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Handbooks for the Identification of British Insects
Vol. 8, Part 1c

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CHARIPIDAE, IBALIIDAE & FIGITIDAE

HYMENOPTERA: CYNIPOIDEA

N.D.M. Fergusson



ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

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Identification of British Insects

Vol. 8, Part 1c

Editors: P. C. Barnard & R. R. Askew



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HYMENOPTERA: CYNIPOIDEA

By

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The aim of the *Handbooks* is to provide illustrated identification keys to the insects of Britain, together with concise morphological, biological and distributional information. The series also includes a *Check List of British Insects*.

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Abstract

The British Charipidae, Ibaliidae and Figitidae are revised. The literature on the Cynipoidea is reviewed and is followed by details of methods of collection and preservation. The biology of the three families is summarized. Keys are presented to the families of British Cynipoidea and to the genera and species of the three families. The keys to species are annotated with details of distribution and host information. A check list of the British Charipidae (4 genera and 18 species),

Ibaliidae (1 genus and 2 species) Figitidae (12 genera and 25 species) is provided, together with a glossary, 97 text figures, and an extensive list of references.

One new genus (*Apocharips*), and three new species (*Figites ictus, Alloxysta semiaperta* and *Alloxysta abdera*) are described, and two genera and forty species are synonymized. A section on nomenclature includes twenty lectotype designations.

Introduction

The Cynipoidea is a large group of parasitic Hymenoptera. Species are commonly encountered in most habitats, but because of their small size they are frequently overlooked. The superfamily is perhaps best known because of the galls it causes on oak and rose trees but the gall-causing cynipids (the Cynipidae) comprise only one of the five families of British Cynipoidea. The remainder are protelean parasites. The Cynipidae were monographed by Eady & Quinlan (1963) and the Eucoilidae (parasites of Diptera) by Quinlan (1978). The three remaining families, the Ibaliidae (parasites of siricid sawflies), the Figitidae (parasites of Diptera and Neuroptera) and the Charipidae (parasites of Psylloidea and hyperparasites of aphids) are revised in this present work. This completes the handbook coverage of the superfamily.

The taxonomy of the parasitic Hymenoptera ("Parasitica") is the least known of any major group of insects. Many sections of the Parasitica are without recent keys, have large numbers of species and the literature contains many errors. This neglect is deplorable because the Parasitica contains much that is important and interesting. The great need for revisions and handbooks on the Parasitica is not only in the interests of "pure research", as many species have hosts which are economically important pests of crops. Biological control of these pests can be effective only if their parasites are studied and this in turn necessitates their accurate determination.

The Natural Environment Research Council Report on the Role of Taxonomy (N.E.R.C., 1976) has identified many areas of taxonomic ignorance but the report has also stated that ignorance alone is not an *ipso facto* reason for research priority. However the report identified the parasitic Hymenoptera as a group of high priority, and a hindrance to ecological research is foreseen if this lack of knowledge is not remedied. The absence of handbooks for many groups of parasitic Hymenoptera is specifically noted.

Cynipoids are generally small (except *Ibalia*, which is over 10mm long) and robust insects, brown or black in colour and with a distinctive triangular radial cell (Fig. 2). The forewing lacks a true pterostigma [two rare subfamilies of Cynipidae (figs 26, 27) from Australia and Africa have a pseudopterostigma], the pronotum reaches to the tegulae, the tarsi are five-segmented and the gaster is often laterally compressed. If the genitalia are obscured then the sexes can be distinguished by the antennae, the females having 13 segments and the males 14 or 15 segments (with rare exceptions).

There is a clear advantage in maintaining continuity, so this handbook closely conforms to the style of the previous two cynipoid handbooks. However, one major change has been the inclusion of a comprehensive bibliography. The publications on the Charipidae, Ibaliidae and Figitidae consist, mostly, of small papers and it is essential to provide the reader with an entry into this literature. A general introduction to collecting techniques and an overview of the biology have also been provided. The considerable amount of synonymy that is a product of this study is summarised in a synonymic check list of the British species. An introduction is

given to each family, subfamily and genus. A key is provided to the species of each genus, and after each species is a statement headed "Distribution", which gives data obtained from the specimens examined. Where there are only a few records the counties have been listed, otherwise the expressions "widespread", "common" and "very common" have been used. "Common" has been given the arbitrary definition of more than fifty examined specimens, which is common by the standards of this group. "Very common" is many more than fifty specimens, and "widespread" means less than fifty specimens but from a wide range of counties. If there is any restriction such as "only in the south of England", this is specified, but the widespread condition usually represents a discontinuous distribution of collecting sites. The few Irish records that are available have been included after the British data. Following the distributional data there is a statement regarding host species, based on material that has been examined.

Literature

The first important works on British cynipoids were by Westwood (1833) and Curtis (1829, 1838). After this the centre of publication shifted to Austria, Germany and Sweden. Hartig (1840–1843) produced several papers containing very brief descriptions of new species. The descriptions were better in Dahlbom (1842), and in 1860 Giraud and then Reinhard produced work that was very good. The excellent work of Thomson (1862) was marred only by its lack of illustration. Förster (1869) attempted the construction of a generic and higher level classification, but he described many genera that have since been synonymized.

Cameron (1890) published a revision of all the British cynipoids; unfortunately the work is of very limited value as it contains numerous misidentifications and descriptions of many new "species" based on minor colour differences (most of Cameron's names are synonymized in the present handbook).

In 1910 Dalla Torre & Kieffer produced the first comprehensive study of the Cynipoidea. This work has many faults but these are, even today, balanced by its completeness. Weld (1952) updated the 1910 work and devised a classification that forms the basis of all current research. Hellén (1958, 1963) based his revision of the cynipid fauna of Finland on the work of Dalla Torre & Kieffer. Recent Royal Entomological Society handbooks on the Cynipidae and Eucoilidae, together with the present work, complete the coverage of the British Cynipoidea.

Collection and preservation

The small size and fast escape actions of parasitic cynipoids make them difficult to collect. However, certain techniques and devices have been developed which make collecting more efficient, and the most relevant of these are mentioned here.

Sight collection involves searching vegetation and collecting by net or pooter. This technique is particularly useful for collecting Anacharitinae from the bark of trees and Alloxystinae from aphid colonies. Valuable host or habitat information can be obtained by this method.

A *pooter* is a device for aspirating insects into a glass or clear plastic chamber (see Noyes, 1982). A convenient design has a 75 by 25mm, flat bottomed, glass tube as the chamber; when the tube is full it can be exchanged for a fresh tube. A crumpled piece of tissue placed in the tube prevents "sweating". When not in

use the end of the pooter should be secured by a small cork, or a finger placed over the entrance to stop insects escaping. Possible health hazards of using a pooter have been recently reviewed by Douglas (1984).

Sweeping produces a good number of species but can only provide a limited amount of bionomic information. The sweep-net described by Noyes (1982) can be used but a round net frame with a short handle can, if used skilfully, produce good results. The net bag should be of strong terylene with a mesh size that allows the easy passage of air but is small enough to prevent small insects escaping. Canvas is not suitable except as a reinforcement at the rim of the bag. The net should be white and not deeper than 65cm. When sweeping keep the net very close to the vegetation (or ground) as this has a great effect on the size of the catch. To empty the net turn to face the sun and poot the insects as they run up the sunny side. The debris at the bottom can be retained and placed in a light box (see below).

The *Malaise trap* is the best method of getting large numbers of cynipoid species. A good design has been described by Townes (1972). If correctly positioned the trap will provide a good sample of all but the apterous forms. The trap vessel should contain 90% alcohol and this should be changed if it has been diluted by rain. The trap is examined every one or two days and the catch removed.

A combination of *Yellow pan* (or *Moericke trap*) and *pitfall traps* consists of a shallow tray, 7cm deep and about 20cm by 25cm, sunk flush with the surrounding ground. It is painted bright yellow on the inside to attract insects. The tray is filled with water and a few drops of detergent are added to lower the surface tension. The trap must be emptied daily as the catch decays quickly. An equal mixture of water and ethylene glycol can be used in the pan and the trap can then be emptied once a week. The pan is emptied using a small net, such as the type sold for clearing fish tanks, and the catch is washed and then transferred to 90% alcohol.

The *interception trap* has recently been developed by Masner & Goulet (1981). It combines the concepts of the Malaise trap with that of the pan trap, and also utilises insecticide. It consists of a vertical net, covered by a roof, that is positioned above the mid-line of a tray filled with preservative. The net is treated with insecticide. This trap should be extremely effective.

A *light box* is roughly the size of a shoe box and has a clear plastic top. Plant debris from sweep-net collecting, or leaf litter, is placed in the box and the insects emerge and congregate under the lid, from where they can be aspirated. Masner & Gibson (1979) have described a similar device, called a separation bag, that may be an improvement on the light box.

A *beating tray* consists of a square metre of white canvas stretched over a frame. This is held under a tree or bush which is beaten with a stick. This technique works well, but the pooter must be used speedily to catch the cynipoids before they recover from the fall and fly from the sheet.

Fogging is a method used to collect arboreal insects. Collecting trays or sheets are spread over the ground or lower foliage and a pyrethrum spray is discharged into the tree from the exhaust of a manually operated or radio controlled "fogger". The fogger produces a fog with a droplet diameter of less than 5 microns.

Rearing is the most profitable method of collecting cynipoids because of the bionomic data that it provides. The host requirements of so many species are unknown that almost any additional information is useful. The technique will vary depending on the species under study. Andrews (1978) gives some details on the rearing of Alloxystinae, and James (1928) explains how to rear Figitinae from dipterous larvae by placing meat in shallow trays and allowing it to putrefy. The main problems are that the host species may be attacked by fungus or suffer from dehydration. The growth of fungus can be inhibited by the use of thymol or salt solution.

Preservation

Cynipoids should be collected into or transferred to 90% alcohol. They should be kept cool and stored in the dark, until they can be mounted. Before mounting the specimens should be relaxed in a humid chamber or box, and it is usually necessary to open the mandibles and free various appendages for ease of identification at a later stage. The insect should be glued to a 3 by 10mm card triangle by cold water soluble glue; P.V.A. is not suitable. The insect should be mounted on one side so that only one mesepisternum is obscured. Apart from the large *Ibalia* spp., no cynipoids should be directly pinned or micropinned.

Biology

The biology of parasitic Cynipoidea, unlike that of the phytophagous forms, is only poorly known. Except for the Alloxystinae, which are hyperparasites, protelean Cynipoidea are all primary, solitary endoparasites. The main host preferences are shown in the following table, a more detailed account can be found under the relevant family, subfamily or genus.

Charipidae
- Charipinae: primary parasites of Psylloidea.
- Alloxystinae: hyperparasites of aphids via Aphidiinae (Hymenoptera: Braconidae) and Aphelinidae (Hymenoptera: Chalcidoidea).

Ibaliidae
- Ibaliinae: internal parasites of siricid wood wasps (Hymenoptera: Symphyta, Siricidae) in timber (*Abies, Picea, Pinus, Larix*).

Figitidae
- Figitinae: internal parasites of Diptera in carrion and dung.
- Anacharitinae: parasites of Hemerobiidae (Neuroptera).
- Aspicerinae: parasites of Syrphidae (Diptera) preying on aphids.

Our knowledge of immature stages of the Cynipoidea is confined to a very few species, half of which are Eucoilidae (for an account of eucoilid biology see Quinlan, 1978). The typical cynipoid egg has an elongate body and a tail that is at least as long as the body (fig. 17). The early larval stages of parasitic cynipoids have a special interest because they bear a modified resemblance to specific developmental phases that in other insects are usually passed in the egg stage. Owing to the small quantity of yolk which the eggs of cynipoids (and many other parasitic Hymenoptera) contain, and also because of the favourable conditions in which the egg is placed at oviposition, eclosion from the egg is considerably hastened. Hence many of the early instars in the development of cynipoid larvae still retain resemblances to certain early embryonic forms from which they have doubtless been derived (James, 1928).

Imms (1925) developed the work of Berlese (1913) and considers that there are four distinct phases (protopod, polypod, oligopod and apodous) in the embryology of insect larvae, based chiefly on stages of segmentation and development of the appendages. The protopod stage has incomplete abdominal segmentation and the paired appendages are confined to the cephalic and thoracic segments. In the polypod stage the segmentation is complete and all segments have appendages. In the oligopod stage the abdominal appendages are absent and the thoracic legs are well developed. The apodous larva, which has no appendages, is, in the majority of cases, derived from the oligopod larva.

Many of the parasitic cynipoids that have been investigated have an eucoiliform or modified eucoiliform primary larva. The eucoiliform larva was first described by Keilin & Baume-Pluvinel (1913) in a study of *Eucoila keilini* (Kieffer), its chief diagnostic features being the presence of three pairs of long thoracic processes and a long cauda. Eclosion from the egg, as a eucoiliform larva, is suggested to occur in the middle of the protopod stage (James, 1928).

The first stage larva of *Figites anthomyiarum* (Figitinae) (fig. 14) is a modified eucoiliform larva; its well defined segmentation places it as hatching later in embryonic development than the Eucoilidae. The structure of the anus in the eucoiliform larva has affinities to the enlarged anus described by Haviland (1921) for the primary larva of *Alloxysta* (Alloxystinae) (fig. 15). *Alloxysta* differs from the above examples in that it is devoid of thoracic processes and thus appears to belong to the apodous stage but, as very reduced thoracic processes appear in the second instar, James (1928) has inferred that the primary larva represents something in ontogeny prior to or at the beginning of the protopod stage.

In general terms the eclosion from the egg in parasitic cynipoids takes place at or near the protopod stage and then is often followed by a polypod like stage, (termed a polypodiform larva by James, 1928). However, the first instar larvae of *Ibalia* (Iballiidae) (fig. 13) and *Anacharis* (Anacharitinae) (fig. 16) are polypodous and thus have developed to a later stage before eclosion. The larvae of the Charipinae and Aspicerinae have not yet been described. In the later larval stages of parasitic cynipoids the extra body appendages and the cauda shorten and disappear, the tracheal system develops, the nervous system expands and development takes place normally.

From the information available it seems likely that many parasitic cynipoids have more than one generation per year. *Callaspidia defonscolombei* has two generations (Rotheray, 1979) and *Figites* can have three. James (1928) has suggested that the preponderance of females in bred *Figites anthomyiarum* might indicate that a certain amount of parthenogenesis occurs. More data are needed before a more complete summary of cynipoid biology can be provided.

Morphology

Many of the terms used in this handbook are explained in annotated diagrams (figs 1, 2, 3); the remainder are defined in a glossary.

The morphological terms used in this handbook are taken from the introductory handbook to the Hymenoptera (Richards, 1977). Further terminology of the Cynipoidea is adopted from Eady & Quinlan (1963) and Nordlander (1982a). Terms for surface sculpture are taken from Eady (1968) and, to a lesser extent, from Harris (1979).

Abbreviations

The abbreviations used in the text are defined below.

AI, AII AIII etc. – antennal segment one, two, three etc. The scape is AI, the pedicel is segment AII and the first flagellar segment is AIII.

P.O.L – posterior ocellar line; the distance between the posterior (=lateral) ocelli.

TI, TII etc. – gastral tergite one, two etc. TI forms the petiole (cf. Weld, 1952 and Quinlan, 1979).

The following abbreviations have been used for depositories containing type and other material which has been examined.

ZM, Bergen – Zoological Museum, Bergen University, Muséplass 3, Bergen N 5014, Norway.

MNHU, Berlin – Museum für Naturkunde der Humboldt-Universität, Invalidenstrasse 43, 1040 Berlin, East Germany.

BMNH – British Museum (Natural History), Cromwell Road, London SW7 5BD, England.

NMI, Dublin – National Museum of Ireland, Kildare St, Dublin 2, Ireland.

ZMU, Helsinki – Zoological Museum of the University, P.-Rautatiekatu 13, 00100 Helsinki 10, Finland.

ZI, Lund – Zoologiska Institution, Helgonavägen 3, 22362 Lund, Sweden.

MV, Melbourne – Museum of Victoria, Melbourne, 71 Victoria Crescent, Abbotsford, Victoria 3067, Australia.

ZSBS, Munich – Zoologische Sammlung des Bayerischen Staates, Munich, West Germany.

UM, Oxford – University Museum, Parks Road, Oxford OX1 3PW, England.

MNHN, Paris – Muséum National d'Histoire Naturelle, 45 Rue de Buffon, 75005 Paris, France.

NR, Stockholm – Naturhistoriska Riksmuseet, S 10405, Stockholm 50, Sweden.

USNM, Washington – National Museum of Natural History, Washington D.C., 20560, U.S.A.

NM, Vienna – Naturhistorisches Museum, Burgring 7, 1014 Wien, Austria.

Check list

The following check list of the British Charipidae, Ibaliidae and Figitidae corrects and brings up to date the list published in the second edition of Kloet & Hincks (Fitton *et al.*, 1978). Species and genera are arranged in alphabetical order within the higher classification. An asterisk in front of a specific name indicates that the type material has been examined; synonyms are indented under the senior name, and misidentifications are bracketed.

CHARIPIDAE

CHARIPINAE

APOCHARIPS **gen. n.**
**xanthocephala* (Thomson, 1862)

DILYTA Förster, 1869
CHARIPS Haliday in Marshall, 1870
GLYPTOXYSTA Thomson, 1877
**subclavata* Förster, 1869
**microcera* (Haliday in Marshall, 1870)
**heterocera* (Thomson, 1877)

ALLOXYSTINAE

ALLOXYSTA Förster, 1869
ALLOTRIA Westwood, 1833 preoccupied
XYSTUS Hartig, 1840 preoccupied
PEZOPHYCTA Förster, 1869
NEPHYCTA Förster, 1869
THOREAUANA Girault, 1930
abdera **sp. n.**
**brachyptera* (Hartig, 1840)
**brevis* (Thomson, 1862)
mullensis* (Cameron, 1883) **syn. n.
[*minuta* Hartig; Cameron, 1890 misidentification]
arcuata* (Kieffer, 1902) **syn. n.
castaneiceps (Kieffer, 1904) **syn. n.**
**citripes* (Thomson, 1862)
**britannica* Kieffer, 1902
**fulviceps* (Curtis, 1838)
castanea* (Hartig, 1841) **syn. n.
defectus* (Hartig, 1841) **syn. n.
nigriventris* (Thomson, 1862) **syn. n.
**ruficollis* (Cameron, 1883)
ruficeps* (Cameron, 1883) preoccupied **syn. n.
[*trapezoidea* Hartig; Cameron, 1886 misidentification]
megaptera* (Cameron, 1889) **syn. n.
rubriceps Kieffer, 1902
cameroni (Dalla Torre & Kieffer, 1910) **syn. n.**
pruni (Hedicke, 1928)
**macrophadna* (Hartig, 1841)
piceomaculata* (Cameron, 1883) **syn. n.
maculicollis* (Cameron, 1886) **syn. n.
basimacula* (Cameron, 1886) **syn. n.
caledonica* (Cameron, 1886) **syn. n.
[*aptera* Hartig; Cameron, 1886 misidentification]
[*testaceus* Hartig; Cameron, 1889 misidentification]
filicornis* (Cameron, 1889) **syn. n.
perplexa* (Cameron, 1889) **syn. n.
crassa* (Cameron, 1889) **syn. n.
[*nigriventris* Thomson; Cameron, 1890 misidentification]
[*brachyptera* Hartig; Cameron, 1890 misidentification]
marshalliana* (Kieffer, 1900) **syn. n.
scutellata Kieffer, 1902
nigriventris* var. *rubromaculata* Kieffer, 1902 **syn. n.
ignorata (Kieffer, 1900)

pallidicornis (Curtis, 1838)
minuta (Zetterstedt, 1838)
forticornis (Giraud, 1860)
basalis (Thomson, 1862)
anthracina Andrews, 1978
pedestris (Curtis, 1838)
halterata (Thomson, 1862) **syn. n.**
pleuralis (Cameron, 1879)
gautieri Kieffer, 1922
semiaperta **sp. n.**
victrix (Westwood, 1833)
ruficeps (Zetterstedt, 1838)
erythrocephalus (Hartig, 1840)
fuscicornis Hartig, 1841 **syn. n.**
circumscriptus (Hartig, 1841) **syn. n.**
macrocera (Thomson, 1877)
atriceps (Buckton, 1879) **syn. n.**
curvicornis (Cameron, 1883) **syn. n.**
ancylocera (Cameron, 1886) **syn. n.**
brassicae (Ashmead, 1887) **syn. n.**
victrix var. *infuscata* (Kieffer, 1902) **syn. n.**
amygdali (Dalla Torre & Kieffer, 1910) **syn. n.**
grioti (De Santis, 1937)
aphidiinaecida (De Santis, 1937)

PHAENOGLYPHIS Förster, 1869
HEMICRISIS Förster, 1869 **syn. n.**
AULOXYSTA Thomson, 1877
BOTHRIOXYSTA Kieffer, 1902
CHARIPSELLA Bréthes, 1913
dolichocera (Cameron, 1889)
ruficornis (Förster, 1869)
pubicollis (Thomson, 1877)
salicis (Cameron, 1883)
forticornis Cameron, 1888 **syn. n.**
villosa (Hartig, 1841)
piciceps (Thomson, 1862)
collina (Cameron, 1889)
carpentieri (Kieffer, 1902)
foveigera (Kieffer, 1902)
curvata (Kieffer, 1902)
recticornis (Kieffer, 1902)
subaptera (Kieffer, 1904)
campyla (Kieffer, 1904)
xanthochroa Förster, 1869
rufa (Thomson, 1877)
obfuscata Kieffer, 1902



IBALIIDAE

IBALIINAE

IBALIA Latreille, 1802
SAGARIS Panzer, 1806
leucospoides (Hockenwarth, 1785)
cultellator (Fabricius, 1793)
ensiger Norton, 1862
suprunenkoi Jacobson, 1899
gigantea Yoshimoto, 1970

rufipes Cresson, 1879
drewseni Borries, 1891
shirmeri Dalla Torre & Kieffer, 1910

FIGITIDAE

FIGITINAE

FIGITES Latreille, 1802
PSILOGASTER Hartig, 1840
PYCNOTRICHIA Förster, 1869
OMALASPOIDES Hedicke, 1913
SEITNERIA Tavares, 1928
**anthomyiarum* Bouché, 1834
**consobrinus* Giraud, 1860
[*scutellaris* Rossi; Zetterstedt, 1838 misidentification]
dentiscuta* Hellén, 1937 **syn. n.
ictus **sp. n.**
scutellaris (Rossi, 1794)
ruficornis (Rossi, 1794)
abbreviator (Herrich-Schäffer in Panzer, 1801)
**tibialis* (Hartig, 1840)
letzneri (Hedicke, 1913)

LONCHIDIA Thomson, 1862
**clavicornis* Thomson, 1862
**maculipennis* (Dahlbom, 1842)

MELANIPS Haliday in Walker, 1835
SCYTODES Hartig, 1840
AMBLYNOTUS Hartig, 1843
ANOLYTUS Förster, 1869 **syn. n.**
**alienus* Giraud, 1860
dalmanni (Dahlbom, 1842) nomen nudum
longitarsus* (Reinhard, 1860) **syn. n.
**microcerus* (Kieffer, 1903)
[*opacus* Hartig; Thomson, 1862 misidentification]
**opacus* (Hartig, 1840)
femoralis* Cameron, 1883 **syn. n.
**sylvanus* Giraud, 1860
rufipes* (Förster, 1869) **syn. n.
biusta (Cameron, 1879)

SAROTHRUS Hartig, 1840
AMPHITHECTUS Hartig, 1840
**areolatus* Hartig, 1840
**dahlbomii* (Hartig, 1840)
piceus (Dahlbom, 1842) nomen nudum
fumipennis (Giraud, 1860)
**tibialis* (Zetterstedt, 1838)
**canaliculatus* Hartig, 1840
silesiacus (Hedicke, 1913)

XYALOPHORA Kieffer, 1901
**clavata* (Giraud, 1860)

ZYGOSIS Förster, 1869
DICERAEA Förster, 1869
THYREOCERA Ashmead, 1887
**urticeti* (Dahlbom, 1842)

**heteropterus* (Hartig, 1843)
urticeti* var. *flavicornis* Hellén, 1937 **syn. n.

ANACHARITINAE

AEGILIPS Haliday in Walker, 1835
atricornis Fergusson, 1985
**nitidula* (Dalman, 1823)
**rufipes* (Westwood, 1833)
**fumipennis* (Westwood, 1833)
**dalmani* Reinhard, 1860
**rugicollis* Reinhard, 1860
**ruficornis* Cameron, 1883
**striolata* Cameron, 1883
**bicolarata* Cameron, 1887
romseyensis Fergusson, 1985
vena Fergusson, 1985

ANACHARIS Dalman, 1823
MEGAPELMUS Hartig, 1840
SYNAPSIS Förster, 1869
eucharioides (Dalman, 1818)
tinctus* Walker, 1835 **syn. n.
typica* Walker, 1835 **syn. n.
petiolata* (Zetterstedt, 1838) **syn. n.
spheciformis* (Hartig, 1840) **syn. n.
**immunis* Walker, 1835
ensifer* Walker, 1835 **syn. n.
rufiventris* (Hartig, 1841) **syn. n.
**staegeri* Dahlbom, 1842
aquisgranensis (Förster, 1869) **syn. n.**

XYALASPIS Hartig, 1843
CONASPICERA Hedicke, 1914
**armata* (Giraud, 1860)
abientina* (Thomson, 1862) **syn. n.
scotica* (Cameron, 1883) **syn. n.
**petiolata* Kieffer, 1901
[*subulifer* Thomson; Cameron, 1883 misidentification]

ASPICERINAE

ONYCHIINAE

ASPICERA Dahlbom, 1842
ONYCHIA Haliday in Curtis, 1829 preoccupied
BELLONA Giraud, 1860
scutellata (Villers, 1789)
ediogaster (Rossi, 1790)
bicolor (Fonscolombe, 1832)
aculeator (Fonscolombe, 1832)

CALLASPIDIA Dahlbom, 1842
**defonscolombei* Dahlbom, 1842
**nigripes* (Cameron, 1879)

OMALASPIS Giraud, 1860
TAVARESIA Kieffer, 1901
LAMBERTONIA Kieffer, 1901
carinata (Kieffer, 1901)

Key to families of the British Cynipoidea

(based on Quinlan 1979: 90)

1 Largest segment of gaster (in lateral view) the 6th (fig. 5). Radial cell of forewing at least 9 times as long as broad (fig. 12). Basitarsus of hind leg almost twice as long as tarsal segments 2–5 combined and second hind tarsal segment with a blunt spur (figs 18, 19). Gaster of female strongly compressed laterally, blade-like. Length 10mm or longer ..... Ibaliidae (p. 20)

— Largest segment of gaster (in lateral view) the second or third (figs 6-10). Radial cell of forewing much less than 9 times as long as broad (figs. 20–22). Basitarsus of hind leg shorter or second hind tarsal segment without spur. Gaster of female not so strongly compressed. Length much less than 10mm 2

2 Scutellum with a dorsal "cup" (fig. 4). Pronotum often very pronounced, produced frontodorsally into an anterior plate with a strong posterior margin (Fig. 11) .... **Eucoilidae** (see Quinlan, 1978)

— Scutellum without a "cup". Pronotum if raised dorsally into an anterior plate then without a posterior margin, very often indistinct or absent 3

3 Winged; forewing with cubital vein (Rs+M), when visible arising from a point at or close to the junction of basal vein with M+Cul (fig. 20). Gaster of male only weakly compressed except certain Aspicerinae in which TII is saddle-shaped (fig. 8). Female frequently with TIII the largest gastral tergite but often it is TII (figs 8,9,10). Thorax at least partially sculptured. Scutellum may have an apical spine ... **Figitidae** (p. 22)

— Winged or apterous; forewing with cubital vein, when visible, arising from a point nearer the middle of basal vein than to the junction of basalis with M+Cul (fig. 21). Gaster of both sexes laterally compressed, TII not saddle-shaped. Female with the largest tergite either the second (fig. 6) or the second and third fused (fig. 7) [with or without an obsolete suture visible]. Whole of thorax may be smooth and shiny. Scutellum never with an apical spine 4

4 Vertex, mesonotum, scutellum, mesepisternum and gaster smooth and shiny. Mid tibia often with only one spur, hind tibia with one or two unequal spurs. Pronotum sharply angled anteriorly, forming a vertical carina. Gaster with a ring of pubescence at base of TII. Male often with AIV, rarely with AIII or AIII to AV emarginate .... **Charipidae** (p. 14)

— At least vertex, mesonotum, scutellum or gaster sculptured. Mid and hind tibia each with two distinct spurs. Pronotum generally not sharply angled anteriorly but if a carina is indicated then head and thorax strongly sculptured. Gaster only rarely with pubescence at base of TII. Emarginate segment of male antenna, when present, always AIII . ..... **Cynipidae** (see Eady & Quinlan, 1963)

Family Charipidae

The Charipinae together with the Alloxystinae have been recognized as a family, distinct from the Cynipidae, by Kierych (1979b), Evenhuis & Kiriak (1985) and Nordlander (1982a, 1982b). However, Kierych and Evenhuis & Kiriak used Alloxystidae, based on Alloxystinae Hellén, 1931, as the new family name. This usage is inconsistent with articles 23 and 36 of the *International Code of Zoological Nomenclature* because the subfamily name Charipinae was used in 1910 by Dalla Torre & Kieffer. Nordlander (1982b) correctly used the family name Charipidae and his usage will be followed in the present handbook. [It should be noted that the second paragraph of Evenhuis & Kiriak (1985) contains a most confusing misquotation. The authors have accidentally upgraded the two subfamilies to families.]

The family name Allotrioidae used by Förster (1869) is based on *Allotria* Westwood, a junior homonym of *Allotria* Hübner and thus is not valid (article 39 of the *Code*).

Key to subfamilies

1 AXIII and AXII of female forming a club (figs 29, 30), the two segments separated by a fine division that does not appear to be a fully functional articulation. Distal gastral tergites often covered by the large tergite so that gaster is apically rounded (fig. 24). Primary parasites of Psylloidea ..... **Charipinae** (p. 15)

— AXIII and AXII of female not clavate, the segments articulated normally (fig. 28). Distal gastral tergites exposed, apex of gaster truncate (fig. 25). Hyperparasites of aphids through Aphidiinae and Aphelinidae ..... **Alloxystinae** (p. 16)

Subfamily Charipinae

The subfamily name Charipinae was first used by Dalla Torre & Kieffer (1910) for the genera *Charips* Haliday (=*Allotria* Westwood), *Alloxysta* Förster (=*Dilyta* Förster and *Glyptoxysta* Thomson), *Hemicrisis* Förster, *Nephycta* Förster, *Phaenoglyphis* Förster and *Pezophycta* Förster. Before 1910 the name Allotriinae had been used, but this was changed to Alloxystinae because *Allotria* is a junior homonym. Hellén (1958, 1963) realised that *Dilyta* was a valid genus with *Charips* and *Glyptoxysta* as synonyms. Andrews (1978) excluded *Dilyta* from the remainder of the Alloxystinae, and Kierych (1979b) created the new subfamily Dilytinae. In an excellent paper, Quinlan & Evenhuis (1980) sorted out the confusion and showed that under article 40 of the *International Code of Zoological Nomenclature*, the correct subfamily name for *Dilyta* is Charipinae.

The Charipinae are distinguishable from the Alloxystinae by having the last two antennal segments of the female clavate and incompletely separated, and by the shape of the gaster, but most significantly they are primary parasites of Psylloidea and not, like Alloxystinae, hyperparasites of aphids.

The Charipinae consists of two genera, each with only one European representive; other species have been described from North America and Australia but the generic placement of these species has not been confirmed.

Key to genera

1 TII and TIII fused (fig. 23). Scutellum smooth or at most with a small apical ridge. Rs not quite meeting wing margin, not parallel to R_1; basal angles of radial cell greater than 90° (fig. 31) ..... **Dilyta** Förster (p. 15)

— TII and TIII not fused (fig. 24). Scutellum margined by a lateral ridge and a crenulate apical carina. Rs reaching wing margin and parallel to R_1; basal angles of radial cell both 90° (fig. 32) ..... **Apocharips gen. n.** (p. 16)

Genus **Dilyta** Förster

(Figs 23, 29, 31)

Dilyta Förster 1869: 338. Type-species *Dilyta subclavata* Förster, by original designation.

Charips Haliday in Marshall, 1870: 181. Type-species *Charips microcera* Haliday in Marshall, by monotypy. (Synonymized by Hellén, 1963: 4.)

Glyptoxysta Thomson, 1877: 811. Type-species, *Glyptoxysta heterocera* Thomson, by subsequent designation (Ashmead, 1903: 142) (Synonymized by Hellén, 1963: 4.)

Dilyta is represented in Europe by a single species, *D. subclavata*. It is closely related to the following genus but is distinguishable by having the second and third gastral segments fused.

— AIII of male antenna emarginate. Propodeal carinae curved. One large tergite forms most of gaster (fig. 23). Radial cell of forewing twice as long as high. Rs not reaching wing margin (fig. 31) ..... subclavata Forster
Distribution: Buckinghamshire, Dyfed, Fife, Highland, Norfolk, Northamptonshire, Suffolk, Surrey. Host: primary parasite of Psylloidea. Bred from Psylla pyri *(Linnaeus).*

Genus **Apocharips gen. nov.**

(Figs 24, 30, 32)

Type-species *Allotria xanthocephala* Thomson, 1862: 407. Lectotype female, Sweden (ZI, Lund [examined].

When Thomson (1877: 811) described *Glyptoxysta* he included two species — *Allotria xanthocephala* Thomson, 1862 and a new species *G. heterocera*. In 1903 Ashmead designated *heterocera* as the type-species. In 1917 Rohwer & Fagan published a second and therefore invalid type-species designation, selecting *xanthocephala*; in 1919 they corrected their mistake. Kierych (1979a) realised that these two species belong to different genera. He has suggested that an application could be made to the International Commission on Zoological Nomenclature to set aside the first type-species designation so that the name *Glyptoxysta* could be used for *xanthocephala* and he has used this incorrect combination in his papers (1979a; 1979b). Subsequent workers have not accepted Kierych's argument and it is clearly much better to describe a new genus for *xanthocephala* than to attempt the overturn of a valid type-species designation which would cause more, not less, confusion. As this species has now been found in England, I am taking this opportunity to supply the new generic name that this species requires.

— AIII of male antenna not emarginate. AIII of female 1.4 times length of AV, AIV 1.2 times length of AV. Scutellum smooth but laterally margined by a ridge which develops into a concave posterior carina. Propodeal carinae almost vertical. TIII large (fig. 24). forming most of gaster. Radial cell of forewing short (fig. 32), approximately as long as high ..... **xanthocephala** (Thomson)
Distribution: Bedfordshire, Dyfed, Northamptonshire, Suffolk, Surrey. Host: Psylla *sp.*

Subfamily Alloxystinae

The Alloxystinae are widely distributed. They have been found in all continents, from above the arctic circle in Lapland and Alaska to 47 degrees South in Argentina, and they have been collected at elevations above 2750m in Arizona to below sea level in California (Andrews, 1978).

All Alloxystinae that have been investigated are hyperparasites of aphids via Aphidiinae (Braconidae) or Aphelinidae (Chalcidoidea) (Andrews, 1978; Evenhuis, 1971-1978; Evenhuis & Barbotin, 1977). The cynipoid approaches and palpates the aphid; it then orientates itself head to head and inserts its ovipositor into the aphid's abdomen. The insertion may be repeated several times. The egg is inserted into the primary parasite larva which lies in the haemocoel of the aphid. Supernumerary eggs may be laid but only one will complete development. Unparasitized aphids may be probed but no egg is laid. The cynipoid stills its restless behaviour during oviposition. Development within the aphid can take from twenty days in *Alloxysta victrix* to four months in a diapausing *Phaenoglyphis* sp.

The cynipoid larva does not spin a cocoon but may use the one spun by the primary parasite prior to its death. The adult cynipoid chews a hole through the abdomen of the aphid and emerges.

Evenhuis (1971-78) and others have sometimes inferred that certain species of Alloxystinae are host specific, but Andrews (1978) concluded that "no known species can be defined by its host associations" although there is a degree of preference shown by most species for certain aphid/primary parasite host associations.

Key to genera

1 Mesepisternum without transverse suture (fig. 33) ..... **Alloxysta** Förster (p. 17)
— Mesepisternum with transverse suture (fig. 34) ..... **Phaenoglyphis** Förster (p. 19)

Genus **Alloxysta** Förster

(Figs 15, 28, 33, 35–45, 97)

Allotria Westwood, 1833: 494. Type-species *Allotria victrix* Westwood by monotypy. [Homonym of *Allotria* Hübner, 1823: 280.] (Synonymized by Hellén 1963: 8.)

Xystus Hartig, 1840: 199. Type-species *Xystus erythrocephalus* Hartig, by subsequent designation (Rohwer & Fagan, 1917: 378). [Homonym of *Xystus* Schoenherr, 1826: 310.] (Synonymized by Hellén 1963: 8.)

Alloxysta Förster, 1869: 338. Type-species *Xystus macrophadnus* Hartig, by original designation.

Pezophycta Förster, 1869: 338. Type-species *Xystus brachypterus* Hartig, by original designation. (Synonymized by Hellén 1963: 8.)

Nephycta Förster, 1869: 338. Type-species *Nephycta discreta* Förster, by original designation. (Synonymized by Hellén 1963: 8.)

Thoreauana Girault, 1930: 2. Type-species *Thoreauana nativa* Girault, by monotypy. (Synonymized by Weld 1952: 102.)

Alloxysta is a large genus and now that the generic synonymy has been stabilized it contains over 150 nominal species. However, more specific synonymy is likely amongst the Palaearctic representatives. The genus is widely distributed throughout the world but, because its distribution is linked to that of its aphid hosts, *Alloxysta* is better represented in temperate than in tropical regions.

Cameron described many species of *Alloxysta* and *Allotria* from Great Britain (and misidentified many more); most of these species have been synonymized in this handbook, including seven Cameron names that are synonyms of one species – *A. macrophadna*!

Aspects of the biology of the commonest British representative, *Alloxysta victrix*, have been studied by Gutierrez (1970a–d) and Gutierrez & Van den Bosch (1970a, b). *A. victrix* attacks the immature stages of Aphidiinae that develop in the haemocoel of the aphid. All larval stages can be successfully attacked but once the aphid mummifies, the aphidiid larva is not accessible for attack. In cases of superparasitism by primary parasites, *A. victrix* usually develops only in the live, dominant larva.

The egg of *victrix* is 0.01mm by 0.006mm and oval with a short peduncle. The first stage larva (fig. 15) measures 0.38 by 0.13mm, is heavily armoured with dark segmental sclerotized plates and has a distinct head and 13 body segments. The final stage larva moults 36 to 48 hours after eclosion and the next moult occurs 24 to 36 hours later. The *victrix* larva develops within the haemocoel of the braconid or chalcid larva until attaining about two-thirds of the host's volume when it pierces the host's integument in the posterodorsal region. The grub-like *victrix* larva grows to a semicircular shape as it consumes the more cephalic portions of the host larva.

In the laboratory the pupal period is 8 to 11 days.

Several species of *Alloxysta* have been distinguished by coloration, especially head colour. This character has been carefully examined and has proved to be variable and an unreliable feature for species' determination. Two other characters that have been used are the lengths of certain antennal segments and the shape of the radial cell; these characters can be related to the total size of the insect and must be used with care. The two most frequently cited species names in this genus are *A. brassicae* and *A. victrix*. The characters of head colour and antennal segment length, which it has been claimed distinguish these two notional species, break down when long series of specimens are examined, and *A. brassicae* is here synonymized with *A. victrix*.

Key to species

1 Brachypterous species 2
— Fully winged species 3
2 Propodeal carinae absent. Radial cell, when visible, open. AIII clearly longer than AIV. Larger species (1.1 to 1.4mm). AIII and AIV of male weakly concave (fig. 35). .... **pedestris** (Curtis)
Distribution: widespread. Hosts: Metopolophium dirhodum *(Walker)*, Microlophium carnosum *(Buckton)*.
— Propodeal carinae present (fig. 38). Radial cell, when visible, closed. Length of AIII approximately equal to that of AIV. Smaller species (0.7 to 1.0mm). AIII and AIV of male not concave ..... **brachyptera** (Hartig)
Distribution: Berkshire, Bedfordshire, Fife, Gwynedd, Lancashire, Norfolk, Surrey, Tayside. Ireland: Dublin, Wicklow. Host: Prociphilus bumeliae *(Schrank) recorded by Cameron (1890: 236)*.
3 Radial cell closed (figs 40, 41) 4
— Radial cell open (figs 42, 44, 45) or partially open (fig. 43) 5
4 Propodeal carinae absent. AIII, AIV and AV of male distinctly and deeply emarginate (fig. 37). Radial cell large, approximately 0.4mm long. AIII of female clearly longer than AII ..... **victrix** (Westwood)
Distribution: very common. Hosts: a wide range of aphids, especially Aphidinae and Macrosiphinae, via Aphidiinae (Praon, Aphidius Diaeretiella, Trioxys) *and Chalcidoidea* (Aphelinus) *primary parasites.*
— Propodeal carinae present (fig. 39). Basal flagellar segments of male not emarginate. Radial cell small, approximately 0.2mm long. AIII often not longer than AII. [Radial cell often almost as high as long (fig. 40) but in small specimens it is long and thin (fig. 41) and AIII, AIV and AV are narrow] ..... **brevis** (Thomson)
Distribution: common. Hosts: Aphis *spp. via* Lysephedrus; Myzus cerasi *(Fabricius) and* Dysaphis plantaginea *(Passerini) via* Ephedrus *on fruit trees.*
5 Venation transparent, clear-yellow. Radial cell half open (fig. 43); propodeal carinae absent or only weakly developed. Male without AIII and AIV emarginate; legs clear-yellow ..... **citripes** (Thomson)
Distribution: Bedfordshire, Berkshire, Buckinghamshire, Essex, Hampshire, Lancashire, Norfolk, Northamptonshire, Tayside. Hosts: Tuberculoides, Pterocallis *and* Myzocallis *via* Trioxys; Drepanosiphum *via* Aphelinus.
— Venation not transparent, dark-yellow or brown. Radial cell open or closed; if half open, then legs dark yellow to brown or propodeal carinae distinct and male with weak emarginations on AIII and AIV 6
6 Propodeum without vertical carinae 7
— Propodeum with vertical carinae (fig. 38) 8
7 Radial cell fully open. AIV and AV of male deeply emarginate (fig. 36); AIII of female approximately as long as AIV. Legs yellow, rarely brown ... **macrophadna** (Hartig)
Distribution: common. Hosts: Acyrthosiphon pisum *(Harris) via* Aphidius ervi *Haliday*; Metopolophium dirhodum *(Walker) via* Aphidius poacearum *Stary*; Aphis medicaginis *Koch*; Microlophium carnosum *(Buckton)*; Metopolophium festucae *(Theobald) and* Pemphigus.

— Radial cell only half open. Basal segments of male antenna not emarginate; AIII of female clearly longer than AIV. Legs brown or dark yellow ..... **semiaperta sp. n.**
Distribution: Holotype female, England, Oxfordshire [Witney] 1.IX.1977 (L.A. Mound) ex Epilobium *(BMNH); Paratypes 7 males, 22 females same data as holotype; 1 female Kent, N.E. of Dover 16.VIII.1981 (R.G. Brown); 1 female Berkshire, Hamstead Marshall 17.VIII.1981 (R.G. Brown); all in BMNH. Host: unknown.*

8 Angle of Rs to 2r is 90°, R_1 almost straight and parallel to Rs (fig. 44). Radial cell fully open and AIV of male without emargination. Hind tibial spur of female large, about one third length of basitarsus ..... **pleuralis** (Cameron)
Distribution: Hertfordshire, Highland, Lancashire, Northamptonshire, Strathclyde, Suffolk, Ireland: Dublin. Hosts: Aphis pomi *DeGeer via* Trioxys pallidus *(Haliday);* Aphis fabae *Scopoli and* A. craccivora *Koch.*

— Angle of Rs to 2r clearly greater than 90°, R_1 curved and not parallel to Rs (fig. 45). Radial cell half open or if fully open then AIV of male deeply emarginate. Hind tibial spur of female usually small, frequently less than one quarter length of basitarsus ... 9

9 AIII of female as long as AI and AII together. Radial cell fully open and 2r clearly longer than $Sc+R_1$ ..... **pallidicornis** (Curtis)
Distribution: the locality of the British specimen is unknown. Host: hyperparasite of Lachnidae, on coniferous trees, via Pauesia *spp.*

— AIII of female slightly longer than AII but not as long as AI and AII together. Radial cell half open or if fully open than 2r shorter than or at most equal to length of $Sc+R_1$ 10

10 Radial cell completely open. AIV of male with deep emargination. Head mostly brown, vertex brown, face yellow or sometimes yellow-brown ..... **abdera sp. n.**
Distribution: Holotype male, England, Lancashire, Belmont, 25.IX.1981 (BMNH). Paratypes: 2 males, 2 females, same data as holotype; 1 male, 1 female, Cheshire, Abbots Moss 3–21.X.1974 (M. R. Shaw); 2 males, Bedfordshire 7.V.1966 (V. H. Chambers); all in BMNH. Host: unknown

— Radial cell half open. AIV of male without clear emargination. Head mostly yellow, vertex yellow to yellow-brown, face yellow ..... **fulviceps** (Curtis)
Distribution: widespread. Host: Hyalopterus pruni *Geoffroy via* Praon volucre *(Haliday).*

Genus **Phaenoglyphis** Förster
(Figs 46–51)

Phaenoglyphis Förster, 1869: 338. Type-species *Phaenoglyphis xanthochroa* Förster, by original designation.

Hemicrisis Förster, 1869: 338. Type-species *Hemicrisis ruficornis* Förster, by original designation. (Synonymized by Evenhuis, 1973: 218.)

Auloxysta Thomson, 1877: 812. Type-species *Auloxysta nigripes* Thomson, by subsequent designation (Ashmead, 1903: 142) [vide Rohwer & Fagan, 1919: 237]. (Synonymized by Hellén, 1963: 5.)

Bothrioxysta Kieffer, 1902: 11. Type-species *Auloxysta nigripes* Thomson, by subsequent designation (Rohwer & Fagan, 1917: 362). (Synonymized by Hellén, 1963: 5.)

Charipsella Bréthes, 1913: 159. Type-species *Charipsella laevigata* Bréthes, by original designation. (Synonymized by Quinlan & Evenhuis, 1980: 428.)

Phaenoglyphis is a commonly collected but small genus of thirty species. It has a mainly holarctic distribution but *P. laevigata* is known from Chile and *P. africana* from central Africa. The genus is closely related to *Alloxysta* but is distinguished from the latter by having a mesepisternal suture. *Hemicrisis* has been regarded (Andrews, 1978) as a separate genus, distinguishable from *Phaenoglyphis* by having incomplete notaulices, but this separation cannot be justified because *Phaenoglyphis* contains species which have complete notaulices and species with the notaulices totally wanting.

There is a superficial resemblance between *Melanips microcerus* (Figitidae) and *Phaenoglyphis ruficollis* but the wing venation (see key to families) is different and the head of *P. ruficollis* is smooth while the head of *M. microcerus* is alutaceous.

The species of *Phaenoglyphis* are parasites of Aphidiinae (Braconidae) which are in turn parasites of aphids. *P. villosa* has a wide range of hosts but it is not possible, at present, to comment on the host ranges of the other British species.

Key to species

1 Notaulices present, at least in posterior half of mesonotum. Radial cell closed (fig. 48); scutellar foveae distinct 2

— Notaulices absent. Radial cell only partially closed (fig. 46) or if closed (fig. 47) then scutellar foveae absent 4

2 Mesonotum densely pubescent; notaulices only present in posterior half of mesonotum; scutellar foveae shallow, short (centrally) and wide (fig. 51) ..... **ruficornis** (Förster) *Distribution: one male, Buckinghamshire. Hosts: hyperparasite of Aphidoidea, Lachnidae on Conifers through various* Pauesia *sp.*

— Mesonotum with very few, scattered hairs; notaulices complete; scutellar foveae deep, approximately triangular (fig. 49) or rectangular (fig. 50) 3

3 Head and body yellow; antennae all yellow; coxae yellow-white; claws brown and rest of legs yellow. Scutellar foveae rectangular (fig. 50) ..... **xanthochroa** Förster *Distribution: Berkshire, Buckinghamshire, Dorset, Gloucestershire, Hampshire, Hertfordshire, Norfolk, Northamptonshire, Somerset, Surrey, Wiltshire, Yorkshire. Hosts:* Aphidius ervi *Haliday on* Microlophium carnosum (*Buckton*) & M. evansi (*Theobald*); A. rosae *Haliday on* Macrosiphum rosae (*Linnaeus*); A. sonchi *Marshall on* Hyperomyzus lactucae (*Linnaeus*).

— Head and body black or dark red-brown; antennae yellow proximally and brown distally; coxae brown-yellow or yellow; claws and last tarsal segment brown. Scutellar foveae triangular (fig. 49) ..... **salicis** (Cameron) *Distribution: common. Host:* Uroleucon *sp.*

4 Radial cell only partially closed (fig. 46). Scutellar foveae present. Legs of female yellow, fore and mid legs of male often yellow but all legs may be brown .. **villosa** (Hartig) *Distribution: very common. Host: polyphagous hyperparasite of Aphididae through a wide range of Aphidiinae (Braconidae).*

— Radial cell completely closed (fig. 47). Scutellar foveae absent. Legs of female and male brown ..... **dolichocera** (Cameron) *Distribution: Buckinghamshire, Hampshire, Northamptonshire, Surrey, N. Yorkshire. Ireland: Sligo. Host:* Metopolophium festucae (*Theobald*).

Family Ibaliidae

This family consists of one genus, *Ibalia*. Kerrich (1973) implied that *Myrmoibalia* constituted a second genus but Weld (1952) had previously recognised that *Myrmoibalia* belongs to the Mesocynipinae and is a synonym of *Heteribalia*.

The Ibaliidae can be recognised purely by size, being 10mm or longer, which is approximately double the body length of other British parasitic cynipoids. The radial cell of the forewing is at least nine times as long as broad, and closed on the front margin. In lateral view TVI is the longest gastral tergite, and the preceding three tergites are narrow and TII is wider than TIII. The gaster of the female is laterally compressed and blade-like. The basitarsus of the hind leg is almost twice as long as segments 2 to 5 together and the second hind tarsal segment has a blunt spur (figs 18, 19). The antennae are filiform, with 13 segments in females and 14 segments in males.

Genus **Ibalia** Latreille
(Figs 5, 12, 13, 17, 18, 19, 52, 53)

Ibalia Latreille, 1802: 306. Type-species *Ophion cultellator* Fabricius, 1798, by monotypy.
Sagaris Panzer, 1806: 91. Type-species *Ophion cultellator* Fabricius, 1798, by monotypy. (Isogenotypic with *Ibalia*.)

This is a mainly Holarctic genus of less than ten species. Only two species are known from western Europe and both have been found in Great Britain. Specimens of *Ibalia* have been extensively reared and transported to other regions, especially Australasia, as part of siricid control programmes.

I. leucospoides was first listed (as *cultellator*) as a British species by Curtis (1829) and has since been regularly collected in small numbers. In the Nearctic region this species has a slightly lighter coloured gaster and is known as *leucospoides* var. *ensiger*. A second British species, recorded as *I. drewseni*, was found by Spradbery (1970); Kerrich (1973) synonymized *drewseni* as a Palaearctic subspecies of *I. rufipes*.

The life cycles of *I. rufipes* and *I. leucospoides* have been studied by Spradbery (1970) and Chrystal (1930) respectively. Both species are internal parasites of siricid woodwasps (*Sirex, Urocerus & Xeris*) in timber (Pinaceae). They oviposit down the oviposition shaft of the siricid and into the haemocoel of the host embryo or larva. Normally only one egg (fig. 17) is deposited in the host. The larval stages of *leucospoides* and *rufipes* (Fig. 13) are morphologically similar and the major differences between the two species are the periods of emergence and the subsequent nature of the parasitism. *I. leucospoides* emerges from early August to late October and then parasitizes mature embryos or first or second instar larvae before they migrate into the wood away from the oviposition shaft. By contrast, *I. rufipes* emerges from mid May to the end of June (i.e. sometime before that year's hosts are suitable for parasitization) and parasitizes mature siricid larvae that were produced in the previous autumn and which may have migrated some millimetres from the oviposition shaft.

Both British species are stimulated to oviposit by the presence of the fungal symbiont (*Amylostereum* sp.) from *Sirex noctilio* (Spradbery, 1970; Madden, 1968) but other stimuli are probably also involved.

Key to species

1 Mesosternum shiny with a few fine punctures. Propodeum with only a raised keel below each spiracle. Vertex without or with very weak striae radiating from post-ocellar and ocular-ocellar lines (fig. 52). Vertical keels from near antennal insertions weak and diverging towards eyes (fig. 52). Prolongation of second hind tarsal segment reaching apex of third (fig. 19). Hind femora red. Hind two-thirds of gaster black above and with translucent area below ..... **rufipes** Cresson
Distribution: rare; Highland, Norfolk, Finglack [county?]. Host: Siricidae (Symphyta) in Pinaceae.

— Mesosternum transversely striate. Propodeum with distinct tooth below each spiracle. Vertex with strong striae radiating from post-ocellar and ocular-ocellar lines (fig. 53). Vertical keels from near antennal insertions strong and hardly diverging from outer margin of lateral ocelli (fig. 53). Prolongation of second hind tarsal segment extending beyond apex of third (fig. 18). Hind femora chestnut brown to black. Gaster deep red-brown to black ..... **leucospoides** (Hochenwarth)
Distribution: widespread but not common, South of England to Yorkshire. Host: Siricidae (Symphyta) in Pinaceae.

Family Figitidae

The Figitidae consists of four subfamilies. The Figitinae and Aspicerinae are parasites of Diptera, and the Anacharitinae are parasites of Neuroptera. The fourth subfamily (outside the coverage of this handbook), the Himalocynipinae, was described by Yoshimoto (1970b) from two males of a new genus and species (*Himalocynips vigintilis*) collected in Nepal. It differs from the other three subfamilies in having twenty antennal segments, an unusually small head in relation to the thorax, a small clypeus which strongly projects forwards and away from the exposed unsclerotized area and the truncate labium beneath, and vein CuA present in the forewing.

Key to subfamilies

1 TII of gaster saddle-shaped (fig. 8). Scutellum with one central and two lateral longitudinal carinae (figs 55–57). Hind tibiae often longitudinally ridged or posteriorly furrowed (fig. 54). Mesonotum sculptured and dull, only appearing shiny if orange in colour (*Aspicera scutellata*). TII with at most one central hair tuft ..... **Aspicerinae** (p. 30)

— TII of gaster not saddle-shaped (figs 9, 10). Scutellum without three complete longitudinal carinae. Hind tibiae not longitudinally ridged or furrowed or at most with longitudinal carina or groove internally. Mesonotum smooth and shining, or if occasionally dull and sculptured (*Melanips*), then TII with two dense lateral hair tufts or a hair collar . 2

2 TII of gaster, in lateral view and measured at or above the mid line, larger than TIII. Petiole long, at least as long as high, generally more than twice as long as high (fig. 10) (TII sometimes overlies part of petiole). TII without hair. Forewing without indication of areolet. Scutellum with two shallow lateral foveae. Mesonotum always shiny. AIII of male antenna not emarginate. ..... **Anacharitinae** (p. 27)

— TII of gaster, in lateral view, shorter than TIII and petiole short, not as long as wide or if TII about equal to TIII and petiole longer, then TII with two dense lateral hair tufts that can almost obscure petiole. Forewing with vestigial areolet indicated, or if absent then scutellum with single deep central fovea or mesonotum granulate and dull. AIII of male antenna often emarginate ..... **Figitinae** (p. 22)

Subfamily Figitinae

The Figitinae is the largest subfamily of the Figitidae, about 125 species having been described in a total of 13 genera. The Figitinae are characterised as follows: TII not saddle-shaped (fig. 9), AIII of male usually emarginate, TII usually shorter than TIII, gaster not petiolate.

Key to genera

1 Eye with long hairs or if hairs short then scutellum with short spine or tooth (fig. 58). Anteriorly TII virtually glabrous. Mesonotum always smooth 2

— Eye glabrous, scutellum without spine. Anteriorly TII with two dense lateral hair tufts that may unite to form proximal ring of pubescence. Mesonotum granulate or smooth 4

2 Scutellum ending in median triangular tooth (fig. 58). Notaulices striate. AXIII of female globular (fig. 68) ..... **Xyalophora** Kieffer (p. 23)

— Scutellum round or truncate terminally, without median tooth. Notaulices smooth. AXIII of female elongate (fig. 69) 3

3 Scutellum completely smooth and shining; smoothly curved posteriorly, without posterior carina. Vertex not concave; head, in dorsal view, almost spherical (fig. 64). Mesepisternum with smooth area in dorsal half ..... **Zygosis** Förster (p. 23)

— Scutellum rugose, if weakly sculptured then with posterior marginal carina. Vertex concave; head, in dorsal view, transverse (fig. 65). Mesepisternum completely striate . ..... **Figites** Förster (p. 24)

4 Scutellum with one central fovea. Radial cell short and often open; mesonotum smooth and shining. Radial cell rectangular basally, R_1 parallel to Rs, 2r straight and perpendicular to R_1 and Rs (fig. 71) ..... **Lonchidia** Thomson (p. 25)

— Scutellum with two lateral foveae (figs 84–86). Radial cell long and closed or if short or if R_1 pale then mesonotum granulate. Radial cell irregular basally (fig. 70), R_1 and Rs not parallel, veins R_1, Rs and 2r all clearly curved 5

5 Mesonotum densely granulate and dull. Scutellum granulate but with a few rugae posteriorly. Thoracic pubescence dense and short. Gena granulate .... **Melanips** Haliday in Walker (p. 25)

— Mesonotum smooth and shining between well spaced punctures. Scutellum coarsely rugose. Thoracic pubescence sparse but long. Gena smooth between punctures .... **Sarothrus** Hartig (p. 27)

Genus **Xyalophora** Kieffer

(Figs 58, 68)

Xyalophora Kieffer, 1901c: 344. Type-species *Figites clavatus* Giraud, 1860, by original designation.

Amongst the Figitinae only two genera, *Neralsia* and *Xyalophora*, have a terminal projection from the scutellum. *Neralsia*, known from the Nearctic and Neotropical regions, has a long spine similar to that found in the Aspicerinae. *Xyalophora* has a small terminal scutellar tooth (fig. 58) and is known from North and South America, Africa and Europe. *Xyalophora* is a small genus of eighteen species, only one of which is known from Britain. It shares similarities with *Figites*, but the scutellar tooth and shape of AXIII in the female are sufficient to justify generic status (Hellén, 1937: 69 replaced the type-species in *Figites* but Weld, 1952: 177 re-established the genus).

Little is known of the biology of *Xyalophora* but there is one record of it being bred from *Sarcophaga* (Ionescu, 1969).

— Antenna of female: AIII-AVI elongate; AVII-AXII rotund; AXIII globular. Frons reticulate-coriaceous; head transverse; occiput strigose. Pronotum striate. Mesonotum smooth and shiny centrally, dull and lightly sculptured laterally. Scutellum coarsely rugose; with two anterior foveae; terminating in median triangular tooth (fig. 58). Posterior-vertical surface of scutellum with parallel vertical ridges. TI striate, TII smooth without pubescence. Legs dark brown. Wing veins brown; radial cell closed . ..... **clavata** (Giraud)
Distribution: one female, Mid Glamorgan, Porthcawl. Host: unknown.

Genus **Zygosis** Förster

(Figs 64, 69)

Zygosis Förster, 1869: 363. Type-species *Figites urticeti* Dahlbom, by original designation [*vide* Rohwer & Fagan, 1919: 240].

Diceraea Förster, 1869: 364. Type-species *Figites urticeti* Dahlbom, by original designation. [Isogenotypic with *Zygosis*.]

Thyreocera Ashmead, 1887: 150. Type-species *Thyreocera nigrifemora* Ashmead, by monotypy. (Synonymized by Weld, 1952: 184.)

Zygosis is closely related to *Figites*, but the total lack of scutellar sculpture and a dorsal smooth area on the mesepisternum are sufficient to differentiate *Zygosis*.

The size of the areolet and the coloration of *Zygosis* are rather variable. *Zygosis* is known from America and Europe, but the only west European species is *Z. urticeti*. The host preferences of the genus have not been adequately established.

— Head globular with long pubescence. Mesonotum smooth. Mesepisternum with dorsal smooth area and ventrally striate. Central hair on basal vein clearly longer in female than in male; marginal fringe long, basally on hind wing almost equal to width of wing . ..... urticeti (Dahlbom)
Distribution: common. Host in Great Britain unknown, bred in Germany from Sarcophaga striolata *Meigen.*

Genus **Figites** Latreille
(Figs 9, 14, 65, 74–79)

Figites Latreille, 1802: 307. Type-species *Cynips scutellaris* Rossi, by subsequent designation (Latreille, 1810: 436.)
Psilogaster Hartig, 1840: 202. Type-species *Figites anthomyiarum* Bouché by subsequent designation (Rohwer & Fagan, 1917: 374). (Synonymized by Dalla Torre & Kieffer, 1910: 83.)
Pycnotrichia Förster, 1869: 363. Type-species *Pycnotrichia erythropa* Förster, by original designation (Synonymized by Dalla Torre & Kieffer, 1910: 83.)]
Omalaspoides Hedicke, 1913: 146. Type-species *Omalaspoides letzneri* Hedicke, by subsequent designation (Rohwer & Fagan, 1917: 372) (Synonymized by Hedicke 1930: 74.)
Seitneria Tavares, 1928: 5. Type-species *Seitneria austriaca*, by monotypy. (Synonymized by Weld, 1952: 185.)

Figites is a frequently collected genus, known from North and South America, Europe, Africa and Sri Lanka. Approximately fifty species have been described and almost half of these occur in Europe. Only four species are recorded from Britain in this handbook, which is a very small proportion of the European fauna, and it is likely that further species will be added to the British list. The taxonomy of *Figites* is difficult as there is a considerable amount of intraspecific variation, particularly in size. Some synonymy amongst the European fauna is probable.

The life-history of only one species of Figitinae, *Figites anthomyiarum*, has been well studied (James, 1928). Females of *F. anthomyiarum* oviposit into first or second instar dipterous larvae in carrion. Oviposition lasts less than one minute and the stimulus to oviposit is directly related to the smell of decomposing meat. The egg measures 0.2 by 0.02mm, has an elongate body and a pedicel as long as the body, and is laid into the haemocoel of the host. The first stage larva (fig. 14) is a modified eucoilidiform larva with reduced thoracic processes and cauda. It is 0.45mm long by 0.13mm wide, thirteen-segmented and feeds only on the host's haemocoelic fluid. The second stage larva is elongate (about 1mm long) and has only eleven body segments; the first ten segments each bear a pair of rudimentary appendages. The full-grown larva is twelve-segmented with spiracles on segments two to ten inclusive. The pupa is exarate and this stage lasts twenty days. The life cycle for insects of the summer generation lasts 60 days, but it is longer for the overwintering generation. The females need two days of maturation before they oviposit and live 8–15 days; males live only about five days.

Key to species

1 Wings without marginal fringe of hairs or occasionally with short length of fringe posteriorly 2
— Wings with complete marginal fringe of hairs 3
2 Mandible, in frontal view, with unevenly spaced and sized teeth (fig. 75). Lateral part of pronotum punctate dorsally. Face of male with two almost smooth areas under

antennal sockets. AXII and AXIII of female elongate (fig. 76); TII striate .... **scutellaris** (Rossi)
Distribution: Berkshire, Greater London. Host: Sarcophaga *sp.*

— Mandible, in frontal view, with evenly spaced and sized teeth (fig. 74). Lateral part of pronotum striate with smooth interstices. Face of male evenly granulate; AXII and AXIII of female more rotund (fig. 77); TII smooth in male, striate in female .... **consobrinus** Giraud
Distribution: widespread but not common. Host: Sarcophaga *sp. Parasite of Diptera associated with dung and carrion.*

3 Scutellum completely sculptured. In male face evenly granulate, antenna black and AIII cylindrical. In female AXIII short and broad (fig. 79), vertex roughly sculptured ... . **ictus sp. n.**
Distribution: Holotype male, England, Dorset, Tarrant Monkton 26.VII.1980 (F. D. Lawton). BMNH. Paratypes: 2 males, same data as the holotype; 1 male, Bedfordshire (V. H. Chambers); 1 male, Berkshire, Slapton 27.VII.1943 (R. B. Benson); 1 male, Cumbria, Wray Castle 26.VI.1936 (J. Smart); 1 male, 1 female, Hertfordshire, Tring (R. B. Benson); 1 male, Yorkshire, Spurn 20.VI.1951 (W. D. Hincks); all in BMNH. Host: unknown.

— Scutellum anteriorly smooth. In male face with two almost smooth areas under antennal sockets, antenna yellow or brown. AIII emarginate. In female AXIII elongate (fig. 78) except in small specimens, vertex often completely smooth or at least smooth behind ocelli ..... **anthomyiarum** Bouché
Distribution: common. Hosts: dipterous larvae, especially when in carrion; Anthomyia, Calliphora, Hydrotaea, Hylemya, Lucilia, Musca, Phorbia *and* Sarcophaga.

Genus **Lonchidia** Thomson
(Fig. 71)

Lonchidia Thomson, 1862: 413. Type-species *Figites maculipennis* Dahlbom, by subsequent designation (Förster, 1869: 364).

Lonchidia consists of only eight species, one from Canada and the remainder from Europe, two of which occur in Britain. It is a rarely collected genus (less than 30 specimens in the BMNH) and no information is available about its hosts or biology. *Lonchidia* has no close affinity with the rest of the Figitinae, and is isolated by the unique fusion of its scutellar foveae into a central scutellar pit. *L. maculipennis* is the less common of the two British species: 75% of the examined specimens were *L. clavicornis*.

Key to species

1 Brown patch present near apex of forewing; forewing fumose near veins. Notaulices distinct and almost reaching anterior margin of mesonotum . **maculipennis** (Dahlbom)
Distribution: Buckinghamshire, Derbyshire, Hertfordshire. Ireland: Dublin, Wicklow. Host: unknown.

— Forewing without brown patch; clear. Notaulices indistinct and short, only reaching approximately half-way up mesonotum ..... **clavicornis** Thomson
Distribution: Bedfordshire, Hertfordshire, Highland, Kent, Lancashire, Northamptonshire, Surrey, N. Yorkshire. Ireland: Dublin, Leitrim, Sligo, Wicklow. Host: unknown.

Genus **Melanips** Haliday in Walker
(Figs 66, 67, 72, 73, 80–86)

Melanips Haliday in Walker, 1835b: 161. Type-species *Scytodes opacus* Hartig, by subsequent designation (Förster, 1869: 367.)

Scytodes Hartig, 1840: 202. Type-species *Scytodes opacus* Hartig, by subsequent designation (Rohwer & Fagan, 1917: 375). [Homonym of *Scytodes* Latreille, 1804: 134.] [Isogenotypic with *Melanips*.]

Amblynotus Hartig, 1843: 419. Type-species *Scytodes opacus* Hartig, by subsequent designation (Rohwer & Fagan, 1917: 360). [Replacement name for *Scytodes* Hartig, 1840.]

Anolytus Forster, 1869: 363. Type-species *Anolytus rufipes* Forster, by original designation. **Syn. n.**

Melanips contains approximately twenty-five described species, and has been found in all but the Afrotropical and Madagascan regions. *M. opacus* is a particularly widespread species and is easily the most frequently collected species of the Figitinae. The published host data record *Melanips* as a parasite of dipterous larvae, often those which are aphid predators eg. Syrphidae and Chamaemyiidae. Only a single generation per year is recorded for *M. opacus* (Evenhuis, 1968).

The genera *Melanips* and *Sarothrus* constitute a close kindred pair but *Melanips* is easily distinguished from all the other Figitinae by having a granulate mesonotum. *Melanips* is occasionally misidentified as a cynipine, presumably because of the granulate thoracic sculpture, but the typical figitine wing venation is usually discernible.

Anolytus was distinguished from all other genera of Figitinae by its lack of scutellar foveae (Hartig, 1843; Weld, 1931). However, examination of the lectotype has shown that small foveae are present and that *Anolytus* is a synonym of *Melanips*.

Key to species

1 Large species (3 to 4.5mm). TIII of female completely punctate; AIII of male deeply emarginate (fig. 83); AIII of female 1.5 times length of AIV ..... **opacus** (Hartig)
Distribution: very common. Hosts: Episyrphus balteatus (*Degeer*) Syrphus ribesii (*L.*), S. torvus *Osten-Sacken &* S. vitripennis *Meigen*.

— Smaller species (1.5 to 3mm). TIII of female at most punctate along posterior margin; AIII of male weakly emarginate (figs 81–82) or if deeply emarginate then AIII of female equal in length to AIV 2

2 Notaulices absent or only very weakly indicated posteriorly; scutellar foveae small and separate (fig. 85). Face round in frontal view (fig. 72); occiput indistinct, back of head curved ..... **sylvanus** Giraud
Distribution: Fife, Surrey. Host: unknown.

— Notaulices distinct, extending between half and full length of mesonotum; scutellar foveae large (fig. 86) or semi-confluent (fig. 84). Face transverse in frontal view (fig. 73); occiput distinguished by flattened area and marked change of plane 3

3 Radial cell squat (ratio of length/height = 1.8 to 2.5) and vein Rs clearly curved (fig. 67). Scutellar foveae semi-confluent and granulate internally. AIII of male deeply emarginate (fig. 80), AIII of female approximately equal in length to AIV. Notaulices usually only on posterior half of mesonotum, notaulices narrow. Pubescence on TII forming complete basal ring or occasionally not quite united dorsally . **alienus** Giraud
Distribution: Northamptonshire, N. Yorkshire, Surrey. Hosts: Diptera, Chamaemyiidae; Leucopis griseola (*Fallén*), L. obscura (*Haliday*) L. praecox (*de Meijere*).

— Radial cell elongate (ratio of length/height = 2.4 to 3) and Rs almost straight (fig. 66). Scutellar foveae large, separate, and often smooth internally; AIII of male weakly emarginate (fig. 82), AIII of female clearly longer than AIV. Notaulices usually complete, notaulices expanded basally. Pubescence on TII limited to two dorso-lateral tufts not united dorsally ..... **microcerus** Kieffer
Distribution: Gloucestershire, Hampshire, Hertfordshire, Surrey. Ireland: Dublin, Wicklow. Host: unknown.

Genus **Sarothrus** Hartig
(Fig. 70)

Sarothrus Hartig, 1840: 203. Type-species *Sarothrus canaliculatus* Hartig, by subsequent designation (Förster, 1869: 367).
Amphithectus Hartig, 1840: 203. Type-species *Amphithectus dahlbomii* Hartig, by monotypy. (Synonymized by Dalla Torre & Kieffer, 1910: 74.)

Sarothrus is a small genus of eighteen species, of which only four occur in western Europe. *Sarothrus* has a close kinship with *Melanips* but lacks the typical granular sculpture and short, dense pubescence of that genus. No host was known for *Sarothrus* until Harwood (1919) recorded it from *Pegohylemyia* (Diptera: Anthomyiidae); recently two further specimens were bred from the same genus.

Key to species

1 Notaulices complete; wings hyaline. Gaster of female black and not laterally compressed. Mesonotal pubescence of female sparse. AIII of male yellow-brown, elongate and deeply excavate ..... **tibialis** (Zetterstedt)
Distribution: common. Host: unknown.

— Notaulices absent or anteriorly indistinct; wings brown. Gaster of female brown-red and laterally compressed. Mesonotal pubescence of female dense (but can be abraded). AIII of male black, short and weakly excavate ..... **areolatus** Hartig
Distribution: Bedfordshire, Buckinghamshire, Cambridgeshire, Greater Manchester, Hertfordshire, Oxfordshire, Suffolk, Surrey, Sussex. Hosts: Pegohylemyia gnava *(Meigen)* & P. sonchi (*Hardy*).

Subfamily Anacharitinae

The Anacharitinae is represented in all zoogeographical regions. At least twelve genera are recognized, three occurring in Great Britain. The subfamily is characterised as follows: AIII of male antenna not emarginate; pronotum truncate, abdomen petiolate, often conspicuously; TII not saddle-shaped, longer than TIII; hind tibia not longitudinally ridged or furrowed externally or posteriorly; areolet obsolete (fig. 22).

The Anacharitinae are parasitic on Neuroptera and all the British host records are of the Hemerobiidae or give information such as "on bark" or "in old galls" that is consistent with parasitism in unseen Neuroptera cocoons. The only detailed study of the biology of this subfamily was by Handlirsch (1886: 235–237) [see Cameron, 1889: 187], who described the larva of *Anacharis*. The maggot-like larva (fig. 16) has twelve body segments and the head is perpendicular to the long axis of the body. The mandibles (fig. 59) are triangular with a long tooth at the apex and two much shorter teeth on the inner edge. The first body segment has, on the upper side, two rounded protuberances, the second to ninth segments support paired conical, fleshy projections. The last segment has a reniform anus. The spiracles are on segments two to ten.

The larva leaves the host from between the legs, consumes the remains of the host, conspicuously increases in size, and then thrusts the apex of its gaster through the cocoon to void the gut contents. In about five days it pupates within the cocoon; the pupal stage lasts about fifteen days and the imago remains in the cocoon for two more days before emerging.

Key to genera

1 Petiole smooth and shiny (fig. 89); tip of gaster acute (fig. 95). Mesepisternum with band of foveolate or striate sculpture, which almost reaches to posterior margin (fig. 96). Petiole long, nearly as long as or often much longer than hind coxa (figs 88, 89). Facial pubescence of male long, and vein 2rm absent from forewing ..... **Anacharis** Dalman (p. 28)

— Petiole, at least laterally, coarsely sculptured (fig. 90); tip of gaster round (fig. 94). Mesepisternum smooth or with weak striae radiating from anterior margin. Petiole short, clearly shorter than hind coxa (fig. 90). Facial pubescence of male short or if long then vein 2rm present in forewing (fig. 87) 2

2 Scutellum elongate forming cone or spine (figs 91, 92); scutellum strongly and closely rugose ..... **Xyalaspis** Hartig (p. 28)

— Scutellum not elongate, rounded, not forming spine or cone (fig. 93); scutellum smooth or weakly sculptured or with a few large rugae . **Aegilips** Haliday in Walker (p. 29)

Genus **Anacharis** Dalman

(Figs 10, 16, 59, 88, 89, 93, 95, 96)

Anacharis Dalman, 1823: 96. Type-species *Cynips euchariodes* Dalman, 1818, by monotypy.
Megapelmus Hartig, 1840: 186. Type-species *Megapelmus spheciformis* Hartig, 1840, by monotypy. (Synonymized by Dalla Torre & Kieffer, 1910: 37.)
Synapsis Förster, 1869: 361. [Homonym of *Synapsis* Bates, 1868.] Type-species *Synapsis aquisgranensis* Förster, 1869 by monotypy. (Synonymized by Kierych, 1984: 336.)
Prosynapsis Dalla Torre & Kieffer, 1910: 45. Type-species *Synapsis aquisgranensis* Förster, 1869. [Replacement name for *Synapsis* Förster nec Bates.] (Synonymized by Kierych, 1984: 336.)

Anacharis is easily recognised as it is the only genus of the Anacharitinae with a long, smooth petiole. Although a small genus, it is known from the Palaearctic, Nearctic, Neotropical, Ethiopian and Australasian regions (from material in the BMNH). There are two west European species both of which occur in Great Britain.

Key to species

1 Petiole shorter than hind coxa in female, about as long as hind coxa in male. Notaulices indistinct, obsolescent anteriorly; occiput smooth. AIII of female approximately equal in length to AIV ..... **immunis** Walker
Distribution: common. Hosts: Hemerobius stigma *Stephens*; H. *sp.*; Wesmaelius betulinus (*Strōm*); W. subnebulosus (*Stephens*).

— Petiole long, longer than hind coxa. Notaulices distinct; occiput strigillose. AIII of female clearly longer than AIV ..... **euchariodes** (Dalman)
Distribution: very common. Hosts: Neuroptera Hemerobiidae; Hemerobius micans *Olivier*; Wesmaelius betulinus (*Strōm*); W. subnebulosus (*Stephens*).

Genus **Xyalaspis** Hartig

(Figs 91, 92)

Xyalaspis Hartig, 1843: 416. Type-species *Xyalaspis laevigatus* Hartig, 1843, by subsequent designation (Rohwer & Fagan, 1917: 378).
Conaspicera Hedicke, 1914: 353. Type-species *Conaspicera norvegica* Hedicke, 1914, by original designation. (Synonymized by Hedicke, 1930: 75.)

Xyalaspis and *Acanthaegilips* are the only genera of the Anacharitinae in which the scutellum terminates in a prolongation or spine. Of these two genera only

Xyalaspis is represented in the Palaearctic region. There are seven European species but only *X. armata* and *X. petiolata* are known from Great Britain and the latter is the more commonly collected species. Apart from the shape of the scutellum, *Xyalaspis* has many characters in common with *Aegilips* and the two genera are more closely related to each other than either is to the third representative of the subfamily, *Anacharis*.

Key to species

1. Scutellum elongated into long and narrow blunt spine (fig. 92). Femora of female yellow. Scutellar foveae deep, with distinct posterolateral external margin. Notaulices of male smooth or at most crossed by weak striae ..... **armata** (Giraud)
Distribution: Highland, Northamptonshire, Strathclyde. Ireland: Dublin, Sligo. Host unknown.
— Scutellum broad and slightly elongate (fig. 91). Mid and posterior femora of female brown. Scutellar foveae shallow, posterolateral external margin often weak. Notaulices of male crossed by strong striae ..... **petiolata** Kieffer
Distribution: common. Hosts: Neuroptera, Hemerobiidae: Wesmaelius subnebulosus *(Stephens)*; Hemerobius *sp. Often found on tree bark, but has been found in the drey of a Grey Squirrel.*

Genus **Aegilips** Haliday in Walker
(Figs 87, 90, 94)

Aegilips Haliday in Walker, 1835: 160. Type-species *Cynips nitidula* Dalman, 1823, by subsequent designation (Westwood, 1840: 56).

Aegilips differs from *Anacharis* in having a short, sculptured petiole and from *Xyalaspis* in not having an elongate scutellum. *Aegilips* is known from the Holarctic region, South America and Africa. Dalla Torre & Kieffer (1910: 42–44) recorded ten European species and eight species were listed as British in Fitton *et al* (1978: 67) but after careful study only four British representatives are now recognized. The synonymy of *Aegilips* with *Xyalaspis* was considered but a study of some of the European species showed that the two genera are definitely distinguishable by the shape of the scutellum.

Key to species

1 Scutellum completely or centrally smooth; if notaulices complete then they are strongly foveolate or if incomplete (obsolescent anteriorly), then vein 2rm is present in forewing (fig. 87). Wing venation yellow 2
— Scutellum of males, and of most females, clearly sculptured; notaulices complete or incomplete, often striate and never strongly foveolate; vein 2rm absent. Wing venation yellow or brown 3
2 Forewing with vein 2rm present (fig. 87). Notaulices incomplete, obsolescent anteriorly; smooth; pronotum smooth laterally or with short rugae on anterior margin. Facial pubescence of male dense. Hind coxa light brown to yellow, other coxae yellow .... **vena** Fergusson
Distribution: Cambridgeshire, Fife, Hampshire, Hereford & Worcester, Highland, Northamptonshire, Surrey, Tayside. Host: unknown.
— Forewing without vein 2rm. Notaulices complete and strongly foveolate; pronotum laterally rugose. Facial pubescence not dense. Hind coxa dark brown, other coxae lighter brown ..... **romseyensis** Fergusson
Distribution: Berkshire, Buckinghamshire, Devon, Dorset, Essex, Hampshire, Hertfordshire, Kent, Salop. Sussex. Host: unknown.
3 Antennae of male black. Wing venation brown; wing lightly fumose. Legs light to dark

brown. Notaulices obsolescent anteriorly ..... **atricornis** Fergusson
Distribution: common. Hosts: Neuroptera, Hemerobiidae; Wesmaelius betulinus *(Strom) and* W. subnebulosus *(Stephens)*.

— Antennae of male yellow or clearly lighter ventrally. Wing venation yellow; wing clear. Legs excluding coxae mostly yellow-orange. Notaulices of males and nearly all females complete ..... **nitidula** (Dalman)
Distribution: common. Hosts: Neuroptera, Hemerobiidae: Hemerobius *sp.*; Wesmaelius subnebulosus *(Stephens)*.

Subfamily Aspicerinae

The Aspicerinae are widely distributed but have yet to be found in the Madagascan or Australasian regions. At present the subfamily consists of eight genera, but only three of these are known to occur in Great Britain. The subfamily is characterised as follows: TII less than half the length of the gaster and saddle-shaped (Fig. 8); hind tibia usually with a longitudinal ridge or furrow on outer or posterior surface (fig. 54); scutellum often with one or more longitudinal carinae and an apical tooth or spine; forewing with an open radial cell.

The host preferences of the Aspicerinae are not clear but the records that are available indicate that puparia or larvae of Syrphidae (Diptera) are the main hosts.

Key to genera

1 Vein R_1 absent (fig. 60). Scutellum posteriorly truncate and with foveae approximately half as long as scutellum (fig. 55). Petiole evident and long, about as long as broad (fig. 62) ..... **Callaspidia** Dahlbom (p. 30)

— Vein R_1 present (fig. 61). Scutellum either terminating in a spine (fig. 57) or rounded and with foveae much less than half length of scutellum (fig. 56). Petiole obscured by TII and short, clearly broader than long (fig. 63) 2

2 Scutellum terminating in a spine (fig. 57); scutellar foveae approximately half length of scutellum excluding spine. Occiput strongly transversely striate. Notaulices and median furrow indistinct and smooth between large crenulations . **Aspicera** Dahlbom (p. 31)

— Scutellum without spine (fig. 56); scutellar foveae clearly less than half length of scutellum. Occiput finely strigose or coriaceous. Notaulices and median furrow distinct and transversely striate ..... **Omalaspis** Giraud (p. 32)

Genus **Callaspidia** Dahlbom
(Figs 54, 55, 60, 62)

Callaspidia Dahlbom, 1842: 10. Type-species *Callaspidia defonscolombei* Dahlbom, 1842, by subsequent designation (Rohwer & Fagan, 1917: 363).

This genus is easily distinguished from other genera of Aspicerinae by its long petiole, truncate scutellum and missing R_1 vein. Ten species have been described from Europe but only *defonscolombei* occurs in Britain. Kloet & Hincks (1945) listed *C. dufori* as a British species with *C. westwoodi* as a synonym, and *defonscolombei* was omitted. *C. dufori* and *C. westwoodi* are here regarded as species separate from *defonscolombei* and no British specimens of them have been seen. The record of *C. dufori* in Salt (1936) is a misidentification. Apart from the Palaearctic region, *Callaspidia* is known from Canada, India and Taiwan. *Callas-*

pidia has been recorded from *Syrphus* larvae by Dalla Torre & Kieffer (1910) and by Salt (1963), and from coleopterous larvae by Kirchner (1867) but this last record is unlikely. *C. dufori* has been bred from *Lasiopticus* (Evenhuis, 1964) and *Xanthandrus* (Besuchet, 1963), and *C. ligurica* has been reared from *Paragus* and *Xanthogramma* (Diptera: Syrphidae) (Vayssiere & Mimeur, 1925). The biology of *C. defonscolombei* has been studied by Rotheray (1979), who reared it from *Syrphus ribesii, S. vitripennis, Meligramma cincta, Sphaerophoria scripta, Melanostoma scalare, Platycheirus manicatus* and *Episyrphus balteatus*. He found that the egg was laid in the cerebral ganglion of the host, and also showed, by the use of a simple T-maze, that *Callaspidia* was attracted by the odour of the aphid prey of these syrphids.

— Head strongly sculptured, mostly rugose, occiput transversely striate. Occipital carina prominent. Mesonotum black; rugose-strigose; with weak central carina which bifurcates over slight hump three-quarters of length of mesonotum from anterior margin. Scutellum with two deep anterior pits and with three longitudinal keels (fig. 55). Two outer longitudinal keels, where they form outer margins of scutellar pits, yellow; rest of keels and scutellum chestnut brown or occasionally black. Scutellum with square termination. Wing pubescence sparse and short ..... **defonscolombei** Dahlbom
Distribution: common. Host: solitary parasite of Syrphidae (Diptera). Bivoltine, adults most numerous in early August and late September.

Genus **Aspicera** Dahlbom
(Figs 57, 61, 63)

Onychia Haliday in Curtis, 1829: 108. Type-species *Cynips ediogaster* Rossi, 1790, by monotypy. [Homonym of *Onychia* Hübner, 1816[–25]: 334.]
Aspicera Dahlbom, 1842: 6. Type-species *Cynips ediogaster* Rossi, 1790, by monotypy. [Replacement name for *Onychia* Haliday in Curtis.]
Bellona Giraud, 1860: 156. Type-species *Cynips ediogaster* Rossi, 1790, by monotypy. [Unnecessary replacement name for *Onychia* Haliday in Curtis.]

Aspicera, Ceraspidia, Paraspicera and *Prosaspicera* are the only genera of the Aspicerinae in which the scutellum terminates in a spine, and of these only *Aspicera* is represented in western Europe. There are twenty European species of *Aspicera* but only *A. scutellata* is known from Great Britain; it was first recorded by Curtis (1829–31: 108). Cameron (1890: 177) stated "there is no evidence that this species is British", but since Cameron's time it has been regarded as a British species and placed in the check lists. There are no British specimens of *scutellata* in the BMNH and enquiries to other museums have failed to locate a British specimen. However, a specimen from Ireland has been examined and it seems likely that *scutellata* does occur in Great Britain.

The host preference of this genus has not been established. There is one published rearing from a cynipid gall and one from a dipterous gall (Dalla Torre & Kieffer, 1910: 55–58).

— Pronotum dark brown anteriorly, but yellow-orange posteriorly. Mesonotum and scutellum red-brown, scutellar spine black or chestnut brown. Scutellum (in dorsal view) slightly constricted at middle; with weak central carina; without outer carinae; with long spine (fig. 57); rugose. Propodeum, mesepisternum, gaster and coxae chestnut brown; remainder of legs testaceous. Petiole obscured, gaster very close to propodeum; short, clearly wider than long ..... **scutellata** (Villers)
Distribution: Ireland, Meath. Host: unknown.

Genus **Omalaspis** Giraud
(Fig. 56)

Omalaspis Giraud, 1860: 131. Type-species *Omalaspis noricus* Giraud, 1860, by monotypy.
Tavaresia Kieffer, 1901b: 158. Type-species *Tavaresia carinata* Kieffer, 1901b, by subsequent designation (Ashmead, 1903: 215). (Synonymized by Weld, 1952: 168.)
Lambertonia Kieffer, 1901b: 158. Type-species *Lambertonia abnormis* Kieffer, 1901b, by subsequent designation (Ashmead, 1903: 215). (Synonymized by Weld, 1952: 168.)

Omalaspis is distinguishable from the rest of the Aspicerinae by its rounded, carinate scutellum and small scutellar foveae (fig. 56). It has a holarctic distribution with eleven species known from Europe, but only *O. carinata* has been recorded from Great Britain (Kloet & Hincks, 1945: 281). The type of *O. carinata* is lost but the single specimen in the BMNH fits Kieffer's description, especially "Différé de toutes par le thorax rouge ...". The host preferences for the genus are not established but two species of *Omalaspis* have been bred from syrphid (Diptera) larvae.

— Antennae red, head brown; subantennal depression present, ocular suture crenulate. Slightly curved keel joins antennal insertion to lateral ocellus on each side. Thorax brown-red, scutellum (fig. 56) with one central and two lateral carinae; lateral carinae curve posteriorly and fuse. R_1 almost reaching wing margin; veins yellow. Largest tergite of gaster smooth anteriorly and finely punctate posteriorly . **carinata** (Kieffer)
Distribution: South Glamorgan. Host: unknown.

Nomenclature

In the course of this study several nomenclatural problems have been solved, mostly by the designation of lectotypes. Those solutions that require further explanation than is found in the main text are detailed here.

ANACHARITINAE

Anacharis ensifer Walker, 1835a: 522. LECTOTYPE ♀, Great Britain (BMNH) **here designated** [examined].

A single Walker specimen, without locality data, stands in the BMNH under the name *ensifer*. It corresponds with the original description and is here designated as the lectotype.

Identity: junior synonym of *Anacharis immunis* Walker. **Syn. n.**

Anacharis immunis Walker, 1835a: 521. LECTOTYPE ♂, Great Britain (BMNH) **here designated** [examined].

A male Walker specimen bearing the name *immunis*, and from the BMNH collection, is here designated as the lectotype.

Identity: *Anacharis immunis* Walker.

Anacharis staegeri Dahlbom, 1842: 4. LECTOTYPE ♀, Sweden (ZI, Lund) **here designated** [examined].

There are five specimens of *A. staegeri* in the Dahlbom collection. I have labelled and here designate a female, without locality data, as the lectotype.

Identity: junior synonym of *Anacharis immunis* Walker; synonymized by Dalla Torre 1893: 13.

Anacharis tinctus Walker, 1835a: 520 LECTOTYPE ♂, Great Britain (BMNH) **here designated** [examined].

The BMNH collection contains three syntypes of this species. One male has been labelled and is here designated as the lectotype.

Identity: junior synonym of *Anacharis eucharioides* (Dalman). **Syn. n.**

Anacharis typica Walker, 1835a: 520–521. LECTOTYPE ♂, Great Britain (BMNH) **here designated** [examined].

In addition to the lectotype, here designated, the BMNH collection contains one other syntype which has been labelled as a paralectotype.

Identity: junior synonym of *Anacharis eucharioides* (Dalman). **Syn. n.**

Cynips eucharioides Dalman, 1818: 78. Type-material lost, Sweden, Vestergöthland.

The two specimens of *eucharioides* in the Dalman collection are from "Sm" (=Småland) and thus are not syntypes. The 9 specimens in the Dahlbom and the 31 specimens in the Thomson collections are also excluded. As there is no confusion about the identity of this species a neotype is not required.

Identity: *Anacharis eucharioides* (Dalman).

Cynips petiolata Zetterstedt, 1838: 409. LECTOTYPE ♀, Sweden (NR, Stockholm) **here designated** [examined].

A specimen without data labels standing under this name in the Zetterstedt collection is here designated as the lectotype of *C. petiolata*.

Identity: junior synonym of *Anacharis eucharioides* (Dalman). **Syn. n.**

Megapelmus rufiventris Hartig, 1841: 358. LECTOTYPE ♀, Germany (West) (ZSBS, Munich) **here designated** [examined].

Hartig described this species from an unspecified number of female specimens collected by Förster in Aachen. The Hartig collection contains only one specimen of *rufiventris*. It closely corresponds to the original description and I have labelled and here designate it as the lectotype.

Identity: junior synonym of *Anacharis immunis* Walker. **Syn. n.**

Megapelmus spheciformis Hartig, 1840: 202. LECTOTYPE ♀, Germany (ZSBS, Munich) **here designated** [examined].

A single specimen standing under this name in the Hartig collection is here designated as the lectotype.

Identity: junior synonym of *Anacharis eucharioides* (Dalman). **Syn. n.**

Xyalaspis petiolata Kieffer, 1901b: 161. LECTOTYPE ♂, Great Britain (BMNH) **here designated** [examined].

Cameron (1883: 374) misidentified some specimens he had collected at Strath Glass, Scotland, as *Aegilips subulifer* Thomson. Kieffer borrowed this material and realised that Cameron had collected a new species of *Xyalaspis*. The Cameron material in the BMNH contains a specimen labelled "Strath Glass" which is here designated as the lectotype of *X. petiolata*. This species has been overlooked by most recent workers and it was omitted from the British Check List (Fitton et al. 1978).

Identity: *Xyalaspis petiolata* Kieffer.

FIGITINAE

Amblynotus longitarsus Reinhard, 1860: 224. LECTOTYPE ♂, Germany (MNHU, Berlin) **here designated** [examined].

Two males stand under this name in the Reinhard collection. One, bearing the name *"longitarsus"* is here designated as the lectotype; the second male is a paralectotype.

Identity: junior synonym of *Melanips alienus* Giraud. Reinhard's 1860 paper was published very soon after Giraud's 1860 paper (cf. footnote in Reinhard, 1860: 204) thus Giraud's names have priority.

Amblynotus microcerus Kieffer, 1903: 334. LECTOTYPE ♀, Sweden (ZI, Lund) **here designated** [examined].

Thomson (1862: 417) misidentified material of an undescribed species as *Sarothrus opacus* Hartig. Kieffer noticed the error and named this new species *Amblynotus microcerus*. The Thomson collection contains one specimen that corresponds to the description of *opacus* Thomson nec Hartig and *A. microcerus* Kieffer. This specimen has been labelled and is here designated as the lectotype of *A. microcerus*. The antennal segments are slightly larger and the radial cell slightly shorter than in all other specimens I have seen of this species.

Identity: *Amblynotus microcerus* Kieffer.

Anolytus rufipes Förster, 1869: 365. LECTOTYPE ♂, Germany (MNHU, Berlin) **here designated** [examined].

When Weld examined the type material in 1931 there were 4 females and one male, but now the curator (Dr Koch) can find only one male and one female. The male is here designated as the lectotype.

Förster (1869: 365) and Weld (1952: 178) state that the scutellar foveae are absent, but these foveae are present although small.

Identity: junior synonym of *Melanips sylvanus* Giraud. **Syn. n.** As *A rufipes* is the type-species of *Anolytus*, *Anolytus* is a junior synonym of *Melanips*. **Syn. n.**

Figites anthomyiarum Bouché 1834: 165. LECTOTYPE ♀, Germany (ZMHU, Berlin) **here designated** [(examined].

There are three specimens standing under this name in the Berlin Museum. Two are Förster specimens and may not be syntypes but the third specimen, although lacking data, conforms to the original description and is here designated as the lectotype.

Identity: *Figites anthomyiarum* Bouché.

Figites consobrinus Giraud, 1860: 153. LECTOTYPE ♀, Austria (MNHN, Paris) **here designated** [examined].

A single female, without locality data, in the Giraud collection has been labelled and is here designated as the lectotype of *F. consobrinus*.

Identity: *Figites consobrinus* Giraud.

Figites dentiscuta Hellén, 1937: 69. LECTOTYPE ♀, Finland (ZMU, Helsinki) **here designated** [examined].

A female *dentiscuta* collected by Hellén from Isthmus Karelicus, Metsapirtti has been labelled and is here designated as the lectotype.

Identity: junior synonym of *Figites consobrinus* Giraud. **Syn. n.**

Lonchidia clavicornis Thomson, 1862: 413. LECTOTYPE ♀, Sweden (ZI, Lund **here designated** [examined].

A female in the Thomson collection and from the type-locality, Fogelsång, is here designated as the lectotype of *L. clavicornis*. A second specimen from Helsingborg, has no type status.

Identity: *Lonchidia clavicornis* Thomson.

Melanips alienus Giraud, 1860: 168. LECTOTYPE ♀, Austria (MNHU, Paris) **here designated** [examined].

There are six specimens of *alienus* in the Giraud collection. Three males have no type status, but one of the three female specimens has a Barbotin holotype label and this specimen has been labelled and is here designated as the lectotype. The other two females are paralectotypes.

Identity: *Melanips alienus* Giraud.

Omalaspis biusta Cameron, 1879: 112. Type lost, England.

In a synopsis of the British genera, Westwood (1840: 56) gave details of the genus *Onychia* Haliday in Curtis, 1829 [=*Aspicera*, Aspicerinae] and he mentioned the manuscript name *Cynips biusta* as a typical example. Marshall (1874: 120) "believed" he had a specimen of "*biusta*", "in bad condition" and he assigned it to *Homalaspis* [=*Omalaspis*, Aspicerinae]. Cameron (1879: 111) examined the Marshall specimen and by describing it, validated the name *Omalaspis biusta* Cameron. In a later paper, Cameron (1890: 174), without any explanation, synonymized *biusta* with *Anolytus rufipes* [Figitinae].

As the Marshall specimen is lost and as Cameron's description of *biusta* is inadequate, it is not possible to recognize *biusta*. In this paper, it has therefore been left as a synonym of *rufipes* which is in turn a synonym of *Melanips sylvanus* Giraud.

Identity: junior synonym of *Melanips sylvanus* Giraud.

Sarothrus areolatus Hartig, 1840: 203. LECTOTYPE ♂, Germany (ZSBS, Munich) **here designated** [examined].

A single male standing under the name *areolatus* in the Hartig collection is here designated as the lectotype. It is damaged but recognizable by the third antennal segment which conforms to the description. The specimen bears a M. Soderlund lectotype label, but this designation is unpublished.

Identity: *Sarothrus areolatus* Hartig.

Sarothrus canaliculatus Hartig, 1840: 203. LECTOTYPE ♂, Germany (ZSBS, Munich) **here designated** [examined].

There are 24 specimens standing under this name in the Hartig collection. A male with a Hartig determination label is here designated as the lectotype and a specimen with a green label is a paralectotype. The type status of the other 22 specimens is uncertain.

Identity: junior synonym of *Sarothrus tibialis* (Zetterstedt); synonymized by Dalla Torre & Kieffer, 1910: 75.

Scytodes opacus Hartig, 1840: 202. LECTOTYPE ♀, Germany (ZSBS, Munich) **here designated** [examined].

There are five specimens of *opacus* in the Hartig collection. Two (1 male, 1 female) were examined and labelled by Weld in 1931 and mentioned in Weld (1952). The female of these two specimens is here designated as the lectotype and the male as paralectotype of *opacus*. The status of the other three specimens is not clear.

Identity: *Melanips opacus* (Hartig).

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Glossary

Abdomen — the abdomen consists of the propodeum, which is functionally part of the thorax, and the gaster. The petiole is the first gastral segment.

Afrotropical — a zoogeographical region, Africa south of the Sahara.

Apterous — wingless.

Bivoltine — having two generations in a year.

Carina — a raised line of surface sculpture.

Cephalic — of the head or in the head region.

Clavate — club-shaped.

Club — swelling of apical antennal segments.

Cocoon — the protective silky case spun by larvae before they pupate.

Coriaceous — a semi-regular and non-parallel pattern of minute grooves.

Crenulate — a notched margin with rounded "teeth".

Cup — a round or oval raised area in the centre of the scutellum. Found in the Eucoilidae.

Emarginate — having a notch in the margin.

Exarate — a pupa with free wings and legs.

Fovea — a large pit in the surface cuticle of an insect.

Foveolate — with deep pits.

Fumose — smoky brown colour on the wings.

Glabrous — without hair.

Haemocoel — the general blood-filled body cavity of an insect.

Holarctic — zoogeographical region including northern parts of the Old and New Worlds. The Palaearctic + Nearctic regions.

Homonym — each of two or more identical names for different species (or genera).

Hyperparasite — an organism which is parasitic on or in another parasite.

Imago — last or adult stage in insect metamorphosis.

Instar — insect at a particular stage between moults.

Isogenotypic — genera having the same type-species.

Monotypy — the situation arising when a genus is established with only one originally included species.

Nearctic — a zoogeographical region (or subregion) comprising Greenland and North America apart from southern Mexico.

Obsolescent — gradually disappearing. Said of a structure that is only faintly indicated, in whole or part, and is more fully developed in other species.

Palaearctic — zoogeographical region (or subregion) including Europe, North Africa, northern Asia, Siberia, northern China and Japan.

Parthenogenesis — reproduction without fertilisation of a male gamete.

Petiolate — with a long stalk; abdomen with a long petiole.

Phytophagous — feeding on plants.

Pterostigma — a filled-in area on the leading edge of the forewing.

Punctate — a sculpture pattern of fine impressed punctures.

Pupate — to pass into the pupal stage.

Reniform — kidney-shaped.

Rugae — ridges of cuticle that form rugose sculpture.

Rugose — a pattern of strong irregular wrinkles.

Saprophage — an organism which feeds on decaying organic matter.

Striae — the ridges or furrows that constitute striate sculpture.

Striate — parallel furrows or ridges.

Strigillose — minute ridges, a weaker form of strigose.

Strigose — a sculpture pattern like striate but with the striae not parallel.

Symbiont — one of the partners in symbiosis (a condition in which two organisms live in a mutually beneficial partnership).

Tergite — the dorsal plate of each segment of the gaster.

Testaceous — a brown-yellow colour.

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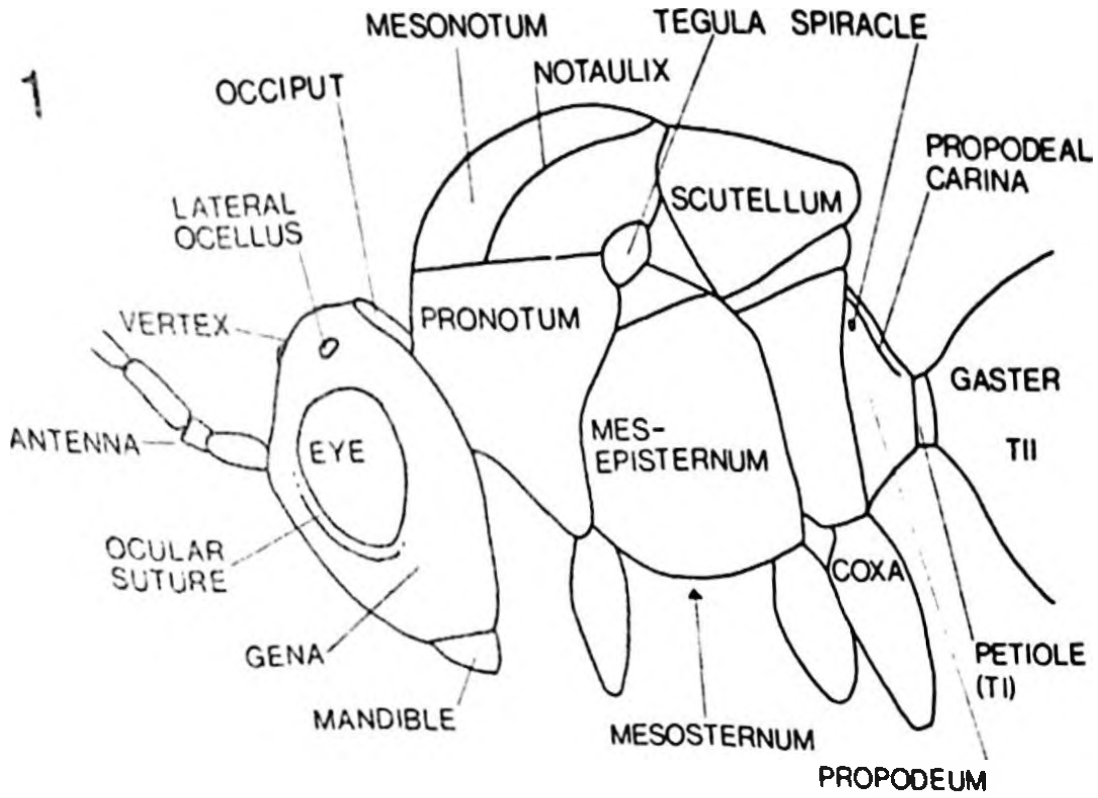
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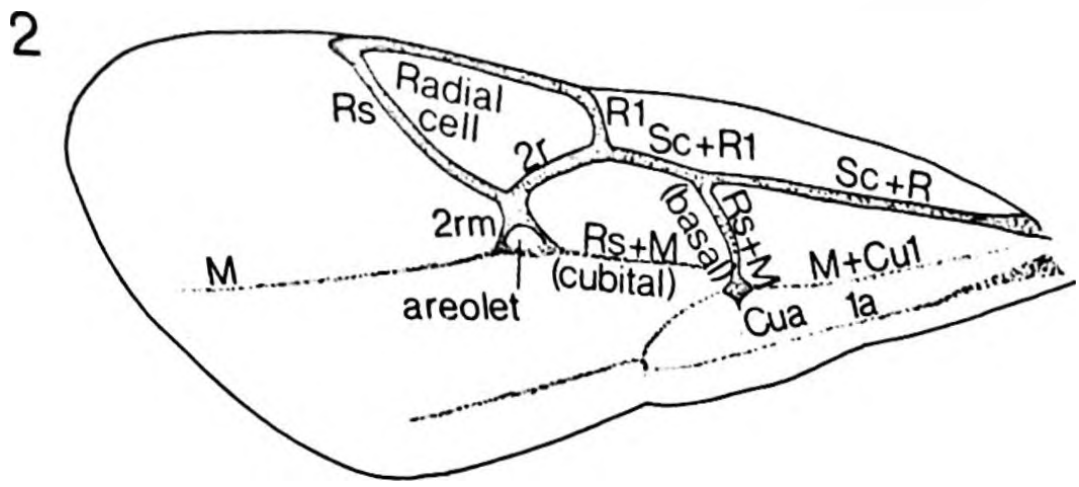
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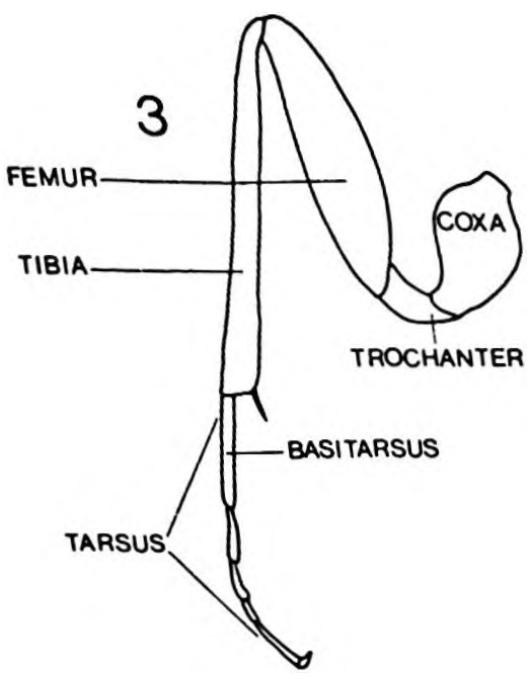
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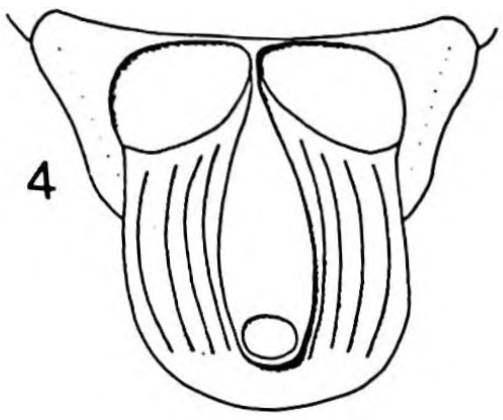
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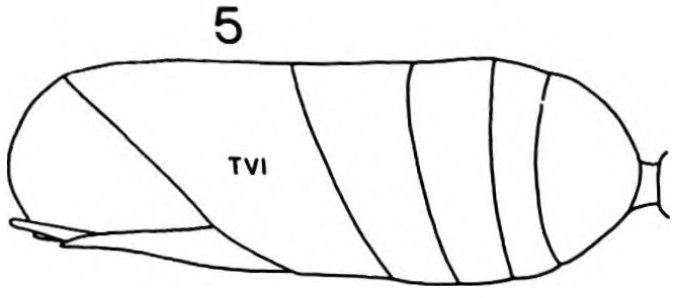
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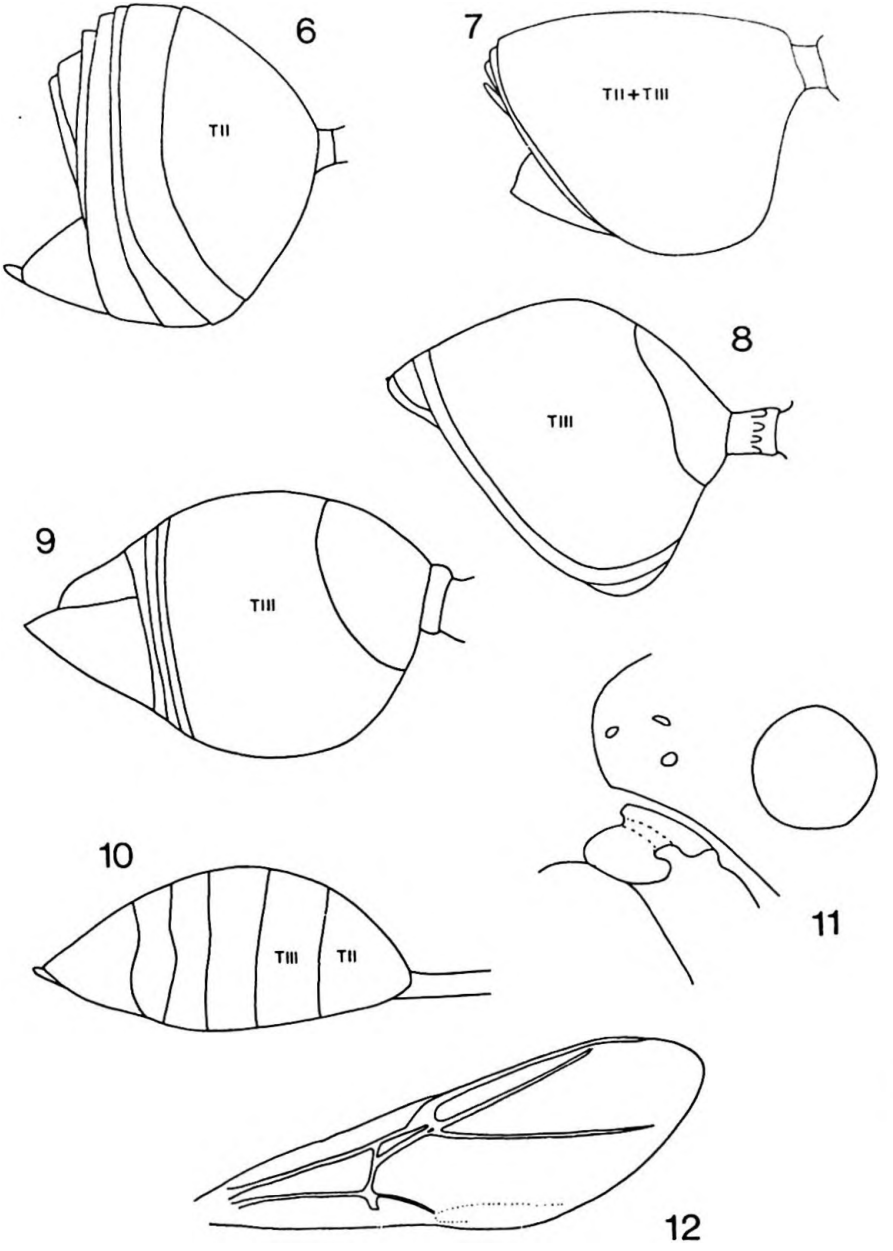




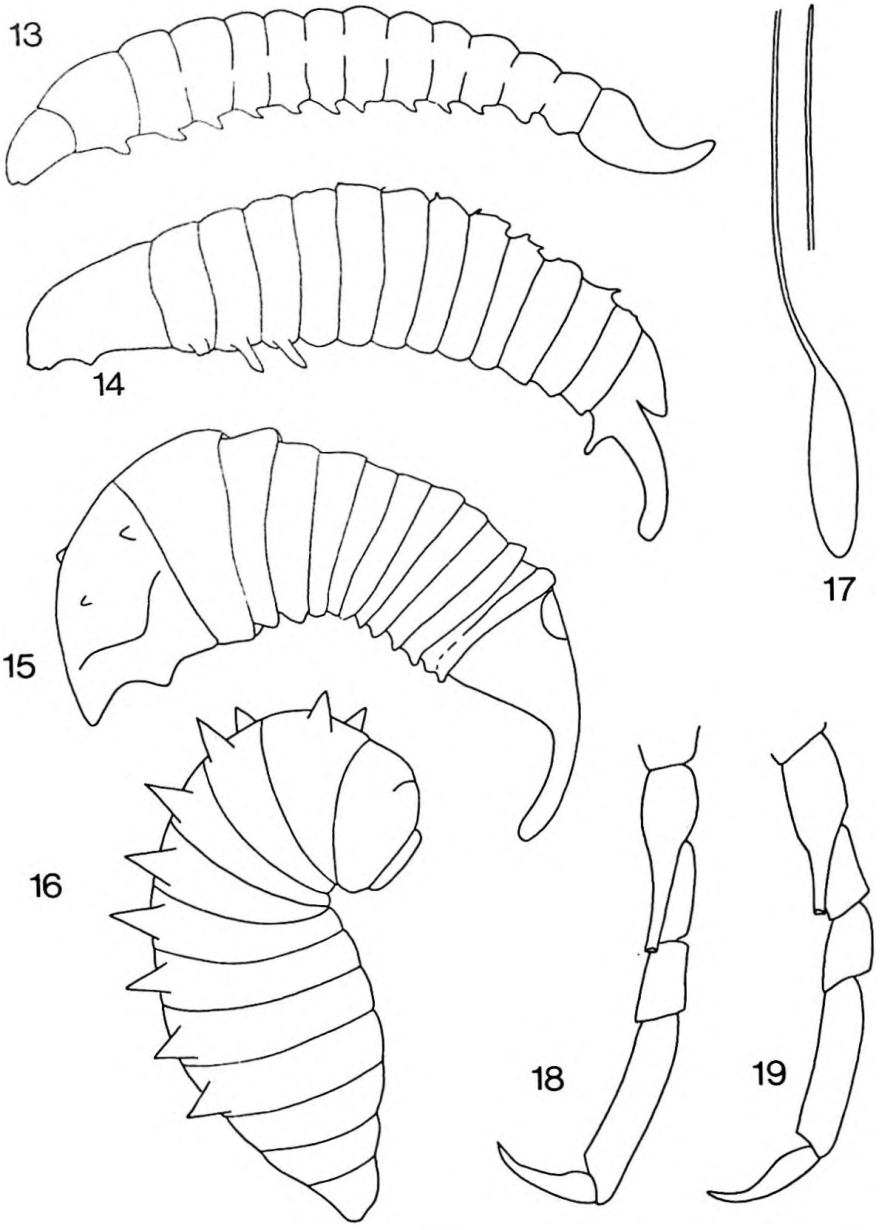




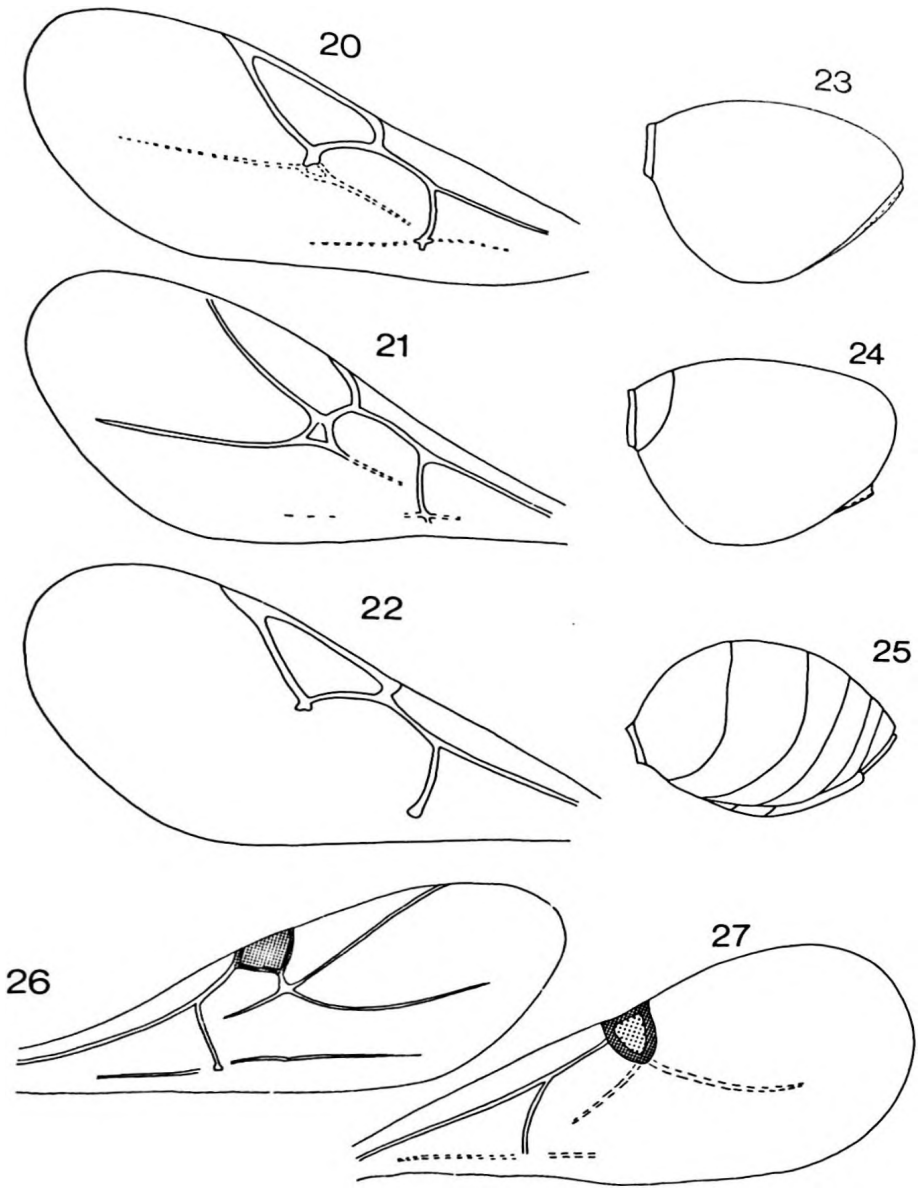
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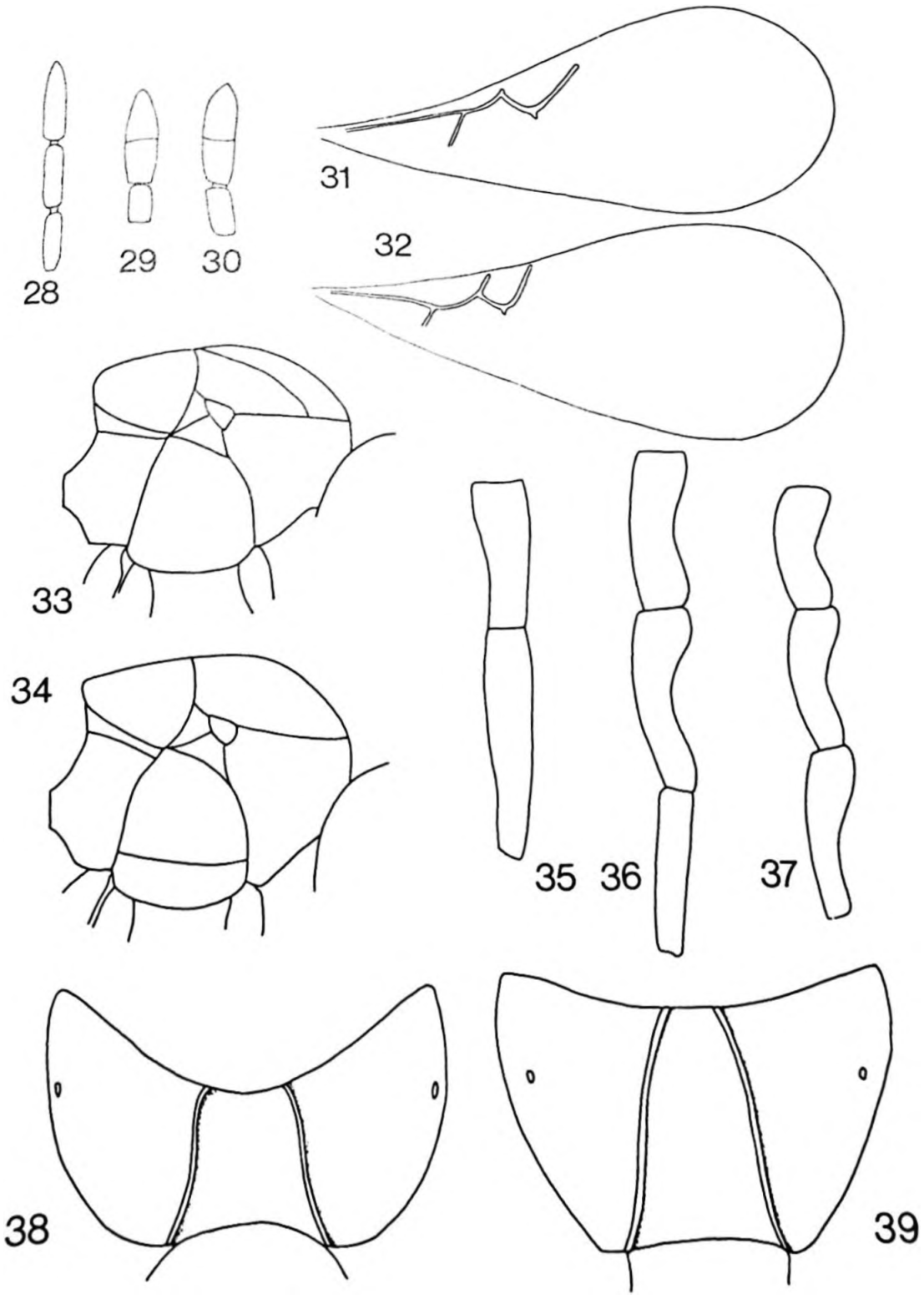
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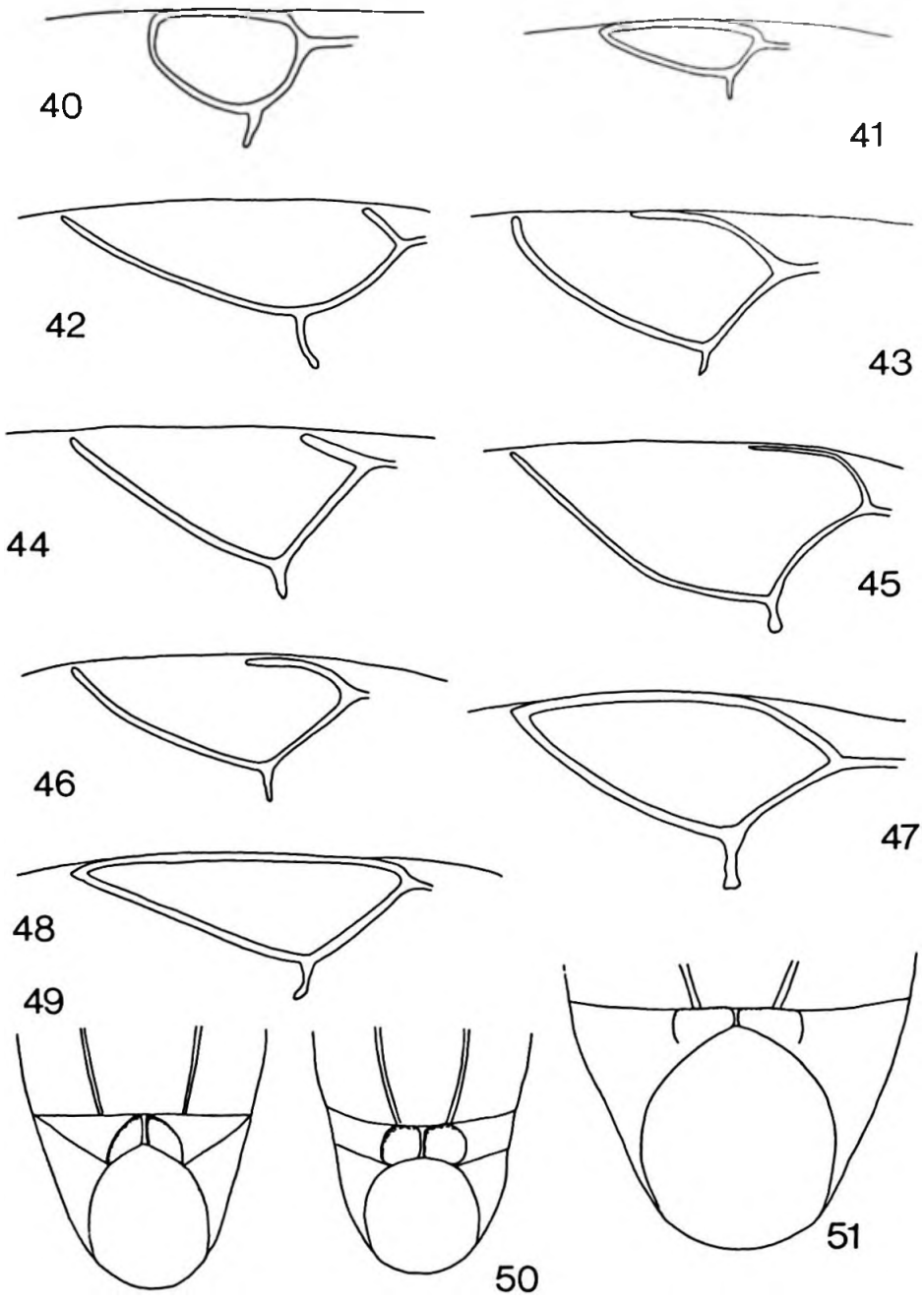
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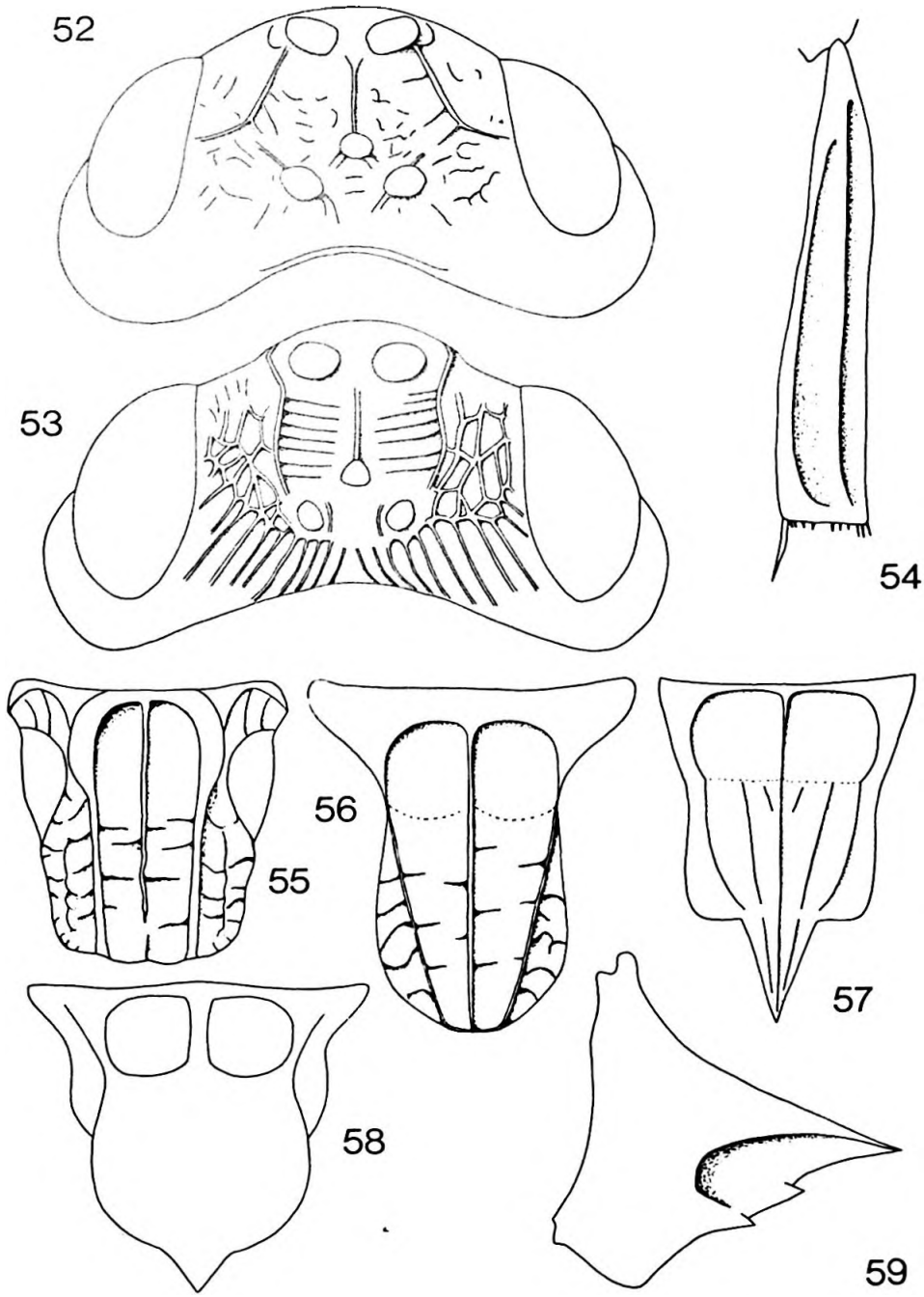
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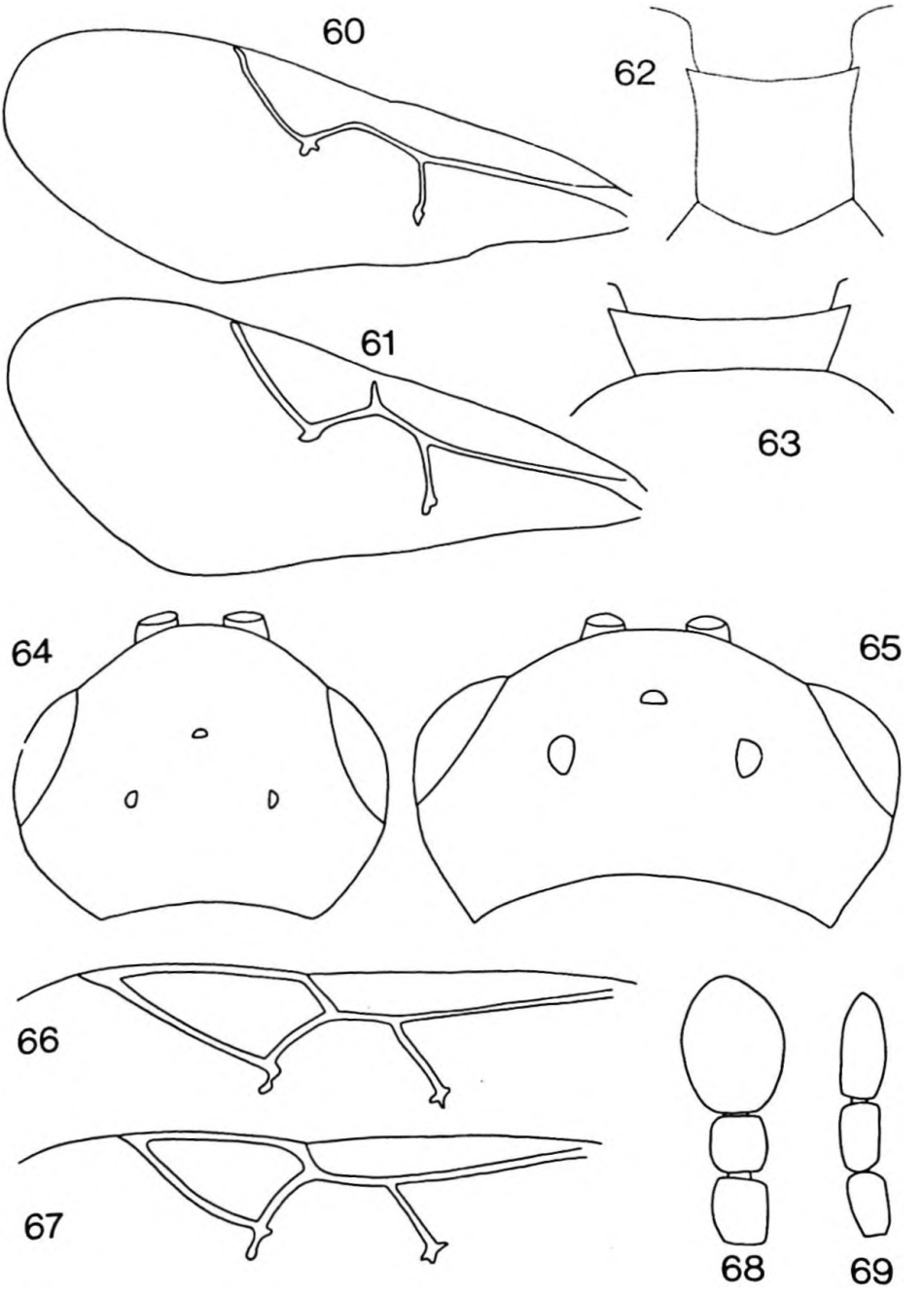
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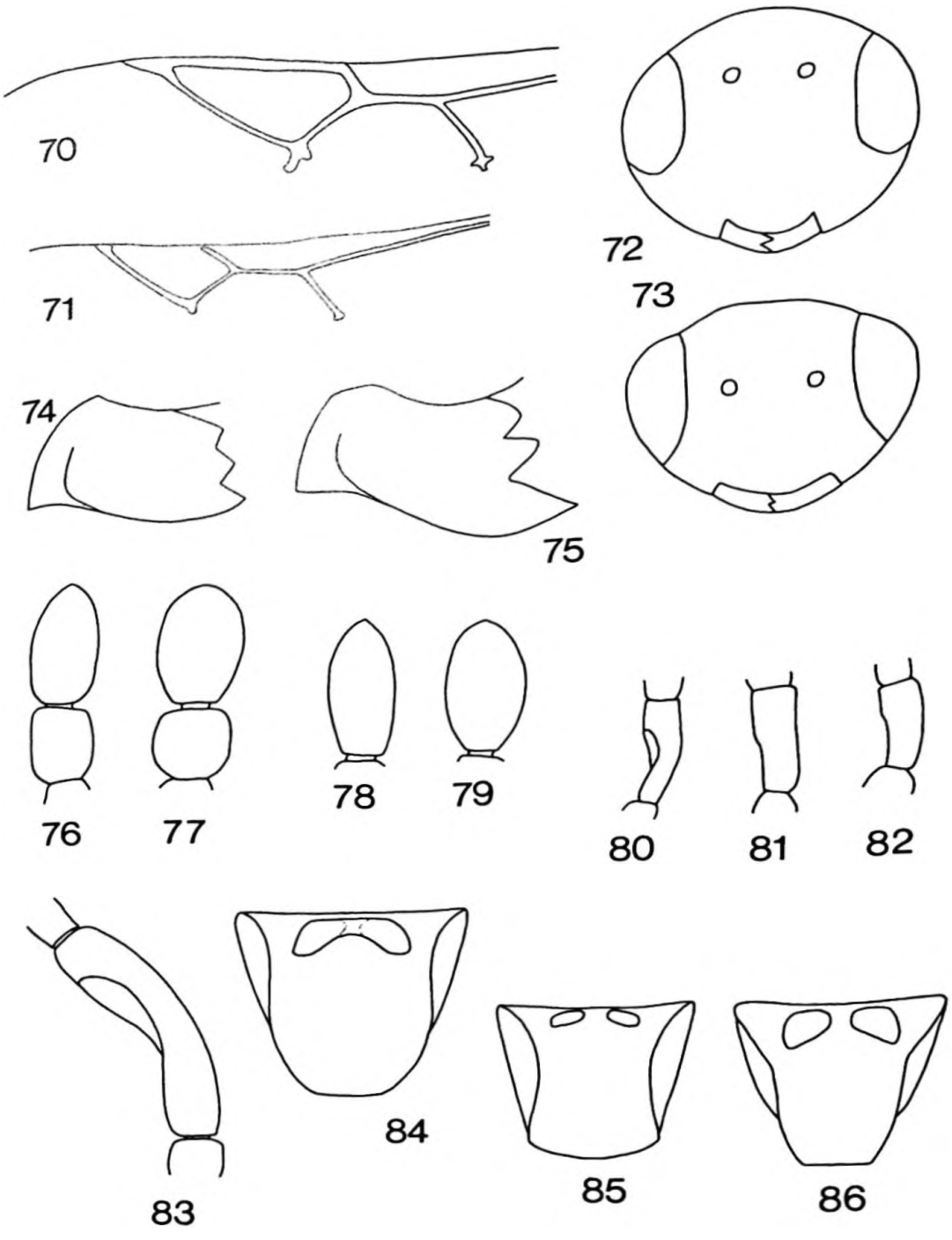
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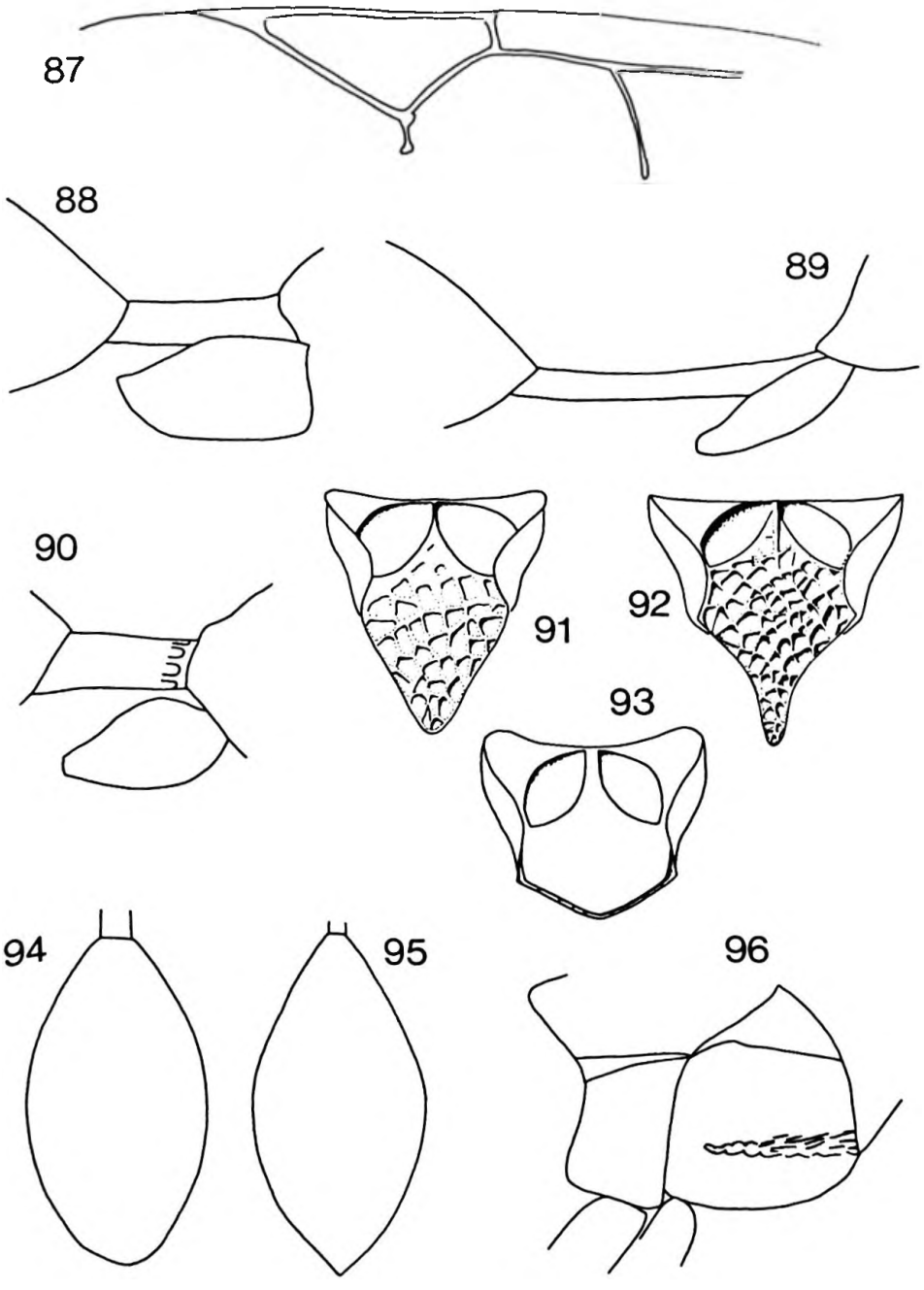
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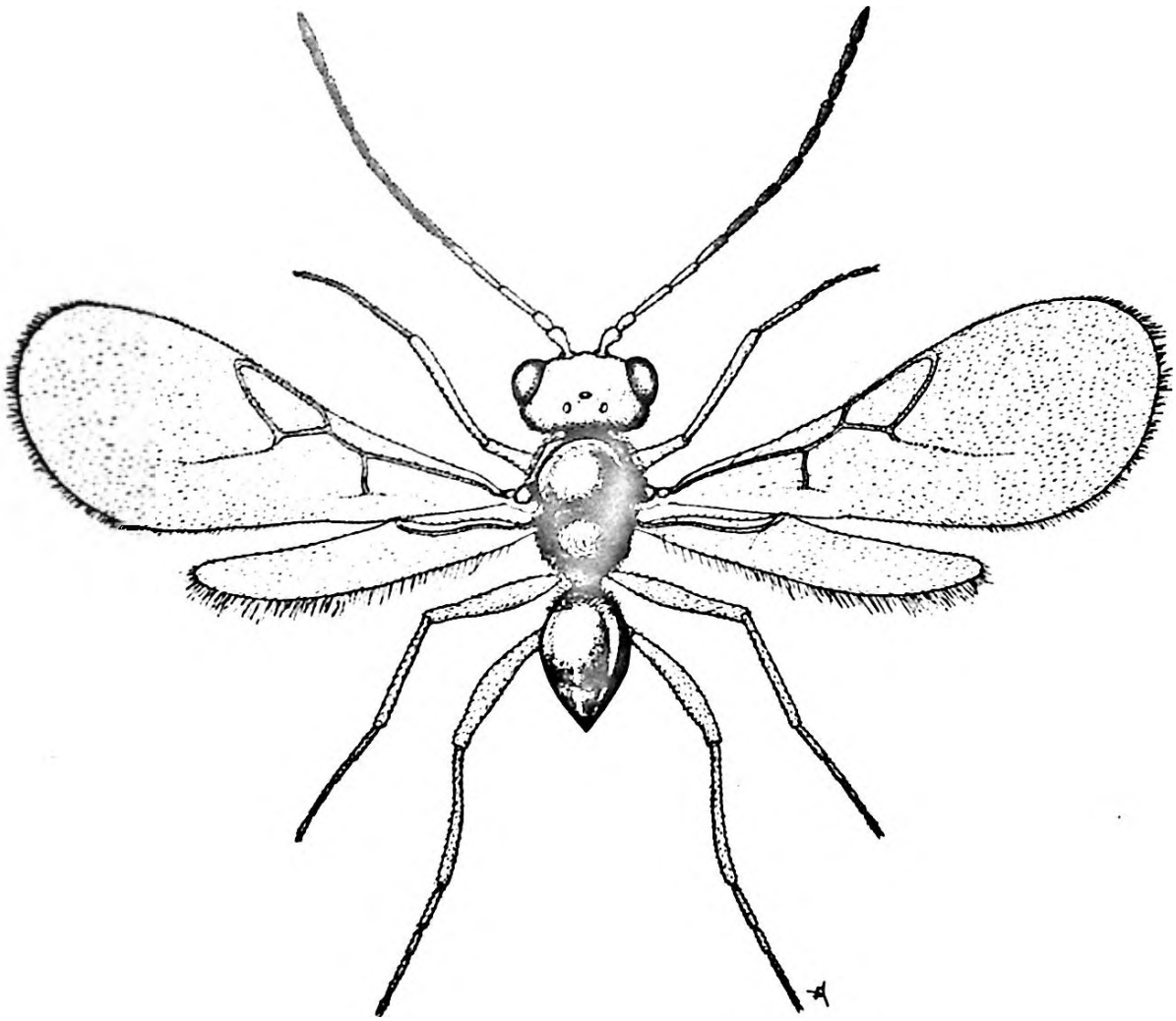
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