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Mymaridae
(Insecta: Hymenoptera)
– introduction, and review of genera

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Front cover. The insects depicted are *Cybomymar fasciifrons*, female (*above*) and *Australomymar* sp., female (*below*).

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ABSTRACT

The family Mymaridae is briefly diagnosed, and the forty-two genera recognised as occurring in New Zealand are keyed for both sexes. Each genus is diagnosed and illustrated by line drawings of at least one representative species, and notes are provided on distribution, biology, and the major taxonomic references. The following seventeen genera and species are described as new: *Acmotemnus luteiclava*, *Allanagrus magniclava*, *Allarescon ochroceras*, *Apoxypteran grandiscapus*, *Ceratanaphes monticola*, *Cybomymar fasciifrons*, *Dorya pilosa*, *Haplochaeta mandibularis*, *Ischiodasys occulta*, *Mimalaptus obscurus*, *Neserythmelus zelandicus*, *Paracmotemnus potanus*, *Paranagroidea verrucosa*, *Pseudanaphes hirtus*, *Scleromymar breve*, *Steganogaster silvicola*, and *Zelanaphes lamprogonius*. A further three genera are recognised as new but are not formally described. *Dahmsia* Doult is synonymised with *Anagroidea* Girault, and *Douttiella* Annecke with *Cleruchus* Enoch.

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INTRODUCTION

The Mymaridae (or 'fairy flies') include some of the smallest insects known. Some are less than 0.4 mm long, and thus are smaller than many unicellular protozoans. Their small size is not surprising because, so far as is known, mymarids develop only as parasitoids within the eggs of other insects. Although all mymarids are small, some that occur in the Southern Hemisphere may reach a length of over 4 mm, and thus can be considered veritable giants of the mymarid world. The small size and delicate appearance of mymarids made them popular with amateur microscopists during the late nineteenth and early twentieth centuries, and some of the microscope slides made of them by people such as the English microscopist Fred Enock are considered by some to be objects of great beauty.

Adult mymarids are rather fragile, the body generally being slender and the wings narrow with an elongate marginal fringe. They effectively 'swim' through the air rather than fly, and their small size means that they can probably be carried great distances in the aerial plankton.

Their diminutive size also makes mymarids very difficult to collect and study. Consequently the mymarid faunas of all parts of the world are very incompletely known, and the true diversity of the group has yet to be ascertained. Not surprisingly, therefore, the classification of the group is still at an elementary stage. Many of the currently accepted genera are only weakly separated and may prove to be untenable when more species are known. Systematic and biological research on the Mymaridae up until 1984 has been reviewed recently by Huber (1986). The major taxonomic treatises on the group are those of Debauche (1948), Annecke & Doutt (1961), Peck *et al.* (1964), and Schauff (1984). Further works which should be of interest are those of Annecke (1961a), Debauche (1949), Enock (1909), Ghesquière (1942), Girault (1910, 1913a,b, 1915a,b), Graham (1982), Hincks (1950, 1952, 1959), Kryger (1950), Matthews (1986), New (1974, 1976), Ogloblin (1935, 1936, 1946, 1952, 1956, 1959a,b), Sahad & Hirashima (1984), Soyka (1949, 1956a, 1961), and Valentine (1971).

Within New Zealand, very little attention has been paid to the Mymaridae prior to the present study. Apart from the descriptions of new taxa by Gahan (1927), Hincks (1961), and Valentine (1971), published work has been limited almost totally to papers on two species of economic importance, *Anaphes nitens* and *Anagrus armatus* (see p. 10).

The present study is based on the collections that have accumulated in the New Zealand Arthropod Collection, held by DSIR's Entomology Division in Auckland, and on material collected during an extensive Malaise trap and sweep-net survey in both the North and South islands during 1980 and 1981. It is intended only as an introduction to the Mymaridae occurring in New Zealand; a complete

revision is beyond the scope of the present work, owing mainly to a lack of well preserved material.

When studying the New Zealand mymarid fauna we made every attempt to include the New Zealand species in the ninety or so described world genera of mymarids that are presently considered valid (see Noyes 1978, Huber 1986). Some difficulty was experienced in placing certain flightless species in previously recognised genera because many are defined on features of the wings. Further to this, reduction of the wings has occasionally led to structural simplification of the thorax and fusion of many of the sclerites, e.g., in a species here placed in *Cleruchus* Enock. Most genera have been described from the Neotropical, Holarctic, and Afrotropical regions, and thus it often proved impossible to place the New Zealand species without unrealistically altering the limits of these genera. Therefore, to accommodate these species, we found it necessary to propose seventeen new genera in the present review. For each of them only the type species is described in order to validate the generic name. Eight of these genera are presently monotypic, four are known to contain at least two species, and five contain three or more species. We believe that the genera we propose reflect discrete natural groupings of species. We believe also that we have been conservative in proposing these new genera. For instance, other workers may consider that the two largest species placed by us in *Australomymar* (see Fig. 49 and 50) require placement in two other, as yet undescribed, genera. Most of the material used in the present study was obtained from a limited survey of New Zealand chalcids conducted in 1980–81. The study of additional material will certainly yield many more species belonging to these new genera.

All primary type material of the species described here is deposited in NZAC.

DIAGNOSTIC CHARACTERS

The family Mymaridae is the most easily recognised of all those included in the superfamily Chalcidoidea. Mymarids are generally small to minute, usually less than 1.5 mm long, although some species over 4 mm long are known. Without exception the head has a transverse membranous line across the frontovertex, between the anterior ocellus and antennal toruli, connecting further membranous areas along the inner margins of the eyes. These possibly permit the sclerites to hinge apart, allowing expansion of the membranous areas to facilitate emergence from the host egg (cf. the ptilinum of Diptera). This sort of structure is also to be found in other chalcid parasitoids of eggs, e.g., Trichogrammatidae and some Encyrtidae. In addition the scutellum of mymarids is almost always divided into an anterior sensory part and a posterior non-sensory part usually marked by

differences in sculpture. The hindwings are, with few exceptions (*Anagroidea* spp.), petiolate proximad of the apex of the venation; this character is not found in any other chalcid family, all of which have relatively broad wings at this point. Both forewings and hindwings of mymarids are generally long and relatively narrow, and usually have a long marginal fringe. The antennae rarely have fewer than nine segments and often as many as thirteen, and are generally long and filamentous. The tarsi may be either four- or five-segmented.

CLASSIFICATION

In the past two separate basic classifications of the Mymaridae have been proposed. Both divided the family into two subfamilies. Debauche (1948), following Ashmead (1904), made use of the different number of tarsal segments to divide the mymarids into the Gonatocerinae (five-segmented tarsi) and the Mymarinae (four-segmented tarsi). Girault (1929b), and later Annecke & Doutt (1961), on the other hand, relied on the relative width and length of the gastral petiole to define the Alaptinae (gaster sessile; petiole very short and broad, thus abdomen not or hardly constricted between propodeum and gaster) and the Mymarinae (gaster petiolate or subpetiolate; petiole distinct and relatively narrow, thus abdomen distinctly constricted between propodeum and gaster). Yoshimoto *et al.* (1972) proposed a third subfamily, the Eubroncinae, based on two genera, neither of which occurs in New Zealand.

A more detailed historical survey of mymarid classification is presented by Huber (1986). The classifications of Debauche and Annecke & Doutt have been discussed by Schauff (1984), and in general the hypothetical phylogeny proposed by him agrees best with the classification proposed by Debauche. It is our opinion that both systems are incorrect, but that proposed by Ashmead and Debauche is of more practical value. However, this classification places *Alaptus*, *Dicopus*, and *Gonatocerus* into one subfamily and *Anaphes* and *Polynema* into the other. On the basis of the shape and structure of the forewing venation, we think that *Alaptus*, *Dicopus*, *Anagrus*, and *Anaphes* (stigma vein relatively long and distinct, forming a sigmoidal curve with marginal vein) belong to a monophyletic group that excludes both *Polynema* and *Gonatocerus* (stigma vein short and indistinct, together with marginal vein either globular or long and more or less linear). In other words the reduction in the number of tarsal segments may have occurred on several occasions.

Since we believe that many of the New Zealand genera cannot be placed confidently within any existing classificatory framework, we arrange the genera treated in this work in alphabetical, and not systematic, order. However,

for convenience the genera of Mymaridae occurring in New Zealand can be divided roughly into groups of possible monophyly as follows.

• **Arescon-group** (long marginal vein; 5-segmented tarsi):
Arescon

• **Australomymar-group** (long marginal vein; 4-segmented tarsi):

Acmotemnus, ?*Allarescon*, *Apoxypterion*, *Australomymar*, ?*Cybomymar*, *Ischiodasys*, *Nesomymar*, ?*Nesopatasson*, *Paracmotemnus*, *Pseudanaphes*, *Scleromymar*, *Stegano-gaster*

• **Gonatocerus-group** (gaster petiolate; antennal funicle of female with more than 6 segments; forewing with venation short, marginal vein straight and elongate, and stigmal vein short and sub sessile; tarsi 5-segmented):

Gonatocerus, *Ooctonus*

• **Anaphes-group** (gaster varying from petiolate to sessile; antennal funicle of female with not more than 7 segments; forewing with venation short, the marginal and stigmal veins forming a sigmoidal curve; tarsi 4- or 5-segmented):

• **subgroup a** (female funicle 7-segmented; gaster petiolate; tarsi 5-segmented, posterior scutellum not elongate, not longitudinally cleft):

Camptoptera, *Paranagroidea*

• **subgroup b** (gaster varying from sessile to sub sessile; female funicle varying from 5- to 7-segmented; posterior scutellum usually not longitudinally cleft; tarsi 5-segmented):

Alaptus, *Dicopomorpha*, *Dicopus*, *Mimalaptus*

• **subgroup c** (female funicle 6-segmented; tarsi 4-segmented; gaster broadly sessile; posterior scutellum often elongate or longitudinally cleft):

Allanagrus, *Anagrus*, *Idiocentrus*, *Paranaphoidea*, *Stethynium*, Genus C

• **subgroup d** (female funicle 6-segmented; tarsi 4-segmented; gaster varying from sub sessile to petiolate; posterior scutellum not elongate, not longitudinally cleft):

Anagroidea, *Anaphes*, *Ceratanaphes*, *Cleruchus*, *Dorya*, *Haplochaeta*, *Neserythmelus*, *Prionaphes*, *Zelanaphes*, ?Genus A, Genus B

• **Polynema-group** (forewing with venation truncate, marginal vein short, and stigmal vein inconspicuous and sessile; tarsi 4-segmented; gaster with elongate petiole):

Mymar, *Polynema*, *Richteria*, *Stephanodes*

FAUNAL RELATIONSHIPS

The mymarid fauna of New Zealand (including the offshore islands from the Kermadecs to Campbell Island; see inside front cover) is particularly species-rich. It is known to comprise at least 160 species, many of which are

undescribed, in 42 genera. This is a very high number when compared with similar land-masses in other areas. For example, the British mymarid fauna, one of the most extensively studied in the world, comprises only 84 species in 16 genera (Fitton *et al.* 1978), which is approximately half as many species per unit area as occur in New Zealand. The size of the New Zealand mymarid fauna is even more remarkable when one considers that it is approximately equivalent to 10% of the described world species. Within New Zealand the species richness of mymarids in relation to other chalcidoids is also unusually high; about 25% of the total number of chalcidoid species are mymarids, which compares with an average of less than 10% for the rest of the world.

The proportion of flightless species or species that have some flightless individuals is also exceptionally high, there being at least 17 genera in New Zealand that include species with abbreviated wings. This is probably a result of being associated with habitats where flight is not advantageous, or where wings may be an encumbrance when searching in dense habitats, e.g., alpine grasslands, leaf litter, or moss. The largest number of species with flightless individuals are associated with leaf litter.

Table 1 summarises the zoogeographic relationships, at a generic level, of the New Zealand mymarid fauna. It can be seen that most genera (20) appear to be endemic, and cosmopolitan genera make up most of the remainder (13). Four genera are found only in Australia and New Zealand and a further three genera are more widely distributed, being found also on the Indian subcontinent.

The patterns of distribution of the genera not belonging to the *Australomymar*-group are difficult to comment upon because they belong to groups of cosmopolitan distribution. Cosmopolitan genera (or species-groups) are, in the main, poorly defined, and in many instances their status is controversial (see Huber 1986), particularly those related to *Polynema*. For instance it is possible that *Richteria*, a genus apparently confined to Australia and New Zealand, will be considered a polyphyletic assemblage of species belonging to the cosmopolitan genus *Polynema*. The species here placed in *Dicopomorpha* may be placed similarly in the cosmopolitan genus *Dicopus*, or all species of *Prionaphes* may be placed in the cosmopolitan genus *Cleruchus*. Until the classification and phylogenetics of the Mymaridae are studied on a world-wide basis, any comment concerning the zoogeographic relationships of these groups must be speculative.

The distribution of *Australomymar*, a genus restricted to New Zealand, Australasia, and South America, warrants some discussion since its nearest relatives (see *Australomymar*-group, this page) are limited to New Zealand and Australia. This genus may represent a relict group of

Table 1 The distribution world-wide of genera of Mymaridae known from New Zealand. In parentheses, the number of species of each genus occurring in New Zealand.

NEW ZEALAND	<i>Prionaphes</i> (3)	NEW ZEALAND,	COSMOPOLITAN
<i>Acmotemnus</i> (1)	<i>Scleromyrmar</i> (5)	SOUTH AMERICA	<i>Alaptus</i> (5)
<i>Allanagrus</i> (1)	<i>Steganogaster</i> (5)	<i>Dicopomorpha</i> (1)	<i>Anagrus</i> (6)
<i>Allarescon</i> (1)	<i>Zelanaphes</i> (1)		<i>Anaphes</i> (18)
<i>Apoxypterom</i> (1)	Genus A (1)	NEW ZEALAND,	<i>Arescon</i> (2)
<i>Cybomyrmar</i> (1)	Genus B (1)	AUSTRALASIA,	<i>Camptoptera</i> (15)
<i>Dorya</i> (2)	Genus C (1)	SOUTH AMERICA	<i>Cleruchus</i> (11)
<i>Haplochaeta</i> (1)		<i>Australomyrmar</i> (18)	<i>Dicopus</i> (2)
<i>Idiocentrus</i> (1)	NEW ZEALAND,		<i>Gonatocerus</i> (5)
<i>Ischiodasys</i> (15)	AUSTRALIA	NEW ZEALAND TO	<i>Mymar</i> (1)
<i>Mimalaptus</i> (3)	<i>Ceratanaphes</i> (1)	INDIAN SUBCONTINENT	<i>Ooctonus</i> (1)
<i>Neserythmelus</i> (1)	<i>Paracmotemnus</i> (6)	<i>Anagroidea</i> (4)	<i>Polynema</i> (11)
<i>Nesomyrmar</i> (2)	<i>Paranaphoidea</i> (1)	<i>Paranagroidea</i> (1)	<i>Stephanodes</i> (1)
<i>Nesopatasson</i> (1)	<i>Richteria</i> (1)	? <i>Pseudanaphes</i> (1)	<i>Stethynium</i> (2)

relatively primitive genera of earlier southern distribution, but there is no fossil evidence to support this view. Very few fossil mymarids are known, the oldest being about 40 million years old (see Yoshimoto 1975), whereas any possible land connection between Australia and South America probably ceased at least about 55 m years ago, and between Australia and New Zealand at least about 80 m years ago (Rich 1975). However, it is possible for insects to cross the Tasman Sea even today (Fox 1978). In support of the view that *Australomyrmar* represents a relict group of southerly distribution is the fact that, of the known extant genera, this genus is possibly one of the closest to the hypothetical primitive mymarid. It is likely that the most primitive mymarid would have had a forewing with long marginal and postmarginal veins, five-segmented tarsi, and a thirteen-segmented antenna. In no known extant mymarid genus is this the case, although a genus recently collected in Western Australia has all these attributes except that the antenna of the female is twelve-segmented (BMNH, CNCI). *Australomyrmar* has a long marginal vein on the forewing, and in some species the postmarginal vein is long. However, the tarsi are four-segmented and only the antenna of the male has thirteen segments, the female antenna being nine-segmented. Cosmopolitan genera showing several of these primitive states are *Gonatocerus* and *Arescon*, but neither of these has a postmarginal vein apparent. In addition the forewing venation of *Gonatocerus* is generally very short and the female antenna is eleven-segmented, and the female antenna of *Arescon* is only eight-segmented. To date there is no phylogenetic evidence to suggest that the *Australomyrmar*-group, as defined here, is closely

related to *Arescon* or to *Gonatocerus*. The *Australomyrmar*-group (see page 8) comprises 12 of the 42 genera and 56 of the 163 species of mymarids known from New Zealand. This indicates that it is particularly species-rich here, as well as morphologically diverse. By way of comparison, in Australasia the group is represented by only 5 genera and not more than 25 species. In South America it is represented by a single genus containing not more than four or five species (all undescribed; CNCI, BMNH).

Not belonging to the *Australomyrmar*-group, but perhaps also a relict of an earlier southern distribution, is the genus *Anagroidea*. This does not show any of the primitive characters outlined above, but it is only one of perhaps two or three genera of mymarids (the others placed in the subfamily Eubroncinae—not yet found in New Zealand) in which the wing membrane extends to the base of the hindwing. This might be the primitive state of the hindwing, with a petiolate hindwing the more derived condition (see Gibson 1986).

BIOLOGY AND LIFE HISTORY

All Mymaridae are believed to be internal parasitoids of the eggs of other insects, and records of other hosts are almost certainly erroneous. For example, Lampel (1959) documented the supposed development of *Polynema schmitzi* Soyka in the nymphal and adult stages of the aphid *Pemphigus populi-nigrae* Schrank. However, his figures and description of the immature stages of the parasitoid are probably those of an aphidiine braconid. Most mymarids are solitary parasitoids, but gregarious parasitism does

occur in some species, up to fifty individuals developing in a single host egg (Jackson 1956). Several species are known to be thelytokously parthenogenetic, that is females lay eggs that develop only into females, and males are unknown.

The majority of recorded hosts are the eggs of species of Sternorrhyncha (Hemiptera), but the eggs of other Hemiptera, Coleoptera, and Psocoptera are also commonly attacked (Huber 1986). Mymarids most commonly seem to parasitise eggs that are laid in concealed situations, such as those that are embedded in plant stems, placed under bracts, or hidden in the ground. Females seem to prefer eggs that have not undergone much development. After oviposition further development of the host egg normally ceases, but it is not known whether mymarids inject an arrestment venom during oviposition, as do many other egg parasitoids (Strand 1986).

The mymarid egg is elongate-oval with a short pedicel at one end (Jackson 1961). The number of larval instars is difficult to ascertain, but from two to four have been recorded (Balduf 1928, Bakkendorf 1934, Sahad 1982).

The first-instar larva is generally either sacciform (a simple sac with few processes and no hairs) or mymariform (body curved, with a cephalic process, long caudal appendage, and long cuticular hairs).

The second larval instar of some species with a sacciform first-instar larva is very distinctive and is known as a histriobdellid larva. It is cylindrical and divided into 6 segments, the first and last segments largest, and often bearing paired fleshy processes (see Dumbleton 1934, Jackson 1961). The second-instar larva of other species is often without segmentation, spines, or setae. There appear to be no functional tracheae or spiracles in any larval instar.

Overwintering is normally as a mature larva in the host egg. Pupation normally takes place within the host egg-shell.

Several extralimital species of mymarid are known to parasitise the submerged eggs of aquatic insects, e.g., *Caraphractus cinctus* Walker, a parasitoid of dytiscid (Coleoptera) eggs in Britain. To do this they are capable of swimming under water, using their wings as paddles (Jackson 1966; see also Matheson & Cosby 1912). Females need not leave the water immediately after emergence, and mating may also take place under water. Individuals are capable of remaining under water for 15 consecutive days (Rimsky-Korsakov 1933). The mymarid may leave the water by climbing the stem of a plant that breaks the surface.

MYMARIDS IN BIOLOGICAL CONTROL

Mymarids have proved to be of some value in controlling insect pests in New Zealand. The most notable instance is the use of *Anaphes nitens* (Girault), first introduced in 1927, in an effort to control the eucalyptus weevil *Gonipterus scutellatus* Gyll., which was causing severe damage to *Eucalyptus* species (Miller 1927). This mymarid subsequently became established in both the North and South islands (Clark 1931, Miller *et al.* 1936), and successfully controlled the weevil (Sweetman 1935, Doull 1955). Another species of mymarid, *Anagrus armatus* (Ashmead), affords some control of the leafhopper *Typhlocyba froggatti* Baker, a pest of apple (Dumbleton 1934). Up to 80% of leafhopper eggs may be parasitised by this mymarid (Dumbleton 1937).

COLLECTING AND PRESERVATION

Perhaps the main difficulty in the study of mymarids is their small size and thus their relative unpopularity with insect collectors. Therefore, a common complaint of the serious student of this group (or indeed of any microhymenoptera) is that there is not adequate material available for study. The following methods are the most rewarding for collecting and preserving mymarids. For greater detail on collecting and preservation, see Noyes (1982).

Collecting methods

MALAISE TRAPPING. This is probably the best single method for collecting mymarids, since even species of small size that are rarely collected by any other means can be collected in quite large numbers, e.g., *Alaptus* spp. A design for an efficient trap for collecting chalcids has been described by Townes (1972). The advantage of a Malaise trap is that it can be set up and serviced by anyone. It can be emptied relatively infrequently – at fortnightly intervals if ethyl alcohol is used as a killing and preserving agent. The use of ethyl alcohol is slightly disadvantageous because material is collected wet (see ‘Preservation’, below), and the subsequent sorting of required specimens from the catch takes considerable time. It is possible to collect dry using fumigants such as Vapona®, but the catch is greatly reduced and the material is often covered with moth scales and damaged by dying insects.

SWEEPING. Sweep-net collecting is a satisfactory method for collecting larger mymarids, since a large number of species may be collected in a short time. The insects can be removed from the net using an aspirator, and killed by placing a plug of paper tissue or cotton wool soaked in ethyl acetate in the entry tube of the aspirator. Before any insects

are sucked into the aspirator it is advisable to place in it a crumpled sheet of soft tissue to prevent insects from sticking to the sides of the tube. It is important to keep the specimens as dry as possible.

The sweep-net is most efficient if the handle is about 1.2 m long and the head triangular, with the handle joining the head in the middle of one side of the triangle. The triangular head allows the net to be used most efficiently on grassland, i.e., more of the net will be in contact with the ground during sweeping. The relatively long handle allows the net to be held as far away from the body as possible, so that insects are not forewarned by footfalls, etc. It also allows for greater reach when collecting in forest habitats. The best material for the frame is aluminium, since this is sufficiently rigid yet light enough in use. The net bag should be of a material which is strong and durable, yet allows easy passage of air; canvas is not suitable.

When sweeping grassland it is very important to sweep in long arcs, keeping the head of the net in contact with the ground for the entire arc by pressing down on the handle.

YELLOW PAN TRAPPING. This is a good method of catching mymarids. The trap consists of a tray about 30 cm square and 5–8 cm deep, painted yellow on the inside. Insects are attracted to the yellow colour and drown in the collecting medium contained in the pan. The collecting medium may be water with a few drops of detergent to break the surface tension, or water plus ethylene glycol (1:1), or a dilute solution of picric acid, or a saturated solution of common salt. If water is used the trap must be emptied at least once a day or the material will deteriorate very badly. With other media the trap can be emptied weekly (weather permitting). Specimens must be rinsed well in clean water before transferring them to 70% ethanol. Ethylene glycol is not recommended because the subsequent slide-preparation of material may be difficult; the specimens tend to collapse badly on transfer to balsam. Picric acid causes the gaster to distend (this is not often important taxonomically).

Pan trapping is ideal for collecting from among trees and in forest where there is little undergrowth.

REARING. Rearing is the most rewarding method of obtaining specimens, since much can be learned about their biology. A limitation is that much effort has to be put into locating possible host eggs and rearing mymarids from them. A good method for circumventing this is to use the eggs laid in the laboratory by a potential host species. These can then be placed in suitable habitats outdoors and returned to the laboratory after a suitable period of time to await the emergence of parasitoids. Potential host eggs should be kept in a container appropriate to the size of the sample and examined regularly for the emergence of

mymarids. Care should be taken to ensure that the correct host is recorded. It is very easy to collect an egg on a small piece of leaf and assume that a parasitoid found wandering around or dead in the tube comes from the egg, whereas in fact it may have emerged from some other host such as an agromyzid pupa which may have been overlooked. Rearing from individually isolated hosts can overcome this problem.

SUCTION TRAPPING. The suction trap has a single advantage over a Malaise trap in that it actively sucks in small flying insects. It has many disadvantages, e.g., it needs an electric power source, is much more expensive, and fails to catch flightless insects. Even so, catches from a suction trap should not be overlooked since they may contain many interesting species.

EXTRACTING FROM LEAF LITTER AND MOSS. This is a good method for collecting some Mymaridae which are rarely collected by other methods. Specimens can be collected from leaf litter or moss using a Berlese funnel or an emergence box.

Preservation

Material collected dry should be kept dry. Specimens that are not mounted within 2 hours of killing in ethyl acetate vapour should be relaxed before mounting, or layered between sheets of cellulose wadding (or even a couple of layers of soft toilet paper), and stored in a strong, dry, airtight box. A crystal or two of thymol should be added to inhibit the growth of mould. Material collected into alcohol, e.g., in Malaise traps or yellow pan traps, should be dried as soon as possible. This can be done by air-drying the material on absorbent card (see below under 'Mounting material'). Unfortunately, air-dried specimens usually collapse or shrivel upon drying. This can be prevented by dehydrating specimens using a critical-point drier (see Gordh & Hall 1979). Dried specimens can be stored between sheets of tissue paper or in gelatin capsules, held in place with finely teased cotton wool. Specimens which have been kept in alcohol for a long time (5 years or more for specimens less than 1 mm in length) are normally unsuitable for making slides.

MOUNTING MATERIAL. Mymarids are best mounted on rectangular cards using a water-soluble glue. The specimens should be mounted with the vertical axis through the thorax at about 45° to the plane of the card, preferably with the wings, legs, and antennae displayed and the wings and head free of glue – see Noyes (1982) for details. This method requires a good deal of practice, but has advantages over card-point mounting in that specimens are well pro-

tected, and the various parts are much easier to see against the white background of the card.

Specimens from alcohol should be dried on a piece of moderately absorbent card, e.g., Bristol board. The insect should be placed in a drop of alcohol on the card with its wings flat against the card. As soon as it is dry, in 5–25 seconds, it should be removed and mounted.

RELAXING SPECIMENS. Specimens that have been dry for some time become extremely brittle, and should be softened to prevent breakage of appendages. This is best done by placing them on a piece of tissue on a glass dish inside a plastic box. Put in a few drops of water or glacial acetic acid (not more than 1.5 ml per 0.75 l of box) and leave for 8–24 hours. If material is layered, put it in the box still in layers, otherwise it may be damaged when removing the top layer. If the material was killed in ethyl acetate vapour it should be sufficiently relaxed to be mounted without any damage whatsoever.

SLIDE MOUNTING. It is necessary to make good slides of at least some specimens from a series in order to see characters of taxonomic value.

(a) Temporary slides. These usually entail mounting whole specimens in a water-soluble medium such as Hoyer's or Berlese. It is not recommended, and should be used only if there is a surfeit of material of the one species available. Its main (and probably only) advantage is that slides are relatively quick and easy to make.

(b) Permanent slides. It is essential that slides be made using Canada balsam if material is of taxonomic value, or if only a limited amount of material is available. This method is laborious and time-consuming, and requires a good deal of practice to master it. Preferably, body parts should be mounted (after clearing in 10% potassium hydroxide solution) under four or five separate 6 mm coverslips. For a detailed description of the method, see Noyes (1982).

Briefly, the method is as follows. Remove the wings and place them in balsam. Clear the specimen in 10% KOH at 20°C for 24–48 hours (if it has never been in alcohol), or at 20°C for 72 hours, or at 20°C for 24 hours followed by 40°C for 24 hours (if it has been in alcohol). Next, neutralise the preparation in glacial acetic acid for 10 minutes, followed by distilled water, then dehydrate through 35%, 70%, and 95% alcohols (each for 10 minutes), and finally clear in clove oil (or terpineol warmed under a bench light) for 10 minutes. Position the body parts in individual drops of balsam on a slide and keep in an oven at 40°C for 4 weeks; this fixes them in position. Finally, add the requisite amount of balsam to each part (smallest amount possible for wings and antennae, and largest for thorax and gaster), and place

a coverslip over each part of the preparation. **NOTE:** the balsam should be relatively thick, i.e., if a pin is put in it and pulled out the balsam should form 'strings'. If the balsam is thinner it will be difficult to position the coverslip flat; the balsam will also contract as it dries, crushing the part that it covers.

DATA LABELS. All material should be labelled adequately with at least collection locality, date, and host data (if reared). Never use code numbers alone and keep the data separate; data may be lost or mislaid in this way.

TEXT CONVENTIONS

The following terminology and abbreviations are employed in the text.

Head (Fig. 1–5)

ANTENNAL TORULI – the antennal sockets.

CORONAL SUTURE – a median suture connecting the postfrontal suture with the occipital suture, if present.

FLAGELLUM – all segments distad of pedicel, usually differentiated into a 1–3-segmented terminal clava and 3–8-segmented funicle.

MALAR SPACE – the minimum distance between the eye and mouth margin.

MEDIAN SUTURE (Debauche 1948: median carina) – a transverse membranous line across the frontovertex between the antennal toruli and anterior ocellus and connecting the two interorbital membranous lines (see Fig. 1) (Debauche 1948: frontal carinae). These lines are not carinae, but appear to be membranous areas connecting the sclerotised plates of the head. They probably allow for expansion of the head to facilitate emergence from the host egg (cf. ptilinum of Diptera).

OCCIPITAL SUTURE – a transverse suture across the occiput between the postfrontal suture and occipital foramen.

OOL – the minimum distance between posterior ocellus and eye margin.

PEDICEL – the second joint of the antenna.

POL – the minimum distance between the posterior ocelli. Postfrontal suture – a transverse suture behind the ocelli.

RADICLE – basal joint connecting the antenna to the antennal socket, occasionally fused to scape in some mymarids.

SCAPE – first joint of antenna.

STEMMATICUM – a small, raised, triangular or rectangular area on which the ocelli are located and which is delimited by membranous lines.

Thorax (Fig. 6)

ANTERIOR SCUTELLUM – the anterior, sensory part of the scutellum, separated from the posterior part by a transverse

line about level with or well behind the hind margins of the axillae, and usually distinguished by slightly different sculpture.

METANOTUM – the sclerite immediately behind the scutellum, usually a very narrow band and often partly fused with the propodeum. The minute sublateral seta on either side of the metanotum is occasionally lost.

NOTAULAR LINES – a pair of internal longitudinal ridges which act as muscle attachment points, almost visible externally as a pair of sublateral grooves on the mesoscutum.

PHRAGMA – an internal sclerotised band projecting back towards the gaster from the anterolateral part of the metanotum.

POSTERIOR SCUTELLUM – the non-sensory posterior half of the scutellum, separated from the anterior part by a transverse line and usually distinguishable by slightly different sculpture.

PROPODEAL SETA – a single seta on either side of the propodeum, between the spiracle and the posterior margin of the propodeum.

Wings (Fig. 7 and 8)

HYPCHAETA – a long, backward-directed seta arising near the submarginal vein in the distal part of the costal cell on the ventral surface of the forewing; usually distinguishable by its slightly hooked end and usually occurring singly, although in some genera there may be several.

Gaster (Fig. 9)

The gaster includes only the 3rd to 10th abdominal segments. The 1st true abdominal segment is the propodeum, which is here treated as part of the thorax, and the 2nd abdominal segment is the petiole (see Fig. 9).

CERCUS – the cercus is composed of the cercal plate and the cercal bristle, and is situated on the 8th gastral tergite. In mymarids the 7th and 8th gastral tergites are normally fused to form the epipygium (= syntergum).

GASTRAL SPIRACLE – if present, situated on the penultimate (= 6th) gastral tergite.

Abbreviations (after Watt 1979)

- ANIC Australian National Insect Collection, CSIRO, Canberra, A.C.T.
 BMNH British Museum (Natural History), London
 CNCI Canadian National Collection of Insects, Biosystematics Research Institute, Ottawa
 NZAC New Zealand Arthropod Collection, Entomology Division, DSIR, Auckland
 USNM United States National Museum of Natural History, Washington D.C.



KEY TO GENERA OF MYMARIDAE KNOWN FROM NEW ZEALAND

- 1 Wings not reaching apex of gaster ... 2
 —Wings reaching apex of gaster ... 32
- 2(1) Tarsi 5-segmented ... 3
 —Tarsi 4-segmented ... 5
- 3(2) Flagellum 9- or 11-segmented, no segments anelli-
 form (Fig. 84, 86) ... (p. 34) .. *Gonatocerus*
 —Flagellum 8-segmented (Fig. 57) or 10-segmented, the
 2nd and sometimes 4th segments anelliiform (Fig. 57, 61,
 62, 129) ... 4
- 4(3) Flagellum 8-segmented (females) (Fig. 57) or, if 10-
 segmented (males), then 2nd and 4th segments anelli-
 form (Fig. 61, 62); forewing very narrow, hardly wider
 than venation and usually with marginal setae restricted
 to 1 or 2 at apex (Fig. 60) ... (p. 29) .. *Camptoptera*
 —Flagellum 10-segmented with only 2nd segment anelli-
 form, 4th of normal proportions (Fig. 129); forewing
 broader, at least 3–4x as wide as venation and with setae
 along posterior margin as well as at apex (Fig. 130)
 ... (p. 44) .. *Paranagroidea*
- 5(2) Petiole conspicuous, at least as long as broad ... 6
 —Petiole inconspicuous, at most half as long as broad ... 7
- 6(5) Hind coxa with a strong tuft of hairs posteriorly in its
 basal third (as in Fig. 96) ... (p. 37) .. *Ischiodyas*
 —Hind coxa more or less naked ... (p. 46) .. *Polynema*
- 7(5) Flagellum 9-segmented, not clearly differentiated
 into funicle and clava; clava entire, hardly longer than
 8th funicle segment, so antenna male-like in appearance
 (Fig. 180) ... (p. 54) .. *Genus A*
 —Either flagellum not 9-segmented, or if 9-segmented
 then clearly composed of a 6-segmented funicle and 3-
 segmented clava ... 8
- 8(7) Apterous or with wings very small and indistinct ... 9
 —Brachypterous; wings very clearly visible, although
 sometimes very small and only 2–3x as long as tegulae
 but reaching level with posterior margin of scutellum ... 17
- 9(8) Females: flagellum 5-, 7-, or 9-segmented ... 10
 —Males: flagellum 11-segmented ... 15
- 10(9) Clava 3-segmented ... 11
 —Clava entire or 2-segmented ... 13
- 11(10) Phragma not projecting past propodeal seta (Fig.
 113) ... (p. 42) .. *Nesomyrmar*

- Phragma projecting well past propodeal seta, reaching posterior margin of propodeum or projecting into base of gaster (Fig. 116) ... 12
- 12(11) Gaster apically rounded in dorsal view; torulus separated from median suture by at least about its own length (Fig. 114) ... (p. 42) .. *Nesopatasson*
 —Gaster apically pointed in dorsal view; antennal torulus separated from median suture by much less than its own length ... (p. 42) .. *Paracmotemnus*
- 13(10) Gaster subsessile, broadly attached to propodeum; 1st tergite occupying at most one-third of gaster in dorsal view; thorax weakly sclerotised ... (p. 31) .. *Cleruchus*
 —Gaster petiolate; 1st tergite covering more than half of gaster in dorsal view; thorax relatively strongly sclerotised, almost box-like in appearance (Fig. 74, 154, 156) ... 14
- 14(13) Funicle 4-segmented (Fig. 75) ... (p. 31) .. *Cybomyr*
 —Funicle 6-segmented (Fig. 155) ... (p. 49) .. *Scleromyr*
- 15(9) Head relatively large, in dorsal view at least one-third wider and only about one-third shorter than thorax ... (p. 49) .. *Scleromyr*
 —Head more normal, in dorsal view at most about one-quarter wider than thorax and half as long ... 16
- 16(15) Scutellum anteriorly without a separate sclerotised strip; axillae inwardly pointed (Fig. 116) ... (p. 42) .. *Nesopatasson*
 —Scutellum anteriorly with a separate narrow, transverse, sclerotised strip between axillae, so axillae inwardly truncate (as in Fig. 121) ... (p. 42) .. *Paracmotemnus*
- 17(8) Notaular lines very indistinct or absent; male flagellum 10- segmented ... (p. 31) .. *Cleruchus*
 —Notaular lines distinct; male flagellum 10- or 11-segmented ... 18
- 18(17) Females: flagellum with 9 or fewer segments ... 19
 —Males: flagellum 10- or 11-segmented ... 26
- 19(18) Exserted part of ovipositor at least as long as gaster ... (p. 28) .. *Australomyr*
 —Ovipositor not or hardly exserted ... 20
- 20(19) Gastral sternites anteriorly produced between hind coxae (as in Fig. 39) ... (p. 26) .. *Anaphes*
 —Gastral sternites not anteriorly produced ... 21
- 21(20) Clava 3-segmented ... (p. 42) .. *Paracmotemnus*
- Clava entire ... 22
- 22(21) Occipital margin well rounded ... 23
 —Occipital margin sharp, at least behind ocelli ... 24
- 23(22) Propodeum without carinae or flanges; disc of mesoscutum with only a single pair of setae; gaster with sclerites of normal appearance, shiny; 1st tergite covering at least about two-thirds of gaster in dorsal view ... (p. 46) .. *Polynema*
 —Each side of propodeum with a strong carina or vertical flange running nearly to base of hind coxa (as in Fig. 163); disc of mesoscutum with 1–3 pairs of setae; gaster with sclerites membranous and dull in appearance; 1st tergite covering about one-third of gaster in dorsal view (as in Fig. 161, 165) ... (p. 51) .. *Steganogaster*
- 24(22) Mandibles long, narrow, well exposed; head below each antennal torulus with a distinct carina or strong sculpture (as in Fig. 29, 30); 1st funicle segment at least about twice as long as any other (as in Fig. 31) ... (p. 25) .. *Anagroidea*
 —Mandibles relatively small, usually more or less hidden by clypeus; head without a carina or strong sculpture below each antennal torulus; 1st funicle segment not or hardly longer than any others ... 25
- 25(24) Posterior scutellum with significantly deeper, rougher sculpture than anterior scutellum, which is more or less smooth (as in Fig. 12); propodeum with at least 1 pair of setae in addition to propodeal setae (as in Fig. 12) ... (p. 20) .. *Acmotemnus*
 —Scutellum more or less uniformly smooth; propodeum without any setae in addition to propodeal setae (as in Fig. 141) ... (p. 47) .. *Prionaphes*
- 26(18) Flagellum 10-segmented ... (p. 20) .. *Acmotemnus*
 —Flagellum 11-segmented ... 27
- 27(26) Mandibles long, narrow, each with 2 strong apical teeth; head below each antennal torulus with a distinct carina or strong sculpture (as in Fig. 29, 30) ... (p. 25) .. *Anagroidea*
 —Mandibles of normal proportions or reduced, with 3 (sometimes small) apical teeth; head below antennal toruli without carinae, not strongly sculptured ... 28
- 28(27) Head large, in dorsal view at least about one-quarter wider than thorax (as in Fig. 55) ... (p. 28) .. *Australomyr*
 —Head not or hardly wider than thorax ... 29
- 29(28) Propodeum laterally with a strong carina or vertical flange running nearly to base of coxa, and usually

- with a median carina (as in Fig. 163); disc of mesoscutum with 1–3 pairs of setae; head in dorsal view with eyes separated from occipital margin by nearly half their length; occipital margin rounded; gaster with sclerites membranous, translucent, dull (as in Fig. 161, 165)
 ... (p. 51) .. *Steganogaster*
- Propodeum without lateral flanges or central carinae; disc of mesoscutum with only 1 pair of setae; head in dorsal view with eyes very rarely reaching occipital margin, which is more less sharp, at least behind ocelli; gaster with sclerites of normal appearance ... 30
- 30(29) Occipital margin sharp behind ocelli only; head in side view gradually rounded anteriorly, not abruptly angled inwards below antennal toruli
 ... (p. 26) .. *Anaphes*
- Occipital margin sharp behind eyes and ocelli; head in side view abruptly angled inwards below antennal toruli (as in Fig. 39) ... 31
- 31(30) Pedicel more than half as long as scape (as in Fig. 122) ... (p. 42) .. *Paracmotemnus*
- Pedicel less than half as long as scape (as in Fig. 144) ... (p. 47) .. *Prionaphes*
- 32(1) Tarsi 5-segmented ... 33
 —Tarsi 4-segmented ... 41
- 33(32) Forewing marginal vein very long, reaching to about three-quarters along wing (Fig. 47); female funicle 5-segmented (Fig. 46); male flagellum 11-segmented (Fig. 48) ... (p. 28) .. *Arescon*
- Forewing marginal vein shorter, reaching to at most two-fifths along wing; female funicle 5–8-segmented; male flagellum 8–11-segmented ... 34
- 34(33) Gaster broadly attached to propodeum; petiole at least nearly half as wide as propodeum; phragma often projecting into gaster; male flagellum 8- or 10-segmented ... 35
 —Gaster distinctly petiolate; petiole at most one-third as wide as propodeum; phragma never projecting into gaster; male flagellum 10- or 11-segmented ... 38
- 35(34) Female flagellum 6-segmented (Fig. 16); male flagellum 8-segmented (Fig. 17) ... (p. 21) .. *Alaptus*
- Female flagellum 8-segmented; male flagellum 10-segmented ... 36
- 36(35) Apex of phragma about level with base of gaster; petiole at most about half as wide as propodeum (Fig. 104) ... (p. 38) .. *Mimalaptus*
- Phragma clearly projecting into gaster; petiole at least half as wide as propodeum or wider ... 37
- 37(36) Posterior margin of forewing strongly and abruptly excised opposite apex of marginal vein (Fig. 77); antenna of female with 2nd funicle segment anelliform, several times shorter than 1st or 3rd segment (Fig. 76)
 ... (p. 32) .. *Dicopomorpha*
- Posterior margin of forewing gradually curved opposite apex of marginal vein (Fig. 80); antenna of female with 2nd funicle segment at least half as long as 1st (Fig. 79)
 ... (p. 33) .. *Dicopus*
- 38(34) Female funicle with at most 7 segments (Fig. 57, 126); male flagellum 10-segmented, with at least 2nd segment anelliform and contrasting with much longer 1st and 3rd segments (Fig. 61, 62) ... 39
- Female funicle 8-segmented (Fig. 84, 118); male flagellum 11-segmented, without anelli (Fig. 86) ... 40
- 39(38) Propodeum and head very strongly sculptured; eyes small, not as long as malar space (Fig. 125); forewing relatively broad, at most 7x as long as broad (Fig. 128) ... (p. 44) .. *Paranagroidea*
- Head with very weak sculpture, more or less smooth; propodeum usually more or less smooth but occasionally more deeply sculptured medially; eyes longer than malar space; forewing at least 10x as long as broad (Fig. 58, 59) ... (p. 29) .. *Camptoptera*
- 40(38) Petiole about half as long as wide; antenna of female with first 3 funicle segments shorter than any following (Fig. 84) ... (p. 35) .. *Gonatocerus*
- Petiole at least twice as long as wide; antenna of female with first 3 funicle segments longer than any following (Fig. 118) ... (p. 42) .. *Ooctonus*
- 41(32) Propodeum laterally with a strong crest or carina nearly extending to base of hind coxa, and centrally with an inverted Y-shaped carina (Fig. 163); setae in infumate area of forewing below venation with conspicuous hyaline areas surrounding their sockets (Fig. 168); gaster with sclerites membranous, appearing translucent and completely matt in card-mounted specimens (Fig. 161, 165); disc of mesoscutum with 1–3 pairs of setae (Fig. 163)
 ... (p. 51) .. *Steganogaster*
- Propodeum without lateral or median carinae or, if median carina present, then simple and not forking; forewing hyaline or, if infumate, then setae below venation without hyaline areas surrounding their sockets; gaster with sclerites normal, usually slightly shiny in card-mounted specimens; disc of mesoscutum only rarely with more than 1 pair of setae ... 42
- 42(41) Females ... 43
 —Males ... 76

Females

- 43(42) Clava entire ... 44
—Clava 2- or 3-segmented; sutures sometimes incomplete ... 61
- 44(43) Gaster with petiole at least about as long as broad ... 45
—Gaster sessile or subsessile, petiole not more than half as long as broad ... 49
- 45(44) Forewing marginal vein relatively long, reaching well over one-third along wing (Fig. 95, 100) ... (p. 37) .. *Ischiodasys*
—Forewing marginal vein short, not reaching one-third along wing ... 46
- 46(45) Hindwing filiform or poorly developed; forewing partly infusate, with setae in disc of more or less normal length (Fig. 107, 151) ... 47
—Hindwing normal, or if poorly developed then forewing hyaline, with extremely long setae in disc as well as along margin (Fig. 138) ... 48
- 47(46) Forewing oar-shaped, with an elongate petiole and enlarged apex (Fig. 107); 2nd funicle segment relatively abnormally long (Fig. 106) ... (p. 40) .. *Mymar*
—Forewing of normal shape (Fig. 151); 2nd funicle segment in proportion with others (Fig. 150) ... (p. 48) .. *Richteria*
- 48(46) Scape with inner surface smooth, not covered with scale-like structures (Fig. 135, 136); forewing marginal vein thickened, swollen (Fig. 137, 138) ... (p. 46) .. *Polynema*
—Scape with inner surface rough, covered with numerous scale-like structures (Fig. 169); forewing marginal vein not swollen (Fig. 170) ... (p. 52) .. *Stephanodes*
- 49(44) Exserted part of ovipositor at least two-thirds as long as gaster or, if ovipositor not exserted, then species more than 3 mm long ... (p. 28) .. *Australomymar*
—Ovipositor not exserted or, if exserted, then exserted part not more than half as long as gaster; species much shorter than 3 mm ... 50
- 50(49) Clava as long as funicle or longer, gradually tapering to a very fine point; radicle over half as long as scape, and base of scape abruptly broader than radicle (Fig. 82) ... (p. 33) .. *Dorya*
—Either clava at least a little shorter than funicle or, if as long, then oval, parallel-sided, with apex rounded or truncate, never pointed; radicle shorter than half length of scape ... 51
- 51(50) Apex of phragma clearly projecting past posterior margin of propodeum; gaster varying from sessile to subpetiolate ... 52
—Apex of phragma not projecting past posterior margin of propodeum; gaster subsessile or petiolate ... 56
- 52(50) Head in frontal aspect with eyes converging ventrad and distinctly closer together than at vertex (Fig. 175) ... (p. 53) .. *Zelanaphes*
—Head in frontal aspect with inner eye margins more or less parallel, not converging ventrad, not closer together than at vertex ... 53
- 53(52) Head in side view more or less evenly rounded anteriorly; antennal toruli each joined to clypeus by a membranous line (as in Fig. 20) ... (p. 25) .. *Anagrus*
—Head in side view abruptly angled in towards mouth below antennal toruli, which are not joined to clypeus by a membranous line ... 54
- 54(53) Forewing distinctly broadening apically, at least half broader at its broadest point than at marginal vein (Fig. 142, 146); metanotum well developed, clearly separate from propodeum (Fig. 141) ... (p. 47) .. *Prionaphes*
—Forewing broadest at marginal vein (Fig. 72, 110); metanotum poorly developed, sometimes not separated from propodeum medially (Fig. 71) ... 55
- 55(54) Forewing more than 7x as long as broad; venation not reaching more than two-fifths along wing (Fig. 72) ... (p. 31) .. *Cleruchus*
—Forewing less than 7x as long as broad; venation reaching to about halfway along wing (Fig. 110) ... (p. 40) .. *Neserythmelus*
- 56(51) Hindwing not more than 10x as long as its greatest width (as in Fig. 34); mandibles very long and narrow (Fig. 29, 30), each with 2 or 3 strong, acute apical teeth clearly visible in card-mounted specimens; ovipositor much shorter than half length of middle tibia ... (p. 25) .. *Anagroidea*
—Hindwing more than 10x as long as its greatest width; mandibles difficult to see in card-mounted specimens, each usually short, broad, never with 2 acute apical teeth, occasionally with 2 blunt teeth; ovipositor more than four-fifths as long as middle tibia ... 57
- 57(56) Propodeum and posterior scutellum with strong, irregular sculpture (Fig. 12); gaster with a short, distinct petiole; forewing marginal vein long, reaching more than halfway along wing, hyaline for part of its length,

- the proximal and distal parts darkened (Fig. 13)
 ... (p. 20) .. *Acmotemnus*
 —Propodeum and posterior scutellum more or less smooth or with shallow sculpture or, if propodeum with deep, rough sculpture then gaster sessile; forewing marginal vein usually short, never reaching as far as halfway along wing, never hyaline in part ... 58
- 58(57) Gastral petiole distinct, at least about half as long as broad, although often tucked in under propodeum and difficult to see in dorsal view; phragma never projecting past posterior part of propodeum
 ... (p. 37) .. *Ischiodytes*
 —Gaster sessile or subpetiolate; petiole indistinct, clearly several times broader than long; attachment of gaster to propodeum often nearly half as wide as propodeum; phragma occasionally projecting into base of gaster ... 59
- 59(58) Forewing dorsal surface with numerous setae in disc below venation (Fig. 40); ventral part of gaster often produced anteriorly between hind coxae (Fig. 39)
 ... (p. 26) .. *Anaphes*
 —Forewing dorsal surface with few setae in disc below venation (Fig. 142, 146; as in Fig. 68); ventral part of gaster never produced anteriorly between hind coxae... 60
- 60(59) All funicle segments at least twice as long as broad (Fig. 66); face with 2 small, tooth-like protuberances below each antennal torulus, clearly visible when head viewed dorsally in card-mounted specimens (Fig. 63)
 ... (p. 29) .. *Ceratanaphes*
 —All funicle segments subquadrate or transverse (Fig. 140); no tooth-like protuberances below antennal toruli
 ... (p. 47) .. *Prionaphes*
- 61(43) Clava 2-segmented; suture occasionally incomplete ... 62
 —Clava 3-segmented; 2 sutures always present, but either or both sometimes incomplete ... 69
- 62(61) Forewing at least slightly more than 1.5X as broad at broadest point than at marginal vein, distinctly widening towards apex; setae in disc distad of venation more or less scattered, not arranged in lines ... 63
 —Forewing at most slightly less than 1.5X as broad at broadest point as at marginal vein, not widening greatly towards apex; margins usually parallel or subparallel, sometimes tapering distad of venation; setae in disc distad of venation often arranged in lines parallel to wing margins ... 66
- 63(62) Face with a pair of membranous lines or channels connecting each torulus to mouth margin (as in Fig. 20)
 ... (p. 53) .. *Stethynium*
 —Face without such lines or channels ... 64
- 64(63) Forewing more or less naked in disc until well past apex of venation, at most with 3 below venation (Fig. 134)
 ... (p. 46) .. *Paranaphoidea*
 —Forewing with numerous setae in disc below venation ... 65
- 65(64) Third to 6th funicle segments subequal or gradually shortening, never as below; apex of clava rounded; forewing usually with a conspicuous single, erect, submarginal seta in disc just proximad of marginal setae on hind margin (Fig. 40)
 ... (p. 26) .. *Anaphes*
 —Fourth and 6th funicle segments subequal, distinctly shorter than the subequal 3rd and 5th; apex of clava acutely pointed (Fig. 181); forewing without a conspicuous single, erect, submarginal seta in disc just proximad of marginal setae on hind margin (Fig. 182)
 ... (p. 55) .. **Genus B**
- 66(62) Antennal toruli more or less touching mouth margin (Fig. 87); head in profile anteriorly more or less gradually, evenly rounded; mandibles very large, more than half as long as narrowest width of frontovertex, with 3 strong, acute teeth ... (p. 35) .. *Haplochaeta*
 —Antennal toruli separated from mouth margin by at least about half the length of a torulus; head in profile abruptly angled inwards below toruli towards mouth; mandibles at longest not quite half as long as narrowest width of frontovertex, with teeth usually diminutive and not strong ... 67
- 67(66) Phragma not projecting past posterior margin of propodeum; mandibles minute, not meeting medially; frontovertex at narrowest point about four-fifths head width; eyes relatively small, not longer than shortest distance from anterior eye margin to anterior margin of head in dorsal view (Fig. 43) ... (p. 26) .. *Apoxypteron*
 —Apex of phragma clearly projecting past posterior margin of propodeum into base of gaster; mandibles meeting in middle; frontovertex at narrowest point nearly half as wide as head; eyes relatively large, much longer than shortest distance from anterior eye margin to anterior margin of head in dorsal view ... 68
- 68(67) Forewing margins more or less parallel (Fig. 72); posterior margin of metanotum not distinct (Fig. 71)
 ... (p. 31) .. *Cleruchus*

- Forewing slightly but clearly widening towards apex distad of venation (Fig. 142, 146); metanotum well developed, distinctly separated from propodeum (Fig. 141) ... (p. 47) .. *Prionaphes*
- 69(61) Gaster projecting forwards ventrally between coxae and beneath head, hence apex clearly visible in dorsal view (Fig. 90) ... (p. 36) .. *Idiocentrus*
—Gaster not projecting forwards ventrally, or if so then not extending past forecoxae ... 70
- 70(69) Phragma projecting into base of gaster ... 71
—Phragma not projecting past posterior margin of propodeum ... 72
- 71(70) Sutures of clava transverse, complete, clearly separating segments; micropilosity on ventral surface of clava in a narrow strip, very dense on all segments; 4th and 6th funicle segments distinctly shorter than 5th (Fig. 21) ... (p. 22) .. *Allanagrus*
—Sutures of clava strongly oblique towards ventral surface, with 2nd often incomplete, hence segments not clearly separated; micropilosity on ventral surface of clava scattered, sparse; 4th and 6th funicle segments not distinctly shorter than 5th (Fig. 171) ... (p. 53) .. *Stethynium*
- 72(70) Forewing with a single conspicuous, erect, submarginal seta in disc immediately basad of hind marginal fringe (Fig. 40) ... (p. 26) .. *Anaphes*
—Forewing without such a seta ... 73
- 73(72) Forewing venation not reaching more than two-fifths along wing (Fig. 184); ovipositor at least about as long as gaster, about twice as long as middle tibia ... (p. 55) .. *Genus C*
—Forewing venation extending more than two-fifths along wing, usually over half or, if less than half, then ovipositor much shorter than gaster, about two-thirds as long as middle tibia ... 74
- 74(73) Funicle segments at least 4x as long as broad; apical segment of clava with a pair of extraordinarily long subapical setae each about 3x as long as maximum width of clava (Fig. 27) ... (p. 23) .. *Allarescon*
—At least one segment of funicle not more than twice as long as broad; clava with setae of normal length ... 75
- 75(74) Forewing marginal fringe longer than maximum width of wing (Fig. 123); ovipositor at least about as long as gaster, much longer than middle tibia; mesoscutum with discal setae in anterior half (Fig. 121) ... (p. 42) .. *Paracmotemnus*
- Forewing marginal fringe not longer than half maximum width of wing (Fig. 149); ovipositor much shorter than gaster or middle tibia; mesoscutum with discal setae near hind margin (Fig. 147) ... (p. 47) .. *Pseudanaphes*
- Males**
- 76(42) Flagellum of fewer than 11 segments ... 77
—Flagellum 11-segmented ... 79
- 77(76) Head very enlarged, broader than thorax; flagellum 10-segmented (Fig. 14) ... (p. 20) .. *Acmotemnus*
—Head of normal proportions, not or only slightly broader than thorax; flagellum 9- or 10-segmented ... 78
- 78(77) Forewing with subparallel margins, nowhere wider than at marginal vein (as in Fig. 71); eyes not converging ventrad; head in profile abruptly angled in towards mouth immediately below antennal toruli ... (p. 31) .. *Cleruchus*
—Forewing distinctly widening distad, at widest point nearly twice as wide as at marginal vein (as in Fig. 177); eyes converging ventrad (as in Fig. 175); head in profile more or less evenly rounded anteriorly, not distinctly angled inwards towards mouth below antennal toruli ... (p. 53) .. *Zelanaphes*
- 79(76) Gaster broadly attached to propodeum, with phragma clearly projecting past hind margin of propodeum into base of gaster ... 80
—Gaster petiolate or, if more broadly attached, phragma not projecting past hind margin of propodeum ... 84
- 80(79) Head very enlarged (Fig. 24), robust, distinctly wider than thorax, anteriorly rounded in profile; setae on flagellum moderately dense, the longest at least as long as the diameter of a segment (Fig. 25) ... (p. 22) .. *Allanagrus*
—Head of more normal size, not or hardly wider than thorax, sometimes dorsoventrally flattened and abruptly angled in towards mouth below antennal toruli; flagellar setae sparse, not longer than diameter of segment of origin ... 81
- 81(80) Body distinctly flattened dorsoventrally; head in side view flattened, abruptly angled in towards mouth below antennal toruli ... (p. 47) .. *?Prionaphes*
—Body not or only slightly flattened; head in side view rounded anteriorly, not abruptly angled inwards below antennal toruli ... 82
- 82(81) Disc of forewing completely naked distad of venation (except perhaps for a single seta on ventral surface);

- hind margin of wing opposite apex of venation more or less straight (as in Fig. 92) ... (p. 36) .. *Idiocentrus*
 —Disc of forewing with several setae below venation; hind margin opposite apex of venation strongly excised (as in Fig. 35, 173) ... 83
- 83(82) Posterior scutellum medially not more than twice as long as anterior scutellum; forewing with hypochaeta basad of distal macrochaeta on venation (as in Fig. 36) ... (p. 25) .. *Anagrus*
 —Posterior scutellum medially at least twice as long as anterior scutellum; forewing with hypochaeta at least level with proximal macrochaeta, usually distad of it (as in Fig. 173) ... (p. 53) .. *Stethynium*
- 84(79) Petiole distinct, at least as long as broad ... 85
 —Gaster sessile or with petiole not more than about half as long as broad ... 88
- 85(84) Forewing marginal vein relatively long, reaching over one-third along wing (as in Fig. 95, 100); setae on funicle often very long, sometimes 4x as long as diameter of segment of origin (Fig. 97) ... (p. 37) .. *Ischiodasy*
 —Forewing venation not reaching one-third along wing; setae on funicle always much shorter than diameter of segment of origin ... 86
- 86(85) Forewing hyaline; hindwing normal, or if poorly developed then disc of forewing clothed in abnormally long setae (as in Fig. 138) ... (p. 46) .. *Polynema*
 —Forewing partly infuscate, though infuscation sometimes weak; setae in disc more or less normal, never abnormally long; hindwing filiform or poorly developed (Fig. 153; as in Fig. 107) ... 87
- 87(86) Forewing oar-shaped, with an elongate petiole and enlarged apex (as in Fig. 107) ... (p. 40) .. *Mymar*
 —Forewing normal (Fig. 153) ... (p. 48) .. *Richteria*
- 88(84) Head enlarged, robust, distinctly wider than thorax, anteriorly evenly rounded in profile, with occipital margin rounded ... 89
 —Head of more normal size, not or hardly wider than thorax, often abruptly angled inwards below antennal toruli, often with occipital margin sharp ... 90
- 89(88) Forewing marginal fringe much shorter than maximum wing width; setae in disc distad of apex of venation moderately dense (as in Fig. 53) ... (p. 28) .. *Australomymar*
- Forewing marginal fringe about twice as long as maximum wing width; setae in disc distad of apex of venation sparse, not more than 20 in number (Fig. 159) ... (p. 49) .. *Scleromymar*
- 90(88) Hindwing not more than 10x as long as its maximum width (Fig. 34); mandibles clearly visible in card-mounted specimens, long, narrow, each with 2 or 3 strong, acute apical teeth (as in Fig. 29, 30); head below each antennal torulus with a distinct carina or strong sculpture ... (p. 25) .. *Anagroidea*
 —Hindwing more than 12x as long as its maximum width; mandibles of more normal size, difficult to see in card-mounted specimens, never each with 2 strong apical teeth; head below antennal toruli without carinae, weakly sculptured ... 91
- 91(90) Forewing disc naked below venation, except for a single seta on ventral surface; head abruptly angled inwards below antennal toruli ... 92
 —Forewing disc with several setae below venation; head anteriorly evenly rounded in profile, occasionally abruptly angled inwards below antennal toruli ... 93
- 92(91) Face with a pair of parallel grooves from clypeus to angle of face just inside antennal toruli (as in Fig. 65); 2 small, tooth-like projections below each antennal torulus clearly visible when head viewed dorsally (as in Fig. 64) ... (p. 29) .. *Ceratanaphes*
 —Face without parallel grooves from inside toruli to mouth margin; tooth-like projections below antennal toruli absent ... (p. 47) .. *Prionaphes*
- 93(91) Forewing marginal vein relatively short, curved; disc almost always with a conspicuous, erect, submarginal seta on dorsal surface immediately basad of hind marginal fringe (as in Fig. 40) ... (p. 26) .. *Anaphes*
 —Forewing marginal vein relatively long, straight; disc lacking such a seta ... 94
- 94(93) Forewing with longest marginal setae much longer than maximum wing width (as in Fig. 123); petiole indistinct, several times broader than long ... (p. 42) .. *Paracmotemnus*
 —Forewing with longest marginal setae not longer than half maximum wing width (as in Fig. 95, 100); petiole distinct, usually at least about half as long as broad ... (p. 37) .. *Ischiodasy*

DESCRIPTIONS

Acmotemnus new genus

Figures 10–15

Key couplets – female 25, 57, male 26, 77

Type species *Acmotemnus luteiclava* new species.

Generally robust species.

Female. HEAD about one-quarter wider than thorax, in frontal view broader than long, in side view more or less gradually rounded anteriorly, slightly longer than its maximum depth. Face very slightly angled inwards just below antennal toruli. Area above occipital foramen without a semicircular ridge. Occipital margin sharp and strongly concave in dorsal view. Stemmaticum, occipital suture, and coronal suture absent. Ocelli in a very obtuse angle of about 130°. Eyes hairy, moderately large, clearly separated from occipital margin by at least the diameter of a posterior ocellus. Frontoververtex slightly wider than half head width; inner eye margins subparallel. Inner eye margins, vertex, and frons below antennal toruli with long, conspicuous setae nearly half as long as scape. Antennal toruli slightly nearer to median suture than to mouth margin, separated from each other by about 1.5x their own maximum length, from eye margin by two-thirds that length, and from mouth margin by twice their own maximum length. Antenna: radicle free, about one-fifth as long as scape; scape moderately long, subcylindrical, reaching to about level with anterior ocellus; pedicel subconical; funicle 6-segmented; clava entire; longitudinal sensilla present on funicle segments 3–6 and clava; setation conspicuous, moderately long. Mandibles of moderate size, meeting centrally, apparently unidentate.

THORAX in side view dorsally fairly flat, in dorsal view with pronotum not clearly visible. Pronotum with anterior margin lacking a carina and not longitudinally divided medially, short medially; posterior margin very concave; prosternum not divided; pronotal setae long. Mesoscutum about one-half broader than long; mesothoracic spiracle not visible; notaular lines interrupted. Axillar setae long. Scutellum about as long as mesoscutum, without a posteriorly projecting ridge; posterior and anterior parts subequal in length. Metanotum moderately long and distinct medially, about one-quarter as long as scutellum. Propodeum medially almost as long as scutellum. Dorsum of thorax with a few scattered, long setae. Wings normally fully developed. Fully developed forewing moderately broad, about 4x as long as broad; discal setae moderately dense, more or less evenly distributed, slightly more sparse towards base of wing; marginal fringe about one-fifth of

maximum wing width; venation extending to over halfway along wing; marginal vein about as long as submarginal; postmarginal absent; stigmal not more than one-eighth as long as marginal vein. Hindwing slightly shorter than forewing; blade more or less parallel-sided, its maximum width one-twelfth its length; venation not quite reaching half way; marginal fringe at longest slightly longer than maximum wing width. Phragma reaching to about base of projection enclosing gastral petiole. Femur about 3.5x as long as broad. Hind coxa with shallow, reticulate sculpture, not covered with denticles. Foretibia with a short, subapical row of sensilla; spur bifurcate, without lateral branches, its base without a tooth. Tarsi 4-segmented; claws of normal length, not longer than width of empodium.

GASTER slightly longer than thorax, with a very short petiole at least twice as broad as long and enclosed by a posterior projection of propodeum. Tergites subequal in length except for 1st, which is about twice as long as 2nd. Spiracle present. Cerci well separated, each with 4 subequal bristles. Hypopygium extending to about one-third along gaster. Ovipositor about as long as gaster or not quite twice as long as middle tibia.

Male. Except for antennae and head, very similar in appearance to female. Head 1.5x as broad as thorax; antennal toruli distinctly above lower eye margins. Flagellum 10-segmented, the joints very similar in shape but diminishing in size distally; all flagellar segments with longitudinal sensilla; scape relatively short, about twice as long as pedicel. Mandibles large, tridentate, the upper tooth blunt. Eyes relatively small, so in frontal view occipital margin forms margin of head at side, rather than eyes. Setae on frontoververtex relatively shorter than in female, but still conspicuous. Genitalia relatively simple, with a fairly broad phallobase; digiti each with 5 apical hooks; aedeagus about two-thirds as long as middle tibia.

Remarks. *Acmotemnus* belongs to the *Australomyrmex* group of genera. It can be distinguished from other genera included in this group by the key characters, particularly in that the marginal vein is hyaline for most of its length and the clava is entire.

Found in New Zealand only; one species is known.

Acmotemnus luteiclava new species

Figures 10–15

Female. Length range 0.78–1.10 mm ($n = 97$); holotype 0.86 mm. Head black, shiny; scape and pedicel testaceous; clava and sometimes apical funicle segments yellowish. Thorax shiny orange-brown; legs, including coxae, and

gaster dark brown. Wings more or less hyaline, but forewing varying from slightly brownish to infumate greyish, darkest below base of marginal vein, and with a diagonal, almost hyaline streak across blade from nearly below apex of stigmal vein towards anal angle.

HEAD (Fig. 11) above median suture with moderate, raised, rugose-reticulate sculpture; below this, sculpture more shallow and of smaller mesh; below antennal toruli and on cheeks almost smooth. Hairs on eyes about as long as diameter of a facet to twice as long; setae on vertex three-eighths as long as scape, more or less directed forwards. Posterior ocellus separated from occipital margin by slightly less than its diameter, and from eye margin and anterior ocellus by nearly twice its diameter. Relative dimensions of head (holotype): maximum head width 42; frontovertex width at median suture 25; head length (frontal view) 32; maximum eye length 22.5, width 17; malar space 10; POL 10; OOL 5; scape length 22, maximum width 6; other proportions of antenna as in Fig. 10.

THORAX (Fig. 12) with moderate, raised, almost hexagonal reticulations on pronotum; mesoscutum almost smooth, but with very shallow, engraved, hexagonal reticulate sculpture; anterior scutellum almost smooth, but with very shallow rugose sculpture; posterior scutellum, metanotum, and propodeum with deep, almost regular, raised, reticulate sculpture; mesopleuron and metapleuron with irregular, raised, reticulate sculpture. Disc of mesoscutum usually with 2, rarely 3 pairs of very long setae; anterior half of scutellum with 3 pairs of setae; sides of propodeum with a few long setae. Forewing, Fig. 13.

GASTER about as long as thorax. Relative lengths (paratype): ovipositor 70 [middle tibia 37].

Male. Length range 0.79–1.25 mm ($n = 6$). More or less similar in coloration to female, but head sometimes relatively paler and concolorous with thorax.

HEAD (Fig. 14) devoid of sculpture except near ocelli, where it is shallowly rugose, and near base of mandible, where it is shallow engraved-reticulate. Setae on eyes more sparse than in female, about 1.5x as long as diameter of a facet; setae on vertex about one-third longer than major diameter of antennal torulus. Relative dimensions (paratype 1): maximum head width 58; frontovertex width at median suture 30; head length (frontal view) 44; maximum eye length 23, breadth 15; malar space 10; POL 11; OOL 9; scape length 20, maximum breadth 7; other proportions of antennae as in Fig. 14.

THORAX (Fig. 14) similar to that of female, but mesoscutum more or less smooth, and disc of mesoscutum with 3 pairs of long setae.

GASTER. Genitalia, Fig. 15. Relative lengths (paratype 2): aedeagus 39; middle tibia 71.

Type data. **Holotype:** female, AK, Birkenhead, Malaise trap in second growth bush, January 1981, J.F. Longworth (NZAC).

Paratypes (107 females, 8 males) from the following localities: ND – Waipoua State Forest, Mangamuka Saddle; AK – Lynfield, Titirangi, Huia, Birkenhead, Massey; WI – Palmerston North; BR – Mawhera State Forest, lower Buller Gorge.

Material examined. Type series only (NZAC, BMNH, USNM, CNCI, ANIC).

ND, AK, WI / BR.

Habitats noted: second-growth bush, forest clearing, litter, moss, garden.

Adults collected January–April, November, and December.

Biology. Unknown.

Remarks. In addition to the material included in the type series, we have examined four brachypterous females which may represent a short-winged form of *luteiclava*. We exclude these specimens from *luteiclava* pending examination of further material.

Genus *Alaptus* Westwood

Figures 16–19; key couplet 35

Alaptus Westwood, 1840: 79. Type species *Alaptus minimus* Westwood, 1840; England.

Diagnosis. Female. Length (excluding ovipositor) about 0.3–0.5 mm. Antenna: scape moderately short; funicle 5-segmented, all segments usually longer than broad; clava elongate-oval, unsegmented. Wings fully developed. Forewing long, narrow, not less than 7x as long as broad; hind margin abruptly excised opposite marginal vein; venation short, reaching hardly more than one-quarter along wing; marginal vein very short; stigmal vein almost absent; longest part of marginal fringe at least about 3x as long as maximum wing width. Hindwing long, strap-like; marginal fringe at least about 5x as long as maximum wing width. Tarsi 5-segmented. Phragma clearly projecting into base of gaster. Gaster sessile, about as long as head and thorax together; petiole at least about three-quarters as wide as propodeum; ovipositor varying from hardly to quite strongly exerted.

Male. Length about 0.30–0.40 mm. Generally similar to female, but flagellum 8-segmented, the segments usually subequal in size.

Biology. One New Zealand species has been reared from eggs of Psocoptera (Valentine 1967). Elsewhere also recorded as parasitoids of eggs of various Homoptera.

Remarks. Taxonomy: Soyka (1939), DeBauche (1948), Hincks (1959, 1960), Annecke & Doutt (1961), Cheke & Turner (1973).

World status: 49 species; cosmopolitan.

New Zealand: probably at least five species, none of them identified.

Allanagrus new genus

Figures 20–26

Key couplets – female 71, male 80

Type species *Allanagrus magniclava* new species.

Generally moderately robust species.

Female. HEAD in dorsal view about one-quarter wider than thorax, in side view more or less gradually curved anteriorly; face slightly angled inwards just above antennal toruli; vertex moderately flat. Area above occipital foramen without a semicircular ridge. Stemmaticum and occipital and coronal sutures absent. Ocelli large, forming a right angle; posterior ocelli clearly less than their diameter from occipital margin; anterior ocellus about half-way between occipital margin and median suture. Eye with short, inconspicuous setae, moderately large, very nearly reaching occipital margin, which is sharp and moderately concave in dorsal view. Frontoververtex at narrowest a little more than half head width. Inner eye margins, vertex, and frons below toruli with a few sparse, moderately long setae, each hardly longer than diameter of an ocellus. Antennal toruli situated about midway between median suture and mouth margin, their lower margins level with lowest eye margin, each separated from median suture and from other torulus by about 1.25X its own length. Lower part of head with a pair of internal channels or grooves connecting antennal toruli to mouth at clypeus (Fig. 20). Antenna: radicle fused to scape and about one-tenth as long; scape slightly broadened, reaching above level of vertex by slightly less than half its length; pedicel subconical; funicle 6-segmented, each segment about as long as broad; clava relatively large, not much shorter than funicle, 3-segmented; longitudinal sensilla present on 3rd and 5th funicle segments and clava; antennal setae moderately long, the longest not or hardly longer than diameter of segment of origin. Mandibles small, unidentate, not quite meeting centrally.

THORAX in side view dorsally moderately flat, in dorsal view with pronotum visible dorsally. Pronotum short;

anterior margin without a carina, not longitudinally divided medially; posterior margin strongly concave, with 2 pairs of long setae; prosternum longitudinally divided by a suture; pronotal setae long. Mesoscutum nearly twice as long as broad; mesothoracic spiracle at posterolateral corner of pronotum, flush with pronotum, its opening unmodified; notaular lines distinct, not interrupted, more or less straight. Axillar setae extremely short. Scutellum about one-half longer than mesoscutum, one-quarter longer than wide, without a posteriorly projecting median ridge, medially with posterior scutellum about twice as long as anterior scutellum. Metanotum one-quarter as long as scutellum. Propodeum long, but with posterior margin indistinct; propodeal seta nearly at posterolateral margin of propodeum. Wings fully developed. Forewing about 4.5X as long as broad; discal setae moderately dense except proximad of apex of venation, where there are fewer than 10; venation reaching about two-fifths along forewing; marginal vein short; marginal fringe at longest about two-thirds maximum wing width. Hindwing only slightly shorter than forewing, about 13X as long as broad; blade margins subparallel; disc with 1 or 2 lines of setae; marginal fringe a little more than 4X as long as maximum wing width; venation reaching to about one-third along wing. Phragma clearly projecting into base of gaster. Middle and hind coxae smooth. Foretibia without a basal tooth, with only 1 pair of subapical sensilla basiconica; spur bifurcate, without lateral branches; fore and hind tibiae about 4X as long as broad; middle tibia about 5X as long as broad. Tarsi 4-segmented; 1st segment subequal in length to 2nd; claws relatively short, not quite as long as width of empodium.

GASTER distinctly longer than thorax, sessile; petiole about half as wide as propodeum. Gastral spiracle absent. Cerci well separated, each with 2 setae of equal length. Hypopygium reaching to about halfway along gaster. Ovipositor clearly shorter than gaster, about as long as middle tibia.

Male. Except for head, antennae, and genitalia essentially as female. Head seemingly enlarged, but only about one-quarter wider than thorax. Eyes relatively small, separated from occipital margin by nearly twice the diameter of an ocellus. Occipital margin clearly visible lateral to eyes when head viewed frontally. Frontoververtex at narrowest nearly three-fifths head width. Ocelli in a slightly obtuse angle. Antennal toruli connected to mouth by a pair of bulging ridges, each appearing to contain an internal channel or groove. Antenna: scape slightly broadened, reaching slightly above level of vertex; pedicel subcylindrical; flagellum 11-segmented, the segments subequal in size; longest setae about as long as diameter of segment of origin; longitudinal sensilla present on all segments of flagellum.

Mandible very large, with 3 small teeth, the upper one broad and rounded apically. Genitalia with phallobase relatively broad; aedeagus slightly more than one-third as long as middle tibia.

Remarks. The structure of the wings and thorax and the presence of the internal channels from the antennal toruli to the mouth margin suggest a close affinity with *Anagrus*. *Allanagrus* can be separated from this genus by the greatly enlarged, three-segmented clava in the female and the distinctly broader forewings, the dimensions of the eyes in the male, sexual dimorphism in head shape and size of mandibles, and the much more simple genitalia of the male.

Found in New Zealand only; one species is known.

Allanagrus magniclava new species

Figures 20–26

Female. Length range 0.49–0.75 mm ($n = 39$); holotype about 0.67 mm. Body generally testaceous brown; sutures of thorax darker, dusky brown; base of gaster slightly tinged with orange. Antennae yellowish testaceous; apical segments darker; clava dusky greyish brown. Forewings lightly suffused greyish brown from base to about half way, almost hyaline, remainder hyaline.

HEAD (Fig. 20) with shallow, engraved, rugose, reticulate sculpture on frontovertex; sculpture shallower and almost indiscernible on parts of face below antennal toruli. A single seta situated between each posterior ocellus and anterior ocellus; a pair of inward-directed setae between antennal toruli, and several scattered setae on lower parts of face. Internal 'channels' between toruli and mouth margin converging slightly (Fig. 20); hairs on eyes about as long as diameter of facet. Relative dimensions of head (holotype): maximum head width 80; frontovertex width at median suture 48; head length (frontal view) 53; scape length 21, maximum width 7; other proportions of antennae as in Fig. 21.

THORAX (Fig. 22) with shallow, rugose sculpture on pronotum; mesoscutum centrally with slightly longitudinally elongate, shallow, reticulate sculpture, more regularly reticulate laterally; anterior scutellum with similar sculpture to centre of mesoscutum, but of smaller mesh; posterior scutellum and metanotum with very irregular, shallow, longitudinally rugose sculpture. Setation of dorsum, Fig. 22. Wings, Fig. 23.

GASTER about one-quarter longer than thorax (including propodeum). Relative lengths (holotype): ovipositor 52 [middle tibia 54].

Male. Length range 0.62–0.84 mm ($n = 14$). Similar in

coloration to female, but antennae uniformly testaceous, and legs a little paler, being whitish yellow.

HEAD in frontal view, Fig. 24; antennae, Fig. 25. Sculpture more or less totally absent. Relative dimensions (paratype 1): minimum frontovertex width 48; malar space 18; eye length 26, width 19.5; scape length 19.5, maximum width 10; other proportions of antennae as in Fig. 25.

THORAX essentially as in female.

GASTER. Genitalia, Fig. 26. Relative lengths (paratype 2): aedeagus 30 [middle tibia 89].

Type data. **Holotype:** female, AK, Titirangi, Malaise trap, April 1980, P.A. Maddison (NZAC).

Paratypes (53 females, 18 males) from the following localities: ND – Waipoua State Forest; AK – Huia, Titirangi, Birkenhead, Massey, Lynfield; HB – Napier (Bluff Hill).

Material examined. Type series only (NZAC, BMNH, USNM, CNCI, ANIC).

ND, AK, HB / —.

Habitats noted: second-growth bush, garden,
Adults collected January–July.

Biology. Unknown.

Remarks. We have not seen any other species belonging to this genus.

Allarescon new genus

Figures 27, 28; key couplet – female 74

Type species *Allarescon ochroceras* new species.

Generally fairly slender species.

Female. **HEAD** in side view strongly angled inwards below antennal toruli. Frontovertex flattened, forming an angle of about 50–60° with flattened lower parts of face below toruli. Area above occipital foramen without a semicircular ridge. Occipital margin not sharp, more or less rounded, moderately convex in dorsal view. Stemmaticum and occipital and coronal sutures absent. Ocelli forming an angle of slightly more than 90°. Eye moderately large, separated from occipital margin by at least the diameter of a facet, with short, inconspicuous hairs, none of them longer than the diameter of a facet. Frontovertex at anterior ocellus about two-fifths head width, at narrowest (in ventral aspect) a little less than half head width. A few sparse setae on vertex near ocelli, not longer than 1.5X the diameter of an ocellus; a pair of long setae between antennal

toruli. Antennal toruli separated by slightly more than their own diameter. Antenna: radicle separate, about one-seventh as long as scape; scape long, cylindrical, reaching well above level of vertex, only slightly shorter than maximum head width; pedicel conical; funicle 6-segmented, the segments at least twice as long as broad; clava 3-segmented, with a pair of very long sensory setae on apical segment (Fig. 27); longitudinal sensilla present on all flagellar segments except the first. Mandibles much reduced, separated from each other by at least about their own length, devoid of teeth.

THORAX in side view dorsally flat, with mesoscutum anteriorly convex and propodeum slightly angled downwards from scutellum. Pronotum not divided medially; posterior margin very concave; anterior margin without a carina; pronotal setae relatively short; prosternum divided by a longitudinal suture. Mesoscutum a little more than 1.5X as broad as long; spiracles not visible; notaular lines deeply impressed, straight, not interrupted. Axillar setae relatively short. Scutellum without a median, posteriorly projecting ridge, about as long as mesoscutum. Metanotum nearly half as long as scutellum. Propodeum about two-thirds as long as scutellum; spiracle separated from anterior margin by about its own diameter. Disc of mesoscutum devoid of setae; scutellum, axillae, and metanotum each with a pair of short setae. Wings fully developed. Forewing slender, with subparallel margins, slightly more than 5X as long as broad; discal setae moderately dense and evenly distributed, but only 5 or 6 setae present proximad of marginal vein; marginal fringe at least about 1.5X as long as maximum wing width; marginal vein long, only slightly shorter than submarginal, with apex of venation reaching nearly two-thirds along wing. Hindwing slightly longer than two-thirds of forewing, gradually tapering from apex of venation, more than 20X as long as its greatest breadth; marginal fringe nearly 5X as long as maximum wing width; discal setae in 2 lines distad of venation, which reaches a little more than two-fifths along wing. Phragma reaching posterior margin of propodeum. Middle and hind coxae smooth, without denticles. Femora about 5–6X as long as broad. Foretibia without a basal tooth, with a pair of subapical sensilla basiconica; spur simple, without teeth. Tarsi 4-segmented; basal segment subequal to 2nd segment; claws short, not longer than width of empodium.

GASTER petiolate, a little shorter than thorax, with ovipositor slightly exerted apically; petiole about as long as broad; 1st tergite about twice as long as any succeeding one, all of which are subequal. Gastral spiracle absent. Cerci well separated, each with 4 setae, one a little shorter than the others. Hypopygium reaching to about halfway along gaster. Ovipositor about four-fifths as long as middle tibia, or nearly as long as gaster;

Male. Unknown.

Remarks. *Allarescon* is superficially like *Arescon*, since there are similarities in the forewing venation and thorax, but the four-segmented condition of the tarsi suggests that it may belong to the *Australomymar* group of genera. Females of *Allarescon* can be separated from females of all other genera in this group by the peculiar long setae arising from the apical segment of the clava.

Found in New Zealand only; one or perhaps two species are known.

Allarescon ochroceras new species

Figures 27, 28

Female. Length range 0.43–0.63 mm ($n=26$); holotype about 0.55 mm. Head dark brown or black. Antennae pale testaceous brown; clava occasionally whitish or distinctly pale. Thorax and legs pale testaceous brown; forewings infumate pale greyish brown. Gaster dark brown.

HEAD above median suture with shallow, engraved, reticulate sculpture; below this, sculpture very much shallower and of slightly longer mesh. A pair of moderately long setae present between antennal toruli, and another between posterior ocelli; a long seta present on either side of anterior ocellus near eye margin. POL:OOL approximately 12:10. Relative dimensions (holotype): maximum head width 61; frontovertex width at median suture 35; scape length 52, maximum width 5.5; other proportions of antennae as in Fig. 27.

THORAX. Mesoscutum with longitudinally elongate reticulate sculpture; propodeum with reticulate sculpture of about the same depth; scutellum with very shallow, relatively indistinct, reticulate sculpture. Wings, Fig. 28.

GASTER. Relative lengths (holotype): ovipositor 67; gonostylus 27; middle tibia 83.

Male. Unknown.

Type data. **Holotype:** female, AK, Titirangi, August 1980, P.A. Maddison (NZAC).

Paratypes (29 females) from the following localities: AK – Titirangi, Laingholm, Lynfield; BP – Lake Rotoiti Reserve, Horohoro State Forest; TO – Kaimanawa North Forest Park; BR/NN – Inangahua; KA – Kaikoura (Puhipuhi Valley); MC – Sharplin Falls; FD – Darran Mountains (Tutoko Bench); SL – Dolamore Park.

Material examined. Type series only (NZAC, BMNH, USNM, CNCI, ANIC).

AK, BP, TO / BR, NN, MC, FD, SL.

Habitats noted: *Podocarpus* forest, beech forest, garden, moss, litter.

Adults collected in all months except June, November, December.

Biology. Unknown.

Remarks. A single specimen from Prices Valley, Banks Peninsula MC may represent a second species, differing from *ochroceras* in having the setae on the forewing more sparse, with a naked area between the apex of the venation and the wing apex.

Genus *Anagroidea* Girault

Figures 29–34

Key couplets – female 24, 56, male 27, 90

Anagroidea Girault, 1915a: 164. Type species *Eustochus dubius* Girault, 1913b; Australia.

Dahmsia Doutt, 1975: 254–256. Type species *Dahmsia australiensis* Doutt, 1975; Australia. **New synonymy.**

Diagnosis. Female. Length about 0.80–1.05 mm. Head (Fig. 29, 30) with a pair of transverse carinae across either side of face below antennal toruli, which are inserted very close to median suture; below carinae, face strongly sculptured or smooth. Antenna (Fig. 31): scape moderately long; funicle 6-segmented, the 1st segment longer than any other, about as long as the elongate pedicel; clava large, elongate. Mandibles elongate, clearly visible in card-mounted material, each with 2 or 3 acute apical teeth. Wings (Fig. 32) often shortened. Fully developed forewing relatively broad, not more than 4x as long as broad; marginal vein less than one-third as long as submarginal, twice as long as stigmal; venation not quite reaching halfway along wing. Hindwing broad, not more than about 7x as long as broad; membrane more or less reaching base of wing (Fig. 34b). Gaster about as long as head and thorax together, subsessile; petiole about one-fifth as wide as propodeum; 1st tergite long, covering at least half of gaster. Ovipositor not or hardly exerted. Hypopygium reaching apex of gaster.

Male. Length about 0.65–0.85 mm. Very similar in general appearance to female, but antenna (Fig. 33) filiform, with an 11-segmented flagellum, the segments subequal. Wings, Fig. 34. Genitalia simple.

Biology. Unknown.

Remarks. We have not examined the holotype of *Dahmsia australiensis* Doutt (QMBA), but it is clear from

Doutt's description that the species belongs to *Anagroidea*.

World status: three species; Oriental and Australasian regions.

New Zealand: possibly as many as four undescribed species; North, South, and Three Kings islands.

Genus *Anagrus* Haliday

Figures 35, 36

Key couplets – female 53, male 83

Anagrus Haliday, 1833: 346. Type species *Ichneumon atomus* Linnaeus, 1767; Europe.

Diagnosis. Female. Length (excluding ovipositor) about 0.35–0.80 mm. Antennal toruli each joined to mouth margin by a membranous line. Antenna (Fig. 35): scape moderately short, not more than about 3x as long as broad; funicle 6-segmented; clava solid. Thorax with axillae advanced into side lobes of mesoscutum; posterior scutellum divided by a longitudinal sulcus, medially not more than twice as long as anterior scutellum. Phragma projecting well into base of gaster. Wings always fully developed. Forewing (Fig. 36) normally at least about 6.5x as long as broad, abruptly narrowed distad of venation; venation not reaching more than one-third along wing; marginal vein very short, forming a more or less smooth, sigmoid curve with stigmal vein; hypochaeta proximad of macrochaetae on distal part of venation (Fig. 36); marginal fringe long, considerably longer than maximum wing width. Tarsi 4-segmented. Gaster sessile; petiole at least about two-thirds as wide as propodeum; ovipositor occasionally strongly exerted.

Male. Length about 0.35–0.65 mm. Generally very similar to female, but flagellum filiform, 11-segmented, with all segments subequal in size and longer than broad.

Biology. *A. armatus* is a common parasitoid of the eggs of the apple leafhopper, *Typhlocyba froggatti* Baker (Homoptera: Cicadellidae) (Dumbleton 1934, 1937; Teulon & Penman 1986). None of the other New Zealand species has been reared, but elsewhere species have been recorded from the eggs of other families of Homoptera and Heteroptera, and also reported as parasitising eggs of Lepidoptera and Diptera. The immature stages of *A. armatus* have been described by Dumbleton (1934).

Remarks. *Anagrus* is very close to *Stethynium*, but we maintain them here as distinct genera. They have been separated on a number of characters by Schauff (1984), viz segmentation of the clava (entire in *Anagrus*, three-segmented in *Stethynium*), relative position of the hypo-

chaeta (basad of distal macrochaetae on venation in *Anagrus*, between these microchaetae in *Stethynium*), and position of the axillae in relation to the mesoscutum (advanced into side lobes of mesoscutum in *Anagrus*, not advanced in *Stethynium*). The length of the posterior scutellum relative to the anterior scutellum can also be used to separate the two genera (more than twice as long as anterior scutellum in *Stethynium*). However, at least one New Zealand species has a combination of characters intermediate between the two genera, viz female clava two-segmented, suture incomplete, and hypochaeta about level with proximal macrochaeta on distal part of venation. This species we place in *Stethynium* because the axillae are not advanced into the side lobe of the mesoscutum and the posterior scutellum is slightly more than twice as long as the anterior scutellum.

Taxonomy: Debauche (1948), Soyka (1956b), Walker (1979), Graham (1982), Schauff (1984).

World status: 78 species, many probably synonymous; cosmopolitan.

New Zealand: about six species, *A. armatus* (Ashmead) and five others, all undetermined; North and South islands.

Genus *Anaphes* Haliday

Figures 37–42

Key couplets – female 20, 59, 65, 72, male 30, 93

Anaphes Haliday, 1833: 346. Type species *Ichneumon punctum* Shaw, 1798; Europe.

Diagnosis. Female (Fig. 39). Length about 0.4–0.8 mm. Antenna (Fig. 37, 38): scape short, not more than about 4x as long as wide; funicle 6-segmented, the 1st segment often conspicuously shorter; clava entire, 2- or 3-segmented, the sutures sometimes incomplete. Wings occasionally shortened. Fully developed forewing (Fig. 40a) from about 2.5x to about 6x as long as broad; venation reaching not more than about one-third along wing; marginal vein short, forming a more or less sigmoid curve with postmarginal; discal setae often forming a conspicuous line from distal part of submarginal vein to posterior wing margin near marginal fringe, this most often distinct in narrower-winged species; a single, suberect, dorsal discal seta immediately proximad of marginal setae on posterior wing margin (Fig. 40b). Tarsi 4-segmented. Phragma not or hardly projecting past posterior margin of propodeum. Propodeum with a median longitudinal sulcus. Gaster sessile, the ventral part often projecting anteriorly between coxae (Fig. 39); petiole not more than about one-third as wide as propodeum; ovipositor not or hardly exerted.

Male. Length about 0.40–0.80 mm. Similar in general appearance to female, but antenna (Fig. 42) with flagellum filiform, 11-segmented, the 1st segment often very short, and all others usually subequal. Head, Fig. 41.

Biology. The host is known only for *A. nitens* (see below), the biology of which has been described in detail by Clark (1931). Elsewhere species have been recorded as parasitoids of the eggs of Coleoptera, Hemiptera, Diptera, and Lepidoptera.

Remarks. The single erect seta basad of the posterior marginal fringe of the forewing seems to be unique to this genus. All macropterous species we have examined from all parts of the world and placed in *Anaphes* by us and others have this feature. Many New Zealand species which we place in *Anaphes* have a three-segmented clava, a character which seems to be unique to New Zealand. We do not think that the presence of a second suture in the clava of these species warrants their separate generic status, especially so when several specimens we have examined have this second suture incomplete and sometimes almost absent.

Taxonomy: Debauche (1948), Soyka (1949, 1953, 1954–55).

World status: well over 200 described species; cosmopolitan.

New Zealand: at least eighteen species, including *Anaphes nitens* (Girault), introduced to control *Gonipterus scutellatus* Gyllenhal on *Eucalyptus* species. The remaining species are all undetermined.

Apoxypteron new genus

Figures 43–45; key couplet – female 67

Type species *Apoxypteron grandiscapus* new species.

Generally slender, dorsoventrally flattened species.

Female. HEAD in side view opisthognathous, strongly angled inwards just below antennal toruli, distinctly flattened dorsoventrally, in dorsal view slightly longer than broad, subrectangular; occipital margin sharp; posterior margin more or less straight in dorsal view. Stemmaticum absent. Ocelli forming a more or less right-angled triangle; posterior ocellus separated from occipital margin by about its own diameter; anterior ocellus only slightly more than one-third of distance from occipital margin to median suture. Eye relatively small, separated from occipital margin by at least about 3x the diameter of a posterior ocellus, less

than half as long as head in dorsal view, with a few relatively long, distinct bristles, separated from angle and from face by nearly its own length. Frontoververtex about four-fifths as wide as head. Inner eye margins and vertex (particularly between eyes, occipital margin, and posterior ocelli) beset with very long, thick bristles, the longest slightly more than half length of scape, or nearly half as long as minimum width of frontoververtex (Fig. 43). Antennal toruli almost touching facial angle, hardly separated from median suture. Antenna: radicle free, about one-quarter as long as scape; scape very stout, only about twice as long as broad, only slightly more than half as long as maximum head width; pedicel conical, a little more than half as long as scape; funicle 6-segmented; clava 2-segmented; longitudinal sensilla usually present on all but the first 2 or 3 flagellar segments; antennal setation conspicuous, moderately long. Mandibles minute, not meeting in middle.

THORAX dorsoventrally flattened. Pronotum very short, not longitudinally divided, only just visible in dorsal view; posterior margin very concave; anterior margin without a carina; pronotal setae moderately long; prosternum without a longitudinal suture. Mesoscutum about one-quarter wider than long; posterior margin convex, produced between axillae, so that they appear to be distinctly advanced forward; mesothoracic spiracle at posterolateral corner of pronotum, its opening unmodified and flush with surface of pronotum; notaular lines not interrupted. Axillar setae moderately long. Scutellum short, less than half as long as mesoscutum, without a posteriorly projecting median ridge, very nearly twice as broad as long; posterior half greatly reduced, only about half as long as anterior scutellum. Metanotum nearly two-thirds as long as scutellum; metanotal setae relatively large and distinct. Propodeum about as long as scutellum; propodeal seta much nearer to posterior margin than to spiracle. Forewing long, distinctly longer than body, slender, about 12X as long as broad, gradually tapering distad of venation to an acute apex; marginal fringe more than 3X as long as greatest width of wing; setae in disc moderately dense, but setae totally absent near base of wing; venation reaching to nearly halfway along wing; marginal vein several times longer than broad. Hindwing a little shorter than forewing, about 20X as long as its greatest width; margins subparallel distad of venation, but gradually tapering to a fairly acute apex; venation not quite reaching to one-third along wing; marginal fringe about 5X as long as greatest width of wing; setae in disc fairly dense and scattered. Phragma only just reaching level with posterior margin of propodeum. Legs rather short and squat. Femora not more than 3X as long as broad. Middle coxae smooth; hind coxae with sparse denticles. Foretibia without a basal tooth, with a single sensillum basiconicum immediately distad of spur, rela-

tively long and forked, with a few short lateral branches. Tarsi 4-segmented; basal segments a little longer than 2nd segments; claws not longer than width of empodium;

GASTER a little longer than thorax, subpetiolate; petiole ring-like; gastral tergites (except the last) subequal; 1st tergite slightly larger than any following, and last tergite distinctly narrower. Gastral spiracle absent. Cerci well separated, each with 2 bristles. Hypopygium with apex about one-third along gaster. Ovipositor about two-thirds as long as gaster, or about twice as long as middle tibia.

Male. Unknown.

Remarks. *Apoxypteran* belongs to the *Australomyar* group of genera, and can be separated from other genera of this group by the shape of the head and the rather narrow, tapering forewing. It is similar in appearance to *Haplochaeta*, but can be distinguished by the relatively long marginal vein, shape of the head, and small mandibles.

Found in New Zealand only; one species is known.

Apoxypteran grandiscapus new species

Figures 43–45

Female. Length range 0.59–0.66 mm ($n=6$); holotype about 0.65 mm. Generally dark shining brown; legs testaceous; forewing hyaline, but very slightly suffused with greyish-brown.

HEAD (Fig. 43) with very shallow, rugose-reticulate sculpture on frontoververtex, most distinct near ocelli and immediately above median suture; between anterior ocellus and this suture almost totally smooth. Two pairs of setae on frontoververtex, one near inner margin of each posterior ocellus, the other near inner eye margins, between angle of head and occipital margin; 2 pairs of bristles between antennal toruli, and a line of 4 or 5 strong bristles between eye and angle of head. Posterior ocellus separated from occipital margin by about its own diameter, and from eye margin by about 3X its own diameter. Relative dimensions (holotype): maximum head width 34; minimum frontoververtex width 27; head length (dorsal view) 35; eye length (dorsal view) 13.5; distance from anterior eye margin to angle of face 14.5; POL 12; OOL 6.5; scape length 23; other proportions of antenna as in Fig. 44.

THORAX smooth, devoid of sculpture. A single pair of setae in disc of mesoscutum, in anterior half; axillae and scutellum each with a pair of long bristles. Wings, Fig. 45.

GASTER. Relative lengths (holotype): ovipositor 54; gonostylus 15 [middle tibia 26].

Male. Unknown.

Type data. Holotype: female, AK, Lynfield, January 1981, G. Kuschel (NZAC).

Paratypes (6 females) from the following localities: AK – Lynfield, Birkenhead.

Material examined. Type series only (NZAC, BMNH). AK / —.

Habitats noted: second-growth bush.

Adults collected January–March.

Biology. Unknown.

Genus *Arescon* Walker

Figures 8, 46–48; key couplet 33

Arescon Walker, 1846: 49. Type species *Mymar dimidiatus* Walker in Curtis, 1832; England.

Diagnosis. Female. Length (excluding ovipositor) about 0.5–0.8 mm. Head in side view more or less evenly curved anteriorly. Antenna (Fig. 46): scape moderately long; funicle 5-segmented, the 1st segment usually shortest; clava solid. Wings fully developed. Forewing at least about 4x as long as broad; venation reaching at least about two-thirds along wing; marginal vein much longer than submarginal (Fig. 8, 47). Hindwing long, slender, at least about 20x as long as broad. Phragma not reaching past posterior margin of propodeum. Tarsi 4-segmented. Gaster subsessile to subpetiolate; petiole at most about one-third as broad as propodeum. Hypopygium reaching or not reaching apex of gaster. Ovipositor varying from hardly to strongly exerted.

Male. Length about 0.5–0.8 mm. Generally very similar to female, but antenna (Fig. 48) with flagellum 11-segmented, the segments subequal or the 1st conspicuously shorter.

Biology. Not known; elsewhere recorded as parasitoids of eggs of Cicadellidae (Homoptera), and doubtfully also from eggs of Diaspididae (Homoptera).

Remarks. One of the New Zealand species is unusual in having the hypopygium elongate and reaching the apex of the gaster, as in *Erythmelus*, but we do not consider this character to be sufficiently important for separate generic status.

World status: eighteen species; cosmopolitan.

New Zealand: two species, both unidentified; North and South islands.

Genus *Australomymar* Girault

Figures 49–56

Key couplets – female 19, 49, male 28, 89

Australomymar Girault, 1929a: 343. Type species *Australomymar aurigerum* Girault, 1929a; Australia.

Diagnosis. Female (Fig. 49–51). Length (excluding ovipositor) about 0.75–4.50 mm. Head more or less evenly curved anteriorly in profile. Antenna (Fig. 52): radicle often long, occasionally more than half length of scape; scape relatively long; funicle 6-segmented; clava solid. Wings (Fig. 53, 54) usually fully developed, although some species with shortened wings are known. Fully developed forewing at least about 3x as long as broad; marginal vein about as long as submarginal; postmarginal vein generally at least about half as long as marginal, although sometimes rather weakly indicated; a diagonal, curved fold in membrane normally present from apex of stigmal vein to posterior wing margin. Hindwing narrow, at least about 17x as long as broad. Phragma not extending past posterior margin of propodeum. Tarsi 4-segmented. Gaster longer than head and thorax together, subpetiolate; petiole about one-quarter as wide as propodeum. Ovipositor normally strongly exerted.

Male. Length about 0.75–2.75 mm. Generally similar to female, but head relatively larger, with smaller eyes, and antenna (Fig. 56) with flagellum 11-segmented, the segments subequal. Head and thorax, Fig. 55.

Biology. Unknown, but their size suggests that these mymarids might be parasitic in eggs of wetas or related insects (Orthoptera), or possibly cicadas (Homoptera).

Remarks. Two of the New Zealand species of *Australomymar* are probably amongst the largest mymarids known (Fig. 49, 50), both being well over 4 mm long, excluding the ovipositor. Both differ from other species of *Australomymar* and from each other in the peculiar structure of the ovipositor and gaster (cf. Fig. 49–51), but we do not consider this to be of generic value.

Taxonomy: New (1974).

World status: one described species; Australia. Several undescribed species are known from the Neotropical region and various parts of S.E. Asia.

New Zealand: eighteen species, all undescribed; North, South, Chatham, and Three Kings islands.

Genus *Camptoptera* Förster

Figures 57–62; key couplets 4, 39

Camptoptera Förster, 1856: 116, 119, 144. Type species
Camptoptera papaveris Förster, 1856; Germany.

Diagnosis. Female. Length about 0.25–0.65 mm. Head varying from smoothly rounded anteriorly to angular in profile. Antenna (Fig. 57): scape varying from relatively short to relatively long, i.e., from much shorter to much longer than width of head; funicle 7-segmented, the 2nd segment a very short ring-joint; clava solid. Wings (Fig. 58–60) frequently reduced or shortened, often represented by bristles only. Fully developed forewing relatively slender and normally recurved apically; marginal vein very short, forming a sigmoidal curve with submarginal and stigmal veins; venation not reaching as much as one-third along wing. Hindwing very narrow, at least about 20x as long as broad. Phragma not projecting past posterior margin of propodeum. Tarsi 5-segmented. Gaster normally longer than thorax, petiolate; petiole normally at least about as long as broad, less than about one-third as wide as propodeum. Ovipositor not or hardly exerted.

Male. Length about 0.25–0.50 mm. Similar to female, but antenna (Fig. 61, 62) with flagellum 10-segmented, the 2nd segment and usually the 4th very short and ring-like, the other segments subequal.

Biology. None of the New Zealand species has been reared; elsewhere recorded as parasitoids of the eggs of Thysanoptera, Homoptera (Cicadellidae, Aleyrodidae), Lepidoptera, and Coleoptera (Buprestidae).

Remarks. The New Zealand species are morphologically diverse, some being very heavily sculptured and relatively squat, others being rather more elongate and very lightly sculptured. However, they all appear to belong to two distinct groups: (a) with head strongly angled inwards below antennal toruli, and scape relatively long, and (b) with head more gradually and evenly rounded anteriorly in profile, and scape relatively short. Further work may show that these groups should be given separate generic status, but for the present we include them all in *Camptoptera*.

Taxonomy: Debauche (1948), Soyka (1961), Taguchi (1971, 1972, 1977), Viggiani (1978).

World status: 63 species; cosmopolitan.

New Zealand: about 15 species, none identified; North, South, Snares, and Three Kings islands.

Ceratanaphes new genus

Figures 63–69

Key couplets – female 60, male 92

Type species *Ceratanaphes monticola* new species.

Fairly long, slender, slightly dorsoventrally flattened species.

Female. HEAD distinctly triangular in profile, angled inwards at an angle of about 70° just below antennal toruli; face below this and frontovertex above this more or less flat. Area above occipital foramen without a semicircular ridge. Stemmaticum absent; occipital suture present, coronal suture absent. Ocelli in an obtuse angle of about 110°, the posterior ones separated from occipital margin by no more than their own diameter. Eye naked, moderately large, more or less reaching occipital margin, which is sharp and straight or slightly convex in dorsal view. Inner eye margins and frontovertex with rather short, inconspicuous setae. Antennal toruli separated from mouth margin by about 4x their own diameter, each also more or less connected to mouth margin by an external groove (Fig. 65), and each separated from eye margin by about twice its own diameter; a pair of horn-like protuberances anterolateral to each torulus, clearly visible in dorsal view (Fig. 64); toruli separated from each other by a little more than their own major diameter. Antenna very nearly as long as body; radicle free, about one-seventh as long as scape; scape subcylindrical, fairly long, distinctly reaching past occipital margin, about as long as head in dorsal view; pedicel subconical; funicle 6-segmented, the segments at least twice as long as broad; clava solid; longitudinal sensilla present on funicle segments 4–6 and clava; antennae with very short, inconspicuous setae, appearing almost naked. Mandibles of moderate size, narrow, each with a pair of apical teeth.

THORAX conspicuously flattened dorsoventrally. Pronotum clearly visible in dorsal view, very clearly divided medially, strongly incised posteromedially, its anterior margin not ridged; prosternum not longitudinally divided; pronotal setae moderately long. Mesoscutum about one-quarter broader than long; mesothoracic spiracle at posterolateral corner of pronotum, its opening unmodified and flush with surface of pronotum; notaular lines straight, well impressed, not interrupted. Axillar setae short. Scutellum about as long as broad, without a posteriorly projecting median ridge; anterior part slightly shorter than posterior part; posterior margin square. Anterior scutellum devoid of setae; mesoscutum with a pair of setae in disc. Metanotum a little shorter than anterior scutellum. Propodeum about three-quarters as long as scutellum; propodeal seta about

midway between spiracle and posterior margin. Forewing about 5.5X as long as broad; discal setae moderately dense in apical half but very sparse basally, more or less absent basad of apex of venation, which is just less than one-third along wing; marginal fringe a little longer than maximum width of wing. Hindwing a little shorter than forewing, slightly wider subapically than distad of apex of venation, about 1.5X as long as broad; discal setae moderately dense, but markedly less so towards base of wing; marginal setae 3X as long as maximum wing width; venation reaching a little less than one-third along wing. Phragma not quite reaching posterior margin of propodeum. Middle and hind coxae smooth, without denticles. Femora about 4.0–4.5X as long as broad. Foretibia without a basal tooth, but with a pair of sensilla basiconica; spur forked, unbranched. Tarsi 4-segmented; 1st segment much longer than 2nd; claws very short, not as long as width of empodium.

GASTER about twice as long as thorax, laterally compressed, subpetiolate; petiole distinctly transverse, about one-third width of propodeum; tergites 2–5 subequal; 1st tergite distinctly smaller. Gastral spiracle absent. Cerci separated by less than half their own diameter, each with 4 bristles, 2 in middle, 2 on posterior margin. Hypopygium reaching apex of gaster. Ovipositor about half as long as gaster, or nearly twice as long as middle tibia.

Male. Essentially as for female, but antennae filiform, 13-segmented, with radicle about one-third as long as scape. Aedeagus about two-thirds as long as middle tibia to nearly as long; digiti each armed with 4 apical teeth, otherwise simple.

Remarks. *Ceratanaphes* belongs to the *Anaphes* group of genera, and would probably run to *Erythmelus* Enock in Annecke & Doutt (1961) because the hypopygium reaches the apex of the gaster. It does not appear to be closely related to this genus, and can be distinguished by the shape of the head (anteriorly rounded in profile in *Erythmelus*) and the relatively short ovipositor (nearly as long as the gaster in *Erythmelus*). The structure of the gaster is also very different, in *Erythmelus* being of the more usual mymarid form, with the hypopygium elongate and prominent, whereas in *Ceratanaphes* all the tergites and sternites are subequal in size.

Only one species is known in New Zealand. *Ceratanaphes* is also found in Queensland and South Australia. The Australian material (BMNH) is very close to the New Zealand species, differing mainly in the relatively longer aedeagus in the male (about as long as the middle tibia), the relatively narrower forewings, and the relatively longer scape in the female (slightly less than one-third as long as flagellum).

Ceratanaphes monticola new species

Figures 63–69

Female. Length of holotype 1.08 mm. Dark brown, nearly black, shiny. Scape slightly paler; pedicel basally dark brown, apically testaceous brown; remainder of antenna dark brown. Legs brown except for femora and tibiae at apex and base and foretibia and tarsi, which are testaceous. Wings hyaline.

HEAD (Fig. 63–65) with very shallow, transverse, rugose-reticulate sculpture on frontovertex above median suture; sculpture between eyes and inner orbital sutures similar, but rather more longitudinally elongate. A pair of setae present between antennal toruli, and another pair at top of prominence between grooves joining toruli to mouth margin; 'teeth' below toruli with a pair of long setae on either side, each seta about half as long as a torulus. Posterior ocellus touching occipital margin. Relative dimensions: head width 35; minimum frontovertex width, 18.5; head length (dorsal view) 36; eye length 21; malar space 10; POL 10; OOL 6; scape length 24, width 5; other proportions of antenna as in Fig. 66.

THORAX. Pronotum with very shallow, longitudinal, rugose-reticulate sculpture; a few scattered setae, and a pair on posterior margin at either side. Mesoscutum with very shallow, squamiform-reticulate sculpture, and a pair of setae in posterior one-third of disc. Scutellum smooth. Forewing similar to that illustrated for male (Fig. 68).

GASTER a little longer than head and thorax together; all tergites subequal in length, but gradually narrowing after the 4th; first 4 tergites, except basal half of 1st, with conspicuous striate sculpture.

Male. Length range 0.79–0.95 mm ($n=10$). Similar in general appearance to female. Relative dimensions: head width 86; minimum frontovertex width 54; scape length 45, maximum width 13; middle tibia length 93; aedeagus length 70. Antenna as in Fig. 67, but with flagellar setae moderately dense and very short, each not more than half as long as diameter of segment of origin. Forewing, Fig. 68. Genitalia, Fig. 69.

Type data. **Holotype:** female, OL, Coronet Peak, 1640 m, tussock, alpine shrubs, *Hebe*, mat plants, January 1981, swept, J.S. Noyes & E.W. Valentine (NZAC).

Paratypes (12 males) from the following localities: OL – Coronet Peak, Crown Peak; CO – Watts Rock.

Material examined. Type series only (BMNH, NZAC). — / OL, CO.

Habitats noted: tussock, alpine shrubs and herbs, mat plants, *Hebe*, grasses, *Juncus*, and *Sphagnum*, all at alti-

tudes of 1200 m or above.

Adults collected in January.

Biology. Unknown.

Genus *Cleruchus* Enock

Figures 70–73

Key couplets – female 13, 55, 68, male 78

Cleruchus Enock, 1909: 453. Type species *Cleruchus pluteus* Enock, 1909; England.

Douttiella Annecke, 1961b: 71. Type species *Douttiella depressa* Annecke, 1961b; S. Africa. **New synonymy.**

Diagnosis. Female. Length about 0.45–0.65 mm. Head in profile sharply angled inwards below antennal toruli. Antenna (Fig. 70): scape clearly shorter than maximum width of head; funicle 6-segmented; clava solid or 2-segmented. Mandibles fairly large, meeting medially. Wings normally fully developed, but some brachypterous or apterous forms are known. Fully developed forewing (Fig. 72) at least about 10x as long as broad, nowhere broader than at marginal vein; venation not reaching more than about two-fifths along wing; marginal vein very short, forming a more or less smooth, sigmoid curve with distal part of submarginal vein and stigmal vein. Hindwing at least about 20x as long as broad. Metanotum poorly developed, normally not distinct from propodeum medially (Fig. 71). Tarsi 4-segmented. Phragma in winged forms projecting at least a little way into gaster. Gaster about as long as head and thorax together, varying from subsessile to almost petiolate; petiole about half as wide as propodeum. Ovipositor not or hardly exerted.

Male. Length about 0.45–0.65 mm. Similar to female, but antenna (Fig. 73) with flagellum 10-segmented. [The male of *fransseni* (Ogloblin), from Papua New Guinea and Java, has been reported as having an eleven-segmented flagellum and an enlarged head (Subba Rao 1968).]

Biology. Unknown, but adults associated with leaf litter and bracket fungi. Elsewhere recorded from eggs of Acrididae (Orthoptera).

Remarks. We have not examined any material of *Douttiella* Annecke, but from the original description it is clearly a junior synonym of *Cleruchus*. Many species included here are brachypterous or even apterous, and may belong to genera as yet undescribed. However, it is possible to place them in *Cleruchus* even though the lack of wings and often greatly reduced thorax makes this uncertain. One species, associated with *Gahnia* litter, apparently has fully

winged and completely apterous forms which differ from each other in the structure of the thorax. In the apterous form the thorax is simple, not unsimilar to that figured for *Notomyrmar* Doutt & Yoshimoto (1970), but in the macropterous form the thorax is normal for the genus.

Taxonomy: Debauche (1948).

World status: fourteen species; probably cosmopolitan.

New Zealand: at least eleven species, all unidentified and probably undescribed; North and South islands.

Cybomyrmar new genus

Figures 74, 75; key couplet – female 14

Type species *Cybomyrmar fasciifrons* new species.

Robust, strongly sclerotised species.

Female. HEAD in side view curved, but almost flat above median suture. Area above occipital foramen without a semicircular ridge. Occipital margin distinctly concave in dorsal view. Stemmaticum and occipital and coronal sutures absent. Ocelli forming an angle of about 110–120°, the posterior ones about equidistant from eye margins and occipital margin. Eyes long, oval, with a few short, inconspicuous setae not longer than the diameter of a facet, reaching occipital margin, which is sharp at this point but almost rounded medially; ventral margin of eyes almost straight; inner margins more or less parallel. Frontoververtex at narrowest about half maximum head width, with a few inconspicuous setae, particularly along inner eye margins and near ocelli. Malar space about half as long as eye; sulcus present. Antennae about level with lowest eye margin, nearer to mouth margin than to anterior ocellus; toruli separated from median suture and from eyes by clearly less than their own diameter, and from each other by about twice their own diameter; radicle free, about one-third as long as scape; scape distinctly flattened, about three-quarters as long as minimum width of frontoververtex, reaching to about level with anterior ocellus; pedicel subconical; funicle 4-segmented; clava entire. Mandibles tridentate, about one-third as long as minimum width of frontoververtex.

THORAX relatively robust and box-like, dorsally very flat from pronotum to propodeum. Pronotum clearly visible in dorsal view, not longitudinally divided, about as long as mesoscutum, which is about one-half longer than scutellum; anterior edge carinate; anterolateral margins acute; prothoracic spiracles not visible; pronotal setae small; prosternum divided by a longitudinal suture. Notaular lines interrupted, straight, sometimes indistinct. Axillar setae absent. Scutellum medially without a post-

eriorly projecting ridge. Propodeum about as long as mesoscutum and scutellum together. Sutures between all dorsal sclerites straight, parallel. Propodeum fused to metapleuron; posterior and lateral margins acutely angled downwards, straight; spiracles situated on outer face. Wings and phragma absent. Middle and hind coxae with rough sculpture, without denticles. Foretibia without a basal tooth, with 1 pair of subapical sensilla basiconica; spur unforked, unbranched. Forefemur about 2.5X as long as broad; middle femur about 3.5X as long as broad; hind femur about 3X as long as broad. Tarsi 4-segmented; 1st segment longer than 2nd, conspicuously so on foreleg; claws slightly shorter than width of empodium.

GASTER subsessile, slightly longer than head and thorax together; petiole about one-third as wide as propodeum; 1st tergite enlarged, covering about half of gaster in dorsal view. Gastral spiracle absent. Cerci well separated, minute, each with 3 subequal bristles. Gaster ventrally projecting forwards between all coxae. Ovipositor hardly projecting from apex of gaster, about 3X as long as middle tibia.

Male. Unknown.

Remarks. *Cybomyr* appears to be related to *Scleromyr*, and thus belongs to the *Australomyr* group of genera. It can be separated by the absence of wings and by the four-segmented funicle.

Only one species is known.

Cybomyr fasciifrons new species

Figures 74, 75

Female (Fig. 74). Length range 0.67–0.78 mm ($n=4$); holotype 0.78 mm. Head from yellowish to brownish orange, dark brown across median suture and lower margins of toruli; a paler band between eyes below toruli, occasionally continued to occiput; below this to mouth margin dark brown. Antenna with radicle, scape, and pedicel yellowish; first 2 or 3 segments of funicle brown, remainder pale yellow; clava brown, paler towards apex. Thorax and gaster orange-brown; gaster paler towards apex. Tarsi yellowish; pretarsi dark brown; remainder of legs brownish to yellowish testaceous.

HEAD. Frontoververtex almost smooth, but with very shallow, raised, reticulate sculpture of mesh slightly larger than diameter of ocelli; lower parts of face smooth, with very shallow, irregular sculpture. About 5 pairs of short setae on frontoververtex, and several along inner eye margins. Relative dimensions of head (holotype): maximum head width 39; minimum frontoververtex width 20; maximum eye length 23.5, width 15; malar space 12; POL 7.5; OOL 5; scape

length 14.5, maximum width 6; other proportions of antenna as in Fig. 75.

THORAX dorsally almost smooth, but with very shallow, raised, irregular sculpture except on pronotum and propodeum, where sculpture usually much more regular and reticulate, though still shallow. Pronotum, mesoscutum, and scutellum each with a pair of lateral setae. Thoracic pleura with irregular, raised sculpture distinctly deeper than that on dorsum.

GASTER with a ventral anterior projection reaching level with anterior margin of forecoxae. Relative lengths (paratype): ovipositor 57; gonostyli 12; middle tibia 17.5.

Male. Unknown.

Type data. Holotype female: AK, Lynfield, Malaise trap, 3 April 1979, G. Kuschel (NZAC).

Paratypes (5 females) from the following localities: ND – Poor Knights Is (Tawhiti Rahi); AK – Wattle Bay.

Material examined. Type series only (NZAC, BMNH). ND, AK / —.

Habitats noted: bush.

Adults collected March, April, December.

Biology. Unknown.

Genus *Dicopomorpha* Ogloblin

Figures 76–78; key couplet 37

Dicopomorpha Ogloblin, 1956: 387. Type species *Dicopomorpha macrocephala* Ogloblin, 1956; Argentina.

Diagnosis. Female. Length about 0.27–0.28 mm. Antenna (Fig. 76): scape without marginal teeth, relatively short, hardly longer than pedicel; funicle 7-segmented, all segments longer than broad except the 2nd, which is anelliform; clava solid. Mandibles moderately large, overlapping medially. Wings fully developed. Forewing (Fig. 77) at least about 8X as long as broad; posterior margin abruptly and strongly excised opposite stigmal vein (Fig. 77); venation reaching to about one-third along wing; marginal fringe long. Hindwing at least about 20X as long as broad. Tarsi 5-segmented. Phragma large, projecting well into gaster. Gaster broadly sessile; petiole well over half as wide as propodeum.

Male. Generally very similar to female, but antenna (Fig. 78) with funicle 10-segmented; 2nd segment anelliform, the remainder longer than broad, subequal.

Biology. Unknown.

Remarks. World status: one described species; Neotropics.

New Zealand: one undescribed species; North Island.

Genus *Dicopus* Enock

Figures 79–81; key couplet 37

Dicopus Enock, 1909: 455. Type species *Dicopus minusima* Enock, 1909; England.

Diagnosis. Female. Length about 0.22–0.40 mm. Antenna (Fig. 79): scape moderately long, usually with 2 or 3 setaceous teeth on ventral margin; funicle 7-segmented, the 2nd segment longer than broad, not or only slightly shorter than the 1st; clava entire. Mandibles blade-like, projecting downwards, meeting in middle but not overlapping. Wings fully developed. Forewing (Fig. 80) at least about 9–10X as long as broad; venation reaching about one-quarter along wing; posterior margin gently curving inwards opposite apex of marginal vein; marginal fringe long. Hindwing at least about 20X as long as broad. Tarsi 5-segmented. Phragma projecting well into gaster. Gaster broadly sessile; petiole over half as wide as propodeum.

Male. Length about 0.28–0.34 mm. Generally very similar to female, but antenna (Fig. 81) with flagellum 10-segmented; 2nd segment longer than broad, but often shorter than either 1st or 3rd segment.

Biology. Unknown.

Remarks. The New Zealand species of *Dicopus* are distinguishable from each other on wing shape and setation and relative measurements of the antennal segments.

Taxonomy: Doutt (1974), Schauff (1984).

World status: ten species; Nearctic, Palearctic, Afrotropical, Oriental, and Australasian regions, although at least three species may be incorrectly placed in this genus; probably cosmopolitan.

New Zealand: two species, both unidentified; North Island and Three Kings Islands.

Dorya new genus

Figures 82, 83

Key couplet – female 50

Type species *Dorya pilosa* new species.

Moderately slender species.

Female. HEAD in side view gradually rounded anteri-

orly. Area above occipital foramen without a semicircular ridge. Supraoccipital suture nearly reaching occipital foramen. Stemmaticum and coronal and occipital sutures absent. Ocelli quite large, separated from inner eye margin by about their own diameter. Eye naked, of moderate size, not reaching occipital margin, which is rounded and gently concave in dorsal view. Head in median view a little broader than long; frontovertex at narrowest a little less than half maximum head width. Vertex near ocelli, inner eye margins, and lower parts of face with short, inconspicuous setae. Antennal toruli slightly more than their own length from median suture, clypeal margin, and each other, much less than their own diameter from eye margin, and with their lowest margin about level with that of eyes. Antenna: radicle free, about two-thirds as long as scape, which is slightly flattened and broadened, reaching to above level of vertex; pedicel subconical; funicle 6-segmented; clava about as long as funicle, gradually tapering, acutely pointed apically; longitudinal sensilla present on clava only; setation very short and inconspicuous. Mandibles moderately large, each with 3 acute teeth.

THORAX in side view rather flat dorsally. Pronotum visible in dorsal view, longitudinally divided, its anterior edge without a carina, its posterior margin strongly concave; prosternum divided by a longitudinal suture; pronotal setae small to moderately long. Mesoscutum a little less than twice as broad as long; mesothoracic spiracle at posterolateral corner of pronotum, its opening unmodified but a little above surface of pronotum; notaular lines distinct, straight, not interrupted. Axillar setae small. Scutellum medially without a posteriorly projecting ridge, slightly longer than mesoscutum, about as broad as long. Metanotum a little less than one-quarter as long as scutellum. Propodeum nearly two-thirds as long as scutellum medially. Forewing slender, at least 4.5X as long as broad, with at most only 1 or 2 setae in disc proximad of apex of venation; marginal vein much shorter than submarginal; apex of venation reaching to about two-fifths along wing; marginal setae slightly longer than half maximum wing width. Hindwing slightly more than four-fifths length of forewing, about 11X as long as broad; margins subparallel; blade very slightly broader subapically than immediately distad of venation; marginal setae nearly twice as long as maximum width of blade; venation reaching to slightly more than one-third along wing. Phragma projecting slightly past posterior margin of propodeum. Middle and hind coxae without denticles. Foretibia without a basal tooth, with a single subapical sensillum basiconicum; spur unbranched, unforked; fore and hind tibiae 3X as long as broad; middle tibia 4X as long as broad. Tarsi 4-segmented; 1st segment longer than 2nd, more distinctly so in middle and hind legs; claws shorter than width of empodium.

GASTER subpetiolate, distinctly longer than head and thorax together; tergites subequal in length. Gastral spiracle present. Cerci close together, almost touching, each with 3 bristles plus a 4th on hind margin. Hypopygium reaching to about one-quarter along gaster. Ovipositor slightly but distinctly exserted at apex, projecting slightly forwards between hind coxae, about 3X as long as middle tibia.

Male. Unknown.

Remarks. *Dorya* clearly belongs to the *Anaphes* group, and possibly is nearest to *Idiocentrus*. It is distinguishable from related genera by the structure of the antennae, e.g., long, acutely pointed clava, relatively long radicle, and distribution of sensilla on flagellum and clava.

Found in New Zealand only; two species are known.

Dorya pilosa new species

Figures 82, 83

Female. Length range 1.05–1.41 mm ($n=5$); holotype 1.41 mm. Generally dark brown. Femora slightly paler at apices; fore and middle tibiae and all tarsi testaceous yellow; hind tibia whitish yellow. Forewings infuscate pale brown, almost hyaline proximally, but slightly darker below venation and occasionally subapically.

HEAD. Vertex with shallow, reticulate sculpture; frons above antennal toruli with shallow, reticulate sculpture, becoming more rugose towards transfacial suture and below toruli, and becoming shallow below toruli. Setae near ocelli sparse; only a single pair between antennal toruli; 3 or 4 pairs of short setae near mouth margin. Antenna (Fig. 82): funicle segments 2–6 each with a dorsal subapical sensillary seta; clava distally with scale-like sensory setae on ventral surface for at least half its length. Relative dimensions (paratype): maximum head width 59.5; minimum frontovertex width 28; head length (frontal view) 53; radicle length 19.5; scape length 30, maximum breadth 11; other proportions of antenna as in Fig. 82.

THORAX. Pronotum with very shallow, rugose sculpture; mesoscutum with very shallow, longitudinally elongate, reticulate sculpture; anterior scutellum with very shallow, hexagonally reticulate sculpture; posterior scutellum and metanotum with sculpture similar to that on mesoscutum, but with slightly smaller mesh; propodeum almost smooth, but with relatively shallow, reticulate sculpture. A pair of conspicuous setae on posterior margin of pronotum, and a pair near posterior margin of mesoscutum; axillae each with a single, very short seta posteriorly; a single seta on either side of anterior scutellum; propodeal seta situated

about midway between spiracle and posterior margin. Wings, Fig. 83.

GASTER longer than head and thorax together; anterior part of venter just projecting between hind coxae. Relative lengths (paratype): ovipositor 77 [middle tibia 27].

Male. Unknown.

Type data. **Holotype:** female, AK, Huia, Malaise trap in bush, February 1981, B.M. May (NZAC).

Paratypes (6 females) from the following localities: ND – Poor Knight Is (Tawhiti Rahi); CL – Ohena Is (Koruenga I.), Mercury Is (Middle I.); MC – Banks Peninsula.

Material examined. Type series only (NZAC, BMNH). ND, CL / MC.

Habitats noted: litter, native bush.

Adults collected January, February, November, December.

Biology. Unknown.

Remarks. A second New Zealand species, represented by a single specimen from Banks Peninsula MC, can be distinguished by the conspicuously less dense discal setae of the forewing.

Genus *Gonatocerus* Nees

Figures 7, 84–86; key couplets 3, 40

Gonatocerus Nees, 1834: 192. Type species *Gonatocerus longicornis* Nees, 1834; Germany.

Diagnosis. Female. Length (excluding ovipositor) about 0.5–2.2 mm. Antenna (Fig. 84) with funicle 8-segmented, clava entire. Pronotum without a transverse carina. Forewings normally fully developed, but brachypterous forms are known. Fully developed forewing (Fig. 85) relatively broad, at most about 5X as long as broad; marginal fringe at most about half as long as width of wing; venation reaching to about one-third along wing; marginal vein varying from punctiform to several times as long as broad; hypochaeta about midway between 2 macrochaetae on apical part of venation. Phragma not extending past posterior margin of propodeum. Tarsi 5-segmented. Gaster varying from subpetiolate to distinctly petiolate; petiole about one-quarter as wide as propodeum. Ovipositor occasionally well exserted.

Male. Length about 0.5–2.1 mm. Similar in appearance to female, but antenna (Fig. 86) with flagellum 11-seg-

mented, the segments subequal.

Biology. No New Zealand species has been reared; elsewhere recorded as egg parasitoids of Homoptera (mostly Cicadellidae and Membracidae).

Remarks. New Zealand species belong to the *litoralis*-group (see Debauche 1948, Matthews 1986), and can be distinguished from each other on general coloration of the body, relative dimensions of antennal segments, and relative length of the exerted part of the ovipositor.

Taxonomy: Girault (1913a,b, 1915a, 1938), Debauche (1948, 1949), Ogloblin (1935, 1936, 1959a), Matthews (1986), Sahad & Hirashima (1984).

World status: about 250 species; cosmopolitan.

New Zealand: five species, all unidentified; North and South islands.

Haplochaeta new genus

Figures 87–89; key couplet – female 66

Type species *Haplochaeta mandibularis* new species.

Generally fairly slender species.

Female. HEAD in side view evenly rounded anteriorly; foramen magnum nearly at top of occiput. Occipital margin rounded, hardly concave in dorsal view. Stemmaticum absent, but a transverse membranous line present across vertex immediately below anterior ocellus; median suture distinctly closer to mouth margin than to this line or to anterior ocellus; occipital and coronal sutures not discernible. Ocelli forming an obtuse angle of about 130–140°; in frontal view, anterior ocellus well above dorsal level of eyes. Eye small, with extremely short, almost invisible hairs, separated from ill defined occipital margin by about half its own length or several times the diameter of a posterior ocellus; dorsal margin well below level of anterior ocellus. A series of long setae present around inner eye margins, the dorsalmost longest, nearly as long as scape; a shorter seta either side of anterior ocellus, and a pair of inconspicuous setae between antennal toruli; a few longer setae either side of toruli. Antennal torulus adjacent to mouth margin, separated from median suture by a little more than its own length and from other torulus by about 1.5x its own length; malar space about one-third as long as eye. Antenna: radicle free, about one-third as long as scape; scape short, broad, shorter than maximum width of frontovertex, which is almost half head width; pedicel about two-thirds as long as scape, subconical; funicle 6-segmented, with all segments transverse; clava 2-segmented,

about as long as funicle; longitudinal sensilla present on clava only, somewhat long and oblique; setae on antennae sparse, the longest about equal to diameter of 1st funicle segment. Mandibles tridentate, relatively large, over half as long as width of head.

THORAX very flat, dorsoventrally flattened. Pronotum about as long as mesoscutum, clearly visible in dorsal view, longitudinally divided, anteriorly without a carina, with a pair of submedian bristles near posterior margin; pronotal setae moderately long; prosternum divided longitudinally by a suture. Mesoscutum a little more than 1.5x as long as broad; mesothoracic spiracle slightly inside posterolateral corner of pronotum, its opening flush with pronotum, unmodified; notaular lines distinct, straight, not interrupted, each with a single seta about halfway along inner margin. Axillar setae moderately long. Scutellum a little shorter than mesoscutum, without a posteriorly projecting median ridge; anterior and posterior parts about equal in length. Metanotum about one-twelfth as long as scutellum. Propodeum about as long as scutellum; post-spiracular seta about three-quarters distance from spiracle to posterior margin. Fully developed forewing long, narrow, nearly parallel-sided, about 10x as long as its greatest width; venation reaching to about two-fifths along wing; marginal vein largely hyaline, with a single long seta arising from its base; marginal setae about 4x as long as maximum wing width; discal setae sparse, arranged in lines. Hindwing a little shorter than forewing, about 25x as long as broad; blade nearly parallel-sided, with apex acute; venation reaching to about one-third along wing; marginal fringe about 8x as long as wing width; discal setae sparse, short. In forms with wings slightly reduced in length, marginal setae reduced to as few as 10. Phragma just projecting into base of gaster, hardly reaching beyond posterior margin of propodeum. Legs relatively short and stout. Middle and hind coxae smooth, without denticles. Fore and hind femora about 3x as long as broad; middle femur about 4x as long as broad. Foretibia without a basal tooth, but with a single subapical sensillum basiconicum; spur bifurcate, without lateral branches. Tarsi 4-segmented; 1st foretarsal segment longer than 2nd; middle and hind tarsi with 1st segment subequal to 2nd; claws a little longer than width of empodium.

GASTER about as long as thorax, sessile; petiole indistinct, about one-third as wide as propodeum; tergites subequal in length. Gastral spiracle absent. Cerci separated by about their own diameter, each with 2 bristles. Hypopygium nearly reaching apex of gaster, or about three-quarters along gaster. Ovipositor about half as long as gaster, or about one-third longer than middle tibia.

Male. Unknown.

Remarks. *Haplochaeta* is probably closely related to *Cleruchus*, but can be separated by the head being rounded (not flattened dorsoventrally or angular), with a transverse membranous line adjacent to the anterior ocellus, the mandibles very large, and the hyaline marginal vein of the forewing with a long seta from its base.

Found in New Zealand only; one species is known.

Haplochaeta mandibularis new species

Figures 87–89

Female. Length range 0.48–0.73 mm ($n=81$); holotype about 0.65 mm. Body generally shiny greyish-brown and chestnut brown (one specimen almost completely yellowish-brown except at apex of gaster, where it is brown). Head with a dark brown mark either side of mouth. Scape and pedicel testaceous yellow; flagellum testaceous brown. Anterior scutellum usually tinged orange. Legs yellow. Base of gaster tinged yellowish.

HEAD (Fig. 87) apparently devoid of sculpture except immediately above median suture, where there is some extremely shallow, transversely rugose sculpture. Relative dimensions (holotype): maximum head width 48.5; frontovertex width at median suture 24; head length (frontal view) 43; maximum eye length 21; scape length 21, maximum width 8; other proportions of antenna as in Fig. 88; suture separating clava segments incomplete.

THORAX smooth, without sculpture. Wings (Fig. 89) slightly infumate greyish.

GASTER. Relative lengths (holotype): ovipositor 52 [middle tibia 31].

Male. Unknown.

Type data. **Holotype:** female, NN, Whangamoia Saddle, *Nothofagus* forest, 27 January – 3 February 1979, A.K. Walker & L.A. Mound (NZAC).

Paratypes (84 females) from the following localities: ND – Waipoua State Forest; AK – Birkenhead, Huia, Lynfield, Titirangi; CL – Mercury Is (Middle I.); WI – Palmerston North; NN – Dun Mountain track, Farewell Spit, Whangamoia Saddle; MC – Banks Peninsula.

Material examined. Type series only (NZAC, BMNH, ANIC, CNCI, USNM).

ND, AK, CL, WI / NN, MC.

Habitats noted: *Nothofagus* forest; forest clearing; second-growth bush; litter.

Adults collected January–April, September–December.

Biology. Unknown.

Remarks. A single specimen collected from litter of *Dacrydium cupressinum* on Banks Peninsula MC has the wings slightly reduced in length and the marginal setae of each forewing and hindwing reduced to ten and two respectively. It undoubtedly belongs to *H. mandibularis*, but is excluded from the paratype series.

Genus *Idiocentrus* Gahan

Figures 90–93

Key couplets – female 69, male 82

Idiocentrus Gahan, 1927: 35. Type species *Idiocentrus mirus* Gahan, 1927; New Zealand.

Diagnosis. Female (Fig. 90). Length (excluding ovipositor) about 1.00–1.60 mm. Antennal toruli connected to mouth margin by a canal or groove. Antenna (Fig. 91): scape short, only slightly longer than pedicel; funicle 6-segmented, all segments longer than broad; clava 3-segmented. Posterior scutellum elongate, at least about twice as long as anterior scutellum, with a median longitudinal groove. Wings fully developed. Forewing (Fig. 92) a little more than 4X as long as broad; venation reaching about two-fifths along wing; distal part of submarginal vein and marginal and stigmal veins forming a sigmoid curve; marginal fringe not longer than maximum wing width; disc of wing almost completely naked in proximal half. Hindwing about 15X as long as broad. Phragma extending into base of gaster. Tarsi 4-segmented. Gaster sessile; petiole much more than half as wide as propodeum; ventral sternites accommodating ovipositor and projecting anteriorly between coxae, often extending past head (Fig. 90); ovipositor exerted a short way posteriorly.

Male. Length about 1.00–1.20 mm. Very similar to female, but antenna (Fig. 93) with flagellum 11-segmented, the segments longer than broad, subequal.

Biology. Reared from eggs of *Kikihia muta* (Fabricius), *Rhodopsalta cruentata* (Fabricius), and *Amphipsalta ?cinculata* (Fabricius) (Homoptera: Cicadidae); see Valentine 1967.

Remarks. There appears to be some variation in the relative length of the first funicle segment and the exerted part of the ovipositor. At present we consider this to be no more than infraspecific variation, but study of freshly collected material may show that more than one species is present.

World status: one species; New Zealand only.

New Zealand: one species, *mirus* Gahan; North, South, and Chatham islands.

Ischiodasys new genus

Figures 94–101

Key couplets – 6, female 45, 58, male 85, 94

Type species *Ischiodasys occulta* new species.

Generally rather robust species of fairly smooth, shiny appearance.

Female. HEAD in side view gently and evenly curved anteriorly, more strongly so just above median suture; vertex distinctly convex but less curved; lower parts of face almost flat. Area above occipital foramen without a semi-circular ridge. Occipital margin slightly concave in dorsal view. Postfrontal suture indicated laterally. Stemmaticum and occipital and coronal sutures absent. Ocelli forming an angle of about 100–130°. Eye naked or with extremely short setae, large, clearly separated from rounded occipital margin by at least twice the diameter of a posterior ocellus. Inner eye margins and face below median suture with short to moderately long, conspicuous setae. Frontoververtex at narrowest a little more than half head width. Antennal torulus separated from median suture by about its own diameter, from eye margin by much less, from other torulus and mouth margin by about 2–3x its own length; lowest margin at least about its own length above lowest eye margin; inner eye margins convex. Antenna: radicle free, about one-fifth as long as scape; scape slightly dilated and flattened, reaching to about level with anterior ocellus; pedicel subconical; funicle 6-segmented; clava entire; longitudinal sensilla present on 4th and 6th funicle segments and clava, or on all flagellar segments except the 1st. Mandibles of moderate size, meeting centrally, each with 3 acute teeth.

THORAX in side view almost flat but distinctly convex, in dorsal view about as wide as head. Pronotum clearly visible, longitudinally divided, about 3–5x as wide as its median length, occasionally with a collar which is medially sharply margined; anterior margin not carinate; posterior margin slightly concave; pronotal setae short to fairly long; prosternum with a longitudinal suture in posterior half or less. Mesoscutum about twice as broad as long; mesothoracic spiracle near posterolateral corner of pronotum, its opening unmodified and flush with pronotum; notaular lines more or less straight, not interrupted. Axillar setae small to moderately long. Scutellum divided or undivided, at least a little longer than mesoscutum, without a posteriorly projecting ridge. Metanotum one-third as long as scutellum. Propodeum a little shorter than scutellum. Dorsum of thorax with a few scattered, short or long setae. Forewing sometimes shortened; fully developed forewing a little more than 2.5x as long as broad; discal setae mod-

erately dense, more or less evenly distributed; longest marginal setae about one-fifth as long as maximum wing width; marginal vein relatively long, not quite reaching halfway along anterior margin of wing. Hindwing about three-quarters as long as forewing, at apex of venation about one-fifteenth as wide as long; sides subparallel; marginal fringe nearly twice as long as maximum wing width; venation reaching to about two-fifths along wing. Phragma not quite reaching posterior margin of propodeum, which is slightly produced posteriorly. Middle and hind coxae without denticles, but hind coxa in many species with a conspicuous tuft of setae (Fig. 96). Femora 4x as long as broad. Foretibia without a basal tooth, but with an irregular line of about 3–8 sensilla basiconica, or with 5–8 pairs of sensilla basiconica along its length; spur unforked and unbranched, or forked with several short lateral branches. Tarsi 4-segmented; 1st segment slightly to considerably longer than the 2nd; claws shorter than width of empodium or about as long.

GASTER distinctly shorter to longer than thorax, distinctly petiolate; petiole at least about as long as broad, although occasionally bent under propodeum and thus hidden, and occasionally with a pair of long dorsal bristles; 1st tergite covering from one-third to one-sixth of gaster, at most half as long as 2nd tergite, which usually covers most of remainder, often with 1 or 2 distinct lines of setae on either side basally. Gastral spiracle present. Cerci separated by about their own length, each with 3 short bristles. Hypopygium reaching more than halfway along gaster. Ovipositor about as long as gaster, or slightly longer than middle tibia to more than twice as long. Gonostyli relatively long, nearly half as long as ovipositor.

Male. Except for antennae and genitalia, almost identical to female. Flagellum 11-segmented, each segment with a whorl of long setae; setae varying from about as long as diameter of segment to 3–4x as long (see Fig. 97, 101). Gastral spiracle absent. Aedeagus about two-fifths as long as middle tibia.

Remarks. *Ischiodasys* is superficially very similar to *Polynema*, but can be separated by the relatively long venation. It belongs to the *Australomymar* group of genera, and can be distinguished from these related genera by the key characters. The pronotum clearly visible in dorsal view, the long petiole, and the commonly very hairy hind coxae also serve to distinguish this genus.

Ischiodasys occulta new species

Figures 94–98

Female. Length range 0.83–1.13 mm ($n=93$); holotype 1.11 mm. Entirely very dark shining brown, almost black. Legs orange-brown to dark brown; proximal segments of tarsi paler. Forewing distinctly infumate brownish below marginal vein.

HEAD above median suture with very shallow, transverse, rugose sculpture; below this, and especially below antennal toruli, sculpture very similar but distinctly reticulate. Hairs on eyes extremely short, much shorter than the diameter of a facet; hairs on face below and between antennal toruli about one-quarter as long as scape, pointing inwards and downwards. Ocelli forming an angle of about 130° ; posterior ocellus separated from occipital margin and anterior ocellus by about $3\times$ its own diameter. Relative dimensions (holotype): maximum head width 46; minimum frontovertex width 27; head length (frontal view) 34; maximum eye length 22, width 17; malar space 12; POL 13; OOL 8.5; scape length 20, maximum width 7; other proportions of antenna, Fig. 94.

THORAX. Median prosternal suture about one-quarter as long as prosternum; pronotum about $5\times$ as broad as long in dorsal view, with an almost smooth collar, and anterior to collar with shallow, transverse, reticulate sculpture; a pair of long setae on either side of anterior margin of collar. Mesoscutum and scutellum with very shallow, reticulate sculpture, becoming shallower and more longitudinally elongate on scutellum. Metanotum and propodeum more or less entirely smooth. Notaular lines each with a single, long seta about halfway along inner margin. Scutellum with a very long seta near inner margin of each axilla, and axillae each with a short seta on posterior margin; long seta on scutellum only a little shorter than scutellum itself; setae on mesoscutum a little more than half as long. Forewings (Fig. 95) fully developed. Sides of propodeum with about 8–10 very long, conspicuous white setae, and some shorter ones on metapleuron. Foretibia with 3 or 4 sensilla basiconica along its length; spur forked, with several short lateral branches. Tarsi with 1st segment much longer than 2nd, most distinctly so on foreleg; claws about as long as width of empodium. Hind coxa with a very conspicuous line of setae along posterior margin (Fig. 96); femora and tibiae with conspicuous long setae, much longer than diameter of segment of origin, those on hind leg the longest and most conspicuous.

GASTER a little shorter than thorax; petiole about twice as long as broad, naked; 1st tergite occupying about one-quarter of gaster, 2nd tergite about three-quarters; 1st tergite with 2 converging lateral lines each of about 5–7 long setae. Ovipositor hardly exerted. Relative lengths

(paratype): ovipositor 76; gonostyli 38 [middle tibia 65].

Male. Length range 0.87–1.03 mm ($n=23$). Identical to female except for antennae (Fig. 97) and genitalia (Fig. 98). Relative lengths: aedeagus 48; middle tibia 123.

Type data. **Holotype:** female, NN, Cobb Ridge (south), 1100 m, native tussock grassland, 3 December 1980, J.S. Noyes, E.W. Valentine, & A.K. Walker (NZAC).

Paratypes (94 females, 24 males) from the following localities: NN – Cobb Ridge (south), Cobb Reservoir, upper Takaka River (asbestos mine track); BR – St Arnaud.

Material examined. Type series only (NZAC, BMNH, ANIC, CNCI, USNM).

— / NN, BR.

Habitats noted: alpine *Nothofagus* forest; *Nothofagus* forest; mixed *Nothofagus* forest; clearing in *Nothofagus*.

Adults collected January, December.

Biology. Unknown.

Remarks. About fourteen other species are known, with records from AK, CL, NN, BR, WD, MC, OL, CO, Chatham Islands, and Three Kings Islands. The species can be separated in the female using the following characters (see Fig. 99–101): relative length of setae on head; angle formed by ocelli, and their relative positions; relative lengths of antennal segments, and positions of longitudinal sensilla; relative length of pronotum, and presence or absence of a distinguishable collar; relative lengths of setae on dorsum of thorax; length, shape, and venation of forewing; presence or absence of long hairs on hind coxa; presence or absence of a pair of bristles on petiole; relative length of petiole; relative length of gaster and its tergites; relative length of ovipositor and its exerted part. The males vary similarly, and also in the relative length of the antennal setae.

Mimalaptus new genus

Figures 102–105; key couplet 36

Type species *Mimalaptus obscurus* new species.

Small, moderately robust, squat species.

Female. **HEAD** at least slightly broader than long in frontal view, and in side view more or less gradually and evenly curved anteriorly. Area above occipital foramen without a semicircular ridge. Stemmaticum and occipital and coronal sutures absent. Eyes naked; vertex, inner

margins of eyes, and lower parts of face with setae varying from short and inconspicuous to very long and conspicuous, the shortest hardly longer than the diameter of an ocellus, the longest about 5X the diameter of an ocellus. Eyes converging slightly ventrad, not quite reaching occipital margin, which is sharp and slightly concave in dorsal view. Frontoververtex at narrowest about half head width; central (straight) part of median suture about equal to or slightly wider than distance between antennal toruli. Antennal torulus about its own length or slightly less from median suture, less than its own diameter from inner eye margin, and about twice its diameter from mouth margin; lowest margin of torulus about level with lowest eye margin to distinctly above it. Antenna: radicle free, about one-quarter as long as scape; scape stout, short, not more than about two-thirds as long as minimum width of frontoververtex; pedicel relatively large, not much shorter than scape and distinctly broader; funicle 7-segmented, the first 4 or 5 segments closely joined and under low magnification appearing as one long segment; all funicle segments longer than broad; clava entire; longitudinal sensilla present on clava only. Mandibles quite large, from about half to two-thirds as long as minimum width of frontoververtex, bidentate.

THORAX moderately deep, dorsally quite flat. Pronotum very short, not visible in dorsal view, longitudinally divided; anterior margin without a carina; pronotal setae fairly long; prosternum divided by a longitudinal suture. Mesoscutum about one-half broader than long; mesothoracic spiracle near posterolateral corner of pronotum, its opening unmodified and flush with pronotum; notaular lines uninterrupted, situated towards sides of mesoscutum. Axillar setae absent. Scutellum without a posteriorly projecting median ridge, slightly shorter than mesoscutum; posterior part large, over twice as long as anterior part, divided by a longitudinal suture. Metanotum very short, not more than one-tenth as long as scutellum. Propodeum medially nearly one-third as long as scutellum. Forewing of normal length, over 6X as long as broad, abruptly broadened below marginal vein, then constricted and broadening towards apex; venation not reaching one-third along wing; marginal vein short; postmarginal vein absent; marginal fringe about 3X as long as maximum wing width. Hindwing about as long as forewing, narrow, parallel-sided, rounded at apex, over 20X as long as broad; marginal fringe about 7–8X as long as maximum wing width; venation not quite reaching one-third along wing. Phragma clearly projecting past posterior margin of propodeum into base of gaster. Middle and hind coxae without denticles. Femora nearly 5X as long as broad. Foretibia without a basal tooth or sensilla basiconica; spur very short, forked, without lateral branches. Tarsi 5-segmented; 1st segment very slightly larger than the 2nd; claws about as long as width of empodium.

GASTER slightly shorter than thorax, subsessile; petiole about half as wide as propodeum; 1st tergite longest, extending to about one-third along gaster. Gastral spiracle absent. Cerci well separated, each with 3 setae, 2 centrally and 1 near posterior margin. Hypopygium not reaching one-quarter along gaster. Ovipositor nearly as long as gaster, or at least about as long as middle tibia.

Male. Very similar to female, but antenna (Fig. 105) with flagellum 10-segmented, the first 2 segments shortest, and the 2nd abruptly shorter than the 1st and 3rd; longitudinal sensilla present on all except first 3 flagellar segments. Gaster about two-thirds as long as thorax. Aedeagus about one-quarter as long as middle tibia; phallobase about one-third as long as middle tibia. Cerci each with 3 central setae and 1 near posterior margin.

Remarks. *Mimalaptus* is clearly related to *Alaptus*, *Dicopus*, etc., but can be separated by the gaster being distinctly petiolate, the seven-segmented funicle in the female, and the sigmoid shape of the forewings (Fig. 103). It is superficially very similar to *Kubja* Subba Rao, described from India, but differs in the much shorter and stouter scape, broader forewings, longer scutellum, narrower petiole, and shorter phragma (in *Kubja* the scape is at least 5–6X as long as broad and at least about as long as the head width, the forewing is at least 8X as long as broad, the scutellum is strongly transverse and strap-like, the petiole is very nearly as wide as the propodeum, and the phragma projects well over halfway into the gaster).

At least two species, and possibly as many as four are known, all from New Zealand only.

Mimalaptus obscurus new species

Figures 102–104

Female. Length range 0.30–0.48 mm ($n=17$); holotype about 0.37 mm. Body generally dark brown; anterior scutellum with a reddish tinge. Scape and pedicel testaceous yellow; flagellum dusky greyish-brown, becoming darker towards apex. Legs yellowish testaceous; hind coxae and tibiae slightly darker, more or less dusky or greyish-brown; occasionally hind femora also greyish-brown.

HEAD in frontal view about one-fifth wider than long. Frontoververtex, lower parts of face, and eye margins with very short setae, hardly any longer than maximum diameter of an ocellus. Straight central portion of median suture about one-half longer than minimum distance between antennal toruli, distinctly above lower eye margins. Malar space about two-thirds length of an eye. Mandibles

less than half minimum width of frontovertex, clearly bidentate, the lower tooth the shorter. Relative dimensions (holotype): head width 52, length (facial aspect) 44; minimum frontovertex width 24.5; scape length 11.5, width 7; other proportions of antenna as in Fig. 102.

THORAX (Fig. 104). Mesoscutum with shallow, longitudinal, semi-striate sculpture on disc; anterior scutellum smooth, with some sculpture laterally; posterior scutellum with shallow, irregular, rugose-reticulate sculpture arranged in almost imperceptible whorls on either side of longitudinal suture; propodeum smooth. Pair of setae near anterior margin of mesoscutum clearly not longer than anterior scutellum. Anterior scutellum with sensillary structures near anterior margin and distinct sutures extending transversely inwards for about one-third of width. Phragma with apex clearly truncate, not rounded. Forewing, Fig. 103.

GASTER. Ovipositor very slightly longer than middle tibia. Relative lengths (holotype): ovipositor 50 [middle tibia 47.5].

Male. Unknown.

Type data. **Holotype**: female, AK, Lynfield, Malaise trap, October 1980, G. Kuschel (NZAC).

Paratypes (25 females) from the following localities: AK – Birkenhead, Lynfield, Massey, Titirangi.

Material examined. Type series only (NZAC, BMNH, USNM, CNCI, ANIC).

AK / —.

Habitats noted: second-growth bush; garden.

Adults collected January–June, October, November.

Biology. Unknown.

Remarks. *M. obscurus* can be distinguished as follows: relative length of head in frontal view; length of setae on head, mesoscutum, and marginal vein where it joins front margin of wing; position of antennal toruli; shape of mandibles; relative length of antennal segments; sculpture of thorax; setation of wings; and shape of apex of phragma.

Genus *Mymar* Curtis

Figures 106–108

Key couplets – female 47, male 87

Mymar Curtis, 1832: 411. Type species *Mymar pulchellum* Curtis, 1832; Europe.

Diagnosis. **Female**. Length about 0.70–1.00 mm. Antenna (Fig. 106): scape elongate, longer than width of head,

medially constricted; funicle 6-segmented, the 2nd segment generally longest; clava entire. Forewing (Fig. 107a) oar-shaped, consisting of a long petiole and expanded apex, the petiole at least about two-thirds the length of the wing; expanded apex at least partly infusate. Hindwing (Fig. 107b) filamentous or almost so, varying from very short to almost two-thirds as long as forewing. Tarsi 4-segmented. Gaster petiolate; petiole at least about 5X as long as broad.

Male. Length about 0.60–0.90 mm. Generally very similar to female, but antenna (Fig. 108) with flagellum filamentous, 11-segmented, the segments subequal in length.

Biology. Unknown; elsewhere reared from eggs of Delphacidae.

Remarks. Taxonomy: Annecke (1961a).

World status: six species; cosmopolitan.

New Zealand: one species, *pulchellum* Curtis; North Island and Three Kings.

Neserythmelus new genus

Figures 109, 110; key couplet – female 55

Type species *Neserythmelus zelandicus* new species.

Generally fairly slender species.

Female. **HEAD** in side view strongly angled inwards immediately below antennal toruli; area above occipital foramen without a semicircular ridge. Stemmaticum and occipital and coronal sutures absent. Ocelli forming a strongly obtuse angle. Eye with very few, extremely short, inconspicuous setae, moderately large, reaching occipital margin, which is acute and very slightly concave in dorsal view. Inner eye margins with conspicuously long setae, particularly near posterior ocelli; setae about half as long as scape. Frontovertex width a little less than half head width. Antennal toruli separated from median suture clearly by more than their own length, from each other by about their own length, and from eye margin by about one-third their own length. Antenna: radicle free, about one-fifth as long as scape; scape subcylindrical, reaching to about level with occipital margin; pedicel subconical, a little longer than the first 2 funicle segments; funicle 6-segmented, nearly naked but with a few moderately long, indistinct setae; clava entire, more or less pointed apically; longitudinal sensilla present on clava only. Mandibles of moderate size, clearly meeting medially, each with 3 strong teeth.

THORAX in side view fairly flat. Pronotum medially quite short, almost hidden by head; posterior margin very

concave, longitudinally divided; anterior margin without a carina; setae moderately long; prosternum divided by a longitudinal suture. Mesoscutum about one-half wider than long; mesothoracic spiracle at anterolateral corner of pronotum, its opening unmodified and flush with pronotum; notaular lines distinct, complete. Axillar setae small. Scutellum without a posteriorly projecting median ridge, about as long as mesoscutum; posterior part about twice as long as anterior part. Metanotum more or less fused with propodeum, together with propodeum a little shorter than scutellum; posterior margin completely indistinguishable. Mesoscutum with 1 pair of setae on disc; anterior scutellum also with 1 pair of setae. Forewing moderately narrow, nearly 7X as long as broad, widest at base of marginal vein; margins subparallel; posterior margin slightly swollen opposite base of marginal vein; marginal fringe a little more than 3X as long as greatest width of wing; disc almost completely naked; venation very nearly reaching halfway along wing. Hindwing about as long as forewing, about 19X as long as broad; blade with parallel margins, apically rounded; marginal fringe about 8X as long as greatest wing width; disc almost completely naked; venation reaching to about one-third along wing. Phragma clearly projecting into base of gaster. Middle coxa smooth; hind coxa with a few denticles on inner face. Fore and hind femora about 3X as long as broad; middle femur about 3.5X as long as broad. Foretibia without a basal tooth, but with a single sensillum basiconicum; spur unbranched, unforked. Tarsi 4-segmented; foretarsus with 1st segment distinctly longer than the 2nd; middle and hind tarsi with 1st segment subequal to the 2nd; claws shorter than width of empodium.

GASTER a little longer than head and thorax together, sessile, its attachment to thorax about half as wide as propodeum. Gastral spiracle absent. Cerci well separated, each with 4 bristles. Hypopygium with apex about halfway along gaster. Ovipositor about half as long as gaster, or about one-half longer than middle tibia.

Male. Unknown.

Remarks. The yellowish base to the gaster and structure of the antennae and wings suggest a close affinity to *Erythmelus* Enock. *Neserythmelus* can be distinguished by its shorter hypopygium, i.e., not extending to apex of gaster. It is also superficially similar to *Cleruchus*, but differs in the key characters, in the rather less conspicuous setae on the flagellum (appearing naked at low magnification), and the more slender clava. The wings should serve to distinguish *Neserythmelus* from other related genera. The forewing venation is fairly typical of all genera related to *Anaphes*, but extends a disproportionate distance along the wing.

Found in New Zealand only; one species is known.

Neserythmelus zelandicus new species

Figures 109, 110

Female. Length range approximately 0.44–0.60 mm ($n=3$); holotype about 0.60 mm. Head and thorax chestnut-brown. Antennae the same, but scape yellowish, and pedicel intermediate in colour. Wings hyaline, very slightly infused with greyish-brown. Legs yellow. Gaster yellow in basal half, dark brown apically.

HEAD almost completely smooth, but between median suture and anterior ocellus with some very shallow, transverse, rugose sculpture. Hairs on eyes about half as long as diameter of a facet, those along inner eye margins about as long as antennal torulus, and the longest (dorsal) one nearly as long as minimum width of frontovertex, or half as long as scape. Relative dimensions (holotype): maximum head width 58; minimum frontovertex width 28; scape length 36, width 8; other proportions of antenna as in Fig. 109.

THORAX completely smooth. Wings, Fig. 110.

GASTER. Relative lengths (holotype): ovipositor 70 [middle tibia 48].

Male. Unknown.

Type data. **Holotype:** female, AK, Lynfield, April 1981, G. Kuschel (NZAC).

Paratypes (2 females) from the following localities: ND – Poor Knights Is (Tawhiti Rahi); AK – Lynfield.

Material examined. Type series only (NZAC, BMNH). ND, AK / —.

Adults collected April, December.

Biology. Unknown.

Genus *Nesomyrma* Valentine

Figures 111–113; key couplet – female 11

Nesomyrma Valentine, 1971: 329. Type species *Nesomyrma magniclave* Valentine, 1971; Campbell I., New Zealand.

Diagnosis. Female. Length about 0.40–0.55 mm. Head, Fig. 112. Antenna (Fig. 111): scape moderately long, about as long as width of frontovertex; funicle 6-segmented, the segments varying from transverse to slightly longer than broad; clava 3-segmented. Wings absent. Phragma very short, V-shaped, not projecting past propodeal setae (Fig. 113). Tarsi 4-segmented. Propodeum about as long as scutellum and metanotum together. Gaster about as long as thorax, subsessile or subpetiolate; petiole about one-third as wide as propodeum.

Male. Unknown.

Biology. Unknown.

Remarks. *Nesomyar* is close to *Paracmotemnus* and *Nesopatasson*, differing from these genera in the key characters (see also Remarks under *Paracmotemnus*). This genus may be related to *Notomyar* Doutt & Yoshimoto, but can be separated by having better developed dorsal thoracic sclerites. The resemblance may be superficial, as a result of wing reduction.

World status: one described species; subantarctic islands of New Zealand.

New Zealand: one species, *magniclave* Valentine, from Campbell I., The Snares, and Auckland I.; a further undescribed species in the South Island (CO).

Genus *Nesopatasson* Valentine

Figures 114–117

Key couplets – female 12, male 16

Nesopatasson Valentine, 1971: 327. Type species *Nesopatasson flavidus* Valentine, 1971; Auckland Is, New Zealand.

Diagnosis. Female. Length about 0.5–0.7 mm. Head, Fig. 114. Antennal toruli separated from median suture by at least about their own length. Antenna (Fig. 115): scape fairly short, not as long as width of frontovertex; funicle 6-segmented, the segments varying from subquadrate to about twice as long as broad; clava 3-segmented. Wings extremely short, almost absent. Phragma more or less reaching posterior margin of propodeum (Fig. 116). Tarsi 4-segmented. Gaster in dorsal view more or less rounded apically, subsessile or subpetiolate; petiole about one-third as wide as propodeum.

Male. Length about 0.50–0.60 mm. Generally similar to female, but antenna (Fig. 117) with flagellum 11-segmented, the segments subequal.

Biology. Unknown.

Remarks. *Nesopatasson* is close to *Paracmotemnus* and *Nesomyar*, and can be separated from these genera using the key characters (see also Remarks under *Paracmotemnus*). It is also related possibly to *Notomyar* Doutt & Yoshimoto, differing in the shorter pronotum (longer than mesoscutum in *Notomyar*) and better developed dorsal thoracic sclerites. The resemblance may be superficial, as a result of wing reduction.

World status: one species; New Zealand only.

New Zealand: one species, *flavidus* Valentine; Auckland Is and The Snares.

Genus *Ooctonus* Haliday

Figures 118, 119; key couplet 40

Ooctonus Haliday, 1833: 343. Type species *Ooctonus insignis* Haliday, 1833; England.

Diagnosis. Female. Length about 0.9–1.7 mm. Antenna (Fig. 118): scape moderately long, but generally not longer than width of frontovertex; funicle 8-segmented; clava solid. Pronotum with a transverse carina near posterior margin. Wings normally fully developed, but some short-winged forms known. Fully developed forewing (Fig. 119) with marginal and stigmal veins forming an almost linear sigmoid curve. Tarsi 5-segmented. Propodeum with several sharp carinae medially. Gaster distinctly petiolate; petiole at least about 3x as long as broad; ovipositor not or hardly exerted.

Male. Length about 0.90–1.7 mm. Generally similar to female, but flagellum 11-segmented, the segments subequal in length.

Biology. Unknown; elsewhere recorded as parasitoids of eggs of Homoptera and Coleoptera.

Remarks. Taxonomy: Debauche (1948), Soyka (1949, 1949–50), Hincks (1952).

World status: about 60 species; cosmopolitan.

New Zealand: one undetermined species, North Island.

Paracmotemnus new genus

Figures 120–124

Key couplets – female 12, 21, 75, male 16, 31, 94

Type species *Paracmotemnus potanus* new species.

Moderately robust species.

Female. HEAD about one-third wider than thorax, in side view strongly inflexed anteriorly below antennal toruli; vertex moderately rounded; face below angle flat. Area above occipital foramen without a carina. Stemmaticum and occipital and coronal sutures absent. Ocelli in a very obtuse angle of about 130°. Eye relatively large, nearly reaching occipital margin laterally, hairy, each hair about as long as the diameter of an ocellus; inner eye margin subparallel. Frontovertex at narrowest a little less than half

head width, strongly concave in dorsal view; vertex and inner margins of eyes with short to conspicuous long setae, the longest in some species nearly half as long as scape; malar space about one-quarter eye length. Antennal toruli almost touching median suture, separated from each other by a little more than their own length, and from eye margin by about one-quarter their own length. Antenna: radicle free, about one-fifth as long as scape; scape subcylindrical, long, reaching to or slightly above anterior ocellus, longer than minimum width of frontovertex; pedicel subconical; funicle 6-segmented; clava 3-segmented; longitudinal sensilla present on funicle segments 3 and 5 and apical segment of clava; setation, particularly of scape, moderately long and conspicuous. Mandibles moderately large, unidentate, meeting centrally.

THORAX in profile fairly deep, but more or less flat dorsally. Pronotum in dorsal view hidden by head, very short medially, longitudinally divided, without a carina along its anterior margin; posterior margin very concave; pronotal setae small; prosternum divided by a longitudinal suture. Mesoscutum about two-thirds broader than long; mesothoracic spiracle at posterolateral corner of pronotum, its opening unmodified, flush with pronotum; notaular lines uninterrupted, straight. Axillar setae small. Scutellum without a posteriorly projecting ridge; posterior scutellum distinct. Metanotum distinct, medially about one-third as long as scutellum. Propodeum nearly half as long as scutellum; spiracles not large, separated from anterior margin by less than their own diameter. Dorsum of thorax with about 4 pairs of long setae. Phragma reaching to about posterior margin of propodeum. Wings fully developed or shortened; brachypterous forms with no distinct posterior scutellum, and metanotum shorter. Fully developed forewing almost 5X as long as broad; marginal fringe at longest about twice maximum wing width; venation long, reaching more than halfway along wing; marginal vein hyaline for most of its length, relatively long, about as long as base of wing, almost naked. Hindwing about 20X as long as broad, slightly shorter than forewing; blade more or less parallel-sided; venation extending about two-fifths along wing; marginal fringe at most about 6X as long as maximum wing width. Middle and hind coxae smooth. Femora about 3.5X as long as broad. Foretibia with neither sensilla basiconica nor a basal tooth; spur unforked, unbranched. Tarsi 4-segmented; 1st segment clearly longer than the 2nd on foretarsus, subequal but a little longer on middle and hind tarsi; claws about as long as width of empodium.

GASTER acute apically, slightly shorter than thorax, with a very short petiole at least twice as broad as long; tergites subequal in length except 1st, which is twice as long as others, and 7th, which is distinctly shorter. Cerci separated by about their own width or less, each with 3 bristles which

are usually very long, often half length of gaster. Spiracles absent. Hypopygium extending to about one-third along gaster. Ovipositor slightly exerted, slightly longer than gaster, or about 1.5X as long as middle tibia.

Male. Very similar in general appearance to female, but flagellum 11-segmented, eyes relatively smaller, malar space nearly half length of eye, and frontovertex nearly two-thirds maximum head width. Aedeagus about as long as middle tibia.

Remarks. *Paracmotemnus* belongs to the *Australomyrmar* group of genera, and in addition to the key characters can be distinguished by the hyaline marginal vein in winged forms and the three-segmented clava in the female. The brachypterous species can be separated from *Nesopatasson* and *Nesomyrmar* by the presence of an additional sclerite between the inner margins of the axillae, the relatively long cercal bristles, and the close proximity of the antennal toruli to the median suture. In *Nesopatasson* and *Nesomyrmar* there is no additional sclerite between the axillae, the cercal bristles are relatively short, and the antennal toruli are separated from the median suture by at least about their own length. The gaster is acute apically (rounded in *Nesopatasson*), and the phragma projects well past the propodeal seta (not reaching as far as propodeal setae in *Nesomyrmar*).

Paracmotemnus is found in Australia and New Zealand. It is distributed throughout the whole of New Zealand, including the Three Kings Islands and The Snares. About six species are known in New Zealand, including the one described below as new.

Paracmotemnus potanus new species

Figures 120–124

Female. Length range 0.36–0.63 mm ($n=86$); holotype 0.56 mm. Generally pale brown; gaster slightly darker. Legs testaceous brown, as also antennal segments, but these becoming darker towards apex of antenna, where they are fairly dark brown. Head dark brown, paler on frons. Wings suffused with pale brown; forewing with a noticeable narrow, hyaline streak in centre of blade from below centre of marginal vein nearly to apex.

HEAD above median suture almost smooth, but with shallow, raised, reticulate sculpture about equal in mesh size to diameter of anterior ocellus; smaller mesh around posterior ocelli. Setae along inner margins of eyes and a pair on vertex nearly half as long as scape, more or less pointing forwards; other setae on head much shorter, particularly below antennal toruli on inflexed part of face.

Posterior ocelli separated from occipital margin by less than their own diameter, from eye by about their own diameter, and from anterior ocellus by slightly more. Relative dimensions (holotype): maximum head width 35; width of frontovertex at median suture 17; head length (frontal view) 22; maximum eye length 17, breadth 19; malar space approx. 4; POL 9; OOL 3.5; scape length 20, maximum breadth 5; other proportions of antenna as in Fig. 120.

THORAX (Fig. 121) more or less completely smooth. Mesoscutum with a pair of long discal setae just inside notaular lines and a single seta laterally; scutellum with a pair of setae about midway between frenal sulcus and anterior margin, a short seta on either side of metanotum, about level with outer margins of scutellum, and a single seta on either side of propodeum a little nearer to spiracles than to posterior margin. Posterior scutellum marked off by an indistinct transverse sulcus. Forewing fully developed, infused with pale greyish brown except for a longitudinal hyaline streak in disc.

GASTER slightly shorter than thorax. Cercal bristles quite long, the longest about half as long as gaster. Ovipositor very slightly exerted, the exerted part about one-seventh as long as gaster, or one-sixth as long as middle tibia. Relative lengths (paratype): ovipositor 66 [middle tibia 49].

Male. Length range 0.38–0.51 mm ($n=8$). In general appearance and coloration identical to female. Antennae (Fig. 122) uniformly testaceous brown. Frontovertex relatively broader than in female; head a little more than 1.5X as wide as frontovertex at median suture; posterior ocellus separated from eye margin by slightly more than its own diameter, and from anterior ocellus by about twice its diameter. Forewing, Fig. 123; genitalia, Fig. 124. Relative lengths: aedeagus 31; middle tibia 55.

Type data. **Holotype:** female, AK, Lynfield, January 1981, G. Kuschel (NZAC).

Paratypes (87 females, 9 males) from the following localities: ND – Omahuta State Forest, Waipoua State Forest, Poor Knights Is (Tawhiti Rahi); AK – Birkenhead, Huia, Laingholm, Lynfield, Titirangi; WI – Palmerston North; SD – Mt Robinson; BR – Capleston Beetle Reserve, Lake Rotoiti, Mawhera State Forest; SL – Longwood Range.

Material examined. Type series only (NZAC, BMNH, USNM, CNCI, ANIC).

ND, AK, WI / SD, BR, SL.

Habitats noted: rotten stumps; bush; second-growth bush; moss; litter.

Adults collected in all months except May and June.

Biology. Unknown.

Remarks. *P. potanus* can be separated from other known species by the relative proportions of the antennal segments, relative lengths of the cercal bristles, and sculpture of the frontovertex and thoracic dorsum. Most other species also have the wings at least partially shortened.

Paranagroidea new genus

Figures 125–131; key couplets – 39, male 4

Type species *Paranagroidea verrucosa* new species.

Generally robust species.

Female. **HEAD** in side view more or less evenly rounded anteriorly, but slightly angled inwards below antennal toruli; occipital margin slightly concave in dorsal view. Area above occipital foramen without a semicircular ridge. Postfrontal sutures extending nearly to occipital foramen; stemmaticum and occipital and coronal sutures absent. Ocelli rather small and inconspicuous, forming an angle of about 120–140°. Eye relatively small, not longer than malar space, with short, almost invisible hairs, separated from rounded occipital margin by at least about the diameter of a posterior ocellus. Frontovertex about three-fifths of head width, with moderately long setae, the longest varying from slightly longer than diameter of antennal torulus to much longer. Head sculpture distinctive, raised, reticulate, the mesh about the same diameter as an eye facet or slightly greater. Antennal toruli situated high on head, slightly nearer to occipital margin than to mouth margin, separated from median suture and eye margins by about their own diameter, and from mouth margin by about 3X their own diameter. Antenna: radicle free, about one-fifth as long as scape; scape about two-thirds as long as maximum width of head, moderately flattened; pedicel subconical; funicle of 6-segmented appearance, but with a membranous, anelliform to quadrate segment between 1st and 2nd segments, which are distinctly longer than broad; additional segment not clearly visible in card-mounted material; clava nearly as long as funicle or longer, entire; longitudinal sensilla present on clava only; setation conspicuous, moderately long, the longest setae slightly longer than diameter of segment of origin. Mandibles moderately large, meeting centrally, bidentate.

THORAX in side view robust, more or less convex dorsally, but mesoscutum and scutellum fairly flat. Pronotum not divided, short medially in dorsal view; anterior margin not carinate; posterior margin very concave, only just

visible in dorsal view; pronotal setae small; prosternum without a longitudinal suture. Mesoscutum about 2.5X as broad as long; mesothoracic spiracle at posterolateral corner of pronotum, its opening unmodified, flush with surface of pronotum; notaular lines not interrupted. Axillar setae moderately long. Scutellum about one-quarter to one-half longer than mesoscutum, without a posteriorly projecting ridge; anterior scutellum about one-quarter to one-half as long as posterior scutellum. Metanotum medially hidden by posterior edge of scutellum. Propodeum about as long as scutellum, with well raised, reticulate sculpture similar to that of head. Forewing slender, about 8–9X as long as broad; discal setae almost totally absent; marginal fringe about 3X as long as maximum wing width; venation reaching to about two-fifths to one-half along wing; marginal vein short. Hindwing curved, very nearly as long as forewing, about 18–20X as long as its greatest width; venation not reaching as much as one-third along wing; fringe about 5–7X as long as greatest wing width; discal setae sparse. Phragma not reaching posterior margin of propodeum to about level with it. Middle and hind coxae with deep sculpture, but not covered with denticles. Femora about 5X as long as broad. Foretibia without a basal tooth or sensilla basiconica; spur forked, unbranched. Tarsi 5-segmented; 1st segment much longer than the 2nd; claws about as long as width of empodium.

GASTER a little shorter than thorax, subpetiolate, globular, anterodorsally very steep-sided; petiole anelliform, about one-quarter as wide as propodeum; first 6 gastral tergites subequal in length except the 1st, which is distinctly longer than any other. Spiracle present. Cerci very narrowly touching, each with 4 bristles. Hypopygium reaching a little over halfway along gaster. Ovipositor about two-thirds as long as gaster or middle tibia.

Male. Except for antennae, wings, and genitalia very similar in appearance to female. Antennae filiform; funicle 10-segmented, with all segments except the 2nd much longer than broad, subequal; 2nd segment subquadrate, anelliform, several times smaller than any other. Wings of all known males shortened, not or hardly reaching apex of gaster. Forewing about 6X as long as broad, devoid of setae in disc; marginal setae rather sparse, the longest only slightly longer than maximum wing width; venation nearly reaching to three-quarters along wing. Hindwing about 14X as long as broad, about three-quarters as long as forewing, devoid of discal setae but with a few marginal setae, the longest twice the maximum wing width; venation reaching about halfway along wing. Genitalia relatively simple; aedeagus about one-third as long as middle tibia.

Remarks. *Paranagroidea* is closely related to *Campto-*

ptera and *Macrocamptoptera* Girault. It can be separated from *Camptoptera* by the key characters. It is most similar to *Macrocamptoptera*, from which it can be separated by the longer venation, less densely setose forewings, curved hindwing, presence of notaular lines, and longer fringe on the anterior margin of the forewing. In *Macrocamptoptera* the venation reaches to not more than one-fifth along the wing, the wings have several lines of setae in the disc, the hindwing is straight, notaular lines are absent, and the fringe along the anterior margin of the forewing is mostly shorter than the width of the wing. *Paranagroidea* may also be related to *Decamymar* Annecke, but differs in having much smaller eyes and heavily sculptured head and thorax (relatively shallow in *Decamymar*), petiolate gaster (cf. sessile, with phragma projecting well into base of gaster), and more developed venation.

Two species are known, one from New Zealand described below, and the other undescribed from India (BMNH).

Paranagroidea verrucosa new species

Figures 125–131

Female. Length range 0.60–0.85 mm ($n=11$); holotype 0.83 mm. Body dark brown or black; anterior half of scutellum occasionally tinged reddish. Scape and pedicel testaceous; scape margined darker brown. Coxae almost black; femora and tibiae dark reddish brown, slightly paler apically; tarsi testaceous. Wings hyaline, slightly suffused greyish-brown.

HEAD (Fig. 125) with very strong, raised reticulations about equal in mesh size to the diameter of an eye facet; sculpture around antennal toruli, which are slightly recessed, rather finer and shallower. Posterior ocellus separated from occipital margin by about its own diameter; ocelli forming an angle of about 130°. Eyes separated from occipital margin by twice the diameter of an ocellus. Longest seta on vertex slightly longer than diameter of antennal torulus. Relative dimensions (holotype): maximum head width 42; width of frontovertex at median suture 25; head length (anterior view) 38; maximum eye length 12, width 15; malar space 15; POL 16; OOL 8; scape length 30, maximum width 10; other proportions of antennae as in Fig. 126.

THORAX (Fig. 127). Pronotum and mesoscutum with raised, reticulate sculpture distinctly shallower than that on head, although of similar mesh size; anterior scutellum with shallow, raised, irregular, rugose-reticulate sculpture; posterior scutellum, propodeum, and metapleuron with slightly shallower, reticulate sculpture; sides of metanotum smooth. Disc of mesoscutum on either side with a seta

inside notaular line in anterior half; axillar seta almost in centre of axilla; anterior scutellum devoid of setae, about half as long as posterior scutellum. Wings, Fig. 128.

GASTER a little shorter than thorax in slide-mounted material, distinctly shorter in dry material. Relative lengths (paratype): ovipositor 72 [middle tibia 100].

Male. Length range 0.76–0.86 mm ($n=9$). Similar to female in all respects except antennae (Fig. 129), wings (Fig. 130), and genitalia (Fig. 131). In all known males wings reduced in size, not quite reaching apex of gaster.

Type data. **Holotype:** female, SD, Shakespeare Bay, litter 69/106, 11 August 1969, J. McBurney (NZAC).

Paratypes (13 females, 12 males) from the following localities: ND – Waipoua State Forest; SD – Shakespeare Bay.

Material examined. Type series only (NZAC, BMNH, CNCI, USNM, ANIC).

ND / SD.

Habitats noted: litter.

Adults collected August, October.

Biology. Unknown.

Remarks. *P. verrucosa* differs from the undescribed Indian species in forewing coloration and setation, sculpture of head and thorax, strength of bristles on head and thorax, and relative proportions of antennal segments.

Genus *Paranaphoidea* Girault

Figures 132–134; key couplet – female 64

Paranaphoidea Girault, 1913b: 115. Type species *Paranaphoidea egregia* Girault, 1913b; Australia.

Diagnosis. **Female** (Fig. 132). Length (excluding ovipositor) about 0.60–1.30 mm. Antenna (Fig. 133): scape moderately long; funicle 6-segmented; clava 2-segmented. Forewing (Fig. 134) at most about 3X as long as broad, apically rounded (New Zealand species only; normally truncate); marginal fringe relatively short; marginal and stigmal veins forming a shallow, sigmoid curve; disc below venation and a little distad of this naked, or nearly so. Posterior scutellum much longer than anterior scutellum, with a median longitudinal sulcus. Tarsi 4-segmented. Gaster subsessile or subpetiolate; sternites normally projecting forwards between hind and middle coxae. Ovipositor normally at least slightly exerted.

Male. Unknown.

Biology. Unknown.

Remarks. *Paranaphoidea* is very close to *Idiocentrus*, and may be regarded eventually as synonymous. For the present we maintain the two genera as distinct, pending examination of freshly collected material. As understood here, *Paranaphoidea* can be separated from *Idiocentrus* by having a two-segmented clava and the anterior gastral sternites less strongly advanced between the coxae.

Taxonomy: Girault (1913b, 1915a,b), Doutt (1973).

World status: about ten species; Australia.

New Zealand: one unidentified species.

Genus *Polynema* Haliday

Figures 135–139

Key couplets – 6, female 23, 48, male 86

Polynema Haliday, 1833. Type species *Ichneumon ovulorum* Linnaeus, 1758; Europe.

Diagnosis. **Female.** Length about 0.60–2.00 mm. Antenna (Fig. 135, 136): scape relatively short, not or hardly longer than width of frontovertex; funicle 6-segmented; clava solid. Wings (Fig. 137, 138) normally fully developed. Fully developed forewing hyaline or with an infuscate pattern, relatively narrow, about 4–5X as long as broad; venation short, hardly reaching more than one-quarter along wing; marginal and stigmal veins confluent, swollen, globular; discal setae sometimes extremely long (Fig. 138). Tarsi 4-segmented. Gaster petiolate; petiole at least about 2–3X as long as broad.

Male. Length about 0.50–1.70 mm. Similar in general appearance to female, but antenna (Fig. 139) with flagellum 11-segmented, the segments subequal.

Biology. Not known; elsewhere recorded as parasitoids of eggs of Diptera, Hemiptera, Coleoptera, and Lepidoptera.

Remarks. The New Zealand species can be separated from each other by the relative lengths of funicle segments, head shape, wing shape and setation, relative length of gaster and exerted part of ovipositor, and structure of thorax and propodeum. Two of them are unusual: one is completely apterous, with an almost cylindrical thorax, elongate pronotum, and reduced mesoscutum and scutellum; the other has the forewing with extremely long hairs in the disc, as in *Mymarilla* Westwood, and the hindwings reduced and filamentous. We follow Schauff (1984) in regarding *Barypolynema* Ogloblin as a junior synonym of *Polynema*.

Taxonomy: Soyka (1956a), Hincks (1950), New (1976), Schauf (1984).

World status: over 250 species; cosmopolitan.

New Zealand: eleven species; North and South islands.

Genus *Prionaphes* Hincks

Figures 140–146

Key couplets – female 25, 54, 56, 60, 68,
male 31, 781, 92

Prionaphes Hincks, 1961: 159. Type species *Prionaphes depressus* Hincks, 1961; New Zealand.

Diagnosis. Female. Length about 0.60–1.05 mm. Head (Fig. 143) angled inwards below antennal toruli towards mouth. Antenna (Fig. 140, 145): scape moderately long, at least a little longer than width of frontovertex; funicle 6-segmented; clava entire, or 2-segmented with suture incomplete. Wings fully developed or almost completely absent. Fully developed forewing (Fig. 142, 146) about 6x as long as broad, broadest subapically, here about one-half wider than at marginal vein; marginal and stigmal veins forming a shallow, sigmoid curve. Metanotum well developed, distinct from propodeum (Fig. 141). Phragma not or hardly reaching past posterior margin of propodeum. Tarsi 4-segmented. Gaster varying from subpetiolate to petiolate; petiole about one-third as wide as propodeum but always strongly transverse. Ovipositor not exerted, generally not more than half as long as gaster.

Male. Length about 0.60–1.05 mm. Generally similar in appearance to female, but antenna (Fig. 144) with flagellum filamentous, 11-segmented, the segments subequal.

Biology. Parasites of eggs of Cerambycidae (Coleoptera); *P. depressus* has been reared from eggs of *Prionoplus reticularis* White.

Remarks. *Prionaphes* is extremely close to *Cleruchus* Enoch, and may eventually be considered synonymous. We do not regard the segmentation of the clava as a good character for separating the genera, since many species have the clava indistinctly segmented, with the suture incomplete. However, the metanotum of *Cleruchus* is weak and often fused with the propodeum, whereas in *Prionaphes* it is distinct and always separate from the propodeum. Wing shape also seems to be a realistic character in separating the two genera. In *Cleruchus* the forewing is generally relatively more narrow (at least 9x as long as broad) and as broad near the apex as at the marginal vein, whereas in *Prionaphes* it is relatively broader (at most only a little more than 6x as long as broad) and distinctly broader

nearer the apex than at the marginal vein.

World status: known only from New Zealand.

New Zealand: three species, *depressus* Hincks and two undescribed; North and South islands.

Pseudanaphes new genus

Figures 147–149; key couplet – female 75

Type species *Pseudanaphes hirtus* new species.

Moderately robust species.

Female. HEAD in side view more or less evenly rounded anteriorly but very slightly flattened on vertex, in frontal view nearly one-half broader than long, in dorsal view with occiput vertical, about twice as broad as long and with frontovertex over twice as broad as an eye in this aspect. Area above occipital foramen without a semicircular ridge. Stemmaticum and occipital and coronal sutures absent. Ocelli very nearly in a straight line, forming an angle of about 160–170°; posterior ocelli nearly touching occipital margin. Eyes hairy, reaching occipital margin, which is slightly concave in dorsal view and sharp medially; setae each about as long as the diameter of a facet. Frontovertex at narrowest slightly more than half head width. Inner eye margins, vertex, face below toruli, genae, and part of occiput nearest genae with conspicuous long setae. Antennal torulus inserted at least its own diameter above lowest eye margin, separated from median suture by about its own diameter, from other torulus by about twice its own major diameter, from eye margin by about half its diameter, and from mouth margin by a little more than twice its own diameter. Antenna: radicle free, about one-fifth as long as scape; scape subcylindrical, reaching to a little above level of vertex; pedicel subconical; funicle 6-segmented; clava 3-segmented; setae on funicle about as long as diameter of segment of origin or slightly longer. Mandibles of moderate size, each with 3 apical teeth.

THORAX in side view moderately convex. Pronotum not clearly visible in dorsal view, short medially, not longitudinally divided; anterior margin not carinate; posterior margin strongly concave; pronotal setae moderately long; prosternum more or less divided by a longitudinal suture. Mesoscutum a little more than 1.5x as broad as long; mesothoracic spiracle near posterolateral corner of pronotum, its opening not modified, flush with surface of pronotum; notaular lines very deeply impressed, not interrupted. Scuto-scutellar suture very deeply impressed. Scutellum without a posteriorly projecting median ridge, a little longer than mesoscutum. Metanotum about one-third as long as scutellum. Propodeum moderately long, about

half as long as scutellum. A few scattered setae near posterior margin of pronotum, a pair of setae near posterior margin of mesoscutum, 1 on each axilla, and a pair on anterior scutellum; propodeal seta long. Forewing moderately broad, nearly 3x as long as broad; marginal fringe less than half as long as maximum wing width; discal setae moderately dense, evenly distributed, extending nearly to wing base; venation not quite reaching halfway along anterior margin; marginal and stigmal veins quite long. Hindwing about 1.5x as long as broad, about three-quarters as long as forewing; blade gradually tapering towards apex; venation not quite reaching halfway; marginal fringe a little more than twice as long as maximum wing width. Phragma barely reaching level with posterior margin of propodeum. Middle and hind coxae smooth. Fore and hind femora about 4x as long as broad; middle femur about 5x as long as broad. Foretibia without a basal tooth or sensilla basiconica; spur bifurcate, with 2 short lateral branches near its base. Tarsi 4-segmented; 1st segment slightly longer than the 2nd; claws shorter than width of empodium.

GASTER much shorter than thorax to about as long, subpetiolate; petiole distinctly transverse, not visible in dry-mounted material but about two-thirds as wide as thorax; 1st tergite at least about twice as long as any other, covering about half of gaster in dorsal view. Spiracle absent. Cerci well separated, each with 3 or 4 setae, 2 or 3 centrally and 1 on posterior margin. Hypopygium reaching to about two-thirds along gaster. Ovipositor at most about two-thirds as long as gaster or middle tibia.

Male. Unknown.

Remarks. *Pseudanaphes* bears a strong superficial resemblance to several species of *Anaphes*, but can be separated by the relatively hairy forewing, long marginal vein, and relatively short ovipositor (in most species of *Anaphes* the ovipositor is at least about as long as the gaster). *Pseudanaphes* belongs to the *Australomymar* group of genera, and can be separated from related genera by the key characters.

Found in New Zealand and possibly also Nepal (CNCI); in New Zealand only one species is known.

Pseudanaphes hirtus new species

Figures 147–149

Female. Length range 0.48–0.71 mm ($n=23$); holotype 0.67 mm. Head very dark shining brown, almost black; thorax more or less the same, but tinged slightly reddish-brown; gaster brown, but if slightly distended then base yellowish. Antennae with scape testaceous brown, paler at

apices; flagellum brown. Tibiae and tarsi testaceous yellow. Forewing more or less hyaline, but slightly infuscate below proximal end of marginal vein and immediately below latter; base of forewing and most of hindwing suffused pale greyish-brown.

HEAD smooth on frontovertex above median suture, above and below antennal toruli with shallow, rugose sculpture, between toruli with very shallow, faint reticulations. Setae on vertex nearly half as long as scape, those below toruli about half to two-thirds as long, distinctly curved upwards. Posterior ocellus nearly touching occipital margin, separated from eye margin by twice its own diameter. Relative dimensions (holotype): maximum head width 38; minimum frontovertex width 23; head length (frontal view) 29; maximum eye length 19, width 15; malar space 8; POL 14; OOL 4; scape length 17.5, maximum width 4.5; other proportions of antennae as in Fig. 147.

THORAX (Fig. 148) apparently entirely smooth on dorsum and sides except for some extremely shallow, reticulate sculpture near posterior margin of anterior scutellum; propodeum with some shallow, rugose sculpture near spiracle. Disc of mesoscutum with a pair of setae nearly at posterior margin, each seta nearly half as long as mesoscutum; setae on scutellum about as long as these; setae on axillae distinctly shorter. Forewing, Fig. 149.

GASTER. Relative lengths (paratype): ovipositor 59 [middle tibia 85].

Male. Unknown.

Type data. Holotype: female, AK, Titirangi, Malaise trap in garden, October 1980, P. A. Maddison (NZAC).

Paratypes (24 females) from the following localities: ND – Omahuta State Forest; AK – Huia, Titirangi, Waitakere Range; NN – Karamea.

Material examined. Type series only (NZAC, BMNH, CNCI, USNM, ANIC).

ND, AK / NN.

Habitats noted: moss, garden.

Adults collected August–November.

Biology. Reared from moss, and possibly parasitic on eggs of weevils (Coleoptera: Curculionidae) in the moss.

Genus *Richteria* Girault

Figures 5, 150–153

Key couplets – female 47, male 87

Richteria Girault, 1920b: 2. Type species *Richteria lamennai* Girault, 1920b; Australia.

Diagnosis. Female. Length about 1.00–1.15 mm. Antenna (Fig. 150): scape moderately long, about as long as width of frontovertex or a little longer; funicle 6-segmented; clava solid. Wings (Fig. 152) fully developed. Forewing about 4–6x as long as broad, infusate, with at least 1 subapical dark band and sometimes another proximal of it; venation short, not reaching one-quarter along wing; stigmal and marginal veins confluent, slender. Hindwing filamentous, about half as long as forewing. Tarsi 4-segmented. Gaster petiolate; petiole longer than broad.

Male. Length about 1.00–1.15 mm. Generally very similar to female, but antenna (Fig. 152) with flagellum filamentous, 11-segmented, the segments subequal. Dark markings on forewing (Fig. 153) paler than in female.

Biology. Unknown.

Remarks. *Richteria* is very close to *Polynema*, and may eventually be considered synonymous. As understood here it can be separated by its slightly shorter venation and filiform hindwings. A number of species described in *Polynema* by Girault may well belong in *Richteria* (see New 1976).

World status: two described species; Australia.

New Zealand: one species, probably undescribed; alpine areas of the South Island.

***Scleromyar* new genus**

Figures 154–160

Key couplets – female 14, male 15, 89

Type species *Scleromyar breve* new species.

Generally rather robust, heavily sclerotised species.

Female. HEAD in frontal view broader than long, in side view more or less evenly and gradually curved, very slightly flattened on vertex and below antennal toruli. Area above occipital foramen without a semicircular ridge. Occipital margin fairly to very concave in dorsal view. Stemmaticum and occipital and coronal sutures absent. Ocelli very small, in an obtuse angle of about 100–130°. Eyes naked or with extremely short, inconspicuous hairs, large, reaching or well separated from occipital margin, which is more or less rounded. Frontovertex at narrowest slightly more than half head width. Vertex, inner eye margins, and lower parts of face with short, inconspicuous setae. Antennal toruli slightly less than their own length from median suture, about 3.5x their own length from

mouth margin, separated from each other by about twice their own major diameter and from inner eye margin by less than their own diameter. Antenna: radicle free, about one-third as long as scape; scape subcylindrical to slightly flattened, reaching to about level with anterior ocellus; pedicel subconical; funicle 6-segmented; clava solid, enlarged, much wider than funicle; setation sparse; longitudinal sensilla present on clava only. Mandibles moderately large, at least about one-third as long as minimum width of frontovertex, each with 3 acute teeth or with lowest tooth blunt, middle tooth acute, and upper tooth almost absent.

THORAX in profile dorsally very flat, box-like, usually with sides dorsally very sharp; sutures between sclerites very straight. Pronotum not longitudinally divided; anterior margin slightly carinate; pronotal setae minute; prosternum divided by a longitudinal suture. Mesoscutum about 3x as broad as long; mesothoracic spiracle at posterolateral corner of pronotum, its opening unmodified, flush with pronotum; notaular lines indistinct, uninterrupted. Axillae without setae. Scutellum without a posteriorly projecting median ridge, conspicuously shorter than mesoscutum but also about 3x as broad as long. Metanotum very small, inconspicuous, about 3x as broad as long. Propodeum large, fused to metapleuron, much longer than scutellum, equivalent in size to mesoscutum; propodeum often with posterior half vertical, at 90° to anterior half, the junction between the two very sharp; propodeal spiracles small, on lateral face of propodeum, not visible in dorsal view. Dorsum of thorax with about 3 pairs of very short, inconspicuous setae. Pleural sutures very straight, almost perpendicular. Phragma and wings absent. Middle and hind coxae not covered with denticles. Femora about 4x as long as broad. Foretibia without a basal tooth or sensilla basiconica; spur bifurcate, without lateral branches. Tarsi 4-segmented; 1st foretarsal segment at least twice as long as the 2nd; middle and hind tarsi with 1st segment only slightly longer than the 2nd; claws slightly shorter than width of empodium.

GASTER at least about as long as head and thorax together, subsessile; petiole very short, not visible in dry-mounted specimens; 1st tergite covering nearly entire gaster. Spiracle present. Cerci not visible, possibly absent. Gaster ventrally projecting slightly anteriorly between hind coxae and occasionally all coxae. Ovipositor at least about as long as gaster, or twice as long as middle tibia, often exerted at apex of gaster.

Male. HEAD more or less evenly rounded anteriorly in side view, enlarged, so that in dorsal view it is at least about one-third wider than thorax. Area above occipital foramen without a semicircular ridge. Occipital margin rounded, only slightly concave in dorsal view. Stemmaticum and

occipital and coronal sutures absent. Ocelli forming an angle of about 130°; posterior ocelli much closer to occipital margin than to posterior eye margin. Eye relatively small, clearly separated from occipital margin by about half its own length. Frontoververtex width about two-thirds of head width. Antennal torulus touching median suture, nearly touching inner eye margin, separated from mouth margin by about 2.3–3.0x its own diameter and from other torulus by about twice its diameter. Mandibles very large, more than half as long as minimum width of frontoververtex. Antenna: radicle more or less free, about one-third as long as scape; scape subcylindrical, reaching to about level with anterior ocellus; pedicel subconical; flagellum 11-segmented, the segments nearly naked, usually with only a pair of subapical setae. Mandible large, more than half as long as minimum width of frontoververtex, each with 3 strong, acute apical teeth.

THORAX dorsally flat, but less robust and box-like than in female. Pronotum not long; anterolateral margins more or less acute. Mesoscutum about 2.5x as broad as long; notaular lines present. Scutellum about two-thirds as long as mesoscutum. Metanotum a little over one-fifth as long as scutellum. Propodeum about as long as mesoscutum. Wings absent or fully developed. Fully developed forewing about 5x as long as broad; marginal vein long (see Fig. 159). Hindwing about half as long as forewing, about 15x as long as broad; anterior marginal setae very short, sparse.

GASTER slightly shorter than head and thorax together. Genitalia with digiti moderately long and broad, each with 3 subapical socketed pegs.

Remarks. The structure of the head and the forewing venation of the male strongly suggest that *Scleromyrmar* – and thus perhaps also *Cybomyrmar* – may belong in the *Australomyrmar* group of genera. The male can be separated from males of related genera by the absence of wings or, in the winged form, by having the anterolateral margins of the pronotum acute. Females can be distinguished by the structure of the thorax and the absence of wings.

New Zealand only; about five species are known.

***Scleromyrmar brevis* new species**

Figures 154–160

Female (Fig. 154). Length range 0.48–0.73 mm ($n=21$); holotype 0.59 mm. Generally orange-brown, although gaster occasionally dark brown and head dark purplish brown. Antennae ranging from testaceous to totally dark brown, but radicle always testaceous, and 5th and 6th funicle segments sometimes much paler than remainder of

flagellum. Legs testaceous to testaceous brown.

HEAD with fairly rough, raised, reticulate sculpture on frontoververtex; below antennal toruli and on cheeks sculpture shallower, raised, reticulate. Setae on eyes extremely short, hardly visible. Posterior ocellus equidistant from occipital margin, eye, and anterior ocellus. Relative dimensions (holotype): maximum head width 37; minimum frontoververtex width 18; head length (frontal view) 23; maximum eye length 18, width 15; malar space 9.5; POL 10; OOL 2; scape length 14.5, maximum width 4.5; other proportions of antenna as in Fig. 155.

THORAX (Fig. 156). Pronotum with shallow, raised, reticulate sculpture; remainder of dorsum smooth or with very shallow, reticulate sculpture on mesoscutum and scutellum; propodeum smooth or with shallow, irregular, raised, rugose sculpture. A pair of setae each on pronotum, mesoscutum, and scutellum. Propodeum with a sharp, transverse carina near middle, this usually complete and straight, sometimes broken medially or laterally and not straight; propodeum angled 90° at carina in lateral view.

GASTER. Venter anteriorly just projecting between hind coxae. Relative lengths (paratype): ovipositor 100 [middle tibia 46].

Male. Length about 0.5 mm ($n=1$). Head in facial view, Fig. 157; antenna, Fig. 158; forewing, Fig. 159; genitalia, Fig. 160; otherwise as in generic description. Relative dimensions: head width 61; scape length 26; middle tibia length 61; aedeagus length 35.

Type data. **Holotype:** female, AK, Lynfield, Wattle Bay, litter under *Scirpus* grass, April 1977, A.K. Walker (NZAC).

Paratypes (24 females, 1 male) from the following localities: ND – Waipoua State Forest; AK – Lynfield; NN – Mount Augustus; BR – Mawhera State Forest, Punakaiki, Reefton (Tawhai State Forest).

Material examined. Type series only (NZAC, BMNH, CNCI, USNM, ANIC).

ND, AK / NN, BR.

Habitats noted: litter under *Scirpus* grass; litter; swards; moss.

Adults collected March, April, July, September, October.

Biology. Unknown.

Remarks. The remaining, undescribed species can be distinguished from *brevis* by the relative length of antennal segments, shape of thoracic sclerites, and relative length of ovipositor.

Steganogaster new genus

Figures 161–168

Key couplets – 41, female 23, male 29

Type species *Steganogaster silvicola* new species.

Generally fairly robust species with head, in dry-mounted specimens, characteristically tucked in towards forecoxae.

Female. HEAD in side view more or less evenly rounded anteriorly, although rather more strongly so above antennal toruli; vertex and face conspicuously flatter; occipital margin slightly concave in dorsal view. Area above occipital foramen without a semicircular ridge. Stemmaticum and occipital and coronal sutures absent. Ocelli forming an obtuse angle of about 110°. Eye naked, not large, clearly separated from rounded occipital margin by at least the diameter of a posterior ocellus. Frontovortex slightly more than half as wide as head. Inner eye margins subparallel, converging slightly ventrad. Setae on vertex, face, and along inner eye margins moderately long and conspicuous. Antennal toruli situated at least their own diameter above inferior eye margin, their own diameter below median suture, less than half a diameter from eye margin, and about twice their own diameter from mouth margin and from each other. Antenna: radicle more or less free, about one-third as long as scape; scape not long, not reaching anterior ocellus, slightly flattened; pedicel subquadrate, abruptly narrowed near base; funicle 6-segmented; clava solid or occasionally with a pair of incomplete sutures dorsally; longitudinal sensilla present on funicle segments 5 and 6 and on clava; setation from fairly short and inconspicuous to about as long as the diameter of segment of origin. Mandibles moderately large, each with 3 strong teeth.

THORAX dorsally very flat in side view, although anterior half of mesoscutum slightly convex, and propodeum forming a strong angle with scutellum. Pronotum hidden in dorsal view, not longitudinally divided, not carinate anteriorly; posterior margin very concave; pronotal setae not long; prosternum entire or divided in posterior half by a longitudinal suture. Mesoscutum nearly twice as broad as long; mesothoracic spiracle at posterolateral corner of pronotum, its opening unmodified, flush with surface of pronotum; notaular lines present or absent; disc with 1–3 pairs of setae. Axillar setae minute to fairly long. Scutellum about as long as mesoscutum, its apex produced to form a short, translucent flange, posteriorly with no projecting ridge. Metanotum about one-fifth as long as scutellum; metanotal setae flattened, scale-like. Propodeum (Fig. 163) about half as long as scutellum, laterally with a characteristic sharp, often partly transparent ridge extending from above posterior edge of hind coxae to about anterior

margin of propodeum; propodeum with a pair of distally converging carinae in the form of a V or Y. Forewing moderately broad, fully developed or shortened; fully developed forewing about 3.5x as long as broad; marginal setae about one-quarter width of wing; discal setae more or less evenly distributed; all species more or less infusate below proximal two-thirds of venation; setae below proximal half of marginal vein each characteristically encircled with a small hyaline area (Fig. 168); marginal vein elongate; apex of venation reaching about two-fifths along wing. Hindwing not quite as long as forewing, over 20x as long as broad; blade subparallel-sided; apex pointed; discal cilia arranged in 1 or 2 lines; marginal setae a little more than 3x as long as greatest wing width; apex of venation a little more than one-third along wing. Phragma reaching to about posterior margin of propodeum. Middle and hind coxae without denticles. Forefemur a little more than about 4x as long as broad; middle and hind femora about 3.5–4.0x as long as broad. Foretibia without a basal tooth, with about 10 sensilla basiconica arranged in 2 irregular rows along its length; spur forked, with or without a few lateral branches. Tarsi 4-segmented; 1st segment considerably longer than the 2nd; claw about as long as width of empodium.

GASTER about as long as head and thorax together or a little shorter, with a very characteristic appearance (Fig. 161, 165): first 2 tergites and all sternites forming a translucent envelope which completely encloses at least proximal half and sometimes all of gaster. Spiracle present. Cerci well separated, each with 3 bristles. Ovipositor not exerted to distinctly exerted, and from shorter than gaster (a little longer than middle tibia) to clearly longer than gaster (more than twice as long as middle tibia), often slightly upcurved apically.

Male. Almost identical to female, but scape and pedicel relatively slightly shorter; antennal flagellum 11-segmented, with longitudinal sensilla on every segment; gastral spiracle absent; genitalia with phallobase reduced, almost ring-like; digiti long and slender.

Remarks. *Steganogaster* belongs to the *Australomyrmar* group, and is probably most closely related to *Ischiodasys*. The lateral carinae on the propodeum, the hyaline areas surrounding each seta below the forewing marginal vein, and the peculiar structure of the gaster distinguish *Steganogaster* from all other genera. The structure of the 'translucent envelope' enclosing the gaster is not entirely clear, but it appears to comprise the fused first, second, and possibly even third gastral tergites and all the sternites. This will be resolved only by dissecting fresh material.

Found in New Zealand only; at least five species, in North, South, Three Kings, and Chatham islands.

Steganogaster silvicola new species

Figures 161–167

Female (Fig. 161). Length range 0.84–0.96 mm ($n=14$); holotype 0.96 mm. Head and thorax obscure dark shining brown; occasionally thorax slightly reddish-brown. Scape and pedicel yellowish, but dusky along dorsal margins; 1st funicle segment testaceous brown, remainder of flagellum dark brown. Legs brownish testaceous, with apices of segments and all tarsal segments except the 4th yellowish. Forewing largely hyaline, but with an infuscate area in disc below apex of submarginal vein and marginal vein; setae below marginal vein each surrounded by a small, circular, hyaline area; hindwing very lightly infuscate just below subapical area of venation. Gaster with 'envelope' translucent, whitish, the internal sclerites dark brown.

HEAD above median suture with shallow, rugose sculpture, between ocelli almost reticulate, below suture very nearly smooth, but with some barely perceptible reticulate sculpture; genae with shallow, engraved, reticulate sculpture. Setae on vertex short, hardly longer than the diameter of an ocellus; 3 pairs of downward- and inward-directed setae between toruli, and numerous setae on lower parts of face, these about as long as minimum width of scape. Posterior ocellus separated from eye margin by about 3X its own diameter, and from anterior ocellus by about twice its diameter. Relative dimensions (holotype): maximum head width 41; minimum frontovertex width 22.5; head length (frontal view) 35; maximum eye length 21, width 15; malar space 12; POL 10; OOL 6.5; scape length 17, maximum width 5.5; other proportions of antenna as in Fig. 162.

THORAX (Fig. 163). Pronotum with very shallow, rugose sculpture; mesoscutum with shallow, engraved, reticulate sculpture, becoming rugose laterally; scutellum almost devoid of sculpture, but with some very shallow, irregular, longitudinally elongate, rugose sculpture. Disc of mesoscutum with 2 or 3 pairs of short setae just inside the rather obscure notaular lines; axillae each with a pair of fairly long setae. Carinae on propodeum in the shape of a V, or a Y with a short stalk; supracoxal carina very distinct, posteriorly with a transparent, oval window. Prosternum divided longitudinally by a suture in posterior half only. Forewing (Fig. 164) fully developed. Foretibial spur with a few very short lateral branches.

GASTER (Fig. 165) slightly longer than thorax, with ovipositor slightly exerted at apex. Several pairs of long setae along lateral margins of gaster; 'membranous envelope' nearly reaching apex of gaster ventrally. Relative lengths (paratype): ovipositor 103 [middle tibia 62].

Male. Length about 0.73–0.94 mm ($n=2$). Generally similar to female, apart from antennae (Fig. 166) and

genitalia (Fig. 167). Relative dimensions: head width 53; minimum frontovertex width 30; scape length 15; middle tibia length 68; aedeagus length 31.

Type data. **Holotype:** female, MC, Banks Peninsula, Prices Valley, Malaise trap, edge of native bush, December 1980, R. P. Macfarlane (NZAC).

Paratypes (15 females, 2 males) from type locality.

Material examined. Type series only (NZAC, BMNH, CNCI, USNM, ANIC).

— / MC.

Habitats noted: edge of native bush.

Adults collected January, December.

Biology. Unknown.

Remarks. The species of *Steganogaster* are distinguishable from each other by their antennal structure, depth of the notaular lines, colour of the thorax, strength of the propodeal carinae, shape of the median carina on the propodeum, relative length of the ovipositor, development and shape of the forewing (see, e.g., Fig. 168), and relative length of the marginal fringe.

Genus *Stephanodes* Enock

Figures 4, 169–171; key couplet – female 48

Stephanodes Enock, 1909: 457. Type species *Stephanodes elegans* Enock, 1909; England.

Diagnosis. Female. Length about 0.80–1.13 mm. Antenna (Fig. 169): scape short, stout, much shorter than minimum width of frontovertex; inner surface rough, rasp-like, covered with numerous scale-like structures; funicle 6-segmented; clava solid. Prothoracic spiracle advanced, situated about halfway along lateral margin of pronotum. Wings fully developed. Forewing (Fig. 170) about 4X as long as broad; venation short, not reaching more than about one-quarter along wing; marginal and stigmal veins confluent, very slender. Tarsi 4-segmented. Gaster petiolate; petiole slender, at least 3–4X as long as broad. Ovipositor not or hardly exerted.

Male. Length about 0.80–1.10 mm. Similar to female, but flagellum 11-segmented, the segments subequal.

Biology. Unknown; elsewhere recorded as parasitoids of eggs of Membracidae (Homoptera).

Remarks. Taxonomy: Taguchi (1978).

World status: seven species; Holarctic, Afrotropical, and Oriental regions.

New Zealand: one unidentified, possibly undescribed species from subalpine and alpine areas of the South Island.

Genus *Stethynium* Enock

Figures 171–175

Key couplets – female 71, male 88

Stethynium Enock, 1909: 452. Type species *Stethynium triclavatum* Enock, 1909; England.

Diagnosis. Female. Length (excluding ovipositor) about 0.40–0.70 mm. Head, Fig. 171. Antennal toruli each joined to mouth margin by a membranous line. Antenna (Fig. 172): scape moderately short, not more than about 3x as long as broad, about as long as minimum width of frontovertex; funicle 6-segmented; clava 2- or 3-segmented, the sutures sometimes incomplete. Thorax (Fig. 173) with axillae not advanced into lateral lobes of mesoscutum; posterior scutellum divided by a longitudinal sulcus, medially more than twice as long as anterior scutellum. Phragma projecting into base of gaster. Wings (Fig. 174) fully developed. Forewing about 4–6x as long as broad, abruptly narrowed distad of venation; venation not reaching more than one-third along wing; marginal vein very short, forming a more or less smooth, sigmoid curve with stigmal vein; a hypochaeta present between proximal and distal macrochaetae on distal part of venation (Fig. 173); marginal fringe long, exceeding maximum wing width. Tarsi 4-segmented. Gaster sessile; petiole at least about two-thirds as wide as propodeum. Ovipositor hardly to clearly exerted.

Male. Length about 0.40–0.70 mm. Similar in appearance to female, but antenna (Fig. 175) with flagellum filiform, 11-segmented, the segments subequal, longer than broad.

Biology. Unknown; elsewhere recorded from eggs of Membracidae (Homoptera).

Remarks. *Stethynium* is very close to *Anagrus* (q.v.).

Taxonomy: Girault (1912, 1914, 1915a, 1920a, 1931, 1938).

World status: fifty-one species; cosmopolitan, but most species described by A.A. Girault from Australia.

New Zealand: at least two species; North and South islands.

Zelanaphes new genus

Figures 176–179

Key couplets – female 52, male 78

Type species *Zelanaphes lamprogonius* new species.

Generally moderately slender species.

Female. HEAD in side view more or less gradually and evenly curved from frontovertex to mouth margin, not angled below antennal toruli, although slightly inflexed at this point; occipital margin only slightly concave in dorsal view. Area above occipital foramen without a semicircular ridge. Stemmaticum rectangular; coronal and occipital sutures absent. Postfrontal suture nearly reaching occipital foramen. Ocelli forming an angle of 130°. Eyes with moderately long setae, each about as long as the diameter of a facet, separated from occipital margin – which is sharp, but not strongly so – by several times the diameter of a posterior ocellus, clearly converging ventrad; frontovertex thus level at its narrowest point with lower eye margins, here less than one-third maximum width of head (Fig. 175); inner eye margins more or less straight; malar space short, only about one-fifth length of eye. Frontovertex with a few moderately long, conspicuous setae, particularly along inner eye margins, near posterior ocelli, and below antennal toruli. Antennal toruli separated from median suture by slightly less than their own length, and from each other by about their own length, nearly touching inner eye margins, separated from mouth margin by about 3x their own length. Antennae set relatively high on head, at least slightly above centre of eyes; radicle free, about one-sixth as long as scape; scape reaching above posterior ocelli; funicle 6-segmented; clava entire; longitudinal sensilla present on clava only; longest setae on flagellum nearly twice as long as diameter of 1st funicle segment. Mandibles moderately large, nearly as long as minimum width of frontovertex, each with 3 strong teeth.

THORAX. Mesoscutum fairly convex; scutellum, metanotum, and propodeum moderately flat. Pronotum short medially, not clearly visible in dorsal view, longitudinally divided, without an anterior carina; posterior margin very concave; prosternum divided by a longitudinal suture. Mesoscutum about one-half broader than long; anterior margin slightly produced, overhanging pronotum; hind margin very concave; mesothoracic spiracle at posterolateral corner of pronotum, its opening large, unmodified, flush with surface of pronotum; pronotal setae fairly long; notaular lines clearly visible, straight, not interrupted. Axillar setae fairly short. Scutellum about as long as mesoscutum, medially without a posteriorly projecting ridge, but produced as 2 short lateral lobes, so apex dis-

tinctly concave. Metanotum medially about one-fifth as long as scutellum; posterior margin almost straight. Propodeum medially a little over half as long as scutellum; spiracles not large, situated about their own diameter from anterior margin of propodeum. Forewing relatively broad, about 6X as long as broad; venation reaching to about two-fifths along wing; marginal fringe at longest not quite twice maximum wing width. Hindwing about as long as forewing, over 20X as long as broad; margins subparallel, gradually tapering towards acute apex; marginal fringe at longest about 6X as long as maximum width of wing; venation reaching to about one-third along wing. Phragma clearly projecting past posterior margin of propodeum into base of gaster. Middle coxa with a few denticles on its internal face; hind coxa without denticles. Femora about 4X as long as broad. Foretibia without a basal tooth, with a few scattered sensilla basiconica in its distal half; spur bifurcate, with a few short lateral branches. Tarsi 4-segmented; 1st segment a little longer than the 2nd; claw about as long as width of empodium.

GASTER about as long as thorax, subsessile; petiole slightly less than half as broad as propodeum; tergites 1–6 subequal in length. Spiracle absent. Cerci well separated, each with 3 bristles. Hypopygium not quite extending to about halfway along gaster. Ovipositor about as long as gaster, or slightly longer than middle tibia.

Male. Generally very similar to female, but flagellum 9-segmented, and clava about as long as the preceding 2 segments together.

Remarks. *Zelanaphes* belongs to the same group of genera as *Anaphes*, and is characterised by the high position of the antennal toruli, strongly convergent eyes, short malar space, eyes well separated from occipital margin, and nine-segmented flagellum in the male.

Found in New Zealand only; a single species is known.

Zelanaphes lamprogonius new species

Figures 176–179

Female. Length range approximately 0.49–0.56 mm ($n=3$); holotype about 0.56 mm. Head and gaster dark brown; thorax, including legs, orange-brown. Antennae yellowish testaceous. Wings infusate pale brownish; forewing with a hyaline area from apex to anal angle (Fig. 177).

HEAD (Fig. 176) almost smooth, but with some very shallow, longitudinally rugose sculpture below antennal toruli. Setae on vertex about as long as those on inner margin of scape, which in turn are about one-fifth as long as scape. Posterior ocellus separated from occipital margin

by about its own diameter, clearly closer to the latter than eye is to occipital margin, separated from eye and anterior ocellus by about twice its own diameter. Relative dimensions (holotype): maximum head width 72; minimum width of frontovertex 23.5; length of head (frontal view) 63; eye length (frontal view) 48; scape length 47; other proportions of antenna as in Fig. 177.

THORAX almost smooth, but disc of mesoscutum with some extremely shallow, almost imperceptible, hexagonal reticulate sculpture; scutellum with extremely shallow, longitudinally rugulose sculpture. Disc of mesoscutum with a pair of long setae almost at anterior margin; anterior scutellum and metanotum each with a single seta on either side; propodeum with postspiracular seta much nearer to posterior margin than to spiracle. Forewing, Fig. 178.

GASTER about as long as thorax. Relative lengths (holotype): ovipositor 85 [middle tibia 66].

Male. Length 0.41 mm ($n=1$). Very similar to female. Antenna, Fig. 179. Relative dimensions: frontovertex width at median suture 28; scape length 33; middle tibia length 62; aedeagus length 18.

Type data. **Holotype:** female, BP, Mamaku Plateau, Horohoro State Forest, Tikitiki Stream, 24 July 1976, liverworts and mosses 76/52, J. S. Dugdale (NZAC).

Paratypes (4 females, 2 males) from the following localities: AK – Lynfield; BP – Horohoro State Forest.

Material examined. Type series only (NZAC, BMNH). AK, BP / —.

Habitats noted: litter; liverworts and mosses.

Adults collected April, July.

Biology. Unknown.

Genus A

Figure 180; key couplet 7

Diagnosis. **Female** (Fig. 180). Length about 0.5–0.6 mm. Antenna with flagellum undifferentiated, 9-segmented, filamentous, more or less male-like in appearance; 7th and 8th flagellar segments each with a curious apicoventral projection. Wings extremely short, not reaching apex of gaster. Tarsi 4-segmented. Gaster about as long as head and thorax together, subsessile; petiole very transverse, indistinct, about one-third as wide as propodeum; ovipositor very slightly exerted, only a little shorter than gaster.

Male. Unknown.

Biology. Unknown.

Remarks. The material at hand consists of a series of thirteen females collected from leaf litter at 1200 m on Mt Stokes MB, but is in very poor condition. A formal description of the genus must be deferred until fresh material becomes available.

World status: one species; New Zealand only.

New Zealand: one undescribed species, MB.

Genus B

Figures 181, 182; key couplet 65

Diagnosis. Female. Length about 0.8–0.9 mm. Antenna (Fig. 181) with 6 funicle segments; 4th and 6th segments subequal, distinctly shorter than the subequal 3rd and 5th; clava 2-segmented, its apex acutely pointed. Wings fully developed. Forewing (Fig. 182) gradually widening distad; discal setae moderately dense; marginal and stigmal veins forming a smooth, sigmoid curve; disc opposite marginal vein without a single, conspicuous, erect, submarginal seta just proximad of marginal setae on hind margin. Tarsi 4-segmented. Gaster about as long as thorax, subsessile; petiole strongly transverse, about one-third as wide as propodeum.

Male. Unknown.

Biology. Unknown.

Remarks. The genus appears to be related to *Anaphes*, but lacks the single erect seta basad of the posterior marginal fringe of the forewing, and also has very characteristic short fourth and sixth funicle segments (cf. some species of *Ischiodasys*). A formal generic description is deferred pending study of freshly collected material, to determine more accurately its relationship with *Anaphes*.

World status: one species; New Zealand only.

New Zealand: one undescribed species.

Genus C

Figures 183, 184; key couplet 73

Diagnosis. Female. Length about 0.9 mm. Antenna (Fig. 183) with 6 funicle segments, these gradually increasing in width and decreasing in length from 2nd to 6th; 1st segment subequal in length to 6th; clava 3-segmented, its apex rounded. Wings fully developed. Forewing (Fig. 184) hyaline, about 4–5x as long as broad; marginal and stigmal veins forming a smooth, sinuate curve; apex of venation about one-third along wing; discal setae moderately dense; marginal setae a little shorter than maximum wing width. Phragma not projecting past posterior margin of propo-

deum. Gaster subsessile, not ventrally advanced between coxae; ovipositor about as long as gaster.

Male. Unknown.

Biology. Unknown.

Remarks. This genus is closely related to *Idiocentrus*, but differs in having more densely hairy forewings and lacking the anterior extension of the gastral sternites. We have examined only a single female specimen in relatively poor condition, and defer a formal description until further material is available for study.

World status: one species; New Zealand only.

New Zealand: one undescribed species.

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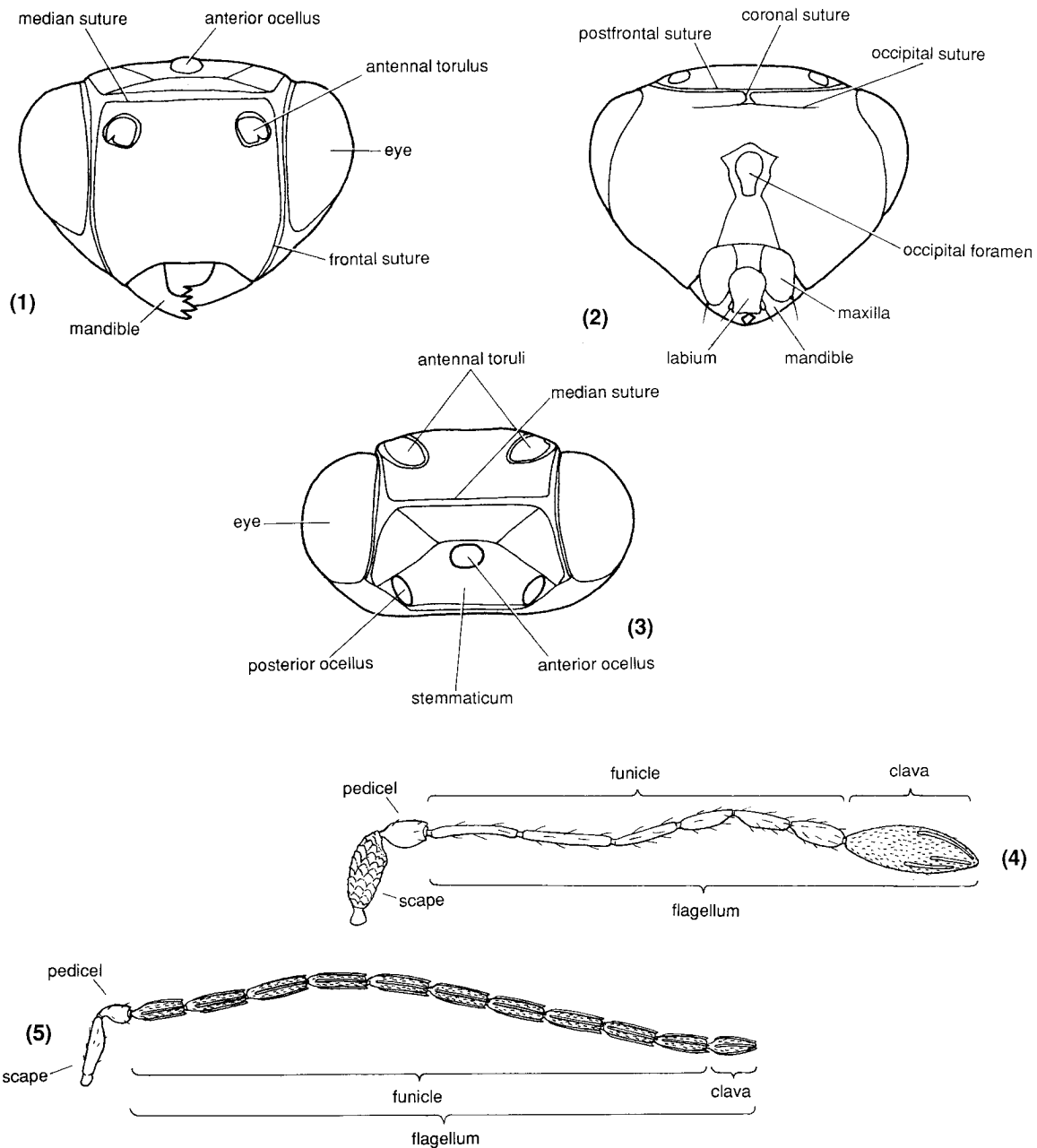
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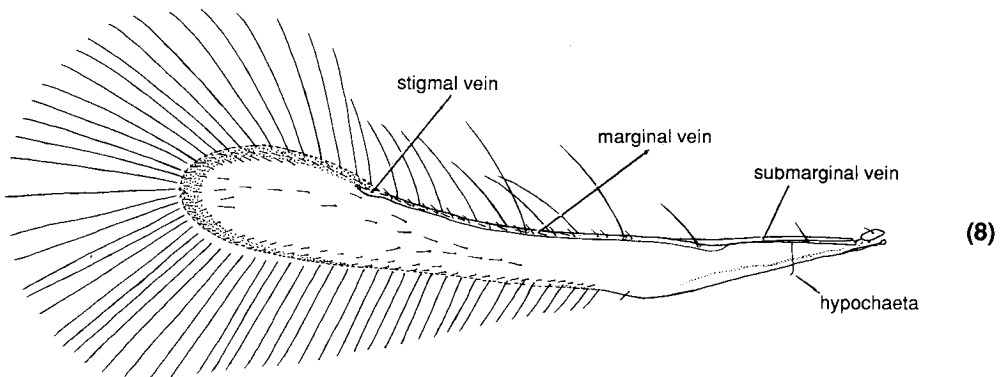
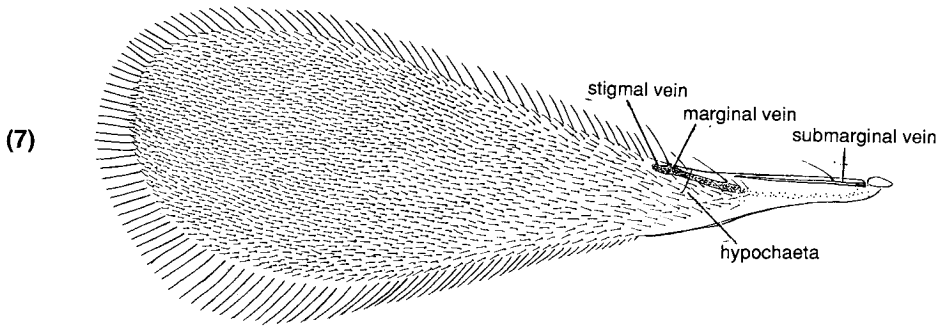
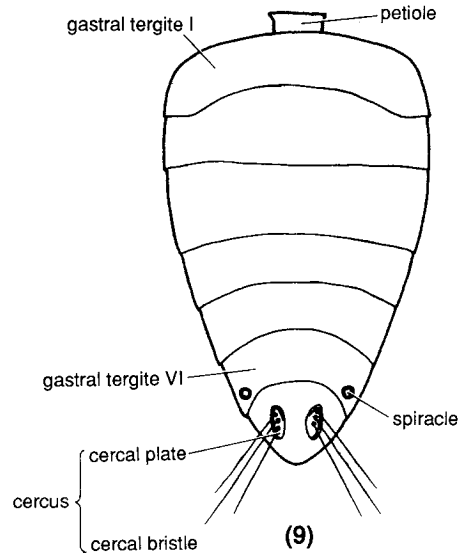
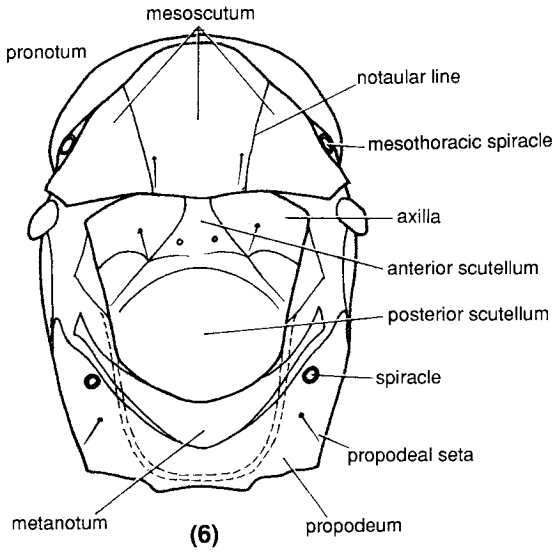
Appendix Table 1 Host associations of some New Zealand Mymaridae. A list of the sources of some of these records is given by Valentine (1967).

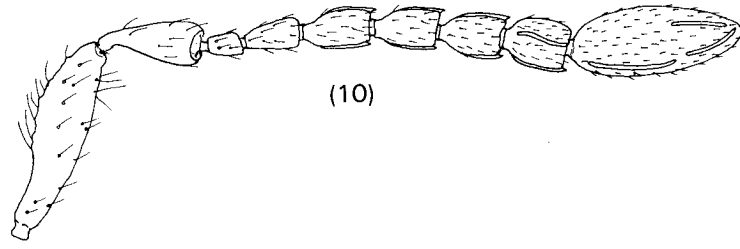
Mymarid species	Host species	Host family	Host order
<i>Alaptus</i> sp.	unknown	unknown	Psocoptera
<i>Anagrus armatus</i>	<i>Typhlocyba froggatti</i>	Cicadellidae	Hemiptera
<i>Anaphes nitens</i>	<i>Gonipterus scutellatus</i>	Curculionidae	Coleoptera
<i>Idiocentrus mirus</i>	<i>Amphipsalta? cingulata</i>	Cicadidae	Hemiptera
	<i>Kikihia muta</i>	Cicadidae	Hemiptera
	<i>Rhodopsalta cruentata</i>	Cicadidae	Hemiptera
<i>Prionaphes depressus</i>	<i>Prionoplus reticularis</i>	Cerambycidae	Coleoptera

ILLUSTRATIONS

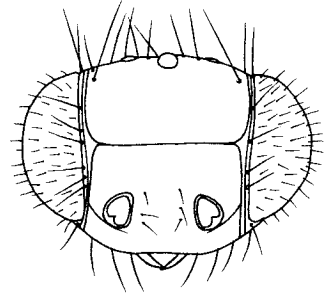


Figures 1–9 Morphology of Mymaridae: 1–3, generalised head, in frontal, posterior, and dorsal aspect. 4, 5, antennae of female (*Stephanodes* sp.) and male (*Richteria* sp.). 6 generalised thorax, dorsal aspect. 7, 8, forewings of female *Gonato-cerus* sp. and *Arescon* sp. 9, generalised gaster, dorsal aspect.

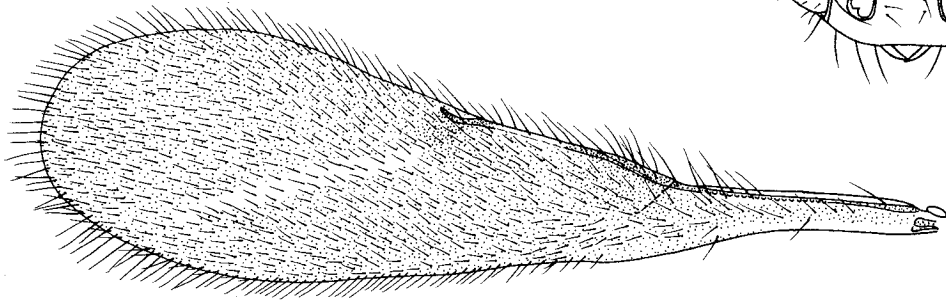




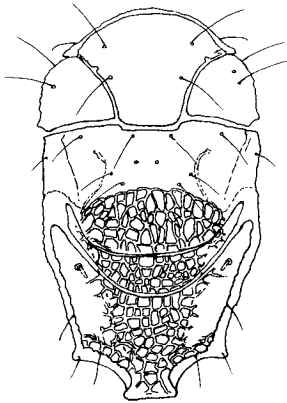
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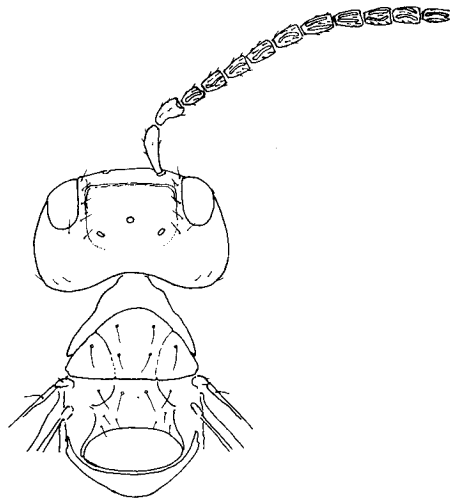
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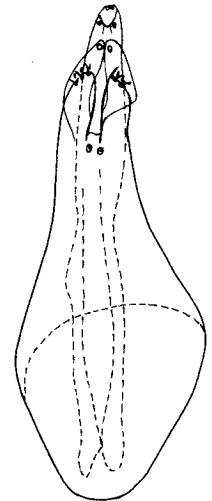
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(12)



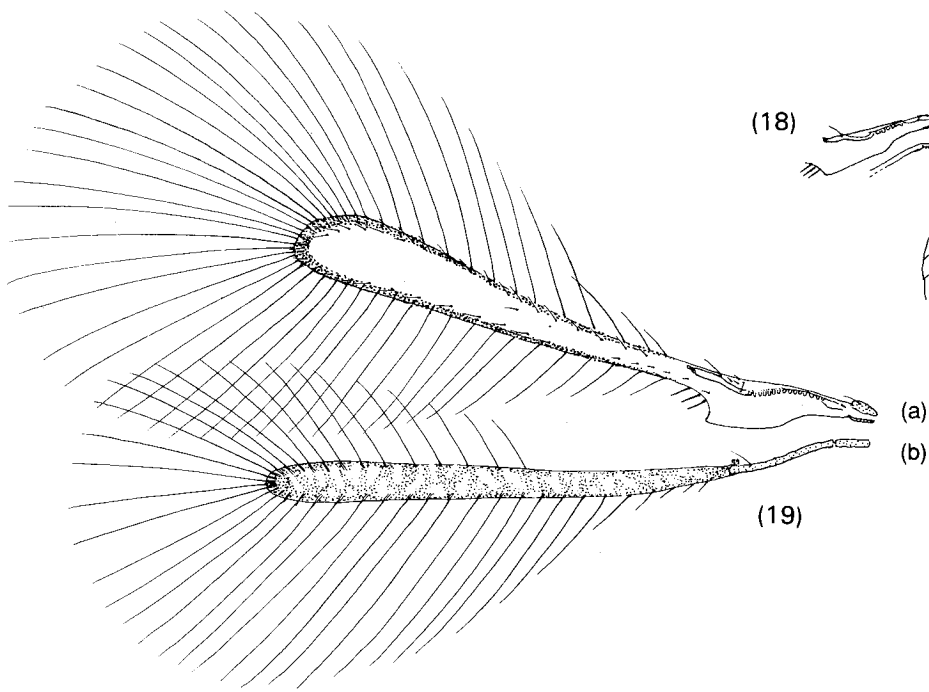
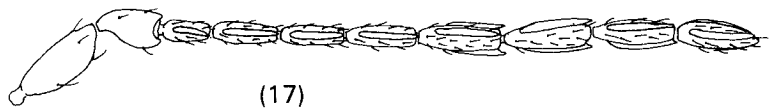
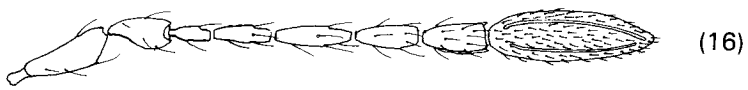
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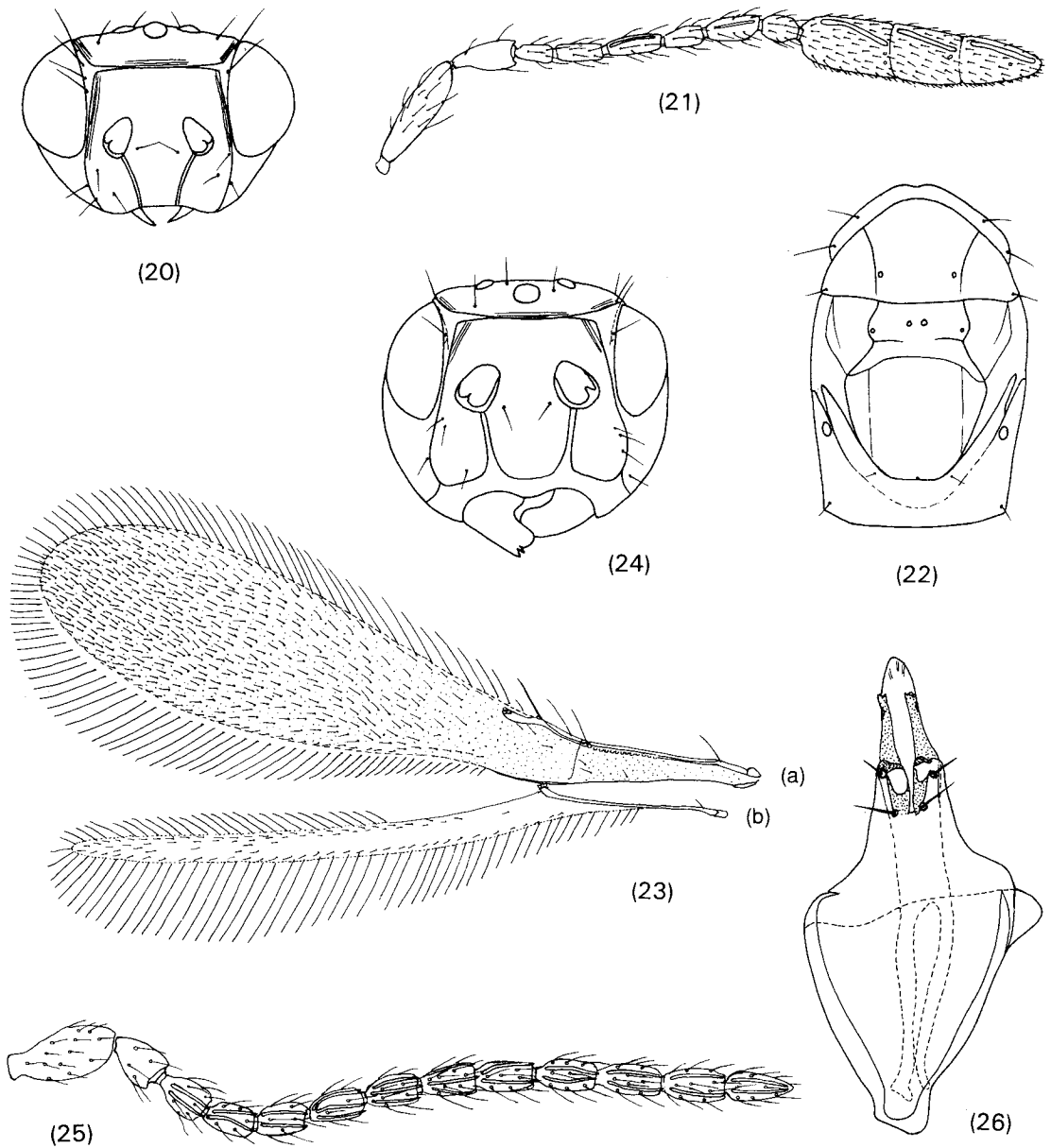


(15)

Figures 10–15 *Acmotemnus luteiclava*: (10) antenna, female; (11) head, frontal aspect, female; (12) thorax, dorsal aspect, female; (13) left forewing, upper surface, female; (14) head and thorax, dorsal aspect, male; (15) genitalia, male.

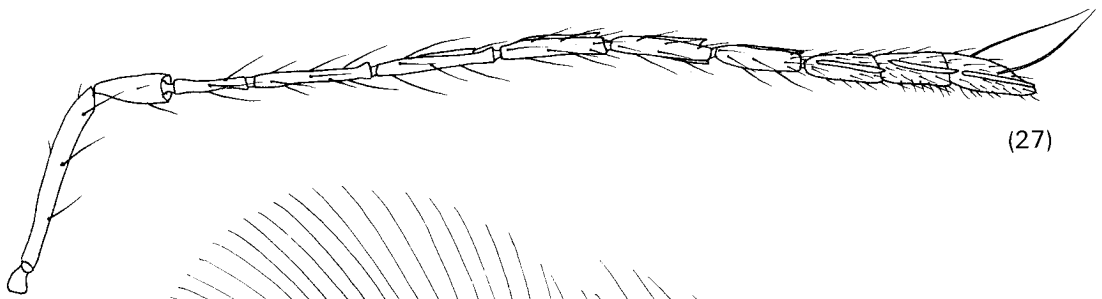
Figures 16–19 *Alaptus* sp.: (16) antenna, female; (17) antenna, male; (18) thorax, dorsal aspect, male; (19) wings, upper surface, left pair – (a) forewing, (b) hindwing.



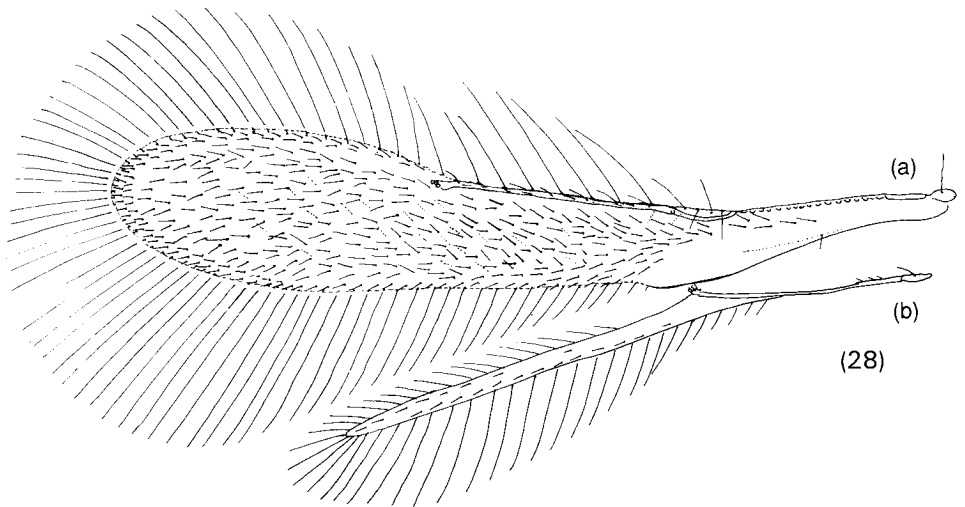


Figures 20–26 *Allanagrus magniclava*: (20) head, frontal aspect, female; (21) antenna, female; (22) thorax, dorsal aspect, female; (23) wings, upper surface, left pair – (a) forewing, (b) hindwing; (24) head, frontal aspect, male; (25) antenna, male; (26) genitalia, male.

Figures 27, 28 *Allarescon ochroceras*: (27) antenna, female; (28) wings, upper surface, left pair – (a) forewing, (b) hindwing.



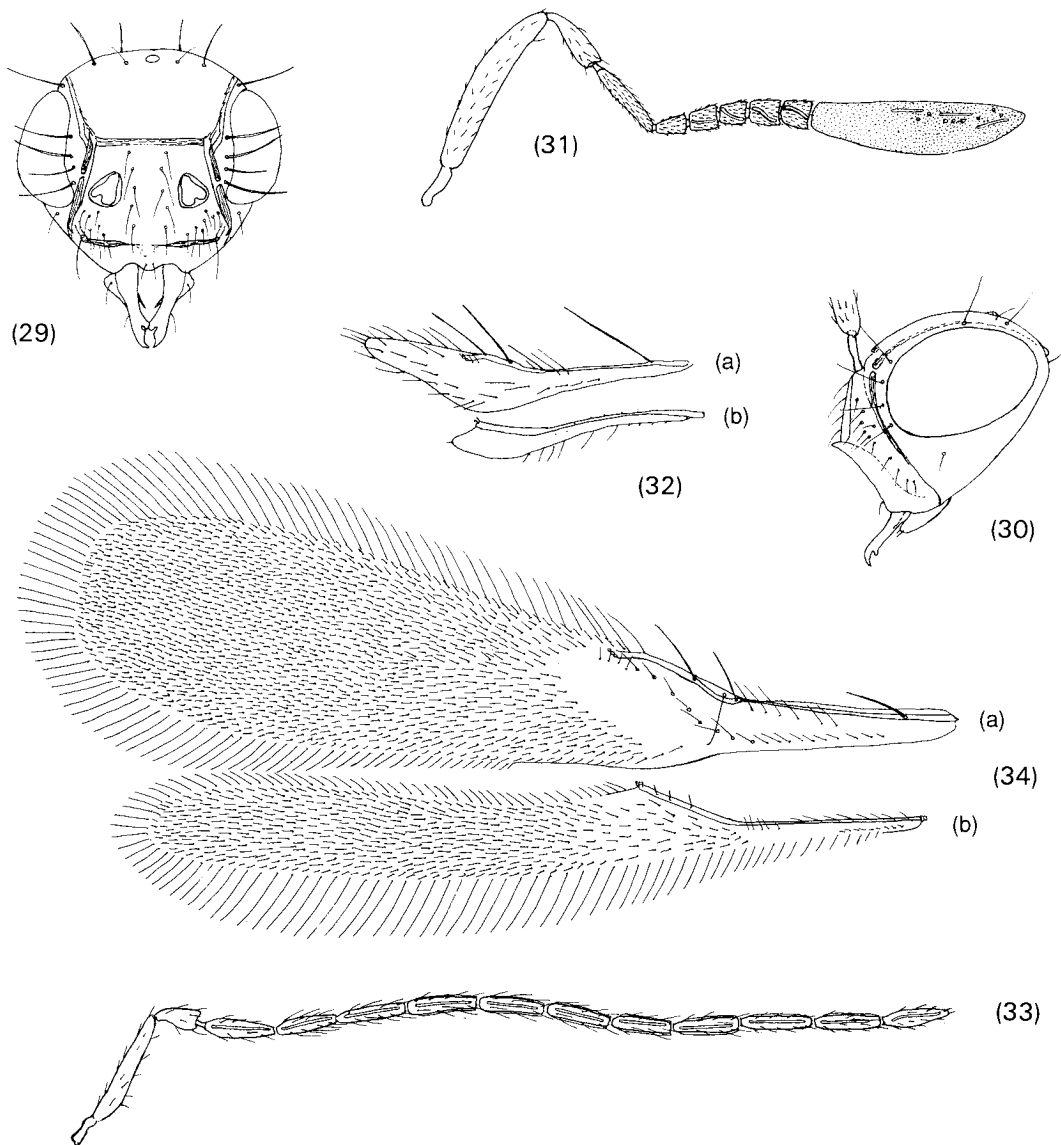
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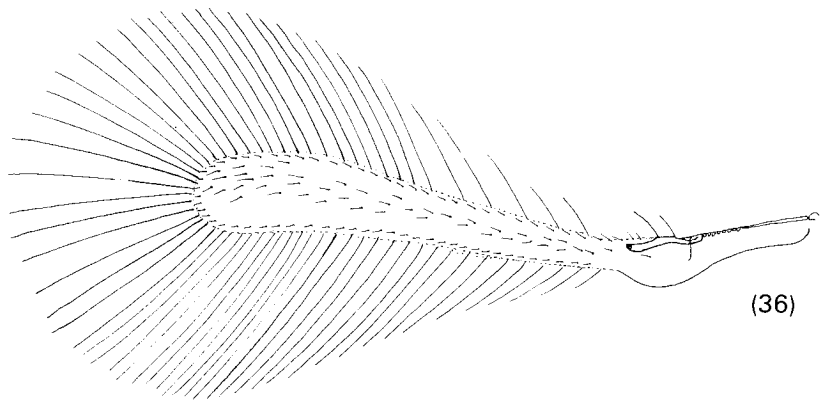
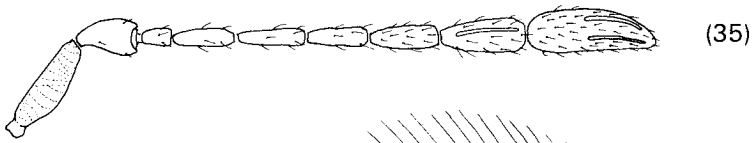
(a)

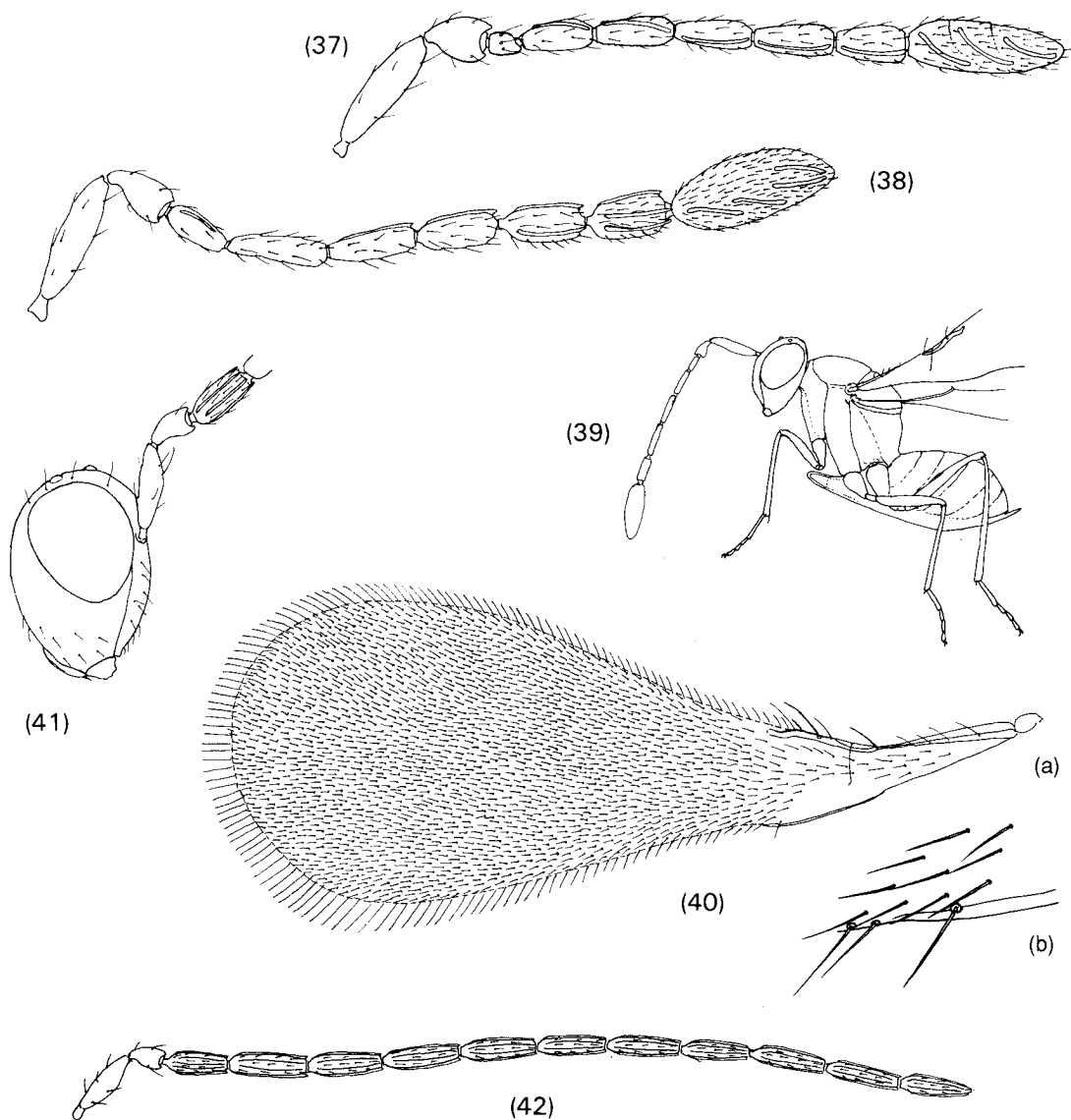
(b)

(28)



Figures 29–34 *Anagroidea* sp.: (29) head, frontal aspect, female; (30) head, lateral aspect, female; (31) antenna, female; (32) wings, upper surface, left pair – (a) forewing, (b) hindwing; (33) antenna, male; (34) wings, upper surface, left pair, male.
Figures 35, 36 *Anagrus* sp., female: (35) antenna; (36) forewing, upper surface.

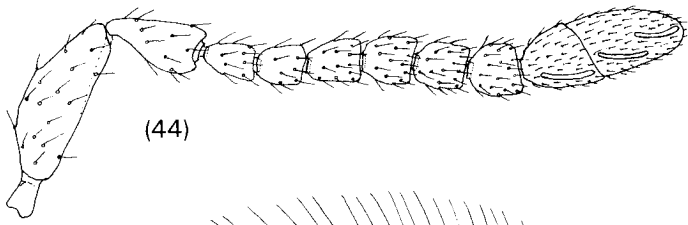




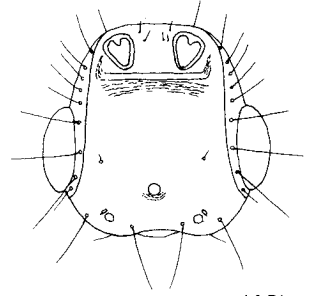
Figures 37–42 *Anaphes* sp.: (37,38) antenna, female, variants; (39) habitus, left side, female; (40) forewing, upper surface, female – (a) entire wing, (b) posterior margin opposite stigmal vein, enlarged to show characteristic erect seta; (41) head, lateral aspect, male; (42) antenna, male.

Figures 43–45 *Apoxypteron grandiscapus*: (43) head, dorsal aspect, female; (44) antenna, female; (45) wings, upper surface, left pair – (a) forewing, (b) hindwing.

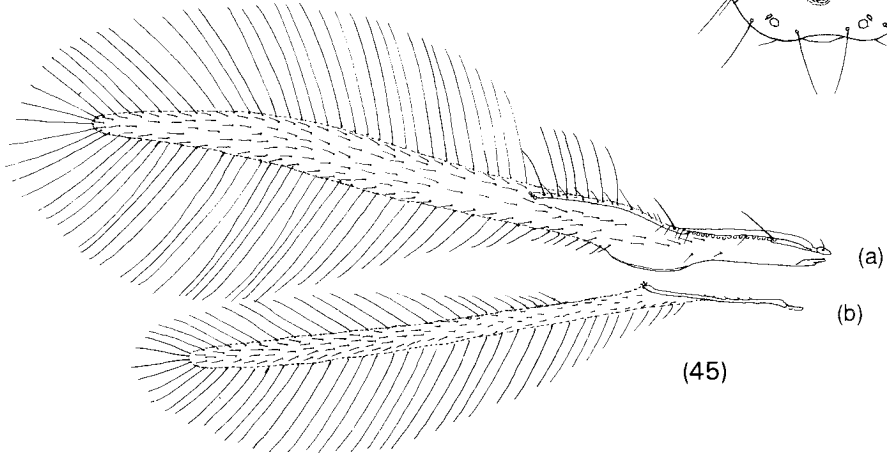
Figures 46–48 *Arescon* sp.: (46) antenna, female; (47) forewing, upper surface, female; (48) antenna, male.



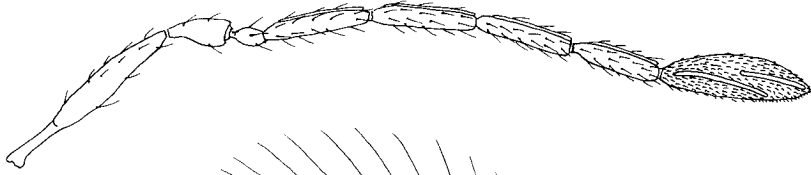
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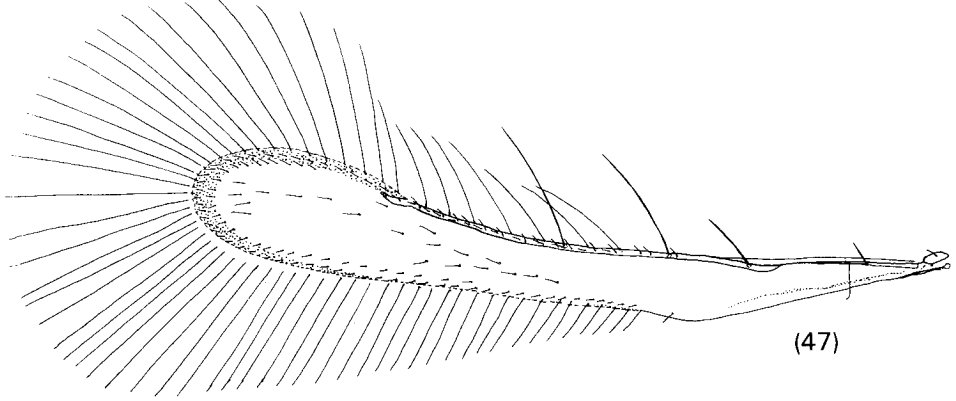
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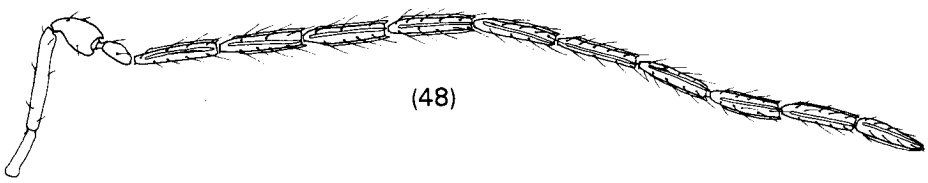
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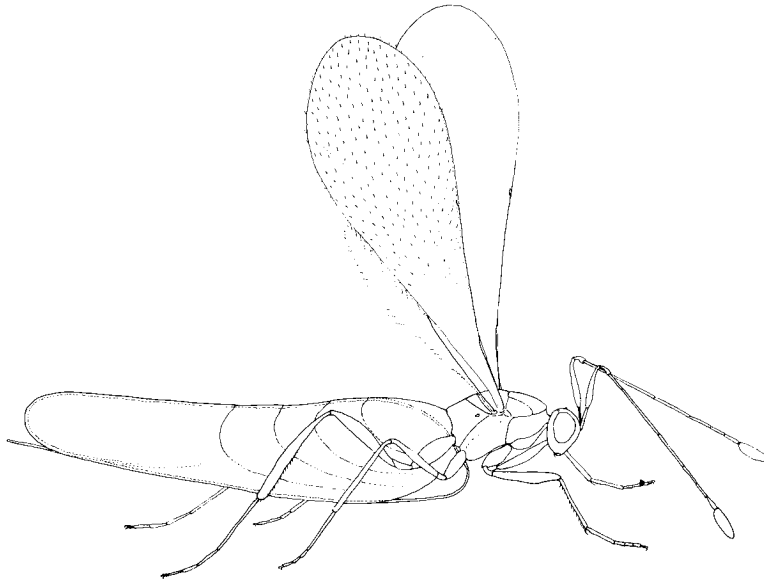
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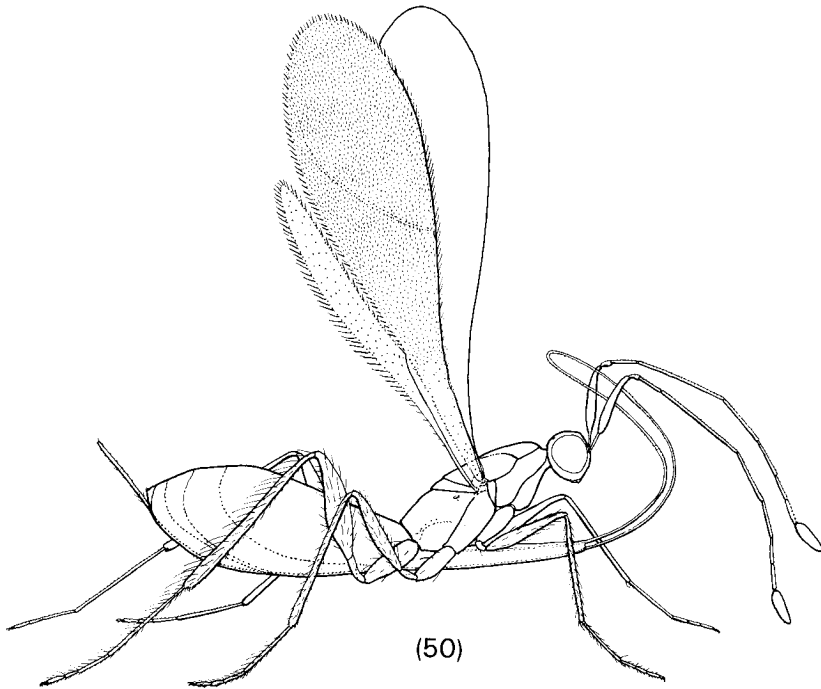
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(48)

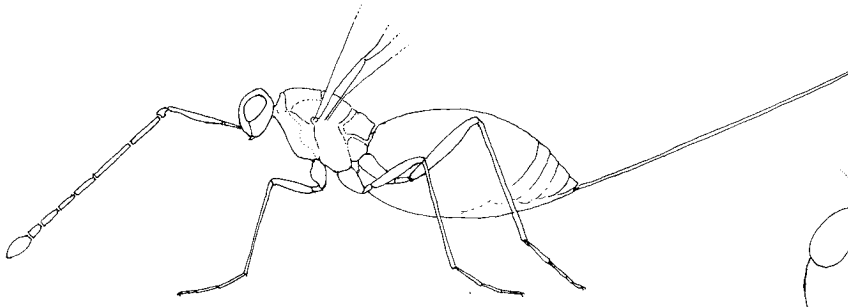


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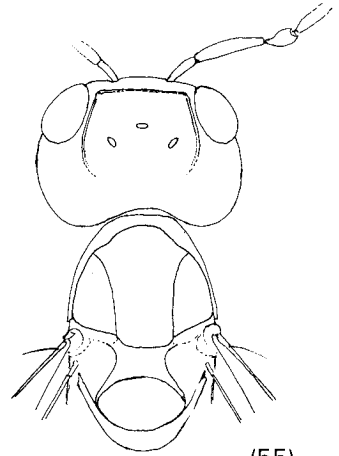


(50)

Figures 49–56 *Australomymar* sp.: (49,50) habitus, right side, female, variants; (51) habitus, left side, female; (52) antenna, female; (53) wings, upper surface, left pair – (a) forewing, (b) hindwing; (54) left forewing base, upper surface, female; (55) head and thorax, dorsal aspect, male; (56) antenna, male.



(51)



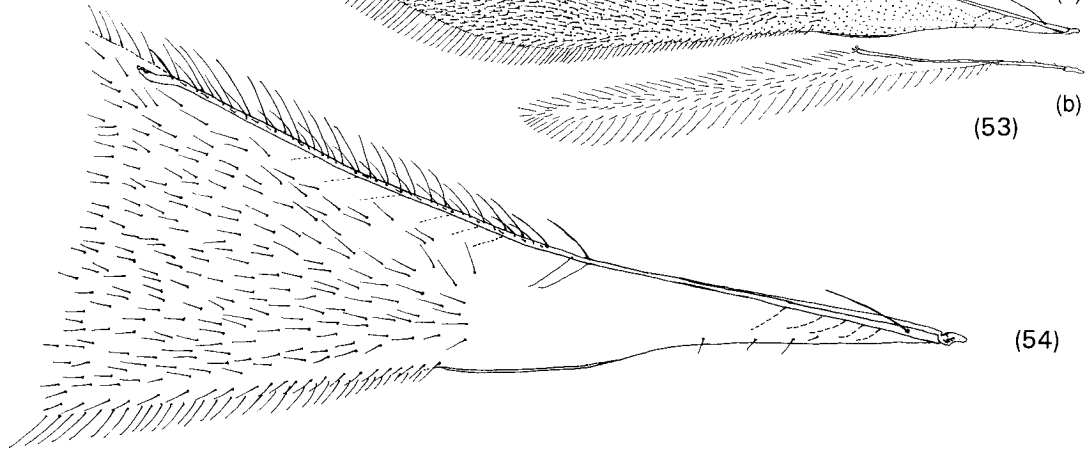
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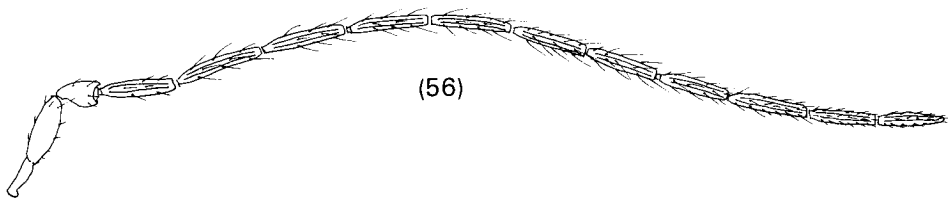
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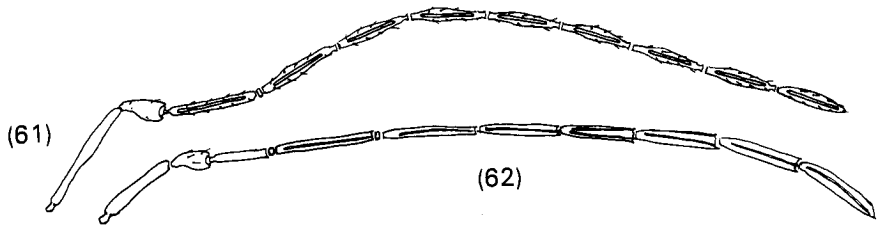
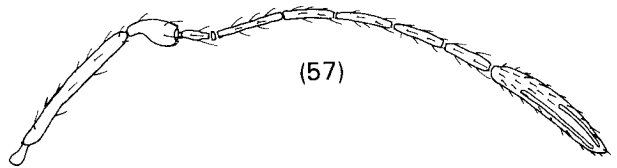
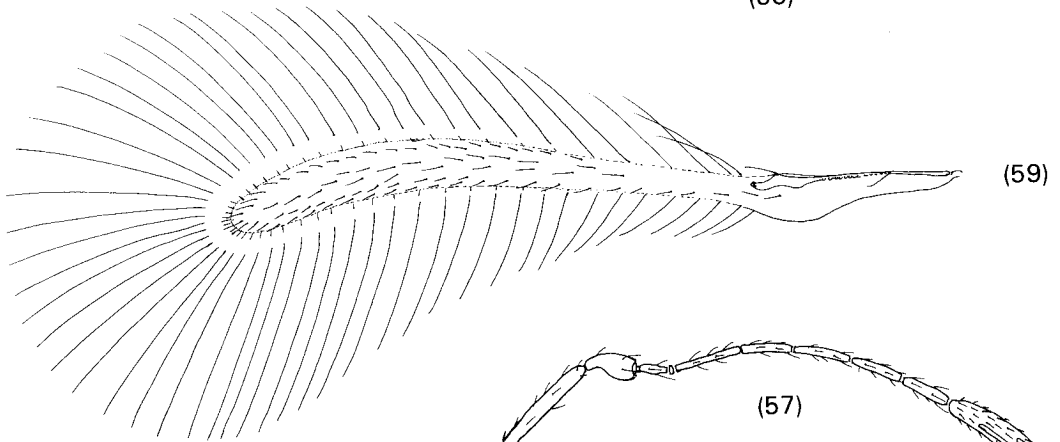
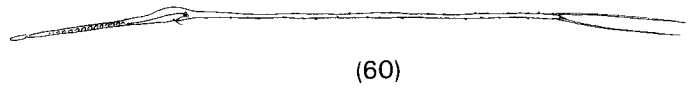
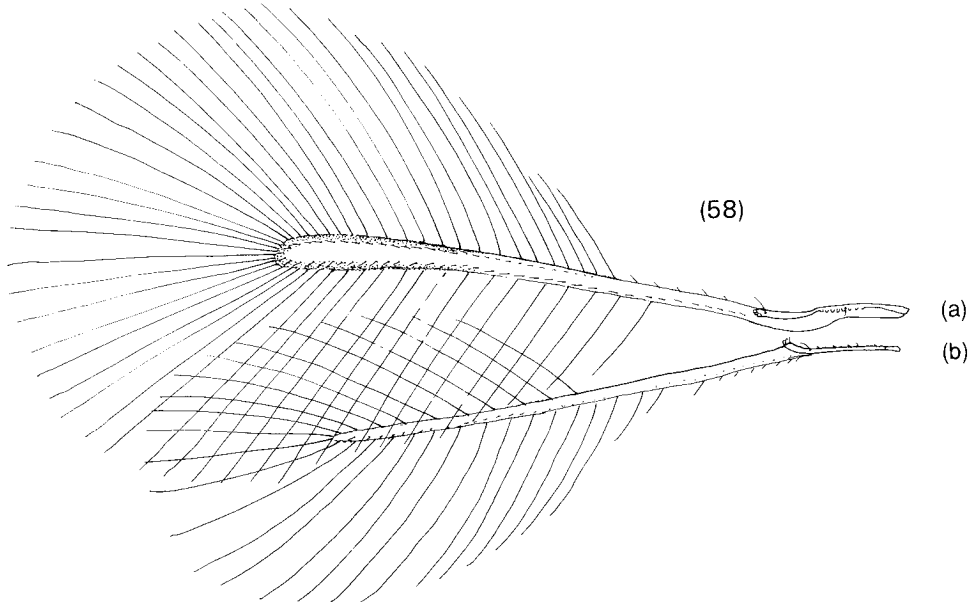
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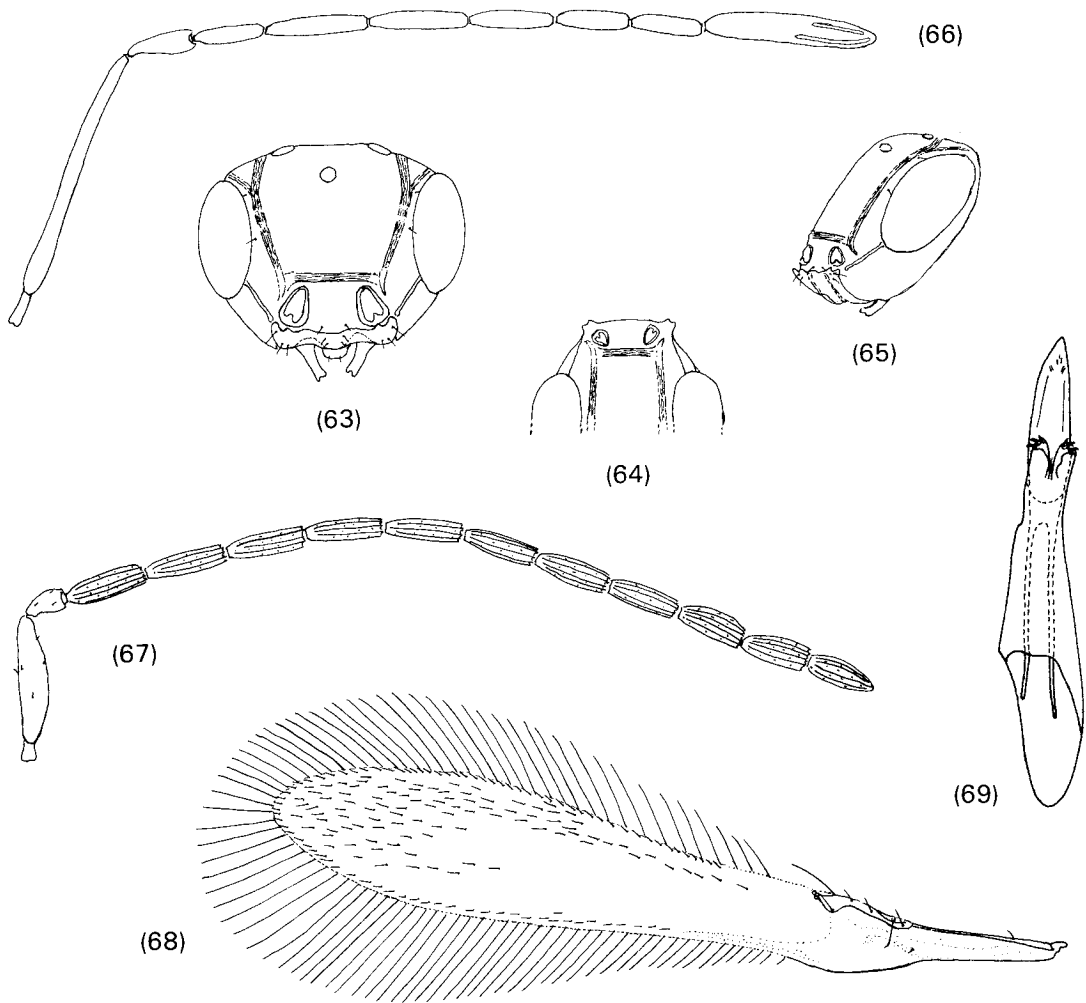


(54)

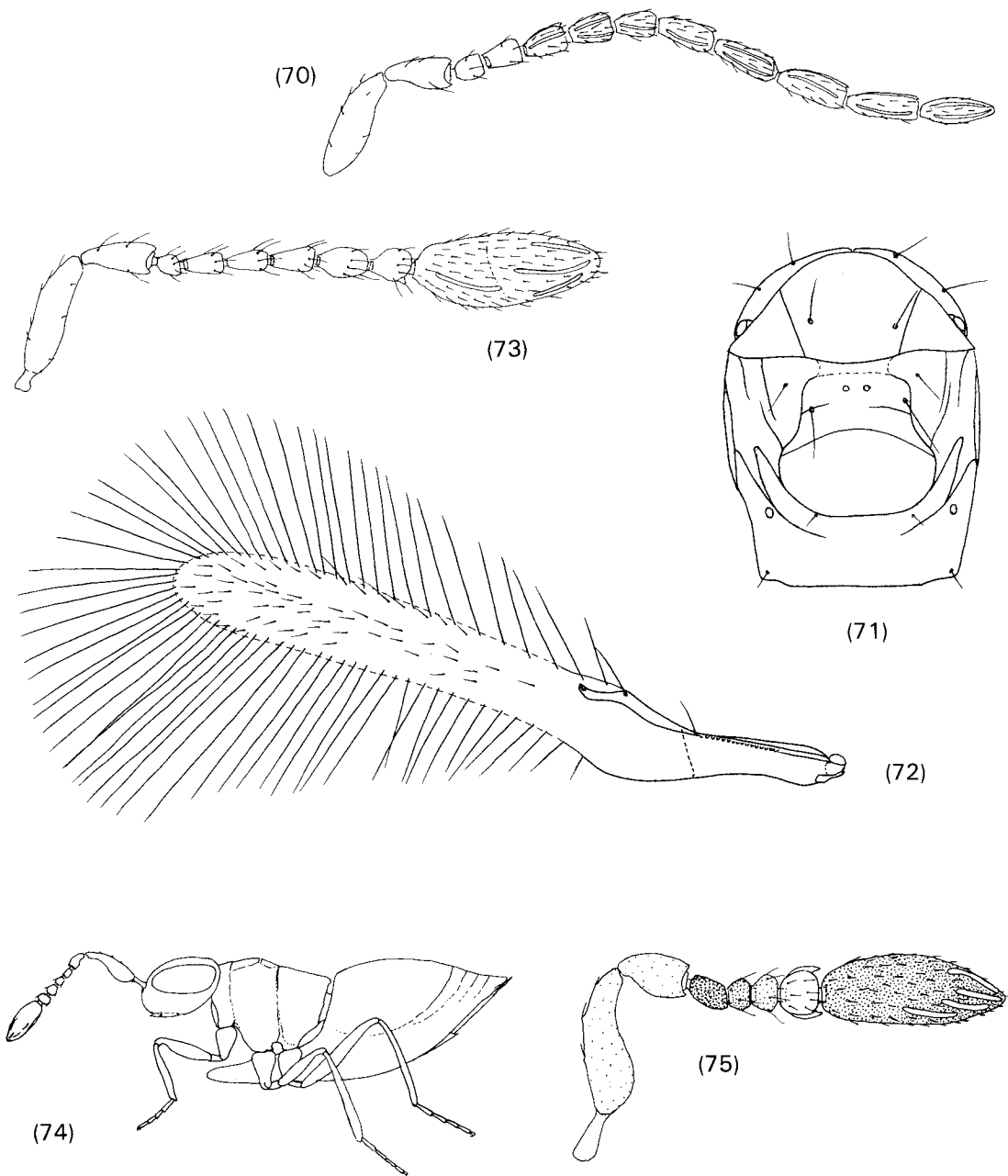


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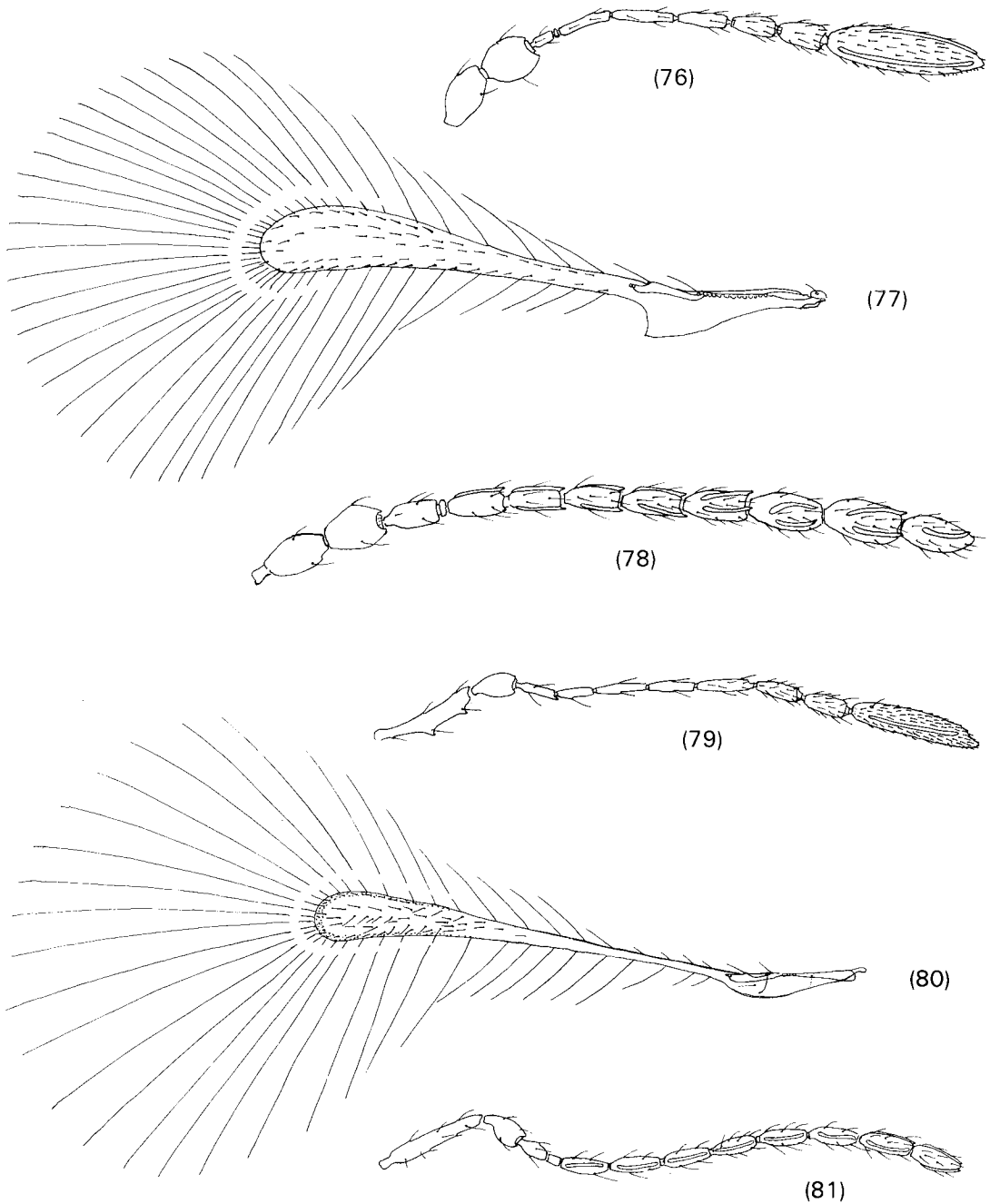




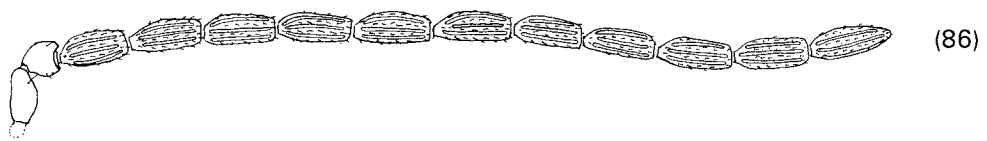
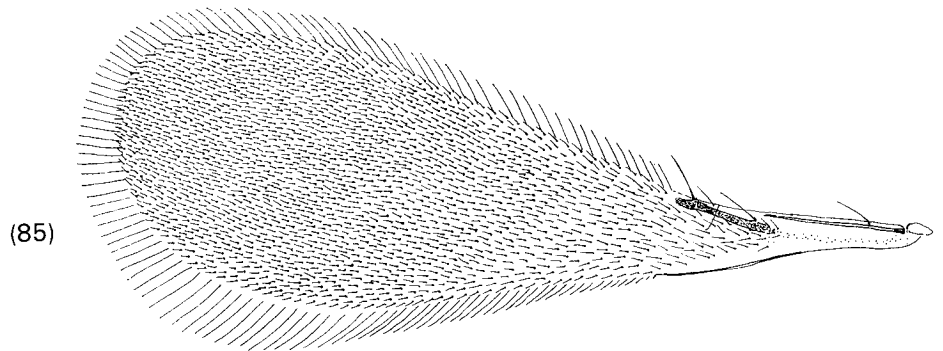
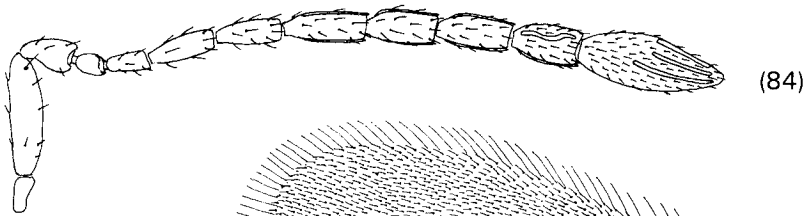
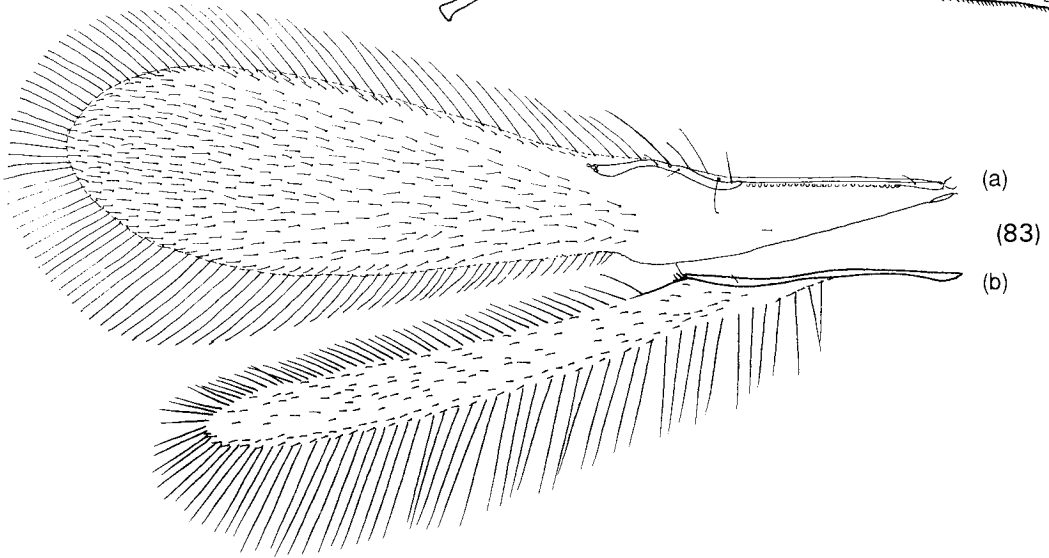
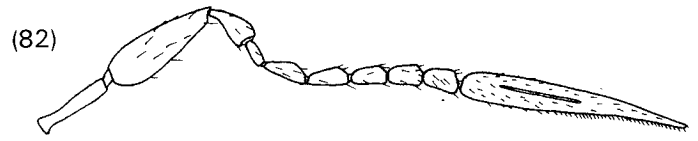
Figures 57–62 *Camptoptera* sp.: (57) antenna, female; (58) wings, upper surface, left pair – (a) forewing, (b) hindwing; (59,60) left forewing, upper surface, female, variants; (61,62) antenna, male, variants.
Figures 63–69 *Ceratanaphes monticola*: (63–65) head, female, in frontal, dorsal, and anterolateral aspect; (66) antenna, female (card-mounted; setae omitted); (67) antenna, male (flagellar setae omitted); (68) forewing, upper surface, male; (69) genitalia, male.

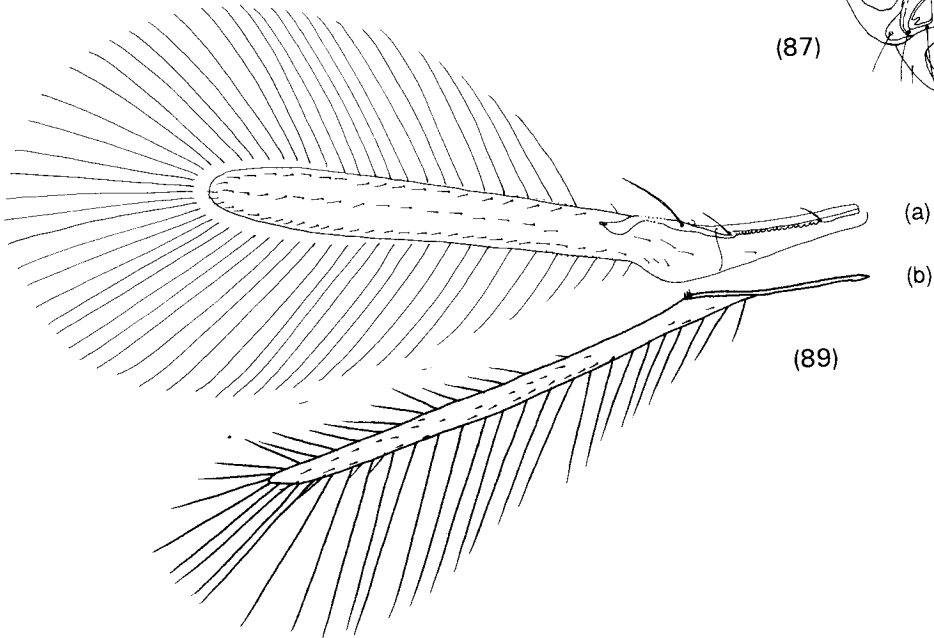
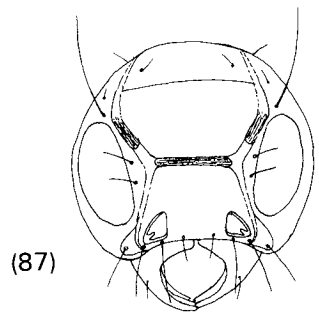
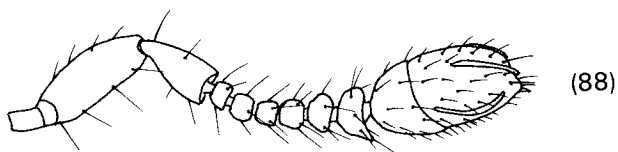


Figures 70–73 *Cleruchus* sp.: (70) antenna, female; (71) thorax, dorsal aspect, female; (72) left forewing, upper surface, female; (73) antenna, male.
Figures 74, 75 *Cybomyr fasciifrons*, female: (74) habitus, left side; (75) antenna.

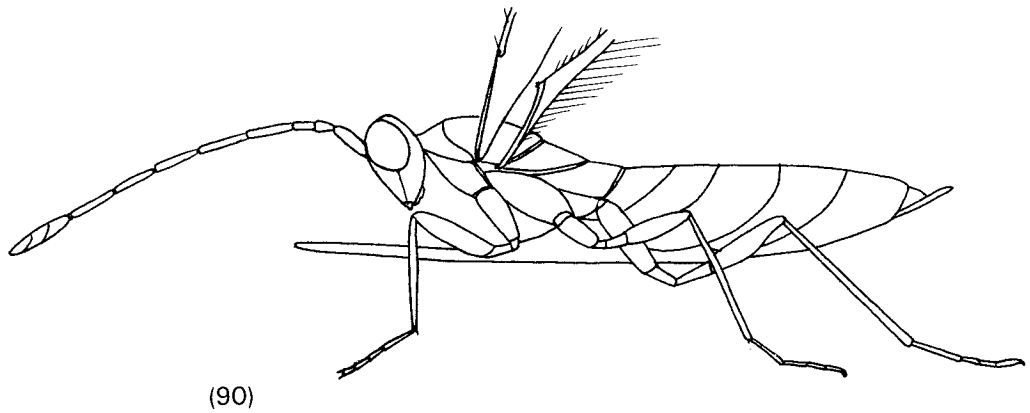


Figures 76–78 *Dicopomorpha* sp.: (76) antenna, female; (77) left forewing, upper surface, female; (78) antenna, male.
Figures 79–81 *Dicopus* sp.: (79) antenna, female; (80) left forewing, upper surface, female; (81) antenna, male.

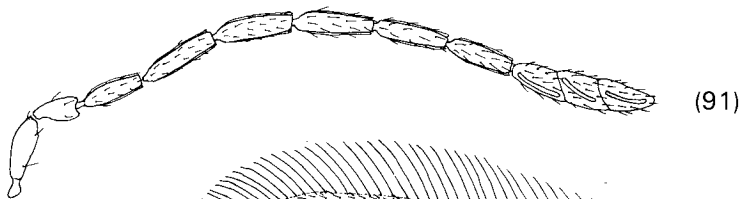




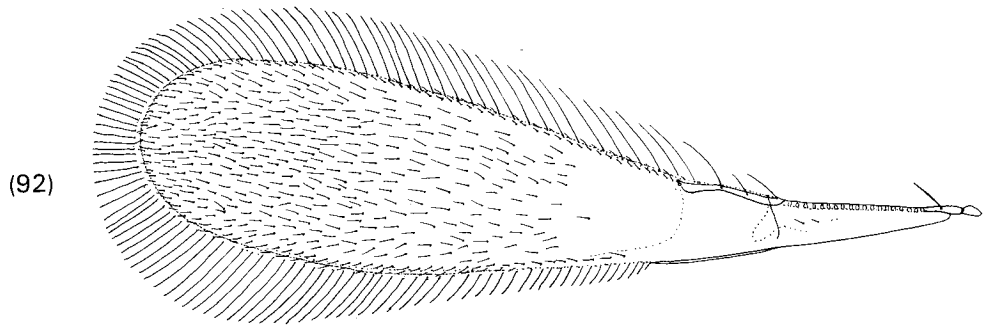
Figures 82, 83 *Dorya pilosa*, female: (82) antenna; (83) wings, upper surface, left pair – (a) forewing, (b) hindwing.
Figures 84–86 *Gonatocerus* sp.: (84) antenna, female; (85) left forewing, upper surface, female; (86) antenna, male.
Figures 87–89 *Haplochaeta mandibularis*, female: (87) head, frontal aspect; (88) antenna; (89) wings, upper surface, left pair – (a) forewing, (b) hindwing.



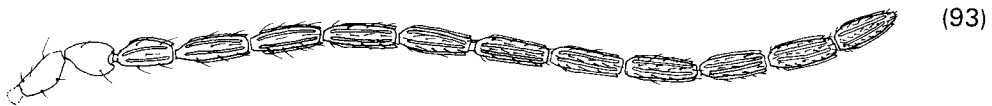
(90)



(91)



(92)

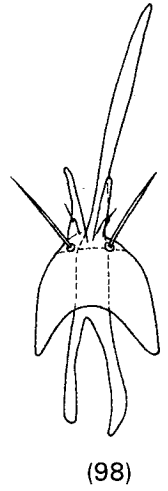
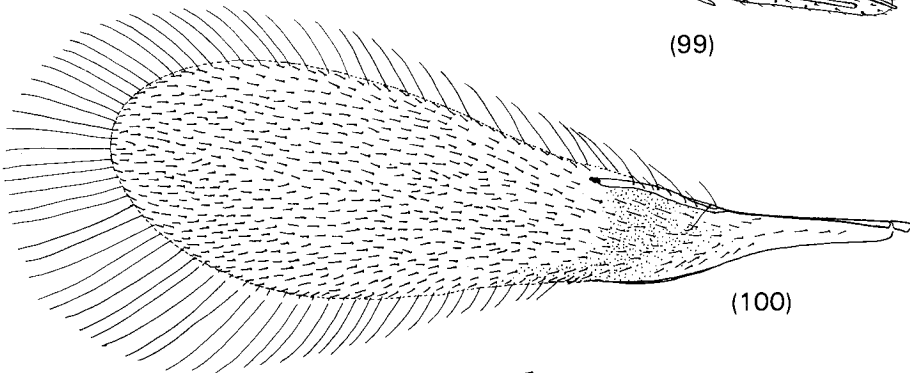
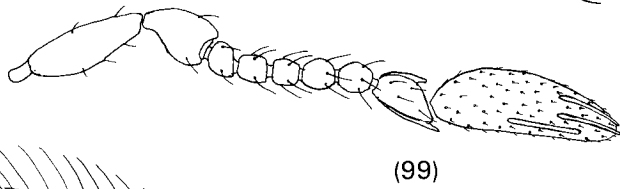
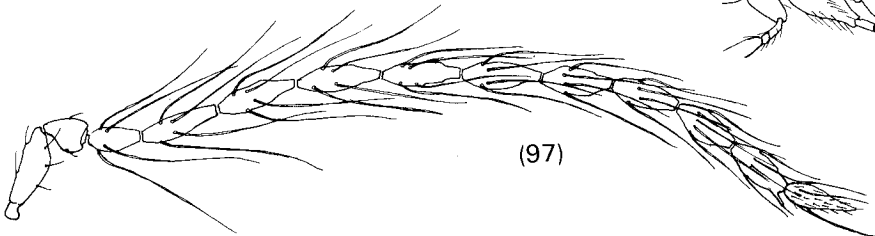
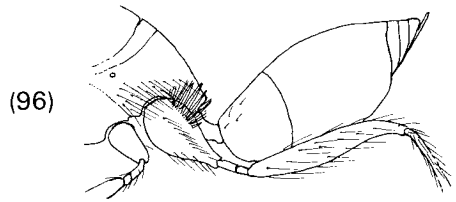
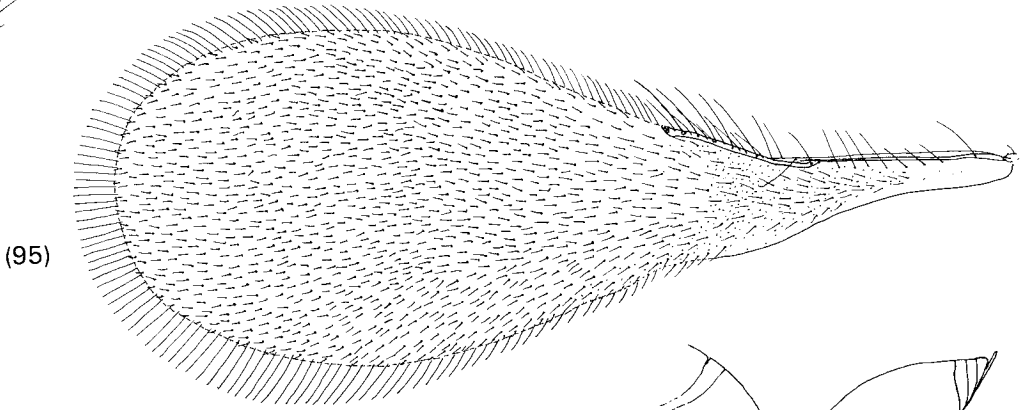
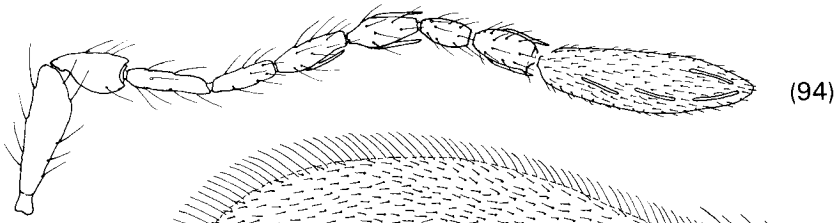


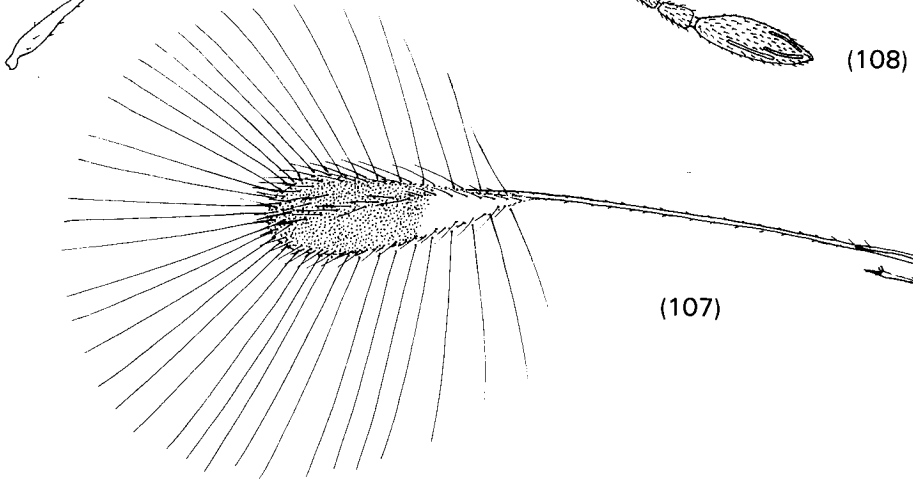
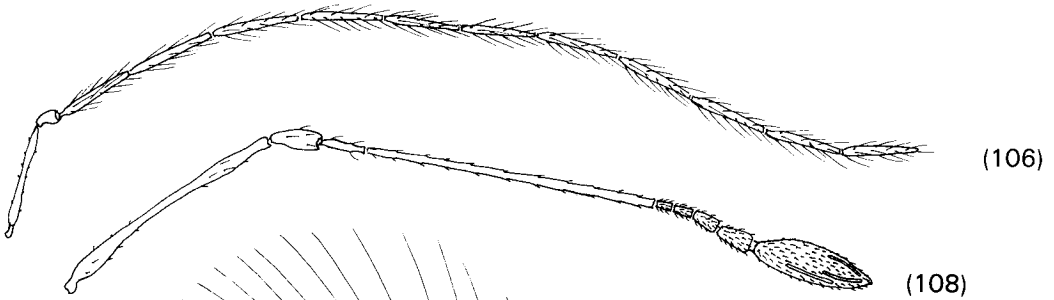
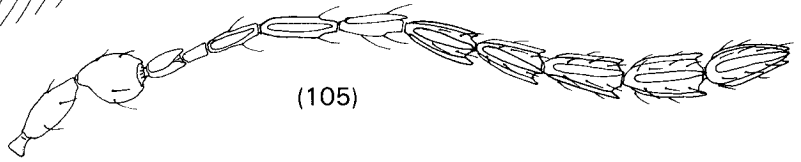
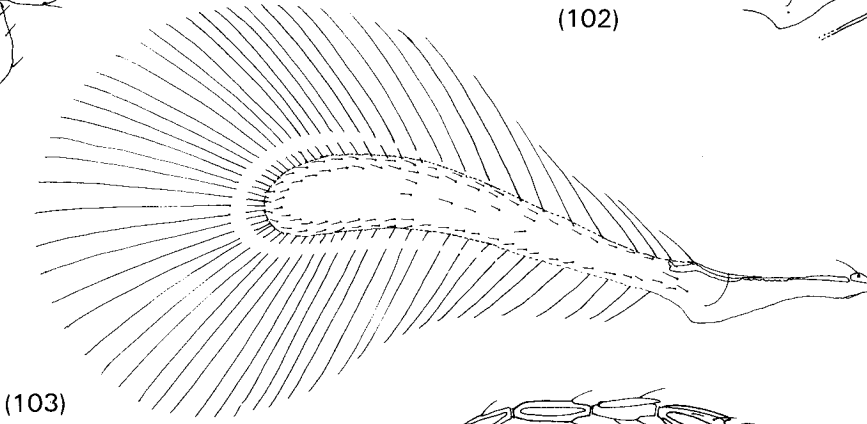
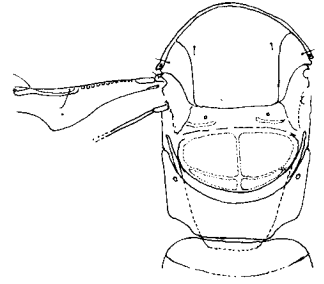
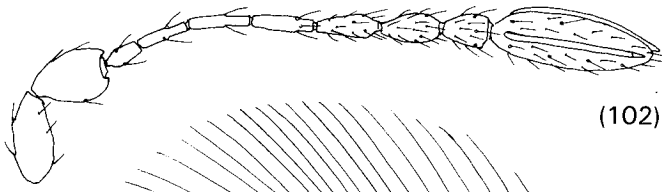
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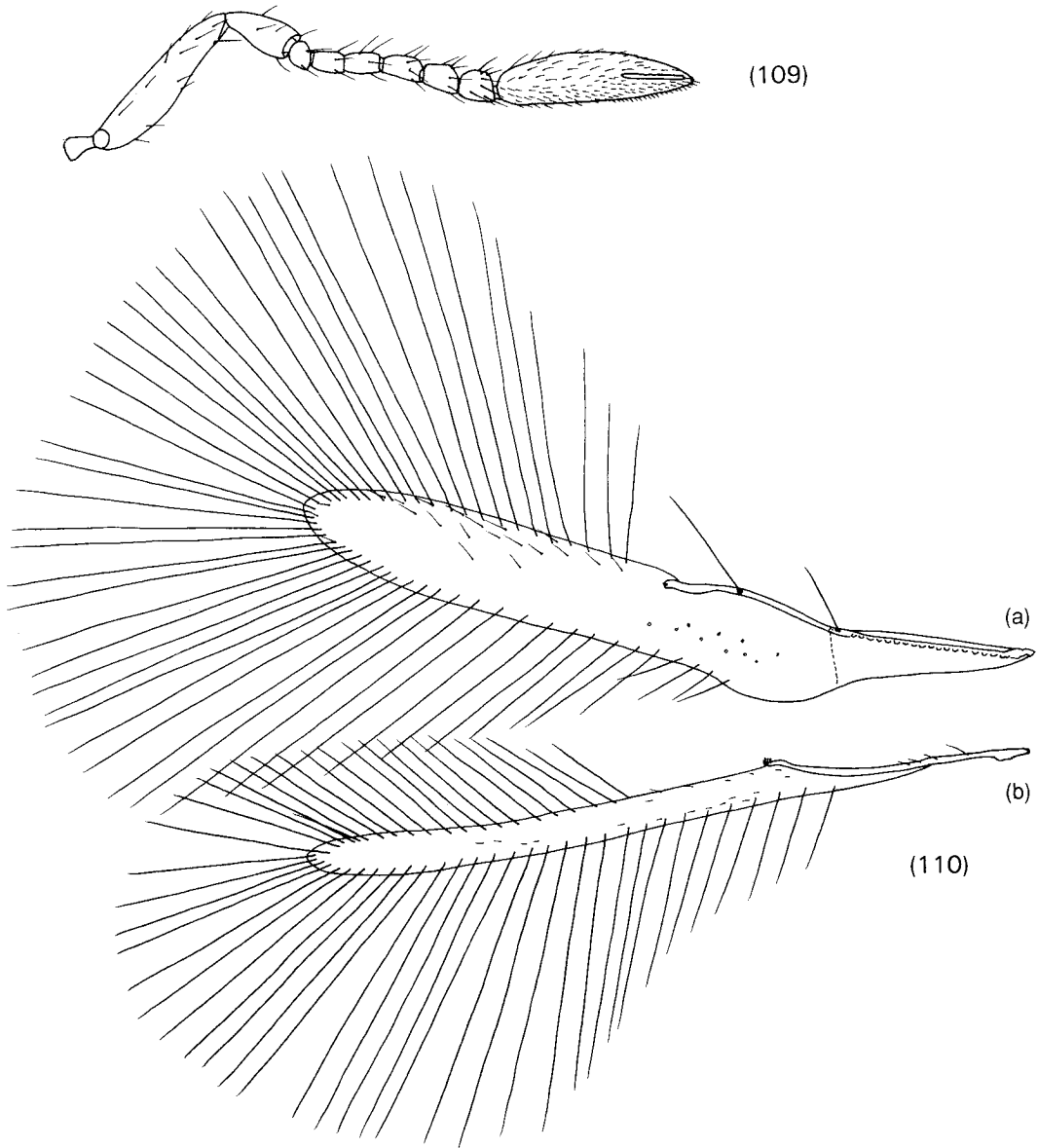
Figures 90–93 *Idiocentrus mirus*: (90) habitus, left side, female; (91) antenna, female; (92) left forewing, upper surface, female; (93) antenna, male.

Figures 94–98 *Ischiodasys occulta*: (94) antenna, female; (95) left forewing, upper surface, female; (96) thorax and gaster, left side, female; (97) antenna, male; (98) genitalia, male.

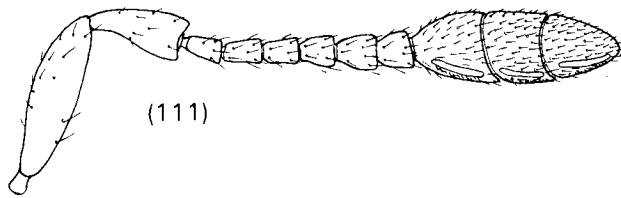
Figures 99–101 *Ischiodasys* sp.: (99) antenna, female; (100) left forewing, upper surface, female; (101) antenna, male.



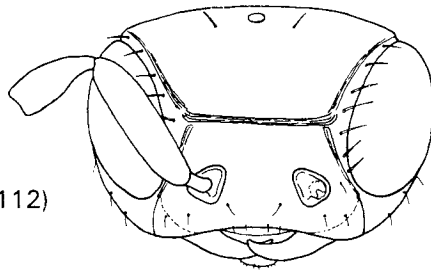




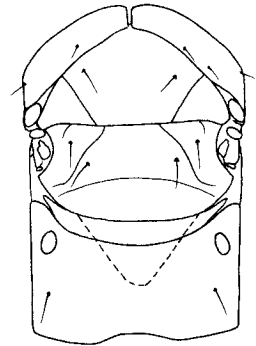
Figures 102–104 *Mimalaptus obscurus*, female: (102) antenna; (103) left forewing, upper surface; (104) thorax, dorsal aspect. **105** *Mimalaptus* sp., male, antenna.
Figures 106–108 *Mymar pulchellum*: (106) antenna, female; (107) wings, upper surface, left pair, female – (a) forewing, (b) hindwing; (108) antenna, male.
Figures 109, 110 *Neserythmelus zelandicus*, female: (109) antenna; (110) wings, upper surface, left pair – (a) forewing, (b) hindwing.



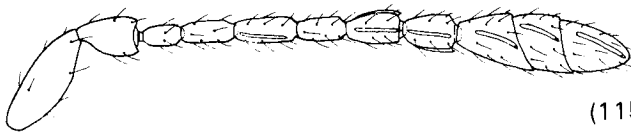
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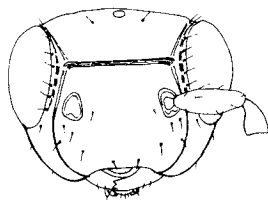
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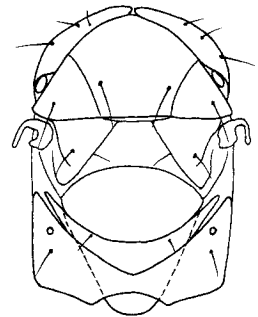
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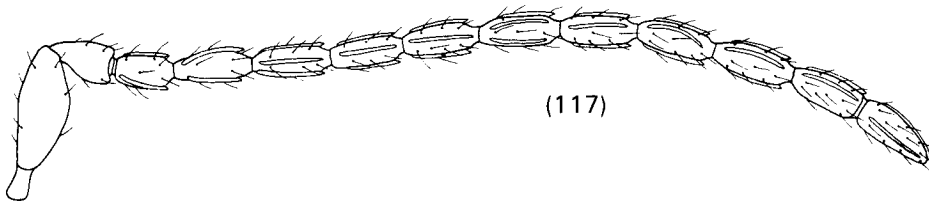
(115)



(114)



(116)



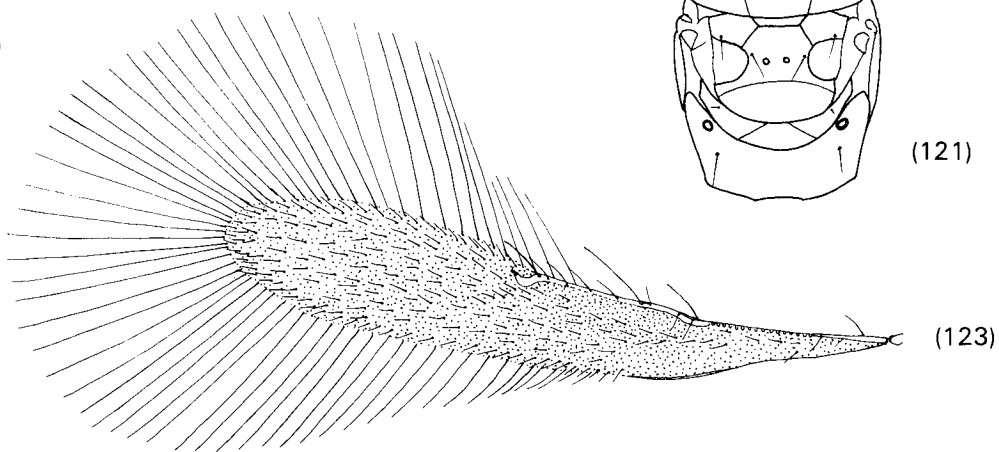
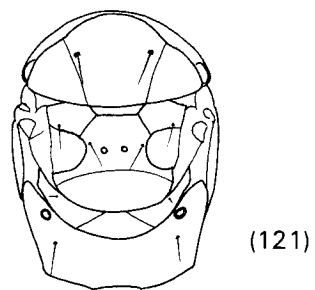
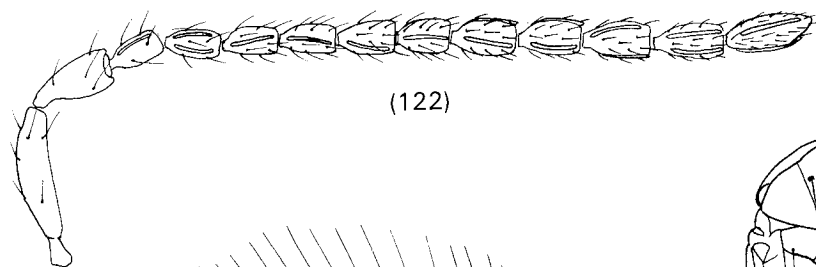
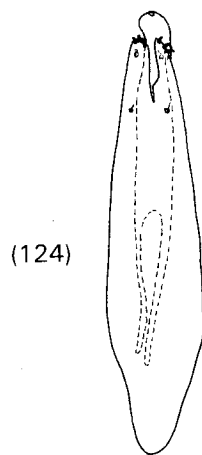
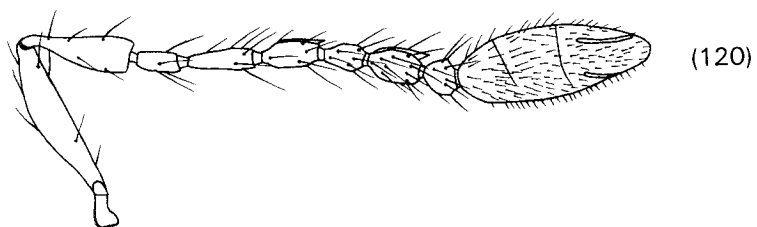
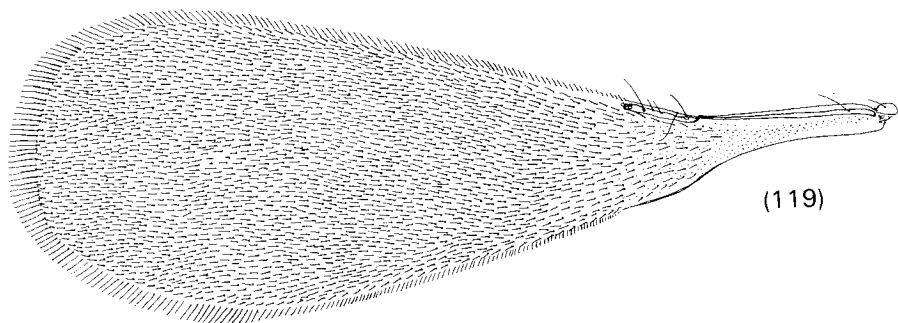
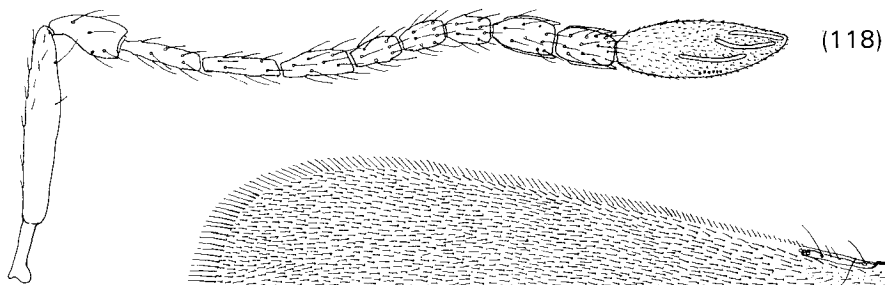
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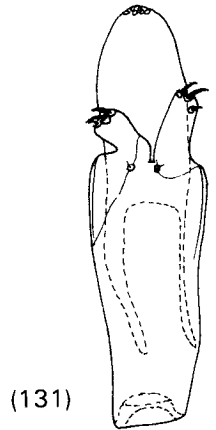
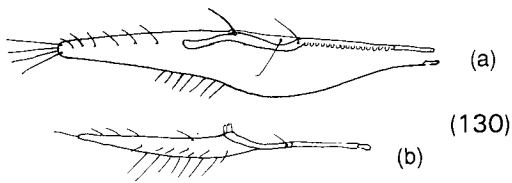
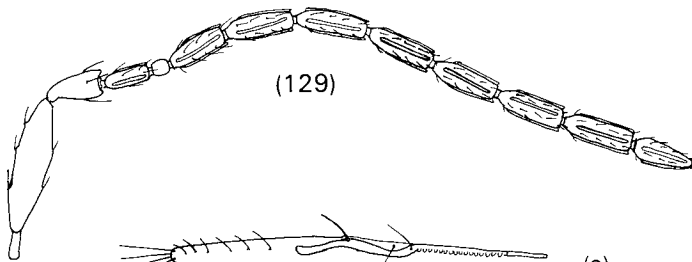
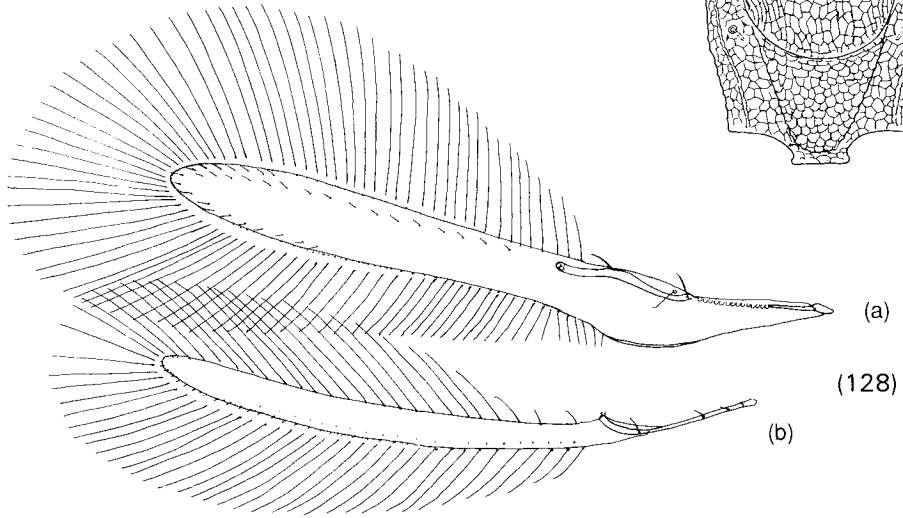
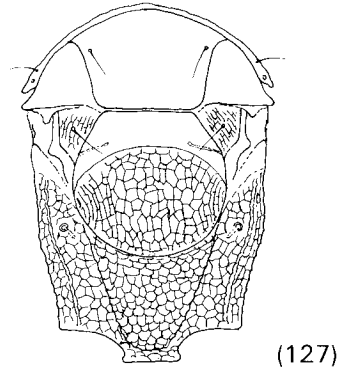
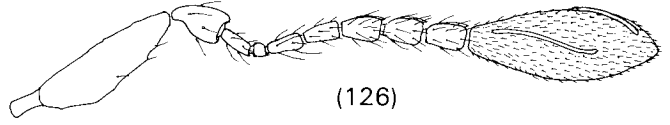
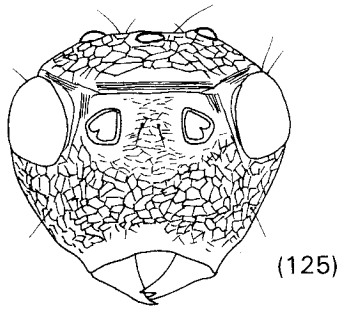
Figures 111–113 *Nesomymar magniclave*, female: (111) antenna (from Valentine 1971); (112) head, frontal aspect (from Valentine 1971); (113) thorax, dorsal aspect.

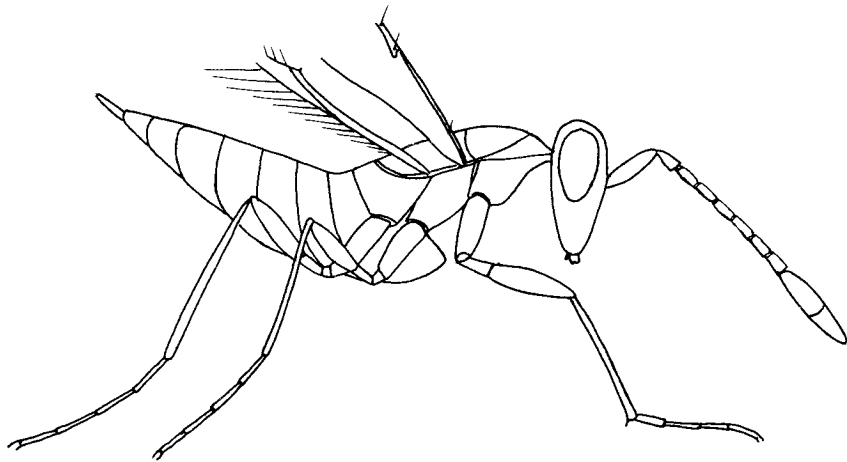
Figures 114–117 *Nesopatasson flavidus*: (114) head, frontal aspect, female (from Valentine 1971); (115) antenna, female (from Valentine 1971); (116) thorax, dorsal aspect, female; (117) antenna, male (from Valentine 1971).

Figures 118, 119 *Ooctonus* sp., female: (118) antenna; (119) left forewing, upper surface.

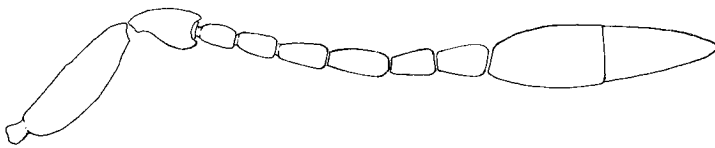
Figures 120–124 *Paracmotemnus potanus*: (120) antenna, female; (121) thorax, dorsal aspect, female; (122) antenna, male; (123) left forewing, upper surface, male; (124) genitalia, male.



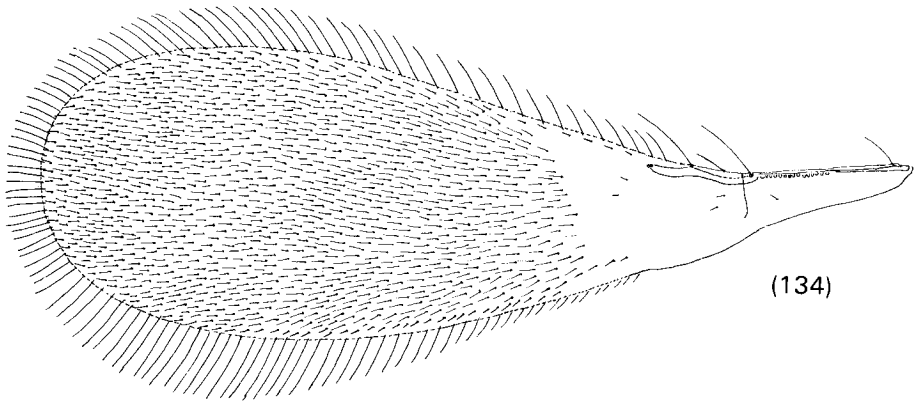




(132)



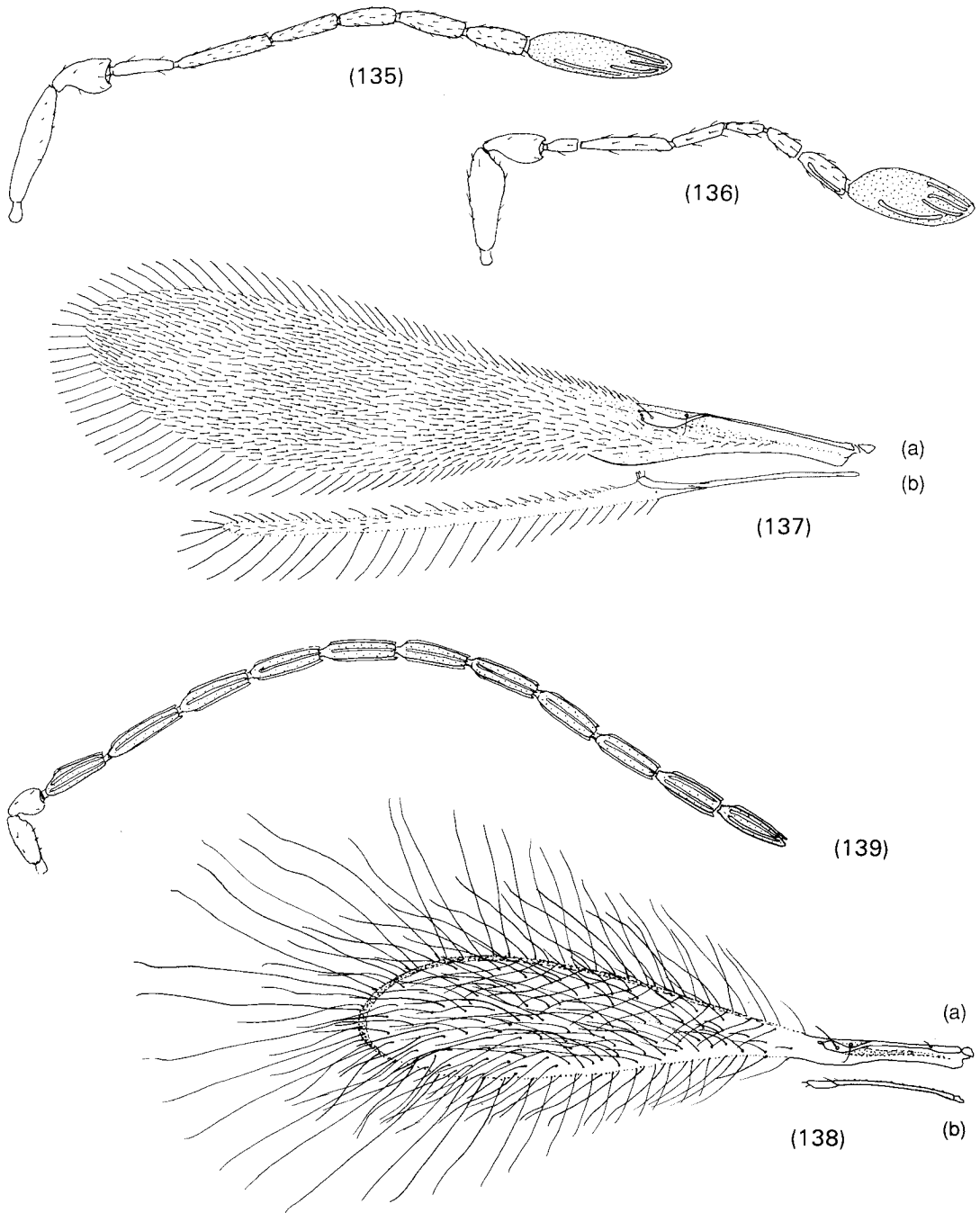
(133)



(134)

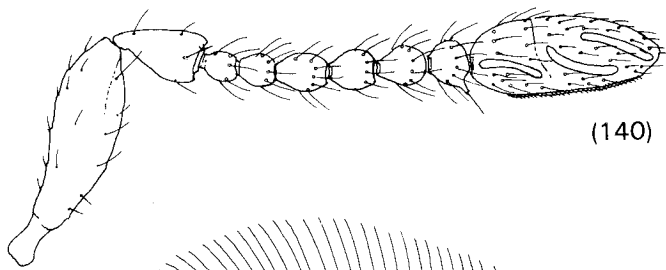
Figures 125–131 *Paranagroidea verrucosa*: (125) head, frontal aspect, female; (126) antenna, female; (127) thorax, dorsal aspect, female; (128) wings, upper surface, left pair, female – (a) forewing, (b) hindwing; (129) antenna, male; (130) wings, upper surface, left pair, male – (a) forewing, (b) hindwing; (131) genitalia, male.

Figures 132–134 *Paranaphoidea* sp., female: (132) habitus, right side; (133) antenna (card-mounted specimen; setae omitted); (134) left forewing, upper surface.

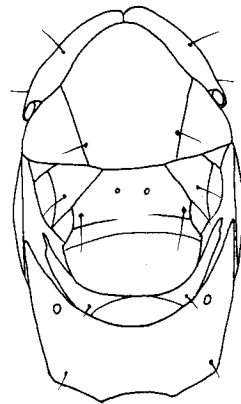


Figures 135–139 *Polynema* sp., female: (135,136) antenna, variants; (137,138) wings, upper surface, left pair, variants – (a) forewing, (b) hindwing; (139) antenna, male.

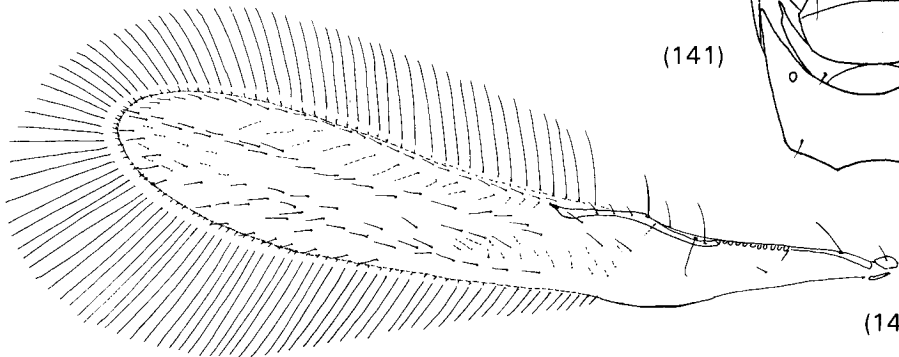
Figures 140–144 *Prionaphes depressus*: (140) antenna, female; (141) thorax, dorsal aspect, female; (142) left forewing, upper surface, female; (143) head, frontal aspect, female; (144) antenna, male. **145, 146** *Prionaphes* sp., female: (145) antenna; (146) left forewing, upper surface.



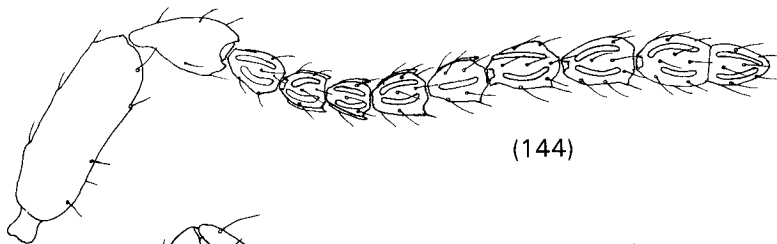
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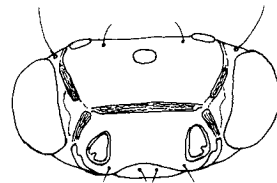
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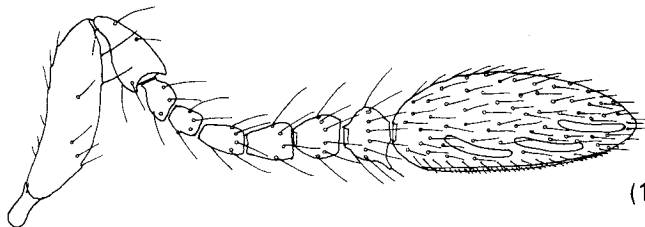
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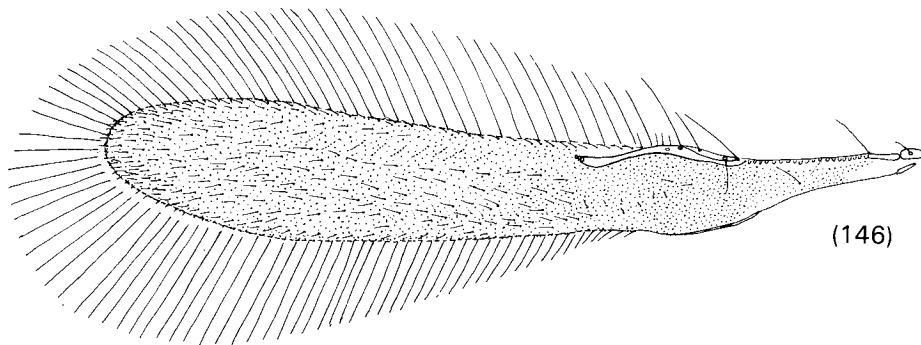
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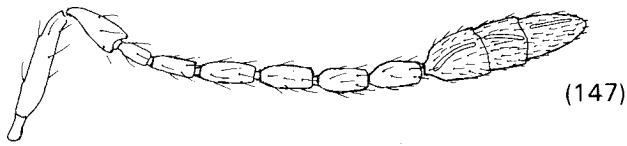
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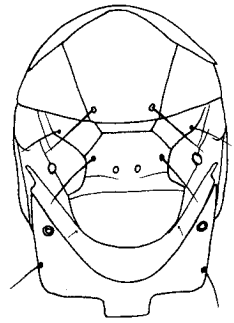
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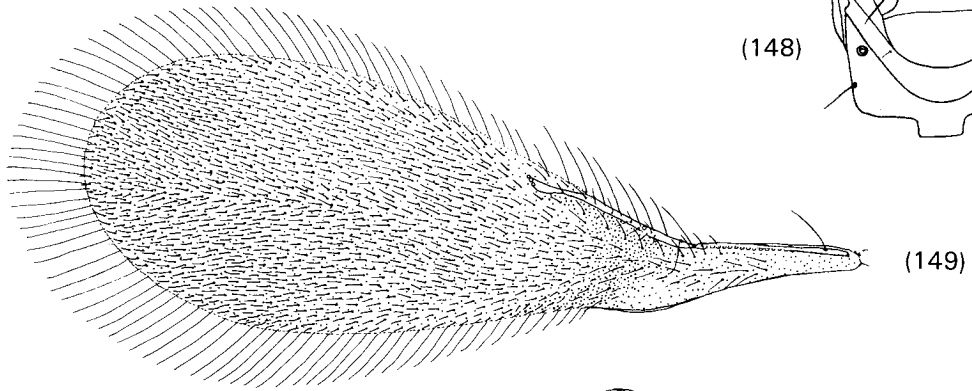
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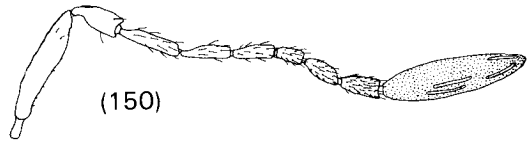
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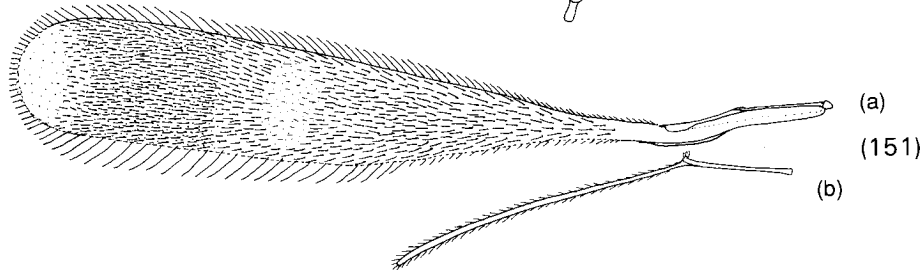
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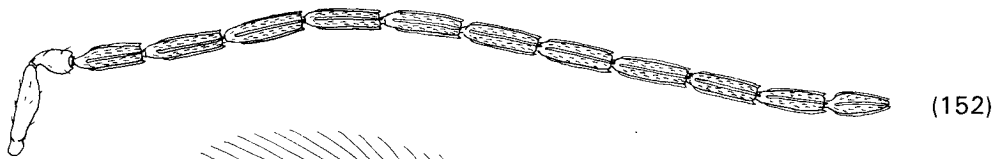
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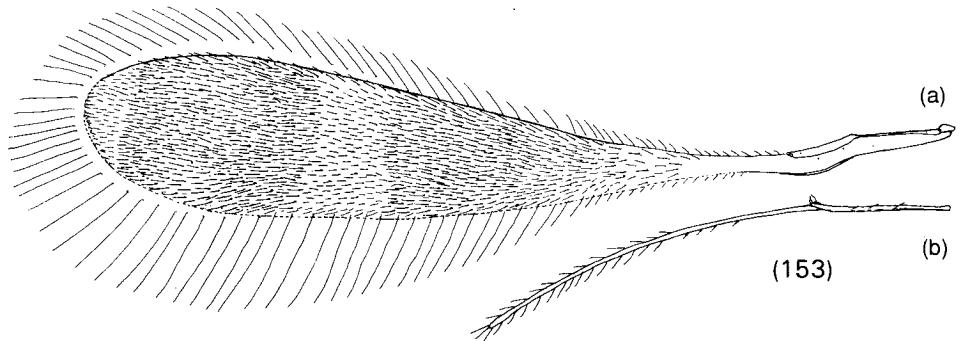
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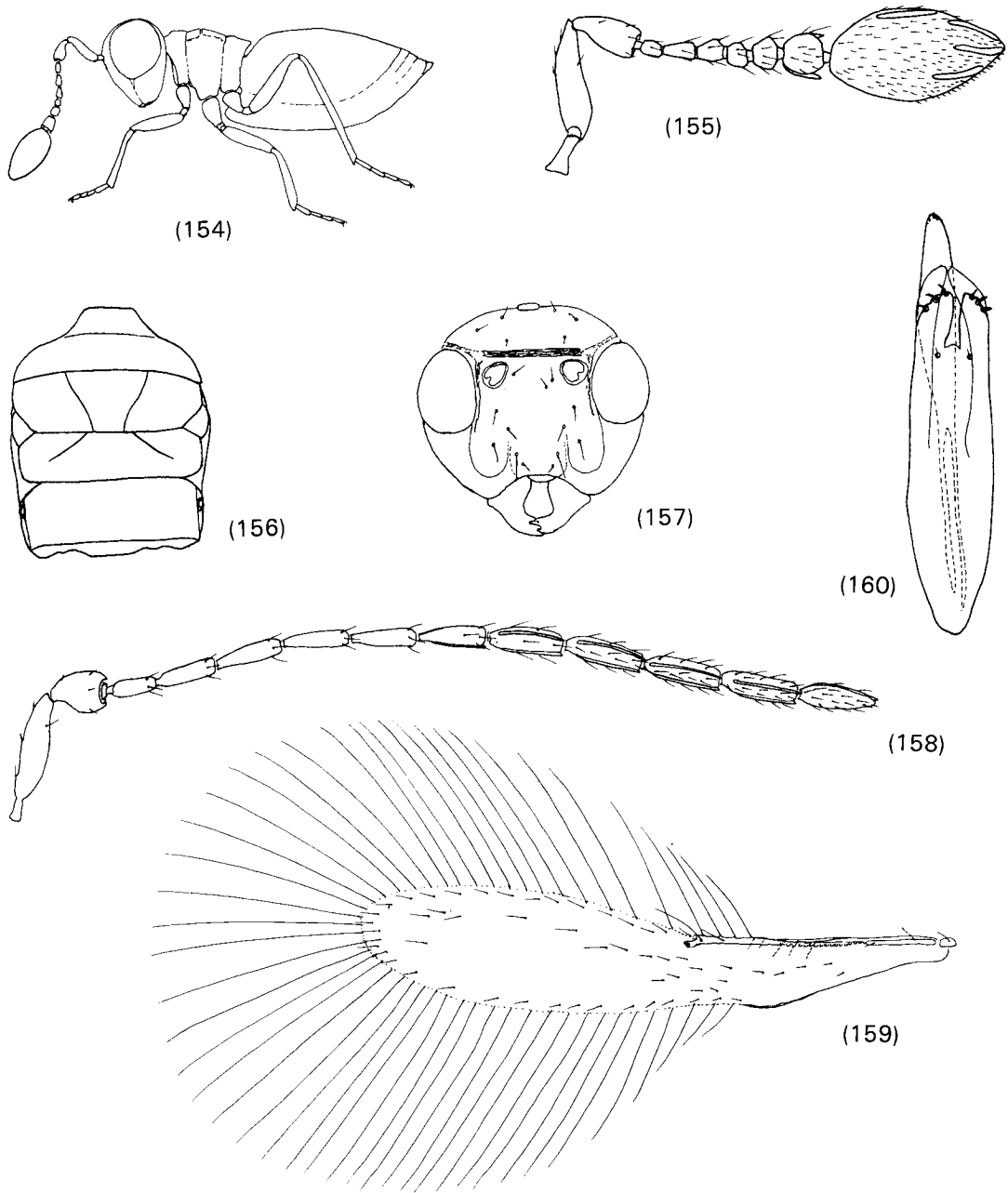
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(a)

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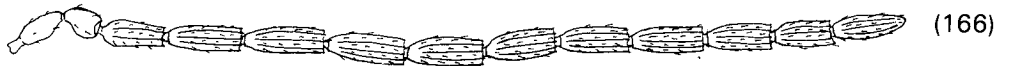
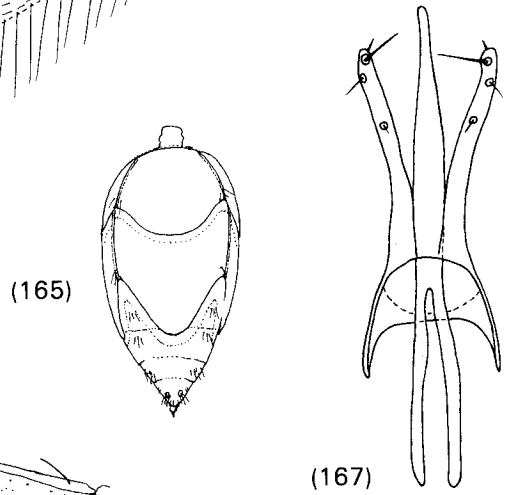
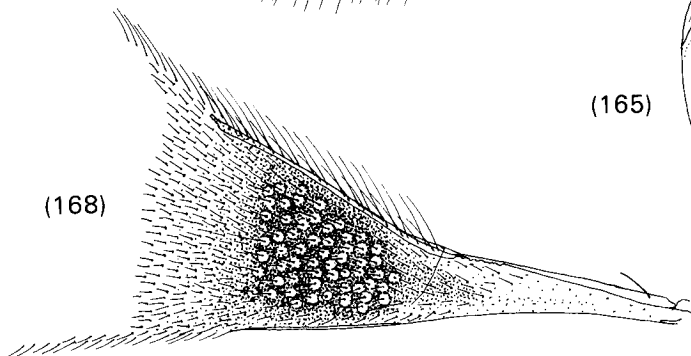
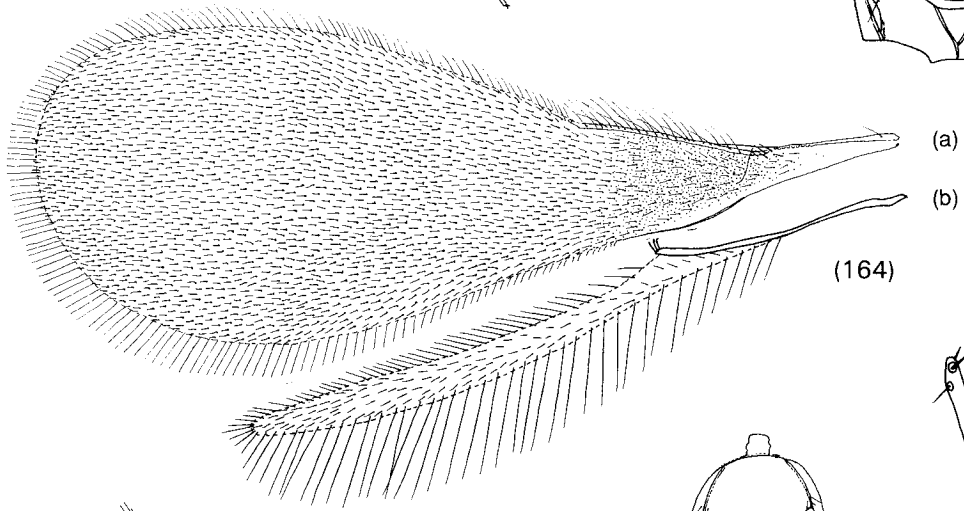
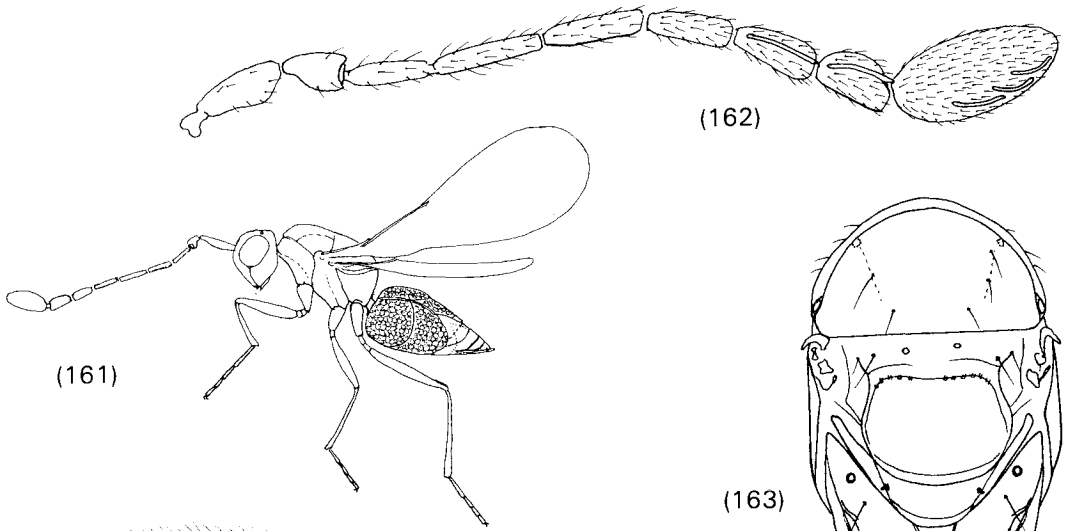
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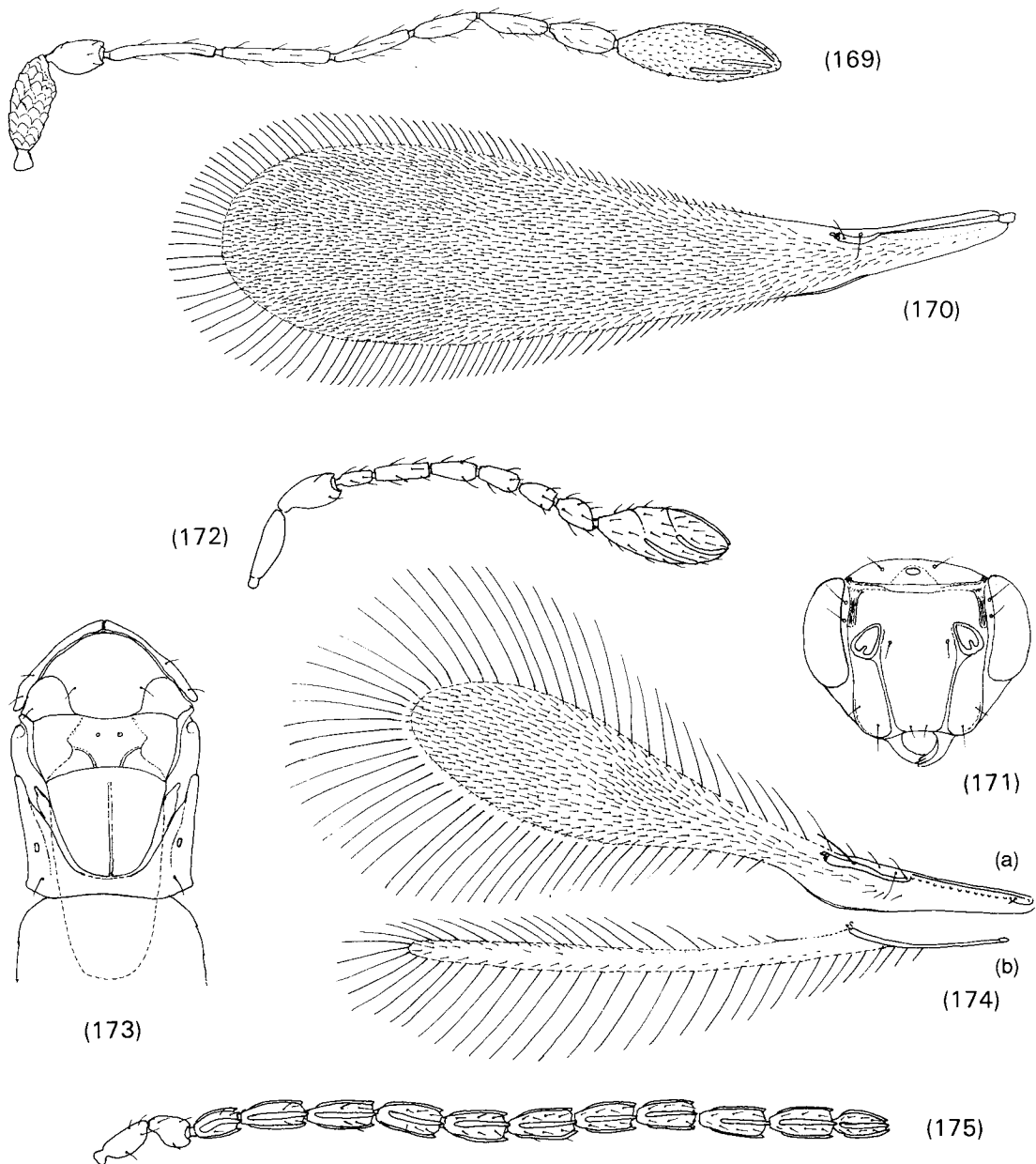


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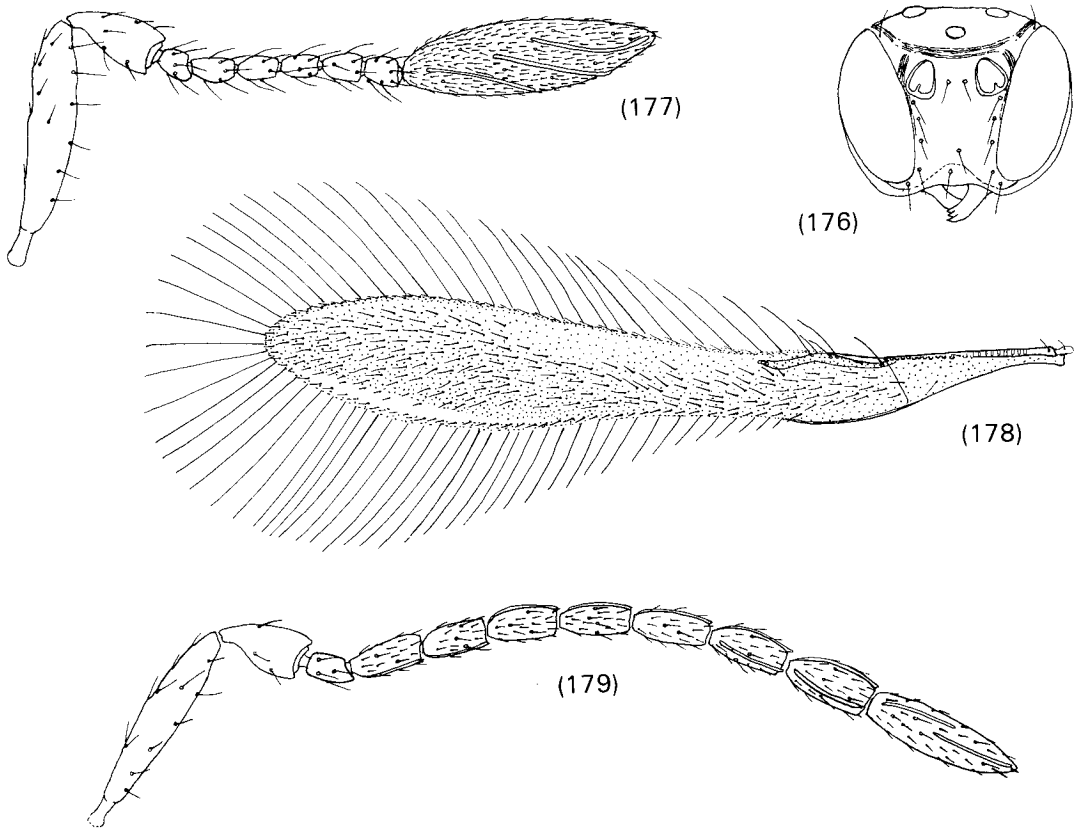
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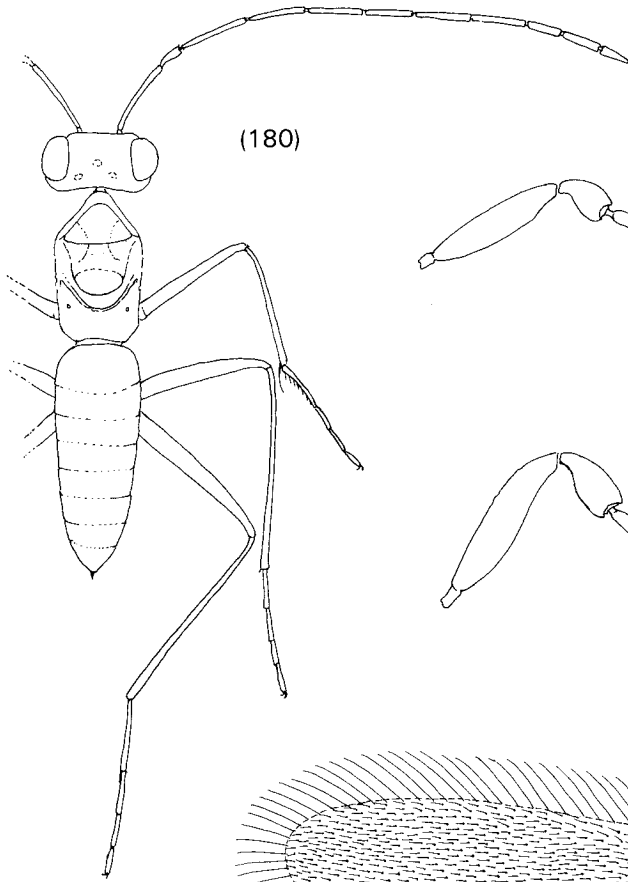


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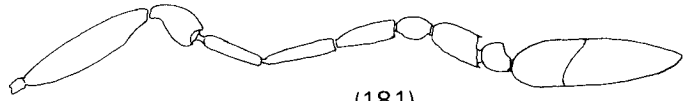
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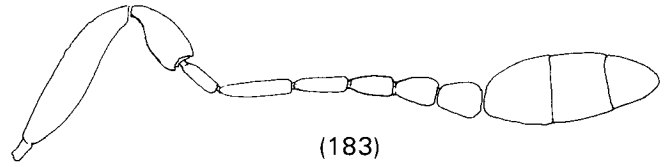
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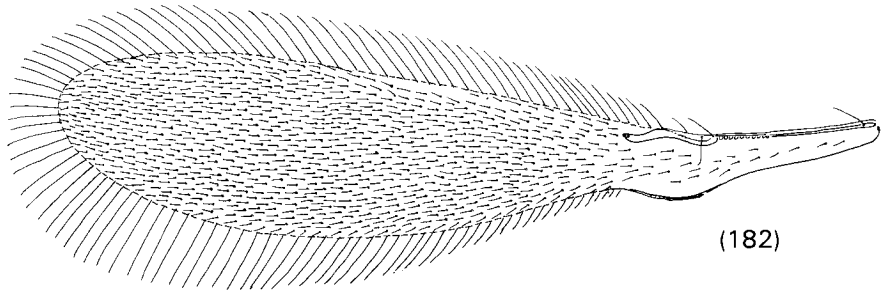
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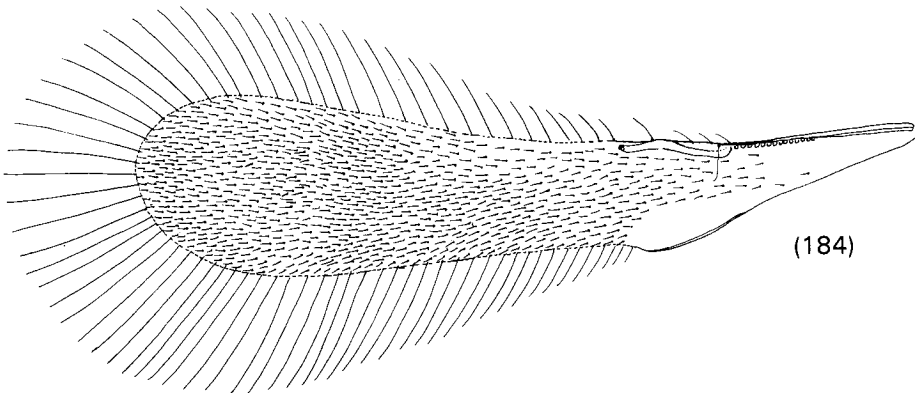
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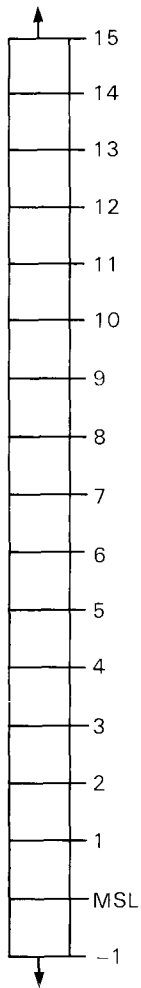
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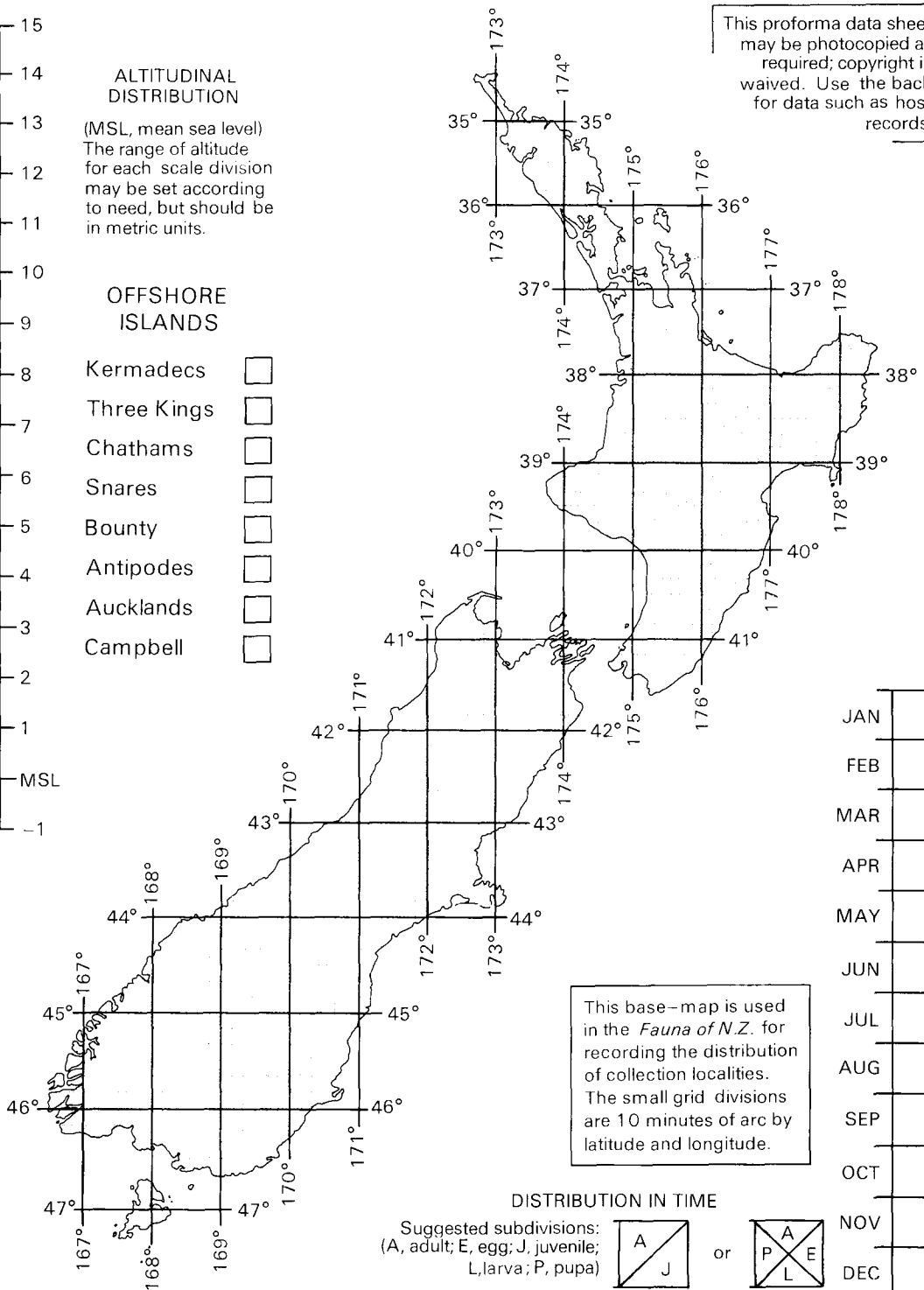


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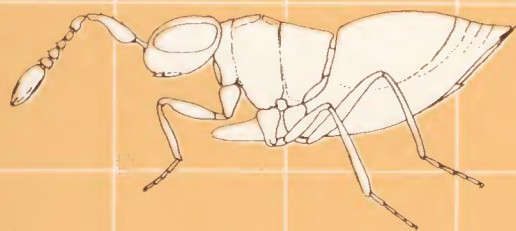
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Fauna of New Zealand



Number 17

Mymaridae

(Insecta: Hymenoptera)

— introduction, and
review of genera



J. S. Noyes &
E. W. Valentine

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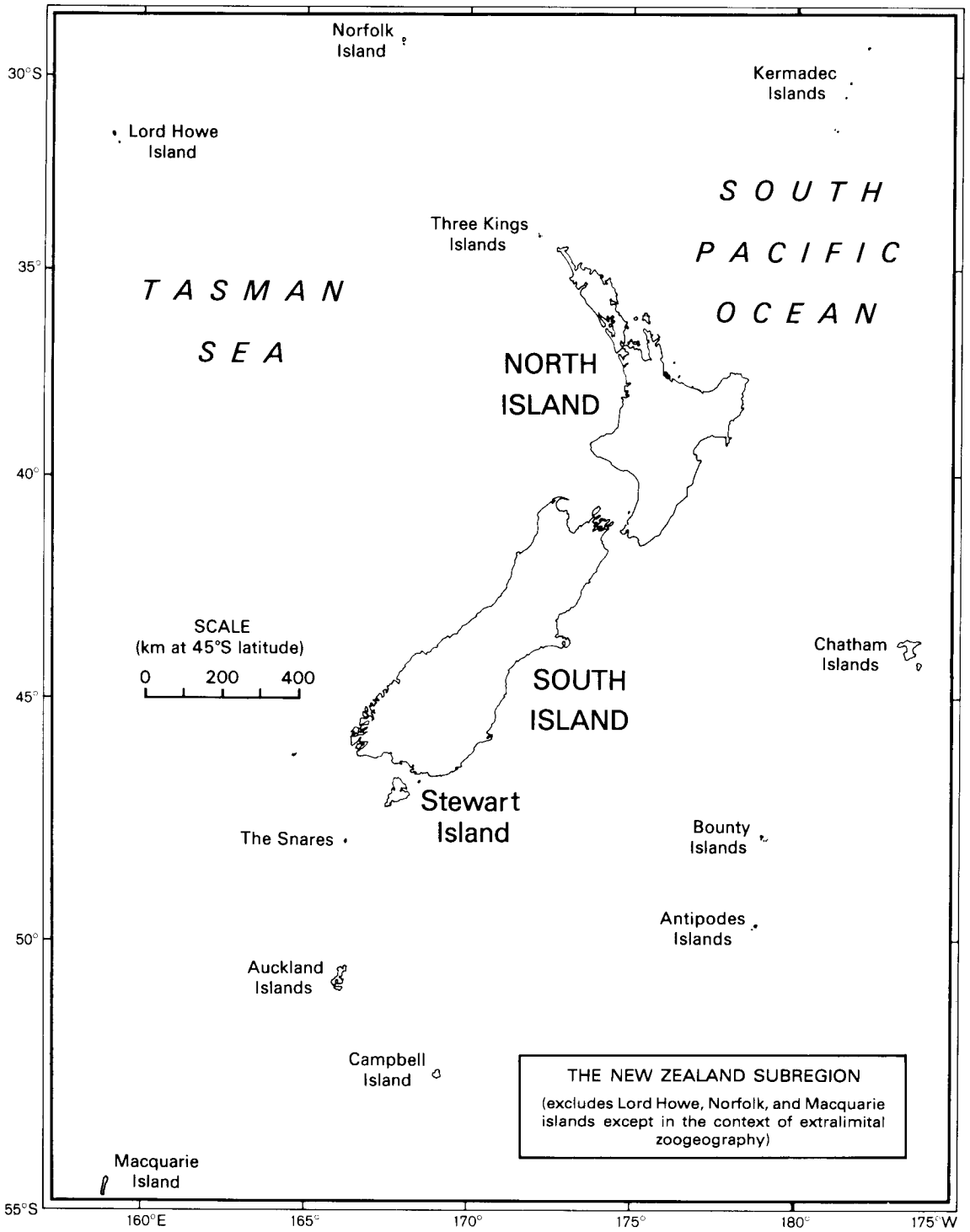
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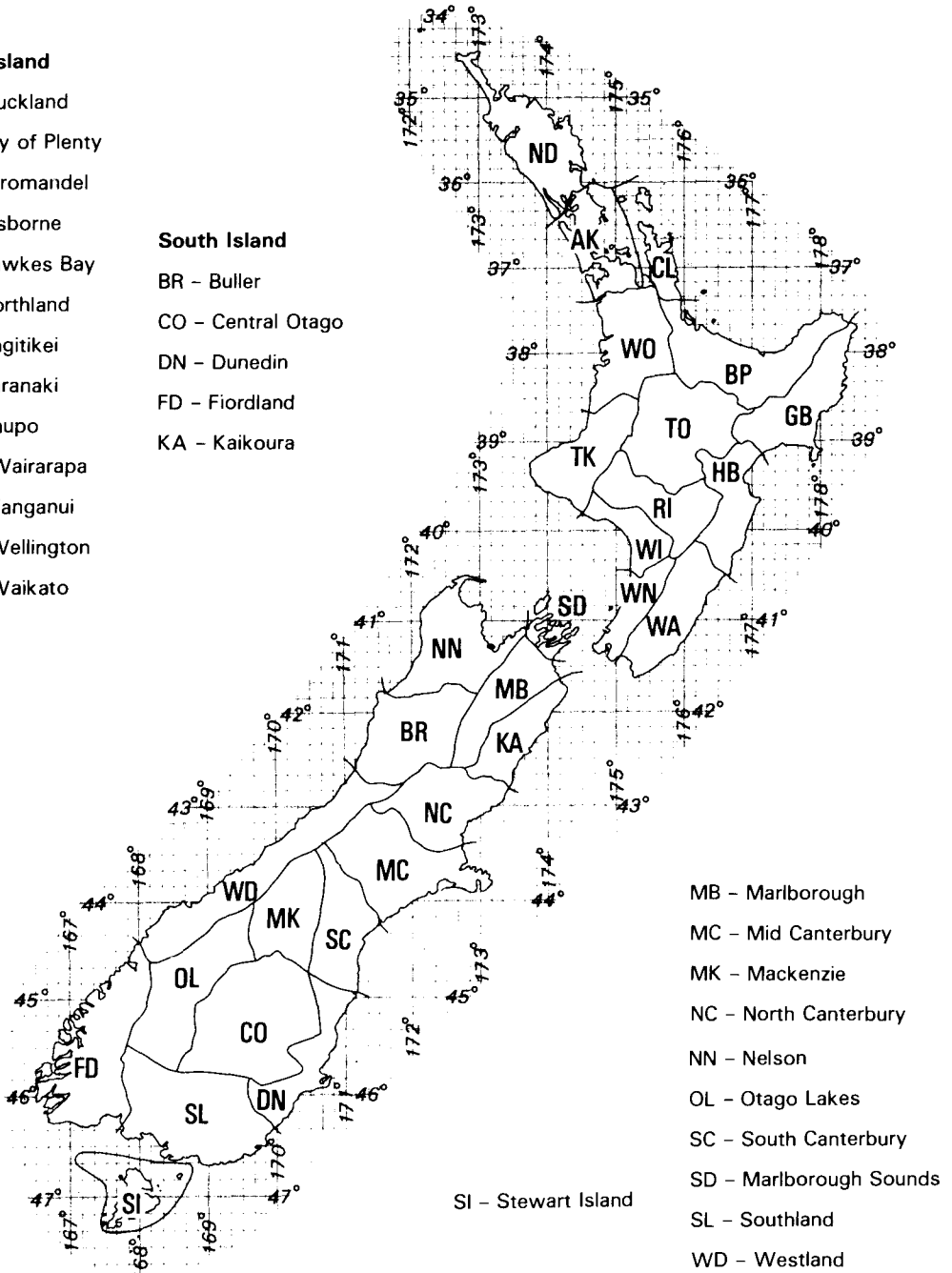


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- AK - Auckland
- BP - Bay of Plenty
- CL - Coromandel
- GB - Gisborne
- HB - Hawkes Bay
- ND - Northland
- RI - Rangitikei
- TK - Taranaki
- TO - Taupo
- WA - Wairarapa
- WI - Wanganui
- WN - Wellington
- WO - Waikato

South Island

- BR - Buller
- CO - Central Otago
- DN - Dunedin
- FD - Fiordland
- KA - Kaikoura



- MB - Marlborough
- MC - Mid Canterbury
- MK - Mackenzie
- NC - North Canterbury
- NN - Nelson
- OL - Otago Lakes
- SC - South Canterbury
- SD - Marlborough Sounds
- SL - Southland
- WD - Westland

Area codes and boundaries proposed by Crosby *et al.* (1976)
for use with specimen locality data

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