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A RECLASSIFICATION OF  
THE EUROPEAN TETRASTICHINAE  
(HYMENOPTERA: EULOPHIDAE):  
REVISION OF THE REMAINING GENERA.

by  
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A RECLASSIFICATION OF THE EUROPEAN TETRASTICHINAE  
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**Synopsis**

The remaining genera of European Tetrastichinae, not included in the first part of this work (Graham, 1987) are revised. Two new genera (*Puklina*, *Kostjukovius*) are described. The European species of *Aceratoneuromyia*, *Quadrastichus* (= *Cecidotetrastichus*), *Baryscapus* (= *Eutetrastichus*), *Puklina*, *Kostjukovius*, *Pronotalia*, *Crataepus*, *Kocourekia*, *Melittobia*, *Oomyzus*, *Tetrastichus*, *Holcotetrastichus*, *Sphenolepis*, *Tamarixia*, *Tetrastichomyia* and *Peckelachertus* are revised, keyed and illustrated. A host list is provided. Three new species of *Aprostocetus* are also described and a redescription of *Aprostocetus subterraneus* (Szelényi) is given. Notes on the genera *Dzhanokmenia*, *Thripastichus*, *Quadrastichodella* and *Nesolyrx* are added. Of the 240 nominal species discussed, 177 are considered to be valid, 64 being described as new. 141 primary types have been examined and 23 lectotypes and 13 neotypes are here designated; 20 new synonymys are established.

**Introduction**

The present paper concludes my revision of European Tetrastichinae begun in my paper of 1987. Since then, thanks to the co-operation of Dr. John LaSalle, a rather wider survey of certain genera has been made. Some little-known genera, the type-species of which had not been critically examined until recently, were investigated. The type-material of these genera, deposited in museums in North America and Australia, have been examined by us. Two generic names, *Baryscapus* Förster and *Quadrastichus* Girault, take priority over *Eutetrastichus* Kostjukov and *Cecidotetrastichus* Kostjukov, which were used in my earlier paper. Two new genera, *Puklina* and *Kostjukovius*, are described here and their placing indicated.

Since the publication of my earlier key (Graham, 1987) some changes in the generic nomenclature have taken place, whilst two new genera must be added. For these reasons, and to make the present work complete, a revised key is presented. The opportunity has also been taken to correct some errors in the earlier key. It was decided to include the revised key at a late stage of the work, so to avoid changes in the numbering of figures, those illustrating the key have been grouped together and separately numbered as "Key Figures" (K1, K2, ...). The figures themselves have been redrawn, with some details slightly altered.



## Host check-list

## HOSTS

## TETRASTICHINE PARASITES

## ACARINA

## ERIOPHYIDAE

*Eriophyes phloeocoptes**Quadrastichus sajo*

## INSECTA

## COLEOPTERA

## BRUCHIDAE

*Bruchidius ater**B. brachialis**B. cinerascens**B. fasciatus**B. lentis**B. ulicis**Baryscapus endemus**Baryscapus bruchivorus**B. bruchivorus**B. bruchivorus**B. bruchivorus**B. bruchivorus*

## BUPRESTIDAE

*Agrilus aurichalceus**A. biguttatus**A. integerrimus**A. mendax**A. roscidus**A. suvorovi**A. viridis**Baryscapus agrilorum**B. agrilorum**Tetrastichus heeringi**B. agrilorum**Baryscapus starki**B. agrilorum**B. agrilorum**Quadrastichus misellus**Tetrastichus heeringi**Tetrastichus telon*

## CHRYSMELIDAE

*Cassida deflorata**C. murrea**C. nebulosa**C. rubiginosa**C. viridis**C. sp.**Crioceris asparagi**C. duodecimpunctata**Donacia sp.**Gallerucella* (see *Pyrrhalta*)*Galeruca tanacetii**Lema lichenis**L. melanopa**L. sp.**Plagiodera versicolora**Pyrrhalta luteola**Holcotetrastichus rhosaces**Tetrastichus clito**T. clito**H. rhosaces**H. rhosaces**T. clito**H. rhosaces**H. rhosaces**Tetrastichus coeruleus**Tetrastichus crioceridis**T. coeruleus**Melittobia acasta**Oomyzus galerucivorus**Oomyzus tanacetii**Tetrastichus julis**T. julis**T. julis**Tetrastichus ? lyridice**Baryscapus erynniae**Oomyzus gallerucae*

## COCCINELLIDAE

*Chilocorus bipustulatus**C. renipustulatus**Chilomenes sexmaculata**Coccinella septempunctata**Oomyzus scaposus**Oomyzus sempronius**O. scaposus**O. scaposus**O. scaposus*

## COCCINELLIDAE (continued)

*C. undecimpunctata*  
*Epilachna argus*  
*E. chrysomelina*  
*Subcoccinella vigintiquatuorpunctata*  
*Synharmonia conglobata*

## CURCULIONIDAE

*Carphoborus minimus*  
*Cionus scrophulariae*  
*Cryptorhynchus lapathi*  
*Larinus jaceae*  
*L. sp.*  
*Lixus iridis*

*Orchestes* (see *Rhynchaenus*)

*Rhynchaenus alni*

*R. fagi*

*R. pilosus*

*R. quercus*

*R. salicis*

## SCOLYTIDAE

*Leperesinus orni*

## DIPTERA

## AGROMYZIDAE

*Phytomyza orobanchia*

## CECIDOMYIIDAE

*Asphondylia sp.*  
*Dasineura pteridicola*  
*D. ulmariae*  
*Harmandia loewi*  
*Monarthropalpus buxi*  
*Perrisia persicariae*  
*Rhabdophaga pseudococcus*  
*Wachtliella rosarum*

## CHLOROPIDAE

*Calamoncosis (?) minima*  
*Lipara lucens*

## MUSCIDAE

*Atherigona sp.*  
*Musca domestica*

## SARCOPHAGIDAE

*Pterella convergens*  
*Sarcophaga albiceps*  
*S. auricaudata*  
*Setulia* (see *Pterella*)

## STRATIOMYIDAE

*Geosargus sp.*

## TACHINIDAE

*Compsilura concinnata*

*O. scaposus*  
*Tetrastichus epilachnae*  
*T. epilachnae*  
*T. epilachnae*  
*O. scaposus*

*Baryscapus pinetorum*  
*Baryscapus endemus*  
*Quadrastichus cryptorhynchi*  
*Baryscapus crassicornis*  
*B. crassicornis*  
*Baryscapus endofiticus*  
*Baryscapus garganus*

*Tetrastichus miser*  
*Baryscapus endemus*  
*T. miser*  
*T. miser*  
*B. endemus*  
*Baryscapus nigroviolaceus*  
*T. miser*  
*T. miser*

*Tetrastichus ulmi*

*Baryscapus phytomyzae*  
*Pronotalia orobanchiae*

*Tetrastichus halidayi*  
*Quadrastichus pteridis*  
*Quadrastichus vacuna*  
*Quadrastichus ventricosus*  
*Quadrastichus ? anysis*  
*Quadrastichus lasiocerus*  
*Quadrastichus pedicellaris*  
*Quadrastichus perissiae*

*Pronotalia carlinarum*  
*P. carlinarum*  
*Tetrastichus legionarius*

*Aceratoneuromyia atherigonae*  
*Melittobia acasta*

*Pronotalia carlinarum*  
*Aceratoneuromyia evanescens*  
*Aceratoneuromyia indica*

*Tetrastichus murcia*

*Melittobia acasta*  
*Tetrastichomyia clisiocampae*

## TACHINIDAE (continued)

*Erynnia nitida**Lydella grisescens*

## TEPHRITIDAE

*Bactrocera* sp.*Ceratitis capitata**Chaetoriella jaceae**Dacus dorsalis**D. ferrugineus**D. xanthodes**Strumeta passiflorae**S. tryoni**Terellia colon**T. flavicauda**T. florentiae**T. fuscicornis**T. serratulae**Urophora jaceana**U. stylata*

## HEMIPTERA

## COCCIDAE

*Ceroplastes* sp.*Eulecanium tiliae**Parthenolecanium corni**Rhodococcus spiraeae**R. turanicus**Sphaerolecanium prunastri*

## APHALARIDAE

*Strophingia arborea**S. ericae**S. fallax*

## TRIOZIDAE

*Trioza apicalis**T. centranthi**T. chenopodii**T. kratochvili**T. magnisetosa**T. remota**T. rumicis**T. tremblayi**T. urticae*

## HYMENOPTERA

## ANTHOPHORIDAE

*Anthophora abrupta*

## APIDAE

*Bombus* sp.*Baryscapus erynniae**M. acasta**Aceratoneuromyia indica**A. indica**Baryscapus gradwelli**Pronotalia trypetae**A. indica**A. indica**A. indica**A. indica**A. indica**Baryscapus दौरा**B. दौरा**Crataepus marbis**B. दौरा**C. marbis**B. दौरा**C. marbis**B. दौरा**C. marbis**B. दौरा**Baryscapus gradwelli**C. marbis**Baryscapus ceroplastiphilus**Baryscapus sugonjaevi**B. sugonjaevi**B. sugonjaevi**B. sugonjaevi**B. sugonjaevi**Tamarixia arborea**Tamarixia actis**T. arborea**Tamarixia pronomus**T. pronomus**Tamarixia bicolor**T. pronomus**Tamarixia poddubnyi**Tamarixia pubescens**Tamarixia pygmaeola**Tamarixia tremblayi**Tamarixia upis**Melittobia acasta**M. acasta*

## ARGIDAE

*Arge ochropus**A. pagana**Tetrastichus hylotomarum**T. hylotomarum*

## BRACONIDAE

Note. The generic name in square brackets in the case of some *Apanteles* is that adopted by Mason (1981) whose conclusions are not accepted by all workers.

*Apanteles* [*Cotesia*] *affinis**A.* [*A.*] *carpatius**A.* [*Cotesia*] *glomeratus**A.* [*Cotesia*] *plutellae**A.* [*Cotesia*] *rubecula**A.* sp.*Baryscapus galactopus**Baryscapus tineivorus**B. galactopus**Oomyzus sokolowskii**B. galactopus**Baryscapus endemus**B. galactopus**B. endemus**Eubadizon minutus**Microplitis gortynae**Protomicroplitis alvearius**Sigalphus fagi**Tetrastichomyia clisiocampae**B. endemus**B. endemus*

## CHRYSIDIDAE

? gen. et sp.

*Melittobia acasta*

## COLLETIDAE

*Anthidium* sp.*Prosopis* sp.*M. acasta**M. acasta*

## CYNIPIDAE

*Andricus kollari* (gall)*A. quercustozae* (gall)*Biorhiza pallida* (gall)*Baryscapus berhidanus**B. berhidanus**Baryscapus anasillus**Baryscapus diaphantus**Baryscapus pallidae*

## DIPRIONIDAE

*Diprion pini**Baryscapus oophagus*

## ELASMIDAE

*Elasmus flabellatus* (possibly *steffani*)*E. schmitti**Baryscapus nigroviolaceus**Baryscapus elasmii*

## ENCYRTIDAE

*Blastothrix longipennis**Copidosoma kriechebaumeri**Litomastix* (see *Copidosoma*)*Microterys hortulanus**M. sylvius**Ooencyrtus pityocampae**Baryscapus sugonjaevi**Baryscapus endemus**Baryscapus sugonjaevi**B. sugonjaevi**Baryscapus servadeii**Baryscapus transversalis*

## EULOPHIDAE

*Entedon* sp.*Pediobius saulius**Prigatio agraulis**Minotetrastichus frontalis**Sympiesis sericeicornis**Baryscapus endemus**Baryscapus nigroviolaceus**B. nigroviolaceus**B. nigroviolaceus**B. nigroviolaceus*

## EUMENIDAE

*Gymnomerus laevipes**Melittobia acasta*

## EURYTOMIDAE

*Bruchophagus gibbus**B. platypterus**B. roddi**Baryscapus bruchophagi**B. bruchophagi**B. bruchophagi*

## FORMICIDAE

*Formica fusca**F. sanguinea**Melittobia acasta**M. acasta*

## ICHNEUMONIDAE

*Bathyplectes curculionum**Campoplex* (see *Sinophorus*)*Diadegma armillata**Mesochorus confusus**Scambus* sp.*Sinophorus alkae**Baryscapus bruchophagi**Baryscapus evonymellae**B. evonymellae**Baryscapus talitzkii**Melittobia acasta*

## LEUCOSPIDAE

*Leucospis intermedia**M. acasta*

## MEGACHILIDAE

*Anthidium* sp.*Heriades* sp.*Megachile muraria**Osmia adunca**O. leucomelaena**Stelis nasuta**M. acasta**M. acasta**M. acasta**M. acasta**M. acasta**M. acasta*

## PTEROMALIDAE

*Habrocytus fenomenalis**Baryscapus garganus**Pteromalus sequester**Pronotalia fiorii**P. tenuicornis**Baryscapus endemus**Tricomalus* sp.*Baryscapus pospelovi**B. endemus*

## SPHECIDAE

*Trypoxylon figulus**Melittobia acasta*

## TENTHREDINIDAE

*Cladius pectinicornis**Tetrastichus hylotomarum*

## TORYMIDAE

*Monodontomerus obsoletus**Melittobia acasta*

## LEPIDOPTERA

## GELECHIIDAE

*Exoteleia dodecella**Baryscapus turionum*

## GRACILLARIIDAE

*Phyllonorycter blancardella**P. cavella**P. froelichella**P. manni**Baryscapus nigroviolaceus**B. nigroviolaceus**B. nigroviolaceus**Baryscapus szoecsi*

## LYMANTRIIDAE

*Porthetria dispar**Tetrastichomyia clisiocampae*

## LYONETIIDAE

*Leucoptera lotella**Baryscapus lotellae**L. scitella**Baryscapus nigroviolaceus*

## NOCTUIDAE

*Achatodes zeae**Tetrastichomyia clisiocampae**Acronycta megacephala**T. clisiocampae**Lithophane ornitopus**Baryscapus szoecsi*

## NOTODONTIDAE

*Cerura vinula**Baryscapus galactopus*

## OECOPHORIDAE

*Agonopterix alpigena**Baryscapus endemus*

## PIERIDAE

*Pieris* sp.*Baryscapus galactopus**Pontia daplidice**B. galactopus*

## PLUTELLIDAE

*Plutella xylostella*  
*Prays oleae*

*Oomyzus sokolowskii*  
*Baryscapus nigroviolaceus*

## PYRALIDAE

*Diatraea crambidoides*  
*Ostrinia nubilalis*

*Tetrastichomyia clisiocampae*  
*T. clisiocampae*

## THAUMETOPOEIDAE

*Thaumetopoea pityocampa*

*Baryscapus servadeii*  
*Baryscapus transversalis*

## TINEIDAE

*Niditinea fuscipunctella*  
*Tinea pellionella*  
*Tineola bisselliella*

*Baryscapus tineivorus*  
*B. tineivorus*  
*B. tineivorus*

## TORTRICIDAE

*Blastesthia turionella*  
*Cydia molesta*  
*C. pomonella*  
*Rhyacionia buoliana*

*Baryscapus turionum*  
*Tetrastichomyia clisiocampae*  
*Melittobia acaosta*  
*B. turionum*

## YPONOMEUTIDAE

*Yponomeuta cagnatella*  
*Y. malinella*

*Baryscapus evonymellae*  
*B. evonymellae*  
*Baryscapus pospelovi*  
*Baryscapus endemus*  
*B. evonymellae*

*Y. padella*

## NEUROPTERA

## CHRYSOPIDAE

*Chrysopa carnea*  
*C. flavifrons*

*Oomyzus sempronius*  
*Baryscapus impeditus*  
*O. sempronius*  
*O. sempronius*  
*B. impeditus*

*C. ventralis*  
*C. sp.*

## CONIOPTERYGIDAE

*Conwentzia pineticola*

*Baryscapus conwentziae*

## Adult morphology

In my earlier paper (Graham, 1987) the male genitalia were found to provide useful characters, in some cases of generic value, and many were illustrated. In some of the genera dealt with in the present part, such as *Quadrastichus* Girault, *Tetrastichus* Haliday, *Oomyzus* Rondani and *Tamarixia* Mercet, interspecific differences were found to be small. As limited material of males is available, the range of variation of the genitalia cannot be adequately studied. Hence it was decided not to illustrate these structures.

On the other hand, apparently useful distinctions between certain species were found in the shape of the female hypopygium, a number of which are illustrated for each genus. Features which are apparently of generic value are evident in *Aceratoneuromyia*, *Tamarixia* and *Tetrastichomyia*, all of which have the anterior margin of the hypopygium truncate or nearly so. In the remaining genera the anterior margin of the hypopygium is almost invariably distinctly trilobed, the lobes obsolescent in a few *Quadrastichus*. Some differences are discernible between related species but are generally small; if considerable, then the species usually has more distinctive external characters. In general the

overall shape of the hypopygium, its length relative to breadth, length of the anterior median lobe relative to the lateral lobes, its length relative to its own breadth, shape (whether parallel-sided or tapering; hind margin subtruncate, curved, obtuse or subacute) are apparently the most useful characters. Most of the characters vary somewhat, but not so much as to lack individuality.

For other details of adult morphology and terminology, my earlier paper should be consulted (Graham, 1987: 16-20).

### Depositories

BMNH	The Natural History Museum, London.
DEL	Institut für Pflanzenschutzforschung (formerly Deutsches Entomologisches Institut), Eberswalde.
GD	G. Domenichini collection, Piacenza.
IEA	Instituto di Entomologia agraria, Portici.
IEE	Instituto Espanol de Entomologia, Madrid.
ITZ	Instituut voor Taxonomische Zoölogie, Zoölogisch Museum, Amsterdam.
LEMV	Laboratoire d'Écologie du Mont Ventoux, Malaucène, France.
MCSN	Museo Civico di Storia Naturale "Giacomo Doria", Genoa.
MHN	Muséum d'Histoire Naturelle, Geneva.
MIZSU	Museo ed Istituto di Zoologia Sistemica dell'Università, Turin.
MJG	M.J. Gijswijt collection, 's Graveland, Netherlands.
MNHN	Muséum National d'Histoire Naturelle, Paris.
MVG	M.W.R. de V. Graham second collection, Oxford.
NM	Naturhistorisches Museum, Vienna.
NMG	Naturhistoriska Museet, Göteborg, Sweden.
NMI	National Museum of Ireland, Dublin.
NMP	Národní Muzeum v Praze, Prague.
NR	Naturhistoriska Riksmuseet, Stockholm.
RHPIB	Royal Hungarian Phytosanitary Institute, Budapest
RNH	Rijksmuseum van Natuurlijke Historie, Leiden.
RRA	R.R. Askew collection, Manchester.
RSM	Royal Scottish Museum, Edinburgh.
SAM	South Australian Museum, Adelaide.
SB	S. Bellin collection, Universität Hannover.
SZFA	Station de Zoologie Forestière, Avignon.
TM	Természettudományi Múzeum, Budapest.
UM	University Museum, Oxford.
USNM	United States National Museum, Washington, D.C.
ZI	Zoologiska Institutionen, Lund, Sweden.
ZIL	Zoological Institute, Academy of Sciences, Leningrad.
ZMU	Zoological Museum of the University, Helsinki.
ZSBS	Zoologische Sammlung des Bayerischen Staates, Munich.

### Revised Key to European Genera

#### Females

- 1 Antenna: inner aspect of scape with distinctly raised, honeycomb-like reticulation; interno-dorsal surface of pedicellus (Fig. K1) with raised sculpture which forms transverse ridges; in the species found in Europe there are four distinct anelli whose combined length equals that of the first

funicular segment, the flagellum is short and clavate, funicular segments slightly broader than long. Forewing (Fig. K2) with postmarginal vein moderately long, though shorter than the stigmal vein. Species introduced into Mediterranean area associated with eucalypts.

- ..... **QUADRASTICHODELLA** (p.296)
- Antenna: these surfaces of scape and pedicellus without raised sculpture, except in *Aprostocetus eurytus* which has funicular segments about twice as long as broad, postmarginal vein (as in the majority of genera which follow) a short stub or absent. Anelli rarely so distinct, usually difficult to see individually, their combined length almost always less than that of the first funicular segment. Species not associated with eucalypts. .... 2
- 2 Scutellum with numerous setae scattered irregularly over the surface, except sometimes a band down the middle; in the single European species without submedian lines. Mid lobe of mesoscutum with a number of setae scattered over its surface. Head including eyes, antennae, thorax dorsally (except dorsellum and propodeum) legs and gaster, rather thickly pilose, the specialized setae hardly exceeding the ordinary ones in length. Malar sulcus absent. .... **KOCOUREKIA** (p.179)
- Scutellum with paired setae; nearly always with 2 pairs, rarely 3 pairs in aberrant specimens, with more than 3 pairs in one European and some extralimital species. Setae of mid lobe of mesoscutum usually confined to the sides, rarely scattered over the whole surface. The other parts of the body mentioned are much less hairy but have more specialized setae. . 3
- 3 Malar sulcus usually absent, rarely indicated just near the eye. Gaster with tip of hypopygium situated well beyond the middle, or near the apex. Forewing: submarginal vein with 3 to 6 dorsal setae. Mid lobe of mesoscutum without median line. .... 4
- Malar sulcus present and extending from eye to mouth edge, though sometimes fine; in some species expanded just below the eye to form a fovea. Gaster with tip of hypopygium rarely situated so far distad. Forewing: submarginal vein sometimes with fewer than 3 dorsal setae. Mid lobe of mesoscutum with or without a median line. .... 6
- 4 Mid lobe of mesoscutum with setae scattered over its whole surface. Median area of frons (Fig. K3) wedge-shaped, 2.0-3.5 times as high as broad; head in front view as high as or a little higher than broad. Forewing with marginal vein 3.5-4.7 times as long as the stigmal vein. Antennal scape (Fig. 184) at least 0.75 length of eye, slender proximally but expanded above the middle, 2.7-3.5 times as long as broad. .... **MELITTOBIA** (p.180)
- Mid lobe of mesoscutum with a single row of adnotaular setae. Median area of frons (Figs K7, K8) trapeziform or subtriangular, at most slightly higher than broad, sometimes slightly broader than high; head in front view (unless distorted) usually a little broader than high, occasionally as high as broad. Forewing with marginal vein 2.0-3.2 times as long as stigmal. Antennal scape only about 0.5 length of eye, hardly 2.5 times as long as broad. .... 5

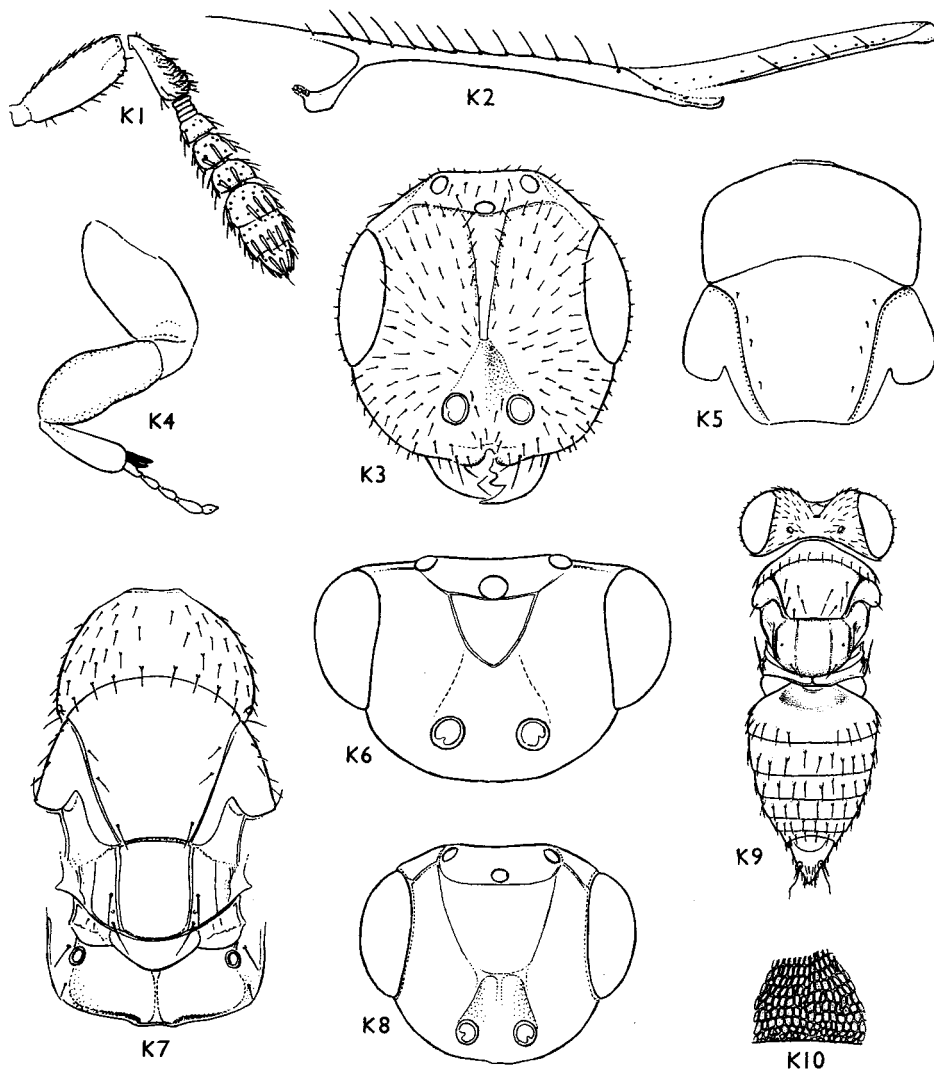


- 5 Fore tibia (Fig. K4) with a strong, black, deeply bifid apical spur. Pronotum (Fig. K17) large, transversely subrectangular, with prominent shoulders and subparallel sides. Head in front view (Fig. K7) 1.5-1.7 times as broad as high. Fore coxae large, longer than hind coxae. Exerted part of ovipositor sheaths at least 0.6 length of hind tibia. . . . . *CRATAEPUS* (p.178)
- Fore tibia with a simple, usually pale, apical spur. Pronotum (Fig. K6) with less prominent shoulders, its sides tending to converge forward. Head in front view (Fig. K8) at most about 1.3 times as broad as high. Fore coxae not or hardly longer than hind coxae. Ovipositor sheaths hardly, or only slightly, projecting beyond apex of gaster. . . . . *PRNOTALIA* (p.168)
- 6 Macropterous species with postmarginal vein almost or quite as long as the stigmal vein (care needed, as the postmarginal vein is sometimes fine and not easy to see). Anterior margin of clypeus (except in *Apotetrastichus sericothorax*) truncate and without teeth. Spiracles of propodeum small, their whole rim visible from above. . . . . 7
- Either macropterous species having postmarginal vein at most 0.5 length of stigmal vein (though nearly always very short or absent); or brachypterous. Anterior margin of clypeus most often bidentate, sometimes truncate. Spiracles of propodeum varying from very small to very large, sometimes with the outer part of their rim partly covered by a raised lobe of the callus (especially in a slightly lateral view) (Figs K40, K42, K43). . . . . 9
- 7 Scutellum without submedian lines; anterior pair of setae well in front of the middle. Forewing: submarginal vein with 3 to 6 dorsal setae. . . . . *PECKELACERTUS* (p.294)
- Scutellum with submedian lines; anterior pair of setae not in front of the middle. Forewing: dorsal setae of submarginal vein variable in number, sometimes only 1, sometimes 2 or (*Apotetrastichus postmarginalis*) 3. . . . . 8
- 8 Spiracles of propodeum separated by nearly or just twice their diameter from hind margin of metanotum. Thorax distinctly longer than broad; reticulation of mesoscutum and scutellum composed of elongate areoles (mostly 3 to 4 times as long as broad). . . . . *APOTETRASTICHUS*
- Spiracles of propodeum almost touching hind margin of metanotum. Thorax (Fig. K9) hardly longer than broad; reticulation of mesoscutum and scutellum (Fig. K10) composed of short areoles which vary from nearly isodiametric to about twice as long as broad. . . . . *SPHENOLEPIS* (p. 274)
- 9 Forewings rudimentary, or more or less abbreviated. . . . . 10
- Forewings fully developed. . . . . 11
- 10 Hind margin of scutellum projecting over the propodeum, which slopes vertically with respect to the dorsal surface of the thorax. Mid lobe of mesoscutum, and scutellum, each about twice as broad as long, dull, with very slightly raised reticulation composed of very short areoles. Gaster convex dorsally. Forewings rudimentary, hardly extending beyond hind edge of propodeum. . . . . *SPHENOLEPIS* (p.274)
- Scutellum not projecting over the propodeum, the latter sloping moderately or sometimes nearly horizontal. Mid lobe of mesoscutum and scutellum less

than twice as broad as long, moderately shiny, with lightly engraved reticulation which has some or all of its areoles longer than broad. Gaster usually somewhat sunken dorsally in dried specimens. Forewings shortened but reaching at least slightly beyond hind edge of propodeum (*A. brevipennis* and some *A. fulvipes*). . . . . **APROSTOCETUS**

- 11 Thorax (Fig. K12) with dorsellum divided medially, either by a longitudinal channel which separates it into two convex lobes (*clisiocampae*) or by a fine longitudinal ridge (one African species). Propodeum: callus with a sharp carina which runs obliquely from the fovea in which the spiracle is placed to the subrectangular or acute hind corner; surface of propodeum with slightly raised reticulation and some rugosity or wrinkles, spiracles small and circular, separated by slightly more than their diameter from hind margin of metanotum. Antenna (Fig. K11): third anellus large, with several setae. Scutellum without submedian lines; sublateral lines deep, their outer edge sharply carinate. Vertex with a transverse ridge just behind the ocellar triangle. Lower edge of antennal toruli level with ventral edge of eyes. Mid lobe of mesoscutum without median line. Frons without transverse suture in front of median ocellus. . . . . **TETRASTICHOMYIA** (p.293)
  - Normally the dorsellum is convex and lacks a longitudinal channel or ridge (in a few extralimital *Tetrastichus* there is a weak longitudinal ridge, but these species have discoid anelli, submedian lines present on scutellum, vertex lacking a transverse ridge, mid lobe of mesoscutum with a very distinct median line). Frons most often with a straight or V-shaped suture just in front of the median ocellus, usually extending to near the front edge of the lateral ocelli and sometimes continued to the eyes. . . . . 12
- 12 Propodeum (Fig. K13) with plica which extends from hind margin to near each spiracle, or even to the base; from about the middle of each plica, a branch (paraspiracular carina) extends towards the hind corner of the propodeum, the space between each plica and paraspiracular carina sometimes forming a raised, reticulate triangular platform; surface between the plicae reticulate, this reticulation nearly always slightly raised, sometimes with additional carinulae or rugosity; propodeum medially slightly to much longer than the dorsellum. Hind coxae in most species with some raised reticulation or rugosity on their externo-dorsal surface. Forewing: submarginal vein in most species with only 1 dorsal seta (with 2 setae on occasional aberration of a few European species, and 2 or more in a few extralimital species). Body black with at least a slight metallic tinge, often strongly metallic, not pale-marked, except rarely the gaster. . . . . **TETRASTICHUS** (p.205)
  - Propodeum in nearly all species without plicae or with these indicated at the hind margin in a few; very rarely complete, but then their basal part runs considerably mesad of the spiracles, whilst the surface between then is shiny and weakly sculptured, and the hind coxae are shiny with weak superficial reticulation; paraspiracular carinae most often absent or weak, rarely sharp. Propodeum in many species only as long as, or shorter than, the dorsellum. Forewing: submarginal vein with 1, 2 or more dorsal setae. Body metallic or non-metallic, sometimes pale-marked or wholly pale. . . . . 13

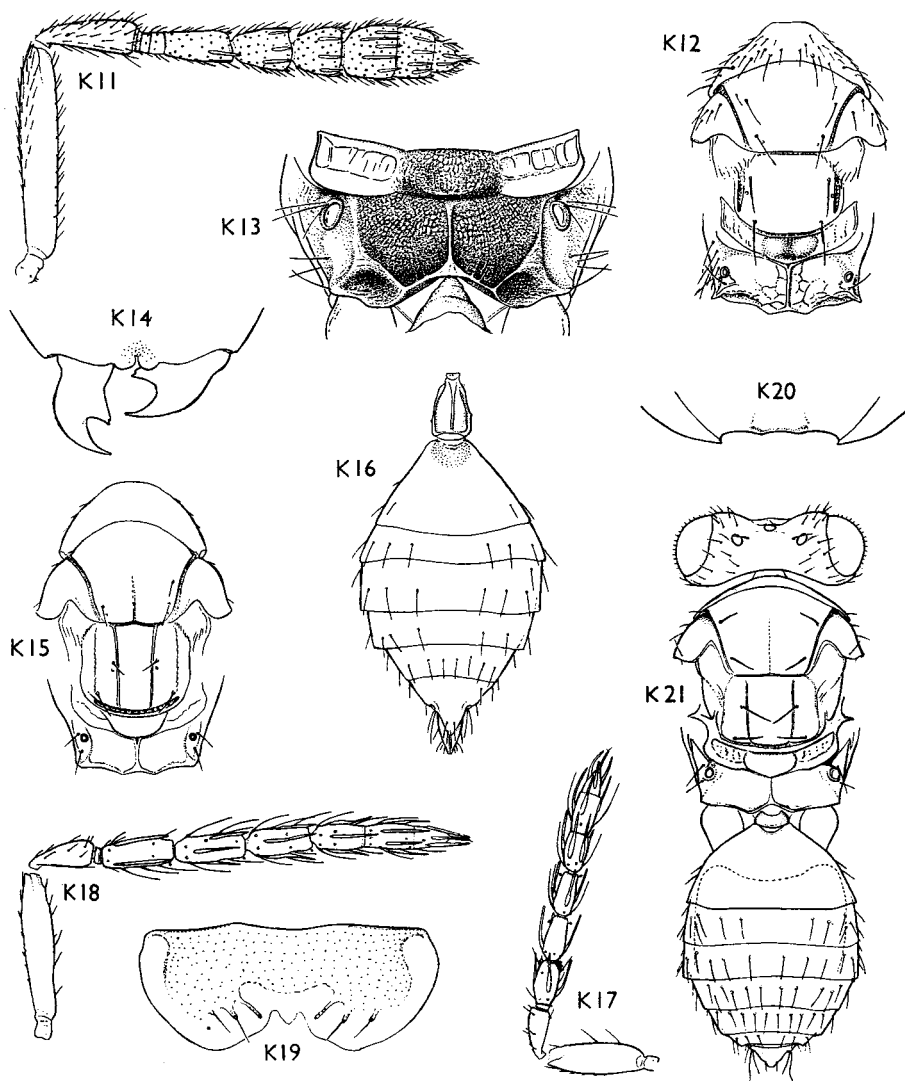
- 13 Forewing: submarginal vein with 1 dorsal seta [rarely there is 1 seta on one wing and 2 setae on the other; such cases are provided for by inclusion in both sections of the key]. . . . . 14
- Forewing: submarginal vein with 2 or more dorsal setae. . . . . 21
- 14 Scutellum with 3-6 pairs of setae. Mandible (Fig. K14) with long falcate outer tooth and two minute and closely approximated inner teeth. Whole surface of thorax relatively dull, with very fine but distinctly raised reticulation; mid lobe of mesoscutum without a median line, with long suberect setae which form 1-3 irregular rows on each side. Dorsal surface of gaster finely reticulate (except sometimes at the base). Body brightly metallic, green to blue-green. . . . . **CHAENOTETRASTICHUS**
- Scutellum normally with 2 pairs of setae (with 3 setae on one or both sides in occasional aberrations). Mandible tridentate with the two inner teeth relatively large, the innermost tending to be rounded or subtruncate. The other characters not all agreeing with the above. . . . . 15
- 15 Gastral petiole (Fig. K16) conspicuous, 1.2-1.7 times as long as broad, with at least traces of 3 longitudinal carinae. Anterior margin of clypeus subtruncate with 2 minute, rather widely-spaced tubercles. Spiracles of propodeum (Fig. K15) very small, circular, separated by about their diameter from hind edge of metanotum. Vertex, upper part of occipital surface, and pronotum, with rather coarse and slightly raised reticulation which contrasts with the excessively fine, engraved, longitudinally lineolate sculpture of the mesoscutum and scutellum. Body black, non-metallic; fore coxae mainly black, mid and hind coxae at least mainly yellow. . . . . **MISCHOTETRASTICHUS**
- Gastral petiole usually at least slightly broader than long (as long as broad in *Petalidion*), without longitudinal carinae, rarely with traces of median carina, in some other species with vague reticulation in the posterior part. Anterior margin of clypeus most often distinctly bidentate. Spiracles of propodeum usually larger and nearer to hind margin of metanotum. Sculpture of vertex and other parts mentioned often different from that of alternate. Body sometimes metallic, or pale-marked; if the fore coxae are black, then the mid and hind coxae are also black. . . . . 16
- 16 Propodeum about twice as long as the dorsellum, its median portion or nucha projecting backwards slightly behind the level of the posterior edge of the supracoxal flanges; surface relatively dull, with strong, raised reticulation; paraspicular carinae present. Gastral petiole about as long as broad, with trace of a median carina; gaster hardly sunken dorsally but slightly convex. Antenna (Fig. K18) with flagellum long and slender; all funicular segments longer than broad. Mid lobe of mesoscutum with a distinct median line. . . . . **PETALIDION**
- Propodeum not simultaneously so long and so strongly reticulate except in some *Oomyzus* in which its median part usually does not project backwards behind the level of the supracoxal flanges; also in that genus the gastral petiole is distinctly transverse and smooth or nearly so, whilst the antennal flagellum is short and stouter, with funicular segments hardly longer than



Figs K1-K10 K1, K2, *Quadrastichodella nova* Girault ♀; (K1) right antenna; (K2) forewing venation. K3, *Melittobia acasta* (Walker) ♀, head in front view. K4-K6, *Crataepus marbis* (Walker) ♀; (K4) foreleg; (K5) pronotum and mesoscutum; (K6) head in front view. K7, K8, *Pronotalia carlinarum* (Szelényi & Erdős) ♀; (K7) thorax; (K8) head in front view. K9, K10, *Sphenolepis pygmaea* Nees ♀; (K9) body; (K10) mesoscutum, sculpture.

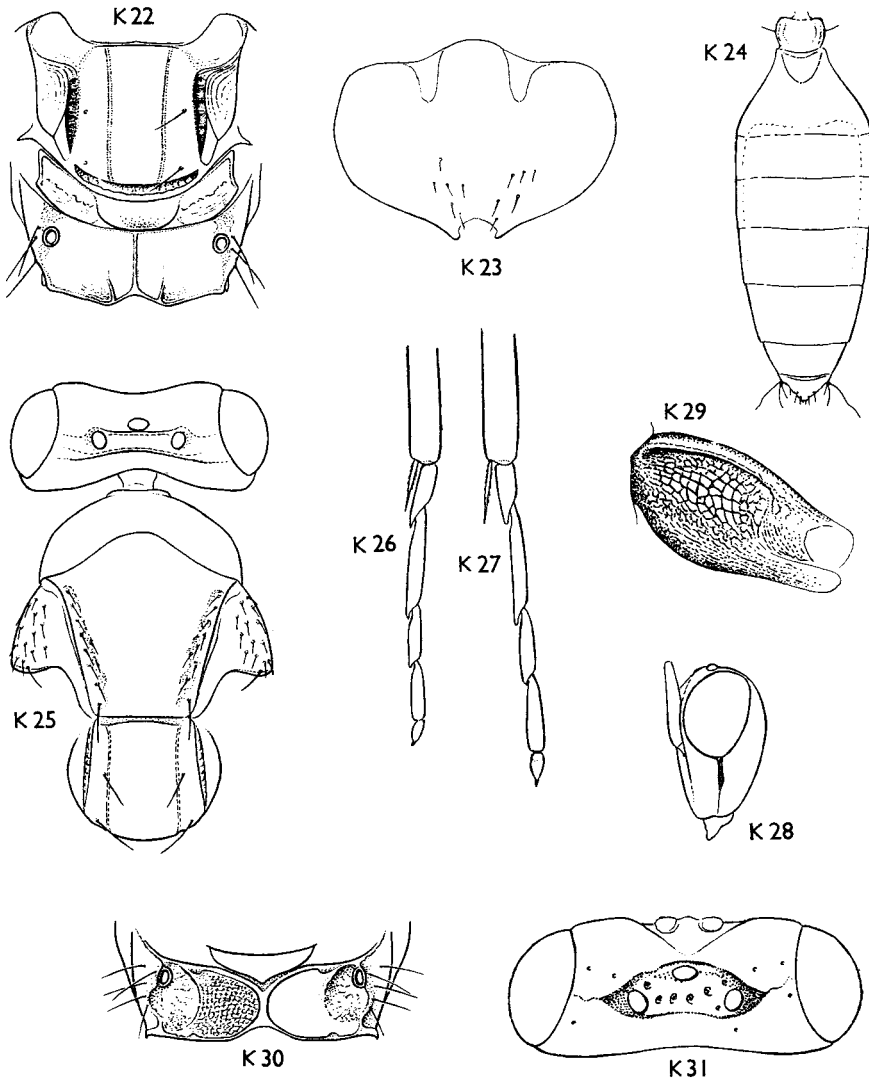
broad, mid lobe of mesoscutum lacking a median line. Gaster usually more or less sunken dorsally. . . . . 17

- 17 Mid lobe of mesoscutum (Fig. K21) with two relatively strong adnotaular setae on each side, placed before and behind the middle, the two setae virtually equal in length and suberect. Anterior margin of clypeus (Fig. K32) truncate, usually without teeth, rarely with two minute tubercles. Forewing with marginal vein slightly to much shorter than costal cell (Figs 313, 322). Relatively squat species with thorax at most 1.3 times as long as broad; body black, occasionally with weak metallic tints; gaster sometimes partly to main yellow, rarely the head more or less yellow. Hypopygium (Fig. K19; Figs 391, 392) with anterior margin almost straight; setae of disc arising from sublinear bases. Parasites of Hemiptera Psylloidea.  
. . . . . *TAMARIXIA* (p.275)
- Mid lobe of mesoscutum with 1 to 5 adnotaular setae on each side; if with 2, then anterior margin of clypeus distinctly bidentate (as in nearly all species of the following section, though weakly in one) whilst the adnotaular setae differ in some respect from those of *Tamarixia* (either the anterior seta of each side is shorter than the posterior seta, or is not situated before the middle, or else both setae are reclinate). Marginal vein often as long as or longer than the costal cell; thorax sometimes more elongate; body often with distinct metallic tints, or with some parts of head or thorax yellow. Hypopygium with anterior margin usually strongly trilobed (Figs 338-343, 345, 370-375) rarely weakly trilobed (Figs 344, 346, 347); setae of disc arising from simple annular bases. Not parasites of Psylloidea, except in rare cases. . . . . 18
- 18 Spiracles of propodeum very small, circular, separated by nearly twice their diameter from hind edge of metanotum and placed about equidistant from that and from hind edge of propodeum. Thorax strongly flattened, much broader than high; pronotum in dorsal view subtriangular. Foramen magnum situated slightly to distinctly above middle of head height. Body black, non-metallic. . . . . *KOSTJUKOVIVUS* (p.167)
- Spiracles of propodeum varying from very small to moderate-sized, but separated by at most their own diameter (though usually by less) from hind edge of metanotum. Thorax not or hardly flattened, at most slightly broader than high; pronotum usually short and lunate. Foramen magnum often situated less high on the head. . . . . 19
- 19 Body at least slightly metallic; antennal flagellum relatively slender with all funicular segments longer than broad; one seta of each cercus nearly or quite twice the length of the next longest, kinked in the middle; marginal vein slightly to distinctly longer than costal cell. Mesosternum flat or virtually so; propodeal spiracles very small or minute (a very few aberrant forms of species in subgenera *Ootetrastichus* and *Chrysotetrastichus*).  
. . . . . *APROSTOCETUS*
- Either body is non-metallic, black or black and yellow; or funicular segments of antenna are not all longer than broad, the cercal setae are subequal in length or one seta at most 1.5 times the length of the next longest, and



Figs K11-K21 K11, K12, *Tetrastichomyia clisiocampae* (Ashmead) ♀; (K11) right antenna; (K12) thorax. K13, *Tetrastichus miser* (Nees) ♀, metanotum and propodeum. K14, *Chaenotetrastichus grangeri* (Erdős) ♀, clypeus and mandibles. K15-K17, *Mischotetrastichus petiolatus* (Erdős) ♀; (K15) thorax; (K16) petiole and gaster; (K17) right antenna. K18, *Petalidion hellenicum* Graham ♀, right antenna. K19-K21, *Tamarixia pubescens* (Nees) ♀; (K19) hypopygium; (K20) clypeus; (K21) body.

- marginal vein at most as long as costal cell; or mesosternum is convex and propodeal spiracles small to moderate-sized. . . . . 20
- 20 Antennae with all funicular segments longer than broad, the first nearly always as long as or longer than the pedicellus, the third 1.5-3.5 times as long as broad. Mid lobe of mesoscutum in most species with only 1 adnotaular seta on each side, in the posterior half; a few with 2 or 3 setae, in which case either the body is non-metallic and sometimes more or less yellow; or thorax is 1.35-1.5 times as long as broad and gaster is at least twice as long as broad. Antennal flagellum (Figs 11, 14, 17-24, 27, 29-31, 33-35, 39, 42) relatively long and slender; funicular segments, or at least the third, with some long curved setae whose length equals or exceeds the breadth of the segments. Metapleuron and propodeum usually with very weak engraved or superficial, rarely slightly raised, reticulation.
- . . . . . *QUADRASTICHUS* (p.46)
- Usually at least the third funicular segment is quadrate to slightly transverse; first segment often shorter than the pedicellus (Figs 185, 187, 192, 199, 200); if the third segment is distinctly longer than broad (Figs 188, 191, 195, 196, 202, 203) then mid lobe of mesoscutum has 2-5 adnotaular setae on each side, body is black with slight to strong metallic tints, thorax is only very slightly longer than broad, and gaster is at most 1.6 times as long as broad. Antennal flagellum usually short and thick; funicular segments usually with relatively short setae, occasionally long setae on third segment, rarely also on the second. Metapleuron and propodeum often with distinct, at least very slightly raised, reticulation. . . . . *OOMYZUS* (p.183)
- 21 Scutellum (Fig. K22): sublateral lines forming very deep and broad grooves which are margined externally and have some strong transverse costulae; flange of hind margin of scutellum with longitudinal costulae and usually very broad. Anterior margin of clypeus subtruncate, without distinct teeth. Forewing: submarginal vein usually with 2, occasionally 3, dorsal setae. Dorsellum with raised reticulation, not evenly convex but with a shallow depression before its hind margin, which is sharp medially. Body black, non-metallic. First segment of mid and hind tarsi slightly shorter than second. Gastral petiole distinct, not more than 1.6 times as broad as long, expanded posteriorly to form a transverse ridge which is usually more or less reticulate or bears traces of longitudinal costulae. Tip of hypopygium situated near apex of gaster. Posterior margin of hypopygium (Fig. K23) produced and bidentate medially. . . . . *HOLCOTETRASTICHUS* (p.272)
- Scutellum with sublateral lines nearly always shallow, narrow, and lacking transverse costulae or with very fine ones (Fig. K36); rarely, in some *Sigmophora* (Fig. K25) and *Aceratoneuromyia* (Fig. 4) somewhat like those of *Holcotetrastichus*, but then anterior margin of clypeus bidentate and submarginal vein with 3 or more dorsal setae. Dorsellum evenly convex, its hind edge not sharp, generally weakly reticulate to nearly smooth. Body often more or less metallic, or pale-marked. First segment of mid and hind tarsi usually as long as or longer than the second. Gastral petiole most often smooth, sometimes more strongly transverse than in the above. Tip of hypopygium nearly always situated less far distad on the gaster. Posterior



**Figs K22-K31** K22, K23, *Holcotetrastichus rhosaces* (Walker) ♀; (K22) scutellum, metanotum and propodeum; (K23) hypopygium. K24, *Thripastichus gentilei* (Del Guercio) ♀, gaster. K25, *Sigmophora brevicornis* (Panzer) ♀, head, pronotum, mesoscutum and scutellum. K26, *Kolopterna quartensis* Graham ♀, mid tibia (distal part) and tarsus. K27, K28, *Kolopterna salina* Graham ♀; (K27) mid tibia; (K28) head, profile. K29-K31, *Anaprostocetus acuminatus* (Ratzeburg) ♀; (K29) hind coxa; (K30) propodeum; (K31) head, dorsal.



margin of hypopygium (Figs 348-368) not or hardly produced medially, its lateral lobes often extending farther back than the median part. . . . . 22

- 22 Forewing: submarginal vein with 2 dorsal setae which are fairly close together near the middle. Gaster (Fig. K24) much narrowed at base, with distinct suboval petiole which has a seta on each side (often worn off!), apically obtuse, with a pale subbasal spot; ovipositor concealed. Mandible with an acute outer tooth and an obliquely truncate, serrulate lobe. Occipital surface of head, face and genae, with fine, striate-reticulate sculpture. Head and thorax black, with weak violet and bluish tints.

..... **THRIPASTICHUS** (p.296)

- Either the submarginal vein has 3 or more dorsal setae; or the other characters differ. Gaster nearly always with a differently shaped petiole, ovipositor sheaths usually projecting at least very slightly, sometimes very long. Mandibles tridentate. Head nearly always reticulate without striate sculpture. Body often non-metallic, or pale-marked (though rarely the gaster alone). . . . . 23

- 23 Malar sulcus indicated but weak and superficial. Antennal toruli placed well below level of ventral edge of eyes. Forewing (Figs 169, 173) with a decolorized break separating the parastigma from the marginal vein. Body black with hardly perceptible metallic tinge. Tip of hypopygium situated slightly beyond middle of gaster. Frons (Fig. K8) without a median line but with a trapeziform median area. . . . . **PRONOTALIA** (p.168)

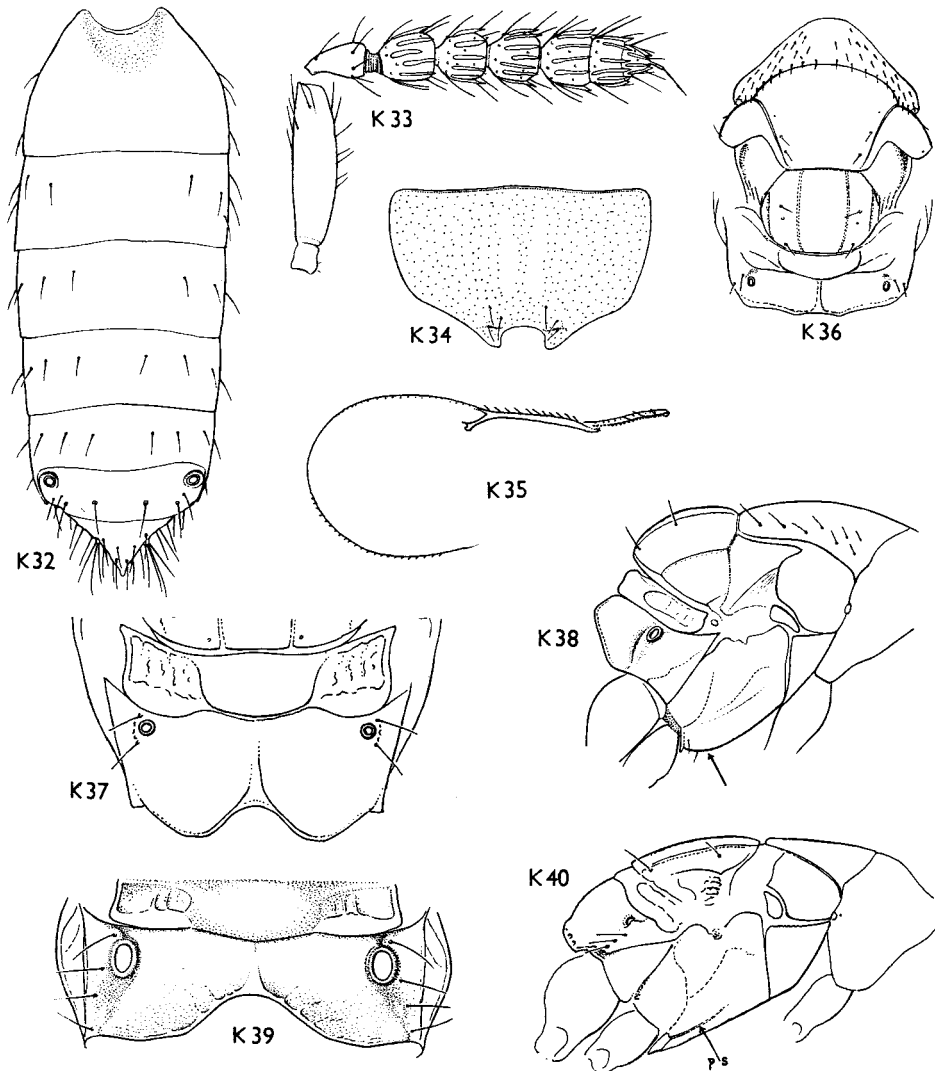
- Malar sulcus distinct though sometimes fine. Antennal toruli placed at a higher level and forewing without such a decolorized break except in some *Baryscapus* in which the body is distinctly metallic and the tip of the hypopygium is most often situated in or before the middle of the gaster, frons without a trapeziform median area (Fig. 128). . . . . 24

- 24 Vertex (Fig. K25) with a sharp transverse carina separating vertex from occiput, and reaching or nearly reaching the eyes; usually a second carina within the ocellar triangle, occasionally a third at the upper edge of the antennal scrobes. First segment of mid and hind tarsi slightly to somewhat shorter than the second. Mid lobe of mesoscutum with adnotaular setae placed in a shallow channel or depressed area (Fig. K25). Propodeal callus often with a longitudinal carina running from just outside each spiracle to hind corner of propodeum. Antennae with 3 anelli of which the third is usually the largest. Body non-metallic, yellow and black, rarely wholly black in dark northern forms of *brevicornis*. Mid lobe of mesoscutum in European and most other species without a median line. Malar sulcus most often with a subtriangular or oblong fovea just below the eye. . . . **SIGMOPHORA**

- Vertex normally without transverse carinae, occasionally a very vague trace of one in *Kolopterna*, but then first segment of mid and hind tarsi much shorter than second. The other characters not all present in combination.

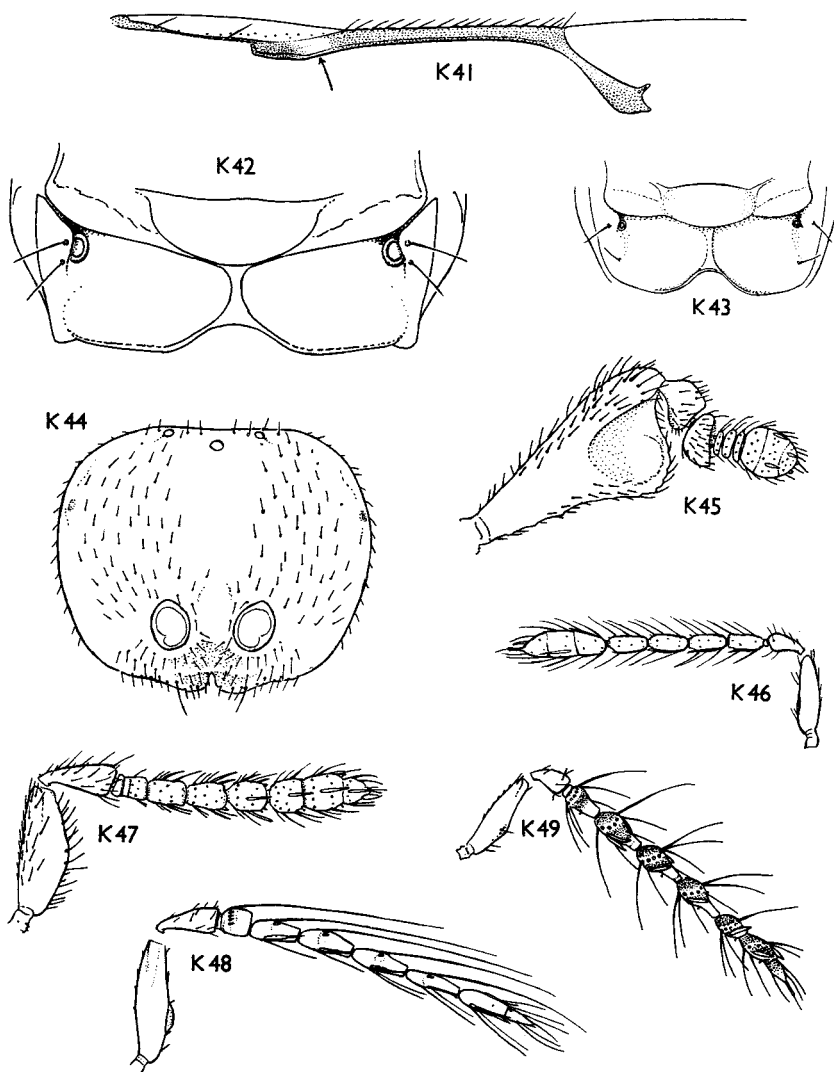
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- 25 First segment of mid and hind tarsi (Figs K26, K27) much shorter than second. Malar sulcus (Fig. K28) with a sublinear fovea below eye.



Figs K32-K40 K32, K33, *Aceratoneuromyia evanescens* (Ratzeburg) ♀ lectotype; (K32) gaster; (K33) right antenna. K34, *Aceratoneuromyia granularis* Domenichini ♀, hypopygium. K35, K36, *Xenaprostocetus pungens* Graham ♀; (K35) forewing; (K36) thorax. K37, *Minotetrastichus frontalis* (Nees) ♀, metanotum and propodeum. K38, *Baryscapus endemus* (Walker) ♀, thorax, profile. K39, *Baryscapus adalia* (Walker) ♀, metanotum and propodeum. K40, *Neotrichoporoides mediterraneus* Graham ♀, thorax, profile; ps, precoxal suture.

- Forewing with marginal vein shorter than or at most as long as the costal cell. Body yellow and black, non-metallic. . . . . **KOLOPTERNA**
- First segment of mid and hind tarsi usually at least as long as second, occasionally slightly shorter (some *Baryscapus* and *Aprostocetus*) but then malar sulcus not foveate, body at least slightly or partly metallic. . . . 26
- 26 Hind coxa (Fig. K29) with a fine curved dorsolateral carina. Propodeum (Fig. K42) with a sharp curved paraspiracular carina on each side; area between the two carinae with distinct, slightly raised reticulation; outside the carinae smoother. Ocelli (Fig. K31) enclosed in an area marked off by impressed lines; just outside each lateral ocellus there is a shallow subtriangular fovea. Antenna with 3 anelli. Body conspicuously metallic. . . . . **ANAPROSTOCETUS**
- Hind coxa without such a carina. Propodeum nearly always without, or with at most vague, paraspiracular carina; if with rather more distinct carina, then either the surface between them has weak superficial reticulation, or the body is black without metallic tints. Ocelli usually not enclosed in such a distinct area; there is rarely a distinct fovea outside the lateral ocelli. Antenna with 2, 3 or (often) 4 anelli. . . . . 27
- 27 Antennal funicle with 4 segments, the first usually longer than broad and bearing one or more sensilla, rarely quadrate and lacking sensilla; clava with 3 segments. Body non-metallic, black with more or less extensive yellow and tan markings, or mainly yellow (*elongatus*-group only). **APROSTOCETUS**
- Antennal funicle normally with 3 segments and clava with 3 [a very few extralimital species have 4 funicular segments because the first claval segment is constricted off from the rest of the clava, which is then 2-segmented]. . . . . 28
- 28 Malar sulcus with a conspicuous subtriangular or oblong fovea just below the eye, extending down the gena from 0.2 to 0.66 of its length. . . . . 29
- Malar sulcus usually without a fovea, rarely with a minute fovea. . . . 30
- 29 Pronotum, in exact dorsal view of the thorax, appearing in most species subconical and 0.5-0.65 length of mesoscutum, if less than 0.5 then anterior setae of scutellum much nearer to sublateral lines than to submedian lines, body brightly metallic. Scutellum nearly always as long as or slightly longer than the mesoscutum and as long as or a little longer than broad; anterior setae in most species at least slightly before the middle, slightly to much shorter than the posterior setae, usually nearer to sublateral lines than to submedian lines or equidistant from both (if nearer to submedian lines then marginal vein of forewing 6.0-9.5 times as long as stigmal vein). Propodeum slightly to much longer than dorsellum. Mid lobe of mesoscutum nearly always without a median line, occasionally with a rather broad but shallow linear depression. Thorax moderately arched dorsally. POL not or hardly greater than OOL. Antennae with flagellum relatively long and slender, filiform or weakly clavate; first funicular segment nearly always slightly to much longer than the pedicellus, rarely only as long as the pedicellus, 2.5-5.5 times as long as broad. Body either metallic, or more or less yellow. . . . . **NEOTRICHOPOROIDES**



**Figs K41-K49** K41, *Baryscapus दौरα* (Walker) ♀, forewing venation. K42, *Aprostocetus aethiops* (Zetterstedt) ♀, metanotum and propodeum. K43, *Aprostocetus cebennicus* Graham, F, metanotum and propodeum. K44, K45, *Melittobia acasta* ♂; (K44) head in front view; (K45) right antenna. K46, *Peckelachertus anglicus* Graham ♂, left antenna. K47, *Tetrastichomyia clisiocampae* (Ashmead) ♂, right antenna. K48, *Sphenolepis pygmaea* Nees ♂, right antenna. K49, *Apotetrastichus postmarginalis* (Bouček) ♂, right antenna.

- Pronotum, thus viewed, appearing shorter, at most 0.3 length of mesoscutum but usually less. Scutellum usually distinctly shorter than mesoscutum and at least slightly broader than long; anterior setae nearer to submedian lines than to sublateral lines or, if submedian lines are absent then thorax is flattened dorsoventrally and body is non-metallic, black. Forewing with marginal vein at most 5.5 times as long as stigmal vein. Propodeum most often as long as or shorter than the dorsellum, rarely somewhat longer. Mid lobe of mesoscutum often with a fine median line. POL often distinctly to much greater than OOL. Antennal flagellum usually relatively shorter and more or less clavate; first funicular segment usually quadrate to twice as long as broad, if somewhat more then either body is non-metallic, or propodeum is not longer than the dorsellum. . . . . 31
- 30 Forewing with stigmal vein very short, much shorter than the parastigma; marginal vein 7.0-9.5 times as long as the stigmal vein. Anterior setae of scutellum at least slightly nearer to sublateral lines than to submedian lines; scutellum as long as or slightly longer than the mesoscutum, most often as long as or a little longer than broad. Propodeum medially 1.5-2.2 times length of dorsellum, most often with strong and slightly raised reticulation; median carina strong and sharp; callus with (3-) 4-7 setae. Pronotum, as seen in exact dorsal view of thorax, normally at least 0.5 length of mesoscutum, rarely a little less. Mid lobe of mesoscutum normally without a median line, rarely a broad shallow linear depression. POL not or hardly greater than OOL. Body either extensively to wholly yellow, or brightly metallic with no or restricted pale markings. Antennal flagellum long, filiform or nearly so; first funicular segment 1.5-2.3 times as long as the pedicellus. . . . . **NEOTRICHOPOROIDES**
- Forewing with stigmal vein relatively longer; marginal vein at most 5 times as long as stigmal vein but usually less; if as much as 6 times then stigmal vein only slightly shorter than the parastigma. Anterior setae of scutellum in most species nearer (often much nearer) to submedian lines than to sublateral lines; if nearer to sublateral lines, or submedian lines absent, then scutellum slightly to very distinctly broader than long and usually somewhat shorter than mesoscutum. Propodeum medially usually as long as or shorter than the dorsellum, rarely longer, most often weakly reticulate; median carina sometimes weak; callus most often with 2 setae, sometimes 3 or more. Pronotum, viewed dorsally, rarely as much as 0.5 length of mesoscutum, often much less than this. POL often greater than OOL. Body sometimes wholly or mainly black and non-metallic. Antennal flagellum often relatively short, and with first funicular segment shorter than or about as long as pedicellus. . . . . 31
- 31 Thorax depressed dorsoventrally, weakly arched so that the surface of the mesoscutum, scutellum, dorsellum and propodeum lie nearly in the horizontal plane; scutellum in profile flat or nearly so. Antennae most often inserted low on the head with their toruli about level with lower edge of eyes. . . . . 32
- Thorax moderately to strongly arched dorsally, with surfaces of dorsellum and propodeum sloping at a distinct angle to the tangential plane of

- mesoscutum and scutellum; scutellum in profile at least slightly, most often moderately to strongly, convex. Antennae usually inserted higher on the head. . . . . 35
- 32 Vertex (Fig. 161) with a pale, weakly-sclerotized suture (po.s) connecting the lateral ocelli; the head collapses along this suture so that the vertex on drying forms a sharp ridge; POL slightly to quite distinctly less than twice OOL. Either the gaster (Fig. 163) is obtuse apically; or the apical margin of the forewing is bare. Body black with greenish to blue-green metallic tints; head and thorax in one species with a few pale spots. Submedian lines of scutellum distinct. . . . . *PUKLINA* (p.163)
- Vertex without such a suture, rarely collapsing so much as to form a sharp ridge, and then irregularly. POL sometimes twice OOL. Gaster usually acute apically, if obtuse then body non-metallic. Apical margin of forewing with cilia. Submedian lines of scutellum present or absent. . . . . 33
- 33 Submedian lines of scutellum usually absent or obsolescent, rarely distinct. Mid lobe of mesoscutum without a median line. Body black, non-metallic or with at most a weak bronze tinge. . . . . 34
- Submedian lines of scutellum very distinct. Mid lobe of mesoscutum usually having at least some trace of a median line. Body with greenish to bluish metallic tints. . . . . 35
- 34 Antennal clava (Figs 1, 2, 6, 7, 9, 10) with apical seta of terminal spine at least about twice as long as the spine (this seta is sometimes broken off, therefore the other characters noted below should be checked). Gaster in dorsal view (Fig. K32) obtuse or bluntly pointed apically, ovipositor sheaths concealed, spiracles of penultimate segment usually visible though sometimes partly covered by the hind edge of the preceding tergite. Tip of hypopygium situated at 0.75-0.80 the length of the gaster measured from the base. Anterior margin of hypopygium (Fig. K34) truncate. Setae of vertex, or at least one seta situated between each lateral ocellus and the eye, very long (their length nearly or quite twice the diameter of an ocellus). Anterior setae of scutellum situated in posterior half of the sclerite and usually relatively close to the posterior setae. . . . *ACERATONEUROMYIA* (p.35)
- Antennal clava with apical seta of terminal spine not or hardly longer (sometimes shorter) than the spine. Gaster in dorsal view acutely pointed apically with ovipositor sheaths projecting at least very slightly, sometimes far beyond tip of last tergite; spiracles of penultimate tergite not visible. Tip of hypopygium situated at not more than 0.6 length of gaster measured from the base. Anterior margin of hypopygium trilobed. Setae of vertex often relatively shorter. Anterior setae of scutellum nearly always situated in or before the middle and relatively distant from the posterior setae. . . . . *APROSTOCETUS*
- 35 Forewing (Fig. K35) with apical margin bare. Anterior margin of clypeus truncate. Spiracles of propodeum circular, separated by about their diameter from hind edge of metanotum, their whole rim exposed. Both

pairs of scutellar setae (Fig. K36) slightly nearer to sublateral lines than to submedian lines. Body non-metallic, testaceous with brown markings.

- ..... **XENAPROSTOCETUS**
- Forewing with apical margin nearly always ciliate, if bare then anterior margin of clypeus bidentate and either (*Aprostocetus calvus*) spiracles of propodeum oval and almost touching metanotum, both pairs of scutellar setae about equidistant from submedian and sublateral lines; or (two species of *Baryscapus*) body black with metallic tints. .... 36
- 36 Propodeal spiracles circular, separated by at least 1.5 times their diameter from hind margin of metanotum. Thorax not strongly flattened. Forewing at most 2.3 times as long as broad. Anterior margin of clypeus truncate.
- ..... **MINOTETRASTICHUS**
- Propodeal spiracles almost always separated from hind margin of metanotum by less (often much less) than their major diameter; if by more than their diameter (*Aprostocetus askewi*) then thorax strongly flattened and forewing about 3 times as long as broad. Anterior margin of clypeus always bidentate, though in *Minotetrastichus* the teeth are represented by low curved lobes. .... 37
- 37 Propodeal spiracles (Fig. K37) very small or minute, their whole rim exposed. Either the setae of each cercus are subequal in length and the body is metallic with yellow markings or mainly yellow; or the antennal clava has a conspicuous terminal spine which is nearly as long as the third claval segment. .... **MINOTETRASTICHUS**
- Propodeal spiracles usually moderate-sized, if very small or minute (*Aprostocetus* subgenera *Chrysotetrastichus* (Fig. K43) and *Ootetrastichus*) then one seta of each cercus is much longer than the others. Claval spine relatively shorter. Body often without yellow markings. .... 38
- 38 At least two setae of each cercus equal or subequal in length, relatively short, sometimes inconspicuous among the other setae which clothe the last tergite, usually pale and weakly curved or straight. .... 39
- One seta of each cercus 1.3-2.0 times the length of the next longest, most often dark, usually more or less kinked or sinuate, occasionally curved. .... 40
- 39 Thorax moderately to strongly flattened, distinctly broader than high. Body and tegulae black with metallic tints, normally not pale-marked; at most with upper angle of mesopleuron yellow. (Malar sulcus distinctly curved).
- ..... **BARYSCAPUS** (p.75)
- Thorax distinctly arched and convex dorsally, at most slightly broader than high. Body sometimes more extensively pale-marked, or non-metallic. .... 40
- 40 Body and tegulae black with metallic tints, not pale-marked. Propodeal spiracles normally (Fig. K39; Fig. 97) having their whole rim exposed, the rim on the outer side visible even in oblique side view (Fig. K40). Either the mesosternum (Fig. K38) is convex just in front of the trochantal lobes; or the forewing has at least some trace of a decolorized spot delimiting the

- parastigma from the marginal vein (Fig. K41). POL at least twice OOL. Malar sulcus distinctly curved. Mesepisternum in most species without a precoxal suture, or with this virtually obsolete. Mid lobe of mesoscutum often with more than one row of adnotaular setae on each side, sometimes several irregular rows. Propodeal callus nearly always with 3 or more setae. .... **BARYSCAPUS** (p.75)
- Either body and/or tegulae pale-marked (sometimes extensively) or non-metallic; or differing in some other character; in most species the propodeal spiracles have the rim on their outer side more or less covered by a raised lobe of the callus (Figs K42, K43) and thus not visible in oblique side view; mesosternum nearly always flat just in front of the trochantal lobes (Fig. K40) and forewing lacking a decolorized spot on the submarginal vein, POL often less than twice OOL, malar sulcus in many species straight, mesepisternum in most species with a distinct though superficial precoxal suture (Fig. K40, ps) traceable over the posterior two-thirds or, occasionally only the posterior third, mid lobe of mesoscutum rarely with more than one row of adnotaular setae on each side (if more than one then the body is not distinctly metallic), propodeal callus most often with 2 setae, occasionally more. .... 41
  - 41 Submarginal vein of forewing with 3 or more dorsal setae (most species of this genus). .... **APROSTOCETUS**
  - Submarginal vein with 2 dorsal setae, or occasionally with only 1 seta on one forewing. .... 42
  - 42 Antennal clava solid or with at most its first segment indistinctly separated from the rest of the clava (*Aprostocetus* (*Coriophagus*) *miridivorus* and *A. (Ootetrastichus) askewi*). .... **APROSTOCETUS**
  - Antennal clava with at least its first segment distinctly separated from the rest of the clava by a suture. .... 43
  - 43 Either mesosternum, just in front of the trochantal lobes, virtually flat, and precoxal suture indicated by a fine impressed line extending one-third to two-thirds the length of the mesosternum (*Aprostocetus* subgen. *Chrysotetrastichus*, a few species of *Aprostocetus* s.str.); or (most species of *Aprostocetus* subgen. *Ootetrastichus*) longest seta of each cercus about twice the length of the next longest and more or less kinked medially, forewing subcubital line of setae extending basad to level of basal vein, body slightly to strongly metallic or more or less yellow, legs most often yellow with at most coxae dark, occasionally the femora dark, rarely the tibiae. .... **APROSTOCETUS**
  - Mesosternum slightly convex; precoxal suture absent; longest seta of each cercus either less than twice length of next longest, or else not kinked; subcubital line of setae on forewing not reaching basad as far as level of basal vein; body black with at most a weak bluish or bronze tinge; coxae, and femora mainly, black, tibiae sometimes infuscate. .... 44
  - 44 Propodeum medially as long as, or slightly longer than the dorsellum. Gaster ovate, at most as long as head plus thorax (*O. anomalus* only). .... **OOMYZUS** (p.183)



- Propodeum medially usually slightly shorter than dorsellum; if not, then gaster (Fig. 13) lanceolate and longer than head plus thorax (aberrant specimens of *vacuna* only). . . . . **QUADRASTICHUS** (p.46)

#### Males

- 1 Inner surface of antennal scape with distinctly raised, honeycomb-like reticulation; interno-dorsal surface of pedicellus with slightly raised sculpture which forms transverse ridges (as in Fig. K1); flagellum short, slightly clavate, funicular segments in species occurring in Europe slightly transverse or quadrate. Forewing (Fig. K2) with postmarginal vein moderately long. . . . . **QUADRASTICHODELLA** (p.296)
- Inner surface of antennal scape and pedicellus without raised reticulation except in *Aprostocetus eurytus*, which has antennal flagellum long and filiform, funicular segments about twice as long as broad, and postmarginal vein (as in most of the genera that follow) rudimentary, absent, or a short stub. . . . . 2
- 2 [? Scutellum with numerous setae scattered over its surface, except perhaps in the median line; submedian lines absent. Unknown males of *Kocourekia* might have these characters].
- Scutellum with paired setae; nearly always 2 pairs, rarely 3 or more in which case the scutellum has distinct submedian lines. . . . . 3
- 3 Malar sulcus usually absent, rarely indicated just near the eye. . . . . 4
- Malar sulcus present and complete, though sometimes fine; in some species expanded just below the eye to form a fovea. . . . . 6
- 4 Brachypterous; head (Fig. K44) without sutures, ocelli minute, eyes absent or represented by small scars; antennal scape (Fig. K45) long, its length about two-thirds height of head, very strongly expanded distally, where there is a projecting lobe or spine and behind this (in most species) a large hollow. Trochanter and femur of mid leg with a fringe of long, outstanding setae beneath. Spur of hind tibia virtually or just as long as basitarsus. . . . . **MELITTOBIA** (p.180)
- Macropterous; ocelli small to large; eyes always normally developed; antennal scape shorter, at most hardly half the height of the head, not so strongly expanded distally, with at most a small hollow. Trochanter and femur of mid leg without such a fringe. Spur of hind tibia shorter than the basitarsus. . . . . 5
- 5 Fore tibia with a strong black, deeply bifid apical spur. Head in front view 1.5-1.7 times as broad as high. Fore coxa about 1.3 times as long as hind coxa. . . . . **CRATAEPUS** (p.178)
- Fore tibia with a simple, usually pale, apical spur. Head in front view at most 1.3 times as broad as high. Fore coxa not or hardly longer than hind coxa. . . . . **PRONOTALIA** (p.168)
- 6 Macropterous: postmarginal vein nearly or quite as long as the stigmal vein. Anterior margin of clypeus truncate, nearly always without teeth, rarely with minute teeth. Propodeal spiracles very small, their whole rim exposed.

- Antennal scape with a short ventral plaque, placed slightly below the middle. . . . . 7
- Species either macropterous but with postmarginal vein at most half as long as the stigmal (though nearly always very short or absent); or brachypterous. Anterior margin of clypeus most often bidentate, sometimes truncate. Propodeal spiracles small, moderate-sized, or large. Plaque of antennal scape sometimes otherwise. . . . . 9
- 7 Scutellum without submedian lines; anterior pair of setae well before the middle. Antenna (Fig. K46) with scape slender, funicular segments not constricted apically, without whorls of long setae, clava without a constriction between its first and second segments. . . . . **PECKELACHERTUS** (p.294)
- Scutellum with both submedian and sublateral lines; anterior pair of setae not before the middle. Antennae either with scape swollen and hardly 1.5 times as long as broad, flagellum short and clavate, with funicular segments quadrate (*Apotetrastichus contractus*); or flagellum (Figs K48, K49) long and filiform, funicular segments longer than broad and sometimes constricted apically, with whorls of long setae, clava with a strong constriction between its first and second segments. . . . . 8
- 8 Propodeum: spiracles separated by 1.5-2.0 times their diameter from hind margin of metanotum; surface of propodeum with delicate, superficial reticulation. Reticulation of mesoscutum and scutellum composed of elongate areoles (mostly 3-4 times as long as broad). . . . . **APOTETRASTICHUS**
- Propodeum: spiracles almost touching hind margin of metanotum; surface of propodeum with stronger, slightly raised reticulation. Reticulation of mesoscutum and scutellum composed of short areoles (from nearly isodiametric to about twice as long as broad). . . . . **SPHENOLEPIS** (p.274)
- 9 Dorsellum (see Fig. K12) in the single European species with a pair of convex lobes separated by a median longitudinal channel [in another, extralimital species, divided by a median longitudinal ridge]. Brachypterous, with forewings not reaching tip of gaster, and more than 3 times as long as broad. Propodeum (Fig. K12): callus with a sharp carina which runs from the fovea in which the spiracle is placed to the rectangular or acute hind corner; surface of propodeum with slightly raised reticulation and some wrinkles or rugosity; spiracles small, circular, separated by slightly more than their diameter from hind margin of metanotum. Antenna (Fig. K47) with third anellus in the European species large, with some setae; flagellum without whorls of long dark setae; toruli about level with lower edge of eyes. Scutellum without submedian lines; sublateral lines deep, their outer edge sharply carinate. Mid lobe of mesoscutum without median line. Legs short and stout, tarsal segments short. . . . . **TETRASTICHOMYIA** (p.293)
- Dorsellum nearly always convex and without a median longitudinal channel or ridge; very rarely with a weak ridge, in which case the wings are fully developed, whilst the other characters do not agree with the above. . . 10
- 10 Propodeum (Fig. K13) with curved plicae which extend from the hind margin to near each spiracle, or even to the base; from about the middle of

each plica a branch (paraspircular carina) extends towards the hind corner of the propodeum; surface between the plicae reticulate, this sculpture at least slightly raised; medially the propodeum is slightly to much longer than the dorsellum. Hind coxae in most species with some raised reticulation or rugosity on their externo-dorsal surface. Forewing: submarginal vein in most species with 1 dorsal seta (with 2 setae in occasional aberrations of a few European species and in some extralimital species). Body black with slight to strong metallic tints, not pale-marked, except rarely the gaster. Antennal scape with a long ventral plaque, centered about in the middle (Figs 286-309). . . . . **TETRASTICHUS** (p.205)

- Propodeum in nearly all species without plicae, or with plicae indicated at the hind margin in a few; very rarely complete (e.g., one extralimital *Tamarixia*) but then their basal part runs considerably mesad of the spiracles, whilst the surface between them is shiny and weakly sculptured, and the hind coxae are shiny with only weak superficial reticulation; paraspircular carinae most often weak or absent, rarely sharp. Propodeum in many species only as long as, or shorter than, the dorsellum. Forewing: submarginal vein with 1, 2 or more dorsal setae. Body metallic or non-metallic, sometimes pale-marked or mainly pale. . . . . 11
- 11 Antenna (Fig. K48); first segment of clava separated from the second by a short peduncle, so that the funicle appears to be 5-segmented; the long whorled setae of the funicular segments arise from about the middle of each segment; scape with a short ventral plaque placed slightly below the middle. Forewing sometimes somewhat shortened; submarginal vein usually with 1 dorsal seta, occasionally with 2 setae; postmarginal vein nearly as long as the stigmal vein. Body black, non-metallic. Thorax squat, only slightly longer than broad. . . . . **SPHENOLEPIS** (p. 274)
- Antennae with first segment of clava usually broadly attached to the second, sometimes marked off by a constriction; rarely by a short peduncle, in which case the long whorled setae (if present) arise from near the bases of the funicular segments, whilst the plaque of the scape is either longer or is placed differently. Forewing rarely shortened; postmarginal at most half as long as the stigmal but usually very short or absent. Body often metallic, sometimes pale-marked. . . . . 12
- 12 Forewing: submarginal vein with only 1 dorsal seta (rare aberrations have a single seta on one wing and two on the other; such cases are allowed for in the key). . . . . 13
- Forewing: submarginal vein with 2 or more dorsal setae. . . . . 18
- 13 Gastral petiole (Fig. K16) conspicuous, about 1.5 times as long as broad, with traces of 3 longitudinal carinae. Anterior margin of clypeus subtruncate, with 2 minute submedian tubercles. Propodeal spiracles very small, circular, separated by about their diameter from hind margin of metanotum. Body black, non-metallic. . . . . **MISCHOTETRASTICHUS**
- Gastral petiole usually at least slightly broader than long, if as long as broad then without longitudinal carinae. Anterior margin of clypeus often with

distinct teeth. Propodeal spiracles often moderate-sized or large, usually closer to metanotum. Body often more or less metallic-tinged. . . . . 14

- 14 Antennae (Figs 323-331): flagellum with whorls of very long dark setae; ventral plaque of scape extremely short, its length at most 0.2 that of scape, placed near the middle; first funicular segment distinctly shorter than any of the following segments and not or hardly longer than broad. Anterior margin of clypeus truncate, without teeth or rarely with two minute tubercles. Mid lobe of mesoscutum with 2 subequal and suberect adnotaular setae on each side, one before and one behind the middle. Genitalia (Fig. 328) characteristic: digitus 4-6 times as long as broad, with a curved apical spine the outer edge of which is continuous with the line of the outer edge of the digitus itself; the whole genital armature (not counting the very elongate aedeagus, which is often extruded) 4-8 times as long as broad.

. . . . . **TAMARIXIA** (p. 275)

- Either the antennal flagellum lacks whorls of long dark setae; or the ventral plaque of the scape is at least 0.35 length of scape and/or the first funicular segment is distinctly longer than broad. Anterior margin of clypeus (except *Quadrastichus anysis* and *Oomyzus scaposus*) distinctly bidentate. Mid lobe of mesoscutum with 1 to several adnotaular setae on each side, when with 2 they tend to be unequal in length, or are placed differently from those of *Tamarixia*. Genitalia with relatively shorter digitus, which has a spine placed in the middle of its hind margin. . . . . 15

- 15 Antenna: funicular segments with whorls of very long dark setae. Forewing only 1.9-2.0 times as long as broad, with tip of marginal vein situated at about 0.4 length of wing. Body black with weak metallic tints (some specimens of *suevius*-group of subgen. *Chrysotetrastichus*).

. . . . . **APROSTOCETUS**

- Antenna: funicular segments usually lacking such whorls of setae, or with whorls of much shorter setae; if with longer setae (some *Quadrastichus*) then body is non-metallic and often pale-marked. . . . . 16

- 16 Antenna with scape greatly swollen and bladder-like, only 1.5-2.0 times as long as broad. Propodeum shiny, with obsolescent sculpture. Body metallic with at least part of head, and the base of the gaster yellow. Forewing with marginal vein longer than the costal cell. One seta of each cercus about twice the length of the next longest (some specimens of *crino* and *ibericus* in subgen. *Ootetrastichus*). . . . . **APROSTOCETUS**

- Antennal scape usually not swollen (sometimes broad but then flattened) but if so strongly swollen as in the above (2 species of *Oomyzus*) then propodeum distinctly reticulate, body not pale-marked, marginal vein not longer than costal cell, setae of cercus subequal in length. . . . . 17

- 17 Antennae (Figs 43-57) with second to fourth funicular segments 1.6-2.5 times as long as broad. Either each funicular segment has compact subbasal whorls of long dark setae which reach slightly beyond the tip of the segment following that which bears them (*fungicola*, *anysis* and *sajoi*, Figs 48, 56, 57); or the first funicular segment is 1.6-2.0 times as long as broad and not or hardly shorter than the second segment (Figs 43-47, 49-55). Body most

- often non-metallic, black, black and yellow, or yellow; in a very few species with a weak bluish or bronze tinge, in which case one seta of each cercus is at least 1.5 times the length of the next longest. Mid lobe of mesoscutum most often with 1 adnotaular seta on each side, occasionally 2 setae, rarely 3. .... *QUADRASTICHUS* (p.46)
- Antennae (Figs 204-214) either with at least the fourth funicular segment, sometimes all the segments, not longer than broad (Figs 204, 209, 210); or the funicle lacks compact whorls of long dark setae or has relatively shorter setae and the first funicular segment is quadrate to transverse and usually shorter than the second segment (Figs 205-208, 211-214). Body black with weak to strong metallic tints, not pale-marked. Setae of cercus either subequal in length, or the longest at most 1.3 times the length of the next longest. Mid lobe of mesoscutum with 2 to 4 adnotaular setae on each side. .... *OOMYZUS* (p.183)
- 18 Vertex with a pale, weakly sclerotized suture connecting the lateral ocelli (as in Fig. 161). Thorax strongly depressed dorsoventrally, much broader than high; pronotum rather long; mid lobe of mesoscutum without a median line. Antennae (Figs 165, 166): scape with a moderately long to very long ventral plaque. Body black with greenish to bluish metallic tints; head and thorax with a few pale spots in one species. Malar sulcus distinct. .... *PUKLINA* (p.163)
- Vertex without such a suture. Other characters not present in combination except in a very few species of the *daira*-group of *Baryscapus*. .... 19
- 19 Antennae: each segment of funicle with a compact subbasal whorl of long dark setae; first and often second segment of clava with partial whorls of similar setae (Figs 9, 10, 43, 46, 48, 54, 56, 57, 113, 116, 118-123, 125-127, 155, 176, 181, 309). .... 20
- Antennae: segments of funicle and clava without compact whorls of long dark setae (Figs 44, 45, 47, 49-53, 55, 152-154, 156-159). .... 35
- 20 Scutellum (Fig. K22) with sublateral lines forming deep broad grooves which are margined externally and have some strong transverse costulae. Anterior margin of clypeus subtruncate, without distinct teeth. Forewing: submarginal vein usually with 2, rarely 3, dorsal setae; marginal vein not longer than costal cell. Body black, non-metallic. First segment of mid and hind tarsi slightly shorter than the second. .... *HOLCOTETRASTICHUS* (p.272)
- Scutellum with sublateral lines relatively shallow, narrow, and without transverse costulae or with at most very fine ones, except in some *Sigmophora* and *Aceratoneuromyia*, in which the anterior margin of the clypeus is distinctly bidentate (as in all except a few of the following genera). Forewing: submarginal vein most often with 3 or more, less often 2, dorsal setae (if with 2, then body usually metallic); marginal vein often longer than costal cell. .... 21
- 21 Malar sulcus indicated but weak and superficial. Forewing (Figs 169, 173) with a decolorized spot delimiting the parastigma from the marginal vein. Antennae with the dark whorled setae of each funicular segment reaching only to the level of the tip of the segment following that which bears them

- (Figs 176-181). Hind ends of notauli (Fig. K7) intercept scutellum at or only very slightly outside the bases of the submedian scutellar lines; scapular flanges more broadly triangular. . . . . **PRNOTALIA** (p.168)
- Malar sulcus distinct. Forewing in most species without a decolorized spot in the position mentioned. Darked whorled setae of funicular segments often relatively longer. Hind ends of notauli (Figs K25, K36) intercept scutellum distinctly outside the bases of the submedian scutellar lines, or else the latter are absent; scapular flanges usually very narrowly triangular or sublinear. . . . . 22
- 22 Vertex (Fig. K25) with a transverse carina delimiting the vertex from the occiput and reaching or nearly reaching the eyes; sometimes with a second carina crossing the ocellar triangle. First segment of mid and hind tarsi slightly to somewhat shorter than second. Body non-metallic, either black, or more usually with yellow and tan markings which may be extensive, the body sometimes wholly yellow. Malar sulcus in European (and some other) species with a subtriangular or oblong fovea below the eye. Genital armature very long, 8-14 times as long as broad. . . . . **SIGMOPHORA**
- Vertex without transverse carinae (a transverse ridge sometimes caused by collapse of the head should not be mistaken for a true carina). The other characters not present in combination except in *Kolopterna*, which has first segment of mid and hind tarsi very much shorter than the second. . . 23
- 23 First segment of mid and hind tarsi (Figs K26, K27) very much shorter than second. Malar sulcus (Fig. K28) with a sublinear fovea below the eye. Body non-metallic, yellow and black. Genital armature very long as in *Sigmophora*. . . . . **KOLOPTERNA**
- First segment of mid and hind tarsi usually at least as long as second but if slightly shorter then malar sulcus not foveate and body with metallic tints. Genital armature nearly always less elongate (2.5-6.5 times as long as broad except in *Aprostocetus grylli* in which it is nearly 8 times). . . . . 24
- 24 Outer surface of hind coxae (Fig. K29) with a fine curved dorsal carina. Propodeum (Fig. K30) with a sharp arcuate paraspiracular carina on each side; surface between the two carinae with distinct, slightly raised reticulation. Body black with metallic tints; gaster with a pale subbasal spot. Antenna with 2 anelli. . . . . **ANAPROSTOCETUS**
- Hind coxae without a dorsal carina. Propodeum nearly always without, or with at most vague, paraspiracular carinae; if with sharper carinae, then body without metallic tints. Antennae with 2 or 3 anelli. . . . . 25
- 25 Malar sulcus with a conspicuous subtriangular or oblong fovea just below the eye. . . . . 26
- Malar sulcus nearly always without a fovea, rarely with a minute one. 27
- 26 Pronotum, in exact dorsal view of thorax, conical and at least half as long as the mesoscutum, the latter normally without a median line (rarely with a shallow, rather broad channel). Body usually strongly metallic at least in part (in a few mainly yellow species metallic tints are restricted to dark areas, and if the body is wholly yellow metallic tints may be absent). Scutellum in most species about as long as broad and nearly or quite as long

as the mesoscutum, with its anterior pair of setae at least slightly before the middle, and each seta about equidistant from submedian and sublateral lines, or nearer to the latter. Forewing with stigmal vein short to very short, marginal vein 5-9 times as long as the stigmal. Antennae: the whorled dark setae of each funicular segment reach at most to the tip of the segment following that which bears them, except in one species where they reach a little beyond that level; usually there is a very strong constriction, sometimes even a short peduncle, between the first and second segments of the clava. Propodeum medially slightly to much longer than the dorsellum; callus usually with 3-5 setae, occasionally 2. . . . . **NEOTRICHOPOROIDES**

- Pronotum relatively short, at most slightly more than one-third as long as the mesoscutum, but usually less. Body most often black and non-metallic, or weakly bluish- to olive-tinged, occasionally brightly metallic; not yellow-marked except sometimes the gaster. Scutellum at least very slightly broader than long, usually shorter than the mesoscutum, its anterior pair of setae usually not before the middle and always nearer to the submedian lines than to the sublateral lines. Forewing with stigmal vein relatively longer; marginal vein at most 5 times as long as the stigmal. Antennae: the whorled dark setae of each funicular segment almost always reach beyond the tip of the segment following that which bears them; first segment of clava usually broadly attached to the second, rarely separated from it by a strong constriction. Propodeum sometimes slightly shorter, at most a little longer, than the dorsellum; callus sometimes with only 2 setae. . . . . 28
- 27 Pronotum, in exact dorsal view of thorax, conical and at least half as long as mesoscutum, the latter without a median line. Propodeum in European species 2.0-2.2 times as long as dorsellum, with relatively strong, raised reticulation; callus with 3-5 setae. Scutellum as long as or slightly longer than broad, nearly or quite as long as mesoscutum. Scapulae rather shallowly, or only moderately excised posteriorly, scapular flanges broadly triangular. Antennae: funicular segments all 3-4 times as long as broad, subequal in length or the first hardly shorter than the others; whorled setae of each funicular segment reach at most half way along the segment following that which bears them. Body most often extensively or mainly yellow, dark parts metallic. In yellow-marked species the stigmal vein is very short, the marginal vein 8-9 times as long as the stigmal, whilst the antennal scape has a ventral plaque extending most of its length. . . . . **NEOTRICHOPOROIDES**
- In most species the pronotum is relatively shorter, the scutellum distinctly shorter than the mesoscutum and at least slightly broader than long; but if approaching *Neotrichoporoides* in these respects (some *Aprostocetus* subgen. *Ootetrastichus*) then scapulae deeply excised with flanges narrowly triangular to sublinear. Mid lobe of mesoscutum often with median line. Propodeum most often shorter relative to dorsellum. Antennae with first funicular segment nearly always less than 3 times as long as broad, if as much as 3 times then the whorled setae reach somewhat beyond the tip of the segment following that which bears them; funicular segments 2 to 4 often less than 3 times as long as broad. Body often without yellow markings, often

- non-metallic. Forewing with stigmal vein relatively longer, marginal vein at most 5.6 times length of stigmal. Ventral plaque of antennal scape often otherwise. .... 28
- 28 Antennae: the dark whorled setae of each funicular segment reach at most about half way along the segment following that which bears them (Figs 113, 116-123, 125-127). Body metallic, not pale-marked except sometimes the gaster (most species of *evonymellae*-group). .... **BARYSCAPUS** (p.75)
- Antennae: the dark whorled setae reach at least level with the tip of the segment following that which bears them. Body sometimes non-metallic, or pale-marked. .... 29
- 29 Antennal scape: ventral plaque placed mainly or wholly in the upper half (as in Figs 9, 10). .... 31
- Antennal scape: ventral plaque either extending over most of the length of the scape; or placed about in the middle of the scape and extending about equally into its upper and lower halves; or placed mainly to wholly in lower half of scape. .... 30
- 30 Antennae: whorled setae of each funicular segment reach beyond the tip of the segment following that which bears them, except in a very few species which have the first funicular segment shorter than the others. Forewing: submarginal vein in most species with 3 or more dorsal setae. .... **APROSTOCETUS**
- Antennae: whorled setae reach at most level with the tip of the segment following that which bears them (Fig. 43). Forewing: submarginal vein with 2 dorsal setae (sometimes even 1 seta on one forewing) (Occasional aberrations of *vacuna*). .... **QUADRASTICHUS** (p.46)
- 31 Setae of vertex, or at least one seta on each side situated between lateral ocellus and eye, very long (length nearly or quite twice the diameter of an ocellus). Body black, non-metallic or weakly bronze-tinged. Thorax more or less depressed, at least slightly broader than high; submedian lines of scutellum usually absent or obsolescent, rarely distinct; mid lobe of mesoscutum without a median line. .... 32
- Setae of vertex shorter, their length rarely even as great as the diameter of an ocellus. Body either black with or without metallic tints, or partly to mainly yellow or reddish. Thorax usually convex and not broader than high; submedian lines of scutellum usually distinct; mid lobe of mesoscutum often with a median line. .... 33
- 32 Antennal clava (Figs 9, 10) with the apical seta of the terminal spine about twice as long as the spine [check the other characters below, as the seta is sometimes broken off]; funicular segments not or only slightly longer than broad. Spiracles of penultimate segment of gaster dorsal in position, usually visible though sometimes partly covered by the edge of the preceding tergite. .... **ACERATONEUROMYIA** (p.35)
- Antennal clava with the apical seta of the terminal spine at most slightly longer than the spine; at least funicular segments 2 to 4 distinctly, often



- much, longer than broad (*subplanus* and a few species of *fulvipes*-group only). . . . . **APROSTOCETUS**
- 33 Forewing: submarginal vein with 2 dorsal setae which tend to lie rather close together near the middle; marginal vein becoming gradually thicker basad. Head with fine striate-reticulate sculpture. Propodeum nearly twice as long as dorsellum, shiny and nearly smooth. Body black with weak, chiefly violet, metallic tints; gaster with pale subbasal spot. . . . . **THRIPASTICHUS** (p.296)
- Forewing: submarginal vein most often with 3 or more dorsal setae. Sculpture of head reticulate, without striae. The other characters usually different from above. . . . . 34
- 34 Spiracles of propodeum very small or minute, circular, their whole rim exposed (as in Fig. K37). Either the propodeal spiracles are separated by at least their diameter from hind margin of metanotum; or the setae of each cercus are subequal in length, slightly curved or straight, pale, and the mesoscutum lacks a median line. Body at least partly metallic. . . . . **MINOTETRASTICHUS**
- Spiracles of propodeum usually moderate-sized, rarely small, usually suboval, with the outer part of their rim tending to be covered by a raised lobe of the callus; spiracles nearly always separated by at most half their major diameter from hind margin of metanotum, sometimes almost touching it. Most often one seta of each cercus is clearly longer than the others, often dark and kinked or sinuate in the middle. Mid lobe of mesoscutum often with a median line. Body metallic or non-metallic (Many species of this genus). . . . . **APROSTOCETUS**
- 35 Mid lobe of mesoscutum with only 1 adnotaular seta on each side, placed in the posterior half. Submarginal vein with 2 dorsal setae (rarely one forewing has only a single seta). Body non-metallic, black, or black with some yellow markings. . . . . **QUADRASTICHUS** (p.46)
- Mid lobe of mesoscutum with 2 or more adnotaular seta on each side. Submarginal vein nearly always with 2 or more dorsal setae, rarely (some *Aprostocetus crino*) with 1 seta, in which case the body is metallic with yellow markings. . . . . 36
- 36 Antennae with funicular segments longer than broad, the first segment 2-8 times as long as broad, the segments subequal in length, or the first is the longest. . . . . **APROSTOCETUS**
- Antennae with at least the first funicular segment distinctly less than twice as long as broad, sometimes quadrate, often distinctly shorter than the second segment. . . . . 37
- 37 Antennal scape strongly swollen and bladder-like, hardly 1.5 times as long as broad, yellow; flagellum clavate, proximally much more slender than the pedicellus but thickening considerably distad; funicular segments only a little longer than broad. Propodeal spiracles very small, separated by more than their diameter from hind margin of metanotum (*M. napomyzae* only). . . . . **MINOTETRASTICHUS**

- Antennal scape nearly always at least twice as long as broad and flattened though not swollen; rarely swollen and slightly less than twice as long as broad, but then the funicle proximally is nearly or quite as stout as the pedicellus, whilst the propodeal spiracles are close to the metanotum (most often separated by slightly to much less than their major diameter from the metanotum, rarely by their diameter). . . . . 38
- 38 Antennae (Figs 152-154, 156-159, 165) with at least the fourth funicular segment more or less transverse; none of the funicular segments longer than broad; flagellum very short, combined length of pedicellus and flagellum slightly less than or equal to breadth of mesoscutum, flagellum clavate or fusiform; clava only 1.3-2.0 times as long as broad. Thorax more or less, sometimes strongly, depressed dorsoventrally so as to be broader than high. Lower edge of antennal toruli usually a little below ventral edge of eyes. Forewing with a decolorized spot delimiting the parastigma from the marginal vein (Most species of *daira*-group). . . . . **BARYSCAPUS** (p.75)
- Antennae otherwise: usually at least some of the funicular segments longer than broad (Figs 109-112, 114, 124); rarely all about quadrate (Figs 108, 110, 115) in which case the clava is at least 2.5 times as long as broad; flagellum usually filiform or nearly so, rarely very slightly clavate, usually longer than in alternate part of couplet. Thorax usually not depressed. Lower edge of antennal toruli not below ventral edge of eyes. Forewing (except in one species of *Baryscapus*) without such a decolorized spot. . . . . 39
- 39 Setae of cercus subequal in length. Propodeal spiracles with the whole of their rim exposed. Body black with metallic tints, not pale-marked, except sometimes the gaster. Malar sulcus curved. Mid lobe of mesoscutum often with more than 5 adnotaular setae on each side, forming a single row or more than one row; median line usually distinct (Some species of *evonymellae*-group). . . . . **BARYSCAPUS** (p.75)
- One seta of each cercus distinctly longer than the others. Propodeal spiracles with the outer part of their rim more or less covered by a raised lobe of the callus, especially if viewed from a little to one side. Malar sulcus straight or nearly so. Mid lobe of mesoscutum with a single row of 2-5 adnotaular setae on each side; median line sometimes indistinct or absent (Only a few species of the genus). . . . . **APROSTOCETUS**

### **ACERATONEUROMYIA** Girault

*Aceratoneuromyia* Girault, 1917: 151. Type-species: *Aceratoneuromyia australia* Girault, 1917, by original designation.

[*Melittobia* Westwood; Gahan, 1938: 227. Misidentification.]

*Aceratoneuromyia* Girault; Gradwell, 1959: 277-278; Domenichini, 1966b: 55-56, 1967: 103-108; Kostjukov, 1978: 432, 465; Graham, 1987: 32-33, 39; Bouček, 1988: 689-690.

**DIAGNOSIS.** Differs from *Aprostocetus* Westwood by the following apomorphies. Antennal clava with apical seta of spine very long, at least about twice as long as the spine itself (Figs K33, 1, 2, 6, 7). Spiracles of penultimate segment of gaster rather large, usually visible in dorsal view (Figs K32, 8). Female gaster

tending to be convex dorsally; anterior margin of hypopygium truncate, posterior margin bidentate (Fig. K34), tip of hypopygium near apex of gaster. Setae of vertex very long. Flagellum of female, especially the clava, with long outstanding setae. Scutellum with anterior pair of setae situated in posterior half of the sclerite and usually close to the posterior setae; submedian lines tending to be weak or absent. Thorax (except usually the propodeum) shiny and very weakly sculptured. An easily recognizable genus from the foregoing combination of characters.

**DISTRIBUTION.** Europe, South Asia, Africa, Mauritius, Australia, Fiji; Americas (*indica*, introduced).

**BIOLOGY.** Hosts are Diptera Anthomyiidae, Muscidae, Sarcophagidae, Scatophagidae and Tephritidae. Gregarious endoparasites of the host larvae and pupae.

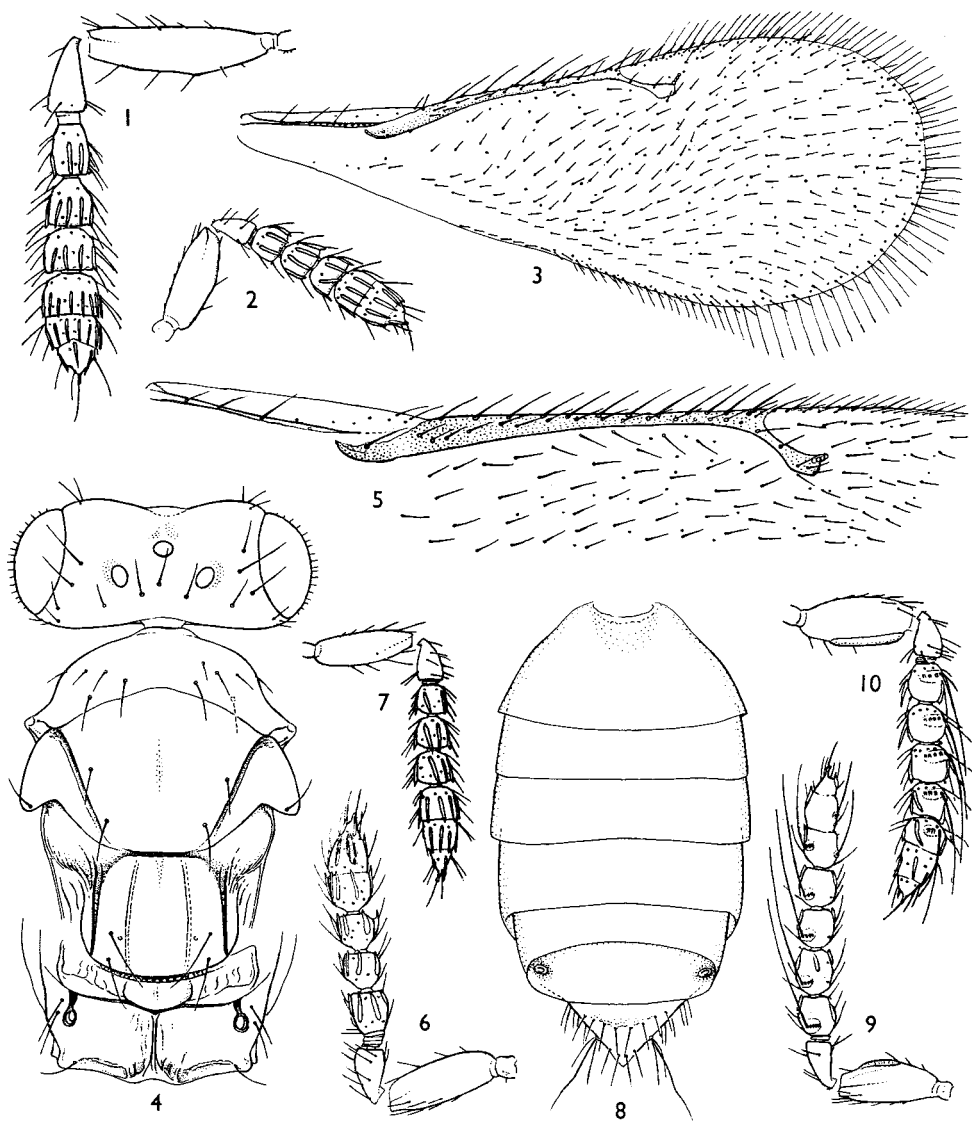
**COMMENTS.** Dahms (1984a: 272) stated that *Aceratoneuromyia* fell into the group of genera lacking a malar sulcus, to which Domenichini (1966a: 63) had given the tribal name Melittobiini. This is incorrect because Domenichini did not include the genus in his 1966a paper and mentioned (1966a: 186) in his remarks on *Tetrastichus evanescens* (Ratzeburg) that he had not seen the type-species of *Aceratoneuromyia*. Moreover, in his later account of *Aceratoneuromyia* (1967: 103) he stated that it had a distinct malar sulcus and was referable to his tribe Tetrastichinae. The species of this genus do in fact possess a malar (genal) sulcus, although it is sometimes fine. The genus does not appear to have a close relationship with Domenichini's Melittobiinae, a view supported by Bosch & Assem (1986) in their paper on the courtship behaviour. It appears to constitute a monophyletic group, possibly the sister-group of *Aprostocetus*, differing from it in the synapomorphies listed above (see **DIAGNOSIS**) though retaining some characters in plesiomorphic state, e.g. the exposed rim of the propodeal spiracles, absence of median line on mesoscutum. Apparently the very long apical seta of the claval spine of the antennae is an autapomorphic character, at all events I have not so far discovered it in any other Tetrastichine genus.

### Key to Palearctic species

#### Females

- 1 Antenna (Fig. 1) with scape somewhat longer than an eye, reaching median ocellus. Propodeal callus polished, virtually smooth; metapleuron shiny but with weak alutaceous sculpture. Marginal vein of forewing with short setae on its front edge, the longest at most 0.5 length of ST; apical margin of wing with length of cilia 0.07-0.10 breadth of wing. Pronotum bare except for a row of 4 long setae near its hind margin and sometimes 2-3 short ones at sides; spiracles placed at the tips of horn-like projections.  
..... *polita* (p.39)
- Antennae (Figs 2, 6, 7) with scape at most as long as an eye, often slightly to much shorter, not reaching median ocellus. Propodeal callus and metapleuron distinctly alutaceous, sometimes with slightly raised reticulation. Marginal vein with setae of front edge normally at least as long as ST (only 0.66 ST in some *indica*); cilia of apical margin 0.1-0.2 breadth of wing.

- Pronotum (except in *evanescens*) with a row of 6 or more setae near hind margin, sometimes with additional setae anterior to these; spiracles (except in *evanescens*) projecting only slightly, or not projecting ..... 2
- 2 Forewing with costal cell 8-9 times as long as broad, slightly longer than M. Ocelli larger, POL 1.6-2.0 times OD. Antenna with F2 and F3 somewhat broader than long. Body length 1.5-2.0 mm. (Scutellum without submedian lines) ..... *indica* (p.40)
- Forewing with costal cell 10-20 times as long as broad, sometimes shorter than M. Ocelli (except in *evanescens*) smaller, POL nearly or quite 3 times OD. Antenna with F2 and F3 sometimes not or hardly broader than long. Body length 1.0-1.6 mm. .... 3
- 3 Propodeum medially fully as long as scutellum. Scutellum with traces of submedian lines. Forewing with cilia of apical margin nearly 0.2 length of ST; wing quite thickly pilose. Propodeal callus and metapleuron moderately shiny, their sculpture hardly stronger than that of the rest of the propodeum ..... *atherigona* (p.41)
- Propodeum medially at least slightly shorter than scutellum. Scutellum (except in *evanescens*) without submedian lines. If the cilia of apical margin of forewing are as much as 0.2 length of ST, then the wing is sparsely pilose. Propodeal callus (except some *fimbriata*) and metapleuron relatively dull, their sculpture stronger than that of the rest of the propodeum ..... 4
- 4 Forewing (Fig. 3) sparsely pilose all over; cilia of apical margin about 0.2 breadth of wing and as long as or slightly longer than ST. Gaster shiny with at least the basal tergite smooth, the rest with very weak alutaceous sculpture; about 1.5 times as long as broad. (Funicular segments all slightly transverse) ..... *fimbriata* (p. 43)
- Forewing tending to be thickly pilose all over; cilia of apical margin sometimes relatively shorter. Gaster rather dull, strongly alutaceous except sometimes the basal part of the basal tergite; often more elongate .. 5
- 5 Antenna (Fig. K33) with scape about 4 times as long as broad, nearly as long as an eye. Eyes (Fig. 4) with very short pilosity. POL 1.2-1.25 times OOL; OOL about twice OD. Gaster (Fig. K32) with cercal setae subequal in length and nearly straight. Pronotal spiracles on conical projections. Scutellum (Fig. 4) with submedian lines. Body black, non-metallic. .... *evanescens* (p.41)
- Antennae (Figs 6, 7) with scape at most 3 times as long as broad, somewhat shorter than an eye. Eyes with moderately long pilosity. POL equal to or slightly less than OOL; OOL nearly 3 times OD. Gaster (Fig. 8) with cercal setae unequal, the longest 1.5-2 times the length of the next longest, sinuate. Pronotal spiracles not or hardly projecting. Submedian lines of scutellum absent or hardly traceable. Body with very slight olivaceous metallic tinge. .... 6
- 6 Head in dorsal view 2.1-2.3 times as broad as long. Gaster 2.0-2.4 times as long as broad, at most 1.4 times as broad as high, tending to be subcarinate ventrally along the median line. Larger species, 1.4-1.7 mm. .... *claridgei* (p.44)



**Figs 1-10** 1, *Aceratoneuromyia polita* sp. n. ♀, antenna. 2, 3, *A. fimbriata* sp. n. ♀; (2) antenna; (3) forewing. 4, 5, *A. evanescens* (Ratzeburg) ♀ lectotype; (4) head and thorax; (5) forewing. 6, *A. claridgei* sp. n. ♀, antenna. 7, 8, *A. granularis* Domenichini ♀; (7) antenna; (8) gaster. 9, *A. fimbriata* sp. n. ♂, antenna. 10, *A. granularis* Domenichini ♂, antenna.

- Head in dorsal view 2.6-2.7 times as broad as long. Gaster (Fig. 8) 1.6-1.8 times as long as broad, much (up to 1.8 times) broader than high, convex and hardly carinate ventrally. Smaller species, length 1.1-1.4 mm.  
..... *granularis* (p.45)

Males (those of *polita* and *evanescens* are unknown)

- 1 Antennal scape (Fig. 9) with ventral plaque only about 0.4 its length, situated mainly or wholly in the upper half. Gaster polished, with weak alutaceous sculpture in places ..... 2
- Antennal scape (Fig. 10) with ventral plaque 0.55-0.6 length of scape, extending somewhat into the lower half. Gaster less shiny, with distinct and rather regular, nearly isodiametric reticulation over most of its surface 3
- 2 Forewing sparsely pilose (as in female, Fig. 3); longest cilia of apical margin fully as long as, or longer than ST. Tibiae infuscate medially. Antenna (Fig. 9) with funicular segments not longer than broad. Small species, length about 1 mm. .... *fimbriata* (p.43)
- Forewing rather less sparsely pilose; length of longest cilia of apical margin at least slightly less than ST. Tibiae yellowish. Antenna with funicular segments as long as or slightly longer than broad. Species tending to be larger ..... *indica* (p.40)
- 3 Propodeum medially about as long as scutellum. Scutellum with trace of submedian lines (Japan). .... *atherigona* (p.41)
- Propodeum medially shorter than scutellum. Scutellum without submedian lines (Europe) ..... 4
- 4 Head slightly broader than mesoscutum. Thorax only slightly broader than high ..... *claridgei* (p.44)
- Head not broader than mesoscutum. Thorax flattened, very distinctly broader than high. (Antenna, Fig. 10) ..... *granularis* (p.45)

#### *Aceratoneuromyia polita* sp.n.

(Fig. 1)

[*Geniocerus evanescens* (Ratzeburg) Erdős, 1954: 360. Misidentification.]

[*Tetrastichus evanescens* (Ratzeburg) Domenichini, 1966a: 186. Misidentification.]

[*Aceratoneuromyia evanescens* (Ratzeburg) Domenichini, 1967: 108; Kostjukov, 1978: 465. Misidentification.]

♀. Differs from that of *evanescens* (Ratzeburg) as follows. Head only as wide as mesoscutum, about 2.5 times as broad as long; temples about 0.3 length of eyes; POL nearly 1.2 OOL, OOL 2.1 OD. Head in front view subtrapeziform, slightly broader than high. Malar space 0.66 length of eye, sulcus fine and weak, straight. Eyes with very short, sparse pubescence. Length of longest setae of vertex about 2.1 times OD. Antenna (Fig. 1) with scape 1.25 length of eye, about 4 times as long as broad, reaching median ocellus; pedicellus plus flagellum somewhat less than breadth of mesoscutum; pedicellus 2.5 times as long as broad, clearly longer than F1; funicle distinctly clavate, funicular segments decreasing very slightly in length, F1 slightly longer than broad, F2 very slightly

transverse, F3 1.3 times as broad as long; clava hardly broader than F3, about twice as long as broad, obtuse, with C1 very slightly transverse, C2 hardly shorter, C3 distinctly shorter. Thorax more weakly arched dorsally. Pronotum about 0.3 length of mesoscutum, its hind margin strongly arcuate; surface shiny, bare except for 4 long erect setae near hind margin and 1-3 short setae at sides. Mid lobe of mesoscutum slightly broader than long, shiny, with very fine and weak alutaceous sculpture; 2 adnotaular setae on each side. Scutellum about 0.75 length of mesoscutum, very shiny and virtually smooth. Dorsellum crescentic. Propodeum shiny, with very fine and delicate alutaceous sculpture; median carina thin at base but gradually broadening to form a large subtriangular smooth plate in posterior half. Coxae virtually smooth; hind femora 3.5 times as long as broad; spur of mid tibia hardly more than 0.5 length of basitarsus but slightly longer than breadth of tibia; basitarsus much longer than fourth tarsal segment. Forewing with costal cell slightly shorter than M, about 12 times as long as broad; a decolorized break between parastigma and base of M; front edge of M with 9-10 short setae, the longest hardly 0.5 length of ST. Cilia of hindwing hardly 0.5 breadth of wing. Gaster oval or oblong, hardly as long as thorax and narrower than it, 1.8-2.5 times as long as broad; surface moderately shiny, with very fine and delicate alutaceous sculpture; longest cercal seta only very slightly longer than the next longest, slightly curved.

Black; tip of pedicellus, and trochanters, pale; tips of femora, bases and tips of tibiae, tarsi except their tips, testaceous; tibiae mainly brown. Wings hyaline, venation brown. Length 1.3-1.7 mm.

♂. Unknown.

MATERIAL EXAMINED. 2 ♀. Holotype ♀, **Italy**: Aosta, Sarra, 12.ix.1971 (Bouček) (BMNH).

Paratype. **Jugoslavia**: 1 ♀, Crna Gora, Durmitor, 24.vi.1987 (Bouček) (BMNH).

HOSTS. Unknown.

### *Aceratoneuromyia indica* (Silvestri)

*Syntomosphyrum indicum* Silvestri, 1910: 230-244, fig. 3. Syntypes, India, Bangalore, reared 21.iv.1909 (Silvestri) (?IEA; USNM) [some examined].

*Aceratoneuromyia australia* Girault, 1917: 151. Syntypes, Western Australia (USNM) [not examined]. [Synonymised with *indicum* by Gahan, 1938: 221.]

*Melittobia indica* (Silvestri) Gahan, 1938: 221.

*Aceratoneuromyia indica* (Silvestri) Ferrière, 1960: 105-106; Domenichini, 1966b: 56; Bouček, 1988: 690.

I have examined syntypes of *S. indicum* in USNM collection; presumably others exist in IEA, Portici and as far as I know a lectotype has not yet been selected. The species was described from material reared from pupae of *Ceratitis capitata* which Silvestri had imported into Italy from Australia; but the Australian material had originated from India (Bangalore, according to labels on syntypes in USNM). It is widely distributed in tropical and subtropical countries from India to Malaysia, Australia and Pacific islands; introduced into Italy, South

Africa, Central and South America and Australia as an agent for control of fruit-flies (Tephritidae).

*A. indica* should be recognizable from the characters given in the keys. For other features see the original description.

MATERIAL EXAMINED. Several  $\sigma$ ,  $\varphi$ . **India.**

The following record evidently represents an accidental introduction: 1  $\varphi$ , Great Britain, London district, Highgate, 19.x.1977 (S.J. Farooqi) (BMNH).

HOSTS. *Ceratitis capitata* (Wiedemann), *Dacus* spp., *Notodacus xanthodes* (Dipt., Tephritidae).

### *Aceratoneuromyia atherigona* Ferrière

*Aceratoneuromyia atherigona* Ferrière, 1960: 106-108, figs 1, 2. Syntypes,  $\varphi$ ,  $\sigma$ , Japan, Honshu, Gifu, from *Atherigona* sp., ix.1954 (MHN; University of Kyushu) [not examined].

*Aceratoneuromyia atherigona* Ferrière; Domenichini, 1966b: 55.

Ferrière (1960: 108) examined 2  $\sigma$   $\varphi$  and 3  $\varphi$  of *atherigona* and stated "Type déposé au Muséum d'Histoire Naturelle de Genève, paratypes à l'Université de Kyushu". The sex of the "Type" was not stated (probably  $\varphi$ ) and it will be necessary to validate it by a more precise designation, but I have not considered it within my remit for the present work. I have examined one specimen of each sex (BMNH) from the type locality but reared ix.1953, bearing Ferrière's label "Gen.n.près Melittobia"; they agree with the description of *atherigona* and are certainly that species.

MATERIAL EXAMINED. 1  $\sigma$ , 1  $\varphi$ . **Japan:** Honshu, Gifu.

HOSTS. *Atherigona* sp. (Dipt., Muscidae). According to Ferrière's label the specimens reared in 1953 were obtained from "tiges de millet" [*Panicum ? miliaceum*].

### *Aceratoneuromyia evanescens* (Ratzeburg)

(Figs K32, K33, 4, 5)

*Entedon evanescens* Ratzeburg, 1848: 171. LECTOTYPE  $\varphi$ , Germany: unlocalised, v.1847, from puparium of *Sarcophaga albiceps* (Reissig) (NM), here designated [examined].

*Geniocerus evanescens* (Ratzeburg) Kurdjumov, 1913: 249.

*Aceratoneuromyia evanescens* (Ratzeburg) Domenichini, 1966b: 55, in part (excluding record from Hungary).

$\varphi$ . (Redescription from syntypes). Head hardly broader than mesoscutum, about 2.4 times as broad as long; temples 0.14-0.16 length of eyes; POL 1.2-1.25 OOL, OOL twice OD. Head in front view about 1.3 times as broad as high, transversely oval. Eyes 1.3 times as long as broad, separated by 1.5 times their length, with very short sparse pilosity. Malar space 0.6 length of eye, sulcus strongly impressed, virtually straight. Mouth 1.5 malar space. Setae of vertex long, the longest twice OD. Antenna (Fig. K33) with scape nearly as long as eye, about 4 times as long as broad; pedicellus plus flagellum nearly as great as breadth of mesoscutum; funicle proximally distinctly stouter than pedicellus,



thickening a little distad; pedicellus 1.85-2.1 times as long as broad, slightly longer than F1; F1 very slightly longer than broad, F2 quadrate, F3 very slightly transverse; clava twice as long as broad, slightly longer than F2 plus F3, with spine about 0.5 length of C3, its apical seta more than twice length of spine; setae of pedicellus and flagellum standing out strongly. Thorax (Fig. 4) 1.5-1.6 times as long as broad, weakly arched, propodeal slope about 20. Pronotum subconical, about 0.33 length of mesoscutum, moderately shiny, with extremely fine, superficial isodiametric reticulation, except at sides where it is coarser and slightly raised; some setae at sides and 4 long ones near hind margin; spiracles on conical tubercles. Mesoscutal mid lobe about 1.3 times as broad as long, moderately convex, shiny, with extremely fine delicately engraved reticulation having areoles twice or less than twice as long as broad; no median line; 2 long suberect adnotaular setae on each side. Scutellum about 0.75 length of mesoscutum, 1.3-1.4 times as broad as long, rather weakly convex in profile but moderately so transversely, shiny, sculptured rather more finely than mesoscutum; submedian lines present but superficial, distinctly nearer to sublateral lines than to each other, enclosing a space about twice as long as broad; setae equal in length, which is equal to distance between submedian lines, anterior pair well behind middle and close to posterior setae. Dorsellum about 2.3 times as broad as long, not very shiny, with excessively fine, hardly raised isodiametric reticulation and a trace of a longitudinal ridge. Propodeum slightly more than twice length of dorsellum and more than half length of scutellum, relatively dull, with very fine slightly raised reticulation whose areoles are slightly lengthened in the longitudinal axis, giving a substrate appearance in certain lights; median carina distinctly raised, thin and sharp except in posterior third where it broadens; callus with 2 setae near spiracle and 1-2 near hind corner; spiracles moderate-sized, oval, separated by about 0.33 their length from metanotum. Metapleuron sculptured like propodeum. Prepectus not very shiny, with very fine slightly raised isodiametric reticulation. Legs of medium length; hind coxae rather strongly oblique, twice as long as broad, with extremely fine slightly raised, nearly isodiametric reticulation; hind femora about 4 times as long as broad; tibiae and tarsi slender; spur of mid tibia 0.75 length of basitarsus, fourth tarsal segment slightly shorter than basitarsus. Forewing (Fig. 5) about 2.3 times as long as broad; costal cell 11-12 times as long as broad; SM with 3-4 dorsal setae; M distinctly longer than costal cell, thin distally but thickened towards base, about 4 times length of ST, its front edge with 13-16 setae; PM rudimentary; ST thin near base but thickening from half its length to form a subrhomboidal stigma; speculum small, extended as a very narrow strip to ST, open at extreme base; basal vein bare or with 1 seta; disc of wing moderately thickly pilose, thickly so distad; cilia about 0.75 length of ST. Hindwing obtuse; cilia 0.25 breadth of wing. Gaster (Fig. K32) subcylindrical and only slightly broader than high, nearly or just as long as broad; dorsal surface, except base of basal tergite, with very fine superficial alutaceous reticulation; last tergite broader than long; cercal setae subequal; ovipositor sheaths barely reaching tip of last tergite; tip of hypopygium close to apex of gaster.

Black, non-metallic. Antennae brownish with scape ventrally, pedicellus beneath and at tip, testaceous. Coxae black, legs otherwise testaceous with

fourth tarsal segment and pretarsus slightly darker. Tegulae fuscous. Wings hyaline, venation testaceous. Length 1.4-1.6 mm.

♂. Unknown to me.

MATERIAL EXAMINED. 2 ♀. **Germany**, unlocalised (syntypes of *Entedon evanescens* Ratzeburg). Ratzeburg (1848: 171) mentioned that many ♀ and a few ♂ of *evanescens* had been reared; but no males are now present in the remains of his collection. The second extant ♀ is here designated paralectotype.

HOSTS. *Sarcophaga albiceps* Meigen (Dipt., Sarcophagidae) (Ratzeburg, 1848).

*Aceratoneuromyia fimbriata* sp.n.

(Figs 2, 3, 9)

♀. Differs from that of *claridgei* sp.n. as follows. Antenna (Fig. 2) with pedicellus only 1.6-1.65 times as long as broad; funicular segments all slightly transverse, F1 about 1.3 times, F2 1.15 times, F3 1.15 times as broad as long; clava only about 1.6 times as long as broad, nearly as long as the whole funicle, with C1 and C2 each nearly twice as broad as long. Thorax very weakly arched, dorsellum and propodeum nearly horizontal; in dorsal view only 1.5-1.6 times as long as broad; nearly twice as broad as high. Mid lobe of mesoscutum about 1.5 times as broad as long; only 2 adnotaular setae on each side, the anterior setae shorter than the posterior. Scutellum with reticulation much finer than that of mesoscutum. Propodeum with median carina thin at base but expanding in hinder half and very broad where it adjoins the petiolar foramen. Hind coxae strongly oblique; hind femora only 3 times as long as broad; spur of mid tibia virtually as long as the basitarsus. Forewing (Fig. 3) with costal cell as long as or slightly longer than M, 12-13.5 times as long as broad; SM with dorsal setae; M 3.1-4.5 times length of ST, its front edge with 7-9 long setae; wing beyond speculum sparsely pilose; cilia of apical margin as long as or slightly longer than ST and about 0.2 breadth of wing. Gaster ovate, broadest a little behind the middle and moderately pointed apically, about 1.5 times as long as broad, about as long as thorax, as broad as or a little broader than thorax, at least twice as broad as high; dorsal surface slightly sunken, shiny; basal and following tergite virtually smooth, remaining tergites with some weak alutaceous sculpture; last tergite only slightly broader than long; setae of cerci not very unequal.

Tibiae infusate with bases and tips testaceous. Wings hyaline. Length 1.0-1.1 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 9) with scape expanded and flattened, about 2.25 times as long as broad, ventral plaque mainly in upper half and about 0.4 length of scape; pedicellus plus flagellum about 1.5 times breadth of mesoscutum; pedicellus 1.6 times as long as broad, slightly longer than F1; funicle nearly filiform, about as stout as pedicellus, its segments subequal in length (F2 a little longer than the others), F1 about 1.3 times as long as broad, F2 1.6 times, F3 1.3 times, F4 1.2 times as long as broad; clava fully 3 times as long as broad, distinctly longer than F3 plus F4, with C1 and C2 equal in length, each hardly longer than broad, separated by a distinct constriction, C3 about 0.5

length of C2, spine 0.3 length of C3, its apical seta nearly 3 times as long as the spine. Gaster oblong-elliptic, nearly as long as but slightly narrower than the thorax, obtuse; ventrally concave, without a distinct plica.

MATERIAL EXAMINED. 1 ♂, 3 ♀. Holotype ♀, **Czechoslovakia**: western Bohemia, Polesi Březník, 15.viii.1975, from host on *Larix decidua* (M. Skrzypszynska) (BMNH).

Paratypes. 1 ♂, 2 ♀, same data as holotype (BMNH).

HOSTS. Not determined.

*Aceratoneuromyia claridgei* sp.n.

(Fig. 6)

♀. Differs from that of *evanescens* (Ratzeburg) as follows. Head slightly broader than mesoscutum, only 2.1-2.3 times as broad as long; temples 0.3-0.35 length of eyes, more rounded; POL a little less than, or equal to OOL; OOL nearly 3 times OD. Head in front view hardly broader than high, with vertex more arched. Eyes with moderately long pilosity. Malar space about 0.75 length of eye, sulcus slightly curved. Antenna (Fig. 6) with scape slightly shorter than eye, 2.5-3 times as long as broad; pedicellus 1.8 times as long as broad, about 1.5 length of F1; funicle distinctly stouter than pedicellus, its segments decreasing a little in length, F1 quadrate, F2 hardly transverse, F3 slightly so; clava slightly broader than F3, twice as long as broad, distinctly longer than F2 plus F3. Thorax 1.7-1.8 times as long as broad. Pronotum with a row of 10-12 long setae near hind margin. Mesoscutum with areoles of reticulation 2-3 times as long as broad; 3 adnotaular setae on each side. Scutellum nearly flat in profile; submedian lines absent or hardly traceable. Dorsellum with hind edge angulate. Propodeum about 3 times as long as dorsellum and fully 0.66 length of scutellum, slightly more shiny and rather less strongly reticulate than in *evanescens*. Forewing with costal cell 13-16 times as long as broad; SM with 3-5 dorsal setae; M as long as or slightly longer than costal cell, 3.6-4.2 times length of ST, its front edge with 9-12 setae; speculum very small, closed below. Hindwing subobtusate, cilia about 0.4 breadth of wing. Gaster oblong-elliptic, slightly longer and only a little narrower than thorax, its sides tending to be slightly curved, 2.0-2.3 times as long as broad; cercal setae inequal, the longest seta about 1.5 length of next longest, kinked.

Body black, with a very weak bronze or olive tinge on parts of head and thorax; gaster sometimes faintly bronze-tinged. Antennae blackish, scape beneath and tip of pedicellus sometimes obscurely testaceous. Coxae black; trochanters testaceous or partly brown; femora fuscous, tips of fore and mid ones mores broadly, of hind ones very narrowly, testaceous; legs otherwise testaceous with tips of tarsi brown. Tegulae brown; wing subhyaline or faintly grey, venation testaceous to brown. Length 1.4-1.7 mm.

♂. Differs from ♀ as follows. Antenna with scape swollen, about 2.5 times as long as broad and virtually as long as an eye though not reaching median ocellus, with ventral plaque 0.55 length of scape, extending into both upper and lower halves; pedicellus about 1.6 times as long as broad, 1.8 times as long as F1

which is quadrate and not broader than the pedicellus [rest of antenna broken off]. Mesoscutum with 2-3 adnotaular setae on each side. Propodeum less transverse, about 1.5 times as long as dorsellum. Forewing slightly more than twice as long as broad; SM with 3 dorsal setae; M 2.5 times length of ST, its front edge with 6-7 setae. Gaster elliptic, about as long and as broad as thorax, obtuse, with strong ventral plica.

Tibiae broadly infusate medially. Length 1.25 mm.

**MATERIAL EXAMINED.** 1 ♂, 6 ♀. Holotype ♀, **Great Britain:** Oxfordshire, Otmoor, reared v.1956 from Muscid puparium on *Filipendula* (M.F. Claridge) (BMNH).

Paratypes. 1 ♂, 5 ♀, same data as holotype (BMNH).

I have pleasure in naming this species after Professor Michael F. Claridge, recalling earlier days when we collected Chalcidoidea together.

*Aceratoneuromyia granularis* Domenichini  
(Figs 7, 8, 10)

*Aceratoneuromyia granularis* Domenichini, 1967: 105. Holotype ♀, **Great Britain:** Wales, Glamorgan, Newton, 1966 (M.C. Day) (MIZSU) [examined].

*Aceratoneuromyia granularis* Domenichini; Kostjukov, 1978: 465; Bosch & Assem, 1986: 19-23.

♀. Differs from that of *claridgei* sp.n. as follows. Head 2.6-2.7 times as broad as long; temples shorter, at most 0.2 length of eyes. Antenna (Fig. 7) with F1 sometimes a little broader than long, F2 and F3 tending to be more distinctly transverse. Thorax more flattened, much broader than high, dorsal surface hardly arched, dorsellum and propodeum nearly horizontal. Hind edge of pronotum with 8-10 long setae. Mid lobe of mesoscutum with 2-3 adnotaular setae on each side. Scutellum rather more transverse, 1.4-1.6 times as broad as long. Propodeum slightly longer, 0.7-0.8 length of scutellum. Gaster (Fig. 8) slightly shorter than, or at most hardly longer than, the thorax, 1.6-1.8 times as long as broad, 1.8-2.1 times as broad as high, one seta of each cercus about 1.65 times the length of the next longest, kinked. Hypopygium (see Graham, 1987, fig. 46).

Antennal scape tending to be paler, often testaceous with only dorsal edge darker; femora tending to be less infusate. Size less, length 1.1-1.4 mm.

For other details, and figures, see Domenichini (1967).

♂. Differs from ♀ as follows. Antenna (Fig. 10) with scape swollen, about as long as an eye and 2.3-2.5 times as long as broad, ventral plaque about 0.66 length of scape; pedicellus plus flagellum about 1.15 times breadth of mesoscutum; pedicellus about 1.6 times as long as broad, slightly longer than F1; funicular segments equal in length, quadrate; clava about twice as long as broad, longer than F3 plus F4; each segment of funicle with a compact subbasal whorl of long dark setae, those of F1 reaching level with tip of F3, those of following segments comparably long; C1 with a partial dorsal whorl of similar setae. Gaster elliptic, tending to be slightly shorter than thorax; ventrally slightly

concave, without a distinct plica. Length 0.75-1.15 mm.

**MATERIAL EXAMINED.** Many ♂, ♀. **Czechoslovakia:** 1 ♀, Bohemia, Praha-Břve, 11.viii.1953, 1 ♀, Hradec Kralové, 7.ix.1955; Slovakia, 1 ♀, Gbelce, 29.vii.1955 (Bouček) (BMNH). **Germany:** 15 ♀, Kiel, reared 15.iv.1982 from *Pegomya rubivora* (Coq.) on *Filipendula ulmaria* (Dreyer) (BMNH). **Great Britain:** syntypes and other specimens (Day, Graham). **Jugoslavia:** 1 ♀, Dobra Voda, Goc, 1.vii.1968 (Bouček) (BMNH).

**HOSTS.** *Cleigastra* (= *Cnemopogon*) *apicalis* (Meigen) (Dipt., Scatophagidae), parasitising the puparia of the fly, which infests the excrement of *Archanara geminipunctata* (Haworth) (Lep., Noctuidae) on *Phragmites australis* (M.C. Day); *Pegomya rubivora* (Coquillett) (Dipt., Anthomyiidae) on *Filipendula ulmaria* (Dreyer).

**COMMENTS.** The courtship behaviour of *granularis* has been studied by Bosch & Assem (1986).

### ***QUADRASTICHUS* Girault**

*Quadrastichus* Girault, 1913a: 232, 252. Type-species: *Quadrastichus nigrinotatus* Girault, 1913a, by original designation.

*Cecidotetrastichus* Kostjukov, 1977: 189 (as subgenus of *Tetrastichus*). Type-species: *Cirrospilus vacuna* Walker, 1839a, by original designation. [Synonymised with *Quadrastichus* by Graham & LaSalle, 1991: 94.

*Cecidotetrastichus* Kostjukov (as genus); Graham, 1987: 30, 36-37.

*Quadrastichus* Girault; Graham & LaSalle, 1991: 94.

The identity of *Quadrastichus* has been discussed in a separate paper (Graham & LaSalle, 1991).

**DIAGNOSIS.** Characters of *Aprostocetus* Westwood, except as follows. Vertex with no impressed line, or an extremely weak and superficial line, between lateral ocelli and eyes. Antenna of female with one to three anelli, the first transverse, the second and third when present laminar. Antenna of male with scape not greatly swollen, with moderately long to very long ventral plaque; one or two anelli; segments of funicle with or without compact whorls of long dark setae, if without then first funicular segment not or hardly shorter than second, all funicular segments longer than broad. Forewing SM normally with 1 dorsal seta placed before the middle; occasionally 2 setae in aberrant specimens of *vacuna*. Mid lobe of mesoscutum usually with only 1 adnotaular seta on each side, placed in posterior half; in a few species with a row of 2 setae, rarely 3. Submedian lines of scutellum distinct. Propodeal spiracles small to moderate-sized, close or fairly close to metanotum, their rim exposed, or its outer part more or less hidden. Mesosternum, just in front of trochantal lobes, usually moderately convex, occasionally weakly so. Mesopleuron: precoxal suture normally absent, occasionally weakly indicated, rarely as much as 0.6 length of mesopleuron. Ovipositor sheaths not or only slightly projecting beyond last tergite of gaster. Digitus of male genitalia with a single spine on hind margin.

Difficulty may be experienced in distinguishing between a very few aberrant

specimens of *Quadrastichus* and some *Aprostocetus*. *Quadrastichus* species normally have only 1 dorsal seta on SM. In *Aprostocetus* the only European species with this character in some individuals are *suevius* (Walker), *celtidis* (Erdős) and *crino* (Walker). Both *suevius* and *celtidis* have a very broad forewing with distinctive venation (see Graham, 1987, fig. 160), while the ovipositor of *suevius* is far exerted. Females of *A. crino* have 4 anelli which are transverse but not laminar and subequal in length; males have 3 similar anelli. The body of *crino* is metallic, while most *Quadrastichus* are non-metallic. Occasional individuals of *Quadrastichus vacuna* have 2 dorsal setae on SM. Only a few species of *Aprostocetus* have that number (most species of subgenera *Ootetrastichus* and *Chrysotetrastichus*, *A. gnomus*, rare examples of a few others). These have 4 anelli in females and 3 in males, with the exception of subgenus *Chrysotetrastichus* which has fewer. *Chrysotetrastichus* species differ from *Quadrastichus vacuna* in their squat thorax, relatively short gaster, and the presence of a short precoxal suture on the mesosternum.

DISTRIBUTION. Material has been seen from all continents.

BIOLOGY. Parasites of Diptera Cecidomyiidae or (*misellus*, *cryptorrhynchi*) Coleoptera Curculionidae and Buprestidae; and Acarina. Generally endoparasites of host larvae and pupae; *misellus* and *cryptorrhynchi* are endoparasitic in the host eggs.

COMMENTS. The systematic position of this genus is uncertain. It does not appear to be closely related to the other genera which usually have only 1 dorsal seta on SM, such as *Oomyzus* and *Tetrastichus*. Possibly it is a development from *Aprostocetus*, having some apomorphic characters such as the single dorsal seta on SM and reduced number of anelli and adnotaular setae. The biology of the majority of its species might support this idea.

The characters of the species groups are indicated in the keys to species.

### Key to European species

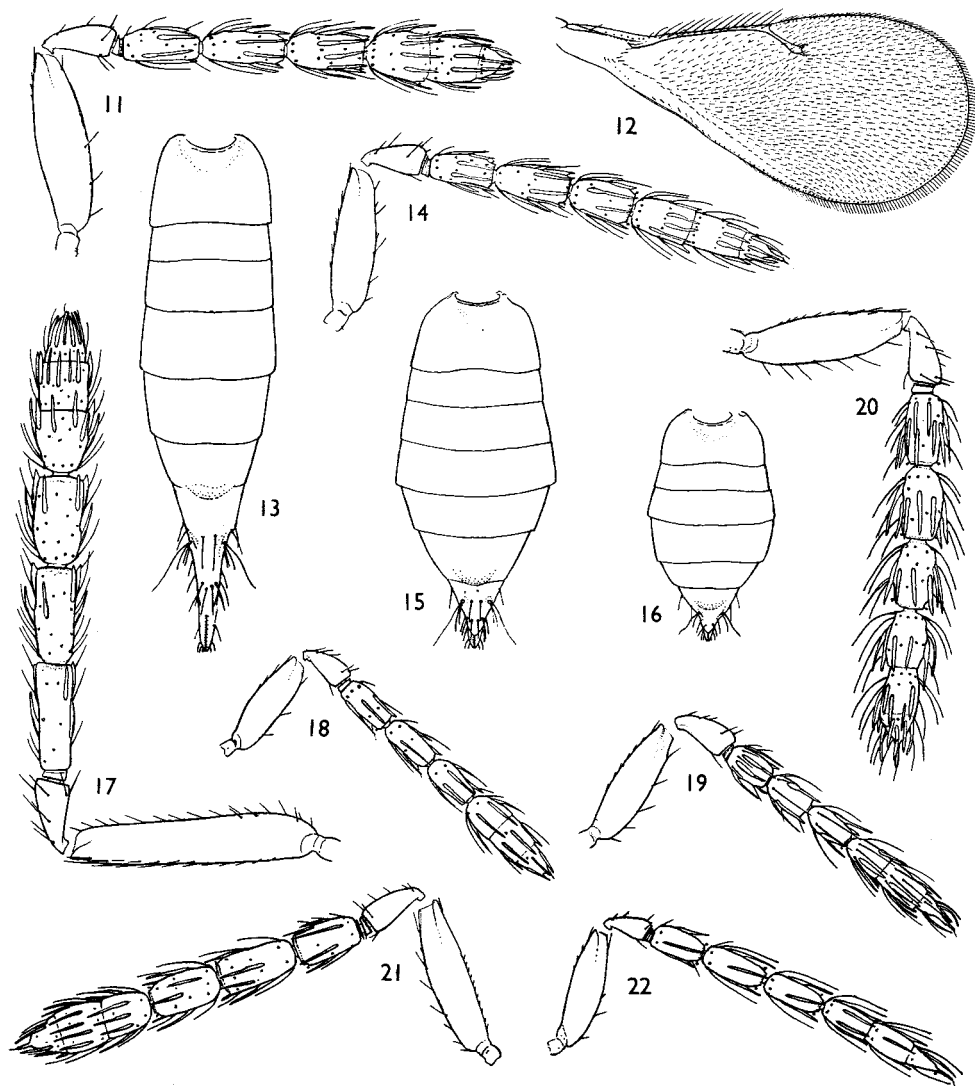
#### Females

- 1 Body black with yellow markings (sometimes only base of gaster), non-metallic. Frons (except in North American species *flora*) with median area (Fig. 36) but no median longitudinal carina; lines delimiting the scrobes laterally converge at most slightly dorsad. Malar sulcus (Fig. 37) distinctly curved. Scutellum without an offset border along its hind edge (except in *sajoi*, in which malar sulcus is expanded into a triangular fovea below eye). (*anysis*-group and *sajoi*). . . . . 19
- Body black, occasionally with very weak bluish lustre, without yellow markings (in *misellus* and another, extralimital species, with testaceous subbasal spot on gaster). Frons with median longitudinal carina; lines delimiting the scrobes converge dorsad to meet a short distance in front of median ocellus. Malar sulcus often nearly straight, occasionally distinctly curved, never foveate below eye. Scutellum (Fig. 32) with offset border along its hind edge. (*brevinervis*-group). . . . . 2

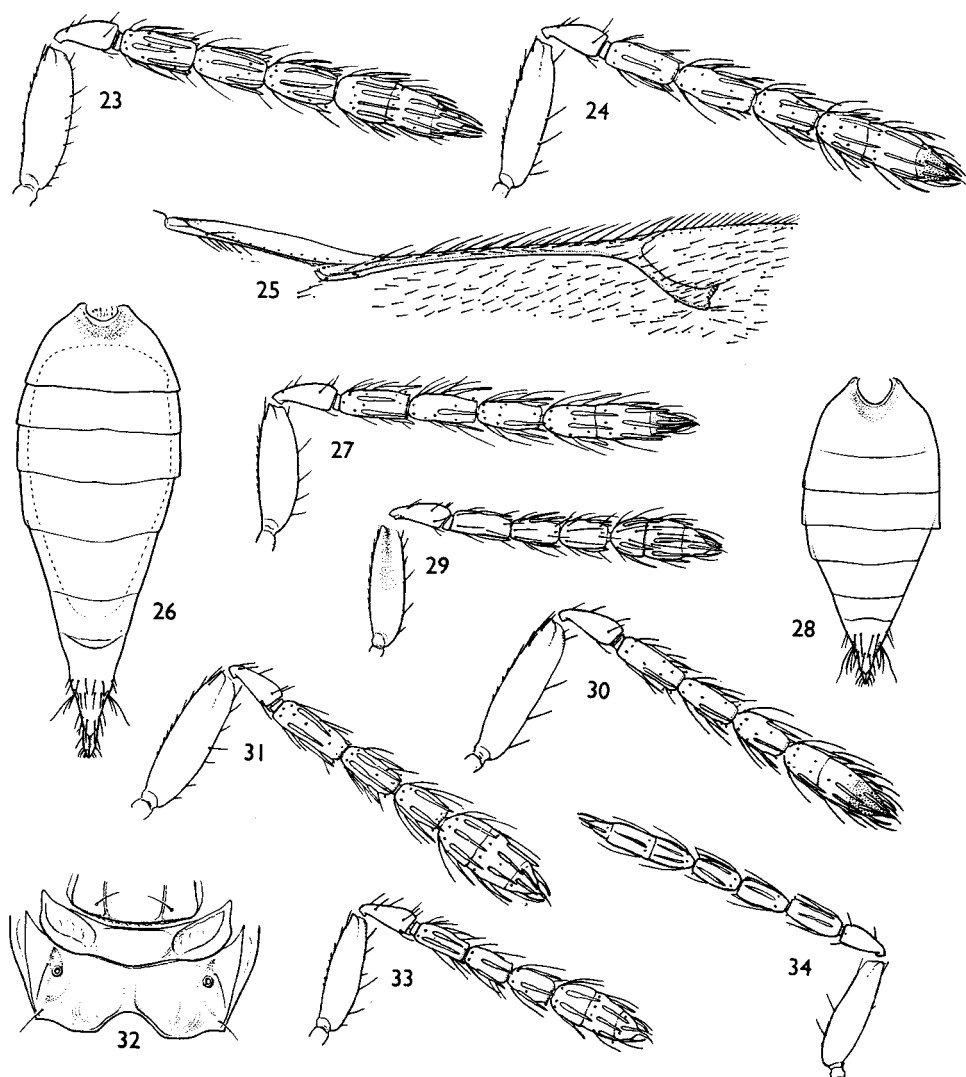
- 2 Base of gaster with a large testaceous spot; gaster about 3 times as long as broad. Mid lobe of mesoscutum with 2 or more adnotaular setae on each side. Body black or brown, non-metallic. Malar sulcus strongly curved.  
..... *misellus* (p.62)
- Gaster very rarely pale-marked and then only with an obscure pale spot, sometimes relatively short. Mid lobe of mesoscutum often with only 1 adnotaular seta on each side, if with 2 or more then body usually slightly metallic. Malar sulcus straight or curved. .... 3
- 3 Mid lobe of mesoscutum with 2-3 (rarely 4) adnotaular setae on each side. Antenna with funicular segments equal or subequal in length; setae of flagellum not standing out strongly. .... 4
- Mid lobe of mesoscutum normally with only 1 adnotaular seta on each side, placed in the hind half of the sclerite (rarely with 2 setae on one side only in aberrations, in which case *either* the first funicular segment is rather longer than the others, *or* the flagellum has strongly outstanding setae. 8
- 4 Antenna (Fig. 19) with funicular segments each slightly shorter than the pedicellus; clava longer than F2 plus F3, sometimes as long as whole funicle, with a conspicuous terminal spine the length of which is about equal to that of C3. Forewing with M 3.7-4.2 length of ST. Body black, non-metallic.  
..... *centor* (p.63)
- Antennae (Figs 14, 18) with funicular segments not shorter than the pedicellus except in dwarf specimens; clava usually not distinctly longer than F2 plus F3, with a shorter and less conspicuous terminal spine. Forewing (Fig. 12) with M 2.8-3.2 length of ST. Body with a weak bluish to bronzy metallic tinge (hardly perceptible in some specimens). .... 5
- 5 Antenna (Fig. 18) with sensilla of flagellum relatively sparse. Submedian lines of scutellum slightly nearer to each other than to sublateral lines. Propodeum rather shallowly and not broadly emarginate, medially about as long as dorsellum. Malar sulcus strongly curved. Body with hardly perceptible metallic tinge. .... *cryptorrhynchi* (p.62)
- Antennae (Figs 11, 14) with sensilla of flagellum more numerous. Submedian lines of scutellum about equidistant from each other and from sublateral lines. Propodeum tending to be rather deeply and broadly emarginate, medially usually slightly shorter than dorsellum, occasionally as long. Malar sulcus (except in some *vacuna* slightly curved or nearly straight. Body with bluish or bronze metallic tints (rarely extremely weak). ... 6
- 6 Antenna (Fig. 14) with pedicellus plus flagellum 1.35-1.4 breadth of mesoscutum; clava 3.5-4 times as long as broad; scape 0.75-0.85 length of eye, not reaching median ocellus or only just reaching its lower edge. Tibiae yellow to yellowish-testaceous. (Malar sulcus tending to be only slightly curved). .... *pteridis* (p.60)
- Antenna (Fig. 11) with pedicellus plus flagellum 1.15-1.25 breadth of mesoscutum; clava 2.7-3.2 times as long as broad; scape 0.9-0.95 length of eye. Tibiae usually more or less infusate. .... 7

- 7 Gaster (Fig. 13) 1.7-3.2 times length of thorax and 2.5-4.0 times as long as broad, strongly acuminate with last tergite 1.2-2.5 times as long as broad; ovipositor sheaths projecting slightly to very distinctly; tip of hypopygium slightly before 0.5 length of gaster. Antennal flagellum black to brown. Malar sulcus tending to be more distinctly curved. . . . . *vacuna* (p.57)
- Gaster (Fig. 16) 1.3-1.6 times length of thorax and 1.65-2.35 times as long as broad, slightly acuminate with last tergite at most as long as broad; ovipositor sheaths projecting at most very slightly; tip of hypopygium at 0.5 length of gaster. Antennal flagellum testaceous to brownish-testaceous. Malar sulcus nearly straight. . . . . *artemisiphilus* (p.60)
- 8 Antenna (Fig. 17) with scape 4.5-6 times as long as broad, longer than an eye and (unless the head is distorted) reaching well above level of vertex; in profile the scape tapers slightly upwards and its ventral (front) edge has 7-13 setae. (Gaster ovate, about as long as head plus thorax, 1.7-2.3 times as long as broad; last tergite not longer than broad). . . *brevinervis* (p.61)
- Antennal scape at most 4 times as long as broad and at most as long as an eye, not or hardly reaching above level of vertex; in profile the scape tends to appear broadest about the middle, whilst its ventral edge has at most 7 setae (but normally fewer than 7). (Gaster ovate to lanceolate, often longer than head plus thorax). . . . . 9
- 9 Antenna (Fig. 20) with setae of flagellum standing out rather strongly; C3 with a conspicuous terminal spine which is nearly as long as the segment itself; flagellum moderately thick. Spiracles of propodeum relatively large, separated by much less than their length from hind margin of metanotum; propodeum deeply and rather broadly emarginate, its median length less than or at most equal to that of dorsellum. Gaster lanceolate, acuminate, much longer than head plus thorax, 3.0-3.5 times as long as broad. Legs, except coxae and sometimes hind femora partly, testaceous. . . . . *lasiocerus* (p.63)
- Antennae (Figs 21-24, 27, 29-31, 33, 34) with setae of flagellum standing out less strongly; spine of clava usually shorter and less conspicuous, if not then (*perissiae*) femora extensively black, or (*fungicola*) flagellum slender. Spiracles of propodeum often small or minute and more widely separated from metanotum. The other characters rarely present in combination. 10
- 10 Spiracles of propodeum rather small but separated by distinctly less than their length from hind margin of metanotum. Malar sulcus (except in *colothorax*) weakly curved or nearly straight. . . . . 11
- Spiracles of propodeum (Fig. 32) very small or minute, separated by about their own length, or by rather more, from hind margin of metanotum. Malar sulcus distinctly curved. . . . . 15
- 11 Thorax squat, only 1.12-1.27 times as long as broad. Antenna (Fig. 22) with flagellum slender; claval spine about 0.7 length of C3. . . *fungicola* (p.64)
- *Either* thorax 1.45-1.5 times as long as broad; *or* (*colothorax*, Fig. 21) antenna with thicker flagellum and shorter claval spine. . . . . 12
- 12 Malar sulcus strongly curved. Thorax squat, 1.35 times as long as broad. Gaster lanceolate, nearly 3 times as long as broad. . . . *colothorax* (p.64)





Figs 11-22 11-13, *Quadrastichus vacuna* (Walker) ♀; (11) antenna; (12) forewing; (13) gaster. 14, 15, *Q. pteridis* sp. n. ♀; (14) antenna; (15) gaster. 16, *Q. artemisiphilus* sp. n. ♀, gaster. 17, *Q. brevinervis* (Zetterstedt) ♀, antenna. 18, *Q. cryptorrhynchi* (Domenichini) ♀, antenna. 19, *Q. centor* (Graham) ♀, antenna. 20, *Q. lasiocerus* (Graham) ♀, antenna. 21, *Q. colothorax* sp. n. ♀, antenna. 22, *Q. fungicola* sp. n. ♀, antenna.



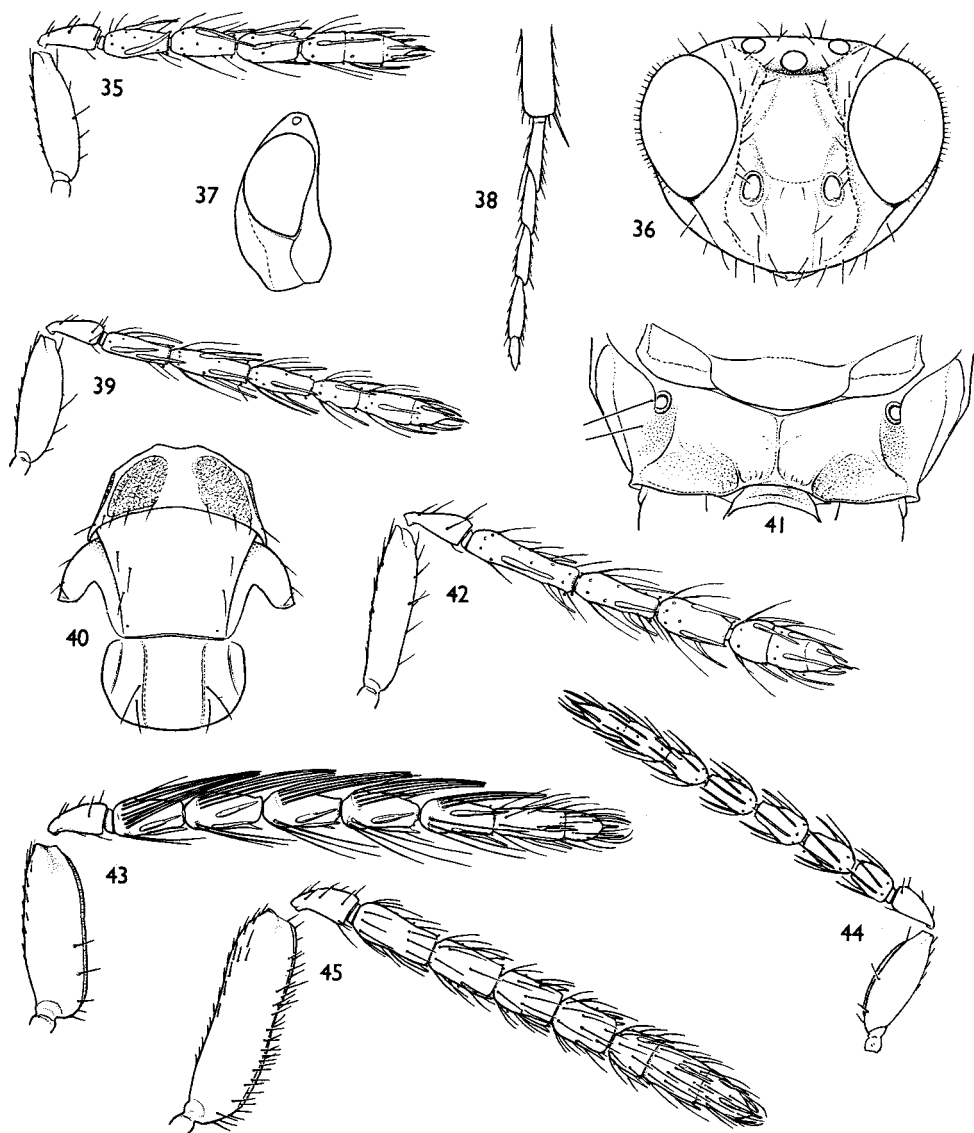
Figs 23-34 23, *Quadrastichus perissiae* (Janata) ♀, antenna. 24-26, *Q. ventricosus* (Graham) ♀; (24) antenna; (25) forewing; (26) gaster. 27, 28, *Q. pedicellaris* (Thomson) ♀; (27) antenna; (28) gaster. 29, *Q. malhamensis* (Graham) ♀, antenna. 30, *Q. stenocranus* sp. n. ♀, antenna. 31, 32, *Q. praecox* (Graham) ♀; (31) antenna; (32) metanotum and propodeum. 33, *Q. thysanotus* (Förster) ♀, antenna. 34, *Q. elachistus* sp. n. ♀, antenna.

- Malar sulcus weakly curved or nearly straight. Thorax 1.45-1.5 times as long as broad. Gaster lanceolate or ovate. .... 13
- 13 Antenna (Fig. 23) with a relatively long claval spine, about 0.66 length of C3; flagellum brown. .... *perissiae* (p.65)
- Antennae (Figs 24, 27) with a shorter claval spine; flagellum yellowish to brownish-testaceous with clava infuscate apically. .... 14
- 14 Gaster lanceolate, 1.4-1.5 times as long as head plus thorax and 2.5-3.5 times as long as broad; last tergite 1.2-1.5 times as long as broad. Body length 1.4-2.2 mm. .... *ventricosus* (p.67)
- Gaster ovate or lanceolate-ovate, not or hardly longer than head plus thorax, 1.6-2.3 times as long as broad; last tergite at most as long as broad, sometimes slightly broader than long. Body length 1.0-1.8 mm.  
..... *pedicellaris* (p.67)
- 15 Thorax 1.7-1.9 times as long as broad. .... 16
- Thorax at most 1.5 times as long as broad. .... 17
- 16 Lateral ocelli very small, POL nearly twice OD. Gaster slightly longer than head plus thorax; last tergite somewhat longer than broad.  
..... *malhamensis* (p.68)
- Lateral ocelli slightly larger, POL 1.35-1.55 OD. Gaster about as long as head plus thorax; last tergite not longer than broad. .. *stenocranus* (p.68)
- 17 Antenna (Fig. 34) with clava about 5 times as long as broad. Gaster 1.4 times as long as broad, not longer than thorax. Very small species, length 0.85 mm. Otherwise much like *thysanotus*. .... *elachistus* (p.70)
- Antennae (Figs 31, 33) with clava 2.0-2.8 times as long as broad. Gaster 1.6-2.7 times as long as broad. Length 0.9-1.75 mm. .... 18
- 18 Antenna (Fig. 33) with F1 at most twice as long as broad, shorter than or at most as long as pedicellus; clava 2.2-2.6 times as long as broad. Gaster 1.6-2.2 times as long as broad. Very small species, length 0.9-1.3 mm.  
..... *thysanotus* (p.69)
- Antenna (Fig. 31) with F1 (2.0-) 2.2-3.5 times as long as broad and at least slightly longer than pedicellus; clava 2.7-3 times as long as broad. Gaster 2.0-2.7 times as long as broad. Species usually larger length 1.2-1.75 mm.  
..... *praecox* (p.69)
- 19 Malar sulcus with a large subtriangular fovea just below eye. Pronotum (Fig. 40) with 4 coarsely reticulate yellowish areas, the rest of the surface more finely reticulate and often dark. Scutellum with an offset strip bordering its hind edge (as in Fig. 32). .... *sajoi* (p.71)
- Malar sulcus not foveate. Pronotum uniformly sculptured, without differentiated areas. Scutellum without offset strip along its hind edge.  
..... 20
- 20 Antennal scape not longer than eye, not reaching above vertex. Mid lobe of mesoscutum with a single adnotaular seta on each side, placed in posterior half. Gaster ovate, not or somewhat longer than thorax; tip of hypopygium situated slightly beyond middle. Anterior margin of clypeus subtruncate, without teeth. .... *anysis* (p.72)

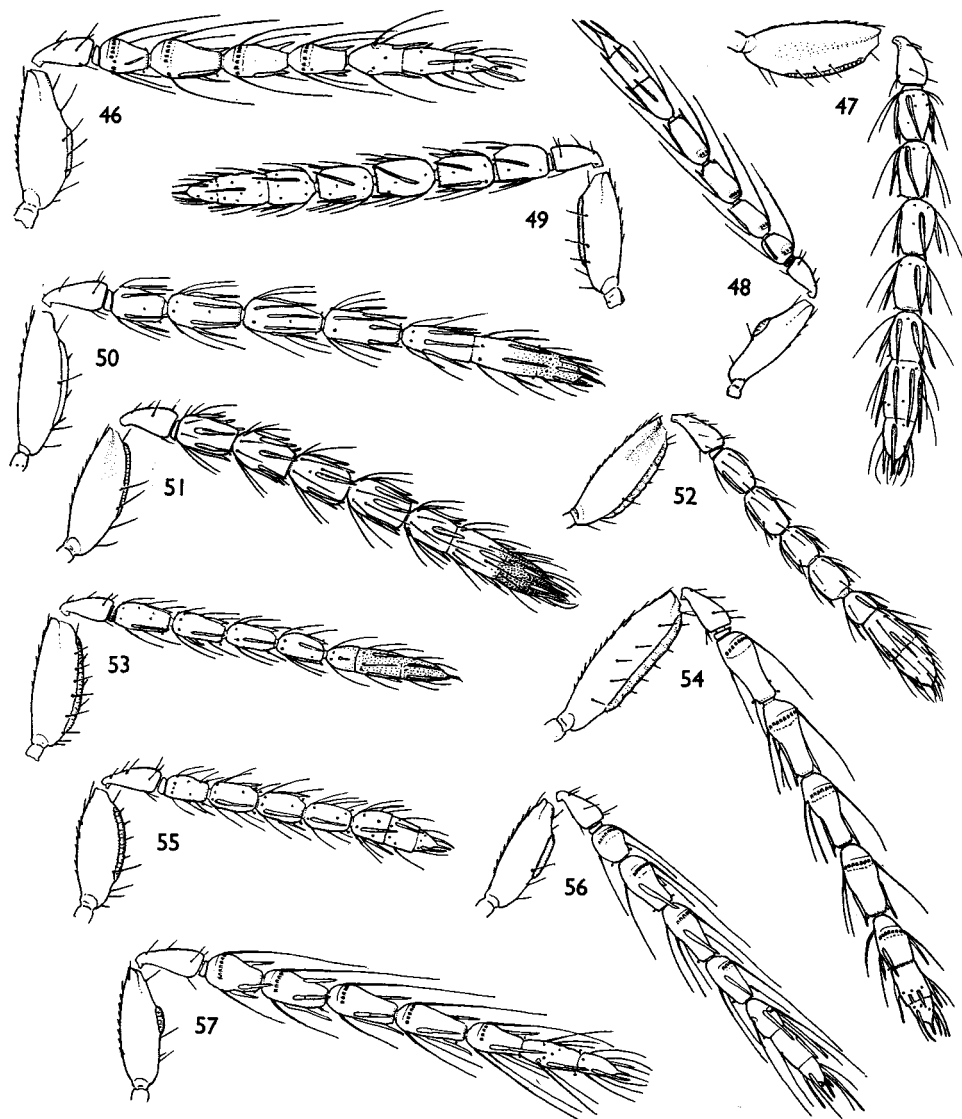
- Antennal scape about 1.2 times as long as eye, reaching (in specimens with undistorted head) above level of vertex. Mid lobe of mesoscutum normally with 2-3 adnotaular setae on each side. Gaster ovate to sublanceolate, often longer than head plus thorax; tip of hypopygium situated slightly before middle of gaster inclusive of ovipositor sheaths. Anterior margin of clypeus bidentate. .... 21
- 21 Gaster (see Graham, 1974, fig. 3) ovate, acute and slightly acuminate, at most as long as head plus thorax, 1.4-2.0 times as long as broad; last tergite 0.8-1.5 times as long as broad. Body less extensively yellow-marked. .... *citrinus* (p.74)
- Gaster (see Graham, 1974, fig. 2) more acuminate, distinctly longer than head plus thorax, 1.8-2.4 times as long as broad; last tergite 1.3-2.0 times as long as broad. Body more extensively yellow, or wholly so. .... *xanthosoma* (p.74)

## Males

- 1 Malar sulcus strongly curved, expanded into a subtriangular fovea just below the eye. Pronotum with 4 areas which are more coarsely reticulate than the rest and are pale, the rest of the pronotum being usually dark. .... *sajoi* (p.71)
- Malar sulcus straight or curved but never expanded into a fovea below eye. Pronotum without such differentiated area. .... 2
- 2 Frons without median longitudinal carina, but with median area (as in ♀, Fig. 36). Malar sulcus (Fig. 37) distinctly curved. Head, at least in southern European specimens, more or less yellow. Antenna (Fig. 56) with F1 much shorter than F2 and hardly longer than broad; whorled setae of F1 reaching beyond tip of F2, those of following segments comparably long. .... *anyis* (p.72)
- Frons with median longitudinal carina. Malar sulcus curved or nearly straight. Head black. Antenna with F1 usually longer; whorled setae usually relatively shorter, or absent. .... 3
- 3 Antenna with 3 funicular segments and a 3-segmented clava; each segment of funicle, and first segment of clava, with a compact subbasal whorl of long dark setae which reach nearly to the tip of the following segment. Gaster with testaceous subbasal spot. .... 4
- Antenna with 4 funicular segments and a 3-segmented clava; segments of funicle and clava with or without compact subbasal whorls of long dark setae. Gaster with or without pale subbasal spot. .... 5
- 4 Ventral plaque of antennal scape about 0.65 length of scape (see Delucchi, 1954, fig. 4F). .... *misellus* (p.62)
- Ventral plaque of antennal scape about 0.4 length of scape (see Domenichini, 1967, fig. 12). .... *cryptorrhynchi* (p.62)
- 5 Antenna: each segment of funicle, sometimes also first segment of clava, with a compact subbasal whorl of long dark setae. .... 6
- Antenna: segments of funicle and clava without compact subbasal whorl of long dark setae. .... 9



**Figs 35-45** 35-38, *Quadrastichus anysis* (Walker) ♀; (35) antenna; (36) head in front view; (37) head in profile; (38) part of hind tibia, and tarsus. 39, 40, *Q. sajo* (Szelényi) ♀; (39) antenna; (40) pronotum, mesoscutum and scutellum. 41, *Q. citrinus* (Thomson) ♀, metanotum and propodeum. 42, *Q. xanthosoma* (Graham) ♀, antenna. 43, *Q. vacuna* (Walker) ♂, antenna. 44, *Q. pteridis* sp. n. ♂, antenna. 45, *Q. brevinervis* (Zetterstedt) ♂, antenna.



Figs 46-57 Antennae, males. 46, *Quadrastichus centor* (Graham). 47, *Q. lasiocerus* (Graham). 48, *Q. fungicola* sp. n. 49, *Q. perissiae* (Janata). 50, *Q. ventricosus* (Graham). 51, *Q. pedicellaris* (Thomson). 52, *Q. malhamensis* (Graham). 53, *Q. stenocranus* sp. n. 54, *Q. praecox* (Graham). 55, *Q. thysanotus* (Förster). 56, *Q. anysis* (Walker). 57, *Q. sajoi* (Szelényi).

- 6 Antenna (Fig. 43): setae of the subbasal whorl of each funicular segment reach level with the tip of the following segment; scape with a very long ventral plaque. Mid lobe of mesoscutum with 2-3 adnotaular setae on each side. Head and thorax with weak bluish metallic tint. . . . *vacuna* (p.57)
- Antennae: setae of the subbasal whorl of each funicular segment reach at most half way along the following segment and *either* the scape has a relatively shorter ventral plaque *or* mid lobe of mesoscutum has only 1 adnotaular seta on each side. Head and thorax non-metallic. . . . . 7
- 7 Antenna (Fig. 54): scape slightly longer than an eye and reaching slightly above the vertex, with a very long ventral plaque which is situated mainly above the middle; first segment of funicle hardly shorter than second. Mid lobe of mesoscutum with 1 adnotaular seta on each side.  
 . . . . . *praecox* (p.69)
- Antenna (Figs 46, 48): scape not longer than an eye and not reaching above the vertex, its ventral plaque relatively short; first segment of funicle distinctly shorter than second. Mid lobe of mesoscutum with 1 or 2 adnotaular setae on each side. . . . . 8
- 8 Thorax squat, about 1.2 times as long as broad; mid lobe of mesoscutum with 1 adnotaular seta on each side. Antenna (Fig. 48) with ventral plaque of scape about 0.2 length of scape. . . . . *fungicola* (p.64)
- Thorax 1.5 times as long as broad; mid lobe of mesoscutum with 2 adnotaular setae on each side. Antenna (Fig. 46) with ventral plaque of scape 0.37 length of scape. . . . . *centor* (p.63)
- 9 Antenna (Fig. 45) with scape distinctly longer than an eye and reaching well above the vertex, its front (ventral) edge with numerous setae, ventral plaque extending most of its length. Forewing with a fuscous streak on coastal margin near apex (may be faint in teneral specimens).  
 . . . . . *brevinervis* (p.61)
- Antennal scape with fewer setae on its front edge, usually not longer than an eye or reaching above the vertex, ventral plaque often relatively shorter. Forewing immaculate. . . . . 10
- 10 Mid lobe of mesoscutum with 2 adnotaular setae on each side. Head and thorax with weak bluish tinge; mesoscutum rather dull. Antenna (Fig. 44) with ventral plaque of scape very long. Propodeal spiracles separated by less than their length from hind margin of metanotum.  
 . . . . . *pteridis* and *artemisiphilus* (p.60)
- Mid lobe of mesoscutum normally with 1 adnotaular seta on each side, very rarely 2 setae on one side only. Head and thorax non-metallic; mesoscutum relatively shiny. *Either* the antennal scape has a relatively shorter ventral plaque; *or* the propodeal spiracles are very small and separated by at least their own length from hind margin of metanotum. . . . . 11
- 11 Propodeal spiracles separated by at least slightly less than their own length from hind margin of metanotum. Malar sulcus weakly curved or nearly straight. . . . . 12
- Propodeal spiracles very small, separated by at least their own length from hind margin of metanotum. Malar sulcus distinctly, usually rather strongly, curved. . . . . 15

- 12 Antenna (Fig. 50): funicular segments 2 to 4 each twice as long as broad or slightly more; first and second segments of clava each about twice as long as broad; scape very slightly longer than an eye, reaching above the vertex; flagellum testaceous or yellowish with C3 and sometimes part of C2 fuscous. . . . . *ventricosus* (p.67)
  - Antennae with funicular segments, and at least the first segment of the clava, slightly to distinctly less than twice as long as broad; scape about equal in length to an eye; flagellum sometimes coloured otherwise. . 13
- 13 Legs, except coxae and tips of tarsi, testaceous. Antenna (Fig. 47): flagellum uniformly brownish-testaceous, with setae standing out strongly. . . . . *lasiocerus* (p.63)
  - Femora usually darkened proximally or mainly dark, if pale then antennal clava pale proximally and blackish distally; flagellar setae tending to stand out less strongly. . . . . 14
- 14 Antenna (Fig. 49) with flagellum uniformly brownish-testaceous. . . . . *perissiae* (p.65)
  - Antenna (Fig. 51): clava yellowish with its third segment, sometimes also apex of second segment, fuscous to black. . . . . *pedicellaris* (p.67)
- 15 Antenna (Fig. 55) with ventral plaque of scape about 0.6 length of scape; clava 2.5-3 times as long as broad, at most slightly longer than F3 plus F4; first funicular segment at least slightly shorter than the pedicellus. . . . . *thysanotus* (p.69)
  - Antennae (Figs 52, 53) with ventral plaque of scape 0.7-0.75 length of scape; clava 3.5-5 times as long as broad, much longer than F3 plus F4; first funicular segment slightly shorter than, or as long as, the pedicellus. . 16
- 16 Antenna (Fig. 52) with clava about 3.5 times as long as broad, slightly broader than F4, with dorsal edge of C3 more strongly curved than the ventral edge; funicular segments rather shorter. . . . . *malhamensis* (p.68)
  - Antenna (Fig. 53) with clava about 5 times as long as broad, not broader than F4, with dorsal and ventral edges of C3 about equally curved; funicular segments rather longer. . . . . *stenocranus* (p.68)

## THE *BREVINERVIS*-GROUP

### *Quadrastichus vacuna* (Walker) (Figs 11-13, 43, 338)

*Cirrospilus Vacuna* Walker, 1939a: 305. Lectotype ♂, Great Britain: near London (Walker) (BMNH), designated by Graham (1916b: 43) [examined].

*Cirrospilus Quercens* Walker, 1839a: 307. Lectotype ♀, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 43) [examined]. [Synonymised with *vacuna* by Graham, 1961b: 42.]

*Cirrospilus Numeria* Walker, 1839a: 321. Lectotype ♀, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 43) [examined]. [Synonymised with *vacuna* by Graham, 1961b: 42.]



- Cirrospilus Sotades* Walker, 1839d: 417. Lectotype ♀, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 43) [examined]. [Synonymised with *vacuna* by Graham, 1961b: 42.]
- Cirrospilus Rhoesus* Walker, 1839d: 417-418. Lectotype ♀, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 43) [examined]. [Synonymised with *vacuna* by Graham, 1961b: 43.]
- Cirrospilus Alciuhoe* Walker, 1839d: 418. Lectotype ♀, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 43) [examined]. [Synonymised with *vacuna* by Graham, 1961b: 43.]
- Cirrospilus Brunchus* Walker, 1839f: 236. Lectotype ♀, Scotland: Edinburgh (Greville) (RSM), designated by Graham (1961b: 43) [examined]. [Synonymised with *vacuna* by Graham, 1961b: 43.]
- Tetrastichus migrator* Förster, 1861: 38. Lectotype ♀, Switzerland: Rosegal (Förster) (NM), designated by Domenichini (1966a: 105-106) [examined]. [Synonymised with *vacuna* by Graham, 1961b: 43.]
- Tetrastichus penetrans* Förster, 1861: 38. Lectotype ♀, Switzerland: Rosegal (Förster) (NM), designated by Domenichini (1966a: 105-106) [examined]. [Synonymised with *vacuna* by Graham, 1961b: 43.]
- Tetrastichus compressiventris* Thomson, 1878: 286. Lectotype ♀, Sweden: Halsingborg (Thomson) (ZIL), designated by Graham (1961b: 43) [examined]. [Synonymised with *vacuna* by Graham, 1961b: 43.]
- Quadrastichus vacuna* (Walker) Graham & LaSalle, 1991: 94.

♀. Head as broad as or slightly broader than mesoscutum, about 2.25 times as broad as long; temples 0.1 length of eyes; POL about 1.5 times OOL, OOL about 1.5 OD. Eyes 1.2 times as long as broad, very shortly, sparsely pubescent. Malar space about 0.66 length of eye, sulcus rather distinctly curved. Mouth 1.25 malar space. Antenna (Fig. 11) with scape nearly as long as eye, reaching middle of ocellus; pedicellus plus flagellum 1.15-1.25 times breadth of mesoscutum; pedicellus 2.2-2.5 times as long as broad, very slightly shorter than pedicellus F1 in larger specimens, slightly longer than F1 in small ones; funicle proximally slightly stouter than pedicellus, hardly thickening distad, its segments subequal in length, or F1 a little shorter than F2, with F1 1.6-2.1 times, F2 2.0-2.2 times, F3 1.7-2.0 times, as long as broad; clava somewhat broader than F3, 2.7-3.2 times as long as broad, from nearly as long to slightly longer than F2 plus F3, pointed, with C1 1.1-1.3 times as long as broad, C2 at most slightly elongate, C3 short, spine 0.4 length of C3, apical seta slightly shorter than spine; sensilla in one irregular row on each segment. Thorax 1.25-1.45 times as long as broad. Mid lobe of mesoscutum as broad as or slightly broader than long, moderately shiny, with extremely fine lightly engraved reticulation having most areoles 3-4 times as long as broad; median line at least traceable in some lights, sometimes distinct; 2-3 (rarely 4) adnotaular setae on each side. Scutellum 1.2-1.25 times as broad as long; moderately convex; submedian lines almost equidistant from each other and from sublateral lines, enclosed space 2-3 times as long as broad; setae equal, their length somewhat less than distance between submedian lines, anterior pair in or slightly behind middle. Propodeum broadly and relatively deeply emarginate, usually slightly shorter than dorsellum, occasionally as long; surface with fine, hardly raised reticulation; median carina distinct but very short, rapidly expanding caudad and forking; spiracles moderate-sized, subcircular, about 0.33 their length from metanotum; spiracular sulci with inner edge sometimes giving the impression of a curved paraspiracular carina; callus with two setae, one

outside spiracle, the other near hind corner. Legs moderately long, rather slender; hind femora 4.5-5 times as long as broad; spur of mid tibia 0.66 length of basitarsus. Forewing (Fig. 12) 2.0-2.2 times as long as broad; costal cell 12-14 times as long as broad; SM usually with 1 dorsal seta, occasionally 2 setae on one wing, rarely on both; M hardly longer than costal cell, rather thin, 2.5-2.9 times length of ST, its front edge with 9-14 longish setae; ST very thin proximally but expanded distad; speculum small, wing beyond it moderately thickly pilose; cilia 0.37-0.65 length of ST. Hindwing acute, cilia 0.5-0.7 breadth of wing. Gaster (Fig. 13) long-ovate to lanceolate, acuminate, 1.7-2.3 times length of thorax and 2.5-4.0 times as long as broad; last tergite (1.2-) 1.5-2.5 times as long as broad; ovipositor sheaths at least very slightly, often very distinctly, projecting. Hypopygium (Fig. 338) with its tip before middle of gaster, moderately transverse, lobes subequal in length, median lobe rather narrow, rounded.

Body black with weak bluish tint, sometimes partly suffused with bronze. Coxae, and femora except their tips, coloured like body; tibiae sometimes yellow to testaceous but usually more or less broadly infuscate medially, in darkest forms black except for a very narrow basal ring; fore tarsi brown to black, mid and hind tarsi testaceous proximally darkening to fuscous at tips, in dark forms wholly fuscous. Tegulae black. Wings hyaline or slightly grey, venation testaceous to brown. Antennae brown to fuscous, scape often black. Length 0.9-2.3 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 43) with scape subcylindrical, 1.10-1.15 length of eye, reaching above vertex, with ventral plaque extending most of its length; pedicellus plus flagellum 1.65-1.7 breadth of mesoscutum; pedicellus as long as or somewhat shorter than F1, about twice as long as broad; flagellum proximally a little stouter than pedicellus, tapering very slightly distad, funicular segments equal in length, or F1 slightly to distinctly shorter than the others and 1.5-2.0 times as long as broad, F2 to F4 each 1.8-2.2 times as long as broad; clava 4.8-5.5 times as long as broad, distinctly shorter than F2 plus F3 plus F4; each funicular segment with a compact subbasal whorl of dark setae, which reach about level with the apex of the segment following C1 with a partial dorsal and partial ventral whorl of similar setae. Gaster oblong-sublinear, as long as but much narrower than thorax.

Antennae blackish, pedicellus and flagellum sometimes brown.

**MATERIAL EXAMINED.** 15 ♂, many ♀. **Austria, Czechoslovakia, France, Great Britain** (including Wales and Scotland), **Ireland, Norway, Poland, Sweden, Switzerland.**

**HOSTS.** *Dasineura ulmaria* (Bremer) (Dipt., Cecidomyiidae); but in view of its abundance and wide distribution over various types of habitat, it seems likely to have other hosts as well.

**COMMENTS.** This is one of the most abundant (and probably widespread) European species. It sometimes occurs in large numbers in shady woods and in damp situations such as edges of ditches and rivers.

*Quadrastichus pteridis* sp.n.

(Figs 14, 15, 44)

♀. Differs from that of *vacuna* (Walker) as follows. Antenna (Fig. 14) with pedicellus plus flagellum 1.35-1.4 times breadth of mesoscutum (longer than in *vacuna*), clava relatively longer, scape slightly shorter, only 0.75-0.85 length of eye; gaster (Fig. 15) on average shorter, 2-3 times as long as broad (occasionally more if abnormally compressed), with last tergite relatively shorter, varying from a little broader than long to 1.5 times as long as broad; ovipositor sheaths at most slightly projecting; malar sulcus tending to be only slightly curved; antennal scape ventrally, or wholly except dorsal edge, testaceous, pedicellus mainly so, flagellum testaceous to brownish-testaceous, tibiae yellow to yellowish-testaceous. Hypopygium similar to that of *vacuna* (Fig. 338). Length 1.3-1.8 mm.

♂. Differs from that of *vacuna* particularly in antenna (Fig. 44) which has scape more elliptical, barely or only just as long as an eye, not reaching above vertex; funicular segments and C1 without compact whorls of long dark setae but with elongate sensilla having short bases but very long outstanding blades; clava virtually as long as F2 plus F3 plus F4. Antennal scape brown, pedicellus and funicle testaceous, clava brown.

MATERIAL EXAMINED. 2 ♂, 22 ♀. Holotype ♀, **Ireland**: Co. Down, Newcastle, amongst bracken on sand dunes near Murlough House, 29.vi.1957 (Graham) (BMNH).

Paratypes. **Austria**: 1 ♂, Silbertal, reared v.1978 from *Iteomyia capreae* (ITZ). **Ireland**: same locality and situation as holotype, 1 ♂, 5 ♀, 19.vi.1957, 2 ♀, 28.vi.1957, 13 ♀, 29.vi.1957 (Graham) (BMNH, MVG). **Netherlands**: 1 ♀, Amerangen, 9.viii.1971, from gall of *Dasineura filicina* on *Pteridium* (H.J. Vlugg) (MJG).

HOSTS. *Dasineura filicina* (Kieffer) and *Iteomyia capreae* (Winnertz) (Dipt., Cecidomyiidae). Most specimens were taken on bracken (*Pteridium aquilinum*) suggesting that *Dasineura filicina* is the chief host.

*Quadrastichus artemisiphilus* sp.n.

(Fig. 16)

♀. Differs from that of *vacuna* in the characters given in the key to species (females), couplet 7. The details there stated are to be taken as the description. Gaster (Fig. 16). Hypopygium similar to that of *vacuna* (Fig. 338). Length 0.9-1.3 mm.

The ♀ differs from that of *pteridis* sp.n. in its slightly shorter antennal flagellum, shorter clava, very slightly longer scape, on average shorter gaster, smaller size.

♂. Very similar to that of *pteridis* in antennae and other features.

MATERIAL EXAMINED. 1 ♂, 34 ♀. Holotype ♀, **Great Britain**: Berkshire, Thatcham Reeds, near Newbury, 31.viii.1964, swept from *Artemisia vulgaris* (Graham) (BMNH).

Paratypes. **Great Britain:** 25 ♀, same data as holotype (BMNH); 4 ♀, Middlesex, Southgate, 25.ix.1969 (Graham) (BMNH). **Italy:** 1 ♀, Sicily (Trapani), Selinunke, 23.ix.1971, from *Artemisia arborescens*, 1 ♂, 3 ♀, 30.iii.1972 (G. Kruseman) (ITZ).

HOSTS. Unknown but most probably some species of Diptera Cecidomyiidae. *Artemisia* species support a rich fauna of possible hosts in that family, one or more of which may be hosts of *artemisiphilus*.

***Quadrastichus brevinervis* (Zetterstedt), comb.n.**  
(Figs 17, 45, 338)

*Entedon brevinervis* Zetterstedt, 1838: 428. Lectotype ♀, Sweden: Lapland, Mole Ro (Zetterstedt) (ZIL), designated by Graham (1961b: 43) [examined].

*Tetrastichus subdepressus* Thomson, 1878: 285. Lectotype ♀, Sweden: Halsingborg (ZIL), designated by Graham (1961b: 43) [examined]. [Synonymised by Graham, 1961b: 43.]

*Aprostocetus brevinervis* (Zetterstedt) Graham, 1961b: 43, 1961c: 29-30.

*Tetrastichus brevinervis* (Zetterstedt) Domenichini, 1966a: 103, 1966b: 21; Askey & Ruse, 1974: 152-157.

♀. Very distinct from the other Palaearctic species, recognizable from the characters given in couplet 8 of key to females, particularly the antennal scape. Head hardly as broad as mesoscutum. POL 1.7-1.75 OOL, OOL 1.6-1.9 OD. Malar space 0.55-0.65 length of eye, sulcus curved. Antenna (Fig. 17) with flagellum relatively longer in small, shorter in large specimens, funicular segments shorter in small specimens but longer in large females; pedicellus distinctly shorter than F1, 2.5-3.0 times as long as broad; funicle proximally not or hardly stouter than pedicellus but thickening slightly distad, its segments decreasing in length, F1 2.5-3.0 times, F2 2.0-2.25 times, F3 about 1.75 times as long as broad; clava slightly broader than F3, slightly shorter than F2 plus F3 in largest specimens but slightly longer than F2 plus F3 in small ones. Mid lobe of mesoscutum as broad as or slightly broader than long; median line more or less indicated. Scutellum slightly broader than long; submedian lines about equidistant from each other and from sublateral lines, enclosed space 2.0-2.5 times as long as broad. Propodeal spiracles rather small but separated by somewhat less than their length from metanotum. Forewing with costal cell slightly shorter than M, 12.5-15 times as long as broad; M rather thin, 2.65-3.5 times length of ST; speculum rather small, hardly extended below M, wing beyond it moderately thickly pilose; cilia 0.25-0.7 length of ST. Longest seta of each cercus about 1.5 times length of next longest, kinked. Hypopygium (Fig. 339).

Black. Tip of scape more or less testaceous; pedicellus distally, and flagellum, brown to subtestaceous. Coxae, and femora mainly black; tibiae testaceous or more or less infusate. Forewing subhyaline, in very dark specimens with a weak infumate streak between end of M and tip of wing. Length 1.3-2.1 mm.

♂. Recognizable amongst Palaearctic species by the characters given in couplet 9 of key to males. Antenna (Fig. 45) with pedicellus 1.95-2.4 times as

long as broad; flagellum filiform, slightly stouter than pedicellus, funicular segments usually decreasing slightly in length, F1 2.1-2.3 times, F2 2.0-2.1 times, F3 1.8-2.1 times, F4 1.6-1.7 times as long as broad; clava 3.5-4 times as long as broad, as long as or somewhat longer than F3 plus F4; flagellum without compact whorls of long dark setae. Gaster oblong, as long as but narrower than thorax.

Antennae and femora mainly testaceous in pale forms.

MATERIAL EXAMINED. 6 ♂, many ♀. **Czechoslovakia, Great Britain, Italy, Norway, Sweden.**

HOSTS. Chiefly *Massalongia betulifolia* Harris (Dipt., Cecidomyiidae), as an endoparasite of the host larvae; occasionally *M. rubra* (Kieffer), both as hyperparasite and primary parasite (Askew & Ruse, 1974). These authors give a full account of the life history. *C. brevinervis* appears to be associated exclusively with hosts on *Betula* spp. and is evidently more common in the north of Europe.

COMMENTS. The species recorded from Hungary by Erdős (1971: 222-223) appears to be different.

***Quadrastichus misellus* (Delucchi), comb.n.**

*Tetrastichus misellus* Delucchi, 1954: 101-102. Holotype ♀, Germany: Oberbayern, Grafrath (H. Heering) (VD) [not examined].

I have not had access to the original material of this species, which is included solely on the basis of Delucchi's description. It would appear to be related, both by structure and biology, to *cryptorrhynchi* (Domenichini), the males of both species having only 3 instead of the usual 4 funicular segments. The species is assigned provisionally to *Quadrastichus*, though examination of the original material may show that it is an alien element in this genus.

Kostjukov (1978: 436) recorded *misellus* from the Voroshilovgrad district of USSR but I have not seen this material. Professor Trjapitzin kindly loaned some specimens from another locality, determined as *misellus* by Kostjukov, and reared from *Agrilus betuleti*; these disagree with the description of *misellus* in several respects and may represent an undescribed species.

MATERIAL EXAMINED. None.

HOSTS. *Agrilus viridis* L. (Col., Buprestidae), as an endoparasite of host larvae and (?) eggs. Delucchi stated that *misellus* occurred in small numbers (10-12 per cent of all *Tetrastichus*) in the original rearings.

***Quadrastichus cryptorrhynchi* (Domenichini), comb.n.**  
(Fig. 10)

*Tetrastichus cryptorrhynchi* Domenichini, 1967: 100, figs. 4, 12, 22, 23. Holotype ♀, Italy: Rome, 1964 (B. Cavalcaselle) (MIZSU) [examined].

Domenichini's description and figures are adequate for recognizing this species

and I add only a few details not mentioned by him.

♀. Malar sulcus strongly curved. Antenna (Fig. 18). Mid line of mesoscutum fine, distinct except in front; 2 fine, not very long adnotaular setae on each side. Submedian lines of scutellum distinctly nearer to each other than to sublateral lines, enclosed space 2.25-2.55 times as long as broad. Gaster lanceolate, slightly longer than head plus thorax, 2.0-2.5 times as long as broad; longest seta of each cercus nearly twice length of next longest, kinked.

♂. Not examined.

MATERIAL EXAMINED. 2 ♀. **Italy.**

HOSTS. *Cryptorrhynchus lapathi* (L.) (Col., Curculionidae), as endophagous parasite of host eggs.

***Quadrastichus centor* (Graham), comb.n.**

(Figs 19, 46)

*Aprostocetus centor* Graham, 1961a: 12-13. Holotype ♀, Great Britain: Cornwall, Marazion, 7.vii.1955 (Graham) (UM) [examined].

*Tetrastichus centor* (Graham) Domenichini, 1966a: 105; 1966b: 23.

♀. Refer to the original description (Graham, 1961a). Antenna (Fig. 19).

♂. [new]. Differs from ♀ as follows. Antenna (Fig. 46) with scape 0.75 length of eye, not reaching median ocellus, 2.5 times as long as broad, with ventral plaque 0.37 length of scape and placed very slightly below the middle; pedicellus plus flagellum about 1.7 times breadth of mesoscutum; pedicellus about twice as long as broad, somewhat longer than F1; flagellum proximally slightly stouter than pedicellus, tapering a little distad; F1 distinctly shorter than F2 and about 1.5 times as long as broad; F2 to F4 subequal in length, each about twice as long as broad; clava hardly broader than F4, distinctly longer than F3 plus F4, about 5 times as long as broad, acutely pointed, with C1 and C2 equal in length, each nearly twice as long as broad, C3 shorter, with a long spine; each funicular segment with a compact whorl of dark setae which reach about to the tip of the following segment, C1 with two partial whorls. Gaster oval, about as long and as broad as thorax, with a ventral plica.

MATERIAL EXAMINED. 1 ♂, 13 ♀. **Great Britain:** 1 ♀, Cornwall, Marazion, 7.viii.1955, 3 ♀, 8.vii.1955; 1 ♀, Oxfordshire, Bald Hill, near Lewknor, 8.vi.1968 (UM, BMNH). **Ireland:** 1 ♂, 4 ♀, Co. Down, Newcastle, 19.vi.1957, 2 ♀, 26.iv.1957, 2 ♀, 29.vi.1957 (Graham) (BMNH).

HOSTS. Unknown.

***Quadrastichus lasiocerus* (Graham), comb.n.**

(Figs 20, 47)

*Aprostocetus lasiocera* Graham, 1961a: 13-14. Holotype ♀, Great Britain: Berkshire, Wytham Wood, 30.viii.1953 (Graham) (UM) [examined].

*Tetrastichus lasiocera* (Graham), Domenichini, 1966a: 195, 1966b: 36; Kostjukov, 1978: 436; van den Assem, Gijswijt & Nübel, 1982: 208, 219.

For description of both sexes see Graham (1961a). To the description of the ♀ should be added: malar sulcus slightly curved; last tergite of gaster 1.4-2.0 times as long as broad. Antenna of ♀ (Fig. 20), of ♂ (Fig. 47).

**MATERIAL EXAMINED.** 2 ♂, 8 ♀. **Czechoslovakia, France, Great Britain, Ireland.**

**HOSTS.** *Wachtliella persicariae* (L.) (Dipt., Cecidomyiidae) according to Domenichini (1966b: 36) but I have not been able to check this record; and van den Assem, Gijswijt & Nübel (1982: 219).

**COMMENTS.** The courtship behaviour of *lasiocerus* was described by van den Assem, Gijswijt & Nübel (1982: 208).

*Quadrastichus colothorax* sp.n.

(Fig. 21)

♀. Much resembles that of *lasiocerus* but differs as follows. Malar sulcus strongly curved. Antenna (Fig. 21): flagellum with setae standing out only slightly; pedicellus about as long as F1; funicle filiform, slightly stouter than pedicellus, F1 slightly shorter than F2 and 1.8 times as long as broad, F2 fully twice as long as broad, F3 slightly shorter than F2 and 1.8 times as long as broad; clava slightly broader than funicle, slightly shorter than F2 plus F3, 2.8 times as long as broad; C1 and C2 not longer than broad, spine about 0.5 length of C3. Thorax more squat, 1.35 times as long as broad, more strongly arched dorsally. Mid lobe of mesoscutum slightly broader than long. Scutellum about 1.3 times as broad as long. Forewing about 2.35 times as long as broad; only 2.6 times length of ST. Hindwing less acute, cilia only 0.33 breadth of wing. Gaster 2.8 times as long as broad.

Body black, non-metallic. Antennal scape blackish with distal 0.3 testaceous; rest of antenna sordid testaceous, pedicellus dark at base, flagellum a little darker dorsally. Coxae black, rest of legs yellowish, with proximal 0.6 of all femora black. Length 1.7 mm.

♂. Unknown.

**MATERIAL EXAMINED.** 1 ♀. Holotype ♀, **Jugoslavia:** Durmitor, Zabljak distr., Podgora (r.Tara), 30.vi.1958 (Bouček) (BMNH).

**HOSTS.** Unknown.

*Quadrastichus fungicola* sp.n.

(Figs 22, 48)

♀. Resembles that of *lasiocerus* in general facies and colour, but differs particularly in its slender antennal flagellum which has sparse sensilla and fewer (though very long) setae; more squat thorax, broader forewing, narrower and more acuminate gaster.

Antenna (Fig. 22) with funicle slender, only slightly stouter than pedicellus, nearly filiform; F1 slightly shorter than F2, 1.7-2.0 times as long as broad, F2 and

F3 subequal in length, each about 2.2 times as long as broad; clava hardly broader than funicle, distinctly longer than F2 plus F3, strongly acute, spine about 0.7 length of C3, apical seta 0.5 length of spine; sensilla sparse, very long and slender; each segment except F1 with a subbasal whorl of a few very long curved setae. Thorax squat, 1.12-1.27 times as long as broad. Mid lobe of mesoscutum 1.3 times as broad as long, with median line more distinct. Scutellum 1.5-1.6 times as broad as long. Forewing twice as long as broad. Gaster lanceolate, much narrower than thorax, more strongly acute and acuminate, 3.7-4.2 times as long as broad; last tergite 2.3-2.6 times as long as broad.

Colour as *lasiocerus* but scape testaceous, legs testaceous with only fore coxae black. Length 1.4-1.5 mm.

♂. Antenna (Fig. 48) with scape not longer than an eye, not reaching above vertex, ventral plaque only 0.2 length of scape; pedicellus plus flagellum 1.5-1.55 times breadth of mesoscutum; pedicellus slightly longer than F1; flagellum rather slender, filiform, F1 shorter than F2 and slightly longer than broad, F2 to F4 increasing a little in length, F2 hardly twice, F4 fully twice, as long as broad; clava longer than F3 plus F4, about 6.5 times as long as broad, with very long spine; each segment of funicle with a compact subbasal whorl of long dark setae which reach slightly beyond the tip of the following segment. Gaster oblong-subspatulate, as long as but narrower than thorax.

MATERIAL EXAMINED. 3 ♂, 3 ♀. Holotype ♀, **Great Britain:** England, Warwickshire, Oversley Wood, 7.vi.1970, from gall on fungus *Peniophora cinerea* (R.E. Evans) (BMNH).

Paratypes. **Great Britain:** 1 ♀, same data as holotype, "with a Cecidomyiid" (BMNH); 3 ♂, 1 ♀, Norfolk, Dereham, Welborne, near Mattishall, 1970, from galls of *Brachyneurina* ? sp. on fungus *Peniophora cinerea* (R.E. Evans) (BMNH).

HOSTS. Probably *Brachyneurina* sp. (Dipt., Cecidomyiidae) on the fungus *Peniophora cinerea*.

*Quadrastichus perissiae* (Janata), **comb.n.**  
(Figs 23, 49)

*Tetrastichus perissiae* [Kurdjumov MS] Janata, 1912: 91-94. Syntypes, USSR: Crimea, reared 1911 from larvae of *Dichelomyia rosarum* (Janata) [not located].

[*Tetrastichus perissiae* Janata; Domenichini, 1966a: 104, 1966b: 44. Invalid emendation.]

There is no doubt as to the identity of this species, as material reared from the host mentioned is available. The original description (in Russian) is very brief and a redescription follows.

♀. Head very slightly broader than mesoscutum, about 2.3 times as broad as long; temples 0.12 length of eyes; POL nearly twice OOL, OOL about 1.5 OD. Eye 1.25 times as long as broad, with very short sparse pubescence. Malar space 0.63 length of eye, sulcus nearly straight. Mouth about 1.3 times malar space. Antenna (Fig. 23) with scape slightly shorter than eye, just reaching median ocellus; pedicellus plus flagellum 1.25 times breadth of mesoscutum; pedicellus



slightly shorter than F1, about twice as long as broad; funicle filiform, very slightly stouter than pedicellus, its segments subequal in length, each about twice as long as broad; clava a little broader than funicle, about 3.5 times as long as broad, fully as long as F2 plus F3, bluntly pointed, spine slender, about 0.66 length of C3; setae of flagellum standing out somewhat. Thorax 1.5 times as long as broad. Mid lobe of mesoscutum as broad as long; median line very fine but complete, 1 adnotaular seta on each side. Scutellum about 1.3 times as broad as long; submedian lines about equidistant from each other and from sublateral lines, enclosed space slightly more than twice as long as broad; setae subequal, their length slightly less than distance between submedian lines. Propodeum medially virtually as long as dorsellum, details much as in *ventricosus* (Graham). Legs of medium length, somewhat slender; hind femora about 4 times as long as broad; spur of mid tibia about 0.66 length of basitarsus. Forewing about 2.3 times as long as broad; costal cell about 16 times as long as broad; M distinctly longer than costal cell, 3.3 times length of ST, its anterior margin with 12-13 setae; ST thin proximally but gradually expanding to the small stigma; speculum small, not extended below M, wing beyond it moderately thickly pilose; cilia about 0.25 ST. Hindwing acute, cilia about 0.33 breadth of wing. Gaster lanceolate, slightly acuminate, 1.35 times length of head plus thorax, about as broad as thorax, 2.8 times as long as broad; last tergite slightly longer than broad; ovipositor sheaths projecting by about 0.3 length of last tergite; longest seta of each cercus nearly twice length of next longest; tip of hypopygium slightly before 0.5 length of gaster.

Body black, non-metallic. Antennal scape testaceous beneath, pedicellus testaceous beneath and apically, flagellum brown. Coxae black, trochanter partly yellowish, femora black with tips fairly broadly yellowish, tibiae yellowish, fore tarsi brownish, mid and hind tarsi yellowish gradually darkening to brown apically. Wings subhyaline, venation testaceous. Length 1.3-2.0 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 49) with scape as long as an eye, 2.3-2.7 times as long as broad, ventral plaque 0.65-0.7 length of scape; pedicellus plus flagellum 1.4-1.5 times breadth of mesoscutum; pedicellus 1.6-1.7 times as long as broad, as long as or slightly shorter than F1; funicle somewhat stouter than pedicellus, filiform, its segments subequal in length, each 1.5-1.75 times as long as broad; clava not broader than funicle, as long as or somewhat longer than F3 plus F4, 3.2-3.6 times as long as broad; flagellum without compact subbasal whorls of long dark setae. Gaster oblong, as long as but much narrower than thorax.

MATERIAL EXAMINED. 10 ♂, 17 ♀. **Great Britain, Netherlands** (original material from USSR not seen).

HOSTS. *Dasineura rosarum* (Hardy) (Dipt., Cecidomyiidae), also according to Janata (1912) its parasite *Torymus abbreviatus* Boheman, but Janata's identification of the *Torymus* is doubtful. A solitary endoparasite of the host larvae and pupae. The following are new records of reared material. **Netherlands:** 8 ♂, 11 ♀, Boxtel, reared between 14 and 17.v.1965 from *Wachtliella* [= *Dasineura*] *rosarum* (W.C. Nijveldt) (ITZ); 4 ♂, 3 ♀, Cuyk, reared between 30.v.1974 and 6.vi.1974 from same host (H.J. Vlugh) (ITZ).

***Quadrastichus ventricosus* (Graham), comb.n.**

(Figs 24-26, 50, 340)

*Aprostocetus ventricosus* Graham, 1961c: 31-32. Holotype ♀, Great Britain: Lancashire, Freshfield, 4.ix.1960 (Graham) [destroyed]; NEOTYPE ♀, Great Britain: Lancashire, Freshfield, 4.ix.1960 (Graham), here designated [examined].

*Tetrastichus ventricosus* (Graham) Domenichini, 1966a: 104, 1966b: 53; Askew & Ruse, 1974: 157-159.

The holotype of *ventricosus* was loaned some years ago but only the mount returned.

♀. Refer to original description (Graham, 1961c). Hypopygium (Fig. 340) transverse; median lobe slightly longer than lateral lobes, rounded. Antenna (Fig. 24), forewing (Fig. 25), gaster (Fig. 26).

♂. Antenna (Fig. 50); for characters see couplet 12 of key to males.

MATERIAL EXAMINED. 3 ♂, 20 ♀. **Czechoslovakia:** 1 ♀, Kamenná, near Slavkov, 17.vii.1951 (Bouček) (BMNH). **Great Britain:** see Graham, 1961c.

HOSTS. Chiefly *Massalongia rubra* (Kieffer), very rarely *M. betulifolia* Harris and *Anisostephus betulinum* (Kieffer), on *Betula* (Askew & Ruse, 1974); rarely *Harmandia loewi* (Rübsaamen) on *Populus* (Domenichini, 1966b; Askew & Ruse, 1974) (Dipt., Cecidomyiidae).

***Quadrastichus pedicellaris* (Thomson), comb.n.**

(Figs 27, 28, 51, 339)

*Tetrastichus pedicellaris* Thomson, 1878: 286. Lectotype ♀, Sweden: Lund (Thomson) (ZIL), designated by Graham (1961b: 43) [examined].

*Tetrastichus flavicornis* Erdős, 1954: 362. Holotype ♀, Hungary: Bakony, Vinyesándormajor, 3.vi.193 (Erdős) (TM) [examined]. [Synonymised with *pedicellaris* by Domenichini, 1966b: 43.]

*Aprostocetus pedicellaris* (Thomson) Graham, 1961b: 43.

*Aprostocetus flavicornis* (Erdős) Graham, 1961b: 43.

*Tetrastichus pedicellaris* Thomson; Domenichini, 1966a: 104, 1966b: 43.

♀. Differs from that of *ventricosus* in the characters given in the key to females, couplet 14. The antennal scape (Fig. 27) is a little shorter, 0.9-0.93 length of eye, and does not reach above the vertex. Gaster (Fig. 28) shorter. Hypopygium (Fig. 341) transverse; median lobe shorter than lateral lobes, rounded.

The tibiae are more or less infusate in dark specimens.

♂. Differs from ♀ as follows. Antenna (Fig. 51) with scape about as long as an eye, with ventral plaque about 0.55 length of scape; pedicellus plus flagellum 1.5-1.6 times breadth of mesoscutum; pedicellus twice as long as broad, about as long as F1; flagellum proximally slightly stouter than pedicellus but tending to taper a little distad, funicular segments subequal in length, each about 1.5 times as long as broad; clava nearly or just as long as F2 plus F3 plus F4, 4.8-5 times as long as broad, with its segments slightly longer than broad; flagellum without compact subbasal whorls of long setae, but with some scattered setae which are nearly as long as the segments themselves. Gaster oblong, as

long as but much narrower than thorax.

**MATERIAL EXAMINED.** 4 ♂, 33 ♀. **Czechoslovakia, Germany, Great Britain, Hungary, Ireland, Italy, Sweden.**

**HOSTS.** Possibly *Rhabdophaga pseudococcus* Rübsaamen (Dipt., Cecidomyiidae) according to a record from Germany cited by Domenichini (1966a: 103) which appears likely to be correct. Doubtless, however, the species has other hosts, probably also Cecidomyiidae. In my experience the species occurs especially on *Salix* spp.

***Quadrastichus malhamensis* (Graham), comb.n.**  
(Figs 29, 52)

*Aprostocetus malhamensis* Graham, 1961c: 32-33. Holotype ♀, Great Britain: Yorkshire, Malham Tarn, 17.viii.1958 (W.D. Hincks) (MM) [examined].

*Tetrastichus malhamensis* (Graham) Domenichini, 1966a: 104, 1966b: 39.

♀. To the original description, the following notes should be added. Head about as broad as mesoscutum; ocelli very small, POL about 1.55 OOL, OOL nearly twice OD. Malar sulcus rather strongly curved. Antenna (Fig. 29).

♂. See original description. Antenna (Fig. 52).

**MATERIAL EXAMINED.** 5 ♂, 5 ♀. **Great Britain.**

**HOSTS.** Unknown.

***Quadrastichus stenocranus* sp.n.**  
(Figs 30, 53)

♀. Differs from that of *malhamensis* as follows. Head (unless distorted) very slightly broader than mesoscutum, and from barely twice, to 2.1 times as broad as long; POL 1.6-1.7 times OOL, lateral ocelli slightly larger with OOL 1.35-1.55 OD. Antenna (Fig. 30) with pedicellus usually shorter than F1 (hardly so in a dwarf), 2.0-2.3 times as long as broad; funicular segments decreasing slightly in length, F1 2.8-3.5 times, F2 2.0-2.3 times, F3 2.0-2.2 times as long as broad. Gaster rather less elongate, about as long as head plus thorax, 2.0-2.8 times as long as broad, not acuminate; last tergite at most as long as broad.

♂. Differs from ♀ as follows. Antenna (Fig. 53) with scape about 0.85 length of eye, reaching level of vertex, ventral plaque very long, several setae arise from mesad of the plaque; pedicellus plus flagellum about 1.6 breadth of mesoscutum; pedicellus about equal in length to F1 and about twice as long as broad; funicle proximally very slightly stouter than pedicellus, tapering a little distad, its segments decreasing very slightly in length, each nearly twice as long as broad; clava not broader than F4, distinctly longer than F3 plus F4, about 5.3 times as long as broad, with C1 much shorter than C2 and hardly longer than broad, C2 and C3 each nearly twice as long as broad, spine prominent; no compact whorls of dark setae on flagellum, but numerous rather long fine paler

setae. Gaster oblong, as long as but somewhat narrower than thorax, with a ventral plica.

Antenna yellowish; base and ventral plaque of scape blackish, also pedicellus proximally; C1 brownish, C2 and C3 blackish.

The ♂ differs from that of *malhamensis* in having more numerous setae arising from just mesad of the ventral plaque of the scape; funicular segments slightly more elongate; clava not broader than F4, about 5.3 times as long as broad, acute, with C1 very slightly longer than broad and not separated by a distinct constriction from C2, C2 and C3 more elongate.

**MATERIAL EXAMINED.** 1 ♂, 15 ♀. Holotype ♀, **Great Britain:** Berkshire, Wytham Wood, 31.viii.1960, swept from foliage of *Betula* (Graham) (BMNH).

**Paratypes.** **Great Britain:** 1 ♀, Berkshire, Fence Wood, 22.ix.1963 (Graham) (BMNH); 7 ♀, Cheshire, Lindow, 7.ix.1970, 1 ♂, 5 ♀, 13.ix.1971, on *Betula* (R.R. Askew) (BMNH).

**HOSTS.** Unknown, but probably some Cecidomyiid on *Betula*.

***Quadrastichus praecox* (Graham), comb.n.**

(Figs 31, 32, 54)

*Aprostocetus praecox* Graham, 1961a: 15. Holotype ♀, Great Britain: Berkshire, Wytham Wood, 29.iii.1957 (Graham) (destroyed). NEOTYPE ♀, Great Britain: same data as holotype (BMNH), here designated [examined].

*Tetrastichus praecox* (Graham) Domenichini, 1966a: 105, 1866b: 46.

The holotype of *praecox* was loaned some years ago but only the mount, without the specimen, was returned. A neotype from the same batch as the original holotype is therefore designated.

To the original description (Graham, 1961a) a few notes may be added. The range of variation of the ♀ antennal segments needs correction: F1 is (2.0-) 2.2-3.5 times as long as broad; the clava 2.7-3 times as long as broad. Antenna ♀ (Fig. 31), metanotum and propodeum (Fig. 32), antenna ♂ (Fig. 54).

**MATERIAL EXAMINED.** 7 ♂, 38 ♀. **Czechoslovakia:** 2 ♀, Bohemia mer., Blatná, 22.v.1965 (Bouček) (BMNH). **Great Britain:** 3 ♀, Berkshire, Wytham Wood, 17.v.1951, 3 ♀, 19.iv.1953, 2 ♂, 17 ♀, 29.iii.1957, 5 ♂, 13 ♀, 20.iv.1957 (Graham) (UM, BMNH).

**HOSTS.** Unknown but probably some species of Cecidomyiidae.

***Quadrastichus thysanotus* (Förster), comb.n.**

(Figs 33, 55, 342)

*Tetrastichus thysanotus* Förster, 1861: 38. Lectotype ♀, Switzerland: Rosegal (Förster), designated by Domenichini (1966a: 104) [examined].

*Aprostocetus pumilio* Graham, 1961a: 17-18. Holotype ♀, Great Britain: Berkshire, near Wytham Wood, 3.viii.1954 (Graham) (destroyed). NEOTYPE ♀, same data as holotype (BMNH), here designated [examined]. [Synonymised with *thysanotus* by Domenichini, 1966a: 104.]

The holotype of *pumilio* was loaned with that of *praecox*, but only the mount returned. A neotype is therefore designated from the same batch.

For characters of both sexes, see original description of [*Aprostocetus*] *pumilio*, also the keys to species in the present paper. Antenna ♀ (Fig. 33), antenna ♂ (Fig. 55). ♀ hypopygium (Fig. 342) moderately transverse; median lobe shorter than lateral lobes, almost semicircular.

**MATERIAL EXAMINED.** Many ♂, ♀. **Czechoslovakia, Great Britain, Ireland, Switzerland.**

**HOSTS.** Unknown.

*Quadrastichus elachistus* sp.n.

(Fig. 34)

♀. Resembles the ♀ of *thysanotus* (Förster) but differs chiefly in having a much longer antennal clava but a shorter gaster. Malar space about 0.5 length of eye, sulcus slightly curved. Antenna (Fig. 34) with scape equal in length of eye; pedicellus plus flagellum 1.35 times breadth of mesoscutum; pedicellus a little shorter than F1, twice as long as broad; funicle filiform, slightly stouter than pedicellus, its segments subequal in length, each about twice as long as broad; clava very slightly broader than funicle, 5 times as long as broad, with C1 and C2 subequal in length, each about 1.6 times as long as broad; sensilla sparse, long and slender, arising from rather short bases. Mid lobe of mesoscutum with fine median line; 1 adnotaular seta on each side. Dorsellum about twice as broad as long, subrectangular. Propodeum medially slightly longer than dorsellum, surface with some weak reticulation; callus with 1 seta outside the spiracle and another further back. Legs of medium length; hind femora 4.7 times as long as broad. Forewing with costal cell extremely narrow; M approximately twice length of ST, its front edge with 8-9 long setae; speculum very small, not extended below M, wing beyond it moderately thickly pilose; cilia about 0.8 length of ST. Hindwing strongly acute; cilia about as long as breadth of wing. Gaster short ovate, about equal in length to thorax and nearly as broad; sides converging strongly in distal 0.25, then with a triangular projection formed by the last tergite which is somewhat broader than long; ovipositor sheaths just reaching apex of last tergite; longest seta of each cercus about 1.6 length of next longest, kinked; tip of hypopygium at about 0.5 length of gaster.

Body black, non-metallic; mouth edge and mandibles testaceous; an obscure testaceous subbasal spot on gaster. Antennae testaceous with dorsal edges of scape and pedicellus fuscous. Coxae black, legs otherwise testaceous with about proximal 0.66 of all femora infuscate and last tarsal segment brownish.

♂. Unknown.

**MATERIAL EXAMINED.** 1 ♀. Holotype ♀, **Spain: Vigo, Pontevedra, ix.1966** (N.L.H. Krauss, no. 1967-401) (BMNH).

**HOSTS.** Unknown.

## SPECIES SOLA

*Quadrastichus sajoi* (Szelényi), **comb.n.**

(Figs 39, 40, 57, 343)

*Myiomisa sajoi* Szelényi, 1940: 92-93 [Hungarian text], 96-97 [English text]. Holotype ♀, Hungary: Budapest, Hűvösvölgy, from galls of *Eriophyes phloeocoptes* on *Prunus instiitia* (Szelényi) (RHPB) [not examined].

*Myiomisa sajoi* Szelényi; Erdős, 1958: 223.

*Aprostocetus scabricollis* Graham, 1961a: 18-20. Holotype ♀, Great Britain: Berkshire, Wytham Wood, 25.ix.1953 (Graham) (UM) [examined]. [Synonymised with *sajoi* by Domenichini, 1966b: 48.]

*Aprostocetus sajoi* (Szelényi) Graham, 1961b: 42.

*Tetrastichus sajoi* (Szelényi) Domenichini, 1966a: 101, 1966b: 48; Kostjukov, 1978b: 435.

*Tetrastichus pellucens* Erdős, 1969: 44. Holotype ♀, Hungary: Tompa, 4.vi.1962 (Erdős) (TM) [examined]. **Syn.n.**

The holotype ♀ of *pellucens* belongs to *sajoi* but the males seem to be different.

♀. See original description of *sajoi*. A small correction needs to be made to Szelényi's figure 1 of the ♀; the mesoscutum is shown as having a row of 5 adnotaular setae on each side but I have never found more than 3. See also description of *Aprostocetus scabricollis* Graham. Antenna (Fig. 39), pronotum, mesoscutum and scutellum (Fig. 40). Hypopygium (Fig. 343) characteristic in shape, much broader anteriorly than posteriorly; lateral lobes with broad flanges on their inner margin; median lobe broader than long, subtruncate.

♂. [new]. Differs from ♀ as follows. Antenna (Fig. 57) with scape broader, about 2.5 times as long as broad, ventral plaque 0.25-0.33 length of scape; pedicellus plus flagellum 1.5-1.6 times breadth of mesoscutum; pedicellus slightly longer than F1; funicle proximally slightly stouter than pedicellus, tapering a little distad; F1 somewhat shorter than F2 and 1.1-1.3 times as long as broad, F2 to F4 subequal in length or increasing slightly, F2 1.8-2.0 times, F3 2.2-2.4 times, F4 about 2.5 times as long as broad; clava hardly broader than funicle, distinctly longer than F3 plus F4, 5-6 times as long as broad, with C1 and C2 distinctly longer than broad. Gaster oblong, slightly shorter and narrower than thorax.

Colour often darker, in British specimens sometimes black with only face and frons more or less, spots of pronotum, the prepectus and upper angle of mesopleuron, and a large subbasal spot on gaster, testaceous. In Continental specimens the yellow colour is usually more extensive and a ♂ from Yugoslavia is yellow with ocellar triangle, marks on pronotum and axillae, most of metanotum, propodeum and metapleuron, and apical 0.5 of gaster, brownish-black.

**MATERIAL EXAMINED.** 13 ♂, 21 ♀. **Czechoslovakia, Germany, Great Britain, Hungary, Italy, USSR, Syria.**

**HOSTS.** *Eriophyes phloeocoptes* Nalepa (Acarina, Eriophyidae), predaceous on the mites in their galls (Vereshchagina, 1961). A full account of the biology is given by this author.

## THE ANYSIS-GROUP

*Quadrastichus anysis* (Walker)

(Figs 35-38, 56, 344)

*Cirrospilus Anysis* Walker, 1838b: 203, 202. Lectotype ♀, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 42 [examined].

[*Myiomisa microscopica* (Rondani; Szelényi, 1940: 91-92, 94-96. Misidentification.)

[*Aprostocetus microscopicus* (Rondani) Graham, 1961b: 42. Misidentification.]

[*Tetrastichus microscopicus* (Rondani) Domenichini, 1966a: 101, 1966b: 40; Kostjukov, 1978b: 434-435. Misidentifications.]

*Tetrastichus anysis* (Walker) Domenichini, 1966a: 102, 1966b: 18.

*Quadrastichus anysis* (Walker) Graham & LaSalle, 1991: 94.

Note. Walker validated *Cirrospilus anysis* on p. 203 of his paper (1838b) but the paragraph beginning "*Mas. Corpus nitens* ..." on p. 202 also refers to this species.

♀. Frons (Fig. 36) with oblong median area but without longitudinal carina. Eyes about 1.2 times as long as broad, moderately thickly clothed with fairly long pubescence. Malar space 0.55 length of eye, sulcus (Fig. 37) curved. Mouth about 1.5 times malar space. Antenna (Fig. 35) with scape nearly as long as an eye, almost reaching level of vertex; pedicellus plus flagellum about 1.2 times breadth of mesoscutum; pedicellus about as long as F1, 2.1-2.3 times as long as broad; funicle subfiliform, hardly stouter than pedicellus, its segments subequal in length (or F2 a little longer than the others), each 2.0-2.2 times as long as broad; clava a little broader than funicle, 3.2-3.9 times as long as broad, slightly shorter than or as long as F2 plus F3, acute, its segments subequal in length, each as long as or a little longer than broad; spine nearly as long as C3; sensilla sparse; segments of flagellum with some long setae as well as shorter ones. Thorax about 1.25 times as long as broad. Mid lobe of mesoscutum slightly broader than long, shiny, with excessively fine and delicate, superficial or hardly engraved reticulation, areoles mostly 4-6 times as long as broad; median line absent, or traceable in some lights though extremely fine; 1 adnotaular seta on each side. Scutellum 1.5-1.6 times as broad as long, moderately convex; submedian lines slightly nearer to sublateral lines than to each other, enclosed space 1.3-1.5 times as long as broad; anterior setae nearly as long as distance between submedian lines, posterior setae distinctly shorter. Propodeum medially a little longer than dorsellum, its hind border hardly emarginate; median carina very slightly raised, thinner anteriorly but expanding caudad; spiracles subcircular, nearly touching metanotum; callus with a long seta outside spiracle and a shorter one farther back. Legs of medium length; hind femora about 4 times as long as broad; spur of mid tibia (Fig. 38) about 0.65 length of basitarsus. Forewing 2.0-2.1 times as long as broad; costal cell slightly shorter than or as long as M, 14-17 times as long as broad; M thin, 3.0-4.4 times length of ST, its front edge with 9-11 setae which are about as long as ST; ST very thin basally, stigma small; speculum very small, not extending below M, wing beyond it moderately thickly pilose; cilia as long as or slightly longer than ST. Hindwing very strongly acute, cilia as long as or slightly longer than breadth of wing. Gaster ovate or elliptic, equal in length to or slightly longer than thorax, nearly or about as broad as thorax, 1.2-1.8 times as long as broad, rather dull, alutaceous; apex right-angled to slightly acute; last tergite slightly to distinctly broader than long; ovipositor

sheaths hardly projecting; longest seta of each cercus about 1.5 times length of next longest, kinked; tip of hypopygium slightly beyond 0.5 length of gaster. Hypopygium (Fig. 344) strongly transverse; anterior margin with 3 very low, hardly developed lobes.

Variable in colour, northern forms tending to be darker. Head with at least face more or less testaceous to yellow, in paler British forms and many Continental specimens the pale colour extends on to the frons, temples and genae, in extreme cases the whole head yellow. Thorax in most British ♀ black, non-metallic, occasionally scapulae pale; in Continental ♀ scapulae, scutellum more or less, especially at sides, pronotum, prosternum, prepectus and upper angle of mesopleuron, may be yellow. Gaster at least testaceous at base, sometimes yellowish in basal 0.5 or more above and below; in paler southern forms the basal 0.5 or more, last tergite, and venter, are usually yellow, occasionally the whole gaster is yellow. Antennae yellowish or testaceous, clava tending to be darker, incisures between flagellar segments brownish; pedicellus often infuscate proximally. Tegulae brown, or partly to wholly yellow. Wings hyaline or faintly yellowish, venation pale to deep yellow. Legs in pale forms wholly yellow except pretarsi, in dark forms with hind coxae infuscate proximally, fore and mid coxae dark basally. Length 0.95-1.2 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 56) with scape slightly shorter than eye, about 2.5 times as long as broad, ventral plaque about in middle and 0.42 length of scape; pedicellus plus flagellum nearly 1.5 times breadth of mesoscutum; pedicellus fully twice as long as broad, somewhat longer than F1; funicle filiform, or tapering very slightly, proximally slightly stouter than pedicellus, F1 shorter than F2, quadrate, F2 to F4 each 1.8-2.2 times as long as broad; clava 5.5 times as long as broad, longer than F3 plus F4, with C1 and C2 subequal in length, each 1.6-2.0 times as long as broad; each funicular segment with a compact subbasal whorl of long dark setae, those of F1 reaching to about middle of F3, those of following segments comparably long; C1 with a partial dorsal and partial ventral whorl. Gaster oblong, about as long but much narrower than thorax.

Body in specimens seen black with head partly to mainly, upper angle of mesopleuron, and a subbasal spot or basal 0.5 of gaster yellowish.

**MATERIAL EXAMINED.** 5 ♂, 20 ♀. Czechoslovakia, France, Great Britain, Hungary, Italy, Jugoslavia, USSR.

**HOSTS.** *Monarthropalpus buxi* Laboulbène (Dipt., Cecidomyiidae), as an endoparasite of the host larvae (Szelényi, 1940).

**COMMENTS.** Domenichini (1966a: 101) placed *Aprostocetus flora* Girault, 1917 and *Epitetrastichus tricolor* Girault, 1917, in synonymy with *Tetrastichus microscopicus* (Rondani) *sensu* Szelényi, 1940. The syntypes of *Myiomisa microscopica* Rondani, 1877 were subsequently examined by Bouček (1974: 257-258) and by Graham, and were found to comprise two different species. The lectotype selected belonged to the *caudatus*-group of *Aprostocetus*.

I have examined ♀ specimens determined as *flora* Girault by Burks. They



are very close to *anysis* but differ in having a median longitudinal carina on the frons, speculum of forewing larger and extended somewhat below M, ST relatively longer, cilia of fore and hindwings slightly shorter, hindwings less strongly acute, setae of antennal flagellum rather shorter, spine of clava apparently shorter. The hypopygium (Fig. 345) has distinctly trilobate anterior margin. The ♂ of *flora* (which I have not seen) is said by Burks (1943:534) to have the carina [ventral plaque] extending almost the entire length of the scape, whereas in *anysis* (Fig. 56) it is relatively short. Therefore I believe that *flora* should be regarded as distinct from *anysis*.

***Quadrastichus citrinus* (Thomson), comb.n.**

(Figs 41, 346)

*Tetrastichus citrinus* Thomson, 1878: 284-285. Lectotype ♀, Sweden: Stockholm (ZIL), designated by Graham (1961a: 18) [examined].

*Aprostocetus citrinellus* Graham, 1961a: 18. [Replacement name for *Aprostocetus citrinus* (Thomson), then a secondary homonym of *A. citrinus* (Förster).]

*Tetrastichus citrinellus* (Graham) Domenichini, 1966a: 102, 1966b: 25; Graham, 1974: 106-109, figs. 1, 3; Kostjukov, 1978b: 434.

The replacement name *citrinellus* Graham was proposed because *Eulophus citrinus* Förster, 1841 and *Tetrastichus citrinus* Thomson, 1878 had both been referred to the genus *Aprostocetus*. Since *citrinus* Thomson is now removed to *Quadrastichus*, it is no longer a secondary homonym.

For description of ♀ see Graham (1974). Metanotum and propodeum (Fig. 41). Hypopygium (Fig. 346) rather like that of *anysis*.

♂. Unknown, and may not exist.

**MATERIAL EXAMINED.** 21 ♀. **Bulgaria, Czechoslovakia, France, Great Britain** (including Wales and Scotland), **Italy, Sweden.**

**HOSTS.** *Massalongia rubra* (Kieffer) (Dipt., Cecidomyiidae) on species of *Betula*; reared by Dr. Askew.

***Quadrastichus xanthosoma* (Graham), comb.n.**

(Figs 42, 347)

*Tetrastichus xanthosoma* Graham, 1974: 109-110. Holotype ♀, Great Britain: Cheshire, Lindow, reared 1971 from blister-gall of *Massalongia betulifolia* on *Betula* (J.M. Ruse & R.R. Askew) (UM) [examined].

*Tetrastichus xanthosoma* Graham; Kostjukov, 1978b: 434.

For description of ♀ see Graham (1974: 109-110, fig. 2). Antenna (Fig. 42). Hypopygium (Fig. 347) similar to that of *anysis*. The ♂ is unknown and may not exist.

**MATERIAL EXAMINED.** Many ♀. **Czechoslovakia, Great Britain** (including Scotland), **Jugoslavia, Sweden, USSR.**

**HOSTS.** *Massalongia betulifolia* Harris (Dipt., Cecidomyiidae) on *Betula*; reared by Ruse and Askew.

**BARYSCAPUS** Förster

*Baryscapus* Förster, 1856: 84, 86. Type-species: *Baryscapus centricolae* Ashmead, 1887, by subsequent monotypy.

*Baryscapus* Förster; Ashmead, 1887: 202; LaSalle & Graham, 1990: 122.

*Thripasoma* Crawford, 1913: 255. Type-species: *Thripasoma grafi* Crawford, 1913, by original designation. [Synonymized with *Baryscapus* by LaSalle & Graham, 1990: 122.]

*Tetrastichopsis* Girault, 1916: 132. Type-species: *Tetrastichopsis prionomeri* Girault, 1916, by original designation. [Synonymised with *Baryscapus* by LaSalle & Graham, 1990: 122.]

[*Syntomosphyrum* Förster; Burks, 1952: 258-264. Misidentification.]

[*Baryscapus* Förster; Erdős, 1954: 363-364, in part.]

*Eutetrastichus* Kostjukov, 1977: 189 (as subgenus of *Tetrastichus*). Type-species: *Eulophus evonymellae* Bouché 1834, by original designation. [Synonymised with *Baryscapus* by LaSalle & Graham, 1990: 122.]

*Eutetrastichus* Kostjukov (as genus); Graham, 1987: 33, 45.

The identity of *Baryscapus* and of its type-species has been discussed by LaSalle & Graham (1990).

The type-species of *Thripasoma*, *grafi* Crawford, belongs to the species-group of *daira* (Walker) and has some of the characters of *diaphantus* (Walker) with others peculiar to *daira*.

*Tetrastichopsis prionomeri* Girault belongs to the species-group of *evonymellae* Bouché (syntypes examined) but is aberrant in having the submedian lines of the scutellum absent (though their position is evident from a slight change of surface), while the mesonotum and scutellum are polished and very weakly sculptured. For these reasons Burks (1952) placed this species erroneously in *Syntomosphyrum*.

This genus is not difficult to recognize, given a little practice. The best characters for recognizing it are the curved malar sulcus, widely-separated lateral ocelli, wholly exposed rim of propodeal spiracles, and relatively short subequal cercal setae. The body has no pale markings apart from the upper angle of the mesopleuron and rarely the clypeus in part.

**DIAGNOSIS.** Malar sulcus present and distinctly, often rather strongly, curved. Vertex without a pale suture connecting the lateral ocelli; the latter are far apart so that POL is at least twice OOL. Antenna of ♀ with anelli discoid or laminar, 2 or 3 in number; funicle with 3 segments; clava with 3 segments (but the suture between second and third segments sometimes indistinct). Antenna of ♂: funicular segments either without compact subbasal whorls of long dark setae, or with relatively short setae which reach at most slightly beyond the tip of the segment that bears them. Mid lobe of mesoscutum with a variable number of setae, sometimes only one row but more often with two or more irregular rows, or with setae scattered over almost the whole surface. Scapular flanges sublinear. Scutellum with submedian lines nearly always present and distinct, rarely absent. Propodeum with spiracles circular to oval, small to moderate-sized, the whole of their rim exposed (Graham, 1987, fig. 51); callus usually with 3 or more, rarely only 2, setae. Mesosternum, just in front of trochantal lobes, in most species distinctly convex (Graham, 1987, fig. 50) except in some *daira*-group species where the thorax is strongly flattened.

Mesopleuron: precoxal suture obsolescent or absent. First segment of mid and hind tarsi a little shorter than second. Forewing with ST forming a relatively less acute angle with costal edge of wing than in *Aprostocetus*; parastigma sometimes marked off from M by a decolorized spot (Graham, 1987, fig. 53); SM (except in *embolicus* Kostjukov and *globosiclava* sp.n.) with 2 or more dorsal setae; cilia of apical margin short to extremely short, occasionally absent. Hindwing usually obtuse apically. Gaster: cercal setae subequal in length, rather short, straight to slightly curved, often pale. Anterior margin of ♀ hypopygium trilobed. Genitalia of ♂ at most 6 times as long as broad; digitus at most 3.5 times as long as broad, hind margin with a single, more or less obliquely-directed spine. Body weakly to strongly metallic, without pale markings except for usually the upper angle of mesopleuron and rarely clypeus partly. Tegulae black, except in *globosiclava*.

DISTRIBUTION. All continents (but probably introduced to Australia); apparently few species in South America.

BIOLOGY. Hosts are many species of various families of Lepidoptera, some Hymenoptera and Coleoptera, occasionally Diptera (Tephritidae), rarely Neuroptera and Coccoidea. Sometimes hyperparasitic, with Ichneumonidae, Braconidae, Cynipoidea and Chalcidoidea as primary hosts. When primary parasites, attacking the larvae or pupae of their hosts; usually endophagous and gregarious, occasionally solitary, parasites.

COMMENTS. *Baryscapus* is evidently larger than any other tetrastichine genus except *Aprostocetus*. It is relatively uniform and many species are rather difficult to distinguish by easily appreciable characters. In some there is considerable variation in size, with correlated differences in certain characters such as setation. Most characters appear to be in plesiomorphic state and the genus is perhaps as generalized as any. Apomorphic features are the distinctly curved malar sulcus, widely-separated lateral ocelli, reduced number of antennal anelli, and reduction of the digital spines of ♂ genitalia to one (the latter character, however, is shared by a number of other genera).

Kostjukov (1978: 444) in his key to species placed *xania* Kostjukov with species of the *evonymellae*-group. I have seen *xania*, which belongs to the *pausiris*-group of *Aprostocetus* (comb.n.) and is very near to *pausiris*.

#### Key to European species-groups

- 1 Malar sulcus straight or virtually so. Mid lobe of mesoscutum with only a single row of 2-3 adnotaular setae on each side. Forewing: M usually with only 1 dorsal seta, occasionally 2 setae. ♀ gaster ovate-subcircular, not longer but fully as broad as thorax; flagellum stout, funicular segments quadrate. ♂ antenna (Fig. 205): each funicular segment with a compact subbasal whorl of dark setae, these reaching somewhat beyond the tip of the segment. . . . . [see *Oomyzus sokolowskii*]
- Not having the above combination of characters. Malar sulcus moderately to strongly curved. Mid lobe of mesoscutum most often with at least a partial second row of setae on each side, often with numerous setae placed more irregularly, occasionally covering most of the surface. Forewing: M

with 2 or more dorsal setae, except in *embolicus* and *globosiclava*. ♀ gaster usually relatively longer; funicular segments often longer than broad. ♂ funicular segments often lacking compact whorls of dark setae. . . . . 2

- 2 Forewing with apical margin bare.  
 . . . . . (*tineivorus* and *elasmi* in *EVONYMELLAE*-GROUP)
- Forewing with apical margin ciliate (the cilia often very short). . . . . 3
- 3 Submedian lines of scutellum in nearly all species slightly to much nearer to sublateral lines than to each other, with enclosed space only 1.5-2.0 times as long as broad; if not (*anasillus* sp.n.) then propodeum medially longer than dorsellum, with spiracles separated by at most 0.35 their diameter from hind margin of metanotum, and forewing with a distinct hyaline spot separating parastigma from marginal vein, as in most species of this group (see Graham, 1987, fig. 53). Thorax often more or less depressed dorsoventrally so as to be broader than high; scutellum in profile weakly convex to almost flat. ♀ antennae short, with pedicellus plus flagellum usually slightly to much less than breadth of mesoscutum; funicular segments subquadrate, or one or more transverse. ♂ antennae short; clava 1.2-2.0 (-2.5) times as long as broad; pedicellus plus flagellum slightly less than, or at most slightly greater than, breadth of mesoscutum; funicular segments equal or subequal in length, subquadrate to transverse. . . . . *DAIRA*-GROUP (p.142)
- Submedian lines of scutellum normally about equidistant from each other and from sublateral lines, with enclosed space 2.2-3.5 times as long as broad; if slightly nearer to sublateral lines than to each other then *either* (some *berhidanus*) propodeum medially hardly longer than dorsellum, with spiracles 0.75-1.0 their diameter from hind edge of metanotum, or (*euphorbiae*) propodeum shorter than dorsellum and forewing without a hyaline spot separating parastigma from marginal vein (as in nearly all species of this group). Thorax when undistorted not depressed, about as high as broad; scutellum in profile usually moderately to strongly convex. ♀ antennae short to long; pedicellus plus flagellum from somewhat less, to distinctly greater, than breadth of mesoscutum; most often at least F1 longer than broad, sometimes all funicular segments distinctly so, less often all quadrate. ♂ antennae with clava (except in sp.indet.3) at least 2.8 times as long as broad; pedicellus plus flagellum nearly always greater, rarely slightly less, than breadth of mesoscutum; most often at least F2 to F4 are longer than broad, only occasionally quadrate, F1 very often shorter than F2.  
 . . . . . *EVONYMELLAE*-GROUP (p.77)

## THE *EVONYMELLAE*-GROUP

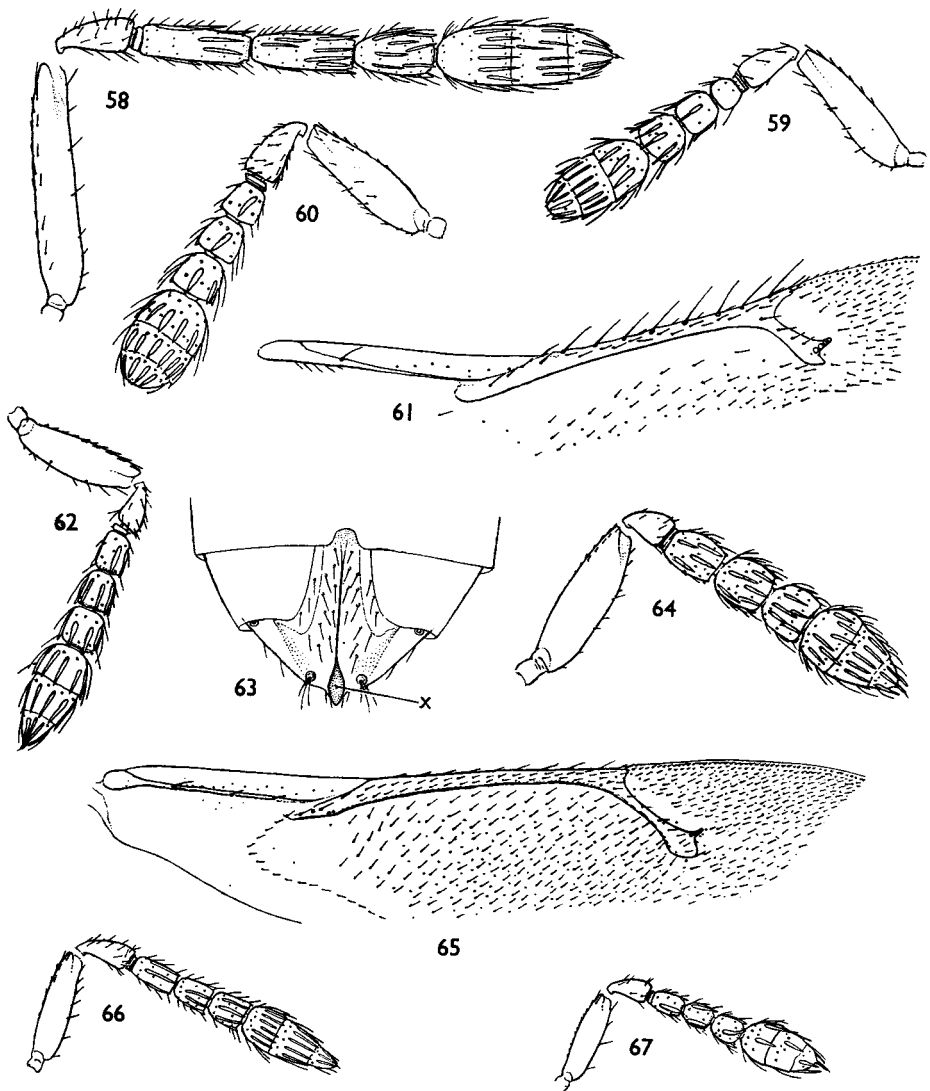
### Key to European species

#### Females

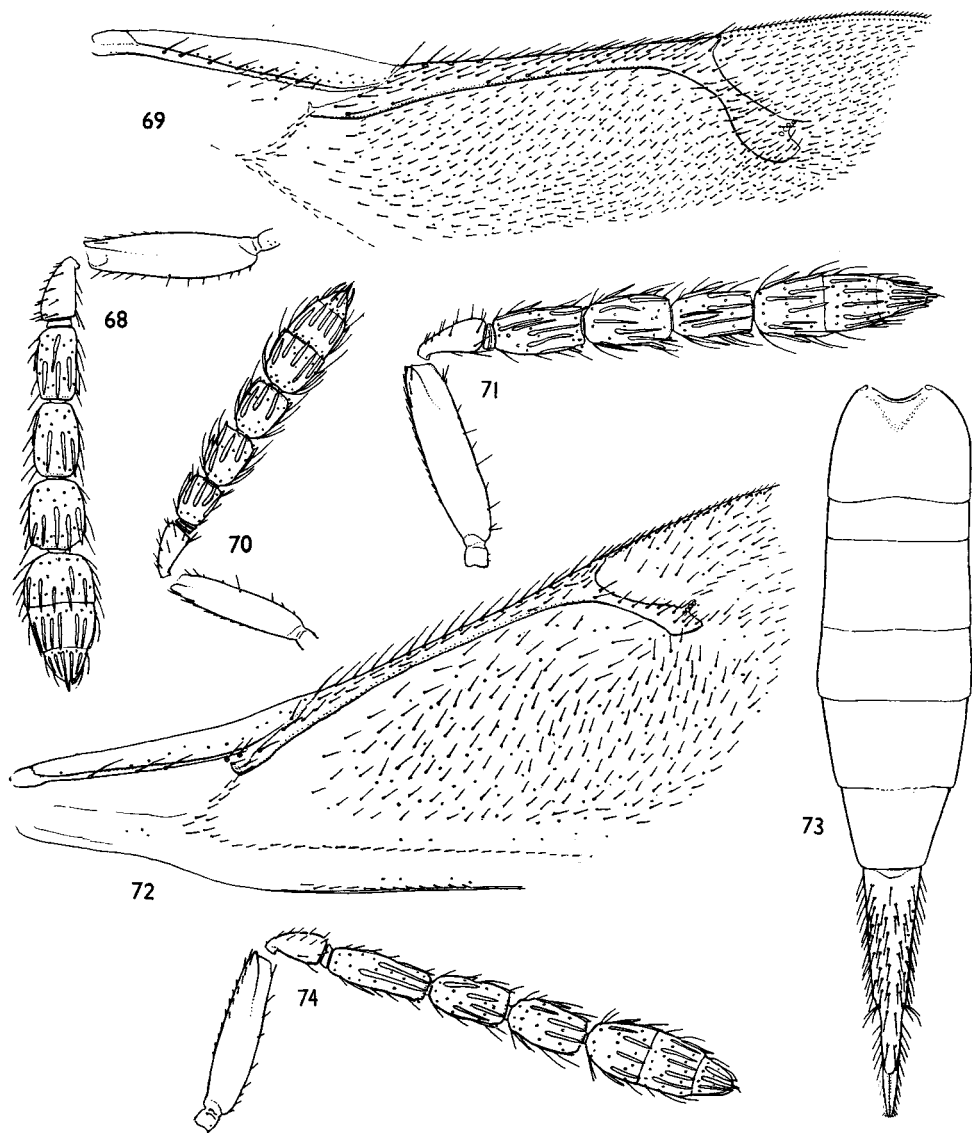
- 1 Antenna (Fig. 58) with scape very slender, longer than an eye, reaching level of vertex or even slightly above it; pedicellus plus flagellum obviously greater than breadth of mesoscutum; flagellum slender, funicle proximally hardly stouter than pedicellus with F1 obviously longer than pedicellus and 2-3

- times as long as broad, F3 1.7-2 times as long as broad; clava slightly to distinctly shorter than F2 plus F3. Mesoscutum with only one row (occasionally a little irregular) of adnotaular setae on each side. (Gaster similar in shape to that of *szoecsi* (Fig. 79), 3.3-5 times as long as broad; 1.4-1.7 times length of head plus thorax). . . . . *adalia* (p.102)
- Antennae with scape broader, shorter than or barely as long as an eye, not reaching level of vertex and often not reaching median ocellus; pedicellus plus flagellum often not greater than breadth of mesoscutum; flagellum rarely so slender, F1 often relatively shorter, F3 nearly always at least slightly less than twice as long as broad; clava at least as long as F2 plus F3. Mesoscutum often with at least a partial second row of setae on each side, sometimes 3 or more rows. . . . . 2
- 2 Antenna (Fig. 59) with F1 at most 0.5 as long as F2, without sensilla, slightly to distinctly transverse. Forewing: SM with only 1 dorsal seta, placed before the middle; wing with a large speculum which extends below M as far as ST. . . . . *embolicus* (p.97)
- Antenna having F1 from almost as long as, to longer than F2, provided with sensilla, transverse to elongate. Forewing very rarely with only 1 dorsal seta, normally with 2 or more setae; speculum nearly always relatively smaller. . . . . 3
- 3 Antenna (Fig. 60) with clava subglobose, about 1.5 times as broad as F3 and hardly 1.5 times as long as broad, apically rounded, without a terminal spine; pedicellus plus flagellum slightly less than breadth of mesoscutum; funicular segments subquadrate. Forewing (Fig. 61) with a large speculum which extends as a broad strip below M to ST; SM with only 1 dorsal seta. Tegulae yellow. Gaster ovate, slightly less than twice as long as broad. . . . . *globosiclava* (p.98)
- Antennal clava not subglobose, rarely so broad relative to F3, usually relatively longer, almost always apically pointed or acute, if somewhat rounded then with a terminal spine; pedicellus plus flagellum often relatively longer; funicular segments often longer than broad. Forewing with a relatively small speculum which frequently does not extend below M; SM with 2 or more dorsal setae. Tegulae black with metallic tinge, rarely obscurely yellowish anteriorly. Gaster ovate to lanceolate. . . . . 4
- 4 Tips of ovipositor sheaths (Fig. 63) not quite reaching apex of last tergite, but leaving a hollow space before it; gaster subcircular or very short oval, not longer than thorax. Antenna (Fig. 62) with funicular segments subquadrate; clava as long as two and a half to three funicular segments. Antennal scape yellow, pedicellus and flagellum yellowish or testaceous. Submedian lines of scutellum usually slightly nearer to each other than to sublateral lines, enclosing a space 3-4 times as long as broad. Body green. . . . . *impeditus* (p.99)
- Tips of ovipositor sheaths reaching to apex of last tergite or somewhat beyond it; gaster nearly always longer than thorax, ovate to lanceolate. The other characters rarely present in combination. . . . . 5

- 5 Forewing (Fig. 65) with apical margin bare from postmarginal vein to tornus. .... 6
- Forewing with apical margin ciliate throughout, though sometimes the cilia are extremely short. .... 7
- 6 Forewing (Fig. 65) with length of setae on front edge of M much less than breadth of the vein. Setae of pronotum and mesoscutum very short, subdecumbent. Antenna (Fig. 64) with clava 1.7-2.0 times as long as broad. Body bright green to blue-green. .... *elasmii* (p.103)
- Forewing with length of setae on front edge of M equal to maximum breadth of the vein. Setae of pronotum and mesoscutum of ordinary length, not subdecumbent. Antenna (Fig. 66) with clava 2.3-2.4 times as long as broad. Body with weak, sometimes hardly perceptible, bluish to blue-green tints. .... *tineivorus* (p.104)
- 7 Antenna (Fig. 67): clava with a long, slightly curved spine the length of which is about 0.75 that of C3. Very small species, length 0.8-1.2 mm. Hindwing acutely pointed apically. Mid lobe of mesoscutum with only one row of 2-3 (-4) adnotaular setae on each side. Propodeal callus usually with 2, rarely 3, setae. Gaster lanceolate. .... *mucronatus* (p.105)
- Antennae with claval spine shorter, and straight, at most 0.5 length of C3 and if as much as this then length of body is greater than in *mucronatus*. Hindwing usually obtuse or rounded apically. Mid lobe of mesoscutum most often with more numerous setae, sometimes arranged in two or more rows on each side. Propodeal callus usually with 3 or more setae, rarely 2. Gaster short ovate to lanceolate. .... 8
- 8 Forewing (Fig. 69); SM with (5-) 6-9 dorsal setae; M and ST very thick; wing beyond the small speculum densely pilose. Propodeal callus with 6-10 setae. Antenna (Fig. 68) with F3 quadrate. .... *multisetosus* (p.106)
- Forewing with M and ST rarely so thick; if so then *either* (*eudolichocerus*) SM with at most 4 dorsal setae, speculum larger, wing beyond it less densely pilose; *or* F3 very distinctly longer than broad. Propodeal callus rarely with more than 5 setae. Antennae with F3 often longer than broad. .... 9
- 9 Gaster with tip of hypopygium situated at 0.7-0.73 its length, the gaster somewhat longer than head plus thorax and more than twice as long as broad. Mid lobe of mesoscutum with one row of 3-5 adnotaular setae on each side. Malar sulcus strongly curved. .... *servadeii* (p.107)
- Tip of hypopygium usually not situated beyond 0.5 length of gaster but if slightly beyond this then gaster not longer than head plus thorax and at most twice as long as broad. Mid lobe of mesoscutum often with more than one row of adnotaular setae on each side. Malar sulcus moderately curved. .... 10
- 10 Antennal clava 4.2-4.3 times as long as broad, longer than F2 plus F3. Gaster at least 1.5 times as long as thorax. Mid lobe of mesoscutum without a median line. .... *buxi* (p.111)



Figs 58-67 *Baryscapus* species, females. 58, *B. adalia* (Walker), antenna. 59, *B. (?) embolicus* (Kostjukov), antenna. 60, 61, *B. globosiclava* sp. n.; (60) antenna (61) forewing, part. 62, 63, *B. impeditus* (Nees); (62) antenna; (63) gaster, ventral view. 64, 65, *B. elasmii* (Graham); (64) antenna; (65) forewing. 66, *B. tineivorus* (Ferrière), antenna. 67, *B. mucronatus* sp. n., antenna.

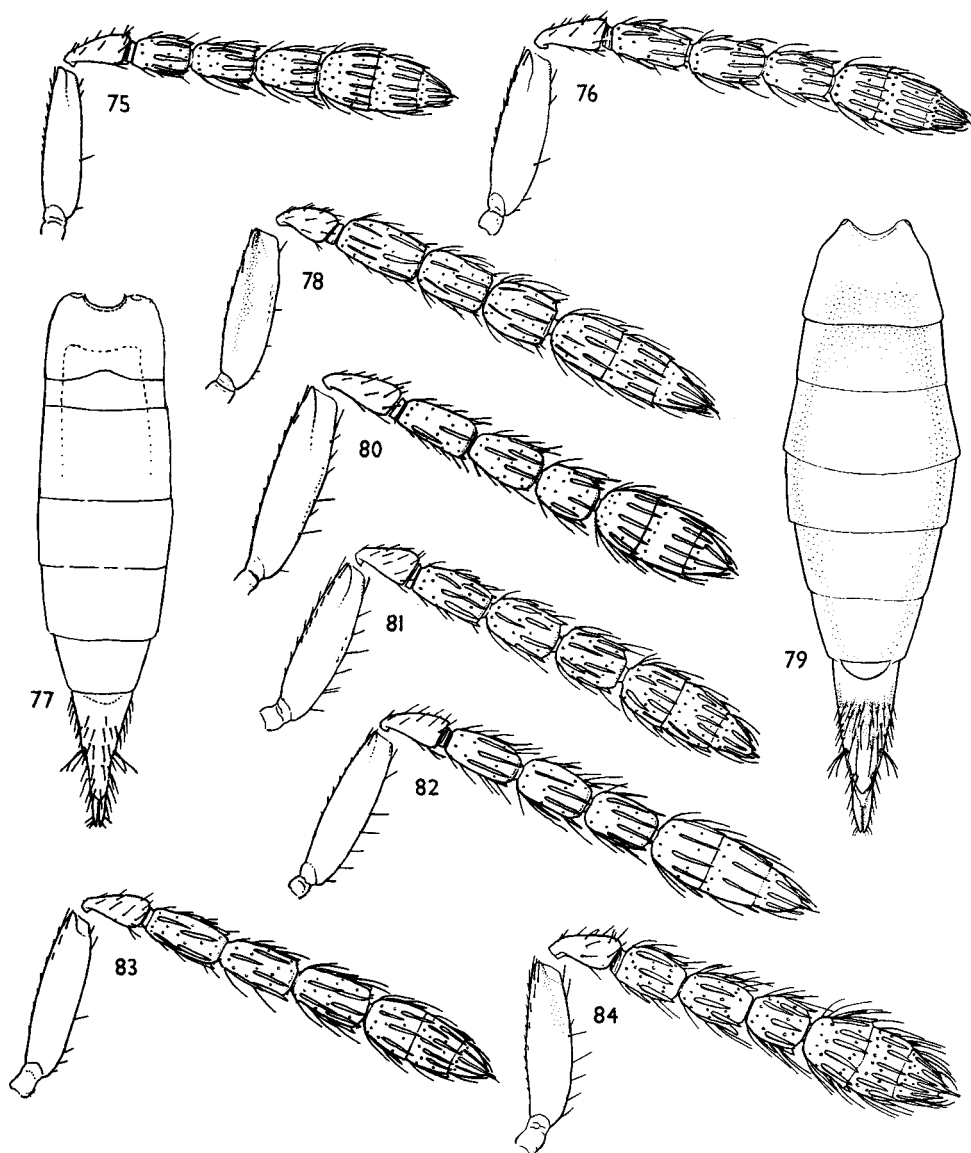


**Figs 68-74** *Baryscapus* species, females. 68, 69, *B. multisetosus* sp. n.; (68) antenna; (69) forewing. 70, *B. servadeii* (Domenichini), antenna. 71-73, *B. agrilorum* (Ratzeburg) lectotype; (71) antenna; (72) forewing; (73) gaster. 74, *B. eudolichocerus* sp. n., antenna.

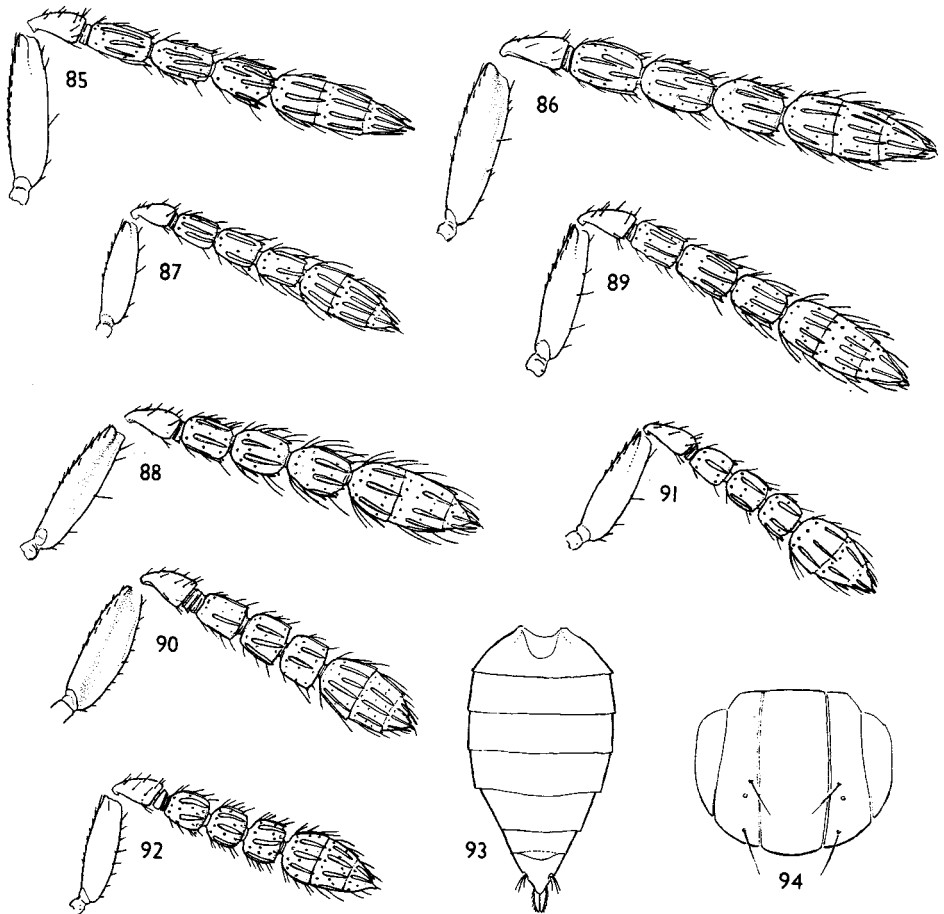


- Antennal clava at most 3.2 times as long as broad, if as much as this then gaster relatively shorter and mid lobe of mesoscutum with a median line. .... 11
- 11 Gaster (Fig. 73) twice or slightly more than twice as long as head plus thorax, about 5 times as long as broad, wedge-shaped; last tergite 3.3-4.1 times as long as broad. Antenna (Fig. 71) with scape nearly as long as an eye and about 4 times as long as broad; F1 about twice as long as broad, distinctly longer than pedicellus. .... *agrilorum* (p.108)
- Gaster *either* less than twice as long as head plus thorax, 1.25-4.6 times as long as broad, ovate to lanceolate with curved sides; *or* with last tergite at most twice as long as broad. Antennal scape (except in *eudolichocerus*) much shorter than an eye; F1 usually less than twice as long as broad, often not longer than broad. .... 12
- 12 Antenna (Fig. 74) with pedicellus plus flagellum about 1.4 times breadth of mesoscutum; F1 about 2.5 times as long as broad and 1.5 times length of pedicellus; scape 0.95 length of eye, about 4.5 times as long as broad, reaching median ocellus. Gaster lanceolate, slightly longer than head plus thorax; last tergite longer than broad. (Dark blue; mid and hind tibiae mainly fuscous). .... *eudolichocerus* (p.110)
- Antennae with pedicellus plus flagellum at most 1.15 times breadth of mesoscutum; F1 at most 2.2 times as long as broad; scape much shorter than an eye, not reaching median ocellus. Gaster often relatively shorter. .... 13
- 13 Gaster (Figs 77, 79) 1.8-2.0 times as long as thorax, 3.4-4.6 times as long as broad, strongly acuminate, with last tergite distinctly (up to twice) as long as broad. .... 14
- Gaster at most about 1.5 times as long as thorax, at most 3 times as long as broad, with last tergite at most slightly longer than broad. .... 19
- 14 Antenna with F1 slightly shorter than F2 and subquadrate; F2 and F3 slightly longer than broad. Forewing: SM with 3 dorsal setae. .... *sugonjaevi* (p.112)
- Antennae with F1 as long as or longer than F2; F2 and F3 longer than broad or quadrate. Forewing: SM sometimes with only 2 dorsal setae. .... 15
- 15 Antennae (Figs 90, 99) with all funicular segments quadrate or subquadrate. Forewing: SM with 3-5 dorsal setae. .... 34
- Antennae with F1 at least 1.5 times as long as broad, F2 and F3 usually longer than broad. Forewing: SM with 2-3 (-4) dorsal setae. .... 16
- 16 Antennal clava only 2.0-2.2 times as long as broad, with a rather long spine, about 0.4 length of C3. .... *phytomyzae* (p.112)
- Antennal clava *either* more elongate, *or* with a very short spine. .... 17
- 17 Mid lobe of mesoscutum with one (sometimes irregular) row of 4-8 adnotaular setae on each side. Antenna (Fig. 76): clava with spine very

- short; scape partly to mainly yellowish. Body with greenish, bluish and bronze tints. Parasite of wood-boring Coleoptera. . . . . *hylesini* (p.109)
- Mid lobe of mesoscutum normally with at least a partial second row of adnotaular setae, sometimes 3 or 4 irregular rows (dwarf *szoecsi* may have only a single row, but then body is dark blue and the scape is mainly black). Hyperparasites of Lepidoptera. . . . . 18
- 18 Antenna (Fig. 78): clava 2.8-3.0 times as long as broad, with a moderately long spine. Body dark to bright blue. . . . . *szoecsi* (p.112)
- Antennal clava normally less elongate, if approaching the above then with a very short spine. Body sometimes differently coloured. . . . . 31
- 19 Gaster not or hardly longer than thorax, at most 1.7 times as long as broad, with ovipositor sheaths only just reaching apex of last tergite, therefore not visible in dorsal view. Antenna (Fig. 83) with all funicular segments distinctly longer than broad. Forewing with M at most twice length of ST. . . . . *spartifoliellae* (p.138)
- Gaster usually at least as long as head plus thorax but if as short as in *spartifoliellae* then *either* tips of ovipositor sheaths project very slightly beyond apex of last tergite so as to be visible in dorsal view; *or* at least F3 is not longer than broad. Forewing with M sometimes longer relative to ST. . . . . 20
- 20 Gaster about 1.2 times as long as broad, not or hardly longer than thorax. Propodeum medially only 0.25 length of scutellum. Scutellum hardly broader than long. . . . . *starki* (p.120)
- Gaster at least 1.5 times as long as broad and slightly to very obviously longer than thorax, *except* in some *bruchivorus* in which the propodeum is 0.3-0.33 length of scutellum, and in *obesulus* in which scutellum is 1.3-1.4 times as broad as long. . . . . 21
- 21 Antenna with F1 at least 1.5 times as long as broad *except* in some *oophagus* in which F3 is 1.2-1.6 times as long as broad and length of body is at most 1.2 mm; F2 usually, F3 sometimes, longer than broad (doubtful cases are included in both sections of the key). . . . . 22
- Antenna with F1 1.0-1.25 times as long as broad *or*, if slightly more, then F3 quadrate. . . . . 34
- 22 Antenna (Fig. 84) with claval spine 0.4-0.5 length of C3; flagellum brownish or testaceous, sometimes infusate dorsally, with setae standing out somewhat. Submedian lines of scutellum slightly nearer to each other than to sublateral lines. Mid lobe of mesoscutum with 5-8 setae on each side. Body-length 1.7-2.1 mm. Mid and hind tarsi tending to be strongly infusate, though testaceous proximally in pale forms. Host on *Epilobium hirsutum*. . . . . *fossarum* (p.120)
- Antennae with much shorter claval spine *except* in *pilicornis* which has flagellum black, submedian lines of scutellum not nearer to each other than to sublateral lines, mid lobe of mesoscutum with 3-5 setae on each side, body-length at most 1.6 mm. Mid and hind tarsi often extensively pale. Hosts different. . . . . 23



Figs 75-84 *Baryscapus* species, females. 75, *B. ceroplastiphilus* (Domenichini), antenna. 76, 77, *B. hylesini* sp. n.; (76) antenna; (77) gaster. 78, 79, *B. szoecsi* (Erdős); (78) antenna; (79) gaster. 80, *B. evonymellae* (Bouché), antenna. 81, *B. pospelovi* (Kurdjumov), antenna. 82, *B. nigroviolaceus* (Nees), antenna. 83, *B. spartifoliellae* sp. n., antenna. 84, *B. fossarum* sp. n., antenna.

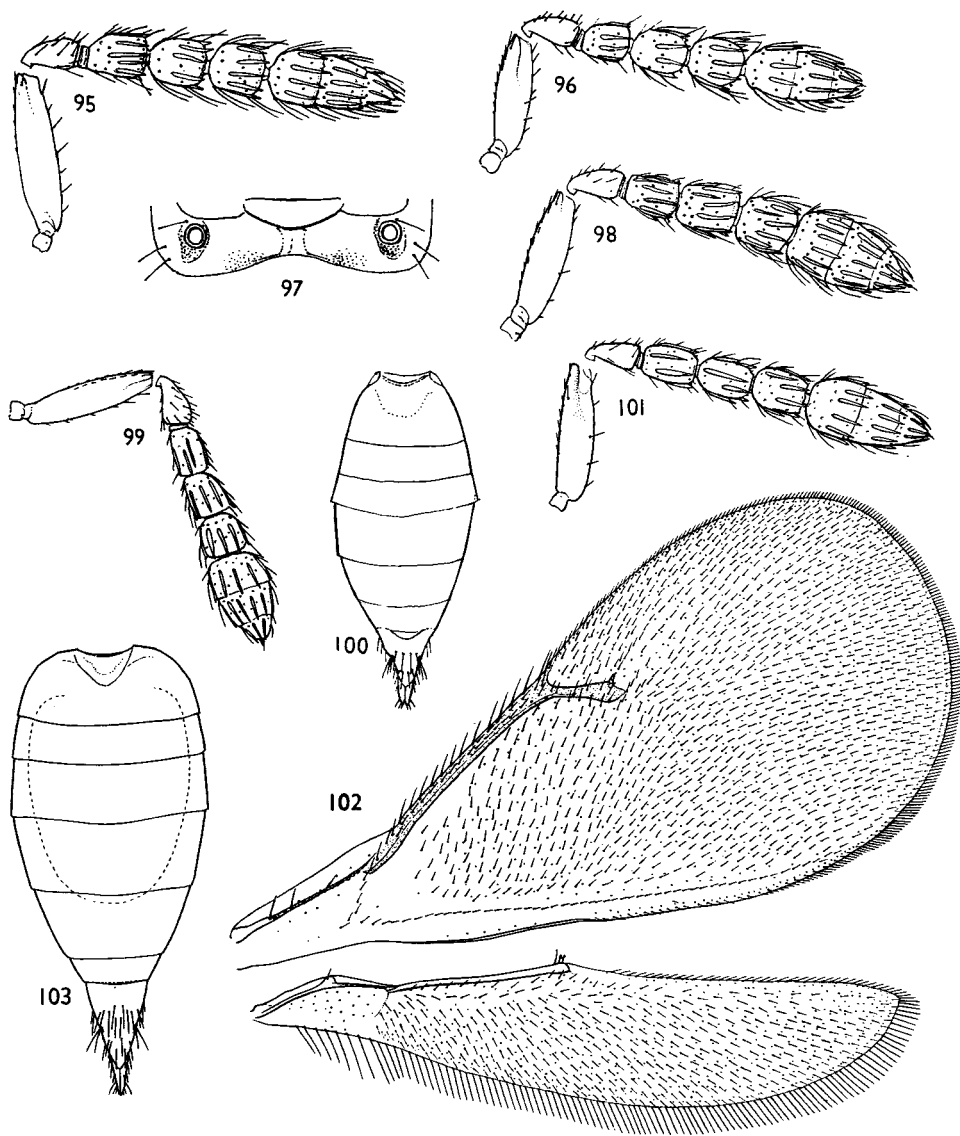


Figs 85-94 *Baryscapus* species, females. 85, *B. erynniae* (Domenichini), antenna. 86, *B. lotellae* (Delucchi), antenna. 87, *B. oophagus* (Otten), antenna. 88, *B. pilicornis* sp. n., antenna. 89, *B. conwentziae* (Ferrière) paratype, antenna. 90, *B. berhidanus* (Erdős), antenna. 91, *B. obesulus* sp. n., antenna. 92, 93, *B. irideus* (Domenichini); (92) antenna; (93) gaster. 94, *B. contingens* sp. n., scutellum.

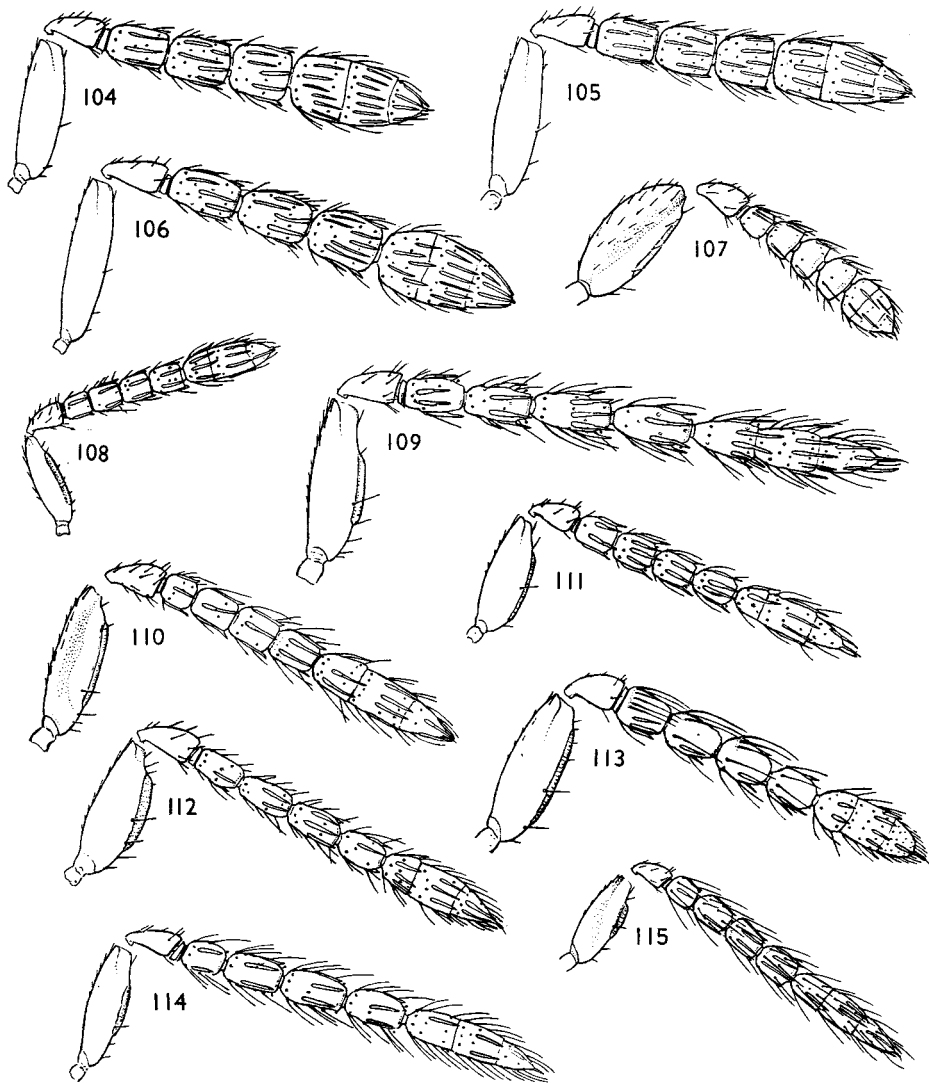
- 23 Antenna (Fig. 85) with clava 2.9-3.2 times as long as broad, very distinctly longer than F2 plus F3; scape yellow with dorsal edge more or less infusate. Gaster 1.65-2.3 times as long as broad. Mid lobe of mesoscutum with an irregular row of 4-6 adnotaular setae on each side, plus (usually) a second row of 1-2 setae. Forewing with M 2.8-3 times length of ST.  
 ..... *erynniae* (p.125)
- Either antennal clava is less elongate (and sometimes not longer than F2 plus F3); *or* antennal scape is mainly black; *or* the gaster is more elongate; *or* mesoscutum has more numerous setae. .... 24
- 24 Gaster 1.3-1.5 times as long as broad, hardly longer than thorax. Antenna (Fig. 106) with F3 only slightly longer than broad. Forewing: PM absent. Body blue. .... *bruchivorus* (p.137)
- Gaster at least 1.8 times as long as broad *except* in *spenceri* which has F3 very distinctly longer than broad, PM a distinct stub, body mainly violet-black. .... 25
- 25 Antenna (Fig. 86) with pedicellus plus flagellum 1.25-1.3 times breadth of mesoscutum; funicular segments 1.7-1.8 times as long as broad. Mid lobe of mesoscutum with one irregular row of 3-5 adnotaular setae on each side. .... *lotellae* (p.118)
- Antennae with pedicellus plus flagellum not or hardly greater than breadth of mesoscutum. Mid lobe of mesoscutum often with more numerous setae (including *nigroviolaceus* which much resembles *lotellae*). .... 26
- 26 Gaster 1.5-1.6 times as long as broad. Antenna with clava not longer than F2 plus F3. Body-length 1.9-2.0 mm. .... *spenceri* (p.119)
- Gaster at least 1.8 times as long as broad, if less than twice (some *conwentziae*) then antennal clava distinctly longer than F2 plus F3 *and* body-length 1.0-1.4 mm. .... 27
- 27 Very small dark bluish species, length 0.9-1.5 mm; propodeal spiracles small, separated by at least 0.5 their length from hind margin of metanotum, and by about 1.5 times their length from hind corner of propodeum. Mid lobe of mesoscutum with 3-5 adnotaular setae on each side, arranged in a single row (plus occasionally 1 seta of a second row). Forewing: SM with 2 dorsal setae. .... 28
- Species usually larger, length up to 2.5 mm; propodeal spiracles larger, nearer to (occasionally almost touching) hind margin of metanotum, separated by slightly more than their length from hind corner of propodeum. Mid lobe of mesoscutum with 5-12 setae on each side, arranged in one to four irregular rows. SM sometimes with 3-5 dorsal setae. .... 29
- 28 Antenna (Fig. 87) with clava 2.3-2.6 times as long as broad, its spine less prominent; flagellum with less conspicuous setae; funicular segments subrectangular in profile. .... *oophagus* (p.126)
- Antenna (Fig. 88) with clava 2.5-2.9 times as long as broad, its spine longer and more prominent; flagellum with more conspicuous setae; F2 and F3 more oval in shape. .... *pilicornis* (p.127)
- 29 Small species, length 1.1-1.4 mm with gaster 1.8-2.1 times as long as broad. Antenna (Fig. 89) with funicle proximally hardly stouter than pedicellus in

dorsal view; clava distinctly longer than F2 plus F3; flagellum black.

- ..... *conwentziae* (p.128)
- Species usually larger and with more elongate gaster than in above; if not then *either* funicle proximally distinctly stouter than pedicellus in dorsal view, or clava not or hardly longer than F2 plus F3; flagellum sometimes partly pale. .... 30
- 30 Antenna with funicle proximally at most 1.2 times as broad as pedicellus in dorsal view but tending to thicken slightly distad; flagellum yellowish to brown, when brown often paler beneath; scape sometimes extensively yellowish. Forewing: SM normally with 2 dorsal setae, rarely 3. Tibiae usually yellow or whitish, though more or less infusate in some forms; femora often yellow. .... 31
- Antenna with funicle proximally 1.25-1.5 times as broad as pedicellus in dorsal view, not or hardly thickened distad; flagellum usually black or fuscous, occasionally paler beneath; scape usually black, occasionally more or less pale distally. Forewing: SM sometimes with 3-5 dorsal setae. Tibiae often more or less infusate medially, sometimes mainly black. .... 33
- 31 Gaster with at least the anterior tergites bronze to purplish with their hind margins very narrowly to broadly bluish, sometimes whole disc of gaster purplish-bronze. Head and thorax mainly olive-greenish to bluish-olive, often with dorsum of thorax suffused with bronze or coppery-bronze. Mid lobe of mesoscutum with 9-20 setae on each side, arranged in two to four irregular rows. (Gaster 2.0-3.6 times as long as broad.  
..... *evonymellae* (p.113)
- Gaster blue with hind margins of tergites narrowly to moderately broadly bronze to purplish; disc of gaster sometimes with a bronze or purplish-bronze suffusion in *nigroviolaceus*. Head and thorax dark to bright blue or occasionally partly to wholly violet. Mid lobe of mesoscutum with 6-12 setae on each side, arranged in two irregular rows, or one row plus a partial second row. .... 32
- 32 Gaster 2.0-3.3 times as long as broad; last tergite 1.0-1.4 times as long as broad. Forewing venation pale yellow to yellowish-testaceous. Parasite of free-living larvae and pupae of Lepidoptera Yponomeutidae.  
..... *pospelovi* (p.116)
- Gaster 2.0-2.5 times as long as broad; last tergite slightly shorter than, or at most as long as broad. Forewing venation sometimes testaceous but often greyish-testaceous or brown. Parasite of Lepidopterous leaf-miners of families Gracillariidae, Yponomeutidae, Lyonetiidae and Heliozelidae.  
..... *nigroviolaceus* (p.117)
- 33 Propodeum medially somewhat longer than dorsellum. Forewing: SM usually with 2, occasionally 3, dorsal setae; M 2.2-2.5 times length of ST.  
..... *nigroviolaceus* (p.117)
- Propodeum medially slightly shorter than, or about as long as dorsellum. Forewing: SM usually with 3-5 dorsal setae, occasionally 2; M 2.3-3.2 times length of ST. .... 45



**Figs 95-103** *Baryscapus* species, females. 95, *B. galactopus* (Ratzeburg) antenna. 96-97, *B. transversalis* sp. n.; (96) antenna; (97) propodeum. 98, *B. euphorbiae* sp. n., antenna. 99, 100, *B. turionum* (Hartig); (99) paralectotype, antenna; (100) lectotype, gaster. 101-103, *B. endemus* (Walker); (101) antenna; (102) fore- and hindwings; (103) gaster.



Figs 104-115 *Baryscapus* species, antennae. 104, *B. bruchophagi* (Gahan), paralectotype ♀. 105, *B. protasis* sp. n., ♀. 106, *B. bruchivorus* (Gahan) paratype ♀. 107, *B. berhidanus* (Erdős) ♂. 108, *B. tineivorus* (Ferrière) ♂. 109, *B. fossarum* sp. n. ♂. 110, *B. impeditus* (Nees) lectotype ♂. 111, *B. starki* (Kostjukov) ♂. 112, *B. evonymellae* (Bouché) ♂. 113, *B. elasmii* (Graham) ♂. 114, *B. servadeii* (Domenichini) ♂. 115, *B. szoecsi* (Erdős) ♂.

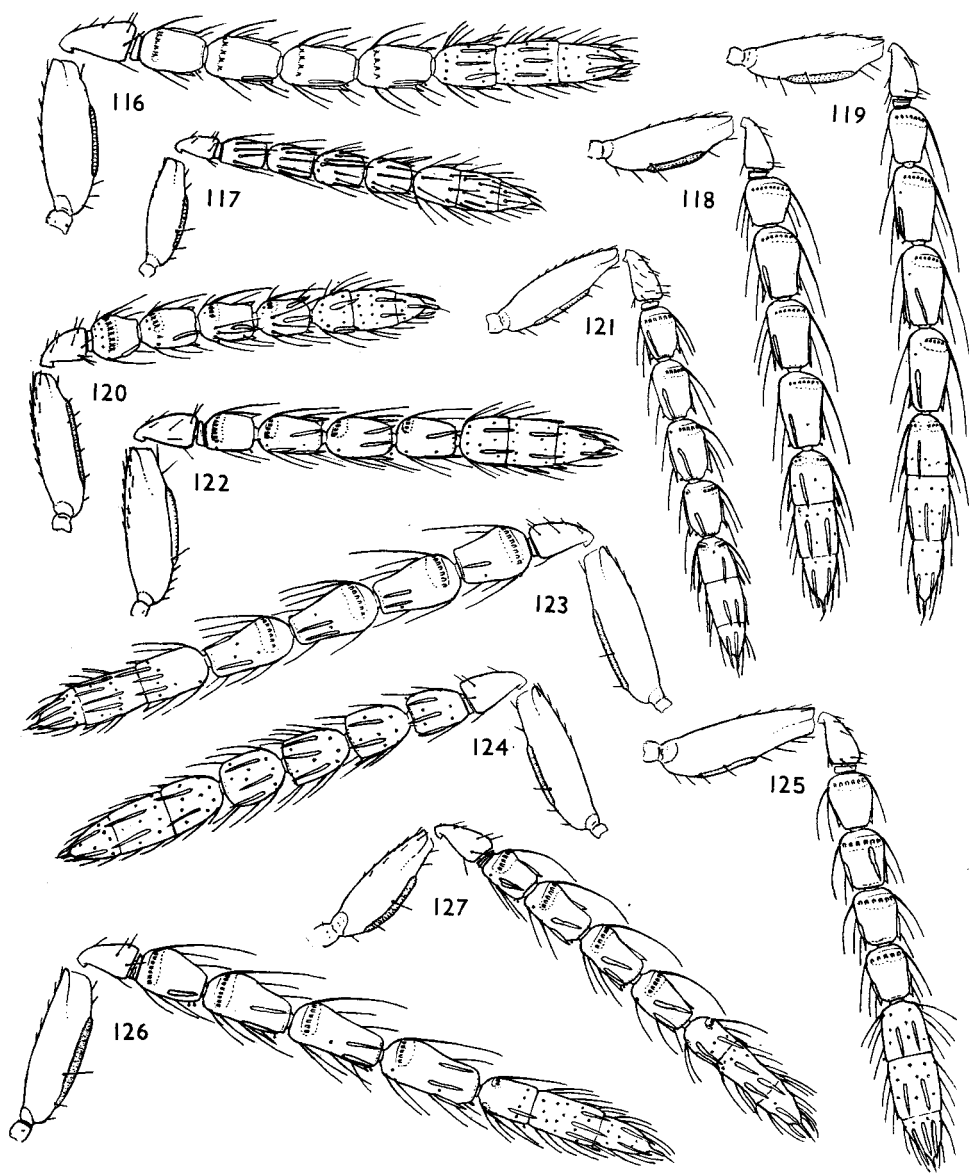


- 34 Antenna (Fig. 90) with pedicellus plus flagellum somewhat less than breadth of mesoscutum; F1 quadrate, F3 slightly transverse. Propodeal spiracles small, circular, separated by 0.75-1.0 their diameter from hind edge of metanotum. Forewing: SM with 3-5 dorsal setae. Gaster lanceolate. Parasitic in galls on *Quercus* spp. . . . . *berhidanus* (p.141)
- Antennae with pedicellus plus flagellum usually at least equal to breadth of mesoscutum, if less then F3 quadrate. Propodeal spiracles usually larger, suboval, and separated by at most 0.5 their length from hind edge of metanotum but usually by less than this. Gaster lanceolate or ovate. Hosts (where known) on different plants. . . . . 35
- 35 Antenna (Fig. 88): clava with rather prominent spine, nearly 0.5 length of C3; F2 and F3 oval in outline. Mid lobe of mesoscutum with a single row of 3-4 (-5) adnotaular setae on each side (occasionally 1 seta of a second row). Gaster lanceolate. . . . . *pilicornis* (p.127)
- Antennae (Figs 91, 92, 95, 96): clava with a shorter spine; F2 and F3 more rectangular in outline. Mid lobe of mesoscutum often with more numerous setae. Gaster lanceolate or ovate. . . . . 36
- 36 Gaster 1.5-2.1 times as long as broad, with last tergite usually distinctly broader than long, occasionally only slightly so; tip of hypopygium at 0.5-0.65 length of gaster. Forewing: SM usually with 2, occasionally 3-4, dorsal setae. . . . . 37
- Gaster 2.0-3.2 times as long as broad, if less than 2.3 then last tergite as long as broad, tip of hypopygium at 0.33-0.45 length of gaster, and SM of forewing with 3 or more dorsal setae. . . . . 42
- 37 Antennae (Figs 91, 92) with funicle proximally only a little stouter than pedicellus, but thickening slightly distad; F1 distinctly shorter than pedicellus; clava distinctly longer than F2 plus F3. . . . . 38
- Antennae (Figs 95, 96) with funicle proximally distinctly stouter than pedicellus, hardly thickening distad; F1 at most slightly shorter than pedicellus; clava not or only slightly longer than F2 plus F3. . . . . 40
- 38 Propodeum rather strongly transverse, 3.3-3.8 times as broad as its length at level of spiracles; medially only about 0.25 as long as scutellum. Mid lobe of mesoscutum with only one row of 3-5 adnotaular setae on each side. Gaster 1.3-1.75 times as long as broad. . . . . *obesulus* (p.128)
- Propodeum relatively less transverse; medially 0.30-0.35 length of scutellum. Mid lobe of mesoscutum with 6-10 setae on each side. Gaster 1.75-2.3 times as long as broad. . . . . 39
- 39 Forewing with a hyaline break between parastigma and M (see Domenichini, 1967, fig. 7). Placoid sensilla of scutellum about 1.5 times as far from posterior setae as from anterior setae. . . . . *irideus* (p.129)
- No such hyaline break, parastigma continuous with M. Placoid sensilla of scutellum (Fig. 94) at least twice as far from posterior setae as from anterior setae. . . . . *contingens* (p.130)
- 40 Thorax 1.3-1.4 times as long as broad. Propodeum less transverse, 3.0-3.5 times as broad as its length at level of spiracles, medially as long as or a

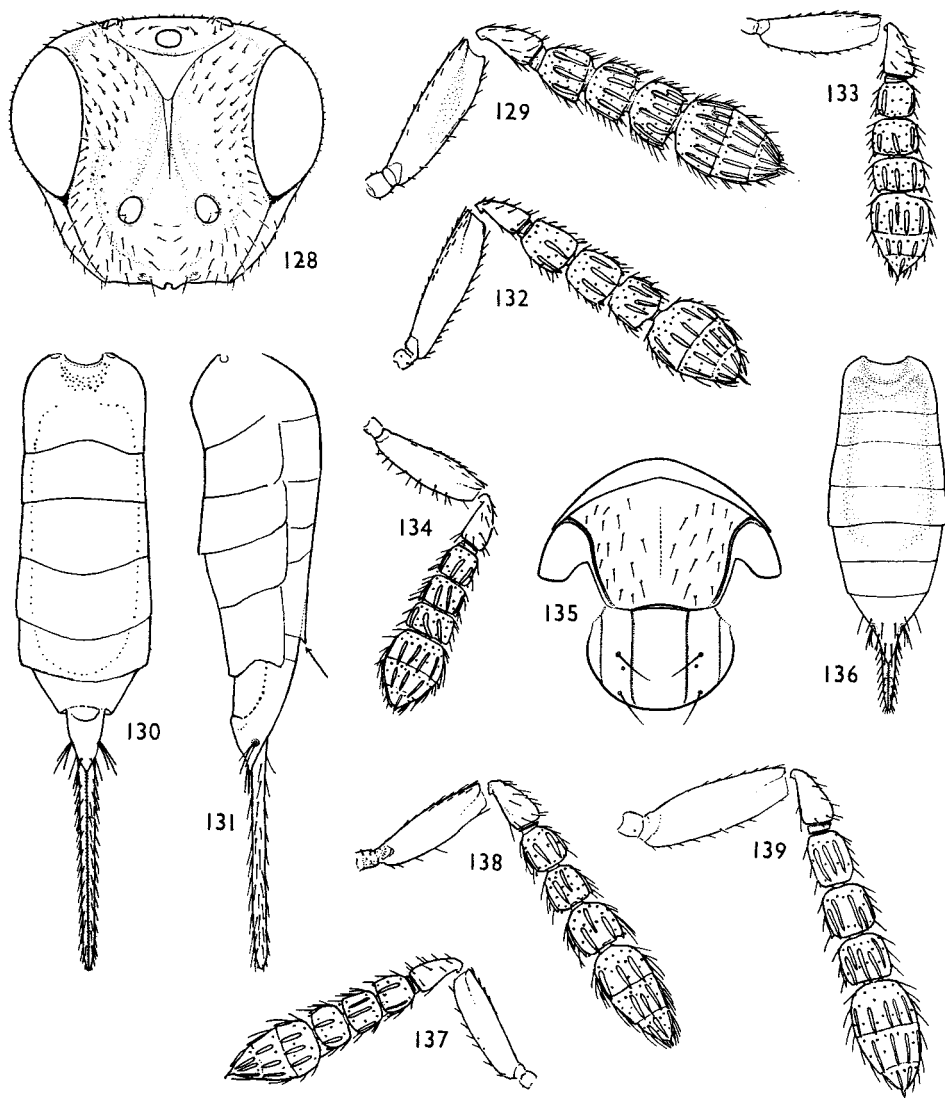
- little longer than dorsellum; spiracles separated by distinctly more than their length from hind corner of propodeum. . . . . *galactopus* (p.130)
- Thorax 1.15-1.25 times as long as broad. Propodeum (Fig. 97) more transverse, 4-4.5 times as broad as its length at level of spiracles, tending to be a little shorter medially than the dorsellum; spiracles separated by hardly more than their length from hind corner of propodeum. . . . . 41
  - 41 Submedian lines of scutellum about equidistant from each other and from sublateral lines. Forewing: SM usually with 2, very rarely 3, dorsal setae. Parasite of *Thaumetopoea pityocampa*. . . . . *transversalis* (p.132)
  - Submedian lines of scutellum slightly nearer to sublateral lines than to each other. Forewing: SM with 3-4 dorsal setae. . . . . sp.indet.1 (p.162)
  - 42 Antenna (Fig. 99) with funicle proximally about 1.25 times as broad as pedicellus, thickening slightly distad; flagellum brownish or brownish-testaceous. Scutellum 1.3-1.45 times as broad as long; space enclosed by submedian lines 2.0-2.35 times as long as broad. . . . . 43
  - Antennae (Figs 98, 101, 104) with funicle proximally 1.3-1.5 times as broad as pedicellus, not or hardly thickening distad; flagellum usually black, occasionally paler beneath. Scutellum 1.1-1.3 times as broad as long; space enclosed by submedian lines 2.2-3 times as long as broad. . . . . 44
  - 43 Forewing: SM with 3-4 dorsal setae. Mid lobe of mesoscutum with at least a partial second row of setae on each side. . . . . *turionum* (p.133)
  - Forewing: SM with 2 dorsal setae. Mid lobe of mesoscutum with a single row of setae on each side. . . . . *pallasi* (p.138)
  - 44 Submedian lines of scutellum slightly nearer to sublateral lines than to each other, enclosing a space 2.2-2.4 times as long as broad. Antenna (Fig. 98) with pedicellus plus flagellum 0.85-0.95 breadth of mesoscutum. . . . . *euphorbiae* (p.133)
  - Submedian lines of scutellum approximately equidistant from each other and from sublateral lines, enclosing a space 2.4-3 times as long as broad. Antennae with pedicellus plus flagellum fully equal to or slightly greater than breadth of mesoscutum. . . . . 45
  - 45 Antenna (Fig. 101) with pedicellus not or hardly longer than F1, in dorsal view 1.6-1.8 times as long as broad. Spur of mid tibia 0.7-0.83 length of basitarsus. Mid and hind tibiae normally with at least a weak brownish postmedian ring, but often more or less extensively infuscate, in dark forms mainly black. . . . . *endemus* (p.122)
  - Antenna (Fig. 104) with pedicellus 1.15-1.4 times as long as F1, 1.8-2.0 times as long as broad. Spur of mid tibia 0.6-0.65 length of basitarsus. Mid and hind tibiae wholly yellow, or at most with a weak postmedian brownish ring. . . . . *bruchophagi* (p.135)

#### Males

- 1 Funicular and claval segments of antennae lacking compact subbasal whorls of long dark setae (Figs 108-112, 114, 115, 117, 124); in *berhidanus*, *pallasi*



Figs 116-127 *Baryscapus* species, antennae, males. 116, *B. hylesini* sp. n. 117, *B. ceroplastiphilus* (Domenichini). 118, *B. pospelovi* (Kusdjumov). 119, *B. nigroviolaceus* (Nees). 120, *B. turionum* (Hartig). 121, *B. erynniae* (Domenichini). 122, *B. galactopus* (Ratzeburg). 123, *B. bruchivorus* (Gahan). 124, *B. bruchophagi* (Gahan) paralectotype. 125, *B. protasis* sp. n. 126, *B. endemus* (Walker). 127, *B. transversalis* sp. n.



Figs 128-139 *Baryscapus* species, females. 128-131, *B. दौरा* (Walker); (128) head, front view; (129) antenna; (130) gaster, dorsal view; (131) gaster, profile. 132, *B. cirsiicola* sp. n., antenna. 133, *B. carthami* sp. n., antenna. 134-136, *B. diaphantus* (Walker); (134) antenna; (135) mesoscutum and scutellum; (136) gaster. 137, *B. anasillus* sp. n., antenna. 138, *B. pallidae* sp. n., antenna. 139, *B. garganus* (Domenichini) paralectotype, antenna.

- and *ceroplastiphilus* with rudimentary whorls of *pale* setae on some segments (Figs 107, 117). . . . . 2
- Each funicular segment, usually also first segment of clava, with a compact subbasal whorl of long dark setae (Figs 113, 116, 118-123, 125-126). . 14
- 2 Antenna (Fig. 107) with flagellum short and clavate; F1 quadrate, F2 to F4 more or less transverse; clava very short; scape swollen. Spiracles of propodeum separated by 0.75-1.0 their diameter from hind edge of metanotum. Mid lobe of mesoscutum with more than one row of setae on each side. . . . . *berhidanus* (p.141)
- Antennae with flagellum longer and not or hardly clavate; distal funicular segments not transverse; clava more elongate; scape not swollen, though sometimes broad, but then flattened. Spiracles of propodeum usually nearer to metanotum. Mid lobe of mesoscutum sometimes with fewer setae. 3
- 3 Forewing: apical margin lacking cilia. Antenna (Fig. 108) with clava 2.5-2.6 times as long as broad, its segments hardly longer than broad or even slightly transverse. Body black with very weak bluish tinge. . . . . *tineivorus* (p.104)
- Forewing: apical margin ciliate (the cilia sometimes extremely short). Antennal clava 2.6-4.6 times as long as broad, with one or more of its segments usually longer than broad. Body often coloured otherwise. . 4
- 4 Antenna (Fig. 109): clava with a slight constriction between C1 and C2; C3 with a long spine, nearly 0.5 its length; ventral plaque of scape 0.45 length of scape; sensilla of flagellum with long, somewhat outstanding blades, the flagellum with rather long setae. Mid and hind tarsi tending to be fuscous with only their bases pale. . . . . *fossarum* (p.120)
- Antennal clava without a constriction between C1 and C2; C3 with spine rarely so long, if so (*starki*) then ventral plaque about 0.66 length of scape; sensilla of flagellum usually decumbent with short or very short outstanding blades, flagellum often with less conspicuous setae. Mid and hind tarsi normally pale with only tips dark. . . . . 5
- 5 Forewing: SM with 4-5 dorsal setae; both M and ST relatively thick; wing beyond speculum rather densely pilose. Femora and tibiae broadly black medially. . . . . *multisetosus* (p.106)
- Forewing: SM with 2-3 dorsal setae; M and ST either not thick, or only M somewhat thickened; wing just beyond speculum tending to be only moderately thickly pilose, or even rather sparsely. Legs usually paler than in above. . . . . 6
- 6 Antenna (Fig. 110) with funicular segments subequal in length, quadrate or hardly longer than broad; ventral plaque of scape 0.55-0.66 length of scape. Spiracles of propodeum separated by 0.5-0.7 their diameter from hind edge of metanotum. Mid lobe with one (sometimes slightly irregular) row of 3-6 setae on each side. . . . . 7
- *Either* at least funicular segments 2 to 4 distinctly longer than broad; *or*, if the segments are hardly longer than broad then spiracles of propodeum are very close to or almost touch hind edge of metanotum. Mid lobe of

- mesoscutum sometimes with a partial second row of setae on each side, occasionally a third row. .... 8
- 7 Submedian lines of scutellum slightly nearer to each other than to sublateral lines. Antennae testaceous to yellow with at most ventral plaque of scape, pedicellus dorsally, and sometimes the clava, brown. Legs except coxae usually testaceous to yellow, occasionally some or all femora more or less infusate proximally. .... *impeditus* (p.99)
- Submedian lines of scutellum equidistant from each other and from sublateral lines. Antennal scape and pedicellus mainly black, flagellum brown. Coxae, and femora mainly, black; tibiae broadly black medially. .... *sp.indet.2* (p.162)
- 8 Antenna (Fig. 111) with ventral plaque about 0.66 length of scape; clava with C1 much smaller than C2 and not longer than broad, spine nearly 0.5 length of C3; sensilla of flagellum with rather long, outstanding blades; funicular segments only slightly longer than broad. .... *starki* (p.120)
- Antennae with ventral plaque at most 0.5 length of scape, except in *pallasi* which has C1 equal in length to C2; C1 (except in *evonymellae*) not much smaller than C2; C3 with spine at least slightly shorter than in *starki*; sensilla of flagellum decumbent with short, hardly outstanding blades; funicular segments usually relatively longer. .... 9
- 9 Antenna (Fig. 112): first segment of clava distinctly smaller than the second and not longer than broad; antenna yellow with at most ventral plaque of scape and incisures between funicular segments darker. Gaster usually with yellow subbasal transverse band or large spot, occasionally reduced to an obscure testaceous spot. Legs, except coxae and part of hind femora usually yellow, occasionally fore and mid femora slightly infusate basally. .... *evonymellae* (p.113)
- Antennae with first segment of clava not or only slightly smaller than the second, if slightly shorter then a little longer than broad. Gaster with at most a small or obscure subbasal testaceous spot, sometimes immaculate. Legs usually darker, only occasionally as pale as in *evonymellae*. .... 10
- 10 Spiracles of propodeum very close to or nearly touching hind margin of metanotum. Antenna with funicular segments not or only slightly longer than broad, subequal in length. .... 11
- Spiracles of propodeum separated by at least 0.3 their length from hind margin of metanotum. Antennae with at least funicular segments 2 to 4 distinctly longer than broad, F1 shorter than F2. .... 13
- 11 Antennae (Figs 117, 124) with ventral plaque hardly 0.5 length of scape. .... 12
- Antenna with ventral plaque about 0.66 length of scape. .... *pallasi* (p.138)
- 12 Antenna (Fig. 117): funicular segments with some long, rather thick, pale setae which tend to group dorsally, but do not form compact whorls; sensilla apparently absent. .... *ceroplastiphilus* (p.140)
- Antenna (Fig. 124): funicular segments without long thick setae, but with numerous sensilla. .... *bruchophagi* (p.135)

- 13 Thorax (when undistorted) about 1.45 times as long as broad. Gaster black. Body dark blue. Antenna (Fig. 115). . . . . *szoecsi* (p. 112)
- Thorax 1.3-1.35 times as long as broad. Gaster with obscure testaceous subbasal spot. Body with greenish and bluish tints. Antenna (Fig. 114). . . . . *servadeii* (p. 107)
- 14 Forewing: apical margin lacking cilia. Setae of mesoscutum very short, nearly decumbent. Antenna (Fig. 113) with ventral plaque about 0.65 length of scape; F1 quadrate, F2 to F4 slightly longer than broad, clava about 3 times as long as broad. . . . . *elasmii* (p.103)
- Forewing: apical margin ciliate. Setae of mesoscutum normal in length, not decumbent. Antennae usually with a different combination of characters. . . . . 15
- 15 Antennae short (pedicellus plus flagellum slightly less than breadth of mesoscutum) with flagellum strongly clavate, clava slightly less than twice as long as broad; funicular segments quadrate, their dark setae reaching somewhat beyond the tips of the segments. . . . . sp.indet.3 (p.162)
- Antennae relatively longer (pedicellus plus flagellum at least equal to breadth of mesoscutum); flagellum at most slightly clavate, clava at least 2.8 times as long as broad; funicular segments sometimes longer than broad. . . . . 16
- 16 Antenna (Fig. 116): whorled dark setae of funicular segments hardly reaching to level of tips of segments; claval spine very short. . . . . *hylesini* (p.109)
- Whorled dark setae of funicular segments reaching at least slightly beyond the tips of the segments; claval spine sometimes longer. . . . . 17
- 17 Gaster *either* with a very distinct subbasal yellowish-white to yellow transverse band, which continues over the lateral margins and across the ventral surface; *or* with a large testaceous spot on the dorsal surface and another on the ventral surface. (Ventral plaque 0.4-0.53 length of scape). . . . . 18
- Gaster either immaculate black, or with at most an obscure testaceous subbasal spot. . . . . 19
- 18 Antenna (Fig. 118) with scape (except the ventral plaque) yellow, or at least broadly yellow distally; pedicellus plus flagellum 1.45-1.55 times breadth of mesoscutum. . . . . *pospelovi* (p.116)
- Antenna (Fig. 119) with scape black, or more or less broadly yellow distally; pedicellus plus flagellum 1.3-1.4 times breadth of mesoscutum. . . . . *nigroviolaceus* (p.117)
- 19 Antenna (Fig. 120) with funicular segments quadrate or only slightly longer than broad; ventral plaque of scape 0.62-0.63 length of scape; clava about 3 times as long as broad. . . . . *turionum* (p.133)
- Antennae with at least F2 to F4 very distinctly longer than broad except in some *galactopus* which have ventral plaque at most 0.6 length of scape and clava rather longer. . . . . 20

- 20 Antenna (Fig. 121): clava with C1 and C2 subequal in length and at most slightly longer than broad. Very small species, length 1.0-1.2 mm. Forewing: SM with 2 dorsal setae. Gaster with obscure testaceous subbasal spot. .... *erynniae* (p.125)
- *Ei*ther antennal clava has C2 longer than C1 and distinctly longer than broad; *or* the species is relatively larger; *or* SM of forewing has 3-4 dorsal setae; *or* the gaster is black. .... 21
- 21 Antenna (Fig. 122): clava with C1 and C2 not or hardly longer than broad; F3 and F4 1.0-1.6 times as long as broad. Forewing: SM usually with 2, rarely 3, dorsal setae. Gaster immaculate. .... *galactopus* (p.130)
- Antennae: clava with either C1 or C2 (sometimes both) distinctly longer than broad; F3 and F4 1.6-2.1 times as long as broad. Forewing: SM with 2-4 dorsal setae. Gaster sometimes with a more or less distinct testaceous subbasal spot. .... 22
- 22 Antennae (Figs 123, 126): ventral plaque 0.52-0.67 length of scape; pedicellus plus flagellum 1.45-1.65 times breadth of mesoscutum. Forewing: SM normally with 3-4 dorsal setae, 2 only in dwarfs. Gaster immaculate. Body-length 1.2-1.7 mm. .... 23
- *Ei*ther ventral plaque is at most 0.48 length of scape; *or* pedicellus plus flagellum is 1.3-1.4 times breadth of mesoscutum. Forewing: SM most often with 2, occasionally 3, dorsal setae. Gaster often with a more or less distinct testaceous subbasal spot. Size sometimes less than in the above, ... 24
- 23 Antenna (Fig. 123) with pedicellus 1.8-2.0 times as long as broad; clava distinctly longer than F3 plus F4. .... *bruchivorus* (p.137)
- Antenna (Fig. 126) with pedicellus 1.3-1.5 times as long as broad; clava not, or only slightly, longer than F3 plus F4. .... *endemus* (p.122)
- 24 Body-length 0.9-1.15 mm. Antenna (Fig. 127) with ventral plaque 0.55-0.6 length of scape. .... *transversalis* (p.132)
- Body-length 1.2-1.5 mm. Antenna with ventral plaque 0.37-0.48 length of scape. .... 25
- 25 Antenna (Fig. 125) with C1 and C2 only slightly longer than broad. Gaster immaculate. .... *protasis* (p.136)
- Antennae with C1 and C2 distinctly longer than broad. Gaster sometimes with testaceous or pale subbasal spot. .... 26
- 26 Antenna (Fig. 119) with ventral plaque of scape 0.4-0.48 length of scape. Hyperparasite or parasite of leaf-miners. .... *nigroviolaceus* (p.117)
- Antenna with ventral plaque 0.37-0.4 length of scape. Parasite of Neuroptera Coniopterygidae. .... *conwentziae* (p.128)

*Baryscapus embolicus* (Kostjukov), **comb.n.**  
(Fig. 59)

*Tetrastichus embolicus* Kostjukov, 1978: 440. Holotype ♀, USSR: Astrakhan province, 18.vii.1974, on *Tamarix* (Kostjukov) (ZIL) [not examined].



This species was described from 3 ♀ taken at the same time and in the same locality. According to Kostjukov's description (very brief, contained in a key to species) and his figure (1978, fig. 140.7) it can be distinguished by the very small, almost anelliform, first funicular segment of the ♀ (♂ unknown).

The specimen recorded below runs to *embolicus* in Kostjukov's key and agrees on the whole with his description except for slight differences in the proportions of the antennal segments.

♀. Head slightly broader than mesoscutum. Malar sulcus strongly curved. Antenna (fig. 59) with scape somewhat shorter than eye, not reaching median ocellus; pedicellus plus flagellum about 0.9 breadth of mesoscutum; pedicellus twice as long as broad, as long as anelli plus F1 plus F2; F1 very slightly transverse, about as broad as pedicellus, only about 0.5 as long as F2, without sensilla; flagellum beyond this clavate with F2 and F3 subequal in length, each quadrate; clava broader than F3, about twice as long as broad, slightly longer than whole funicle. Thorax 1.5 times as long as broad, strongly arched dorsally, propodeal slope 50 degrees. Mid lobe of mesoscutum as long as broad, convex, with sharp median line; a single row of 4-5 setae on each side. Scutellum 1.2 times as broad as long, strongly convex; submedian lines equidistant from each other and from sublateral lines, enclosed space 2.5 times as long as broad; setae subequal, their length almost as great as distance between submedian lines. Propodeum medially a little longer than dorsellum; spiracles small, suboval, about 0.4 their length from hind margin of metanotum. Forewing twice as long as broad; costal cell distinctly longer than M, 9 times as long as broad; SM with 1 dorsal seta on right wing, 2 setae on left wing (the second, distal, seta shorter); M thick, 2.4 length of ST, its front edge with 8-9 setae; ST wedge-shaped, composed mainly of the stigma and only slightly thinner at base; PM a distinct stub; speculum large and extending as a bare wedge below M to ST; wing beyond rather sparsely pilose, rather more thickly distad; cilia 0.2 length of ST. Hindwing obtuse, cilia 0.2 breadth of wing. Gaster ovate, slightly shorter than but as broad as thorax, 1.5 times as long as broad, slightly acute; last tergite somewhat broader than long; ovipositor sheaths only just reaching tip of last tergite.

Body bright greenish-blue; hind margins of gastral tergites weakly purplish. Antennal scape yellow, brownish dorsally; flagellum brown, pedicellus paler beneath. Coxae and proximal 0.6 of hind femora black, legs otherwise yellow with fourth tarsal segment fuscous. Tegulae testaceous anteriorly (a very rare feature in the genus). Wing hyaline, venation yellow. Length 1.4 mm.

MATERIAL EXAMINED. 1 ♀. Greece: Rhodes, 10 km North of Malona, between 11. and 13.iv.1970 (A.C. & W.N. Ellis) (MJG).

*Baryscapus globosiclava* sp.n.  
(Figs 60, 61)

♀. Head somewhat collapsed, structure apparently as in *irideus* (Domenichini). Malar space 0.8 length of eye, sulcus strongly curved. Antenna (Fig. 60) with scape 0.8 length of eye, not reaching median ocellus; pedicellus plus flagellum

0.85 breadth of mesoscutum; pedicellus distinctly longer than F1, about 1.8 times as long as broad, with rather numerous setae; funicular segments subequal in length, F1 quadrate, F2 hardly transverse, F3 slightly so; clava about 1.5 times as broad as F3, about as long as two and a half funicular segments, subglobose, hardly 1.5 times as long as broad, rounded apically; flagellum clothed with white setae. Thorax 1.5 times as long as broad, moderately convex dorsally. Mid lobe of mesoscutum about as long as broad; median line strong, complete; 3-4 adnotaular setae on each side. Scutellum 1.2 times as broad as long, moderately convex in profile; submedian lines strong, equidistant from each other and from sublateral lines, enclosing a space 2.3 times as long as abroad; length of setae about 0.65 distance between submedian lines, anterior pair in middle. Propodeum medially about as long as dorsellum; median carina slightly raised, triangularly expanded in posterior 0.5; spiracles small, subcircular, separated by about 0.5 their diameter from hind edge of metanotum. Legs of median length and thickness; spur of mid tibia 0.83 length of basitarsus. Forewing (Fig. 61) with costal cell about 1.25 times length of M and 12 times as long as broad; SM with 1 dorsal seta, placed before middle; parastigma very thick; M about 3.2 times length of ST; PM about 0.4 length of ST; ST rather thick, wedge-shaped; speculum large, extended as a broad strip below M and reaching ST; wing beyond moderately thickly pilose; cilia about 0.25 length of ST. Hindwing rounded apically; cilia 0.25 wing breadth. Gaster ovate, nearly as long as head plus thorax, as broad as thorax, 1.8 times as long as broad, acute; last tergite slightly broader than long; ovipositor sheaths hardly projecting; tip of hypopygium at about 0.5 length of gaster.

Head and thorax bright bluish-green; gaster blue with hind margins of segments narrowly purplish-bronze. Antennal scape yellow, infusate dorsally in distal 0.3; pedicellus and flagellum brownish-testaceous. Fore coxae mainly yellowish. Mid and hind coxae coloured like body; legs otherwise yellow with hind edge of fore tibiae, fore tarsi, basal 0.3 of hind femora and fourth segment of mid and hind tarsi, brown; third segment of mid and hind tarsi brownish apically. Tegulae yellow (an almost unique feature in this genus). Wings hyaline, venation yellow. Length 1.6 mm.

♂. Unknown.

MATERIAL EXAMINED. 1 ♀. Holotype ♀, **Spain**: Granada, Cherin, R. de Alcoleo, 12.v.1986 (Gijswijt) (MJG).

HOSTS. Unknown.

COMMENTS. In some respects this species resembles *embolicus* (Kostjukov) but differs particularly in its antennae.

***Baryscapus impeditus* (Nees) comb.n.**  
(Figs 62, 63, 110, 350)

*Eulophus impeditus* Nees, 1834: 178. Lectotype ♂, Germany: Sickershausen, 1812 (Nees) (UM), designated by Graham (1988: 27) [examined].

*Aprostocetus impeditus* (Nees) Graham, 1961b: 47.

*Tetrastichus impeditus* (Nees) Domenichini, 1966a: 120 ["♀" in error], 1966b: 36.

*Tetrastichus principiae* Domenichini, 1966a: 125, 1966b: 46. Holotype ♀, France: Versailles, 17.v.1955, from pupa of *Chrysopa flavifrons* (Jourdheuil) (MNH) [examined]. [Synonymised with *impediatus* by Graham, 1988: 27.]

*Eutetrastichus impediatus* (Nees) Graham, 1988: 27.

♀. Head slightly wider than mesoscutum, slightly more than twice as broad as long; temples 0.12-0.14 length of eyes; POL 2.5-2.9 OOL, OOL equal to or hardly greater than OD. Eye 1.3 times as long as broad. Malar space about 0.66 length of eye. Vertex with numerous very short pale setae. Antenna (Fig. 62) with scape about 0.8 length of eye, not nearly reaching median ocellus; pedicellus distinctly longer than F1, about 1.8 times as long as broad; funicle proximally slightly stouter than pedicellus, thickening a little distad, its segments equal or subequal in length, quadrate or subquadrate, F1 sometimes a little longer than broad; clava slightly broader than F3, about twice as long as broad, nearly as long as whole funicle; spine of clava about 0.2 length of C3, apical seta slightly shorter than spine; sensilla rather sparse on funicle, more numerous on clava, long, decumbent. Mid lobe of mesoscutum as long as broad or (usually) slightly broader than long, rather strongly convex, only moderately shiny, with extremely fine, hardly raised reticulation having areoles mostly about twice as long as broad; median line sometimes fine though always traceable in some lights, sometimes stronger; a row (sometimes irregular or double) of 4-6 rather short adnotaular setae. Scutellum slightly broader than long, rather strongly convex; submedian lines distinct, at least very slightly nearer to each other than to sublateral lines, enclosed space 2.8-3.5 times as long as broad; setae subequal in length, or anterior pair slightly shorter, their length nearly equal to distance between submedian lines, anterior pair from hardly, to distinctly, behind middle. Propodeum narrowly and shallowly emarginate, as long as or slightly longer than dorsellum, shiny, sculpture fine and weak; median carina weak and hardly raised, broadening posteriorly; spiracles moderate-sized, subcircular, separated by 0.5-0.65 their length from metanotum; callus with 4-7 setae. Legs rather short; hind femora about 3.5 times as long as broad; spur of mid tibia slightly shorter than basitarsus, fourth segment of mid and hind tarsi hardly longer than first. Forewing about twice as long as broad; costal cell distinctly longer than M, 10-11 times as long as broad; SM with 2 dorsal setae; M slightly thickened, 2.2-2.6 times length of ST, its front edge with 8-11 setae; ST thin proximally but expanding from about middle to the moderate-sized stigma; speculum moderate-sized, extended as a narrow strip about half way along M, wing beyond moderately thickly pilose, quite thickly distad; cilia extremely short. Hindwing bluntly pointed or subobtuse, cilia 0.2-0.3 breadth of wing. Gaster subcircular to shortly ovate, slightly pointed, a little shorter than or about as long as thorax, slightly broader than thorax; tergites strongly transverse and with numerous rather long pale setae; last tergite very short, broader than long, reflexed inwards so as to lie nearly ventral, cerci almost ventral; tips of ovipositor sheaths not reaching apex of last tergite but leaving a space (Fig. 63, x). The ovipositor is completely concealed; the apical segment of the sheaths is unusually short, about 0.2 the length of the rest of the third valvula, triangular, about twice as long as broad. Hypopygium (Fig. 350) strongly transverse; lateral lobes very broad, median lobe very short, tapering, subobtuse.

Body usually bright green to blue-green; gaster sometimes tinged with brassy or bronze basally. Antennal scape yellow, occasionally a little darkened at tip dorsally; pedicellus yellowish with a fuscous dorsal mark at base, sometimes extending nearly to tip; flagellum testaceous to brownish-testaceous. Coxae usually coloured like body (in very pale southern European forms fore and mid coxae are pale apically), legs otherwise pale or ochraceous yellow with fourth segment of all tarsi fuscous, fore tarsi sometimes brown; femora usually at least slightly brownish proximally, hind femora usually broadly fuscous, fore and mid femora sometimes infuscate proximally. Tegulae black. Wings hyaline, venation pale to dark yellowish. Length 1.0-1.6 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 110) with scape broader, ventral plaque about 0.6 length of scape; pedicellus plus flagellum 1.2-1.25 times breadth of mesoscutum; pedicellus 1.7-1.8 times as long as broad; funicle proximally hardly or just as stout as pedicellus, thickening very slightly distad; F1 usually a little shorter than F2, F2 to F4 subequal or equal in length, F1 subquadrate, following segments usually a little longer than broad though sometimes quadrate; clava hardly broader than F4, 2.8-3 times as long as broad, with C1 and C2 each about as long as broad; flagellum clothed with pale thin setae, some short but length of the longest equal to breadth of the segments. Gaster oblong-elliptic, narrower than thorax.

MATERIAL EXAMINED. Many ♂, ♀. **Andorra, Czechoslovakia, France, Germany, Italy, Turkey.**

HOSTS. *Chrysopa flavifrons* Brauer, *C. ? carnea* Stephens and *C. sp.* (Neur., Chrysopidae), as endoparasite of the host pupae (Domenichini, 1966a: 125).

COMMENTS. The short, concealed ovipositor of this species and of *chrysopae* is probably connected with their oviposition habits.

**[*Baryscapus chrysopae* (Crawford), comb.n.]**

*Geniocerus chrysopae* Crawford, 1915: 584-585. Holotype (?) ♀, USA: South Carolina, Batesburg, from cocoons of *Chrysopa* (USNM) [not examined].

*Tetrastichus chrysopae* (Crawford) Burks, 1943: 525, fig. 21g.

I have examined paratypes of this species, which is mentioned here because it is closely related to the European *impeditus* (Nees), from which it differs in having larger propodeal spiracles, close to hind margin of metanotum, body black with at most a weak bronze or greenish metallic tinge.

Burks (1943: 510) included *chrysopae* at couplet 1 of his key to species, having "Ovipositor sheaths short, thickened, and somewhat flattened (fig. 21g)" and (couplet 2) "ovipositor sheaths densely covered with short, stout setae". The structures supposed to be ovipositor sheaths, however, appear to be ventrally infolded portions of the last tergite, the ovipositor being wholly concealed as in *impeditus* (Fig. 63) and not reaching the apex of the gaster.]

***Baryscapus adalia* (Walker), comb.n.**

(Figs 58, 348)

*Cirrospilus Adalia* Walker, 1839b: 351. Lectotype ♀, Great Britain: (Walker) (BMNH), designated by Graham (1961b: 47) [examined].

*Tetrastichus adalia* (Walker), 1846: 74; Domenichini, 1966a: 113, 1966b: 16.

*Tetrastichus crassinervis* Thomson, 1878: 289. LECTOTYPE ♀, Sweden: Lund (Thomson), here designated [examined]. [Synonymised with *adalia* by Graham, 1961b: 47.]

*Aprostocetus adalia* (Walker) Graham, 1961b: 47.

*Eutetrastichus adalia* (Walker) Graham, 1987: 43, fig. 51; 379, fig. 731.

There are 5 ♀ syntypes of *crassinervis* in Thomson's collection. The lectotype bears a label "Lund" and my red lectotype label. The remaining specimens are designated paralectotypes.

♀. Head as broad as, or hardly broader than mesoscutum, 2.1-2.3 times as broad as long; temples 0.15-0.2 length of eyes; POL 2.0-2.2 OOL, OOL 1.25-1.5 OD. Eyes 1.3-1.35 as long as broad. Malar space 0.55-0.65 length of eye. Mouth 1.5 times malar space. Antenna (Fig. 58) with scape somewhat longer than an eye and reaching fully to or (usually) above vertex, tapering slightly upwards; pedicellus plus flagellum 1.3-1.45 times breadth of mesoscutum; pedicellus 2.2-2.5 times as long as broad, 0.7-0.9 length of F1; funicle slender, proximally hardly stouter than pedicellus but thickening slightly distad, its segments decreasing slightly in length, F1 2.4-3.3 times, F2 2.1-2.6 times, F3 1.7-2.1 times as long as broad; clava slightly broader than F3, slightly to distinctly shorter than F2 plus F3, 2.6-3 times as long as broad, bluntly pointed, with C1 and C2 not or hardly longer than broad, spine short, apical seta nearly as long as spine; sensilla of funicle relatively sparse, decumbent, usually in two irregular rows on each segment, occasionally only one row on F3. Thorax 1.5-1.65 times as long as broad, strongly arched dorsally. Mid lobe of mesoscutum as long as or very slightly longer than broad, moderately shiny; median line distinct throughout, usually strong; a row of 3-5 setae on each side. Scutellum 1.1-1.25 times as broad as long, strongly convex; submedian lines about equidistant from each other and from sublateral lines, enclosed space

2.5-3.0 times as long as broad; setae subequal, their length about equal to distance between submedian lines, anterior pair slightly behind middle. Propodeum long at sides and medially as long as or slightly longer than dorsellum; surface moderately shiny; median carina not or only weakly raised, broadening in posterior 0.5; callus with 3-5 setae. Legs of medium length and thickness; spur of mid tibia 0.75-0.8 length of basitarsus, basitarsus of mid and hind legs slightly shorter than the second segment. Forewing with costal cell slightly shorter than or as long as M, 9-12 times as long as broad: SM with 2-4 dorsal setae; M more or less thickened (especially at either end) and 12-15 times as long as thick, 2.4-3.2 times length of ST, its front edge with 12-15 rather short setae; ST nearly straight, moderately thick even proximally, weakly expanded to form the stigma which has a projecting lower corner which, with the uncus, makes it appear almost bifurcate; speculum not large, extending as a narrow wedge below M for some distance; wing just beyond speculum moderately thickly pilose, densely so distad; cilia 0.15-0.4 length of ST. Hindwing obtuse or

subobtuse, cilia 0.2-0.25 breadth of wing. Gaster lanceolate, about 1.5 times length of head plus thorax, narrower than thorax, acuminate, 3.5-4.5 times as long as broad; last tergite 1.5-1.7 times as long as broad; ovipositor sheaths projecting slightly beyond last tergite; tip of hypopygium at 0.4-0.45 length of gaster. Hypopygium (Fig. 348) not much broader than long; lateral lobes moderately broad, median lobe long, tapering.

Body with strong metallic tints, varying from green with golden flecks through blue-green to blue. Antennal scape black, extreme tip sometimes testaceous; pedicellus black with tip usually, lower surface often, testaceous; flagellum varying from brownish-testaceous with dorsal edge infuscate, to fuscous or black. Coxae, trochanters wholly or mainly, and femora except their tips, coloured like body; tips of femora moderately broadly, all tibiae and mid and hind tarsi except their brownish tips, yellow to yellowish-testaceous (rarely the tibiae faintly brownish medially); fore tarsi brownish. Wings hyaline or nearly, venation usually yellow to testaceous, occasionally brown, in which case ST tends to be paler proximally. Length 2.1-2.5 mm.

♂. Unknown.

**MATERIAL EXAMINED.** 28 ♀. **Czechoslovakia:** 2 ♀, Slovakia mer., Kamenin, 20.v.1968 (Strejeck), 1 ♀, Kovacov, 19.v.1968 (Strejeck), 1 ♀, 17.vii.1969 (Bouček) (BMNH). **France:** 1 ♀, Hérault, Les Rives, 30.vi.1977 (Gijswijt) (MJG); 1 ♀, Vaucluse, Combe de Veaux, near Malaucène, 5.vi.1980 (Graham) (MVG). **Great Britain:** 16 ♀, Oxfordshire, Otmoor, taken on various dates between 6.vii.1956 (Graham) (BMNH); 2 ♀, unlocalised (Walker) (BMNH). Some of the Otmoor specimens were taken on flowers of *Angelica*. **Sweden:** 4 ♀, Skåne (syntypes of *crassinervis*).

**HOSTS.** Unknown.

**COMMENTS.** This is a very distinct species, recognizable by the characters given in the key to females. Specimens from France, Czechoslovakia and Italy recorded as *adalia* by Domenichini (1967: 83) were misidentified and belong to *endemus* (Walker).

***Baryscapus elasmii* (Graham) comb.n.**  
(Figs 64, 65, 113, 349)

*Tetrastichus elasmii* Graham, 1986: 181-184. Holotype ♀, France: Vaucluse, Malaucène, 28.iv.1981, from nymph of *Elasmus schmitti* Ruschka in nest of *Polistes nimpha* (G. Demolin) (MNHM) [examined].

For description of both sexes see Graham (1986). ♀ hypopygium (Fig. 349). The very short, almost decumbent setae of the mesoscutum in both sexes distinguish this species from all other European species known to me.

**MATERIAL EXAMINED.** 12 ♂, 42 ♀. **France** (Vaucluse) (MNHN, LEMV, MVG).

**HOSTS.** *Elasmus schmitti* Ruschka (Hym., Elasmidae) in nests of *Polistes* (Hym., Vespidae). Demolin stated that *T. elasmii* was an endoparasite of its host, attacking the larvae and pupae and causing a high mortality (95 and even 100

per cent in some nests). Females imbibe fluid from the bodies of *Polistes* nymphs.

***Baryscapus tineivorus* (Ferrière)**

(Figs 66, 108)

*Tetrastichus* sp., Geigy & Zinkernagel, 1941: 225.

*Tetrastichus tineivorus* Ferrière, 1941: 374. Holotype ♀, Switzerland: Bale, 1941, from *Tineola biseliella* (J.R. Geigy) (MHN) [examined].

*Tetrastichus carpatus* Burks, 1943: 566-567. Holotype ♀, USA: California, Monrovia, from *Apanteles carpatus* (W. Moore) (USNM) [examined]. [Synonymised with *tineivorus* by Gahan, 1951: 171.]

*Tetrastichus tineivorus* Ferrière; Gahan, 1951: 171; Peck, 1963: 152; Domenichini, 1966a: 188, 1966b: 51; Burks in Krombein et al., 1979: 1001.

*Aprostocetus tineivorus* (Ferrière) Graham, 1961b: 47.

*Baryscapus tineivorus* (Ferrière) LaSalle & Graham, 1990: 124.

The holotype ♀ of *tineivorus* bears the data cited above, Ferrière's determination label, and a red label "TYPUS".

♀. Head collapsed in the specimens seen. Eyes about 1.4 times as long as broad. Malar space about 0.66 length of eye, sulcus distinctly curved. Antenna (Fig. 66) with scape distinctly shorter than eye, not reaching median ocellus, its front edge with a row of 7-10 short setae; pedicellus plus flagellum nearly or just equal to breadth of mesoscutum; pedicellus as long as or slightly longer than F1, about twice as long as broad; funicle proximally as stout as or slightly stouter than pedicellus, filiform or thickening very slightly distad, its segments decreasing in length, F1 1.7-2.0 times, F2 about 1.5 times, F3 1.0-1.3 times as long as broad; clava slightly broader than F3, distinctly longer than F2 plus F3, about twice as long as broad, pointed, C1 slightly transverse, C2 hardly longer and about as long as broad, spine hardly longer than broad with apical seta about as long as spine; sensilla moderately numerous, decumbent. Thorax 1.2-1.3 times as long as broad, strongly arched dorsally. Mid lobe of mesoscutum 1.2-1.4 times as broad as long; median line distinct; 8-12 setae on each side, arranged in two or three irregular rows. Scutellum 1.3-1.5 times as broad as long, moderately convex in profile; submedian lines slightly nearer to sublateral lines than to each other, enclosed space 1.9-2.2 times as long as broad; length of setae somewhat less than distance between submedian lines, anterior pair in middle. Propodeum medially 1.5-2.0 length of dorsellum; median carina weakly raised thin basally but broadening caudad; callus with 3-5 setae. Legs rather short; hind femora about 3.5 times as long as broad; spur of mid tibia 0.65 length of basitarsus. Forewing with costal cell very slightly longer than M; SM with 2 dorsal setae; M rather thick, about 3 times length of ST, its front edge with 9-12 setae; apical margin bare; speculum small, hardly extended below M; wing beyond it moderately thickly pilose, the setae short. Hindwing bluntly pointed; cilia 0.2-0.25 breadth of wing. Gaster long-ovate to lanceolate, 1.2-1.4 times as long as head plus thorax, slightly narrower than thorax, strongly acute though not acuminate, 2.0-3.0 times as long as broad; last tergite as broad as or a little broader than long; tips of ovipositor sheaths projecting very slightly; tip of hypopygium at about 0.5 length of gaster.

Body with weak (sometimes hardly perceptible) bluish or greenish-blue tint; sides of dorsellum sometimes testaceous (? teneral state). Antennal scape and pedicellus yellowish to testaceous, scape sometimes darkened dorsally, pedicellus infusate dorsally at least at base; flagellum testaceous to brownish. Coxae coloured like body; trochanters fuscous or partly yellowish; femora black, tips yellowish; rest of legs yellowish to testaceous with tibiae usually more or less brown to fuscous medially, sometimes mainly so; fourth segment of tarsi brownish. Wings hyaline, venation yellowish to testaceous. Length 1.1-1.6 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 108) with scape about 3.5 times as long as broad, ventral plaque 0.65 length of scape, front edge with several short setae; pedicellus plus flagellum 1.15-1.2 times breadth of mesoscutum; pedicellus somewhat longer than F1 and about 1.8 times as long as broad; funicle as stout as or slightly stouter than pedicellus, nearly filiform, F1 a little shorter and narrower than the following segments, all slightly longer than broad; clava slightly broader than funicle, nearly as long as F2 plus F3 plus F4 and nearly 3 times as long as broad, with C1 not longer than broad, C2 about 1.5 times as long as C1 and 1.5 times as long as broad; funicle clothed with short setae and a few longer ones, clava with moderately long slightly curved setae. Gaster oblong or elliptic, about as long and nearly as broad as thorax.

MATERIAL EXAMINED. 4 ♂, 23 ♀. **Great Britain, Switzerland, USA.**

HOSTS. *Niditinea fuscipunctella* (Haworth), *Tinea pellionella* (L.), *Tineola bisselliella* (Hummel) (Lep., Tineidae); and (facultatively) *Apanteles carpatus* (Say) (Hym., Braconidae); a gregarious endoparasite of the host larvae.

***Baryscapus mucronatus* sp.n.**

(Figs 67, 351)

♀. Resembles that of *oophagus* (Otten) in its very small size and general facies but differs from it and from other species of the genus in its short, strongly clavate antennal flagellum and conspicuously long claval spine.

Antenna (Fig. 67) with pedicellus 1.8-2.0 times as long as broad, very distinctly longer than F1; funicle proximally hardly or only just as stout as pedicellus, thickening at most very slightly distad; funicular segments often decreasing slightly in length though sometimes subequal in length, F1 quadrate to 1.5 times as long as broad, F2 quadrate or very slightly longer than broad, F3 quadrate; clava much broader than F2, 1.8-2.0 times as long as broad, nearly or quite as long as whole funicle, its segments decreasing in length, C1 quadrate, spine conspicuous, tending to be slightly curved, 0.75-0.9 length of C3, with apical seta about 0.33 length of spine; sensilla rather sparse. Mid lobe of mesoscutum with one row of 2-3 (-4) adnotaular setae on each side. Propodeal callus with 2-3 setae. Gaster lanceolate, 2.2-2.7 times as long as broad. Hypopygium (Fig. 351) slightly transverse; lobes subequal in length, median lobe tapering and subacute.

Colour much as in *oophagus*. Length 0.8-1.2 mm (one of the smallest species of the genus).



♂. Unknown.

MATERIAL EXAMINED. 18 ♀. Holotype ♀, **France**: Var, Bois de Pourrières, 24.vii.1979, swept in a wood of parasol pine (*Pinus pinea* L.) (Graham) (BMNH).

Paratypes. **France**: 15 ♀, same data as holotype; 1 ♀, Dordogne, near Les Eyzies, 6.viii.1974; 1 ♀, Vaucluse, St. Pierre de Vassols, 11.viii.1976 (Graham) (BMNH).

*Baryscapus multisetosus* sp.n.

(Figs 68, 69)

♀. Head about 2.5 times as broad as long; temples 0.15 length of eyes, rounded; POL 2.3 times OOL, OOL 1.25-1.4 OD. Eyes 1.25-1.3 times as long as broad, separated by 1.2 their length. Malar space 0.66 length of eye. Mouth 1.2 malar space. Antenna (Fig. 68) with scape 0.85-0.87 length of eye, not reaching median ocellus; pedicellus plus flagellum slightly less than breadth of mesoscutum; pedicellus twice as long as broad, very slightly longer than F1; funicle proximally slightly stouter than pedicellus, thickening slightly distad, its segments subequal in length, F1 1.4-1.5 times, F2 1.25-1.3 times, as long as broad, F3 quadrate; clava slightly broader than F3, 1.9-2.0 times as long as broad, its segments decreasing in length, spine about 0.25 length of F3; sensilla not very numerous except on clava, in one irregular row on each segment; setae of flagellum rather short, tending to be straight. Thorax 1.3-1.4 times as long as broad. Mid lobe of mesoscutum slightly broader than long, with median line complete, or obsolescent just in front; two or three irregular rows of setae on each side, composed of 5-6, 2-4 and 0-3 setae respectively. Scutellum 1.25-1.28 times as broad as long; submedian lines about equidistant from each other and from sublateral lines, enclosed space 2.8 times as long as broad. Propodeum medially slightly shorter than dorsellum; median carina low, rather broad, expanding posteriorly, smooth; spiracles moderate-sized, oval, 0.15-0.2 their length from hind margin of metanotum; callus with 6-10 setae. Legs of medium length and thickness; spur of mid tibia 0.73 length of basitarsus. Forewing (Fig. 69) twice as long as broad; costal cell equal in length of M, 8.5-10 times as long as broad; SM with 5-9 rather short dorsal setae; M thick, 2.35-2.55 times length of ST, its front edge with 13-15 setae; PM rudimentary; ST thick, with a large subrhomboidal stigma; basal vein pilose, the pilosity occasionally forming a triangular patch of setae; speculum small, not extended below M, wing beyond densely pilose, especially distad; cilia 0.12-0.15 length of ST. Hindwing obtuse, cilia 0.16-0.19 breadth of wing. Gaster ovate, nearly as long as head plus thorax, 1.7-2.2 times as long as broad, bluntly pointed or somewhat acute; last tergite slightly broader than long; ovipositor sheaths hardly projecting; tip of hypopygium at about 0.55 length of gaster.

Dark blue. Antennae black. Legs black with bluish tint; tips of femora, anterior surface of fore tibiae, bases and tips of mid and hind tibiae, and segments 1 and 2 of mid and hind tarsi, yellow. Wings slightly tinged with grey, venation sordid testaceous to brownish-grey. Length 1.6-1.9 mm.

♂. Differs from that of *bruchophagi* (Gahan) as follows. Antenna with clava

not broader than funicle, somewhat shorter than F2 plus F3 plus F4. Mid lobe of mesoscutum with about 11 setae on each side, arranged in two irregular rows plus a third partial row. Forewing: SM with 4-5 dorsal setae; M thick, 3.4 times length of ST, the latter rather thin at base but gradually broadening to the large stigma.

Superficially *multisetosus* rather resembles *endemus* (Walker), especially as regards the ♀ antennae, but it differs in the greater number of dorsal setae on SM, thicker M and ST, greater number of setae on propodeal callus and shorter gaster. The ♂ of *multisetosus* differs from that of *endemus* particularly in the lack of compact whorls of long dark setae on the funicular segments.

**MATERIAL EXAMINED.** 1 ♂, 10 ♀. Holotype ♀, **France:** Var, St. Tropez, 15.vi.1980 (Bouček) (BMNH).

**Paratypes.** **Cyprus:** 4 ♀, Prodhormos, 1400m, 17.vi.1971 (M.J. & J.P. Duffels) (ITZ). **France:** 1 ♀, same data as holotype but taken 12.vi.1980 (BMNH). **Greece:** 1 ♀, Kriti, Kato Assiti, 27.iv.1978 (Gijswijt) (ITZ). **Spain:** 1 ♂, 2 ♀, Avila, Candaleda, between 24. and 30.vi.1986 (Gijswijt) (MJG).

***Baryscapus servadeii* (Domenichini), comb.n.**  
(Figs 70, 114, 352)

[*Tetrastichus attalus* Walker: Dours, 1873: 110, in part. Misidentification.]

[*Tetrastichus miser* Nees: de Gaulle, 1908: 107. Misidentification.]

[*Tetrastichus tibialis* (Kurdjumov) Androic, 1956: 250-261; Biliotti, 1958: 23-24. Misidentification.]

*Tetrastichus servadeii* Domenichini, 1966a: 113-116. Holotype ♀, Italy: Gemona (Friuli), 6.vii.1958 (A. Servadei) (GD) [examined].

*Tetrastichus servadeii* Domenichini, 1966b: 48-49, 1967: 83.

The description given by Domenichini (1966a) is sufficient for recognizing the ♀ of *servadeii*. The position of the tip of the hypopygium, situated far beyond the middle of the gaster (illustrated in Domenichini's figure 9) distinguishes it from females of all other species of the *evonymellae*-group. Hypopygium (Fig. 352) characteristic, not much broader than long, with lateral anterior lobes broad, median lobe shorter though longer than broad.

Domenichini (1966a: 115) stated that 5 anelli were present in the ♀ antenna; I can detect only 3.

♂. Differs from ♀ as follows (description made from ♂ allotype). Antenna (Fig. 114): scape with ventral plaque 0.42 length of scape; pedicellus plus flagellum 1.5 breadth of mesoscutum; pedicellus slightly longer than F1; F1 distinctly shorter than the following segments, hardly longer than broad; F2 to F4 subequal in length, each 1.8-2.0 times as long as broad; clava nearly 6 times as long as broad, longer than F3 plus F4, with C1 and C2 subequal in length, each about 1.5 times as long as broad, C3 shorter, spine about 0.3 length of C3; funicle without compact whorls of long dark setae. Gaster oblong, as long as but much narrower than thorax, with a fairly distinct subbasal, circular testaceous spot.

MATERIAL EXAMINED. 2 ♂, many ♀. Bulgaria, France, Greece, Italy, Jugoslavia, Portugal, Spain, Turkey, Algeria, Tunisia, Israel.

HOSTS. *Thaumetopoea pityocampa* (D. & S.) and *T. wilkinsoni* Tams (Lep., Thaumetopoeidae), as a solitary endoparasite of the host egg. The species is normally uniparental and I have seen only two males.

*Baryscapus agrilorum* (Ratzeburg), comb.n.  
(Figs 71-73)

*Eulophus agrilorum* Ratzeburg, 1844: 169. LECTOTYPE ♀, Germany: Harz, Blankenburg, 1838 (NM), here designated [examined].

*Entedon agrilorum* Ratzeburg, 1848: 168.

? *Tetrastichus agrilorum* (Ratzeburg) Delucchi, 1954: 102-105, figs 3A-D.

Ratzeburg originally had one male and 10 females of *agrilorum*. Delucchi (1954: 102) stated "die Typen seiner Sammlung nicht mehr existieren". However, 2 ♀ syntypes of *agrilorum* from Ratzeburg's collection are still extant in NM, Vienna. They are mounted side by side on a card tag and bear labels "Eulophus"; "Collectio Ratzeburg"; "agrilorum R. det. Ratzeburg". They agree with the description. A ♀ with complete antennae, placed near the staging pin, is designated lectotype. The other ♀, lacking both antennal clavae, is designated paralectotype.

♀. Head somewhat collapsed in the specimens seen. Eyes 1.4 times as long as broad, with very short but moderately thick pubescence. Malar space about 0.66 length of eye. Mouth about 1.3 malar space. Antenna (Fig. 71) with scape about as long as eye, nearly 4 times as long as broad, almost reaching median ocellus; pedicellus plus flagellum slightly less than breadth of mesoscutum; pedicellus 2.3-2.4 times as long as broad, slightly shorter than F1; funicle proximally slightly stouter than pedicellus, thickening slightly distad, its segments decreasing a little in length, F1 about twice, F2 almost twice, F3 about twice as long as broad; clava slightly broader than F3, three times as long as broad, slightly longer than F2 plus F3, bluntly pointed; C1 slightly longer than broad, C2 and C3 progressively shorter; spine about 0.3 length of C3, apical seta 0.5-0.66 length of spine; sensilla numerous, in two irregular and partly overlapping rows on each funicular segment and C1, in one row on C2 and C3, virtually decumbent; setae mostly short, very slightly curved, some on F3 and claval segments longer and curved. Thorax nearly 1.5 times as long as broad. Pronotum with 16-20 not very long setae near hind edge and several shorter ones at sides. Mid lobe of mesoscutum hardly broader than long, moderately convex, moderately shiny, with extremely fine superficial reticulation having areoles averaging twice as long as broad; median line distinct throughout; 9-12 setae on each side, arranged in one irregular row or two rows, setae rather short except the posterior one of each side. Scutellum slightly broader than long, moderately convex in profile; sculpture slightly finer than that of mesoscutum; submedian lines, distinct, about equidistant from each other and from sublateral lines enclosed space 2.3-2.7 times as long as broad; setae equal in length, anterior pair about in middle. Propodeum narrowly and shallowly emarginate, medially slightly longer than dorsellum; moderately shiny with extremely fine superficial

reticulation; median carina vague, hardly raised, thin at base but rapidly broadening so as to be subtriangular; spiracles suboval, 0.5-0.8 their length from hind edge of metanotum; callus with 5-6 setae. Legs long and slender; hind femora about 4.2 times as long as broad; hind tibia about 12 times as long as thick; spur of mid tibia 0.55 length of basitarsus, fourth tarsal segment 0.66 length of basitarsus. Forewing (Fig. 72) 2.2-2.3 times as long as broad; costal cell 10-11 times as long as broad; SM with 3-4 dorsal setae; M not very thick, about as long as costal cell, 2.7-3 times length of ST, its front edge with 14-17 setae; ST thin proximally, stigma small and subrhomboidal; PM a distinct stub; speculum small, hardly extended below M, wing beyond it rather thickly pilose, almost densely so distad; a narrow bare strip above ST and another extending distad from the stigma, a third extending obliquely from lower edge of stigma; cilia about 0.12 length of ST. Hindwing obtuse, cilia 0.15 breadth of wing. Gaster (Fig. 73) characteristic, linear-lanceolate-cuneate, 2.3-2.4 times length of thorax and about 5 times as long as broad; last tergite 3.3-4.1 times as long as broad, setose except basally; tips of ovipositor sheaths projecting somewhat; tip of hypopygium at 0.4 length of gaster.

Body black with moderately strong metallic tints, on head and thorax mostly blue-green and green, in one ♀ slightly brassy on disc of scutellum; gaster dorsally coppery-bronze with distal tergites mainly blue-green, ventrally with bronze and greenish tints. Antennae fuscous; tip of scape, and of pedicellus very narrowly, paler. Coxae, and all femora except their tips rather narrowly, black with metallic tint; trochanterelli paler; tips of femora, tibiae and tarsi yellowish-testaceous, mid tibiae with brownish postmedian band, hind tibiae brownish except bases and tips; fore tarsi brownish, fourth segment of mid and hind tarsi brown. Wings hyaline, venation testaceous. Length 2.8-3.15 mm.

♂. Unknown to me. That described by Delucchi (1954: 104) may be the true male but not having access to his material I cannot check this.

MATERIAL EXAMINED. 3 ♀. **Germany:** 2 ♀, Harz, Blankenburg, 1838 (Ratzeburg) (NM); 1 ♀, Baden Wurtemberg, Ringingen, Hohenzollern, 25.v.1957, from *Agrilus viridis* L. (Wellenstein) (BMNH).

HOSTS. *Agrilus viridis* L. (Col., Buprestidae), possibly also *A. aurichaleus* Mannerheim, *A. biguttatus* F., and *A. mendax* Mannerheim.

COMMENTS. The greater part of Delucchi's redescription of *agrilorum* (1954: 102-105), based on material reared in Germany, agrees well with the extant syntypes, except his statement (p. 104) that the gaster is about 3 times as long as broad. His material needs to be re-examined.

*Baryscapus hylesini* sp.n.  
(Figs 76, 77, 116)

[*Tetrastichus agrilorum* Ratzeburg; Domenichini, 1966a: 122. Misidentification.]

♀. Differs from that of *agrilorum* (Ratzeburg) as follows. Antenna (Fig. 76) with scape only about 0.85 length of eye and 3.5 times as long as broad; pedicellus hardly shorter than F1; funicular segments a little shorter, F1 1.8-1.9 times, F2

1.5-1.6 times, F3 1.5-1.6 times as long as broad; clava 2.6-2.8 times as long as broad, with C1 not longer than broad. Mid lobe of mesoscutum with one slightly irregular row of 4-8 short adnotaular setae on each side. Propodeum: spiracles separated by about 0.35 their length from hind edge of metanotum; callus with 3 setae. Legs rather shorter and thicker; hind femora somewhat less than 4 times as long as broad; hind tibia about 9 times as long as thick; spur of mid tibia fully 0.75 length of basitarsus. Gaster (Fig. 77) shorter, only 1.3-1.5 length of head plus thorax and 3.0-4.3 times as long as broad; last tergite 1.5-2 times as long as broad (but hardly longer than broad in one ♀), less extensively setose.

Metallic tints stronger: head and thorax blue-green to blue, scutellum sometimes bronzy distally; gaster similarly coloured but sometimes the disc subbasally, and hind margins of tergites very narrowly, purplish. Antennal scape and pedicellus yellowish, more or less darkened dorsally; flagellum brownish-testaceous. Tibiae pale yellow. Length 1.7-2.3 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 116) with scape broader, ventral plaque about 0.62 length of scape; pedicellus about twice as long as broad, a little longer than F1; flagellum filiform, F1 slightly shorter than the following segments and 1.6 times as long as broad, following segments equal in length, each twice as long as broad; clava about 4.3 times as long as broad, much longer than F3 plus F4, its segments somewhat longer than broad; each segment of funicle with a compact subbasal whorl of dark setae which reach at most to the tip of the segment.

MATERIAL EXAMINED. 2 ♂, 8 ♀. Holotype ♀, **Italy**: Piemonte, 10.v.1960 (Arru) (BMNH).

Paratypes. **Italy**: 2 ♂, 5 ♀, same data as holotype (BMNH).

Non-paratypic material. **Great Britain**: 3 ♀, Surrey, Ranmore Common, i.1936, "bred from mature larva in tunnels of *Hylesinus fraxini*" (O.W. Richards) (BMNH).

HOSTS. *Agrilus suvorovi populneus* (Schaeff.) (Col., Buprestidae), attacking the final stage larvae.

***Baryscapus eudolichocerus* sp.n.**

(Fig. 74)

♀. Head about as broad as mesoscutum; temples 0.15 length of eyes. Eyes 1.42 times as long as broad, with sparse, excessively short pubescence. Malar space 0.6 length of eye. Mouth hardly greater than malar space. Antenna (Fig. 74) with scape 0.93 length of eye, reaching lower edge of median ocellus; pedicellus plus flagellum 1.45 breadth of mesoscutum; pedicellus much shorter than F1, 1.8 times as long as broad; funicle proximally somewhat stouter than pedicellus, thickening a little distad, its segments decreasing in length, F1 2.5 times, F2 2.15 times, F3 1.6 times as long as broad; clava somewhat broader than F3, about as long as F2 plus F3, 2.55 times as long as broad, bluntly pointed, its segments decreasing in length, C1 slightly longer than broad, C2 quadrate, spine 0.2 length of C3; sensilla moderately numerous, irregularly uniseriate. Thorax 1.45 times as long as broad, strongly arched dorsally. Mid lobe of mesoscutum 1.25 times

as broad as long; median line complete, distinct; setae forming two (- three) irregular rows on each side, composed of 5, 2, and 0 or 2 setae respectively. Scutellum 1.4 times as broad as long, strongly convex; submedian lines very slightly nearer to each other than to sublateral lines, enclosed space 3 times as long as broad; setae equal, their length equal to distance between submedian lines. Propodeum medially hardly shorter than dorsellum, weakly alutaceous; median carina low, rather vague, expanding posteriorly; spiracles oval, close to metanotum; callus with 4-5 setae. Legs not thick; hind femora 4.2 times as long as broad; spur of mid tibia 0.75 length of basitarsus, which is slightly shorter than second tarsal segment. Forewing 2.15 times as long as broad; costal cell slightly longer than M, 10.5 times as long as broad; SM with 3-4 dorsal setae; M thick, 2.55 length of ST, its front edge with 11 setae; PM a short stub; ST not thin proximally, gradually expanding into the stigma; speculum moderate-sized, extending as a very narrow strip below M; wing beyond it moderately thickly pilose, only very slightly more so distad; cilia 0.25 length of ST. Hindwing obtuse, cilia 0.35 breadth. Gaster lanceolate, 1.7 times length of thorax, much narrower than thorax (but sides are abnormally rolled inwards), 4.5 times as long as broad, strongly acute; last tergite nearly twice as long as broad; ovipositor sheaths projecting somewhat; tip of hypopygium apparently at 0.5 length of gaster.

Body deep blue; hind margins of anterior gastral tergites narrowly purplish. Antennal scape and pedicellus black, flagellum fuscous. Coxae, trochanters, and femora except their tips narrowly, bluish-black; fore tibiae mainly testaceous, mid and hind tibiae blackish with bases and tips narrowly yellowish; tarsi brownish with basitarsus of mid and hind legs testaceous. Wings subhyaline, venation brownish-testaceous, ST paler proximally. Length 1.85 mm.

♂. Unknown.

The ♀ of *eudolichocerus* much resembles that of *szoecsi* (Erdős) but has eyes, antennal scape and F1 relatively longer, clava slightly shorter; forewing rather more thickly pilose beyond speculum, forewing venation and legs darker.

MATERIAL EXAMINED. 1 ♀. Holotype ♀, **France**: Lozère, Mont Aigoual, Hort de Dieu, 5.viii.1978 (Graham (BMNH)).

HOSTS. Unknown.

***Baryscapus buxi* (Kostjukov), comb.n.**

*Tetrastichus buxi* Kostjukov, 1978: 444. Holotype ♀, USSR: Moldavia, Kishinev, 19.vii.1974, from *Psylla buxi* (Poddubny) (ZIL) [not examined].

This species has been included in my key to females on the basis of the original description. Its male is unknown.

MATERIAL EXAMINED. None.

HOSTS. *Psylla buxi* L. (Hem., Psyllidae).

***Baryscapus sugonjaevi* (Kostjukov), comb.n.**

*Tetrastichus sugonjaevi* Kostjukov, 1976a: 171-173. Holotype ♀, USSR: Moldavia, Karmanovo, from cocoon of *Microterys hortulanus* on *Sphaerolecanium prunastri*, 23.v.1965 (Goantza) (ZIL) [not examined].

Thanks to Professor Trjapitzin, I have been able to examine paratypes of this species.

♀. For description (in Russian) and figures including hypopygium, see Kostjukov (1976a).

♂. Unknown, according to Kostjukov (1976: 173); in his figures 17 and 18 he illustrated the antenna and venation of a male but this appears to belong to some species of *Aprostocetus*.

MATERIAL EXAMINED. 3 ♀. Distributed from Moldavian USSR eastwards through Armenia, Tadzhikistan, Kazakhstan, Altai and Primorsk regions.

HOSTS. Several species of soft scales (Coccoidea, Coccidae) and their chalcidoid (Encyrtidae) parasites (see Kostjukov, 1976a).

***Baryscapus phytomyzae* (Kostjukov), comb.n.**

*Tetrastichus phytomyzae* Kostjukov in Kostjukov & Dyurich, 1978: 26-29. Holotype ♀, USSR: Moldavia, Bender, from *Phytomyza*, 13.xii.1971 (G. Dyurich) (ZIL) [not examined].

Professor Trjapitzin kindly made paratypes of this species available for examination.

♀. This should be recognizable from the characters mentioned in the key to females. For further details see the original description.

♂. Unknown.

MATERIAL EXAMINED. 2 ♀. Distributed from Moldavian USSR through Armenia to Samarkand region. Its host has a wide distribution westward, so that *phytomyzae* should be sought there.

HOSTS. *Phytomyza orobanchia* Kaltenbach (Dipt., Agromyzidae).

***Baryscapus szoecsi* (Erdős) comb.n.**

(Figs 78, 79, 115)

*Geniocerus szoecsi* Erdős, 1958: 221. LECTOTYPE ♀, Hungary: Fót, reared 2.viii.1954 from *Lithocolletis manni* on *Quercus* (J. Szöcs) (TM), here designated [examined].

*Aprostocetus szoecsi* (Erdős) Graham, 1961b: 47.

*Tetrastichus szoecsi* (Erdős) Domenichini, 1966a: 118, 1966b: 50, 1967: 83; Erdős, 1971: 246-247, fig. 89; Kostjukov, 1978: 444.

*Eutetrastichus szoecsi* (Erdős) Graham, 1987: 379, fig. 733.

The lectotype ♀ is labelled "Fót 1954.viii.2 Szöcs; E Lithocollete manni Z. in Quercu; ♀; Cotypus [pink label]; *Geniocerus szoecsi* Erd. det. Erdős." Erdős (1958, fig. 9) gave a figure of the whole insect (♀) which represents it quite well, except that the submarginal vein is shown as having too many dorsal setae.

♀. Very like that of *pospelovi* (Kurdjumov) but gaster longer and more acuminate, last tergite relatively longer, antennal clava (Fig. 78) tending to be slightly more elongate.

Gaster (Fig. 79) lanceolate, very strongly acute and acuminate, narrower than thorax, 1.8-2 times length of thorax and 3.4-4.5 times as long as broad; last tergite 1.5-2.1 times as long as broad; ovipositor sheaths projecting by a length equal to 0.15-0.2 that of hind tibia; tip of hypopygium before middle of gaster. Setae of mesoscutum variable: in small specimens there is a row of 5 plus 1 or 2 of a second row, on each side, but in some large ♀ the setae are arranged in three rows of 5, 3 and 3 respectively.

Body dark to rather bright blue. Tibiae white or cream. Wing venation yellowish to testaceous. Length 1.5-2.6 mm.

♂. Differs from that of *pospelovi* in having funicular segments of antenna (Fig. 115) without compact subbasal whorls of dark setae. Gaster immaculate.

MATERIAL EXAMINED. 18 ♂, 6 ♀. **Czechoslovakia, France, Great Britain, Hungary, Italy.**

HOSTS. The species appears to be normally hyperparasitic on hymenopterous parasites of Lepidoptera. Reared from *Phyllonorycter manni* (Zeller) by Erdős (1958) and in Britain from *P. roboris* (Zeller) by Askew (Lep., Gracillariidae), probably as hyperparasites. In Czechoslovakia, Capek reared it from *Apanteles* sp. on *Biston strataria* (Hugnagel) (Lep., Geometridae), also from "*Eulophus* sp." on *Orthosia stabilis* (D. & S.) (Lep., Noctuidae). Dr. P. du Merle (INRA, Avignon) has reared males in Vaucluse, from pupae of *Elachertus fenestratus* (Nees), *Sympiesis xanthostoma* (Nees), *Pteromalus (Habrocystus)* sp., either *chrysos* (Walker) or *semotus* (Walker), also from a cocoon of *Apanteles* sp.; all these being parasites of *Tortrix viridana* (L.) which had probably been reared from a braconid parasite of *Xylina* (= *Lithophane*) *ornitopus* Rott. (Lep., Noctuidae) and (1967: 83) recorded *Yponomeuta mahalebella* Gr. as a further host in Italy.

***Baryscapus evonymellae* (Bouché)**  
(Figs 80, 112)

*Eulophus evonymellae* Bouché, 1834: 172, "♂". Syntypes, Germany (destroyed). NEOTYPE ♀, USSR: Moldavia, Kishinev, reared 7.vii.1964 from pupa of *Yponomeuta cagnatella* (Hübner) (Talitzkii) (BMNH), here designated [examined].

*Tetrastichus evonymellae* (Bouché) Walker, 1846: 73.

*Entedon evonymellae* (Bouché) Ratzeburg, 1848: 168, 1852: 212.

*Entedon cribrellae* Rondani, 1877a: 174-175. Lectotype ♀, Italy (Rondani), designated by Bouček (1974: 248) [examined]. [Synonymised with *evonymellae* by Bouček, 1974: 248.]

*Tetrastichus evonymellae* (Bouché) Ruschka, 1924: 6-16; Servadei, 1930: 275-282; Domenichini, 1966a: 117, 1966b: 31, 1967: 83; van den Assem, Gijswijt & Nübel, 1982: 209-210.

*Geniocerus evonymellae* (Bouché) Erdős, 1954: 359.

*Aprostocetus evonymellae* (Bouché) Graham, 1961b: 47.

*Baryscapus evonymellae* (Bouché) LaSalle & Graham, 1990: 124.

Bouché referred to his material as "Mann" (1834: 172) but on the following page he described the abdomen as "lang zugespitzt" which, with the colour of antennae



and legs described, fits only the female sex. The species has occasionally been misidentified (e.g., by Thomson, 1878; Marchal, 1900) but there has been general agreement as to its identity since the time of Walker and Förster, as proved by the specimens in their respective collections. This information has been transmitted through specialists, while the host-association has also been a useful indication. As *evonymellae* has never been described in detail, a redescription is given here.

♀. Head nearly or about as broad as mesoscutum; temples 0.1 length of eyes; POL about 2.5 OOL, OOL 1.0-1.2 OD. Eyes 1.25 times as long as broad, separated by 1.1-1.3 times their length, moderately thickly clothed with very short pubescence. Malar sulcus 0.66 length of eye. Mouth slightly greater than malar space. Antenna (Fig. 80) with scape distinctly shorter than eye, not nearly reaching median ocellus; pedicellus plus flagellum nearly or just as great as breadth of mesoscutum; pedicellus 2.0-2.2 times as long as broad, usually equal in length to F1, occasionally slightly longer, or shorter; funicle proximally very slightly stouter than pedicellus, thickening a little distad, its segments decreasing slightly in length or subequal, F1 1.5-2.2 times, F2 1.3-1.8 times, F3 1.0-1.6 times as long as broad; clava slightly broader than F3, as long as or somewhat longer than F2 plus F3, 2.0-2.6 times as long as broad, spine 0.35 length of C3; sensilla rather sparse, in one irregular or partly double row on each segment, decumbent. Thorax 1.35-1.4 times as long as broad. Mid lobe of mesoscutum fully as broad as long or slightly broader than long, moderately shiny, with excessively fine lightly-engraved reticulation, areoles mostly 2-2.5 times as long as broad; median line complete, usually strong; 2-4 irregular rows of setae on each side (9-20 each side), usually leaving a median band bare but rarely scattered over the whole surface. Scutellum 1.2-1.3 times as broad as long; submedian lines about equidistant from each other and from sublateral lines, enclosed space 2.5-3 times as long as broad; setae subequal in length, which is nearly as great as distance between submedian lines. Propodeum narrowly and moderately deeply emarginate, medially as long as or a little longer than dorsellum, moderately shiny, with extremely fine, hardly raised reticulation; median carina only slightly raised, relatively broad; spiracles oval, separated by about 0.5 their length from metanotum; callus with 3-6 setae. Legs of medium length and thickness; hind femora 3.8-4.3 times as long as broad; spur of mid tibia about 0.75 length of basitarsus. Forewing 2.05-2.15 times as long as broad; costal cell slightly longer than M, 8-9.5 times as long as broad; SM with 2-3 (-4) dorsal setae; M moderately thick, 2.0-2.8 times length of ST, its front edge with 10-14 fine setae which are less than 0.5 length of ST; ST rather thin proximally but expanding gradually to form a thick oblong stigma; basal vein with a few setae; speculum moderate-sized, extending as a wedge below M and sometimes reaching ST; often a small bare patch above ST; wing beyond speculum rather sparsely pilose, but more thickly distad; cilia at most 0.4 length of ST. Hindwing obtuse or rounded, cilia at most 0.25 breadth of wing. Gaster normally lanceolate but shorter in some specimens, 1.7-3.6 times as long as broad, 1.5-1.85 times length of thorax, usually narrower than thorax, acute and slightly acuminate; last tergite usually 1.3-1.8 times as long as broad, rarely only as long as or slightly shorter than broad; ovipositor sheaths projecting slightly; tip of hypopygium at 0.4-0.5

length of gaster. Hypopygium similar to that of *endemus* (Fig. 354).

Colour rather variable. Most European specimens have moderately strong metallic tints on head and thorax, mainly olive-green to bluish-green; dorsum of thorax sometimes more or less suffused with bronze or coppery-bronze; gaster with bronze to purplish transverse bands on the basal part of each segment, sometimes whole disc so coloured. Antennal scape sometimes black with only the tip yellowish, sometimes yellowish ventrally, rarely wholly yellow; pedicellus and flagellum varying from yellowish-testaceous to brown, the articulations usually darker, pedicellus infusate dorsally, at least at base, flagellum occasionally more or less infusate dorsally. Coxae coloured like thorax, trochanters fuscous or partly yellow; femora black, their tips more or less broadly yellow; tibiae yellow or occasionally infusate medially; tarsi yellow, fourth segment often brown, sometimes tarsi gradually darkening distad. Wings hyaline, venation yellow to testaceous. British ♀ tend to have antennal scape heavily infusate dorsally, often also pedicellus and flagellum; mid and hind tibiae, except bases and tips, testaceous, brown or fuscous; venation often brownish-testaceous. Length 1.3-2.7 mm.

♂. Antenna (Fig. 112) characteristic: scape a little shorter than eye, about 3 times as long as broad, ventral plaque in middle and 0.5-0.52 length of scape; pedicellus plus flagellum 1.25-1.3 breadth of mesoscutum; pedicellus about twice as long as broad, 1.3-1.5 times length of F1; funicle proximally about as stout as pedicellus, hardly thickening distad, with F1 slightly shorter than the following segments which are subequal in length, F1 1.3-1.8 times, F2 1.6-2.0 times, F3 1.4-1.9 times, F4 1.4-1.7 times as long as broad; clava slightly broader than F4, somewhat longer than F3 plus F4, 2.6-3.2 times as long as broad, with C1 distinctly shorter than both F4 and C2, as long as broad or very slightly transverse, C2 longer and subquadrate, C3 shorter, spine about 0.33 length of C3; sensilla sparser than in ♀; flagellum with pale setae which stand out at a moderate angle, some short, others about 0.7 length of the segments; no compact whorls of dark setae. Gaster oval or oblong, about as long but slightly narrower than thorax.

Antennae usually entirely yellow, sometimes ventral plaque of scape and articulations of flagellar segments brownish, pedicellus occasionally brownish basally. Fore and mid femora usually yellow, occasionally darker at base; hind femora less extensively dark than in ♀; rest of legs yellow. Gaster with yellowish subbasal spot (occasionally indistinct) or transverse band.

**MATERIAL EXAMINED.** Many ♂, ♀. **Belgium, Czechoslovakia, France, Germany, Great Britain, Hungary, Italy, Jugoslavia, Netherlands, Romania, Spain, Sweden, Switzerland, USSR, Iran, USA** (? introduced). I have examined a ♀ from the Sudan (Erkowitz, near Kassala, 24.iv.1962 (Bouček coll.) which may be *evonymellae*.

**HOSTS.** *Yponomeuta cagnatella* (Hübner), *Y. evonymella* (L.) and *Y. padella* (L.) (Lep., Yponomeutidae), as gregarious endophagous parasite of the host larvae and pupae; also their parasites *Diadegma armillata* (Grav.) and *Mesochorus confusus* Holmgren (Hym., Ichneumonidae). Bouché's original record of the host

"Yponomeuta Evonymella" (1834: 172) probably refers to *Y. cagnatella*, to judge by his remarks on the immature stages of the host (1834: 127-128).

COMMENTS. For notes on courtship behaviour of *evonymellae*, see van den Assem, Gijswijt & Nübel (1982).

***Baryscapus pospelovi* (Kurdjumov) comb.n.**  
(Figs 81, 118)

*Tetrastichus pospelovi* Kurdjumov, 1912a: 237-238. Lectotype ♀, USSR: ex *Yponomeuta malinella* (ZIL), designated by LaSalle (1986: 600) [examined].

[*Tetrastichus pospelovi* Kurdjumov, 1912b: xxxi. Invalid emendation.]

*Geniocerus pospelovi* Kurdjumov, 1913: 251.

*Aprostocetus pospelovi* (Kurdjumov) Graham, 1961b: 47.

*Tetrastichus pospelovi* Kurdjumov; Domenichini, 1966a: 120, 1966b: 45.

*Tetrastichus pospelovi* Kurdjumov; LaSalle, 1986: 600-601.

The lectotype ♀ selected by LaSalle, which I was able to examine thanks to Professor Trjapitzin, and males reared more recently in USSR from *Y. malinella*, agree well with Kurdjumov's description.

♀. Antenna (Fig. 81) with pedicellus very slightly longer than F1 in small specimens, very slightly shorter than F1 in large ones; F1 1.5-2.1 times, F2 1.6-2.0 times, F3 1.1-1.6 times as long as broad; clava very slightly longer than F2 plus F3 in larger ♀, distinctly longer in small ♀. Median line of mesoscutum tending to be sharply impressed; setae tending to be less numerous than in *evonymellae*. Forewing with apical margin almost evenly rounded; SM with 2 (-3) dorsal setae; M 2.35-2.6 times length of ST; speculum moderate-sized to large, extended as a wedge below M, sometimes nearly reaching ST, wing beyond it rather sparsely pilose. Gaster (2.0-) 2.5-3.3 times as long as broad, 1.3-1.6 times length of thorax, strongly acute, moderately acuminate; last tergite 1.0-1.35 times as long as broad; ovipositor sheaths projecting slightly; tip of hypopygium at 0.5 length of gaster. Hypopygium similar to that of *endemus* (Fig. 354).

Body usually a rather dark blue, occasionally slightly bronze or violet on scutellum, or whole thorax violet; gaster with *posterior* margins of tergites narrowly purplish. Antennal scape black with distal 0.2-0.4 testaceous; pedicellus fuscous, testaceous at tip and usually beneath; flagellum testaceous to fuscous. Tibiae sometimes wholly white, sometimes weakly to rather strongly and broadly infusate medially. Wings hyaline, venation pale yellowish. Length 1.3-2.0 mm.

Some ♀ might be mistaken for *szoecsi* but that species has a relatively longer and more acuminate gaster and slightly longer antennal clava. The ♂ of *szoecsi* lacks dark whorled setae on the antennal flagellum.

♂. Very like that of *nigroviolaceus* (Nees) but antennal clava (Fig. 118) on average rather shorter, 3.6-4.2 times as long as broad; scape (except ventral plaque) sometimes wholly yellow, at least broadly so distally; gaster with at least a large subbasal testaceous spot on the dorsal surface and another on the ventral surface, but often with a very distinct subbasal yellowish-white transverse band which continues over the lateral margins and across the ventral surface.

MATERIAL EXAMINED. 28 ♂, 58 ♀. France, Great Britain, USSR.

HOSTS. *B. pospelovi* has been reared in the USSR from lepidopterous species whose larvae live freely in webs, such as *Yponomeuta cagnatella* (Hübner), *Y. malinella* Zeller and *Scythropia crataegella* (L.) (Lep., Yponomeutidae), probably as hyperparasites. In France (Vaucluse) Dr. P. du Merle has reared both sexes from various hymenopterous primary parasites of the larvae of *Tortrix viridana* (L.) which live in folded leaves of *Quercus pubescens*: *Macrocentrus linearis* (Nees), *Apanteles* sp. (Braconidae); *Pteromalus* sp., either *chrysos* Walker or *semotus* (Walker) (Pteromalidae); *Elachertus fenestratus* (Nees), ? *Euplectrus* sp., *Sympiesis xanthostoma* (Nees) (Eulophidae); *Goniozus claripennis* (Förster) (Chrysididae).

COMMENTS. This species is very close to *nigroviolaceus* (Nees) and might not be distinct. Because there are apparently small structural differences and some of colour, and *pospelovi* seems to attack parasites of free-living larvae, whilst *nigroviolaceus* attacks parasites of leaf-miners, I retain them provisionally as valid species.

***Baryscapus nigroviolaceus* (Nees), comb.n.**

(Figs 82, 119)

*Eulophus nigro-violaceus* Nees, 1834: 174-175. Syntypes, Germany: Sickershausen (Nees) (destroyed). NEOTYPE ♀, Great Britain: Cheshire, Timperley, from pupa of *Leucoptera laburnella* (R.R. Askew) (BMNH), here designated [examined].

*Entedon amethystinus* Ratzeburg, 1848: 170. Syntypes, Germany: from *Orchestes quercus* and *Tinea cavella* (Ratzeburg) (destroyed). Syn.n.

*Entedon antisipilae* Rondani, 1877: 290. Lectotype ♀, Italy: reared from *Holocacista rivillei* on leaf of vine (Rondani), designated by Bouček (1974: 244) [examined]. Syn.n.

*Geniocerus amethystinus* (Ratzeburg) Erdős, 1954: 359; Zangheri & Ravelli, 1957: 185.

*Tetrastichus amethystinus* (Ratzeburg) Ciampolini, 1959: 55-75; Celli, 1960: 271-279; Ciampolini, 1960: 229-240; Bouček, 1961: 22, 1974: 244; Viggiani, 1963: 1-63; Domenichini, 1966a: 119, 1966b: 17.

The ♀ selected as neotype agrees well with Nees' description of *nigroviolaceus*, which includes a statement "nervo subcostali [M] prope a rami stigmatici [ST] origine desinente", which implies that a short postmarginal vein was present. This feature does occur in a number of specimens of *nigroviolaceus*, including the neotype, PM being represented by a rather conspicuous stub.

Ratzeburg (1848: 170) stated that he had reared a single ♀ of *amethystinus*, with rather poorly preserved head, from *Orchestes quercus*. He added "Später habe ich noch ein Stück aus *Tinea cavella* erhalten". The specimen from *O. quercus* seems likely to have been *Baryscapus endemus* (Walker). That from *Tinea* [now *Phyllonorycter*] *cavella* could have been the present species.

♀. Antenna (Fig. 82) with pedicellus plus flagellum not or hardly greater than breadth of mesoscutum; funicular segments tending to decrease slightly in length, but sometimes subequal, F1 1.6-1.9 times, F3 1.2-1.5 times as long as broad; clava as long as or slightly longer than F2 plus F3. Gaster 1.8-2.35 (-2.5) times as long as broad, from slightly longer than thorax to 1.2 times length of

head plus thorax, slightly narrower than thorax, less strongly acute than in *pospelovi*; last tergite slightly shorter than, or at most as long as, broad; ovipositor sheaths projecting very slightly, sometimes hardly so. Forewing tending to be obliquely subtruncate apically in some specimens; SM with 2-3 dorsal setae (most often 2); M 2.2-2.5 times length of ST; PM often represented by a distinct stub; speculum rather smaller than in *pospelovi*, wing beyond it rather more thickly pilose.

Head and thorax varying from rather bright blue through violet-blue to violet, occasionally black with only a weak violet tinge. Antennae fuscous to black with at most apex of scape and pedicellus beneath testaceous. Forewing venation tending to be grey-testaceous or brown, occasionally yellowish. Gaster coloured as in *pospelovi* but disc sometimes more or less purplish-tinged. Coxae, trochanters mainly to wholly, femora except their tips, black; tips of femora cream; tibiae fuscous with bases narrowly and tips narrowly to very broadly cream, rarely wholly cream; tarsi cream with fourth segment fuscous, or pale at extreme base and gradually darkening to their tips. Length 1.5-2.0 mm.

♂. Antenna (Fig. 229) with scape 2.8-3.3 times as long as broad, ventral plaque 0.45-0.48 length of scape; pedicellus plus flagellum 1.3-1.4 times breadth of mesoscutum; pedicellus 1.7 times as long as broad, a little longer than F1; funicle filiform, slightly stouter than pedicellus; F1 somewhat shorter than F2 and 1.4-1.55 times as long as broad; following segments subequal in length, each 1.8-2.0 times as long as broad; clava 4.4-4.6 times as long as broad, distinctly longer than F3 plus F4; each funicular segment with a compact subbasal whorl of dark setae which reach somewhat beyond the tip of the segment, C1 with two partial whorls.

Antennal scape fuscous with about distal 0.3 yellowish; pedicellus blackish above, pale beneath; flagellum brownish-testaceous to brown. Gaster (in the specimens seen) immaculate.

The ♂ appears to differ from that of *pospelovi* only in the paler coloration of its antennae and the lack of any pale marking on the gaster; also the antennal clava is on average rather longer.

**MATERIAL EXAMINED.** 5 ♂, 25 ♀. **Czechoslovakia, Germany, Great Britain, Hungary, Italy, Yugoslavia, USSR.**

**HOSTS.** Leaf-mining Lepidoptera of the families Gracillariidae, Yponomeutidae, Lyonetiidae and Heliozelidae, or their primary parasites. Hosts checked: *Antispila rivillei* (Stainton), *Argyresthia fundella* v. Rösl. and *A. sp.*, *Leucoptera laburnella* (Stainton), *Lyonetia clerckella* (L.), *Phyllonorycter blancardella* (F.).

*Baryscapus lotellae* (Delucchi), **stat.rev., comb.n.**  
(Fig. 86)

*Tetrastichus lotellae* Delucchi, 1954: 107-108. Holotype ♀, Germany: Unterföhring, near München, reared between 8.iii. and 28.iv.1952 from *Leucoptera lotella* (F. Groschke) (VD) [not examined].

[*Tetrastichus amethystinus* (Ratzeburg) Domenichini, 1966a: 119, 1966b: 17. [Misidentifications.]

Neither Professor Domenichini nor I have been able to see the holotype of *lotellae*. It was synonymised with *amethystinus* by Domenichini (1966a: 119). However, I possess three females which agree with Delucchi's description and which appear different from *nigroviolaceus* (= *amethystinus*). I believe they represent *lotellae*.

♀. Extremely close to *nigroviolaceus* but differs in its antenna (Fig. 86) which has pedicellus plus flagellum longer, 1.25-1.3 times breadth of mesoscutum; funicular segments equal or subequal in length, or F2 a little longer than F1 or F3; clava a little longer than F2 plus F3; mid lobe of mesoscutum with a single irregular row of 3-5 adnotaular setae on each side; PM of forewing absent or rudimentary, speculum rather smaller, not extended below M. The gaster is 1.8-2.0 times as long as broad, equal to or slightly longer than head plus thorax.

♂. Unknown.

MATERIAL EXAMINED. 3 ♀. **Sweden:** Skåne, Falsterbo, 27.vii.1959, swept from low vegetation on sand-dunes (Graham) (BMNH).

HOSTS. *Leucoptera lotella* (Stainton) (Lep., Lyonetiidae).

*Baryscapus spenceri* sp.n.

♀. Differs from that of *nigroviolaceus* (Nees) as follows. Forewing with speculum smaller, not extending below M, wing beyond it rather more thickly pilose; M 2.8-3.0 times length of ST. Gaster ovate, 1.5-1.6 times as long as broad, not quite as long as head plus thorax, as broad as thorax. Antenna like that of *nigroviolaceus* (Fig. 82) but clava equal in length to F2 plus F3.

Body black with obscure violet tinge; posterior half of gaster mainly bluish. Antennal scape black, pale at tip; pedicellus fuscous, testaceous beneath and at tip; flagellum brownish-testaceous with F1 and F2 paler beneath. Coxae, trochanters mainly, and femora except tips narrowly, black; tibiae fuscous, narrowly pale testaceous at base and broadly at tips; tarsi pale testaceous with fourth segment fuscous. Wings hyaline, venation greyish-testaceous. Length 1.9-2.0 mm.

♂. Unknown.

MATERIAL EXAMINED. 2 ♀. Holotype ♀, **Great Britain:** Surrey, Epsom, reared 27.vii.1953 from *Phytomyza cytisi* (K.A. Spencer) (BMNH).

Paratype. **Sweden:** 1 ♀, Skåne, on shore of L. Yddingen, 29.vii.1959 (Graham) (BMNH).

HOSTS. *Phytomyza cytisi* Brischke (Dipt., Agromyzidae) on *Laburnum anagyroides* Medicus. Presumably has other hosts, as *Laburnum* is not present in the Swedish locality.

COMMENTS. Askew (1968: 15-16) discussed the parasitoids of *Phytomyza cytisi* in Great Britain, but found no tetrastichine amongst them.

***Baryscapus starki* (Kostjukov), comb.n.**

(Fig. 111)

*Tetrastichus starki* Kostjukov, 1978: 450. Holotype ♀, USSR: Saratov district, Balashov, 16.vi.1964, from *Agrilus roscidus* (Stark) (ZIL) [not examined].

Professor Trijapitzin made paratypes of *starki* available for examination.

♀. This should be recognizable from the characters given in the key to females, in conjunction with the details given in the original description. Besides the distinctions between it and ♀ *sokolowskii* mentioned by Kostjukov, *starki* also has a distinctly curved malar sulcus.

♂. This was described only in general terms and the following details may be useful. Antenna (Fig. 111) with scape 0.8 length of eye, ventral plaque 0.66 length of scape; pedicellus about 1.6 times as long as broad, hardly longer than F1; funicular segments nearly equal in length, each about 1.5 times as long as broad; clava 3.3 times as long as broad, somewhat longer than F2 plus F3 plus F4, with a very long spine (nearly 0.5 length of C3); no compact subbasal whorls of long setae on flagellum; sensilla with long projecting blades. Mid lobe of mesoscutum with one row of 3 setae on each side. Submedian lines of scutellum equidistant from each other and from sublateral lines, enclosed space 2.5 times as long as broad. Propodeum medially 0.37 length of scutellum; spiracles separated by about 1.5 their length from hind margin of propodeum. Forewing: SM with 2 dorsal setae.

Gaster with very faint subtestaceous spot near base.

MATERIAL EXAMINED. 1 ♂, 1 ♀. USSR.

HOSTS. *Agrilus roscidus* Kiesw. (Col., Buprestidae).

***Baryscapus fossarum* sp.n.**

(Figs 84, 109, 353)

[*Tetrastichus langiellae* (Förster MS) Fulmek, 1962: 306. Nom. nud.].

♀. Head about as broad as mesoscutum; temples 0.15 length of eyes; POL about 1.7 OOL, OOL 1.2 OD. Eyes about 1.3 times as long as broad, with extremely short inconspicuous pubescence. Malar space 0.66 length of eye, sulcus strongly curved. Mouth hardly greater than malar space. Antenna (Fig. 84) with scape somewhat shorter than eye, barely reaching median ocellus; pedicellus plus flagellum slightly greater than breadth of mesoscutum; pedicellus about twice as long as broad, as long as or very slightly longer than F1; funicle moderately stout, distinctly stouter than pedicellus, filiform; funicular segments subequal in length, each 1.5-1.6 times as long as broad; clava distinctly broader than funicle, 2.5-2.75 times as long as broad, slightly to distinctly longer than F2 plus F3, bluntly pointed, spine prominent and 0.4-0.5 length of C3, apical seta about 0.5 length of spine; sensilla moderately numerous, moderately long, in one irregular row on each segment of funicle and clava; setae of flagellum moderately long but not standing out very strongly. Thorax 1.5 times as long as broad. Mid lobe of mesoscutum about as broad as long, only moderately glossy; median line distinct

except sometimes at front; setae rather short, placed irregularly but tending to form an outer row of 3-4 and an inner row of 2-4 setae on each side. Scutellum strongly convex, 1.1-1.2 times as broad as long; submedian lines slightly nearer to each other than to sublateral lines, enclosed space 3.0-3.5 times as long as broad; setae equal in length, this about equal to distance between submedian lines. Propodeum medially about as long as dorsellum, its hind edge with almost semicircular emargination; median carina weak, hardly raised; surface very finely, delicately alutaceous; callus with 3-6 setae. Legs moderately long, not stout; hind femora 4 times as long as broad; spur of mid tibia 0.75 length of basitarsus. Forewing slightly more than twice as long as broad; costal cell about as long as M, about 9.5 times as long as broad; SM with 2-3 dorsal setae; M at most slightly thickened, 2.3-2.6 length of ST, the latter thickening gradually distad; speculum moderate-sized, extended as a bare strip below M for about half the length of the latter; there is also a bare strip above ST and two small bare spots outside the stigma; wing beyond speculum moderately thickly pilose; cilia extremely short. Hindwing obtuse or subobtuse, cilia 0.15-0.25 breadth. Gaster lanceolate or sub lanceolate, acute and slightly acuminate, 1.3-1.35 times length of head plus thorax, nearly or about as broad as thorax, 2.6-3.5 times as long as broad; last tergite 1.1-1.3 times as long as broad; tips of ovipositor sheaths projecting a little; tip of hypopygium at about 0.5 length of gaster. Hypopygium (Fig. 353) with median and lateral lobes subequal in length, median lobe broad and rounded.

Body deep blue to greenish-blue; last tergite of gaster sometimes more obscurely metallic; hind margins of the other tergites narrowly bronze or violet. Antennal scape black, narrowly to broadly yellowish distally; pedicellus testaceous, more or less infusate dorsally at least in basal half; flagellum brownish-testaceous, sometimes infusate dorsally. Coxae coloured like body; trochanters blackish; femora black with tips narrowly to broadly yellowish; tibiae yellowish to testaceous, mid and hind tibiae sometimes more or less broadly infusate medially; tarsi either yellowish proximally and darkening gradually to blackish at tips, or almost wholly fuscous. Wings subhyaline or faintly yellowish, venation yellowish-testaceous to testaceous, or fuscous. Length 1.7-2.4 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 109) with scape 0.9 length of eye, just reaching lower edge of median ocellus, ventral plaque 0.46 length of scape; pedicellus plus flagellum 1.6 breadth of mesoscutum; pedicellus twice as long as broad, a little longer than F1; funicle slender, not stouter than pedicellus, virtually filiform; F1 very slightly shorter than F2, which is a little shorter than F3, the latter subequal to F4; clava 4.5 times as long as broad, as long as F2 plus F3 plus F4, with segments subequal in length, C1 slightly narrower than C2 and separated from it by a constriction; spine very prominent, slender, nearly half length of C3; flagellum without compact whorls of long dark setae. Gaster oblong, about as long as but narrower than thorax.

MATERIAL EXAMINED. 1 ♂, 32 ♀. Holotype ♀, **Czechoslovakia**: Bohemia or., Velký Vřešňov, v.1954, reared from *Mompha fulvescens* on *Epilobium* (Bouček) (BMNH).

Paratypes. Same data as holotype, 5 ♀ (BMNH). **France**: 2 ♀, Corsica, Calvi, 25-27.viii.1971 (A.C. & W.N. Ellis) (ITZ); 1 ♀, Bouches du Rhône,



Fonscolombe, 4 ♀, 10.viii.1983, 1 ♀, 25.viii.1988, all on *Epilobium hirsutum* in a ditch (Graham) (BMNH); 3 ♀, Vacluse, near Bédoin, 16.viii.1976 (Graham), 2 ♀, Faucon, 31.vii.1978, on *Epilobium* (Gijswijt) (MJG), 1 ♀, Roussillon, 22.vi.1977 (Graham) (BMNH), 1 ♂, Saumane, 15.vii.1978, in a marshy place (Graham) (BMNH). **Great Britain:** 1 ♀, Middlesex, Southgate, 8.vii.1968, 1 ♀, 22.viii.1969, 1 ♀, 25.ix.1969, 1 ♀, 24.viii.1970, 2 ♀, 1.ix.1970, 2 ♀, 30.vi.1971, 1 ♀, 22.ix.1972, all on *Epilobium hirsutum* (Graham) (BMNH); 5 ♀, Kent, Bromley, vii.1976, reared from *Mompha fulvescens* on *Epilobium hirsutum* (P.A. Sokoloff) (RRA); 1 ♀, Sussex, Shoreham-by-Sea, 7.vi.1970 (Bouček) (BMNH).

**HOSTS.** *Mompha fulvescens* (Haworth) (Lep., Momphidae) on *Epilobium hirsutum* L. The species mentioned by Fulmek (1962) under the MS name *langiellae*, as a parasite of *Mompha epilobiella* Roem., was no doubt *fossarum*.

***Baryscapus endemus* (Walker), comb.n.**

(Figs 101-103, 126, 354)

[*Cinips acuta* var. C, Fonscolombe, 1832: 292.]

*Cirrospilus Endemus* Walker, 1838c: 180. Lectotype ♀, Great Britain: (UM), designated by Bouček & Graham (1978: 234) [examined].

*Tetrastichus decisus* Walker in Newman, 1863: 8610 (in part), 8609 (in part). Holotype or syntypes ♀, Great Britain: London district (E. Newman) (lost). **Syn.n.**

[*Tetrastichus vinulae* Ratzeburg; Thomson, 1878: 290. Misidentification.]

*Geniocerus tibialis* Kurdjumov, 1913: 251 [Replacement name for *vinulae* Thomson, not Ratzeburg.] **Syn.n.**

*Tetrastichus encyrti* Ferrière, 1926: 592-594. Syntypes, France: "10 juillet, de Tortrix sp. avec Encyrtus" (Giraud) (MNHN) [examined]. **Syn.n.**

*Tetrastichus orchestidis* Bukowsky, 1938: 168-169. Lectotype ♀, USSR: Crimea (ZIL), designated by LaSalle (1986: 601) [not examined]. **Syn.n.**

*Aprostocetus encyrti* (Ferrière) Graham, 1961b: 47.

*Tetrastichus encyrti* Ferrière; Domenichini, 1966a: 120, 1966b: 29.

*Tetrastichus orchestidis* Bukowsky; Domenichini, 1966a: 122, 1966b: 42.

[*Tetrastichus adalia* (Walker) Domenichini, 1967: 83. Misidentification.]

*Tetrastichus cioni* (Domenichini MS) Erdős, 1971: 248-249. Syntypes, Hungary: Buda mountains, Kelebia, Borzony mountains and Batorliget (TM) [examined] **Syn.n.**

? *Tetrastichus femoralis* Erdős, 1971: 249. Syntypes, Sweden, USSR, Hungary: (? TM) [not examined]. **Syn.n.**

*Tetrastichus endemus* (Walker) Bouček & Graham, 1978: 234.

*Eutetrastichus endemus* (Walker) Graham, 1987: 43, fig. 50.

**TYPE MATERIAL**

*Tetrastichus decisus* Walker. Type material not found. The first step towards recognising the species was taken when I pointed out (Graham, 1961b: 62) that Walker had mixed up part of his description with that of *Pteromalus boarmiae*, described in the same paper. The Latin diagnosis of *T. decisus* (1863: 8610) begins with the words "Foem. Laete viridis ...". The English translation which follows begins "Female. Dark aeneous ..." but it obviously refers to *Pteromalus boarmiae*, the Latin description of which begins on p. 8609 with "Foem. Aeneus ...". The English description clearly intended for *decisus* follows this on the same page, with "Female. Bright green ...". These conclusions are confirmed by an examination of the extant syntypes of *Pteromalus boarmiae*, which agree with the

description but only when that is adjusted as I have indicated. Domenichini (1966b: 59) evidently overlooked my earlier note (1961b: 62) on this confusion, as he listed *decisus* as a doubtful species with the remark "Probably a species of *Pteromalus*".

Both *Tetrastichus decisus* and *Pteromalus boarmiae* were reared from *Boarmia perfumaria* Newman through *Microgaster* (= *Protomicroplitis*) *alvearius* according to Newman's note (1863: 8609) which precedes Walker's descriptions of the parasites. The fact that both the *Tetrastichus* and *Pteromalus* [now *Dibrachys*] *boarmiae* were reared from the same host strongly suggests that *Tetrastichus decisus* belonged to *Baryscapus*, two species of which (*galactopus* and *endemus*) have been subsequently reared together with *Dibrachys* from one and the same host. *B. galactopus* disagrees with Walker's description of *decisus* in several respects. However, I have a ♀ of *B. endemus* (Walker) collected at Southgate, Middlesex, on 25.ix.1969, which agrees very well with the description of *decisus*, particularly in having both wing-venation and tarsi blackish (a very unusual combination in the genus). Therefore I consider that *decisus* must have been a form of *endemus*. The larvae of *Boarmia perfumaria* [now regarded as a melanic form of *Peribatodes rhomboidaria* (D. & S.)] from which *Tetrastichus decisus* was originally reared, came from the London district, so that Southgate may be quite near the type locality. The recorded host of *decisus*, *Protomicroplitis alvearius*, has several times been reared from the above moth in Britain.

*Tetrastichus encyrti* Ferrière. The syntypes appear to be very small specimens of *endemus*. No lectotype yet selected.

*Tetrastichus cioni* Erdős. No lectotype yet selected.

♀. Head about as broad as mesoscutum, 2.2-2.5 times as broad as long; temples 0.1-0.15 length of eyes; POL almost twice OOL, OOL about 1.3 OD. Eyes 1.3-1.35 times as long as broad. Malar space 0.55-0.66 length of eye. Vertex thickly clothed with short setae, their length about 0.5 OD. Antenna (Fig. 101) with scape distinctly shorter than eye, not reaching median ocellus; pedicellus plus flagellum fully equal to, or very slightly greater than, breadth of mesoscutum; pedicellus 1.6-1.8 times as long as broad, slightly shorter than F1 in large ♀, but in medium-sized and small ♀ as long as or very slightly longer than F1; funicle proximally 1.3-1.5 times as broad as pedicellus, hardly thickening distad, its segments subequal in length (sometimes F1 very slightly longer than the others, or F2 a little longer than either F1 or F3), F1 1.2-1.7 times, F2 1.2-1.3 times, F3 1.1-1.2 times as long as broad; clava somewhat broader than F3, 2.1-2.5 times as long as broad, as long as or slightly longer than F2 plus F3, pointed; C1 slightly transverse, C2 slightly transverse and nearly as long as C1, C3 much shorter, spine 0.2-0.25 length of C3, apical seta nearly as long as spine; sensilla moderately numerous (less so in dwarfs), in one irregular row in small ♀, in two overlapping rows on funicular segments and C1 in large ♀, decumbent; setae of flagellum standing out only slightly. Thorax about 1.5 times as long as broad. Mid lobe of mesoscutum about as broad as long, moderately shiny, with excessively fine lightly-engraved reticulation having most areoles somewhat longer

than broad; median line complete, very distinct; a row of 3-5 setae on each side and usually a second partial row of 1-3 mesad of the first. Scutellum 1.1-1.3 times as broad as long, moderately convex; lines distinct, submedians equidistant from each other and from sublateral lines, enclosed space 2.4-3 times as long as broad; setae subequal, their length nearly equal to distance between submedian lines, anterior pair about in middle; distance between placoid sensilla and posterior seta 1.8-3.3 times that between it and anterior seta. Propodeum medially a little shorter than or almost as long as dorsellum, rather shiny; median carina hardly raised, broadening conspicuously towards hind margin; spiracles moderate-sized, close to or almost touching hind margin of metanotum, separated from hind edge of propodeum by slightly more than their length; callus with 3-7 setae. Legs of medium length and thickness; hind femora about 4 times as long as broad; spur of mid tibia 0.70-0.83 length of basitarsus, fourth mid tarsal segment slightly shorter than basitarsus. Forewing (Fig. 102) with costal cell about as long as or a little shorter than M, 9-10 times as long as broad; SM normally with 3-5 dorsal setae, rarely 2 in dwarfs; M varying from rather thin to moderately thick, 2.35-3.2 times length of ST, its front edge with 9-15 setae; ST thin proximally but gradually expanding to the rhomboidal or subcircular stigma; speculum moderate-sized, sometimes extended as a bare strip below M, wing beyond moderately thickly pilose, quite thickly distad; cilia 0.07-0.33 length of ST. Hindwing (Fig. 102) obtuse or rounded, cilia 0.2-0.3 breadth. Gaster (Fig. 103) lanceolate, usually 2.0-3.2 times (rarely slightly less than twice) as long as broad and 1.1-1.3 length of head plus thorax, slightly narrower or about as broad as thorax, slightly acuminate; last tergite as long as or slightly longer than broad; ovipositor sheaths projecting slightly; tip of hypopygium a little before 0.5 length of gaster. Hypopygium (Fig. 354) with median lobe slightly longer than lateral lobes, apically rounded.

Body varying from green with some golden or bronze reflections, through green and blue-green (most usual) to blue or violet-blue; hind margin of some gastral segments often narrowly purplish. Antennae black, flagellum sometimes fuscous; scape rarely narrowly testaceous at apex, pedicellus occasionally pale beneath. Coxae, and femora mainly, coloured like body; trochanters mainly to wholly black; tips of femora narrowly to broadly yellow or testaceous; fore tibiae brownish or testaceous, often with dark external stripe; mid tibiae yellow or testaceous, usually with brown or black postmedian band, hind tibiae usually narrowly testaceous to yellow at base and narrowly to broadly so at apex, occasionally yellow with dark postmedian ring, or with this and a narrow subbasal ring; in very pale southern forms mid and sometimes hind tibiae are wholly yellow. Fore tarsi brown to blackish; mid and hind tarsi usually yellow with third and fourth segments fuscous, occasionally also the second, rarely almost wholly black. Forewings hyaline, venation yellowish through testaceous to brown (very rarely black); proximal part of ST tending to be paler. Length 1.1-2.5 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 126) with scape 3.0-3.3 times as long as broad, ventral plaque 0.54-0.67 length of scape; pedicellus plus flagellum 1.45-1.65 breadth of mesoscutum; pedicellus 1.3-1.5 times as long as broad, slightly shorter than or as long as F1; F1 somewhat shorter than F2 and 1.2-1.6 times as long as broad, F2 tending to be a little shorter than F3 and

1.6-1.8 times as long as broad, F3 and F4 subequal in length, each 1.7-2.0 times as long as broad; clava 3.3-4.8 times as long as broad, as long or slightly longer than F3 plus F4; each funicular segment with a compact subbasal whorl of dark setae which reach slightly beyond the tip of the segment; C1 with two rudimentary half-whorls. Gaster oblong, as long as but narrower than thorax.

Antennal scape black, sometimes narrowly pale distally; pedicellus black, or testaceous apically (sometimes also beneath); flagellum brown to black. Variation in colour of body and legs much as in ♀.

**MATERIAL EXAMINED.** Many ♂, ♀. **Austria, Czechoslovakia, Denmark, France, Germany, Great Britain, Hungary, Ireland, Netherlands, Norway, Spain, Sweden, Turkey, USSR.**

**HOSTS.** Reared from numerous hosts though probably not a primary parasite, but hyperparasitic in most cases. Reared in Britain from *Apanteles* sp. on *Enargia ypsilon* (D. & S.) (Lep., Noctuidae) (B.S. Doubleday); also, if my identification of *decisus* is correct, from *Protomicroplitis alvearius* (F.) (Hym., Braconidae) parasitising *Peribatodes rhomboidaria* (D. & S.); in Co. Durham, Drigg, 8.xi.1978, as hyperparasite of *Elachertus olivaceus* (Thomson) in pupae of *Coleophora alticolella* Zeller (Lep., Coleophoridae) on *Juncus squarrosus* (M. Randall) (BMNH); from *Bruchophagus* ? *platypterus* (Walker) on *Lotus corniculatus* (Hym., Eurytomidae), Warwickshire, Bulkington, 23.ix.1975 (M. Compton); in Germany from *Eurytoma onobrychidis* Nik. (Hym., Eurytomidae); in USSR from *Sigalphus fagi* Ratzeburg, *Eubadizon minutus* Ratzeburg (Hym., Braconidae) and *Trichomalus* sp. (Hym., Pteromalidae) (Bukowsky); in Switzerland from *Litomastix kriechebaumeri* Mayr (Hym., Encyrtidae), a parasite of *Depressaria alpinella* Frey (Lep., Oecophoridae) on *Lasrepitium siler* (Ferrière). Other hosts are: *Cionus scrophulariae* (L.) on *Scrophularia nodosa* in Britain (Graham), *C. hortulanus* (Geoffroy in Fourcroy) in Hungary (Erdős) (Col., Curculionidae); pupae of *Heterogynis penella* (Hübner) (Lep., Heterogynidae) in France (Graham); *Clavigesta purdeyi* (Durrant) in Britain (H.S. Hanson) and *Rhyacionia buoliana* (D. & S.) in Austria (Lep., Tortricidae); diprionid parasitised by *Mesopolobus subfumatus* (Ratzeburg) (Hym., Pteromalidae) in Poland (BMNH); *Stereonychus fraxini* (Degeer) (Col., Curculionidae) in Yugoslavia (J. Miklos); *Hypera postica* (Gyllenhal) (Col., Curculionidae) larvae in Turkey. Other material has been obtained, without further data, from stems of *Verbascum lychnitis* in France (Graham); from heads of *Plantago lanceolata* in Britain (O.W. Richards) and in Czechoslovakia (Bouček); from "*Scrophularia*" in Czechoslovakia (Samšínák).

*Baryscapus erynniae* (Domenichini)  
(Figs 85, 121)

[*Tetrastichus rapo* Walker; Silvestri, 1910: 281-283. Misidentification.]

*Tetrastichus erynniae* Domenichini, 1966a: 123-124. Holotype ♀, France: Var, Hyères, 1934, from *Erynnia nitida*, a parasite of *Pyrhalla luteola* (Parker) (MCSN) [examined].

*Tetrastichus erynniae* Domenichini, 1966b: 30; Burks in Krombein et al., 1979: 994.

*Baryscapus erynniae* (Domenichini) LaSalle & Graham, 1990: 124.

♀. To the original description the following note are added. Malar space fully 0.6 length of eye. Antenna (Fig. 85) with scape 0.9 length of eye; pedicellus plus flagellum 1.15 times breadth of mesoscutum; pedicellus about as long as F1, 1.8-2.0 times as long as broad; funicle proximally slightly stouter than pedicellus and hardly thickening distad; funicular segments tending to decrease very slightly in length, F1 1.55-1.9 times, F2 1.4-1.6 times, F3 1.4-1.6 times as long as broad; clava slightly broader than F3, about 3 times as long as broad, slightly to distinctly longer than F2 plus F3, acute, spine 0.4 length of C3. Mid lobe of mesoscutum with median line distinct over at least posterior 0.5. Scutellum 1.1-1.2 times as broad as long; submedian lines equidistant from each other and from sublateral lines, enclosed space 2.6-2.7 times as long as broad; length of setae nearly equal to distance between submedian lines. Hind femora 3.7-3.8 times as long as broad; spur of mid tibia 0.65 length of basitarsus. Forewing with costal cell slightly longer than M; SM with 2 dorsal setae; M 2.8-3.0 times length of ST, anterior margin with 9-12 setae; speculum moderately large, extending some distance below M, wing beyond it somewhat sparsely pilose; cilia very short. Hindwing subobtusate, cilia about 0.2 breadth of wing. Gaster ovate to long-ovate, 1.35-1.5 times as long as thorax, about as broad as thorax, acute, 1.65-2.2 times as long as broad; last tergite slightly to rather distinctly broader than long; tip of hypopygium at about 0.5 length of gaster.

♂. Antenna (Fig. 121) with scape nearly as long as eye, ventral plaque 0.47 length of scape; pedicellus plus flagellum 1.45 times breadth of mesoscutum; pedicellus about as long as F1, 1.5-1.8 times as long as broad; funicle filiform, somewhat stouter than pedicellus; F1 slightly shorter than F2 and 1.2-1.5 times as long as broad, following segments subequal in length each 1.5-1.7 times as long as broad; clava hardly broader than funicle, 3.5-3.8 times as long as broad, somewhat longer than F2 plus F4; each funicular segment with a compact subbasal whorl of dark setae which reach hardly beyond its tip. Gaster elliptic, about as long as but slightly narrower than thorax, with a rather obscure testaceous subbasal spot.

MATERIAL EXAMINED. 7 ♂, 8 ♀. **France; USA** (introduced). Also recorded from Italy by Domenichini (1966b: 30).

HOSTS. *Erynna nitida* R.-D. (Dipt., Tachinidae), a parasite of *Pyrhalla luteola* (Müller) (Col., Chrysomelidae); a gregarious, synchronous, endophagous parasite of the host larvae and pupae (Silvestri, 1910). Also reared in USA from *Erynniopsis rondanii* Townsend (Dipt., Tachinidae) on *Pyrhalla luteola*.

***Baryscapus oophagus* (Otten), comb.n.**  
(Fig. 87)

*Tetrastichus oophagus* Otten, 1942: 160-162. Syntypes, Germany: Schriesheim and Eberswalde, 1929 (Sachtleben, Kruel) ? DEI [not examined].

*Tetrastichus oophagus* Otten; Domenichini, 1966a: 178, 1966b: 42.

♀. Very similar to some dwarfs of *endemus* (Walker) but differing as follows. Antenna (Fig. 87) with pedicellus about as long as F1 and 1.6-1.7 times as long as broad; funicle proximally only 1.25 times as broad as pedicellus, hardly

thickening distad, its segments subequal in length, F1 1.35-1.7 times, F2 1.3-1.6 times, F3 1.2-1.6 times as long as broad; clava obviously broader than F3, 2.3-2.6 times as long as broad, from somewhat longer than F2 plus F3 to nearly as long as whole funicle. Mid lobe of mesoscutum with median line finer; 3 adnotaular setae on each side, occasionally a fourth seta anteriorly and mesad of the first row. Propodeum rather deeply emarginate, medially only 0.2-0.23 length of scutellum; spiracles smaller, separated by 0.5-0.7 their diameter from hind edge of metanotum; callus with 3 setae. Forewing with costal cell about 12 times as long as broad; SM with 2 dorsal setae; front edge of M with 8-9 setae; cilia longer, 0.5-0.55 length of ST. Hindwing bluntly pointed, cilia 0.33 breadth of wing.

Body dark blue or greenish-blue, dorsum of thorax sometimes partly violet. Antennae with tips of scape and of pedicellus sometimes testaceous; flagellum brown to fuscous. Legs coloured as in darker ♀ of *endemus*. Length 1.0-1.25 mm (-1.5 mm according to Otten).

♂. Unknown to me. Domenichini (1966a: 178) referred to a ♂ from Czechoslovakia but I have not seen it.

MATERIAL EXAMINED. 4 ♀. **France:** 1 ♀, Loiret, Forêt d'Orléans, 6.ix.1964, from egg of *Diprion pini* (Grisson) (BMNH). **Poland:** 1 ♀, Silniczka, v.1965, from egg of Diprionid (E. Górnás) (BMNH). **USSR:** 2 ♀, Kamenskiy, 27.xi.1977, 16.vii.1978 from egg of *D. pini* (A.A. Sharov) (ZIL).

HOSTS. *Diprion pini* L. (Hym., Diprionidae), attacking the eggs.

*Baryscapus pilicornis* sp.n.

(Fig. 88)

♀. Differs from that of *oophagus* (Otten) as follows. Antenna (Fig. 88) with setae of flagellum standing out more strongly; F1 tending to be slightly shorter than F2, F2 and F3 more oval in shape; clava 2.5-2.9 times as long as broad, as long as F3 plus F2 plus half to two thirds of F1, more acute, with longer spine, nearly or quite 0.5 length of C3, with apical seta at most 0.5 length of spine.

Differs from ♀ *endemus* in antennal structure, lesser average size (length 1.1-1.6 mm), smaller propodeal spiracles, subacute or subobtusate hindwing.

♂. Unknown.

MATERIAL EXAMINED. 20 ♀. Holotype ♀, **Great Britain:** Berkshire, Wytham Wood, 13.vi.1959, swept from foliage of Norway Spruce (*Picea abies*) (Graham) (BMNH).

Paratypes. **France:** 1 ♀, Lozère, Mont Aigoual, near St.-Sauveur, 5.vii.1977 (Graham) (MVG). **Great Britain:** 18 ♀, same data as holotype (BMNH).

HOSTS. Unknown.

***Baryscapus conwentziae* (Ferrière), comb.n.**

(Fig. 89)

*Tetrastichus conwentziae* Ferrière, 1959: 154-156. Holotype ♀, Austria: Hundsheim, v.1954, from cocoon of *Conwentzia pineticola* (F. Schremmer) (MHN) [examined].

*Aprostocetus conwentziae* (Ferrière) Graham, 1961a: 47.

*Tetrastichus conwentziae* Ferrière; Domenichini, 1966a: 125, 1966b: 26; Agekian, 1975: 528-533, fig. 8.

In MHN there are two females attached to card-points mounted on the same pin, labelled "Autriche, Hundsheim, v.1954 (Soyka) [sic]; Ex *Conwentzia pineticola* (Coniopterygidae). *Tetrastichus conwentziae* Type. Ch. Ferrière det.". The ♀ attached to the upper card-point is in better condition and I am taking this to be the holotype.

♀. Differs from that of *endemus* (Walker) as follows. POL only 1.5-1.7 OOL. Antenna (Fig. 89) with pedicellus plus flagellum slightly (up to 1.2 times) greater than breadth of mesoscutum; pedicellus a little longer than F1; clava 2.5-2.8 times as long as broad, distinctly longer than F2 plus F3; setae of flagellum standing out rather more strongly. Mid lobe of mesoscutum with 2-3 rows of setae on each side: a row of 2-5, a second partial row of 1-4, and sometimes a third partial row of 1-3. Forewing rather shorter and broader, 1.85-1.9 times as long as broad; SM with only 2 dorsal setae as a rule, rarely 3; M only 1.9-2.1 times length of ST. Gaster shorter, short- to long-ovate, not quite or only just as long as head plus thorax, 1.8-2.1 times as long as broad.

Body dark blue or dark greenish-blue. Length 1.1-1.4 mm.

♂. Antenna similar to that of *pospelovi* (Fig. 118); differing from that of *endemus* in having a shorter ventral plaque on the scape (see also Ferrière, 1959, fig. 2). Gaster with an obscure testaceous subbasal spot.

**MATERIAL EXAMINED.** 1 ♂, 7 ♀. **Austria** (syntypes ♂, ♀, of *conwentziae*). **Great Britain:** 1 ♀, Berkshire, Wytham Wood, 13.vi.1959, 1 ♀, 3.vi.1960 (Graham) (BMNH). **Italy:** 1 ♀, Merano, ix. or x.1954 (Schaller) (GD).

**HOSTS.** *Conwentzia pineticola* Enderlein (Neur., Coniopterygidae) on *Larix* (Ferrière, 1959).

***Baryscapus obesulus* sp.n.**

(Fig. 91)

♀. Antenna (Fig. 91) with scape 0.8 length of eye, not reaching median ocellus; pedicellus plus flagellum 0.9-0.95 breadth of mesoscutum; pedicellus 1.7-1.8 times as long as broad, somewhat longer than F1; funicle proximally a little stouter than pedicellus, thickening slightly distad, its segments subequal in length, quadrate (or F1 very slightly longer than broad); clava much broader than F3, about twice as long as broad, much longer than F2 plus F3, or nearly as long as whole funicle; sensilla sparse. Thorax 1.27-1.3 times as long as broad. Mid lobe of mesoscutum about as long as broad; median line fine though distinct; 3-5 short adnotaular setae on each side. Scutellum 1.3-1.4 times as broad as long, strongly convex; submedian lines about equidistant from each other and from sublateral

lines, enclosed space 2.2-2.3 times as long as broad; setae subequal, their length much less than distance between submedian lines. Propodeum strongly transverse, 3.3-3.8 times as broad as its length at level of spiracles, rather deeply emarginate, medially as long as, or slightly shorter than the dorsellum; median carina tending to be rather vague, expanded posteriorly, smooth; spiracles small, subcircular, 0.4-0.6 their diameter from hind edge of metanotum; callus with 3-4 setae. Legs rather short; hind femora 3.5-4 times as long as broad; spur of mid tibia 0.85 length of basitarsus. Forewing with costal cell slightly longer than M, 12.5-13.5 times as long as broad; SM with 2 dorsal setae; M not thick, 2.4-2.55 times length of ST, its front edge with 7-9 (-10) setae; ST thin at base but gradually expanding into the stigma; speculum as in *impeditus*; wing beyond it somewhat sparsely pilose, though more thickly distad; cilia 0.2 length of ST. Hindwing slightly pointed or subobtusate, cilia 0.3 breadth of wing. Gaster ovate, as long as or somewhat longer than thorax, as broad as or slightly broader than thorax, 1.3-1.75 times as long as broad, acute but not acuminate; last tergite broader than long; ovipositor sheaths projecting very slightly; tip of hypopygium slightly beyond half length of gaster.

Body bluish-olive to olive-greenish, head and thorax sometimes partly bronze. Antennal scape fuscous, testaceous distally; pedicellus fuscous, testaceous beneath and at apex; flagellum brownish-testaceous. Coxae, and femora except their tips rather broadly, coloured like body; trochanters mainly black; legs otherwise yellowish-testaceous with tibiae sometimes narrowly infusate medially, third tarsal segment brownish, fourth fuscous. Tegulae coloured like body. Wings hyaline, venation testaceous. Length 1.15-1.3 mm.

♂. Unknown.

The ♀ resembles that of *impeditus* (although apparently not closely related to it) in antennal structure, propodeal spiracles, wings and some other features; but differs in its more transverse propodeum, longer and apically acute gaster with last tergite not reflexed, ovipositor sheaths projecting very slightly, scape and legs more infusate.

**MATERIAL EXAMINED.** 5 ♀. Holotype ♀, **France:** Bouches du Rhône, Fonscolombe, 20.vii.1979, on a flower of *Centaurea calcitrapa* (Graham) (BMNH).

**Paratypes.** **France:** 3 ♀, same data as holotype (BMNH). **Sweden:** 1 ♀, Skåne, Kullaberg, 26.vii.1959 (Graham) (BMNH).

**HOSTS.** Unknown.

***Baryscapus irideus* (Domenichini), comb.n.**  
(Figs 92, 93)

*Tetrastichus irideus* Domenichini, 1967: 84-86. Holotype ♀, Italy: Piemonte, Caluse, between 11.vii. and 24.vii.1951, from cocoons of *Bracon rhynchitii* in leaf-roll of *Bytiscus betulae* (A. Goidanich) (MIZSU) [examined].

The species was described from 7 reared females with the data cited above. I have been able to examine some of them.



♀. Domenichini gave a detailed description, accompanied by good figures (1967: 84-86, figs. 2 and of ♀ antennae, figs. 7-8 of fore- and hindwings). A few details, not mentioned in his description, are added here.

Antenna (Fig. 92) with pedicellus plus flagellum about 1.05 breadth of mesoscutum. Mid lobe of mesoscutum with 8-10 setae on each side. Submedian lines of scutellum about equidistant from each other and from sublateral lines, or hardly nearer to the latter; placoid sensillum of each side about 1.5 times as far from posterior seta as from anterior seta. Propodeal spiracles rather small, separated by about 0.3 their diameter from metanotum and by about 1.5 their diameter from hind margin of propodeum. The forewing has a hyaline spot between the parastigma and the marginal vein (correctly indicated in Domenichini's figure 7, but not shown in the figure on Plate 1). Gaster (Fig. 93) 1.9-2.1 times as long as broad, slightly longer than head plus thorax; tip of hypopygium at about 0.5 length of gaster including ovipositor sheaths.

♂. Unknown.

MATERIAL EXAMINED. 4 ♀. **Italy.**

HOSTS. *Bracon rhynchitii* (Grese) (Hym., Braconidae), in leaf-roll formed by *Bytiscus betulae* (L.) (Col., Attelabidae); reared from the pupa of the host.

*Baryscapus contingens* sp.n.

(Fig. 94)

♀. Differs from that of *irideus* (Domenichini) as follows). Mid lobe of mesoscutum with fewer setae, 6-7 on each side. Anterior setae of scutellum distinctly behind the middle; placoid sensillum (Fig. 94) of each side very near to the anterior seta and about twice as far from the posterior seta as from the anterior seta. Forewing without any hyaline spot between parastigma and M, the two being continuous. Gaster 1.75-2.1 times as long as broad, about as long or a little longer than head plus thorax.

Tibiae usually yellow, occasionally weakly brownish medially. Length 1.2-1.6 mm.

♂. Unknown.

MATERIAL EXAMINED. 10 ♀. Holotype ♀, **France:** Drôme, Col de Macuègne, near Séderon, 1.viii.1979 (Graham) (BMNH).

Paratypes. Same data as holotype, 8 ♀ (BMNH). **Spain:** 1 ♀, Malaga, Estepona, 27. or 30.vi.1974 (Bouček) (BMNH).

HOSTS. Unknown.

*Baryscapus galactopus* (Ratzeburg)

(Figs 95, 122)

*Eulophus galactopus* Ratzeburg, 1844: 169. Syntypes, Germany: from *Microgaster vinulae* (Graff) (destroyed). NEOTYPE ♀, Germany: Darmstadt, 1961, from *Apanteles glomeratus* on *Pieris brassicae* (CIE coll. NO. 17643) (BMNH), here designated [examined].

- Eulophus vinulae* Ratzeburg, 1844: 169. Syntypes, Germany: from *Microgaster vinulae* (Graff) (destroyed). NEOTYPE ♀, Germany: the neotype of *galactopus*, here designated.
- Tetrastichus lissonotus* Müller, 1886: 83-84. Syntypes, Sweden: ? Skåne [not examined]. [Synonymised with *galactopus* by Domenichini (1966a: 122.)]
- [*Tetrastichus microgastri* (Bouché); Martelli, 1907: 220. Misidentification.]
- [*Geniocerus rapo* (Walker); Kurdjumov, 1913: 250. Misidentification.]
- [*Tetrastichus rapo* (Walker); Silvestri, 1910: 281-283; Ferrière & Faure, 1925: 221; Burks, 1943: 587-588; Delucchi, 1950: 441-450; Domenichini, 1953: 96; Erdős, 1954: 359; Peck, 1963: 146-147. Misidentification.]
- Aprostocetus galactopus* (Ratzeburg) Graham, 1961b: 47.
- Tetrastichus galactopus* (Ratzeburg) Domenichini, 1966a: 120; 1966b: 32; Burks in Krombein et al., 1979: 995.
- Eutetrastichus galactopus* (Ratzeburg) Graham, 1987: 379, fig. 732; Bouček, 1988: 681.
- Baryscapus galactopus* (Ratzeburg) LaSalle & Graham, 1990: 124.

#### TYPE MATERIAL

Müller stated (1886) that he had reared 73 specimens (representing both sexes) of *Tetrastichus lissonotus* from larvae of *Pieris brassicae*. I did not find any so named in the G.F. Müller collection in Naturhistoriska Museet, Göteborg. Domenichini (1966a: 122) reported that a male of *lissonotus* labelled "Typus" existed in NM, Vienna and stated that it was conspecific with *galactopus*. If no other syntypes turn up, then this male could be designated lectotype of *lissonotus*.

♀. Differs from that of *endemus* (Walker) as follows. OOL equal to or hardly greater than OD. Antenna (Fig. 95) with funicular segments rather shorter, F1 quadrate to 1.25 times as long as broad, F2 quadrate to 1.1 times as long as broad, F3 from very slightly transverse to 1.1 times as long as broad; claval spine slightly longer, its seta a little shorter; setae of flagellum slightly longer and more outstanding. In small specimens F1 is slightly shorter than the pedicellus. Thorax 1.3-1.4 times as long as broad. Mid lobe of mesoscutum with median line tending to be finer, occasionally weak or incomplete; setae variable in number: an outer row of 4-6, an inner row (sometimes absent) of 1-6. Propodeum medially as long as or slightly longer than dorsellum; callus with 3-6 setae. Forewing a little broader, 1.9-2.0 times as long as broad; SM usually with 2, sometimes 3, dorsal setae; M with 9-11 (-12) setae on front edge. Gaster ovate, not or hardly longer than head plus thorax, 1.5-1.8 times as long as broad, tending to be a little broader than thorax, not or hardly acuminate; last tergite usually somewhat broader than long, occasionally nearly as long as broad; tip of hypopygium at about 0.5 length of gaster. Hypopygium similar to that of *endemus* (Fig. 354).

Body usually deep blue to blue-green, occasionally with some bronze reflections on parts of head, thorax and gaster (most often in British specimens). Antennae black. Coxae coloured like body; trochanters pale, or mainly fuscous; femora coloured like body, their tips narrowly to broadly whitish or testaceous; tibiae whitish or yellow in pale forms, testaceous in darker forms, sometimes infusate medially, rarely mainly so; tarsi whitish to testaceous, darker at tips, occasionally more extensively infusate. Wings subhyaline, venation very pale yellowish varying to testaceous, or brown. Length 1.2-2.0 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 122) with scape 2.6-3.2 times

as long as broad, ventral plaque 0.48-0.6 length of scape; pedicellus plus flagellum 1.25-1.4 times breadth of mesoscutum; pedicellus about 1.6 times as long as broad, distinctly longer than F1; F1 slightly shorter than following segments and 1.1-1.5 times as long as broad, following segments subequal in length, F2 1.2-1.6 times, F3 1.1-1.6 times, F4 1.0-1.6 times as long as broad; clava 2.8-3.8 times as long as broad, somewhat longer than F3 plus F4; each segment of funicle with a compact whorl of dark setae which reach somewhat beyond the tip of the segment. Gaster oblong, nearly as long but much narrower than thorax.

**MATERIAL EXAMINED.** Many ♂, ♀. **Czechoslovakia, France, Germany, Great Britain, Ireland, Italy, Portugal (Azores)** (2 ♂, 10 ♀, Horta, Fayal, 29.viii.1929, "from lepidopterous pupa"), **Sweden, Switzerland, USSR, USA, Australia, New Zealand** (probably introduced).

**HOSTS.** *Apanteles* spp., especially *A. glomeratus* (L.), also *A. affinis* (Nees) and *A. rubecula* Marshall on Lepidoptera Pieridae, such as *Pieris brassicae* (L.), *Artogeia rapae* (L.) and *Pontia daplidice* (L.); also *Apanteles* sp. on *Cerura vinulae* (L.) (Lep., Notodontidae); *Hyposoter ebeninus* (Gravenhorst) (Hym., Ichneumonidae). A gregarious, endophagous hyperparasite of host larvae and pupae (see Martelli, 1907, Ferrière & Faure, 1926).

*Baryscapus transversalis* sp.n.  
(Figs 96, 97, 127, 355)

*Eutetrastichus* sp. near *servadeii*: Bellin, Schmidt & Douma-Petridou, 1990: 115-116, 119.

♀. Differs from ♀ of *galactopus* (Ratzeburg) as follows. Thorax slightly more squat, only 1.15-1.25 times as long as broad (when undistorted); propodeum (Fig. 97) more strongly transverse; gaster on average slightly longer 1.7-2.05 times as long as broad; antenna (Fig. 96) with F1 a little shorter than the pedicellus. Hypopygium (Fig. 355) with median lobe slightly shorter, tapering and subacute.

Specimens from mainland Greece tend to have darker legs than those from Crete, the tibiae being more heavily infusate.

♂. Antenna (Fig. 127) very similar to that of ♂ *galactopus*. Thorax slightly more squat than in *galactopus* (like that of ♀). Gaster sometimes (Kriti material) with a small testaceous subbasal spot.

**MATERIAL EXAMINED.** 311 ♂, 271 ♀. Holotype ♀, **Greece: Kriti, Krania**, vi.1972, reared from egg of *Thaumetopoea pityocampa* (G. Demolin) (BMNH).

Paratypes. **Greece:** 296 ♂, 250 ♀, same data as holotype (LEMV, MNHN, BMNH); 15 ♂, 21 ♀, **Kassandra**, reared between 27.ix.1988 and 25.iv.1989, from eggs of *T. pityocampa* (S. Bellin) (MVG).

**HOSTS.** Bellin, Schmidt & Douma-Petridou (1990:119) state "These data suggest that *Eutetrastichus* sp. can be considered an obligatory hyperparasitoid of the primary parasitoids of *T. pityocampa*."

**COMMENTS.** This species, attacking the same host as *B. servadeii*, is very different from it, especially in the structure of the ♀ gaster including the

hypopygium, also in the structure of the  $\sigma$  antenna. Moreover, males are extraordinarily numerous, whereas in *servadeii* the male is very rare.

***Baryscapus euphorbiae* sp.n.**

(Fig. 98)

♀. Differs from that of *endemus* (Walker) as follows. Antenna (Fig. 98) with scape slightly shorter, 0.75-0.8 length of eye; pedicellus plus flagellum 0.85-0.95 breadth of mesoscutum; flagellum more distinctly clavate; pedicellus as long as F1; funicular segments nearly equal in length, F1 quadrate to 1.2 times as long as broad, F2 quadrate to 1.1 times as long as broad, F3 quadrate; clava slightly less than twice as long as broad. Thorax about 1.3 times as long as broad, rather less arched dorsally, propodeal slope 35-45 degrees. Mid lobe of mesoscutum 1.1-1.2 times as broad as long, less convex. Scutellum less convex; submedian lines slightly nearer to sublateral lines than to each other, enclosed space 2.2-2.4 times as long as broad; setae slightly shorter. Propodeum more strongly transverse, slightly shorter than dorsellum. Forewing with costal cell very slightly to distinctly longer than M, the latter with 10-13 setae on its front edge. Length 1.3-1.9 mm.

♂. Unknown.

MATERIAL EXAMINED. 14 ♀. Holotype ♀, Netherlands: Wessum, reared between 1.viii.1971 and 4.viii.1971 from ? *Bayeria capitigena* on *Euphorbia* (H.J. Vlug) (ITZ).

Paratypes. 8 ♀, same data as holotype; 5 ♀, same locality as holotype but reared between 5.viii.1971 and 12.viii.1971 from same host (H.J. Vlug) (MJG).

HOSTS. Possibly *Bayeria capitigena* (Bremi) (Dipt., Cecidomyiidae), though it seems likely to be a hyperparasite.

***Baryscapus turionum* (Hartig)**

(Figs 99, 100, 120)

*Eulophus turionum* Hartig, 1838: 268. LECTOTYPE ♀, Germany: from *Tortrix buoliana* (Hartig) (ZSBS), here designated [examined].

*Eulophus turionum* Hartig; Ratzeburg, 1844: 168.

*Entedon turionum* (Hartig) Ratzeburg, 1848; 170; 1852: 214.

*Tetrastichus turionum* (Hartig) Marlatt, 1933: 1-47; Dowden, 1934: 602; Strong, 1935: 60; Baird, 1939: 116-127; Burks, 1943: 568; Coppel & Arthur, 1954: 55-58; Clausen, 1956: 8, 130; Juillet, 1959: 209-218; Schaffner, 1959: 28-83; Peck, 1963: 153-154; Domenichini, 1966a: 116, 1966b: 52; Burks in Krombein et al., 1979: 1001-1002.

*Eutetrastichus turionum* (Hartig) Graham, 1987: 11.

*Baryscapus turionum* (Hartig) LaSalle & Graham, 1990: 124.

Other references are given in Peck (1963). It may be necessary to check some of the above records because *Baryscapus endemus* (Walker) has occasionally been reared from the same host as *turionum*, as shown by specimens from Britain and Austria which I have checked.

In the Hartig collection (ZSBS) there are 9 syntypes, 8 ♀ and 1 ♂, of

*turionum* mounted on card-points arranged in a whorl on one pin; below them is a pine-shoot and a blue label bearing the number 1407. Protruding from the pine-shoot is a broken lepidopterous pupa-case, from which a ♂ *Copidosoma* (Hym., Encyrtidae) has partly emerged; inside the pupa-case is another specimen of *turionum*. I have remounted a ♀ from the whorl and labelled it lectotype; the remaining specimens are designated paralectotypes.

♀. Differs from that of *endemus* (Walker) as follows. Eyes 1.35-1.4 times as long as broad. Antenna (Fig. 99) with pedicellus tending to be slightly longer than F1; funicle proximally only about 1.25 times as broad as pedicellus, but thickening slightly distad, its segments subquadrate, or F1, and sometimes F2, rarely F3, very slightly longer than broad; clava slightly longer than F2 plus F3; sensilla in one, sometimes slightly irregular, row on each segment of funicle and clava. Mid lobe of mesoscutum slightly broader than long; setae tending to be more numerous, with an outer row of 4-5, a second row of 2-5, and occasionally a partial third row of 1-2. Scutellum 1.3-1.45 times as broad as long. Propodeum medially a little longer than dorsellum; spiracles slightly smaller; callus with 3-5 setae. Forewing: SM with 3-4 dorsal setae; M 2.4-2.8 times length of ST. Gaster (Fig. 100) 2.3-2.9 times as long as broad, 1.6-1.85 times length of thorax.

Antennal scape often testaceous beneath, occasionally testaceous with dorsal edge fuscous; flagellum brownish or brownish-testaceous. Length 1.4-2.0 mm.

The best characters for distinguishing ♀ *turionum* from ♀ *endemus* seem to be the paler antennal flagellum, funicle less stout proximally; slightly broader mid lobe of mesoscutum; rather more transverse scutellum with the space enclosed by the submedian lines less elongate. Some ♀ are not easy to distinguish from small *endemus*.

♂. Differs from ♀ as follows. Antenna (Fig. 120) with scape nearly as long as eye, ventral plaque 0.60-0.63 length of scape; pedicellus plus flagellum about 1.15 times breadth of mesoscutum; pedicellus about 1.8 times as long as broad, slightly longer than F1; funicle filiform, slightly stouter than pedicellus; F1 slightly shorter than F2, quadrate, following segments subequal in length, each a little longer than broad (F4 sometimes quadrate); clava hardly broader than funicle, about 3 times as long as broad, somewhat longer than F3 plus F4; each segment of funicle with a compact subbasal whorl of dark setae which reach slightly beyond the tip of the segment; C1 with two partial whorls. Gaster oval-elliptic, slightly shorter and narrower than thorax.

MATERIAL EXAMINED. 12 ♂, 44 ♀. **Czechoslovakia, Germany, Romania.** Also recorded from Austria, Belgium, Great Britain (introduced), Hungary, Italy, Yugoslavia, Canada and USA (introduced).

HOSTS. *Rhyacionia buoliana* (D. & S.), *Blastesthia turionella* (L.) (Lep., Tortricidae) *Exoteleia dodecella* (L.) (Lep., Gelechiidae); and facultatively, their parasites *Copidosoma geniculatum* (Dalman) and some Diptera Tachinidae. Gregarious endoparasite of host larvae and pupae (Lemarie, 1958; Juillet, 1959; Arthur & Juillet, 1961).

COMMENTS. *B. turionum* is of some economic importance as a parasite of some lepidopterous pests of forest trees (see references cited in synonymy above).

***Baryscapus bruchophagi* (Gahan)**

(Figs 104, 124)

*Tetrastichus brucophagi* [sic] Gahan, 1913: 439. LECTOTYPE ♀, USA: California, Corcoran, 15.i.1913, from *Bruchophagus* sp. (T.D. Urbahns) (USNM under No. 16357), here designated [examined].

*Tetrastichus bruchophagi* Gahan; Girault, 1916: 132 [valid emendation.]; Urbahns, 1917: 277-282; Burks in Butler & Hanson, 1958: 224-225; Peck, 1963: 125-126; Domenichini, 1966a: 124-125, 1966b: 21; Burks in Krombein et al., 1979: 992.

*Aprostocetus bruchophagi* (Gahan) Bouček, 1988: 679.

*Baryscapus bruchophagi* (Gahan) LaSalle & Graham, 1990: 124.

More detailed references are given by Peck (1963) and Burks in Krombein et al. (1979).

Syntypes, 38 specimens from Corcoran and Tulare County, California. In his original description Gahan did not specify one particular specimen as holotype, although one ♀ of the series is labelled "Type" and was evidently intended as such; it lacks antennae and gaster. As incomplete specimens of this group are almost impossible to identify, I designate as lectotype a complete ♀ from the series having the same data as that marked "Type". It bears the following labels: "Corcoran Cal. 5.1.13; T.D. Urbahns Collector; Paratype U.S.N.M. [on red label]; Webster No. 6712".

♀. Extremely close to that of *endemus* (Walker) and some specimens are difficult to distinguish, but spur of mid tibia a little shorter, pedicellus on average longer. Antenna (Fig. 104) with pedicellus 1.8-2.0 times as long as broad, 1.15-1.4 length of F1; funicle distinctly stouter than pedicellus, thickening slightly distad; funicular segments subequal in length (or F1 very slightly shorter than the others), F1 and F2 1.1-1.3 times, F3 1.0-1.2 times as long as broad; clava broader than F3, 2.0-2.25 times as long as broad, hardly longer than F2 plus F3 in large ♀ but distinctly longer in small ones. Mid lobe of mesoscutum with one (sometimes irregular) row of 4-6 setae on each side. Scutellum: distance between placoid sensillum and posterior seta 1.6-1.8 times the distance between it and anterior seta. Spur of mid tibia 0.6-0.65 length of basitarsus. Gaster 2.1-2.4 times as long as broad, slightly narrower than thorax; last tergite as long as broad or only slightly broader than long; ovipositor sheaths projecting very slightly.

Body bright blue to greenish-blue. Antennal scape black with distal 0.1-0.3, sometimes also ventral edge, testaceous; pedicellus testaceous, black dorsally except at apex; flagellum brown, sometimes testaceous beneath. All tibiae usually pale yellow, occasionally weakly and narrowly infusate medially. Venation yellowish. Length 1.3-1.8 mm.

♂. Antenna (Fig. 124) with scape 3.2-3.4 times as long as broad, ventral plaque 0.45-0.47 length of scape; pedicellus plus flagellum 1.25-1.4 times breadth of mesoscutum; pedicellus as long as or slightly longer than F1, about 1.8 times

as long as broad; flagellum slightly fusiform, distinctly stouter than pedicellus; F1 a little shorter than F2, 1.0-1.45 times as long as broad; clava not broader than F4, 2.9-3.6 times as long as broad, distinctly longer than F3 plus F4; funicular segments with rather more numerous sensilla than usual; flagellum without compact whorls of long setae, those present being irregularly disposed. Spur of mid tibia 0.6 length of basitarsus. Gaster oblong-oval, as long as but slightly narrower than thorax.

Antennal scape fuscous with distal 0.3-0.5 yellow; pedicellus yellow with dorsal surface fuscous except at apex; flagellum yellowish with incisures darker, sometimes dorsal surface infuscate. Tibiae yellow, sometimes with brown postmedian ring.

MATERIAL EXAMINED. 4 ♂, 8 ♀. USA: it is not clear whether it is native, or has been introduced from Europe along with seeds of *Medicago* or *Trifolium*. Sweden. Other European records need verification. It has also been recorded from South America (Argentina). Introduced to New Zealand (Valentine, 1967: 1126).

HOSTS. The host from which the original material of *bruchophagi* was reared was said to be *Bruchophagus funebris* Howard, but this was a misidentification, the true host being *B. roddi* Guss. as recognised by Peck (1963: 125-126). This host is specifically associated with alfalfa (*Medicago*). Other material was reared from *Trifolium*, the host being no doubt *Bruchophagus gibbus* (Boheman).

*Baryscapus protasis* sp.n.  
(Figs 105, 135)

♀. Specimens believed to represent this species are extremely like those of *bruchophagi* but have the placoid setae of the scutellum slightly nearer to the anterior setae (distance between sensilla and posterior setae 1.85-2.0 times the distance between them and posterior setae); spur of mid tibia slightly longer (as in *endemus*). The ♀ can hardly be distinguished from small ♀ of *endemus* having yellow tibiae. Antenna (Fig. 105).

♂. Appears to differ from that of *endemus* (Walker) only as follows. Antenna (Fig. 125) with scape rather more slender, 3.2-3.35 times as long as broad, with ventral plaque 0.38-0.48 length of scape; pedicellus plus flagellum 1.35-1.45 breadth of mesoscutum; pedicellus slightly longer, 1.65-1.8 times as long as broad, as long as or slightly longer than F1; funicular segments rather shorter, F1 quadrate to 1.45 times as long as broad, F2 1.1-1.37 times, F3 1.2-1.65 times, F4 1.27-1.62 times as long as broad. The ♂ differs from that of *bruchophagi* in having compact subbasal whorls of long setae on the funicular segments.

Antennae tending to be paler than in *endemus*, with distal 0.2-0.4 of scape yellow; pedicellus yellow with dorsal surface more or less black (usually about basal 0.5); flagellum brown, sometimes paler beneath, in pale forms wholly yellowish. Tibiae yellow, occasionally with brownish postmedian ring.

MATERIAL EXAMINED. 7 ♂, 5 ♀. Holotype ♀, France: Gard, Montpellier district, reared 1978 from seed of *Medicago sativa* (J.P. Aeschlimann) (BMNH).

**Paratypes.** **France:** 1 ♂, Bouches du Rhône, Fonscolombe, 25.vii.1988 (probably swept from *Medicago sativa*) (Graham) (MVG). **Turkey:** 1 ♂, 1 ♀, Eskesehir, 24.viii.1934, ? ex *Bruchus* sp. in alfalfa seeds (N. Schewket) (BMNH); 1 ♂, 3 ♀, Erzerum, 25.vi.1979, 2 ♂, 26.vi.1979, 1 ♂, 1 ♀, 29.viii.1979 (H. Özbek) (BMNH).

**HOSTS.** Possibly *Bruchus* sp. (Col., Bruchidae).

**COMMENTS.** As this species is so close to *bruchophagi* (Gahan), especially the ♀, it may be that some or all of the European records of *bruchophagi* refer really to the present species. More extensive and critical rearing is necessary to elucidate the exact distribution of *bruchophagi*.

***Baryscapus bruchivorus* (Gahan)**

(Figs 106, 123)

*Tetrastichus bruchivorus* Gahan, 1942: 8-10. Holotype ♀, France: Var, 1939 (J.S. Pinckney) (USNM) [examined].

*Tetrastichus bruchivorus* Gahan; Peck, 1963: 125; Domenichini, 1966a: 122, 1966b: 21; Burks in Krombein et al., 1979: 992.

*Baryscapus bruchivorus* (Gahan) LaSalle & Graham, 1990: 124.

This species was described from stock obtained in France and reared in USA. Dr. M. Schauff kindly loaned the holotype and paratypes for examination.

♀. Much resembles paler forms of *endemus* but differs in its much shorter gaster, somewhat more squat thorax, and relatively longer pedicellus. Antenna (Fig. 106) with pedicellus twice as long as broad. Thorax about 1.3 times as long as broad. Mid lobe of mesoscutum slightly broader than long, rather more dull than in *endemus*, with a silky lustre; 5-7 (-9) adnotaular setae on each side, usually forming one irregular row, sometimes a partial second row of 2-3 setae. Scutellum 1.2 times as broad as long, rather dull like mesoscutum. Propodeum medially tending to be slightly longer than dorsellum; median carina raised, broadening almost from its base and becoming very broad posteriorly, smooth. Forewing: SM with 3-4 (-5) dorsal setae. Gaster short-ovate, not or hardly longer than thorax, as broad as thorax, 1.3-1.5 times as long as broad; last tergite broader than long; tips of ovipositor sheaths just level with apex of last tergite.

Body blue or greenish-blue. Antennae black, or flagellum sometimes brown. Legs and wings coloured as in pale forms of *endemus*. Length 1.4-1.65 mm.

♂. Antenna (Fig. 123) with scape about 3.5 times as long as broad, ventral plaque 0.53 length of scape; pedicellus plus flagellum 1.6 times breadth of mesoscutum; pedicellus virtually twice as long as broad, slightly shorter than F1; funicle (slightly collapsed in the specimen figured and therefore appearing abnormally broad) proximally stouter than pedicellus, but tapering slightly distad; F1 very slightly shorter than F2, about 1.5 times as long as broad, F2 to F4 subequal in length, each slightly less than twice as long as broad; clava 4 times as long as broad, somewhat longer than F3 plus F4; each funicular segment with a compact subbasal whorl of dark setae which reach slightly beyond the tip of the segment; C1 with a few similar setae, dorsally and ventrally.



Antennal scape black with distal 0.2 testaceous; pedicellus black, testaceous beneath and narrowly at tip; flagellum brown or subfuscous. Colour otherwise as in ♀.

MATERIAL EXAMINED. 1 ♂, 9 ♀. France, Italy, Spain, Turkey; USA (introduced).

HOSTS. *Bruchus brachialis* Fahr, *B. lentis* Frol., ? *B. pallicornis* Boh., *B. ulicis* Muls. & Rey, *Bruchidius* ? *ater* (Marsham) (*fasciatus* auctt.) (Col., Bruchidae).

***Baryscapus pallasi* (Kostjukov), comb.n.**

*Tetrastichus pallasi* Kostjukov, 1978: 447. Holotype ♀, USSR: Ural region, Dzanybek, Forestry Laboratory Research Station, 13.vii.1974 (Kostjukov) (ZIL) [not examined].

Professor Trjapitzin kindly made paratypes of this species available for study.

♀. This is included in the key to species (females) but the original description should also be consulted.

♂. This was described only in outline, therefore the following notes are added. Antenna with scape slightly shorter than an eye, ventral plaque about 0.65 length of scape; pedicellus plus flagellum 1.3 times breadth of mesoscutum; pedicellus about 1.7 times as long as broad, very slightly longer than F1; funicular segments subequal in length, each very slightly longer than broad; clava 3 times as long as broad, virtually as long as F2 plus F3 plus F4, with C1 and C2 equal in length, both quadrate; funicular segments without compact subbasal whorls of long setae. Mid lobe of mesoscutum with distinct median line; 3-4 adnotaular setae on each side, plus 2 setae forming a partial second row. Scutellum with submedian lines subequidistant from each other and from sublateral lines, enclosed space 2.4 times as long as broad. Propodeum medially 0.3 length of scutellum; spiracles separated by 0.2 their diameter from hind margin of metanotum, and by slightly more than their diameter from posterior edge of propodeum. Forewing: SM with 2 dorsal setae; M 2.2 times length of ST.

Body dark blue; gaster immaculate.

MATERIAL EXAMINED. 1 ♂, 1 ♀. USSR.

HOSTS. Unknown.

***Baryscapus spartifoliellae* sp.n.**  
(Figs 83, 356)

♀. Head (when undistorted) slightly broader than mesoscutum; temples extremely short; POL 2.0-2.3 OOL, OOL 1.1-1.3 OD. Eyes about 1.25 times as long as broad. Malar space 0.55 length of eye. Antenna (Fig. 83) with scape not quite reaching median ocellus; pedicellus plus flagellum about equal to or hardly greater than breadth of mesoscutum; pedicellus nearly twice as long as broad, slightly shorter than or as long as F1; funicle rather slender although proximally a little stouter than pedicellus, hardly thickening distad; F1 1.75-2.0 times, F2 1.55-1.8 times, F3 1.4-1.7 times as long as broad; clava slightly broader than F3,

2.5-2.8 times as long as broad, from nearly as long as, to slightly longer than F2 plus F3, pointed, spine 0.3 length of C3, apical seta about 0.5 length of spine; sensilla moderately numerous, in one irregular row, or in two rows, on each funicular segment and on C1 and C2; setae of flagellum standing out only slightly. Thorax shaped much as in *fossarum* sp.n., perhaps a little more squat. Mid lobe of mesoscutum tending to be slightly broader than long; an irregular row of 3-6 setae on each side plus a second row of 2-4. Scutellum rather broader than in *fossarum*; submedian lines about equidistant from each other and from sublateral lines enclosed space 2.4-2.6 times as long as broad; setae equal in length, this about equal to distance between submedian lines. Propodeum medially slightly longer than dorsellum. Legs much as in *fossarum*. Forewing twice or barely twice as long as broad; costal cell slightly longer than M, 8-9 times as long as broad; SM with 2-3 dorsal setae; M tending to be somewhat thickened, 2.0-2.2 times length of ST, its front edge with 11-16 setae; ST thickening gradually to the rather large subrhomboidal stigma; apical margin of wing strongly oblique; speculum rather large, extending some distance below M, wing beyond it moderately thickly pilose; cilia extremely short. Hindwing obtuse, cilia 0.15-0.17 breadth of wing. Gaster short-ovate, usually about as long as or even a little shorter than thorax, occasionally somewhat longer than thorax, as broad as or a little broader than thorax, 1.25-1.7 times as long as broad, bluntly pointed; last tergite slightly to distinctly broader than long; ovipositor sheaths only just reaching apex of last tergite; tip of hypopygium at 0.55-0.6 length of gaster. Hypopygium (Fig. 356) with lateral and median lobes subequal in length, median lobe tapering, subobtusate.

Body deep blue-green to blue, except last gastral tergite which is hardly metallic. Antennae blackish, tip of pedicellus sometimes paler, also the anelli. Coxae, trochanters, and femora mainly, coloured like body; tips of all femora rather narrowly yellowish; tibiae often wholly yellow to testaceous but sometimes mid and hind tibiae are broadly infusate just beyond the middle, fore tibiae sometimes with a dark stripe on flexor surface; tarsi brown to fuscous, first and second segments of mid and hind tarsi pale testaceous. Wings hyaline, venation testaceous to fuscous, stigmal vein often paler proximally. Length 1.5-1.85 mm.

♂. Unknown.

The ♀ much resembles that of *galactopus* (Ratzeburg) which differs as follows. Antennal flagellum shorter and stouter, funicular segments shorter, clava shorter. Malar space 0.6 length of eye, eyes slightly smaller and a little more elongate. Gaster slightly longer, more pointed and slightly acuminate, ovipositor sheaths usually projecting a little. Forewing with M tending to be rather thinner and paler.

**MATERIAL EXAMINED.** 54 ♀. Holotype ♀, **Great Britain:** Berkshire, Silwood Park, reared 27.v.1964 from pupa of *Leucoptera spartifoliella* on *Sarothamnus scoparius* (J.R. Parnell) (BMNH).

**Paratypes.** **Czechoslovakia:** 13 ♀, Bohemia centr., Kostelec nad Černými Iesy, reared vi.1953 from *Leucoptera spartifoliella* on *Sarothamnus* (Prihoda) (BMNH); 1 ♀, Bohemia mer., Veselí nad Luž., 11.vii.1945 (Bouček) (BMNH). **Germany:** 8 ♀, Rudersdorf, reared 29.vi.1953 from *L. spartifoliella* (H.G.

Bollmann) (BMNH). **Great Britain:** 1 ♀, Berkshire, Silwood Park, 14.v.1964, from same host on *Sarothamnus*, 1 ♀, 16.vi.1964, 3 ♀, 21.v.1964 (J.R. Parnell), 1 ♀, 13.viii.1957, 2 ♀, 20.viii.1957, 1 ♀, 27.viii.1957, 1 ♀, 10.ix.1957, 2 ♀, vii.1958, 2 ♀, 29.vii.1958, 2 ♀, 5.viii.1958, 3 ♀, 12.viii.1958, 1 ♀, 26.viii.1958, 1 ♀, 2.ix.1958, 1 ♀, 9.ix.1958, all from above host (O.W. Richards) (BMNH); 1 ♀, Middlesex, Southgate, 13.viii.1966, 1 ♀, 7.viii.1967, 1 ♀, 21.viii.1968, 5 ♀, 23.viii.1971, 1 ♀, 15.viii.1972, all swept from foliage of *Sarothamnus* (Graham) (BMNH).

**HOSTS.** *Leucoptera spartifoliella* (Hübner) (Lep., Lyonetiidae); apparently as a primary parasite.

***Baryscapus ceroplastiphilus* (Domenichini), comb.n.**

(Figs 75, 117)

[*Tetrastichus ceroplastiphilus* Domenichini; Benassy & Biliotti, 1963: 213-217. Nomen nudum.] *Tetrastichus ceroplastiphilus* Domenichini, 1966a: 111-112. Holotype ♀, France: Antibes, vii.1962 (Biliotti) (? MHN) [not examined].

*Tetrastichus ceroplastiphilus* Domenichini, 1966b: 23.

Domenichini (1966a: 112) designated a ♀ as holotype and stated that it was deposited in MHN. I received several syntypes from Geneva but the specimen bearing a red label "TYPUS" and Domenichini's determination was a ♂ and did not bear the correct data. Clearly some mis-labelling has occurred and I have not located the holotype ♀. However, there is no doubt regarding the identity of the species.

♀. See original description for most characters. Antenna (Fig. 75) with scape about 0.85 length of eye; pedicellus plus flagellum slightly less than breadth of mesoscutum; pedicellus as long as or very slightly longer than F1, 1.3-1.5 times as long as broad; funicle proximally somewhat stouter than pedicellus, thickening slightly distad; funicular segments subequal in length, F1 1.3-1.5 times, F2 1.1-1.2 times, F3 1.0-1.1 times as long as broad; clava 2.0-2.2 times as long as broad, slightly longer than F2 plus F3. Forewing: SM usually with 2, occasionally 3, dorsal setae.

The tibiae are not usually as dark as described by Domenichini; they are often weakly infuscate medially, or even wholly yellow. The colour of the body varies to bright blue-green or greenish-blue.

♂. Differs from ♀ as follows. Antenna (Fig. 117) with scape about 2.7 times as long as broad, ventral plaque about 0.5 length of scape; pedicellus plus flagellum 1.35 times breadth of mesoscutum; pedicellus equal in length to F1 and 1.6 times as long as broad; funicle proximally hardly stouter than pedicellus but thickening slightly distad; F1 hardly shorter than F2, 1.3-1.4 times as long as broad, following segments subequal in length, each 1.3-1.5 times as long as broad; clava hardly broader than F4, 3.3 times as long as broad, nearly as long as F2 plus F3 plus F4, with C1 not, C2 hardly longer than broad; each segment of funicle with some long and rather thick yellowish setae, which tend to group dorsally, also a few finer setae; clava with fine setae only. Gaster oblong, as long as but narrower than thorax.

Antennal scape brownish with distal part testaceous; pedicellus testaceous, infusate dorsally; flagellum testaceous, more or less infusate dorsally.

MATERIAL EXAMINED. 1 ♂, 17 ♀. **France, Italy, Israel, Lebanon, Turkey.**

HOSTS. *B. ceroplastiphilus* is a solitary, endophagous parasite of *Aprostocetus ceroplastae* (Girault) and *Scutellista coerulea* (Fonscolombe), which attack *Ceroplastes* spp. (Hem., Coccoidea) such as *C. rusci* (L.) and *C. floridensis* Comstock; a parasite of the host larvae and pupae (Benassy & Biliotti, 1963).

*Baryscapus berhidanus* (Erdős)  
(Figs 90, 107)

*Baryscapus berhidanus* Erdős, 1954: 363-364. LECTOTYPE ♀, Hungary: Berhida, 29.v.1952 (Erdős) (TM), here designated [examined].

*Aprostocetus berhidanus* (Erdős) Graham, 1961b: 47.

*Tetrastichus berhidanus* (Erdős) Domenichini, 1966a: 129, 1966b: 20; Erdős, 1971: 211-212.

*Baryscapus berhidanus* Erdős; LaSalle & Graham, 1990: 124.

Erdős reared 1 ♂ and 12 ♀ of this species, between 27.v.1952 and 30.v.1952. One pin in his series bears two cards: on the upper card is a ♀ which I have labelled lectotype; two specimens, a ♂ and a ♀, on the lower card are designated paralectotypes. The pin carries labels "Berhida 1952.v.29 dr. Erdős; E Cynipe tozae Bosc; ♀; Cotype; *Baryscapus berhidanus* Erd. det. Erdős". The remaining specimens of the series are also designated paralectotypes.

♀. Much resembles that of *turionum* (Hartig) but differs particularly by its smaller propodeal spiracles, which are more remote from the metanotum. Antenna (Fig. 90) with F1 quadrate, F2 quadrate or hardly transverse, F3 slightly transverse. Mid lobe of mesoscutum with median line fine but usually complete; setae relatively numerous, arranged much as in *diaphantus* (Walker). Gaster long-ovate to (usually) lanceolate, 1.5-1.8 times length of thorax, (1.8-) 2.0-2.75 times as long as broad, acuminate, somewhat narrower than thorax; last tergite usually as long as broad, occasionally slightly broader than long; ovipositor sheaths projecting to a length equal to 0.12-0.25 that of hind tibia; tip of hypopygium at about 0.5 length of gaster.

Colour as in *diaphantus*. Length 0.9-1.8 mm.

The ♀ might be mistaken for that of *pallidae* sp.n. if the thorax happens to be abnormally collapsed, but it differs not only in its smaller and circular propodeal spiracles, but also in having submedian lines of scutellum at most slightly nearer to sublateral lines than to each other and enclosing a space 2.2-2.4 times as long as broad.

♂. Differs from ♀ as follows. Antenna (Fig. 107) with scape swollen, 2.5-2.8 times as long as broad, its ventral plaque rather indistinct, but similar to that of *diaphantus* (Walker); pedicellus plus flagellum about 0.85 breadth of mesoscutum; pedicellus about 1.5 times as long as broad, much longer than F1; flagellum clavate; F1 tending to be a little shorter than the following funicular segments, which are subequal in length, slightly less broad than the pedicellus, quadrate; F1 subquadrate to slightly transverse, F3 and F4 obviously transverse;

clava hardly broader than F4, 1.5-1.6 times as long as broad, hardly longer than F3 plus F4; in some specimens each funicular segment has a rudimentary compact subbasal whorl of setae, which are not longer than the segment itself. Legs rather short and stout. Gaster oval, slightly shorter and slightly narrower than thorax.

MATERIAL EXAMINED. 3 ♂, 44 ♀. **Czechoslovakia, France, Hungary, Italy.**

HOSTS. Reared in Hungary from galls of *Andricus quercustozae* (Bosc) in fruits of *Quercus lanuginosa* [= *pubescens* Willd.] by Erdős; in Czechoslovakia from galls of *Andricus kollari* (Hartig) (Hym., Cynipidae) by Bouček, and in France from the same species of gall by Graham (BMNH). The exact host relationship is not known.

COMMENTS. This species seems to be on the whole best placed in the *evonymellae*-group, although in some respects it is intermediate between that and the *daira*-group.

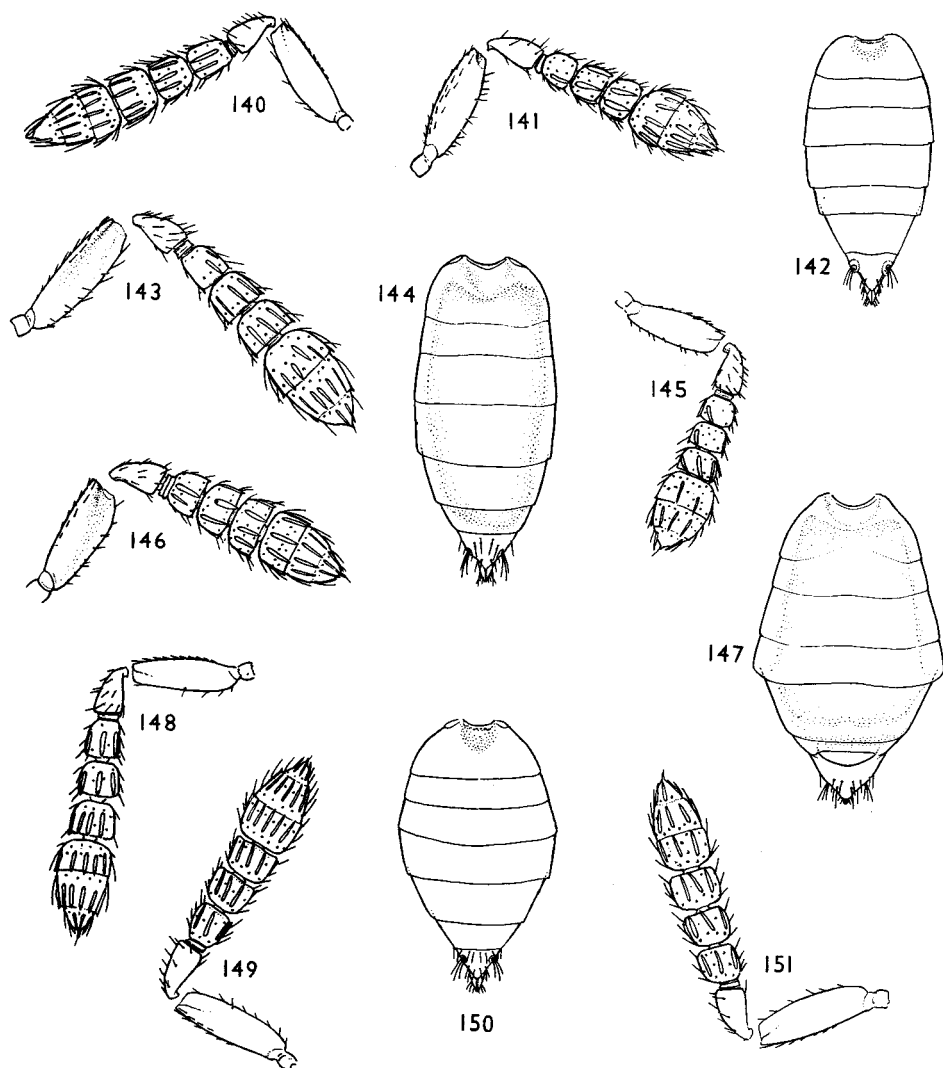
## THE *DAIRA*-GROUP

### Key to European species

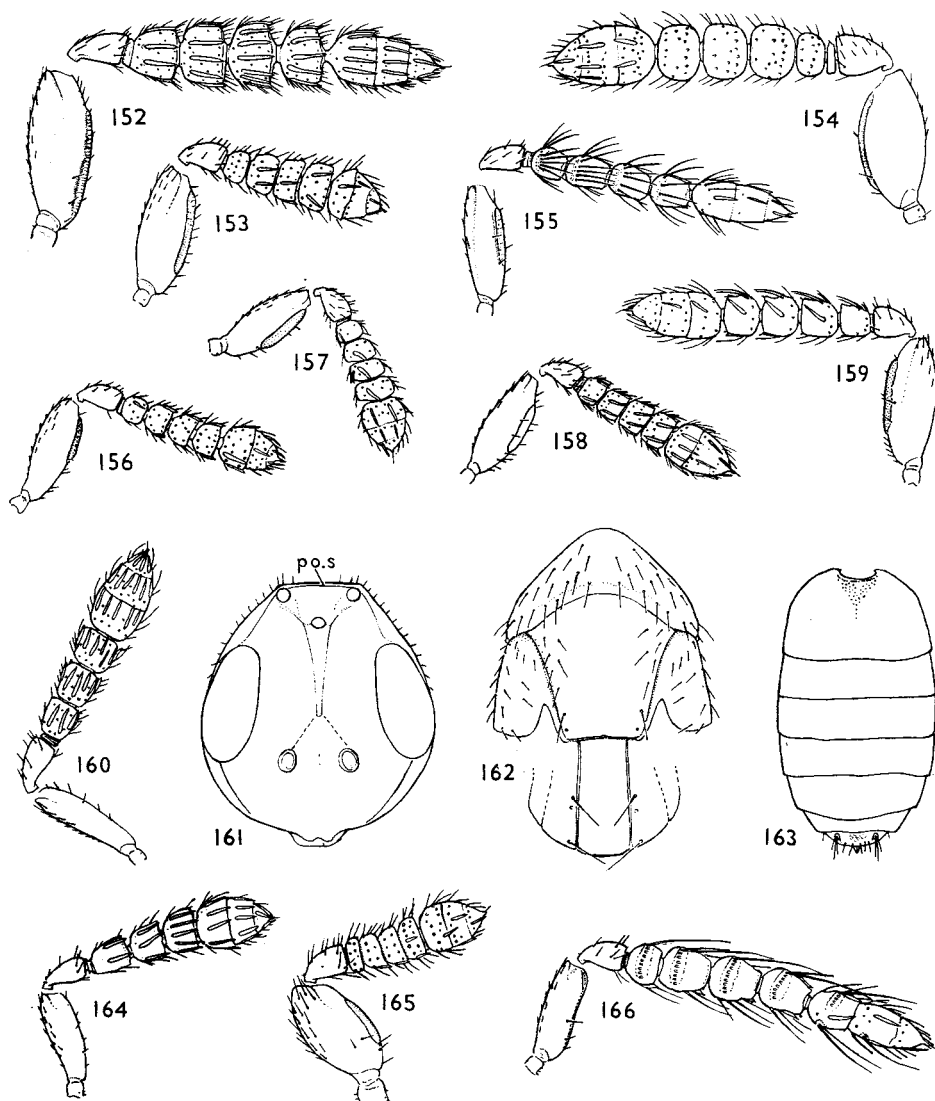
#### Females

- 1 Ovipositor sheaths well or far exerted, their projecting portion 0.25-1.2 times length of hind tibia; tip of hypopygium situated at 0.55-0.75 length of gaster minus ovipositor sheaths. Species associated with Compositae, especially thistles and *Centaurea* spp. . . . . 2
- Ovipositor sheaths normally less, or not, exerted; *or*, if with projecting portion as much as 0.35 length of hind tibia (some *diaphantus*) then tip of hypopygium is situated at 0.36-0.45 length of gaster minus ovipositor sheaths and the species is associated with host plants other than Compositae. . . . 4
- 2 Gaster (Fig. 130) lanceolate, with projecting portion of ovipositor sheaths 0.5-1.2 length of hind tibia; tip of hypopygium (Fig. 131) situated at 0.7-0.75 length of gaster minus ovipositor sheaths. Antennal scape (Fig. 129) with relatively few setae on its front edge. . . . . *daira* (p.147)
- Gaster with projecting portion of ovipositor sheaths 0.25-0.45 length of hind tibia; tip of hypopygium (Fig. 131) situated at 0.55-0.6 length of gaster minus ovipositor sheaths. . . . . 3
- 3 Antenna (Fig. 132) with F2 and F3 hardly broader than long; scape slender, with more numerous setae on its front edge. . . . . *cirsicola* (p.150)
- Antenna (Fig. 133) with F2 slightly to moderately, F3 strongly transverse; scape broader, with fewer setae on its front edge. . . . *carthami* (p.151)
- 4 Antenna (Fig. 134) with flagellum short, about 0.7 breadth of mesoscutum, strongly clavate, with F2 at least slightly, F3 strongly, transverse. Gaster most often 1.8-2.4 times as long as thorax, with ovipositor sheaths projecting to a length 0.17-0.35 that of hind tibia (weakly-developed specimens tend to have shorter gaster and less exerted ovipositor sheaths). Mid lobe of mesoscutum with setae scattered over the whole surface except a

- longitudinal strip down the middle. Forewing with M 2.5-2.8 times length of ST. Species occurring in galls of *Biorhiza pallida* on *Quercus*.  
 ..... *diaphantus* (p.158)
- Species having antennae similar to those of *diaphantus* either have the gaster relatively shorter, or mid lobe of mesoscutum with setae at sides only, or forewing with M at most about 2.0 times length of ST, and have hosts on other plants. .... 5
- 5 Submedian lines of scutellum not or hardly nearer to sublateral lines than to each other, enclosing a space 2.3-2.5 times as long as broad; scutellar setae long, their length 1.0-1.2 times the distance between submedian lines. Mid lobe of mesoscutum with 9-12 setae on each side, in 2-3 irregular rows, leaving only the median third bare. Forewing: SM with 2 (-3) dorsal setae. Antennae (Fig. 137) with F2 hardly, F3 very slightly transverse.  
 ..... *anasillus* (p.160)
- Submedian lines of scutellum slightly to very distinctly nearer to sublateral lines than to each other, enclosing a space 1.5-2.0 times as long as broad; scutellar setae often relatively shorter than in above. Mid lobe of mesoscutum usually with fewer than 9 setae on each side, occasionally 8-12. Forewing sometimes with 3 dorsal setae on SM. Antennae sometimes with one or more funicular segments transverse. .... 6
- 6 Antennae (Figs 138-140, 148) with flagellum less clavate, F2 quadrate, F3 quadrate or at most very slightly transverse. .... 7
- Antennae (Figs 141, 143, 145, 146, 148, 151) with flagellum more clavate, F2 at least slightly, F3 moderately to strongly transverse. .... 11
- 7 Gaster 1.65 times as long as broad, with last tergite broader than long; ovipositor sheaths projecting only very slightly. Propodeum medially 0.42 length of scutellum. Submedian lines of scutellum wide apart, enclosed space 1.7 times as long as broad. .... *sp.indet.4* (p.162)
- Gaster at least twice as long as broad, with last tergite about as long as broad, except in *garganus*, which has propodeum medially about 0.35 length of scutellum and submedian lines of scutellum nearer together, enclosing a space about twice as long as broad. .... 8
- 8 Forewing: SM with 3-4 (-5) dorsal setae. .... 9
- Forewing: SM with 2 dorsal setae (rarely 3 on one wing only). .... 10
- 9 Mid lobe of mesoscutum with median line distinct, complete, often strong; with 4-8 setae on each side. Gaster (2.0-) 2.2-3.0 times as long as broad, 1.4-1.6 times length of thorax. Antenna (Fig. 138). Reared from galls of *Biorhiza* on *Quercus*. .... *pallidae* (p.155)
- Mid lobe of mesoscutum with median line very fine, sometimes incomplete; 7-11 setae on each side. Gaster 1.8-2.1 times as long as broad, 1.2-1.35 times length of thorax. Antenna (Fig. 139). Reared as hyperparasite of pteromalid species on *Lixus iridis*. .... *garganus* (p.159)
- 10 Propodeal spiracles small, circular, separated by about 0.5 their diameter from hind margin of metanotum. Gaster 2.0-2.5 times as long as broad. Antenna (Figs 148, 149). .... *talitzkii* (p.156)
- Propodeal spiracles moderate-sized, oval, separated by about 0.35 their



Figs 140-151 *Baryscapus* species, females. 140, *B. virens* sp. n., antenna. 141, 142, *B. gradwelli* sp. n.; (141) antenna; (142) gaster. 143, 144, *B. bruchidii* (Erdős); (143) antenna; (144) gaster. 145, *B. papaveris* sp. n., antenna. 146, 147, *B. crassicornis* (Erdős); (146) antenna; (147) gaster. 148-150, *B. talitzkii* (Kostjukov); (148) antenna of paratype; (149) antenna of French specimen; (150) gaster. 151, *B. endofiticus* (Domenichini), antenna.



**Figs 152-166** 152-159, *Baryscapus* species, male antennae. 152, *B. दौरа* (Walker). 153, *B. crassicornis* (Erdős). 154, *B. endofiticus* (Domenichini) paralectotype. 155, *B. bruchidii* (Erdős). 156, *B. gradwelli* sp. n. 157, *B. papaveris* sp. n. 158, *B. diaphantus* (Walker). 159, *B. talitzkii* (Kostjukov). 160-166, *Puklina* species. 160-163, *P. amblyteles* sp. n.; (160) ♀ antenna; (161) ♀, head, front view (p.o.s, postocellar suture); (162) thorax; (163) gaster. 164, *P. depilata* sp. n. ♀, antenna. 165, *P. amblyteles* sp. n. ♂, antenna. 166, *P. depilata* sp. n. ♂, antenna.



- length from hind margin of metanotum. Gaster 2.7-3.0 times as long as broad. Antenna (Fig. 140). . . . . *virens* (p.150)
- 11 Mid lobe of mesoscutum without a median line or, rarely, with an extremely fine and superficial line partly indicated; with setae at sides only (a row of 3-4, plus sometimes a partial second row of 1-3, on each side). Propodeum medially 0.47-0.6 length of scutellum. Submedian lines of scutellum wide apart, enclosed space 1.5-1.6 times as long as broad. . . *gradwelli* (p.151)
    - Mid lobe of mesoscutum with a fine to moderately strong median line; setae often more numerous. Propodeum medially about 0.45 length of scutellum in *bruchidii*, in the other species at most 0.35 length of scutellum. Submedian lines of scutellum sometimes closer together. . . . . 12
  - 12 Gaster slightly longer than thorax, about 1.5 times as long as broad. Propodeal spiracles circular, separated by nearly their diameter from hind margin of metanotum. Forewing with M about twice length of ST.
    - . . . . . *hemigaster* (p.157)
    - Gaster at least as long as head plus thorax, 1.6-3.0 times as long as broad. Propodeal spiracles suboval to oval, relatively closer to metanotum. Forewing with M often longer relative to ST. . . . . 13
  - 13 Gaster (Fig. 144) 2.15-2.5 times as long as broad. Antenna (Fig. 143) with pedicellus plus flagellum about 0.9 breadth of mesoscutum; F2 slightly, F3 moderately transverse. Propodeum medially about 0.45 length of scutellum. . . . . *bruchidii* (p.153)
    - Either gaster is at most 1.85 times as long as broad; or antenna has pedicellus plus flagellum relatively shorter and both F2 and F3 distinctly transverse. Propodeum medially at most 0.35 length of scutellum. . . 14
  - 14 Gaster 2.1-2.25 times as long as broad, more acute (much as in *gradwelli*, Fig. 142). Forewing: SM with 3-4 dorsal setae. . . . . *papaveris* (p.161)
    - Gaster (Figs 147, 150) 1.6-1.85 times as long as broad, less acute. Forewing: SM sometimes with only 2 dorsal setae. . . . . 15
  - 15 Antenna (Fig. 146) with F2 and F3 more strongly transverse. Forewing: SM usually with 3-4 (-5) dorsal setae, occasionally 2. . . . *crassicornis* (p.154)
    - Antennae (Figs 148, 149, 151) with F2 and F3 less strongly transverse. Forewing: SM usually with 2, occasionally 3, dorsal setae. . . . . 16
  - 16 Propodeum medially 0.25-0.30 length of scutellum. Forewing: M 2.0-2.5 times length of ST. Reared from tortricid larvae and *Scambus* sp.
    - . . . . . *talitzkii* (p.156)
    - Propodeum medially 0.35-0.4 length of scutellum. Forewing: M 2.5-2.9 times length of ST. Hyperparasite of pteromalid sp. on *Lixus iridis*.
      - . . . . . *endofiticus* (p.161)

#### Males

- 1 Antennae (Figs 152-154, 156-158): funicular segments without compact subbasal whorls of dark setae. . . . . 2
- Antennae (Figs 155, 159): each funicular segment with a compact subbasal whorl of dark setae. . . . . 8

- 2 Antennae (Figs 152-154): ventral plaque 0.6-0.75 length of scape and extending about equally into its upper and lower halves; funicle where broadest with F3 nearly or quite as broad as the clava. . . . . 3
- Antennae (Figs 156-158): ventral plaque 0.45-0.55 length of scape, placed about in middle, or mainly in upper half; funicle often with F3 narrower than clava. . . . . 5
- 3 Antenna (Fig. 152) with F1 as long as F2, not or hardly transverse, provided with sensilla; clava about twice as long as broad; pedicellus plus flagellum not or hardly less than breadth of mesoscutum. . . . . *daira* (p.147)
- Antennae (Figs 153, 154) with F1 shorter than F2 and lacking sensilla; clava at most about 1.8 times as long as broad; pedicellus plus flagellum distinctly less than breadth of mesoscutum. . . . . 4
- 4 Antenna (Fig. 153) with clava very short, hardly longer than broad, its segments very strongly transverse; F3 and F4 nearly twice as broad as long. . . . . *crassicornis* (p.154)
- Antenna (Fig. 154) with clava about 1.8 times as long as broad, its segments less transverse; F3 and F4 1.4-1.5 times as broad as long. . . . . *endofiticus* (p.161)
- 5 Antenna (Fig. 156) with F2, F3 and F4 of about equal breadth; scape with ventral plaque situated mainly in upper half. Mid lobe of mesoscutum without, or with a very weak and superficial, median line. . . . . *gradwelli* (p.151)
- Antennae (Figs 157, 158) with funicle broadening at least slightly distad, with F3 and F4 strongly transverse; scape with ventral plaque situated either in the middle, or mainly in the upper half. Mid lobe of mesoscutum with distinct median line. . . . . 6
- 6 Antenna (Fig. 157) with pedicellus plus flagellum much less than breadth of mesoscutum. Host *Aylax papaveris* on *Papaver*. . . . . *papaveris* (p.161)
- Antenna (Fig. 158) with pedicellus plus flagellum about 0.8 breadth of mesoscutum. Host in galls of *Biorhiza pallida* on *Quercus*. . . . . 7
- 7 Antenna (Fig. 158) with F3 and F4 slightly to distinctly transverse. . . . . *diaphantus* (p.158)
- Antenna with F3 and F4 only very slightly transverse. . . . . ? *pallidae* (p.155)
- 8 Antenna (Fig. 155) with flagellum nearly filiform and with F2, F3 and F4 quadrate to slightly longer than broad; clava 2.3-2.5 times as long as broad; ventral plaque of scape about 0.5 length of scape. . . . . *bruchidii* (p.153)
- Antenna (Fig. 159) with flagellum fusiform or slightly clavate; all funicular segments at least slightly broader than long; clava 1.6-2.0 times as long as broad; ventral plaque about 0.65 length of scape. . . . . *talitzkii* (p.156)

*Baryscapus daira* (Walker)

(Figs 128-131, 152, 356)

*Cirrospilus daira* Walker, 1839a: 330. LECTOTYPE ♀, Great Britain: Isle of Wight (Walker), here designated [examined].*Aprostocetus cirsii* [Förster MS] Kurdjumov, 1913: 252. Syntype ♀, Germany: Aachen (Förster)

- (ZIL) [not examined]. [Synonymised with *daira* by Bouček, 1966: 34.]  
*Aprostocetus canadensis* Ashmead, 1888: 106. Lectotype ♀, Canada: (USNM, No. 28664) (designated by Burks (1967: 759) [not examined]. [Synonymised by Graham, 1961b: 47.]  
*Aprostocetus daira* (Walker) Varley, 1947: 143, 173; Graham, 1961b: 47; Burks in Krombein et al., 1979: 1003.  
 [Geniocerus crassicornis Erdős, 1954: 360, fig. 17e (♀ only). Misidentification.]  
*Aprostocetus canadensis* Ashmead; Peck, 1963: 157.  
*Tetrastichus daira* (Walker) Bouček, 1966: 34; Domenichini, 1966a: 127, 1966b: 27; van den Assem, Gijswijt & Nübel, 1982: 208-209.  
*Tetrastichus cirsii* (Kurdjumov) Erdős, 1971: 215; Redfern, 1983: 11, figs 18, 19.  
*Eutetrastichus daira* (Walker) Graham, 1987: fig. 53.  
*Baryscapus daira* (Walker) LaSalle & Graham, 1990: 124.

#### TYPE MATERIAL

Two ♀ syntypes of *Cirrospilus daira* Walker stand in BMNH, each bearing a Waterhouse label reading "Tetrastichus Daira Walker. Stood under this name in the old B.M. collection". I have labelled the first specimen as lectotype. The second, having gaster abnormally compressed and tibiae mainly black, is designated paralectotype. The two specimens are conspecific.

Some years ago my late colleague George Gradwell examined specimens from Canada determined as *Aprostocetus canadensis* Ashmead. I also saw them and we agreed that *canadensis* was conspecific with *daira*.

LaSalle (1986: 599-600) reported that in ZIL there is a single damaged specimen (sex unknown) from Förster's collection labelled "Tetrastichus Cirsii Forest., A [achen]". As the antennae and gaster were missing LaSalle did not designate this specimen as lectotype. Material from Förster's collection exists in a number of institutions and a better specimen might turn up eventually. From the specific name, and Kurdjumov's brief diagnosis (in a key) I have no doubt that *cirsii* is the same as *daira*. Specimens identified by Erdős and Domenichini are referable to *daira*. In BMNH there is a pair (♂, ♀), probably from Ruschka's collection, reared from *Cirsium eriophorum* and determined as *cirsii*. In default of any Förster material, the ♀ from this pair would be a suitable neotype.

♀. Head (Fig. 128) not quite, or just, as broad as mesoscutum, 2.3-2.5 times as broad as long; temples 0.1-0.15 length of eyes; POL 2.2-2.6 OOL, OOL equal to or only slightly greater than OD. Eyes about 1.3 times as long as broad. Malar space 0.66 length of eye. Mouth about equal to malar space. Setae of vertex and ocellar triangle very short, arising from punctures. Antenna (Fig. 129) with scape much shorter than an eye, not nearly reaching median ocellus; pedicellus plus flagellum 0.66-0.75 breadth of mesoscutum; pedicellus distinctly longer than F1, about twice as long as broad; funicle proximally obviously stouter than pedicellus; F1 quadrate to very slightly transverse, F2 and F3 slightly transverse; clava broader than funicle, 1.6-2.0 times as long as broad, somewhat longer than F2 plus F3, pointed, its segments slightly to distinctly transverse, spine about 0.5 length of C3; sensilla moderately numerous and moderately long, uniseriate, decumbent. Thorax 1.5-1.7 times as long as broad, broader than high. Pronotum 0.3-0.35 length of mesoscutum. Mid lobe of mesoscutum slightly broader than long, weakly convex, moderately shiny, with extremely fine engraved reticulation; median line distinct over at least hinder half, often complete; 3-5 short

adnotaular setae on each side, plus a partial second row of 1-4. Scutellum 1.3-1.4 times as broad as long, rather weakly convex; submedian lines somewhat nearer to sublateral lines than to each other, enclosing a space 1.7-2.0 times as long as broad; length of setae about 0.6 the distance between submedian lines, anterior pair in or hardly behind the middle. Dorsellum 3-3.5 times as broad as long. Propodeum medially 1.1-1.7 times as long as dorsellum, weakly emarginate posteriorly, shiny, with very fine, superficial reticulation; median carina weak or only slightly raised, thin near base but broadening rapidly from the middle; spiracles short-oval, separated by 0.25-0.5 their length from metanotum; callus with 3-6 setae. Legs of medium length and thickness; hind femora about 3.8 times as long as broad; spur of mid tibia slightly shorter than basitarsus. Forewing 2.0-2.2 times as long as broad; costal cell as long as or a little longer than M, 11-12 times as long as broad; SM with 2-3 dorsal setae; M moderately thick, 2.3-2.8 times length of ST, its front edge with 9-13 rather short setae; ST moderately thin proximally but rapidly expanding into the rhomboidal stigma; PM absent or rudimentary; speculum moderate-sized, wing beyond it moderately thickly pilose; cilia 0.12-0.2 length of ST. Hindwing obtuse or bluntly pointed, cilia 0.15-0.2 breadth. Gaster (Figs 130, 131) oblong-elliptic, somewhat longer than head plus thorax, usually narrower than thorax, 2.5-3.3 times as long as broad, acute but not acuminate; last tergite slightly transverse or as long as broad; exerted part of ovipositor sheaths 0.47-1.2 length of hind tibia; tip of hypopygium at 0.7-0.75 length of gaster minus ovipositor sheaths. Hypopygium (Fig. 357) characteristic: not much broader than long; lateral lobes broad, median lobe shorter though much longer than broad, obtuse.

Body varying from golden-green through green and blue to violet-blue. Antennal scape and pedicellus black (in Continental specimens scape sometimes testaceous beneath or wholly so); pedicellus sometimes testaceous beneath and apically; flagellum brownish-testaceous to brown. Coxae, and femora except their tips, coloured like body; trochanters dark or more or less yellow; tibiae testaceous, mid and hind ones usually more or less infuscate medially, sometimes black except at both ends; tarsi yellowish with tips brown, or brownish with basitarsus yellow. Wings milky-hyaline, venation pale yellowish to testaceous; distal part of parastigma, and proximal part of ST, usually decolorized. Length of body 1.45-2.2 mm; of body plus ovipositor 1.8-2.9 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 152) with scape 0.8 length of eye, ventral plaque about 0.75 length of scape; pedicellus plus flagellum 1.0-1.1 breadth of mesoscutum; pedicellus 1.4-1.55 times as long as broad, somewhat longer than F1; funicle tending to be fusiform, much stouter than pedicellus, its segments subequal in length, F1 quadrate to slightly transverse, F2 to F4 distinctly transverse; clava tending to be slightly narrower than F4, 2.0-2.2 times as long as broad; flagellum without compact whorls of long dark setae. Gaster oblong-oval, about as long as but narrower than thorax.

**MATERIAL EXAMINED.** Many ♂, ♀. **Austria, Czechoslovakia, France, Germany, Great Britain, Hungary, Sardinia, Spain, Turkey, USSR; Canada, USA.**

**HOSTS.** Diptera, Tephritidae: commonly *Chaetoriella jaceae* (R.-D.) and *Urophora jaceana* (Hering) (Varley, 1947: 173) in Britain; *Terellia serratulae* (L.)

on *Cirsium* in Britain and France (Graham), many reared in southern France from heads of *Cirsium vulgare* being probably from this host; *Trypeta colon* (Mg.) in Germany; *Terellia florescentiae* (L.) in USA (Detmers, 1927). *B. daira* is a gregarious endoparasite of the host larvae and pupae. The larva and pupa are figured by Redfern (1983, figs 18, 19, as *T. cirsii*).

COMMENTS. Courtship behaviour of *daira* was described by van den Assem, Gijswijt & Nübel (1982: 208-209). Courtship sounds produced by males of *daira* were described and illustrated by van den Assem & Putters (1980).

***Baryscapus cirsicola* sp.n.**

(Fig. 132)

♀. Extremely close to that of *daira* (Walker) but differs as follows. Antenna (Fig. 132) slightly longer, with pedicellus plus flagellum 0.85-0.88 breadth of mesoscutum, scape with more numerous short setae on its front edge; pedicellus hardly longer than F1; funicular segments quadrate, or F3 very slightly transverse; clava tending to be a little shorter and broader. Ovipositor sheaths 0.25-0.45 length of hind tibia; tip of hypopygium at about 0.6 length of gaster minus ovipositor sheaths. Mid lobe of mesoscutum with distinct to strong median line. Forewing: SM with 3 dorsal setae. Length 2.0-2.05 mm.

Differs from some *pallidae* sp.n. in which the ovipositor sheaths are well exerted, in having shorter scutellar setae, anterior margin of scape with more numerous short setae, clava broader and shorter.

♂. Unknown.

MATERIAL EXAMINED. 7 ♀. Holotype ♀, **France**: Drôme, Col de l'Homme Mort, reared 4.ix.1988 from capitulum of *Cirsium vulgare* (Graham) (BMNH).

Paratypes. Same data as holotype, 1 ♀ (MVG); 1 ♀, Aisne, Colligi, 1.vii.1971 (Gijswijt) (MJG). **Great Britain**: 2 ♀, Buckinghamshire, Loudwater, 29.v.1976 (Bouček) (BMNH).

HOSTS. Unknown. A number of insect species occur in the capitula of *Cirsium vulgare* but it is not possible to say which might be the host of *cirsicola*.

***Baryscapus virens* sp.n.**

(Fig. 140)

♀. Differs from that of *daira* particularly in having ovipositor sheaths only slightly projecting, also as follows. Antenna (Fig. 140) with F1 hardly shorter than pedicellus, F2 hardly transverse, F3 only slightly so. Scutellar setae slightly longer, length 0.75-0.8 the distance between the submedian lines. Forewing: SM with only 2 dorsal setae. Gaster similar to that of *turionum* (Fig. 100) but narrower, 2.7-3.0 times as long as broad; ovipositor sheaths projecting by 0.15-0.17 length of hind tibia; tip of hypopygium situated at 0.45-0.5 length of gaster minus ovipositor sheaths.

Body greenish-blue. Wing hyaline, pilosity slightly darker and therefore more conspicuous than in *daira*. Other features of coloration as in *daira*. Length 1.5-1.6 mm.

Also much resembles ♀ of *pallidiae* sp.n. but has F3 slightly transverse, SM of forewing with 2 dorsal setae; it is also associated with a different plant.

♂. Unknown.

MATERIAL EXAMINED. 2 ♀. Holotype ♀, **France**: Haut-Rhin, St. Louis, vi.1987, reared from *Terellia virens* (Stinson) (BMNH).

Paratype: 1 ♀, same data as holotype (BMNH).

Non-paratypic material. 1 ♀, **Hungary**, Budai mountains, 17.ix.1952 (Erdős) (TM) (det. Erdős as "*bruchidii*").

HOSTS. *Terellia virens* (Loew) (Dipt., Tephritidae) on *Centaurea* sp. (probably *maculosa*).

***Baryscapus carthami* sp.n.**

(Fig. 133)

♀. Mostly resembles *cirsicola* sp.n. but differs as follows. Antenna (Fig. 133) with pedicellus much longer than F1, about 1.9 times as long as broad; flagellum rather shorter and more strongly clavate; funicular segments subequal in length, F1 1.1-1.15 times, F2 1.25-1.4 times, F3 1.47-1.8 times as long as broad; clava 1.3-1.5 times as long as broad.

Differs from ♀ *diaphantus* (Walker) in having tip of hypopygium at 0.55-0.57 length of gaster minus ovipositor sheaths; propodeum rather longer, medially about 0.4 length of scutellum; SM of forewing with 2 dorsal setae, M on average shorter, 2.25-2.4 times length of ST. It is associated with *Carthamus*; *diaphantus* with *Biorhiza* galls on *Quercus*.

Differs from *gradwelli* sp.n. in having ovipositor sheaths projecting farther, to 0.25-0.33 length of hind tibia; mid lobe of mesoscutum with a fine median line, tip of hypopygium a little farther distad.

♂. Unknown.

MATERIAL EXAMINED. 13 ♀. Holotype ♀, **Hungary**: Budapest, Julia Major, reared from pupa of *Terellia virens* (Stinson) (BMNH).

Paratypes. Same data as holotype, 10 ♀ (BMNH). **Spain**: 2 ♀, Almeria, Bersa, reared 28.v.1986 from unknown host on *Carthamus* sp. (Gijswijt) (MJG).

HOSTS. *Terellia virens* (Loew) (Dipt., Tephritidae).

***Baryscapus gradwelli* sp.n.**

(Figs 141, 142, 156, 361)

*Tetrastichus* sp.B, Varley, 1947: 172-173, fig. 10D.

[*Tetrastichus daira* (Walker) Redfern, 1983: 8, fig. 11. Misidentification.]

♀. Differs from that of *daira* (Walker) as follows. Antenna (Fig. 141) with clava rather broader relative to F3, 1.6-1.7 times as long as broad, conspicuously longer than F2 plus F3, in smallest ♀ almost as long as whole funicle. Thorax hardly 1.5 times as long as broad. Mid lobe of mesoscutum without a median line; 3-4

adnotaular setae on each side, plus (usually) 1-3 forming a second row. Scutellum with submedian lines much nearer to sublateral lines than to each other, tending to converge slightly caudad, enclosed space only 1.5-1.6 times as long as broad. Propodeum medially 0.47-0.6 length of scutellum. Forewing with M on average shorter, 2.1-2.4 times length of ST. Gaster (Fig. 142) 2.0-2.5 times as long as broad, slightly acuminate; ovipositor sheaths projecting only very slightly, to at most 0.2 length of hind tibia; tip of hypopygium at 0.5 length of gaster. The last tergite tends to flatten on drying, so that the cerci are conspicuous in dorsal view. Hypopygium (Fig. 361) with lobes subequal in length, lateral lobes broad, median lobe tapering and subacute. Length 0.9-1.7 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 156) with scape broader, about 0.8 length of eye, ventral plaque about 0.5 length of scape and situated mainly in the upper half; pedicellus plus flagellum 0.85 breadth of mesoscutum; F1 subquadrate, following funicular segments slightly transverse; clava broader than F4, 1.5-1.75 times as long as broad, somewhat longer than F3 plus F4, occasionally nearly as long as F2 plus F3 plus F4; flagellum without compact subbasal whorls of dark setae. Median line of mesoscutum sometimes traceable in part, though very fine. Gaster as in ♂ *daira*. Length 1.0-1.2 mm.

I dedicate this species to my late friend and colleague George Gradwell, who at one time had intended to describe it.

**MATERIAL EXAMINED.** 24 ♂, 61 ♀. Holotype ♀, **Great Britain:** England, Berkshire, Wytham, reared 5.iii.1951 from *Urophora jaceana* on *Centaurea debeauxii* (G.R. Gradwell) (BMNH).

**Paratypes.** **Czechoslovakia:** 1 ♀, Bohemia or., Hradec Králové, 14.v.1952 (Bouček) (BMNH). **France:** 2 ♀, Drome, Col de l'Homme Mort [*recte* l'Orme Mort!], 27.viii.1988, from capitulum of *Cirsium vulgare*, together with *Terellia serratulae* (Graham) (MVG). **Germany:** 3 ♂, 10 ♀, Bayern, Oberstdorf, on *Centaurea* sp., reared 4-20.ii.1978, 1 ♂, 3 ♀, iii.1978 (B. Nübel) (ITZ). **Great Britain:** 4 ♀, Berkshire, Cumnor Hill, emerged 11.iii.1941 from heads of *Cirsium vulgare* infested by *Terellia serratulae* (G.D.H. Carpenter) (UM); 1 ♀, Berkshire, Wytham, emerged x.1950 from *Urophora jaceana* on *Centaurea debeauxii*, 4 ♂, 7 ♀, emerged 5.iii.1951 from same host (BMNH), 9 ♂, reared 5.iii.1951 from heads of *Centaurea debeauxii* (Gradwell) (UM); Middlesex, Southgate, 7 ♂, 2 ♀, emerged 18.v.1969, 9 ♀, em. 20 or 21.v.1969, 10 ♀ em. 21 or 22.v.1969, 3 ♀, em. 1.v.1972, 8 ♀ em. 2.v.1972, all from capitula of *Centaurea debeauxii* (Graham) (BMNH).

**HOSTS.** *Urophora jaceana* (Hering), possibly also *Terellia serratulae* (L.) (Dipt., Tephritidae). *B. gradwelli* is a gregarious endoparasite of the former (Varley, 1947, as *Tetrastichus* sp.B.).

**COMMENTS.** Some of the specimens reared by Gradwell had *Centaurea nigra* L. indicated as the host-plant; but the late Professor Varley informed me that this identification was incorrect and that the plant was *Centaurea debeauxii* Gren. & Godron. The plants involved in my rearings also belonged to *debeauxii*.

***Baryscapus bruchidii* (Erdős), comb.n.**

(Figs 143, 144, 155)

*Geniocerus bruchidii* Erdős, 1951: 232-233. LECTOTYPE ♀, Hungary: Kalocsa, 26.v.1945 (Erdős), here designated [examined].*Aprostocetus bruchidii* (Erdős) Graham, 1961b: 47.*Tetrastichus bruchidii* (Erdős) Domenichini, 1966a: 128-129, 1966b: 21; Erdős, 1971: 249; Kostjukov, 1978: 451.

Erdős described this species from 2 ♂ and 5 ♀ reared from material collected at Kalocsa. I have marked as lectotype a ♀ labelled "Kalocsa 1945.v.26. dr. Erdős; Glycyrrhiza echinata L. termese; ♀; Cotypus; *Geniocerus bruchidii* Erd. det. Erdős."

♀. Head about as broad as mesoscutum. Malar space hardly 0.6 length of eye. Antenna (Fig. 143) with scape 0.75 length of eye, not reaching median ocellus; pedicellus plus flagellum about 0.9 breadth of mesoscutum; pedicellus 1.7-1.8 times as long as broad, slightly longer than F1; flagellum distinctly clavate; funicle proximally not stouter than pedicellus; funicular segments equal in length, F1 quadrate, F2 very slightly transverse, F3 distinctly so; clava broader than F3, 1.65-1.75 times as long as broad, nearly as long as whole funicle; sensilla moderately numerous. Thorax 1.3 times as long as broad (but possibly a little flattened abnormally), weakly arched dorsally, scutellum very weakly convex in profile, propodeal slope about 25 degrees. Pronotum about 0.17 as long as mesoscutum. Mid lobe of mesoscutum as in *berhidanus*; median line distinct except in front. Scutellum 1.3 times as broad as long; submedian lines distinct, much nearer to sublateral lines than to each other, enclosed space nearly twice as long as broad; length of setae about 0.7 distance between submedian lines. Propodeum weakly emarginate above petiole, medially 0.42-0.45 length of scutellum and about twice as long as dorsellum; median carina vague, foveate at base; spiracles suboval, 0.6 their length from hind edge of metanotum; callus with 3-5 setae. Legs of medium length and thickness; hind femora 4 times as long as broad. Forewing twice as long as broad; costal cell 1.25 times as long as M, about 10 times as long as broad; SM with 2 (-3) dorsal setae; M not thick, 1.8 times length of ST, its front edge with 11-12 setae; speculum small, closed below, wing beyond it fairly thickly pilose; cilia 0.15 length of ST. Hindwing subobtusate, cilia 0.27 breadth of wing. Gaster (Fig. 144) long-ovate, acute but not acuminate, about 1.5 times length of thorax, narrower than thorax, 2.25-2.5 times as long as broad; last tergite broader than long; ovipositor sheaths projecting very slightly.

Body blue-green to greenish-blue. Antennae blackish; scape beneath, and tip of pedicellus, sometimes testaceous. Coxae, and femora except their tips broadly, black; trochanters partly fuscous; legs otherwise testaceous with tarsi darker towards their tips, fourth segment fuscous; tibiae sometimes slightly brownish medially. Wings hyaline, venation yellowish-testaceous. Length 1.5-1.8 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 155) with ventral plaque of scape about 0.5 length of scape; pedicellus plus flagellum very slightly greater than breadth of mesoscutum; pedicellus 1.3-1.4 times as long as broad, slightly longer than F1; flagellum nearly filiform; F1 a little shorter than F2, quadrate,



F2 to F4 subquadrate to very slightly longer than broad; clava 2.3-2.5 times as long as broad, slightly longer than F3 plus F4; each funicular segment with a compact subbasal whorl of dark setae which are about as long as the segment itself, C1 with a rudimentary dorsal whorl. Gaster oval, about as long as but slightly narrower than thorax.

MATERIAL EXAMINED. 1 ♂, 4 ♀. **Hungary.**

HOSTS. *Bruchidius peregrii* Hajóss (Col., Bruchidae) on *Glycyrrhiza echinata* (Leguminosae) according to Erdős (1971: 249).

***Baryscapus crassicornis* (Erdős) comb.n.**

(Figs 146, 147, 153, 362)

*Geniocerus crassicornis* Erdős, 1954: 360 (♀ only). LECTOTYPE ♀, Hungary: Kalocsa, 18.viii.1944 (Erdős) (TM), here designated [examined].

*Aprostocetus crassicornis* (Erdős) Graham, 1961b: 47.

*Tetrastichus crassicornis* (Erdős) Domenichini, 1966a: 128, 1961b: 26; Erdős, 1971: 250; Kostjukov, 1978: 451.

I have examined the 2 ♀ syntypes in the Erdős collection. The lectotype is labelled "Kalocsa 1944.viii.18. dr. Erdős; *Cirsium canum* L.; ♀; *Cotypus*; *Geniocerus crassicornis* Erd. det. Erdős." The other ♀, and the males in his collection, are designated paralectotypes. It should be noted that the male described and figured by Erdős (1954: 360, fig. 17e) as that of *crassicornis* belongs in fact to *daira*, as confirmed by the specimen taken at Kalocsa on 30.vii.1946. I have reared both *daira* and *crassicornis* in the same batch from *Cirsium vulgare* heads (see HOST records below) so the confusion is understandable.

♀. Head hardly broader than mesoscutum; temples about 0.15 length of eyes; POL about 2.5 OOL, OOL about 1.5 OD. Malar space about 0.6 length of eye. Antenna (Fig. 146) with scape about 0.75 length of eye, not reaching median ocellus; pedicellus plus flagellum about 0.8 breadth of mesoscutum; pedicellus somewhat longer than F1 and 1.7 times as long as broad; funicle proximally distinctly stouter than pedicellus, thickening distad; funicular segments about equal in length, F1 quadrate or very slightly transverse, F2 about 1.5 times as broad as long, F3 about 1.7 times; clava 1.5-1.7 times as long as broad, about as long as F3 plus F2 plus half of F1. Thorax 1.4 times as long as broad, very weakly arched dorsally, scutellum nearly flat in profile, propodeal slope about 20 degrees. Pronotum 0.25 length of mesoscutum. Mid lobe of mesoscutum 1.25-1.35 times as broad as long; median line fine and sometimes weak though traceable throughout; a row of 3-5 setae on each side, plus sometimes a single seta of a second row. Scutellum about 1.25 times as broad as long; submedian lines much nearer to sublateral lines than to each other, curving inwards very slightly at hind end, enclosed space 1.7-2.0 times as long as broad; anterior setae tending to be slightly shorter than posterior setae, their length only about 0.6 distance between submedian lines. Propodeum 0.33-0.35 length of scutellum and 1.5-1.8 length of dorsellum, hardly at all emarginate above petiole; median carina thin in anterior 0.4, then triangularly expanded above petiole; spiracles

subcircular, about 0.5 their diameter from hind edge of metanotum; callus with 3-5 setae. Legs much as in *bruchidii*. Forewing about twice as long as broad; costal cell slightly longer than M, 9-9.5 times as long as broad; SM with (2-) 3 (-4) dorsal setae; M 2.4-2.5 times length of ST, its front edge with about 10 setae; speculum small, cilia extremely short, especially between end of M and tip of wing. Hindwing obtuse, cilia 0.25 breadth of wing. Gaster (Fig. 147) ovate, acute but not acuminate, as long as or slightly longer than head plus thorax, fully as broad as thorax, 1.6-1.85 times as long as broad; last tergite somewhat broader than long; tips of ovipositor sheaths not or hardly projecting. Hypopygium (Fig. 362) with lateral lobes broad, median lobe shorter, rounded.

Body blue to blue-green. Antennal scape and pedicellus black, the latter pale beneath; flagellum brownish to fuscous. Legs and wings coloured as in *bruchidii*. Length 1.05-1.65 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 153) with ventral plaque of scape about 0.67 length of scape; pedicellus plus flagellum about 0.6 breadth of mesoscutum; pedicellus 1.5 times as long as broad, much longer than F1; flagellum proximally not broader than pedicellus but expanding strongly distad; F1 distinctly shorter than F2, about 1.5 times as broad as long, without sensilla; F2 to F4 subequal in length, F3 1.8 times, F3 nearly twice as broad as long; clava as broad as F2, hardly longer than broad, its segments transverse, C1 more than twice as broad as long; flagellum without compact whorls of dark setae. Gaster oval, nearly as long but somewhat narrower than thorax.

Antennae testaceous with ventral plaque and dorsal edge of scape fuscous, also pedicellus basally, and the clava.

The ♂ is easily distinguished from that of *daira* by its very short antennal clava.

**MATERIAL EXAMINED.** 9 ♂, 23 ♀. **France:** 5 ♀, Bouches du Rhône, Fonscolombe, reared 15.ix.1988, 10 ♀, 16.ix.1988, 9 ♂, 15 ♀, reared 27.viii.1988, 5 ♀, 3.v.1989, 4 ♀, 5.v.1989, all from capitula of *Cirsium vulgare* (Graham) (MVG). **Hungary:** 1 ♀, Kalocsa, 18.viii.1944, 1 ♀, 27.viii.1946 (Erdős) (TM). **Spain:** 1 ♀, Malaga, Cortes de la Frontera, 5.vi.1986 (Gijswijt) (MJG).

Domenichini (1966a: 128) cited records from Czechoslovakia, Germany and Israel (material not seen).

**HOSTS.** *Larinus jaceae* F. and *L. sp.* (Col., Curculionidae) (Domenichini, 1966a: 128; Erdős, 1971: 250) on *Carduus acanthoides* and *Cirsium canum*. In my rearings from Fonscolombe, some specimens of *Larinus turbinatus* Gyll. were obtained and may have been the host of the *B. crassicornis*.

*Baryscapus pallidae* sp.n.  
(Figs 138, 359)

♀. Differs from that of *garganus* (Domenichini) only in the characters given in the key to female, couplet 9, but in view of these and the apparently different biology, I consider the two distinct.

Differs from ♀ of *diaphantus* (Walker) as follows. Antenna (Fig. 138) with pedicellus plus flagellum and quadrate, F2 quadrate, F3 quadrate or at most very slightly transverse; clava 1.8-2.2 times as long as broad. Mid lobe of mesoscutum with median line complete, distinct, often strong; setae less numerous, in one irregular row of 3-5 on each side, plus usually a partial second row of 1-3. Submedian lines of scutellum sharply impressed. Propodeum medially 0.29-0.33 length of scutellum. Gaster less acuminate, only 1.4-1.6 times length of thorax, (2.0-) 2.2-3.0 times as long as broad; ovipositor sheaths projecting only slightly, to a length at most 0.15 that of hind tibia. Hypopygium (Fig. 359) with lateral lobes broad, median lobe short and broad, rounded.

Colour as *diaphantus* but body tending to be a brighter blue-green or green, (though darker blue in some Swedish ♀); antennal scape often extensively pale, or wholly whitish, flagellum sometimes testaceous or brownish-testaceous; tibiae usually whitish or pale yellowish, rarely much infuscate.

♂. A ♂ reared with some of the above ♀ agrees with them in thoracic features and is probably conspecific. It differs from ♂ *diaphantus* in these thoracic characters, also in having antennal funicle broadening only slightly distad, F1 somewhat shorter than F2 and slightly transverse, F2 to F4 only very slightly transverse.

**MATERIAL EXAMINED.** (?) 1 ♂, 43 ♀. Holotype ♀, **France:** Vaucluse, Beaumont-du-Ventoux, reared 6.ix.1979 from gall of *Biorhiza pallida* on *Quercus pubescens* (Graham) (BMNH).

**Paratypes.** **France:** 6 ♀, Seine et Marne, Forêt de Fontainebleau, 8.vii.1976, 3 ♀, 11.vii.1976, from galls of *B. pallida* on *Q. robur*; 5 ♀, Vaucluse, Beaumont-du-Ventoux, 20.viii.1979, 4 ♀, 24.viii.1979, 2 ♀, 6.ix.1979, 2 ♀, 18.ix.1979, from galls of *B. pallida* on *Q. pubescens* (Graham) (BMNH). **Great Britain:** 3 ♀, Middlesex, Oakwood Park, Southgate, 8.vi.1965, 14 ♀, middle vi.1965, from same species of gall on *Q. robur* (Graham) (BMNH). **Sweden:** 1 ♀, Öland, Skogslund, 5.vii.1974, 1 ♀, Tocknekärr, 23.vi.1975, 1 ♀, Graborg, 6.vii.1976 (L.A. Nilsson) (MVG); taken by Dr. Nilsson during his study of orchid pollination ecology (see Nilsson, 1979).

**Non-paratypic material.** **France:** 1♂, Seine et Marne, Forêt de Fontainebleau, 8.vii.1976 (MVG).

**HOSTS.** Not definitely determined.

***Baryscapus talitzkii* (Kostjukov), comb.n.**  
(Figs 148-150, 159)

[*Tetrastichus bruchidii* (Erdős) Bouček, 1961: 23. Misidentification.]

*Tetrastichus talitzkii* Kostjukov, 1978: 451. Syntypes, USSR: Moldavia (ZIL) [some examined].

*Tetrastichus talitzkii* Kostjukov, 1984: 26-29 (redescription). "Holotype" ♀, USSR: Moldavia, Starye Dubossary, 10.vii.1974 (Talitzki) (ZIL).

*Tetrastichus talitzkii* Kostjukov; LaSalle, 1986: 601-602. Lectotype ♀, USSR: Moldavia, Starye Dubossary, 10.vii.1974 (Talitzki) (ZIL), designated (= "holotype" of Kostjukov, 1984) [not examined].

LaSalle (1986) has explained his reasons for regarding the "holotype" of

Kostjukov (1984) as lectotype, and his "paratypes" as paralectotypes. Thanks to Professor Trjapitzin, I have been able to examine paralectotypes.

♀. Extremely close to ♀ of *crassicornis* (Erdős) but antenna (Figs 148, 149) with F1 quadrate, F2 and F3 at least slightly less transverse; setae of mesoscutum more irregularly arranged, with an outer row of 3-4, a second of 2-3 and sometimes 1-2 setae anteriorly representing a third row; space between submedian lines of scutellum twice as long as broad, the lines sometimes slightly curved; propodeum medially 0.25-0.30 length of scutellum; forewing with M 2.0-2.5 times length of ST, SM with 2-3 dorsal setae; gaster (Fig. 150) with tips of ovipositor sheaths projecting very slightly. For hypopygium see Kostjukov, 1978, fig. 5.

3 ♀ from Moldavian USSR have the gaster longer than usual, 2.0-2.5 times as long as broad; I think they are probably a form of *talitzkii*.

♂. Differs from that of *crassicornis* especially in its antenna (Fig. 159) which has a partial compact whorl of dark setae on each segment of the funicle, these setae reaching a little beyond the tips of the segments; flagellum only weakly clavate; segments of funicle at most slightly broader than long; clava nearly twice as long as broad, its segments much less transverse.

Antennae fuscous with scape and pedicellus sometimes partly paler.

MATERIAL EXAMINED. 10 ♂, 35 ♀. **France:** 3 ♂, 10 ♀, Vaucluse, Mont Ventoux, 750 m, 6.vii.1982, from *Scambus* sp. (P. du Merle) (SZFA). **USSR:** 8 ♂, 30 ♀, Moldavia, 10.vii. to 14.vii.1974, from tortricid larva on apple (Kostjukov) (ZIL).

HOSTS. Larvae of *Scambus* sp. (*calobata* Grav. or *elegans* Woldst.) (Hym., Ichneumonidae) (P. du Merle); larva of tortricid sp. (Lep., Tortricidae) (Kostjukov).

*Baryscapus hemigaster* sp.n.

♀. Differs from ♀ of *crassicornis* (Erdős) chiefly in its slightly smaller propodeal spiracles which are more remote from the hind margin of the metanotum, rather shorter gaster, submedian lines of scutellum only slightly nearer to sublateral lines than to each other, enclosed space about twice as long as broad.

Body with less strong bluish-green metallic tint; flagellum brown; mid and hind tibiae with a weak brownish postmedian ring; wing-venation greyish. Length 0.95 mm.

♂. Unknown.

MATERIAL EXAMINED. 1 ♂. Holotype ♀, **France:** Bouches du Rhône, Fonscolombe, 25.vii.1979 (Graham) (BMNH).

HOSTS. Unknown.

***Baryscapus diaphantus* (Walker), comb.n.**

(Figs 134-136, 158, 358)

*Cirrospilus diaphantus* Walker, 1939a: 327. Lectotype ♀, Great Britain: near London or Windsor Forest (Walker) (BMNH), designated by Graham (1961b: 47) [examined].

*Tetrastichus diaphantus* (Walker) Darwin, 1869: 145.

*Tetrastichus terminalis* Thomson, 1878: 292. LECTOTYPE ♀, Sweden: Öland, here designated [examined]. [Synonymised by Graham, 1961b: 47.]

*Aprostocetus diaphantus* (Walker) Graham, 1961b: 47.

*Tetrastichus diaphantus* (Walker) Askew, 1961: 257, fig. 16; Domenichini, 1966a: 129, 1966b: 27; van den Assem, Gijswijt & Nübel, 1982: 209. Nilsson, 1979: 538, 541.

The series of *Tetrastichus terminalis* in Thomson's collection comprises a number of specimens mounted upon 10 pins. The first pin bears a label "Ö" [Öland] and carries 4 ♂ and 3 ♀. I have remounted one ♀ and labelled it as lectotype. The other specimens of the series are designated paralectotypes.

♀. Head as broad as mesoscutum, about 2.2 times as broad as long; temples about 0.25 length of eyes; POL fully twice OOL. Eyes separated by 1.25 their length, with extremely short but rather dense pubescence. Malar space 0.6-0.7 length of eye. Antenna (Fig. 134) with scape 0.85 length of eye, not reaching median ocellus; pedicellus plus flagellum about 0.7 breadth of mesoscutum; pedicellus 1.6-1.8 times as long as broad, much longer than F1; flagellum strongly clavate; F1 distinctly broader than pedicellus, quadrate to very slightly transverse, F2 slightly to distinctly so, F3 about 1.5 times as broad as long; clava broader than F3, 1.3-1.5 times as long as broad, from somewhat longer than F2 plus F3 to virtually as long as the whole funicle. Thorax when undistorted 1.35-1.4 times as long as broad, only slightly broader than high. Pronotum about 0.3 length of mesoscutum. Mid lobe of mesoscutum (Fig. 135) slightly broader than long, moderately convex; median line sometimes complete but very fine, sometimes incomplete or obsolescent, rarely absent; setae scattered irregularly, occasionally over the whole surface but most often leaving a narrow to broad bare band down the middle. Scutellum 1.4-1.5 times as broad as long, rather weakly convex in profile; submedian lines fine or weak, somewhat nearer to sublateral lines than to each other, enclosed space 1.75-2.0 times as long as broad; length of setae slightly less than distance between submedian lines. Propodeum medially 0.28-0.35 length of scutellum; median carina poorly-defined, with a small fovea at base; spiracles by 0.3-0.5 their length from hind margin of metanotum; callus with 2-5 setae. Legs of medium length; hind femora 3.8-4 times as long as broad; spur of mid tibia 0.6-0.7 length of basitarsus. Forewing 2.2-2.3 times as long as broad; costal cell about as long as M, 10-13 times as long as broad; SM with 3-4 (-5) dorsal setae; M rather thin, 2.5-2.8 times length of ST, its front edge with 8-13 setae; speculum small, wing beyond it not very thickly pilose, though more thickly distad; cilia 0.15-0.2 length of ST. Hindwing pointed to subobtusate, cilia 0.2-0.25 breadth of wing. Gaster (Fig. 136) lanceolate, acuminate, usually 1.8-2.4 times length of thorax, occasionally slightly less, slightly to distinctly narrower than thorax, 2-5 times as long as broad; last tergite about as long as broad; ovipositor sheaths projecting to 0.17-0.36 length of hind tibia; tip of hypopygium at 0.36-0.45 length of gaster minus ovipositor sheaths. Hypopygium (Fig. 358) with lateral lobes broad, median lobe slightly shorter, tapering, subacute.

Body green to blue (brighter in Continental specimens, more obscure in some British). Antennal scape testaceous, more or less infusate dorsally, especially in British specimens; pedicellus and flagellum testaceous to fuscous, clava tending to be paler distally. Coxae coloured like body; legs otherwise usually pale yellowish to yellowish-testaceous, with proximal 0.5 or more of fore and mid femora black, hind femora black with tips narrowly to broadly pale; hind tibiae, or all tibiae, more or less brownish or infusate medially in some specimens; fourth tarsal segment of all legs brownish; trochanters often infusate especially in British specimens. Wings whitish-hyaline, venation pale yellowish to testaceous. Length 1.1-2.15 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 158) with scape broader, ventral plaque 0.5-0.55 length of scape, centred slightly above the middle; pedicellus plus flagellum about 0.8 breadth of mesoscutum; pedicellus about 1.5 times as long as broad; flagellum slightly less strongly clavate; funicular segments subequal in length, F1 subquadrate, F2 very slightly transverse, F3 and F4 more distinctly so. Gaster oblong, about as long but narrower than thorax.

**MATERIAL EXAMINED.** Many ♂, ♀. **Belgium, Czechoslovakia, France, Great Britain, Italy, Netherlands, Portugal (Madeira), Sweden.**

**HOSTS.** This is one of the commonest chalcidoid parasites reared from galls of *Biorhiza pallida* (Oliv.) on *Quercus robur*, *Q. petraea* and *Q. pubescens* in Europe, but the identity of its host is unknown. It may perhaps attack *Mesopolobus* species or some other primary parasites of *Biorhiza*, or other inhabitants of the galls. Adults of *diaphantus* emerge in spring.

**COMMENTS.** Charles Darwin (1869: 145) reported that his son, George Darwin, had observed the fertilization of the orchid *Herminium monorchis* by various insects of which "*Tetrastichus diaphantus* was the commonest". The specimens of *diaphantus* would certainly have been determined by Walker himself. Nilsson (1979) has confirmed that *diaphantus* is involved, in his very interesting account of the pollination ecology of this orchid; I examined the specimens of *diaphantus* to which he referred.

Courtship behaviour of *diaphantus* was described by van den Assem, Gijswijt & Nübel (1982).

***Baryscapus garganus* (Domenichini), comb.n.**  
(Figs 139, 360)

*Tetrastichus garganus* Domenichini, 1957: 115-117, figs II, 7, 8. **LECTOTYPE** ♀, Italy: Gargano, Foresta Umbra, vii.1959, here designated [examined].  
*Tetrastichus garganus* Domenichini, 1966a: 123, 1966b: 33.

Domenichini described this species from 3 females but did not designate a holotype. The lectotype is mounted on a card and bears the following labels; "Foresta Umbra Gargano - viii.1959; endofago di *Habrocytus fenomenalis* Dom.; *Tetrastichus garganus* Dom. det. G. Domenichini; Typus Domenichini" [on a pink label]. The other two females are designated paralectotypes.

♀. Domenichini's original description should be consulted. He placed *garganus*

in the species-group of *evonymellae* (1957: 117; 1966a: 123). It is better placed in the group of *daira* because the thorax is somewhat broader than high, with mesoscutum not strongly convex (the original description says "pianeggiante") and the propodeum slopes at a low angle, about 20 degrees; moreover the submedian lines of the scutellum are distinctly nearer to the sublateral lines than to each other (not stated in the original description), with the enclosed space 1.7-2.1 times as long as broad. The length of the anterior setae of the scutellum is about 0.55, that of the posterior setae 0.7, the distance between the submedian lines. Another feature not mentioned is that the malar sulcus is distinctly curved. Otherwise the detailed description should make the species recognizable. Hypopygium (Fig. 360) with lateral lobes only moderately broad; median lobe longer, longer than broad, obtuse. Antenna (Fig. 139).

♂. Unknown.

MATERIAL EXAMINED. 3 ♀. Italy.

HOSTS. *Habrocytus fenomenalis* Domenichini (Hym., Pteromalidae), as a solitary endophagous parasite of the pupa. I have not been able to examine the host species and to judge by the original description, it may not belong to *Habrocytus* (now considered a synonym of *Pteromalus* Swederus).

*Baryscapus anasillus* sp.n.

(Fig. 137)

♀. Differs from that of *pallidae* sp.n. as follows. Thorax 1.45 times as long as broad. Mid lobe of mesoscutum with more numerous setae, 8-11 on each side, disposed more irregularly and leaving only a rather narrow bare median longitudinal strip. Scutellum with submedian lines hardly, or only very slightly, nearer to sublateral lines than to each other, enclosed space longer, 2.3-2.5 times as long as broad; length of setae 1.0-1.2 distance between submedian lines. Propodeum longer, medially 0.35-0.4 length of scutellum. The gaster is 2.1-2.35 times as long as broad, 1.5-1.55 times as long as thorax. Antenna (Fig. 137).

Body darker, dark blue. Legs darker, tibiae black with only bases and tips very narrowly whitish. Antennal scape and pedicellus black, flagellum fuscous to black.

♂. Unknown.

MATERIAL EXAMINED. 4 ♂. Holotype ♀, **France**: Aveyron, near Trèves, reared 2.iv.1976 from gall of *Biorhiza pallida*, together with 3 ♂ of *Aulogygnus skianeuros* (Ratzeburg) (Graham) (BMNH).

Paratypes. **France**: 3 ♀, same data as holotype (Graham) (BMNH, MVG).

HOSTS. Not ascertained. Possibly hyperparasitic.

COMMENTS. The discovery of a third species of the *daira*-group in galls of *Biorhiza pallida* was most unexpected. Clearly *anasillus* is distinct from *pallidae* sp.n. (1 ♀ of which was reared from the same batch of galls). *B. anasillus* is aberrant in the *daira*-group in its relatively close submedian lines of the scutellum and the more elongate space enclosed by them.

***Baryscapus papaveris* sp.n.**

(Figs 145, 157)

♀. Antenna (Fig. 145) with scape only 0.65 length of eye; pedicellus plus flagellum 0.65-0.7 breadth of mesoscutum; pedicellus much longer than F1, 1.6-1.7 times as long as broad; funicular segments equal in length, F1 very slightly, F2 and F3 very distinctly transverse; clava broader than F3, 1.65-1.75 times as long as broad, nearly as long as whole funicle. Mid lobe of mesoscutum with rather weak median line; setae irregularly disposed, 5-10 on each side, tending to form two rows with rarely a partial third row. Scutellum with submedian lines rather weak, enclosed space 1.6-1.75 times as long as broad; length of setae about 0.6 distance between submedian lines. Propodeum medially 0.3-0.33 length of scutellum and very slightly longer than dorsellum; spiracles subcircular, separated by 0.65 their diameter from metanotum; callus with 3-4 setae. Gaster lanceolate, 1.4-1.5 times length of thorax, 2.1-2.25 times. Forewing: SM with 3-4 dorsal setae; M 1.85-2.3 times length of ST, its front edge with 8-9 setae. Gaster lanceolate, 1.4-1.5 times length of thorax, 2.1-2.25 times as long as broad, acute and slightly acuminate, slightly narrower or as broad as thorax; last tergite a little broader than long; ovipositor sheaths projecting slightly but not more than 0.25 length of hind tibia.

Body bluish-green to greenish-blue. All tibiae pale yellow. Coloration otherwise much as in *diaphantus*. Length 1.2-1.4 mm.

♂. Differs from that of *gradwelli* sp.n. as follows. Antenna (Fig. 157) with ventral plaque of scape longer; flagellum shorter and rather more clavate, funicular segments more strongly transverse, F1 slightly so, F3 and F4 strongly (F4 nearly twice as broad as long). Differs from ♂ of *diaphantus* in having pedicellus plus flagellum much less than breadth of mesoscutum.

MATERIAL EXAMINED. 9 ♂, 13 ♀. Holotype ♀, **France**: Basses Alpes, Col des Toutes Aures, reared 8.viii.1975 from gall of *Aylax papaveris* (Gijswijt) (ITZ).

Paratypes. **France**: 1 ♂, 2.viii.1975, 2 ♂, 9 ♀, 8.viii.1975, 6 ♂, 3 ♀, 15.viii.1975, same locality and host as holotype (Gijswijt) (MJG).

HOSTS. *Aylax papaveris* (Perris) (Hym., Cynipidae).

***Baryscapus endofiticus* (Domenichini), comb.n.**

(Figs 151, 154)

*Tetrastichus endofiticus* Domenichini, 1957: 103-106, fig. II, 1-6. LECTOTYPE ♀, Italy: Gargano (G. Fiori) (GD), here designated [examined].

*Tetrastichus endofiticus* Domenichini, 1966a: 128, 1966b: 29; Kostjukov, 1978: 451.

The species was described from 3 ♂ and 15 ♀, but no holotype was designated. The lectotype here selected is a ♀, one of two mounted upon the same card (the specimen near the middle of the card) and labelled: "Tetrastichus endofiticus det. G. Domenichini; Cotypus (on a pink label); Foresta Umbra Gargano (Italia) da Lixus iridis". The other syntypes are designated paralectotypes.

Domenichini's detailed description and figures should be sufficient for



recognizing this species. It is only necessary to add that the malar sulcus is distinctly curved; submedian lines of scutellum slightly nearer to sublateral lines than to each other, enclosed space about 2.5 times as long as broad, setae equal in length, which is about 0.8 distance between submedian lines; thorax slightly depressed dorsoventrally, broader than high. Antenna of ♀ (Fig. 151), antenna of ♂ (Fig. 154).

MATERIAL EXAMINED. 3 ♂, 15 ♀. **Italy.**

HOSTS. *Lixus iridis* Olivier (Col., Curculionidae), as a gregarious endoparasite of the host larvae (Domenichini, 1957).

*Baryscapus* sp.indet.1

MATERIAL EXAMINED. 1 ♀, **Great Britain:** Middlesex, Southgate, 25.viii.1965 (Graham) (MVG). Belongs to *evonymellae*-group.

*Baryscapus* sp.indet.2

MATERIAL EXAMINED. 1 ♂, **Great Britain:** Middlesex, Southgate, 7.ix.1971 (Graham) (MVG). Belongs to *evonymellae*-group.

*Baryscapus* sp.indet.3

MATERIAL EXAMINED. 2 ♂, 4 ♀ **Turkey:** Izmir Kemalpaşa, ex *Archips rosana*, 11.vi.1973 (Orhan Ulu) (BMNH). Belongs to *evonymellae*-group. Female omitted from key (characters not satisfactorily assessed).

*Baryscapus* sp.indet.4

MATERIAL EXAMINED. 1 ♀. **France:** Vaucluse, Gordes, 26.vii.1975 (Graham) (MVG). Belongs to *daira*-group.

[*DZHANOKMENIA* Kostjukov, stat.nov.

*Dzhanokmenia* Kostjukov, 1977a: 189 (as subgenus of *Tetrastichus*). Type-species: *Tetrastichus bibikovae* Dzhanokmen, 1971, by original designation.

In his key to European *Tetrastichus* Kostjukov (1978: 443) placed three other species in the same section as *bibikovae*: *demakovi* Kostjukov, 1978, *antonovae* Kostjukov, 1978, and *kurdjumovi* Kostjukov, 1978. In a later paper (1984: 30-35) he described three additional species, *nikolskajae*, *kozlovi* and *zadepskyi*, and provided a new key to the species of the subgenus. All these species were taken in the Asiatic region of the USSR and are outside the scope of the present revision. However, as the group is very near *Baryscapus* it is appropriate to discuss briefly its characters.

The type-species, *bibikovae* Dzhanokmen, was kindly sent to me by Dr. Trjapitzin for examination. It has the characters of the *evonymellae*-group of *Baryscapus*, with some exceptions. The marginal and stigmal veins of the forewing are greatly thickened, the submarginal vein has only one dorsal seta,

while the apical margin lacks cilia. The mid lobe of the mesoscutum has only a single row of adnotaular setae on each side. The gaster is partly yellow.

From their descriptions, the other species included in *Dzhanokmenia* also have the above characters, except that the gaster often lacks yellow markings. These species would form a discordant element if included in *Baryscapus* and in my opinion *Dzhanokmenia* should be accorded generic status.]

**PUKLINA** gen.n. (name from Czech puklina, crack, split). Gender: feminine.

Type-species: *Puklina amblyteles* sp.n., by present designation.

**DIAGNOSIS.** Characters of *Baryscapus* Förster, except as follows. Vertex (Fig. 161) with a pale, weakly-sclerotized suture connecting the lateral ocelli; the head collapses along this suture so that the vertex on drying forms a sharp ridge, much as in *Pronotalia* and *Melittobia*; POL slightly to quite distinctly less than twice OOL. The pale suture of the vertex will also distinguish this genus from *Aprostocetus*. Propodeal spiracles in *amblyteles* sp.n. with their whole rim exposed but in *depilata* sp.n. with the outer part hidden. Body in *depilata* with some restricted yellow markings on head and thorax. Thorax depressed dorsoventrally as in *daira*-group of *Baryscapus*. Antenna of ♀ with the first anellus transverse, 2.5-3 times as broad as long, the second (and third when present) laminar.

This genus somewhat resembles *Pronotalia* in facies and in having the lateral ocelli connected by a pale, weakly-sclerotized suture; these similarities may be due to convergence. It differs from *Pronotalia* in having a narrow, wedge-shaped scrobal area (that of *Pronotalia* broad and quadrilateral), also in having a very distinct malar sulcus and fewer anelli. Possibly the genus is most nearly related to *Baryscapus*.

Females of *Puklina* would run in my key to genera (Graham, 1987: 27-34) to couplet 31 and differ from all that follow in the suture of the vertex. Males would run in my key to males (1987: 34-45) to couplet 28, and likewise differ from all the genera that follow in the suture of the vertex. The two species included in *Puklina* differ considerably from each other, but have in common the suture of the vertex.

**DISTRIBUTION.** Southern Europe, Libya.

**BIOLOGY.** Unknown, but one species has been reared from seeds of *Asphodelus* containing a species of *Bruchophagus* (Hym., Eurytomidae).

#### Key to species

##### Females

- 1 Gaster (Fig. 163) obtuse at apex. Vertex, in front view of head (Fig. 161) strongly raised. Malar sulcus curved. Apical margin of forewing with cilia. Whole rim of propodeal spiracles exposed. Head and thorax not pale-marked. . . . . *amblyteles* (p.164)

- Gaster acute at apex. Vertex, in front view of head, only slightly arched. Malar sulcus almost straight. Apical margin of forewing bare. Outer part of rim of propodeal spiracles partly covered by a flap of the callus. Head and thorax with some yellowish markings of small extent.

..... *depilata* (p.166)

#### Males

- 1 Antenna (Fig. 165) with scape strongly swollen, about twice as long as broad, ventral plaque about 0.5 length of scape and situated a little below the middle; flagellum without long dark whorled setae; funicular segments strongly transverse; clava about 1.6 times as long as broad. Characters of head, propodeal spiracles, apical margin of forewing, and colour, as in ♀.  
..... *amblyteles* (p.164)
- Antenna (Fig. 166) with scape hardly swollen, about 3 times as long as broad, ventral plaque extending most of length of scape; segments of funicle, and first and second segments of clava, with compact whorls of dark setae which reach about to the tip of the segment following that which bears them; funicular segments subquadrate; clava about 3 times as long as broad. Characters of head, propodeal spiracles, apical margin of forewing, and pale markings of head and thorax, as in ♀. .... *depilata* (p.166)

#### *Puklina amblyteles* sp.n.

(Figs 160-163, 165, 363)

♀. POL (as measured on the collapsed head) slightly greater than OOL. Vertex with many short, fine setae the length of which is slightly less than OD. Eyes collapsed but appearing very long, with extremely short, sparse hairs. Antenna (Fig. 160) with scape 4-4.5 times as long as broad, rather slender basally but expanded somewhat above middle; pedicellus plus flagellum slightly less than breadth of mesoscutum; 2 anelli, the first about 2.5 times as broad as long, second laminar; pedicellus about 1.5 times length of F1, about 1.7 times as long as broad; funicle proximally slightly stouter than pedicellus, thickening slightly distad, its segments subequal in length, F1 subquadrate, F2 quadrate to very slightly transverse, F3 slightly transverse; clava a little broader than F3, about 1.6 times as long as broad, spine about 0.25 length of C3, apical seta a little longer than spine; sensilla numerous, uniseriate, moderately long, decumbent. Thorax (Fig. 162) 1.75-1.8 times as long as broad. Pronotum 0.33-0.5 length of mesoscutum, subtriangular or slightly V-shaped, with a number of short setae on each side and 8-12 moderately long ones near hind margin. Mesoscutum with areoles averaging about twice as long as broad; median line usually absent, very weakly indicated in one ♀; a row of 4-6 adnotaular setae on each side, plus a partial second row of 2-3. Scutellum collapsed, slightly broader than long, with excessively fine engraved reticulation whose areoles are mostly 3-4 times as long as broad; submedian lines slightly nearer to sublateral lines than to each other, enclosed space somewhat more than twice as long as broad; setae equal in length, this slightly less than distance between submedian lines. Propodeum medially very narrowly and shallowly emarginate, here 1.5-2 times as long as dorsellum; surface shiny; median carina poorly-defined, hardly raised, thin but

expanded at hind end; spiracles subcircular, separated by fully their own diameter from metanotum; callus with 3 rather long setae. Hind femora about 4 times as long as broad; tibiae rather slender; spur of mid tibia about 0.7 length of basitarsus, fourth tarsal segment about as long as basitarsus. Forewing about 2.3 times as long as broad; costal cell slightly to distinctly longer than M, 9-10 times length of ST, its front edge with 9-11 rather short setae; ST nearly straight, stigma oblong; speculum small, not extending below M, wing beyond it very thickly pilose, densely so distad; cilia at most 0.15 length of ST. Hindwing obtuse, cilia 0.2-0.25 breadth of wing. Gaster (Fig. 163) oval-elliptic, about as long and as broad as thorax, obtuse apically, twice or nearly twice as long as broad; surface with rather fine, superficial, nearly isodiametric reticulation; last tergite very short and transverse; ovipositor sheaths just reaching tip of last tergite; tip of hypopygium at 0.6 length of gaster. Hypopygium (Fig. 363) with anterior margin trilobed, middle lobe acute; inner margin of each lateral lobe with a narrow, more weakly sclerotized flange which does not quite reach the base of the lobe and therefore does not connect with the middle lobe.

Body black with moderately strong green to blue-green tints. Antennae brown with tip of pedicellus often testaceous. Legs as in *depilata* but trochanters sometimes partly dark. Wings subhyaline (faintly grey owing to the dense pilosity), venation dull testaceous to brownish. Length 1.3-1.57 mm.

♂. Differs from ♀ as follows. Setae of vertex long and strong, their length much greater than OD. Antenna (Fig. 165) with scape about as long as eye, its dorsal surface with many rather long setae; pedicellus plus flagellum 0.55 breadth of mesoscutum; pedicellus somewhat flattened, hardly 1.5 times as long as broad, longer than F1 plus F2; F1 slightly shorter than F2 and about 2.5 times as broad as long, F2 to F4 subequal in length, each about twice as broad as long; clava hardly broader than funicle, about as long as F2 plus F3 plus F4, spine very short, apical seta somewhat longer than spine; sensilla rather sparse; setae of flagellum moderately long, standing out rather strongly. Legs shorter, with hind femora only slightly more than 3 times as long as broad, fore femora about 3 times, mid femora only slightly more than twice, as long as broad mid and hind tibiae subclavate, about 4 times as long as broad, with numerous setae, those on the outer surface with length at least 0.66 breadth of tibiae; spur of mid tibia as long as basitarsus and its length equal to tibial breadth; tarsi shorter and stouter, with shorter segments, the outer edge of which bears very long setae.

This species bears a remarkable resemblance to *Melittobia*, but differs in having a malar sulcus, a shorter antennal scape which in the ♂ is unmodified, reduced pilosity of mesoscutum, and distinctly metallic body.

MATERIAL EXAMINED. 1 ♂, 6 ♀. Holotype ♀, **Spain**: Murcia, Sierra de Espuña near Totana, 20.vi.1973 (Bouček) (BMNH).

Paratypes. **Sardinia**: 1 ♀, Villasimius, vi.1975 (Bouček) (BMNH). **Spain**: 1 ♀, Barcelona, Calella de Costa, vi.1971; 1 ♀, Murcia, Sierra de Espuña, 20.vi.1973; 1 ♀, Malaga, Estepona, 29. or 30.vi.1975; 2 ♀, Granada, Nerja, 3.vii.1974 (Bouček) (BMNH). **Libya**: 1 ♀, Tripoli, 15.x.1976, in shell of snail (CIE A9251) (BMNH).

HOSTS. Unknown.

*Puklina depilata* sp.n.

(Figs 164, 166, 364)

♀. Head much collapsed; POL about 1.7 OOL in a specimen with uncollapsed head. Head in front view subtrapeziform with vertex gently arched, genae slightly curved; scrobes defined by a wedge-shaped area which is slightly broader than that of *amblyteles*; below this area is another very narrower one, partly divided by a longitudinal carina which extends to near the toruli, the lower edge of which is hardly below the ventral edge of the eyes. Eyes about 1.35 times as long as broad. Mouth about equal to malar space. Antenna (Fig. 164) with scape about 0.6 length of eye, its tip remote from median ocellus; pedicellus plus flagellum about 0.66 breadth of mesoscutum; 3 anelli, the first about 3 times as broad as long, second and third laminar; pedicellus slightly to distinctly longer than F1, 1.7-1.9 times as long as broad; funicle proximally slightly stouter than pedicellus, thickening somewhat distad, its segments subequal in length, F1 about quadrate, F2 very slightly transverse, F3 slightly so; clava slightly broader than F3, 1.3-1.6 times as long as broad, slightly to distinctly longer than F2 plus F3, bluntly pointed, with C1 broader than long, C2 shorter, C3 very short, spine about 0.33 length of C3, apical seta as long as spine; sensilla moderately numerous, about 0.75 as long as the segments, uniseriate. Thorax 1.4-1.5 times as long as broad, much broader than high. Pronotum lunate, 0.2-0.35 length of mesoscutum, with 10-12 rather weak setae before hind margin. Mid lobe of mesoscutum nearly flat, slightly broader than long, moderately shiny, with excessively fine superficial reticulation with areoles averaging 3 times as long as broad (varying from 2 to 4 times); median line absent; 3-5 rather short and weak setae on each side. Scutellum nearly flat, 1.5-1.6 times as broad as long, rather more finely sculptured than mesoscutum; lines distinct, submedians distinctly nearer to sublaterals than to each other, enclosed space about twice as long as broad; setae weak, their length distinctly less than distance between submedian lines. Propodeum hardly emarginate above petiole, medially 1.3-1.5 times as long as dorsellum; surface moderately shiny; median carina slightly raised, expanding in posterior half; spiracles moderate-sized, suboval, almost touching metanotum; callus with 2-4 setae. Legs of medium length and thickness: hind femora about 3.5 times as long as broad; spur of mid tibia virtually as long as basitarsus, fourth tarsal segment slightly shorter than basitarsus. Forewing 2.1-2.2 times as long as broad; apical margin with cilia so extremely short over a considerable distance beyond PM that they hardly project over the edge of the wing which under a low magnification appears bare; costal cell a little longer than M; SM with 4-5 dorsal setae; M varying from thin to somewhat thick, 3.0-3.4 times length of ST, its front edge with 9-12 short setae; ST slightly curved, rather thin and decolorized at base, gradually thickening to the subrhomboidal stigma; speculum small but extended as a very narrow bare strip below M as far as ST; there is a small bare area just above ST; wing moderately thickly pilose, quite thickly distad. Hindwing obtuse, cilia 0.25-0.33 breadth of wing. Gaster lanceolate, 1.4-1.5 length of thorax and 2.5-3.3 times as long as broad, acuminate; last tergite from a little shorter, to slightly longer, than broad; ovipositor sheaths projecting by 0.5-0.75 length of last tergite; tip of hypopygium at 0.5 length of gaster. Hypopygium (Fig. 364) with middle lobe obtuse; a crescentic hyaline bridge

connects the bases of the middle and lateral lobes.

Body black with rather weak to moderately strong olive-green to greenish-blue tints. Coxae and proximal 0.66-0.75 of all femora similarly coloured; sometimes a spot on each side of clypeus, and one on each side of dorsellum, yellowish, sutures of face, notauli, scutellum outside sublateral lines, and inner part of axillae, often yellowish. Antennae fuscous. Remaining parts of legs yellow, the tarsi gradually darkening to fuscous at tips. Tegulae fuscous, sometimes paler anteriorly. Wings hyaline, venation yellowish-testaceous to brown, M not or hardly decolorized where it joins the parastigma, but ST decolorized basally. Length 1.5-1.9 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 166) apparently with 2 anelli; pedicellus plus flagellum 1.15-1.2 times breadth of mesoscutum; pedicellus about 1.7 times as long as broad, somewhat longer than F1; flagellum (probably a little flattened abnormally) proximally obviously stouter than F2, broader than long, F2 to F4 subequal in length, each about 1.5 times as long as broad; clava distinctly longer than F3 plus F4 with C1 and C2 subequal in length, each a little longer than broad, C3 shorter, spine about 0.33 length of C3; sensilla sparse, shorter. Gaster oval, about as long and as broad as thorax, with ventral plica. Antennal scape and pedicellus black, flagellum fuscous. Length 1.25-1.4 mm.

MATERIAL EXAMINED. 3 ♂, 14 ♀. Holotype ♀, **France**: Hérault, Bel Air, 5.iv.1978, reared from seed of *Asphodelus "cerasifer"* [probably = *ramosus* L. of *Flora Europaea*] containing Eurytomidae (J.T. Huber) (BMNH).

Paratypes. **France**: 1 ♂, same locality and rearing data as holotype, 3.iv.1977, 2 ♂, 3 ♀, 5.iv.1978 (BMNH). **Greece**: 2 ♀, Kos, 1986, from seeds of *Asphodelus microcarpus* [= *aestivus* Brot.] (S. Compton (BMNH)). **Spain**: 8 ♀, Malaga, Estepona, 29-30.vi.1974 (Bouček) (BMNH).

HOSTS. Not definitely ascertained; possibly species of Eurytomidae (Hym.).

### **KOSTJUKOVIVUS** gen.n.

Type-species: *Crataepiella platycephalae* Kostjukov in Dyurich & Kostjukov, 1978.

Gender: masculine.

I name this genus in honour of Dr. V.V. Kostjukov (Kishinev, USSR), who has made notable contributions to the study of Palaearctic Tetrastichinae.

DIAGNOSIS. ♀. Foramen magnum situated distinctly above middle of head-height in the type-species, slightly above it in another species. Frons with median longitudinal line (*platycephalae*) or a median area (indet. sp.). Vertex with very short setae. Anterior margin of clypeus bidentate. Malar sulcus present. Antennae: toruli situated slightly below ventral edge of eyes; scape much shorter than eye, at most 2.2 times as long as broad; pedicellus longer than F1; 3 anelli, the first about 2.5 times as broad as long, second and third laminar; flagellum short, clavate, funicular segments quadrate or transverse; clava ovate, spine as long as C3 and slender, apical seta as long as spine. Thorax strongly flattened, much broader than high. Pronotum subtriangular, more than half as long as mesoscutum. Mid lobe of mesoscutum without median line, or only a

weak line; 2-3 adnotaular setae on each side. Scutellum much broader than long, without or with submedian lines. Propodeum long at sides, even medially slightly longer than dorsellum; median carina distinct; spiracles circular, very small, separated by nearly twice their diameter from hind edge of metanotum, their whole rim exposed. Fore femora slightly thickened, hind femora stout, about 3 times as long as broad. Forewing with costal cell very narrow, about as long as M; SM with 1 dorsal seta; M thin; PM absent or rudimentary. Gaster ovate-lanceolate, acute as long as or slightly longer than head plus thorax; tip of hypopygium situated beyond middle of gaster. Body black, non-metallic.

♂. Unknown.

**DISTRIBUTION.** The type-species was taken in the USSR. Dr. LaSalle has shown me another, apparently undescribed, species from the USA, which appears to belong to this genus.

**BIOLOGY.** The type-species has been reared as a parasite of *Platycephala umbraculata* (F.) (Dipt., Chloropidae).

*Kostjukovius* somewhat resembles *Aceratoneuromyia* and *Pronotalia* in general facies but differs from both in having propodeal spiracles remote from metanotum (close or very close to it in the other two genera) and in having only 1 dorsal seta on vein SM (3 or more in the other genera). These characters also distinguish it from *Aprostocetus calamarius*, which has a very similar facies. It further differs from *Pronotalia* in having a malar sulcus.

*Kostjukovius platycephalae* (Kostjukov in Dyurich & Kostjukov) 1978: 23-26, figs 1-6, comb.n.

Dr. Kostjukov kindly sent material for examination; I have seen 3 syntypes. The species should be recognizable from the original description and figures. It is a pupal parasite of *Platycephala umbraculata* (F.) (Dipt., Chloropidae) in the USSR.

### **PRONOTALIA** Gradwell

*Pronotalia* Gradwell, 1957: 1-5. Type-species: *Pronotalia tryptetae* Gradwell, 1957, by original designation.

*Crataepiella* Domenichini, 1957: 107. Type-species: *Crataepiella fiorii* Domenichini, 1957, by monotypy. Syn.n.

*Crataepiella* Domenichini, 1966a: 64, 1966b: 57; Bouček, 1977a: 22; Kostjukov, 1978: 432, 466. *Pronotalia* Gradwell; Graham, 1987: 27, 35.

Bouček (1977a: 22) discussed the question of the dates of the generic names *Pronotalia* and *Crataepiella*, and concluded that there was no proof that *Crataepiella* was published earlier than *Pronotalia*. *Pronotalia* was published on 6 March 1957; the date of publication of *Crataepiella* is not exactly known but the indications are that it was later than *Pronotalia*.

**DIAGNOSIS.** Differs from *Crataepus* Förster, in addition to the characters given in the first part of my revision (Graham, 1987: 27, 35) as follows. Frontal area

(Fig. K8) quadrilateral, with length of upper margin much greater than distance between frontal area and eye. A suture present on vertex, running from eye to eye and immediately behind the ocellar triangle. Genae converging less strongly (due to the head being less broad). Antennal scape 0.55-0.7 length of eye. Tip of hypopygium tending to be slightly less near to apex of gaster. Hypopygium (Figs 366-369) with median lobe broader, as broad as or broader than long, rounded apically.

DISTRIBUTION. Europe, Africa; USA.

BIOLOGY. Hosts are Diptera Tephritidae and occasionally Chloropidae and Agromyzidae. The species are gregarious parasites in the host puparia.

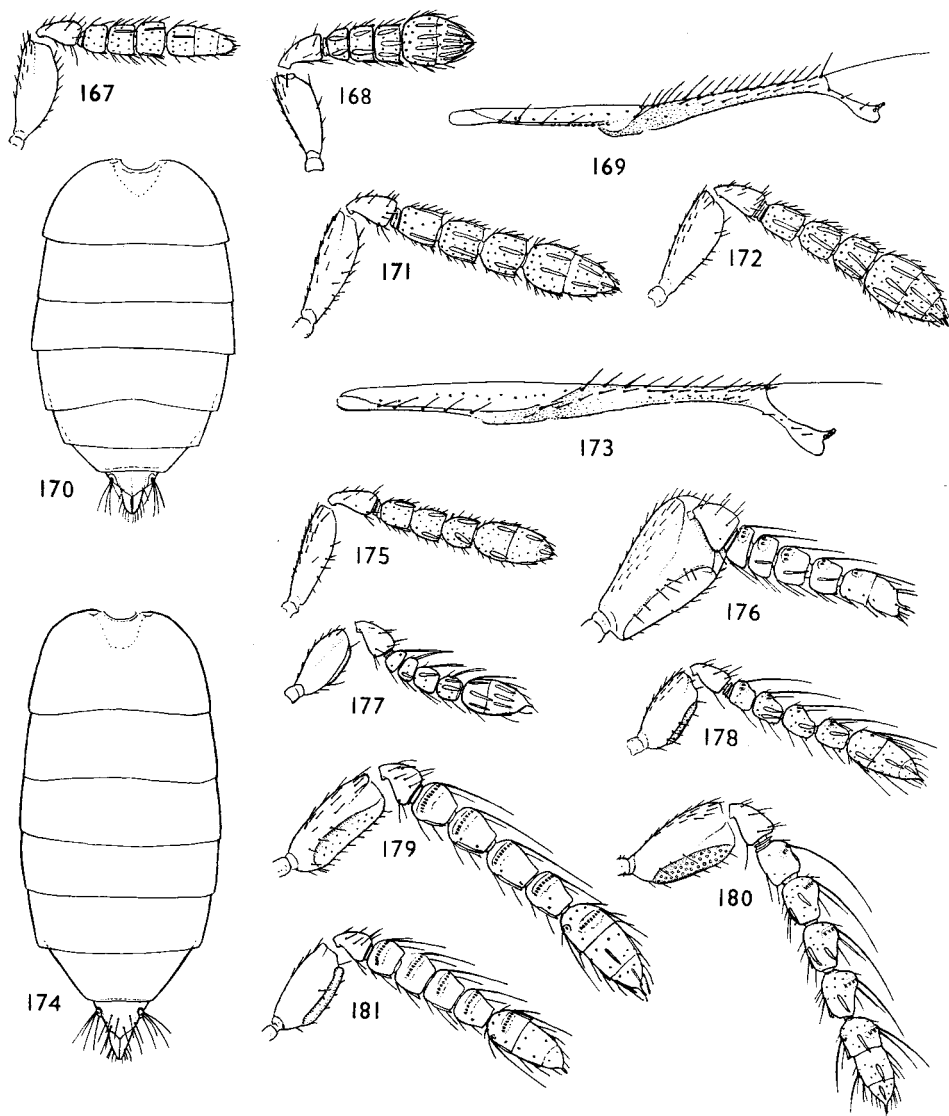
COMMENTS. *Crataepiella platycephalae* Kostjukov in Dyurich & Kostjukov, 1978: 23-26, does not belong to *Pronotalia* but to an undescribed genus (see *Kostjukovius*).

### Key to European species

#### Females

- 1 Antenna (Fig. 168) with all funicular segments about 1.5 times as broad as long; clava much broader than F3 and as long as whole funicle. Malar sulcus usually present though fine. Mesoscutum and scutellum rather strongly shiny, their sculpture weak. Very small species, length 0.8-1.3 mm. .... *orobanchiae* (p.173)
- Antennae (Figs 167, 171, 172, 175) with funicular segments usually quadrate or very slightly transverse; if distinctly transverse (*inflata* sp.n.) then clava not broader than F3. Antennal clava usually distinctly shorter than funicle. Malar sulcus usually absent, occasionally weakly indicated near the eye. Mesoscutum and scutellum (except in *inflata*) relatively less shiny, with distinct alutaceous sculpture. Species sometimes larger, length up to 1.6 mm. .... 2
- 2 Antenna (Fig. 167) with all funicular segments slightly transverse; clava not broader than F3; pedicellus only slightly shorter than F1 plus F2. Head and thorax relatively shiny, with weak alutaceous sculpture. Legs short and stout, especially the femora; hind femora only about 2.5 times as long as broad. .... *inflata* (p.172)
- Antennae (Figs 171, 172, 175) with funicular segments quadrate or only very slightly transverse; clava slightly to distinctly broader than F3; pedicellus much shorter than F1 plus F2. Head and thorax rather dull, with a silky lustre and distinct, very fine reticulation. Legs (except in *fiorii*) tending to be rather less stout, with hind femora 3.0-3.3 times as long as broad. . 3
- 3 Gaster (Fig. 170) with cerci conspicuous, distinctly longer than broad. Forewing (Fig. 169) with costal cell not, or not much (at most 1.25 times) longer than M, the latter 2.6-3.3 times length of ST; cilia of apical margin 0.5-0.66 length of ST. Propodeal callus with 1 long seta near spiracle and usually 1 shorter seta (rarely 2 short setae) farther back. .... *trypetae* (p.174)





Figs 167-181 *Pronotalia* species. 167, *P. inflata* sp. n. ♀, antenna. 168, *P. orobanchiae* sp. n. ♀, antenna. 169, 170, *P. tryptetae* Gradwell ♀; (169) forewing venation; (170) gaster. 171, *P. carlinarum* (Szelényi & Erdős) ♀, antenna. 172-174, *P. hungarica* (Erdős) ♀; (172) antenna; (173) forewing venation; (174) gaster. 175, *P. fiorii* (Domenichini) ♀, antenna. 176, *P. inflata* sp. n. ♂, antenna. 177, *P. orobanchiae* sp. n. ♂, antenna. 178, *P. tryptetae* Gradwell ♂, antenna. 179, 180, *P. carlinarum* (Szelényi & Erdős); (179) ♂, antenna (France: Cantobre); (180) ♂ antenna (paratype of *valkeilai*). 181, *P. hungarica* (Erdős) ♂, antenna.

- Gaster (Fig. 174) with cerci inconspicuous, tuberculiform, not or hardly longer than broad. Forewing (Fig. 173) with costal cell 1.35-1.6 times longer than M, the latter 2.0-2.8 times length of ST; cilia of apical margin 0.2-0.3 length of ST. Propodeal callus with 1 long seta near spiracle and usually 2-3 (-4) short setae farther back (rarely only 1 short seta). . . . . 4
- 4 Spur of mid tibia 1.25-1.5 times length of basitarsus, the latter at most twice as long as broad; legs stout, especially the femora, hind femora about 2.75 times as long as broad (see Domenichini, 1957, fig. VIII.3). Antenna (Fig. 175): spine of clava represented merely by a tubercle which is not higher than thick, apical seta longer than the tubercle. . . . . *fiorii* (p.177)
- Spur of mid tibia from very slightly shorter, to very slightly longer, than the basitarsus, the latter 2.8-3.5 times as long as broad; legs with femora rather less stout, 3.0-3.3 times as long as broad. Antennae (Figs 171, 172) with spine of clava at least 1.5 times as long as thick, apical seta shorter, or at most hardly longer, than the spine. . . . . 5
- 5 Antenna (Fig. 172) with spine of clava fully 3 times as long as thick and more than half as long as C3, apical seta at most 0.5 length of spine; flagellum stouter than in *carlinarum*. Head, pronotum, mesoscutum and scutellum with distinct, often rather strong, olive-green to bluish-olive metallic tints. . . . . *hungarica* (p.176)
- Antenna (Fig. 171) with spine of clava 1.5-2 times as long as thick, less than half as long as C3, apical seta as long as or slightly longer than the spine; flagellum less stout. Head, pronotum, mesoscutum and scutellum with only a very weak bluish to olive-bluish tinge. . . . . *carlinarum* (p. 175)

Key to males of most European species (male of *fiorii* unknown)

- 1 Antenna (Fig. 177) with flagellum relatively short, more strongly clavate; pedicellus slightly longer than F1 plus F2; F1 and F2 each shorter than either of the following segments and very distinctly transverse; clava much broader than F4 and about twice as long as broad; scape with relatively shorter ventral plaque. . . . . *orobanchiae* (p.173)
- Antennae with flagellum only weakly clavate or (*inflata*) not clavate; pedicellus at most as long as F1 plus F2 but usually shorter; F1 and F2 (except in *inflata*) each at most very slightly shorter than either of the following segments, and no funicular segment, or only F1, transverse; clava not or only slightly broader than F4; ventral plaque of scape relatively longer. . . . . 2
- 2 Antenna (Fig. 176) with scape strongly swollen, fully as long as eye, nearly reaching median ocellus; pedicellus plus flagellum only 0.75-0.8 breadth of mesoscutum; pedicellus about as long as F1 plus F2; F1 and F2 strongly transverse, F3 and F4 slightly so. . . . . *inflata* (p.172)
- Antennae (Figs 179-181) with scape 0.8-0.85 length of eye, not nearly reaching median ocellus; pedicellus plus flagellum 1.0-1.1 times breadth of mesoscutum; pedicellus distinctly to much shorter than F1 plus F2; at most F1 distinctly transverse, following segments subquadrate. . . . . 3

- 3 Cerci distinctly longer than broad (as in ♀, Fig. 170). Forewing with cilia of apical margin 0.4-0.5 length of ST; M 2.5-2.65 times length of ST. Antenna (Fig. 178) with scape swollen but subfusiform, broadest about in the middle, with a narrow, smooth ventral plaque. . . . . *trypetae* (p.174)
- Cerci tuberculiform, not or hardly longer than broad. Forewing with cilia of apical margin usually 0.18-0.28 (rarely slightly more) length of ST; M 2.15-2.42 times length of ST. Antennal scape tending to be broadest in upper half; ventral plaque sometimes broader and sometimes with numerous pits visible with transmitted light. . . . . 4
- 4 Head and thorax with rather distinct olive-greenish or bluish-olive tint. Antenna (Fig. 181) with ventral plaque of scape narrower, apparently without pits (? pores) when viewed by transmitted light. Legs tending to be paler, tibiae sometimes testaceous or only lightly infuscate medially. . . . . *hungarica* (p.176)
- Head and thorax with very weak bluish or olive-bluish tinge. Antenna (Figs 179, 180) with ventral plaque of scape broader, with a number of pits visible when viewed by transmitted light. Legs darker, mid and hind tibiae brown to black with at most bases and tips paler. . . . . *carlinarum* (p.175)

Note. I have seen an apparently undescribed species from Africa (Sudan, Kadagti) which is very near *carlinarum* but the ♀ differs in having costal cell 1.8-1.9 times length of M; M twice length of ST; spine of antennal clava virtually absent.

***Pronotalia inflata* sp.n.**  
(Figs 167, 176)

♀. Frontal area slightly broader than high. Mouth equal to malar space. Antenna (Fig. 167) with scape 0.68 length of eye, only 3 times as long as broad; pedicellus plus flagellum only 0.65 breadth of mesoscutum; pedicellus 1.8 times as long as broad, nearly as long as F1 plus F2; funicle proximally not stouter than pedicellus but thickening a little distad, its segments slightly broader than long; clava hardly as broad as F3 and tapering distad, with spine not clearly visible (possibly a short tubercle as in *fiori*); sensilla of flagellum very sparse, slender. Thorax about 1.75 times as long as broad. Propodeal callus with a long seta outside the spiracle and one or two shorter setae farther back. Spur of mid tibia slightly curved, 1.1-1.5 times length of basitarsus. Forewing with costal cell 1.3-1.6 length of M; SM with 4-5 dorsal setae; M 2.3-2.6 times length of ST; cilia about 0.3 length of ST. Gastral cerci tubercle-like, not higher than broad.

Body black with hardly perceptible olivaceous tinge. Antennal scape and pedicellus black, flagellum brown. Legs black with tips of femora narrowly, fore tibiae, bases and tip of mid and hind tibiae, and tarsi except their tips, testaceous. Wings hyaline, venation testaceous. Length 1.3-1.7 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 176) with scape strongly inflated, fully as long as eye, about twice as long as broad, ventral plaque about 0.75 length of scape; pedicellus hardly longer than broad; funicle proximally as stout as pedicellus but tapering distad; F1 hardly shorter than F2, both strongly

transverse; F3 and F4 longer and hardly transverse; clava as broad as F4, about twice as long as broad; each segment of funicle with a partial dorsal whorl of long setae, reaching about level with tip of the following segment. Legs rather less stout; hind femora nearly 3 times as long as broad. Gaster obtuse at apex.

MATERIAL EXAMINED. 1 ♂, 3 ♀. Holotype ♀, **Germany (DDR)**: Greifswald, 1955, ex *Lipara lucens* (W. Ruppolt) (BMNH).

Paratypes. 1 ♂, 2 ♀, same data as holotype (BMNH).

HOSTS. *Lipara lucens* Mg. (Dipt., Chloropidae).

***Pronotalia orobanchiae* sp.n.**

(Figs 168, 177, 366)

♀. Head collapsed; frontal area fully as high as broad. Malar sulcus usually fine though distinct (weak in one ♀), straight. Antenna (Fig. 168) with scape slightly less than 3 times as long as broad; pedicellus plus flagellum 0.7-0.8 breadth of mesoscutum; pedicellus 1.6-1.8 times as long as broad, fully as long as F1 plus F2; funicle proximally about 1.3 times as broad as pedicellus, thickening slightly distad, funicular segments about 1.5 times as broad as long; clava as long as whole funicle, 1.6-1.7 times as long as broad, bluntly pointed. Sides of pronotum converging strongly forwards so that the sclerite appears subtriangular. Mesoscutum and scutellum with very weak engraved sculpture; mid lobe of mesoscutum with 2 (-3) adnotaular setae on each side. Propodeal callus with a long seta outside the spiracle and one shorter seta or two shorter setae farther back. Legs rather short and stout; hind femora about 2.5 times as long as broad; spur of mid tibia fully as long as basitarsus. Forewing with costal cell slightly longer than M, 10-13 times as long as broad; SM with 3-4 dorsal setae; M 3.2-3.9 times length of ST, its front edge with 6-9 moderately long setae; cilia 0.6-0.8 length of ST. Gaster short- to long-ovate, or elliptic; last tergite very short and broader than long; cerci tuberculiform (much as in *hungarica*, Fig. 174). Hypopygium (Fig. 366) transverse; median lobe broader than long.

Body black, without or with hardly perceptible metallic gloss. Antennae fuscous. Legs black with tips of femora narrowly testaceous, tibiae testaceous or more or less broadly infusate medially, to mainly black; tarsi testaceous, sometimes darkening gradually to fuscous at tips. Wings hyaline, venation testaceous to brownish-testaceous, with a hyaline spot between parastigma and base of M, base of ST usually hyaline. Length 0.8-1.3 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 177) with scape flattened, hardly more than twice as long as broad, ventral plaque about 0.66 length of scape; pedicellus plus flagellum about equal to breadth of mesoscutum; pedicellus 1.5-1.6 times as long as broad, somewhat longer than F1 plus F2; funicle hardly stouter than pedicellus, with F1 and F2 each somewhat shorter than the others and about twice as broad as long, F3 and F4 subequal in length and hardly broader than long; clava broader than funicle, about twice as long as broad, about as long as funicle; each funicular segment with a partial whorl of long dark setae as in *inflata*. Gaster narrower and more oblong.

MATERIAL EXAMINED. 12 ♂, 95 ♀. Holotype ♀, **Jugoslavia**: Indija, 20.viii.1982, reared from pupa of *Phytomyza orobanchia* Kalt. (Mihailovic) (BMNH).

Paratypes. **Jugoslavia**: 2 ♂, 8 ♀, same data as holotype; 1 ♀, Deliblat, Pešćara, viii.1969, from *Orobancha cernua* (M. Lekic) (BMNH). **USSR**: 6 ♂, Uzbekistan, Samarkand, 13.vii.1970, 2 ♂, 12 ♀, 16.vii.1970 (Kiauka) (BMNH); 1 ♂, 3 ♀, Vulkaneshti, 23.vii.1970, 3 ♂, 17 ♀, 23.vii.1972 (Kiauka); 5 ♀, Borou, 23.vii.1970 (Kiauka); 8 ♀, Chagir-Iunza, 3.viii.1970, 4 ♀, 6.viii.1970, 6 ♀, 10.viii.1970, 4 ♀, 12.viii.1970 (Kiauka); 1 ♂, 5 ♀, Karmanovo, 18.viii.1970, 12 ♀, Kishinev, 24.viii.1970, 1 ♂, 10 ♀, 26.viii.1970 (Talitzki); 1 ♂, 4 ♀, Dubossary, 26.viii.1970 (Talitzki) (BMNH); all reared from *Phytomyza orobanchia*. **South Iran**: 8 ♀, Buser prov., Kangom, 1986, from *P. orobanchia* (A.A. Ahmadi) (BMNH).

HOSTS. *Phytomyza orobanchia* Kaltenbach (Dipt., Agromyzidae), parasitizing the host pupae.

COMMENTS. The record of *carlinarum* Erdős, from *Phytomyza orobanchia*, cited by Kostjukov (1978: 467) no doubt refers to the present species and not to *carlinarum*.

### *Pronotalia trypetae* Gradwell

(Figs 169, 170, 178, 367)

*Pronotalia trypetae* Gradwell, 1957: 1-3, figs 1-6. LECTOTYPE ♀, Great Britain: Cambridgeshire, Wicken Fen, 19.viii.1933 (G.C. Varley) (UM), here designated [examined]. *Crataepiella trypetae* (Gradwell) Domenichini, 1966b: 58; Kostjukov, 1978: 467.

When describing *trypetae* Gradwell stated (1957: 3) "Types in the Hope Department, University Museum, Oxford" without designating a holotype. Amongst the series of *trypetae* standing as Type Hym.8 in the Hope Entomological Collections, a ♀ bears a red-bordered holotype label and was clearly intended as such. I have formally designated this ♀ as lectotype: it is labelled "Y272 Bred from head *Centaurea nigra* Em. 19.viii.33. G.C. Varley; CAMBS, Wicken Fen. 5-1957; *Pronotalia trypetae* ♀ det. G.R. Gradwell 1956". I have added my lectotype label. Mounted on two other cards are 2 ♂ and 19 ♀ specimens, here designated paralectotypes.

In the ♀ sex *trypetae* is distinguished from the other European species by having cerci distinctly longer than thick (Fig. 170) and from all except *orobanchiae* by the longer cilia on apical margin of forewing and in having costal cell at most 1.25 times as long as M. From *hungarica* it also differs in the short spine of the antennal clava (at most 1.5 times as long as thick, with apical seta fully as long as the spine) and more obscure metallic tint of the body. From *orobanchiae* it differs in having a more slender flagellum with funicular segments not distinctly transverse, and slightly shorter forewing cilia. The head and thorax are rather dull, with a silky lustre and extremely fine though distinct superficial reticulation. Spur of mid tibia about as long as the basitarsus, fine, straight. Hypopygium (Fig. 367) only slightly transverse; median lobe slightly broader than long.

♂. Differs from ♀ in antenna (Fig. 178) which has scape slightly swollen,

fusiform, about 0.6 length of eye; pedicellus plus flagellum nearly equal to breadth of mesoscutum; pedicellus only slightly longer than broad. It differs from males of the other species in the characters given at couplet 3 of the key to males.

**MATERIAL EXAMINED.** Many  $\sigma$ ,  $\varphi$ . **France:** 1  $\varphi$ , Lozère, Col de Solpérière, 21.viii.1975 (Graham) (MVG). **Great Britain:**  $\sigma$   $\varphi$  syntype of the species, Cambridgeshire, Wicken Fen, and Quy Fen (G.C. Varley) (UM); 2  $\sigma$ , 9  $\varphi$ , Middlesex, Southgate, reared 1.viii.1965 from heads of *Centaurea debeauxii*, 11  $\varphi$ , 10.vi.1969, 4  $\varphi$ , 6.vi.1971, all from heads of *Centaurea debeauxii* (Graham) (MVG); several  $\sigma$ ,  $\varphi$ , Surrey, Ashstead Common, reared from *Chaetorellia jaceae* (G.C. Varley) (BMNH).

**HOSTS.** *Chaetorellia jaceae* (R.-D.) (Dipt., Tephritidae) in capitula of *Centaurea debeauxii*; a gregarious endoparasite of the host larvae (Gradwell, 1957).

**COMMENTS.** I was informed by the late Professor Varley that the *Centaurea* species from which *trypetae* was reared was actually *debeauxii* and not *nigra*.

***Pronotalia carlinarum* (Szelényi & Erdős), comb.n.**

(Figs K7, K8, 171, 179, 180, 367)

*Crataepus carlinarum* Szelényi & Erdős in Erdős, 1951: 234-235. **LECTOTYPE**  $\varphi$ , Hungary: Vác, 10.v.1939, from inflorescence of *Carlina brevibracteata* (G. Szelényi) (TM), here designated [examined].

*Pronotalia liparæ* Gradwell, 1957: 3-4. **Holotype**  $\varphi$ , Finland: Tavistia australis, Vanaja (E. Valkeila) (ZMU) [examined]. **Syn.n.**

*Pronotalia valkeilæ* Gradwell, 1957: 4. **Holotype**  $\varphi$ , Finland: Tavistia australis, Vanaja (E. Valkeila) (ZMU) [examined]. [Synonymised with *carlinarum* by Domenichini, 1966b: 57.]

*Crataepiella carlinarum* (Szelényi & Erdős) Domenichini, 1966b: 57, 1967: 109; Kostjukov, 1978: 467.

*Crataepiella liparæ* (Gradwell) Kostjukov, 1978: 467.

Szelényi originally had many bred specimens of *carlinarum* but some of these were subsequently lost (pers. comm.). Now only 4 syntypes (1 $\sigma$ , 3 $\varphi$ ) remain in the Erdős collection (TM). The  $\sigma$ , and 1  $\varphi$ , belong to the series reared 10.v.1939 by Szelényi, and are conspecific. The other two are those collected by Erdős in 1944 and 1946. The  $\varphi$  from Vác, here designated lectotype, agrees best with the description. The other syntypes are designated paralectotypes.

The original material of *P. liparæ* Gradwell does not appear to differ in any essential character from *carlinarum*. The specimens were temporarily placed in some fluid which prevented the usual collapse of the head and other parts; also they are slightly teneral, which accounts for the yellowish sutures of the head and thorax, as well as the pale colour of the ventral surface of the  $\sigma$  antennae.

I cannot discern any difference between the syntypes of *P. valkeilæ* Gradwell and material of *carlinarum* from Europe, hence I accept the synonymy proposed by Domenichini (1966b).

$\varphi$ . Head and thorax rather dull (as in *trypetæ*). Antenna (Fig. 171). Spur of mid tibia fully as long as, or very slightly longer than, the basitarsus, straight.

Hypopygium (Fig. 368) strongly transverse; median lobe short, rounded.

Head, pronotum, mesoscutum and scutellum, sometimes also propodeum, with weak bluish tint, rarely slightly olive-bluish. Legs in dark forms black with base of tibiae testaceous; tarsi partly to wholly infuscate; in pale forms both bases and tips of tibiae, and the whole of the tarsi, are testaceous. Pilosity of wing light brown and fairly distinct.

♂. Differs from ♀ as follows. Antenna (Figs 179, 180) with scape rather strongly swollen, 0.75-0.8 length of eye, ventral plaque broad; pedicellus plus flagellum 1.1-1.15 breadth of mesoscutum; there is some variation in the structure of the antenna, illustrated in the two figures provided.

For characters distinguishing ♂ *carlinarum* from ♂ *hungarica*, see couplet 4 of key to males.

**MATERIAL EXAMINED.** Many ♂, ♀. The following are the more notable records. **Finland:** a number of ♂, ♀, syntypes of *P. liparae* and *P. valkeilai* (ZMU). **France:** 2 ♂, Aveyron, Contobre, 4.ix.1978, 2 ♂, 1 ♀, 5.ix.1978, 1 ♀, 6.ix.1978, all from capitula of *Centaurea scabiosa* (Graham) (MVG). **Hungary:** 1 ♂, 1 ♀, Vác, 10.v.1939 (Szelényi) (TM); 1 ♀, Kalocsa, 28.vii.1944, 1 ♀, 20.vii.1946 (Erdős) (TM). **Italy:** 1 ♂, Viozene, 28.viii.1969; 5 ♀, Aosta, Quart, 13.ix.1969; 1 ♀, Superga, near Torino, 16.ix.1969; 1 ♀, Ceriale, near Albenga, 3.ix.1972 (Bouček) (BMNH). **Sardinia:** 1 ♂, 1 ♀, Villasimius, vi.1975 (Bouček) (BMNH). **USA:** 3 ♂, 3 ♀, Washington, Kittitas Co., Cle Elum, 20.vii.1988 (J.D. Pinto) (USNM).

**HOSTS.** Not definitely known. Specimens have been reared from capitula of *Carlina brevibracteata* [a form of *C. vulgaris* L. according to *Flora Europaea* 4: 210, 467] by Szelényi, and from capitula of *Centaurea cotia* [a subspecies of *C. stenolepis*, see *Flora Europaea* 4: 295] by the same author. Erdős obtained one of the extant syntypes from a capitulum of *Centaurea sadlerana* and swept another from a field containing much *Cirsium arvense*. I have reared specimens from capitula of *Centaurea scabiosa*.

***Pronotalia hungarica* (Erdős), comb.n.**  
(Figs 172-174, 181, 368)

[*Crataepus marbis* (Walker) Erdős, 1951: 234. Misidentification.]

*Crataepus hungaricus* Erdős, 1955: 298-299. LECTOTYPE ♀, Hungary: Kalocsa, 28.vii.1944 (Erdős) (TM), here designated [examined].

*Crataepiella hungarica* (Erdős) Domenichini, 1966b: 58; Kostjukov, 1978: 466.

Four ♀ syntypes stand in the Erdős collection (TM). The ♀ designated lectotype is a particularly large and fine specimen. The other specimens are designated paralectotypes; one belongs to *hungarica*, the other to *fiori* (q.v.).

♀. Close to *carlinarum* but differs particularly in the long spine of its antennal clava (Fig. 172) and from it and the other species in having a more distinct metallic tint on head and thorax. The antennal flagellum is stouter than in all the other species except *orobanchiae*. The legs tend to be paler than in *carlinarum*, the mid and hind tibiae often weakly infuscate medially, or even wholly testaceous. The antennal flagellum tends towards brownish or

brownish-testaceous. The pilosity of the wing tends to be paler and therefore less conspicuous. Some mature ♀ have a testaceous to yellow transverse line just above the mouth-edge, occasionally extended to each end towards the toruli, while immature specimens often have the sutures of head and thorax showing up as pale lines.

♂. Differs from ♀ as follows. Antenna (Fig. 181) with scape moderately swollen, fusiform, about 0.6 length of eye, ventral plaque rather narrow; pedicellus plus flagellum 1.1 breadth of mesoscutum.

MATERIAL EXAMINED. 1 ♂, 19 ♀. **Bulgaria:** 1 ♀, Varvara, viii.1970 (Kocourek) (BMNH). **Czechoslovakia:** 1 ♀, Slovakia, Baba n. Ladmovcu, 23.vi.1952 (Kocourek); 3 ♀, Bohemia centr., Karlstejn, 6.vi.1964 (Bouček) (BMNH). **France:** 2 ♀, Bouches du Rhône, Fonscolombe, 20.vii.1979, 1 ♀, 25.vii.1979; 1 ♀, Vaucluse, Malaucène, 18.vii.1979, reared from capitulum of *Centaurea aspera* (Graham), 1 ♂, 5 ♀, Roussillon, 15.viii.1983, reared from capitula of *C. aspera* (Graham) (BMNH). **Hungary:** 1 ♀, Kalocsa, 28.vii.1944 (Erdős) (TM), 1 ♀, Buda Hills, 22.vii.1952 (Erdős) (TM). **Italy:** 2 ♀, Lago, Bolsena, 28.viii.1972 (Bouček); 1 ♀, Ceriale, near Albenga, 3.ix.1972 (Bouček) (BMNH).

HOSTS. Not identified.

***Pronotalia fiorii* (Domenichini), comb.n.**  
(Fig. 175)

*Crataepiella fiorii* Domenichini, 1957: 110-115. Holotype ♀, Italy: Gargano (G. Fiori) (GD) [not examined].

*Crataepiella fiorii* Domenichini, 1966b: 57.

I have not had access to the holotype of *fiorii*. Domenichini's description mentioned (1957: 113) that the spur of the mid tibia was longer than the basitarsus and his figure VIII,2 confirms this. A ♀ paralectotype of *P. hungarica* in the Erdős collection has this character, whereas no other European species known to me has the spur obviously longer than the basitarsus. I am basing my interpretation of *fiorii* on this specimen, which agrees otherwise with the description of that species.

Domenichini's very detailed description and figures should suffice for the recognition of the ♀ of *fiorii*. One qualification should, however, be mentioned. I have relied on his figures with the exception of figure V which is clearly inaccurate in some respects. For example it shows the spur of the mid tibia as not longer than the basitarsus; the submarginal vein of the forewing has 10 setae, whereas the description (1957: 113) states 7; and the position of the anterior setae of the scutellum is different from that shown in his figure VI,1, being much farther forward. The Erdős specimen has the anterior setae well behind the middle and about 2.6 times as far from the front edge of the scutellum as from the posterior setae, which agrees with Domenichini's figure VI,1.

The only other feature of note (not mentioned by Domenichini) is the presence of only 2 setae on the propodeal callus: a long one outside the spiracle and short one farther back. Antenna (Fig. 175).



♂. Unknown.

MATERIAL EXAMINED. 1 ♀. **Hungary:** Buda, Sashegy, 2.viii.1953 (Erdős) (TM). Another ♀, **Czechoslovakia:** Sturovo, Kováčov, 18.vii.1969 (Bouček) may belong to *fiorii* but has the mid tibial spur only 1.25 times length of the basitarsus.

HOSTS. *Habrocytus fenomenalis* Domenichini (Hym., Pteromalidae) as a solitary endophagous parasite of the pupa (Domenichini, 1957: 115). The host was said to be a predator on the eggs of *Lixus iridis* Olivier (Col., Curculionidae); from the description and figures (Domenichini, 1957: 99-103, fig. 1,1-8) it may belong to some other genus and not to *Habrocytus* (now a synonym of *Pteromalus*).

### *CRATAEPUS* Förster

*Crataepus* Förster, 1878: 61. Type-species: *Crataepus aquisgranensis* Förster, 1878, by monotypy and original designation.

*Crataepus* Förster: Ashmead, 1892: 309; Gradwell, 1953: 73-76; Peck, 1963: 163; Domenichini, 1966b: 58; Kostjukov, 1978: 431, 465; Graham, 1987: 27, 35.

DIAGNOSIS. In addition to the characters given in my key to genera (Graham, 1987: 27, 35) the following may be added. Frontal area (Graham, 1987, fig. 19) small, the length of its upper margin hardly greater than the distance between it and the adjacent eye. Vertex without a suture behind the ocellar triangle, though sometimes with a weak one just behind each lateral ocellus, occasionally connecting it to the eye. Genae converging strongly, mouth hardly greater than malar space. Antennae (Fig. 182) inserted below ventral edge of eyes, the toruli separated from mouth-edge by about their own diameter; scape of ♀ very short, about 0.4 length of eye. Tip of hypopygium at 0.85-0.9 length of gaster; cercal setae subequal in length, moderately long. Forewing with M somewhat thickened proximally, separated from parastigma by a distinct hyaline spot.

DISTRIBUTION. Holarctic.

BIOLOGY. Hosts are larvae and pupae of Diptera Tephritidae.

### *Crataepus marbis* (Walker)

(Figs K4, K5, K6 182, 183, 369)

*Cirrospilus Marbis* Walker, 1839a: 330. Holotype ♀, Great Britain: near London, July [1836], on a thistle-flower (Walker) (BMNH) [examined].

*Crataepus aquisgranensis* Förster, 1878: 62. Holotype (?) ♀, Germany: Aachen (Förster) (NM) [examined]. [Synonymised with *marbis* by Gradwell, 1953: 74.]

*Crataepus fletcherii* Ashmead, 1892: 309. Holotype ♀, Canada: Ontario, Ottawa (USNM) [not examined]. [Synonymised with *marbis* by Gradwell, 1953: 74.]

*Crataepus marbis* (Walker) Gradwell, 1953: 1-5; Peck, 1963: 163; Domenichini, 1957: 107, 1966b: 58; Vikberg, 1982: 140; van den Assem, Gijswijt & Nübel, 1982: 212.

Walker, in a letter to Haliday dated 25 July 1836, wrote "I found a NG [new genus] of tetramerous Chalcidites the other day on a thistle flower - it has a very large prothorax, and the legs are short and stout, particularly the anterior pair ....". This certainly refers to a *Crataepus* and suggests that he had only one specimen, hence I conclude that the ♀ in BMNH is a holotype.

Gradwell's redescription and figures (1953) will allow the species to be recognized. (Foreleg ♀, Fig. K4; prothorax and mesoscutum, Fig. K5; ♀ head in front view, Fig. K3). ♂ antenna (Fig. 183); ♀ hypopygium (Fig. 369).

**MATERIAL EXAMINED.** Many ♂, ♀. **Czechoslovakia, France, Germany, Great Britain, Hungary, Italy, Spain, USSR; Canada.**

**HOSTS.** *C. marbis* is a gregarious endoparasite of the larvae and pupae of Diptera Tephritidae, mainly species of *Terellia*, occasionally *Urophora stylata* (F.). For additional information see Peck (1963) and Domenichini (1966b).

**COMMENTS.** The courtship behaviour of *marbis* was described by van den Assem, Gijswijt & Nübel (1982).

I have an interesting aberrant ♀, reared 23.v.1971 from *Cirsium vulgare* head collected at Southgate, Middlesex, in which both hind tibiae have a second apical spur, black like the usual one but thinner and somewhat shorter.

### **KOCOUREKIA** Bouček

*Kocourekia* Bouček, 1966: 376-378. Type-species: *Kocourekia hirtula* Bouček, 1966, by monotypy and original designation.

*Kocourekia* Bouček; Kostjukov, 1978: 432, 465; Graham, 1987: 27.

The genus had been fully described by Bouček (1966). It appears to be most closely related to *Melittobia* but differs in the lack of submedian lines on the scutellum (an apomorphic state) while retaining the plesiomorphic character state of numerous, irregularly-distributed scutellar setae. A more satisfactory assessment of its characters must await the discovery of the male.

### *Kocourekia debilis* (Ratzeburg)

*Entedon debilis* Ratzeburg, 1852: 210. LECTOTYPE ♀, Germany: (Reissig) (NM), here designated [examined].

*Kocourekia hirtula* Bouček, 1966: 378-379. Holotype ♀, Czechoslovakia: S. Moravia, Mutenice, ex galls of *C. kollari*, 1958 (M. Kocourek) (NMP) [examined]. **Syn.n.**

*Kocourekia hirtula* Bouček; Kostjukov, 1978: 465.

*Kocourekia debilis* (Ratzeburg); Graham, 1987: 27.

Dr. Bouček informed me that he had seen two syntypes of *Entedon debilis* Ratzeburg in NM, Vienna. Later I examined them and confirmed his opinion that they belonged to *Kocourekia*. The two ♀ syntypes are mounted on card-points. One here designated lectotype is labelled "Collectio Ratzeburg; debilis R. det. Ratzeburg". The other ♀, labelled "1603; Collectio Ratzeburg; debilis R. det. Ratzeburg; Ented debilis Rtz" [possibly Ratzeburg's handwriting] is designated paralectotype. The lectotype is in better condition than the paralectotype.

♀. Bouček (1966) has given a good description and figures (as *hirtula*). A few points may be added. Mouth about 1.5 times malar space. Propodeal spiracles small, separated by nearly their own diameter from hind margin of the metanotum; callus with setae long, subequal in length, one outside and slightly

anterior to spiracle, a second just outside the first, behind these a row of 3, the two hindmost very close together. Gaster oval, slightly shorter than but nearly as broad as thorax, 1.3-1.4 times as long as broad, obtuse apically; last tergite very short and strongly transverse; two setae of each cercus equal in length, curved, about 1.5 times as long as the third seta; tip of hypopygium at fully 0.66 the length of gaster.

♂. Unknown.

MATERIAL EXAMINED. 5 ♀. Czechoslovakia, Germany.

HOSTS. Unknown, but in Bouček's opinion probably some Aculeate hymenopteran living in vacated galls of *Andricus kollari* Hartig (Hym., Cynipidae). Ratzeburg (1852:210) stated that his original specimens had been reared by Reissig from wasp ("Spheg") cells filled with aphids, found under pine bark; this might suggest that the host was some species of Pemphredoninae (Hym., Sphecidae).

### **MELITTOBIA** Westwood

*Melittobia* Westwood, 1848: xviii. Type-species: *Melittobia audouinii* Westwood, 1848, by monotypy.

*Melittobia* Westwood, 1849: 1xv.

*Anthophorabia* Newport, 1849: 183. Type-species: *Anthophorabia retusa* Newport, 1849, by monotypy. [Synonymised with *Melittobia* by Smith, 1854.]

*Philopison* Cameron, 1908: 559. Type-species: *Philopison clavicornis* Cameron, 1908, by monotypy. [Synonymised by Ferrière, 1933: 103.]

*Sphecophagus* Brèthes, 1910: 208. Type-species: *Sphecophagus sceliphronidis* Brèthes, 1910, by monotypy. [Synonymised by De Santis, 1949: 276.]

*Sphecophilus* Brèthes, 1910: 310. [Unnecessary replacement name for *Sphecophagus*.] [Synonymised by De Santis, 1949: 276.]

*Melittobia* Westwood; Dahms, 1984a: 271-336, 1984b: 337-360, 1984c: 361-385; Graham, 1987: 27, 34; Bouček, 1988: 594, 698.

In his revision of *Melittobia*, Dahms (1984a: 272, 274) referred to the dispute between Newport and Westwood as to who first recognized the genus. The first published mention of the genus was undoubtedly that of Westwood (Feb. 1839: 160) who had known it since 1835 and briefly described its habits and some male structures, though without naming it.

Wheeler (1912: 752) showed that the publication date of the fascicle containing the Proceedings of the meeting of the Entomological Society of London held on July 5, 1847 (in which the name *Melittobia audouinii* was proposed) was in fact January 12, 1848, not 1847 as usually cited in the literature.

DIAGNOSIS. See Dahms (1984a: 282-283). A few characters not noted by him are as follows. Gastral cerci tuberculiform, not higher than broad. Mid lobe of mesoscutum with several scattered setae. Spur of ♂ hind tibia virtually or just as long as basitarsus (Graham, 1987: 34); ♂ gaster clothed, except at base, with decumbent, backward-directed setae. It may also be mentioned that the flagellar segments of ♂ *acasta* and most other male *Melittobia* lack the tiny mushroom-shaped sensilla ("short basiconic capitate pegs" of Dahms, 1984c; pl.

5, b iv) which are present in females and in nearly all other Eulophidae, and most other families of Chalcidoidea, grouped near the apex of each flagellar segment.

DISTRIBUTION. Cosmopolitan.

BIOLOGY. *Melittobia* species appear to be notably polyphagous, attacking a number of hosts belonging to Hymenoptera (especially Aculeata), Diptera and Lepidoptera. They are gregarious, primary or secondary parasites of the larvae and pupae of their hosts. There are some records of endoparasitic habit but these may be due to inaccurate observation according to Dahms (1984b: 339) who gives much information regarding the biology of *Melittobia*.

Courtship behaviour in *Melittobia* has been studied by van den Assem, in den Bosch and Prooy (1982). Other features of the very unusual biology, also the function of the antennal sense organs, were discussed by Dahms (1984b, 1984c). Females often imbibe fluid exuding from their hosts at oviposition sites.

There is only one European species:

***Melittobia acasta* (Walker)**

(Figs K3, K44, K45, 184)

*Cirrospilus Acasta* Walker, 1839a: 328, "♂" [recte ♀]. LECTOTYPE ♀, Great Britain [probably Southgate] (Walker) (BMNH), here designated [examined].

*Melittobia Audouinii* Westwood, 1848: xviii, ♂. LECTOTYPE ♂, France: near Paris (Audouin) (UM), here designated [examined]. [Synonymised with *acasta* by Smith, 1854: 248 (footnote).]

*Anthophorabia retusa* Newport, 1849: 183. Syntypes, Great Britain: Kent, Richborough (Newport) (destroyed). NEOTYPE ♂, Great Britain: London district, 8.ix.1853 (F. Smith) (BMNH), here designated [examined]. [Synonymised with *acasta* by Smith, 1854: 248.]

*Anthophorabia fasciata* Newport, 1852: 81, pl.8, figs 4-6, ♂ ♀. Syntypes, Great Britain: Kent, Gravesend (Newport) (presumed destroyed). NEOTYPE ♂, Great Britain: Hampshire, Old Winchester Hill, iv.1974, from nest of *Corynopus coarctatus* (G. Else) (BMNH), here designated [examined].

*Melittobia acasta* (Walker) Smith, 1854: 248.

*Melittobia osmiae* Thomson, 1878: 204, ♂. LECTOTYPE ♂, Sweden: Skåne, from *Osmia* (Thomson), here designated [examined]. [Synonymised with *acasta* by Bouček & Graham, 1978: 234.]

*Tetrastichus Metittobius* [sic] Thomson, 1878: 298 (as *Melittobius*, 1878: 307). Lectotype ♀, Sweden: Skåne, Örtöfta (Thomson), designated by Bouček & Graham, (1978: 234). [Synonymised with *acasta* by Bouček & Graham, 1978: 233-234.]

*Melittobia acasta* (Walker) Waterston, 1917: 190-198, figs 1, 2; Dahms, 1984: 283, 285, 288-290; Bouček & Graham, 1978: 233-234.

*Melittobia Strandii* Wolff & Krausse, 1921: 16-21. Syntypes, Germany: reared from pupae of *Chrysis cyanea* in stem of *Rubus* (not located). [Synonymised with *acasta* by Dahms, 1984: 288.]

TYPE MATERIAL. *Cirrospilus acasta* Walker. Walker's sectional diagnosis immediately preceding the description of *acasta* states "Mas..." and "oculi nulli", which suggests males; but the rest of the diagnosis and the description clearly refer to the female sex. There must be some error in the diagnosis (this is known to have happened elsewhere). Syntypes: 3 ♀ labelled "*Cirrospilus Acasta*

Walker. Stood under this name ...." (BMNH); 2 ♀, Walker specimens, one labelled "Acasta" in his handwriting (Dale coll, UM); 1 ♀ labelled "acasta" in Haliday's handwriting, but evidently a Walker specimen (Haliday coll, NMI). A carded ♀ from the BMNH series has been labelled lectotype. The other specimens mentioned are designated paralectotypes. Walker originally had at least two specimens, because he described a var. *β*. He recorded the species "on windows", no doubt those of his home at Arno's Grove, Southgate. J.C. Dale's catalogue (Dale MS 66) has an entry stating that he received *acasta* from Walker in 1847.

*Melittobia audouinii* Westwood. Syntypes on two cards (UM). One card bearing only females is marked in Westwood's handwriting "M. Audouin March 1835". The other card, bearing males, has a lozenge-shaped ticket marked with Westwood's monogram "W". Westwood's earliest description (1848: xviii) mentions the distorted antennae and rudimentary wings of the male. Therefore I designate as lectotype a male near the top right-hand corner of the card, a complete specimen in good condition; I have placed a red spot against it. The other specimens, ♂ and ♀, are designated paralectotypes.

*Anthophorabia retusa* Newport. Original material not preserved (Newport, 1852: 79), where he stated that he no longer possessed the material but only figures, which must have been those included in his 1852 paper, figs 1-3. In BMNH I found a small tube containing specimens taken by F. Smith, presumably those found on 8.ix.1853; from these I have selected and remounted a ♂ which is here designated neotype, taking Smith as first reviser.

*Anthophorabia fasciata* Newport. The original material (150 specimens found in a nest of *Anthophora retusa*) has not been located and is presumed lost. From Newport's description, especially the pale colour of the male (1852: 81) it is clear that he had teneral specimens before him. The male designated as neotype is slightly teneral, whilst females reared with it also agree with Newport's description.

*Melittobia osmiae* Thomson. Syntypes (ZIL) on a pin bearing 5 card-points, which carry 5 males in poor condition; the pin also bears a label in Thomson's handwriting "osmiae Ths". I have remounted the male which is in best condition: it still has both antennal scapes intact (the most important feature) but the flagella and the gaster are missing. It is here designated lectotype. The other males are designated paralectotypes.

♀. For detailed redescription of *acasta* see Dahms (1984a: 288-289). This agrees with British material, including the types of *acasta* and *audouinii*, with the exception of some ratios of the forewing venation. His figures 116 and 128 show the postmarginal vein as a short stub, whereas in nearly all my specimens, and the types, it is 0.3-0.55 the length of the stigmal vein. The ratio of M to ST is variable, from 3.6 to 4.2. Vein SM usually has 4-5 (rarely 3) dorsal setae of subequal length. Antenna ♀ (Fig. 184); see also Graham, 1987, figs 15 (♀ head)m 56 (♂ head), 57 (♂ antenna).

In some southern European specimens the scape is slightly paler than the flagellum, reddish-testaceous, while in tenerals both scape and pedicellus may be

testaceous. In dark forms the femora are mainly black and in extreme cases even the tibiae may be slightly infusate medially. Males occasionally have the forewings more developed, reaching nearly half way along the gaster, with venation complete.

*M. acasta* appears to be the only species of the genus found in Europe. The characters separating it in both sexes from other species are described by Dahms (1984a: 283-285) who also gives a full account of its biology and distribution. Courtship behaviour was studied by van den Assem (19750).

**MATERIAL EXAMINED.** Many ♂, ♀. **Czechoslovakia, France, Great Britain, Italy, Netherlands, ?Portugal (Madeira), Sweden; Japan; Canada, USA.** The species has also been recorded from Argentina and New Zealand (introduced).

**HOSTS.** Like other species, *acasta* is strongly polyphagous. It is a primary or secondary, gregarious ectoparasite of the larvae and pupae of various solitary or occasionally social wasps and bees, of Lepidoptera and Coleoptera, and pupae of parasitic Diptera. The more important hosts were listed by Domenichini (1966b: 56).

**COMMENTS.** *Sphecopagus sceliphronidis* Brèthes, 1910 was synonymised with *Melittobia acasta* by De Santis (1957: 109). Dahms (1984a: 300) stated that from Brèthes' description this was not possible. He also mentioned that he was unable to locate the type of *sceliphronidis*. However, De Santis had said earlier (1949: 277) that he had examined "9 ♂♂ cotipos" in the collection of Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" where possibly they will be found and re-examined.

### *OOMYZUS* Rondani

*Oomyzus* Rondani, 1870: 141. Type-species: *Pteromalus gallerucae* Fonscolombe, 1832, by monotypy.

[*Tetrastichus* Haliday; Domenichini, 1966a: 93-99, in part, 1967: 77-78, in part; Burks in Krombein et al., 1979: 990-1002, in part. Misidentifications.]

[*Aprostocetus* Westwood; Graham, 1961b: 40-41, in part. Misidentification.]

*Oomyzus* Rondani; Graham, 1987: 30, 37; Bouček, 1988: 596, 695.

**DIAGNOSIS.** Differs from *Tetrastichus* Haliday chiefly in lacking plicae on the propodeum (these at most indicated at the hind margin); hind coxae without rugulose or coarser sculpture dorsally. The species differ from those of *Baryscapus* Förster in normally having only one dorsal seta on SM (2 only in rare cases), malar sulcus (except *pegomyae*) virtually straight, POL usually less than twice OOL. *O. sokolowskii* occasionally has 2 dorsal setae on SM and has POL about twice OOL, but its malar sulcus is nearly straight; I assign it provisionally to *Oomyzus*. *O. sempronius* and *O. ellisorum*, in which POL is about twice OOL, both have virtually straight malar sulcus; *sempronius* also has a strongly reticulate propodeum with sharp paraspicular carinae; whilst *ellisorum* has very distinctive forewing venation (Fig. 186) unlike that of any *Baryscapus*.

Other characters of *Oomyzus* are as follows. Antennae of ♀ with flagellum tending to be short and stout with funicular segments not or only slightly longer

than broad (but a few species have funicular segments relatively longer). Antennae of ♂ with ventral plaque variable, from short to very long; segments of funicle with or without compact subbasal whorls of long dark setae. Thorax tending to be relatively short and squat. Mesoscutum: median line often absent, sometimes weakly indicated, rarely (some *gallerucae*-group) very distinct; a single row of 2-5 adnotaular setae on each side. Submedian lines of scutellum sometimes weak or even absent. Propodeum medially as long as, or up to about twice longer than dorsellum; sculpture varying from very weak to strong; paraspiracular carinae sometimes indicated; in *sempronius*-group strong and sharp. Legs in some species short and stout; first segment of mid and hind tarsi sometimes shorter than second. Forewing normally with 1 dorsal seta (2 setae in most *anomalus*, some *sokolowskii* and rarely in *incertus*). Gaster subcircular to ovate, from shorter than thorax to about as long as head plus thorax; ovipositor sheaths not or hardly projecting. Body black or (rarely) brown, with metallic tints varying from very weak to quite strong; without pale markings.

**DISTRIBUTION.** All continents except perhaps South America; some species introduced to North America.

**BIOLOGY.** Mainly parasites of Coleoptera, less often of Neuroptera, Diptera and Lepidoptera, attacking the host larvae or pupae, or sometimes their eggs (*gallerucae*-group).

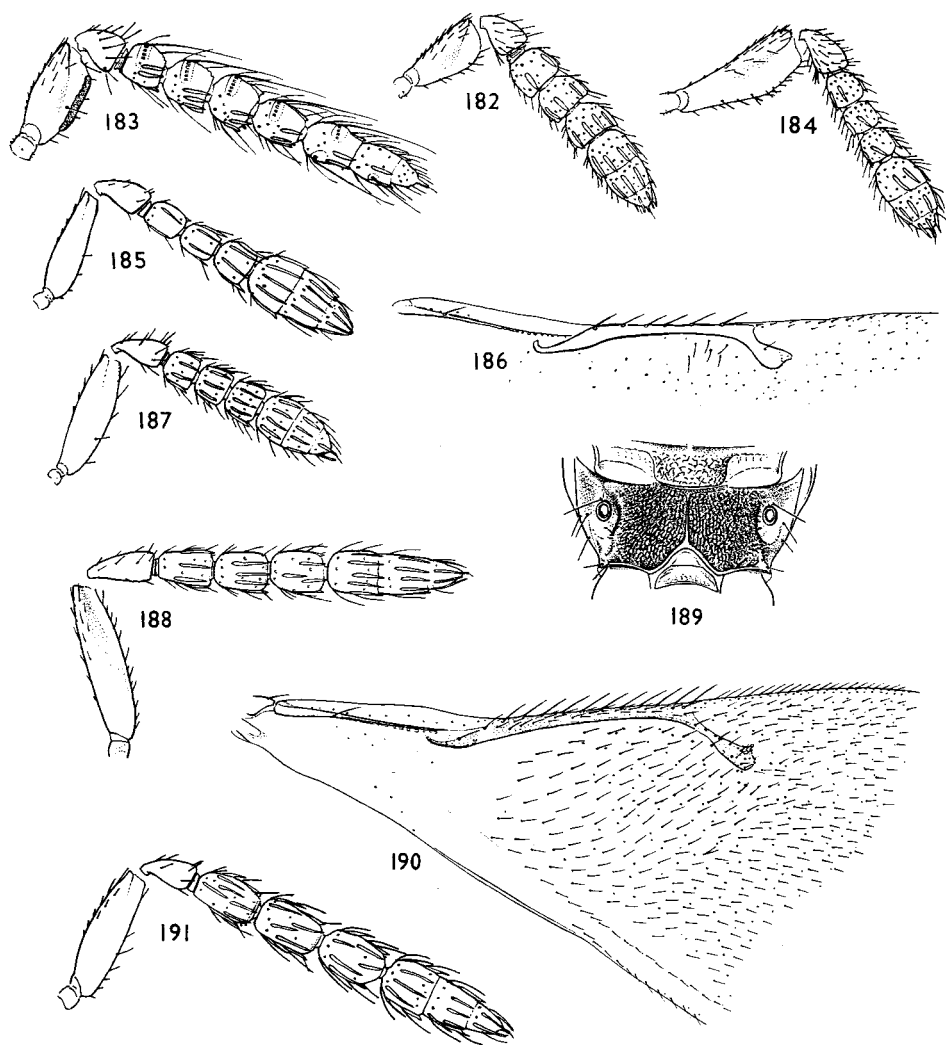
### Key to European species

#### Females

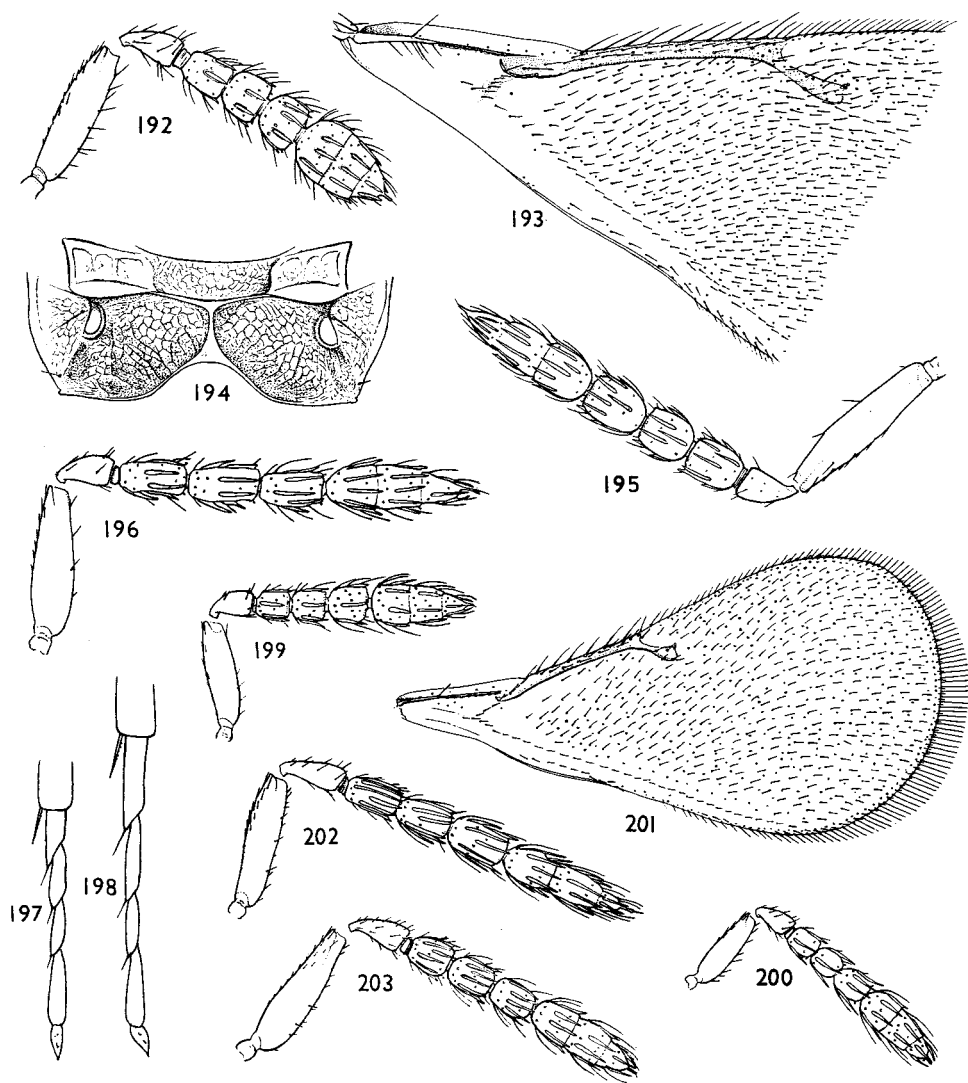
- 1 Apical margin of forewing (Fig. 186) without cilia; stigmal vein composed almost wholly of the sessile or subsessile, subtriangular stigma; surface sparsely pilose, the few setae present extremely short, otherwise only setal bases present. Mesoscutum with slightly raised reticulation. .... *ellisorum* (p.191)
- Apical margin of forewing ciliate; stigma petiolate; pilosity of wing normal. Mesoscutum with engraved reticulation. .... 2
- 2 Scutellum without submedian lines. Thorax depressed, broader than high, mesoscutum weakly convex, scutellum in profile nearly flat. Gaster ovate, pointed; ovipositor sheaths projecting very slightly beyond apex of last tergite. First segment of mid and hind tarsi not shorter than second. Malar sulcus rather distinctly curved. .... *pegomyae* (p.192)
- Scutellum with submedian lines (sometimes weak). Thorax in European and most other species not depressed, mesoscutum and scutellum convex. Gaster ovate to circular, sometimes obtuse apically. First segment of mid and hind tarsi often shorter than second. Malar sulcus straight or very weakly curved. .... 3
- 3 Forewing (Fig. 190) with speculum large, extending some distance below M and sometimes reaching ST, usually more or less open below. Propodeum (Fig. 189) 1.5-2 times longer than dorsellum, with sharp paraspiracular carinae; surface rather dull, with strong and slightly raised reticulation; median carina thin and sharp; callus with 4-8 setae. Submedian lines of

- scutellum in most specimens nearer to each other than to sublateral lines, enclosing a space 3.5-4 times as long as broad. First segment of mid and hind tarsi hardly shorter than second. POL about twice OOL. Parasite of Neuroptera Chrysopidae. . . . . *sempronius* (p.195)
- *Either* speculum of forewing small and hardly extending below M, closed below; *or* propodeum medially relatively shorter, without *or* with at most very weak paraspiracular carinae; surface tending to be more shiny, with weaker reticulation; median carina variable; callus with 2-5 setae. Submedian lines of scutellum usually equidistant from each other and from sublateral lines, *or* nearer to the latter, usually enclosing a relatively shorter and broader space. First segment of mid and hind tarsi sometimes shorter than second. POL sometimes less than twice OOL. Usually parasites of Coleoptera, occasionally Lepidoptera. . . . . 4
  - 4 Antenna (Fig. 199) with flagellum short and stout; funicular segments quadrate, the first slightly shorter than pedicellus. First segment of mid and hind tarsi hardly shorter than second. POL more than twice OOL. Mid lobe of mesoscutum usually with a weak median line more or less indicated, occasionally absent. Body with bright blue to blue-green metallic tints. . . . . *sokolowskii* (p.203)
  - Not having the above combination of characters. If the antennae are similar to those of *sokolowskii* then *either* (*incertus*) the first segment of mid and hind tarsi is distinctly shorter than second *and* POL is distinctly less than twice OOL; *or* (some *gallerucae*-group) mid lobe of mesoscutum has a very distinct median line. Body sometimes with more obscure metallic tinge. . . . . 5
  - 5 Propodeum with strong, slightly raised reticulation, distinctly stronger than that of scutellum. Longest seta of each cercus nearly twice length of next longest. First segment of mid and hind tarsi as long as second. . . . . *propodealis* (p.194)
  - Propodeum with weaker reticulation which is not *or* hardly raised, and only slightly stronger than that of scutellum. Longest seta of each cercus at most 1.5 times length of next longest. First segment of mid and hind tarsi sometimes shorter than second. . . . . 6
  - 6 Mid lobe of mesoscutum usually without a median line except just near the scutellum, though it may be indicated by a shiny but not impressed line *or* by a slight change of surface; in *anomalus* with a fine median line, but in this species the body has a comparatively weak bluish tinge, vein SM of forewing normally has 2 dorsal setae, and body-length is 1.35-1.55 mm. Anterior margin of clypeus (except in *incertus*, which has cercal setae subequal in length) without distinct teeth, at most minute tubercles. . . . . 7
  - Mid lobe of mesoscutum with an impressed median line which is distinct over at least the posterior half of the sclerite, though often complete. Body with relatively strong blue to green metallic tints. Vein SM of forewing with 1 dorsal seta. Very small to minute species, body-length 0.6-1.3 mm. Anterior margin of clypeus with two distinct teeth. One seta of each cercus 1.3-1.5 times length of next longest. . . . . 9





**Figs 182-191** 182, 183, *Crataepus marbis* (Walker); (182) ♀, antenna; (183) ♂, antenna. 184, *Melittobia acasta* (Walker) ♀, antenna. 185-191, *Oomyzus* species, females. 185, 186, *O. ellisorum* sp. n.; (185) antenna; (186) forewing venation. 187, *O. pegomyae* sp. n., antenna. 188-190, *O. sempronius* (Erdős); (188) antenna; (189) metanotum and propodeum; (190) forewing. 191, *O. propodealis* sp. n. antenna.

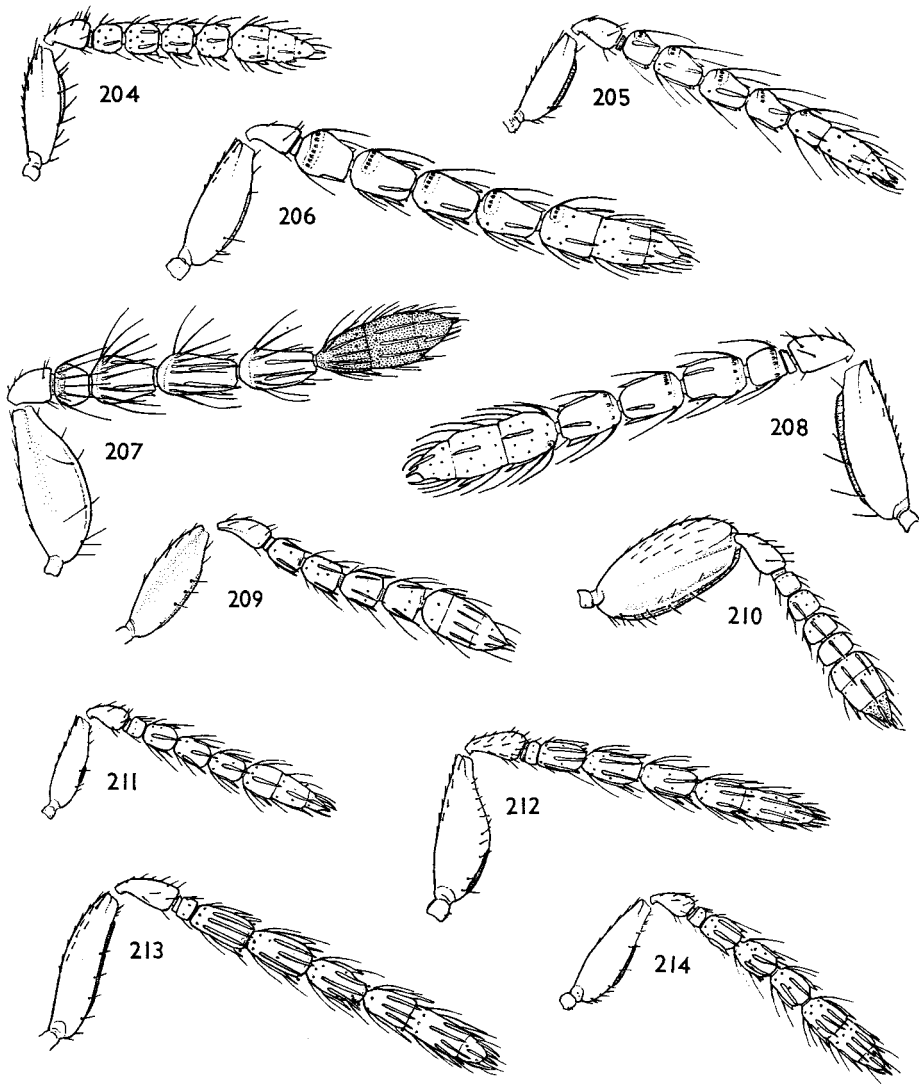


Figs 192-203 *Oomyzus* species, females. 192-194, *O. incertus* (Ratzeburg); (192) antenna; (193) forewing; (194) metanotum and propodeum. 195, *O. scaposus* (Thomson), antenna. 196, *O. anomalus* sp. n., antenna. 197, *O. incertus* (Ratzeburg), hind tarsus. 198, *O. anomalus* sp. n., hind tarsus. 199, *O. sokolowskii* (Kurdjumov), antenna. 200, 201, *O. gallerucae* (Fonscolombe); (200) antenna; (201) forewing. 202, *O. tanacetii* (Graham), antenna. 203, *O. galerucivorus* (Hedqvist), antenna.

- 7 First segment of mid and hind tarsi (Fig. 198), measured along its dorsal edge, not or hardly shorter than second segment. Submedian lines of scutellum distinct. Forewing: SM usually with 2 dorsal setae, rarely only 1 seta. Antenna (Fig. 196) with funicular segments slightly to distinctly longer than broad. One seta of each cercus about 1.5 times length of next longest. .... *anomalus* (p.201)
- First segment of mid and hind tarsi, thus measured, distinctly shorter than second (Fig. 197). Submedian lines of scutellum sometimes weak. Forewing: SM normally with 1 dorsal seta, rarely with 2 setae. Antennae with funicular segments not or only very slightly longer than broad. Setae of cercus subequal in length. .... 8
- 8 Anterior margin of clypeus with two distinct teeth or lobes. Forewing (Fig. 193) thickly or rather densely pilose, speculum very small. Antenna (Fig. 192) with pedicellus distinctly longer than F1; clava at most 2.6 times as long as broad. .... *incertus* (p.197)
- Anterior margin of clypeus with two minute tubercles. Forewing rather less thickly pilose, speculum slightly larger. Antenna (Fig. 195) with pedicellus not or hardly longer than F1; clava 2.7-3.1 times as long as broad. .... *scaposus* (p.200)
- 9 Forewing (Fig. 201) with longest cilia of apical margin 0.5-1.0 length of ST. Antenna (Fig. 200) with funicular segments quadrate or only very slightly longer than broad; clava as long as whole funicle. Length of body 0.6-0.8 mm. Mid lobe of mesoscutum usually with 3, sometimes 2 or 4, adnotaular setae on each side. .... *gallerucae* (p.204)
- Forewing with longest cilia of apical margin at most 0.33 length of ST but usually less. Antennae with funicular segments, or rarely only F1, slightly to very distinctly longer than broad; clava at least slightly shorter than funicle. Length of body 0.9-1.3 mm. Mid lobe of mesoscutum usually with 4-5 (-6), occasionally 3, setae on each side. .... 10
- 10 Antenna (Fig. 202) with clava 3.4-4.0 times as long as broad; funicular segments on average more elongate, F3 1.4-2.0 times as long as broad. Forewing 2.2-2.35 times as long as broad. .... *tanacetii* (p.205)
- Antennae with clava 2.6-3.2 times as long as broad; funicular segments on average less elongate, F3 1.2-1.3 times as long as broad. Forewing 2.0-2.1 times as long as broad. .... 11
- 11 Antenna (Fig. 203) with clava 3.0-3.2 times as long as broad. .... *galerucivorus* (p.205)
- Antenna with clava about 2.5 times as long as broad. .... *repentinus* (p.205)

#### Males

- 1 Scutellum without submedian lines. Thorax slightly depressed dorsoventrally, dorsal surface weakly arched. Antennal flagellum (Fig. 204) without compact whorls of long setae; funicular segments subquadrate. .... *pegomyae* (p.192)



Figs 204-214 *Oomyzus* species, male antennae. 204, *O. pegomyae* sp. n. 205, *O. sokolowskii* (Kurdjumov). 206, *O. propodealis* sp. n. 207, *O. scaposus* (Thomson). 208, *O. anomalus* sp. n. 209, *O. sempronius* (Erdős). 210, *O. incertus* (Ratzeburg). 211, *O. gallerucae* (Fonscolombe). 212, *O. galerucivorus* (Hedqvist). 213, *O. tanacetii* (Graham). 214, *O. repentinus* (Graham).

- Scutellum with submedian lines (occasionally weak). Thorax in European species not depressed, dorsal surface moderately to strongly arched. Antennal flagellum with or without compact whorls of long setae; funicular segments variable in shape. . . . . 2
- 2 Each segment of funicle with a compact subbasal whorl of setae which reach to or distinctly beyond the tip of the segment; F1 distinctly shorter than F2. . . . . 3
- Segments of funicle without compact subbasal whorls of long setae; F1 not or only slightly shorter than F2. . . . . 6
- 3 Antenna (Fig. 205) with whorled setae of funicular segments longer, reaching well beyond the tips of the segments. Body blue to green. Propodeum weakly reticulate. . . . . *sokolowskii* (p. 203)
- Antennae (Figs 207, 208) with whorled setae of funicular segments reaching only slightly beyond the tips of the segments. Body usually black or obscurely bluish, if more brightly metallic then propodeum strongly reticulate. . . . . 4
- 4 Propodeum rather dull, with strong, slightly raised reticulation. Antenna (Fig. 206) with F1 only slightly shorter than F2. Body deep blue. (First segment of mid and hind tarsi as long as second). . . . . *propodealis* (p.194)
- Propodeum slightly shiny, with weak superficial reticulation. Antennae (Figs 207, 208) with F1 distinctly shorter than F2. Body black or obscurely bluish. . . . . 5
- 5 First segment of mid and hind tarsi shorter than second. Antenna (Fig. 207) with scape 2.3-2.5 times as long as broad, ventral plaque relatively shorter; funicle at least partly yellowish. Median line of mesoscutum normally absent. . . . . *scaposus* (p.200)
- First segment of mid and hind tarsi not shorter than second. Antenna (Fig. 208) with scape less broad, its ventral plaque longer; funicle black. Mesoscutum with some trace of a median line. . . . . *anomalus* (p.201)
- 6 Propodeum distinctly (up to 1.5 times) longer than dorsellum, rather dull, with strong, slightly raised reticulation, and with sharp paraspircular carinae. Forewing with speculum large, extending below M and sometimes reaching ST, usually open below. Antenna (Fig. 209) with F1 nearly or quite as long as F2; scape only slightly expanded, not swollen. . . . . *sempronius* (p.195)
- Propodeum 1.0-1.5 times length of dorsellum, more shiny, with weaker reticulation; paraspircular carinae absent or very weak. Forewing with speculum smaller, hardly extending below M, closed below. Antenna either with F1 much shorter than F2; or with scape very strongly swollen. . . . 7
- 7 Antenna (Fig. 210) with scape very strongly swollen, at most about twice as long as broad, 1.2-1.4 times as long as an eye; F1 at least 0.6 length of F2, quadrate; F4 transverse; clava about twice as long as broad. Mid lobe of mesoscutum without median line, or just a trace near scutellum. . . . . *incertus* (p.197)

- Antennae (Figs 211-214) with scape not swollen, though sometimes broad and flattened, not longer than an eye; F1 (except in *gallerucae*) less than 0.5 length of F2, quadrate to transverse; F4 at least slightly longer than broad; clava 3.0-4.5 times as long as broad. Mid lobe of mesoscutum with median line distinct over at least posterior 0.5, sometimes complete. . . . . 8
- 8 Antenna (Fig. 211): scape with ventral plaque short, 0.18-0.22 length of scape, situated very slightly below the middle; clava about as long as F2 plus F3 plus F4. Forewing with longest cilia of apical margin 0.75-1.0 length of ST. . . . . *gallerucae* (p. 204)
- Antennae: scape *either* (Fig. 212) with a very short ventral plaque situated near its base, *or* with a relatively long plaque extending 0.33-0.75 length of scape and centred about its middle (Figs 213, 214); clava at least slightly shorter than F2 plus F3 plus F4. Body-length sometimes greater. Forewing with longest cilia of apical margin nearly always at least slightly shorter than ST. . . . . 9
- 9 Antenna (Fig. 212): scape with very short ventral plaque situated wholly in basal 0.33. (Forewing reaching distinctly beyond tip of gaster when laid back; longest cilia of apical margin less than 0.5 length of ST).  
. . . . . *galerucivorus* (p.205)
- Antennae (Figs 213, 214): scape with longer ventral plaque which extends about equally into its upper and lower halves. . . . . 10
- 10 Antenna (Fig. 213): ventral plaque of scape forming a long strip which extends about 0.75 length of scape. Forewing, when laid back, reaching at most to tip of gaster; longest cilia of apical margin at most 0.5 length of ST. . . . . *tanaceti* (p. 205)
- Antenna (Fig. 214): ventral plaque of scape only about 0.33 length of scape. Forewings, when laid back, reaching distinctly beyond tip of gaster; longest cilia of apical margin about 0.7 length of ST. . . . . *repentinus* (p.205)

## SPECIES SOLA

*Oomyzus ellisorum* sp.n.

(Figs 185, 186)

♀. Anterior margin of clypeus distinctly bidentate. Malar space 0.65 length of eye, sulcus nearly straight. Mouth about 1.2 malar space. Antenna (Fig. 185) with scape 0.75 length of eye, not nearly reaching median ocellus; pedicellus plus flagellum slightly greater than breadth of mesoscutum; pedicellus about twice as long as broad, distinctly longer than F1, with very short setae; flagellum proximally hardly stouter than pedicellus but thickening markedly distad; funicular segments subequal in length, F1 slightly longer than broad, F2 hardly so, F3 quadrate or very slightly transverse; clava broader than F3, slightly more than twice as long as broad, about as long as whole funicle. Thorax strongly arched dorsally. Pronotum very short. Mid lobe of mesoscutum about 1.3 times as broad as long, moderately convex, without median line (partly indicated superficially in one ♀); surface rather dull, with very fine, slightly raised reticulation, composed of areoles which vary from 1.5 to 2 times as long as

broad; the surface enclosed by each areole shows distinct traces of even finer microsculpture; 2 (-3) short adnotaular setae on each side. Scutellum strongly convex, about 1.5 times as broad as long; submedian lines distinct, slightly nearer to sublateral lines than to each other, enclosed space 2.1 times as long as broad; anterior setae in middle, short; reticulation finer than that of mesoscutum, engraved. Dorsellum 3 times as broad as long. Propodeum fairly broadly emarginate, medially about as long as dorsellum; surface shiny, with extremely fine delicate reticulation; median carina sharp, thin and hardly expanded posteriorly; spiracles small, touching metanotum; callus with 3 setae. Legs of medium length, rather stout; hind femora about 4 times as long as broad; hind coxae shiny, with very fine, hardly raised reticulation; first segment of mid and hind tarsi distinctly shorter than second. Forewing (Fig. 186) 2.1 times as long as broad; costal cell 11-13 times as long as broad; SM with 1 dorsal seta; M 0.66-0.75 length of costal cell, slightly thickened, 3.3-3.8 times length of ST, its front edge with 5-6 setae; ST gradually expanding from base to form a rather large stigma; a little below M a row of 4 long, downward-pointing setae; surface otherwise rather sparsely and irregularly clothed with setae which are mostly represented only by their bases; speculum vague; apical margin, from end of M, bare except for a short extent towards anal margin. Hindwing obtuse, cilia about 0.35 wing-breadth. Gaster long-ovate, about 1.3 times length of head plus thorax, 2.0-2.35 times as long as broad, about as broad as thorax, slightly acuminate; last tergite slightly broader than long; cercal setae subequal in length, slightly curved; ovipositor sheaths projecting slightly; tip of hypopygium at about 0.5 length of gaster.

Body brownish-black; gaster with weak bronze tint, weak traces of the same tint on parts of thorax. Mandibles, and sides of dorsellum, more or less testaceous. Antennae testaceous. Coxae, also trochanters and femora mainly, black, tibiae, and tarsi except their tips, testaceous. Length 1.2-1.5 mm.

♂. Unknown.

MATERIAL EXAMINED. 3 ♀. Holotype ♀, Greece: Kriti, Nom. Irákilon, 7 km W. of Irákilon, 28.x.1972 (A.C. & W.N. Ellis) (ITZ).

Paratypes. Same data as holotype, 2 ♀ (ITZ).

HOSTS. Unknown.

## SPECIES SOLA

*Oomyzus pegomyae* sp.n.

(Figs 187, 204, 370)

♀. Head collapsed, vertex usually distorted; in this state POL is about 1.8 OOL; ocelli small, POL probably about 1.7 OD. Eyes about 1.3 times as long as broad, bare. Malar space 0.66 length of eye, sulcus slightly curved. Mouth 1.4 times malar space. Clypeus bidentate. Foramen magnum at middle of head height. Antenna (Fig. 187) with upper edge of toruli apparently hardly above ventral edge of eyes; scape slightly shorter than an eye, not nearly reaching median ocellus; pedicellus plus flagellum somewhat less than breadth of mesoscutum;

pedicellus about twice as long as broad, distinctly longer than F1; funicle filiform, distinctly stouter than pedicellus, its segments equal in length and quadrate, or F3 very slightly transverse; clava somewhat broader than F3, about 1.8 times as long as broad, longer than F2 plus F3. Thorax about 1.3 times as long as broad, broader than high, its dorsal surface almost flat. Pronotum nearly half as long as mesoscutum. Mid lobe of mesoscutum very weakly convex, about 1.5 times as broad as long, without median line, with 2 adnotaular setae on each side, the anterior one short. Scutellum very weakly convex in profile, about 1.5 times as broad as long; anterior pair of setae in middle. Mesoscutum shiny, with extremely fine, delicately engraved reticulation whose areoles are at most 1.5 times as long as broad. Scutellum with similar but finer sculpture. Dorsellum about twice as broad as long. Propodeum medially slightly longer than dorsellum; surface shiny, sculptured like mesoscutum; median carina distinct, broadening from base to apex; spiracles rather small, separated by 0.5 their diameter from metanotum; callus with 1 seta just in front of the spiracle and another near hind corner of propodeum. Legs of medium length, not slender; hind femora about 3.4 times as long as broad; spur of mid tibia 0.6 length of basitarsus. Forewing 2.25-2.3 times as long as broad; costal cell extremely narrow, hardly broader than M, about as long as M; M 2.7-3.1 times length of ST, its front edge with 7-13 setae; ST thin proximally but gradually thickening towards the stigma; speculum small, wing beyond it moderately thickly pilose with short setae; cilia about 0.3 length of ST. Hindwing acute, cilia 0.33 breadth of wing. Gaster ovate, slightly longer than and about as broad as thorax, slightly less than twice as long as broad; last tergite somewhat broader than long; one seta of each cercus about 1.5 times length of next longest, curved; tips of ovipositor sheaths projecting very slightly; tip of hypopygium at 0.4-0.5 length of gaster. Hypopygium (Fig. 370) transverse, lobes subequal in length; lateral lobes broad, median lobe narrower, subacute.

Black; head and thorax with very weak bluish tint, gaster with some bluish and bronze reflections. Antennae black. Legs black; fore and mid tibiae sometimes testaceous; tips of femora and bases and tips of tibiae pale testaceous; tarsi testaceous with fourth segment fuscous. Wings hyaline, venation testaceous. Length 1.05-1.2 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 204) with scape about 3 times as long as broad, ventral plaque about 0.45 length of scape; pedicellus plus flagellum slightly greater than breadth of mesoscutum; pedicellus not quite twice as long as broad; funicle rather less stout, with 4 segments which are subequal in length (or the first very slightly shorter) and subquadrate; clava 2.1-2.3 times as long as broad; funicular segments without compact whorls of long dark setae. Length 1.0-1.1 mm. Digitus hardly twice as long as broad, with 1 oblique spine on its hind edge.

**MATERIAL EXAMINED.** 26 ♂, 158 ♀. Holotype ♀, **Hungary:** Baja, 1986, reared (? from pupa) from *Pegomya argyrocephala* on *Euphorbia cyparissias* (A. Gassmann) (BMNH).

**Paratypes.** **Germany (DDR):** 1 ♀, Erfuhrt, v.1984, 1 ♂, 10 ♀, vi.1984, from same host as holotype (A. Gassmann) (BMNH). **Hungary:** 6 ♂, 5 ♀, Baja, 1985,



11 ♀, vi.1985, 6 ♀, 1986, 4 ♀, vii.1986; 9 ♀, Dabas, 1986; 10 ♀, Kalocsa, vi.1986; 10 ♀, vii.1986; 8 ♀, Kecskemét, 1986; 20 ♀, Lajosmize, 1986; 7 ♂, 2 ♀, Maroslele, v.1985; 1 ♂, 22 ♀, vii.1986; 4 ♂, 14 ♀, Okány, vii.1986; 7 ♀, Sabadsállás, v.1985; 9 ♀, vi.1985; 9 ♀, 1986; 10 ♀, Szeged, 1985, all from same host as holotype (A. Gassmann) (BMNH).

HOSTS. *Pegomya argyrocephala* (Meigen) (Dipt., Anthomyiidae) on *Euphorbia cyparissias* L.

COMMENTS. Both sexes of *pegomyae* run to *Oomyzus* in my keys to genera (Graham, 1987: 27, 34). The species is aberrant in the genus in some morphological characters such as the low insertion of the antennae, and in its host. Provisionally I retain it in *Oomyzus*.

### SPECIES SOLA

*Oomyzus propodealis* sp.n.  
(Figs 191, 206)

♀. Vertex collapsed, but POL clearly less than twice OOL. Malar sulcus straight or nearly so. Antenna (Fig. 191) with scape 0.75 length of eye, not nearly reaching median ocellus; pedicellus plus flagellum about 1.25 times breadth of mesoscutum; pedicellus equal in length to F1 and 1.8 times as long as broad; funicle filiform, slightly stouter than pedicellus, its segments equal in length, each about 1.5 times as long as broad; clava a little broader than funicle, about 2.6 times as long as broad, fully as long as F2 plus F3, pointed, spine moderately long. Mid lobe of mesoscutum with fine median line and 3 (-4) setae on each side. Scutellum 1.2 times as broad as long, rather weakly convex in profile; submedian lines slightly nearer to sublateral lines than to each other, enclosed space 2.1-2.2 times as long as broad; length of setae slightly less than distance between submedian lines. Propodeum medially about as long as dorsellum; surface rather dull, with very fine but strong and slightly raised reticulation; median carina low, broadening caudad; paraspiracular carinae distinct; callus with 2-3 setae. Metapleuron with moderately strong, slightly raised reticulation. Legs rather slender; hind femora 4.1-4.3 times as long as broad; first segment of mid and hind tarsi as long as second. Forewing with costal cell slightly shorter than M, 11 times as long as broad; M and ST rather thin, M 2.8-3.1 times length of ST; speculum very small, wing beyond it thickly and nearly uniformly pilose; cilia 0.25 length of ST. Hindwing slightly pointed, cilia about 0.3 wing breadth. Gaster ovate, 1.6-1.7 times as long as broad, acute, nearly or just as long as head plus thorax; last tergite slightly broader than long; ovipositor sheaths projecting very slightly; longest seta of each cercus nearly twice length of next longest, kinked.

Dark blue. Antennae black. Trochanters partly, tips of femora broadly, tibiae, and mid and hind tarsi yellow; fore tarsi and tips of mid and hind tarsi brown. Wings subhyaline, venation testaceous. Length 1.3-1.35 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 206) with scape 0.85 length of eye, not reaching median ocellus, ventral plaque 0.45 length of scape; pedicellus

plus flagellum about 1.5 times breadth of mesoscutum; pedicellus as long as F1, 1.7 times as long as broad; funicle collapsed, in this state broader than pedicellus, F1 slightly shorter than F2 and quadrate, F2 to F4 1.6 times as long as broad; clava slightly broader than funicle, 3.3 times as long as broad, longer than F3 plus F4; each funicular segment with a compact subbasal whorl of dark setae which reach slightly beyond the tip of the segment. Gaster oblong, as long as but much narrower than thorax.

MATERIAL EXAMINED. 1 ♂, 5 ♀. Holotype ♀, **Netherlands**: Wageningen, reared 13.vii.1981 from larva of *Hypera postica* (T.H. Hsiao) (ITZ).

Paratypes. Same data as holotype, 1 ♂, 4 ♀ (BMNH, ITZ).

HOSTS. *Hypera postica* (Gyllenhal) (Col., Curculionidae).

### THE SEMPRONIUS-GROUP

Characterized mainly by the long, relatively strongly reticulate propodeum, which has strong paraspiracular carinae. The relatively short gaster of the ♀ tends to remain convex dorsally after drying. Legs short, sometimes stout; first segment of mid and hind tarsi hardly shorter than second. Forewing tending to be rather sparsely pilose.

Besides the single European species, I have seen several others, probably undescribed, from Asia and Africa. The species whose biology is known are parasites of Neuroptera Chrysopidae.

#### *Oomyzus sempronius* (Erdős), **comb.n.**

(Figs 188-190, 209, 371)

*Tetrastichus* sp., Principi, 1948: 113.

*Tetrastichus sempronius* Erdős, 1954: 361. LECTOTYPE ♀, Hungary: Sopron (Várhelyi), 31.vii.1952, swept from foliage of *Abies alba* (Erdős) (TM), here designated [examined].

*Aprostocetus sempronius* (Erdős) Graham, 1961b: 40.

*Tetrastichus sempronius* Erdős; Domenichini, 1966a: 93, 1966b: 48.

*T. sempronius* was described from 2 ♂ and 11 ♀ in the collections of Györfi and Erdős. I have not located the syntypes obtained by Györfi but have examined the others in the Erdős collection (TM). The lectotype ♀ is labelled "Sopron 1952.vii.31. dr.Erdős; *Abies alba* Mill.; ♀; Cotypus [pink label]; *Tetrastichus sempronius* Erd. det. Erdős".

Several other species related to *sempronius* occur in Asia and Africa, therefore a redescription is provided.

♀. Head 1.1-1.15 times as broad as mesoscutum, 2.15-2.3 times as broad as long; temples 0.1 length of eyes; POL 2.3-2.6 OOL, OOL 1.0-1.1 OD. Eyes 1.15 times as long as broad. Malar space 0.65 length of eye, sulcus straight. Mouth 1.2 malar space. Antenna (Fig. 188) with scape 0.85 length of eye, not reaching median ocellus; pedicellus plus flagellum 0.9-1.0 breadth of mesoscutum; pedicellus slightly longer than F1, twice as long as broad; funicle proximally hardly stouter than pedicellus, thickening slightly distad, funicular segments equal

in length or decreasing very slightly, 1.0-1.3 times as long as broad; clava somewhat broader than F3, distinctly longer than F2 plus F3, 2.6-2.8 times as long as broad, pointed. Thorax 1.55-1.7 times as long as broad, strongly convex dorsally, hardly broader than high. Mid lobe of mesoscutum as broad as or slightly broader than long, rather strongly convex, moderately shiny; median line indicated in posterior 0.5, or absent; (2-) 3-4 adnotaular setae on each side. Scutellum hardly broader than long, rather weakly convex in profile; submedian lines weak, nearer to sublateral lines than to each other than to sublateral lines, enclosed space 3.5-4 times as long as broad. Propodeum (Fig. 189) 1.5-2 times as long as dorsellum, rather dull, with very fine but slightly raised reticulation; median carina thin, sharp, expanded in posterior 0.3; spiracles subcircular, separated by about their diameter from metanotum; callus with 4-8 setae. Legs of medium length; spur of mid tibia 0.65 length of basitarsus. Forewing (Fig. 190) with costal cell as long as or slightly longer than M, 11-12.5 times as long as broad; M 2.7-3.3 times length of ST; speculum large, open below, extending some distance below M and sometimes reaching ST, wing beyond it rather sparsely pilose, though more thickly distad; cilia 0.25-0.5 length of ST. Hindwing obtuse or subobtuse, cilia 0.15-0.25 breadth of wing. Gaster elliptic or subovate, slightly shorter than thorax, convex dorsally, subobtuse apically (except for the very small last tergite which projects as a short point); ovipositor sheaths not quite, or just, reaching apex of last tergite; tip of hypopygium beyond middle of gaster. Hypopygium (Fig. 371) transverse, median lobe short and broad, semicircular.

Body black; head and thorax with weak bluish tint, gaster faintly bronze. Antennal scape and pedicellus testaceous, the former sometimes, the latter usually, infusate dorsally; flagellum testaceous to brown. Coxae, trochanters mainly, femora except tips broadly, black; legs otherwise testaceous or yellowish with tips of tarsi brownish. Wings hyaline, pilosity pale or greyish; venation yellowish to testaceous. Length 1.0-1.4 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 209) with scape broader, virtually as long as eye, reaching median ocellus, ventral plaque about 0.6 length of scape; pedicellus plus flagellum slightly greater than breadth of mesoscutum; the four funicular segments not or slightly longer than broad; clava not broader than F4, hardly longer than F3 plus F4, about 2.5 times as long as broad; no compact whorls of dark setae on flagellum. Gaster oval or elliptic, much shorter and slightly narrower than thorax.

Antennal funicle testaceous to brownish, clava tending to be darker.

**MATERIAL EXAMINED.** Many ♂, ♀. Czechoslovakia, France, Hungary, Italy, Switzerland, USSR; Egypt.

**HOSTS.** *Chrysopa carnea* Stephens, *C. flavifrons* Brauer, *C. ventralis* Curtis (Neur., Chrysopidae) and occasionally *Chilocorus bipustulatus* (L.) (Col., Coccinellidae) as a gregarious endoparasite of the host larvae. For biological details see Principi (1948).

THE *INCERTUS*-GROUP

Differs from *sempronius*-group in having a relatively shorter propodeum, which is less strongly reticulate and lacks distinct paraspiracular carinae. The ♀ gaster tends to collapse on drying so as to be concave dorsally. Legs tending to be more slender; first segment of mid and hind tarsi often shorter than the second. Forewing tending to be rather thickly pilose. So far as known the species parasitise Coleoptera.

*Oomyzus incertus* (Ratzeburg)

(Figs 192-194, 197, 210, 372)

*Eulophus incertus* Ratzeburg, 1844: 168. Holotype or syntypes, Germany (Saxesen) (destroyed). NEOTYPE ♂, Germany: Bamberg, reared 23.vii.1937, from *Phytonomus variabilis*, (USNM), here designated [examined].

*Tetrastichus incertus* (Ratzeburg) Kurdjumov, 1913: 254; Chamberlin, 1924: 628, 1926: 597-602; Essig & Michelbacher, 1933 [1934]: 72; Strong, 1935: 59, 1936: 83; Peck, 1963: 137; Horn, 1970: 303-304; Mailloux & Pilon, 1970: 123-127; Burks, 1971: 429-431; Burks in Krombein et al., 1979: 996-997; other references in Burks in Krombein, 1979.

*Tetrastichus fumatus* Erdős, 1954: 361. LECTOTYPE ♀, Hungary: Mátra mountains, Bagolyirtás, 17.vi.1952 (Erdős) (TM), here designated [examined]. Syn.n.

*Baryscapus matranus* Erdős, 1954: 363. LECTOTYPE ♂, Hungary: Mátra mountains, Bagolyirtás, 17.vi.1952 (Erdős) (TM), here designated [examined]. Syn.n.

*Aprostocetus fumatus* (Erdős) Graham, 1961b: 41.

*Aprostocetus matranus* (Erdős) Graham, 1961b: 41.

*Tetrastichus ? incertus* Ratzeburg; Peck, 1963: 137.

*Tetrastichus fumatus* Erdős; Domenichini, 1966a: 98.

*Tetrastichus erdoesi* Domenichini, 1966a: 99. [Unnecessary replacement name for *incertus* sensu Erdős, 1954.] [Synonymised with *incertus* by Burks, 1979: 996.]

*Tetrastichus pannonicus* Erdős, 1969: 43-44. Holotype ♂, Hungary: Kungös, 15.vii.1958 (Erdélyi) (TM). [examined]. Syn.n.

*Oomyzus incertus* (Ratzeburg) Graham, 1987: 11.

Ratzeburg's original description of *incertus*, in a footnote to *Eulophus hylotomorum*, is very brief: "Ausserordentlich nahe verwandte ist diesen ein von Hrn. Saxesen herrührender *Eulophus* von unbestimmten Ursprunge (*E. incertus*), den ich jedoch für verschieden halte, weil der Radialnerv am Ende ungewöhnlich verdickt ist, sowie der Doppelnerv eine ausserordentlich dunkle Farbe (der Doppelnerv fast schwarz) hat, auch der Hinterleib bei der Form des *Hylotomorum*, doch oben eingefallen ist". This agrees well enough with some female specimens of the present species.

Kurdjumov (1913) claimed to recognize *incertus* and may possibly have seen Ratzeburg's material. Erdős (1954) included it in his key to species of *Baryscapus*. It was introduced from Italy into the USA and accepted as being *incertus* by Gahan, Chamberlin (1924), Horn (1970) and other workers. The question of its identity was discussed by Burks (1971) who mentioned that material determined as *incertus* by Erdős existed in USNM collections. He pointed out that Domenichini (1966a) had considered *incertus* of Ratzeburg and *incertus* of Erdős to be different species; and that Domenichini later rejected the usage of *incertus*, claiming that American authors had misidentified the species.

Material from Germany in USNM, identified as *incertus*, was kindly loaned to me. It all belongs to the species here identified as *incertus*; a male was so identified by Erdős and no doubt he saw the other specimens as well. I accept this determination which, as Burks pointed out, has been followed since Kurdjumov's time (1913). Although Ratzeburg's original material was probably female, I see no objection to designating a male as neotype, this having more characteristic features than the female. The neotype bears my label "*Eulophus incertus* Ratzeburg, 1844. Neotype  $\sigma$ . M.de V. Graham design., 1989".

#### OTHER TYPE MATERIAL

*Tetrastichus fumatus* Erdős. Syntypes, 2  $\varphi$ . The lectotype is labelled "Mátra 1952.vi.27. dr. Erdős; Bagolyirtás Kaszloja;  $\varphi$ ; *Tetrastichus fumatus* Erd. det. Erdős".

*Baryscapus matranus* Erdős. Syntypes, 2  $\sigma$ , 1  $\varphi$ . The lectotype  $\sigma$  is labelled "Mátra 1952.vi.17. dr. Erdős;  $\sigma$ ; *Baryscapus matranus* Erd. det Erdős".

*Tetrastichus pannonicus* Erdős. Syntypes, 2  $\sigma$ , 1  $\varphi$ , standing under the name "*Baryscapus scaposus*" which is crossed out and "*Tetrastichus pannonicus* sp.n." substituted in the handwriting of Erdős. All three specimens bear the correct rearing data but the date 22.vii.1958. Some mistake in labelling must have occurred because Erdős stated "Educavit ERDÉLYI in Küngös 1  $\sigma$ , 1  $\varphi$  die 15.julii 1958 et 1  $\sigma$  die 21.Julii 1958. Typus est die 15. prodiens, ceteri paratypi ...". The first specimen, a male with date 22.vii.1958, is labelled "Typus" and I accept it as the holotype.

$\varphi$ . Head slightly broader than mesoscutum, 2.25-2.5 times as broad as long; temples 0.15-0.2 length of eyes; ocelli very small, POL 1.5-1.65 OOL, OOL 2.3-2.5 OD. Eyes 1.2-1.25 times as long as broad, separated by nearly 1.5 times their length, with somewhat sparse, very short pubescence. Malar space 0.75 length of eye, sulcus slightly curved. Mouth only slightly greater than malar space. Length of setae on vertex slightly less than OD. Antenna (Fig. 192) with scape about as long as eye, reaching median ocellus; pedicellus plus flagellum about equal to breadth of mesoscutum; pedicellus 1.8-2 times as long as broad, as long as or distinctly longer than anelli plus F1; funicle subfiliform, distinctly stouter than pedicellus, its segments usually quadrate, though F3 is often slightly transverse, F2 occasionally so; clava 2.0-2.5 times as long as broad, from somewhat longer than F2 plus F3 to nearly as long as funicle, spine slender, about 0.4 length of C3, apical seta slightly shorter than spine; sensilla moderately numerous, slightly shorter than the segments, broad, decumbent. Thorax 1.35-1.5 times as long as broad, moderately arched. Mid lobe of mesoscutum slightly broader than long, moderately convex, moderately shiny, with excessively fine engraved reticulation, areoles mostly 3-4 times as long as broad; median line usually traceable in some lights, at least in posterior half; 2-5 setae on each side. Scutellum 1.1-1.2 times as broad as long, moderately convex in profile, rather more finely sculptured than mesoscutum; submedian lines tending to be weak, about equidistant from each other and from sublateral lines, enclosed space 2.4-3.5 times as long as broad; setae subequal in length. Propodeum (Fig. 194) as long as or hardly longer than dorsellum, moderately shiny, with very fine slightly raised reticulation; median carina variable, often vague and hardly raised,

sometimes thin and sharp; spiracles moderate-sized, subcircular, close to metanotum; callus with 2-3 setae. Legs of medium length and thickness; hind femora 4.5-5 times as long as broad; spur of mid tibia hardly shorter than basitarsus; basitarsus of mid and (Fig. 197) hind legs at most hardly 3 times as long as thick, obliquely truncate apically, the outer edge shorter than length of second tarsal segment; fourth segment slightly longer than basitarsus. Forewing (Fig. 193) 2.2-2.3 times as long as broad; costal cell as long as or slightly longer than M, 12-15 times as long as broad; SM normally with 1 dorsal seta, rarely 2 setae; M tending to be a little thickened, 2.7-3.0 times length of ST, its front edge with 7-10 setae; ST usually thin at base but soon expanding to form an oblong-rhomboidal stigma; speculum very narrow, not extended below M; wing beyond rather densely and nearly uniformly pilose; cilia at most 0.5 length of ST. Hindwing slightly pointed or subobtuse, cilia 0.25-0.5 breadth of wing. Gaster subcircular, hardly as long as but broader than thorax, obtuse; last tergite very short and much broader than long; cercal setae subequal; ovipositor sheaths not projecting; tip of hypopygium at 0.5 length of gaster. Hypopygium (Fig. 372) strongly transverse; median lobe shorter and broader than lateral lobes, rounded.

Body black with weak to moderately strong metallic tints. British and some continental specimens have weak bluish, olive or bronze tints but many continental (especially eastern) ones have bright green to blue tints. Antennal scape metallic-black, flagellum light brown to blackish. Coxae, trochanters mainly femora except tips, coloured like body; rest of legs testaceous to yellowish, tibiae often partly to mainly fuscous, tarsi darkened distally, sometimes wholly fuscous. Tegulae black. Forewing subhyaline or weakly infumate, sometimes more strongly infumate around basal vein and below M; venation testaceous to fuscous. Length 1.1-1.3 mm.

♂. Differs from ♀ as follows. Antenna (Fig. 210) with scape greatly swollen, 1.25-1.7 times as long as eye, sometimes collapsed and then abnormally broad, but when undistorted about twice as long as broad, reaching slightly above vertex, ventral plaque 0.75-0.85 length of scape; pedicellus slightly shorter; funicle proximally less stout than pedicellus but thickening slightly distad; F1 tending to be a little shorter and narrower than the other funicular segments, subquadrate to slightly transverse, F3 and F4 slightly transverse; clava somewhat broader than F4, 2.2-2.6 times as long as broad, as long as or slightly longer than F2 plus F3 plus F4. Gaster short oval to subcircular, slightly shorter than but about as broad as thorax.

Antennal scape black in dark males, varying to wholly yellowish in pale ones; flagellum in dark (especially northern) specimens fuscous, in paler ones testaceous with incisures and C3 darker; in the palest specimens the pedicellus (especially more or less dorsally) and flagellum are yellow with only C3 fuscous.

**MATERIAL EXAMINED.** Many ♂, ♀. **Czechoslovakia, France, Germany, Great Britain, Hungary, Ireland, (?)Iran; USSR; Canada, USA (introduced).**

**HOSTS.** *Hypera* (= *Phytonomus*) *postica* (Gyllenhal) (= *variabilis* auctt., not F.) (Col., Curculionidae) on *Medicago* and *Trifolium*.

**COMMENTS.** *O. incertus* varies considerably in colour and to some extent in

structure. Males from Central Europe and USSR have the flagellum mainly yellow (f. *pannonicus* Erdős) but intermediate forms exist between this extreme and northern European forms with fuscous flagellum. Strength of the metallic tints of the body, and colour of legs, vary in both sexes. The size of the  $\sigma$  antennal scape varies noticeably; at one time I thought that two species might be involved, but attempts to segregate them on reliable characters failed. I have examined a form from Iran which differs slightly from European *incertus* in having the first segment of mid and hind tarsi less obviously shorter than the second, stigmal vein shorter (M 3.1-4.0 times length of ST),  $\sigma$  flagellum mainly yellow. It may be specifically distinct but I would prefer to see additional material before expressing a definite opinion.

*Oomyzus scaposus* (Thomson)

(Figs 195, 207, 373)

*Tetrastichus scaposus* Thomson, 1878: 284. Lectotype ♀, Sweden: Småland (Boheman) (ZIL), designated by Graham (1966b: 41) [examined].

*Tetrastichus coccinellae* Kurdjumov, 1912: 239. Lectotype ♀, USSR: Ukraine, Poltava (ZIL), designated by LaSalle (1986: 600) [not examined]. [Synonymised with *scaposus* by Bouček, 1988: 695.]

*Syntomosphyrum taprobanae* Waterston, 1915: 337-340. Holotype ♀, Sri Lanka: Peredeniya, 20.ii.1914 (M.A. Rutherford) (BMNH) [examined]. [Synonymised with *scaposus* by Bouček, 1988: 695.]

*Tetrastichus melanis* Burks, 1943: 529-530. Holotype ♀, USA: Washington, Wenatchee, 1.viii.1915, from pupa of *Coccinella quinquepunctata* (E.J. Newcomer) (USNM) [examined].  
**Syn.n.**

*Aprostocetus coccinellae* (Kurdjumov) Graham, 1961b: 40.

*Tetrastichus coccinellae* Kurdjumov; Domenichini, 1966a: 99, 1966b: 26.

*Oomyzus scaposus* (Thomson); Bouček, 1988: 695.

Krombein, Burks et al. (1967: 227) remarked that *Tetrastichus melanis* Burks was "probably a syn. of the European *coccinellae* Kurdjumov". My examination of the holotype of *melanis* confirms this.

When discussing the synonymy of *scaposus*, Bouček (1988: 695) remarked "*Syntomosphyrum cerococci* Khan & Shafee, 1981, from India, also very probably belongs here". However, Khan & Shafee's figure 1A of the whole insect (female) shows the basitarsus of both mid and hind legs as equal in length to the second tarsal segment (it is distinctly shorter in *scaposus*), while the speculum is very large and extends beneath M as far as ST (much smaller and not extending so far in *scaposus*). Also the host of *cerococci* suggests a different species.

♀. Differs from that of *incertus* as follows. Head not broader than mesoscutum; lateral ocelli larger. Eyes with very short pubescence. Antenna (Fig. 195) with pedicellus shorter, 1.5-1.7 times as long as broad, from hardly as long as, to very slightly longer than F1; funicular segments usually a little longer than broad, rarely quadrate; clava 2.7-3.1 times as long as broad, spine about 0.4 length of C3, apical seta about as long as spine; setae of flagellum standing out only slightly. Thorax about 1.3 times as long as broad, more strongly arched dorsally. Mid lobe of mesoscutum with areoles of reticulation mostly shorter, 2-3 times as long as broad; median line absent; 3-4 fine adnotaular setae on each side.

Scutellum with submedian lines a little nearer to sublateral lines than to each other, enclosed space 2.2-2.6 times as long as broad; anterior setae in or slightly behind middle. Propodeum somewhat (up to 1.5 times longer than dorsellum; median carina sharp, thin and expanded only near hind margin; surface with very fine, very slightly raised reticulation; sometimes traces of plicae at hind margin; spiracles suboval, fully exposed, about 0.5 their length from metanotum; callus with 2-5 setae. Forewing 2.1-2.15 times as long as broad; M slightly shorter than costal cell, 3.0-3.7 times length of ST, its front edge with 9-12 setae; speculum somewhat larger, pilosity of wing beyond it less thick. Hindwing obtuse or subobtuse, cilia 0.27-0.33 breadth of wing. Hypopygium (Fig. 373) transverse; lateral lobes broad, median lobe short, rounded.

Metallic gloss of head and thorax bluish but often very weak, occasionally absent. Antennae fuscous to black. Tibiae mainly brown to blackish. Length 1.1-1.6 mm.

♂. Differs as follows. Antenna (Fig. 207) with scape about as long as eye, flattened, about 2.5 times as long as broad, ventral plaque placed about in middle and about 0.6 length of scape; pedicellus plus flagellum 1.2-1.25 breadth of mesoscutum; pedicellus 1.4-1.7 times as long as broad; funicle filiform, slightly stouter than pedicellus; F1 subquadrate, distinctly shorter than F2, F2 1.3-1.5 times as long as broad, tending to be a little shorter than F3, F3 and F4 subequal in length, each 1.6-1.85 times as long as or slightly longer than F3 plus F4, with C1 1.5-1.7 times as long as broad, C2 slightly shorter and hardly longer than broad, C3 much shorter; each funicular segment with a compact subbasal whorl of dark setae, those on F1 and F2 reaching somewhat beyond the tips of the segments, those on F3 and F4 reaching hardly beyond; C1 with some rather long subbasal setae. Gaster oblong-oval, about as long as but slightly narrower than thorax.

Antennae funicle at least partly pale, sometimes brownish proximally and testaceous distally, often with F1 and F2 testaceous and F3 and F4 yellowish; occasionally whole funicle yellowish; clava fuscous or black.

**MATERIAL EXAMINED.** Many ♂, ♀. **Austria, Czechoslovakia, Germany, Great Britain, Hungary, Spain** (Canary Islands), **Sweden, Switzerland, USSR; Egypt; India, Indonesia, Pakistan, Sri Lanka; USA.**

**HOSTS.** *Coccinella quinquepunctata* Kirby, *C. septempunctata* L., *C. undecimpunctata* L., *C. sp.*, *Chilocorus bipustulatus* (L.), *Chilomenes sexmaculata* (F.), *Synharmonia conglobata* (L.), as a gregarious endophagous parasite of the host prepupae and pupae.

**COMMENTS.** The scape of the male often collapses (and sometimes appears to be stretched slightly) in dried specimens, when it appears abnormally broad (as in the figure 18b in Erdős, 1954). The undistorted scape appears as in Fig. 207.

*Oomyzus anomalus* sp.n.  
(Figs 196, 198, 208)

♀. Differs from those of *incertus* and *scaposus* mainly in the characters given in



the key to females, couplet 6. It differs from ♀ *incertus* as follows. Clypeus with weaker teeth, separated by a smaller incision. Antenna (Fig. 196) with pedicellus hardly or about as long as F1, 1.8-2.0 times as long as broad; pedicellus plus flagellum 1.25-1.4 times breadth of mesoscutum; funicle more slender, although slightly stouter than the pedicellus, filiform, with longer segments, F1 1.3-1.7 times, F2 1.3-1.7 times, F3 1.2-1.6 times as long as broad; clava 2.8-3.0 times as long as broad. Mid lobe of mesoscutum with a very fine median line; 2-3 setae on each side. Basitarsus of mid and hind (Fig. 198) legs at least 4 times as long as broad, its outer edge hardly shorter than second tarsal segment; fourth segment hardly as long as basitarsus. Forewing with M 2.6-2.85 length of ST; speculum a little larger, wing beyond rather less thickly pilose, than in *incertus*. Gaster ovate, subacute, as long as or somewhat longer than thorax; last tergite slightly less transverse than in *incertus*; longest seta of each cercus about 1.5 times length of next longest, tending to be slightly kinked or twisted.

Differs from ♀ of *scaposus* in having first segment of mid and hind tarsi hardly shorter than second; clypeus with two small teeth; pedicellus relatively longer, flagellum longer, funicular segments distinctly longer than broad; thorax longer; mid lobe of mesoscutum with median line; submedian lines of scutellum distinct and rather closer together; gaster longer.

Body black with bluish tint. Antennae black. Coxae black; trochanters partly pale; femora black with about distal 0.3 of fore and mid femora, distal 0.25 of hind femora, testaceous; tibiae testaceous or more or less infusate medially, sometimes fuscous except bases and tips; fore tarsi brown, mid and hind tarsi testaceous but darkening towards their tips, or more extensively infusate. Wings hyaline, venation testaceous to brownish. Length 1.35-1.55 mm.

♂. Differs as follows. Antenna (Fig. 208) with scape as long as an eye, with ventral plaque about 0.75 its length; pedicellus plus flagellum about 1.4 times breadth of mesoscutum; pedicellus twice as long as broad, much longer than F1; F1 hardly broader than pedicellus, shorter than F2, quadrate; F2 to F4 slightly stouter than pedicellus, subequal in length, 1.5-1.6 times as long as broad; clava not broader than F4, about 3 times as long as broad, slightly longer than F3 plus F4; each segment of funicle, and C1, with a compact subbasal whorl of dark setae which (except those on F1) do not reach beyond the tip of the segment. Gaster oblong, about as long but narrower than thorax.

**MATERIAL EXAMINED.** 1 ♂, 7 ♀. Holotype ♀, **France:** Aveyron, St.-Sauveur-des-Pourcils, near Meyreuis, 5.vii.1977 (Graham) (BMNH).

**Paratypes.** **Czechoslovakia:** 1 ♀, Bohemia, Rožmburk u Třeboně, 16.vi.1946 (Bouček) (BMNH). **France:** 1 ♀, Aveyron, Gorges du Trévezél, 31.vii.1974; 1 ♀, Cantal, Lac Crégut, 19.vii.1977; 1 ♀, Vaucluse, near Bédoin, 5.viii.1976 (Graham) (BMNH). **Great Britain:** 1 ♂, Middlesex, Southgate, 2.vi.1970; 1 ♀, Oxfordshire, Lewknor, 18.vi.1958 (Graham) (BMNH). **Jugoslavia:** 1 ♀, Drazovac, 19.viii.1979 ("Lj M") (BMNH).

**HOSTS.** Unknown.

## SPECIES SOLA

*Oomyzus sokolowskii* (Kurdjumov) **comb.n.**

(Figs 199, 205, 375)

*Tetrastichus sokolowskii* Kurdjumov, 1912: 238-239. Lectotype ♀, USSR (ZIL), designated by LaSalle (1986: 601) [examined].

*Tetrastichus sokolowskii* Kurdjumov, 1913: 254; Cheerian & Basheer, 1939: 87-98; Erdős, 1954: 363, 1971: 224; Peck, 1963: 150; Domenichini, 1966a: 116-117, 1966b: 49; 1967: 83, Yaseen, 1978: 111-114; Burks in Krombein et al., 1979: 1000; LaSalle, 1986: 601.

*Aprostocetus sokolowskii* (Kurdjumov) Graham, 1961b: 39.

Kurdjumov (1912: 238, fig. 6) described and figured the submarginal vein of *sokolowskii* as having a single dorsal seta before the middle and a "verruer" (apparently the base of a second seta) beyond the middle. Domenichini (1966a: 117) stated that nearly all the specimens seen by him had 2 dorsal setae on SM. Most of those I have examined show, on the contrary, only one seta. Domenichini referred the species to the group of *evonymellae* (now part of *Baryscapus*). Its placing depends on the relative importance attached to some characters, as it seems intermediate between *Baryscapus* and *Oomyzus*. In its weakly curved malar sulcus and the presence as a rule of only one dorsal seta on SM, it fits better into *Oomyzus*. The female hypopygium lacks a flange on the inner edge of the lateral anterior lobes and seems to resemble those of *Oomyzus* in that respect.

♀. Antenna (Fig. 199) with scape 0.85 length of eye, not reaching median ocellus; pedicellus plus flagellum about equal to breadth of mesoscutum; pedicellus 1.5-1.6 times as long as broad, a little longer than F1; funicle stouter than pedicellus, hardly thickening distad, its segments quadrate, or F3 slightly transverse; clava slightly broader than funicle, 2.0-2.25 times as long as broad. Mesoscutum with median line weak, sometimes absent anteriorly; 2-3 setae on each side. Scutellum 1.25-1.3 times as broad as long, moderately convex in profile; submedian lines about equidistant from each other and from sublateral lines, enclosed space 2.3-2.9 times as long as broad. Propodeum as long as or slightly longer than dorsellum; spiracles rather small, subcircular, about 0.5 their diameter from metanotum; callus with 2 setae. Legs rather slender. Forewing with M not thick, 2.1-2.4 times length of ST; speculum small, hardly extended below M, wing beyond it rather thickly pilose; cilia 0.2-0.25 length of ST. Hindwing slightly pointed; cilia 0.3-0.4 breadth of wing. Gaster short-ovate, as long as or slightly longer than thorax, usually slightly broader than thorax, 1.2-1.5 times as long as broad, apically forming a right-angle or slightly obtuse angle; last tergite distinctly broader than long; ovipositor sheaths not projecting. Hypopygium (Fig. 375) with lobes moderately broad, median lobe obtuse.

Moderately bright golden-green, or green to blue. Antennae black, flagellum sometimes brown; trochanters, tips of femora broadly, and tibiae, yellow; mid and hind tarsi yellow basally, gradually darkening to brown at tips. Wings hyaline, venation testaceous to brownish. Length 1.0-1.3 mm.

♂. Differs as follows. Antenna (Fig. 205) with scape 0.9-0.93 length of eye, nearly reaching median ocellus, ventral plaque about 0.6 length of scape;

pedicellus plus flagellum 1.25-1.3 times breadth of mesoscutum; funicle slightly stouter than pedicellus, F1 a little shorter than F2 and slightly transverse or subquadrate, F2 to F4 subequal in length, quadrate or slightly longer than broad; clava 3.2-4.0 times as long as broad, longer than F3 plus F4; each funicular segment with a compact subbasal whorl of long setae which reach distinctly beyond the tip of the segment. Gaster oval, slightly shorter than thorax.

**MATERIAL EXAMINED.** Many ♂, ♀. **France, Hungary, Italy, Switzerland, USSR; Bangladesh, India, Japan, Pakistan, Sri Lanka; Kenya, South Africa; Canada, USA; Brazil, Trinidad, West Indies.** Probably introduced to some countries.

**HOSTS.** *Plutella xylostella* (L.) (= *maculipennis* Curtis) (Lep., Yponomeutidae) and its parasite *Apanteles* [*Cotesia*] *plutellae* Kurdjumov, as a gregarious endoparasite of the host larvae and pupae. Biological information is given in Cheerian & Basheer (1939).

### THE *GALLERUCAE*-GROUP

A natural group which, however, is difficult to define. Distinguished from *incertus*-group particularly by the characters given in the key to females, couplet 6. The species are parasites of Coleoptera Chrysomelidae.

The European species were revised by Graham (1985). Males can be rather easily determined by the characters of the antennal scape. Females are often more difficult to distinguish and care is necessary when attempting to identify those which have not been reared.

Newly-emerged specimens tend to have yellowish-testaceous flagella but in some females this later darkens to fuscous.

### *Oomyzus gallerucae* (Fonscolombe), **comb.rev.** (Figs 200, 201, 211)

*Pteromalus gallerucae* Fonscolombe, 1832: 302. Syntypes, France, Bouches du Rhône, Aix district (Fonscolombe) (destroyed). Neotype ♀, France: Bouches du Rhône, Fonscolombe, 8.viii.1983, from egg of *Pyrrhalta luteola* (Graham) (BMNH), designated by Graham (1985: 1061) [examined].

*Oomyzus gallerucae* (Fonscolombe) Rondani, 1870: 141.

[*Oomyzus xanthomelaenae* Rondani, 1873: 148. *nom. nud.*]

*Tetrastichus xanthomelaenae* (Rondani) Marchal, 1905: 64-68; Silvestri, 1910: 271-276; Kurdjumov, 1913: 253; Berry, 1938: 859-863; Burks, 1943: 544-545; Erdős, 1954: 363.

[*Tetrastichus gallerucae* (Fonscolombe) Bouček, 1957: 180; Domenichini, 1964: 36-37, 1966a: 97, 1966b: 32. Invalid emendation.]

*Tetrastichus gallerucae* (Fonscolombe) Burks in Krombein et al., 1979: 995; Graham, 1985: 1061-1065, figs 1-3.

For discussion of the identity of the species, see Bouček (1957); and for redescription, see Graham (1985). Antenna ♀ (Fig. 200), forewing ♀ (Fig. 201), antenna ♂ (Fig. 211).

**MATERIAL EXAMINED.** Many ♂, ♀. **France, Italy; USA** (introduced from Europe).

HOSTS. *Pyrhalta luteola* (Müller) (Col., Chrysomelidae) on *Ulmus* spp.; solitary endophagous parasite of the host eggs. For biological information see Silvestri (1910), Marchal (1905) and Berry (1938).

***Oomyzus tanaceti* (Graham), comb.n.**

(Figs 202, 213, 374)

*Tetrastichus tanaceti* Graham, 1985: 1061, 1065-1066. Holotype ♀, Great Britain: Berkshire, Silwood Park, 7.xi.1961, reared from egg of *Galeruca tanaceti* (W.O. Steel) (BMNH) [examined].

For description of both sexes, see Graham (1985). Antenna ♀ (Fig. 202); antenna ♂ (Fig. 213); hypopygium ♀ (Fig. 374) strongly transverse, with median lobe slightly shorter than lateral lobes, broad, rounded.

MATERIAL EXAMINED. 44 ♂, 7 ♀. **Great Britain.**

HOSTS. *Galeruca tanaceti* (L.) (Col., Chrysomelidae).

***Oomyzus galerucivorus* (Hedqvist), comb.n.**

(Figs 203, 212)

*Tetrastichus galerucivorus* Hedqvist [Heqvist], 1959: 141-142, figs 3, 4. Holotype ♀, Sweden: Uppland, Vallentuna, 1952, from egg of *Galeruca tanaceti* (Hedqvist) (KJH) [examined].

*Tetrastichus galerucivorus* Hedqvist; Domenichini, 1966a: 98, 1966b: 33; Graham, 1985: 1061, 1066-1067, figs 7, 8.

For description of both sexes see Hedqvist (1959); redescription, see Graham (1965). Antenna ♀ (Fig. 203), antenna ♂ (Fig. 212).

MATERIAL EXAMINED. 9 ♂, 2 ♀. **Czechoslovakia, France, Hungary, Sweden.**

HOSTS. *Galeruca tanaceti* (L.) (Col., Chrysomelidae), as solitary endophagous parasite of the host eggs.

***Oomyzus repentinus* (Graham), comb.n.**

(Fig. 214)

*Tetrastichus repentinus* Graham, 1985: 1061, 1067. Holotype ♀, Yugoslavia: Biograd, 20.vii.1968 (Bouček) (BMNH) [examined].

For description of both sexes, see Graham (1985). Antenna ♂ (Fig. 214).

MATERIAL EXAMINED. 2 ♂, 1 ♀. **Yugoslavia.**

HOSTS. Unknown, but probably a beetle related to *Galeruca* (Col., Chrysomelidae).

***TETRASTICHUS* Haliday**

*Tetrastichus* Haliday, 1844: 297-298. Type-species: *Cirrospilus attalus* Walker, by monotypy.

*Ennetoma* Dahlbom, 1857: 292. Type-species: *Eulophus hylotomorum* Bouché, by designation of Graham (1990: 198). [Synonymised with *Tetrastichus* by Graham, 1990: 198.]

*Solenoderus* Motschulsky, 1863: 71. Type-species: *Solenoderus cyaniventris* Motschulsky, by

monotypy. [Synonymised by Bouček, 1965: 554.]

*Lygellus* Giard, 1896: 839. Type-species: *Lygellus epilachnae* Giard, by monotypy. [Synonymised by Domenichini, 1966a: 68.]

*Tetrastichus* Haliday; Kurdjumov, 1913: 247, 253-254, in part; Burks, 1943: 509-602, in part; Erdős, 1954: 361-362, in part; Domenichini, 1966a: 86-95 [*miser*-group], 1966b: 15-55, in part, 1967: 76-77 [*miser*-group]; Kostjukov, 1978: 435-436; Bouček, 1988: 693-694.

*Ceratoneuromyia* Girault, 1913: 252. Type-species: *Ceratoneuromyia arnoldi* Girault, by original designation. [Synonymised by Bouček, 1988: 693.]

*Pseudomphaloides* Girault, 1915: 258. Type-species: *Pseudomphaloides aenellus* Girault, by original designation. [Synonymised by Bouček, 1988: 693.]

*Redinia* Girault, 1936: 4. Type-species: *Redinia hispidivertex* Girault, by monotypy. [Synonymised by Bouček, 1988: 693.]

*Tetrastichus* Haliday subgen. *Musciformia* Kostjukov, 1977: 188. Type-species: *Tetrastichus puncticoxae* Kurdjumov, by original designation.

*Tetrastichus* Haliday subgen. *Tenthredophagus* Kostjukov, 1977: 188. Type-species: *Tetrastichus [recte Eulophus] hylotomarum* Bouché, by original designation.

DIAGNOSIS. Head (except in species-group of *clito*) usually rigid and not or hardly collapsed on drying. Frons (except group of *clito*) with a weakly-defined elongate scrobal area (Fig. 216) the sides of which are subparallel or converge only slightly towards the median ocellus; in the *clito*-group the frons (Fig. 283) has a median longitudinal carina. Malar sulcus straight or very slightly curved, not foveate below eye. Anterior margin of clypeus bidentate. Mandible tridentate with outer tooth acute, sometimes large, middle tooth less acute, inner tooth usually obtuse; in species having a broad mouth, such as *halidayi* (Fig. 216) and less so in *coeruleus*, the two inner teeth are relatively close together and acute, approaching the form seen in *Chaenotetrastichus*. Antenna of ♀ with 2-3 anelli which are discoid or laminar; funicle with 3 segments; clava with 3 (but the suture between C2 and C3 sometimes obsolescent). Antenna of ♂ with scape somewhat broadened and flattened, with a relatively long ventral plaque; 4 funicular segments, sometimes without compact subbasal whorls of long setae, sometimes with such whorls but then the setae reach at most slightly beyond the tip of the segment that bears them. Thorax normally convex dorsally, rarely more or less flattened, not short. Pronotum short. Mid lobe of mesoscutum with extremely fine, usually superficial or hardly raised, rarely engraved or obsolescent, reticulation, areoles mostly 2-3 times as long as broad; median line nearly always present, often strong, very rarely indicated only near the scutellum; usually with one row of adnotaular setae on each side, rarely a second row, very rarely with setae scattered over the whole surface. Scapular flanges sublinear. Scutellum with excessively fine engraved or superficial reticulation, areoles tending to be more elongate than those of mesoscutum; submedian lines normally distinct, rarely weak; two pairs of setae present. Propodeum relatively long, medially 1.0-2.0 times length of dorsellum; median carina distinct, often sharp; plicae present at least posteriorly but normally extending farther forward and sometimes reaching level of spiracles, usually curved but straight in some extralimital species, sending a branch (paraspiracular carina) towards hind corner of propodeum; submedian panels weakly to very strongly reticulate, the reticulation often more or less raised, rugulosity present in some Asiatic species; spiracles subcircular, very variable in size, from small to (in some extralimital species) very large, their whole rim usually exposed, occasionally the outer part

hidden by a raised flap of the callus; callus with 2-10 setae. Prepectus and metapleuron usually distinctly reticulate. Mesosternum, just in front of trochantal lobes, usually convex, occasionally weakly so or nearly flat. Precoxal suture absent. Hind coxae (except in group of *clito* and some extralimital species) more strongly reticulate or rugulose at base than elsewhere. First segment of mid and hind tarsi not shorter than second. Macropterous: forewing with costal cell shorter than or as long as M; SM usually with 1 dorsal seta placed before the middle, occasionally 2 setae (some Asiatic and African species and aberrations of a few others, e.g. *hylotomarus*); M not or only slightly thickened, parastigma not marked off from M by a decolorized spot; PM absent, rudimentary, or a short stub. Hindwing nearly always obtuse apically (slightly acute in some small species). Petiole subconical or transverse, usually smooth, rarely indefinitely sculptured. Gaster of ♀ not strongly sclerotized, collapsing to a greater or lesser degree on drying, varying from subcircular to lanceolate; ovipositor sheaths most often reaching tip of last tergite; cercus in most species with one seta 1.5-2 times the length of the next longest and often more or less kinked, occasionally only 1.2-1.4 times, very rarely the cercal setae subequal in length. Anterior margin of hypopygium trilobed. Genitalia of ♂ much as in *Baryscapus*. Body with at least a very weak, but sometimes strong, metallic tints, normally without any pale markings (with pale spot on gaster in a few extralimital species). Tegulae normally black, rarely pale.

Represents a monophyletic group and is relatively easy to recognize amongst European genera by the distinctly sculptured propodeum having distinct plicae; vein SM normally with only 1 dorsal seta (the Asiatic species with 2 dorsal setae on SM have particularly strong, usually partly rugulose, propodeal sculpture). Strong plicae and other carinae are present on the propodeum in some extralimital species that do not belong to *Tetrastichus*, but they can be recognized by other features not present in that genus.

DISTRIBUTION. All continents. The third largest genus of Tetrastichinae.

BIOLOGY. Parasites of Coleoptera (usually Chrysomelidae, occasionally Coccinellidae); Hymenoptera Tenthredinoidea; occasionally Lepidoptera or Diptera; attacking host larvae or pupae, occasionally hyperparasitic.

COMMENTS. Other species-groups exist in addition to those represented in the European fauna. The Asiatic *T. howardi* (Olliff, 1893) and *T. inferens* Yoshimoto, 1970 constitute one such group, characterized by 2 dorsal setae on SM and a partly rugose propodeum with straight plicae. The African *T. atriclavus* Waterston, 1915 and *T. sculpturatus* Waterston, 1915 hardly differ except in having only 1 dorsal seta on SM. *T. spirabilis* Waterston, 1922, having enormous propodeal spiracles, seems to be a rather isolated species. Additional groups certainly exist but cannot be dealt with here.

Amongst other species that belong to *Tetrastichus* as defined here, the following may be noted. Indo-Malayan and Pacific areas: *brontispae* Ferrière, 1933, *giffardianus* Silvestri, 1915, *krishnieri* Mani, 1941, *schoenobii* Ferrière, 1931, *taylori* Ferrière, 1933.

Ethiopian region: *dispar* Masi, 1917, *giffardii* Silvestri, 1913, *oxyurus* Silvestri, 1914, *sesamiae* Risbec, 1951.

Australian region: Bouček (1988: 693-694) lists 16 species, of which some belong to distinct groups.

Nearctic region: *agrili* Crawford, 1914, *auplopus* Burks, 1963, *pompilicola* Graham, 1960, *scriptus* Burks, 1943, *trisulcatus* (Provancher, 1887).

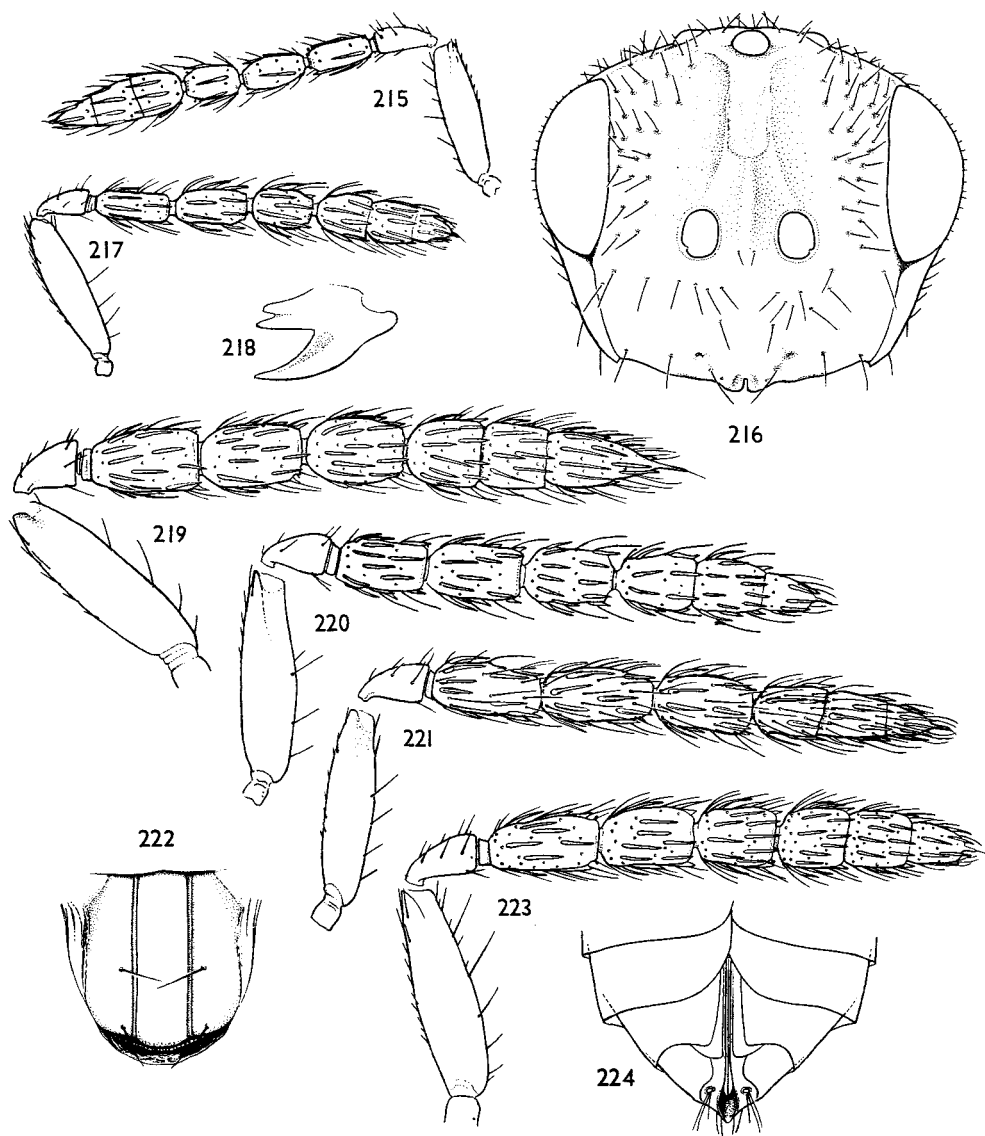
## Key to European species

### Females

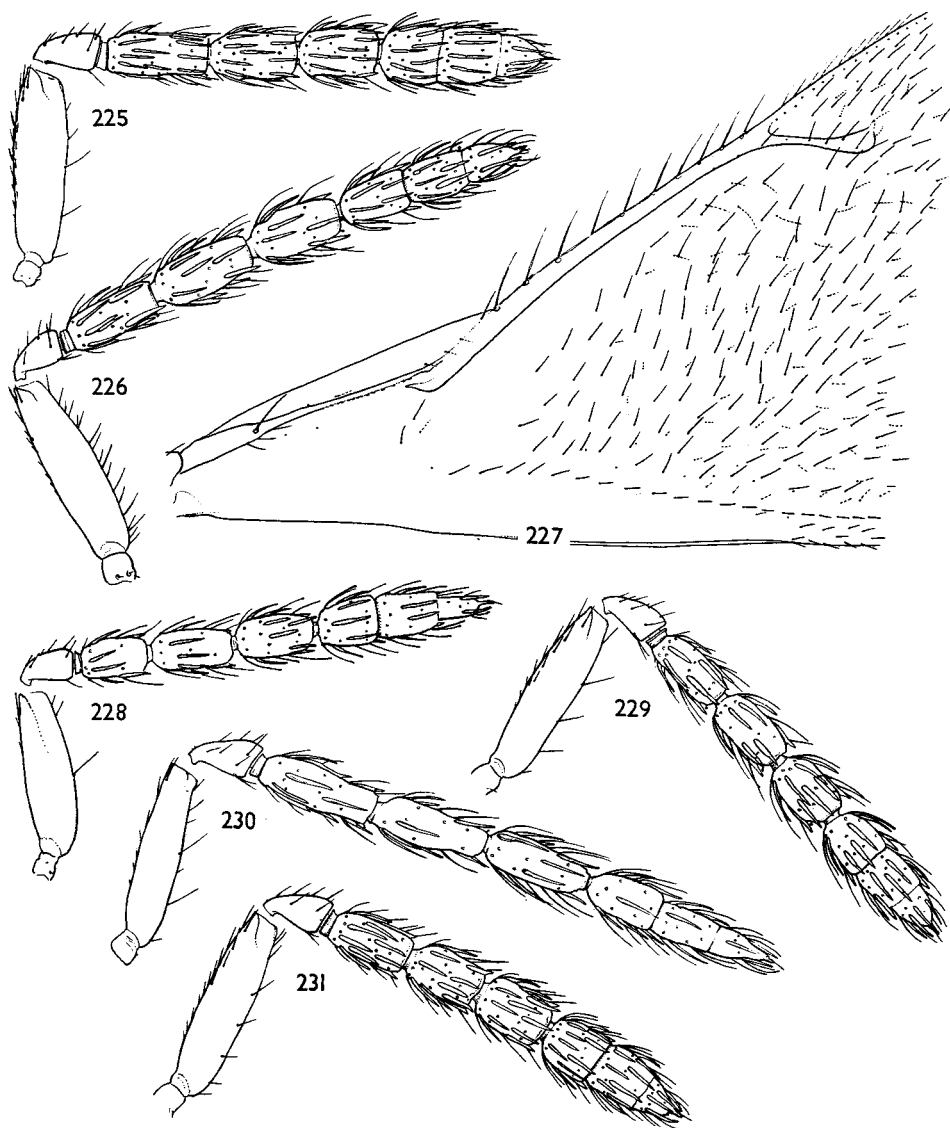
- 1 Thorax dorsally (except propodeum) strongly shiny, with excessively fine obsolescent reticulation. Propodeum with plicae obsolescent in anterior half. Frons with median longitudinal carina which reaches to above middle. Hind coxae finely reticulate externally. Antenna (Fig. 215) with scape and pedicellus testaceous, flagellum brown; body black with hardly perceptible bronze and bluish tints. Median line of mesoscutum obsolescent.  
 ..... *leionotus* (p.231)
- Thorax dorsally moderately shiny or rather dull, with distinct engraved reticulation. Propodeum with plicae at least moderately distinct in anterior half (except in some *clito*-group), distinct in posterior half. Frons often with weak median carina which is distinct only in the lower part. Hind coxae most often rugulose basally on the externo-dorsal surface. Antennal scape and pedicellus rarely pale simultaneously; body often differently coloured. Median line of mesoscutum most often distinct. .... 2
- 2 Hind coxae more strongly and coarsely reticulate dorsally than elsewhere, usually more or less rugulose dorsally in basal part. Frons nearly always with an oblong median area (Fig. 216), the median longitudinal carina reaching from between the antennal toruli to not more than half way towards the median ocellus; above this there is a flat oblong to sublinear scrobal area, defined laterally by sutures which tend to converge ventrad to join the median carina; frons usually not collapsing on drying. Propodeum (see Graham, 1987, fig. 25) with the subtriangular area between the posterior part of each plica and the adjacent paraspircular carina tending to be concave or foveate. Costal cell of forewing often relatively broad as in Fig. 273, usually less than 10 times as long as broad. .... 3
- Hind coxae reticulate externally and dorsally, nowhere rugulose, though sometimes less finely reticulate dorsally than ventrally. Frons (Fig. 283) with a more or less distinct median longitudinal carina extending from between the toruli to near the median ocellus; the sutures which define the scrobal area laterally tend to diverge ventrad, away from the median carina; the frons tends to collapse somewhat in dried specimens. Propodeum with the subtriangular area between the posterior part of each plica and the adjacent paraspircular carina tending to be flat or hardly concave. Forewing with costal cell narrow or (Fig. 285) very narrow, 10-17 times as long as broad.  
 ..... 42

- 3 Head (Fig. 216) with mouth about twice malar space; mandible (Fig. 218) very large, with outer tooth falcate and separated by a wide gap from the two small inner teeth, which are subacute and closely approximated. At least head and thorax mainly dull olive- or bronze-greenish. Ovipositor sheaths reaching apex of last tergite. . . . . *halidayi* (p.232)
- Mouth 1.6-1.8 malar space in *coeruleus*, which has mandibles less large, head and thorax dark to bright blue or violet, ovipositor sheaths not reaching apex of last tergite. In all the other species the mouth is at most 1.5 times the malar space (most often hardly greater than the malar space). . . . 4
- 4 Antenna (Fig. 219): clava with a very long, slightly tapering spine, the clava itself much longer than F2 plus F3; flagellum stout; funicular segments subequal in length or differing only slightly, all less than twice as long as broad; scape virtually as long as an eye and reaching level of vertex. Mouth 1.3-1.4 malar space. . . . . *setifer* (p.233)
- Antennal clava usually with a relatively short spine, if approaching the length seen in *setifer* the clava is not or hardly longer than F2 plus F3 and either the flagellum is less stout or the scape is longer than an eye and reaches above the vertex. Mouth most often not greater than malar space. . . . . 5
- 5 Mouth 1.3-1.8 malar space. Gaster 1.0-1.7 times as long as broad. . . . 6
- Mouth at most slightly greater than malar space. Gaster sometimes more elongate than in above. . . . . 10
- 6 Antennae (Figs 220, 221) with clava more acute, spine relatively long and conspicuous; scape 1.0-1.15 length of eye, reaching to or above vertex. . . . . 7
- Antennae with clava subobtusate, spine relatively short and inconspicuous; scape 0.9-0.95 length of eye, not reaching above vertex. . . . . 8
- 7 Antenna (Fig. 220) with pedicellus plus flagellum about 1.25 times breadth of mesoscutum; funicular segments relatively shorter. . . . . *perkinsorum* (p.234)
- Antenna (Fig. 221) with pedicellus plus flagellum 1.4-1.5 times breadth of mesoscutum; funicular segments relatively longer. . . . . *julis* (p.235)
- 8 Ovipositor sheaths (Fig. 224) not reaching apex of last tergite. Mouth 1.6-1.8 malar space. (Antenna, Fig. 223). . . . . *coeruleus* (p.238)
- Ovipositor sheaths reaching apex of last tergite. Mouth 1.4-1.6 malar space. . . . . 9
- 9 Antenna (Fig. 225) with F3 less than twice as long as broad; clava about as long as F2 plus F3. . . . . *crioceridis* (p.256)
- Antenna (Fig. 267) with F3 2.0-2.35 times as long as broad; clava distinctly to much shorter than F2 plus F3. . . . . *sodalis* (p.256)
- 10 Antenna (Fig. 226) with scape very slightly longer than an eye, reaching a little above the vertex, its front edge with numerous setae. Gaster subcircular, hardly as long as, but slightly broader than, the thorax; in ventral view the tips of the ovipositor sheaths reach nearly to the apex of the last tergite. (Body blue-green; tibiae testaceous). . . . . *tachos* (p.244)





Figs 215-224 *Tetrastichus* species, females. 215, *T. leionotus* sp. n., antenna. 216-218, *T. halidayi* (Graham); (216) head, front view; (217) antenna; (218) mandible. 219, *T. setifer* Thomson, antenna. 220, *T. perkinsorum* sp. n., antenna. 221, 222, *T. julis* (Walker); (221) antenna; (222) scutellum (from holotype of *maderae*). 223, 224, *T. coeruleus* (Nees); (223) antenna; (224) gaster, ventral view.

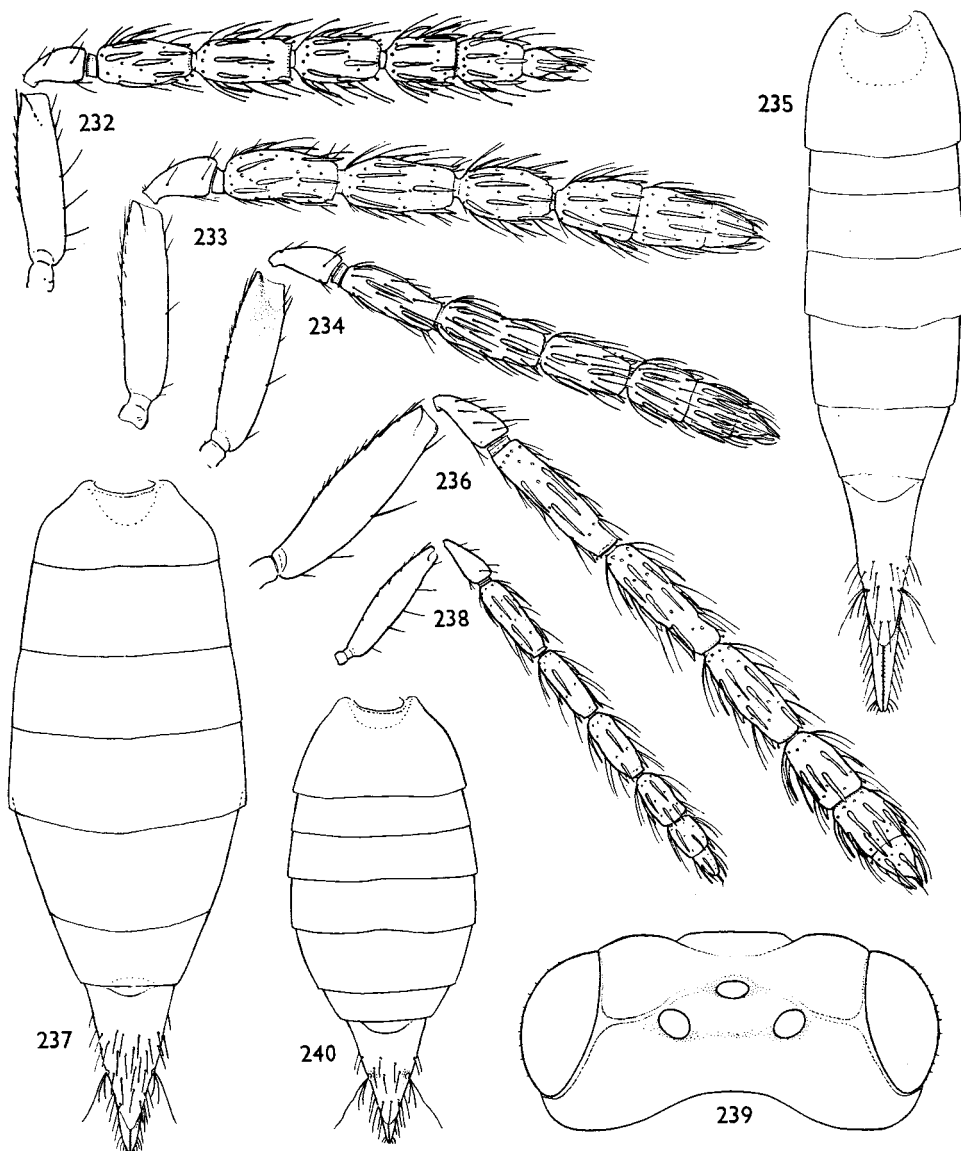


Figs 225-231 *Tetrastichus* species, females. 225, *T. crioceridis* Graham, antenna. 226, 227, *T. tachos* (Walker); (226) antenna; (227) forewing. 228, *T. inaequalis* sp. n., antenna. 229, *T. helviscapus* sp. n., antenna. 230, *T. brevicar* sp. n. 231, *T. hylotomarum* (Bouché), antenna.

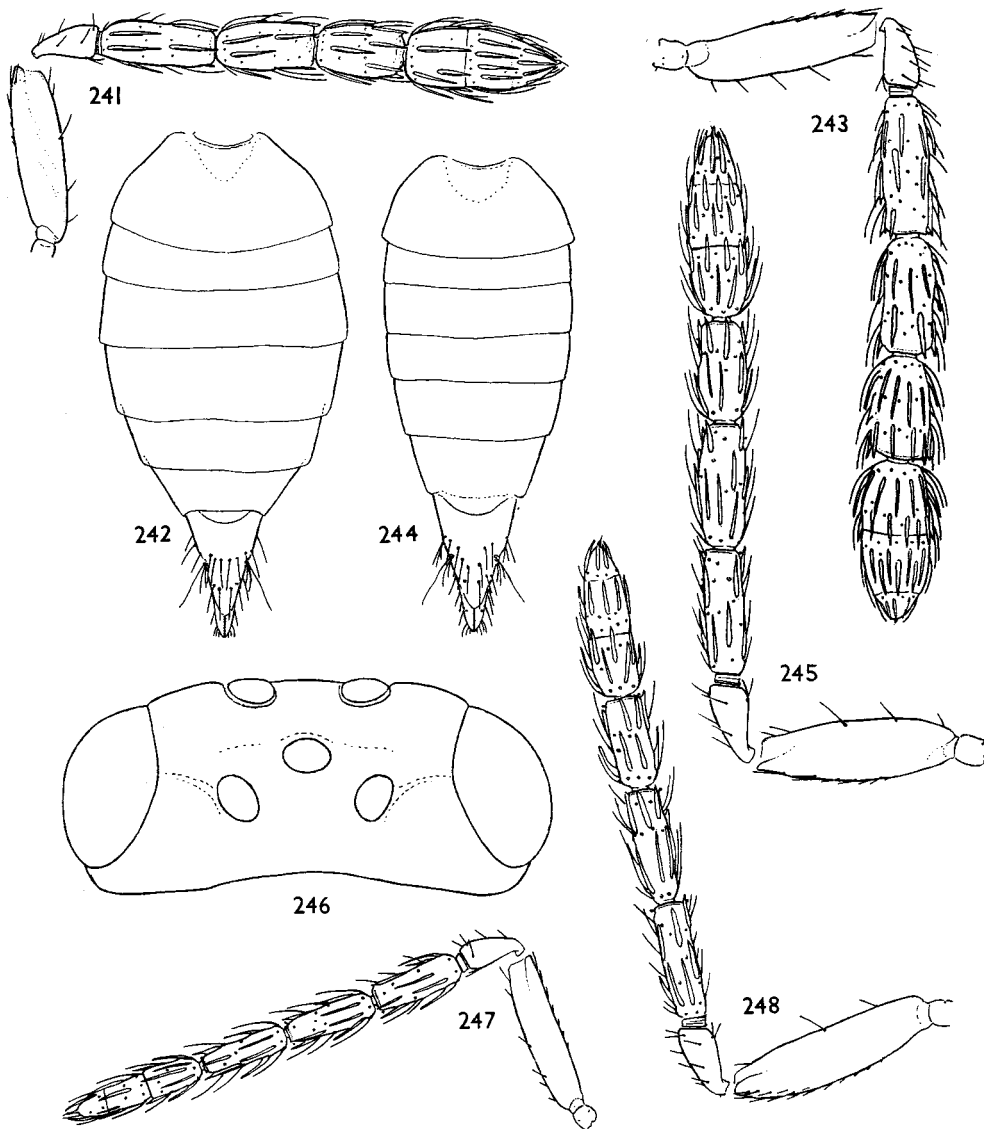
- Antennal scape rarely longer than an eye, usually shorter, its front edge with fewer (at most 6) setae. Gaster most often ovate to lanceolate with tips of ovipositor sheaths reaching apex of last tergite only in *coeruleus*-group. 11
- 11 Ovipositor sheaths (Fig. 224) not reaching apex of last tergite; cerci placed ventrally on last tergite. Gaster at most 1.5 times as long as broad and ovate, but usually subcircular; not longer, though usually broader, than the thorax. Eyes relatively small, usually separated by 1.6-1.8 times their own length. Antennal scape virtually as long as, or even slightly longer than an eye; in specimens having undistorted head, the scape sometimes reaches slightly above the vertex. . . . . 12
- Ovipositor sheaths (Fig. 276) reaching apex of last tergite, or even extending slightly beyond it so that their tips are just visible in dorsal view; cerci placed laterally or dorsolaterally on last tergite. Gaster variable in shape, rarely subcircular, usually ovate to lanceolate. Eyes most often relatively larger. Antennal scape most often shorter than an eye and not reaching above the vertex. . . . . 17
- 12 Antenna (Fig. 228) with F1 distinctly shorter than F2 and only very slightly longer than the pedicellus; flagellum not stout, F3 nearly twice as long as broad. Tibiae testaceous. . . . . *inaequalis* (p.241)
- Antennae with F1 as long as or longer than F2 and at least slightly longer than the pedicellus except in some *ilithyia*, in which the tibiae are mainly black. . . . . 13
- 13 Antennae with funicular segments relatively shorter, F3 at most 1.6 times as long as broad; clava 2.0-3.4 times as long as broad, with only a weak constriction between C1 and C2. . . . . 14
- Antennae with funicular segments relatively longer, F3 nearly or quite twice as long as broad except in small *ilithyia*, in which the clava (Fig. 232) has a deep constriction between C1 and C2; clava 3.3-5 times as long as broad. . . . . 15
- 14 Antenna (Fig. 229) with flagellum rather more slender; clava 2.9-3.4 times as long as broad, C2 tending to be slightly longer than broad. Antennal scape mainly or wholly testaceous. Mid and hind tibiae normally testaceous, rarely slightly brownish medially. . . . . *helviscapus* (p.242)
- Antenna (Fig. 231) with flagellum stouter; clava 2.0-2.9 times as long as broad, with C2 slightly shorter than or at most as long as broad. Antennal scape black. Mid and hind tibiae broadly infuscate, sometimes mainly black. . . . . *hylotomarum* (p.237)
- 15 Antennal clava (Fig. 232) with a deep constriction between C1 and C2; spine about 0.5 length of C3. Gaster tending to be ovate; cerci placed laterally on last tergite; the longest seta of each cercus nearly twice length of next longest and tending to be kinked or bisinuate. Mid and hind tibiae dark brown to black with at most their bases and tips reddish. . . . . *ilithyia* (p.235)
- Antennal clava (Figs 230, 233) with a weak constriction between C1 and C2; spine relatively shorter. Gaster circular or subcircular; cerci placed ventrally

on last tergite; longest seta of each cercus less than twice length of next longest and slightly curved or straight. Tibiae sometimes wholly pale.

- ..... 16
- 16 Spur of mid tibia about 0.75 length of basitarsus. Antenna (Fig. 233) with flagellum stouter; funicular segments rather shorter, F1 2.0-2.3 times, F3 1.8-2.0 times as long as broad; clava tending to be shorter and less acute, 3.3-4.0 times as long as broad, its segments relatively shorter, spine tending to be hidden. .... *coelarchus* (p.240)
- Spur of mid tibia hardly more than 0.5 length of basitarsus. Antenna (Fig. 230) with flagellum more slender; funicular segments rather longer, F1 2.4-2.7 times, F3 2.2-2.5 times as long as broad; clava tending to be longer and more acute, spine fully 0.33 length of C3. .... *brevicalcar* (p.243)
- 17 Gaster (Fig. 235) with last tergite 1.9-2.5 times as long as broad; the gaster itself acuminate, 3.2-5 times as long as broad, 1.4-1.6 times length of head plus thorax, distinctly narrower than thorax. Body bronze-black with at most some very weak greenish or bluish reflections. Antenna (Fig. 234) with clava nearly 3 times as long as broad, without an obvious constriction between C1 and C2. .... *telon* (p.248)
- Gaster with last tergite at most 1.7 times as long as broad. If the gaster itself is almost as elongate as in *telon* then *either* the body is brighter green to blue *or* the antennal clava is only about twice as long as broad. .. 18
- 18 Gaster lanceolate, at least slightly longer than head plus thorax. Antennae (Figs 236, 238) with scape as long as or longer than an eye, in specimens with undistorted head reaching at least slightly above the vertex; pedicellus rather more than twice as long as broad; flagellum slender, at most slightly stouter than the pedicellus; F3 twice or more than twice as long as broad; clava 3.6-4 times as long as broad, usually at least slightly stouter than F2 plus F3. Malar space 0.8-0.9 length of eye. Head (Fig. 239) at most 2.2 times as broad as long; temples distinct, rounded. Body with relatively bright blue-green to blue tints. .... 19
- *Either* the gaster is ovate and about as long as the thorax; *or* the antennal scape is slightly shorter than an eye, or does not reach the vertex, the pedicellus is relatively shorter and the flagellum is less slender. Antennal clava usually about 3 times as long as broad, or rather less. Malar space usually shorter. Head usually more strongly transverse and with temples very short. Body colour sometimes otherwise. .... 20
- 19 Gaster (Fig. 237) 2.7-3.3 times as long as broad and nearly twice length of thorax; last tergite 1.5-1.9 times as long as broad. Antenna (Fig. 236) with scape somewhat longer than an eye; funicular segments rather more elongate; clava distinctly shorter than F2 plus F3. Head, pronotum, mesoscutum and scutellum rather duller, their sculpture slightly stronger. .... *legionarius* (p.245)
- Gaster (Fig. 240) 1.9-2.3 times as long as broad, less than twice as long as thorax; last tergite not or hardly longer than broad. Antenna (Fig. 238) with scape not or hardly longer than an eye; funicular segments rather less elongate; clava not or only very slightly shorter than F2 plus F3. Head,



**Figs 232-240** *Tetrastichus* species, females. 232, *T. ilithyia* (Walker), antenna. 233, *T. coelarchus* sp. n., antenna. 234, 235 *T. telon* (Graham); (234) antenna; (235) gaster. 236, 237, *T. legionarius* (Giraud); (236) antenna; (237) gaster. 238-240, *T. temporalis* (Graham); (238) antenna; (239) head, dorsal; (240) gaster.

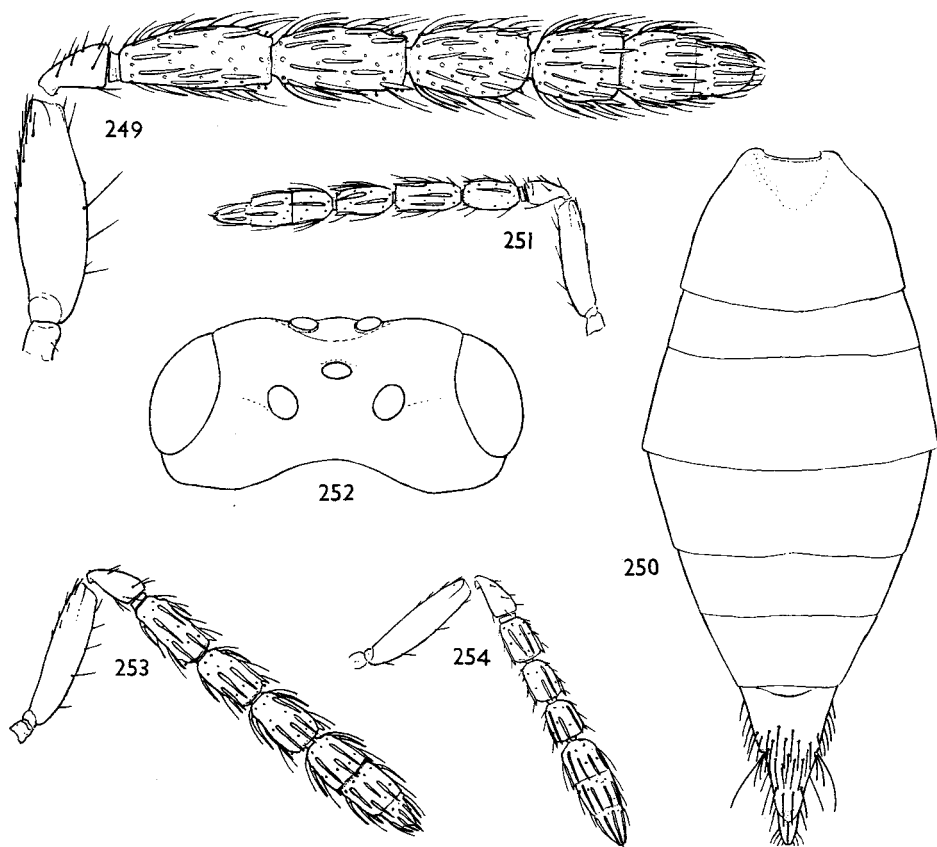


Figs 241-248 *Tetrastichus* species, females. 241, 242, *T. macrops* (Graham); (241) antenna; (242) gaster. 243, 244, *T. ulmi* Erdős; (243) antenna; (244) gaster. 245, 246, *T. agriloides* sp. n.; (245) antenna; (246) head, dorsal. 247, *T. heterus* sp. n., antenna. 248, *T. heeringi* (Delucchi), antenna.

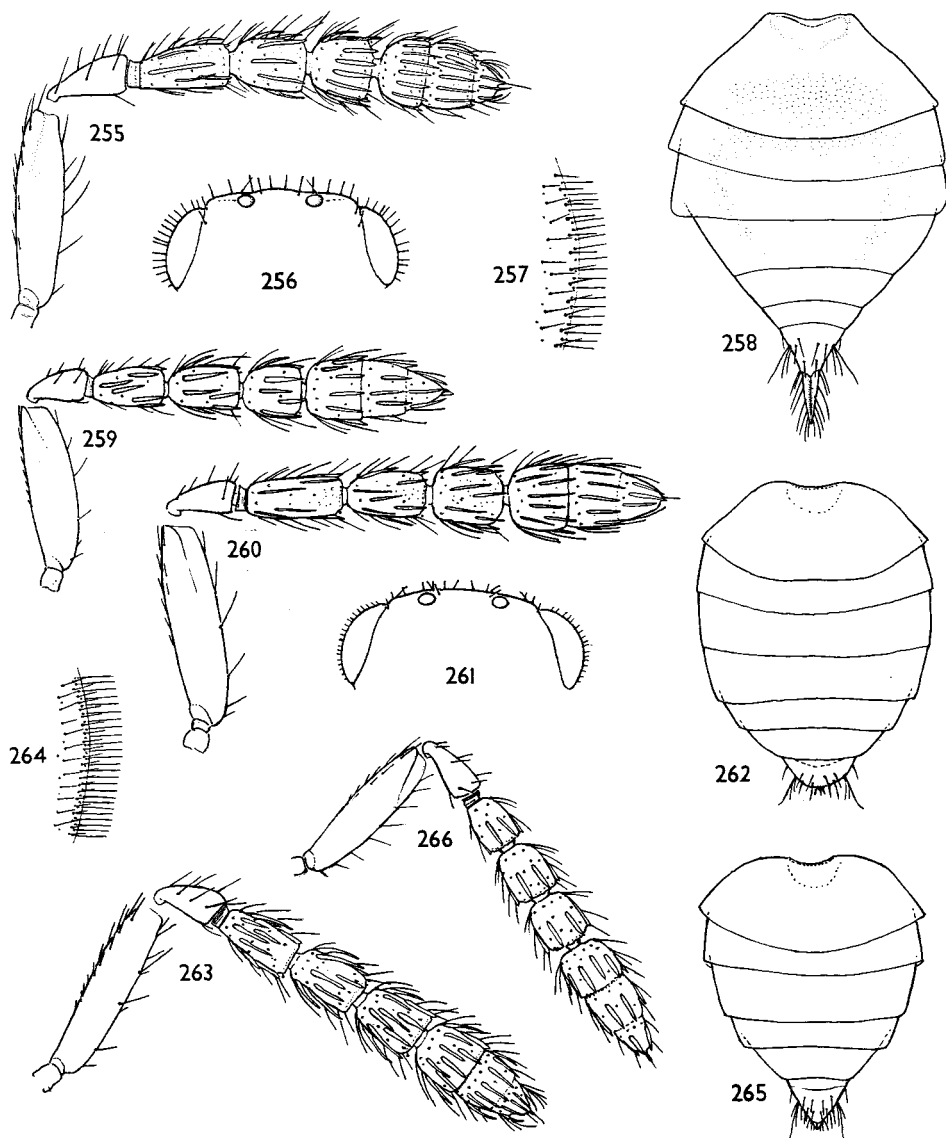
- pronotum, mesoscutum and scutellum rather more shiny, their sculpture rather more delicate. . . . . *temporalis* (p.247)
- 20 Antennal clava distinctly to much shorter than F2 plus F3, without a constriction between C1 and C2, obtuse or bluntly pointed (Figs 241, 243, 245). Gaster at least slightly, usually distinctly, longer than head plus thorax. . . . . 21
- *Eiher* antennal clava different (not or hardly shorter than F2 plus F3, or with a distinct constriction between C1 and C2); or gaster at most as long as head plus thorax. . . . . 23
- 21 Eyes larger, separated by 1.1-1.25 times their length; temples virtually nil (much as in *lyridice*, Fig. 269). Antennal scape mainly to wholly, and tibiae, yellow or yellowish-testaceous. Parasite of *Cis* on fungi. . . . . *macrops* (p.251)
- Eyes smaller, separated by 1.3-1.35 times their length; temples variable, 0.07-0.15 length of eyes. Antennal scape and/or tibiae sometimes more or less infusate. Parasites of Buprestidae, Scolytidae, and Cerambycidae. . . . . 22
- 22 Antenna (Fig. 243) with flagellum slightly stouter than pedicellus; funicular segments on average shorter, F1 2.0-2.7 times, F2 1.9-2.2 times, F3 1.6-2.0 times, as long as broad. . . . . *ulmi* (p.249)
- Antenna (Fig. 245) with flagellum hardly stouter than pedicellus; funicular segments on average longer, F1 2.5-3.4 times, F2 2.5-3.0 times, F3 2.0-2.3 times, as long as broad. . . . . *agrilacidus* (p.250)
- 23 Species with following combination of characters: antenna (Fig. 248) with F1 3.0-3.2 times as long as broad and 0.7-0.8 length of clava, the latter much shorter than F2 plus F3; flagellum proximally hardly stouter than the pedicellus; gaster at most twice as long as broad. (Temples short but distinct, about 0.15 length of eyes). . . . . *heeringi* (p.251)
- Antenna *either* with F1 relatively shorter; or with clava almost as long as F2 plus F3; or with flagellum proximally distinctly stouter than the pedicellus. Gaster sometimes more elongate. . . . . 24
- 24 Gaster about 2.3 times as long as broad, as long as head plus thorax. Antenna (Fig. 247) with funicle slender, hardly stouter than pedicellus; clava distinctly shorter than F2 plus F3, with a distinct constriction between C1 and C2. . . . . *heterus* (p.247)
- *Eiher* gaster at most twice as long as broad (and often shorter than head plus thorax); or antennal funicle very stout; or clava at least as long as F2 plus F3; or clava without a constriction between C1 and C2. . . . . 25
- 25 *Eiher* gaster at least 2.4 times as long as broad and distinctly longer than head plus thorax; or antennal flagellum (Fig. 249) very stout and segments of funicle with numerous sensilla arranged in 2-3 rows, clava with a strong constriction between C1 and C2 and slightly shorter than F2 plus F3. . . . . 26
- Gaster shorter than or at most as long as head plus thorax, at most twice as long as broad; antenna either with flagellum more slender or funicle with fewer sensilla, or clava with at most a weak constriction between C1 and C2. . . . . 28

- 26 Antenna (Fig. 249) with flagellum distinctly stouter than pedicellus; sensilla in 2 rows on each segment of funicle, sometimes 3 rows on some segments; clava slightly shorter than F2 plus F3. Head 2.3-2.4 times as broad as long, with temples extremely short (much as in *lyridice*, Fig. 269). Length 2.4-3.0 mm. .... *pachycerus* (p.252)
- Antennae (Figs 251, 253) with flagellum only slightly stouter than the pedicellus; sensilla less numerous or relatively sparse; clava as long as or a little longer than F2 plus F3. Head (Fig. 252) 2.1-2.25 times as broad as long with temples more distinct. Length 1.3-2.0 mm. .... 27
- 27 Antenna (Fig. 251) with sensilla of funicle sparse, in one (sometimes irregular) row on each segment; clava without a constriction between C1 and C2. Antennal scape mainly testaceous. .... *leptosoma* (p.253)
- Antenna (Fig. 253) with sensilla of funicle less sparse, in two partly overlapping rows on at least F1 and F2; clava with a distinct constriction between C1 and C2. Antennal scape black. .... *paululus* (p.254)
- 28 Species with following combination of characters: head hardly more than twice as broad as long, with temples distinct; submedian lines of scutellum 1.8-2.0 times as far apart as their distance from sublateral lines; costal cell of forewing narrow, 11-12.5 times as long as broad; antennal scape mainly yellow; propodeum shiny, its sculpture rather weak, sometimes partly smooth; gaster 1.7-2.0 times as long as broad. .... *theoi* (p.254)
- Not with above combination of characters. *Either* head more transverse with temples shorter; *or* submedian lines of scutellum less far apart; *or* costal cell of forewing broader; *or* antennal scape mainly to wholly black; *or* propodeum distinctly reticulate. .... 29
- 29 Antenna (Fig. 232) with scape as long as or slightly longer than an eye, in specimens with undistorted head reaching slightly above the vertex; clava acutely pointed, with spine 0.4-0.5 length of C3. Eyes smaller, separated by 1.6-1.75 their length. [Note: small *julis* may be mistaken for *ilithyia* if ratio of mouth to malar space has not been measured; see couplet 5].  
 .... *ilithyia* (p.235)
- *Either* antenna has scape at least very slightly shorter than an eye and not reaching above the vertex *and* the claval spine relatively shorter; *or* the eyes are larger, separated by about 1.35 times their length. (Eyes separated by 1.1-1.5 times their length). .... 30
- 30 Gaster at least twice as long as broad. Antenna (Fig. 241) with clava distinctly shorter than F2 plus F3, without a constriction between C1 and C2, these segments not or hardly longer than broad; scape at least mainly yellowish; setae of flagellum standing out only slightly. . *macrops* (p.251)
- *Either* gaster is less than twice as long as broad; *or* antennal clava is at least as long as F2 plus F3 *and* the scape is black; *or* (*lyridice*) flagellum has more outstanding setae and the clava has a distinct constriction between C1 and C2. .... 31
- 31 Eyes (Fig. 256) with longer, conspicuous pubescence, length of the setae 0.4-0.7 OD. Setae of vertex (Figs 257, 261) strong and long, their length





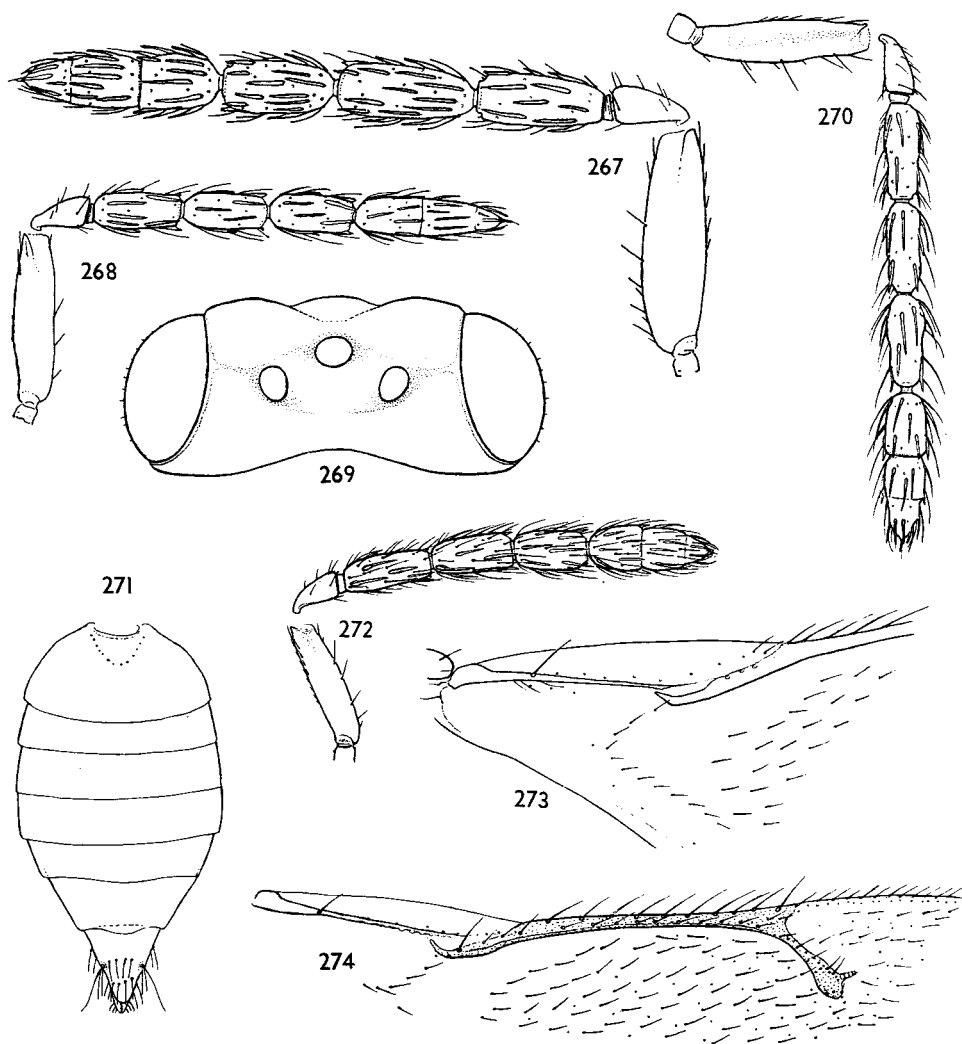
Figs 249-254 *Tetrastichus* species, females. 249, 250, *T. pachycerus* sp. n.; (249) antenna; (250) gaster. 251, *T. leptosoma* sp. n., antenna. 252, 253, *T. paululus* sp. n.; (252) head, dorsal; (253) antenna. 254, *T. theoi* sp. n., antenna.



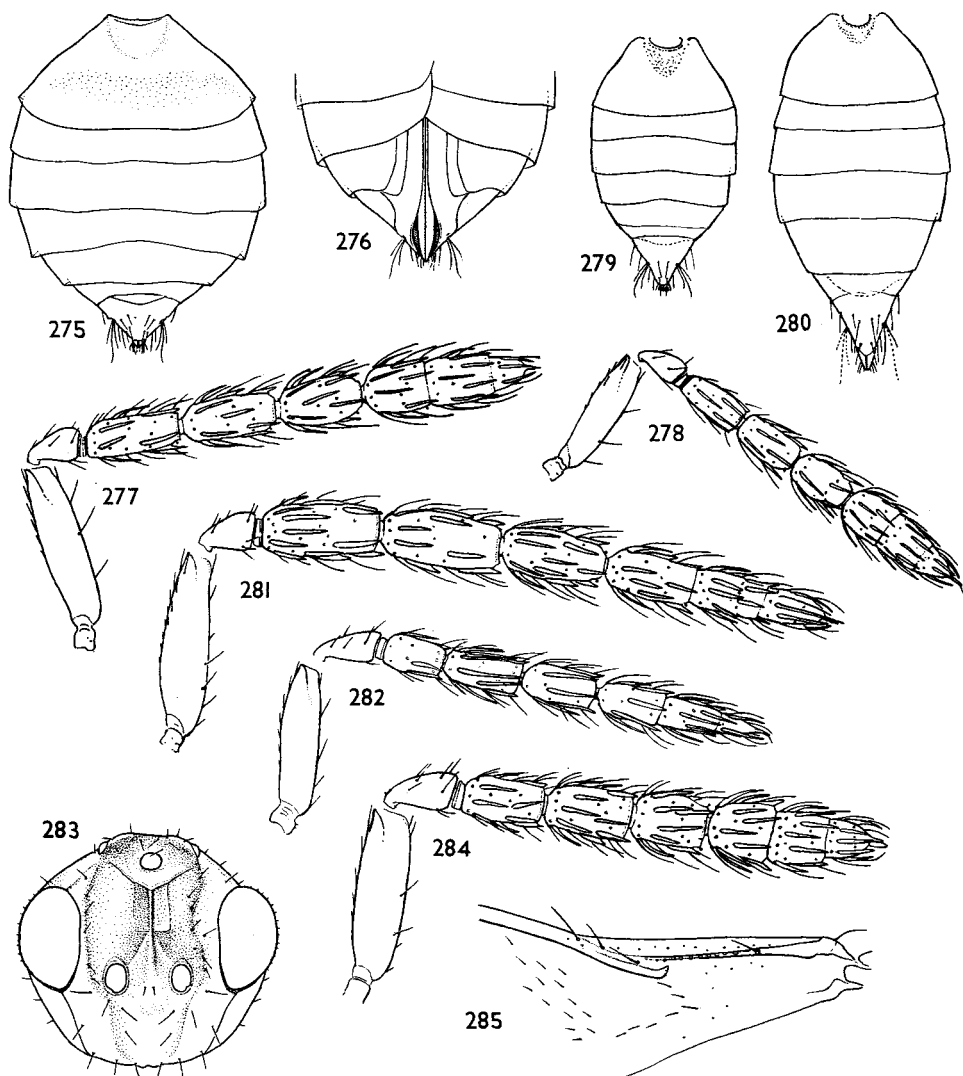
Figs 255-266 *Tetrastichus* species, females. 255-258, *T. murcia* (Walker); (255) antenna; (256) head, viewed from behind; (257) apical margin of forewing; (258) gaster. 259, *T. brachyopae* sp. n., antenna. 260-262, *T. atratulus* (Nees); (260) antenna; (261) head, viewed from behind; (262) gaster. 263-265, *T. dasyops* sp. n.; (263) antenna; (264) apical margin of forewing; (265) gaster. 266, *T. solvae* sp. n., antenna.

- 0.7-1.0 OD. Setae on hind margin of pronotum, and adnotaular setae (including the anterior ones) relatively long and suberect. . . . . 32
- Eyes with shorter, or very short and inconspicuous pubescence, length of the setae 0.2-0.35 OD. Setae of vertex usually shorter, their length at most 0.6 OD but usually less (Fig. 269). Setae on hind margin of pronotum, and adnotaular setae (especially the anterior ones) usually shorter, weaker and reclinate. . . . . 36
- 32 Antenna (Fig. 266) with pedicellus 1.35-1.5 times length of F1; funicle stout, funicular segments short, F1 and F2 1.1-1.25 times as long as broad. Mid lobe of mesoscutum without a median line, or with the line indicated only near the scutellum. . . . . *solvae* (p.266)
- Antenna with pedicellus not or only slightly longer than F1; funicle stout or slender; F1 1.5-2.5 times, F2 1.2-2.0 times, as long as broad. Mid lobe of mesoscutum with median line distinct over at least posterior 0.5, sometimes complete. . . . . 33
- 33 Gaster (Fig. 258) with ovipositor sheaths projecting distinctly, length of projecting part about equal to that of hind basitarsus; longest seta of each cercus 1.5-1.6 length of next longest. Submedian lines of scutellum nearer to sublateral lines than to each other. Setae of forewing, just beyond the speculum, suberect; cilia of apical margin (Fig. 257) with the setae which arise from the upper surface (*us*) relatively widely-spread. POL 1.5-1.6 OOL. . . . . *murcia* (p.261)
- Gaster with ovipositor sheaths not projecting, or only very slightly; if slightly (*brachyopae*) then longest seta of each cercus about twice length of next longest, submedian lines of scutellum about equidistant from each other and from sublateral lines, setae of forewing, just beyond speculum, more reclinate, cilia of apical margin (Fig. 264) with setae arising from upper surface closely-spaced, POL 1.9-2.3 OOL. . . . . 34
- 34 Submedian lines of scutellum equidistant from each other and from sublateral lines, or hardly nearer to the latter. Gaster with ovipositor sheaths projecting slightly. Antennal funicle (Fig. 259) rather stout, its segments relatively short, F1 1.5-1.7 times, F2 1.4-1.5 times, as long as broad. . . . . *brachyopae* (p.265)
- Submedian lines of scutellum slightly nearer to sublateral lines than to each other. Gaster with ovipositor sheaths not or hardly projecting beyond apex of last tergite. Antennal funicle less stout, funicular segments on average longer, F1 1.7-2.5 times, F2 1.2-2.0 times, as long as broad. . . . . 35
- 35 Antenna (Fig. 260) with pedicellus plus flagellum 1.15-1.35 times breadth of mesoscutum; F1 2.0-2.5 times, F2 1.6-2.0 times, as long as broad. Setae of eyes (Fig. 261) shorter, their length 0.25-0.4 OD. . . . . *atratus* (p.264)
- Antenna (Fig. 263) with pedicellus plus flagellum 1.0-1.05 breadth of mesoscutum; F1 1.7-2.0 times, F2 1.2-1.6 times, as long as broad. Setae of eyes longer, their length 0.45-0.55 OD. . . . . *dasyops* (p.263)
- 36 Setae of vertex longer and stronger, their length 0.6-0.8 OD. Gaster slightly shorter than or at most as long as thorax, less than twice as long as broad.

- Body with very weak bluish and bronze tints. Antennae with pedicellus slightly shorter than, or virtually as long as F1. . . . . 34
- Setae of vertex relatively shorter and finer; in case of doubt then *either* gaster slightly longer than thorax; *or* body bright blue to green; *or* antenna with pedicellus much shorter than F1 (sometimes two or more of these characters present simultaneously). . . . . 37
- 37 Antenna (Fig. 225) with scape virtually or just as long as an eye, reaching nearly to level of vertex, black; flagellum moderately stout; clava as long as F2 plus F3. . . . . *crioceridis* (p.256)
- Antennal scape at least slightly shorter than an eye, not reaching vertex, sometimes more or less testaceous or yellow; flagellum tending to be more slender; clava sometimes shorter than F2 plus F3. . . . . 38
- 38 Forewing with costal cell very narrow, 13-17 times as long as broad (much as in *clito*, Fig. 285). Antenna (Fig. 268) with claval spine about 0.5 length of C3; scape yellow. Body bright green to blue. . . . . *melasomae* (p.267)
- Forewing with costal cell broader. Antenna with claval spine relatively shorter; scape often black or partly infusate. Body sometimes dark blue or olive-greenish. . . . . 39
- 39 Antenna (Fig. 270) with pedicellus plus flagellum 1.25-1.4 times breadth of mesoscutum; setae of flagellum long and standing out at a greater angle; clava with a distinct constriction between C1 and C2, and somewhat shorter than F2 plus F3; scape more or less testaceous. Gaster long-ovate, 1.6-2.0 times as long as broad, usually slightly longer than thorax; last tergite usually as long as broad, occasionally slightly transverse. . . . . *lyridice* (p.255)
- Antennae (Figs 272, 277, 278) with pedicellus plus flagellum 1.1-1.25 times breadth of mesoscutum; setae of flagellum standing out less strongly and tending to be shorter; clava either with a very weak constriction between C1 and C2 or else at least as long as F2 plus F3; scape often black. Gaster subcircular to ovate, 1.2-1.9 times as long as broad, shorter than to slightly longer than thorax; last tergite usually at least very slightly broader than long. . . . . 40
- 40 Gaster (Fig. 280) virtually twice as long as broad, nearly or just as long as head plus thorax, strongly acute; last tergite as long as broad. Antenna with clava equal in length to F2 plus F3. Eyes small, separated by 1.5 times their length. . . . . *acutiusculus* (p.261)
- Gaster not more than 1.6 times as long as broad, not longer than thorax except in some *sinope* which has gaster only slightly longer than thorax, with last tergite at least very slightly transverse, antennal clava slightly longer than F2 plus F3. Eyes separated by 1.27-1.45 times their length. . . . . 41
- 41 Antennae (Figs 272, 277) with clava usually slightly shorter than, sometimes equal in length to, F2 plus F3; funicular segments normally decreasing in length, F1 2.2-2.6 times as long as broad and 1.4-1.7 times length of pedicellus, F3 1.6-2.2 times as long as broad. Gaster (Fig. 275) 1.2-1.5 times as long as broad, as long as or slightly shorter than the thorax. Tibiae



Figs 267-274 *Tetrastichus* species. 267, *T. sodalis* sp. n., ♀ antenna. 268, *T. melasomae* sp. n., ♀, antenna. 269-271, *T. hyridice* (Walker) ♀; (269) head, dorsal; (270) antenna; (271) gaster. 272-274, *T. miser* (Nees); (272) ♀ antenna; (273) forewing, proximal half; (274) ♂, forewing (from lectotype of *medianus* Ratzeburg).



**Figs 275-285** *Tetrastichus* species, females (except 283, male). 275, 276, *T. miser* (Nees); (275) gaster, dorsal; (276) gaster, ventral view. 277, *T. (?) leocrates* (Walker), antenna. 278, 279, *T. sinope* (Walker); (278) antenna; (279) gaster. 280, *T. acutiusculus* sp. n., gaster. 281, *T. decrescens* sp. n., antenna. 282, *T. pilemostomae* sp. n., antenna. 283-285, *T. clio* (Walker); (283) head, front view; (284) antenna; (285) forewing, proximal half.

sometimes testaceous though often more or less infusate medially, almost wholly black in dark specimens. Length 1.4-2.1 mm.

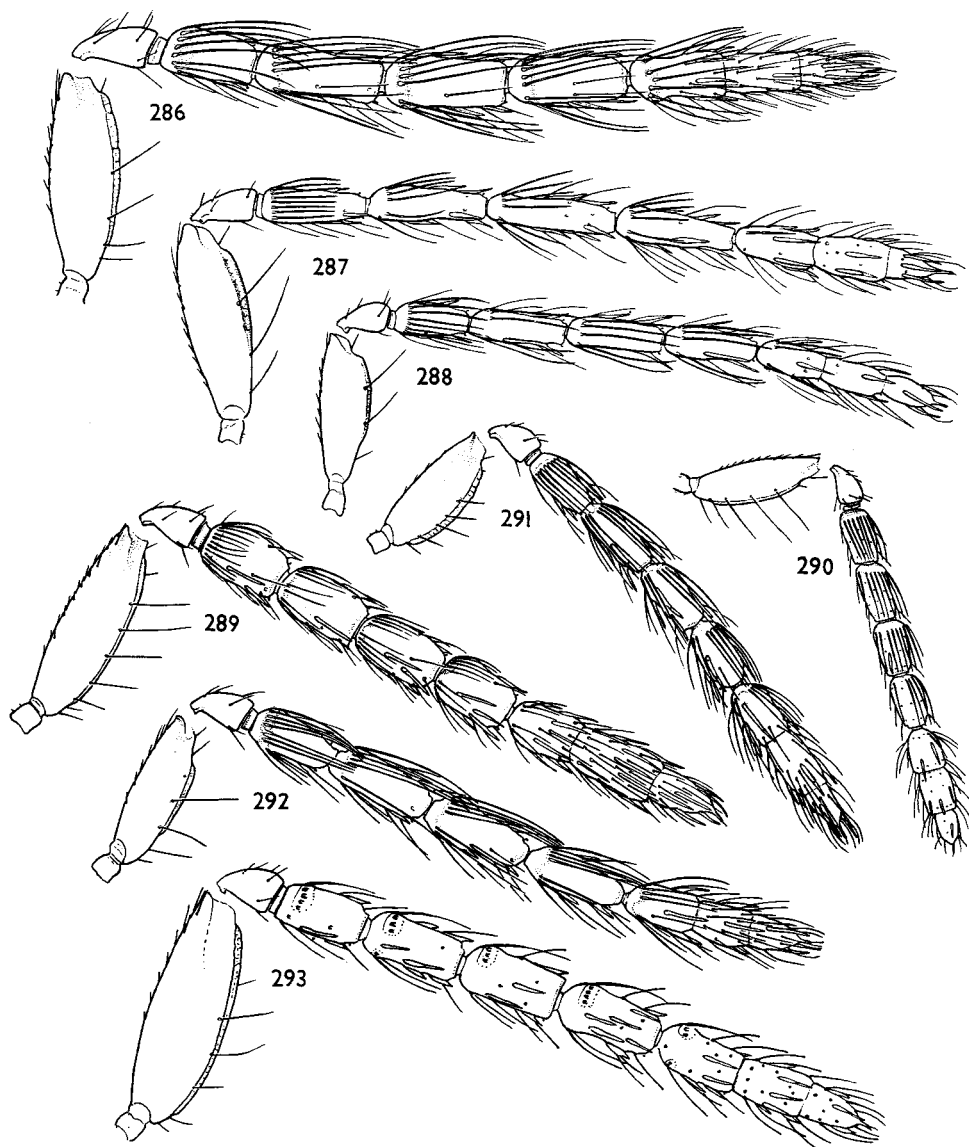
- ..... *miser* (p.257) (? and *leocrates* - p.259)
- Antenna (Fig. 278) with clava as long as F2 plus F3 plus one quarter to half of F1; funicular segments subequal in length, or F1 at most very slightly longer than F2; F1 1.6-2.0 times as long as broad and 1.15-1.3 times length of pedicellus, F3 1.3-1.7 times as long as broad. Gaster (Fig. 279) 1.6-1.9 times as long as broad, slightly longer than thorax. Legs black with at most knees, tips of tibiae, and bases of tarsi pale. Length 1.2-1.7 mm.  
..... *sinope* (p.260)
  - 42 Antennae (Fig. 281) with F1 much longer than pedicellus; flagellum proximally about 1.5 times as stout as pedicellus but tending to taper slightly distad; clava 3.8-4.8 times as long as broad with C1 distinctly longer than broad. Gaster 2.0-2.2 times as long as broad, as long as or slightly longer than head plus thorax, distinctly acute and sometimes slightly acuminate.  
..... *decreescens* (p.271)
  - Antenna with F1 not or hardly longer than pedicellus except in *melasomae* which has flagellum (Fig. 268) only slightly stouter than pedicellus; clava sometimes shorter. Gaster 1.2-2.0 times as long as broad, often hardly longer than thorax, relatively less acute. .... 43
  - 43 Antenna (Fig. 268) with F1 much longer than pedicellus; flagellum slender. Gaster 1.6-1.9 times as long as broad. .... *melasomae* (p.267)
  - Antennae (Figs 282, 284) with F1 not or hardly longer than pedicellus; flagellum sometimes rather stouter. Gaster 1.2-1.7 times as long as broad. .... 44
  - 44 Antenna (Fig. 282) with clava 4.0-4.7 times as long as broad, strongly acute, with C1 and C2 distinctly longer than broad. Forewing with costal cell 14-15 times as long as broad. .... *pilemastomae* (p.270)
  - Antenna (Fig. 284) with clava 3.1-3.6 times as long as broad, less acute, with C1 and C2 not or only slightly longer than broad. Forewing with costal cell 10-13 times as long as broad. .... 45
  - 45 Gaster as long as or slightly longer than thorax. Hosts: *Cassida* spp. (Col., Chrysomelidae). .... *clito* (p.267)
  - Gaster as long as head plus thorax, or slightly (up to 1.15 times) longer. Hosts: Coccinellidae spp. .... *epilachnae* (p.269)

#### Males

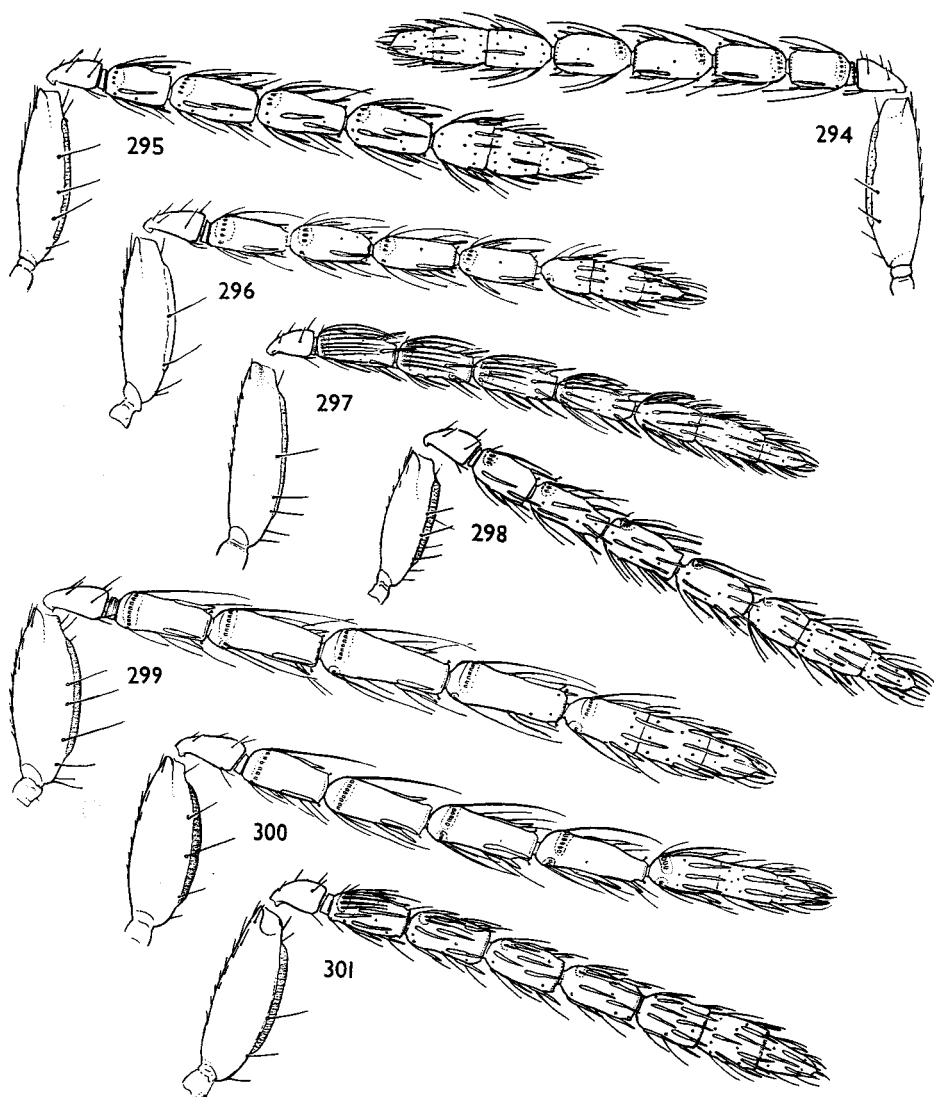
- 1 Antennae (Figs 287, 288, 290-294, 296-300): each funicular segment with an externo-dorsal, subbasal compact whorl of long dark setae [if whorls only partial and rudimentary, tibiae reddish-testaceous, see *crioceridis*]. ... 2
- Antennae (Figs 301-306): funicular segments without compact subbasal whorls of long dark setae. .... 21
- 2 Hind coxae, on their externo-dorsal surface, with sculpture coarser than elsewhere, generally rugulose, sometimes just more strongly reticulate, in

- that case the reticulation is raised. Frons most often without a median longitudinal carina but with a flat oblong or sublinear median area (as in Fig. 216). . . . . 3
- Hind coxae with very fine, hardly raised reticulation, without any rugulose sculpture. Frons with a median longitudinal carina as in Fig. 283. . . 27
- 3 Mouth about twice malar space (see Fig. 216). Mandibles large, with outer tooth falcate and very acute, widely separated from the two small inner teeth which are subacute. . . . . *halidayi* (p.232)
- Mouth at most 1.85 times malar space. Mandibles relatively smaller; middle tooth usually subobtuse, inner tooth obtuse or almost truncate. . . . . 4
- 4 Antennal scape (see Waterston, 1915, fig. 7a) with 10-12 very short setae on its front edge. . . . . *tachos* (p.244)
- Antennal scape with fewer (usually 4-6) moderately long to very long setae on its front edge. . . . . 5
- 5 Antennae (Figs 287, 288): ventral plaque only 0.55-0.7 length of scape, the latter at least slightly longer than an eye and reaching well above the vertex; length of setae on front edge of scape about equal to breadth of scape; pedicellus plus flagellum fully twice breadth of mesoscutum. Head with temples rather distinct, about 0.15 length of eyes in dorsal view; head only 2.1-2.25 times as broad as long. . . . . 6
- Antenna either with ventral plaque of scape relatively longer, or if not (*lyridice*, Fig. 292) then scape not longer than an eye and pedicellus plus flagellum at most 1.85 times breadth of mesoscutum; setae on front edge of scape often shorter; pedicellus plus flagellum usually 1.25-1.85 times breadth of mesoscutum, rarely nearly twice. Head usually with temples very short or extremely short, rarely 0.15 length of eyes; the head itself most often more transverse. . . . . 7
- 6 Antenna (Fig. 287): whorled dark setae of funicular segments not reaching the tips of the segments; length of longest setae on front edge of scape tending to be slightly greater than breadth of scape. Body length 1.6-2.2 mm. . . . . *legionarius* (p.245)
- Antenna (Fig. 288): whorled setae of funicular segments reaching level with the tips of the segments; length of longest setae on front edge of scape equal to breadth of scape. Body-length 1.2-1.6 mm. . . *temporalis* (p.247)
- 7 Mouth 1.7-1.85 times malar space. Antenna (Fig. 289): length of whorled dark setae of funicular segments about 0.5 length of the segments. . . . . *coeruleus* (p.238)
- Mouth at most 1.4 malar space. Antenna (except in sp.indet.1) with whorled dark setae of funicular segments from nearly as long as, to somewhat longer than, the segments themselves. . . . . 8
- 8 Antenna with whorled dark setae of F1 slightly shorter than the segment; those of F2 to F4 only about 0.5 as long as these segments. (Mouth 1.3 malar space). Antennal scape equal in length to eye. Tibiae infusate. . . . . sp.indet.1 (p.257)



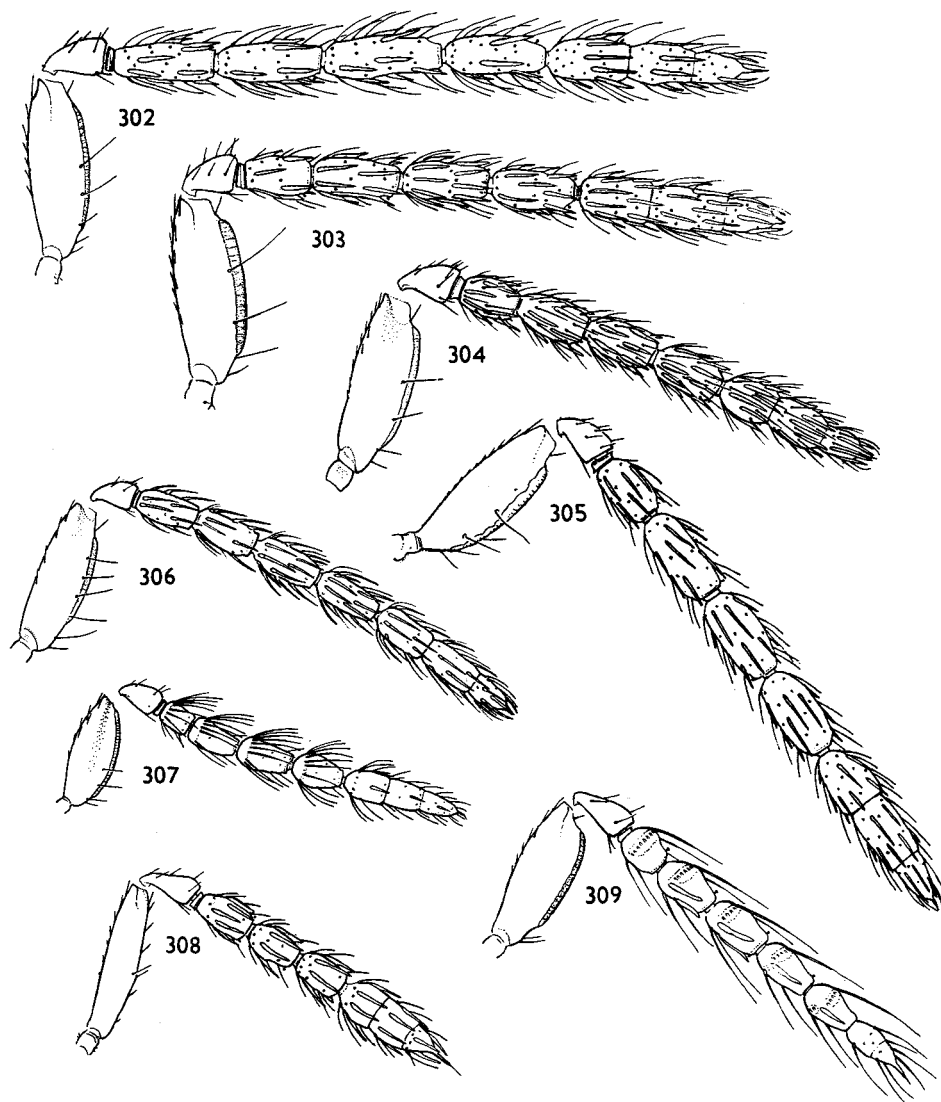


Figs 286-293 *Tetrastichus* species; antennae, males. 286, *T. halidayi* (Graham). 287, *T. legionarius* (Giraud). 288, *T. temporalis* (Graham). 289, *T. coeruleus* (Nees). 290, *T. julis* (Walker). 291, *T. ilithyia* (Walker). 292, *T. tyridice* (Walker). 293, *T. perkinsorum* sp. n.



Figs 294-301 *Tetrastichus* species; antennae, males. 294, *T. brachyopae* sp. n. 295, *T. dasyops* sp. n. 296, *T. atratulus* (Nees). 297, *T. miser* (Nees). 298, *T. sinope* (Walker). 299, *T. agriloidus* sp. n. 300, *T. heeringi* (Delucchi). 301, *T. crioceridis* Graham.

- Antennae with whorled dark setae of funicular segments from nearly as long, to somewhat longer, than the segments themselves. . . . . 9
- 9 Eyes with relatively long and conspicuous pubescence, length of the setae 0.4-0.6 OD. Length of some setae of vertex 0.8-1.0 OD. Body black with very weak bronze or bluish tints. . . . . 10
- Eyes with short or very short pubescence, length of the setae at most 0.25 OD. Length of longest setae of vertex at most 0.7 OD but usually less than this. Body sometimes with brighter metallic tints. . . . . 12
- 10 Antenna with pedicellus about 1.25 times as long as F1, the latter only 1.5 times as long as broad. . . . . *solvae* (p.266)
- Antennae with pedicellus about as long as F1 or even a little shorter; F1 1.4-1.8 times as long as broad. . . . . 11
- 11 Antenna with pedicellus plus flagellum about 1.25 times breadth of mesoscutum; funicular segments 2 to 4 at most 1.6 times as long as broad. Eyes with very long setae, length about 0.6 OD. . . . . *murcia* (p.261)
- Antenna (Fig. 295) with pedicellus plus flagellum 1.48-1.6 times breadth of mesoscutum; funicular segments 2 to 4 about twice as long as broad. Eyes with length of setae 0.45-0.55 OD. . . . . *dasyops* (p.263)
- 12 Antennae (Figs 290, 292) with length of longest setae on front edge of scape 1.1-1.5 times breadth of scape; C1 and C2 at most 1.7 times as long as broad. . . . . 13
- Antennae with length of longest setae on front edge of scape less than or hardly as great as breadth of scape; C1 and C2 often relatively longer. . . . . 14
- 13 Mouth about 1.4 times malar space. Ventral plaque of antennal scape (Fig. 290) about 0.7 length of scape. . . . . *julis* (p.235)
- Mouth hardly greater than malar space. Ventral plaque of antennal scape (Fig. 292) 0.50-0.55 length of scape. . . . . *lyridice* (p.255)
- 14 Eyes small, separated by 1.6-1.85 times their length. Antennal scape as long as, or somewhat longer than, an eye, reaching above level of vertex. . 15
- Eyes larger, separated by 1.35-1.5 times their length. Antennal scape either not quite as long as an eye, or if as long then not reaching above level of vertex. . . . . 16
- 15 Antenna (Fig. 293) with scape about 1.25 length of eye; the whorled dark setae of each funicular segment reach to level of tip of the segment; scape about 2.8 times as long as broad. Eyes separated by 1.85 times their length. . . . . *perkinsorum* (p.234)
- Antenna (Fig. 291) with scape about equal in length to an eye; the whorled setae of each funicular segment reach slightly beyond the tip of the segment; scape 2.5-2.7 times as long as broad. Eyes separated by 1.6-1.65 times their length. . . . . *ilithya* (p.235)
- 16 Length of longest setae of vertex 0.5-0.7 OD. Body black with weak bronze or bluish tints. . . . . 17



Figs 302-309 302-307, *Tetrastichus* species; antennae, males. 302, *T. brevicar* sp. n. 303, *T. helviscapus* sp. n. 304, *T. hylotomarum* (Bouché). 305, *T. coelarchus* sp. n. 306, *T. leocrates* (Walker). 307, *T. clito* (Walker). 308, 309, *Holcotetrastichus rhosaces* (Walker); (308) ♀, antenna; (309) ♂, antenna.

- Length of longest setae of vertex at most 0.25 OD. Body sometimes more brightly metallic. . . . . 18
- 17 Submedian lines of scutellum about equidistant from each other and from sublateral lines. Antenna (Fig. 294) with scape 0.83 length of eye, not quite reaching level of vertex; setae near front edge of scape relatively short; funicle slightly stouter than pedicellus. . . . . *brachyopae* (p.265)
- Submedian lines of scutellum slightly nearer to sublateral lines than to each other. Antenna (Fig. 296) with scape 0.9-0.97 length of eye, reaching level of vertex; setae near front edge of scape tending to be longer; funicle not stouter than pedicellus. . . . . *atratus* (p.264)
- 18 Antennae (Figs 297, 298): whorled setae of funicular segments at most just reaching the tips of these segments; scape 2.7-3.2 times as long as broad. . . . . 19
- Antennae (Figs 299, 300) with whorled setae of funicular segments reaching slightly beyond the tips of these segments; scape 2.4-2.8 times as long as broad. . . . . 20
- 19 Antenna (Fig. 297) with F1 not or hardly shorter than F2; clava with short spine. . . . . *miser* (p.257)
- Antenna (Fig. 298) with F1 distinctly shorter than F2; clava with long spine. . . . . *sinope* (p.260)
- 20 Body-length 1.8-2.1 mm. Antenna (Fig. 299) with length of longest seta on front edge of scape nearly equal to breadth of scape. . . . . *agrilodius* (p.250)
- Body-length 1.2-1.6 mm. Antenna (Fig. 300) with length of longest seta on front edge of scape somewhat less than breadth of scape. . . . . *heeringi* (p.251)
- 21 Antenna (Fig. 301) with setae on dorsal surface near bases of funicular segments 2 to 4 slightly longer than the others and close together, forming a rudimentary whorl which arises from a pale area on each segment. . . . . *crioceridis* (p.256)
- Antennal funicular segments without any trace of compact whorls of longer setae. . . . . 22
- 22 Antenna (Fig. 302): scape as long as an eye and reaching above vertex; funicular segments usually 2.5-3 times (rarely only twice) as long as broad, F1 as long as F2; pedicellus plus flagellum 1.5-1.6 times breadth of mesoscutum. Spur of mid tibia 0.5-0.6 length of basitarsus. . . . . *brevicalcar* (p.243)
- Antennal scape usually not reaching above vertex; or, if slightly so, then funicular segments at most 2.3 times as long as broad and F1 shorter than F2; pedicellus plus flagellum sometimes shorter relative to breadth of mesoscutum. Spur of mid tibia at least 0.7 length of basitarsus. . . . 23
- 23 Length of longest setae near front edge of antennal scape slightly greater than breadth of scape; scape as long as eye, reaching very slightly above the vertex, antenna black. . . . . sp.indet.2
- Length of longest setae near front edge of antennal scape at most equal to

- breadth of scape, and then scape slightly shorter than eye and not reaching vertex, flagellum partly pale. . . . . 24
- 24 Antenna (Fig. 303): length of longest seta near front margin of scape about equal to breadth of scape; flagellum yellowish-testaceous proximally, gradually darkening distad to the brown clava; F1 not longer than pedicellus, at most 1.6 times as long as broad. . . . . *helviscapus* (p.242)
- Antenna: length of longest seta near front margin of scape somewhat less than breadth of scape; flagellum fuscous to black; F1 usually at least slightly longer than pedicellus, 1.1-2.2 times as long as broad. . . . . 25
- 25 Antenna (Fig. 304) with F1 shorter than, or hardly as long as the pedicellus, 1.1-1.5 times as long as broad; pedicellus plus flagellum 1.35-1.45 times breadth of mesoscutum. Tibiae broadly infusate medially or mainly black. . . . . *hylotommarum* (p.237)
- Antennae with F1 at least very slightly longer than pedicellus, 1.8-2.2 times as long as broad; pedicellus plus flagellum 1.55-1.75 times breadth of mesoscutum. Tibiae variable in colour; testaceous, medially infusate, or mainly black. . . . . 26
- 26 Antenna (Fig. 305) with pedicellus plus flagellum 1.5-1.55 times breadth of mesoscutum; pedicellus slightly shorter than F1; clava about 4.5 times as long as broad, with C1 relatively shorter, about 1.7 times as long as broad. . . . . *coelarchus* (p.240)
- Antenna (Fig. 306) with pedicellus plus flagellum 1.7-1.75 times breadth of mesoscutum; pedicellus much shorter than F1; clava 4.7-5.3 times as long as broad, with C1 1.8-2.0 times as long as broad. . . . . *leocrates* (p.259)
- 27 Antenna (Fig. 307) with ventral plaque 0.65-0.75 length of scape; pedicellus 1.6-1.7 times as long as broad. Hosts: *Cassida* spp. . . . . *clito* (p.267)
- Antenna with ventral plaque 0.5-0.58 length of scape; pedicellus 1.8-1.9 times as long as broad. Hosts: Coccinellidae. . . . . *epilachnae* (p.269)

## SPECIES SOLA

*Tetrastichus leionotus* sp.n.

(Fig. 215)

♀. Head slightly broader than thorax, 2.4 times as broad as long; temples 0.08 length of eyes; POL about twice OOL, OOL hardly greater than OD. Eyes 1.18 times as long as broad, rather thickly pilose with setae about 0.2 OD, separated by 1.25 times their length. Malar space 0.66 length of eye, sulcus nearly straight. Mouth slightly greater than malar space. Head shiny, with weak engraved reticulation. Antenna (Fig. 215) with scape nearly as long as eye, reaching median ocellus; pedicellus plus flagellum 1.35 times breadth of mesoscutum; pedicellus about 2.5 times as long as broad, hardly shorter than F1; funicle proximally slightly stouter than pedicellus, hardly thickening distad; F1 twice as long as broad and slightly longer than F2 which is about 1.85 times as long as broad, F3 1.65 times as long as broad; clava 3.3 times as long as broad, somewhat longer than F2 plus F3, acute, with C1 quadrate, C2 hardly longer

than broad, C3 shorter, spine 0.3 length of C3; sensilla sparse, uniseriate. Thorax 1.5 times as long as broad, convex dorsally. Mid lobe of mesoscutum hardly broader than long, polished, with obsolescent sculpture; median line traceable only near scutellum; 4 reclinate adnotaular setae on each side. Scutellum hardly broader than long, scarcely less shiny than mesoscutum; submedian lines slightly nearer to sublateral lines than to each other, enclosed space 2.3 times as long as broad. Propodeum 1.3 times as long as dorsellum, slightly shiny, with moderately fine reticulation; median carina thin and sharp, expanding posteriorly; spiracles rather small, about 0.6 their diameter from metanotum; callus with 2 setae outside spiracle and 3 farther back. Legs rather slender; hind femora 4 times as long as broad; spur of mid tibia 0.5 length of basitarsus. Forewing twice as long as broad; costal cell 15 times as long as broad; SM with 1 dorsal seta; M 3 times length of ST, its front edge with 12-13 setae; PM absent; speculum very narrow, hardly extended below M; wing beyond it rather thickly pilose; cilia 0.28 length of ST. Hindwing obtuse, cilia 0.25 breadth of wing. Gaster ovate, slightly acute, slightly longer than thorax, 1.8 times as long as broad; last tergite about 1.5 times as broad as long; cercal setae pale, the longest about 1.7 times length of next longest, slightly kinked; ovipositor sheaths just reach apex of last tergite; surface of gaster shiny, with some obsolescent alutaceous sculpture in places.

Body black with weak metallic gloss. Antennal scape and pedicellus testaceous, flagellum brownish. Coxae, and femora except tips narrowly, black; trochanters fuscous; tips of femora, tibiae, and tarsi, testaceous, fourth segment of tarsi brown. Tegulae black. Wings hyaline, venation testaceous. Length 1.3 mm.

♂. Unknown.

MATERIAL EXAMINED. 1 ♀. Holotype ♀, **France**: Cantal, Lac Crégut, 1 km north of La Tuilière, 31.vii.1973 (Graham) (BMNH).

HOSTS. Unknown.

COMMENTS. This species is distinguished from all other European species by the characters given in the key to females.

#### SPECIES SOLA

*Tetrastichus halidayi* (Graham)  
(Figs 216-218, 376)

*Aprostocetus halidayi* Graham, 1961a: 5-8. Holotype ♀, Ireland: unlocalized (Haliday) (UM) [examined].

*Tetrastichus halidayi* (Graham) Domenichini, 1966a: 94, 1966b: 35.

For description of both sexes, see Graham (1961a). The species should be recognizable by the large mandibles (Fig. 218) and broad mouth (Fig. 216), combined with the other features mentioned in the keys to females and males. Hypopygium of ♀ (Fig. 376) strongly transverse; lateral lobes broad, median lobe longer than broad, obtuse apically.

MATERIAL EXAMINED. 7 ♂, 19 ♀. **Czechoslovakia, Germany, Great Britain, Ireland, Sweden, Norway.**

HOSTS. Reared in Czechoslovakia from *Agropus ahrensi* Germar (Col., Chrysomelidae) (P. Starý) (BMNH).

COMMENTS. Another species which may be related to *halidayi* is *hispidivertex* Girault, according to Bouček (1988: 693).

### THE *SETIFER*-GROUP

Very similar to *miser*-group, but the female differs in having smaller eyes, separated by 1.6-1.85 times their length; antennal clava distinctly, sometimes strongly, acute.

#### *Tetrastichus setifer* Thomson

(Fig. 219)

*Tetrastichus setifer* Thomson, 1878: 283. Lectotype ♀, Sweden: Lindholmen (Thomson) (ZIL), designated by Graham (1961b: 39) [examined].

*Aprostocetus setifer* (Thomson) Graham, 1961b: 39.

*Tetrastichus setifer* Thomson; Domenichini, 1966a: 91, 1966b: 49.

♀. Head very slightly broader than mesoscutum, 2.5-2.6 times as broad as long; temples about 0.1 length of eyes; POL 1.8-2.0 OOL, OOL 1.3-1.5 OD. Malar sulcus very weakly sinuate. Mouth 1.2-1.4 malar space. Eyes separated by 1.8-1.83 times their length. Antenna (Fig. 219) with scape virtually as long as an eye, reaching level of vertex; pedicellus plus flagellum 1.2 times breadth of mesoscutum; pedicellus somewhat shorter than F1, 1.7-1.9 times as long as broad; funicle distinctly stouter than pedicellus, virtually filiform, its segments subequal in length or decreasing a little, F1 1.8-1.9 times, F2 1.6-1.8 times, F3 1.3-1.5 times as long as broad; clava not broader than funicle, about 4 times as long as broad, slightly to very distinctly longer than F2 plus F3, acute, with C1 and C2 subequal in length, each hardly longer than broad, C3 a little longer; a distinct constriction between C1 and C2; claval spine slender, tapering slightly, about 0.5 length of C3, apical seta somewhat shorter than spine; sensilla numerous, in two irregular rows on each segment. Thorax about 1.4 times as long as broad, moderately arched. Mid lobe of mesoscutum as broad as or a little broader than long, moderately convex, with very fine superficial reticulation having most areoles less than or at most twice as long as broad (but longer on front part); median line distinct, quite strong posteriorly; 3-4 rather weak adnotaular setae on each side. Scutellum hardly broader than long, rather weakly convex in profile, sculptured like mesoscutum but more finely at sides; submedian lines usually diverging slightly caudad, equidistant from each other and from sublateral lines, enclosed space 2.6-2.8 times as long as broad; setae rather weak, their length slightly less than distance between submedian lines. Propodeum medially about twice as long as dorsellum; reticulation moderately fine, hardly raised, plus a few fine irregular wrinkles; median carina strong, raised, moderately broad anteriorly, broader posteriorly; plicae strong, sharp, nearly reaching spiracles, which are moderate-sized, their length about 0.25 length of propodeum at their level; callus with 5-6 setae. Legs of medium length and thickness; hind femora 4.5-5 times as long as broad; tibiae rather slender.



Forewing about 2.2 times as long as M, 9-10 times as long as broad; M not unusually thick, 3.5-3.7 times length of ST, its front edge with 14-16 setae; speculum small, hardly extended below M, wing beyond it somewhat sparsely pilose but more thickly distad; cilia 0.25-0.33 length of ST. Hindwing obtuse or rounded, cilia about 0.2 breadth of wing. Gaster as long as, or slightly longer than thorax, tending to be slightly broader than thorax, bluntly pointed, 1.3-1.7 times as long as broad; tergites strongly transverse, last tergite broader than long; longest seta of each cercus 1.3 length of next longest; tip of ovipositor sheaths not quite reaching apex of last tergite; tip of hypopygium slightly beyond middle of gaster.

Body with moderately strong deep blue tint, in parts sometimes tending towards greenish-blue. Antennae black, scape sometimes reddish at base, pedicellus sometimes reddish at tip. Coxae, trochanters, and femora mainly, coloured like body; tips of femora reddish, fore tibiae reddish, mid and hind tibiae obscurely reddish to fuscous with bases and tips reddish, fore tarsi fuscous, mid and hind tarsi reddish at base gradually darkening to fuscous at tips, or wholly fuscous. Wings subhyaline, venation brown to fuscous. Length 1.8-2.6 mm.

♂. Unknown.

MATERIAL EXAMINED. 4 ♀. **Czechoslovakia:** 1 ♀, Slovensky Raj, Čingov, 27.vii.1965 (Bouček) (BMNH). **France:** 1 ♀, Meuse, Deuxnouds, 6.vii.1985 (Gijswijt) (MJG). **Jugoslavia:** 1 ♀, Crna Gora, Žabljak, between 25.vi. and 7.vii.1958 (Bouček) (BMNH). **Sweden:** 1 ♀, Skåne, Lindholmen (lectotype) (ZIL).

HOSTS. Unknown.

COMMENTS. The ♀ of *setifer* is distinguished from those of other European species by its characteristic antennae.

*Tetrastichus perkinsorum* sp.n.

(Figs 220, 293)

♀. Differs from that of *julis* (Walker) as follows. Antenna (Fig. 220) with scape rather longer, 1.15 length of eye, reaching more distinctly above vertex; pedicellus plus flagellum only 1.6 times breadth of mesoscutum; funicular segments shorter, F1 1.6 times, F2 1.6 times, F3 1.45 times as long as broad; clava 3.6 times as long as broad. Eyes rather farther apart, separated by 1.85 times their length. Malar space 0.88 length of eye. Veins M and ST thicker. Gaster slightly shorter than thorax, 1.3 times as long as broad. All tibiae reddish-testaceous. Length 2.0 mm.

♂. Differs from that of *julis* as follows. Eyes slightly farther apart, separated by 1.85 times their length. Malar space 0.83 length of eye. Antenna (Fig. 293) with scape 1.25 length of eye, reaching well above vertex, with longest seta near front edge shorter than breadth of scape; pedicellus plus flagellum 1.55 times breadth of mesoscutum; clava 5.2 times as long as broad.

MATERIAL EXAMINED. 1 ♂, 1 ♀. Holotype ♀, **Sweden:** Skåne, Höör district, 8.vi.1938 (D.M.S. & J.F. Perkins) (BMNH).

Paratype. **Sweden:** 1 ♂, same data as holotype (BMNH).

HOSTS. Unknown.

*Tetrastichus ilithyia* (Walker)  
(Figs 232, 291)

*Cirrospilus Ilithyia* Walker, 1839b: 355. Lectotype ♀, Great Britain: Scotland (BMNH), designated by Graham (1961b: 38) [examined].

[*Cirrospilus Idithyia* Walker, 1839a: 332. Lapsus.]

*Tetrastichus ilithyia* (Walker) 1846: 74; Domenichini, 1966a: 90, 1966b: 36.

*Aprostocetus ilithyia* (Walker) Graham, 1961b: 38.

♀. Differs from that of *julis* as follows. Mouth only 1.1-1.15 times malar space. Antenna (Fig. 232): clava with a deeper constriction between C1 and C2. Size on average less, 1.5-1.7 mm.

♂. Differs from that of *julis* as follows. Mouth hardly greater than malar space. Antenna (Fig. 291) with scape only as long as an eye, setae near its front edge at least slightly shorter than breadth of scape; clava more elongate, 4.5-5.3 times as long as broad, with C1 and C2 each 1.7-2.0 times as long as broad. Length 1.1-1.35 mm.

MATERIAL EXAMINED. 9 ♂, 15 ♀. **Czechoslovakia, Germany, Great Britain, Ireland.**

HOSTS. Unknown.

*Tetrastichus julis* (Walker)  
(Figs 221, 222, 290, 381)

*Cirrospilus Julis* Walker, 1839b: 354. Lectotype ♂, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 38) [examined].

[*Cirrospilus Tulis* Walker, 1839a: 333. Lapsus.]

*Tetrastichus Maderae* Walker, 1872: 128. Lectotype ♀, Portugal: Porto Santo (Wollaston), designated by Graham, 1961b: 40 (BMNH) [examined]. *Syn.n.*

*Aprostocetus julis* (Walker) Graham, 1961b: 38.

? *Tetrastichus* sp., Hodson, 1929: 5-14; Knechtel & Manolache, 1936: 186-208.

[*Tetrastichus cassidarum* (Ratzeburg) Manolache et al., 1936: 477-500; Domenichini, 1966a: 89, 1966b: 22. Misidentifications.]

*Tetrastichus julis* (Walker) Domenichini, 1966a: 90, 1966b: 36; Graham, 1987: 10.

I have examined females of *julis* reared in Romania by Manolache, from *Cassida nebulosa*, and determined as *T. cassidarum* Ratzeburg. However, I consider the latter to have been a different species (see *clito*).

The syntypes of *Tetrastichus maderae* Walker appear to differ from European *julis* only in having a rather broader flange on the posterior border of the scutellum (Fig. 222) but this seems to be within the range of variation of *julis*.

♀. Head slightly broader than mesoscutum, about 2.5 times as broad as long, with temples 0.12-0.14 length of eyes; POL 1.5-1.7 OOL, OOL 1.6-1.7 OD. Eyes smaller than in *miser*, separated by 1.6-1.65 their length. Malar space about 0.7 length of eye. Mouth 1.4-1.5 malar space. Mandibles slightly larger than in

*miser*. Antenna (Fig. 221) with scape slightly longer than eye, reaching slightly above vertex; pedicellus plus flagellum 1.4-1.5 times breadth of mesoscutum; flagellum filiform, distinctly stouter than pedicellus; F1 2.0-2.5 times, F2 1.9-2.0 times, F3 1.6-2.15 times as long as broad; clava 3.7-4.0 times as long as broad, acute, with a relatively weak constriction between C1 and C2, spine 0.25-0.33 length of C3; setae of flagellum standing out rather more strongly than in *miser*. Thorax 1.5-1.57 times as long as broad. Mid lobe of mesoscutum with 3-5 adnotaular setae on each side. Scutellum (Fig. 222) hardly broader than long. Forewing with costal cell 9.0-10.5 times as long as broad; M rather thick, or slightly thickened, 3.2-3.8 times length of ST, usually about as long as costal cell, occasionally a little longer. Gaster ovate, more or less acute but not acuminate, as long as or very slightly longer than thorax, as broad as or broader than thorax, 1.2-1.6 times as long as broad; last tergite slightly to somewhat broader than long; tips of ovipositor sheaths just reaching apex of last tergite, sometimes not quite reaching it. Hypopygium (Fig. 381) transverse; lateral lobes moderately broad; median lobe shorter than lateral lobes, broader than long, rounded. Other features much as in *miser*.

Body dark blue to dark green; mid and hind tibiae mainly to entirely fuscous or black, at most their bases and tips narrowly testaceous; tarsi often brown or fuscous except basally. Wing-venation brown to blackish. Length 1.5-2.2 mm.

♂. Differs as follows. POL 1.6-1.85 OOL. Eyes separated by 1.6-1.75 their length. Malar space 0.72-0.78 length of eye. Antenna (Fig. 290) with scape 1.07-1.2 length of eye, nearly or just reaching vertex, 3.3-3.6 times as long as broad, setae near front edge 1.1-1.5 breadth of scape; pedicellus plus flagellum 1.6-1.7 times breadth of mesoscutum; pedicellus at least a little shorter than F1, 1.6-2.2 times as long as broad; flagellum slightly stouter than pedicellus, filiform or nearly so, with F1 to F3 subequal in length, each 1.9-2.2 times as long as broad, F4 tending to be a little shorter, 1.7-1.9 times as long as broad; clava nearly or quite as long as F3 plus F4, 3.7-3.9 times as long as broad, pointed, its segments decreasing slightly in length, C1 and C2 only slightly longer than broad; funicular segments and C1 each with a compact subbasal whorl of dark setae which reach hardly beyond the tips of the segments.

**MATERIAL EXAMINED.** 17 ♂, 41 ♀. France, Germany, Great Britain, Poland, Portugal (Madeira), Romania, Sweden.

**HOSTS.** *Lema* (*Oulema*) species, including *melanopus* (L.) and *lichenis* Voet (Col., Chrysomelidae). A gregarious, endophagous parasite of the host larvae, with two or perhaps three generations per annum (Hodson, 1929).

**COMMENTS.** The name *Lema* (*Oulema*) *melanopus* (L.) has been applied to the species found in Madeira, which might have been the host of *Tetrastichus maderae*, here considered a form of *julis*. Berti has shown (1989: 47-56) that the Madeiran species recorded as *melanopus* is really *duftschmidti* (Redtenbacher) which is therefore another possible host of *julis*.

THE *HYLOTOMARUM*-GROUP (*Ennetoma* Dahlbom, 1857, *Tetrastichus* subgen. *Tenthredophagus* Kostjukov, 1977).

Differs from *miser*-group in the structure of the female gaster; the ovipositor sheaths not reaching the apex of the last tergite, cerci situated ventrally.

***Tetrastichus hylotomarus* (Bouché)**

(Figs 231, 304, 377)

*Eulophus Hylotomarus* Bouché, 1834: 211, pl. 9, figs. 34-40. Syntypes, Germany: ex *Hylotoma rosae* (destroyed). NEOTYPE ♀, Czechoslovakia: Bohemia, Hradec Králové, ix. 1947, ex *Arge rosae* (Bouček) (BMNH), here designated [examined].

*Eulophus hylotomarus* Bouché; Ratzeburg, 1844: 168.

[*Tetrastichus atrocoeruleus* (Nees) Thomson, 1878: 283; Kurdjumov, 1913: 254; Servadei, 1934: 207; Erdős, 1954: 362, 1956: 390, 1971: 220. Misidentifications.]

*Aprostocetus hylotomarus* (Bouché) Graham, 1961b: 40.

*Tetrastichus hylotomarus* (Bouché) Domenichini, 1966a: 88, 1966b: 35; Kostjukov, 1978: 436.

Bouché's description agrees well with the present species, though amongst his account of the male he stated that the maxillary palpi were 4-segmented (and are so shown in his figure 37). As the maxillary palpi of Tetrastichinae have only one segment, he must have accidentally figured the palpi of some other insect. Ratzeburg (1844: 168) gave a redescription of *hylotomarus* which suggests that he may have seen Bouché's material.

♀. Head as broad as or slightly broader than mesoscutum, 2.3-2.5 times as broad as long; temples 0.15-0.2 length of eye; POL 1.6-1.9 OOL, OOL 1.2-1.5 OD. Eyes separated by about 1.5 times their length. Malar space 0.7 length of eye. Mouth slightly greater than malar space. Antenna (Fig. 231) with scape virtually as long as an eye, reaching to middle of median ocellus, or nearly to vertex; pedicellus plus flagellum about equal to breadth of mesoscutum; pedicellus 1.75-2.0 times as long as broad; funicle proximally distinctly stouter than pedicellus, hardly thickening distad; funicular segments subequal, or decreasing very slightly, in length, F1 as long as or slightly longer than pedicellus and 1.5-2.0 times as long as broad, F2 1.5-1.7 times, F3 1.0-1.45 times, as long as broad; clava slightly broader than F3, about as long as or slightly longer than F2 plus F3, 2.0-2.9 times as long as broad. Mid lobe of mesoscutum as broad as or slightly broader than long; median line very distinct, except sometimes anteriorly; 4-6 setae on each side. Scutellum 1.15-1.2 times as broad as long; submedian lines somewhat nearer to sublateral lines than to each other, enclosed space 2.1-2.8 times as long as broad. Propodeum medially 1.3-1.5 times length of dorsellum. Legs rather short, of medium thickness; spur of mid tibia about 0.75 length of basitarsus. Forewing with costal cell 9-12.5 times as long as broad; SM usually with 1 dorsal seta before the middle, occasionally 2 setae placed rather close together; cilia 0.2-0.35 length of ST. Hindwing obtuse, cilia 0.15-0.2 breadth of wing. Gaster subcircular to short oval, slightly longer and distinctly broader than thorax; last tergite very short, distinctly to much broader than long, tip of hypopygium at 0.5-0.55 length of gaster. Hypopygium (Fig. 377) transverse; lateral lobes broad; median lobe shorter, narrower, rounded.

Body bright bluish-green, through blue-green to blue, occasionally

violet-tinged in places. Antennae black. Coxae, and femora mainly, coloured like body; tibiae broadly infusate medially, or mainly fuscous to black with bases and tips testaceous; tarsi testaceous proximally, gradually darkening to fuscous at tips. Wings coloured as in *miser*. Length 1.1-2.0 mm.

♂. Differs as follows. Antenna (Fig. 304) with scape 0.9-1.0 length of eye, reaching vertex or a little above it, ventral plaque 0.7-0.75 length of scape; pedicellus plus flagellum 1.35-1.45 breadth of mesoscutum; pedicellus 1.5-1.6 times as long as broad, at least very slightly longer than F1; funicle filiform, slightly stouter than pedicellus, with F1 distinctly shorter than F2 and 1.1-1.5 times as long as broad, following segments subequal in length or F2 tending to be a little shorter, each 1.8-2.0 times as long as broad; clava not broader than funicle, 3.7-4 times as long as broad, with C1 and C2 subequal in length, each not or only slightly longer than broad, C3 shorter, spine about 0.3 length of C3; flagellum without compact whorls of long setae. Gaster elliptic, about as long as but slightly narrower than thorax.

MATERIAL EXAMINED. 4 ♂, many ♀. Bulgaria, Czechoslovakia, France, Germany, Great Britain, Hungary, Netherlands, Sweden, USSR.

HOSTS. *Arge ochropus* (Gmelin in L.), *A. pagana* (Panzer), *A. rosae* (L.) [records from the latter may refer to *ochropus*] (Hym., Argidae); *Athalia cordata* Lep., *Cladius pectinicornis* (Geoffroy in Fourcroy) (Hym., Tenthredinidae), parasitising the host larvae and pupae.

COMMENTS. The courtship behaviour of *hylotomarum* is mentioned by van den Assem, Gijswijt & Nübel (1982: 212).

***Tetrastichus coeruleus* (Nees), comb.n.**

(Figs 223, 224, 289, 378)

*Eulophus coeruleus* Nees, 1834: 174. Syntypes ♀, Germany: near Sickershausen (Nees), in part destroyed. Lectotype ♀ (UM), designated by Graham (1961b: 39-40) [examined].

*Tetrastichus asparagi* Crawford, 1909: 150. Syntypes ♀, USA: Massachusetts, Amherst (H.T. Fernald) (USNM) [not examined]. [Synonymised with *coeruleus* by Graham, 1961b: 39.]

*Tetrastichus asparagi* Crawford; Johnston, 1915: 303-313; Burks, 1943: 532; Peck, 1963: 123-124; Graham, 1983: 275-277; Burks in Krombein et al., 1979: 991.

*Aprostocetus coeruleus* (Nees) Graham, 1961b: 39-40.

A redescription of the ♀ is given because those published are inadequate for recognizing the species; identification has to some extent been based on the host. The ♂ has not been fully described, indeed some authors have doubted its existence.

♀. Head broader than mesoscutum, 2.55-2.7 times as broad as long; temples about 0.1 length of eyes; POL 1.3-1.55 OOL, OOL 1.75-2.0 OD. Eyes separated by 1.5-1.6 times their length. Malar space 0.67-0.75 length of eye. Mouth 1.6-1.8 malar space. Mandibles relatively large, approaching the form seen in *halidayi* (Fig. 218), with the two outer teeth somewhat approximated, both acute. Antenna (Fig. 223) with scape virtually or just as long as eye, nearly or just reaching vertex; pedicellus plus flagellum 1.1-1.2 times breadth of mesoscutum;

pedicellus somewhat shorter than F1, 1.9-2.0 times as long as broad; funicle proximally distinctly stouter than pedicellus, thickening very slightly distad, its segments decreasing slightly in length, F1 1.9-2.0 times, F2 1.4-1.7 times, F3 1.2-1.5 times as long as broad; clava hardly broader than F3, as long as or slightly longer than F2 plus F3, 2.7-3.1 times as long as broad. Thorax much as in *hylotomarus* but mid lobe of mesoscutum with 3-5 adnotaular setae on each side; submedian lines of scutellum hardly nearer to sublateral lines than to each other; propodeum medially 1.7-2.0 times length of dorsellum. Forewing: SM with 1 dorsal seta. Gaster subcircular to ovate, 1.1-1.5 (-1.7) times as long as broad, hardly longer than thorax, usually somewhat broader than thorax, its apex forming a right angle or slightly obtuse angle; last tergite very small, much broader than long; tips of ovipositor sheaths not reaching apex of last tergite (Fig. 224). Hypopygium (Fig. 378) transverse; lateral lobes broad; median lobe short, broad, almost truncate.

Body with strong metallic tints varying from blue-green through blue to violet-blue and violet. Antennae blackish. Coxae coloured like body; trochanters partly to mainly blackish; femora black with tips testaceous to reddish (hind femora less broadly); tibiae yellowish to reddish; tarsi yellowish with pretarsi brown or, in dark forms, the tarsi becoming gradually darker distad fore tarsi sometimes wholly brown. Wings hyaline; venation testaceous to dark brown, base of ST tending to be paler. Length 1.6-2.3 mm.

♂. Differs as follows. Mouth only 1.7-1.85 malar space. Antenna (Fig. 289) with scape broader, 3.1-3.4 times as long as broad, ventral plaque about 0.8 length of scape; length of longest seta near front edge equal to or slightly greater than breadth of scape; pedicellus plus flagellum about 1.5 times breadth of mesoscutum; flagellum filiform, its segments subequal in length, each somewhat less than twice as long as broad; clava about 4.2 times as long as broad, nearly as long as F2 plus F3 plus F4; F1 with a compact subbasal whorl of setae which reach about half way along the segment, F2 to F4 with similar whorls but of fewer setae. Gaster oblong, as long as but narrower than thorax.

**MATERIAL EXAMINED.** 2 ♂, many ♀. **France, Great Britain, Germany, Hungary, Italy, Netherlands; USA.**

**HOSTS.** *Crioceris asparagi* (L.) (Col., Chrysomelidae), attacking the host eggs. Adult females feed extensively upon the host eggs (see Johnston, 1915). The species has also been recorded (as *asparagi*) from *Crioceris duodecimpunctata* (L.) by Beaulne (1935: 59) and Macnay (1958: 68). These records need checking as *Tetrastichus crioceridis* Graham might have been involved.

**COMMENTS.** *T. coeruleus* is apparently thelytokous in North America, though in Europe males are occasionally produced.

The courtship behaviour of *coeruleus* (as *asparagi*) was mentioned by van den Assem, Gijswijt & Nübel (1982: 212).

*Tetrastichus coelarchus* sp.n.

(Figs 233, 305)

♀. Head 2.3-2.45 times as broad as long, shaped much as in *lyridice* (Fig. 269) but with temples not so extremely short; POL 1.4-1.7 times OOL, OOL 1.4-1.5 OD. Eyes rather small, separated by 1.5-1.66 times their length. Malar space 0.8-0.85 length of eye. Mouth about equal to malar space. Antenna (Fig. 233) with scape virtually as long as an eye, reaching vertex or slightly above it; pedicellus plus flagellum 1.2-1.3 times breadth of mesoscutum; pedicellus 1.6-1.8 times as long as broad, distinctly shorter than F1; funicle filiform or virtually so, somewhat stouter than pedicellus, its segments subequal in length, or F3 a little shorter; F1 2.0-2.3 times, F2 2.0-2.2 times, F3 1.8-2.0 times as long as broad; clava slightly broader than funicle, 3.7-4.0 times as long as broad, nearly as long as or somewhat shorter than F2 plus F3, with rather weak constriction between C1 and C2, moderately acute, C1 1.2-1.5 times as long as broad, spine 0.25 length of C3; sensilla moderately numerous, in two irregular rows on each segment. Thorax about 1.5 times as long as broad. Mid lobe of mesoscutum with median line distinct over posterior 0.5, obsolescent anteriorly; 3-5 rather fine and short adnotaular setae on each side. Scutellum with submedian lines about equidistant from each other and from sublateral lines, enclosed space 2.7-3 times as long as broad. Propodeum much as in *miser* (see Graham, 1987, fig. 25); callus with 5-8 setae. Legs rather slender; spur of mid tibia about 0.75 length of basitarsus and somewhat greater than breadth of tibia. Forewing with costal cell slightly shorter than M, 10-13 times as long as broad; M rather thin, 3.0-3.3 times length of ST, its front edge with 13-17 setae; speculum small, extending only a short distance below M, wing beyond it moderately thickly, nearly uniformly pilose; cilia 0.2-0.3 length of ST. Hindwing obtuse or bluntly pointed, cilia 0.2 breadth of wing. Gaster subcircular, 1.1-1.3 times as long as broad, as long as or a little shorter than thorax, broader than thorax; in distal part its sides converge to form an angle of about 95 degrees, but the small last tergite projects as a short point.

Body a fairly bright to bright bluish-green or green, sometimes with golden-green tinge in places. Antennae black, scape sometimes testaceous proximally or more extensively. Coxae coloured like body; trochanters mainly fuscous; femora black with tips narrowly testaceous; tibiae testaceous, or reddish with bases and tips paler; fore tarsi brownish, mid and hind tarsi testaceous proximally and fuscous distally. Wings subhyaline, venation brownish-testaceous. Length 1.6-2 mm.

♂. Differs as follows. Antenna (Fig. 305) with scape 0.93 length of eye, 2.8 times as long as broad, reaching middle of median ocellus, ventral plaque 0.8 length of scape; pedicellus plus flagellum 1.55 times breadth of mesoscutum; pedicellus 1.6 times as long as broad, slightly shorter than F1; funicle filiform, hardly stouter than pedicellus; F1 slightly shorter than F2, 1.8-1.9 times as long as broad, following segments subequal in length, each 2.0-2.2 times as long as broad; clava hardly broader than funicle, somewhat longer than F3 plus F4, about 4.5 times as long as broad, with C1 and C2 equal in length, each 1.7 times as long as broad, C3 shorter; flagellum without compact whorls of long setae. Gaster oblong-elliptic, as long as but narrower than thorax.

MATERIAL EXAMINED. 2 ♂, 12 ♀. Holotype ♀, **Sweden**: Skåne, Kivik, 20.vii.1938 (D.M.S. & J.F. Perkins) (BMNH).

Paratypes. **Czechoslovakia**: 1 ♀, Bohemia, Praha-Kunratice, 10.viii.1965; 1 ♀, Slovakia, Slovensky Raj, Biala Voda, 29.vii.1965 (Bouček) (BMNH). **Great Britain**: 2 ♀, Berkshire, Windsor Forest, 14.viii.1973; 1 ♀, Buckinghamshire, Hell Coppice, near Oakley, 2.viii.1953; 1 ♀, Oxfordshire, Lewknor, 18.vii.1957 (Graham) (BMNH). **Ireland**: 2 ♀, Co. Wicklow, Athdown, 13.viii.1954 (Graham) (BMNH). **Jugoslavia**: 1 ♀, Dobra Voda, Goč, 30.vi.1968 (Bouček) (BMNH). **Sweden**: 2 ♂, 1 ♀, Skåne, Kivik, 24.vii.1938 (D.M.S. & J.F. Perkins) (BMNH).

HOSTS. Unknown.

COMMENTS. The North American species *trisulcatus* Provancher differs from *coelarchus* in having the female head less transverse, eyes slightly larger, 1.38 times their length apart; OOL almost equal to OD; submedian lines of scutellum a little nearer to sublateral lines; M slightly longer, 3.75 times length of ST; antennal scape and pedicellus testaceous.

*Tetrastichus inaequalis* sp.n.

(Fig. 228)

♀. Head 2.45 times as broad as long, shaped much as in *hyridice* (Fig. 269) but temples about 0.17 length of eyes and distinctly rounded; POL 1.4 OOL, OOL 1.6 OD. Eyes separated by 1.55 their length. Malar space 0.8 length of eye. Mouth hardly greater than malar space. Antenna (Fig. 228) with scape 0.95 length of eye, reaching middle of median ocellus; pedicellus plus flagellum about 1.25 times breadth of mesoscutum; pedicellus 1.5 times as long as broad, a little shorter than F1; funicle distinctly stouter than pedicellus, filiform; F1 distinctly shorter than F2 and 1.6 times as long as broad; F2 and F3 equal in length, each 1.9 times as long as broad; clava hardly broader than funicle, 4 times as long as broad, strongly acute, C1 and C2 equal in length, each 1.3 times as long as broad, separated by a deep constriction, C3 shorter, spine slender, 0.4 length of C3. Thorax 1.45 times as long as broad, strongly arched dorsally. Mid lobe of mesoscutum about as long as broad, convex; median line distinct except in front; 4 rather short, fine setae on each side. Scutellum 1.2 times as broad as long, moderately convex in profile; submedian lines slightly nearer to sublateral lines than to each other, enclosed space 2.65 times as long as broad; length of setae about equal to distance between submedian lines. Propodeum medially 0.43 length of scutellum; median carina strongly raised, thin except in posterior 0.3 where it is triangularly expanded; spiracles rather small, separated by about twice their length from hind edge of propodeum; callus with 5-6 setae. Legs not stout; spur of mid tibia 0.8 length of basitarsus. Forewing with costal cell equal in length to M, 12 times as long as broad; M rather thin, 3 times length of ST, its front edge with 11 setae; speculum rather small, not extended below M, wing beyond it rather thickly and nearly uniformly pilose; cilia 0.35 length of ST. Hindwing obtuse, cilia 0.25 breadth of wing. Gaster subcircular, slightly shorter than but much broader than thorax, obtusely angulate at apex, about as long as broad.



Body fairly bright blue-green. Antennae black. Coxae, and femora except their tips narrowly, coloured like body; trochanters mainly fuscous; tips of femora, and tibiae, bright testaceous; fore tarsi brown, mid and hind tarsi testaceous darkening to brown at tips. Wings hyaline, venation pale testaceous. Length 1.6 mm.

Closely resembles ♀ of *coelarchus* sp.n., but this differs in having scape reaching vertex or slightly above it; F1 as long as F2, clava with a weak constriction between C1 and C2; submedian lines of scutellum about equidistant from each other and from sublateral lines.

♂. Unknown.

MATERIAL EXAMINED. 1 ♀. Holotype ♀, **Great Britain:** Oxfordshire, Lewknor, 5.vii.1959 (Graham) (BMNH).

HOSTS. Unknown.

*Tetrastichus helviscapus* sp.n.

(Figs 229, 303, 384)

♀. Differs from ♀ of *hylotomarum* (Bouché) in having antennal flagellum (Fig. 229) rather more slender and slightly longer; clava 2.9-3.4 times as long as broad, with C2 tending to be slightly longer than broad; antennal scape and tibiae pale.

Differs from ♀ *coelarchus* sp.n. in its shorter funicular segments, F1 1.9-2.1 times, F2 1.35-1.7 times, F3 1.4-1.5 times as long as broad; clava shorter, 2.9-3.4 times as long as broad, with C1 not longer than broad.

From ♀ *brevicalcar* sp.n. it differs in its longer mid tibial spur, much shorter funicle segments and clava.

Hypopygium (Fig. 384) transverse; lateral lobes broad; median lobe small, short, rounded.

Body with strong metallic tints which vary from golden-green through bright green to violet-blue. Antennal scape either wholly testaceous, or more or less infuscate distally, especially on dorsal surface; pedicellus and flagellum light to darker brown. Coxae, and femora mainly, coloured like body; trochanters partly to mainly fuscous; tips of femora, and tibiae, testaceous; rarely hind tibiae slightly brownish medially; tarsi testaceous with pretarsus of all legs brown, fourth tarsal segment sometimes brown, fore tarsi sometimes brown. Wings hyaline, venation yellowish to dark testaceous. Length 1.4-2.1 mm.

♂. Differs as follows. Antenna (Fig. 303) with scape 0.82 length of eye, 2.65 times as long as broad, reaching lower edge of median ocellus, ventral plaque 0.72 length of scape, setae near front edge as long as breadth of scape; pedicellus plus flagellum 1.4 times breadth of mesoscutum; pedicellus 1.6 times as long as broad, about as long as F1; funicle filiform, slightly shorter than pedicellus; F1 distinctly shorter than F2, 1.5-1.6 times as long as broad, following segments subequal in length, each about twice as long as broad; clava not broader than

funicle, 4.7 times as long as broad, slightly longer than F3 plus F4, with C1 and C2 equal in length, each 1.7 times as long as broad, C3 shorter; flagellum without compact whorls of long setae. Gaster oblong-oval, about as long as but slightly narrower than thorax. Antennal scape mainly, and pedicellus, brown; flagellum yellowish-testaceous proximally, gradually darkening distad, clava brown.

**MATERIAL EXAMINED.** 2 ♂, 26 ♀. Holotype ♀, **Great Britain:** Berkshire, Wytham Wood, reared 17.vi.1957 from sawfly pupa (G.R. Gradwell) (BMNH).

**Paratypes.** **Czechoslovakia:** 1 ♀, Bohemia, Praha-okolí, Suchdol, 15.vii.1963 (Bouček), 1 ♀, Praha-Troja, 28.vii.1964 (Strejcek), 1 ♀, Velký Vřeštov, 22.vi.1954 (Bouček), 1 ♀, Slovakia merid., Sturovo-Kovačov, 23.vii.1963 (Bouček) (BMNH). **Great Britain:** 2 ♂, 15 ♀, same data as holotype (BMNH); 4 ♀, Surrey, Dorking, 16.vi.1964 (Bouček) (BMNH). **Jugoslavia:** 1 ♀, Dobra Voda, Goč, 1.vii.1968 (Bouček) (BMNH). **USSR:** 1 ♀, Moldavia, Korneshty, 30.vi.1961, 1 ♀, Kotovskoje, 12.vii.1961 (Bouček & Talitzki) (BMNH), 1 ♀, Birch Grove, Moscow Canal, 4.viii.1968 (R.R. Askew) (RRA).

*Tetrastichus brevicar* sp.n.

(Figs 230, 302)

♀. Differs from ♀ of *coelarchus* sp.n. as follows. Antenna (Fig. 230) with flagellum rather more slender; funicular segments longer, F1 2.4-2.7 times, F3 2.2-2.5 times as long as broad; clava longer and more acute, 4-5 times as long as broad, with a distinctly projecting spine and with relatively longer segments, C1 1.6-2.0 times as long as broad; sensilla sparser. Length of mid tibial spur hardly more than half that of basitarsus, and hardly greater than breadth of tibia. Propodeal callus with fewer setae on average (3-6). Marginal vein on average longer, 3.0-3.7 times length of ST.

Antennal scape with at least proximal 0.5 testaceous, or wholly so except a dorsal stripe.

♂. Antenna (Fig. 302) with scape as long as an eye and reaching above vertex; funicular segments usually 2.5-3.0 times (rarely only twice) as long as broad, F1 as long as F2; pedicellus plus flagellum 1.5-1.6 times breadth of mesoscutum. Spur of mid tibia 0.5-0.6 length of basitarsus. Gaster oblong, as long as but narrower than thorax.

Body more obscurely metallic; antennae black.

**MATERIAL EXAMINED.** 2 ♂, 4 ♀. Holotype ♀, **Great Britain:** Buckinghamshire, Hell Coppice, near Oakley, 30.viii.1958 (Graham) (BMNH).

**Paratypes.** **Great Britain:** 1 ♀, Buckinghamshire, Hell Coppice, 2.viii.1957; 1 ♀, Middlesex, Southgate, 10.viii.1967, 2 ♂, 1 ♀, 22.viii.1967 (Graham) (BMNH).

**HOSTS.** Unknown.

**SPECIES SOLA**

*Tetrastichus tachos* differs from the species of other groups in the very numerous setae near the front edge of the antennal scape, in both sexes.

*Tetrastichus tachos* (Walker)

(Figs 226, 227)

*Cirrospilus Tachos* Walker, 1839b: 352-353. Lectotype ♂, Great Britain: (Walker) (BMNH), designated by Graham (1961b: 39) [examined].*Tetrastichus tachos* (Walker) 1848: 146; Waterston, 1915: 244; Domenichini, 1966a: 91, 1966b: 50.*Aprostocetus tachos* (Walker) Graham, 1961b: 39.

♀. Head slightly broader than mesoscutum, about 2.5 times as broad as long; temples about 0.12 length of eyes; POL 1.8 OOL, OOL 1.6 OD. Eyes separated by 1.45-1.5 times their length. Malar space 0.78 length of eye, sulcus virtually straight. Mouth about 1.2 malar space. Antenna (Fig. 226) with scape very slightly longer than eye, reaching a little above vertex, its front edge with numerous short setae, behind which (on inner aspect of scape) can be seen another row; pedicellus plus flagellum 1.3 breadth of mesoscutum; pedicellus distinctly shorter than F1, hardly twice as long as broad; funicle proximally somewhat stouter than pedicellus, virtually filiform, its segments decreasing very slightly in length, F1 and F2 each about 2.1 times as long as broad, F3 about twice; clava barely as broad as funicle, about 4.5 times as long as broad, about as long as F2 plus F3, pointed, with C1 1.5 times as long as broad, C2 slightly shorter and a little longer than broad, C3 still shorter, spine 0.25 length of C3, apical seta hardly shorter than spine. Mid lobe of mesoscutum slightly broader than long, moderately convex; median line fairly strong in posterior 0.5 but finer anteriorly; 4 adnotaular setae on each side. Scutellum about 1.2 times as broad as long; submedian lines a little nearer to sublateral lines than to each other, enclosed space 2.2-2.3 times as long as broad; setae subequal in length, which is slightly less than distance between submedian lines. Propodeum fully twice as long as dorsellum; median carina thin, but expanded in posterior 0.25; plicae sharp virtually to level of spiracles; callus with anterior group of 3 setae and a posterior group of 3. Legs rather slender, especially tibiae; hind femora nearly 5 times as long as broad; spur of mid tibia about 0.66 length of basitarsus. Forewing (Fig. 227) with costal cell slightly longer than M, about 11 times as long as broad; M thin, 3.2 times length of ST, its front edge with 10-11 setae; ST very thin proximally but expanding gradually into the rather small stigma; speculum small but extending as a narrow strip below M for about half its length; there is also a small bare area above ST; wing beyond speculum somewhat sparsely pilose; cilia about 0.35 length of ST. Hindwing obtuse, cilia 0.25 breadth of wing. Gaster ovate-subcircular, slightly shorter than but a little broader than thorax; last tergite small, nearly twice as broad as long, cercal setae reaching well beyond apex of gaster, the longest nearly twice length of next longest, distinctly kinked; ovipositor sheaths not quite reaching apex of gaster; tip of hypopygium at 0.55 length of gaster.

Body with moderately strong dark blue tint, slightly greenish-blue in places, especially base of gaster. Antennae black, scape slightly reddish at extreme base. Coxae, and femora mainly, coloured like body; trochanters fuscous; tips of femora rather narrowly, tibiae, and tarsi, testaceous, fourth tarsal segment brownish. Wings hyaline, venation testaceous. Length 1.7 mm.

♂. Differs as follows. Antenna (see Waterston, 1915, fig. 7a) with scape about 3.5 times as long as broad, 1.1 times length of eye, reaching vertex, its front edge with numerous setae as in ♀, ventral plaque 0.77 length of scape; pedicellus plus flagellum 1.7 times breadth of mesoscutum; pedicellus distinctly shorter than F1 and about 1.7 times as long as broad; flagellum proximally a little stouter than pedicellus, tapering very slightly distad; F1 slightly shorter than F2 and twice or nearly twice as long as broad, F2 to F4 subequal in length, each about 2.5 times as long as broad; clava about 4.7 times as long as broad, somewhat longer than F3 plus F4, with C1 and C2 subequal in length, each slightly less than twice as long as broad, C3 shorter; each funicular segment with a compact subbasal whorl of dark setae, those of F1 just reaching the tip of the segment, those of F2 to F4, and C1, not quite reaching it. Propodeum fully 3 times length of dorsellum. Gaster oblong, slightly longer but narrower than thorax.

MATERIAL EXAMINED. 1 ♂, 2 ♀. **Czechoslovakia:** 1 ♀, Bohemia, Praha-Ruzyně, 22.vii.1953 (Bouček) (BMNH). **Great Britain:** 1 ♂ (Walker) (BMNH); 1 ♀, Buckinghamshire, Hell Coppice, 25.vii.1957 (Graham) (BMNH).

HOSTS. Unknown.

#### THE *LEGIONARIUS*-GROUP

Differs from *miser*-group in smaller eyes, separated by 1.5-1.6 times their length; antennal scape as long as or longer than an eye, reaching above the vertex, in male broader above the middle, with ventral plaque centred a little above the middle; temples longer than in most species of *miser*-group.

Differs from *setifer*-group in the longer, more acute gaster, and more slender flagellum of ♀.

#### *Tetrastichus legionarius* Giraud (Figs 236, 237, 287, 379)

*Tetrastichus legionarius* Giraud, 1863: 1273. Lectotype ♀, ?Austria (MNHN), designated by Domenichini (1966a: 95) [examined].

*Tetrastichus legionarius* Giraud; Kurdjumov, 1913: 254; Erdős, 1954: 362; Ruppolt, 1957: 289-290 [as "sp.n.!!"]; Domenichini, 1966a: 95, 1966b: 37.

*Aprostocetus legionarius* (Giraud) Graham, 1961b: 38-39.

Syntypes of *legionarius* were represented by 9 pith blocks, from 4 of which the specimens had disappeared. The remaining syntypes, 2 ♀, 3 ♂, were somewhat broken when I examined them many years ago, but enough remained to substantiate the essential characters of the species.

♀. Head slightly broader than mesoscutum, slightly more than twice as broad as long; temples rounded, about 0.2 length of eyes; POL 1.75-1.9 OOL, OOL about 1.5 OD. Eyes about 1.15 times as long as broad. Malar space 0.85-0.9 length of eye, sulcus nearly straight. Mouth about equal to malar space. Antenna (Fig. 236) with pedicellus plus flagellum about 1.5 times breadth of mesoscutum; pedicellus 1.8-2.0 times as long as broad, 0.5-0.6 length of F1; funicle slender,

proximally hardly stouter than pedicellus and hardly thickening distad, its segments decreasing in length, F1 3.7-4.4 times, F2 3.2-3.5 times, F3 2.5-2.8 times as long as broad; clava slightly broader than F3, 3.5-3.7 times as long as broad, as long as F3 plus 0.5 to 0.66 of F2, bluntly pointed, spine 0.3 length of C3. Thorax about 1.5 times as long as broad. Mid lobe of mesoscutum slightly broader than long; median line distinct, except sometimes in front; 3-5 setae on each side. Scutellum slightly broader than long, rather weakly convex in profile; submedian lines about equidistant from each other and from sublateral lines, enclosed space 2.5-2.7 times as long as broad; setae subequal, their length slightly less than distance between submedian lines. Propodeum nearly or just twice as long as dorsellum; median carina strongly raised, broadening caudad; plicae sharp to level of spiracles; callus with 4-6 setae arranged in two groups. Legs of medium length, somewhat slender; hind femora about 4 times as long as broad; spur of mid tibia 0.6 length of basitarsus. Forewing about 2.4 times as long as broad; costal cell somewhat shorter than M, 11-12 times as long as broad; M not thick, 3.9-4.1 times length of ST, its front edge with 12-15 setae; speculum small, not extending below M; cilia 0.33-0.37 length of ST. Hindwing subobtusate or slightly pointed, cilia 0.2-0.22 breadth of wing. Gaster (Fig. 237) lanceolate, acuminate, nearly twice as long as thorax, about as broad as thorax, 2.7-3.3 times as long as broad; last tergite 1.5-1.9 times as long as broad; longest seta of each cercus about 1.6 length of next longest; ovipositor sheaths projecting slightly; tip of hypopygium at 0.3-0.35 length of gaster. Hypopygium (Fig. 379) moderately transverse; lateral lobes broad, median lobe long, tapering, obtuse.

Body with moderately strong greenish-blue to green tints. Antennae blackish; scape sometimes paler basally. Coxae, and femora mainly, coloured like body; trochanters partly or mainly fuscous; tips of femora moderately broadly, and tibiae, yellow to testaceous; fore tarsi brown, mid and hind tarsi pale testaceous proximally, gradually darkening to fuscous at tips. Wings hyaline or subhyaline, venation testaceous to brown. Length 2.5-2.9 mm.

♂. Differs as follows. Antenna (Fig. 287) with scape much longer than eye and reaching well above vertex, 3.0-3.2 times as long as broad, ventral plaque about 0.6 length of scape; pedicellus plus flagellum about twice breadth of mesoscutum; pedicellus twice as long as broad, about 0.6 length of F1; funicular segments subequal in length, or F1 slightly shorter than the others, F1 2.8-3.0 times, F2 3.3-3.4 times, F3 3.5-3.6 times, F4 3.3-3.7 times as long as broad; clava slightly broader than funicle, 5.5-6 times as long as broad, slightly shorter than F3 plus F4, with C1 fully twice, C2 twice, as long as broad, C3 much shorter; each funicular segment with a subbasal whorl of dark setae which reach only about 0.75 the length of the segment. Gaster oblong or elliptic, slightly longer and narrower than thorax.

**MATERIAL EXAMINED.** 6 ♂. 14 ♀. **Austria, Czechoslovakia, France, Hungary, Italy, Netherlands, Spain.**

**HOSTS.** *Lipara lucens* Meigen (Dipt., Chloropidae); *legionarius* is a gregarious endoparasite of the host larvae and pupae. Immature stages were described by Giraud (1863) and Ruppolt (1957).

*Tetrastichus temporalis* (Graham)

(Figs 238-242, 288, 380)

*Aprostocetus temporalis* Graham, 1961a: 10-11. Holotype ♀, Great Britain: Berkshire, Wytham Wood, 24.viii.1952 (Graham) (UM) [examined].

*Tetrastichus temporalis* (Graham) Domenichini, 1966a: 95, 1966b: 51.

♀. See original description. It may be distinguished from that of *legionarius* Giraud by the characters given in the key to females. Hypopygium (Fig. 380) like that of *legionarius* but with median lobe slightly broader.

♂ (new). Differs from ♀ as follows. Antenna (Fig. 288) with scape 1.1-1.15 times length of eye, reaching well above vertex, 2.7-3 times as long as broad, ventral plaque 0.55-0.7 length of scape, length of longest seta on front edge about equal to breadth of scape; pedicellus plus flagellum about twice breadth of mesoscutum; funicular segments tending to be rather shorter than in *legionarius*; whorled setae of each funicular segment reaching level with tip of the segment, or even very slightly beyond it.

MATERIAL EXAMINED. 6 ♂, 16 ♀. **Great Britain, Sweden.**

HOSTS. Unknown. I have several times swept specimens from *Phalaris arundinacea* L. (Gramineae) and it may have a host on this grass.

## THE MISER-GROUP

The central group of the genus, containing its type-species. Hind coxae with some coarser sculpture dorsally in basal part. Eyes moderate-sized or rather large, separated by 1.15-1.45 their length. Setae of vertex relatively fine and short, their length distinctly less than OD. Eyes with sparse, extremely short pubescence. Antennal scape nearly always slightly shorter than an eye, not reaching above the vertex. Propodeum with plicae often strong; triangular space between posterior part of plica and the paraspiracular carina tending to be concave. Gaster subcircular to lanceolate; tips of ovipositor sheaths reaching apex of last tergite, or slightly beyond it.

*Tetrastichus heterus* sp.n.

(Fig. 247)

♀. Head about 2.3 times as broad as long; temples 0.1 length of eyes; POL 1.5 OOL, OOL 1.5 OD. Eyes separated by 1.25 times their length. Malar space 0.63 length of eye. Mouth hardly greater than malar space. Antenna (Fig. 247) with scape 0.9 length of eye, reaching level of vertex; pedicellus plus flagellum about 1.5 times breadth of mesoscutum; pedicellus twice as long as broad, somewhat shorter than F1; funicle filiform, hardly stouter than pedicellus, its segments subequal in length, F1 about 2.8 times, F2 3.0 times, F3 3.1 times as long as broad; clava hardly broader than funicle, distinctly shorter than F2 plus F3, about 5 times as long as broad, with C1 1.8 times as long as broad, C2 much shorter, C3 still shorter, spine about 0.3 length of C3; sensilla rather sparse, very long and slender, with short bases but very long outstanding blades. Thorax 1.4

times as long as broad. Mid lobe of mesoscutum as broad as long; median line distinct except in front; 4 rather short, reclinate adnotaular setae on each side. Scutellum somewhat broader than long; submedian lines slightly nearer to sublateral lines than to each other, enclosed space 2.4 times as long as broad; length of anterior setae slightly less than distance between submedian lines. Legs rather slender. Forewing with costal cell slightly shorter than M, 11 times as long as broad; M rather thin, 3.6 times length of ST, its front edge with 12-13 setae; ST very thin proximally; speculum narrow, hardly extended below M, wing beyond moderately thickly pilose; cilia 0.4 length of ST. Hindwing bluntly pointed, cilia 0.35 breadth of wing. Gaster rather like that of *hyridice* (Fig. 271), lanceolate-ovate, equal in length to head plus thorax, slightly narrower than thorax, 2.3 times as long as broad, acute and slightly acuminate; last tergite as long as broad; ovipositor sheaths projecting very slightly.

Body dark blue. Antennal scape fuscous, testaceous basally; flagellum fusco-testaceous. Coxae, and femora except their tips, coloured like body; trochanters partly infusate; legs otherwise testaceous (tarsi paler), last tarsal segment brownish, pretarsi fuscous. Wings hyaline, venation yellowish-testaceous. Length 1.6 mm.

♂. Unknown.

MATERIAL EXAMINED. 1 ♀. Holotype ♀, **Jugoslavia**: Crna Gora, Sutomore, 6.vi.1968 (Bouček) (BMNH).

HOSTS. Unknown.

COMMENTS. *T. heterus* superficially resembles *temporalis* (Graham) but has eyes slightly larger, antennal scape hardly as long as an eye and not reaching above vertex, metallic tint of body less bright.

***Tetrastichus telon* (Graham)**  
(Figs 234, 235)

*Aprostocetus telon* Graham, 1961a: 89. Holotype ♀, Great Britain: Oxfordshire, Otmoor, 27.viii.1957 (Graham) (UM) [examined].

*Tetrastichus telon* (Graham) Domenichini, 1966a: 94-95, 1966b: 50; Kostjukov, 1978: 435.

♀. See original description. A feature not there mentioned is that the submedian lines of the scutellum are about equidistant from each other and from the sublateral lines, enclosing a space 2.4-2.75 times as long as broad. The proportions of the last tergite of the gaster vary more than originally stated, from 1.9 to 2.5 times as long as broad. Antenna (Fig. 234); gaster (Fig. 235).

♂. Domenichini (1966a: 95) described this sex from material reared in Germany and Italy, from *Agilus viridis*. I have not seen this material. From his description the male would run in my key to males to couplet 20 and might be expected to bear some resemblance to the male of *agriloidus*.

MATERIAL EXAMINED. 8 ♀. **Czechoslovakia, France, Great Britain.** Domenichini (1966a) also recorded it from Germany and Italy; Kostjukov (1978) from the USSR.

HOSTS. *Agrilus viridis* L. (Col., Buprestidae) according to Domenichini (1966a).

*Tetrastichus ulmi* Erdős  
(Figs 243, 244)

*Tetrastichus ulmi* Erdős, 1954: 362. Holotype ♀, Hungary: Tompa, Zsiroskúti erdő, 14.vi.1952 (Erdős) (TM) [examined].

*Aprostocetus ulmi* (Erdős) Graham, 1961b: 39.

*Tetrastichus ulmi* Erdős; Domenichini, 1966a: 91, 1966b: 52, 1967: 77; Kostjukov, 1978: 435.

♀. Head about as broad as mesoscutum, 2.2-2.35 times as broad as long; temples extremely short and receding strongly; POL 1.7-1.8 OOL, OOL about 1.3 OD. Eyes about 1.3 times as long as broad, separated by 1.35-1.4 times their length. Malar space 0.75 length of eye, sulcus slightly curved. Mouth hardly greater than malar space. Antenna (Fig. 243) with scape 0.75-0.85 length of eye, not quite, or virtually, reaching lower edge of median ocellus; pedicellus plus flagellum about 1.3 times breadth of mesoscutum; pedicellus 1.8-2.0 times as long as broad, distinctly shorter than F1; funicle proximally slightly stouter than pedicellus, thickening very slightly distad, its segments usually decreasing in length, occasionally subequal, F1 2.0-2.7 times, F2 1.9-2.2 times, F3 1.6-2.0 times, as long as broad; clava slightly broader than F3, 2.05-2.6 times as long as broad, distinctly shorter than F2 plus F3, obtuse or, in small specimens, slightly pointed, with C1 not longer than broad, C2 and C3 progressively shorter spine usually hidden by sensilla, short; no distinct constriction between C1 and C2. Thorax 1.5 times as long as broad. Mid lobe of mesoscutum slightly broader than long; median line distinct except sometimes in front; 3-5 setae on each side. Scutellum 1.2-1.25 times as broad as long, moderately convex in profile; submedian lines slightly to quite distinctly nearer to sublateral lines than to each other, enclosed space 2.15-2.4 (-2.7) times as long as broad; setae equal in length, this slightly less than distance between submedian lines. Propodeum medially 1.4-1.5 times length of dorsellum; plicae sharp only in posterior half; callus with 4-6 setae. Femora fully 4 times as long as broad; spur of mid tibia 0.55-0.65 length of basitarsus. Forewing 2.1-2.25 times as long as broad; costal cell distinctly shorter than M, 9-10 times as long as broad; M not thick, 3.0-3.9 times length of ST, its front edge with 11-17 setae; speculum small, tending to be extended as a very narrow strip below M, sometimes reaching ST, wing beyond it somewhat sparsely pilose, moderately so distad; cilia 0.2-0.5 length of ST. Hindwing obtuse, or very slightly pointed, cilia 0.2-0.33 breadth of wing. Gaster (Fig. 244) lanceolate, slightly to distinctly (up to 1.3 times) longer than head plus thorax, slightly narrower than or as broad as thorax, 2.05-2.4 times as long as broad, acuminate; last tergite 1.0-1.3 times as long as broad; tips of longest cercal setae not reaching level with tips of ovipositor sheaths, the latter projecting by 0.15-0.3 length of last tergite; tip of hypopygium at about 0.5 length of gaster.

Body dark bluish, or sometimes partly to mainly bronze; gaster usually more brightly metallic. Antennae blackish, scape sometimes testaceous at base, or up to proximal 0.5 pale. Legs black with tips of femora narrowly, occasionally the tibiae, and tarsi mainly, testaceous; tibiae usually more or less broadly infuscate medially, rarely mainly black; tarsi darker apically. Wings hyaline, venation



testaceous to brownish. Length 1.5-2.6 mm.

♂. Unknown.

**MATERIAL EXAMINED.** 20 ♀. **Bulgaria, Czechoslovakia, Great Britain, Hungary, Italy, Jugoslavia, USSR.**

**HOSTS.** *Scolytus rugulosus* (Müller), *S.* sp. and *Leperisinus orni* Fuchs (Col., Scolytidae); *Agrilus* sp. (Col., Buprestidae). I have examined specimens reared in the presence of *Magdalis* sp. (Col., Curculionidae) and *Tetrops* sp. (Col., Cerambycidae). Another host recorded in the literature but needing confirmation, is *Anthaxia* sp. (Col., Buprestidae).

*Tetrastichus agrilocidus* sp.n.  
(Figs 245, 246, 299, 382)

♀. Extremely close to that of *ulmi* Erdős but differs as noted in the key to females. The antenna (Fig. 245) also has the scape reaching the lower edge of the median ocellus, or even a little above this. Submedian lines of scutellum tending to be rather closer together, not or slightly nearer to sublateral lines than to each other, enclosed space 2.6-3.0 times as long as broad. Spur of mid tibia about 0.5 length of basitarsus. Hypopygium (Fig. 382).

Antennal scape bright testaceous, usually infusate at tip, sometimes also on dorsal edge. All tibiae bright testaceous. Wing-venation yellowish to testaceous. Length 2.3-3.2 mm.

♂. Differs as follows. Antenna (Fig. 299) with scape about 2.5 times as long as broad, ventral plaque about 0.68 length of scape, longest seta of row near front edge nearly equal to breadth of scape; pedicellus plus flagellum 1.6-1.7 times breadth of mesoscutum; funicle proximally distinctly stouter than pedicellus, tending to taper very slightly distad, F1 somewhat shorter than F2 and 1.9-2.3 times as long as broad, following segments subequal in length, each 2.5-2.75 times as long as broad; clava slightly broader than F4, somewhat shorter than F3 plus F4, about 4 times as long as broad, with C1 1.5-1.8 times as long as broad, C2 a little shorter and as long as or slightly longer than broad, C3 slightly shorter than C2; each funicular segment with a compact subbasal whorl of dark setae which reach slightly beyond the tip of the segment, C1 with two partial whorls. Gaster oblong, about as long as but much narrower than thorax.

Antennae black. Hind tibiae narrowly to broadly infusate medially, mid tibiae sometimes similarly darkened.

**MATERIAL EXAMINED.** 5 ♂, 11 ♀. Holotype ♀. **Poland:** Kamień, 10.vi.1965, from *Agrilus* sp. on *Fagus* (Z. Capecki) (BMNH).

**Paratypes.** **Czechoslovakia:** 2 ♂, 2 ♀, Bohemia, Revnice, 1962, from *Xylotrechus pantherinus* (M. Sláma) (BMNH). **Hungary:** 1 ♀, Heggajla Dobozés, 26.vii.1955, swept from *Vaccinium myrtillus* (Erdős) (TM). **Poland:** 1 ♂, 2 ♀, same data as holotype; 3 ♀, Kamień, 12.vii.1965; 1 ♂, Swietokrzynski, SW of Krzyz, 15.vii.1965, 2 ♂, 3 ♀, 19.vii.1965, from larvae of *Agrilus* sp. (Capecki) (BMNH).

HOSTS. *Agrilus* sp. (Col., Buprestidae), *Xylotrechus pantherinus* Savenius (Col., Cerambycidae).

***Tetrastichus macrops* (Graham)**

(Figs 241, 242)

*Aprostocetus macrops* Graham, 1961a: 9-10. Holotype ♀, Great Britain: Berkshire, Wytham Wood, 22.xi.1955 (K. Paviour-Smith) (UM) [examined].

*Tetrastichus macrops* (Graham) Domenichini, 1966a: 94, 1966b: 39.

♀. For description see Graham (1961a). Antenna (Fig. 241); gaster (Fig. 242).

♂. Unknown.

MATERIAL EXAMINED. 22 ♀. **Great Britain, Netherlands.**

HOSTS. Probably *Cis* spp. (Col., Cistidae) inhabiting certain fungi of the family Polyporaceae, such as *Polystictus versicolor* Fr. and (?) *Polyporus adustus* Fr.

COMMENTS. The original record of the host-plant of *macrops* ("*Erpex* sp., possibly *versicolor* Fr.") was erroneous. The collector later informed me that the specimens of *macrops* had been obtained from a very old dead fungus which was probably *Polyporus adustus* (Willd.) Fr. I have myself reared it from *Polystictus versicolor* infested by *Cis*, in England.

***Tetrastichus heeringi* Delucchi**

(Figs 248, 300)

*Tetrastichus heeringi* Delucchi, 1954: 99-101. Syntypes, ♂, ♀, Germany: Grafrath/Obb. (H. Heering) (VD) [not examined].

*Tetrastichus heeringi* Delucchi; Heering, 1956: 85-88; Bouček, 1961: 23; Domenichini, 1966a: 94, 1966b: 35; Kostjukov, 1978: 435.

I have not had access to the syntypes of *heeringi*, for which it will be necessary to select a lectotype. However, there is no doubt regarding the identity of the species.

♀. Head about as broad as mesoscutum and 2.3 times as broad as long; temples 0.15-0.17 length of eyes; POL 1.6-2.0 OOL, OOL 1.3-1.5 OD. Eyes 1.25-1.3 times as long as broad, separated by 1.4 times their length. Malar space 0.75-0.78 length of eye. Mouth hardly greater than malar space. Antenna (Fig. 248) with scape 0.87-0.9 length of eye, reaching middle of median ocellus; pedicellus plus flagellum 1.1-1.15 times breadth of mesoscutum; pedicellus much shorter than F1, 2.2-2.4 times as long as broad; funicle proximally hardly stouter than pedicellus, thickening at most very slightly distad, F1 3.0-3.2 times, F2 2.0-2.9 times, F3 1.8-2.3 times as long as broad; clava very slightly broader than F3, distinctly to much shorter than F2 plus F3, its segments decreasing in length, C1 slightly, C2 not longer than broad. Thorax 1.4-1.45 times as long as broad. Mid lobe of mesoscutum about as long as broad; median line complete, strong; (3-) 4-6 adnotaular setae on each side. Scutellum 1.2-1.25 times as broad as long, moderately convex in profile; submedian lines hardly nearer to sublateral lines than to each other, enclosed space 2.3-2.4 times as long as broad; length of

setae somewhat less than distance between submedian lines. Propodeum medially 1.7-2.3 times length of dorsellum; callus with 5-8 setae. Hind femora about 3.7 times as long as broad; spur of mid tibiae 0.6-0.65 length of basitarsus. Forewing with costal cell slightly shorter than M, 10-11 times as long as broad; M 3.7-4.0 times length of ST, its front edge with about 18 setae; speculum rather small, hardly extended below M, wing just beyond it rather sparsely pilose, though more thickly distad; cilia about 0.3 length of ST. Hindwing obtuse or slightly pointed, cilia about 0.17-0.24 breadth of wing. Gaster long-ovate, from slightly longer than thorax to slightly longer than head plus thorax, 1.8-1.9 times as long as broad, acute; last tergite slightly to distinctly broader than long; longest seta of each cercus about twice length of next longest, slightly kinked; ovipositor sheaths projecting slightly; tip of hypopygium at 0.5-0.6 length of gaster.

Body rather bright blue to green, or bronze-green; gaster brighter, with hind margins of segments purplish. Antennal scape testaceous, usually infusate at apex, rest of antenna black. Coxae, trochanters, and femora except their tips, coloured like body; rest of legs bright or orange-testaceous; tips of tarsi brown; rarely hind tibia with brownish antemedian ring. Wings hyaline, venation yellowish or testaceous. Length 1.5-2.4 mm.

♂. Differs as follows. Antenna (Fig. 300) with scape barely as long as eye (22:23), not reaching above vertex, 2.4-2.8 times as long as broad, ventral plaque 0.7-0.75 length of scape, longest seta near front edge shorter than breadth of scape; pedicellus plus flagellum 1.7 times breadth of mesoscutum; pedicellus somewhat shorter than F1 or (in dwarfs) about as long, 1.8-2.1 times as long as broad; funicle filiform, somewhat stouter than pedicellus, F1 distinctly shorter than F2 and 1.6-2.2 times as long as broad, following segments subequal in length, F2 2.3-2.8 times, F3 2.8-3.1 times, F4 2.7-3.1 times as long as broad; clava not broader than F4, shorter than F3 plus F4, 4.7-4.9 times as long as broad; each funicular segment with a compact subbasal whorl of dark setae which reach slightly beyond its tip. Gaster oblong, as long as but narrower than thorax.

Antennae black. Tibiae sometimes more or less infusate, occasionally mainly black.

**MATERIAL EXAMINED.** 8 ♂, 24 ♀. Bulgaria, Czechoslovakia, France, Germany, Hungary, Italy, USSR.

**HOSTS.** *Agrilus aurichalceus* Redtenbacher (= *chrysoderes* Rebel), *A. integerrimus* Ratzeburg, *A. viridis* (L.) (Col., Buprestidae); *heeringi* is a gregarious, endophagous parasite of the host larvae. For details of biology see Heering (1956).

***Tetrastichus pachycerus* sp.n.**  
(Figs 249, 250)

♀. Somewhat resembles *telon* (Graham) but differs in its shorter gaster, as well as in other characters, as follows. Head slightly more transverse, 2.3-2.4 times as broad as long. Malar space 0.66 length of eye. Mouth nearly 1.2 times malar space. Antenna (Fig. 249) with scape slightly shorter than an eye; pedicellus not

quite twice as long as broad; flagellum stouter; funicle with rather shorter segments; clava with a distinct constriction between C1 and C2, both of which are not longer than broad, apex obtuse, spine extremely short; sensilla more numerous, in two irregular rows on funicular segments and C1 and C2 (even three rows on F1). Forewing with M 3.4-3.8 times length of ST. Gaster (Fig. 250) lanceolate-ovate, acuminate, 1.15-1.2 times as long as head plus thorax; last tergite 1.0-1.3 times as long as broad.

Body with dark blue-green tint, gaster a brighter blue-green. Antennae black. Coxae, trochanters, and femora except their tips narrowly, black; tips of femora, and fore tibiae, testaceous, mid and hind tibiae infusate with bases and tips testaceous in holotype, wholly testaceous in paratypes; tarsi testaceous, darkened distally. Wings hyaline, venation testaceous to brownish-testaceous. Length 2.4-3.0 mm.

♂. Unknown.

MATERIAL EXAMINED. 4 ♀. Holotype ♀, **Great Britain:** Berkshire, Wytham, 21.vi.1952 (Graham) (BMNH),

Paratypes. **Czechoslovakia:** 1 ♀, Praha-okolí, on *Quercus*, 1946 (Bouček), 1 ♀, Lovoš u. Lovosic, 7.vii.1956 (Bouček) (BMNH). **France:** 1 ♀, Vaucluse, near Bédoin, 27.vi.1985 (Graham) (MVG).

HOSTS. Unknown.

*Tetrastichus leptosoma* sp.n.  
(Fig. 251)

♀. Much resembles that of *telon* (Graham) but differs particularly in its much shorter and less acuminate gaster, relatively shorter funicular segments, but longer clava. Head about 2.1 times as broad as long, with rather distinct rounded temples. Eyes separated by 1.35 times their length. Antenna (Fig. 251) with pedicellus 1.7-1.9 times as long as broad; F1 1.85-2.0 times as long as broad and very slightly shorter than F2 which is about 2.1 times as long as broad, F3 1.8-1.95 times as long as broad; clava (when undistorted) 3.1-3.25 times as long as broad, as long as or hardly shorter than F2 plus F3. Mid lobe of mesoscutum with median line complete and distinct; 3 (-4) adnotaular setae on each side. Scutellum with submedian lines parallel, 1.25-1.4 times as far apart as their distance from sublateral lines, enclosed space 2.0-2.25 times as long as broad. Propodeum about as long as dorsellum, tending to be relatively shiny, its sculpture sometimes weak. Forewing with costal cell 11-12.5 times as long as broad; M 3.5-4.1 times length of ST. Gaster 2.5-3.0 times as long as broad, strongly acute; last tergite 1.2-1.7 times as long as broad.

Black; gaster with distinct bluish tint, head and thorax hardly perceptibly bluish. Antennal scape testaceous with dorsal edge infusate. Legs black with knees very narrowly, fore tibiae, about distal half of mid and hind tibiae, testaceous; tarsi whitish-testaceous with fourth segment brownish. Wings hyaline, venation testaceous. Length 1.3-1.6 mm.

♂. Unknown.

MATERIAL EXAMINED. 4 ♀. Holotype ♀, **France:** Bouches du Rhône, Fonscolombe, 14.viii.1986 (Graham) (BMNH).

Paratypes. **Czechoslovakia:** 1 ♀, Bohemia, Holovousy, v.1954 (Bouček) (BMNH); 1 ♀, Slovakia mer., Kamenica nad Hronom, 23.vii.1963 (Bouček) (BMNH). **France:** 1 ♀, same data as holotype (MVG).

HOSTS. Unknown.

*Tetrastichus theoi* sp.n.

(Fig. 254)

♀. Appears to be related to *leptosoma* sp.n. but differs particularly in having submedian lines of scutellum much farther apart, gaster much shorter, ovate, not longer than head plus thorax. Eyes a little smaller, separated by 1.43 times their length. Antenna (Fig. 254) much as in *leptosoma* but with clava 2.6-3.1 times as long as broad. Mid lobe of mesoscutum with 2-3 rather short reclinate adnotaular setae on each side. Scutellum with submedian lines 1.8-2.0 times as far apart as their distance from sublateral lines, tending to diverge slightly caudad; enclosed space 1.8-2.0 times as long as broad. Dorsellum 2.2-2.8 times as broad as long, weakly alutaceous. Propodeum shiny, rather weakly and irregularly reticulate, the parts adjacent to median carina sometimes polished and nearly smooth. Forewing with M 4.1-5.0 times length of ST. Gaster ovate, acute but not acuminate, nearly or just as long as head plus thorax, 1.7-2.0 times as long as broad; last tergite a little broader than long.

Body mainly dark bluish. Antennal scape testaceous, infusate dorsally. Otherwise as in *leptosoma*.

♂. Unknown.

MATERIAL EXAMINED. 3 ♀. Holotype ♀, **France:** Var, Fréjus, 16.x.1987 (Gijswijt) (ITZ).

Paratypes. **France:** 1 ♀, Var, Taradeau, between 6.x.1987 and 9.x.1987; 1 ♀, Agay, between 9.x.1987 and 14.x.1987, on *Inula viscosa* (Gijswijt) (BMNH, MJG).

HOSTS. Unknown.

COMMENTS. This species is named after my friend Mr. M.J. ["Theo"] Gijswijt, in recognition of his enthusiasm for collecting Tetrastichinae, and constant help.

*Tetrastichus paululus* sp.n.

(Figs 252, 253)

♀. Closely resembles that of *leptosoma* sp.n., differing in the characters noted in the key to females. Head (Fig. 252) with distinct temples. Antenna (Fig. 253) with pedicellus 1.9-2.0 times as long as broad; F1 1.9-2.0 times as long as broad, fully as long as or very slightly longer than F2, which is 1.7-2.0 times as long as broad, F3 1.5-1.7 times as long as broad; clava 2.6-3.2 times as long as broad, with a distinct constriction between C1 and C2. Gaster lanceolate, 2.4-2.9 times as long as broad; last tergite 1.1-1.5 times as long as broad.

Body dark blue or (one British ♀) bronze. Length 1.65-2.0 mm.

♂. Unknown.

MATERIAL EXAMINED. 3 ♀. Holotype ♀, **Great Britain**: Wales, Pembrokeshire, Penally, 22.vii.1960 (Graham) (BMNH).

Paratypes. **France**: 1 ♀, Vaucluse, Mont Ventoux, Col de Perrache, 27.vi.1985 (MVG). **Great Britain**: 1 ♀, Dorset, Bere Wood, 24.vi.1955 (Graham) (BMNH).

HOSTS. Unknown.

*Tetrastichus lyridice* (Walker)

(Figs 269-271, 292)

*Cirrospilus Lyridice* Walker, 1839a: 307. Lectotype ♀, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 38) [examined].

*Tetrastichus lyridice* (Walker) 1848: 149; Domenichini, 1966a: 90, 1966b: 38.

*Aprostocetus lyridice* (Walker) Graham, 1961b: 38.

♀. Differs from that of *miser* (Nees) as follows. Head (Fig. 269) rather more transverse; temples almost nil; POL 1.65-1.8 OOL. Antenna (Fig. 270) with pedicellus plus flagellum 1.25-1.4 breadth of mesoscutum; pedicellus 2.0-2.2 times as long as broad; F1 1.8-2.6 times as long as broad and 1.2-1.5 length of pedicellus; F2 1.8-2.2 times, F3 1.7-2.2 times as long as broad; clava hardly broader than funicle, more distinctly pointed apically, 3.3-3.5 times as long as broad, as long as F3 plus half of F2 in large specimens, but nearly as long as F2 plus F3 in small ones; C1 not or slightly longer than broad, separated from C2 by a distinct constriction; setae of flagellum relatively longer and standing out at a moderate angle. The funicular segments usually decrease in length but are subequal in some small specimens. Gaster longer (Fig. 271), 1.6-2.0 times as long as broad, from as long as thorax to as long as head plus thorax, acute and usually slightly acuminate; last tergite about as long as broad; ovipositor sheaths reach apex of last tergite or sometimes projecting very slightly beyond it.

Body dark blue, or sometimes a brighter blue dorsally; gaster sometimes with greenish tints, occasionally parts of the thorax slightly so. Antennal scape testaceous to reddish, sometimes infusate dorsally. All tibiae and tarsi yellowish-testaceous to reddish. Length 1.7-2.6 mm.

♂. Differs as follows. Antenna (Fig. 292) with scape broader, slightly shorter than an eye but almost reaching vertex, ventral plaque 0.5-0.55 length of scape, length of longest setae near front edge slightly greater than breadth of scape; pedicellus 1.8 times as long as broad, somewhat shorter than F1; pedicellus plus flagellum about 1.8 breadth of mesoscutum; F1 slightly shorter than F2 and fully twice as long as broad, following segments subequal in length, each about 2.5 times as long as broad; clava hardly broader than funicle, 4.8 times as long as broad, slightly shorter than F3 plus F4, with C1 and C2 at most 1.7 times as long as broad; each funicular segment with a compact subbasal whorl of dark setae which reach somewhat beyond the tip of the segment. Gaster oblong, as long as but narrower than thorax.

Antennal scape, and tibiae mainly, black.

**MATERIAL EXAMINED.** 1 ♂, 13 ♀. **Great Britain, Netherlands.** A record from Italy (Domenichini, 1966a: 90) needs confirmation.

**HOSTS.** Domenichini (1966a: 90) recorded 5 females from Italy, reared from pupae of *Plagiodera versicolora* (Laich.), doubtfully as *lyridice*, stating that there were slight differences between them and the lectotype. The record needs checking.

***Tetrastichus crioceridis* Graham**  
(Figs 225, 301)

*Tetrastichus crioceridis* Graham, 1983: 275-277. Holotype ♀, Netherlands: Wassenaar (Meyendel), vii.1978, ex *Crioceris duodecimpunctata* L. (J. van Alphen) (ITZ) [examined].

For description of both sexes, see Graham (1983). They are also included in the keys to females and males in the present paper. Antenna ♀ (Fig. 225); antenna ♂ (Fig. 301).

**Note.** The date of rearing of the holotype was originally cited as "vi.1978"; this should have been vii.1978.

**MATERIAL EXAMINED.** 13 ♂, 31 ♀. **France, Netherlands.**

**HOSTS.** *Crioceris duodecimpunctata* (L.) (Col., Chrysomelidae) on *Asparagus officinalis*; the parasite attacks eggs and larvae of its host.

***Tetrastichus sodalis* sp.n.**  
(Fig. 267)

♀. Differs from that of *crioceridis* Graham particularly in its rather less stout and slightly longer antennal flagellum, more elongate F3, and clava distinctly shorter than F2 plus F3. From *lyridice* (Walker) it differs in having the mouth broader, setae of flagellum standing out less, and rather shorter gaster.

POL 1.45-1.6 OOL, OOL 1.2-1.4 OD. Mouth about 1.35 malar space. Antenna (Fig. 267) with scape 0.9 length of eye, not quite reaching vertex; pedicellus plus flagellum 1.2-1.25 breadth of mesoscutum; pedicellus much shorter than F1, twice as long as broad; funicle virtually filiform, somewhat stouter than pedicellus, with F1 and F2 subequal in length, F3 a little shorter, F1 2.2-2.6 times, F2 2.3-2.4 times, F3 2.0-2.35 times as long as broad; clava hardly broader than funicle, somewhat to very distinctly shorter than F2 plus F3, 3.5-4.0 times as long as broad, pointed, with a fairly distinct constriction between C1 and C2; setae of flagellum not very long, subdecumbent. Forewing with M 3.5-3.8 times length of ST; speculum moderate-sized, extended a short way below M, wing just beyond it relatively sparsely pilose, but fairly thickly in distal 0.3. Gaster ovate, slightly to distinctly acute, slightly longer than thorax, 1.55-1.65 times as long as broad.

Colour as in *crioceridis*. Length 2.3-2.45 mm.

♂. Unknown.

MATERIAL EXAMINED. 3 ♀. Holotype ♀, **Czechoslovakia**: Slovakia or., Kevežd, 28.vi.1948 (Bouček) (BMNH).

Paratypes. **France**: 1 ♀, Bouches du Rhône, Fonscolombe, 22.vi.1987 (Graham) (MVG). **Czechoslovakia**: 1 ♀, Králové Chlumea, 27.vi.1948 (Bouček) (BMNH).

HOSTS. Unknown.

*Tetrastichus* sp.indet.1

♂. Resembles that of *crioceridis* but has more distinct compact whorls of setae on segments of funicle, with 6-7 setae on each segment. The tibiae are blackish with bases and tips narrowly pale.

♀. Unknown.

MATERIAL EXAMINED. 1 ♂. **Greece**: Kiklâdes, Mikonos, Psarouí, 19.iv.1974 (A.C. & W.N. Ellis) (ITZ).

HOSTS. Unknown.

*Tetrastichus miser* (Nees)

(Figs K13, 272-276, 297, 383)

*Eulophus miser* Nees, 1834: 173. Syntypes, ♀, Germany: Sickershausen, August (Nees) (destroyed). NEOTYPE ♀, Great Britain: ? near London (Walker), the lectotype of *Cirrospilus attalus* Walker, 1839b (BMNH), here designated [examined].

*Cirrospilus Attalus* Walker, 1839b: 353. Lectotype ♀, Great Britain: ? near London (Walker) (BMNH), designated by Graham (1961b: 37) [examined]. [Synonymised with *miser* by Walker, 1848: 145.]

*Entedon medianus* Ratzeburg, 1848: 169. LECTOTYPE ♂, France: Loire Atlantique, Grand Jouan (Nördlinger) (NM), here designated [examined]. [Synonymised with *miser* by Domenichini, 1966a: 93.]

*Tetrastichus miser* (Nees) Walker, 1848: 145; Kurdjumov, 1913: 253; Domenichini, 1966a: 93-94, 1966b: 40.

*Aprostocetus miser* (Nees) Graham, 1961b: 37.

? *Tetrastichus violaceus* Kurdjumov, 1913: 253, 254-255. Holotype ♀, USSR: Ukraine, Poltava experimental Station, 8.viii.1910 (ZIL) [examined].

The type-material of *Entedon medianus* Ratzeburg was stated by Domenichini (1966a: 94) to be "introvabile". However, one male from the remains of Ratzeburg's collection exists in NM, Vienna. It is labelled "♂; Collectio Ratzeburg; medianus R. det.Ratzeburg" and is here designated lectotype. Ratzeburg stated (1848: 169) that his male had come from Grand Jouan; this is situated near Nozay, about 38 km north of Nantes.

The holotype of *T. violaceus* Kurdjumov, kindly loaned by Dr. Trjapitzin, appears to differ from dark forms of *miser* only in having rather more slender antennae. Probably it is a small dark form of this species.



As *miser* is the type-species of the genus, and some other species may be confused with it, a very full redescription is given.

♀. Head about as broad as mesoscutum, 2.4-2.6 times as broad as long; temples 0.08-0.09 length of eyes; POL 1.75-2.0 OOL, OOL 1.3-1.5 OD. Eyes about 1.2 times as long as broad, separated by 1.27-1.45 their length, with extremely short pubescence. Malar space 0.66 length of eye, sulcus hardly curved. Mouth equal to or a little less than malar space. Setae of vertex short, about 0.5 OD. Antenna (Fig. 272) with scape slightly shorter than eye, reaching lower edge of median ocellus, or slightly above this; pedicellus plus flagellum 1.1-1.18 breadth of mesoscutum; pedicellus 1.8-2.0 times as long as broad; funicle 1.2-1.3 times as stout as pedicellus, filiform; funicular segments usually decreasing slightly in length, rarely subequal, F1 2.2-2.5 times as long as broad and 1.3-1.7 times length of pedicellus, F2 1.8-2.2 times, F3 1.6-2.2 times as long as broad; clava not or hardly broader than F3, 2.8-3.5 times as long as broad, nearly or just as long as F2 plus F3, with C1 usually slightly longer than C2 and slightly to distinctly longer than broad, separated from C2 by a very weak or rather weak constriction, spine very short and tending to be hidden by sensilla; setae of flagellum slightly curved, standing out only slightly; sensilla moderately numerous, in large females in 3 irregular rows on each funicular segment and 2 rows on each claval segment, in small females in 2 irregular rows on each funicular segment and 1 row on each claval segment. Thorax 1.4-1.5 times as long as broad, strongly arched dorsally. Mid lobe of mesoscutum about as broad as long, convex; median line almost always distinct, at least over posterior 0.5; (4-) 5-9 adnotaular setae on each side. Scutellum 1.2-1.3 times as broad as long, moderately convex in profile; submedian lines equidistant from each other and from sublateral lines, or hardly nearer to the latter, parallel or diverging very slightly caudad, enclosed space 2.2-2.8 times as long as broad; anterior setae with length nearly equal to distance between submedian lines, placed hardly or very slightly behind middle. Dorsellum subrectangular, 2.0-2.5 times as broad as long. Propodeum medially 1.5-1.7 times length of dorsellum, rather dull, with fine to very fine isodiametric and slightly raised reticulation; median carina raised, sharp, broadening at hind end; plicae sharp, especially posteriorly, reaching or nearly reaching base of propodeum; paraspiracular carinae distinct, space between them and plicae slightly concave; spiracles medium-sized, oval, close to metanotum; callus alutaceous, with 4-7 setae arranged in two groups, one near the spiracle and the other near hind corner of propodeum. Legs moderately long, rather slender; hind coxae with rugulose sculpture dorsally at base; hind femora about 4 times as long as broad; spur of mid tibia 0.65-0.7 length of basitarsus. Forewing (Fig. 273) with costal cell about as long as M, 7-9 times as long as broad; SM with 1 dorsal seta; M not thick, 2.9-3.3 times length of ST, its front edge with 12-15 fine setae; speculum small, wing beyond it moderately thickly pilose; cilia at most 0.25 length of ST. Hindwing obtuse or rounded, cilia about 0.15 breadth of wing. Gaster (Fig. 275) subcircular to ovate, at least very slightly pointed at apex (apical angle 80-115 degrees), 1.2-1.5 times as long as broad, slightly shorter than or as long as thorax; last tergite very short, somewhat to much broader than long; ovipositor sheaths just reaching apex of gaster; one seta of each cercus about 1.5 times length of next longest; tip of hypopygium at about 0.5 length of gaster.

Hypopygium (Fig. 383) strongly transverse; lateral lobes moderately broad, median lobe rather short, broad, rounded.

Body black with rather weak to moderately strong metallic tints, more evident dorsally; these vary from bronze to coppery-bronze in some, olive to bronze-green in others; less often bluish. Antennae black with scape often testaceous beneath, sometimes wholly so, pedicellus sometimes testaceous beneath or wholly so. Coxae, and femora except tips, black; rest of legs in paler females testaceous (tarsi even paler) but in others with tibiae more or less infusate medially, in dark specimens wholly black; tarsi in some darker distally, or with only bases pale. Wings hyaline, venation testaceous to brown with base of ST usually paler. Length 1.4-2.1 mm.

♂. Differs as follows. POL about twice OOL. Antenna (Fig. 297) with scape broader, about 3 times as long as broad, ventral plaque about 0.66 length of scape, length of setae near front edge less than breadth of scape; pedicellus plus flagellum 1.7-1.75 breadth of mesoscutum; pedicellus 1.7-1.9 times as long as broad; flagellum slender though slightly stouter than pedicellus, filiform, funicular segments subequal in length (or F3 and F4 slightly longer than the others), F1 1.8-2.2 times as long as broad and 1.3-1.6 length of pedicellus, F2 nearly or quite twice, F3 and F4 2.0-2.2 times, as long as broad; clava 4.5-5.5 times as long as broad, somewhat longer than F3 plus F4, with C1 as long as or slightly shorter than C2 and 1.6-2.2 times as long as broad, C2 2.0-2.3 times as long as broad, these segments not separated by a constriction; each funicular segment with a compact subbasal whorl of dark setae which reach nearly to the tip of the segment. Gaster oblong, hardly shorter but much narrower than thorax, with ventral plica.

Colour of body usually tending towards dark blue, though sometimes partly olivaceous or bronze.

**MATERIAL EXAMINED.** Many ♂, ♀. Austria, Czechoslovakia, Denmark, Finland, France, Germany, Great Britain, Hungary, Ireland, Jugoslavia, Netherlands, Spain, Sweden, ? USSR.

**HOSTS.** *Rhynchaenus alni* (L.), *R. fagi* (L.), *R. pilosus* (F.), *R. quercus* (L.), *R. salicis* (L.), *Ramphus oxyacanthae* (Marsham) (Col., Curculionidae).

*Tetrastichus leocrates* (Walker)  
(Figs 277, 306)

*Cirrospilus Leocrates* Walker, 1839a: 319. Lectotype ♂, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 38) [examined].

*Tetrastichus leocrates* Walker, 1848: 150; Domenichini, 1966a: 90, 1966b: 37.

*Aprostocetus leocrates* (Walker) Graham, 1961b: 38.

♀. Not distinguished from that of *miser*, and some females attributed to that species might actually belong to *leocrates*. Careful and extensive rearing is necessary to solve this problem; the reared series available do not give a definite answer. The antenna of a female reared in the same batch with male *leocrates* is illustrated (Fig. 277) but it is not certain if the two sexes are conspecific.

♂. Differs from that of *miser* in the vestiture of the antennal flagellum (Fig. 306). The flagellum has numerous whitish curved sensilla of moderate length, distributed irregularly on the segments, plus some fine setae; compact whorls of dark setae are entirely absent.

Colour of body normally dark blue, rarely bronze.

**MATERIAL EXAMINED.** Many ♂. **Denmark, Finland, France, Great Britain, Italy, Spain.**

**HOSTS.** *Rhynchaenus alni* (L.) (Col., Curculionidae) on *Ulmus*.

***Tetrastichus sinope* (Walker)**  
(Figs 278, 279, 298)

*Cirrospilus Sinope* Walker, 1839a: 295. Lectotype ♀, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 38) [examined].

*Cirrospilus Hippiis* Walker, 1839a: 304. Lectotype ♀, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 38) [examined]. [Synonymised with *sinope* by Graham, 1961b: 38.]

*Cirrospilus Agathocles* Walker, 1839b: 353-354. Lectotype ♀, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 38). [Synonymised with *sinope* by Graham, 1961b: 38.]

*Cirrospilus Rapo* Walker, 1839c: 415. Lectotype ♀, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 38) [examined]. [Synonymised with *sinope* by Graham, 1961b: 38.]

*Tetrastichus sinope* (Walker) 1848: 148; Domenichini, 1966a: 89, 1966b: 49.

*Aprostocetus sinope* (Walker) Graham, 1961b: 37.

♀. Differs from that of *miser* in the characters given in the key to females. Ocelli tending to be slightly smaller, OOL 1.5-1.7 OD. Antenna (Fig. 278) with clava tending to have a more distinct constriction between C1 and C2. Gaster (Fig. 279) more acute, its apical angle 60-80 degrees; last tergite less transverse, sometimes only slightly so.

Body usually dark bluish, rarely thorax slightly bronze tinged in places.

♂. Differs from ♀ as follows. Antenna (Fig. 298) similar to that of *miser* but with scape somewhat broader; flagellum a little stouter; F1 not or hardly longer than the pedicellus, distinctly shorter than F2, 1.4-1.6 times as long as broad; clava with C1 only slightly longer than broad, C3 with longer spine.

Legs black with knees, sometimes also bases of tarsi, whitish. Length ca. 1.2 mm.

**MATERIAL EXAMINED.** 2 ♂, 23 ♀. **Great Britain, Ireland, Netherlands.**

**HOSTS.** Unknown.

**COMMENTS.** Occasional dwarfs of *miser* having dark legs much resemble *sinope* but have relatively shorter gaster and shorter antennal clava.

*Tetrastichus acutiusculus* sp.n.

(Fig. 280)

♀. POL 1.8 OOL, OOL 1.5 OD. Eyes separated by 1.5 times their length. Malar space 0.77 length of eye. Antenna much like that of *miser*; scape 0.9 length of eye, reaching hardly above lower edge of median ocellus; pedicellus plus flagellum 1.2 times breadth of mesoscutum; pedicellus distinctly shorter than F1, about 1.8 times as long as broad; funicle proximally slightly stouter than pedicellus, thickening very slightly distad, its segments decreasing a little in length, F1 2.25 times, F2 1.7 times, F3 hardly 1.5 times, as long as broad; clava hardly broader than F3, equal in length to F2 plus F3, 3.0 times as long as broad. Mid lobe of mesoscutum with median line fine over posterior 0.6, obsolescent in front of this; 4 adnotaular setae on each side. Propodeal callus with 4 setae. Gaster (Fig. 280) almost or just as long as head plus thorax, as broad as thorax, nearly twice as long as broad, strongly acute; last tergite conspicuous, as long as broad; ovipositor sheaths projecting very slightly.

Colour as in *sinope*. Length 1.8 mm.

Differs from ♀ *miser* in distinctly longer and more acute gaster, slightly smaller eyes and longer malar space.

Differs from ♀ *sinope* in slightly longer and rather more acute gaster, slightly longer funicular segments, clava not longer than F2 plus F3, eyes a little smaller.

♂. Unknown.

MATERIAL EXAMINED. 1 ♀. Holotype ♀, **Great Britain**: Berkshire, Windsor Forest, 8.vi.1976 (Graham) (BMNH).

HOSTS. Unknown.

THE MURCIA-GROUP (*Tetrastichus* subgen. *Musciformia* Kostjukov, 1977).

The species included here have a rather characteristic facies which, however, is difficult to define. They are recognizable by the relatively long setae of the vertex and the moderately long to very long setae of the eyes. Besides those dealt with here, the extralimital *T. giffardianus* Silvestri and *T. giffardii* Silvestri belong to the group. The European species are parasites of Diptera Stratiomyiidae, Xylomyiidae and Syrphidae. *T. giffardianus* and *T. giffardii* have been used in biological control, against Tephritidae.

*Tetrastichus murcia* (Walker)

(Figs 255-258)

*Cirrospilus Murcia* Walker, 1839c: 177 [also 1839b: 355]. Lectotype ♂, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 39) [examined].

*Tetrastichus murcia* Walker, 1848: 146; Domenichini, 1966a: 87, 1966b: 41.

*Tetrastichus trichops* Thomson, 1878: 282. Lectotype ♀, Sweden: Lund (Thomson) (Zl), designated by Graham (1961b: 39) [examined]. *Syn.n.*

*Aprostocetus murcia* (Walker) Graham, 1961b: 39.

*Tetrastichus trichops* Thomson; Domenichini, 1966a: 88, 1966b: 52.

At the end of his paper of January 1839 (1839b: 355) Walker included a sectional diagnosis (beginning "*Mas. Corpus robustum* ...") which clearly refers to *murcia*, the only species included in this section; but he did not name the species until the first page of his subsequent paper (1839c: 177) and it is therefore validated from that date.

I have re-examined the lectotype male of *murcia* and now consider that *trichops* Thomson is conspecific.

♀. Head a little broader than mesoscutum, 2.5 times as broad as long; temples virtually nil; POL 1.5-1.6 OOL, OOL about 1.3 OD. Eyes 1.2 times as long as broad, separated by 1.5 times their length, with setae long, 0.55-0.7 OD. Malar space 0.8 length of eye. Mouth hardly greater than malar space. Setae of vertex strong and long, length about equal to OD (Fig. 256). Antenna (Fig. 255) with scape virtually as long as an eye, nearly or just reaching vertex; pedicellus plus flagellum about 1.1 breadth of mesoscutum; pedicellus 2.0-2.4 times as long as broad, virtually or just as long as F1, the length of its setae nearly or just equal to breadth of the pedicellus; funicle proximally somewhat stouter than pedicellus, thickening slightly distad, its segments decreasing in length, F1 2.0-2.1 times, F2 1.4-1.7 times, as long as broad, F3 quadrate or very slightly transverse; clava slightly broader than F3, 2.1-2.2 times as long as broad, about as long as F2 plus F3, its segments very slightly transverse, spine 0.2 length of C3; sensilla moderately numerous, in two partly overlapping rows on each funicular segment. Thorax moderately arched dorsally. Hind margin of pronotum subangularly excised, its setae suberect and long. Mid lobe of mesoscutum somewhat broader than long, moderately convex, rather dull, with excessively fine engraved reticulation, most areoles at least twice as long as broad; median line distinct over posterior 0.5 but fading out anteriorly; 4-6 long, suberect setae on each side. Scutellum rather weakly convex in profile, slightly broader than long; submedian lines 1.5-1.7 times as far from each other as from sublateral lines, enclosed space twice as long as broad. Propodeum much as in *miser*; callus with (2-) 3 setae. Hind coxae rugulose dorsally; hind femora 4.5 times as long as broad; spur of mid tibia 0.5 length of basitarsus. Forewing with costal cell slightly shorter than M, about 9 times as long as broad; M rather thin, 4.0-4.2 times length of ST, its front edge with 12-14 setae; speculum rather small, not extending below M; wing beyond it somewhat thickly and uniformly setose, setae just distad of the speculum tending to be suberect; cilia of apical margin (Fig. 257) with their setae placed farther apart than usual, and 0.4-0.6 length of ST. Hindwing obtuse, cilia 0.25 breadth of wing. Gaster (Fig. 258) ovate, as long as or somewhat longer, and as broad as or broader than thorax, acute; last tergite slightly broader than long; ovipositor sheaths projecting by a length equal or slightly less than hind basitarsus; longest seta of each cercus 1.5 times length of next longest, nearly straight.

Body with weak bluish, olivaceous and bronze tints, the head tending to be more distinctly bluish. Antennae black, scape testaceous or with dorsal edge fuscous; pedicellus sometimes pale at tip and below. Legs black; tips of femora narrowly, tibiae and tarsi, testaceous; fore tarsi tending to be brown, fourth

segment of mid and hind tarsi brown. Wings hyaline, venation testaceous. Length 1.7-2.1 mm.

♂. Differs from ♀ as follows. Antenna with scape 0.9 length of eye, length of setae near its front edge somewhat less than breadth of scape, ventral plaque 0.75 length of scape; pedicellus plus flagellum about 1.25 breadth of mesoscutum; pedicellus about as long as F1, 2.1 times as long as broad; flagellum filiform, somewhat stouter than pedicellus; funicular segments subequal in length, F1 hardly 1.5 times, F2 fully 1.5 times, F3 1.6 times as long as broad; clava 3.7 times as long as broad, about as long as F3 plus F4, with C1 somewhat shorter than F4 and 1.4 times as long as broad, C2 slightly shorter and quadrate, C3 hardly shorter than C2; whorled setae of funicular segments reach hardly beyond the tips of the segments. Gaster short-oval, shorter and narrower than thorax.

Antennal scape blackish.

MATERIAL EXAMINED. 1 ♂, 17 ♀. France, Germany, Great Britain, Sweden.

HOSTS. *Geosargus* sp. (Dipt., Stratiomyiidae); endoparasite of the pupa (Domenichini, 1966a: 88, as *trichops*).

COMMENTS. There is a Walker specimen (♀) of *murcia* in BMNH, labelled by him "Tetrastichus divisus" [nom. nud.], which is possibly British.

*Tetrastichus dasyops* sp.n.

(Figs 263-265, 295, 386)

♀. Differs from that of *murcia* (Walker) as follows. POL 1.9-2.3 OOL, OOL about 1.5 OD. Length of setae of eyes 0.45-0.55 OD. Antenna (Fig. 263) with scape reaching only to lower edge or middle of median ocellus; pedicellus plus flagellum not or hardly greater than breadth of mesoscutum; pedicellus 1.8-2.0 times as long as broad, length of its setae somewhat less than breadth of pedicellus; funicular segments decreasing less obviously in length, F1 1.7-2.0 times, F2 1.2-1.6 times, F3 1.0-1.2 times as long as broad; clava 2.1-2.35 times as long as broad. Mid lobe of mesoscutum with 3-4 adnotaular setae on each side. Submedian lines of scutellum tending to be rather less far apart. Forewing with M 3.1-3.5 times length of ST; cilia of apical margin (Fig. 264) denser, the setae placed closer together than in *murcia*. Gaster (Fig. 265) ovate, slightly acute (apical angle 60-80 degrees); last tergite as broad as, or somewhat broader than long; ovipositor sheaths not or hardly projecting; longest seta of each cercus 1.7-1.8 length of next longest, slightly kinked. Hypopygium (Fig. 386) transverse; lateral lobes moderately broad; median lobe short, tapering, obtuse. Length 1.3-1.8 mm.

♂. Differs as follows. Antenna (Fig. 295) with scape 0.9 length of eye, reaching level of vertex, about 3 times as long as broad, with length of setae near its front edge slightly less than breadth of scape, ventral plaque about 0.8 length of scape; pedicellus plus flagellum about 1.6 breadth of mesoscutum; pedicellus about equal in length to F1 and 1.8 times as long as broad; flagellum filiform, slightly stouter than pedicellus; F1 slightly shorter than the following segments, 1.8 times as long as broad, following segments subequal in length, each twice as

long as broad; clava 4 times as long as broad, slightly shorter than F3 plus F4, with C1 about 1.6 times as long as broad, C2 slightly shorter, C3 much shorter; whorled setae of funicular segments reaching slightly beyond the tips of the segments. Gaster oblong, slightly shorter and much narrower than thorax.

Antennal scape black; hind tibiae sometimes slightly infusate.

MATERIAL EXAMINED. 2 ♂, 19 ♀. Holotype ♀, **Great Britain**: Oxfordshire, Oxford, 5 Salisbury Crescent, swept from foliage of *Populus nigra*, 26.vii.1955 (Graham) (BMNH).

Paratypes. Same locality as holotype, 1 ♀, 15.vii.1955, 1 ♀, 23.vii.1955, 1 ♀, 25.vii.1955, 2 ♂, 3 ♀, 26.vii.1955, 9 ♀, 27.vii.1955, 3 ♀, 29.vii.1955 (BMNH, MVG).

HOSTS. Unknown.

*Tetrastichus atratulus* (Nees)

(Figs 260-262, 296, 385)

*Eulophus atratulus* Nees, 1834: 180. Syntypes, ♂, ♀, Germanh: Sickershausen (Nees) (destroyed).

NEOTYPE ♀, Czechoslovakia: Bohemia, Hazmburk, 3.ix.1958 (Šedivý) (BMNH), here designated [examined].

*Tetrastichus puncticoxae* Kurdjumov, 1913: 253, 255. Holotype ♀, USSR: Ukraine, Poltava (ZIL) [examined]. **Syn.n.**

[*Tetrastichus violaceus* Kurdjumov; Erdős, 1954: 362. Misidentification.]

[*Tetrastichus puncticoxe* Kurdjumov; Domenichini, 1966b: 47. Lapsus.]

[*Tetrastichus trichops* Thomson; Bouček, 1970: 73. Misidentification.]

[*Tetrastichus murcia* (Walker) Bouček, 1977b: 117. Misidentification.]

*Tetrastichus puncticoxae* Kurdjumov; LaSalle, 1986: 601.

I consider that the description of *Eulophus atratulus* Nees fits the present species well enough to make its identity certain, and have therefore designated a neotype.

LaSalle (1986: 601) reported on the holotype of *Tetrastichus puncticoxae*; I have since examined it, thanks to the kind co-operation of Dr. Trjapitzin.

♀. Differs from ♀ of *dasyops* sp.n. as follows. Setae of eyes slightly shorter, their length 0.25-0.4 OD (Fig. 261). Antenna (Fig. 260) with pedicellus plus flagellum 1.15-1.35 breadth of mesoscutum; funicle proximally hardly, or very slightly, stouter than pedicellus; funicular segments decreasing more obviously in length, F1 2.0-2.5 times, F2 1.6-2.0 times, F3 1.1-1.3 times as long as broad; clava 2.4-3.0 times as long as broad. Forewing: M 3.1-4.0 times length of ST. Gaster (Fig. 262) subobtuse apically (apical angle 60-95 degrees); last tergite broader than long, ovipositor sheaths normally not quite, or only just, reaching apex of last tergite (in the holotype of *puncticoxae* they project slightly but appear to be abnormally exerted due to distortion); longest seta of each cercus twice length of next longest, distinctly kinked. Hypopygium (Fig. 385) strongly transverse; lateral lobes moderately broad; median lobe slightly shorter, rounded apically.

♂. Differs from that of *dasyops* as follows. Antenna (Fig. 296) with ventral plaque of scape 0.63-0.68 length of scape; pedicellus plus flagellum 1.43-1.5 times breadth of mesoscutum; funicle not stouter than pedicellus; funicular segments

subequal in length, each 2.0-2.2 times as long as broad; clava about as long as F3 plus F4. Setae of eyes shorter, their length about 0.25 OD.

**MATERIAL EXAMINED.** Many  $\sigma$ ,  $\varphi$ . Czechoslovakia, France, Germany, Great Britain, Italy, Yugoslavia, USSR, Japan.

**HOSTS.** Reared in Japan from *Ptecticus tenebrifer* (Walker) (Dipt., Stratiomyiidae) but as that species is confined to Asia, *atratus* must have other hosts.

**COMMENTS.** Japanese specimens are particularly large (up to 2 mm. in  $\varphi$ ) but do not appear to differ otherwise from European examples.

In Britain I have taken *atratus* in two different localities, upon nettles (*Urtica dioica*) in autumn.

*Tetrastichus brachyopae* sp.n.  
(Figs 259, 294, 387)

[*Tetrastichus murcia* (Walker) Domenichini, 1967: 77, in part. Misidentification.]

$\varphi$ . Differs from that of *murcia* (Walker) as follows. Setae of vertex shorter, their length 0.5-0.55 OD. POL 1.7-2.0 OOL, OOL slightly greater than OD. Eyes 1.35 times as long as broad, separated by 1.3 times their length, with short setae the length of which is about 0.2 OD. Antenna (Fig. 259) with scape 0.9 length of eye, reaching median ocellus; pedicellus twice as long as broad, hardly shorter than F1, length of its setae only about 0.5 breadth of pedicellus; F1 1.5-1.7 times, F2 1.4-1.5 times as long as broad, F3 subquadrate; clava 2.2-2.3 times as long as broad. Mid lobe of mesoscutum with 3-4 slightly reclinate setae on each side. Scutellum with submedian lines equidistant from each other and from sublateral lines, enclosed space 2.6-2.8 times as long as broad. Forewing with costal cell about as long as M, 10-13 times as long as broad; M 3.5 times length of ST; speculum small, extending only a little way below M, wing beyond it somewhat sparsely pilose, the setae finer than in *murcia* and standing up rather less strongly. Gaster with ovipositor sheaths projecting slightly less; one seta of each cercus nearly twice the length of next longest, and kinked or bisinuate. Hypopygium (Fig. 387) moderately transverse; lobes equal in length, lateral lobes broad, median lobe moderately broad, subobtusate.

Colour as in *murcia*. Length 1.6-1.95 mm.

$\sigma$ . Differs as follows. Antenna (Fig. 294) with scape 0.83 length of eye, reaching only to level of middle of median ocellus, ventral plaque 0.62 length of scape, length of longest seta near front edge much less than breadth of scape; pedicellus plus flagellum 1.4 times breadth of mesoscutum; pedicellus about as long as F1, 1.8 times as long as broad; funicle filiform, slightly stouter than pedicellus; funicular segments increasing very slightly in length, F1 1.5-1.55 times, F2 1.75-1.85 times, F3 1.85-2.0 times, F4 1.97-2.0 times as long as broad; clava not broader than funicle, 4.6 times as long as broad, slightly longer than F3 plus F4; whorled setae of funicular segments reaching somewhat beyond the tips of



the segments. Gaster oblong-oval, shorter and narrower than thorax. Length 1.2-1.4 mm.

**MATERIAL EXAMINED.** 11 ♂, 39 ♀. Holotype ♀, **Czechoslovakia:** Moravia, Bílovice nad Svitavou, reared iv.1960 from pupa of *Brachyopa* sp. (J. Dušek) (BMNH).

Paratypes. Same data as holotype, 11 ♂, 38 ♀. (BMNH).

**HOSTS.** *Brachyopa* sp. (Dipt., Syrphidae).

**COMMENTS.** The above material of *brachyopae* was misidentified as *murcia* (Walker) by Domenichini (1967).

*Tetrastichus solvae* sp.n.

(Fig. 266)

♀. Differs from that of *murcia* as follows. POL about twice OOL. Longest setae of vertex 0.8 OD. Setae of eyes 0.4-0.5 OD. Antenna (Fig. 266) with scape reaching lower edge of median ocellus; pedicellus as long as F1 and 1.35-1.5 times as long as broad; funicular segments subequal in length, F1 and F2 each 1.1-1.25 times as long as broad, F3 quadrate to 1.1 times as long as broad; clava 2.6-2.8 times as long as broad, spine more prominent, 0.3-0.35 length of C3. Mid lobe of mesoscutum: median line absent or traceable just for a short distance in front of scutellum; 3 adnotaular setae on each side. Mesoscutum and scutellum rather more delicately sculptured and slightly more shiny. Forewing with M 3.65-3.85 length of ST, its front edge with 10 setae. Gaster subcircular, shorter than but about as broad as thorax, its apex forming an obtuse angle; last tergite very short, much broader than long; ovipositor sheaths hardly projecting.

Head and thorax black, non-metallic or with a weak bluish tinge in places; gaster with a more distinct bluish tint. Length 1.1-1.4 mm.

♂. Differs as follows. Antennal scape 2.8 times as long as broad, just reaching vertex, ventral plaque 0.6 its length, setae near front edge broken off, but their length was probably less than breadth of scape; pedicellus 1.25 times length of F1 and twice as long as broad; funicle hardly stouter than pedicellus, nearly filiform; F1 slightly shorter than F2 and 1.5 times as long as broad, following segments subequal in length, each about 1.8 times as long as broad; clava hardly broader than F4, 3.6 times as long as broad, somewhat longer than F3 plus F4; each funicular segment with a compact whorl of dark setae which reach slightly beyond the tip of the segment. Median line of mesoscutum fine but traceable over about posterior 0.5. Gaster short-oval, much shorter than thorax. Length about 1.1 mm.

**MATERIAL EXAMINED.** 2 ♂, 2 ♀. Holotype ♀, **Spain:** Canary Islands, Tenerife, Barranco de Bufadero, reared 25.v.1971 from *Solva* (= *Xylomyia*) *cabreræ* (J. Menier) (BMNH).

Paratypes. Same data as holotype, 2 ♂, 1 ♀ (BMNH).

**HOSTS.** *Xylomyia cabreræ* (Becker) (Dipt., Xylomyiidae) in twigs of *Euphorbia canariensis*.

THE *CLITO*-GROUP

Differs from *miser*-group in the characters summarised in the second part of couplet 2 of key to females.

*Tetrastichus melasomae* sp.n.  
(Figs 268, 388)

♀. Superficially resembles ♀ *lyridice* (Walker) but readily distinguished from it by its very narrow, almost parallel-sided costal cell. It also has weaker reticulation of the externo-dorsal surface of the hind coxae, while the malar space is shorter; 0.5-0.55 length of eye.

POL virtually twice OOL. Antenna (Fig. 268) with scape 0.84-0.87 length of eye; pedicellus plus flagellum 1.23-1.25 breadth of mesoscutum; pedicellus much shorter than F1 and twice as long as broad; funicular segments subequal in length, each 2.1-2.5 times as long as broad; clava 3.8-4 times as long as broad, hardly as long as F3 plus F4, without a constriction between C1 and C2; setae of flagellum standing out only slightly. Mid lobe of mesoscutum with 3-4 adnotaular setae on each side. Propodeal callus with 1 or 2 setae near spiracle and 1 farther back. Forewing with costal cell 13-17 times as long as broad. Gaster ovate, about as long as head plus thorax, 1.6-1.9 times as long as broad, acute; last tergite slightly broader than long. Hypopygium (Fig. 388) moderately transverse; lateral lobes broad; median lobe narrower, subobtusate.

Body bright blue to greenish-blue; hind margins of gastral tergites narrowly purplish. Antennal scape yellow, sometimes infuscate dorsally; rest of antennae brown. Coxae coloured like body; femora except their tips broadly black; legs otherwise yellow, with claws sometimes fourth tarsal segment brown. Wings hyaline, venation yellowish to testaceous. Length 1.5-1.8 mm.

♂. Unknown.

MATERIAL EXAMINED. 7 ♀. Holotype ♀, Czechoslovakia: Moravia, Mohelno, reared 21.vi.1964 from *Melasoma* (= *Chrysomela*) *vigintipunctata* (Hrdý) (BMNH).

Paratypes. Same data as holotype, 6 ♀ (BMNH).

HOSTS. *Chrysomela vigintipunctata* (L.) (Col., Chrysomelidae).

COMMENTS. This species seems best placed in the *clito*-group although in some respects it is intermediate between that and the *miser*-group.

*Tetrastichus clito* (Walker)  
(Figs 283-285, 307, 389)

*Cirrospilus Clito* Walker, 1839c: 30. Lectotype ♂, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 39) [examined].

*Eulophus cassidae* Dufour, 1846: 20. Syntypes ♂, ♀. France: ex *Cassida murrea* (Dufour) (not located). *Syn.n.*

*Entedon Cassidarum* Ratzeburg, 1852: 248. Syntypes, Germany: unlocalised (von Siebold, Rosenhauer) (destroyed). *Syn.n.*

? *Tetrastichus cassidarum* (Ratzeburg) Kurdjumov, 1912: 240.

*Aprostocetus clito* (Walker) Graham, 1961b: 39.

*Tetrastichus clito* (Walker); Peck, 1963: 128; Domenichini, 1966a: 89, 1966b: 25.

The brief description of *Eulophus cassidae* Dufour, and the host cited, *Cassida maculata* (= *murraea* L.), agree rather well with some specimens of *clito* recently taken in France. Hence I regard *cassidae* as a synonym of *clito*.

Ratzeburg's description of *Entedon cassidarum*, which he compared with his *medianus* [*miser* (Nees)] is very brief. He stated that his material had been twice reared "aus Käfern (*Cassida*)" by von Siebold and by Rosenhauer. Curiously, in his host-list he did not mention *Cassida*, but (1852: 250) listed *Entedon cassidarum* as a parasite of *Chrysomela 12-punctata*. The only species recorded from this host are *Tetrastichus coeruleus* (Nees) and *T. crioceridis* Graham, neither of which fit the description of *cassidarum*. In any case, he first cited *Cassida* sp. as the host. Assuming the latter host record to be correct, *T. clito* (Walker) would accord both with the host, and in structure, and in colour if one takes northern European specimens which tend to have darker legs. I feel certain that *clito* was the species Ratzeburg had before him when describing *cassidarum*. Kurdjumov's redescription (1912) of *cassidarum* might also apply to some females of *clito*. Other authors, e.g. Manolache et al. (1936, 1939) misidentified *cassidarum*.

♀. Head (Fig. 283) tending to collapse somewhat, about 2.5 times as broad as long; temples 0.13 length of eyes; POL about 1.4 OOL, OOL 1.6-1.7 OD. Eyes separated by 1.4 times their length, with extremely short setae. Malar space 0.75 length of eye. Mouth 1.2 malar space. Antenna (Fig. 284) with scape 0.9 length of eye, not quite, or just, reaching median ocellus; pedicellus plus flagellum 1.25-1.35 breadth of mesoscutum; pedicellus 1.9-2.0 times as long as broad, from a little shorter than to very slightly longer than F1; funicle filiform, somewhat stouter than pedicellus, with segments subequal in length, or F3 slightly shorter than the others. F1 1.5-1.8 times, F2 1.5-1.7 times, F3 1.5-1.6 times as long as broad; clava not broader than funicle, about as long as F2 plus F3 in larger specimens, but somewhat longer in very small ones, 3.1-3.6 times as long as broad, acutely pointed, with C1 quadrate or slightly longer than broad, C2 slightly shorter and quadrate, these two separated by a rather strong constriction, C3 still shorter, spine 0.3 length of C3. Thorax 1.5 times as long as broad, moderately arched dorsally. Mid lobe of mesoscutum slightly broader than long, moderately convex; median line very fine, often obsolescent anteriorly; (2-) 3 fine reclinate setae on each side. Scutellum about 1.2 times as broad as long, moderately convex in profile; submedian lines equidistant from each other and from sublateral lines, or hardly nearer the latter, enclosed space 2.4-2.8 times as long as broad; length of setae nearly equal to distance between submedian lines. Propodeum 1.4-1.6 length of dorsellum, only slightly shiny, with slightly raised reticulation which is fine in larger specimens but often coarse in smaller ones, occasionally irregular; median carina thin but expanding in posterior 0.3; plicae weak, sometimes represented by a groove; length of spiracles 0.3 length of propodeum at their level; callus with 1 seta outside spiracle and 1 (-3) farther back. Legs rather slender; hind coxae somewhat shiny, with very fine, usually

very slightly raised reticulation; spur of mid tibia 0.65-0.72 length of basitarsus. Forewing (Fig. 185) with costal cell slightly shorter than or nearly as long as M, 10-11.5 times as long as broad, M 2.5-3.4 times length of ST, its front edge with 9-15 setae; speculum small, not extended below M, wing beyond rather thickly pilose, especially distad; ST rather thin proximally but expanded in distal 0.5; cilia 0.3-0.4 length of ST. Hindwing subobtusate (large specimens) or acute (small specimens), cilia 0.28-0.33 breadth of wing. Gaster short-ovate, about as long as or slightly longer than thorax, slightly broader than thorax, 1.2-1.6 times as long as broad, apical angle varying from slightly acute to slightly obtuse; last tergite broader than long; longer seta of each cercus nearly twice length of next longest, curved or kinked; ovipositor sheaths virtually or just reaching apex of last tergite; tip of hypopygium at 0.6 length of gaster. Hypopygium (Fig. 389) moderately transverse; lobes subequal in length, moderately broad; median lobe rounded.

Black, usually with weak, sometimes hardly perceptible, bluish to greenish-blue tinge, somewhat brighter in southern forms. Antennae black or brown, scape sometimes yellowish beneath, or wholly so. Coxae, trochanters, and femora extensively or mainly black; tibiae yellow in southern forms but more or less infusate in others, sometimes black with only bases narrowly reddish; tarsi yellowish with tips brown, partly infusate or wholly so in dark forms. Wings hyaline, venation yellow to fuscous. Length 1.3-1.8 mm.

♂. Differs as follows. Antenna (Fig. 307) with scape about as long as eye, about 3 times as long as broad, ventral plaque 0.65-0.75 length of scape; pedicellus plus flagellum 1.6-1.7 times breadth of mesoscutum; pedicellus 1.6-1.7 times as long as broad, as long as or slightly longer than F1; flagellum virtually filiform, somewhat stouter than pedicellus, F1 distinctly shorter than F2 and 1.27-1.53 times as long as broad, F2 as long as or slightly shorter than F3 and 1.5-1.65 times as long as broad, F3 and F4 subequal in length, each 1.55-1.9 times as long as broad; clava not broader than F4, 3.8-4.6 times as long as broad, as long as or somewhat longer than F3 plus F4; each funicular segment with a compact subbasal whorl of dark setae which reach somewhat beyond the tip of the segment; C1 with two partial whorls of such setae. Gaster oblong, slightly shorter, and narrower, than thorax.

**MATERIAL EXAMINED.** 10 ♂, many ♀. Czechoslovakia, France, Germany, Great Britain, Canada.

**HOSTS.** *Cassida murraea* L., *C. rubiginosa* Muller, *C. deflorata* Suffrian (Col., Chrysomelidae).

### *Tetrastichus epilachnae* (Giard)

*Lygellus epilachnae* Giard, 1896: 839. Syntypes, France: Saint-Roch, near Valenciennes (not located).

*Tetrastichus Jablonowskii* Széleányi, 1940: 85, 86-88, figs 1, 2. Holotype ♀, Hungary: Budapest, Hármashatárhegy, 11.vi.1934 (GS) [examined]. [Synonymised with *epilachnae* by Domenichini, 1966a: 92.]

*Aprostocetus jablonowskii* (Széleányi) Graham, 1961b: 39.

*Tetrastichus epilachnae* (Giard) Domenichini, 1966a: 92, 1966b: 30.

Many years ago I examined the holotype of *Tetrastichus jablonowskii* Szelenyi and made notes on it and some paratypes of both sexes. The holotype carried the following labels: "TYPUS [red label]; Budapest 11.vi.1934 dr. Szelenyi; Hármashatárhegy; Subcoccinella XXIV-punctata paras.; Tetrastichus jablonowskii n.sp.det. DR SZELÉNYI; 2446." More recently the late Dr Szelenyi informed me that the original material had been destroyed. I base my interpretation of *epilachnae* (Giard) upon my study of the holotype and paratypes of *jablonowskii*.

♀. Extremely close to ♀ *clito* but has slightly longer and rather more acute gaster in the material seen; the tibiae are yellow. Some specimens of *clito* have yellow tibiae and are not easy to distinguish from *epilachnae*. Accurate determination may have to rest on rearing data. The hosts of *epilachnae* are species of Coccinellidae, whereas I have seen *clito* reared only from *Cassida* species.

♂. Differs from that of *clito*, so far as can be determined from limited material, in having antennal scape slightly broader, about 2.8 times as long as broad, with shorter ventral plaque, 0.55-0.58 length of scape; the pedicellus slightly longer; flagellum apparently rather more slender.

MATERIAL EXAMINED. 2 ♂, 4 ♀. **France, Hungary, Sweden.**

HOSTS. *Epilachna argus* (Geoffroy in Fourcroy), *E. chrysomelina* F., *Subcoccinella vigintiquatuor punctata* (L.) (Col., Coccinellidae). The biology has been described in detail (as *jablonowskii*) by Szelenyi (1940). The species is a gregarious, endophagous parasite of the host larvae and pupae.

*Tetrastichus pilemostomae* sp.n.  
(Fig. 282)

♀. Head somewhat collapsed so that its proportions cannot be accurately measured; temples extremely short. Malar space about 0.75 length of eye. Mouth slightly greater than malar space. Mandibles rather small. Antenna (Fig. 282) with scape more than 0.75 length of eye; pedicellus plus flagellum about 1.3 times breadth of mesoscutum; pedicellus about as long as F1 and twice as long as broad; funicle nearly filiform, very slightly stouter than pedicellus; F1 slightly shorter than F2 and 1.5-1.8 times as long as broad, F2 the longest segment and 2.0-2.2 times as long as broad, F3 slightly shorter than F2 but a little longer than F1, 1.7-2.0 times as long as broad; clava 4.0-4.7 times as long as broad, somewhat longer than F2 plus F3, acute, spine prominent and about 0.5 length of C3; sensilla rather sparse, in one irregular row on each segment. Thorax about 1.4 times as long as broad, sculptured a little more finely than in *miser*. Mid lobe of mesoscutum with median line fine, evanescent anteriorly; usually with 3 adnotaular setae (in one ♀ 2) on each side. Scutellum about 1.2 times as broad as long; submedian lines distinctly nearer to sublateral lines than to each other, enclosed space 2.0-2.3 times as long as broad. Propodeum as in *miser* except in the characters noted for the species-group of *clito*; callus with 2 setae, one outside spiracle, the other farther back. Legs rather slender; spur of mid tibia about 0.5 length of basitarsus. Forewing about 2.25 times as long as broad; costal cell 14-15 times as long as broad; M 3.0-3.3 times length of ST, its front

edge with 9-10 setae; speculum small, not extended below M, wing beyond rather thickly pilose; cilia 0.3 length of ST. Hindwing acute, cilia 0.3-0.4 breadth of wing. Gaster short-ovate, slightly longer than thorax, 1.25-1.4 times as long as broad; apex forming a right angle or slightly acute angle; last tergite broader than long; ovipositor sheaths hardly projecting beyond last tergite; longest seta of each cercus nearly twice length of next longest, sinuate.

Body a fairly bright blue-green or blue. Antennal scape and pedicellus black, flagellum fuscous. Coxae, trochanters, femora mainly black; tips of femora and all tibiae testaceous; fore tarsi brownish, mid and hind tarsi testaceous with tips fuscous. Wings hyaline, venation brownish-testaceous. Length 1.0-1.3 mm.

♂. Unknown.

MATERIAL EXAMINED. 10 ♀. Holotype ♀, **Great Britain:** Berkshire, Wytham, reared xi.1951 from a pupa of *Pilemostoma fastuosa* (B.M. Hobby) (UM).

Paratypes. 9 ♀, same data as holotype (UM, BMNH).

HOSTS. *Pilemostoma fastuosa* (Schaller) (Col., Chrysomelidae).

*Tetrastichus decrescens* sp.n.

(Fig. 281)

♀. Head about 2.5 times as broad as long; temples virtually nil; POL 1.7-2.0 OOL, OOL 1.3-1.45 OD. Eyes separated by 1.45 their length. Malar space 0.6 length of eye. Mouth 1.25 malar space. Frons with fine median longitudinal carina extending nearly to median ocellus. Antenna (Fig. 281) with scape 0.8-0.9 length of eye, reaching lower edge of median ocellus; pedicellus plus flagellum about 1.55 breadth of mesoscutum; pedicellus distinctly shorter than F1, 1.8 times as long as broad; flagellum proximally very distinctly stouter than pedicellus but normally tapering very slightly distad (sometimes the distal part of the flagellum collapses so that the tapering is obscured); funicular segments subequal in length, F1 1.8-2.0 times, F2 and F3 each 2.0-2.2 times as long as broad; clava 3.8-4.8 times as long as broad, as long as or hardly longer than F2 plus F3, with C1 1.3-1.8 times as long as broad, C2 and C3 progressively shorter, spine 0.2-0.3 length of C3; sensilla moderately numerous, in two overlapping rows on each funicular segment. Thorax about 1.35 times as long as broad. Mid lobe of mesoscutum slightly broader than long; median line fine but distinct; 3-4 reclinate adnotaular setae on each side. Scutellum about 1.2 times as broad as long; submedian lines slightly nearer to sublateral lines than to each other, enclosed space 2.2-2.25 times as long as broad; length of setae slightly less than distance between submedian lines. Propodeum medially 1.2-1.5 length of dorsellum; rather irregularly reticulate; plicae fine; in one female also some oblique striae; median carina thin except in posterior 0.3 where it is expanded; length of spiracles about 0.25 length of propodeum at same level; space between plicae and paraspicular carinae rather flat; callus with 1 seta outside spiracle and 1 near hind corner. Legs rather slender; hind coxae rather dull, with fine, very slightly raised reticulation; spur of mid tibia 0.65 length of basitarsus. Forewing with costal cell slightly shorter than M, 12-13 times as long as broad; M not thick, 2.6-3.1 times length of ST, its front edge with 12-15 setae; ST rather thin basally,

expanded moderately in distal 0.5; speculum small, extended as a narrow strip some distance below M, wing beyond rather thickly pilose, quite thickly distad; cilia about 0.3 length of ST. Hindwing slightly acute, cilia 0.3 breadth of wing. Gaster long-ovate, about as long as or slightly longer than head plus thorax, about as broad as thorax, 2.0-2.2 times as long as broad, acute, sometimes slightly acuminate; last tergite nearly as long as broad; ovipositor sheaths projecting very slightly; tip of hypopygium at 0.4 length of gaster.

Body usually mainly dark blue or blue-green (but mainly bronze in holotype); gaster sometimes with greenish tinge. Antennae black; scape pale beneath in distal 0.5. Coxae and femora except tips, coloured like body; trochanters mainly fuscous; rest of legs testaceous or yellow with fore tarsi brown, tips of mid and hind tarsi brownish. Wings hyaline, venation brownish-testaceous. Length 1.4-1.6 mm.

♂. Unknown.

MATERIAL EXAMINED. 7 ♀. Holotype ♀, Sweden: Uppland, Ekerö, 6.viii.1959 (H. von Rosen) (BMNH).

Paratypes. Czechoslovakia: 1 ♀, Bohemia, Pchorany u Litomeric, 11.v.1954 (Bouček) (BMNH). France: 1 ♀, Bouches du Rhône, Camargue, 9.vii.1980, in a reed-bed; 2 ♀, Meuse, Dompcevrin, 3. or 4.vi.1985 (Gijswijt) (MJG). Great Britain: 1 ♀, Oxfordshire, Lewknor, 12.vi.1970; 1 ♀, Middlesex, Southgate, 19.ix.1969 (Graham) (BMNH).

HOSTS. Unknown.

### *HOLCOTETRASTICHUS* Graham

*Holcotetrastichus* Graham, 1987: 23-24, 30, 37, figs 34, 35. Type-species: *Cirrospilus rhosaces* Walker, by original designation.

DIAGNOSIS. The true position of this genus is difficult to determine. In many respects it agrees with *Aprostocetus*, but differs in having anterior margin of clypeus truncate, also in the shape of the female hypopygium, and in the deep, transversely costate sublateral lines of the scutellum in both sexes (Graham, 1987, figs 35, 34) as well as the relatively long, strong reticulate propodeum with plicae indicated posteriorly, and the entire rim of the propodeal spiracles exposed.

DISTRIBUTION. Europe, India.

BIOLOGY. Parasitic upon several species of *Cassida* (Col., Chrysomelidae).

### *Holcotetrastichus rhosaces* (Walker)

(Figs K22, K23, 308, 309)

*Cirrospilus Rhosaces* Walker, 1839a: 293. Lectotype ♀, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 37) [examined].

*Cirrospilus Racilla* Walker, 1839a: 312. Lectotype ♀, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 37) [examined]. [Synonymised with *rhosaces* by Graham, 1961b: 37.]

[*Tetrastichus atratulus* (Nees) Thomson, 1878: 282. Misidentification.]

*Aprostocetus rhosaces* (Walker) Graham, 1961b: 37.

?*Tetrastichus rhosaces* (Walker) Szélnyi, 1964: 207-210.

*Tetrastichus rhosaces* (Walker) Domenichini, 1866a: 179-180, 1966b: 47.

*Holcotetrastichus rhosaces* (Walker) Graham, 1987: 23, 37, figs 34, 35.

♀. Vertex, sides of pronotum, prepectus, metapleuron and propodeum with stronger, raised reticulation. Head 1.1-1.13 times as broad as mesoscutum, about 2.5 times as broad as long; temples 0.12 length of eyes; POL 1.4-1.6 OOL, OOL nearly twice OD. Eyes 1.25 times as long as broad, separated by 1.5 times their length. Malar space 0.7 length of eye, sulcus nearly straight. Mouth equal to malar space. Antenna (Fig. 308) with scape as long as eye, reaching lower edge of median ocellus; pedicellus plus flagellum about equal to breadth of mesoscutum; pedicellus slightly longer than F1, 1.8-2 times as long as broad; funicle hardly stouter than pedicellus, its segments subequal in length or decreasing very slightly, F1 1.2-1.6 times, F2 1.1-1.3 times, F3 1.0-1.3 times as long as broad; clava slightly broader than funicle, longer than F2 plus F3, 3.2-3.4 times as long as broad, spine as long as C3. Thorax (Graham, 1987, fig. 34) with mid lobe of mesoscutum slightly broader than long, strongly convex; median line absent or indicated only posteriorly; 2 fine adnotaular setae of equal length on each side, before and behind the middle; reticulation very fine, almost engraved anteriorly but a little raised posteriorly, areoles hardly longer than broad; notauli very deep. Scutellum subrectangular; submedian lines rather weak, about equidistant from each other and from sublateral lines, enclosed space about 2.5 times as long as broad; anterior setae in middle. Propodeum medially 1.5 times length of dorsellum; surface dull, with fine though strong distinctly raised reticulation; median carina sharp, raised, narrow; plicae indicated at posterior margin; spiracles moderate-sized, circular, nearly their diameter from metanotum; inner edge of callus forming a ridge, with 3-4 setae. Legs rather slender; hind coxae with strong raised reticulation; spur of mid tibia about 0.5 length of basitarsus. Forewing broad; SM with 2 dorsal setae: costal cell very narrow, slightly longer than M, the latter rather thick and 2.75-3.2 times length of ST; ST hardly expanded apically; PM a distinct stub; speculum small, wing beyond it rather thickly pilose. Hindwing slightly pointed, cilia 0.25-0.4 breadth of wing. Gastral petiole short, distinctly broader than long, usually slightly reticulate or granulate. Gaster subcircular to short-oval, shorter than but usually slightly broader than thorax; basal tergite 0.3-0.5 of total length, its hind margin straight with a weak median emargination, following tergites strongly transverse, the last forming a short point; all tergites with weak alutaceous sculpture; longest seta of each cercus fully 1.5 length of next longest; tips of ovipositor sheaths not quite reaching apex of last tergite. Hypopygium, see Graham, 1987, fig. 35.

Black, non-metallic, rather dull; pedicellus and flagellum usually brown; trochanters more or less pale; tips of fore and mid femora broadly, of hind femora narrowly, the tibiae, tarsi except their tips, testaceous (hind tibiae sometimes more or less infuscate). Tegulae black. Wings faintly yellowish; venation testaceous to brown. Length 1.1-1.5 mm.

♂. Differs as follows. Antenna (Fig. 309) with scape broader, ventral plaque about 0.65 length of scape; pedicellus plus flagellum 1.3-1.35 times breadth of mesoscutum; flagellum tapering slightly distad; F1 usually slightly shorter than F2



and quadrate to slightly transverse, following segments subequal in length, each 1.2-1.6 times as long as broad; each segment of funicle with a compact subbasal whorl of fine dark setae which reach well beyond the tip of the segment. Gaster oblong, shorter and narrower than thorax.

**MATERIAL EXAMINED.** 9 ♂, many ♀. **Austria, Czechoslovakia, France, Germany, Great Britain, Hungary, Ireland, Italy, Romania, Sweden, Switzerland, Moldavian SSR.**

**HOSTS.** *Cassida deflorata* Suffrian, *C. nebulosa* L., *C. murrea* L., *C. nobilis* L., *C. rubiginosa* Müller, *C. viridis* L., *C. vittata* de Villers (Col., Chrysomelidae). Gregarious endoparasite of host larvae and pupae. For further information on biology see Domenichini (1966b: 47). Szelényi's record (1964) of *rhosaces* may not be correct as he cited as probable synonyms two other names which certainly do not refer to *rhosaces*, and I have not located his material.

*Holcotetrastichus manaliensis* sp.n.

♀. Differs from that of *rhosaces* (Walker) as follows. Antenna with pedicellus plus flagellum about 1.3 times breadth of mesoscutum. Median line of mesoscutum traceable throughout, strong in the holotype. Scutellum with submedian lines distinct, slightly nearer to sublateral lines than to each other. Propodeum shiny, its sculpture very weak. Forewing: SM with 2-3 dorsal setae; M 2.4-2.7 times length of ST. Gastral petiole hardly broader than long, with some reticulation or with an indication of a median and lateral longitudinal carinae. Gaster more shiny, its sculpture obsolescent.

Antennal scape, pedicellus, and legs including mid and hind coxae, testaceous. Wing-venation pale yellowish. Length 1.2-1.4 mm.

♂. Unknown.

**MATERIAL EXAMINED.** 2 ♀. Holotype ♀, **India:** Himachal Pradesh, Manali, 12.x.1979 (Bouček) (BMNH).

Paratype. Same data as holotype but 11.x.1979, 1 ♀ (BMNH).

**HOSTS.** Unknown.

*SPHENOLEPIS* Nees

*Sphenolepis* Nees, 1834: 256-257. Type-species: *Sphenolepis pygmaea* Nees, by monotypy.

*Sphenolepis* Nees; Bouček, 1961a: 475-480; Graham, 1961b: 37, 1987: 28, 35.

*Peltephorus* Erdős, 1961: 483. Type-species: *Peltephorus apheliniformis* Erdős, 1961, by monotypy and original designation. **Syn.n.**

This genus remained a mystery for many years, until Bouček (1961a) recognized its type-species and gave a full discussion of it with a re-description and figures. His conclusion was confirmed by Graham, who had found a drawing of the type-species, made by Westwood (see Graham, 1988).

**DIAGNOSIS.** The characters distinguishing the genus were indicated by Graham (1987). Synapomorphies are the steeply sloping propodeum with very small

circular spiracles; strong sculpture of mesoscutum with areoles not much longer than broad; dimorphism in ♀ (winged and brachypterous forms); reduction of anelli to 2; reduction of dorsal setae on SM to 1; separation of first claval segment of male by a peduncle.

DISTRIBUTION. Europe.

### *Sphenolepis pygmaea* Nees

*Sphenolepis pygmaea* Nees, 1834: 258-259. Holotype ♀, Germany: near Sickershausen, 25.viii.1812 (Nees) (destroyed). NEOTYPE ♀, Czechoslovakia: Bohemia, Unhošť-Poteply, 30.vi.1965 (Strejček) (BMNH), here designated [examined].

*Peltephorus apheliniformis* Erdős, 1961: 483-484. Holotype ♀, Hungary: Budapest, Hűvösvölgy, 15.viii.1931 (Biró) (TM) [examined]. [Synonymised with *pygmaea* by Domenichini, 1966a: 106.]

*Sphenolepis pygmaea* Nees; Bouček, 1961a: 476-479; Graham, 1988: 33, fig. 9.

*Tetrastichus pygmaeus* (Nees) Domenichini, 1966a: 106-107, 1966b: 47.

For a full re-description and figures, see Bouček (1961a). A small drawing by Westwood of the holotype ♀ is reproduced in Graham (1988). The ♂ genitalia were figured in Graham (1987, fig. 542).

MATERIAL EXAMINED. 4 ♂, 4 ♀. **Czechoslovakia, France, Hungary, Italy.** The following are new records of this rare species. **France:** 1 ♂, Jonte gorges, Plombal, near Gatuzières, 9.vii.1977, on a grassy slope (Graham) (BMNH). **Italy:** 1 ♂, Como prov., Lanzo d'Intelvi, ca. 1100 m., forest, 12.viii.1982 (C. van Achterberg) (ITZ).

HOSTS. Unknown.

### *TAMARIXIA* Mercet

*Tamarixia* Mercet, 1924: 57-58. Type-species: *Tamarixia bicolor* Mercer, 1924, by monotypy and original designation.

[*Aprostocetus* Westwood; Graham, 1961b: 41-42, in part. Misidentification.]

[*Tetrastichus* Haliday; Domenichini, 1966a: 81-86, in part, 1966b: 15-54, in part, 1967: 76; Burks in Krombein et al., 1979: 990-1002, in part. Misidentifications.]

*Tamarixia* Mercet; Graham, 1987: 29, 36; Bouček, 1988: 596-695.

This is a distinctive genus with strongly apomorphic state of three characters: the male genitalia, which seem to be unique in Tetrastichinae; the characteristic female hypopygium; and the adnotaular setae of the mesoscutum, two on each side, of nearly equal length. Additional apomorphic features which, however, recur in other genera, are: truncate margin of clypeus, lacking distinct teeth; reduction of dorsal setae of submarginal vein to one.

DIAGNOSIS. Head in front view with genae converging strongly. Malar sulcus straight or nearly so, not foveate. Anterior margin of clypeus truncate, with at most two minute, widely-separated tubercles. Antenna of ♀ with one transverse anellus and sometimes a rudimentary laminar second anellus; funicle with 3 segments, clava usually with 3 (rarely, solid). Antenna of ♂ with a very small or minute ventral plaque on the scape, placed near the middle; funicle with 4

segments, clava with 3; each funicular segment bears a compact subbasal whorl of very long dark setae. Thorax short and squat; scutellum rather strongly transverse. Pronotum short. Mid lobe of mesoscutum with 2 setae on each side, these equal or subequal in length and tending to be suberect. Scapular flanges sublinear. Scutellum with submedian lines; sublateral lines neither broad nor deep. Propodeum with median carina normally thin, expanded only near hind end, usually sharp; plicae and paraspircular carinae absent; spiracles small or moderate-sized, subcircular, close to metanotum, the outer part of their rim tending to be partly covered by a flap of the callus. Mesosternum, just in front of trochantal lobes, somewhat convex; precoxal suture weak but usually traceable to about 0.6 length of mesosternum. Hind coxae without dorsal carina or rugulose sculpture. First segment of mid and hind tarsi as long as second. Forewing with costal cell from very slightly to much longer than M; SM with 1 dorsal seta; M sometimes rather thick; PM absent or rudimentary; ST from very short to moderately long. Hindwing acute. Gaster of ♀ subcircular to ovate; ovipositor sheaths not or hardly projecting; ovipositor relatively short; one seta of each cercus 1.5 times or more the length of the next longest. Hypopygium (Figs 391, 392) with anterior margin truncate; disc with a few setae which arise from linear ridges. Genital armature of ♂ 4-8 times as long as broad; digitus 4-6 times as long as broad, its outer edge extended as a curved hook or spine which is not articulated. Body black or occasionally partly yellow (head and/or gaster), non-metallic or weakly metallic.

DISTRIBUTION. All continents.

BIOLOGY. Parasites of immature stages of Hemiptera Psylloidea, especially Trioziidae.

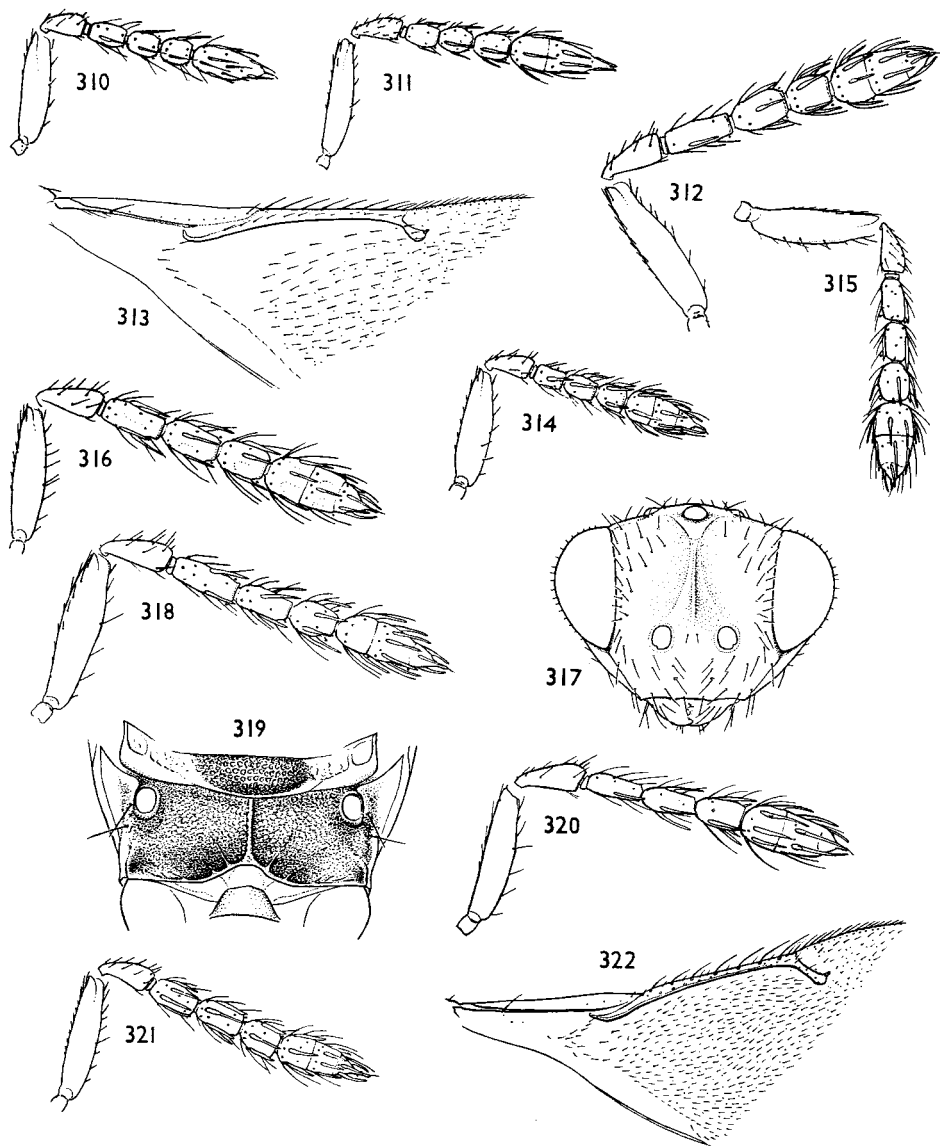
COMMENTS. The following extralimital species belong to *Tamarixia*. *Tamarixia akkumica* (Kostjukov, 1978), **comb.n.**, *T. caillardiae* (Kostjukov, 1978), **comb.n.**, *T. flaviventris* (Kostjukov, 1978), **comb.n.**, *T. rudolfae* (Kostjukov, 1978), **comb.n.**, *T. turundaevskyae* (Kostjukov, 1978), **comb.n.**, in the USSR (all from *Tetrastichus* Haliday). The Ethiopian *Tamarixia dryi* (Waterston) and *T. radiata* (Waterston) were transferred to this genus from *Tetrastichus* by Bouček (1988: 695); *Tamarixia flavigaster* (Brothers & Moran, 1969) **comb.n.** from *Tetrastichus* belongs here; possibly also *Tetrastichus psyllidis* Khan & Shafee, 1981. Two North American species belong to *Tamarixia*: *T. dyra* (Burks, 1943), **comb.n.**, and *T. triozae* (Burks, 1943). Bouček (1988b) has described *Tamarixia leucaenae* from Trinidad. Two Australian species have been referred to *Tamarixia* (see Bouček, 1988a: 696).

The unusual structure of the male genitalia was noted by Burks (1943: 543) in *dyra*, *triozae*, *dryi* and *radiata*. This author also recognized the importance of the subequal adnotaular setae in [*Tetrastichus*] *dyrus* and *triozae*, although in his key to species (1843: 512) there is an error in both parts of couplet 23. In the first part the statement "anterior and posterior praescutal bristles approximately the same size" should be transposed with the opposing statement in the second part "posterior praescutal bristles larger and longer than the anterior ones", so as to lead to couplet 24 which includes *dyrus* and *triozae*.

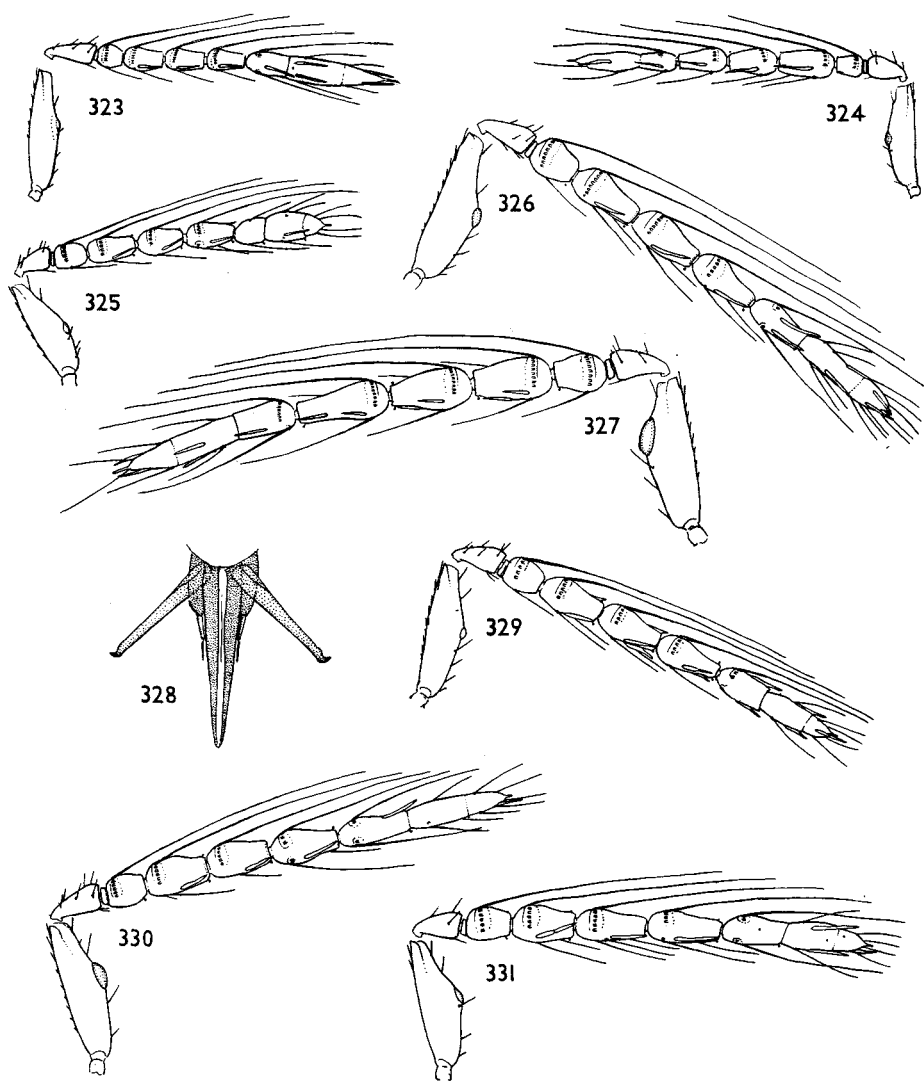
## Key to European species

## Females

- 1 Forewing (Fig. 313) with speculum moderate-sized to large, extended as at least a narrow bare strip below M and nearly or just reaching ST; M only 0.6-0.73 length of costal cell; ST relatively short, the stigma sometimes nearly sessile. . . . . 2
- Forewing (Fig. 322) with speculum narrow or even absent, not extended below M; M 0.77-0.9 length of costal cell; ST relatively longer, stigma always petiolate. . . . . 7
- 2 Antenna (Fig. 308) with clava not distinctly segmented, nearly as long as the whole funicle. Gaster wholly, or almost wholly, pale yellow. Legs pale yellow with at most coxae more or less black. Very small species, length 0.7-0.95 mm. . . . . *bicolor* (p.282)
- Antennae (Figs 311, 312, 314-316, 318, 319, 321): clava with at least C1 distinctly separated from C2 by a suture, the clava often shorter than the funicle. Gaster usually black, rarely with as much as proximal 0.5 yellow in a form of (?) *monesus*. Legs sometimes darker. . . . . 3
- 3 Face and genae yellow. Tegulae yellow. Antenna (Fig. 311) with clava fully as long as, or slightly longer than, the whole funicle. . . . . *poddubnyi* (p.284)
- Head black (sutures of frons may be testaceous in teneralis). Tegulae usually brown to black, only occasionally yellow. Antennal clava sometimes relatively shorter. . . . . 4
- 4 Antenna with F1 much shorter than pedicellus and at most 1.5 times as long as broad; F2 and F3 subquadrate. . . . . 5
- Antenna with F1 not or only slightly shorter than pedicellus, 1.7-2.0 times as long as broad; F3 quadrate or longer than broad. . . . . 6
- 5 Antennal scape lemon-yellow; F1 hardly longer than broad. Body-length 0.53 mm. . . . . *pallicornis* (p.284)
- Antennal scape infusate medially; F1 about 1.5 times as long as broad. Body-length 0.9-1.0 mm. . . . . sp.indet. (p.285)
- 6 Forewing (Fig. 313) with M 4.5-5.5 length of ST. Femora yellow, occasionally infusate at base; tibiae yellow. . . . . *monesus* (p.285)
- Forewing with M 3.7-4.1 times length of ST. Femora at least infusate proximally, often broadly so; tibiae sometimes infusate medially or broadly black. . . . . *tremblayi* (p.286)
- 7 Forewing: speculum absent, wing densely pilose from basal vein to tip. Dorsellum moderately shiny, with delicate sculpture. . . . . 8
- Forewing: speculum usually present even if narrow; if virtually absent (some *pronomus*) then dorsellum dull and distinctly reticulate. . . . . 9
- 8 Antenna (Fig. 314) with pedicellus 1.5-2.0 times length of F1, relatively less setose; F2 1.25-1.55 times as long as broad. Antennal scape yellow, rarely darkened above distally. Legs varying from wholly yellow except tips of tarsi, to mainly dark. Gaster most often yellowish at base, or extensively so,



Figs 310-322 *Tamarixia* species, females. 310, *T. bicolor* Mercet, antenna. 311, *T. poddubnyi* (Kostjukov), paratype, antenna. 312, 313, *T. monesius* (Walker); (312) antenna; (313) forewing. 314, *T. actis* (Walker), antenna. 315, *T. arboreae* (Graham), antenna. 316, *T. pubescens* (Nees), antenna. 317-319, *T. upis* (Walker); (317) head, front view; (318) antenna; (319) metanotum and propodeum. 320, *T. leptothrix* sp. n., antenna. 321, 322, *T. pronomus* (Walker); (321) antenna; (322) forewing.



Figs 323-331 *Tamarixia* species, males. 323, *T. poddubnyi* (Kostjukov), antenna. 324, *T. bicolor* Mercet, antenna. 325, *T. actis* (Walker), antenna. 326, *T. monesius* (Walker), antenna. 327, 328, *T. tremblayi* (Domenichini); (327) antenna; (328) genitalia. 329, *T. pronomus* (Walker), antenna. 330, *T. upis* (Walker), antenna. 331, *T. pubescens* (Nees), antenna.

- rarely wholly black in some northern forms. Tegulae sometimes yellow. Head and thorax (especially in paler forms) with bluish to olive tinge. Body-length 0.6-1.0 mm. .... *actis* (p.287)
- Antenna (Fig. 315) with pedicellus 1.3-1.5 length of F1, relatively more setose; F2 1.2-1.7 times as long as broad. Antennal scape at least heavily infuscate dorsally, sometimes nearly wholly black. Legs mainly dark. Gaster black. Tegulae black. Head and thorax non-metallic, or with at most a hardly perceptible bluish tinge. Body-length 0.8-1.2 mm. .... *arboreae* (p.288)
- 9 Anterior setae of scutellum longer and stronger, their length about equal to distance between submedian lines. Setae of vertex longer, length fully equal to or slightly greater than OD. Dorsellum shiny, with very delicate sculpture, sometimes nearly smooth. Forewing: M 2.5-3.2 times length of ST. Legs with femora partly to mainly black, tibiae sometimes more or less infuscate. .... *pubescens* (p.289)
  - Anterior setae of scutellum shorter and finer, their length somewhat less than distance between submedian lines. Setae of vertex finer and shorter. Dorsellum sometimes distinctly reticulate. Forewing: M 3.2-4.5 times length of ST. Legs sometimes more extensively pale. .... 10
  - 10 Femora and tibiae yellow; fore coxae often partly or wholly yellow, mid and hind coxae occasionally partly yellow. Dorsellum (Fig. 319) dull, with distinctly raised reticulation. Antenna (Fig. 318) with F1 2.0-2.2 times as long as broad. Antennal scape wholly yellow, or with at most dorsal edge infuscate. .... *upis* (p.291)
  - Femora at least slightly infuscate proximally, but most often extensively black; if only slightly infuscate at base (some *pronomus*) then F1 1.3-1.75 times as long as broad. Dorsellum sometimes more shiny. Fore coxae black; tibiae sometimes partly infuscate. Antennal scape usually strongly infuscate dorsally or mainly black. .... 11
  - 11 Antenna (Fig. 320) with F1 1.8-2.0 times as long as broad, at most very slightly shorter than pedicellus. Dorsellum slightly shiny, with weak superficial reticulation. Propodeum somewhat or moderately shiny, with relatively weak, superficial reticulation which tends to be rather irregular. Legs longer and more slender; hind femora 4.5-4.7 times as long as broad. Forewing beyond speculum less densely pilose. .... *leptothrix* (p.290)
  - Antennae with F1 1.0-1.75 times as long as broad, slightly to very distinctly shorter than pedicellus. Dorsellum dull, with strong, slightly raised, isodiametric reticulation. Propodeum only slightly more shiny than dorsellum, with relatively strong and slightly raised, almost isodiametric reticulation. Legs shorter and stouter; hind femora about 4 times as long as broad. Forewing beyond speculum (Fig. 322) moderately densely to very densely pilose. .... 12
  - 12 Mesoscutum with fine-meshed reticulation; reticulation of scutellum very fine. Submedian lines of scutellum enclosing a space 1.7-1.9 times as long as broad. Antennal flagellum testaceous to brown; scape often more or less infuscate medially, sometimes nearly wholly black. ... *pronomus* (p.292)

- Mesoscutum with coarse (wide-meshed) reticulation; reticulation of scutellum moderately fine. Submedian lines of scutellum enclosing a space about 1.5 times as long as broad. Antennal flagellum pale yellow; scape hardly infusate medially. . . . . *pygmaeola* (p.293)

## Males

- 1 Lower half of head, antennal scape, and legs including all coxae, yellow. Antenna (Fig. 323) with pedicellus about 2.5 times as long as broad. Forewing with speculum large and stigmal vein very short (much as in *monesus*, Fig. 313). . . . . *poddubnyi* (p.284)
- Head normally black, rarely mouth-edge obscurely testaceous. Antennal scape and legs sometimes more or less infusate. Antenna with pedicellus 1.5-2.0 times as long as broad. Forewing often with smaller speculum or longer stigmal vein. . . . . 2
- 2 Basal 0.3-0.5 of gaster, antennal scape, and legs including all coxae at least mainly, clear pale yellow. Forewing with distinct speculum beyond which it is rather sparsely pilose. Antenna (Fig. 324) with clava about 5 times as long as broad. Very small species, length 0.6-0.7 mm. . . . *bicolor* (p.282)
- Gaster normally black, though basally or mainly testaceous to yellow in pale *actis*, in which forewing has no speculum, the wing beyond basal vein is densely pilose, and antennal clava is about 3 times as long as broad. Legs often more or less infusate. Size often greater. . . . . 3
- 3 Forewing: speculum absent, wing beyond basal vein densely pilose. Antenna (Fig. 325) with ventral plaque of scape slightly below the middle; clava 3.0-3.8 times as long as broad and not or hardly longer than F3 plus F4, with relatively short segments. Dorsellum shiny, with delicate alutaceous sculpture. . . . . 4
- Forewing with at least a narrow speculum, except in some *pronomus*, in which ventral plaque of scape is situated in the middle, the clava is rather longer and has relatively longer segments, and the dorsellum is dull, with slightly raised reticulation. . . . . 5
- 4 Body-length 0.55-0.8 mm. Antenna (Fig. 325) with scape usually wholly yellow, though infusate dorsally in dark forms. Gaster usually yellowish at base, or more extensively yellow, occasionally black. Legs varying from wholly yellow including the coxae, to rather extensively infusate; but even in dark forms the fore coxae are usually yellowish. Body (especially in paler forms) with bluish to bluish-green metallic tinge. . . . . *actis* (p.287)
- Body-length 0.8-0.9 mm. Antenna with scape black or with at most base and tip yellowish. Gaster black. Coxae wholly, femora mainly, black; tibiae and tarsi more or less infusate. Body non-metallic or with at most a very faint bluish tinge. . . . . *arboreae* (p.288)
- 5 Forewing (Fig. 313) with speculum large and extending some distance below M; stigmal vein very short. . . . . 6
- Forewing (Fig. 322) with speculum relatively narrow, sometimes indistinct, not extending below M; stigmal vein relatively longer. . . . . 7



- 6 Antenna (Fig. 326) with ventral plaque of scape situated about in the middle. Fore coxae often yellow, mid and hind coxae sometimes partly so; femora yellow. . . . . *monesus* (p.285)
- Antenna (Fig. 327) with ventral plaque of scape situated slightly above the middle. Coxae black; at least hind femora partly black; tibiae sometimes more or less infusate. . . . . *tremblayi* (p.286)
- 7 Dorsellum normally dull, with distinct, slightly raised reticulation; propodeum sometimes rather strongly reticulate (more especially in *pronomus*), though usually a little more shiny than dorsellum. (In occasional specimens of *upis* the dorsellum is less distinctly reticulate; these may be recognized by having the femora wholly yellow, coxae at least partly so).  
 . . . . . 8
- Dorsellum somewhat shiny, with weaker reticulation which is not raised, sometimes almost smooth; propodeum weakly reticulate, relatively shiny. Femora at least infusate proximally, coxae always black. . . . . 9
- 8 Antenna (Fig. 329) with clava not or hardly longer than F3 plus F4, with C3 not or only slightly longer than broad. Coxae black; femora at least infusate proximally, often mainly black; tibiae sometimes slightly infusate. . . . . *pronomus* (p.292)
- Antenna (Fig. 330) with clava somewhat longer than F3 plus F4, with C3 very distinctly longer than broad. Legs yellow with coxae usually more or less yellow. . . . . *upis* (p.291)
- 9 Length of anterior setae of scutellum about equal to distance between submedian lines. Forewing with M 2.3-2.8 times length of ST. (Antenna, Fig. 331). . . . . *pubescens* (p.289)
- Length of anterior setae of scutellum distinctly less than distance between submedian lines. Forewing with M 3.0-3.5 times length of ST.  
 . . . . . *leptothrix* (p.290)

### *Tamarixia bicolor* Mercet

(Figs 310, 324)

*Tamarixia bicolor* Mercet, 1924: 58-59. Holotype (?) ♀, Spain: Madrid prov., Sesena (Mercet) (not located).

*Tetrastichus tamaricis* Domenichini, 1967: 76 [unnecessary replacement name for *bicolor* Mercet, a secondary homonym of *Tetrastichus bicolor* Girault, 1913].

♀. Antenna (Fig. 310) with scape slightly shorter than eye, not reaching median ocellus; pedicellus plus flagellum hardly less than breadth of mesoscutum; pedicellus somewhat longer than F1, 1.7-2.0 times as long as broad; funicle proximally hardly as stout as pedicellus but thickening slightly distad, F1 1.0-1.5 (?-1.7) times as long as broad, F2 slightly longer than broad, F3 quadrate to slightly longer than broad; clava slightly broader than F3, 2.5-2.8 times as long as broad, distinctly longer than F2 plus F3, not distinctly segmented, acute, spine rather long. Thorax about 1.1 times as long as broad. Mid lobe of mesoscutum about 1.7 times as broad as long, with extremely fine engraved sculpture whose areoles average twice as long as broad; median line absent. Scutellum 1.7-1.8

times as broad as long, sculptured like mesoscutum; submedian lines equidistant from each other and from sublateral lines, or slightly nearer to the latter, enclosed space 1.85-1.9 times as long as broad; length of anterior setae distinctly less than distance between submedian lines. Dorsellum moderately shiny, with very fine superficial reticulation. Propodeum very strongly transverse, medially slightly longer than dorsellum, with very fine superficial or hardly raised reticulation; median carina not very distinct, slightly raised and rather broad. Legs rather short, stout; hind femora hardly 3 times as long as broad; spur of mid tibia virtually as long as basitarsus. Forewing hardly more than twice as long as broad; costal cell about 1.5 times as long as M which is rather thick and 2.7-3.5 times length of ST, its front edge with 4-5 (-6) setae; ST (on upper surface of wing) with only 1 long seta at about the middle of its length; speculum moderate-sized, extended as a narrow strip below M as far as ST; also a small bare spot above ST; wing beyond speculum somewhat sparsely to moderately thickly pilose; cilia 0.5-1.0 length of ST. Hindwing strongly acute, cilia about 0.66 breadth of wing. Gaster ovate, nearly as long as head plus thorax, about as broad as thorax, at most 1.6 times as long as broad; last tergite nearly twice as broad as long.

Head and thorax black; gaster pale yellow, sometimes slightly brownish in basal fovea around the petiole and with traces of brownish spots at sides ventrally; ovipositor sheaths brownish apically. Antennal scape and pedicellus yellowish-white, the latter sometimes brownish basally; flagellum pale to chrome yellow. Legs pale yellow, sometimes with extreme bases of coxae, occasionally proximal 0.5-1.7 of hind coxae, blackish; tips of tarsi brownish. Length 0.7-0.85 mm.

♂. Differs as follows. Antenna (Fig. 324) with scape a little longer than eye, 4.3-4.4 times as long as broad, ventral plaque small, in middle; pedicellus plus flagellum about 1.55 times breadth of mesoscutum; pedicellus 1.5-1.7 times as long as broad; flagellum proximally a little stouter than pedicellus but tending to taper slightly distad; F1 distinctly shorter than F2 and 1.2-1.3 times as long as broad, F2 to F4 subequal in length, each about twice as long as broad; clava not broader than F4, 4.0-4.5 times as long as broad. Gaster oval, obtuse, nearly as long as but slightly narrower than thorax.

Only proximal 0.3-0.5 of gaster yellow. Flagellum brownish; pedicellus sometimes with a dusky spot at base dorsally. Length 0.6-0.7 mm.

**MATERIAL EXAMINED.** 3 ♂, 7 ♀. **Bulgaria:** 1 ♀, Burgs, 13(?)..viii.1932 (S. Novitzky) (BMNH). **Pakistan:** 3 ♂, 6 ♀, Islamabad, reared 25.vi.1979 from *Trioza chenopodii* on *Chenopodium album* (BMNH).

**HOSTS.** *Trioza chenopodii* Reuter (Hem., Triozidae) on *Chenopodium album*.

**COMMENTS.** *Tetrastichus flaviventris* Kostjukov, 1978: 437 appears from the description to be closely related to *Tamarixia bicolor* although in Kostjukov's figure 138.1 of the ♀ antenna, the pedicellus is shown as relatively shorter and broader, F1 and F2 rather short, clava with a short spine; whilst the antennae and gaster are described as light brown. It was recorded from the Ural region of the USSR.

***Tamarixia poddubnyi* (Kostjukov), comb.n.**

(Figs 311, 323)

*Tetrastichus poddubnyi* Kostjukov, 1978: 438. Holotype ♀. USSR: Kishinev, Ryshkanova, from *Trioxa magnisetosa* on *Eleagnus* sp., 10.x.1972 (Poddubny) (ZIL) [not examined].

I have examined paratypes of this species. Both sexes may be distinguished from those of other European species by the yellow colour of the face.

♀. Apart from the partly yellow head, resembles *mones* (Walker) in most respects. It differs as follows. Antenna (Fig. 311) with pedicellus much longer than F1, 2.4-2.5 times as long as broad; funicle not quite as stout as pedicellus, thickening slightly distad, its segments subequal in length, F1 1.4-1.5 times, F2 1.3 times, F3 1.3 times as long as broad; clava distinctly broader than F3, about 2.5 times as long as broad, strongly acute, nearly as long as whole funicle.

♂. Differs from ♀ as follows. Antenna (Fig. 323) with scape about as long as eye, with minute ventral plaque placed above the middle; pedicellus plus flagellum 1.1 times breadth of mesoscutum; pedicellus 2.5 times as long as broad, twice length of F1; funicle hardly stouter than pedicellus, tapering slightly distad; F1 much shorter than F2 and quadrate, F2 to F4 equal in length, each about 1.8 times as long as broad; clava somewhat broader than funicle, nearly 6 times as long as broad, as long as whole funicle, strongly acute, spine nearly half length of C3. Gaster oblong, slightly longer but narrower than thorax.

MATERIAL EXAMINED. 1♂, 4 ♀. USSR.

HOSTS. *Trioxa magnisetosa* Loginova (Hem., Triozidae) on *Eleagnus* (?) *orientalis* L.

COMMENTS. I have seen a ♀ from the USSR, Tashkent, labelled as having been reared from *Capitophorus hippophaes* (Walker) (Hem., Aphididae) on *Eleagnus occidentalis*, but this host record would appear to be a mistake.

***Tamarixia pallicornis* (Walker), comb.n.**

*Gastrancistrus pallicornis* Walker, 1872: 116. Holotype (?) ♀, Portugal: Madeira, Northern Deserta [Ilhéu Chão] (Wollaston) (BMNH) [examined].

The only specimen so named, presumably the holotype, does not agree too well with the description, but this is not surprising considering how inaccurate Walker's diagnoses had become by 1872. It is in fair condition, although the antennae are gummed to the card mount and I can give only approximate proportions for the flagellar segments. A more satisfactory re-description must await the discovery of fresh material. I have myself collected on Ilhéu Chão but not refound the species.

♀. Antenna with pedicellus about 1.3 length of F1; funicle proximally about 1.3 times as stout as pedicellus; funicular segments virtually equal in length, F1 hardly longer than broad, F2 quadrate, F3 very slightly transverse; clava broader than F3, 1.6 times as long as broad, acute, spine apparently as long as C3. Mesoscutum shiny, with extremely fine engraved reticulation, its areoles about twice as long as broad; median line very fine but traceable throughout.

Submedian lines of scutellum very slightly nearer to sublateral lines than to each other, enclosed space 2.4 times as long as broad. Dorsellum moderately shiny, weakly alutaceous. Propodeum moderately shiny, with rather coarse though hardly raised reticulation medially, sculpture weaker at sides. Forewing with M about 0.65 length of costal cell and about 3 times length of ST, its front edge with 5 rather long setae; speculum large, extended as a wedge-shaped strip as far as ST; wing beyond it rather sparsely pilose; ST only very slightly constricted basally, with 1 long seta just beyond the middle.

Black; mesoscutum with extremely weak olivaceous tinge. Antennal scape pale yellow, pedicellus brownish, flagellum ochraceous. Coxae and proximal 0.65 of femora black, legs otherwise yellow with a narrow subbasal fuscous ring on hind tibiae, fourth segment of tarsi black. Tegulae fuscous. Wings hyaline, venation yellowish-testaceous. Length 0.55 mm.

♂. Unknown.

MATERIAL EXAMINED. 1 ♀. **Portugal** (Madeira).

HOSTS. Unknown.

*Tamarixia* sp.indet.

♀. Very close to the holotype of *pallicornis* (Walker), differing only in the characters noted in the key to females, couplet 5.

♂. Unknown.

MATERIAL EXAMINED. 2 ♀. **Spain**: 1 ♀, Canary Islands, Tenerife, Adeje, Boco del Infierno, 19.iii.1984 (Gijswijt) (MJG). **Turkey**: 1 ♀, Burdur, 900 m., 22.vii.1981 (H. & Th.v.Oorschot & v.d. Brink) (MJG).

HOSTS. Unknown.

COMMENTS. I have thought it advisable not to describe this species, in case further material should indicate that it could be within the range of variation of *pallicornis*.

*Tamarixia monesus* (Walker), **comb.n.**

(Figs 312, 313, 326)

*Cirrospilus Monesus* Walker, 1839a: 297-298. Lectotype ♂, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 41) [examined].

*Tetrastichus pallicornis* Thomson, 1878: 286. Lectotype ♀, Sweden: Smaland (Boheman) (ZI), designated by Graham (1961b: 41) [examined]. [Synonymised with *monesus* by Graham, 1961b: 41.]

*Tetrastichus monesus* (Walker) 1846: 75; Domenichini, 1966a: 83, 1966b: 40, 1967: 76; Kostjukov, 1978: 440, fig. 140, 1-6.

*Aprostocetus monesus* (Walker) Graham, 1961b: 41.

♀. The forewing venation and large speculum, black head and mainly yellow legs are characteristic. In other respects much resembles *pubescens* (Nees) from which it differs as follows. Eyes separated by 1.1-1.2 times their length. Setae

of vertex finer and shorter, their length less than OD. Antenna (Fig. 312) with scape slightly shorter than, or virtually as long as, an eye; distal funicular segments rather shorter, F2 1.1-1.5 times, F3 1.0-1.2 times, as long as broad. Anterior setae of scutellum finer and slightly shorter. Hind femora slightly stouter. Forewing (Fig. 313) with M shorter, only 0.6-0.73 length of costal cell, 4.5-5.5 times length of ST, its front edge with 8-9 setae; speculum large, extended below M nearly or quite to ST; above ST there is a bare spot; wing just beyond speculum rather more sparsely pilose.

Body black, sometimes with a very weak bluish or olive tinge. Antennal scape pale yellow; rest of antenna testaceous or yellowish, pedicellus usually dark basally, sometimes also dorsally; articulations of flagellar segments sometimes darker. Legs yellow with coxae black, sometimes fore coxae more or less yellow, less often mid coxae apically; hind femora sometimes more or less infusate in proximal 0.5, mid and fore femora occasionally infusate proximally; fourth tarsal segment brown. Wings hyaline or faintly yellowish, venation yellow to testaceous. Length 1.0-1.6 mm.

♂. Differs as follows. Antenna (Fig. 326) with scape fully as long as, or very slightly longer than an eye, reaching vertex, ventral plaque about in middle, about 0.18 length of scape; pedicellus plus flagellum 1.6-1.8 times breadth of mesoscutum; pedicellus 1.8-2.0 times as long as broad, much longer than F1; funicle proximally slightly stouter than pedicellus but tapering very slightly distad, F1 hardly longer than broad and much shorter than F2, F2 to F4 subequal in length, each about twice as long as broad; clava 5.3-5.5 times as long as broad, slightly to distinctly longer than F3 plus F4, with C1 and C2 each slightly less than twice as long as broad. Gaster oval or oblong, about as long as but usually narrower than thorax.

Antennal scape yellow, sometimes more or less infusate dorsally; pedicellus yellow or testaceous, or with proximal 0.3-0.75 blackish at least dorsally; flagellum testaceous, sometimes with darker articulations. Coxae tending to be more extensively pale, fore coxae usually wholly yellow, mid and hind coxae partly to entirely so.

**MATERIAL EXAMINED.** 6 ♂, many ♀. Czechoslovakia, Germany, Great Britain, Italy, Yugoslavia, USSR.

**HOSTS.** Unknown, but doubtless some species of *Trioza*.

**COMMENTS.** A ♀ from Yugoslavia, Slovenia, Bohinjsko jezero, 7.vii.1927 (S. Novitzky) has the base of the gaster yellow, but appears to belong to *monesus*.

***Tamarixia tremblayi* (Domenichini), comb.n.**  
(Figs 327, 328)

*Tetrastichus* sp., Tremblay, 1965: 37-138.

*Tetrastichus tremblayi* Domenichini, 1966a: 83-85. Holotype ♀. Italy: Portici, May or June 1962 or 1963 (E. Tremblay) (GD) [examined].

*Tetrastichus tremblayi* Domenichini, 1966b: 51.

♀. Differs from that of *monesus* (Walker) in the characters given in the key to

females. For other details see the original description.

♂. Differs from that of *monesus* in the characters given in the key to males. For other details see original description.

MATERIAL EXAMINED. 4 ♂, 16 ♀. **Czechoslovakia, Great Britain, Italy.**

HOSTS. *Trioza tremblayi* Wagner (Hem., Triozidae) on *Allium cepa*. For details of life history see Tremblay (1965).

*Tamarixia actis* (Walker)

(Figs 314, 325)

*Pteroptrix actis* Walker, 1839a: 20. LECTOTYPE ♀, Great Britain: near London (Walker) (BMNH), here designated [examined].

*Tetrastichus actis* (Walker) Dalla Torre, 1898: 9; Domenichini, 1966a: 85, 1966b: 16, Hodkinson, 1973: 241-242.

*Aprostocetus actis* (Walker) Graham, 1961b: 41-42.

*Tetrastichus callunae* Erdős, 1969: 44-45. Holotype ♀, Hungary: Szakonyfalu, Vendvidék, 13.vii.1961 (Erdős) (TM) [examined]. *Syn.n.*

*Tamarixia actis* (Walker) Graham, 1987: 5.

A ♀ in the BMNH series of *actis* has been labelled by me as lectotype.

I have examined the whole series of *callunae* in the Erdős collection. The syntypes represent a rather pale form, resembling the lectotype of *actis*.

♀. Head about as broad as mesoscutum; POL about 1.6 OOL, OOL 2.0-2.5 OD. Eyes rather large, 1.2-1.3 times as long as broad, separated by hardly more than their length. Malar space 0.35 length of eye, sulcus slightly curved. Mouth about 1.5 times malar space. Longest setae of vertex about equal to OD. Antenna (Fig. 314) with scape slightly shorter than eye, not reaching median ocellus; pedicellus plus flagellum about equal to breadth of mesoscutum; pedicellus 2.0-2.5 times as long as broad, 1.5-2.0 times length of F1; funicle proximally hardly as stout as pedicellus, thickening slightly distad; F1 1.25-1.6 times, F2 1.25-1.55 times, F3 1.0-1.5 times as long as broad; clava distinctly broader than F3, 2.3-2.8 times as long as broad, in large specimens slightly longer than F2 plus F3, in small ones nearly as long as funicle, pointed, spine nearly as long as C3. Thorax 1.2-1.25 times as long as broad. Mid lobe of mesoscutum about 1.5 times as broad as long, moderately shiny, with very fine engraved sculpture, areoles about twice as long as broad; median line weak or absent. Scutellum about 1.5 times as broad as long, moderately convex, sculpture for the most part much finer than on mesoscutum; submedian lines slightly nearer to sublateral lines than to each other, enclosed space hardly twice as long as broad; anterior setae about as long as distance between submedian lines, posteriors slightly shorter. Dorsellum 2.5-3 times as broad as long, shiny, finely alutaceous. Propodeum medially as long as or a little longer than dorsellum, with sculpture similar but tending to be slightly raised; median carina rather thin and only slightly raised; spiracles almost circular, nearly touching metanotum; callus with a seta outside the spiracle and another farther back. Legs rather short and stout; hind femora 3 times as long as broad; spur of mid tibia virtually as long as basitarsus and hardly greater than breadth of tibia; tarsal segments short, 1 to 3 very short and

subequal in length, fourth longer. Forewing with costal cell hardly longer than M, 11-12 times as long as broad; M not unusually thick, 3.0-3.2 times length of ST, its front edge with 5-8 setae; ST not thin; wing distad of basal vein densely pilose, with relatively short setae; cilia shorter than ST in large females, slightly longer than ST in small ones. Hindwing strongly acute, cilia 0.66 breadth of wing. Gaster ovate, nearly as long as head plus thorax, pointed, 1.3-2.0 times as long as broad; last tergite at least slightly broader than long; ovipositor sheaths projecting very slightly; tip of hypopygium at about 0.5 length of gaster.

Variable in colour. Head and thorax black, usually with a weak olive or bluish tint; gaster varying from black through fuscous to brown, often more or less testaceous to yellow basally. In pale specimens the yellow colour extends caudad until only the tip of the gaster is dark, whilst in some (e.g., from Hungary and Azores) the gaster is yellow with only the dorsal surface more or less infusate. Antennal scape yellow, rarely darkened above distally; pedicellus and flagellum yellowish to brown, pedicellus more or less infusate proximally and sometimes dorsally. In darker northern forms the fore coxae vary from yellow to partly or mainly fuscous, mid coxae partly yellow, or black; hind coxae black; femora, less often the mid and fore femora, infusate proximally; in very dark forms all femora are mainly black, the tibiae more or less infusate, tarsi fuscous. In the palest forms the legs, except tips of tarsi, are yellow; this form occurs in Central Europe and the Azores. Tegulae varying from yellow to partly or mainly brown. Wings lightly to rather strongly infumate; venation yellowish to brown. Length 0.6-1.0 mm.

♂. Differs as follows. Antenna (Fig. 325) with scape virtually as long as an eye, broadest a little below middle where the very small ventral plaque (length about 0.2 length of scape) is situated; pedicellus plus flagellum 1.5 breadth of mesoscutum; pedicellus 1.6-1.7 times as long as broad nearly twice length of F1; funicle slightly stouter than pedicellus; F1 slightly transverse and hardly more than half length of F2; F2 to F4 subequal in length, each 1.5-1.7 times as long as broad; clava 3.0-3.5 times as long as broad, hardly longer than F3 plus F4. Gaster oblong, slightly shorter and narrower than thorax.

Antennal scape yellow with ventral plaque, and sometimes dorsal edge, fuscous, in dark forms wholly fuscous.

**MATERIAL EXAMINED.** 6 ♂, many ♀. Czechoslovakia, France, Great Britain, Hungary, Ireland, Portugal (Azores).

**HOSTS.** *Strophingia cinereae* Hodkinson and *S. ericae* (Curtis) (Hem., Psylloidea) on *Erica cinerea* (reared by I.D. Hodkinson); see Hodkinson, 1973. In the Azores, Dr. A. van Harten has swept specimens of *actis* from foliage of *Erica scoparia* subsp. *azorica*, but the host was not determined.

***Tamarixia arboreae* (Graham), comb.n.**  
(Figs 315, 391)

*Tetrastichus arboreae* Graham, 1979: 282-283. Holotype ♀, Portugal: Madeira, Machico, Rocha Alta, 5.i.1973 (Graham) (BMNH) [examined].  
*Tetrastichus arboreae* Graham, 1984: 3-4.

♀. See original description (Graham, 1979); for distinction between it and *actis*, see key to females, couplet 8. Antenna (Fig. 315). Hypopygium (Fig. 391).

♂. Differs from that of *actis* in the characters given in the key to males, couplet 4. Antenna similar to that of *actis* (Fig. 325).

MATERIAL EXAMINED. 3 ♂, 25 ♀. **Portugal** (Madeira).

HOSTS. Not definitely known. *T. arboreae* appears to be associated with *Erica arborea* and *E. scoparia*, particularly the former. Dr. van Harten suggested that *Strophingia arborea* Loginova and *S. fallax* Loginova (Hem., Aphalaridae), both of which occur on *Erica arborea*, might be possible hosts of *T. arboreae*.

***Tamarixia pubescens* (Nees)**  
(Figs K19-K21, 316, 331)

*Eulophus pubescens* Nees, 1834: 180. Lectotype ♀, Germany: near Sickershausen (Nees) (UM), designated by Graham (1961b: 41) [examined].

*Aprostocetus pubescens* (Nees) Graham, 1961b: 41.

*Tetrastichus pubescens* (Nees) Domenichini, 1966a: 82, 1966b: 46.

*Tetrastichus problematicus* var. *unicolor* Erdős, 1969: 46-47, in part.

*Tamarixia pubescens* (Nees) Graham, 1987: figs 31-33.

♀. Head barely or just as broad as mesoscutum; POL at least twice OOL; vertex with length of longest setae fully equal to or slightly greater than OD. Eyes 1.2-1.3 times as long as broad, separated by 1.3 times their length. Malar sulcus fine, virtually straight. Mouth slightly greater than malar space. Antenna (Fig. 316) with scape slightly shorter than eye, reaching lower edge of median ocellus; pedicellus plus flagellum about equal to breadth of mesoscutum; pedicellus 2.2-2.5 times as long as broad, as long as or slightly longer than F1; funicle nearly filiform, F1 1.7-2.0 times as long as broad, F2 slightly shorter and 1.5-1.85 times as long as broad, F3 slightly shorter than or as long as F2, 1.1-1.5 times as long as broad; clava slightly broader than F3, 2.5-3.0 times as long as broad, slightly longer than F2 plus F3, acute, spine about 0.5 length of C3, apical seta less than 0.5 length of spine. Thorax 1.25-1.3 times as long as broad. Mid lobe of mesoscutum with a fine median line. Scutellum with submedian lines slightly nearer to sublateral lines than to each other, enclosed space 1.6-1.85 times as long as broad; anterior setae strong, their length about equal to distance between submedian lines, posterior setae shorter. Dorsellum 3.4-4 times as broad as long, shiny, nearly smooth. Propodeum 1.1-1.3 times as long as dorsellum, shiny, with very fine superficial reticulation; median carina distinct, fine; callus with 2 setae outside the spiracle. Legs somewhat slender; hind femora fully 4 times as long as broad; spur of mid tibia 0.7 length of basitarsus; tarsal segments 1 to 3 more than twice as long as broad. Forewing slightly more than twice as long as broad; costal cell slightly longer than M; M rather thick proximally but thinner distad, 2.55-3.15 times length of ST, its front edge with 9-12 long setae; speculum very narrow and extending only a short distance below M, or nearly absent, wing beyond moderately densely pilose; cilia 0.5-0.7 length of ST. Hindwing pointed or acute, cilia 0.2-0.5 breadth of wing. Gaster ovate, from as long as thorax to as long as head plus thorax, 1.4-1.9 times as long as broad; last tergite small,



much broader than long; tips of ovipositor sheaths hardly projecting.

Body black, non-metallic. Antennal scape black, testaceous proximally and more or less broadly distally; flagellum testaceous to brown. Coxae black; trochanters partly to wholly testaceous; femora black with tips more or less broadly testaceous; tibiae testaceous, or brownish, or fuscous with bases and tips pale; mid and hind tarsi varying from testaceous with brown tips, to brown with bases pale. Wings subhyaline or lightly infumate, venation testaceous to brown. Length 1.1-1.3 mm.

♂. Differs as follows. Antenna (Fig. 331) with scape broadest in middle where the very short ventral plaque is situated; pedicellus plus flagellum 1.8 times breadth of mesoscutum; pedicellus about twice as long as broad, hardly longer than F1; funicle proximally a little stouter than pedicellus, tapering very slightly distad; F1 shorter than F2 and slightly longer than broad, F2 to F4 subequal, or tending to increase slightly, in length, F2 hardly twice, F3 and F4 slightly more than twice, as long as broad; clava not broader than F4, about 5 times as long as broad, about as long as F3 plus F4, with C1 and C2 each about twice as long as broad.

MATERIAL EXAMINED. 2 ♂, many ♀. **Czechoslovakia, Germany, Great Britain, Hungary, Italy, Jugoslavia.**

HOSTS. *Trioza remota* Förster (Hem., Psyllidae). I have swept specimens most frequently from foliage of *Quercus* (deciduous species).

COMMENTS. One ♀ of *Tetrastichus problematicus* Erdős var. *unicolor*, from foliage of *Salix alba*, 10.vii.1961, belongs to *pubescens*; the data (16.vii.1961) recorded by Erdős (1969: 47) was evidently a mistake.

*Tamarixia leptothrix* sp.n.

(Fig. 320)

♀. Differs from that of *pubescens* (Nees) chiefly in having shorter and finer setae on vertex and scutellum. Vertex with length of setae hardly as great as OD. Length of posterior adnotaular setae of mesoscutum only about 0.5 the distance between submedian lines of scutellum. Length of anterior setae of scutellum somewhat less than distance between submedian lines. Forewing with M 3.0-4.1 times length of ST. Antenna (Fig. 320).

♂. Differs from that of *pubescens* in having shorter and finer setae on vertex and scutellum, and in its longer marginal vein (see key to males, couplet 9). Antenna very similar to that of *pubescens* (Fig. 321).

MATERIAL EXAMINED. 3 ♂, 23 ♀. Holotype ♀, **Great Britain:** Middlesex, Southgate, 11.viii.1970, on foliage of *Salix fragilis* (Graham) (BMNH).

Paratypes. **Czechoslovakia:** 1 ♀, Bohemia centr., Unhost, 30.iii.1946 (Bouček), 1 ♀, Bohemia or., Velký Vřeštov, viii.1961 (Bouček), 1 ♀, Slovakia mer., Mala nad Hronom, 24.vi.1968 (Strejček) (BMNH). **Great Britain:** 1 ♀, Berkshire, Wytham, 10.iii.1952, 1 ♀, 20.iv.1952, 1 ♀ on *Salix cinerea*, 8.iv.1960 (Graham) (BMNH); 1 ♂, Middlesex, Southgate, 10.vii.1970, 1 ♂, 1 ♀, 16.vii.1970,

on *Salix fragilis*, 3 ♀, 11.viii.1971, 2 ♀, 10.viii.1972 (Graham) (BMNH); 1 ♀, Surrey, Esher Common, 9.viii.1970 (Bouček) (BMNH). **Hungary:** 1 ♀, Vendvidék, Szakonyfalu, on foliage of *Salix alba*, 10.vii.1961 (Erdős) (TM). **Ireland:** 1 ♀, Co. Donegal, Maherabeg, near Donegal, on *Salix cinerea*, 17.ix.1958 (Graham) (MVG). **Italy:** 2 ♀, Viozene (Cuneo), 28.viii.1969 (Bouček) (BMNH). **Jugoslavia:** 1 ♂, Dobra Voda, Goč, 30.vi.1968, 1 ♀, 1.vii.1968 (Bouček) (BMNH).

HOSTS. Unknown, but doubtless a species of *Trioxa*. The occurrence of several specimens on *Salix* spp. suggests a host on these plants.

COMMENTS. The Hungarian ♀ paratype from Szakonyfalu was recorded by Erdős as having been taken on 16.vii.1961, but his label bears the date 10.vii.1961.

***Tamarixia upis* (Walker)**

(Figs 317-319, 330, 392)

*Cirrospilus Upis* Walker, 1839a: 297. Lectotype ♂, Great Britain: ?near London (Walker) (BMNH), designated by Graham (1961b: 41) [examined].

*Cirrospilus Orsillus* Walker, 1839a: 318-319. Lectotype ♀, Great Britain: (Walker) (BMNH), designated by Graham (1961b: 41) [examined]. [Synonymised with *upis* by Graham, 1961b: 41.]

*Tetrastichus Bermius* Walker, 1848: 151, 237. Lectotype ♂, England: (Walker) (BMNH), designated by Graham (1961b: 41) [examined]. [Synonymised with *upis* by Graham, 1961b: 41.]

[*Tetrastichus obscuratus* (Förster) André; Zangheri, 1954: 272. Misidentification.]

*Aprostocetus upis* (Walker) Graham, 1961b: 41.

*Tetrastichus upis* (Walker) 1846: 75; Domenichini, 1966a: 82, 1966b: 52, 1967: 76.

*Tamarixia upis* (Walker) Graham, 1988: 83.

♀. Differs from that of *leptothrix* sp.n. particularly in having dorsellum (Fig. 319) dull, with distinctly raised reticulation; legs yellow with at most some or all the coxae black; propodeum less shiny, with slightly stronger and slightly raised reticulation. Forewing with M 3.2-4.5 times length of ST, its front edge with 9-11 setae. Antenna (Fig. 318) with F1 2.0-2.2 times, F2 1.7-1.8 times, F3 1.3-1.6 times as long as broad. Hypopygium (Fig. 392). Length 1.1-1.4 mm.

♂. Differs as follows. Antenna (Fig. 330) with scape fully as long as an eye, reaching slightly above vertex, 2.8-3.0 times as long as broad, ventral plaque about in middle, 0.16-0.2 length of scape; antenna otherwise similar to that of *mones*. Gaster oval or oblong, about as long as but usually narrower than thorax.

MATERIAL EXAMINED. 12 ♂, many ♀. **Czechoslovakia, France, Great Britain, Italy, Portugal (Madeira).**

HOSTS. *Trioxa urticae* L. (Hem., Trioziidae); see Zangheri, 1954. A common species in Britain upon nettles (*Urtica*).

COMMENTS. In his key to species of the European part of the USSR, Kostjukov stated (1978: 440) that the antennal clava of *upis* is unsegmented, and the appendages of the body sometimes darkened. The clava of *upis*, however, is 3-segmented although the second and third segments are sometimes indistinctly separated, while the legs are always mainly yellow.

*Tamarixia pronomus* (Walker), comb.n.

(Figs 321, 322, 329)

*Cirrospilus Pronomus* Walker, 1839a: 312-313. Lectotype ♀, Great Britain: near London (Walker) (BMNH), designated by Graham (1961b: 42) [examined].

*Cirrospilus pamyles* Walker, 1839a: 313. Lectotype ♀, Great Britain: Isle of Wight (Walker) (BMNH), designated by Graham (1961b: 42) [examined]. [Synonymised with *pronomus* by Graham, 1961b: 42.]

*Tetrastichus pronomus* (Walker) 1946: 77; Domenichini, 1966a: 85, 1966b: 46.

*Tetrastichus obscuratus* André, 1878: 83. LECTOTYPE ♀, France: Beaune, from galls on *Centranthus angustifolius* (André) (MNHM), here designated [examined]. Syn.n.

There are two female syntypes of *Tetrastichus obscuratus* from André's collection in MNHN, and they are both conspecific with *pronomus* (Walker), showing only very slight differences in sculpture and other details, which I regard as being within the range of variation of *pronomus*. The lectotype is labelled "Beaune; ♀; Des galles de *Centranthus angustifolius*; MUSEUM PARIS COLLECTION ERNEST ANDRÉ 1914"; it now bears my lectotype label.

♀. Resembles ♀ of *upis* (Walker) in several respects, particularly its dull, distinctly reticulate dorsellum and rather distinctly reticulate propodeum. It differs in having shorter funicular segments, darker legs, usually more or less darkened antennal scape, and more densely pilose forewing. Antenna (Fig. 321) with pedicellus 1.2-1.55 times length of F1 and 2.0-2.5 times as long as broad; funicle proximally tending to be a little stouter than pedicellus, funicular segments subequal in length, F1 1.3-1.75 times, F2 1.3-1.55 times, F3 1.0-1.35 times as long as broad; clava 2.3-2.5 times as long as broad, hardly or somewhat longer than F2 plus F3. Submedian lines of scutellum slightly nearer to sublateral lines than to each other, enclosed space 1.7-1.9 times as long as broad. Propodeum tending to be duller than in *upis*, with rather stronger reticulation which is slightly raised, occasionally almost as dull as the dorsellum; median carina thin and sharp, expanded only slightly at hind end. Forewing (Fig. 322) with speculum usually represented by a very narrow strip just outside the basal vein, sometimes rudimentary or almost absent; wing beyond it densely to very densely pilose; M 3.0-3.85 times length of ST, its front edge with 6-9 (-10) setae.

Colour much as in *pubescens* but a little more variable. Antennal scape sometimes yellow but often broadly infusate medially, or wholly black. Femora sometimes only infusate basally, in dark specimens black with only their tips pale. Wings hyaline or lightly infumate. Length 0.8-1.5 mm.

In a ♀ from Canary Islands, La Palma, the antennal scape is yellow and there is an obscure testaceous transverse band near the base of the gaster, but it appears to belong to *pronomus*.

♂. Differs as follows. Antenna (Fig. 329) with scape about as long as an eye and reaching vertex, 3.0-3.5 times as long as broad, ventral plaque minute, about in middle; pedicellus plus flagellum about 1.4 times breadth of mesoscutum; pedicellus about twice as long as broad, distinctly longer than F1; funicle proximally distinctly stouter than pedicellus but tapering slightly distad; F1 much shorter than F2 and quadrate or very slightly transverse, F2 to F4 subequal in length, each 1.7-2.0 times as long as broad; clava 4.0-4.5 times as

long as broad, as long as or slightly longer than F3 plus F4, with weak constriction between C1 and C2, each of which is 1.6-1.8 times as long as broad. Gaster oval, as long as or slightly shorter than thorax, tending to be a little narrower than thorax.

**MATERIAL EXAMINED.** 10 ♂, many ♀. **Czechoslovakia, France, Great Britain, Greece, Italy, Norway, Portugal** (including Madeira), **Spain** (Canary Islands), **Sweden.**

**HOSTS.** *Trioza apicalis* Förster, *T. centranthi* (Vallot) *T. kratochvili* Vompr. (Hem., Triozidae).

***Tamarixia pygmaeola* (Erdős), comb.n.**

*Tetrastichus pygmaeus* Erdős, 1954: 362. Holotype ♀, Hungary: Berhida, 30.vii.1952 (Erdős) (TM) [examined]. [Secondary homonym of *Tetrastichus pygmaeus* (Nees), 1834.]

*Tetrastichus pygmaeolus* Erdős, 1958: 321. [Replacement name for *pygmaeus* Erdős, homonym of *pygmaeus* Nees.]

*Aprostocetus pygmaeolus* (Erdős) Graham, 1961b: 42.

*Tetrastichus pygmaeolus* Erdős; Domenichini, 1966a: 85, 1966b: 47, 1967: 76.

♀. Very close to *pronomus* (Walker). The only distinctions between the two appear to be those noted in the key to females, couplet 12. I have not seen any ♀ of *pronomus* which agrees completely with the holotype of *pygmaeus* Erdős and conclude that they are distinct species. The antennae of *pygmaeolus* are yellow with the pedicellus slightly darker basally, and the scape with an extremely weak brownish tinge medially. The forewings are hyaline, with very pale, almost white, pilosity; venation pale yellow. Length about 0.7 mm.

♂. Unknown to me; mentioned, without description, by Domenichini (1966a: 85).

**MATERIAL EXAMINED.** 1 ♀. **Hungary** (holotype). Domenichini (1966a: 85) recorded the species also from France, but I have not seen the material.

**HOSTS.** A species of Hemiptera Psyllidae (not more closely identified) on *Rumex scutatus*, according to Domenichini (1966a: 85).

***TETRASTICHOMYIA* Girault**

*Tetrastichomyia* Girault, 1916: 48. Type-species: *Miotropis clisiocampae* Ashmead, by monotypy and original designation.

[*Syntomosphyrum* Förster; Burks in Krombein et al., 1979: 1004-1005. Misidentification.]

*Tetrastichomyia* [Girault] Graham, 1987: 28, 35, figs 23, 24; LaSalle & Schauff, 1990: 283-284.

**DIAGNOSIS.** See Graham (1987: 28, 35). The genus appears to be relatively isolated. It is recognizable by the following synapomorphies. Dorsellum of metanotum divided, by a median longitudinal groove or by a ridge; propodeum with some rather irregular sculpture, often rugosity or wrinkles, hind corners subrectangular or acute, callus with a sharp longitudinal carina; mid lobe of mesoscutum without median line, scutellum without submedian lines; anterior margin of ♀ hypopygium not trilobed but almost truncate; ♂ brachypterous, with legs short and (especially the femora) very stout, tarsi very short and thick.

*Tetrastichomyia clisiocampae* (Ashmead)

(Figs K11, K12)

*Miotropis clisiocampae* Ashmead, 1894: 341. Holotype (?) ♀, USA: West Virginia, Morgantown (USNM) [not examined].

*Tetrastichomyia clisiocampae* (Ashmead) Girault, 1916: 48; Graham, 1987, figs 23, 24; LaSalle & Schauff, 1990: 284.

*Miotropis clisiocampae* Ashmead; Peck, 1963: 172.

*Tetrastichus Goidanichi* Domenichini, 1967: 96-100. Holotype ♀, Italy: Milan, Sesto S. Giovanni, 2.v.1964, from pupa of *Apatele megacephala* (Domenichini) (MIZSU) [examined]. *Syn.n.*

*Syntomosphyrum clisiocampae* (Ashmead) Burks in Krombein et al., 1979: 1004.

Many other references to *clisiocampae* were cited by Peck (1963).

Although I have not seen the holotype of *clisiocampae*, I have examined material of both sexes from USA so determined, I assume correctly; there appears to be no appreciable difference between these and the corresponding sexes of *goidanichi*.

Domenichini (1967, as *Tetrastichus Goidanichi*) gave a good description and figures of this species. His figure 21 of the ♂, however, shows the antennal flagellum as too thick. The antennal scape (Graham, 1987, fig. 59) is about 0.9 length of an eye and does not reach the median ocellus, broadest in middle where there appears to be a very short, poorly-defined ventral plaque; scape and pedicellus with numerous long setae; pedicellus plus flagellum barely equal to breadth of mesoscutum; pedicellus 2.5 times as long as broad, longer than anelli plus F1 plus F2; funicle proximally distinctly less stout than the pedicellus but thickening slightly distad; F1 tending to be a little shorter than F2 and slightly transverse; F2 1.0-1.2 times as long as broad, F3 and F4 about quadrate; clava 2.5 times as long as broad, longer than F2 plus F3 plus F4, its segments separated by distinct constrictions. For other details of both sexes, see Domenichini (1967). The ♀ antenna and thorax are illustrated in Figs K11 and K12.

MATERIAL EXAMINED. 3 ♂, 8 ♀. Italy, USA.

HOSTS. Lepidoptera: *Lymantria dispar* (L.) (Lymantriidae), *Acronycta megacephala* (D. & S.), *Achatodes zae* (Harris) (Noctuidae), *Diatraea crambidoides* Grote, *Ostrinia nubilalis* (Hübner) (Pyralidae), *Cydia molesta* (Busck) (Tortricidae); also their parasites *Compsilura concinnata* (Mg.) (Dipt., Tachinidae), *Microplitis gortynae* Riley (Hym., Braconidae).

**PECKELACHERTUS** Yoshimoto

*Peckelachertus* Yoshimoto, 1970: 908-910. Type-species: *Peckelachertus diprioni* Yoshimoto, 1970, by monotypy and original designation.

*Peckelachertus* Yoshimoto; Graham, 1977: 45-47, 1987: 27, 35.

This genus seems rather isolated in the subfamily. It combines the plesiomorphic character states of developed postmarginal vein and anterior scutellar setae situated well forward on the sclerite, with the apomorphic states of a truncate clypeus and absence of longitudinal lines of mesoscutum and scutellum. The

male genitalia, which have a rather distinctive digitus, were figured for *diprioni* by Graham (1987, fig. 543).

### Key to European species

#### Females

- 1 Posterior pair of scutellar setae near the hind margin of the sclerite. Spur of mid tibia nearly as long as basitarsus and much longer than breadth of tibia. Antennal flagellum (Fig. 333) somewhat stouter than pedicellus, funicular segments at most 1.5 times as long as broad. . . . . *diprioni*
- Posterior pair of scutellar setae only slightly behind the middle of the sclerite. Spur of mid tibia weak, its length not greater than breadth of tibia. Antennal flagellum (Fig. 334) slender, funicular segments about twice as long as broad. . . . . *anglicanus*

#### Males

- 1 Antenna (Fig. 335) with pedicellus plus flagellum about 1.5 times breadth of mesoscutum; funicular segments 2 to 4 distinctly less than twice as long as broad; setae of flagellum shorter. Other characters as in ♀. . . *diprioni*
- Antenna (Graham, 1987, fig. 58) with pedicellus plus flagellum about 1.75 times breadth of mesoscutum; funicular segments 2 to 4 fully twice as long as broad; setae of flagellum longer. Other characters as in ♀. . . . . *anglicanus*

#### *Peckelachertus diprioni* Yoshimoto (Figs 333, 335)

*Peckelachertus diprioni* Yoshimoto, 1970: 909-910. Holotype ♀, Canada: Quebec, Katevale (D. de Oliveria) (CNC) [not examined].

*Peckelachertus diprioni* Yoshimoto; Graham, 1977: 47.

I have examined paratypes of this species. For description of both sexes see Yoshimoto (1970) and Graham (1977).

MATERIAL EXAMINED. Several ♂, ♀. **Finland; Canada.**

HOSTS. *Gilpinia pallida* (Klug) (Hym., Diprionidae), parasitising the host eggs.

#### *Peckelachertus anglicanus* Graham (Fig. 334)

*Peckelachertus anglicanus* Graham, 1977: 45-47. Holotype ♂, Great Britain: Berkshire, Windsor Forest, 4.vi.1973 (Graham) (BMNH) [examined].

For description of both sexes see Graham (1977).

MATERIAL EXAMINED. 1 ♂, 2 ♀. **Great Britain.**

HOSTS. Unknown.

**THRIPASTICHUS** Graham

*Thripastichus* Graham, 1987: 26, 30, 39, fig. 36. Type-species: *Tetrastichus gentilei* Del Guercio, by original designation.

*Thripastichus* Graham; Bouček, 1988: 596-597.

DIAGNOSIS. See Graham, 1987.

DISTRIBUTION. The single known species has been found in the Holarctic, Indomalayan and Neotropical regions (probably introduced into Europe). It is not closely related to any other European genus.

BIOLOGY. Hosts are Thysanoptera.

***Thripastichus gentilei* (Del Guercio)**

*Tetrastichus Gentilei* Del Guercio, 1911: 222-227. Syntypes, Italy (Del Guercio) (not located).

*Tetrastichus thripophonus* Waterston, 1923: 453-455. Holotype ♀, West India: Trinidad, summer 1922 (F.W. Urich) (BMNH) [examined]. [Synonymised with *gentilei* by Domenichini, 1966a: 179.]

*Tetrastichus tatei* Dozier, 1937: 129-130. Holotype ♀. Puerto Rico: Mayaguez (USNM) [not examined]. [Synonymised by Burks, 1943: 526.]

*Tetrastichus thripophonus* Waterston; Burks, 1943: 525-526.

*Tetrastichus thripophorothripsidis* Narayanan, Subba Rao & Ramachandra Rao, 1960: 171. Holotype ♀, India [not examined]. [Synonymised by Bouček, 1988: 597.]

*Tetrastichus gentilei* Del Guercio; Domenichini, 1966a: 178-179, 1966b: 33.

*Thripastichus gentilei* (Del Guercio) Graham, 1987: 26, fig. 36.

Additional references were cited by Peck (1963) and Domenichini (1966a, 1966b).

The syntypes of *gentilei* may be lost. Waterston (1923: 455) stated that he had tried to obtain material but without result. However, there is now general agreement regarding the identity of the species. The most detailed description is that of Waterston (as *thripophonus*).

MATERIAL EXAMINED. 1 ♂, 12 ♀. **France, Italy; India; Trinidad; Brazil.**

HOSTS. *Gynaikothrips ficorum* (Marchal), *G. uzeli* (Zimmerman), *Liothrips laureli* (Mason), *L. oleae* (Costa), *L. urichi* Karny, *Phlaeothrips pedicularius* Haliday (Thysanoptera, Phlaeothripidae).

**QUADRASTICHODELLA** Girault

*Quadrastichodella* Girault, 1913: 237, and 1913: 69. Type-species: *Quadrastichodella bella* Girault, by original designation.

*Quadrastichodes* Girault, 1913: 68. Type-species: *Quadrastichodes cyaneiviridis* Girault, by original designation. [Synonymised with *Quadrastichodella* by Bouček, 1988: 668.]

*Flockiella* Timberlake, 1957: 109. Type-species: *Flockiella eucalypti* Timberlake, by original designation. [Synonymised with *Quadrastichodella* by Bouček, 1977: 25.]

*Quadrastichodella* Girault; Bouček, 1977: 25; Graham, 1987: 27, 34, figs 13, 14; Bouček, 1988: 594, 668-669, figs 1170-1172.

For diagnosis of the genus, see Graham (1987); and for distribution and biology, see Bouček (1988). It is not closely related to any other European genus, and has been introduced there and to other places along with eucalypts.

*Quadrastichodella nova* Girault

*Quadrastichodella nova* Girault, 1922: 40-41; Bouček, 1988: 669.

For synonymy and distribution, see Bouček (1977: 25, 1988: 669).

The species originated from Australia where it is associated with eucalypts (possibly phytophagous in the seeds). It has been introduced into southern Europe, South Africa, North and South America. Bouček (1977: 25) recorded it from Sardinia and Spain.

**[NESOLYNX** Ashmead

*Nesolynx* Ashmead, 1905: 966. Type-species: *Nesolynx flavipes* Ashmead, by monotypy.

For discussion of the synonymy, biology and distribution of this genus, see Bouček (1988: 696-697). It occurs mainly in tropical and subtropical countries, with warmer parts of the temperate zones of Africa, Asia, Australia and the Pacific area.

This genus was included in my keys to European genera (Graham, 1987: 31, 37 on the basis of a male *Nesolynx* which I had examined, supposed to have been taken in southern Spain but apparently mislabelled and originating from a laboratory culture.)

ADDITIONAL SPECIES OF *APROSTOCETUS*

*Aprostocetus* (*Aprostocetus*) *subterraneus* (Szelényi), **comb.n.**  
(Fig. 336)

*Tetrastichus subterraneus* Szelényi, 1973: 306-307. Holotype ♀, Hungary: Nagyszénás, Nagykovácsi, reared 17.vii.1966 from gall of *Planetella fireni* (Kieffer) on *Carex humilis* (Szelényi) (TM [examined]).

Dr. J. Papp kindly allowed me to examine the holotype and female paratypes of this species.

Related to *A. phineus* (Walker), differing from my redescription of the female of that species (Graham, 1987: 354-355) as follows. Antenna (Fig. 336) with scape shorter, about 0.65 length of eye; pedicellus plus flagellum about equal to or hardly greater than breadth of mesoscutum; funicular segments relatively shorter; thorax squat, only about 1.25 times as long as broad; mid lobe of mesoscutum about 1.3 times as broad as long; propodeum more broadly emarginate posteriorly, medially slightly shorter than dorsellum, with median carina rather thick, not foveate basally, expanded posteriorly; gaster longer, about 1.5 times length of head plus thorax, slightly tough distinctly acuminate, with last tergite about as long as broad; ovipositor sheaths projecting slightly.

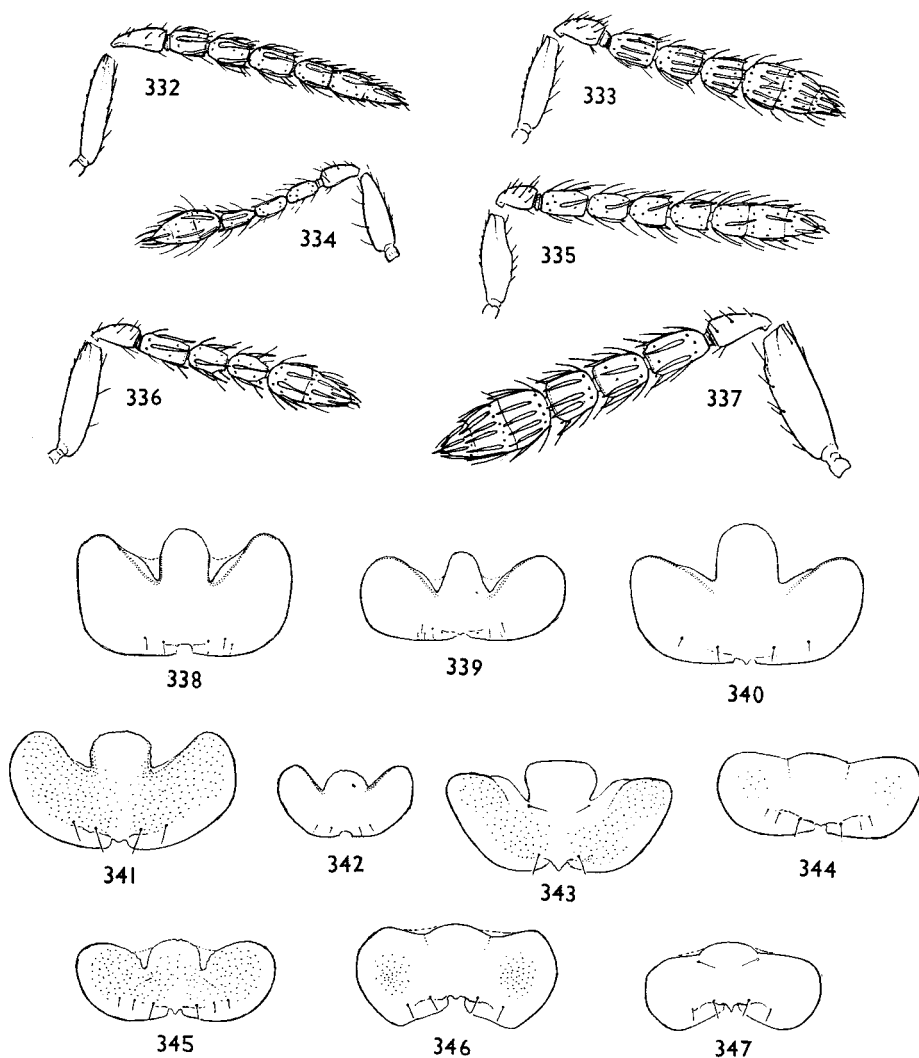
Szelényi (1973: 306) described the gaster as "dull brown", but in the holotype and paratypes there is an obscure testaceous subbasal area on the gaster.

♂. Unknown.

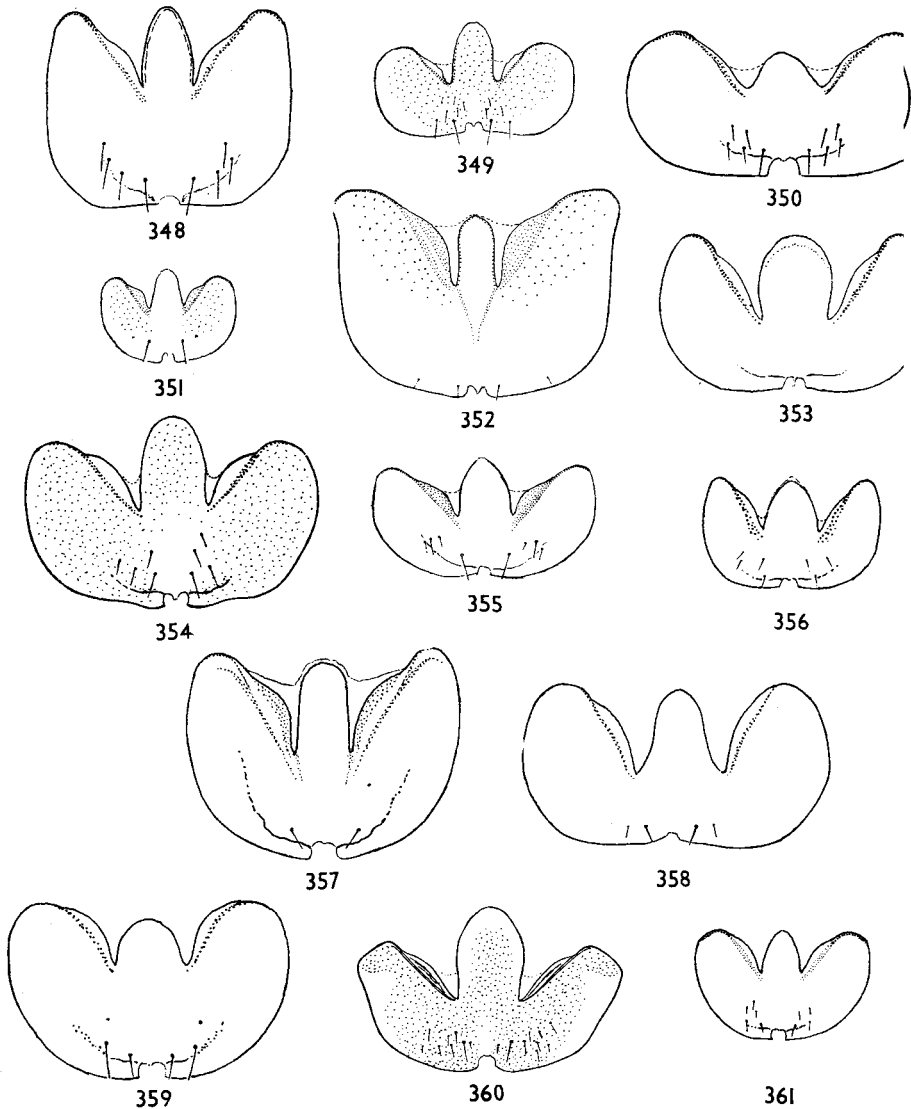
MATERIAL EXAMINED. 7 ♀. **Hungary.**

HOSTS. Presumably *Planetella fireni* (Kieffer) (Dipt., Cecidomyiidae).

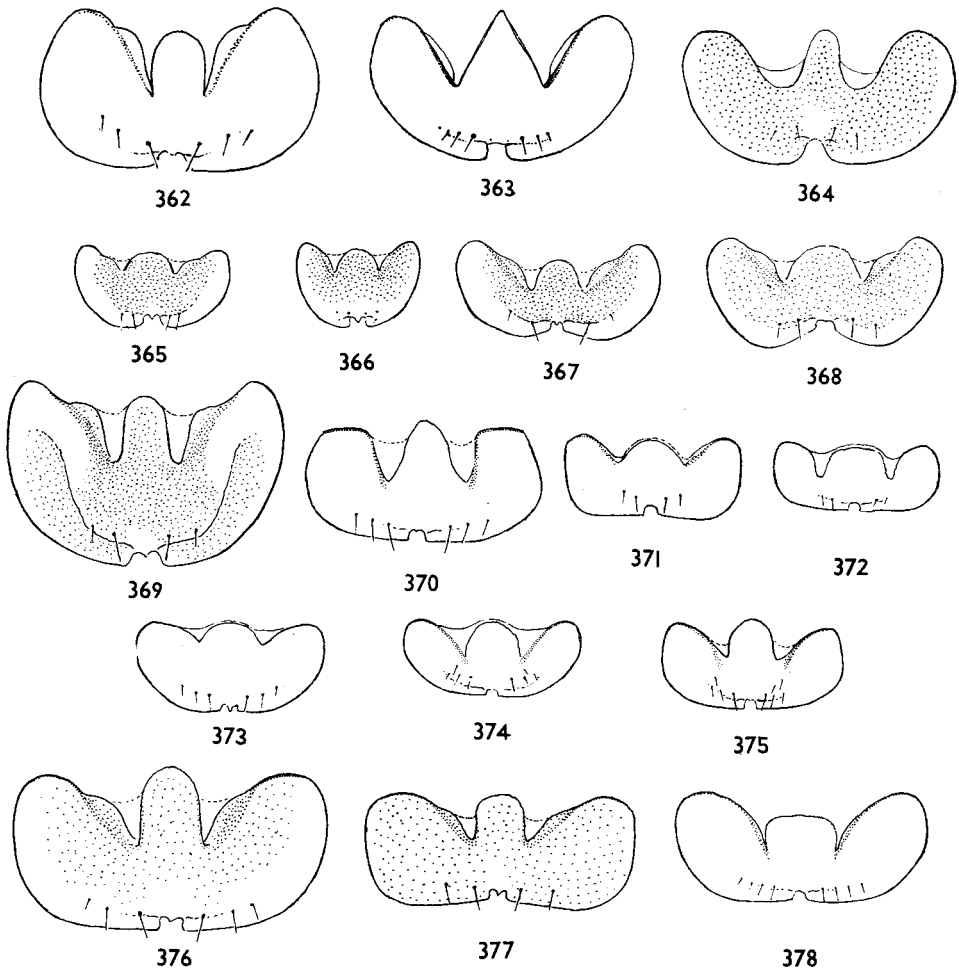




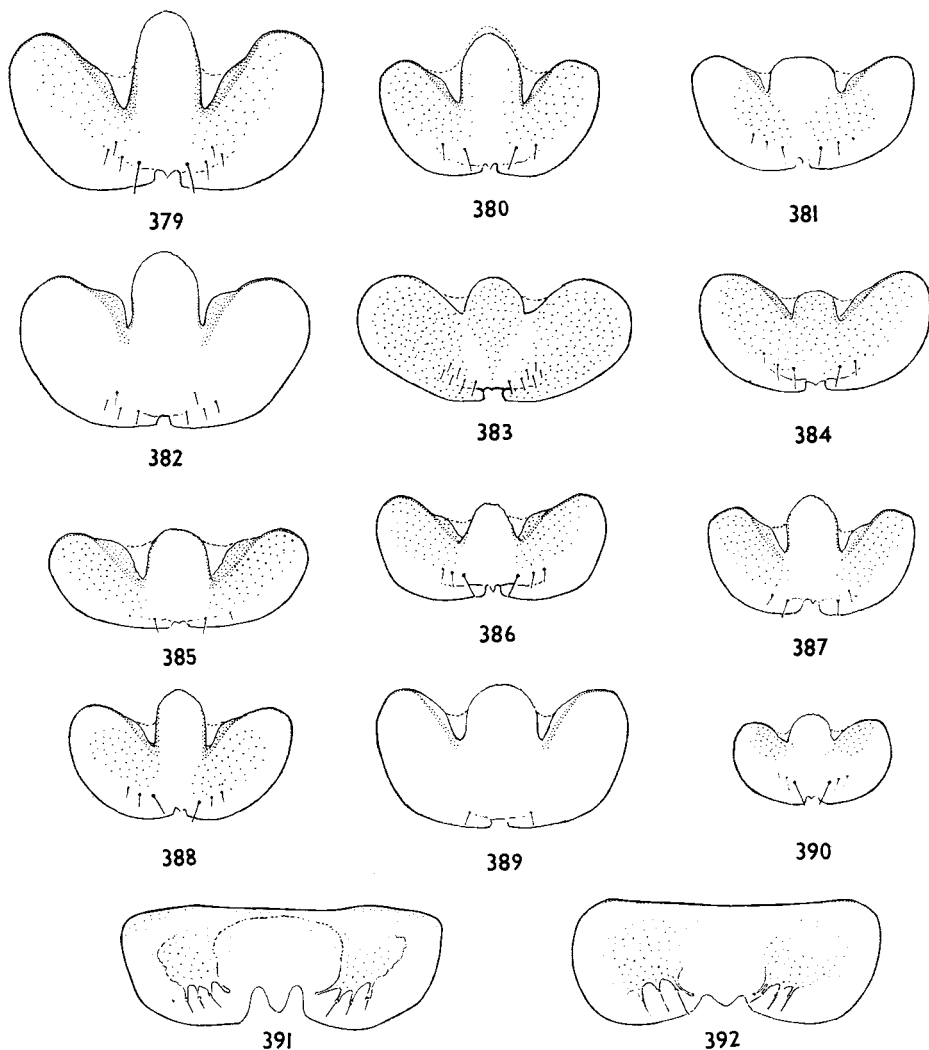
Figs 332-347 332, *Sphenolepis pygmaea* Nees ♀, antenna. 333, *Peckelachertus diprioni* Yoshimoto ♀, antenna. 334, *P. anglicus* Graham ♀, antenna. 335, *P. diprioni* Yoshimoto ♂, antenna. 336, *Aprostocetus (Aprostocetus) subterraneus* (Szelényi) ♀, antenna. 337, *A. (A.) curtivena* sp. n. ♀, antenna. 338-347, hypopygia, females. 338, *Quadrastichus vacuna* (Walker). 339, *Q. brevinervis* (Zetterstedt). 340, *Q. ventricosus* (Graham). 341, *Q. pedicellaris* (Thomson). 342, *Q. thysanotus* (Förster). 343, *Q. sajo* (Szelényi). 344, *Q. anysis* (Walker). 345, *Q. flora* (Girault). 346, *Q. citrinus* (Thomson). 347, *Q. xanthosoma* (Graham).



Figs 348-361 Hypopygia, females. 348, *Baryscapus adalia* (Walker). 349, *B. elasmii* (Graham). 350, *B. impeditus* (Nees). 351, *B. mucronatus* sp. n. 352, *B. servadeii* (Domenichini). 353, *B. fossarum* sp. n. 354, *B. endemus* (Walker). 355, *B. transversalis* sp. n. 356, *B. spartifoliellae* sp. n. 357, *B. दौरα* (Walker). 358, *B. diaphantus* (Walker). 359, *B. pallidae* sp. n. 360, *B. garganus* (Domenichini). 361, *B. gradwelli* sp. n.



Figs 362-378 Hypopygia, females. 362, *Baryscapus crassicornis* (Erdős). 363, *Puklina amblyteles* sp. n. 364, *P. depilata* sp. n. 365, *Pronotalia orobanchiae* sp. n. 366, *P. trypetae* Gradwell. 367, *P. carlinarum* (Szelényi & Erdős). 368, *P. kungarica* (Erdős). 369, *Crataepus marbis* (Walker). 370, *Oomyzus pegomyae* sp. n. 371, *O. sempronius* (Erdős). 372, *O. incertus* (Ratzeburg). 373, *O. scaposus* (Thomson). 374, *O. tanacetii* (Graham). 375, *O. sokolowskii* (Kurdjumov). 376, *Tetrastichus halidayi* (Graham). 377, *T. hylotomarum* (Bouché). 378, *T. coeruleus* (Nees).



**Figs 379-392** Hypopygia, females. 379, *Tetrastichus legionarius* (Giraud). 380, *T. temporalis* (Graham). 381, *T. julis* (Walker). 382, *T. agriloides* sp. n. 383, *T. miser* (Nees). 384, *T. helviscapus* sp. n. 385, *T. atratulus* (Nees). 386, *T. dasyops* sp. n. 387, *T. brachyopae* sp. n. 388, *T. melasomae* sp. n. 389, *T. clito* (Walker). 390, *Mischotetrastichus petiolatus* (Erdős). 391, *Tamarixia arboreae* (Graham). 392, *T. upis* (Walker).

*Aprostocetus (Aprostocetus) viridescens* Förster, **comb.n.**

*Tetrastichus viridescens* Förster, 1861: xxxviii.

Two specimens stand under this name, both females. One disagrees with the description and bears the wrong locality. The other, designated lectotype by Domenichini (1966a: 157) is labelled: Roseggthal; Först; Collect. G. Mayr; *T. viridescens* Förster Type. I saw the lectotype some years ago and thought it might be a small specimen of *Aprostocetus zosimus* (Walker), though confirmation is desirable.

The following new species should also be added to the European list.

*Aprostocetus (Aprostocetus) deceptor* sp.n.

*Aprostocetus (Aprostocetus)* sp.1, Graham, 1987: 155.

♀. Briefly diagnosed, at couplet 106 of my key to females of *Aprostocetus* (Graham, 1987: 155). Differs from ♀ of *agrus* (Walker) as follows. Mid lobe of mesoscutum with hardly raised and finer reticulation, most areoles over at least anterior 0.5 three or rather more times as long as broad; median line finer. Antennal clava rather longer, 2.4-2.75 times as long as broad; spine well visible, longer (about 0.7 length of C3) and more slender, apical seta shorter, about 0.35 length of spine.

Gaster 1.9-2.1 times as long as broad. Holotype yellow with the following parts blackish: occiput mainly; large spot on pronotum anteriorly, small spots on the spiracles; spots on scapulae and on axillae, anteriorly; propodeum except laterally; transverse bands on gaster, spot on mesosternum. Antennae fuscous, ventral surface of scape and pedicellus yellow. Paratype darker, mainly black with bluish tint; antennae, also coxae and femora mainly, black. Length 1.65 mm.

♂. Unknown.

MATERIAL EXAMINED. 2 ♀. Holotype ♀, **France:** Var, Bois de Pourrières, 24.vii.1979 (Graham) (BMNH).

Paratype. **France:** 1 ♀, Vaucluse, near Bédoin, 20.vii.1981 (Graham) (MVG).

HOSTS. Unknown.

*Aprostocetus (Aprostocetus) curtivena* sp.n.

(Fig. 337)

*Aprostocetus (Aprostocetus)* sp.2; Graham, 1987: 130, Fig 403.

♀. Differs from that of *pygmaeus* (Zetterstedt) mainly in the shorter spine of the antennal clava, shorter marginal vein and relatively short gaster. Antenna (Fig. 337) with pedicellus plus flagellum hardly equal to breadth of mesoscutum; pedicellus twice as long as broad, approximately equal in length to F1; funicular segments decreasing in length, F1 1.7 times, F2 1.4 times as long as broad, F3

quadrate; clava about twice as long as broad; spine about 0.5 length of C3. Submedian lines of scutellum slightly nearer to sublateral lines than to each other, enclosed space 2.2 times as long as broad. Forewing with costal cell equal in length to M and nearly 10 times as long as broad; M 2.5 times length of ST. Hindwing subobtusate. Gaster short ovate, hardly longer but slightly broader than thorax, 1.35 times as long as broad, acute and slightly acuminate; last tergite somewhat broader than long.

Black, including antennae, and legs mainly; tips of all femora fairly broadly, fore tibiae mainly, proximal third and tips of mid and hind tibiae, and basitarsus of mid and hind tarsi testaceous. Wings hyaline, venation brownish. Length 1.82 mm.

♂. Unknown.

MATERIAL EXAMINED. 1 ♀. Holotype ♀, **France**: Aveyron, near Lapanouse du Cernon, 25.vii.1978 (Graham) (BMNH).

This species was included, as "*A. (A.)* sp.2", at couplet 171 of my key to females of *Aprostocetus* s.str. (Graham, 1987: 130) and the forewing venation was figured in fig. 403; but no description was given.

HOSTS. Unknown.

*Aprostocetus (Aprostocetus) maurus* sp.n.

*Aprostocetus (Aprostocetus)* sp.3; Graham, 1987: 130.

♀. Much resembles *aethiops* (Zetterstedt) but differs especially in its shorter antennal flagellum, shorter funicle segments and shorter clava, narrower costal cell of forewing.

Antenna with scape 0.8 length of eye, not reaching vertex; pedicellus plus flagellum slightly less than breadth of mesoscutum; pedicellus 2.5 times as long as broad, distinctly longer than F1; funicle proximally slightly stouter than pedicellus, thickening very slightly distad, its segments subequal in length, F1 and F2 slightly longer than broad, F3 quadrate; clava broader than F3, hardly longer than F2 plus F3, slightly more than twice as long as broad, spine about 0.5 length of C3. Mid lobe of mesoscutum without a median line. Forewing with costal cell, 3.5 times length of ST, somewhat thicker than in *aethiops*. Gaster about 1.4 times length of head plus thorax and about 2.3 times as long as broad.

Black; mouth edge, upper angle of mesopleuron and dorsellum testaceous; coxae black, legs otherwise yellowish-testaceous with fore femora infuscate proximally, hind femora entirely black, fourth tarsal segment fuscous, third slightly brownish-tinged. Tegulae yellow. Wings hyaline, venation brownish-testaceous. Length 2.2 mm.

♂. Unknown.

MATERIAL EXAMINED. 1 ♀. Holotype ♀, **Hungary**: Berhida, 28.vii.1952 (Erdős) (BMNH, ex coll. Bouček). (Det. Erdős as "*inunctus* Nees").

HOSTS. Unknown.

## SPECIES INQUIRENDAE

*Eulophus atrocoeruleus* Nees

*Eulophus atrocoeruleus* Nees, 1834: 173-174. Syntypes, ♀, Germany: Sickershausen (destroyed). Thomson (1878: 283) considered this to be the same as "*hylotomarum* Ratzeburg" but his identification is not convincing. I cannot at present recognize *atrocoeruleus*.

*Eulophus depressus* Nees

*Eulophus depressus* Nees, 1834: 182-183. Syntypes, Germany: Sickershausen (destroyed).

Mentioned, as a synonym of *roesellae* (Nees) by Kurdjumov (1913: 250) but that author's concept of *roesellae* included several species. The original description made no mention of scutellar lines and does not point with certainty to a tetrastichine.

*Eulophus inconspicuus* Nees

*Eulophus inconspicuus* Nees, 1834: 184.

Referred to *Tetrastichus* by Marchal (1900). The original description hardly suggests a tetrastichine.

*Entedon pinetorum* Ratzeburg

*Entedon pinetorum* Ratzeburg, 1852: 212-213. Syntypes, Germany: from *Hylesinus minimus* (Ratzeburg) (destroyed).

? *Geniocerus pinetorum* (Ratzeburg) Erdős, 1954: 359; 1971: 248.

Ratzeburg's description is inadequate for recognizing this species. He cited as host *Hylesinus* [now *Carphoborus*] *minimus* (F.). This, together with the minute size attributed to *pinetorum* (0.75-1.1 mm.) may eventually lead to recognition of the species if fresh material can be reared from the original host.

The Erdős collection (TM) contains several specimens which he had placed under *pinetorum*. Two of these, females swept from *Abies alba* in 1972, and from *Picea excelsa* in 1953, evidently formed the basis of his concept of *pinetorum* as included in his key of 1954. They are both near *Baryscapus galactopus* (Ratzeburg) but have longer gaster and funicular segments. They are too large to fit the description of *pinetorum*. Erdős also had some other specimens, determined as *pinetorum*, which belong to *Tetrastichus* s.str. Clearly no definite conclusion regarding the species can be reached at present.

*Geniocerus capitatus* Ratzeburg

*Geniocerus capitatus* Ratzeburg, 1852: 216-217. Syntypes, Germany: (Reissig) (not located).

Placed in *Tetrastichus* by Kirchner (1867: 187). Ratzeburg's description is poor. He had a male, reared by Reissig from a Cecidomyiid gall on leaf of *Tilia* but

which had the thorax so soiled that he could see nothing of the mesothoracic or scutellar lines. He described the stigmal vein as being non-petiolate, monstrous and shaped like the head of a bird. He also described a female with the same kind of stigmal vein. I cannot recognize the species.

*Eulophus crinicornis* Perris

*Eulophus crinicornis* Perris, 1840: 405. Syntypes, FRANCE (not located).

*Tetrastichus crinicornis* (Perris); Marchal, 1900; Domenichini, 1966b: 26.

The original material of *crinicornis* was reared from *Cecidomyia urticae* Perris (= *Dasineura urticae* (Perris)) (Dipt., Cecidomyiidae). The description is inadequate for recognizing this species. Marchal apparently included several species under this name (see Domenichini, 1966b) but I have not seen his material.

*Tetrastichus impurus* Förster

*Tetrastichus impurus* Förster, 1861: xxxviii. Holotype or syntypes, Switzerland: Rosegal (Förster) (? lost).

The only specimen standing under this name in Förster's collection (NM) bears a locality label "Aachen" and cannot be a syntype. It is a female, apparently conspecific with *Aprostocetus epicharmus* (Walker). The very brief description is consistent with its being that species.

The identity of the other species listed as doubtful (under *Tetrastichus*) by Domenichini (1966b: 59-61) has now been ascertained.

## NOMINA NUDA

*Eulophus osmiarum* Robineau-Desvoidy, 1836: 361.

This name appeared in a report by Duméril on seven memoirs written by Robineau-Desvoidy and submitted to the Academy of Sciences in December 1836. He stated that the first memoir contained a description of two species of the bee genus *Osmia* and of their parasite *Eulophus osmiarum*. I can find no evidence that these descriptions were ever published, hence the name *Eulophus osmiarum* is a *nomen nudum*.

Other *nomina nuda* were listed by Domenichini (1966b: 62) and need not be repeated here.

## GENUS EXCLUDED FROM TETRASTICHINAE

*Stomoctea* Dufour, 1846: 23. A junior synonym of *Gastrancistrus* Walker, 1833. [See Graham, 1991: 55-56].



## SPECIES EXCLUDED FROM TETRASTICHINAE

*Eulophus ater* Nees, 1834: 186. Placed in *Tetrastichus* by Laboulbène (1877). It was described as having a 6-segmented antennal funicle and was no doubt a species of the pteromalid genus *Gastrancistrus*, like the species which follows it (*glabellus* Nees).

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