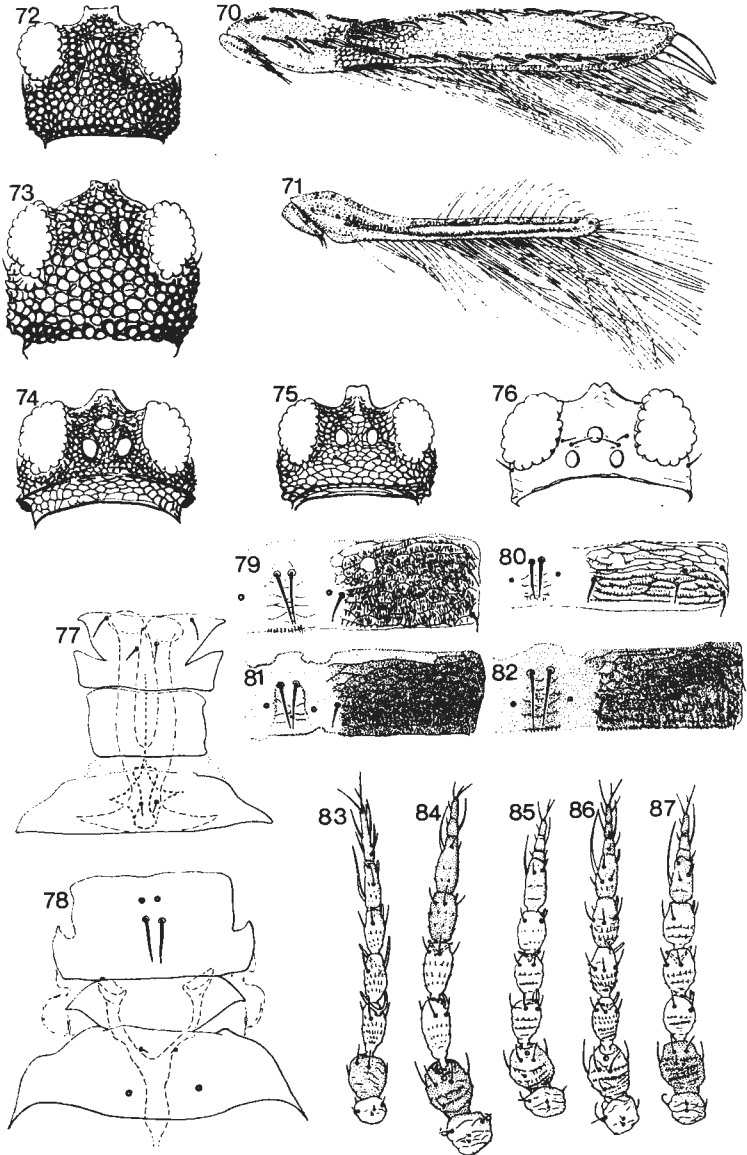
Genus **FRANKLINIELLA** Karny

(figs 88-89, 90-92, 95, 97, 99-102)

This is a large genus found mainly in the Neotropical region. A few species, including *schantzei* Trybom, are widespread in the tropics, but two species appear to be native to Britain. In addition *Iridothrips iridis* (the type-species of *Iridothrips*) is here regarded as an aberrant species of *Frankliniella*, and the name *Iridothrips* Priesner is therefore a junior synonym of *Frankliniella* **syn.n.** The only other species in *Iridothrips*, *mariae* Pelikan from Czechoslovakia, is regarded as a degenerate member of *Frankliniella* with the typical ctenidium on the eighth tergite.

KEY TO SPECIES

- 1 ♀ usually micropterous, ♂ always micropterous; metanotum with equiangular reticulations, median setae less than half as long as metanotum (fig. 101); tergites sculptured between median pair of setae; head unusually large (fig. 99); brown species with antennal segments III and IV as well as fore tibiae yellow
iridis (Watson)



FIGS 70-87. 70, *Parthenothrips dracaenae* forewing. 71, *Heliethrips haemorrhoidalis* forewing. 72, *P. dracaenae* head. 73, *H. haemorrhoidalis* head. 74, *Helionothrips errans* head. 75, *Hercinothrips bicinctus* head. 76, *Leucothrips nigripennis* head. 77, *Dendrothrips eastopi* metathoracic furca. 78, *H. bicinctus* metathoracic furca. 79, *D. saltator* tergite V. 80, *D. eastopi* tergite V. 81, *D. ornatus* tergite V. 82, *D. degeeri* tergite V. 83, *L. nigripennis* antenna. 84, *D. saltator* antenna. 85, *D. ornatus* antenna. 86, *D. eastopi* antenna. 87, *D. degeeri* antenna.

In Iris pseudacorus leaf funnels; ♀ *micr.* v-viii, ♀ *macr.* vii, ♂ and larvae vi-viii; widespread in Europe but collected infrequently in Britain; 3, 4, 21, [28], 36, 54, 71.

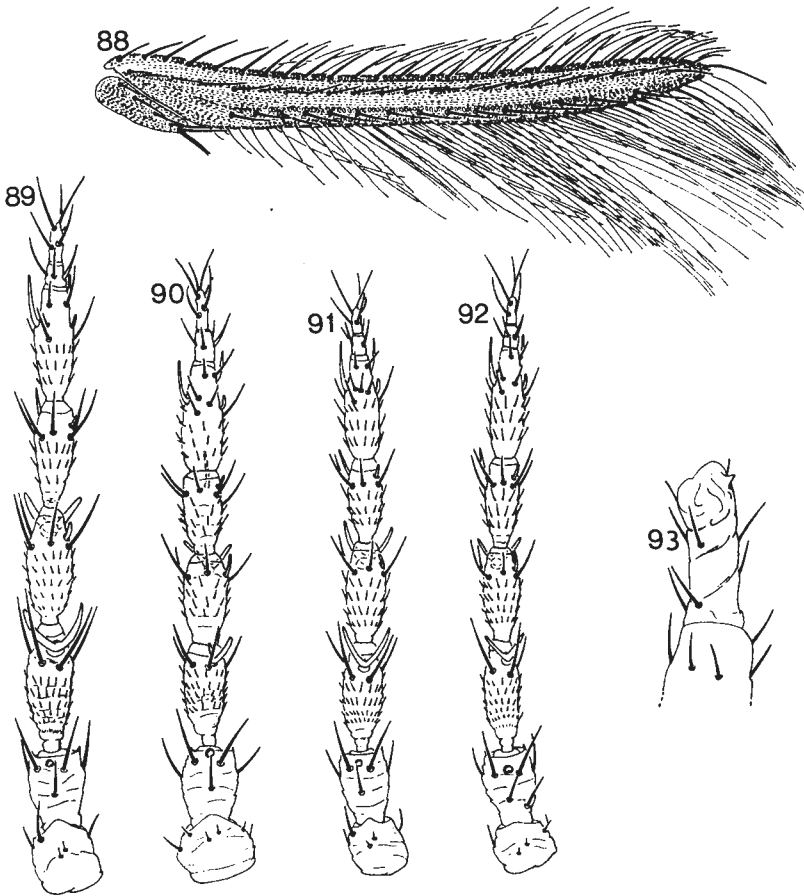
- Both sexes macropterous; metanotum with longitudinally elongate reticulations, median setae more than two-thirds as long as metanotum (fig. 102); tergites not sculptured between median setae (fig. 95)..... 2
- 2 Posterior margin of tergite VIII of ♀ without comb of microtrichia; ocellar setae pair III arising on a line joining anterior margins of posterior ocelli

schultzei (Trybom)

A common pest in the tropics, recorded in bulb stores in Netherlands; 1 ♀ collected on Pinus in Berkshire and described as *anglicana* Bagnall.

- Posterior margin of tergite VIII of ♀ with comb of broadly based microtrichia (fig. 95); ocellar setae pair III arising well in front of posterior ocelli..... 3
- 3 Head strongly produced in front of eyes (fig. 100), more than 0.9 times as long as wide; antennae slender, segment IV more than 2.5 times as long as wide, segment V uniformly shaded (fig. 92)

tenuicornis (Uzel)



FIGS 88-93. 88, *Frankliniella intonsa* forewing. 89, *Kakothrips pisivorus* antenna. 90, *F. iridis* antenna. 91, *F. intonsa* antenna. 92, *F. tenuicornis* antenna. 93, *K. pisivorus* foretarsus.

On Gramineae, particularly Avena; ♀ iv-x, ♂ and larvae vii-ix; widespread in Europe and North America; 1, 3-6, 9, 20-22, [25], 28, [29], 33, [37], 42, 54, 75, 76, [78, 79, 84].

- Head broad, less than 0.75 times as long as wide, not produced in front of eyes (fig. 97); antennae stout, segment IV less than 2.3 times as long as wide, segment V yellow at base (fig. 91) **intonsa** (Trybom)

On many flowers, particularly Erica; ♀ i, iii-xi, ♂ i, vi-x, larvae v-x; very common throughout Europe to Pakistan, infrequent in northern Britain; 1-6, [7], 8, 9, 11, 12, [13], 14-18, 20, 21, [22], 23, [25, 26, 31], 33, [37], 39-41, [44], 51, 52, [74], 75, 76, [79].

Genus HELIOTHRIPS Haliday

(figs 71, 73)

There are two species in this genus. One is found only in South Africa, the other is common throughout the tropics and subtropics, highly polyphagous and is sometimes a pest in glasshouses in temperate regions.

Body dark brown when mature, abdomen frequently paler in teneral specimens, legs yellow; ♂ very rare **haemorrhoidalis** (Bouché)

Genus HELIONOTHRIPS Bagnall

(fig. 74)

More than six species of this genus are known from the tropics of the Old World, but one of these was described originally from a glasshouse in Britain.

Body dark brown; ♂ with large glandular areas on sternites VII-VIII **errans** (Williams)

Genus HERCINOTHRIPS Bagnall

(figs 75, 78)

All eight species of this genus probably originated in Africa. Two have been found in many parts of the sub-tropics as well as in glasshouses in temperate regions. The males have a slender transversely elongate glandular area on four abdominal sternites.

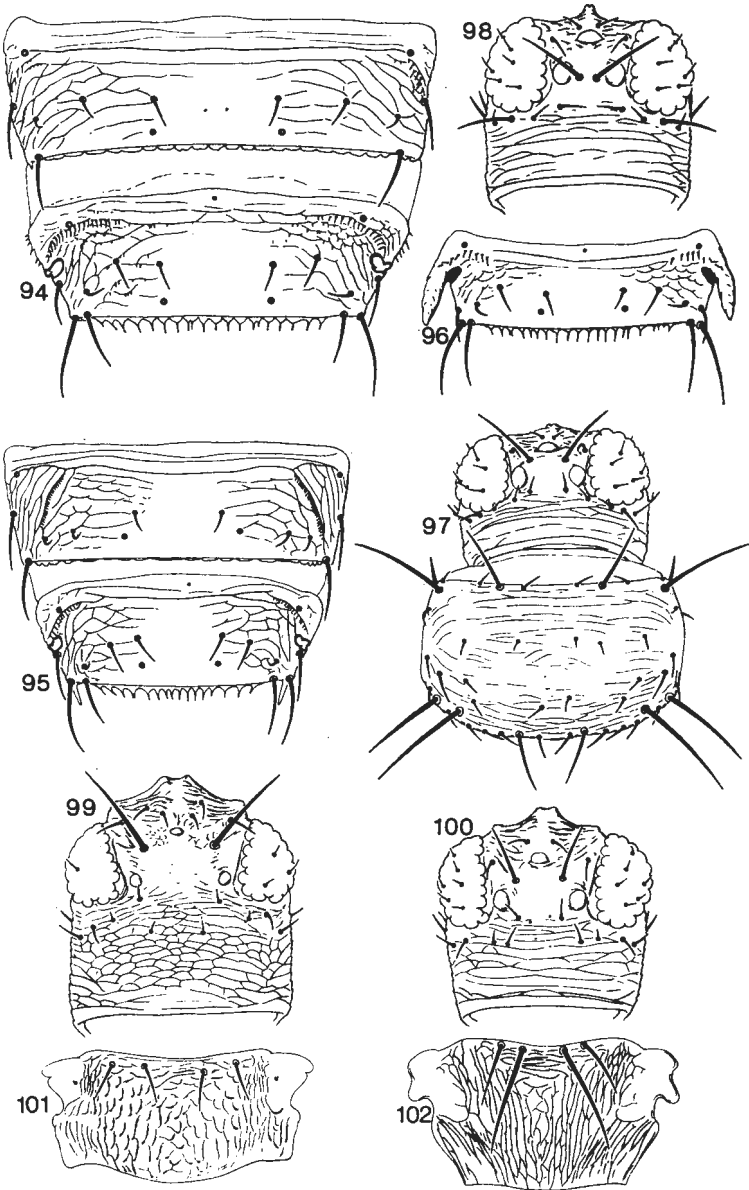
KEY TO SPECIES

- 1 Median pale area of forewing less than half as long as first dark cross band, frequently indistinct so that wing is dark in colour except at base and apex **femorialis** (Reuter)
Highly polyphagous in glasshouses, but not common; sometimes reared for insecticide trials.
- Median pale area of forewing usually longer than first dark cross band, so that wing is largely pale with 2 distinct transverse dark bands **bicinctus** Bagnall
Polyphagous but rare in British glasshouses; sometimes a pest on cultivated bananas in East Africa, Canary Islands and Australia.

Genus KAKOTHRIPS Williams

(figs 89, 93, 96, 98)

This genus of five European species is closely related to *Frankliniella*. It can be distinguished by the characters given in the key to genera, although



FIGS 94-102. 94, *Kakothrips pisivorus* ♀ tergites VII-VIII. 95, *Frankliniella intonsa* ♀ tergites VII-VIII. 96, *K. pisivorus* ♂ tergite VIII. 97, *F. intonsa* head and pronotum. 98, *K. pisivorus* head. 99, *F. iridis* head. 100, *F. tenuicornis* head. 101, *F. iridis* metanotum. 102, *F. tenuicornis* metanotum.

not all *Kakothrips* species have a pair of projections on tergite VIII of the male.

Large brown thrips with deeply shaded wings, tarsi and antennal segment III yellow; tooth at apex of fore tarsus visible only in lateral view (fig. 93)

(= *robustus* (Uzel)) ***pisivorus*** (Westwood)
The Pea Thrips, breeding in flowers of Pisum, Lathyrus and Vicia, frequently causing damage; ♀ v-viii, ♂ v-vii, larvae vi-viii; widespread in Europe but not recorded from Scotland; 1, 3-6, [12, 13, 18], 21, 22, [24], 28, 33, 50, [53].

Genus LEUCOTHRIPS Reuter

(figs 76, 83)

This genus includes several minute leaf-feeding species, all of which jump actively when disturbed. They are found mainly in the tropics. One species has been collected rarely in Britain on ferns in glasshouses.

Body yellow with almost black forewings, less than 0.9mm long; ♂ not known
nigripennis Reuter

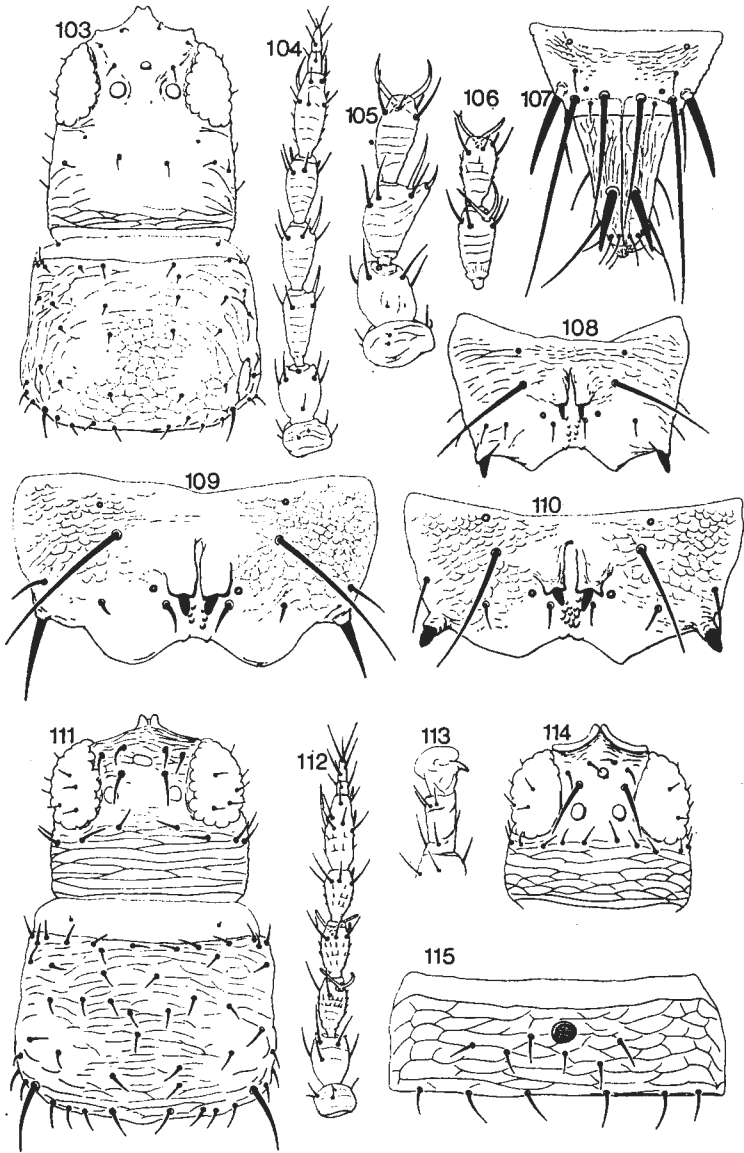
Genus LIMOTHRIPS Haliday

(figs 103-110)

The five species in this genus all breed only on Gramineae. They probably originated in the Palearctic, but three of them are now found in many temperate parts of the world. One species, *angulicornis* Jablonowski, is unusual in having the second antennal segment prolonged into a lateral tooth, but although this species is found in central and southern Europe as well as in Australia and California no specimens from Britain have been studied.

KEY TO SPECIES

- 1 Antennal segment III strongly asymmetric, prolonged externally (fig. 105); ♂ with no sternal glandular areas, and lateral setae on tergite IX slender and not on stout tubercles (fig. 109) ***denticornis*** Haliday
In florets of Gramineae, particularly Avena; ♀ i-xi, ♂ vi-x, larvae vii-viii; widespread in Europe and North America, also in Australia, apparently more common in southern England than in Scotland; 1-9, 12, [13, 15], 17, [18], 20-22, 24, 25, [26], 28-31, [33, 36, 37, 38], 40, [45, 46, 50, 52], 53, 54, [55, 58, 63, 68, 70, 73, 74]. 75-79, 81, 91, 95, 96, [99].
- Antennal segment III not strongly produced externally (fig. 104) 2
- 2 Tergite IX of ♀ with 1 pair of setae very stout, similar to setae on tergite X; antennal segment III and IV with sense cones forked, sometimes forked twice (fig. 106), but in ♂ not forked on III; ♂ with no sternal glandular areas, and lateral setae on tergite IX very stout on pronounced tubercles (fig. 110) ***schmutzi*** Priesner
Uncommon in central Europe, recorded 3 times in Britain, Surrey, Box Hill, v.1926 and Leith Hill, vii.1924, also Hertfordshire, Hoddesdon, vii.1952. The latter record included both sexes and larvae on Zerna ramosa.
- Tergite IX of ♀ without stout setae; antennal segments III and IV each with 1 simple sense cone (fig. 104); ♂ with a small round glandular area on sternites III-VII, lateral setae on tergite IX stout and arising from tubercles with oblique apex (fig. 108) ***cerealium*** Haliday
On various Gramineae, sometimes abundant on cereals; ♀ i-xii, ♂ vi-ix, larvae vi-x; widespread throughout Europe, and introduced to many parts of the world; 1-9, [12, 13], 14, 15, 17, 18, 20-25, 28-38, 40, [42-46], 49-55, [57, 58, 60, 63, 68, 71, 72], 73-79, 81, 84, 85, [86, 87], 91, 95, 96, [97, 98], 99.



FIGS 103-115. 103, *Limothrips cerealium* head and pronotum. 104, *L. cerealium* antenna. 105, *L. denticornis* antennal segments I-IV. 106, *L. schmutzi* antennal segments III-IV. 107, *L. schmutzi* ♀ tergite IX-X. 108, *L. cerealium* ♂ tergite IX. 109, *L. denticornis* ♂ tergite IX. 110, *L. schmutzi* ♂ tergite IX. 111, *Oxythrips ulmifoliorum* head and pronotum. 112, *O. ulmifoliorum* antenna. 113, *O. ajugae* ♀ left fore tarsus. 114, *O. bicolor* head. 115, *O. bicolor* ♀ sternite III.

Genus MYCTEROTHRIPS Trybom

(figs 136-137, 139-142)

This generic name is now used for a group of about 20 species which feed on the leaves of shrubs and trees in the holarctic region and the old world tropics. The tropical species have numerous microtrichia on the tergites, but these are reduced in the species from temperate regions and these species could be grouped under the name *Physothrips*. One species, *consociatus*, has been placed in a separate genus, *Rhopalandrothrips*, because of sexual dimorphism in the antennae.

KEY TO SPECIES

- 1 Postocular setae stout, ocellar setae pair III arising in front of a line joining anterior margins of posterior ocelli (fig. 136); metanotal furca with median spinula poorly developed or not visible; tergites VII and VIII with lines of sculpture medially; wings rather short, scarcely 3 times as long as pronotal width; mature body colour brown with antennae similar to *salicis*, but ♀ very pale in midsummer after emergence
latus (Bagnall)
On Betula leaves; ♀ iv-ix, ♂ vi-viii, larvae vi-ix (adult ♀ overwinters?); possibly widespread in Europe, but rare in southern Britain; [1], 5, 7, 8, [31, 33, 50], 51-54, [57, 60, 63, 72, 74], 75-79, 81, [84], 85.
- Postocular setae small and fine, ocellar setae pair III arising on a line joining anterior margins of posterior ocelli (fig. 137); metanotal furca with well developed median spinula (fig. 142); tergites VII and VIII with no sculpture medially (fig. 141); wings fully developed, four times as long as pronotal width.....2
- 2 Pronotal disc with 22-28 setae; antennal segment III as brown as rest of antenna; ♀ with head and thorax as brown as abdomen; ♂ light brown, with antennal segment VI greatly enlarged (fig. 140)
consociatus (Targioni-Tozzetti)
On Betula leaves; ♀ iv, vii-ix, ♂ vii-ix, larvae viii; widespread in Europe, but not common; 3, 5-7, 15, 21.
- Pronotal disc with 12-18 setae; antennal segment III and base of IV much paler than II and V-VIII; head and thorax frequently paler than abdomen; ♂ very pale, antennae normal
salicis (Reuter)
On leaves of Salix species, particularly purpurea and viminalis; ♀ v-ix, xii, ♂ and larvae viii; widespread in Europe but not commonly collected; 1, 3, 4, 7, 18, 35, 53-55.

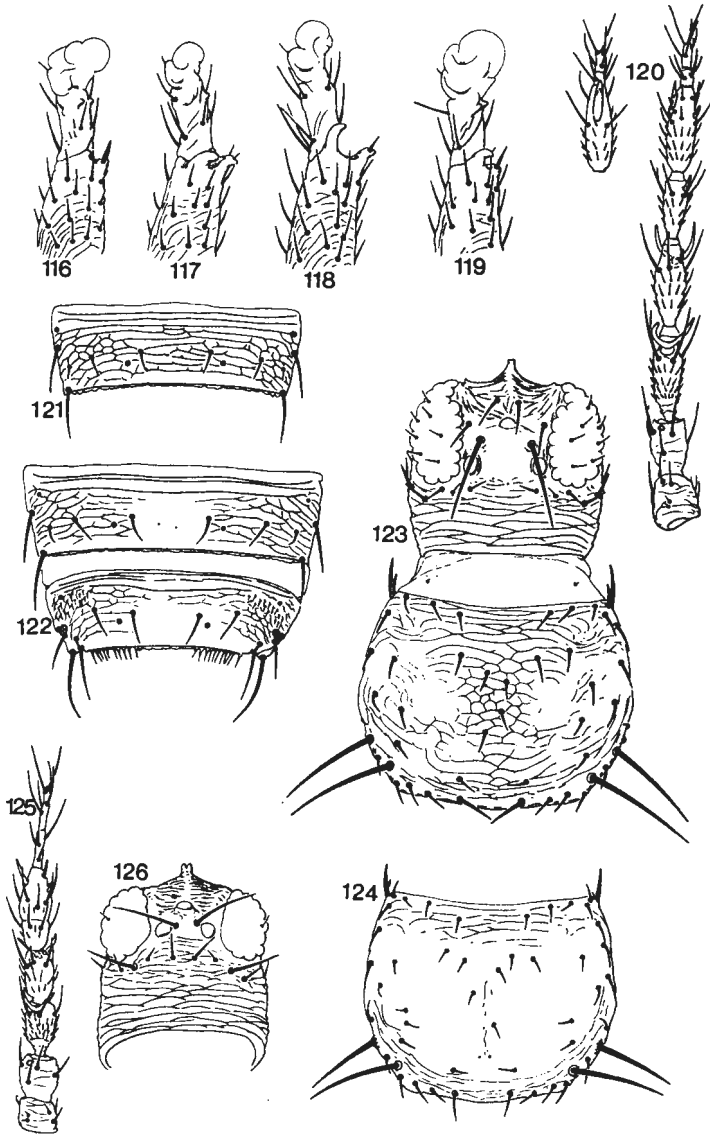
Genus ODONTOTHRIPS Amyot & Serville

(figs 116-124, 127-132)

There are 25 species in this genus. Twenty-three of these are found in the Palearctic region where the available host records indicate that they breed in flowers of Leguminosae. Although eight species have been recorded in Britain, the record of a single female of the central European species *intermedius* on *Lathyrus pratensis* in Perthshire (Morison, 1947) is not accepted here. Females of *intermedius* are indistinguishable from *phaleratus*, although the males lack median lobes on abdominal sternites IV to VII.

KEY TO SPECIES

- 1 Fore tibiae without distinct apical claws (fig. 116).....2
- Fore tibiae with 1 or 2 apical claws (figs 117-119).....3
- 2 Pronotum with lines of sculpture medially in both sexes (fig. 123); ♂ genitalia with 4 or 5 (rarely more) pairs of endothelial spines which are almost equally spaced and which decrease in size distally (fig. 131)
ignobilis Bagnall
On Ulex and U. minor; ♀ and ♂ v-ix, larvae ix; found in France, Spain and Portugal, widespread in Britain including the Channel Islands; 2-5, 7, 12, 15, 33, 43, 53, 55.

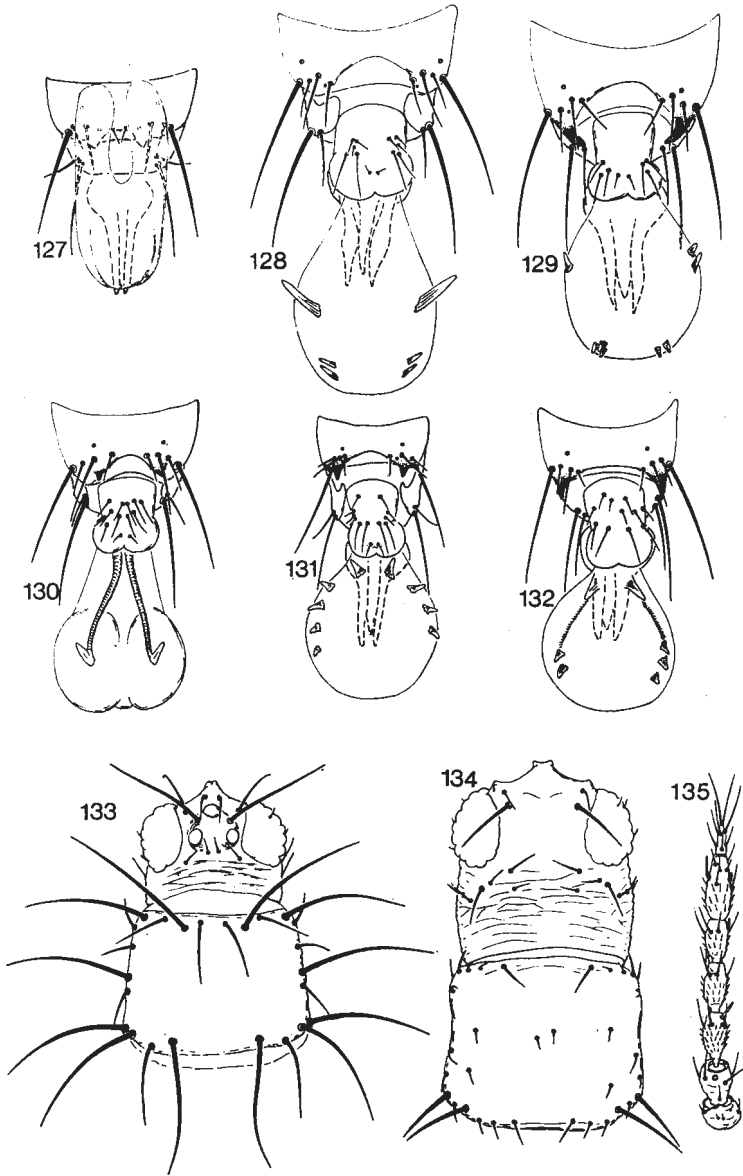


FIGS 116-126. 116, *Odontothrips ignobilis* left fore tarsus. 117, *O. biuncus* left fore tarsus. 118, *O. ulicis* left fore tarsus. 119, *O. loti* left fore tarsus. 120, *O. ulicis* antenna and lateral view of VI-VIII. 121, *O. biuncus* ♀ tergite VII. 122, *O. ulicis* ♀ tergites VII-VIII. 123, *O. ignobilis* head and pronotum. 124, *O. meliloti* pronotum. 125, *Rhaphidothrips longistylus* antenna. 126, *R. longistylus* head.

- Pronotum with no lines of sculpture medially in either sex (fig. 124); ♂ genitalia with 3 or 4 pairs of endothecal spines, the basal pair set apart and usually larger (fig. 132) **melloti** Priesner
On Melilotus; ♀ and ♂ *vi-viii*, larvae not recorded; widespread in central and southern Europe, probably introduced into Britain with its host plant; 3, 4, [13].
- 3 Fore tibiae with 2 distinct claws (figs 117-118)..... 4
- Fore tibiae with 1 claw and a bristle-bearing tubercle (fig. 119)..... 6
- 4 Abdominal tergites II-VIII with lines of sculpture between the median setae as well as laterally (fig. 121); antennal segment IV yellow brown, intermediate in colour between segments III and V; distal fore tarsal segment with 1 or 2 small hooks or tubercles on inner margin (fig. 117); ♂ genitalia with 1 pair of stout endothecal spines, each supported by a well developed canaliculus (cf. fig. 130 **biuncus** John
On Vicia; ♀ and ♂ *vi-ix*, larvae *vii-viii*; widespread in Europe and Britain; 1, 3-6, 12, 21, [33, 39, 50], 52, [53], 55, [60, 73, 75], 76, [77, 78], 81, [84].
- Abdominal tergites II to VIII striate laterally but with no sculpture between median setae (fig. 122); antennal segment IV brown, concolourous with antennal segment V; distal fore tarsal segment without small tubercles on inner margin (fig. 118); ♂ genitalia without canaliculi, but with at least 3 pairs of spines (figs 128-129)..... 5
- 5 Forewing with 13 to 19 setae on lower vein; ♂ tergite IX with pair of strong dark processes on posterior margin, genitalia with 3 or 4 pairs of endothecal spines, basal pair not much larger than distal pairs (fig. 129) **cytisi** Morison
On Cytisus (Sarthamnus) scoparius; ♀ *ii-xi*, ♂ *ii-x*, larvae *vi*; recorded only from northern Scotland where it is fairly common; [60, 73], 75, 76, [77, 78, 79], 81, [84-86].
- Forewing with 16-25 setae on lower vein; ♂ tergite IX without dark processes on posterior margin, genitalia with 3 or 4 pairs of endothecal spines, basal pair larger than distal pairs (fig. 128) **ulicis** (Haliday)
On Ulex europeus; ♀ *i-xii*, ♂ *i-v*, larvae *v-vii*, *ix*; recorded from France, widespread and common in Britain; 2, 3, 6, [7], 11, 12, 15, 18, [20, 21], 52, 54, 55, [68, 73], 75, 76, [77, 78], 79, [81, 82], 84, [85, 86], 87, 93, [97].
- 6 Upper vein of forewing usually with a short interval in row of setae, ♀ with 4 + 10-16 + 2 setae, ♂ with 4 + 8-14 + 2 setae; antennal segment IV yellow brown, intermediate in colour between segments III and V; distal fore tarsal segment with 1 or 2 small hooks or tubercles on inner margin (fig. 119); ♂ genitalia with 1 pair of stout endothecal spines supported by a well developed canaliculus (fig. 130); ♂ sternites without median lobes **loti** (Haliday)
On Lotus, Anthyllis, and Ononis; ♀ *vi-ix*, ♂ *iv*, *vi-viii*, larvae *vii-viii*; widespread in Europe and common in Britain; 1-4, [8], 9, 12, [13], 14, 17, 23, 29, [33], 50, 53, [55, 60, 73, 74], 75-79, 81, [84, 86].
- Upper vein of forewing usually with a long interval in row of setae, ♀ with 4 + 6-11 + 2 setae, ♂ with 4 + 4-9 + 2 setae; antennal segment IV brown, concolourous with segment V; distal fore tarsal segment without tubercles; ♂ genitalia bilobed without endothecal spines (fig. 127); sternites IV-VII each with a median lobe on posterior margin **phalaratus** (Haliday)
On Lathyrus and Vicia; ♀ *v-ix*, ♂ *v-viii*, larvae *vii-ix*; widespread in central Europe; 1-4, [6, 8], 11, [12, 15], 18, 21, [22], 23, [28], 31, [33, 37, 46], 47, 49, [50, 51], 52, [53, 54], 55, [58, 60, 63, 70, 73, 74], 75-79, 81, [82, 84], 86, 87, [98, 99].

Genus OXYTHRIPS Uzel
(figs 111-115)

This genus includes about 30 species which are found mainly in the Holarctic region. Some species are very difficult to identify as is evident from the key below. The two British species *ajugae* and *bicolor*, are usually easy to recognize, although in the neighbourhood of Aberdeen intersex individuals which cannot be placed in either species have been collected regularly (Mound, 1971a). The other three species of *Oxythrips* found in Britain are apparently host-specific to Ash, Elm and Oak trees, but no reliable morphological differences have been found between them in males,



FIGS 127-135. 127, *Odontothrips phaleratus* ♂ genitalia. 128, *O. ulicis* ♂ genitalia. 129, *O. cytisi* ♂ genitalia. 130, *O. loti* ♂ genitalia. 131, *O. ignobilis* ♂ genitalia. 132, *O. meliloti* ♂ genitalia. 133, *Scolothrips longicornis* head and pronotum. 134, *Bolacothrips jordani* head and pronotum. 135, *B. jordani* antenna.

females or larvae. The two original females of *virginalis* Priesner from Austria have been studied and compared with males and females recorded under that name from Britain. All these specimens are here regarded as teneral individuals of *ulmifoliorum*, and so *virginalis* Priesner is a junior synonym of *ulmifoliorum* Haliday syn.n.

KEY TO SPECIES

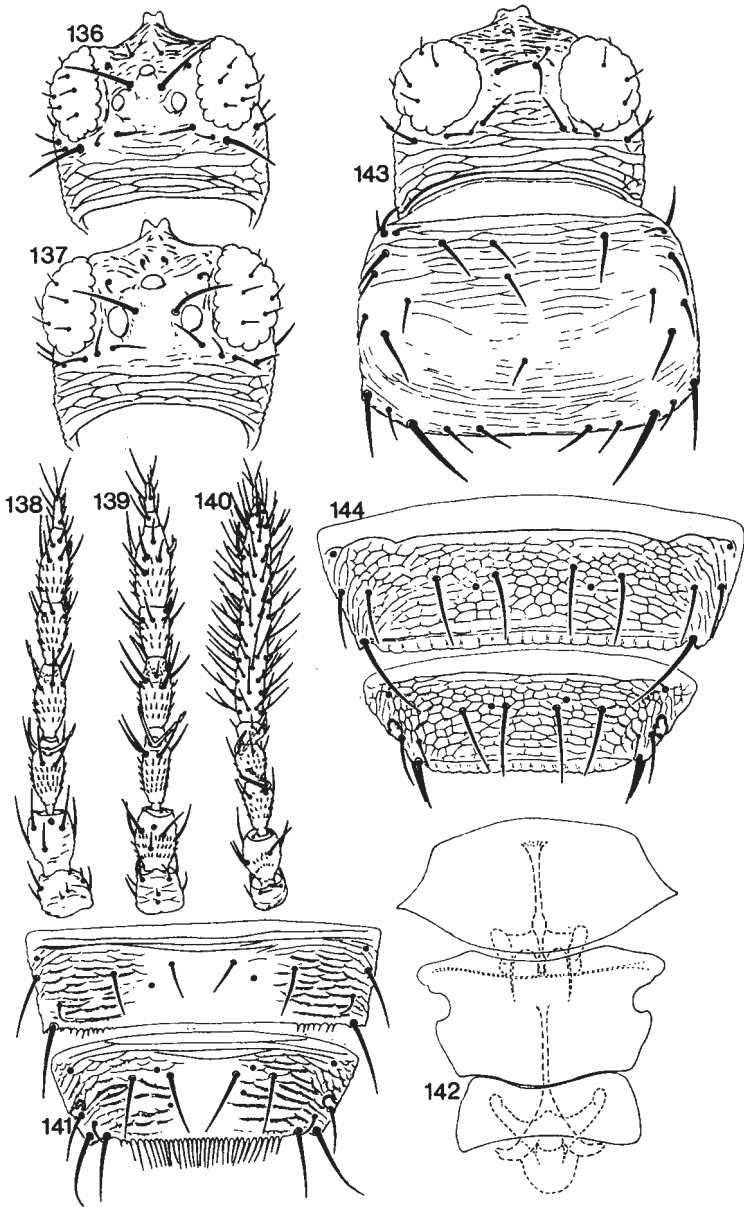
- 1 Ocellar setae pair III about 1.5 times as long as the distance between their bases (fig. 114); sternites III-VI of ♀ with accessory setae. 2
 - Ocellar setae pair III shorter than distance between their bases (fig. 111); sternites III-VI without accessory setae, but sternite II sometimes with 1 or 2. 3
- 2 Abdominal segment X of ♀ about as long as segment IX; both sexes with fore tarsal claw (fig. 113); sternites III-VI with accessory setae but without glandular areas; hind vein of forewing with 8-13 setae in ♀, 8-12 setae in ♂; antennal segments I-III pale, body colour brown in ♀, yellow in ♂ **ajugae** Uzel
On male cones of Pinus; ♀ i, iv-vii, ix-x, ♂ iv-vi, x, larvae v-vii; widespread across Europe to Turkey, probably more common in Britain than records suggest; 3, 7, 14, 15, 21, 54, [73], 74-79, 81, 84, 85, [86], 90, 93.
- Abdominal segment X of ♀ about twice as long as IX; both sexes without fore tarsal claw; sternites III-VII with accessory setae, III-IV with small circular glandular area medially (fig. 115); hind vein of forewing with 11-18 setae in ♀, 10-16 setae in ♂; antennal segments I-III pale, body colour brown in ♀, yellow in ♂ **bicolor** (Reuter)
On male cones of Pinus; ♀ i, iv-vii, x, ♂ ii-v, x-xi, larvae v-vii; widespread from Britain to Roumania; [37, 53], 54, [55, 73, 74], 75-79, 81, 84, [85], 86.
- 3 ♀ body and antennae dark brown, antennal segment I as dark as II but III sometimes paler; usually micropterous or hemimacropterous, forewing of macropterae with 19-24 setae on costa and 8-12 setae on hind vein; scutellum with heavy sculpture; ♂ unknown **halidayi** Bagnall
On Fraxinus; ♀ ii-xi, larvae vii-viii; recorded from Germany and France, widespread but infrequently collected; 1, 3, 4, 8, 12, 22, 33, 34, [36], 42, 50, 52, 53, 60, 75-79, 81, 84, 85, 90, 99.
- ♀ body pale to dark brown, antennal segment II darker than I and III; both sexes macropterous; forewing with 22-27 setae on costa and 6-11 setae on hind vein in ♀, 19-22 setae on costa and 4-10 setae on hind vein in ♂; scutellum not heavily sculptured; ♂ body colour yellow **ulmifoliorum** Haliday
On Ulmus; ♀ i-x, ♂ vii-x, larvae vi-ix; widespread in Europe, locally common throughout Britain; 1-9, 11-13, 15, 17, 18, [21, 28, 29], 30, 33, 35, 36, 50, 52-54, [55, 56, 60, 63, 73], 74-79, 81, 84, 85, [86], 96, 99.
- ♀ body yellow, antennal segments I-III pale but II sometimes darker than I and III; both sexes macropterous; forewing with 25-29 setae on costa and 6-12 setae on hind vein in ♀, 21-23 setae on costa and 6-10 setae on hind vein in ♂; scutellum not heavily sculptured; ♂ body colour yellow **quercicola** Bagnall
On Quercus robur; ♀ i-ii, iv-ix, xi, ♂ vi-ix, larvae vi-ix; not recorded from continental Europe, locally common in Britain; 9, 53, 54, [73, 74], 75, 76, 81, 84.

Genus PARTHENOTHRIPS Uzel

(figs 70, 72)

The only species in this genus is rare in British glasshouses, but is widespread in the sub-tropics.

Body colour yellow to brown, ♂ frequently paler with a round glandular area on median abdominal sternites **dracaenae** (Heeger)



FIGS 136-144. 136, *Mycetothrips latus* head. 137, *M. salicis* head. 138, *Platythrips tunicatus* antenna. 139, *M. consociatus* ♀ antenna. 140, *M. consociatus* ♂ antenna. 141, *M. consociatus* ♀ tergites VII-VIII. 142, *M. salicis* meso- and metathoracic furcae. 143, *P. tunicatus* head and pronotum. 144, *P. tunicatus* tergites VII-VIII.

Genus **PLATYTHRIPS** Uzel

(figs 138, 143-144)

The only species in this genus resembles the species in the *Thrips* and *Baliothrips* complex but differs from them in the absence of tergal ctenidia and the presence of both tergal and sternal craspeda.

Abdominal segments II-VIII dark brown, antennal segments II-VII light brown, rest of body yellowish; ♂ pale yellow, sternites III-VII with slender transverse glandular area **tunicatus** (Haliday)

On Galium species; ♀ apt. i-xii, ♀ macr. vi-viii, ♂ apt. v-x, larvae vi-ix; wide-spread in Europe and Britain; 1-5, 7-9, 14, 21, [28, 30], 33, 50, 53, 54, [73, 74], 75-78, 81, [84, 85].

Genus **RHAPHIDOTHRIPS** Uzel

(figs 125-126)

The only species in this genus is found mainly in central Europe, but also occurs in eastern North America.

Colour dark brown, tarsi and antennal segments III and IV yellow; wings shaded but pale in basal fifth; antennal structure unique (fig. 125); head with 1 pair of long ocellar setae and postocular setae (fig. 126); tergites without ctenidia laterally, but VIII with posteromarginal comb of microtrichia; wings variable in length

longistylus Uzel

On Gramineae; 1 ♀ macr. recorded from Britain, Cambridge, Wicken Fen, ix. 1953.

Genus **SCOLOTHRIPS** Hinds

(fig. 133)

More than 12 species have been described in this genus from sub-tropical parts of the world. These are probably all predators on red spider mites. The only species recorded in Britain has no dark spots on the body, and no pronotal discal setae (fig. 133) unlike the cosmopolitan species *sexmaculatus* Pergande.

Body colour clear yellow, antennal segments III-VIII grey, forewings with 2 small transverse dark bands **longicornis** Priesner

Predatory on Eotetranychus; widespread in Europe, 1 ♀ recorded in Britain, Norfolk, Flitcham, v. 1944.

Genus **SCIRTOTHRIPS** Shull

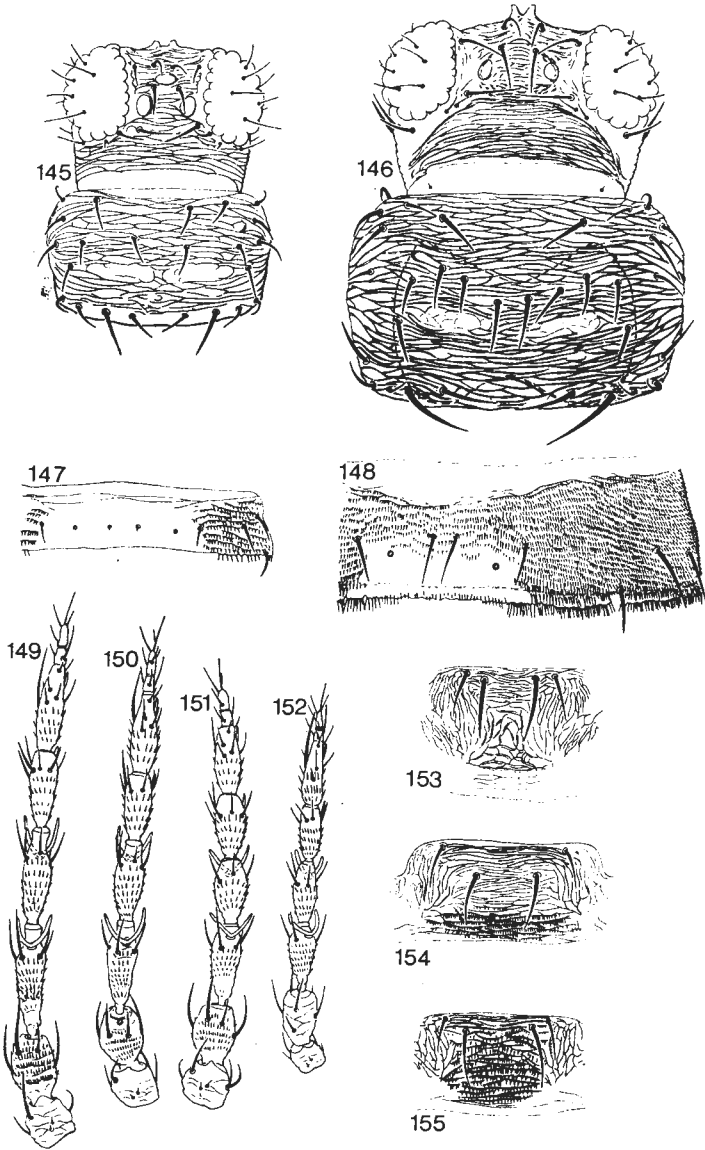
(figs 145, 152)

This is a large genus of small leaf-feeding species found throughout the tropics. One species has been found on a few occasions in glasshouses in Britain.

Colour mainly yellow but abdominal tergites with a transverse dark line; wings, distal antennal segments and anterior margin of head brown; ♂ unknown

longipennis (Bagnall)

Polyphagous but infrequent; recorded widely in Europe and North America in glasshouses.



FIGS 145-155. 145, *Scirtothrips longipennis* head and pronotum. 146, *Sericothrips gracilicornis* head and pronotum. 147, *Drepanothrips reuteri* tergite III. 148, *S. gracilicornis* tergite III. 149, *S. gracilicornis* antenna. 150, *Sericothrips abnormis* antenna. 151, *Sericothrips staphylinus* antenna. 152, *S. longipennis* antenna. 153, *S. gracilicornis* metanotum ♀ macr. 154, *S. abnormis* metanotum ♀ micr. 155, *S. staphylinus* metanotum ♀ micr.

Genus SERICOTHRIPS Haliday

(figs 146, 148-151, 153-155)

This is a large genus with species in most parts of the world. Many species have the median part of the posterior two-thirds of the pronotum defined by prominent dark apodeme (fig. 146). Three species are found in Britain, on Leguminosae.

KEY TO SPECIES

- 1 Metanotum with no microtrichia (fig. 153); posteromedian part of tergites I-III not completely covered with microtrichia (fig. 148); antennal segment III more than 3.3 times as long as wide (fig. 149); always macropterous **gracilicornis** Williams
On Vicia cracca; ♀ v-ix, ♂ and larvae vii-ix; widespread in Europe, not uncommon in south-eastern England; 1-3, [8], 21.
- Metanotum with microtrichia near posterior margin at least (figs 154-155); posteromedian part of tergites I-III covered with microtrichia; antennal segment III less than 3.1 times as long as wide; both sexes macropterous or micropterous. 2
- 2 Metanotum with microtrichia forming a transverse band at posterior margin (fig. 154); median metanotal setae arising about 0.5 of their length from anterior margin; antennal segment III about 3.0 times as long as wide (fig. 150); ♀ macropteræ uncommon, ♂ macropteræ rare **abnormis** (Karny)
On Lotus corniculatus; ♀ micr. i, iii-xi, ♂ micr. iii-xi, ♀ macr. vi-viii, ♂ macr. vii, larvae v-ix; widespread in Europe, apparently uncommon in southern England; 1, 3, 21, 30, 52, 53, 75-79, 81, 84.
- Metanotum with microtrichia arranged irregularly, frequently developed medially (fig. 155); median metanotal setae arising less than 0.3 of their length from anterior margin; antennal segment III about 2.5 times as long as wide (fig. 151); macropteræ of both sexes more common than *abnormis* **staphylinus** Haliday
On Ulex; ♀ and ♂ micr. i-x, ♀ macr. i-iii, v-x, xii, ♂ macr. vi, ix-x, larvae vi-ix; recorded from Denmark, common in Britain; 1-3, 5, 7, 11, 12, 15, 21, 31, [33, 42, 50], 53, 54, [60], 75-79, 81, [84], 85, [86], 91.

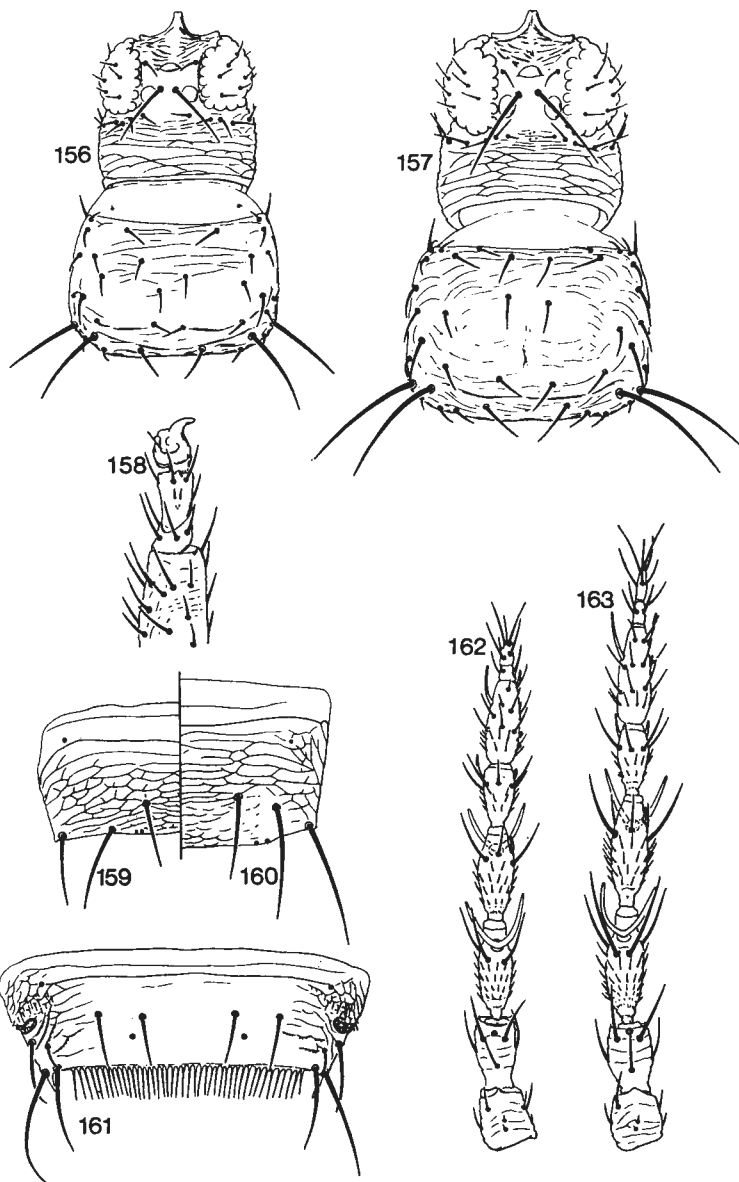
Genus TAENIOTHRIPS Amyot & Serville

(figs 156-163)

This genus is now used in a restricted sense for a small group of large brown flower-living species which have no ctenidia on the abdominal tergites and lack pair I of the ocellar setae. Several other species which used to be placed in *Taeniothrips* because of their eight-segmented antennae are now placed in *Ceratothrips*, *Mycterothrips* or *Thrips*.

KEY TO SPECIES

- 1 Fore tarsus with terminal claw (fig. 158); sternite VII with submedian setae arising at margin (fig. 159); ocellar setae pair III less than 0.5 times as long as width of head across eyes (fig. 156); pronotum with 2 pairs of setae on posterior margin between the posteroangular setae; antennal segment III shaded brown, little paler than IV; base of forewing shaded although paler than rest of wing; ♂ rare, with small oval glandular area on sternites III-VII **inconsequens** (Uzel)
The Pear Thrips, also breeding on Malus, Prunus and Acer; ♀ iii-vi, xi, ♂ v, larvae iv-vi, ix; widespread in Europe and North America, locally common in Britain; 1-4, 6, 8, 9, 12, 16, 21-23, 30, 35, 49, 52, [53, 54, 60, 73], 75-78, 81, [85, 86].
- Fore tarsus without terminal claw; sternite VII with submedian setae arising in front of margin (fig. 160); ocellar setae pair III more than 0.5 times as long as width of head across eyes (fig. 157); pronotum with 3 pairs of small setae on posterior margin between posteroangular setae; antennal segment III mostly yellow, much paler than IV; base of forewing not shaded; ♂ with large transverse glandular area on sternites III-VII **picipes** (Zetterstedt)



Figs 156-163. 156, *Taeniothrips inconsequens* head and pronotum. 157, *T. picipes* head and pronotum. 158, *T. inconsequens* fore tarsus. 159, *T. inconsequens* ♀ sternite VII. 160, *T. picipes* ♀ sternite VII. 161, *T. picipes* ♀ tergite VIII. 162, *T. inconsequens* antenna. 163, *T. picipes* antenna.

In flowers of many herbs, Teuchrium, Primula, Cochlearia, Anemone; ♀ and ♂ iii-ix, larvae iv-ix; widespread in Britain and northern Europe; 1, [2], 3, 7, 8, 11, 12, 15, 18, [21, 30, 33, 36], 39, 40, [42], 43, [45, 47, 51], 52-54, [58, 60, 70, 73, 74], 75-79, 81, 82, 84-88, 90, 97.

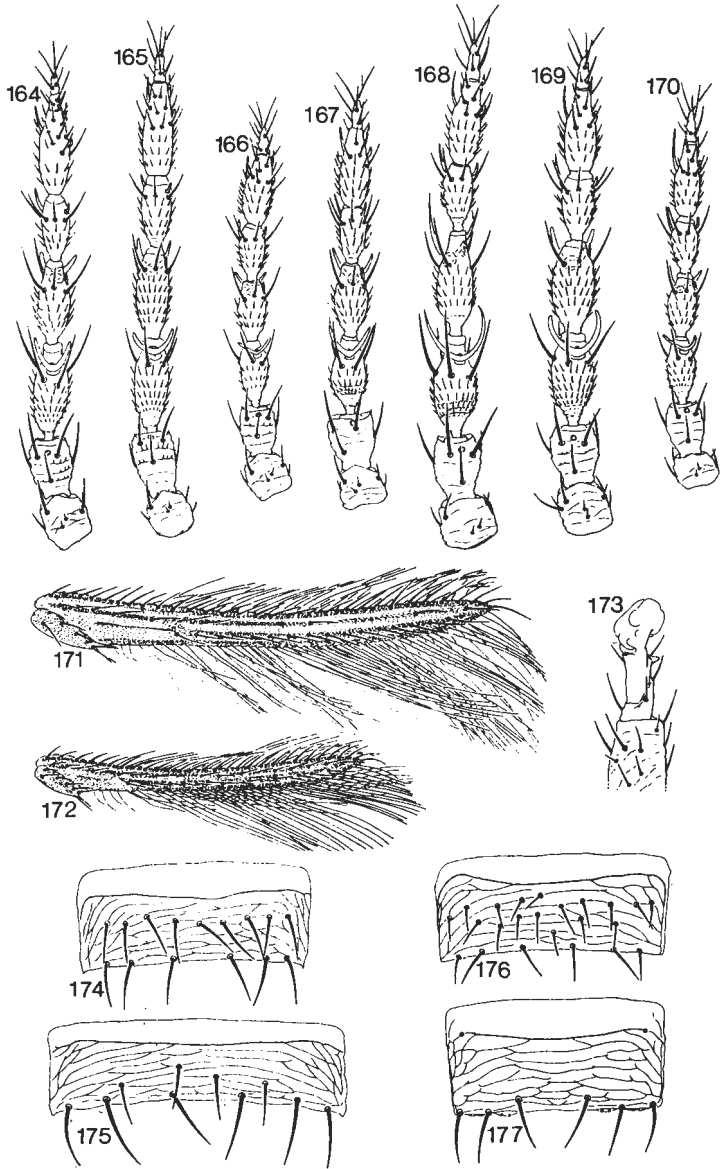
Genus THRIPS Linnaeus

(figs 164-232)

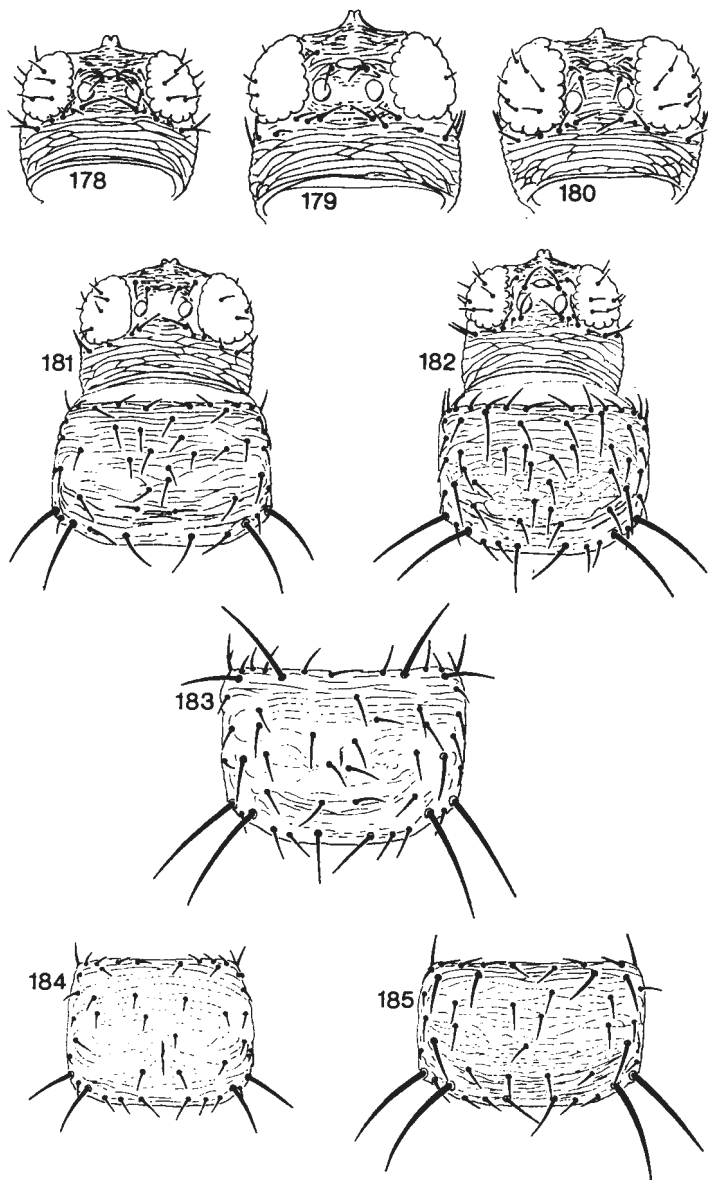
This genus has been used traditionally for a large group of species with seven-segmented antennae. However, in recent years it has become evident that this antennal character is not a satisfactory indication of relationship, and several species which were placed in *Taeniothrips* or *Parafrankliniella* have now been transferred to *Thrips*. In Britain this applies to *atratus* Haliday, *simplex* (Morison), *verbasci* (Priesner) and *vulgatissimus* Haliday, although the record of *pini* Uzel is here rejected as a probable misidentification. *Thrips menyanthidis* Bagnall is here regarded as a large dark form of *fuscipennis*, and the record of *praeternissus* Priesner from Britain is recognized as a misidentification of *pillichi*. The single specimen on which the British record of *Thrips albipes* Bagnall is based (Mound, 1967) was probably wrongly labelled and did not come from this country. As a result, 35 species are now recorded in this genus from Britain, although *paludosus* Bagnall cannot be recognized (Mound, 1967). *Thrips* species are found throughout the world although the centres of diversity appear to be Europe and Africa.

KEY TO SPECIES

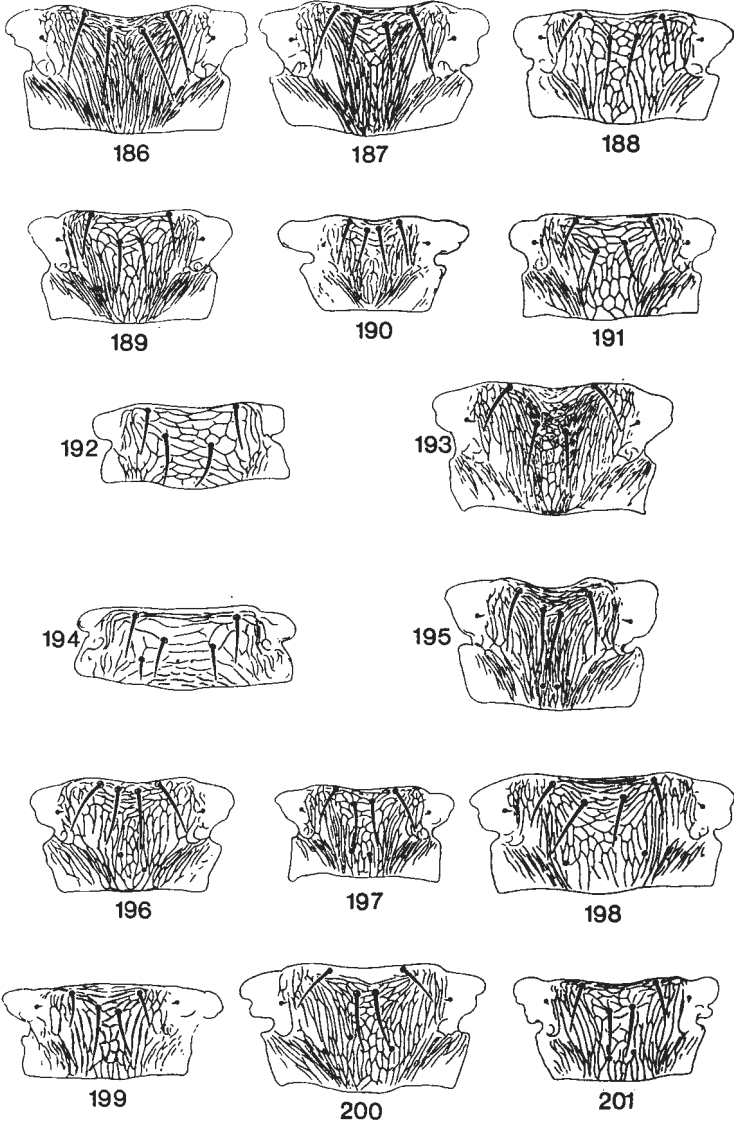
- 1 At least sternites III-IV of abdomen with accessory setae medially in addition to the 6 marginal setae (figs 174-176)..... 2
- All abdominal sternites without accessory setae medially..... 12
- 2 Pleurotergites III-IV with accessory setae medially (fig. 206)..... 3
- Pleurotergites III-IV with postero-marginal setae only (figs 203-205)..... 7
- 3 Antenna with 8 segments, style 2-segmented (figs 164-165)..... 4
- Antenna with 7 segments, style 1-segmented (figs 166-170)..... 6
- 4 Forewing pale, first vein with 3 setae on distal half of wing (fig. 171); antennal segment III pale **vulgatissimus** Haliday
In flowers of many plants, particularly white flowers; ♀ i-xii, ♂ v-viii, larvae v-ix; widespread in Europe, probably more common in northern than in southern Britain; 1-6, [7-9], 11-13, 17-18, 20-23, [24-26, 28-31], 33, 34, [35-39], 40, [42-47], 49, [50, 53], 54, 55, [56-58], 60, [63, 64, 68, 71-73], 74-79, 81-84, [85, 86], 87, 88, 91, 93, 97, [98, 99].
- Forewing dark or shaded in distal two-thirds, first vein with at least 5 setae on distal half of wing..... 5
- 5 Pronotum with 1 pair of setae on anterior margin more than 2.0 times as long as discal setae (fig. 183); antennal segment III usually pale **verbasci** (Priesner)
On Verbascum spp.; ♀ and ♂ vii-viii; widespread in Europe but collected infrequently in Britain; 3, 4, 15.
- Pronotum with anteromarginal setae less than 1.5 times as long as discal setae; antennal segment III usually shaded brown **atratus** Haliday
On flowers of many plants, particularly Caryophyllaceae; ♀ i-xi, ♂ and larvae v-x; widespread in Europe and Britain; 1-9, 12-18, [20, 21], 22, 23, [24-26, 28-30], 31, [32, 33], 34-37, [38, 39], 40, [41], 42, [45-50], 51-55, [56-58, 60, 63, 64, 67, 70-73], 74-79, 81, [82], 83, 84, [85, 86, 88], 91, 95, 97, [98, 99].
- 6 Forewing with 7 to 11 setae on distal half of first vein (fig. 172); abdominal tergite II with 4 lateral marginal setae (cf. fig. 208); sternites with a single row of accessory setae (fig. 174); body colour light to dark brown, antennal segments I-III paler than IV-VII **minutissimus** Linnaeus



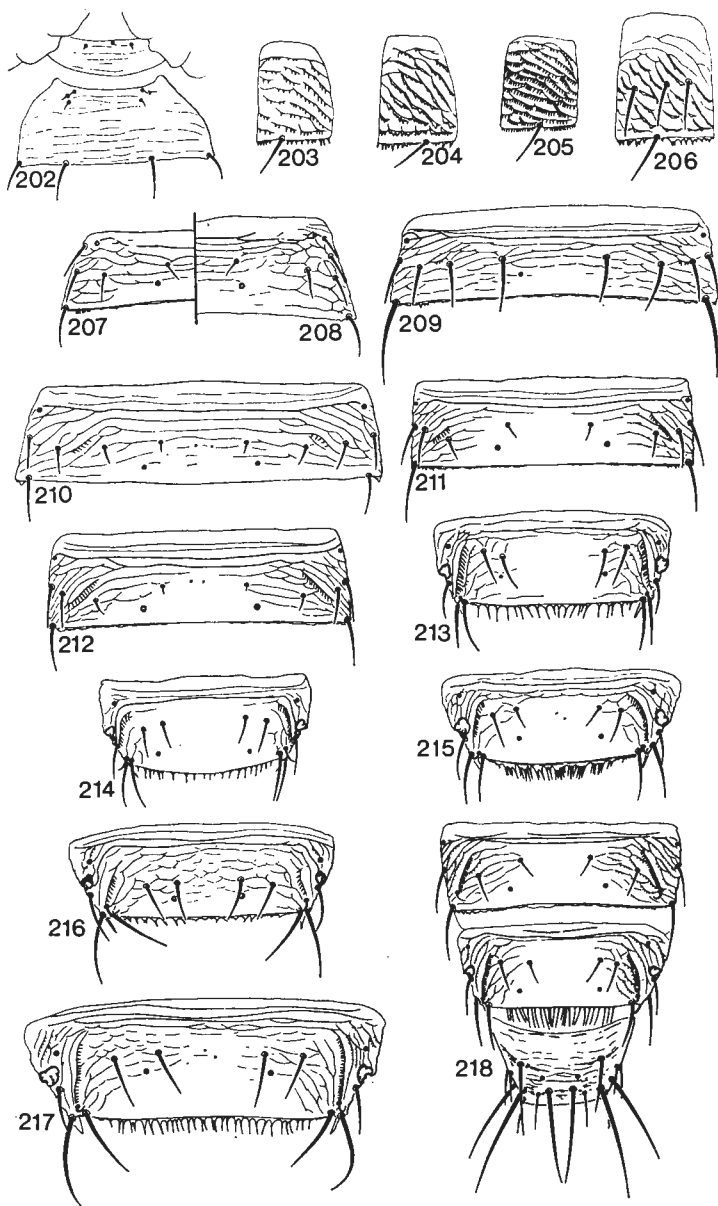
FIGS 164-177. 164, *Thrips atratus* antenna. 165, *T. simplex* antenna. 166, *T. angusticeps* antenna. 167, *T. dilatatus* antenna. 168, *T. klapaleki* antenna. 169, *T. palustris* antenna. 170, *T. discolor* antenna. 171, *T. vulgarissimus* forewing. 172, *T. minutissimus* forewing. 173, *T. calcaratus* fore tarsus. 174, *T. minutissimus* ♀ sternite V. 175, *T. origani* ♀ sternite V. 176, *T. pillichii* ♀ sternite V. 177, *T. fuscipennis* ♀ sternite VII.



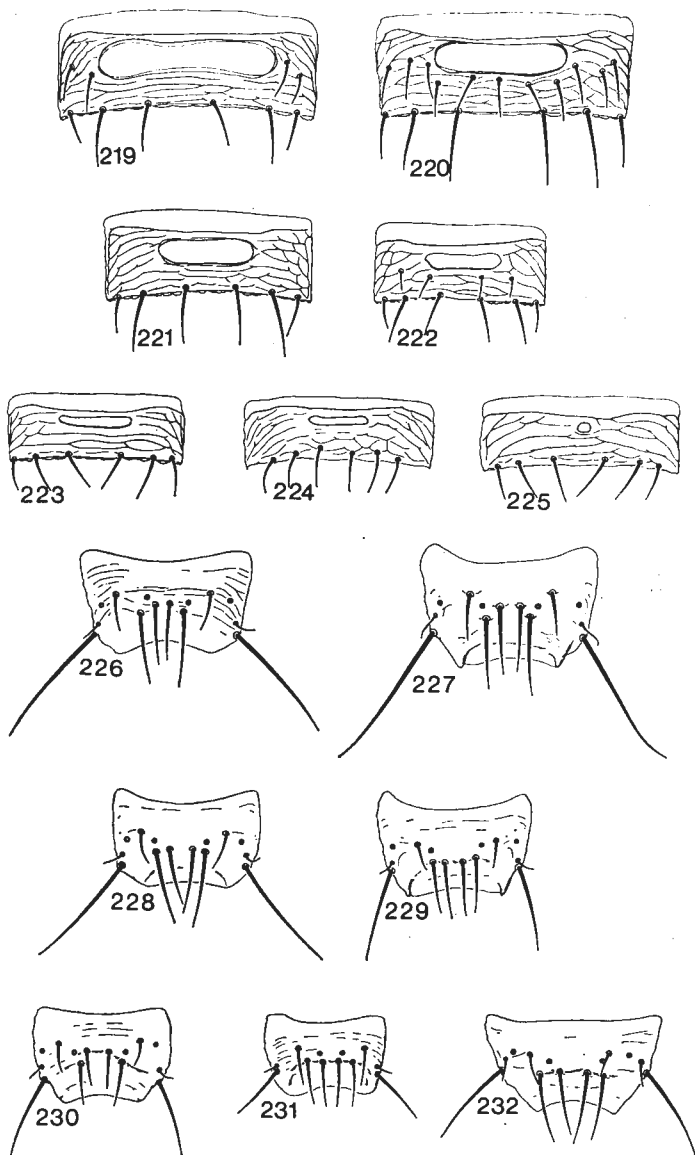
FIGS 178-185. *Thrips* heads and pronota. 178, *flavus*. 179, *klapaleki*. 180, *physapus*. 181, *sambuci*. 182, *urticae*. 183, *verbasci*. 184, *viminalis*. 185, *fulvipes*.



FIGS 186-201. *Thrips metanota*. 186, *validus*. 187, *physapus*. 188, *inopinatus*. 189, *major*. 190, *crassicornis*. 191, *juniperinus*. 192, *discolor* micr. 193, *simplex*. 194, *funebri* micr. 195, *verbasci*. 196, *calcaratus*. 197, *fuscipennis*. 198, *klapaleki*. 199, *difficilis*. 200, *palustris*. 201, *viminalis*.



FIGS 202-218. *Thrips* ♀. 202, *juniperinus* sternites I-II. 203-206, pleurotergite III. 203, *major*. 204, *fuscipennis*. 205, *tabaci*. 206, *brevicornis*. 207-208, tergite II. 207, *major*. 208, *validus*. 209-212, tergite V. 209, *nigropilosus*. 210, *difficilis*. 211, *major*. 212, *viminalis*. 213-217, tergite VIII. 213, *physapus*. 214, *calcaratus*. 215, *angusticeps*. 216, *discolor*. 217, *klapaleki*. 218, *tabaci* tergites VII-IX.



FIGS 219-232, *Thrips* ♂. 219-225, sternite V. 219, *simplex*. 200, *atratus*. 221, *brevicornis*. 222, *physapus*. 223, *fuscipennis*. 224, *tabaci*. 225, *validus*. 226-232, tergite IX. 226, *simplex*. 227, *atratus*. 228, *brevicornis*. 229, *physapus*. 230, *major*. 231, *tabaci*. 232, *discolor*.

- On *Quercus robur* flowers; ♀ iii-vi, ♂ iv-vi, larvae v-vii; throughout Europe, locally common in Britain; 1-3, 6, 7, 9, 12, 14, 15, 17, 18, 21, 53, 54, 66, [73, 74], 75-78, 81, 84, 85.
- Forewing with 3 setae on distal half of first vein; tergite II with 3 lateral marginal setae (cf. fig. 207); accessory setae arranged in 2 rows, at least on posterior sternites (fig. 178); colour light brown, abdomen and metanotum sometimes orange, antennal segment III and base of IV and V yellow, rest of antenna brown; ♂ body colour yellow **pillichii** Priesner
In flowers of Compositae, e.g. Senecio, Achillea; ♀ v-ix, ♂ vi-ix; found in southern Europe, not recorded from Scotland or Ireland; 1-9, 12-15, 18, [21, 23], 24, [25, 26], 28, [29], 33, [35-37, 40], 42, [53, 55].
- 7 Antenna with 8 segments, style 2-segmented (fig. 165); metanotum reticulate medially, reticles with internal markings (fig. 193); ♂ with large transverse glandular area on sternites III-VII, and accessory setae lateral but not posterior to these areas (fig. 219); forewings shaded except in basal fifth, body colour dark brown, tarsi and antennal segment III paler **simplex** (Morison)
The Gladiolus Thrips; ♀ and larvae vii-ix, ♂ viii-ix; probably from south Africa originally, but now found wherever *Gladiolus* is cultivated; in Britain probably overwinters only in mild weather or under glass; 1, 2, 4, 6, 9, 13, 29, 34, 72.
- Antenna with 7 segments; metanotal sculpture different. 8
- 8 Accessory setae usually in more than 1 transverse row on all sternites; frequently micropterous or hemimacropterous, if macropterous then forewing with 7 to 11 setae on distal half of first vein; microtrichia of comb on tergite VIII frequently arising in groups (fig. 215); pronotum frequently with 4 pairs of small setae on posterior margin; body colour of both sexes usually brown to dark brown, antennal segment III paler **angusticeps** Uzel
On Linum and various Cruciferae; ♀ micr. iv-vi, ♂ micr. v, ♀ macr. v-viii, ♂ macr. v-vii, larvae iv-vii; widespread in Europe; 1-4, [5], 6, 7, 9, 13, 17, 18, [20], 21, 22, 24, [31, 33], 35-37, [50], 76.
- Sternal accessory setae, when numerous, arranged in a single transverse row except on sternites VI-VII; macropterous, forewing with 3 to 4 setae on distal half of first vein, rarely with reduced wings; microtrichia of comb on tergite VIII not arising in groups; pronotum with 3 pairs of posteromarginal setae. 9
- 9 Sternites III-VI with 1 to 5 accessory setae; pleurotergites with rows of ciliate microtrichia (cf. fig. 205); comb on tergite VIII with microtrichia long, fine and close together; anterior pair of pores on tergite IX absent; body colour of ♀ yellowish with light brown markings, tergal antecostal ridge and distal antennal segments brown; ♂ unknown (*dyssochaetus* Bagnall based on ♀ with reduced wings) **origani** Priesner
On Origanum vulgare; ♀ vi-xi (larvae not distinguished from tabaci); widespread in Central and southern Europe, locally common in Britain; 1, 3, 7, 13, [21], 33, [53], 75, [77].
- Sternal accessory setae more numerous; pleurotergites without ciliate microtrichia. 10
- 10 Fore tarsus with a slender claw at apex ventrally, best seen in lateral view (fig. 173); metanotum with elongate reticulations medially (fig. 196); tergites VI-VII with no lines of sculpture reaching median pores; comb on tergite VIII with microtrichia widely spaced, about 9µm apart (fig. 214); wings shaded, body colour brown, tarsi and antennal segment III paler **calcaratus** Uzel
In buds of Tilia; ♀ iv-vi, larvae vi-vii; ♂ not known; throughout Europe, locally common in Britain; 3, [4], 6, 12, 53, 54, [60, 73, 74], 75-78, 81, [84, 85].
- Fore tarsus without an apical claw; metanotum more or less striate medially (fig. 187); tergites VI-VII with lines of sculpture reaching median pores; comb on tergite VIII with microtrichia closely spaced, scarcely 6µm apart (fig. 213). . . 11
- 11 ♂ brown; ♀ with $x_1 + 2x_2 + x_3$ more than 450µm (where x_1 = length of pronotal posteroangular setae; x_2 = length of seta B₃ of abdominal tergite IX; x_3 = length of abdominal tergite X—see Pitkin, 1976b) **hukkineni** Priesner
On flowers of Taraxacum and other Compositae; ♀ iv-ix, ♂ v, vii-ix; widespread in Europe, but published records require confirmation; [2], 3-5, 7, 12, 18, 20, 23, 33, 37, 40, 42, 53, 75, 76, 85.
- ♂ yellow; ♀ with $x_1 + 2x_2 + x_3$ less than 430µm (see notes above) **physapus** L.

On flowers of Taraxacum and other Compositae; ♀ v, vii-ix, ♂ vi, viii-ix; wide-spread in Europe, but published records require confirmation; 1-5, 9, 12, 13, 20, 21, 31-34, 36, 37, 42, 43, 53, 78.

- 12 Pleurotergites III and IV with one or more accessory setae medially (fig. 206) 13
- Pleurotergites III and IV with setae at posterior margin only 14
- 13 Body colour yellow, setae dark, distal antennal segments shaded; metanotum closely striate medially (5 striae in 6µm) **brevicornis** Priesner
In flowers of Lonicera; ♀ ii-ix, ♂ vii, larvae v-vii; frequently confused with *flavus*, probably more common in Europe than records indicate; 1, 14, 15, [33], 40, 52, 53, 55, [60, 63], 75, 76, [77, 78], 81, 82, [84-86], 87.
- Body colour brown, legs and antennal segment III yellow; metanotum not closely striate medially (3 striae in 6µm) **fulvipes** Bagnall
On Mercurialis perennis; ♀ iv-viii, x, ♂ vii-viii, x, larvae vi-viii; widespread in Europe, locally common in Britain; 1-3, 7, 8, 12, 22, 33, [52], 53, 60, 75-77, 81.
- 14 Abdominal tergite VIII with complete comb of fine microtrichia on posterior margin, sometimes arising from broad triangular bases (figs 217-218) 15
- Abdominal tergite VIII without a posterior marginal comb, or comb not developed medially, or microtrichia reduced to broad triangular teeth (fig. 216) 25
- 15 Abdominal pleurotergites with numerous fine ciliate microtrichia on lines of sculpture (fig. 205); ♀ tergite IX with only 1 pair of pores, the anterior pair not developed (fig. 218); ♂ with glandular area on sternites III-V (fig. 224); second instar larvae without spiracles on second abdominal segment 16
- Abdominal pleurotergites without rows of fine ciliate microtrichia; ♀ tergite IX frequently with 2 pairs of pores; ♂ (where known) with glandular areas on sternites III-VII; second instar larvae (where known) with spiracles on second abdominal segment 17
- 16 Forewing with 5 to 9 setae on distal half of first vein; antennal segments III-VI bicoloured, yellow at base; ♀ body colour variable from yellow to light brown; ♂ sternal glandular areas about twice as wide as long **euphorbicola** Bagnall
On Euphorbia amygdaloides; ♀ iv, ix, ♂ and larvae ix; recorded from France but collected only rarely; 9, 12, 15.
- Forewing usually with 4 setae on distal half of first vein, sometimes 3 or 5 (very large individuals rarely have 6 setae); antennal segments III-VI not sharply bicoloured, sometimes paler at base than apex; ♀ body colour variable, from yellow to brown; ♂ sternal glandular areas 6-10 times as wide as long (fig. 224) **tabaci** Lindeman
The Onion Thrips, found on flowers and leaves of many plants, particularly Compositae; ♀ and larvae i-xii, ♂ v-x; possibly originally from the eastern Mediterranean but now world-wide; 1-9, 11-15, [17, 18, 20], 21, 22, [23-26], 28-30, [31], 33-37, 40, 42, 43, [45, 47, 49, 50], 51-54, [55-58], 60, [63, 68, 71-74], 75-79, 81-83, [84-86], 87, 91, [98], 99.
- 17 Head and thorax clear yellow, or if yellow with faint brown markings then median 2 pairs of tergal setae half as long as tergites 18
- Head and thorax brown to dark brown in both sexes 21
- 18 Intercellar setae arising posterior to first ocellus, within ocellar triangle (fig. 178); pronotal anteromarginal setae all subequal in length; body colour yellow, without brown markings on thorax or grey markings on abdomen; antennal segments IV-V (sometimes VI) bicoloured **flavus** Schrank
The Yellow Flower-Thrips in many flowers, particularly Ulex; ♀ iii-x, ♂ vi-x, larvae vii-ix; common throughout Europe; [1], 2-7, 11-15, [17], 20, [21-23, 25, 28-30], 31, 33, [36], 37, [38], 39, 40, 42, 43, [44, 47], 50-55, [57, 58], 60, [63, 64, 71, 73, 74], 75-79, [81, 84-86].
- Intercellar setae arising almost lateral to first ocellus, anterolateral to ocellar triangle (fig. 182) 19
- 19 Usually micropterous; tergites IV-V usually with 2 pairs of median setae more than 0.5 times as long as median length of these tergites (fig. 209); tergites IV-V with several lines of sculpture medially; body colour yellow with light brown markings, antennal segment III usually as brown as IV; forewing of macropterae pale **nigropilosus** Uzel
The Chrysanthemum Thrips in glasshouses; elsewhere on Plantago lanceolata and P. maritima, also various Compositae; ♀ micr. i-xi, ♀ macr. and larvae v-ix; wide-spread in Europe, also in North America, and in Kenya as a pest of cultivated

Pyrethrum; 1, 2, 4-7, 12, [18, 20], 21, [28, 29], 33, 42, [47, 50, 52], 53, 54, [58, 60, 73], 75-79, 81, [84].

- Macropterous; median setae on tergites IV-V less than 0.3 times as long as median length of these tergites; tergites IV-V with no lines of sculpture medially; head and thorax yellow, abdominal tergites sometimes with grey markings medially, antennal segment III usually paler than IV, forewings pale or shaded 20
- 20 Abdominal tergites with a grey area medially; pronotum with a pair of setae on anterior margin almost 2.0 times as long as discal setae (fig. 182); antennal segment V usually yellow at base; forewing pale or lightly shaded

urticae Fabricius

In flowers of Urtica dioica; ♀ *v-x*, ♂ *viii*, larvae *v, ix*; widespread in Europe but collected infrequently; 1, 2, 4, 6, [9], 12-14, [18], 21, [22, 33, 40, 44], 54.

- Abdominal tergites yellow; pronotum without a pair of longer setae at anterior margin; antennal segment V usually brown at base; forewing lightly shaded

alni Uzel

On Alnus glutinosus; ♀ *v, viii*; found in Central Europe, but in Britain recorded only from Surrey and Norfolk.

- 21 Metanotum closely striate (fig. 186); abdominal tergite II with 4 setae on lateral margin (fig. 208); tergites V-VI with no lines of sculpture extending to median pores; ♂ with small circular glandular area on sternites III-VII (fig. 225); body colour dark brown, tarsi and antennal segment III yellow; forewings dark except near base

validus Uzel

On yellow flowers of various genera of Compositae; ♀ and ♂ *iv-ix*, larvae *v-ix*; found throughout Europe and Britain; 1-4, [5], 6, [7, 8], 9, 11, 12, [13, 15, 17, 18, 20, 21], 22, [23, 25, 28, 29-31, 33], 36, [37], 43, [44, 45, 47, 50, 51], 52, 53, [55, 58, 60], 63, [74], 75-79, 81, [84], 85, [93], 99.

- Metanotum more or less reticulate (figs 190, 198, 200), if lines of sculpture close together then tergite II with 3 setae laterally (cf. fig. 207); ♂ (where known) 22
- 22 Antennal segments III and IV swollen with constricted vasiform apices (figs 167-168); tergite VII with median setae 0.5 times as long as this tergite; ♂ micropterous, ♀ macropterous or micropterous 23
- Antennal segments III and IV without an elongate apical neck (fig. 169); tergite VII with median setae about 0.3 times as long as this tergite; ♀ and ♂ macropterous 24
- 23 Tergite II with 4 lateral setae (cf. fig. 208); comb on tergite VIII with long slender microtrichia (fig. 217); antennal segment III brown dorsally, usually yellow at base and apex and on ventral surface; large dark species with much red internal pigment; body length > 1.5mm; forewing dark except at base; ♀ macropterous or hemimacropterous

klapaleki Uzel

In flowers of Gymnadenia and Dactylorhiza spp.; ♀ and larvae *vi-vii*; collected infrequently but probably widespread in Europe; 1, 75, 76, 78.

- Tergite II with 3 lateral setae (cf. fig. 207); comb on tergite VIII with microtrichia not much longer than their broad triangular bases; antennal segment III yellowish brown; body colour brown to dark brown, with little internal red pigment; body length < 1.4mm; forewing dark except at base; ♀ macropterous, hemimacropterous or micropterous; ♂ micropterous, glandular areas on sternites III-VII about 8 times as wide as long

dilatatus Uzel

In flowers of Euphrasia; ♀ *micr. iv-x*, *macr. vi-viii*, ♂ and larvae *vi-x*; found throughout Europe; 2, [3, 8], 12, 21, 51, 53, 60, [63, 73], 75-79, 81, [85].

- 24 Pronotal setae hyaline; small, light brown species, forewings uniformly and weakly shaded; body length < 1.2mm; metanotum with lines of sculpture converging at posterior (fig. 190); tergite II with 3 setae at lateral margin

crassicornis Bagnall

On Euphorbia amygdaloides; ♀ *iv*; recorded twice in Britain, Devon and Hampshire. [This may be the same species as euphorbiae Knechtel; the published differences do not apply to specimens in the BMNH.]

- Pronotal setae dark; large dark species, forewings dark except near base; body length > 1.3mm; metanotum with elongate reticles medially (fig. 200); tergite II with 4 lateral setae

palustris Reuter

In flowers of Pedicularis palustris; ♀ *iii-x*, ♂ *vii-x*, larvae *ix-x*; found in northern Europe, but in Britain recorded only from Aberdeen and Kincardine.

- 25 Body colour of ♀ yellow, antennal segments VI-VII and distal half of IV-V brown; very similar to *major* in structure **albopilosus** Uzel
The Hop Thrips, in flowers of Humulus lupulus; ♀ *vii-ix*; widespread in Europe, collected infrequently in Britain; 3, 4, 39.
- Body colour of ♀ largely brown, sometimes bicoloured; ♂ yellow or brown. 26
- 26 ♂ micropterous, ♀ usually micropterous, sometimes macropterous; metanotum with reticulate sculpture medially (figs 192, 194); tergite VII with 2 pairs of setae more than 0.4 times as long as this tergite; tergite VIII with comb on posterior margin represented by a few weak triangular teeth which are sometimes not visible (? absent). 27
- Both sexes macropterous (rarely hemimacropterous); metanotum with sculpture longitudinal at least in part (figs 199, 201); tergite VII with median setae less than 0.3 times as long as tergite. 29
- 27 Antennal segment III swollen with flask-like apical neck (fig. 167) tergite II with 3 lateral setae see **dilatatus** Uzel
- Antennal segment III without an apical neck; tergite II with 4 lateral marginal setae. 28
- 28 Pronotal disc with pair of median setae on posterior third; ♀ with head and thorax largely yellow, abdomen brown; ♂ yellow, with transversely oval glandular areas on sternites III-VII, median 2 pairs of setae on tergite IX arise in a straight line (fig. 232) **discolor** Haliday
On leaves of Ranunculus repens; ♀ *micr. i-xii*, ♀ *macr. and ♂ vii-ix*, larvae *viii-ix*; throughout Europe, locally common in Britain; 1, 4, [9, 12, 13], 21, [26, 33, 36], 47, 50, 53, [56], 57, 58, 60, [63, 73], 75-78, [84].
- Pronotal disc without pair of median setae on posterior third; ♀ with head, thorax and abdomen uniformly dark brown; ♂ yellow, with sternites and tergite IX similar to *discolor*; ♀ macropteræ not recorded **funebri** Bagnall
On Triglochin maritimum; ♀ *micr. v-viii*, ♂ *vii*, larvae *vii-viii*; recorded from Germany, collected 4 times in Britain; 13, 15, 21.
- 29 Tergites III-VII with at least 2 lines of sculpture between the median setae (fig. 210); tergite II with 3 lateral marginal setae; comb on tergite VIII variable, with broad triangular bases to the microtrichia; sternite I with no small median setae between the hind coxae; ♂ with small, oval glandular areas on sternites III-VII; both sexes macropterous or hemimacropterous; body colour brown, forewings pale **difficilis** Priesner
On Salix repens; ♀ and ♂ *vii*; recorded from Austria, France and Germany, collected once in Britain, Lancashire, 1924.
- Tergites III-VII with no lines of sculpture between the median setae, sculpture sometimes not even reaching these setae from lateral areas (figs 211-212). 30
- 30 Pronotal disc with lines of sculpture absent or very faint (fig. 184); tergites III-VII with lines of sculpture extending to median setae or a little beyond (fig. 212); sternite I with 1 to 3 small (5µm) setae between the hind coxae (cf. fig. 202); ♂ with glandular areas on sternites III-VI, posterior areas smaller than anterior; both sexes brown, forewings shaded, antennal segment III and most of IV yellow **viminalis** Uzel
In leaf buds of Salix; ♀ *iii-xii*, ♂ *vi-x*, larvae *vii-viii*; widespread in Europe, locally common in Britain; 1, 3, 4-6, [7], 8, 13, 29, [30], 33, 50, 52-54, 60, 75-79.
- Pronotal disc with many well developed transverse lines of sculpture (fig. 181); ♂ with glandular areas on sternites III-VII. 31
- 31 Lines of sculpture on pleurotergites with ciliate microtrichia (fig. 203); tergite II with 3 lateral marginal setae (fig. 207); ♂ tergite IX with 4 anterior and 2 posterior dorsal setae (fig. 230). 32
- Lines of sculpture on pleurotergites with dentate microtrichia (fig. 204); tergite II with 4 lateral marginal setae; ♂ tergite IX with 2 anterior and 4 posterior dorsal setae (cf. fig. 231). 33
- 32 Abdominal sternite I with 2 to 3 very small (5µm) setae between the hind coxae (fig. 202); metanotal sculpture usually equiangular medially (fig. 191); pronotal posteroangular setae usually less than 0.4 times as long as median length of pronotum; antennal segment III light brown, body brown with thorax sometimes orange, legs paler, forewings pale to shaded **juniperinus** L.
On Juniperus communis; ♀ *i-xii*, ♂ *vii-x*, larvae *vi-vii*; in southern Norway ♀ overwinters on host beneath snow; locally common in Scotland; 75-79, 81, 85.

- [Probably the same species as *carpathicus* Knechtal from Austria and Roumania.]
- Abdominal sternite I with no small setae; metanotal sculpture usually with elongate reticles medially (fig. 189); pronotal posterioangular setae usually more than 0.4 times as long as median length of pronotum; antennal segment III frequently yellowish; body and wings variable in colour **major** Uzel
In flowers of many species, particularly Rosaceae; ♀ iv-ix, xii, ♂ and larvae v-ix; a variable species found throughout Europe but not in northern Scotland; 1-9, 11-17, 18, [20], 21-24, 23, [30], 31, 33, [35], 36, 37, [38, 39], 40, 42, 43, [44-47, 49], 50-55, [57, 58], 60, [63, 64], 68, 90, 91, 93, 95, 96, [97], 98, 99.
- 33 ♀ with wings pale, scarcely shaded; median setae on sternite VII close to posterior margin; ♂ with sternal glandular areas almost circular; antennal segment V pale at base; metanotal sculpture usually broadly reticulate **inopinatus** zur Strassen
In flowers of Solanum dulcamara; ♀ iv, vii-ix, ♂ vii-viii, larvae vii; probably widespread in Europe but not found in Scotland; 1, 2, 4, 12, 13, 18, 21, 26, 31, 33, 51.
- ♀ with wings deeply shaded; median setae on sternite VII arise about 4 times their basal diameter from posterior margin; ♂ sternal glandular areas transversely oval or degenerate 34
- 34 Antennal segment V pale in basal half; ♂ sternal glandular areas sometimes poorly developed **sambuci** Uzel
On Sambucus nigra; ♀ v-ix, xii, ♂ viii-ix, larvae v, vii-ix; widespread in Europe; 1, [2], 3, 4, [5], 6, 12, [13, 21], 29, 30, 33, [37], 53, 55, [63], 75, 76, 78, [79].
- Antennal segment V dark in basal half; ♂ sternal glands well developed **fuscipennis** Haliday
In flowers of many plants, particularly Rosaceae, also on young leaves of trees, ♀ overwinters under bark; ♀ i-xii, ♂ and larvae v-viii; widespread across Europe, also North America; 1-9, 11, [12], 14, 15, [17], 18, 21, [22-26], 28, [29-31], 32, 33, [34, 35], 36, 37, [38, 39], 40, 42, 43, [44-47], 50, [51], 52-55, [56, 57], 58-60, [63, 64, 68, 70-74], 75-79, 81-84, 85, 90, 91, 95-97, [98-99].

Genus **TMETOTHRIPS** Amyot & Serville

(figs 42, 44, 50-51)

The only species in this genus seems to be intermediate in structure between the Anaphothripina and the Thripina.

Colour dark brown, tibiae and tarsi usually yellow, forewings uniformly shaded; tergites without ctenidia laterally, VIII without a comb of microtrichia on posterior margin; sternites without accessory setae, margin lobed between the marginal setae (fig. 50); posterior angles of pronotum with 1 pair of major setae and a second pair of setae about half as long (fig. 42) **subapterus** (Haliday)

On Galium palustre and Stellaria graminea; ♀ and ♂ apt. vii-ix, ♀ macr. vii, larvae vii-viii; widespread in central Europe, local in southern England; 2, 3, 6, 7, 9, 21, [52].

Family **PHLAEOTHRIPIDAE**

The family Phlaeothripidae comprises more than 300 genera, but most of these are confined to the tropics. A few genera are found typically in flowers, particularly the Haplothripini on Compositae and Gramineae, and a few are predatory. Many genera, such as *Liothrips* and *Gynaikeothrips*, include leaf-feeding species, and particularly in the tropics these may induce leaf or bud galls on a wide range of plants. However, most members of this family are associated with the early stages of fungal decay on dead wood or in leaf litter. They apparently feed on fungal hyphae or their breakdown products, although all species in the subfamily Idolothripinae feed on fungal spores.

Only 14 genera have been found in Britain, and one of these is represented by an unestablished species from the tropics.

KEY TO GENERA

- 1 Maxillary stylets close together in middle of head, cheeks broadly rounded (fig. 233); antennal segment III with 3 stout sense cones, IV with 4 sense cones, segment VIII broadly joined to VII (fig. 238); forewings not constricted medially but narrowing slightly near apex; ♀ and ♂ with well developed tarsal tooth; ♂ sternites V-VII with transverse band of longitudinal reticulations anterior to accessory setae, possibly associated with sternal glands **ABIASTOTHRIPS**
- Not the above combination of characters; stylets frequently wide apart in middle of head (figs 243, 254); antennal segment VIII usually constricted at base, or sense cones on III and IV different (figs 292-297); forewings sometimes constricted medially (fig. 326); fore tarsal tooth present or absent; ♂ sometimes with porous glandular area on sternite VIII (figs 301-306), never with specialized reticulations on V-VII.....2
- 2 Maxillary stylets broad and band-like, more than 5µm wide throughout their length, i.e. stylets twice as wide as bases of postocular setae (figs 237, 307) (Idolothripinae).....3
- Maxillary stylets slender, 2-3µm wide, i.e. about as wide as bases of postocular setae. [The stylets must not be confused with the maxillary guides which are sometimes stout, see figs 254-256.] (Phlaeothripinae).....6
- 3 Head less than 1.2 times as long as wide, eyes prolonged ventrally, maxillary stylets wide apart and arranged in a V-shape (fig. 234) **BOLOTHRIPS**
- Head at least 1.3 times as long as wide, usually much longer, if relatively short then with maxillary stylets close together medially; eyes not prolonged on ventral surface of head (figs 237, 307).....4
- 4 Tube without prominent lateral setae; pelta without lateral wings (fig. 235); antennal segment IV with 3 sense cones (fig. 239); head without a pair of stout interocellar setae (fig. 237); ♂ tergite VI without lateral tubercles; ♂ fore tarsus with a stout tooth **CRYPTOTHRIPS**
- Tube with prominent lateral setae (fig. 310); pelta with distinct lateral wings (figs 308, 313); antennal segment IV with 4 sense cones (fig. 312); head with a pair of stout interocellar setae (figs 307, 311); ♂ tergite VI with a pair of long lateral tubercles (fig. 310); ♂ fore tarsus without a tooth.....5
- 5 Head with cheeks slightly constricted behind eyes, maxillary stylets not retracted into head as far as postocular setae (figs 307, 309); ♂ tergite VIII with pair of small lateral tubercles (fig. 310); lateral lobes of pelta not slender (fig. 308) **MEGATHRIPS**
- Head with convex cheeks and maxillary stylets retracted to compound eyes (fig. 311); lateral lobes of pelta slender (fig. 313); ♂ tergite VIII without pair of lateral tubercles **MEGALOTHRIPS**
- 6 Mouth cone exceptionally long and slender, extending to mesosternum (fig. 253); pronotum and margins of head and abdomen with chalky white markings; macropterous or micropterous; on dead branches **POECILOTHRIPS**
- Mouth cone frequently rounded at apex; when pointed, neither slender nor extending more than two-thirds prosternum; body without chalky white markings....7
- 7 Always macropterous with forewings constricted medially and duplicated cilia always present on distal posterior margin (fig. 326).....8
- Sometimes apterous or micropterous; if macropterous then forewing broad with parallel sides (fig. 327), duplicated cilia occasionally absent.....9
- 8 Antennal segment III with 3 sense cones (fig. 252); prosternal praepectus absent; head usually with a pair of stout setae on tubercles on cheeks; maxillary stylets close together in middle of head with no maxillary bridge (fig. 248); ♂ fore femora frequently with 2 tubercles near inner apex (fig. 250); on dead wood **HOPLANDROTHRIPS**
- Antennal segment III without sense cones or with 1 or 2 sense cones (1 rare species with 3); prosternal praepectus present (fig. 254); cheeks without setae on tubercles; maxillary bridge present, stylets usually not close together in middle of head (figs 254-256); fore femora without tubercles; mainly in flowers, particularly inflorescences, sometimes on leaves of trees or on dead wood **HAPLOTHRIPS**

- 9 Maxillary stylets one-third of head width apart (cf. fig. 254); antennal segment III with 2 sense cones, IV with 4 sense cones; ♂ with stout fore tarsal tooth, ♀ with minute fore tarsal tooth; variably short winged individuals on *Armeria* in coastal regions
Haplothrips statices
- Maxillary stylets close together in middle of head (figs. 245, 314); if one-third of head width apart then maxillary bridge not present and, either both sexes lacking a fore tarsal tooth and macropterae lacking duplicated cilia, or macropterae with numerous ventral sense cones on antennal segment IV (fig. 298); antennal sense cones different from above.....10
- 10 Antennal segment III with 1 sense cone, feeding on living tissues of Angiosperms. . .11
- Antennal segment III with 2 or 3 sense cones; most species feeding on fungal hyphae on dead wood.....13
- 11 Pronotum without sculpture, major setae very reduced, epimeral setae less than 0.25 as long as pronotum (fig. 245); antennal segment IV with 2 sense cones, segment VI broadly truncate at apex (fig. 247); dorsal setae on tergite IX less than 0.3 times as long as tube; forewings without duplicated cilia on hind margin; small, usually apterous species living in grasses
CEPHALOTHRIPS
- Pronotum more or less sculptured, at least epimeral setae elongate and more than 0.5 times as long as pronotum; antennal segment IV with 3 sense cones, segment VI not truncate at apex; dorsal setae on tergite IX 0.6 times as long as tube; forewings with duplicated cilia; large macropterous species on leaves of trees and on lily bulbs.....12
- 12 Pronotal sculpture weak medially, all 5 pairs of major setae elongate
LIOTHRIPS
- Sculpture complex and well developed over entire pronotum, only epimeral setae more than twice as long as discal setae (fig. 242)
GYNAIKOTHRIPS
- 13 Head with prominent setal bearing tubercles on cheeks (fig. 314, 316).....14
- Head without prominent tubercles, frequently with 1 or more pairs of prominent setae (figs 277-287, 315).....15
- 14 Antennal segments III and IV with constricted apical neck, each with 3 sense cones (fig. 323); fore femora with a stout tooth near inner apex (fig. 320)
ACANTHOTHRIPS
- Antennal segments III and IV without an apical neck, III with 3 sense cones, IV with 4 sense cones (fig. 325); fore femora without an apical tooth
Phlaeothrips coriaceus
- 15 Macropterous, with duplicated cilia on distal hind margin of forewing (cf. fig. 327); both sexes large and dark brown, metanotum reticulate particularly in posterior half; dorsal setae on tergite IX (B_1 and B_2) rounded at apex, less than half as long as tube
Phlaeothrips annulipes
- Not this combination of characters; macropterous or micropterous, forewing sometimes without duplicated cilia; species variable in colour, large and dark or yellowish, if dark then metanotum not reticulate; dorsal setae on tergite IX usually acute at apex, more than half as long as tube
HOPLOTHRIPS

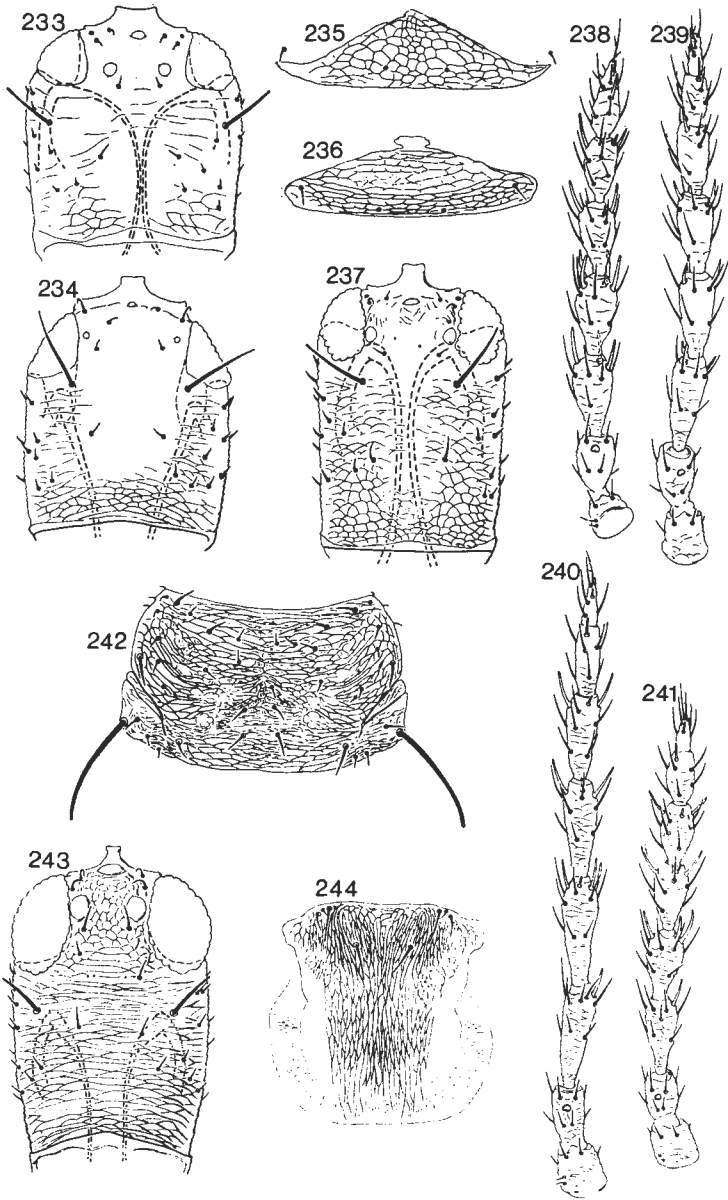
Genus ABIASTOTHRIPS Priesner

(figs 233, 238)

This genus is closely related to the pantropical genus *Adelothrips* Hood. It appears to belong in the Phlaeothripinae, but the species have relatively broad maxillary stylets which suggest that the food is fungal spores.

Colour mainly dark brown, tarsi lighter, antennal segments III-V more or less yellow at base; forewing shaded medially; with the characters given in the key above; body size 2.3-3.8mm
schaubergeri (Priesner)

On dead branches?; ♂ vii, 1 British record, Box Hill, Surrey; widespread but not common in southern Europe.



FIGS 233-244. 233, *Abiastothrips schaubergeri* head. 234, *Bolothrips dentipes* head. 235, *Cryptothrips nigripes* pelta. 236, *B. dentipes* pelta. 237, *C. nigripes* head. 238, *A. schaubergeri* antenna. 239, *C. nigripes* antenna. 240, *Liothrips setinodis* antenna. 241, *L. vaneECKEi* antenna. 242, *Gynaikothrips ficorum* pronotum. 243, *L. setinodis* head. 244, *L. vaneECKEi* metanotum.

Genus ACANTHOTHIRIPS Hood

(figs 314, 317, 320, 323)

This genus is found in the Holarctic region and also in the montane parts of the Neotropics. It can be distinguished from *Phlaeothrips* and *Hoplandrothrips* by the relative proximity of the postocular setae.

Colour mainly brown, abdominal segments III-VIII with a white spot laterally; antennal segments III-VI more or less yellow at base; tarsi, fore tibiae, base and apex of mid and hind tibiae yellowish. Body size 3.0-4.0mm; head with 1 or more pairs of prominent tubercles on cheeks (fig. 314); fore femora with apical tubercle in both sexes (fig. 320); ♂ sternite VIII with slender transverse glandular area; pelta broad and reticulate (fig. 317). Larva II yellow with longitudinal red markings, ventrolateral horns on head extending almost to apex of antennal segment II

nodicornis (Reuter)

On dead branches; ♀ v-x, ♂ viii-x, larvae vi-ix; widespread in Europe, also in northern U.S.A., not common in Britain; 3, 6, [8, 12], 35, 75, 76, 81.

Genus BOLOTHRIPS Priesner

(figs 234, 236)

This is a holarctic genus with several species in South Africa.

Colour mainly dark brown; antennal segment III, tarsi and bases of tibiae yellowish. Macropterae not recorded in Britain. Body size 3.0-4.0mm; head prolonged in front of eyes, broadest across posterior part of eyes; eyes prolonged on ventral surface (fig. 234); ♀ and ♂ with fore tarsal tooth; pelta broadly rounded (fig. 236); B₁ setae on tergite IX about half as long as tube. Larvae yellow with black bolus of spores internally

dentipes (Reuter)

Feeds on fungal spores at base of Juncus, Carex and Spartina; ♀, ♂ apterae and larvae vii-ix; widespread in Europe, rare in North America, locally common in Britain; [2], 5, 14, 15, 22, [24, 96].

Genus CEPHALOTHIRIPS Uzel

(figs 245-247)

This genus comprises seven species from various parts of the world, but not all of these species are closely related to *monilicornis*, the type-species.

Colour mainly brown, tarsi, apices of tibiae and bases of antennal segments III-VI yellow. Body size 1.5-2.0mm; head slender with eyes elongate ventrally (fig. 245); fore tarsal tooth small; pelta transversely oval (fig. 246); usually apterous, ♂ not known in Britain; with the characters in the key to genera above

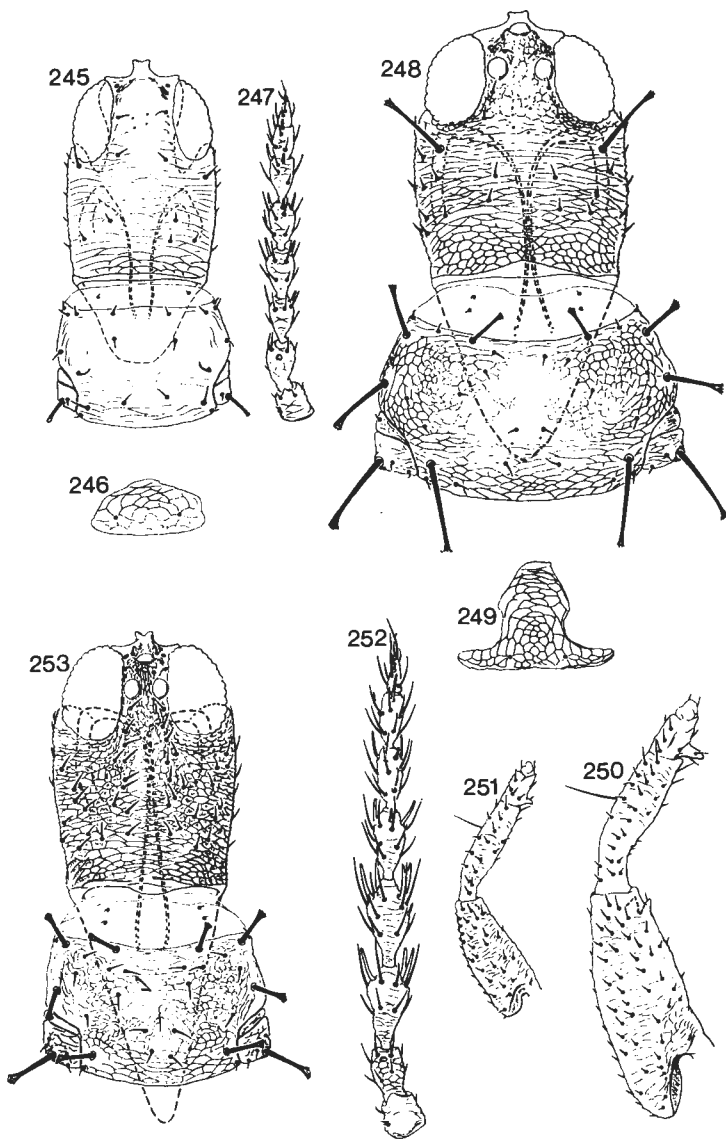
monilicornis (Reuter)

Associated with grass leaves; ♀ apterae iii, v-vi, viii-ix; ♀ macropterae iii, ix; widespread in Europe, also found in North America; in Britain collected infrequently, but possibly common locally; 1, 3, 9, 15, 21, 22, 78.

Genus CRYPTOTHIRIPS Uzel

(figs 235, 237, 239)

This genus has been used for an assortment of dark brown thrips from various parts of the world. However, the type-species is *nigripes* Reuter, which is found in Britain, and the genus should be restricted to a few fungal spore-feeding species which have exceptionally broad maxillary stylets.



FIGS 245-253. 245, *Cephalothrips monilicornis* head and pronotum. 246, *C. monilicornis* pelta. 247, *C. monilicornis* antenna. 248, *Hoplandrothrips bidens* ♀ head and pronotum. 249, *H. bidens* pelta. 250, *H. bidens* large ♂ foreleg. 251, *H. bidens* small ♂ foreleg. 252, *H. bidens* antenna. 253, *Poecilothrips albopictus* head and pronotum.

Body colour dark brown, antennal segment III largely yellow; wing pale, broad, with duplicated cilia; head almost parallel sided, stylets exceptionally broad (fig. 237); tergites of macropterae with only 1 pair of wing retaining setae

nigripes (Reuter)

Feeding on spores on dead branches; ♀ macr. v-vii, ♀ and ♂ micr. i, v-ix, xii, larvae i-iii, vii-xii; widespread in Europe, collected infrequently in Britain; 3-5, 8, 15, [34], 55, 75, 76, [78], 79.

Genus GYNAIKOTHRIPS Zimmermann

(fig. 242)

This is a large genus of leaf-feeding species found on trees and shrubs in the tropics.

Colour mainly black, tarsi, apices of tibiae, antennal segments III-V and bases of VI-VII yellow. Body size 3.0mm; pronotum with characteristic sculpture and only 1 pair of elongate setae (fig. 242)

ficorum (Marchal)

One British record, Cheshire, on leaves of Ficus elastica imported from Denmark; causes rolled leaf galls on Ficus spp. in many tropical countries.

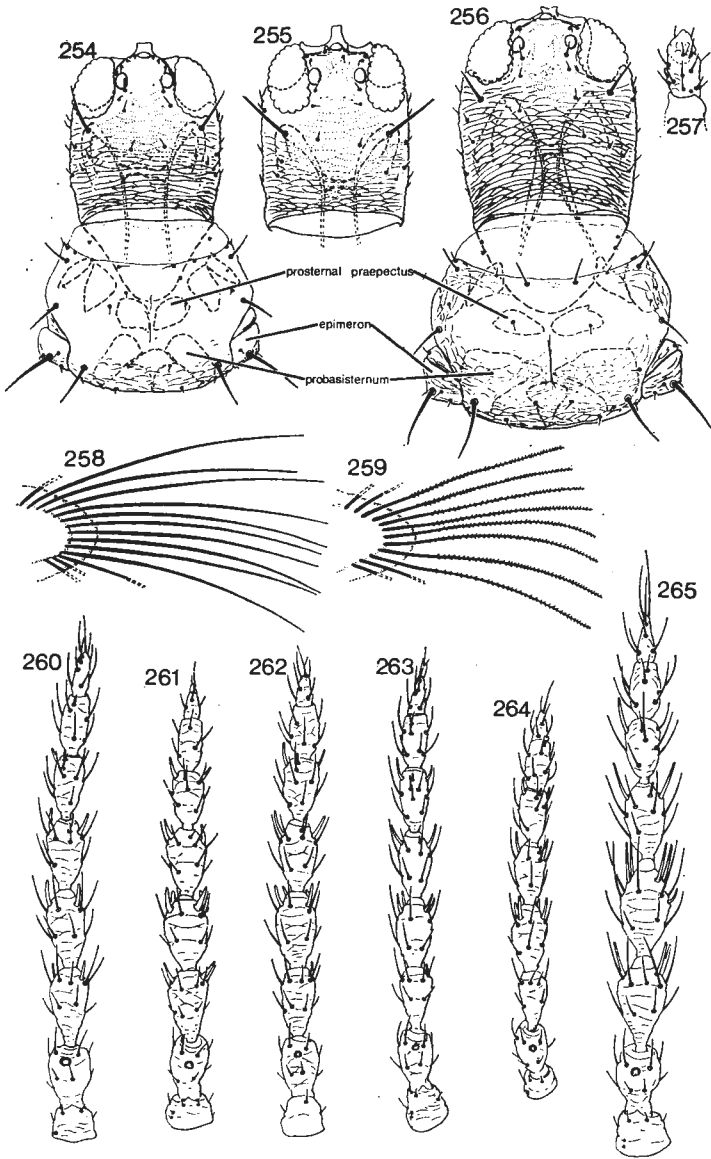
Genus HAPLOTHRIPS Amyot & Serville

(figs 254-274)

This is one of the largest genera of Thysanoptera, with numerous species in the Holarctic region in the flowers of Compositae and Gramineae. However, there are many species in warmer parts of the world associated with dead wood, either as predators or apparently feeding on fungal hyphae, but attempts to divide the genus into smaller groups have never been successful. The 16 species of *Haplothrips* found in Britain are usually easily recognized by the presence of a well developed maxillary bridge and constricted forewings. The record of *verbasci* Osborn is not accepted here as it was based on a casual observation, and the record of *angusticornis* Priesner from Britain is recognised as a misidentification of *propinquus*. *H. hukkineni* Priesner is an addition to the British list.

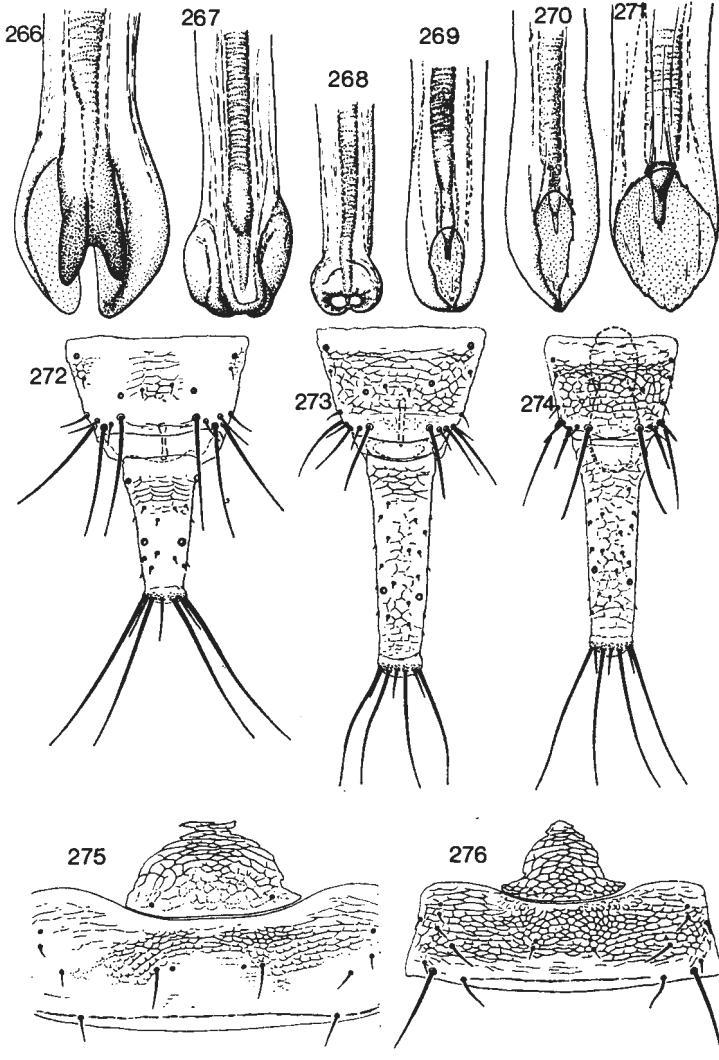
KEY TO SPECIES

- 1 Antennal segment III with 2 sense cones (figs 260-261).....2
- Antennal segment III with 3, 1 or 0 sense cones (figs 262-265).....13
- 2 Pronotal anteromarginal setae well developed, about half as long as epimeral setae3
- Pronotal anteromarginal setae weakly developed (fig. 254).....5
- 3 Postocular setae blunt or expanded at apex (fig. 255); forewing with 5 to 12 duplicated cilia; ♂ genitalia with lanceolate aedeagus (cf. fig. 269); larva II with red pigment
senecionis Bagnall
In flowers of Senecio jacobaea and S. aquaticus; ♀ and ♂ v-viii, larvae v-x; recorded from France, widespread in northern Britain; 22, [25, 31, 49, 50, 53, 57, 59, 60, 63], 72, [74], 75-77, [79], 81, 84, [85, 86].
- Postocular setae acute or softly rounded at apex.....4
- 4 Antennal segment III brownish yellow, IV, V and VI yellow at base and brown at apex; forewing with 9 to 15 duplicated cilia; ♂ genitalia with aedeagus abruptly swollen at apex (fig. 267); larva II with red pigment
distinguendus (Uzel)
In flowers of Cirsium and Carduus, also Scrophularia; ♀ and ♂ vi-viii, larvae vii-viii; widespread in Europe and southern Britain; 3, 4, 5, 12, 20, 33, 37, 42, 45.
- Antennal segment III brownish yellow, IV, V and VI pale brown; forewing with 6 to 10 duplicated cilia; ♂ genitalia with a lanceolate apex (cf. fig. 269)
marrubicola Bagnall



FIGS 254-265. 254, *Haplothrips aculeatus* head and pronotum showing prosternal sclerites. 255, *H. senecionis* head. 256, *H. juncorum* head and pronotum. 257, *H. juncorum* right fore tarsus. 258, *H. leucanthemi* forewing apex. 259, *H. setiger* forewing apex. 260, *H. fuliginosus* antenna. 261, *H. senecionis* antenna. 262, *H. subtilissimus* antenna. 263, *H. flavitibia* antenna. 264, *H. minutus* antenna. 265, *H. subterraneus* antenna.

- In flowers of Marrubium vulgare; recorded from Spain and Jugoslavia, in Britain known only from the type-series, Sussex, Rye, vi. 1930.*
- 5 Antennal segment IV with 2 sense cones (fig. 260); forewings with 3 to 9 duplicated cilia; mid and hind tarsi yellow to brownish yellow; ♂ genitalia broadly lanceolate (fig. 271) **fuliginosus** Schille
On dead twigs or under bark of various trees and shrubs; ♀ i, iii-ix, xii; ♂ iii-x, larvae v-viii; recorded from Austria, Hungary and Poland, widespread in Britain but not common; 1, 3-5, 7-9, 13, 18, 21, 22, [24], 33, 34, 42, 53, [55, 74], 75-77, [79].
- Antennal segment IV with 4 sense cones (fig. 261)..... 6
- 6 Maxillary stylets lying close together in centre of head, usually less than 0.15 of head width apart (fig. 256); antennal segments IV-VI brown with yellow bases; forewings colourless except at base, with 5 to 12 duplicated cilia; ♂ genitalia with slender lanceolate aedeagus (cf. fig. 269); larvae II orange red **juncorum** Bagnall
In flowers of Juncus and Scirpus; ♀ and ♂ vi-ix, larvae vi-viii; recorded from France, Germany and Italy, locally common in southern Britain; 1-5, 8, 9, 14, 15, 21, 55. [Three ♀ from Sussex, Winchelsea, identified by Klimt (1970) as utae Klimt are here considered to be pale specimens of juncorum. The German species utae has a broader male aedeagus than juncorum].
- Maxillary stylets usually more than 0.2 of head width apart (cf. fig. 254), if closer together than antennal segments IV-VI brown and forewings pale brown..... 7
- 7 Wings reduced; ♂ genitalia with lanceolate aedeagus (cf. fig. 269); larvae II crimson **statices morisoni** Priesner
In flowers of Armeria; ♀ and larvae v-viii, ♂ v-vii; recorded from coastal regions of northern and western Europe; 75, 78, 81-84, 87, 90, 95, 97, 99. [Short winged specimens of statices have not been found together with long winged specimens, they are therefore treated here as distinct subspecies.]
- Wings fully developed..... 8
- 8 Distal cilia of forewing distinctly barbed (fig. 259); ♂ genitalia with aedeagus slightly constricted medially (fig. 270); all pronotal setae minute except epimerals; larvae II red-pigmented **setiger** Priesner
In flowers of Senecio, Crepis, Matricaria and Achillea; recorded in Europe and the Canary Islands, but not found in northern Britain; 1, 3-6, [9], 15.
- Distal fringe cilia of forewing apparently smooth (fig. 258)..... 9
- 9 Tube less than 2.0 times as long as maximum width (fig. 272); forewing with 7 to 13 duplicated cilia; ♂ genitalia with aedeagus bilobed at apex (fig. 268); larva II whitish yellow to deep yellow with terminal abdominal segments orange to crimson **hukkineni** Priesner
Recorded from Hungary, Yugoslavia, Albania, Palestine and Egypt on Phragmites, Typha, Oryza and Cyperus; collected once in Britain, Sussex, Winchelsea, 5♀ 5♂ on Scirpus maritimus, ix. 1961.
- Tube 2.5 times as long as maximum width or longer (figs. 273-274); ♂ genitalia with apex of aedeagus not bilobed..... 10
- 10 Postocular setae well developed, longer than median ocellus..... 11
- Postocular setae minute, shorter than median ocellus..... 12
- 11 Postocular setae usually little more than 0.5 times as long as antennal segment III; forewings usually pale brown; ♂ genitalia with aedeagus lanceolate (cf. fig. 269); larvae II crimson **statices statices** (Haliday)
In flowers of Armeria; ♀ and ♂ v-vii, larvae vi-vii; widespread along the coast of north western Europe, locally common in Britain; 2, 6, 7, 12, 21, 33, 51, 54, [60], 62, [63], 75-78, 84, 97.
- Postocular setae as long as or longer than antennal segment III; forewings colourless except at base and around margin; ♂ genitalia with aedeagus similar to *statices* **jasionis** Priesner
On Jasione montana; described from Austria and from Hayling Island, Hants, also recorded from Cefn Rolf, Caernarvon.
- 12 Aedeagus of ♂ genitalia broadly swollen distally, constricted medially (fig. 266); larva II red **propinquus** Bagnall
In flowers of Achillea millefolium; ♀ v-ix, ♂ vi-viii, larvae i, iii, vii-ix; found in France and Norway, locally common in Britain; [4], 12, [13, 18], 21, [26], 29, 33, [35, 36, 45, 47, 50, 52], 53, [55-57], 58, 60, [74], 75-78, [79], 81, [84].



FIGS 266-276. 266, *Haplothrips propinquus* apex ♂ aedeagus. 267, *H. distinguendus* apex ♂ aedeagus. 268, *H. hukkineni* apex ♂ aedeagus. 269, *H. leucanthemi* apex ♂ aedeagus. 270, *H. setiger* apex ♂ aedeagus. 271, *H. fuliginosus* apex ♂ aedeagus. 272, *H. hukkineni* ♀ tergites IX-X. 273, *H. leucanthemi* ♀ tergites IX-X. 274, *H. leucanthemi* ♂ tergites IX-X. 275, *Haplothrips corticis* pelta and tergite II. 276, *Haplothrips fungi* pelta and tergite II.

- Aedeagus of ♂ genitalia lanceolate (fig. 269); larva II red **leucanthemi** (Schrank)
In flowers of Chrysanthemum leucanthemum; ♀ and ♂ *v-ix*, larvae *vii-x*; wide-
spread in Europe and North America, common in Britain; 2, 3, 12, 21, 22, 24, [33],
34, 50, 53, [55, 60, 70], 75, 76, 78, 81.
- 13 Antennal segment III with 3 sense cones (fig. 265) **subterraneus** Crawford
*On Lily bulbs; the only British record is based on the type series taken in quarantine
in the U.S.A.; also recorded from Japan and Netherlands.*
- Antennal segment III with 1 or 0 sense cones (figs 262–264)..... 14
- 14 Tibiae and tarsi yellow..... 15
- Tibiae brown except at extreme apex..... 16
- 15 Antennal segment III with no sense cones (fig. 264) **minutus** Uzel
*Probably on dead twigs; recorded from western and central Europe; 1 ♀ collected in
Britain, Westmorland, Mauld's Meaburn, ix. 1966.*
- Antennal segment III with 1 small sense cone (fig. 263) **flavitibia** Williams
*Probably on dead twigs; recorded from Germany, collected 4 times in Britain;
Surrey, viii. 1915; Nottingham, vii. 1938; Berkshire, vii. 1948; Hertford, vii. 1947.*
- 16 Pronotal anteromarginal setae well developed, about 0.5 times as long as epimeral
setae; postocular setae blunt or expanded at apex (cf. fig. 255); larva II banded
red and white **subtilissimus** (Haliday)
*On Quercus branches, probably predatory on small anthropods; ♀ v-xi, ♂ v-x,
larvae vii-ix; widespread in Europe, locally common in Britain; 1, 3-9, 12, 17, 21,
28, 33, [45], 47, 52-54.*
- Pronotal anteromarginal setae weakly developed (fig. 254); postocular setae acute at
apex; larva II orange-yellow **aculeatus** (Fabricius)
*In flowers of Gramineae, Juncaceae and Cyperaceae; ♀ and ♂ viii-ix, larvae viii;
widespread from Europe to Japan, uncommon in Britain; 8, 21.*

Genus HOPLANDROTHRIPS Hood

(figs 248–252)

This is a large ill-defined genus found throughout the world. The single polymorphic species found in Britain can be distinguished from *Phlaeothrips* species by the median constriction of the forewings, the more slender pelta, and the relatively longer setae on tergite IX (B_1 setae half as long as tube).

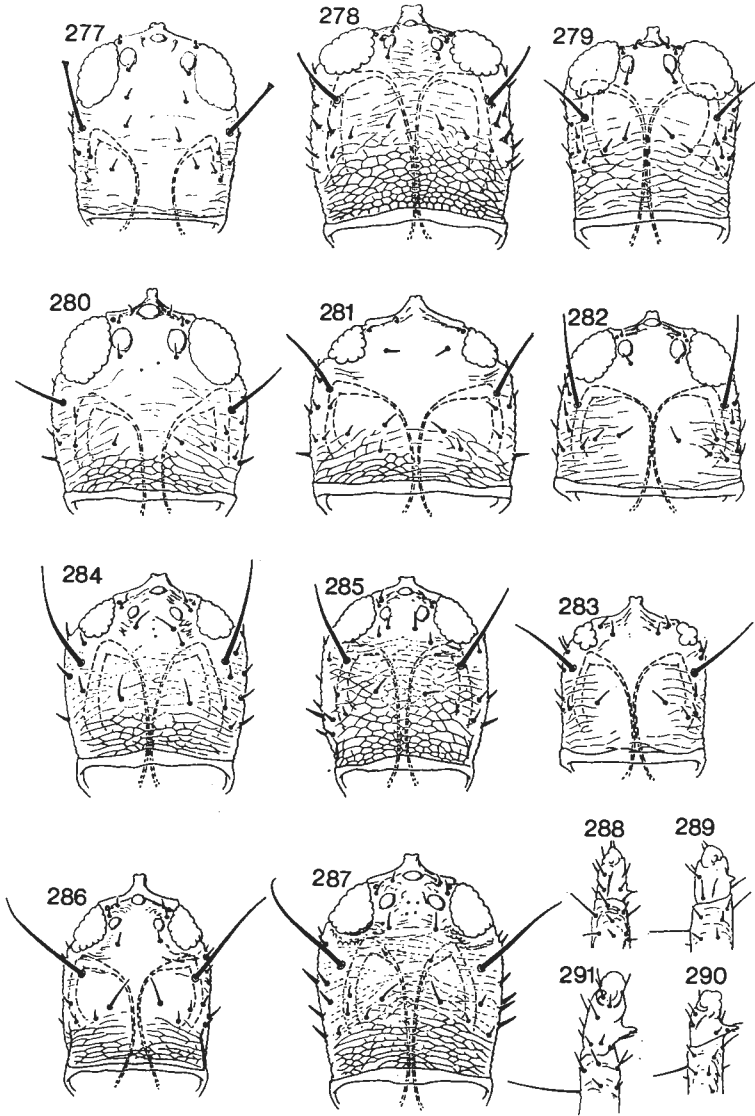
Colour mainly brown with red internal pigment, bases of antennal segments III–VI yellow; all tarsi, most of fore tibiae, and usually base and apex of mid and hind tibiae yellow. Body size 2.0–3.0mm; head with at least 1 pair of stout, cheek setae (fig. 248); postocular and pronotal setae longer in ♂ than ♀; large ♂ with 2 apical tubercles on fore femur and 1 median tubercle on fore tibia, small male without these tubercles (figs 250–251); ♂ sternite VII with circular glandular area. Larva II mainly yellow with 3 longitudinal red stripes; head with small ventrolateral horns near eyes **bidens** (Bagnall)

On dead branches; ♀ and larvae iii-x; ♂ iv-ix; widespread in Europe but not common in Britain; 1-4, 6-9, 12, 23, 34, 35, 47, 75-79, 81.

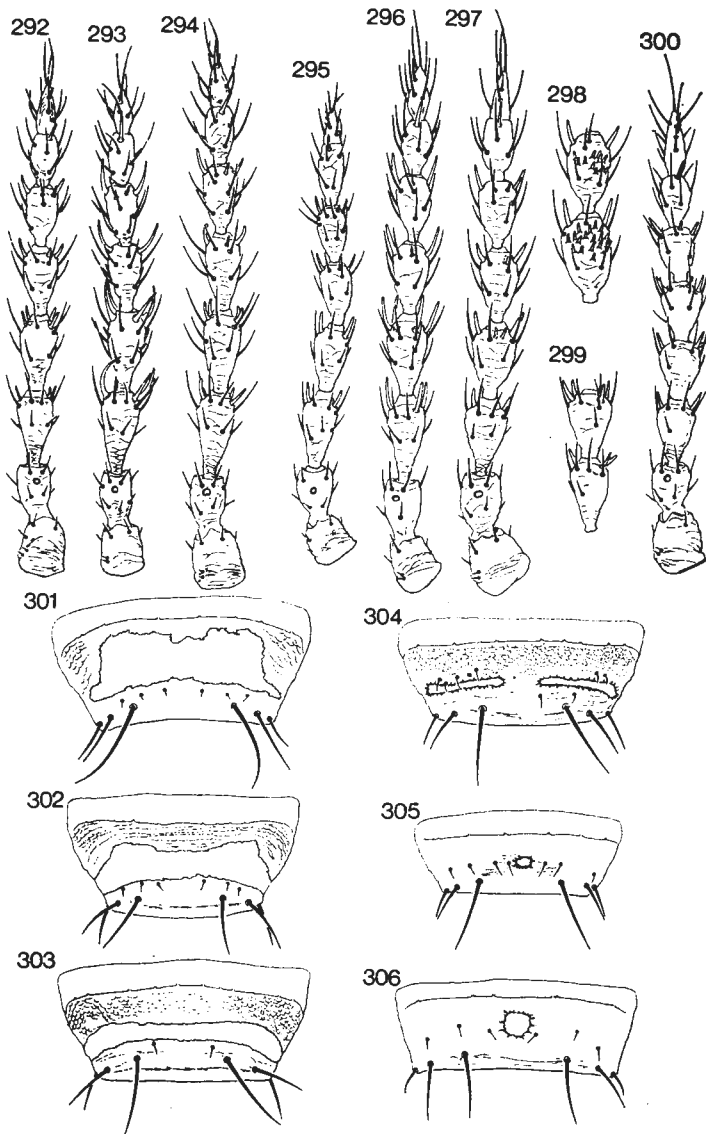
Genus HOPLOTHRIPS Amyot & Serville

(figs 275–306)

This is a very large genus, with species in most parts of the world, although only eight species are recorded in Britain. These live on dead branches and were listed under *Phlaeothrips* in Kloet & Hincks (1964: 98). One species, *longisetis* Bagnall, has been placed in a subgenus *Maderothrips* (Priesner, 1964) but this is not accepted here in view of the diversity of form in *Hoplothrips*. Three species are closely related to each other, *corticis*, *fungi* and *ulmi*, but the others are more distantly related. In *longisetis* and *semicaecus*, as well as the apterae of *unicolor*, antennal segments III and IV have only two



Figs 277-291. *Hoplothrips*. 277, *longisetis* ♀ macr. head. 278, *pedicularius* ♀ macr. head. 279, *polysticti* ♀ macr. head. 280, *semicaecus* ♀ macr. head. 281, *semicaecus* ♀ apt. head. 282, *unicolor* ♀ macr. head. 283, *unicolor* ♀ apt. head. 284, *corticis* ♀ micr. head. 285, *fungi* ♀ micr. head. 286, *ulmi* ♂ micr. head. 287, *ulmi* ♀ micr. head. 288, *polysticti* ♀ fore tarsus. 289, *unicolor* ♀ fore tarsus. 291, *fungi* small ♀ fore tarsus.



FIGS 292-306, *Hoplothrips*. 292, *corticis* ♀ antenna. 293, *fungi* ♀ antenna. 294, *ulmi* ♀ antenna. 295, *longisetis* ♀ antenna. 296, *polysticti* ♀ macr. antenna. 297, *semicaecus* ♀ apt. antenna. 298, *semicaecus* ♀ macr. antennal segments IV & V. 299, *unicolor* ♀ macr. antennal segments III & IV. 300, *unicolor* ♀ apt. antenna. 301, *corticis* ♂ sternite IX. 302, *fungi* ♂ sternite IX. 303, *ulmi* ♂ sternite IX. 304, *pedicularius* ♂ sternite IX. 305, *polysticti* ♂ sternite IX. 306, *unicolor* ♂ sternite IX.

sense cones. However, the macropterae of *unicolor* have the usual *Hoplothrips* arrangement of three sense cones on segment III and four on segment IV, and the macropterae of *semicaecus* have numerous small sense cones on the ventral surface of the fourth segment. In most members of this genus the maxillary stylets are close together medially in the head, but in *longisetis* and the macropterae of *semicaecus* the stylets are wide apart. The fore tarsal tooth is similarly variable; it is absent in *longisetis*, very small in *unicolor* females although well developed in males, small in both sexes of *polysticti*, but large in both sexes of the other species. Moreover the glandular area on sternite VIII of the males varies between species from completely absent to occupying about one-half of the area of the sternite. Because of this variation the genus *Hoplothrips* is very difficult to define.

The species *flumenellus* Hood is here regarded as a synonym of *unicolor* Vuillet **syn.n.**, after a comparison of type-material of both forms with specimens from Scotland.

KEY TO SPECIES

- 1 Setae B₁ on tergite IX at least 1.1 times as long as the tube; antennal segments III and IV usually with 2 sense cones (figs 295, 300).....2
- Setae B₁ on tergite IX less than 0.9 times as long as the tube; antennal segment III usually with 3 sense cones, IV usually with 4 sense cones.....3
- 2 Fore tarsus without a tooth in either sex; maxillary stylets about one-third of head width apart (fig. 277); macropterae and micropterae with 2 sense cones on antennal segments III and IV, segment VIII broadly joined to VII (fig. 295); forewing of macropterae without duplicated cilia on distal hind margin; ♂ sternite VIII without a glandular area. Colour mainly light brown, tarsi, much of the tibiae, and base of antennal segment III yellow, wings faintly shaded; body length 1.5-2.5mm. Larva II with scattered red pigment internally **longisetis** (Bagnall)
On dead branches, probably predaceous; ♀ macr. ii-v, vii-x, xii; ♂ micr. ii, iv-v, vii-ix, xii; larvae iii-iv, viii-ix; widespread but infrequent in Europe; 3, 8, 12, 52, 75-77, [79], 81, 84.
- Fore tarsal tooth minute in ♀, large in ♂ (figs 289-290), maxillary stylets close together in middle of head (figs 282-283); apterae usually with 2 sense cones on segments III and IV, macropterae with 3 sense cones on III and 4 on IV, segment VIII constricted at base (figs 299-300); forewing with duplicated cilia on distal hind margin; ♂ sternite VIII with a small circular glandular area (fig. 306). Colour of ♀ macropterae mainly light brown, legs yellow with brown shading on femora, tube golden yellow, antennae yellow distally; forewings pale; micropterae largely yellow; body length 1.5-2.5mm. Larva II yellowish white **unicolor** Vuillet
On dead Pinus branches, feeding on the fungus Polystictus abietinus; ♀ macr. iv-ix; ♂ and ♀ apterae and larvae ii-xi; locally common from 1939-1964 in Aberdeen and Kincardine; probably introduced, known otherwise from U.S.A. (New York) and Algeria.
- 3 Elongate lateral setae on tergite VIII bluntly rounded or expanded at apex (faulty mounting techniques cause this expansion to collapse but it is still recognizable as a pale area); head and body usually not uniformly brown.....4
- Elongate lateral setae on tergite VIII finely pointed at apex; head and body uniformly brown to dark brown.....5
- 4 Antennal segments III and IV each with 2 sense cones, but ♀ macropterae with numerous small sense cones ventrally on IV (figs 297-298); maxillary stylets about one seventh of head width apart in ♀ macropterae, but close together in apterae (figs 280-281); sternite VIII of ♂ with broad transverse glandular area. Colour of ♀ macropterae mainly light brown with yellow tibiae and tarsi, basal quarter of tube yellowish-brown, antennal segments II and III yellow in contrast to the brown of segment IV, wings pale; apterae usually more extensively yellow, with brown pronotum. Body length 2.0-2.5mm. Larva II yellowish grey with scattered red pigment internally, legs and antennal segments I-III pale, terminal abdominal segments weakly shaded **semicaecus** (Uzel)

On dead wood of Angiosperms; ♀ macr. iii, vii, ix; ♀ apterae ii-v, vii-viii, xi; ♂ apterae and larvae iii, v, vii, xi; widespread in Europe, also recorded from North America and New Zealand; in Britain mainly from south-eastern counties; 3, 5, 8, 9, 18, 21, 22, 52.

- Antennal segment III with 3 sense cones, segment IV with 4 sense cones; maxillary stylets close together in middle of head (fig. 278); ♂ sternite VIII with transverse slender glandular area about $10\mu\text{m}$ long, extending across width of sternite but usually interrupted medially (fig. 304). Colour of ♀ macropteræ mainly brown but with abdominal segments VIII-IX paler than IV-VI, tube frequently golden yellow with apex grey, sometimes pale brown medially; micropteræ with head and fore femora largely yellow (1 sample from Kerry, Ireland, includes micropteræ of both sexes with head, fore femora and tube brown). Body length 1.3-3.0mm. Larva II yellowish with red internal pigment, antennæ and abdominal segments IX-X brown, legs shaded

pedicularius (Haliday)

On dead wood of Angiosperms, feeding on Stereum species; ♀ macr. iii-xii, ♂ macr. vi-viii, ♀ and ♂ micr. i-ix, larvae II i-xii, larvae V v-vii; widespread and common throughout Europe; 1, 3, 5, [6], 8, 9, 12, 15, [21], 31, 33, 36, 48, 50, 52-54, [55, 58], 60, [67, 74], 75-78, [80], 81, 84, [85], 90, 91, [98].

- 5 Fore tarsal tooth small or minute, less than 0.3 times as long as tarsal width (fig. 288); cheeks without major setae, parallel sided and not constricted at base (fig. 279); sense cones on antennal segments III and IV frequently reduced in number in micropteræ (fig. 296); ♂ sternite VIII with median irregular glandular area scarcely $15\mu\text{m}$ in diameter (fig. 305); body colour light brown with red internal pigment, legs and antennæ paler, forewings hyaline. Body length, 1.3-2.0mm. Larva II pale with diffuse red internal pigment, abdominal segment X and posterior half of IX brown

polysticti (Morison)

On dead Pinus, feeding on Polystictus abietinus; ♀ macr. iii-vii, ♂ macr. vii, ♀ and ♂ micr. and larvae ii-vi, viii-xi; known only from Scotland between 1939 and 1964; 75, 76, 78, [81].

- Fore tarsal tooth well developed, more than 0.5 times as long as tarsal width, in ♂ frequently as long as tarsal width (fig. 291); cheeks convex and constricted to base, frequently with 1 or more pairs of stout setae (figs 284-287); antennal segment III with 3 sense cones, IV with 4 sense cones; ♂ sternite VIII with transverse glandular area; body colour dark brown to black. Body size larger 2.5-4.0mm. Larva II with abdominal segments IX-X largely blackish brown. 6

- 6 Median length of glandular area on sternite VIII of ♂ 50-60 μm , not or scarcely extending posterolateral to the spiracles (fig. 301); posterolateral corners of pelta confluent with anterior margin of tergite II (fig. 275); inner sense cone on antennal segment III short (fig. 292), less than 0.16 as long as setae B_1 on abdominal tergite IX; macropterous ♂ not recorded. Body colour dark brown, tibiae and at least basal parts of antennal segments III-VI yellowish although these segments are not strongly bicoloured; forewings shaded in distal third. Larva II with variable amounts of pink to red internal pigment, antennal segment III paler than IV, apex of femora paler than base of tibiae, base of abdominal segment IX paler than apex

corticis (De Geer)

On dead wood of Angiosperms, feeding on fungi; ♀ macr. iii, v-ix, xii, ♀ and ♂ micr. ii-x, larvae iii-x; widespread in Europe, also in North America and New Zealand; less common in Britain than ulmi or fungi; 1-4, [5], 12, 18, 21, 76, 77, 79.

- Median length of glandular area on sternite VIII of ♂ 15-40 μm , prolonged laterally posterior to the spiracles (figs 302-303); posterolateral corners of pelta curve away from anterior margin of tergite II (fig. 276); inner sense cone on antennal segment III either short of long, 0.10-0.25 times as long as setae B_1 on tergite IX; ♂ either micropterous or macropterous. Body colour dark brown, tibiae yellow at least at base and apex, antennal segments IV-VI strongly bicoloured yellow and dark brown. Larvae II usually pink to red, antennal segment III as dark as IV, apices of femora not paler than bases of tibiae, abdominal segments IX and X uniformly dark brown. 7

- 7 Inner sense cone on antennal segment III long and curved (fig. 293), 0.16-0.25 times as long as setae B_1 on tergite IX; median glandular area on sternite VIII of ♂ 25-40 μm (fig. 302); ♂ macropteræ common

fungi (Zetterstedt)

On dead wood of Angiosperms, feeding on fungi (? Peniophora); ♀ and ♂ macr.

and apt. also larvae II *i-x*, larvae V *v-viii*; widespread and common (probably throughout the Holarctic, but under other names); 1, 3, 4, [9], 12, 14, 20, [33, 50], 53, [73, 74], 75, 76, [77], 78, [79, 84, 85].

- Inner sense cone of antennal segment III short and straight (fig. 294), 0.10–0.15 times as long as setae B₁ on tergite IX; median length of glandular area on sternite VIII of ♂ 15–20 μm (fig. 303); ♂ macropterae rare ulmi (Fabricius)
On dead wood of Angiosperms, feeding on fungi (? Peniophora); ♀ macr. i, iv-x, ♂ macr. iii, ix, ♀ and ♂ micr. also larvae i-xii; widespread and common; 2-4, 6, 8, 9, 12, 16, 21, [23], 24, 32, 35, 52-54, 60, 76, 78, [79], 81, 84.

Genus LIOTHRIPS Uzel

(figs 240–241, 243–244)

This genus includes a large number of species in the tropics and in North America, most of which feed on the leaves of trees and shrubs. There are about eight species recorded from Europe but only two of these are known from Britain, one on lily bulbs and the other on the leaves of various trees. *Liothrips austriaca* Karny is here regarded as a central European species: three females from Austria have been studied and, unlike *setinodis*, these have the metanotal setae expanded not acute at the apex and the epimeral setae are pale not dark.

KEY TO SPECIES

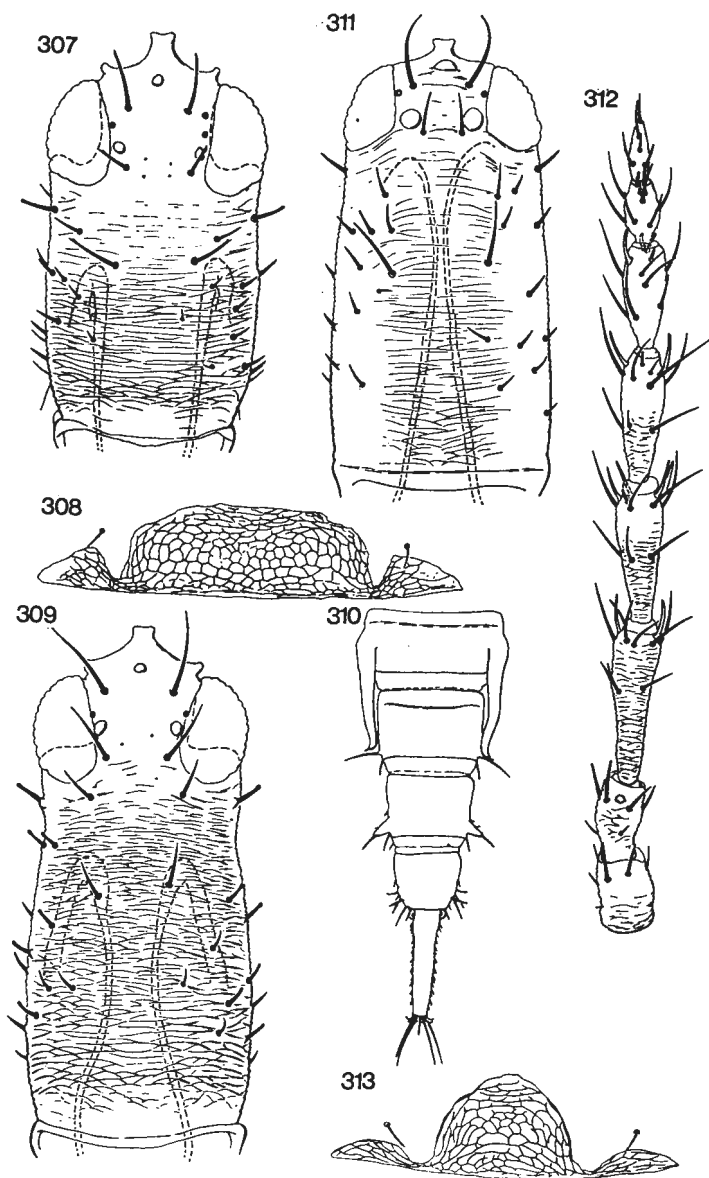
- 1 Metanotum almost striate medially, reticulations elongate and well developed, about 5 μm wide (fig. 244); antennae relatively short, segment IV less than 1.8 times as long as wide (fig. 241); body colour dark brown, tarsi, fore tibiae and apices of mid and hind tibiae mainly yellow, antennal segments III–VI yellow with brown apices, segments VII–VIII brown; major setae dark, including sub-basal wing setae, but epimeral and lateral abdominal setae paler; wings weakly shaded vaneeckel Priesner
Recorded infrequently as a pest on Lily bulbs in glasshouses; probably introduced periodically from Europe where it is reported to live out of doors.
- Metanotum frequently without sculpture medially, reticulations when present equiangular and about 10 μm wide; antennae relatively slender, segment IV more than 2.0 times as long as wide (fig. 240); body colour similar to *vaneeckel* but antennal segments usually with less brown shading, even VII sometimes yellow in basal half; epimeral and lateral abdominal setae as dark as the other major setae setinodis (Reuter)
On leaves of Fraxinus and Ulmus, larvae II overwintering in moss on trunk and in leaf litter; ♀ v-ix, ♂ v-viii. larva II i-v, viii-xii, larva IV and V vi-vii; widespread and locally common, but most southern records from Fraxinus and most northern records from Ulmus; 1-4, 7, 18, 20, 23, 24, 29, 33, 37, 50, 52, 53, 55, 60, 63, 72, 75-78, 81, 84.

Genus MEGALOTHRIPS Uzel

(figs 311–313)

This small holarctic genus has one species in Britain which is widespread but uncommon in central and southern Europe.

Colour mainly blackish brown, tarsi paler, antennal segment III mainly yellow, IV and V with yellow pedicels; wings weakly shaded near base. Body size 3.5–4.5 mm; head elongate with long interocellar and short postocular setae (fig. 311, of *delmasi* from southern France because available *bonannii* too badly damaged); maxillary stylets retracted to eyes, close together in midline; ♀ and ♂ without a fore tarsal tooth; pelta with slender lateral wings (fig. 313); ♂ tergite VI with 1 pair of elongate lateral tubercles extending almost to posterior margin of tergite VII bonannii Uzel



FIGS 307-313. 307, *Megathrips lativentris* head. 308, *M. lativentris* pelta. 309, *M. nobilis* head. 310, *M. nobilis* ♂ tergites VI-X. 311, *Megalothrips delmasi* head. 312, *M. bonannii* antenna. 313, *M. bonannii* pelta.

Feeds on fungal spores under bark; ♀ viii-x; ♂ and larvae x; recorded twice in Britain at Wood Walton Fen, Huntingdon.

Genus MEGATHRIPS Targioni-Tozzetti

(figs 307-310)

This Holarctic genus is closely related to the genus *Bactridothrips* Karny from the Old World tropics. There are two species in Britain, both of which are widespread in Europe, and *lativentris* also occurs in North America.

KEY TO SPECIES

- 1 Colour mainly dark brown, tibiae, tarsi, bases of femora and at least pedicels of antennal segments III-V yellow; forewings clear; major setae hyaline. Body size 3.5-5.0mm; head less than 1.7 times as long as wide, maxillary stylets wide apart (fig. 307); pronotum with epimeral sutures well developed but not complete; dorsal setae on tergite IX broadly rounded at apex. Larva II with red internal pigment which is discontinuous in the mesothorax; head and pronotum brown, tibiae paler than brown femora **lativentris** (Heeger)
Feeds on fungus spores in Betula and Quercus leaf litter; ♀ macr. iv-viii, ♀ micr. i-x, ♂ micr. iv-ix, larvae v-x; widespread but infrequently collected; [7], 9, 14, 15, 31, 74-76, 79, 81.
- Colour mainly dark brown including tibiae, tarsi light brown, pedicels of antennal segments III-V yellow; forewings clear; major setae pale brown. Body size 4.0-7.0mm; head more than twice as long as wide, maxillary stylets close together medially (fig. 309); pronotal epimeral sutures not developed; dorsal setae on tergite IX acute at apex. Larva II with continuous crimson internal pigment, tibiae as dark as the femora **nobilis** Bagnall
Feeds on fungal spores on dead Salix branches (also in leaf litter or in grass tussocks?); ♀ macr. ♀ micr. ♂ micr. and larvae viii-ix; recorded twice in Britain, Cambridge (Wicken Fen), Ross-shire (Garve).

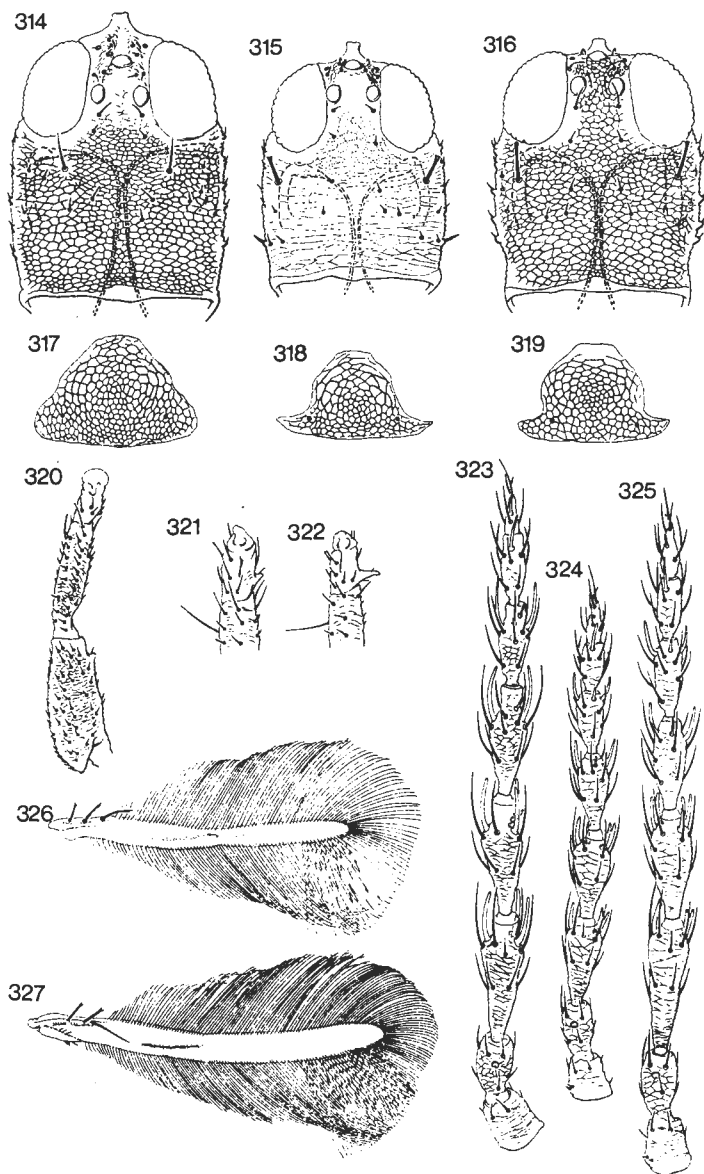
Genus PHLAEOTHRIPS Haliday

(figs 315-316, 318-319, 321-322, 324-325, 327)

There are more than 20 nominal species from various parts of the world placed in this genus but it is doubtful how many of these are congeneric with the type-species, *coriaceus*. The two species in Britain are both widespread in Europe. They can be distinguished from *Hoplandrothrips* species by the parallel-sided wings, the broad pelta, the median dorsal setae on tergite IX of the ♀ scarcely one-third as long as the tube, and the absence of the ♂ of both a tubercle on the fore femur and a glandular area on sternite VIII. These species can be distinguished from *Acanthothrips* species by the greater distance between the postocular setae.

KEY TO SPECIES

- 1 Lateral margins of head with several small tubercles but without a pair of stout setae in basal third (fig. 316); antennal segment III about 3.0 times as long as wide, largely yellow but weakly shaded near apex (fig. 325); pelta strongly reticulate (fig. 319); fore tarsal tooth usually less than half as long as tarsal width (fig. 321). Larva II yellow with 2 longitudinal red lines, pronotum strongly rugose, head with projecting ventrolateral horns **coriaceus** Haliday
On dead branches; ♀ ii, v-x; ♂ ii-iii, v-x, xii; widespread in Europe but collected infrequently in England; 1, [2], 3, 5, 6, 8, 9, [15], 18, [33], 34, 35, 52, [54].
- Lateral margins of head with 1 stout seta in basal third (fig. 315); antennal segment III about 2.5 times as long as wide (fig. 324), usually brown in distal half; pelta



FIGS 314-327. 314, *Acanthothrips nodicornis* head. 315, *Phlaeothrips annulipes* head. 316, *P. coriaceus* head. 317, *A. nodicornis* pelta. 318, *P. annulipes* pelta. 319, *P. coriaceus* pelta. 320, *A. nodicornis* ♀ left fore leg. 321, *P. coriaceus* ♀ left fore tarsus. 322, *P. annulipes* ♀ left fore tarsus. 323, *A. nodicornis* antenna. 324, *P. annulipes* antenna. 325, *P. coriaceus* antenna. 326, *Hoplandrothrips bidens* forewing. 327, *P. coriaceus* forewing.

weakly reticulate (fig. 318); fore tarsal tooth usually more than half as long as tarsal width (fig. 322). Larva II crimson, pronotum not rugose, ventrolateral horns scarcely projecting beyond eyes

annulipes Reuter
On dead branches, particularly *Betula*; ♀ v-ix, ♂ vi-ix, larvae i, iii, v-ix, xi; uncommon in northern Europe, locally abundant in Britain on 'birch brooms' used as fire beaters in forest reserves; [9], 14, 21, 22, [51], 53, 54, 60, 75, 76, [78, 79], 81, 98.

Genus POECILOTHRIPS Uzel

(fig. 253)

The single British species in this genus is widespread in Europe and North America. The only other member of the genus is found in South Africa.

Colour mainly brown, but with red internal pigment and a chalky white deposit in the pronotum; tarsi, apices of tibiae, and bases of antennal segments III-VI yellow. Body size 2.0-2.5mm; macropterous or micropterous; fore tarsus without a tooth; eyes exceptionally large, postocular setae minute (fig. 253); mouth cone extending to mesosternum. Larva II vividly coloured with transverse, red and white bands

albopictus Uzel
On dead branches; ♀ macr. ♀ micr. also larvae ix; 1 British record near Ascot, Berkshire.

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APPENDIX

British county divisions adopted in this handbook

- | | | |
|---------------------|------------------------|--------------------|
| 1. Kent | 30. ^f Derby | 60. Ayrshire |
| 2. Sussex | 31. Cheshire | 61. Renfrew |
| 3. Surrey | 32. Stafford | 62. Clyde Isles |
| 4. Middlesex/London | 33. Shropshire | 63. Lanark |
| 5. Essex | 34. Warwick | 64. Peebles |
| 6. Hertfordshire | 35. Worcester | 65. Selkirk |
| 7. Buckinghamshire | 36. Hereford | 66. Berwick |
| 8. Oxford | 37. Monmouth | 67. Haddington |
| 9. Berkshire | 38. Flint | 68. Edinburgh |
| | 39. Denbigh | 69. Linlithgow |
| 10. Is. of Scilly | | |
| 11. Cornwall | 40. Pembroke | 70. Dunbarton |
| 12. Devon | 41. Carmarthen | 71. Stirling |
| 13. Somerset | 42. Glamorgan | 72. Fife |
| 14. Dorset | 43. Cardigan | 73. Angus |
| 15. Hampshire | 44. Brecon | 74. Perth |
| 16. Is. of Wight | 45. Radnor | 75. Kincardine |
| 17. Wiltshire | 46. Montgomery | 76. Aberdeen |
| 18. Gloucester | 47. Caernarvon | 77. Banff |
| | 48. Merioneth | 78. Moray |
| 20. Suffolk | 49. Anglesey | 79. Nairn |
| 21. Norfolk | | |
| 22. Cambridge | 50. Yorkshire | 80. Argyll |
| 23. Bedford | 51. Lancashire | 81. Inverness |
| 24. Huntingdon | 52. Durham | 82. Ebudes |
| 25. Northampton | 53. Westmorland | 83. Outer Hebrides |
| 26. Leicester | 54. Northumberland | 84. Ross |
| 27. Rutland | 55. Cumberland | 85. Sutherland |
| 28. Nottingham | 56. Wigtown | 86. Caithness |
| 29. Lincoln | 57. Kirkcudbright | 87. Orkneys |
| | 58. Dumfries | 88. Shetlands |
| | 59. Roxburgh | |
| | 90. Kerry | |
| | 91. Cork | |
| | 92. Clare | |
| | 93. Galway | |
| | 94. Donegal | |
| | 95. Wexford | |
| | 96. Dublin | |
| | 97. Down | |
| | 98. Armagh | |
| | 99. Antrim | |

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