

PTEROMALINAE
(PTEROMALIDAE : CHALCIDOIDEA : HYMENOPTERA)
Of
Indian Subcontinent

P.M. SURESHAN



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P. M. SURESHAN

Zoological Survey of India. Western Ghats Field Research Station Calicut

Edited by the Director Zoological Survey of India, Kolkata



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PREFACE

The present work is the compilation of my investigations on the systematics of subfamily **Pteromalinae** of **Pteromalidae** (Hymenoptera : Chalcidoidea) of Indian subcontinent for the last one decade. By presenting this work my intention is to bring together a complete picture of the actual **Pteromalid** fauna belonging to the subfamily **Pteromalinae** of the region. It contains the revisions of 57 known genera and 128 species known from the region. In addition to this 4 new species are also described

The Indian subcontinent dealt in the study comprises countries south of the Himalaya ie. **India, Pakistan, Nepal, Bangladesh, Bhutan, Myanmar and Sri Lanka**. All the known synonyms under each genera and species are included in the present study. Identification keys to the genera and species of **Pteromalinae** known from the region are provided. Some interesting aspects about the zoogeographical distribution of the genera and species are discussed. A check list of genera and species and the distribution of genera in other zoogeographical regions are provided. A host-parasite list and index to genera and species are also included at the end of the monograph.

All possible type material of the known species have been examined for the present work except in few cases where the type materials are either not traceable or not accessible to me. In such cases I could only provide the short original descriptions of the taxa and some of them translated from other languages. Altogether about 15000 specimens were studied for the present work. It is hoped that the present work would stimulate further research on these interesting and economically important group of insects.

P. M Sureshan

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***DEDICATED
TO MY TEACHER
PROF. Dr.T.C.NARENDRAN,
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For his guidance and encouragement
in my research

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INTRODUCTION

Pteromalinae is the largest subfamily of Pteromalidae, which in turn is one of the largest families of Chalcidoidea (Hymenoptera). Both taxonomically and phenetically, Pteromalinae is an ill defined group. When compared with other subfamilies of Pteromalidae, Pteromalinae possess less positive characters for which reason the real limits of the family is not yet defined satisfactorily. Among the workers who attempted to define the limits of the subfamily the work of Graham (1969) and Boucek (1988) are important. Graham (1969) keyed out the subfamily Pteromalinae from the closely related Miscogasterinae. Boucek (1988) included several taxa treated by Graham in Miscogasterinae under Pteromalinae, thereby widening the limits of the subfamily and his classification is currently followed by recent workers.

Systematics and Fauna

The characters used in categorizing the subfamily have been much debated and opinion divided among scientists so that it has been practically impossible to enumerate the genera and species of Pteromalinae on a world wide basis. According to Graham (1969) the subfamily comprises of 507 species under 120 genera from Europe. According to Grissell and Schauff (1991) 227 species under 64 genera of Pteromalinae are known from the Nearctic region and 82 species under 36 genera from the Neotropical region. Boucek (1988) recorded 166 species under 84 genera of Pteromalinae from the Australasian region. He has divided the subfamily into 8 tribes. Boucek et al (1979) recorded a total of 63 species of Pteromalinae under 36 genera from India and adjacent countries.

Diagnosis

From a practical point of view identifying members of Pteromalinae by unique combination of characters is not easy. The main difficulty encountered is in distinguishing some species of Miscogasterinae from Pteromalinae. Earlier the subfamily Pteromalinae used to be diagnosed by its members having incomplete notauli and sessile gaster and the subfamily Miscogasterinae having complete notauli and petiolate gaster. However Miscogasterinae also included the tribe Sphegigasterini possessing a distinct petiolate gaster and incomplete notauli. But intermediate forms exhibiting intergrading characters are now known and the genera previously included under the tribes Trigonoderini and Sphegigasterini of Miscogasterinae are now included under Pteromalinae (Boucek, 1988). Accordingly Pteromalinae can broadly be defined as possessing 13 segmented antennae with 2 or 3 anelli, sessile or petiolate gaster and with either incomplete or complete notauli.

Biology

The species of Pteromalinae attack a wide variety of holometabolous insect hosts. Most of them attack hosts associated with the aerial parts of plants. Groups of closely related

genera often attack related groups of insects (Boucek & Rasplus, 1991). For example genera related to *Cheiopachus* and *Rhopalicus* attack mainly bark beetles. *Anisopteromalus*, *Dinarmus* and *Lariophagus* attack members of coleopteran family Bruchidae in stored grains or in the field. Members of the genera *Pteromalus*, *Trichomalopsis*, and *Mesopolobus* have a wider spectrum of host species. Species of *Dibrachys*, *Catolaccus*, *Euneura* and *Pachyneuron* are hyperparasites of other parasitic hymenoptera through Aphids. Species of *Acroclisoides*, *Manineura* and *Agiommatus* are egg parasites. *Callitula*, *Chlorocytus*, *Homoporus*, *Oxysychus*, *Sphigigaster* and *Syntomopus* attack various insect hosts developing inside the stems or other parts of plants. The biology of several genera like *Eurydinotomorpha*, *Halticopterella*, *Cryptoprymna*, *Merismomorpha*, and *Psilocera* are not known. Owing to the great diversity of insects attacked by members of pteromalinae, they play an important role in the biological control of noxious pest insects in the field. However there are no reliable records of them successfully utilised in biological control programmes in the region. Many species have proven value in biological control programmes in different parts of the world.. Boucek & Rasplus (1991) provided a list of various Pteromalidae utilised in biological control programmes which include members of the subfamily pteromalinae such as *Anisopteromalus calandrae*, *Cheiopachus quadrum*, *Dibrachys cavus*, *Dinarmus acutus*, *Lariophagus distinguendus*, *Nasonia vitripennis*, *Pachycrepoideus vindemmiae*, *Pteromalus puparum* and *Pteromalus semotus*.

Pteromalinae of the Indian subcontinent

The study of Pteromalinae pertaining to the Indian subcontinent is still in an infantile stage and available information is scattered in scientific literature. Boucek *et al.* (1979) projected a figure of 63 species of Pteromalinae under 36 genera occurring in India and the adjacent countries. Farooqi & Subba Rao (1985, 1986) have also dealt with the Pteromalinae of India and the adjacent countries. In the present study all the known species and genera of Pteromalinae from the Indian subcontinent are revised taxonomically. The subfamilial classification of Boucek (1988) is followed here. It is hoped that the present study would provide a comprehensive information on the Pteromalinae of Indian subcontinent that would be of use in projects connected with the biocontrol of injurious pests employing these parasitoids.

MATERIALS AND METHODS

The study is based on freshly collected specimens from different parts of India mainly of southern states and borrowed material from several scientists and museums. Relevant types have been examined by me for the present work. The methods of collection, preservation, mounting etc. are followed as described by Noyes (1982). Fresh collections are mainly made from the field by employing a sweep net specially designed for the purpose. A good number of specimens were also collected by rearing the suspected hosts (immature

stages such as pupae, larvae, eggs etc.) in the laboratory. The collected insects were mounted on rectangular cards measuring 14 mm length and 5mm width and pinned with entomological pins (NO.3) (size 38 mm x 0.53mm). The pinned specimens were observed under MZ6 LEICA WILD stereozoom (Switzerland) microscope. Figures were drawn using the drawing tube and measurements were taken with the measuring graticule of the same microscope. In most cases drawings were enlarged with a photocopier before inking. Photographs of the specimens were taken with a CENSICO Stereozoom trinocular microscope with a built in Ashai pentax 35mm camera.

Terminology

The morphological terminology used in this work follows that of Boucek (1988) and Boucek & Rasplus (1991). The term mesosoma is used here which includes the propodeum. The term gaster and petiole are used separately. Most of the terms are illustrated in figures 1-3.. The antennal formula depict the scape, pedicellus, number of anelli, number of funicular segments (F1 to F6) and claval segments. In some cases proximal funicular segments are unusually short and look like anelli and are described anelliform. In such cases clear separation of the number of anelli in the antennal formula became difficult. POL is the distance between the posterior ocelli and OOL the distance between posterior ocellus and eye. The following abbreviations are also used in the text.

ABBREVIATIONS OF MUSEUMS AND DEPOSITORIES

BMNH	The Natural History Museum, London, U.K.
BPBM	Bernice Bishop Museum, Honolulu, Hawaii
DZCU	Department of Zoology, University of Calicut.
EIHU	Entomological Institute, Hokkaido University, Sapporo, Japan
IARI	Division of Entomology, Indian Agricultural Research Institute, New Delhi, India.
MCSG	Museo Civico di Storia Naturel, Genova, Italy
NM	Entomologicke oddeleni, Narodni Museum, Praha, CSSR.
NMV	- Naturhistorisches Museum, Vienna, Austria.
NRS	Naturhistoriska Riksmuseet, Stockholm, Sweden.
QM	Queensland Museum, Brisbane, Australia.
USNM	United States National Museum of Natural History, Washington DC, USA.
UZIL	- Universitetets Zoologiska Institutionen, Lund. Sweden.

ZMMS	Mosco State University Museum, Mosco, USSR.
ZSI	Zoological Survey of India, Calcutta, India.
ZSIC	Zoological Survey of India, Western Ghats Field Research Station, Calicut, India

ABBREVIATIONS OF THE INDIAN STATES AND UNION TERRITORIES

AM	Assam	KL	Kerala
ANI	Andaman and Nicobar Islands	KT	Karnataka
AP	Arunachal pradesh	MR	Maharashtra
BR	Bihar	OR	Orissa
DL	Delhi	PB	Punjab
GT	Gujrat	RJ	Rajasthan
HP	Himachal Pradesh	TN	Tamil Nadu
HR	Haryana	UP	Uttar Pradesh
J&K	Jammu and Kashmir	WB	West Bengal

GENERAL ABBREVIATIONS

F	Female	POL	Postocellar distance
F1-F6	Funicular segments 1 to 6	SMV	Submarginal vein
		Sp. nov.	species nova.
M	Male	STV	Stigmal vein
MV	Marginal vein	Syn.	Synonym.
OOL	Ocellocular distance	T1-T6	Tergites 1 to 6
PMV	Postmarginal vien		

FORM OF PRESENTATION

Key to genera

A dichotomous key to identify all the genera of Pteromalinae known from the Indian subcontinent is provided. The key is based on characters of the females and if male characters are used they are separately mentioned in the couplets.

Systematic treatment of the taxa

For practical reasons genera are listed in alphabetical order. Under each genus detailed list of synonymy is given. This is followed by a brief diagnosis of the genus, its distribution

and a general note on the biology. Keys to identify the known species under the genus is given. Under each genus detailed taxonomic information of the species known from the region is given. This includes the list of synonymy, followed by a detailed diagnosis of the species, distribution and host recorded from the region. The distribution of the species in the region is given first followed by its distribution in other parts of the world (in brackets). New species are described in detail.

A checklist of all the genera and species of Pteromalinae known from the region is also provided. In the checklist distribution of all the species are given in brackets followed by its distribution in other parts of the world. Genera endemic to India are marked with asterisks. A list of recorded hosts of all the species of Pteromalinae known from the region are given in the form of a host parasite list. Arthropod hosts and plant hosts are dealt with separately. Name of the host is given in capitals and under which the names of the species reported from that host are provided.

**Key to the Genera of Pteromalinae
(Pteromalidae : Chalcidoidea) of Indian Subcontinent.
(Based mainly on females)**

1. Gaster distinctly petiolate 2
 - Gaster sessile or subsessile 25
2. Forewing with MV thickened (Figs. 4,10,12,14,18,35,43), sometimes slightly and uniformly and stigma large or moderate 3
 - Forewing with MV not thickened 11
3. Notaular grooves complete 4
 - Notaular grooves incomplete, posteriorly indistinct 6
4. Stigma of forewing moderately large (Figs. 4, 10) 5
 - Stigma of forewing normal 9
5. Head unusually transverse (Figs.5, 8, Pl. I. fig.1) with conspicuous occipital carina; anterior margin of clypeus rather straight, not produced; antennae inserted high above centre of face; face not extensively striated *Acroclisoides* Girault
 - Head not unusually transverse, (Fig.9) without occipital carina; anterior margin of clypeus angularly produced; antennae inserted not much above center of face as above; face extensively striated *Coruna* Walker
6. Axillae moderately advanced (Fig.12); pronotal collar not developed; antennae placed high above centre of long convex face with 2 anelli; face bears strong setae directed upwards *Manineura* Boucek

- Axillae not advanced; pronotal collar distinct ; antennae inserted lower on face with 2 or rarely with 3 anelli; face without setae as above.....7
7. Gaster with T2 large and parallel sided (Figs.14, 17); antennae with 3 anelli (Fig. 16) forewing with MV almost parallel sided *Pachycrepoideus* Ashmead
- Gaster with T2 not as above; antennae with 2 anelli (if with 3 anelli then MV strongly wedge shaped (Fig. 26); forewing with MV more or less broadening apically 8
8. Gaster dorsally rather strongly convex (Fig.11) antennae inserted slightly above middle of face; face almost entirely vertically striated (Fig.13); gastral petiole transverse *Euneura* Walker
- Gaster dorsally flat, more or less caving, almost weakly convex; antennae inserted below middle of face; face reticulate centrally, not striate; petiole transverse to elongate (Figs.18, 32, 33, Pl. III. fig. 30); (antennae with 3 anelli in *Paphidis* and MV strongly wedge shaped) *Pachyneuron* Walker
9. Eyes very large; head with inner orbits converging upwards (Fig. 37, 40, Pl. I. fig. 2.) so that frons relatively narrow; forewing with MV fairly long and slightly thickened uniformly (Fig. 35) *Agiommatius* Crawford
- Eyes not usually large; inner orbits not as above; MV not so long and not uniformly thickened 10
10. Forewing with MV longer, abruptly and roundedly thickened at its proximal half (Fig. 43); antennae inserted near to mouth, in female with 3 and in male with 2 anelli; PMV shorter than MV; clypeal margin not produced; gaster as in figure 42 *Platecrizotes* Ferriere
- Forewing (Fig. 46) with MV parallel sided, not or hardly longer than STV; PMV much longer than MV; antennae (Fig.44) inserted slightly above centre of face, in both sexes with 3 anelli; clypeal margin distinctly produced; more or less lobe like (Fig.45) *Oricoruna* Boucek
11. Female gaster subcircular, shorter than mesosma (Figs. 390-392, Pl. I. fig. 8.); body broad, eyes rather large; antennae short, inserted low on face, flagellum with 2 or 3 anelli, clava subacuminate, forewing with PMV hardly longer than STV, marginal fringe extensively short *Cyclogastrella* Bukowski
- Gaster ovate to elongate, not as above, body not broad as above; other characters partly or completely different 12
12. Antennae inserted very high on face (Figs. 47, 48, Pl. II. fig. 20); clypeus with a median notch anteriorly; face covered with moderately dense long white hairs; antennae in female with 3 and in male with 2 anelli; propodeum and gaster of female as in figure. 49 *Narendrella* Sureshan

- Antennae inserted not very high on face as above; other characters partly or completely different 13
- 13. Notaular grooves complete, fine or deeply impressed 14
- Notaular grooves incomplete 16
- 14. T1 of gaster long on sides but dorsally broadly emarginate (Fig. 386); propodeum with coarse irregular areolation merging with rugosity; forewing extensively hairy in basal third (Fig. 385); male palpi enlarged (Fig. 387) *Cyrtogaster* Walker
- T1 of gaster not as above; propodeum different; forewing not extensively hairy as above; male palpi not enlarged 15
- 15. Mesosoma very high and robust ; fore coxa separated from mid coxa by horizontal shelf delimited by transverse carina posterior to fore coxa (Fig. 53); scutellum without median fovea; gena posteriorly with strong lamina visible even from above; gaster more or less laterally compressed *Paracarotomus* Ashmead
- Mesosoma not very high and robust, without carinate shelf; gena not carinate; gaster not as above; scutellum with an elongate median fovea before frenal groove (Fig. 52, Pl. II. fig. 19) *Notoglyptus* Masi
- 16. Propodeum strongly ascending, the attachment of petiole on propodeum is peculiar as in figures 58, 59, Pl. I. fig. 9 *Eurydinotomorpha* Girault
- Propodeum not as above, attachment of petiole different 17
- 17. Propodeum with 3 longitudinal depressions or shallow grooves, median the longest and often subdivided by transverse carinulae with median carina (Figs. 54, 57, Pl. I. fig. 12) *Miscogasteriella* Girault
- Propodeum not as above 18
- 18. Mesosoma usually flattened (Figs. 60, 66, Pl. III. fig. 34); pronotum large, quadrangular; gaster with T1 largest, its hind margin incised in the middle (Figs. 64, 68) *Syntomopus* Walker
- Mesosoma not unusually flattened as above; pronotum not quadrangular; other characters varying 19
- 19. Antennae with F1 subconical, constricted in its proximal half; about as long as F2 and F3 together (Fig. 73); forewing with unusually sparse pilosity (Fig. 71) *Conomorium* Masi
- F1 not as above; forewing with pilosity not as above 20
- 20. . Gastral petiole distinctly sinuate in profile, posteriorly on ventral side embraced by a narrow extension of first gastral sternite (Figs. 74, 80) clypeal margin rounded, subconical or truncate (Figs. 81, 87, Pl. II. fig. 14) *Merismomorpha* Girault

- Gastral petiole not as above (in some cases sinuate in male and embraced by a narrow extension of first gastral sternite, then clypeus and fore wing venation different and petiole shorter; clypeus not as above 21
21. T1 of gaster covering most of it, other tergites almost completely hidden (Figs. 89, 92, Pl. I. fig. 6); flagellum in female strongly clavate *Cryptoprymna* Forster
- T1 of gaster not covering most of it, other tergites not hidden as above; flagellum different 22
22. Axillae in outer corner with a small deep pit; stigma of forewing moderately capitate; propodeum (Fig. 119) moderately long, without carina, with a pair of shallow submedian longitudinal grooves posteriorly which converge to merge with the saddle like constriction before nucha, this constriction connects laterally with deep supra coxal pit; gaster dorsally collapsing (Figs. 114, 116, Pl. III. fig. 31) *Paraiemea* Sureshan & Narendran
- Axillae without pit; propodeum not as above; gaster dorsally not collapsing 23
23. Propodeum with a distinct short subglobose nucha (Figs. 94, 95), plicae strongly curving towards median line, but disappearing before reaching middle; gaster dorsally rather convex, not collapsing *Delislea* Girault
- Propodeum with or without nucha, not subglobose; plicae different; gaster different.. 24
24. Gastral petiole anteriorly on either side with a sharp triangular tooth, seems to be composed of three parts, the median stalk is the true petiole, whilst the side parts are connected ventrally and form a stiffened ventral projection of the first gastral sternite; T2 not the largest (Fig. 96, Pl. III. fig. 35); anterior margin of clypeus without teeth *Toxeumorpha* Girault
- Petiole not as above, ventrally without projection of first gastral sternite as above; gaster with T2 largest, covering most of it (Figs. 102, 103, 112); anterior margin of clypeus with sharp teeth (Figs. 105, Pl. II. fig. 18) *Sphigigaster* Spinola
25. Forewing with MV thickened either uniformly or at base or distally 26
- Forewing with MV not thickened 30
26. Female flagellum unusual, short and clavate, clava very short and with a digitiform process (Fig. 388); antenna normal, almost filiform in male; in both sexes forewing with dark macula at MV (Fig. 389) *Rhaphitelus* Walker
- Antenna different in female, without digitiform process; forewing with different spot if present 27
27. Antennae with third anellus quadrate (Fig. 120); forewing with MV only slightly thickened from base (Fig. 121) *Ischyroptyx* Delucchi

- Antennae with 2 or three anelli, if three then third not quadrate; forewing with MV uniformly thickened (parallel sided) or widening distally 28
- 28. Forewing with MV widening distally (Figs. 122, 125) not parallel sided with a more or less vertical infumation below; all femora enlarged *Metacolus* Forster
 - Forewing with MV parallel sided, without any infumation below; femora normal 29
- 29. Clypeal margin broad with a deep median incision (Fig. 128), female antenna with 2 anelli, inserted lower on face (Fig. 127); pronotum barely visible dorsally and has no collar (Fig. 126, Pl. III. fig. 28); gaster subsessile *Inkaka* Girault
 - Clypeal margin different (Fig.131) ; female antenna with 3 very short anelli, inserted above level of lower orbital borders; pronotum with collar visible dorsally (Figs. 130, 136, Pl. II. fig. 15) *Metastenus* Walker
- 30. Pronotum with collar appears in the form of two blunt lateral teeth due to, a median notch (Fig.2); clypeus with a broad median tooth (Fig. 3, Pl. I. fig. 4, Pl. II. fig.13) *Kumarella* Sureshan
 - Pronotum without lateral teeth as above; clypeus different 31
- 31. Fore femur enlarged; pronotum moderately large, but not bell shaped 32
 - Fore femur not enlarged, pronotum mostly shorter 34
- 32. Ovipositor sheaths in female well protruded, exerted part longer than one fourth length of gaster (Fig. 138); forewing immaculate *Roptrocerus* Ratzeburg
 - Ovipositor sheaths not as above, normal; forewing mostly maculate 33
- 33. Pronotum rounded off into the neck region without carina; STV with a large capitate stigma (Figs. 139, 140) *Rhopalicus* Forster
 - Pronotum slightly ridged anteriorly, laterally large with deep emargination along posterior border (Fig. 142); forewing with two fuscous maculae (Fig. 143) hind tibia dorsally with a row of short but conspicuous spines (Fig. 141) *Cheiopachus* Westwood
- 34. Clypeus with a sharp median tooth (Fig.148); occipital carina present; gaster dorsally convex, cylindrical, subconical with T2 very short, with hind margin medially excised (Figs. 146, 149, Pl. III. fig. 33) *Unicypea* Boucek
 - Clypeus with or without tooth, but not shaped as above; other characters partly or completely varying 35
- 35. Propodeum with a short, distinct neck and conspicuous plicae which define a broadly cordiform median area; plicae high, converging, connected posteriorly by a weak or

- distinct costula; (Figs. 153, 155, 162, Pl. III. fig. 26); notaular grooves deep but hardly traceable behind middle of mesoscutum; scutellum with extensive pilosity, except for a narrow median strip *Halticopterella* Girault & Dodd
- Propodeum with or without nucha, but not structured as above; other characters varying 36
36. Hind tibia with two spurs; body mostly robust, reticulate punctate with white pubescence on head and mesosoma; pronotum as broad as mesoscutum 37
- Hind tibia with one spur; head and mesosoma without distinct pubescence as above; pronotum narrower than mesoscutum 44
37. Antennae slender in female terminal segment of clava spine like at apex; in male funicular segments petiolate with whorls of long erect hairs (Figs. 166, 173, 175); Pronotum very broad, hence mesosoma very compact; dorsum of head and mesosoma including most of scutellum with abundant curved hairs (Figs. 169, 180, Pl. II. fig. 21).....
..... *Norbanus* Walker
- Antennae without terminal spine in female. in male funicular segments not petiolate, but with or without long erect hairs; other characters varying 38
38. Propodeum with hind margin deeply and arcuately excised (Fig.184); pronotum dorsally very short, but sharply carinate (Fig.183); clypeus large, well delimited, lower margin produced, bilobed with a sharp median incision (Fig.182, 185, Pl. I. fig. 11); mesoscutum densely pubescent; antennae and legs including coxae yellow
..... *Mokrzeckia* Mokrzecki
- Propodeum different, its adpetiolar margin not unusually emarginate; pronotum bluntly ridged or rounded, not sharply carinate; other characters varying 39
39. Propodeum with a short or well developed nucha 40
- Propodeum not produced to form a nucha 43
40. Propodeum with a conspicuous subglobose nucha; gaster short and cordiform (Figs. 190, 196, 201) mesosoma short and very compact; female antenna with 3 and male with 2 anelli; costal cell of forewing bulged in some species (Figs. 194, 197, Pl. I. fig. 5)
..... *Dinarnus* Thomson
- Propodeum with nucha not subglobose; gaster not cordiform, rather elongated; other characters partly or completely varying 41
41. Antenna with 2 anelli in both sexes (Figs. 204, 205, Pl. II. fig. 23); gaster mostly yellow with one median and two lateral longitudinal brownish lines, which are sometimes incomplete or absent; hind margin of T1 truncate; propodeum uniformly convex and finely reticulate punctate; male antenna with funicular segments long and with erect hairs *Propicroscytus* Szelenyi

- Female antenna with 3 anelli; gaster different; T1 medially produced; propodeum mostly smooth with a cross carina or at least medially raised; male antenna different 42
- 42. Notauli groove like, almost complete; clypeus with two distinct teeth, propodeum with a cross carina (Fig. 206); T1-T3 covering half or less than half of gaster (Fig. 207, 209, Pl. II. fig. 16) *Oniticellobia* Boucek
 - Notauli finer, indicated only anteriorly; clypeus only shallowly emarginate; propodeum medially raised without cross carina; T1-T3 covering more than half of gaster (Figs. 210, 212) *Anisopteromalus* Ruschka
- 43. Pronotal collar with a complete fine carina; clava with a line of pilosity extending all along its length; propodeum between spiracles almost flat or weakly convex. (Fig. 220, Pl. II. fig. 22) *Oxysychus* Delucchi
 - Pronotal collar weakly carinate in the middle; clava with the pilosity limited to its apical segment; propodeum not so flat (Fig. 228) *Cyrtoptyx* Delucchi
- 44. Terminal segment of clava in female narrowly pointed (Figs. 233, 243, 246, 249, 254) 45
 - Terminal segment of clava in female not narrowly pointed 46
- 45. Female antenna with 3 anelli and 5 funicular segments (Figs. 233, 243, 246.) propodeum produced into a distinct reticulate and subglobose nucha (Figs. 232, 241, 242, Pl. I. fig. 3); T1 or sometimes T2 also evidently enlarged *Callitula* Spinola
 - Female antenna with 2 anelli and 6 funicular segments (Figs. 249, 254) propodeum with nucha short, not subglobose (Figs. 249, 250, 255, Pl. III. fig. 25); gastral tergites different *Homoporus* Thomson
- 46. Head and mesosoma finely engraved reticulate; antennae in both sexes short; stout, filiform with 2 anelli and 6 funicular segments; female head transverse, oval (Fig. 256); in male wings shortened *Nasonia* Ashmead
 - Head and mesosoma reticulate punctate; other characters partly or completely different. 47
- 47. Scutellum with distinct frenal groove (Fig. 263), behind the groove scutellum evidently convex; forewing extensively bare, hairs reduced (Fig. 261); pronotal collar not well delimited *Schizonotus* Ratzeburg
 - Scutellum without clear frenal groove; other characters different 48
- 48. Head stout behind eyes (Fig. 257); gena hollowed at mandibular base; forewing sometimes extensively hairy (Fig. 265) *Catolaccus* Thomson

- Head not stout as above; forewings not so hairy 49
49. Forewing without fringe; PMV as long as STV (Fig. 268); occiput margined by blunt or sharp transverse ridge (Fig. 266) *Dibrachys* Forster
- Forewing with marginal fringe; PMV longer than STV, occiput rounded, if ridged then the ridge always near foramen 50
50. Occiput with transverse ridge placed near foramen, far behind and below lateral ocelli (Fig. 275); propodeum with distinct plicae and mostly with distinct median carina, all converging to globose reticulate nucha (Figs. 271, 279, 285, Pl. III. fig. 36)
..... *Trichomalopsis* Crawford
- Occiput without transverse ridge; other characters partly or completely different.
..... 51
51. Toruli situated clearly below centre of face with 3 anelli (Fig. 308, 309, 312) pronotal collar with abrupt ridge but not carinate; propodeum smooth; plicae complete, without nucha (Figs. 307, 311, 316, Pl. I. fig. 10) *Mesopolobus* Westwood
- Toruli situated in about the middle of face; antenna mostly with 2 anelli; pronotal collar rounded or ridged; propodeum different 52
52. Sides of propodeum and T1 thickly set with white hairs (Fig. 319, 322, 323, Pl. III. fig. 32); pronotal collar with smooth sharp margin *Trichomalus* Thomson
- Sides of propodeum and T1 without dense patches of hairs; pronotal collar mostly rounded
53
53. Female antenna strongly clavate, of male with pedunculate segments, with whorls of erect bristles. (Figs. 324, 327, 334, 337), head much broader than mesoscutum; gaster with posterior margins of several terga usually with median indentation; in some species scutellum raised into a triangular horn with finger nail like tip (Figs. 331-333, Pl. III. fig. 27) *Psilocera* Walker
- Female antenna different, not strongly clavate as above; male antenna different; other characters varying 54
54. Hind corners of propodeum (Fig. 343) in dorsal view appearing right angled or even slightly acute; hind margin of T1 slightly produced medially (Fig. 344) lower face swollen (Fig. 342, Pl. III. fig. 29); clypeal margin emarginate
..... *Lariophagus* Crawford
- Hind corners of propodeum rather rounded, not as above; T1 of gaster not produced; other characters partly or completely different 55

55. Pronotal neck appears longer than collar in dorsal view (Fig. 347); prepectus relatively large, its upper margin at least as long as tegula, its surface nearly regularly reticulate, rather slender; propodeum without nucha (Fig. 348); forewing with MV more than 1.5x as long as STV (Figs. 346, 350, Pl. I. fig. 7) *Chlorocytus* Graham

Pronotal neck hardly visible; prepectus small; horizontally shorter than tegula; its surface smooth or hardly sculptured and mesosoma not slender (Fig. 355) propodeum with a narrow or distinct nucha (Figs. 370, 373, 377), forewing with MV usually 1.5x as long as STV (Figs. 353, 360, 364, Pl. II. fig. 24) *Pteromalus* Swederus

SYSTEMATIC ACCOUNT

Genus 1. *Acroclisoides* Girault & Dodd

1915. *Acroclisoides* Girault & Dodd, in Girault, *Mem. Qd. Mus.* 3 : 334. Type species : *Acroclisoides megacephalus* Girault & Dodd by original designation.

Diagnosis : Head unusually broad (Figs. 5, 8); occipital carina distinct; clypeal margin not produced, rather straight; antennae with two anelli, inserted high above centre of face; mesoscutum with notauli complete; gaster petiolate, petiole subquadrate, smooth and dorsally flat; T1 often narrowed basally so that gaster is prolonged behind the petiole; MV of forewing more or less widened (Figs. 4, 8).

Distribution : India, Myanmar (Africa, New Guinea, America, Australia).

Biology : Parasites in eggs of Pentatomid Heteroptera.

Key to the species of *Acroclisoides* of India and adjacent countries

1. Forewing (Fig. 4) with a broad brown spot beneath STV; gaster long, 0.8x as long as head plus mesosoma combined; in dorsal view head width 2.2x length; antennal flagellum dark brown (Pl. I. fig. 1) *maculatus* Sureshan & Narendran

Forewing (Fig. 8) hyaline, without brown spot; gaster short, length 0.6x as long as head plus mesosoma combined; in dorsal view head width 1.9x length; flagellum pale brown *indicus* Ferriere

1 *Acroclisoides indicus* Ferriere

(Figs. 7, 8)

1931. *Acroclisoides indicus* Ferriere, *Bull. Ent. Res.* 22 : 279, India : Dehradun (BMNH).

Diagnosis : Length 1.4mm. Head and mesosoma dark metallic blue, lower face with golden reflection; gaster brown ventrally; antennae pale brown except scape, pedicel and

anelli testaceous; fore and hind coxae concolrous with mesosoma except tips testaceous, mid coxae and remainder of legs testaceous with tips of tarsi brown. Head closely and coarsely reticulate, 1.4x as wide as mesosoma; POL 0.8x OOL; lower posterior corner of gena produced in to a short spine. Antennal scape as long as eye; pedicel plus flagellum length almost equal to head width; FI-F3 equal. Forewing length 2.3x width; PMV only little longer than MV. Gaster 0.6x as long as head plus mesosoma combined.

Distribution : India (KL, TN, UP), Myanmar.

Host : Eggs of Pentatomid Heteroptera (Boucek et al., 1979).

2. *Acroclisoides maculatus* Sureshan & Narendran (Figs. 4-6, Pl. I. fig. 1)

2002. *Acroclisoides maculatus* Sureshan & Narendran *Rec. zool. Surv. India*. **100** (3-4) : 128, F. M. India KL (ZSIC).

Diagnosis : Length 1.5mm. Head and mesosoma dark metallic blue, lower face with golden reflection; gaster including petiole brown with metallic blue reflection beyond middle. Head in dorsal view 1.4x as wide as mesosoma.; POL 0.7x. OOL; lower posterior corner of gena with a sharp tooth; antennal scape little shorter than eye; pedicel little wider than long. Pronotal collar dorsally shiny behind anterior carina; mesoscutum width 2.4x length. Forewing length 2.3x width; basal cell and speculum closed below; STV with an obscure brown spot beneath. Gaster (without petiole), 0.8x as long as head plus mesosoma combined.

Distribution : India (KL, TN)

Host : Unknown

Genus 2. *Agiommatus* Crawford

1911. *Agiommatus* Crawford, *Proc. U.S. Natn. Mus.* **41**: 278. Type species: *Agiommatus sumatraensis* Crawford, by original designation.
1913. *Pterosemella* Girault, *Mem. Qd. Mus.* **2** : 317 and 1914: *Societas ent.* **29** : 55. Type species : *Pterosemella viridis* Girault, by original designation. (Syn. Boucek, 1976 : 18)
1913. *Polycystella* Girault, *Mem. Qd. Mus.* **2** : 325. Type species : *Polycystella fasciiventris* Girault by original designation (Syn. Boucek, 1988 : 458).

Diagnosis : Head with inner eye orbits converging upwards so that the frons narrow; clypeal margin produced, anteriorly with deep and broad emargination (Fig.37). Antennae short with 3 anelli (Fig.36). Pronotal edge rounded or rectangular, without sharp carina. Mesoscutum with notauli almost complete; lateral lobe often with a distinct fovea in lateral corner (at tegula) and another at outer corner of axilla. Propodeum with an anterior depression

which is subdivided by costula. Forewing (Fig.35) with MV long and slightly thickened uniformly; gaster distinctly petiolate (Figs. 39, 41).

Distribution : India, Sri Lanka (Sumatra, Malay peninsula, Australia, Africa, Indonesia).

Biology : Parasites in eggs of Lepidoptera especially of larger species Sphingidae, Saturnidae, Noctuidae etc.

Key to the Indian species of *Agiommatus*

1 Gaster (Fig. 41) aeneous brown, dorsally with 2 yellowish transverse bands, one broad, covering end of T2 and base of T3 and second narrow at the hind part of T4, yellow ventrally; T4 large, 2.5x as long as T3 medially; temple length 0.6x eye length (Fig. 40); mesoscutum width 2.4x length; body bright metallic greenish blue; size 2.3-2.5 mm.
..... *paria* (Motschulsky)

Gaster (Figs. 35, 39) uniformly dark brown without yellowish cross bands; T4 only little longer than T3; temple length (Fig. 38) 0.4x eye length; mesoscutum width 2.1x length; body dull metallic bluish green; size.1.8-1.9mm (Pl. I. fig. 2).....
..... *geethae* Sureshan & Narendran

1. *Agiommatus paria* (Motschulsky) (Figs. 40-41)

1863. *Eulophus paria* Motschulsky, *Bull. Soc. Imp. Nat. Moscou.* **36** : 63. F. Sri Lanka (Lectotype, ZMMS).

1931. *Agiommatus acherontiae* Ferriere, *Bull. Ent. Res.* **22** : 279-280. F. M. India : Dehradun (BMNH) examined (Syn. Boucek, *et al.* 1979 : 435).

Diagnosis : Length 2.3-2.5mm. Head and mesosoma bright metallic greenish blue, gaster aeneous brown above with two yellowish transverse stripes, almost yellow ventrally; antennae testaceous; legs entirely clear yellow except bases of fore and hind coxae brown. Head finely reticulate, face below antennae 2x as wide as vertex; temple length 0.6x eye length. Pronotum sharply angulate along its front margin. Scutellum more finely reticulate posteriorly. Mesoscutum width 2.4x length. Forewing with MV 3x STV. Gaster oval, little longer than mesosoma; petiole 2x as long as broad.

Distribution : India (UP), Sri Lanka.

Host : Eggs of *Acherontia stynx* (Lepidoptera : Sphingidae).

2. *Agiommatus geethae* Sureshan & Narendran
(Figs. 35-39, Pl. I. fig. 2)

1996. *Agiommatus geethae* Sureshan & Narendran, *J. Bomb. Nat. Hist. Soc.* **93**: 59-61. F. India: KT(ZSIC).

Diagnosis : Length 1.8-1.9mm. Head and mesosoma dark metallic blue; gaster dark brown, pale ventrally. Antennae with scape, pedicel and anelli pale yellow, remainder pale brownish yellow. Head in dorsal view width 1.7x length; POL 3x OOL. Mesoscutum width 2x length. Forewing length 2x width; basal part almost bare with few setae on basal vein. Gaster elongate, ovate, petiole 2x as long as wide, length 2.8x width in dorsal view.

Distribution : India (KT).

Host : Eggs of cutworm (Lepidoptera : Noctuidae) on mulberry.

Genus 3. *Anisopteromalus* Ruschka

1912. *Anisopteromalus* Ruschka, *Verh. Zool. Bot. Ges. Wien.* **62** : 243-245. Type species: *Anisopteromalus mollis* Ruschka by monotypy.

1913. *Aplastomorpha* Crawford, *Proc. U.S. Nat. Mus.* **45** : 252. Type species : *Aplastomorpha pratti* Crawford, by original designation.

Diagnosis : Body usually bronze, bluish black or dark greenish with metallic reflections. Vertex slightly raised; anterior margin of clypeus shallowly emarginate. Antennae with 3 anelli and 5 funicular segments; third anellus largest (Fig. 211). Mesoscutum and scutellum densely hairy; notauli incomplete; propodeum with short but distinct, rather weakly convex smooth nucha; median carina developed only anteriorly; plicae indicated only by the anterior plical foveae. Gaster with T1 sub angularly or arcuately produced; T1-T3 covering more than half of gaster (Figs. 210, 212).

Distribution : Cosmopolitan.

Biology : Well known parasite of beetles associated with stored grains (Cereals, especially wheat and rice) especially *Sitophilus*, also occurs outdoors.

In the region the only species known is *Anisopteromalus calandrae* (Howard).

1 *Anisopteromalus calandrae* (Howard)

(Figs. 210-212)

1881. *Pteromalus calandrae* Howard, *Ann. Report U.S. Dept. Agr. for 1880*: 273. M. USA (Texas) (USNM, presumably destroyed).

1891. *Pteromalus oryzae* Cameron, *Mem. Proc. Lit. Phil. Soc. Manchester* **4** : 184. India (Coimbatore) (Syn. Boucek. et. al. 1979. 435).

1913. *Neocatolaccus australiensis* Girault, *Mem. Qd. Mus.* **2** : 306. Queensland (Syn. Boucek, 1988. 414).

1937. *Neocatolaccus indicus* Ayyar & Mani, *Rec. Indian. Mus.* **39** : 126 : F, India (Coimbatore) (ZSI).

1972. *Pteromalus schwenkei* Roomi, Khan & Khan, *Z. Angew. Ent.* **72** : 395. F, Pakistan.

Diagnosis : Length 2.1-3.1mm. Head and mesosoma bluish black; gaster brownish black; coxae concolrous with mesosoma; femora brown except distal part and remainder of legs testaceous. Head finely reticulate; POL 1.6x OOL; Antennae, with scape not reaching median ocellus; pronotal collar with sharp edge, not carinate. Gaster elongate, ovate, as long as or longer than head and mesosoma combined.

Distribution : Cosmopoliton. In the region records are available from India (KL, TN, WB) Pakistan and Myanmar.

Host : Recorded hosts are *Sitophilus* sp., *Sitophilus oryzae*, *Sitophilus granarius*, *Tribolium castaneum*, *Athesapeuta cyperi*, *Oryzaephilus surinamensis*, *Pempheruls affinis*, *Rhizopertha dominica*, *Cyperus rotundus*, *Callosobruchus* sp.

Genus 4. *Callitula* Spinola

1811. *Callitula* Spinola, *Ann. Mus. Hist. Nat. Paris*, **17** (98) : 151. Type species: *Callitula bicolor* Spinola, by monotypy.

1833. *Micromelus* Walker, *Ent. Mag.* **1** : 371.464, Type species: *Micromelus rufomaculatus* Walker, by designation of westwood, 1840.

1856. *Baeotomous* Forster, *Hym. Stud.* **2** : 145. Unnecessary replacement name for *Micromelus* supposedly preoccupied.

The other synonyms are *Pterosemoidea* Girault, 1913, *Apterosemoidea* Girault, 1913, *Eurydinotella* Girault, 1913, *Pseudosphegigasterus* Girault 1913, *Eurydinotelleus* Girault, 1913 and *Polycystomyia* Dodd in Girault, 1915 (Syn. Boucek, 1988 : 439).

Diagnosis : Body mostly metallic; head wider than mesosoma, antennae with 3 anelli and 5 funicular segments; clava acuminate or with a narrow spicule (Figs. 233, 237, 243); pronotal collar with sharp margin; propodeum usually with long convex, reticulate nucha; gaster often with T1 or also T2 evidently enlarged, petiole if visible bordered ventrally by flange visible on either side and formed from extension of first gastral sternite (Figs. 235, 242).

Distribution : All countries.

Biology : Parasites of small Diptera, especially Agromyzidae and Cecidomyiidae. Attack larvae which burrow in grass stems or other plant parts.

Key to the species of *Callitula* from the Indian subcontinent

1. Anterior margin of clypeus roundly produced (Figs. 229, 236) 2
- Anterior margin of clypeus slightly or moderately emarginate 3

2. Gaster (Fig. 231, 247) distinctly longer than mesosoma, not collapsing, in dorsal view length 2.7x width; fore wing with basal cell open below, speculum broad; antenna (Fig. 230) with pedicel shorter than Fl; pronotal collar not margined anteriorly, only little raised in the middle; POL subequal to OOL; gaster with metallic blue reflection on T1 dorsally
keralensis Sureshan

Gaster (Fig. 239) as long as mesosoma, sunken dorsally, in dorsal view length 1.8x width; forewing (Fig. 238) with basal cell closed below, speculum narrow; pedicel (Fig. 237) little longer than Fl; pronotal collar distinctly margined at least medially; POL 1.6x OOL; gaster without metallic blue reflection dorsally on T1
..... *anguloctypea* Sureshan

3. Forewing with PMV short, almost half of MV; antennal flagellum distinctly widened towards the tip, clava with terminal stylus prominent (Figs. 381, 383)
..... *bambusae* Narendran and Jobiraj

PMV longer than half of MV; antennal flagellum not widened as above, terminal stylus of clava less prominent 4

4. Body robust, (Fig. 232), length 3.7mm; gaster (Fig. 235) 1.1x as long as head plus mesosoma and length 3.1x width in dorsal view; antenna with scape not exceeding level of vertex. (Pl. I. fig. 3) *robusta* Sureshan

- Body not robust, smaller species; gaster shorter than head plus mesosoma combined; scape exceeding level of vertex 5

5. Gaster with T2 large (Fig. 242), occupying 0.2x total length of gaster; head and mesosoma dark metallic blue; legs with coxae brown *rugosa* (Waterston)

Gaster with T2 not as above (Fig. 241, 380); head and mesosoma metallic green or black; legs including coxae testaceous 6

6. Antennae (Fig. 378) with scape exceeding well above level of vertex; pedicel plus flagellum length equal to head width; terminal stylus of clava distinct; forewing with basal cell bare; head and mesosoma metallic green
..... *peethapada* Narendran & Mohana

Scape exceeding only little above level of vertex (Fig. 246); pedicel plus flagellum length little more than head width; terminal stylus of clava less distinct; basal cell of forewing closed below and hairy towards the distal half; head and mesosoma black
..... *travancorensis* Sureshan.

1. *Callitula rugosa* (Waterston)
(Figs. 242-245)

1915. *Trigonogastra rugosa* Waterston, *Bull. Ent. Res.* 5 : 326, M, F, Sri Lanka (BMNH) examined.

Diagnosis : Length 1.5-1.8mm. Head and mesosoma dark green, almost black; gaster brownish black with slight bluish tinge dorsally; antennae brown except scape yellowish brown; legs testaceous except coxae dark brown; vertex abruptly curving to occiput; POL 1.5x OOL; anterior margin of clypeus slightly emarginate; antennal scape reaching above level of vertex; pedicel about twice as long as wide; Fl little shorter than pedicel. Pronotal collar sharply margined, almost smooth dorsally; scutellum medially longer than mesoscutum. Forewing with basal cell closed with few scattered hairs; MV 2x STV; underside with a row of 8 long hairs below MV. Gaster as long as mesosoma, not collapsing, T1 occupying more than 1/3 length; T2 large, little longer than half of T1 dorsally.

Distribution : India (KL), Sri Lanka.

Host : Parasite of *Ophiomyia phaseoli* (Diptera : Agromyzidae)

2. *Callitula keralensis* Sureshan
(Figs. 229-231, 247-248)

2002. *Callitula keralensis* Sureshan *Rec. zool. Surv. India* 100 (1-2) : 23. F, India (KL) (ZSIC).

Diagnosis : Length 1.7-2.7mm. Head and mesosoma dark metallic blue; gaster almost black with metallic blue reflection on T1; antennae brown except scape and pedicel testaceous. Head 1.14x as wide as mesosoma; POL : OOL = 6.5 : 6; clypeus anteriorly roundly produced. Scape exceeding level of vertex; pedicel shorter than Fl. Pronotal collar not margined; scutellum little longer than mesoscutum; propodeum shorter than scutellum, basal foveae deep. Forewing with stigma slightly capitate. Gaster distinctly longer than mesosoma, not collapsing, length 2.7x width in dorsal view.

Distribution : India (KL).

Host : Not known.

3. *Callitula anguloclypea* Sureshan
(Figs. 236-239)

2002. *Callitula anguloclypea* Sureshan *Rec. zool. Surv. India* 100 (1-2) : 25. F, M, India (KL) (ZSIC).

Diagnosis : Length : 1.2-1.7mm. Head and mesosoma black; gaster brown with an yellow spot at base dorsally; antennae brown except scape, pedicel and anelli testaceous; head uniformly engraved reticulate; POL 1.6x OOL; anterior margin of clypeus roundly

produced. Antennal scape reaching very little above level of vertex; Fl little shorter than pedicel; clava as long as two preceding segments combined. Mesosoma with uniformly scattered white hairs; pronotal collar distinctly margined at least medially; mesoscutum with 2.3x length; propodeum strongly produced, nucha occupying one third length; spiracles close to hind margin of metanotum, separated by less than their diameter. Forewing with basal cell closed below; marginal fringe long. Gaster as long as mesosoma, sunken dorsally; Tl occupying one third length, hind margin curved medially.

Distribution : India (KL).

Host : Not known.

4. *Callitula travancorensis* Sureshan (Figs.240,241,246)

2002. *Callitula travancorensis* Sureshan *Rec. zool. Surv. India* **100** (1-2) : 26. F. India (KL), (ZSIC).

Diagnosis : Length 1.1-1.4mm. Head and mesosoma black; gaster mostly yellowish brown; antennae dark brown except scape and pedicel testaceous; legs reddish brown except tips of tarsi darker. Head uniformly engraved reticulate; anterior margin of clypeus weakly emarginate; POL 1.7x OOL; scape length 1.2x eye height, reaching above level of vertex; pedicel little longer than Fl; terminal stylus of clava short. Pronotal collar finely but sharply carinate; propodeum with plicae less sharp, reaching up to base of nucha; spiracles separated by more than their diameter from hind margin of metanotum. Forewing with basal cell closed; speculum very narrow, almost closed below. Gaster short, ovate, length 0.72 x as long as head plus mesosoma; petiole wider than long; Tl reaching more than one third length of gaster.

Distribution : India (KL).

Host : Not known.

5. *Callitula robusta* Sureshan (Figs. 232-235, Pl. I. fig. 3)

2002. *Callitula robusta* Sureshan *Rec. zool. Surv. India* **100** (1-2) : 22. F, India (KL) (ZSIC).

Diagnosis : Length 3.7mm. Body bright metallic bluish green; gaster metallic blue, almost black dorsally; golden reflection on dorsal part of head and mesosoma; antennae dark brown except scape and pedicel testaceous; coxae concolorous with mesosoma, legs otherwise testaceous. Head raised reticulate, 1.4x as wide as mesosoma; POL little shorter than OOL; clypeus weakly emarginate. Pronotal collar anteriorly ridged in the middle, with a smooth strip posteriorly; propodeum with median area raised in the form of a ridge; nucha posteriorly deeply emarginate. Gaster length 1.1x head plus mesosoma.

Distribution : India (KL).

Host : Not known.

6. *Callitula peethapada* Narendran & Mohana
(Figs. 378-380)

2001. *Callitula peethapada* Narendran & Mohana, *Uttarpradesh J. Zool.* **21**(1) : 31. F. India (KL) (ZSIC).

Diagnosis : Length 1.4-2.1mm. Head and mesosoma metallic green with bronzy reflection dorsally; gaster brown with a broad yellowish spot dorsally at base; antennae brown except scape and pedicel testaceous; all legs including coxae brownish yellow. Head moderately reticulate, 1.4x as wide as mesosoma; POL 1.6x OOL; anterior margin of clypeus shallowly emarginate; antennal scape reaching well beyond level of vertex; pedicel as long as F1; clava as long as two preceding segments combined, terminal stylus long. Pronotal collar anteriorly margined with smooth strip posteriorly; propodeum with nucha well constricted, almost half of median length; spiracles very small, separated by less than their diameter from hind margin of metanotum. Gaster elongate, ovate, 0.84x as long as head plus mesosoma combined; petiole short, finely reticulate.

Distribution : India (KL)

Host : Not known.

7. *Callitula bambusae* Narendran & Jobiraj
(Figs. 381-384)

2001. *Callitula bambusae* Narendran & Jobiraj, *Uttarpradesh J. Zool.* **21**(1) : 29. F. M. India (KL) (ZSIC).

Diagnosis : Length 1.64-2mm. Head and mesosoma metallic bluish green; gaster brown with T1 having bluish tinge dorsally; antennae testaceous. Head 1.2x as wide as mesosoma, moderately reticulate; POL 1.3x OOL; clypeus with anterior margin weakly emarginate; scape slightly reaching above level of vertex; F1 shorter than pedicel; clava as long as 2.5 preceding segments combined, terminal stylus prominent and long. Pronotal collar carinate, almost smooth; propodeum with median area little raised on median line; spiracles oval, separated by less than their diameter from hind margin of metanotum. Forewing with pubescence very sparse. Gaster short, 0.7x as long as head plus mesosoma; hind margin of T1 produced medially.

Distribution : India (KL).

Host : Not known. Collected from *Bambusa* inflorescence.

Genus 5. *Catolaccus* Thomson

1878. *Catolaccus* Thomson, *Hym. Scand.* 5 : 152. Type species : *Catolaccus cavigena* Thomson, by monotypy (as subgenus of *Pteromalus*).
1911. *Merisoides* Masi, *Boll. Lab. Zool. Gen. Agr. Portici.* 5 : 141. Type species *Merisoides crassiceps* Masi by monotypy.

Diagnosis : Head stout, (Fig. 257) much broader than length of pedicel plus flagellum; gena hollowed at mandibular base. Antenna with 2 anelli and 6 funicular segments, second anellus almost quadrate (Fig. 258). Mesosoma short and high; pronotum dorsally rounded; propodeum steep, almost vertical with distinct plicae and short and not very convex nucha with transverse striation, without median carina (Fig. 259). Forewing behind MV with rather dense extensive setae, STV hardly capitate.

Distribution : India, Pakistan (Europe, America).

Biology : Primary or secondary parasites in cocoons of Lepidoptera and Coleoptera.

The only species known from the region is *Catolaccus crassiceps* (Masi).

1. *Catolaccus crassiceps* (Masi) (Figs. 257-260, Pl. II. fig. 17)

1911. *Merisoides crassiceps* Masi, *Boll. Lab. zool. Gen. Agr. Portici.* 5 : 141. F, Italy (MCSG) (examined).

Diagnosis : Length 2.3-3mm. Body black with metallic reflection; antennae with scape and pedicel black, remainder brown; coxae and femora concolrous with mesosoma; tibiae and tarsi apically pale brown. Head finely reticulate, almost shiny, in dorsal view 1.14x as wide as mesosoma; POL 1.2x OOL; anterior margin of clypeus with two sharp teeth; antennae inserted along with lower margin of eyes; scape not reaching median ocellus; pedicel plus flagellum 0.8x as long as head width. Mesosoma moderately reticulate; mesoscutum width 2.2x length; propodeum very finely engraved reticulate, almost shiny. Gaster dorsally collapsing, 1.2x as long as head plus mesosoma combined

Distribution : India (DL, PB, UP).

Host : Recorded hosts are *Characoma nilotica*, *Coniatus indicus*, *Pectinophora gossypiella*, *Apanteles* sp, *Apanteles glomeratus* with *Coccidohystrix insolita*, *Platyedra gossypiella*.

Genus 6. *Cheiopachus* Westwood

1828. *Cheiopachus* Westwood, *Zool. J. Lond.* 4 : 23. Type species : *Diplolepis quadrum* Fabricius by original designation.

1833. *Cheiopachys* Haiday, *Ent. Mag.* 1 : 268. Erroneous subsequent spelling.
1846. *Pachychirus* Agassiz, *Nomencl. Zool. Index Univer.* 77. Replacement name for *Cheiopachus*, supposedly preoccupied.
1871. *Chiropachys* van Vollenhoven, *Schetsen. Hym.*, 3 : 10. Erroneous subsequent spelling.
1904. *Tropidogastra* Ashmead, *Mem. Carnegie Mus.*, 1 : 323. Type species : *Tropidogastra arizonensis* Ashmead, by monotypy and original designation.

Diagnosis : Clypeus shallowly emarginate; pronotal collar distinctly less wider than mesoscutum, mesosoma in dorsal view obviously longer than broad; forewing often with 2 transverse maculae (Fig. 143), stigmal knob short; fore femur with a broad tooth on ventral edge (Fig. 141); hind femur also enlarged, much stouter than mid femur; hind tibia dorsally with a row of stout but conspicuous spines.

Distribution : India, Pakistan (Europe, Africa, America).

Biology : Parasitic on various wood boring coleoptera especially Scolytidae on deciduous trees.

The only species known from the region is *Cheiopachus quadrum* (Fabricius).

1. ***Cheiopachus quadrum*** (Fabricius)
(Figs. 141-143)

1787. *Ichneumon quadrum* Fabricius, *Mantissa. Ins.* 1 : 270. M. Europe (Lectotype. Kiel Univ.).

Diagnosis : Length 1.8-4.7mm. Colour mostly greenish bronzy; anterior margin of clypeus shallowly emarginate; pronotal collar distinctly less wider than mesoscutum; fore femur with a broad tooth on ventral edge; hind tibiae dorsally with a row of short but conspicuous spines; forewing with MV at least very slightly longer than STV, with two fuscous clouds.

Distribution : India (HP, J&K), Pakistan (Europe).

Host : Parasite of shot-hole bark beetle *Scolytus* sp. on apple tree *Malus silvestris* (Linn.) (Narendran, et al., in press), Xylophagous beetles on cherry bark (Boucek, et al., 1979).

Genus 7. ***Chlorocytus*** Graham

1956. *Chlorocytus* Graham, *Ent. Mon. Mag.* 92 : 92. Type species : *Pteromalus pulchripes* Walker : by original designation.

Diagnosis : Body mostly metallic; antennae (Figs. 345, 351) with 13 segments mostly with 2 anelli; anterior margin of clypeus mostly truncate to slightly emarginate. Mesosoma rather slender; prepectus relatively large, the exposed part dorsally fully as long as tegula; pronotal neck appears longer than collar in dorsal view. Mesoscutum with notauli almost always incomplete; propodeum without nucha, nuchal part reduced to a narrow adpetiolar strip (Fig. 348); gaster sessile or subsessile, elongate (Fig. 349).

Distribution : From Europe to East Africa and throughout Asia to Australia.

Biology : Developing in grass stems and other herbs as parasites of various insect hosts boring inside.

Key to the *Chlorocytus* species of Indian subcontinent

1. Pronotal collar not sharply margined; median area of propodeum with coarse wrinkles and distinct foveolae subapically; median carina not complete (Fig. 348)
..... *xanthopus* (Cameron)
- Pronotal collar sharply margined; median area of propodeum without coarse wrinkles and subapical foveolae, median carina complete or nearly so, fairly sharp (Fig. 347) ..
..... 2
2. Propodeum with plicae indicated only anteriorly; median area moderately reticulate; antenna with F6 distinctly longer than wide (Fig. 345); MV 2.7x as long as STV (Fig. 346); general colour including most of gaster metallic blue; length 1.6-2.3mm (Pl. I. fig. 7) *indicus* Sureshan
- Propodeum with plicae sharp over at least posterior half; median area less strongly sculptured; antenna with F6 quadrate or hardly elongate; MV 1.7x as long as STV; colour of head and mesosoma green or bluish green; gaster black with green to blue and bronze reflection; length 2.6 – 3.15mm *murriensis* Graham

1. *Chlorocytus xanthopus* (Cameron) (Figs. 348-351)

1906. *Etroxys xanthopus* Cameron, *J. Bombay Nat. Hist. Soc.* 17 : 97. F. Pakistan : Quetta (Lectotype BMNH) examined.

Diagnosis : Female : Length 1.6-2.3mm. Bright metallic bluish green with brassy tint; gaster brown with slight greenish reflection. Head 1.1x as broad as mesosoma; clypeus clearly demarkated from rest of the face, anterior margin shallowly emarginate. Mesosoma reticulate punctate, pronotal collar raised in the anterior margin, margin not sharp. Mesoscutum width 2x length. Scutellum as long as wide. Fore wing with pubescence less dense, basal part almost bare; basal vein not setate. Gaster 1.1x as long as head plus mesosoma combined and 2.3x as long as hind tibia..

Distribution : India (DL), Pakistan.

Host : Not known.

2. *Chlorocytus indicus* Sureshan
(Figs. 345-347, Pl. I. fig. 6)

2000. *Chlorocytus indicus* Sureshan, *Rec. Zool. Sur. India*. **98** (2) : 143. F. M India (KL) (ZSIC).

Diagnosis : Female : Length 1.6-2.3mm. Bright metallic blue with golden reflections; antenna with scape and pedicel testaceous, remainder brown. Head closely and distinctly punctate, 1.3x as broad as mesosoma in dorsal view, width 2x length. Antennae with scape 0.82x as long as eye height, pedicel plus flagellum length 1.2x head width. Mesosoma closely reticulate punctate; pronotal collar sharply carinate anteriorly; mesoscutum width 1.6x length; propodeum with fine, complete median carina. Forewing with basal vein setate. Gaster longer than head plus mesosoma combined, (1.1x), dorsally collapsing.

Distribution : India (KL).

Host : Not known.

3. *Chlorocytus murriensis* Graham
(Fig. 352)

1965. *Chlorocytus murriensis* Graham, *Trans. R. Ent. Soc. London*, **117** : 298. F. Pakistan : Murree (BMNH).

Diagnosis : Female : Length. 2.6 - 3.15 mm. Head and mesosoma green or bluish green; gaster black with green to blue and bronze reflections. Anterior margin of clypeus very slightly curved forwards, no median depression. Antennal toruli about equidistant from anterior margin of clypeus and median ocellus; combined length of pedicel and flagellum slightly greater than head width; F1 hardly longer than pedicel; F6 quadrate or hardly elongate. Pronotal collar sharply margined except at the sides. Propodeum with median area about half as long as scutellum. Median area less strongly sculptured, median carina complete or nearly so; spur of mid tibia virtually half as long the first tarsal segment. Gaster lanceolate, 3.1-3.25x as long as broad, slightly longer than head plus mesosoma combined.

Distribution : Pakistan.

Host : Bred from dipterous pupa in stem of *Utrica* sp.

Genus 8. *Conomorium* Masi

1924. *Conomorium* Masi, *Ann. Mus. Civ. Stor. Nat. Giacomo Doria*. **50** : 215. Type species : *Pteromalus eremita* Forster, by monotypy.

Diagnosis : Head protuberant at level of antennal toruli; posterior half of mesosternum clothed with long whitish hairs which stand out nearly at right angle to the surface; antennal flagellum (Fig. 73) stout, filiform, with F1 long, widening apically. Propodeum (Fig. 72)

about half as long as scutellum, with plicae forming semicircular ridges curving towards median area. Forewing (Fig. 71) with unusually sparse pilosity; MV less than 1.5x as long as STV, thus often longer than PMV.

Distribution : India (Europe, America).

Biology : Gregarious parasites in pupae of various Lepidoptera.

Boucek, *et al.* (1979) recorded an indetermined species under this genus from India (UP).

Genus 9. *Coruna* Walker

1833. *Coruna* Walker, *Ent. Mag.* 1 : 380. Type species : *Coruna clavata* Walker, by monotypy.

1856. *Coryna* Forster, *Hym. Stud.* 2 : 59. Invalid emendation. Preoccupied by Gartner, 1766.

1856. *Pachycrepis* Forster, *Hym. Stud.* 2 : 51, 54, 59. Replacement name for *Coryna* Forster, not Gartner.

Diagnosis : Clypeal margin angularly produced (Fig.9); face extensively striate; antennae with 2 anelli and 6 funicular segments. Pronotum sharply carinate; notauli deep and broad; scutellum anteriorly acuminate, narrowly touching mesoscutum. Forewing (Fig.10) with MV and stigma thickened; STV only slightly shorter than MV. Gaster subpetiolate with T1 longer than broad and much narrowing than remaining tergites.

Distribution : India, (Europe, America)

Biology : Hyperparasite of Aphididae through Aphidiinae (Braconidae).

The only species known under this genus from the region is *Coruna clavata* Walker

1. *Coruna clavata* Walker

(Figs. 9, 10)

1833. *Coruna clavata* Walker, *Ent. Mag.* 1 : 380. M. F. Europe (Lectotype, BMNH).

Diagnosis : Length 1.6-2.2mm. Dark green, sometimes with brassy reflections. Head 2x as wide as long in dorsal view; OOL 1.5x the diameter of lateral ocellus; eyes separated by about 1.2x their length; antennae with funicular segments longer than wide; pedicel plus flagellum little longer than head width. Mesosoma strongly arched dorsally; mid lobe of mesoscutum rather strongly reticulate; scutellum more coarsely reticulate on frenum; propodeum with a weak median carina; nucha distinctly set off; smooth. Forewing with SMV 2x MV; PMV 1.3x STV. Gaster as long as mesosoma, petiole about as long as wide.

Distribution : India (J. & K.); (Europe, America).

Host : Recorded from India from *Trioxys indicus* in *Macrosiphum* sp.

Genus 10. *Cryptoprymna* Forster

1833. *Prosodes* Walker, *Ent. Mag.* 1 : 371, 374, Type species : *Prosodes* Walker, by monotypy. Pre-occupied by *Prosodes* Eschscholz, 1829.
1856. *Cryptoprymna* Forster, *Hym.Stud.* 2 : 52, 56, 59. Replacement name for *Prosodes* Walker, not Eschscholz.
1878. *Cryptoprymna* Thomson, *Hym. Scand.* 5 : 17, 22. Cresson, 1887 : *Trans. Amer. Ent. Soc. Suppl. Vol. 75* (key) (invalid emendation).
1915. *Polycystelomorpha* Girault, *Mem. Qd. Mus.* 3 : 340. Type species *Polycystelomorpha flavifemur* Girault, by original designation, synonymy by Boucek, 1988 : 467.

Diagnosis : Head, mesosoma, coxae and petiole black, gaster dark brown. Head transversely oval in front view; clypeus with anterior margin truncate; genae with broad concavity extending from mouth margin to lower orbit (Fig. 89). Antennal formula, 11263, inserted below middle of face; clava distinctly wider than F6. Pronotal collar with sharp transverse carina anteriorly. Propodeum as long as scutellum, strongly arched. Median carina and plicae sharp. Gaster ovate, petiole elongate; and sculptured; T1 enlarged, hypopygium extending to tip of gaster.

Distribution : India, Sri Lanka, Malaysia, Europe, Africa, South Asia to New Guinea, America and Australia.

Biology : Little is known about the biology of the species under this Genus. They are probably parasitic on syrphids on conifers (Heydon, 1988).

Key to the Indian species of *Cryptoprymna*

1. Antenna slender (fig. 89) with F1 as long as F2, scape little longer than eye; clava 2x as long as wide; MV length 1.3x PMV; gastral petiole (Fig.90) slender, length 2.9x width *elongata* Sureshan & Narendran
- Antenna stout (Fig. 92) with F1 shorter than F2, scape little shorter than eye, clava 1.6x as long as wide; MV shorter, as long as PMV; petiole short (Fig.93), length 2.3x width (Pl. I. fig. 6) *indiana* Sureshan & Narendran

1. *Cryptoprymna elongata* Sureshan & Narendran
(Figs. 89-91)

2000. *Cryptoprymna elongata* Sureshan & Narendran, *J. Bombay Nat. Hist. Soc.* 79 (3) : 403, F.M. India (KL) (ZSIC).

Diagnosis : Female : length 1.8 – 2.0 mm. Body black. Antenna testaceous with clava darker. Head finely reticulate. Anterior margin of clypeus slightly emarginate. Antennae with scape reaching median ocellus, clava little longer than three preceding segments combined. Mesoscutum finely reticulate, width 1.5x length. Gaster length 1.5x width, petiole length 2.9x width.

Distribution : India (KL).

Host : Not known.

2. *Cryptoprymna indiana* Sureshan & Narendran
(Figs. 92-93, Pl. I. fig. 6)

2000. *Cryptoprymna indiana* Sureshan & Narendran, *J. Bombay Nat. Hist. Soc.* 79(3)
: 405, F, India (KL) (ZSIC).

Diagnosis : Female Length 1.7-1.8mm. Body black; gaster brownish ventrally. Head finely reticulate, in dorsal view width 2x length; POL 1.4x OOL; clypeus with anterior margin almost straight. Antennae with scape not reaching median ocellus; clava as long as 3.5 preceding segments combined. Mesoscutum moderately reticulate, width 2.9x length. Scutellum broadly reticulate, frenal area shiny. Gaster length 1.5x width; petiole length 2.3x width.

Distribution : India (KL).

Host : Not known.

3. *Cryptoprymna brama* (Motschulsky)

1863. *Eulophus brama* Motschulsky, *Bull. Soc. Imp. Natur. Moscou.* 36 : 64. F. Sri Lanka (Lectotype. ZMMS).

Diagnosis : Female length 1.25mm. elongate, convex, shiny black; pedicellus pale testaceous, its apex smoky grey brown; head flat and broad; eyes oblong, projecting, colour oily black; funicular segments subtransverse; pronotum subtransverse; gaster subovate.

Distribution : Sri Lanka (Malaysia).

Host : Probabaly a parasite of some Diptera.

Genus 11. *Cyclogastrella* Bukowski

1938. *Cyclogastrella* Bukowski, *Ent. Obozr.* 27 : 153-154. Type species *Cyclogastrella quercina* Bukowski, by monotypy.

Diagnosis : Body broad with circular gaster in female (Fig. 390); genae very short but eyes rather large; clypeus medially protruding and its margin more or less bilobed; mandibles broad and short, 4 toothed; ocelli very small. Antennae (Fig. 391) inserted rather low on the face, short and have 2 or 3 anelli. Pronotum hardly edged anteriorly. Forewing with PMV hardly longer than STV; marginal fringe extremely shortened anteriorly outside the veins.

Distribution : India, Europe, North America, Australia

Biology : Parasites of pupae of several species of Tortricidae (Lepidoptera).

The only species known from the region under the genus is *Cyclogastrella nigra* Sureshan.

1. *Cyclogastrella nigra* Sureshan
(Figs. 390-392, Pl. I. fig. 8)

Cyclogastrella nigra Sureshan (in press for *Hexapoda*, Chennai), F. India (KL) (ZSIC).

Diagnosis : Length 2.8mm. Head and mesosoma shiny black; gaster brownish black with a clear longitudinal brown spot in the middle dorsally. Head in dorsal view 2.1x as wide as long; POL : OOL = 8.5 : 7; head in profile thick with face receding less strongly below toruli; clypeus with anterior margin deeply emarginate, lies above level of lower margin of head. Antennae with combined length of pedicel plus flagellum 0.74x head width. Pronotal collar slightly edged in the middle anteriorly; propodeum with median carina and plicae complete, adpetiolar strip raised into an angulate shiny shelf. Gaster dorsoventrally flattened, 1.2x as wide as mesosoma.

Distribution : India (KL).

Host : Not known.

Genus 12. *Cyrtogaster* Walker

1833. *Cyrtogaster* Walker, *Ent. Mag.* 1: 377, 381. Type species : *Cyrtogaster rufipes* Walker, by designation of Westwood. 1839 : 68.
1839. *Polycystus* Westwood, *Synopsis of genera of Brit. Ins.* 68. Type species : *Polycystus matthewsii* Westwood, by monotypy. Syn. by Heydon. 1989 : *J. New York Entomol. Soc.* 97 (2) : 198.
1840. *Dicormus* Forster, *Beitrag. Zur. Mono. Der. Pteromalinen. Nees.* 1: 38. Type species : *Dicormus aquisgranensis* Forster by monotypy.
1955. *Hatia* Risbec, *Bull. Inst. Fr. Afr. Noire* 17 : 248. Type species : *Hatia nigra* Risbec

Diagnosis : Head and mesosoma blue green to dark green; gaster dark metallic green to black. Head transversely oval; clypeus with three symmetrically arranged teeth; antennal formula 11263 (Fig. 385); flagellum strongly clavate. Notauli complete or incomplete; frenal grooves of scutellum distinct; propodeum rugulose; callus with dense setae. Forewing with basal cell completely hairy or bare. Gastral petiole transverse or longer than wide; T1 and T2 covering nearly its entire dorsal surface (Fig. 386); hind margin of T1 broadly concave, remainder with hind margin straight. Maxillary palpi enlarged in males.

Distribution : India (Europe, America).

Biology : Pupal parasites of different leaf, stem, or seed mining Diptera.

The only species known under the genus from the region is *Cyrtogaster clavicornis* Walker.

1. *Cyrtogaster clavicornis* Walker
(Figs. 385-387)

1833. *Cyrtogaster clavicornis* Walker, *Entomol. Mag.* 1 : 383.

Diagnosis : Length 1.4mm. Body dark bluish green; antennae brown; coxae brown, legs otherwise testaceous. Head very finely reticulate, 1.3x as wide as mesosoma, 2x as wide as long; antennae with pedicel plus flagellum slightly longer than head width; pedicel longer than F1; POL : OOL = 4.5 : 3.5; Anterior margin of pronotal collar carinate, shiny behind carina; notauli complete, groove like; propodeum with coarse irregular areolation. Forewing completely hairy; marginal fringe long. Gaster length 1.9x width; petiole transverse. Maxillary palpi of male enlarged.

Distribution : India (KL)

Host : No record from the region.

Genus 13. *Cyrtoptyx* Delucchi

1956. *Cyrtoptyx Delucchi*, *Z. Angew. Ent.* 39 : 240. Type species : *Dinarmus robustus* Masi, by original designation.

Diagnosis : Body (Fig. 228) generally bluish black, dark metallic green or bronze tinged; clypeus not incised; gena without a sharp edge; antennal clava with sutures not oblique, and with only a small area of micropilosity on the third segment, third anellus transverse, antennae inserted well above level of lower orbital borders; pedicel plus flagellum combined slightly shorter than head width. Pronotal collar not margined or with at most a weak carina in the middle. Forewing with MV at least 1.8x as long as STV; forewing hyaline or subhyaline.

Distribution : India, Pakistan (Europe).

Biology : Parasitic on *Dacus* flies (Tephritidae) and some Curculionids.

1. *Cyrtoptyx latipes* (Rondani)
(Figs. 228)

1877. *Pteromalus latipes* Rondani, *Boll. Soc. Ent. Ital.* 9 : 194. F. Italy (Florence Mus.).

Diagnosis : Length 3-4 mm. Colour bluish black, at places greenish; gaster brown with green tinge, antennae yellow, femora and tibiae blackish; hind tibiae with tarsi whitish; Fl of female slightly longer than wide. F5 almost squared. Gaster almost equal to length of head and mesosoma.

Distribution : India (TN) (Pakistan).

Host : *Cydia sinana* in stem of *Cannabis sativa*, *Hypolixus truncatulus* (F) in *Amaranthus spinosus*, Larva on *Cypparis decidua*; *Hypolixus* in *Amaranthus*.

Genus 14. *Delislea* Girault

1936. *Delislea* Girault, *Chalcididae, Capsidae spec. nov. Aust. Giraulti* : 2. Type species : *Delislea pattersoni* Girault by monotypy.

Diagnosis : Body moderate; clypeus striate with two small teeth, separated by a small narrow emargination; gena convex; mandibular teeth 3 and 4; antenna with funicle rather slender; Fl about 1.8x as long as the pedicel and bearing 3 rows of sensillae, anelli three. Pronotal collar not carinate, hind margin horizontal and lateral corners sharp, protruding because of a deep gap at scapula; mesoscutal scapula has the lateral corner narrow, depressed and with raised margins. Scutellum without frenum; propodeum with distinct, short, subglobose nucha (Figs. 94, 95); plicae strongly curving towards median line but disappearing before reaching middle. Gaster dorsally rather convex; petiole short and narrow, situated under nucha; anterior margin of first sternite laterally produced forwards and reflexed outwards, but medially very little so.

Distribution : India (Australia)

Biology : Little is known about the biology of the species in this genus. Narendran et al. (1992b) described a species of *Delislea* emerged as hyperparasitic on the cocoon of Braconid wasp *Apanteles taragamae* Wilkinson parasitic on *Opisina arenosella* (Walker) from India.

1. *Delislea rahimani* Narendran & Anil (Figs. 94-95)

1992b. *Delislea rahimani* Narendran & Anil, *Jr. Bombay Nat. Hist. Soc.* **89** (2) : 231, F. India (KL) (QM).

Diagnosis : Body shining black; gaster brown. Head reticulate, antennae inserted slightly towards clypeal margin than to median ocellus, scape almost reaching median ocellus. Mesosoma reticulate with sparse white hairs; notauli groove like anteriorly, posteriorly faintly indicated, incomplete; mesoscutal scapula narrow with a depression and with raised margins; axillae with a small round pit at the base of antero-lateral corner below scapula; fore wing with PMV 0.77x MV; STV 0.64x PMV. Gaster dorsally collapsing, slightly longer than mesosoma (38 : 34).

Distribution : India (KL).

Host : Hyperparasite in the cocoon of braconid wasp *Apanteles taragamae* Wilkinson on *Opisina arenosella* (Walker).

Genus 15. *Dibrachys* Forster

1856. *Dibrachys* Forster, *Hym. Stud.* 2 : 55. Type species. *Pteromalus boucheanus* Ratzeburg designated by Thomson, 1878.

Diagnosis : Occiput with distinct arch-like margin near posterior margin of vertex or near occipital foramen (Fig. 266). Antennae (Fig. 267) inserted distinctly below centre of face on a distinct hump, formula 11263; clypeal margin with two wavy lobes; fore wing with pilosity reduced, especially the marginal fringe on the anterior part of apical margin; PMV never distinctly longer than STV (Fig. 268).

Distribution : World wide.

Biology : Mostly hyperparasites in cocoons and pupae of Lepidoptera through Tachinidae (Diptera) (mostly), Braconidae, Ichneumonidae or Vespidae.

The only species known from the region is *Dibrachys cavus* (Walker).

1. *Dibrachys cavus* (Walker)
(Figs. 266-268)

1835. *Pteromalus cavus* Walker, *Ent. Mag.* 2 : 477. ? M. F. Gallia (Lectotype, BMNH).

Diagnosis : Head and mesosoma bronze, dark bluish or dark greenish blue; antennal scape often entirely fuscous; head 1.85x to 1.9x as broad as its maximum length; eyes 1.65-1.85x as long as broad, in profile posterior orbit of the eye appears shallowly emarginate in the middle; clypeus shallowly emarginate. Antennae with second anellus some times quadrate or only slightly transverse. Forewing with MV 2-2.9x STV; PMV as long as or even slightly longer than STV. Gaster usually longer than mesosoma.

Distribution : India (HP).

Host : Recorded from pupa of geometrid *Ectropis deodarae* Prout.

Genus 16. *Dinarmus* Thomson

1878. *Dinarmus* Thomson, *Hym. Scand.* 5 : 50, 56. Type species : *Dinarmus acutus* Thomson, by designation of Ashmead, 1904.

1904. *Bruchobius* Ashmead, *Mem. Carnegie. Mus.* 1 (4) : 314. Type species: *Bruchobius laticeps* Ashmead, by original designation.

1915. *Metastenoides* Girault, *Mem. Qd. Mus.* 4 : 190. Type species : *Metastenoides simus* Girault, by original designation (Syn. by Boucek, 1988 : 413).

1924. *Sphaerakis* Masi, *Ann. Mus. Civ. Stor. Nat. Giacomo Doria* : 50 : 214. Type species : *Sphaerakis mayri* Masi by monotypy.

1922. *Oedaule* Waterston, *Ind. Forest Rec.* 9 : 31. Type species: *Oedaule stringifrons* Waterston by monotypy (Syn. by Boucek, 1988 : 413).

Diagnosis : Head large, not prominent behind eyes; anterior margin of clypeus shallowly emarginate or toothed (Figs. 195, 200); female antenna with 3 anelli and male with 2 anelli; third anellus sometimes quadrate (Figs. 189, 192). Mesosoma stout, convex; pronotum as broad as mesoscutum, collar broad, bluntly ridged or rounded, not sharply carinate; neck hardly visible from above; prepectus small, subquadrate; propodeum short, reticulate, constricted into subglobose nucha. Forewing with stigma more or less capitate; costal cell enlarged sometimes. Gaster short; legs stout, hind tibia with two spurs.

Distribution : All temperate, subtropical and tropical zones.

Biology : Probably all species of *Dinarmus* attack Bruchid beetles in pods of leguminous plants.

Key to *Dinarmus* species of india and adjacent countries

- 1 Anterior margin of clypeus with two sharp teeth (Fig. 195)); forewing with discal pubescence very sparse, almost indistinct; stigma strongly capitate; costal cell enlarged in males (Figs. 194, 197); POL 2x OOL; propodeum with nucha short (Fig. 196). ...
 *altifrons* (Walker)
- Anterior margin of clypeus almost straight, shallowly emarginate or weakly bidentate), but not as above; forewing with discal pubescence not reduced as above; stigma normal or moderately capitate; costal cell not enlarged as above; nucha moderately or distinctly projecting; POL less than 2x OOL 2
2. Forewing with PMV distinctly shorter than MV (0.6x) and only as long as STV; discal pubescence very short and less distinct; POL only slightly longer than OOL (6 : 5) (Fig. 191) *vagabundus* (Timberlake)
- PMV as long as, little longer or shorter than MV but distinctly longer than STV; discal pubescence distinct; POL distinctly longer than OOL 3
3. Anelli transverse, third anellus not longer than second 4
- Third anellus distinctly longer than second and as long as first and second combined 5
4. Anterior margin of clypeus weakly bidentate; antennae with pedicel as long as F1 (Fig. 189); forewing with PMV as long as MV; gaster short, not collapsing, 0.7x as long as head plus mesosoma combined (Fig.190) *acutus* (Thomson)
- Anterior margin of clypeus slightly projecting, not bidentate; pedicel little shorter than F1; PMV 0.8x as long as MV (Fig.193); gaster long, dorsally slightly collapsing, subequal to head and mesosoma combined. (Fig. 203) *colemani* (Crawford)

5. Anterior margin of clypeus almost straight, not projecting (Fig. 200); PMV as long as or slightly longer than MV (Fig. 199); antennae slender with scape reaching middle of median ocellus, yellowish brown except anelli and clava brown; similar brown bands on funicular segments distally (Fig. 198); POL subequal to OOL; gaster highly cordiform. (Fig. 201, Pl. I. fig. 5) *maculatus* (Masi)

Anterior margin of clypeus shallowly emarginate, slightly projecting; PMV 1.3x OOL; antennae not slender, scape hardly reaching median ocellus, uniformly yellowish brown or brown without brown rings on funicular segments; POL 1.3x OOL; gaster not cordiform (Fig. 192) *basalis* (Rondani)

1. *Dinarmus acutus* (Thomson)
(Figs. 189-190)

1878. *Dimacus (Dinarmus) acutus* Thomson, *Hym. Scand.* 5 : 56. F. Boheman (UZIL).

Diagnosis : Length : 2.1-3.3mm. Body dark metallic blue; gaster darker; antennae with scape testaceous, remainder brown; body distinctly reticulate punctate; anterior margin of clypeus with two small teeth; antennae with third anellus not longer than second; pronotum as broad as mesoscutum; scutellum convex; propodeum with nucha elongate. Forewing with PMV as long as MV. Gaster short and cordiform, 0.7x as long as head plus mesosoma combined.

Distribution : India (KL), Europe.

Host : Parasites of Bruchid beetles.

2. *Dinarmus basalis* (Rondani)
(Fig. 192)

1877. *Entedon basalis* Rondani, *Boll. Soc. Ent. Ital.* 9 : 174. M. Italy (Lectotype, Florence Mus.).

Diagnosis : Length: 2.2-2.7mm. Dark green with brassy reflection; antennae yellowish brown or brown; head moderately reticulate; anterior margin of clypeus slightly produced, shallowly emarginate; POL 1.3x OOL; antennae with scape hardly reaching median ocellus, pedicel shorter than Fl (0.6x); third anellus longest. Mesosoma reticulate punctate; propodeum with nucha long. Forewing with PMV longer than MV (1.3x). Gaster ovate, dorsally flat, less collapsing, 0.84 x as long as head plus mesosoma combined.

Distribution : India (KL, DL, AP, BR, HR, RJ), Pakistan.

Host : Recorded hosts are *Callosobruchus analis*, *Callosobruchus chinensis*, *Callosobruchus maculatus*, *Trogoderma granarium*, Bruchids.

3. *Dinarmus colemani* (Crawford)
(Figs. 193, 203)

1913. *Bruchobius colemani* Crawford, *Proc. U. S. Natn. Mus.* **45** : 250. F, India (Bangalore) (USNM).

Diagnosis : Length 2.4mm. Bluish black with metallic reflection; gaster brownish black; head narrow in profile; moderately reticulate; anterior margin of clypeus almost straight; antennae inserted distinctly above lower margin of eyes; scape reaching upto 3/4 length of median ocellus; pedicel little shorter than Fl, third anellus longest. Mesosoma reticulate punctate; propodeum with nucha long. Forewing with stigma moderately capitate; PMV little shorter than MV (0.8x); gaster ovate; slightly collapsing, subequal to head and mesosoma combined.

Distribution : India (KL, BR, DL, KT, TN) Bangladesh.

Host : *Callosobruchus chinensis*.

4. *Dinarmus maculatus* (Masi)
(Figs.198-201, Pl.I.fig.5)

1924. *Sphaerakis maculatus* Masi, *Ann. Mus. Civ. Stor. Nat. Giacomo Doria* **51** : 157. Myanmar (MCSG) examined.

Diagnosis : Length 2.5-3mm. Body metallic blue with bronzy patches on vertex and thoracic dorsum; gaster darker; antennae yellowish brown except anelli and clava brown; coxae concolorous with mesosoma, femora and median part of tibiae brown; base and apical 2/3 part of tibiae and all tarsi yellow; wings slightly smoky; anterior margin of clypeus almost straight; POL subequal to OOL (9 : 8); antennae with scape reaching upto middle of median ocellus; pedicel plus flagellum 0.8x head width;; third anellus as long as first and second combined. Mesosoma length 1.2x width; mesoscutum width 2x length; propodeum with nucha moderate; plicae sharp, basal part of propodeum with short vertical rugae. PMV as long as or little longer than MV. Gaster cordiform..

Distribution : India (KL, WB), Myanmar.

Host : Not known.

5. *Dinarmus vagabundus* (Timberlake)
(Figs.191)

1926. *Bruchobius vagabundus* Timberlake, *Proc. Hawaii Ent. Soc.* **6** : 305. F. USA, Hawaii, Honolulu (BPBM).

Diagnosis : Length 1.8-2.6mm. Head and mesosoma black without metallic reflection; gaster brownish black with brassy lusture; head closely and finely reticulate; anterior margin of clypeus weakly emarginate; vertex narrow; antennae inserted little above lower margin of eyes; scape just reaching median ocellus; pedicel, as long as Fl; third anellus quadrate,

largest. Mesosoma reticulate punctate; propodeum with nucha short. Forewing with discal pubescence very short and indistinct; PMV as long as STV. Gaster broadly ovate, shorter than head plus mesosoma combined.

Distribution : India (KL, KT, PB, TN) Pakistan, Sri Lanka.

Host : Common parasite of various bruchids.

6. *Dinarmus altifrons* (Walker) (Figs. 194-197)

1862. *Pteromalus altifrons* Walker, *Trans ent. Soc. Lond.* (3) : 388.

1922. *Dinarmus stringifrons* Waterston, *Ind. Forest Rec.* 9 : 32. M. India (Dehradun) (BMNH) Syn. by Rasplus, 1989 : 149.

Diagnosis : Length 2.2-4.2mm. Body metallic green with bronzy reflection; gaster brown with bluish reflection; antennae brown; head reticulate punctate; clypeus sharply bidentate; POL 2x OOL; antennae inserted above lower margin of eyes; scape reaching median ocellus; mesosoma reticulate punctate. Notaular grooves reaching just above hind margin of mesoscutum; propodeum with basal foveae deep. Forewing with discal pubescence almost indistinct; costal cell enlarged in males; gaster elongate, ovate, dorsally collapsing.

Distribution : India (UP, PB, DL, TN), Pakistan, (Africa, Israel, Algeria).

Host : Parasitic on Bruchids (Coleoptera) attacking plant galls and seeds. Reported from seeds of *Albizia lebbek*, Bruchids on *Sesbania acutifolia*, pods of *Pueraria tuberosa* and *Caryedon gonagra* (Coleoptera).

Genus 17. *Euneura* Walker

1844. *Euneura* Walker, *Ann. Mag. Nat. Hist.* 14 : 331. Type species *Euneura augarus* Walker, by monotypy.

1846. *Eunerva* Agassiz, *Nomencl. Zool. Index Univer.* 427. Invalid emendation.

1856. *Hypsicamara* Forster, *Hym. Stud.* 2 : 52, 54. Type species *Hypsicamara ratzeburgi* Reinhard, by subsequent reference of Reinhard., 1859. *Stett. Ent. Zeit.* Jahrg. 20 : 195.

1898. *Hypsicamera* Dalla Torre, *Catalog. Hym.* 5 : 168. Invalid emendation.

Diagnosis : Antennae inserted slightly above centre of face which is almost (completely vertically striated (Fig.13); anterior margin of clypeus deeply emarginate; flagellum with 2 anelli; pedicel about as long as Fl. Apical margin of forewing ciliate; PMV fully 1.5x as long as STV. Gaster (Fig. 11) dorsally rather strongly convex, petiole always wider than long, dorsally with weak to strong median longitudinal carina.

Distribution : Pakistan, (Europe, America.)

Biology : Hyperparasites of Aphididae.

The only species known from the region is *Euneura lachni* (Ashmead).

1. *Euneura lachni* (Ashmead)
(Fig. 11)

1877. *Pachycrepis lachni* Ashmead, *Trans. Amer. Ent. Soc.* **14** : 193. F. USA, Florida (USNM).

1939. *Pachyneuron nazeeri* Mani, *Ind. J. Ent.* **1** : 81. F. M. Pakistan; Quetta (IARI).

Diagnosis : Length 1.5mm. Body metallic green or very dark metallic green; head much wider than mesosoma; head and femora finely reticulate and also with a few scattered setigerous punctae; notauli relatively fine; gaster dorsally convex.

Distribution : Pakistan, (Europe, America).

Host : Recorded host is *Myzus persicae* (= *Lachnus* sp.).

Genus 18. *Eurydinotomorpha* Girault

1913. *Eurydinotomorpha* Girault, *Mem. Qd. Mus.* **2** : 320. Type species : *Eurydinotomorpha pax* Girault, by original designation.

1915. *Eurydinotomorpha* Girault, *Can. Ent.* **47** : 45 Type species : *Eurydinotomorpha pax* Girault by original designation (apparently based on the 1913 specimens, Boucek 1988 : 453).

1973. *Asoka* Boucek, *Oriental Ins.* **7** : 557. Type species *Asoka appendigaster* Boucek, by original designation (Syn. by Sureshan & Narendran, 1990 : 219).

Diagnosis : Antennae with 3 anelli and 5 funicular segments; anterior margin of clypeus shallowly emarginate or deeply and narrowly excised in the middle; propodeum short but from its base medially horizontal or even ascending straight to the apex of the narrow neck which is raised high above hind coxae, under this nuchal apex, the narrow smooth elongate petiole moves from horizontal position down to a vertical position; gaster elongate (Figs. 58, 59).

Distribution India, Sri Lanka, (Malaya, Taiwan, Australia, New Guinea).

Biology : Not known. Species occur in forests.

Key to the Oriental species of *Eurydinotomorpha*

1. Propodeum with plicae weakly indicated, nuchal part projecting upwards and forwards over level of scutellum; petiole about 3x as long as scutellum; gaster slender (Fig. 58)
Sri Lanka, Malaya *petiolatus* (Boucek)

Propodeum with plicae distinct, nuchal part projecting upwards to level of scutellum; petiole about as long as scutellum; gaster shorter than in alternate 2

2. Antennae with scape never exceeding vertex level; hypopygium ending at the level of hind margin of T4; epipygium not narrower than preceding tergite (Fig. 59) India : (KL) (Pl. I. fig. 9) *malabarensis* Sureshan & Narendran

Antenna with 0.25 of scape exceeding vertex level; hypopygium ending at the level of middle of T4; epipygium narrower. Taiwan. *appendigaster* (Boucek)

1. *Eurydinotomorpha malabarensis* Sureshan & Narendran
(Fig. 59, Pl. I. fig. 9)

1990. *Eurydinotomorpha malabarensis* Sureshan & Narendran, *Oriental Ins.* **24** : 220. F, India : KL (ZSIC).

Diagnosis : Length 3.1mm. Bright metallic blue; anterior margin of clypeus incised in the middle; antennal scape nearly reaching median ocellus, nearly as long as F2; F1 and F3 equal. Mesosoma reticulate punctate; nuchal region of propodeum thrust upwards to level of scutellum; plicae present. Gaster elongate; petiole in dorsal view expanding caudad; length 2.1x maximum width; hypopygium ending with hind margin of T4.

Distribution : India (KL).

Host : Not known.

2. *Eurydinotomorpha petiolatus* (Boucek)
(Fig. 58)

1973. *Asoka petiolatus* Boucek, *Oriental Ins.* **7** : 560. (Syn. by Sureshan & Narendran, 1990 : 219).

Diagnosis : Length 6.2-7.3mm. Dark bluish or slightly greenish; mesoscutum mainly blackish; antennae brown to black, scape and pedicel testaceous. Head in front view 1.26-1.28x as wide as high; long diameter of lateral ocellus less than its distance from median ocellus; POL 1.9-2x OOL; dorsal eye orbits moderately diverging backwards; pedicel plus flagellum 1.45x as long as width of head. Pronotal collar with anterior carina distinct; scutellum trapeziform; transverse; apex partly hidden under overlapping nuchal region of propodeum. Forewing with stigmal knob very weak. Gastral petiole slightly longer than distance between anterior margin of pronotum and apex of scutellum, slightly widening caudad; tergites except for basal ones dorsally microscopically cross reticulate to cross striate.

Distribution : Sri Lanka, (Malaya).

Host : Not known.

Genus 19. *Halticopterella* Girault. & Dodd

1915. *Halticopterella* Girault & Dodd in Girault, *Mem. Qd. Mus.* 4 : 198; F : Type species : *Halticopterella nigriflagellum* Girault, by original designation.
1911. *Lyubana* Boucek, in Boucek & Rasplus, *Inst. Natnl. Rec. Agro. Paris.* 129. Type species : *L.slavica* Boucek by original designation. (Syn. by Sureshan, 2001 : 29-38).

Diagnosis : Head and mesosoma reticulate and moderately pilose (Fig.162) except for a median longitudinal band on scutellum; occiput immargined; anterior margin of clypeus with 2 triangular teeth. Antennal formula 11353. Pronotal collar anteriorly with sharp carina; notauli anteriorly deep, incomplete; propodeum (Fig. 157) with distinct nucha and conspicuous plicae which define a broadly cordiform median area; plicae connected posteriorly by a weak or distinct costula, median carina hardly indicated anteriorly. Forewing with PMV shorter than MV. Gaster sessile, lanceolate; Tl occupying 0.2x length of gaster.

Distribution : India (Australia, New Guinea, China, Yugoslavia).

Biology : Not known, occurs in rainforest.

Key to the Indian species of *Halticopterella*

1. Antennae with flagellum slender, funicular segments elongate (Fig 162); clava distinctly shorter than two preceding segments combined (0.75x); propodeum (Fig. 155) with costula reaching anterior margin of nucha *longiflagellum* Sureshan
 Antennae with flagellum stouter; clava longer than or as long as two preceding segments combined; costula reaching half or little above hind margin of nucha 2
2. Antennae (Fig. 163) with Fl as long as pedicel; clava 1.4x as long as two preceding segments combined; propodeum (Fig. 164) with fine and sharp costula reaching almost up to hind margin of nucha; adpetiolar margin very thin and shiny; callus convex, without spine; POL 1.3x OOL; body slender, legs including coxae pale brown; hind margin of Tl straight *rampurensis* Sureshan.
- Antennae with Fl longer than pedicel, clava as long as two preceding segments combined; propodeum with costula not sharp as above, reaching not almost upto hind margin of nucha; adpetiolar margin not very thin, moderately or finely reticulate; callus ending in a blunt or sharp spine; POL subequal to OOL; body not slender; legs with coxae black or brown; hind margin of Tl produced and with weak median incision 3
3. Propodeum (Fig. 153) with median area within the plicae 2.3x as wide as long; nucha short, medially propodeum 0.5x as long as scutellum; adpetiolar margin finely reticulate; forewing (Fig. 152) with MV 1.4x PMV and 3.3x STV; gaster dorsally collapsing, length 2.6x width; head and mesosoma dark metallic blue (Pl. III. fig. 26) *robusta* Sureshan

Propodeum (Fig. 157) with median area within the plicae 1.7x as wide as long; nucha long, medially propodeum 0.61x as long as scutellum, adpetiolar margin moderately reticulate; forewing with MV 1.2x PMV and 2.5x STV; gaster strongly sclerotised, hardly collapsing, in dorsal view length 3.4x width; head and mesosoma black.....
 *burwelli* Sureshan

1. *Halticopterella robusta* Sureshan
 (Figs. 151-154, Pl. III. fig. 26)

2001b. *Halticopterella robusta* Sureshan, *Oriental Ins.* 35 : 32, F, India (KL) (ZSIC).

Diagnosis : Length 2.7-3.4mm. Head and mesosoma dark metallic blue; gaster brownish black; antennal flagellum thick, Fl 1.3x as long as pedicel; clava little longer than two preceding segments combined; mesosoma robust, coarsely reticulate; propodeum with short nucha, median area within the plicae 2.3x as wide as long, callus ending in a blunt spine; gaster dorsally collapsing, 1.2x as long as head plus mesosoma combined.

Distribution : India (KL).

Host : Not known.

2. *Halticopterella burwelli* Sureshan
 (Figs. 156-157, 160-161)

2001b. *Halticopterella burwelli* Sureshan, *Oriental Ins.* 35 : 33 : F, India (KL), ZSIC.

Diagnosis : Length 3.3-3.5mm. Head and mesosoma shiny black, gaster brown with metallic blue reflection; POL as long as OOL; antennal scape touching median ocellus; Fl 1.5x pedicel; clava almost equal to two preceding segments combined. Propodeum with median area including nucha coarsely reticulate; nucha longer, median area within the plicae 1.7x as wide as long; callus ending in a sharp spine. Gaster strongly sclerotised, 1.2x as long as head plus mesosoma combined; hind margin of T1 produced.

Distribution : India (KL).

Host : Not known.

3. *Halticopterella longiflagellum* Sureshan
 (Figs. 155, 162)

2001b. *Halticopterella longiflagellum* Sureshan, *Oriental Ins.* 35 : 34, F, India (KL) (ZSIC).

Diagnosis : Length 3-3.5 mm. Head and mesosoma black; gaster brown; POL 1.2x OOL; antennal scape touching median ocellus; Fl 2x as long as pedicel; clava 0.75x as long as two preceding segments combined. Propodeum with median area including nucha

coarsely reticulate, nucha long; costula reaching up to anterior margin of nucha; callus ending in a sharp spine. Gaster dorsally collapsing, 1.2x as long as head plus mesosoma combined; hind margin of T1 produced.

Distribution : India (KL).

Host: Not known.

4. *Halticopterella rampurensis* Sureshan
(Figs. 163-164)

2001b. *Halticopterella rampurensis* Sureshan, *Oriental Ins.* 35 : 35, F, India (KL), ZSIC.

Diagnosis : Length 2.3mm. Head and mesosoma black; gaster brown. POL 1.3x OOL: antennal scape touching median ocellus, Fl as long as pedicel; clava 1.4x as long as two preceding segments combined; propodeum with median area moderately reticulate, costula sharp and fine, reaching little above hind margin of nucha; adpetiolar margin very; thin; shiny; callus without spine. Gaster dorsally collapsing, 1.13x as long as head plus mesosoma; hind margin of T1 not produced.

Distribution : India (KL)

Host : Not known.

Genus 20. *Homoporus* Thomson

1878. *Homoporus* Thomson, *Hym. Scand.* 5 : 60, 64 (as subgenus of *Merisus* Walker). Type species : *Pteromalus fulvicornis* Walker, designated by Ashmead 1904.
1878. *Phaenacra* Forster, *Verh. Naturh. Ver. Preuss. Rheinfl.* 35 : 51. Type species : *Phaenacra nubigera* Forster by monotypy.
1904. *Parapteromalus* Ashmead, *Mem. Carnegie. Mus.* 1 (4) : 320, 384. Type species: *Parapteromalus isosomatis* Ashmead, by monotypy and original designation.
1924. *Merisoporus* Masi, *Ann. Mus. Civ. Stor. Nat. Giacomo Doria* 50 : 226. Type species : *Pteromalus luniger* Nees, by original designation.
1953. *Pseudomerisus* Erdos & Novitzsky, in Erdos, *Acta Biol. Acad. Scient. Hung.* 4 : 236. Type species : *Pseudomerisus stipae* Erdos & Novitzsky, by original designation. (As subgenus)

Diagnosis : Antennae with 2 or 3 anelli (Figs. 249, 254), each funicular segment usually having 1, but some times 2 rows of long, often sparse longitudinal sensillae; clava with apex acute or acuminate. Pronotum narrower, mesosoma not compact, dorsum of mesosoma especially scutellum with pilosity strongly reduced. Gaster dorsally collapsing, flat concave, sometimes more or less yellow.

Distribution : India (Europe, America, Africa, Australia, South and East Asia).

Biology : Associated with insects in stems of grasses and other herbaceous plants, the host larvae are either Diptera or Hymenoptera and some of their primary parasites.

Key to the Indian species of *Homoporus*

- 1 Antennae slender (Fig. 249) inserted distinctly above lower margin of eyes; clava with apex acute, terminal stylus not prominent; gaster with hind margin of T1 straight; fifth tarsal segment of mid and hind legs swollen (Fig. 251, Pl. III. fig. 25)
 *gladius* Sureshan & Narendran
- Antennae not slender (Fig. 254) inserted almost level with lower margin of eyes, clava acuminate with terminal stylus prominent; gaster with hind margin of T1 medially produced and slightly incised (Fig. 255) tarsal segments not swollen as above
 *acuminatus* Sureshan & Narendran

1. *Homoporus acuminatus* Sureshan & Narendran (Figs.254-255)

2000. *Homoporus acuminatus* Sureshan & Narendran; *Zoos print* 16 (1) : 391. F. India : (KL) (ZSIC).

Diagnosis: Length 1.3-2.3mm. Head and mesosoma black; gaster yellowish brown; head finely engraved reticulate; anterior margin of clypeus weakly emarginate; POL 1.2x OOL; antennae inserted below middle of face, almost level with lower margin of eyes; scape not reaching median ocellus, clava acuminate with a sharp terminal stylus. Mesosoma strongly arched in profile; pronotal collar anteriorly finely ridged mainly on sides. Fore wing with PMV slightly shorter than MV. Gaster ovate, dorsally collapsing, little longer than head plus mesosoma combined (1.1x).

Distribution : India (KL)

Host : Not known.

2. *Homoporus gladius* Sureshan & Narendran (Figs. 249-253, Pl. III. fig. 25)

2000. *Homoporus gladius* Sureshan & Narendran, *Entomon* : 25 (2) : 126, F.M, India (KL) ZSIC.

Diagnosis : Length 2.5-2.8mm. Head and mesosoma black without metallic reflection; gaster pale brownish yellow with two dark brown lines dorso-laterally on either sides, tip also brown; head finely reticulate, anterior margin of clypeus with a deep notch in the middle; antennae inserted in the middle of face, scape reaching beyond median ocellus, clava acute. Mesosoma moderately arched in profile; reticulate punctate. Forewing with PMV distinctly shorter than MV. Gaster elongate, ovate, dorsally collapsing; hind margin of T1 almost straight.

Distribution : India (KL).

Host : Not known.

Genus 21. *Inkaka* Girault.

1939. *Inkaka* Girault, *N. Qd. Nat* 7 (58) : 2. Type species : *Inkaka quadridentata* Girault by original designation.

1939. *Leptospermophila* Girault, *Ohio. J. Sci.* 39 : 324 : Type species : *Leptospermophila fauna* Girault by original designation (Syn. by Boucek, 1988 : 440).

Diagnosis : Clypeal margin broad with deep median incision (Fig. 128); female antenna with 2 anelli, inserted lower on face (Fig. 127); malar groove distinct. Pronotum shortened dorsomedially, barely visible dorsally, strongly reduced; scutellum convex with frenum defined by a raised cross line. Gaster sessile, with short T2. Forewing densely pubescent; MV thickened, almost parallel sided; PMV distinctly longer than MV (Fig. 129).

Distribution : India (KL) (China, Australia and New Zealand).

Biology : Reared from coccinellid beetles in Sydney (Boucek, 1988 : 441).

1. *Inkaka keralensis* Sureshan & Narendran (Figs. 126-129, Pl. III. fig. 27)

1997. *Inkaka keralensis* Sureshan & Narendran, *Hexapoda* 9 (1&2) : 30. F, India (Kerala) (ZSIC).

Diagnosis : Length 1.4-1.6mm. Head and mesosoma black; gaster brownish black with blue reflection dorsally on T1. Head finely reticulate; POI 1.7x OOL; antennae inserted along with lower margin of eyes; scape not reaching median ocellus; funicular segments wider than long; clava little longer than three preceding segments combined. Mesoscutum coarsely reticulate; notauli not traceable. Gaster ovate, dorsally collapsing, length 1.9x that of hind tibia.

Distribution : India (KL).

Host : Not known.

Genus 22. *Ischyroptyx* Delucchi

1956. *Ischyroptyx* Delucchi, *Z. angew. Ent.* 39 : 240. Type species : *Dinarmus ligusticus* Masi, by original designation.

Diagnosis : Antenna (Fig. 120) inserted slightly above centre of face, in female with 3 anelli and 5 long funicular segments, in male formula 11272; pedicel plus flagellum in both sexes longer than width of head. Pronotum as broad as mesoscutum, hairs on mesosoma curved and broad, conspicuous; hind tibia with 2 spurs. Forewing (Fig. 121) with MV slightly widened from base, at most about 1.4x STV.

Distribution : India (Europe).

Biology : Not known.

One indetermined species is known from India (DL, BR) (Boucek et. al. 1979).

Genus 23. *Kumarella* Sureshan

1999. *Kumarella* Sureshan, *Oriental Ins.* 32 : 99-100. Type species : *Kumarella angulus* Sureshan, by original designation.

Diagnosis : Body metallic; head wider than mesosoma, scrobe deep; clypeus broad, clearly demarcated anteriorly with a broad median tooth (Fig. 3); antennal formula 11353 in female and 11263 in male. Pronotum anteriorly weakly carinate; collar laterally appears in the form of two blunt teeth due to a median notch; scutellum with frenal separated (Fig. 3); propodeum with median carina and costula; hind tibia with one spur. Forewing with MV longer than PMV. Gaster sessile, lanceolate, longer than head plus mesosoma combined.

Distribution : India (KL).

Biology : Unknown (in rain forests).

Key to species of *Kumarella*

1. Gaster long, 2.45x as long as mesosoma (Fig.137); frenal area of scutellum with a distinct median ridge; propodeum with median carina not extending beyond costula; pedicel distinctly shorter than F2; body black with metallic green refringence; size. 5.16mm (Pl. II. fig. 13) *sandroi* Narendran & Mohana
- Gaster short; length 1.78x as long as mesosoma (Figs. 1, 2), frenal area without median ridge; propodeum with median carina extending beyond costula upto nucha; pedicel as long as F2; head and mesosoma metallic blue. Size. 3.9-4mm. (Pl. I. fig. 4). *angulus* Sureshan

1. *Kumarella angulus* Sureshan (Figs. 1-3, Pl. I. fig. 4)

1999. *Kumarella angulus* Sureshan, *Oriental Ins.* 32 : 100-101. F, M. India (KL) (ZSIC).

Diagnosis : Length 3.9-4mm. Head and mesosoma dark metallic blue; gaster brown; POL 0.7x OOL; antennal toruli above lower margin of eyes; scape reaching median ocellus; pedicel as long as F2; third anellus little longer; clava little shorter than two preceding segments combined; propodeum with median area in the form of four depressed areas. Forewing with marginal fringe small; MV 1.4x PMV. Gaster 1.3x as long as head plus mesosoma.

Distribution : India (KL).

Host : Not known.

2. *Kumarella sandroi* Narendran & Mohana
(Fig.137,Pl.II.fig.13)

2001. *Kumarella sandroi* Narendran & Mohana, *U. P. J. Zool.* 21 (1) : 27. F. India (KL) (ZSIC).

Diagnosis : Length 5.2mm. Body black; head with metallic green refringence; mesosoma with brownish yellow reflection on posterior half of pronotum, rest of mesosoma with slight bluish or violet refringence; gaster with metallic bluish, greenish and violet reflection; antenna brown with scape and pedicel pale, densely pubescent; POL 0.71x OOL; antennal scape reaching median ocellus. Mesosoma coarsely reticulate; scutellar frenum fairly reticulate with a median raised ridge; propodeum with median carina not extending to nucha. Gaster 1.8x as long as head plus mesosoma, epipygium 1.3x length of T5 in dorsal view.

Distribution : India (KL).

Host : Not known.

Genus 24. *Lariophagus* Crawford

1909. *Lariophagus* Crawford, *Proc. Ent. Soc. Washington.* 1 : 52. Type species *Lariophagus texanus* Crawford by monotypy.

1915. *Uriellomyia* Girault, *Mem. Qd. Mus.* 3 : 319. Type species *Uriellomyia resoluta* Girault, by original designation (Syn. by Boucek, 1988 : 414).

Diagnosis : Clypeal margin emarginate; lower face swollen (Fig. 342), hind margin of gena ridged; antennae with 2 anelli and 6 funicular segments, most funicular segments quadrate or oblong. Mesosoma convex; pronotal collar rounded off in front; propodeum (Fig. 343) with plicae remote from spiracles, sinuate, sometimes costula indicated, short punctate nucha often present; callus with a longitudinal ridge, hind corners of propodeum in dorsal view appearing prominent, rectangular or acute. Gaster (Fig. 344) with cercus having at least 1 very long seta; T1 and T2 with posterior margins produced in slight arch.

Distribution : India, Nepal, (Cosmopoliton).

Biology : Cosmopoliton parasite of beetles (probably mainly Anobiidae).

1. *Lariophagus distinguendus* (Forster)
(Figs. 342-344, Pl. III. fig. 29)

1841. *Pteromalus distinguendus* Forster, *Beitrag Zur Monogr. Pterom.* Nees. 1 : 17, M, Germany (NRS).

Diagnosis : Length 2.1-3.1mm. Head and mesosoma bluish black; gaster black; head finely reticulate, densely pubescent; clypeus narrowly emarginate; antennae with combined length of pedicel plus flagellum approximately equal to width of head; flagellum proximally

not stouter than pedicel; malar space about two thirds the height of eye. Apical margin of forewing without cilia. Gaster dorsally convex.

Distribution : Cosmopolitan. In India records are available from Kerala and Tamil Nadu.

Host : Cosmopolitan parasite of grain weevils and other beetles attacking stored grains in particular *Sitophilus* spp.

Genus 25. *Manineura* Boucek

1978. *Manineura* Boucek, *Oriental Ins.* 12 (4) : 471. Type species : *Pachyneuron pentatomivora* Mani, by original designation.

Diagnosis : Head with whole anterior part and vertex strongly convex, posterior side separated from vertex by distinct edge just behind ocelli; clypeus slightly produced in middle anteriorly; antennae very slender, formula 11263 in both sexes; funicular segments elongate. Mesosoma short and high, convex; pronotum hardly visible dorsally, collar not developed. Mesoscutum with notauli distinct only anteriorly; axillae strongly advanced; propodeum transverse, short and triangularly expanded. Gaster (Fig. 12) short, clavate, on distinct but short petiole, in both sexes of similar shape.

Distribution : India (WB).

Biology : Parasite in the eggs of Heteroptera (Pentatomidae)

The genus is known by the type species only.

1. *Manineura pentatomivora* (Mani) (Fig.12)

1939. *Pachyneuron pentatomivora* Mani, *Ind. J. Ent.* 1 : 81, M. F. India, N. Bengal, Lost ?

Diagnosis : Length : 0.75mm. Body very dark brown or brownish black; head considerably wider than long, wider than mesosoma; anterior margin of clypeus dentate; POL less than OOL; antennae inserted well above lower ocular line in the middle face; scape about half as long as flagellum; second anellus large, clava slightly wider than last funicular segment, somewhat less than combined length of three preceding segments. Pronotum very much narrowed in front; propodeum with a short nucha. Forewings rather large with dense discal ciliation; marginal fringe moderately long; MV less than half length of STV; PMV shorter than STV. Gaster round or ovate in dorsal view; petiole very short and smooth.

Distribution : India (East Bengal).

Host: Parasitic in eggs of pentatomid bug *Urostylis punctigera*.

Genus 26. *Merismomorpha* Girault

- 1913. *Merismomorpha* Girault, *Trans R. Soc. Aust.* **37** : 82 –83. Type species : *Merismomorpha acutiventris* Girault, by original description, repeated by Girault, 1913 : *Mem. Qd. Mus.* **2** : 321.
- 1915. *Epipolycystus* Girault, *Mem. Qd. Mus.* **3** : 335. Type species *Epipolycystus asilus* Girault, by original designation. synonymy by Boucek, 1988 : 461.
- 1915. *Neopolycystella* Girault, *Mem. Qd. Mus.* **3** : 336. Type species *Neopolycystella sicarius* Girault, by original designation (Syn. Boucek, 1988 : 461)
- 1933. *Giorgonia* Girault, *New Insects. Girault : Brisbane* : **4** : Type species *Giorgonia flavipetiole* Girault by monotypy, (syn. Boucek, 1988 : 461).

Diagnosis : Head little wider than mesosoma, lower face often convex along the median line, the convexity continuing down to apex of clypeus; lower margin of clypeus produced and often rounded, sub-conical, in some species apex angulate, blunt, or even slightly emarginate (Figs. 81, 87). Antennal formula 11353 (Figs. 75, 82). Mesosoma (Fig. 74) arched in profile; pronotal collar not carinate; propodeum with distinct nucha and with converging submedian channels. Forewing with MV longer than PMV; hind tibia with one spur. Gaster ovate, lanceolate; petiole always long and more or less sinuate, at apex embraced from below by the thin and narrow extension of first gastral sternite; T3 mostly enlarged and convex.

Distribution : India, (Australia).

Biology : Not known (probably parasites of Diptera).

Key to the Indian species of *Merismomorpha*

1. Forewing (Fig. 84) with PMV only slightly shorter than MV (0.9x); basal hairline indicated; antennae with scape reaching to upper margin of median ocellus; propodeum (Fig. 83), with median carina *elongata* Sureshan
 PMV distinctly shorter than MV (0.5-0.7x); basal hairline not indicated; scape hardly reaching lower margin of median ocellus; propodeum without median carina..... 2
2. Lower margin of clypeus truncate (Fig. 87); lower face not evidently convex along the median line; petiole as long as hind coxa, embraced below by a very short extension of first gastral sternite (Fig. 85); exposed part of T3 slightly longer than T4; hind margin of T1 & T2 without median incision; propodeum with basal fovea deep and broad. (Pl. II. fig. 14) *truncata* Sureshan

Lower margin of clypeus angulate; lower face distinctly convex along the median line; petiole distinctly shorter than hind coxa (Fig.74), embraced by a longer extension of gastral sternite; exposed part of T3 distinctly longer than T4; hind margin of T1 & T2 incised in the middle; propodeum (Fig. 77) with basal fovea not broad and deep as above
 *minuta* Sureshan

1. *Merismomorpha elongata* Sureshan
 (Figs.81-84)

2000. *Merismomorpha elongata* Sureshan, *Rec. Zool. Sur. India*. **98** (3) : 107. F. India (KL) (ZSIC).

Diagnosis : Length 2.3mm. Head and mesosoma bluish black; gaster dark metallic blue, brown ventrally. Head moderately reticulate, almost shiny on the convex median line of lower face; POL little shorter than OOL; lower margin of clypeus angulate; antennae inserted distinctly above middle of face; pedicel as long as Fl; third anellus as long as first and second combined. Propodeum with median carina indicated. Gaster elongate, ovate, petiole as long as hind coxa, broadened before middle, embraced by a very short extension of first gastral sternite; gaster slightly longer than head and mesosoma combined.

Distribution : India (KL).

Host : Not known.

2. *Merismomorpha minuta* Sureshan
 (Figs. 74-79)

2000. *Merismomorpha minuta* Sureshan, *Rec. Zool. Sur. India* **98** (3) : 105. F, M. India (KL) (ZSIC).

Diagnosis : Length 1.5-2.1mm. Head and mesosoma bluish black; gaster mostly metallic bluish black except T1 and ventral part dark brown; head finely reticulate; POL 1.3x OOL; lower margin of clypeus angulate; antennae inserted little above middle of face; pedicel as long as Fl. Mesoscutum with reticulation shallower on frenal area; propodeum medially 0.6x as long as scutellum; median carina absent. Forewing with PMV 0.65x as long as MV. Gaster short, ovate; petiole short, widened medially, embraced by a long extension of first gastral sternite; gaster slightly longer than head plus mesosoma.

Distribution : India (KL).

Biology : Not known.

3. *Merismomorpha truncata* Sureshan
 (Figs. 85-88, Pl. II. fig. 14)

2000. *Merismomorpha truncata* Sureshan, *Rec. Zool. Sur. India*. **98** (3) : 109. F, India (KL) (ZSIC).

Diagnosis : Length 2.2mm. Head and mesosoma black; gaster brownish black with slight metallic blue reflection and basally brown; head finely reticulate; lower face not evidently convex along median line; POL 1.3x OOL; lower margin of clypeus truncate. Antennae inserted very little above middle of face. Propodeum with median area raised, finely reticulate; basal foveae broad and deep; submedian channels moderately deep. Gaster elongate, as long as head plus mesosoma combined; petiole as long as hind coxa, widened in the middle, embraced by a short extension of gastral sternite, exposed part of T3 only little longer than T4.

Distribution : India (KL).

Host : Not known.

Genus 27. *Mesopolobus* Westwood

1833. *Mesopolobus* Westwood, *Phil. Mag.* 2 : 443. Type species : *Mesopolobus fasciventris* Westwood by monotypy.
1913. *Urielloides* Girault, *Trans. R. Soc. Aust.* 37 : 109-107. Type species *Urielloides fulvipes* Girault, by original designation (syn. Boucek, 1988; 432).
1915. *Paranogmus* Girault & Dodd in Girault, *Mem. Qd. Mus.* 3 : 318; Type species : *Paranogmus pallidicornis* Girault & Dodd by original designation (Syn. Boucek, 1988: 432)
1924. *Anogmoidea* Girault, *Insec. Ins. Menst.* 12 : 174. Type species : *Anogmoides joulei* Girault by monotypy. (Syn. Boucek, 1988 : 432).

Other synonyms are : *Platymesopus* Westwood, 1833, *Platyterma* Walker, 1834, *Amblymerus* Walker, 1834, *Eutelus* Walker, 1834, *Xenocrepis* Forster, 1856, *Asemantus* Forster, 1878, *Syntomocera* Forster, 1878, *Disema* Forster 1878, *Baeoponerus* Masi, 1924, *Euamblymerus* Hincks, 1944, *Disemisca* Ghesquiere, 1946, *Syntomocerella* Ghesquiere, 1946, *Ahlbergiella* Von Rosen, 1955, *Sturovia* Boucek, 1961. (Boucek, 1988).

Diagnosis : Antennal toruli distinctly below middle of face (Fig. 308); antennae with 3 anelli and 5 funicular segments, third anellus often only slightly transverse or quadrate or even oblong; anterior margin of clypeus truncate or shallowly emarginate. Pronotal collar short or long; mesoscutum with notauli incomplete; scutellum without frenum; median area of propodeum usually more shiny and relatively weakly sculptured; plicae usually sharp throughout or distinct at base of propodeum; spiracles large, oval close to hind margin of metanotum. Gaster ovate, lanceolate.

Distribution : apparently worldwide, best known in Europe, N. America and other parts of north temperate zone.

Biology : Parasites of various dipterous (mainly cecidomyiid), hymenopterous and coleopterous gall makers and larvae developing in seeds of plants and stems of grasses.

Key to the Indian species of *Mesopolobus*

1. Antennae rather long (Fig. 309), combined length of pedicel plus flagellum as long as head width; FI-F3 longer than wide; propodeum (Fig. 311) long, medially 0.6x as long as scutellum; plicae sharp and complete; gaster little shorter than head plus mesosoma combined; all legs except coxae yellow
 *keralensis* Sureshan & Narendran

Antennae short, combined, length of pedicel plus flagellum 0.8-0.9x head width; FI-F3 strongly transverse or quadrate; propodeum short, medially 0.4-0.5x as long as scutellum; plicae not very sharp as above, complete or incomplete; gaster 1.1-1.2x as long as head plus mesosoma combined; legs with femora pale or dark brown
 2

2. Temple broad, length 0.6x eye length; mesoscutum (Fig. 306) width 1.6x length; pronotal collar anteriorly carinate; propodeum (Fig. 307) medially 0.5x as long as scutellum; plicae not distinct beyond middle; reticulation on head coarse; antennae (Fig. 308) with basal funicular segments strongly transverse; forewing with PMV 0.7x MV; body bright-green with golden reflection (Pl. I. fig. 10)
 *harithus* Sureshan & Narendran

Temple narrow (Fig. 314), length 0.3x eye length; mesoscutum width 2x length; pronotal collar finely carinate anteriorly; propodeum (Fig. 316) medially 0.4x as long as scutellum; plicae fine but complete, reticulation on head finer; basal funicular segments of antenna not much transverse; PMV (Fig. 315) short, only 0.5x MV; body bluish black with slight metallic reflection
 *minutus* Sureshan & Narendran

1. *Mesopolobus minutus* Sureshan & Narendran (Figs. 313-316)

2002. *Mesopolobus minutus* Sureshan & Narendran *Entomon* 27 (1) : 88, F. M. India (KL), ZSIC.

Diagnosis : Length 1.1-1.7mm. Head and mesosoma bluish black; gaster brownish black with bluish reflection on T1 dorsally; head width 1.9x length in dorsal view; temple length 0.3x eye length; POL 2x OOL; anterior margin of clypeus shallowly emarginate; antennae with scape not reaching median ocellus, pedicel slightly longer than anelli and F1 combined. Pronotal collar finely carinate; mesoscutum width 2x length; propodeum medially 0.4x as long as scutellum; plicae fine, complete. Forewing with PMV 0.5x MV. Gaster 1.2x as long as head plus mesosoma combined.

Distribution : India (KL).

Host : Not known.

2. *Mesopolobus keralensis* Sureshan & Narendran
(Figs. 309-312)

2002. *Mesopolobus keralensis* Sureshan & Narendran *Entomon* 27 (1) : 81. F. India, KL, (ZSIC).

Diagnosis : Length 1.5-2.1mm. Bluish green with brassy reflection; head width 2x length in dorsal view; temple length 0.33x eye length; anterior margin of clypeus shallowly emarginate; antennae inserted little above lower margin of eyes, scape hardly reaching median ocellus. Pronotal collar finely carinate; mesoscutum width 1.7x length; propodeum medially 0.6x as long as scutellum; plicae sharp and complete; gaster little shorter than head and mesosoma combined.

Distribution : India (KL).

Host : Not known.

3. *Mesopolobus harithus* Sureshan & Narendran
(Figs. 306-308, Pl. I. fig. 10)

2002. *Mesopolobus harithus* Sureshan & Narendran *Entomon* 27 (1) : 84, F. India (KL) (ZSIC).

Diagnosis : Length 1.7mm. Head and mesosoma golden green; gaster darker. Head raised reticulate, in dorsal view width 1.8x length; temple length 0.6x eye length; POL 2x OOL; anterior margin of clypeus shallowly emarginate; antennae with scape just reaching median ocellus, strongly clavate; pedicel as long as three anelli and Fl combined. Pronotal collar not carinate; mesoscutum width 1.6x length; propodeum medially 0.5x as long as scutellum; plicae sharp but indistinct beyond middle. Gaster little longer than head plus mesosoma combined.

Distribution : India (KL).

Host: Not known.

Genus 28. *Metacolus* Forster

1856. *Metacolus* Forster. *Hym.Stud* 2 : 65 : Type species : *Metacolus unifasciatus* Forster, by monotypy.

1878. *Pterosema* Forster, *Verh. Naturh. Ver. Preuss. Rheinl.* 35 : 44. Type species : *Pterosema varicolor* Forster by monotypy and original designation.

Diagnosis : Clypeus reticulate; pronotum large, without collar, notauli incomplete; prepectus with at least one short row of fine setae near posterior margin. Forewing (Figs. 122, 125) with MV widening distally; PMV often shorter than STV.

Distribution : India (Europe, America).

Biology : Parasites of various scolytidae in twigs of conifers.

1. *Metacolus unifasciatus* Forster
(Fig. 125)

1856. *Metacolus unifasciatus* Forster, Hym. Stud. 2 : 70. M, F. Suecia, Germania. (?NMV).

Diagnosis : Length 2.7-4.2mm. Head and mesosoma shiny greenish blue; scape and pedicel orange, remainder of antenna brownish black; antenna with combined length of pedicel plus flagellum slightly greater than breadth of head; pedicel not or only slightly longer than Fl; proximal segments of funicle at least slightly longer than broad. Forewing with a fuscous band extending from MV, usually at least half way across the wing.

Distribution : India (HP) (Europe).

Biology : No host record is available from the region.

2. *Metacolus beelsoni* (Mani & Kaul)
(Figs. 122-124)

1973. *Zapachia beelsoni* Mani & Kaul, Mem. School Ent. Agra. No. 2 : 60-62. M. India, Simla (USNM).

Diagnosis : Male. Length 2-3.9mm. Head and mesosoma metallic green with some violet reflection; gaster mostly violet; face closely and minutely reticulate, 2x as wide as long in dorsal view; POL about 2x OOL; occiput distinctly margined; antennae inserted distinctly a little below the middle of face. Propodeum smooth without median carina. Forewing length to width 100 : 42; PMV as long as STV. Gaster smooth, shiny, a little less than 0.5x of the body.

Distribution : India (HP, J&K, UP) (Israel).

Host : Not known.

Genus 29. *Metastenus* Walker

1834. *Metastenus* Walker, Ent. Mag. 2 : 301. Type species : *Metastenus concinnus* Walker, by monotypy (BMNH) examined.

1904. *Scymnophagus* Ashmead, Mem. Carnegie. Mus. 1 (4) : 319. Type species : *Scymnophagus townsendi* Ashmead, by monotypy and original designation.

1915. *Tripolycystus* Dodd in Girault, Mem. Qd. Mus. 3 : 337. Type species : *Tripolycystus sulcatus* Dodd by original designation. (Syn. Boucek, 1988 : 440).

Diagnosis : Gena with a hollow above the base of mandible (Figs. 130, 136), extending fully one third up the malar space; female flagellum with 3 very short anelli and 5 funicular segments with dense longitudinal sensillae. Propodeum tapering to nucha. MV parallel sided, somewhat thickened. Gaster sessile (Fig. 134).

Distribution : India, (Europe, China, Africa, and Australia).

Biology : Parasites of coccidophagous and aphidophagous coccinellid beetles.

Key to the species of *Metastenus* from the Indian subcontinent

1. Propodeum (Fig. 134) with nucha moderate and coarsely reticulate; plicae raised and distinct; antennae (Fig. 136) inserted at centre of face, body moderately reticulate
..... *concinus* Walker
- Propodeum (Fig.132) with nucha short, finely reticulate; plicae very fine, almost indistinct; antennae (Fig. 130) inserted below middle of face, reticulation of body finer especially on head and propodeum (Pl. II. fig. 15).....
..... *indicus* Sureshan & Narendran

1. *Metastenus indicus* Sureshan & Narendran
(Figs. 130-133, Pl. II. fig. 15)

2002. *Metastenus indicus* Sureshan & Narendran *Rec. Zool. Surv. India* **100** (3-4) : 125, F. M. India (KL) (ZSIC).

Diagnosis : Length 1.6-1.8mm. Black; antennae testaceous; head finely reticulate; POL little greater than OOL; both mandibles with three teeth; antennae inserted below middle of face. Anterior margin of pronotal collar not carinate; scutellum without frenum; propodeum with nucha short. Gaster little longer than head plus mesosoma combined.

Distribution : India (KL).

Host : Not known.

2. *Metastenus concinns* Walker
(Figs. 134-136)

1834. *Metastenus concinns* Walker, *Ent. Mag.* **2** : 302. M; England (BMNH) examined.

Diagnosis : Length 1.5mm. Brownish black; antennae dark brown; head and mesosoma moderately reticulate, reticulation coarser on median part of propodeum; clypeus finely striate, anterior margin shallowly emarginate; malar space length 0.6x eye height; POL : OOL = 5 : 4; posterior margin of gena sharp; antennal scape 0.7x as long as the eye; pedicel longer than Fl. Pronotal collar anteriorly carinate; scutellum with frenum clearly separated; propodeum with plicae sharp and complete, Forewing with PMV 1.4x MV. Gaster as long as head plus mesosoma combined.

Distribution : India (KL), Europe.

Host : Coccids.

Genus 30. *Miscogasteriella* Girault

1915. *Miscogasteriella* Girault, Mem. Qd. Mus. 4 : 196-197. Type species : *Miscogasteriella longiventris* Girault, by original designation.
1926. *Glyptosticha* Masi, Konowia 5 : 348-349. Type species : *Glyptosticha flavipes* Masi by original designation. Syn. By Boucek, 1988 : 402.

Diagnosis : Clypeal margin broadly truncate, sub emarginate between the slight and blunt sublateral teeth; clypeus smooth, neighbouring lower face with raised reticulation and conspicuous pilosity; tentorial pits not distinct. Scutellum with frenal groove removed from apex thus delimiting a distinct frenal area; propodeum (Fig. 54) with median and submedian longitudinal furrows subdivided by cross-rugae but no clear cut median carina.

Distribution : India (From Japan and China, to Papua New Guinea and Queensland).

Biology : Forest dwellers.

The only species known from the region is *Miscogasteriella jayasreeae* Sureshan.

1 *Miscogasteriella jayasreeae* Sureshan (Figs. 54-57, Pl. I. Fig. 12)

1999. *Miscogasteriella jayasreeae* Sureshan, *Oriental Insects*. 33 : 104-105. F. India (KL) (ZSIC).

Diagnosis : Length 7.5mm. Body dark metallic blue; gaster almost black towards tip, brownish ventrally. Head finely reticulate, in dorsal view 1.3x as wide as mesosoma; POL little longer than OOL; antennae inserted well below centre of face; pedicel plus flagellum 1.6x that of head width; clava as long as three preceding segments combined. Mesoscutum width 1.7x length. Forewing with basal cell hairy; costal cell hairy on anterior 2/3; basal vein infusate. Gaster much longer than head plus mesosoma combined; T1 with hind margin deeply incised in the middle.

Distribution : India (KL).

Host : Not known, occurring in rain forests.

Genus 31. *Mokrzeckia* Mokrzecki

1933. *Mokrzeckia* Mokrzecki, *Polskie. Pismo. Ent.* 12 : 143. Type species : *Pteromalus pini* Hartig by monotypy.
1958. *Beierina Delucchi*, *Entomophaga*, 3 : 271. Type species : *Pteromalus pini* Hartig, by original designation.

Diagnosis : Clypeus large (Figs. 182, 185) well delimited, its lower margin produced, bilobed with sharp median incision; antenna with 2 anelli and funicular segments, each

flagellar segment generally with 2 rows of sensilla. Pronotum dorsally very short but sharply carinate; mesoscutum densely pubescent; propodeum (Fig. 184) with adpetiolar margin raised and deeply emarginate medially. Gaster ovate, about as long as mesosoma

Distribution : Oriental region as far as Java and Japan, Europe.

Biology : Hyperparasite of Lepidoptera through braconids eg. *Apanteles* and *Macrocentrus*.

1. *Mokrzeckia orientalis* Subba Rao
(Figs. 185-188)

1973. *Mokrzeckia orientalis* Subba Rao, *Oriental Ins.* 7 : 356 : M, F, Indonesia (BMNH).

1973. *Mokrzeckia indica* Subba Rao, *Oriental Ins.* 7 : 358-360, M.F, Indonesia : Java (BMNH).

Diagnosis : Length 2.4-2.6mm, Head and mesosoma bright metallic bluish green; antennae dark brown; gaster dorsally brown with metallic tinge on sides and ventrally yellowish; head very much wider than mesosoma; antennae inserted in the middle of face, all funicular segments longer than broad and sub equal. Pronotal collar evenly and strongly carinate. Forewing with PMV 0.8x MV, with irregular setae below SMV, stigmal knob large and quadrate. Gaster ovate or lanceo-ovate, as long as mesosoma, collapsing.

Distribution : India (KT, MR, UP) Sri Lanka, (Indonesia, Thailand).

Biology : Parasite in cocoons of *Apanteles* sp., with *Hamonia coffearea*, *Polithlipta macralis*.

2. *Mokrzeckia menzeli* Subba Rao
(Figs. 182-184, Pl. I. fig. 11)

1973. *Mokrzeckia indica* Subba Rao, *Oriental Ins.* 7 : 358. ex parte.

1981. *Mokrzeckia menzeli* Subba Rao, *Proc. Ind. Acad. Sci. (Anim. Sci.)* 90 : 479, M, F, India (Dehra Dun) (BMNH).

Diagnosis : Length 2.4-2.6mm. Head and mesosoma bright metallic green; gaster dark brown with metallic tinge on sides, sterna pale. Antennae with scape and pedicel testaceous, remainder dark brown. Head moderately reticulate; clypeus with anterior margin deeply incised; antennae inserted in the middle of face; POL shorter than OOL; pronotal collar carinate. Forewing without irregular cilia below SMV. Gaster depressed, ovate-lanceolate; ovipositor exerted out.

Distribution : India (KL, U.P.).

Host : Hyperparastic on *Hyblaea parea* through *Apanteles malevolus*; *Hapalia machaeralis* through *Miocolus dubius*, ex. *Apanteles obliqua*, indetermined cocoons.

Genus 32. *Narendrella* Sureshan

1999. *Narendrella* Sureshan, *Oriental Ins* : 33 : 101-102. Type species : *Narendrella nilamburensis* Sureshan by original designation.

Diagnosis : Body metallic, head and mesosoma raised reticulate with distinct white pubescence. Head wider than mesosoma; anterior margin of clypeus (Fig. 47) with a deep notch in the middle and two blunt teeth; antennae inserted well above middle of face with 3 anelli in female and 2 in male. Pronotal collar anteriorly margined; notauli incomplete; propodeum (Fig. 51) with costula, submedian area depressed; plicae distinct anteriorly; hind tibia with one spur. Forewing with MV longer than PMV. Gaster petiolate; petiole smooth embraced by the projecting first sternite up to middle ventrally; hind margin of T1 deeply incised in the middle.

Distribution : India (KL).

Biology : Not known.

1. *Narendrella nilamburensis* Sureshan (Figs. 47-51, Pl. II. fig. 20)

1999. *Narendrella nilamburensis* Sureshan, *Oriental Ins* : 33 : 102-103. F. M, India (KL) (ZSIC).

Diagnosis : Length 1.6-2.7mm. Head and mesosoma dark metallic blue; gaster dark brown with metallic blue reflection dorsally. Head in dorsal view width 2x length; POL 1.4x OOL; antennal flagellum slender; clava little wider than funicle; scape little shorter than eye; clava 1.4x as long as two preceding segments. Mesoscutum width 2x length; propodeum with median carina indicated in the anterior part; basal fovea deep. Forewing with MV 4.1x STV. Gaster ovate, dorsally collapsing; petiole length 1.4x width; T1 smooth, other tergites microsculptured.

Distribution : India (KL).

Host : Not known.

Genus 33. *Nasonia* Ashmead

1904. *Nasonia* Ashmead, *Mem. Carnegie. Mus.* 1 (4) : 317, 318. Type species : *Nasonia brevicornis* Ashmead by original designation.

1904. *Mormoniella* Ashmead, *Mem. Carnegie. Mus.* 1 (4) : 316, 317. Type species (*Mormoniella brevicornis* Ashmead) = *Nasonia brevicornis* Ashmead, by monotypy and original designation.

Diagnosis : Lower face (Fig. 256) strongly receding from toruli to mouth; female antenna stout; funicular segments strongly transverse, antelli two; clypeal margin hardly emarginate. Mesosoma and head shiny, for most part delicately engraved-reticulate; propodeum with reticulate nucha.

Distribution : Cosmopoliton.

Biology : Common parasite in puparia of diptera in bird nests.

The only species known from the region is *Nasonia vitripennis* (Walker).

1. *Nasonia vitripennis* (Walker)
(Fig. 256)

1836. *Pteromalus vitripennis* Walker, *Ent.Mag.* 3 : 492. F, England (BMNH).

Diagnosis : Length 1.5-2.5mm. Body bluish black with bronze reflections; antennae and legs rust coloured; antennae inserted along lower orbital border; pedicel longer than first two funicular segments combined. Notauli almost complete. Forewing with STV as long as PMV and little shorter than MV. Gaster oval.

Distribution : Cosmopoliton. In India recorded only from Delhi.

Host : Records not available from India.

Genus 34. *Norbanus* Walker

1843. *Norbanus* Walker, *Annl. Soc. Ent. France*, (2) 1 : 159. Type species : *Norbanus dysaulus* Walker by designation of Ashmead, 1904.

1856. *Arthrolysis* Forster, *Hym. Stud.* 2 : 52. Type species : *Pteromalus scabriculus* Nees by designation of Ashmead, 1904.

1878. *Picroscytus* Thomson, *Hym. Scand.* 5 : 50, 58. Type species *Pteromalus scabriculus* Nees by monotypy.

1904. *Stylophorella* Ashmead, *Mem. Carnegie. Mus.* 1 (4) : 389. Type species *Stylophorella perplexa* Ashmead by monotypy and original designation.

The other synonyms are *Amicromelus* Girault, 1913, *Epicaudonia* Girault, 1914, *Apirene* Girault, 1914, and *Neocaudonia* Dodd in Girault, 1915 (Boucek, 1988 : 408).

Diagnosis : Female antenna (Figs. 166, 168) with 2 anelli, terminal segment of clava spine like at apex, in male, flagellum (Fig. 175) with whorls of bristles or sparse erect hairs. Pronotum very broad, hence mesosoma very compact; prepectus much smaller than tegula; propodeum (Fig. 165) rather smaller, flat and featureless, with regular raised reticulate sculpture and without distinct nucha. Gaster sessile or subsessile.

Distribution : Almost all continents.

Biology : Parasitic on larvae of Diptera and Hymenoptera, less often of other insects developing in grass stems.

Key to the species of *Norbanus* from India and adjacent countries

- 1 Gaster (Fig. 180) not much pointed towards the tip, uniformly golden yellow; mesosoma narrow; posterior margin of pronotal collar deeply emarginate; smaller species, length 1.8-2.2mm *thekkadiensis* sp. nov.
 Gaster pointed towards the tip, brown or black, not golden yellow; mesosoma wider, posterior margin of pronotal collar not as above; if deeply emarginate then antennae thicker and body robust; larger species, length 1.9-5mm..... 2
2. Antennae with terminal funicular segment as long as wide, penultimate segment 1.5 as long as wide, clava a little longer than two preceding segments combined; forewing with MV 2x STV; pedicel yellow *indorum* (Masi)
 Terminal funicular segment longer than wide; penultimate segment 2x as long as wide; clava little shorter than 2 preceding segments combined; if little longer, then PMV of forewing very short; MV 2.3-3.5x STV; pedicel brown or black 3
3. Anelli transverse, (Fig.173) equal in length; pedicel plus flagellum little shorter than head width (48 : 49.5); forewing with discal pubescence very small, almost indistinct; antennae uniformly testaceous..... *equus* sp. nov.
 - Antennae with second anellus twice as long as first; pedicel plus flagellum as long as or little longer than head width; discal pubescence of forewing moderately dense; antennae blackish brown 4
4. Gaster (Fig.165) with T6 large; antennae thick, Fl with 5 or 6 irregular rows of sensillae, terminal stylus less sharp, antennae inserted only little below middle of face (Fig.166); posterior margin of pronotal collar deeply emarginate; body with coarse reticulation ...
 *birmanus* (Masi)
 Gaster with T6 short; antennae less thick than in alternate; Fl with 3 or 4 rows of sensillae; terminal stylus sharp; antennae inserted well below middle of face; posterior margin of pronotal collar only slightly emarginate; body with finer reticulation.
 5
5. Forewing (Fig. 167) with MV 3.5x STV; PMV short, only 0.54x. MV
 *scrobatus* sp. nov.
 Forewing with MV 2.4-2.5x STV; PMV only little shorter than MV 6
6. Hind femora thick, length 2.5x width; gaster (Fig.169), thick, length 2.1x width; head in side view thick. (Pl. II. fig. 21)..... *acuminatus* Dutt & Ferriere
 Hind femora slender, length 3.4x width; gaster slender (Fig. 179), length 2.5x width in dorsal view; head in side view thin..... *malabarensis* sp. nov.

1. *Norbanus birmanus* (Masi)
(Figs.165-166)

1927. *Picroscythus birmanus* Masi, *Ann. Mus. Civ. Stor. Nat. Giacomo Doria* : 52 : 267. F. Myanmar (Lectotype, MCSG) (examined).

Diagnosis : Length 5.8mm. Head and mesosoma bluish black; gaster brownish black; antennae brown, base of scape whitish; head moderately reticulate, 1.2x as wide as mesosoma; POL almost as long as OOL; toruli slightly below middle of face; pedicel plus flagellum 1.2x as long as head width; Fl 1.2x F2; clava 0.82x as long as two preceding segments combined.. Mesosoma coarsely reticulate punctate; posterior margin of pronotal collar deeply emarginate. Forewing with basal hair line not indicated. Gaster 1.4x as long as head plus mesosoma combined; T6 large.

Distribution : Myanmar.

Host : Not known.

2. *Norbanus acuminatus* Dutt & Ferriere
(Figs. 169-171, Pl. II. fig. 21)

1961. *Norbanus acuminatus* Dutt & Ferriere, *Ind. Jr. Agric. Sci.* 31 : 141. F. India : Barrackpore (ZSI).

Diagnosis : Length 2.5-5mm. Head and mesosoma bluish black; gaster brown with greenish coppery shine; antennae brownish black; head engraved reticulate, 1.2x as wide as mesosoma; POL almost as long as OOL; anterior margin of clypeus weakly emarginate; antennae inserted at same level or little below lower margin of. eyes; second anelli twice as long as first; clava almost as long as two preceding segments combined. Mesosoma moderately reticulate punctate. Forewing with discal pubescence small. Gaster elongate, ovate, 1.2x as long as head plus mesosoma combined.

Distribution India (KL, WB).

Biology : Parasitic on *Nupserha bicolor* Thoms. (Coleoptera).

3. *Norbanus indorum* (Masi)

1927. *Picroscythus indorum* Masi, *Ann. Mus. Civ. Stor. Nat. Giacomo Doria*: 52 : 267. India: Orissa (ZSI).

Diagnosis : Head on side view large with face a little convex below middle; penultimate funicular segment 1.5x as long as thick; terminal segment as long as thick; clava a little longer than two preceding segments combined; scape metallic white at base; pedicel yellow. Forewing with relative lengths of MV 100; PMV 80, STV 50. Gaster conical.

Distribution India (OR), Pakistan.

Biology : Borer in Cyperaceae.

4. *Norbanus scrobatus* sp.nov.
(Figs. 159, 167-168)

Holotype : Female : Length 3.8mm. Head and mesosoma bluish black with slight metallic reflection; gaster brownish black with metallic blue reflection on median part of tergites. Antennae brownish black, except base of scape testaceous and clava and two preceding segments yellowish brown. Coxae concolrous with mesosoma; femora dark brown with base and tips paler; tibiae and tarsi testaceous except hind tibiae brown medially. Tegulae brown; wings hyaline, veins brown.

Head : Reticulation and measurements as in *N. birmanus*; pubescence long; anterior margin of clypeus shallowly emarginate; clypeus clearly marked off from rest of the face; toruli situated below middle of face, scape reaching little beyond upper margin of median ocellus, shorter than eye (0.9x); F1 as long as F2 with 4 rows of sensillae; clava with terminal stylus less sharp, little longer than two preceding segments combined (Fig. 168).

Mesosoma : Moderately reticulate with sparse long hairs; pronotal collar sharply edged on the sides, posterior margin deeply emarginate. Mesoscutum width 2x length. Scutellum medially 0.8x as long as scutellum. Propodeum medially 0.7x as long as scutellum; basal foveae broad and deep; nuchal area short, transversely striated. Forewing (Fig.167) with relative lengths: SMV 32, MV 21, PMV 11.5, STV 6; speculum very narrow, few hairs on basal hairline.

Gaster : (Fig. 159) 1.3x as long as head plus mesosoma combined and length 2.3x width in dorsal view; T1 dorsally incised sublaterally on either sides.

Holotype : INDIA : KL, Palghat District, Silent valley, 9.xii.1987; Coll. P. M. Sureshan; Paratypes : 1 Female, KL : Quilon: Kuravanthavalam, 13.viii.1987, Coll. P. M. Sureshan (ZSIC).

Remarks : This species resembles *N. birmanus* (Masi) in general morphology and measurements but differs in having antennae with F1 as long as F2 with 4 rows of sensillae, clava little shorter than two preceding segments combined; propodeum with short nucha and broad basal foveae; forewing with short PMV and gaster with T1 incised laterally on either sides and T6 short (in *indorum* (Masi) antennae with F1 longer than F2 with 6 or 7 irregular rows of sensillae, clava little shorter than two preceding segments combined; propodeum with nucha longer, basal foveae not broad, forewing with PMV longer and T1 of gaster not incised laterally and T6 large).

5. *Norbanus thekkadiensis* sp.nov.
(Figs. 180-181)

Female : Length 1.8-2.2mm. (Holotype 2.2mm.). Head and mesosoma bluish black; gaster uniformly testaceous; antennae testaceous; fore and hind coxae concolrous with

mesosoma, mid coxae brown, remainder of legs testaceous with fore femora darker and tips of tarsi brown. Tegulae pale brown; wings hyaline, veins pale brown.

Head : Moderately reticulate punctate, pubescence sparse; width 1.3x mesosoma. In dorsal view head width 2x length and in front view width 1.2x height; temple length 0.5x eye length; POL 1.98x OOL; clypeus radiately striated, striae not reaching much beyond outer margin of clypeus, anterior margin of clypeus shallowly emarginate; malar space length 0.6x eye length; eyes separated 1.5x their height; eye height 1.4x width; Antennae (Fig.181) inserted slightly above lower margin of eyes; scape reaching median ocellus, as long as eye; pedicellus plus flagellum 1.1x as long as head width; clava with terminal stylus elongate, as long as 2.5 preceding segments combined.

Mesosoma : (Fig. 180) Moderately reticulate. Length 1.7x width; pronotum as broad as mesoscutum. Mesoscutum width 1.6x length. Scutellum medially 0.8x mesoscutum. Propodeum medially 0.7x scutellum, uniformly and moderately reticulate; spiracles very small, separated by less than their diameter from hind margin of metanotum. Forewing with basal part bare. Relative lengths : SMV 26.5, MV 14.5, PMV 11.5, STV 6.

Gaster : Elongate, ovate, length 2.2x width in dorsal view and as long as head plus mesosoma combined.

Holotype : Female, INDIA: KL, Thekkadi, 14.ix.1986, Coll.P.M.Sureshan; Paratypes : 1 Female, KT, Coorg district, Otekolly, 8.iii.1994; 2 Female, KL, Malampuzha, 13.i.1986, 16.i.1986, 1 Female, data same as that of holotype; 1 Female, KL, Calicut University campus, iii.1989, Coll.P.M.Sureshan; 1 Female, KL, Malappuram, Chungathara, 1982, Coll. T. C. Narendran (ZSIC).

Remarks : This species can be segregated from all the other species as given in the key especially in the nature of gaster and small body size.

6. *Norbanus equus* sp.nov. (Figs. 172-175)

Female : Length 1.9-3.1mm. (Holotype 3.3mm.). Head and mesosoma dark metallic blue; gaster blackish brown with metallic blue reflection dorsolaterally and ventrally. Antennae testaceous. Legs with coxae concolrous with mesosoma, femora dark brown except tips testaceous, tibiae and tarsi yellow with tips of tarsi brown. Tegulae and veins pale brown; wings hyaline.

Head : Moderately reticulate with moderately dense pubescence, 1.3x as wide as mesosoma, in dorsal view width 2.3x length and in front view width 1.2x height; lower part of face below toruli longitudinally striated, striae not reaching gena; temple length 0.4x eye length; POL 1.3x OOL; malar space length 0.5x eye height; eyes separated 1.4x their height; eye height 1.7x width in profile; anterior margin of clypeus weakly emarginate. Antenna (Fig. 173) inserted along the lower margin of eyes; toruli separated by nearly half of their

diameter; scape as long as eye, just reaching median ocellus; pedicellus plus flagellum little shorter than head width (48 : 49.5), anelli equal, transverse; clava as long as two preceding segments combined, terminal stylus sharp.

Mesosoma : Length 1.3x width; moderately reticulate, pubescence moderately dense. Pronotal collar finely margined on the sides. Mesoscutum width 2.2x length. Scutellum medially little shorter than mesoscutum. Propodeum medially 0.7x scutellum, uniformly and moderately reticulate. Forewing (Fig.174) length 2.7x width, discal pubescence less distinct, basal part almost bare. Relative lengths: SMV 37, MV 18.5, PMV 15, STV 7.5.

Gaster : (Fig. 172) elongate, ovate, length 2x width in dorsal view; T1 smooth, other tergites transversely rugulose; hypopygium not exceeds T2; gaster 1.1x as long as head plus mesosoma combined.

Male : Length 1.7mm. Resembles female but differs as follows: antenna (Fig.175) uniformly blackish brown, inserted well above middle of face, scape exceeds well beyond median ocellus, funicle segments elongate and binodose, each with two whorls of long setae; anelli very short and transverse; gaster short and compressed with a yellow spot at base.

Holotype : Female : INDIA: KL, Calicut University campus, ix.1985, Coll. Narendran & party; *Paratypes* : 1 male, KL, Calicut University campus, iv.1989, Coll. Sureshan; 23 Female, 2 male, KL, Calicut University campus, 1986-1989; 1 Female, KL, Calicut, 30.x.1985, 2 Female, KL, Trivandrum: Kazhakuttom, 25.ii.1989; 1 Female, Ernakulam, 9.ii.1989, Coll.P.M.Sureshan (ZSIC).

Remarks This species closely resembles *N.acuminatus* Dutt & Ferriere but differs in the nature of antenna with anelli equal, inserted well below middle of face, scrobe less distinct, mesosoma coarsely punctate with dense pubescence (in *acuminatus* antennae with second anellus twice as long as first, inserted little below middle of face, scrobe deep, mesosoma with reticulation and pubescence moderate).

7. *Norbanus malabarensis* sp.nov. (Figs.176-179)

Female : Length 2.9-4.1mm. (Holotype 4.1mm.). Head and mesosoma bluish black; gaster reddish brown. Antennae blackish brown with basal two third of scape yellowish brown. Fore and hind coxae concolorous with mesosoma, mid coxae dark brown, remainder of legs testaceous with tips of tarsi brown, femora darker. Tegulae brown, wings hyaline, veins brown.

Head : (Fig.178) 1.2x as wide as mesosoma, uniformly engraved reticulate with sparse pubescence. In dorsal view head width 2.1x length and in front view width 1.3x height; temple length 0.3x eye length; POL as long as OOL; clypeus with anterior margin weakly emarginate; malar space length 0.6x eye height; eyes separated by 1.4x their height; eye height 1.5x width. Antennae (Fig.176) inserted slightly above lower margin of eyes, scape

as long as eye; pedicel plus flagellum 1.1x as long as head width, second anellus 2x first, clava almost as long as two preceding segments combined.

Meosoma : Length 1.2x width, reticulate punctate with sparse pubescence; pronotal collar not margined. Mesoscutum width 2.3x length. Scutellum medially 0.7x mesoscutum, finely reticulate. Forewing (Fig.177) length 2.4x width; costal cell hairy on upper half, discal pubescence moderately dense. Relative lengths: SMV 42, MV 23, PMV 20, STV 9.5.

Gaster : (Fig.179) Lanceolate, 1.2x as long as head plus mesosoma combined and length 2.5x with in dorsal view, T1 smooth, others weakly rugulose.

Holotype : Female : INDIA : KL, Palghat district, Silent valley, 16.v.1985, Coll. Narendran & party; *Paratypes* : 1 Female, data same as that of holotype; 1 Female, KL, Trichur district, Vazhani, 7.ii.1989, Coll. P. M. Sureshan.

Remarks : This species closely resembles *N.acuminatus* Dutt & Ferriere but differs from it as follows: gaster slender, length 2.5x width; hind femora slender, yellowish brown, posterior margin of pronotal collar very slightly emarginate, almost straight (in *acuminatus* gaster not slender, hind femora thick, dark brown, posterior margin of pronotal collar moderately emarginate.)

Genus 35. *Notoglyptus* Masi

1917. *Notoglyptus* Masi, *Novit. Zool.* 24 : 181. Type species : *Notoglyptus niger* Masi, by original designation.

Diagnosis : Colour black to metallic green; head ovate to triangular in anterior view; clypeus with anterior margin straight or produced, sometimes bidentate; genal concavities well developed, extending half to one third of malar length; antennae with 2 anelli and 6 funicular segments. Pronotum reduced, much narrower and depressed; collar bordered anteriorly by weak to strong carina; notauli complete; scutellum (Fig.52) with scuto-scutellar sulcus foveolate medially; frenal groove distinct; propodeum with plicae and median carina. Forewing with MV longer than PMV. Gaster petiolate, ovate, petiole quadrate to elongate; T1 nearly concealing succeeding tergites.

Distribution : India (from central Europe to South Africa, throughout southern Asia to Japan and Queensland, America).

Biology : Probably parasites of small Diptera associated with herbaceous vegetation.

The only species known from the region is *Notoglyptus scutellaris* (Dodd & Girault).

1. *Notoglyptus scutellaris* (Dodd & Girault) (Figs. 52, Pl.II.fig.19)

1915. *Merismus scutellaris* Dodd & Girault, in Girault, *Mem. Qd. Mus.* 3 : 328. Queensland; Gordonvale.

1915. *Merismus squamosus* Girault, *Mem. Qd. Mus.* 3 : 328; Queensland, Gordonvale (QM).

1917. *Notoglyptus niger* Masi, *Novit. Zool.* 24 : 181. Italy.

1917. *Notoglyptus virescens* Masi, *Novit. Zool.* **24** : 181-183. Seychelles : Mahe (BMNH). Examined.

Diagnosis : Length 1.3mm. Head mesosoma and petiole dark green; gaster brown; antennae with scape yellow, remainder brown; head delicately alveolate; except clypeus smooth; clypeus separated from face by obscure sulcus, anterior margin nearly straight, slightly reflexed; POL : OOL = 6 : 4.5; antenna with combined length of pedicel plus flagellum 1.1x head width; pronotal collar finely carinate; scutellum coriaceous with distinct discal fovea; propodeum with nucha not bordered by carina anteriorly; gastral petiole alveolate, length 1.2x width with weak median carina; gaster length 1.3x width.

Distribution : India (DL, KL, UP), Italy, Seychelles Island, Japan, South Africa, America, Australia.

Biology : Not known.

Genus 36. *Oniticellobia* Boucek

1976. *Oniticellobia* Boucek *J. Ent. Soc. S. Africa.* **39** : 22. Type species : *Oniticellobia sublaevis* Boucek by original designation.

Diagnosis : Head moderately large, reticulate; occiput shallowly emarginate; lower margin of clypeus with two distinct teeth; antennae inserted below middle of face but above ocular line, formula 11353; third anellus sometimes fairly large but without sensilla. Mesosoma (Fig. 209) short, compact; pronotal collar not carinate, but slightly edged; notauli distinct, groove like, almost complete; scutellum with frenum vaguely separated and narrow; propodeum (Fig. 206) short with convex nucha, median carina and costula. Gaster sessile; smooth, convex in female, fusiform-conical, T3 largest; T5 shortest, hind margin of T1 distinctly angulate.

Distribution : India, Sri Lanka, (Africa).

Biology : Reared from brood balls of scarabaeid beetles.

Key to the species of *Oniticellobia* Boucek

1. Mesosoma shiny, reticulation very weak on mesoscutum (and vertex) mainly engraved, alutaceous; gaster in female hardly longer than head plus mesosoma, more fusiform; epipygium only slightly longer than broad at its base; pedicel in female about 2.4x as long as broad and much longer than Fl. S. Africa *sublaevis* Boucek
 Mesosoma dull, distinctly raised reticulate; gaster in female much longer than head plus mesosoma, narrow, conical posteriorly; epipygium 2-2.5x as long as broad; pedicel in female 1.82x as long as broad and shorter than Fl 2
2. Antenna with third anellus longer than first and second combined; POL slightly greater than OOL; ocelli large, median from lateral by hardly more than its maximum diameter; epipygium about twice as long as broad. S. Africa, S. West Africa and Ethiopia
 *reticulata* Boucek

Antenna (Fig. 209) with third anellus as long as first and second combined; POL 1.5x OOL; ocelli moderate, median from lateral by 1.5x of its maximum diameter; epipygium 2.5x as long as broad. India : KL (Pl. II. fig. 16)
 *longigastra* Sureshan & Narendran

1. *Oniticellobia longigastra* Sureshan & Narendran

(Figs. 206-209, Pl. II. fig.16)

1994a. *Oniticellobia longigastra* Sureshan & Narendran, *Rec. Zool. Sur. India*. **94** (1) : 113. F. M. India (KL) (ZSIC).

Diagnosis : Length 2.5-5mm. Body shiny black with greenish gloss; antennae with scape pedicel and anelli testaceous, remainder dark brown; head 1.2x as broad as mesoscutum; POL 1.5x OOL; antennae with third anellus as long as first and second combined. Mesosoma raised reticulate; propodeum finely reticulate, costula weak; plicae indicated only by an anterior swelling mesad of spiracle. Gaster narrow, sharply acuminate, 1.4x as long as head plus mesosoma combined; epipygium 2.5x as long as broad.

Distribution : India (KL, WB).

Host : Not known.

Genus 37. *Oricoruna* Boucek

1978. *Oricoruna* Boucek, *Oriental Ins.* **12** (4) : 469. Type species : *Pachycrepis orientalis* Crawford by original designation.

Diagnosis : Vertex strongly transverse; occiput without carina; POL sub equal to OOL; temples strongly receding behind elliptic bare eyes; antennae (Fig. 44) inserted slightly above middle of face; in both sexes formula 11353; funicular segments stout, much broader than short pedicel; lower margin of clypeus distinctly produced (Fig. 45); mouth margin forming a lobe on either side of the clypeus.

Mesosoma short and broad, dorsally densely reticulate and pubescent; pronotal collar bluntly carinate on anterior edge; mesoscutum very short, notauli complete; scutellum with frenal groove distinct, but shallow; propodeum with distinct nucha and two submedian channels converging to base of nucha. Forewing (Fig. 46) with MV widened, parallel sided; PMV much longer than MV. Gaster short, petiolate, lanceolate.

Distribution : India (Philippines, Africa).

Biology : Parasites of Coccids.

The only species known from the region is *Oricoruna arcotensis* (Mani & Kurian)

1. *Oricoruna arcotensis* (Mani & Kurian)
(Figs. 44-46)

1953. *Pachycrepoides arcotensis* Mani & Kurian, *Ind. J. Ent.* 15 : 11, F, India (N. Arcot) (Lost).

1953. *Pachycrepoides coorgensis* Mani & Kurian, *Ind. J. Ent.* 15 : 10, M. F. India (Bangalore) (Lost).

Diagnosis : Length 1.5-2mm. Black; legs yellowish brown; wings hyaline; head viewed from above rectangular, 2.5x as broad as long, vertex dull, distinctly coarsely punctate; mandibles with 3 and 4 teeth; antennal scape reaching upto median ocellus. Pronotum closely and finely punctate; mesoscutum rugoso-punctate; propodeum without median carina. Forewing 2x as long as broad; SMV nearly 3X MV; which is slightly longer than STV. Gaster as long as mesosoma; petiole shorter than propodeum.

Distribution : India (BR, KT).

Host : *Icerya aegyptiac* on rose plant, *Icerya* sp. on Casurina.

Genus 38. *Oxysychus* Delucchi

1956. *Oxysychus* Delucchi, *Z. Angew. Ent.* 39 : 240. Type species : *Dinarmus silvestrii* Masi, by original designation.

Diagnosis : Body mostly robust (Figs. 218, 220), sometimes moderately large upto 7mm. long; anterior margin of clypeus medially often deeply excised, bidentate; female antenna (Fig. 219) with 3 anelli and 5 funicular segments. Pronotum with abrupt margin; dorsal part of mesosoma with extensive pilosity; propodeum medially flat, without convex nucha, with or without median carina, but strongly reticulate between plical foveae. Gaster sessile; hind tibia with two spurs.

Distribution : India, Pakistan (from central and south Africa and southern Europe to China, Australia, New Guinea, America, Philippines).

Biology : Parasites of beetle larvae (Curculionidae and Buprestidae) burrowing in tough stems of some herbaceous plants and in twigs of some woody plants.

Key to the Indian species of *Oxysychus*

1. Gaster with hind margin of TI-T3 medially produced and distinctly notched in the middle (Fig. 226); antennae not much slender (Fig. 224); forewing with PMV 2x STV (Fig. 223); all femora testaceous *macregaster* Sureshan & Narendran

Gaster with hind margin of TI-T3 not produced or notched as above; antennae not much slender; PMV shorter, less than 2x STV; femora brown to blackish brown (prominent on hind femora) 2

2. Hind tibia with one spur; scutellum almost flat (Fig. 213); antennae with scape not reaching above level of vertex; propodeum (Fig. 216) with a weak median carina obliterated in the middle by an obscure cross ridge; forewing with STV slightly curved
 *sphenopterae* (Ferriere)
- Hind tibia with two distinct spurs; scutellum convex; scape reaching above level of vertex; propodeum without median carina and cross ridge; STV not curved 3
3. Gaster (Fig. 217) elongate and pointed at tip; distinctly narrower than mesosoma; scutellum highly convex, almost as long as broad; antenna (Fig. 219) with clava shorter than two preceding segments combined; STV shorter, only one third of MV. (Pl. II. fig. 22)
 *coimbatorensis* (Ferriere)
- Gaster oval (Fig. 220), not narrower than mesosoma; scutellum, less convex, shorter than broad; clava little longer than two preceding segments combined; STV longer, almost half of MV
 *nupserhae* (Dutt & Ferriere)

1. *Oxysychus coimbatorensis* (Ferriere)
 (Figs. 217-219, Pl. II. fig. 22)

1926. *Dinarmus sauteri* Masi, *Konowia* 5 : 360. F. Taiwan (MCSG).

1939. *Dinarmus coimbatorensis* Ferriere, *Bull. Ent. Res.* 33 : 164. M. F. India (Coimbatore) (BMNH) examined.

Diagnosis : Length 2.5-5mm. Head and mesosoma dark bluish green; gaster aeneous, shining green at base; body stout, covered with distinct white pubescence; antennae with Fl 2x as long as pedicel. Mesosoma convex; scutellum broadly rounded at tip; propodeum without median carina. Forewing with MV 3x STV; PMV almost 2x STV. Gaster elongate, longer than head plus mesosoma.

Distribution : India (KL, TN, DL, BR, AP).

Biology : Parasites of stem weevils (Curculionidae) attacking cotton, Amaranthus etc

2. *Oxysychus nupserhae* (Dutt & Ferriere)
 (Figs. 220-222)

1961. *Neocatolaccus nupserhae* Dutt & Ferriere, *J. Agric. Sci.* 31 : 139. M. F. India (Bharatpur) (ZSI).

Diagnosis : Length 3-6mm. Head and mesosoma dark blue, almost black; gaster aeneous with coppery shine; head with frons swollen, cheeks large, POL greater than OOL; antennae with third anellus little longer than others; clava little longer than two preceding segments combined. Mesosoma rugulose punctate; propodeum with lateral folds less prominent, median carina absent. Forewing with MV almost half of SMV; STV half of MV. Gaster oval, longer than head plus mesosoma combined, not narrower than mesosoma.

Distribution : India (KL DL, WB).

Biology : Parasite of the Cerambycid beetle *Nupserha bicolor* girdling the stem of jute.

3. *Oxysychus sphenopterae* (Ferriere)
(Figs. 213-216)

1931. *Neocatolaccus sphenopterae* Ferriere, *Bull. Ent. Res.* **22** : 130. M, F. Sudan (BMNH) examined.

Diagnosis : Length 3.3mm. Head and mesosoma dark blue, almost black, gaster aeneous with little greenish reflection on T1; head punctate, lower face swollen; antennae with flagellum thick, clava little shorter than two preceding segments combined. Mesosoma punctate; scutellum almost flat; propodeum with an obscure median ridge and a weak median carina indicated anteriorly. Forewing with MV half of SMV; STV half of MV. Gaster oval, pointed, longer than mesosoma.

Distribution : India (PB).

Biology : Parasites of the larvae of Buprestid beetle *Sphenoptera gossypii*.

4. *Oxysychus macregaster* Sureshan & Narendran
(Figs .223-227)

2002. *Oxysychus macregaster* Sureshan & Narendran *J. Bombay Nat. Hist. Soc.* **99** (1) : 75. M. F, India (KL) (ZSIC).

Diagnosis : Length 2.9-4mm. Head and mesosoma bluish black; gaster aeneous with bluish reflection on T1; head moderately reticulate; POL 1.5.x OOL; antennae with pedicel length 2x width; clava as long as two preceding segments combined. Mesosoma raised reticulate; pronotum finely margined; propodeum sometimes with a weak median carina. Forewing with basal vein setate. Gaster elongate, acuminate, longer than head plus mesosoma combined.

Distribution : India (KL).

Host : Not known.

Genus 39. *Pachycrepoideus* Ashmead

1904. *Pachycrepoideus* Ashmead, *Mem. Carnegie. Mus.* **1** (4) : 329. Type species : *Pachycrepoideus dubius* Ashmead, by monotypy.

1915. *Toxeumopsis* Girault, *Mem. Qd. Mus.* **4** : 196. Type species : *Toxeumopsis nigra* Girault, by original designation.

1954. *Anisopteromalia* Boucek, *Acta Ent. Mus. Natl. Pragae* **29** : 57. Type species : *Anisopteromalia crassinervis* Boucek, by original designation.

Diagnosis : Antennae (Fig. 16) with 3 anelli and 5 funicular segments, inserted at level with ventral edge of eyes. Pronotum (Figs. 14, 17) dorsally rounded; mesopleuron entirely reticulate. Forewing with MV distinctly longer than STV, about equally widened throughout. Gaster petiolate, petiole if exposed reticulate and bordered on either side by flange formed by extension of first gastral sternite; T1 and T2 approximately equal in length together covering most of gaster.

Distribution : Cosmopolitan.

Biology : Parasites of small Diptera of families Drosophilidae, Tephritidae, Muscidae etc.

1. *Pachycrepoideus vindemmiae* (Rondani)
(Fig.17)

1875. *Encyrtus (Pteromalus) vindemmiae* Rondani, *Boll. Comizio Agrar. Parmen* 8 : 148. F, Italy (lectotype, Florence Mus.).

Diagnosis : Length 1.9-2.3mm. Body black with greenish or bronze green, scape testaceous, legs except coxae testaceous; head and mesosoma with very short and quite appressed thin and sparse pubescence; scape slender, reaches the anterior border of median ocellus; pedicel 2x as long as wide; third anellus as long as first and second combined; Fl longer than wide. Notauli very weak, anteriorly distinct; propodeum with a weak median carina and plicae. Forewing with very short pubescence, basally bare. Gastral petiole as long as wide, finely reticulate; T1 with posterior margin produced.

Distribution : India (PB, KT, MR, TN).

Biology : Widely distributed as parasite in puparia of various small Diptera, recorded hosts are *Musca domestica*, *Orseola oryzae*, Tachinid pupa.

2. *Pachycrepoideus veerannai* Narendran & Anil.
(Figs.14-16)

1992a. *Pachycrepoideus veerannai* Narendran & Anil, *Bioved* 3 (1) : 1-3. F. India (Bangalore) (ZSIC).

Diagnosis : Length 2.01mm. Black; head little wider than mesosoma, closely reticulate punctate; clypeal margin arcuate; antenna filiform, inserted at level of lower margin of eye; scape ends about one ocellar diameter before median ocellus; pedicel twice as long as wide. Mesosoma arched, closely reticulate punctate; propodeum with an obsolete, weak median carina and plicae, median carina anteriorly angularly raised. Gaster slightly longer than mesosoma; petiole nearly as long as wide.

Distribution : India (KT).

Host : Pupal parasite of the uzi fly *Exorista sorbillans* Weid. on *Bombyx mori* (Narendran et al. 1992a).

Genus 40. *Pachyneuron* Walker

1833. *Pachyneuron* Walker, *Ent. Mag.* 1 : 371 : Type species : *Pachyneuron formosum* Walker by monotypy.
1913. *Serimus* Brethes, *Ann. Mus. Nat. Hist. Buenos Aires*, 24 : 90. Type species : *Serimus argentinus* Brethes, by monotypy.
1955. *Atrichoptilus* Delucchi, *Z. angew. Ent.* 38 : 141: Type species : *Pachyneuron aeneum* Masi, by original designation.

Diagnosis : Antennae (Figs. 21-24) inserted at lower ocular line with 2 or rarely with 3 anelli; flagellum hardly clavate; clypeus produced, anterior margin more or less truncate or even shallowly emarginate; gena with a shallow depression at mouth corner, behind the depression the edge ends more or less sharply. Pronotum dorsally with a narrow smooth strip behind the collar carina or edge; propodeum narrowing into a short nucha, without median carina; forewing with MV mostly distinctly expanding distally (Figs. 18, 19, 26), wedge like. Gaster dorsally flat, mostly collapsing, more or less petiolate, petiole sometimes transverse and short.

Distribution : Cosmopolitan.

Biology : Mostly associated with coccids, aphids and their predators rarely in eggs of forest Lepidoptera.

Key to the Indian species of *Pachyneuron*

- 1 Antennae with 3 anelli and 5 funicular segments (Fig. 25); forewing with, MV thick, about 2.7x as long as its maximum width (Fig. 26); anterior margin of clypeus strongly produced and rounded at middle (Fig. 27) *aphidis* (Bouche)
- Antennae with 2 anelli and 6 funicular segments; forewing with MV less thick, more than 4x as long as its maximum width (if thicker, then without apical fringe and PMV only slightly longer than STV); medially produced portion of clypeus having its anterior margin emarginate or truncate 2
2. Forewing with speculum closed below (Fig. 34); propodeum narrowed posteriorly and remarkably produced beyond bases of hind coxae (Fig. 32), median area of it longitudinally and broadly elevated and plicae indicated by an elevation between basal fovea and spiracular sulcus so that a 'V' shaped depression is formed between the median and lateral elevations; petiole slender *solitarium* (Hartig)
- Forewing without speculum, if speculum closed, then MV little longer than STV and petiole not slender); propodeum not much produced beyond bases of hind coxae, median area without any depression as above 3
3. Forewing with apical fringe 4

- Forewing without apical fringe 6
- 4. Forewing with MV shorter than STV (Fig. 18)..... *leucopiscida* Mani
- Forewing with MV longer than STV 5
- 5. Scutellum with faint frenum (Fig. 30) forewing with discal ciliation less dense than in alternate (Fig. 31), basal part bare, marginal and cubital folds and speculum absent; MV 4.3x as long as wide (Pl. III. fig. 30)..... *groenlandicum* (Holmgren)
- Scutellum without frenum; forewing with dense discal ciliation (Fig. 19) with hairy basal and cubital folds and closed speculum; MV 4x as wide as long *chambaense* Mani & Saraswat
- 6. Antenna (Fig. 22) with all funicular segments thicker than long; forewing with MV about 2x as long as wide; PMV only little longer than STV (Fig. 28)..... *aeneum* Masi
- Antenna (Fig. 21) with funicular segments longer than thick, except last two little wider than long; forewing (Fig.29)with MV about 3.5x as long as wide; PMV much longer than STV *ahlaense* Mani & Saraswat

1. *Pachyneuron aeneum* Masi
(Figs. 22, 28)

- 1929. *Pachyneuron aeneum* Masi. *Ann. Mus. Civ. Stor. Nat. Giacomo Doria* **53** : 229. F, Libya (MCSG).
- 1974. *Pachyneuron kamathi* Mani & Saraswat, *Mem. School. Ent. Agra No. 3* : 95. F. India (Dalhousie) (USNM) examined.
- 1974. *Pachyneuron deccanensis* Mani & Saraswat, *Mem. School. Ent. Agra No. 3* : 95. India (Poona) (USNM).

Diagnosis : Body dark brown to black; antenna dark ferruginous brown. Head finely reticulate; anterior margin of clypeus weakly emarginate; antenna with 2 anelli; scape not reaching median ocellus. Mesosoma finely reticulate, reticulation finer on hind part of scutellum. Forewing without marginal fringe; discal ciliation very sparse; indistinct; PMV only slightly longer than STV; MV strongly thickened. Gastral petiole slightly transverse, shiny, with obscure reticulate microsculpture.

Distribution : India (MR, UP, HP).

Host : ex. syrphid puparia.

2. *Pachyneuron ahlaense* Mani & Saraswat
(Figs. 21, 29)

- 1974. *Pachyneuron ahlaensis* Mani & Saraswat, *Mem. School. Ent. Agra No. 3* : 90. F. India (Dalhousie) (USNM) examined.

Diagnosis : Body black with metallic bluish green reflections; gaster brownish black; antenna ferruginous brown; head with prominent microsculpture; clypeus emarginate anteriorly; funicular segments of antenna longer than wide except last two little wider than long; forewing without marginal fringe; almost bare basally; gaster with petiole wider at base, about 0.1x of gaster; gaster including petiole little more than 0.5x rest of the body.

Distribution : India (DL, HP, KT).

Host : ex syrphid puparia.

3. *Pachyneuron aphidis* Bouche (Figs. 25-27)

Diplolepis aphidis Bouche, *Natur. Ins. Berlin*, 5 : 170. M, F.

1939. *Pachyneuron lali* Mani, *Ind. J. Ent.* 1 : 81. M, India (Karnal) IARI.

1939. *Pachyneuron ferrieri* Mani, *Ind. J. Ent.* 1 : 83. India : Chaubattia (IARI).

1974. *Pachyneuron triarticulata* Mani & Saraswat, *Mem. School. Ent. Agra No. 3* : 98. F. India (Dalhousie) (USNM). Examined.

Diagnosis : Body brownish black; gaster with a greenish or bluish tinge, shiny; antennal scape brownish black, pedicel and flagellum dark brown; anterior margin of clypeus strongly produced and rounded at middle; antennae with 3 anelli and 5 funicular segments; third anellus nearly as long as the first and second combined. Mesosoma strongly arched dorsally; propodeum finely reticulate, its surface flat, without elevations or carinae. Forewing with MV thick, about 2.7x as long as its maximum width. Gaster round, with petiole not longer than wide.

Distribution : India (DL, HR, J & K) Pakistan, Europe, America, Japan.

Host : ex. *Myzus* sp. on *Prunus domestica*, ex. *Aphidius* sp on *Macrosiphum*, *Aphis rumicis*, *Brachycaudus helichrysi* and indet aphids, aphids on *Prunus persica*..

4. *Pachyneuron groenlandicum* (Holmgren) (Figs. 23, 30-31, Pl. III. fig. 30)

1872. *Pteromalus groenlandicus* Holmgren, *Ofvers. Kungl. Vet. Akad. Forh.* 29 : 100. M, F.

1939. *Pachyneuron karnalensis* Mani, *Ind. J. Ent.* 1 : 85 F, India (Karnal) IARI.

1955. *Pachyneuron umbratum* Delucchi, *Z. Angew. Ent.* 38 : 132-133.

1974. *Pachyneuron bakrotus* Mani & Saraswat, *Mem. School. Ent. Agra No. 3* : 102. F. India (Dalhousie) (USNM). examined.

Diagnosis : Body bluish black with metallic reflection; antennae dark brown; scape paler, coxae concolrous with mesosoma, remainder of legs brown; clypeus slightly emarginate or truncate anteriorly; antennae with scape reaching front ocellus. Mesosoma moderately reticulate, scutellum with a faint frenum; propodeum with nuchal area polished, median carina absent. Forewing without speculum, few hairs on the basal hairline. Gastral petiole widened towards the end, longer than thick; gaster fusiform, short.

Distribution : India (DL, HP, KL, HR, J&K, OR, TN, KT), Europe.

Host : ex. *Ishiodon* sp. on *Cassia* sp. syrphid with *Brachycaudus* sp.

5. *Pachyneuron solitarium* (Hartig) (Figs. 32-34)

1758. *Pachyneuron coccorum* auctt, ex parte (nec. *Ichneumon coccorum*) Linne. *Syst. Nat. 10th Ed.*

1838. *Chrysolampus solitarius* Hartig, *Jahr. Forst. forst. Naturk. 1* : 250.

Diagnosis : Head and mesosoma bluish black; gaster dark bluish green; scape yellowish brown; pedicel and flagellum dark brown; coxae concolrous with mesosoma; femora dark brown, remainder of legs yellowish brown; median produced portion of clypeus narrow with anterior margin slightly emarginate or truncate; scape reaching upper edge of front ocellus. Propodeum sloping at less steep angle relative to the tangential plane of mesoscutum and scutellum, narrowed posteriorly and remarkably produced beyond base of hind coxae. Propodeum densely reticulate; nucha finely reticulate with front edge not distinctly defined. Forewing with MV as long as STV. Gastral petiole slender, shiny; gaster fusiform.

Distribution : India (KL), (Japan, Europe).

Host : No host data is available from India. The species has a wide range of hosts, hyperparasitising aphids, coccids etc.

6. *Pachyneuron chambaense* Mani & Saraswat (Figs. 19-20)

1974. *Pachyneuron chambaensis* Mani & Saraswat, *Mem. School. Ent. Agra No. 3* : 100. F. India : Dalhousie (USNM) examined.

1974. *Pachyneuron jandrihatensis* Mani & Saraswat, *Mem. School. Ent. Agra No. 3* : 104. F. India : Dalhousie, Jandrihat (USNM).

Diagnosis : Body dark brown to black with metallic blue green reflection; antennae dark brown. Head finely reticulate; clypeus anteriorly truncate; antenna with scape long, slightly more than 5x as long as wide. Mesosoma finely reticulate; propodeum without carina. Forewing with relatively dense pubescence, with hairy basal and cubital folds and closed speculum. Gaster with petiole shiny, including petiole about 0.5x rest of the body.

Distribution : India (HP).

Host : Not known.

7. *Pachyneuron leucopiscida* Mani (Fig. 18)

1939. *Pachyneuron leucopiscida* Mani, *Ind. J. Ent.* **1** : 86. M, F = M. India : Coimbatore (IARI).

1953. *Pachyneuron cremifaniae* Delucchi, *Bull. Inst. R. Sci Nat. Belge* **29** : 8-12.

Diagnosis : Body dark metallic blue; gaster brownish black; scape pale brown, remainder of antenna dark brown; head finely reticulate, anterior margin of clypeus weakly emarginate; antennal scape just reaching front ocellus, POL 2x OOL. Pronotal collar finely carinate; mesoscutum with notauli deep and incomplete; propodeum with nucha almost smooth and marked off by a distinct constriction. Gaster fusiform; T1 occupying nearly half length of gaster; petiole longer than hind coxa, reticulate

Distribution : India (KL, BR, TN, DL), Europe.

Host : ex. *Leucopis nigricornis* on *Zea mays* and *Dactylopius* sp. on cotton

Genus 41. *Paracarotomus* Ashmead

1894. *Paracarotomus* Ashmead, *Trans. Amer. Ent. Soc.* **21** : 335. Type species : *Paracarotomus cephalotes* Ashmead, by monotypy.

Diagnosis : Head very large, gena high and compact (Fig. 53). Antenna with 2 anelli and 6 funicular segments. Mesosoma very high and compact, in front of mid coxae (ventrally) with a horizontal shelf which is anteriorly delimited by a cross carina; pronotum as broad as mesoscutum, anteriorly with carinate edge; scutellum with frenal groove. Gaster more or less laterally compressed; hypopygium reaching apex; petiole at least as long as steep propodeum.

Distribution : Probably cosmopolitan.

Biology : Parasitic in puparia of aphidophagous Syrphidae.

1. *Paracarotomus cephalotes* Ashmead (Fig. 53)

1894. *Paracarotomus cephalotes* Ashmead, *Trans. Amer. Ent. Soc.* **21** : 336. M, USA : (Virginia) (USNM).

Diagnosis : Length 4mm. Body black; gaster brownish black; coxae concolorous with mesosoma, rest of legs testaceous; antennae brownish black; head reticulate punctate; POL as long as OOL; antennae inserted above lower margin of eyes; scape hardly reaching median ocellus; anterior margin of clypeus produced, shallowly emarginate. Pronotal collar carinate; mesoscutal scapula with shallow sculpture; notauli broadly groove like, complete. Forewing with costal cell completely hairy; gastral petiole closely reticulate; gaster with very long hypopygium.

Distribution : India (KT, KL), cosmopolitan, but uncommon.

Host : Parasite of syrphid puparia especially of *Paragus* sp.

Genus 42. *Paraiemea* Sureshan & Narendran

1998. *Paraiemea* Sureshan & Narendran, *Oriental Ins.* 32 : 185 : Type species : *Paraiemea vishnuae* Sureshan & Narendran by original designation.

Diagnosis : Head in dorsal view strongly transverse; occiput without carina, lower face convex; anterior margin of clypeus (Fig. 117) with two moderate teeth; antenna (Fig. 114) in female with formula 11353 and in male 11263 Pronotal collar weakly carinate in the middle; notauli groove like, incomplete; axillae wide apart, in outer corner with a deep small pit; propodeum (Fig. 119) with a pair of shallow submedian longitudinal grooves, posteriorly which converge to merge with the saddle like constriction before nucha. Forewing with MV longer than PMV and STV; stigma moderately capitate. Gaster petiolate, petiole smooth, as long as broad in female and longer than broad in male.

Distribution : India.

Biology : Not known.

Key to the species of *Paraiemea*

1. Gaster short (Fig. 116) almost as long as head and mesosoma combined and 2.5x as long as hind femur, less collapsing; propodeum (Fig. 119) 2.5x as long as hind femur, less collapsing, with median carina indicated; forewing with stigma less capitate, PMV shorter, only 0.6x MV; scrobe moderately deep; head and mesosoma moderately reticulate; antennae uniformly testaceous ;hind coxae bluish black except on tip.....
..... *convexa* Sureshan & Narendran
- Gaster long, (Fig. 114) 1.2x as long as head and mesosoma combined and 3x as long as hind femur; more collapsing; propodeum with median carina hardly indicated; forewing with stigma moderately capitate, PMV longer, 0.8x MV; scrobe shallow, head and mesosoma finely reticulate; antennae brown except scape and pedicel testaceous; hind coxae brown except on tip. (Pl. III. fig. 31)
..... *vishnuae* Sureshan & Narendran

1. *Paraiemea vishnuae* Sureshan & Narendran
(Figs. 114-115, Pl. III. fig. 31)

1998. *Paraiemea vishnuae* Sureshan & Narendran, *Oriental Ins.* **32** : 187. F, M., India (KL) (ZSIC).

Diagnosis : Length 2.6-3.2mm. Head and mesosoma dark bluish to almost black; gaster dorsally blue; antennae brown except scape and pedicel testaceous; head engraved reticulate; POL little shorer than OOL; antennae with pedicel as long as F3. Pronotum engraved reticulate; mesoscutum moderately reticulate. Forewing basally bare; PMV 0.8x MV. Gaster lanceolate, collapsing, hind margin of T1 and T2 slightly concave; gaster 1.2x as long as head plus mesosoma.

Distribution : India (KL).

Host : Not known.

2. *Paraiemea convexa* Sureshan & Narendran
(Figs. 116-119)

1998. *Paraiemea convexa* Sureshan & Narendran, *Oriental Ins.* **32** : 188. F, India (KL) (ZSIC).

Diagnosis : Length : 3.5mm. Head and mesosoma bluish black; gaster brown with bluish green reflection; antennae uniformly testaceous; head moderately reticulate; POL slightly shorter than OOL. Pronotal collar anteriorly raised ; mesoscutum and scutellum coarsely reticulate. Forewing with PMV 0.6x MV. Gaster almost as long as head plus mesosoma, less collapsing; hind margin of T1 and T2 slightly rounded.

Distribution : India (KL).

Host : Not known.

Genus 43. *Platecrizotes* Ferriere

1934. *Platecrizotes* Ferriere, *Mitt. Schweiz. Ent. Ges.* **16** : 90. Type species : *Platycrezotes sudanensis* Ferriere, by monotypy.

Diagnosis : Body dorsally depressed; head subprognathous; antennae short, inserted evidently below ocular line with 3 anelli and 5 funicular segments; funicular segments transverse. Forewing (Fig. 43) with MV strongly widened at proximal end, its lower edge sinuate. Gaster (Fig. 42) petiolate, petiole sharp, angulate, punctate; gaster ovate, flat, T1 occupying about one third of it.

Distribution : India. (Africa, Europe).

Biology : Parasites of Dipterous puparia (Drosophilidae, Cecidomyidae).

One indetermined species of *Platecrizotes* is reported from India (TN) (Boucek et.al. 1979).

Genus 44. *Propicroscytus* Szelenyi

1941. *Propicroscytus* Szelenyi, *Annl. Hist. Natn. Mus. Hung.* 34 : 123. Type species : *Arthrolysis trilongifasciatus* Girault by original designation Examined.

1973. *Obtusiclava* Subba Rao, *Bull. Ent. Res.* 62 : 627. Type species : *Obtusiclava oryzae* Subba Rao by monotypy and original designation.

Diagnosis : Head (Fig. 204) wider than mesosoma; occiput not margined; lower margin of clypeus emarginate; scrobes virtually absent; represented only by a shallow depression just above insertion of antennae; antennae inserted distinctly above lower margin of eyes, filiform with 2 anelli and 6 funicular segments; in male funicular segments long and with long whorls of erect hairs. Pronotum short, collar somewhat carinate; notauli incomplete, indicated only anteriorly; propodeum with short nucha and without carinae; plicae indicated only anteriorly by small depressions. Forewing with MV and PMV very long; hind tibia with one spur. Gaster longer than combined length of head and mesosoma, mostly yellow with dark markings.

Distribution : Southeast Asia to Australia, Africa, Zimbabwe.

Biology : Primary or secondary parasites of certain larger cecidomyiidae in grass stems, including the rice pest *Orseolia oryzae*. Also attacks hosts in grasses other than rice.

1. *Propicroscytus mirificus* (Girault)

(Fig. 204)

1915. *Arthrolysis mirificus* Girault, *Mem. Qd. Mus.* 4 : 191. Australia : Queensland (QM), Examined.

1915. *Arthrolysis flaviventris* Girault & Dodd in Girault, *Mem. Qd. Mus.* 4 : 190, 191. Australia, Queensland.

1915. *Arthrolysis trilongifasciatus* Girault, *Mem. Qd. Mus.* 4 : 191. Australia : Queensland.

1981. *Propicroscytus indicus* Subba Rao, *Proc. Ind. Acad. Sci. (B)* 90 : 474-475. F. India : Punjab (BMNH) examined.

Diagnosis : Length 2.5-4mm. Head and mesosoma black or bluish black, or dark metallic green; gaster pale to dark yellow with sides and middle with brown streaks longitudinally; antennal scape, pedicel and anelli testaceous, remainder dark brown; scape almost as long as eye; pedicel plus flagellum 1.4x head width; clava 1.6x as long as preceding segment; clypeus slightly emarginate anteriorly; POL almost equal to OOL. Pronotum distinctly at a lower level; notauli indicated only anteriorly; propodeum medially 0.63x as long as scutellum. Gaster lanceolate, 1.2x as long as head plus mesosoma.

Distribution : Indo-Australian regions. South China, East Malaysia.

Host : Parasitic, sometimes secondary of gall midges in rice and stems of some other grasses, as *Paspalidium* and *Imperata cylindrica*.

2. *Propicroscytus oryzae* (Subba Rao)

(Fig. 205, Pl. II. fig. 23)

1973. *Obtusiclava oryzae* Subba Rao, *Bull. Ent. Res.* **62** : 627 : M, F. Sri Lanka : Peradeniya (BMNH) examined.

Diagnosis : Closely resembles *P. mirificus* (Girault) and mainly segregated by the body colour; Head and mesosoma usually metallic green, dorsum usually with distinct green iridescence in certain lights.

Distribution : India (KL, OR, MR, AP), Sri Lanka.

Host : Parasite of *Orseolia oryzae* (Wood-Mason), ex, paddy gall fly

Genus 45. *Psilocera* Walker

1833. *Psilocera* Walker, *Ent. Mag.* **1** : 373. Type species : *Psilocera obscura* Walker by monotypy.

1834. *Metopon* Walker, *Ent. Mag.* **2** : 302. Type species : *Metopon atrum* Walker by monotypy.

1839. *Eupsilocera* Westwood, *Appendix : Introd. Modern class. Ins.*, **2** : 69 (Unnecessary replacement name for *Psilocera* Walker, supposedly preoccupied).

1856. *Dichalysis* Forster, *Hym. Stud.* **2** : 52, 56, Unnecessary replacement name for *Psilocera* Walker, supposedly preoccupied.

1904. *Acanthometopon* Ashmead, *Mem. Carnegie. Mus.* **1** (4) : 314, 315, 498. Type species : *Acanthometopon clavicorne* Ashmead by monotypy and original designation. Syn. by Sureshan, 2001 : 83-90.

1913. *Polycystoides* Girault, *Ent. News.* **24** : 459. Type species : *Polycystoides kennysoni* Girault by original designation.

1915. *Parapolycystus* Girault & Dodd in Girault, *Mem. Qd. Mus.* **3** : 339. Type species : *Parapolycystus pulchricornis* Girault by original designation.

Diagnosis : Head (Fig. 324) distinctly wider than mesosoma; vertex narrow; occiput abruptly sloping, immargined; lower margin of clypeus with two triangular teeth; antennae strongly clavate, with 2 or three anelli; male flagellum filiform (Figs. 337, 338) with 6-8 peduncles between segments bearing whorls of setae. Mesosoma strongly arched in profile. Pronotal collar carinate; scutellum highly convex, sometimes with a conical hump bearing a finger nail like tip (Figs. 331-333); propodeum constricted into nucha with median carina and costula. Gaster short, petiole smooth, hind margins of basal tergites incised in the middle.

Distribution : Asia, Australia, New Guinea, Europe, Africa, America.

Biology : Host not known, assumed as parasites of beetles dwelling in soil or having the pupal stage there (Boucek, 1988).

Key to the species of *Psilocera* from India and adjacent countries

1. Scutellum with a conical hump bearing a fingernail-like tip (Figs. 331-333) 2
 - Scutellum normal, without conical hump (Figs. 324, 325, 327) 3
2. Hump of scutellum very long with finger nail sharp and highly projecting; median length of scutellum upto tip of hump 0.93x that of median length of mesoscutum (Figs. 329, 331); forewing with basal cell hairy and closed below (Fig. 339); larger species, length 4mm *clavicornis* (Ashmead)
 - Hump of scutellum not very long as above, not highly projecting, median length of scutellum up to tip of hump 0.72-0.82x as that of median length of mesoscutum; (Figs. 328, 330); forewing with basal cell not closed below; smaller species, length 2.5-3.6mm 3
3. Hump of scutellum short (Figs. 330, 333) median length of scutellum up to tip of hump 0.73x median length of mesoscutum; hind tibial spur long, almost half as long as basitarsus; forewing with PMV 0.72x as long as MV; eyes shorter, height 1.6x width; gaster dorsally with metallic blue reflection; antenna with scape, pedicel and anelli brown; legs with femora brown. *heydoni* Sureshan
 - Hump of scutellum long (Figs. 328, 332), median length of scutellum up to tip of hump 0.82x median length of mesoscutum; hind tibial spur short, 0.3x as long as basitarsus; PMV 0.9x as long as MV; eyes longer, height 1.9x width; gaster without metallic blue reflection; scape pedicel and anelli testaceous; femora testaceous (Pl. III. fig. 27) *scutellata* Sureshan
4. Antennal flagellum strongly clavate (Fig. 324); Fl short, anelliform, scape reaching far below median ocellus; antennae except clava testaceous *clavata* Sureshan & Narendran
 - Antennal flagellum less clavate (Figs. 325, 327); Fl not anelliform, scape either touching or just short of reaching median ocellus; antennae except scape, pedicel, anelli and Fl blackish brown 5
5. Scape just short of reaching median ocellus; clava shorter than three preceding segments combined; mesosoma shorter than gaster (0.8x); gaster 0.93x as long as head plus mesosoma combined (Fig. 327); malar grooves indistinct; scutellum without long white haris *ghanii* Subba Rao

Scape just reaching median ocellus; clava as long as three preceding segments combined; mesosoma as long as gaster; gaster short, 0.8x as long as head plus mesosoma combined (Fig. 325); malar grooves distinct; scutellum with long white hairs
 *vinayaki* Sureshan & Narendran.

1. *Psilocera scutellata* Sureshan
 (Figs. 328, 332, 335, 337, 340, Pl. III. fig. 27)

2001a. *Psilocera scutellata* Sureshan, *Oriental Ins* : 35 : 86, F. M, India (KL) (ZSIC).

Diagnosis : Length 2.5-3.6mm. Head and mesosoma black, gaster dark brown. Antennae with scape pedicel and anelli testaceous, remainder black; POL 1.3x OOL; antennae with pedicel plus flagellum length 0.9x head width. Scutellum with a conical hump bearing a fingernail-like tip. Fore wing with PMV 0.9x as long as MV. Gaster without metallic reflection.

Distribution : India (KL).

Host : Not known.

2. *Psilocera heydoni* Sureshan
 (Figs. 330, 333, 336, 338, 341)

2001a. *Psilocera heydoni* Sureshan, *Oriental Ins* : 35 : 87, F. M, India (KT, Coorg) (ZSIC).

Diagnosis : Length 2.7-2.9mm. Head and mesosoma black; gaster blackish brown dorsally with metallic blue reflection; POL 1.4x OOL; antennal scape just reaching median ocellus. Median length of scutellum up to tip of hump 0.73x median length of mesoscutum; hind tibial spur long, almost half as long as basitarsus. Forewing with PMV 0.72x MV. Gaster length 1.7x hind tibia.

Distribution : India (KT).

Host : Not known.

3. *Psilocera vinayaki* Sureshan & Narendran
 (Figs. 325-326)

1995. *Psilocera vinayaki* Sureshan & Narendran, *J. Ecobiol.* 7 (3) : 209, F. M, India (KL) (ZSIC).

Diagnosis : Length 1.6-2.4mm. Head and mesosoma black; gaster metallic green with brownish reflection ventrally; POL : OOL = 14 : 13; antennal scape hardly reaching lower margin of median ocellus, flagellum less clavate. Mesoscutum slightly shorter than scutellum medially. Gaster length 3x that of scutellum.

Distribution : India (KL).

Host : Not known.

4. *Psilocera clavata* Sureshan & Narendran
(Figs. 324)

1995. *Psilocera clavata* Sureshan & Narendran, *J. Ecobiol.* 7 (3) : 211. F, M, India (KL) (ZSIC).

Diagnosis : Length 2.1mm. Head and mesosoma black; gaster blackish brown; antenna testaceous except clava black; head moderately reticulate; POL : OOL = 6.5 : 5.5; antennal scape never reaching median ocellus; flagellum strongly clavate; Fl short, anelliform. Mesosoma reticulate punctate on mesoscutum and scutellum; propodeum with median carina and costula weakly indicated. Gaster as long as mesosoma.

Distribution : India (KL).

Host : Not known.

5. *Psilocera clavicornis* (Ashmead)
(Figs. 329, 331, 334, 339)

1904. *Acanthometopon clavicorne* Ashmead, *Mem. Carnegie. Mus.* 1 (4) : 498. Brazil : Corumba. Syn. by Sureshan, 2001 : 85.

Diagnosis : Length 4mm. Head and mesosoma black; gaster brownish black with metallic blue reflection dorsally and brown ventrally; antennae with scape pedicel, anelli, Fl and F2 testaceous, remainder brown with clava darker; head reticulate punctate; POL 1.4x OOL; antennal scape just reaching median ocellus; clava as long as 4.5 preceding segments combined. Scutellum with long hump, highly projecting; propodeum with median carina and costula sharp. Forewing with basal cell closed below. Gaster collapsing, 0.8x as long as rest of the body.

Distribution : Sri Lanka (Brazil, Laos and China).

Host : Not known.

6. *Psilocera ghanii* Subba Rao
(Fig. 327)

1981. *Psilocera ghanii* Subba Rao, *Proc. Indian Acad. Sci. (B)* : 90 : 481. F. Pakistan : Babakewal (BMNH) examined.

Diagnosis : Length 2.1mm. Head and mesosoma black; gaster metallic bluish green; brown ventrally; antennae with scape, pedicel, anelli and Fl testaceous, otherwise blackish brown; head finely reticulate, width 2.6x length in dorsal view; POL : OOL = 7 : 6; malar grooves indistinct; antennal toruli below middle of face; scape just short of reaching median ocellus. Mesosoma shorter than gaster; scutellum as long as mesoscutum. Gaster elongate, acuminate, 0.93x as long as head plus mesosoma combined.

Distribution : Pakistan.

Biology : Parasitic on *Cryptocephalus faustulus* Suff. (Coleoptera) on *Tamarix dioica*.

Genus 46. *Pteromalus* Swederus

1795. *Pteromalus* Swederus, *Kung. Svenska Vetensk. Akad. Handl.* 16 : 201. Type species : *Ichneumon puparum* Linnaeus designated by Westwood, 1840.
1878. *Habroclytus* Thomson, *Hym. Scand.* 5 : 88, 109. (as subgenus of *Etraxys* Forster) Type species : *Pteromalus albipennis* Walker designated by Ashmead 1904.
1937. *Heterolaccus* Masi, *Geburstage E. Strand.* 3 : 371. Type species : *Heterolaccus mauritanicus* Masi, by original designation.

Diagnosis : Moderate. Head and mesosoma reticulate punctate; occipital foramen not margined; prepectus small, usually shorter than tegula, its surface smooth or hardly sculptured; anterior margin of clypeus mostly shallowly emarginate, rarely deeply emarginate or truncate to slightly produced. Pronotal neck hardly visible; notaular grooves incomplete; propodeum (Figs. 373, 377) often much shorter than half of scutellum, produced into a short subglobose nucha. Forewing (Figs. 360, 364) with PMV always longer than STV. Gaster (Figs. 371, 372) sessile.

Distribution : Cosmopolitan.

Biology : Mainly parasites of pupae of Lepidoptera, Coleoptera, Hymenoptera, gall making Tephritidae (Diptera) etc.

Key to the *Pteromalus* species of Indian subcontinent

1. Clypeus with anterior margin deeply incised medially, hence appearing almost bidentate (Fig. 354); propodeum with median area almost shiny with complete median carina (Fig. 370) *sequester* Walker
 Clypeus with anterior margin not as above; shallowly to moderately emarginate; propodeum with median area finely or moderately reticulate; median carina not complete, if complete, only vaguely indicated 2
2. Propodeum (Figs. 357, 373) with costula indicated, plicae not complete, not reaching hind margin of nucha 3
 Propodeum with costula not indicated, plicae complete, reaching hind margin of nucha 4
3. Gaster (Fig. 372) elongate, 1.2x as long as head plus mesosoma combined, length 2.6x width in dorsal view; antennal scape reaching to upper margin of median ocellus; Fl longer than pedicel (6 : 5); clava as long as two preceding segments combined; body dark metallic blue *metallicus* Sureshan

- Gaster (Fig. 355, 358) a little shorter than head plus mesosoma combined, length 1.6x width in dorsal view; scape hardly reaching median ocellus; Fl a little shorter than pedicel (0.8-0.9x); clava a little shorter than two preceding segments combined; body black. (Pl. II. fig. 24) *keralensis* Sureshan
- 4. Propodeum (Fig. 377) with nucha long, medially propodeum 0.7x as long as scutellum; POL as long as OOL; gaster (Fig. 376) shorter than head plus mesosoma combined; temple (Fig. 363) wide, length 0.6x eye length *puparum* (Linnaeus)
 Propodeum with nucha short, medially propodeum 0.4-0.5x as long as scutellum; POL 1.8x to 2x OOL; gaster longer than head plus mesosoma combined; temple narrow, length 0.3-0.4x eye length 5
- 5. Antennae (Fig. 361) with Fl longer than pedicel; propodeum (Fig. 375) medially 0.4x as long as scutellum; gaster (Fig. 374) 1.3x as long as head plus mesosoma combined and 2.5x as long as wide in dorsal view; MV (Fig. 360) 2x as long as STV; POL 2x OOL *nigrus* Sureshan
- Fl little shorter than pedicel; propodeum (Fig. 369) medially 0.5x as long as scutellum; gaster (Fig. 368) 1.1x as long as head plus mesosoma combined and 2.1x as long as wide; MV short, 1.1-1.6x as long as STV; POL 1.8x OOL *semotus* (Walker)

1. *Pteromalus sequester* Walker
(Figs. 354, 366, 370, 371)

1835. *Pteromalus sequester* Walker, *Ent. Mag.* 2 : 495. M, F. England (Lectotype) examined.

Diagnosis : Length 3mm. Head and mesosoma metallic bluish green; gaster mostly brown with some metallic blue reflection; antennae with scape testaceous, remainder dark brown; anterior margin of clypeus deeply incised medially; POL 1.4x OOL; temple round, length 0.6x eye length; antennae with pedicel as long as Fl. Propodeum shiny, median carina complete, nucha represented only by a narrow transverse strip. Gaster elongate; 1.3x as long as head plus mesosoma.

Distribution : India (DL, PB) Europe.

Host : Not known.

2. *Pteromalus semotus* (Walker)
(Figs. 367-369)

1834. *Eutelus semotus* Walker, *Ent. Mag.* 2 : 367. F. England (Lectotype. BMNH).

1906. *Etroxys marginicollis* Cameron, *J. Bombay Nat. Hist. Soc.* 17 : 97 : F, Pakistan, Quetta (Lectotype. BMNH) examined.

Diagnosis : Length 1.9-2.8mm. Body dark metallic green with golden reflection; antennae testaceous; POL 1.8x OOL; temple length 0.4x eye length; anterior margin of clypeus

weakly emarginate; antennae with pedicel little longer than Fl. Propodeum medially 0.5x as long as scutellum. Forewing with MV short, 1.1x to 1.6x STV. Gaster 1.1x as long as head plus mesosoma combined.

Distribution : India (KL), Cosmopolitan.

Host : Primary or secondary parasite in pupae of various lepidoptera, less often certain beetles (Curculionidae).

3. *Pteromalus puparum* (Linnaeus) (Figs. 362-364, 377)

1758. *Ichneumon puparum* Linnaeus, *Syst. Nat. 10th Edt.* 567. M, F, Lectotype, (Linn. Society, London).

Diagnosis: Length 2.4-3mm. Body dark metallic blue, antennae with scape testaceous, remainder brown; POL as long as OOL; temple length 0.6x eye length; anterior margin of clypeus shallowly emarginate; antennae with Fl longer than pedicel; funicular segments longer than wide. Propodeum medially 0.7x as long as scutellum; nucha long. Gaster ovate, shorter than head plus mesosoma combined.

Distribution : India (KL, UP, AM, BR), Cosmopolitan.

Host : Parasite in pupae of various Butterflies.

4. *Pteromalus metallicus* Sureshan (Figs. 365, 372-373)

2001. *Pteromalus metallicus* Sureshan, *Rec. Zool. Sur. India* 99 (1-4) : 9, F, (ZSIC).

Diagnosis : Length 2.6-3.6mm. Head and mesosoma dark metallic blue; gaster blackish blue; antennae testaceous; head width 2.3x length in dorsal view; anterior margin of clypeus emarginate; POL 1.5x OOL; pedicel plus flagellum length 0.9x head width, pedicel little shorter than Fl. Pronotal collar anteriorly sharp; propodeum with a weak costula; plicae not indicated beyond costula. Forewing with basal hairline indicated by 3 or 4 hairs. Gaster 1.2x as long as head plus mesosoma combined.

Distribution : India (KL, KT).

Host : Not known.

5. *Pteromalus nigrus* Sureshan (Figs. 359-361, 374-375)

2001. *Pteromalus nigrus* Sureshan, *Rec. Zool. Sur. India* 99 (1-4) : 12, F (ZSIC).

Diagnosis : Length 1.8-3.8mm. Head and mesosoma bluish black ; gaster brownish black; antennae dark brown except scape and pedicel testaceous. Head finely reticulate, 1.1x

as broad as mesosoma; vertex narrow, abruptly sloping; POL 2x OOL; anterior margin of clypeus emarginate; antennae inserted below centre of face, Fl 1.5x pedicel. Propodeum with two transverse depressions connecting basal and apical foveae of both sides; plicae less sharp, median carina vaguely indicated at the base. Gaster 1.3x as long as head plus mesosoma combined.

Distribution : India (KL).

Host : Not known.

6. *Pteromalus keralensis* Sureshan
(Figs. 353, 355-358, Pl. II. fig. 24)

2001. *Pteromalus keralensis* Sureshan *Rec. Zool. Sur. India* 99 (1-4) : 12, F (ZSIC).

Diagnosis : Length 1.4-2.4mm. Body black with metallic blue reflection on gaster dorsally; antennae pale brown with scape and pedicel testaceous. Head moderately and closely reticulate, width 2.4x length in dorsal view; POL 1.8x OOL; antennal scape hardly reaching median ocellus, Fl almost as long as pedicel. Anterior margin of pronotum rounded; propodeum with costula, median carina vaguely indicated. Gaster short, ovate, length 1.6x width.

Distribution : India (KL).

Host : Not known.

Genus 47. *Rhaphitelus* Walker

1834. *Rhaphitelus* Walker, *Ent. Mag.* 2 : 168, 178. Type species : *Rhaphitelus maculatus* Walker. by monotypy.

Diagnosis : Flagellum (Fig. 388) unusual, short and clavate, clava with apical segment a narrow digitiform like process; male flagellum almost filiform, clava not modified. In both sexes forewing (Fig. 389) with MV thick, STV capitate, both veins distinctly darkened and wing often with dark rectangular macula adjacent to MV.

Distribution : India (Europe, N. America, Japan, Argentina, Israel, New Zealand).

Biology : Parasites of Scolytidae and Curculionidae (Coleoptera) developing in twigs of various forest trees especially of coniferous trees.

The only species known from the region under the genus is *Rhaphitelus maculatus* Walker.

1. *Rhaphitelus maculatus* Walker
(Figs. 388-389)

1834. *Rhaphitelus maculatus* Walker, *Ent. Mag.* 2 : 179. F. England (BMNH).

Diagnosis : Length 1.7-3mm. Body brown with metallic green reflection on head and mesosoma, T1 of gaster dorsally with metallic blue reflection; antennae brown with scape and pedicel paler; legs testaceous, except mid and hind coxae brown. Head and mesosoma closely reticulate punctate. Head as wide as mesosoma in dorsal view; malar grooves distinct; POL 2.4x OOL; anterior margin of clypeus slightly projecting; antennae (388) attached slightly above level of lower margin of eyes, scape just reaching median ocellus; flagellum unusual, short and clavate, clava short and at collapsing apex with a narrow digitiform process. Pronotal collar not margined anteriorly; mesoscutum 1.4x as wide as long; propodeum with plicae and median carina complete. In both sexes forewing (Fig. 389) stigma widened and with quadrangular dark spot attached to it and to the parallel sided MV; MV 3x as long as wide; height of stigma not more than the width of MV. Gaster collapsing, elongatedly ovate, posterior margin of T1 incised in the middle.

Distribution : India (J&K).

Host : Parasite of shot-hole bark beetle *Scolytus* sp. on apple tree *Malus silvestris* (Linnaeus) (Narendran et al, 2001).

Genus 48. *Rhopalicus* Forster

1856. *Rhopalicus* Forster, *Hym. Stud.* 2 : 66. Type species : *Cleonymus maculifer* Forster by monotypy.

Diagnosis : Flagellum with 2 anelli and 6 funicular segments; toruli often near middle of face. Pronotum (Fig. 140) dorsally rounded, collar not distinctly separated; propodeum medially short, with median carina and incomplete plicae, without nucha; prepectus bare. Forewing (Fig. 139) with stigma at most gradually broadening; PMV longer than STV; Fore femur enlarged; hind tibia with one spur. Gaster sessile.

Distribution : India (Europe, America).

Biology : Parasites of scolytid beetles on coniferous trees, some species attack Curculionid beetles.

One indetermined species of *Rhopalicus* (close to *tutela* Walker) is reported from India (Meghalaya, Shillong, Khasi hills) ex. *Blastophagus khasianus* on *Pinus khasia*.

Genus 49. *Roptrocercus* Ratzeburg

1844. *Pachycercus* Ratzeburg, *Ich. Forstins* 1 : 217. Type species : *Pachycercus xylophagorum* Ratzeburg, by monotypy. suppressed by ICZN 1957, opinion 437. 25-40.

1848. *Roptrocercus* Ratzeburg, *Ich. Forstins.* 2 : 209. Replacement name for *Pachycercus* Ratzeburg thought to be preoccupied by *Pachycercus* Gyllenhal, 1826. Unnecessarily proposed but adopted as valid after *Pachycercus* was rejected.

1939. *Roptroceroidea* Ishii, *Kontyu* 13 : 190-191. Type species : *Roptroceroidea karafutoensis* Ishii, by original designation, synonymy by Boucek, 1988; 422.

Diagnosis : Lower face in both sexes with scattered unusually deep punctures; fore femur distinctly thickened, female antenna with 3 anelli. Dorsum of mesosoma convex, shiny, reticulation extremely fine and partly engraved; pronotum rounded, fairly long. Female gaster (Fig. 138) with ovipositor sheaths greatly protruding, longer than half of hind tibia.

Distribution : India (Europe, America).

Biology : Ectoparasites of larvae of scolytidae, and Coleoptera on coniferous trees, especially Pinus and Picea.

The only species known from the region is *Roptrocercus xylophagorum* (Ratzeburg).

1. *Roptrocercus xylophagorum* (Ratzeburg)
(Fig. 138)

1844. *Pachycercus xylophagorum* Ratzeburg, *Ichneum. Forstins.* 1 : 218. F, (Presumed destroyed).

1922. *Roptrocercus sulcatus* Waterston, *Ind. Forest. Rec.* 9 : 85. F, India : Kumaon, Bhowali (BMNH).

Diagnosis : Length 5.5mm. Body dark aeneous, metallic green; gaster paler at sides; head in front view broadly oval, lower face with scattered deep punctures; anterior margin of clypeus slightly produced in the middle; antennae with combined length of pedicel and flagellum approximately equal to breadth of head, third anellus longer than either of the others, reticulation of mesosoma extremely fine and partly engraved. Pronotum rounded. Forewing a little less than 3x as long as wide. Gaster with ovipositor sheaths well protruded, in dorsal view appear subadpressed.

Distribution : India (Europe, N.America.)

Host : Parasitic on larvae of bark beetles (Scolytidae) on coniferous trees.

Genus 50. *Schizonotus* Ratzeburg

1852. *Schizonotus* Ratzeburg, *Ichneum. Forstins* 3 : 230. Type species : *Pteromalus sieboldi* Ratzeburg, by designation of Ashmead, 1904 (as subgenus of *Pteromalus*).

Diagnosis : Antennae inserted very slightly above level of ventral edge of eyes, with 2 anelli, both quite strongly transverse; genae slightly hollowed at base of mandible. Pronotal collar not well delimited; scutellum (Fig. 263) with distinct frenal groove, behind the groove evidently convex. Forewing (Fig. 261) extensively bare, hairs reduced. Gaster subglobose.

Key to species of *Schizonotus* from Indian subcontinent.

1. Head in front view with clypeus projecting somewhat below level of ventral ends of the genae(Fig. 264); antennal funicle yellowish beneath, darker above, clava fuscous to

blackish; combined length of two anelli greater than the breadth of second anellus; F2 subquadrate *sieboldi* Ratzeburg

Head in front view with clypeus not projecting below the level of the ventral ends of genae (Fig. 262); antennal flagellum uniformly fuscous to black; combined length of two anelli approximately equal to breadth of second anellus; F2 1.2-1.5x as broad as long *latus* (Walker)

1. *Schizonotus sieboldi* (Ratzeburg)
(Fig. 264)

1852. *Pteromalus (Schizonotus) sieboldi* Ratzeburg, *Ichneum. Forstins.* 3 : 230. F, M. (presumed lost).

Diagnosis : Length 2-2.25mm. Clypeus projecting below gena; antennae yellow below, darker above; clava dark to black; anelli together longer than width of second anellus, F2 subquadrate.

Distribution : Pakistan, Europe.

Host : Parasitic on larvae of Chrysomelid beetles eg. *Melasoma populi*, ex. Coccinellid pupa on fir.

2. *Schizonotus latus* (Walker)
(Fig.261-263)

1833. *Pteromalus latus* Walker, *Ent. Mag.* 1 : 481. F. England (Lectotype BMNH).

Diagnosis : Length : 1.9-2.7mm. In female clypeus not projecting below level of genae; antennae uniformly dark to black; anelli together almost equal to width of second anellus; F2 1.2-1.5x as wide as long. Forewing as in figure 261.

Distribution : Pakistan, (Europe, N.America).

Host : Parasites of Chrysomelidae, ex. Chrysomelid on *Populus* from Pakistan.

Genus 51. *Sphegigaster* Spinola

1811. *Sphegigaster* Spinola, *Annl. Mus. Hist. Nat.* 17 : 147. Type species : *Diplolepis pallicornis* Spinola designated by Ashmead, 1904.

1904. *Trigonogastra* Ashmead, *Mem. Carnegie. Mus.* 1 (4) : 330, Type species : *Trigonogastra aurata* Ashmead, by original designation.

1915. *Paratrigonogastra* Girault, *Mem. Qd. Mus.* 3 : 343. Type species : *Paratrigonogastra voltairei* Girault, by monotypy. Syn. By Boucek, 1988 : 465.

1957. *Basilewskyella* Risbec, *Bull. Inst. Fr. Afr. Noire* (4) 19 (1) : 194-195. Type species : *Basilewskyella elongatula* Risbec, by original designation. Syn. by Boucek, 1988; 465.

Diagnosis : Body slender; clypeal margin with two sharp teeth; antennae always with 2 anelli; gena with a large fovea above base of mandible; notauli incomplete. Pronotum rather long behind anterior subrectangular edge which sometimes bears several blunt teeth. Propodeum without longitudinal carinae, about as strongly reticulate as scutellum, dull. Gastral petiole longer than propodeum, dorsally with dense reticulation; T2 very large.

Distribution : South Asia, Africa, Europe, America, Australia.

Biology : Parasites of Diptera especially Agromyzidae mining in the leaves or other soft parts of plants.

Key to the species of *Sphegigaster* of Indian subcontinent

1. Antennae short (Fig.99), all funicular segments transverse, scape metallic brownish black or black..... *stepicola* Boucek
- Antennae long, slender, funicular segments longer than broad, scape yellow or testaceous 2
2. Gaster with posterior margin of T1 medially produced (Figs. 106, 111)..... 3
- Posterior margin of T1 not produced, straight.....4
3. Antennae (Fig. 108) with pedicel length 2x width; F1 distinctly longer than pedicel, not narrowed basally; forewing with basal hairline indicated; gaster (Fig.106) (without petiole) distinctly longer than mesosoma (Pl. II. fig. 18).....
..... *anamudiensis* Sureshan & Narendran
- Pedicel length 1.5x width; F1 little longer than pedicel (4 : 3), narrowed basally (Fig. 110); forewing with basal hairline not indicated; gaster not longer than mesosoma (Fig. 109)*brunneicornis* (Ferriere)
4. Gaster (Figs. 112, 113) slender, elongate; petiole short and stout (length 2x width); T2 small, only 0.3x as long as body of gaster; scutellum with frenum clearly marked off; propodeum medially raised, median carina indicated anteriorly
..... *indica* Sureshan & Narendran
- Gaster (Fig. 102, 103) not slender and elongate as above; petiole long and slender (length 3-3.8x width), T2 large, 0.6x as long as body of gaster; scutellum with frenum marked only on sides *reticulata* Sureshan & Narendran

1. *Sphegigaster stepicola* Boucek
(Figs. 99-100)

1965. *Sphegigaster stepicola* Boucek, *Acta Fauna Ent. Mus. Natl. Pragae* **11** : 12-14. M, F. CSSR : Bohemia (NM).

1971. *Acroclisis melanagromyzae* Mani, *J. Nat. Hist.* **5** : 591-593. F, India : Agra (USNM).

Diagnosis : Length 1.5-2mm. Body shiny black, slender, legs relatively dark; antennae with all funicular segments transverse; Fl obviously shorter than pedicel. Gaster oval, shorter than mesosoma; petiole length nearly 3x width; hind margin of T1 with its middle portion truncate or virtually so.

Distribution : India (KL, DL, BR, UP). Austria, Czechoslovakia, Moldavian SSR and Algeria).

Host : Reported from India as a parasite of *Melanagromyza soyae* (Soya bean fly), *Melanagromyza* and *Phytomyza* (Agromyzidae : Diptera) mining the leaves of *Helianthus* and of *Vigna catjang*.

2. *Sphegigaster brunneicornis* (Ferriere)
(Figs. 109-111)

1930. *Trigonogastra brunneicornis* Ferriere, *Bull. Ent. Res.* **21** : 356-357. F, Sri Lanka; Paradeniya (Lectotype. BMNH) examined.

Diagnosis : Length 2-2.5mm. Body dark green, almost black, especially on head; gaster dark green; antennae with scape pedicel and anelli clear yellow, flagellum reddish brown; Fl longer than pedicel, narrowed basally; all funicle segments longer than wide except F6 subquadrate; clava almost as long as two preceding segments combined. Pronotum distinctly carinate. Gaster (excluding petiole) not longer than mesosoma.

Distribution : India (KL), Sri Lanka.

Host : Reported as a parasite on pupae of *Agromyza* sp. mining stems of *Hibiscus esculentus* and *Ophiomyia phaseoli* (Tryon) on beans.

3. *Sphegigaster anamudiensis* Sureshan & Narendran
(Figs. 104-108, Pl. II. fig. 18)

1997. *Sphegigaster anamudiensis* Sureshan & Narendran, *Entomon* **22** (3&4) : 194-195, F, India, KL (ZSIC).

Diagnosis : Length 3.2mm. Body bluish green with slight golden reflection on head and mesosoma; antennae dark brown except scape testaceous; head 1.2x as broad as mesosoma; POL almost equal to OOL; antennae inserted below middle of face, scape reaching median

ocellus. Pronotal collar sharply margined anteriorly, scutellum as long as wide. Forewing length 2.3x width. Gaster 1.2x as long as mesosoma in profile; petiole length 0.3x of gaster in profile.

Distribution : India (KL).

Host : Not known.

4. *Sphegigaster reticulata* Sureshan & Narendran
(Figs. 102-103)

1997. *Sphegigaster reticulata* Sureshan & Narendran *Entomon* **22** (3&4) : 195. F, India (KL) (ZSIC).

Diagnosis : Length 2.7 mm. Head, mesosoma and petiole bluish black, gaster black; antennae yellow. Head finely reticulate, width 2x length; POL 1.6x OOL; antennal scape hardly reaching median ocellus; Fl very slightly shorter than pedicel; funicle segments longer than wide except last two almost as long as wide. Pronotal collar nearly rectangular; scutellum slightly convex. Forewing with basal vein setate. Gaster elongate, ovate; petiole length 3.6x width; T2 occupying more than half of gaster.

Distribution : India (KL).

Host : Not known.

5. *Sphegigaster indica* Sureshan & Narendran
(Figs.112-113)

2001. *Sphegigaster indica* Sureshan & Narendran *Zoosprint* **17** (1) : 671, F India (KL) (ZSIC).

Diagnosis : Length 2.4mm. Head, mesosoma and petiole metallic blue; gaster blackish brown. Head 1.1x as wide as mesosoma; POL 1.3x OOL; antennae inserted little below middle of face, scape hardly reaching median ocellus; pedicel plus flagellum little longer than head width. Mesosoma reticulate punctate; anterior margin of pronotal collar ridged; mesoscutum width 2x length; scutellar frenum clearly marked off; median area of propodeum strongly raised on median line; median carina strongly indicated anteriorly. Forewing length 2.4x width. Gaster elongate, slender; petiole short, length 1.9x width; T2 only 0.3x as long as body of gaster.

Distribution : India (KL).

Host : Not known.

Genus 52. *Sphegigastrella* Masi

1917. *Sphegigastrella* Masi, *Novit. Zool.* **24** : 183. Type species : *Sphegigastrella longigastra* Masi, by designation of Gahan & Fagan, 1923.

The only information available about the genus is that given by Masi (1917). Boucek et al (1979) recorded an indetermined species of *Sphegigastrella* from Myanmar. Farooqi & Subba Rao (1985, 1986) also recorded the genus. All subsequent works on Pteromalidae (Boucek, 1988, Boucek & Rasplus, 1991, Boucek & Heydon, 1997) not mentioned about the genus. All my attempts to trace out further details of the genus and the whereabouts of the type did not materialise. From the original description (in Latin) by Masi it is very difficult to place the genus any where in the family. Because of these reasons I have not included the genus in the present key.

Diagnosis : (translated from original description in Latin). Flagellum with three anelli, second one slightly larger, little square shaped; funicle elongate, clava 3 articulate. Gaster elongate, not much difference between bottom and top like a ring, hardly compressed.

Distribution : Sri Lanka, (Africa).

Biology : Not known.

Genus 53. *Syntomopus* Walker

1833. *Syntomopus* Walker, *Ent. Mag.* 1 : 371-372. Type species : *Syntomopus thoracicus* Walker by designation of Westwood, 1839.

1926. *Merismorella* Girault, *New pests from Australia* V. 1, Type species : *Merismorella shakespearei* Girault, by monotypy. Syn. by Boucek, 1988 : 466.

Diagnosis : Clypeus with three broad symmetrically arranged denticles; lateral part of mouth margin with short genal concavity; antennae (Figs. 60, 62, 63) with flagellum compact. Mesosoma (Fig.66) flattened dorsally; pronotum large, quadrangular; propodeum with median panel long (width about 1.5x length); median carina and plicae well developed and connected posteriorly by 'W' shaped carina. Gastral petiole longer than wide, cylindrical with complete basal flange continuous laterally and ventrally without median carina, lateral setae present; gaster ovate, acuminate, hind margin of T1 sinuous laterally, typically emarginate medially (Figs. 61, 64).

Distribution : India (Australia, Europe, America, Africa, South Asia).

Biology : Parasites of small Diptera, especially agromyzidae mining stiff stems of some herbaceous plants.

Key to the Indian species of *Syntomopus*

1. Propodeum with median carina effaced in the middle, indicated on anterior and posterior ends, width 1.5x maximum length; T1 of gaster deeply incised in the middle (Fig.64); POL 1.4x OOL; temple length 0.3x eye length; body dark green with golden reflection on head and dorsal part of mesosoma, length 3mm
.....*rajamalaiensis* Sureshan & Narendran

- Propodeum with median carina either complete or indicated only anteriorly (slightly), width 1.7-2x maximum length; Tl not as above; POL greater than 1.4x OOL (1.6-1.9x); temple length greater than 0.3x eye length; body bright green or bluish black without golden reflection. Length 1.5-2.2mm..... 2
- 2. Propodeum with median carina indicated only anteriorly; POL 1.9x OOL; scape length 0.8x eye length; mesoscutum width 1.8x length; forewing (Fig. 69) with MV 1.7x STV; PMV 1.3x STV; body (Fig. 70) bluish black; antenna with scape and pedicel bluish black with metallic reflection, remainder dark brown; legs except coxae not testaceous. Length 1.5-1.7mm *nigrus* Sureshan & Narendran
- Propodeum with median carina complete; POL 1.6x OOL; scape length 0.6x eye length; mesoscutum width 2.2x length; forewing (Fig. 67) with MV 2.9x STV; PMV 2x STV; body (Fig. 60) bright metallic green; antenna with scape and pedicel testaceous, remainder pale brown; legs except coxae testaceous. Length 1.7-2.2mm (Pl. III. fig. 34).....
..... *carinatus* Sureshan & Narendran

1. *Syntomopus carinatus* Sureshan & Narendran
(Figs. 60, 67-68, Pl. III. fig. 34)

1999. *Syntomopus carinatus* Sureshan & Narendran, *Rec. zool. Sur. India.* 97 (4) : 84-86. F, M. India (KL) (ZSIC).

Diagnosis : Length : 2.1mm. Head, mesosoma, gastral petiole and coxae metallic green; gaster brown with greenish tinge, antennae brown with scape and pedicel testaceous. Head finely reticulate, width 2.14x length; POL 1.6x OOL; antennal scape not reaching median ocellus, clava as long as 2.5 preceding segments combined. Propodeum with median area finely reticulate, lateral areas and nucha almost shiny; median carina complete. Gaster length 1.8x width in dorsal view, petiole length almost 2x width.

Distribution : India (KL).

Host : Not known.

2. *Syntomopus nigrus* Sureshan & Narendran
(Figs. 61-62, 69-70)

1999. *Syntomopus nigrus* Sureshan & Narendran, *Rec. Zool. Sur. India.* 97 (4) : 86-87, M, F. India (KL) (ZSIC).

Diagnosis : Length 1.7mm. Body bluish black with bluish reflection on propodeum and gaster; antenna dark brown with scape and pedicel bluish black. Head finely reticulate, width 2.3x length; POL 1.9x OOL; antennal scape not reaching median ocellus. Propodeum uniformly and finely reticulate, median carina absent. Forewing with pubescence less distinct. Gaster length 1.9x width, petiole length 1.9x width.

Distribution : India (KL).

Host : Not known.

3. *Syntomopus rajamalaiensis* Sureshan & Narendran (Figs. 63-66)

1999. *Syntomopus rajamalaiensis* Sureshan & Narendran *Rec. Zool. Sur. India*. **97** (4) : 86-89 F, India (KL) (ZSIC).

Diagnosis : Length 3 mm. Head and mesosoma dark green with golden reflection on head and dorsal part of mesosoma; gaster dark bluish green with metallic blue reflection on T1; antennae dark brown except scape dark blue. Head finely reticulate, width 2.5x length; POL 1.4x OOL; antennal scape not reaching median ocellus. Propodeum with median area moderately reticulate, lateral parts nearly smooth; median carina effaced in the middle. Forewing with few setae on basal vein. Gaster length 1.7x width; petiole length 2x width with 3 pairs of lateral setae; hind margin of T1 deeply incised.

Distribution : India (KL).

Host.: Not known.

Genus 54. *Toxeumorpha* Girault

1915. *Toxeumorpha* Girault *Mem. Qd. Mus.* **4** : 195. Type species : *Toxeumorpha nigra* Girault, by original designation.

1976. *Nigricolana* Boucek, *J. Ent. Soc. S. Africa.* **39** : 16-17. Type species : *Trigonogastra nigricola* Ferriere by original designation. (Syn. by Boucek 1988 : 443).

Diagnosis : Head and mesosoma including propodeum reticulate, occiput immargined; clypeus with anterior margin produced, shallowly emarginate in the middle; antennae (Figs. 97, 98) with 3 anelli and 5 funicular segments. Pronotal collar rounded anteriorly; propodeum without median carina. Forewing with MV distinctly longer than STV. Gastral petiole elongate, reticulate, in female with fine median carina, seems to be composed of three parts, the median stalk is the true petiole, while the side parts are connected ventrally and actually form a stiffened ventral projection of the first gastral sternite (Fig. 96).

Distribution: India, Sri Lanka, (Africa, South Asia, Australia).

Biology : Parasites of puparia of small Diptera.

1. *Toxeumorpha megacephala* (Waterston)

1914. *Trigonogastra megacephala* Waterston, *Bull. Ent. Res.* **5** : 328. M?, F. Sri Lanka : Bandarawela (Lectotype, BMNH). Syn. by Boucek, *et al.* **1979** : 447.

1959. *Trigonogastra joachimi* Fernando, *Ceylon J. Sci. (Biol.)* **2** : 249. Sri Lanka. Syn. by Boucek *et al.* **1979** : 447.

Diagnosis : Female: Length 1.6mm. Body generally black. Head reticulate; clypeus striate; scape 6x as long as thick, not swollen preapically; pedicel a little more than 0.33x of scape; first funicular segment slightly thicker than long, shorter than second; funicular segments 2-5 sub equal, as long as thick, sixth a little short; clava distinctly swollen with the segments subequal.

Distribution : Sri Lanka

Host : ex. Tea leaf miner *Tropicomyia theae* (Cotes) (Boucek et al, 1979).

2. *Toxeumorpha minuta* Sureshan & Narendran.
(Figs. 96-98, Pl. III. fig. 35)

2000. *Toxeumorpha minuta* Sureshan & Narendran, *J. Bombay Nat. Hist. Soc.* **97** (3) : 406. M,F, India, KL (ZSIC).

Diagnosis : Length 1.2mm. Body black, antennae brown with scape paler, head width 1.8x length in dorsal view; temple length 0.4x eye length; POL 1.4x OOL; antennae inserted along the lower margin of eyes, scape not reaching median ocellus, pedicel longer than Fl; third anellus as long as first and second combined. Propodeum with plicae complete; callus with black bristles similar as on other areas of mesosoma. Forewing length 2.3x width; basal vein setate. Gaster length 1.4x width; T1 and T2 covering most of the gaster.

Distribution : India (KL).

Host : Not known.

Genus 55. *Trichomalopsis* Crawford

1913. *Trichomalopsis* Crawford, *Proc. U.S. Natn. Mus.* **45** : 251, Type species : *Trichomalopsis shirakii* Crawford, by original designation.

1913. *Eupteromalus* Kurdjumov, *Rev. Russe. Ent.* **13** : 5, 12-13 : Type species : *Pteromalus nidulans* Thomson, by original designation.

1917. *Nemicromelus* Girault, *Des. Hym. Chal. var. cum. Obs. V.* 4. Type species : *Merisus subapterus* Riley, by monotypy.

1926. *Metadicylus* Girault, *Insec. Inscit. Menstr.* **14** : 71. Type species : *Metadicylus australiensis* Girault, by monotypy. Syn. by Boucek, 1988 : 438.

Diagnosis : Occiput with transverse carina placed about half way down to foramen (Figs. 275, 276); antenna (Figs. 274, 281) with 2 anelli and 6 funicular segments in both sexes, flagellum rather slender, only weakly clavate. Pronotal collar weakly and irregularly margined or immargined; notaular grooves incomplete; propodeum (Figs. 271, 279, 285) with subglobose reticulate nucha; median area delimited by sinuate plicae, mostly with distinct median carina. Gaster sessile or subsessile, not or hardly collapsing. petiole highly transverse.

Distribution : All major regions. Best known in Europe and N.America.

Biology : Gregarious parasites in cocoons and pupae of various moths, in puparia of some Diptera, less frequently in egg sacs of spiders, cells of some pompilidae. Sometimes Hyperparasites.

Key to the Indian species of *Trichomalopsis*

1. Lower margin of clypeus incised medially (Fig. 277); head in dorsal view thick, 1.85-1.95x as broad as long (Fig. 275, 276); occipital carina strongly curved medially.
..... *apanteloctena* (Crawford)
- Lower margin of clypeus only weakly emarginate; head not much thick in dorsal view, if thick (1.9-2x as broad as long) then lower margin of face as in figure 283; occipital carina not strongly curved medially as above 2
2. Lower margin of face on either side of clypeus curved and projected below level of lower margin of clypeus (Fig. 283); head 1.9x-2x as broad as long; flagellum in female stout (Fig. 282) *deplanata* Kamijo & Grissell
- Lower margin of face not projecting below level of lower margin of clypeus; head 2-2.1x as broad as long; flagellum not stout as above 3
3. Gastral petiole almost as long as nucha, weakly sculptured (Figs. 279); propodeum with post spiracular sulcus without transverse ridge; legs with coxae not concolrous with mesosoma, yellowish brown or brownish yellow 4
- Gastral petiole strongly transverse and unsculptured; post spiracular sulcus with a distinct transverse ridge; legs with coxae mostly concolrous with mesosoma 5
4. Pronotal collar weakly and irregularly margined or immargined; scape 0.9x eye length; pedicel plus flagellum almost about as long as head width; T1 of gaster reaching only little more than one third length (Fig.280); temple length 0.5x eye length; head and mesosoma greenish black with metallic reflection; antennae paler
..... *acarinata* Sureshan & Narendran
- Pronotal collar weakly but sharply margined except at sides; scape as long as eye; pedicel plus flagellum 0.84x as long as head width; T1 reaching almost half length of gaster (Fig. 286); temple narrow, length 0.4x eye length; head and mesosoma black with little reflection; antennae darker *nigra* Sureshan & Narendran
5. Gaster oval; ovipositor sheaths strongly protruded out (Fig. 291); head in dorsal view with temples rounded (Fig. 288); median area of propodeum broad (Fig. 292) 1.3x as broad as long; plicae not very sharp *ovigastrea* Sureshan & Narendran

- Gaster more elongated; ovipositor sheaths not strongly protruded out as above; head in dorsal view with temples not much rounded; median area of propodeum less broad, 1.1x -1.2x as broad as long; plicae more sharp 6
- 6. Propodeum with plicae very sharp reaching upto tip of nucha; nucha more constricted; median carina strong (Fig. 271); T1 of gaster reaching only upto one third length (Fig. 273); head in dorsal view with temples short (Fig. 269) length 0.5x eye length; pronotal collar irregularly margined (Pl. III. fig. 36)
 *thekkadiensis* Sureshan & Narendran
- Propodeum with plicae not sharp as above, at least slightly incomplete towards the end of nucha, median carina not very strong; temples longer, 0.7x as long as eye; T1 occupying little beyond or before half length of gaster; pronotal collar weakly but more regularly margined 7
- 7. Gaster (Figs. 294, 297) 1.8x as long as broad and longer than mesosoma; T1 occupying little less than half length with only slight metallic blue reflection dorsally; nucha less convex in profile (Fig.298); scape little shorter than eye (0.9x)
 *travancorensis* Sureshan & Narendran
- Gaster (Figs. 300, 304) 1.6x as long as broad and as long as mesosoma; T1 occupying little beyond middle with bright metallic blue reflection dorsally; nucha more convex in profile, scape as long as eye *neelagastra* Sureshan & Narendran

1. *Trichomalopsis apanteloctena* (Crawford)
 (Figs. 274-277)

- 1911. *Trichomalopsis apanteloctenus* Crawford, *Proc. U.S. Natn. Mus.* **39** : 618, M, F. Japan : Konosu (USNM).
- 1919. *Eupteromalus parnarae* Gahan, *Proc.U.S. Natn. Mus.* **56** : 522. F. India : Karvetnagar (Lectotype, USNM).

Diagnosis : Length 1.6-2.5 mm. Lower margin of clypeus rather deeply incised medially; striae of clypeus extending to lower margin of eyes and to malar sulcus; both mandibles with four teeth; head thick, in dorsal view 1.85 – 1.95x as broad as long; occipital carina sharp, in postero-dorsal view strongly curved medially. Antennae with combined length of pedicel plus flagellum in female 0.8-0.93x and in male 0.95-1.05x head width. Pronotal collar indistinctly margined. Forewing with MV 1.55 to 2.1x STV. Gaster 1.7-2x as long as broad.

Distribution : India (KL, TN, KT), Bangladesh (Korea, Malaysia, China, Japan, Taiwan, Philippines and Formosa).

Host : Reared from *Cnaphalocrocis medinalis* (Lepidoptera :Pyralidae) and *Pelopidas mathias* (Lepidoptera : Hesperidae) in India.

2. *Trichomalopsis deplanata* Kamijo & Grissell.
(Figs. 282-283)

1982. *Trichomalopsis deplanata* Kamijo & Grissell, *Kontyu* 50 (1) : 84-86, M, F. Japan : Koriyama (EIHU).

Diagnosis : Length 1.5–2.4mm. Head in front view transverse, 1.3x as broad as high; lower margin of face on either side of clypeus curved and projecting below lower margin of clypeus; anterior margin of clypeus weakly emarginate; both mandibles with four teeth; antennal scape much shorter than eye length, almost reaching lower edge of median ocellus; flagellum stout. Pronotal collar not margined anteriorly; propodeum with median carina not so strong; plicae sharp throughout; spiracular sulcus with a transverse ridge at middle. Forewing with MV 1.45-1.85x STV and a little longer than PMV. Gaster ovate, about as long as mesosoma, 1.3 – 1.4x as long as broad.

Distribution : India (KL, WB), (Japan, Korea, China).

Host : Reared from Tachinid puparia on paddy.

3. *Trichomalopsis thekkadiensis* Sureshan & Narendran
(Figs. 269-273, Pl. III. fig. 36)

2001. *Trichomalopsis thekkadiensis* Sureshan & Narendran *J. Bombay. Nat. Hist. Soc* 98 (3) : 398 M, F India : KL (ZSIC).

Diagnosis : Length : 1.6-2.7 mm. Body bluish green with metallic reflection. Head 1.2x as wide as mesosoma; POL 1.3x OOL; temple length 0.5x eye length, strongly converging behind eyes; anterior margin of clypeus weakly emarginate; antennal scape almost reaching little above median ocellus; clava as long as 2.5 preceding segments combined. Mesosoma raised reticulate; pronotal collar irregularly margined; propodeum medially about as long as scutellum, median carina distinct, nucha highly constricted. Forewing with MV about 1.5x STV. Gaster length 1.6x width, slightly longer than mesosoma.

Distribution : India (KL).

Host : Not known.

4. *Trichomalopsis nigra* Sureshan & Narendran
(Figs. 284-286)

2001. *Trichomalopsis nigra* Sureshan & Narendran *J. Bombay. Nat. Hist. Soc.* 98 (3) : 400. M, F, India : KL (ZSIC).

Diagnosis : Length 1.5-2mm. Body blue black with slight metallic reflection; antenna dark brown with scape paler on basal part. Head 1.2x as broad as mesosoma; temple narrow,

length 0.4x eye length; POL 1.3x OOL; antennal toruli only slightly above lower edge of eyes; scape reaching level of vertex, second anellus little longer than first. Pronotal collar weakly but sharply margined except on sides; propodeum with median carina weak, plicae not sharp. Gaster petiole as long as nucha; gaster shorter than mesosoma, length 1.4x width,

Distribution : India (KL).

Host : Not known.

5. *Trichomalopsis acarinata* Sureshan & Narendran
(Figs. 278-281)

2001. *Trichomalopsis acarinata* Sureshan & Narendran, *J. Bombay. Nat. Hist. Soc.* **98** (3) : 401. F, India (KL) (ZSIC).

Diagnosis : Length 1.3 –2.0mm. Head and mesosoma dark green, gaster dark brown. Antennae dark brown except scape yellowish brown. Head width 1.3x mesosoma; POL 1.3x OOL; temple length half of eye length; anterior margin of clypeus weakly emarginate; antennal scape reaching level of vertex; clava little shorter than 3 preceding segments combined. Pronotal collar weakly margined or immargined; propodeum with median carina weak, plicae not sharp. Gastral petiole almost as long as nucha, sculptured; gaster length 1.5x width; T1 occupying little more than one third length of gaster

Distribution : India (KL).

Host : Not known.

6. *Trichomalopsis ovigastra* Sureshan & Narendran
(Figs. 287-293)

2001. *Trichomalopsis ovigastra* Sureshan & Narendran *J. Bombay. Nat. Hist. Soc.* **98** (3) : 402. M. F, India (KL) (ZSIC).

Diagnosis : Length 1.8-2.4mm. Body dark brownish green with metallic reflection; antennae brown with scape paler in basal part. Head width 2x length in dorsal view; temple rounded posteriorly, length 0.5x eye length; POL 1.4x OOL; antennal scape reaching beyond median ocellus. Pronotal collar margined anteriorly; propodeum with median area broad, 1.3x as broad as median length; plicae sharp, median carina weak. Basal cell of fore wing with few scattered hairs on the distal end; basal vein bare. Gaster ovate, length 1.3x width; ovipositor sheaths strongly protruded out.

Distribution : India (KL).

Host : Not Known.

7. *Trichomalopsis travancorensis* Sureshan & Narendran
(Figs. 294-299)

2001. *Trichomalopsis travancorensis* Sureshan & Narendran *J. Bomb. Nat. Hist. Soc.* **98** (3) : 404. F, India : KL (ZSIC).

Diagnosis : Length 1.6-2.3mm. Head and mesosoma. dark green with bronzy reflection; gaster brown. Antennae brown with scape testaceous basally. Head 1.14x as wide as mesosoma; POL 1.4x OOL; temple length 0.7x eye length; antennal scape length 0.9x eye length. Pronotal collar sharply margined throughout. Scutellum with frenal area distinct. Propodeum with median carina weak; nucha moderately convex. Forewing with basal cell and basal vein bare; MV 1.9x STV. Gaster elongatedly ovate, length 1.8x width, longer than mesosoma; petiole strongly transverse.

Distribution : India (KL).

Host : Not known.

8. *Trichomalopsis neelagastra* Sureshan & Narendran
(Figs. 300-305)

2001. *Trichomalopsis neelagastra* Sureshan & Narendran, *J. Bombay. Nat. Hist. Soc.* **98** (3) : 404. F India : KL (ZSIC).

Diagnosis : Length 2-2.4mm. Head and mesosoma dark bluish green with bronzy reflection; gaster dark bluish green; T1 with strong metallic blue reflection. Head width 1.2x that of mesosoma; temple length 0.7x eye length; POL 1.5x OOL; antennal scape as long as eye, reaching level of vertex. Pronotal collar margined throughout; propodeum with median carina weak; nucha convex. Forewing with MV 1.8x STV. Gaster ovate, as long as mesosoma, 1.7x as long as broad; T1 occupying 0.54x length of gaster

Distribution : India (KL).

Host : Not known.

Genus 56. *Trichomalus* Thomson

1878. *Trichomalus* Thomson, *Hym. Scand.* **5** : 134. Type species : *Trichomalus punctinucha* Thomson by designation of Ashmead, 1904. (As subgenus of *Isocyrtus*).

1953. *Lanceosoma* Erdos, *Acta. Biol. Hung.* **4** : 234-235. Type species : *Lanceosoma athaceae* Erdos by monotypy and original designation.

Diagnosis : Flagellum with 2 anelli (Figs. 317, 320) and 6 funicular segments. Pronotal collar margined with sharp carina; propodeum (Figs. 319, 322), with complete plicae and with panels of the median area very shiny, smooth or having only traces of weak sculpture;

spiracular sulci distinctly impressed; sides of propodeum and of first tergite of gaster with patches of whitish hairs.

Distribution : India, Pakistan, Myanmar (Europe, America).

Biology : Parasites of Diptera eg : Chloropidae in stems of Gramineae and small curculionidae (Coleoptera) in herbaceous plants.

1. *Trichomalus keralensis* Sureshan
(Figs. 317-319, Pl. III. fig. 32)

2002. *Trichomalus keralensis* Sureshan Fauna of Eravikulam Nat. Park, Con. Area S. No. 13 : 30, F. India (KL) (ZSIC).

Diagnosis : Length 2.3mm. Body brownish black with bronzy reflection dorsally; gaster dark brown. Antennae dark brown, Head moderately reticulate; anterior margin of clypeus weakly emarginate; POL 1.8x OOL; antennal scape reaching the level of vertex; combined length of pedicel plus flagellum 1.2x that of head width; pedicel half as long as F1. Propodeum with median area 1.1x as broad as long. Gaster elongatedly ovate, length 1.3x that of mesosoma and 1.8x as long as broad.

Distribution : India (KL).

Host : Not known.

2. *Trichomalus kannurensis* Sureshan & Narendran
(Figs. 320-323)

1994. *Trichomalus kannurensis* Sureshan & Narendran, *Hexapoda* 6 (2) : 60-61. F. M, India : KL (ZSIC).

Diagnosis : Length 1.7-2.1 mm. Body dark green with slight bronzy tinge; gaster brown with bronzy tinge. Antennae dark brown with scape testaceous at base. Head 1.2x as wide as mesoscutum; temple length 0.53x eye length; POL 1.2x OOL; anterior margin of clypeus almost straight; antennal scape reaching level of vertex; propodeum with median carina not reaching beyond costula. Gaster longer than head plus mesosoma combined; hypopygium reaching hind margin of T4.

Distribution : India (KL).

Host : Not known.

Genus 57. *Uniclypea* Boucek

1976. *Uniclypea* Boucek, *J. Ent. soc. S. Africa* 39 : 27-28. Type species : *Uniclypea conica* Boucek, by original designation.

Diagnosis : Body strong (Figs. 144,150) with large head, high squat mesosoma and conical gaster; clypeus (Fig. 148) with one strong median tooth anteriorly; antennae in female with 2 anelli. Pronotal collar not carinate; notaular grooves complete, shallow posteriorly; scutellum with distinct frenal groove; propodeum with costula indicated, not well developed. Gaster with T1 small and thin, hind margin produced, but with median excision; similar excision on T2.

Distribution : India, (Vietnam, Sumatra, Borneo, South Africa).

Biology : Parasites of beetles.

Key to the species of *Uniclypea*

1. Occiput without a distinct carina; clypeal tooth narrow and sharp; forewing with PMV 1.9x STV and 0.6x MV *conica* Boucek
 Occiput with distinct carina; clypeal tooth broader; PMV 2.4 -3.1x STV and 0.8-0.9x MV 2
2. Propodeum without median carina; forewing with PMV 3. 1x STV, costal cell 1.9x MV*deporai* Boucek
 - Propodeum with a distinct median carina; PMV 2.4-2.5x STV, costal cell 1.4-1.5x MV 3
3. Gaster slender (Figs. 149, 150), elongate, length 4.5x width and 1.2x as long as head plus mesosoma combined (Pl. III. fig. 33) *elongata* Sureshan & Narendran
 - Gaster not slender, elongatedly ovate, as long as head plus mesosoma combined and length 2.8x width. (Figs. 145, 146) *kumarani* Sureshan & Narendran

1. *Uniclypea kumarani* Sureshan & Narendran (Figs. 144-147)

1994b. *Uniclypea kumarani* Sureshan & Narendran, *Hexapoda* 6 (2) : 62-63. F. India (KL) (ZSIC).

Diagnosis: Length 2.9-3.7mm. Head and mesosoma black; gaster dark metallic blue, almost black towards the tip. Antennae testaceous with clava brown; head 1.2x as broad as mesoscutum; temple length 0.53x eye length; POL 1.2x OOL; antennae with scape reaching the vertex, pedicel little longer than F1. Propodeum with median carina not reaching beyond costula, callus thickly pilose. Gaster longer than head plus mesosoma combined; hypopygium reaching hind margin of T4.

Distribution : India (KL).

Host : Not known.

2. *Uniclypea elongata* Sureshan & Narendran
(Figs. 148-150, Pl. III. fig. 33)

1997. *Uniclypea elongata* Sureshan & Narendran, *Hexapoda* 9 (1&2) : 27-29. F, India, KL (ZSIC).

Diagnosis : Length 3.5mm. Head and mesosoma black; gaster black towards tip; antennae testaceous with tips of clava dark; head in dorsal view width 2x length, finely reticulate; occiput with a weak carina well below ocelli; antennal scape not reaching median ocellus. Mesosoma raised reticulate; propodeum with median carina distinct; median area depressed, callus with few long hairs. Gaster 1.2x as long as head plus mesosoma combined, acute apically; length 4.5x width in dorsal view.

Distribution : India (KL).

Host : Not known.

DISCUSSION

The present study deals with 132 species pertaining to 57 genera known so far from the Indian subcontinent including the descriptions of four new species. Out of the 57 genera reported, 5 are endemic to India. The genera endemic to India are *Kumarella* Sureshan, *Narendrella* Sureshan, *Paraiemea* Sureshan & Narendran, *Oricoruna* Boucek and *Manineura* Boucek. Among the remaining genera 34 (59%) are of Palearctic, 9 (16.1%) of Australian, 6 (11%) of Oriental and 4 each (7.1%) of Nearctic and Ethiopian affinity (Chart.I). 9 genera (16 %) are world wide (cosmopolitan) in distribution. Out of the 132 species known from the region, 96 (72 %) are Oriental, 28 (21%) Palearctic, 4 (3.1%) Nearctic and Neotropical, 2 (1.5%) each Australian and Ethiopian (Chart.II). Five species enjoy a world wide distribution. They are, *Lariophagus distinguendus* (Forster), *Pteromalus puparum* (Linn.), *Nasonia vitripennis* (Walker), *Dibrachys cavus* (Walker) and *Anisopteromalus calandrae* (Howard). Among the 132 species known from the region 60% are endemic to India.

The present study reveals several interesting features and peculiarities in the geographical distributional patterns particularly in the genera, *Miscogasteriella*, *Uniclypea*, *Inkaka*, *Delislea*, *Halticopterella*, *Eurydinotomorpha* and *Merismomorpha*. *Miscogasteriella* Girault was previously known to occur only in Japan, China, Australia and Papua New Guinea (Boucek, 1988). Members of the genus are forest dwellers which develop as parasitoids of wood boring beetles. The discovery of a new species of *Miscogasteriella* from the forested tracts of southern western ghats at Parambikulam, Kerala reveals the occurrence of the genus in similar forested habitats in the Indian subcontinent (Sureshan, 1999). *Uniclypea* Boucek was originally described from South Africa and is also distributed in Vietnam, Sumatra and Borneo. The discovery of two new species of *Uniclypea* from southern western ghats is of

biogeographical significance (Sureshan & Narendran, 1994b, 1997).

Inkaka Girault was earlier known to occur in China, Australia and New Zealand. The discovery of a new species of *Inkaka* from Kerala, India is interesting (Sureshan, & Narendran, 1997). Narendran et al (1992b) reported a new species of *Delislea* from Kerala, which proves the existence of a genus previously known only from Australia in Peninsular India. *Halticopterella* Girault & Dodd was known to occur in Australia and New Guinea. Xiao & Huang (1997) reported three new species of *Halticopterella* from China. Further, Sureshan (2001b) has discovered three more new species of this genus from southern western ghats. He also synonymised *Lyubana* Boucek under *Halticopterella* and accordingly the genus also occur in the Palearctic Region. Boucek (1988) mentioned the occurrence of *Merismomorpha* Girault in India by an indetermined species. The genus was otherwise known to occur only in Australia. The discovery of three new species of *Merismomorpha* from Kerala, India by Sureshan (2000) confirmed the occurrence of the genus in the Oriental region.

Another interesting pattern of distribution is that of *Eurydinotomorpha* Girault. The genus was previously known from Australia, New Guinea and New Hebrides Islands (Boucek, 1988). Sureshan & Narendran (1990) synonymised *Asoka* Boucek under *Eurydinotomorpha* thereby transferring two species of the former genus known from Taiwan, Sri Lanka and Malaysia under *Eurydinotomorpha*. They also described a new species of *Eurydinotomorpha* from India, thus extending the distribution of it further to Indian subcontinent. *Oniticellobia* Boucek is an African genus and its presence in India and Sri Lanka was mentioned by Boucek et al (1979). A new species of *Oniticellobia* was later discovered from Kerala by Sureshan & Narendran (1994).

Some of the other interesting findings of the present investigation are the report of genera such as *Psilocera* Walker, *Trichomalus* Crawford, *Cryptoprymna* Forster, *Toxeomorpha* Girault, *Cyclagastrella* Bukowski and *Homoporus* Thomson and the species *Sphegigaster brunneicornis* (Ferriere), *Cyrtogaster clavicornis* Walker and *Pachyneuron solitarium* (Hartig) from India for the first time. *Psilocera* Walker was previously known only from Pakistan in the Oriental Region. Sureshan & Narendran (1995) reported *Psilocera* for the first time from India by describing two new species from Kerala. Sureshan (2001a) synonymised *Acanthometopon* Ashmead under *Psilocera* and further added two more species from India. *Acanthometopon* was formerly included a single species, *A. clavicorne* Ashmead, characterised by a peculiar scutellum with a finger nail like tip. Boucek & Heydon (1997) tentatively placed *Acanthometopon* under *Psilocera* pending further studies. Intermediate forms of scutellum were later observed in *Psilocera* species from India which led to the synonymy of *Acanthometopon* under *Psilocera*.

The present study confirms that the Pteromalid fauna of Indian subcontinent is not isolated from other parts of the world. Boucek et al. (1979) expressed the same view and also mentioned the possibility of the occurrence of many circum-tropical species in Indian subcontinent. They also opined that due to the large scale destruction of tropical forests

globally, many jungle dwelling species may survive only in small forest pockets and retain their wider distribution in the past in such areas. The distributional pattern presently exhibited by genera like *Halticopterella*, *Miscogasteriella*, *Unicypea* etc. prove this point.

The occurrence of many Palearctic genera and species in Peninsular India as revealed by the rediscovery of several Palearctic elements from isolated pockets of Western ghats is a likely indication that these genera and species continue to exist as the last remnants of a fauna once widely distributed in other parts of India. The occurrence of a good number of Ethiopian elements in Indian subcontinent may be attributable to the past land connection between the Indian subcontinent and Africa. The occurrence of a good number of Australian elements in peninsular India is very intriguing and further studies are required to analyse this interesting pattern of geographical distribution.

Some of the genera and species have apparently become cosmopolitan due to their introduction in different parts of the world mainly with various crops and as biocontrol agents. The species like *Lariophagus distinguendus* (Forster) and *Anisopteromalus calandrae* (Howard) which are active parasitoids of small beetles associated with stored grains reached different parts of the world along with the shipment of pulses and grains. Species like *Pteromalus puparum* (Linnaeus), *Nasonina vitripennis* (Walker), and *Dibrachys cavus* (Walker) were released in different countries as biocontrol agents.

CHECKLIST OF THE GENERA AND SPECIES OF PTEROMALINAE (PTEROMALIDAE) OF THE INDIAN SUBCONTINENT

Genus 1 *Acroclisoides* Girault & Dodd

1. *Acroclisoides indicus* Ferriere 1931 (India, Myanmar)
2. *Acroclisoides maculatus* Sureshan & Narendran 2002 (India)

Genus 2 *Agiommatius* Crawford

3. *Agiommatius paria* (Motschulsky) 1863 (India, Sri Lanka)
4. *Agiommatius geethae* Sureshan & Narendran 1996 (India)

Genus 3 *Anisopteromalus* Ruschka

5. *Anisopteromalus calandrae* (Howard) 1881 (India, Pakistan, Myanmar),
Cosmopolitan.

Genus 4 *Callitula* Spinola

6. *Callitula rugosa* (Waterston) 1915 (India, Sri Lanka)
7. *Callitula keralensis* Sureshan 2002 (India)
8. *Callitula anguloclypea* Sureshan 2002 (India)
9. *Callitula travancorensis* Sureshan 2002 (India)
10. *Callitula robusta* Sureshan 2002 (India)
11. *Callitula peethapada* Narendran & Mohana 2001 (India)

12. *Callitula bambusae* Narendran & Jobiraj 2001 (India)

Genus 5 *Catolaccus* Thomson

13. *Catolaccus crassiceps* (Masi) 1911 (India, Pakistan), Europe

Genus 6 *Cheiopachus* Westwood

14. *Cheiopachus quadrum* (Fabricius), 1787 (India, Pakistan), Europe, America

Genus 7 *Chlorocytus* Graham

15. *Chlorocytus xanthopus* (Cameron) 1906 (India, Pakistan)

16. *Chlorocytus indicus* Sureshan 2000 (India)

17. *Chlorocytus murriensis* Graham 1965 (Pakistan)

Genus 8 *Conomorium* Masi

18. *Conomorium* sp. indet. (India)

Genus 9 *Coruna* Walker

19. *Coruna clavata* Walker 1833 (India), Europe, America.

Genus 10 *Cryptoprymna* Forster

20. *Cryptoprymna elongata* Sureshan & Narendran 2000 (India)

21. *Cryptoprymna indiana* Sureshan & Narendran 2000 (India)

22. *Cryptoprymna brama* (Motschulsky), 1863. (Sri Lanka), Malaysia.

Genus 11 *Cyclogastrella* Bukowski

23. *Cyclogastrella nigra* Sureshan 2001 (India)

Genus 12 *Cyrtogaster* Walker

24. *Cyrtogaster clavicornis* Walker, 1833 (India), Europe, America.

Genus 13 *Cyrtoptyx* Delucchi

25. *Cyrtoptyx latipes* (Rondani) 1877 (India, Pakistan), Europe.

Genus 14 *Delislea* Girault

26. *Delislea rahimani* Narendran & Anil 1992 (India)

Genus 15 *Dibrachys* Forster

27. *Dibrachys cavus* (Walker) 1835 (India), Cosmopolitan

Genus 16 *Dinarmus* Thomson

28. *Dinarmus acutus* (Thomson) 1878 (India), Europe, Africa.

29. *Dinarmus basalis* (Rondani) 1877 (India, Pakistan, Bangladesh), Europe, Africa, Thailand.

30. *Dinarmus colemani* (Crawford) 1913 (India, Bangladesh)

31. *Dinarmus maculatus* (Masi) 1924 (India, Myanmar)

32. *Dinarmus vagabundus* (Timberlake) 1926 (India, Pakistan, Sri Lanka), Vietnam, Africa.

33. *Dinarmus altifrons* (Walker) 1862 (India, Pakistan), Europe, Africa.

Genus 17 *Euneura* walker

34. *Euneura lachni* (Ashmead) 1877 (Pakistan), Europe.

Genus 18 *Eurydinotomorpha* Girault

35. *Eurydinotomorpha malabarensis* Sureshan & Narendran 1990 (India)

36. *Eurydinotomorpha petiolatus* (Boucek) 1973 (Sri Lanka), Malaysia.

Genus 19 *Halticopterella* Girault & Dodd

37. *Halticopterella robusta* Sureshan 2001 (India)

38. *Halticopterella burwelli* Sureshan 2001 (India)

39. *Halticopterella longiflagellum* Sureshan 2001 (India)

40. *Halticopterella rampurensis* Sureshan 2001 (India)

Genus 20 *Homoporus* Thomson

41. *Homoporus acuminatus* Sureshan & Narendran 2000 (India)

42. *Homoporus gladius* Sureshan & Narendran 2000 (India)

Genus 21 *Inkaka* Girault

43. *Inkaka keralensis* Sureshan & Narendran 1997 (India)

Genus 22 *Ischyroptyx* Delucchi

44. *Ischyroptyx* sp. indet. (India)

* Genus 23 *Kumarella* Sureshan

45. *Kumarella angulus* Sureshan 1999 (India)

46. *Kumarella sandroi* Narendran & Mohana 2001 (India)

Genus 24 *Lariophagus* Crawford

47. *Lariophagus distinguendus* (Forster) 1841 (India, Nepal), Cosmopolitan.

* Genus 25 *Manineura* Boucek

48. *Manineura pentatomivora* Boucek 1939 (India)

Genus 26 *Merismomorpha* Girault

49. *Merismomorpha minuta* Sureshan 2000 (India)

50. *Merismomorpha elongata* Sureshan 2000 (India)

51. *Merismomorpha truncata* Sureshan 2000 (India)

Genus 27 *Mesopolobus* Westwood

52. *Mesopolobus minutus* Sureshan & Narendran (India)

53. *Mesopolobus keralensis* Sureshan & Narendran (India)

54. *Mesopolobus harithus* Sureshan & Narendran (India)

Genus 28 *Metacolus* Forster

55. *Metacolus unifasciatus* (Forster) 1876 (India), Europe.

56. *Metacolus beelsoni* (Mani & Kaul) 1973 (India), Israel.

Genus 29 *Metastenus* Walker

57. *Metastenus indicus* Sureshan & Narendran, 2002 (India)

58. *Metastenus concinnus* walker 1834 (India), Europe.

Genus 30 *Miscogasteriella* Girault

59. *Miscogasteriella jayasreeae* Sureshan 1999 (India)

Genus 31 *Mokrzeckia* Mokrzecki

60. *Mokrzeckia orientalis* Subba Rao 1973 (India, Sri Lanka), Indonesia, Thailand.

61. *Mokrzeckia menzeli* Subba Rao 1973 (India)

* Genus 32 *Narendrella* Sureshan

62. *Narendrella nilamburensis* Sureshan 1999 (India)

Genus 33 *Nasonia* Ashmead

63. *Nasonia vitripennis* (Walker) 1836 (India), Cosmopolitan

Genus 34 *Norbanus* Walker

64. *Norbanus birmanus* (Masi) 1927 (Myanmar)

65. *Norbanus acuminatus* Dutt & Ferriere 1961 (India)

66. *Norbanus indarum* (Masi) 1927 (India, Pakistan)

67. *Norbanus scrobatus* sp. nov. (India)

68. *Norbanus thekkadiensis* sp. nov. (India)

69. *Norbanus equus* sp. nov. (India)

70. *Norbanus malabarensis* sp. nov. (India)

Genus 35 *Notoglyptus* Girault

71. *Notoglyptus scutellaris* (Dodd & Girault) 1915 (India), Europe, Australia, America.

Genus 36 *Oniticellobia* Boucek

72. *Oniticellobia longigastra* Sureshan & Narendran 1994 (India)

* Genus 37 *Oricoruna* Boucek

73. *Oricoruna arcotensis* (Mani & Kurian) 1953 (India)

Genus 38 *Oxysychus* Delucchi

74. *Oxysychus coimbatorensis* (Ferriere) 1939 (India, Pakistan)

75. *Oxysychus nupserhae* (Dutt & Ferriere) 1961 (India)

76. *Oxysychus sphenopterae* (Ferriere) 1931 (India), Africa

77. *Oxysychus macregaster* Sureshan & Narendran 2001. (India)

Genus 39 *Pachycrepoideus* Ashmead

78. *Pachycrepoideus vindemmiae* (Rondani) 1875 (India), Europe.

79. *Pachycrepoideus veerannai* Narendran & Anil 1992 (India)

Genus 40 *Pachyneuron* Walker

- 80. *Pachyneuron aeneum* Masi 1929 (India), Europe.
- 81. *Pachyneuron ahlaense* Mani & Saraswat 1974 (India)
- 82. *Pachyneuron aphidis* (Bouche) 1834 (India, Pakistan), Europe.
- 83. *Pachyneuron groenlandicum* (Holmgren) 1872 (India), Europe.
- 84. *Pachyneuron solitarium* (Hartig) 1838 (India), Europe, Japan.
- 85. *Pachyneuron chambhaense* Mani & Saraswat 1974 (India)
- 86. *Pachyneuron leucopiscida* Mani (India)

Genus 41 *Paracarotomus* Ashmead

- 87. *Paracarotomus cephalotes* Ashmead 1894 (India), Australia, America, Europe.

* Genus 42 *Paraiemea* Sureshan & Narendran

- 88. *Paraiemea vishnuae* Sureshan & Narendran 1998 (India)
- 89. *Paraiemea convexa* Sureshan & Narendran 1998 (India)

Genus 43 *Platecrizotes* Ferriere

- 90. *Platecrizotes* sp. indet. (India)

Genus 44 *Propicroscytus* Szelenyi

- 91. *Propicroscytus mirificus* (Girault) 1915 (India, Sri Lanka), Australia.
- 92. *Propicroscytus oryzae* (Subba Rao) 1973 (India, Sri Lanka)

Genus 45 *Psilocera* Walker

- 93. *Psilocera scutellata* Sureshan 2001 (India)
- 94. *Psilocera heydoni* Sureshan 2001 (India)
- 95. *Psilocera vinayaki* Sureshan & Narendran 1995 (India)
- 96. *Psilocera clavata* Sureshan & Narendran 1995 (India)
- 97. *Psilocera clavicornis* (Ashmead) 1904 (Sri Lanka), South America.
- 98. *Psilocera ghanii* Subba Rao 1981 (Pakistan)

Genus 46 *Pteromalus* Swederus

- 99. *Pteromalus sequester* Walker 1835 (India), Europe.
- 100. *Pteromalus semotus* (Walker) 1834 (India, Pakistan), Europe.
- 101. *Pteromalus puparum* (Linnaeus) 1758 (India), Cosmopolitan.
- 102. *Pteromalus metallicus* Sureshan 2001 (India)
- 103. *Pteromalus nigrus* Sureshan 2001 (India)
- 104. *Pteromalus keralensis* Sureshan 2001 (India)

Genus 47 *Rhaphitelus* Walker

- 105. *Rhaphitelus maculatus* Walker, (India), Europe, Australia, America.

Genus 48 *Rhopalicus* Forster

- 106. *Rhopalicus* sp. indet.(India)

Genus 49 *Roptrocerus* Ratzeburg

107. *Roptrocerus xylophagorum* (Ratzeburg) 1844 (India), Europe.

Genus 50 *Schizonotus* Ratzeburg

108. *Schizonotus sieboldi* (Ratzeburg) 1852 (Pakistan), Europe.

109. *Schizonotus latus* (Walker) 1833 (Pakistan), Europe.

Genus 51 *Sphegigaster* Spinola

110. *Sphegigaster stepicola* Boucek 1965 (India), Europe, Austria, Algeria.

111. *Sphegigaster brunneicornis* (Ferriere) 1930 (India, Sri Lanka)

112. *Sphegigaster anamudiensis* Sureshan & Narendran 1997 (India)

113. *Sphegigaster reticulata* Sureshan & Narendran 1997 (India)

114. *Sphegigaster indica* Sureshan & Narendran 2002 (India)

Genus 52 *Sphegigastrella* Masi

115. *Sphegigastrella* sp. indet. (Sri Lanka)

Genus 53 *Syntomopus* Walker

116. *Syntomopus carinatus* Sureshan & Narendran 1999 (India)

117. *Syntomopus nigrus* Sureshan & Narendran 1999 (India)

118. *Syntomopus rajamalaiensis* Sureshan & Narendran 1999 (India)

Genus 54 *Toxeumorpha* Girault

119. *Toxeumorpha megacephala* (Waterston) 1915 (Sri Lanka)

120. *Toxeumorpha minuta* Sureshan & Narendran 2000 (India)

Genus 55 *Trichomalopsis* Crawford

121. *Trichomalopsis apanteloctena* (Crawford) 1911 (India, Bangladesh), Japan, Korea, Malaysia, China, Taiwan, Philippines, Korea.

122. *Trichomalopsis deplanata* Kamijo & Grissell 1982 (India) China, Japan, Korea.

123. *Trichomalopsis thekkadiensis* Sureshan & Narendran, 2001 (India)

124. *Trichomalopsis nigra* Sureshan & Narendran, 2001 (India)

125. *Trichomalopsis acarinata* Sureshan & Narendran, 2001 (India)

126. *Trichomalopsis ovigastra* Sureshan & Narendran, 2001 (India)

127. *Trichomalopsis travancorensis* Sureshan & Narendran, 2001 (India)

128. *Trichomalopsis neelagastra* Sureshan & Narendran, 2001 (India)

Genus 56 *Trichomalus* Thomson

129. *Trichomalus keralensis* Sureshan & Narendran, 2002 (India)

130. *Trichomalus kannurensis* Sureshan & Narendran 1994 (India)

Genus 57 *Uniclypea* Boucek

131. *Uniclypea kumarani* Sureshan & Narendran 1994 (India)

132. *Uniclypea elongata* Sureshan & Narendran 1997 (India)

* Endemic to India.

**Distribution of genera of Pteromalinae of Indian
subcontinent in other zoogeographical regions**

Genera	OR	PAL	AUS	ETH	NEA	NEO
<i>Acroclisoides</i> Girault & Dodd	x		x			
<i>Agiommatius</i> Crawford	x		x	x		
** <i>Anisopteromalus</i> Ruschka	x	x	x	x	x	x
<i>Callitula</i> Spinola	x	x	x	x	x	x
<i>Catolaccus</i> Thomson	x	x			x	
<i>Cheiropachus</i> Westwood	x	x		x	x	
<i>Cholrocytus</i> Graham	x	x	x	x	x	
<i>Conomorium</i> Masi	x	x			x	
<i>Coruna</i> Walker	x	x			x	
<i>Cryptoprymna</i> Forster	x	x	x	x	x	
<i>Cyclogastrella</i> Bukowski	x	x	x		x	
<i>Cyrtogaster</i> Walker	x	x			x	
<i>Cyrtoptyx</i> Delucchi	x	x				
<i>Delislea</i> Girault	x		x			
** <i>Dibrachys</i> Forster	x	x	x	x	x	x
<i>Dinarmus</i> Thomson	x	x	x	x	x	x
<i>Euneura</i> Walker	x	x			x	
<i>Eurydinotomorpha</i> Girault	x		x			
<i>Halticopterella</i> Girault & Dodd	x		x			
<i>Homoporus</i> Thomson	x	x	x	x	x	
<i>Inkaka</i> Girault	x		x			
<i>Ischyroptyx</i> Delucchi	x	x				
* <i>Kumarella</i> Sureshan	x					
** <i>Lariophagus</i> Crawford	x	x	x	x	x	x
* <i>Manineura</i> Boucek	x					
<i>Merismomorpha</i> Girault	x		x			
** <i>Mesopolobus</i> Westwood	x	x	x	x	x	x
<i>Metacolus</i> Forster	x	x			x	

Genera	OR	PAL	AUS	ETH	NEA	NEO
<i>Metastenus</i> Walker	X	X	X	X	X	-
<i>Miscogasteriella</i> Girault	X	X	X	-	-	-
<i>Mokrzeckia</i> Mokrzecki	X	X	-	-	-	-
* <i>Narendrella</i> Sureshan	X	-	-	-	-	-
** <i>Nasonia</i> Ashmead	X	X	X	X	X	X
<i>Norbanus</i> Walker	X	X	X	X	X	X
<i>Notoglyptus</i> Girault	X	X	X	X	X	-
<i>Oniticellobia</i> Boucek	X	-	-	X	-	-
* <i>Oricoruna</i> Boucek	X	-	-	-	-	-
<i>Oxysychus</i> Delucchi	X	X	X	X	X	-
** <i>Pachycrepoideus</i> Ashmead	X	X	X	X	X	X
** <i>Pachyneuron</i> Walker	X	X	X	X	X	X
** <i>Paracarotomus</i> Ashmead	X	X	X	X	X	X
* <i>Paraiemea</i> Sureshan & Narendran	X	-	-	-	-	-
<i>Platecrizotes</i> Ferriere	X	X	-	X	-	-
<i>Propicroscytus</i> Szelenyi	X	-	X	X	-	-
<i>Psilocera</i> Walker	X	X	X	X	X	X
** <i>Pteromalus</i> Swederus	X	X	X	X	X	X
<i>Rhaphitelus</i> Walker	X	X	X	-	X	X
<i>Rhopalicus</i> Forster	X	X		-	X	-
<i>Roptrocerus</i> Ratzeburg	X	X	X	-	X	-
<i>Schizonotus</i> Ratzeburg	X	X	-	-	X	-
<i>Sphegigaster</i> Spinola	X	X	X	X	X	X
<i>Sphegigastrella</i> Masi	X	-	-	X		-
<i>Syntomopus</i> Walker	X	X	X	X	X	X
<i>Trichomalopsis</i> Crawford	X	X	X	X	X	X
<i>Trichomalus</i> Thomson	X	X	-	-	X	-
<i>Toxeumorpha</i> Girault	X	-	X	X	-	-
<i>Uniclypea</i> Boucek	X	-	-	X	-	-

OR - Oriental, PAL - Palearctic, AUS - Australian, ETH - Ethiopian, NEA - Nearctic, NEO - Neotropical

* Endemic to India, ** World wide in distribution

HOST-PARASITE LIST (INSECT HOSTS)

- Acherontia styx* Westwood (Lepidoptera : Sphingidae)
Agiommatus paria
- Agromyza* spp. (Diptera : Agromyzidae)
Sphegigaster brunneicornis
- Apanteles glomeratus* (Linnaeus) (Hymenoptera : Braconidae)
Catolaccus crassiceps
- Apanteles malevolus* Wilkinson
Mokrzeckia menzeli
- Apanteles obliqua niger* Wilkinson
Mokrzeckia menzeli
- Apanteles ruficrus* Haliday
Mokrzeckia menzeli
- Apanteles taragamae* Wilkinson
Delislea rahimani
- Apanteles* spp.
Catolaccus crassiceps, Mokrzeckia orientalis
- Aphidius* spp. (Hymenoptera : Aphididae)
Pachyneuron aphidis
- Aphids* (Homoptera : Aphidoidea)
Pachyneuron aphidis, Pachyneuron solitarium
- Aphis rumicis* Linnaeus (Homoptera : Aphidoidea)
Pachyneuron aphidis
- Athesapwuta cyperi* Marshall (Coleoptera : Curculionidae)
Anisopteromalus calandrae
- Bark beetle* (Coleoptera : Scolytidae)
Roptrocerus xylophagorum
- Beetles-Pupa*
Pteromalus semotus
- Blastophagus khasianus*
Rhopalicus sp.
- Bombyx mori*

Pachycrepoideus veerannai

Borer (Lepidoptera)

Norbanus indorum

Brachycaudus helichrysi (Kaltenbach) (Homoptera : Aphidoidea)

Pachyneuron aphidis

Brachycaudus sp.

Pachyneuron groenlandicum

Bruchids (Coleoptera : Bruchidae)

Dinarmus acutus, Dinarmus basalis, Dinarmus vagabundus, Dinarmus altifrons

Butterflies-Pupa

Pteromalus puparum

Callosobruchus analis (Coleoptera : Bruchidae)

Dinarmus basalis

Callosobruchus chinensis (Linnaeus) (Coleoptera : Bruchidae)

Dinarmus basalis, Dinarmus colemani

Callosobruchus maculatus (Fabricius)

Dinarmus basalis

Callosobruchus spp.

Anisopteromalus calandrae

Caryedon gonagra (Coleoptera : Bruchidae)

Dinarmus altifrons

Characoma nilotica Rogenhofer (Lepidoptera : Noctuidae)

Catolaccus crassiceps

Chrysomelids (Coleoptera : Chrysomelidae)

Schizonotus latus

Cnaphalocrocis medinalis (Guenee) (Lepidoptera : Pyralidae)

Trichomalopsis apanteloctena

Coccidohystrix insolita (Green) (Homoptera : Pseudococcidae)

Catolaccus crassiceps

Coccoidea (Homoptera)

Metastenus concinnus, Pachyneuron solitarium

Coniatus indicus Marshall (Coleoptera : Curculionidae)

Catolaccus crassiceps

Cryptocephalus faustus Suffrian (Coleoptera : Chrysomelidae)

Psilocera ghanii

Curculionidae (Coleoptera)

Pteromalus semotus, *Oxysychus coimbatorensis*.

Cutworm (Lepidoptera : Noctuidae)

Agiommatus geethae

Cydia sinana (Lepidoptera : Tortricidae)

Cyrtoptyx latipes

Cyperus rotundus

Anisopteromalus calandrae

Dactylopius sp. (Homoptera : Dactylopidae)

Pachyneuron leucopiscida

Diptera (Including leaf miners)

Propicroscytus mirificus, *Pachycrepoideus vindemmiae*, *Chlorocytus murriensis*

Ectropis deodarae Prout (Lepidoptera Geometridae)

Dibrachys cavus

Exorista sorbillans Wied. (Diptera : Tachinidae)

Pachycrepoideus veerannai

Gall Fly (Diptera)

Propicroscytus oryzae

Gall Midge (Diptera : Cecidomyiidae)

Propicroscytus mirificus

Hapalia macheralis

Mokrzeckia menzeli

Hesperidae (Lepidoptera)

Trichomalopsis apanteloctena

Homona coffearia (Nietner) (Lepidoptera Tortricidae)

Mokrzeckia orientalis

Hyblaea puera (Cramer) (Lepidoptera Hyblaeidae)

Mokrzeckia menzeli

Hymenia recurvalis (Fabricius) (Lepidoptera : Pyralidae)

Catolaccus crassiceps

Hypolixus truncatulus (Fabricius) (Coleoptera : Curculionidae)

Cyrtoptyx latipes, *Oxysychus coimbatorensis*

Hypolixus sp.

Cyrtoptyx latipes

Icerya aegyptiaca (Douglas) (Homoptera : Margarodidae)

Oricoruna arcotensis

Icerya spp.

Oricourna arcotensis

Ishiodon sp. (Hemiptera : Aphididae)

Pachyneuron groenlandicum

Lepidoptera

Mokrzeckia orientalis, *Pteromalus puparum*, *Pteromalus semotus*

Leucopis nigricornis (Diptera : Chamaemyiidae)

Pachyneuron leucopiscida

Macrosiphum spp. (Homoptera : Aphidoidea)

Coruna clavata, *Pachyneuron aphidis*

Melanagromyza spp. (Diptera : Agromyzidae)

Sphegigaster stepicola

Melasoma populi (Coleoptera : Chrysomelidae)

Schizonotus sieboldi

Miocolus dubius

Mokrzeckia menzeli

Musca domestica Linnaeus (Diptera : Muscidae)

Pachycrepoideus vindemmiae,

Myzus persicae (Sulzer) = *LACHNUS* sp. (Homoptera : Aphidoidea)

Euneura lachni

Myzus sp. (Homoptera: Aphidoidea)

Pachyneuron aphidis

Nupserha bicolor (Thomson) (Coleoptera : Cerambycidae)

Norbanus acuminatus, *Oxysychus nupserhae*

Ophiomyia phaseoli (Tryon) (Diptera : Agromyzidae)

Callitula rugosa, *Sphegigaster brunneicornis*

Opisina arenosella Walker (Lepidoptera)

Delislea rahimani

Orseolia oryzae (Wood-Mason) (Diptera : Cecidomyiidae)
Pachycrepoideus vindemmiae, Propicroscytus oryzae

Oryzaephilus surinamensis (Coleoptera: Silvanidae)
Anisopteromalus calandrae

Papilio sp. (Lepidoptera : Papilionidae)
Pteromalus puparum

Paragus sp.(Diptera: Syrphidae)
Paracarotomus cephalotus

Pectinophora gossypiella (Saunders) (Lepidoptera : Gelechiidae)
Catolaccus crassiceps

Pelopidas mathias (Fabricius) (Lepidoptera : Hesperiiidae)
Trichomalopsis apanteloctena

Pempherulus affinis (Faust) (Coleoptera : Curculionidae)
Anisopteromalus calandrae, Oxysychus coimbatorensis

Pentatomid Bug Eggs (Heteroptera, Pentatomidae)
Acroclisoides indicus, Manineura pentatomivora

Phytomyza spp. (Diptera : Agromyzidae)
Sphegigaster stepicola

Polithlipta macralis Lederer (Lepidoptera : Pyralidae)
Mokrzeckia orientalis

Rhizopertha dominica Fabricius (Coleoptera : Bostrychidae)
Anisopteromalus calandrae

Scirpophaga incertulas (Walker)
Propicroscytus mirificus

Scolytus sp : Scolytidae)
Rhaphitelus maculatus, Cheiropachus quadrum

Sitophilus granarius (Linnaeus) (Coleoptera : Curculionidae)
Anisopteromalus calandrae

Sitophilus oryzae (Linnaeus)
Anisopteromalus calandrae

Sitophilus sp.
Anisopteromalus calandrae, Lariophagus distinguendus

Sphenoptera gossypii Cotes (Coleoptera : Buprestidae).

Oxysychus sphenopterae

Stegobium paniceum (Linnaeus) (Coleoptera : Anobiidae)

Lariophagus distinguendus

Syrphids (Diptera)

Pachyneuron aeneum, *Pachyneuron ahlaense*, *Pachyneuron groenlandicum*,
Paracarotomus cephalotus

Tachinids (Diptera)

Pachycrepoideus vindemmiae, *Trichomalopsis deplanata*

Tribolius castaneus (Coleoptera : Tenebrionidae)

Anisopteromalus calandrae

Trioxys indicus Subba Rao & Sharma (Hymenoptera : Aphididae)

Coruna clavata

Trogoderma granarium Everts (Coleoptera : Dermestidae)

Dinarmus basalis

Tropicomyia theae (Cotes) (Diptera : Agromyzidae)

Toxeumorpha megacephala

Urostylis punctigera Westwood (Heteroptera : Pentatomidae)

Manineura pentatomivora

Xylophagous Beetle (Coleoptera)

Cheiropachus quadrum

PLANT HOSTS

Albizia lebbek – Seeds

Dinarmus altifrons

Cynodon dactylon – galls

Propicroscytus mirificus

Pueraria tuberosa – Pods

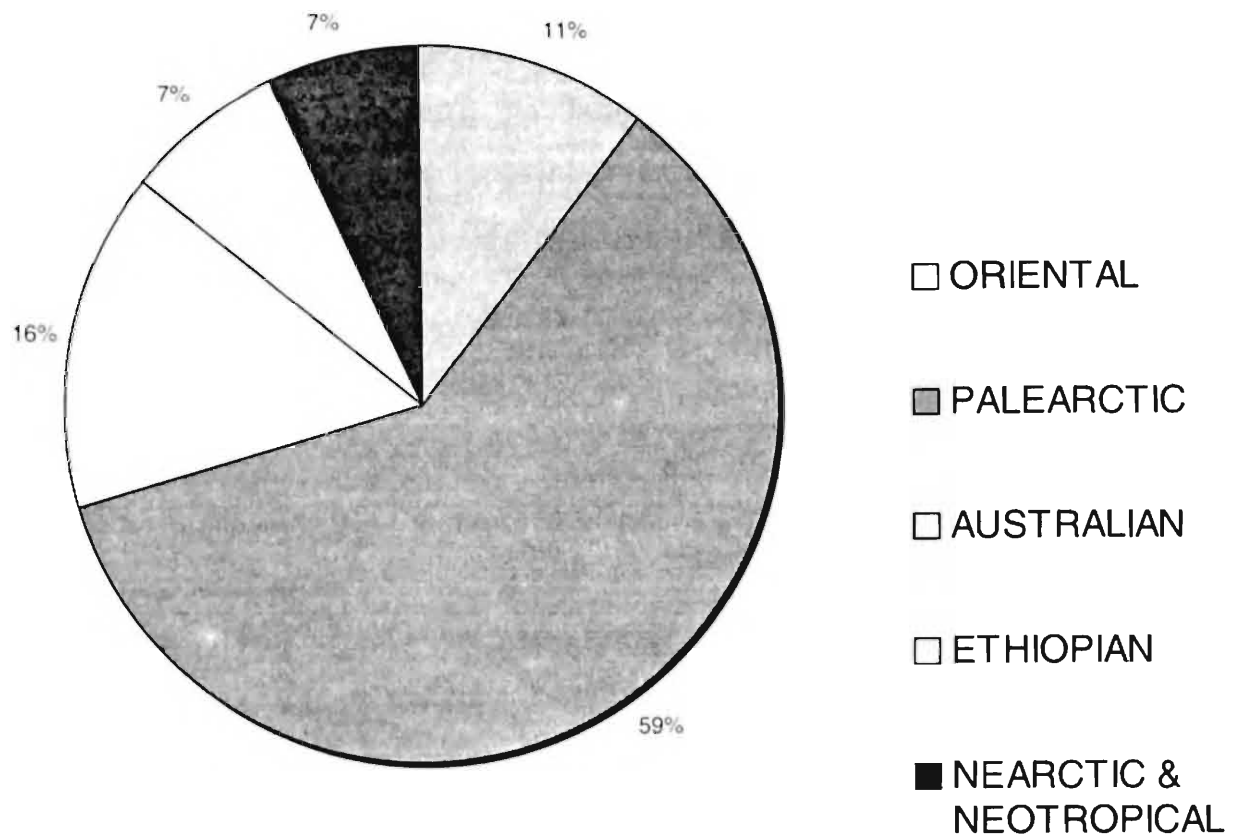
Dinarmus altifrons

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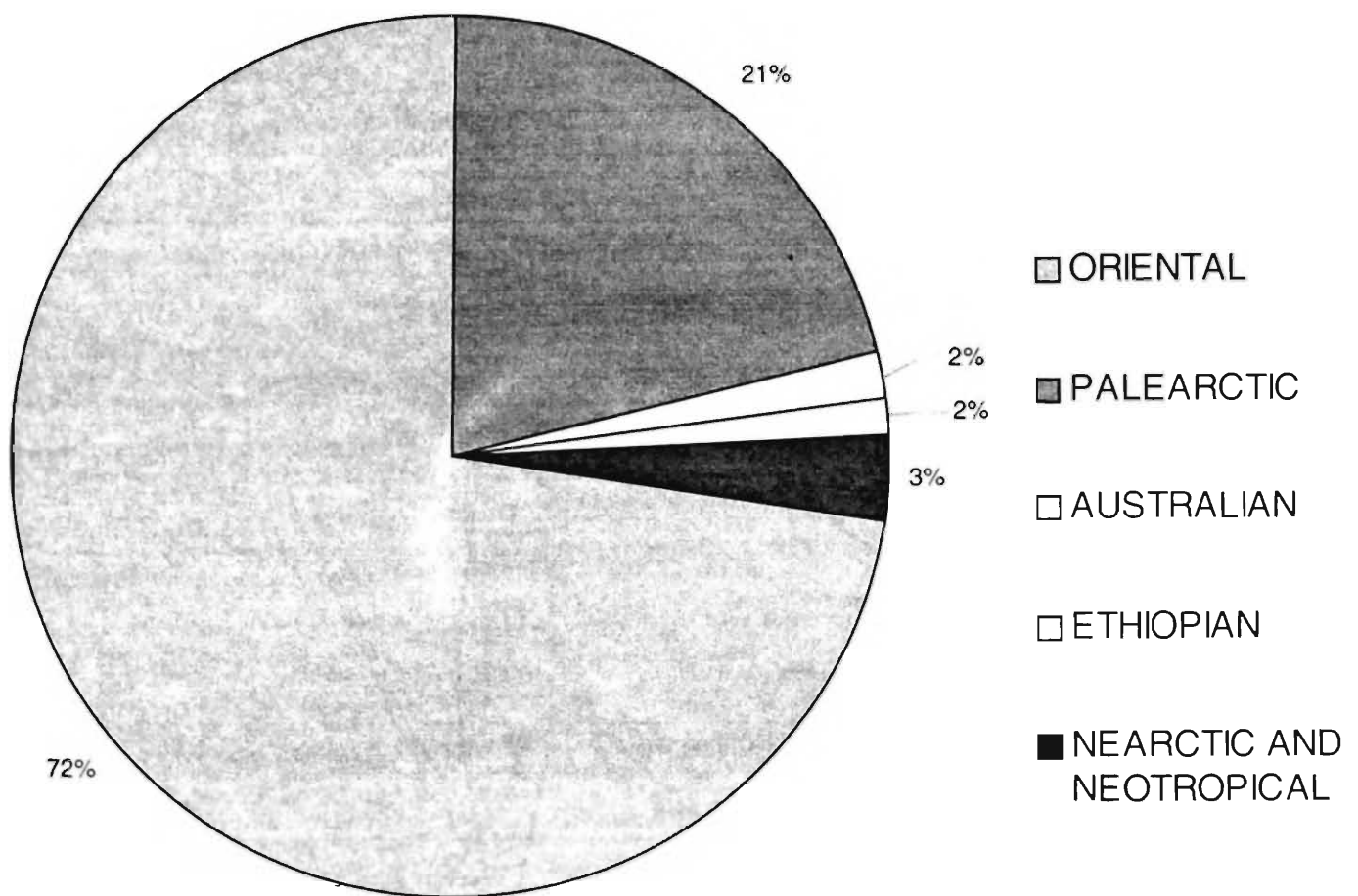
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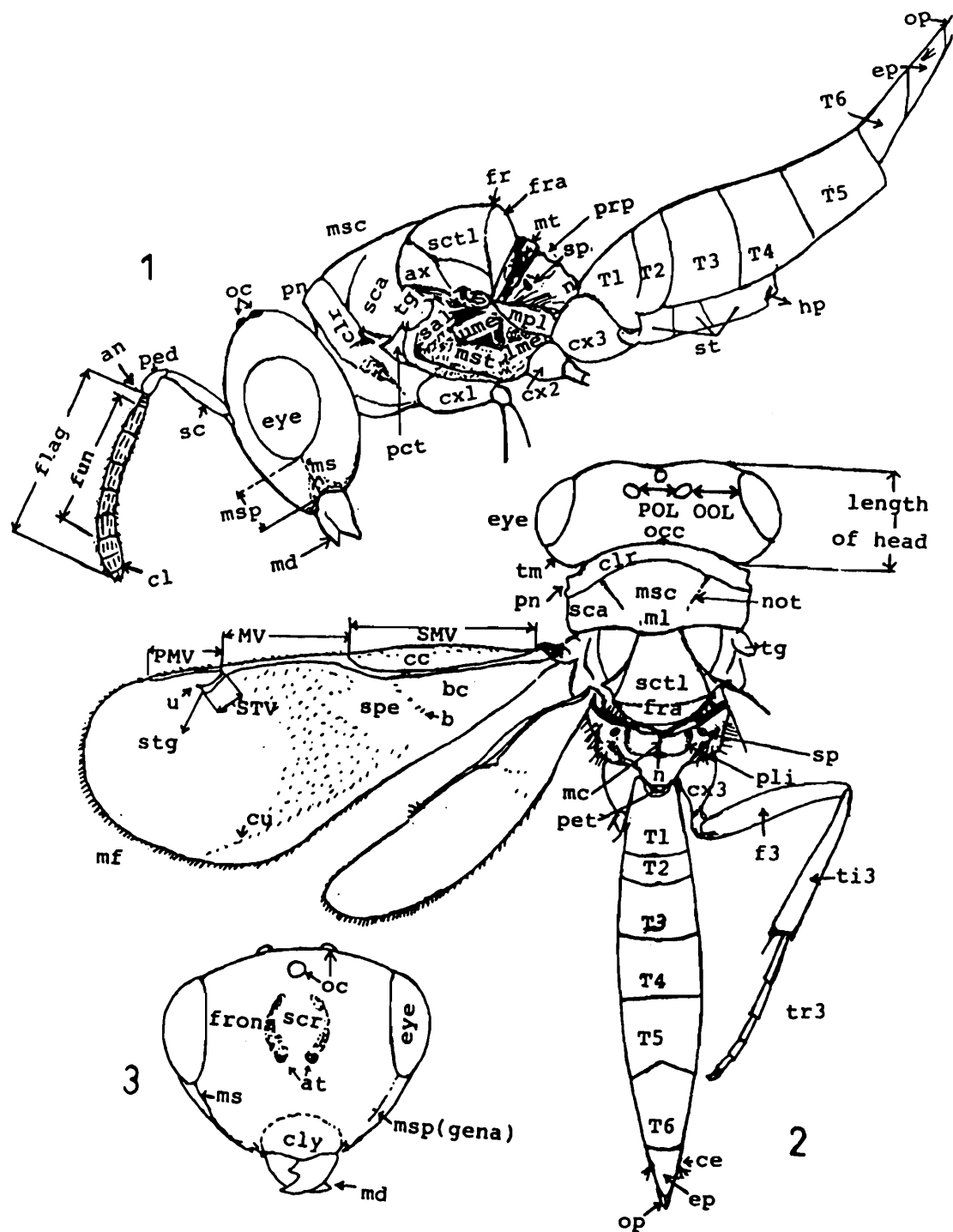
CHART. I.

**ZOOGEOGRAPHICAL ANALYSIS OF THE GENERA IN THE
SUBFAMILY PTEROMALINAE**

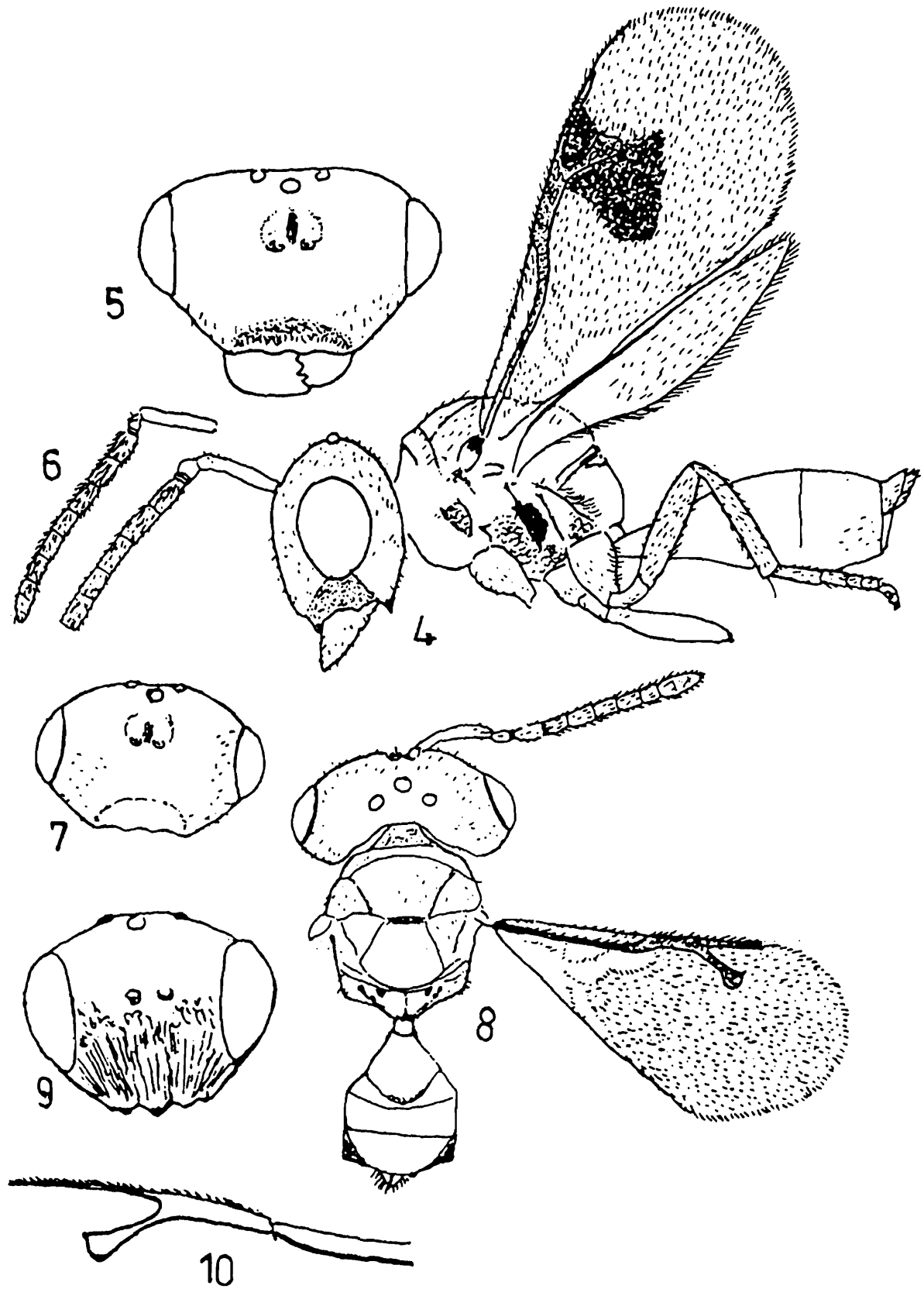
CHART. II.



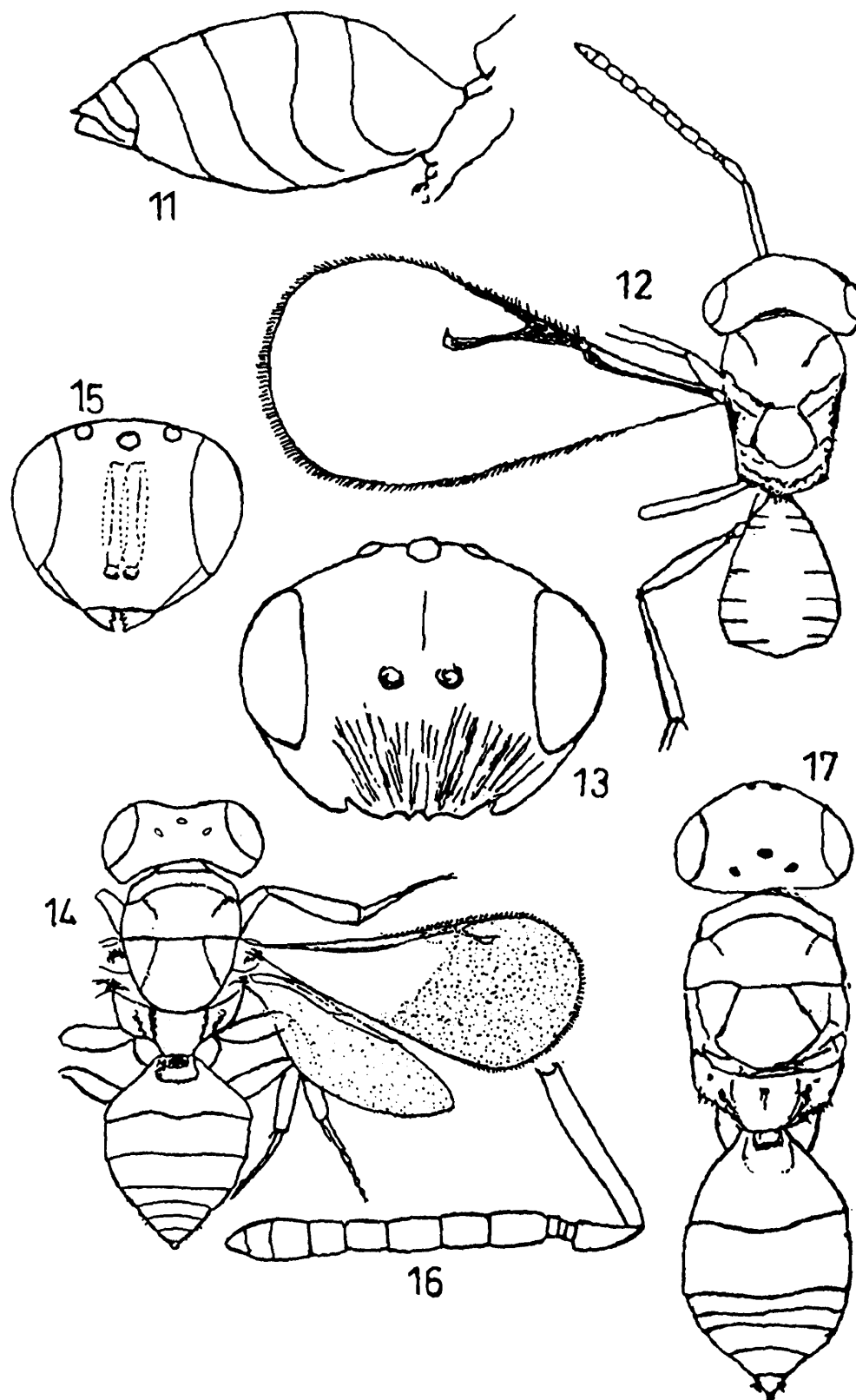
**ZOOGEOGRAPHICAL ANALYSIS OF THE SPECIES IN THE
SUBFAMILY PTEROMALINAE**



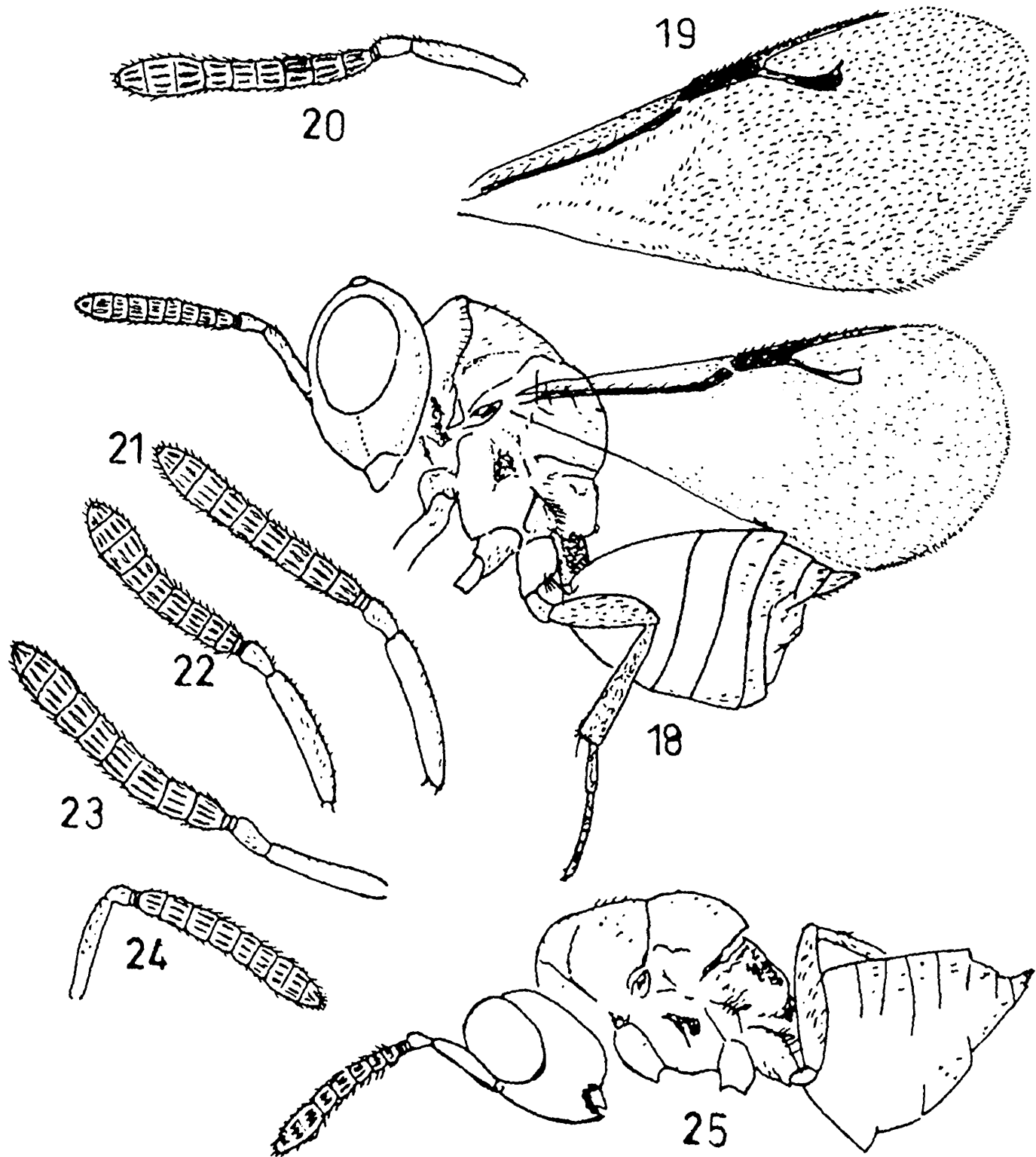
1-3 : *Kumarella angulus* Sureshan Female : an : anelli, ax : axilla, at : antennal toruli; b : basal cell; cc : costal cell; ce : cercus; cl : clava; clm : collum; clr : collar; cly : clypeus; cu : cubital vein; cx. 1-3 : fore, mid and hind coxa; ep : epipygium; f3 : hind femur; flag : flagellum; fr : frenal line; fra : frenal area; fun : funicle; lme : lower epimeron; MV : marginal vein; mc : median carina; md : mandible; mf : marginal fringe; ml : mid lobe; mpl : metapleuron; ms : malar sulcus; msc : mesoscutum; msp : malar space; mst : mesepisternum; mt : metanotum; n : nucha (neck); not : notaulus; oc : ocelli; OOL : ocellular distance; pct : prepectus; ped : pedicellus; pet : petiole; pli : plica; PMV : post marginal vein; pn : pronotum; POL : post-ocellar distance; prp : propodeum; sal : sub alar area; sc : scapus; sca : scapula (lateral lobe); scr : scrobe; scl : scutellum; SMV : submarginal vein; sp : spiracle; spe : speculum; STV : stigmal vein; stg : stigma; T1-T6 : gastral tergites 1-6; tg : tegula; ti 3 : hind tibia; tr3 : hind tarsus; u : uncus; ume : upper mesepimeron.



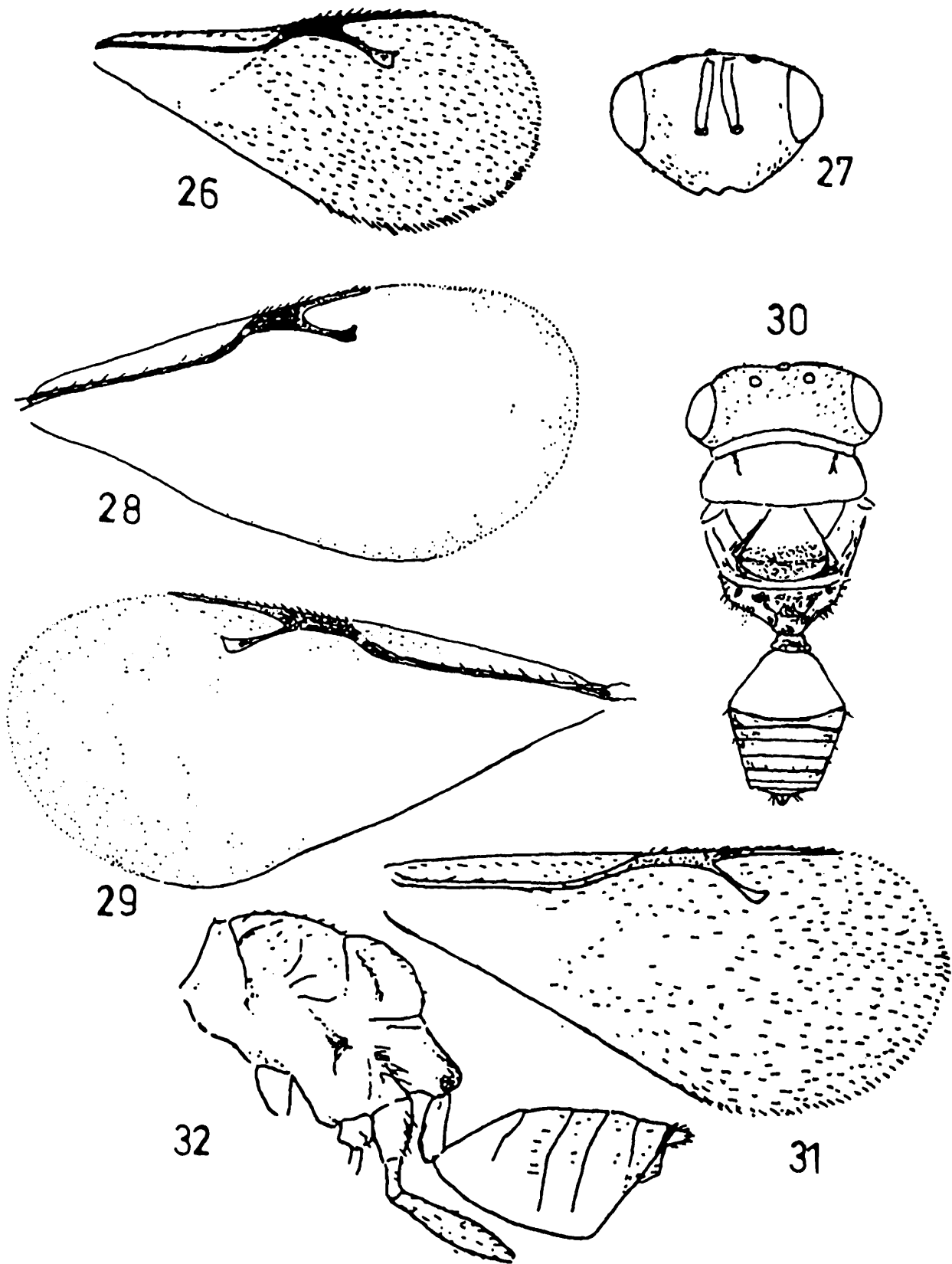
4-6. *Acroclisoides maculatus* Sureshan & Narendran Female : 4, body in profile; 5, head front view; 6, male antenna; 7-8. *Acroclisoides indicus* Ferriere Female : 7, head front view; 8, body dorsal view ; 9-10. *Coruna clavata* Walker Female : 9, head front view; 10, forewing venation.



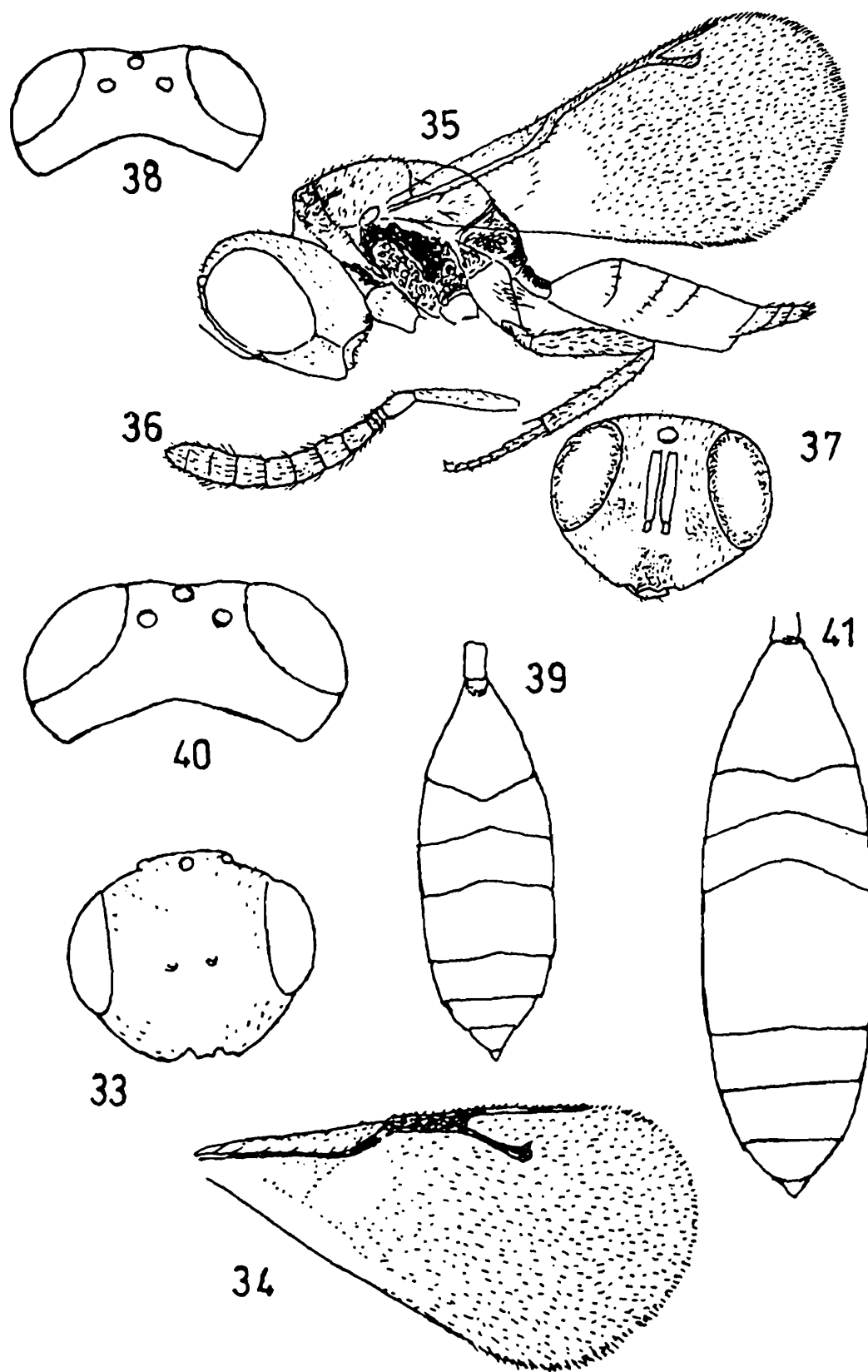
11. *Euneura lachni* (Ashmead) female gaster; 12, *Manineura pentatomivora* (Mani), female body; 13, *Euneura* sp. Head front view; 14-16. *Pachycrepoideus veerrannai* Narendran & Anil Female : 14, body in dorsal view; 15, head front view; 16, antenna; 17. *Pachycrepoideus vindemmiae* (Rondani), female body.



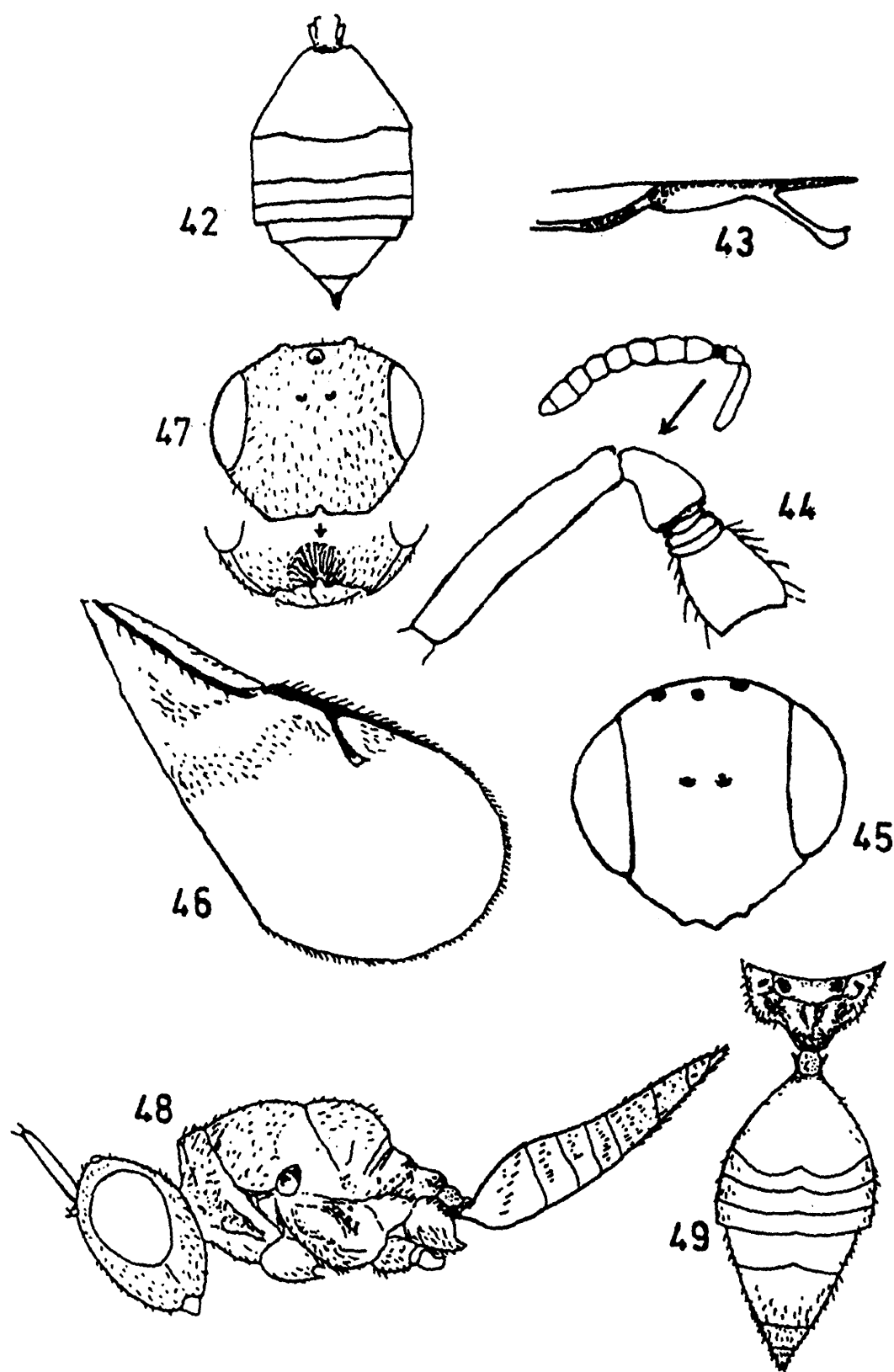
18, *Pachyneuron leucopiscida* Mani female body in profile; 19-20, *Pachyneuron chambaense* Mani & Saraswat Female: 19, forewing; 20, antenna; 21, *Pachyneuron ahlaense* Mani & Saraswat, female antenna; 22 *Pachyneuron aeneum* Masi, female antenna; 23, *Pachyneuron groenlandicum* (Holmgren), female antenna; 24, *Pachyneuron solitarium* (Hartig), female antenna; 25, *Pachyneuron aphidis* (Bouche), female body in profile.



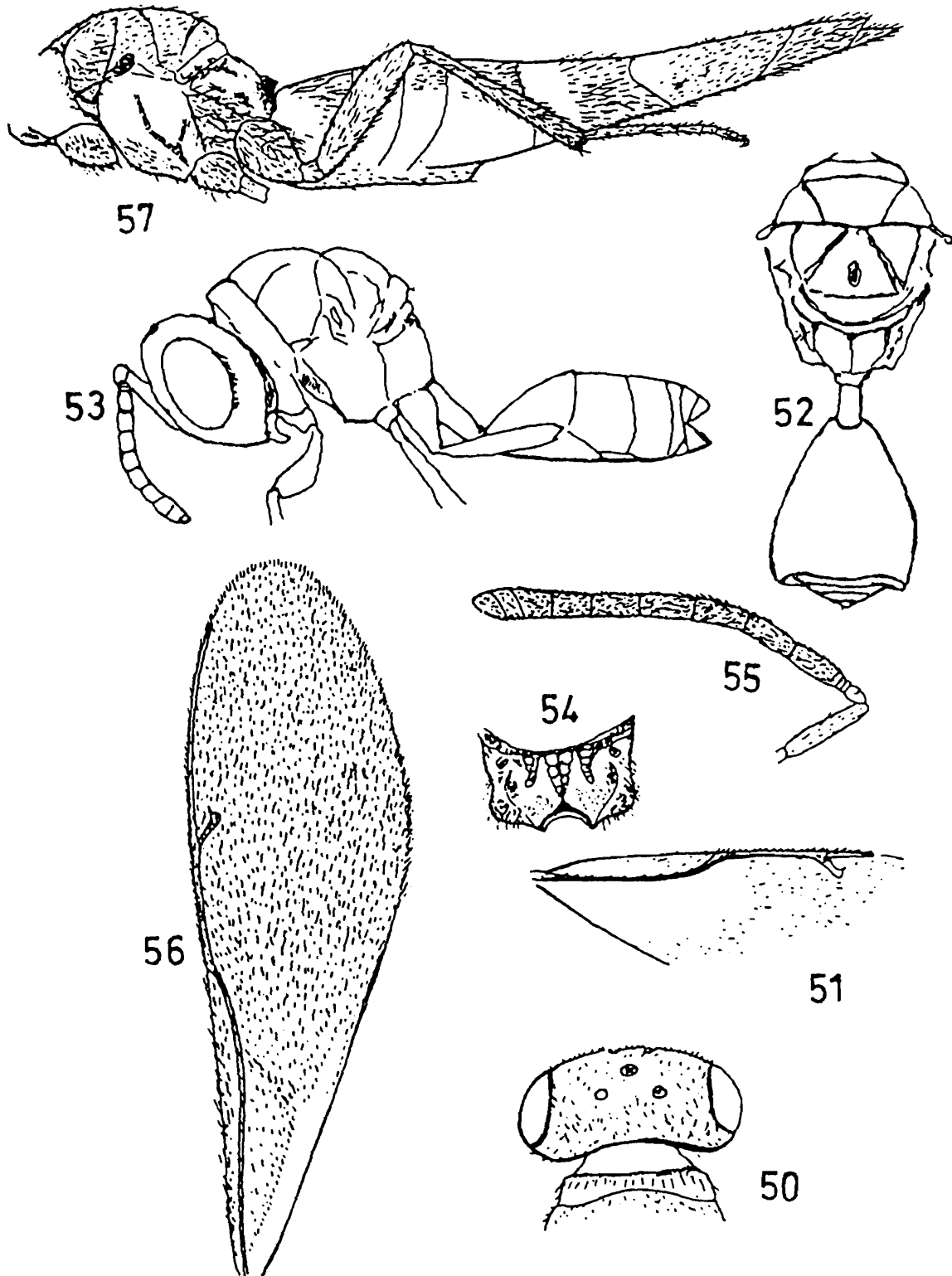
26-27, *Pachyneuron aphidis* (Bouche) Female : 26, forewing; 27, head front view. 28, *Pachyneuron aeneum* Masi, forewing; 29, *Pachyneuron ahlaense* Mani & Saraswat, forewing; 30-31, *Pachyneuron groenlandicum* (Holmgren) Female : 30, body dorsal view; 31, forewing; 32, *Pachyneuron solitarium* (Hartig), female body (without head).



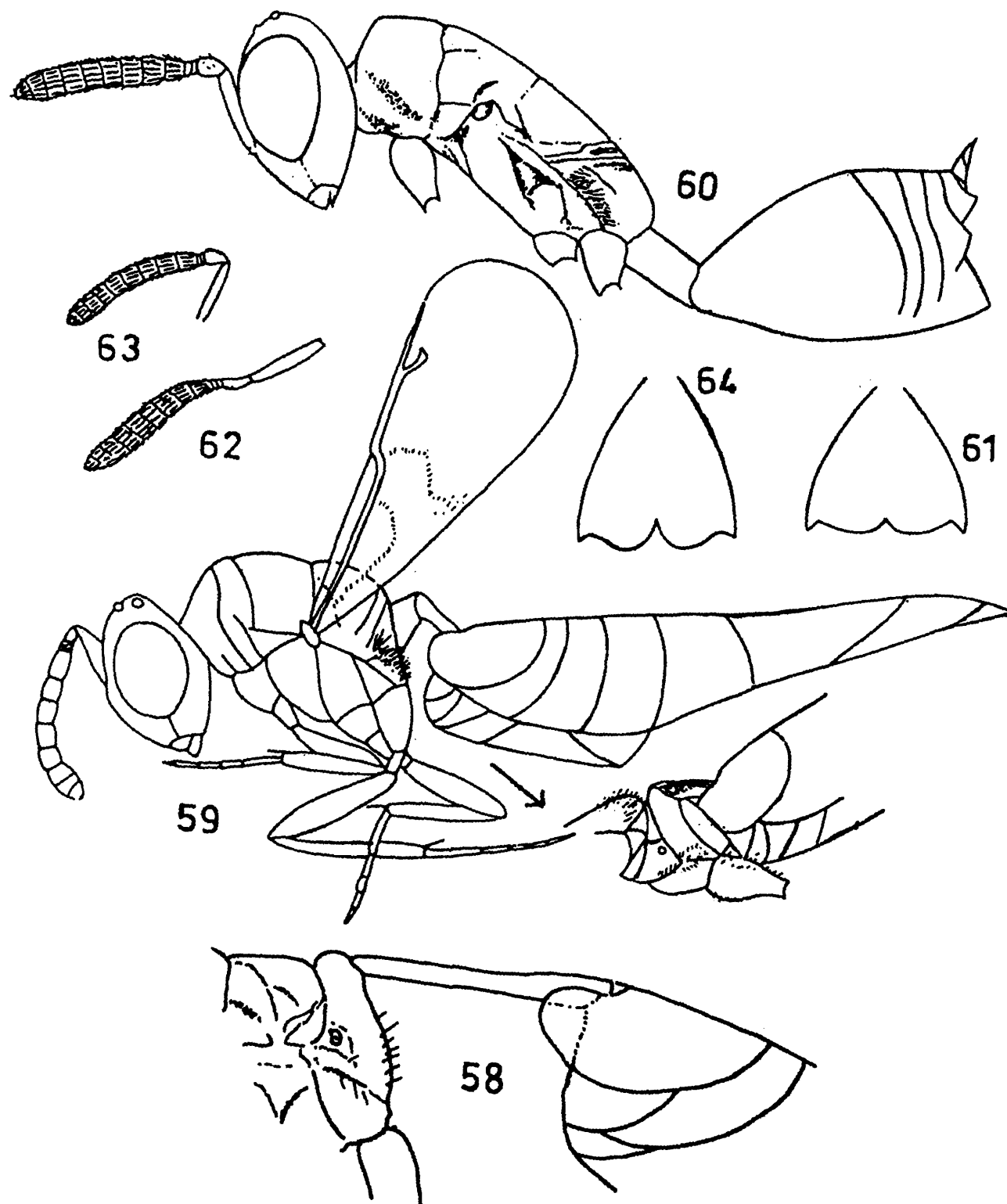
33-34. *Pachyneuron solitarium* (Hartig) Female : 33, head front view; 34, forewing; 35-39. *Agionmmatus geethae* Sureshan & Narendran Female : 35, body in profile; 36, antenna; 37, head front view; 38, head dorsal view, 39 gaster dorsal view; 40-41. *Agionmmatus paria* (Motschulsky) Female : 40, head dorsal view; 41, gaster dorsal view.



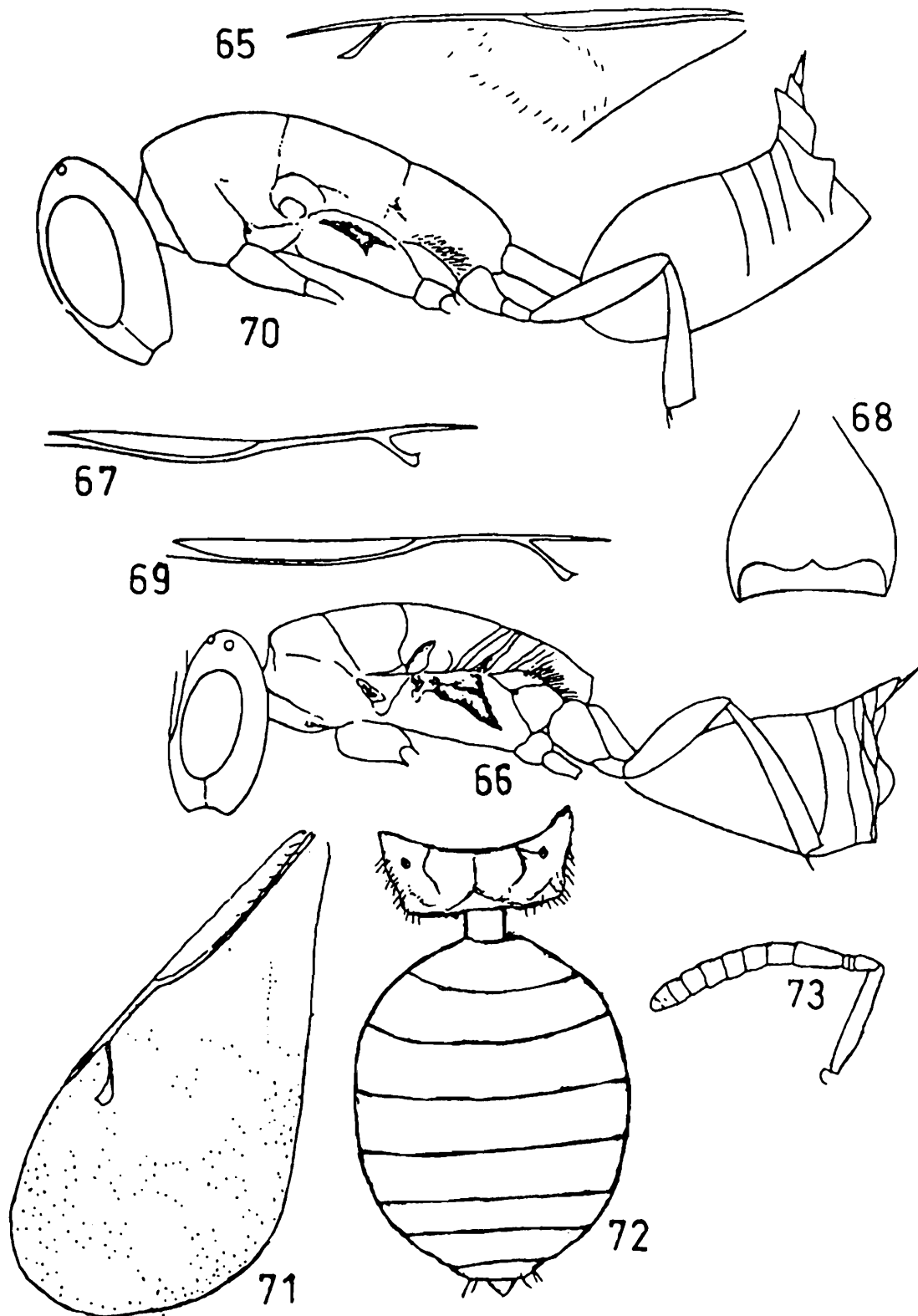
42. *Platecrizotes sudanensis* Ferriere, female gaster 43, *Platecrizotes* sp. female forewing venation; 44-46. *Oricoruna arcotensis* (Mani & Kurian) Female : 44, antenna; 45, head front view; 46, forewing; 47-49. *Narendrella nilamburensis* Sureshan, Female : 47, head front view; 48, body in profile; 49, propodeum and gaster dorsal view.



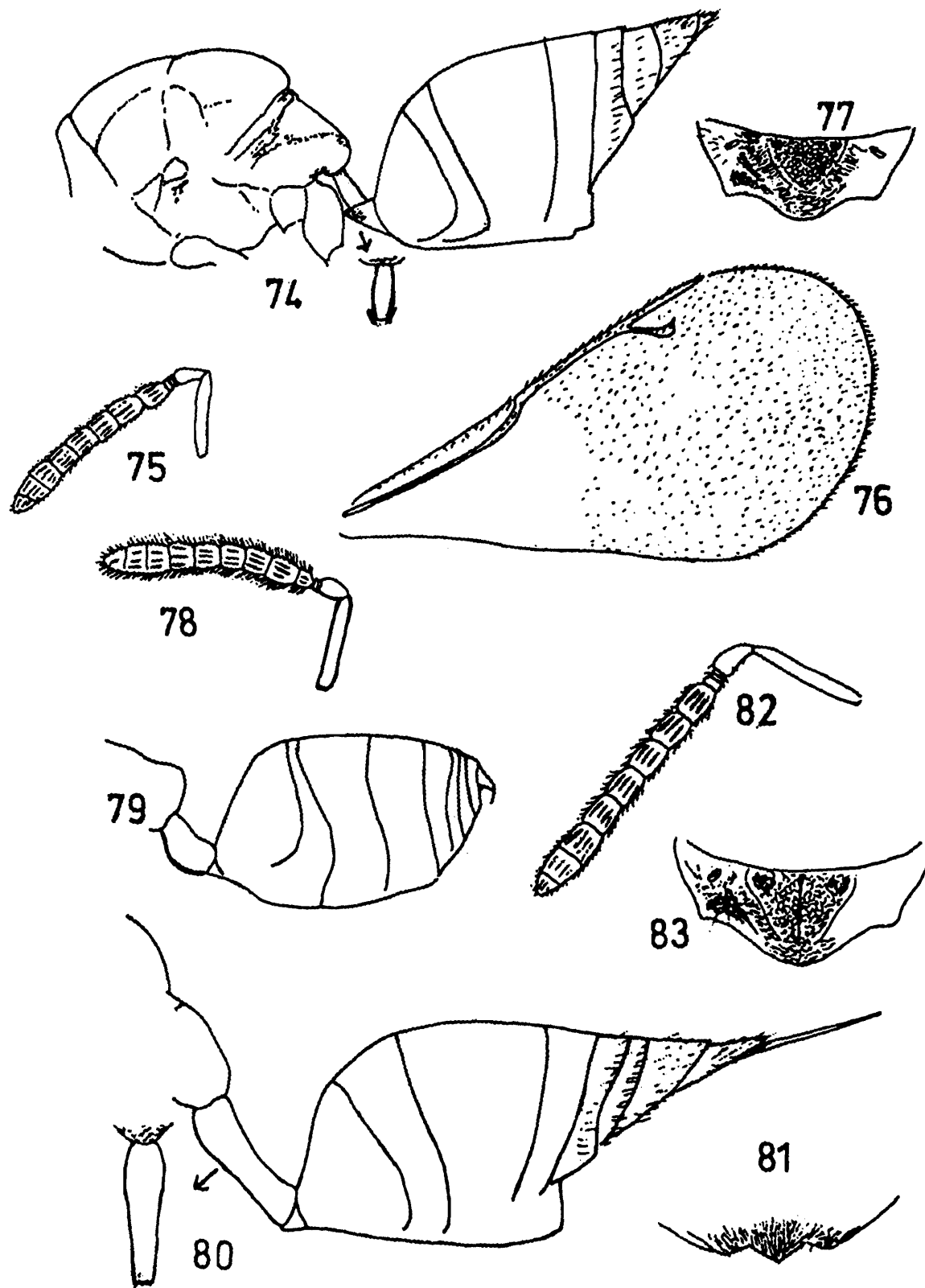
50-51. *Narendrella nilamburensis* Sureshan, Female : 50, head and part of mesosoma dorsal view; 51, forewing; 52, *Notoglyptus scutellaris* (Dodd & Girault); female body (part) dorsal view; 53, *Paracarotomus cephalotes* Ashmead, female body. 54-57, *Miscogasteriella jayasreeae* Sureshan, Female : 54, propodeum dorsal view; 55, antenna 56, forewing; 57, body (without head) in profile.



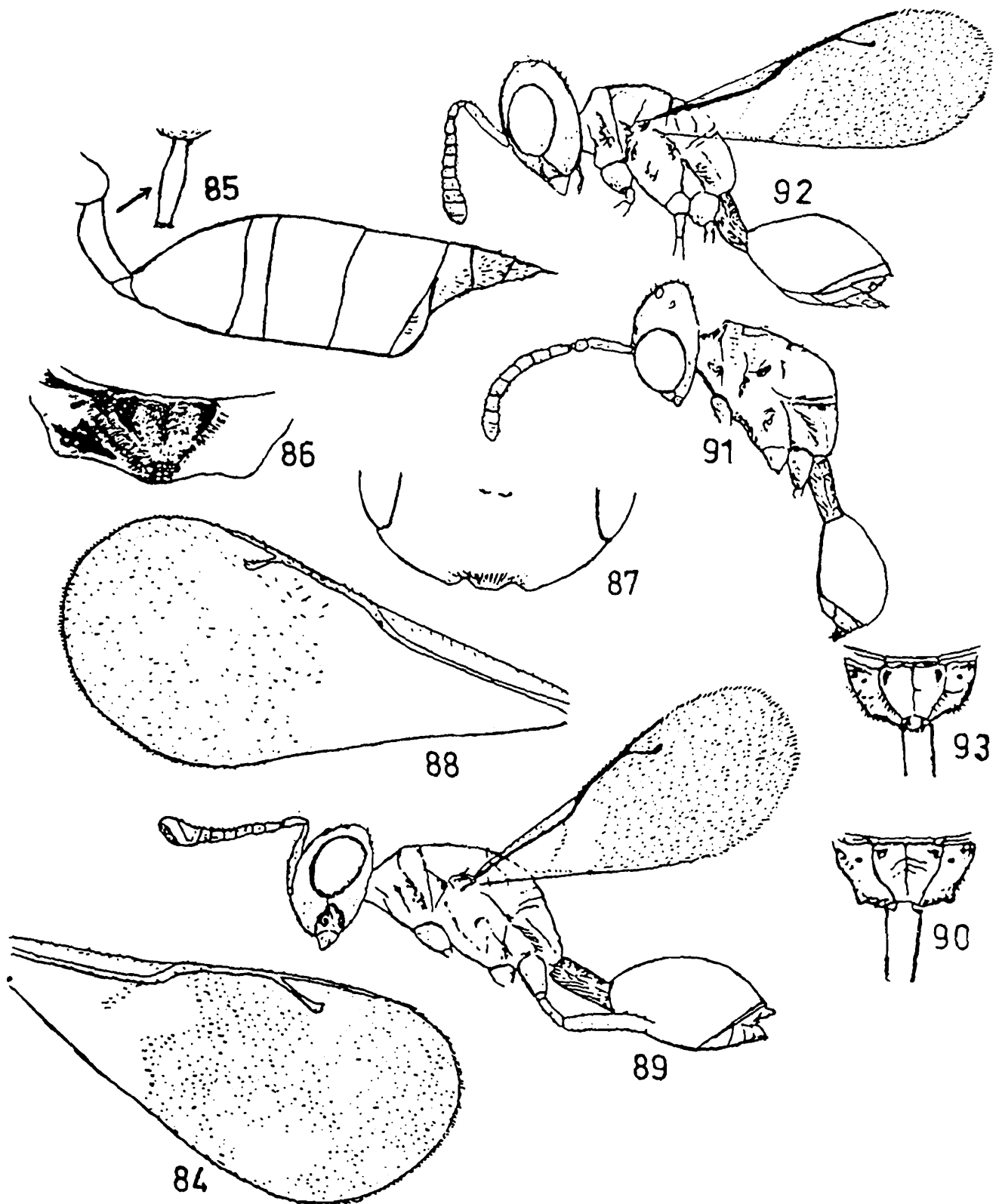
58, *Eurydinotomorpha petiolatus* (Boucek) female propodeum and part of gaster, in profile; 59, *Eurydinotomorpha malabarensis* Sureshan & Narendran, female body; 60, *Syntomopus carinatus* Sureshan & Narendran, female body; 61-62, *Syntomopus nigrus* Sureshan & Narendran Female: 61, T1 of gaster; 62, female antenna; 63-64 *Syntomopus rajamalaiensis* Sureshan & Narendran, Female : 63, antenna; 64, T1 of gaster.



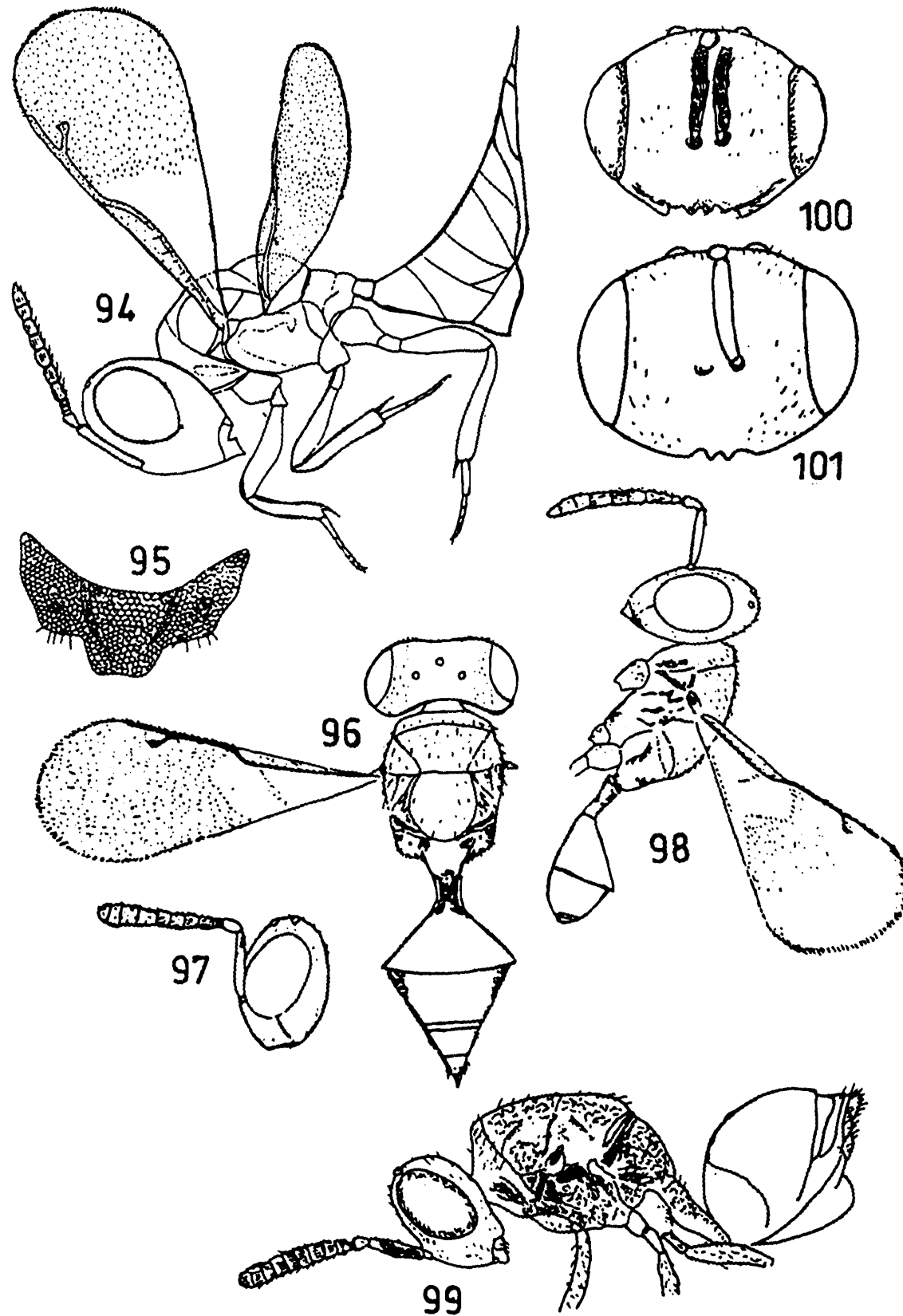
65-66. *Syntomopus rajamalaiensis* Sureshan & Narendran, Female : 65, forewing venation; 66, body in profile; 67-68. *Syntomopus carinatus* Sureshan & Narendran, Female : 67, forewing venation; 68, T1 of gaster; 69-70. *Syntomopus nigrus* Sureshan & Narendran, Female : 69, forewing venation; 70, body in profile; 71-72. *Conomorium patulum* (Walker) Female : 71, forewing; 72, propodeum and gaster dorsal view; 73, *Conomorium* sp. Female antenna.



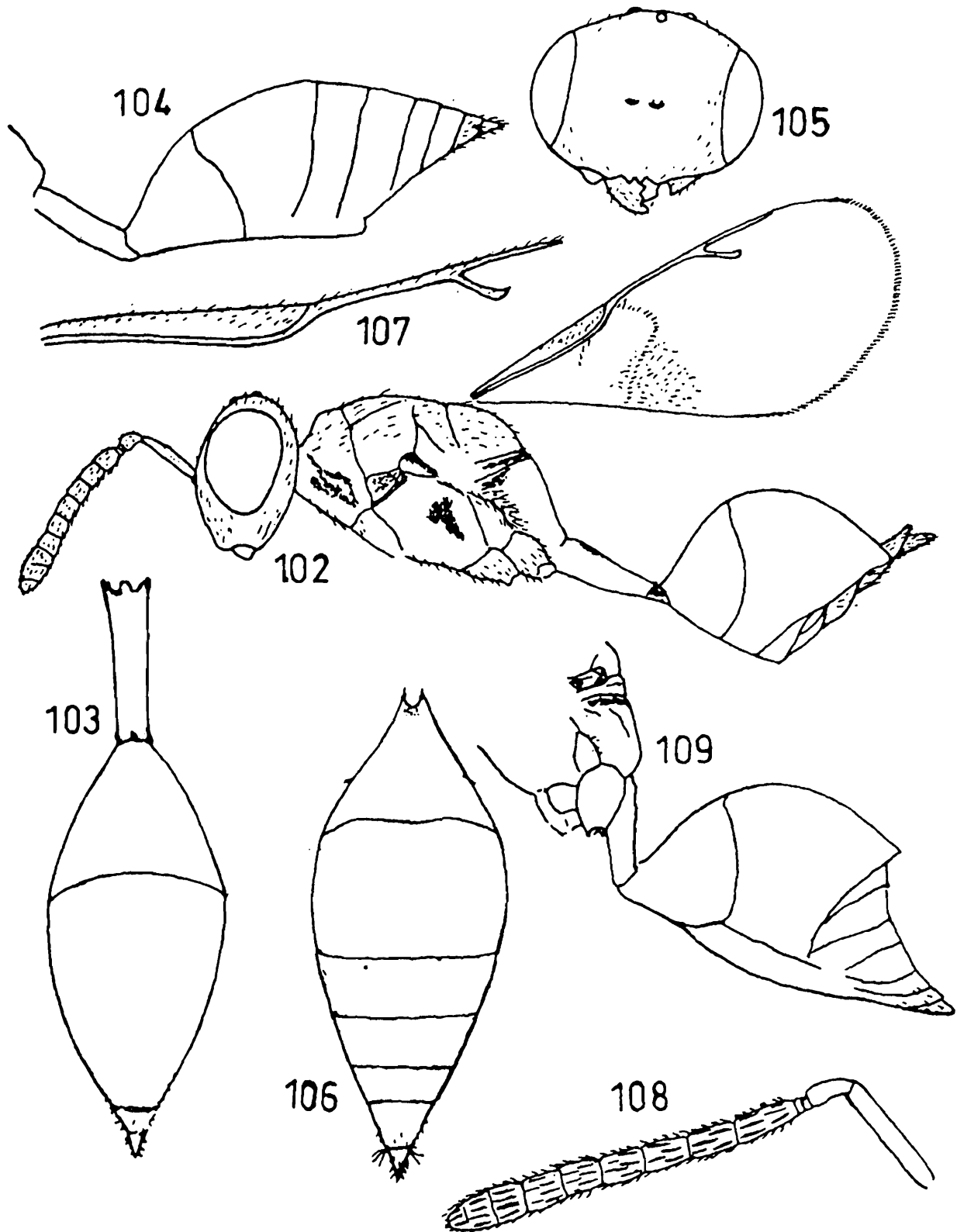
74-79. *Merismomorpha minuta* Sureshan, Female : 74, body (without head) in profile; 75, antenna; 76, forewing; 77, propodeum; 78, male antenna; 79, male gaster; 80-83, *Merismomorpha elongata* Sureshan, Female : 80, gaster; 81, clypeus; 82, antenna; 83, propodeum.



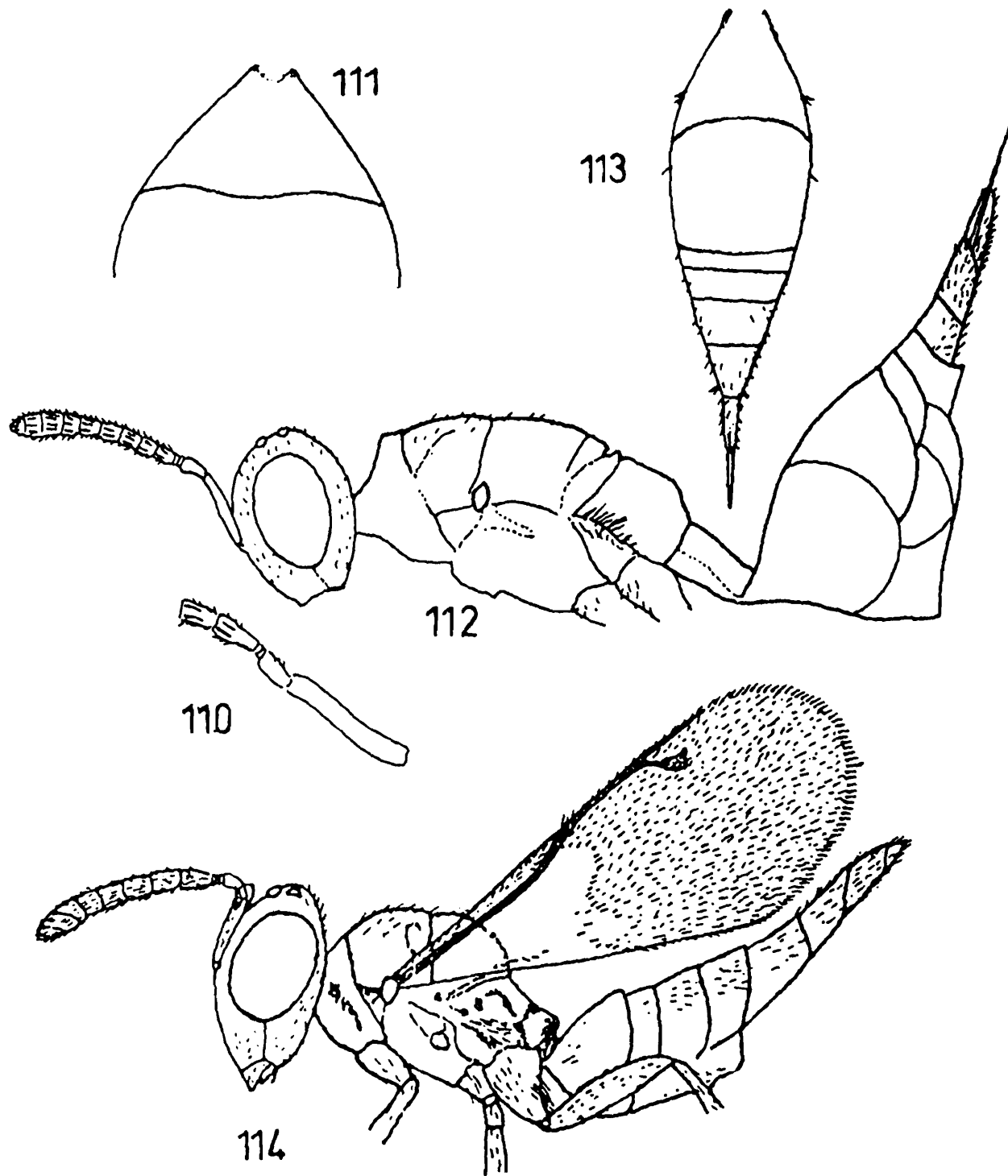
84. *Merismomorpha elongata* Sureshan, female forewing; 85-88. *Merismomorpha truncata* Sureshan, Female : 85, gaster in profile; 86, propodeum; 87, lower part of head; 88, forewing 89-91. *Cryptoprymna elongata* Sureshan & Narendran, Female : 89, body in profile; 90, propodeum and petiole in dorsal view; 91, male body in profile; 92-93. *Cryptoprymna indiana* Sureshan & Narendran, Female : 92, body in profile; 93, propodeum and petiole in dorsal view.



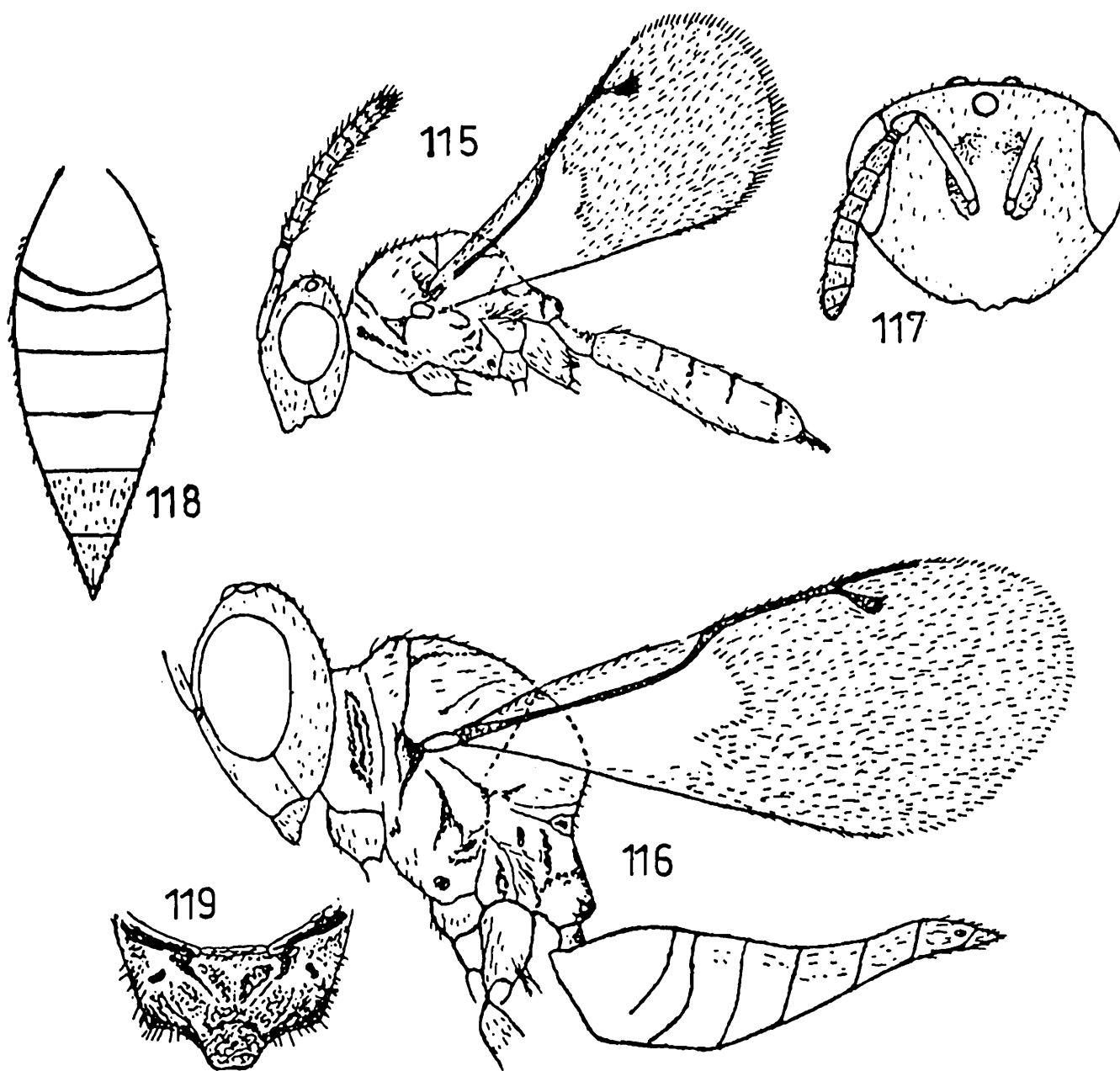
94-95. *Delislea rahimani* Narendran & Anil, Female : 94, body in profile; 95, propodeum; 96-98. *Toxeumorpha minuta* Sureshan & Narendran, Female : 96, body in dorsal view; 97, head and antenna in profile; 98, male body in profile; 99-100, *Sphegigaster stepicola* Boucek, Female : 99, body in profile; 100, head front view; 101, *Sphegigaster reticulata* Sureshan & Narendran, female head front view.



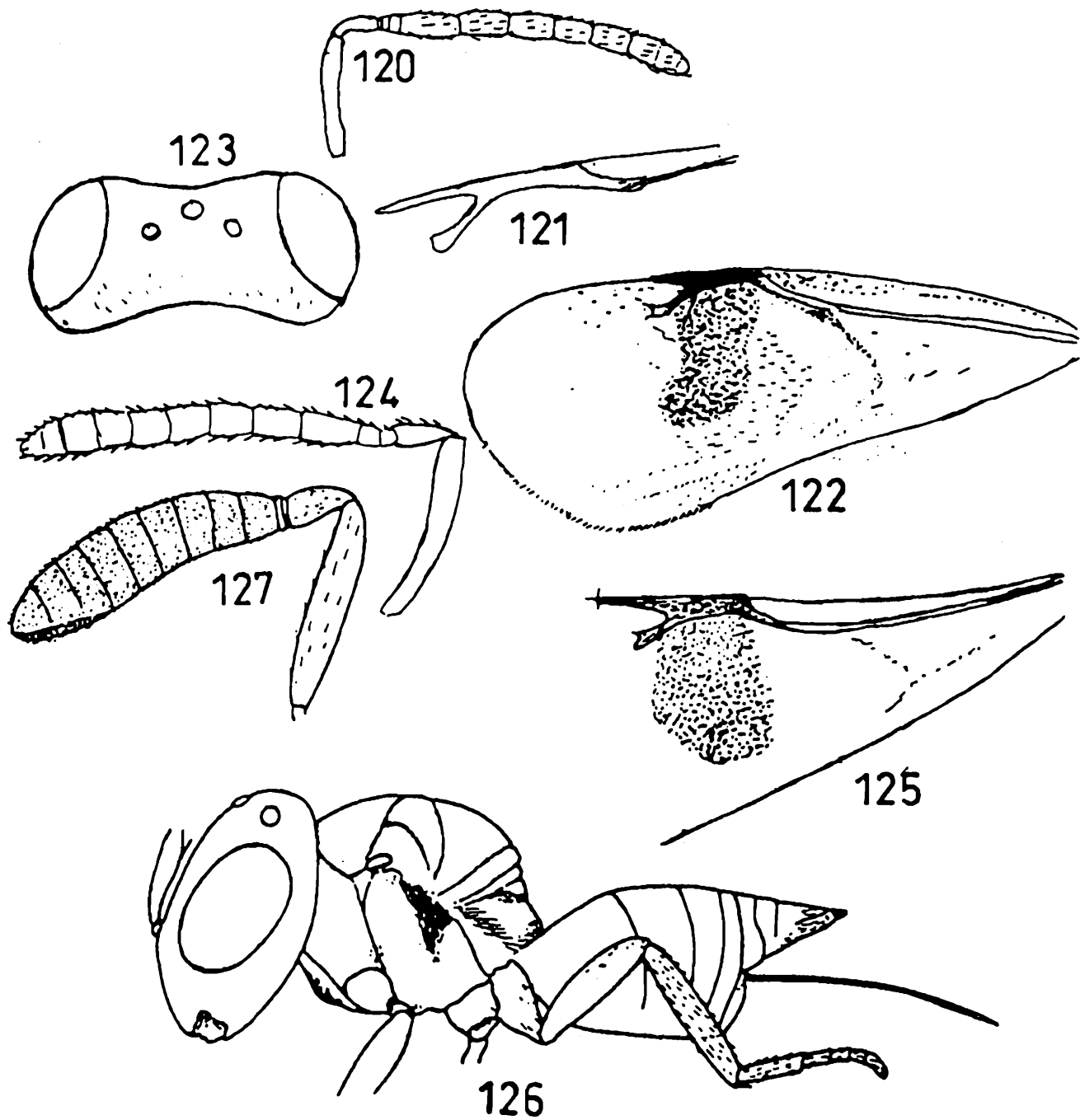
102-103. *Sphegigaster reticulata* Sureshan & Narendran, Female : 102, body in profile; 103, petiole and gaster dorsal view; 104-108. *Sphegigaster anamudiensis* Sureshan & Narendran, Female : 104, gaster in profile; 105, head front view; 106, gaster dorsal view; 107, forewing venation; 108, antenna; 109, *Sphegigaster brunneicornis* (Ferriere) Female, gaster and propodeum (part) in profile.



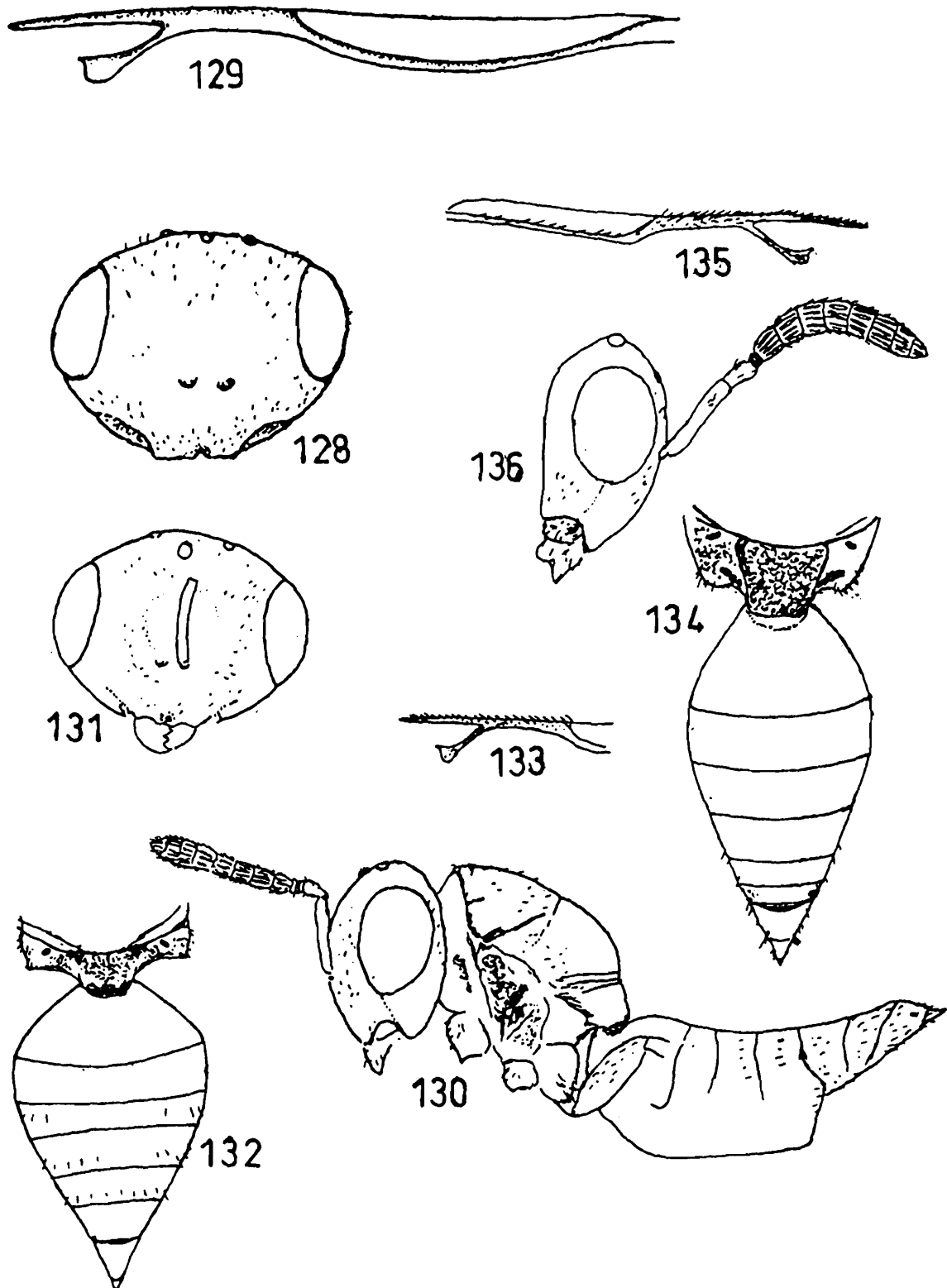
110-111. *Sphigigaster brunneicornis* (Ferriere) Female : 110. part of antenna; 111. T1 of gaster; 112-113. *Sphigigaster indica* Sureshan & Narendran, Female : 112. body in profile; 113. gaster dorsal view. 114. *Paraiemea vishnuae* Sureshan & Narendran, female body.



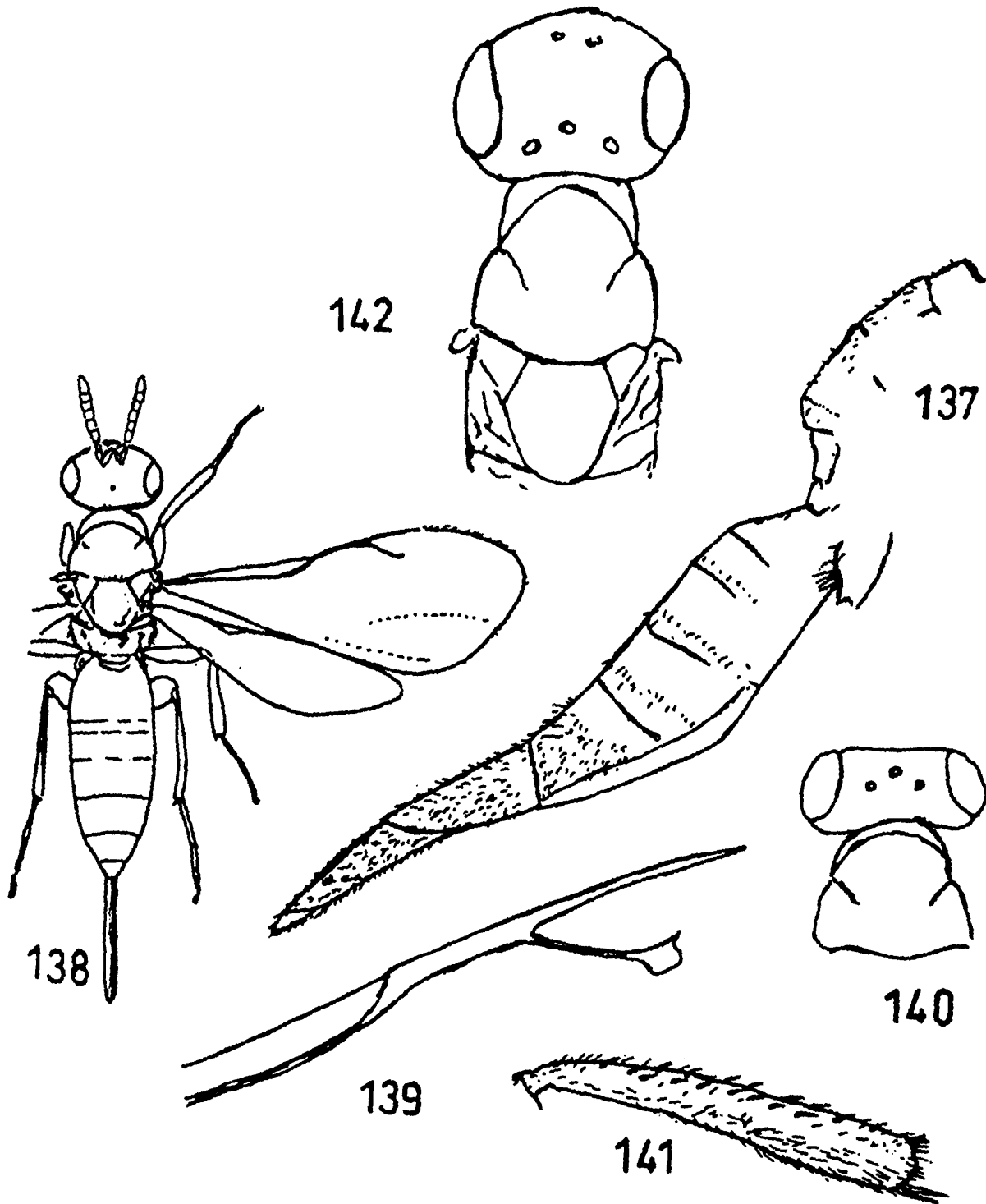
115. *Paraiemea vishnuae* Sureshan & Narendran, male body in profile; 116-119. *Paraiemea convexa* Sureshan & Narendran, Female : 116, body in profile; 117, head front view; 118, gaster; 119, propodeum.



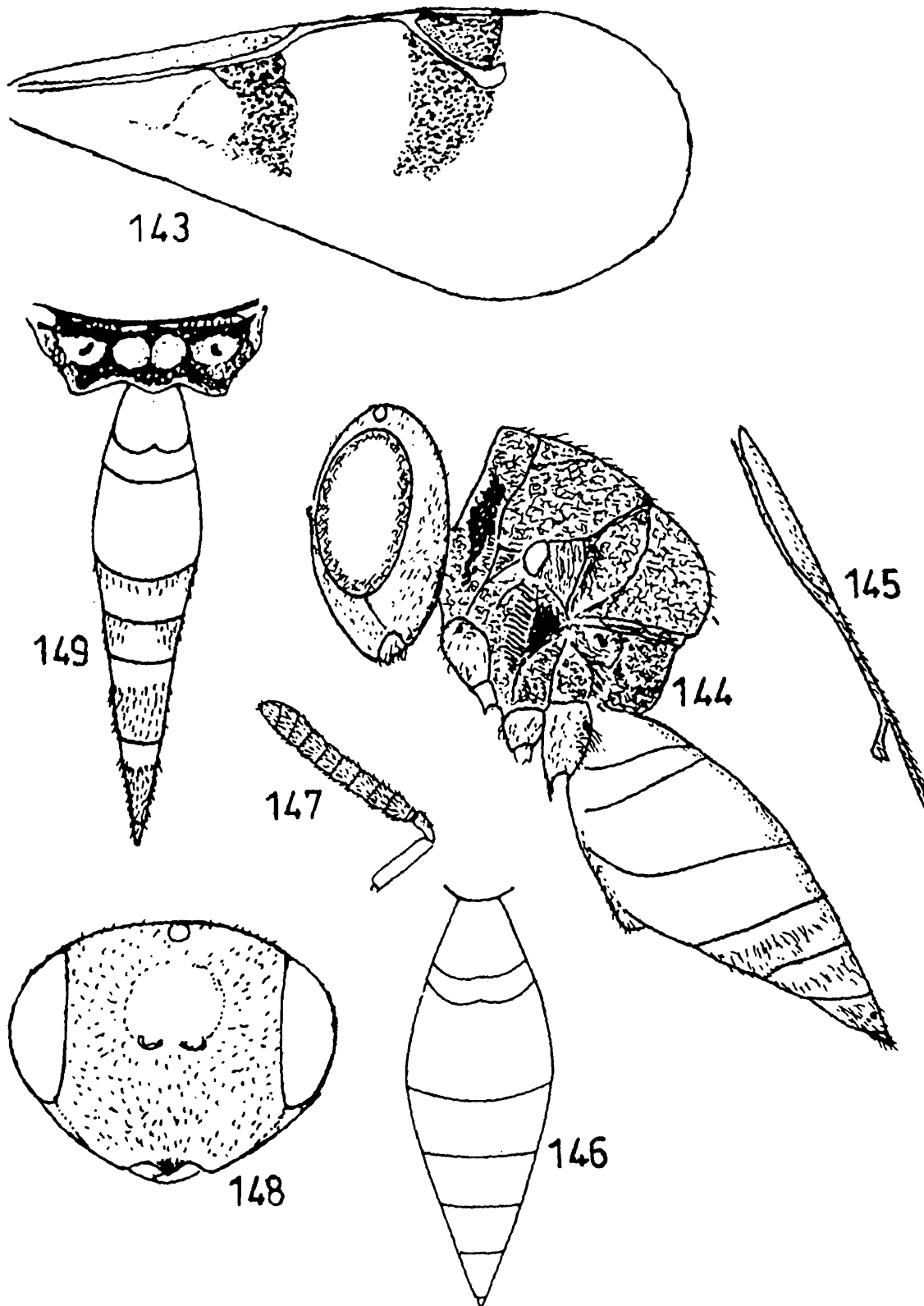
120-121, *Ischyroptyx* sp. Female : 120, antenna; 121, forewing venation; 122-124, *Metacolus beelsoni* (Mani & Kaul), Female : 122, forewing; 123, head dorsal view; 124, antenna; 125, *Metacolus unifasciatus* Forster, forewing venation; 126-127, *Inkaka keralensis* Sureshan & Narendran, Female : 126, body in profile; 127, antenna.



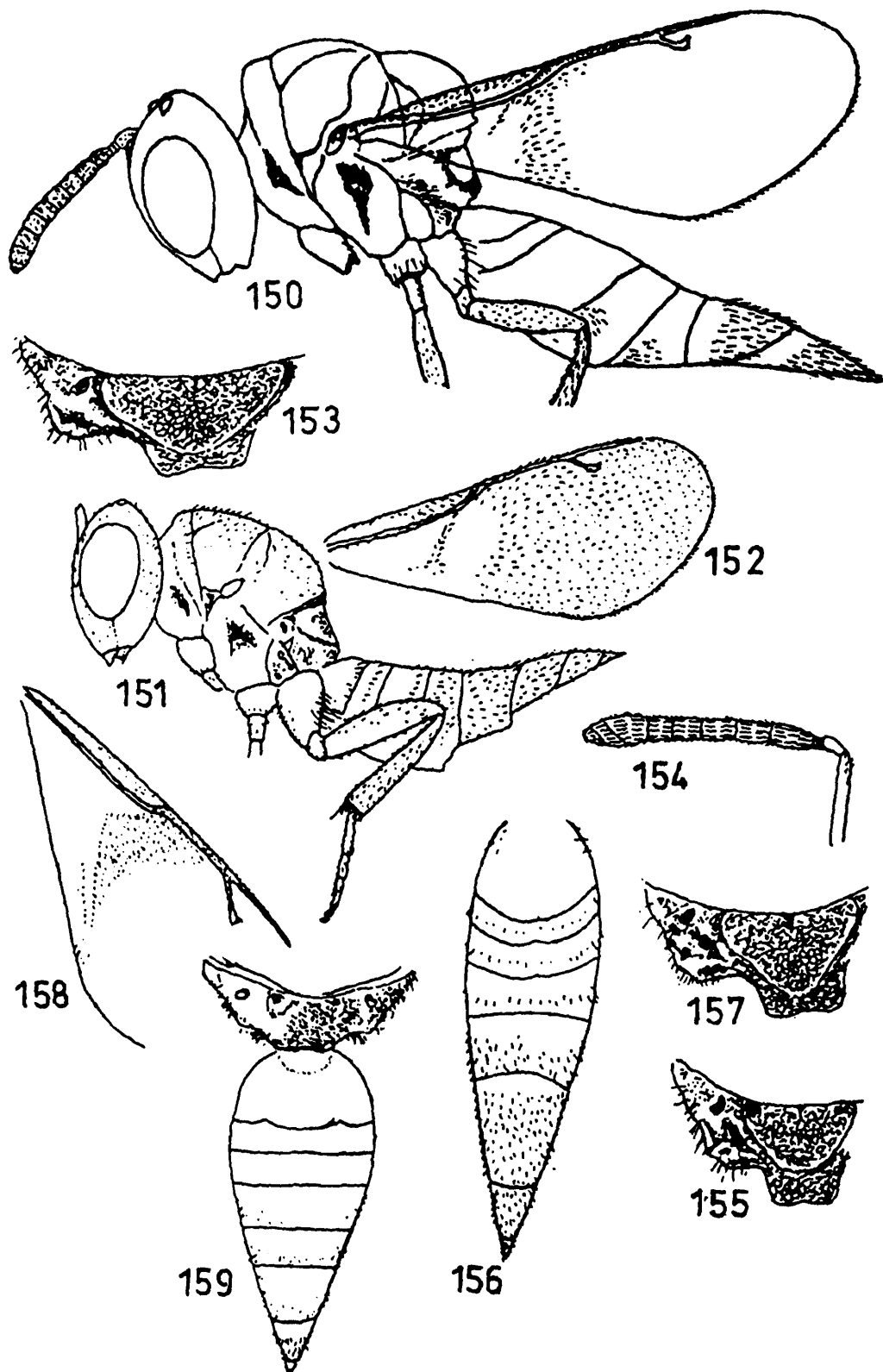
128-129, *Inkaka keralensis* Sureshan & Narendran, Female : 128, head front view; 129, forewing venation; 130-133, *Metastenus indicus* Sureshan & Narendran, Female : 130, body in profile; 131, head front view; 132, propodeum and gaster dorsal view; 133, forewing venation; 134-136, *Metastenus concinnus* Walker, Female : 134, propodeum and gaster; 135, forewing venation; 136, head in profile.



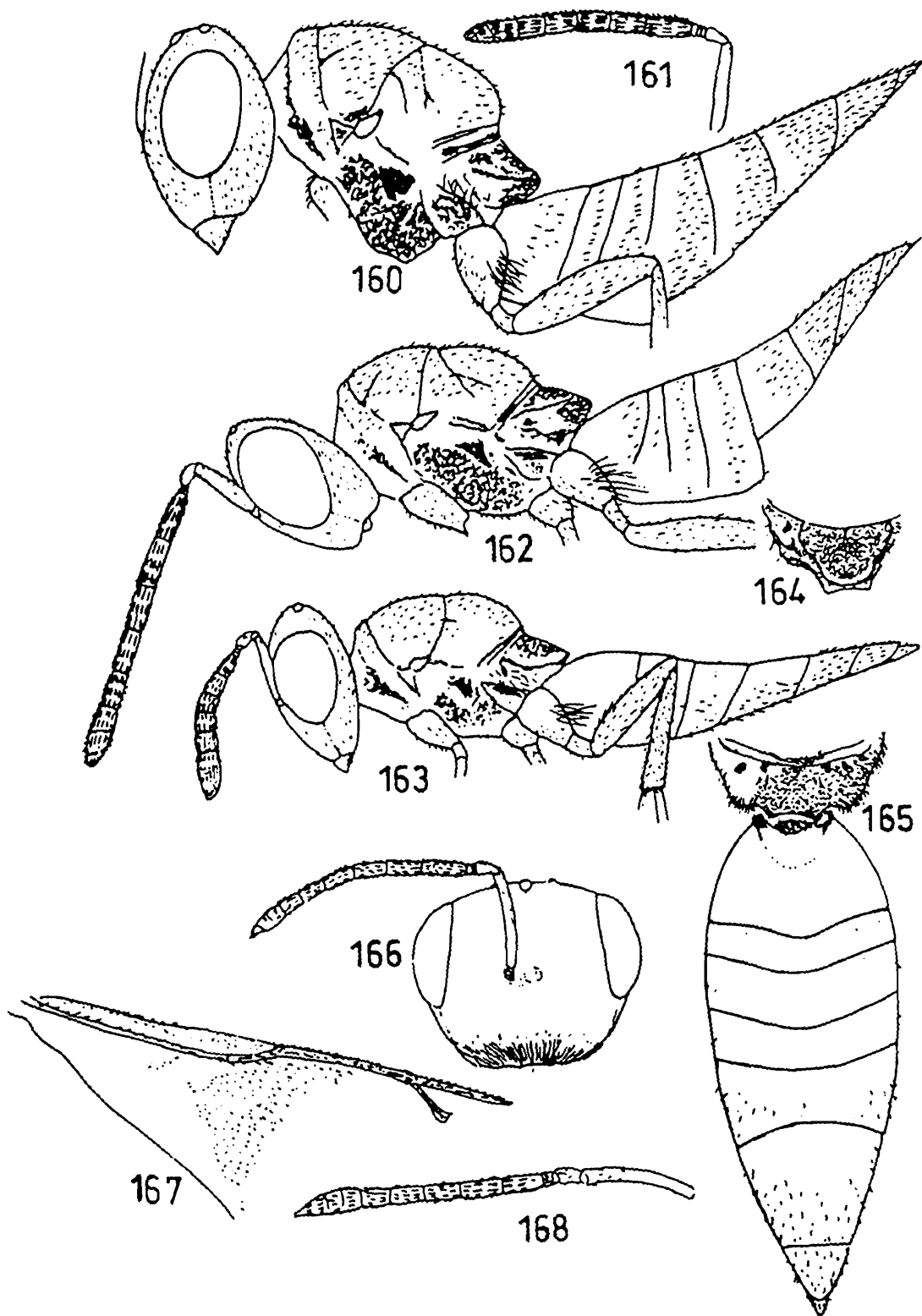
137, *Kumarella sandroi* Narendran & Mohana, female body (part) in profile; 138, *Roptrocerus xylophagorum* (Ratzeburg), female body dorsal view; 139-140, *Rhopalicus* sp. 139, forewing venation; 140, head and mesosoma (part) dorsal view; 141-142, *Cheiropachus quadrum* (Fabricius), Female : 141, hind tibia; 142, head and mesosoma (part) dorsal view.



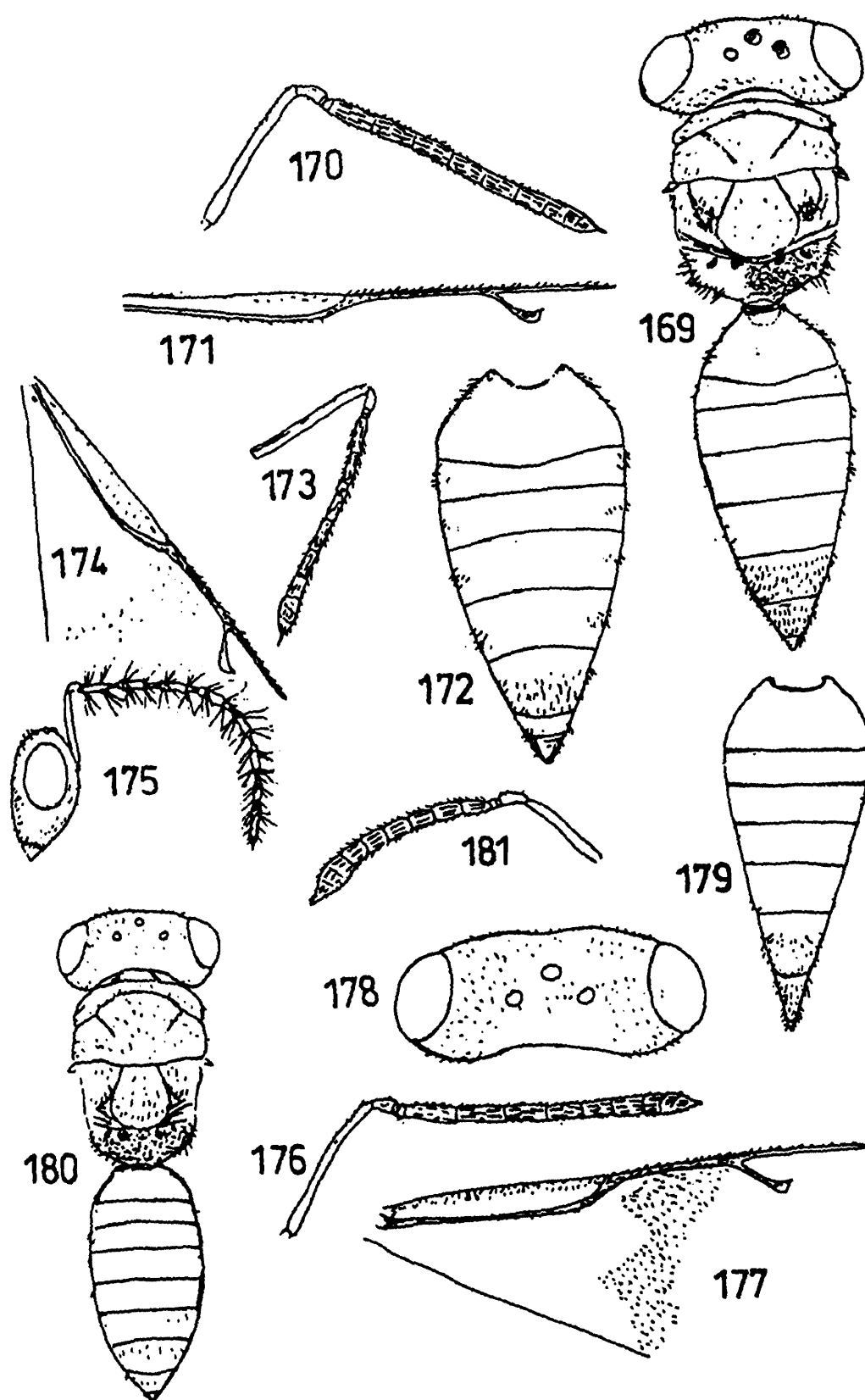
143. *Cheirpachus quadrum* (Fabricius), female forewing; 144-147, *Uniclypea kumarani* Sureshan & Narendran, Female: 144, body in profile; 145, forewing venation; 146, gaster; 147, antenna; 148-149, *Uniclypea elongata* Sureshan & Narendran, Female : 148, head front view; 149, propodeum and gaster dorsal view.



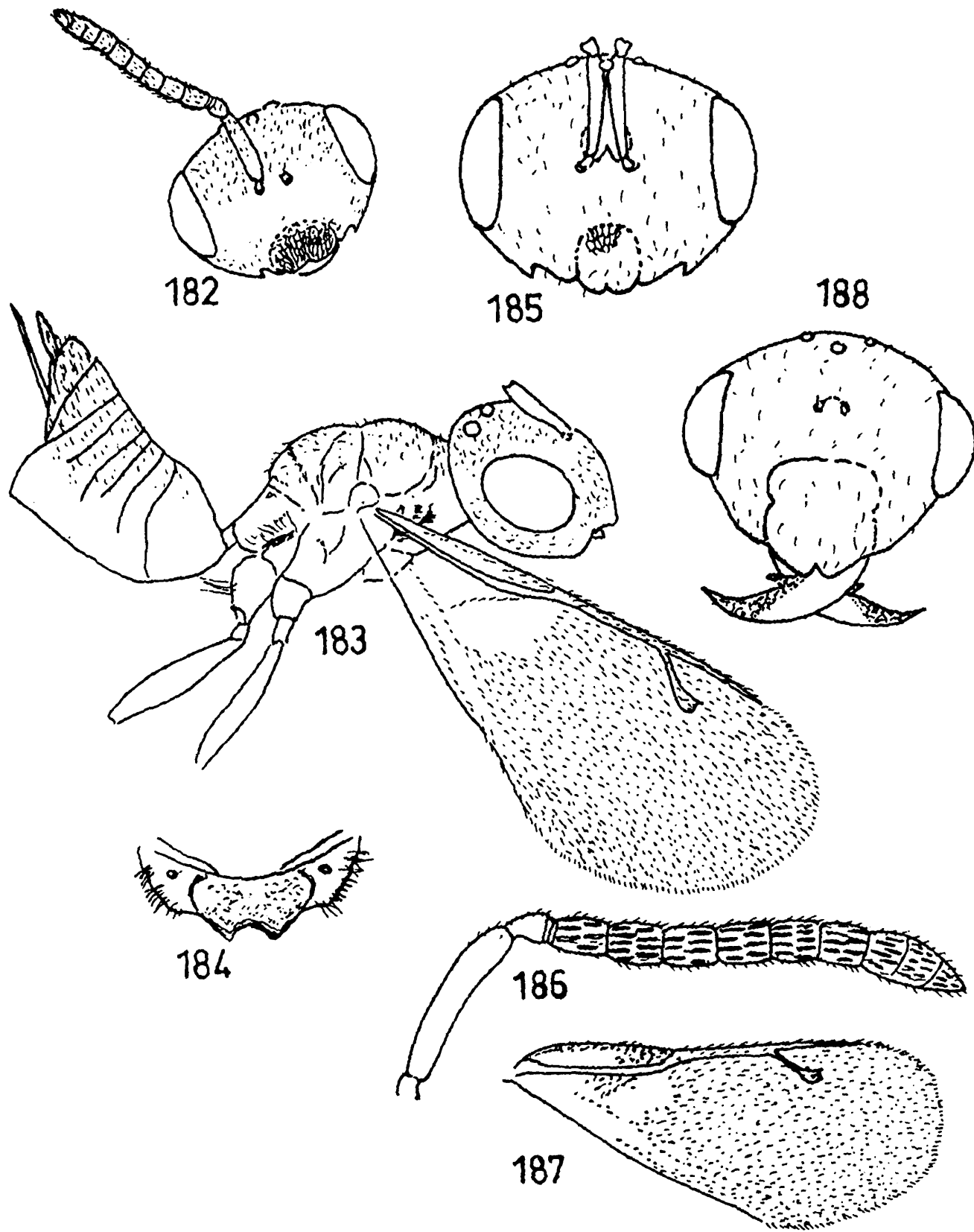
150, *Uniclypea elongata* Sureshan & Narendran, female body in profile; 151-154. *Halticopterella robusta* Sureshan, Female : 151, body in profile; 152, forewing; 153, propodeum; 154, antenna; 155. *Halticopterella longiflagellum* Sureshan, female propodeum (part) in dorsal view; 156-157. *Halticopterella burwelli* Sureshan, Female : 156, gaster dorsal view; 157, propodeum (part) dorsal view; 158, *Norbanus birmanus* (Masi), female forewing; 159, *Norbanus scrobatus* sp.nov., female propodeum and gaster dorsal view.



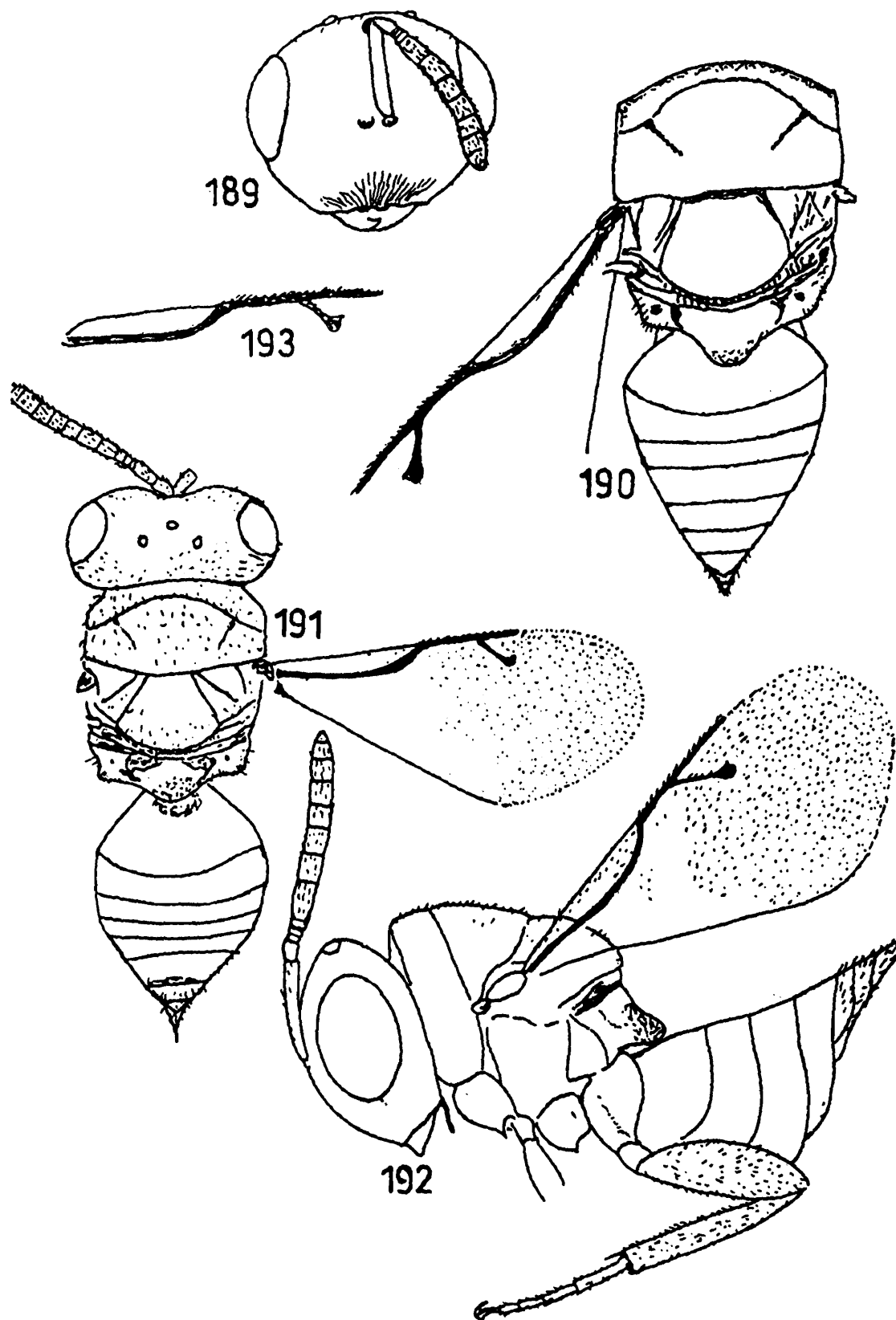
160-161. *Halticopterella burwelli* Sureshan, Female : 160, body in profile; 161, antenna; 162. *Halticopterella longiflagellum* Sureshan, female body in profile; 163-164. *Halticopterella rampurensis* Sureshan, Female : 163, body in profile; 164, propodeum (part) dorsal view; 165-166, *Norbanus birmanus* (Masi), Female : 165, propodeum and gaster dorsal view; 166, head front view; 167-168, *Norbanus scrobatus* sp.nov., Female : 167, forewing; 168, antenna.



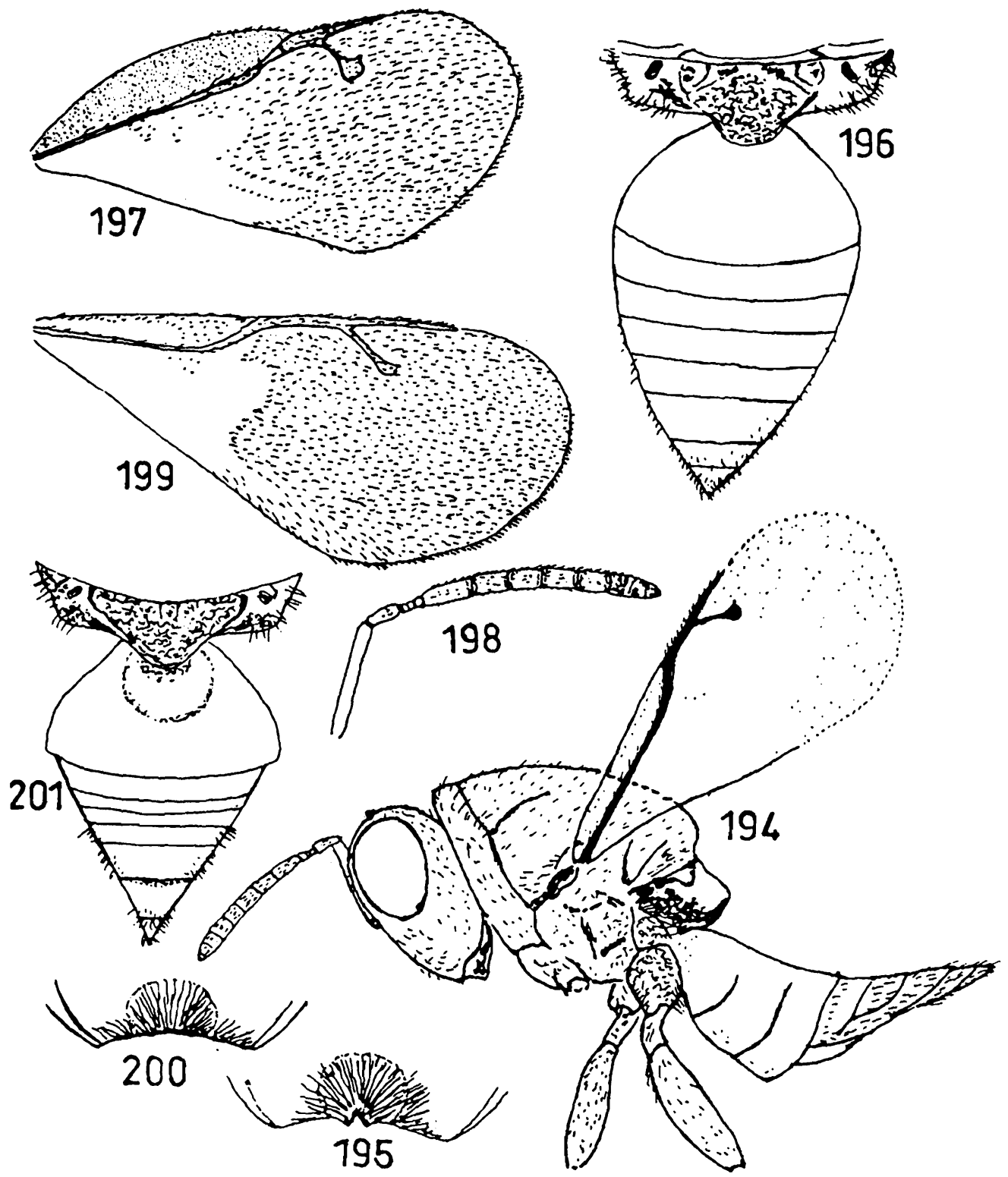
169-171. *Norbanus acuminatus* (Dutt & Ferriere), 169, female body dorsal view; 170, antenna, 171, forewing venation; 172-175. *Norbanus equus* sp. nov., Female: 172, gaster, dorsal view; 173, antenna, 174, forewing venation, 175, male head and antenna in profile; 176-179, *Norbanus malabarensis* sp. nov. Female : 176, antenna; 177, forewing; 178, head dorsal view; 179, gaster dorsal view; 180-181, *Norbanus thekkadiensis* sp. nov., Female: 180, body indorsal view, 181, antenna.



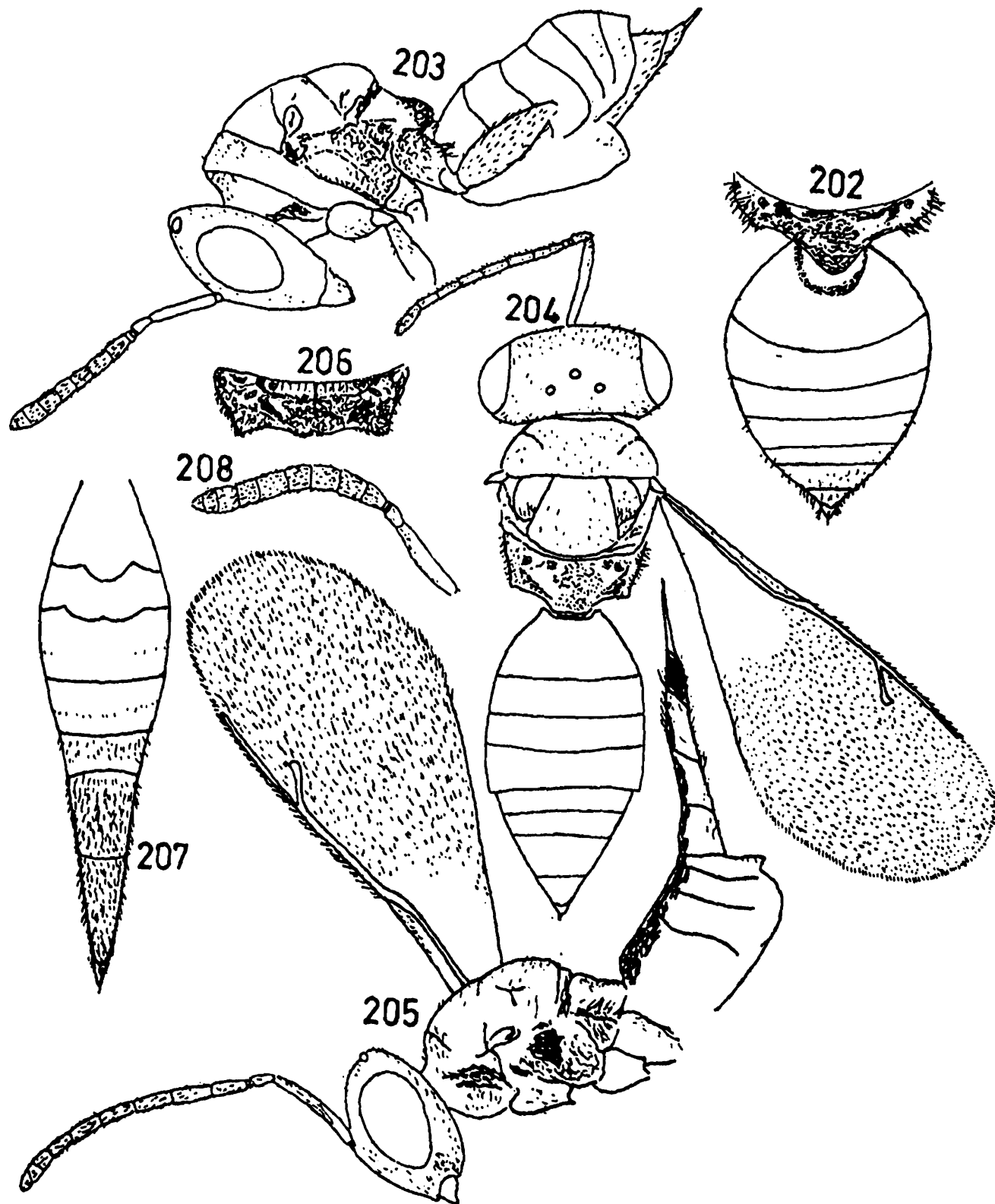
182-184, *Mokrzeckia menzeli* Subba Rao, Female : 182. head front view; 183, body in profile; 184, propodeum dorsal view; 185-188, *Mokrzeckia orientalis* subba Rao, Female : 185, head front view; 186, antenna. 187, forewing; 188, male head front view.



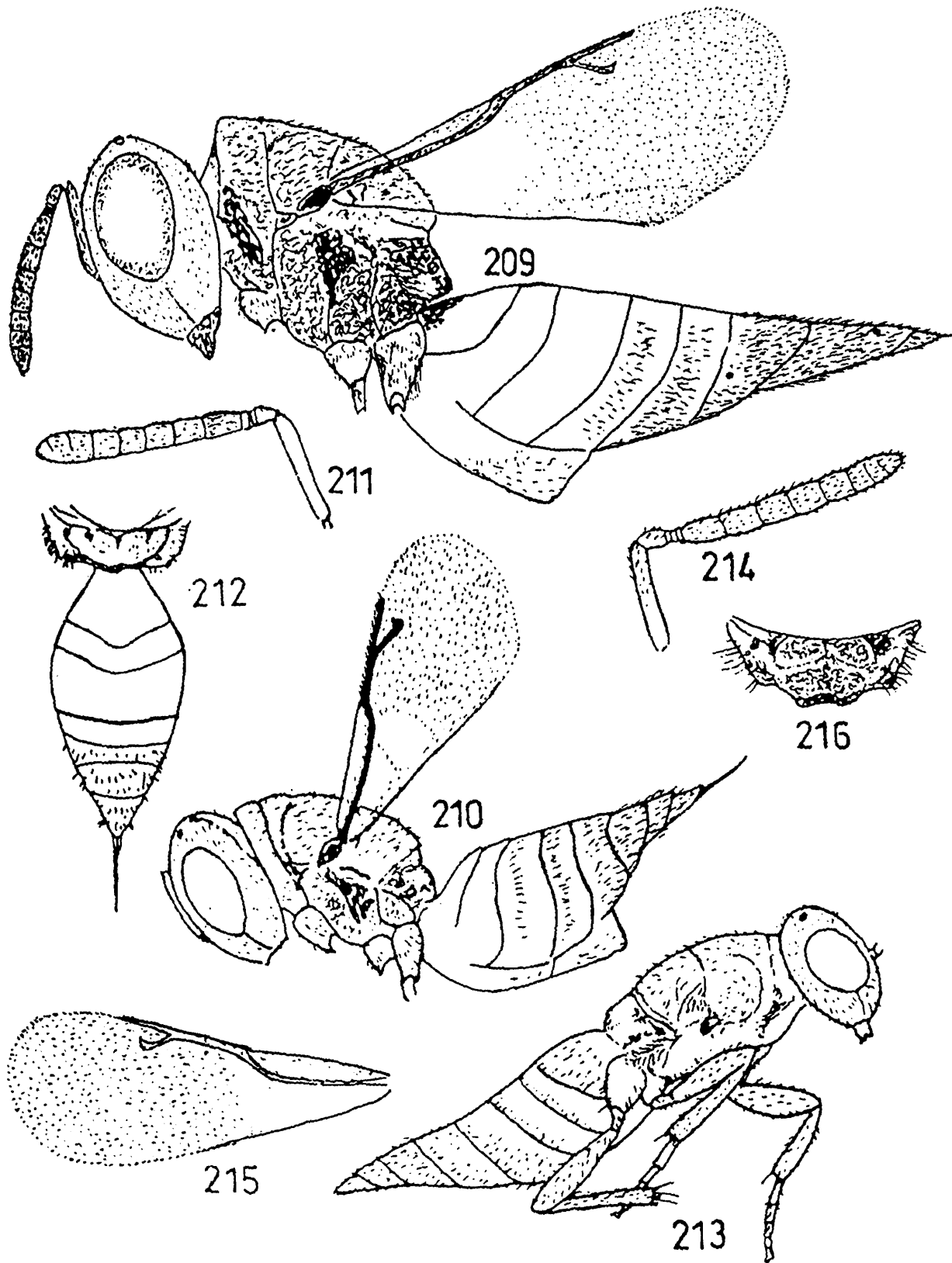
189-190. *Dinarmus acutus* (Thomson), Female : 189, head front view; 190, body (without head) dorsal view; 191, *Dinarmus vagabundus* Timberlake, female body dorsal view; 192, *Dinarmus basalis* (Rondani), female body in profile; 193, *Dinarmus colemani* (Crawford), female forewing venation.



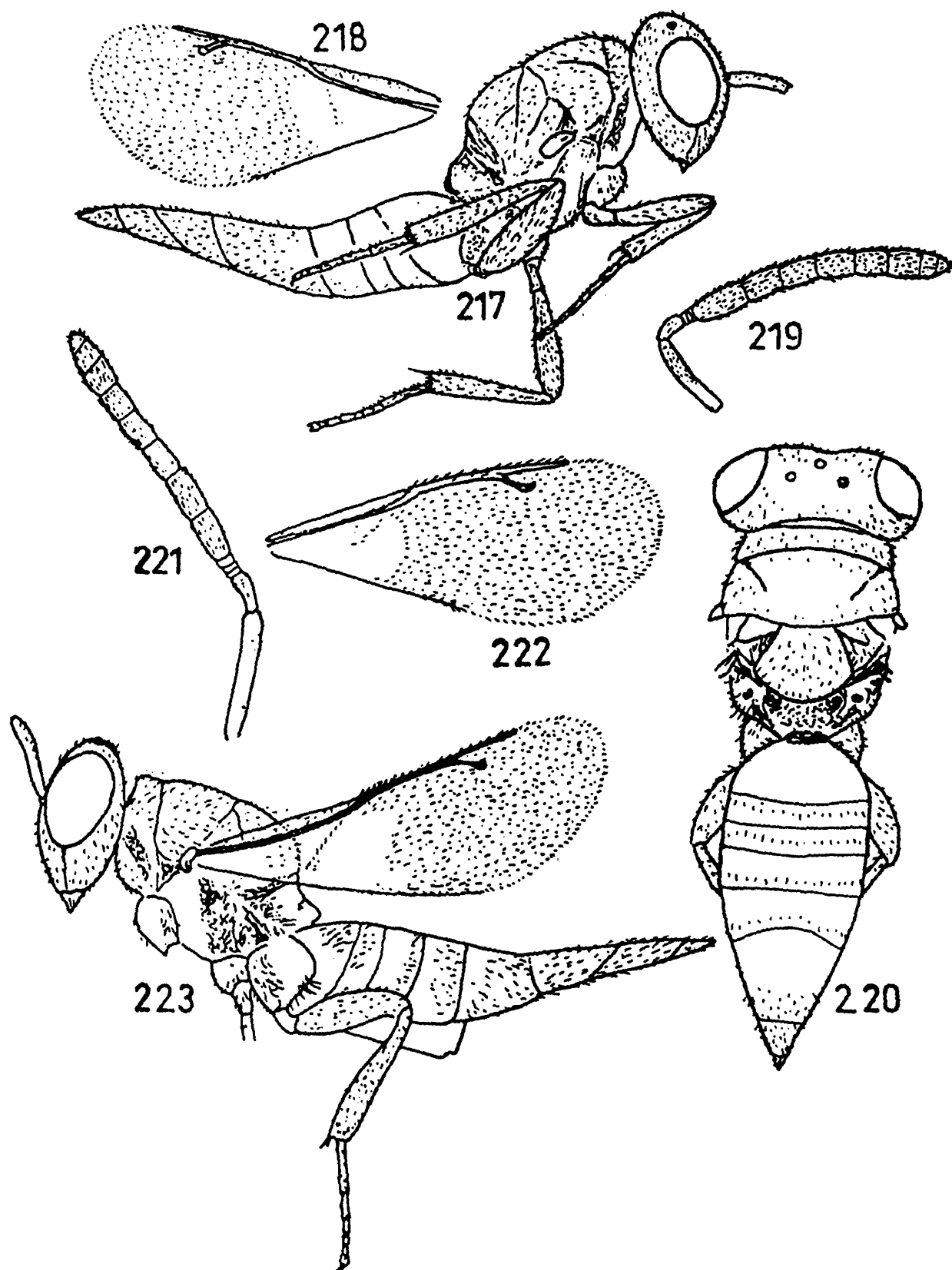
194-197. *Dinarmus altifrons* (Walker), Female : 194, body in profile, 195, anterior margin of clypeus; 196, propodeum and gaster dorsal view; 197, male forewing; 198-201, *Dinarmus maculatus* (Masi), Female : 198, antenna; 199, forewing, 200, anterior margin of clypeus; 201, propodeum and gaster dorsal view.



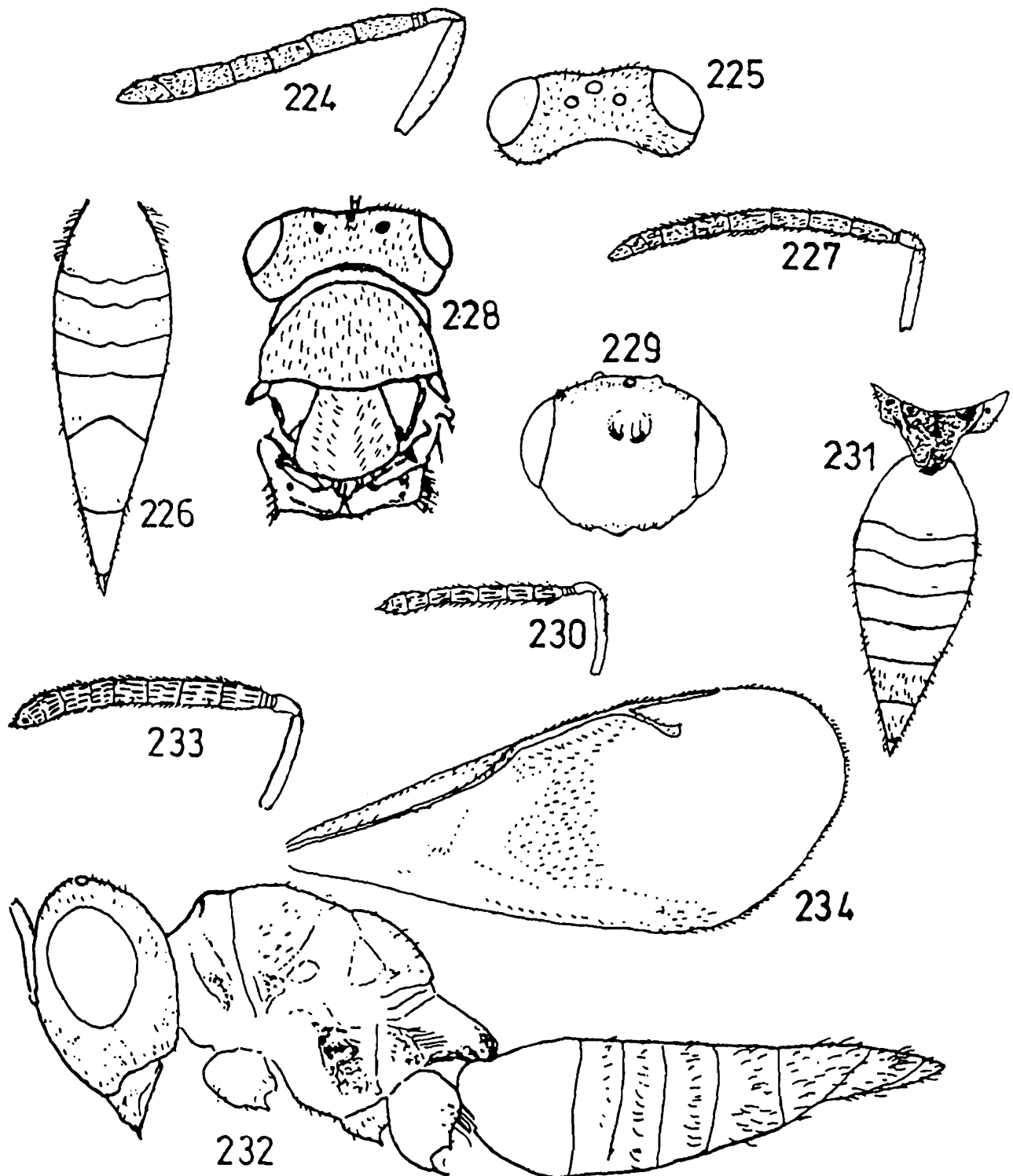
202, *Dinarmus basalis* (Rondani), female propodeum and gaster dorsal view; 203, *Dinarmus colemani* (Crawford), female body in profile; 204, *Propicrosecytus oryzae* (Subba Rao), female body dorsal view; 205, *Propicrosecytus mirificus* (Girault), female body in profile; 206-208, *Oniticellobia longigastrea* Sureshan and Narendran, Female : 206, propodeum dorsal view; 207, gaster dorsal view; 208, male antenna.



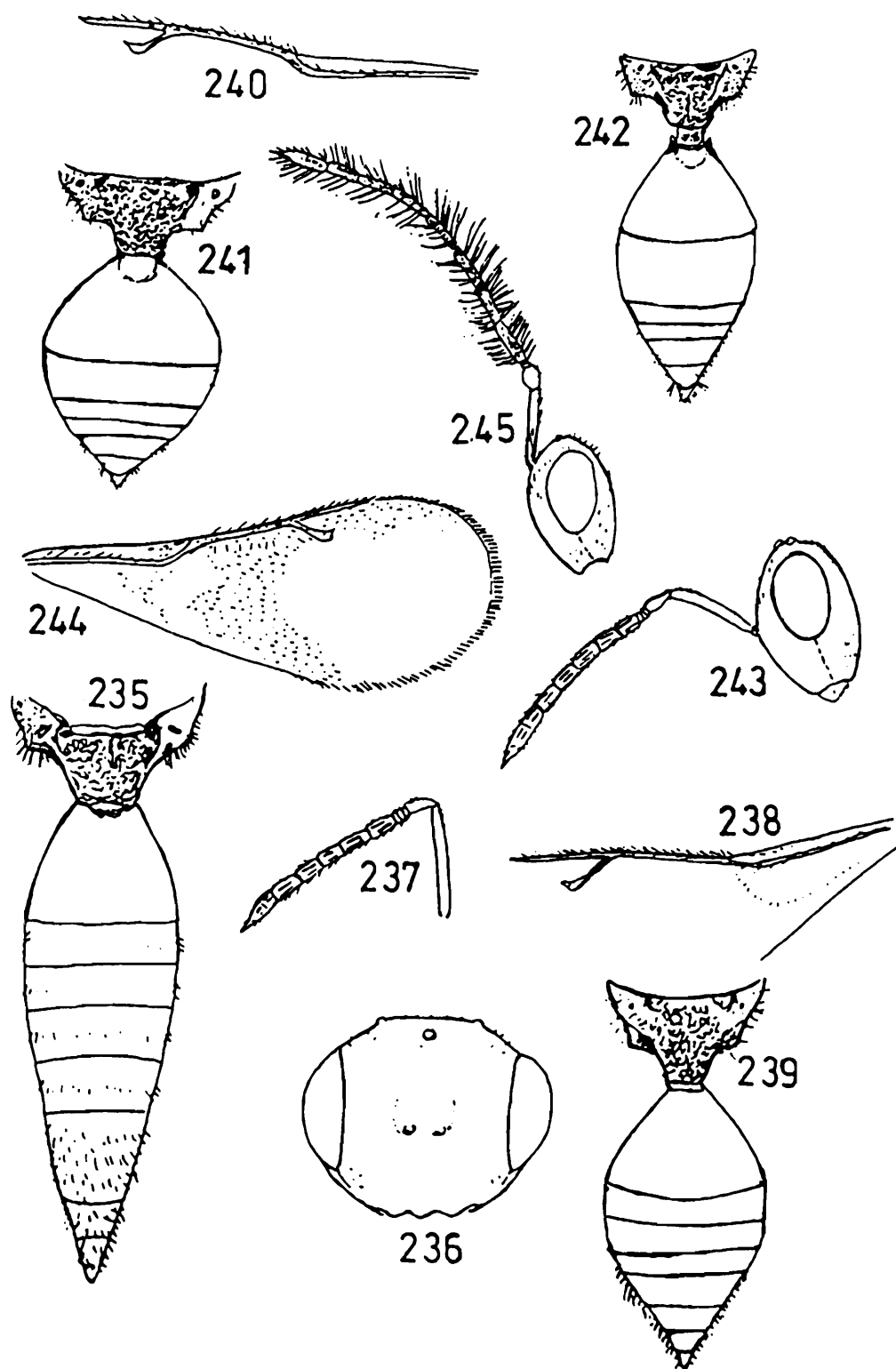
209, *Oniticellobia longigastra* Sureshan & Narendran, female body in profile; 210-212, *Anisopteromalus calandrae* (Howard), Female : 210, body in profile; 211, antenna, 212, propodeum and gaster dorsal view; 213-216, *Oxysychus sphenopterae* (Ferriere), Female : 213, body in profile; 214, antenna; 215, forewing; 216, propodeum dorsal view.



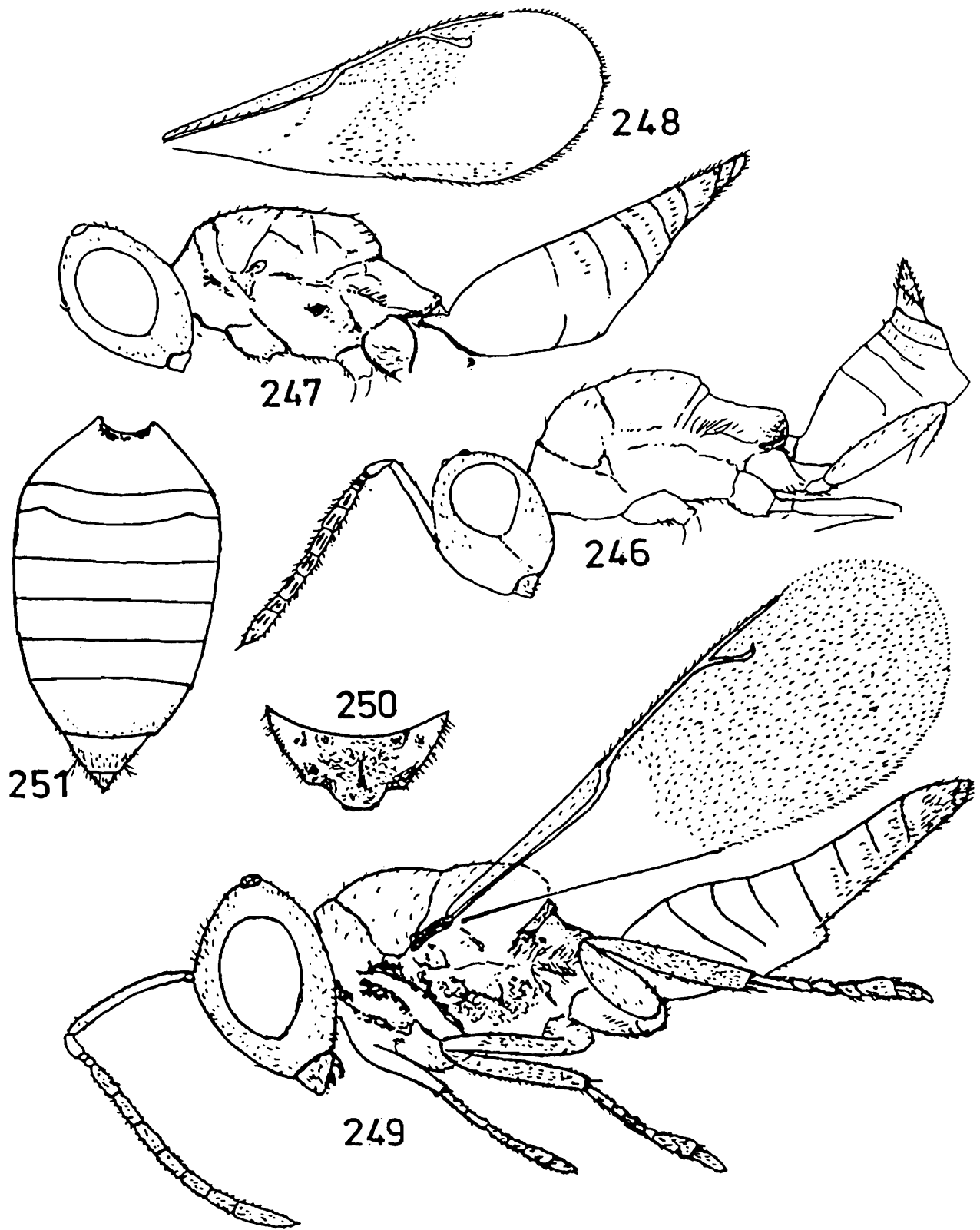
217-219, *Oxysychus coimbatorensis* (Ferriere); Female : 217, body in profile; 218, forewing; 219, antenna; 220-222, *Oxysychus nupserhae* (Dutt & Ferriere), Female : 220, body dorsal view; 221, antenna; 222, forewing; 223, *Oxysychus macregaster* Sureshan & Narendran, female body in profile.



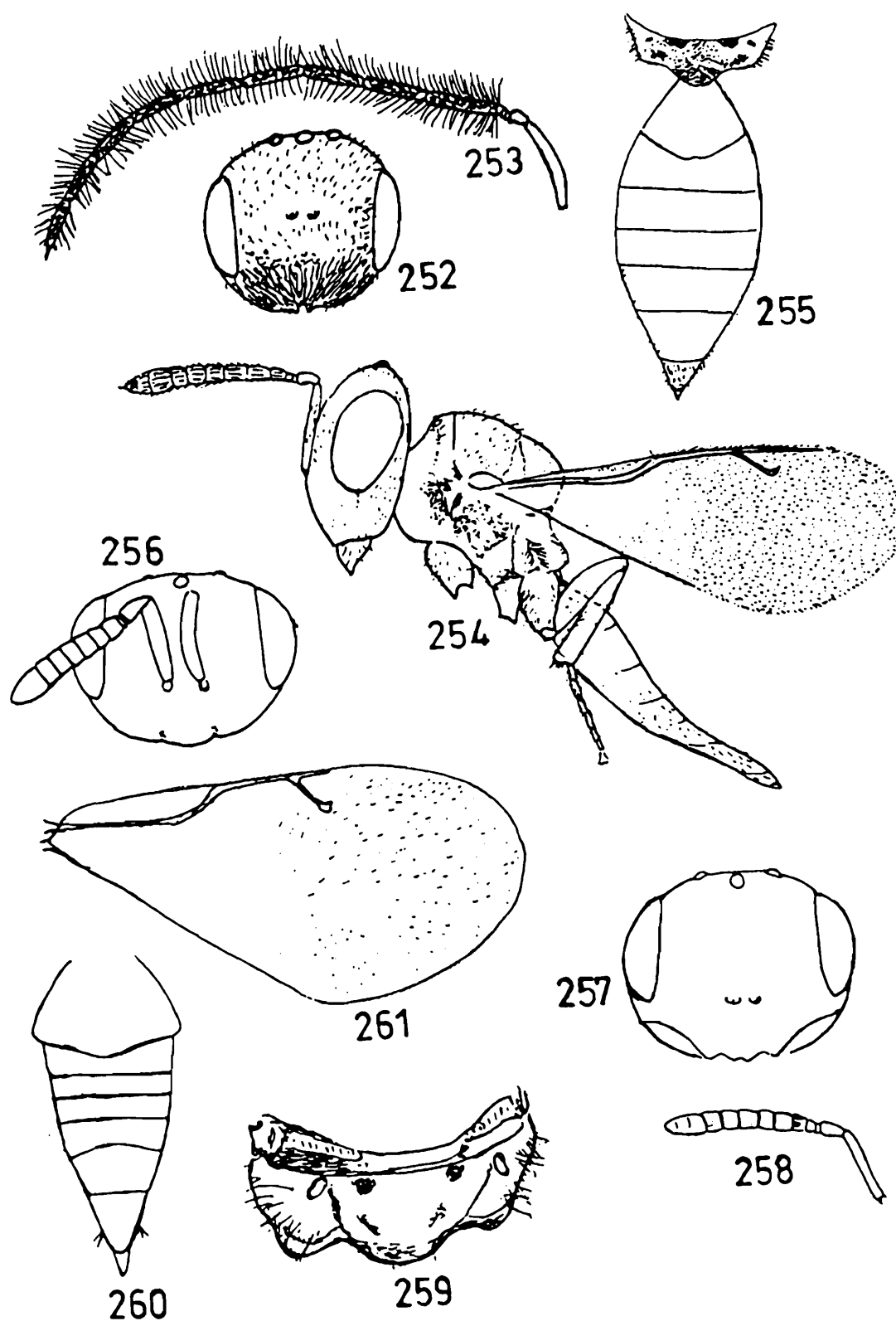
224-227, *Oxysychus macregaster* Sureshan & Narendran: Female : 224, antenna; 225, head dorsal view; 226, gaster dorsal view; 227, male antenna; 228, *Cyrtotypx latipes* (Rondani), female head and mesosoma dorsal view; 229-231, *Callitula keralensis* Sureshan, Female : 229, head front view; 230, antenna; 231, propodeum and gaster dorsal view; 232-234, *Callitula robusta* Sureshan, Female : 232, body in profile; 233, antenna; 234, forewing.



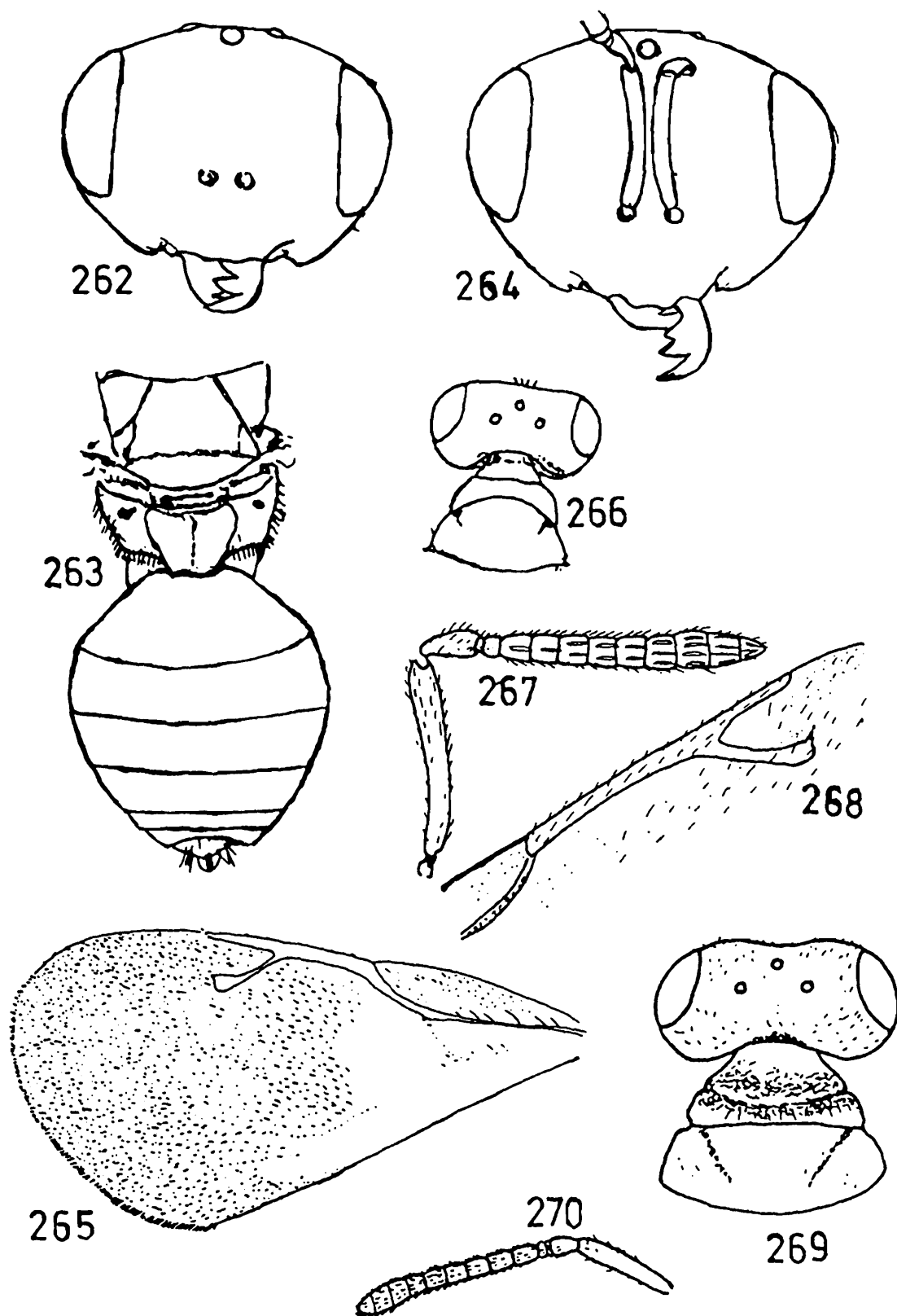
235, *Callitula robusta* Sureshan; female propodeum and gaster dorsal view; 236-239, *Callitula anguloclypea* Sureshan, Female : 236, head front view; 237, antenna; 238, forewing venation; 239, propodeum and gaster dorsal view; 240-241, *Callitula travancorensis* Sureshan, Female : 240, forewing venation; 241, propodeum and gaster dorsal view; 242-245, *Callitula rugosa* (Waterston); Female : 242, propodeum and gaster dorsal view; 243, head and antenna; 244, forewing; 245, male head in profile.



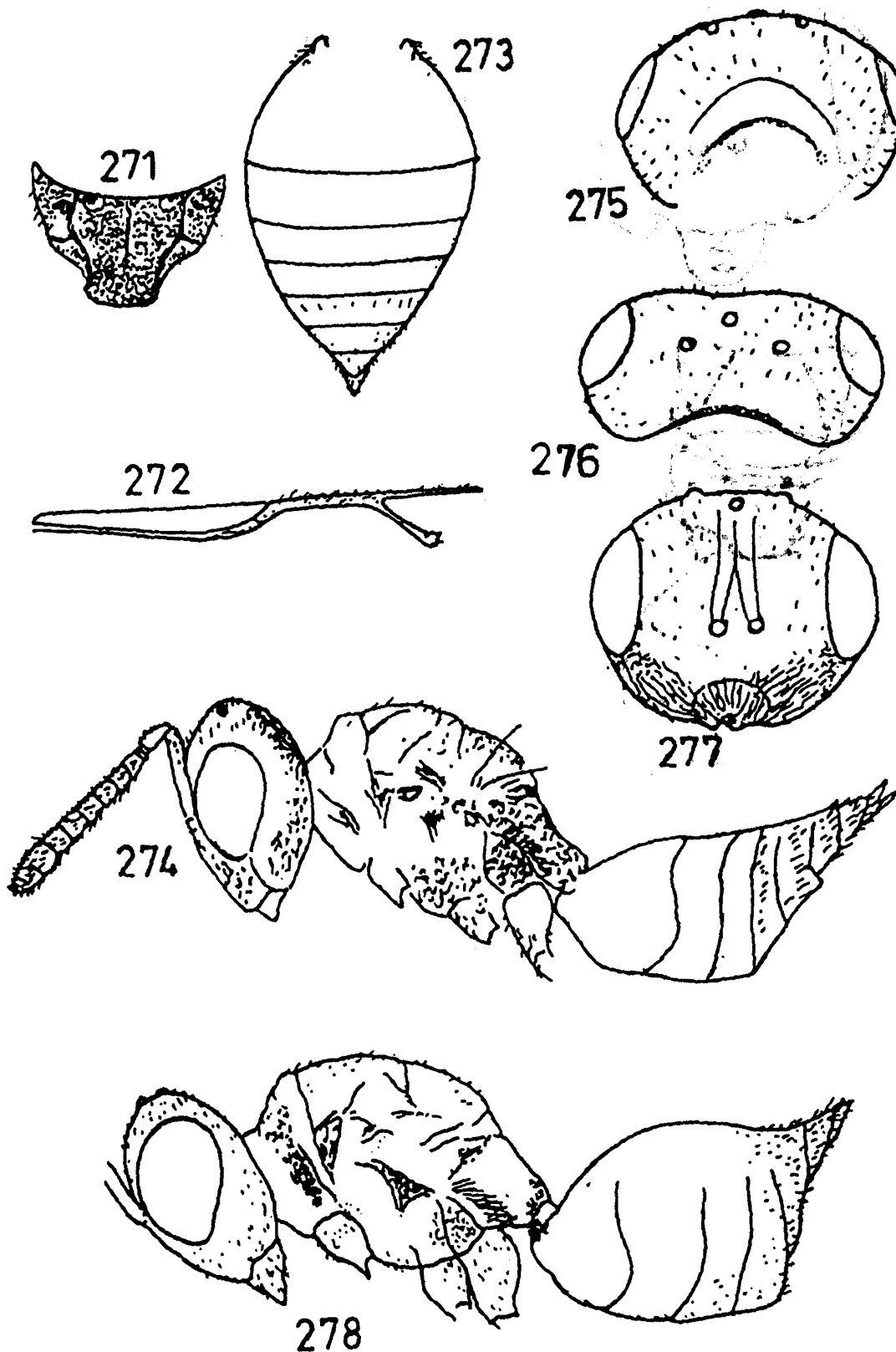
246. *Callitula travancorensis* Sureshan, female body in profile; 247-248, *Callitula keralensis* Sureshan; Female : 247, body in profile; 248, forewing; 249-251, *Homoporus gladius* Sureshan & Narendran; Female : 249, body in profile; 250, propodeum dorsal view; 251, gaster dorsal view.



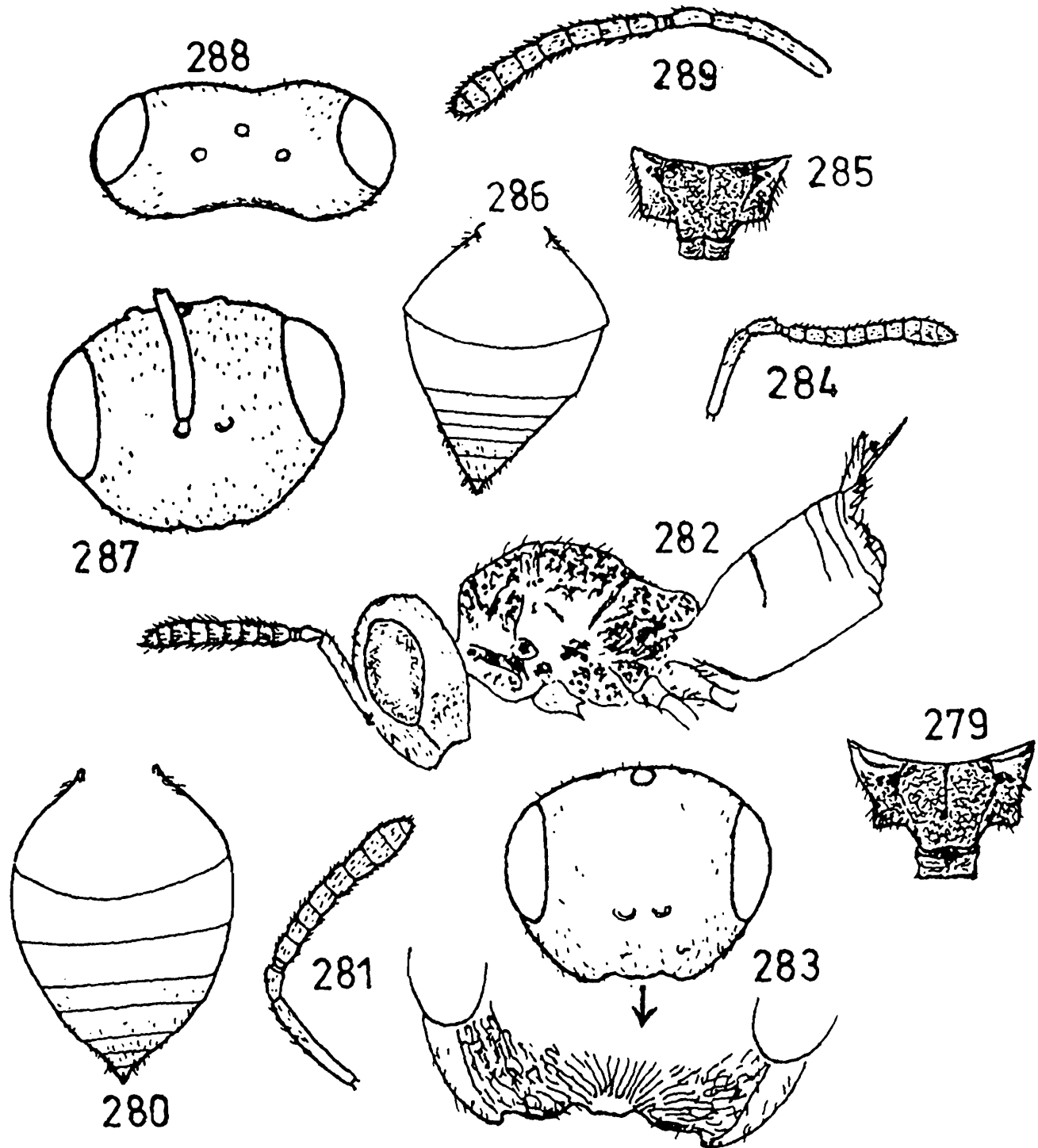
252-253. *Homoporus gladius* Sureshan & Narendran Female : 252, head front view; 253, male antenna; 254-255. *Homoporus acuminatus* Sureshan Female : 254, body in profile; 255, propodeum and gaster dorsal view; 256. *Nasonia vitripennis* (Walker) female, head front view; 257-260, *Catolaccus crassiceps* (Masi), Female : 257, head front view; 258, antenna; 259, propodeum; 260, gaster; 261, *Schizonotus latus* (Walker), female forewing.



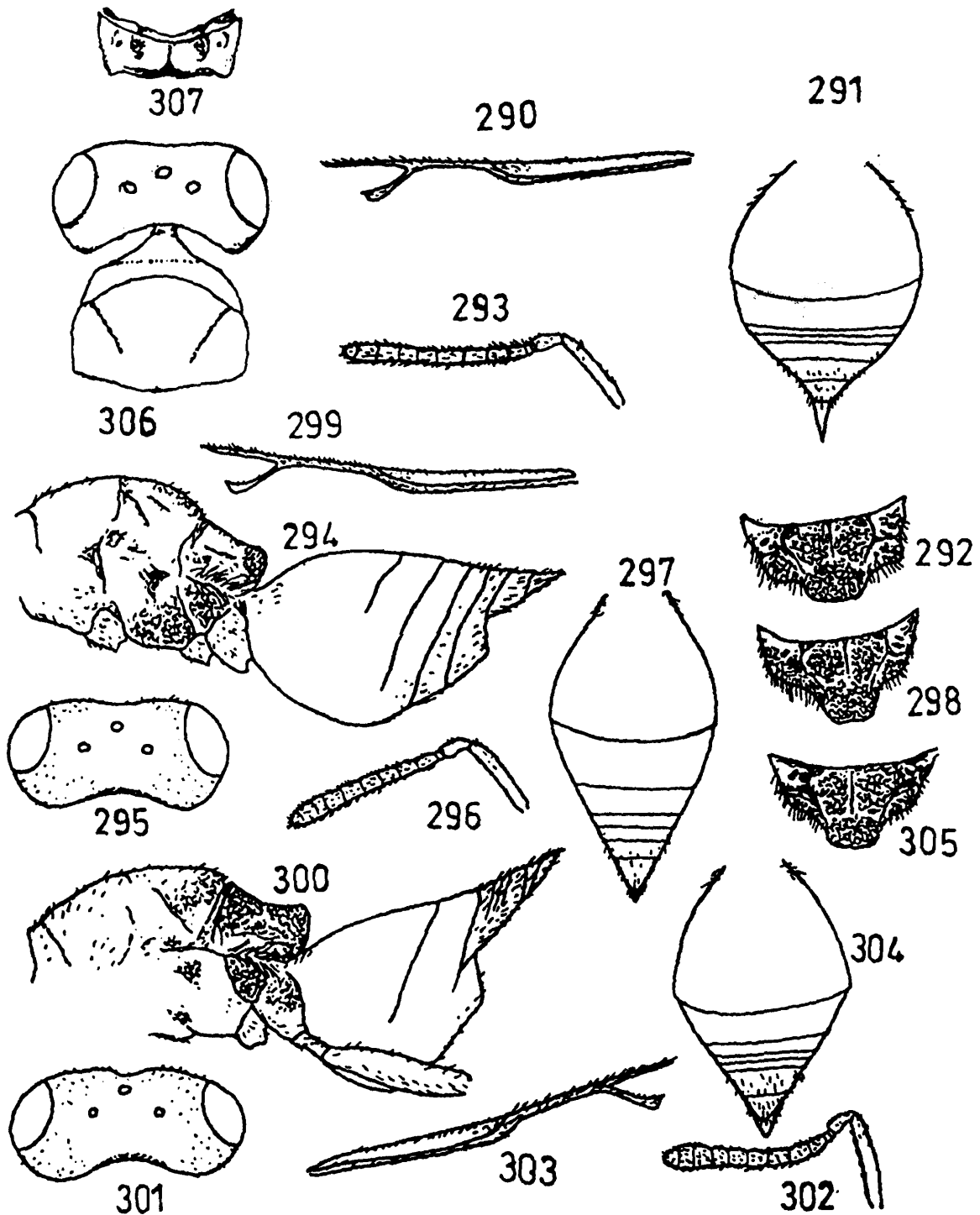
262-263. *Schizonotus latus* (Walker), Female : 262, head front view; 263, mesosoma (part) and gaster dorsal view; 264, *Schizonotus sieboldi* (Ratzeburg), female head front view; 265, *Catolaccus crassiceps* (Masi), female forewing; 266-268, *Dibrachys cavus* (Walker) Female : 266, head and mesosoma (part) ; 267, antenna; 268, forewing venation; 269-270, *Trichomalopsis thekkadiensis* Sureshan & Narendran, Female : 269, head and mesosoma (part); 270, antenna.



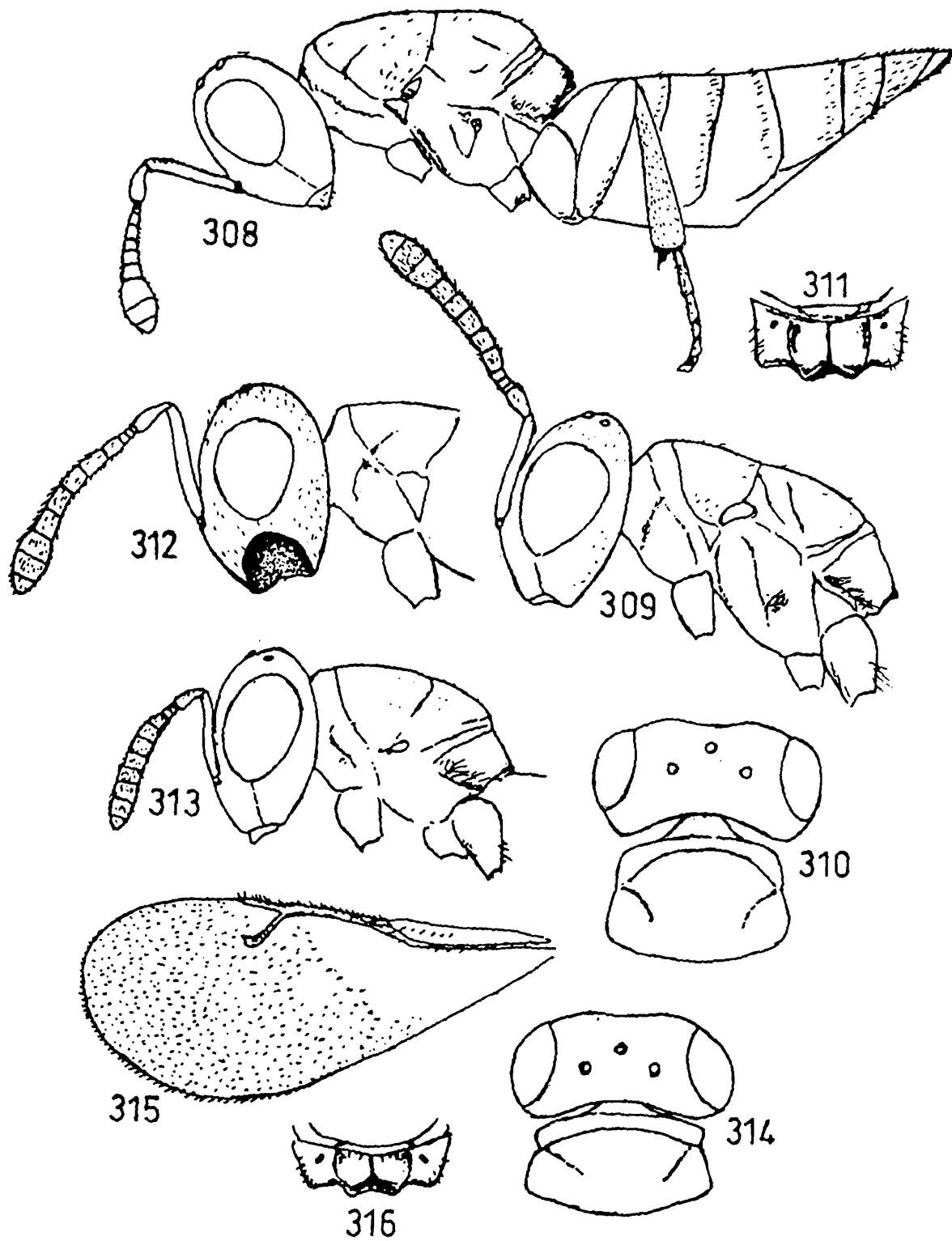
271-273. *Trichomalopsis thekkadiensis* Sureshan & Narendran, Female : 271, propodeum; 272, forewing venation; 273, gaster; 274-277, *Trichomalopsis apanteloctena* (Crawford), Female : 274, body in profile; 275, head postero-dorsal view; 276, head dorsal view; 277, head front view; 278; *Trichomalopsis acarinata* Sureshan & Narendran, female body in profile.



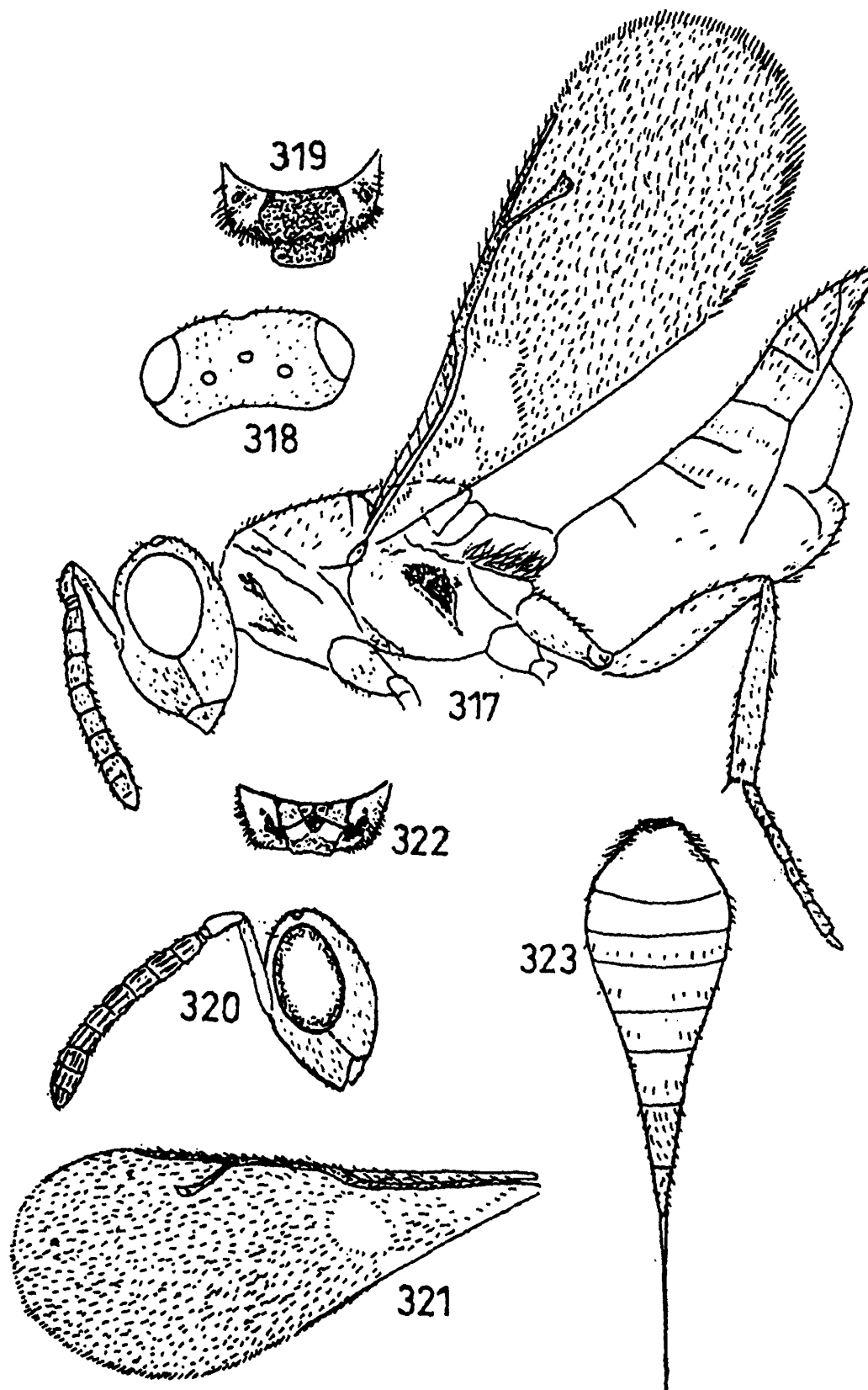
279-281. *Trichomalopsis acarinata* Sureshan & Narendran, Female : 279, propodeum and gastral petiole dorsal view; 280, gaster; 281, antenna; 282-283; *Trichomalopsis deplanata* Kamijo & Grissell, Female : 282, body in profile; 283, head front view; 284-286. *Trichomalopsis nigra* Sureshan & Narendran, Female : 284, antenna; 285, propodeum and gastral petiole dorsal view ; 286, gaster dorsal view; 287-289 : *Trichomalopsis ovigastra* Sureshan & Narendran, Female : 287, head front view; 288, head dorsal view; 289, antenna.



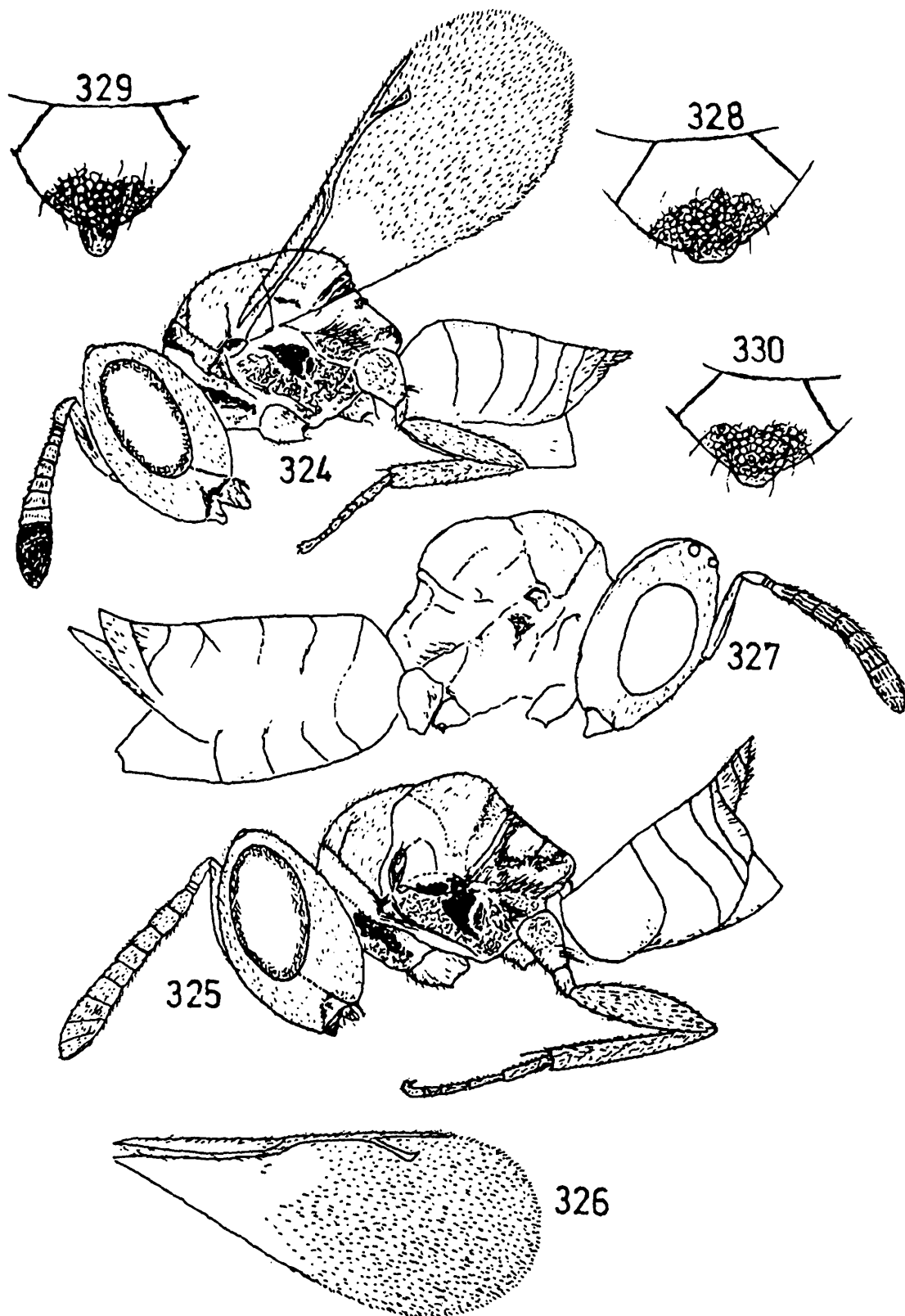
290-293. *Trichomalopsis ovigastra* Sureshan & Narendran, Female : 290, forewing venation; 291, gaster; 292, propodeum; 293, male antenna; 294-299. *Trichomalopsis travancorensis* Sureshan & Narendran, Female : 294, body (part) in profile; 295, head dorsal view; 296, antenna; 297, gaster; 298, propodeum; 299, forewing venation; 300-305; *Trichomalopsis neelagastra* Sureshan & Narendran, Female : 300, body in profile; 301, head dorsal view; 302, antenna; 303, forewing venation; 304, gaster; 305, propodeum; 306-307; *Mesopolobus harithus* Sureshan & Narendran, Female: 306, head and mesosoma (part) dorsal view; 307, propodeum.



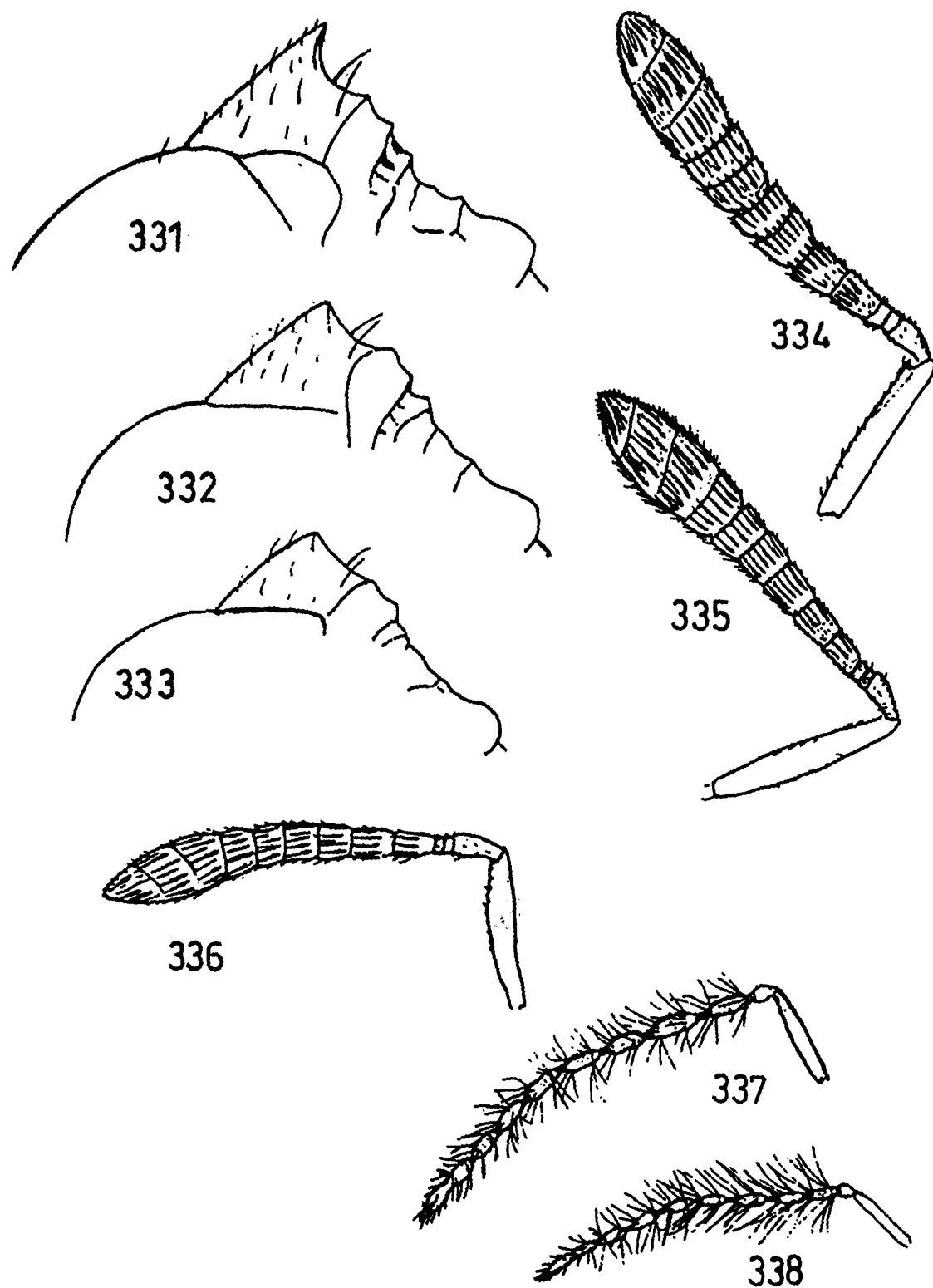
308, *Mesopolobus harithus* Sureshan & Narendran, female body in profile; 309-312, *Mesopolobus keralensis* Sureshan & Narendran, Female : 309, body (part) in profile; 310; head and mesosoma (part) dorsal view; 311, propodeum; 312, male body (part) in profile; 313-316, *Mesopolobus minutus* Sureshan & Narendran, Female : 313, body (part) in profile; 314, head and mesosoma (part) dorsal view; 315, forewing; 316, propodeum.



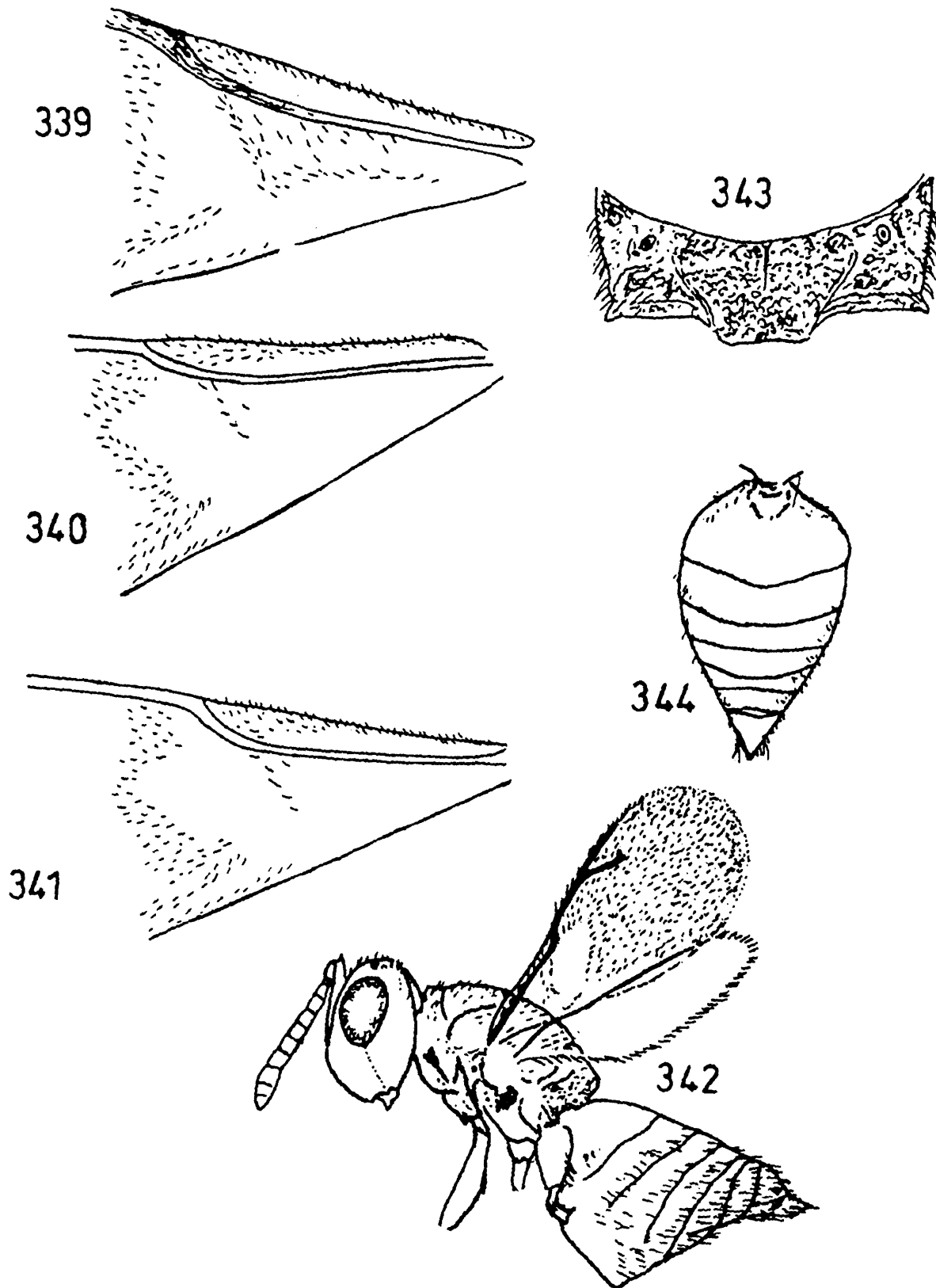
317-319, *Trichomalus keralensis* Sureshan, Female : 317, body in profile; 318, head dorsal view; 319, propodeum; 320-323, *Trichomalus kannurensis* Sureshan & Narendran, Female : 320, head and antenna in profile; 321, forewing; 322, propodeum; 323, gaster dorsal view.



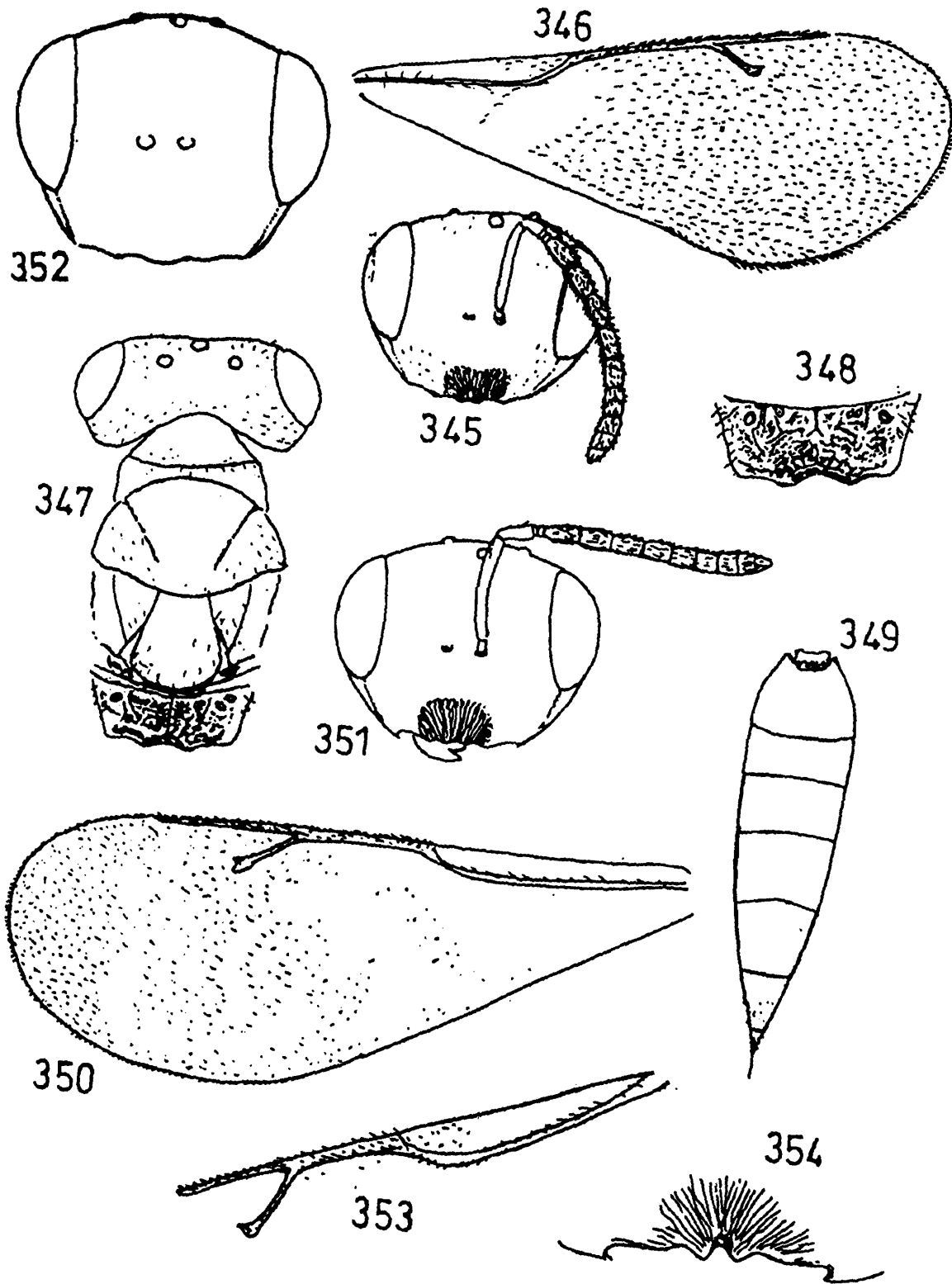
324, *Psilocera clavata* Sureshan & Narendran, female body in profile; 325-326, *Psilocera vinayaki* Sureshan & Narendran, Female : 325, body in profile; 326, forewing; 327, *Psilocera ghanii* Subba Rao, female body in profile; 328, *Psilocera scutellata* Sureshan, scutellum in dorsal view; 329, *Psilocera clavicornis* (Ashmead) female scutellum in dorsal view; 330, *Psilocera heydoni* Sureshan, female scutellum in dorsal view;



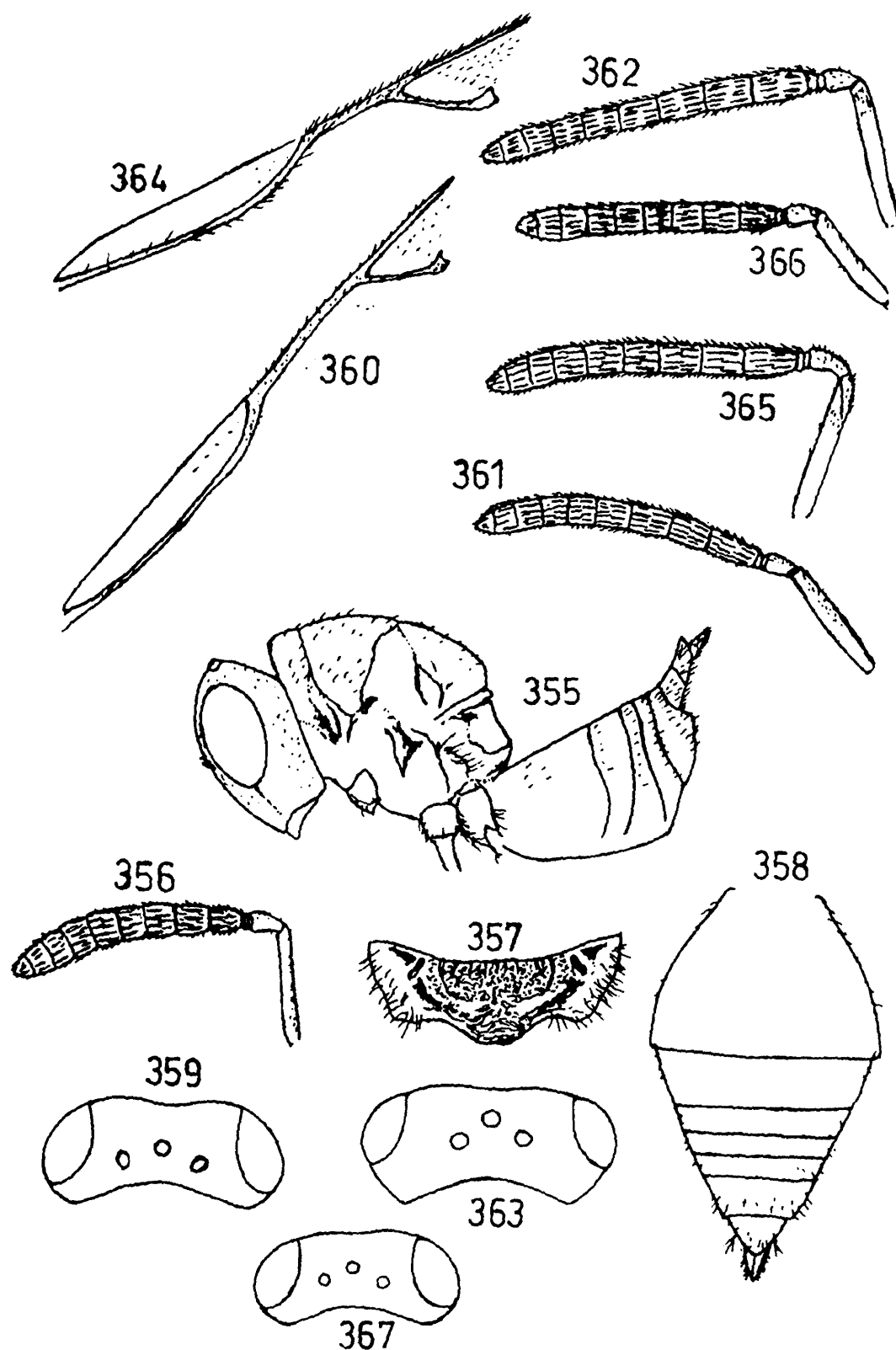
331, *Psilocera clavicornis* (Ashmead) female mesosoma in profile; 332 *Psilocera scutellata* Sureshan, female mesosoma in profile; 333, *Psilocera heydoni* Sureshan, female mesosoma in profile; 334-336, *Psilocera* spp. female antenna; 334, *Psilocera clavicornis* (Ashmead); 335, *Psilocera scutellata* Sureshan; 336, *Psilocera heydoni* Sureshan; 337-338, *Psilocera* spp. male antenna; 337, *Psilocera scutellata* Sureshan; 338, *Psilocera heydoni* Sureshan.



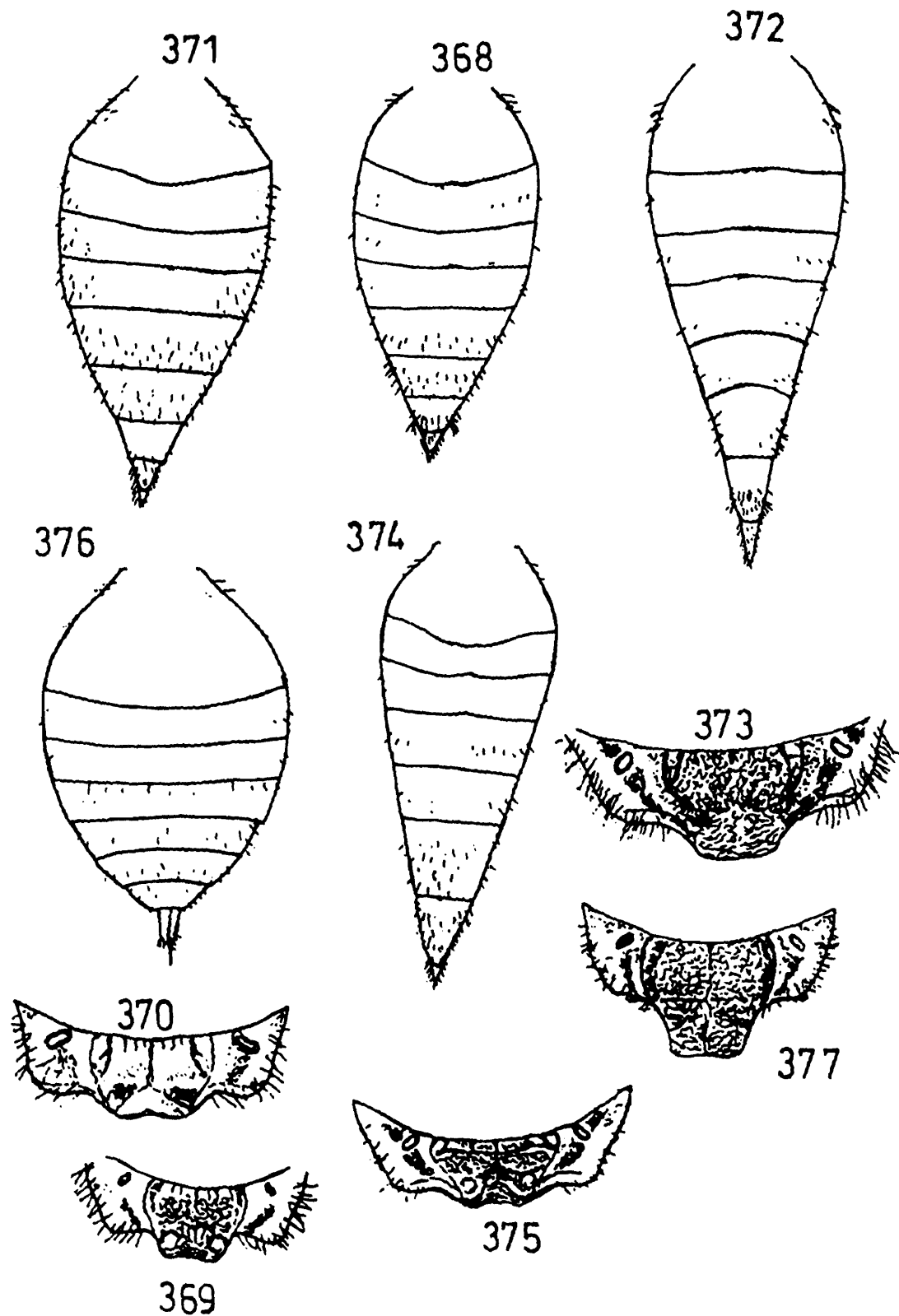
339-341; *Psilocera* spp. basal part of forewing; 339, *Psilocera clavicornis* (Ashmead); 340, *Psilocera scutellata* Sureshan; 341, *Psilocera heydoni* Sureshan; 342-344, *Lariophagus distinguendus* (Forster), Female : 342, body in profile; 343, propodeum.344, gaster dorsal view.



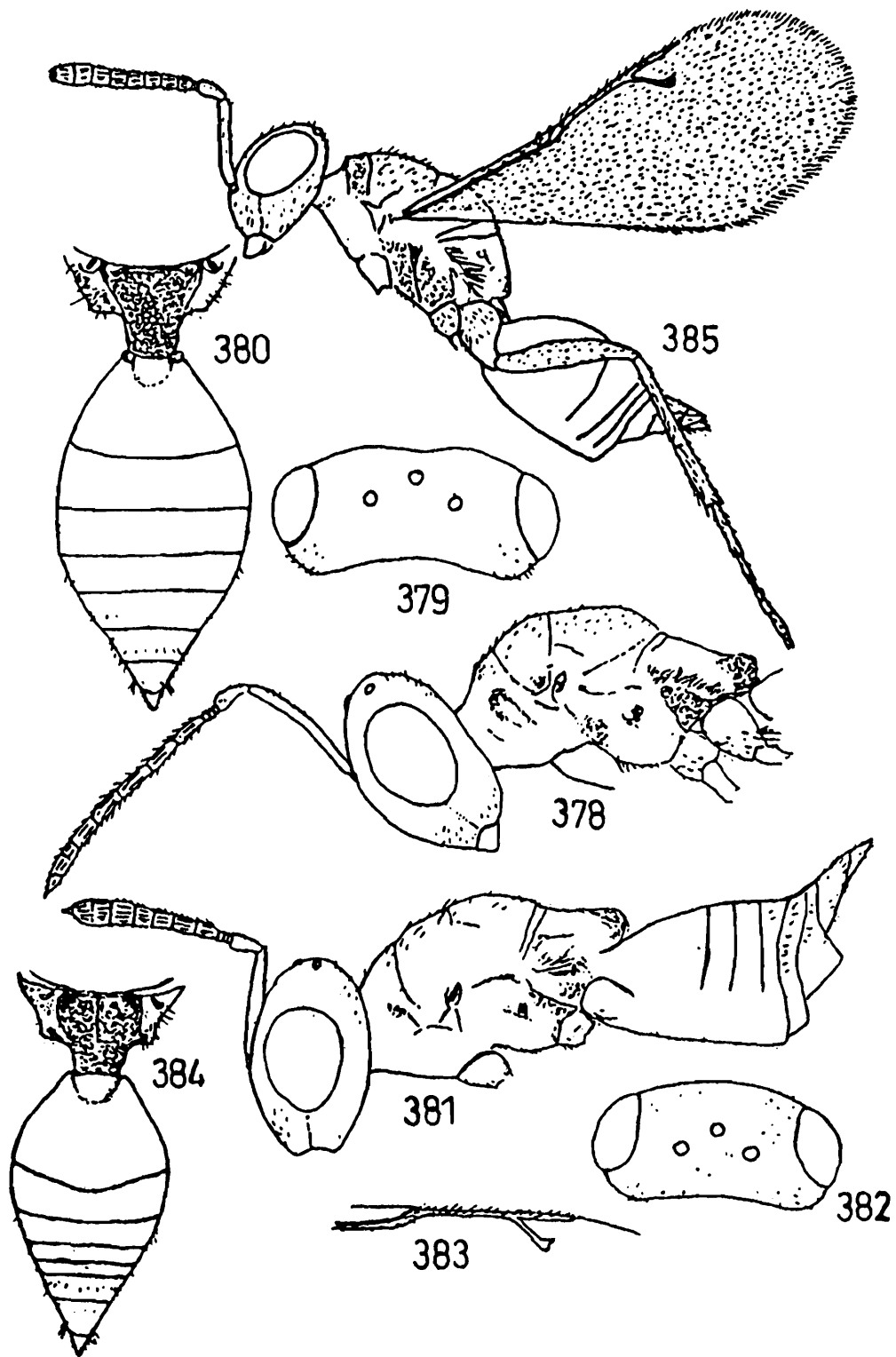
345-347. *Chlorocytus indicus* Sureshan, Female : 345, head front view; 346, forewing; 347, head and mesosoma dorsal view; 348-351, *Chlorocytus xanthopus* (Cameron), Female : 348, propodeum; 349, gaster dorsal view; 350, forewing; 351, head front view; 352, *Chlorocytus murriensis* Graham, female head front view; 353, *Pteromalus keralensis* Sureshan, forewing venation; 354, *Pteromalus sequester* (Walker), anterior margin of clypeus.



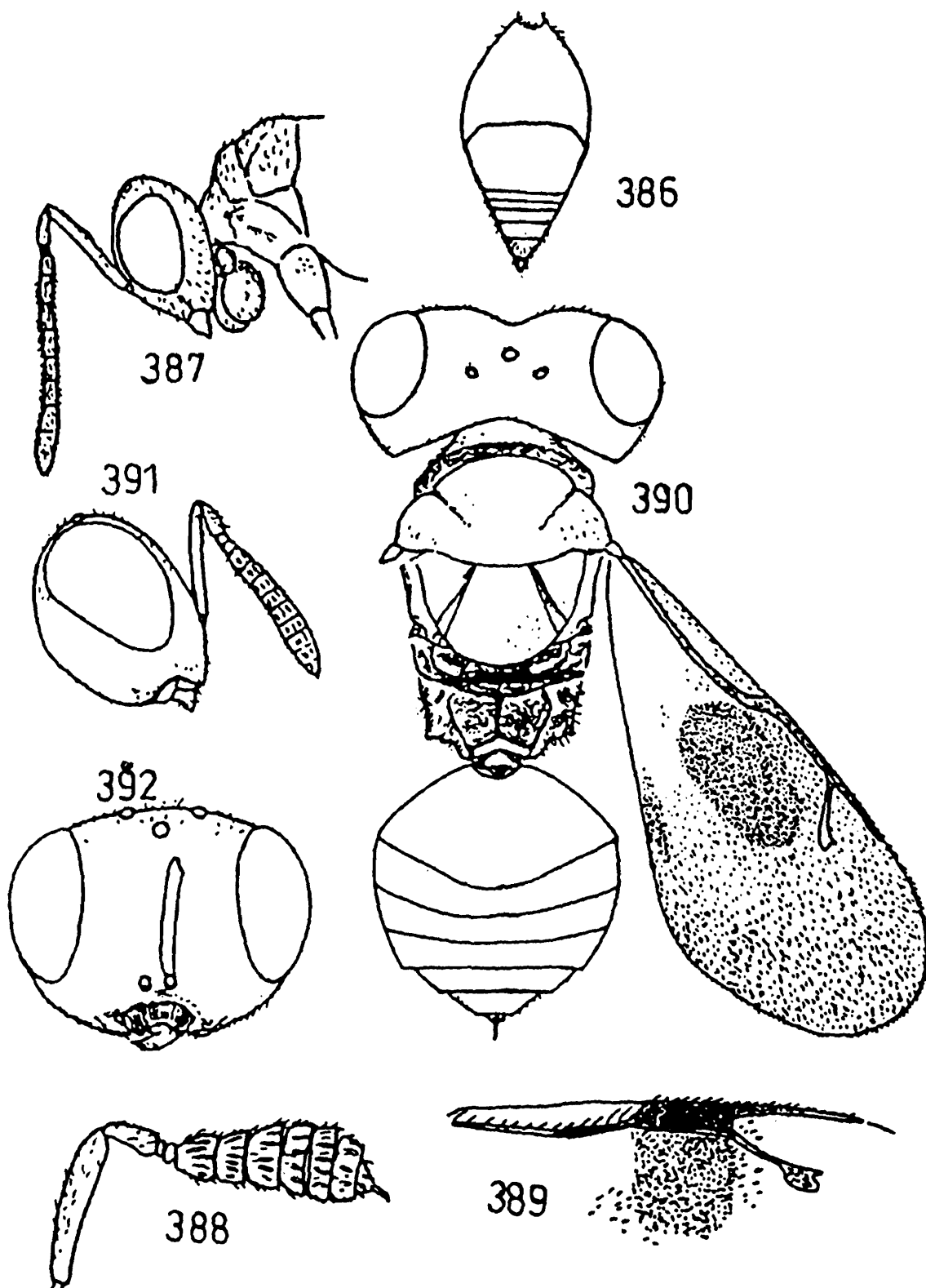
355-358, *Pteromalus keralensis* Sureshan, Female : 355, body in profile; 356, antenna; 357, propodeum; 358, gaster dorsal view; 359-361, *Pteromalus nigrus* Sureshan, Female : 359, head dorsal view; 360, forewing venation; 361, antenna; 362-364, *Pteromalus puparum* (Linnaeus), Female : 362, antenna; 363, head dorsal view; 364, forewing venation; 365, *Pteromalus metallicus* Sureshan, female antenna; 366, *Pteromalus sequester* Walker, female antenna; 367, *Pteromalus semotus* Walker, female head dorsal view



368-369, *Pteromalus semotus* (Walker), Female : 368, gaster; 369, propodeum; 370-371 *Pteromalus sequester* Walker; Female : 370, propodeum; 371, gaster; 372-373, *Pteromalus metallicus* Sureshan, Female : 372, gaster; 373, propodeum; 374-375, *Pteromalus nigrus* Sureshan, Female : 374, gaster; 375, propodeum; 376-377, *Pteromalus puparum* (Linnaeus), Female : 376, gaster; 377, propodeum.



378-380. *Callitula peethapada* Narendran & Mohana, Female : 378, head and mesosoma in profile; 379, head dorsal view; 380, propodeum and gaster dorsal view; 381-384. *Callitula bambusae* Narendran & Jobiraj, Female : 381, body in profile; 382, head dorsal view; 383, forewing venation; 384, propodeum and gaster dorsal view; 385, *Cyrtogaster clavicornis* Walker, female body in profile.



386-387. *Cyrtogaster clavicornis* Walker, Female : 386, gaster in dorsal view; 387, male head and part of mesosoma in profile; 388-389. *Rhaphitelus maculatus* Walker, Female : 388, antenna; 389, forewing venation; 390-392. *Cyclogastrella nigra* Sureshan, Female: 390, body dorsal view; 391, head in profile; 392, head front view;

PLATE-I



1

Acroclisoides maculatus



2

Agiommatius geethae



3

Callitula robusta



4

Kumarella angulus



5

Dinarmus maculatus



6

Cryptoprymna indiana



7

Chlorocytus indicus



8

Cyclogastrella nigra



9

Eurydinotomorpha malabarensis



10

Mesopolobus harithus



11

Mokrzeckia menzeli



12

Miscogasteriella jayasreeae

PLATE-II



13
Netomocera sp.



14
Merismomorpha truncata



15
Metastenus indicus



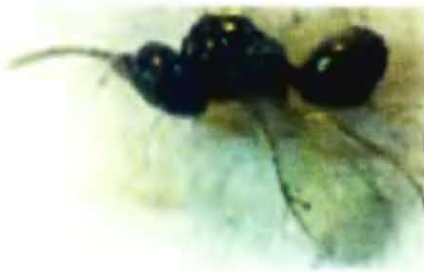
16
Oniticellobia longigastra



17
Catolaccus crassiceps



18
Sphegigaster anamudiensis



19
Notoglyptus scutellaris



20
Narendrella nilamburensis



21
Norbanus acuminatus



22
Oxysychnus coimbatorensis



23
Propicroscythus oryzae



24
Pteromalus keralensis

PLATE-III



25
Homoporus gladius



26
Halticopterella robusta



27
Psilocera scutellata



28
Inkaku keralensis



29
Lariophagus distinguendus



30
Pachyneuron groenlandicum



31
Paraiemesa vishnuae



32
Trichomalus keralensis



33
Uniclypea elongata



34
Syntomopus carinatus



35
Toxomorpha minuta



36
Trichomalopsis thekkadiensis

PLATE-IV



37
***Cephaleta* sp**



38
***Parurios* sp.**



39
***Spalangia* sp.**



40
Cerocephala dinoderi



41
Systasis nigra



42
Stictomischus turneri



43
Dipara keralensis



44
Cyrtogaster clavicornis



45
Heydenia tuberculata



46
Theocolax elegans



47
Storeya minuta



48
***Panstenon* sp.**