

OCCASIONAL PAPER No. 267

MANTID FAUNA OF KERALA

M. C. VYJAYANDI



ZOOLOGICAL SURVEY OF INDIA

OCCASIONAL PAPER No. 267

**RECORDS
OF THE
ZOOLOGICAL SURVEY OF INDIA**

Mantid Fauna of Kerala, India

M. C. VYJAYANDI

Reader in Zoology, Providence Women's College

Calicut 673 009, Kerala

E.mail : vyji@rediffmail.com

Edited by the Director, Zoological Survey of India, Kolkata



सत्यमेव जयते

**Zoological Survey of India
Kolkata**

CITATION

Vyjayandi, M.C. 2007. Mantid Fauna of Kerala, India, *Rec. zool. Surv. India, Occ. Paper No.*, 267 : 1-169, (Published by the Director, *Zool. Surv. India*, Kolkata)

Published : June, 2007

ISBN 978-81-8171-153-3

© Govt. of India, 2007

ALL RIGHTS RESERVED

- No Part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior permission of the publisher.
- This book is sold subject to the condition that it shall not, by way of trade, be lent, resold, hired out or otherwise disposed off without the publisher's consent, in a form of binding or cover other than that in which, it is published.
- The correct price of this publication is the price printed on this page. Any revised price indicated by a rubber stamp or by a sticker or by any other means is incorrect and should be unacceptable.

PRICE

Indian Rs. 400.00

Foreign \$ 30 £ 25

Published at the Publication Division, by the Director, Zoological Survey of India, 234/4 A.J.C. Bose Road, 2nd MSO Building, Nizam Palace (13th floor), Kolkata 700 020 after laser typeset by Typographia, Kolkata 700 012 and printed at Calcutta Repro Graphics, Kolkata 700 006

PREFACE

For the past seven years I have been working on Praying Mantis (Insecta: Mantodea) of Kerala. This is the most diversified group of all the insects and lesser in density also. During these years I have studied more than 500 specimens of mantids from various geographical regions of Kerala and the net effort is published as this book. These specimens are taxonomically identified, described and drawn. The dichotomous key to the Family, Genera and Species and a Check list of Family, Genera and Species have also been provided. The photographs of the various specimens are also included in this work. Hope that this work will help and lead the new comers in the field of Taxonomy for their further research.

M. C. Vyjayandi

ACKNOWLEDGEMENT

I am indebted to my Research Guide Dr. T.C. Narendran, Professor & Head (Retd.), Department of Zoology, University of Calicut, who helped me to acquire the taxonomic skill so that I could proceed with the task of preparing a hand book of this kind. The information gathered from specialists of this field, Mr. Ehrmann (Germany), Dr. T.K. Mukherjee (Kolkatta), Dr. Hemant Ghate (Poona) is thankfully acknowledged. I am thankful to the Management and Principal of my parental Institution, Providence Women's College, Calicut for the consent and the facilities provided. I express my deepfelt gratitude to Mr. C. Radhakrishnan, Joint Director, Zoological Survey of India, Calicut station for his whole hearted support and constant encouragement at this occasion. I register my sincere thanks to Mr. Rajeesh R.S. Research Scholar, Department of Zoology, Providence Women's College Calicut, Kerala, for the immense help rendered in all stages of this work.

**RECORDS
OF THE
ZOOLOGICAL SURVEY OF INDIA
OCCASIONAL PAPER**

267

2007

Page 1-169

CONTENTS

INTRODUCTION	1
REVIEW OF LITERATURE	5
MATERIALS AND METHODS	5
ABBREVIATIONS	10
SYSTEMATIC STATUS AND GENERAL FEATURES OF ORDER MANTODEA	10
KEY TO FAMILIES	11
SYSTEMATIC ACCOUNT	12
Family AMORPHOSCELIDAE	12
Subfamily AMORPHOSCELINAE	12
Genus <i>Amorphoscelis</i> Stal	12
Key to Indian species of <i>Amorphoscelis</i>	13
<i>Amorphoscelis annulicornis</i> Stal	13
Family EMPUSIDAE	14
Subfamily EMPUSINAE	16
Genus <i>Gongylus</i> Thunberg	16
Key to Indian species of <i>Gongylus</i> Thunberg	17
<i>Gongylus gongylodes</i> (Linnaeus)	17
Family HYMENOPODIDAE	21
Subfamily ACROMANTINAE	21

Tribe Acromantini	21
Genus <i>Acromantis</i> Saussure	22
Key to Indian species of <i>Acromantis</i> Saussure	23
<i>Acromantis insularis</i> Giglio-Tos	23
<i>Acromantis montana</i> Giglio-Tos	25
Genus <i>Ambivia</i> Stal	28
<i>Ambivia popa</i> Stal	29
Genus <i>Anaxarcha</i> Stal	29
Key to Indian species of <i>Anaxarcha</i> Stal	32
<i>Anaxarcha limbata</i> Giglio-Tos	32
Genus <i>Euantissa</i> Giglio-Tos	35
Key to Indian species of <i>Euantissa</i> Giglio-Tos	35
<i>Euantissa pulchra</i> (Fabricius)	35
Genus <i>Hestiasula</i> Saussure	38
Key to Indian species of <i>Hestiasula</i> Saussure	38
<i>Hestiasula brunneriana</i> Saussure	39
Subfamily HYMENOPODINAE	42
Genus <i>Creobroter</i> Audinet- Serville	42
Key to Indian species of <i>Creobroter</i> Audinet- Serville	42
<i>Creobroter apicalis</i> Saussure	43
Family MANTIDAE	46
Key to Indian subfamilies of Mantidae	46
Subfamily AMELINAE	47
Tribe Amelini	48
Key to Indian genera of Amelini	48
Genus <i>Amantis</i> Giglio-Tos	48
Key to Indian species of <i>Amantis</i>	49
<i>Amantis malabarensis</i> Vyjayandi	49

Genus <i>Cimantis</i> Giglio-Tos	52
Key to Indian species of <i>Cimantis</i> Giglio-Tos.....	52
<i>Cimantis testacea</i> Werner	52
<i>Cimantis fuliginosa</i> Werner	55
Genus <i>Elmantis</i> Giglio-Tos	57
<i>Elmantis trincomaliae</i> (Saussure)	57
Subfamily CALIRIDINAE	60
Genus <i>Leptomantis</i> Giglio-Tos	60
Key to Indian species of <i>Leptomantis</i> Giglio-Tos	61
<i>Leptomantis parva</i> Werner	61
Subfamily IRIDOPTERYGINAE	64
Key to Indian genera of tribe Iridopterygini	64
Genus <i>Hapalopeza</i> Stal	64
Key to Indian species of <i>Hapalopeza</i> Stal	65
<i>Hapalopeza periyara</i> Mukherjee & Hazra	65
<i>Hapalopeza nilgirica</i> Wood-Mason	67
Subfamily LITURGUSINAE	67
Genus <i>Humbertiella</i> Saussure	70
Key to Indian species of <i>Humbertiella</i> Saussure	70
<i>Humbertiella similis</i> Giglio-Tos	70
<i>Humbertiella ceylonica</i> Saussure	73
Subfamily MANTINAE	75
Tribe Mantini	75
Key to Indian genera of Mantini	75
Genus <i>Hierodula</i> Burmeister	76
Key to Indian species of <i>Hierodula</i>	77
<i>Hierodula membranacea</i> (Burmeister)	78
<i>Hierodula bipapilla</i> (Audinet-Serville)	80

<i>Hierodula keralensis</i> Vyjayandi & Narendran	82
<i>Hierodula tenuidentata</i> Saussure	87
<i>Hierodula ventralis</i> Giglio-Tos	89
Genus <i>Rhombodera</i> Giglio-Tos	89
Key to Indian species of <i>Rhombodera</i> Giglio-Tos	91
<i>Rhombodera woodmasoni</i> Werner	91
Genus <i>Mantis</i> Linnaeus	94
Key to Indian species of <i>Mantis</i> Linnaeus	94
<i>Mantis nobilis</i> Brunner	95
<i>Mantis religiosa</i> Linnaeus	95
Genus <i>Plistospilota</i> Giglio-Tos	99
<i>Plistospilota nova</i> Beier	99
Genus <i>Statilia</i> Stal	102
Key to Indian species of <i>Statilia</i> Stal	102
<i>Statilia nemoralis</i> (Saussure)	102
<i>Statilia maculata</i> (Thunberg)	105
Tribe Miomantini	107
Key to Indian genera of Miomatini	107
Genus <i>Deiphobe</i> Stal	108
<i>Deiphobe infuscata</i> Giglio-Tos	108
Genus <i>Deiphobella</i> Giglio-Tos	111
Key to Indian species of <i>Deiphobella</i>	111
<i>Deiphobella laticeps</i> (Wood-Mason)	112
Genus <i>Iris</i> Saussure	115
Key to Indian species of <i>Iris</i>	115
<i>Iris keralensis</i> Vyjayandi	115
Subfamily SCHIZOCEPHALINAE	118
Genus <i>Schizocephala</i> Audinet-Serville	118

<i>Schizocephala bicornis</i> (Linnaeus)	118
Subfamily THESPINAE	121
Tribe Parathespini	122
Genus <i>Parathespis</i> Saussure	122
<i>Parathespis humbertiana</i> Saussure	122
Subfamily PHYLLOTHELINAE	125
Genus <i>Phyllothelys</i> (Wood-Mason)	125
<i>Phyllothelys westwoodi</i> (Wood-Mason)	125
Subfamily TOXODERINAE	129
Tribe Toxoderini	129
Key to genera of tribe Toxoderini	129
Genus <i>Aethalochroa</i> Wood-Mason	130
<i>Aethalochroa ashmoliana</i> (westwood)	131
Genus <i>Cheddikulama</i> Henry	134
<i>Cheddikulama straminea</i> Henry	134
Genus <i>Toxoderopsis</i> Wood-Mason	137
Key to Indian species of <i>Toxoderopsis</i> Wood-Mason	137
<i>Toxoderopsis spinigera</i> Wood-Mason	138
Subfamily ANGELINAE	141
Genus <i>Euchomenella</i> Giglio-Tos	141
<i>Euchomenella indica</i> H Ghaté	141
DISCUSSION	144
CHECK LIST	144
REFERENCES	154
PLATES AND FIGURES	I-XIV

INTRODUCTION

Praying mantids can easily be recognized by their large size, ranging from 10 to 120 millimetres in body length and their characteristic way of standing with forelegs held together. The common name "Praying Mantis" has come from their habit of holding their forelegs up in a 'praying attitude' while waiting for their prey. Because of this habit a mantid is also called 'Soothsayer' and 'Holyman' or 'Wiseman'. They are remarkable group of raptors or snatchers. They have the elongated body, raptorial, spiny forelegs, two pairs of wings (some species with reduced wings in females), highly mobile triangular head with distinct ocelli, large compound eyes and with filiform antennae.

Praying mantids are generally seen on tree trunks and other vegetations. They are camouflaged merging with particular sites where they feed and live. They are carnivorous, both in their adult and nymphal stages and eat a variety of insects including other mantids, which they seize with their powerful forelegs. These superior ambush predators with their peculiar habits of prey capture, camouflage and reproductive behaviour, play a vital role in natural control of insect pests.

SCOPE AND IMPORTANCE OF THE PRESENT STUDY

Mantids play both positive and negative roles in ecosystem. They are predators of insects which include both beneficial and harmful ones. However, the beneficial aspects as predators of insects far outweigh their harmful effects as destroyers of beneficial or non injurious insects. Hence the study of mantids is economically very important. Unfortunately, the mantid fauna is very poorly known in India especially from Kerala. The present investigation was undertaken with a view to document the diversity of mantids as it occurs in the Kerala state, India.

Till date, in scientific literature 15 species of mantids have been recorded from Kerala. The present study has yielded information on 25 species in addition from Kerala state. Dealing with 40 species, the present work forms the first consolidated document on the mantid fauna of Kerala.

STUDY AREA

The present study was conducted from 1999 to 2006 covering all the 14 districts of the Kerala State. (Map-1)

Kerala State lies along the southern west coast of India approximately between the latitudes 8° 17' and 12° 45' N and longitudes 75° 11' and 77° 20' E. It is bounded by the

state of Karnataka in the north, state of Tamil Nadu in the south, Western Ghats in the east and Lakshadweep Sea (Arabian Sea) in the west. The land area is about 38, 863 sq.km. Physiographically, the area can be broadly divided into four provinces namely, the high lands (600-2500m above MSL), the midlands (300-600m above MSL), the low lands (30-300m MSL) and the coastal plains. The high land areas support tropical rain forests and mixed deciduous forests (Plates I & II) while midlands are under extensive cultivation of cashew, coconut, arecanut, tapioca banana, pepper and vegetables. The lowland areas form the basin of 41 of the 44 rivers of the state (3 flowing eastwards) and support some degraded mangrove forests. This land area is also used for extensive paddy and coconut cultivation.

The climate of Kerala is of the tropical monsoon type with abundant rainfall and hot summer. The southwest monsoon pours over Kerala from June to September, which is the main rainy season of the state. Rains also occur during October to December under the influence of the northeast monsoon. March to May is the summer season. The mean temperature varies from 19^o-33^oC. The mean rainfall is from 180cm to 380cm.

Kerala exhibit high richness in its floral and faunal composition. The higher diversity truly reflects the biogeographic significance of the Western Ghats system of which Kerala forms the integral part. The physiographic features and the tropical climate of this region with very high annual rainfall invariably influence the state's biodiversity potential.

GEOGRAPHICAL DISTRIBUTION OF MANTIDS

The total number of species of mantids reported so far from whole world is 2300 (Ehrmann, 2002) of which 162 species, (Mukherjee 1995) are documented from India.

The endemic families and subfamilies of Mantodea occurring in the Oriental region are: Metallyticidae, Schizocephalinae, Phyllothelinae and Parathespininae. Some endemic genera belonging to Hymenopodidae, Amelinae, Iridiopteryginae, Toxoderinae are also known from Oriental region. The Oriental region shows habitat diversity and faunal diversity of mantids closer to the Ethiopian and the Australian region rather than Neotropical or Holarctic regions.

Fourteen subfamilies of mantids are common to Oriental and Ethiopian regions. These are: Oxythespininae, Iridiopteryginae, Amelinae, Tarachodinae, Liturgusinae, Caliridinae, Thespininae, Acromantinae, Hymenopodinae, Toxoderinae, Empusinae, Blepharodinae, Deroplatinae and Eremiaphilinae.

Six subfamilies of mantids are common to the Oriental and Neotropical region viz. Acromantinae, Amorhoscelinae, Hymenopodinae, Choeradodinae, Liturgusinae and Thespininae.

Four subfamilies occur both in Oriental and Palaeartic region viz. Oxythespininae, Iridiopteryginae, Amelinae and Empusinae. Only two subfamilies Amelinae and Thespininae

are present in Oriental and Nearctic regions together. Iridiopteryginae and Toxoderinae are common to Australian and Oriental regions. The Sri Lankan region is comparatively richer in endemism than Indian subregion. (Mukherjee 1995).

BEHAVIOUR AND BIOLOGY

Mantids are peculiar group of insects showing vivid types of behaviour. They are usually seen among vegetations, on flowers, twigs, grass leaves and even sometimes within home premises. They remain motionless for hours, and only the head rotates about 180 degree to watch any disturbances caused by flying insects which are their only food. Usually they proceed rather slowly towards the prey till they come within comfortable distance. Sometimes sedentary insects like aphids are usually hunted by mantids with short and modified foretibiae (as in subfamily Thespinae). Nymphal stages of mantids usually feed on aphids, which are easily accessible. Species of *Tenodera* wait for hours on nearby flowers or on twigs with stretched forelegs (Mukherjee & Hazra 1995). When prey is within their striking distance, the mantids capture the prey with their raptorial forelegs.

Henry (1932) narrates his observations concerning the lives of mantids as follows: "It is often very difficult to supply the young ones with insects small and numerous enough for their needs. Ripe plantains are exposed so that when it is full of maggots of *Drosophila*, they are placed in mantid cages, fresh plantain being introduced every few days. This way constant supply of the small flies is forthcoming and the young mantises feed greedily upon them. By this, the nymphs indulge less in cannibalism in the presence of abundant fly food. After the third or fourth ecdysis, many species become too large for drosophilae and require larger flies and small grasshoppers"

In captivity species of *Dysaules* spend, much time crouched on dry twigs or grass stems with face looking downwards and the forelegs flexed and lay close against the prosternum. In this position, they are compact and very hard to distinguish from dry twigs. They are strongly phototactic.

On the approach of enemy, especially one of their own kinds, they would rear up the fore part of the body and curve the abdomen upwards, at the same time extending the raptorial legs laterally and displaying the "scare marks" on the prosternum and fore coxae. The tegmina and wings are also raised and displayed to threaten or warn the intruder. Even young nymph adopts this attitude.

Cheddikulama straminea Henry behaves peculiarly. According to Henry (1932), "On several occasions when disturbed, it was seen to stiffen itself with its ambulatory legs laid along the body, and allow itself to drop to the ground where it would lie shamming death for a long time. In this position of course, the straw like camouflage reached its maximum effectiveness."

Wood-Mason (1882) in his paper on new and little known Mantodea described the stridulating mantid of Africa viz *Idolomorpha capensis* Burmeister and stated "sounds

emitted by them were as loud as, but more crepitating in character than the hiss of a large snake” He described the presence of stridulatory apparatus in *Hierodula (Sphodromantis) bicarinata*. The front edge of the tegmina is strongly toothed to rub against the apical half of the upper or posterior faces of each of the posterior femora.

Copulation of mantids is accomplished in several steps and they are visually controlled. The eyes are large to spot the partner. After copulation, the female devour the male.

MECHANISM OF FORMATION OF OOTHECA

The gravid females by repeated tapping of cerci find out a suitable place to lay the eggs in cluster within the cocoon like chamber, the ootheca. The secretion from the accessory gland of first abdominal segment, a frothy mass, on contact with air hardens to form ootheca. To fix ootheca on any suitable substratum, a yellowish base is produced first. Then the secretion from the accessory glands oozes out through the pore near the cerci and the gonapophyses make it spongy. The terminal abdominal segments move rapidly and air is pumped into the material from the eighth pair of spiracles. Each egg is pushed into the individual compartments, which are obliquely placed. The entire ootheca is constructed within 2.5 to 3 hours. As the ootheca hardens the colour changes from whitish yellow to dirty brown.

Various Hymenopteran hyperparasites lay their eggs in mantid ootheca. For example, members of the genus *Podagrion spinola* (Hymenoptera: Torymidae) is parasitic on the ootheca of mantids.

STRUCTURE OF OOTHECA

A typical ootheca possesses 10 transverse and 18 to 20 longitudinal rows. The horizontal sections show that five egg cells in one transverse half row open into a common vestibule, those of the corresponding half row on the other side opening into the next vestibule. (Henry 1932). The egg cells may vary from 6 to 300 depending on the size of the species. The ootheca of *Gonypetyllis semuncialis* Wood-Mason, (the smallest known mantid) contains 6 eggs and that of *Tenodera aridifolia* Stal seem to have 300 eggs.

Mantids can be identified from the shape and size of ootheca. The ootheca of *Hierodula* is globular and attached to the twig; bulged and shield-like in *Mantis* Linnaeus, *Empusa* Illiger and *Blepharopsis* Rehn; spindle shaped in *Gongylus* Thunberg; elongated and pyramidal in *Creobroter* Audinet-Serville, *Euantissa* Giglio-Tos and *Statilia* Stal.

The average time for development of *Statilia nemoralis* Saussure is 83 days and the incubation period is 16 days. There are 7 instars, the last one being the longest, about 25 days. (Mukherjee & Hazra 1995).

ECOLOGY AND DISTRIBUTION

Mantids are commonly distributed at the warm and moist regions of the world, especially tropical rain forests and are rare at the temperate zone.

Locality records show that *Hierodula* Burmeister, *Elmantis* Giglio-Tos, *Mantis* Linnaeus, *Statilia* Stal, *Amantis* Giglio-Tos, *Euantissa* Giglio-Tos and *Humbertiella* Saussure etc are widely distributed in India. *Amorphoscelis* Stal, *Humbertiella* Saussure, *Tenodera* Burmeister etc are bark dwellers. *Nemotha* Wood-Mason, *Eomantis* Giglio-Tos, *Eumantis* Giglio-Tos etc are restricted to hilly regions of Assam. The species of *Eremiaphila* Lefebvre are present at the semi-arid regions. The monotypic species of *Schizocephala* Audinet-Serville prefer grass meadows and adjoining fields and bushes. *Mantis* Linnaeus, *Statilia* Stal, *Creoboter* Audinet-Serville etc prefer dense shrubs in plains and hills.

REVIEW OF LITERATURE

The earlier workers of Mantodea include Olivier (1792), Stoll (1813), Thunberg (1817), Saussure (1869). It was Burmeister (1838) who placed mantids in a separate order Mantodea. Wood-Mason (1891) published the second part of the catalogue which was a continuation of the first catalogue (1889). A thorough observation of world mantids was done by Giglio-Tos and his consolidated work was published in 1927. Werner (1935), Uvarov (1939), Beier (1931) Mukherjee and Hazra (1995) made further contributions. Lombardo, published several papers on mantids from 1985 onwards. Ehrmann (2002) published a book on world Mantodea. The literature pertaining to mantid fauna of India are of Mukherjee & Hazra (1995) and H.V. Ghate (2004).

MATERIALS AND METHODS

Collection work

Mantids are collected from different habitats of Kerala like Tropical Rain Forests, Deciduous Forests, Grasslands, Mangrooves, Human inhabitations etc. for the present investigation.

TERMINOLOGY

Following are the morphological terms used in the taxonomy of Order Mantodea

1. Antenna : (Fig. 1) Paired sensory organ on the head.
 - Scape : Basal antennal segment attached to head.
 - Pedicel : Second antennal segment between scape and flagellum.
 - Flagellum : Distal part of antenna attached to pedicel.
 - Filiform : Flagellum thin thread like.

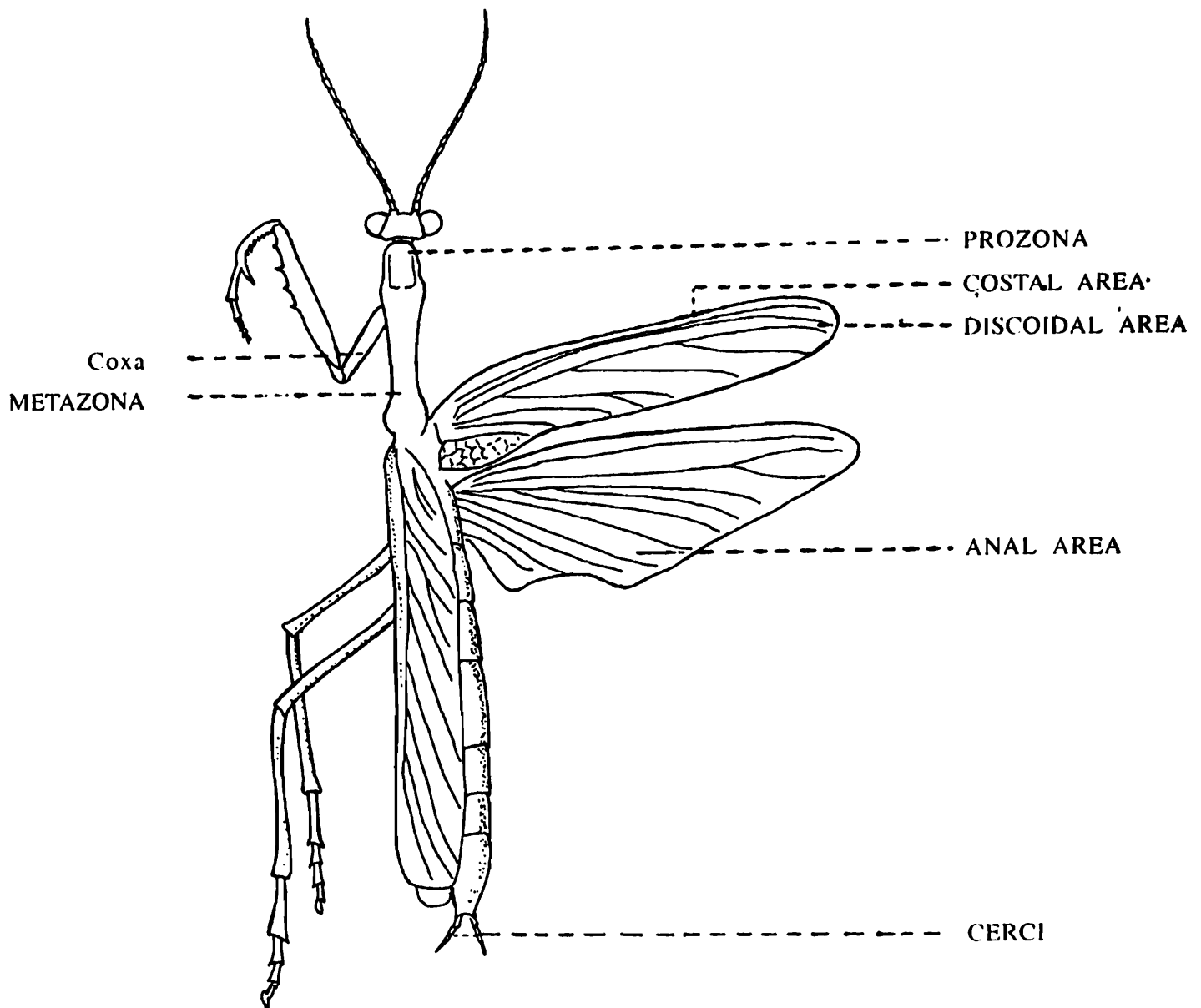


Fig. 1 : Mantis : General morphology

2. Apterous : Completely wingless.
3. Arolium : Small scale like lobe between tarsal claws.
4. Brachypterous : With elytron and hind wing shorter than abdomen, but overlapping or touching each other.
5. Cercus : (Fig. 1) A paired process variously shaped and sized at base of the Supra anal plate.
6. Claw : (Fig. 2C) One pair of claws at the apex of distal tarsal segment.
7. Claw groove : (Fig. 2C) The groove on the femur where tibial claws rests.
8. Clypeus : (Fig. 2B) Facial sclerite between frontal sclerite and labrum.

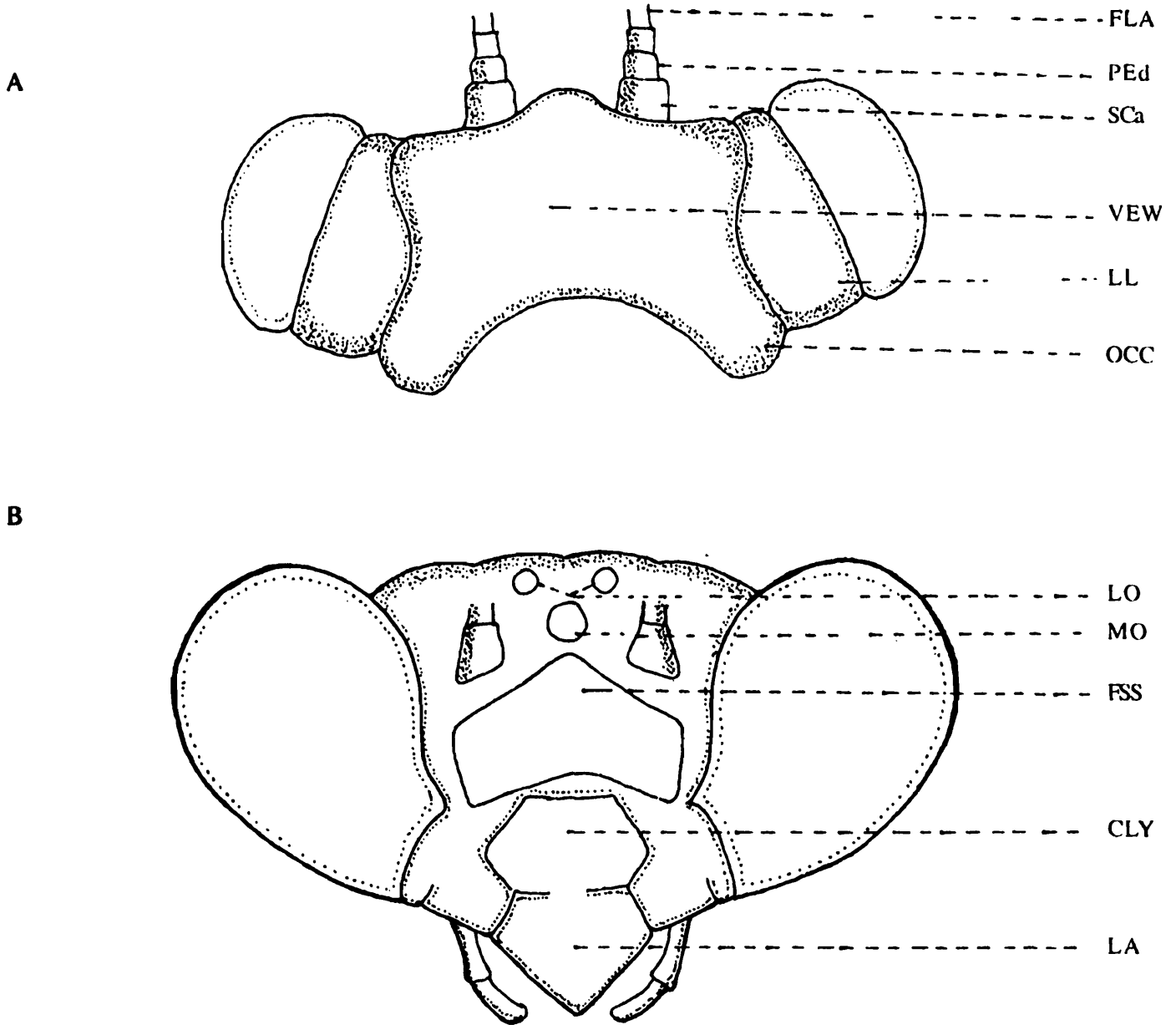


Fig. 2 : Head A – Dorsal view, B – Ventral view

A		B	
FLA	: Flagellum	LO	: Lateral Ocelli
PED	: Pedicel	MO	: Median Ocelli
SCa	: Scape	FSS	: Frontal Sclerite
VEr	: Vertex	CLY	: Clypens
LL	: Lateral lobe	LA	: Labrum
OCC	: Occiput		

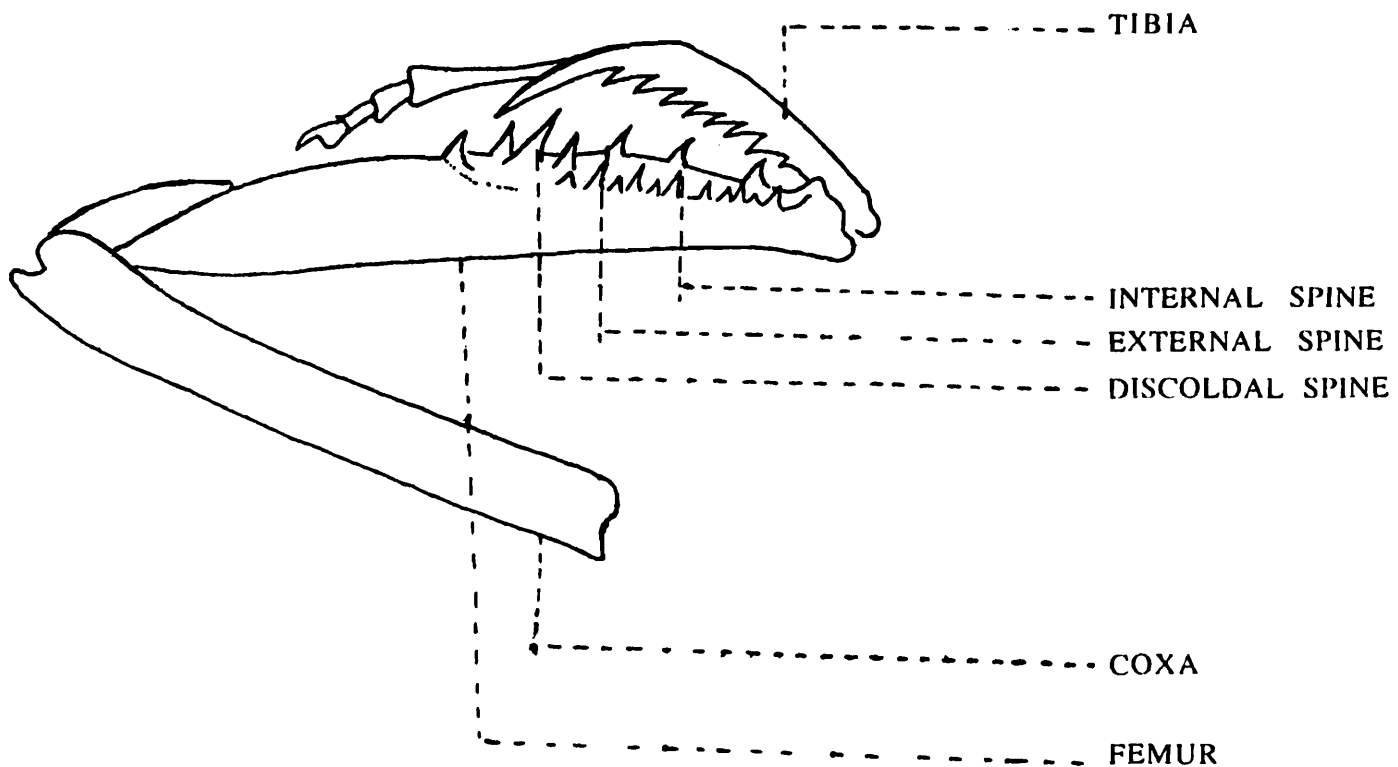


Fig. 2C : Foreleg

9. Coxa : (Fig. 2C) Basal segment of leg, by which the leg is attached to the body.
10. Discoidal spines : (Fig. 2C) Row of spines on the fore femur between external and internal rows of spines.
11. Elytron : (Fig. 1) Tegmen, pl. elytra = tegmina, forewing.
12. External spines : (Fig. 2C) Spines located on the external border of fore femur/foretibia.
13. Face : (Fig. 2B) Whole anterior part of head visible from front.
14. Femur : (Fig. 2C) Basal part of leg between trochanter and tibia.
15. Frontal sclerite : (Fig. 2B) The facial sclerite beneath the antenna, in between the eyes and above the clypeus.
16. Gena : (Fig. 2B) Lateral part of the head.
17. Internal spines : (Fig. 2C) Row of spines at the internal border of fore femur/foretibia
18. Labrum : (Fig. 2B) Upper lip.
19. Pronotum : (Fig. 1) The prothorax which is variously modified.

Prozona : (Fig. 1) Part of Pronotum between head and coxal orogin.

Metazona : (Fig. 1) Part of Pronotum between coxal origin and posterior tip of it where wings originate.

20. **Abdomen :** (Fig. 1) Abdomen.
21. **Mesosternum :** Ventral part of Pronotum.
22. **Occiput :** (Fig. 2A) Lower part of vertex.
23. **Reticulation :** Net of veinlets on the membrane of elytron.
24. **Supra anal plate :** (Fig. 1) Eleventh abdominal tergite covering the anus from above.
25. **Supra coxal dialation :** (Fig. 1) Dialation of Pronotum at the junction of prozona and metazona.
26. **Tarsus :** (Fig. 2C) Four segmented distal part of leg.
27. **Metatarsus :** (Fig. 2C) First tarsal segment.
28. **Tibia :** (Fig. 2C) Part of the leg between femur and tarsus.
29. **Venation :** Distribution and pattern of main veins of elytra and hind wings and areas between them.

(Followed Giglio-Tos 1927, Mukherjee 1995)

Costal vein (Mediastinal vein) (C) : (Fig. 1) First main vein of elytra and hind wing.

Subcostal vein (Anterior radial vein) : (Fig. 1) Second main vein on the elytra and hind wing.

Radial vein (Posterior radial vein) : (Fig. 1) Third main vein of elytra and hind wing.

Cubitus (Discoidal vein) : (Fig. 1) Fourth main vein on the elytra and hind wing.

Posterior cubitus vein (ulnare vein) : (Fig. 1) Vein seen beneath the fourth vein.

Anal veins : (Fig. 1) Veins at the posterior base of elytra and hind wing.

Areas of wing

Costal area : Area between costal vein and elytra and hind wing border.

Subcostal area : Area between costa and subcosta.

Discoidal area : Area between subcosta and anal vein.

Anal area : Area posterior to anal vein of elytra and hind wing.

Anal membrane : Basal membraneous flap of the elytra.

30. **Vertex :** (Fig. 2A) Dorsal upper part of the head above the occiput.

ABBREVIATIONS

Cali. Uni. Campus : Calicut University Campus

DZCU : Department of Zoology, Calicut University, Calicut, Kerala, India,

FRID : Forest Research Institute, Dehra Dun, India.

MNHN : Museum National d' Historie Naturelle, Paris, France.

BMNH : Natural History Museum, London, England.

NHMB : Naturhistorisches Museum, Basel, Switzerland.

NHRM : Naturhistoriska Riksmuseet, Stockholm, Sweden.

SJCT : St. Joseph's College, Thiruchirappally, India.

ZMHU : Zoologisches Museum der Humboldt- Universitat, Berlin.

ZSI : Zoological Survey of India. Culcutta (Kolkotta), India.

ZSIC : Zoological Survey of India, Calicut, Kerala, India

SYSTEMATIC STATUS AND GENERAL FEATURES OF ORDER MANTODEA

Mantids were formerly placed under the Order Dictyoptera. According to Wood-Mason they belong to Order Orthoptera. They were considered closest to Order Isoptera. Fossil records show that mantids had been existing from Palaeocene period (ROY 1996).

Considering the special characteristics, mantids are now placed in a separate Order Mantodea BURMEISTER (1838) under Super Order Blattopterodera.

WOOD MASON (1889) placed mantids under the Order Orthoptera in family Mantodea. He divided the family Mantodea into two grades viz. Grade A Promantodea which included the Subfamily Amorphoscelidae Stal with four genera and Grade B Eumantodea with two Subfamilies viz. Subfamily 1 Eremiaphilidae Stal with seventeen genera and Subfamily 2 Mantidae Stal with eight genera.

GIGLIO-TOS (1927) divided the family Mantidae into 32 Subfamilies and 368 genera while recording the world fauna of mantids in 'Das Tierreich'

In this work he grouped many heterogeneous species together. BEIER (1964) divided the Order Mantodea into 8 families:

- Family Chaeteesidae
- Family Metallyticidae

- Family Mantoididae
- Family Amorphoscelidae
- Family Eremiaphilidae
- Family Hymenopodidae
- Family Mantidae
- Family Empusidae

MUKHERJEE, HAZRA and GHOSH (1995) made a systematic list of mantids so far known from India which included 6 families, 19 subfamilies, 68 genera and 162 species. The 6 subfamilies reported from India are (1) Family Metallyticidae Chopard (2) Family Amorphoscelidae Stal, (3) Family Eremiaphilidae Lefebvre, (4) Family Hymenopodidae Chopard (5) Family Mantidae Burmeister and (6) Family Empusidae Burmeister.

GENERAL FEATURES OF ORDER MANTODEA

Mantids are a group of insects, which can be easily identified by their raptorial fore legs. Being highly predaceous, the fore femur and fore tibia of mantids are with an array of spines to catch hold of the moving insects. Classification of Mantodea is based on the morphological features of the eye, vertex, frontal sclerite, pronotum, fore legs, fore and hind wings. The shape and size of cerci and phallomeres are also taken into consideration for identification of mantids. KARNY (1921) classified mantids into eight families on the basis of wing venation. The size and shape of ootheca varies with species viz. ootheca may be larger and globular and attached to twigs in *Hierodula* Burmeister, bulged in *Mantis* Linnaeus, spindle shaped in *Gongylus* Thunberg.

Family Metallyticidae is a group of mantids with metallic green or blue colour of body and wings. Family Amorphoscelidae constitutes a peculiar group of bark dwelling mantids without mantalian array of spines on the fore femur and foretibia, fore femur with a single spine in the place of the first discoidal spine and foretibia bearing only the terminal claw. Family Eremiaphilidae contains a group of desert dwelling mantids with a short pronotum. Family Hymenopodidae is a group of mantids which possess cephalic horn. These are spectacular mantids camouflaging with flowers and twigs. Apart from the spike on the vertex, they have eye-like markings on the hind wings. Family Empusidae includes grotesque mantids with slender pronotum bearing foliaceous lamina. Most widely distributed mantids belong to the Family Mantidae.

Key to families

1. Body metallic bluish green; fore femur with elongated external spines.....
 METALLYTICIDAE

- Body not metallic coloured; fore femur with external spines not elongated (2)
- 2. Pronotum almost squarish or little longer than broad. (Fig. 6) (3)
- Pronotum usually distinctly longer than broad (4)
- 3. Foretibia without ventral rows of spines; forelegs reduced ... AMORPHOSCELIDAE
- Foretibia with ventral rows of spines; forelegs stout EREMIAPHILIDAE
- 4. Antenna of male pectinate; internal spines of fore femur with each long spine alternating with 3-4 short spines (Fig. 13) EMPUSIDAE
- Antenna of male simple; internal spines of fore femur with each long spine alternating with one short spine (5)
- 5. Vertex usually with spine; foretibial spines curved, numerous and arranged closely; forewing usually with eye like marking HYMENOPODIDAE
- Vertex usually without spine; foretibial spines straight and well separated; forewing without eye like marking MANTIDAE

SYSTEMATIC ACCOUNT

Family AMORPHOSCELIDAE

Mostly bark dwelling. Body small sized; eyes round and large; occiput with backwardly directed and pointed conical knobs. Pronotum short, depressed, with paired large tubercles; forelegs depressed; fore femur and foretibia without usual mantid-like pattern of spines; fore femur with a single spine fore tibia ornamented with a single large claw.

One subfamily with one genus occurs in India.

Subfamily AMORPHOSCELINAE

Pronotum short depressed, with knob like paired tubercles; cerci expanded at distal end.

Genus *Amorphoscelis* Stal

1871. *Amorphoscelis* Stal. *Ofvers. K. Vetensk. Akad. Forh.*, **28** : 401. Type species : *Amorphoscelis annulicornis* Stal.

Diagnostic characters : Head wider than Pronotum; eyes round, prominent; frontal sclerite transverse, narrow, superiorly truncate and arched laterally; vertex with tubercles; occiput produced into large conical protuberances. Pronotum short, somewhat

triangular with paired tubercles; fore coxa smooth; fore femur with a single discoidal spine, no external or internal spines; foretibia depressed with only a terminal claw, no external or internal spines. Cerci flat at distal segment.

Key to Indian species of *Amorphoscelis*
(Modified from Mukherjee & Hazra 1995)

1. Pronotum with 2 anterior and 2 posterior tubercles 2
- Pronotum with 2 posterior tubercles only, anterior tubercles absent.....
..... *A. brunneipennis* Beier
2. Body ventrally black; fore femur internally black; fore coxae with 3 black bands internally *A. annulicornis* Stal
- Body ventrally brick red; fore femur internally brown; fore coxae without black bands *A. singaporana* Giglio-Tos

(Only one species viz. *A. annulicornis* Stal is known from Kerala)

***Amorphoscelis annulicornis* Stal**
(Figs. 3-8)

1871. *Amorphoscelis annulicornis* Stal. *Ofvers K. Vetensk. Akad. Forh.*, **28** : 401. Type M (?). India (NHRM)

1915. *Amorphoscelis indica* Giglio-Tos. *Bull Soc. Entomol. Ital.*, **46** : 33. Holotype.

M. India : Ratnagiri. (BMNH)

Amorphoscelis keiseri Beier. 1956. *Verh. Naturf. Ges. Basel.* 67 : 33. Holotype. M. Sri Lanka. N.C.P. Anuradhapura (NHMB)

Diagnosis : Male Body length 19 mm.

Colour : Deep brown; *Head* : Bluntly triangular, vertex depressed, on either side of median line with 2 large tubercles; occiput produced into 2 large pointed conical tubercles; eyes round, projecting laterally; antenna filiform; frontal sclerite transverse.

Pronotum : Longer than fore coxa; depressed; forelegs simple; coxa a little shorter than femur, without spines; femur simple with a single median spine corresponding to distal spine, no external or internal ones; a row of denticles present at inner edge; tibia short, without external or internal spines, tibial claw well developed; wings longer than abdomen; forewing semiopaque, leathery, costal area opaque with reticulate veins,

Abdomen : Shorter than wings, fusiform with racket shaped cerci.

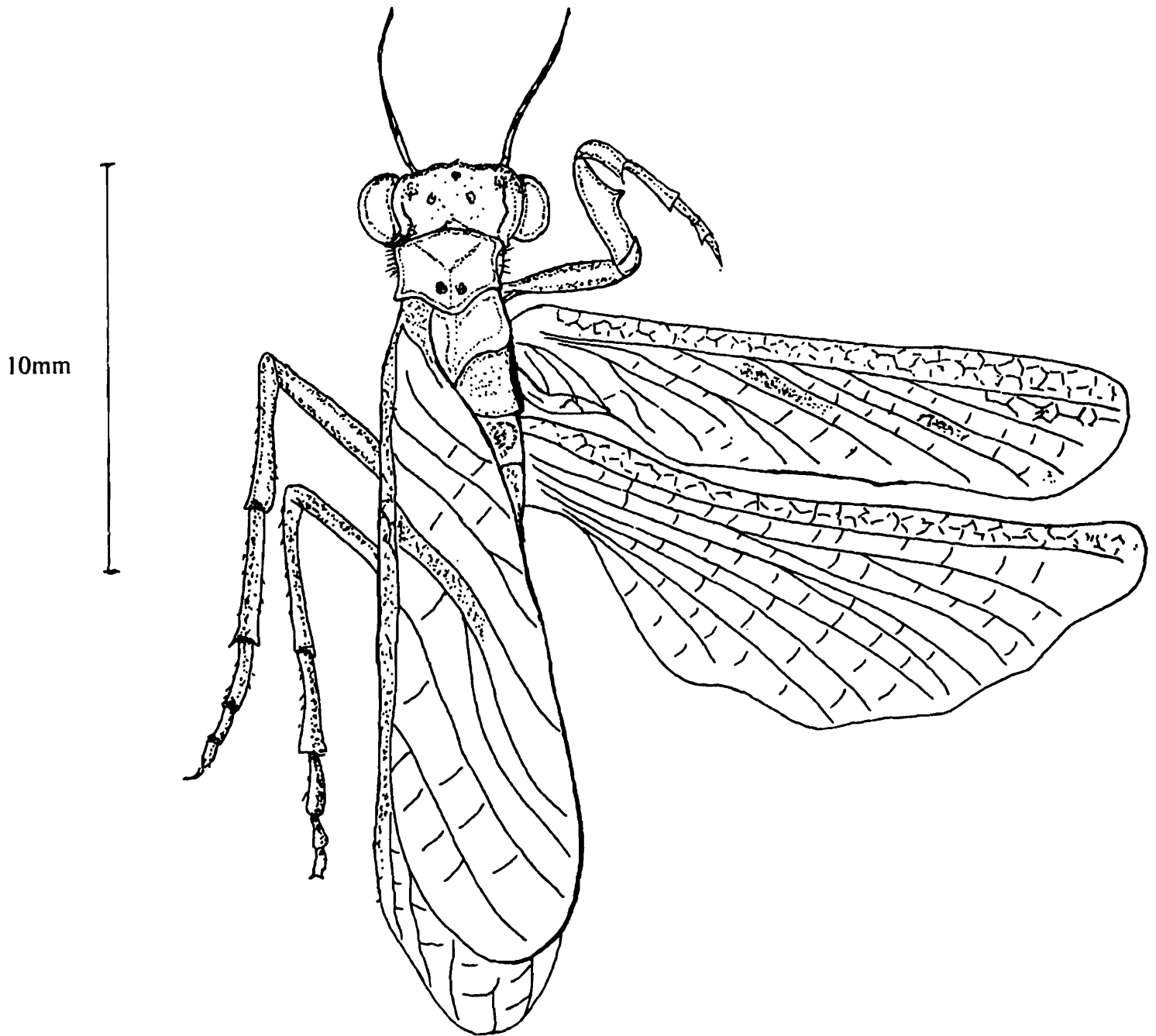


Fig. 3 : *Amorphoscelis annulicornis* (Stal)

Female : Slightly larger than male, body length 16-18mm (Mukerjee et.all), elytra shorter than abdomen.

Material examined : Plesiotype : Male, Inia, Tamil Nadu, Kuttalam, between 1991-1993. Edwin (DZCU).

Family EMPUSIDAE

Body medium to large, greenish or brown; always winged. Vertex prolonged into conical protuberance; antenna of male bipectinate; clypeus and frontal sclerite carinate; eyes oval. Forefemora with 5 external and 4-5 discoidal spines, internally 1 large spine

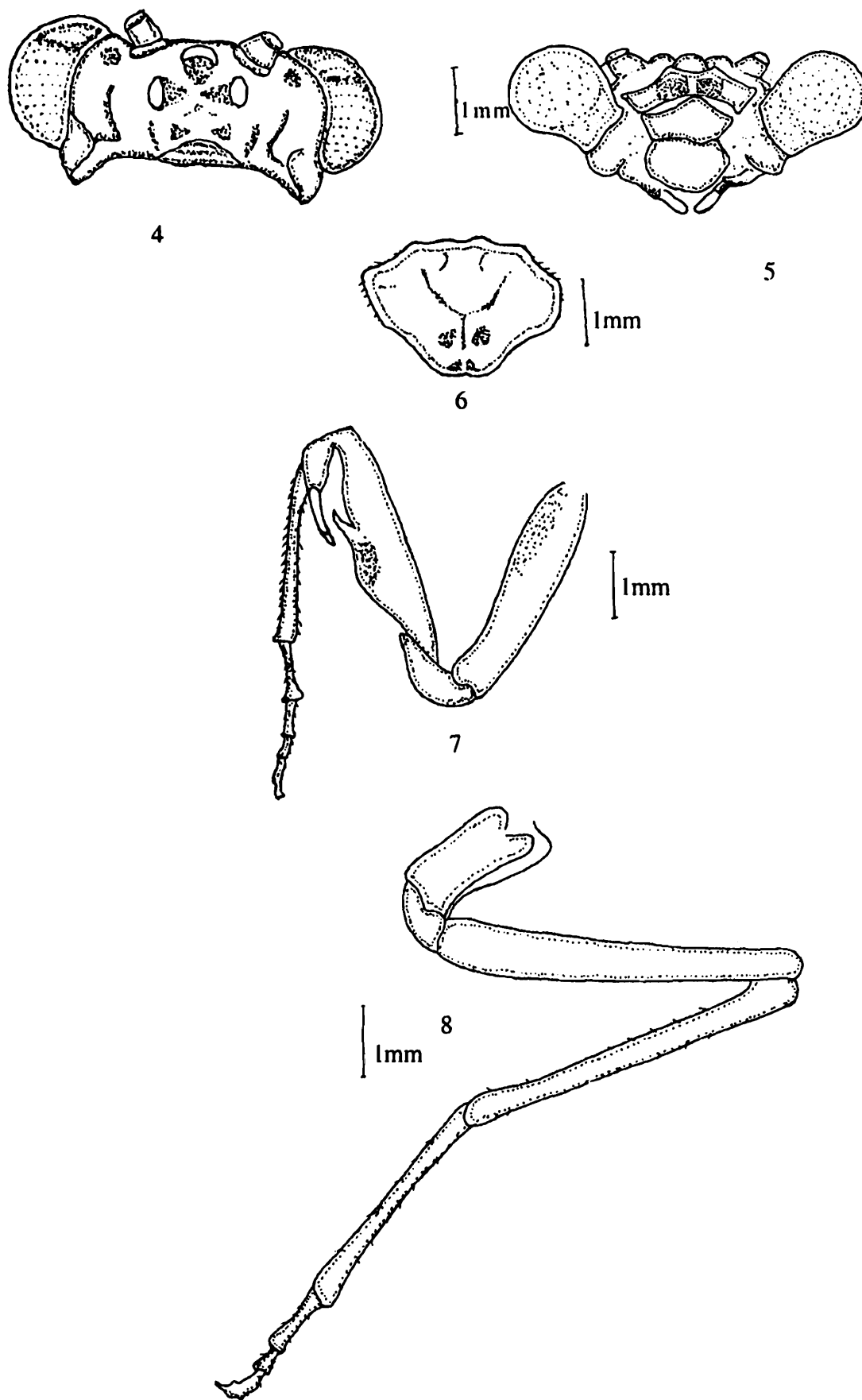


Fig. 4-8 : *Amorphoscelis annulicornis* (Stal)

Fig. 4 : Head Dorsal view

Fig. 5 : Head Ventral view

Fig. 6 : Pronotum

Fig. 7 : Foreleg

Fig. 8 : Hindleg

alternates with 3-4 smaller spines; foretibia with neumerous spines externally and internally. Abdomenal segments usually with expansions; supra anal plate short, broad, transverse. Cerci simple.

Two subfamilies are known from India.

Key to subfamilies

1. Pronotum slender, long; fore coxa with prolonged spiniform process at distal end ..
..... EMPUSINAE
- Pronotum short, depressed; fore coxa without spiniform process at distal end
..... BLEPHARODINAE

Subfamily EMPUSINAE

Winged forms; in male antenna pectinate. Pronotum slender, longer than fore coxa; fore coxa with backwardly directed spiniform process at distal end.

Key to Indian genera

- 1 Fore femur with dialated superior end; mid and hind femur with ventral lobes
..... *Gongylus* Thunberg
- Fore femur without dialation; mid and hind femora without ventral lobes
..... *Empusa* Illiger

(Only *Gongylus* is known from Kerala)

Genus *Gongylus* Thunberg

1815. *Gongylus* Thunberg *Mem. Acad. Sci. St. Petersburg*, 5 : 220. Type species : *Gongylus gongylodes* (Linnaeus)

Diagnostic characters : Body bizzare shaped; brown or yellowish green. Head small, vertex with protuberance; antenna filiform in the case of female, pectinate in male. Pronotum slender with rhomboidal dialation; fore coxa with backwardly directed, distal spiniform process; superior border of fore femur dialated; with 5 external and 4 discoidal spines ;mid and hind legs slender, coxa with external lobes; femur with distal, triangular lobe dorsally and semicircular lobe ventrally; wings well developed; in males wings longer and in female shorter than abdomen.

Distribution : Asia, Oriental Region.

Key to Indian species of *Gongylus* Thunberg

1. Dialation of pronotum rhomboidal, covers one third of pronotum, lateral extension angular..... *G. gongylodes* (Linnaeus)
- Dialation of pronotum cordiform, almost entirely covers the pronotum, lateral extension rounded..... *G. trachelophyllus* Burmeister

(Only *G. gongylodes* is known from Kerala)

Gongylus gongylodes (Linnaeus) (Figs. 9-14) (Plate I. Figs. 1 & 2)

1758. *Grillus (Mantis) gongylodes* Linnaeus *Syst. Nat.*, 10 : 426.

1767. *Mantis gongylodes* Linnaeus *Syst. Nat.*, 2(10) : 610.

1793. *Mantis flabellicornis* Fabricius *Entomol. Syst.*, 2 : 16.

1871. *Gongylus gongylodes* Saussure *Mem. Soc. Geneve*, 21 : 185.

Plesiotype : Female, Body Length 95 mm.

Colour : Greenish brown.

Head : Conical, compressed, with anteriorly prolonged foliaceous lobes; eyes oval; frontal sclerite spiniform, as high as wide, with rhomboidal carinated disc; antenna filiform, short and non ciliated.

Pronotum : Slender, longer than fore coxa, anteriorly with rhomboidal dialation extending from anterior tip to upper one third of metazona. Fore legs: coxa simple, middorsally carinated, apical lobes conical, backwardly directed, trochanter slender; femur foliaceous, deeply grooved ventrally, with 5 external, 4 discoidal, 8-9 long internal, 20 short internal spines, one longer internal spine alternates with 3-4 shorter spines; femur longer than coxa. Middle and hind legs: coxa short, femur with distal dorsal triangular lobe and with ventral semicircular lobes

Abdomen : Broad, laterally laminated, longer than wings, carinated. supra anal plate short, cerci short,

Male : A little shorter than female; fore wings extended beyond the abdomen, but it is reduced in female. body length 80 mm.

Material examined : Plesiotype : Female, INDIA, Kerala, Cali. Uni. Campus, U. V. K. Mohammed (DZCU). Other material examined : 1 Male, Malaparamba, 11-viii-1999, Vyjayandi. 1 Male, T R F (Trissur), Vellanimala, 9-x-1995, Gopi (ZSI, Calicut) Reg. No. 11985.

1 Male, Kerala, Kolavipalam (mangrove), 10-ix-2001, Jaffer.

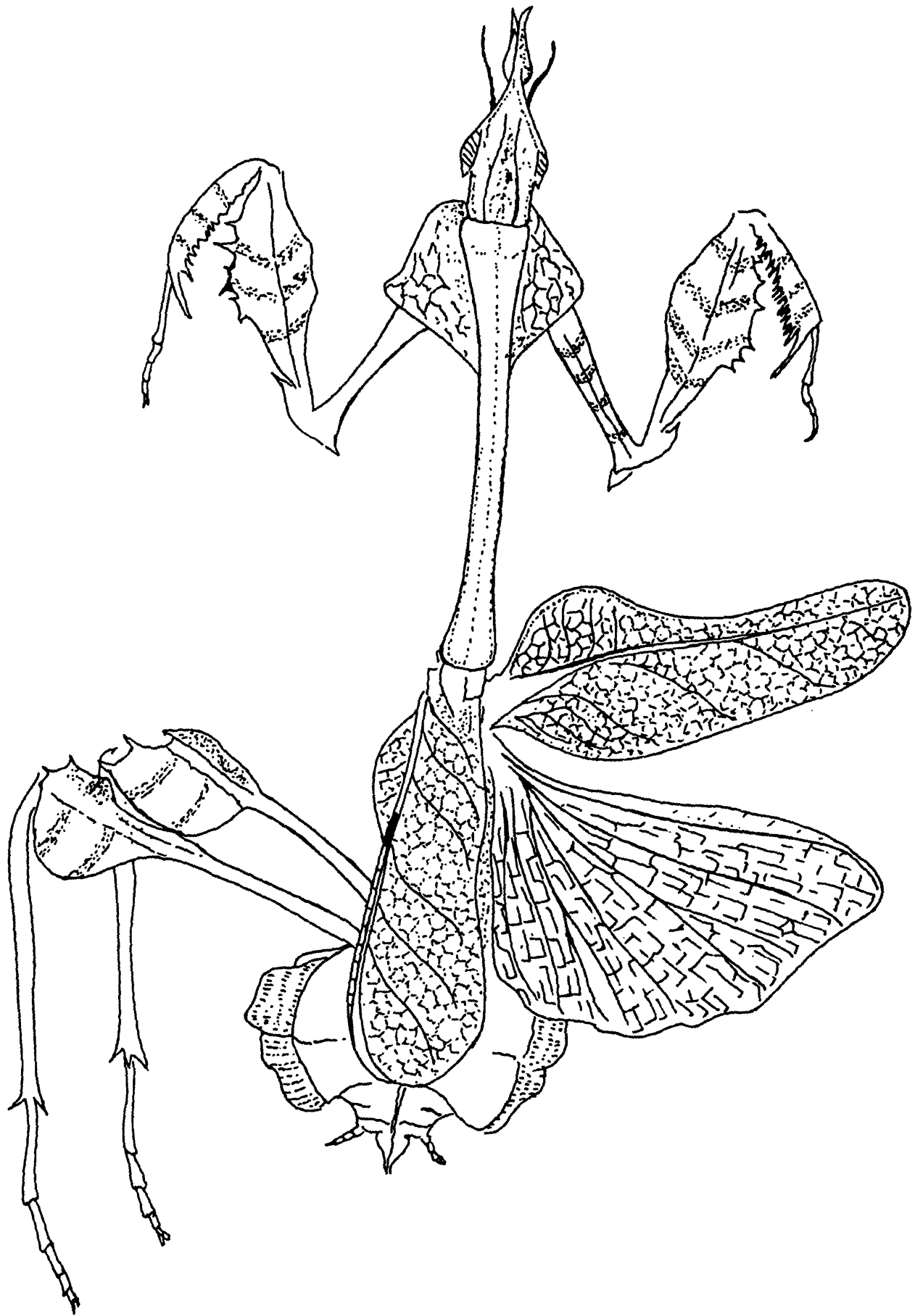
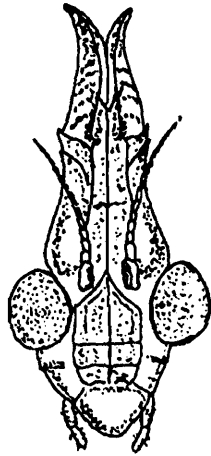
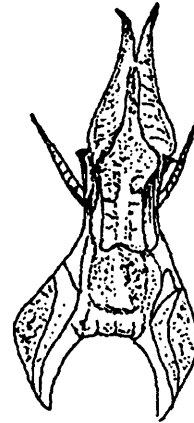


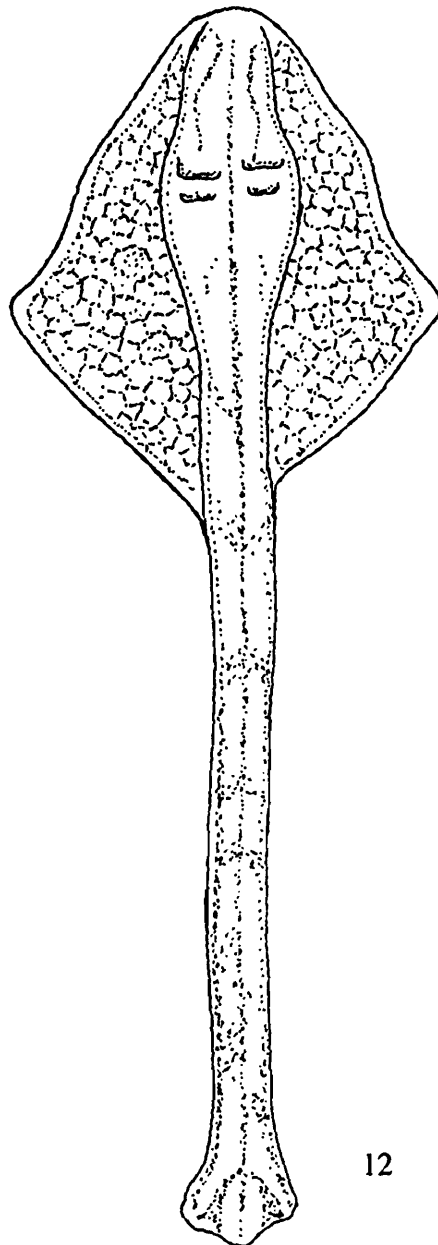
Fig. 9 : *Gongylus gongylodes* (Linnaeus)



10



11



12

Fig. 10-12 : *Gongylus gongylodes* (Linnaeus)
Fig. 10 : Head Dorsal view Fig. 11 : Head Ventral view Fig. 12 : Pronotum

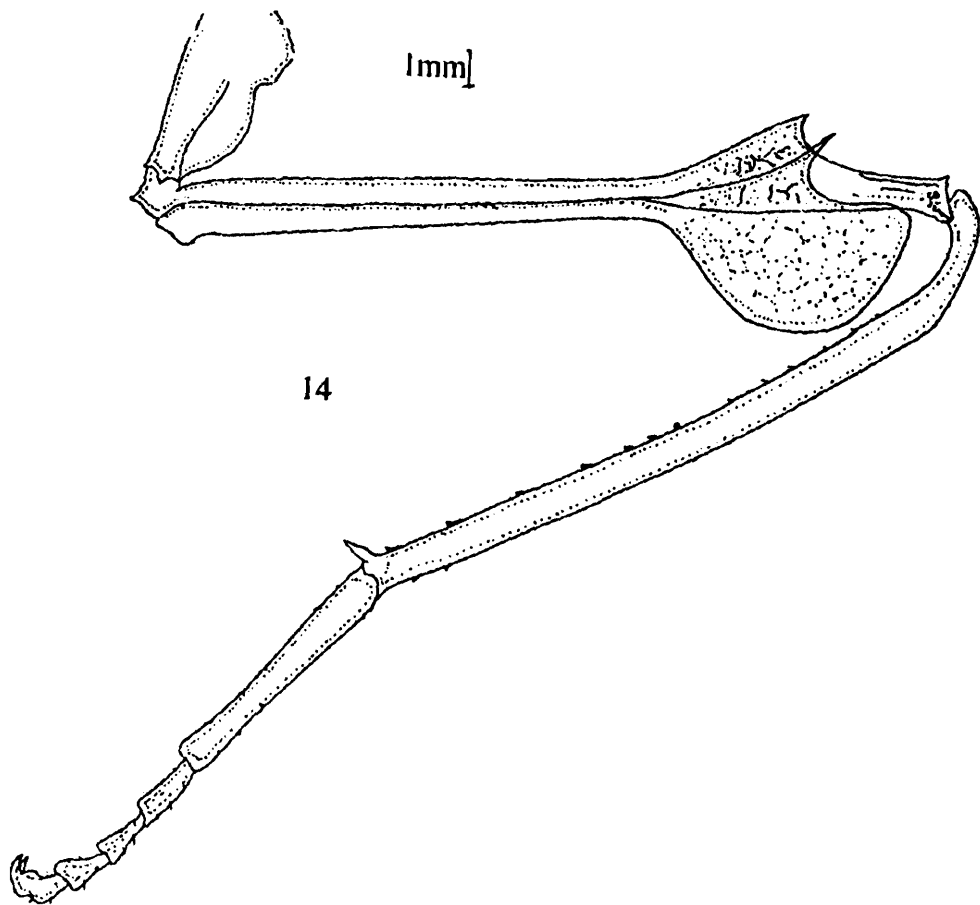
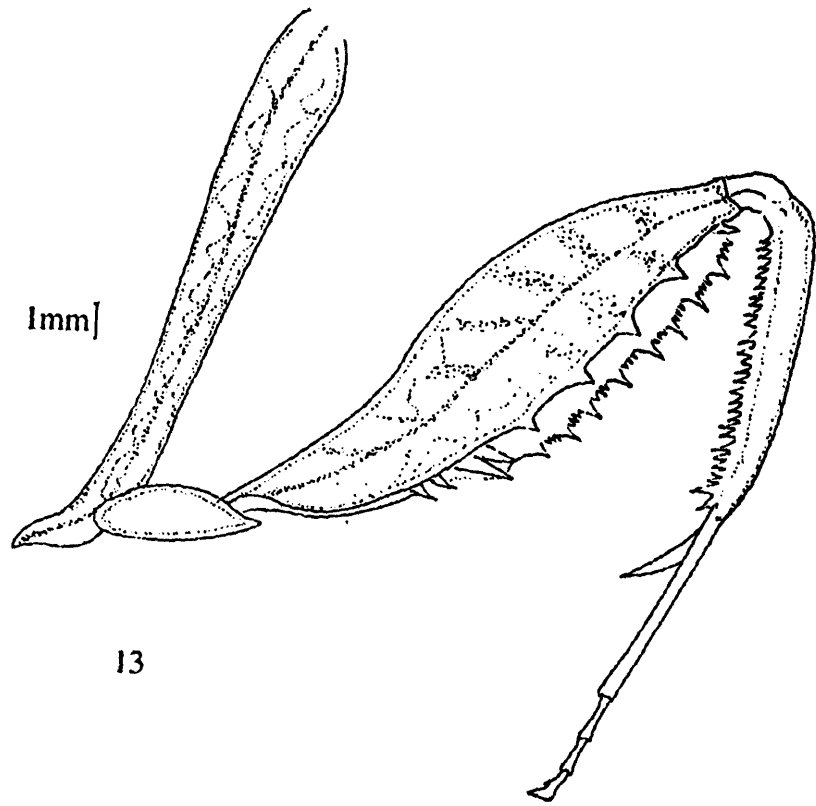


Fig. 13 : Foreleg Fig. 14 : Hindleg

Family HYMENOPODIDAE

Diagnostic characters : Usually medium sized (20-40 mm) mantids; brightly coloured; vertex with protuberance; frontal sclerite with spiniform process. Pronotum almost as long as fore coxa; claw groove at basal portion of fore femur; fore tibia with closely placed and curved numerous spines, external spines apparently fused ; middle and hind legs slender, coxa with external distal and femur with ventral lobes; both wings longer than Abdomen; forewings often with eye like or spiral markings. Supra anal plate transverse.

Two subfamilies are known from India.

Key to subfamilies

- 1. Frontal sclerite superiorly and medianly spiniform; without wing like or excavated extensions on either side; eyes within the circumference of head (Fig. 17) ACROMANTINAE
- Frontal sclerite superiorly and medianly not spiniform, with excavated or wing like extensions on either side; eyes project beyond the circumference of head (Fig. 55) HYMENOPODINAE

Subfamily ACROMANTINAE

Frontal sclerite transverse, disc flat, superior edge medianly spiniform. Vertex with protuberance; eyes globular. Pronotum laterally denticulated ; fore femur with 4 external and 4 discoidal spines; external spines of fore tibia closely packed, directed forward; middle and hind femur usually with lobes; wings well developed, longer than adomen with coloured patches.

Only one tribe viz. Tribe Acromantini is reported from India.

Tribe Acromantini

Diagnostic characters : Vertex with protuberance; Pronotum slender, usually denticulated laterally; fore and hind limbs with or without lobulations.

There are 9 genera under Tribe Acromantini.

Key to Indian genera

- 1. Vertex with protuberance. Mid and hind legs with lobes (Figs. 48 & 53)..... 2
- Vertex without protuberance. Mid and hind legs without lobes 5

2. Pronotum slender; fore femur foliaceous; internal apical lobes of fore coxa convergent 3
 – Pronotum broad; fore femur simple, internal apical lobes of fore coxa divergent.... 4
3. Disc of frontal sclerite carinated. External edge of fore femur denticulated *Ephestiasula* Giglio-Tos
 – Disc of frontal sclerite not carinated. External edge of fore femur smooth *Hestiasula* Saussure
4. Wings truncate at tip (Fig. 21) *Acromantis* Saussure
 – Wings round at tip (Fig. 27) *Ambivia* Stal
5. Frontal sclerite obtusely angular 6
 – Frontal sclerite spiniform (Fig. 17) 7
6. Pronotum slender with metazonal constriction *Nemathoa* Wood-Mason
 – Pronotum not slender without metazonal constriction *Euantissa* Giglio-Tos
7. Pronotum flat, without constriction *Odontomantis* Saussure
 – Pronotum slender, with constriction 8
8. Fore coxa with 8-10 large tubercles; internal apical lobes convergent *Heliomantis* Giglio-Tos
 – Fore coxa with a few weak denticles; internal apical lobes divergent *Anaxarcha* Stal
- (*Ephestiasula*, *Nemathoa*, *Odontomantis* and *Heliomantis* are not so far reported from Kerala)

Genus *Acromantis* Saussure

1870. *Acromantis* Saussure *Mitt. Schweiz. Entomol. Ges.*, 3 : 229. Type species : *Acromantis formosa* Saussure.

Diagnostic characters : Vertex usually with protuberance; frontal sclerite transverse, spiniform superiorly; eyes globular. Mesosoma slightly longer than fore coxa, usually with tuberculated margin; fore leg simple; internal apical lobes of fore coxa divergent; fore femur with 4 external and 3 discoidal spines; middle and hind femur with proximal and distal ventral lobes. Both wings truncate, well developed, longer than abdomen and with coloured patches.

Distribution : Asia, Oriental Region.

Four species are known from India.

Key to Indian species of *Acromantis* Saussure

1. Vertex without tubercles *A. nicobarica* Mukherjee
- Vertex with tubercles 2
2. Pronotum with tubercular border in male, discoidal area of fore wing less densely reticulate in female. 3
- Pronotum without tubercular border discoidal area in female densely reticulated
..... *A. oligoneura* (De Hann)
3. Longer internal spines of fore femur entirely black; *A. montana* Giglio-Tos
- Longer internal spines of fore femur black at tips only, (Fig. 15)
..... *A. insularis* Giglio-Tos

***Acromantis insularis* Giglio-Tos
(Figs.15-20)**

1915. *Acromantis insularis* Giglio Tos. *Boll. Mus. Torino.*, 30(702) : 6

Plesiotype : Male Body length 32 mm

Colour : Clay brown.

Head : Wider than high; vertex not smooth, elevated in the middle, anteriorly thrown into a pointed protuberance; eyes globular; antenna filiform, non-ciliated; frontal sclerite anteriorly projecting, spiniform, transverse, wider than high.

Pronotum : A little longer than fore coxa; metazona laterally tuberculated. Fore legs : Outer margin of coxa with 5-7 tubercles, internal apical lobes divergent; femur slightly longer than coxa, outer margin sinuate, with 4 external and 4 discoidal spines (the third one longest); tibial spines gradually elongated towards apex; tibial claw equal in size of metatarsus; metatarsus as equal as all other tarsal segments. Middle and hind legs : Coxa both in middle and hind legs shorter than femur; femur with preapical and postapical lobes ventrally; wings truncate; veins widely and obliquely placed with broader reticulation of venioles; forewing with opaque costal area, discoidal area hyaline, costal vein bifurcates; hindwing with distal superior tip with dense reticulation, anterior radial vein trifurcates, posterior radial vein bifurcates.

Abdomen : Shorter than wings, supra anal plate short; cerci short.

Female : Protuberance of vertex not much pointed in female.

Materials examined : Plesiotype: Male, INDIA, Kerala, Cali. Uni. Campus, 12-iv-2000, T. C. Narendran, (DZSU). Other materials examined: 1 Male, Kannur, Cherukunnu, 5-i-2001, Celin (DZCU).

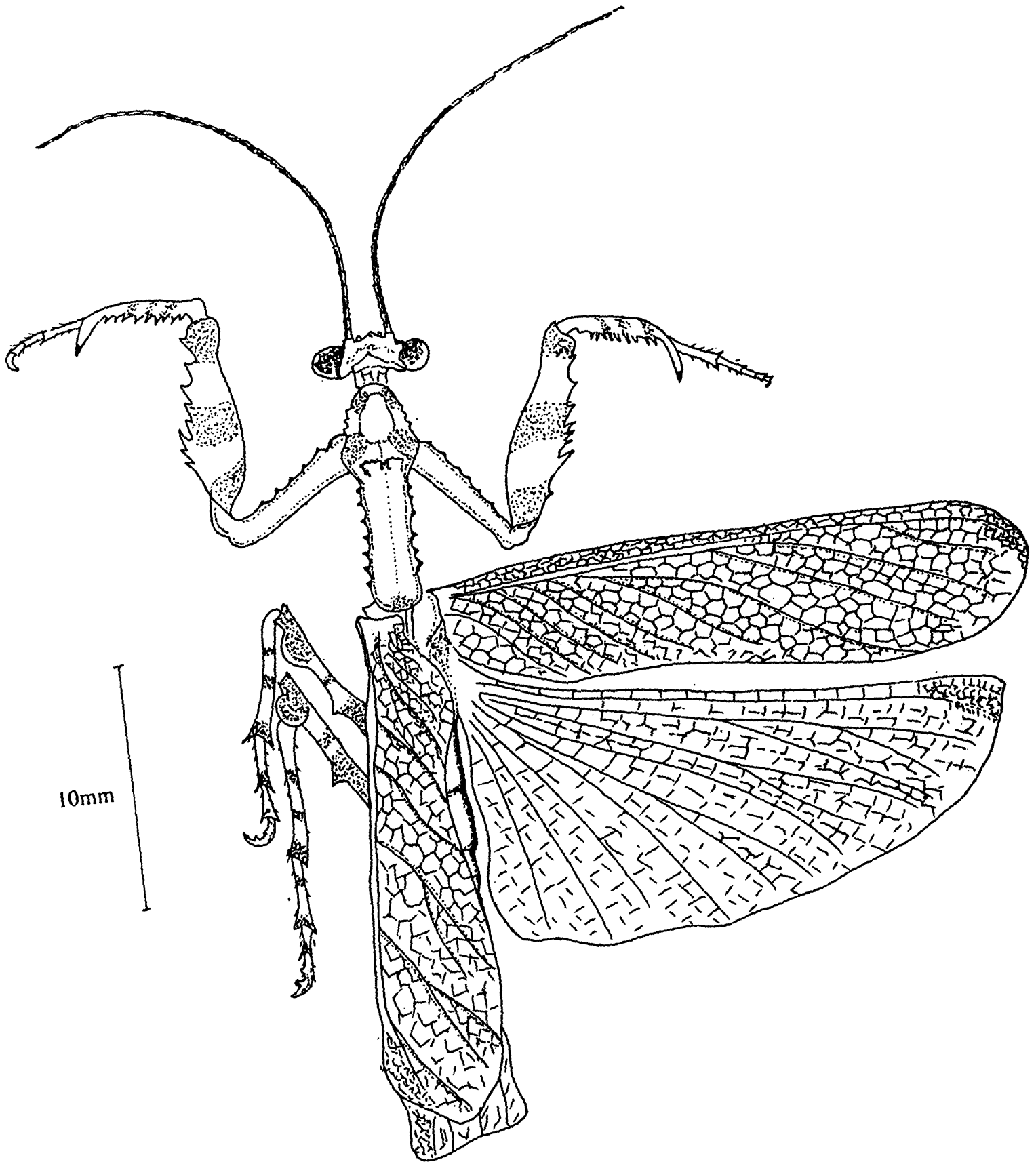


Fig. 15 : *Acromantis insularis* Giglio-Tos

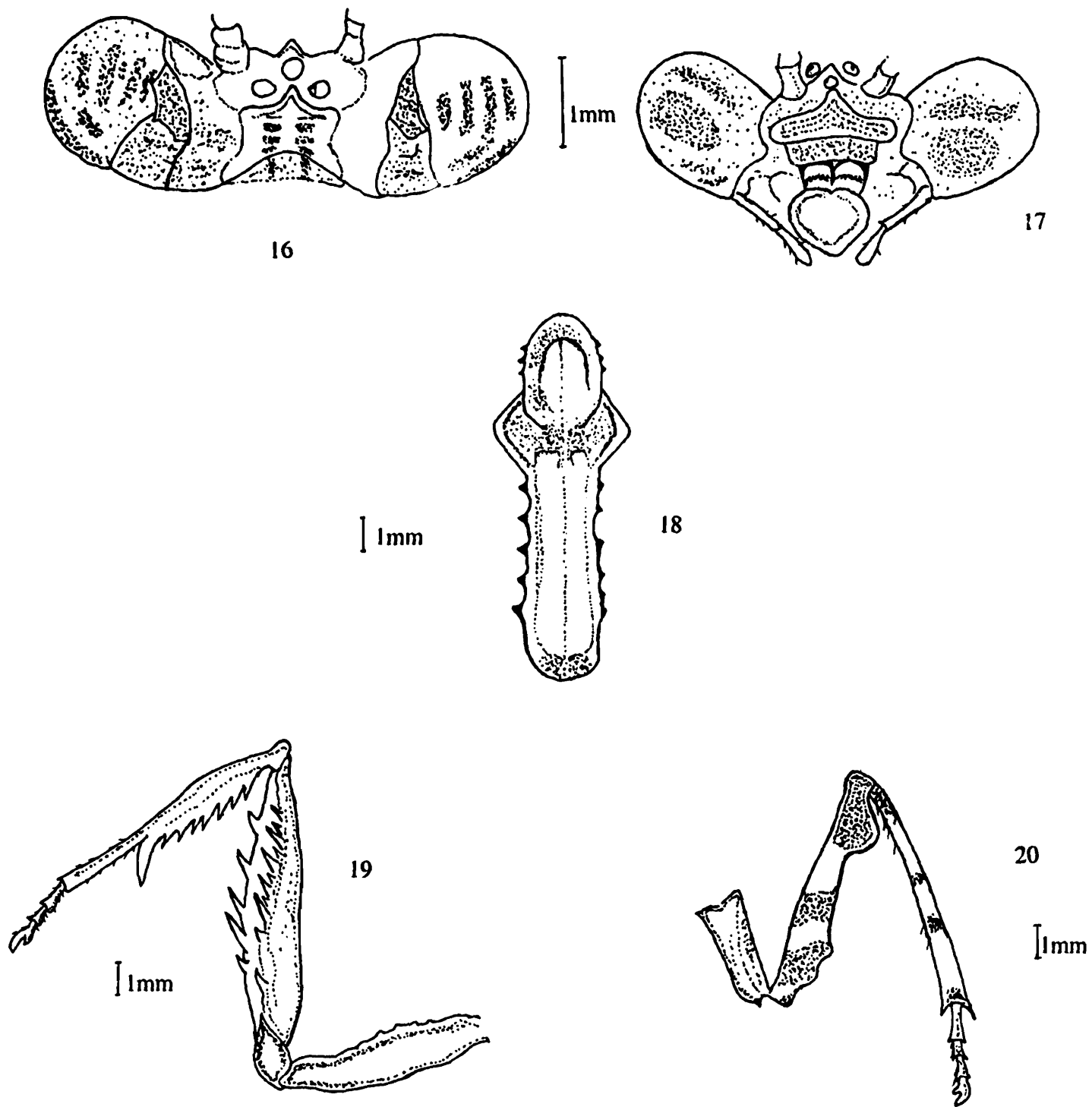


Fig. 16-20 : *Acromantis insularis* Giglio-Tos

Fig. 16 : Head Dorsal view Fig. 17 : Head Ventral view Fig. 18 : Pronotum Fig. 19 : Foreleg
Fig. 20 : Midleg

***Acromantis montana* Giglio-Tos**
 (Figs. 21-26) (Plate I. Fig. 3)

1915. *Acromantis montana* Giglio-Tos *Bull. Mus. Torino*, 30 (702) : 7

Diagnosis : Female body length 38 mm.

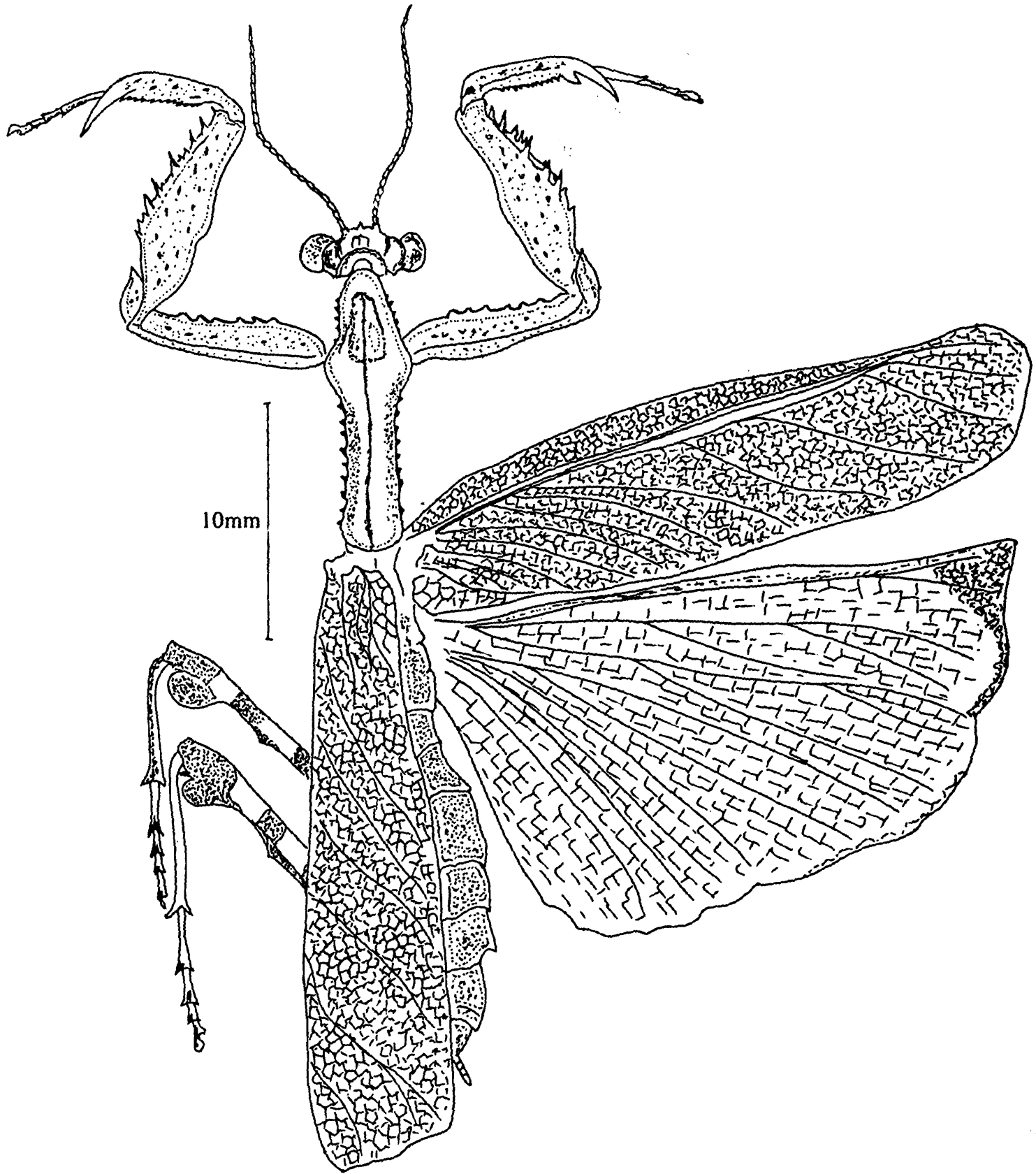


Fig. 21 : *Acromantis montana* Giglio-Tos

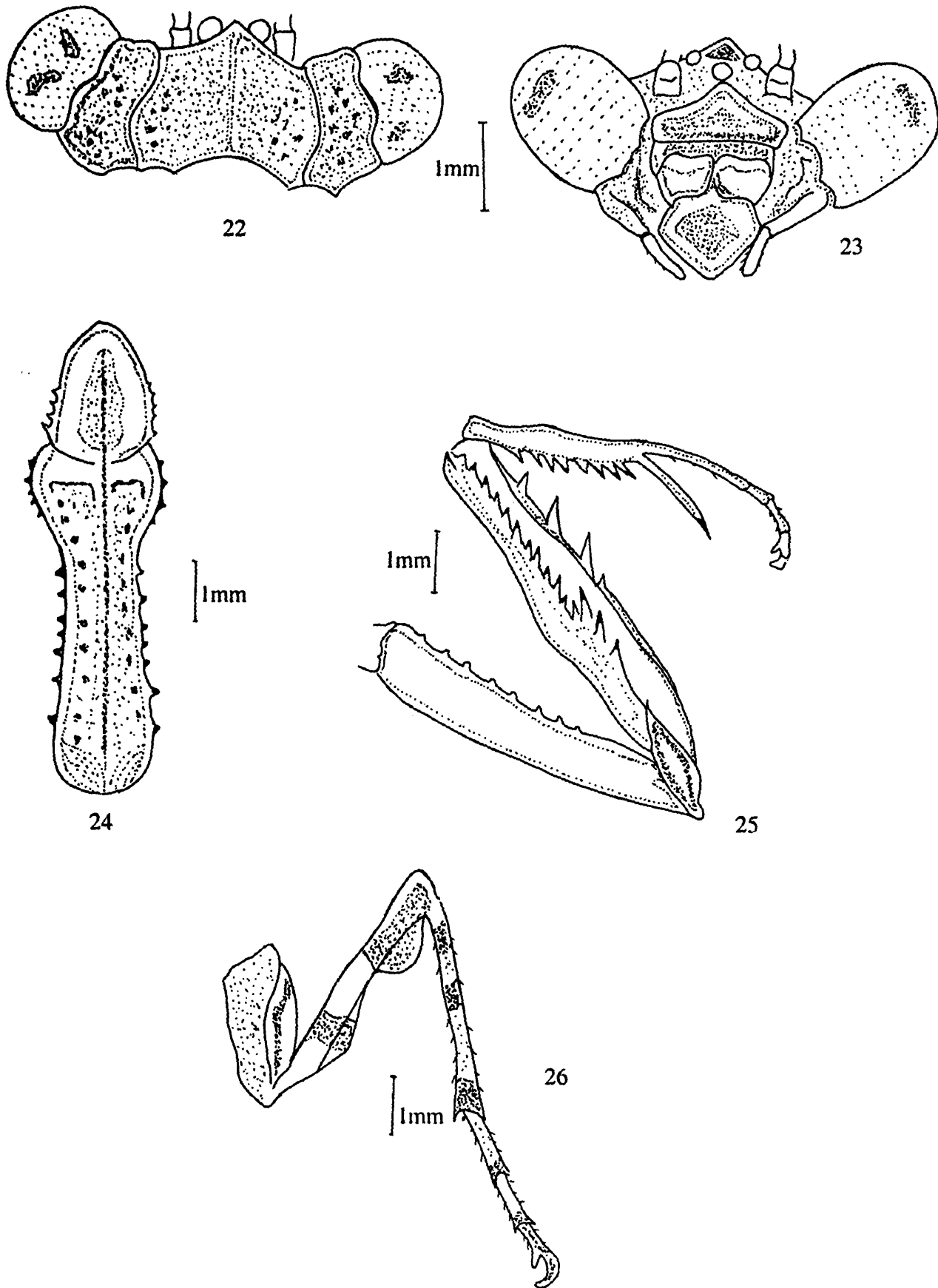


Fig. 22-26 : *Acromantis montana* Giglio-Tos
Fig. 22 : Head Dorsal view Fig. 23 : Head Ventral view Fig. 24 : Pronotum Fig. 25 : Foreleg
Fig. 26 : Midleg

Colour : Brown.

Head : Wider than high; vertex with distinct middorsal lobe, terminating in a central triangular spike; eyes globular, frontal sclerite wider than high, mid superior tip spiniform, disc carinated.

Pronotum : A little longer than fore coxa, metazona constricted at middle, laterally with 5-7 strong blunt spines; Fore legs : Simple; coxa with dorsal median ridge, inner margin with 5 blunt spines, internal apical lobes divergent; femur longer than coxa and tibia, with 4 external, 3 discoidal, 5 longer internal and 7 shorter internal spines (the distal two longer internal spines enclose two shorter ones); claw groove proximally placed; tibia compressed, with 10 minute external and 12 sharp internal spines; metatarsus as long as other tarsal segments. Middle and hindlegs : Coxa short, carinated; femur with ventral distal semicircular and proximal triangular lobes; metatarsus a little shorter than all other tarsal segments together. Wings truncate, forewings semihyaline, costal area opaque costal vein bifurcates at the distal tip; posterior radial vein trifurcates, anal membrane transparent veinlets form fine mesh work; hind wing hyaline, anterior radial and posterior radial veins bifurcate, anterior tip opaque.

Abdomen : Shorter than wings, a little broad posteriorly, supra anal plate short, broad. Cerci many segmented with pubescence.

Male : Has no remarkable differences from that of female, but body size a little shorter than female. Body length 24mm.

Material examined : Plesiotype : Female, INDIA, Kerala, Trissur, 15-1-2001, Vyjayandi. Other materials examined : 1 Female, Cali. Uni. Campus, 1-x-1997, Pookoya (DZCU). 1 Male, Kerala, Trissur, 15-iii-2001, K.Usha (DZCU).

Genus *Ambivia* Stal

1877. *Ambivia* Stal *Bih. K. Svenska. Ventensk Akad. Handl.*, 4(10) : 88. Type species : *Ambivia popa* Stal.

Diagnostic characters : Body dirty brown. Vertex with sharp triangular protuberance in front of median ocellus, lobulated; frontal sclerite transverse, superiorly spiniform; eyes large and globular. Pronotum compressed with dark tubercles both on sides and on surface, constricted at middle; fore coxa internally and distally with serrated lobes, internal apical lobes converging; fore femur with 4 external and 4 discoidal spines ; middle and hind femur shorter than their tibia and with ventral lobes; wings longer than abdomen in both sexes and round at tips.

Distribution : India, Oriental Region, Srilanka, Sumatra, Borneo.

Only one species is known from India and also from all over the world.

***Ambivia popa* Stal**
(Figs. 27-32) (Plate II. Fig. 4)

1877. *Ambivia popa* Stal, *Bih. K. Svenska Ventensk Akad. Handl.*, 4(10) : 88

1908. *Popa undata* F. Werner, *Ann. Mus. St. Petersburg*, 13 : 124, Syn. by Giglio Tos 1915.8

Diagnosis : Female Body length 53 mm.

Colour : Fuscous to clay brown.

Head : Wider than high; vertex not smooth, middle portion elevated, with conical spine; eyes globular frontal sclerite wider than high, transverse, mid superior edge spiniform; antenna delicate, filiform, non setaceous

Pronotum : A little longer than fore coxa; supracoxal dialation pronounced, oval; lateral sides of prozona with 8-9 tubercles; below supracoxal dialation metazona constricts at middle; metazonal disc with scattered tubercles; metazona longer than prozona; fore coxa ridged strongly at mid dorsal side, ventrally smooth and somewhat bulging anteriorly; internal apical lobes of fore coxa convergent to form a notch; dorsally and distally fore coxa dialates to form a lobe with upper margin tuberculated; fore femur slender, tuberculated outside, with 4 external, 4 discoidal, 6 larger internal, 7 smaller internal spines (third discoidal spine longest). Mid hind legs: metatarsus much smaller, almost same as other tarsal segments; forewing semihyaline, hindwings transparent, both wings longer than abdomen in both sexes, not truncate, round at tip.

Abdomen : Fusiform, shorter than wings; cerci short.

Male : Both male and female are similar in appearance, but male a little shorter than female.

Materials examined : Plesiotype : Female, Sulthan Bathery (Wayanad), 14-iv- 2000, Lambert. Other materials examined : 3 Males, Cali. Uni. Campus, 11-iii-1998, 22-i-2000, 29-ii-2000, T.C. Narendran, Arif, Beena.P.C. 1 Male, Thrissur, 11-iv-2001, K.Usha.1 Male, Athiripally, 23-ix-1996, Reg. No.8774, C. Radhakrishnan.

Distribution : India, Sikkim, W.Bengal, Indonesia, Sumathra, Srilanka.

Genus *Anaxarcha* Stal

1877. *Anaxarcha* Stal. *Bih. K. Svenska Akad. Handl.*, 4(10) : 81. Type species : *Anaxarcha graminea* Stal.

Diagnostic characters : Body slender, light green. Vertex with conical spine and with prominent lateral lobes; eyes globular; frontal sclerite transverse, superiorly spiniform, bicarinated. Pronotum slender, a little longer than fore coxa, denticulated laterally; supracoxal dialation oval; fore coxa with divergent internal apical lobes; fore femur

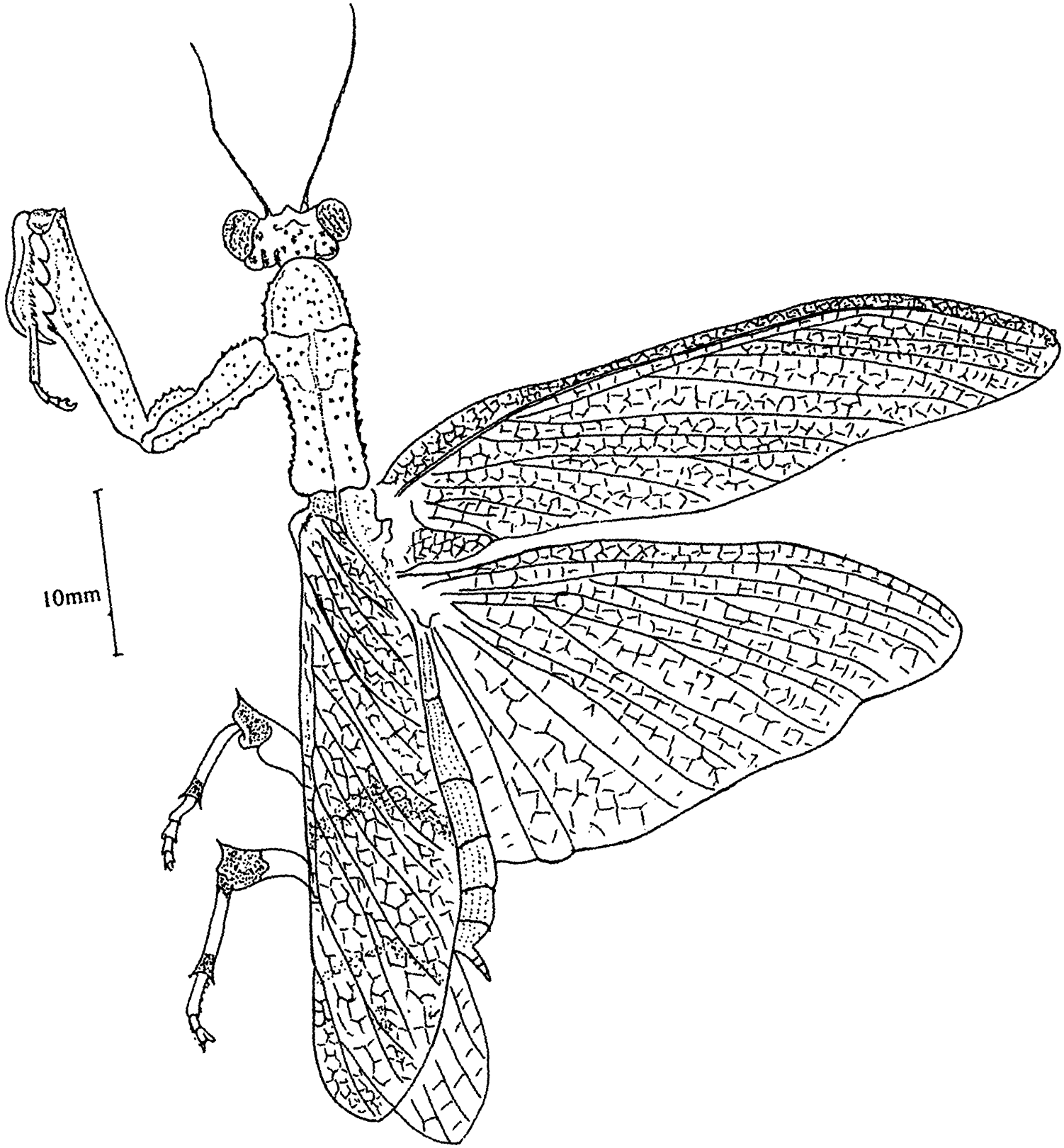
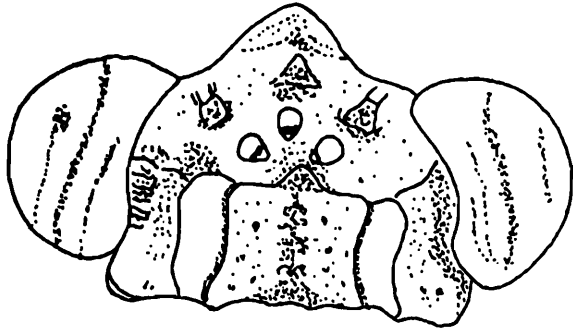
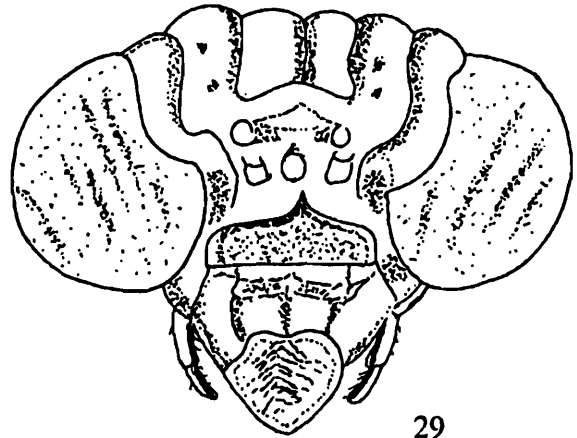


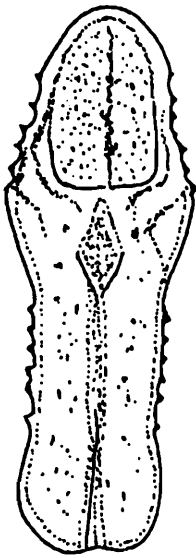
Fig. 27 : *Ambivia popa* (Stal)



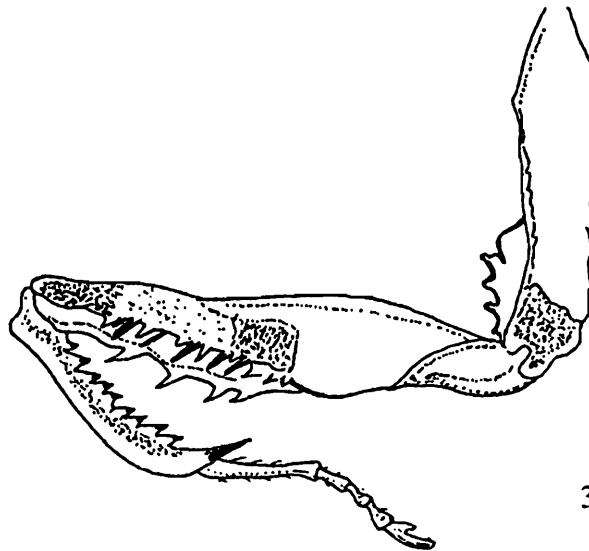
28



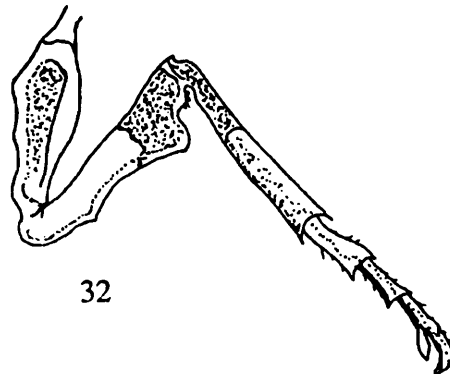
29



30



31



32

Fig. 28-32 : *Ambivia popa* (Stal)

Fig. 28 : Head Dorsal view

Fig. 29 : Head Ventral view

Fig. 30 : Pronotum

Fig. 31 : Foreleg

Fig. 32 : Midleg

simple, slender, superior edge straight with 4 external and 4 discoidal spines; fore tibia with external spines short and forwardly directed. Middle and hind legs short. Wings delicate, longer than abdomen.

Distribution : India, Borneo.

Four species are known from India.

Key to Indian species of *Anaxarcha* Stal

- 1 Pronotum border black 2
 - Pronotum border not black 3
 - 2. Longer internal spines of fore femur entirely black *A. intermedia* Mukherjee
 - Longer internal spines of fore femur black at tip only *A. limbata* Giglio-Tos
 - 3. Prosternum behind coxal joint with black patch *A. graminea* Stal
 - Prosternum behind coxal joint without black patch *A. acuta* Beier
- (Only *A. limbata* is known from Kerala)

Anaxarcha limbata Giglio-Tos (Figs. 33-38) (Plate II. Fig. 5)

1915. *Anaxarcha limbata* Giglio-Tos *Bull. Mus. Torino*, 30(702) : 1 type *F. Kalimantan*.

Diagnosis : Male body length 30 mm.

Colour : Green.

Head : Wider than high; vertex without any protuberance, lateral lobes prominent; eyes slightly oblong, antenna filiform with minute sparsely distributed setae; frontal sclerite disc flat, laterally carinated, wider than high, superior border triangular and spiniform.

Pronotum : Slender, supra coxal dialation oval, metazona with slight constriction at middle, laterally denticulated. Fore legs simple, fore femur slightly longer than fore coxa, fore coxal margin denticulated; fore femur with 4 external, 4 discoidal, 5 longer internal, 8 shorter internal spines; fore tibia with short horizontally placed 12 external, vertically placed 13 internal spines. Middle and hind legs: coxa short, femur as long as tibia, metatarsus as long as all other tarsal segments together. Forewing hyaline, parallel venation at costal area, reticulately venated at discoidal area; hind wings hyaline.

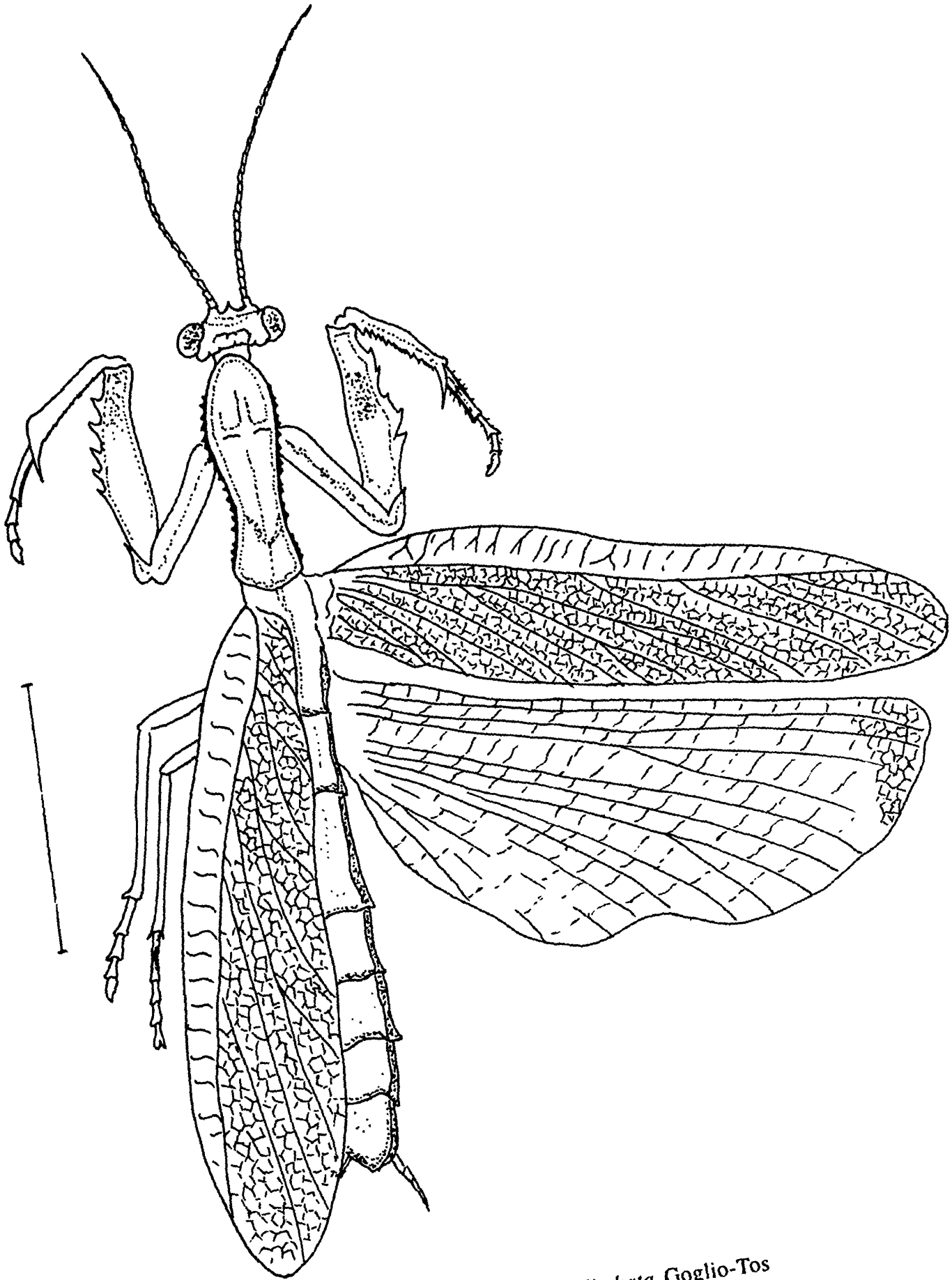


Fig. 33 : *Anaxarcha limbata* Goglio-Tos

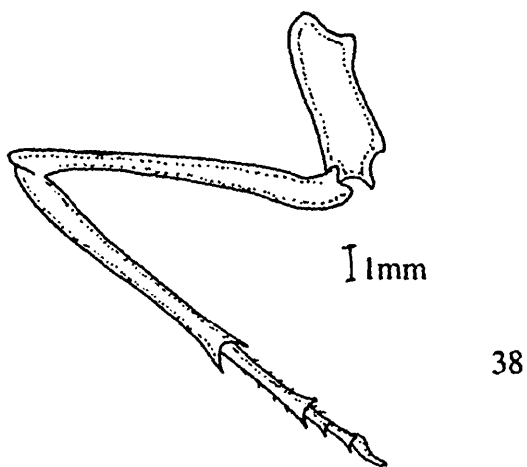
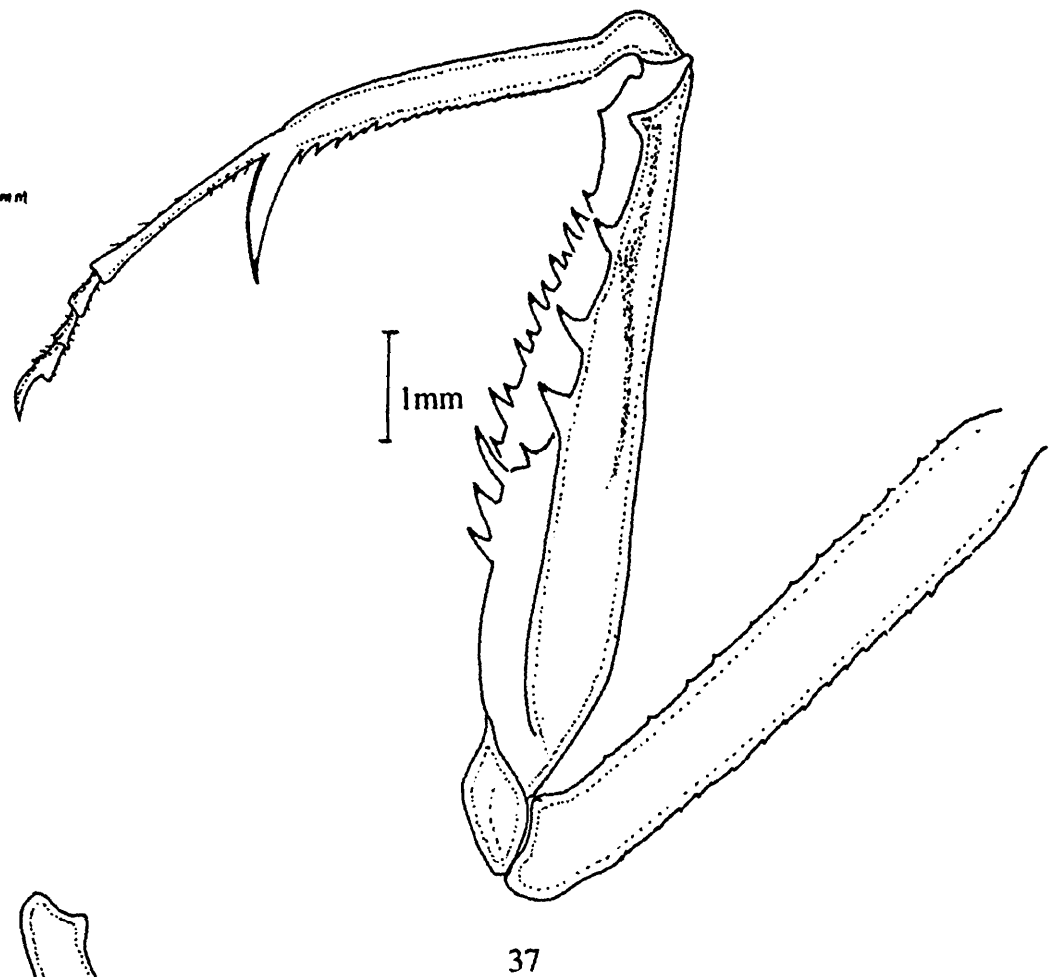
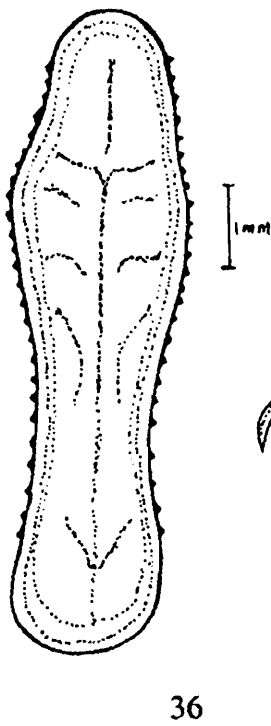
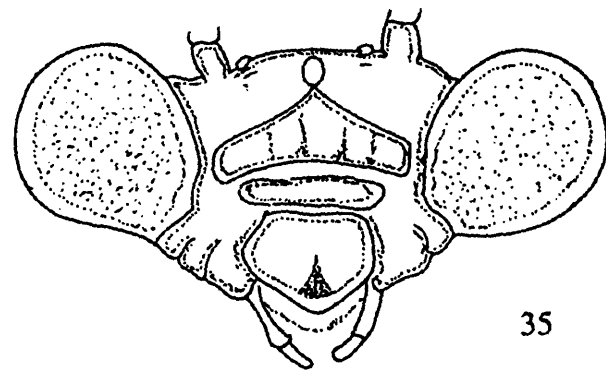
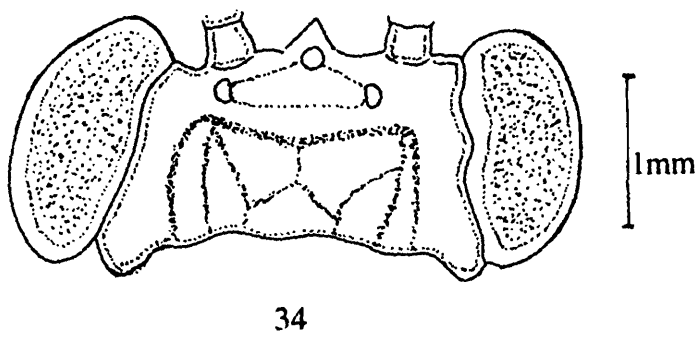


Fig. 34-38 : *Anaxarcha limbata* Goglio-Tos
Fig. 34 : Head Dorsal view Fig. 35 : Head Ventral view Fig. 36 : Pronotum Fig. 37 : Foreleg
Fig. 38 : Midleg

Abdomen : Not slender, somewhat flat, supra anal segment short, cerci short, stout, with bristles.

Female : Same as male.

Materials examined : Plesiotype : Male, Thirunelly (Wayand) (1000m MSL), 20-v-2001, Jaffer. Other materials examined : 1 Female, Silent Valley, 22-v-1995, Binoy C.F.

Distribution : India, Kerala, Sikkim, West Bengal, Kalimantan.

Genus *Euantissa* Giglio-Tos

1927. *Euantissa* Giglio-Tos *Das Tierreich.*, 50 : 540. Type species : *Euantissa pulchra* (Fabricius)

Diagnostic characters : Body medium length; green. Vertex four lobed, without protuberance; eyes oblong; frontal sclerite transverse, narrow, with a median longitudinal furrow, upper edge widely arched. Pronotum broad, little longer than fore coxa with no metazonal constriction, sides parallel, border denticulated; supra coxal dialation not pronounced; fore femur simple with 4 sharp long external and 4 discoidal spines; external spines of fore tibia compressed; middle and hind legs shorter, femora without any lobes; wings brightly coloured, longer than abdomen; forewing green and opaque; hindwing coloured with dark spots or patches.

Distribution : India, Bangladesh.

Two species are known from India.

Key to Indian species of *Euantissa* Giglio-Tos

- Hind wings with dark large spot *E. ornata* Werner
 – Hind wings with dark line along the outer border *E. pulchra* (Fabricius)

(Only *Euantissa pulchra* is known from Kerala)

Euantissa pulchra (Fabricius)

(Figs. 39-45) (Plate III. Figs. 6 & 7)

1787. *Mantis pulchra* Fabricius *Mant. Ins.*, 1 : 229. Type Hab. Tranquebariae.

1927. *Euantissa pulchra* Giglio-Tos *Das Tierreich*, 50 : 541.

Diagnosis : Female Body length 23 mm.

Colour : Green. Forewings moss green, anal membrane light orange; hindwings proximal area orange, distal peripheral border with thick black line.

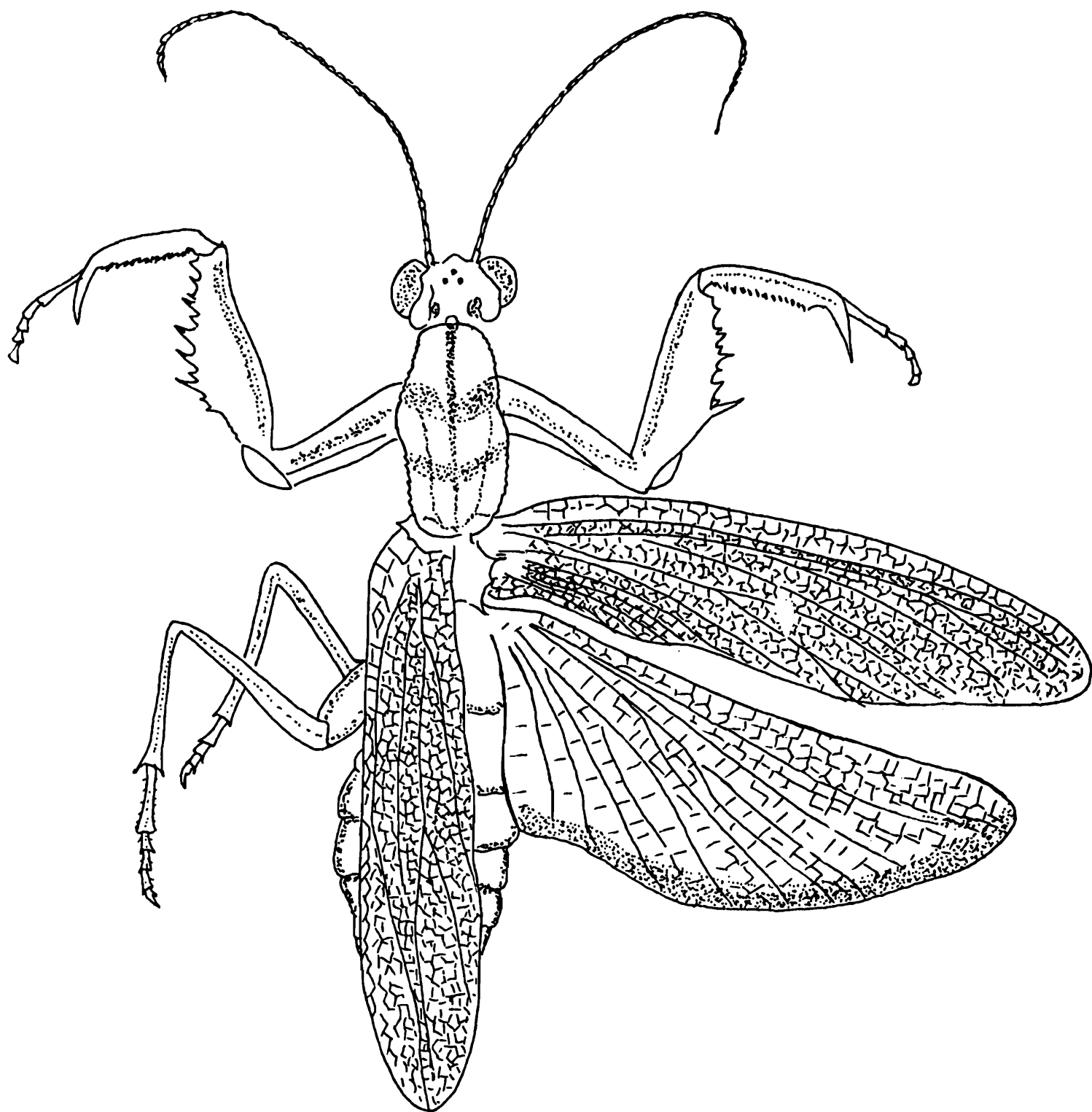


Fig. 39 : *Euantissa pulchra* (Fabricius)

Head : Bluntly triangular, wider than high; vertex without protuberance, thrown distinctly into five lobes; eyes oblong; antenna filiform, not too slender, short; frontal sclerite trasverse, wider than high.

Pronotum : Nearly as long as fore coxa, without metazonal constriction, lateral sides run parallel, denticulated, prozona spatulated; supra coxal dialation not pronounced.

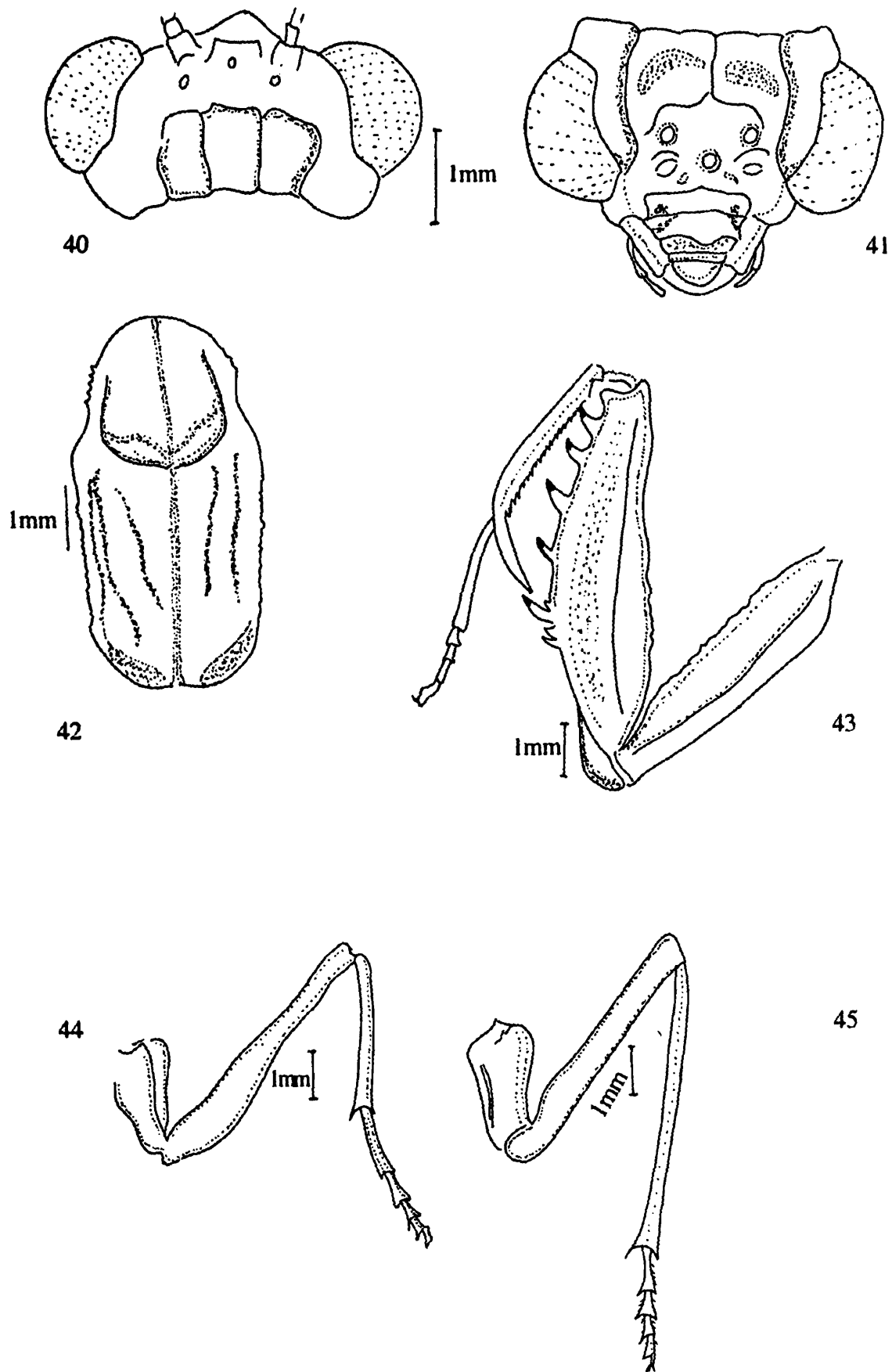


Fig. 40-45 : *Euantissa pulchra* (Fabricius)
Fig. 40 : Head Dorsal view Fig. 41 : Head Ventral view Fig. 42 : Pronotum Fig. 43 : Foreleg
Fig. 44 : Midleg Fig. 45 : Hindleg

Forelegs simple, coxa with outer longitudinal ridge, outer margin straight, femur longer than coxa with 4 external, 4 discoidal, (the third one longest), 6 longer internal, 5 shorter internal spines, distal spines placed more wide apart than proximal ones; tibia with 12 small external and 11 longer internal spines. Metatarsus slightly longer than all other tarsal segments together. Middle and hindlegs : middle legs slightly shorter than hind legs; metatarsus as long as all other tarsal segments together. Wings longer than abdomen, forewings leathery, opaque, with densely reticulated veinlets; hindwings semi hyaline.

Abdomen : Fusiform, shorter than wings; supra anal plate short. Cerci long, with pubescence.

Male : A little shorter than female; faint dorso median carina present only at metazona; ocelli fuscous at base; fore wing opaque, green at costal area, rest dark brown; hind wing pale orange at base, rest sub opaque, blackish brown with white venules.

Materials examined : Plesiotype : Female, Adivaram, 11-iv-2000, Mohana. Other materials examined: 1 Female, Vellayil (Calicut), 21-xi-1999, Janitha. 2 Males, Cali. Uni. Campus, 13-iii-2000, Vyjayandi.

Distribution : India : Kerala, Eastern and North Eastern India, Sri Lanka.

Genus *Hestiasula* Saussure

1871. *Hestiasula* Saussure, *Mem. Soc. Phys. Hist. Nat. Geneva*, 21 : 30. Type species : *Hestiasula brunneriana* Saussure.

Diagnostic characters : Vertex usually with protuberance; frontal sclerite transverse, disc smooth. Pronotum rhomboidal; fore coxa simple, internal apical lobes convergent; femur foliaceous, external edge smooth, disc with 2-3 rectangular black patches; middle and hind femora with insignificant triangular lobes.

Distribution : Asia, Tropical Oriental Region.

Key to Indian species of *Hestiasula* Saussure

1. Vertex with tubercle..... 2
- Vertex without tubercles 5
2. Fore coxa internally black 3
- Fore coxa entirely yellow *H. woodi* Giglio-Tos
3. Fore femur with a black patch internally along upper edge *H. masoni* Giglio-Tos
- Fore femur with more than one patches internally along upper edge 4

4. Fore femur with two black patches internally; all spines of fore femur entirely black
 *H. castetsi* (Boliver)
- Fore femur with three black patches internally; all spines of fore femur black at tips only
 *H. brunneriana* Saussure
5. Fore coxa yellowish brown *H. nigrofemorata* Werner
- Fore coxa black 6
6. A black spot at claw groove of fore femur *H. kasteneri* Beier
- A black patch from base of discoidal spine proceeding along superior border of fore femur *H. inermis* (Wood-Mason)

(Only *H. brunneriana* is reported from Kerala)

***Hestiasula brunneriana* Saussure**
 (Figs. 46-53) (Plate III. Fig. 8)

1871. *Hestiasula brunneriana* Saussure, *Mem. Soc. Phys. Hist. Nat. Geneve*, 21 : 330

1872. *Hestias brunneriana* Saussure, *ibid*, v.23, p.83

Diagnosis : Male Body length 27 mm

Color : Earth brown.

Head : Wider than high, conical; vertex not flat, not smooth, centrally with a trapizoidal elevation (in female prominent spine-like); frontal sclerite transverse, midsuperiorly spiniform, wider than high, inferiorly arched.

Pronotum : Rhomboidal, supracoxal dialation spiniform laterally, disc longer than wide; metazona constrict at middle, disc not smooth with 3-4 bosses, middorsally carinated; inferior and lateral borders of metazona indistinctly arched; sternum with postlongitudinal furrow; fore legs : Coxa slender, simple, non granulated disc; coxal margin on inferior side with 2 spines proximally; femur foliaceous, with 5 external, 3 discoidal, 6 internal longer, 6 internal smaller spines, external ones very small and equal sized, third discoidal longest, tibia with 11 external and 11 internal spines,; middle and hind legs : Coxa stouter; femur slender with a distal ventral small lobe, more pronounced in hind femur than the mid femur; wings semi hyaline; forewings costal area green, opaque, and anterior half dark brown with a faint dark brown marking, slightly iridescent, without any marginal hairs; both wings truncate.

Abdomen : Fusiform; supra anal plate oblong, shorter, sternum with 3-4 triangular projections, with pubescence; cerci short.

Female : The trapizoidal elevation of vertex in female is prominent spine-like.

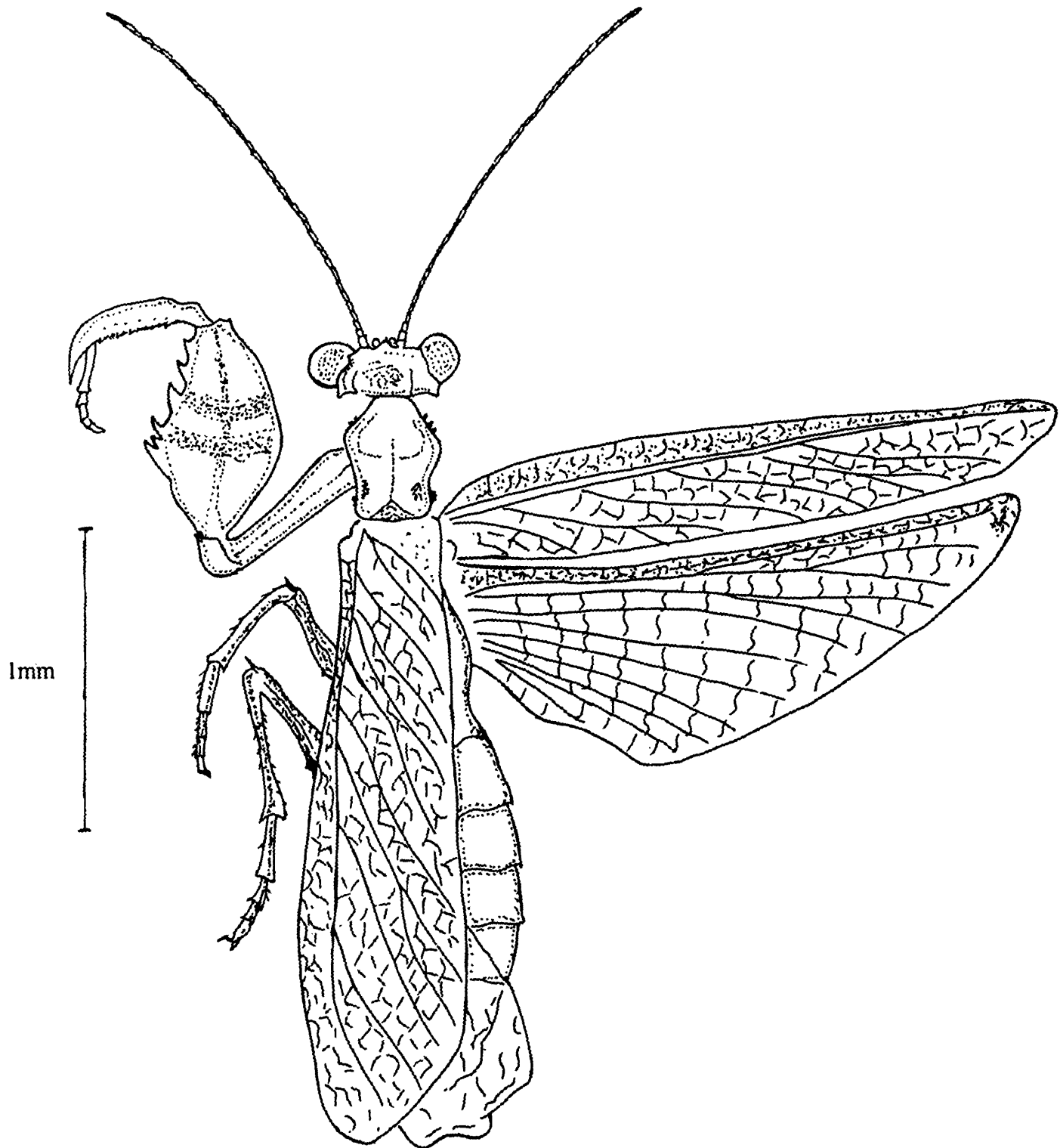


Fig. 46 : *Hestiasula brunneriana* (Saussure)

Materials examined : Plesiotype : Male, Thamarassery (Kozhikode), 11-iii-1999, Vyjayandi. Other materials examined : 1 Male, Cali. Uni. Campus, 7-iv-1998, T.C. Narendren. 1 Male, Nilambur, 23-i-1996. 1 Female, Alapuzha, 12-v-1995, Sheela.

Distribution : India, Kerala, Andhra Pradesh, West Bengal, Meghalaya, Srilanka.

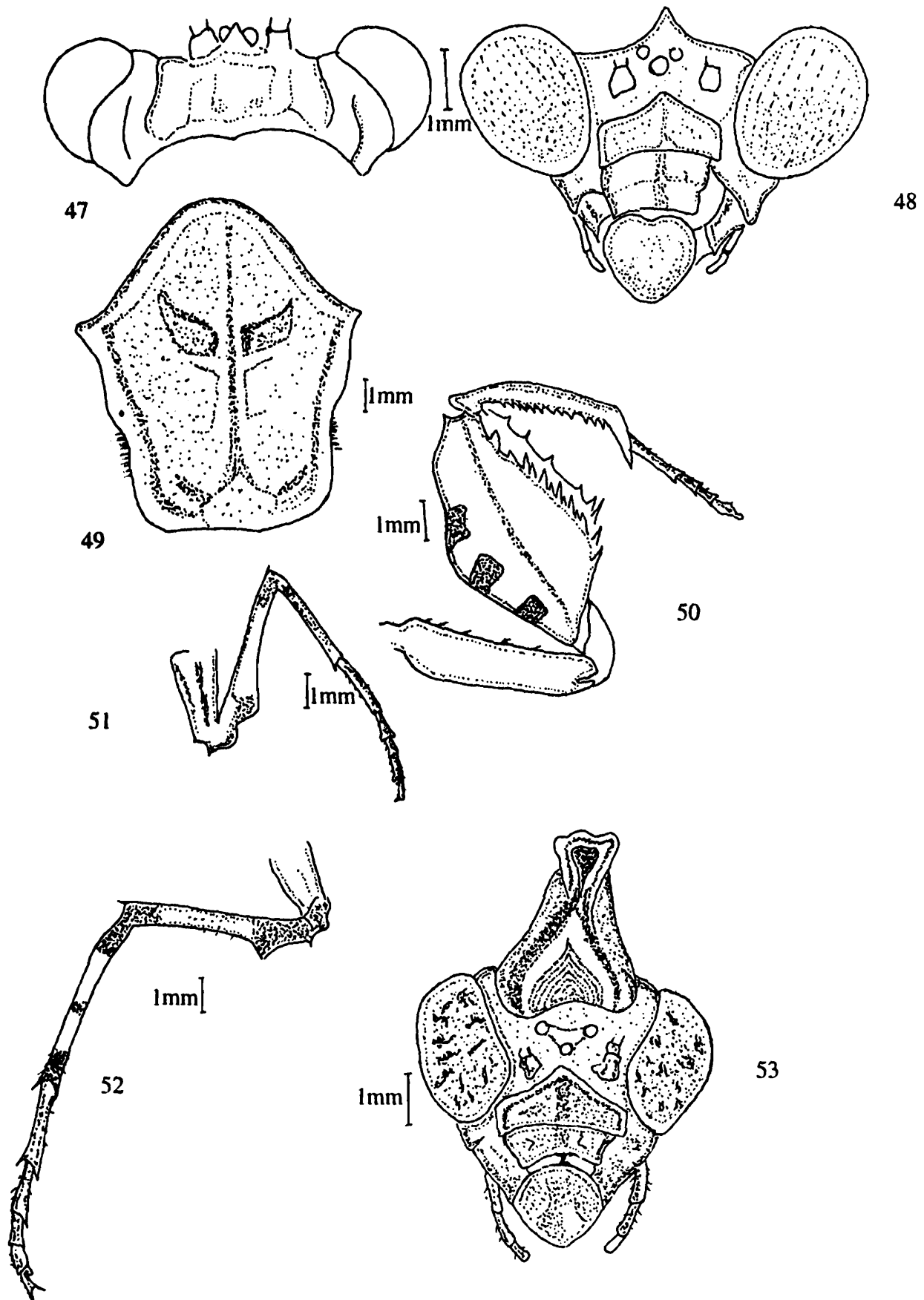


Fig. 47-53 : *Hestiasula brunneriana* (Saussure)

**Fig. 47 : Head Dorsal view Fig. 48 : Head Ventral view Fig. 49 : Pronotum Fig. 50 : Foreleg
 Fig. 51 : Midleg Fig. 52 : Hindleg Fig. 53 : Female Head Ventral view**

Subfamily HYMENOPODINAE

Body medium sized. Vertex with protuberance above median ocelli; eyes conical, projects above the circumference of head, ocelli prominent; frontal sclerite excavated or depressed at centre, laterally with wing like extensions; superior margin with two small spiniform structures on either side of excavation. Pronotum rhomboidal, shorter than fore coxa; supracoxal dialation and metazonal constrictions well pronounced; fore coxa with spines on the internal margin, internal apical lobes converging; fore femur with 4 external and 4 discoidal spines; middle and hind legs long; femur with distal ventral lobes.

Two genera are known from India.

Key to Indian genera

- Middle and hind femora with ventral distal lobe.....*Creobroter* Audinet- Serville
 - Middle and hind femora with ventral lobe along the entire length
*Hymenopus* Audinet- Serville

Genus *Creobroter* Audinet-Serville

1839. *Harpas (Creobroter)* Audinet-Serville *Hist. Nat. In. Orth.* P. 160. Type species : *Creobroter discifera* (Audinet-Serville)

1869. *Creobrotra* Saussure *Mitt. Schweiz. Entomol. Ges.*, 3 : 59.

Diagnostic characters : Body green. Vertex with protuberance; eyes conical, extending beyond circumference of head; vertex extend above eyes; frontal sclerite with squarish excavation at centre, laterally winged, bicarinate. Pronotum short, saddle shaped; supra coxal dialation well pronounced; metazona constricted in middle; fore legs coxa inner margin tuberculated; femur simple with 4 external and 4 discoidal spines; middle and hind legs : Long, femora with distal ventral lobe; both wings longer than Abdomen, forewing green with yellow markings; hindwings coloured in female.

Distribution : Asia, Oriental Region, America.

Six species are known from India.

Key to Indian species of *Creobroter* Audinet-Serville

1. Forewing with eye-spot in the middle..... 2
 - Forewing with eye-spot in front of middle 3
 2. Base of forewing with yellow spot in male *C. apicalis* Saussure
 - Base of forewing without yellow spot in male *C. urbanus* (Fabricius)

3. Eye spot encloses black spots 4
 – Eye spot does not enclose black spots *C. species. A.* (Mukherjee et al 1995)
4. Fore wing with anal membrane black *C. laevicollis* (Saussure)
 – Forewing with anal membrane not black 5
5. Body more robust, smokey patch of hindwing large *C. elongata* Beier
 – Body less robust, smokey patch of hindwing small *C. gemmatus* (Stoll)
- (Only *C. apicalis* is known from Kerala)

***Creobroter apicalis* Saussure**
 (Figs. 54-59) (Plate IV. Fig. 9)

1869. *Creobrotra apicalis* Saussure *Mitt. Schweiz. Entomol. Ges.*, **3** : 73 Holotype India.

1927. *Creobroter apicalis* Giglio-Tos *Das Tierreich.*, **50** : 558.

Diagnosis : Female Body Length 37 mm.

Colour : Green with yellow spot on fore wing.

Head : Trapezoid, wider than high, vertex not smooth, with middorsal spine, lateral lobes prominent, squarish; eyes conical, projecting upwards; antenna slender, filiform; ocelli conspicuous, frontal sclerite centrally with an excavated trapezoid area, laterally with two wing like extensions, superior border arched with two projections.

Pronotum : Saddle shaped, shorter than fore coxa, supracoxal dialation well pronounced, prozona spatulate, laterally denticulated, with central indistinct carina, metazonal constriction well pronounced,. Fore legs : Coxa triangular dorsally with 8-9 obtuse marginal spines, middorsal carina with spines, internal apical lobes converging; femur longer than coxa, with 4 external, 4 discoidal, (third longest and stoutest,) with six longer internal and seven shorter internal spines, two distal longer internal spines enclose two shorter spines; tibia with 16-17 smaller, depressed external spines, 14 longer internal closely arranged spines; metatarsus as long as all other tarsal segments together. Middle and hind legs : mid femur twice as long as mid tibia, with semicircular, distal ventral lobe, with two genicular spines; tibia with three distal genicular spines. Wings : Both wings longer than abdomen; costal and anal areas of forewing transparent, other parts semiopaque; hind wings transparent.

Abdomen : Fusiform, posteriorly a little broader, cerci many segmented, with pubescence.

Male : In general appearance both male and female are similar.

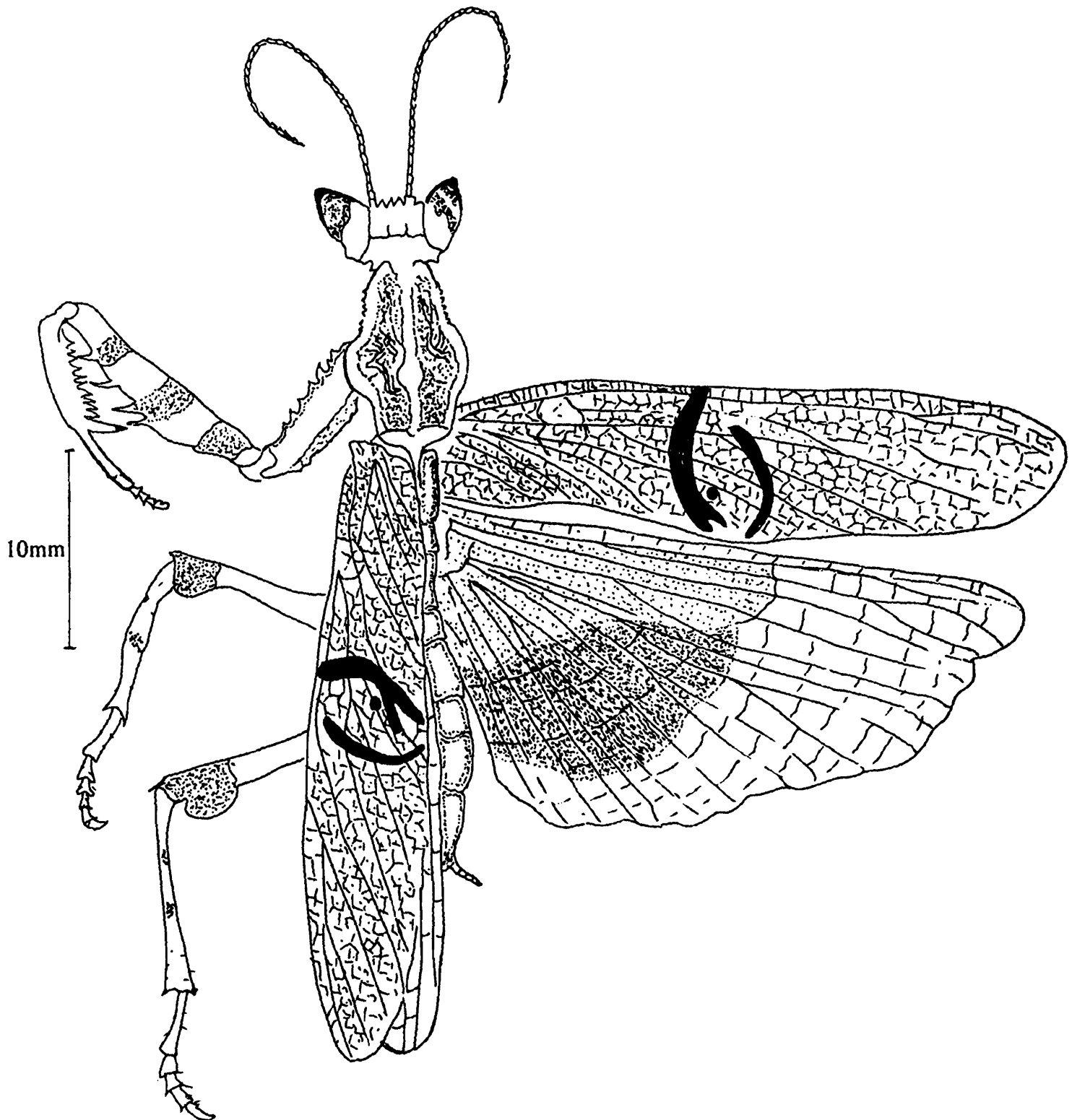


Fig. 54 : *Creobroter apicalis* (Saussure)

Materials examined : Female, Cali. Uni. Campus, 22-v-2000, Rajesh K.P. Other materials examined : 1 Female, Malaparamba, 24-ix-2000, Sreekala. 1 Female, Koylandi, 7-ii-2000, Shabna. 1 Female, Kannur, 16-vi-1999, Vyjayandi. 1 Male, Idukky, 11-xi-1996, Sureshan P.M.

Distribution : India, Kerala, Karnataka, Assam, Meghalaya, Manipur, Sikkim, West Bengal.

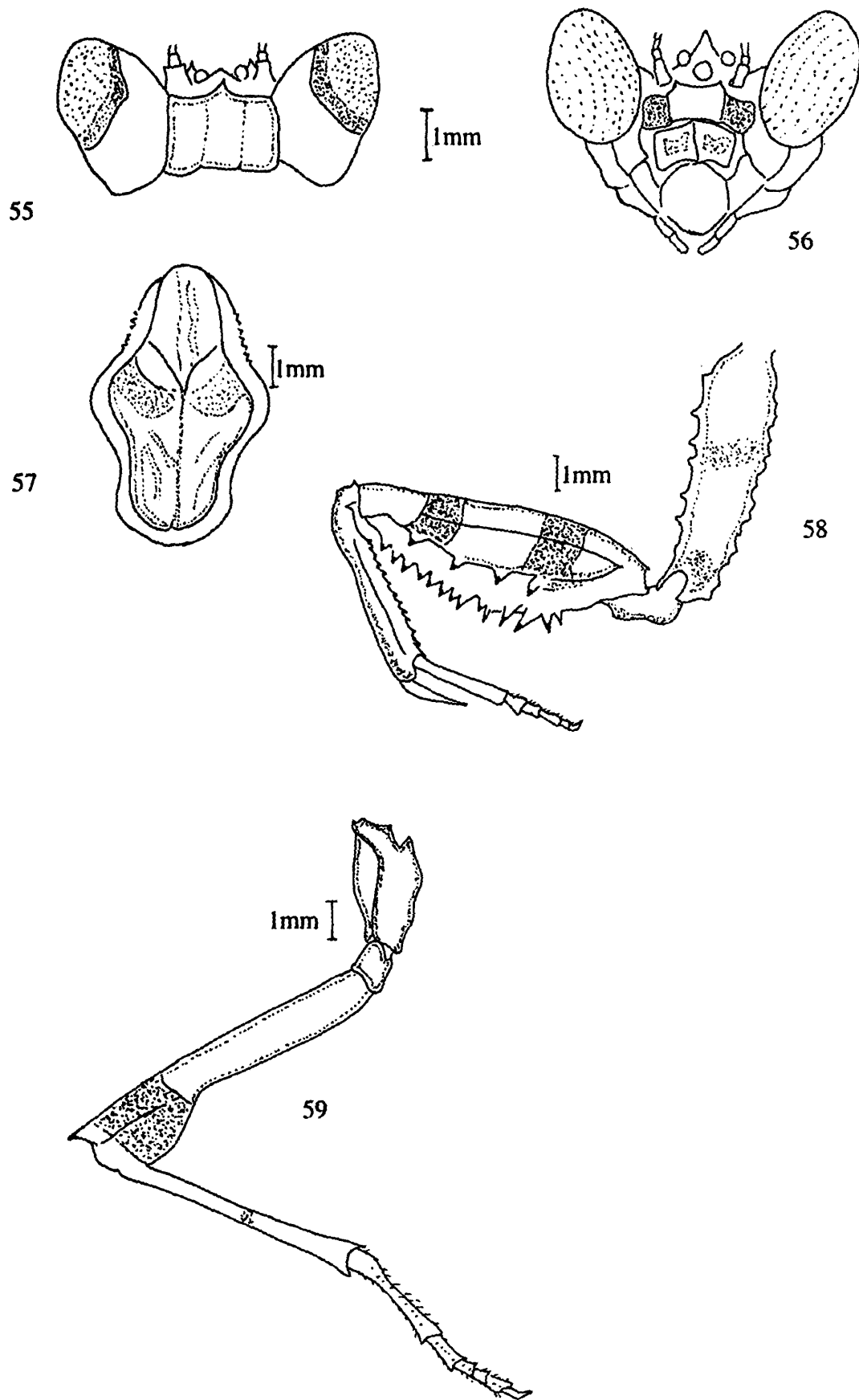


Fig. 55-59 : *Creobroter apicalis* Saussure

Fig. 55 : Head Dorsal view

Fig. 56 : Head Ventral view

Fig. 57 : Pronotum

Fig. 58 : Foreleg

Fig. 59 : Midleg

Family MANTIDAE

Diagnostic characters : Body small to large size. Antenna long, weakly setaceous or non setaceous; eyes globular or conical, with or without spines; frontal sclerite transverse. Fore legs simple, fore coxa with or without marginal spines; fore femur internally one longer spine alternates with one shorter spine. Mid and hind legs with or without lobes. Wings never truncate round at tip. Cerci simple or foliaceous.

There are fourteen subfamilies reported from India.

Key to Indian subfamilies of Mantidae

1. Pronotum broad, disc like 2
 - Pronotum elongated, not disc like 5
2. Body large; eyes less prominent ; pronotum much dilated; anterior crypt of prozona conceals the head CHOERADODINAE
 - Body small to medium sized; eyes prominent; pronotum not much dilated, anterior crypt of prozona not concealing head..... 3
3. Body medium sized, bark coloured LITURGUSINAE
 - Body small sized; brown or testaceous or green 4
4. Antenna thinner, with sparse setae, one at a segment; wings iridescent, wing border and surface never setaceous IRIDOPTERYGINAE
 - Antenna thick, with rosettes of bristles at the junction of each segment; wings not iridescent, bordered with sharp setae, entire surface of wings setaceous AMELINAE
5. Fore femur with 4 external and 4 discoidal spines; body slender 6
 - Fore femur with 4 to 7 external and 1 to 3 discoidal spines; body large to bizarre shaped 9
6. Eyes flat; pronotum as long as or a little longer than fore coxa, fore tibia with 6 to 8 external spines CALIRIDINAE
 - Eyes not flat, conical; pronotum much longer than fore coxa; fore tibia with more than 8 spines 7
7. Eyes with spine; mid and hind legs shorter OXYTHESPINAE
 - Eyes without spine; mid and hind legs long 8

8. Median apical lobes of fore coxa expanded, larger than laterals; mid and hind legs long and slender THESPINAE
- Median apical lobes of fore coxa not expanded; mid and hind legs not slender MANTINAE
9. Pronotum depressed; eyes conical or elongated; head bifid in appearance 10
- Pronotum well developed; eyes globular; head not bifid in appearance 13
10. Antenna thick at base, body stick-like and elongated; vertex not much elongated ... SCHIZOCEPHALINAE
- Antenna slender; body not stick like head with vertex much elongated 11
11. Middle and hind legs with lobular extension; foretibia not compressed 12
- Middle and hind legs without lobular extension; foretibia more or compressed TARACHORDINAE
12. Pronotum with leaf like expansion DEROPLATINAE
- Pronotum without leaf like expansion PHYLLOTHELINAE
13. Brownish insects, metazona strongly carinated; fore femur without carina between rows of external and internal spines, mid and hind legs with without lobular extensions 14
- Green insects; metazona without carina; fore femur with carina between rows of external and internal spines; mid and hind legs without lobulations PHOTININAE
14. Mid and hind leg with lobular extensions, Head not transverse TOXODERINAE
- Mid and hind leg with out lobular extensions, Head transverse ANGELINAE

Subfamily AMELINAE

Body small; head thick; eyes globular; ocelli conspicuous; frontal sclerite trapezoid; antenna thick, long with rosettes of bristles at the junction of two segments. Pronotum short; shorter than fore coxa, rhomboidal; fore legs simple, anterior portion of fore femur dilated, with 4 external and 4 discoidal spines; disc between row of external and internal spines denticulated; wings longer than abdomen, surface and border setaceous. Abdomen fusiform, supra anal plate short.

Only one tribe is known from India.

Tribe **Amelini**

Eight genera are known from India.

Key to Indian genera of Amelini

1. Fore metatarsus longer than all other tarsal segments together 2
 - Fore metatarsus not longer than all other tarsal segments together 7
2. Frontal sclerite as high as wide (Fig. 62) *Amantis* Giglio-Tos
 - Frontal sclerite not as high as wide (Fig. 73) 3
3. Frontal sclerite bicarinate *Cimantis* Giglio-Tos
 - Frontal sclerite not bicarinate 4
4. Frontal sclerite transverse, superior margin angular *Gimantis* Giglio-Tos
 - Frontal sclerite transverse with superior margin not angular 5
5. Frontal sclerite with superior margin arched *Gonypeta* Saussure
 - Frontal sclerite with superior margin sinuate 6
6. Foretibia with 10-11 external spines *Elmantis* Giglio-Tos
 - Foretibia with 9 external spines *Eumantis* Giglio-Tos
7. Elytra of female shorter than abdomen; margin of vertex extends beyond the circumference of eye *Memantis* Giglio-Tos
 - Elytra of female not shorter than abdomen; margin of vertex confluent with eyes ...
..... *Gonypetyllis* Wood-Mason

Genus *Amantis* Giglio-Tos

1915. *Amantis* Giglio-Tos. *Bull. Soc. Entamol. Ital.*, **46** : 151. Type species : *Amantis reticulata* (Deltaan)

Diagnostic characters : Body very small; eyes prominent; ocelli conspicuous; antenna thick and bristled; frontal sclerite as wide as high, superior border truncate; carina indistinct. Pronotum short rhomboidal with black stripe extending upto head; metazona a little longer than prozona; fore femur dialated with 4 external and 4 discoidal spines; metatarsus longer than all other tarsal segments together; middle and hind legs much longer; wings longer than abdomen.

Distribution : Asia, Oriental region

Six species are known from India.

Key to Indian Species of *Amantis*

1. Frontal sclerite with black spot 2
- Frontal sclerite without black spot 3
2. Pronotum entirely black with discontinuous stripes in black *A. biroi* Giglio-Tos
- Pronotum with a dark median line *A. saussurei* (Boliver)
3. Fore femur black, mid and hind coxa brown 4
- Fore femur brown, mid and hind coxa black *A. malabarensis* Vyjayandi
4. Forelegs with second tarsal segment brown 5
- Forelegs with second tarsal segment black *A. subirina* Giglio-Tos
5. Fore femur with 2-3 black dots internally *A. bolivarii* Giglio-Tos
- Fore femur with 3 indistinct bands *A. indica* Giglio-Tos

(3 Species of *A. saussurei*, *A. malabarensis*, *A. biroi* are known from Kerala)

***Amantis malabarensis* Vyjayandi**
(Figs. 60-66) (Plate V. Figs. 10 & 11)

1807-1808. March 2005 : Zoos' Print, 20 (3)

Holotype : Male. Body length 14 mm.

Colour : Black with orange tinge.

Head : Thick, broadly triangular, wider than high; vertex with five insignificant lobes; eyes globular; ocelli large, conspicuous, frontal sclerite pentagonal, almost as wide as high, angular superiorly, slightly arched inferiorly, not carinated, disc flat; antenna thick, with rosettes of sharp bristles at the junction of two segments.

Pronotum : A little shorter than fore coxa, rhomboidal, supra coxal dialation pronounced; metazona constricted at middle, disc smooth with insignificant carina; forelegs simple, not foliaceous; coxa with mid dorsal carina; margin with hairs; femur with 4 external, 4 discoidal and 12 internal (6 long and 6 short) spines; disc between rows of external and internal spines denticulated, tibia with 11 external and 11 internal spines; metatarsus slightly longer than all other tarsal segments together; hind metatarsus a little longer than the other tarsal segments together; wings semihyaline, setaceous on surface and border; fore wings costal area opaque, costal vein setaceous, veinules with broad spaces.

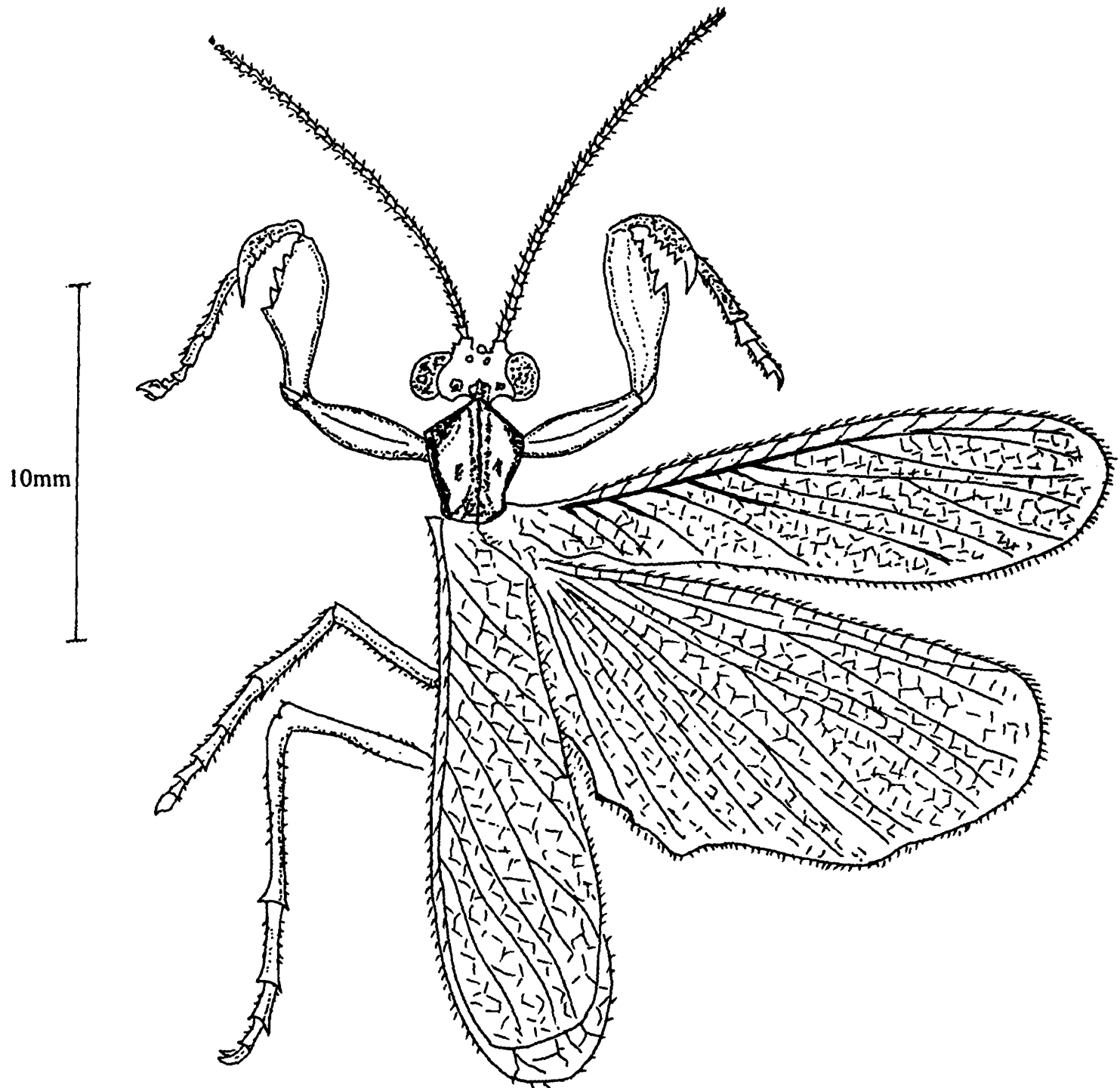


Fig. 60 : *Amantis malabarensis* (Vyjayandi)

Abdomen : Shorter than wings, stout, fusiform; supra anal plate short; posterior part subconical; cerci short, segmented, posterior part with pubescence.

Female : In female the head a little more broader and wings are highly reduced.

Materials examined : Holotype : Male, Kovoov, Calicut, 21-v-2000, Vyjayandi. Paratype : 3 Males, Malaparamba, 18-ii-2000, Vyjayandi, Malaparamba, 21-iii-1999, Grace. Cal. Uni. Campus, 5-x-2001, Vyjayandi. 1 Female, Nilambur, 30-xi-2005, Fousi.

Female : In females wings are shorter.

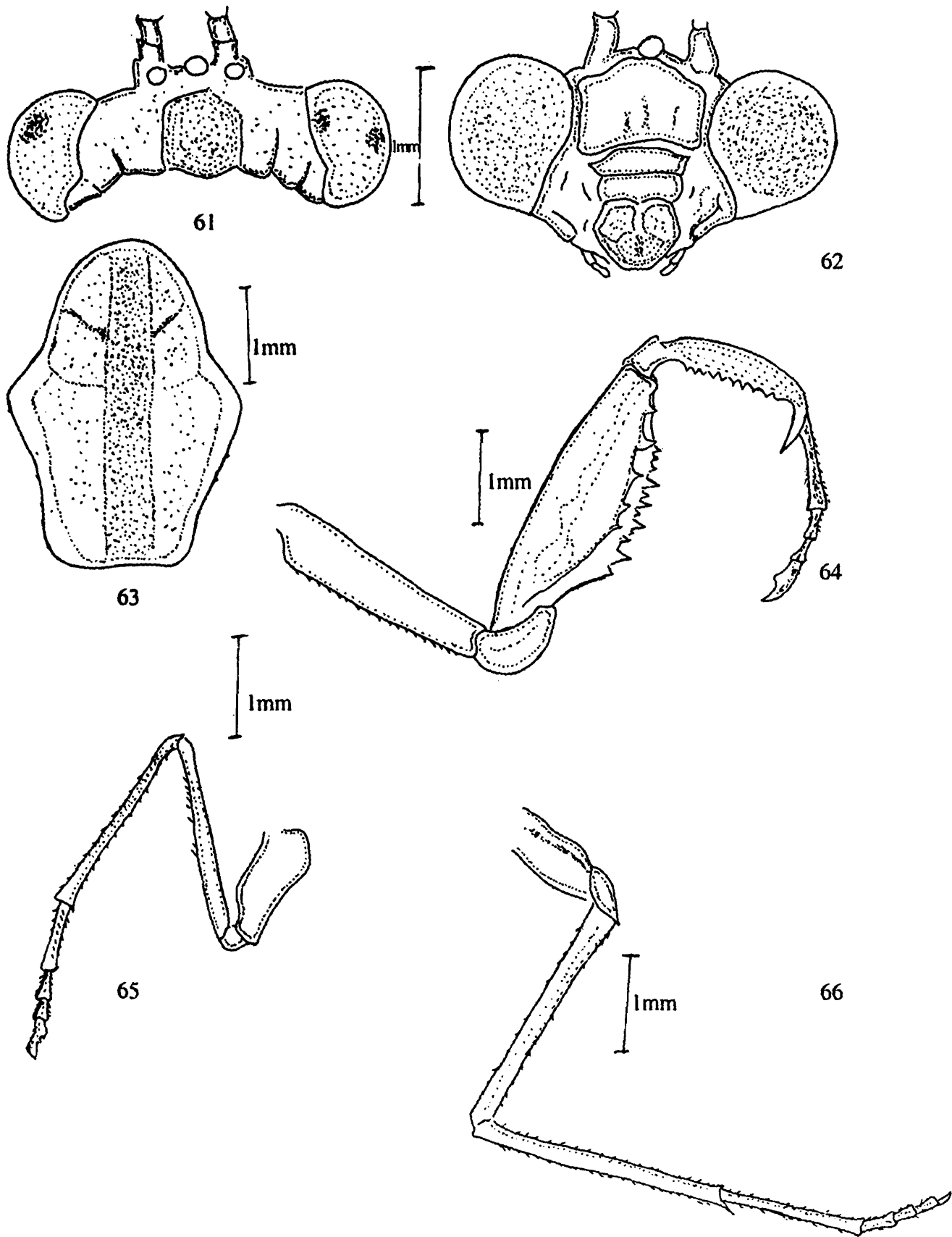


Fig. 61-66 : *Amantis malabarensis* Vyjayandi

Fig. 61 : Head Dorsal view Fig. 62 : Head Ventral view Fig. 63 : Pronotum Fig. 64 : Foreleg
Fig. 65 : Midleg Fig. 66 : Hindleg

Genus *Cimantis* Giglio-Tos

1915. *Cimantis* Giglio-Tos. *Bull. Soc. Entomol. Ital.*, 46 : 154. Type Species : *Cimantis fumosa* Giglio-Tos.

Diagnostic characters : Body small, brown; head thick; eyes globular, bulging; antenna thick, long with rosettes of bristles between two flagellar segments; frontal sclerite transverse, flat, bicarinate. Pronotum rhomboidal, shorter than fore coxa; forelegs : Coxa simple; femur a little dialated, with 4 external and 4 discoidal spines; tibia with 9 external spines. Abdomen fusiform; supra anal plate short and triangular.

Distribution : Oriental region.

Three species are known from India.

Key to Indian species of *Cimantis* Giglio-Tos

1. Carina of frontal sclerite formed by the fusion of two tubercles (Fig. 68); body testaceous *C. testacea* Werner
- Carina of frontal sclerite not formed by the fusion of tubercles, distinct and longitudinal (Fig. 73) ; body grey to black 2
2. Wings fuliginous (grey); costal area of fore wing rather broad; mid and hind legs not triannulated *C. fuliginosa* Werner
- Wing smokey, costal area of fore wing not so broad; mid and hind legs with triannulation *C. fumosa* Giglio-Tos

(*C. fumosa* is not yet reported from Kerala)

***Cimantis testacea* Werner**
(Figs. 67-72)

1931. *Cimantis testacea* Werner *Proc. Zool. Soc. London*, 1931 : 1330

Holotype : Male. India, Darjeeling, Teesta Valley, 700ft (BMNH)

Diagnosis : Male Body length 17 mm.

Colour : Creamy yellow with testaceous and fuscous patches.

Head : Vertex smooth, convex dorsally, lateral lobes more conspicuous, wider than high; frontal sclerite flat, smooth and bicarinate; carina formed by the fusion of tubercles, broader than high; superior border arched, slightly sinuate, inferior border slightly concave; eyes globular, antenna thick, longer with rosettes of bristles at junction of each segment.

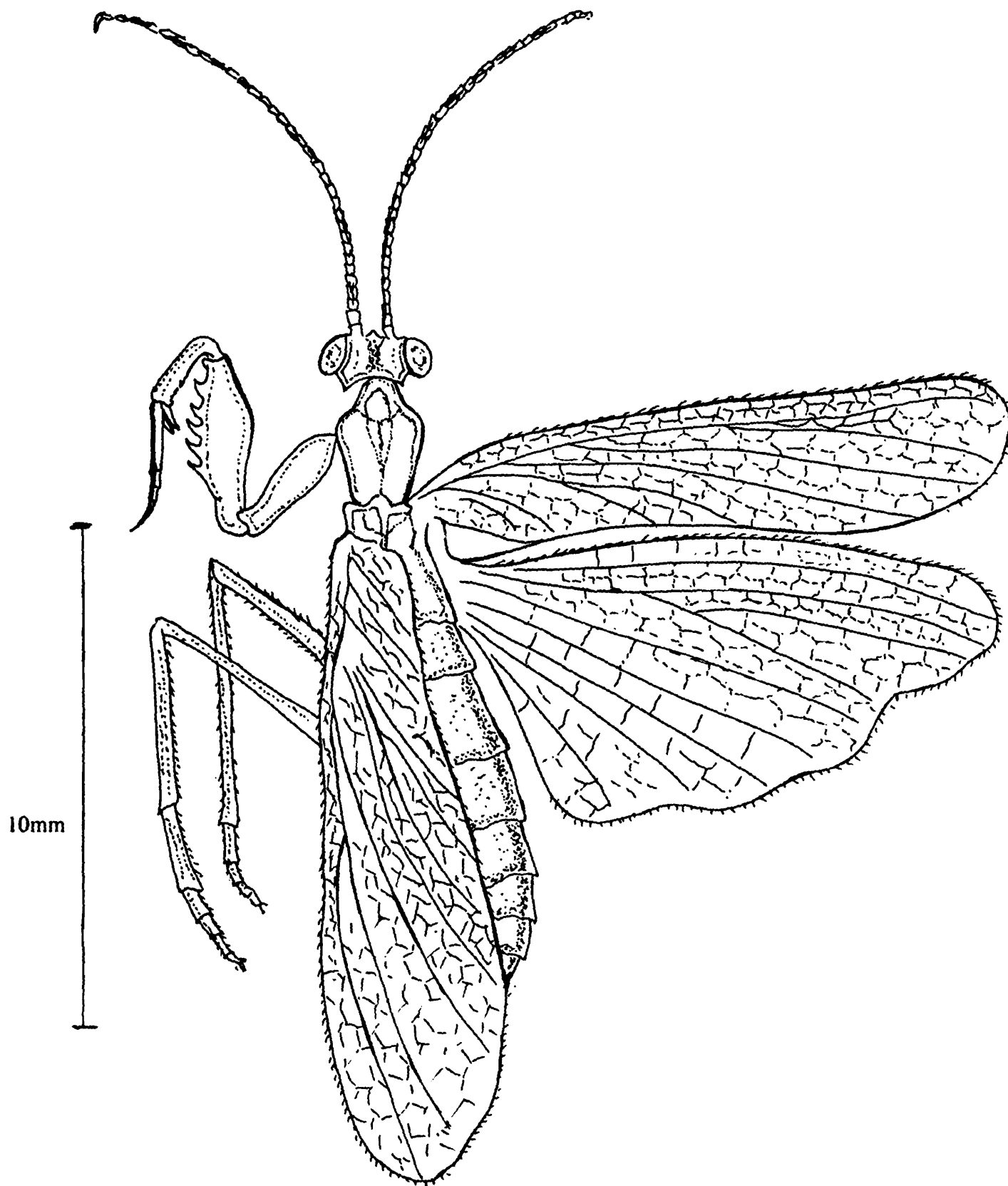


Fig. 67 : *Cimantis testacea* Werner

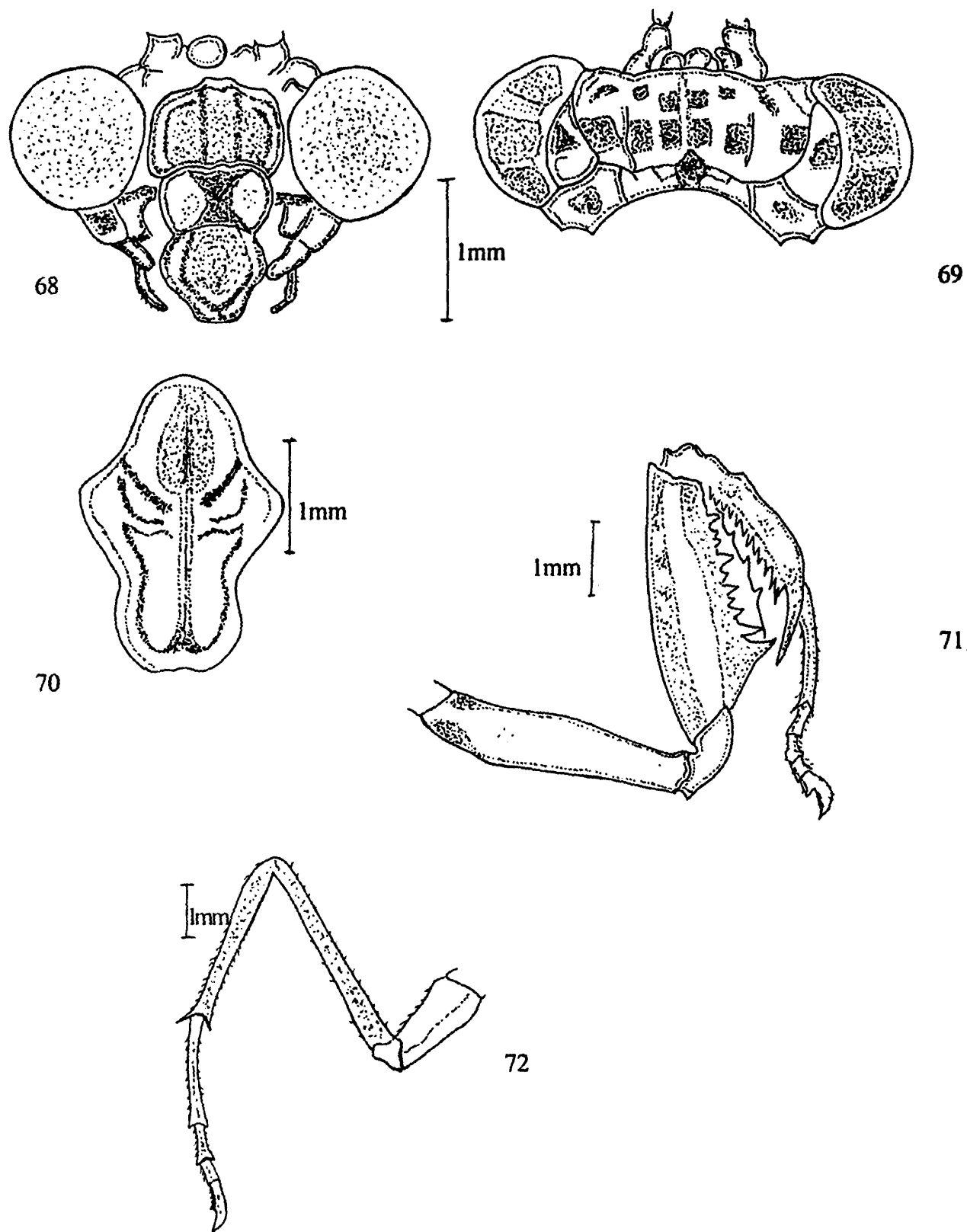


Fig. 68-72 : *Cimantis testacea* Werner

Fig. 68 : Head Dorsal view

Fig. 69 : Head Ventral view

Fig. 70 : Pronotum

Fig. 71 : Foreleg

Fig. 72 : Midleg

Pronotum : Short, rhomboidal, supracoxal dialation well pronounced with concave sides; disc not smooth, thrown into bosses; prozona with swollen elevation; metazonal constriction well marked; with a longitudinal median furrow. Forelegs : coxa without any spine; slightly broad; internal apical lobes contiguous, dorsal surface denticulated slightly; ventral surface smooth; trochanter broad, well pronounced, setaceous; femur broader than coxa, slightly dialated, superior margin straight with 4 external, 4 discoidal (third largest), 6 longer internal and 6 shorter internal spines; distally 2 longer spines enclosing two shorter ones; space between rows of external and internal spines denticulated; fore tibia with 9 smaller external spines and 11 gradually elongating internal spines; metatarsus twice long as all other tarsal segments together, setaceous; middle and hind legs elongated, densely setaceous; metatarsus slightly longer than all other tarsal segments together; wings testaceous, reaching far beyond tip of abdomen; costal area broad, with oblique broader veinules meshes; costal vein not reaching far beyond middle of wing.

Abdomen : Small, slender, fusiform, supra anal plate short. broadly triangular with pubescence, cerci 4 segmented.

Female : In general appearance both male and female are similar.

Material examined : Plesiotype : Male, Nellyampathi (920m Above MSL), Palakkad, 9-iv-2001, Vyjayandi.

Distribution : India, Kerala, Tamil Nadu (Tropical rain forests)

***Cimantis fuliginosa* Werner**
(Figs. 73-77)

1931. *Cimantis fuliginosa* Werner *Proc. Zool. Soc. London*, 1330 Holotype

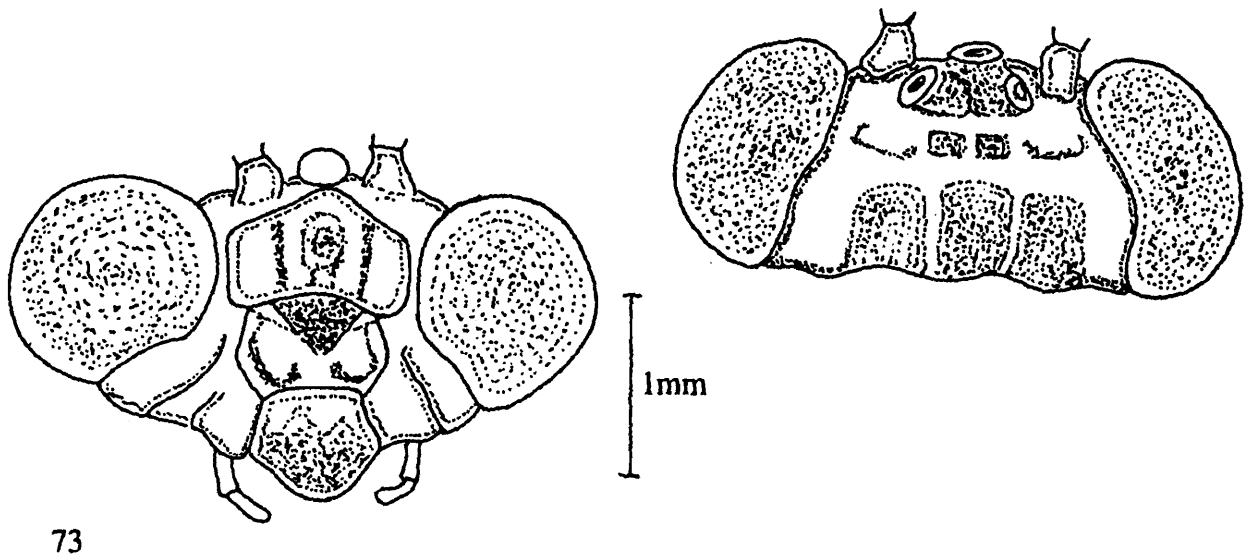
Holotype : M : India Tamil Nadu Annamalai Hills, 2400 ft. (BMNH).

Diagnosis : Female Body Length 15 mm.

Colour : Testaceous with grey tinge

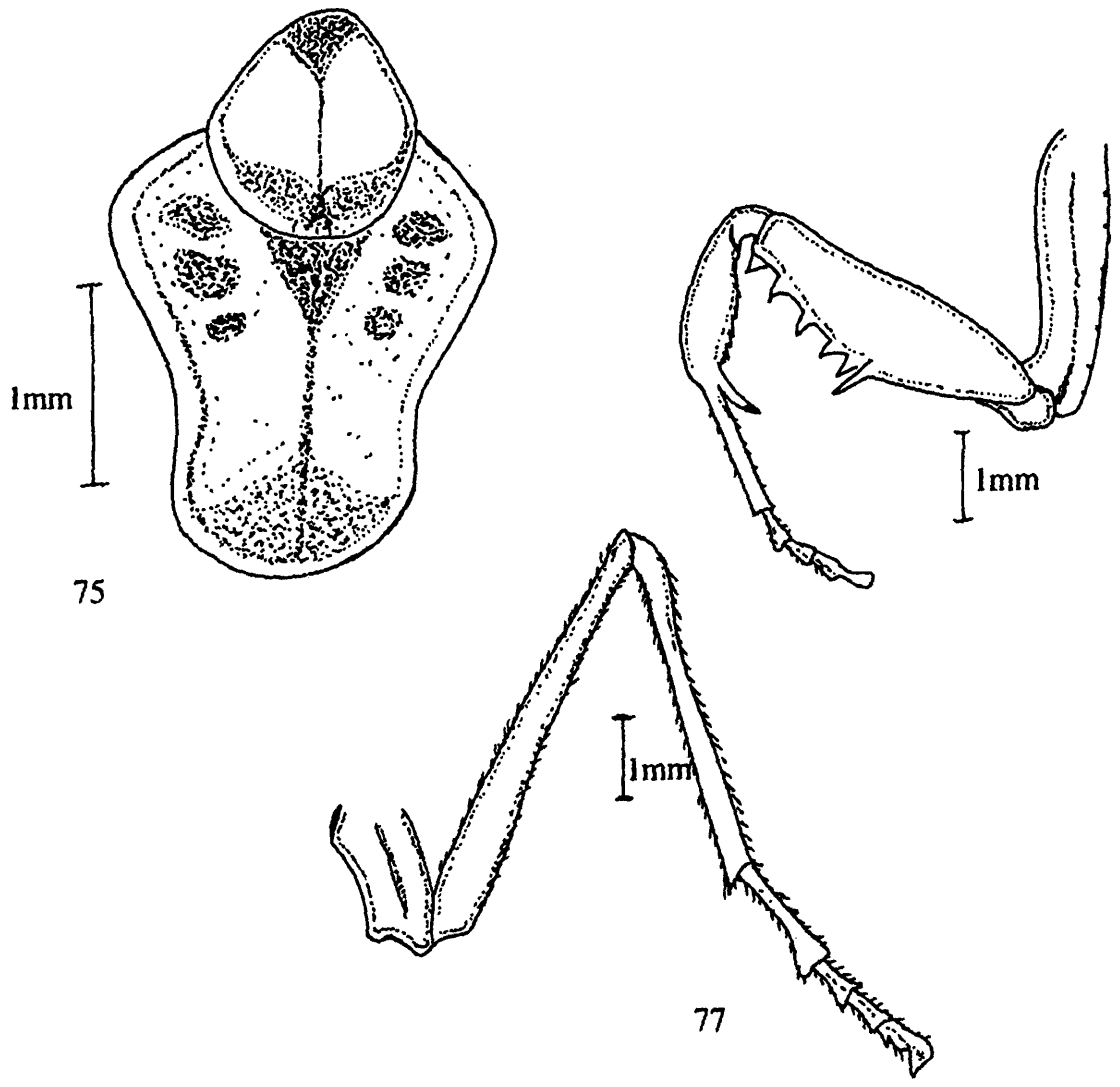
Head : Wider than high, vertex lobbed; eyes globular; ocelli large, antenna thick, flagellar segments squarish with sharp rosettes of bristles at junctions; frontal sclerite wider than high, superior border arched in center, laterally sinuate, slightly concave inferiory; clypeus squarish; labrum globular.

Pronotum : Short, rhomboidal, as long as fore coxa with well pronounced supracoxal dialation and metazonal constriction; prozona oval, metazona with three anterior lateral bosses, inferior end semicircular. Fore legs simple; coxa as long as femur, with mid dorsal ridge, hairy, internal apical lobes divergent; trochanter slightly swollen, with a row of hairs; femur slightly dialated at base, with wide ventral denticulated gap, outer surface with two



73

74



75

76

77

Fig. 73-77 : Cimantis fulginosa Werner
Fig. 73 : Head Dorsal view Fig. 74 : Head Ventral view Fig. 75 : Pronotum Fig. 76 : Foreleg
Fig. 77 : Midleg

grooves, with 4 external, 4 discoidal (second and third longer), internally 6 long and 6 short spines (distal two longer internal spines enclose two short spines), claw groove proximally placed; tibia hairy, with 8 external and 11 internal spines, slightly longer than metatarsus; metatarsus hairy, as long as all other tarsal segments together; mid and hind legs hairy; midleg slightly shorter than hindleg; midtibia with apical spines, wings much longer than abdomen, hairy, semi opaque; in forewings anterior radial and posterior radial veins bifurcates; in hindwings anterior radial vein trifurcates, postradial vein bifurcates, veinlets broad.

Abdomen : Fusiform, hairy, supra anal plate short, triangular; cerci short.

Male : Male not differ from female.

Material examined : Plesiotype : Female, Silent Valley, 26-vii-1995, Binoy.

Habitat : At high altitudes; undisturbed Tropical Rain forest

Distribution : India, (Kerala, Tamil Nadu).

Genus *Elmantis* Giglio-Tos

1915. *Elmantis* Giglio-Tos. *Bull. Soc. Entomol. Ital.*, **46** : 161. Type species : *Elmantis trincomaliae* (Saussure).

Diagnostic characters : Body small, earth brown; head with 4 lobes; eyes prominent, bulging; frontal sclerite transverse, superior edge sinuate, lateral edges angular; antenna thick with rosettes of bristles between flagellar segments. Pronotum rhomboidal, disc not smooth, with bosses; metazona constricted posteriorly; fore coxa simple, femur a little dialated, with 4 external first two proximal ones of external spines closely placed, 4 discoidal spines; tibia with 10-11 external spines; wings semihyaline, setaceous (both on surface and border); post metatarsus longer than all other tarsal segments together; wings longer than abdomen. Abdomen fusiform; cerci short.

Distribution : Oriental region.

Elmantis trincomaliae (Saussure) (Figs. 78-83) (Plate VI. Figs. 12 & 13)

1896. *Gonypeta trincomaliae* Saussure *Mitt. Schweiz Entomol. Ges.*, **3** : 63. Type Sri Lanka.

1915. *Elmantis trincomaliae* Giglio-Tos *Bull. Soc. Entomol. Ital.*, **46** : 161

Plesiotype : Male 20.3 mm.

Colour : Body generally brown with dark brown dots and patches.

Head : Wider than high, vertex smooth, lateral lobe well distinct; eyes round; frontal sclerite transverse, depressed, superior border arched, slightly sinuate at middle.

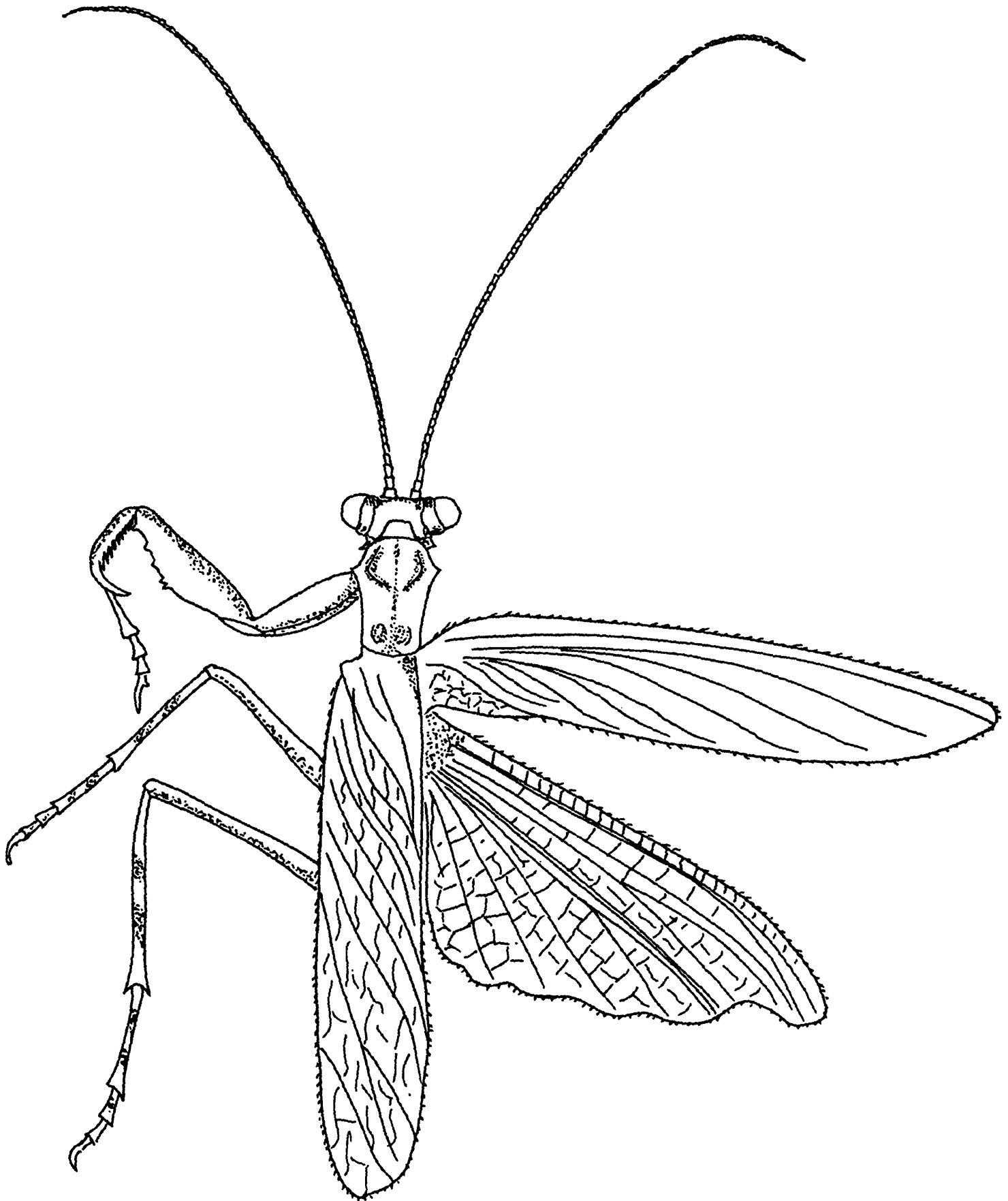
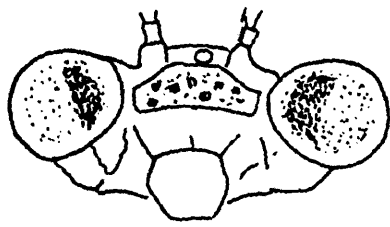
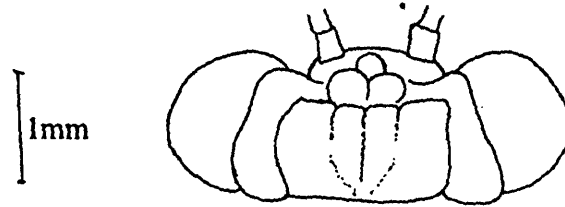


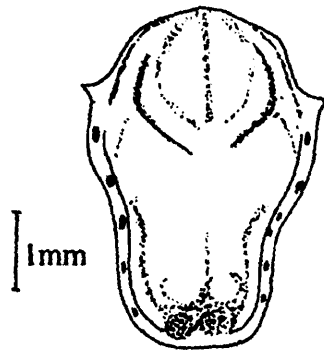
Fig. 78 : *Elmantis trincomaliae* (Saussure)



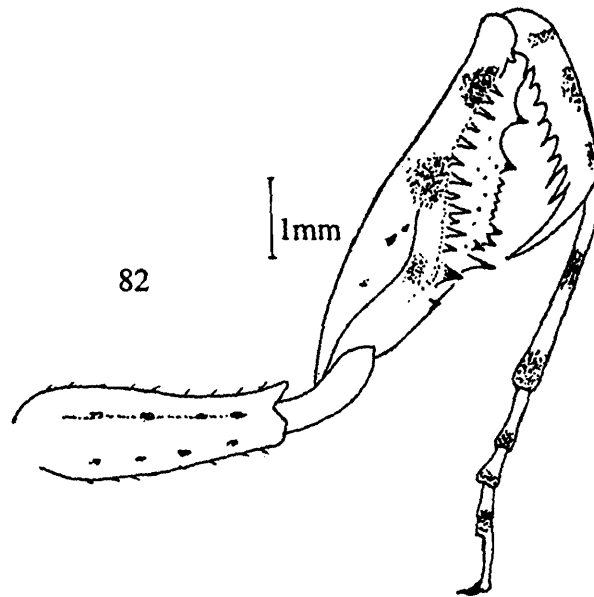
80



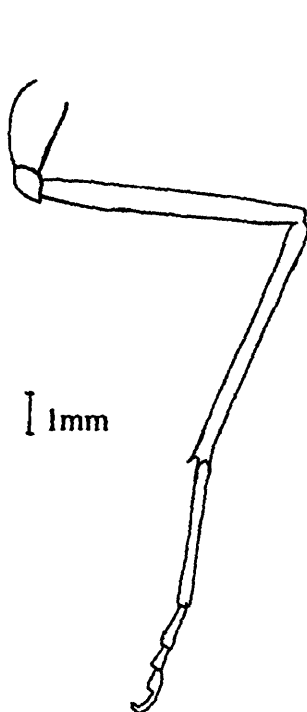
79



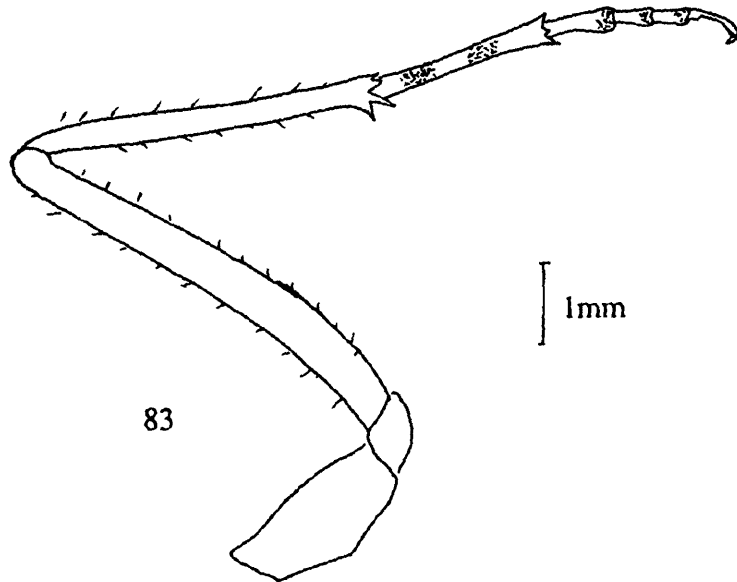
81



82



1mm



83

1mm

Fig. 79-83 : *Elmantis trincomaliae* (Saussure)

Fig. 79 : Head Dorsal view Fig. 80 : Head Ventral view Fig. 81 : Pronotum Fig. 82 : Foreleg
Fig. 83 : Hindleg

Pronotum : Medium sized, a little longer than fore coxae, four tubercles present at metazona, two at basal margin, lateral margin slightly ciliated, supra coxal dilation well distinct, edge toothed. Leg : Foreleg, coxa denticulate at both margin; trochanter setaceous, femur triangular, anterior margin slightly denticulated with 4 external, six to seven smaller spines present in between first and second external spines, 12 internal spines; claw groove proximal, tibia well setaceous at anterior margin with 10 external, 9 internal spines. Wings : both wing hyaline.

Abdomen : Shorter than wing, supra anal plate triangular, a little wider than high; cerci short, ten segmented.

Female : A little more darker than male, tubercles on metazona well distinct, size almost same or a little longer than male, head more broader, three dark bands on femur more distinct; fore coxa, femur more denticulated; female short winged, forewing of 4.5mm.

Material examined : Plesiotype : Male, Wayanad, 30-v-2005, Rajeesh. Other materials examined : 2 Males and 3 Females, Wayanad, 30-v-2005, Rajeesh.

Distribution : India : Andra Pradesh, Karnataka, Kerala, Tamil Nadu; Sri Lanka.

Subfamily CALIRIDINAE

Diagnostic characters : Body slender. Vertex not prolonged; eyes not protruding; antenna slender. Pronotum as long as fore coxa; internal apical lobes of fore coxa divergent; fore femur with 4 external, 4 discoidal spines; tibia with 6 to 7 external spines.

Two genera belonging to this subfamily

Key to Indian Genera of CALIRIDINAE

1. Discoidal spines of fore femur arranged in a row; foretibia with six external spines *Caliris* Giglio-Tos
- First discoidal spine of fore femur placed inner to the second; foretibia with seven external spines *Leptomantis* Giglio-Tos

(Only *Leptomantis* occur in Kerala)

Genus *Leptomantis* Giglio-Tos

1915. *Leptomantis* Giglio-Tos *Bull. Soc. Entomol. Itali.*, 46 : 87. Type species : *Leptomantis albella* (Burmeister)

Diagnostic characters : Body slender, pale green; antenna slender and backwardly directed; frontal sclerite transverse, superior edge arched; fore coxa with divergent

internal apical lobes; femur simple, outer surface straight, with 4 external and 4 discoidal spines; foretibia with 7 external spines. Pronotum long, slender, supra coxal dialation not well pronounced; metazona as long as fore coxa; wings semi hyaline; fore wings costal area with transverse parallel veinlets; middle and hind legs long and slender; hind metatarsus longer than other all tarsal segments together.

Distribution : Asia, Tropical Oriental Region.

Five species are known from India.

Key to species Indian species of *Leptomantis* Giglio-Tos

1. Frontal sclerite wider 2
 - Frontal sclerite narrow 4
 2. Prozona with black patch 3
 - Prozona without black patch *L. parva* Werner
 3. Fore coxa with 2 black spots; trochanter without black spots *L. montana* Beier
 - Fore coxa without black spots; trochanter with black spot *L. indica* Giglio-Tos
 4. Trochanter with black spot *L. lactea* (Saussure)
 - Trochanter without black spot *L. nigrocoxata* Mukherjee
- (Only one species *L. parva* is known from Kerala)

Leptomantis parva Werner (Figs. 84-89) (Plate VI. Fig. 14)

1933. *Leptomantis parva* Werner, *Proc. Zool. Soci. London*, 1933 : 890

Diagnosis : Male : Body length 21 mm.

Colour : Delicate light green with yellowish tinge.

Head : Wider than high; vertex not smooth or flat, thrown into lobes; eyes globular; frontal sclerite transverse, angular superiorly, wider than high; antenna filiform, thick, without setae.

Pronotum : Elongated, longer than fore coxa; pronotum not flat, slightly denticulated laterally, middorsally with weak longitudinal carina; posteriorly arched. Fore coxal dorsal disc of fore coxa not flat, with midlongitudinal ridge, internal apical lobes slightly converging; femur slender with 4 external, 4 discoidal, internally 6 longer, 6 shorter spines; (the distal most two longer spines enclose two shorter spines); fore tibia with 7 external, 10 internal spines with pubescence; metatarsus longer than other tarsal

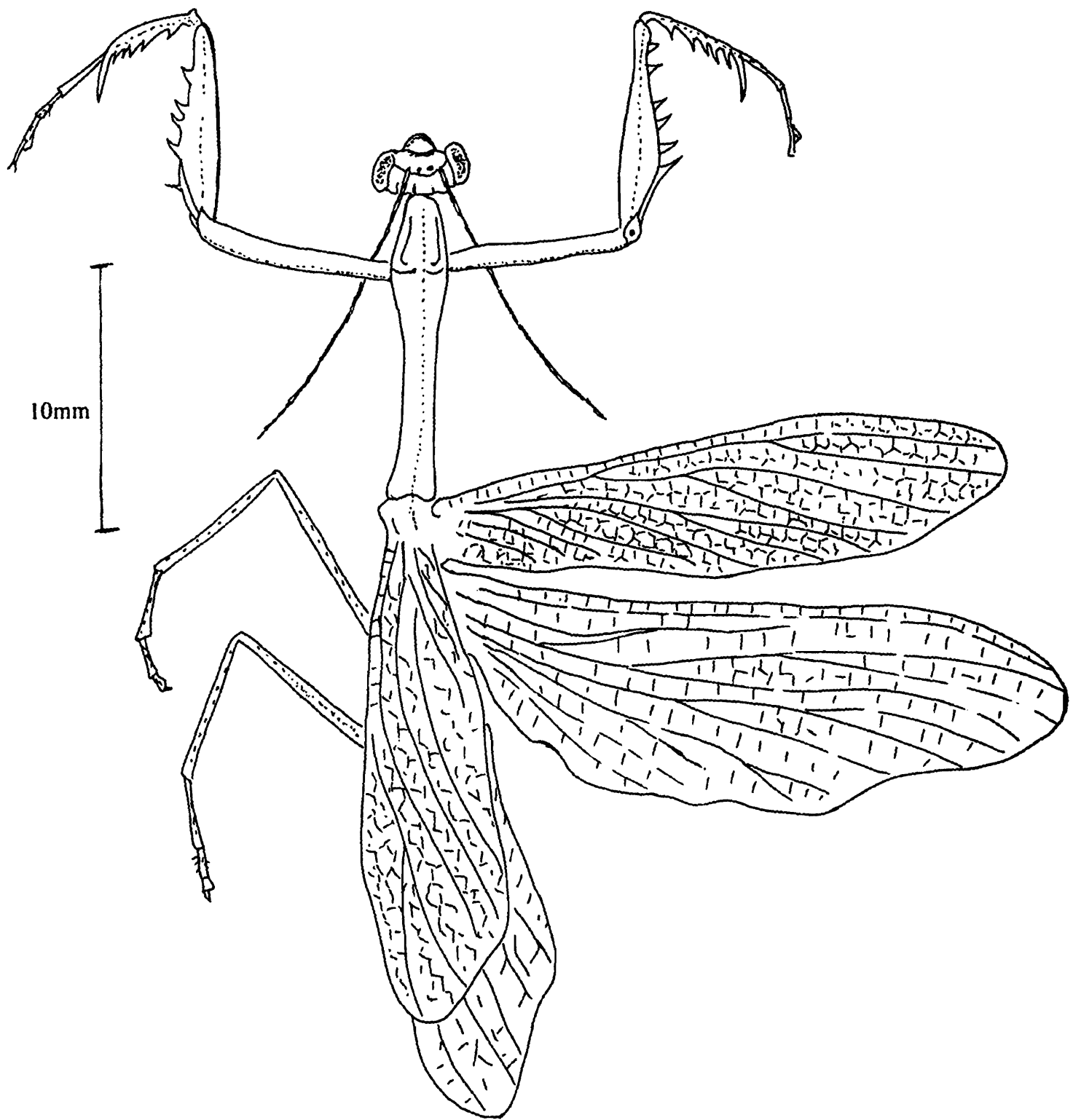


Fig. 84 : *Leptomantis parva* Werner

segments together. Wings : both wings hyaline, round at tip, much longer than abdomen, costal margin of forewing with minute setae, veinlets of costal area transverse.

Abdomen : Fusiform; highly pubescent; cerci thicker and with pubescence.

Female : Female slightly larger than male.

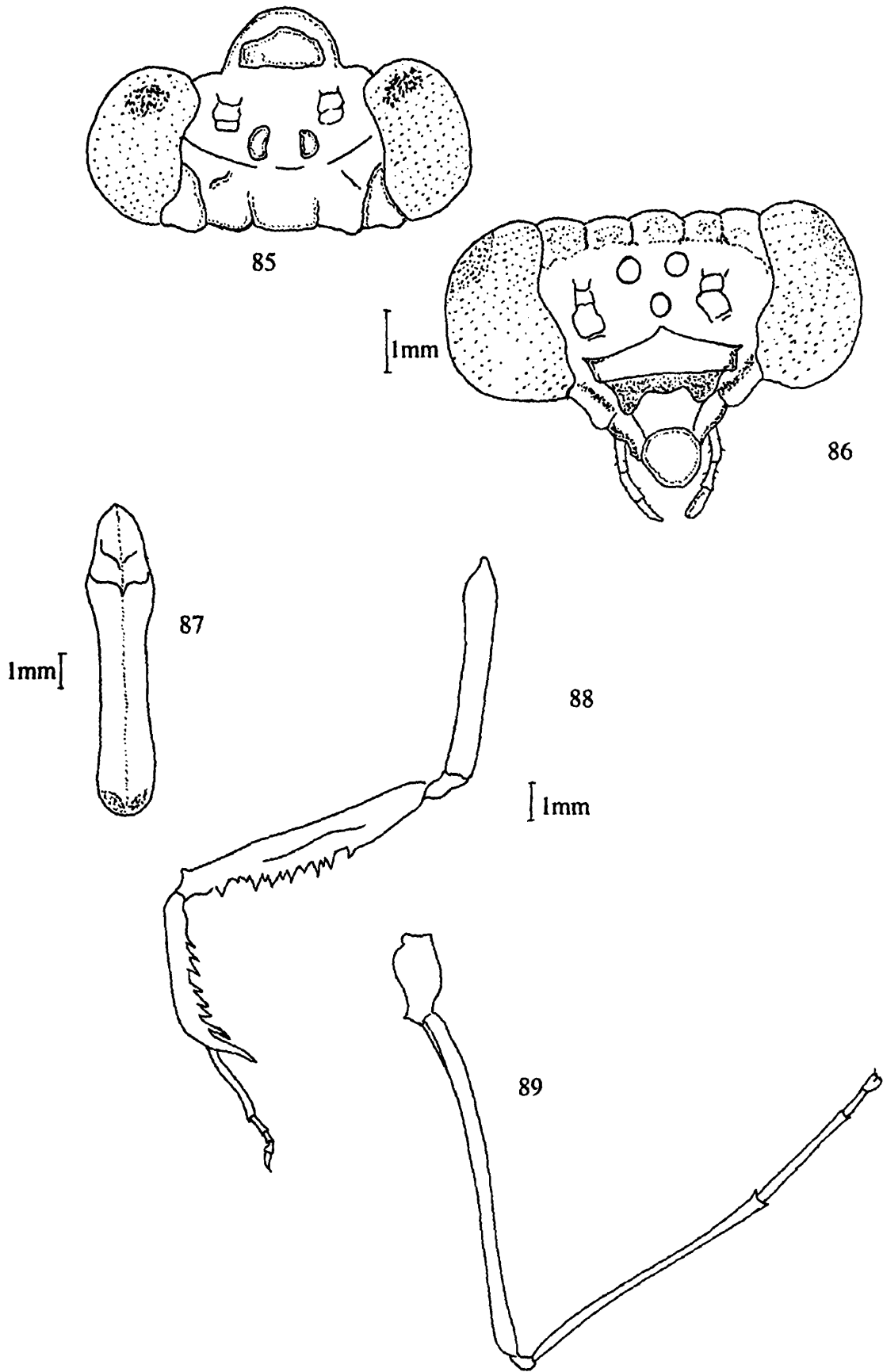


Fig. 85-89 : *Leptomantis parva* Werner
Fig. 85 : Head Dorsal view Fig. 86 : Head Ventral view Fig. 87 : Pronotum Fig. 88 : Foreleg
Fig. 89 : Hindleg

Material examined : Plesiotype : 1 Male, Kannur, 11-iii-1999, Shonitha. J.K. Other material examined : 1 Male, Kovoov, 9-viii-2001, Vyjayandi. 1 female, Chemenchery, 9-ix-2001, Sudheer. 1 Male, Kannur, 30-x-2001, Jathin.

Habitat : Usually seen at human inhabitations.

Distribution : India, (Kerala, Uttar Pradesh).

Subfamily IRIDOPTERYGINAE

Body small, slender. Head thick; eyes globular, prominent; frontal sclerite transverse; antenna long with sparse setae. Pronotum short; forelegs with 4 external, 3 discoidal spines; claw groove proximally placed; wings iridescent, hyaline, as long as body; cerci short.

Two tribes are known from India.

Key to Tribes

- Metazona with indistinct carina IRIDOPTERYGINI
 Metazona with distinct carina TROPIDOMANTINI

Tribe Iridopterygini

Claw groove at the proximal side of the fore femur. Metazona with indistinct carina.

Key to Indian genera of Iridopterygini

1. Pronotum saddle shaped, short; foretibia with 8-9 external spines *Hapalopeza* Stal
- Pronotum with parallel margin, long; foretibia with 6-7 spines 2
2. Pronotum as long as fore coxa *Paranomantis* Mukherjee
- Pronotum longer than fore coxa *Nanomantis* Saussure

(Only *Hapalopeza* is known from Kerala)

Genus *Hapalopeza* Stal

Diagnostic characters : Head thick; eyes globular, prominent; frontal sclerite transverse, trapezoid, upper margin wavy. Pronotum short, with metazonal constriction; fore femur with 4 external, 3 discoidal spines; foretibia with 8 short, well separated internal spines; wings slightly longer than Abdomen, hyaline, iridescent. Abdomen fusiform; supra anal plate short, round; cerci short, conical.

Key to Indian species of *Hapalopeza* Stal

1. Frontal sclerite with black patch 2
 Frontal sclerite without black patch *H. nilgirica*
2. Antenna black alternates with white in colour *H. nitens* (Saussure)
- Antenna completely black *H. periyara* Mukherjee & Hazra
 (*H. nitens* is not yet reported from Kerala)

***Hapalopeza periyara* Mukherjee & Hazra**

(Figs. 90-96)

1985. *Hapalopeza periyara* Mukherjee & Hazra *Entomon.*, 10(4) : 257. Holotype India, Kerala (ZSI)**Diagnosis** : Female Body Length 17 mm.**Colour** : Testaceous.

Head : Thick, wider than high, vertex faintly lobed; eyes slightly oblong, ocelli small, antenna long, slender, filiform, ciliated; frontal sclerite transverse, disc depressed, wider than high, with median carina, superiorly arched, inferiorly concave.

Pronotum : Short, as long as fore coxa, saddle shaped, disc smooth, non-denticulated laterally; prozona raised, supracoxal dialation pronounced, metazona twice longer than prozona, with posterior constriction, inferiorly semicircular. Forelegs: coxa simple, without marginal spines, internal apical lobes divergent; femur slightly dialated proximally, with 5 external, 3 discoidal (third longest), internally with 6 longer and 7 shorter spines; claw groove proximally placed; tibia with 7 external and 12 internal spines; metatarsus slightly longer than tibia, twice longer than all the other tarsal segments together. Wings: iridiscient, longer than abdomen, ends round; forewing with minute bristles on the surface and along costal area, costal area opaque, rest subhyaline, enfumated, and anterior radial vein bifurcates, veinlets broad celled.

Abdomen : Fusiform, supra anal plate short, posterior tip triangular; cerci long, with pubescence.

Male : Unknown.

Material examined : Plesiotype : Female, Parambikulam W.L.S, 24-iii-1997, K.C. Gopi (ZSI Calicut), Reg. 10146. Other materials examined : 1 Female, Schendurini W.L.S, Rajacoop (Quilon), 14-viii-1997, P. M. Sureshan (ZSI Calicut), Reg. No. 10588. 1 Female, Perumthody (Quilon), 13-ix-1997, P.M. Sureshan (ZSI Calicut), Reg. No. 10126.

Distribution : India : Kerala.

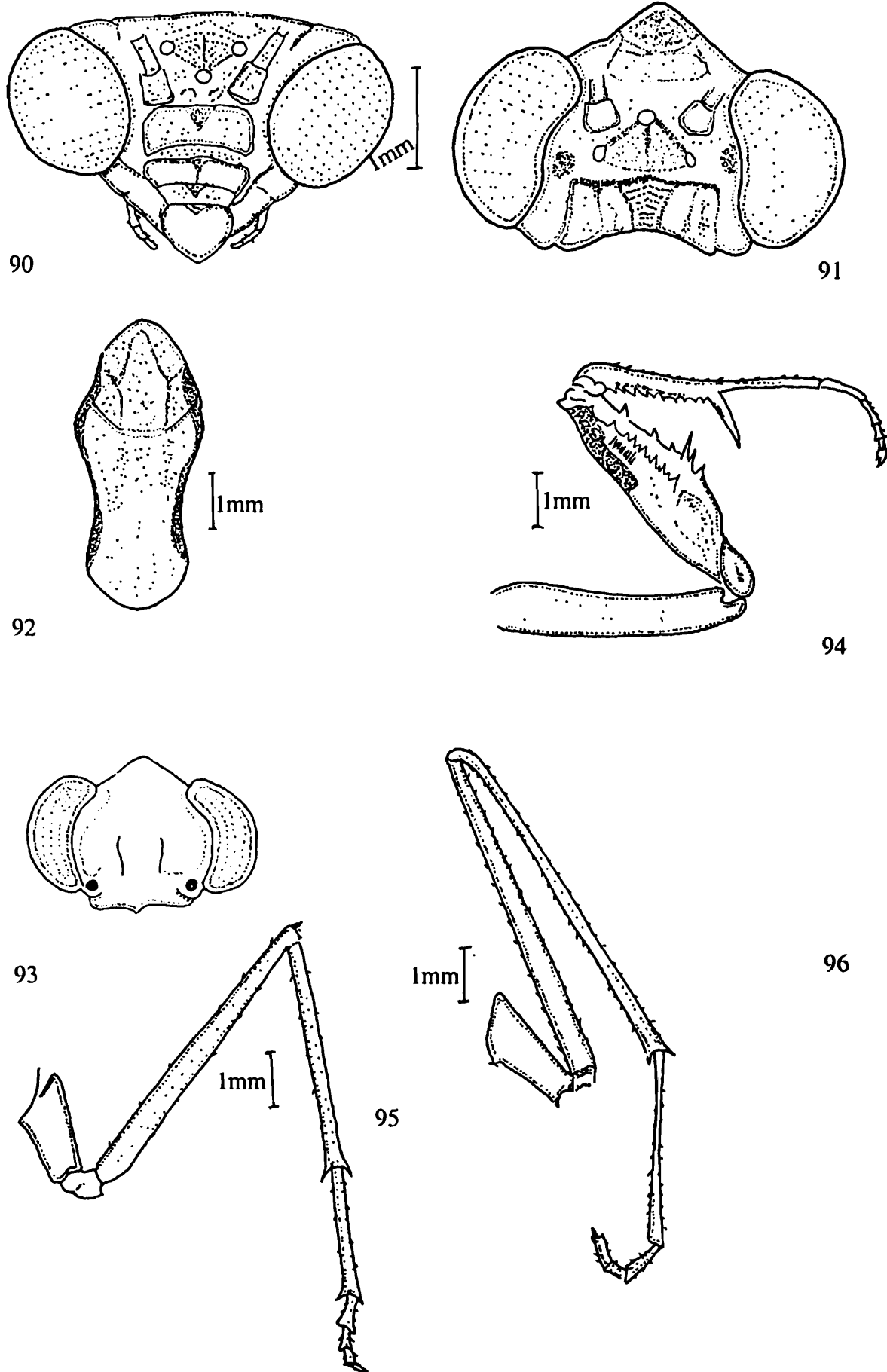


Fig. 90-96 : *Hapalopeza periyara* Mukherjee & Hazra

Fig. 90 : Head Dorsal view Fig. 91 : Head Ventral view Fig. 92 : Pronotum Fig. 93 : Head inner view Fig. 94 : Foreleg Fig. 95 : Midleg Fig. 96 : Hindleg

***Hapalopeza nilgirica* Wood-Mason**
(Figs. 97-102) (Plate VII. Figs. 15)

1891. *Hapalopeza nilgirica* Wood- Mason, *A Catalogue of Mantodea...*, Pl.2, f.4.4a.4b. Holotype; India : Nilgris.

1927. *Hapalopeza nilgirica* : Giglio-Tos, *Das Tierreich*, 50 : 132.

1951. *Hapalopeza nilgirica* : Roonwall & Bhasin, *Indian Forester*, 77(5) : 313-318

Plesiotype : Female, length 16 mm.

Colour : Moss green with testaceous tinge.

Head : Vertex smooth, four lobbed, lateral lobes prominent; frontal sclerite transverse, smooth, wider than high, eyes round,

Pronotum : Saddle shaped, medium sized, supra coxal dialation distinct, lateral edge smooth but slightly setaceous, a faint carina present dorsomedially, two tubercles at the posterior end dorsally; fore femur a little broader with 4 external, 4 discoidal, 12 internal, all spines black at apical half; tibia with 12 internal spines and 8 external spines; claw grooves placed proximally; mid femur with an apical spine. Wings : Fore wing hyaline and iridescent, semi opaque at the costal region, longer than abdomen in both male and female; hind wing hyaline.

Abdomen : Short, pointed at tip, more setaceous at the distal segment, cerci cylindrical, supra anal plate triangular.

Male : Both male and female similar in the general appearance but male differ in being a little shorter than female and in having abdomen rounded at tip. Moreover the black patch on the fore femur and brown patch on the fore tibia well distinct in male.

Material examined : Plesiotype : Female, Arippa forest Thiruvananthapuram, 20-v-2005, Rajeesh. Other specimen examined : 4 Males, Thiruvampady, 9-xii -2005, 10-xi-2005, Vyjayandi. 2 Males, Muthapanpuzha, 3-iii-2005, Rajeesh. 1 Male & 1 Female, TBGRI Palode, 19-v-2005, Rajeesh.

Habitat : Near riparian area of dense vegetations.

Subfamily LITURGUSINAE

Body medium sized; bark coloured; vertex straight; eyes prominent, bulging round. Pronotum short, flat, rhomboidal, margin angular, disc with bosses; fore femur short, stout, with 4 external, 4 discoidal spine, with wide ventral space. Abdomen fusiform.

Key to genera

1. Costal area of forewing much narrower than discoidal area
..... *H.:mbertiella* Saussure

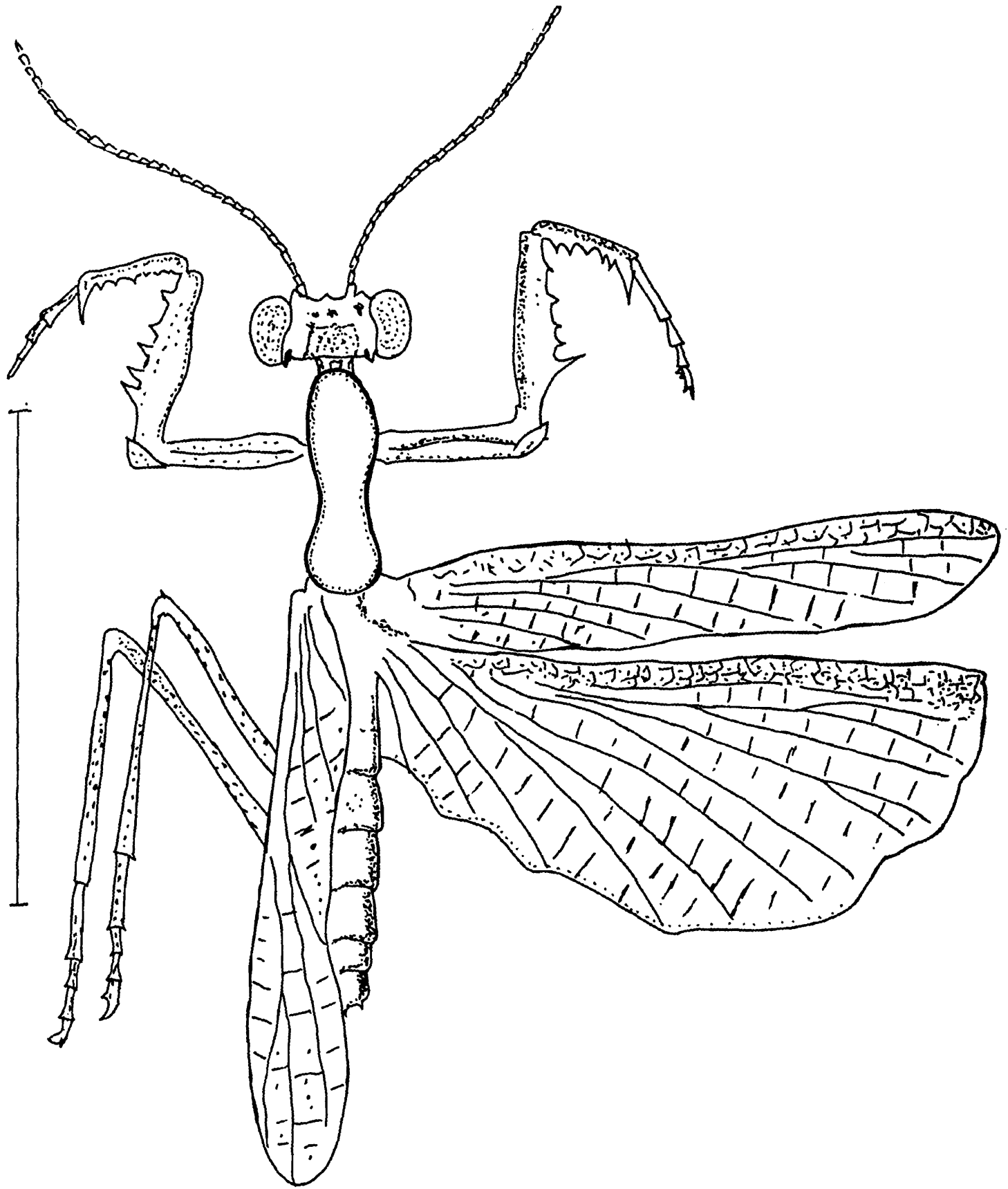
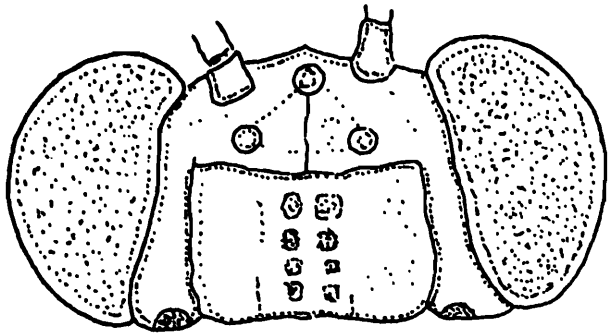
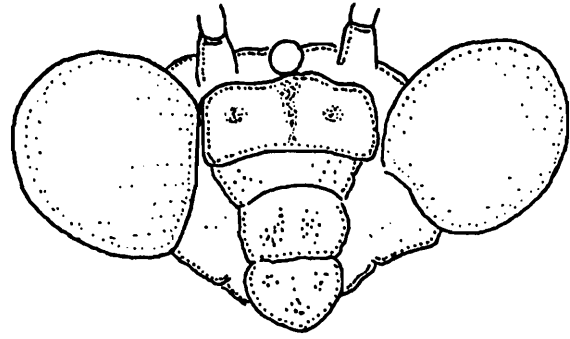


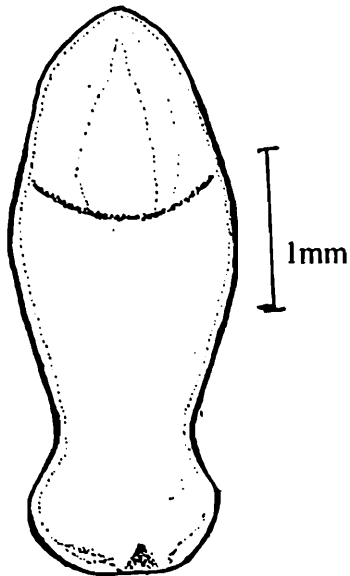
Fig. 97 : *Hapalopeza nilgirica* Wood-Mason



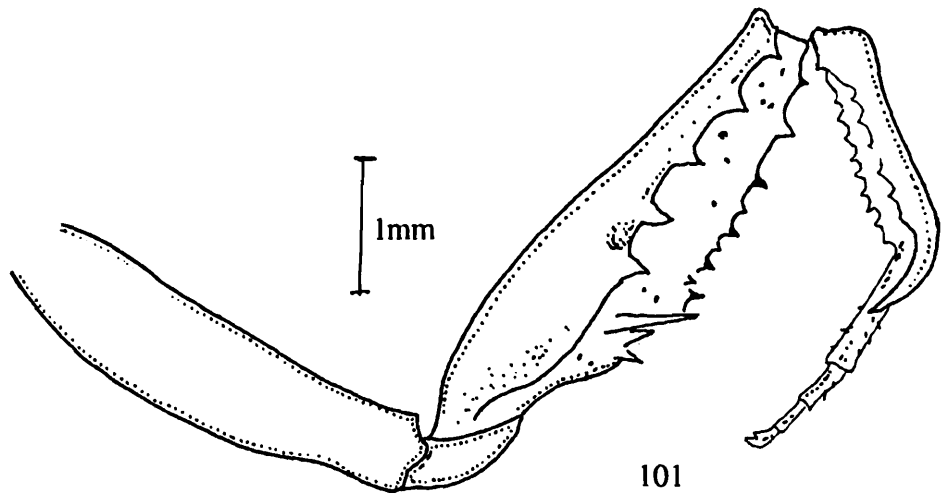
98



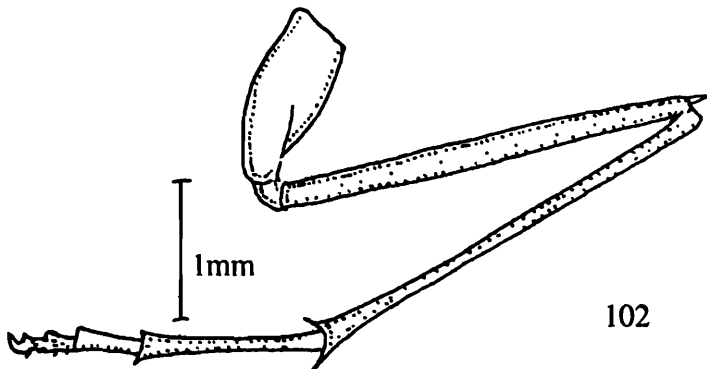
99



100



101



102

Fig. 98-102 : *Haspalopeza nilgirica* Wood-Mason

**Fig. 98 : Head Dorsal view Fig. 99 : Head Ventral view Fig. 100 : Pronotum Fig. 101 : Foreleg
Fig. 102 : Hindleg**

- Costal area of forewing almost as wide as discoidal area, gradually narrowed towards apex *Theopompa* Stal

Genus *Humbertiella* Saussure

1869. *Humbertiella* Saussure *Mitt. Schweiz. Entomol. Ges.*, 3 : 55. Type species : *Humbertiella ceylonica* Saussure

Diagnostic characters : Vertex lobbed; antenna slender; eyes conspicuous, round. Pronotum short, trapezoid; fore femur stout, ventral gap wide, denticulated; foretibia well developed, with regularly spaced 9 spines.

Key to Indian species of *Humbertiella* Saussure

1. Longer internal spines of fore femur completely black 2
 - Longer internal spines of fore femur black at apex only 3
2. Frontal sclerite completely black *H. ceylonica* saussure
 - Frontal sclerite with a whitish patch at the median curvature
..... *H. nigrospinosa* Sjostedt
3. Costal area of forewing with parallel veinules *H. indica* Saussure
 - Costal area of forewing with reticulated venation 4
4. Frontal sclerite with arched superior edge *H. affinis* Giglio-Tos
 - Frontal sclerite with superior edge almost straight. *H. similis* Giglio-Tos

Humbertiella similis Giglio-Tos

(Figs. 103-108) (Plate VII. Figs. 16 & 17)

1897. *Humbertiella indica* Bolivar *Ann. Soc. Entomol. France*, 66 : 303.

1917. *Humbertiella similis* Giglio-tos *Bull. Soc. Entomol. Ital.*, 48 : 83.

Diagnosis : Male body Length 35 mm.

Colour : Bark brown.

Head : Triangular wider than high; vertex 5 lobbed; eyes globular, well projecting; ocelli prominent, closely placed antenna filiform, scape placed closer to frontal sclerite, slender, non ciliated; frontal sclerite transverse, superior end sinuate, inferior end slightly arched.

Pronotum : Rhomboidal, anterior lateral corner angular, supra coxal dialation not much pronounced, disc not smooth, with 5 pairs of bosses; prozona elevated. Forelegs :

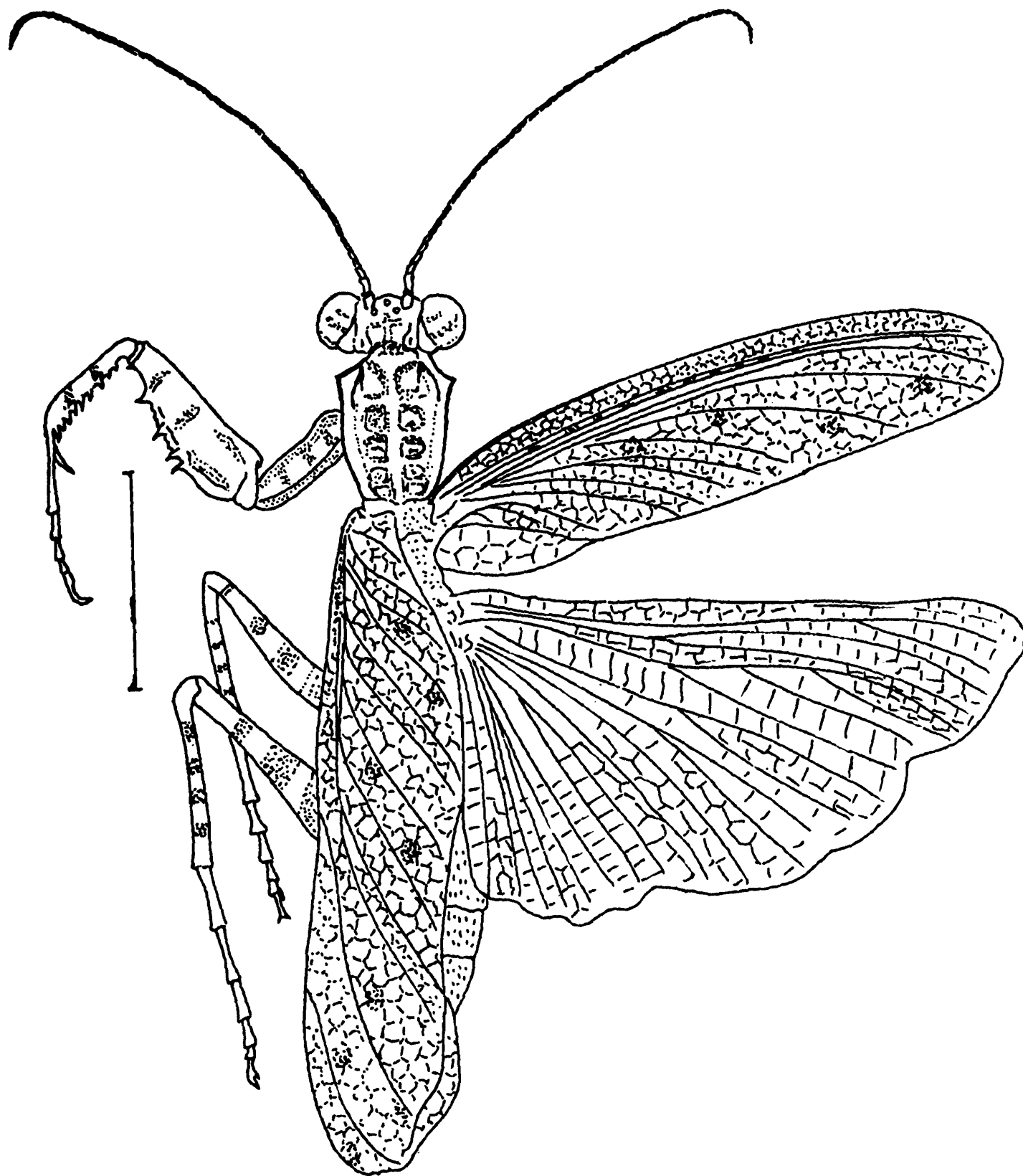
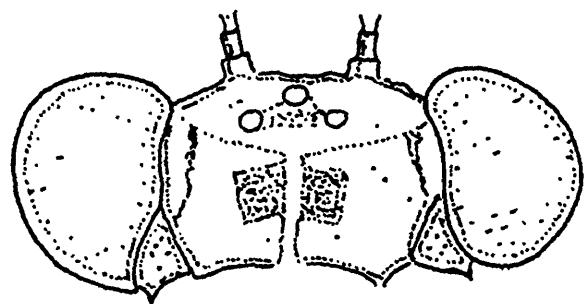
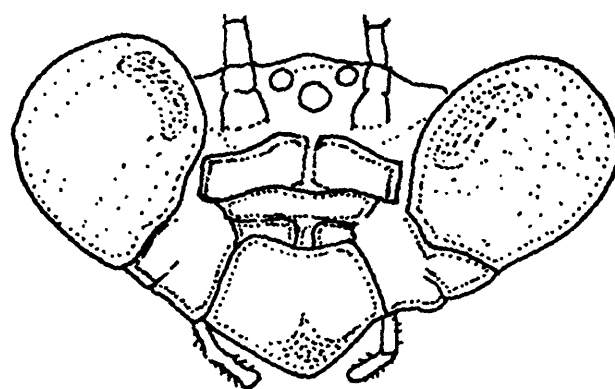


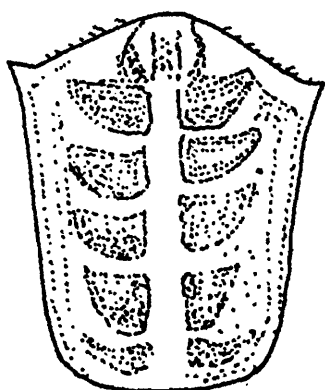
Fig. 103 : *Humbertiella Similis* Giglio-Tos



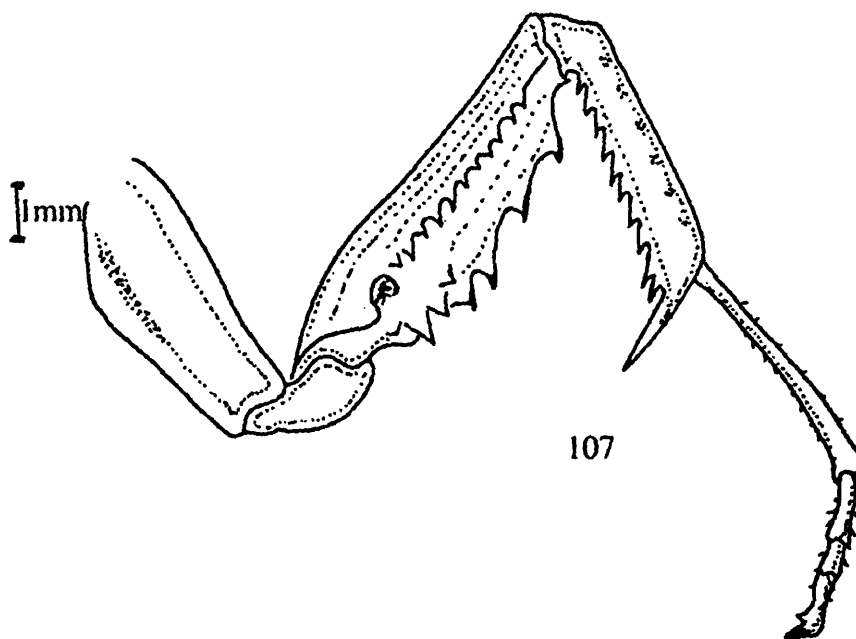
104



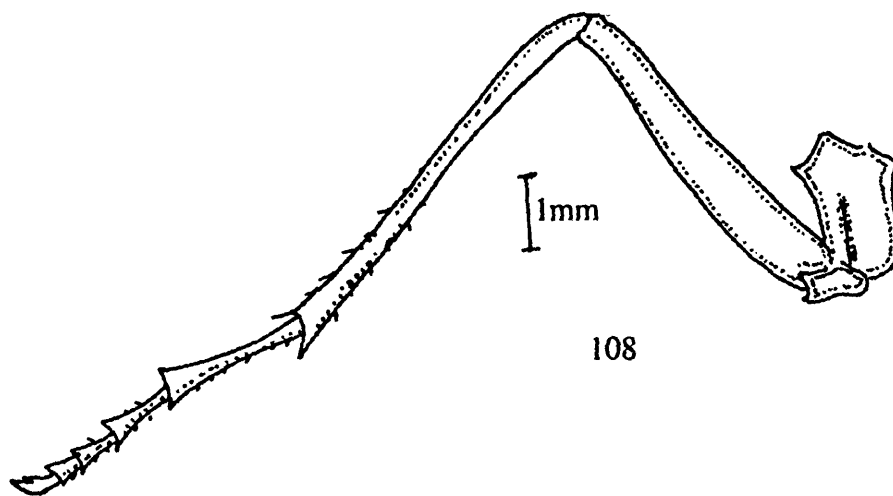
105



106



107



108

Fig. 104-108 : *Humbertiella similis* Giglio-Tos

Fig. 104 : Head Dorsal view **Fig. 105 :** Head Ventral view **Fig. 106 :** Pronotum **Fig. 107 :** Foreleg
Fig. 108 : Hindleg

Coxa with middorsal ridge, ventrally smooth, internal apical lobes divergent; trochanter bulky; femur ventral proximal aspect bulged, superior border sinuate, with 4 external, 4 discoidal and internally with 6 longer, 8 shorter spines, proximally spines closely placed, distally distributed with wide gap; claw groove proximally placed; tibia with 9 external and 10 internal spines; metatarsus a little shorter than all other tarsal segments together. femur in hindlegs, with two apical spines; metatarsus shorter than all other tarsal segments together.

Abdomen : Fusiform, shorter than wings, supra anal plate short, cerci long, hairy.

Female : Females are short winged.

Material examined : Plesiotype : Male, Thottilpalam (Calicut), 5-v-2000, Vyjayandi. Other materials examined : 1 Female, Nanmanda, 15-x-2000, Sreeleka, 1 Male, Kovoov, 11-iii-1998, Vyjayandi. 1 Female, Trissur, 8-v-2000, Usha. K.

Habitat : This species is usually seen at human inhabitations.

Distribution : India : Himachal Pradesh, Kerala, Jammu, Madhya Pradesh, Orissa, Uttar Pradesh, Nepal, Sri Lanka.

Humbertiella ceylonica Saussure

(Figs. 114-118)

1869. *Humbertiella ceylonica* Saussure *Mitt. Schweiz. Entomol. Ges.*, 3 : 62 Holotype Srilanka.

1891. *Theopompa septentrionum* Wood-Mason *A Catalogue of Mantodea*, 2 : 61

Diagnosis : Female body Length 33 mm.

Colour : Wood brown with black tinge.

Head : Triangular, wider than high; vertex with 5 lobes, lateral lobes well pronounced; eyes globular dorsally, ventrally oblong, frontal sclerite twice wider than high, disc flat non carinated, superior border arched, inferiorly truncate; clypeus elevated, shelf like; labrum rhomboidal.

Pronotum : Short, rhomboidal; supracoxal dialation well pronounced; metazona with well pronounced posterior constriction, carinated middorsally. Forelegs : Coxa dorsally with longitudinal ridge, ventrally smooth, superior and inferior borders slightly serrated internal apical lobes divergent; trochanter slightly swollen; femur bulged, outer border wavy, ventrally grooved, with submarginal rows of denticles, with 4 external, 4 discoidal, internally 5 longer and 5 shorter spines; tibia with 9 external shorter, 10 internal longer spines, twice longer than metatarsus; metatarsus a little longer than all other tarsal segments together. Hindmetatarsus slightly longer than all other tarsal segments together. Forewings opaque, costal area reticulately veinated, posterior radial vein bifurcates twice proximally; hindwings sub hyaline.

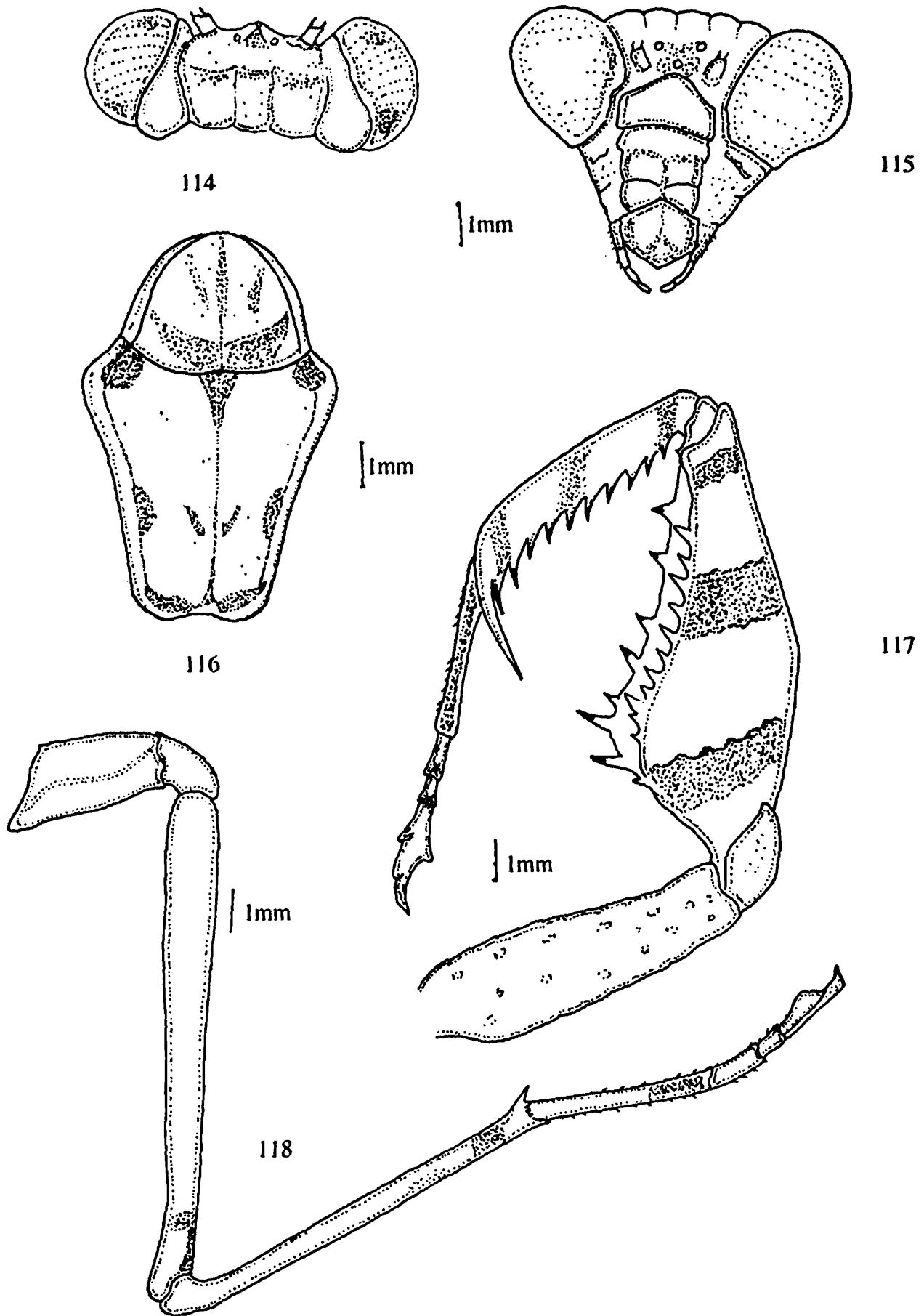


Fig. 114-118 : *Humbertiella ceylonica* Saussure

**Fig. 114 : Head Dorsal view Fig. 115 : Head Ventral view Fig. 116 : Pronotum Fig. 117 : Foreleg
 Fig. 118 : Midleg**

Abdomen : Shorter than wings, broader, cerci many segmented.

Male : Male is similar to female.

Materials examined : Plesiotype : Female, Kotavasal (Aryankavu range), quilon, 15-viii-1997, P.M. Sureshan, (ZSI Calicut), Reg. No. 10585. Other materials examined : 1 Male, Kuttalam, Fifth falls, 1991-1993, Edwin.

Distribution : India, Kerala, Karnataka, Tamil Nadu, Assam, Uttar Pradesh, West Bengal, Sri Lanka.

Subfamily MANTINAE

Diagnostic characters : Body medium to somewhat large in size; brown or green insects. Head small, eyes globular; antenna slender; fore femur with 4-5 external spines and 3-4 discoidal spines; fore tibia with normal spines. Pronotum longer than fore coxa. Wings well developed in both sexes, occasionally reduced in females. Supra anal segment short.

Two tribes are known in India.

Key to tribes

- 1. Fore femur with 4 discoidal and 4 external spine; wings usually longer than Abdomen MANTINI
- Fore femur with 3 discoidal and 4-5 external spines; wings usually shorter than Abdomen MIOMANTINI

Tribe Mantini

Pronotum as long as or longer than fore coxa; fore femur with 4 external and 4 discoidal spines, second discoidal spine much longer than the first. Both wings well developed, usually longer than abdomen in both sexes.

Nine genera are present in India out of which six genera are found in Kerala.

Key to Indian genera of Mantini

- 1. Frontal sclerite almost as wide as high..... 2
- Frontal sclerite 2-3 times wider than high 4
- 2. Hind femur with apical spine; fore and hind wings without transverse brown patches 3

- Hind femur without apical spines; fore and hind wings with transverse brown patches *Plistospilota* Giglio-Tos
- 3. Fore wing border crenulated *Parhierodula* Giglio-Tos
- Fore wing border not crenulated 8
- 4. Frontal sclerite upper margin spiniform *Oxymantis* Werner
- Frontal sclerite upper margin arched or angular 5
- 5. Eyes globular 6
- Eyes oblong or conical *Mesopteryx* Saussure
- 6. Body somewhat robust, antenna not much elongated, hind femora without apical spine 7
- Body slender, much elongated; antenna very much elongated, hind femora with apical spine *Tenodera* Burmeister
- 7. Claw groove placed at distal part of fore femur *Statilia* Stal
- Claw groove placed at middle of fore femur *Mantis* Linnaeus
- 8. Dialation of the Pronotum not extending upto the base *Hierodula* Giglio-Tos
- Dialation of the Pronotum extending upto the base *Rhombodera* Giglio-Tos

Genus *Hierodula* Burmeister

1838. *Hierodula* Burmeister *Hand b. Entomol.*, 2 : 536. Type species : *Hierodula membranacea* (Burmeister).

Diagnostic characters : Body large; eyes globular laterally; conical in front view; frontal sclerite usually higher than wide bicarinate; Pronotum elongated, robust, carinated; supracoxal dialation oval. Fore coxa with marginal spines, internal apical lobes contiguous; fore femur with 4 external, 4 discoidal (3rd longest) spines; distal internal two long spines enclose two smaller spines. Mid and hind femur with apical spines; forewing border not crenulated, with broad, opaque, costal area; rest semi hyaline, hind wings hyaline. Abdomen broad, supra anal plate transverse and short.

Distribution : India, Java, Indonesia, China, Taiwan, New Guinea, Australia.

Genus *Hierodula* Giglio-Tos

There are 12 species reported from India out of which 6 are known from Kerala.

Key to Indian species of *Hierodula*

1. Fore coxa with sharp saw-like marginal spines 2
 - Fore coxa with obtuse, stout marginal spines 6
2. Fore coxal spines 15-20 in number (Fig. 123) 3
 - Fore coxal spines less than 10 (Fig. 152) 4
3. Clypeus broader than high; metatarsus 1.4x longer than all other tarsal segments together (Figs. 130, 134) *H. keralensis* Vyjayandi
 - Clypeus higher than broad, metatarsus as long as all other tarsal segments together (Figs. 121) *H. membranacea* (Burmeister)
4. Fore coxa with 7-9 marginal spines without any spinules among them 5
 - Fore coxa with 5-6 marginal spines with a few spinules among them
..... *H. unimaculata* (Olivier)
5. All internal spines of fore femora black at apex only *H. nicobarica* Mukherjee
 - First and third discoidal, first, fifth and last internal spines of fore femora entirely black *H. beieri* Mukherjee
6. Metazona shorter than fore coxa (Fig.145) 7
 - Metazona much longer than fore coxa (Fig.119) 8
7. Prosternum with 2 black bands *H. assamensis* Mukherjee
 - Prosternum without such bands *H. tenuidentata* Saussure
8. Fore coxa with 8-10 marginal spines trochanter black at apex
..... *H. grandis* Saussure
 - Fore coxa with less than 8 marginal spines trochanter not black at apex 9
9. Fore coxa with 2-3 marginal spines (Fig. 127) *H. bipapilla* (Audinet-Serville)
 - Fore coxa with 4-7 marginal spines (Fig. 152) 10
10. Pro and mesosternum with black markings 11
 - Pro and mesosternum without black markings with two white spots
..... *H. saussurei* Kirby
11. Pro and mesosternum with oblique stripes *H. ventralis* Giglio-Tos
 - Pro and mesosternum with a median stripe and 4 round spots... *H. doveri* Chopard

***Hierodula membranacea* (Burmeister)**

(Figs. 119-123) (Plate VIII. 18)

1838. *Mantis (Hierodula) membranacea* Burmeister. *Handb. Ent.* V2, p.536.
 1870. *Stagmatoptera veneratoria* Saussure. *Mitt. Schweiz. Entomol Ges.*, 3 : 232.
 1878. *Hierodula birivia* Wood-Mason. *Ann. nat., Hist.* Vol. 1, p.146.
 1904. *Hierodula membranacea* W.F. Kirby. *Cat. Orth. Brit. Mus.* V. 1., p.246.
 1927. *Hierodula (Hierodula) membranacea* Giglio-Tos. *Das Tierreich*, 50 : 440.

Diagnosis : Male length 90 mm.

Colour : Light green.

Head : Triangular, wider than high; vertex not flat mid vertex a little elevated; lateral lobes well pronounced; eyes globular, antenna filiform, slender, with sparse delicate cilia; frontal sclerite wider than high, superiorly semicircular, not angular, disc a bit depressed with three longitudinal carina, one median, two lateral; clypeus elevated with transverse and longitudinal carinae.

Pronotum : Elongated, longer than fore coxa; supracoxal dialation not much pronounced, prozona spatulate with median longitudinal depression; carinated middorsally towards posteriorly, arched inferiorly, laterally not denticulated; fore coxa ridged outwardly, outer superior margin with nineteen sharp spines, all not of equal size, inferior end serrated, internal apical lobes contiguous; fore femur with 4 external, 4 discoidal (3rd spines twice longer than second), 7 longer external, 8 shorter internal spines, distally internal spines spaced more than proximally, distal most two longer internal spines enclose two shorter spines; tibia with 11 external and 12 internal spines; spines distally elongate; metatarsus as long as all other tarsal segments together; middle and hind legs slender. Wings: longer than abdomen, forewings costal area opaque, discoidal area subopaque; stigma well pronounced; hind wing hyaline.

Abdomen : Fusiform, with broad tip; supra anal plate transverse, cerci shorter, slender with pubescence.

Female : Both male female are alike.

Material examined : Plesiotype : Male, Pulpally (Wayand), 18-ix-1999, Vyjayandi. Other materials examined : 1 Male, Sulthan Bathery, 11-ix-1999, Vyjayandi. 1 Male, Trissur, 15-ix-1999, Usha. K. 1 Female, Cal. Uni. Campus, 11-iii-2000, Beena, 1 Female, Periyar Tiger Reserve Mullakudi (Idukky), 11-ix-1996, P.M. Sureshan (ZSI Calicut, Reg. No. 9552).

Habitat : Green bushes.

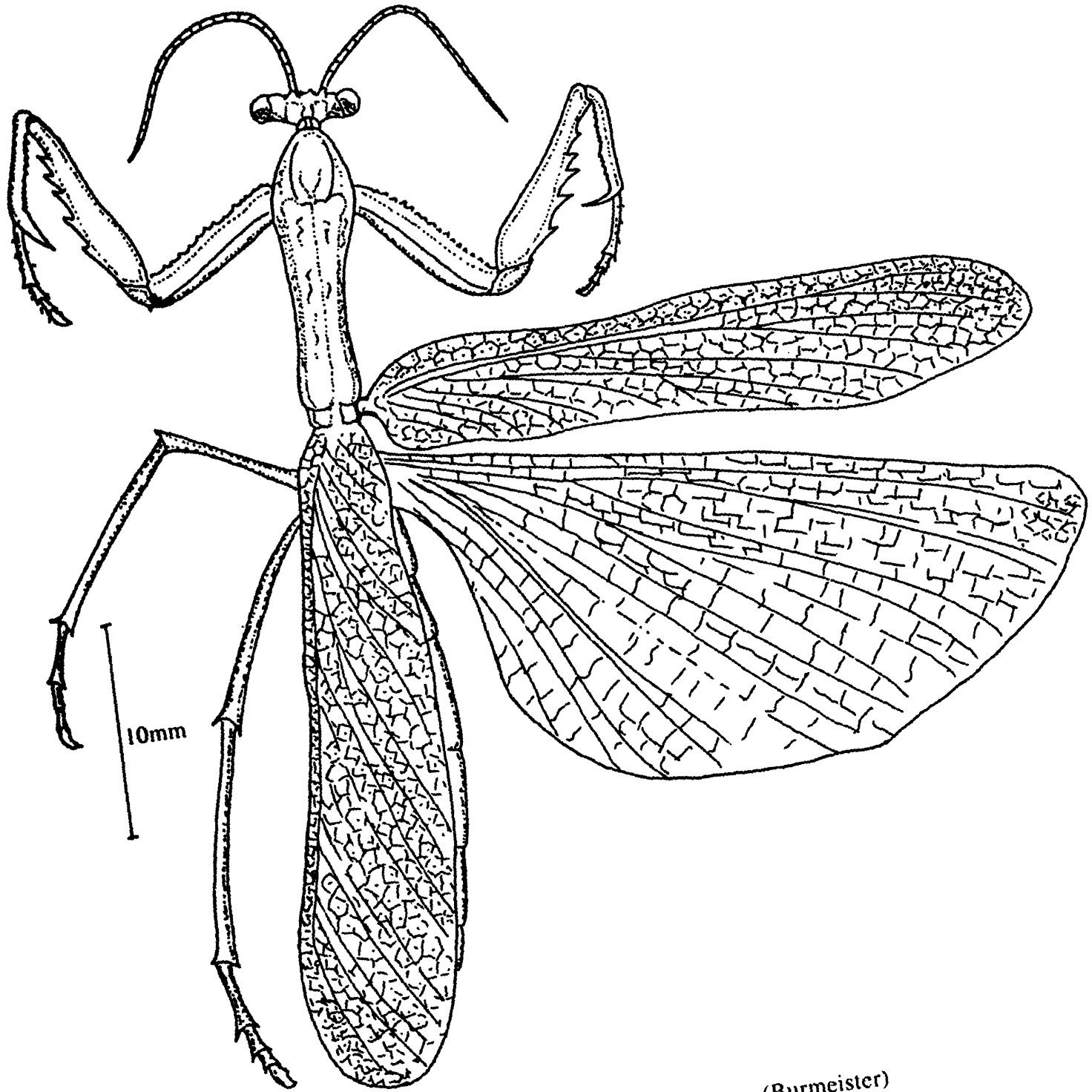


Fig. 119 : *Hierodula membranacea* (Burmeister)

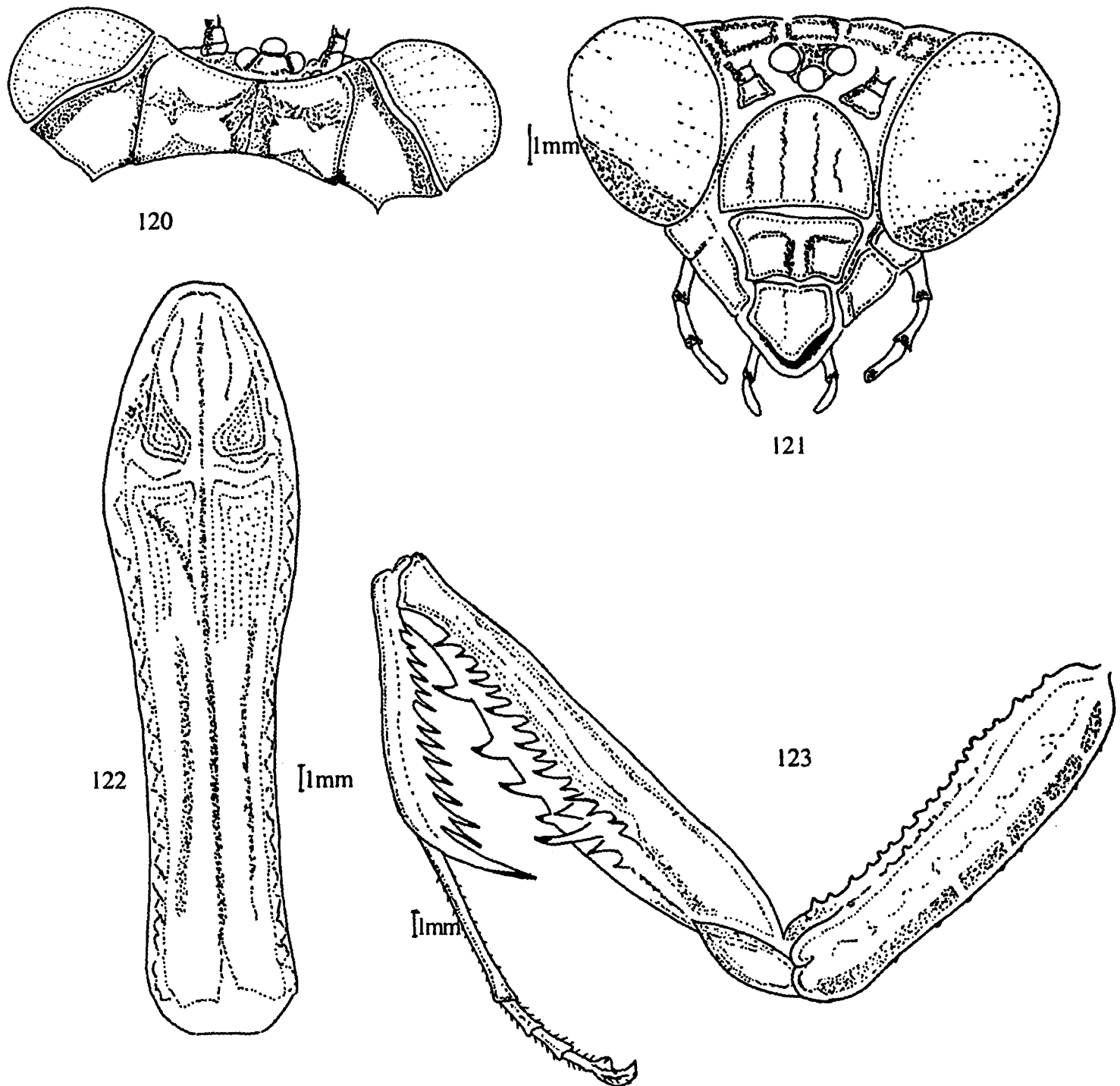


Fig. 120-123 : *Hierodula memberanacea* (Burmeister)

Fig. 120 : Head Dorsal view Fig. 121 : Head Ventral view Fig. 122 : Pronotum Fig. 123 : Foreleg

***Hierodula bipapilla* (Audinet-Serville)**

(Fig. 124-129)

1839. *Mantis bipapilla* Audinet-Serville *Hist. Nat. Ins. Orth.*, p.188.

1889. *Hierodula patellifera* Westwood *Revis. Mantid.*, p.35.

1904. *Hierodula bipapilla* Kirby. *Cat. Orth. Brit. Mus.*, 1 : 245.

1927. *Hierodula (Hierodula) bipapilla* Giglio-Tos. *Das Tierreich*, 50 : 448.

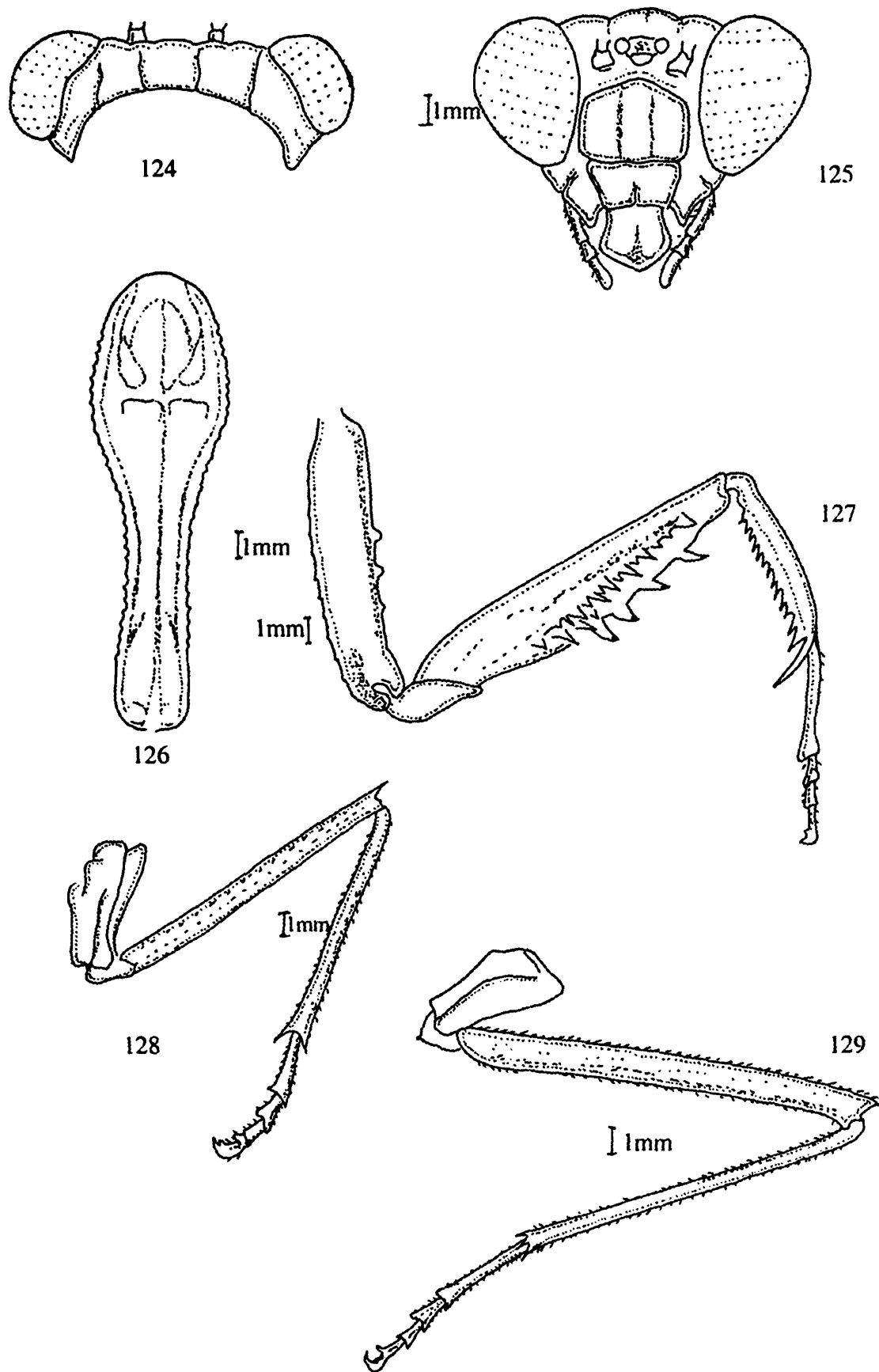


Fig. 124-129 : *Heirodula bipaipilla* (Audinet-Serville)

Fig. 124 : Head Dorsal view Fig. 125 : Head Ventral view Fig. 126 : Pronotum Fig. 127 : Foreleg
Fig. 128 : Midleg Fig. 129 : Hindleg

Diagnosis : Female length 74 mm.

Colour : Green.

Head : Triangular, wider than high, vertex smooth, lateral lobes slightly prominent; eyes globular, ocelli closely placed antenna slender, non setaceous; frontal sclerite rhomboidal, wider than high, bicarinate, superiorly angular, inferiorly slightly sinuate, disc flat, labrum trapezoid, carinate.

Pronotum : Elongated, longitudinally carinated; supracoxal dialation oval; prozonal denticles well pronounced than metazonal ones; metazona immediately narrows posterior to supracoxal dialation; laterally denticulated; coxa simple, internal apical lobes contiguous, with 2-3 obtuse marginal spines, with 4 external, 4 discoidal (3rd one longest), 7 internal longer, 8 internal shorter spines; tibia with 9-10 external and 14-15 internal spines; metatarsus little longer than all other tarsal segments together; middle and hind legs: simple. Wings: both wings longer than abdomen forewings with opaque costal and semihyaline discoidal areas;

Abdomen : Flat, supra anal plate short and transverse; cerci long, conical.

Habitat : Among bushes.

Materials examined : Plesiotype : Female, Manjeri, 2-ii-1999, Fousi.K.

Male : Same as male

Distribution : India : Kerala, Bihar, Himachal Pradesh, Uttar Pradesh, West Bengal, Java, Formosa, Japan, China, Taiwan

***Hierodula keralensis* Vyjayandi & Narendran**
(Figs. 130-136)

2003. *Hierodula keralensis* Vyjayandi & Narendran : Entomon, 28(4) : 315-320.

Holotype : Male Body length 83 mm.

Colour : Light green

Head : Triangular, wider than high; vertex smooth, lateral lobes more prominent; eyes globular laterally, oval ventrally; antenna filiform, slender, non ciliated; frontal sclerite pentagonal, almost as wide as high, superior margin slightly angular, disc not much depressed, bicarinate, inferiorly weakly arched and lateral corners bluntly conical; clypeus transverse nearly 2x wider than high, with 2 bosses; labrum transverse.

Pronotum : Elongated, longer than fore coxa, robust; supracoxal dialation oval, prozona bluntly spatulate with denticulated margin; disc with carina; metazona 2.5x longer than prozona. carina not well pronounced as in *H. membranacea*, inferiorly arched

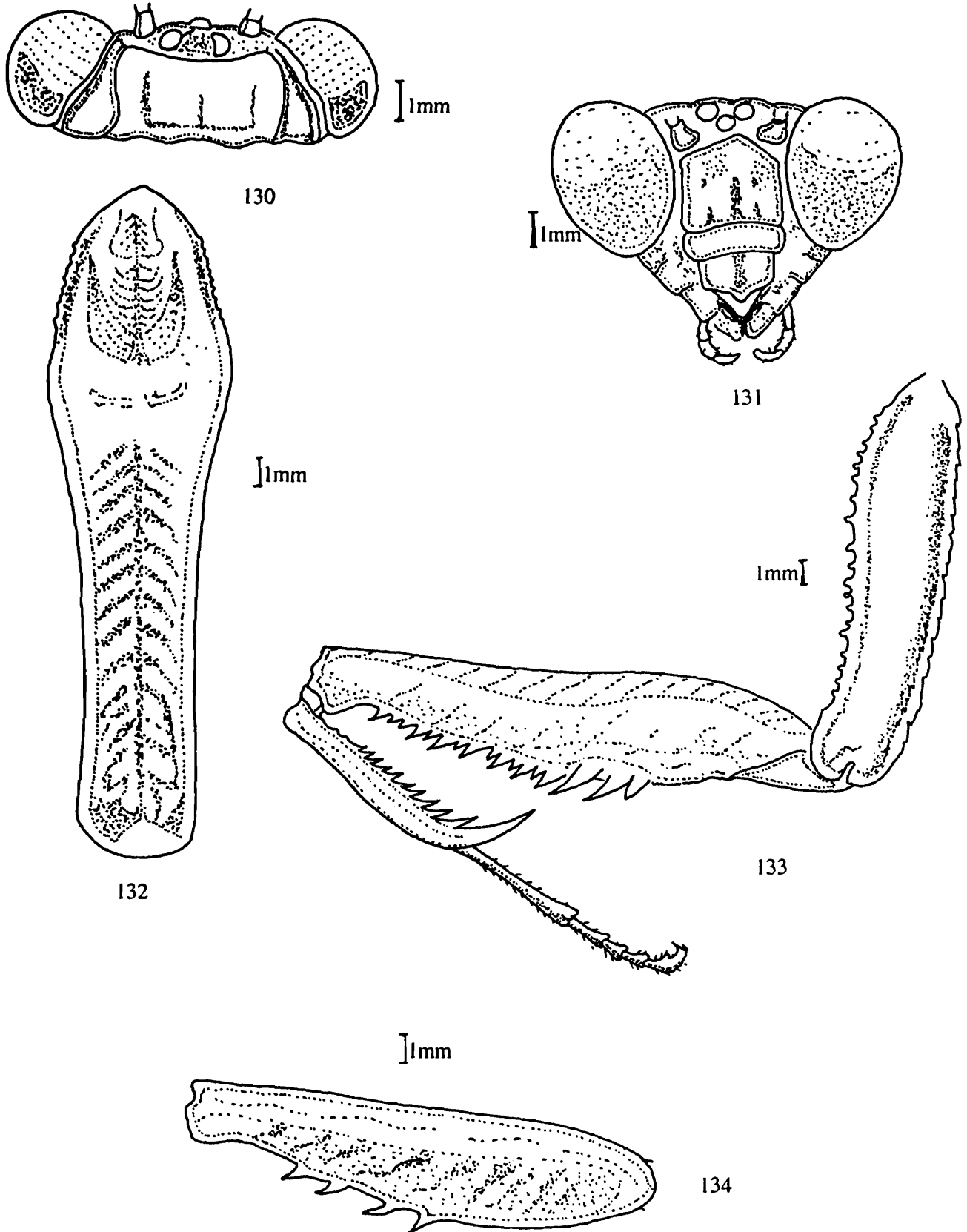
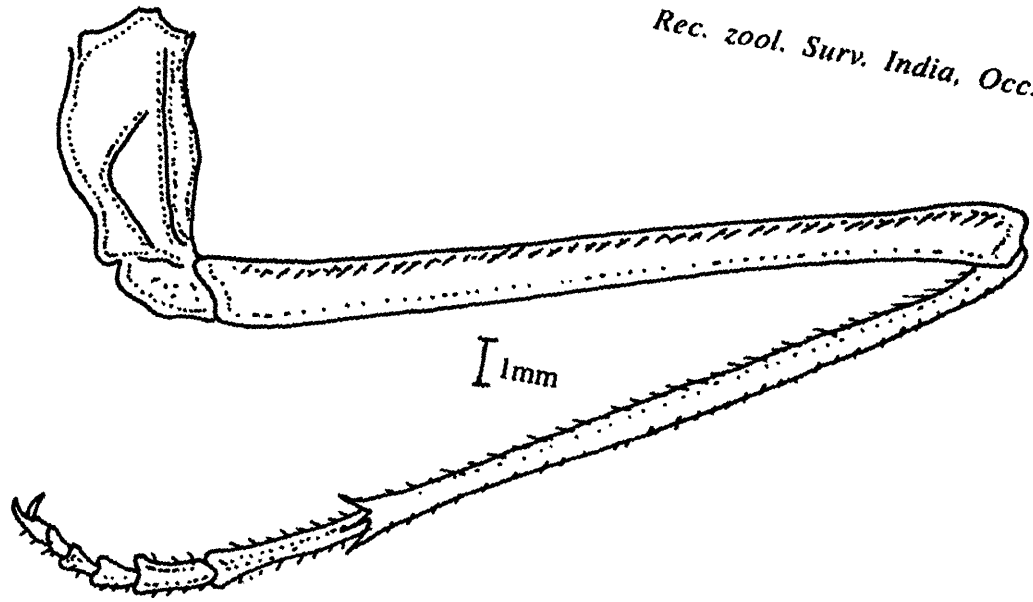
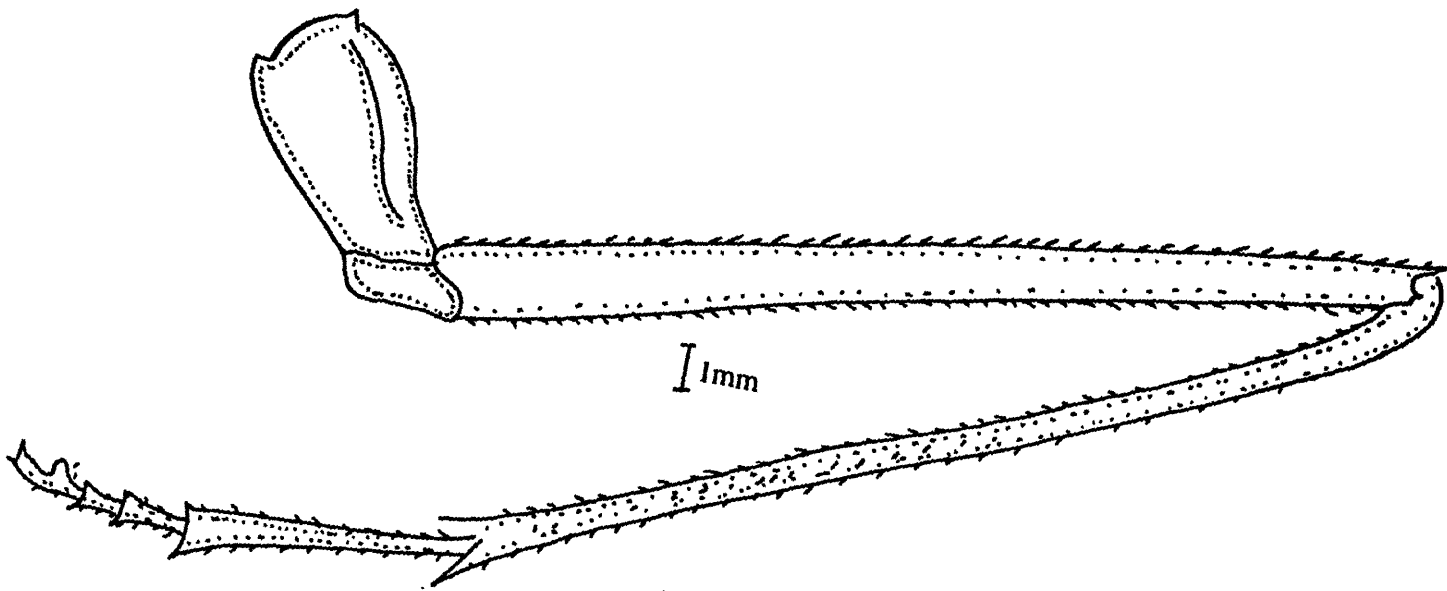


Fig. 130-134 : *Hierodula keralensis* Vyjayandi

**Fig. 130 : Head Dorsal view Fig. 131 : Head Ventral view Fig. 132 : Pronotum Fig. 133 : Foreleg
Fig. 134 : Forefemur external view**



135



136

Fig. 135 : Midleg **Fig. 136 : Hindleg**

slightly Forelegs: stouter than *H. membranacea*; coxa with seventeen strong saw-like spines; internal apical lobes contiguous, inferior margin serrated; femur with 4 external, 4 discoidal, 8 internal longer, 7 internal shorter spines; tibia with 10 external and 11 internal spines; metatarsus longer than all other tarsal segments together. Middle and hind legs : Slender. Wings: both wings longer than abdomen; forewing with costal area broader, opaque, discoidal area semihyaline; hind wing hyaline;

Abdomen : A little flat posteriorly; supra anal plate tranverse; cerci short, slender.

Female : Unknown.

Material examined : Holotype: Male, Attapadi, 1-xi-2000, Vyjayandi.

Habitat : Seen among leaves of undisturbed areas.

***Hierodula (Hierodula) saussurei* Kirby**
(Figs. 137-142)

1904. *Hierodula (Hierodula) saussurei* F. Kirby *Cat. Orth. Brit. Mus.*, 1 : 245. Syntype Nepal. (BMNH).

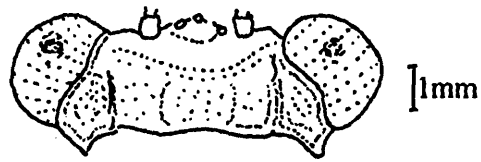
Diagnosis : Female Body length : 67 mm.

Colour : Green.

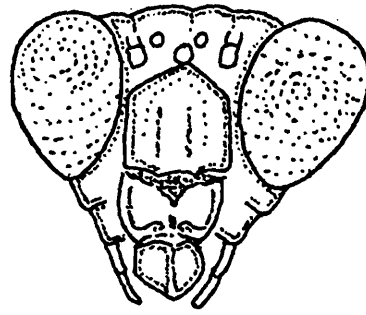
Head : Triangular, wider than high; vertex smooth, lateral lobes a little prominent; eyes globular dorsally, subconical ventrally; ocelli closely packed, antenna slender, without setae; frontal sclerite disc rhomboidal, flat, bicarinate, superior border angular, as broad as high; labrum slightly elevated.

Pronotum : Longer than forecoxa; supra coxal dialation oval, immediately narrows posterior to it, laterally denticulated, mtezona slender, 2.5x longer than prozona, inferiorly slightly arched. Forelegs : Coxa ridged externally, internally flat, with 6-7 strong, stout marginal spines, with 4-5 submarginal verrucose patches, internal apical lobes contiguous; femur slightly longer than coxa, with 4 external, 4 discoidal (third longest and flat) internally 7 longer, 8 shorter spines, distally two longer spines enclose two smaller spines; 2.12x longer than tibia; tibia 1.3x longer than metatarsus; metatarsus 2x longer than all other tarsal segments together. Middle and hind legs : middle leg slightly shorter than hind legs, coxa short, femur 1.3x longer than fibia, metatarsus 2x longer than tibia, as equal as all other tarsal segments together. Forewing opaque except at apex, with dense reticulate veins; costal area broader, anterior radial vein bifurcates distal to stigma, posterior radial vein bifurcates proximally and then rebranches; ulnare vein bifurcates twice.

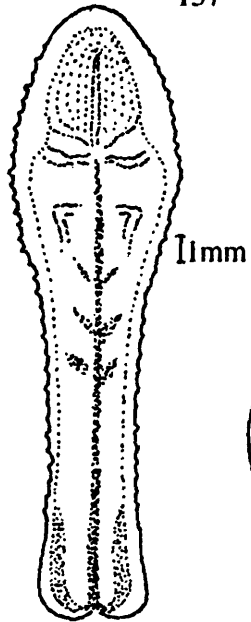
Abdomen : Shorter than wings, slightly broad, supra anal plate short; cerci short with pubescence.



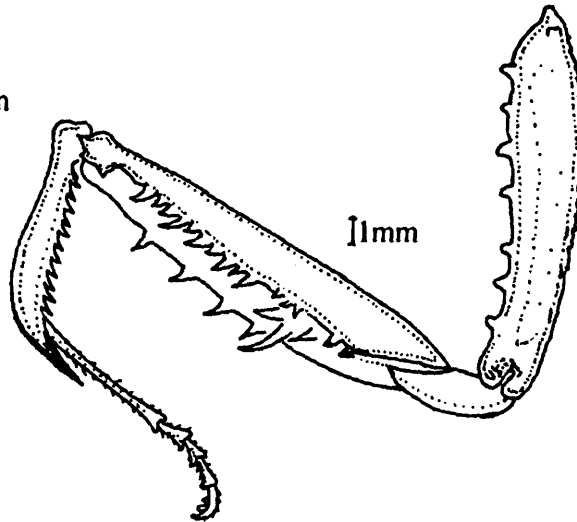
137



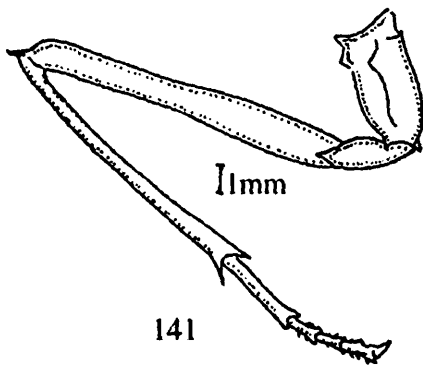
138



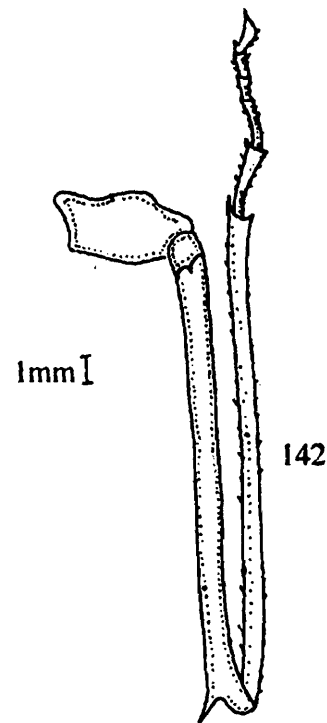
139



140



141



142

Fig. 137-142 : *Hierodula saussurei* Kirby

Fig. 137 : Head Dorsal view Fig. 138 : Head Ventral view Fig. 139 : Pronotum Fig. 140 : Foreleg
Fig. 141 : Midleg Fig. 142 : Hindleg

Materials examined : Plesiotype : female, INDIA, Kerala, Calicut University Campus, 31-iv-1999, Lakshmi (DZCU).

Other materials examined : 1 female : INDIA, Kerala, Malaparamba (Calicut) 17-viii-2000, Shija (DZCU) 1 Female, Kerala, Kasargod, 14-ix-99, Balamony (DZCU). 1 Female, Calicut University Campus, 15-vi-99, Lakshmy (DZCU).

Biology : Not known.

Habitat : Undisturbed green bushes.

Distribution : India, Arunachal Pradesh, Bhutan, China, Indonesia, Java.

***Hierodula tenuidentata* Saussure**

(Figs. 143-148)

1869. *Hierodula tenuidentata* Saussure. *Mit. Schweiz. Entomol. Ges.*, 3 : 68.

Hierodula simulacrum Westwood. *eviv. Mantid.*, p.34.

Sphodromantis tenuidentata W.F. Kirby. *ibid.*, V. 1. p.244.

1927. *Hierodula (Hierodula) tenuidentata* Giglio-Tos. *Das Tierreich.*, 50 : 444.

Diagnosis : Female Body length 75 mm.

Colour : Green.

Head : Triangular, wider than high, vertex smooth, lateral lobes prominent; eyes globular laterally, subconical ventrally; ocelli large, closely placed; antenna slender, non ciliated; frontal sclerite pentagonal, wider than high, disc depressed, bicarinate, angular superiorly, with a tubercle at center, inferiorly sinuate;

Pronotum : Oval shaped, slightly longer than fore coxa; supracoxal dialation oval, sides slightly laminated; border denticulated; prozona oval, denticulated laterally, metazona 2x longer than prozona; ventrally mesosternum with 2 pairs of blunt large tubercles. Forelegs: coxa ridged dorsally; superior margin with five blunt spines, inferior margin serrated, internal apical lobes convergent; femur simple, with 4 external, 4 discoidal (third discoidal longest), 7 longer internal, 8 shorter internal spines, distal two internal longer spines enclose two smaller ones; claw groove basal; tibia with 12 external and 14 internal spines; metatarsus longer than all other tarsal segments together. Middle and hindlegs : Simple. Wings : Longer than abdomen, forewing costal area opaque, broad, discoidal area semiopaque,

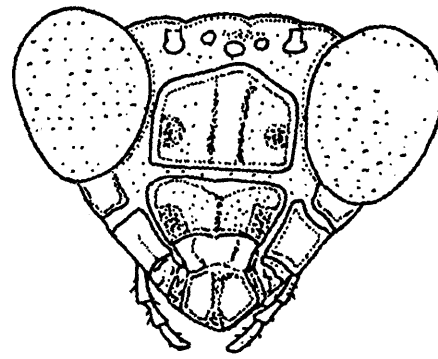
Abdomen : Broader, posteriorly bluntly triangular; cerci shorter with pubescence.

Male : Same as female.

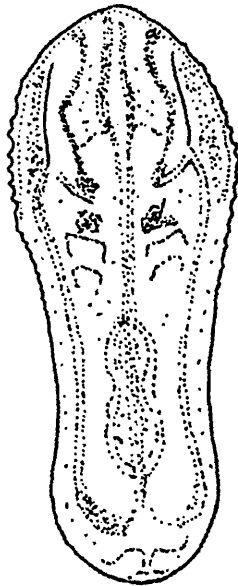


143

[1mm

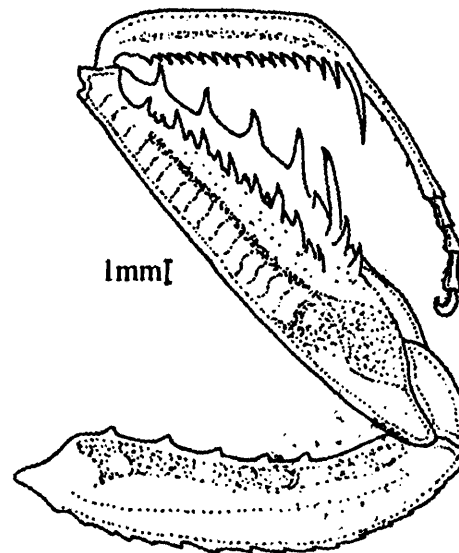


144



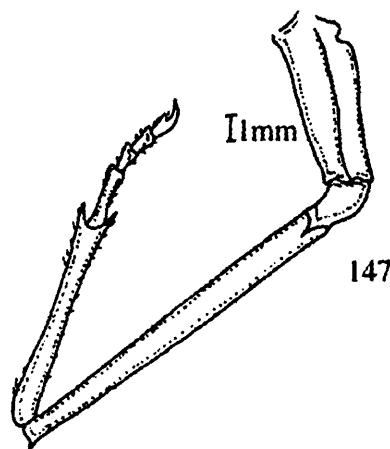
145

[1mm



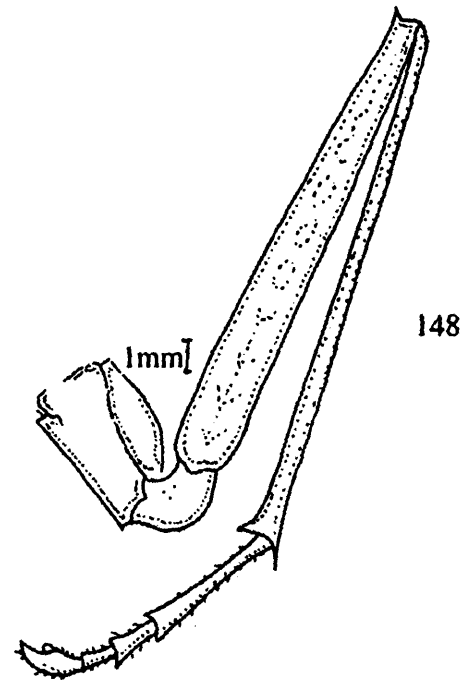
146

1mm]



147

[1mm



148

1mm]

Fig. 143-148 : *Hierodula tenuidentata* Saussure
Fig. 143 : Head Dorsal view Fig. 144 : Head Ventral view Fig. 145 : Pronotum Fig. 146 : Foreleg
Fig. 147 : Midleg Fig. 148 : Hindleg

Materials examined : Plesiotype : Female, Malaparamba, 14-ii-1998, Vyjayandi.

Habitat : Among vegetations, in less disturbed area.

***Hierodula ventralis* Giglio-Tos**
(Figs. 149-154) (Plate VIII. 19)

1912. *Hierodula (Hierodula) ventralis* Giglio-Tos. *Bull. Soc. Entomol.*, 43 : 82.

Diagnosis : Male Body length 65 mm.

Colour : Pale green.

Head : Thick, triangular wider than high; vertex smooth, lateral lobes slightly pronounced; eyes globular laterally, ventrally subconical, antenna filiform, slender without setae; frontal sclerite pentagonal, superior border angular, wider than high, bicarinate, inferiorly sinuate, disc depressed clypeus rhomboidal, carinated

Pronotum : Elongate; supra coxal dialation oval, with indistinct midlongitudinal carina,; prozonal outer rim with indistinct denticles; metazona 3x longer than prozona. Forelegs: superior margin of coxa with 4 to 5 obtuse thick spines, outer surface ridged, inferior end not serrated; internal apical lobes slightly diverging; femur, with 4 external, 4 discoidal (third discoidal spine longest), 7 longer internal, 8 shorter internal spines; tibia with 10 external and 14 internal splines; metatarsus as long as all other tarsal segments together. Middle and hind legs: coxa short; femur slightly shorter than tibia in mid leg, longer than tibia in hind leg; metatarsus nearly as long as all other tarsal segments together. Wings longer than abdomen, forewing with opaque, broad coastal area.

Abdomen : Flat, broader towards posterior; cerci slightly elongated with pubescence.

Female : Female with opaque elytra.

Materials examined : Plesiotype : Male, Kovoov (Calicut), 9-iv-1999, Vyjayandi. Other materials examined : 1 Male, Malaparamba, 9-ix-2000, Sasikala, 1 Male, Trissur, 4-ix-1998, Usha. K. 1 Male, Palakkad, 11-i-2001, Vyjayandi. 1 Male, Kannur, 11-iii-2000, Vyjayandi. 1 Female, Cali. Uni. Campus, 14-x-1996, T.C. Narendran. 1 Male, Wayand, 15-iii-1999, Sheeja. 1 Female, Parambikulam, 30-ix-1995, C. Radhakrishnan (ZSI Calicut, Reg. No. 83471).

Habitat : Seen among green vegetation.

Distribution : India, Kerala, Chandigarh, Madhya Pradesh, Maharashtra

Genus ***Rhombodera*** Giglio-Tos

Diagnostic Characters : Body large, robust. Head thick, a little wider than high; eyes globular; frontal sclerite rhomboidal, superior apex with or without spine. Pronotum with

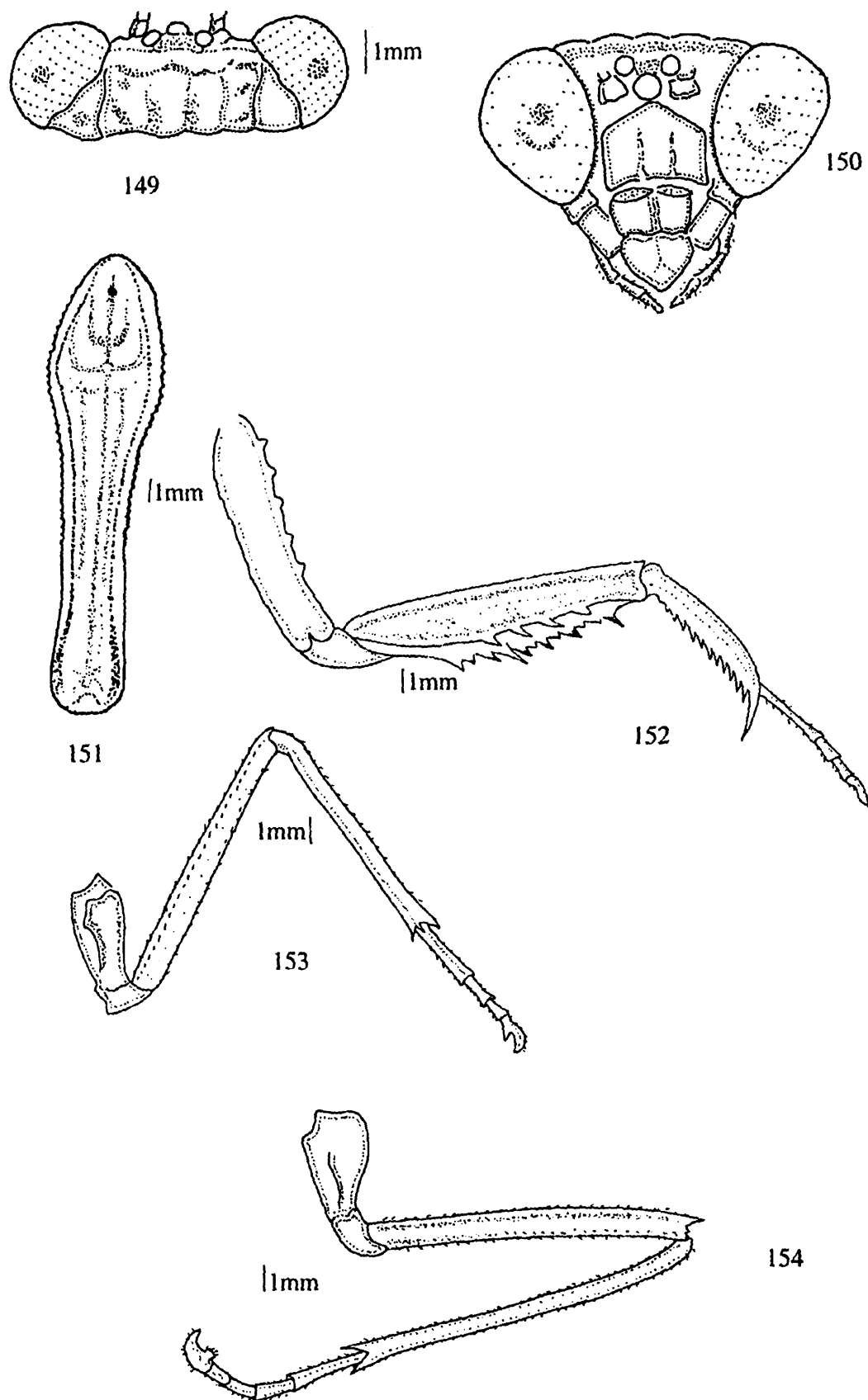


Fig. 149-154 : *Hierodula ventralis* Giglio-Tos

Fig. 149 : Head Dorsal view Fig. 150 : Head Ventral view Fig. 151 : Pronotum Fig. 152 : Foreleg
 Fig. 153 : Middleleg Fig. 154 : Hindleg

dialation extending from anterior to posterior tip, usually lateral lamina with denticles ; forelegs : Coxal margin with obtuse spines. Abdomen flat, supra anal plate short, transverse; cerci long, conical.

Distribution : Oriental region, Australia.

Six species are known from India.

Key to Indian species of *Rhombodera* Giglio-Tos

1. Frontal sclerite superiorly with spine 2
 - Frontal sclerite superiorly without spine 4
2. Fore femur with three internal dark bands *R. woodmasoni* Werner
 - Fore femur without any bands internally 3
3. Fore coxa with ten 10-12 blunt spines; a red shining blotch at base of fore femur..
 - *R. tectiformis* Saussure
 - Fore coxa with 6-9 blunt spines; base of the fore femur without any red blotch
 - *R. crassa* Giglio-Tos
4. All larger internal spines and three discoidal spines entirely black 5
 - All larger internal spines and discoidal spines black at tips only
 - *R. dorina* Laid law
5. Metazona 2.5x as long as prozona; fore femur without brown bands
 - *R. fracticida* Wood-Mason
 - Metazona shorter; fore femur with brown bands *R. butleri* Wood-Mason

Rhombodera woodmasoni Werner (Figs. 155-161) (Plate IX. Fig. 20)

1931. *Rhombodera woodmasoni* Werner. *Proc. Zool. Soc. London.*, 1931 : 1331. Holotype F. India, (BMNH).

Diagnosis : Female Body length 90 mm. *Colour* : Testaceous.

Head : Obtusely triangular, wider than high; vertex smooth, lateral lower lobe pronounced; frontal sclerite rhomboidal, 1.5x wider than high, disc bicarinate, superior border with a central spine, superior border not angular, sinuate, inferior border wavy, laterally pointed; clypeus with tubercles; antenna slender, short, without setae.

Pronotum : Rhomboidal, not smooth, with bossess at central portion, laterally laminated, 1.6x longer than wide at supracoxal diation, with mid longitudinal carina,

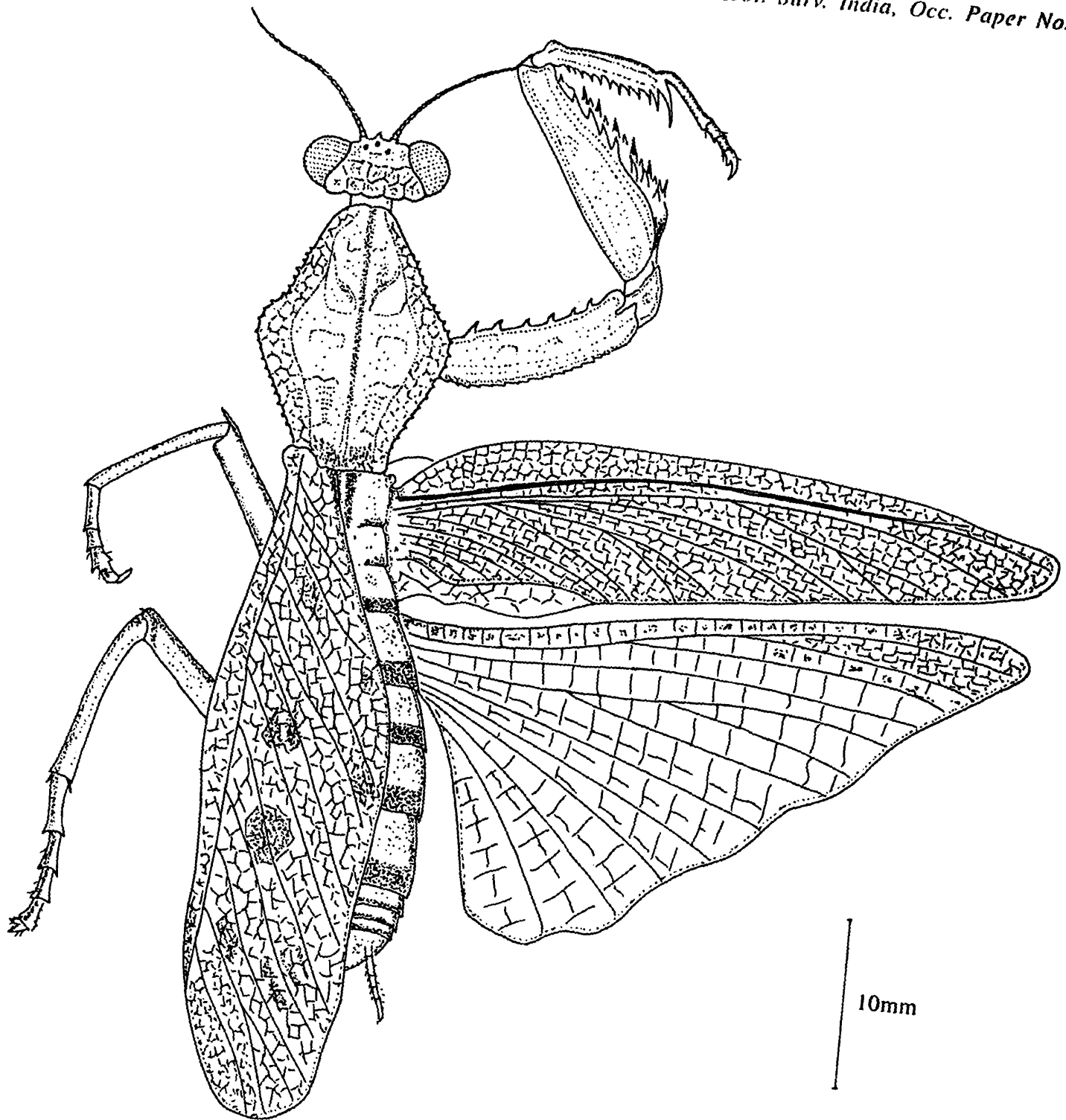


Fig. 155 : *Rhombodera woodmasoni* Werner

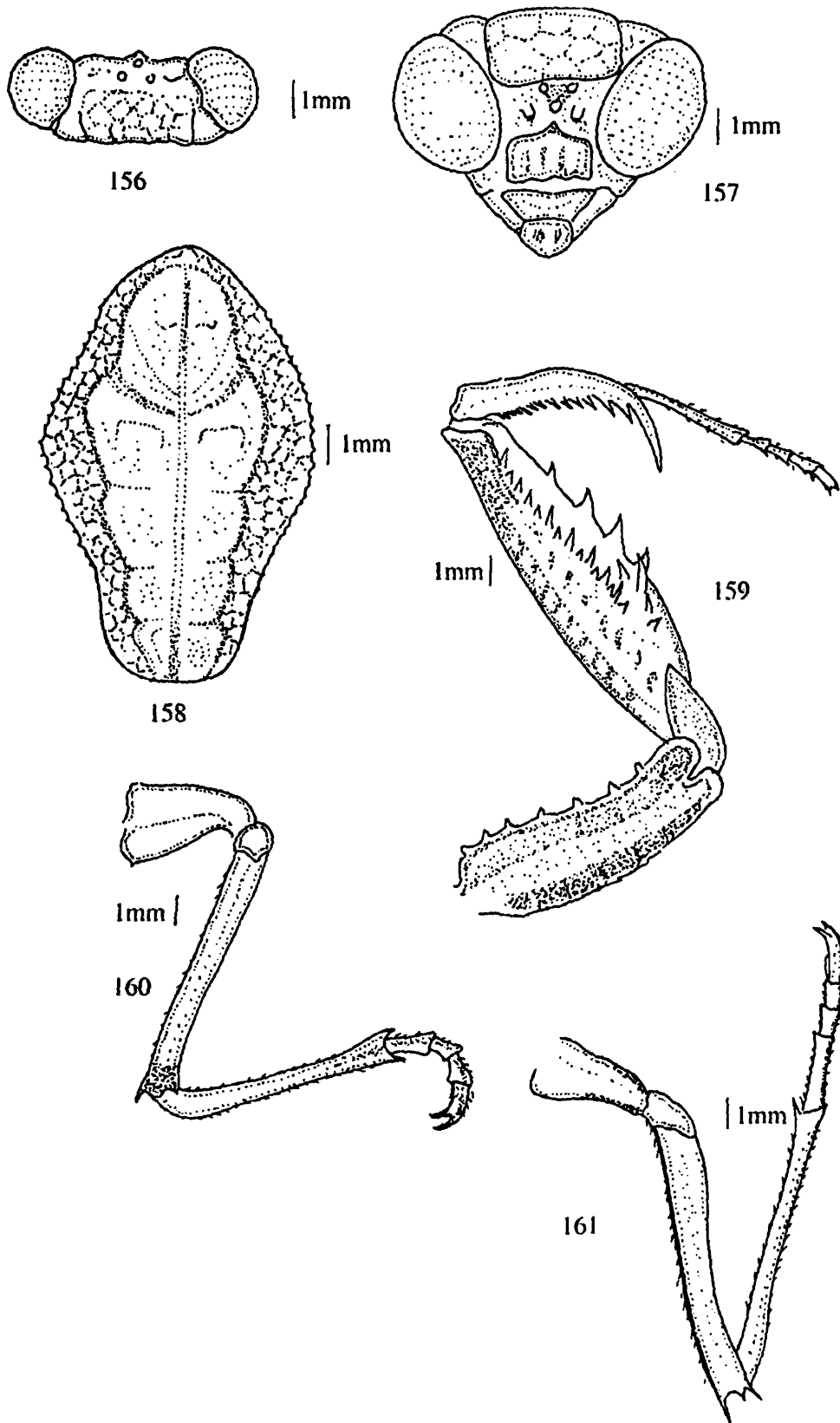


Fig. 156-161 : *Rhombodera woodmasoni* Werner

Fig. 156 : Head Dorsal view Fig. 157 : Head Ventral view Fig. 158 : Pronotum Fig. 159 : Foreleg
Fig. 160 : Midleg Fig. 161 : Hindleg

prozona oval, metazona 2x longer than prozona. Forelegs: coxa ridged outwardly with strong 6 marginal spines blunt at apex; inferior border serrated, internal apical lobes contiguous, trochanter broad; femur 1.2x longer than coxa and 2x longer than tibia with 4 external, 4 discoidal, 7 internally longer, 8 shorter spines, distal two longer spines enclose two smaller ones; tibia with 11 external, and 13 internal spines, metatarsus 2x longer than all other tarsal segments together. Middle and hind legs : Slender, simple coxa short, both middle and hind femur with genicular spines; femur a little longer and stouter than tibia; metatarsus as long as second tarsal segment. Wings : Longer than abdomen, forewings semihyaline, costal area enfumated and densely reticulated, hind wing costal area more enfumated, than discoidal area.

Abdomen : Shorter than wings, broad at middle; cerci many segmented, slightly long, with pubescence.

Male : A little shorter than female.

Materials examined : Plesiotype : Female, Trissur, Sholayar, 23-iii-1996, C. Radhakrishnan (ZSI Calicut, Reg. No. 8747). Other specimen examined: 1 Female, Mananthavadi, 11 -vi-2006, coll: Mercy.

Habitat : Undisturbed Evergreen Forest in India.

Distribution : India, Madhya Pradesh, Meghalaya, Oriental Region.

Genus *Mantis* Linnaeus

1758. *Grillus (Mantis) Linnaeus. Syst. Nat., 10* : 425. Type species : *Mantis religiosa*. Linnaeus.

1927. *Mantis* Giglio-Tos. *Das Tierreich*, 50 : 405.

Diagnostic characters : Body medium sized, slightly robust. Head small; eyes globular, projecting laterally; frontal sclerite 2x wider than high, superior border angular; antenna a little thicker than that of *Statilia* Stal; antennal toruli placed closer than in the case of *Statilia*; ocelli large. Pronotum a little longer than fore coxa, shorter when compared to that of *Statilia*, supra coxal dialation less pronounced; forelegs slender, fore coxa with internal apical lobes divergent, without marginal spines; fore femur with 4 external and 4 discoidal spines, inner side with a yellow spot medially; claw groove placed at the middle of fore femur. Wings a little longer than abdomen.

Distribution : India, Asia, Europe, Africa, Australia.

Four species are known from India, out which only 2 are known from India.

Key to Indian species of *Mantis* Linnaeus

1. Fore coxa internally with a black patch 2
- Fore coxa internally without a black patch 3

2. Fore femur with black patch *M. nobilis* Brunner
 – Fore femur without black patch *M. religiosa* Linnaeus
 3. Fore femur with black patch..... *M. indica* Mukherjee
 – Fore femur without black patch *M. inornata* Werner

***Mantis nobilis* Brunner**

(Plate IX. Fig. 21)

1892. *Mantis nobilis* Brunner, Ann. Mus. Genova, 33 : 70.

1927. *Manis nobilis* : Giglio-Tos, Das Tierreich, 50 : 408

1951. *Manis nobilis* : Roonwal & Bhasin, Indian Forester, 77(5) : 313-318

1941. *Manis nobilis* : Beier, Ann. Nat. Mus. Wien, 52 : 142

Diagnosis : Male Body length 40 mm.

Color : Light brown.

Head : Vertex smooth, four lobed with transverse brown sripe; eyes round, ocelli medium sized; frontal sclerite transverse, upper margin a little pointed at middle.

Pronotum : Longer than fore coxae, lateral margins dentate with dorsomedian carina; metazona more than 3x longer than prozona; metasternum with black patch at coxal joint. Foreleg : Coxa with 6 spines on superior margin ventrally, a black patch at base, internal apical lobe contiguous; femur with black shining patch near claw groove extending to 2nd discoidal spine, 4 external, 4 discoidal, 14 internal spines, larger internal spines black and colour extending as parallel line; tibia slightly setaceous with 11 internal, 7 external spines. Mid and hind legs : Both setaceous, hind metatarsus longer than all other tarsal segments combined together. Wings : a little longer than abdomen, fore wing opaque at costal area, rest hyaline; hind wing hyaline.

Abdomen : Slender, ceci setaceous, supra anal plate triangular.

Female : Male and female are similar

Materials examined : Plesiotype : Male, Chelannur, Calicut, 5-iii-2005, Rajeesh. Otherspecimen examined : 1Male, Chelannur, 6-iv-2005, Rajeesh.

Distribution : India : Kerala, Himachal Pradesh, Manipur, West Bengal; Myanmar.

***Mantis religiosa* Linnaeus**

(Figs. 162-167)

1758. *Gryllus (Mantis) religiosus* Linnaeus, Sys. Nat., 10 : p.426

1775. *Mantis religiosa*. Fuessly Verz. Schweiz. Ins, p.22

1813. *Mantis oratoria*, Stall, *Represent spectres*, p. 53.t.17.f.64

1872. *Mantis capensis*, Saussure, *ibid.*, V.23 .p.46

Diagnosis : Male Body length 50 mm.

Colour : Yellowish green.

Head : Triangular, wider than high, with five indistinct lobes; eyes globular; frontal sclerite rhomboidal, convex inferiorly and conical at superior middle part and angular superio-laterally; superio-lateral most corners sharply conical, inferior lateral corners bluntly conical, disc carinated at sides, concave at middle; antenna filiform.

Pronotum : Slightly longer than forecoxa; metazona more than twice longer than prozona; prozona spatulate with supracoxal dialation and midmetazonal constriction not much pronounced, metazonal inferior margin arched. Forelegs : Coxa with 6 to 7 submarginal granules, internally with marble callous spots, apical lobes divergent; femur slender; claw groove middle, with 4 external and 4 discoidal (third longest) spines; internally with 6 longer spines alternating with 6 shorter spines; tibia with seven external and eleven internal spines. Mid and hindlegs: slender, metatarsus as long as all other tarsal segments together. Wings : Both wings hyaline, costal area of forewing opaque.

Abdomen : A little shorter than wings. Supra anal plate elongated; cerci many segmented.

Female : Fore wing distinctly longer than abdomen but in male both wings are a little shorter than abdomen.

Materials examined : Plesiotype: Palagaht, 25-x-1998, Francy. K. Other materials examined : 1Male, Thrissur, 20-v-1998, Usha.K. 2 Females, Thrissure, 11iii- 2001, Usha.

Habitat : Usually seen at fringes of paddy field.

Distribution : India : Kerala, Karnataka, Madya Pradesh, Manipur, Uttar Pradesh, West Bengal

Variation : *Mantis religiosa* Linnaeus shows two types of colouration : 1. forewings green with ferrugeneous superior border as given in diagnosis and 2. forewings light yellowish brown with dark brown border. In the latter case, 3 varieties of specimens are seen with earth brown body and the proximal side of fore coxa inside with yellow patch bordered by black and with callous spots. 3. black spot on the fore coxa in the same position as in the above case and with callous spots.

- a) Fore coxa inside with dark brown colouration and without callous spots.
- b) Abdomen with blackish brown patch ventrally, more shorter than wings compared to other specimens.

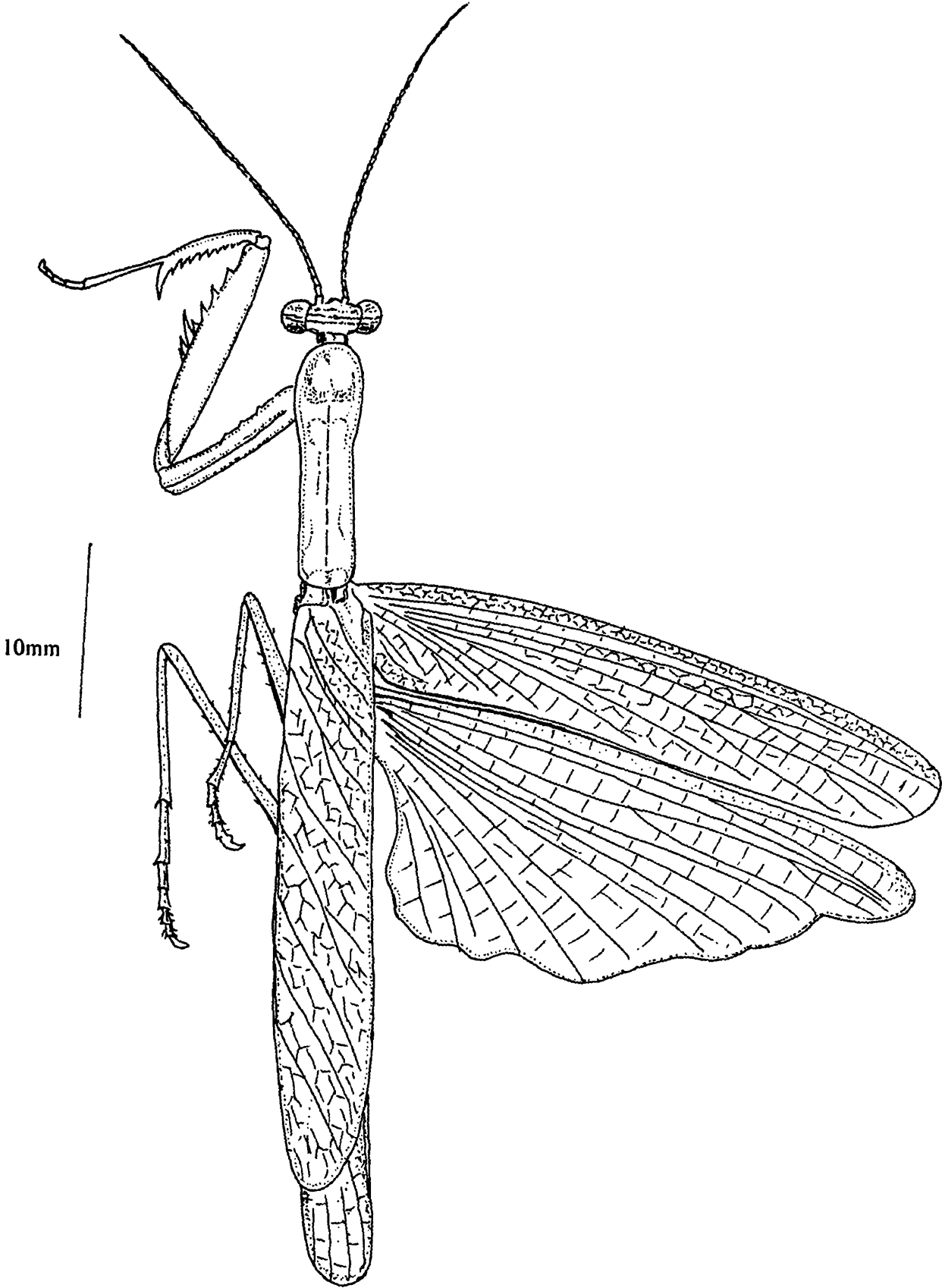
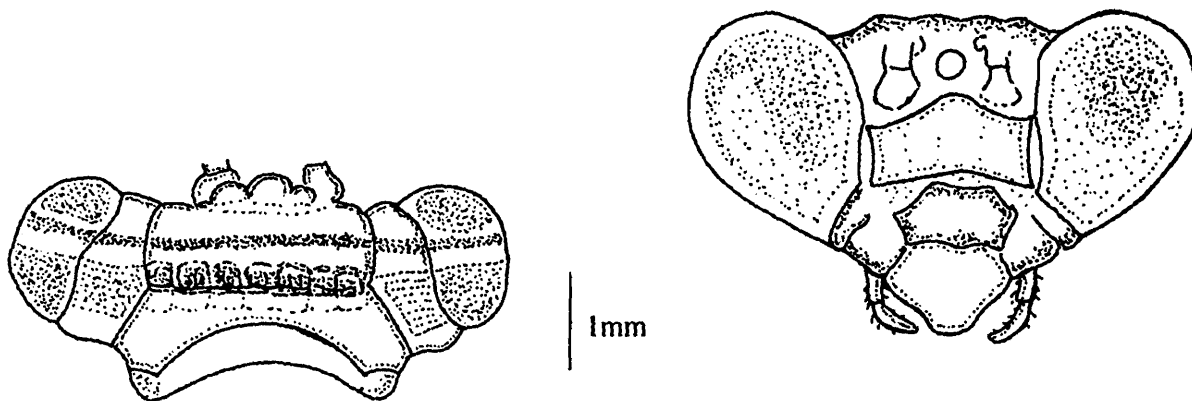
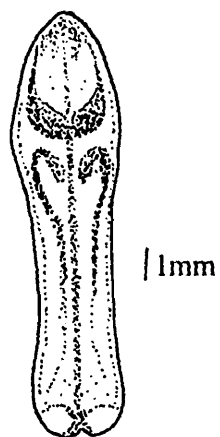


Fig. 162 : *Mantis religiosa* Linnaeus

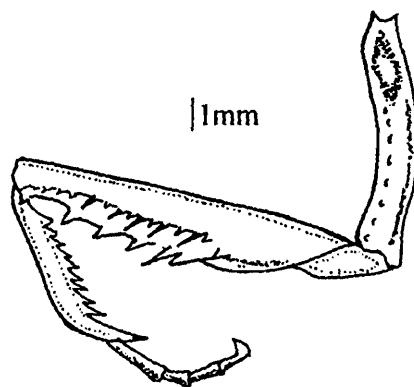


163

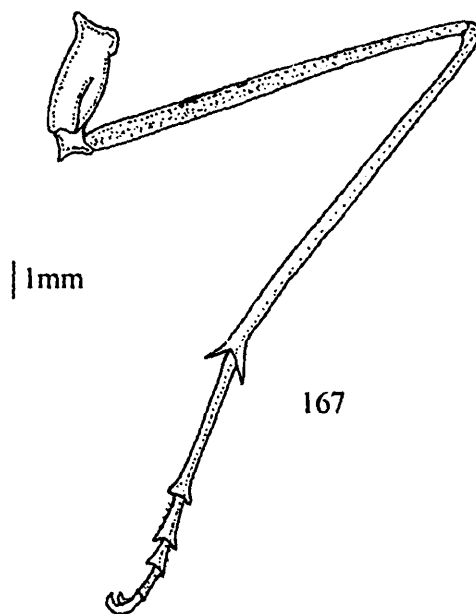
164



165



166



167

Fig. 163-167 : *Mantis religiosa* Linnaeus

Fig. 163 : Head Dorsal view

Fig. 164 : Head Ventral view

Fig. 165 : Pronotum

Fig. 166 : Foreleg

Fig. 167 : Hindleg

Genus *Plistospilota* Giglio-Tos

1911. *Plistospilota* Giglio-Tos *Bull. Soc. Entomol. Ital.*, **42** : 6. Type species : *Plistospilota validissima* (Gerstaecker).

Diagnostic Characters : Body large. Head flat, smooth; eyes globular; frontal sclerite a little wider than high, superior border slightly arched, disc carinated. Pronotum strongly built, supra coxal dialation oval; metazona longer than fore coxa; forelegs simple, slender, rectangular in cross section, internal apical lobes contiguous; fore femur with 4 external, 4 discoidal, spines; claw groove middle; tibia with 10-11 external spines; metatarsus as long as all tarsal segments together; hindwing discoidal area traversed with alternate yellow and black bands, anal area smokey.

Distribution : Oriental Region, Africa.

One species occur in India.

Plistospilota nova Beier

(Figs. 168-172)

1930. *Plistospilota nova* Beier *Ann. Mag. Hist.*, (10) **6** : 452 Holotype F Indi Cachar (BMNH)

Diagnosis : Male Body Length 84 mm.

Colour : Dirty greenish yellow.

Head : Flat; vertex smooth, lateral lobes distinct, 1.6 x wider than high; eyes round dorsally, slightly oblong ventrally; ocelli conspicuous, frontal sclerite rhomboidal, 1.5x wider than high, slightly arched superiorly, carinated; antenna filiform short, slender, non setaceous.

Pronotum : More than twice longer than fore coxa, robust, supra coxal dialation oval, with finely denticulated margin, prozona spatulate with longitudinal groove; metazona 3x longer than prozona. Forelegs : Coxa slender, rectangular in cross section, outer margin denticulated, internal apical lobes converging; femur with 4 external, 4 discoidal (third longest), internally 7 longer, 8 shorter spines distally two longer spines enclose two shorter spines, claw groove middle, with basal row of denticles; tibia somewhat compressed, with 7 external, 9 internal spines, metatarsus as long as all other tarsal segments together. Middle and hindlegs slender, elongated, midlegs slightly shorter than hindlegs; metatarsus as long as all tarsal segments together. Wings slightly shorter than abdomen, forewing costal area opaque, discoidal area subopaque, hindwings with costal area subopaque, discoidal area transparent, enfumated.

Abdomen : Slender, elongated, with a few setae middorsally, supra anal plate elongated, with obtuse triangular tip; cerci long and pointed.

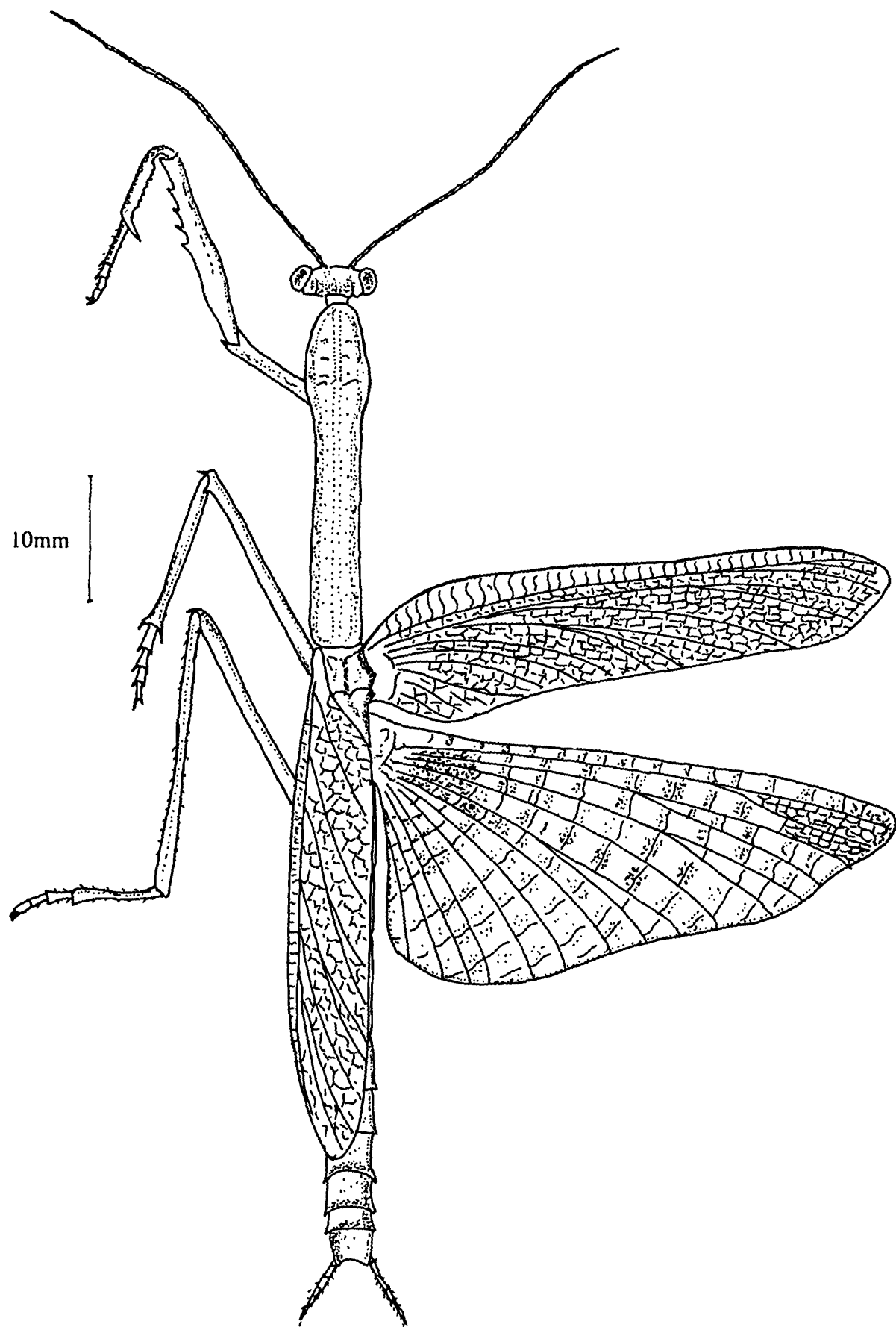


Fig. 168 : *Plistospitotu nova* Beier

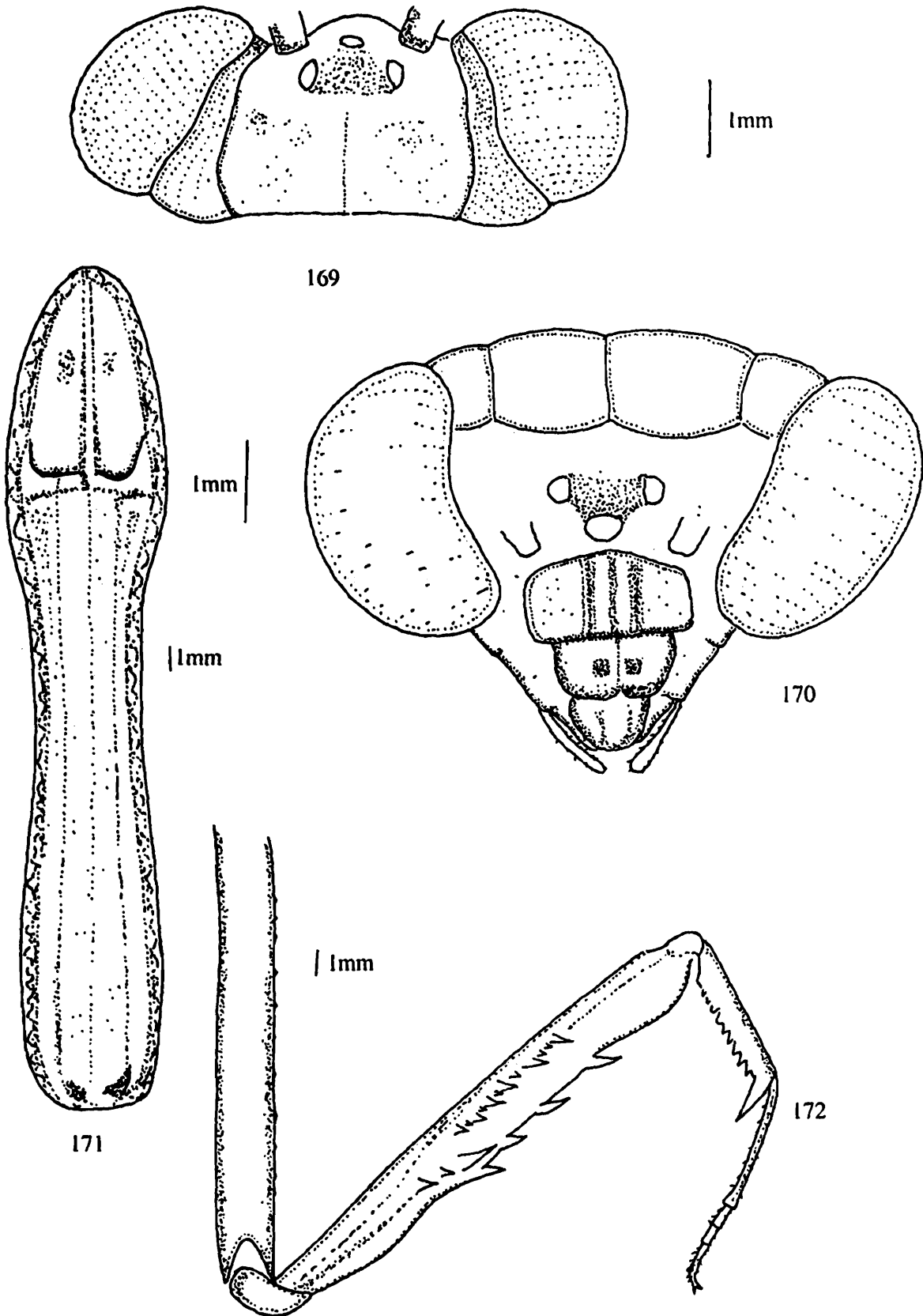


Fig. 169-172 : *Plistospilota nova* Beier

Fig. 169 : Head Dorsal view Fig. 170 : Head Ventral view Fig. 171 : Pronotum Fig. 172 : Foreleg

Male : Not known.

Materials examined : Plesiotype : Female, Trivandurm, Bonacaurd, 26-iii-1992, K. C. Gopy (ZSI, Calicut) Reg. No. 5850. Other material examined : 1 Female, Thrissur, 12-10-1998, Mathew.

Habitat : Inner core of Tropical Rain Forest.

Variation : Black spot between base and claw groove of fore femur absent.

Distribution : India, Assam, Kerala.

Genus *Statilia* Stal

1877. *Statilia* Stal Bih. K.Svenska Ventensk Akad Handl, 4(10) : 36. Type Species : *Statilia nemoralis* (Saussure)

Diagnostic Characters : Body somewhat robust; eyes globular laterally; ocelli small; antenna slender, non setaceous; antennal toruli wide apart; frontal sclerite transverse, not narrow, 2x wider than high. Pronotum slender, longer than fore coxa; laterally denticulated; supra coxal dialation well pronounced. Fore legs slender, coxa with marginal spines, internal apical lobes contiguous; fore femur with 4 external and 4 discoidal spines, inner disc with pale yellow and black patches; claw groove placed distally. Wings as long as Abdomen Supra anal segment short.

Distribution : Asia, Oriental region, New Guinea, Africa.

Three species are known from India out of which 2 are known from India.

Key to Indian species of *Statilia* Stal

1. Prosternum at the coxal origin black *S. maculata* (Thunberg)
- Prosternum at the coxal origin not black 2
2. Prosternum posteriorly with a black patch *S. apicalis* (Saussure)
- Prosternum without a black patch posteriorly *S. nemoralis* (Saussure)

Statilia nemoralis (Saussure)
(Figs. 173-178) (Plate X. Fig. 22)

1870. *Pseudomantis nemoralis* Saussure, Mitt. Schweiz. Entomol. Ges., 3 : 229

1870. *Mantis orientalis* Saussure, Mitt. Schweiz. Entomol. Ges., 3 : 233

1877. *Statilia nemoralis* Stal, Bih. Svenska Ak, v.4, p.55

Diagnosis : Female Body length 59 mm.

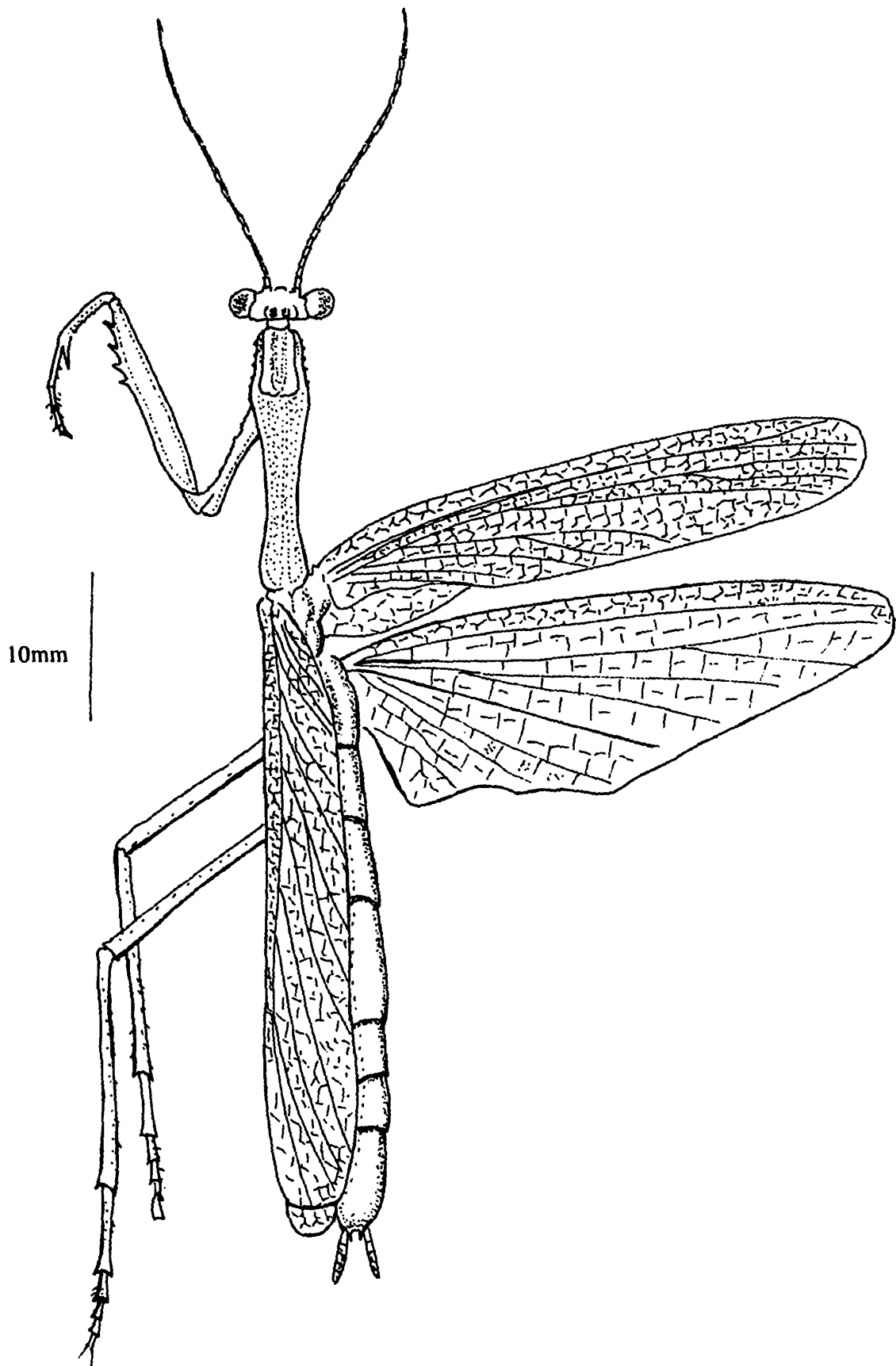


Fig. 173 : *Statilia nemoralis* (Saussure)

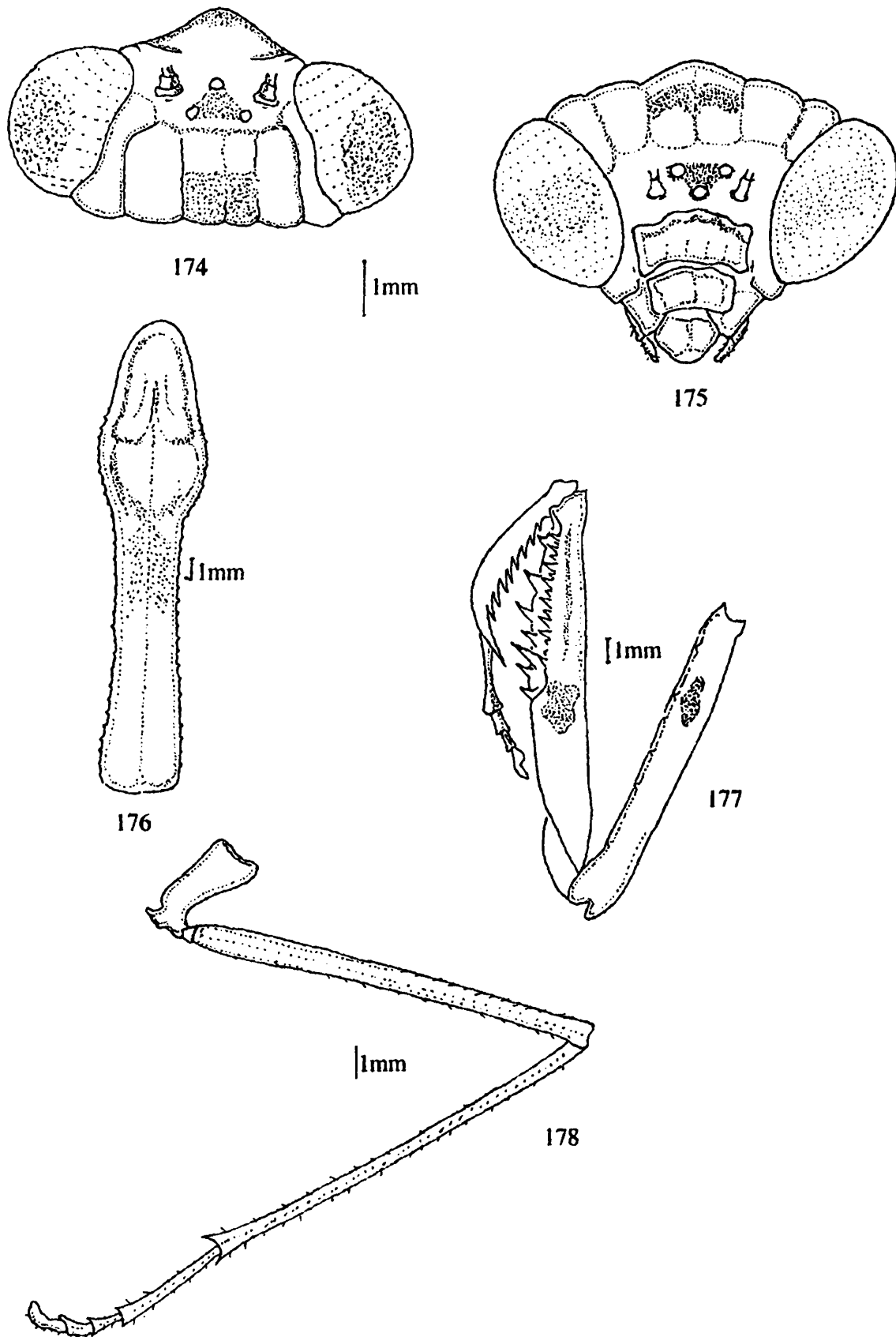


Fig. 174-178 : *Statilia nemoralis* (Saussure)

Fig. 174 : Head Dorsal view Fig. 175 : Head Ventral view Fig. 176 : Pronotum Fig. 177 : Foreleg
 Fig. 178 : Hindleg

Colour : Straw yellow with grass green shade.

Head : Wider than high, vertex not smooth, thrown into faint five lobes; eyes globular dorsally, ventrally subconical, ocelli small, not closely placed, frontal sclerite depressed, transverse, sinuate and arched superiorly, 2.2x wider than high.

Pronotum : Elongated. metazona dorsally thrown into 2 pairs of smaller bosses, metazona constricted at middle, midlongitudinally with a carina; lateral sides of prozona and metazona denticulated. Forelegs : Coxa with 5-6 sharp spines, internal apical lobes contiguous; femur slender, simple with 4 external, 4 discoidal, 6 longer internal, 8 shorter internal spines, tibia with 12 internal and 8-9 external shorter spines, metatarsus as long as all other tarsal segments. Wings : Forewings opaque, hindwings semihyaline.

Abdomen : Fusiform, tuberculated, as long as wings; supra anal plate oblong, short; cerci short with pubescence.

Male : Male same as female, but a little shorter than female.

Materials examined : Plesiotype : Female, Thrissur, 11-ix-1999, K. Usha. Other materials examined : 1 Female, Cali. Uni. Campus, 18-v-1999, T.C. Narendran (DZCU). 1 Male, Cali. Uni. Campus, 23-viii-2001, Vyjayandi. 1 female, Kasaragod, 25-v-2001, Balamony.

Habitat : Undisturbed bushes.

***Statilia maculata* (Thunberg)**
(Fig. 179-183) (Plate X. Fig. 23)

1784. *Mantis maculata* Thunberg *Nov. Ins. Spec.*, **3** : 61

1871. *Pseudomantis maculata* Hanni, Saussure *Mem. Soc. Geneva*, v.21 p.37, 276

1897. *Statilia maculata* Bolivar. *Ann. Soc. Entomol. France*, **66** : 309

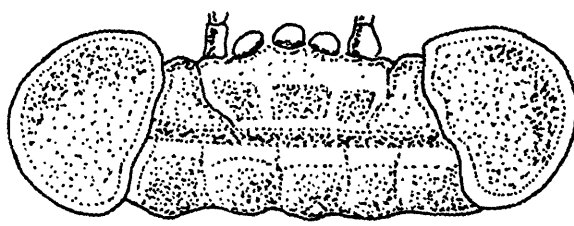
1912. *Statilia huanii* Giglio. *Tos. Bull. Soc. ent. Ital.* v.43 p.6

Diagnosis : Male Body length 53 mm.

Colour : Fumy brown

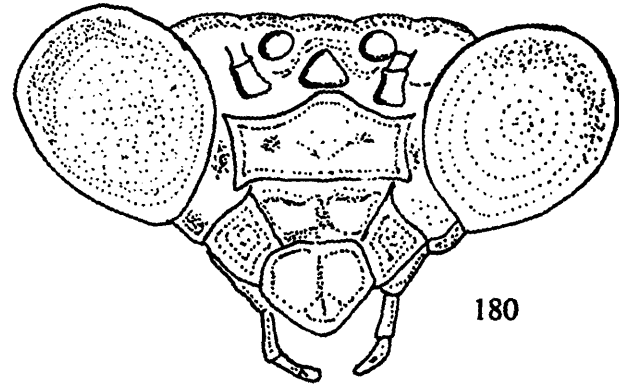
Head : Triangular, wider than high; vertex convex, without any protuberances, thrown into 5 lobes separated by much shallow grooves, lateral most ones somewhat prominent; eyes globular, projects laterally; ocelli closely placed and larger compared to *S. nemoralis* and kept raised on a platform; antenna slender, filiform with sparsely distributed setae; frontal sclerite rhomboidal, not spiniform, superiorly angular and laterally sinuate, lower lateralmost edges with conical projections; clypeus carinated midlongitudinally.

Pronotum : Elongated with metazonal constriction; prozona with midlongitudinal carina, sides with tubercles. Forelegs : Slender, coxa with middorsal tuberculated ridge, ventrally

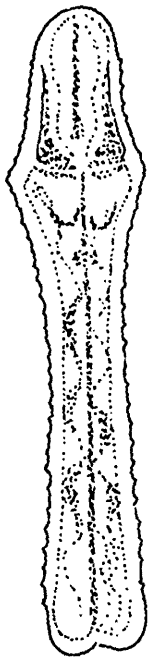


179

1mm

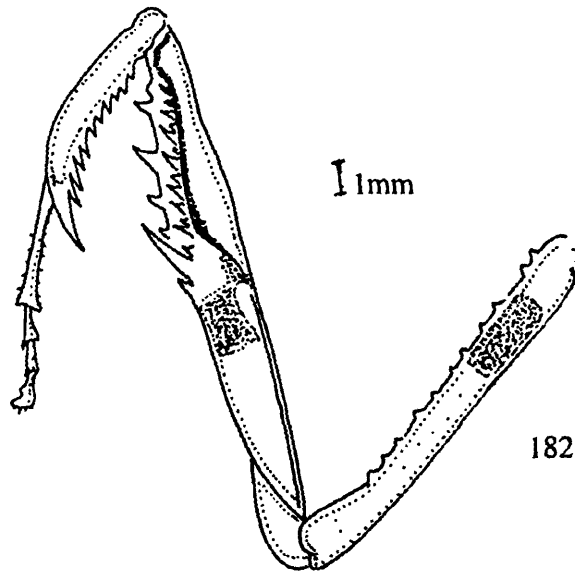


180



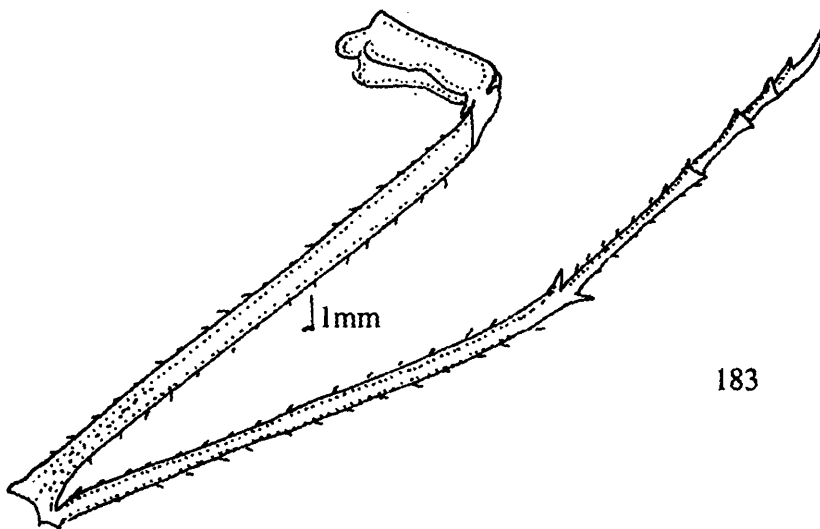
181

1mm



182

1mm



183

1mm

Fig. 179-183 : *Statilia maculata* (Thunberg)

Fig. 179 : Head Dorsal view Fig. 180 : Head Ventral view Fig. 181 : Pronotum Fig. 182 : Foreleg
 Fig. 183 : Hindleg

submarginal area with 6-7 large well pronounced tubercles, internal apical lobes contiguous; trochanter well formed; fore femur slender, with 4 external, 4 discoidal, 6 longer internal, 8 smaller internal spines, distal two longer spines enclose 3 smaller spines; femur with 4 genicular spines apically; tibia with 10 external and 11 internal spines. Wings: both wings non-truncate with conical endings; forewing costal area opaque, discoidal area semihyaline, hindwings semihyaline.

Abdomen : As long as wings. Supra anal plate short; posteriorly abdomen obtusely conical with 9 segmented cerci.

Female : Discoidal area of fore wing semi opaque in female. Body size a little less than male.

Materials examined : Plesiotype: Male, Thenhipalam (Malapuram), 2-vi-1999, T. Narendran (DZCU). Other materials examined : 1 Male, Muthanga, 6-xi-1999, Vyjayandi. 1 Male, Thrissur, 29-xi-1998, Usha. K. 1 Male, kovoov (Calicut), 18-iv-2001, Vyjayandi. 1 Male, Kannur, 6-iv-2000, Seena Sadanandan.

Habitat : Undisturbed bushes

Distribution : India, (Kerala, Arunachal Pradesh, Assam, Sikkim, West Bengal, Bihar, Madhya Pradesh)

Tribe **Miomantini**

Body usually brown; frontal sclerite narrow; wings shorter than abdomen; hind wings mostly with spots.

Seven genera occur in India.

Key to Indian genera of Miomatini

1. Fore femur with 5 external spines *Iris* Saussure
- Fore femur with 4 external spines 2
2. Eyes round..... 3
- Eyes conical 6
3. Occiput produced on each side into a flat round lobe. *Indothespis* Werner
- Occiput not produced into flat round lobe 4
4. Internal apical lobes of fore coxa contiguous *Pararivetina* Beier
- Internl apical lobes of fore coxa divergent..... 5

5. Supra anal plate as long as broad with triangular tip *Deiphobe* Stal
 – Supra anal plate short round at tip *Arria* Stal
 6. Supra anal plate as long as broad *Diephobella* Giglio-Tos
 – Supra anal plate longer than broad *Rivetinula* La Greca

Genus *Deiphobe* Stal

1877. *Deiphobe* Stal, Bih. K. Svenska Vetensk Akad. Handl, 4(10) : 33.

1927. *Deiphobe* : Giglio-Tos, Das Tierreich, 50 : 486

Diagnostic Characters : Both male and female with elongated body, head large; frontal sclerite narrow, transverse, superior border a little arched at middle, pronotum longer than fore coxae, prozona depressed, granulated; fore coxa dentate, granulated ventrally; fore femur a little dilates at middle, superior border straight, claw groove at middle, 4 discoidal, 4 external spines; fore tibia with 7-8 external spines. Abdomen thin in male, fusiform in female; elytra in male long, narrow, costal area opaque; elytra female short, opaque, supra anal plate triangular, cerci long, cylindrical.

Distribution : India, Sri Lanka, Nepal, Australia

Deiphobe infuscata (Saussure) (Fig. 184-189) (Plate XII. Fig. 27)

1916. Giglio-Tos, *Bullettino della Societa entomologica Italiana.*, 47 : 25.

1995. Mukerjee, Hazra & Ghosh, *Oriental Insects*, Vol. 29, 277-282

1792. Olivier, Enc. Meth., 7 : 635.

1871. Saussure, Mem. Soc. Phy. Hist. Nat. Geneve, 21 : 130.

Plesiotype : Male, Body length 78 mm.

Colour : Body colour generally of dried leaf with faint brown dots and patches; vertex dark brown; antennae light brown; frontal sclerite black; eyes in frontal view pale green with horizontal black bands, in dorsal view fuscous, pale green posteriorly; ocelli dark brown at base; upper face pale brown; prozona, anterior half of metazona fuscous; prosternum with black transverse band; fore leg, coxa externally with faint brown dots, femur with two black dots, one on claw groove, second on femoral brush, all spines dark brown at tip only; metatarsus and other tarsal segments pale brown; mid and hind tarsals blackish brown; fore wing costal area light green, anal membrane black with pale violet tinge; hind wing colourless at base, discoidal area dark brown distally with black veins and a pale round blotch rest blackish brown with white veinlets.

Head : Wider than high; vertex smooth, slightly convex; lateral lobes prominent; frontal sclerite transverse, slightly sinuate at middle, clypeus a little elevated at middle forms a transverse carina; antennae shorter than body, slightly setaceous; eyes round.

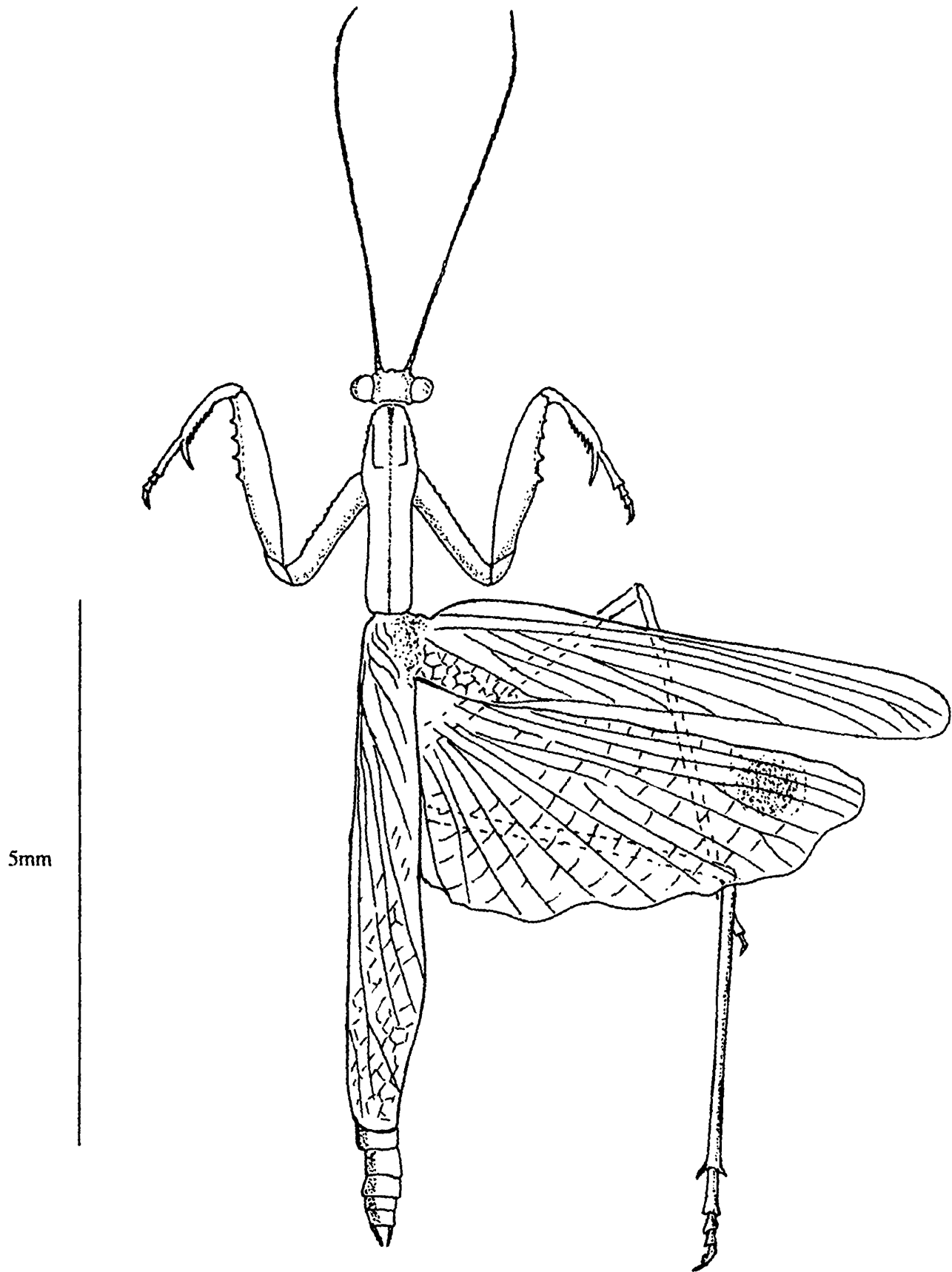


Fig. 184 : *Deiphobe infusata* (Saussure)

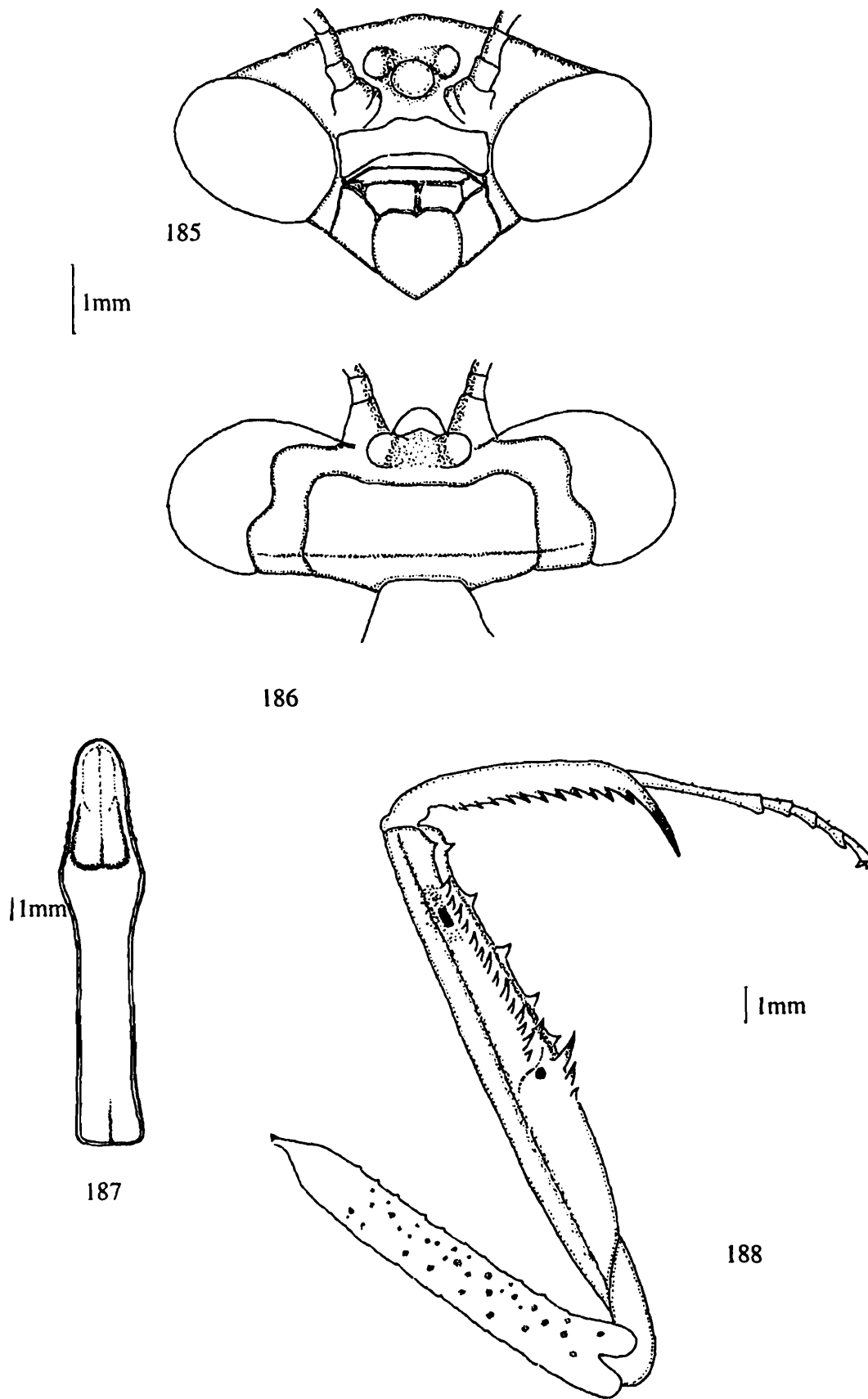


Fig. 185-189 : *Deiphobe infuscata* (Saussure)

Fig. 185 : Head Dorsal view Fig. 186 : Head Ventral view Fig. 187 : Pronotum Fig. 188 : Foreleg
 Fig. 189 : Hindleg

Pronotum : A little broader, stout, dentate at prozonal margin, longer than fore coxae, metazona almost as long as fore coxa; supracoxal dialation distinct, a faint carina present dorsomedially. **Legs** : Fore leg, coxa shorter than pronotum, ridged dorsally, dentate at lower margin, more than 7 spinules present at anterior margin, internal apical lobe divergent; femur straight at anterior margin, dorsal and ventral surface proximally a little granulated, 13 internal (6 longer, 7 shorter), 4 external, 4 discoidal spines present, claw groove at middle, tibia with 13 internal spines longer towards distally and 8 external spines; metatarsus longer than all other tarsal segments together; mid femur a little longer than tibia; hind femur as long as tibia; hind metatarsus a little longer than all other tarsal segments together and spinulated ventrally. **Wings** : Shorter than body, fore wing reaches upto 8th abdominal segment, costal area opaque, discoidal and anal area sub opaque, anterior border smooth; hind wing semi transparent.

Abdomen : Longer than fore wing, cerci cylindrical, eleven segmented, setaceous, supra anal plate higher than width with a median carina.

Female : In female dark median line on the pronotum absent, lateral margin of pronotum dentate, disc granular; fore wing shorter than pronotum. Body length 85mm.

Materials Examined : Plesiotype : 1 Male, Manandavadi (altitude 950 MSL), 11 -vi- 2006, coll : Mercy. Other specimens examined : 4 Males, Muthumala, 19-V-2006, Coll. Vyjayandi.

Habitat : Evergreen core forest.

Distribution : India : Kerala, Tamil Nadu, Bihar, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Utter Pradesh; Nepal, Sri Lanka.

Genus *Deiphobella* Giglio-Tos

1916. *Deiphobella* Giglio-Tos *Bull. Soc. Entomol. Ital.*, 47 : 26. Type species : *Deiphobella laticeps* (Wood-Mason).

Diagnostic characters : Head wide and flat; eyes conical laterally; antenna slender, non setaceous; frontal sclerite narrow, superior border arched; vertex with its upper edge extending over the eyes. Pronotum slender, prozona spatulate; metazona much longer than fore coxa; fore coxa with internal apical lobes divergent; fore femur with 4 external and 4 discoidal spines; claw groove middle; middle and hindlegs with spines; cerci long.

Distribution : Oriental region, (India, Sri Lanka).

Key to Indian Species of *Deiphobella*

Fore coxa internally granulated; a black transverse band on the frontal sclerite
 *D. laticeps* (Wood-mason)

- Fore coxa not granulated; frontal sclerite without transverse black band
 *D. gardeneri* Werner

***Deiphobella laticeps* (Wood-Mason)**

(Figs. 190-195)

1876. *Ficheria laticeps* Wood-Mason *Ann. Mag. Nat. Hist.* 4 (Syn Type) India. F : India : Bangalore.

1878. *Deiphobe laticeps* Wood-Mason *Proc. Zool. Soc. London.*, 38 : 580

1904. *Eremoplana laticeps* Kirby *Cat. Orth. Brit. Mus.*, 1 : 266

1927. *Deiphobella laticeps* Giglio-Tos. *Das Tierreich.*, 50 : 490

Diagnosis : Female body length 94 mm.

Colour : Colour of rotten leaves.

Head : Flat and wide, more than twice wider than high; vertex smooth, ocelli placed on elevated platform; eyes conical laterally, without spine; antenna filiform, slender, thin, nearly as long as pronotum, not setaceous; frontal sclerite transverse, 6x wider than high, placed at right angle to clypeus, superior border sinuate, inferior border almost straight, disc not carinated.

Pronotum : Much elongated than fore coxa, supra coxal dialation well marked, with two lateral carina and weak middle carina (tricarinate), sides denticulated; prosternum denticulated; prozona spatulate. Forelegs : Simple, slender; coxa denticulated, internal apical lobes divergent; femur with 4 external, 4 discoidal (third one twice longer than second, fourth smallest, first shorter than second), 7 longer internal and 8 shorter internal spines (distally 2 longer spines enclose 3 shorter ones); all spines placed equally spaced at distal half of femur (space between internal and external row of spines without any denticles or weak bristles), distal tip with 2 genicular spines, disc with a row of minute denticles externally; tibia with 8 external and 16 internal spines; metatarsus a little longer than all other tarsal segments together. Middle and hind legs simple, elongated, midlegs a little shorter than hind legs; femur and tibia nearly of same length; metatarsus nearly as long as all other tarsal segments together. Wings: both wings shorter than abdomen, forewing leathery, hindwings sub hyaline.

Abdomen : Elongated, slender; with triangular supra anal plate; cerci multi segmented.

Male : Male longer than female; both wings extend beyond the abdomen; hind wing smoky.

Materials examined : Plesiotype: Female, Cali. Uni. Campus, 11-iii-1997, Pookoya.

Habitat : Undisturbed areas.

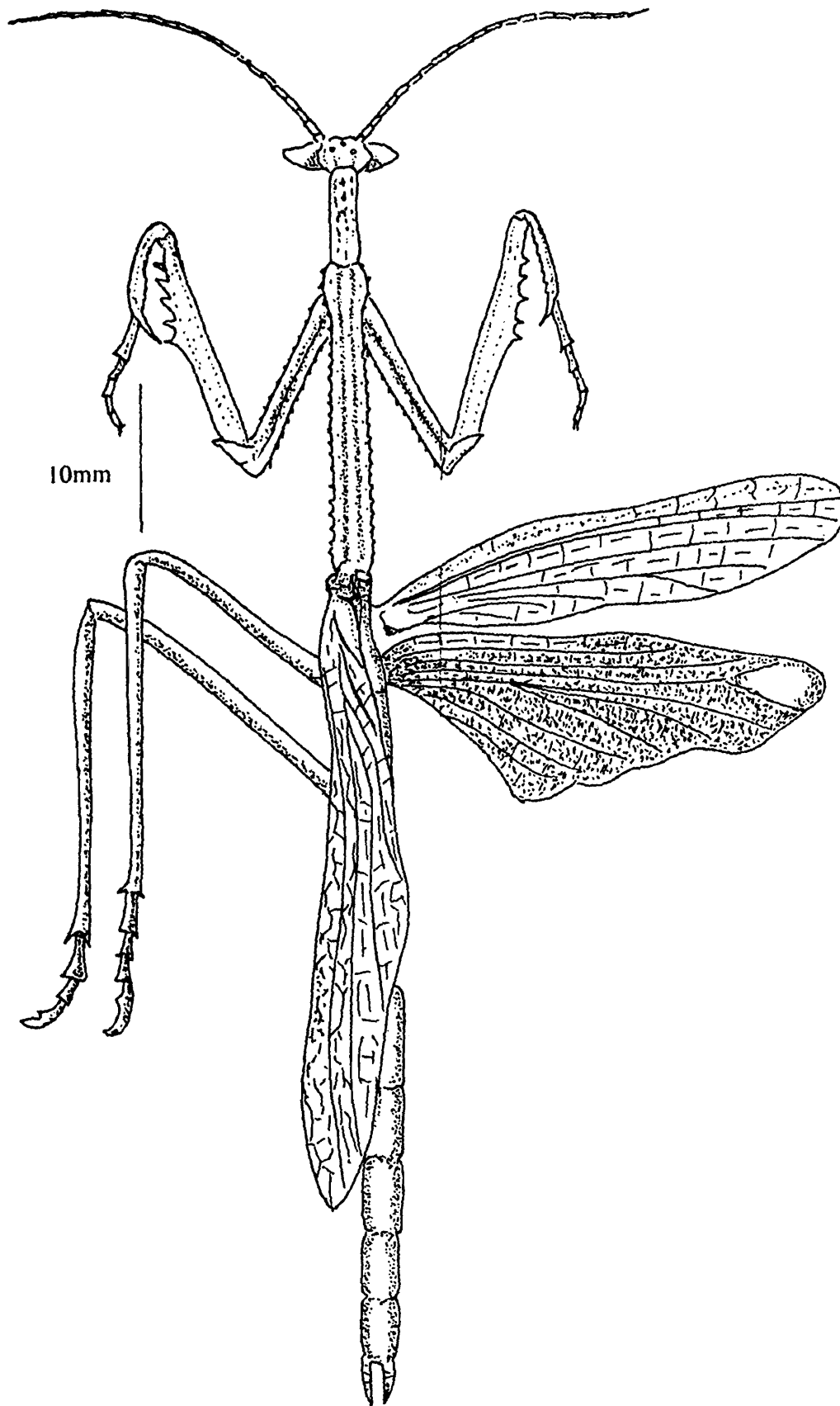


Fig. 190 : *Deiphobella laticeps* (Wood-Mason)

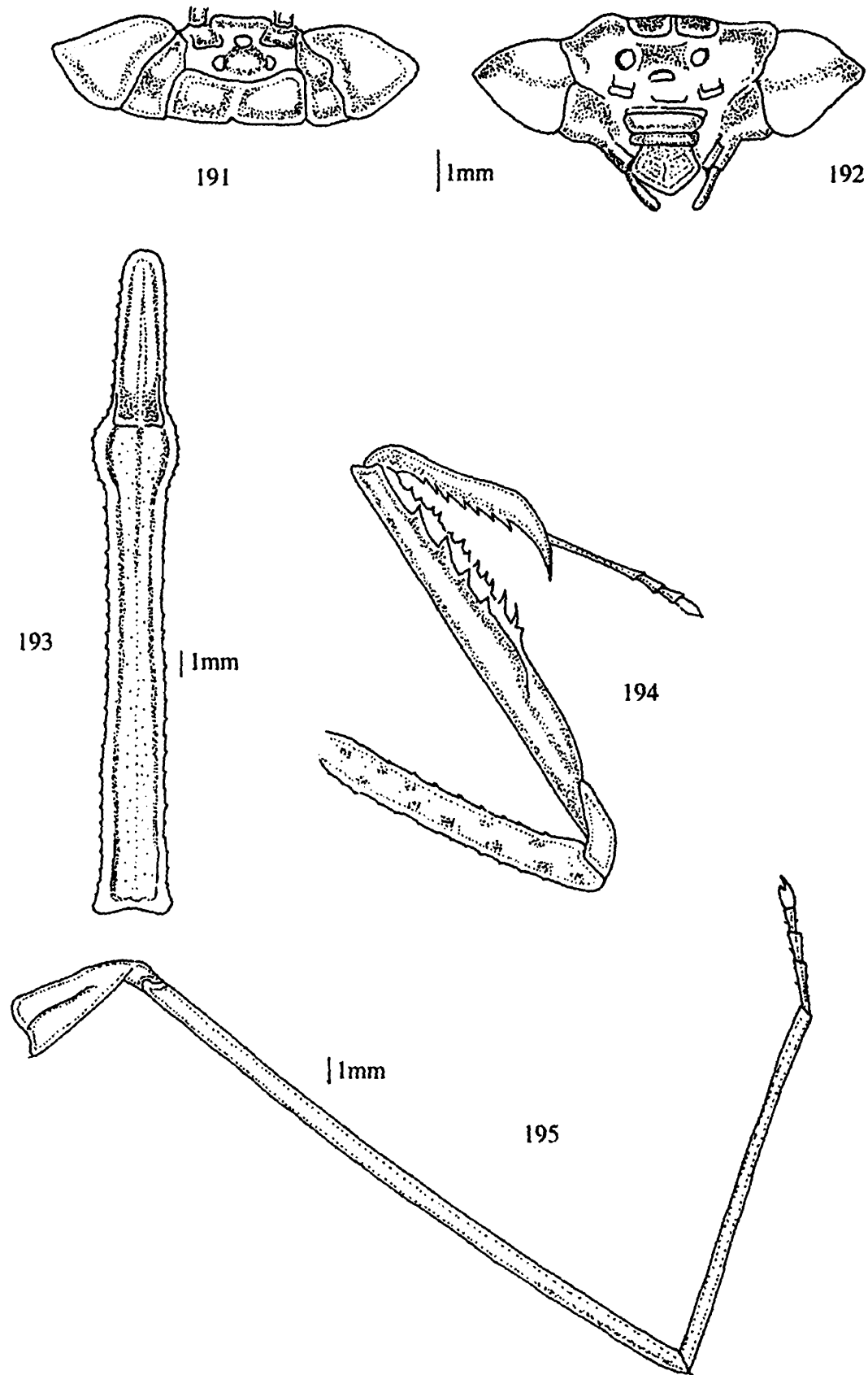


Fig. 191-195 : *Deiphobella laticeps* (Wood-Mason)

**Fig. 191 : Head Dorsal view Fig. 192 : Head Ventral view Fig. 193 : Pronotum Fig. 194 : Foreleg
 Fig. 195 : Hindleg**

Genus *Iris* Saussure

1869. *Iris* Saussure *Mitt. Schweiz. Entomol. Ges.*, 3 : 56. Type species : *Gryllus (Mantis) oratorius* Linnaeus.

Diagnostic characters : Body slender. Head large; eyes globular, large; vertex 5 lobed, dorso laterally extending above eyes; antenna slender; frontal sclerite more than twice as broad as high. Pronotum slender, a little longer than fore coxa; fore femur with 5 external and 4 discoidal spines; middle and hindlegs simple, long; forewings short; opaque in female, long and subhyaline in male; hindwings brightly coloured, shortened in female. Abdomen fusiform. Supra anal plate bluntly triangular.

Distribution : Asia, Europe, Africa, America.

Key to Indian Species of *Iris*

1. Pronotum in female denticulated 2
- Pronotum in female non denticulated *nana* Uvarov
2. Hind wing with a large fuscous blotch on discoidal area *orientalis* Wood-Mason
- Hind wing yellowish orange, with distal two black spots at apex and nine series of 3-4 black spots concentrically arranged (not of same size) at anal area *keralensis*.

Iris keralensis Vyjayandi

(Figs. 196-202) (Plate XII. Figs. 25 & 26)

Diagnosis : Female body length 34 mm.

Colour : Green with testaceous tinge.

Head : Wider than high; vertex smooth, lateral lobes prominent; eyes globular, Ocelli very small; filliform, without setae; frontal sclerite spiniform, bituberculated, 2.5x longer than wide.

Pronotum : Longer than fore coxa and as long as fore femur; lateral edges of metazona and prozona denticulated; fore coxa with denticulated ridge externally, superior margin with 7 minute spines, inferior slightly denticulated. Fore femur longer than fore coxa; claw groove proximally placed; with 5 long and sharp external, 4 discoidal (third one longest) spines; internally with 6 longer and 8 shorter spines, distal 2 longer spines enclose 3 shorter spines. Fore tibia with 6 distally placed external spines, (a wide gap between first and second spine), distal-most spine longer and stouter; internally fore tibia with 12 spines; claw sharp and curved. Mid legs shorter than hind legs. Wings shorter than body, reaching upto fifth abdominal segment; fore wings leathery and opaque, testaceous green and

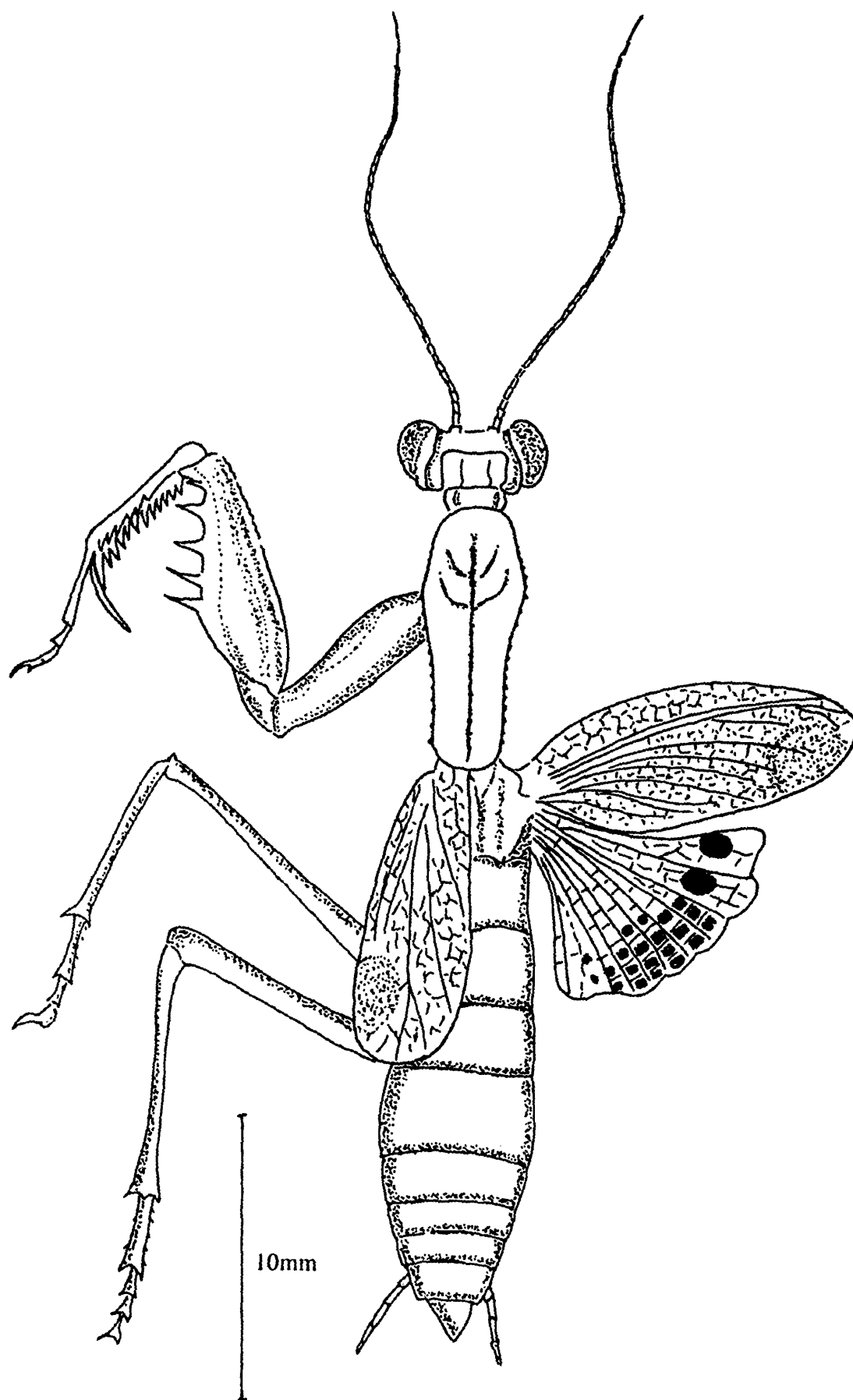


Fig. 196 : *Iris keralensis* Vyjayandi

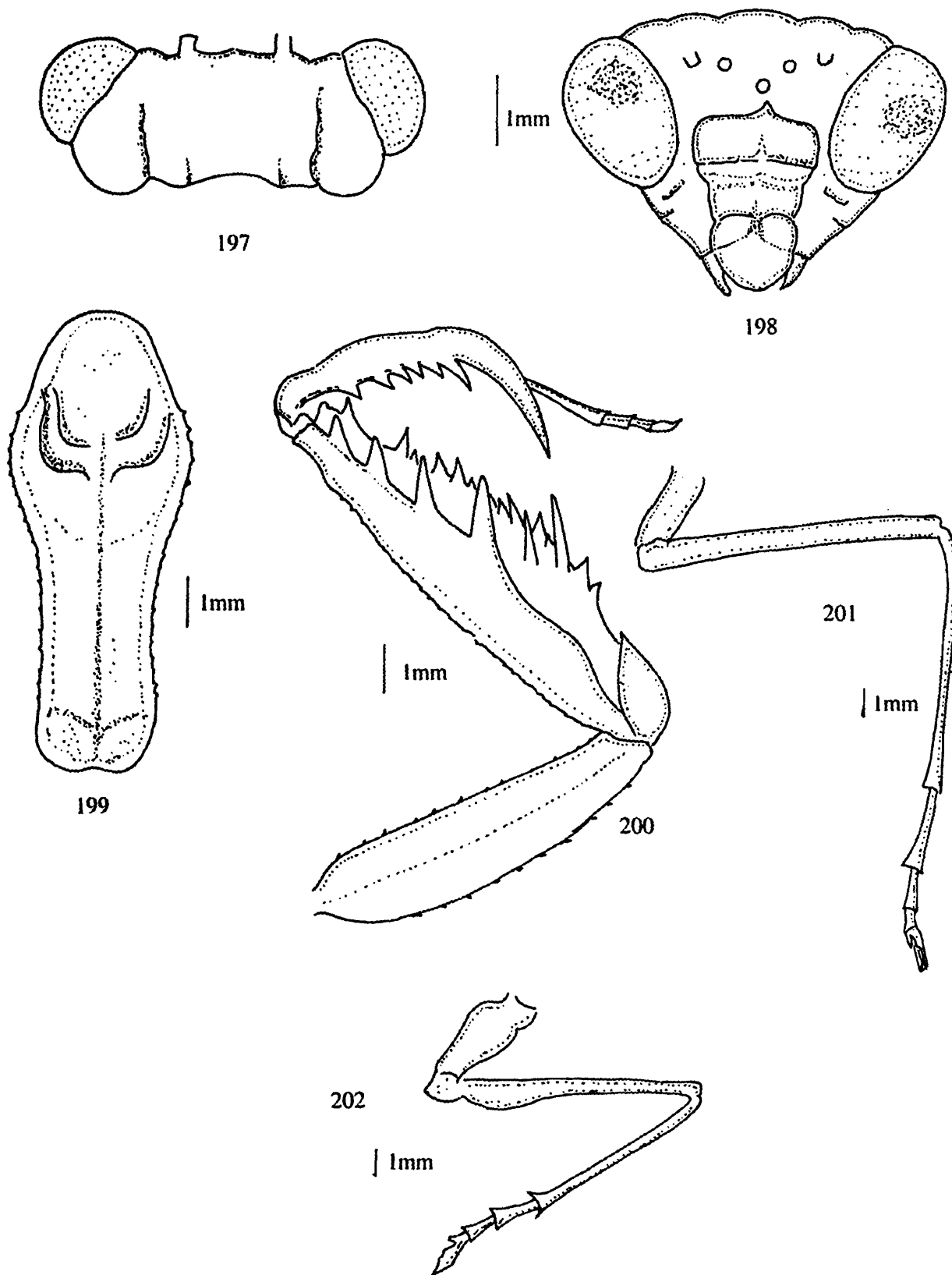


Fig. 197-202 : *Iris keralensis* Vyjayandi
Fig. 197 : Head Dorsal view Fig. 198 : Head Ventral view Fig. 199 : Pronotum Fig. 200 : Foreleg
Fig. 201 : Midleg Fig. 202 : Hindleg

slightly, with fuscous distal patch; costal area wide, oblong, hind wing fan shaped and semi-circular, yellowish orange, with distal two black spots at apex and nine series of 3-4 black spots concentrically arranged (not of same size) at anal area.

Abdomen fusiform, testaceous, 4 segments not covered by wings. Supra anal plate short and triangular. Cerci short.

Male : In male fore wing slightly longer than abdomen, hyaline, smoky at discoidal and anal area; hind wing also hyaline without any distinct colour pattern as in the female.

Materials examined : Plesiotype : Female, Wayand, 11-ix-1999, Joshila. Other materials examined : 1 Female, Malayatoor, (Evergreen forest), 15-ix-1999, P.M Sureshan (ZSI, Calicut, Reg. No. 11233). 1 Male veerajpetta (Makkutta Forest) 18-3-2006 Rajeesh

Habitat : Evergreen Forests of Kerala.

Subfamily SCHIZOCEPHALINAE

Body stick like, slender, long. Head narrow, long; eyes conical, anteriorly pointed; frontal sclerite much higher than wide. Pronotum much elongated, slender; forelegs long, slender; fore femur with 4 external, 3 discoidal spines, all spines placed at distal most end; foretibia short and compressed; wings : short and leathery, in female, long and semi transparent in males. Abdomen slender, supra anal plate longer than broad.

Genus *Schizocephala* Audinet – Serville

1831. *Schizocephala* Audinet-Serville *Ann. Sci. Nat.*, **22** : 55 Type species : *Schizocephala bicornis* (Linnaeus).

Diagnostic characters : Body very long, slender. Head long; eyes conical dorsally, terminating into spiniform process; vertex lobbed apically; frontal sclerite much higher than wide, with a median dorsal and two lateral grooves; antenna thick at base sharply tapers terminally. Pronotum long, slender; with less prominent supracoxal dialation; forelegs long, slender, claw groove distally placed on fore femur; fore femur 4 external, 3 discoidal spines. Abdomen slender; supra anal plate triangular and carinated.

Schizocephala bicornis (Linnaeus) (Figs. 203-208) (Plate XIII. Fig. 28)

1758. *Grillus (Mantis) bicornis* Linnaeus *Syst. Nat.*, **1**(10) : 426 Holotype : India

1781. *Mantis oculata* Fabricius *Spec. Ins.*, **1** : 348.

1831. *Schizocephala striata* Audinet Serville *Ann. Sci. Nat.*, **22** : 56.

1927. *Schizocephala bicornis* Giglio-Tos *Das Tierreich*, **50** : 237.

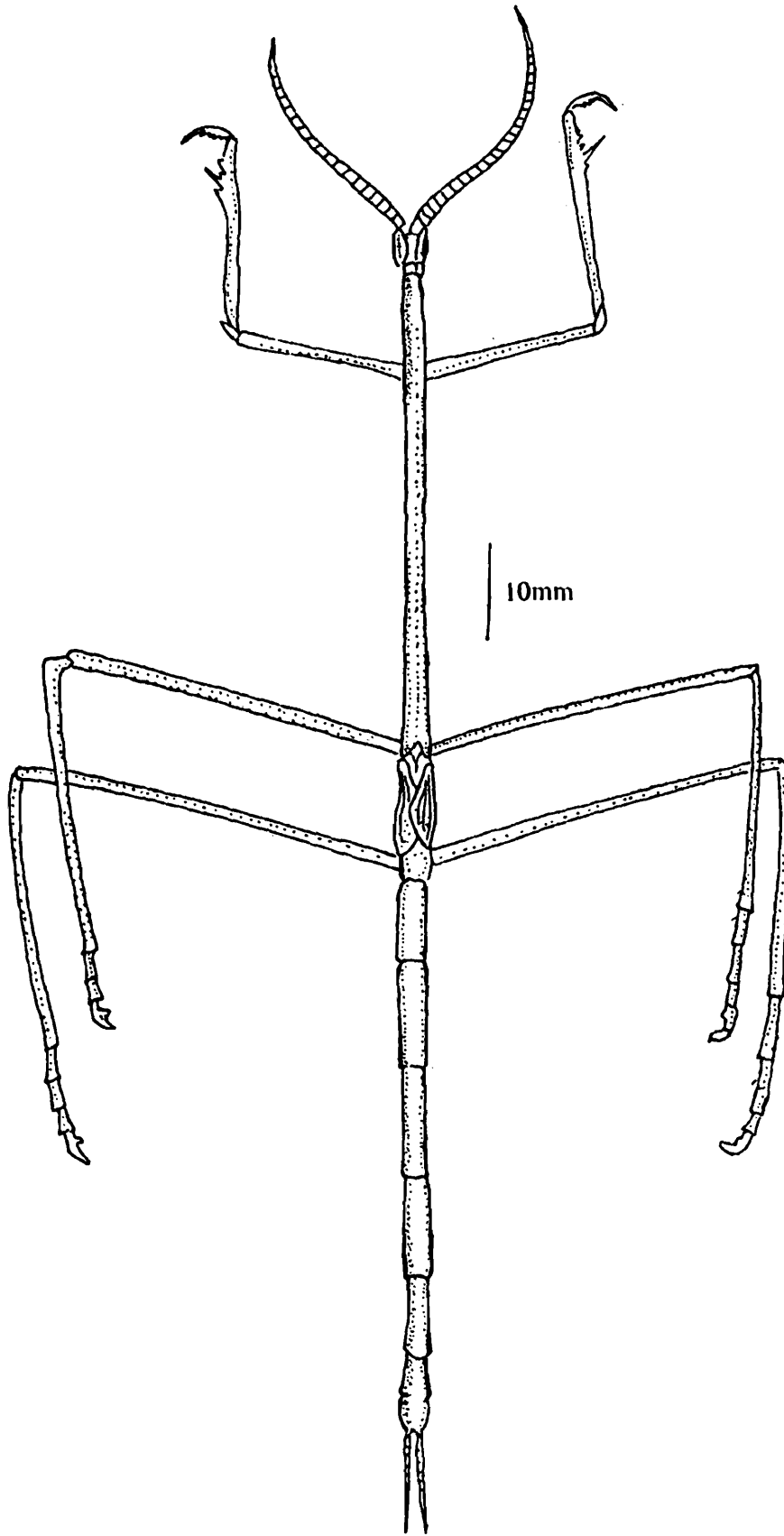


Fig. 203 : *Schizocephala bicornis* (Linnaeus)

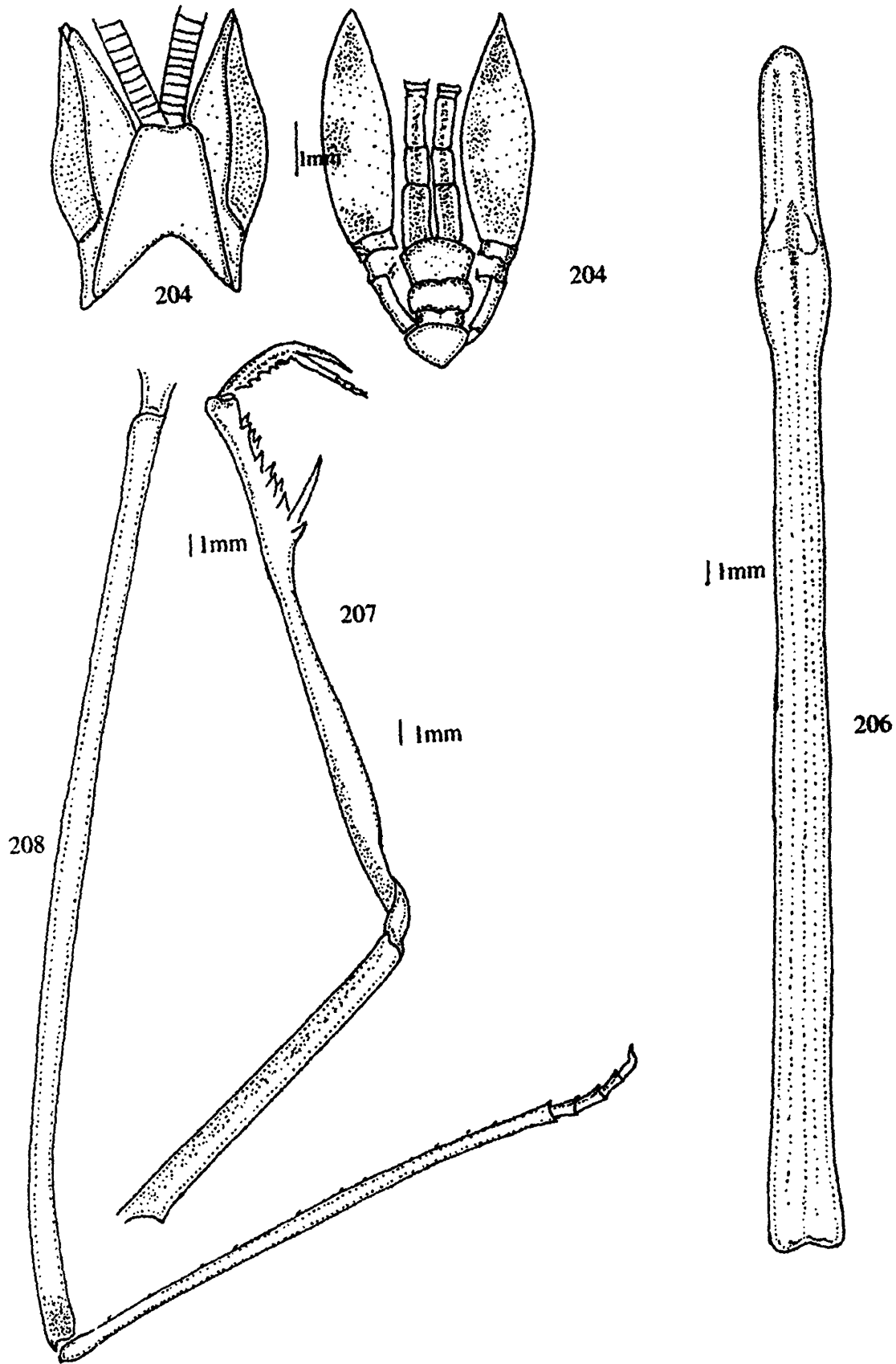


Fig. 204-208 : *Schizocephala bicornis* (Linnaeus)
Fig. 204 : Head Dorsal view Fig. 205 : Head Ventral view Fig. 206 : Pronotum Fig. 207 : Foreleg
Fig. 208 : Midleg

Diagnosis : Female : Body Length 125 mm.

Colour : Straw yellow with green tinge.

Head : 1.8x wider than high, vertex trapezoid, anteriorly bifid; eyes conical, pointed towards apex; antenna filiform, thick at base, flagellum tapers distally; frontal sclerite pentagonal, 3x higher than wide, medianly grooved, superior edge truncate.

Pronotum : Elongated, slender, supra coxal dialation weak, lateral border denticulated, prozona spatulate, metazona 4.8 x longer than prozona. Forelegs elongate, internal apical lobes divergent; femur 5 x longer than tibia, with 4 external, 3 discoidal second spine 3 x longer than first), internally 4 long, 7 short spines, all spines at distal most end of femur; claw groove distally placed; tibia with 5 external and 9 internal spines; metatarsus a little longer than all other tarsal segments together; middle and hindlegs : Femur as long as tibia in midlegs, tibia shorter than femur in hindlegs, metatarsus nearly 2x longer than all other tarsal segments together. **Wings** : Short, leathery, reaches upto second abdominal segment.

Abdomen : Slender, much elongated; supra anal plate elongated, triangular, cerci long.

Male : Fore wing of male well developed but shorter than abdomen, pale green coloured and very narrow; costal area opaque, discoidal area hyaline with almost parallel longitudinal veins. In female fore wing very short and opaque.

Materials examined : Plesiotype : Female, Cali. Uni. Campus, 15-iii-1998, T.C Narendran. Other materials examined : 1 Male, Madaippara (Kannur), 10-iv-1999, Vyjayandi. 1 Male, Wayand, 10-ii-1996, Reeja Samuel. 1 Male, Manjeri, 18-iii-1999, Fousi. K.

Habitat : Undisturbed grass lands.

Distribution : India : Kerala, Tamil Nadu, Madhya Pradesh, Uttar Pradesh, West Bengal, Sri Lanka.

Subfamily THESPINAE

Body delicate, medium sized, dirty yellowish brown, frontal sclerite narrow. Pronotum slender, a little longer than fore coxa, prozona spatulate, metazona carinated; forelegs simple, slender; fore femur with 4 external and 4 discoidal spines; middle and hind legs long and slender; both wings shorter than abdomen.

Two tribes occur in India.

Key to Tribes

1. Eyes globular **Thespini**
- Eyes obtusely conical dorsally **Parathespini**

Tribe **Parathespini**

Eyes dorsally conical; forewing short; fore coxa with divergent internal apical lobes; fore femur with 4 external and 4 discoidal (third the longest) spines; claw grooves at distal one third of fore femur; supra anal plate long and lanceolate; cerci slender

Genus *Parathespis* Saussure

1869. *Parathespis* Saussure Mitt. Schweiz. Entomol. Ges., 3 : 58. Type species : *Parathespis humberiana* Saussure

Diagnostic characters : Body delicate; eyes conical dorsally, globular ventrally; frontal sclerite transverse, narrow, truncate superiorly. Pronotum a little longer than fore coxa, slender, prozona spatulate; metazona carinated; forelegs slender; fore coxa with divergent internal apical lobes; fore femur with 4 external and 4 discoidal spines (third spine 3x longer than second); claw groove distally placed; foretibia compressed with 5 external spines; middle and hind legs much longer and slender; supra anal plate lance shaped.

Distribution : India, Tropical Oriental Regions.

Parathespis humberiana Saussure

(Figs. 209-214)

1869. *Parathespis humberiana* Saussure Mitt. Schweiz. Entomol. Ges., 3 : 71 Holotype. Sri Lanka.

Diagnosis : Male body length 32 mm.

Colour : Straw yellow.

Head : Wider than high, vertex concave in front, middorsally slightly elevated, occiput with pointed tip; eyes laterally globular; anteriorly conical; ocelli globular, conspicuous, large, all three of same size; frontal sclerite transverse, 4x wider than high, superior margin straight at middle, laterally concave; depressed, inferiorly sinuate; antenna slender, with minute setae, flagellar segments elongated, tapering towards apex.

Pronotum : Elongated, slender, prismatic with raised carina midlongitudinally, sides denticulated; nearly twice longer than fore coxa; prozona spatulate and carinate medially; metazona more than twice longer than prozona. **Forelegs** : Elongated, slender and simple, internal apical lobes divergent; femoral spines placed at distal one third portion, with 4 external, 3 discoidal (third longest), 6 longer internal and 6 shorter internal spines; tibia with five external and seven internal spines; metatarsus longer than all other tarsal segments together; middle and hindlegs slender, elongated and simple; middle tibia shorter than midfemur; metatarsus more than twice longer than all other tarsal segments together; forewings shorter than hindwings; subopaque, costal area opaque hindwing semihyaline, all veins run parallel.

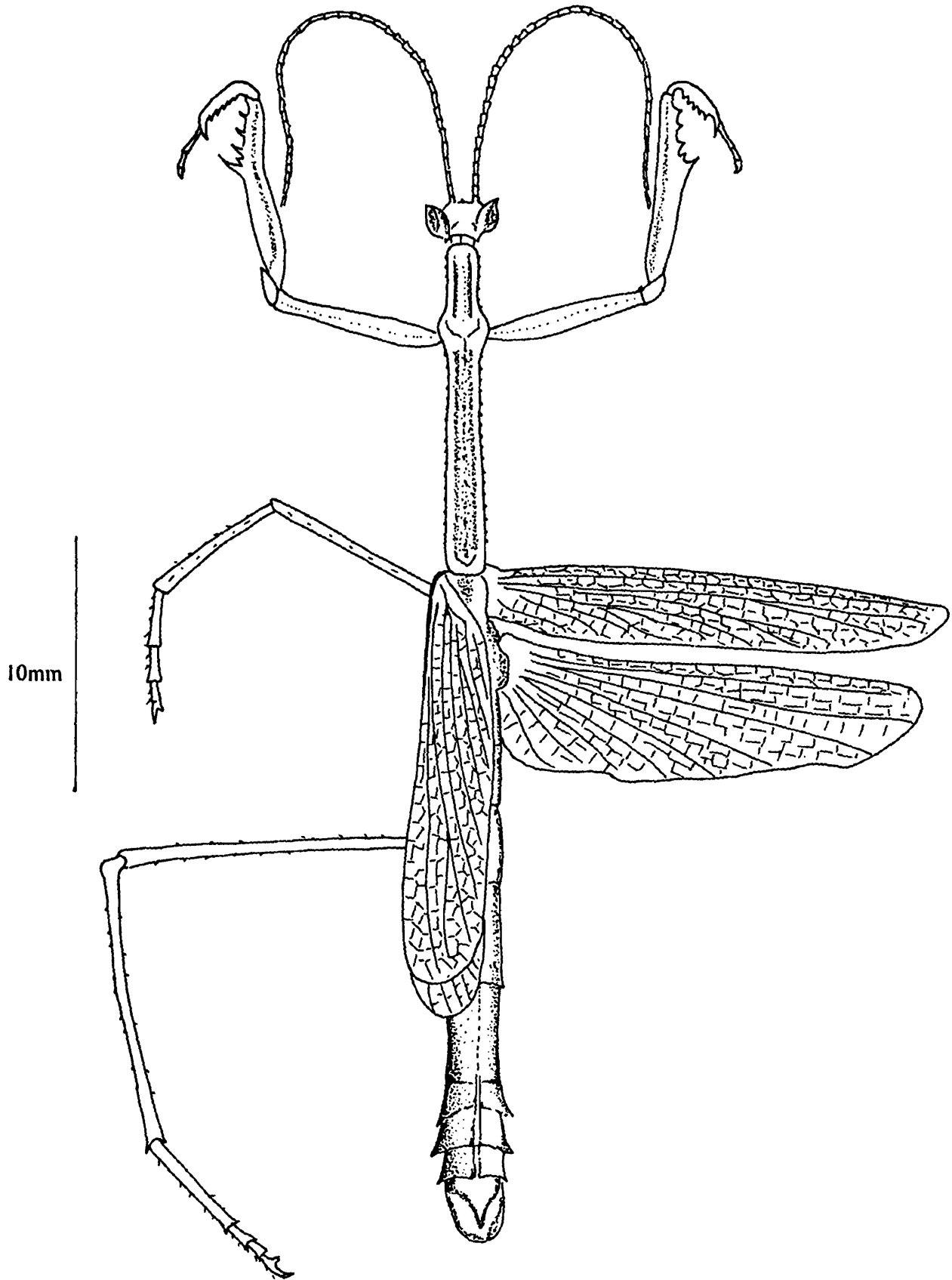


Fig. 209 : *Parathespis humbertiana* Saussure

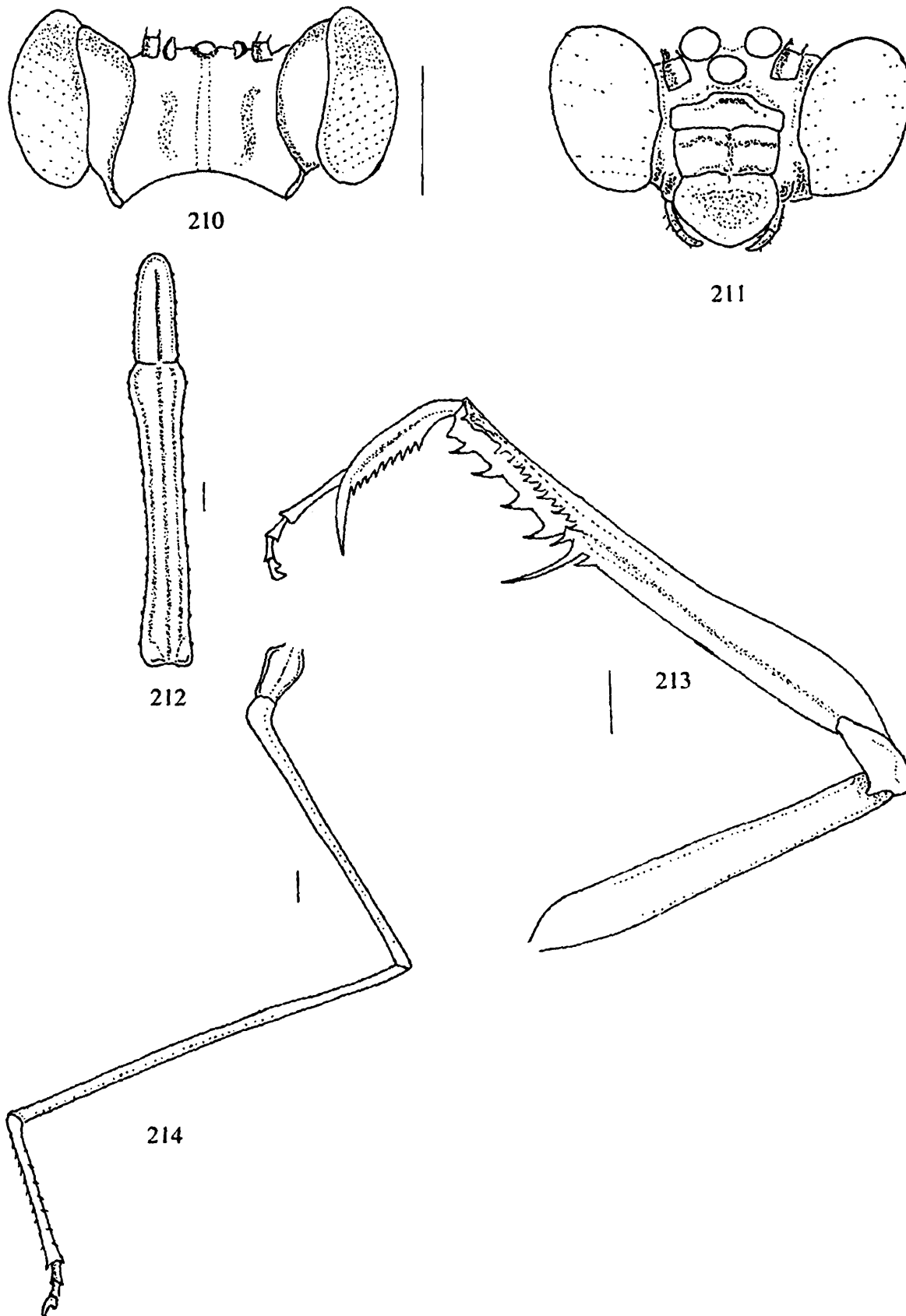


Fig. 210-214 : *Parthespis humberiana* Saussure
 Fig. 210 : Head Dorsal view Fig. 211 : Head Ventral view Fig. 212 : Pronotum Fig. 213 : Foreleg
 Fig. 214 : Hindleg

Abdomen : Shorter than wings; slender, elongated and carinated middorsally; supra anal plate broad; cerci short.

Female : Female a little longer than male (male 29-33 mm, female 41 mm) and the right femur with 12 and left with 13 internal spines, all spines of femur black at apical region only; fore wing pale brown, opaque, extending up to the base of 1st abdominal segment; hind wing with pale brown costal area, discoidal area reddish brown near base and the rest pale brown, anal area bright metallic violet with 2-3 transverse veinlet distally. (Mukherjee 1995)

Materials examined : Plesiotype : Male, Annamali, 11-viii-2000, R. Kanakarajan.

Distribution : India, (Andhra Pradesh, Karnataka, Madhya Pradesh, Tamil Nadu) Sri Lanka.

Subfamily PHYLLOTHELINAE

Body brown coloured, moderate size. Vertex with a short median conical elevation in male; band like in female. Pronotum long, often laterally serrated, fore femora with 4 discoidal, 4 external spines; claw groove middle; mid and hind femora with ventral lobulation; both wings well developed; supra anal plate transverse, cerci simple.

Genus *Phyllothelys* (Wood-Mason)

1877. *Phyllothelys* Wood-Mason Proc. Entomol. Soc. London., p18 Type species : *phyllothelys* (Wood-Mason)

1885. *Phyllothelys* Wood-Mason J. Asiatic Society. Bengal, 53 : 206

1927. *Phyllothelys* Giglio Tos Das Tierreich, 52 : 531

Diagnosis : Protuberance of vertex short in male, long in female, frontal sclerite pentagonal, higher than width, bicarinate, pronotum slender with denticulate borders, metazona longer than fore coxa, mid and hind femora short with ventral lobes.

Distribution : India, Indonesia, Java.

Phyllothelys westwoodi (Wood-Mason) (Figs. 240-245)

1876. *Phyllothelys westwoodi* Wood-Mason. Proc. Asiatic Soc. Bengal, 1876 : 176

1927. *Phyllothelys westwoodi* : Giglio-Tos, Das Tierreich, 50 : 532

1951. *Phyllothelys westwoodi* : Roonwal & Bhasin, Indian Forester, 77 (5) : 313-318

Diagnosis : Female body length 50 mm.

Colour : Brown.

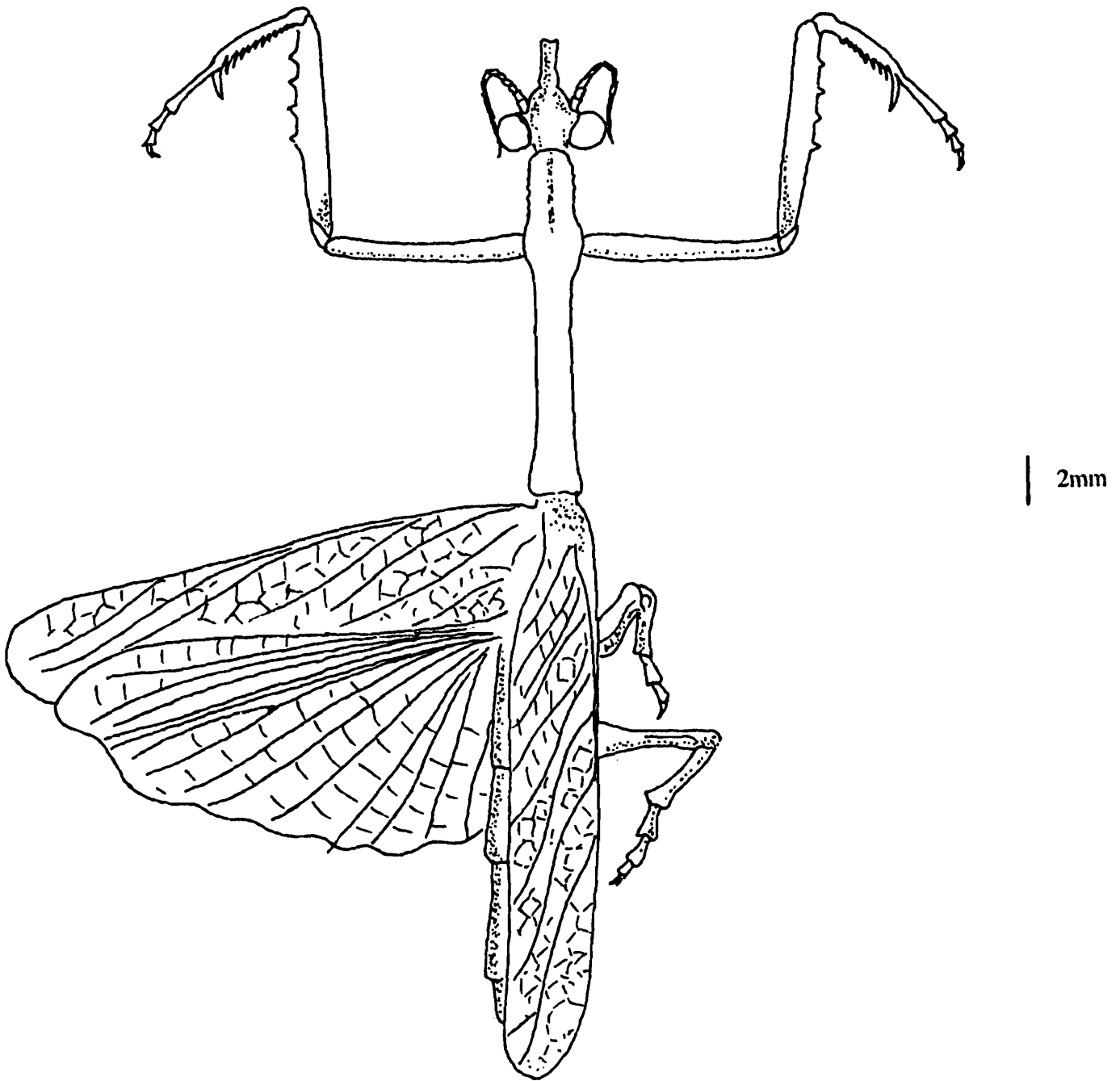


Fig. 240 : *Phyllothelys westwoodi* (Wood-Masion)

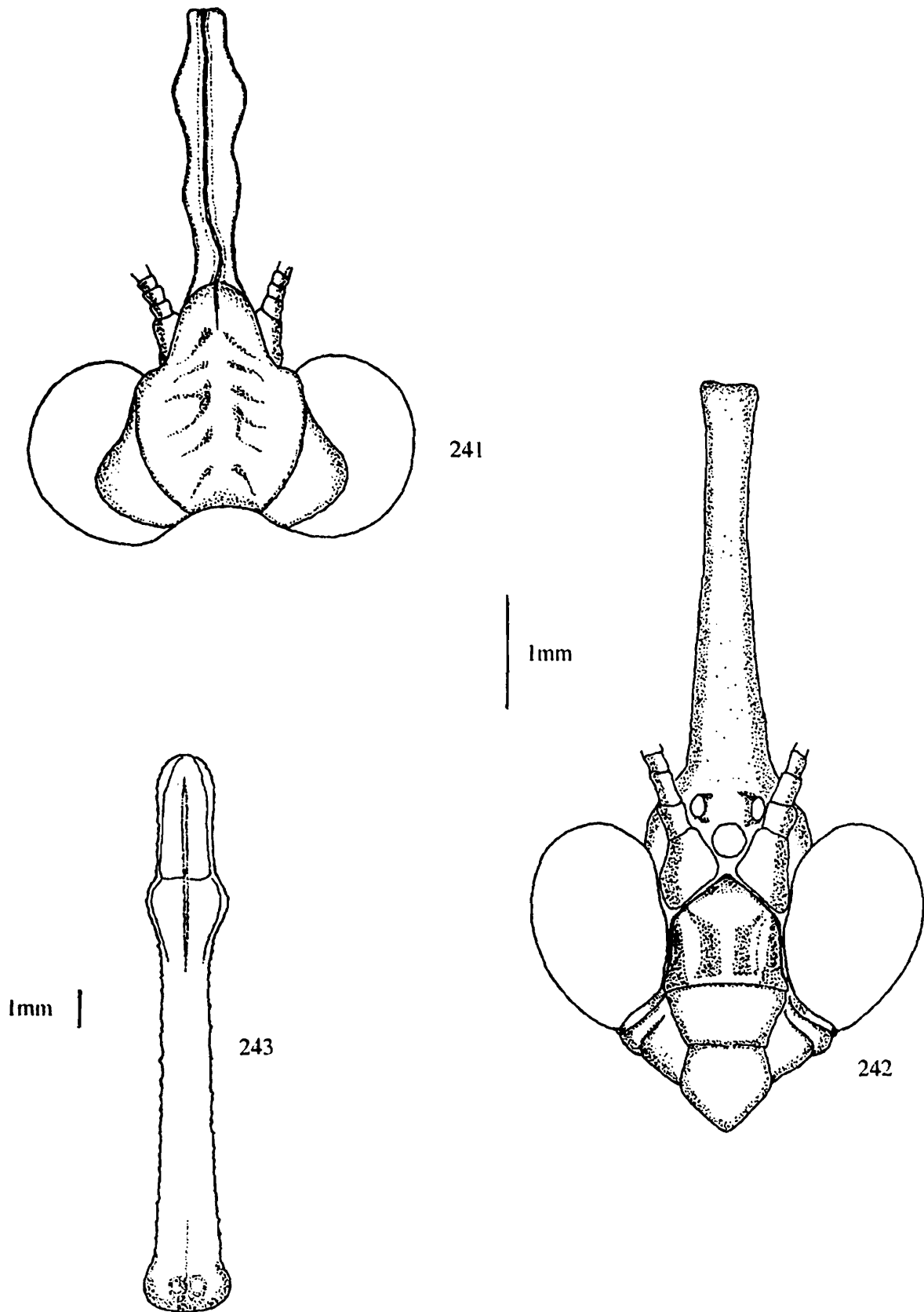


Fig. 241-243 : *Phyllothelys westwoodi* (Wood-Mason)
Fig. 241 : Head Dorsal view Fig. 242 : Head Ventral view Fig. 243 : Pronotum

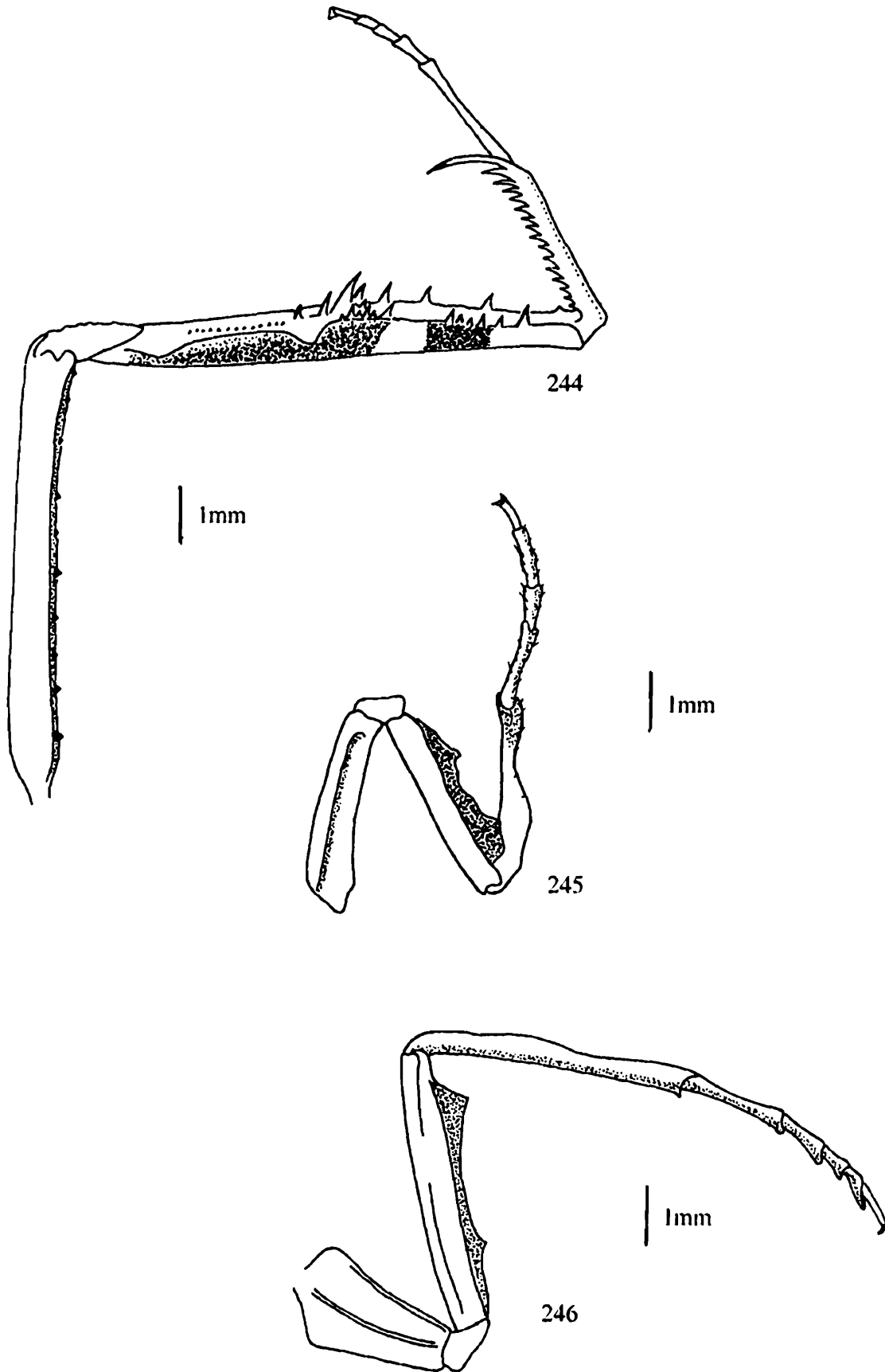


Fig. 244-246 : *Phyllothelys westwoodi* (Wood-Mason)
Fig. 244 : Foreleg Fig. 245 : Midleg Fig. 246 : Hindleg

Head : Eyes round; antenna setaceous; protuberance of vertex long, band like, excised at apex; frontal sclerite pentagonal, bicarinated. **Pronotum** : Slender, longer than fore coxa, lateral edge serrated, prozona with dorsomedian groove; metazona more than 2x longer than prozona. **Fore leg** : Coxa a little shorter than metazona, anterior margin with 10 black spinules, apical lobe contiguous; trochanter dentate at lower margin; femora internally black with two yellow bands one near claw groove at distal half, other oblong at middle of proximal half, 4 external, 4 discoidal spine present; tibia internally black below with 16 outer spines, 15 inner spines. **Mid and Hind legs** : Mid and hind femora with sharp ventral lobular extensions; mid and hind tibiae slightly swollen proximally. **Wings** : Brown, a little longer than abdomen, fore wing opaque at costal area, rest transparent; in hind wing costal area sub hyaline.

Abdomen : 4th and 5th abdominal segments with ventro lateral lobe; cerci short, setaceous; supra anal plate transverse.

Male : Male smaller and slender with cephalic horn and its cerst reduced to a rudimentary condition as a flexible projection about a millimeter length.

Material Examined : 1 Female, INDIA, Kerala, Attapadi, 14-viii 2006, coll: Binoy

Habitat : Evergreen forest.

Distribution : India: Assam, Uttar Pradesh, Kerala; Myanmar.

Subfamily TOXODERINAE

Body usually brown, long and bizzare shaped; head small; eyes conical or oval with or without spine. Pronotum longer than fore coxa; metazona carinated. Fore femur with 4-6 external, 3-4 discoidal spines; claw groove palced proximally; foretibial spines distributed towards distal end. Middle and hind legs with lobes. Supra anal plate transverse; cerci flat.

One tribe is known from India.

Tribe Toxoderini

Fore tibial spines at distal end only

Seven genera are known from India.

Key to genera of tribe Toxoderini

1. Fore femur with 4 external spines *Cheddlikulama* Henry
- Fore femur with 5-6 external spines 2

2. Mid and hind tibia dorsally carinate ***Aethalochroa*** Wood-Mason
 – Mid and hind tibia not dorsally carinate 3
3. Vertex with protuberance 4
 – Vertex without protuberance 5
4. Middle lobe of vertex elevated more than lateral lobes ***Toxoderopsis*** Wood-Mason
 – Middle lobe of vertex not elevated more than lateral lobes
 ***Paradanuria*** Wood-Mason
5. Abdomenl terga produced posteriorly into a delicate filamentous process
 ***Euthyphleps*** Wood-Mason
 – Abdomenl terga not produced into filamentous process 6
6. Metazona as long as prozona ***Toxomantis*** Giglio-Tos
 – Metazona much longer than prozona ***Loxomantis*** Giglio-Tos
- (Among these 5 genera only 3 are found in India)

Genus ***Aethalochroa*** Wood-Mason

1877. *Arsacia* Stal Bih. K. Svenska. Vetensk Akad. Handl. 4 (10) : 70. Type species : *Arsacia ashmoliana* (Westwood) Pre occupied.

1877. *Aethalochroa* Wood-Mason Ann. Nat. Hist. London (4) 19 : 308. Type species : *Aethalochroa ashmoliana* (Westwood).

Diagnostic characters : Body large, bizzare shaped, dark fuscous. Head small, vertex with mid lobe slightly elevated antero posteriorly, summit of vertex carinated and concave; eyes large, globular, sometimes terminates in a spine; antenna short and slender, non ciliated; frontal sclerite pentagonal at right angle to clypeus. Pronotum, longer than fore coxa, robust, distinctly carinated midlongitudinally, highly tuberculated; fore coxa a little dialated; fore femur slender with 5 external, 3 discoidal spines, claw groove at base; foretibia slender, with spines at distal end; mid and hindlegs short, femur and tibia lobed and carinated with genicular spines; metatarsus and other tarsal segments short; wings grey brown to fuscous, forewings with proximal and distal dark patches; hindwings semihyaline with concentrically arranged dark patches. Abdomen linear, slightly flattened, segments with ventral carina, last 3 segments exposed since wings are short; supra anal plate short, twice as broad as long; cerci flat and foliaceous.

Distribution : India, Kerala, Orissa, North India.

***Aethalochroa ashmoliana* (Westwood)**
(Figs. 215-220) (Plate XIII. Fig. 29)

1841. *Vates ashmoliana* Westwood *Ann. Nat. Hist.*, **8** : 272 Syntypes M F India Murshidabad and Calcutta.

1871. *Popa ashmoliana* Saussure *Mem. Soc. Phys. Hist. Nat. Geneva*, **21** : 161.

1877. *Arsacia ashmoliana* Wood Mason *Bih. K. Svenska Vetensk Akad. Handl.*, **4**(10) : 75.

1877. *Aethalochroa ashmoliana* Wood Mason *Ann. Nat. Hist.*, **19**(4) : 308.

Diagnosis : Male body length 110 mm.

Colour : Colour of dried leaves.

Head : Small, more or less globular, wider than long; vertex not smooth; middle lobe angular, raised at middle summit; occiput obtusely angular at base; eyes globular, antenna simple, slender, filiform, not setaceous; ocelli large, conspicuous, closely placed.

Pronotum : Elongated, robust, denticulated laterally, dorsally and ventrally; prozona spatulate; distinctly carinated mid longitudinally, supra coxal dialation well pronounced; Forelegs: simple, slender, coxa triangular in cross section; ridged middorsally, tuberculated inferiorly; internal apical lobes divergent; femur slender; slightly longer than coxa with 5 external, 3 discoidal, 8 longer internal and 5 shorter internal spines; a wide gap between two internal longer distal spines; claw groove at base, with a pit in between first and second external spines; tibia slender, spines born distally, tibia with 9 internal (gradually elongated towards the apex) and 5 external spines (placed towards distal end); metatarsus equal in size with all tarsal segments together. Middle and hind legs short and stout; femur slightly foliaceous with internal and external distal lobes; femur triangular in cross section, tibia foliaceous, with lamellar carinae and two terminal spines; metatarsus short; other tarsal segments a little longer than metatarsi; forewings semihyaline; costal area more opaque; reticulately venated; hind wing longer than forewing (both wings shorter, upto three fourth of abdomen).

Abdomen : Elongated; supra anal plate triangular; cerci foliaceous.

Female : Slightly longer than male; with stouter body; abdomen flatter, with semiopaque forewing; hindwing purple checks alternates with transparent, hyaline blocks; costal area deep purple, posterior tip of both wings deep purple.

Materials examined : Plesiotype : Male, Cali. Uni. Campus, 4-vi-1994, Pramila. Other materials examined : 1 Female, Meenangadi, 18-v-1999, Vyjayandi. 1 Female, Cali. Uni. Campus, 24-vii-1993, Biji.M.

Habitat : Seen at the interior undisturbed forest area.

Distribution : India, Maharashtra, Orissa, West Bengal.

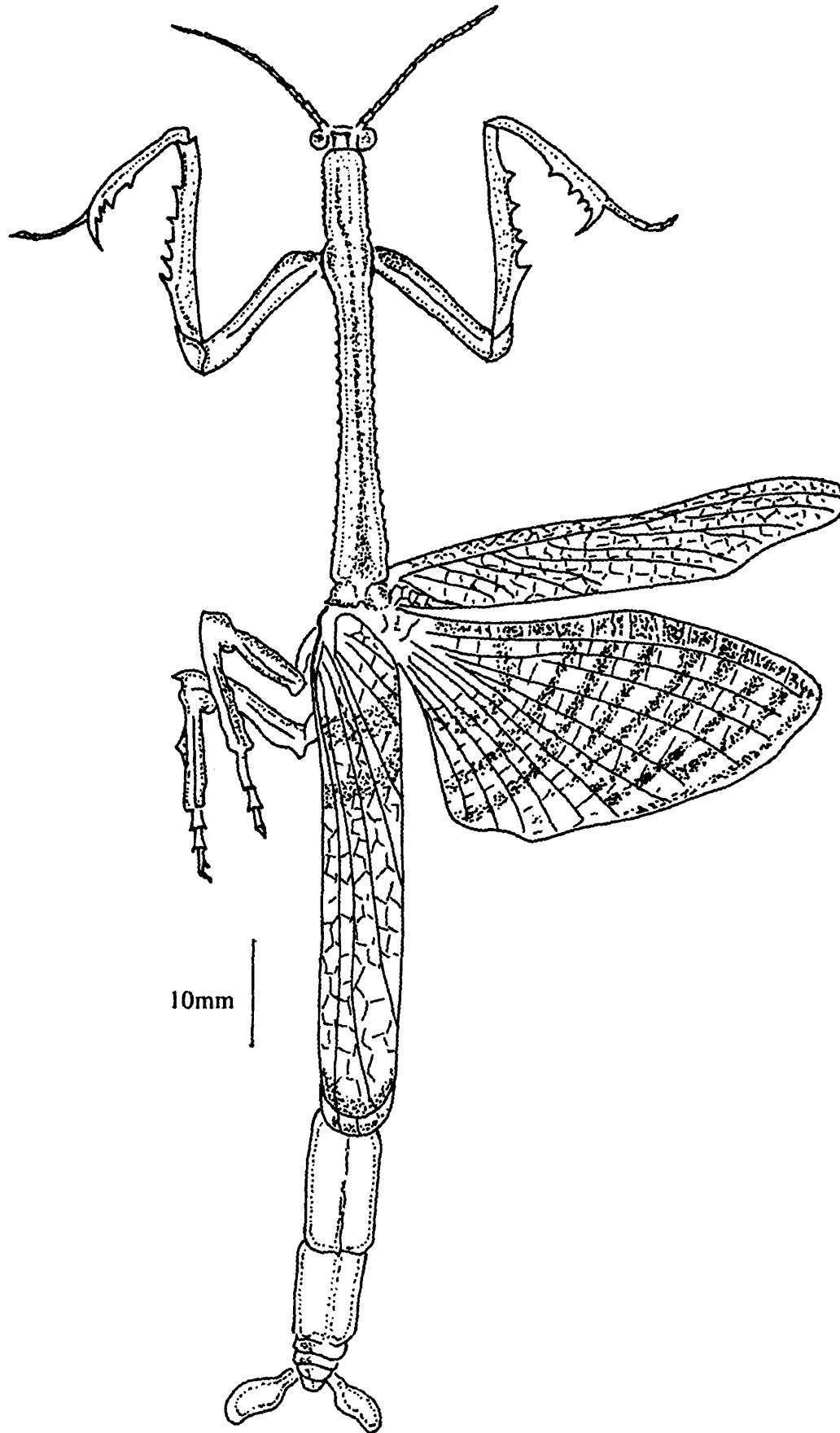


Fig. 215 : *Aethalochroa ashmoliana* Westwood

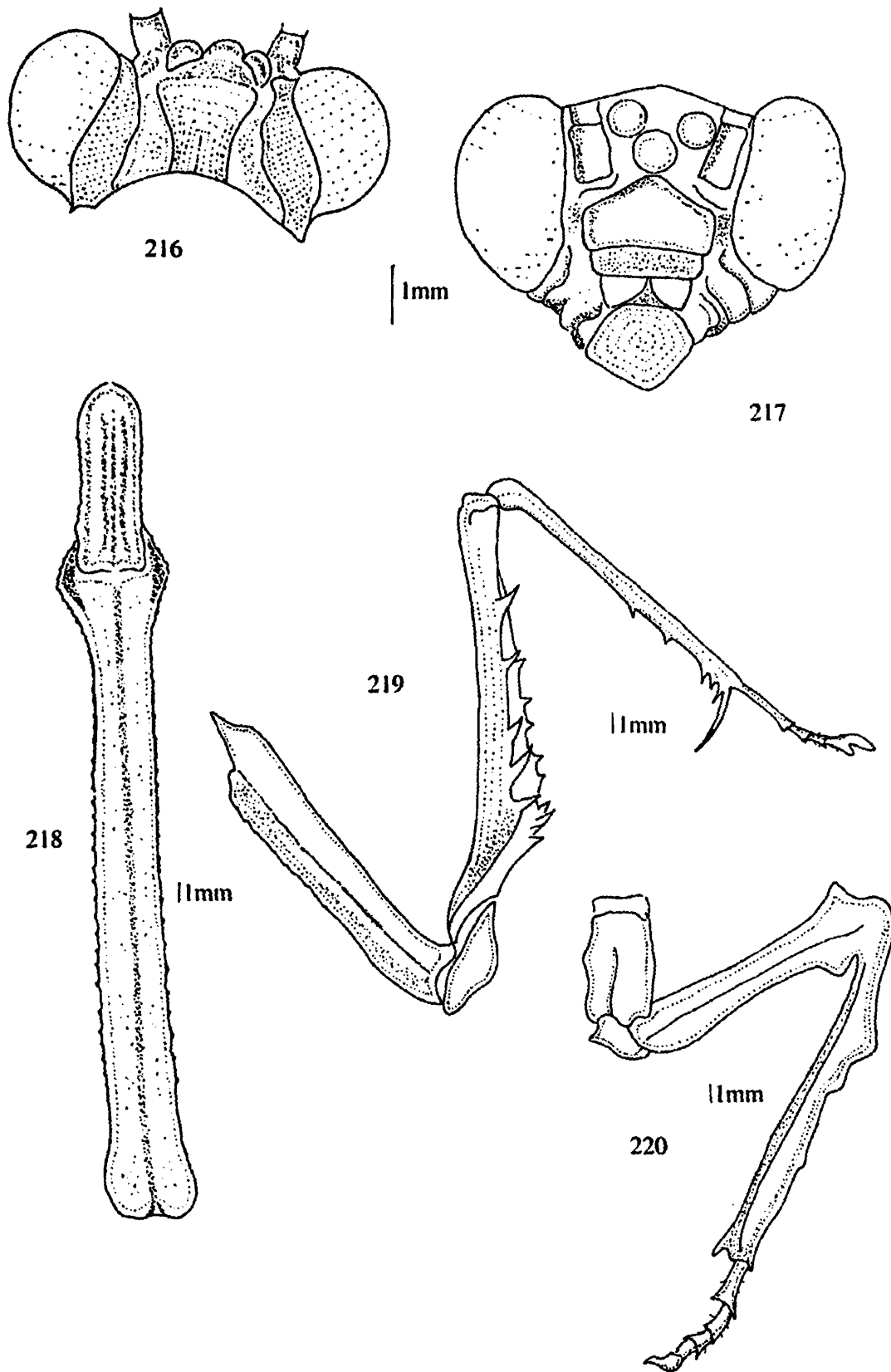


Fig. 216-220 : *Athalochroa ashmoliana* (Westwood)

**Fig. 216 : Head Dorsal view Fig. 217 : Head Ventral view Fig. 218 : Pronotum Fig. 219 : Foreleg
Fig. 220 : Hindleg**

Genus *Cheddikulama* Henry

1932. *Cheddikulama* Henry *Spolia Zeylanica*. vol., 17 (1) : 13. Type species : *Cheddikulama straminea* Henry.

Diagnostic characters : Body long and slender, in general appearance resembles a piece of straw. Head large, broader than long, pentagonal, flattened; occiput produced into two angular lobes; frontal sclerite transverse, superior end bluntly conical; eyes laterally conical, bearing a small bifid tubercle at their lateral extremity. Pronotum slender, twice longer than fore coxa; supra coxal dialation very little pronounced; metazona medianly carinated; fore coxa slightly expanded, internal apical lobes divergent; forefemora slender with 4 external and 4 discoidal spines; internal spines one longer alternating with one shorter spine proximally. distalmost two longer internal spines enclose 4-5 smaller spines; midfemora carinated and two ventral carinae produced distally into a pair of slender, compressed, spine like genicular lobes; hindlegs much longer than middle legs; wings ornate; forewing with parallel venation; hindwing with purple blotch and concentrically arranged purple patches.

Abdomen : Slender; cerci compressed, almost foliaceous.

Distribution : India, Sri Lanka.

***Cheddikulama straminea* Henry**
(Figs. 221-227) (Plate XIV. Fig. 30)

1932. *Cheddikulama straminea* Henry *Spolia Zeylanica*, 17(1) : 13

Diagnosis : Male body length: 60 mm

Colour : Straw yellow.

Head : Large, flattened, wider than high, broadly pentagonal; occiput produced into two angular lobes with a round knob between them, posterior margin of occiput concave; vertex flat, middle lobe slightly pronounced; ocelli large, face short; eyes produced laterally, mammiform, each with a small, slightly bifid tubercles at lateral extremity; frontal sclerite transverse, 2.5x wider than high; slightly arched upward and below, not carinate; clypeus somewhat globular.

Pronotum : Long, slender, twice longer than fore coxa, supra coxal dialation very little pronounced, prozona spatulate, somewhat depressed, metazona semicylindrical, 3x longer than prozona; granulated. *Forelegs* : Elongated, angular, fore coxa slender internal apical lobes angular and divergent; fore femur slender, distally produced into a slightly up-turned, bluntly pointed lobe, with 4 external, 4 discoidal internally with 5 longer and 8 shorter spines, a row of small tubercles present at base, immediately distal to fourth discoidal spine a round pit present for reception of distal external tibial spine; claw groove middle; foretibia compressed with 11 small external and 15 internal

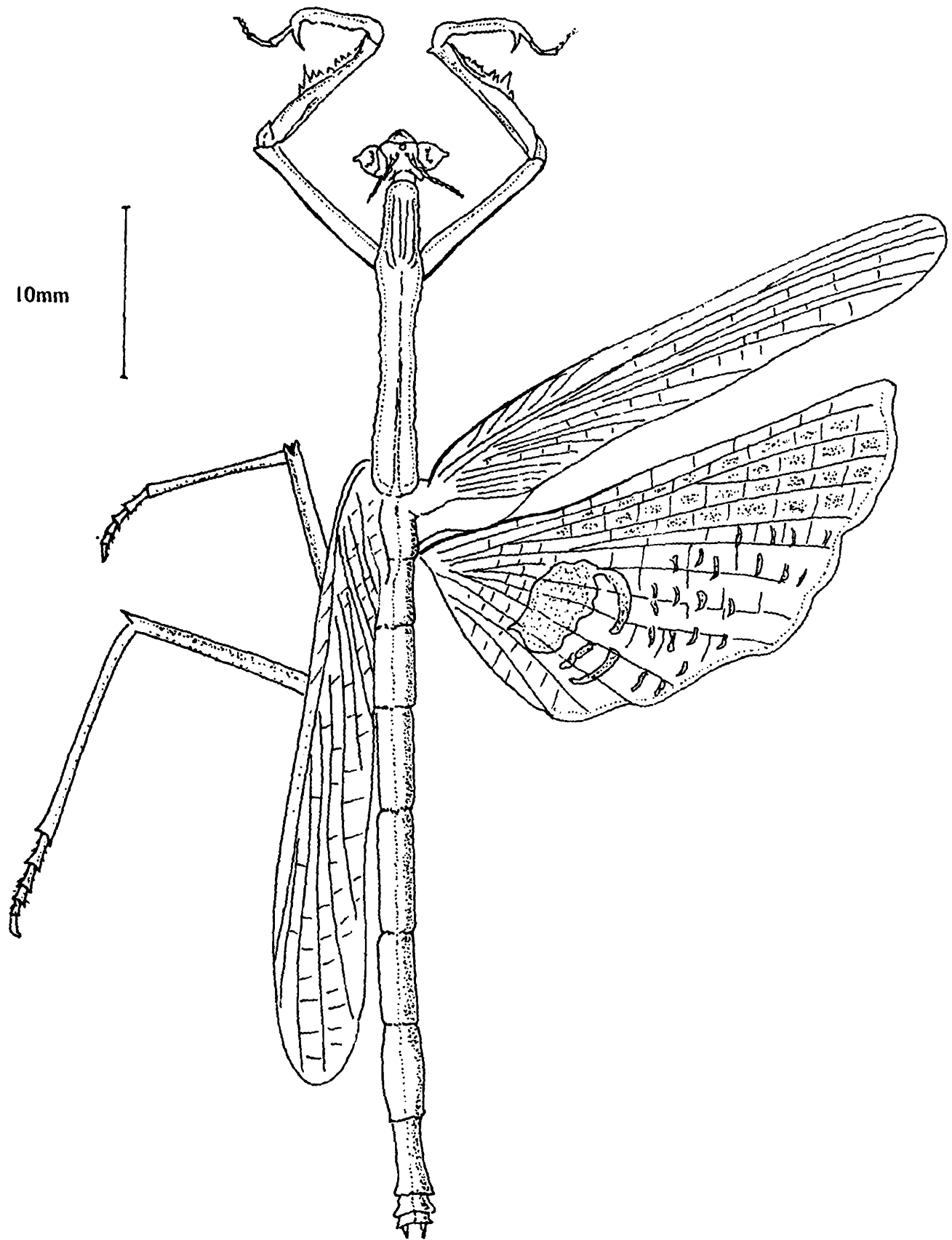


Fig. 221 : *Cheddikulama straminea* Henry

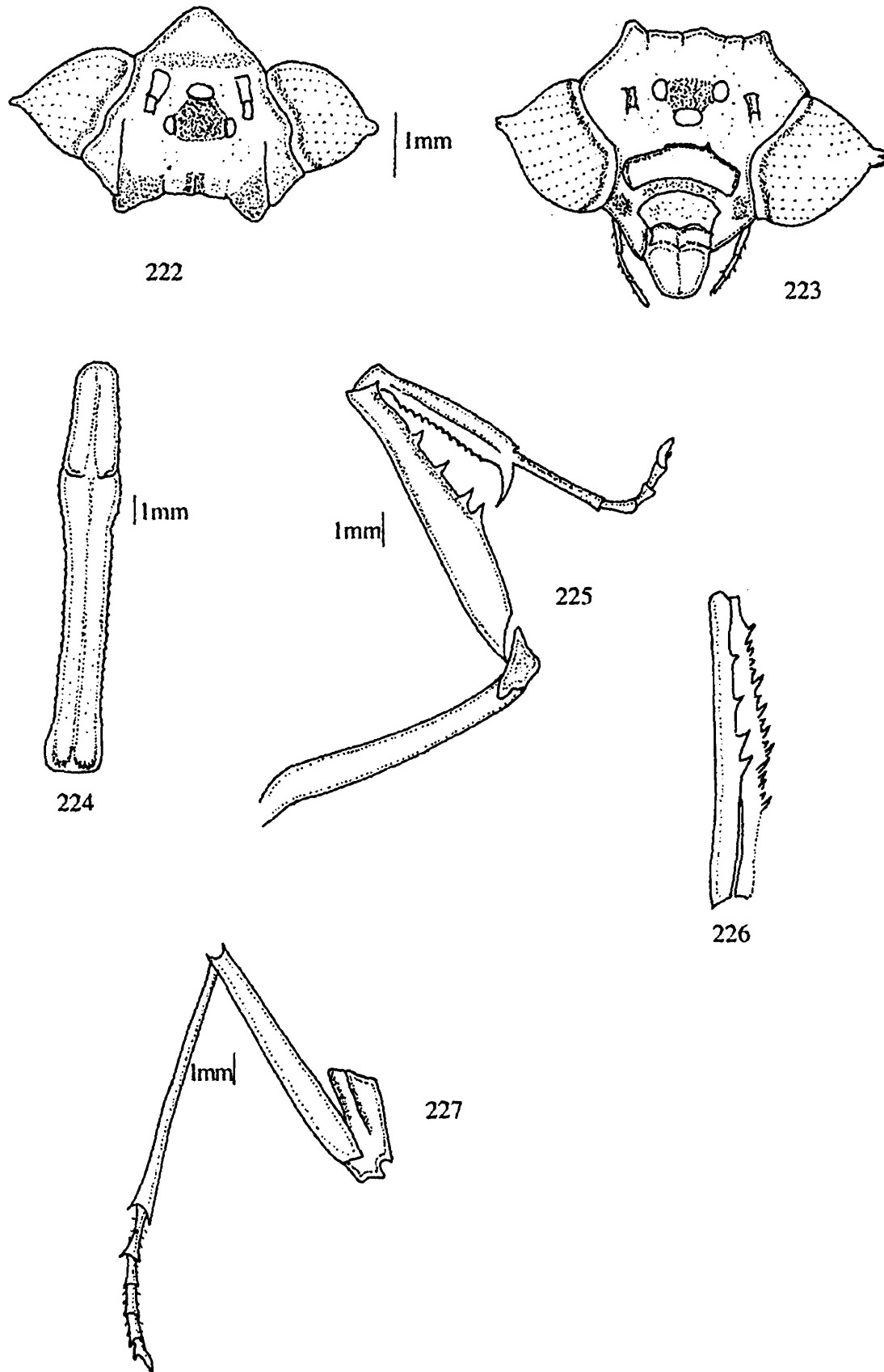


Fig. 222-227 : *Cheddikulama straminea* Henry

Fig. 222 : Head Dorsal view Fig. 223 : Head Ventral view Fig. 224 : Pronotum Fig. 225 : Foreleg
 Fig. 226 : Forefemur front view Fig. 227 : Hindleg

spines; metatarsus as long as all other tarsal segments together; midfemur with outer and inner longitudinal carina outwardly and distally forms into somewhat compressed, long, pointed genicular lobes; metatarsus shorter than all other tarsal segments together. Wings : Shorter than abdomen, subopaque, forewing narrow, with somewhat dilated costal area, tip sharply round; venation almost parallel, anal membrane narrow; hindwing hyaline, except along costal area, rose pink at base of anal area with large oval fuscous blotch illuminated with blue and violet reflections on discoidal area outer to blotches with broken concentric bands of same colour extending nearly to margin; shorter than forewing, costal area with transverse cross veins.

Abdomen : Narrow, supra anal plate transverse, truncated medially; cerci short, more or less oval, strongly compressed at base.

Male : Male similar to female.

Materials examined : Plesiotype : Female, Cal. Uni. Campus, 11-ix-1997, T.C. Narendran. Other materials examined: Female, Parambikulam Wild Life Sanctuary, Anjupoola, 31-x-1995. P.M. Sureshan, (ZSI, Calicut) Reg. No.8357.

Habitat : Undisturbed areas.

Distribution : India, Kerala, Uttar Pradesh

Genus *Toxoderopsis* Wood-Mason

1889. *Toxoderopsis* Wood-Mason *J. Asiatic. Soc. Bengal.*, **58** : 317. Type species : *Toxoderopsis spinigera* Wood-Mason.

Diagnostic characters : Body brown; bizarre shaped. Head small, wider than high; median lobe of vertex higher than laterals; frontal sclerite narrow, truncate superiorly with a median prominent semicircular area and lateral quadrate area; eyes with lateral spine; ocelli large. Pronotum spiny or tuberculated; prozona spatulate, supra coxal dialation well pronounced; metazona carinated, as long as fore coxa fore coxa with inner distal serrated lobe; fore femur slender with five external and three discoidal spines, claw groove proximally placed; middle and hind legs short, mid and hind femora with genicular spines and with two small dorsal and one ventral foliaceous lobes; mid and hindtibia simple; wings shorter than abdomen. Abdomen a little flat, supra anal segment short, cerci foliaceous.

Distribution : India, (Kerala, Maharashtra, Orissa).

Two species occur in India.

Key to Indian species of *Toxoderopsis* Wood-Mason

1. Frontal process above the ocelli spiniform..... *T. spinigera* Wood-Mason

- Frontal process above the ocelli bifid in female, truncate in male
 *T. taurus* Wood-Mason
 (*T. taurus* is not so far known from Kerala)

***Toxoderopsis spinigera* Wood-Mason**
 (Figs. 228-233) (Plate XIV. Fig. 31)

1889. *Toxoderopsis spinigera* Wood-Mason *J. Asiat. Soc. Bengal.*, **58** : 319. Holotype. F. India, Bombay ZSI.

Diagnosis : Male Body length 88 mm. Colour of dried, decaying leaves.

Head : As wide as high, vertex centrally with a triangular elevation, anteriorly with a trapezoidal area marked out by ridge, possess a sharp frontal spinuous process; anteriorly between eye and antenna a spine like tubercle present; antenna filiform, slender with minute dispersed setae; eyes laterally oval, produced slightly above the level of lateral lobes of vertex with upper and outer angles bearing a very sharp incurved conical, corneal spine; ocelli large, placed raised from the surface; frontal sclerite 4x wider than high; divided into three parts, median prominent semicircular lobe with sinuate superior border and two lateral sub quadrate areas, leaving a very narrow space intervening them and eye.

Pronotum : Elongated, tuberculated all over surface, with distinct denticulated metazonal mid dorsal carina, supra coxal dialation well pronounced, Forelegs long and slender, coxa with anterior crest upto two-fifths of its length, distally with a inner conspicuous, expanded, dentate, foliaceous lobe, internal apical lobes divergent; trochanter small, tuberculated; femur narrow, slender, carinated, carina ending in a sharp genicular lobe, somewhat longer than the lateral lobes, femur with 5 external (in between first and second spine a pit present), 3 discoidal, 5 longer internal, 5 shorter internal spines, tibia slender, straight, with 9 internal and 4 external spines, Middle and hind legs short and weak, coxa simple, femur prismatic, slightly tapering both ends with 4 strong crests and strong ridge on each side, with 3 genicular lobes, ventral crests expanded into a foliaceous lobe divided into two obliquely pointed lobules, tibia simple, slender, longer than femur, metatarsus shorter than other two tarsal segments together. Wings: both shorter than abdomen, semihyaline, forewing with costal area opaque, with reticulate venation, costal veins bifurcate peripherally, anterior radial and post radial veins originate from the main stem and post radial and ulnare vein bifurcates.

Abdomen : Smooth and polished without foliaceous lobes, bluntly carinated dorsally, last segment with serrated ends; cerci foliaceous, acutely bifid.

Female : Female similar to male.

Materials examined : Plesiotype : Male, Cali. Uni. Campus, 10-ix-1999, T.C. Narendran. 2Females; Cali. Uni. Campus, 13-ix-1999, 10-ix-1999, T.C. Narendran and C.F.Hussain.

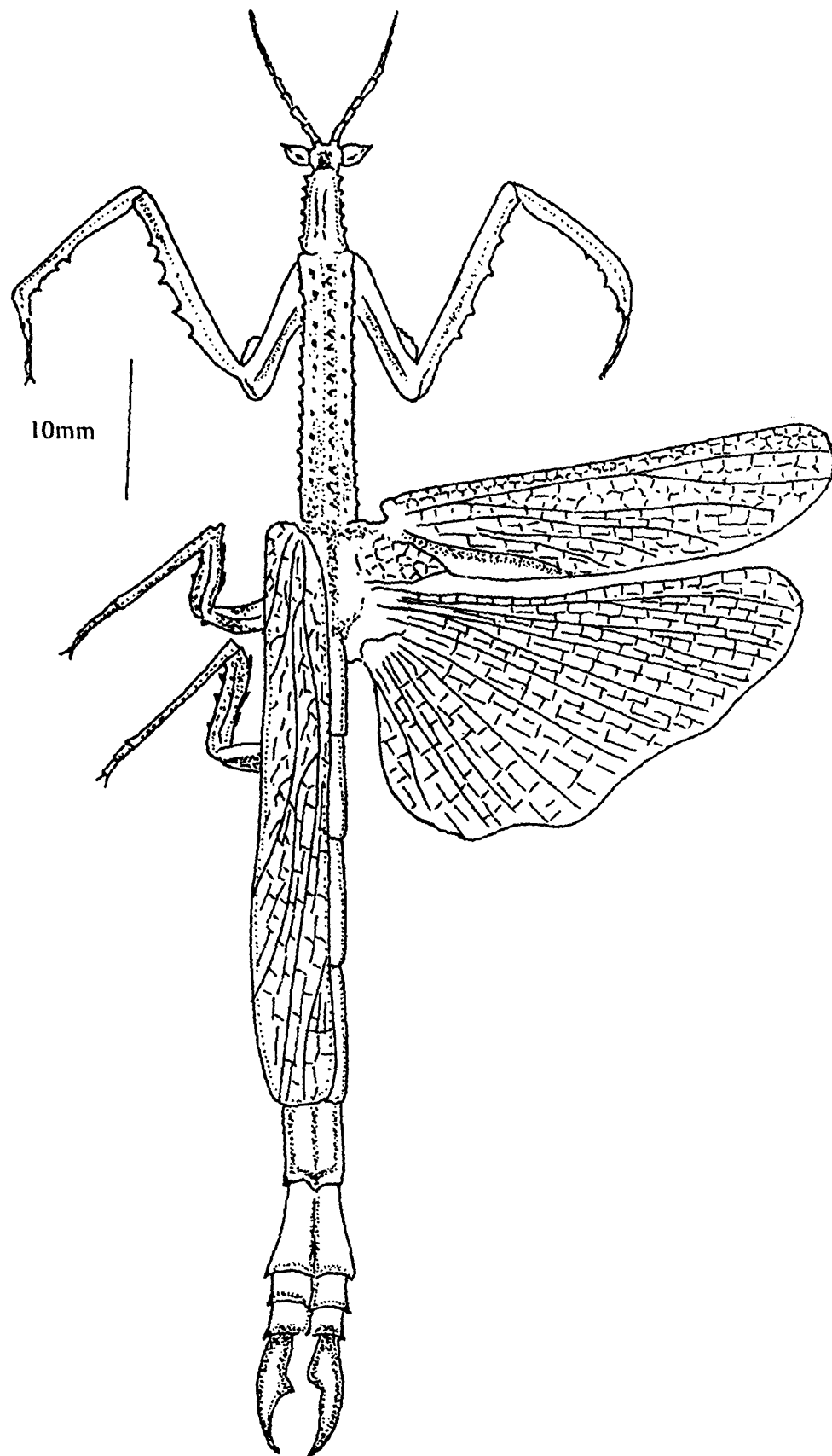


Fig. 228 : *Toxoderopsis spinigera* Wood-Mason

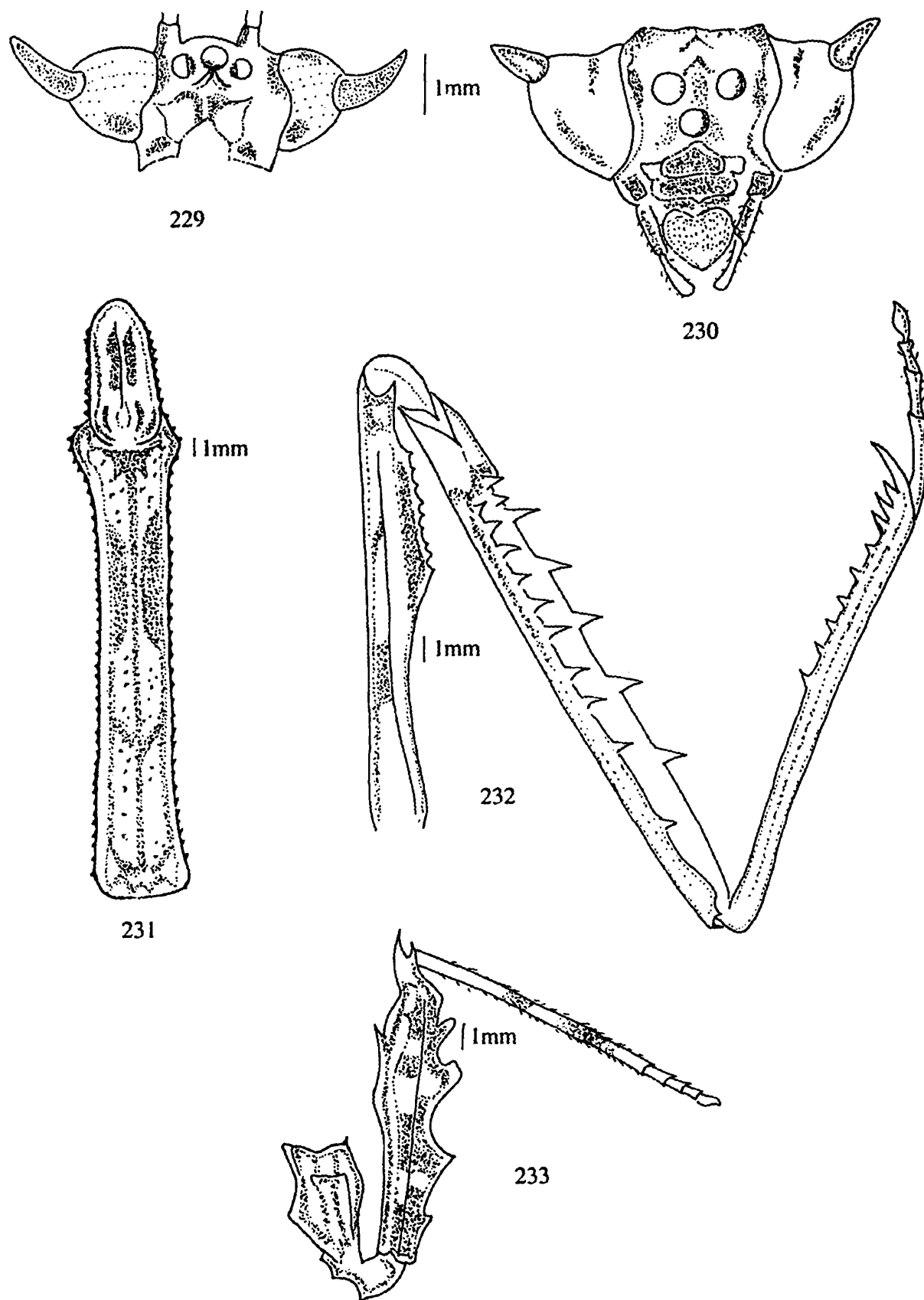


Fig. 229-233 : *Toxoderopsis spinigera* Wood-Mason

Fig. 229 : Head Dorsal view Fig. 230 : Head Ventral view Fig. 231 : Pronotum Fig. 232 : Foreleg
 Fig. 233 : Midleg

Habitat : Undisturbed areas.

Distribution : India, Kerala, Maharashtra

Subfamily ANGELINAE

Genus : *Euchomenella* Giglio-Tos

Diagnostic characters : Slender mantis with long pronotum, transverse head, large bulging eyes; frontal sclerite transverse; fore coxae with convergent internal apical lobes, typical arrangement of external internal femoral spines; distal claw groove and brachypterous condition in female.

Euchomenella indica H Ghatе
(Figs. 234-239) (Plate XI. Fig. 24)

2004. *Euchomenella indica* Hemant V Ghatе and Tushar K Mukherjee

Diagnosis : Female Body length 75 mm.

Colour : Brown.

Head : Transverse, eyes large, bulging and rounded; antennae shorter than pronotum with bristles; frontal sclerite transverse.

Pronotum : Slender, longer than fore coxae, prozona distinctly denticulated; metazona finely denticulated at lateral margins. In fore legs, coxae with 7-8 minute spines at anterior edge and with spinules among them; femora with 4 external, proximal two entirely blackish, distal two black at tips only, 15 internal (6 long and 9 short), 4 discoidal; tibia short with 8 external spines and 14 internal spines. Mid and hind legs: long and slender; metatarsus longer than all other tarsal segments put together. Wings: both wings very short and opaque; fore wing green at costal area rest brown, hind wing entirely blackish brown with white veinlets.

Abdomen : Supra anal plate transverse, rounded at tip. cerci long, cylindrical and setaceous.

Male : Smaller than female (body length 64 mm): wings extended beyond the abdomen but in female wings are very much reduced reaching up to 1st abdominal segment; male also possesses golden bristles at the abdominal sternites, but in female abdominal sternites are smooth.

Materials examined : Plesiotype: Female, Arippa forest, Trivandrum, 20-v-2005, Rajeesh. Other materials examined: 2 Nymphs (last instar), Mullamkuzhi, Ernakulam, 31-v-2006, Rajeesh.

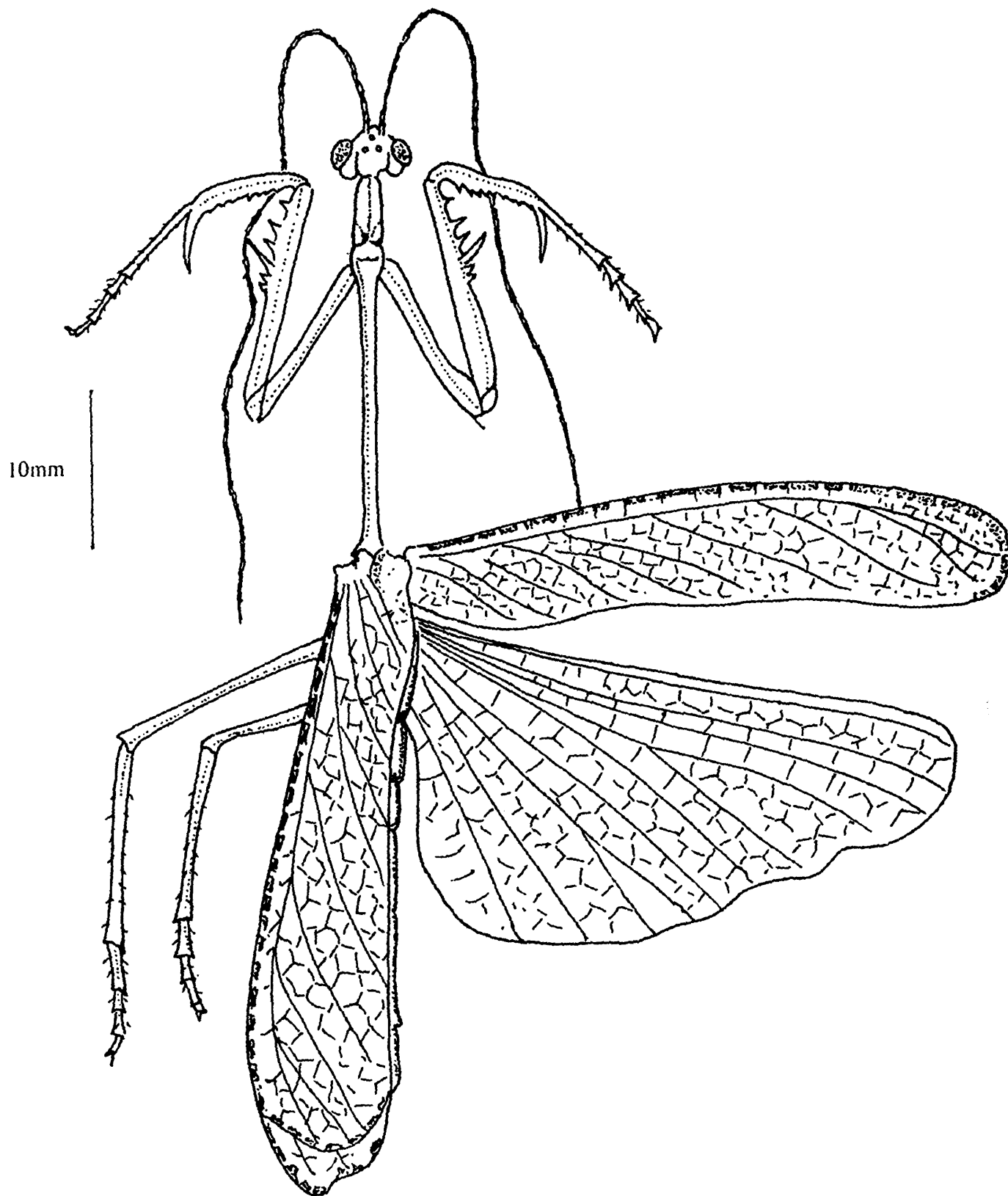


Fig. 234 : *Euchomenella indica* H. Ghatge

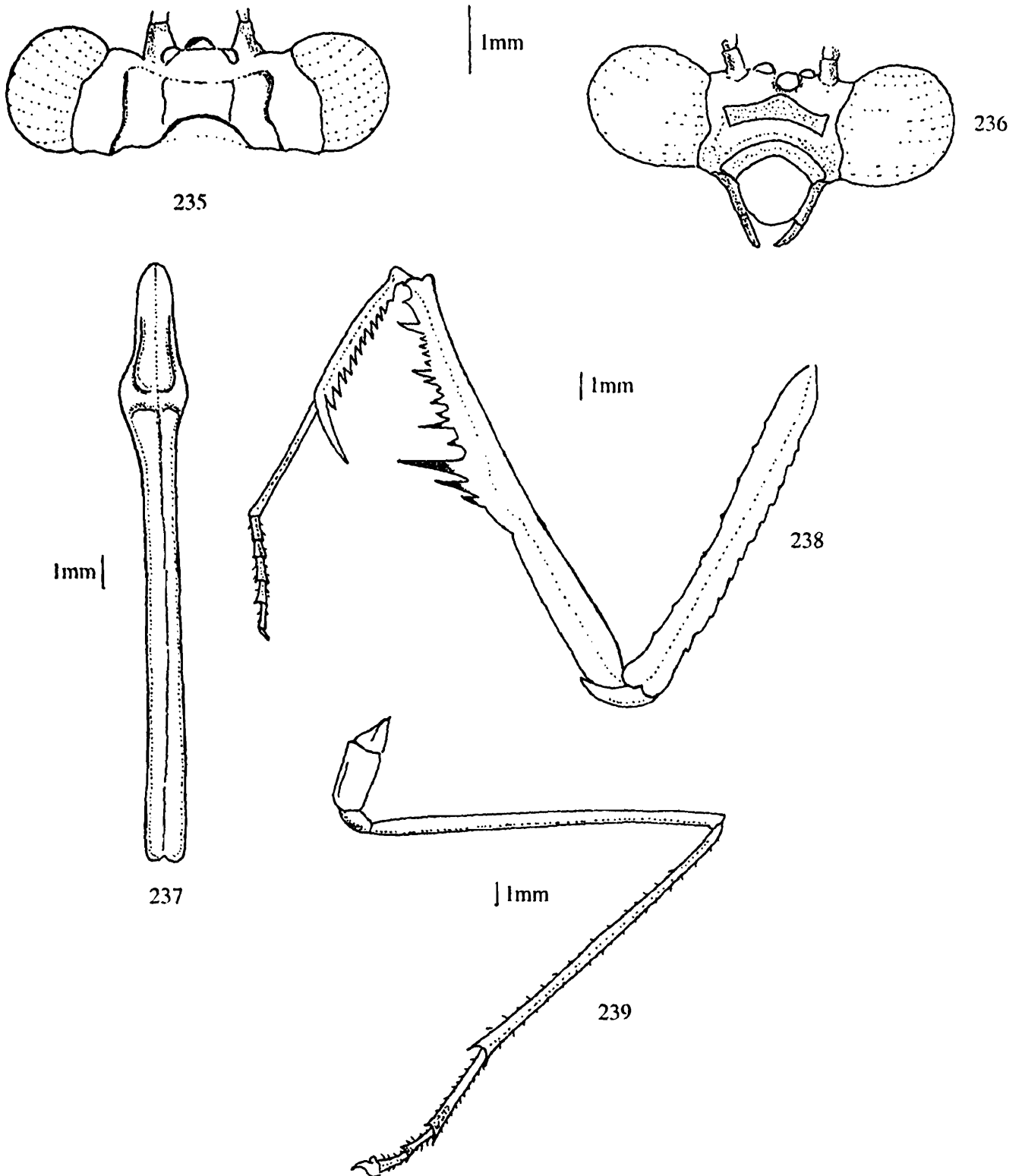


Fig. 235-239 : *Euchomenella indica* H. Ghaté

**Fig. 235 : Head Dorsal view Fig. 236 : Head Ventral view Fig. 237 : Pronotum Fig. 238 : Foreleg
Fig. 239 : Hindleg**

Habitat : Ever green forest.

Disribution : India : South India.

DISCUSSION

The present systematic study of Order Mantodea Burmiester reveals that the Mantid Fauna of Kerala is fascinating and consists of 4 families 29 genera and 40 species. They have been studied and analysed systemically.

In the present investigation 3 new species *Heirodula keralensis*, *Iris keralensis* and *Amantis malabarensis* are new to Science.

Following are the new records for subfamilies for Kerala. Subfamily Hymenopodinae, 2. Subfamily Litugrusinae, 3. Subfamily Schizocephalinae, 4. Sub Family Toxoderinae. 5. Subfamily Phyllothelinae

Following are the new records of genera of Kerala. 1. *Ambiva* Stal, 2. *Euantissa* Giglio-Tos, 3. *Hestiasula* Saussure, 4. *Humbertilla* Saussure, 5. *Schizocephala* Audinet-Serville, 6. *Elmantis* Giglio-Tos, 7. *Mantis* Linneaus, 8. *Plistospilota* Beier, 9. *Statilia* Stal, 10. *Diephobella* Giglio-Tos, 11. *Phellothelys* Wood-Mason.

11. *Iris* Saussure, 12. *Aethalochroa* Wood-Mason, 13. *Cheddikulama* Henry, 14. *Toxoderopsis* Wood-Mason.

CHECKLIST

Mantodea of Indian Subcontinent

Family AMORPHOSCELIDAE Stal

1. Genus *Amorphoscelis* Stal

A. annulicornis Stal, 1871 (India, Assam, Bihar, Daman & Diu, Himachal Pradesh, Kerala, Meghalaya, Tamil Nadu, West Bengal. (Sri Lanka)

A. brunneipennis Beier, 1956 (India, Kerala. (Sri Lanka)

A. singaporana Giglio-Tos, 1915 (India, Assam, (Singapore, Sumatra, Thailand)

Family EMPUSIDAE Burmeister

Subfamily EMPUSINAE Saussure

2. Genus *Empusa* Illiger

E. fasciata Brulle, 1832 (India, Bihar (Philippiens, Balacan)

E. guttata (Thunberg), 1815 (India, Andra Pradesh, Orissa, Rajasthan, Uttar Pradesh, (Africa)

E. pauperata (Fabricius), 1781 (India, Eastern Coast, (Myanmar, Sri Lanka)

E. spinosa Krauss, 1902 (India, Chandigarh (Saudi Arabia)

3. Genus *Gongylus* Thunberg

G. gongyloides (Linneaus), 1758 (India, Andra Pradesh, Kerala, Tamil Nadu, West Bengal (Indonesia, Java, Sri Lanka)

G. trachelophyllus Burmeister, 1838 (India, Bihar, Orissa)

Subfamily BLEPHARODINAE Beier

4. Genus *Blepharopsis* Rehn

B. mendica (Fabricius), 1775 (India, Rajasthan, Uttar Pradesh, (Africa, Canary Island)

Family EREMIAPHILIDAE Wood-Mason

5. Genus *Eremiaphila* Lefebvre

E. rotundipennis Kirby, 1871 (India, Gujarat, (Egypt)

Family HYMENOPODIDAE Chopard

Subfamily ACROMANTINAE Giglio – Tos

Tribe *Acromantini*

6. Genus *Acromantis* Saussure

A. insularis Giglio-Tos, 1915 (India, Kerala, Tamil Nadu, Karnataka, (Indonesia, Java, Sumatra)

A. montana Giglio-Tos, 1915 (India, Arunachal Pradesh, Kerala, Meghalaya, Tripura (Indonesia, Java)

A. nicobarica Mukherjee, 1966 (India, Nicobar Island)

A. oligoneura (De Hann), 1842 (India, Assam, Meghalaya (Bangladesh, Indonesia, Sunda Island)

7. Genus *Ambivia* Stal

A. popa Stal, 1877 (India, Kerala, Sikkim, West Bengal (Indonesia, Kalimantan, Sumatra, Myanmar, Sri Lanka)

8. Genus *Anaxarcha* Stal

A. acuta Beier, 1963 (India, Meghalaya, Sikkim, West Bengal)

A. graminea Stal, 1877 (India, Kerala, Sikkim, West Bengal)

A. intermedia Mukherjee, 1983 (India, Arunachal Pradesh, Meghalaya)

A. limbata Giglio-Tos, 1915 (India, Kerala, (Indonesia, Kalimantan, Borneo)

9. Genus *Ephestiasula* Giglio-Tos

E. amoena (Bolivar), 1897 (India, Kerala, Tamil Nadu, West Bengal)

E. intermedia Werner, 1930 (India, Jammu & Kashmir, Karna Madhya Pradesh, Rajasthan, Uttar Pradesh, Orissa)

E. pictipes (Wood-Mason), 1897 (India Madhya Pradesh, Orissa, Uttar Pradesh)

10. Genus *Euantissa* Giglio-Tos

E. ornata Werner, 1935 (India, Bangladesh)

E. pulchra (Fabricius), 1787 (India, Eastern & North Eastern India, Kerala (Sri Lanka)

11. Genus *Heliomantis* Giglio-Tos

H. elegans (Navas), 1904 (India, Assam, West Bengal)

12. Genus *Hestiasula* Saussure

H. brunneriana Saussure, 1871 (India, Andra Pradesh, Meghalaya, West Bengal, (Bangladesh, Sri Lanka)

H. castetsi (Boliver), 1897 (India, Tamil Nad

H. inermis (Wood-Mason), 1897 (India, Assam, Sikkim, West Bengal)

H. nigrofemorata Werner, 1930 *H. masoni* Giglio-Tos, 1915 *H. kastneri* Beier, 1941 (India, Tamil Nadu)

H. woodi Giglio-Tos, 1915 (India)

13. Genus *Nemotha* Wood-Mason

N. metallica (Westwood), 1843 (India, Arunachal Pradesh, Assam, (Bangladesh)

14. Genus *Odontomantis* Saussur

O. micans (Saussure), 1871 (India, Indonesia, Kalimantan, Sumatra, Sri Lanka

O. montana Giglio-Tos, 1915 (India, Orissa Indonesia, Sumatra)

15. Genus *Creobroter* Audinet-Serville

C. apicalis Saussure, 1869 (India, Assam, Karnataka, Kerala, Manipur, Meghalaya, Orissa, Sikkim,

C. elongata Beier, 1929 (India, Sikkim) West Bengal

C. gemmatus (Stoll), 1813 (India, Arunachal Pradesh, Himachal-Pradesh, Sikkim, UttarPradesh (Myanmar, China, Indonesia, Java

C. laevicollis (Saussure), 1870 (India, Andhra Pradesh, Assam, Meghalaya, Sikkim, West Bengal, (Indonesia, Java

C. urbanus (Fabricius), 1775 (India, Meghalaya, (Indonesia, Java)

16. Genus *Hymenopus* Audinet-Servill

H. coronatus (Oliver), 1792 (India, Assam, (Indonesia, Kalimantan, Sunda Islands) India, Assam, (Indonesia, Kalimantan, Sunda Islands)

Family MANTIDAE Burmeister

Subfamily AMELINAE Giglio-Tos

Tribe **Amelini**

17. Genus *Amantis* Giglio-Tos

A. biroi Giglio-Tos, 1915 (India, Andhra Pradesh, West Bengal)

A. indica Giglio-Tos, 1915 (India, Sikkim)

A. malabaransis Vyjayandi. (India, Kerala)

A. saussurei (Bolivar), 1897 (India, Andhra Pradesh, Kerala, Tamil Nadu)

A. subirina Giglio-Tos, 1915 (India, Assam, West Bengal)

18. Genus *Cimantis* Giglio-Tos

C. fuliginosa Werner, 1931 (India, Tamil Nadu)

C. fumosa Giglio-Tos, 1915 (India, Arunachal Pradesh, Kerala, Uttar Pradesh, West Bengal)

C. tetacea Werner, 1931 (India, West Bengal)

19. Genus *Elmantis* Giglio-Tos

E. trincomaliae (Saussure), 1869 (India, Andhra Pradesh, Karnataka, Kerala Maharashtra, Tamil Nadu, (Sri Lanka)

E. nira Mukherjee & Hazra 1983 (India, Maharashtra)

20. Genus *Eumantis* Giglio-Tos

E. assamica Giglio-Tos, 1915 (India, Assam, Tamil Nadu)

21. Genus *Gimantis* Giglio-Tos

G. authaemon (Wood-Mason), 1882 (India, Meghalaya (Myanmar)

22. Genus *Gonypeta* Saussure

G. punctata (De Hann) 1842 (India, Karnataka, Meghalaya, Tamil Nadu, Uttar Pradesh), (Indonesia, Java, Sumatra)

23. Genus *Gonypetyllis* Wood-Mason

G. semuncialis Wood-Mason, 1891 (India, Gujarat, Uttar Pradesh, West Bengal)

24. Genus *Memantis* Giglio-Tos

M. fulginosa (Thunberg), 1815 (India)

M. gardeneri Werner, 1931 (India, Madhya Pradesh, Uttar Pradesh)

M. minor Werner, 1931 (India, Andhra Pradesh)

Subfamily CALIRIDINAE Giglio-Tos

25. Genus *Caliris* Giglio-Tos

C. masoni (Westwood), 1889 (India, Arunachal Pradesh, Meghalaya, Tamil Nadu, West Bengal)

26. Genus *Leptomantis* Giglio-Tos

L. indica Giglio-Tos, 1915 (India, Himachal Pradesh, Meghalaya, Tamil Nadu, West Bengal)

L. lactea (Saussure), 1870 (India, Meghalaya, (Indonesia, Java, Kalimantan, Philippines)

L. montana Beier, 1941 (India, Assam, Meghalaya, West Bengal)

L. nigrocoxata Mukherjee, 1995 (India, Arunachal Pradesh)

L. parva Werner, 1933 (India, Kerala, Uttar Pradesh)

Subfamily CHOERADODINAE Kirby

27. Genus *Choeradodis* Audinet-Serville

C. cancellata (Fabricius), 1775 (India, Meghalaya, South India, Central India, (Sri Lanka)

C. squilla Saussure, 1869 (India, Meghalaya, (Sri Lanka)

Subfamily DEROPLATINAE Giglio-Tos

28. Genus *Parablepharis* Saussure

P. kuhlil (De Hann), 1842 (India, Arunachal Pradesh, Assam, (Indonesia, Java, Kalimantan)

Subfamily IRIDOPTERYGINAE Giglio-Tos

Tribe **Iridopterygini**29. Genus *Hapalopeza* Stal

H. nilgrica Wood-Mason, 1891 (India, Tamil Nadu)

H. periyara Mukherjee & Hazra, 1985 (India, Kerala)

30. Genus *Nanomantis* Saussure

N. lactea Mukherjee, 1995 (India, Tamil Nadu)

31. Genus *Parananomantis* Mukherjee

P. brevis Mukherjee, 1995 (India, Assam, Himachal Pradesh, Jammu, Karnataka, Manipur, West Bengal).

Tribe **Tropidomantini**32. Genus *Eomantis* Giglio-Tos

E. guttatipennis (Stal), 1877 (India, Assam, Bihar, Gujarat, Karnataka, Tamil Nadu, West Bengal, (Tibet)

E. iridipennis (Westwood), 1889 (India, Kerala, (Indonesia, Java, Sri Lanka)

33. Genus *Ormomantis* Giglio-Tos

O. indica Giglio-Tos, 1919 (India)

Subfamily LITRUGUSINAE Giglio-Tos

34. Genus *Humbertiella* Saussure

H. affinis Giglio-Tos, 1917 (India, Karnataka, Kerala, Orissa, (Sri Lanka)

H. ceylonica Saussure, 1869 (India, Assam, Bihar, Kerala)

H. indica Saussure, 1869 (India, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Tamilnadu, Uttar Pradesh, (Sri Lanka)

H. nigrospinosa Sjostedt, 1930 (India, Orissa, Uttar Pradesh)

H. similis Giglio-Tos, 1917 (India, Himachal Pradesh, Jammu, Kerala, Madhya Pradesh, Orissa, Uttar Pradesh, (Nepal, Sri Lanka)

35. Genus *Theopompa* Stal

T. ophthalmica (Oliver), 1792 (India, Eastern & Southern India, (Indonesia, Ambon, Seram, Java)

T. serville (De Hann), 1842 India (?), (Indonesia, Java, Seram, Thailand, Mergui)

Subfamily MANTINAE Burmeister

Tribe **Mantini**36. Genus **Hierodula** BurmeisterSubgenus *Hierodula (Hierodula)* Giglio-Tos

H. (H) assamensis Mukherjee, 1995 (India, Arunachal Pradesh, Assam, Meghalaya)

H. (H) beieri Mukherjee, 1995 (India, Arunachal Pradesh)

H. (H) bipapilla (Audinet-Serville), 1839 (India, Bihar, Himachal Pradesh, Uttar Pradesh, West Bengal, Kerala, (Indonesia, Java, China, Taiwan, Japan)

H. (H) doveri Chopard, 1924 (India, Karnataka, Kerala, Orissa, Tamil Nadu)

H. (H) grandis Saussure, 1870 (India, Assam, (Bangladesh)

H. (H) malabarensis Vyjayandi (India, Kerala)

H. (H) membranacea (Burmeister), 1838 (India, Kerala, Orissa, Tamil Nadu (Indonesia, Java, China)

H. (H) nicobarica Mukherjee, 1995 (India, Nicobar Islands)

H. (H) saussurei Kirby, 1904 (India, Arunachal Pradesh, Kerala, (Bhutan, China, Indonesia, Java)

H. (H) tenuidentata Saussure, 1869 (India, Andamans, Bihar, Kerala, Lakshadweep, Kerala, Madhya Pradesh, Orissa, Uttar Pradesh, West Bengal, (Indonesia, Kalimantan, West Asia)

H. (H) unimaculata (Oliver), 1792 (India, Karnataka, West Bengal (China, Java, Sri Lanka)

H. (H) ventralis Giglio-Tos, 1912 (India, Kerala, Chandigarh, Madhya Pradesh, Maharashtra)

Subgenus *Hierodula (Rhombodera)* Giglio-Tos

H. (R) butleri Wood-Mason, 1878 (India, Assam, Meghalaya, Sikkim, West Bengal)

H. (R) crassa Giglio-Tos, 1912 (India, Madhya Pradesh, Meghalaya)

H. (R) doriana Laidlaw, 1931 (India, Bihar)

H. (R) fracticida Wood-Mason, 1878 (India, Kerala, (Indonesia, Kalimantan, Sumatra)

H. (R) tectiformis Saussure, 1870 (India, Bihar, Sikkim, Tamil Nadu, West Bengal)

H. (R) woodmasoni Werner, 1931 (India, Tamil Nadu, Uttar Pradesh, (Malaysia)

37. Genus **Mantis** Linnaeus

M. indica Mukherjee, 1995 (India, Himachal Pradesh)

M. inornata Werner, 1930 (India, Uttar Pradesh)

M. nobilis Brunner, 1892 (India, Himachal Pradesh, Manipur, West Bengal, (Myanmar)

M. religiosa Linnaeus, 1758 (India, Karnataka, Kerala, Madhya Pradesh, Manipur, Uttar Pradesh, West Bengal, (Asia, Europe, Africa, Australia)

38. Genus *Mesopteryx* Saussure

M. platycephala (Stal), 1877 (India, Assam, Sikkim, (Myanmar)

M. robusta Wood-Mason, 1882 (India, Andamans, Manipur, Sikkim)

39. Genus *Oxymantis* Werner

O. punctillata Werner, 1931 (India, Tamil Nadu)

40. Genus *Parahierodula* Giglio-Tos

Subgenus *Parahierodula* (*Parahierodula*)

P. (P) coarctata (Saussure), 1869 (India

P. (P) venosa (Oliver), 1792 (India (Indonesia, Sunda Island)

41. Genus *Plistospilota* Giglio-Tos

P. nova Beier, 1930b India, Assam)

Subfamily MANTINAE Burmeister

42. Genus *Statilia* Stal

S. apicalis (Saussure), 1871 (India, Andra Pradesh, Arunachal Pradesh, Bihar, Himachal Pradesh, Uttar Pradesh, West Bengal, (Australia)

S. maculata (Thunberg), 1784 (India, Andra Pradesh, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Kerala, Madhya Pradesh, Meghalaya, Sikkim, Uttar Pradesh, West Bengal, (Eastern Asia)

S. nemoralis (Saussure), 1870 (India, Arunachal Pradesh, Kerala, Tamil Nadu, West Bengal, (Eastern Asia, Philippines)

Tribe Miomantini

44. Genus *Arria* Stal

A. cinctipes Stal, 1877 (India, Eastern India, Manipur)

45. Genus *Deiphobe* Stal

D. brevipennis Sjostedt, 1930 (India, Himachal Pradesh

D. brunneri (Saussure), 1871 (India, Himachal Pradesh, Manipur, Uttar Pradesh)

D. incisa Werner, 1933 (India, Madhya Pradesh, Maharashtra, Punjab, Rajasthan)

D. indica Giglio-Tos, 1916 (India, Himachal Pradesh, Madhya Pradesh)

D. infusate (Saussure), 1871 (India, Bihar, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Tamil Nadu, Uttar Pradesh)

D. longipes Werner, 1926 (India)

D. mesomelas (Olivier), 1792 (India, Himachal Pradesh, Maharashtra)

46. Genus *Deiphobella* Giglio-Tos

D. gardeneri Werner, 1935 (India, Uttar Pradesh)

D. laticeps (Wood-Mason), 1876 (India, Karnataka, Kerala, (Sri Lanka)

47. Genus *Indothespis* Werner

I. assamensis Werner, 1935 (India, Assam)

48. Genus *Iris* Saussure

I. nana Uvarov, 1930 (India, Punjab, Rajasthan, (Afghanistan, Iran, Iraq)

I. orientalis Wood-Mason, 1882 (India, Himachal Pradesh, Rajasthan)

I. keralensis Vyjayandi 2006 (India, Kerala)

Subfamily OXYOTHESPINAE Giglio-Tos

49. Genus *Heterochaetula* Wood-Mason

H. fissispinis Wood-Mason, 1889 (India, Andhra Pradesh, Karnataka, Tamil Nadu)

H. tricolor (Wood-Mason), 1876 (India, Bihar, Maharashtra, Orissa, West Bengal)

Subfamily PHOTININAE Giglio-Tos

Tribe **Photinini**

50. Genus *Beesoniella* Werner

B. pallida Werner, 1935 (India, Tamil Nadu)

Subfamily PHYLLOTHELINAE Beier

51. Genus *Phyllothelys* Wood-Mason

P. decipiens Giglio-Tos, 1915 (India, Indonesia, Java, Kalimantan)

P. wernerii Karny, 1915 (India, Uttar Pradesh, (Taiwan)

P. westwoodi Wood-Mason, 1876 (India, Assam, Uttar Pradesh, (Myanmar)

Subfamily SCHIZOCEPHALINAE Beier

52. Genus *Schizocephala* Audinet-Serville

S. bicornis (Linnaeus), 1758 (India, Kerala, Madhya Pradesh Maharashtra, Uttar Pradesh, West Bengal (Sri Lanka))

Subfamily TARACHODINAE Handlirsch

53. Genus *Didymocorypha* Wood-Mason

D. lanceolata (Fabricius), 1798 (India, Bihar, Karnataka, Madhya Pradesh, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal, (Sri Lanka))

54. Genus *Dysaules* Stal

D. himalayanus, Wood-Mason, 1889 (India, Himachal Pradesh, Madhya Pradesh)

D. longicollis. Stal, 1877 (India, Karnataka, West Bengal)

55. Genus *Oxyophthalma* Saussure

O. engaea (Wood-Mason), 1889 (India, Tamil Nadu, Sri Lanka)

O. gracilis Saussure, 1869 (India, Karnataka, Tamil Nadu, Sri Lanka)

Subfamily THESPINAE Giglio-Tos

Tribe **Thespini**56. Genus *Pseudothespis* Mukherjee

P. meghalayensis Mukherjee, 1985 (India, Meghalaya)

57. Genus *Thespis* Audinet-Serville

T. dissimilis westwood, 1889 (India, Madras)

Tribe **Parathespini**58. Genus *Parathespis*

P. humbertiana Saussure, 1869 (India, Andhra Pradesh, Madhya Pradesh, Tamil Nadu, Sri Lanka)

Subfamily TOXODERINAE Giglio-Tos

Tribe **Toxoderini**59. Genus *Aethalochroa* Wood-Mason

A. ashmoliana (Westwood), 1841 (India, Kerala, Maharashtra, Orissa, West Bengal)

A. insignis Wood-Mason, 1878 (India, North India)

A. simplicipes Wood-Mason, 1878 (India, Maharashtra)

60. Genus *Cheddikulama* Henry

C. straminea Henry, 1932 (India, Kerala, Uttar Pradesh, (Sri Lanka)

61. Genus *Euthyphleps* Wood-Mason

E. curtipes (Westwood), 1889 (India, Maharashtra)

E. rectivenis Wood-Mason, 1889 (India, Himachal Pradesh)

62. Genus *Loxomantis* Giglio-Tos

L. indica Giglio-Tos, 1914 (India, Tamil Nadu)

63. Genus *Paradanuria* Wood-Mason

P. orientalis Wood-Mason, 1877 (India, Karnataka)

P. parvula Westwood, 1889 (India?)

64. Genus *Toxoderopsis* Wood-Mason

T. spinigera Wood-Mason, 1889 (India, Kerala, Maharashtra)

T. taurus Wood-Mason, 1889 (India, Bihar, Orissa, (Pakistan)

65. Genus *Toxomantis* Giglio-Tos

T. westwoodi Giglio-Tos, 1914 (India, Karnataka)

Subfamily ANGELINAE

67. Genus *Euchomenella* Giglio-Tos 1927

E. indica Hemant V. Ghate 2004

Family METALLYTICIDAE Chopard

66. Genus *Metallyticus* Westwood

M. splendidus Westwood, 1835 (India, Kerala, Peninsular Malaysia, Sumatra, Borneo)

REFERENCES

Audinet-Serville, J. C. 1831. Revue methodologique des Insects de l' ordre Orthopteres.
Ann. Sci. Nat., **22** : 28-65.

Balderson, J. 1984. Catalogue of Australian Mantodea., *Tech Paper. Div. Entomol.*,
CSIRO, Australia no, **23** : 1-17.

- Balderson, J. 1988. *Acromantis australis* Saussure Mantodea, Hymenopodidae. Acromantinae., a new family and subfamily record for Australia, *Aust. Entomol. Mag.*, **15**(3) : 81-84.
- Balderson, J. 1991. Mantodea (Praying Mantids)., *Insects of Australia A text book for students and research workers*, CSIRO, Melbourne University Press, **1** : 348-356.
- Balderson, J. Rentz D C F, Roach A M E 1998 *Zoological Catalogue of Australia*, **23** : 251-258.
- Beier, M. 1929. Weitere new Mantiden aus der Sammlung des Naturhistorischen Museum in Wein., *Zool. Anz.*, **81** : 245-254.
- Beier, M. 1930a. Die Mantiden der Ausbeute Collenette aus Britische-Somalialand., *Zool. Anz.*, **91** : 193-198.
- Beier, M. 1930b. New and rare Mantodea (Orthoptera) in the British Museum, *Ann. Mag. Nat. Hist.*, **10** : 432-460.
- Beier, M. 1931a. Neue und seltene Mantodean aus dem Zoologischen Statsinstiut und Zoologischen Museum in Hamburg., *Mitt. Zool. Stinst, Hamburg.*, **45** : 1-21.
- Beier, M. 1931b. Three new species of Mantidae (Orthoptera)., *Ann. Mag. Nat. Hist.*, (10)**7** : 359-361.
- Beier, M. 1932. Neue und interessante Mantiden., *Bull. Raffles. Mus.*, **6** : 149-154.
- Beier, M. 1934a. Orthoptera, Mantodea. Fam Mantidae. Subfam Hymenopodinae. *Genera Insectorum*. Fasc., **196** : 1-37 + 2 pages supplement of 1937.
- Beier, M. 1934b. Orthoptera Fam. Mantidae Subfam. Sibyllinae Empusinae., *Genera Insectorum* Fasc, **197** : 1-10 + 2 page supplement of 1937
- Beier, M. 1934c. Orthoptera Fam. Mantidae Subfam. Toxoderinae., *Genera Insectorum* Fasc **198** : 1-9 +2 page supplement of 1937.
- Beier, M. 1935a. Orthoptera Mantodea Fam. Mantidae Subfam. Thespinae., *Genera Insectorum* Fasc, **200** : 1-32 + I page supplement of 1937.
- Beier, M. 1935b. Orthoptera Mantodea Fam. Mantidae Subfam. Orthoderinae Choeradodinae Deroplatinae *Genera Insectorum* Fasc, **201** : 1- 10.
- Beier, M. 1935c. Orthoptera Mantodea Fam. Mantidae Subfam. Mantinae *Genera insectorum* Fasc, **203** : 1-143, + 3 pages supplement of 1937.
- Beier, M. 1937a. Mantodea from the Lake Rudolf Rift Valley Expedition., *Ann. Mag. Nat. Hist.*, (10) **19** : 376-379.

- Beier, M. 1937b. Results of Oxford University Expedition to Sarawak (Borneo) 1932. Mantodea., *Proc. R. Ent. Soc. London.*, (b) **6** : 177-181.
- Beier, M. 1941. New and Seltene Mantodeen aus Deutschen Museum., *Ann. Naturf. Mus. Wien.*, **52** : 126-154.
- Beier, M. 1952. Mantidae aus Ostindonesian *Sond. Verh. Naturfas. Ges.*, **63** : 296 –306.
- Beier, M. 1963. Neue und Bemerkenswerte Mantiden Verschiedener *Herkunft. Stuttg. Beitr. Naturkd.*, **106** : 1-11.
- Beier, M. 1964. Arthropoda Insecta Blattopteroidea Ordnung Mantodea Burmeister 1838 (Raptoriae Latrille 1802 Mantodea Handlirsch 1903 (auct) *In. Bronn's Klassen Und Ordnungen des Tierreich*, Leipzig., (5) (3) **6** : 849 –970.
- Beier, M. 1965. Uber Einige Mantiden von der Insel Prince of Wales., *Pac. Insects*, **7** : 442-452.
- Beier, M, 1968. Ordnung Mantodea (Fangheuschrecken). *Handbuch der Zoologie*, **4(2)** : 2/2 lief 4, 3-12.
- Blanchard, C. E. 1853. Description des Insects Zoologie, Paris. *Gide & J. Baudry*, **1** : 1-422.
- Bodenheimer, F. S. 1933. Eine new *Eremiaphila* Art (Orth. Mant),, *Mitt. dt. Ent. Ges.*, **4** : 79-80.
- Bolivar, I. 1876. Family Mantodea Synopsis de los Orthopteros., 53-66.
- Bolivar, I. 1897. Les Orthopteros de St. Joseph's College Trichinopoly., *Ann. Soc. Entomol. France*, **66** : 303-316.
- Borror & DeLong, 1954. An Introduction to the Study of Insects; Page 128.
- Brown, W. L. Jr. 1982. Mantodea, Synopsis and Classification of Living Organisms., vol, **2** : 347-349 Mc Graw Hill, New York.
- Brunner, 1892. *Ann. Mus. Genova.*, **33** : 65-70.
- Burmeister, H. 1838. Handbuch der Entomologie band 2 Berlin.
- Burmeister, H. 1864. Notiz uber die Mantis Arten bei Bvenos Aires, Berlin., *Entomol Zeitschr.*, **8** : 234-238.
- Burt, E. 1943. The Defencive Attitude of Mantid *Idolum diabolium* Saussure., *Proc. Roy. Entomol. Soc. London.*, A, **18** : 57.
- Cannings, R. A. 1987, Ground Mantis *Litaneutria minor* (Dictyoptera: Mantidae) in British Columbia., *J. Entomol. Soc. B. C.*, **84** : 64-65.

- Cerda, F. J. 1993. Taxonomic value of male genitalia in neotropical mantids (Dictyoptera: Mantodea)., *Bol. Entomol. Venez* vol 18 no, 1 : 33-52
- Chopard, L. 1921. Report on the Orthoptera of Mesopotamia and Persia., *Bom. Nat. Hist. Soc.*, 27 : 47-59, 3pls
- Chopard, L. 1924. *Rec. Indian mus.*, 26 : 175
- Chopard, L. 1949. Superorder Blattopteroidea, Suborder Mantodea Burmeister 1813., *Traite de Zoologie*, 9 : 386-402
- Ehrmann, R. 1991. *Telomantis* Giglio-Tos 1915, an interesting genus of order Mantodea (Mantidae: Amelinae; Amelini)., *Entomol. Z.* vol. 101. no., 17 : 313-317
- Ehrmann, R. 1996. The Mantodea fauna of Egypt., *Zeitschrift*, vol. 106. no.
- Ehrmann, R. 2002. Mantodea *Gottesanbeterinnen der Welt*, 10 : 410-424
- Fabricius, J. C. 1775. *Systema Entomologiae* Flensburgi et Lipsiae., 11 : 1-832.
- Fabricius, J. C, 1781. *Spec. Ins.*, 1 : 348.
- Fischer, L. H. 1854. Familia Mantodea, in *Orthoptera Europea* London., 18-135.
- Ghate, H. V, Rana N, Ranade S. 2000. Recent Record of *Creobroter apicalis* Saussure (Insecta: Mantodea) from Pune, Maharashtra and Kumta, Karnataka., *J. Bom. Nat. His. Soc.*, 97(2) : 297-298.
- Giglio-Tos, E. 1907. Ortoteri Africani., parte 11 Blattodea, Mantodea, Phasmodea, Locustodea, Gryllodea. *Bull Mus. Zool Univ. Tornio.*, 22 : 1-26
- Giglio-Tos, E. 1911a. Mantidi Esotici 11 *Polispilote*. *Bull. Soc. Entomol. Ital*, 42 : 3-38
- Giglio-Tos, E. 1911b. *Boll. Soc. Entomol. Ital.*, *Plistospilota*, 42 : 6
- Giglio-Tos, E. 1912. Mantidi Esotici V Mantes *Tenodera*, *Hierodulae*, *Rhomboderae*. *Boll. Soc. Entomol ital.*, 43 : 3-167
- Giglio-Tos, E. 1913. Orthoptera Fam Mantidae Subfam Perilamantidae. *Genera Insectorum*, 144 : 1-13
- Giglio-Tos, E. 1914a. Mantidi Esotici VI Perilamantidae. *Boll. Soc. Entomol. Itali.*, 45 : 3-60
- Giglio-Tos, E. 1914b Mantidi Raccolti de S.A.R. la Duchessa d' Hosta nella regione dei grandi laghi dell' Africa equatoriale, Revisone della Sotto famiglia dei Toxoderini., *Ann. Mus. Zool. Univ Napoli* (n s), 4 : 1-17
- Giglio-Tos, E. 1915a. Mantidi Esotici.VIII. Acromantinae., *Bull. Musei. Zool. Anat. Camp. R. Univ. Tornio*, 30 : 1-16

- Giglio-Tos, E. 1915b. Mantidi Esotici genere e specie nuove., *Bull. Soc. Ent. Itali* 31-108
- Giglio-Tos, E. 1915c. Mantidi Esotici genere e specie nuove., *Bull. Soc. Ent. Ital.*, **46** : 134-200.
- Giglio-Tos, E. 1916. Mantidi Esotici genere e specie nuove., *Bull. Soc. Ent. Ital.*, **47** : 3-44.
- Giglio-Tos, E. 1917a. Mantidi Esotici genera e specie nuove., *Boll. Soc. Ent. Ital.*, **48** : 43-108.
- Giglio-Tos, E. 1917b. Note al Catalogo dei Mantidi Kirby. *Boll. Soc. Ent. Ital.*, **48** : 139-163.
- Giglio-Tos, E. 1919. Saggio di una nuova classification dei Mantidi. *Boll.Soc. Ent. Itali.*, **49** : 50-79
- Giglio-Tos, E. 1927. Orthoptera Mantodea '*Das Tierreich*' Lief., **50** : 1-707
- Gillon Y & Roy R. 1968. Les mantos de Lamto et Savenes de Noire. *Bulleten de l Institut. Fontamental d' Afrique Noire*, **30**(4) : 1038-1151
- Guerrero, G. A., Cukier. N. Maggese. M. C. 1986. Taxonomic characters of mantids; Chorion and micropyle specificity. *Rev. Bras. Biol.* Vol 46 no, 1 : 11-16
- Gurney, A. B. 1951. Praying Mantids of, the United States., native and Introduced. *Annual report of the Smithsonian Institute* 1950. 339-362.
- Haan, De. 1842. *Verh. Nat. Ges. Nederl. Bezitti. Ins.*, **85**
- Handlirsch, A. 1925. Ordnung Mantodea Burm; *Handbuch der 'Zoologie'* (Ed.c.Schroter.) *bol.*, **3** : 493-502.
- Handlirsch, A. 1930. Mantodea oder Fangheuschrecken. In Kuckenthatkarumbach. *Hand. Zool.*, **4** : 803-819.
- Harz, K. & Kaltenbach, A. 1976. The Orthoptera of Europe Order Mantodea 129-168, The Orthoptera of Europe 3 *series Entomologica* 12 W. Junk Publishers, The Hague 434 pages.
- Hebard, M. 1920. Studies in Malayan, Papuan and Australian Mantidae. *Proc. Acad. Nat. Sci. Phila.*, **72** : 14-82.
- Hegde, N. C. Y. 2000. Mantid fauna of Sanjay Gandhi National Park, Mumbai with some new records for Maharashtra State. *J. Bombay. Nat.His. Soc.*, **97**(2) : 295-297.
- Henry, G. M. 1931. New Ceylonese Mantidae; *Spolia Zeylan.*, **16** : 123-128.

- Henry, G. M. 1932. Observations on some Ceylonese Mantids with descriptions of New Species. *Spolia Zeylan.*, **17** : 1-19
- Hinton, H. E. 1939. Notes on Australian Mantidae (Orthoptera). *Ann. Mag. Nat. Hist.*, **4** : 282-289.
- Hill, D. S., Hore, P. M. & Thornton, I. W. B. Insects of Hong Kong; Hong Kong Press, Hong Kog. 128-132.
- Jantsch, L. J. 1984, Description of a new species of Neotropical mantid (Mantodea, Mantidae, Vantidae, Stagmatopterini) *Rev. Bras. Entomol.*, **28** : 257-259
- Jantsch, L. J. 1991. New species of *Eumiopteryx* from Para; (Mantodea, Mantidae, Pseudomiopteryginea) *Rev. Bras. Entomol.*, **35**(No 3) : 577-578
- Jantsch, L. J. 1994. A New species of Neotropical praying mantid (Mantodea, Mantidae, Thespiniae, Pseudomiopterigini); *Biociencias*, **2** : 75-78
- Jantsch, L. J. 1995 New American mantids (Insecta, Mantodea) *Biociencias*, **3** : 145-153
- Kaltenbach, A. 1979. Die Mantodea der Kanarischen Inseln. *Ann. Nat. Mus. Wien.*, **82** : 517-531.
- Kaltenbach, A. 1980. Ergebnisse einiger Sammelreisen nach Vorderasien. 7. Mantodea und Saltoria. *Ann. Nat. Mus. Wein.*, **83** : 575-584.
- Kaltenbach, A. 1982. Insects of Saudi Arabia; Mantodea. *Fauna of Saudi Arabia*, **4** : 29-74.
- Kaltenbach, A. 1984. Insects of Saudi Arabia ; New species and Further records of Mantodea from Saudi Arabia and Oman. *Entomologica Nat. Hist. Mus. Basal.* (Switzerland) 203- 209.
- Karny, H. 1921. Zur Systematik der Orthopterodien Insekten. *Treubia*, **1** : 163-269
- Kevan, McE. D. K. 1954. Mantodea from Northern Kenya and Jubaland. *Ann. Mag. Nat. Hist.* (12)**7** : 455-473
- Kevan, McE. D. K. 1977. The higher classification of the orthopteroid Insects. *Mem. Lyman. Ent. Mus. Res. Lab.* 4 (Spec. Pub.) No, **12** : 52 26 pages.
- Key, K. H. L. 1970. The Insects of Australia, a text book for students and research workers. Melbourne University Press, Carlton, Australia; XIII + 1029 pages, Mantodea (Praying Mantids) 294-301.
- Kirby, W. F. 1899. On a collection of Mantidae from the Transvaal & C. formed by Mr. W L Distant. *Ann. Mag. Nat. Hist.*, (7) **4** : 344-353

- Kirby, W. F. 1900. A monograph of Christmas Islands XIII + 337 pages, 21 Pls, London.
- Kirby, W. F. 1903. Description of new species of Mantidae referred to in the above paper. *Ann. Mag. Nat. Hist.*, (4) 7 : 304
- Kirby, W. L. 1904a. IX –Notes on Mantidae in the collection of the British Museum (Natural History) South Kensington, with description of new species; *Ann. Mag Nat. Hist.*, (7) 13 : 81-88
- Kirby, W. L., 1904b A Synonymic Catalogue of Orthoptera. 1 X+501 pages London.
- Klass, K. D. 1997 The external genitalia and phylogeny of Blattaria and Mantodea Bonner Zoologische Monographien 42 (1) : 341.
- Krauss, 1902. *Anz. Ak. Wein.* 39 : 53.
- La Greca, M. 1952. Specie nuove e note critiche su Mantodei dell' Africa orientale. *Annular. Ist. Mus. Zool. Univ. Napoli*, 4 : 1-54
- La Greca, M. 1969. Su akuni Mantodei dell' Australia edelle Filippine. *Annal. Mus. Civ. Stor. Nat. Giacomo Doria*, 77 : 633-639.
- La Greca, M. 1977. *Rivetinula* n. gen. di Mantodei dell' India, per Rivetina fraternal (Saussure). *Animalia*, 4(1/2) : 23-33.
- La Greca, M & Lombardo F. 1987a. Considerations on the genus *Chrysomantis* Gigliot-Tos (Insecta: Mantodea) with descriptions of 4 new species, *Animalia*, 14 : 107-124.
- La Greca, M. & Lombardo F. 1987b. Mantodea of Sestian with descriptions of the new genus of Oxythespinae, *Animalia* 14 No. 1-3 237-246.
- La Greca, M. & Lombardo F. 1997 A new species of *Pseudacanthopis* Saussure 1870 from Bolivia (Insecta: Mantodea), *Trop. Zool.* 10 No., 1 : 49-55.
- Laidlaw, W. B. R. 1931. A New Mantid from Bihar, *Entomol. Monthly Mag.*, 67 : 88-89.
- Latreille, P. A. 1807 *Gen. Crust. Ins.*, 3 : 21.
- Leach, W. E. 1818. Sous-Ordre Mantodea Burmeister, *Traite de Zoologie Anatomie, Systematique, Biologie* Paris 386-402.
- Lefebvre, M. A. 1835. Nouveau group d' Orthoptres de la Famille des Mantides, *Ann. Soc. Entomol. France*, 4 : 499.
- Lichtenstein, A. A. H. L. 1802. A dissertation on the natural genera hitherto confounded under the name of Mantis, *Trans. Linn. Soc. London*, 6 : 1-39.

- Lindt, I. T. 1971. Genere dela fauna des Mantes (Mantodea) dell' Asia Moyenno. *Internat. Congr. Entomol.*, **1** : 164-165.
- Linnaeus, C. 1758. *Systema Naturae* 10th Ed. Pt 1 Holmiae.
- Lombardo, F. 1985. On the presence in Algeria, of the genus *Pseudoyersinia* Kirby (Insecta Mantodea) and description of the three new species, *Animalia*, 12 No.1-3 119-128.
- Lombardo, F. 1988. Mantids from Somalia, *Animalia* 15, No. 1-3 91-112.
- Lombardo, F. 1991a. Remarks on the genus *Severinia* Finot 1902 & a description of two new genera of Oxythespinae (Insects: Mantodea, *Trop. Zool.* 4 No., **2** : 203-207.
- Lombardo, F. 1991b. Mantodea from Southern Ethiopia, *Fragm. Entomol.* 23 No., **2** : 277-286.
- Lombardo, F. 1992a. A new species of *Euthyphleps* of Afghanistan (Insecta: Mantodea, Toxoderinae) *Animalia*, **19** : 61-65.
- Lombardo, F. 1992b. A new species of *Rombodera* of Thailand(Insecta:Mantodea); *Rombodera fusca*; *Animalia* **19** : 97-100.
- Lombardo, F. 1995a. *Parahestiasula obscura* gen. nov. spec. nov. from Nepal (Insecta : Mantodea, Hymenopodidae); *Spixiana* 18 No., **1** : 11-14.
- Lombardo, F. 1995b. A review of the genus *Popa* Stal 1856 (Insecta : Mantodea); *Trop. Zool.* 8 No., **2** : 257-267.
- Lombardo, F. 1999. Remarks on the genus *Metriomantis* Saussure Zehntner & descriptions of two new species and a new genus; *Rev. Sul. de. Zoologie.* 106, No., **2** : 393-405.
- Lombardo, F. 2000. *Stenophylla lobivertex*, a new species of Stenophyllinae from Amazonia (Insecta : Mantodea); *Swets & Zeitlinger* 34-37.
- Mac Leay, W. S. 1827. Annulosa. Catalogue of insects collected by Captain King, Narrative of a Survey of the Intertropical and Western Coasts of Australia Performed between the years 1818 and 1822. (Mandibulata). London : *J.Murray* II 438-457.
- Mani, M. S. 1973. General Entomology Oxford & IBH Publishing Co. Page 56
- Marshall, J. A. 1975. A catalogue of Primary types of Mantodea (Dictyoptera) in the British Museum(Natural History); *Bull. Brit. Mus. (Nat. Hist.); Entomol*, **31** : 309-329
- Milledge, G. 1989. *Scolodera paralotus* n. gen., n. sp., (Mantodea : Mantidae) from Northern Queensland, Australia *Rec. Aust. Mus.*, **41** : 107-110.

- Milledge, G. 1990. Revision of the genus *Nesoxypilus* (Mantodea : Amorphoscelidae : Paraoxypilinae); *Mem. Mus. Vic.*, **50**(2) 347-355.
- Milledge, G. 1997. Revision of the tribe Archimantini (Mantodea : Mantidae : Mantinae); *Mem. Mus. Vic.*, **56**(1), 1-63.
- Mukherjee, T. K. & Hazra, A. K. 1983 On small collection of Mantidae (Dictyoptera) from Maharashtra India, with description of new species; *Rec. Zool. Surv. India*, **80** : 459-465.
- Mukherjee, T. K. & Hazra, A. K. 1985(a). New Records of deserticolous Mantid family (Mantodea : Eremiaphilidae) from India; *Entomon*, **10**(3) : 245-247.
- Mukherjee, T. K. & Hazra, A. K. 1985(b) Insecta: Mantodea *Rec. Zool. Surv. India*, **82** (1-4) : 33-39.
- Mukherjee, T. K. & Hazra, A. K. 1985(c) On some little known and anew praying mantid (Mantodea) from Mulla-Periyar Tiger Reserve, Kerala, India. *Entomon*, **10** (4) : 255-259.
- Mukherjee, T. K, Hazra, A. K. & Balderson. 1992. Type specimens of Mantodea in the Zoological survey of India collections Culcutta, India. *Raffles Bull. Zool* ; **40** (1) 65-68.
- Mukherjee, T. K., Hazra, A. K. & Ghosh. 1995. The mantid fauna of India (Insecta : Mantodea) *Oriental Insects*; vol, **29** : 185-358.
- Nair, S. C. 1991. Southern and Western Ghats., In-Tach Publishers X VIII 1-92.
- Negi, S. S. 1993. Biodiversity and its conservation in India published by M C Gidwani, Indus Publishing Company. Fs 5. Tagore – Garden, New Delhi. 1-343
- Otte, D. 1978. The primary types Orthoptera (Saltatoria, Mantodea, Phasmatodea and Blattodea) at the Academy of Natural Sciences, Philadelphia., *Proc. Acad. Nat. Sci. Phila.*, **130** : 26-87.
- Pascoe, F. P. 1882. Description of a new species of Mantidae., *Ann. Mag. Nat. Hist.*, (5) **9** : 423-424.
- Peterson, G. & Gaedike, H. 1970 Katalog der in den Sammlungen Deutschen Entomologischen Institutes dufbewahrten Typen II. Dermaptera, Mantodea, Blatteria, Isoptera, Phasmida, Saltatoria. *Beitr. Entomol.*, **20** : 145-172.
- Petry, M. 1983. Regarding the types of the Zoological State Collection of Munich (Orders Mantodea and Saltoria, Ensifera)., *Spixiana* (Suppl.), **9** : 283-290.
- Preston-Mafham, K. 1991. Grasshoppers and Mantids of the World. Facts on file New York. 192 pages (NCSU Libraries Q L 506 p 74)

- Preudhomme de Borbe, A. 1883. Liste des mantides du Musee Royal d' Histoire Naturelle de Belgique., *Ann. Soc. Entomol. Belg.*, **27** : 60-81.
- Ragge, D. R. 1955. The Wing Veination of the Orthoptera Salteroria, with notes on Dictyopteran wing veination. Trustees of British Museum London XII + 299 pages (NCSU Libraries : Q1 509.B 75)
- Ragge, D. R. & Roy, R. 1967. A Review of the Praying Mantises of Ghana., *Bull. Inst. Fond. Afr. Noire* (A 29 586-644).
- Rane, N. Ranade S, Ghate H. V. & Mukherjee, T. K. 2000. On the Description of Female of *Acromantis Montana* Giglio-Tos from Kumta, Karnataka; *Entomon.*, **25**(1) : 61-62.
- Rehn, J. A. G. 1903. Studies in the Old World Mantidae (Orthoptera). *Proc. Acad. Nat. Sc. Phila.*, **55** : 701-718.
- Rehn, J. A. G. 1904. Studies in American Mantids of Soothsayers., *Proc. U. S. Nat. Mus.*, **27** : 561-574.
- Roonwal, M. L. 1951. A Systematic catalogue of the main identified entomological collections at Forest Research institute, Dehra Dun. *Indian Forester*, **77**(5) : 311-318.
- Roy, R. 1961. Dictyoptera, Mantodea, Le Para National du Niokolokoba. Fasc 11. *Mem. Ins. Fr. Agri. Noire, Daker.*, **62** : 91-103, 2 pls 8 figs.
- Roy, R. 1965. Contribution a' la connaissance des *Amorphoscelis* de la region orientale (Mantodea Amorphoscelidae). Les. especes Indo: Cingalises. *Bull. Soc. Entomol. France*, **70** : 267-283.
- Roy, R. 1966a. Revision preliminaire du genre *Oxypilus* Audinet-serville (Mantodea) *Bull. Inst. fond. Afr. noire* (A), **28** : 1420-1486.
- Roy, R. 1966b. Contribution a' la connaissance des *Amorphoscelis* ect. 11. Les Especies Extreme Orient; *Bull. Soc. Entomol. France*, **71** : 261-273.
- Roy R. 1966c. A new species of *Amorphoscelis* from Iraq. (Mantodea : Amorphoscelidae); *Entomol. News.*, **77** : 267-270.
- Roy, R. 1969. Complements a' la connaissance du genre *Oxypilus* (Mantodea); *Bull. Inst. fond. Afr. noire* (A), **31** : 1105-1127.
- Roy, R. 1972a. Contribution a' la conssiance du genre *Junodia* (Mantodea : Hymenopodidae); *Bull. Inst. fond. Afr. noire* (A), **34** : 550-589.
- Roy, R. 1972b. Contribution a' la connaissance du genre *Congoharpax* (Mantodea; Hymenopodidae); *Bull. Inst. fond. Afr. noire* (A), **34** : 857-868.

- Roy, R. 1987. General observations on the systematics of Mantodea ; Evolutionary Biology of Orthopteroid Insects. Chichester Ellis Horwood Ltd. 483-488.
- Roy, R. 1992. A new species placed in a new genus very close to *Mantis* Linn. and *Statilia* Stal. (Dictyoptera; Mantodea); *Bull. Soc. Entomol.* 97 No., 4 : 333-337.
- Roy, R. 1996. Revision of the Fossil mantid and Ephemerid species described by Piton from the Palaeocene of Menat (France) Mantodea : Chaeteessidae : Mantidae; Ensifera, Tettigonidae). *J. Entomol.* 93 No., 2 : 223-234.
- Roy, R. 1999. Updating of the knowledge for the genus *Oxypilus* Audinet-Serville 1831 (Mantodea: Hymenopodidae); *Bull. de la Soc. Entomologique. France.* 104, No. 4 : 327-335.
- Saussure, H. de. 1861. *Ann. Soc. Entomol. France*; 1(4) : 469
- Saussure, H de. 1869. Essai d' un Systeme des Mantidae *Mitt. Schweiz. Entomol. Ges.*, 3 : 49-73.
- Saussure, H. de. 1870 Additions au systeme des Mantides ;*Mitt. Schweiz. Entomol. Ges.*, 3 : 221-224.
- Saussure, H. de. 1871a Melanges Orthopterologiques; Fasc. 3 *Mem. Soc. Phys. Hist. Nat. Geneve.*, 21 : 1-214.
- Saussure H de. 1871b Melanges Orthopterologiques; Supplement au III me fascicule., *Mem. Soc. Phys. Hist. Nat. Geneve.*, 21 : 239-336.
- Saussure, H de. 1873 Melanges Orthopterologiques; Fas. 4. *Mem. Soc. Phys. Hist. Nat. Geneve.*, 23 : 1-160.
- Saussure, H de. 1892. Orthoptera Centrali-Americana; *Societas ent.*, 7 : 121-124.
- Saussure, H. de. & Zehnter, L. 1893. Suborder Orthoptera genuine fam. Mantidae. *Biologia cent. am*, 1 : 123-197, pls 6-10.
- Saussure, H. de. & Zehnter L. 1895. Histoire naturelle des Blattides et Mantides; *Hist. Phys. Nat. et. Politique de Madagascar.* Paris., 23 : 147-244.
- Schoeman, A. S. 1985 Mantodea (Mantids, praying mantids); Insects of Southern Africa Butterworths, Durban, viii + 502 pages (NCSU Libraries : QL485 A356 S36)
- Shelford, R. 1903. Bionomical notes on some Bornean Mantidae. *Ann. Mag. Nat. Hist.*, (4)7 : 293-304.
- Sjostedt, Y. 1909. Wissenschaftliche Ergebnisse der Schwedischen zoologischen expedition nach dem kilimandjaro, dem Meru und Umgebenden Massaisteppeen Deutsch-Ostafrikas. 1905-1906; 3(17), 7-147., 3pls. Stockholm.

- Sjostedt, Y. 1818. Results of Dr. E. Mjoberg's Swedish scientific expeditions to Australia 1910-1913. 17 Mantidae und Phasmidae. *Ark. Zool.*, **11** : 1-61, 7pls.
- Stal, C. 1871. Orthoptera quaedam Africana; *Olvers. K.Vetenk Akad.Forh.*, **3** : 375-401.
- Stal, C. 1877. *Systema Mantodeorum; Bih. K. Svenska VetenskAkd. Handl.*, **4(10)** : 1-91.
- Stoll, C. 1813. Representation Exactly colored d'apres Nature des specters au Phasmes, des Mantes, Sauterelles, des Grillons, des Criquets et des Blattes Amsterdam.
- Strager, R. 1928. *Mantis religiosa* L. als Musikerin. *Z. Wiss. Ins. Biol*; **23** : 162-164.
- Tepper, J. G. O. 1904. Descriptions of some new species of Orthoptera from north western South Australia No1, *Trans. Proc. Rep. R. Soc.. Aust.*, **28** : 162-167.
- Tepper, J. G. O. 1905. Insects collected in the north western region of South Australia proper by H. Basedow; with descriptions of new species of Mantids and Phasmidae No.2. *Trans. Proc. Rep. R. Soc. S. Aus.*, **29** : 237-245.
- Terra, P. S. 1982. New genera and new species of mantids from South America (Mantodea Mantidae) *Rev. Bras. Entomol.* 26, No 3-4, 327-332.
- Terra, P S. 1991. New species of *Xystropeltis* Rehn (Mantodea : Vatiidae); *Rev. Bras. Entomol.* 35, No., **3** : 579-581.
- Terra, P. S. 1995 Systematics of the Neotropical genera of Praying Mantids (Mantodea), *Rev. Bras. Entomol.* 39 No., **1** : 13-94.
- Thunberg, C. P. 1781-1791. Nove Insectorum species : *Dissertationes Entomologicae* Pars 1-6 Upsaliae
- Thunberg, C. P. 1815. *Mem. Acad. Sci. St. Petersburg*, **5** : 220.
- Tindale, N. B. 1923 Review of Australian Mantidae. *Rec. South Aust. Mus. (Adelaidae)*, **2** : 425-457.
- Tindale, N. B. 1924. Review of Australian Mantidae Part 2. *Rec. South Aust. Mus.(Adelaidae)*, **2** : 547-552.
- Tindale, N. B. 1930. Mantidae in Australian Museum; *Rec. Aust. Mus.*, **17** : 343-347
- Tuxen, S. L. 1956 Taxonomists Glossary of genitalia in insects; Copenhagen.
- Uvarov, B. P. 1921. *Eremiaphila fraseri* sp. n; a new Mantid from Mesopotamia; *Entomologist's mon. Mag.*, **57** : 175-176.

- Uvarov, B. P. 1922. Records and descriptions of Orthoptera from S. W. Asia; *J. Bom. Nat. Hist. Soc.*, **28** : 351-370.
- Uvarov, B. P. 1923. Records and descriptions of Orthoptera from North West Africa; *Novit. Zool.*, **30** : 59-78, 1pl.
- Uvarov, B. P. 1924. Some new and interesting Orthoptera in the collection of the Ministry of Agriculture, Cairo; *Bull. Minist. Agric. Egypt tech. Scient. Serv.* No.41, iv + 41pages; 3pls.
- Uvarov, B. P. 1927a Some Orthoptera of the families Mantidae, Tettigonidae and Acrididae from Ceylon *Spolia Zeylan*; **14** : 85-114, 1pl.
- Uvarov, B. P. 1929. IV A. Orthoptera collected in Sinai by Dr. F. S. Bodenheimer and Dr. Theodor. In *Ergebnisse der Sinai Expedition 1927*; viii + 143 pages, Leipzig.
- Uvarov, B. P. 1930a. Notes on Palaearctic Mantidae (Orthoptera). *Ann. Mag. Nat. Hist.* (10)**5** : 631-633, 1pl.
- Uvarov, B. P. 1930b. Orthoptera collected by Professor T.D.A. Cockerell in Morocco; *Bull.Soc. Sci. Nat. Maroc*, **10** : 210-214.
- Uvarov, B. P. 1931a. Notes on the genus *Iris* Saussure (Orthoptera:Mantidae); *Ann. Mag. Nat. Hist.*, (10)**7** : 234-238, 1pl.
- Uvarov, B. P. 1931b. A new Mantid from Baluchistan; *Ann. Mag. Nat. Hist.*, (10)**8** : 418-419.
- Uvarov, B. P. 1933a. Notes on and little known Orthoptera from Palestine; *Ann. Mag. Nat. Hist.*, (10)**11** : 663-672.
- Uvarov, B. P. 1933b. Orthoptera collected by Mr. Bertram Thomas in Southern Arabia; *Proc. Zool. Soc. Lond.*, **1933** : 259-271.
- Uvarov, B. P. 1935a. Two new Orthoptera from Morocco; *Bull. Soc. Sci. Nat. Maroc.*, **15** : 41-43.
- Uvarov, B. P. 1935b. Some Orthoptera from the high regions of the Mt. Cameroon, West Africa. *Ann. Mag. Nat. Hist.*, (10)**16** : 205-210.
- Uvarov, B. P. 1936a. Studies in the Arabian Orthoptera;- I Descriptions of new genera, species and subspecies; *J. Linn. Soc. Lond. (Zool.)*, **39** : 531-554, 2pls.
- Uvarov, B. P. 1936b. New Orthoptera from Cyprus; *Ann. Mag. Nat. Hist.*, (10)**18** : 505-515.
- Uvarov, B. P. 1939a. Studies in the Arabian Orthoptera .-II. New and little known Mantidae and Phasmidae. *J. Linn. Soc. Lond.(Zool.)*, **40** : 547- 559.

- Uvarov, B. P. 1939b New and less known Palestinian Orthoptera; *Ann. Mag. Nat. Hist.*, (11)4 : 216-227, 1pl.
- Uvarov, B. P. 1940. Twenty eight new generic names in Orthoptera; *Ann. Mag. Nat. Hist.*, (11)5 : 173-176.
- Uvarov, B. P. 1948. Andalusian orthoptera described by Rambur; *Eos*, 24 : 369-390.
- Vickery, V. R. & Kevan. McE D. K. 1983. A monograph of the Orthopteroid Insects of Canada and adjacent regions.; *Mem. Lyman. Ent. Mus.*, 13(1) : 1-679.
- Vyjayandi, M. C. & Narendran, T. C. 2003. A New species and a Key to Indian Species of *Heirodula Burmeister* (Mantodea : Mantidae) *Entomon*, 28(4) : 315-320
- Vyjayandi, M.C. & Narendran, T. C. 2005. A new species of Praying Mantis from India : *Zoos'Print*, 20(3) : 1807-1808
- Vyjayandi, M.C., Narendran, T.C. & T. K. Mukherjee. 2006. A New Species of Praying Mantis (Insecta : Mantodea) from Kerala, India. *Oriental Insects*, Vol., 40 : 285-290
- Walker, F. 1859. Characters of some apparently undescribed Ceylon insects. Order Orthoptera; *Ann. Mag. Nat. Hist.*, (3)4 : 220-221.
- Wang, Z. 1987. Key to common mantids of horticulture and Forest, *Kunchong Zhishi*, 24(6) : 355-356.
- Wang, Tianqin, Xianwel, Yin & Haischeug. 1994. New species of the genus *Hymenopus* from China. *Entomotaxonomia* 16, No., 2 : 79-81.
- Werner, F. 911. Die Mantodeen der Aru- und kei inseln. *Abh. Senckenb. Naturforsch. Ges.*, 23 : 389-396.
- Werner, F. 1912. Mantiade and Phasmodea In Die Fauna Sudwest-Australiens; *Ergebnisse der Hamberger*, 4(3) : 47-56.
- Werner, F. 1922. Zur kenn tnis der Mantodeen fauna der Niederlandischen kolonien; *Zool. Meded. Rijks. Mus. Nat. Hist. Leiden*, 7 : 115-126.
- Werner, F. 1923. Zweitter Beitrag zur kenntnis der Mantodeen fauna von Niederlandisch-Indien *Treubia*; 3 : 387-404.
- Werner, F. 1926. Species novae mantidarum ex Museo Basiliensi; *Soc. Entomol. Stuttgart.*, 41 : 17-18.
- Werner, F. 1927. Neue Mantodeen aus vier Erdteilen. *Konowia*; 6 : 275-281.

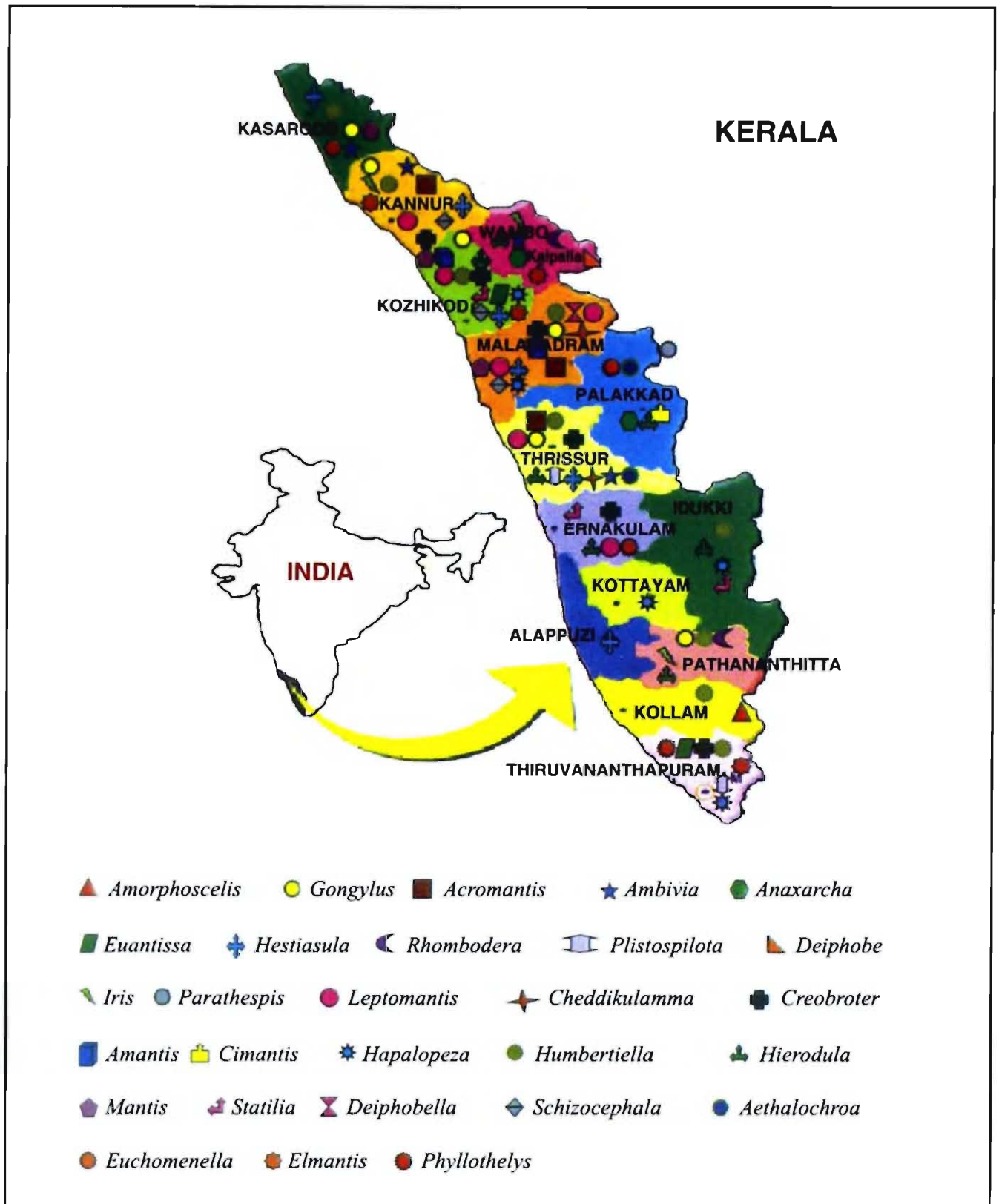
- Werner, F. 1928. Zur Kenntnis der Mantodeen fauna des Hinterlands von Kamerun und des Sepikgebietes von Neuguinea. Nebst Beschreibung einiger interessanter Arten aus anderen Ländern. *Mitt. Zool. Mus. Berl.*, **14** : 12-41.
- Werner, F. 1930. Indian Mantids or praying Insects; *Proc. Zool. Soc. London*; **1930** : 689-690, 1pl.
- Werner, F. 1931. Further notes on Indian Mantids or praying insects; *Proc. Zool. Soc. London*, **1931** ; 1329-1334, 1pl.
- Werner, F. 1933. Third contribution to the knowledge of Indian Mantids or Praying Insects; *Proc. Zool. Soc. London.*, **1933** : 897-901.
- Werner, F. 1935. Further communication on Indian Mantids or praying insects; *Proc. Zool. Soc. London* 1935, 495-498.
- Westwood, J. O. 1835. *Zool. J.* 5, 441-442
- Westwood, J. O. 1834-45. Illustrations of new, rare and interesting insects 2 *Arcana Entomologica* 192 pages, 47 pls. London.
- Westwood, J. O. 1889. *Revisio Insectorum familiae Mantidarum, speciebus Novis aut Minus Cognitis Descriptis et Delineatis* ; 52+iii pages 14pls, London.
- Wood-Mason, J. 1876. Description of a new species of Mantidae; *Ann. Mag. Nat. Hist.*, (4)**18** : 337-338.
- Wood-Mason, J. 1877. Description of two new genera and species of Indian Mantidae; *Ann. Mag. Nat. Hist.*, (4)**19** : 219-308.
- Wood-Mason, J. 1878. Notes on new and little known Mantidae; *Ann. Mag. Nat. Hist.*, (1)**5** : 143-147.
- Wood-Mason, J. 1879 Description of *Sigerpes occidentalis*, the type of a new genus of Mantodea from West Africa; *Proc. Asiat. Soc. Bengal.*, **1879** : 257-259.
- Wood-Mason, J. 1882. On new and little known Mantodea; *J. Asiatic. Soc. Bengal*, **51**(2) : 21-36.
- Wood-Mason, J. 1884a. On the *Mantis metallica* of Westwood; *Ann. Mag. Nat. Hist.*, (5) **13** : 34-37.
- Wood-Mason, J. 1884b *Phyllothelys*, a remarkable genus of Mantodea from Oriental Region; *J. Asiatic. Soc. Bengal*, **53** : 206-210.
- Wood-Mason, J. 1889a. the Ethiopian and Oriental representatives of the Mantodean. *J. Asiatic Soc. Bengal*, **58** : 306-326.

- Wood-Mason, J. 1889b. Monograph of *Phyllothelys*, a genus of Mantodea peculiar to the Oriental Region; *J. Asiatic Soc. Bengal* of Nov 366-368.
- Wood-Mason, J. 1889c. A Catalogue of Mantodea in the collection of the Indian Museum; Published by Trustees of the Indian Museum. Calcutta. No., 1 : 1-48.
- Wood-Mason, J. 1890a. Description of a new genus and species *Parymenopus davisonii* of Mantodea from the Oriental Region. *Ann. Mag. Nat. Hist.* for June 437- 439.
- Wood-Mason, J. 1890b. Description of *Triaenocorypha dohertii* the type of new genus and species of Mantodea ; *Ann. Mag. Nat. Hist.* for June, 1890 : 439-440.
- Wood-Mason, J. 1891. A Catalogue of the Mantodea in the collection of the Indian Museum No., 2 : 49-66. Calcutta.
- Zhang G. H. 1986a. New species of the genus *Humbertiella* from China (Mantidae : Eremiaphinae); *Entomotaxonomia* 18 No., 3 : 231-233.
- Zhang, G. H. 1986b. New species of *Ceratomantis* from China (Mantidae:Oxypillinae); *Entomotaxonomia* 8 No., 3 : 235-236.
- Zhang, G. H. 1990. A new species of the genus *Hierodula* (Mantodea:Mantidae) from China *Entomotaxonomia*, 12 : 113-114.
- Zhang, G. H. 1991. A new species of the genus *Hierodulla* Giglio-Tos (Mantodea: Mantidae) from China *Entomotaxonomia*, 13 : 235-236.
- Zheng, J H. 1988. Description of the new species of the genus *Creobroter* Serville from China; (Mantodea: Hymenopodinae); *Entomotaxonomia* 10, No. 1-2, 97-101.

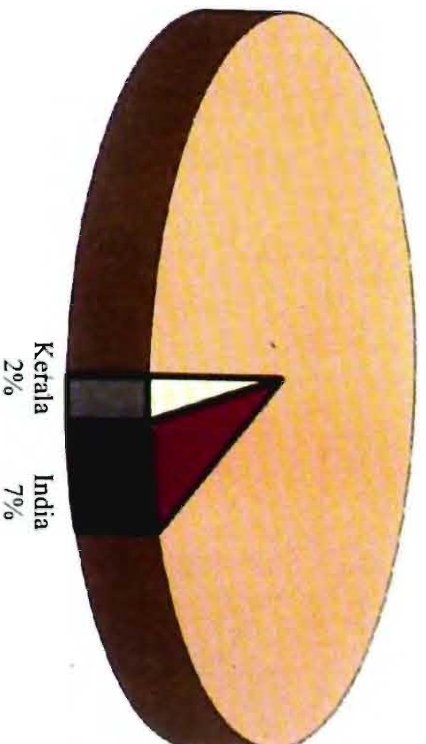
75°

76°

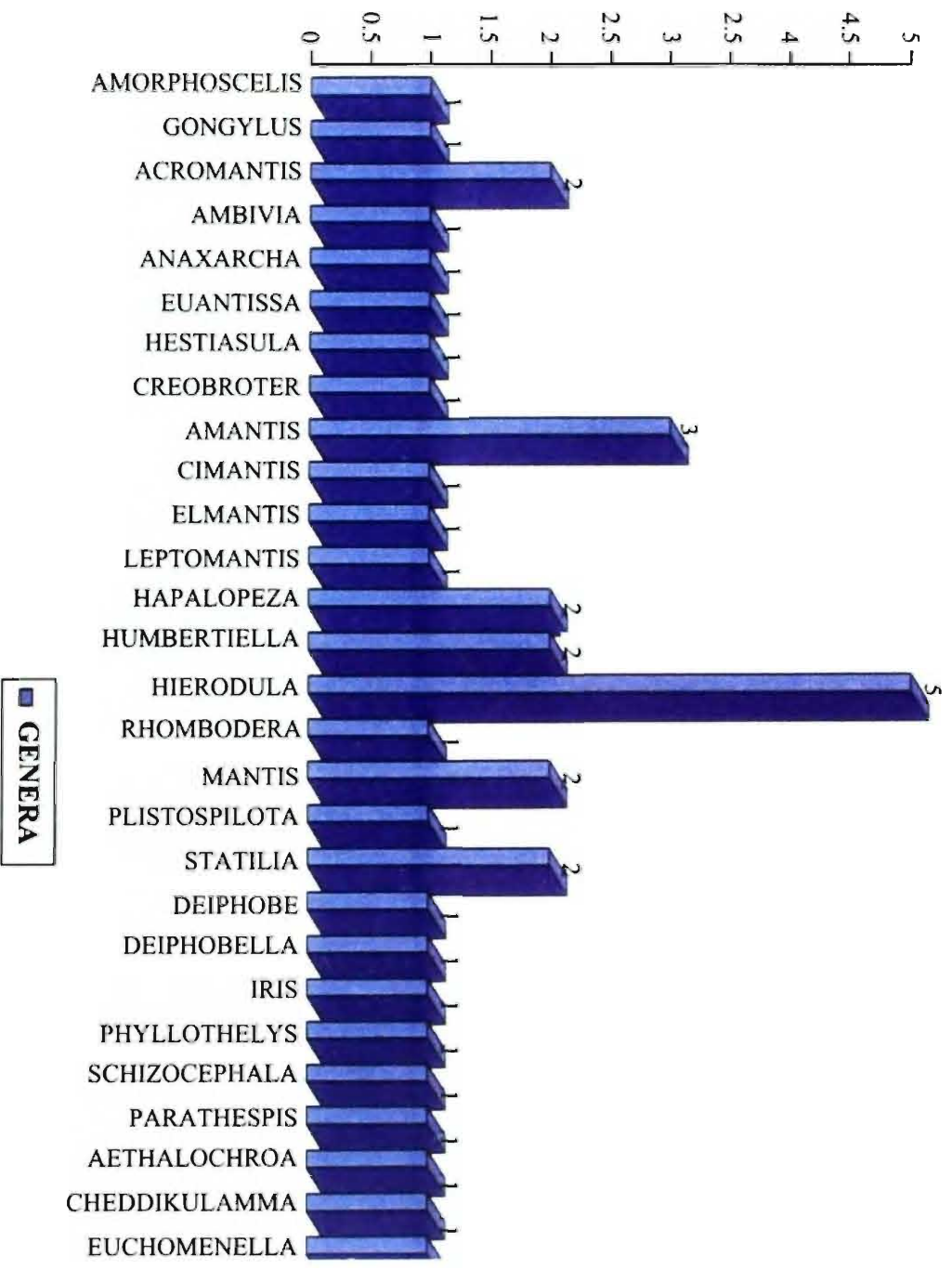
77°



Distribution map of genera of Mantodea recorded from Kerala

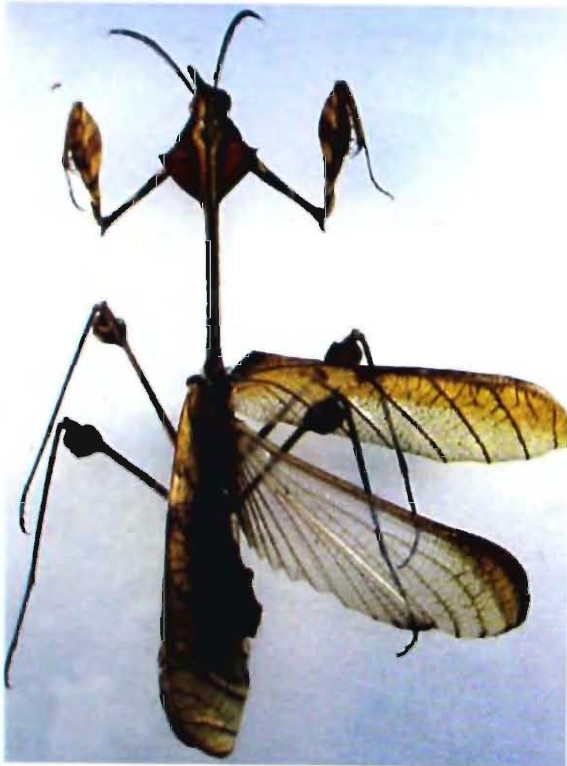


Percentage composition of species of mantids recorded from World, India and Kerala



Analysis of Genera and Species of Mantids in Kerala

PLATE-I



1. *Gongylus gongylodes* (Linnaeus) (Male)



2. *Gongylus gongylodes* (Linnaeus) (Female)



3. *Acromantis montana* Giglio-Tos

PLATE-II



4. *Ambivia popa* Stal



5. *Anaxarcha limbata* Giglio-Tos

PLATE-III



6. *Euantissa pulchra* (Fabricius) (Male)



7. *Euantissa pulchra* (Fabricius) (Female)



8. *Hestiasula brunnerlana* Saussure

PLATE-IV



9. *Creobroter apicalis* Saussure

PLATE-V



10. *Amantis malabarensis* Vyjayandi (Male)



11. *Amantis malabarensis* Vyjayandi (Female)

PLATE-VI



12. *Elmantis trincomaliae* (Saussure) (Male)



13. *Elmantis trincomaliae* (Saussure) (Female)



14. *Leptomantis parva* (Werner)

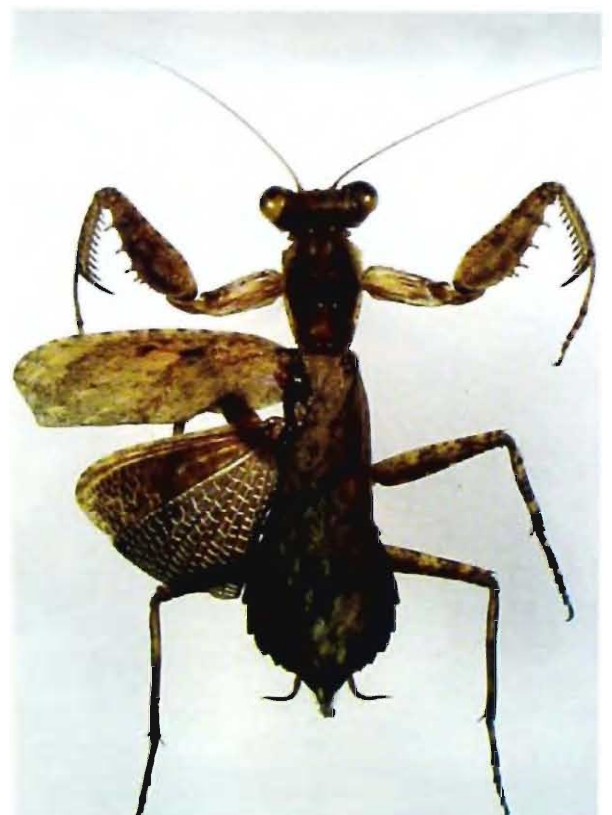
PLATE-VII



15. *Hapalopeza nilgirica* Wood-Mason



16. *Humbertiella similis* Giglo-Tos (Male)

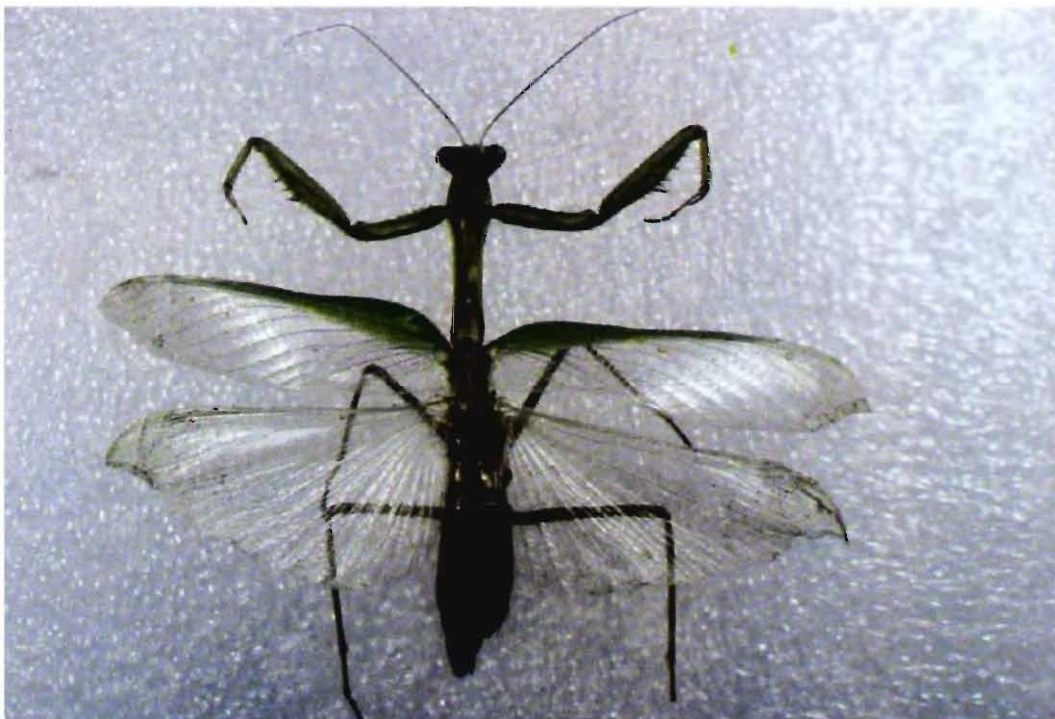


17. *Humbertiella similis* Giglo-Tos (Female)

PLATE-VIII



18. *Hierodula membranaces* (Burmeister)



19. *Hierodula ventralis* Gilgio-Tos

PLATE-IX

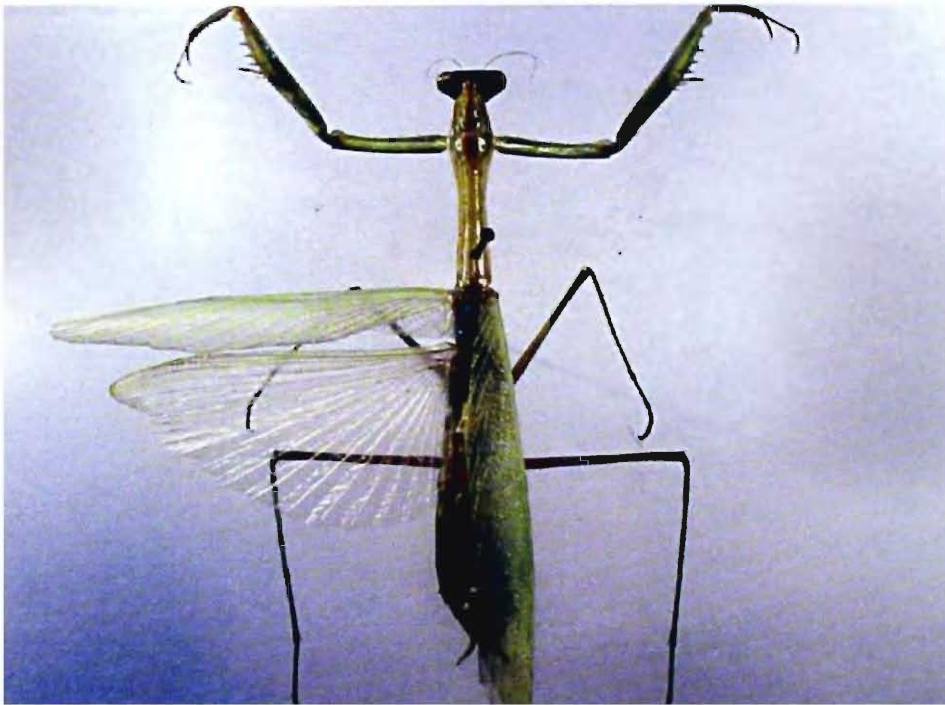


20. *Rhombodera woodmasoni* Werner



21. *Mantis nobilis* Brunner

PLATE-X

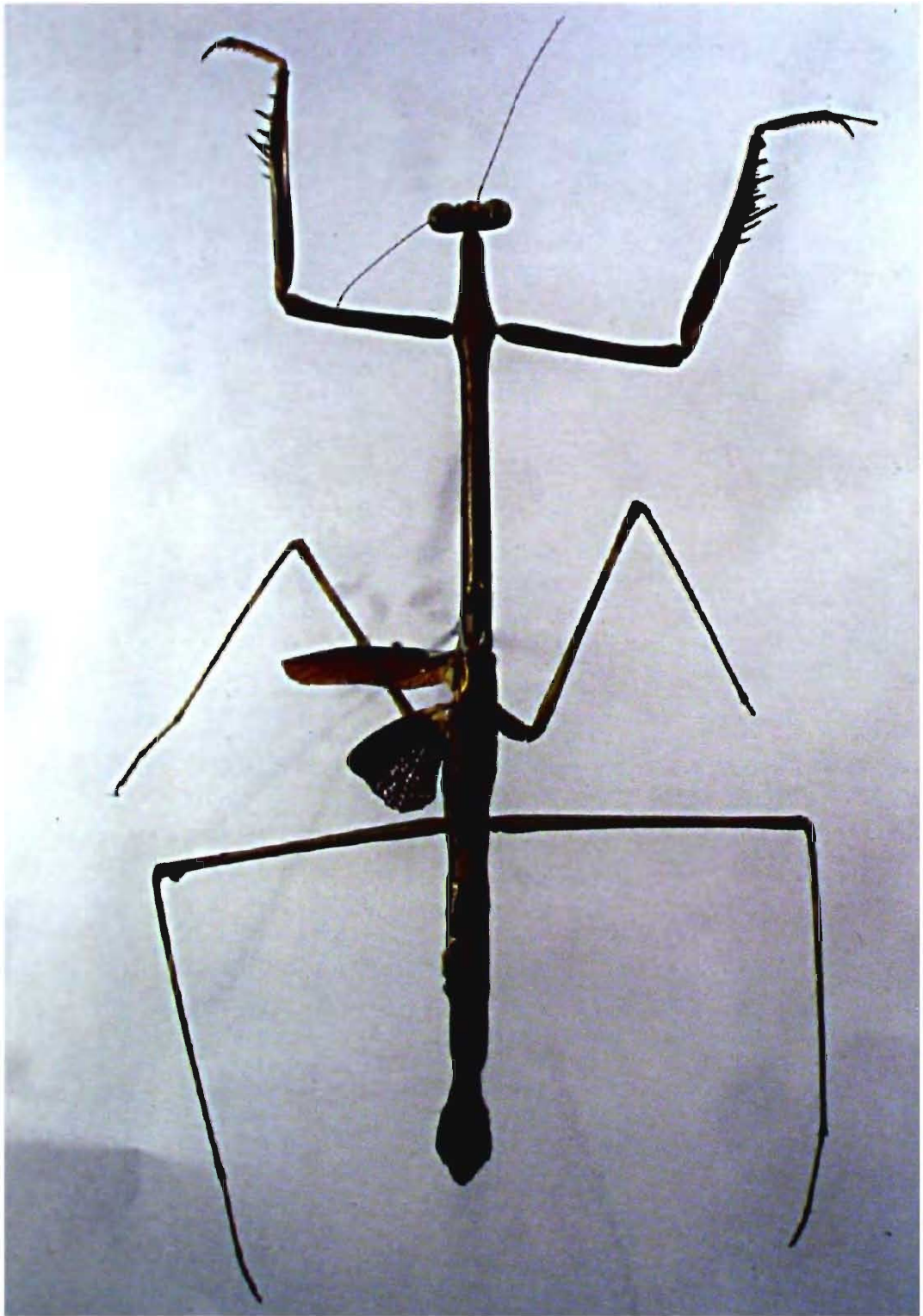


22. *Statilia menoralis* (Saussure)



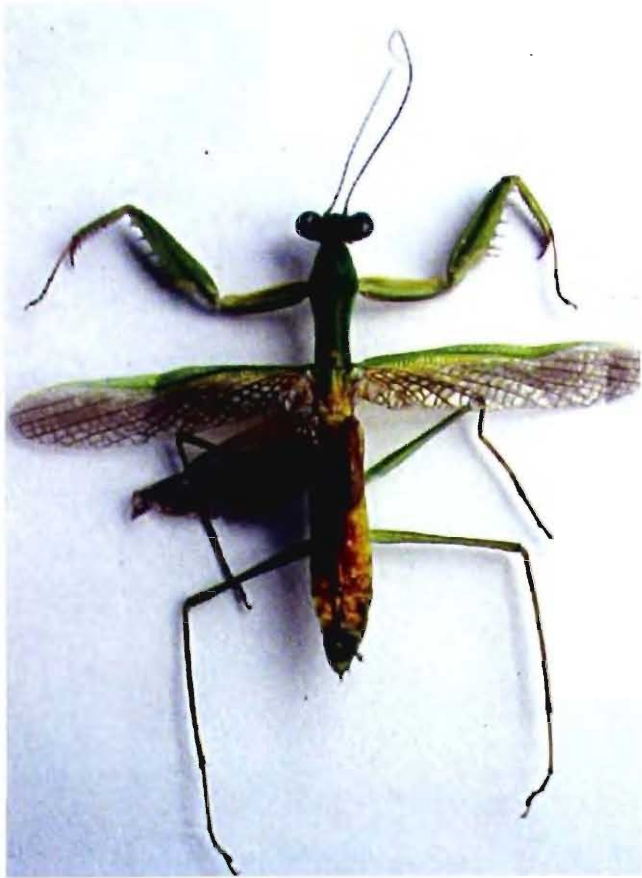
23. *Statilia maculata* (Thunberg)

PLATE-XI



24. *Euchomendella indica* n. sp.

PLATE-XII



25. *Iris keralensis* Vyjayandi (Male)

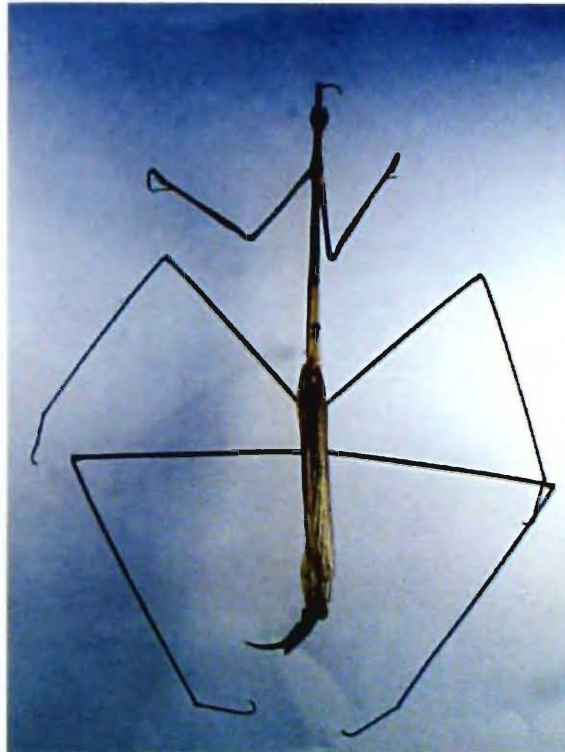


26. *Iris keralensis* Vyjayandi (Male)



27. *Deiphobe infuscata* (Saussure)

PLATE-XIII

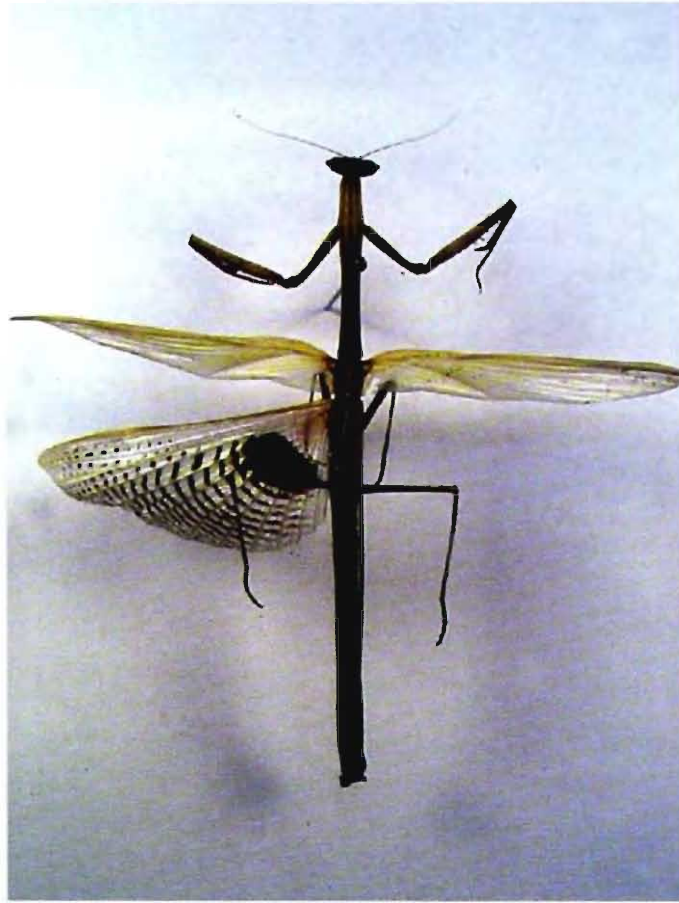


28. *Schizocephala bicornis* (Linnaeus)



29. *Aethalochroa ashmoliana* (Westwood)

PLATE-XIV



30. *Cheddikulama straminea* Henry



31. *Toxoderopsis spinigera* Wood-Masion