



**TAXONOMY OF THE FAMILY PTEROMALIDAE
(HYMENOPTERA)**

THESIS SUBMITTED FOR THE DEGREE OF
Doctor of Philosophy
IN
ZOOLOGY
IN THE FACULTY OF LIFE SCIENCES
(ALIGARH MUSLIM UNIVERSITY, ALIGARH)

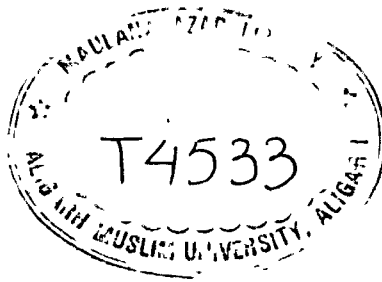
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ABSTRACT

The present work deals with the "taxonomy of family Pteromalidae", an economically important hymenopterous parasite of superfamily Chalcidoidea.

Suprageneric categories as proposed or recognised by early workers have been mentioned in Review of Literature. Recent classification proposed by Boucek (1988) is duly recognised and adapted with some modifications. Contributions by early workers on oriental pteromalids have been mentioned.

Brief diagnosis of the family, key to subfamilies, tribes, Indian genera and separate keys for species studied, wherever necessary have been given.

Apart from the complex nature and heterogeneity of this group, following diagnostic characters for the family have been taken into consideration : Legs with tarsi 5-segmented, foretibial spur curved; antennae 10-13 segmented, with 1-3 anelli, rarely absent; prepectus not fused with pronotum; mesoscutum with incomplete or complete parapsidal grooves; forewing venations well developed.

For the diagnosis of subfamilies, tribes and genera, conventional characters have been mostly used. However, for generic diagnosis some additional characters have also been suggested and adequately mentioned in the text.

Important characters for specific separation such as number of anelli, elongated or transverse condition of funicular segments, flattened or cylindrical nature of scape; colour and comparative lengths of ocelli; nature of clypeus; heterodont condition of mandibles; carinate and rounded pronotum; presence or absence of frenum on scutellum; nature of plicae on propodeum and various characters of forewings have been used in the present work. Female genital characters, overlooked in past, have been studied for the first time, and given due weightage.

The package of characters included in this work for generic and specific separation as well as descriptions are considered sufficient for the identification and establishment of new taxon.

The present work is based on 32 genera and 63 species spread over 11 subfamilies namely, Asaphinae, Colotrechninae, Diparinae, Eunotinae, Herbertiinae, Miscogasterinae, Ormocerinae, Panstencninae, Pireninae, Pteromalinae and Spalangiinae.

An updated key of all Indian genera has been provided, with modifications wherever necessary, to enable easy generic diagnosis. Each genus is separately dealt with carrying maximum and up-to-date informations as far as possible, including historical and present status, distribution, number of species (from world as well as India) their hosts and diagnosis.

Species under each genus is keyed out carefully, on the basis of outstanding features. Only species studied are discussed and illustrated, with additional supplementary characters. New species are described in detail with suitable reasons of their alienation and separate entity.

Subfamily and tribe-wise placement of Indian genera in the present work and their distribution in six zoogeographical regions have been provided.

The work is based on materials collected mainly by sweeping grassy lands of important agricultural areas of Andhra Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan and Uttar Pradesh. Cephaleta australiensis, C. brunneiventris, Dinarmus laticeps and Scutellista cyanea were reared in laboratory.

Ten new species are proposed which are as follows :
Ecrizotomorpha tenkasiensis **sp.n.**, Gastrancistrus agarwali **sp.n.**,
Merismus indicus **sp.n.**, Mesopolobus heterodontus **sp.n.**,
Mesopolobus setosus **sp.n.**, Merismomorpha yousufi **sp.n.**, Spalangia parfuscipes **sp.n.**,
Systasis aligarhensis **sp.n.**, Trichomalopsis pilosus **sp.n.**, and Trigonoderopsis bouceki **sp.n.**

Three new combinations viz. Pteromalus brachygaster (Graham) **comb.n.**, Pteromalus chlorogaster (Thomson) **comb.n.** each for Habrocytus and Trichomalopsis albopilosus (Graham) **comb.n.** for Eupteromalus; and following three synonyms given in parentheses, have been proposed; Cephaleta australiensis. (=

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Cephaleta tripathii (Kaul) **syn.n.**, ~~Halticoptera~~ aenea
 (= Halticoptera imphalensis Chisti & Shafee **syn.n.**), Halticoptera
jaipurensis Chisti **syn.n.**).

Six genera namely Caenocrepis Thomson, Colotrechnus Thomson, Dipara Walker, Parurios Girault, Panstenon Walker, Trigonoderopsis Girault, and following 34 species (including one unidentified species) are reported for the first time from India: Caenocrepis arenicola Thomson, Callitula bicolor Spinola, Callitula elongata (Thomson), Callitula ferriere Boucek, Colotrechnus notaularis Boucek, Dipara petiolata Walker, Homoporus arestor (Walker), Homoporus subniger (Walker), Ischyroptyx ligusticus (Masi), Mesopolobus aequus (Walker), Mesopolobus mesostenus Graham, Miscogaster elegans Walker, Parurios sp., Platecrizotes sudanensis Ferriere, Psilocera obscura Walker, Panstenon oxylus (Walker), Pteromalus brachygaster Graham, Pteromalus chlorogaster Thomson, Pteromalus chrysos Walker, Pteromalus procerus Graham, Pteromalus smaragdus Graham, Spalangia fuscipes Nees, Spalangia simplex Perkins, Sphegigaster brunneicornis (Ferriere), Sphegigaster nigricornis (Nees), Syntomopus incisus Thomson, Systasis angustula Graham, Systasis encyrtoides Walker, Systasis parvula Thomson, Systasis tenuicornis Walker, Trichomalopsis albopilosus (Graham), Trichomalopsis maurus Graham, Trichomalopsis oryzae Kamijo and Trichomalopsis tigasis (Walker).

The type specimens have been deposited in the museum, Deptt. of Zoology, A.M.U., Aligarh (U.P.) India.

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CERTIFICATE

Certified that Mr. Md. Jamal Ahmad has carried out his research work entitled "Taxonomy of the family Pteromalidae (Hymenoptera)" under the supervision of (Late) Dr. S. Adam Shafee, who served as Reader, in the Department of Zoology of this university.

The work is an original contribution and a distinct addition to the Indian Pteromalidae, containing some new and important observations.

As authorised by the Board of Studies in Zoology at its special meeting held on August 23, 1994, I am permitting Mr. Md. Jamal Ahmad to submit his thesis for the award of Ph.D. degree in Zoology of Aligarh Muslim University, Aligarh, India.


(A.K. JAFRI)

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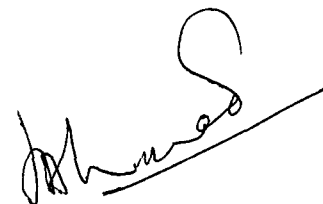
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(Md. Jamal Ahmad)

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I. INTRODUCTION

Family Pteromalidae has been a fascinating group within Chalcidoidea since ages, as evident from mammoth contributions from early workers such as Walker (1833-1872), Thomson (1876, 1878), Girault (1913-1940) and a number of present eminent taxonomists exclusively Graham, Boucek, Burks, Gahan and Mani etc. The underlying secret of its focal attention greatly owes to its easy availability, well sclerotized body enabling safe handling, its absolute parasitic behaviour as other chalcids and a wide range of host selection. Additionally, its potential to check various pest populations makes study of this group quite worthwhile.

This family is credited for being at par with Encyrtidae and Eulophidae, in terms of recognized number of taxa. It however constitutes one of the most complex and heterogenous groups, with a wide range of diversity making their identification difficult, as also acknowledged by prominent workers like Peck, Boucek & Hoffer (1964), Graham (1969) and Boucek (1988) etc. Various transitional forms add much to the heterogeneity of this group and have been an age-old source of taxonomical confusions and still pose problems, regarding classification and various unsettled placements.

In spite of great structural diversity and various morphological variations, this group can however be recognized on the basis of following characters : Body usually metallic with head and thorax reticulately punctate; antennae usually 10-13

segmented with 1-3 anelli, funicle 5-6 segmented; mesoscutum with parapsidal grooves complete or incomplete; forewings with well developed venations; legs with tarsi 5-segmented; gaster usually sessile or petiolate.

The family is represented by 28 subfamilies and 19 tribes from the world. Mani (1989) recognized 26 subfamilies and 9 tribes from the Indian subcontinent.

The basic need of present work on Indian pteromalids stems from the cumulative effect of tremendous output from Europe, Australia and America and growing interests towards their utilization in the field of biological control, but a considerable rarity of work done from India, with just 62 genera and 74 species (Boucek, Subba Rao & Farooqi 1978; Farooqi & Subba Rao 1986) as compared to world's total record of over 700 genera and more than 3200 species. Such a small record from India promises certainly a large wealth of pteromalids unexplored yet.

Although Farooqi (1977-1986), Mani (1938-1989) and Boucek, Subba Rao & Farooqi (1978) made notable contributions, nevertheless, it won't be impertinent to say that the field is still in infancy in India, and calls for due attention and good expertise for intensive survey to update the family size with detailed study, in order to exploit them successfully in the field of bio-control. With these factors in view and being rather optimistic about better parasitic gain, a project was launched for the survey of Indian

pteromalids, though purely with taxonomical view, but with more practical relevance indeed.

Biological significance of pteromalids lies in their invasion of almost all the terrestrial forms of habitat, with a wide spectrum of host selection at their different developmental stages. Further, these include nearly all the parasitic forms i.e. primary, secondary, tertiary and quaternary, existing both as entomophagous and phytophagous forms. Systasis cenchrivora Farooqi has been so far reported as a phytophagous type from India, ovipositing in the seeds of Cenchrus ciliaris. A large majority however is represented by entomophagous forms varying from highly host specific to polyphagous. Many of these are on experimental trials against important major pests of agriculture as well as horticulture, and some have really proved quite a successful bioagent, separately or in combination with other chalcids.

scutellista cyanea continues to be an efficient natural enemy of black scale, Saissetia olea in citrus orchard, and has shown to reduce the pest population by about 75%. Anisopteromalus calandrae is widely known for its attack on Sitophylus oryzae, both indoor and outdoor, and is known to suppress the pest population from a little 47.4% to a maximum 95.3% (Press et al 1984; Cline, Press & Flaherty 1985). Pteromalus puparum is another pupal parasite of Pieris spp., major pest of cabbage and cauliflower throughout the world. The parasite is being used in China against Pieris rapae, though with limited success. In Southern Iran the extent of pupal parasitization of Papilio

demoleus, an important pest of orange there by Pteromalus puparum has been recorded to reach nearly 86% (Farid 1989). In Pakistan, Pteromalus puparum acts as a main limiting factor for suppressing the population of Papilio demoleus, causing pupal mortality upto 14.3% and 34% in first and second generation respectively (Rafi, Irshad & Matin 1991). Many species of Spalangia are being successfully exploited in California against stable fly, Stomoxys calcitrans and Musca domestica in dairy farms. Percentage parasitization of fly puparia by Spalangia spp. in field conditions has been reported to be about 74.3% (Meyer, Mullens, Cyr & Stokes 1990).

The present work is based on 32 genera and 63 species spread over 11 subfamilies, namely Asaphinae, Colotrechninae, Diparinae, Eunotinae, Herbertinae, Miscogasterinae, Ormocerinae, Panstenoninae, Pireninae, Pteromalinae and Spalangiinae. An updated key of all Indian genera has been provided with some modifications to enable an easy generic separation. Each genus is separately discussed, in sufficient detail, as far as possible. Species under each genus is carefully keyed out on the basis of outstanding characters. Species studied are illustrated and discussed, with addition of various supplementary characters and their affinities with foreign allies. New species are described in detail with suitable reasons of their alienation and separate entity.

The materials were collected mainly by sweeping grassy lands from various Indian states like Andhra Pradesh, Karnataka,

Madhya Pradesh, Maharashtra, Orissa, Rajasthan and Uttar Pradesh. Cephaleta australiensis, Cephaleta brunneiventris, Dinarmus laticeps and Scutellista cyanea were reared from Sitophylus oryzae, Bruchus and pseudococcus spp. respectively.

Ten new species are proposed which are as follows : Ecrizotomorpha tenkasiensis sp.n., Gastrancistrus agarwali sp.n., Merismus indicus sp.n., Mesopolobus heterodontus sp.n., Mesopolobus setosus sp.n., Merismomorpha yousufi sp.n., Spalangia parfuscipes sp.n., Systasis aligarhensis sp.n., Trichomalopsis pilosus sp.n., and Trigonoderopsis bouceki sp.n.

Three new combinations viz. Pteromalus brachygaster (Graham) **comb.n.**, Pteromalus chlorogaster (Thomson) **comb.n.** each for Habrocytus and Trichomalopsis albopilosus (Graham) **comb.n.** for Eupteromalus; and following three synonyms given in parentheses, have been proposed: Cephaleta australiensis (= Cephaleta tripathii (Kaul) **syn.n.**), Halticoptera aenea (= Halticoptera imphalensis Chisti & Shafee **syn.n.**), Halticoptera circulus (= Halticoptera jaipurensis Chisti **syn.n.**).

Six genera namely Caenocrepis Thomson, Colotrechnus Thomson, Dipara Walker, Parurios Girault, Panstenon Walker, Trigonoderopsis Girault, and following 34 species (including one unidentified species) are reported for the first time from India : Caenocrepis arenicola Thomson, Callitula bicolor Spinola, Callitula elongata (Thomson), Callitula ferriere Boucek, Colotrechnus notaularis Boucek, Dipara petiolata Walker, Homoporus arestor

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The type specimens have been deposited in the museum, Deptt. of Zoology, A.M.U., Aligarh (U.P.) India.

II. REVIEW OF LITERATURE

The recent knowledge of chalcids owes greatly to the European workers of 19th century exclusively Walker and Thomson, who undoubtedly set up a landmark for the future workers. Walker (1832-1875) laid the foundation of chalcid taxonomy by publishing an immense collection of works, far greater than combined publications of all the taxonomists of the world, of over next fifty years. His publications in *Monographia Chalciditum* (1833-1839) are still held at high esteem and constitute illustrious contributions in the field of Chalcidoidea, especially the family Pteromalidae. Thomson's works in *Hymenoptera Scandinaviae* (1876-1878), remarkable in style and accuracy, reinforced the foundation of chalcid taxonomy. The combined effect of these two taxonomists was not just an awareness of the 'world of chalcids' but a worldwide fascination to a multitude of taxonomists for exploration of the hidden minute treasure of the nature, and their exploitation for nature's own sake.

Dalman (1820) proposed the name 'Pteromalini', the second earliest available name in Chalcidoidea (Boucek, 1988).

Walker (1839) elevated 'Pteromalini' to the rank of family, and called it Pteromalidae. Further, he proposed Cleonymidae, Miscogasteridae and Ormoceridae as distinct families and separated them from Pteromalidae on the basis of some

vague characters.

Westwood (1839) proposed the name 'Pteromalides' for *Pteromalidae* and added 'Spalangiides' to it. Also, he placed *Torymidae* under *Pteromalides*.

Thomson (1876, 1878) demoted all the earlier proposed family names to the rank of tribes and called them *Pirenina*, *Spalangiina* and *Pteromalina*, with inclusion of *Cleonymides* and *Mischogastrides* as subtribes of *Pteromalina*. Further, he replaced *Ormocerides* by *Tridymina* accepting it as a tribe.

Howard (1886) for the first time proposed two major sections of *Pteromalidae*, on the basis of tarsal segments ----- *Macrocentri* and *Microcentri*, the former with 5-segmented tarsi, and the latter with 3-4. He placed present day *Pireninae*, *Pteromalinae*, *Spalangiinae* and *Tridyminae* under *Macrocentri*.

Ashmead (1904) followed Thomson's system of classification and recognized *Cleonymidae*, *Miscogasteridae* and *Pteromalidae* as distinct families and proposed 14 subfamilies and their tribes. Break-up into subfamilies and tribes is based on insertion of antennae, number of antennal segments, nature of parapsidal grooves, sessile or petiolate condition of gaster etc. Classification proposed by him is as follows :

Cleonymidae : *Chalcedectinae*, *Cleonyminae*, *Colotrechninae*, *Pelecinellinae*.

Miscogasteridae : Lelapinae, Miscogasterinae (Halticopterini, Miscogasterini), Pireninae, Tridyminae (Metastenini, Tridymini).

Pteromalidae : Diparinae, Eunotinae, Merisinae (Isoplatini, Merisini, Roptrocerini), Pteromalinae (Eutelini, Metaponini, Pteromalini, Raphitelini), Spalangiinae, Sphegigasterinae (Asaphini, Cratomini, Pachyneurini, Sphegigasterini).

Kurdjumov (1913) accepted Ashmead's (1904) classification, with slight changes. He upgraded Tridyminae to the family rank Tridymidae with inclusion of Eunotinae, Pireninae and Tridyminae as its subfamilies. Further he recognized the placement of Lelapinae and Miscogasterinae under Miscogasteridae with addition of Diparinae and Sphegigasterinae, earlier placed under Pteromalidae.

Girault's works (1913-1942) constitute undoubtedly an immortal contribution in the field of Chalcidoidea (with 900 genera and ca 3500 species). Being influenced by Ashmead's work, Girault (1915) largely followed the former's system of classification. Like Ashmead, he too gave much stress on the number of mandibular teeth. According to Boucek (1988) "this obsession of examining mandibles caused nearly maximum destruction of head, with departure of other characters, of rather more taxonomic value".

Schmiedeknecht (1930) suppressed Pteromalidae by Chalcididae including therein subfamilies Cleonyminae, Miscogasterinae and Pteromalinae among others, as subfamilies

of Chalcididae. He provided useful generic keys under each subfamily.

Mani's catalogue (1938) on Indian insects (Chalcidoidea) contains a comprehensive key to families upto tribal level, almost based on Ashmead's classification, with the exception of Colotrechninae being placed under Miscogasteridae instead of Cleonymidae. He proposed tribal endings with a suffix 'ariae', instead of 'ini'. He separated Miscogasteridae from Pteromalidae on the basis of two distinct hind tibial spurs, and placed Cleonymidae close to Encyrtidae. He catalogued 17 genera, 24 species under Pteromalidae; 4 genera and 7 species under Miscogasteridae and none under Cleonymidae. Mani (1942) proposed a subfamily Bruchobiinae to accomodate Bruchobius Ashmead (= Sphearakis Masi) and Oedaule Waterston, and placed it under Miscogasteridae. Mani truly deserves the title of "father of Indian Chalcidoidea" not only because of starting this field here, but total devotion (1938-1989) and remarkable output. Present Indian taxonomists though acknowledge his prowess unquestionably, but donot agree with his school of thought, so singularly different and unconvincing.

Townes (1950) recognized subfamily status of Cleonyminae, Miscogasterinae and Pteromalinae, but, like Schmiedeknecht (1930) he placed them all under the family Chalcididae.

Muesbeck, Karl and Townes (1951) in their catalogue of 'Hymenoptera of America North of Mexico' revived the family status of Pteromalidae and proposed its subfamily and tribewise breakup

as follows :

Pteromalinae : Brachyscelidiphagini, Cleonymini, Eunotini, Merisini, Metastenini, Pirenini, Pteromalini, Raphitellini, Tridymini.

Sphegigasterinae : Asaphini, Cerocephalini, Cratomini, Diparini, Halticopterini, Lamprotatini, Pachyneurini, Spalangiini, Sphegigasterini.

Further, they catalogued 417 species under 104 genera of family Pteromalidae.

Peck (1951) supported the family status of Pteromalidae and its subdivisions as proposed by Muesbeck, Karl and Townes (1951).

Risbec (1951) considered Eunotidae, Miscogasteridae, Pteromalidae and Spalangiidae as distinct families. Later on, in his monograph (1952), he retained family status of Pteromalidae and Spalangiidae with the addition of Cleonymidae. He dropped Miscogasteridae and demoted Eunotidae to tribal level. Further, he added 31 new species under 25 genera (including 5 new genera) and split the family Pteromalidae into following subfamilies and tribes :

Metoponina, Pachyneuronina, Pteromalina (Sphegigasterini), Raphitelina, Sphegigasterina (Diparini) and Tridymina (Eunotini, Lelapini, Pteromalini).

Nikolskaya (1952) for the first time published an extensive work on Chalcidoidea with excellent keys and

descriptions, that became a fundamental treatise on Chalcidoidea throughout the world till 70's. She keyed out 132 genera under families Cleonymidae, Miscogasteridae, Pteromalidae, Spalangiidae and Tridymidae, which she opined, though closely related, but quite different families. She separated them on the basis of number of antennal segments, insertion of antennal toruli, structure of head, number of hind tibial spur and gastral petiole etc., and excluded the possibility of dividing families into subfamilies and tribes.

Peck (1963) catalogued 118 genera and 331 species of Pteromalidae, with updated synonymies and various new combinations. He reunited the five families proposed as distinct by Nikolskaya (1952) into one, and followed the classification of Muesbeck, Karl and Townes (1951) with slight modification.

'Keys to Chalcidoidea of Czechoslovakia' by Peck, Bucek & Hoffer (1964) came as a big treat to the world's Chalcidologists, in its extraordinary quality and entirely newer treatment of the family, with excellent set of characters, easy, prominent and absolutely non-confusing for generic separation. It keyed out 171 genera of Pteromalidae with elaborate classification of the family spreading to 9 subfamilies and 8 tribes given as below : Ceinae, Cerocephalinae, Cleonyminae, Colotrechninae, Diparinae, Miscogasterinae (Asaphini), Pteromalinae (Cheiropachini, Dinarmini, Merisini), Spalangiinae and Tridyminae (Eunotini, Neodiparini, Pirenini & Trigonoderini).

Baltazar (1966) followed Peck's system of classification (1963) and endorsed the idea of dividing family into subfamilies

and tribes.

Graham's monograph (1969) has been a major breakthrough of 20th century in the field of Pteromalidae, with more elaborated classification and considerably wider treatment of the family (800 species, including 87 new species and 4 new genera). Newer approach of classifying various taxa, detailed description of species both males and females, with separate keys plus biology and distribution, contributed a lot towards better understanding of this group. A wide variety of characters used by Graham, such as brachypterous or macropterous type of wings; nature of clypeus, gena, temple, scrobes, prepectus; distribution of hairs on body especially head, wings and coxa, plus many other characters not only facilitated the job of taxonomists with widened horizon but also had a significant impact on the later developments and classification of family Pteromalidae. Graham gave much attention to Miscogasterinae and Pteromalinae and separated them like Peck, Boucek & Hoffer (1964), on the basis of characters like presence of gastral petiole, complete parapsidal grooves and asymmetrical clypeal incision. The latter of course, is looked upon as more stable character associated with Miscogasterinae. Graham spread the family upto 15 subfamilies with their tribes as follows :

Asaphinae, Ceinae, Cerocephalinae, Chrysolampinae, Cleonyminae, Colotrechninae, Cratominae, Diparinae, Eunotinae, Macromesinae, Neodiparinae, Miscogasterinae (Micradelini, Miscogasterini, Ormocerini, Pirenini, Sphegigasterini, Termolampini, Trigonderini), Panstenoninae, Pteromalinae and Spalangiinae.

Riek (1970) included Ormyridae, Perilampidae and Eucharitidae under the family Pteromalidae.

Boucek, Subba Rao and Farooqi (1978) listed 112 genera with 86 identified species from Indian subcontinent (with 63 genera and 74 species from India) under 8 subfamilies and 4 tribes : Asaphinae, Cerocephalinae, Diparinae, Eunotinae, Miscogasterinae (Micradelini, Miscogasterini, Ormocerini, Sphegigasterini) & Pteromalinae.

Burks in Krombein, Paul, Smith & Burks (1979) proposed 15 subfamilies with 11 tribes under Pteromalidae, almost after Graham's system of classification, with some modifications. He included 5 subfamilies-----Brachyscelidiphaginae, Cleonyminae, Eutrichosomatinae, Perilampinae and Ormyrinae; divided Cleonyminae into three tribes (Cleonymini, Chalcedectini, Trigonoderini) reduced tribal number of Miscogasterinae to four (Miscogasterini, Ormocerini, Pirenini & Sphegigasterini) and split Pteromalinae into four tribes (Cratomini, Pachyneurini, Pteromalini & Raphitelini). Further, he catalogued 394 species under 132 genera of family Pteromalidae.

Farooqi & Subba Rao (1985) gave a useful key of Indian genera of Pteromalidae, following almost Graham's pattern (1969).

Dzhanokmen (1987) entirely followed Graham's system of classification.

Farooqi & Subba Rao (1986) updated the list of total 78 genera and 89 species from Indian subcontinent (with 61 genera and 74 species from India).

Boucek (1952-1990), the most celebrated taxonomist of the world, stands at par with Walker, in contribution to the chalcids' taxonomy, and excels all others in producing not only a monumental work, but ushering the field into newer direction, with modern insight and quite logical approach. His '**Australasian Chalcidoidea**' (1988) with 235 pteromalid genera, including 73 new genera, represents such an embodiment, that truly revolutionized the traditional concepts of Pteromalidae, with more outstanding package of characters, highlighting their evolutionary, behavioural and ecological relevances with more acceptable reasonings. He broadened limits of the family upto 28 subfamilies and 19 tribes (including 11 new subfamilies and 7 new tribes) as follows :

Asaphinae, Austrosystasinae*, Austroterobiinae*, Cerocephalinae*, Chromeurytominae*, Cleonyminae (Chalcedectini, Cleonymini, Lyciscini, Ooderini), Colotrechninae (Amerostenini*, Colotrechnini, Divnini*, Hetreulophini, Uzkini*), Coelocybinae*, Diparinae (Diparini, Lieparini*), Eunotinae (Eunotini, Moranilini*, Tomocerodini*), Macromesinae, Ditropinotellinae*, Erotolepsiinae*, Elatoidinae*, Eutrichosomatinae, Herbertinae*, Keiraninae*, Leptofoeninae, Louriciinae, Miscogasterinae, Nefoeninae*, Ormocerinae (Melanosomellini, Systasini*), Panstenoninae, Parasaphodinae*, Pireninae, Pteromalinae (Pteromalini, Trigonoderini), Spalangiinae and Storeyinae*. Further, he shifted the subfamily Chrysolampinae to Perilampidae, placed earlier under Pteromalidae by Graham (1969).

* new subfamilies and tribes by Boucek (1988).

Boucek's school of thought has been extraordinarily convincing since decades and still governs the minds of Chalcidologists especially Pteromalidists, in its novel approach and logicity. His adoption of various characters (1988) like genal carina, parascrobal crests on head, asymmetric nature of antennal club, modifications in pronotum, nature of axillae and mesopleuron, presence of frenal bristles and nature of sublateral lines on scutellum, stiffened black hairs on parastigma of forewings, various modifications of propodeum, nucha, petiole and basal gastral tergite attribute to his establishment and recognitions of a score of new taxa. He reduced the limit of Miscogasterinae to the retention of just a single tribe Miscogasterini and merged most others with Pteromalinae, earlier placed under Miscogasterinae by Graham (1969). This, he justified by discussing in detail, on the diversity of petiole characters and parapsidal grooves among various groups, and their unreliability for singling out Miscogasterinae on these basis alone, which in pair, made diagnostic characters earlier.

Mani (1989) made a good attempt in compiling earlier works from Indian subcontinent with useful keys and descriptions, however, his reinstated family status of Miscogasteridae and Cleonymidae, reflects his obvious fancy of primitive classification. He reported 73 species under 46 genera from Indian region and included 26 subfamilies and 9 tribes under families Cleonymidae, Miscogasteridae and Pteromalidae, given as below :

Cleonymidae : Chalcidectinae, Cleonyminae, Pelecinellinae

Miscogasteridae : Brachyscelidiphaginae, Colotrechninae, Lelapinae, Micradelinae, Miscogasterinae (Halticopterini, Miscogasterini), Ormocerinae (Ormocerini), Pireninae, Sphegigasterinae, Termolampinae, Trigonoderinae.

Pteromalidae : Asaphinae, Cerocephalinae, Crataminae, Diparinae, Euno~~t~~inae, Eutrichosomatinae, Merisinae (Cheiropachini, Merisini), Neodiparinae, Netomocerinae, Panstenoninae, Pachyneurinae, Pteromalinae (Eutelini, Metaponini, Pteromalini, Rhapsitelini), Spalangiinae.

Some important contributions on the taxonomy of family Pteromalidae from Oriental region by earlier workers are as follows : Ahmad & Mani (1939)*, Ashmead (1903*, 1904, 1905), Ayyar (1925*), Ayyar & Margabandhu (1934*), Ayyar & Mani (1937*), Baltazar (1966), Bhatnagar (1951), Boucek (1973*, 1978*, 1986*, 1988*), Boucek, Subba Rao & Farooqi (1978*), Burks (1959), Cameron (1906, 1909), Cotes (1896*), Crawford (1910), Dutt & Ferriere (1961*), Farooqi (1980*), Farooqi & Menon (1972*, 1973*^{a,b}), Farooqi & Subba Rao (1985*, 1986*), Fernando (1957, 1959), Ferriere (1930, 1931^{a,b}, 1939*), Gahan (1910, 1925), Girault (1917, 1919), Kamijo & Takada (1973), Kamijo & Grissell (1982*), Kaul & Saraswat (1974*), Mani (1938*, 1939*, 1941*, 1942*, 1989*), Mani et al (1973*, 1974*), Narayanan et al (1957*), Pruthi & Mani (1940*), Roomi et al (1972), Saraswat & Mukerji (1975*), Sharma & Subba Rao (1958*), Subba Rao (1973, 1981), Subba Rao & Hayat (1985*, 1986*), Walker (1860), Waterston (1915, 1922*), Yadav (1978*).

* contributions from India.

The present author upholds Boucek's view of classification and his selection of characters for suprageneric as well as generic separation. Opinion differences however from Boucek's views have been given, wherever necessary. Key to Chalcidoidea (Peck, Boucek & Hoffer 1964), Graham's monograph (19969) and Australasian Chalcidoidea (Boucek 1988) have been far too indispensable during the course of present work.

III. MATERIALS AND METHODS

The materials under study were largely collected by the author from important agricultural areas of various states (Andhra Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan and Uttar Pradesh). Major part of the collection studied in this work was collected from Aligarh and its adjoining areas.

Materials were mainly collected by sweeping grassy lands, crop fields, bushes and canopies of accessible plants in horticulture farms, by using transparent white nylon net with sub-triangular frame. Weather, timing of collection and selection of area always constituted important factors towards a positive gain. Surveys were carried out mostly in February-May and September-November. Collections made during morning and early evening hours always gave a good catch. Thick unsprayed grassy vegetation, moderate shady area at noon and suitable humidity promised the presence of chalcids in search.

An attempt was also made to rear the parasites in laboratory from homopteran pests like coccids and pseudococcids, attacking various agricultural crops including citrus groves and cotton fields. For this purpose, pest-infested twigs and leaves were cut into pieces and placed in rearing jars, with their open ends covered with muslin cloth. A daily observation for the emergence of parasites, if any, from their respective hosts was duly recorded. Pseudococcids on cotton and scale insects on citrus

plants showed a considerable parasitization, by pteromalid parasites, Cephaleta australiensis and C. brunneiventris attacking heavily the former and Scutellista cyanea on the latter. Anisopteromalus calandrae and Dinarmus laticeps were reared from Sitophilus oryzae on gram and Bruchus sp. on cow pea respectively.

The materials collected by sweeping or from rearing jars were selectively sucked into aspirator and killed by treating with Ethyl acetate, followed by temporary preservation in homeopathic vials, 3x1 cms. A complete record of the survey regarding locality, date, host-insects and host-plants was duly maintained.

Identification was carried out in the laboratory under stereoscopic binocular, after cleaning, drying, and card mount. For cleaning, when necessary, in order to see finer details of the body, the material was progressively passed through ascending alcohol grades upto 100%, then to Xylene and finally Clove oil, the latter used as a cleaning agent here. Exactly the reverse process upto 70% after cleaning made the material ready for card mount and identification.

The easiest method for card mounting applied here, consisted in placing the material on a small piece of Whatman filter paper under binocular and spreading the appendages i.e. antennae, legs and wings apart, the latter opened in semi-scissor like fashion, with the help of fine needles. Undesired positions were easily readjusted by placing just few more drops of alcohol. This method ensured exactness of material without any slightest damage,

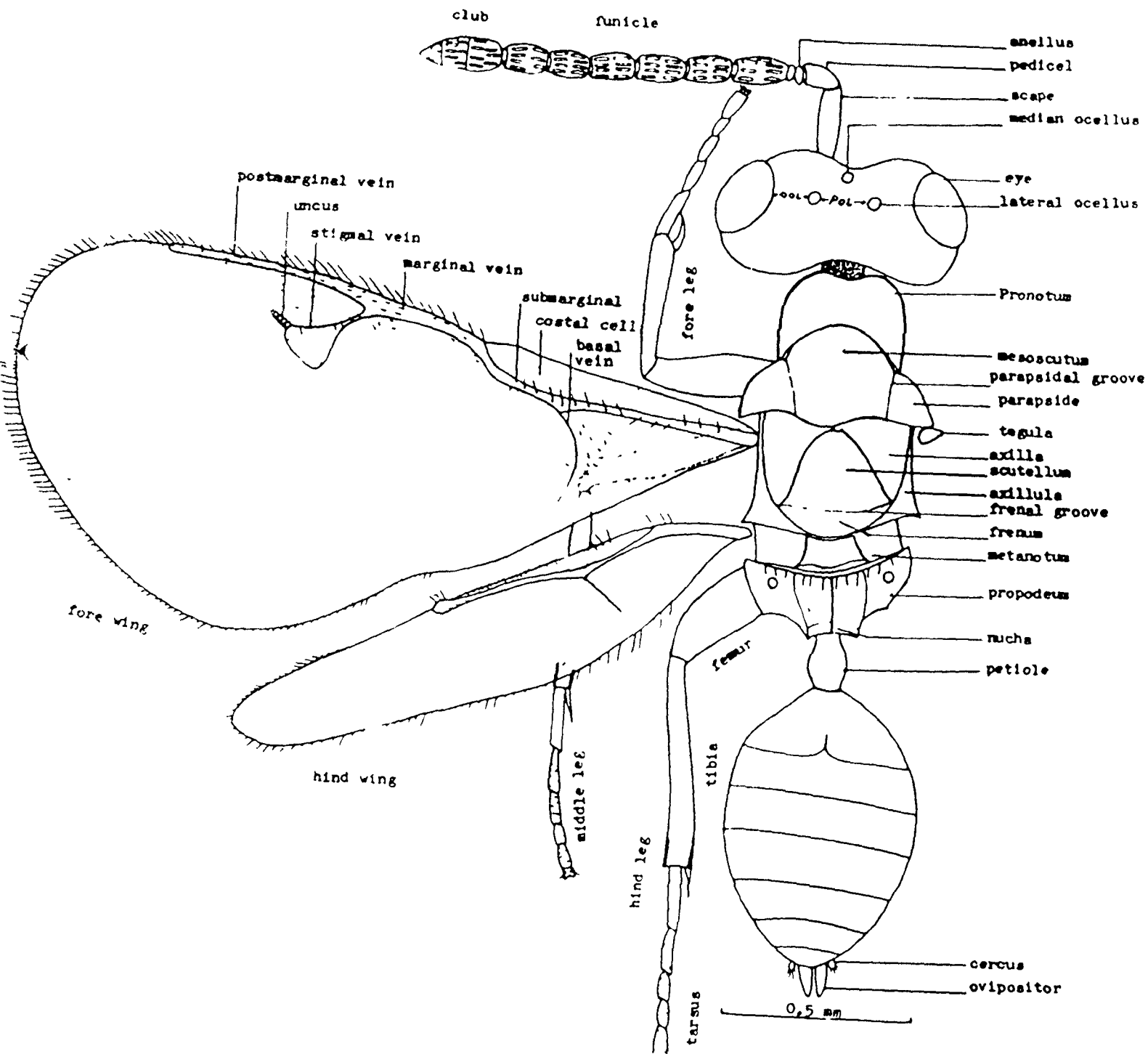
quick drying and easy picking for card mounting. Dried specimen was gently transferred on card, measuring 1.5 x 0.5 cms. with a drop of glue, placing thoracic pleuron of right side at an angle of 30° with longitudinal axis of the card, and appendages exclusively wings and antennae raised from the surface. This angular position enabled easy detection of morphological details of the specimen.

Holotypes were dissected for their one side appendages, mouth parts and ovipositor, prior to card mounting. Examination of mandibles or removal of mouth parts sometimes led to unavoidable damage of head. Paratypes when available, one of these was completely dissected and permanently mounted in Canada balsam. For this, the material was run into ascending grades of alcohol, from 70-100%, keeping 10-15 minutes in each, then into xylene and finally Clove oil.

Dissection was done under Stereoscopic binocular with the help of fine needles, and, removed appendages including mouth parts and ovipositor were mounted in thin layered balsam on a slide, with a coverslip overlaid. Remaining body parts were card mounted and duly labelled corresponding to slides. Slides were dried for about a week under thermostat, maintained at 45°C.

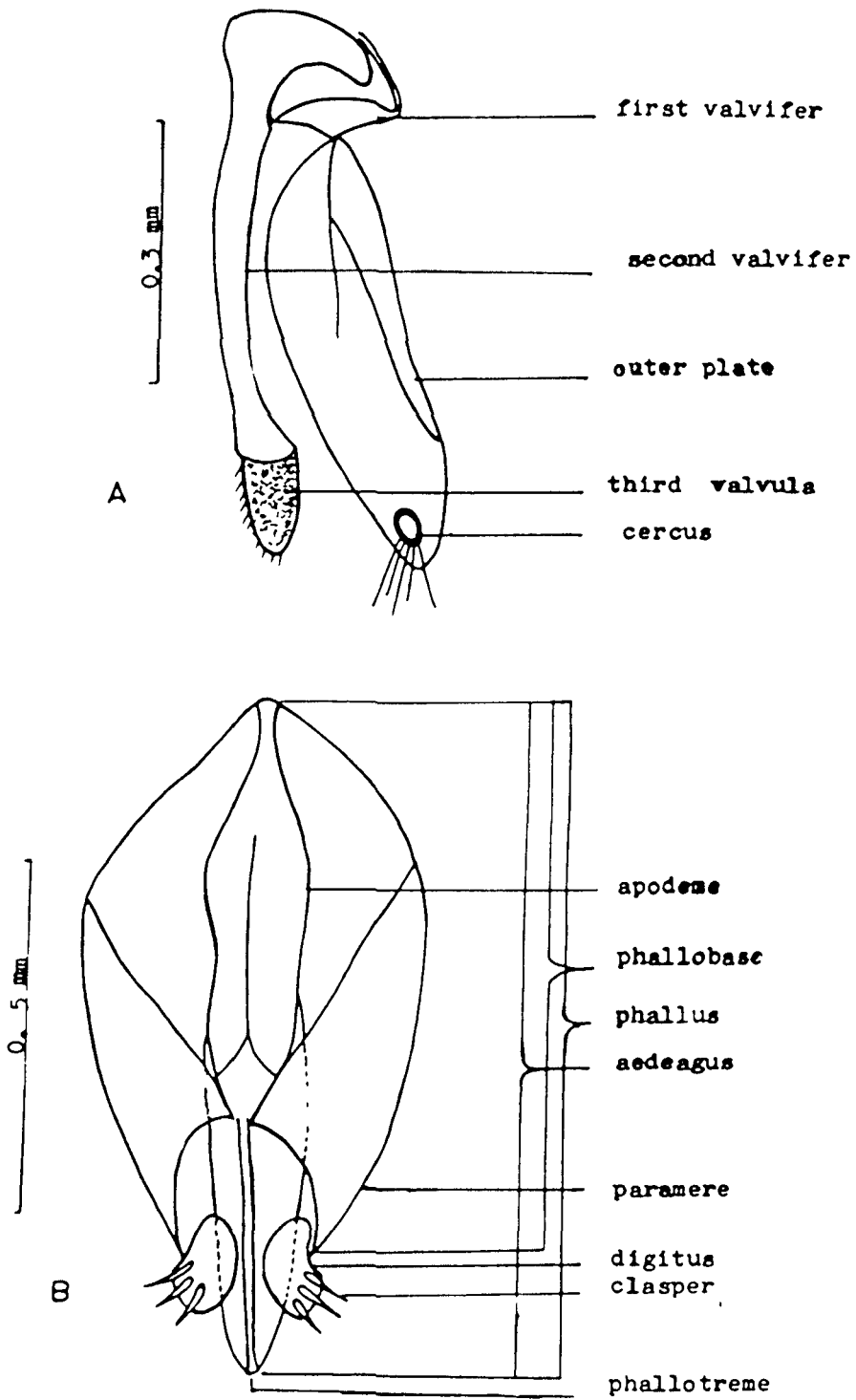
Diagrams of important structures were sketched with the help of Camera Lucida, of desired magnifications. Body proportions or relative measurements given in the text were done under ocular micrometer. Body length was measured in millimeter prior to dissection.

While describing a species, effort has been made to furnish maximum information as far as possible with comparative differences highlighted wherever necessary. This will certainly help future workers to compare specimens and enable possibly a correct placement.



Miscogaster elegans Walker, ♀

(Fig. 1)



A. Part of female external genitalia

B. Male genitalia

(Fig. 2)

IV. KEY TO THE SUBFAMILIES AND TRIBES OF FAMILY

PTEROMALIDAE

1. Antennal radicle about 4.0x as long as wide, toruli wide apart, close to mouth; body and appendages very slender and long; marginal vein 8.0x as long as the stigmal; ovipositor long. **LOURICIINAE**
- Antennal radicle hardly longer than wide; other characters different..... 2
2. Antennal toruli situated at the lower margin of head, anellus abseni, funicle 7-segmented, club solid, undivided; head prognathous or subprognathous; marginal vein long..... 3
- Antennal toruli situated above the lower margin of head; other characters different 4
3. Body mainly yellowish; head and thorax almost smooth; scutellum with fine outcurving sublateral grooves; disc of forewings convex, almost bare, parastigma with a tuft of black hairs **STOREYINAE**
- Body metallic black; head and thorax with distinct punctures and rugosity: scutellum without outcurving sublateral grooves, often with punctate frenal line; disc of forewings flat, without tuft of hairs at parastigma **SPALANGIINAE**
4. Head subprognathous or globose with large ridge or tooth between antennae; occipital carina strong; foramen magnum situated near top of the head; forewings inconspicuously

- setose with long marginal cilia, sometimes with a tuft of hairs at parastigma..... **CEROCEPHALINAE**
- Head mostly hypognathous; foramen magnum not situated near top of the head; forewings different. 5
 - 5. Antennae with at least 12 segments, anellus never more than one 6
 - Antennae with fewer than 12 segments or at least 2 anelli... 32
 - 6. Head subcubical with toothed parascrobal crests; pronotum large; gastral petiole, legs and wings unusually long and slender; ovipositor much exerted; antennae without anellus ...
..... **LEPTOFOENINAE**
 - Head transverse, mostly without toothed parascrobal crests; other characters different 7
 - 7. Pronotum large and subconical, rounded off anteriorly, if moderately large, then with a distinct median line on sloping collum; inner eye-orbits strongly diverging in lower half; thorax densely punctured and pilose; scutellum without frenal bristles..... 8
 - Pronotum short, if large then anteriorly carinate, always without a median line on collum; inner eye-orbits not unusually diverging in lower half; thorax with different sculpture; scutellum often with frenal bristles..... 20
 - 8. Scutellum with distinct outcurving sublateral grooves; antennae with one anellus and 7-segmented funicle, if sublateral

- grooves more towards sides than antennae with 4 anelli;
axillae advanced ahead; ovipositor exerted.....
-, **COLOTRECHNINAE** .. 9
- Scutellum without sublateral grooves; other characters
different..... **13**
- 9.** Thorax with axillae strongly advanced; postmarginal and
stigmatal veins much reduced **10**
- Thorax with axillae not strongly advanced; postmarginal and
stigmatal veins well developed **11**
- 10.** Pronotum large; thorax much flattened; mesoscutum with
parapsidal grooves indistinct; antennae without anelli
..... **UZZKINI**
- Pronotum small; thorax not flattened; mesoscutum with
distinct parapsidal grooves; antennae except Pachyneuronella
with 2 anelli..... **COLOTRECHNINI**
- 11.** Antennae with 4 anelli; mesoscutum with parapsidal grooves
deep and complete **AMEROSTENINI**
- Antennae with 1-2 anelli; mesoscutum with parapsidal
grooves fine, usually incomplete **12**
- 12.** Pronotum medially divided: propodeum large and smooth;
legs with femur short and broad; antennae with 2 anelli;
marginal vein much shorter than postmarginal; ovipositor
swollen; scutellum without frenal groove **DIVNINI**
- Pronotum medially not divided; propodeum small, reticulate;
legs with femur slender; antennae with one anellus; marginal
vein much longer than postmarginal; ovipositor not swollen;

- scutellum with frenal groove present **HETREULOPHINI**
13. Propodeum short with deep petiolar emargination; gastral petiole long, subconical; body with unusually long bristles; legs with femora slender **NEFOENINAE**
- Propodeum without deep petiolar emargination; body without long bristles **14**
14. Scutellum with distinct frenal groove, with frenal bristles on either side; antennae with club enlarged, usually with fused segments..... **COELOCYBINAE**
- Scutellum without frenal groove and frenal bristles; antennae with club not enlarged, segments distinct **15**
15. Pronotum carinate, without a longitudinal line on collum; thorax sculpture irregularly rugulose, with dense pilosity; ovipositor sheath upturned; hind femora not thickened or toothed **DITROPINOTELLINAE**
- Pronotum rounded off, often with smooth strip or a longitudinal line on collum; thorax usually punctured; ovipositor sheath not upturned; hind femora usually thickened or toothed **CLEONYMINAE .. 16**
16. Female antennae always with a preclaval process; head and thorax densely punctured and hairy **CLEONYMINI**
- Female antennae never with a preclaval process; head and thorax not densely punctured and hairy..... **17**
17. Hind femora strongly enlarged with a row of teeth on ventral edge; antennal club collapsed except a strongly developed stylus **CHALCEDECTINI**

- Hind femora if as above then antennal club never collapsed, stylus rarely present..... 18
- 18. Body long; ovipositor much exserted **LYCISCINI**
- Body normal; ovipositor short 19
- 19.- Fore - femur enlarged, ventral surface densely setose; mesoscutum with parapsidal grooves nearly meeting at scuto-scutellar suture; parascrobal crests present **OODERINI**
- Fore - femur enlarged or ventrally setose; mesoscutum with parapsidal grooves not meeting posteriorly; parascrobal crests absent; pronotum unusually long; antennal club distinctly 3-segmented **HEYDENIINI**
- 20. Mesoscutum with parapsidal grooves incomplete, wide apart; marginal vein basally thickened; thorax reticulate, without bristles; antennae with 1 anellus and 7-segmented funicle **PTEROMALINAE**
(in part)
- 21. Mesoscutum with parapsidal grooves complete, if incomplete then marginal vein not basally thickened 21
- 22. Head without temple, gena posteriorly carinate; mesopleuron shiny with a deep pit; gaster with second tergite large
..... **ASAPHINAE**
- Head with temple, gena not carinate; mesopleuron different, gaster with second tergite small 22
- 22. Gaster with first tergite greatly enlarged, convex, concealing most of the part of gaster; toruli usually close to each other 23

- Gaster with first tergite never enlarged and convex; toruli wide apart 28
- 23. Antennae 13-segmented with 1 anellus, funicle 7-segmented; hind coxae long, inserted unusually high, its outer surface with transverse striations; vertex and thorax with dark bristles..... DIPARINAE .. 24
- Antennae 12-segmented with 1 anellus and 6-segmented funicle, other characters different 25
- 24. Hind femora ventrally toothed LIEPARINI
- Hind femora not ventrally toothed DIPARINI
- 25. Thorax with coarse and deep piliferous punctures, hairs not placed on elevated papillae; hind coxae large, inserted high; gaster sessile somewhat laterally compressed AUSTROSYSTASINAE
- Thorax finely sculptured, if densely pilose, hairs arising from elevated papillae; hind coxae normal not inserted high; gaster different 26
- 26. Gastral petiole long with longitudinal ribs; pronotum large, transverse; clypeal margin arcuately produced; mandibles curved ELATOIDINAE
- Gastral petiole transverse, often concealed; pronotum small; clypeus not produced; mandibles normal 27
- 27. Gaster with basal tergite with longitudinal striae; head and thorax dorsally, often with paired bristles; postmarginal vein shorter than stigmal or sometimes absent EROTOLEPSIINAE

- Gaster with basal tergite without longitudinal striae; whole body densely setose, paired bristles absent; postmarginal vein much longer than the stigmal **HERBERTIINAE**
- 28. Legs long and slender, middle tarsi 4-segmented, middle basitarsus unusually long; mesoscutum with scapula produced backwards outside of axilla, the latter 2.0x as long as wide..... **MACROMESINAE**
- Legs normal, middle tarsi always 5-segmented, middle basitarsus not unusually long; mesoscutum with scapula not produced backwards; axillae short..... **29**
- 29. Head with occipital carina absent; axillae usually meeting anteriorly; propodeal spiracles unusually large; thorax mostly non-metallic, sculpture transversely rugose or fine, sparsely setose..... **ORMOCERINAE .. 30**
- Head with occipital carina present; axillae not meeting anteriorly; propodeal spiracles small; other characters different..... **31**
- 30. Thorax without piliferous punctures; antennae 13-segmented **MELANOSOMELLINI**
- Thorax with conspicuous piliferous punctures; antennae 12-segmented **SYSTASINI**
- 31. Thorax with axillae strongly advanced anteriorly; base of stigmal vein thickened; gena carinate posteriorly; pronotum shorter than mesoscutum **PARASAPHODINAE**
- Thorax with axillae not advanced; base of stigmal vein not thickened; gena rounded off; pronotum as long as mesoscutum, dull, with transverse rugosity **KEIRANINAE**

32. Antennae 12 or 13-segmented with at least 2 anelli; mesoscutum with parapsidal grooves complete or incomplete 37
- Antennae with fewer than 12 segments with or without anellus; mesoscutum with parapsidal grooves complete 33
33. Head with posterior ocelli touching the occipital edge; gena long, posteriorly carinate; antennae with funicle at most 5-segmented; thorax with distinct sparse bristles; clypeal margin straight **EUNOTINAE** .. 34
- Head with posterior ocelli not touching the occipital edge; gena short, posteriorly rounded off; antennae with funicle 6-segmented; thorax without strong bristles; clypeal margin mostly produced 36
34. Scutellum without bristles, usually produced apically concealing propodeum; nucha much reduced..... **EUNOTINI**
- Scutellum always with paired bristles, never produced apically to conceal propodeum; nucha well developed 35
35. Gaster with first tergite unusually large, concealing following segments; propodeum rugose, without costula..... **MORANILINI**
- Gaster with second tergite unusually large, concealing rest of segments; propodeum not rugose, costula present **TOMOCERODINI**
36. Pronotum large, subrectangular, anteriorly carinate or rounded off; antennae with funicle always 6-segmented, first segment sometimes anelliform, club asymmetric; ovipositor much exserted..... **CHROMEURYTOMINAE**

- Pronotum short, rounded off anteriorly; antennae with funicle 5-6 segmented, most of them anelliform; club mostly symmetric; ovipositor slightly exserted..... **PIRENINAE**
- 37. Pronotum not visible; axillae strongly advanced; marginal vein usually thickened **38**
- Pronotum visible; axillae not advanced; marginal vein rarely thickened..... **39**
- 38. Axillae strongly advanced, almost fused with mesoscutum; scutellum roofing over propodeum; antennae with 1 anellus and 7 funicular segments; clypeus with deep median incision; marginal vein broadly wedge-like, postmarginal almost absent..... **EUTRICHOSOMATINAE**
- Axillae hardly advanced, never fused with mesoscutum; antennae with 3 anelli and 5 funicular segments; clypeus roundedly produced; marginal vein not wedge-like; whole body including eyes densely setose; other characters different..... **AUSTROTEROBIINAE**
- 39. Forewings unusually narrow, about 3.4x as long as wide, completely setose; pronotum long, subconical; costal cell narrow, 12-20.0x as long as wide **PANSTENONINAE**
- Forewings not unusually narrow; costal cell not as above..... **40**
- 40. Clypeal margin with asymmetric incision; antennae inserted at or below ocular line; mesoscutum with parapsidal groove usually complete; marginal vein slender, never thickened; gaster usually petiolate **MISCOGASTERINAE**

- Clypeal margin symmetric, with or without teeth; antennae very rarely inserted below ocular line; mesoscutum with parapsidal grooves usually incomplete; marginal vein sometimes thickened; gaster usually sessile or subsessile **PTEROMALINAE .. 41**
- 41. Mesoscutum with scapula exposed dorsally; scutellum with deep and crenulate frenal groove; genal depression at the mouth corner with a well delimited peristomal area; body usually metallic black **TRIGONODERINI**
- Mesoscutum with scapula not completely exposed dorsally; scutellum without deep and crenulate frenal groove; genal depression very rarely with a delimited peristomal area; body usually metallic green..... **PTEROMALINI**

V. KEY TO THE INDIAN GENERA OF FAMILY PTEROMALIDAE

- 1 Antennae without anellus2
- Antennae with anellus5
2. Body with coarse piliferous punctation or rugosity; antennae
.. inserted wide apart, close to oral margin (Fig. 9A), funicle
7-segmented, club undivided; gaster petiolate with long ridges
(Fig. 10 I); wings developed Spalangia Latreille
- Body without coarse piliferous punctation; wings reduced;
other characters different3
3. Head globose, dorsally convex, with large ridge between
antennae; forewings with tuft of stiff black hairs on
parastigma, marginal fringe long Cerocephala Westwood
- Head not globose, without a ridge between antennae; other
characters varying4
4. Head much elongated, almost parallel sided; forewings without
tuft of hairs at parastigma; mesoscutum with parapsidal
grooves convergent, almost touching the scuto-scutellar suture
..... Choetospilisca Hedqvist
- Head long, not parallel sided; forewings with a tuft of hairs
at parastigma; mesoscutum with parapsidal grooves not
convergent, distinctly apart Choetospila Westwood
5. Pronotum large, subconical, with a median longitudinal line
on collum; legs with fore-and hind femora swollen to varying
degrees6

- Pronotum short, without a median longitudinal line on collum; legs with fore-and hind femora normal13
- 6. Female gaster strongly sclerotized and irregularly punctate, apically produced into a narrow long tail.... Solenura Westwood
- Female gaster finely sculptured, not produced into a long tail7
- 7. Mesoscutum with parapsidal grooves complete, V-shaped, touching the scuto-scutellar suture; fore femur enlarged with strong black bristles and a comb of stout spines along its ventral surface; parascrobal crests developed Oodera Westwood
- Mesoscutum with parapsidal grooves indistinct posteriorly, never V-shaped; fore femur not enlarged; other characters different8
- 8. Antennae with preclaval segment produced along ventral side of club; in male, antennae branched; hind femur moderately broad, with numerous teeth Zolotarewskya Risbec
- Antennae different, if preclaval process present then club acuminate; other characters in different combination..... .9
- 9. Forewings with a tuft of stiff hairs on or below parastigma..... **10**
- Forewings without such hairs on or below parastigma11
- 10. Antennal club acuminate, basal segment asymmetric, with a preclaval process; gastral petiole mostly reticulate; forewing with parastigma not widened Notanisus Walker
- Antennal club not acuminate, basal segment symmetric, without preclaval process; gastral petiole if present, smooth;

- forewings with parastigma widened Heydenia Foerster
11. Mesoscutum with parapsidal grooves incomplete; hind femora serrated ventrally or with a subapical tooth; whole body including eyes, wings and gaster densely setose..... ..
..... Cleonymus Latreille
- Mesoscutum with parapsidal grooves complete; hind femora without ventral serrations or apical tooth; body not hairy..... 12
12. Eyes with cross-bands; scrobes not reaching median ocellus; pronotum large; occipital carina inconspicuous
..... Thaumasura Westwood
- Eyes without cross-bands; scrobes reaching to median ocellus; pronotum small; occipital carina distinct on sides.....
..... Riekisura Boucek
13. Vertex and thorax with strong bristles; antennae with one anellus and 7-9 segmented funicle 14
- Vertex and thorax without strong bristles; antennae with 2-3 anelli and 5-6 segmented funicle 16
14. Body robust; gaster sessile or subsessile; hind coxa without dorsal striations; pronotum carinate; scutellum distinctly longer than scutum Netomocera Boucek
- Body normal, not robust; gaster distinctly petiolate in male; hind coxa with dorsal striations; pronotum rounded off or anteriorly carinate; scutellum shorter than scutum 15
15. Thorax thickly setose; pronotum rounded off anteriorly; male antenna (Fig. 5F) filiform, inserted at the lower level of

- eyes, with 7-segmented funicle, club 3-segmented; gaster with basal tergite large, concealing others..... Parurios Girault
- Thorax moderately setose; pronotum carinate anteriorly; male antenna (Fig. 5A) inserted much above the lower level of eyes, nodose, with 10-segmented funicle including undifferentiated club; gaster with basal tergite not concealing others..... Dipara Walker
- 16.** Body short and broad; head crescentic; ocelli touching posterior edge of head; pronotum usually narrow; scutellum large **17**
- Body mostly elongated; head not crescentic; ocelli not touching posterior edge of head; pronotum not narrow; scutellum normal 20
- 17.** Scutellum with regular pilosity, its apex distinctly produced over propodeum..... **18**
- Scutellum with paired bristles, without regular pilosity, its apex never produced over propodeum **19**
- 18.** Scutellum roofing over at least basal gastral tergite (Fig.7D); gena dull, not carinate posteriorly; hind corner of propodeum flat dorsally..... Scutellista Motschulsky
- Scutellum not or at most produced over the propodeum; gena shiny, carinate posteriorly; hind corner of propodeum angularly raised, vertically up Cephaleta Motschulsky
- 19.** Propodeum with much elongated nucha, without costula; forewings with dark bristles, obliquely placed below parastigma Ophelosia Riley

- Propodeum with nucha much reduced, costula present; forewings without dark bristles below parastigma
..... Moranila Cameron
- 20. Pronotum large, somewhat semirectangular; antennae attached below lower level of eyes 21
- Pronotum small, if large then either body flattened or forewings with marginal vein thickened 22
- 21. Entire body including eyes densely setose; antennae (Fig.6D) with one anellus and 7-segmented funicle; forewings (Fig. 6E) with marginal vein 5.0x as long as stigma; gaster sessile..... Herbertia Howard
- Body not setose as above; eyes bare; antennae (Fig.3C) with 2 anelli and 6-segmented funicle; forewings (Fig. 3D) with marginal vein as long as stigmal; gaster petiolate.....
..... Asaphes Walker
- 22. Propodeum strongly narrowed into a long nucha; gastral petiole long, attached almost vertically straight with nucha; gaster elongated, compressed Eurydinotomorpha Girault
- Propodeum normal, not narrowed into long nucha; gastral petiole short, not vertically attached with nucha; gaster short, uncompressed 23
- 23. Antennae almost 12-segmented (except 13-segmented in Trigonoderopsis) 24
- - Antennae always 13-segmented 27
- 24. Antennae with 2 anelli, inserted higher up on face; head and thorax with fine piliferous puncts; forewings (Figs. 11C,

- F) with a row of large outstanding setae below marginal vein separated by a bare space..... Systasis Walker
- Antennae with anellus either absent, only one or the second microscopic, inserted at or below lower level of eyes; other characters different 25
- 25.** Antennae (Fig. 14D) with funicle 6-segmented; forewings (Fig. 14E) with marginal vein 5.0x as long as stigmal, the latter upcurved; a row of outstanding setae below marginal vein present, separated by a bare space
- Trigonoderopsis Girault
- Antennae with funicle usually 5-segmented; forewings with marginal vein 2-3.0x as long as stigmal, the latter not upcurved; other characters absent 26
- 26.** Antennae (Fig. 15C) 10-segmented, without anellus; funicle segments first and third anelliform; club with three long terminal spines; fore tibia armed with 4-5 stout spines apically
- Ecrizotomorpha Mani
- Antennae (Fig. 15H) 11-segmented, rarely 13-segmented, with 1-3 anelli; funicle segments not anelliform; club without terminal spines; fore tibia without stout spines
- Gastrancistrus Westwood
- 27.** Gaster distinctly petiolate 28
- Gaster sessile or subsessile 48
- 28.** Forewings with marginal vein thickened 29
- Forewings with marginal vein not thickened , 38

29. Mesoscutum with parapsidal grooves distinctly complete; forewings with stigma moderately large..... 30
- Mesoscutum with parapsidal grooves incomplete; forewings with stigma normal 32
30. Head unusually broad; occipital carina present; antennae inserted distinctly above the centre of face; clypeus emarginate anteriorly..... Acroclisoides Girault
- Head normal, not unusually broad; occipital carina absent; antennae inserted nearly in the centre of face; clypeus different..... 31
31. Antennae with 5-segmented funicle and 3 anelli; base of scutellum broad; pronotum long medially; clypeal margin roundedly produced anteriorly; gena not carinate posteriorly Oricoruna Boucek
- Antennae with 6-segmented funicle and 2 anelli; base of scutellum narrow; pronotum narrow medially; clypeal margin angularly produced; gena carinate posteriorly.....
..... Coruna Walker
32. Marginal vein uniformly thickened 33
- Marginal vein not uniformly thickened 35
33. Antennae inserted below lower level of eyes; forewings with postmarginal vein distinctly longer than marginal; gaster with second tergite large, parallel sided
..... Pachycrepoideus Ashmead
- Antennae inserted distinctly above lower level of eyes; forewings with postmarginal vein shorter than or as long as marginal vein; other characters different 34

34. Inner eye-orbits converging upwards; propodeum with costula; gaster petiolate; mandibles bidentate; forewings with marginal vein much longer than postmarginal
 **Agiommatus** Crawford
- Inner eye-orbits straight; propodeum without costula; gaster sessile; mandibles different; forewings with marginal vein as long as postmarginal **Metastenus** Walker
35. Thorax with axillae strongly advanced; pronotum hidden dorsally; labial palpi 2-segmented; antennae inserted distinctly above the centre of face, the latter with stout bristles directed upwards. **Manineura** Boucek
- Thorax with axillae normal, not advanced; pronotum distinctly visible dorsally; labial palpi 3-segmented; antennae inserted usually below the centre of face, the latter without stout bristles 36
36. Antennae inserted much below lower level of eyes, always with 3 anelli and 5-segmented funicle; forewings (Fig. 19C) with marginal vein abruptly thickened basally, much longer than postmarginal and stigmal separately.....
 **Platecrizotes** Ferriere
- Antennae inserted distinctly above lower level of eyes, mostly with 2 anelli, rarely 3; forewings with marginal vein widened apically, usually shorter than postmarginal and stigmal separately..... 37

37. Thorax robustly humped; mesoscutum with numerous black bristles; gaster strongly convex dorsally.....
 Euneura Walker
- Thorax moderately convex; mesoscutum without black bristles; gaster flattened dorsally Pachyneuron Walker
38. Mesoscutum with parapsidal grooves complete, fine or deeply impressed..... 39
- Mesoscutum with parapsidal grooves incomplete or posteriorly indistinct 42
39. Scutellum with an oblong fovea before frenal groove; propodeum with distinct nucha; gaster with basal tergite much enlarged Notoglyptus Masi
- Scutellum without oblong fovea before frenal groove; propodeum with or without nucha; gaster with basal tergite different 40
40. Mesoscutum with parapsidal grooves fine throughout; thorax robustly humped; pronotum broad, strongly carinate anteriorly; mesopleuron with a cross carina before middle coxa Paracarotomus Ashmead
- Mesoscutum with parapsidal grooves deep throughout; pronotum small, rounded off or weakly carinate; mesopleuron without cross carina before middle coxa 41
41. Antennal club (Fig. 16C) with a long band of micropilosity; forewings with normal stigma, speculum large, basal vein not infuscated; prepectus with an oblique carina; basal tergite of gaster medially not incised
 Merismus Walker

- Antennal club without micropilosity; forewings (Fig. 17D) with huge stigma, entirely hairy except a small bare area below parastigma; basal vein distinctly infuscated; prepectus without an oblique carina; basal tergite of gaster medially incised **Miscogaster** Walker
- 42. Body unusually flattened; pronotum large with rectangular corners; clypeus (Fig. 21A) asymmetrically three dentate, middle tooth longer than others; gaster with basal tergite large, medially incised **Syntomopus** Walker
- Body normal, not unusually flattened; pronotum small without rectangular corners; clypeus not asymmetrically toothed .. 43
- 43. Forewings (Fig. 13D) unusually narrow, about 3.4x longer than wide; marginal vein 3.0x as long as stigmal; pronotum long, subconical; propodeum alveolate-rugulose.....
.....' **Panstenon** Walker
- Forewings not as above; pronotum small; propodeum not alveolate-rugulose; other characters different..... 44
- 44. Clypeus angularly produced, with blunt apex; labial palpi 2-segmented; gastral petiole with posterior half ventrally embraced by first gastral sternite; mandibles (Fig. 22B,C) heterodont, right 4- left 3- dentate; antennae with 5-segmented funicle and 3 anelli..... **Merismomorpha** Girault
- Clypeus not as above; labial palpi always 3-segmented; gastral petiole not embraced by sternite of basal tergite,
- other characters varying 45

45. Gaster with second tergite unusually large, petiole long and slender; clypeus symmetrically bidentate; antennae with 2 anelli Sphegigaster Spinola
- Gaster with second tergite not large, petiole never slender; clypeus usually symmetric; antennal character different.... 46
46. Head protuberant at antennal base; forewings with a bare strip below marginal vein, apical cilia absent
..... Conomorium Masi
- Head not protuberant at antennal base; forewings without a bare strip below marginal vein, apical cilia present 47
47. Gastral petiole basally widened; forewings with postmarginal vein longer than marginal; male maxillary palpi normal..
..... Thinodytes Graham
- Gastral petiole basally not widened; forewings with postmarginal vein shorter than marginal; male maxillary palpi (Fig. 18G,P) enlarged Halticoptera Spinola
48. Fore femur enlarged; pronotum large 49
- Fore femur not enlarged; pronotum small 51
49. Ovipositor very long; thorax with reticulately striate sculpture; forewings not infuscated Roptrocercus Ratzeburg
- Ovipositor not long; thorax with mostly reticulately punctate sculpture; forewings mostly infuscated 50
50. Hind tibia with two spurs, outer surface of legs with short and stout spines; pronotum sharply carinate anteriorly; forewings with two fuscous clouds..... Cheirpachus Westwood

- Hind tibia with single spur, outer surface of legs without short and stout spines; pronotum rounded off anteriorly; forewings with one fuscous cloud, if present
..... Rhopalicus Foerster
- 51. Thorax with axillae much advanced; scutellum with outcurving sublateral grooves; forewings (Fig. 4D) with reduced stigmal vein, stigma large; hind tibia with 2 spurs..... Colotrechnus Thomson
- Thorax with axillae normal, not advanced; scutellum with or without sublateral grooves, if present, either incomplete or not outcurving; forewings with stigmal vein not as above; hind tibial spurs varying 52
- 52. Forewings with marginal vein thickened, with more or less vertical infumation below 53
- Forewings with marginal vein not thickened, with or without infumation below 54
- 53. Legs with femora enlarged; forewings with marginal vein considerably thickened, distinctly longer than postmarginal, hind tibia with one spur..... Metacolus Foerster
- Legs with femora normal; forewings (Fig. 24B) with marginal vein moderately thickened, distinctly shorter than postmarginal, usually with fuscous clouds; hind tibia with 2 spurs Caenocrepis Thomson
- 54. Body including eyes and forewings densely setose; mesoscutum with parapsidal grooves deep, complete; pronotum invisible Austroterobia Girault

- Body slightly pubescent; eyes bare; mesoscutum with parapsidal grooves incomplete; pronotum visible 55
- 55. Gaster with tergites 1-5 medially incised; antennae (Fig. 25D) clavate, club with a longitudinal band of micropilosity; anterior margin of clypeus (Fig. 25A) bidentate; mandibles large with three acute teeth.....
..... Psilocera Walker
- Gaster with tergites medially not incised; antennal and other characters different 56
- 56. Body mostly robust, reticulately punctate, with pubescence on head and thorax; pronotum as wide as mesoscutum; hind tibia usually with 2 spurs 57
- Body not robust; head and thorax without distinct pubescence; pronotum narrower; hind tibia with one spur.. 65
- 57. Antennae slender, club strongly acuminate, always with 2 anelli and 6-segmented funicle; propodeum with nucha much reduced; funicular segments in male petiolate-binodose with whorls of long erect hairs Norbanus Walker
- Antennae not acuminate; other characters varying 58
- 58. Clypeus bilobed with deep median incision; pronotum sharply carinate anteriorly; propodeum deeply emarginate behind Mokrzeckia Mokrzecki
- Clypeus different, not bilobed; pronotum bluntly ridged or rounded off anteriorly; propodeum not emarginate behind... 59

59. Propodeum with short or well developed nucha..... 60
 - Propodeum without nucha or at most represented by a thin strip 63
60. Pronotum (Fig. 26H) medially arched; propodeum with nucha large; forewings with stigma moderately large; gaster short, basal tergite with a deep fovea..... Dinarmus Thomson
 - Pronotum medially not arched; nucha small; forewings with stigma normal; gaster long, basal tergite without fovea.... 61
61. Antennae (Fig. 27B,G) always with 2 anelli and 6 long funicular segments; gaster yellow with black or brown median and lateral stripes, basal tergite with hind margin truncate; propodeum finely reticulately punctate
 Propicroscytus Szelenyi
 - Antennae always with 3 anelli and 5-segmented funicle; gaster brown without stripes, basal tergite with hind margin medially produced; propodeum mostly smooth 62
62. Mesoscutum with deep parapsidal grooves, almost complete; clypeus bidentate; propodeum with a transverse carina; antennae with third anellus as long as first funicle segment..... Oniticellobia Boucek
 - Mesoscutum with fine parapsidal grooves, incomplete; clypeus shallowly emarginate; propodeum without a transverse carina; antennae with third anellus much smaller than the first funicle segment Anisopteromalus Ruschka
63. Forewings with marginal vein thickened basally; antennae with third anellus quadrate Ischyroptyx Delucchi

- Forewings with marginal vein not thickened basally; antennae with third anellus transverse..... 64
- 64. Pronotum finely carinate anteriorly; antennal club with oblique sutures; gena at the base of mandibles with sharp edge..... Oxysychus Delucchi
- Pronotum rounded off anteriorly; antennal club with transverse sutures; gena at the base of mandibles without sharp edge..... Cyrtoptyx Delucchi
- 65. Antennal club acuminate apically 66
- Antennal club not acuminate apically 67
- 66. Occipital carina present; antennae (Fig. 29A) with 6-segmented funicle and 2 anelli; forewings without a row of outstanding setae below marginal vein; mandibles usually 4-dentate, rarely heterodont; nucha small.. Homoporus Thomson
- Occipital carina absent; antennae (Fig. 30E,J) with 5-segmented funicle and 3 anelli; forewings with a row of outstanding setae below marginal vein; mandibles often heterodont, right 4- left 3-dentate; nucha well developed Callitula Spinola
- 67. Head and thorax finely reticulate or alutaceously sculptured; forewings always without apical cilia; antennae clavate Nasonia Ashmead
- Head and thorax reticulately punctate; other characters different 68

68. Head unusually stout behind eyes; forewings completely setose without speculum Catolaccus Thomson
- Head not stout behind eyes; forewings moderately setose, usually with a speculum 69
69. Occipital carina present 70
- Occipital carina absent 71
70. Forewings without apical cilia; postmarginal vein shorter than stigmal; occipital carina distinctly above the foramen Dibrachys Foerster
- Forewings (Fig. 31D,N) with apical cilia present; postmarginal vein usually longer than stigmal; occipital carina close to foramen Trichomalopsis Crawford
71. Antennae (Fig. 33D,H) inserted below middle of face, mostly with 3 anelli and 5-segmented funicle; propodeum without nucha; middle tibia of male often enlarged with markings.. Mesopolobus Westwood
- Antennae inserted in about middle of face, always with 2 anelli; middle tibia of male never enlarged; propodeum with nucha present 72
72. Prepectus small; thorax not slender; nucha with transverse strigosity Pteromalus Swederus
- Prepectus (Fig. 37E) large; thorax slender; nucha without transverse strigosity Chlorocytus Graham

VI. CHECKLIST OF INDIAN GENERA ALONG WITH DISTRIBUTIONAL DATA

List of Indian genera	Australian	Ethiopian	Nearctic	Neotropical	Oriental	Palearctic
1. <u>Acroclisoides</u> Girault & Dodd	+	+	-	-	+	+
2. <u>Agiommatius</u> Crawford	+	+	-	-	+	-
3. <u>Anisopteromalus</u> Ruschka	+	+	+	+	+	+
4. <u>Asaphes</u> Walker	+	+	+	+	+	+
5. <u>Austeroterobia</u> Girault	+	+	-	-	+	?
6. <u>Caenocrepis</u> Thomson	-	+	?	?	+	+
7. <u>Callitula</u> Spinola	+	+	+	+	+	+
8. <u>Catolaccus</u> Thomson	-	?	+	?	+	+
9. <u>Cephaleta</u> Motschulsky	+	?	+	+	+	+
10. <u>Cerocephala</u> Westwood	+	+	+	+	+	+
11. <u>Cheiropachus</u> Westwood	-	+	+	+	+	+
12. <u>Chlorocytus</u> Graham	+	+	+	?	+	+
13. <u>Choetospila</u> Westwood	+	+	+	+	+	+
14. <u>Choetospilisca</u> Hedqvist	?	?	+	?	+	?
15. <u>Cleonymus</u> Latreille	+	+	+	?	+	+
16. <u>Colotrechnus</u> Thomson	+	+	+	+	+	+
17. <u>Conomorium</u> Masi	-	+	-	-	+	+

List of Indian genera	Australian	Ethiopian	Nearctic	Neotropical	Oriental	Palearctic
18. <u>Coruna</u> Walker	-	+	+	-	+	+
19. <u>Cyrtopyx</u> Delucchi	-	+	+	-	+	+
20. <u>Dibrachys</u> Foerster	+	+	+	+	+	+
21. <u>Dinarmus</u> Thomson	+	+	+	+	+	+
22. <u>Dipara</u> Walker	+	+	+	-	+	+
23. <u>Ecrizotomorpha</u> Mani	-	-	-	-	+	-
24. <u>Euneura</u> Walker	-	+	+	-	+	+
25. <u>Eurydinotomorpha</u> Girault	+	+	+	-	+	+
26. <u>Gastrancistrus</u> Westwood	+	+	+	+	+	+
27. <u>Halticoptera</u> Spinola	+	+	+	-	+	+
28. <u>Herbertia</u> Howard	+	+	+	-	+	+
29. <u>Heydenia</u> Foerster	+	+	+	-	+	+
30. <u>Homoporus</u> Thomson	+	+	+	+	+	+
31. <u>Ischyropyx</u> Delucchi	-	+	-	-	+	+
32. <u>Manineura</u> Boucek	-	-	-	-	+	-
33. <u>Merismomorpha</u> Girault	+	-	-	-	+	-
34. <u>Merismus</u> Walker	?	+	+	-	+	+
35. <u>Mesopolobus</u> Westwood	+	+	+	+	+	+

List of Indian genera	Australian	Ethiopian	Nearctic	Neotropical	Oriental	Palearctic
36. <u>Metacolus</u> Foerster	-	+	+	-	+	+
37. <u>Metastenus</u> Walker	+	+	+	-	+	+
38. <u>Miscogaster</u> Walker	+	+	+	-	+	+
39. <u>Mokrzeckia</u> Mokrzecki	-	-	-	-	+	+
40. <u>Moranila</u> Cameron	+	-	+	+	+	+
41. <u>Nasonia</u> Ashmead	+	+	+	+	+	+
42. <u>Netomocera</u> Boucek	+	+	+	+	+	+
43. <u>Norbanus</u> Walker	+	+	+	+	+	+
44. <u>Notaninus</u> Walker	+	+	-	-	+	+
45. <u>Notoglyptus</u> Masi	+	+	-	-	+	+
46. <u>Oniticellobia</u> Boucek	-	+	-	-	+	-
47. <u>Oodera</u> Westwood	+	+	+	-	+	+
48. <u>Ophelosia</u> Riley	+	-	-	-	+	+
49. <u>Oricoruna</u> Boucek	-	-	-	-	+	-
50. <u>Oxysychnus</u> Delucchi	+	+	+	-	+	+
51. <u>Pachycrepoideus</u> Ashmead	+	+	+	+	+	+

List of Indian genera	Australian	Ethiopian	Nearctic	Neotropical	Oriental	Palearctic
52. <u>Pachyneuron</u> Walker	+	+	+	+	+	+
53. <u>Panstenon</u> Walker	+	+	+	+	+	+
54. <u>Paracarotomus</u> Ashmead	+	+	+	?	+	+
55. <u>Parurios</u> Girault	+	-	-	-	+	-
56. <u>Platetricozotes</u> Ferriere	-	+	-	-	+	+
57. <u>Propicroscytus</u> Szelenyi	+	+	-	-	+	+
58. <u>Psilocera</u> Walker	+	+	+	+	+	+
59. <u>Pteromalus</u> Swederus	+	+	+	+	+	+
60. <u>Rhopalicus</u> Foerster	-	+	+	-	+	+
61. <u>Riekisura</u> Boucek	+	?	?	?	?	+
62. <u>Roptrocerus</u> Ratzeburg	+	+	+	+	+	+
63. <u>Scutellista</u> Motschulsky	+	+	+	+	+	+
64. <u>Solenura</u> Westwood	-	+	?	-	+	+
65. <u>Spalangia</u> Latreille	+	+	+	+	+	+
66. <u>Sphegigaster</u> Spinola	+	+	+	+	+	+

List of Indian genera	Australian	Ethiopian	Nearctic	Neotropical	Oriental	Palearctic
67. <u>Syntomopus</u> Walker	+	+	+	+	+	+
68. <u>Systasis</u> Walker	+	+	+	-	+	+
69. <u>Thaumasura</u> Westwood	+	-	-	-	+	+
70. <u>Thinodytes</u> Graham	-	+	-	-	+	+
71. <u>Trichomalopsis</u> Crawford	+	+	+	+	+	+
72. <u>Trigonoderopsis</u> Girault	+	-	-	-	+	-
73. <u>Zolotarewskya</u> Risbec	+	+	-	-	+	-

FAMILY PTEROMALIDAE

Subfamily ASAPHINAE

Asaphes*

Subfamily AUSTROTEROBIINAE

Austroterobia

Subfamily CEROCEPHALINÆ

CerocephalaChoetospilaChoetospilisca

Subfamily CLEONYMINAE

Tribe CLEONYMINI

CleonymusNotanisusSolenuraZolotarewskya

Tribe HEYDENIINI

Heydenia

Tribe LYCISCINI

RiekisuraThaumasura

Tribe OODERINI

Oodera

Subfamily COLOTRECHNINAE

Colotrechnus*

Subfamily DIPARINAE

Dipara*Parurios*Netmocera

Subfamily EUNOTINAE

Tribe EUNOTINI

Cephaleta*Scutellista*

Tribe MORANILINI

MoranilaOphelosia

Subfamily HERBERTIINAE

Herbertia*

Subfamily MISCOGASTERINAE

Tribe MISCOGASTERINI

Halticoptera*Merismus*Miscogaster*

Subfamily ORMOCERINAE

Tribe SYSTASINI

Systasis*

Subfamily PANSTENONINAE

Panstenon*

Subfamily PIRENINAE	<u>Metacolus</u>
<u>Ecrizotomorpha*</u>	<u>Metastenus</u>
<u>Gastrancistrus*</u>	<u>Mokrzeckia</u>
<u>Trigonoderopsis*</u>	<u>Nasonia</u>
Subfamily PTEROMALINAE	<u>Norbanus</u>
Tribe PTEROMALINI	<u>Notoglyptus*</u>
<u>Acroclisoides</u>	<u>Oniticellobia</u>
<u>Agiommatus</u>	<u>Oricoruna</u>
<u>Anisopteromalus</u>	<u>Oxysychus</u>
<u>Caenocrepis*</u>	<u>Pachycrepoides</u>
<u>Callitula*</u>	<u>Pachyneuron</u>
<u>Catolaccus</u>	<u>Paracarotomus</u>
<u>Cheiopachus</u>	<u>Platecrizotes*</u>
<u>Chlorocytus*</u>	<u>Propicroscytus*</u>
<u>Conomorium</u>	<u>Psilocera*</u>
<u>Coruna</u>	<u>Pteromalus*</u>
<u>Cyrtoptyx</u>	<u>Rhopalicus</u>
<u>Dibrachys</u>	<u>Roptrocerus</u>
<u>Dinarmus*</u>	<u>Sphegigaster*</u>
<u>Euneura</u>	<u>Syntomopus*</u>
<u>Eurydinotomorpha</u>	<u>Thinodytes</u>
<u>Homoporus*</u>	<u>Trichomalopsis*</u>
<u>Ischyroptyx*</u>	Subfamily SPALANGIINAE
<u>Manineura</u>	<u>Spalangia*</u>
<u>Merismomorpha*</u>	
<u>Mesopolobus*</u>	

* Genera studied

VII. TAXONOMY

A. SUBFAMILY ASAPHINAE

Genus *ASAPHES* Walker

Asaphes Walker, 1834: 151.

Type species : Asaphes vulgaris Walker, by monotypy.

Isocratus Foerster, 1856: 53.

Asaphes Walker; Graham, 1969: 78.

Peck (1963) regarded it a member of tribe Asaphini and placed under Sphegigasterinae as earlier proposed by Ashmead (1904:327). Peck et al (1964) accepted its tribal status, but coined it with subfamily Miscogasterinae. Graham (1969) shifted it under subfamily Asaphinae, recognized by later workers.

The genus is almost cosmopolitan in distribution, hyperparasitic on aphids, and comprises nearly 10 spp. from the world. India shares just two species, known so far.

Diagnostic Characters : Body dark with metallic gloss; occipital carina present; gena carinate posteriorly; anterior margin of clypeus truncate; mandibles heterodont, right 3- left 2-dentate; maxillary and labial palpi 4- and 3-segmented respectively; antennae inserted at the lower level of eyes, 13-segmented, with 6-segmented funicle and 2 anelli; pronotum rounded off anteriorly; mesoscutum with parapsidal grooves complete, mesopleuron shiny smooth with a deep pit; scutellum with frenal groove; propodeum alveolate-rugulose, without

plicae, nucha small; forewings hyaline, marginal vein subequal to postmarginal; hind tibiae with one spur; gaster petiolate, basal two tergites large; ovipositor exserted.

The genus Asaphes is reported to contain two species from India, known so far. A key for their separation is given below.

**Key to the Indian species of Asaphes Walker based
on males**

1. Antenna (Fig. 3C) with funicle segments wider than long, but not transverse, second anellus about 1.5x as wide as long; scape slender, 5-6.0x as long as widei. A. vulgaris Walker
- Antenna with funicle segments distinctly transverse, second anellus nearly twice as wide as long; scape stout, at most 4.5x longer than wide ii. A. suspensus (Nees)

Asaphes vulgaris Walker

(Fig. 3A-D)

Asaphes vulgaris Walker, 1834: 152.

Eurytoma aenea Nees, 1834: 42.

Chrysolampus aeneus Ratzeburg, 1848: 185.

Chrysolampus aphidophila Rondani; Boucek, 1974: 275.

Isocratus vulgaris (Walker) Thomson, 1876: 208.

Pachycrepoideus indicus Bhatnagar, 1951: 160.

Asaphes vulgaris Walker; Graham, 1969: 80.

Asaphes vulgaris Walker; Mani, 1989: 637.

Material examined : 10♂ INDIA: Uttar Pradesh, Aligarh, 15.iv.1989 (Jamal Ahmad).

Body length : 1.7 mm.

The male of this species can be easily identified on the basis of characters given in the key. Some additional characters are as follows : Body black with metallic green reflections, more on head and thorax, excluding propodeum and gaster, petiole dull, head and frenum shiny; sculpture on thorax excluding propodeum not raised from general surface, propodeum alveolate-rugulose, petiole densely granulate; eyes pubescent, 2.0x as long as malar space (14:7); ocelli arranged in obtuse triangle, POL 2.0x as long as OOL (8:4); antennal toruli inserted at the lower level of eyes, inter-torular distance equal to torulo-ocular distance (4:4), scape reaching the median ocellus, pedicel much longer than anellus plus F1 & F2 together, club slightly shorter than preceding four funicle segments together (9:10); forewing (Fig. 3D) wholly setose, more on distal half, relative lengths of marginal, post-marginal and stigmal veins in the ratio of 11:12:7; gastral petiole 1.8x as long as wide (9:5).

Asaphes suspensus (Nees)

Chrysolampus suspensus Nees, 1834: 127.

Chrysolampus altiventris Nees, 1834: 127. ex parte.

Chrysolampus aphidiphagus Ratzeburg, 1844: 181.

Asaphes sawraji Sharma & Subba Rao, 1958: 181.

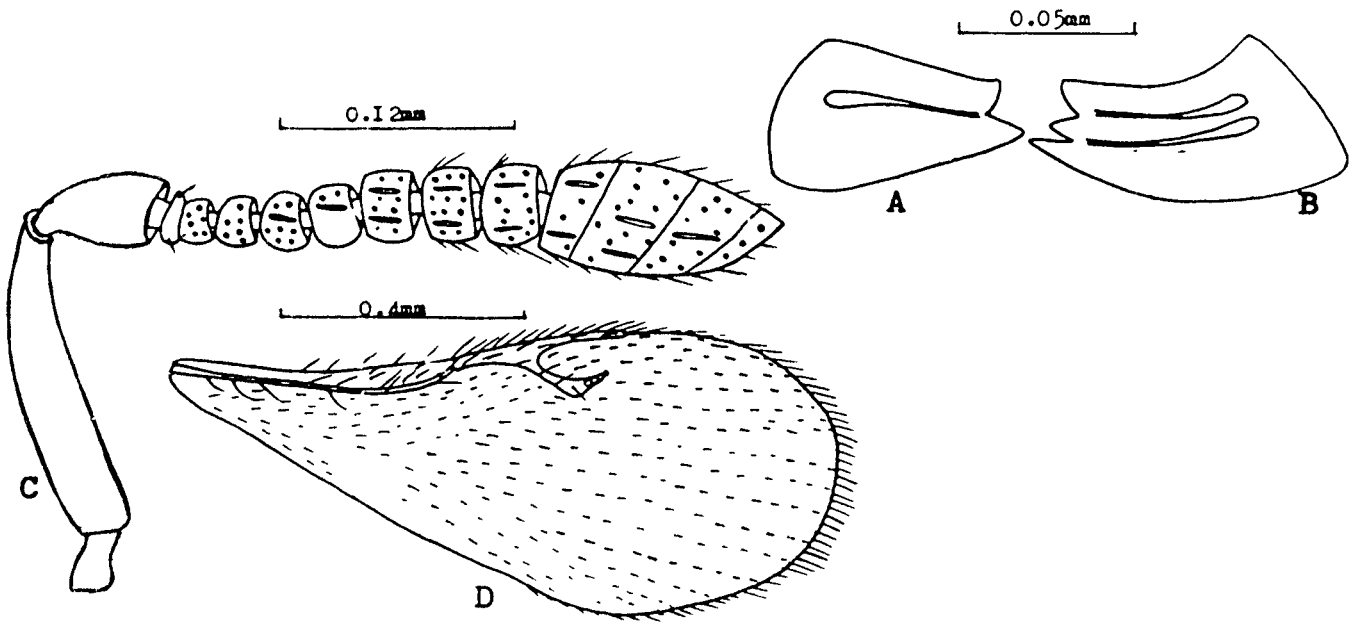
Pachyneuron uniarticulata Mani & Saraswat, 1974: 96.

Asaphes suspensus (Nees); Mani, 1989: 638.

Distribution : INDIA: Jammu & Kashmir, Punjab.

Fig. 3 A-D. Asaphes vulgaris Walker ♂

- A. Left mandible
- B. Right mandible
- C. Antenna
- D. Forewing



(Fig. 3)

B. SUBFAMILY COLOTRECHNINAE

Genus **COLOTRECHNUS** Thomson

Colotrechnus Thomson, 1878: 46.

Type species : Colotrechnus subcoeruleus Thomson by monotypy.

Zanonia Masi, 1921a: 184.

Type species : Zanonia viridis Masi, by monotypy.

Mani (1938) regarded it to be a member of subfamily Colotrechninae, as also accepted by the subsequent workers like Peck et al (1964), Graham (1969) and Boucek (1988), except Peck (1963) who earlier placed it under Cleonymini of subfamily Pteromalinae. Boucek (1988) allied the genus with tribe Colotrechnini recognizing its subfamily status. This genus is known to contain eight species from the world, but a single from India, known so far.

Diagnostic Characters : Body dark with metallic green reflections; clypeus truncate anteriorly or slightly angulate; mandibles 3-dentate; maxillary and labial palpi 4- and 3-segmented respectively; antennae inserted slightly above the lower level of eyes, 13-segmented, with 6-segmented funicle and 2 anelli, in males 5-segmented funicle and 3 anelli; pronotum rounded off anteriorly; mesoscutum with incomplete parapsidal grooves, shallowly impressed; axillae produced forward; scutellum with sublateral grooves curving outwards;

propodeum without nucha; forewings with marginal vein distinctly longer than postmarginal, stigmal short, with large stigma; hind tibiae with two spurs; gaster sessile; ovipositor hidden.

Comments : The genus Colotrechnus Thomson is reported for the first time from India. It is known to contain a single species, reported yet.

Colotrechnus notaularis Boucek

(Fig. 4A-D)

Colotrechnus notaularis Boucek, 1988: 281.

Material examined : 10[♂]. INDIA: Haryana, Faridabad, 8.x.1991 (M. Yousuf).

Body length : 1.25 mm.

Comments : This species is recorded for the first time from India. The male can be identified easily, in addition to figures, on the basis of following combination of characters: Body black with bluish green reflections; antennae, legs except tarsi, dark brown; tarsi and ocelli testaceous; forewing venation yellowish pale. Head slightly wider than long (30:26), ocelli with POL slightly more than 3.0x as long as OOL (10:3), scrobes deep, antenna (Fig. 4C) inserted distinctly

above the lower level of eyes, toruli distinctly closer to clypeus than the median ocellus (9:12), scape slightly less than 3.0x as long as wide (8:3) not reaching the median ocellus; mandible (Fig. 4B) 3-dentate, third tooth broadly obtuse; thorax 1.3x as long as wide (37:28), mesoscutum 1.4x as wide as long (28:20); scutellum slightly wider than long (15:13) with fine outcurving sublateral lines; forewing (Fig. 4D) hyaline, sparsely setose, veins slightly thickened, relative lengths of marginal, postmarginal and stigmal in the ratio of 15:10:5, stigma large; gaster as long as thorax (37:37), slightly more than 2.0x as long as wide.

Characters of male given here, fit largely for the female of notaularis Boucek (1988:281) and also the figures (454 & 455) given by him. This leads to tentative placement of this male under C. notaularis Boucek.

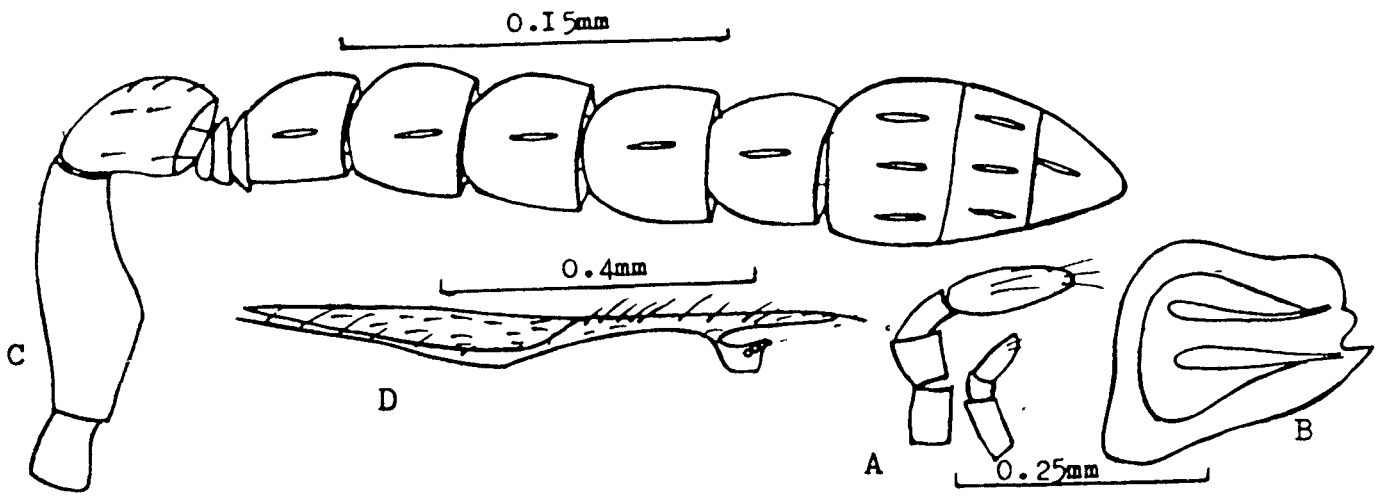
Fig. 4 A-D. Colotrechnus notaularis Thomson ♂

A. Maxillary & labial palpi

B. Mandible

C. Antenna

D. Part of forewing venation



(Fig. 4)

C. SUBFAMILY DIPARINAE

Genus **DIPARA** Walker

Dipara Walker, 1833:371.

Type species : Dipara petiolata Walker, by monotypy.

Tricoryphus Foerster, 1856: 46.

Type species : Tricoryphus fasciatus Thomson, 1878,
by subsequent reference.

Apterolelaps Ashmead, 1901: 312.

Type species : Apterolelaps nigriceps Ashmead, by
monotypy and original designation.

Epilelaps Girault, 1915b: 344.

Type species : Epilelaps hyalinipennis Girault, by
original designation.

Pseudiparella Girault, 1927: 334.

Type species : Pseudiparella emersoni Girault, by
monotypy.

Hispanolelaps Mercet, 1927: 60.

Type species : Hispanolelaps coxalis Mercet, by
monotypy.

Afrolelaps Hedqvist, 1963: 47.

Type species : Afrolelaps maculata Hedqvist, by
original designation.

Dipara Walker; Graham, 1969: 64.

Dipara Walker; Boucek, 1988: 334.

This genus is placed under Diparini of subfamily
Diparinae. Male of this genus can be easily identified by

having antennal flagellum 10-segmented with undifferentiated club. It is known to be represented by about 14 spp. from the world recorded so far, including a single species from India, reported for the first time.

Diagnostic Characters : Body black with metallic green reflections; vertex with strong bristles; anterior margin of clypeus roundedly produced; mandibles 3-dentate; antennae in male nodose, 13-segmented with one anellus and 9-segmented funicle, club solid, undifferentiated; pronotum strongly carinate anteriorly; mesoscutum with complete parapsidal grooves; scutellum with distinct frenal groove; propodeum alveolately rugose, nucha short; forewing hyaline, marginal and submarginal veins with strong bristles, the former much longer than postmarginal and stigmal separately; hind coxae elongated with transverse striations dorsally; gastral petiole long.

Dipara petiolata Walker

(Fig. 5A-B)

Dipara petiolata Walker, 1833: 373.

Dipara cinetoides Walker, 1834: 166.

Tricoryphus fasciatus Thomson, 1876: 210.

Hispanolelaps coxalis Mercet, 1927: 62.

Dipara petiolata Walker; Graham, 1969: 65.

Material examined : 10[♂] INDIA: Assam, Jorhat, 3.iii.1993 (Sudhir Singh).

Body length : 1.80 mm

Comments : This species has been reported for the first time from India. Male of this species can be identified easily on the basis of following characters: Antenna with toruli inserted distinctly above the lower level of eyes, scape 7.0x as long as wide (14:2); forewing (Fig. 5B) slightly less than 3.0x as long as wide (93:32), marginal, postmarginal and stigmal in the ratio of 34:12:4.5, apical margin of wing lightly maculated, with long cilia; gastral petiole long, slightly more than 5.0x as long as wide (21:4), basal tergite of gaster large.

Genus PARURIOS Girault

Parurios Girault, 1913e : 84.

Type species : Parurios australiana Girault, by monotypy.

Uriolelaps Girault, 1915c : 201.

Type species : Uriolelaps argenticoxae Girault, by original designation.

Emersonia Girault, 1933 : 1.

Type species : Emersonia atriscutum Girault, by monotypy.

Parurios Girault; Boucek, 1988 : 335.

Boucek (1988) placed this genus under the tribe Diparini of subfamily Diparinae. It resembles Dipara but differs in having body rather plump with strong bristles on head and thorax, and antennae filiform without long hairs. It is almost restricted to South Asia and Australian continent, together contributing about 21 spp. reported so far. This genus is reported for the first time from India.

Diagnostic Characters : Body brown with dull reflections; vertex with strong bristles; anterior margin of clypeus roundedly produced; antennae 13-segmented with 7-segmented funicle and one anellus; pronotum rounded off anteriorly; mesoscutum with strong bristles, parapsidal grooves complete; scutellum with distinct frenal groove; propodeum alveolately rugose, nucha short; forewings hyaline, marginal and submarginal veins with strong bristles, the former much longer than postmarginal and stigmal separately; hind coxae moderately large, dorsally with

transverse striations, tibiae with two spurs; gastral petiole distinctly longer than wide, basal tergite of gaster longest.

Parurios sp. indet.

(Fig. 5C-G)

Parurios sp. 6♂♂, INDIA : Uttar Pradesh, Aligarh, 20.x.1990
(Jamal Ahmad).

Body length : 1.90 mm.

Comments : This unidentified species closely resembles with Parurios sp. (Boucek 1988 : Fig. 610). Some important characters of this unidentified male species are as follows : Head in dorsal view slightly more than 4.0x as wide as long (50:12), distinctly wider than thorax (50:45); vertex with 6-8 strong black bristles; ocelli pale, POL slightly more than 1.2x as long as OOL (11:8); eye nearly 1.3x as long as wide (22:16), 2.2x as long as malar space (22:10), malar sulcus distinct; antenna (Fig. 5F) with toruli placed closer to clypeus than median ocellus (17:21), scape shorter than the length of an eye (19:22) not reaching the level of vertex; scrobes distinct; pronotum 2.0x as wide as long (30:15), posterior edge with smooth strip; forewing (Fig. 5G) venations with strong black bristles, relative length of marginal, postmarginal and stigmal in the ratio of 34:17:11; legs honey yellow, hind coxa large with 12 strong transverse striations dorsally.

Fig. 5 A-B. Dipara petiolata Walker, ♂

A. Antenna

B. Forewing

Fig. 5 C-H. Parurios sp., ♂

C. Head in frontal view

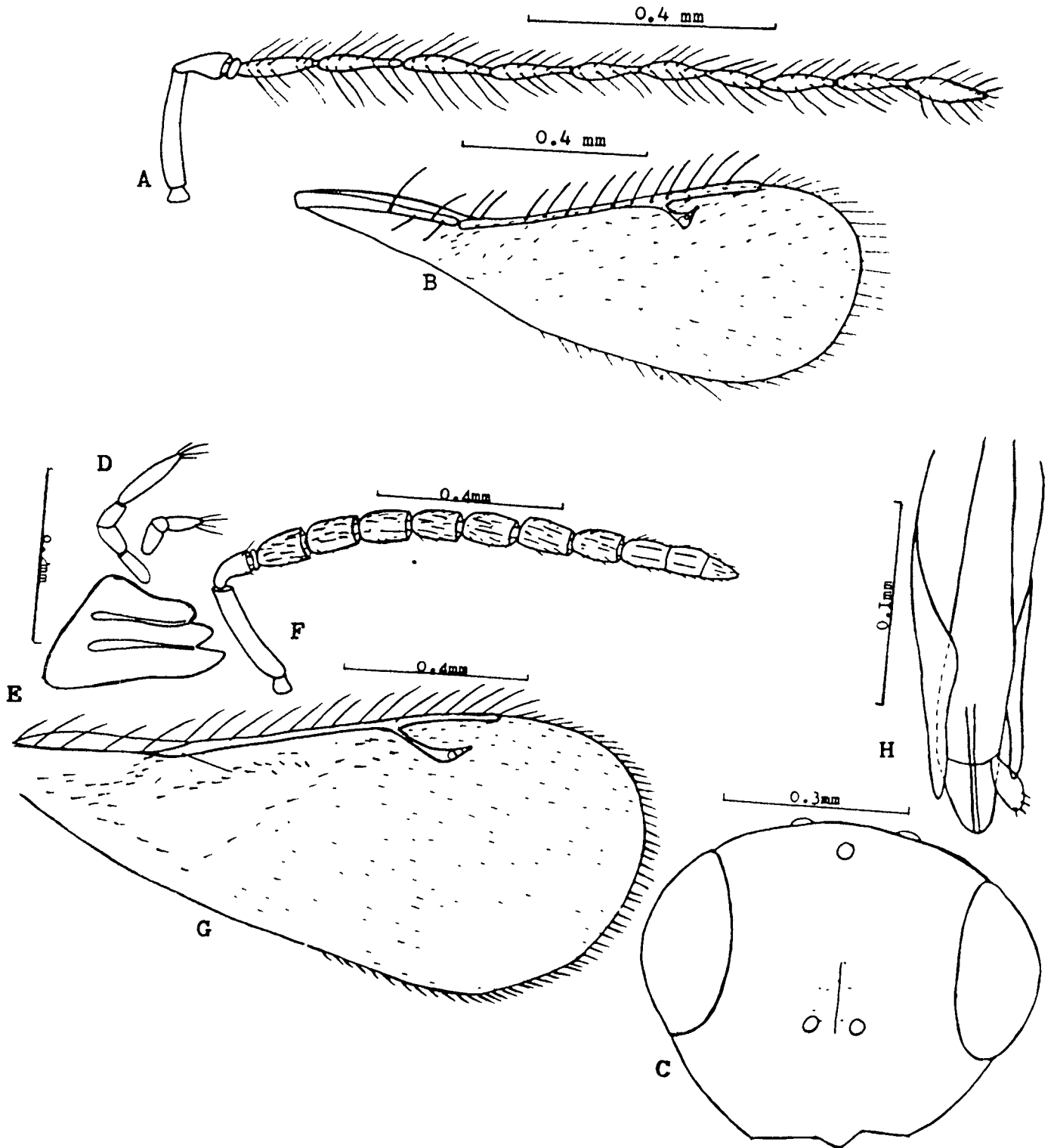
D. Maxillary & labial palpi

E. Mandible

F. Antenna

G. Forewing

H. Male genitalia



(Fig. 5)

D. SUBFAMILY HERBERTIINAE

Genus **HERBERTIA** Howard

Herbertia Howard, 1894 : 98.

Type species : Herbertia lucens Howard, by monotypy.

Tetracampoides Dodd, in Girault 1915a : 191.

Type species : Tetracampoides setosus Dodd, by original designation.

Trydymiformis Girault, 1915c : 188.

Type species : Trydymiformis australiensis Girault, by original designation.

Herbertia Howard; Burks, 1959 : 249.

Herbertia Howard; Boucek, 1988 : 347.

Peck (1963) placed this genus under Pirenini of subfamily Pteromalinae. Graham (1969) accepted its tribal status but considered it to be a member of Miscogasterinae. Boucek, Subba Rao & Farooqi (1978) shifted it under Asaphinae. Boucek (1988) erected a new subfamily Herbertiinae for Herbertia, because of its very outstanding features, like body including eyes densely setose; pronotum large; forewing with marginal vein very long, and basal tergite of gaster large, bell shaped. Mani (1989) proposed its association with Pireninae. The present work however agrees with Boucek (1988), for its placement suitably under Herbertiinae, owing to very distinguishing features as given above.

These are mainly parasites of leaf-mining Diptera, and are almost confined to tropical areas, comprising about 12 spp.,

reported so far. India shares just one species, as on record.

Diagnostic Characters : Body black, densely setose; gena carinate posteriorly; clypeus subdivided by a transverse ridge from gena to gena; mandibles bidentate; maxillary and labial palpi 2- and 3-segmented respectively; antennae inserted at or below lower level of eyes, 12-segmented, with 6-segmented funicle and one anellus; pronotum large, rounded off anteriorly; mesoscutum with parapsidal grooves complete, mesopleuron usually smooth; propodeum with raised median carina and plicae; nucha well developed; forewings hyaline, extensively pilose; hind tibiae with two spurs; gaster sessile, with basal tergite large, bell shaped; ovipositor slightly exserted.

The genus Herbertia Howard is reported to contain a single species from India, known so far.

Herbertia indica Burks

(Fig. 6A-F)

Herbertia indica Burks, 1959 : 252.

Herbertia indica Burks; Boucek, Subba Rao & Farooqi, 1978; 444.

Material examined : 3 ♀♀. INDIA : Uttar Pradesh, Nainital, 2.ix.1990 (M. Yousuf).

Body length : 1.5 mm.

This species can be easily identified on the basis of following combination of characters : Basal tergite of gaster with a transverse lamina at base; antennal club (Fig. 6D) with a strong spicule; forewing (Fig. 6E) with marginal vein 2.5x as long as postmarginal (30:12).

Comments : Mani (1989:537) synonymized Herbertia indica with his proposed combination Herbertia taskhiri (Mani). Generic differences alone between Herbertia Howard and Ecrizotomorpha Mani, as tabulated while discussing the latter, are too great to provide any ground for synonymy.

Fig. 6 A-F. Herbertia indica Burks, ♀
+

A. Head in frontal view

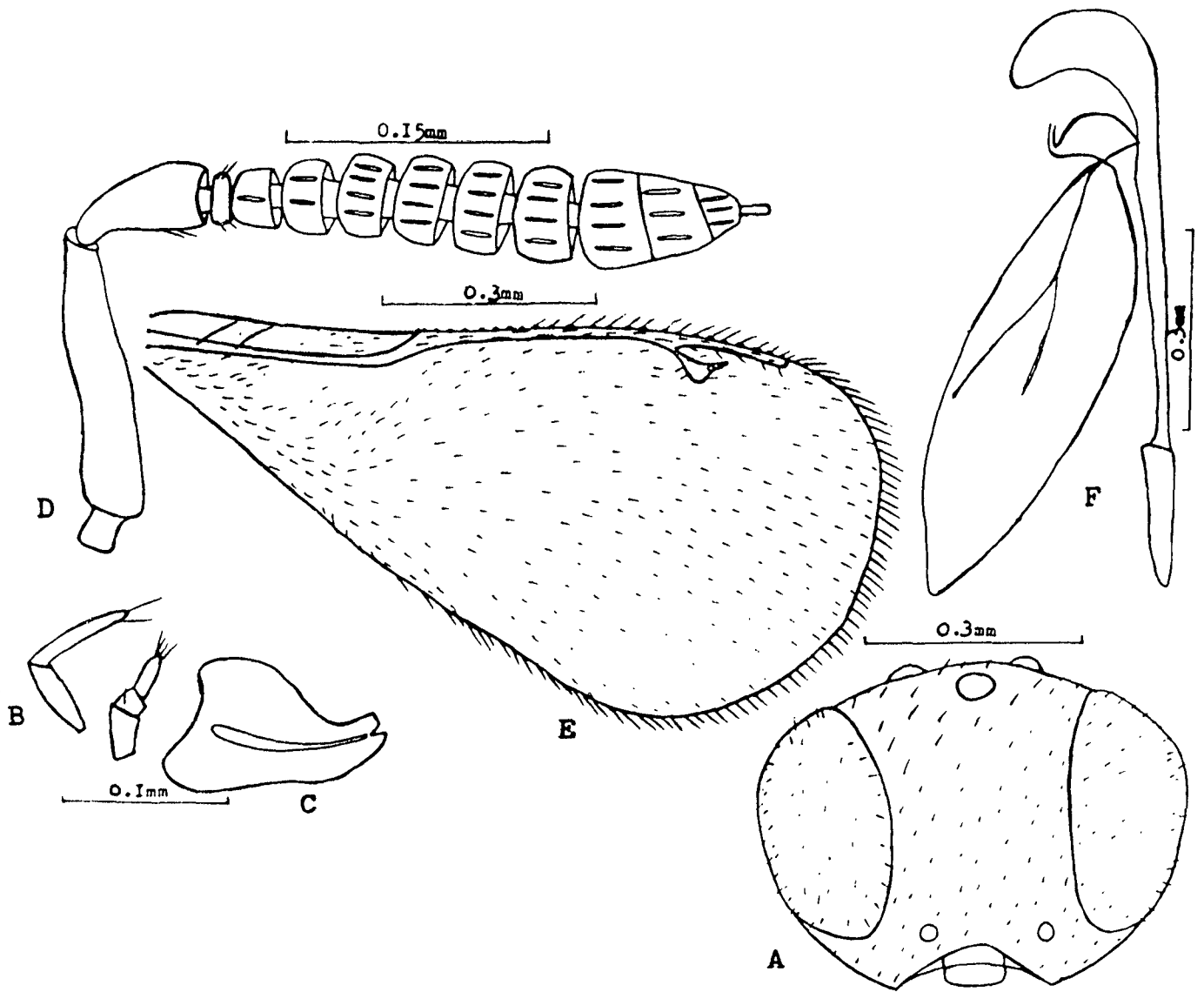
B. Maxillary & labial palpi

C. Mandible

D. Antenna

E. Forewing

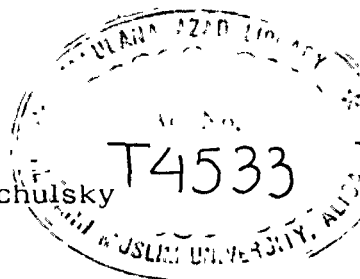
F. Part of ovipositor



(Fig. 6)

E. SUBFAMILY EUNOTINAE

Genus SCUTELLISTA Motschulsky



Scutellista Motschulsky, 1859: 172.

Type species : Scutellista cyanea Motschulsky, by monotypy.

Aspidocoris Costa, 1863: 25.

Type species : Aspidocoris cyaneus Costa, by monotypy.

Enargopelte Foerster, 1878: 62.

Type species : Enargopelte obscura Foerster, by monotypy.

Eugastropelte Masi, 1931: 452.

Type species : Scutellista gigantea Berlese, by original designation.

This genus falls under the tribe Eunotini of subfamily Eunotinae. It stands out distinctly from all other genera in having scutellum characteristically produced over gaster. Although cosmopolitan, however, it is quite predominant in tropical countries including India, and exploited universally as a significant bio-agent against various scale insects such as Ceroplastes, Coccus, Lecanium and Saissetia spp.

Diagnostic Characters : Body squat, black, with dull reflections; head without temple, acutely margined behind; anterior margin of clypeus truncate; gena long and flat, rounded off posteriorly; antennae usually clavate, inserted below lower level of eyes, with 5-segmented funicle and club mostly solid; pronotum carinate anteriorly; mesoscutum with parapsidal grooves complete; scutellum large, extending over greater part of gaster; propodeum

with hind corners rounded; forewings densely setose, submarginal vein sinuate apically, marginal vein much longer than postmarginal and stigmal separately; gaster sessile, shorter than thorax; ovipositor slightly exserted.

The genus is reported to contain two species from India. A key for their separation is given below.

Key to the Indian species of Scutellista Motschulsky, based on females

1. Scutellum (Fig.7D) considerably large, produced over about three fourth of gaster, 1.2x as long as wide, 2.6x as long as mesoscutum; antenna (Fig. 7C) clavate, club undivided; forewing (Fig. 7E) with disc sub-triangularly densely setose, postmarginal distinctly shorter than stigmal i. S. cyanea Motschulsky
- Scutellum small, slightly produced over basal tergite of gaster, slightly longer or as long as wide, about 1.8x as long as mesoscutum; antenna (Fig. 7L) normal not clavate, club 2-segmented; forewing (Fig. 7M) uniformly setose, posmarginal vein as long as stigmal ii. S. hayati (Farooqi)

1. Scutellista cyanea Motschulsky

(Fig. 7A-H)

Encyrtus caeruleus Fonscolombe, 1832: 304.

Scutellista cyanea Motschulsky, 1859: 172.

Aspidocoris cyaneus Costa, 1863: 24.

Material examined : 5♀, 5♂. INDIA: Uttar Pradesh, Aligarh, by rearing scale insects (20.iv. 1987).

Body length : 2.25 mm.

It is most common species attacking scale insects of various plants specially citrus groves, and can be easily identified by characters given in the key. Some additional characters are as follows : Head as wide as thorax (63:63); POL slightly greater than 7.0x as long as OOL (22:3); eye longer than gena (26:21); scutellum 1.2x as long as wide (55:45); forewing (Fig. 7E) basally setose with marginal, postmarginal and stigmal in the ratio of 17:5:8.

Comments : Although Encyrtus caeruleus Fonscolombe was proposed much earlier than S. cyanea Mots. however, according to Graham (1969:76) "The name cyanea is so well known that Fonscolombe's name should be rejected even though it has priority". Boucek (1988:351) reinstated the name caeruleus Fonscolombe, suppressing cyanea Mots. The present work supports Graham's view and opines to retain the name cyanea Mots. not only because of its age old established status and long use in economic entomology, but also, to avoid taxonomical confusion.

ii. Scutellista hayati (Farooqi)

(Fig. L-M)

Cephaleta hayati Farooqi, 1980: 119.

Scutellista hayati (Farooqi) Boucek, 1988: 352.

Material examined : 2500. INDIA: Uttar Pradesh, Aligarh, reared from Cerococcus sp. 20.iv.1986. (Adam's Collection).

Body length : 2.0 mm.

Characters supplementary to those in the key are as follows: Head wider than thorax (67:60); ocelli with POL 2.6x as long as OOL (16:6); eye as long as gena (27:27); scutellum nearly as long as wide (37:37), with posterior end moderately acute; forewing (Fig. 7M) with basal and cubital line infuscated, basally setose, marginal, postmarginal and stigmal veins in the ratio of 23:9:8.

Comments : This species was originally placed under Cephaleta, although the author then was quite in agreement with Boucek, of its close alliance with Scutellista. Boucek (1988:352) shifted it under Scutellista, because of its various similarities such as, large scutellum, rounded gena, hind corner of propodeum broadly obtuse and distinct thoracic microsculpture.

Fig. 7 A-F. Scutellista cyanea Motschulsky, ♀

A. Maxillary & labial palpi

B. Mandible

C. Antenna

D. Thorax with gaster

E. Forewing

F. Part of female genitalia

Fig. 7 G-H. Scutellista cyanea Motschulsky, ♂

G. Antenna

H. Male genitalia

Fig. 7 I-M. Scutellista hayati (Farooqi) , ♀

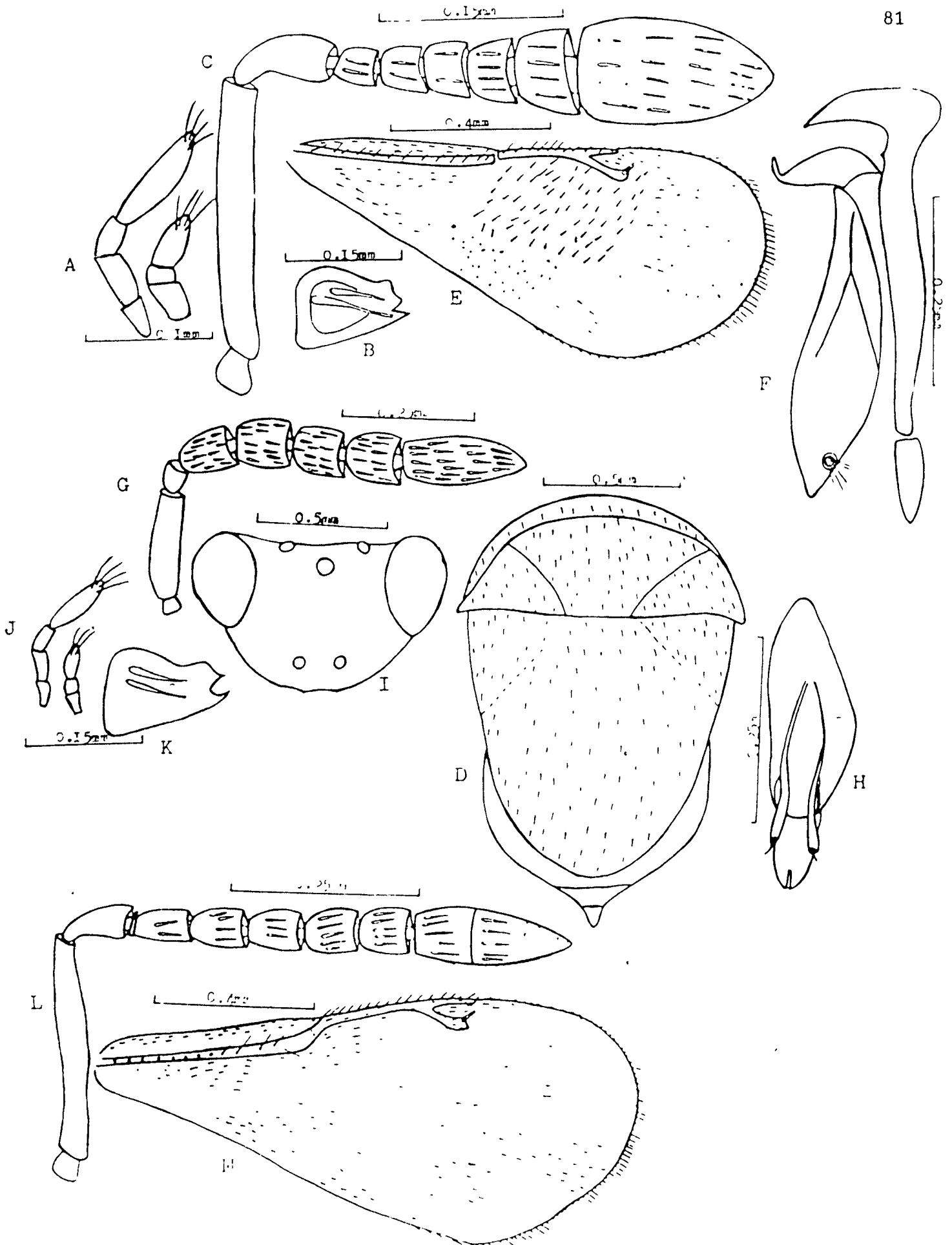
I. Head in frontal view

J. Maxillary & labial palpi

K. Mandible

L. Antenna

M. Forewing



(Fig. 7)

Genus **CEPHALETA** Motschulsky

Cephaleta Motschulsky, 1859: 173.

Type species : Cephaleta purpureiventris Motschulsky, by designation of Ashmead, 1904.

Cardiogaster Motschulsky, 1863: 72.

Type species : Cardiogaster fusciventris Motschulsky, by monotypy.

Anysis Howard, 1896: 167.

Type species : Anysis australiensis Howard, by monotypy.

Eurycephalus Ashmead, 1903: 61.

Type species : Eurycephalus alcocki Ashmead, by monotypy.

Eurycranium Ashmead, 1904: 326. Replacement name for Eurycephalus Ashmead.

Cephaleta Motschulsky; Boucek, 1988: 352.

Placed together with Scutellista Motschulsky under the tribe Eunotini of subfamily Eunotinae, the genus Cephaleta Motschulsky shares many characters with the former, not only morphologically but, both in behaviour as well as almost identical host selection. This close alliance between two genera has been quite controversial among taxonomists to merge Cephaleta with Scutellista. Generic differences however, apart from various resemblances prevent from any hasty decision on the issue of synonymy, till experts justify a convincing position.

It is mostly confined to tropical areas attacking various species of coccids and pseudococcids, represented by 4 spp.,

from the world, including 2 spp., from India, known so far.

Diagnostic Characters : Body black, short and broad, with metallic gloss; anterior margin of clypeus truncated; gena long, posteriorly carinate; antennae inserted below lower level of eyes, 10-segmented, with 5-segmented funicle and one anellus, club 2-segmented; thorax densely setose, setae arising from elevated papillae; mesoscutum with parapsidal grooves complete; scutellum moderately large; propodeum with hind corners angularly raised vertically upward; forewings densely setose, marginal vein much longer than postmarginal and stigmal separately; gaster sessile; ovipositor slightly exerted.

The genus is reported to contain two species from India, known so far. A key for their separation is given below.

Key to the Indian species of Cephaleta Motschulsky based on females

1. Antenna (Fig. 8C) clavate, pedicel as long as F1 and F2 combined, club less than 2.0x as long as wide, apical half infuscated; scutellar sculpture above frenum aciculate; forewing (Fig. 8D) with postmarginal vein distinctly shorter than stigmal; gaster and legs orange yellow ... i. C. brunneiventris Motschulsky
- Antenna (Fig. 8J) not clavate, pedicel distinctly shorter than F1 and F2 combined, club more than 2.0x as long as wide, without infuscation on apical half; scutellar sculpture above frenum indistinct; forewing (Fig. 8K) with postmarginal as long as stigmal; gaster and legs dark brown
..... ii. C. australiensis (Howard)

i. Cephaleta brunneiventris Motschulsky

(Fig. 8A-G)

Cephaleta purpureiventris Motschulsky, 1859: 173.Cephaleta brunneiventris Motschulsky, 1859: 174.Pteromalus magniceps Walker, 1860: 359.Encyrtus obstructus Walker, 1860: 359.Cardiogaster fusciventris Motschulsky, 1863: 72.Eurycephalus alcocki Ashmead, 1903: 61.Eurycranium saissetiae Ashmead, 1905b: 405.Pteromalus magniceps Schmiedeknecht, 1909: 347.Anysis saissetiae Smith & Compere, 1928: 309.Cephaleta brunneiventris Motschulsky; Boucek, Subba Rao & Farooqi, 1978: 438.**Material examined** : 1000, 300[↑]. INDIA: Uttar Pradesh, Aligarh.
Reared from pseudococcids. 20.x.1987 (Janal Ahmad).**Body length** : 2.0 mm.

Characters supplementary to those in the key are as follows: Head wider than thorax (70:60); POL nearly 10.0x as long as OOL (21:2), their diameter twice the OOL (4:2); mesoscutum 3.0x as wide as long (60:20), much shorter than scutellum (20:35), the latter as long as wide; gaster longer than wide (70:58), basal tergite large.

Comments : Although Cephaleta purpureiventris has page precedence over Cephaleta brunneiventris, however, Boucek,

Subba Rao & Farooqi (1978:439) considered the latter species as valid, and said "C. brunneiventris was proposed for the female sex which offers more reliable specific characters in this group (Eunotinae), hence it is given preference over C. purpureiventris, based on the male sex...."

ii. Cephaleta australiensis (Howard)

(Fig. 8H-K)

Anysis australiensis Howard, 1896: 167.

Cephaleta australiensis (Howard) Boucek, Subba Rao & Farooqi, 1978: 438.

Cephaleta tripathi (Kaul), 1974: 187. **Syn.n.**

Material examined : 2000, 500⁺⁺. INDIA: Uttar Pradesh, Aligarh. Reared from pseudococcids. 22.iii.1987 (Jamal Ahmad).

Body length : 1.80 mm - 2.0 mm.

Some additional characters of this species are as follows: Body hairs arising from elevated papillae, those on scutellum longer, surface shiny aciculate; head wider than thorax (75:65); ocelli large, separated by eye margin by their own diameter, POL 4.5x as long as OOL (18:4); mesoscutum distinctly shorter than scutellum in length (27:41), the latter slightly longer than wide (41:39), frenum punctate; gaster ovate with metallic green reflections, longer than wide (70:60).

Comments : Boucek, Subba Rao & Farooqi (1978:439) expressed probability of synonymizing C. tripathi with C. australiensis. The present study after thorough comparison of original description of C. tripathi with specimens of C. australiensis considers both closely allied and conspecific, save minor differences mainly morphometrical as tabulated below, quite insufficient for establishing a species.

<u>C. tripathi</u> (Kaul) Syn.n.	<u>C. australiensis</u> (Howard)
1. Head facially, 1.42x as wide as long.	1. Head 1.26x as wide as long.
2. Head dorsally 3.3x as wide as long.	2. Head dorsally 3.8x as wide as long.
3. Scape 7.0x as long as wide.	3. Scape 6.0x as long as wide.
4. Pedicel 2.5x as long as Fl.	4. Pedicel 3.0x as long as Fl.
5. Antenna brownish black.	5. Antenna deep brown.

Fig. 8 A-E. Cephaleta brunneiventris Motschulsky, ♀

A. Maxillary & labial palpi

B. Mandible

C. Antenna

D. Part of forewing

E. Part of ovipositor

Fig. 8 F-G. Cephaleta brunneiventris Motschulsky, ♂

F. Antenna

G. Male genitalia

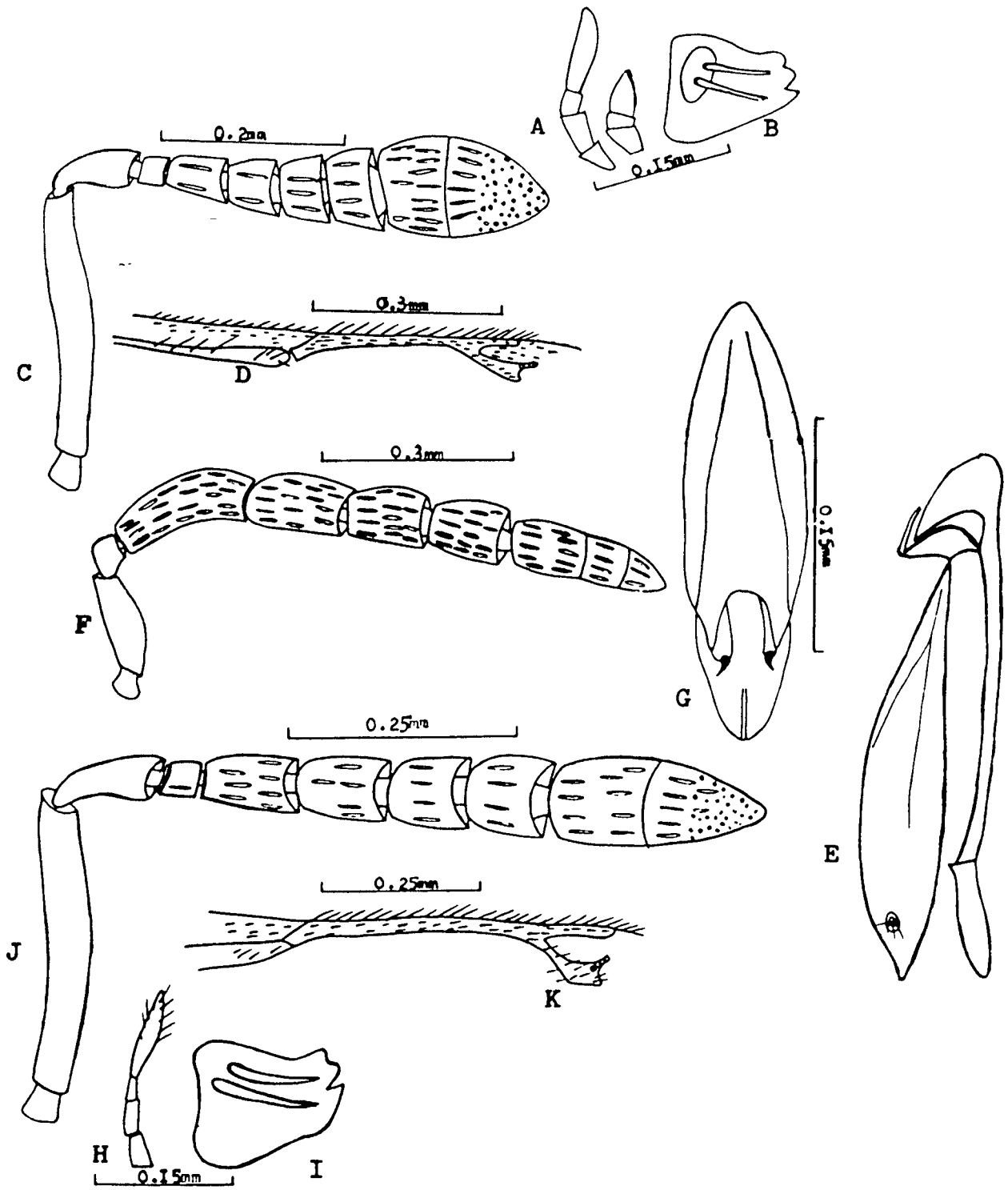
Fig. 8 H-K. Cephaleta australiensis(Howard), ♀

H. Maxillary palpi

I. Mandible

J. Antenna

K. Part of forewing venation



(Fig. 8)

F. SUBFAMILY SPALANGIINAE

Genus **SPALANGIA** Latreille

Spalangia Latreille, 1805: 227.

Type species : Spalangia nigra Latreille, by monotypy.

Spalangia Latreille; Boucek, 1963: 429.

Spalangia Latreille; Graham, 1969: 48.

Spalangia Latreille; Mani, 1989: 641.

Westwood (1839) erected subfamily Spalangiinae, exclusively for Spalangia, owing to outstanding features of the genus. Mani (1938) retained this idea, though many subsequent workers including Nikolskaya (1952) upgraded it to the family level. Gahan (1946) strongly supported Westwood's idea and suggested subfamily status for Spalangia, justifiably acceptable yet.

The genus is cosmopolitan in distribution, represented by about fifty species from the world. These are primary parasites of various Diptera, such as Calliphora, Chrysomyia, Musca domestica, Pycnosoma, Sarcophaga, Stomoxys spp. and sheep maggot flies. Several species have been effectively used for the control of such host flies.

Diagnostic Characters : Body black, with piliferous punctation on head and thorax; head prognathous, with a punctate median groove descending below median ocellus; eyes setose; clypeus truncated anteriorly; mandibles bidentate; maxillary and labial palpi each 2-segmented; antennae filiform, inserted at the corners of clypeal margin, 10-segmented, with 7-segmented funicle and

club solid, anelli absent; pronotum large, anteriorly or rounded off, usually with a cross-line in front of the hind margin; mesoscutum with parapsidal grooves complete; scutellum nearly flat, usually with punctate frenal groove; propodeum large, subhorizontal; nucha indistinct; forewings with marginal vein long, postmarginal and stigmal short, subequal; legs with fore basitarsi stout and compressed; hind tibiae with one spur; gastral petiole with longitudinal ridges, basal tergite with large excavated fovea, second and third tergites usually large; ovipositor slightly exserted.

The genus Spalangia is known to contain eight species (including two new reports and one new species) from India. A key for their separation is given below.

Key to the Indian species of Spalangia Latrielle based on females

1. Pronotum with an isolated cross-line in front of the hind margin..... 2
- Pronotum without such a cross-line, in front of the hind margin..... 6
2. Pronotal collar (Fig. 9E) subpentagonal, distinctly carinate anteriorly; head longer than wide in facial view; gena weakly converging towards mouth; antenna (Fig. 9D) with F1 nearly twice as long as wide; gaster with tergites 1-5 granulate 1. S. nigroaenea Curtis

- Pronotal collar rounded off anteriorly; other characters different..... 3
- 3. Mesoscutum (Fig. 9J) with a distinct cross-line and a round fovea below it, on disc..... ii. S. simplex Perkins
- Mesoscutum without a cross-line and fovea 4
- 4. Pronotum including antero-lateral parts with scanty piliferous punctures, widely spaced, without any impunctate triangular area; cross-line at the hind margin of pronotum slightly angulate medially..... iii. S. endius Walker
- Pronotum including antero-lateral parts densely rugulose punctate except a triangular area medially, interspaces indistinct; cross-line at the hind margin of pronotum straight..... 5
- 5. Head in facial view longer than wide; antenna long with F2 oblong, following segments quadrate, in males, distal funicle segments distinctly longer than wide..... iv. S. cameroni Perkins
- Head in facial view wider than long; antenna short with F2 subquadrate, following segments transverse, in males, distal funicle segments hardly longer than wide..... v. S. gemina Boucek
- 6. Head and pronotum densely punctate, with narrow interspaces; mesoscutum rugulosely punctate; scutellum with distinct frenal groove; forewings basally setose; gastral petiole 2.0x as long as wide vi. S. obscura Boucek
- Head and pronotum finely and sparsely punctate, with wide interspaces; mesoscutum only medially impressed; scutellum with or without frenal groove; forewings basally bare or setose; gastral petiole short..... 7

7. Mesoscutum punctate; scutellum with frenal groove indistinct; propodeum shiny, impunctate laterad; antenna (Fig. 10E) with club as long as preceding three funicle segments together; basally bare vii. S. fuscipes Nees
- Mesoscutum impunctate, absolutely smooth; scutellum with frenal groove distinctly complete; propodeum dull, rugulosely punctate laterad; antenna (Fig. 10H) with club as long as preceding four funicle segments together; forewing (Fig. 10J) basally setose viii. S. parfuscipes sp.n.

i. Spalangia nigroaenea Curtis

(Fig. 9A-H)

Spalangia nigroaenea Curtis, 1839: 740.

Spalangia homolaspis Foerster, 1850: 505.

Spalangia astuta Foerster, 1851: 1.

Spalangia muscidarum Richardson, 1913: 38.

Spalangia sundaica L.F. Graham, 1932: 22.

Spalangia nigroaenea Curtis; Boucek, 1963: 448.

Spalangia nigroaenea Curtis; Boucek, Subba Rao & Farooqi, 1978: 457.

Spalangia nigroaenea Curtis; Mani, 1989: 644.

Material examined : 1♀ 600. INDIA: Uttar Pradesh, Aligarh, 20.iii.1991 (Jamal Ahmad).

Body length : 2.75 mm.

This is the commonest species of Spalangia and can be separated easily on the basis of characters provided in the key. Some additional characters are as follows : Punctuation on head dense, with interspaces usually shorter than the diameter of their own; pronotum with piliferous puncts moderately distributed except bare medially, interspaces wide; mesoscutum with anterior portion shiny smooth, without piliferous puncts, posterior portion with large and irregular punctures, with or without interspaces; propodeum densely punctate, laterally with granulate surface.

ii. Spalangia simplex Perkins

(Fig. 9I-N)

Spalangia simplex Perkins, 1910: 657.

Spalangia parasitica Girault, 1915b: 346.

Spalangia simplex Perkins; Boucek, 1963: 489.

Material examined : 1♂ 200^{↑↑}. INDIA: Uttar Pradesh, Aligarh, 20.iii.1991 (Jamal Ahmad).

Body length : 1.75 mm.

This species has been recorded for the first time from India. It runs well in Boucek's key (1963:482) and can be easily separated from others on the basis of characters provided in the key. Some additional characters are as follows : Head and pronotum with fine piliferous punctures, with wide interspaces; pronotum with a cross-line present in front of its hind margin;

mesoscutum with its anterior two-third portion absolutely smooth, posterior portion with a cross-line and a round fovea below it; scutellum smooth with a complete frenal groove; propodeum with its hind corners sharply acute; gastral petiole 2.0x as long as wide with 3-4 distinct setae on either side.

iii. Spalangia endius Walker

Spalangia endius Walker, 1839: 96.

Spalangia muscidarum var stomoxysiae Girault, 1916: 37.

Spalangia philippinensis Fullaway, 1917: 292.

Spalangia muscidarum var texensis Girault, 1920: 213.

Spalangia orientalis L.F. Graham, 1932: 21.

Spalangia stomoxysiae Peck in Muesebeck et al, 1951: 535.

Spalangia endius Walker; Boucek, 1963: 458.

Spalangia endius Walker: Graham, 1969: 53.

Spalangia endius Walker; Mani, 1989: 651.

Distribution : INDIA : Chandigarh, Delhi.

iv. Spalangia cameroni Perkins

(Fig. 10A-C)

Spalangia cameroni Perkins, 1910: 656.

Spalangia muscidarum var texensis Girault, 1920: 213.

Spalangia melanogaster Masi, 1940: 295.

Spalangia atherigonae Risbec, 1951: 361.

Spalangia cameroni Perkins; Boucek, 1963: 454.

Spalangia cameroni Perkins; Graham, 1969: 53.

Spalangia cameroni Perkins; Mani, 1989: 649.

Material examined : 10[↑] INDIA: Uttar Pradesh, Aligarh, 20.iii.1991 (Jamal Ahmad).

Body length : 2.75 mm.

Some male characters of this species are as follows : Head as long as wide (54:54) in facial view, with punctures usually deep and widely spaced except those between eye-margins and antennal toruli shallow; gena smooth, nearly as long as eye-length (25:25); antenna (Fig. 10A) with scape slightly shorter than F1+F2+F3 combined (33:35), F1 2.0x as long as wide (12:6), twice as long as pedicel (12:6); forewing (Fig. 10B) with marginal, postmarginal and stigmal in the ratio of 32:4:4.

Comments : The male of Indian material resembles European cameroni in various respects (Boucek, 1963:455) except few morphometrical ratios such as gena in the latter 2/3 of the eye-length and scape as long as four funicle segments together. This enables to place the present material tentatively close to S. cameroni.

v. Spalangia gemina Boucek

Spalangia gemina Boucek, 1963: 484.

Spalangia gemina Boucek; Boucek, Subba Rao & Farooqi, 1978:457.

Distribution :INDIA: Karnataka, Tamil Nadu, West Bengal.

vi. Spalangia obscura Boucek

Spalangia obscura Boucek, 1963: 488.

Spalangia obscura Boucek; Boucek, Subba Rao & Farooqi, 1978: 457.

Spalangia obscura Boucek; Mani, 1989: 643.

Distribution : INDIA: Karnataka.

vii. Spalangia fuscipes Nees

(Fig. 10D-G)

Spalangia fuscipes Nees, 1834: 270.

Spalangia fuscipes Nees; Boucek, 1963: 476.

Material examined : 1♀. INDIA: Andhra Pradesh, Mehboob Nagar, 12.x.1987 (Md. Basheer).

Body length : 1.75 mm.

Comments : This species has been recorded for the first time from India. It can be easily identified by following set of characters : Head (Fig. 10D) with fine piliferous punctures, with wide interspaces; antenna (Fig. 10E) with pedicel 2.5x as long as wide (7.5:3), funicle segments F3-F7 distinctly wider than long, club slightly more than 1.6x as long as wide (10:6), as long as preceding three funicle segments together; pronotum rounded off anteriorly, without an isolated cross-line at its hind margin, piliferous punctures slightly larger than those, on head, with wide interspaces; mesoscutum with a group of punctures

in the middle of prescutum; scutellum smooth, without distinct punctures, as long as wide (19:19), without frenal groove; forewing (Fig. 10G) basally bare, marginal, postmarginal and stigmal veins in the ratio of 21:3:2.

viii. Spalangia parfuscipes sp.n.

(Fig. 10H-K)

Female. Length 1.80 mm. Body black with metallic gloss; eyes setose, rusty brown; ocelli light brown; mouth parts, antennal flagellum, tegulae, legs except coxae, and ovipositor dark brown; scape blackish brown with metallic reflections; forewing venation yellowish brown; coxae black; tibial spurs and tarsal segments brown.

Head slightly longer than wide in facial view, with fine piliferous punctures, widely spaced; ocelli arranged in obtuse triangle, POL slightly greater than OOL (9:8); malar sulcus indistinct; gena smooth, as long as an eye-length (14:14); anterior margin of clypeus truncated; mandibles long, bidentate; maxillary and labial palpi 2-segmented each; antenna (Fig. 10H) subclavate, 10-segmented, scape 5.0x as long as wide (25:5), pedicel slightly more than 2.0x as long as wide (9.5:4.5), flagellar segments with following dimension (L:W) : F1(3:3), F2(3:4), F3-F5(4:5), F6 & F7(4:6) & club (16:13), the latter as long as preceding four funicle segments together.

Thorax (Fig. 10I) less than 2.0x as long as wide (74:40), pronotum bell shaped, slightly wider than long (26:23), rounded off

anteriorly, without a cross-line in front of hind margin, piliferous punctures finely distributed, with wide interspaces; mesoscutum smooth, 4.0x as wide as long (40:10), parapsidal grooves complete; scutellum distinctly wider than long (22:16), impunctate, except a complete frenal groove, frenum nearly one-third the length of scutellum (5:16); propodeum subhorizontal, more than twice as wide as long (36:16), with a double longitudinal row of alveolar puncts, rugose laterals, nucha small; forewing (Fig. 10J) narrow, 3.0x as long as wide (105:35), hyaline, with basal area setose, marginal, postmarginal and stigmal in the ratio of 24:5:3, apical cilia long; leg with fore basitarsus compressed 4.0x as long as wide (8:2), mid tibial spur slightly shorter than the basitarsus; hind tibia with two spurs.

Gastral petiole rugulosely sculptured, slightly more than 1.5x as long as wide (14:9), basal tergite as long as the second, the former with a large fovea at base; female genitalia short, as shown in figure (10K).

Holotype Female. INDIA: Uttar Pradesh, Muzaffar Nagar, 15.iii.1991 (M. Yousuf).

Comments : The new species closely resembles S. fuscipes Nees and S. drosophilae Ashmead. It differs from the former in having mesoscutum smooth, impunctate and scutellum with distinct frenal groove; and with the latter, in having body not strongly

flattened; scutellum with frenal groove complete; antenna with F2 not shorter than F3; mesoscutum shiny, without piliferous punctures.

Fig. 9 A-G. Spalangia nigroaenea Curtis, ♀

- A. Head in frontal view
- B. Maxillary & labial palpi
- C. Mandible
- D. Antenna
- E. Pronotum
- F. Forewing
- G. Part of female genitalia

Fig. 9 H. Spalangia nigroaenea Curtis, ♂

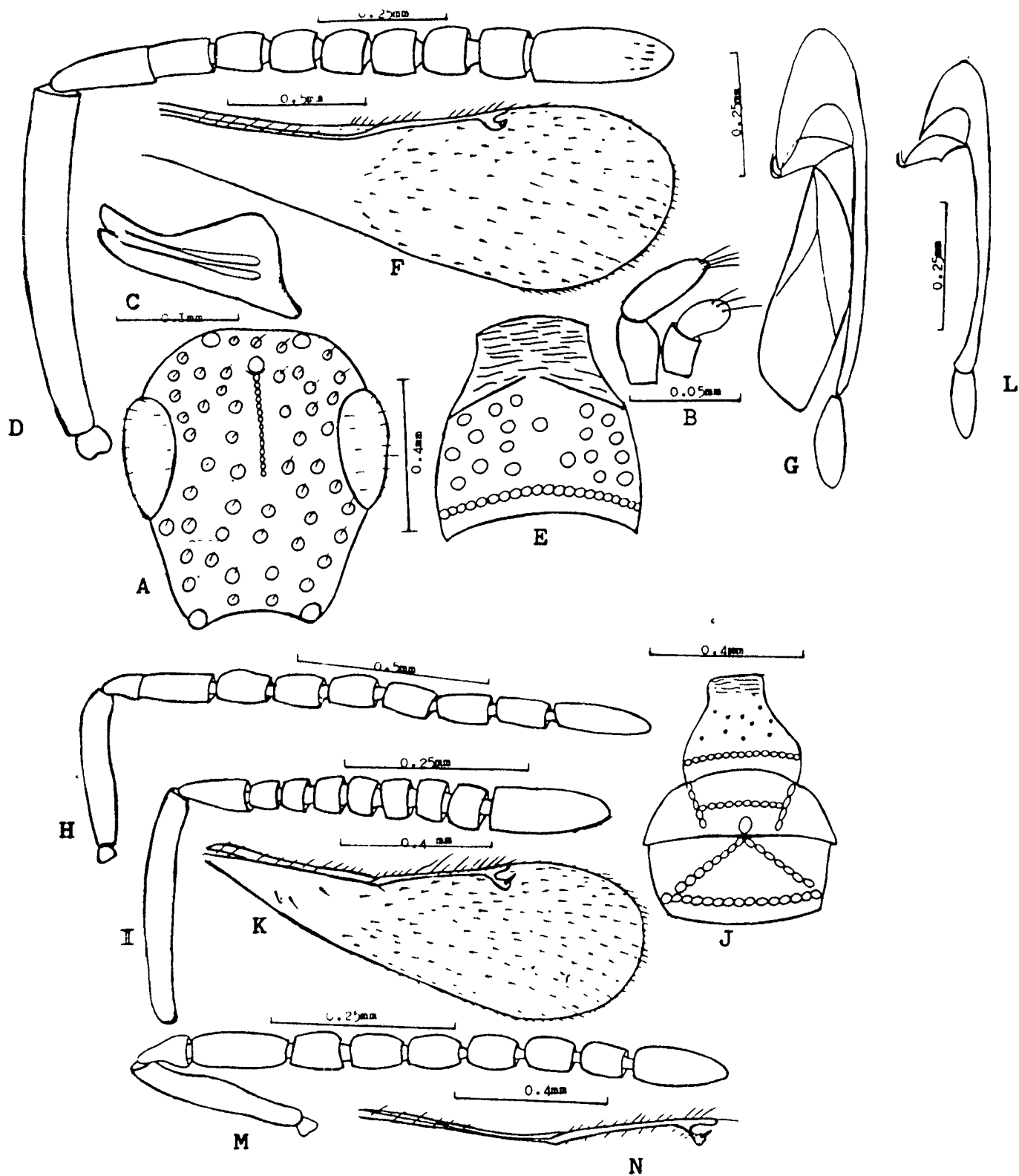
- H. Antenna

Fig. 9 I-L. Spalangia simplex Perkins, ♀

- I. Antenna
- J. Part of thorax
- K. Forewing
- L. Part of female genitalia

Fig. 9 M-N. Spalangia simplex Perkins, ♂

- M. Antenna
- N. Part of forewing venation



(Fig. 9)

Fig. 10 A-C. Spalangia cameroni Perkins, ♂

A. Antenna

B. Forewing

C. Male genitalia

Fig. 10 D-G. Spalangia fuscipes Nees, ♀

D. Head in frontal view

E. Antenna

F. Thorax

G. Forewing

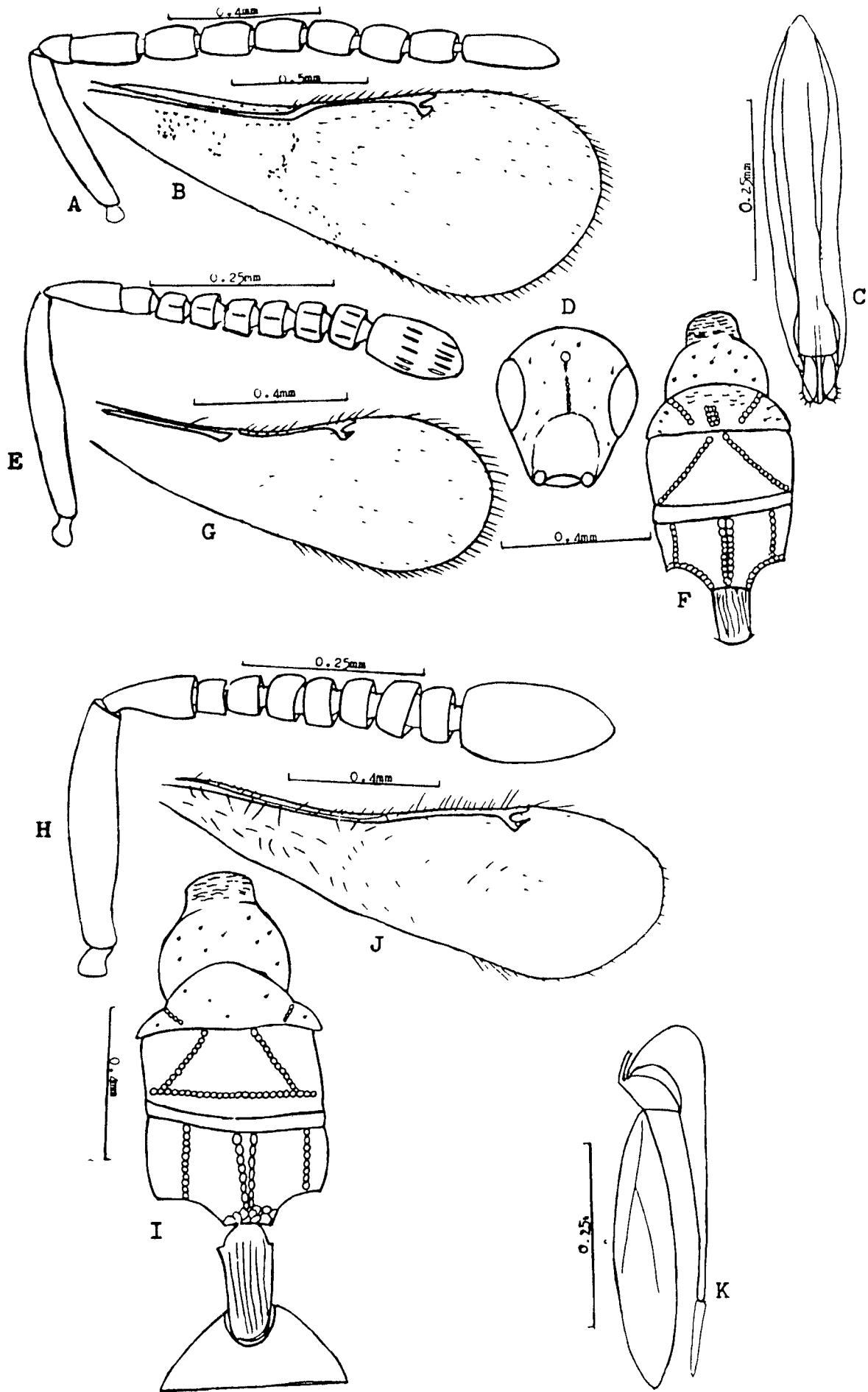
Fig. 10 H-K. Spalangia parfuscipes sp.n., ♀

H. Antenna

I. Thorax with basal gastral tergite

J. Forewing

K. Part of ovipositor



(Fig. 10)

G. SUBFAMILY ORMOCERINAE

Genus **SYSTASIS** Walker

Systasis Walker, 1834: 288.

Type species : Systasis encyrtoides Walker, by designation of Westwood, 1839: 70.

Paruriella Girault, 1913d: 308.

Type species : Paruriella australiensis Girault, by original designation.

Guieralia Risbec, 1951: 253.

Type species : Guieralia guierae Risbec, by monotypy.

Systasina Boucek, 1955: 324.

Type species : Systasina clavicornis Boucek, by original designation.

Systasis Walker; Graham. 1969: 257.

Peck (1963) placed Systasis under Tridymini of subfamily Pteromalinae. Peck et al (1964) transferred it under Pirenini of subfamily Miscogasterinae. Graham (1969) considered it to be a member of Ormocerini of Miscogasterinae. Boucek (1988) erected a new tribe Systasini for Systasis and Semiotellus, placing these under subfamily Ormocerinae. Mani (1989) accepted Graham, but considered Ormocerini a member of subfamily Ormocerinae. The present work agrees with Boucek.

It is a cosmopolitan genus, richly distributed in India, with some species quite abundant in all climatic conditions. It is represented by nearly 45 spp. from the world, including

8 spp. from India, according to present record. The members of this genus are known to attack various gall making Diptera.

Diagnostic Characters : Body with metallic green reflections; face with fine piliferous punctures; mandibles mostly 3-dentate; antennae inserted distinctly above the lower level of eyes, 12-segmented, with 5-segmented funicle and 2 anelli; pronotum small, rounded off anteriorly; mesoscutum with parapsidal grooves complete; forewing venations well developed, area below marginal vein with a row of long outstanding hairs separated by a bare space; propodeum short; gaster sessile; ovipositor slightly exerted with second valvifer thickened basally.

The genus is reported to contain eight species (including one new species and four new reports) from India. A key for their separation is given below.

Key to the Indian species of Systasis Walker based on females

1. Thorax strongly convex; antenna with all funicle segments much wider than long, pedicel as long as basal two funicle segments together i. S. cenchrivora Farooqi & Menon
- Thorax moderately convex; funicle segments not much wider than long 2
2. Forewing (Fig. 11C) with disc densely setose, with 10 outstanding setae below marginal vein, area between postmarginal

- and stigmal setose; in male, antennal scape (Fig. 11E) much flattened ii. S. tenuicornis Walker
- Forewing with disc sparsely setose, always with less than 10 setae below marginal vein, area between postmarginal and stigmal usually bare; in male, antennal scape never flattened 3
3. Mandibles heterodont, left 3- right 4-dentate with a small tubercle between second and third teeth; antenna with second anellus thick, wider than long; forewing with stigma round..... iii. S. dasyneurae Ahmad & Mani
- Both mandibles 3-dentate; antenna with second anellus distinctly transverse; forewing with stigma truncated..... 4
4. Forewing (Fig. 11J) with postmarginal vein slightly shorter than stigmal, area between postmarginal and stigmal slightly setose at the upper surface; antenna (Fig. 11I) with pedicel as long as basal two funicle segments together; mandible (Fig. 11H) with second and third teeth broadly truncated iv. S. aligarhensis sp.n.
- Forewing with postmarginal vein longer than stigmal, area between postmarginal and stigmal mostly bare; antenna with pedicel slightly to distinctly shorter than basal two funicle segments together; mandible with second and third teeth acute..... 5
5. Antenna (Fig. 12C) with scape reaching to or beyond the vertex, funicle segments of uniform thickness; gaster usually shorter than, occasionally as long as head and thorax together; in male, antenna with F1 longer than pedicel, all funicle

- segments distinctly longer than wide v. S. encyrtoides Walker
- Antennal scape not reaching the vertex, funicle segments gradually widening distad; gaster different; in male, antenna with F1 shorter than pedicel, funicle segments usually quadrate - **6**
6. Antenna (Fig. 12H) with pedicel distinctly longer than anelli plus F1 together; forewing (Fig. 12I) with marginal vein distinctly less than 2.0x as long as postmarginal; gaster 1.3 to 1.6x as long as wide vi. S. parvula Thomson
- Antenna with pedicel as long as anelli plus F1 together; forewing with marginal vein distinctly 2.0x as long as postmarginal; gaster nearly 2 to 2.3x as long as wide..... **7**
7. Forewing (Fig. 12M) with marginal vein about 3.0x as long as stigmal, area below stigma setose; ovipositor (Fig. 12N) with basal part of second valvifer much elongated, about 3.0x as long as first valvula; space below antennal toruli transversely reticulate..... vii. S. dalbergiae Mani
- Forewing (Fig. 12R) with marginal vein slightly more than 2.0x as long as stigmal, area below stigma bare; ovipositor (Fig. 12S) with basal part of second valvifer not much elongated, slightly less than 2.0x as long as first valvula; space below antennal toruli reticulate viii. S. angustula Graham

i. Systasis cenchrivora Farooqi & Menon

Systasis cenchrivora Farooqi & Menon, 1972: 111.

Systasis cenchrivora Farooqi & Menon; Boucek, Subba Rao &

Farooqi, 1978: 458.

Distribution : INDIA : Delhi, IARI.

ii. Systasis tenuicornis Walker

(Fig. 11A-F)

Systasis tenuicornis Walker, 1834: 297.

Systasis tenuicornis Walker; Graham, 1969: 260.

Material examined : 300_♀, 200^{♂♂}. INDIA: Uttar Pradesh, Nainital, 22.x.1990 (M. Yousuf).

Body length : 2.0 mm

Comments : This species has been recorded for the first time from India. It can be easily identified by following set of characters : Forewing (Fig. 11C) thickly setose without bare area between postmarginal-stigmal space, speculum large, reaching the end of marginal vein, relative lengths of marginal, postmarginal and stigmal in the ratio of 32:24:12; antenna (Fig. 11B) with scape hardly reaching the level of vertex, pedicel slightly more than 1.5x as long as wide (6.5:4), very slightly shorter than anelli and F1 together (6.5:7). Male with antennal scape (Fig. 11E) considerably flattened, 1.7x as long as wide (17:10), pedicel slightly longer than wide (6:5), slightly thicker than funicle segments (5:4); forewing (Fig. 11F) with marginal, postmarginal and stigmal in the ratio of 20:12:9.

iii. Systasis dasyneurae Ahmad & Farooqi

Systasis dasyneurae Ahmad & Mani, 1939: 535.

Distribution : INDIA: Bihar, Haryana, Madhya Pradesh and Punjab.

iv. Systasis aligarhensis sp.n.

(Fig. 11G-K)

Female. Length 1.75 mm. Body including gaster brown, with bright green reflections; ocelli, wing venation, maxillary palpi and ovipositor light brown; labial palpi and tarsi except last segment, pale; antennae, coxae and femora dark brown; tibiae honey yellow except hind ones with brown infuscation in the middle; head and thorax with fine piliferous punctures.

Head wider than long in facial view (40:35); ocelli arranged in obtuse triangle, POL 4.0x as long as OOL (12:3); eye nearly 1.4x as long as wide (16:11), twice as long as gena (16:8); malar sulcus distinct; clypeus straight; mandible (Fig. 11H) 3-dentate, second and third teeth broadly obtuse; antenna (Fig. 11I) 12-segmented with 5-segmented funicle and 2 anelli, inserted distinctly above the lower level of eyes, distinctly closer to median ocellus than clypeus (11:18), torular diameter slightly greater than intertorular distance (4:3), scape nearly 4.0x as long as wide (12:2.95) reaching the median ocellus, pedicel about 1.6x as long as wide (5:3), distinctly longer than anelli and F1 combined, funicle segments

slightly wider than long, F1 and F2 subequal slightly shorter than distal segments, club slightly less than 2.0x as long as wide (11:6), slightly longer than preceding three segments together.

Pronotum small, rounded off anteriorly; mesoscutum slightly more than 1.6x as wide as long (30:18) with parapsidal grooves complete; scutellum slightly longer than wide (12:10); propodeum narrow, less than half the length of scutellum (5:12), median carina and plicae present, nucha absent; forewing (Fig. 11J) hyaline, slightly more than 2.0x as long as wide (94:41), moderately setose, basal area with 1-2 hairs, space below marginal vein with nine long erect setae, marginal, postmarginal and stigmal in the ratio of 19:6:7, postmarginal-stigmal area bare except four setae at the upper surface; leg with middle tibial spur as long as the basitarsus (5:5), hind tibia 2 spurred.

Gaster as long as head and thorax together; female genitalia as shown in figure 11K.

Holotype Female, INDIA: Uttar Pradesh, Aligarh, 15.iii.1988 (Jamal Ahmad).

Comments : The new species differs from other Indian species in having postmarginal vein slightly shorter than stigmal, and other characters as given in the key. It runs close to S. parvula but can be easily separated on the basis of following differences:

S. parvula ThomsonS. aligarhensis sp.n.

- | | |
|---|--|
| 1. Antenna with scape reaching just short of median ocellus.
2. Pedicel nearly 2.0x as long as wide.
3. Forewing (Fig. 12I) with postmarginal longer than stigmal, six long setae below marginal vein.
4. Postmarginal-stigmal area absolutely bare. | 1. Antenna (Fig. 11I) with scape reaching beyond the median ocellus (12:11).
2. Pedicel 1.6x as long as wide.
3. Forewing (Fig. 11J) with postmarginal shorter than stigmal, nine long setae below marginal vein.
Postmarginal-stigmal area with four setae at upper surface. |
|---|--|

v. Systasis encyrtoides Walker

(Fig. 12A-E)

Systasis encyrtoides Walker, 1834: 296.Systasis encyrtoides Walker; Graham, 1969: 261.

Material examined : 300, 300^{↑↑}, INDIA: Uttar Pradesh, Aligarh, University Campus, 14.iii.1988 (Jamal Ahmad).

Comments : This species has been recorded for the first time from India. It can be easily separated from others by characters given in the key. Some additional characters are as follows : Forewing (Fig. 12D) moderately setose with seven outstanding setae below marginal vein, space between postmarginal-stigmal

usually bare, relative lengths of marginal, postmarginal and stigmal in the ratio of 25:12:9; ovipositor (Fig. 12E) with basal part of second valvifer about half as long as the total length of second valvifer (33:65) and 1.8x as long as first valvula (33:18).

vi. Systasis parvula Thomson

(Fig. 12F-J)

Systasis parvula Thomson, 1876: 205.

Systasis parvula Thomson; Graham, 1969: 263.

Material examined : 200₊₊. INDIA: Uttar Pradesh, Aligarh, 5.iii.1988 (Jamal Ahmad).

Comments : This species has been recorded for the first time from India. It runs well in Graham's key (1969:260) and can be easily identified by following combination of characters : Antenna (Fig. 12H) with scape reaching just short of median ocellus, pedicel slightly more than 2.0x as long as F1 and F2 separately (6.5:4), club as long as three preceding funicle segments together; forewing (Fig. 12I) sparsely setose, with speculum reaching below marginal and stigmal veins, area between postmarginal-stigmal almost bare, relative lengths of marginal, postmarginal and stigmal in the ratio of 20:12:8; legs with coxae and femora except apices brown, remaining parts yellowish, tibiae slightly infuscated.

vii. Systasis dalbergiae Mani

(Fig. 12K-N)

Systasis dalbergiae Mani, 1942: 157.

Material examined : 2♂♂. INDIA: Uttar Pradesh, Muzaffarnagar.
4.iii.1990 (M. Yousuf).

Some additional characters of this species are as follows:
Body bright green with violet hue on clypeus and thorax; eyes
coppery brown; antennal flagellum, pedicel, coxae and femora
dark brown; ocelli, scape, forewing venation, tibiae and last
tarsal segment light brown; rest of the tarsal segments whitish.
Head in dorsal view 3.3x as wide as thick (40:12), slightly
wider than thorax (40:38); POL 3.7x as long as OOL (15:4);
antenna (Fig. 12L) with scape 5.0x as long as wide (15:3),
pedicel as long as anelli + F1 combined, club as long as
preceding three funicle segments together; forewing (Fig. 12M)
with marginal, postmarginal and stigmal in the ratio of 24:12:8,
with nine outstanding setae below marginal vein.

viii. Systasis angustula Graham

(Fig. 12 O-S)

Systasis angustula Graham, 1969: 262.

Material examined : 3♂♂. INDIA: Uttar Pradesh, Nainital,
20.x.1990 (M. Yousuf).

Comments : This species has been recorded for the first time from India. It bears close resemblance with S. dalbergiae as well as S. parvula but can be easily separated on the basis of characters supplied in the key. Characters supplementary to those in the key are as follows: Body bright green; antennae blackish brown with scape testaceous; legs with coxae and femora except knees blackish with metallic green reflections, tibiae testaceous tarsi and knees of coxae and tibiae whitish pale. Ocelli arranged in obtuse triangle, POL 4.5x as long as OOL (9:2); eye about 1.3x as long as wide (12:9); malar space short, less than half the transverse diameter of an eye; forewing (Fig. 12R) like S. parvula, with relative lengths of marginal, postmarginal and stigmal in the ratio of 24:12:9; gaster as long as head and thorax together (40:40).

The Indian material runs well in the Graham's key (1969:260) and resembles with European in all respect except foretibiae without any stripe.

Fig. 11 A-D. Systasis tenuicornis Walker, ♀

A. Mandible

B. Antenna

C. Forewing

D. Part of ovipositor

Fig. 11 E-F. Systasis tenuicornis Walker, ♂

E. Antenna

F. Part of forewing

Fig. 11 G-K. Systasis aligarhensis sp.n., ♀

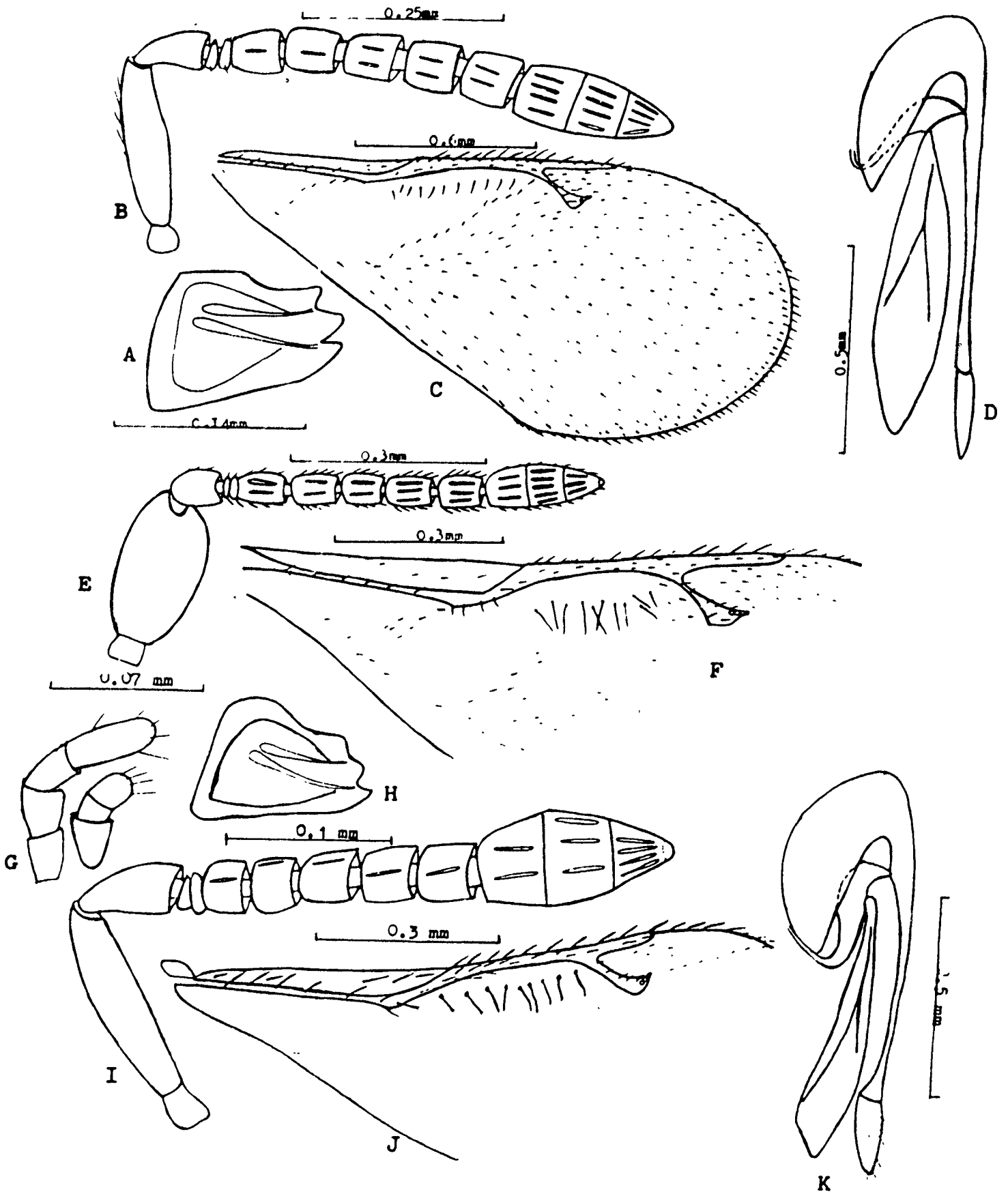
G. Maxillary & labial palpi

H. Mandible

I. Antenna

J. Part of forewing

K. Part of ovipositor



(Fig. 11)

Fig. 12 A-E. Systasis encyrtoides Walker, ♀

- A. Maxillary & labial palpi
- B. Mandible
- C. Antenna
- D. Part of forewing venation
- E. Part of ovipositor

Fig. 12 F-J. Systasis parvula Thomson, ♀

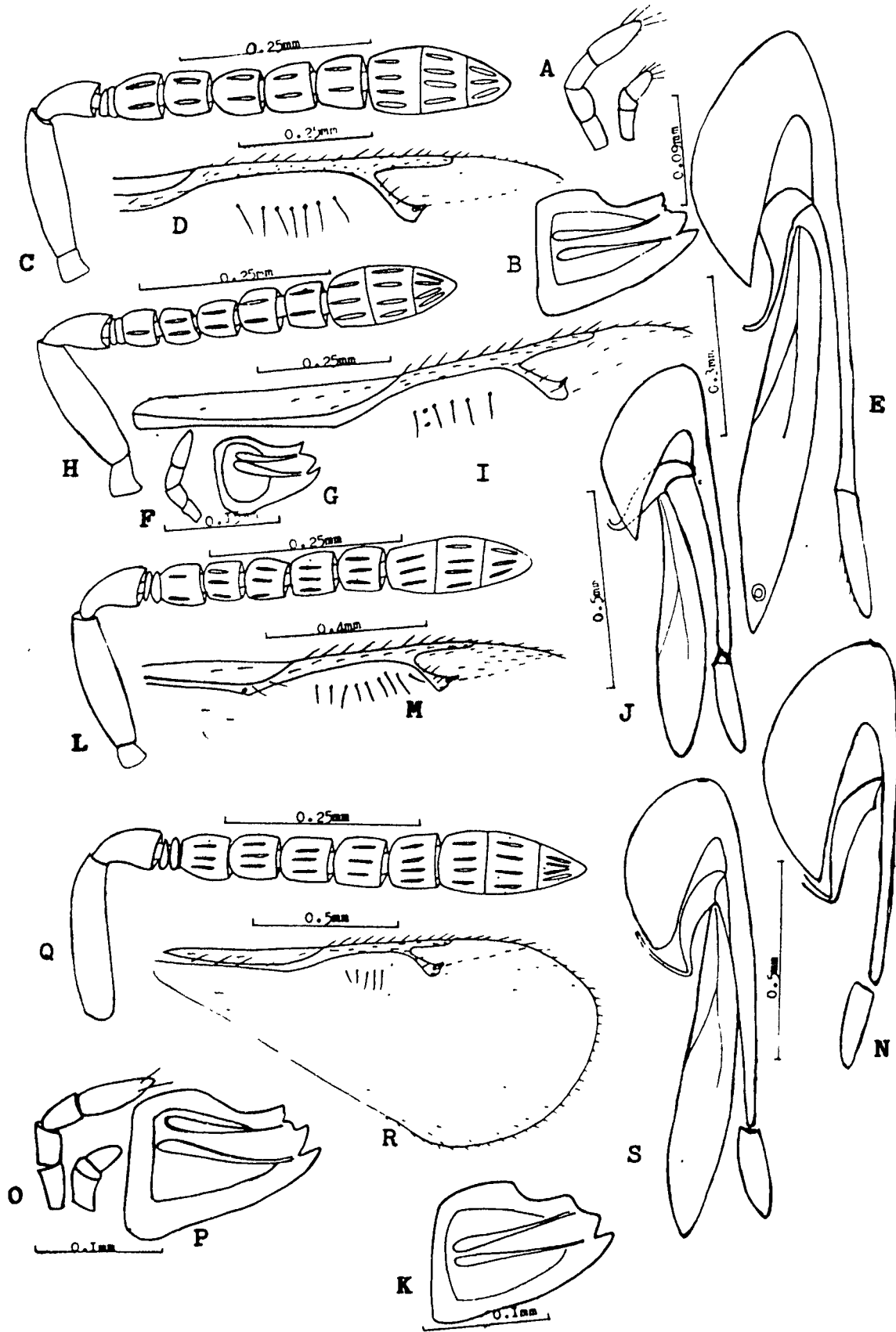
- F. Maxillary palpi
- G. Mandible
- H. Antenna
- I. Part of forewing venation

Fig. 12 K-N. Systasis dalbergiae Mani, ♀

- K. Mandible
- L. Antenna
- M. Part of forewing venation
- N. Part of ovipositor

Fig. 12 O-S. Systasis angustula Graham, ♀

- O. Maxillary & labial palpi
- P. Mandible
- Q. Antenna
- R. Forewing
- S. Part of ovipositor



(Fig. 12)

H. SUBFAMILY PANSTENONINAE

Genus **PANSTENON** Walker

Panstenon Walker, 1846: 29.

Type species : Miscogaster oxylus Walker, 1839 by monotypy.

Caudonia Walker, 1850: 125.

Type species : Caudonia agylla Walker, by monotypy.

Panstenon Walker; Graham, 1969: 92.

Panstenon Walker; Boucek, 1976: 17.

Walker (1846) placed this genus under Pteromalidae. Foerster (1856) transferred it under his family Miscogastroidae. Thomson (1878) treated it together with Dipara Walker, in his subtribe Diparides of Pteromalina. Ashmead (1904) put these two genera under Diparinae. Erdos (1955) assigned a new subfamily Panstenoninae for Panstenon and Neodipara. Kerrich & Graham (1957) included Panstenon under Cleonymidae. Graham (1969) approved Erdos' (1955) idea of placing Panstenon Walker under a separate subfamily Panstenoninae, but excluded Neodipara. The systematic position of Panstenon Walker after Graham (1969), continues to be acceptable.

This genus can be easily identified by having long and narrow forewing. It is represented by about 13 spp. from the world, with P. oxylus and P. agylla being more common in Europe and elsewhere. This genus is reported for the first time from India.

Diagnostic Characters : Body dark with metallic green reflections; clypeus curved forwards; eyes bare; mandibles 4-dentate; maxillary and labial palpi 4- and 3-segmented respectively; antennae inserted distinctly above the lower level of eyes, 13-segmented with 6-segmented funicle and 2 anelli; pronotum long, usually carinate anteriorly, rarely indistinct or rounded off; thorax arched; mesoscutum with parapsidal grooves incomplete; scutellum with or without frenal groove; propodeum alveolate-rugose; nucha small; forewings narrow, about 3.4 times longer than wide, costal cell much narrower, marginal and postmarginal each much longer than stigmal vein, speculum absent; hind tibiae with one spur; gaster shortly petiolate; ovipositor nearly hidden.

This genus is known to contain a single species from India.

Panstenon oxylus (Walker)

(Fig. 13A-E)

Pteromalus assimilis Nees, 1834: 116.

Miscogaster oxylus Walker, 1839: 196.

Pteromalus omissus Foerster, 1841: 30.

Panstenon oxylus Walker, 1846: 29.

Panstenon pidius Walker, 1850: 132.

Panstenon oxylus Walker; Graham, 1969: 94.

Material examined : 400, 10[♂]. INDIA: Orissa, Pipli, 12.x.1988
(Jamal Ahmad).

Body length : 2.6 mm (Female).

Comments : This species has been recorded for the first time from India, and can be easily identified on the basis of following set of characters: Eyes large; pronotal collar carinate anteriorly; scutellum with frenal groove finely impressed; gastral petiole without erect hairs. Additional characters are as follows: Head in dorsal view about 3.0x as wide as long (52:17), much wider than thorax (52:36); ocelli with POL 1.6x as long as OOL (13:8); antennal scape exceeding well beyond the vertex, slightly longer than the length of an eye (25:22); forewing (Fig. 13D) with relative lengths of marginal, postmarginal and stigmal in the ratio of 42:45:1; gastral petiole without erect hairs.

The Indian material though resembles European species but differs in having pronotum yellowish tinged, gaster not sunken dorsally and usually with elongated yellow patch medially. It also resembles closely with African species *P. collaris* Boucek, in colours of pronotum, legs, petiole, gaster as well as some morphometrical ratios, such as size of eyes, relative distances of antennal toruli from clypeus and median ocellus, but differs markedly in having reticulated carinate pronotum and gastral petiole without erect hairs.

Fig. 13 A-E. Panstenon oxylus Walker, ♀

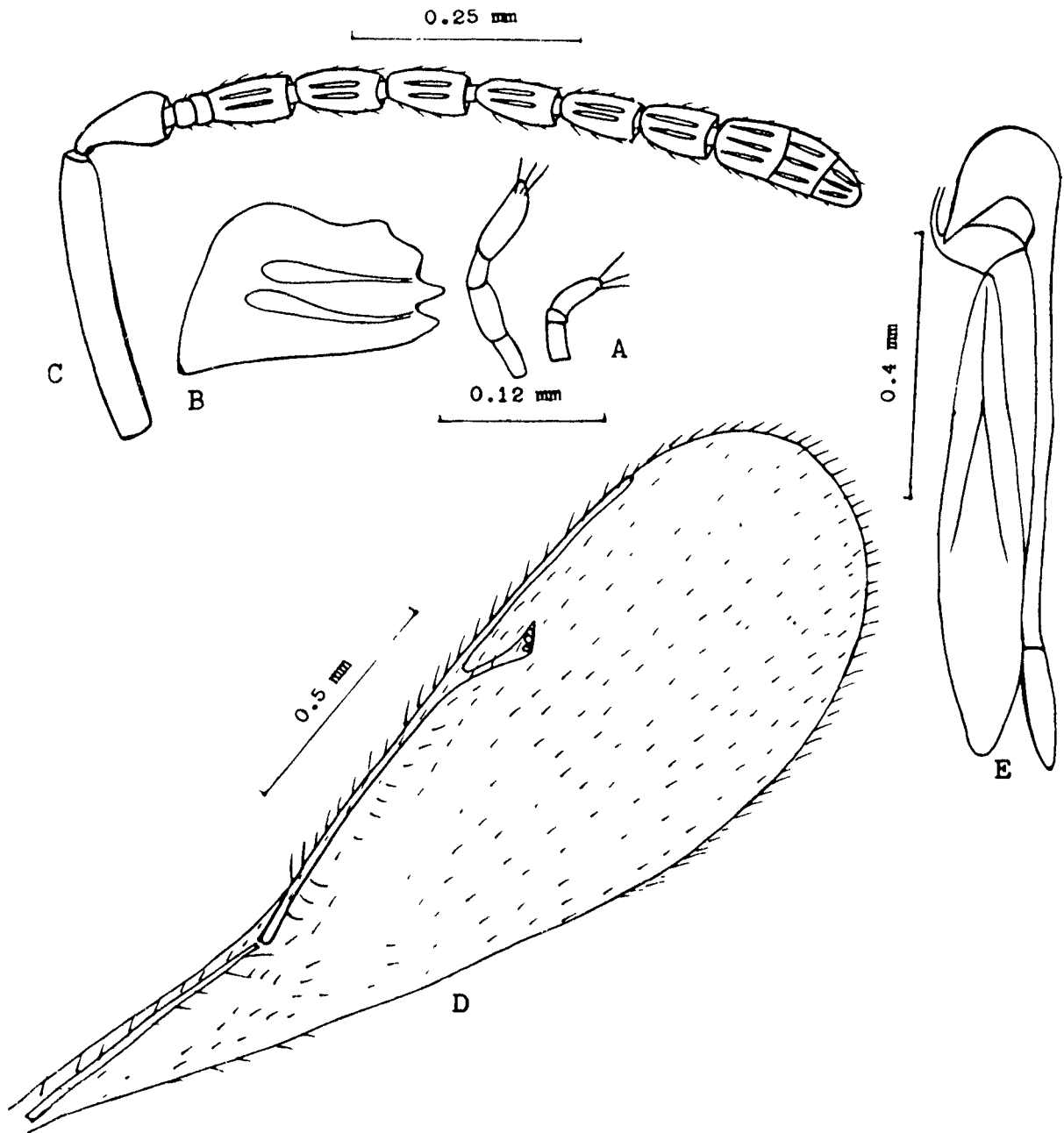
A. Maxillary & labial palpi

B. Mandible

C. Antenna

D. Forewing

E. Part of ovipositor



(Fig. 13)

I. SUBFAMILY PIRENINAE

Genus **TRIGONODEROPSIS** Girault

Trigonoderopsis Girault, 1915d: 210.

Type species : Trigonoderopsis silvensis Girault, by monotypy.

Trigonoderopsis Girault; Boucek, 1988: 474.

The genus Trigonoderopsis seemed rather confined to Australian region only, until recently its discovery from India, with a new species. So far three species (including one new) are known under this genus. Boucek (1988) suggested its alliance with subfamily Pireninae, because of its close resemblance with Gastrancistrus, in characters of broad clypeus, long mandibles with diverging teeth and some thoracic structures. Important differences however, like unusual pattern of wing venation (Fig. 14E), 6-segmented funicle and first anellus microscopic help Trigonoderopsis enjoy a separate entity.

Diagnostic Characters : Body coppery brown, with dull reflections; mandibles 4-dentate; maxillary and labial palpi 4- and 3-segmented respectively; antennae inserted slightly above the lower level of eyes, 13-segmented, with 6-segmented funicle and 2 anelli; clypeus moderately arcuate; pronotum rounded off anteriorly; mesoscutum with parapsidal grooves complete; scutellum with frenal groove present; propodeum with nucha absent; forewing hyaline, with marginal vein much longer than postmarginal and stigmal separately; hind tibia with one spur; gaster sessile; ovipositor hidden.

Comments : The genus Trigonoderopsis Girault is recorded for the first time from India, with T. bouceki sp.n., its representative.

Trigonoderopsis bouceki sp.n.

(Fig. 14A-E)

Female : Length 1.5 mm. Body coppery brown with dull reflections; head brown, with lower face more shiny; eyes, ocelli, forewing venation, tibiae and tarsi whitish pale; antennae, mouth parts and ovipositor pale yellow; coxae and femora yellow.

Head (Fig. 14A) slightly wider than long in facial view (30:26), wider than thorax (30:25); sculpture finely alutaceous; ocelli arranged in obtuse triangle, POL as long as OOL (6:6); eye bare, 1.5x as long as wide (15:10); gena slightly less than eye-width (8:10), malar sulcus present; clypeus broadly arcuate anteriorly; mandible (Fig. 14C) 4-dentate, with diverging teeth; maxillary and labial palpi (Fig. 14B) 4- and 3-segmented respectively; antenna (Fig. 14D) inserted slightly above the lower level of eyes, toruli closer to clypeus than median ocellus (11:13), intertorular distance slightly less than half the torulo-ocular distance, 13-segmented, with 6-segmented funicle and 2 anelli, scape 4.0x as long as wide (12:3), pedicel slightly longer than wide (4:3), longer than anelli and F1 together, first anellus small, microscopic, funicle segments subequal in length,

subquadrate, except F1 distinctly shorter than rest (2:3), club 3.0x as long as wide (15:5) longer than preceding three segments together, flagellum plus pedicel slightly longer than width of head (34:30), the former with erect hairs.

Thorax 2.3x as long as wide (59:25); sculpture as on head but raised from general surface, except scutellum and propodeum finely engraved; pronotum half as long as wide (10:20) narrower than mesoscutum (20:25), rounded off anteriorly; mesoscutum nearly 1.4x as wide as long (25:17) with parapsidal grooves deep, complete; scutellum slightly longer than wide (15:12) with distinct frenal groove; propodeum nearly half as long as wide (13:25) with distinct median carina forking behind, spiracle separated from propodeal edge by more than its width (2.25:1.5); nucha indistinct; forewing (Fig. 14E) hyaline, moderately setose, marginal, postmarginal and stigmal in the ratio of 32:16:6, 11 distinct long setae below marginal vein separated by a bare strip, stigma slightly large, remaining characters as in figure; leg with mid-tibial spur slightly longer than basitarsus (6:5); hind tibia with one spur.

Gaster sessile, shorter than thorax (53:59), petiole indistinct, ovipositor hidden, with second valvifer indistinctly articulated with third valvula.

Holotype Female. INDIA: Uttar Pradesh, Aligarh, 5.v.1987 (Jamal Ahmad).

Comments : The present species bears some resemblance with T. silvensis Girault, but can be easily separated on the basis of differences tabulated below :

T. silvensis Girault

T. bouceki sp.n.

- | | |
|--|---|
| 1. Clypeus moderately emarginate anteriorly. | 1. Clypeus broadly arcuate anteriorly. |
| 2. Antennae inserted at the lower level of eyes. | 2. Antennae inserted slightly above the lower level of eyes. |
| 3. Pedicel slightly shorter than anelli and F1 combined, the latter as long as F2. | 3. Pedicel longer than anelli and F1 together, the latter distinctly shorter than F2. |
| 4. Club oval, about 1.5x as long wide. | 4. Club 3.0x as long as wide. |
| 5. Forewing basally and post-marginal stigmal area bare. | 5. Forewing basally and post-marginal stigmal area setose. |

Fig. 14 A-E. Trigonoderopsis bouceki sp.n., ♀

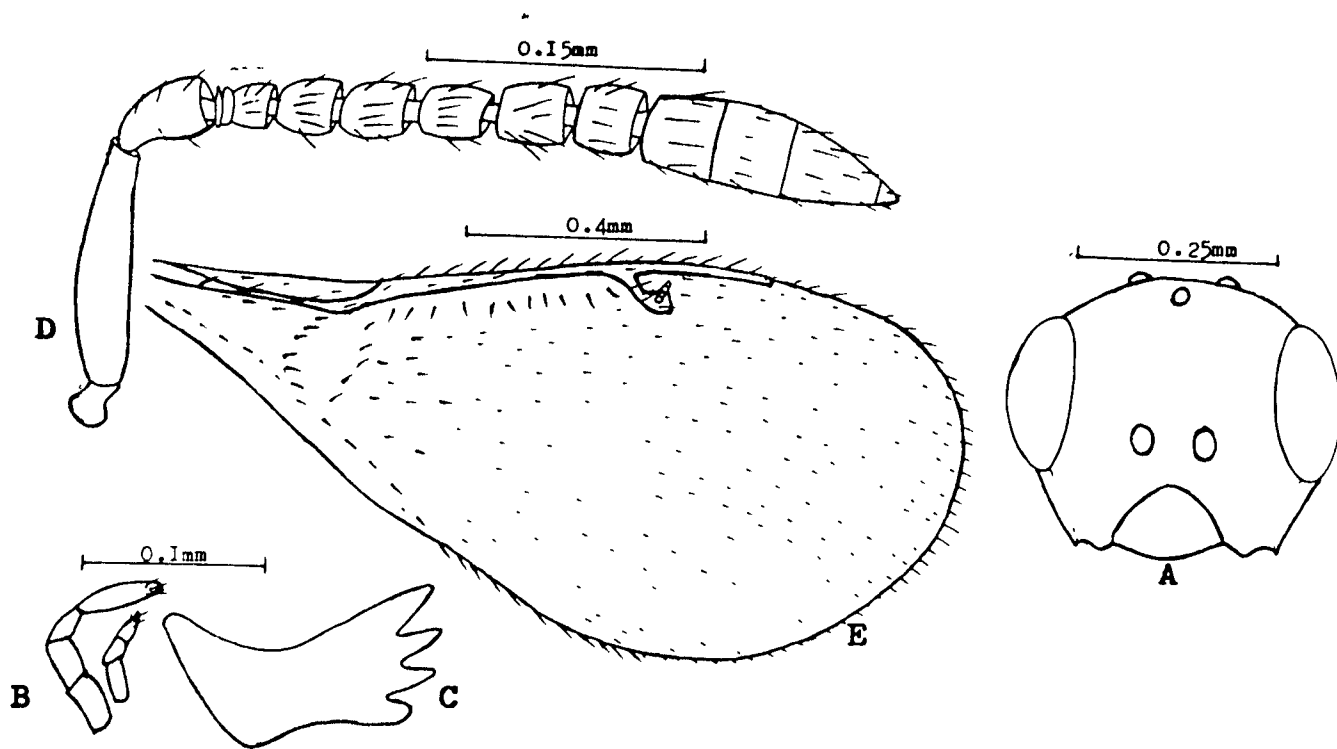
A. Head in frontal view

B. Maxillary & labial palpi

C. Mandible

D. Antenna

E. Forewing



(Fig. 14)

Genus **ECRIZOTOMORPHA** Mani

Ecrozotomorpha Mani, in Ahmad & Mani, 1939.

Type species : Ecrizotomorpha taskhiri Mani, by monotypy and original designation.

Ecrizotomorpha Mani; Farooqi & Subba Rao, 1986: 287.

The identity of this genus has been a subject of discussion because of having mixed characters of many genera and its restricted distribution in India only, with no record from rest of the world so far; however its alliance with subfamily Pireninae is quite acceptable. It closely resembles Ecrizotes and Spathopus in characters, such as stout and compressed fore tibiae armed with strong spines, hind tibiae slightly compressed, and antennae moniliform in male. Prominent differences like eyes pubescent; antennae without anellus, with funicle segments F1 and F3 anelliform, club with three distinct spines; clypeus arcuate and 3-segmented palpi, however, mark it out as distinct genus.

Diagnostic Characters : Body dorsally compressed, with or without metallic reflections; head thin at vertex, wider than long in facial view; eyes pubescent; clypeal margin arcuately produced; mandibles 4-dentate; maxillary and labial palpi 3- and 2-segmented respectively; antennae clavate, inserted below lower level of eyes, 10-segmented, with 5-segmented funicle, F1 and F3 anelliform, club large with terminal end provided with

three stout spines, anelli absent; pronotum rounded off anteriorly; fore tibiae compressed, armed with 4-5 stout spines at its outer edge; hind tibiae with one spur; gaster sessile; ovipositor exerted.

Comments : Mani (1989:536) synonymized Ecrizotomorpha with Herbertia on the basis of just few superficial resemblances, such as pubescent eyes; lower insertion of antennae, large pedicel and dorsally compressed body. Differences however, between these two genera as tabulated below are too great to provide any ground for synonymy.

Herbertia Howard

Ecrizotomorpha Mani

- | | |
|---|--|
| 1. Body densely setose, setae arising from elevated papillae. | 1. Body sparsely setose, setae not arising from papillae. |
| 2. Antenna with one anellus; funicle segments never anelliform. | 2. Antenna without anellus; funicle segments F1 and F3 anelliform. |
| 3. Clypeus straight. | 3. Clypeus arcuate. |
| 4. Stigmal vein upcurved, about one-sixth the marginal vein. | 4. Stigmal vein normal, less than one-third the marginal vein. |
| 5. Gaster with basal fovea. | 5. Gaster without basal fovea. |
| 6. Gena carinate posteriorly. | 6. Gena rounded off posteriorly. |

The genus is known to contain two species (including one new) from India. A key for their separation is given below:

Key to Indian species of Ecrizotomorpha Mani based on females

1. Ocelli arranged in a line; scutellum without frenum; forewing with marginal vein about two-third the submarginal, postmarginal somewhat shorter than stigmal; body non-metallic; length 0.9-1.5 mm. i. E. taskhiri Mani
- Ocelli arranged in obtuse triangle; scutellum with frenum present; forewing with marginal vein one-half the submarginal, postmarginal as long as stigmal; body with metallic reflections; length 1.5-2.0 mm. ii. E. tenkasiensis sp.n.

i. Ecrizotomorpha taskhiri Mani

Ecrizotomorpha taskhiri Mani, in Ahmad & Mani, 1939: 537.

Ecrizotomorpha taskhiri Mani; Pruthi & Mani, 1940: 9.

Ecrizotomorpha taskhiri Mani; Boucek, Subba Rao & Farooqi, 1978: 442.

Distribution : INDIA. Bihar; Pusa, Haryana.

Comments : Mani (1989) transferred Ecrizotomorpha under Herbertia, synonymized Herbertia indica Burks with E. taskhiri Mani. The present study however, after a thorough comparison between species aforesaid, rejects the idea of specific synonymy, and also views the shifting of his genus under Herbertia quite

baseless, owing to vast generic differences, as already discussed.

ii. *Ecrizotomorpha tenkasiensis* sp.n.

(Fig. 15A-E)

Female. Length 1.4 mm. Body black with metallic green reflections; eyes rusty brown; ocelli, antennae except infuscated base of pedicel and antero-dorsum of scape, mouth parts, wing venation, tibiae, tarsi and ovipositor light brown; coxae and femora fuscous; propodeum shiny green; body sculpture finely engraved, with sparsely distributed piliferous punctures on head and thorax.

Head thin at vertex, slightly wider than long in facial view (27:25); ocelli arranged in obtuse triangle, POL 2.0x as long as $\acute{O}OL$ (8:4); eyes pubescent, about 1.6x as long as wide (15:9), 3.0x as long as gena; malar sulcus distinct; clypeus shiny, anteriorly produced; mandible (Fig. 15B) 4-dentate; maxillary and labial palpi (Fig. 15A) 3- and 2-segmented respectively; antenna (Fig. 15C) 10-segmented, inserted slightly below the lower level of eyes, toruli distinctly closer to clypeus than median ocellus; scape slightly less than 3.0x as long as wide (10:3.5), not reaching the median ocellus; pedicel short, slightly longer than wide (4:3) a little shorter than F1 and F2 combined; anelli absent; flagellum with F1 and F3 anelliform, remaining funicle segments distinctly wider than long; club slightly less than 2.0x as long as wide, as long as preceding

four funicle segments together, apical end with three strong spines, one median and two laterals.

Thorax compressed, about 1.3x as long as wide (38:28); pronotum rounded off anteriorly; mesoscutum slightly more than 2.0x as wide as long (28:13), parapsidal grooves deep, complete; scutellum slightly longer than wide (14:13), frenal groove present; propodeum 4.8x as wide as long (24:5), median carina, plicae and nucha altogether absent; forewing (Fig. 15D) hyaline, submarginal vein broken before meeting marginal, relative lengths of marginal postmarginal and stigmal in the ratio of 17:7:6, remaining characters as in figure; leg with fore tibia moderately compressed, slightly less than 4.0x as long as wide (11:13), armed with 4-5 stout spines at its distal outer edge.

Gaster sessile, shorter than thorax (32:38), basal tergite 2.0x as long as preceding tergite; ovipositor (Fig. 15E) exerted.

Holotype Female. INDIA: Tamil Nadu, Tenkasi 4.iv.1987 (M. Yousuf). **Paratypes** 2♀ (same data as above). INDIA: Haryana 15.ii.1991 (M. Yousuf).

Comments : The new species runs close to E. taskhiri Mani, but differs in characters as provided in the key.

Genus **GASTRANCISTRUS** Westwood

Gastrancistrus Westwood, 1833:444.

Type species : Gastrancistrus vagens Westwood,
by monotypy.

Glyphe Walker, 1834:168.

Type species : Glyphe autumnalis Walker by
monotypy.

Tridymus Ratzeburg, 1848:183.

Type species : Tridymus aphidum Ratzeburg, by
designation of Gahan & Fagan, 1923:148.

Tripedias Foerster, 1856:60.

Type species : Gastrancistrus (Tripedias)
tripedias Boucek, 1964.

Roptroceropeus Girault, 1913d:309.

Type species: Roptroceropeus albicornis Girault,
by original designation.

Isoplata Girault, 1913d:312.

Type species : Isoplata geniculata Girault, by
original designation. Preoccupied by Isoplata Foerster,
1856.

Parerotolepsia Girault, 1915c:194.

Type species : Parerotolepsia auripes Girault,
by monotypy.

Proplesiostigma Girault, 1915e:280.

Type species : Proplesiostigma unfasciatum
Girault, by original designation.

Isoplatella Gahan & Fagan, 1923:76. Replacement name for Isoplata Girault.

Muscideomyia Girault, 1915b:325.

Type species: Muscideomyia nigricyanea Girault, by original designation.

Gastrancistrus Westwood; Graham, 1969:270.

Peck (1964) placed this genus under Pirenini of subfamily Tridyminae. Graham (1969) considered it a member of tribe Ormocerini of subfamily Miscogasterinae approved by Boucek, Subba Rao & Farooqi (1978). Later on, Boucek (1988) shifted it under Pireninae.

This genus is widely distributed in North America, Europe and Australia comprising nearly 130 species. India contains three species (including one new species) known so far. These are usually parasites of Cecidomyiidae in their galls.

Diagnostic characters : Body with metallic green reflections; mandibles usually 4-dentate, rarely heterodont or bidentate; maxillary and labial palpi 4- and 3-segmented respectively; antennae inserted slightly above the lower level of eyes, 11-segmented, with 5-segmented funicle and one anellus; clypeus usually medially produced, truncate or emarginate, sometimes dentate; pronotum with or without carina; mesoscutum with parapsidal grooves complete; scutellum with or without frenal groove; propodeum without nucha;

forewings hyaline, marginal vein longer than postmarginal and stigmal separately; hind tibiae with one spur; gaster subsessile or sessile; ovipositor hidden or exserted.

The genus is reported to contain three species (including one new species) from India. A key to their separation is given below:

**Key to the Indian species of Gastrancistrus Westwood,
based on females**

1. Eyes unusually angularly produced; mandibles bidentate; ovipositor not exserted..... i. G. cherryi Boucek
- Eyes normal, not angularly produced; mandibles quadridentate; ovipositor exserted..... 2
2. Antenna with F1 distinctly longer than wide, about twice as long as pedicel, segments F2-F3 longer than wide, F4 & F5 quadrate, club as long as preceding two funicle segments together; forewing with stigma normal; scutellum distinctly longer than mesoscutum; propodeum with well developed median carina; ovipositor slightly exserted..... ii. G. muneswari Yadav
- Antenna (Fig. 15H) with F1 transverse, about one-third as long as the pedicel, remaining segments strongly wider than long, club longer than preceding three funicle segments together; forewing (Fig. 15I) with stigma moderately knobbed; scutellum shorter than

mesoscutum in length (18:20); propodeum without median carina; ovipositor much exerted, as long as fore tibiae..... iii. G. agarwali sp.n.

I. Gastrancistrus cherryi Boucek

Gastrancistrus cherryi Boucek, 1986:399.

Distribution : INDIA : Karnataka. Bangalore.

ii. Gastrancistrus muneswari Yadav

Gastrancistrus muneswari Yadav, 1978:466.

Gastrancistrus mangiferae Subba Rao, 1981:476..

Distribution : INDIA: Bihar, Sabour, on mango stem gall midge, Oligotrophus mangiferae (Kieffer).

III. Gastrancistrus agarwali sp.n.

(Fig. 15F-I)

Female. Length 1.37 mm. Body with bright green reflections; head brownish with green reflections; eyes bare, rusty brown; ocelli, pedicel and scape honey yellow; antennal flagellum light brown; mandibles brown, teeth darkly infuscated; maxillary palpi, wing venation and legs except infuscated coxae whitish pale; ovipositor blackish brown.

Head wider than long in facial view; ocelli arranged in obtuse triangle, POL distinctly longer than

OOL; eye nearly 1.4x as long as wide (18:13), distinctly longer than the length of gena; malar sulcus distinct; anterior margin of clypeus arcuate; mandible (Fig. 15G) long, 4-dentate with outer tooth longest, third tooth much reduced; maxillary and labial palpi (Fig. 15F) 4- and 3-segmented respectively; antenna (Fig. 15H) slightly clavate, 11-segmented with 5-segmented funicle and one anellus, inserted slightly above the lower level of eyes, inter-torular distance equal to torular diameter (3:3), scape slightly less than 4.0x as long as wide (11:3), pedicel as long as wide (4:4) as long as anellus and F1+F2 combined, F1 strongly transverse distinctly shorter than F2, flagellar segments in following dimensions (L:W): F1(1.2:3), F2(2.5:4), F3(3:4), F4(2.5:4), F5(4:4.5) and club (9.5:5).

Thorax slightly more than 1.8x as wide as long (53:29); sculpture finely reticulate, not raised from general surface; pronotum 2.6x as wide as long (26:10), rounded off anteriorly; mesoscutum slightly less than 1.5x as wide as long (29:20) with fine piliferous punctures, parapsidal grooves complete; mesopleuron distinctly marked off from mesepisternum; scutellum 1.2x as long as wide (18:15), frenal groove present, frenum twice as long as propodeum (6:3); propodeum shiny, reticulation finely engraved, medially thin, without plicae and

median carina, nucha absent; forewing (Fig. 15I) hyaline, sparsely setose, basally bare, venations moderately thickened, marginal, postmarginal and stigmal in the ratio of 12:9:6, stigma moderately knobbed; leg with mid-tibial spur longer than the basitarsus; hind tibia with one spur.

Gaster shorter than thorax (45:53), 3.0x as long as wide (45:15), tergites at their hind margins with a row of setae; ovipositor distinctly exserted, the exserted part as long as fore tibia (18:18).

Holotype Female. INDIA: Rohtak 1.iv.1991 (M. Yousuf).

Comments: The new species differs from other Indian species in having scutellum shorter than mesoscutum (18:20) and ovipositor much exserted, and from European in following combination of characters: antenna with F1 transverse, distinctly shorter than F2; forewing venation moderately thickened, stigmal vein about half as long as marginal.

Fig. 15 A-E. Ecrizotomorpha tenkasiensis sp.n., ♀

A. Maxillary & labial palpi

B. Mandible

C. Antenna

D. Forewing

E. Part of ovipositor

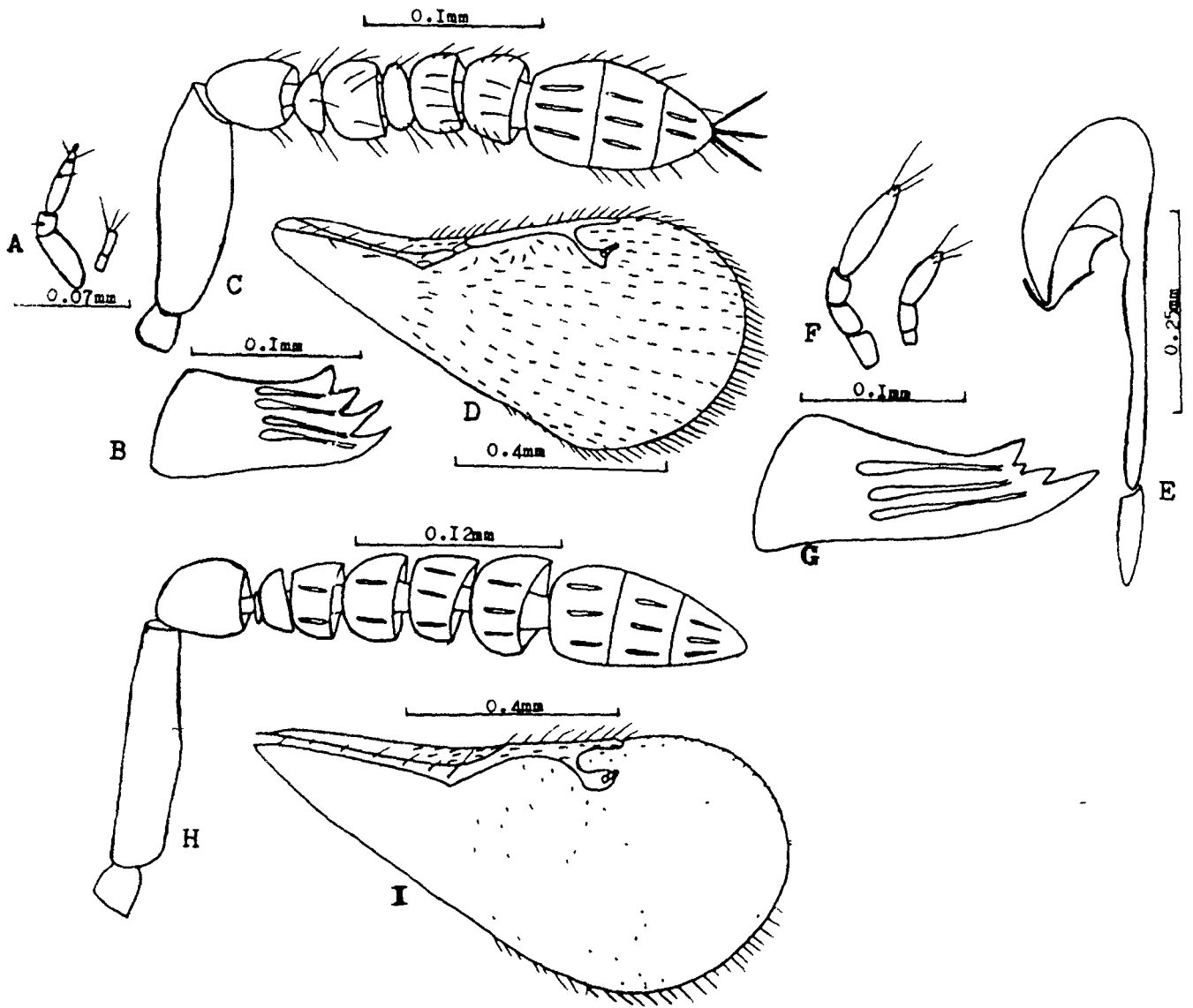
Fig. 15 F-I. Gastrancistrus agarwali sp.n., ♀

F. Maxillary & labial palpi

G. Mandible

H. Antenna

I. Forewing



(Fig. 15)

J. SUBFAMILY MISCOGASTERINAE

Genus **MERISMUS** Walker

Merismus Walker, 1833: 371.

Type species : Merismus rufipes Walker, by designation of Westwood, 1839: 68.

Kentema Delucchi, 1953 : 218.

Type species : Lamprotatus ovatus Walker (recte Miscogaster ovata Walker).

Stylomerismus Graham, 1969: 176 (as subgenus).

Type species : Merismus rufipes Walker, by original designation.

Merismus Walker; Graham, 1969: 171.

Associated with Miscogasterini of subfamily Miscogasterinae, this genus resembles closely with Rhynocoelia and Stictomischus in various respects. It however differs from the former in having pronotum carinate, gaster distinctly petiolate and antennal club with longitudinal band of micropilosity; and with the latter in having forewing with stigma normal, propodeum rugulosely alveolate and gastral petiole with antero-lateral crests. It is known to be reported from Europe (5 spp.), Africa (2 spp.) and Indian subcontinent (2 unidentified spp.), the latter, as recorded by Boucek, Subba Rao & Farooqi (1978:445). The present species is described for the first time from India.

Diagnostic Characters : Body with metallic green reflections; anterior margin of clypeus asymmetrically 3-dentate; mandibles

heterodont, right 4- left 3-dentate; antennae inserted above lower level of eyes, 13-segmented with 6-segmented funicle and 2 anelli, club with a longitudinal band of micropilosity; pronotum anteriorly carinate; mesoscutum with parapsidal grooves complete; scutellum with a distinct frenal groove; propodeum rugulosely alveolate; nucha small; forewing hyaline, postmarginal vein usually longer than marginal and stigmal; hind tibiae with one spur; gaster petiolate; ovipositor slightly exerted.

Merismus indicus sp.n.

(Fig. 16A-E)

Female. Length 2.12 mm. Body bright green, eyes bare, rusty brown; lateral ocelli and mouth parts yellowish brown except mandibles reddish brown; median ocellus, antennae excluding scape, forewing venation and last tarsal segment brown; scape and legs excluding coxae testaceous; antennal sensillae white; coxae shiny, concolorous with thorax.

Head (Fig. 16A & B) wider than long in facial view (47:37), distinctly wider than thorax (47:37) sculpture reticulate, slightly raised from general surface, lower face moderately engraved; ocelli arranged in obtuse triangle, POL longer than OOL (11:7); eye slightly more than 1.4x longer than wide (22:15); malar sulcus present; gena shiny smooth, slightly less than half as long as eye-length (10:22), slightly compressed at the base of mandibles; clypeus smooth, asymmetrically 3-dentate, with left lobe

unequally toothed; oral fossa 2.0x as long as gena (20:10); mandibles heterodont, right 4-left 3-dentate; maxillary and labial palpi 4- and 3- segmented respectively; antenna (Fig. 16C) 13-segmented, inserted distinctly above lower level of eyes, toruli closer to clypeus than median ocellus (12:16), inter-torular distance one-third of torulo-ocular length (3:9), combined length of flagellum and pedicel distinctly longer than width of head (63:47), scape 3.5x as long as wide (14:4) reaching just below median ocellus, pedicel 1.5x as long as wide (6:4) slightly longer than F1, funicle 6-segmented, F1-F3 each longer than wide (5:4), F4-F5 quadrate (5:5), F6 distinctly wider than long (7:4.5), club slightly more than 2.0x as long as wide (19:9) longer than preceding three funicle segments together, with a longitudinal band of micropilosity reaching mid of basal segment.

Pronotum smooth, strongly carinate, 9.0x as wide as long (27:3), narrower than mesoscutum (27:37); mesoscutum 1.8x as wide as long (37:20), reticulately sculptured, area below collar and parapsides alutaceous, parapsidal grooves complete; scutellum as long as wide (20:20) with punctate frenal groove; metanotum shiny smooth; propodeum 2.3x as wide as long (30:13), rugulosely alveolate, median carina and plicae indistinct; nucha absent; forewing (Fig. 16D) 2.3x as

wide as long (70:30), hyaline, moderately setose with an enclosed speculum below parastigma, costal cell hairy, marginal, postmarginal and stigmal in the ratio of 26:34:13, remaining characters as in figure; leg with mid-tibia cylindrical, 14.0x as long as wide (42:3) with spur slightly more than half the basitarsus (6:11); hind tibia with one spur.

Gaster (Fig. 16E) excluding petiole nearly 1.8x as long as wide (66:35) distinctly longer than thorax (66:58), basal tergite less than half the length of next tergite (10:24); petiole granulate with antero-lateral crests slightly less than 3.0x as long as wide (20:7); ovipositor slightly exserted.

Holotype Female. INDIA:Uttar Pradesh, Nainital, 28.x.1990 (M. Yousuf).

Comments : The new species differs from the known European species (Graham, 1969:171) in having gaster with basal tergite distinctly shorter than the second. It however resembles M. megapterus and M. splendens in some respect. The former differs in having temple more convergent; axilla with inner angle with raised reticulation; gena behind malar sulcus reticulate; gaster with basal tergite as long as following five tergites together; splendens differs in having basal tergite of gaster as long as remaining tergites together; petiole shorter than propodeum; ocelli of same colour; club shorter than preceding three funicle segments together.

Fig. 16 A-E. Merismus indicus sp.n., ♀

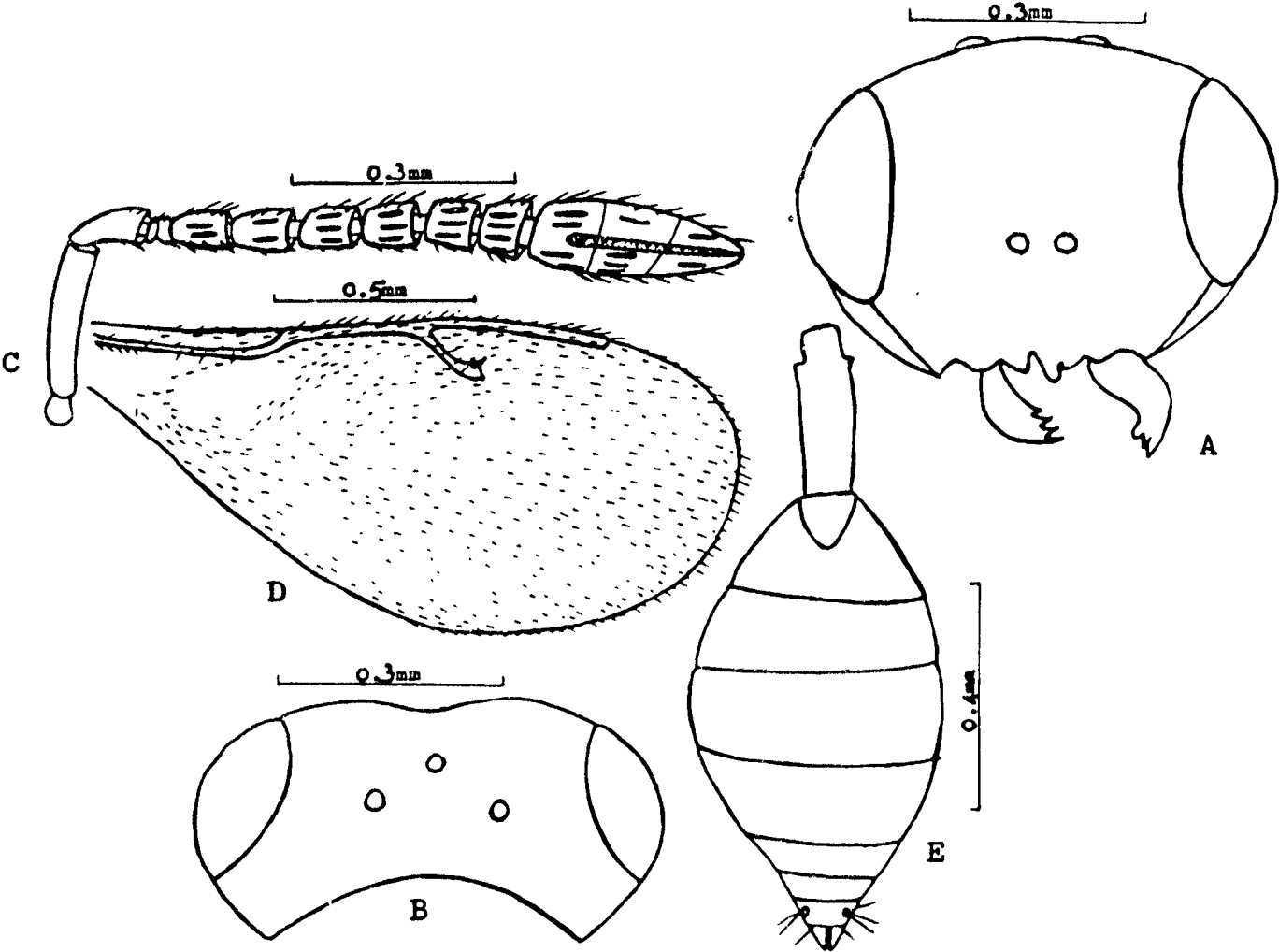
A. Head in frontal view

B. Head in dorsal view

C. Antenna

D. Forewing

E. Gaster with petiole



(Fig. 16)

Genus **MISCOGASTER** Walker

Miscogaster Walker, 1833: 458.

Type species : Miscogaster hortensis Walker, by designation of Ashmead, 1904: 278.

Mischogaster Walker; Thomson, 1876: 220 (invalid emendation).

Miscogaster Walker; Peck et al, 1964: 38.

Miscogaster Walker; Graham, 1969: 226.

Peck (1963) placed this genus under tribe Miscogasterini of subfamily Sphegigasterinae. Peck et al (1964) shifted it under subfamily Miscogasterinae. Graham (1969) accepted its subfamily status and regrouped it under tribe Miscogasterini. Boucek, Subba Rao & Farooqi (1978) and Boucek (1988) supported Peck et al (1964).

This genus resembles Gitognathus and Stictomischus of the same tribal group in having huge stigma, but differs in having distinct basal line on the forewing with a roundish bare area below parastigma, mandibles always 4-dentate, and basal two gastral tergites medially incised.

It is distributed mostly in Europe, represented by 4 spp. recorded so far. A single species is reported identified from India, for the first time. These are known to attack various species of Agromyza and Phytomyza.

Diagnostic Characters : Body with coppery green reflections; maxillary and labial palpi 4- and 3-segmented respectively;

mandibles 4-dentate; anterior margin of clypeus asymmetrically 3-dentate; antennae inserted above the lower level of eyes, 13-segmented with 6-segmented funicle and 2 anelli; pronotum rounded off anteriorly; mesoscutum with parapsidal grooves complete; scutellum with frenal groove deep; propodeum rugose, nūchā absent; forewing densely setose except a small bare area below parastigma, stigma huge; gaster petiolate, with basal two tergites medially incised at hind margin; ovipositor slightly exserted.

The genus is known to contain a single species from India.

Miscogaster elegans Walker

(Figs. 1, 2A-B & 17A-G)

Miscogaster elegans Walker, 1833: 459.

Lamprotatus helenor Walker, 1846: 111.

Miscogaster gracilipes Thomson, 1876: 239 (ex parte).

Miscogaster elegans Walker; Graham, 1969: 226.

Material examined : 600 ♀♀, 1800 ♂♂. INDIA: Uttar Pradesh, Aligarh, University Campus, 15.iv.1987 (Jamal Ahmad).

Comments : This species is recorded identified for the first time from India. It runs well in Graham's Key (1969:226) and can be easily identified by following combination of characters: Face including vertex with fine piliferous punctures; ocelli arranged in obtuse triangle, POL slightly greater than OOL

(13:11); eyes bare, distinctly longer than wide (27:17), slightly more than 5.0x as long as malar space (27:5); antenna (Fig. 17C) with scape not reaching the median ocellus, distinctly shorter than transverse diameter of an eye (13:17); forewing (Fig. 17D) with marginal, postmarginal and stigmal in the ratio of 25:37:17; legs testaceous except coxae blackish brown with metallic green reflections.

Fig. 17 A-G. Miscogaster elegans Walker, ♀

A. Maxillary & labial palpi

B. Mandible

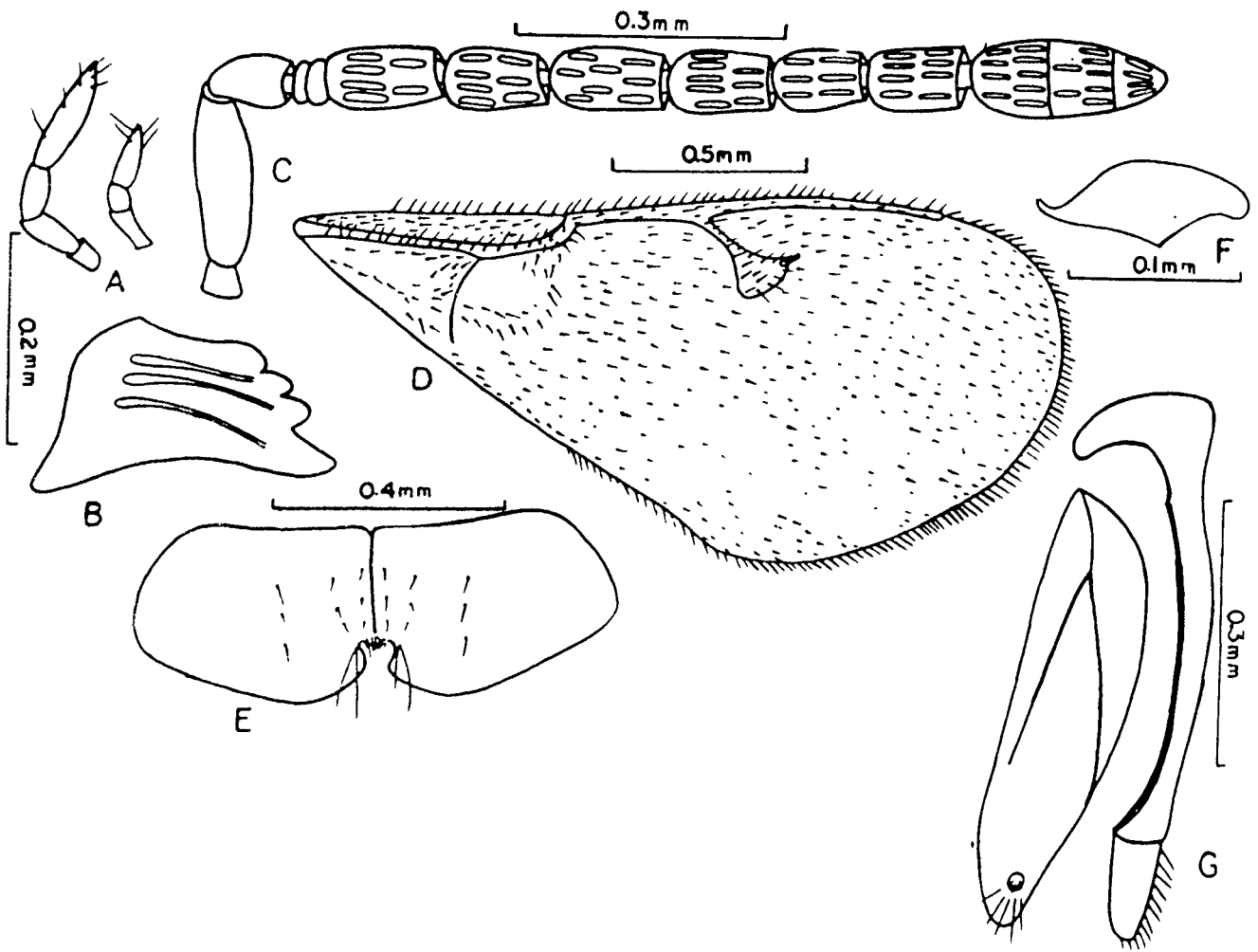
C. Antenna

D. Forewing

E. Subgenital plate

F. First valvifer

G. Part of ovipositor



(Fig. 17)

Genus **HALTICOPTERA** Spinola

Halticoptera Spinola, 1811: 148.

Type species : Diplolepis flavicornis Spinola. Designated by Ashmead, 1904: 376.

Pachylarthrus Westwood, 1832: 127.

Type species : (Pachylarthrus insignis Westwood) = Gonatopus patellanus Dalman, by monotypy.

Phagonia Curtis, 1832: 427.

Type species : Diplolepis flavicornis Spinola, by original designation.

Dicyclus Walker, 1833: 371.

Type species : Dicyclus aeneus Walker. Designated by Westwood, 1839: 68.

Megorismus Walker, 1846: 29.

Type species : Miscogaster daiphron Walker, by monotypy. Megalorismus Schulz, 1906: 147 (invalid emendation).

Halticoptera Spinola; Graham, 1969: 155.

Mani (1938) placed Halticoptera under his proposed tribe Halticopterariae of subfamily Miscogasterinae. Peck (1963) called the tribe Halticopterini, and placed it under Sphegigasterinae. Peck et al (1964) shifted the genus back to Miscogasterinae. Graham (1969) accepted the subfamily status given by Peck et al (1964) but proposed its alliance with Miscogasterini. Boucek, Subba Rao & Farooqi (1978) and Boucek (1988) accepted its inclusion under Miscogasterini.

This genus can be easily identified on the basis of asymmetric clypeal incision, gaster petiolate, and maxillary palpi much inflated in male. It is nearly cosmopolitan, quite abundant in North America and Europe, together representing about 33 spp., whereas just 5 spp. from rest of the world, including 3 spp. from Oriental region. These are mainly parasites of Agromyzidae.

Diagnostic Characters : Body dark with metallic green reflections; clypeus asymmetrically bidentate; maxillary and labial palpi 4- and 3-segmented respectively, maxillary stipite much dilated in males; mandibles 4-dentate; antennae inserted slightly above the lower level of eyes, 13-segmented, with 6-segmented funicle and 2 anelli; pronotum slightly carinate or rounded off anteriorly; mesoscutum with parapsidal grooves incomplete or faintly indicated posteriorly; forewings hyaline, with marginal and postmarginal veins separately longer than stigmal; propodeum with well developed median carina and plicae, nucha short; hind tibiae 2 spurred; gaster distinctly petiolate, basal tergite large, medially incised; ovipositor hidden.

The genus is reported to contain three species from India. A key to their separation is given below.

**Key to the Indian species of Halticoptera Spinola based on
males**

1. Antenna with funicle segments transverse, F1 shorter than F2;

- metanotum smooth and shiny; mesopleuron entirely reticulate.
 i. H. propinqua (Waterston)
- Antenna with funicle segments not transverse, F1 as long as or slightly shorter than F2; metanotum reticulate; mesopleuron with a triangular smooth area..... 2
2. Pronotum slightly carinate anteriorly; propodeum reticulate; maxillary palpi (Fig. 18G) dark brown, much inflated, visible dorsally; antenna (Fig. 18H) with pedicel as long as anelli and F1 together, the latter as long as F2; in female, forewing (Fig. 18D) with marginal vein slightly more than 3.0x as long as stigmal; antenna (Fig. 18C) with F6 wider than long.
 ii. H. aenea (Walker)
- Pronotum rounded off anteriorly; propodeum smooth, shiny; maxillary palpi (Fig. 18P) yellow, less inflated, not or slightly visible from above; antenna (Fig. 18Q) with pedicel slightly longer than anelli and F1 together, the latter slightly smaller than F2; in female, forewing (Fig. 18M) with marginal vein slightly more than 2.0x as long as stigmal; antenna (Fig. 18L) with F6 subquadrate iii. H. circulus (Walker)

i. Halticoptera propinqua (Waterston)

Polycystus propinquus Waterston, 1915: 325.

Halticoptera propinqua (Waterston) Boucek, Subba Rao & Farooqi, 1978: 443.

Distribution : INDIA: Hyderabad, Delhi.

ii. Halticoptera aenea (Walker)

(Fig. 18A-J)

Dicyclus aeneus Walker, 1833: 456.

Dicyclus tristis Walker, 1833: 456.

Pachylarthrus patellanus (Dalman) Sensu; Walker, 1833: 458.

Miscogaster cinctipes Walker, 1833: 462.

Pteromalus sophron Walker, 1839: 270.

Halticoptera petiolata Thomson, 1876: 250.

Halticoptera patellana Dalman; Ferriere, 1952: 172.

Halticoptera aenea (Walker) Graham, 1969: 164.

Halticoptera imphalensis Chisti & Shafee, 1986: 471 **syn.n.**

Material examined : 600₊₊ 300^{↑↑}. INDIA: Uttar Pradesh, Nainital, 29.X.1990 (M. Yousuf).

Some additional characters of this species are as follows:
 In male, maxillary stipite and coxae blackish brown; scape except anterior fuscous portion, flagellum, mandibular teeth, forewing venation and remaining parts of legs honey coloured.
 In female, antennae except basal half of scape which is dark orange, coxae, femora, ovipositor - with second valvifer, first valvula and outer plate blackish to dark brown; mandibular teeth, first valvifer, tibiae and tarsi honey yellow to orange; forewing venation yellowish brown; mandible with innermost tooth in both sexes broadly truncated.

Comments : H. imphalensis Chisti & Shafee is synonymised with aenea mainly on the basis of figures (1986: 471-472) and description, though incomplete.

iii. Halticoptera circulus (Walker)

(Fig. 18K-R)

Dicyclus circulus Walker, 1833: 456.

Dicyclus fuscicornis Walker, 1833: 456.

Miscogaster daiphron Walker, 1839: 198.

Miscogaster crius Walker, 1839: 201.

Miscogaster suilius Walker, 1839: 202.

Halticoptera petiolata Thomson, 1876: 250 (ex parte).

Pteromalus lapponicus Dalla Torre, 1898: 131.

Halticoptera fuscicornis (Walker) Imms, 1930: 1.

Halticoptera aenea Gahan, 1933: 116 (nec Dicyclus aeneus Walker, 1833).

Halticoptera patellana Peck, 1963: 623 (nec Diplolepis patellana Dalman, 1818).

Halticoptera circulus (Walker); Graham, 1969: 163.

Halticoptera jaipurensis Chisti, 1987: 73. **Syn.n.**

Material examined : 1500 ♀♀, 800 ♂♂ INDIA: Uttar Pradesh, Muzaffarnagar, 22.viii.1990 (M. Yousuf).

Body length : 2.2 mm.

Some additional characters of both male and female are as follows : Antennae except dorsal part of pedicel which is brown,

mandibles except testaceous teeth, trochanters, femora, tibiae and tarsi except last segment, light orange; maxillae with stipite brown, except apical half light brown; forewing venation pale; coxae blackish brown. In female, antennae, femora, last tarsal segment and third valvulae dark brown; mandibles except teeth, subgenital plate and remaining parts of ovipositor except valvifer light brown; forewing venation yellowish brown; legs with coxae blackish brown; trochanters, tibiae and tarsi deep orange with brownish tinge; mandibles in both sexes with innermost tooth roundedly obtuse, never like aenea.

Comments : H. jaipurensis Chisti is a synonym of H. circulus (Walker) as indicated from some of the characters like, size and colouration of body as well as stipite, relative measurements of antenna and forewing venations, as mentioned in the paper (1987: 73-74). Characters of specific importance, however, have been almost overlooked, and those given seem doubtful.

Fig. 18 A-E. Halticoptera aenea(Walker), ♀

A. Maxillary & labial palpi

B. Mandible

C. Antenna

D. Forewing

E. Part of ovipositor

Fig. 18 F-J. Halticoptera aenea(Walker), ♂

F. Labial palpi

G. Maxillary stipite

H. Antenna

I. Forewing

J. Male genitalia

Fig. 18 K-N. Halticoptera circulus(Walker), ♀

K. Mandible

L. Antenna

M. Forewing

N. Part of ovipositor

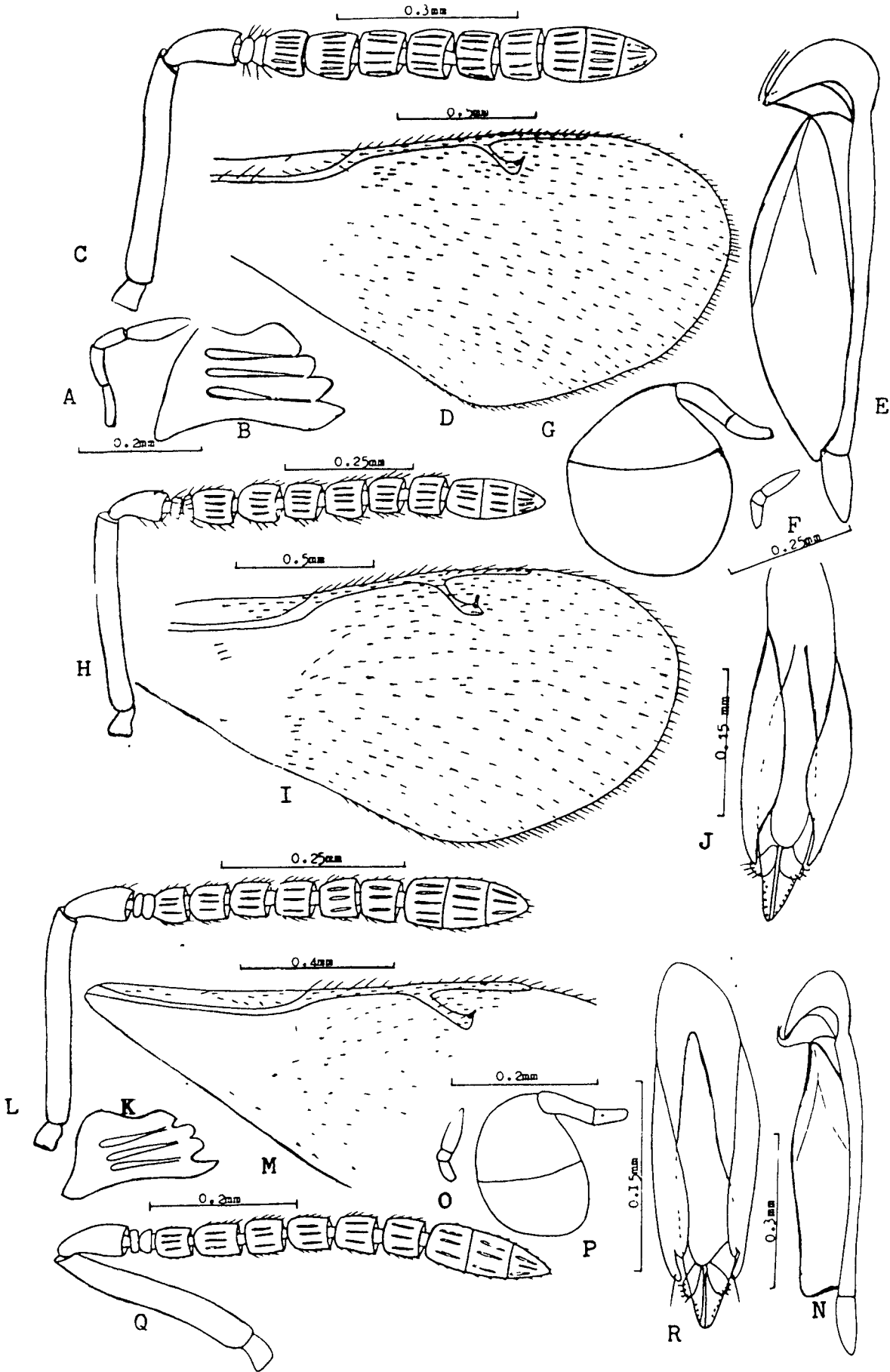
Fig. 18 O-R. Halticoptera circulus(Walker), ♂

O. Labial palpi

P. Maxillary stipite

Q. Antenna

R. Male genitalia



(Fig. 18)

K. SUBFAMILY PTEROMALINAE

Genus PLATECRIZOTES Ferriere

Platecrizotes Ferriere, 1934: 90.

Type species : Platecrizotes sudanensis Ferriere, by monotypy.

Platecrizotes Ferriere; Graham, 1969: 484.

Platecrizotes Ferriere; Boucek, Subba Rao & Farooqi, 1978: 453.

This genus was originally placed under subfamily Pireninae. Boucek (1963: 503) regarded it a close relative of Pachycrepoideus, and considered it to be a member of Pteromalinae. Graham (1969: 848) followed Boucek. Boucek, Subba Rao & Farooqi (1978: 435) included it under Sphegigasterini of subfamily Miscogasterinae but expressed its possible link with Pteromalinae. Boucek (1988:231) finally merged Sphegigasterini with Pteromalini of subfamily Pteromalinae.

Platecrizotes is very closely related with Pachycrepoideus in several characters, and is likely to suffer synonymy in futur , as also expected by many early workers. Some of the important generic differences nevertheless, such as abruptly widened marginal vein, incomplete parapsidal grooves and enlarged basal tergite, in addition to several minor characters of antennae and wings etc., enable this genus to enjoy a separate entity, at least in the present work.

It is almost confined in Africa and South Asia, consisting of only two species, reported so far. India is known to contain a single species, reported till date.

Diagnostic Characters : Body depressed, dark, with metallic reflections; head subprognathous, as long as wide in facial view; anterior margin of clypeus subtruncate; mandibles 4-dentate; maxillary and labial palpi 4- and 3-segmented respectively; antenna inserted much below lower level of eyes, 13-segmented, with 5-segmented funicle and 3 anelli; pronotum long, carinate anteriorly; mesoscutum with parapsidal grooves incomplete, faintly indicated; propodeum broad, subhorizontal; nucha small; forewings hyaline, marginal vein abruptly widened basally; gaster petiolate, as long as head and thorax together, first gastral tergite large, with hind margin broadly produced mesad; ovipositor slightly exerted.

Platecrizotes sudanensis Ferriere

(Fig. 19 A-D)

Platecrizotes sudanensis Ferriere, 1934: 91.

Spalangia pennisetae Ribsec, 1951: 363.

Platecrizotes sudanensis Ferriere; Boucek, 1963: 503.

Material examined : 10₊. INDIA: Karnataka, Mysore, 15.ix.1986 (M. Khalid).

Comments : This species has been recorded for the first time from India. It can be easily identified by following set of characters : Antenna (Fig. 19B) inserted slightly above the clypeus, short, not reaching the median ocellus (16:23) about

8.0x as long as wide (16:2), pedicel distinctly longer than F1(4.5:2), anelli 3, strongly transverse except the third comparatively thicker, funicle segments strongly wider than long, club as long as preceding three funicle segments together; thorax depressed, slightly more than 1.7x as long as its maximum width (50:28), pronotum carinate, about half as long as the mesoscutum (6:12), the latter nearly 2.3x wider than long (28:12), with parapsidal grooves indistinct; propodeum as long as scutellum (13:13), nucha distinct; forewing (Fig. 19C) hyaline, marginal vein considerably thickened basally, relative lengths of marginal, postmarginal and stigmal in the ratio of 13:5:6; legs with femora slightly swollen; petiole slightly longer than wide (9:8); gaster (Fig. 19D) excluding petiole longer than thorax, basal tergite large, as long as following two tergites together.

The Indian material resembles closely with African almost in all respect except propodeum without indication of median carina and gaster with basal tergite as long as following two tergites together.

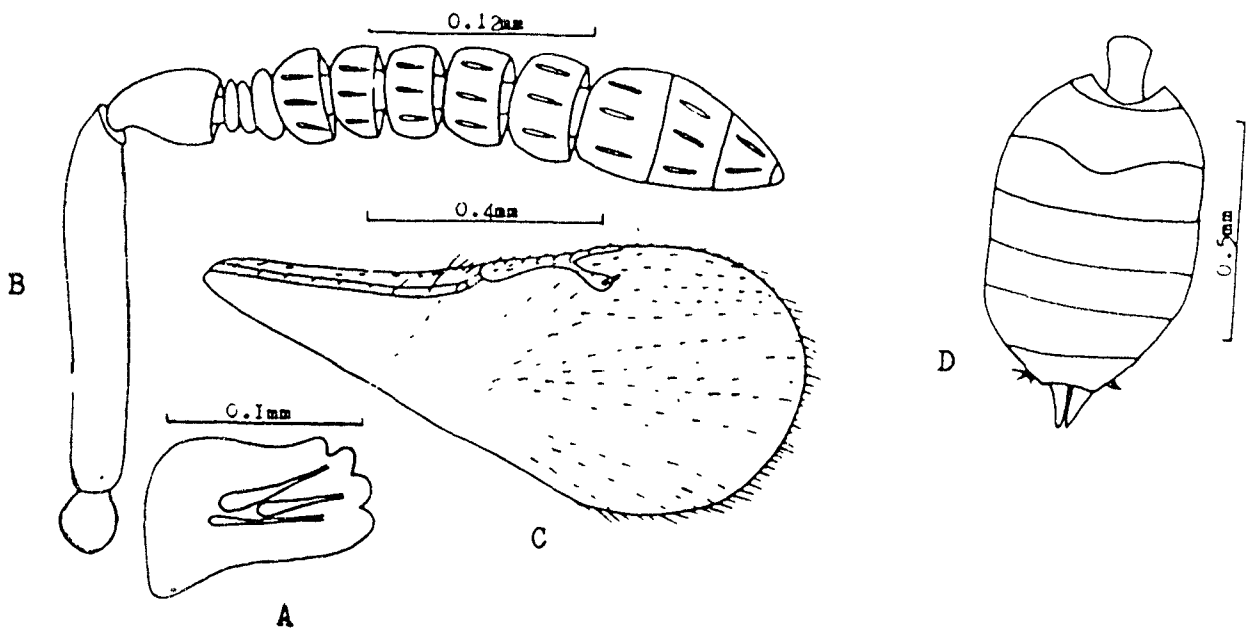
Fig. 19 A-D. Platecrizotes sudanensis Ferriere, ♀

A. Mandible

B. Antenna

C. Forewing

D. Gaster



(Fig. 19)

Genus **NOTOGLYPTUS** Masi

Notoglyptus Masi, 1917: 181.

Type species : Notoglyptus niger Masi, by original designation.

It is the most common genus found abundantly almost in every part of India and throughout world, and can be readily identified on the basis of oblong fovea on scutellum. Peck et al (1964) placed this genus under subfamily Miscogasterinae. Graham (1969) recognized its subfamily status but considered it to be a member of Sphegigasterini. Boucek, Subba Rao & Farooqi (1978) accepted Graham. Later on Boucek (1988) changed its earlier status by placing under Pteromalini of Subfamily Pteromalinae, because of its truncate clypeus and unreliability of petiole character. It is known to contain 6 spp. from the world, reported so far, presumably being parasitic on various agromyzids.

Diagnostic Characters : Body black with metallic green reflections; clypeus almost straight anteriorly; antennae inserted slightly above the lower level of eyes, 13-segmented with 6-segmented funicle and 2 anelli; pronotum carinate anteriorly; mesoscutum with parapsidal grooves complete; scutellum with a deep oblong fovea, frenal groove deep; propodeum with distinct median carina and plicae; gaster petiolate, with basal tergite large.

This genus is reported to contain a single species from India.

Notoglyptus scutellaris (Dodd & Girault)

(Fig. 20A-E)

Merismus scutellaris Dodd & Girault, in Girault, 1915b: 328.Merismus squamosus Girault, 1915b: 328.Notoglyptus niger Masi, 1917: 181.Notoglyptus virescens Masi; Boucek, 1988: 467 synonymised under scutellaris by Boucek.**Material examined** : 2500 ♀♀, 200 ♂♂. INDIA: Uttar Pradesh, Aligarh, University Campus, 15.iii.1987 (Jamal Ahmad).**Body length** : 1.80 mm.**Comments** : The genus Notoglyptus was recognised by its representative species N. niger for a long time until Boucek (1988) discovered a misidentified genus Merismus scutellaris Girault, absolutely similar to N. niger. This led to automatic synonymy of N. niger under N. scutellaris on priority basis.

This species can be easily identified by following combination of characters : Flagellum light brown; scape, pedicel and legs testaceous; head, thorax and petiole reticulate except clypeus smooth to finely reticulate, frenum shiny smooth; gaster with basal tergite large, concealing following tergites; forewing (Fig. 20C) with marginal vein slightly longer than postmarginal and about 2.5x as long as stigmal.

Fig. 20 A-E. Notoglyptus scutellaris(Dodd & Girault), ♀

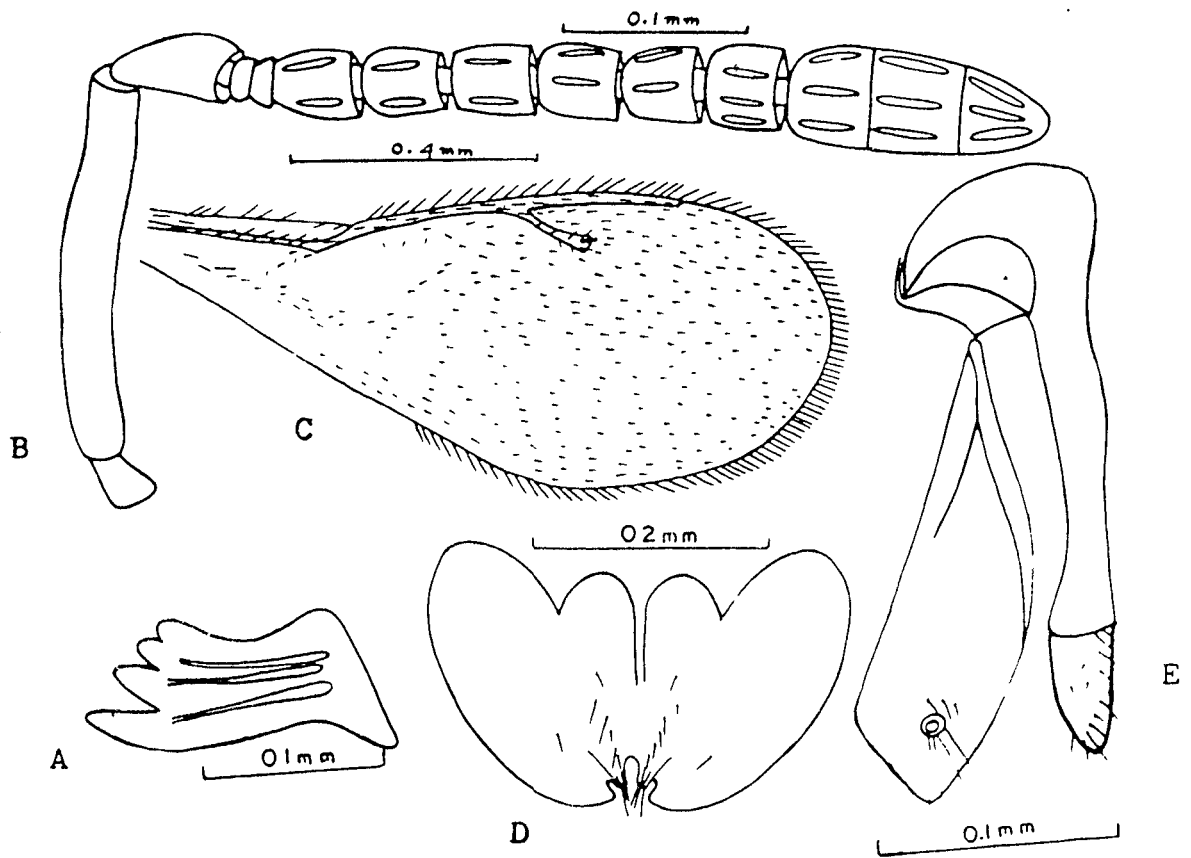
A. Mandible

B. Antenna

C. Forewing

D. Subgenital plate

E. Part of ovipositor



(Fig. 20)

Genus **SYNTOMOPUS** Walker

Syntomopus Walker, 1833: 371.

Type species : Syntomopus thoracicus Walker, designated by Westwood, 1839.

Merismorella Girault, 1926a: 1.

Type species : Merismorella shakespearei, by monotypy.

Syntomopus Walker; Graham, 1969: 137.

Syntomopus Walker; Boucek, 1988: 466.

Quite different from others, this genus can be easily recognized by its flattened thorax, quadrangular pronotum and tridentate clypeus, with median tooth distinctly produced.

Peck (1963) placed this genus under the tribe Miscogasterini of subfamily Sphegigasterinae. Peck et al (1964) shifted it under Miscogasterinae. Graham (1969) retained its subfamily status as proposed by Peck et al (1964), but shifted under the tribe Sphegigasterini. Boucek, Subba Rao & Farooqi (1978) supported Graham's view. Boucek (1988) reshuffled it placing under Pteromalinae of tribe Pteromalini. The genus is represented by about 12 spp. from the world, attacking mainly on agromyzids. India shows just one on record.

Diagnostic Characters : Body flattened, with metallic reflections; maxillary and labial palpi 4- and 3-segmented respectively; mandibles 4-dentate; antennae inserted above the lower level of eyes, 13-segmented with 6-segmented funicle and 2 anelli;

pronotum large, quadrangular; mesoscutum with parapsidal grooves fine, complete; propodeum with or without median carina, mostly effaced posteriorly; forewing hyaline with venations well developed; hind tibia with one spur; gaster petiolate, basal tergite medially incised at its hind margin; ovipositor exerted.

The genus is known to contain a single species from India, reported so far.

Syntomopus incisus Thomson

(Fig. 21 A-D)

Syntomopus incisus Thomson, 1878:23.

Syntomopus incisus Thomson; Graham, 1969:139.

Material examined: 400, 10[↑], INDIA: Uttar Pradesh, Aligarh, 2.iii.1987 (Jamal Ahmad).

Body Length : 1.90mm.

Comments : This species has been reported for the first time from India. It runs well in Graham's key (1969: 138) and can be easily identified by following combination of characters: POL 1.5x as long as OOL; antenna (Fig. 21 B) with scape not reaching median ocellus; funicle segments increasing in width distad; propodeum with median carina indicated anteriorly, effaced behind, plicae absent; gaster with basal tergite medially incised.

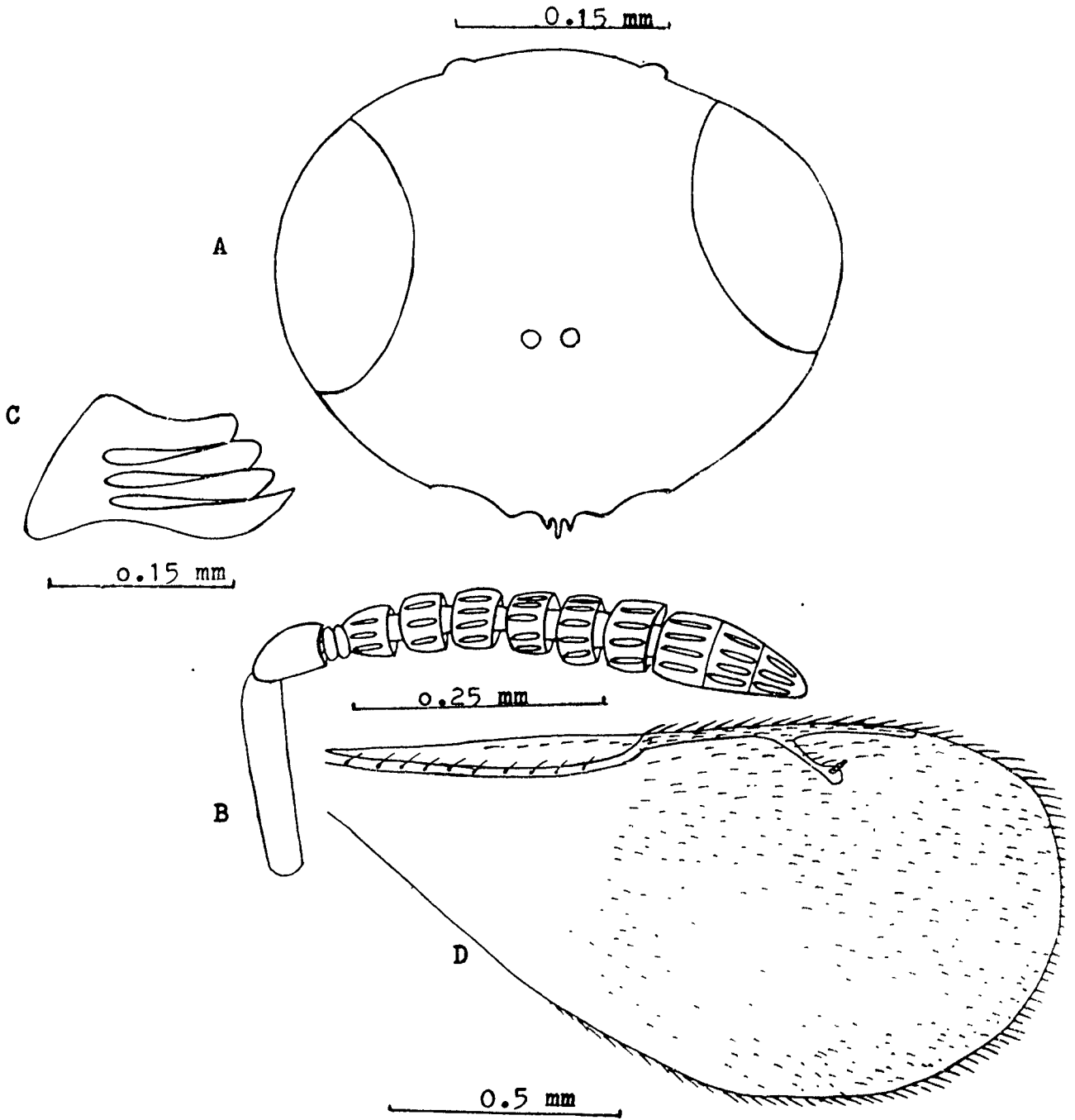
Fig. 21 A-D. Syntomopus incisus Thomson, ♀

A. Head in frontal view

B. Antenna

C. Mandible

D. Forewing



(Fig. 21)

Genus **MERISMOMORPHA** Girault

Merismomorpha Girault, 1913b: 82.

Type species : Merismomorpha acutiventris Girault, by original designation. Description repeated by Girault, 1913d: 321.

Epipolycystus Girault, 1915b: 335.

Type species : Epipolycystus asilus Girault, by original designation.

Neopolycestella Girault, 1915b: 336.

Type species : Neopolycestella sicarius Girault, by original designation.

Giorgionia Girault, 1933: 4.

Type species : Giorgionia flavipetiole Girault, by monotypy.

This genus is known to be reported from Australian and Indian regions so far, together representing 9 spp., one undescribed from India (Boucek, 1988: 462) and remaining from Australia. Difficulty in access to Girault's papers excludes the possibility of comparative study except just a tentative proposal of its newness. Placed under pteromalini of subfamily Pteromalinae, this genus can be easily identified by angularly produced clypeus with blunt apex, gastral petiole long, ventrally embraced by extension of first gastral sternite.

Diagnostic Characters : Body dark with slight metallic gloss; anterior margin of clypeus angularly produced, with blunt apex;

mandibles heterodont, right 4- left 3-dentate; antennae inserted distinctly above the lower level of eyes, 13-segmented with 5-segmented funicle and 3 anelli; pronotum anteriorly carinate; mesoscutum with incomplete parapsidal grooves, posteriorly indistinct; forewing with marginal vein longer than postmarginal and stigmal separately; hind tibiae with two unequal spurs; gastral petiole long, with posterior half ventrally embraced by extension of gastral sternite; ovipositor concealed.

Merismomorpha yousufi sp.n.

(Fig. 22A-F)

Female. Length 1.5 mm. Body black with metallic gloss except gaster violet green; eyes rusty brown, aetose; ocelli honey coloured; antennae with pedicel and flagellum dark brown, scape and first two anelli pale yellow, third anellus light brown; mouth parts light brown, except teeth infuscated; legs with coxae reddish brown, fore- and mid femora yellowish brown, hind femora, all tibiae and tarsi lemon yellow; wing venation brownish pale; petiole reddish brown.

Head slightly wider than long in facial view (40:35) with moderate reticulation except vertex and scrobes fine; ocelli arranged in obtuse triangle, POL distinctly longer than OOL (10:6); eye 2.0x as long as wide (26:13); gena depressed at the base of mandibles, slightly less than one-third the eye

length (8:26); malar sulcus present; clypeus angularly produced, with blunt apex; mandibles (Fig. 22B,C) heterodont, right 4- left 3-dentate. Antenna (Fig. 22D) 13-segmented with 5-segmented funicle and 3 anelli, inserted about in the middle of face, distinctly above the lower level of eyes, torulo-ocular distance equal to torulo-ocellar (12:12); scape 5.6x as long as wide (14:2.5) reaching beyond the median ocellus; pedicel slightly longer than wide (4:3.5); slightly longer than F1; anelli transverse; funicle segments F1-F4 slightly longer than wide, F5 subquadrate; club as long as preceding three funicle segments together.

Thorax 1.5x as long as wide (51:34); sculpture reticulate, raised from general surface, except anterior half of scapula and callus finely engraved; pronotum anteriorly carinate, collar 7.5x as wide as long (30:4), narrower than mesoscutum (30:34); mesoscutum with incomplete parapsidal grooves, mesopleuron with a triangular smooth area, with a deep pit below; scutellum slightly longer than wide (19:18), without frenal groove; propodeum with converging raised plicae, median carina absent, nucha small. Forewing (Fig. 22E) hyaline, 2.0x as long as wide (84:42), basally bare; costal cell setose; marginal, postmarginal and stigmal in the ratio of 20:12:8, stigmal vein thin, stigma moderately large, postmarginal-stigmal area bare; leg with middle tibial spur 0.6x as long as basitarsus (5:8); hind tibia with one spur.

Gaster lanceolate, longer than head and thorax together (65:57), third tergite longer than first two tergites together (20:17); petiole smooth, 3.0x as long as wide (9:3) with posterior half ventrally embraced by extension of gastral sternite; ovipositor (Fig. 22F) almost concealed, second valvifer 4.0x as long as third valvula (48:12), remaining characters as in figure.

Holotype Female. INDIA: Uttar Pradesh, Nainital, 26.x.1990 (M. Yousuf).

Paratype 1♀. 1.90 mm (same data as above except gastral petiole 5.0x as long as wide).

Comments : The new species differs from the known Australian species in having F1 as long as F2, slightly longer than wide, whereas in Australian species it is always anelliform, about half as long as F2.

Fig. 22 A-F. Merismomorpha yousufi sp.n., ♀

A. Maxillary & labial palpi

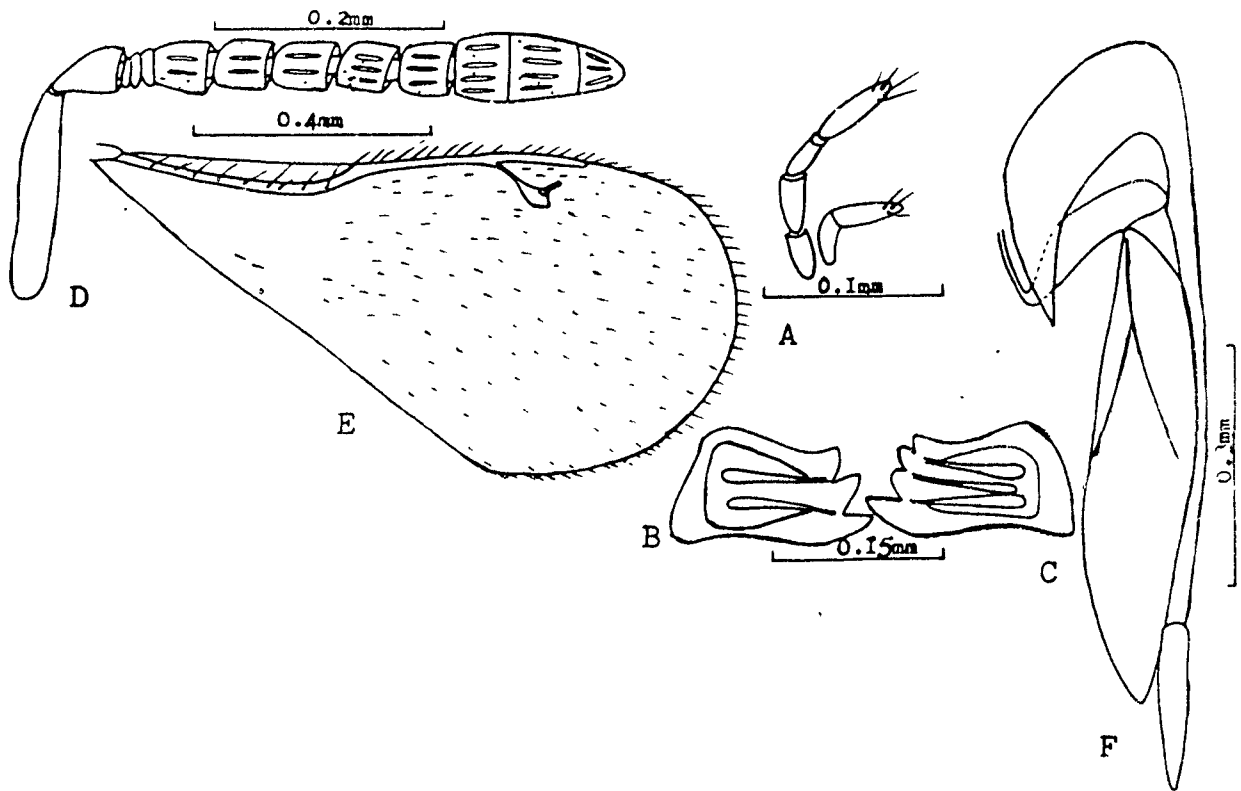
B. Left mandible

C. Right mandible

D. Antenna

E. Forewing

F. Part of ovipositor



(Fig. 22)

Genus **SPHEGIGASTER** Spinola

Sphegigaster Spinola, 1811:149.

Type species : Diplolepis pallicornis Spinola. Designated by Ashmead, 1904.

Trigonogastra Ashmead, 1904 : 330.

Type species : Trigonogastra aurata Ashmead, by original designation.

Sphecigaster Schulz, 1906 : 143 (Invalid emendation).

Paratrigonogastra Girault, 1915b : 343.

Type species : Paratrigonogastra voltairei Girault, by monotypy.

Basilewskyella Risbec, 1951 : 194.

Type species : Basilewskyella elegantula Risbec, by original designation.

Sphegigaster Spinola; Graham, 1969 : 124.

Sphegigaster Spinola; Mani, 1989 : 520.

It is very distinctive genus, characterized by symmetrically incised clypeus, long petiole and second gastral tergite large. Peck (1963) placed this genus under the tribe Sphegigasterini of subfamily Sphegigasterinae. Peck et al (1964) transferred it under Miscogasterinae, supported later on by Graham (1969) and Boucek, Subba Rao & Farooqi (1978), probably owing to its long gastral petiole. Boucek (1988) reshuffled it under Pteromalini of subfamily Pteromalinae because of its symmetrically incised clypeus, a strong character for some

Pteromalines and unreliability of gastral petiole due to its wide range of variation.

The genus is almost cosmopolitan, comprising 20 spp., known so far, India contains 4 spp., reported yet. These are usually known to attack leafminers of family Agromyzidae.

Diagnostic characters : Body dark with metallic green reflections; anterior margin of clypeus symmetrically bidentate; mandibles 4-dentate; antennae inserted distinctly above the lower level of eyes, 13-segmented, with 6-segmented funicle and 2 anelli; pronotum carinate anteriorly; mesoscutum with parapsidal grooves incomplete; forewings with well developed venations; propodeum with nucha small; hind tibiae one spurred; gaster petiolate with petiole slender, second tergite large; ovipositor slightly exserted. The genus Sphegigaster Spinola is known to contain four species from India (including two new reports). A key to their separation is given below:

**Key to Indian species of Sphegigaster Spinola
based on females**

1. Gaster with basal tergite longer than the second; forewing with postmarginal vein half the length of marginal; propodeum smooth
..... i. S. peninsularis (Dubey)
- Gaster with basal tergite always shorter than the second; forewing with postmarginal vein usually as long as marginal; propodeum reticulate..... 2

2. Antenna (Fig. 23.B) with F1 wider than long, distinctly shorter than pedicel and F2 separately; forewing (Fig. 23 C) with basal area with 4-5 setae; gaster with second tergite much enlarged, almost concealing remaining tergites..... ii. S. stepicola Boucek
- Antenna with F1 distinctly longer than wide, as long as or longer than pedicel and F2 separately; forewing basally bare; gaster with second tergite varying in length 3
3. Gaster with basal tergite medially produced; antenna (Fig. 23 F) with F1 longer than pedicel, narrowed basally; propodeum without indication of median carina. iii. S. brunneicornis (Ferriere)
- Gaster with basal tergite truncated posteriorly; antenna (Fig. 23H) with F1 about as long as pedicel, not narrowed basally; propodeum with median carina slightly indicated anteriorly.... .
..... iv. S. nigricornis (Nees)

I. Sphegigaster peninsularis (Dubey)

Trigonogastra peninsularis Dubey, 1974:413.

Sphegigaster peninsularis (Dubey) Boucek, Subba Rao & Farooqi, 1978 : 460.

Sphegigaster peninsularis (Dubey); Mani, 1989 : 522.

Distribution : INDIA : Kerala.

II. Sphegigaster stepicola Boucek

(Fig. 23 A-D)

Sphegigaster stepicola Boucek, 1965 : 12.

Sphegigaster stepicola Boucek; Graham, 1969 : 130.

Acroclisis melanagromyzae Mani, 1971 : 591.

Sphegigaster stepicola Boucek; Mani, 1989 : 523.

Material examined : 500, 10[♂], INDIA : Uttar Pradesh, Aligarh University campus, 15.x.1987 (Jamal Ahmad).

Body length : 2.0 mm.

This species can be easily identified on the basis of its antennal and other characters as provided in the key. Some additional characters are as follows : Body black with metallic green reflections; head wider than thorax (49:39); ocelli with POL slightly longer than OOL (11:9); eyes slightly pubescent, nearly 3.0x as long as gena (24:8); pronotum nearly rectangular, sharply carinate with posterior edge smooth green; scutellum convex, slightly wider than long (24:22); forewing (Fig. 23 C) with marginal, postmarginal and stigmal in the ratio of 25:20:11; gastral petiole nearly 4.0x as long as wide.

III. Sphegigaster brunneicornis (Ferriere)

(Fig. 23 E-G)

Trigonogastra brunneicornis Ferriere, 1930 : 356.

Sphegigaster brunneicornis (Ferriere) Boucek, Subba Rao & Farooqi, 1978 : 458.

Sphegigaster brunneicornis (Ferriere); Mani, 1989 : 520.

Material examined : 10. INDIA: Uttar Pradesh, Nainital, 25.x.1990 (M. Yousuf).

Body length : 2.5 mm.

This species has been recorded for the first time from India. It runs very close to S. nigricornis, but differs in characters given in the key. Characters supplementary to those in the key are as follows: Head much wider than long (55:40); POL slightly longer than OOL (12:11); eye longer than wide (27:16), 3.0x as long as malar space; antenna (Fig. 23 B) with toruli inserted closer to median ocellus than clypeus (17:19), scape reaching beyond the median ocellus (22:17), pedicel slightly shorter than F1(6:7), the latter distinctly narrowed basally, 1.6x narrower than apical width (3:5); pronotum distinctly carinate; mesoscutum shorter than scutellum (19:23); propodeum without median carina and plicae; forewing (Fig. 23 C) basally bare, relative lengths of marginal, postmarginal and stigmal in the ratio of 29:23:10.5; petiole reticulate, with basal half thicker than apical portion, 3.3x as long as wide (27:8); gaster longer than thorax (67:85), basal tergite produced medially.

iv. Sphegigaster nigricornis (Nees)

(Fig. 23 H-J)

Chrysolampus nigricornis Nees, 1834 : 133.

Sphegigaster nigricornis (Nees) Graham, 1969: 132.

Material examined : 2500, 400^{♂♂}. INDIA : Uttar Pradesh, Aligarh, 20.ii.1988 (Jamal Ahmad).

Body length : 2.0 mm.

Comments : This species is recorded for the first time from India. It resembles closely with S. brunneicornis but differs in following respect: Antenna (Fig. 23 H) with toruli inserted equidistant with clypeus as well as median ocellus, scape reaching slightly beyond the vertex, pedicel nearly as long as F1(5:5), the latter not narrowed basally; propodeum with faint diminutive median carina; petiole 4.0x as long as wide (20:5); gaster with basal tergite straight. The Indian material resembles European in all respect except scape yellowish. Colour variation among Indian material themselves has been noticed in gaster and petiole, which may be either black with greenish reflections or brown.

Fig. 23 A-D. Sphegigaster stepicola Boucek, ♀

A. Mandible

B. Antenna

C. Forewing

D. Part of ovipositor

Fig. 23 E-G. Sphegigaster brunneicornis (Ferriere), ♀

E. Mandible

F. Antenna

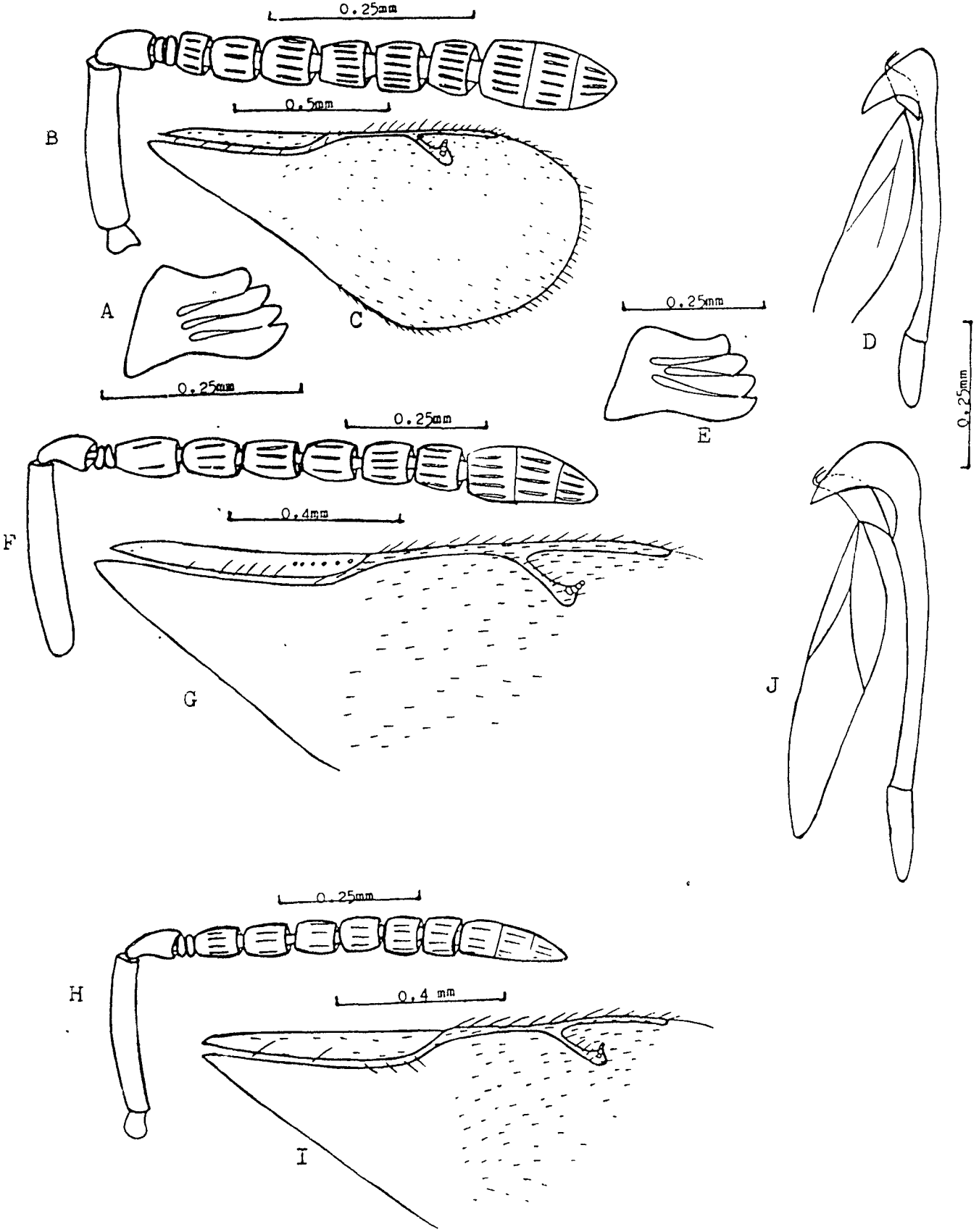
G. Part of forewing

Fig. 23 H-J. Sphegigaster nigricornis (Nees), ♀

H. Antenna

I. Part of forewing

J. Part of ovipositor



(Fig. 23)

Genus **CAENOCREPIS** Thomson

Dimachus s.gen. Caenocrepis Thomson, 1878: 50.

Type species : Caenocrepis arenicola Thomson, by monotypy.

Xenocrepis Ashmead, 1904: 276 (nec Foerster, 1856).

Caenocrepis Thomson; Graham, 1969: 429.

Peck (1963) placed this genus under the tribe Pteromalini of subfamily Pteromalinae. Peck et al (1964) accepted its subfamily status, but shifted under tribe Dinarmini. Graham (1969) too recognised its subfamily status, dropping its any tribal association. Present work agrees with Peck's view (1963) and places it under Pteromalini.

It is reported to contain two species from the world so far.

Diagnostic Characters : Body dark with metallic green reflections; mandibles 3-dentate; maxillary and labial palpi 4- and 3-segmented respectively; clypeus symmetrically bilobed; antennae inserted above the lower level of eyes, 13-segmented, with 6-segmented funicle and 2 anelli; pronotum rounded off anteriorly; mesoscutum with parapsidal grooves incomplete; propodeum short, without nucha; forewings with two fuscous clouds; marginal vein slightly thicker at base, **shorter** than stigmal; **hind** tibiae with two spurs; gaster sessile; ovipositor slightly exserted.

Comments : This genus is reported for the first time from India, represented by a single species recorded so far.

Caenocrepis arenicola Thomson

(Fig. 24 A-B)

Caenocrepis arenicola Thomson, 1878: 51.

Caenocrepis arenicola Thomson; Graham, 1969: 429.

Material examined : 10[♂] INDIA: Haryana, Rohtak, 29.iii.1991 (M. Yousuf).

Body length : 2.15 mm.

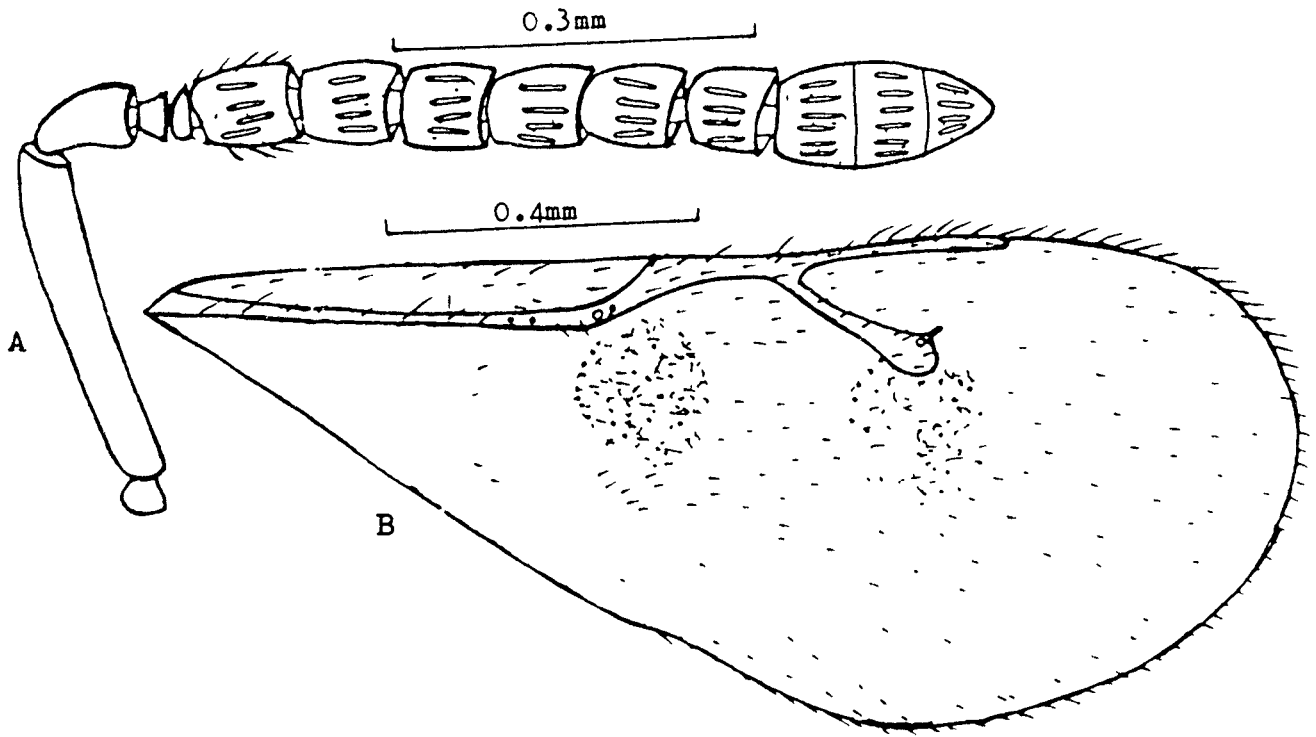
Comments : This species is reported for the first time from India. It runs well in Graham's key (1969:429) and can be easily identified by following combination of characters : Body black with dull reflections; flagellum, anelli, coxae and femora except knees; blackish brown; pedicel scape, tibiae, tarsi and forewing venation testaceous. Ocelli arranged in obtuse triangle, POL slightly less than 2.0x as long as OOL (13:7); eyes slightly more than 2.0x as long as the length of malar space (25:12); antenna (Fig. 24 A) with toruli inserted close to each other, intertorular distance distinctly less than a torular diameter (2:3), inserted closer to clypeus than the median ocellus (20:22), first anellus thicker than the second; clypeus bilobed anteriorly; mandibles with outer teeth strongly sinuate; forewing (Fig. 24 B)

with marginal vein moderately thickened basally, relative measurements of marginal, postmarginal and stigmal in the ratio of 15:27:17, speculum broad; gaster slightly longer than thorax (60:50), hind margin of basal tergite shallowly emarginate medially.

Fig. 24 A-B. Caenocrepis arenicola Thomson, ♀

A. Antenna

B. Forewing



(Fig. 24)

Genus **PSILOCERA** Walker

Psilocera Walker, 1833: 373.

Type species : Psilocera obscura Walker, by monotypy.

Metopon Walker, 1834: 302.

Type species : Metopon atrum Walker, by monotypy.

Epsilocera Westwood, 1839: 69.

Dichalysis Foerster, 1856: 52.

Polycystoides Girault, 1913c: 459.

Type species : Polycystoides tennysoni Girault, by original designation.

Parapolycystus Girault & Dodd in Girault, 1915b: 339.

Type species : Parapolycystus pulchricornis Girault, by original designation.

Psilocera Walker; Graham, 1969: 462.

This genus can be easily distinguished from others by its widely separated clypeal teeth, clavate antennae and club with longitudinal band of micropilosity. In these characters, it resembles Acanthometopon, which differs in having unusual horn on scutellum. Peck (1963) placed Psilocera under Sphegigasterini of subfamily Sphegigasterinae. Later workers including Boucek (1988) regarded it to be a member of Pteromalinae.

About 15 spp. have been reported under this genus from the world so far, India contains a single species, identified lately.

Diagnostic Characters : Body dark with metallic reflections; anterior margin of clypeus bidentate; mandibles large 3-dentate; maxillary and labial palpi 4- and 3-segmented respectively; antennae clavate, inserted above the lower level of eyes, 13-segmented, with 6-segmented funicle and 2 anelli, club with longitudinal band of micropilosity; pronotum anteriorly carinate; mesoscutum with parapsidal grooves incomplete; Propodeum with median carina, plicae and costula present; nucha prominent; forewings hyaline, with marginal vein longer than postmarginal and stigmal separately; hind tibiae with one spur; gaster subsessile, with tergites 1-4 deeply incised medially at their hind margins; ovipositor slightly exerted.

The genus is known to contain a single species from India, known so far.

Psilocera obscura Walker

(Fig. 25A-F)

Psilocera obscura Walker, 1833: 374.

Metopon concolor Thomson, 1878: 168.

Psilocera obscura Walker; Graham, 1969: 465.

Material examined : 200. INDIA: Uttar Pradesh, Aligarh, 17.ix.1990 (Jamal Ahmad).

Comments : This species has been recorded identified for the first time from India. It can be easily identified by following

combination of characters: Body black with slight metallic green reflections, more on gaster; flagellum and coxae black; scape, pedicel, anelli, ocelli and remaining parts of legs dark brown; eyes coffee coloured. Antenna (Fig. 25D) moderately clavate with second anellus slightly larger than the first, pedicel as long as anelli and F1 combined (9:9), funicle segments well separated, F1-F3 distinctly longer than wide, micropilosity on club occupying nearly half its length; forewing (Fig. 25E) with basal area bare, except a few hairs, marginal, postmarginal and stigmal in the ratio of 30:25:11; gaster slightly less than 2.0x as long as wide (38:20), as long as thorax (38:38).

Fig. 25 A-F. Psilocera obscura Walker, ♀

A. Head in frontal view

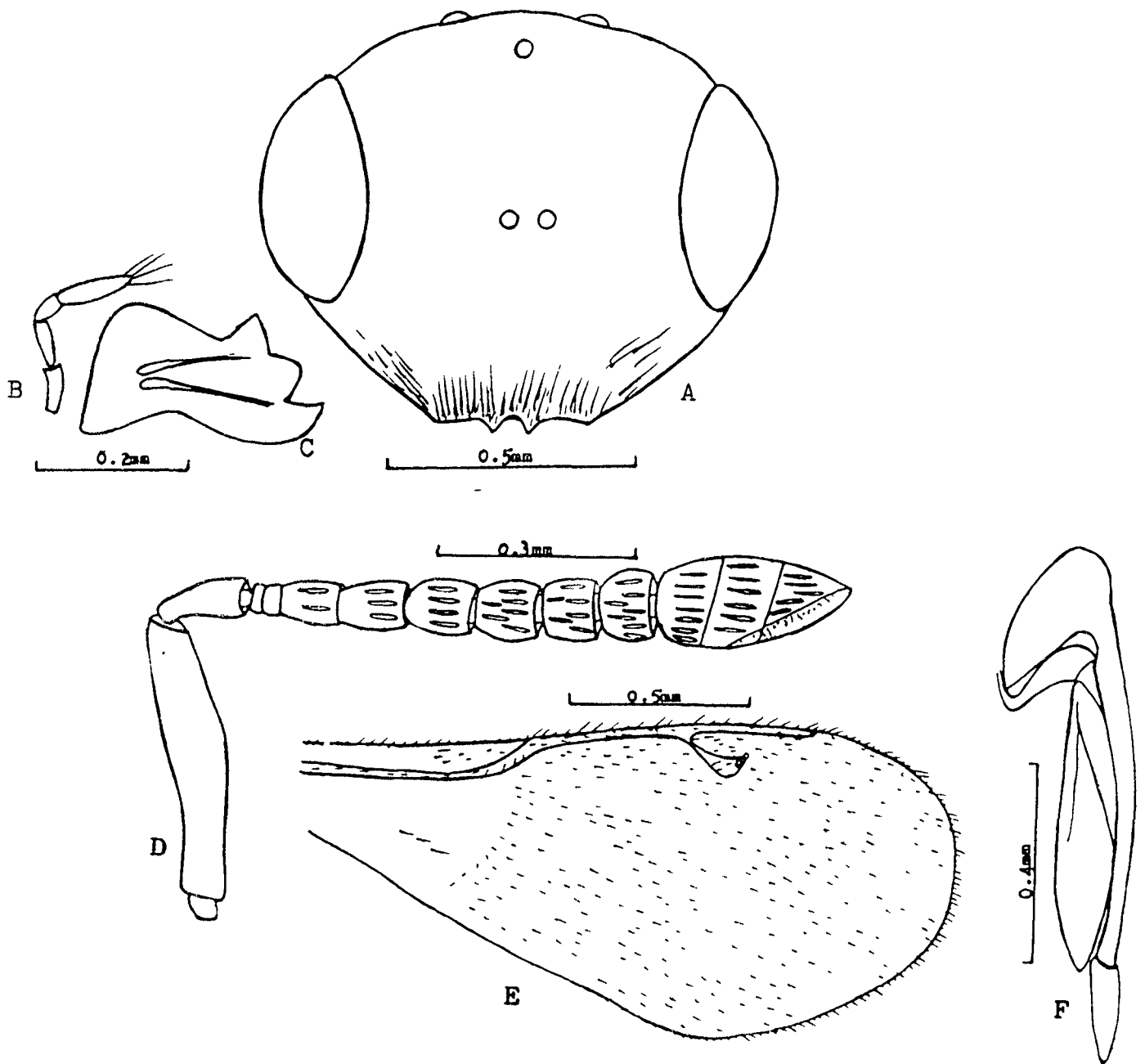
B. Maxillary palpi

C. Mandible

D. Antenna

E. Forewing

F. Part of ovipositor



(Fig. 25)

Genus **DINARMUS** Thomson

Dinarmus Thomson, 1878 : 50.

Type species : Dinarmus acutus Thomson, designated by Ashmead, 1904 : 276.

Bruchobius Ashmead, 1904 : 314.

Type species : Bruchobius laticeps Ashmead, by monotypy and original designation.

Sphaerakis Masi, 1924a : 214.

Type species : Sphaerakis mayri Masi, by monotypy.

Metastenoides Girault, 1915c : 190.

Type species : Metastenoides simus Girault, by original designation.

Oedaule Waterston, 1922 : 31.

Type species : Oedaule stringifrons Waterston, by monotypy.

Dinarmus Thomson; Delucchi, 1956 : 240.

Dinarmus Thomson; Graham, 1969 : 434.

Placed under subfamily Pteromalinae this genus is universally known for its common indoor attack on bruchid beetles of stored grains and beans. It can be easily recognised by its robust body and peculiarly arched pronotum. It is known to contain 11 spp. from the world, including 6 spp. from India, recorded so far.

Diagnostic characters : Body dark, robust, with dull reflections; clypeus moderately emarginate or bidentate anteriorly; mandibles usually heterodont, right 4- left 3-dentate,

rarely both 4-dentate; antennae inserted about in the middle of face, 13-segmented, with 5-segmented funicle and 3 anelli; pronotum medially arched, anteriorly carinate; mesoscutum with parapsidal grooves incomplete, mesopleuron entirely reticulate; propodeum with well developed nucha; forewings with costal cell wide, venations well developed, stigma moderately large; hind tibiae with two spurs; gaster sessile; ovipositor slightly exserted.

The genus is known to contain six species from India. A key for their separation, except D. basalis (Rondani),* is given below.

**Key to the Indian species of Dinarmus Thomson
based on females**

1. Both mandibles 4-dentate; forewing with postmarginal vein subequal to stigmal; antenna with pedicel as long as F1... ..
..... i. D. vagabundus (Timberlake)
- Mandibles heterodont, right 4- left 3-dentate; forewing with postmarginal vein usually longer than stigmal; antenna with pedicel often shorter than F1..... 2

* It is excluded from the key because of unavailability of the literature. Although Mani (1989:569) reproduced a figment of it in his book, but characters taken are too common and fragmentary, of any specific use.

2. Forewing with postmarginal vein longer than marginal and stigmal..... 3
- Forewing with postmarginal vein either equal or shorter than marginal and stigmal..... 4
3. Forewing (Fig. 26 I) without apical cilia, marginal vein subequal to stigmal, stigma short; clypeus slightly emarginate anteriorly; antenna (Fig. 26 G) with third anellus large.....
- ii. D. laticeps (Ashmead)
- Forewing with apical cilia, marginal vein longer than stigmal, stigma large; clypeus truncated anteriorly.....
- iii. D. maculatus (Masi)
4. Forewing (Fig. 26 B) with postmarginal vein subequal to marginal, the latter about 1.5x as long as stigmal; antenna (Fig. 26A) with F1 longest..... iv. D. acutus (Thomson)
- Forewing with postmarginal vein distinctly shorter than marginal, the latter nearly 2.0x as long as stigmal.....
- v. D. colemani (Crawford)

1. Dinarmus vagabundus (Timberlake)

Bruchobius vagabundus Timberlake, 1926:305.

Dinarmus vagabundus (Timberlake) Boucek, Subba Rao & Farooqi, 1978 : 442.

Dinarmus vagabundus (Timberlake); Mani, 1989 : 567.

Distribution : INDIA: Punjab, Karnataka.

ii. Dinarmus laticeps (Ashmead)

(Fig. 26 D-J)

Bruchobius laticeps Ashmead, 1904: 313.

Dinarmus laticeps (Ashmead) Waterston, 1921: 14.

Dinarmus laticeps (Ashmead); Delucchi, 1956: 243.

Dinarmus laticeps (Ashmead); Mani, 1989: 65.

Material examined : 10♀♀, 6♂♂. INDIA: Uttar Pradesh, Aligarh, by rearing Bruchus sp. on pods, 20.i.1992 (Sudhir Singh).

Body length : 1.8 mm.

Some additional characters of this species are as follows:
Body black, pubescent; antenna with scape, pedicel and anelli honey yellow, remaining parts dark brown. Head wider than thorax (82:77); ocelli with POL nearly 1.4x as long as OOL (18:13); antenna (Fig. 26 G) with scape 7.2x as long as wide (29:4), Fl 2.0x as long as wide (11:5.5) distinctly longer than the rest, club as long as preceding two funicle segments together; mesoscutum (Fig. 26 H) slightly more than 2.0x as wide as long (77:34), as long as scutellum (34:34); propodeum with callus setose; forewing (Fig. 26 I) with marginal, postmarginal and stigmal veins in the ratio of 19:24:16, costal cell broad, slightly less than 6.0x as long as wide.

iii. Dinarmus maculatus (Masi)

Sphaerakis maculata Masi, 1924b: 157.

Bruchobius maculatus Mani, 1939a: 76.

Dinarmus maculatus (Masi) Boucek, Subba Rao & Farooqi, 1978: 442.

Distribution : INDIA.

iv. Dinarmus acutus (Thomson)

(Fig. 26 A-C)

Pteromalus robustus Walker, 1847: 230. (nec Walker, 1835).

Dinarmus acutus Thomson, 1878: 56.

Pteromalus kollari Dalla Torre, 1898: 131.

Sphaerakis mayri Masi, 1924a: 215.

Bruchobius mayri Mani, 1939: 76.

Dinarmus acutus Thomson; Delucchi, 1956: 243.

Dinarmus acutus Thomson; Boucek, Subba Rao & Farooqi, 1978: 441.

Dinarmus robustus (Walker) Mani, 1989: 567.

Material examined : 400. INDIA: Uttar Pradesh, Aligarh, 8.iv.1990 (Jamal Ahmad).

Body length : 2.0 mm.

Body black with metallic green reflections; antennae with scape, pedicel and anelli yellowish, remaining portion orange, with slight brownish tinge. Head in dorsal view 3.3x as wide as thick (94:28), distinctly wider than thorax (94:86); ocelli with POL 1.5x as long as OOL (20:13); antenna (Fig. 26 A) with scape 7.0x as long as wide (28:4), F1 1.5x as long as wide

(9:6), longer than remaining funicle segments together; mesoscutum less than 2.0x as wide as long (86:46), longer than scutellum (46:40), the latter distinctly wider than long (50:40); forewing (Fig. 26B) with marginal, postmarginal and stigmal in the ratio of 25:25:17; costal cell 5.3x as long as wide (53:10).

Comments : Although Pteromalus robustus has priority over D. acutus, however, it is suppressed by the latter as it was based on male, whose female described earlier (1835:488) had already been transferred under Trichomalus. Hence, the next available name D. acutus is accepted valid. This leads to D. robustus (Walker) erected as valid name by Mani (1989:567), automatically a synonym again.

v. Dinarmus colemani (Crawford)

Bruchobius colemani Crawford, 1913: 250.

Sphaerakis colemani Masi, 1924b: 157.

Dinarmus colemani (Crawford) Boucek, Subba Rao & Farooqi, 1978: 442.

Dinarmus colemani (Crawford); Mani, 1989: 569.

Distribution : INDIA: Bihar, Delhi, Karnataka.

vi. Dinarmus basalis (Rondani)

Entedon basalis Rondani, 1877: 174.

Dinarmus basalis (Rondani); Boucek, Subba Rao & Farooqi, 1978: 442.

Dinarmus basalis (Rondani); Mani, 1989: 569.

Distribution : INDIA: Andhra Pradesh, Bihar, Karnataka, Rajasthan.

Fig. 26 A-C. Dinarmus acutus(Thomson), ♀

A. Antenna

B. Forewing

C. Part of ovipositor

Fig. 26 D-J. Dinarmus laticeps(Ashmead), ♀

D. Maxillary & labial palpi

E. Left mandible

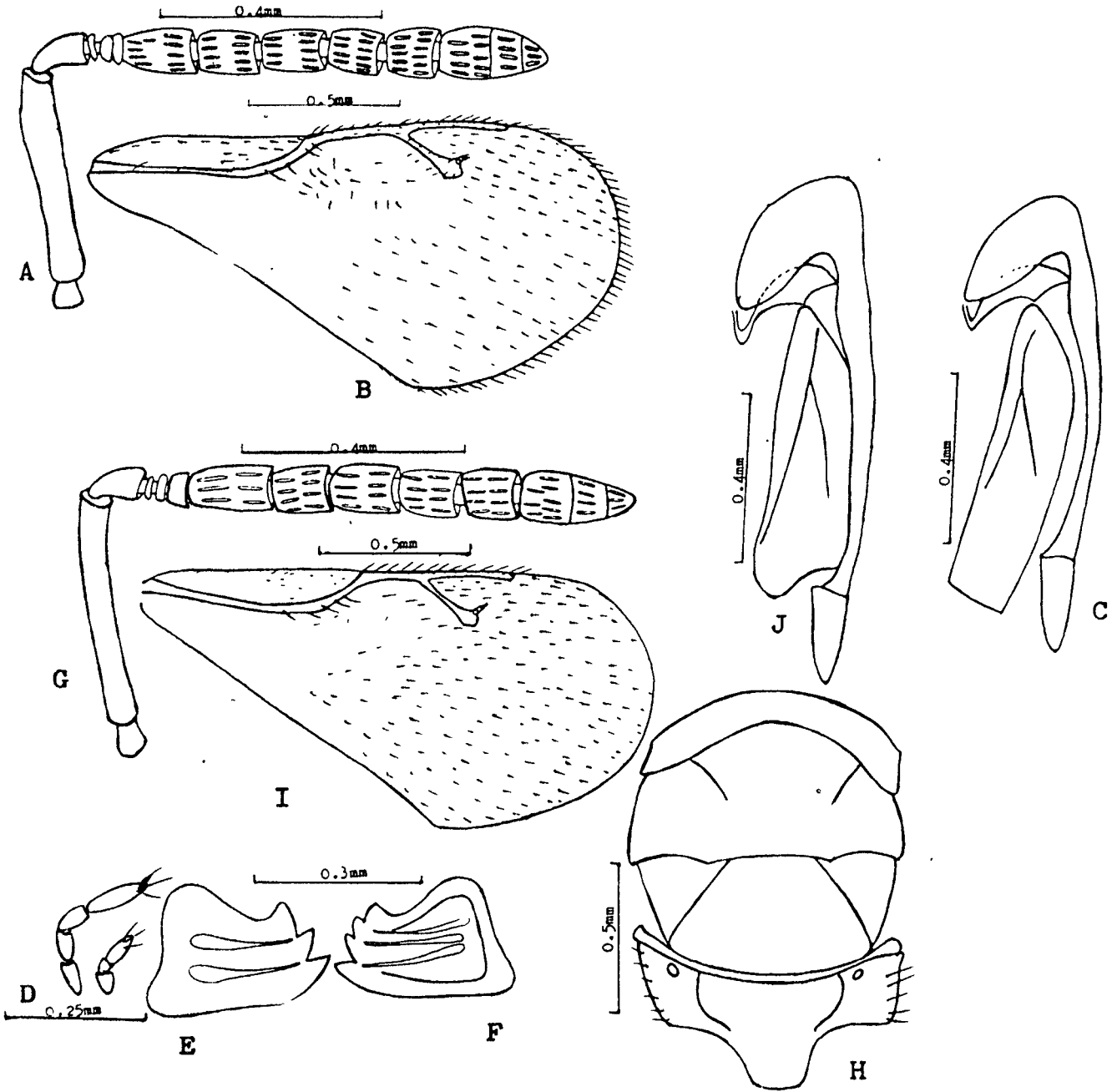
F. Right mandible

G. Antenna

H. Thorax

I. Forewing

J. Part of ovipositor



(Fig. 26)

Genus **PROPICROSCYTUS** Szelenyi

Propicroscytus Szelenyi, 1941: 123.

Type species : Arthrolysis trilongifasciatus Girault, by original designation.

Obtusiclava Subba Rao, 1973: 627.

Type species : Obtusiclava oryzae Subba Rao, by monotypy and original designation.

Propicroscytus Szelenyi; Boucek, 1988: 410.

This genus bears some similarity with Norbanus Walker in the structure of head and antennae, which differs markedly in having antennal club with spicula, large pronotum and compact thorax. It is associated with Pteromalini of subfamily Pteromalinae and distributed to South-East Asia and Australia with 3 spp. reported so far, being mostly parasitic on gall making Diptera on mango, rice and many other weeds of family Graminae.

Diagnostic Characters : Body dark, with or without reflections; anterior margin of clypeus slightly emarginate; mandibles usually 4-dentate; maxillary and labial palpi 4- and 3-segmented respectively; antennae inserted above lower level of eyes, 13-segmented, with 6-segmented funicle and 2 anelli; pronotum anteriorly carinate or sloping abruptly; mesoscutum with parapsidal grooves incomplete; propodeum with nucha small; forewings hyaline, with marginal and postmarginal veins

separately longer than stigmal; hind tibiae with one spur; gaster usually with longitudinal dark markings, longer than head and thorax together, sessile or subsessile; ovipositor hidden.

The genus is represented by two species from India. A key to their separation is given below.

Key to the Indian species of Propicroscytus Szelenyi based on females

1. Foreleg (Fig. 27 D) with coxa and femur blackish brown; antenna (Fig. 27.B) with club dorsally curved; forewing (Fig. 27C) with marginal vein 2.7x as long as stigmal (35:13); pronotum sloping abruptly, without distinct carina. i. P. indicus Subba Rao
- Foreleg with coxa and femur yellow; antenna (Fig. 27 G) with club normal; forewing (Fig. 27 H) with marginal vein 3.6x as long as stigmal (47:13); pronotum with distinct carina
..... ii. P. mirificus (Girault)

i. Propicroscytus indicus Subba Rao

(Fig. 27 A-E)

Propicroscytus indicus Subba Rao, 1981: 474.

Propicroscytus indicus Subba Rao; Boucek, 1988: 410.

Material examined : 400. INDIA: Uttar Pradesh, Aligarh, 17.x.1990 (Jamal Ahmad).

Body length : 2.5 mm.

Some additional characters of this species are as follows: Head and thorax black, non metallic; eyes coppery; antennae including anelli and gaster yellow. Head 1.4x as wide as thorax (65:45); ocelli with OOL longer than POL (14:12); eye 2.0x as long as wide (36:18); antenna (Fig. 27B) with flagellum shorter than the width of head (62:65); forewing (Fig. 27 C) with marginal, postmarginal and stigmal in the ratio of 35:30:12; gaster slightly more than 2.0x as long as wide.

Comments : Boucek (1988:410) opines P. indicus probably a synonym of P. mirificus. The present work however considers the former to be a distinct species, not merely on the basis of different body colouration, but many other characters, as provided in the key and above.

ii. Propicroscytus mirificus (Girault)

(Fig. 27 F-J)

Arthrolysis mirificus Girault, 1915c: 191.

Propicroscytus mirificus (Girault) Szelenyi, 1941: 123.

Arthrolysis flaviventris Girault & Dodd, in Girault, 1915c:190.

Arthrolysis trilongifasciatus Girault, 1915c: 191.

Propicroscytus mirificus (Girault); Boucek, Subba Rao & Farooqi, 1978: 453.

Propicroscytus mirificus (Girault); Boucek, 1988: 410.

Material examined : 26♀, 16♂^{↑↑} INDIA: Uttar Pradesh, Aligarh, 5.ix.1990 (Jamal Ahmad).

Body length : 2.5 mm.

Some additional characters of this species are as follows: Head and thorax with metallic green reflections; eyes red; antennae orange coloured except first anellus yellowish; gaster orange. Head slightly less than 1.4x as wide as thorax (55:40); ocelli with POL slightly longer than OOL (12:11); eye nearly 1.7x as long as wide (22:13); flagellum nearly 1.7x as long as the width of head (95:55); forewing (Fig. 27H) with marginal, postmarginal and stigmal in the ratio of 46:42:13; gaster slightly less than 3.0x as long as wide (80:27).

Fig. 27 A-E. Propicroscytus indicus Subba Rao, ♀

A. Maxillary & Labial palpi

B. Antenna

C. Forewing

D. Part of fore leg.

E. Part of ovipositor

Fig. 27 F-I. Propicroscytus mirificus Girault, ♀

F. Mandible

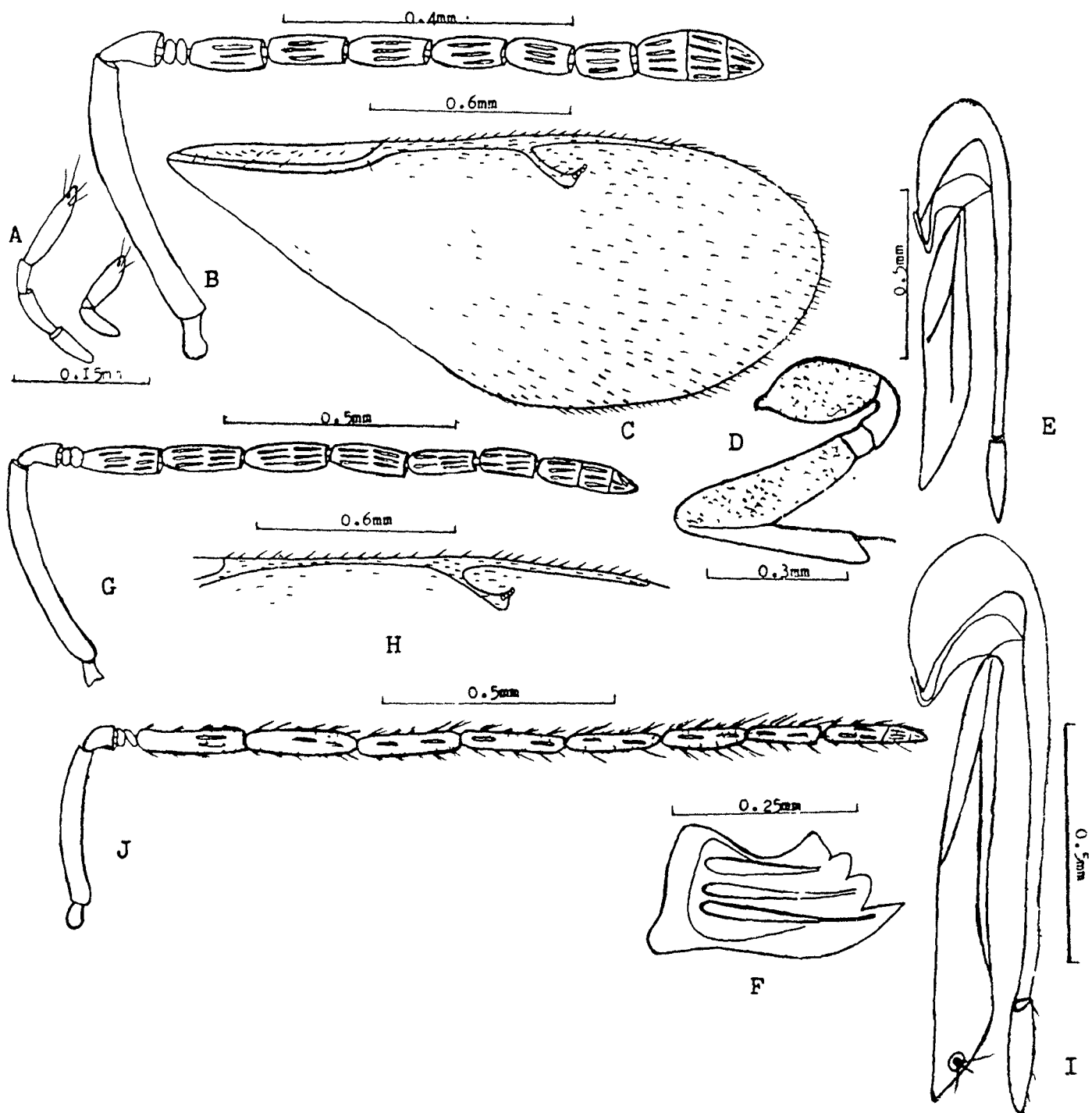
G. Antenna

H. Part of forewing venation

I. Part of ovipositor

Fig. 27 J. Propicroscytus mirificus Girault, ♂

J. Male antenna



(Fig. 27)

Genus **ISCHYROPTYX** Delucchi

Ischyroptyx Delucchi, 1956: 256.

Type species : Dinarmus ligusticus Masi, 1921b: by original designation.

Ischyroptyx Delucchi; Graham, 1969: 433.

This genus bears close resemblance with Oxysyschus and Necocatolaccus in general body form and large size, but can be easily separated on the basis of basally thickened marginal vein, antenna with third anellus large, quadrate, and propodeum excavated behind. It is allied with Pteromalini of subfamily Pteromalinae and is represented by a single species from the world, known so far.

Diagnostic Characters : Body black, with light green reflections; clypeus emarginate medially; mandibles heterodont, right 4-left 3-dentate; maxillary and labial palpi 4- and 3-segmented respectively; antennae inserted about in the middle of face, 13-segmented, with 5-segmented funicle and 3 anelli, the third anellus large, subquadrate; pronotum rounded off anteriorly; mesoscutum with parapsidal grooves incomplete; propodeum with median carina and plicae present; nucha indistinct; forewings with marginal vein slightly thickened at base, longer than postmarginal and stigmal separately; hind tibiae with one spur; gaster sessile, longer than head and thorax together; ovipositor hidden.

The genus is known to contain a single species from India, reported so far.

Ischyroptyx ligusticus (Masi)

(Fig. 28A-G)

Dinarmus ligusticus Masi, 1921b: 271.

Ischyroptyx ligusticus (Masi) Delucchi, 1956: 256.

Ischyroptyx ligusticus (Masi); Graham, 1969: 433.

Material examined : 10. INDIA: Uttar Pradesh, Aligarh, 15.iii.1987 (Jamal Ahmad).

Body length : 2.0 mm.

Comments : This species is reported identified for the first time from India. It can be easily identified by following set of characters: Antenna (Fig. 28E) with third anellus large, subquadrate, funicle segments distinctly longer than wide, F1 longest, 3.0x as long as wide (15:5); mandibles heterodont (Fig. 28C,D), right 4 - left 3-dentate; forewing (Fig. 28F) with marginal vein slightly thickened at base, with marginal, postmarginal and stigmal in the ratio of 29:23:15; propodeum (Fig. 28G) smooth, with distinct median carina, bifurcating posteriorly.

Fig. 28 A-G. Ischyroptyx ligusticus(Masi), ♀

A. Part of head with clypeus

B. Maxillary & labial palpi

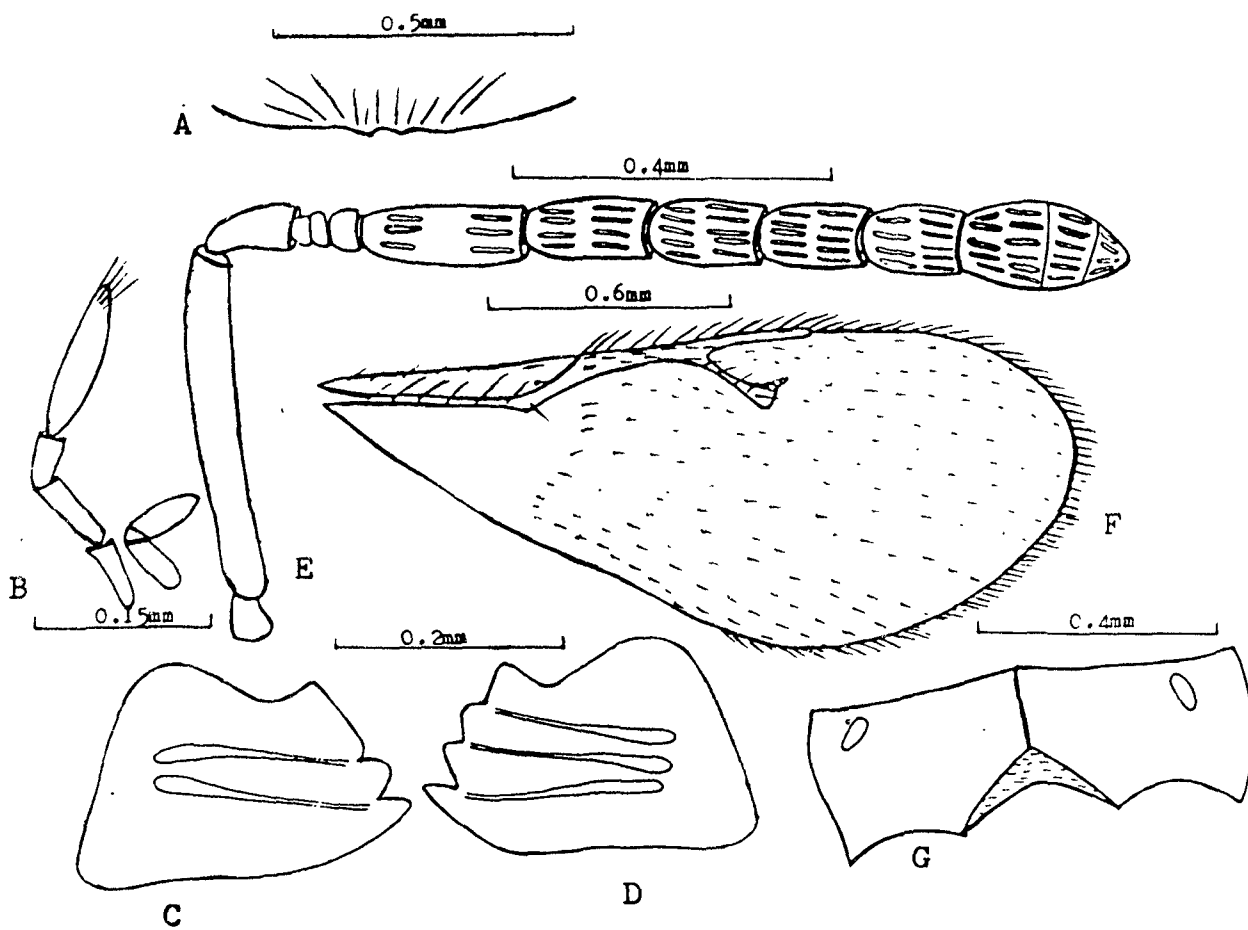
C. Left mandible

D. Right mandible

E. Antenna

F. Forewing

G. Propodeum



(Fig. 28)

Genus **HOMOPORUS** Thomson

Homoporus Thomson, 1878: 60 (as subgenus of Merisus Walker).

Type species : Pteromalus fulvicornis Walker; designated by Ashmead, 1904.

Phaenacra Foerster, 1878: 51.

Type species : Phaenacra nubigera Foerster, by monotypy.

Parapteromalus Ashmead, 1904: 320.

Type species : Parapteromalus isosomatis, Ashmead, by monotypy.

Merisoporus Masi, 1924a: 226.

Type species : Pteromalus luniger Nees, 1834, by original designation.

Pseudomerisus Erdos & Novitzky in Erdos, 1953: 236.

Type species : Pseudomerisus stipae Erdos & Novitzky, by original designation.

Homoporus Thomson; Szelenyi, 1956: 170.

Homoporus Thomson; Graham, 1969: 444.

Since Homoporus and Phaenacra were published in the same year (1878), the priority affair therefore remained unsettled for long. Most of the workers including Kurdjumov (1913) treated Homoporus as a synonym of Phaenacra. Delucchi (1957) for the first time adopted the name Homoporus while revising European species, and continues to be accepted thenceforth. Peck et al (1964) placed this genus under Merisini of subfamily Pteromalinae. Graham (1969) and Boucek, Subba Rao & Farooqi

(1978) accepted its subfamily status. Boucek (1988) allied it with Pteromalini of subfamily Pteromalinae.

This genus is represented by dozens of species from Europe and North America, but fewer from other continents. It has been recorded for the first time from India.

Diagnostic Characters : Body dark with green reflections; occipital carina present; mandibles usually 4-dentate or heterodont, with right 4- and left 3-dentate; clypeus shallowly emarginate; antennae inserted above lower level of eyes, 13-segmented, with 6-segmented funicle and 2 anelli, in some males 5-segmented funicle and 3 anelli, club usually acuminate with or without terminal stylus; pronotum carinate anteriorly; mesoscutum with parapsidal grooves incomplete; propodeum with nucha present; forewings hyaline, venations well developed; hind tibiae with one spur; gaster sessile.

The genus is known to contain two species from India, reported for the first time. A key to their separation is given below:

**Key to Indian species of Homoporus Thomson, based
on males**

1. Mandibles 4-dentate; scutellum with frenum; propodeum with plicae distinct, with indication of costula; forewing (Fig. 29B) with marginal vein subequal to or slightly longer than

postmarginal (22:21), 2.0x as long as stigmal; callus, dorsal surface of coxae and basal tergite of gaster laterally setose
 i. H. arestor Walker
 Mandibles heterodont, right 4- left 3-dentate; scutellum without frenum; propodeum without plicae and costula; forewing (Fig. 29D) with marginal vein distinctly longer than postmarginal (26:17), 3.0x as long as stigmal; callus, dorsal surface of coxae and basal tergite of gaster laterally bare
 ii. H. subniger (Walker)

i. Homoporus arestor (Walker)

(Fig. 29A-B)

Pteromalus arestor Walker, 1848: 124.

Homoporus chlorogaster Thomson, 1873: 66.

Homoporus (Pseudomerisus) simplex Szelenyi, 1956: 171.

Homoporus arestor (Walker) Boucek, 1965: 35.

Homoporus arestor (Walker); Graham, 1969: 452.

Material examined : 10[♂]. INDIA: Orissa, 5.v.1987 (Jamal Ahmad).

Body length : 1.5 mm.

Comments : This species has been reported for the first time from India. Male of this species runs well in Graham's key (1969:448) and can be easily identified on the basis of following characters : Combined length of pedicel and flagellum 1.7x the width of head (69:40); funicle segments distinctly longer than wide; marginal vein 2.0x as long as stigmal (22:11); mandibles

4-dentate. Some additional characters are as follows : Body green with gaster blackish brown, antennae dark brown except scape orange; legs testaceous. Antenna (Fig. 29A) hairy, scape slightly shorter than the eye-length (17:18) exceeding beyond vertex; scutellum with finely impressed frenal groove; propodeum with faintly marked costula, plicae strong; gaster distinctly shorter than thorax (42:52), 2.4x as long as wide.

ii. Homoporus subniger (Walker)

(Fig. 29C-E)

Pteromalus subniger Walker, 1835b: 95.

Pteromalus chalcomelas Walker, 1836: 476.

Homoporus kurdjumovi Szelenyi, 1956: 179.

Homoporus danuvianus Delucchi, 1957: 413.

Homoporus subniger (Walker) Graham; 1969: 451.

Material examined : 200^{♂♂}. INDIA: Haryana, 9.ix.1992 (M. Yousuf).

Comments : This species is reported for the first time from India. It runs well in Graham's key (1969:448) and can be easily diagnosed by following set of characters: Body colour as that of H. arestor, except head and thorax more bright green. POL 1.6x as long as OOL; head 1.4x as wide as thorax; antenna (Fig. 29C) hairy, pedicel 1.6x as long as wide, F1 longer than remaining segments; pronotum carinate; propodeum without plicae, median carina and costula; forewing (Fig. 29D) sparsely setose, marginal, postmarginal and stigmal in the ratio of 26:17:9.

Fig. 29 A-B. Homoporus arestor(Walker), ♂

A. Antenna

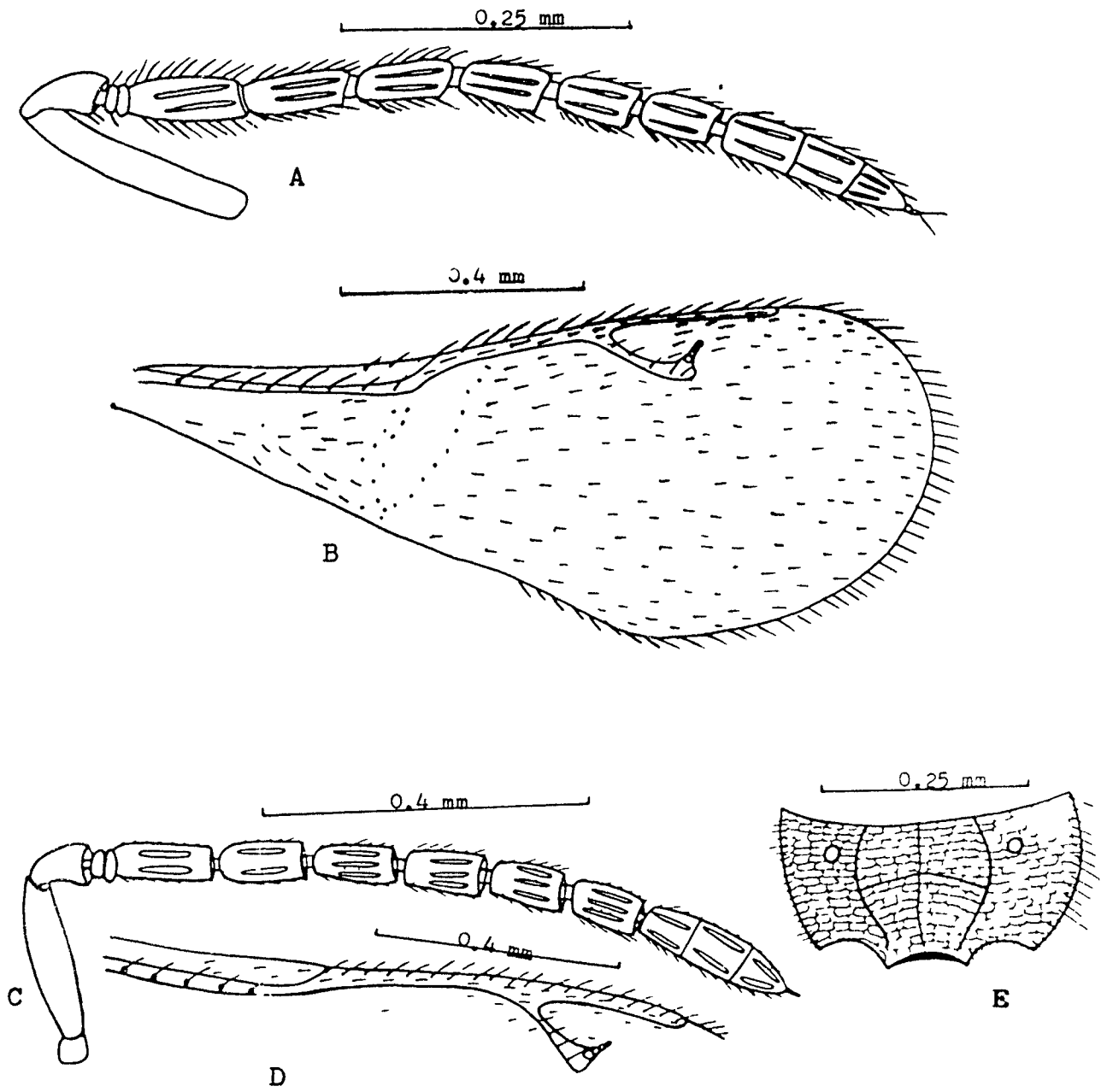
B. Forewing

Fig. 29 C-E. Homoporus subniger(Walker), ♂

C. Antenna

D. Part of forewing venation

E. Propodeum



(Fig. 29)

Genus CALLITULA Spinola

Callitula Spinola, 1811: 151.

Type species : Callitula bicolor Spinola, by monotypy.

Micromelus Walker, 1833: 371.

Type species : Micromelus rufomaculatus Walker, by designation of Westwood, 1839: 69.

Baeotomus Foerster, 1856: 145. Unnecessary replacement name for Micromelus, supposedly preoccupied.

Pterosemoidea Girault, 1913d: 318.

Type species : Pterosemoidea flavipes Girault, by original designation.

Apteroosemoidea Girault, 1913d: 318.

Type species : Apteroosemoidea nigriviridis Girault, by original designation.

Eurydinotella Girault, 1913d: 319.

Type species : Eurydinotella prima Girault, by original designation.

Pseudosphegigasterus Girault, 1913d: 322.

Type species : Pseudosphegigasterus grotiusi Girault, by original designation.

Eurydinotelleus Girault, 1913d: 324.

Type species : Eurydinotelleus silvensis Girault, by original designation.

Polycystomyia Dodd, in Girault, 1915b: 338.

Type species : Polycystomyia punctata Dodd, by original designation.

Callitula Spinola; Graham, 1969: 458.

Callitula Spinola; Boucek, 1988: 439.

Most of the early workers placed this genus under the tribe Merisini of subfamily Pteromalinae. Boucek (1988) shifted it under the tribe Pteromalini. It is almost cosmopolitan in distribution, representing about 23 species from the world, including 4 species from India, known so far. These are mostly parasites of small Diptera, especially Agromyzidae.

Diagnostic Characters : Body dark with metallic green reflections; anterior margin of clypeus emarginate medially; mandibles heterodont, right 4- left 3-dentate, rarely both 4-dentate; maxillary and labial palpi 4 and 3-segmented respectively; antennae inserted well above the lower level of eyes, 13-segmented with 5-segmented funicle and 3 anelli, club acuminate apically; pronotum carinate anteriorly; mesoscutum with parapsidal grooves incomplete; propodeum with nucha well developed; forewings hyaline, marginal vein longer than post-marginal and stigmal separately; gaster petiolate; ovipositor hidden. The genus is known to contain four species (including three new records) from India, reported so far. A key for their separation is given below.

**Key to Indian species of Callitula Spinola, based on
females**

1. Antenna with 6-segmented funicle and 2 anelli; gastral petiole long i. Callitula rugosa (Waterston)

- Antenna with 5-segmented funicle and 3 anelli; gastral petiole short 2
- 2. Antenna (Fig. 30A) inserted slightly below the upper level of eyes, scape reaching much beyond the vertex, distinctly longer than an eye-length; clypeus deeply emarginate anteriorly; large species ii. C. elongata (Thomson)
- Antenna inserted about in the middle of face, scape hardly or just reaching the level of vertex, distinctly longer than an eye-length; clypeus moderately emarginate anteriorly; small species 3
- 3. Antenna (Fig. 30E) with pedicel distinctly longer than F1; gaster (Fig. 30G) with basal tergite as long as the preceding tergite; legs with coxae yellow iii. C. ferrierei Boucek
- Antenna (Fig. 30J) with pedicel distinctly shorter than F1; gaster (Fig. 30L) with basal tergite large, as long as following three tergites together; legs with coxae dark iv. C. bicolor Spinola

i. Callitula rugosa (Waterston)

Trigonogastra rugosa Waterston, 1915: 326.

Callitula rugosa (Waterston) Boucek, Subba Rao & Farooqi, 1978: 437.

Distribution : INDIA.

ii. Callitula elongata (Thomson)

(Fig. 30A-C)

Merisus (Baeotomus) elongatus Thomson, 1878: 62.

Callitula elongata (Thomson) Boucek, 1964: 10.

Callitula elongata (Thomson); Graham, 1969: 460.

Material examined : 30♂♂ INDIA: Haryana, Rohtak, 1.iv.1991
(M. Yousuf).

Comments : This species is recorded for the first time from India. It can be easily separated from others by characters supplied in the key. Supplementary characters for males are as follows : Body bright green with gaster dark brown; head (Fig. 30A) 1.4x as wide as long (42:30), distinctly wider than maximum width of thorax (40:25); antenna (Fig. 30B) yellow, toruli placed much closer to median ocellus than clypeus (4:22), eyes chocolate coloured, as long as malar space (15:15); clypeus strigose, emarginate medially; pronotum indistinctly carinate, twice as wide as long (20:10); forewing (Fig. 30C) with marginal, postmarginal and stigmal in the ratio of 20:15:7; legs yellow; gaster longer than wide (35:26), distinctly shorter than thorax (35:45).

iii. Callitula ferrierei Boucek

(Fig. 30D-G)

Callitula ferrierei Boucek, 1964: 10.

Callitula ferrierei Boucek; Graham, 1969: 460.

Material examined : 200. INDIA: Uttar Pradesh, Aligarh, 10.ix.1990 (Jamal Ahmad).

Comments : This species is reported for the first time from India. Some additional characters of this species are as follows: Head and thorax with metallic green reflections; antennae, ocelli and legs yellow; eyes reddish brown; gaster brownish yellow. Head distinctly wider than thorax (46:33); antenna (Fig. 30E) with scape slightly exceeding the median ocellus; eye slightly more than 1.3x as long as wide (22:16); malar space distinctly less than transverse diameter of an eye (9:16); clypeus broadly emarginate, strigose; thorax slightly more than 1.5x as long as wide (52:33); forewing (Fig. 30F) with marginal, postmarginal and stigmal veins in the ratio of 24:19:10; gaster shorter than thorax.

The Indian material resembles European in all respect except, clypeus broadly emarginate and F1 slightly longer than all anelli together.

iv. Callitula bicolor Spinola

(Fig. 30H-L)

Callitula bicolor Spinola, 1811: 151.

Micromelus rufomaculatus Walker, 1833: 465.

Pteromalus plagiatus Nees, 1834: 115.

Callitula bicolor Spinola; Boucek, 1964: 10.

Callitula bicolor Spinola; Graham, 1969: 460.

Material examined : 1500. INDIA: Uttar Pradesh, Aligarh, 10.x.1990 (Jamal Ahmad).

Comments : This species has been recorded for the first time from India. It runs well in Graham's key (1969:459) and can be easily identified by characters given in the key. Some additional characters are as follows : Body colour as C. ferrierei, except antennae brown excluding basal portion of scape and first anellus yellowish; legs with coxae fuscous; antenna (Fig. 30J) with scape reaching distinctly beyond vertex; pronotum moderately carinate; forewing (Fig. 30K) with marginal, postmarginal and stigmal in the ratio of 25:17:10; gaster as long as thorax with basal tergite as long as the preceding one, about twice as long as third.

Fig. 30 A-C. Callitula elongata(Thomson), ♂

A. Head in frontal view

B. Antenna

C. Forewing

Fig. 30 D-G. Callitula ferrierei Boucek, ♀

D. Maxillary & labial palpi

E. Antenna

F. Part of forewing

G. Gaster

Fig. 30 H-M. Callitula bicolor Spinola, ♀

H. Left mandible

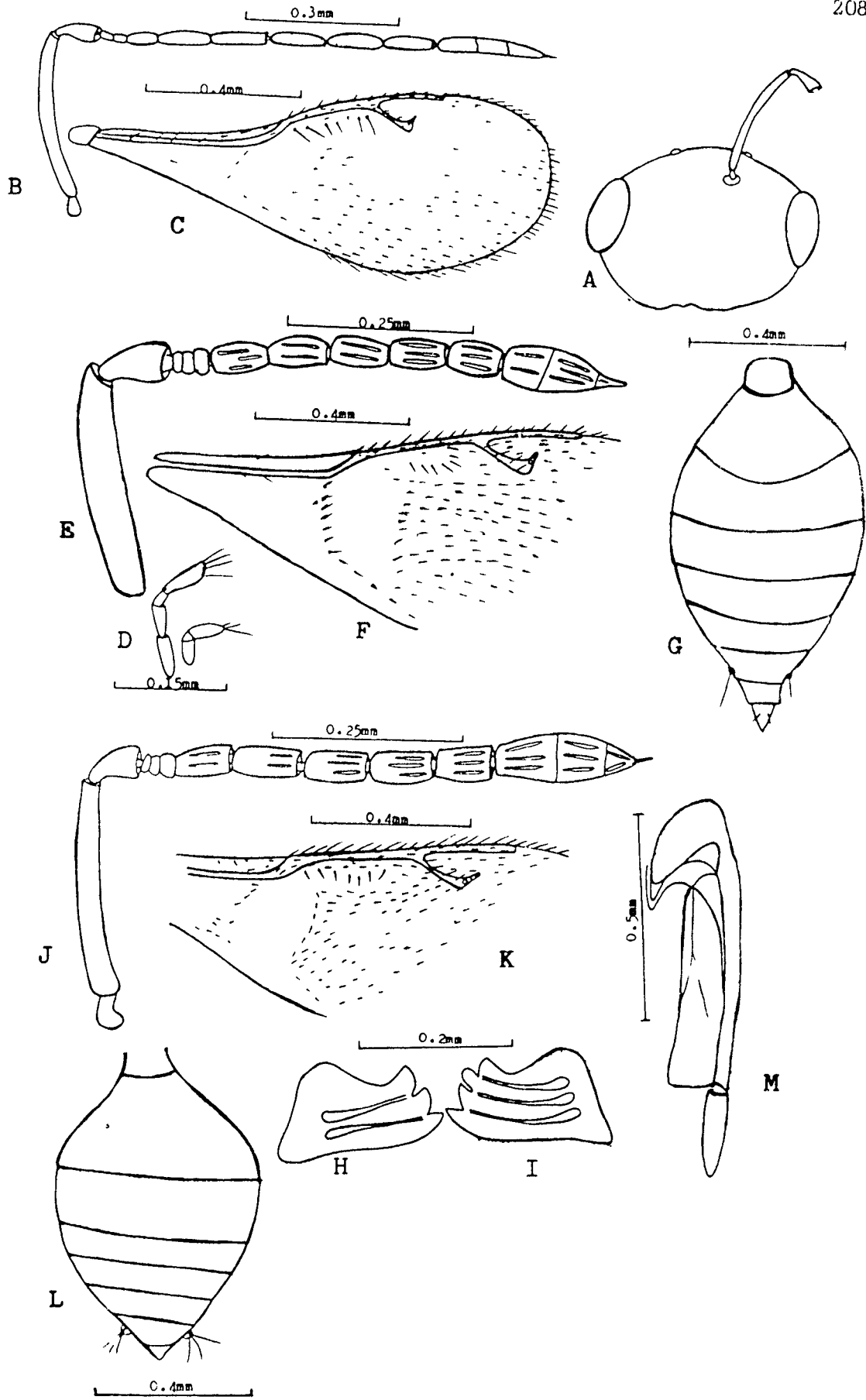
I. Right mandible

J. Antenna

K. Part of forewing

L. Gaster

M. Part of ovipositor



(Fig. 30)

Genus TRICHOMALOPSIS Crawford

Pteromalus Thomson, 1878: 155.

Trichomalus Ashmead, 1904: 318 (nec Thomson, 1878).

Trichomalopsis Crawford, 1913: 251.

Type species : Trichomalopsis shirakii Crawford, by monotypy and original designation.

Eupteromalus Kurdjumov, 1913: 12.

Type species : Pteromalus nidulans Thomson, by original designation.

Nemicromelus Girault, 1917: 4.

Type species : Merisus subapterus Riley, by original designation.

Metadicylus Girault, 1926b: 71.

Type species : Metadicylus australiensis Girault, by monotypy.

Eupteromalus Kurdjumov; Grham, 1969: 737.

Eupteromalus (Kurdjumov) Kamijo & Grissell, 1982: 77.

This genus falls under the tribe Pteromalini of subfamily Pteromalinae. It was known as Eupteromalus for a long time until Kamijo & Grissell (1982:77) synonymized it under Trichomalopsis on priority basis. It resembles Pteromalus in general appearance, but differs mainly in having occiput carinate and nucha reticulate, which in Pteromalus is usually transversely striated.

The genus is represented by over 50 spp. from the world. India to date contains 7 spp. including new records and new additions. These are common parasites of cocoons and pupae of Lepidoptera, and some oriental species associated with rice paddy.

Diagnostic Characters : Body with metallic green reflections; mandibles 4-dentate or heterodont; maxillary and labial palpi 4- and 3-segmented respectively; antennae usually inserted at or above the lower level of eyes, 13-segmented with 6-segmented funicle and 2 anelli; occipital carina always present; pronotum usually carinate anteriorly, mesoscutum with incomplete parapsidal grooves; propodeum with nucha present; forewing hyaline, marginal and postmarginal separately longer than stigmal vein; hind tibiae with one spur; gaster sessile, ovipositor hidden.

The genus is known to contain seven species (including one new and four new records) from India. A key for their separation is given below :

**Key to the Indian species of Trichomalopsis Crawford
based on females**

1. Mandibles (Fig. 31F,G) heterodont, right 4- left 3-dentate; antenna (Fig. 31H) slender, F1 wider than pedicel, slightly shorter than F2; body dark green i. T. tigas (Walker)

- Mandibles always 4-dentate; other characters varying..... 2
- 2. Antenna (Fig. 31C) inserted at lower ocular line, flagellum strongly clavate with distal funicle segments transverse, club oval slightly longer than wide; forewing (Fig. 31D) basally setose, speculum small; pronotum indistinctly carinate
..... ii. T. pilosus sp.n.
- Antenna inserted usually above the lower ocular line, flagellum slender to gradually thickened distad club much longer than wide; forewing basally bare; pronotum usually carinate 3
- 3. Clypeus deeply incised medially; scutellum with distinct frenal groove; head thick, 1.85-1.95x as wide as long
..... iii. T. apanteloctena (Crawford)
- Clypeus weakly emarginate to subtruncate, scutellum without frenal groove; head usually 2.0-3.0x wider than long 4
- 4. Propodeum with callus thickly setose; antenna (Fig. 31M) with pedicel distinctly longer than anelli and F1 combined
..... iv. T. albopilosus (Graham)
- Propodeum with callus sparsely to moderately setose; other characters varying 5
- 5. Antenna (Fig. 32A) with second anellus large, subquadrate to quadrate, pedicel as long as anelli and F1 combined as wide as F1, the latter usually as long as F2; forewing with marginal vein a little longer than postmarginal
..... v. T. oryzae Kamijo
- Antenna with second anellus moderate sized, pedicel distinctly longer than anelli plus F1 together, the latter shorter than

- F2; forewing with marginal vein a little longer than postmarginal 6
6. Thorax depressed, weakly curved in lateral view; antenna inserted distinctly above the lower ocular line; pronotal collar not margined anteriorly; legs with coxae dark, concolorous with thorax vi. T. deplanata Kamijo
- Thorax not depressed, moderately curved in lateral view; antenna (Fig. 32E) inserted slightly above the lower ocular line; pronotal collar anteriorly carinate; legs with coxae testaceous, concolorous with femora vii. T. maurus Graham

i. Trichomalopsis tigris (Walker)

(Fig. 31F-J)

Pteromalus tigris Walker, 1839: 233.

Eupteromalus tigris (Walker); Graham, 1956b: 255.

Eupteromalus tigris (Walker); Graham, 1969: 767.

Material examined : 200. INDIA: Uttar Pradesh, Aligarh, University Campus, 12.x.1990 (Jamal Ahmad).

Comments : This species is reported for the first time from India and can be easily identified on the basis of characters provided in the key. It runs very close to apanteloctena (Crawford) and micropterus (Lindeman) but can be easily separated from the former in having flagellum with F1 wider than pedicel, distinctly longer than wide, body dark green; and with the latter in having head slightly less transverse,

2.08-2.15x as wide as long; femora brownish and tibiae sometimes medially infuscated.

ii. Trichomalopsis pilosus sp.n.

(Fig. 31A-E)

Female. Length 2.0 mm. Body black with metallic green reflections, gaster dark brown; ocelli light brown; eyes rusty; antennae, mouthparts, legs except coxae blackish brown; submarginal and distal half of stigmal vein brown, remaining parts of veins light brown to pale yellow; coxae black.

Head pubescent, wider than long in facial v w (52:41), slightly wider than thorax (52:48); ocelli in obtuse angled triangle, POL 1.4x as long as OOL (13:9); eye slightly pubescent, longer than wide (21:17), nearly 1.6x longer than malar space (21:13); malar sulcus vague; clypeus subtruncate anteriorly; mandible (Fig. 31B) 4-dentate; maxillary and labial palpi (Fig. 31A) 4- and 3-segmented respectively; antenna (Fig. 31C) inserted at the level of lower ocular line, toruli distinctly closer to clypeus than median ocellus (13:25), intertorular distance distinctly greater than a torular diameter (4.5:3), scape reaching the level of median ocellus, slightly less than 8.0x as long as wide (23:3), pedicel slightly more than 1.7x as long as wide (7:4) as long as anelli and F1 together, second anellus slightly thicker than the first, flagellum clavate, funicle segments wider than long, with their relative measurements (W:L) being; F1 (4:3.5), F2 (4:3), F3 (4.75:4),

F4 (5:3.5), F5 (6:3), F6 (7:3); club oval, about 1.2x as long as wide (10:8), slightly shorter than preceding three funicle segments together.

Thorax 1.3x as long as wide (65:48) ; pronotum indistinctly carinate mesoscutum 3.0x as wide as long (45:15), parapsidal grooves incomplete; scutellum as long as wide (22:22) with vaguely indicated frenal groove, posterior edge of scutellum with a row of large squarish spaces; propodeum with moderately converging plicae, median carina distinct; nucha well developed, nearly one-third as long as propodeum (6:17); forewing (Fig. 31D) hyaline, wholly setose except a small speculum below submarginal vein, relative lengths of marginal, postmarginal and stigmal in the ratio of 20:23:15; middle tibial spur distinctly shorter than basitarsus (6.5:10); hind tibia with single spur.

Gaster as long as thorax (65:65) with basal two tergites large, subequal; ovipositor (Fig. 31E) concealed.

Holotype Female. INDIA: Haryana, Rohtak, 1.iv.1991 (M. Yousuf).

Paratype 1♀. (Same data as above).

Comments : The new species closely resembles T. pomplicola Graham, but differs in following respect :

T. pomplicolaT. pilosus sp.n.

- | | |
|---|---|
| 1. Pedicel as long as anelli and F1 + F2 together. | 1. Pedicel as long as anelli and F1 together. |
| 2. Flagellum with F5 & F6 slightly wider than long. | 2. Flagellum with F5 & F6 strongly transverse. |
| 3. Club oblong, nearly 2.0x as long as wide. | 3. Club oval, about 1.2x as long as wide. |
| 4. Scutellum finely reticulate. | 4. Scutellum moderately reticulate. |
| 5. Forewing with basal cell with 8-13 hairs. | 5. Forewing with basal cell thickly setose, with 40-45 hairs. |
| 6. Gaster circular, basal tergite largest. | 6. Gaster acuminate, basal tergite short. |

iii. Trichomalopsis apanteloctena (Crawford)

Trichomalus apanteloctenus Crawford, 1911: 618.

Trichomalopsis shirakii Crawford, 1913: 252.

Eupteromalus parnarae Gahan, 1919: 522.

Eupteromalus apanteloctenus (Crawford); Minamikawa, 1954: 148.

Trichomalopsis apanteloctena (Crawford); Kamijo & Grissell, 1982: 80.

Distribution : INDIA: Tamil Nadu, Karnataka.

iv. Trichomalopsis albopilosus (Graham) comb.n.

(Fig. 31K-Q)

Eupteromalus albopilosus Graham, 1969: 753.

Material examined : 300, 10♂. INDIA: Uttar Pradesh, Aligarh, University Campus, 19.iv.1988 (Jamal Ahmad).

Comments : This species can be easily separated from others by characters given in the key. The Indian material though resembles European, but differs in following respect :

<u>European material</u>	<u>Indian material</u>
1. POL 1.3-1.4x as long as OOL.	1. POL 1.7x as long as OOL.
2. Genae strongly convergent.	2. Genae moderately convergent.
3. Antennae inserted at the level of lower ocular line.	3. Antennae inserted moderately above the lower ocular line.
4. Scape as long as the eye-length.	4. Scape distinctly shorter than the eye-length.

v. Trichomalopsis oryzae Kamijo & Grissell

(Fig. 32A-D)

Trichomalopsis oryzae Kamijo & Grissell, 1982: 82.

Material examined : 1000. INDIA: Uttar Pradesh, Aligarh, University Campus, 20.x.1990 (Jamal Ahmad).

Comments : This species is recorded for the first time from India. It can be easily identified on the basis of its subquadrate second anellus. Some additional characters are as follows : Clypeus slightly emarginate anteriorly; mandibles 4-dentate; malar space nearly half as long as the eye-length (13:26); antennae (Fig. 32A) inserted distinctly above the lower ocular line, scape nearly as long as the eye-length (25.5:26), reaching slightly beyond the median ocellus, F1 shorter than F2 (5:5.5), slightly wider than the pedicel (5:4.8); pronotum sharply carinate anteriorly with a smooth strip at hind margin; propodeum with distinct median carina and plicae; forewing (Fig. 32B) with basal cell bare, speculum open below, marginal vein subequal to postmarginal.

Variations : Antenna with second anellus may be quadrate to distinctly longer than first, F1 as long as or shorter than F2.

vi. Trichomalopsis deplanata Kamijo & Grissell

Trichomalopsis deplanata Kamijo & Grissell, 1982: 84.

Distribution : INDIA: West Bengal.

vii. Trichomalopsis maurus (Graham)

(Fig. 32E-F)

Eupteromalus maurus Graham, 1969: 770.

Trichomalopsis maurus (Graham); Kamijo & Grissell, 1982: 83.

Material examined : 400, 10[♂] INDIA: Uttar Pradesh, Aligarh, University Campus, 20.x.1990 (Jamal Ahmad).

Comments : This species has been reported for the first time from India. It can be easily separated from other species on the basis of characters provided in the key as well as following additional characters : Clypeus subtruncate medially, striate; eye 2.5x as long as malar space (18:17); antenna (Fig. 32E) inserted slightly above the lower ocular line, scape nearly as long as the eye-length (18:18), pedicel distinctly longer than anelli and F1 combined (5:4.5), F1 distinctly shorter than F2 (2:3), subquadrate to slightly wider than long, less wider than pedicel; pronotal collar distinctly carinate anteriorly.

Fig. 31 A-E. Trichomalopsis pilosus sp.n., ♀

A. Maxillary & labial palpi

B. Mandible

C. Antenna

D. Forewing

E. Part of ovipositor

Fig. 31 F-J. Trichomalopsis tigasis (Walker), ♀

F. Left mandible

G. Right mandible

H. Antenna

I. Part of forewing venation

J. Part of ovipositor

Fig. 31 K-O. Trichomalopsis albopilosus (Graham), ♀

K. Maxillary & labial palpi

L. Mandible

M. Antenna

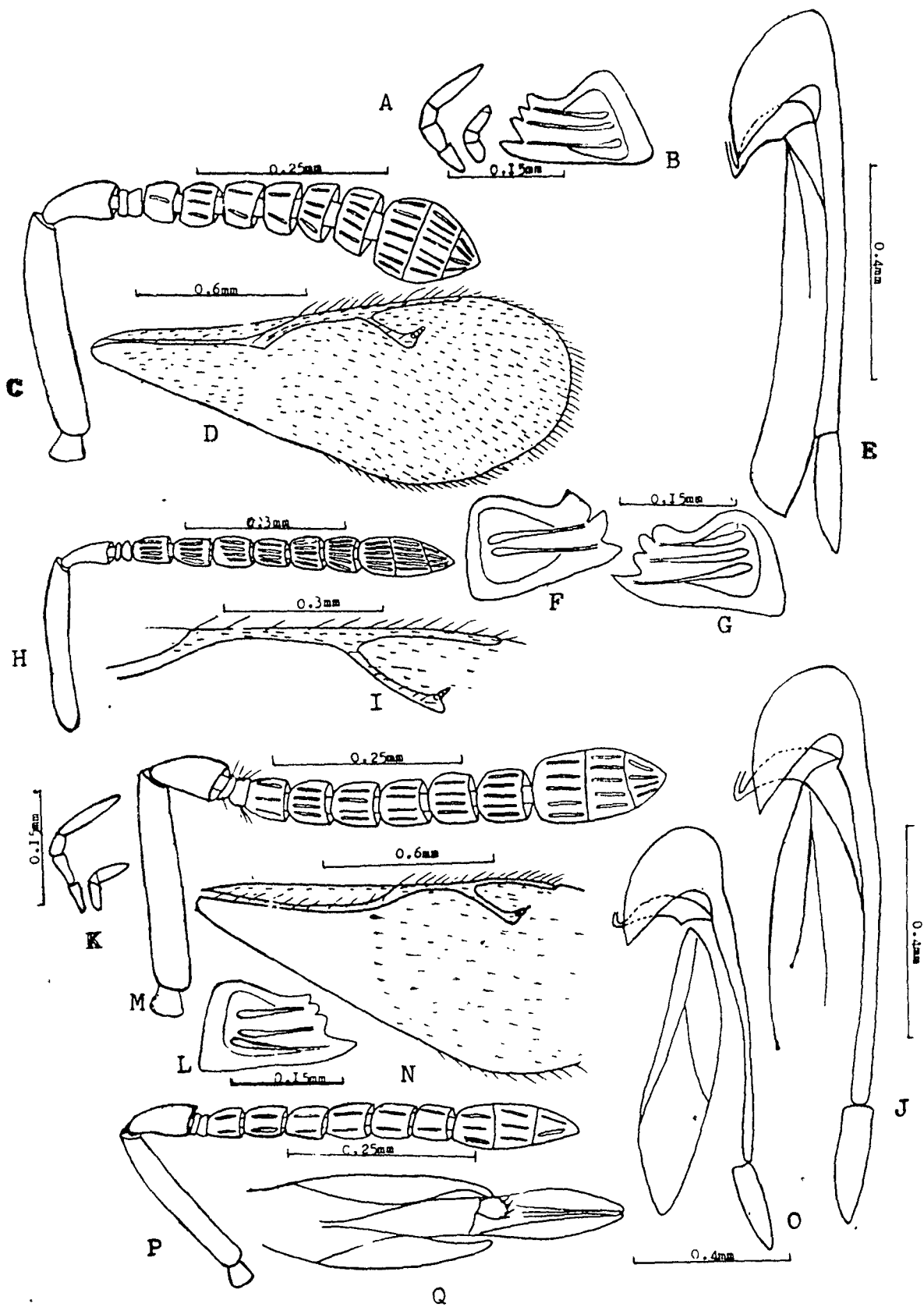
N. Part of forewing

O. Part of ovipositor

Fig. 31 P-Q. Trichomalopsis albopilosus (Graham), ♂

P. Antenna

Q. Male genitalia



(Fig. 31)

Fig. 32 A-C. Trichomalopsis oryzae Kamijo, ♀

A. Antenna

B. Part of forewing venation

C. Part of ovipositor

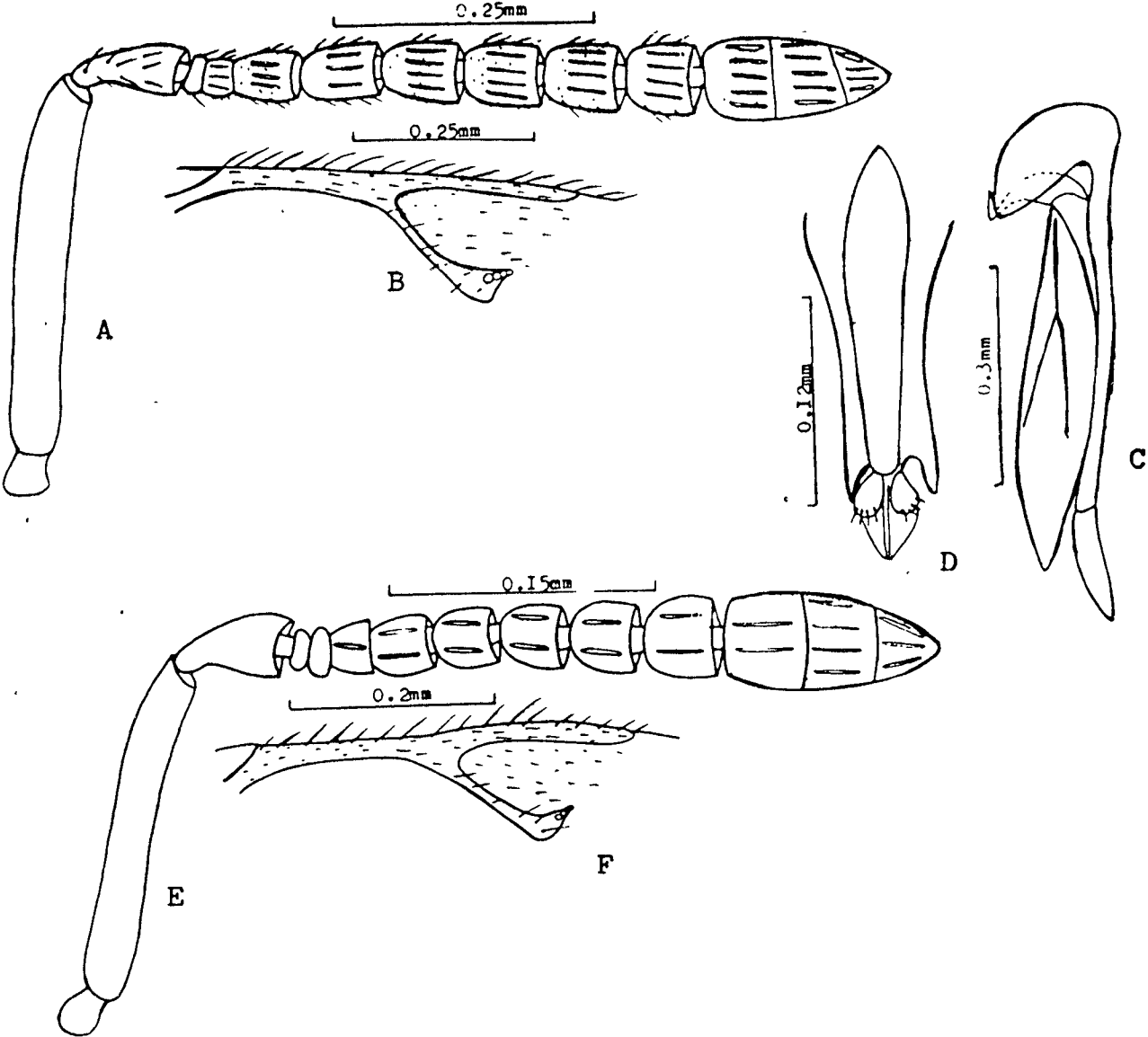
Fig. 32 D. Trichomalopsis oryzae Kamijo, ♂

D. Male genitalia

Fig. 32 E-F. Trichomalopsis maurus Graham, ♀

E. Antenna

F. Part of forewing venation



(Fig. 32)

Genus **MESOPOLOBUS** Westwood

Mesopolobus Westwood, 1833: 443.

Type species : Mesopolobus fasciiventris Westwood, by monotypy.

Platymesopus Westwood, 1833: 444.

Type species : Platymesopus tibialis Westwood, by monotypy.

Platyterma Walker, 1834: 303.

Type species : Platyterma nobile Walker, by designation of Westwood, 1839: 70.

Amblymerus Walker, 1834: 303.

Type species : Amblymerus amaenus Walker, by designation of Westwood, 1839: 70.

Eutelus Walker, 1834: 351.

Type species : Eutelus dilectus Walker, by designation of Westwood, 1839: 71.

Xenocrepis Foerster, 1856: 64.

Type species : Xenocrepis pura Mayr, 1904, by subsequent reference.

Asemantus Foerster, 1878: 51.

Type species : Asemantus amphibolus Foerster by monotypy and original designation.

Syntomocera Foerster, 1878: 52.

Type species : Syntomocera clavicornis Foerster, by monotypy and original designation.

Disema Foerster, 1878: 54.

Type species : Disema pallipes Foerster, by monotypy and original designation.

Urielloides Girault, 1913e: 106.

Type species : Urielloides fulvipes Girault, by original designation.

Paranogmus Girault & Dodd in Girault, 1915b: 318.

Type species : paranogmus pallidicornis Girault & Dodd, by original designation.

Anogmoidea Girault, 1924: 174.

Type species : Anogmoidea joulei Girault, by monotypy.

Baeoponerus Masi, 1924a: 222.

Type species : Baeoponerus aeneus Masi, by monotypy.

Euamblymerus Hincks, 1944: 37.

Syntomocerella Ghesquiere, 1946: 369.

Disemisca Ghesquiere, 1946: 369.

Ahlbergiella V. Rosen, 1955: 88.

Type species : Eutelus aequus Walker, 1834, by original designation.

Sturovia Boucek, 1961: 86.

Type species : Sturovia tenuicornis Boucek, by monotypy and original designation.

It is a very large and complicated genus as evident from the long list of synonymies. It closely resembles Anisopteromalus in general appearance, but differs in having scutellum not densely hairy and gastral tergites 1-2 straight, not angularly produced.

Allied with Pteromalini of subfamily Pteromalinae, this genus is nearly cosmopolitan in distribution, represented by about 70 spp. or more from the world. Two new species and two new reports are recorded for the first time from India. The members of this genus attack a wide variety of insect hosts.

Diagnostic Characters : Body dark with metallic reflections; anterior margin of clypeus usually emarginate, sometimes truncate; mandibles 4-dentate, rarely heterodont; antennae inserted at or above the lower level of eyes, 13-segmented, usually with 5-segmented funicle and 3 anelli, rarely with 6-segmented funicle and 2 anelli; pronotum distinctly carinate, declivous; mesoscutum with parapsidal grooves incomplete; scutellum with or without frenum; propodeum with nucha reduced to thin strip; forewing with marginal vein longer than postmarginal and stigmal separately; hind tibiae with one spur; gaster sessile; ovipositor exerted.

The genus is reported to contain four species (including two new and two new reports) from India. A key to their separation is given below :

**Key to Indian species of Mesopolobus Westwood based
on females**

1. Mandibles (Fig. 33B,C) heterodont, right 4- left 3-dentate; antenna (Fig. 33D) with pedicel much longer than F1: thorax

- metallic green, propodeum smooth, shiny laterals, median carina and plicae present i. M. heterodontus sp.n.
- Mandibles 4-dentate; antenna with pedicel usually as long as F1, rarely longer; thorax black with dull reflections, propodeum reticulate, median carina and plicae absent 2
2. Clypeus angularly produced; mesoscutum fairly setose; forewing (Fig. 33 I) basally setose; antenna (Fig. 33H) with F2-F5 transverse ii. M. setosus sp.n.
- Clypeus emarginate anteriorly; mesoscutum not setose; forewing basally bare; antenna with funicle segments never transverse ... 3
3. Clypeus reticulate; gena (Fig. 33J) compressed, about half as long as its total length; propodeum without median carina; antenna (Fig. 33K) with anelli transverse, pedicel as long as F1, F3-F5 wider than long iii. M. aequus (Walker)
- Clypeus strigose; gena not compressed propodeum with median carina; antenna (Fig. 33N) with anelli large, second and third quadrate, wider than long, pedicel distinctly longer than F1, all funicle segments subequal, subquadrate iv. M. mesostenus Graham

i. Mesopolobus heterodontus sp.n.

(Fig. 33A-E)

Female Length. 2.15 mm. Body with bright green reflections; gaster reddish brown; maxillary and labial palpi whitish pale; antennae light brown, except pedicel fuscous; ocelli yellowish

brown; eyes coppery; propodeum shiny green, more at sides; wing venation yellowish pale; coxae reddish brown, shiny green dorsally, femora and tibiae brown, tarsi light brown.

Head wider than long (47:39) in facial view, distinctly wider than thorax (47:38), sculpture reticulate, isodiametric; ocelli arranged in obtuse triangle, POL 2.0x as long as OOL (12:6); eye shortly oval (22:17); malar sulcus present; gena slightly less than half the eye-length (10:22); clypeus shallowly emarginate anteriorly with obliquely running striations; oral fossa twice as long as gena (20:10); mandibles (Fig. 33B,C) heterodont, right 4- left 3-dentate with third tooth broadly truncate; antenna (Fig. 33D) inserted slightly above the lower level of eyes, torulo-clypeal distance half as long as torulo-ocellar distance, scrobes shallow, scape slightly more than 6.0x as long as wide (19:3), pedicel slightly more than twice as long as wide (7:3), longer than F1 and anelli together, funicle segments subequal in length, subquadrate, except F5 slightly wider than long (4.5:4), club nearly as long as preceding three funicle segments together.

Thorax nearly 1.6x as long as wide (60:38); sculpture as on head, except reticulation slightly larger in size; pronotum anteriorly carinate, slightly less wider than mesoscutum; mesoscutum slightly more than 1.7x as wide as long (38:22), parapsidal grooves incomplete; scutellum slightly shorter than mesoscutum (21:22), as long as wide (21:21); propodeum more

than half as long as scutellum (9:21), finely engraved on sides, medially crenulate, median carina present, plicae strongly converging, callus with 8-10 hairs, nucha short, reduced to a very thin strip; forewing (Fig. 33E) hyaline sparsely setose, basal area bare, costal area hairy, marginal, postmarginal and stigmal in the ratio of 26:23:12, remaining characters as in figure; leg with middle tibial spur distinctly shorter than basitarsus (5:8), hind tibia with one spur.

Gaster sessile, 1.5x as long as thorax (90:60) slightly less than twice as long as wide (90:48) basal tergite 1.5x as long as the preceding one (15:10), with five setae on either side.

Holotype Female. INDIA: Uttar Pradesh, Aligarh, University Campus, 15.iii.1987 (Jamal Ahmad).

Comments : The new species resembles M. typographi (Ruschka) but differs in following respect, as tabulated below :

M. typographi (Ruschka)

M. heterodontus **sp.n.**

- | | |
|--|---|
| 1. Head dorsally 2.0x as wide as long. | 1. Head 3.0x as wide as long. |
| 2. Clypeus straight. | 2. Clypeus emarginate. |
| 3. Antennae with third anellus large. | 3. Antennae with third anellus transverse. |
| 4. Scutellum with frenum. | 4. Scutellum without frenum. |
| 5. Forewing with basal hairline present. | 5. Forewing with basal hairline indistinct. |

ii. Mesopolobus setosus sp.n.

(Fig. 33F-I)

Female. Length 1.6 mm. Body black with dull reflections; gaster reddish brown with metallic green reflections; eyes bare, rusty brown; ocelli, scape, anelli, forewing venations, tibiae and tarsi testaceous; mandibles reddish brown; maxillary palpi, pedicel, flagellum, ovipositor light brown; thorax black, pubescent; coxae blackish brown with greenish reflections; femora dark brown with metallic green reflections.

Head wider than long in facial view (58:46), distinctly wider than thorax (58:50); ocelli arranged in obtuse triangle, POL slightly greater than OOL (14:10); eye nearly 1.4x as long as wide (24:17); malar sulcus indistinct; gena slightly longer than the eye-length (14:12); clypeus angularly produced anteriorly, with oblique striations; oral fossa nearly 1.8x as long as gena (25:14); mandible (Fig. 33G) 4-dentate with outer tooth sinuate; maxillary and labial palpi (Fig. 33F) 4- and 3-segmented respectively; antenna (Fig. 33H) inserted slightly above the lower level of eyes; toruli distinctly closer to clypeus than median ocellus (15:24), scape about 5.0x as long as wide (18:3.5), pedicel short, 1.5x as long as wide (6:4) as long as F1, anelli transverse, funicle 5-segmented with following dimension (W:L): F1 (7:6), F2 (7:4), F3 (8:4), F4-F5 (8:3.5), club as long as preceding three funicle segments together.

Thorax about 1.2x as long as wide (62:50); sculpture as on head; pronotum anteriorly carinate, 4.4x shorter than mesoscutum in length (5:22); mesoscutum slightly less than 2.3x as wide as long (50:22), parapsidal grooves incomplete; scutellum 1.2x as wide as long (30:25), slightly more than 1.6x as long as propodeum (25:15), the latter sloping, without median carina and plicae, nucha slightly produced, with finely engraved reticulation; forewing (Fig. 33 I) hyaline, about 2.0x as long as wide (45:22), basal and costal areas thickly setose, the latter 6.0x as long as wide (42:7), marginal, postmarginal and stigmal in the ratio of 24:17:11, remaining characters as in the figure; leg with middle tibial spur shorter than the basitarsus (9:11); hind tibia with one spur.

Gaster sessile, slightly more than 1.7x as long as wide (60:35), basal tergite large, broadly produced behind, slightly more than 1.4x as long as the preceding tergite (20:14); ovipositor concealed.

Holotype Female. INDIA: Uttar Pradesh, Aligarh, University Campus, 1.x.1990 (Jamal Ahmad).

Paratype 1♀ (Same data as above).

Comments : The new species differs from all other Mesopolobus species in having clypeus angularly produced; mesoscutum fairly and forewing basally setose.

iii. Mesopolobus aequus (Walker)

(Fig. 33J-M)

- Eutelus aequus Walker, 1834: 364.
Pteromalus purpureus Walker, 1835a: 493.
Pteromalus contractus Walker, 1836: 188.
Pteromalus legoras Walker, 1839: 269.
Pteromalus odites Walker, 1845: 261.
Pteromalus temesa Walker, 1848: 124.
Metastenus purus Walker, 1872: 118.
Eutelus (Platytermus) decipiens Thomson, 1878: 77.
Mormoniella oviphaga Ahlberg, 1925: 82.
Amblymerus graminum Hardh, 1950: 88.
Ahlbergiella aequa (Walker); Rosen, 1955: 88.
Ahlbergiella aequa (Walker); Graham, 1957: 222.
Mesopolobus aequus (Walker); Rosen, 1958: 230.
Mesopolobus aequus (Walker); Graham, 1969: 655.

Material examined : 1♂. INDIA: Uttar Pradesh, Aligarh,
 20.iv.1987 (Jamal Ahmad).

Body length : 2.15 mm.

Comments : This species has been reported for the first time from India. Some additional characters of this species are as follows : Head (Fig. 33J) with ocelli arranged in obtuse triangle, POL 1.4x as long as OOL (14:10); antenna (Fig. 33K) with toruli placed closer, inserted much closer to clypeus than median ocellus

(15:25), scape reaching just short of median ocellus (22:25), third anellus comparatively large; forewing (Fig. 33L) sparsely setose with marginal, postmarginal and stigmal in the ratio of 24:20:13; gaster slightly longer than thorax (70:65).

iv. Mesopolobus mesostenus Graham

(Fig. 33N-O)

Mesopolobus mesostenus Graham, 1969: 664.

Material examined : 1♀. INDIA: Uttar Pradesh, Aligarh, University Campus, 12.iv.1987 (Jamal Ahmad).

Body length : 1.75 mm.

Comments : This species has been reported for the first time from India. Some additional characters of this species are as follows : Head roundish; POL 3.4x as long as OOL (17:5); eyes bare, twice as long as malar space (22:11); clypeus nearly truncate; antennae light brown, inserted slightly above the lower level of eyes with toruli placed closely, scape not reaching the median ocellus (17:20); pronotum distinctly carinate; nearly as wide as mesoscutum; forewing (Fig. 33 O) sparsely setose, basal area bare, marginal, postmarginal and stigmal in the ratio of 18:14:11; gaster slightly longer than head and thorax together.

Fig. 33 A-E. Mesopolobus heterodontus sp.n., ♀

A. Maxillary & labial palpi

B. Left mandible

C. Right mandible

D. Antenna

F. Forewing

Fig. 33 F-I. Mesopolobus setosus sp.n., ♀

F. Maxillary & labial palpi

G. Mandible

H. Antenna

I. Part of forewing

Fig. 33 J-M. Mesopolobus aequus (Walker), ♀

J. Head in frontal view

K. Antenna

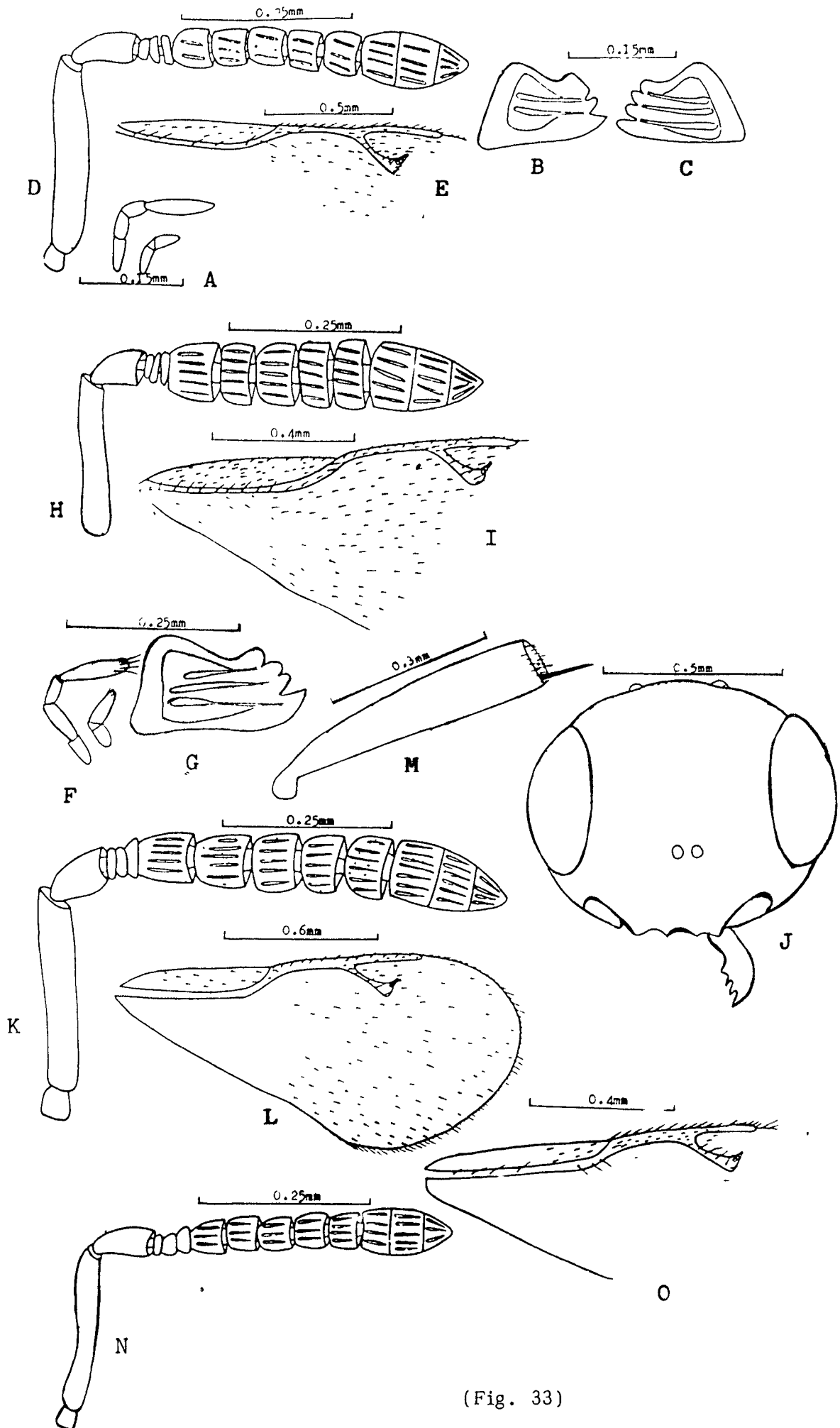
L. Forewing

M. Hind femur

Fig. 33 N-O. Mesopolobus mesostenus Graham, ♀

N. Antenna

O. Part of forewing



(Fig. 33)

Genus PTEROMALUS Swederus

Pteromalus Swederus, 1795: 203.

Type species : Ichneumon puparum Linnaeus, designated by Westwood, 1839: 71.

Colas Curtis, 1827: 166.

Type species : Colas dispar Curtis, by monotypy and original designation.

Gnatho Curtis, 1829: 118.

Colax Curtis, 1829, *ibid.* (emendation of Colas Curtis).

Metopachia Westwood, 1839: 71.

Type species : Colas dispar Curtis, by monotypy and original designation.

Habrocytus Thomson, 1878: 88 (as subgenus of Etroxys Foerster).

Type species : Pteromalus albipennis Walker, designated by Ashmead, 1904.

Pteromalus Swederus; Graham, 1969: 488.

Habrocytus (Thomson) Boucek & Graham, 1978: 228.

It is very old, complicated and one of the largest genera of the subfamily Pteromalinae, with over 100 spp., distributed throughout world. It resembles Trichomalopsis superficially but differs in having occiput without carina, and nucha transversely striate. Graham (1969) treated Habrocytus and Pteromalus as two different genera with their species, but under the same key. He recognised Habrocytus with 4:3 mandibular

teeth and 4:4 in Pteromalus, though being doubtful about the tenability of this generic separation based on such simple difference. Boucek & Graham (1978) synonymized Habrocytus under Pteromalus considering the difference of just specific value. The members of this genus are known to attack pupae of various Lepidoptera and curculionid beetles.

Diagnostic Characters : Body dark with metallic green reflections; anterior margin of clypeus usually emarginate, sometimes truncated or produced; mandibles usually 4-dentate, sometimes heterodont, with right 4- and left 3-dentate; antennae inserted usually above the lower level of eyes, rarely below, 13-segmented, with 6-segmented funicle and 2 anelli; pronotum anteriorly carinate; mesoscutum with parapsidal grooves incomplete; nucha transversely strigose; forewings hyaline; hind tibiae with one spur; gaster subsessile or sessile, ovipositor slightly exserted.

The genus is known to contain seven species (including five new records) from India. A key for their separation is given below :

Key to the Indian species of Pteromalus based on females

1. Mandibles heterodont, right 4- left 3-dentate 2
- Mandibles 4-dentate 4
2. Anterior margin of clypeus (Fig. 34A) bilobed, deeply incised

- medially; malar sulcus present; propodeum (Fig. 34 E) smooth, shiny, plicae less convergent towards median carina, the latter bifurcated posteriorly..... i. P. sequester (Walker)
- Anterior margin of clypeus moderately emarginate; propodeum reticulate, plicae converging strongly towards median carina, the latter not bifurcating posteriorly 3
3. Antennal scape (Fig. 34I) not reaching the median ocellus; propodeum with faintly impressed costula, plicae strongly convergent towards median carina; gaster as long as head and thorax together ii. P. brachygaster Graham
- Antennal scape (Fig. 35D) reaching the median ocellus; propodeum without costula, plicae subparallel with nucha; gaster distinctly longer than head and thorax together
- iii. P. chlorogaster (Thomson)
4. Gena (Fig. 36 A) strongly compressed at the base of mandibles, anteriorly with sharp edge; clypeus produced anteriorly, moderately emarginate; antenna (Fig. 36 D) inserted at lower level of eyes, second anellus large; propodeum (Fig. 36F) with median area transversely reticulate iv. P. chrysos (Walker)
- Gena not compressed; clypeus not produced anteriorly; antenna inserted above the lower level of eyes; propodeum with median area not transversely reticulate 5
5. Forewing with postmarginal vein distinctly longer than marginal; scutellum with frenal groove distinct; propodeum with nucha large; POL as long as OOL v. P. puparum Linnaeus

- Forewing with postmarginal vein shorter than marginal; scutellum with frenal groove absent; propodeum with nucha small; POL longer than OOL 6
- 6. Antenna (Fig. 36J) with F1 shorter than pedicel; propodeum (Fig. 36 L) with median carina distinct; forewing (Fig. 36 K) with basal area almost bare, with 1-2 setae; gaster acuminate, about 2.0x as long as wide vi. P. procerus Graham
- Antenna (Fig. 36 O) with F1 as long as pedicel; propodeum with median carina indistinct; forewing (Fig. 36 P) with basal area with 7-8 setae; gaster ovate, 1.5-1.6x as long as wide vii. P. smaragdus Graham

i. Pteromalus sequester (Walker)

(Fig. 34 A-E)

Pteromalus varius Walker, 1835a: 494.

Pteromalus sequester Walker, 1835a: 495.

Pteromalus infectus Walker, 1835b: 186.

Pteromalus placidus Walker, 1835b: 187.

Pteromalus simulans Walker, 1836: 495.

Pteromalus oroetes Walker, 1839: 211.

Semiotus apionis Goureau, 1847: 252.

Pteromalus eulimene Walker, 1848: 124.

Pteromalus leguminum Ratzeburg, 1852: 234.

Pteromalus insularis Walker, 1872: 100.

Habrocytus sequester (Walker) Kurdjumov, 1913, 21.

Habrocytus medicaginis Gahan, 1914: 163.

Pteromalus sequester (Walker); Boucek, Subba Rao & Farooqi, 1978: 455.

Habrocytus sequester (Walker); Graham, 1969: 554.

Material examined : 10. INDIA: Uttar Pradesh, Nainital, 23.x.1990 (M. Yousuf).

Body length : 2.25 mm.

Comments : This species can be identified by following combination of characters : Antennal toruli distinctly above the lower level of eyes, clypeus strongly reticulate, bilobed, with deep median incision; POL twice as long as OOL (17:8.5); mandibles heterodont; propodeum (Fig. 34 E) smooth, median carina forking posteriorly, plicae convergent; forewing (Fig. 34 D) with costal cell 5.5x as long as its maximum width (50:9) with hairs sparsely distributed, basal area bare; gaster 1.6x as long as wide (80:50), distinctly longer than thorax (80:60), basal tergite smooth with bright green reflections, other tergites finely sculptured.

ii. Pteromalus brachygaster (Graham) **comb.n.**

(Fig. 34 F-L)

Habrocytus brachygaster Graham, 1969: 549.

Material examined : 200. INDIA : Uttar Pradesh, Aligarh, 25.x.1988 (Jamal Ahmad).

Body length : 2.25 mm.

Comments : This species has been reported for the first time from India. The Indian material resembles European in all respect, except costal cell interrupted in the middle and postmarginal vein shorter than marginal (25:29). In colour, it resembles P. sequester except gaster being entirely shiny green. Some additional characters are as follows : Mandibles (Fig. 34G,H) heterodont, right 4- left 3-dentate, the latter with inner tooth broadly truncated; clypeus moderately emarginate; forewing (Fig. 34J) with marginal, postmarginal and stigmal in the ratio of 25:29:18; gaster as long as thorax together.

iii. Pteromalus chlorogaster (Thomson) comb.n.

(Fig. 35A-E)

Habrocytus chlorogaster Thomson, 1878: 119.

Habrocytus chlorogaster Thomson; Graham, 1969: 534.

Material examined : 400. INDIA : Uttar Pradesh, Nainital, ++
24.x.1990 (M. Yousuf).

Body length : 3.0 mm.

Comments : This species has been reported for the first time from India. It closely resembles P. brachygaster, but can be easily separated on the basis of characters provided in the key. Characters supplementary to the key are as follows : Antenna (Fig. 35D) with pedicel 1.7x as long as wide, funicle

segments F1-F5 as long as wide, F6 subquadrate; forewing (Fig. 35E) with marginal, postmarginal and stigmal in the ratio of 26:26:19.

iv. Pteromalus chrysos Walker

(Fig. 36A-G)

Pteromalus chrysos Walker, 1836: 491.

Pteromalus inclusus Walker, 1836: 493.

Pteromalus zipaetes Walker, 1839: 213.

Pteromalus telon Walker, 1839: 216.

Habrocytus acutigena Thomson, 1878: 117.

Habrocytus distinguendus Masi, 1908: 113.

Habrocytus eucerus (Ratzeburg) Otten, 1942: 122.

Habrocytus chrysos (Walker) Boucek, 1965: 8.

Habrocytus chrysos (Walker); Graham, 1969: 527.

Material examined : 1♀, 10♂. INDIA: Uttar Pradesh, Aligarh, 30.vi.1990 (Jamal Ahmad).

Body length : 2.0 mm.

Comments : This species has been recorded for the first time from India. It can be easily separated from others in having strongly compressed gena with sharp edge; clypeus produced medially, moderately emarginate; plicae strongly converging. Some additional characters are as follows : Antenna (Fig. 36D)

inserted at about lower level of eyes, scape and pedicel blackish brown, remaining parts testaceous, pedicel distinctly shorter than anelli and F1 together, second anellus large; propodeum with its median area transversely reticulate, callus finely reticulate; forewing (Fig. 36E) with costal area broad, about 5.0x as long as wide, marginal, postmarginal and stigmal in the ratio of 20:17:13; legs blackish brown except tarsi testaceous; gaster keeled below, slightly longer than head and thorax together.

v. Pteromalus puparum (Linnaeus)

(Fig. 35F-G)

Ichneumon puparum Linnaeus, 1758: 567.

Pteromalus puparum (Linnaeus) Swederus, 1795: 203

Pteromalus latifrons Walker, 1835a: 501.

Pteromalus cephalotes Walker, 1836: 481.

Pteromalus comes Walker, 1836: 492.

Pteromalus ornytus Walker, 1839: 238.

Pteromalus orinus Walker, 1845: 263.

Pteromalus brassicae Curtis, 1842: 8.

Pteromalus nigricans Walker, 1872: 121.

Pteromalus pontiae Curtis, 1842: 8.

Pteromalus pieridis Provancher, 1881: 296.

Pteromalus nigrutilus Dalla torre, 1898: 137 (Replacement name for nigricans Walker, 1872, nec Foerster, 1841).

Pteromalus puparum (Linnaeus); Graham, 1969: 489.

Material examined : 400. INDIA: Assam, Jorhat, 4.iv.1993
 ++
 (Sudhir Singh). Reared from Papilio larva.

Body length : 2.5 mm.

Comments : This species can be easily identified by characters provided in the key. Some additional characters are as follows: Colour bright green. Clypeus moderately emarginate; mandibles 4-dentate; POL as long as OOL (16:16); scape reaching slightly beyond the median ocellus (32:28), 4.0x as long as wide (32:8), funicular segments all longer than wide, with double row of sensillae; scutellum with frenum; propodeum with well developed nucha; forewing (Fig. 35G) with marginal postmarginal and stigmal in the ratio of 29:31:14, costal cell with a complete row of setae, speculum distinct, open below.

vi. Pteromalus smaragdus Graham

(Fig. 36 O-P)

Pteromalus smaragdus Graham, 1969: 494.

Material examined : 700. INDIA: Uttar Pradesh, Aligarh, 25.iii.1988 (Chisti, M.S.A.K.)

Body length : 1.60 mm.

Comments : This species is recorded for the first time from India. It goes very close to P. procerus Graham in many respect

but can be separated by differences as provided in the key and other characters which are as follows : Antennae inserted slightly above the lower level of eyes, F1 slightly longer than wide; forewing (Fig. 36P) with basal area with about 14 setae; gaster distinctly shorter than head and thorax together, basal tergite occupying about one-third the total length of gaster; size large.

vii. Pteromalus procerus Graham

(Fig. 36H-N)

Pteromalus procerus Graham, 1969: 492.

Material examined : 1000₊₊. INDIA: Uttar Pradesh, Aligarh, 20.ii.1988 (Jamal Ahmad).

Body length : 1.5 mm.

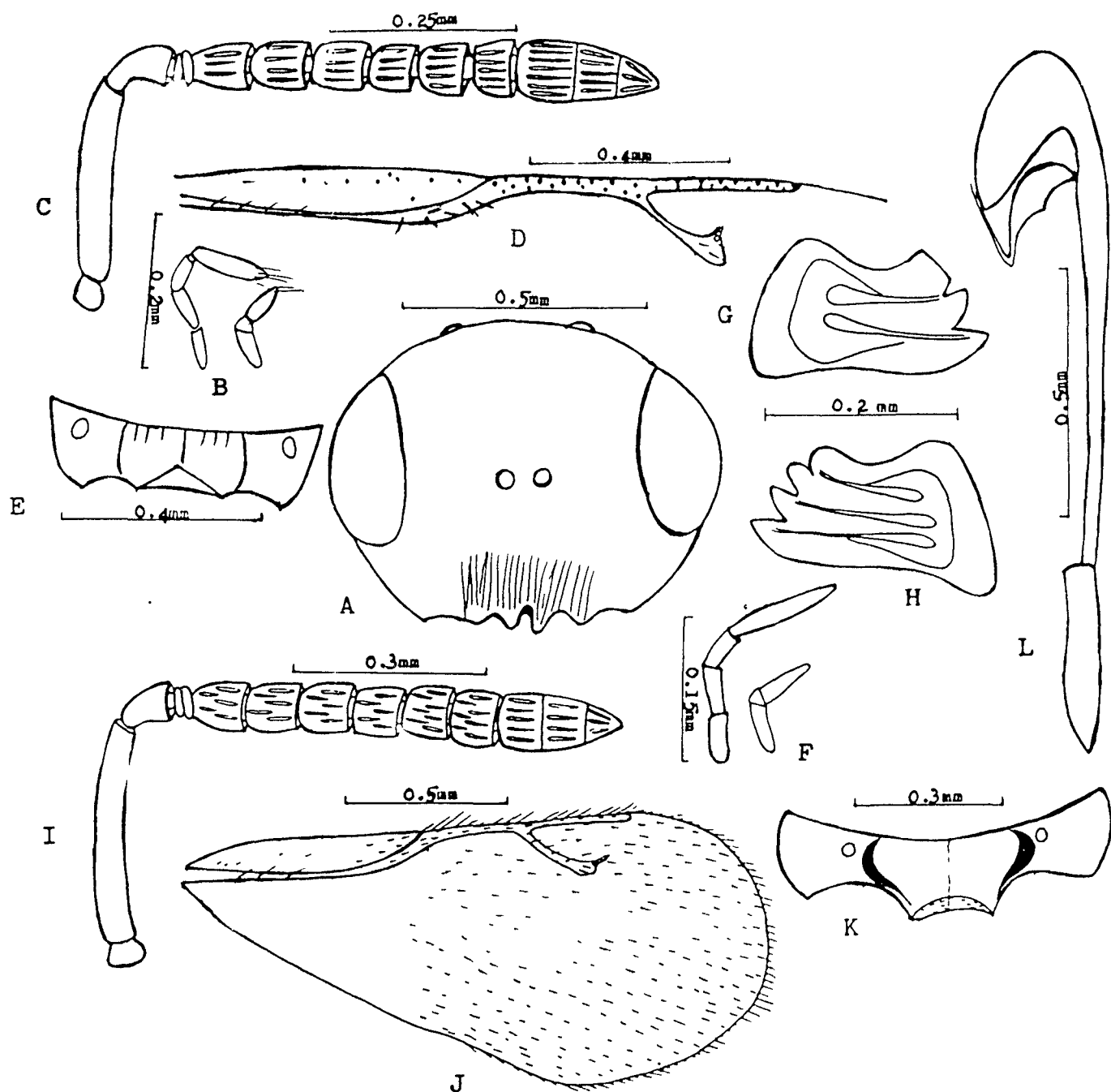
Comments : This species is reported for the first time from India. It runs well in Graham's key (1969:509,513) and can be easily recognised by characters supplied in the key. Characters supplementary to those in the key are as follows: Antenna (Fig. 36J) inserted distinctly above the lower level of eyes, F1 almost subquadrate; forewing (Fig. 36K) with basal area with not more than 4-5 setae; gaster as long as head and thorax together with basal tergite nearly one-quarter of the gaster; size small.

Fig. 34 A-E. Pteromalus sequester(Walker), ♀

- A. Head in frontal view
- B. Maxillary & labial palpi
- C. Antenna
- D. Part of forewing venation
- E. Propodeum

Fig. 34 F-L. Pteromalus brachygaster Graham, ♀

- F. Maxillary & labial palpi
- G. Left mandible
- H. Right mandible
- I. Antenna
- J. Forewing
- K. Propodeum
- L. Part of ovipositor



(Fig. 34)

Fig. 35 A-E. Pteromalus chlorogaster Thomson, ♀

A. Maxillary & labial palpi

B. Left mandible

C. Right mandible

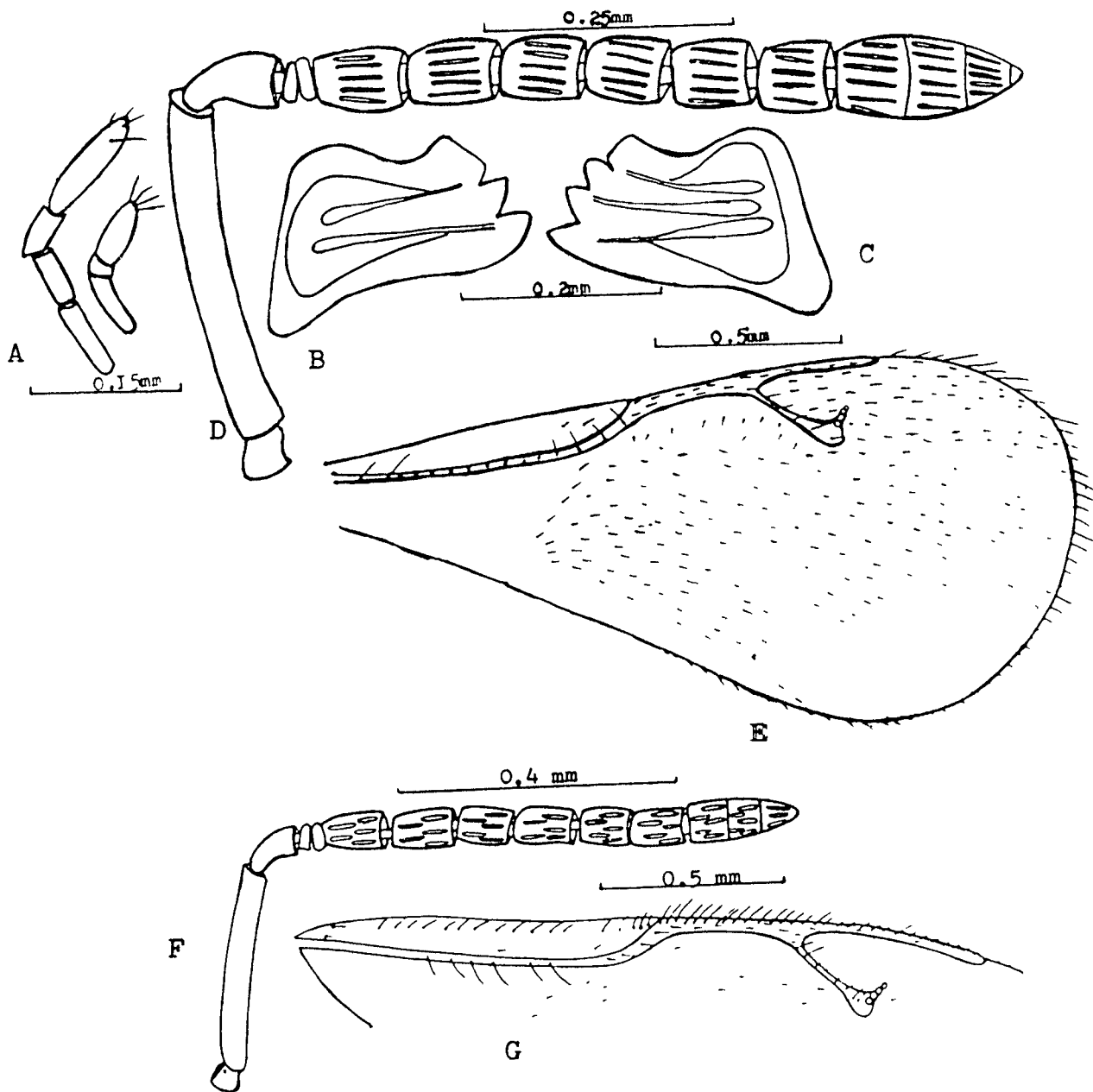
D. Antenna

E. Forewing

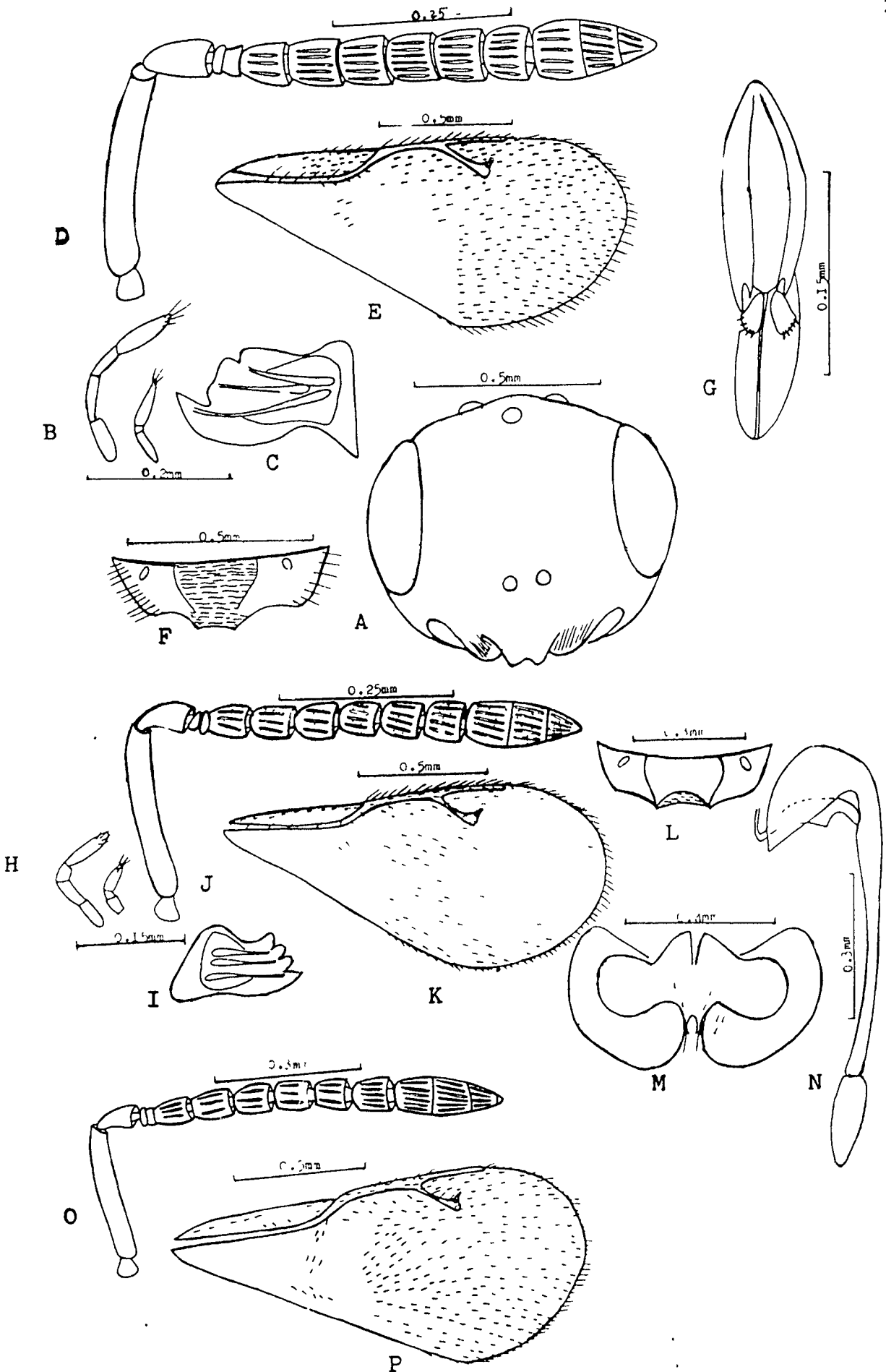
Fig. 35 F-G. Pteromalus puparum Linnaeus, ♀

F. Antenna

G. Part of forewing



(Fig. 35)



(Fig. 36)

Genus **CHLOROCYTUS** Graham

Chlorocytus Graham, 1956a: 92.

Type species : Pteromalus pulchripes Walker, 1836, by original designation.

Chlorocytus Graham; Graham & Claridge, 1965: 285.

Chlorocytus Graham; Graham, 1969: 611.

This genus goes very close to Pteromalus and Stenomalina in some general characters, but differs remarkably from the former in having large prepectus and cylindrical body; and with the latter in lacking median tooth on clypeus. It is placed under the tribe Pteromalini of subfamily Pteromalinae, and is known to contain 32 spp. from the world, reported so far. India shows a single species on record. These are mostly parasites of insect larvae of Diptera, Hymenoptera and Coleoptera boring in stems of Graminae.

Diagnostic Characters : Body cylindrical with metallic green reflections; anterior margin of clypeus emarginate or with a median tooth; mandibles heterodont, right 4- left 3-dentate; maxillary and labial palpi 4- and 3-segmented respectively; antennae inserted above lower level of eyes, 13-segmented, with 6-segmented funicle and 2 anelli; pronotum carinate anteriorly; prepectus large; mesoscutum with parapsidal grooves incomplete; propodeum with nucha reduced to a thin strip; forewing hyaline, marginal and postmarginal veins separately longer than stigmal;

hind tibiae with one spur; gaster cylindrical, sessile; ovipositor slightly exerted.

The genus is reported to contain a single species from India, known so far.

Chlorocyclus xanthopus (Cameron)

(Fig. 37A-G)

Ectrocyclus xanthopus Cameron, 1906: 97.

Chlorocyclus xanthopus (Cameron) Boucek, Subba Rao & Farooqi, 1978: 440.

Material examined : 1400₊₊, INDIA: Uttar Pradesh, Aligarh, 13.iii.1987 (Jamal Ahmad).

Body length : 2.5 mm.

This species can be easily identified by its long cylindrical body with brassy green reflections on head and thorax; gaster smooth and shiny, with more brighter green reflections; legs straw coloured; antenna (Fig. 37D) with all funicle segments longer than wide, F1-F4 subequal, F5-F6 decreasing in length; forewing (Fig. 37F) with marginal vein 3.0x as long as stigmal; clypeus slightly emarginate with obliquely running striations.

Fig. 37 A-G. Chlorocytus xanthopus(Cameron), ♀

A. Maxillary & labial palpi

B. Left mandible

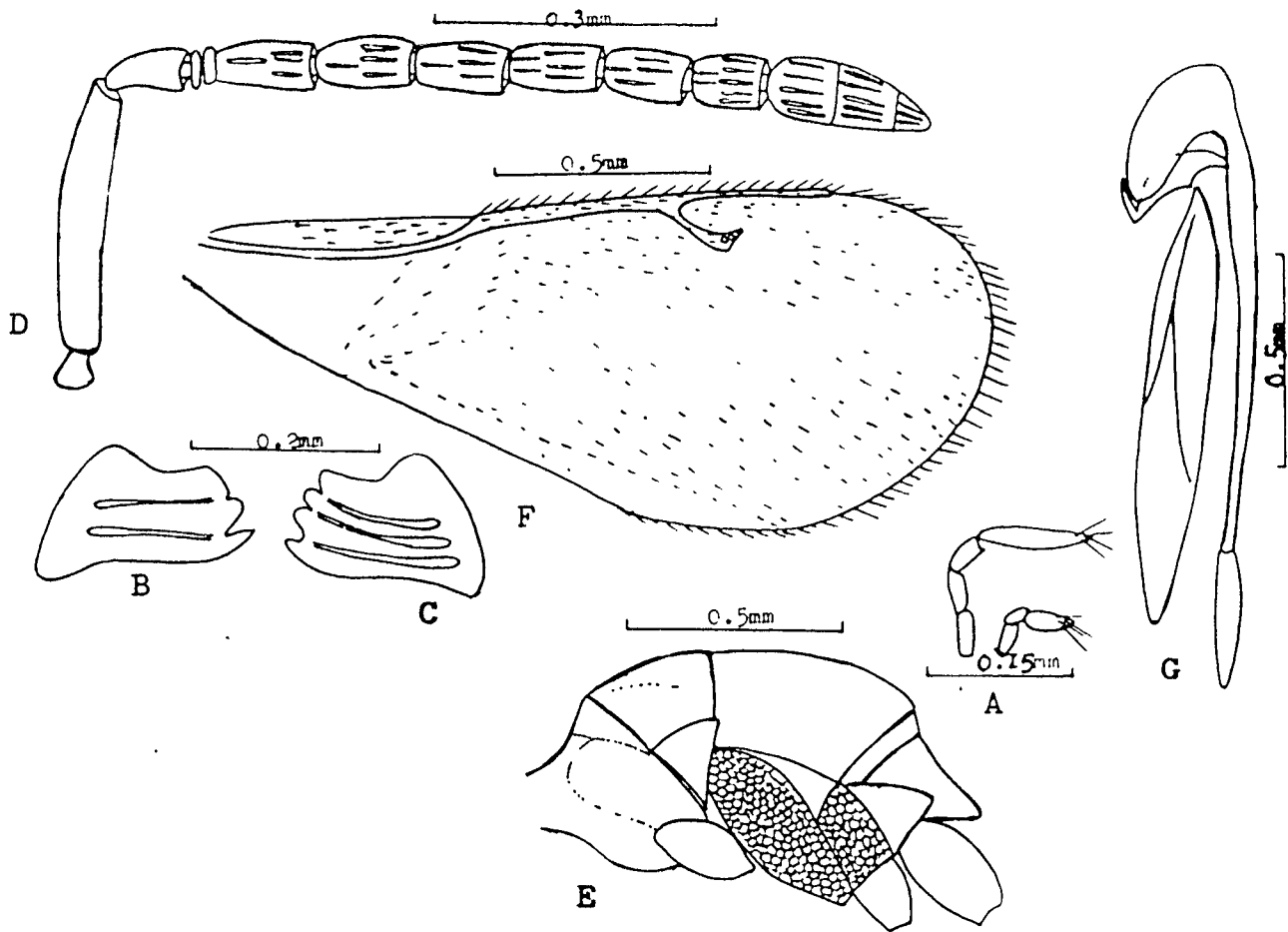
C. Right mandible

D. Antenna

E. Thorax in lateral view

F. Forewing

G. Part of ovipositor



(Fig. 37)

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